Affiliating in crisis:

A linguistic perspective
on community formation on Twitter
after the nuclear accident in Japan in 2011

Ayumi Inako

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Signature of Student:

Date: 30 June 2015

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In Japan, my parents have always been the most optimistic supporters of this endeavour. I would like to thank them for trusting me, with no doubt that their daughter would accomplish this goal.

Finally, I dedicate this thesis to the spirits of the victims of the 3/11 disaster in Japan, upon whose sufferings this work stands.

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Abstract

The present study was motivated by observation, as a resident of Japan, of the growing significance of Twitter as a medium of communication at the time of 3/11 disaster and the subsequent nuclear crisis in 2011. Increasingly on Twitter, a growing proportion of an anxious population sought information, assurance and solidarity. This thesis explores the means and bases for affiliation in two key Twitter communities that formed at this time of crisis – a time of prevailing social uncertainty and heightened anxiety. The communities in focus form around professionals in two relevant fields, physics and freelance journalism.

Drawing on a social semiotic theory of meaning in language (applied here to tweets in Japanese, and to their glossing and translation in English), the study analyses the dynamic formation of the communities in patterns of linguistic choices in Twitter data. The study explores patterns that couple representations of reality with the enactment of values. It also attends to how interpersonal relationships and community membership are negotiated in this medium in Japanese.

A comparison of the two communities reveals significant differences in the basis of affiliation. This is evident in terms of *bonding orientations* and in terms of the extent of negotiation. In brief, the physicist group foregrounds knowledge over values and negotiates it with a non-expert readership in fear of the nuclear crisis. They tend to maintain more open boundaries by negotiating differences in knowledge. By contrast, the group forming around the freelance journalists is based on shared negative values about the nuclear crisis, particularly shared distrust of authorities, including the officialdom of government but also to some degree the expertise of scientists. This community tends to maintain more closed boundaries, in which values are not negotiated.

The two communities contrast in terms of how they construe the world and what values they foreground, yet the rapid expansion of each community at the time of crisis reflects complementary needs for social solidarity. People seek both credible knowledge and reassurance, as they seek to commune around their fear and anger. The different

bonding orientations identified in this study suggest a more generalised tension in communing at times of crisis.

The thesis also makes significant contributions to the field of linguistics. In the application of systemic functional linguistic theory to this study of texts in Japanese, the thesis contributes an expanded description of the system of APPRAISAL, especially in the sub-system of ENGAGEMENT. This also involves a reinterpretation of *keego* choices in Japanese beyond conventional description, towards their roles in negotiating knowledge and values in discourse.

Chapter 1 Introduction

The focus of this thesis emerged from the personal experience of the catastrophic events triggered by the major earthquake off Japan in March 2011, and from the kinds of responses I shared with so many others living in Japan during and in the aftermath of the crisis. My concerns focused on issues of communication and dissemination of information. As I was beginning my candidature as a doctoral student in linguistics at that time, the catastrophe shaped the direction of my study.

1.1 Contextualising the research

1.1.1 Nuclear accident in Fukushima

On the eleventh of March 2011, an earthquake-triggered tsunami hit the coast of Japan precipitating a nuclear accident at the Fukushima Daiichi Nuclear Power Plant. The earthquake occurred in the Pacific Ocean off the north-east part of Japan and was measured at magnitude 9.0 level. A tsunami measuring some 13-14 metres high travelled to the coast at speeds of up to 800 km/hour, devastating the coastal areas of northeast Japan (Eisler 2013, Elliot 2013). This disaster is now known as 'the Great East Japan earthquake', 'the 3/11 disaster' or just '3/11'. According to the Fire and Disaster Management Agency (2015), the number of victims of the disaster is estimated to be 19,225 deaths, with 2,614 people missing.

The nuclear accident at Fukushima was made public on the afternoon of the second day after the earthquake and tsunami. This was at a time when news of the devastation had already spread around the world while the eastern half of the country was suffering from continuing aftershocks. At the Fukushima Daiichi Nuclear Power Plant, the tsunami had hit the cooling system of some of the reactors. This resulted in a loss of control for maintaining low temperatures in the reactors. While the operators at the accident site

struggled to avoid the worst scenario of recriticality, the heated reactors or fuel rods caused hydrogen explosions and the release of radioactive materials from some of the reactor buildings within one week (Tabata, 2011). Scenes of the explosions were broadcast on TV, and shook the minds of people living in the aftershock of the earthquakes.

1.1.2 The challenge of credible information

So began another challenge for the people of Japan – that of determining the credibility of information disseminated by the authorities via the mainstream media of television and newspapers. 'Official' information included press conferences given by the government, the Nuclear and Industry Safety Agency of Japan and the Tokyo Electric Power Company (TEPCO), which is the owner of Fukushima Daiichi Nuclear Power Plant, as well as news commentaries on TV, presented by NHK (*Nihon Hoosoo Kyookai*, or Japan Broadcasting Corporation). From the early period after the accident, there was a growing feeling of dissatisfaction and scepticism about the information broadcast by the mainstream media (Elliot 2013). Some began to seek other sources of information, especially those provided on online media. 'Unofficial' online information sources were extremely varied in the stances they took, from the relatively optimistic to the extremely pessimistic. This generated further confusion within the community.

A distrust of authority was not only promoted by some domestic 'unofficial' sources. From an international perspective, a concern for the credibility of the Japanese authorities also arose due to misunderstanding by U.S. government officials of the situation in Reactor 4 (Blustein 2013). According to Blustein, the U. S. government advised American citizens to evacuate from a 50 km zone around the accident site, when a 20 km evacuation zone was advised by the Japanese government. Ath that time, U.S. officials were working on an understanding that the 'fuel pool in Reactor No. 4 at Fukushima Dai-ichi must be dry' (Blustein 2013). Were that the case it would have caused a much graver scenario. This perception of the state of Reactor 4 was also shared by some Japanese experts (Hayano and Itoi 2013). In fact, the pool was filled with water when the accident happened, owing to a delay in preparation for its draining planned for

08/03/2011 (Okuyama 2012). The lack of accurate information resulted in the perception of a very pessimistic outcome. This misinterpretation was relayed first to media outside Japan, leading 'media the world over [to depict] the Japanese as ludicrously optimistic' (Blustein 2013), and indirectly led to further confusion in the part of Japanese residents.

Within Japan, there was a lasting, and prevalent anxiety about the nuclear accident. Doubt about the safety of low-dose radiation resulted in change in national regulation of standards for radioactive caesium contamination in food, established in 2012. The new standards are ten times stricter than a worldwide standard provided by the Codex Committee on Contaminants in Foods (Government Online 2014). All the nuclear power plants in Japan stopped operation one after another since the accident in Fukushima. At the time of writing of this thesis, no nuclear power plant in Japan is under operation[1]. There remains a strong negative attitude towards the nuclear energy amongst Japanese people. After more than four years, people still express their fear of radioactivity and their concerns about the impact the accident has had on the life and health of residents near the power plant.

1.1.3 The emergence of the study

The present study began taking shape soon after the 3/11 disaster and nuclear accident. In the very early stage of a doctoral study in linguistics, I was concerned to contribute in some way to supporting my country in relation to the difficulties experienced by its people. In the aftermath of the nuclear accident, my focus was drawn to the prevailing sense of confusion, and to the ways that people like myself sought information from online sources. What became very apparent was the contrasting ways in which the same event was reported and evaluated in online sources, including Twitter.

Twitter as a very accessible online medium was one of the most frequently used social media in the time of 3/11 disaster (Moriya and Ryoke 2013). In collaboration with Google (Van Grove 2011), disaster-related posts on Twitter were streamed on Google

[1] Sendai Nuclear Power Plant in Kagoshima Prefecture restarted operation in August 2015 (Wikipedia n.d.).

Realtime Search. I started tracking some Twitter accounts in my own information seeking about the nuclear crisis and observed a process in which two professional groups developed a considerable presence as commentators on the nuclear accident, and who communicated on Twitter in a contrastive manner.

One of these Twitter groups centred around a number of physicists, that is, academic teachers and researchers in physics. The Twitter users, or tweeters, in this group communicated actively and intensively on the nuclear crisis, and in some cases interacted with tweeters of other professions. Through continuing interaction between the physicists and other Twitter users, a form of more sustained and personal relationships began to take shape. By a few months after the nuclear accident, some offline events started being organised to communicate on the issue. These included a Geiger Counter Meeting on 11/06/2011 in Tokyo[2]. The event involved collaborations amongst Twitter users from various professions, including science communicators, a science fiction writer, an art creator, editors and comic writers. The community that emerged around these and other physicists was maintained for a considerable time, with the continuing organisation of meeting, and a number of collaborative publications produced, including Hayano and Itoi (2014) and Kikuchi et al. (2014).

A second influential group to emerge on Twitter during the time of the crisis comprised a number of freelance journalists. This was a group of journalists who did not belong to mainstream media companies, but who were known to people through their appearances on TV news shows as commentators, for example. At a time when distrust in the mainstream media was becoming prevalent, the freelance journalists were perceived as providing alternative views about the event, and releasing information that was not being disclosed by the authorities. This group also attracted the attention of online information seekers dissatisfied with 'official' information. The freelance journalists were disseminating their news not only via Twitter, but also through other online media, including online magazines and video broadcasting sites. As with the physicists, the freelance journalists extended their activities beyond Twitter, including broadcasting official press conferences and interviews with various experts as well as undertaking their own talk shows on their online video broadcasting channels. The community that

[2] http://g-c-m.org/

emerged around freelance journalists was also sustained for longer than a year, with continuing meetings and campaigns.

The focus of the present study formed over the duration of several months of observing these two Twitter groups, and the communities that formed around them. What I found particularly interesting was how the different professional groups reacted to this nuclear crisis in their posts on Twitter, or tweets, the kinds of knowledge and values they communicated to anxious followers, and how their activities on Twitter had the potential to impact those in the communities that formed around them. I was particularly interested to explore the different ways in which the physicists and the freelance journalists attracted attention, interacting with their readership during the nuclear crisis.

The present study explores the nature of Twitter communications by the two professional groups from the period immediately after the nuclear accident and during the ongoing crisis. It aims to identify the different ways in which they functioned in building communities at a time of crisis. It is anticipated that, while the focus here is on specific Twitter communities in the context of a specific crisis, there will be implications for a better understanding of 'unofficial' communication processes in times of disaster or crisis more generally. In this sense, the study also aims to identify an important social role for linguistics in this regard.

More broadly, the research addresses the role that language plays in the formation of Twitter communities around physicists and freelance journalists at a time of crisis that requires knowledge of science. This general research question is elaborated at a later point in this chapter. The following sections of this chapter introduce the general approach that is taken in addressing this general question and the linguistic theory that frames the study.

1.2 A social semiotic approach to understanding community formation on Twitter

There are two main approaches to researching language in social media, quantitative and qualitative (Page et al. 2014). Many of the studies that addressed the use of Twitter in the 3/11 disaster, including 'big data' studies (see Chapter 2), took quantitative approaches. One contribution of quantitative research is that it can provide a picture of communication that is in a sense 'beyond naked eyes'. A flow of information can be captured and visualised at a meta level in geographical or temporal terms. It is useful in tracing 'overarching trends which relate to macro-level perspectives' (Page et al. 2014, p. 51). However, qualitative studies can also make a significant contribution in that they have potential to explain the ways in which instances contribute to emerging trends, and to explore the complex ways in which meanings interrelate around particular information and values.

This study is interested in exploring linguistic contributions to the formation of new communities on Twitter. In this broad sense, the study takes a qualitative approach, characterised by Page et al. (2014) as 'emergent' (p. 52), expecting to provide a complementary perspective to previous works on 3/11 disaster communication.

More precisely, the present study takes a 'social semiotic' approach. It focuses on the discourse of Twitter in order to understand the nature of different communities that emerged on Twitter. Linguistic choices made by Twitter users are conceptualised and explored in terms of systems of meaning and their functions in the service of community formation. The social semiotic model that underpins the exploration is introduced in the next section.

1.3 Introduction to SFL

This section introduces some fundamental concepts in the theory of SFL. It begins by the introduction to the SFL model of language as a social semiotic, elaborating how it is an 'appliable linguistic theory'. The dimensions of the theoretical architecture are introduced in terms of the hierarchies of realisation, instantiation and individuation, and in terms of the time dimension of semogenesis.

1.3.1 Some key characteristics of SFL

This study draws on the theory of systemic functional linguistics (hereafter SFL). As a social semiotic theory, SFL considers language as 'a meaning potential', or a set of resources for meaning-making. In SFL, 'system' means 'a set of options' (Halliday 1978, p. 40). By 'function', SFL focuses on 'what language does and how it does it' (ISFLA n.d.). From an SFL perspective, language is meaningful 'within a sociocultural context, in which the culture itself is interpreted in semiotic terms – as an information system' (Halliday 1978, p. 2). This means that SFL considers language as an integral part of society, focusing on choices people make in making meaning in relation to social activities.

As such, SFL constitutes what is referred to as an appliable linguistic theory (Halliday 2008). Mahboob and Knight (2010) define 'appliable linguistics' as:

> An approach to language that takes everyday real-life language-related problems – both theoretical and practical – in diverse, social, professional and academic contexts as a starting point and then develops and contributes to a theoretical model of language that can respond to and is appliable in the context. (p. 1)

Halliday (1985) proposes 'the value of a theory [should lie] in the use that can be made of it' (p. 7). The aim of this study is also to enhance the value of SFL through putting it to use in the service of understanding community formation at a time of crisis.

Further, SFL is often characterised as an 'extravagant' (Halliday 1986/2013) theory. Unlike formal linguistic theories that segment different components of language such as sound, form and meaning, SFL attends to multiple dimensions and aspects of language as an 'architecture', in order to capture the interplay of these various dimensions in creating meaning. According to Halliday (2003), the term 'architecture' is deployed to 'reflect the multidimensional nature of human experience and its interpersonal relationships' (p. 29). This means that in SFL, focusing on one aspect of language does not mean ignoring the rest. Rather, any aspect of language is attended to in interplay with the context in which language users interact with each other. This provides an important perspective in the present study in which linguistic choices are explored as clues to understanding the nature of the communities that were formed around particular groups of people.

While the present study focuses predominantly on application rather than theorisation, there is some potential to impact back into the theory. The data explored are in Japanese, and the exploration of community formation foregrounds some systems of Japanese that are open to reinterpretation from an SFL perspective (see Chapter 5).

1.3.2 Hierarchies in the architecture of SFL

The following subsections introduce two dimensions of the architecture of SFL relevant to this study, those of hierarchy and of time. The first concerns the dimension of hierarchy, composed of the hierarchies of realisation, of instantiation and of individuation.

1.3.2.1 The hierarchy of realisation

The hierarchy of realisation models the relationship of social context and linguistic systems. It represents a stratified model of language, as phonology/graphology, lexicogrammar and discourse semantics, and a stratified model of context as register and genre (Martin 1992, Martin & Rose 2007). The relationship that adheres between strata is one of realisation, where meaning is said to be metaredundant (Halliday

1987/2003, p. 122), or ‘patterns at one level redounding with patterns at the next level’ (Martin & Rose 2007, p. 308). The diagrammatic modelling of this hierarchy also identifies the trinocular perspective on meaning in the metafunctions of ideational, interpersonal and textual meaning that cross the strata of language and of register (see Figure 1.1).

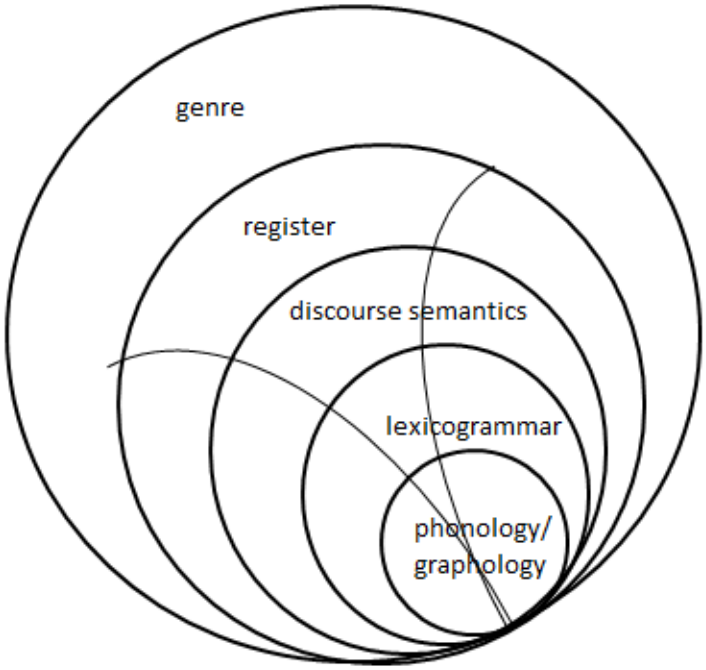


Figure 1.1 The realisation hierarchy

At the highest stratum of language, that of discourse semantics, patterns of meaning are modelled at the level of whole text. The stratum of discourse semantics is at a more abstract level than that of lexicogrammar. Whereas lexicogrammar focuses on patterns realised in the clause, patterns at the level of discourse semantics are conceptualised as having the potential to implicate multiple systems in the lexicogrammar of one language.

The primary orientation of the present study is from the perspective of discourse semantics, with the focus on meaning realised in texts in Japanese. The lexicogrammatical patterns of meaning in Japanese are examined at the more abstract level of meanings in the discourse semantic stratum. An issue that arises here is whether discourse semantic systems operate across multiple languages, or are language-specific.

The issue that is involved in the process is further discussed in Chapter 3 in designing the analytical framework of this study.

At the lowest level of the realisation hierarchy is the stratum of phonology or graphology. Patterns at the stratum of lexicogrammar are realised in choices at this level of expression. In the data of this study, the graphological systems of Japanese are relevant, and are attended to in chapter 3.

In the model of SFL (Martin 1992; Martin & Rose 2007, 2008), context is also stratified – as register and genre. Register consists of three dimensions – field, tenor and mode. According to Martin and Rose (2008), field concerns 'the social action that is taking place' (p. 11), and covers 'the discourse patterns that realise the activity that is going on' (p. 13). In the present study, field becomes particularly relevant in understanding the different kinds of knowledge delivered on Twitter. A detailed explanation of field is provided in Chapter 3 in relation to research design.

Tenor concerns 'kinds of role relationship' (Martin & Rose 2008, p. 11), and is concerned with 'the nature of social relations among interlocutors, with the dimensions of status and solidarity' (p. 12). Tenor is also an important aspect of context for the present study in that it addresses community formation at a time of crisis in terms of how interpersonal relations were negotiated on Twitter. A detailed account of tenor is provided in Chapter 2.

Mode concerns 'what part language is taking' (Martin & Rose 2008, p. 11), and 'deals with the channelling of communication, and thus with the texture of information flows as we move from one modality of communication to another' (p. 14). Mode is addressed in terms of two key variables. The first 'is the amount of work language is doing in relation to what is going on' (pp. 14–15), and the second 'is the complementary monologue through dialogue cline' (p. 15). This latter variable of mode will be relevant in discussing linguistic choices of Japanese resources of *keego*, which will be accounted for in Chapter 5.

The more abstract stratum of context is that of genre. Genre is defined as 'recurrent configurations of meanings [that] enact the social practices of a given culture' (Martin & Rose 2008, p. 6). From this perspective, culture is conceptualised 'as a system of

genres, realised through recurrent configurations of meaning (across language and attendant modalities of communication)' (Martin 2014b, p. 314). In the present study, the perspective of genre is important in understanding Twitter interactions in terms of social practice. The stratified model of realisation means that a linguistic choice made in a lower stratum is the realisation of meaning in a higher stratum. In this way, it is possible to explore lexicogrammatical choices, for instance, in relation with more abstract levels of meaning, as well as in interplay with the context in which social processes are constructed.

The other dimension of the realisation hierarchy is that of 'metafunction'. Metafunction is defined as 'general social function that we use language for' (Martin & Rose 2007, p. 7). In the realisation hierarchy, these general functions are conceptualised as realising variables in the register stratum in terms of field, tenor and mode. In other words, field, tenor and mode are 'realised by a particular functional dimension of language' (Martin & Rose 2008, p. 11) that are referred to as ideational, interpersonal and textual metafunctions. These three metafunctions operate simultaneously in every instance of language use, and overarch the three strata of language – phonology/graphology, lexicogrammar and discourse semantics. The conceptualising of these three metafunctions represents the trinocular nature of the realisation hierarchy, schematised in Figure 1.2.

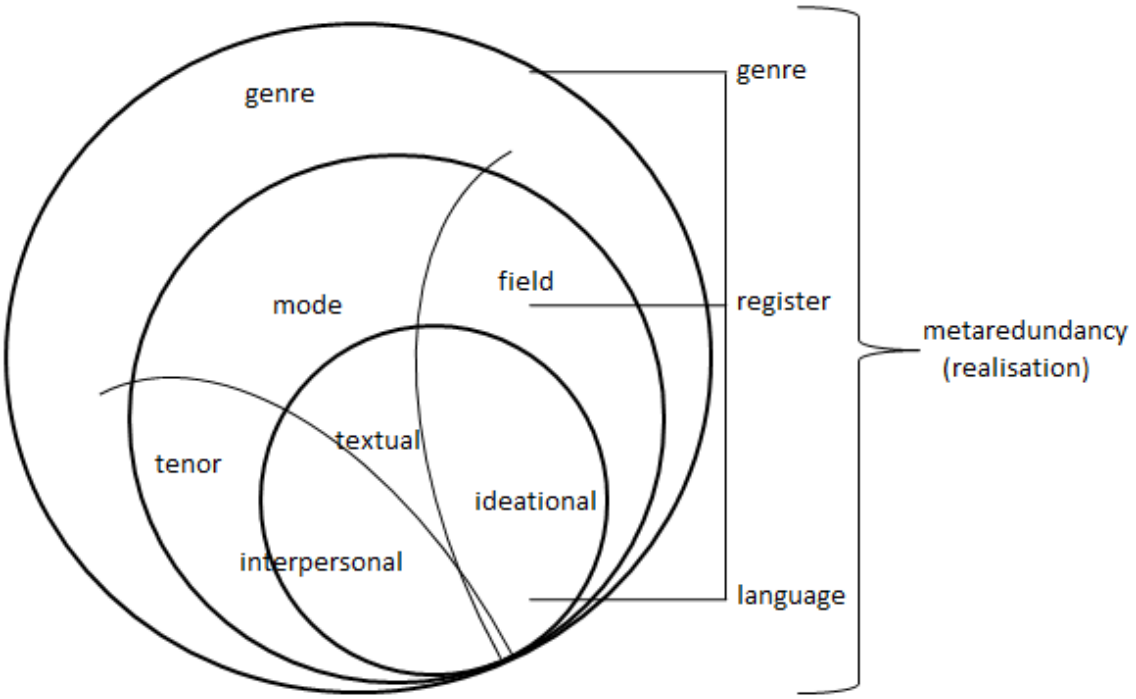


Figure 1.2 Metafunctions in the realisation hierarchy (redrawn from Martin & Rose 2007, p. 309)

In SFL, specific terms are deployed in order to refer to what each of these metafunctions does. The ideational metafunction **construes** experience. It does that in terms of 'what's going on, including who's doing what to whom, where, when, why and how and the logical relation of one going-on to another' (p. 24). The interpersonal metafunction **enacts** interpersonal relationships. It is done by 'negotiating social relations: how people are interacting, including the feelings they try to share' (p. 24). The textual metafunction **organises** discourse, and is 'concerned with information flow: the ways in which ideational and interpersonal meanings are distributed in waves of semiosis' (p. 24).

The present study focuses particularly on the ideational and interpersonal metafunctions. In other words, it is interested in what kind of experience discourse construes, and what kind of interpersonal relationships it enacts. The rationale will be explicated in more detail in Chapter 2 in terms of coupling and in relation to the individuation hierarchy

(see Subsection 1.3.4 as well). Meanings in these two metafunctions are then explored in Chapters 4 and 5.

1.3.2.2 The hierarchy of instantiation

A second hierarchy in the architecture of SFL is that of instantiation. Informed by Saussure's distinction between *langue* and *parole*, Halliday (1996/2002) conceptualised instantiation as a cline, or a continuum, between 'the linguistic system' and 'the linguistic instance' (p. 412). The former is also referred to as 'meaning potential', whereas the latter as 'act of meaning' (p. 412). Halliday conceptualised instantiation by using an analogy of the difference between climate and weather. There are intermediate stages of 'a cluster of similar instances (a "text type, like a patterns of semiotic weather)', and of 'special alignment of the system (a "register", like localized semiotic climate)'. In addition, the current schematisation includes each instance of the reading of a particular text (Martin 2008a, p. 35).

Conceptualised as such, the hierarchy of instantiation is 'a scale of generalisation, aggregating the meaning potential of a culture across instances' (Martin 2009, p. 557). It is schematised as in Figure 1.3.

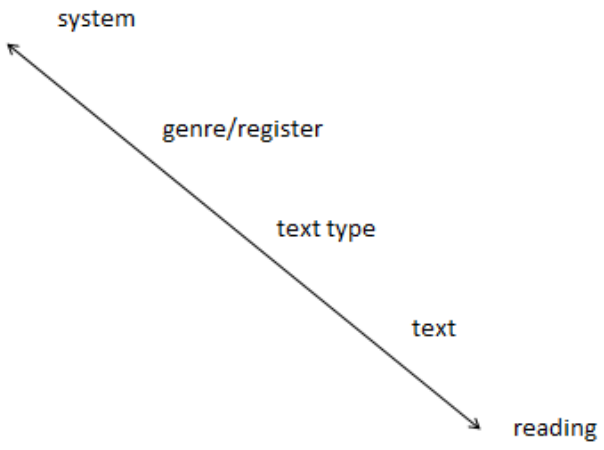


Figure 1.3 The instantiation hierarchy (Martin 2006, p. 285)

The instantiation hierarchy provides a complementary perspective to the realisation hierarchy in the sense that 'all strata along the realisation hierarchy instantiate' (Martin 2009, p. 558). In other words, each stratum in realisation 'can be viewed as relationship between systems of choices and the meaning activated in a process of instantiation' (Martin 2008b, p. 45). Chapter 4 explores instantiation of ideational and interpersonal meanings on Twitter, in terms of 'coupling' (see Chapters 2), in discussing linguistic resources for community formation.

'Commitment' is a notion related to instantiation. It focuses on the amount of meaning instantiated in relation to the potential of meaning. It concerns 'the degree to which meanings in optional systems are taken up and, within systems, the degree of delicacy selected' (Martin 2008b, p. 45). A text can be more or less committed depending on the amount or kinds of options from the systems instantiated in the text, which may have impact on the reading. Some of the analyses of tweets concerning plutonium discusses this aspect of instantiation (see Chapter 4).

1.3.2.3 The hierarchy of individuation

Complementary to the two hierarchies discussed above is the hierarchy of individuation. The individuation hierarchy focuses on the relationship between the meaning potential in a culture and the meaning potential of individual language users (see Figure 1.4). The two clines of individuation focus on 'how semiotic resources are distributed among [language] users (allocation) [by the culture] and how these resources are deployed [by language users] to commune (affiliation)' (Martin 2009, p. 564) with each other to form communities of different orders. Resources are conceptualised, informed by Bernstein (2000), in terms of *repertoire*, or resources possessed by individual users, and of *reservoir*, the total set of resources afforded by the culture (see Chapter 2). The two intermediate levels between culture and *persona* are sub-culture and master identity. The former includes 'relatively "local" familial, collegial, professional and leisure/recreational affiliations' (Martin 2009, p. 564), whereas the latter covers 'more "general" fellowships … including social class, gender, generation, ethnicity, and dis/ability' (p. 564).

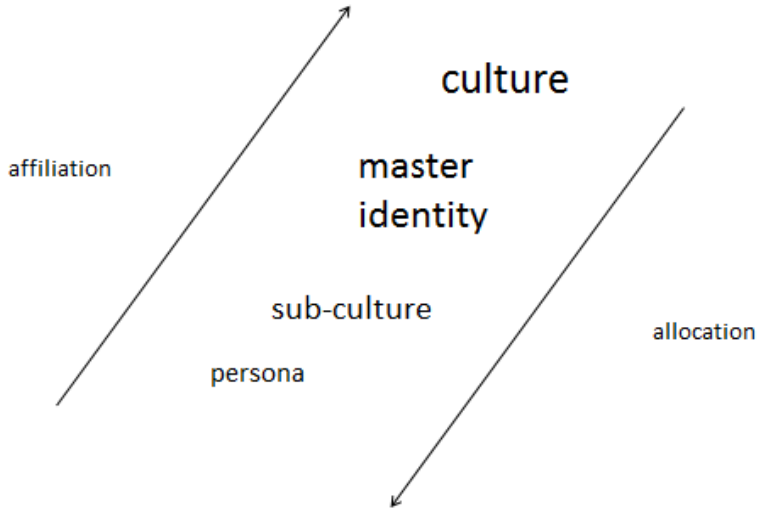


Figure 1.4 The individuation hierarchy (redrawn from Martin 2009, p. 565)

The individuation hierarchy is important in the present study because it focuses on the dynamic relationships between language users and multiple scopes of communities as part of the model of language. The study is interested in the emergence and expansion of new communities around key contributors on Twitter at a time of nuclear crisis. The key unit that forms the basis of affiliation is an instantiated *coupling* of ideational and interpersonal meaning. In other words, community formation concerns how experience is construed and what kind of values are enacted, or *coupled*, with the experience. A more detailed account of the hierarchy is provided in Chapter 2, as part of the foundation of the present study.

According to Martin (2009), 'all strata individuate' (p. 565). In other words, resources in all strata in the realisation have potential for contributing to community formation. The individuation hierarchy, together with the realisation hierarchy, provides an overarching perspective for the present study. The three hierarchies theorised by Halliday and elaborated by Martin and colleagues provide significant perspectives on exploring community formation on Twitter in a time of a nuclear crisis. The other component of the SFL architecture that is relevant for this study concerns time.

1.3.3 Semogenesis

Semogenesis, in SFL, refers to 'the processes by which meaning, and particular meanings, are created' (Halliday and Matthiessen 1999, p. 17) through time. SFL conceptualises three kinds of time frames in which meanings are created – phylogenesis, ontogenesis, and logogenesis. Phylogenesis refers to 'the evolution of human language (and of particular languages as manifestations of this)' (Hallliday & Matthiessen 1999, p. 17). The second time frame, ontogenesis, refers to 'the development of the individual speaker (speaking subject)' (p. 17). Logogenesis focuses on time in which 'creating meaning is continually modified in the light of what has gone before' (p. 18).

Further, the three semogeneses are now understood as being related to the three hierarchies. The idea came from Martin's (1997) attention to the dynamic and innovative aspects of how social subjects are involved in creating of meaning. The semogenetic perspective was considered to:

> enable us to foreground the ways in which subjects engage dynamically with texts as they unfold (logogenesis), the ways in which they are positioned and repositioned socially throughout their life (ontogenesis), and the ways in which a culture reworks hegemony across generations (phylogenesis). (p. 10)

Martin (2010) proposes that 'the temporal unfolding of the texts through time' (p. 28) is related to instantiation, whereas realisation has to do with the 'mapping [of] the meaning potential of cultures' (p. 29). Individuation attends to how individual users develop their meaning potential over time in relation to the potential afforded by a culture. At the same time, Martin points out that 'identity is something that is ongoingly negotiated in discourse' (p. 29), referring to the inseparable relationship between individuation and instantiation.

The relationship between the three hierarchies and the genesis is schematised as in Figure 1.5.

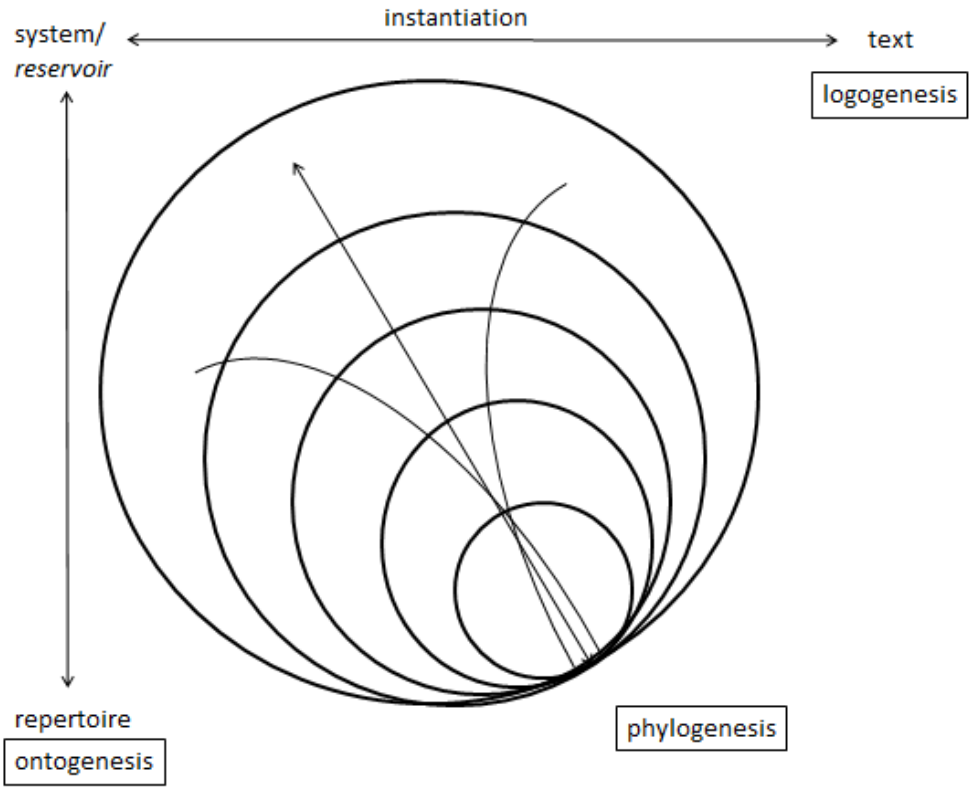


Figure 1.5 Realisation, instantiation and individuation in relation to genesis (redrawn from Martin 2010, p. 30)

With this architecture, SFL is a linguistic model that can capture the multidimensional and dynamic nature of language as social semiotic. In Martin's (1997) terms, the architecture covers 'the meaning potential that is immanent, from moment to moment as a text unfolds, for the social subjects involved, at the point of the evolution of the culture where meanings are being made' (Martin 1997, p. 10).

In the present study, the concept of semogenesis is important in understanding community formation, which happened along with the unfolding of the events over time. Ontogenesis is particularly relevant. Halliday and Matthiessen consider the individual experience 'follows the typical cycle of growth, maturation and decay' (p. 17). The present study focuses on the 'maturation' aspect of ontogenesis, in exploring the formation of new communities motivated by a nuclear crisis.

Choosing SFL as the theoretical underpinning of this study is significant. Drawing on SFL means examining community formation on Twitter in the light of these

multidimensional perspectives, particularly in relation to social activities and with the dimension of time. The present study will explore the nature of two distinct communities that emerged and expanded on Twitter in a time of a nuclear crisis. It will do so by attending to the linguistic choices that they made and the meanings that were created by their choices along with and in relation to the unfolding of the news, events and other activities concerning the nuclear accident. SFL, with its extravagant architecture, is expected to provide a blueprint in the exploration.

1.4 The research questions

In the light of the informing theoretical framework, the general research question presented earlier (see Section 1.1.) is further specified in the following terms:

What does a linguistic analysis reveal about the comparative bases of affiliation in the discourse of Twitter users who are professional physicists and freelance journalists at a time of a nuclear crisis?

1. In a comparative study of Twitter discourse around a specific aspect of nuclear science:
    a) What patterns in the construal of the field are evident for each group?
    b) What values couple with the construal of the field for each group?
    c) What bonds are offered as the basis for affiliation for each group?

2. In the Twitter discourse of physicists:
    a) What are the lexicogrammatical functions of linguistic resources in Japanese referred to as *keego*[3]?
    b) How can the functions of these resources be interpreted from the perspectives of discourse semantic systems of APPRAISAL and NEGOTIATION?

[3] *Keego* refers to a set of lexicogrammatical resources in Japanese that is commonly conceptualised as expressing 'respect' or 'politeness. See also Chapters 2 and 5.

c) From the perspectives of APPRAISAL and NEGOTIATION, how do *keego* choices function in the physicists' tweets to negotiate scientific knowledge in the interests of building a community?

1.5 Significance of this study

The thesis makes a number of significant contributions to the field of linguistics in terms of theory, to the field of research design and presentation of research, and in terms of the field of the object of study, that of bases for affiliation on Twitter at a time of crisis. Contributions to theory and research design arise from exploring discourse semantic meanings in Japanese to be presented in English. This implies two issues to be addressed in the process of research. The first concerns an understanding of the SFL hierarchy of realisation, particularly in terms of the realisation of lexicogrammar and discourse semantics. While it is assumed that systems and functions differ in different languages at the level of lexicogrammar, there is no such explicit understanding for the more abstract level of discourse semantic stratum. The present study conceptualises that discourse semantic systems can be realised in different systems in the lexicogrammar of different languages. Discourse systems are applied in analysing Japanese texts for exploring the abstract level of semantic choices that are realised in Japanese lexicogrammatical systems.

This leads to another challenge concerning the presentation of the analysis of Japanese in the second language, English. In order to minimalise the distortion of meaning in the process of translation, the present study employs the process of glossing (McDonald 2008). This involves segmenting texts into meaningful units, and notating the closest equivalent of each unit in Japanese. By making explicit choices, the original texts are made accessible in English. This thesis sheds light on this stage of processing texts in which the initial theorisation is involved.

Importantly, the study makes a contribution to understanding the social implications of a large-scale crisis in terms of the kinds of affiliation that are sought via social media.

The dynamic process of community formation on Twitter is explored in terms of accumulation of patterned meaning in the common context of an ongoing nuclear crisis. The ways in which communities are formed around key tweeters from two professional groups, namely physicists and freelance journalists, provide the bases for understanding the *bonding orientations* (see Chapter 4) that form these communities. In the process, the study provides a valuable exemplification of the hierarchy of individuation – affiliation.

Further, the study makes contributions in the description of Japanese, by focusing on linguistic resources that contributed to community formation around the key physicists. Lexicogrammatical resources that are generally referred to as *keego* are accounted for as playing an important role in negotiating affiliation. The systems and functions of these resources are reinterpreted from a dual stratal perspective of lexicogrammar and discourse semantics.

Finally, the study contributes to a disaster communication perspective. By providing detailed, linguistic analysis of communication around different kinds of experts on Twitter at a time of an ongoing crisis, the study provides social implications for understanding disaster or crisis communication via social media.

1.6 The organisation of the thesis

In order to address the research questions, the thesis is structured into the following chapters. Chapter 2 provides an account of knowledge that is foundational to this study. Literature relevant to the exploration of community formation is reviewed. This includes studies of kinds of discourses that are relevant to the present study, those of science, journalism and social media, followed by further accounts on the relevant aspects of the theoretical models. The focus in this chapter is on the hierarchy of individuation in SFL and the register variable of tenor. Finally, previous studies on the Japanese linguistic resources referred to as *keego* are reviewed, as foundational for Chapter 5.

Chapter 3 provides a detailed research design. It introduces the social media of Twitter, the nature of the data and their collection process. This is followed by a methodological account of how texts in Japanese are analysed by way of *glossing* (McDonald 2008). Finally, frameworks of analyses are introduced focusing on the ideational and interpersonal metafunctions of discourse semantics.

Chapter 4 begins the exploration of community formation on Twitter by comparing how two distinct communities are construed/enacted through linguistic choices. The focus is on a subfield of discussion, 'plutonium'. The hierarchies in focus here are those of instantiation and individuation. Instantiations of 'coupling' (Knight 2010a, 2010b, see Chapter 2) of ideational and interpersonal meaning are identified, and their functions in the formation of *bonding orientations* towards affiliation are explored.

Chapter 5 attends to the discourse of the physicists. It further explores the negotiation of affiliation in tweets that involve human entities. Focus is drawn to Japanese linguistic resources referred to as *keego*. The chapter begins by revisiting the functions of these resources from a dual stratal perspective of lexicogrammar and discourse semantics. This is followed by an exploration of their functions in the physicists' tweets in negotiating affiliation.

Chapter 6 concludes the thesis by summarising the major findings of the research and by discussing the contribution of the study in terms of linguistic and social significance.

Chapter 2 Foundational theory and research

2.1 Introduction

This chapter sets up a foundation for exploring community formation on Twitter in the period of nuclear crisis after the 3/11 disaster. The literature reviewed for this purpose involves a range of perspectives and is categorised in three main ways. The first includes fields relevant to the object of the study. The second provides an elaborated account of the architecture of SFL focusing on individuation and affiliation, and the third includes the literature on the linguistic resources of Japanese referred to as *keego*. Given the wide extent of the scholarly literature in these fields, this review is necessarily limited to the works that are most relevant to the current study.

The sections to follow explore, firstly, the body of literature which encompasses fields relevant to the object of this study, i.e. the Twitter communities of two professional groups – physicists and freelance journalists. The discourses of science, journalism and social media are reviewed in Section 2.2, 2.3 and 2.4, respectively. They include a range of theoretical orientations, including works based on systemic functional linguistics (SFL).

Section 2.5 focuses on the second significant body of scholarship that constitutes the theoretical foundations of the present study. Extending the architecture of SFL theory introduced in Chapter 1, detailed accounts are provided here on the theorisation and concepts of the individuation hierarchy, as well as the conceptualisation of tenor and its realisation. Section 2.6 reviews the literature on the linguistic aspects of interpersonal meaning making in Japanese, i.e. resources commonly referred to as *keego* (honorifics). This last body of scholarship is of particular relevance to the discussion in Chapter 5 of aspects of interpersonal metafunction in the Japanese language.

2.2 Discourse of science

SFL theorises language as social semiotic, which functions in interaction with social context including genre and register, and which in turn realises different meanings in discourse (see Chapter 1). The focus of this section is the literature on the languages of science, scientific communities, and the public version of science. Note that, except for some work on Japanese rexts, many of the studies reviewed in this and the next two sections focus on English texts. Even so, it is expected that the literature in English about specific registers (e.g. scientific discourse) have register-specific features that are common across the same register in different languages. Halliday (1991/2004), in a discussion of educational contexts, pointed out:

> (T)he terms "language" does not usually encompass the whole of that unwieldy concept we call "English" or "Russian" or "Chinese" – it means the language in one particular variety or aspect, such as scientific Chinese, or Russian for interpreters, or initial literacy in English, and so on – so also the term "culture" will not designate some amorphous object such as 'Chinese culture' or 'Western culture'; it refers to something much more specific, that we can interpret in terms of some overall model such as the present one. (p. 285)

The first two subsections review the literature that formed the early understanding of the science register, focusing on ideational and interpersonal meanings respectively. Following this is a review of works that deal with public versions of science. The last subsection reviews recent works on the discourse and community of science.

2.2.1 The ideational in scientific discourse

The discourse of science has been an important interest for scholars exploring SFL and social semiotics during the last few decades. Motivated by attention to literacy education in Australia in the 1990s, experts in SFL published a number of compilations of works that reflect the high levels of interest in the discourse of science and science education (e.g. Halliday & Martin 1993; Coulthard 1994; Christie & Martin 1997; and

Martin & Veel 1998). In this subsection, some representative works that focused on the ideational meanings in the discourse of science and related areas are reviewed.

Of particular significance in the SFL exploration of scientific discourse is Halliday's exploration of the history of the grammar of science (1988/1993, 1994, 1995/2004, 1999/2004), from which emerged his important conceptualisation of grammatical metaphor. Grammatical metaphor is defined as a pattern in which 'a semantic category such as a process is realised by an atypical grammatical class such as a noun, instead of a verb' (Martin & Rose 2007, p. 106). Halliday particularly attended to cases where processes or qualities are reconstrued as nouns. By focusing on technical nouns and grammatical metaphors in particular texts from different centuries, Halliday (1988/1993) revealed the historical evolution of scientific English, from 'proto-scientific discourse' in Chaucer and 'the birth of scientific English' in Newton's *Opticks* (p. 57) with the emergence of nominalisation as grammatical metaphors (p. 62). Accordingly, features that characterise scientific English include nominal elements forming technical taxonomies as well as summarising and packaging representations of processes, whereas verbal elements served for relating nominalised processes externally (to each other) or internally (to our interpretation of them) and presenting nominalised processes as happenings (p. 64).

Martin (1993b) focused on the characteristics of scientific understandings of the world in terms of how things, including grammatical metaphors, and processes are organised into various genres for various purposes. According to Martin, the literacy of science is enabled not only by technological apparatus but also, and more importantly, by the construction of scientific knowledge through the organisation of things and processes. This affords a different view of the world from that of common sense which 'depends only on observation with the naked eyes' (p. 169).

Another significant contribution to the understanding of scientific discourse was made by science educator Lemke (1998, 2004), who collaborated with SFL researchers on the exploration of the discourses of science and science education. Lemke (1998) began by distinguishing two dimensions of meanings – typological and topological representation of the world – for characterising language as a semiotic resource. Typologically, language formulates difference and relationships, making categorical distinctions. The

topological dimension of meanings consists of continuous change and variation, including degree, quantity, gradation and so on (Lemke 1998, p. 87). The topological dimension represents the scientific view of the world where difference is referred to as 'meaning by degree' as opposed to 'meaning by kind' (Lemke 2004, p. 34). Lemke (1998) also attended to various representations contained in scientific genres as essential components of the discourse of science, including tables, graphs and diagrams, figures captions and texts.

O'Halloran (2003) further explored the inter-semiotic relationship between various modalities in scientific discourse, including mathematical symbolism and visual representation (such as images) by introducing the concept of 'semiotic metaphor', or semantic shifts that involve the reconstruing of processes in language as participants in the visual representation or mathematical symbolism. Continuing attention on the multimodality of science discourse is explored in the SFL literature, which goes beyond the perspective of the current study.

While the literature introduced above deals with the grammar and discourse of science in itself, numerous SFL studies have analysed scientific discourse in relation to discourses in other fields. Among them, Martin (1989/1993) compared two kinds of specialised texts – science and the humanities – with a particular focus on nominalisation. Nominalisation in the humanities is about interpreting the world from a nominal point of view, whereas science goes beyond this by technicalising the phenomena and their relationships, i.e. reconstructing the world 'as a place where things relate to things' (p. 220). Martin (1993a) compared pedagogic discourses in science and history from a wider perspective that include relational process patterns, conjunction patterns, nominalisation, register and genre. He summarised these findings by saying that science textbooks are organised 'as one large report [about] what the world is like', constructing taxonomy and implication sequences. In history, textbooks are organised 'as long generalised recounts [about] what happened', where it is a matter of constructing a text, where grammatical metaphor is concerned with scaffolding, or realising logical connections between events as participants (p. 267). Hayakawa (2013) is an application of this perspective to describe biology textbooks in Japanese secondary schools with a particular focus on classification.

A number of other works in the 1990s compared scientific discourse with related disciplines, including technology and pedagogy of the same period (Rose 1997, 1998; Veel 1998; White 1998). White (1998) compared scientific and technological texts in terms of their lexical preferences, i.e. 'how they mobilise particular resources when construing the phenomenon of their respective 'non-commonsensical' ideational domains' (p. 267). According to White, experiential categories are established in science by reconstruing commonsense experiences of reality as technicality, which White termed 'lexicon revaleurisation', whereas in technology, 'the language develops new categories and new names for these categories as the potential range of vernacular experience is expanded over time'. He named this 'lexicon extension' (pp. 267–268).

Rose (1997) addressed science, technology and technical literacies from the viewpoint that in modern industrial societies, the relationship between science and related fields entails an economic perspective. Informed by Bernstein's (1990) sociology of education, particularly his notion of recontextualisation, Rose (1997) compared the use of English in science and technology, and their pedagogies, by analysing ideational and textual metafunctions of texts from these areas. According to Rose, technological English is concerned with the process and technology of industrial production (p. 41), whereas 'scientific English is concerned with the chemical, physical and biological processes involved in explaining, classifying and manipulating natural phenomena, with the goal of applying these explanations and classifications to industrial production' (p. 42). In terms of recontextualisation, science education, or 'stages of apprenticeship into a scientific field', is viewed as 'science recontextualised as pedagogy' (p. 42), whereas industry is the recontextualisation of science as production. Rose's insights provide a perspective on this research by addressing how the semiotic resources of technicality can be made accessible, or 'redistributed', to a larger population in modern society. Related to this work by White (1998) and Rose (1997) is the notion of 'popular' or 'public' science, the recontextualisation of science for lay audiences. This is reviewed in Subsection 2.2.3.

2.2.2 The interpersonal in scientific discourse

Academic discourse is often considered 'objective' and without much interpersonal meaning (Hood 2010, p. 22). This is particularly the case in scientific discourse. However, interpersonal meanings do play an important part in science texts.

Attention to the interpersonal aspects of scientific discourse is relatively recent in SFL, and this interest has been informed by contributions from other linguistic and related domains, particularly pragmatics (Myers 1989; 1996; Hyland 1998). Hunston (1993, 2000) is an early contributor to work on evaluative meaning in scientific discourse in SFL. In addition, some works that draw on the persona and community of scientists are reviewed in this Section (Campbell 1975; Halliday 1994; Hyland 1998), followed by the issue of gender in the community of scientists mentioned in Lemke (2004) and Kurokawa (2005).

Two works from the pragmatic framework of politeness provide contrasting views about what politeness means in scientific discourse. Myer (1989) adopted the pragmatic framework of politeness provided by Brown and Levinson (1987)[4] in order to illustrate characteristics of the scientific community by attending to tenor enacted in scientific articles. He observed two different kinds of audience in scientific articles, namely the immediate audience of individual researchers and particular groups of researchers doing similar works, and the wider scientific community to whom a research report is supposed to be addressed (Myer 1989, p. 3). He interpreted that the overriding interpersonal relationship within the research community is that of solidarity, where 'everyone must present themselves as equally humble servants of the discipline' (p. 4). He claimed that politeness strategies can serve in 'pending acceptance in the literature, acceptance by the community' (p. 12) when claims and denials are taken as possible impositions on the community.

Hyland (1998) provided a different view from Myer. He criticised Myer (1989) for 'assuming the universality of a scientific culture' (Hyland 1998, p. 67) by referencing Campbell's (1975) account on Kuhn's distinction between 'normal science' and 'scientific revolution' (Campbell 1975, p. 392). Hyland mentioned that in normal

[4] Literature on politeness is reviewed in Section 2.6.

science, politeness is not a matter of avoiding, 'face threatening acts' or FTA (Brown & Levinson 1987; Myer 1989, see also Section 2.6), but a matter of power, indicating that the writer abides 'by the rules of a relationship established by the scientific discourse community' (p. 69). From this perspective, Hyland (1998) began by defining hedging as 'any linguistic means used to indicate either a) lack of competence to the truth value of an accompanying proposition, or b) a desire not to express that commitment categorically' (p. 1). He then distinguished between content-oriented and reader-oriented hedging, claiming that the latter type of hedging 'represents conformity to research community expectations concerning deference due to colleagues in presenting information' (p. 178). The dual view of science is also attended to in recent sociological work in Legitimation Code Theory (LCT) (e.g. Maton 2014).

From a social semiotic perspective, Hunston (1993) provided informative insight by drawing on the communal aspect of scientific discourse. She conceptualised three types of evaluation: status, value and relevance. In her terminology, status reflects 'the writer's degree of certainty and commitment towards the proposition' (pp. 60–61), whereas value 'establishes 'the writer's attitude to the value of the research' (p. 60). Relevance is an aspect of evaluation that attends to the significance of the research paper. By incorporating these notions, she was able to suggest that the purpose of a scientific research article is not only about 'observing and reporting what exists in the natural world', but also about 'persuading the communal development of a "physical world" picture' (pp. 67–68).

Hunston (2000) introduced an additional perspective of the autonomous plane and the interactive plane in constructing an ideational space of evaluation in discourse. The former plane attends to 'the way the world is labelled' and 'what counts as knowledge', whereas the latter deals with constructing valid arguments (p. 205). One of Hunston's findings gained through comparing academic research reports and journalistic persuasive writing was that in the former, evaluation serves to contrast a possible or hypothetical world and the actual world. In journalistic writing, on the other hand, significant division is made between 'fact', whose truth-value can only be contradicted 'by calling the writer a liar', and 'assessment', or opinion, 'which cannot of itself be said to be true or not true' (p. 186). While Hunston's work is not based on the current

APPRAISAL framework (Martin 2000; Martin & White 2005, see also Chapter 3), it still provides valuable insights into the nature of scientific discourse as compared to journalistic writing. This is reviewed further in Section 2.3.

Some literature also touches on the aspect of the scientist persona. Hyland's (1998) work on hedging (see Subsection 2.4.4) was informed by Campbell's (1975) account of scientific *personae* from a theatre and drama perspective. According to Campbell, scientific discourse is 'rhetorical in nature' (p. 391), in that it involves *personae*, defined as 'an imaginary being implied by the work, but a being who has no necessary resemblance to the author' (p. 394). He pointed out that science is personal in the sense that it depends on one's beliefs about what science should accomplish, one's values about the scientific process and fundamental concepts as well as one's resultant perceived realities (p. 395). Campbell further claimed that the personae of scientific discourse, being responsible for the objectivity claimed to be achieved by such discourse, 'are always implicit in the acts themselves and must be inferred directly therefrom' (p. 399). From the same perspective, Hyland (1998) focused on the normative aspects of the research community, which include entering into the interaction with the scientists, being endorsed by the research community and the conduct of scientific debate. As mentioned in Subsection 2.4.3, Hyland's conceptualisation of the scientific community in terms of power is different from that of Myer (1989). For Myer, the scientific community is characterised as having a solidarity in which 'everyone must present themselves as equally humble servants of the discipline' (p. 4).

In terms of the scientist as authority, it is interesting to review Halliday's (1994) analysis of Charles Darwin's *The Origin of Species* from a historical perspective. Halliday's major focus was on the textual organisation, how new knowledge of the evolutionary theory was constructed with thematic progression, and how lexicogrammatical choices were made along with the textual progression. He also examined the construction of value in the last two paragraphs of *The Origin of Species*. By focusing on personal pronouns of the first person, Halliday made explicit how Darwin's own status as authority was constructed. This was done in progression, first by

relating himself with ‘authors of the highest eminence’ (Halliday 1994, p. 149), and then by shifting from ‘I’ to ‘we’ (p. 150).

These different perspectives on the interpersonal meanings in scientific discourse have important implications for the present study in terms of community. On the one hand, there are meanings in terms of ‘solidarity’ within the intra-community negotiation of conformity (Myers 1989) and ‘communal development’ of persuasion of new knowledge (Hunston 1993). On the other hand, there is the aspect of ‘power’, or AUTHORITY (see Section 2.5) reflecting the authoritative (Halliday 1994) and normative (Hyland 1998) aspects of the scientist as a ‘knower’ (Maton 2014). How these two aspects of interpersonal meanings are negotiated by scientists on Twitter is one of the foci of the current study and is addressed in Chapter 5.

Finally, the issue of gender across cultures has been attended to in recent years as one of the concerns of scientific communities. Lemke (2004) points out that the scientific community of Western cultures represents ‘a world of masculine camaraderie’ (p. 44). From an Eastern perspective, Kurokawa (2005) also relates the limited number of leading women scientists in Japan with the male-dominant nature of Japanese society (p. 26). While both Lemke and Kurokawa mention gender from a statistical perspective in terms of proportions of females in the scientist population, gender has some implication in the present study, because one of the Twitter writers of this research is a woman. This issue is discussed in Subsection 2.6.2 in relation to sociolinguistic studies on women’s language in Japanese, and in Chapter 6 in terms of future perspectives.

2.2.3 Public versions of science

Relevant to this present research on how a nuclear crisis was communicated on Twitter is the issue of how scientific knowledge is communicated to lay people. The linguistics literature provides insight into understanding what happens with language choice when scientific matters are directed to non-scientific communities so-called ‘popular science’(Myers 1994; Fuller 1995, 1998).

Before exploring this literature, a note should be made about the term 'popular science' and the different ways in which science can be 'popularised', or addressed to non-scientists. Myers (1994) limited the term 'popularisation' of science to articles in science magazines such as *New Scientist* and *Scientific American*, which were 'aimed at and read by people with some scientific education' (p. 181). From generic and experiential perspectives, Fuller (1995) characterised differences within so-called 'popular science' in terms of a cline between 'reporting popular science' and 'reflective popular science'. Referencing Fahmestock, the former expression is also referred to as 'science accommodation' (Fuller 1995, p. 25), whereas the latter, characterised as more 'expository' (p. 25), is also mentioned in terms of 'critical popular science' (p. 111). From a science communication perspective, the term 'public science' is used in a broad sense 'to refer to contexts in which scientists make scientific claims before non-scientists' (Zehr 1998, p. 7). In the context of this current research, where interest lies in exploring the different orientations that the Twitter writers in the data set took in making 'science' accessible to their readers, it is considered adequate to use a general and pluralised terms such as 'public versions of science', and 'public science'.

Myers (1994) compared technical science and public science, including scientific accommodation and science covered in journalism by attending to grammatical features and text organisation. He pointed out that compared to a research article that is about constructing an argument, the popular version is about telling a story, in which 'the researchers become actors and the claim becomes a discovery event' (p. 183). Myers also pointed out that while scientists 'see their work' as 'tentative and mediated', the public science sees errors as 'due to incompetence or fraud' leaving 'no room for results that lie between total certainty and error' (p. 189).

While Fuller (1995) made similar observations on the 'reporting' version of public science, including newspaper reports on science, her major focus was on another category of public science, 'critical popular science'. Fuller characterised these texts written by 'scientific populariser[s]' (p. 112) as 'forms of pluralist ideology' (p. 118). By focusing on two texts, Gould's *Bully for Brontosaurus* and Suzuki and Knodston's *Wisdom of the Elders*, she revealed how each negotiates relations between science and society in different ways. In *Bully for Brontosaurus*, negotiation was done as

'cultivating' of science, in the sense that the text begins by ploughing different fields, including 'high culture' such as Shakespearean texts, then by fostering intersubjective engagement of the 'idealised' reader, who was not being told, 'but was positioned in the more flattering role of participants' (Fuller 1995, p. 252) in the dialogue of plural voices that include poets, scientists and American presidents (p. 253). In *Wisdom of the Elders*, the text is a matter of reconciliation between 'the technical authority of science' (Fuller 1995, p. 255) and 'the moral authority of Deep Ecology' (p. 262) of Native Americans. Here, 'Natives' are construed as 'a pristine other' (p. 266) to whom no 'heteroglossia is accorded' and whose voice is 'transmitted by "respected" and noted anthropologists' (p. 268). According to Fuller, this is about 'Western ways of knowing' coming to understand 'their' texts, or texts of 'Native science' (p. 315). Fuller's contributions to the heteroglossic nature of texts written by science popularisers have significantly influenced the theorisation of ENGAGEMENT in the APPRAISAL system (see Chapter 3).

A number of implications become apparent from these works on public versions of science. Ideationally, a public version of science is not a matter of argument but rather a discovery event. What Myers (1994) points out about the 'tentative and mediated' aspect of research is compatible with Lemke's (1998) account in which scientific discourse is characterised by its topological attention. In replacing this aspect with an issue of either certainty or error, this topological feature disappears in the public version of science. From an interpersonal perspective, the shift foregrounds the normative aspect of science, by identifying 'error' with 'incompetence or fraud' (Myer 1994, p. 189). Fuller (1995) focuses on how the authority of science is negotiated in critical popular science, even though the enactment of 'our-own-ness' (p. 113) may show a guise of negotiating solidarity. It is done in Gould's *Bully for Brontosaurus* text by inviting the readership into the unfolding of the field together with plural voices belonging to high culture. In Suzuki and Knodston's *Wisdom of the Elders* text, a variety of voices including those of Natives, Western scientists and anthropologists are synthesised into the colonising process. Fuller's use of these two authors to study public versions of science, particularly ones that were written not by scientists but by science popularisers opens up space for exploring what happens when Japanese science experts write about science on Twitter in a time of a crisis, as compared to freelance journalists.

Works reviewed in this section have covered studies on public science, or science addressed to non-scientists. Some of these works compared scientific discourse and journalistic discourse, focusing on how scientific matters are reported in journalistic discourse (Myer 1994; Hunston 2000; Stocking 1998). These and other works are reviewed further in Subsection 2.3.4 in terms of how journalism deals with science.

2.2.4 Recent perspectives on scientific discourse

SFL continues to explore the discourses of various disciplines and interdisciplinary areas, along with the expanding and elaborating of its theoretical frameworks including genres (Martin & Rose 2008), discourse semantics (Martin & Rose 2007), and the interpersonal discourse semantic system of APPRAISAL (Martin & White 2005). There is also collaboration with the educational sociology of Maton's (2007, 2014) Legitimation Code Theory (LCT), built on Bernstein's notions of *Vertical* and *Horizontal discourse* as different forms of knowledge (Bernstein 2000).

In Bernstein (2000), *Vertical discourse*, or non-everyday discourse, is distinguished from *Horizontal discourse*, which is defined as the 'form of knowledge usually typified as everyday and "common sense" knowledge' (p. 157). *Vertical discourse* can either take 'the form of a coherent, explicit and systematically principled structure, hierarchically organised as in the sciences', or 'the form of a series of specialised languages with specialised modes of interrogation and specialised criteria for the production and circulation of texts as in the social sciences and humanities' (p. 157). These two modalities of knowledge are referred to as *hierarchical knowledge structure* and *horizontal knowledge structure* (p. 161) respectively.

Building on these concepts, Maton's LCT (2007, 2014) further elaborates Bernstein's knowledge structure into 'knowledge-knower structures' and 'specialisation codes of legitimation'. Maton begins by distinguishing between knowledge structures and knower structures, making the differences in scientific culture and humanist culture more explicit. Further, he theorises 'specialisation codes of legitimation' consisting of two dimensions, 'epistemic relations' (ER) and 'social relations' (SR), focusing on knowledge aspect and knower aspect respectively. This two-dimensional

conceptualisation enables the schematisation of relative strengths and weaknesses of different disciplines in terms of two scales on a Cartesian plane. Further, the LCT notion of 'gazes', or 'knower-grammars', (Maton 2014, p. 94) provides a useful perspective in understanding the community of scientists relevant to this research. Depending on who constitutes 'legitimate knowers' (p. 94) and the relative strength or weakness of the social relations in the specialisation codes, different types of gazes are conceptualised, i.e. born, social, cultivated and trained. Among them, science is considered to possess the trained gaze, which is relatively weak, in that the gaze is 'gained through training in specialized principles or procedures' (p. 95).

SFL´s exploration of academic discourse in dialogue with LCT continues to bear fruit including work by Christie & Martin (2007) and Christie & Maton (2011). Hood (2004, 2010, 2011, 2012) has investigated academic discourse, integrating LCT's perspective of sociology with the linguistic system of APPRAISAL, particularly its theorisations of GRADUATION and ENGAGEMENT. Her works compared the introductions of research articles from the natural sciences and the humanities, illustrating how the two disciplines differ in terms of visibility of human sources. She discussed that this reflects a difference in terms of knowledge-knower structures of different academic disciplines.

LCT has also been used to investigate ideational meanings in academic discourse. Informed by LCT's notions of semantics (Maton 2007, 2014), the meanings dealt with in terms of technicality and abstraction in the 1990s are now addressed in terms of 'power words', 'power grammar' and 'power composition' (Martin 2013a). According to Martin, 'power words' are those entities (Martin & Rose 2007, p. 113–114, see also Chapter 3) which are construed in terms of both uncommon sense composition and uncommon sense classification (Martin 2013a, p. 25). Composition refers to the taxonomy 'consisting of wholes and their parts and sub-parts' (Martin & Rose 2007, p. 80), whereas classification is the relationship of categories and subcategories. 'Power grammar' is about the process of grammatical metaphor as integral part of reading and writing science (Martin 2013a, p. 28). 'Power composition' comprises masteries in the organisation of genres (p. 31), and works on periodicity, or information flow, in the text (Martin & Rose 2007, p. 20).

This new perspective on knowledge packaged in educational and academic discourse is expected to foster further insight into research and pedagogy of various disciplines. Hao and Humphrey (2012) have applied the notion of coupling of ideational and interpersonal meanings (see Section 2.5) in analysing students' experimental reports in science. The introduction of field-sensitive categories of appreciation in the APPRAISAL system (see Chapter 3) illustrates how undergraduate students of biology extend field knowledge while accruing ways of evaluating it. Hood (2014, in press) focuses on the body language of lecturers in different disciplines, exploring meaning potential of paralinguistic resources in knowledge building. While these works are not directly related to the issue of community building, which is the focus of the present study, there are still some implications in the negotiating of scientific knowledge to lay readers of Twitter.

In summary of this section, the current study is situated in the rich accumulation of works on the discourse of science and its public versions from SFL and other related scholarly domains. Early explorations in SFL focused on the ideational features of scientific discourse as distinct from other related fields. These include grammatical metaphor and construing the world as classification and as topological representation that inevitably involves multimodality. Interpersonal aspects of scientific discourse have been explored, informed by pragmatic approaches to politeness and hedging, and the understanding of persona from theatre study tradition. These works provide implications for understanding how power and solidarity are enacted within scientific communities as well as within communities of non-scientists. Recent works on the scientific discourse are based on and reflect the development of SFL theories, including APPRAISAL and coupling. They are also informed by sociological perspectives on education particularly by Bernstein and LCT. The research attention expands to various semiotic resources in science including multimodality and body language. The present study, which addresses community formation in a time of nuclear crisis, is expected to provide another perspective on the language of science by attending to the way in which science was communicated to the lay public in a specific context.

2.3 Discourse of journalism

SFL has provided a rich accumulation of works on journalistic media discourse that are beyond the capacity of the thesis to cover. This section reviews only a limited number of works that are representative or relevant to the current research context.

2.3.1 Attention to genre and textual meaning

As with the discourse of science, SFL's exploration of the discourse of journalism grew out of an attention to literacy education in the 1990s. These early works on SFL-based journalistic discourse include those by Iedema, Feez and White (1994), Iedema (1997), and White (1997). Overriding interest in the exploration of journalistic discourse in SFL since these years lies in its ideological nature. In order to unfold the ideology woven in the newspaper texts, works in the 1990s particularly drew attention to hard news stories and their generic and textual structures.

According to the Disadvantaged Schools Program (DSP) (cited in Thomson 2001a), genres in news stories consist of 'hard news stories', or 'high newsworthy stories' and 'soft news stories', which are 'designed to counterbalance the destabilising effect of such information' (Thomson 2001a, p. 147). Hard news stories largely consist of 'nucleus' and 'satellite' (White 1997, p. 101). The Nucleus is constituted of the Headline and the Lead, which 'typically communicates what happened in summary, what were the most significant human consequences and the degree to which and the way in which the event is physically, socially or morally "destabilising"' (Iedema et al. 1994, p. 115). The Nucleus is followed by a number of Satellites, which 'expand or explain the information within the Nucleus', in terms of restating the information given in the Nucleus, adding information to it, or giving causes and conditions (p. 117). White (1997) pointed out that this 'orbital structure' of the hard news story supports its function to naturalise the selection of what is newsworthy for the reader, though the selection is a 'thoroughly ideological' process (p. 128). In the same context, Thomson

(2001a) analysed a hard news story and a soft news story as well as a news commentary in Japanese newspapers, and compared their generic and textual structures with those of nursery tales and narratives in Japanese. Other works that attended to journalistic discourse in Japanese from genre or textual perspectives include Thomson (2001b), Washitake (2009, 2011) and Ishikawa (2011).

2.3.2 Attention to APPRAISAL

In the past decade, SFL work on journalistic discourse has expanded its perspective in a number of ways. Influential to the exploration of ideology in journalistic discourse is the development of the APPRAISAL system, particularly of the ENGAGEMENT system (Martin & White 2005; White 2003, see Chapter 3 for the details of the system of APPRAISAL). With this new perspective of APPRAISAL, the two different kinds of voices that typically enact different kinds of evaluative meanings in media texts are made explicit. The first of such voices is the 'reporter voice', in which 'no authorial, or unmediated, inscribed judgement is found. The other kind of voice is the 'writer voice', in which inscribed authorial judgement is found. The writer voice is divided into two types, the 'correspondent voice', in which minimal authorial inscribed social sanction is found, and the 'commentator voice', where there are no co-textual constraints on judgement, either social sanction or social esteem. These patterned ways in which different kinds of voices enact different degree of evaluative meaning can be related to the power hierarchy within mainstream media organisations in which writers are authorised to employ different ranges of evaluative meaning (Martin & White 2005, p. 184). From the readership perspective, the concept of 'putative addressee' (p. 101), a kind of readership that is expected to share the value position with the news reporter, helps us to understand how the value position of the media is naturalised, with the interplay of different kinds of voices addressing the news to a putative reader. These new perspectives, which have opened up with the theorisation of APPRAISAL, foster further exploration of media discourse in various languages and cultures.

Thomson and White (2008) followed this trend by compiling works in various languages, including two works on media discourse in Japanese. Thomson, Fukui and

White (2008) analysed the reporter voice in Lead stories in Japanese newspapers. Sano (2008) examined the rhetorical strategies in editorials in Japanese newspapers by adopting the Generic Structure Potential approach proposed by Hasan, as well as analysing choices in inscribed and invoked attitudinal resources (see Chapter 3). According to Sano (2008), there are 'prosodic shifts' in editorials in Japanese newspapers that begins from a *pianissimo* voice of 'inducement', whose main function is to invite readers into the topic (p. 105). ATTITUDE is only invoked at this stage. Then, at the stage of 'empathetic construction' (p. 107), the positions of the writers and the readers are relativised, with both inscribed and invoked ATTITUDE. Finally at the last stage of 'position' (p. 110) the standpoint is fully made explicit with inscribed ATTITUDE. This prosodic development of Japanese newspaper editorials is explained as a rhetorical strategy for establishing solidarity with their readers, who may not share the same ideological position and thus may potentially be offended (p. 113). Although the adequacy of relating the findings with Ikegami's (1991) notion of 'homologisation'[5] in the Japanese community (Sano 2008, pp. 114–116) may be questioned, Sano's findings suggest that as far as editorials in mainstream newspapers go, the ideological positioning is not taken for granted but rather negotiated stage by stage in Japanese newspapers. This provides a perspective to compare with how the value positions were negotiated or taken for granted in Japanese freelance journalists' tweets.

2.3.3 Attention to multimodality and corpus studies

Another continuing attention in SFL studies of journalistic discourse is on multimodality. Early attention on this aspect of media discourse was inspired by Kress and van Leeuwen's (1996) social semiotic framework for analysing visual images. According to Kress and van Leeuwen (1996), the composition of visual images 'relates the representational and interactive meanings of the image to each other' (p. 183) through the following three interrelated systems, i.e. information value, salience and

[5] Ikegami (1991) proposed the notion of 'homologisation' in relation to Barthes's concept of 'empty centre' which Barthes used to characterise the city of Tokyo. Ikegami related the term to Nakane's (1970) anthropological account that says a Japanese leader tends to lack brilliance. Ikegami characterised a culture with an empty centre for its capacity to 'accommodate and keep in it apparently diverse elements, not in a state of conflict, but in a state of harmony with each other' (p. 15), creating a 'part-to-whole relationship' (p. 17) between man and nature, individual and group, or text and context, for example.

framing. Kress and van Leeuwen (1998) applied this framework to analyse the layout of newspaper front pages. They found out that newspaper front pages 'orient their reader' to a particular kind of world by constructing relations between different events in the news, in relation to 'their readership and to the wider (national) cultural context' (p. 216). In addition to this framework for analysing multimodal discourse, Economou (2008) has brought in the recent SFL frameworks, including APPRAISAL and journalistic voices, to analyse the relationship between photos and texts in hard news stories in Greek and Australian newspapers.

Recent work on journalism keeps broadening its research capacity with continuing attention to its multimodal nature by incorporating new theoretical concepts (Caple 2008, 2009, 2010). Caple (2008) defines image nuclear news stories as having a similar functional structure to verbiage nuclear news stories in that heading and image work together to form a nucleus, from which the evaluative stance of the newspaper towards that particular story can be read. Caple (2010) further incorporates the concepts of 'commitment' or 'degree of meaning potential instantiated in one instance or another' (Hood 2008, p. 356) from the hierarchy of instantiation (Martin 2008a, see also Chapter 1), and 'bonding' (Stenglin 2004, see also Section 2.2). She further introduces the notion of 'allusion' (Caple 2010). Allusion attends to 'the idea of texts making reference to other texts' (p. 114) with the intention 'to create a bond between the author and the reader of the text' (p. 127). From this perspective, Caple discusses how newspapers demand the reader to engage in a complex process of decoding the meaning in the news stories by unpacking the intersemiotic text as well as activating allusion from other texts shared as cultural knowledge and values, and by challenging the readers in that way, to celebrate those who can solve their riddles as belonging to the exclusive community of particular newspapers, e.g. *The Sydney Morning Herald*.

Recent works on journalistic discourse have broadened its perspectives in terms of kinds and amount of data. Knox (2007, 2009) and Caple and Knox (2012) examines multimodal resources on online newspaper websites, exploring the similarities and differences from the paper version in terms of genre, relationship between texts and images in thumbnail faces (Knox 2009) and photojournalism (Caple & Knox 2012). Knox (2009) attends particularly to graphological resources of punctuation, particularly

of emoticons, and explores how these and other resources function to 'attract and retain a readership, and the interpersonal exchange between the institution of the newspaper and its readership' (p. 163) by deploying emoticons, for instance. Bednarek (2006) and Bednarek and Caple (2012) use a corpus approach to explore evaluative meanings in journalistic discourse. In this increasingly electronising society, these new approaches are expected to reveal the kinds of meanings delivered in the online mode of journalism particularly in terms of the ideological stances that it has been taking alongside the paper version. Also, while many of the major works reviewed here attend to mainstream media, this study is interested in exploring the discourse of freelance journalism. A possible area of exploration would be to compare the discourse of mainstream media with that provided by freelance journalists.

2.3.4 Journalism on science

Before closing this section, attention is brought back to the matter of science, which is relevant to the current study. Literature on how journalism covers scientific matters includes Fuller (1995), Myers (1994), Hunston (2000) and Stocking (1998). In Fuller (1995, pp. 97–111), a prestige broadsheet newspaper (*The Australian*) and a local tabloid (*The Telegraph Mirror*) were compared in terms of how much technicality in the sense of construing an abstract quantifiable world, remains in these 'popular' version of science. Her finding was that newspaper texts 'stressed the wonder of science' rather than explaining the procedures of the discovery (p. 111), and that the tabloid accepted scientific claims more unquestioningly, compared to the broadsheet coverage where caution and doubt was articulated (p. 110).

As reviewed in Section 2.2, Myers (1994) compared how the same scientific matter is dealt with differently in research articles and public versions of science, including scientific accommodation and journalistic articles. He suggested that while scientific works are presented as 'tentative and mediated', public versions allow 'no room for results that lie between total certainty and error', and that 'errors' are considered to be 'due to incompetence or fraud' (p. 189).

Hunston (2000) compared academic and journalistic articles from her own perspective of status and values. She pointed out that in academic articles distinction is made between statements that create a possible or hypothetical world, are assumptions and descriptions of hypothetical events, and claim knowledge about the actual world. On the other hand, in journalistic persuasive writing,

> A writer either gives information which purports to have truth-value and which can be contradicted only by calling the writer a liar (a 'fact'), or he or she gives an opinion, something which cannot of itself be said to be true or not true (an 'assessment'). (p. 186)

A similar observation is made from science communication perspective. Stocking (1998), referencing Fahnestock (1986), pointed out that accounts in popular science and news magazines 'exaggerated the scientific claims, playing down the qualifiers and caveats present in the original (Stocking 1998, p. 25). With respect to Lemke's (2004) distinction between 'meaning by degree' and 'meaning by kind', public versions of science can be seen as shifting from the former to the latter. However, Stocking (1998) also mentions that journalists can make scientific matters look controversial, by giving 'equal weight to majority and fringe scientists' (p. 28) or 'equal weight to scientists and nonscientists' (p. 29). Though Stocking considers that this may be due to the routine of journalism that seeks 'journalistic objectivity' (p. 33), she also points out that when 'scientists whose work supports the interests of' (p. 29) particular industry, they may be given equal weight as majority scientists even if they are fringe scientists. Considering the ideological nature of journalistic discourse that SFL has been attending to, Stocking's account on major and fringe journalists is worth paying attention to when comparing the Twitter data written by scientists and freelance journalists.

This section has reviewed literature on the discourse of journalism mainly from SFL perspectives. Overarching attention is paid in the ideological nature of media discourse that has been addressed in the literature in terms of genre, textual organisation, APPRAISAL and voices, as well as multimodality including photos and online media. Works on journalistic discourse that touch on scientific issues also support the understanding of journalistic discourse as ideologically oriented in the sense that scientific matters are dealt with in ways that support interests of particular groups, or

presented to support the ‘objective’ outlook of journalism. These findings from the literature provide the basis on which to explore tweets written by freelance journalists in a time of a nuclear crisis. In the next section, the focus shifts to the online mode of social media, including Twitter. Relevant work from SFL and other domains are reviewed.

2.4 Discourses of social media

Social media is a communication channel that emerged along with the development of internet technology. Given its name, discourse of social media might be considered as part of media discourse. However, for the purpose of this study, it is preferable to regard social media as distinct and different from so-called mass media in which journalism, for example, would be included. Page (2012) distinguishes social media from mass media in that the former ‘is presented as a one-to-many broadcasting mechanism’, whereas the latter ‘delivers content via a network of participants where the content can be published by anyone but is still distributed across potentially large-scale audiences’ (p. 5). As well, social media is not necessarily bound by the ideological pressure that overrides the discourse of mass media, though that does not exclude the possibility that mass media deploy social media to do their ideology work. For its newness and its rapid integration into our lifestyle, internet social media has been attracting attention from people in too many disciplines for this section to cover. The focus here is Twitter, with particular attention to disaster-related studies, including works that focus on the disaster in Japan in 2011. Finally, the SFL account of Twitter provided by Zappavigna (2011, 2012, 2014) is reviewed, in order to up space for a complementary approach to the discourse of Twitter.

2.4.1 Web 2.0

With the rapid spread of internet technology and communication on the web, increasing attention is drawn to the study of Web 2.0 technologies, particularly the interactive

aspects of internet communication. Web 2.0 is characterised by 'the growth of applications that are web-based (rather than in one's own computer), that work across platforms, and that harness the contributions of users to produce additional values (Myers 2010, p. 168). Social media is studied by various disciplinary areas including communication (Lomborg 2014), philosophy Gere (2012), and public relations (Luttrell 2015), to name just a few. Included in social media is Twitter, a microblogging site, and other kinds of media such as discussion forums, blogs, wikis, podcasting, social networking sites such as Facebook, and video sharing.

A compilation of works on the internet language from a sociolinguistic perspective characterises social media in terms of 'multi-authorship, translocality, multimodality, and "modularity" (Thurlow & Mroczek 2011, p. xxxvi). Myers (2010) explored blogs and wikis from contextual and interpersonal perspectives. Contextual aspects include genres, place, time and audiences, and interpersonal aspects include values and evidence, arguing and collaboration. Page (2012) focused on story telling in social media and analysed a number of social media texts attending to their characteristics as narrative.

In the Japanese context, where internet penetration in the population is estimated to be among the highest worldwide at 75%, along with Germans (Crystal 2011, p. 79), social media has drawn interest from various academic domains, including sociolinguistics (Nishimura 2003, 2011; Takahashi 2014) and educational linguistics (Butt, Kobayashi & Sasaki 2009). Nishimura (2003) particularly focused on the graphological resources, including scripts and emoticons (see Chapter 3), as well as lexicogrammatical resources of so-called 'polite' versus 'plain' forms (see Section 2.7 and Chapter 5), discussing how they represent innovative features of the Japanese language in online communication. From a cultural perspective, Takahashi (2014) attended to different types of social media popular among young Japanese, exploring how these media are related to types of identity, collective or individual, and how they are created or recreated. Butt et al. (2009), from an educational linguistic perspective, shows concerns about how online communication has 'modified the role of face-to-face interaction in the social repertoire of community members' (p. 29). The data set of the present study, Twitter in Japanese, can be conceptualised within the context of the internet prevailing in people's lifestyle from their early years.

2.4.2 Twitter on disasters

Studies in social media often focus on the ordinary, everyday types of communing[6], but there are different purposes for using social media other than socialising. As Lomborg (2014) mentions, the connectivity of social media can be used for professional purposes including news dissemination and celebrity branding (p. 15). Luttrell (2012) attends to the functions of social media in crisis management (pp. 157–173).

Prior to the earthquakes and tsunami disasters in Japan in 2011 (known as the 3/11 disasters or 3/11), academic attention had been drawn to Twitter in communicating disasters (Mills, Chen, Lee & Rao 2009; Sutton 2010; Li & Rao 2010). Mills et al. (2009) observed that even though 'Twitter is not yet seen as reliable, deep or broad enough to meet the information needs of professional organizations', it is especially good for 'providing information not covered on radio and television, such as details and first-hand accounts within moments of an event' (p. 21).

Numerous works were published after the 3/11 disaster. Those include works presented by participants of Project 311, or the Great East Japan Earthquake Big Data Workshop held in 2012[7] attended to Twitter. Among them, Inui et al. (2012) focused the expansion and convergence of false information, discussing how credibility of information can be secured by visualising the 'background' of information. Other works were published within various disciplines, including linguistics (Sano Varga, Kazama & Torisawa 2012), public relations (Utz, Schultz & Glocka 2013), psychology (Rubin, Amlot, Wessely & Greenberg 2012) and communication and information science and technology (Acar & Muraki 2011; Sakaki, Toriumi & Matsuo 2011; Chatfield & Brajawidagda 2012; Thomson R., et al. 2013). Most of these works took quantitative approaches except Acar and Muraki (2011).

Among these previous studies, particularly relevant to the current study is that by Thomson R. et al. (2012). They attended to Twitter during the Fukushima Disaster in terms of credibility of information source. In order to 'measure' the credibility of

[6] See section 2.5.
[7] https://sites.google.com/site/prj311/project

different kinds of sources on Twitter, including official and individual ones that were prevalent in the aftermath of 3/11, Thomson et al. adopted two methods: the first was an internet user survey, and the second was an analysis of synthesis-derivative tweet source and credibility, where credibility is conceptualised as determined by 'a source's perceived ability and intention to provide correct information' (p. 4). While admitting that their conceptualisation of credibility relies on users' perceptions, which may or may not reflect the real credibility, their findings provide an interesting perspective for the context that the current research is situated in. Thomson R. et al. (2012) distinguish and compare between official sources, such as traditional media, public institutions and entreprises, and individual sources including freelance journalists, high-trust, academics/professionals and Fukushima locals. Among these, the credibility of freelance journalists was rated four times as high as that of academics and professionals, though both groups were considered to be highly credible according to the survey results (p. 7). In other words, their finding is that freelance journalists were considered to be more credible sources of information when communicating about the Fukushima Disaster on Twitter than academics and professionals. This provides an interesting point to revisit towards the end of the thesis in terms of community building, for one's perception of information as credible plays an important part in whether one also perceives a sense of communal belonging, or bonding (Stenglin 2004, p. 20), particularly in a time of a crisis.

2.4.3 SFL approach to Twitter

In the SFL context, Zappavigna's (2011, 2012, 2014a) works on Twitter provide a sound point of departure for this research. She draws on the tri-hierarchical perspective of SFL, namely, the realisation, instantiation and individuation hierarchies, as well as Knight's (2010) conceptualisation of community of affiliation through coupling of ideational and interpersonal meanings (see Section 2.5). Zappavigna characterises the kind of affiliation on Twitter as 'ambient affiliation', a concept informed by Morville's (2006) notion of 'ambient findability'. From an informatics perspective, 'ambient findability' describes 'a fast emerging world where we can find anyone or anything

from anywhere at any time' (p. 6) and where 'we will enjoy an unprecedented ability to select our sources and choose our news' (p. 7).

Zappavigna (2012) draws on this concept of ambient-ness of new media to characterise the kind of affiliation that occurs on Twitter. According to Zappavigna (2014a), 'the affiliation in operation in microblogging may thus be seen as "ambient" in the sense that microbloggers as individuals do not necessarily have to interact directly in order to align around a common value' (pp. 141–142). Her particular focus is drawn to affiliation around hashtags. She considers that hashtags are 'ideational labels' that couple and enact interpersonal meanings (p. 91). Ambient affiliation is characterised as 'impermanent community, [one which bonds around] evolving topics of interest' (p. 95). In this context, hashtags are considered to 'invite an ambient audience to align with the values with which they are coupled', creating ambient affiliative network of tweets' (p. 96). Based on this assumption, she explores various communities of affiliation formed by different kinds of evaluative meanings around topics, including politics such as presidential elections (Zappavigna 2011) and everyday topics such as coffee (Zappavigna 2014a).

However, affiliation – the formation of new communities – on Twitter does not always occur around hashtags. Lomborg (2014) considers that establishing connection with other users by following and being followed is a prerequisite for communicating with others on Twitter (pp. 99–100). Twitter affords a number of ways in which tweets are displayed (see Chapter 3), and the hashtag is one of them. Affiliation may occur with or without a hashtag. In fact, the current research is addressing community building that formed around particular Twitter users, rather than topics marked by hashtags. This allows us to expand the notion of ambient-ness beyond, being a characteristic that lies in its 'ubiquitous' nature of online communication. Fuller and Harley (2011) suggest that 'ambient reality of life' characterises the life in the wireless world of ubiquitous computing (p. 52). This 'ubiquitous' characteristic of social media is often unmentioned in studies, but it is a core of what it takes to be a social media, whereby wireless mobile technology enables us to perceive surroundings not only in terms of what surrounds us physically, but beyond. While Zappavigna focuses on the aspect of communing around topics of interests, the present research is expected to provide a complementary

perspective that narrows the focus to community formation around specific users in specific professional groups.

2.4.4 Towards an exploration of community formation on Twitter

While the literature of social media covered in this section is limited, it covers a wide range of scholarship. In this sense it reflects the characteristic of social media, particularly of Twitter, mentioned in the literature. Anyone can be connected to anyone about anything anytime and anywhere.

In order to situate this study on a foundation formed by earlier research contributions, the previous three sections reviewed the literature in terms of the discourse of science, journalism and social media. These three kinds of discourses provide context for this study, that is, how groups of physicists, freelance journalists, and other people communicated on Twitter in a time of crisis. Attention now shifts to a theoretical perspective, and some aspects of the architecture of the systemic functional linguistic theory introduced in Chapter 1 is revisited.

2.5 Theorising community formation, power and solidarity

Within the architecture of SFL that was introduced in Chapter 1, this section provides detailed accounts of two aspects of its theoretical foundations that are relevant to the present study. One of them is the hierarchy of individuation, one of the three complementary perspectives that focus on the relationship between culture and language users. The other is the theorisation of the concepts of power and solidarity.

2.5.1 The individuation hierarchy

The individuation hierarchy complements the two other hierarchies (realisation and instantiation) by focusing on the relationship between the meaning potential in a culture with its users. Attention to language users in SFL is by no means new. Halliday (1968) attended the notion of LANGUAGE COMMUNITY as well as different kinds of language varieties within one particular language, distinguishing between DIALECT and REGISTER in the following manner:

> What varieties of its language are there? Under [this] question come these subdivisions: varieties according to users (that is, varieties in the sense that each speaker uses one variety and uses it all the time) and varieties according to user (that is, in the sense that each speaker has a range of varieties and chooses between them at different times). (p. 141)

However, in the conceptualisation of relationship between the language community and individual users in SFL, a number of notions were brought in from the sociological perspective proposed by Bernstein. SFL attended to his notion of 'code', defined as 'culturally determined positioning devices' (Bernstein 1990, p. 13). Based on comparison of children from various social classes in their performance of classifying materials familiar to them, Bernstein proposed that there are different coding orientations, which are distributed depending on 'the distribution of power created by the principles regulating the social division of labour' (p. 21).

Informed by Bernstein, early SFL works focused on 'coding orientation'[8], making important contributions in exploring differentiated resources in different social classes and genders (Cloran 1989; Hasan 1986/2005, 1989, 2002; Williams 2005). In their project of a group of mothers and children, Hasan divided data on mother-child communication into two, according to the level of autonomy of the profession of the breadwinner of the family (Hasan 1989, p. 224), and compared the variation of lexicogrammatical and semantic resources in establishing ways of learning (Williams 2005, p. 469). The findings were interpreted from the following three perspectives:

[8] In earlier theorisations, the system of coding orientations was conceieved in terms of ideology 'at a higher level of abstraction than genre' (Martin 1997, p. 10).

- different ways of social interaction across segments of the same society;
- different forms of consciousness;
- different orientations to meaning. (Hasan 1988, cited in Martin 1992, p. 580)

In Williams (2005), Bernstein's notion of 'code' is revisited as regulating 'the legitimacy and appropriateness of meanings' and creating 'the principle for classifying certain meanings as illegitimate and inappropriate in certain contexts' (p. 462).

Two other key concepts from Bernstein (2000) that informed the SFL theorisation of individuation hierarchy are *reservoir* and *repertoire.*

> I shall use the term *repertoire* to refer to the set of strategies and their analogic potential possessed by any one individual and the term *reservoir* to refer to the set of sets and its potential of the community as a whole. (p. 158)

In SFL, individuation is considered as a cline between *reservoir* and *repertoire*, which Martin (2006) conceptualises as 'a scale of communities of meaning'. In other words, individuation can be defined as the relationship between the cultural affordance of resources for meaning making and individual users' distribution and acquisition of such resources. From this perspective, Hasan and colleagues' work is now interpreted from this perspective as the top-down cline of the individuation hierarchy, attending to 'individuation as a hierarchy of allocation whereby semiotic resources are differentially distributed amongst users' (Martin 2009, p. 563, see also Figure 1.5 in Chapter 1).

The complementary perspective is the cline of affiliation, which attracts more attention in recent years. The trend was initiated by Martin's (2006) proposal to address 'how individual interests resonate up the individuation hierarchy to affect communities as a whole' (p. 295).

This perspective is informed by, and resonates with, Firth (1957), who stressed the importance in linguistic attention to *person*, or social person, defined as 'a bundle of *personae*' (p. 184). Firth further discussed the potentiality of language in creating the future from the perspective of persons:

> There is the element of habit, custom, tradition, the element of the past, and the element of innovation, of the moment, in which the future is being born. When you speak you fuse these elements in verbal creation, the outcome of your language and of your personality. (p. 184)

Firth not only captured the relationship between culture and language users in terms of distribution and maintaining of the status quo, but also the potentiality of the impact that language users can have on the culture and the innovation and creation of the future. It is on this basis that Martin conceptualises language users not as psycho-biological entities but as 'bundles of personae embodied in such entities' (Martin 2009, p. 563), and theorises 'persona' at the bottom level of the individuation hierarchy.

The individuation hierarchy also brings in the ontogenetic perspective (see Chapter 1) to intertextuality[9]. Ontogenetic development is not limited to children and teenagers (Martin 2008a, p. 57), but can also concern adults, as 'identity' is conceptualised as 'something that develops throughout the lifetime of an individual' (Martin 2011, p. 264). In relation to *reservoir*, the process of development is understood as that of 'accumulating logogenesis as *repertoire*' (Martin 2011, p. 264), or the entire set of resources afforded in the culture. In the context of this study, where people faced a kind of nuclear crisis they had not experienced before, the community was inevitably exposed to new information concerning the nuclear crisis. This gave space for expansion of meaning resources in the *repertoires* of community members. This notion of expanding *repertoire* of meaning potential provides an ontogenetic perspective on the present study.

2.5.2 Key units for affiliation

In proposing the hierarchy of individuation, Martin (2008a) stresses the complementary relationship of the three hierarchies – realisation, instantiation and individuation.

[9] In Halliday (1992/2003), the term 'intertexual' is used to refer to the phylogenetic history of texts (p. 361), and the term 'developmental' is used to refer to the individual history of each interactant (p. 363).

> There is of course no way to construe identities other than by instantiating them in texts; and there is no way to form texts other than by drawing on the realisational resources members of a culture share. (p. 57)

In terms of stratification in the realisation hierarchy, Martin emphasises that all strata individuate (2008a, p. 57, 2008b, p. 54 2009, p. 566, 2010, p. 28). However, in terms of metafunction, he draws particular attention to the ideational and interpersonal meaning over textual meaning. This is seen in the following quotes from Martin:

- Communities are formed around attitudes to things. (2004b, p. 188)
- We align ourselves into communing sympathies in relation to events and abstractions of various orders. (2004a, p. 341)
- We don't affiliate with feelings; we affiliate with feelings about people, places and things, and the activities they participate in, however abstract or concrete. (2008a, p. 58)

In other words, people commune around by sharing values about phenomena, whether or not the phenomena concern people, things or events.

The key concepts in exploring affiliation are now introduced. The first is 'coupling'. Martin (2008b) defines coupling in a broad sense as 'the way in which meanings combine, as pairs, triplets, and quadruplets or any number of coordinated choices from system networks' (p. 39). Knight (2010b) takes up this notion, and focuses particularly on 'couplings that combine attitudinal meanings with ideation' (p. 40) in the instances of text.

Another key notion in the individuation hierarchy is 'bond'. This notion is based on Stenglin's (2004) conceptualisation of bonding, which merged from her social semiotic studies of space in the museum. In Martin and Stenglin (2007), bonding is defined as follows:

> Bonding is concerned with constructing the attitudinal disposition of visitors in relation to exhibits; its basic function is to align people into groups with shared dispositions. Bonding is realised in part through icons (flags, logos, colours, memorabilia etc.) which rally visitors around communal ideals. (p. 217)

Informed by this theory of bonding, Knight (2010a) uses the term ‘bond’ in her theory of ‘affiliation’. It is defined as ‘the social process of negotiating shared values in text to construct and co-identify in communities’ (p. 204). ‘Bonds’ are then defined as ‘the social semiotic units by which affiliation is negotiated in the social environment’, and as ‘the social semiotic (value/experience) units that couplings construe in the social context of affiliation’ (p. 207). In Martin’s (2010) terms, ‘the coupling of experience with evaluation, when shared by interlocutors, creates a bond’ (p. 26). In this sense, a bond can be defined as a unit for affiliation, created by ideational and interpersonal coupling when it ‘no longer needs to be negotiated’ (Hood 2010, p. 147), or when it is meant to be shared with other people.

With the linguistic units for affiliation, i.e. coupling and bond, now introduced, attention should return to the hierarchy of individuation, and focusing on the layered levels of affiliation. As mentioned earlier, on the bottom line of the individuation hierarchy is persona, which in some literature is also referred to in terms of identity (Martin 2012; Martin, Zappavigna, Dwyer & Cléirigh 2013; Zappavigna 2014a).

Before conceptualising the further terms, it should be mentioned that identity is actually conceptualised in varied ways in SFL literature. Tann (2010a, 2010b) adopts concepts from ‘Membership Categorisation Analysis’ in the conversational analysis approach, and explores ‘collective identity’ in terms of discursive construction of national membership. Knight (2010a), in her conceptualisation of bond networks (see below in this subsection), argues how cultural identities such as Canadian and Thai ‘can be negotiated … through the discursive construction’ (pp. 268–270) of bond networks. From a corpus perspective, Bednarek (2010) considers identity to be performatively constituted through discourse phylogenetically, ontogenetically and logogenetically, and that studying repeated patterns from corpora is a way to get at the performative nature of identity.

Martin et al. (2013) use the term ‘identity’ to indicate that it is performed by a language user conditioned by genre and register. In Martin’s study, the terms personae and identities are used more or less synonymously.

> The point of departure these perspectives establish … is the idea that users of language perform their identity within uses of language. Identity, in other words, is always already conditioned by register and genre, so that who we are depends on the roles we play in a given situation. The identities we enact with language at a particular point in time are influenced by the particular stage of the particular genre in which we happened to be involved. The way we use verbal and body language to enact our persona depends both on the linguistic repertoire we have accrued in our lives and the pressure of the genre. (Martin et al. 2014, p. 468)

Most recently, Zappavigna (2014a) conceptualises identity as 'coupling disposition', or 'the general tendencies in the patterns of coupling' (p. 154) of ideational and evaluative meanings. This is exemplified by her observation of two bonding tendencies around tweets on the topic of coffee.

It is from this perspective that Martin and colleagues propose the individuation hierarchy. They conceptualise culture as a system of bonds (Knight 2010a, p. 266), and schematise the relationship between culture and a social person in terms of the different kinds of clustering of bonds. Two intermediate levels of what Martin and colleagues call 'subculture' and 'master identity' are also schematised. The two levels are differentiated by Martin (2009) as a cline between more local versus more general (see Chapter 1). In Knight (2010a), these intermediate levels of communities are conceptualised as clusterings of bond networks of different orders in terms of degree of negotiability. The category of 'personal bond networks' is theorised as including friendship groups, mutual interest groups, and other such groups that are populated by a variety of bonds at various levels of negotiability' (p. 254). Ideological networks are defined as 'those communities that are separated by ideological values [constituting of] "over-arching" aspects of our identities' (p. 254), and conceptualised as less negotiable. However, what constitutes more or less negotiable aspects of identities may differ person to person and may not be identifiable a priori. If we apply Zappavigna's (2014a) definition of identity as 'coupling disposition' (see above paragraph), communities of different orders may also be conceptualised in terms of general tendencies in coupling patterns with which people align. Rather than distinguishing kinds of coupling between

more negotiable and less negotiable as in Knight, the present study conceptualises the intermediate levels of communities of different orders in terms of degree of locality.

The individuation hierarchy consists of bidirectional clines, allocation and affiliation. The bottom-up cline of affiliation provides a social semiotic perspective about how people align into groups or communities of different orders around different kinds of couplings, proposed to be shared as bonds. In other words, couplings, proposed as bonds, form a basis on which people affiliate, or a basis for affiliation.

This new perspective on the relationship between language users and culture now complements Hasan and colleagues' work on semantic variation in which focus was more on how linguistic resources are allocated differentially in a culture. Knight (2010a, 2010b) focuses on conversational interaction between friends, examining how affiliation is negotiated along with the logogenetic unfolding of interactive texts. She observed different types of strategies for affiliation with which communal identities are negotiated, including communing affiliation, laughing affiliation and condemning affiliation (Knight 2010b, p. 49).

Miller and Johnson (2014) is an attempt to bring both the bottom-up and top-down clines of the individuation hierarchy. They explore Congressional debates by different parties and genders, incorporating the concept of coupling in addressing 'characteristic (individual/cultural) semantic styles' (p. 346, quoting Hasan 1984). Focusing on the 'phraseology'[10] of *it is * time to/for/that*, they compared how Republicans and Democrats of the two genders construed coupled evaluative meanings of JUDGEMENT (see Chapter 3) in their parliamentary debate on the Iraqi war. The similarities and differences across parties and genders were discussed from the cultural aspect of *reservoir* and the individual aspect of *repertoire*. Miller and Johnson's work introduces a new perspective for exploring how community membership is negotiated with both the restriction and affordance of particular registers in which couplings are instantiated.

While Knight (2010a, 2010b) and Miller and Johnson (2014) examine affiliation in interactive kinds of discourse such as conversation and debate, other works addresses

[10] 'Phraseology' is used here in Sinclair's (1996) terms, meaning 'the tendency of words to "go together and make meanings by their combinations"' (Miller & Johnson 2014, p. 367).

affiliation in less interactive texts. Zappavigna's concept of 'ambient affiliation' (2011, 2012, 2014a, see also Section 2.4) characterises communication on Twitter in which users 'align around a common value' (2014a, p. 142) without necessarily interacting with each other directly. In Zappavigna, hashtags are conceived of as 'inviting' the readership to align with the values coupled with the topic of interests. In this study, which shares a focus on Twitter, affiliation is conceptualised not as being observed in interaction but as being 'proposed' or 'offered' in the discourse, whether or not interaction is visibly involved in the text.

To summarise the theorisation and key concepts so far, the individuation hierarchy is a cline between the cultural *reservoir* of resources and *repertoires* of language users conceptualised as bundles of personae or identities. While allocation deals with different distributions of resources to individual users, affiliation focuses on how personae mobilise social semiotic resources to align with each other. A bond is a social semiotic unit for affiliation, instantiated as a coupling of ideational and interpersonal meanings. The affiliation cline of individuation is theorised as bonds clustering into communities of different orders. Bonds as well as their clustering are understood as negotiated among members of community. Theorised in this way, the hierarchy of individuation affords the linguistic exploration of new community formation from the language users' perspective.

2.5.3 Theorising power and solidarity

In constructing the theoretical foundation for exploring community building in a time of crisis, another set of relevant concepts in the SFL is reviewed. These concepts concern understanding power and solidarity, or vertical and horizontal interpersonal relationship in context. As such, this has to do with tenor in the realisation hierarchy (see Chapter 1).

As a theory of social semiotics, SFL has always been interested in the matter of power and solidarity, particularly in the existing inequality in the distribution of power (Martin 1992, p. 581; Martin & Rose 2007, p. 16). For this study, theorising power and solidarity is essential for exploring community formation in a time of nuclear crisis,

when negotiation involves dealing with the initial imbalance of knowledge and social relations between Twitter writers and their readers.

Early work in SFL on the matter of power and solidarity was informed by Brown and Gilman's (1960) work on two types of second person pronoun, *tu* and *vous* in French. Poynton's works on address forms (1984, 1990) and gender language varieties (1985) also made important contributions by providing an early model of the system network of tenor in terms of three systems, POWER, DISTANCE and AFFECT.

Martin (1992) refers to the overarching concept of power in relation to different aspects of context. In terms of mode, power is referred to as PROMINENCE, or 'the way in which media construct public figures' (p. 527). In terms of field, power is labelled as AUTHORITY, meaning 'the way in which institutions position people through job classification and expertise' (p. 527). CONTROL refers to 'the way in which participants direct other participants to do things' in terms of manipulation in genre (p. 527). The term STATUS refers 'to the relative position of interlocutors in a culture's social hierarchy' (p. 525). In terms of solidarity, the key term in tenor is CONTACT, meaning the interlocutors' 'degree of institutional involvement with each other' (p. 525). Overall, in Martin (1992), tenor was conceptualised as concerning 'the semiotics of relationships' (p. 523), and in terms of three dimensions, STATUS, CONTACT and AFFECT.

Poynton (1985) defined AFFECT as 'an attitudinal dimension concerned with attitude or emotion towards addressee (or towards the field of discourse)' (p. 76). Martin (1992) drew on this definition of AFFECT, but this domain is now dealt with in the discourse semantic stratum as the system of APPRAISAL (see Chapter 3). The current conceptualisation of tenor consists of two dimensions, STATUS and CONTACT (Martin & White 2005, p. 35), referring respectively to the 'vertical and horizontal dimensions of interpersonal relations' (Martin & Rose 2007, p. 302).

Informed by Poynton (1985, 1990), Martin (1992) further identified different kinds of realisation principles for STATUS and CONTACT. STATUS, being composed of two options either equal or unequal, is realised by whether linguistic choices made by interlocutors are reciprocal or non-reciprocal. If the status is unequal, it is further distinguished between dominance and deference. Here, the distinction between dominance and

deference is realised as the difference between choices that each of the interlocutors make. A speaker of higher status may have more choices, or is associated with particular kinds of choices, whereas a speaker of lower status is limited in terms of choices, or associated with other kinds of choices (pp. 527–528). In either case, unequal STATUS of dominance and deference can be realised when more than one interaction between more than one speaker/writer are compared.

CONTACT concerns 'the degree of involvement among interlocutors' (Martin 1992 p. 528), with options being involved and uninvolved. There are two realisation principles for CONTACT. The first principle is that of 'the predictability of meaning at risk' (p. 531), or of proliferation. This means that when there is less contact fewer choices are available, and when greater CONTACT involves more options are available to be taken up. The second principle is that of contraction, or of 'the amount of work it takes to exchange meanings', (Martin & Rose 2007, p. 305). This means that when there is less CONTACT, the more explicit is the realisation, whereas where there is greater CONTACT, the more can be left unsaid (Martin 1992, p. 531).

This SFL set of concepts concerning power and solidarity affords a theoretical foundation for communication that involves inequality of knowledge and of social hierarchy. With these concepts, it is now possible to address how AUTHORITY and STATUS as well as CONTACT are negotiated in the tweets. Now that the theoretical basis is established, attention shifts to a lexicogrammatical aspect that constitutes the foundation of the thesis. Literature concerning a set of resources in Japanese, *keego* or honorifics, which is one of the linguistic foci in the present research of community formation, is reviewed in the next section.

2.6 *Keego*[11] or honorifics in Japanese

[11] In a lot of English mediated literature, 敬語 is transcribed in alphabets as '*keigo*'. The alphabetisation principles of this thesis are explicated in Chapter 3.

Keego, which is written in two Chinese characters 敬語 indicating 'respect' and 'word' respectively (see Chapter 3 for the brief introduction to the graphology of Japanese), is a term commonly used to indicate a set of resources in Japanese. These resources, large parts of which are realised grammatically by affixation or conflation, have largely been understood as 'expressing respect'. Speakers of Japanese learn these resources in school. Adult speakers are exposed to and use it, and talk about it in their social life. People often say things such as young people these days cannot use proper *keego* any more. Continuing publication of books about how to use *keego* (Wetzel 2004) indicates that people are interested in learning how to use it, even after they become adult. *Keego* has also been an issue for the Ministry of Education. The topic is included in the recent yearly opinion surveys of the national language conducted by the Agency for Cultural Affairs, Government of Japan[12] (the Agency for Cultural Affairs 2014). Academically, *keego* is also studied by numerous disciplines including linguistics, sociolinguistics and anthropology from both English and Japanese-mediated traditions. In everyday life as well as in the academic world, and within and beyond the linguistic community of Japanese, *keego* has been a controversial linguistic issue for those interested in the Japanese language.

One of the objectives of this study is to provide an SFL account of these resources, so that their linguistic contribution in the community formation in a time of a nuclear crisis is explained. To that end, multiple aspects need to be attended to. One aspect consists of briefly introducing the lexicogrammatical functions of these resources from an SFL perspective, which is done in the early part of Chapter 5. In this section, which is aimed at establishing a foundation for the resource, focus is on the controversial aspects of *keego* in the linguistic literature. Accounts on the resources from a number of disciplinary areas including Japanese linguistic approaches, pragmatics, sociolinguistics, formal and text-based approaches are reviewed. This provides a rationale for proposing an alternative account from a social semiotic perspective in Chapter 5, which is then applied to explore the object of this study: how these resources contribute to community formation in a time of crisis.

[12] See http://www.bunka.go.jp/kokugo_nihongo/yoronchousa/index.html

2.6.1 Japanese linguistic (*kokugogaku*) approaches to *keego*

When understanding different approaches to language, we tend to presume that there is such a thing as one 'traditional grammar'. Then we might expect that modern linguistics aims to provide alternative accounts against the traditional grammar. However, very often it is not so, as in the case of linguistic tradition in Japan.

Japanese has its own history of linguistics which developed well before westernisation in the 19th century. The development of linguistic studies in Japan owes on one hand to the exposure to foreign languages including Chinese and Sanscrit (Tsukishima 1964), and on the other hand to the heritage of literature written in classical Japanese, including poems, diaries, novels and history texts. Major linguists before the Westernisation period, including Motoori (1730–1801), Fujitani (1738–1779) and Suzuki (1764–1837) (Furuta & Tsukishima 1972), attended to resources that were different from the contemporary Japanese of their era.

From the late 19th century, the Westernisation of educational and academic disciplines accelerated, and linguistics was not an exception. The two traditions of approaching language in the West, namely, formalism and functionalism, were added to the approaches existing in the pre-Westernisation period. This resulted in a number of schools in Japanese linguistics existing within the disciplinary area of *kokugogaku*, or national language studies[13]. For instance, the most widely accepted classification of *keego* into three subcategories, *teeneego* (polite word), *sonkeego* (respectful word) and *kenjoogo* (humble word), comes from so-called *gakkoo bunpoo* (school grammar). It is based on the formalist approach of Hashimoto. However, we might miss some points if we consider Hashimoto grammar is 'the' traditional grammar of Japanese.

Interestingly, Japanese linguists in pre-Westernisation periods did not pay systematic attention to the resources referred to as *keego* today (Ooishi 1977, p. 208, Nishida 1987, p. 208). Nishida acknowledges that only a limited number of fragmentary accounts are found in Yasuhara (1650), Motoori (1789–98) and Fujitani (1807) (Nishida 1987, pp.

[13] It goes beyond the scope of this research to account for different approaches to grammar in Japanese linguistics.

213–215)[14]. Limited attention was the case even though the resources themselves existed from the earliest period of written Japanese, around the seventh and eighth centuries AD (Nishida 2001, p. 222). According to Nishida (1987, p. 217), the first systematic account of *keego* was given in *Arte da Lingoa de Iapam* (1604–1608), written by a Portuguese Jesuit, Rodriquez. Two-and-a-half centuries later, a British Japanologist, Chamberlain (1850-1935), suggested studying *keego* so that Japanese grammarians including Yamada and Matsushita began to engage in grammatical research of *keego* (Tokieda 1941, p. 432). Covered in this subsection is a brief introduction of Tokieda's (1941) work, which influenced both Japanese and English mediated approaches in later years. This is followed by some recent trends in *kokugogaku* accounts of *keego*.

Unlike Hashimoto, who juxtaposed the three types of *keego* already mentioned, *teeneego*, *sonkeego* and *kenjoogo*, Tokieda made a dichotomous distinction between what he calls *shi*-type and *ji*-type. The *shi* concerns the expression of '*gengo no sozai*' or 'linguistic materials' (p. 434). Tokieda considered that this type of *keego* is explained not so much as the speaker's expressions of respect to another person as the expression of the hierarchical relationship between one person and another (p. 440). The *ji*-type concerns a direct expression of respect, which is similar to bowing courteously in front of one's superior (p. 437). In this case, the direct expression is constrained by the situation (p. 434). This distinction proposed by Tokieda made a significant contribution to later studies of *keego*. The two types are now referred to by the names 'referent honorifics' and 'addressee honorifics' respectively, and are adopted in many English-mediated accounts (e.g. Ide 1982). Some of other functions of *keego* are not accounted for by Tokieda, and the functions of these two categories need to be revisited from an SFL perspective. However, the distinction itself is valid and some of his insight touches on the functional aspects of the distinction as well as the choice (Tokieda 1941, p. 437) of a particular expression over others. This may not be unrelated to his having been exposed to Saussure's theory in his younger career, though he distanced himself from it in later years (Tokieda 1941, Morioka 1969).

[14] Wetzel's (2004) account that 'there was no (native) Japanese study of *keigo* until the Meiji period' is a misinterpretation of Nishida (1987, p. 208).

While Tokieda's distinction between addressee honorifics and referent honorifics is valid, *kokugogaku* linguists have attended to other resources and functions that are not covered by his conceptualisation. While Hashimoto and Tokieda's foci were on *keego* resources as part of verb morphology, others attended to lexical choices. In spite of the continuing debate on what *keego* is, the *kokugogaku* scholarship has not reached agreement as to the classification of these resources. Some have further broadened their perspectives from seeing only *keego* to encompassing other resources that have to do with interpersonal relationship of superiority/inferiority and level of intimacy/distance in the name of *taiguu hyoogen* ('expressions of consideration' in Wetzel or 'verbal treatment' in Ishikawa). The study of *keego* constitutes a wide range of scholarship in the discipline of *kokugogaku* (Tsujimura 1967; Ooishi 1975; Minami 1987; Nishida 1987; Kabaya, Kawaguchi & Sakamoto 1998).

The major focus of these scholars has been on how to use *keego* properly, and in addressing that, their attention was drawn to how to classify these resources. As a result, scholars have been proposing different kinds of classification within their own terminologies and definitions, resulting in what Wetzel calls a 'categorical issue' (2004, p. 26). This tendency is reflected in the report on the guideline of *keego* by the Council for Cultural Affairs (2007), in which classification into five subcategories was proposed, namely, *sonkeego*[15] (respectful word), *kenjoogo* I (humble word), *kenjoogo* II or *teechoogo* (courtesy word), *teeneego* (polite word) and *bikago* (beautifying word), in order to replace the widely accepted three-subcategory classification in school grammar.

Having briefly introduced the history of the current situation of Japanese linguistic approach, the focus of attention now shifts from inside to outside Japan, and literature that addresses *keego* from the Western perspectives outside SFL is reviewed. These include pragmatic and sociolinguistic approaches to so-called 'politeness', as well as gender language variations.

[15] The English translations of these terms reflect the ambiguity of the choice of '*.go*' which can either mean 'language' or 'word'. Also noted is that 'word' is also an ambiguous notion in Japanese.

2.6.2 Pragmatic approaches to 'politeness'

In the non-SFL linguistic traditions, it is largely believed that linguistic studies are classified into smaller subdomains, each dealing with different aspects of language. For example phonetics and phonology deals with sound, syntax with the formal rules about making sentences, and semantics with meaning. Within this broad approach of linguistics, pragmatics is considered to take the part of 'the study of language in use, where meaning is inferred not just from the language itself, but from the context in which the language is used' (McCabe 2011, p. 386). The pragmatic domain of linguistics developed under the tradition of the British philosophical theory of Speech Act, which was proposed by Austin and Searle in the 1960s, and was taken over by Grice in the 1970s (Crystal 2010, p. 125). It has also been influenced by Anglo-American trend of generative grammar, in which concepts including 'competence' (Chomsky 1965, p. 4) and 'linguistic universals' (Chomsky 1965, p. 27) are widely accepted. For instance, Lakoff (1973b) proposed pragmatic competence as a counter to Chomsky's linguistic competence, the latter being focused on grammar. Levinson (1983) distinguished between 'universal pragmatics, the general theory of what aspects of context get encoded', and 'the language-specific pragmatics of individual languages' (p. 10). Leech (1983) made the distinction between general linguistics which studies 'the general conditions of the communicative use of language', and socio-linguistics, whose focus is on 'more specific "local" conditions on language use' (p. 10).

The first pragmatic attention to 'politeness' was Lakoff's (1973b) paper, in which she proposed the rules of politeness: '1. Don't impose; 2. Give options; 3. Make A feel good –be friendly' (p. 298), which would be interpreted as a paraphrasing of 'Be polite' in the author's understanding[16]. Yamanashi (1974) wrote an account of Japanese 'honorifics' from a generative grammatical perspectiven in response to Lakoff's proposal (see Subsection 2.6.4).

Brown and Levinson's (1978/1987) work is another pragmatic approach to 'politeness'. It draws on the concept of 'face', as proposed by anthropologist Erving Goffman. In order to explore the 'universals' of politeness, Brown and Levinson began by assuming

[16] Lakoff published another paper on woman's language in the same year, in which woman's language was related to 'the marginality and powerlessness of women' (Lakoff 1973a: 45). The account resonates with some of sociolinguistic approaches introduced in Subsection 2.6.3.

a Model Person (or MP), 'a wilful fluent speaker of a natural language, further endowed with two specific properties – rationality and face' (p. 60). 'Politeness' is considered to operate when there is a 'face-threatening act' (or FTA), and when a strategy is undertaken to minimize the face threat. They proposed a 'bulk' (p. 55) list of politeness strategies in language, based on their observation of three unrelated languages[17]. Japanese honorifics are classified as a strategy to 'give deference' (pp. 178–179), here defined as 'direct grammatical encodings of relative social status between participants, or between participants and persons or things referred to in the communicative event' (p. 179).

Early reactions to Brown and Levinson's concepts of FTA by Japanese linguists were generally negative (Hill, Ide, Ikuta, Kawasaki & Ogino 1986; Matsumoto 1988; Ide 1989, 1990, 2005). The concept of *wakimae*, a Japanese word for 'discernment' that Ide and colleagues proposed was particularly influential in providing an alternative view of politeness from that of FTA avoidance. Hill et al (1986) introduced *wakimae* as colloquially referring to 'the almost automatic observation of socially-agreed-upon rules and applids to both verbal and non-verbal behaviour', defining it as 'conforming to the expected norm' (p. 348). Lakoff and Ide (2005) treat *wakimae* as an important concept for 'explaining politeness in Japanese and other Asian cultures' (p. 10). However, it should be noted that Ide's (2005) approach is more sociolinguistic than pragmatic (see Subsection 2.6.3) in its attending to 'the speaker's sex, age, role, or social ranking' as well as 'the formality of the contexts' as the other dimension (p. 50). Or rather, it might be more adequate to say that Ide's frustration about the linguistic universal of politeness proposed by Brown and Levinson shows a limitation to the segmental approach to language. Here again, SFL is expected to propose an alternative, more comprehensive account of *keego* from a social semiotic perspective, rather than from a segmental, pragmatic perspective.

[17] As Lakoff did in (1973a), Brown (1980) also published a paper about politeness of woman around the same time as the first publication lf Brown and Levinson. In the paper, which is 'a revised version of a paper delivered at the 74th Annual Meeting of the American Anthropological Association' (111), she characterises Japanese culture as one 'where women's subordinate status is more overtly institutionalised' (112), and women's language being more polite in many situation is treated as evidence to support the characterisation. See 2.6.3 for more discussion.

Even so, some recent Japanese linguists have adopted Brown and Levinson's theory of politeness to explain some Japanese linguistic phenomena. Takiura (2005), for example, historically and critically review a number of theories of *keego* in Japanese, his claims also informed by the language policy perspective in sociolinguistics (see 2.6.3). Takiura took a top-down approach, starting from positive and negative strategies, and giving examples in Japanese that match these strategies. He then concluded that *shiten* (point of view) and *kyorika* (distancing) are the key notions for understanding *keego* in Japanese (p. 232). By doing so, Takiura conceptualised honorifics as directly connected with the social relationship of distance, an approach commonly taken previously. The limitations of this approach are discussed in detail in Chapter 5.

Usami (2006) proposes another approach to universal politeness with her concept of 'discourse politeness'. This encompasses 'the concept of relative politeness in addition to absolute politeness, which has thus far been studied within the field of pragmatics' (p. 20). Her perspective is to combine the pragmatic concept of face with the strategies used with Japanese honorifics, frequency of whose use is considered an indicator of 'speech levels' (p. 22). However, her approach retains Brown and Levinson's conceptualisation of politeness, and accordingly addresses Japanese honorifics as a marker of politeness. The issue is that, as Fukuda suggests, the meaning of '*teeneesa*' (politeness) as expressed in some of the *keego* in Japanese, is different from the concept of politeness in Brown and Levinson. Nor all *keego* is about *teeneesa* either.

In this subsection, pragmatic conceptualisations of politeness were reviewed in terms of their limitations in accounting for the functions of *keego* in Japanese. This has resulted in Japanese linguists proposing different theories about politeness. Overall, the limitations of these pragmatic approaches to *keego* in Japanese lie both in their ignoring the different functions of *keego*, and in their lacking of a theoretical framework that comprises these functions. An alternative account based on SFL is expected to capture the various functions of *keego* in Japanese in relation to the contextual variables involved in the selection of these resources.

2.6.3 Sociolinguistic approaches to 'politeness'

According to McCabe (2011), sociolinguistics is defined as 'the branch of linguistics which analyses the effects of society on the different forms of language use' (p. 272). Sociolinguistics covers a wide range of topics such as speech communities and language variations including regional or social dialects and gender-language differences (Holmes 2008). *Keego* is relevant to sociolinguistics in terms of language variation. Gender variation is also relevant to the study, as one of the writers of the data set is a woman who is an expert in physics.

Many sociolinguists attend to ideological issues in dealing with these topics. This is often the case when sociolinguists address *keego* in Japanese. For instance, while some sociolinguists more or less acknowledge the cultural background behind the existence and use of these language-specific resources (Hill, Ide, Ikuta, Kawasaki and Ogino 1986; Ide 1989, 1990, 2005; Wetzel 1990, 1993), others consider *keego* as an indicator of the hierarchical nature of Japanese society, with women's use of it reflecting their lower position in society than men.

The widespread assumption that *keego* reflects the hierarchical nature of Japanese society was informed by Nakane's (1970) anthropological account of interpersonal relationship in Japanese society. She characterised Japanese society as consisting of relationship in two axes, vertical, i.e. superior/inferior, and horizontal, i.e. in-group/out-group. Her influence to date is reflected in the wide range of literature that refers to her work (e.g. Shibamoto 1985; Matsumoto 1988; Reynolds 1990; Wetzel 1990, 1993, 2004; Maynard 1993; Teruya 2007). The assumption is related to women's language, which is conceived as being more polite than men's (Juraku 1979), reflecting the ideology that women are supposed to take in an inferior position to men. This conceptualisation is compatible with Lakoff (1973b) and Brown (1980), who purported similar views with regards to woman's language in English and a Mayan language. Many of the recent sociolinguistic works on *keego* and women's language assume the existence of the 'normative ideology of language and gender' (Okamoto & Smith 2004, p. 7).

The ideological conceptualisation of *keego* is made most explicit in Wetzel (2004, 2008). Based on the assumption that 'dominant ideology favours (in the reflective version) or is manipulated by (in the operational version) the more influential at the expense of the less influential' (Wetzel 2008, p. 114), *keego* is addressed in terms of intervention in the name of language standardisation. This is conceptualised as a by-product of the formation of national identities that began with Westernisation from the 19th century (Wetzel 2004, p. 43). However, Wetzel takes a formalistic approach when it comes to a grammatical account of Japanese. Approaches in *kokugogaku*, or Japanese linguistics (see Subsections 2.6.1 and 2.6.5) is largely criticised as lacking 'the notion that linguistic analysis should disassociate language from context' (p. 42), further criticising that 'from the Western perspective, however, Japanese analysis very often lacks rigor; categories proliferate in the absence of a stated theoretical framework that might control speculation' (p. 42). The present study is expected to provide an alternative account of *keego* in the form of a stated theoretical framework that linguistic analysis should not disassociate language from context, nor separating Western and Japanese perspectives.

While Wetzel foregrounds an ideological take of *keego* from a language policy perspective, Inoue's (2004) concern is similar. She attended to women's language in Japanese by relating it to nationalisation and the modernisation of women. Drawing on the concept of indexicality as a way of constituting reality 'by inverting the order of the index and indexing to make it appear as if the indexed preceded the indexing' (p. 71), she claims that 'the cultural meanings of women are produced and processed and turned into a concrete object' of 'the modern Japanese woman' (p. 70) through novels published in late 19th century and consumed by women themselves. Although Inoue does not use the term ideology, her approach is similar to that of Wetzel in that the national language policy is seen as influential on particular language variations such as *keego* and women's language.

Other works that attend to its use in real situations provide a different picture, even though they draw on the same perspective of ideologies. In terms of *keego*, Okamoto (2004) points out that 'although it is often assumed that honorifics are used nonreciprocally between unequals, reciprocal use are quite common (p. 49), and

‘individuals negotiate the dominant ideology and may or may not adopt it’ (p. 53). Also, such different pictures for women’s language are studied in Sunaoshi (2004) and Okada (2008).

Sunaoshi (2004) observed a conversation between agricultural professionals and a local adviser who were all women in a rural area. Although ‘polite forms’ (see Chapter 5) were used with a particular person whom they do not know well, which was interpreted as indicating ‘the appropriate social distance between them’, the regional dialect, ‘essentially without honorifics’, was largely used and contributed ‘to their establishing rapport and engaging in intimate yet task-oriented conversations’ (p. 199). Sunaoshi concluded ‘that the gender ideology of “Japanese women’s language” has not quite reached, or, rather, has not been internalised by, locally centred people’ (p. 200).

Okada (2008) examined language used by a woman boxing coach using masculine directive expressions in her professional discourse. Her explanation is that in some situations such as boxing, different standards may apply so that women can use the imperative if they are required to, but that the same person may not always ‘disregard the dominant gender ideologies’ (p. 183). Although both Sunaoshi and Okada pointed to interesting examples where women do not use polite language, their accounts needed to exceed their presupposed framework of dominant ideologies in order to provide additional explanations about contextual conditions. In SFL, these cases would be explained from a perspective of register without having to be compared with any ideology.

The sociolinguistic approaches introduced here generally foreground ideological perspectives of language. They see linguistic phenomena such as polite language and women’s language through the lens of ideology. Their perspective is therefore limited when it comes to capturing linguistic choice that users make in doing more than meeting with the requirement.

2.6.4 Syntactic approaches to 'honorifics'

A large part of linguistic resources referred to as *keego* are grammatically realised. In this subsection syntactic approaches to *keego* are introduced in this subsection, including structurism (Martin S. 1975/2004), generative grammar (Kuno1973, Yamanashi 1974, Harada 1976) and other cognitive approaches (Ishikawa 2007, Nakau 2008).

Samuel Martin's *A Reference Grammar of Japanese* (1975/2004) is a comprehensive English-mediated grammar of Japanese from a structurist tradition that roots back to Bernard Bloch. Here, *keego* is dealt with in terms of 'stylisation', consisting of 'polite style' (*teeneego*) which shows respect, and 'honorific style' that shows deference (p. 1026). In the former the 'hyperpolite' style is included. The latter consists of 'subject exaltation' (*sonkeego*) and 'object exaltation' (*kenjoogo*). His syntactic criteria for distinguishing between 'polite style' and 'honorific style' are informed by linguists from the *kokugogaku* (Japanese linguistics) tradition that includes Mio and Mikami. Martin particularly references Mikami (1963) in pointing out 'that the polite infinitive –*mas-i* is not actually used for anything, except to build the gerund –*mashite* (and related forms)' (Martin, S. 1975/2004, p. 1027). This explanation seems as adequate as those provided by Harada (1976) from a generative grammar perspective.

Some Japanese linguists have attended to these resources from formal perspectives, particularly from the Anglo-American approach of generative grammar. Kuno (1973) provided brief syntactic profiles of sentences with polite and honorific expressions. The former expressions are accounted for in terms of 'four levels of sentence styles, consisting of 'informal', 'polite', 'superpolite' and 'formal writing'. The latter type of expressions, or 'honorific forms', are classified into 'plain', 'respect for subject' and 'respect for object'. He also focused on 'giving and receiving verbs' (p. 128).

Yamanashi (1974) was written in response to Lakoff's (1973b) pragmatic attention to politeness. It aimed for a formal explication of honorifics in terms of transformational rules. At the same time, he pointed out that 'honorifics considered above … are based on the relative social relationship between Sp, or 'speaker' and a set of individuals involved in the uttered sentence' (p. 762). Yamanashi's work is worth noting in that,

although he took a formal approach to account for *keego*, he had to mention both linguistic and extra-linguistic factors that 'constitute a crucial part of the honorific context in which Japanese sentences are used [and] handled in grammar' (p. 768). Yamanashi's dilemma provides a rational for an alternative account of the resources from a social semiotic perspective in the way it incorporates grammar and social context.

Harada (1976) has provided a more detailed account, beginning by distinguishing between 'performative honorifics' (*teeneego*) and 'propositional honorifics', the latter consisting of 'subject honorifics' (*sonkeego*) and 'object honorifics' (*kenjoogo*). Harada proposed a number of grammaticality tests for distinguishing between the two types of honorifics. One of them is that 'performative honorifics differ from propositional honorifics in that they do not require the presence of an SSS (socially superior to the speaker) in the propositional content of the sentence' (p. 502). Another criterion is that 'performative honorifics are not allowed to occur in nondirect discourse clausal complements, while propositional honorifics are fully permitted' (p. 503). What he is referring to here is the inadmissibility of having 'performative honorifics' in the nominalised clause. Harada was attending to syntactic rules behind the honorifics from a generative grammar perspective. However, he also had to mention the extralinguistic context of social relationship between the speaker and the non-speaker in order to explain the usage of *keego*, although the theoretical framework of generative grammar distinguishes between syntax that attends to form and semantics that deals with meaning. Wetzel (2004) criticised this point, saying that even formal accounts inevitably draw on extralinguistic context of interpersonal relationship between the speaker and non-speaker (see Subsection 2.6.3).

Nakau (2008a, b, c) revisits Harada (1976) from a cognitive semantic approach. He begins by questioning Harada's distinction between 'subject honorifics' (*sonkeego*) and 'object honorifics' (*kenjoogo*), saying that in the case of the latter, it is less the object than the subject that constrains its use (2008a, p. 26). Nakau further criticises the labelling of 'propositional' honorifics, pointing out that *sonkeego* and *kenjoogo* do not affect the propositional structure but take performative functions, in the same way that so-called *teeneego* does (2008b, p. 23). In this sense, all *keego* takes the interpersonal speech functions, signalling the speaker's treatment of the addressee or the other, the

sense of treatment belonging to the point of utterance (2008c, p. 25). In Nakau's (2008c) terms, the speaker 'expresses' his/her subjective self, rather than 'describing' an objective self, by using *keego* (p. 25). This account, though from a cognitive semantic perspective, is compatible with the SFL theorisation in which interpersonal meaning is considered as being enacted by the language user's choice.

Ishikawa (2007) takes a multiple approach that combines lexical functional grammar from generative grammar tradition on the one hand, and Brown and Levinson's theory of politeness on the other. The focus is the usage of the combination of the causative suffix plus 'benefactive complex predicates' (p. 209), prevailing particularly among younger generations. In order to compensate the extralinguistic factors in the adequate or inadequate choice of honorific predicate that LFG does not theorise, Ishikawa introduces Brown and Levinson's concept of FTA. Although this combined approach may account for the linguistic phenomena of honorification in Japanese to a certain degree, some linguists and sociolinguists already point out that FTA cannot fully account for the use of *keego*. Ishikawa's (2007) perspective would rather be interpreted as pointing to the limitation of approaching *keego* from the Anglo-American segmental analysis of linguistics.

2.6.5 Text-based approaches to 'politeness' and 'honorifics'

Already mentioned in Subsection 2.6.1 is that Japanese traditional linguistics in *kokugogaku* has the two traditions of formalism and functionalism. The same is true in English-mediated studies of *keego*. While many linguists, including the ones introduced in Subsection 2.6.4 were attracted by the formalist approach proposed by generative grammar to explain the linguistic phenomena involved in *keego*, others were frustrated by the limitations of sentence-based formal accounts represented by Kuno (1973), Yamanashi (1974) or Harada (1976). Reviewed in this subsection are some of these English-mediated accounts of *keego* that attend to the functions of these resources in context. Among them, Makino (1983), Maynard (1993), Cook (1998) and Yoshida and

Sakurai (2005) focus on *teeneego*, or what they refer to as formality[18], whereas Hori (1995) relates honorifics with the issue of Subject and Mood, incorporating the early theorisation of SFL in her discussion.

Makino (1983) questions the earlier studies by scholars such as Harada (1976), in which 'formality marking'[19] is explained in terms of social status or the perceived distance between the speaker and the addressee. Makino was informed by Nomoto (1977), who pointed out that 'the informal parts of the passage indicate the inner part of Fukuda's consciousness or a virtual monologue' (Makino 1983, p. 139). He attended to written conversation with mixed formality from a perspective of the speaker/listener-orientation. In cases where there is a shift from formal to informal, what is expressed is 'a highly personalised and highly pre-supposed clause, and it is normally hard for the listener to react to that part of the sentence by repeating it' (p. 129). Also, in explaining the informal style chosen in written Japanese, including academic papers, Makino wrote, 'the choice of informality implies less involvement with the reader' (p. 143), an account that resonates with SFL which theorises language in terms of choice. Makino (2002) revisited the issue by examining written conversations in newspapers and magazines, and concluded that 'the formal-to-informal switching signals that the speaker/writer turns his communicative direction inwardly' (p. 134).

Maynard (1993) attended to the same issue of mixed formality, or '*da* and *desu/masu* mixture' (p. 155) from her own theoretical perspective of discourse modality. She examined casual conversation, conversation in fictions and literary essays, and explained the shifts of formality in terms of the distinction between 'perceptual versus conceptual point of view' (p. 158). More precisely, the *da* (informal, or plain) style is most likely in 'low awareness situations', and *desu/masu* (formal, or polite) style is more likely in 'high awareness situations (p. 178). Although her description of situations could be further broken down using the contemporary SFL framework of register, Maynard's (1993) account provides another argument for claiming that choice in *keego* is not simply a matter of status or distance, although it is certainly a matter of interpersonal meaning.

[18] In Chapter 5, the terminology issue is discussed in favour of 'polite', 'plain' and so on, rather than 'formal' or 'informal'.
[19] The phenomenon of what Makino (1983) refers to as 'formality marking' is redefined as the system of POLITENESS in Chapter 5.

Cook (1998) addressed the mixed use of formality from an indexical perspective. She began from the understanding that 'although honorifics are grammatical encodings of the pragmatic value of deference, when they are used in social contexts they index various shades of situational meaning' (p. 89). In examining data from television interviews as well as a neighbourhood quarrel, she conceptualised two indexical values, namely, the addressee deference and the speaker-focused self-presentation, and proposed that these values operate differently when *masu* form is used (p. 95). In interviews, the shift from *masu* to plain occurs when the addressee-focus is backgrounded and the information content is foregrounded. In the neighbourhood quarrel, reciprocal plain exchange shifted to nonreciprocal usage once the tenant recognised the addressee's higher status as his landlord. Cook's account also provides informative insights in redefining *keego* from an SFL perspective.

Yoshida and Sakurai (2005) focused on family conversations between husband and wife, and between sisters, from a sociocultural perspective. Based on the assumption that addressee honorifics index sociocultural meanings, such as the social distance, determined by age, status, power, and the psychological distance between the speaker and the addressee (p. 199), they investigated cases where shift occurs from plain to formal. They discussed how the shift is not a matter of register, but of 'a particular role performance' in which 'addressee honorifics' are used creatively to express their role-oriented identity, such as the role of a wife getting a meal ready (p. 211).

Hori (1995) based her analysis on the earliest version of IFG where the distinction between Theme, Subject and Actor is made (Halliday 1985, cited in Hori 1995, p. 159). She addressed honorifics in relation to the issue of 'subjectlessness' in Japanese. Hori began from reviewing accounts of honorifics from various approaches including *kokugogaku*, formal and pragmatic approaches. She then introduced Halliday's conceptualisation of Subject and Mood in English, and applied the account to Japanese. In doing so, she proposed that 'the Japanese Mood element consists of the auxiliaries denoting tense, modality, and honorification, together with various sentence final particles' (p. 168). In relation to honorifics, her conclusion was that 'information permeating every part of the honorific system is a powerful mechanism for identifying the Subject of the clause, without its overt presence in the form of NP-*ga* in the clause'

(p. 181). Her accounts of *keego* miss some points. For instance, she ignored the dichotomous distinction of subcategories of *keego* proposed by Tokieda (1941) even though she referenced his work, and instead encapsulated in the gloss of honorifics. Also, her conceptualisation of *keego* remained in the sociological understanding of *uchi/soto* (ingroup/outgroup) (Hori 1995, p. 153). Still, her account provides interesting implications to be revisited for a more comprehensive account of interpersonal metafunctions of Japanese lexicogrammar in the current SFL framework. But this goes beyond the scope of the current study.

Works reviewed in this subsection are English-mediated accounts that attend to the functions of *keego* in the text. They provide informative insights for conceptualising the resources from an SFL perspective in Chapter 5. However, they do not provide a comprehensive account of the whole set of resources of *keego*. For instance, they largely ignore *keego* realised in noun groups such as *kata*, instead of *hito*, to refer to 'person'. Also, resources that are classified as *bikago* (beautification word) and *teechoogo* (courtesy word) in the Council for Cultural Affairs (2007) guideline (see Subsection 2.6.1) are not attended to in these works. The present study is also limited in proposing a comprehensive account of all aspects of *keego*, and not is it the main objective of this thesis. However, the study is expected to make an additional contribution by addressing the issue from the SFL perspective of the realisation hierarchy that comprises of lexicogrammar, discourse semantics and context.

2.6.6 Language user perspective on *keego*

This last subsection is devoted to the work of Watanabe (1971), whose scholarship belongs to Tokieda's approach in *kokugogaku* (see Subsection 2.6.1). In his account of *keego*, however, Watanabe began by countering Tokieda, claiming that the basic meaning of *keego* does not reside in the hierarchical interpersonal relationship as Tokieda accounted for (1941, p. 440, see Subsection 2.6.1), but in '*keei*' or 'the sense of respect' to the referent (Watanabe 1971, pp. 430–431). Watanabe's argument is worth noting in that it questioned the widely accepted conception that *keego* reflects a hierarchical interpersonal relationship prevalent in Japanese society.

Watanabe also provided a perspective of the language user in addressing *keego* that is worth revisiting from an SFL perspective of individuation. While many other accounts treat the use of *keego* as somehow allocated by the society[20], Watanabe considered it in terms of *tashinami*, or taste of the speaker (p. 440). The term *tashinami* (taste) is used in part for one of the subcategories of *keego* that corresponds to *bikago* (beautifying words, see Subsection 2.6.1 and Chapter 5), exemplified by attaching a 'respect' prefix. '*o.*' before a non-human participant such as '*mizu*' (water). As Watanabe also pointed out, from an ontogenetic perspective of the language development of the user, *bikago* is actually the first type of *keego* that children develop along with their socialisation, at kindergarten for example. Watanabe further conceived that users' development of *keego* is then expanded to so-called addressee honorifics, and then to so-called referent honorifics. Furthermore, Watanabe referred to classes, speculating that there is low use of *keego* in classes of people who are low in their sense of taste (p. 441)[21]. At the same time, he attended to people's overuse or misuse of *keego* that is often criticised by scholars, interpreting it as due to the users' overriding sense of *tashinami*. However, even speakers of classes who can use high quality of *keego* may not use it at all in situations where taste of language is not required. Watanabe considered that *tashinami* of *keego* is like language in a formal outfit, whereas non-use of it is like wearing casual clothes (p. 442).

Watanabe's accounts, including this last metaphor, are mostly personal speculations without an elaborated conceptualisation of the meaning of 'respect' or of its context, and are not necessarily supported by contextualised linguistic evidence. It is not the aim of this thesis to validate his accounts from an SFL perspective. However, Watanabe (1971) does shed light on some of the aspects of the language users' choice that many works on *keego* have ignored. This is worth remembering as we move towards understanding the functions of *keego* when used by science experts on Twitter discourse, and how these impacted the formation of community at the time of the nuclear crisis in Japan (see chapter 5).

[20] An example of such accounts is Ide's concept of *wakimae*, or discernment, in which use of *keego* is discussed in terms of adequacy in the situation. See Subsection 2.6.2.
[21] Egawa's (1973) questionnaire research supports Watanabe's speculation that people from higher classes are more bound to use *keego* than people from lower classes, although Egawa acknowledged that class distinction of contemporary Japan was subtle and vague.

This section has focused on the resources called *keego* in Japanese. It has reviewed literature from a number of approaches, including *kokugogaku*, pragmatics, sociolinguistics, formal linguistics and text-based approaches. Common to these is the difficulty of identifying the linguistic resources of *keego* in context. Each approach lacks a framework that can systematically address and incorporate meanings of the linguistic resources and of their context. This gives a strong rationale for an alternative account from an SFL perspective, particularly with the realisation hierarchy. This is attempted in the first part of Chapter 5 by attending to lexicogrammar, context, and the intermediate stratum of discourse semantics. This makes it possible to explore the contribution of these linguistic resources in the community formation that the current study addresses.

2.7 Conclusion

In order to situate the current study in the academic research context, literature has been reviewed from a number of perspectives. The first body of works relevant to the object of the present study were reviewed in three terms, namely, the discourses of science, journalism, and social media. Previous studies on scientific discourse have revealed the nature of scientific knowledge, and how it is negotiated with readers within and outside the scientific communities. Works on journalistic discourse attended to linguistic and multimodal resources deployed to gain readers' attention and distribute its ideological stance. Studies about social media have suggested the potentiality of Twitter for disaster communication and community formation.

The review draws particular attention to previous works that compared public versions of science, as written by scientists, popular scientists and journalists. Some of these did attend to what happens when science is written for lay readers in scientific magazines such as *New Scientist* and *Scientific America*, but no work has been done on scientists' use of social media. Many also attended to how the mainstream media cover scientific issues, but not to roles of freelance journalists. Some recent works on the use of Twitter

during the crisis time attend to the credibility of information as perceived by readers, but have not addressed the issue from a linguistic perspective of meaning making. These previous works create space for the present study, which explores how a scientific matter is communicated by two groups of people – physicists and freelance journalists – to the lay readership of Twitter in a time of nuclear crisis.

The second body of literature constituted some aspects of the theoretical architecture of SFL, namely, the individuation hierarchy and the theorisation of power and solidarity. The individuation hierarchy was introduced as a theoretical framework for community formation, particularly the affiliation cline from individual language users as 'bundles of personae' to communities of different orders in a culture. The concepts of basic linguistic units for affiliation, i.e. couplings and bonds were also introduced. Another relevant set of theoretical concepts reviewed concern power and solidarity. Power is conceptualised differently in relation to different contextual variables in the realisation hierarchy. Among them, AUTHORITY has to do with unequal expertise and classification in the field, and STATUS has to do with tenor inequality of social hierarchy. Together with CONTACT, or solidarity in the realm of tenor, these concepts provide the foundation for exploring linguistic contributions for the emergence of new communities on Twitter when there is an imbalance of knowledge between writers and readers in a time of crisis.

The last body of literature focused on a set of resources in Japanese referred to as *keego*, or honorifics. Studies from Japanese linguistic tradition (*kokugogaku*), pragmatics, sociolinguistics, formal approaches and text-based approaches were reviewed. Limitations in these works in incorporating contextual variables and the linguistic resources used in texts provide a rationale for an alternative account from an SFL perspective. The literature also suggests that the language users' perspective is also relevant in approaching this set of resources.

The foundation for the present study is provided by literature from a wide range of scholarship reviewed in this chapter. In Chapter 3, research design and analytical frameworks for this thesis are presented.

Chapter 3 Research design and analytical frameworks

3.1 Introduction

Upon the foundation established in the last two chapters, Chapter 3 accounts for the research design and analytical frameworks. The chapter begins with a reiteration of the research questions that shape the analysis and interpretation to come. An account of the data and their collection process is then provided with comments on ethical issues and their resolution. This is followed by an introduction to, and discussions of the theoretical and analytical framing of this study. There are two aspects to this. The first focuses on the principles of *glossing* (McDonald 2008), or the processing of the original texts written in one language for the purpose of presentation of linguistic analysis in a second language. It involves segmenting the original text into meaningful units, and providing item-by-item equivalents in English. The second focus is on key dimensions of systemic functional linguistics that inform the analysis and interpretation of the data. Particular attention is drawn to the abstract level of meanings in discourse. A theoretical issue about applying discourse semantic systems in the analysis of texts in Japanese is discussed, before introducing the discourse systems to focus on in this study. The linguistic framework provided in this chapter is adopted throughout the thesis, to explore the ways in which meanings instantiated in the tweets contribute to the formation of communities.

3.2 Research questions

As articulated in Chapter 1, the present research addresses the following general research question, and two specific questions.

What does a linguistic analysis reveal about the comparative bases of affiliation in the discourse of Twitter users who are professional physicists and freelance journalists at a time of a nuclear crisis?

1. In a comparative study of Twitter discourse around a specific aspect of nuclear science:
    a) What patterns in the construal of the field are evident for each group?
    b) What values couple with the construal of the field for each group?
    c) What bonds are offered as the basis for affiliation for each group?

2. In the Twitter discourse of physicists:
    a) What are the lexicogrammatical functions of linguistic resources in Japanese referred to as *keego*?
    b) How can the functions of these resources be interpreted from the perspectives of discourse semantic systems of APPRAISAL and NEGOTIATION?
    c) From the perspectives of APPRAISAL and NEGOTIATION, how do *keego* choices function in the physicists' tweets to negotiate scientific knowledge in the interests of building a community?

3.3 Data

The present research emerged from personal experience of being immersed in the declining credibility of information in the ongoing nuclear crisis in Japan in 2011 (see Chapter 1). The focus on Twitter, and the two professional groups – physicists and freelance journalists – emerged out of my own experience of seeking credible information online through which my attraction was drawn to a number of Twitter users from these particular professional groups. Data collection is also designed to correspond to what I did in my own information search process in the crisis period.

In the discussion of the data, attention is initially drawn to features of Twitter that are relevant to this research in terms of display. This is followed by a description of the data

collection process, and the profiles of the collected data in terms of the content. Finally, the writing system of Japanese is briefly introduced.

3.3.1 Twitter and its conventions

The data analysed in this research consist of posts on Twitter, or tweets. Twitter is a microblogging site, and individual tweets have a length limitation of 140 characters. This has different implications for tweets written in Japanese and in English, a point returned to shortly. Twitter users are often referred to as tweeters.

Like other social media (e.g. facebook), Twitter affords different kinds of ways to display tweets, including a Timeline, a Hashtag#, a @user display, and a User Page. The Timeline displays all tweets written by those people that a user chooses to 'follow'. According to Webopedia, '"following someone" means you will see tweets (Twitter updates) in your personal timeline'. A 'follower' is 'someone who subscribes to receive your updates' (Webopedia n.d.). As such, the kinds of tweets displayed on the Timeline differ depending on whom and how many people one follows. A Timeline can present up to 3,200 most recent tweets.

The User Page displays up to 3,200 of the most recent tweets posted by one user. The User Page is selected when readers only want to read a particular tweeter's tweets. The @user Page is yet another kind of display that shows '@mentions', or tweets written by other people which include one's own user account (Zappavigna 2012, p. 35). This page is selected when users want to read tweets addressed to them, or want to know what the other tweeters discuss about them.

The Hashtag# Page displays tweets written by any user who has included '#', followed without space by any choice of linguistic items. A hashtag may encode topics or emotions, functioning as metadata embedded in posts (Zappavigna 2012, 2014b). As discussed in Chapter 2, SFL works on affiliation on Twitter (Zappavigna 2011, 2012, 2014a) have focused on Hashtag function in exploring how people align over topics of interest.

In the present study, the focus is on tweets written by particular users rather than tweets on particular topics. For this reason, the Hashtag is less relevant than the other three displays. The most relevant is the User Page, the page on which the tweets written by a particular user account are displayed. At the time of the nuclear crisis in 2011 Japan, online information seekers often relied on the profile of the information source to decide the credibility of information (Thomson R. et al. 2012). On Twitter such a profile is provided on the User Page. In fact, the focus on four particular Twitter users in this study emerged out of my own reading of the User Pages of different tweeters in relation to the nuclear crisis. As I did not have a Twitter account at that time, the User Page was the only Twitter display I had access to. Then, the User Page display proved helpful for my personal information search because it gives the intertextual presentation of the tweets as accumulated by one tweeter on one display. In addition, as each tweet is limited in terms of length, tweeters at the time often posted 'sequential tweets', or multiple tweets that are textually related. The User Page allowed readers to capture these tweets in sequence, whereas the Timeline display may have presented these sequential tweets in isolation, separated by tweets posted by other users people follow. From the individuation perspective, the User Page captures the accumulation of tweets posted by one user, from which accumulation of couplings, relevant in the affiliation cline of the individuation hierarchy, can be attended (see Chapter 2).

The other displays that are also relevant to this research are the Timeline and @user displays. The Timeline is important in this research because this display gives Twitter users the general ideas about the topics that are talked about at the moment. Unless the data go through some quantitative analysis such as Twitter StreamGraph (Clark n.d.), it is difficult for end users of Twitter to objectively capture the real time trends of topics. Trendy topics may also differ depending on whom users are following. However, it is true that Twitter users perceive on their Timeline those trends that change along with the unfolding of social events which, in the case of the present research, did constitute part of the context in which the Twitter writers posted their own tweets.

The @user Page may be also relevant. On the @user page, users can access tweets posted by other people who mentioned their account name, either as an addressee or a referent. The Twitter users in this research may well have been informed about what

people tweeted in relation to their own tweets from this display, to which they reacted by tweeting. Then, the @user display may well also constitute part of the context, together with the Timeline, in reaction to which Twitter contributors of nuclear crisis communication posted their tweets.

In this study, this aspect of context constituted by tweets posted by other people on the Timeline and @user page of a Twitter user is referred to as *Twitter ambience*. The term comes from Zappavigna's (2011, 2012) concept of 'ambient affiliation' (see Chapter 2). In this thesis, *Twitter ambience* refers to the evolving, trending topics as perceived by the Twitter user from his/her Timeline and @user. This aspect is relevant in understanding the context in which the tweeters of this research posted tweets on plutonium (see Chapter 4) over one month of the nuclear crisis.

Finally, Twitter's function of 'retweet', or 'act of copying and rebroadcasting' (Boyd, Golder and Lotan 2010) is also relevant in understanding some of the tweets from the data set. In the Japanese Twitter community, retweet is generally conceived of as consisting of two types, i.e. 'official' and 'unofficial' (Webopedia, n.d., Inako 2013). According to Binary (n.d.), the so-called official retweet is the function of republishing a tweet posted by another user by clicking the icon . The so-called unofficial retweet (Binary, n.d.) is a way of republishing all or part of other users' tweets by manually copying and pasting it with the indication of 'RT @' so that the part that follows is read as a quotation of another user. According to Zappavigna (2012), retweeting is one 'way of bringing external voices into a tweet' by republishing 'another user's tweet within your own tweet' (p. 35). In this study, some unofficial retweets are examined, exploring how different voices are managed in those tweets.

In summary, among the multiple displays afforded by Twitter, the present study particularly attends to the User Page, the Timeline, the @user displays for the two separate reasons. The User Page displays how each Twitter writers accumulated tweets in sequences, whereas the latter two displays are relevant in understanding the Twitter ambience perceived by the tweeters, because they gave users the ideas and concerns of other people in the time of the nuclear crisis, which they responded to on Twitter.

3.3.2 Data collection

The data collected for this research consist of four sets of tweets posted during one year of nuclear crisis in Japan, i.e. between 12/03/2011, the day when the accident at Fukushima Daiichi Nuclear Accident was made public, and 11/03/2012. Each of the four sets of tweets were written by one of the four writers from two professional groups, i.e. two academic experts of physics, and two freelance journalists who are not affiliated with a mass media company. As perceived from my personal experience as a Twitter reader in the time of nuclear crisis, physicists and freelance journalists were among those professional groups the most active in communicating about the crisis since the earliest period (see Chapter 1). These two groups are referred to in this thesis as P Group and J Group respectively. The primary focus of analysis in the following chapters will be on the tweets posted in the first month of crisis. This is the time in which Japanese society began being exposed to the new field of a nuclear crisis, the period in which new affiliation started taking shape on Twitter. The selection of tweets for detailed analyses will be further discussed in Chapter 4 and Chapter 5.

The four tweeters were selected primarily because they were among the major contributors from these active professional groups in the 3/11 crisis communication on Twitter (see Chapter 1). In a sense, each of them constituted a *hub*, or 'the central and most active part' (Merriam-Webster, n.d.) of the active professional groups in the interaction about the nuclear crisis on Twitter. The four writers had already been active users of Twitter prior to the nuclear accident. They all provide their authorship, identity and affiliation public. Also, they all store their tweet archives on an internet site called Twilog[22], a service that allows Twitter users to automatically store the tweet logs and present them in the blog format on the public domain on the internet. The site allows access to the data beyond the limitation of 3,200 tweets that Twitter can display. The date and time the tweet was posted are also traced via Twilog.

Twilog is the site from which data were collected for this study. These comprise four sets of tweets, posted by four specific Twitter users between 12/03/2011 and 11/03/2012 as stored on the Twilog site of each user. They were collected by copying, in htm format, each page of Twilog in which all the tweets posted on a particular day is

[22] http://twilog.org/

displayed. As such, the posted date and time were also stored. The reason for collecting data from Twilog is discussed in the next section in relation to ethical issues.

3.3.3 Ethical issues

The data collection of this study has some implications from an ethical perspective. According to Page, Barton, Unger and Zappavigna (2014) how to define ethical conduct in researching social media is not straightforward. Although social media research is unlikely to cause physical harm to the participants in the way medical research might cause, Page et al. (2014) warn that 'harms to participants may appear in forms that are not immediately tangible but nonetheless may be significant' (p. 59). For instance, in the present study that attends to data posted on Twitter, unethical conduct may occur by 'quoting material which might overtly or inadvertently expose some part of a person's identity or activities that they had wished to keep private' (p. 59).

Page et al. also discuss that ethical considerations need to pay attention to 'whether a researcher considers the object of analysis to be people (their identities, behaviour and interaction) or text (as a decontextualized object)' (pp. 59-60). The present study falls into the latter in the sense that focus is not on Twitter users but on their tweeter discourse. However, the data are selected from particular tweeters from particular professional groups, and explores how the linguistic choices they made in a particular context contributed to the formation of communities. It is inevitable that some aspects of the professional identity of the wrters are made explicit in the research. It is then important that the research is designed to avoid possible harm that might come by treating posts on social media as a data set. It is also noted that, as Page et al. mentions, the current regulation of Twitter 'prohibits academics from sharing corpora built from archives of harvested tweets' (p. 63).

In the present study, possible ethical issues are overcome in the following way. First, the data were collected not from Twitter itself but from an external site, Twilog. Twilog is a site on the public domain of the internet which all the selected writers of this research store and display their tweet archives. There are some options in terms of the kinds of tweets they can store and display. For instance, one can either store or not

'official retweets' (see Subsection 3.3.1). The data were collected the way each user stored the tweets on the public domain. Since the data collection in 2012, there has been no change made by the users in the way the data tweets are stored and displayed on Twilog. In terms of the identity of the writers of the data, the selected tweeters are all professional writers who authorise their tweets by providing their identity. From this, it is assumed that the four writers in focus all tweet as a public practice, although they might mention more private matters occasionally. However, taking into account these ethical considerations, the names of the Twitter writers in this research are provided in pseudonyms, i.e. two physicists, P1 and P2, and two freelance journalists, J1 and J2 respectively. It should be acknowledged, however, that their authorship is mentioned when referencing their other forms of publications.

3.3.4 Data Profile

Brief profiles of the four Twitter writers and of the data are provided on Table 3.1. It concerns their profession, the time they started Twitter, the numbers of tweets they posted in one year of data collection as known from their Twilog sites. Approximate numbers of followers before the crisis are also provided if accessible. The numbers of followers at a particular time of the year of crisis are provided for all the tweeters. Table 3.1 is followed by a brief account of what these tweeters did on Twitter that the following chapters cannot cover.

Table 3.1 Profile of Data

Tweeter	P1	P2	J1	J2
Profile	physicist, specialising in antimatter research in Tokyo Uni and CERN	theoretical physicist, specialising in elementary particles in KEK and IPMU	journalist, representative of Independent Web Journal	(golf) journalist, representative (at that time) of Free Press Association of Japan
tweeting since	03/02/2008	23/11/2009	23/12/2009	14/12/2009
number of tweets in one year	13,649	34,350	14,436	3,629
estimated number of characters in one year	1060491	2263802	1545603	334855
number of followers before crisis	appr. 2,000	appr. 2,000	unknown	unknown
number of followers on 29/10/2011	137,932	22,398	111,632	252,441

The two physicists, P1 and P2 are both academic experts in physics. They both had begun using Twitter more than one year before the nuclear crisis. Both P1 and P2 were more attentive to the number of people who followed. They both mentioned in other publications that the numbers of their followers prior to the event were approximately 2,000 –3,000 (Hayano 2011, Nojiri 2011). The number of P1's followers increased sharply to around 150,000 in the first few weeks of the crisis, and decreased slightly several months after the nuclear accident. One reason was, as he mentioned himself on Twitter, that P1's Twitter account was introduced as 'relatively credible Twitter accounts' on Yahoo! Japan news[23]. The number of P2's followers increased slowly, but the small number of followers does not mean that P2 was a marginal contributor compared to P1. According to Nojiri (2011), the number of P2's followers at the time of the publication of the paper, around ten thousand, is estimated to rank in the top .12% among Twitter users in Japan. P2 also posted by the largest number of tweets among the

[23] http://twilog.org/hayano/date-110313/allasc

four tweeters in the one year of nuclear crisis. She was also actively involved in off-line meetings organised by Twitter users (see Chapter 1). One possible reason for a smaller number of followers compared to P1's is because she blocked users[24] more often than P1.

Concerning the freelance journalist tweeters, both J1 and J2 are the representatives of their own organisations. They had started using Twitter more than one year before the nuclear crisis in Japan. The numbers of followers prior to the nuclear crisis are not publicly accessible, although it is highly possible that the numbers increased after the nuclear accident, because both were recognised on Twitter as actively involved in the communication of the crisis. The names of both J1 and J2 were mentioned by P2 in her tweets at some point in the one year (for the attempted interaction of P2 with J2, see Chapter 5).

Figure 3.1 shows how many tweets each of the four tweeters posted each month of the first year of the nuclear crisis, each month from the 12th to 11th.

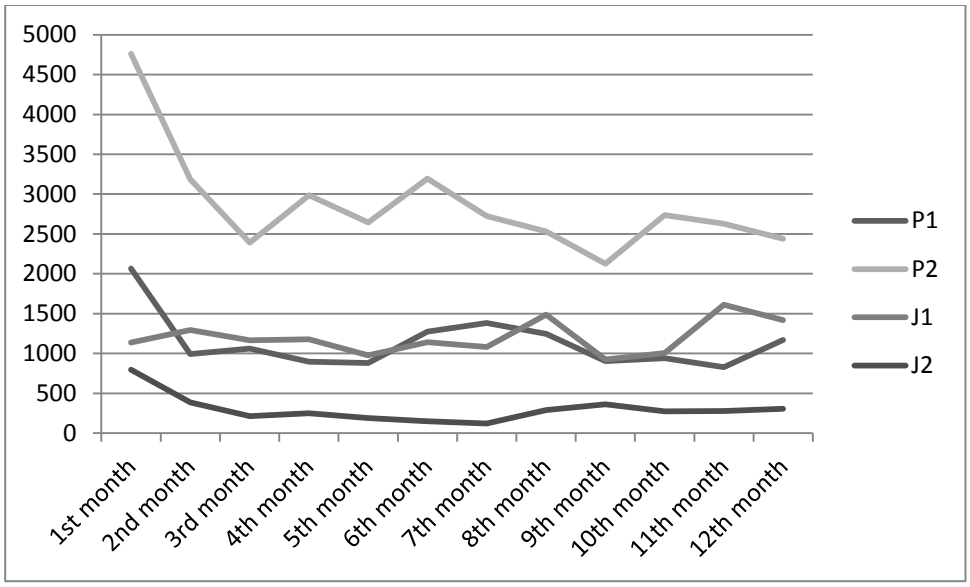


Figure 3.1 Monthly distributions of tweets in the first year of nuclear crisis

Some examples of the types of tweets posted by these tweeters are briefly introduced here. Firstly, one of the features of P1's tweets during the crisis time was his regular

[24] http://twilog.org/Mihoko_Nojiri/date-110403/allasc

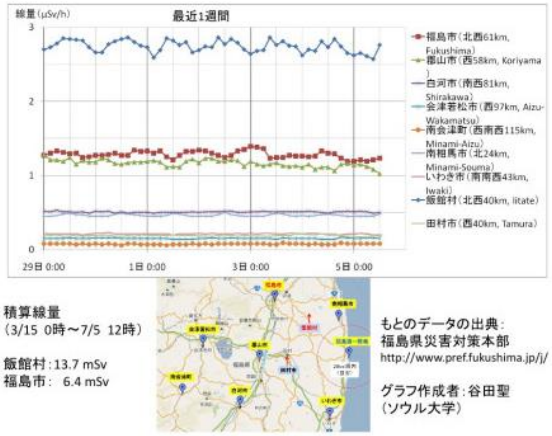
graph updates. In his tweets, P1 began to update diagrams gathered through the collaboration of his Twitter followers and other scientists (see Chapter 5), which became a routine from 20th March on. These updates were posted almost daily during the first two months, less frequently afterwards, in two languages, Japanese and English. These tweets were usually entitled '*gurafu kooshin*' (graph update). The following tweet is one of such tweets, which was posted on 6th July 2011.

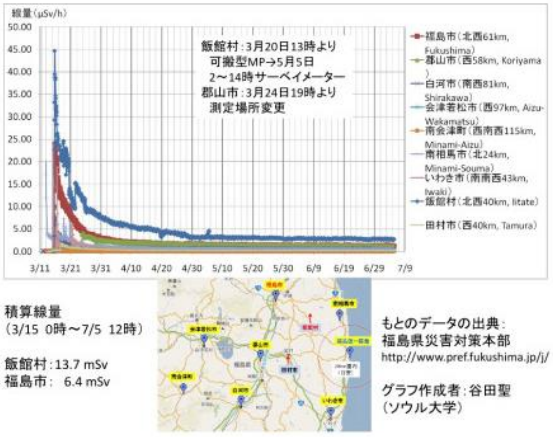
Before introducing the tweet, the manner in which the tweets are provided in the body of the thesis and the appendices is accounted for. Each tweet is annotated with the authorship (e.g. P1), the date and time when it was posted, the original text and the English translation, followed by *glossing* (see Section 3.4). The tweets examined in each of the chapters from 3 to 6 are provided in each of the appendices from 1 to 4. The tweets are presented according to the order in which they appear in the body of the chapters. The following label, [P1-1], indicates that it is the first tweet written by P1 that appears in this chapter, Chapter 3. In the appendices, other [P1-1] are found for other chapters.

Having mentioned that, [P1-1] is one of P1's regular 'graph update tweets' written in Japanese.

[P1-1] 06/07/2011 01:16:24

【グラフ更新 福島県内の放射線量 7/5 まで】上半分は最近 1 週間，下半分は全期間．福島市の積分線量 6.4mSv． http://twitpic.com/5lnfsx





[graph update amount of radiation in Fukushima prefecture until 5/7] The upper (is the graph of) the recent one week, and the below (is the graph of) the whole period. Integral dose in Fukushima city (is) 6.4mSv. http://twitpic.com/5lnfsx

The monthly distribution of similar kinds of tweets either in English or in Japanese is shown on Table 3.2.

Table 3.2 Distribution of P1's 'graph update' tweets in Japanese or English

	Mar 2011	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan-2012	Feb	Mar	total
Japanese	110	98	56	26	6	5	3	4	5	4	4	13	2	336
English	38	62	28	18	1	0	0	0	0	0	0	0	0	147

P2 was the most frequent tweeters of the four, although the number of the followers is the smallest (see above in this section). Her tweets frequently engaged interaction with other Twitter users, as will be examined in the chapters to come.

With regard to the journalists, J1's significant contribution to the online communication on the crisis was the links he provided to his own channels on Ustream, an online video site. He had been running a number of channels since before the nuclear crisis, and had been using the hashtag followed by his own name when mentioning these channels on Twitter. During the crisis period, J1's Ustream channels often broadcast various conferences and interviews, ones run by the national government, Nuclear and Industrial Safety Agency, TEPCO, or those featuring other people and organisations. One such conference is the TEPCO's press conference that reported the detection of plutonium leakage from late evening 28/03/2011 to early morning 29/03/2011 (see Chapter 4). Table 3.3 shows the number of tweets J1 posted on Twitter in the first month that include the hashtag followed by his name, and those among them that relates to the nuclear accident.

Table 3.3 J1's tweets with '#J1[25]' in the first month of nuclear crisis

total number of tweets	tweets with '#J1'	nuclear accident related tweets with '#J1'
1138	334	298

The other freelance journalist J2 posted the fewest number of tweets, but was the most popular tweeter in terms of the number of followers.

The data set characterised as above was collected for the purpose of this research, i.e. the exploration of linguistic contributions of tweets posted by these four Twitter writers for the emergence of new communities in the time of nuclear crisis. These Twitter data were originally written in Japanese. A brief introduction to Japanese graphology on Twitter is provided next.

[25] In the original tweet texts, 'J1' after '#' is J1's real name.

3.3.5 Japanese graphology on Twitter

Twitter has a limitation of 140 characters for the length for one post. However, due to its graphological system, 140 characters in Japanese can convey more resources than the same number of letters in English can convey. Characteristics of Japanese graphology relevant to Twitter are briefly introduced here.

Modern Japanese has a mixed graphology system consisting of multiple scripts. First, *hiragana* and *katakana* are two syllabaries, the latter typically representing loanwords. There are *kanji* or Chinese characters, with which a significant amount of uncommon sense resources are construed in a relatively small number of characters compared to alphabetical languages including English (see Section 3.4). For instance, *genshi.ryoku* (nuclear power) is written in three kanji, 原子力, whereas the English equivalent is in 12 letters. Japanese graphology also employs writing systems imported more recently such as Roman alphabets (*romaji*) and Arabic numeric (*suuji*) to represent meanings. In the data set, letters of the Greek alphabet such as α (alpha) are occasionally used. There is no spacing between words.

Punctuation in Japanese is also different. Two basic punctuation markers are '。' and '、', corresponding to the period and the comma in English respectively. In this study, one of the physicists, P1, consistently uses '.' and ',' in his tweets. This is only typical of science and other related registers (Koyama 2011). The question mark and the exclamation mark are also only used in relatively casual[26] registers including Twitter. Apart from these graphological resources for Japanese writing in general, there are emoticons, a set of resources typical of online communication across languages (Knox 2009, Zappavigna 2012).

Because of these characteristics, one tweet in Japanese can convey more expanded meaning compared to English. For instance, the tweet below which has 113 characters in Japanese will have 329 characters (letters, punctuation and spaces) in the English translation.

[26] See chapter 5 for the discussion of the term 'casual'.

[P1-2] 13 March 2011 10:43:39
福島第一原子力発電所 3 号機はいわゆるプルサーマルですが，プルトニウムは通常炉内にもある．排気などに伴い外部に放出される放射性物質の種類には違いは生じない．格納容器が守られれば，プルサーマルだからと言って特別な事態は生じません．
Fukushima Daiichi Nuclear Power Plant Reactor 3 is a so-called plu-thermal, but plutonium exists in regular furnaces as well. Difference doesn't arise in the kinds of radioactive materials emitted outside along with ventilation and so on. If the container is protected, special matters do not occur because (it) is a plu-thermal.

In this section, the nature of the data set of the present study has been accounted for in terms of displays of Twitter, the process of data collection including potential ethical issues, the profiles of data, and the writing system of Japanese. The next section focuses on issues that arise in exploring meanings in discourse on Twitter in Japanese to be presented in English.

3.4 Glossing: processing of the data in Japanese

A challenge lies in undertaking analysis of text in one language for presentation in another language. It is a required process to translate the original text into the other language in which the text is described or analysed. This section explains how this issue is tackled in the present study by the process of *glossing*.

De Souza (2012) conceptualises translation as 'interlingual re-instantiation'. The process involves consideration of meaning instantiated in the source text from the perspective of all systems and metafunctions within that language, and seeking an equivalent kind of meaning in the target language with respect to the systems and choices in that language. However, chances are that equivalent kinds of meanings from the source language are realised in different linguistic systems, or in systems that may not be available, in the target language. In that case, it is inevitable that the meaning in the source text is somehow distorted in the target text.

This implies significant issues in linguistic exploration of meanings in discourse. Translation is aimed at making accessible the meanings in the source text to readers of the target language without knowledge of the source language, for the purpose of seeing the meaning choices from a more general, linguistic perspective. Providing a translation of the original text may well not be enough. In this study, *glossing* (McDonald 2008) is adopted in order to minimalise potential distortion of meaning implicated in translation, and to make as much meanings in the original texts in Japanese accessible as possible to readers of English without knowledge of Japanese.

This section begins by introducing glossing as conceptualised in McDonald (2008). It is followed by a method to address one of the challenges the present English-mediated linguistic study of another language, Japanese. The lists of glossing symbols and notations adopted in this study are then provided. Finally, unresolved issues in this glossing are discussed.

3.4.1 Rationale for glossing

In McDonald (2008), glossing is defined as follows:

> (I)f the language *of* description (the language in which the description is being written) is different from the language *under* description (the language which is being described), then the original text needs to be 'glossed': that is each significant unit of the original must be given a (rough) equivalent in the language of description. (McDonald, 2008, p. 21)

In this research, glossing refers to the processing of the original texts written in Japanese for the purpose of English-mediate linguistic analysis. A gloss is different from a translation, the latter referred to by McDonald as 'a contextually appropriate English equivalent of each move' (pp. 21–22). Glossing is not the same as lexicogrammatical analysis either, but something on which linguistic analysis will be based. Glossing is done by segmenting the original text into meaningful/functional items, and then by providing to each item an equivalent in English, either as a lexical item or by a grammatical label.

Glossing is not analysis in itself. However, as McDonald admits by referencing Becker (1993), the process of glossing involves an initial theorising, and 'in fact an essential part of any syntactic description (…) that can affect any further descriptive claims made for the text' (McDonald, 2008, p. 11). Then, in this study that takes the systemic functional theoretical framework, glossing is expected to be done in the way that it provides the basis for the analytical claims that are going to be made in the following chapters. In this sense, it is important to make this initial theorising explicit in this study. To this end, McDonald provides two basic principles or criteria in making decisions about glossing, i.e. be 'contingent on the purposes for which it is envisaged', and be 'contrastive', i.e., how linguistic units operate within a 'network of interlocking distinctions' (2008, p. 31).

Glossing in this study involves the following steps. It begins by romanising the original texts at the same time as segmenting the text into 'significant units' (McDonald 2008, p. 21)[27]. The next step is assigning an English equivalent for each significant unit in Japanese. After that, English translations at the group and clause (complex) ranks are provided. Each step is provided on each line of the glossing table. Table 3.4 summarises these steps with an exemplar glossing and English translation of the extract of a tweet originally in Japanese graphology (see Section 3.3) with the exemplar tweet, [P1-3].

Table 3.4 Steps involved in glossing

original text			（そろそろ	疲れてきました.
glossing	Steps 1 & 2	Romanisation and segmentation	(*sorosoro*	*tsukarete.ki.mashi.ta*.
	Step 3	unit-by-unit equivalent	(little-by-little	get-tired.COME.POL.PST.
	Step 4	group rank translation	(gradually	have become tired.
translated text	step 5	clause (complex) rank translation	((I) am getting tired now.	

[27] See later paragraphs of this subsection for the discussion of 'significant units'.

3.4.2 Glossing steps and issues

Each step of the glossing process involves theorising and decision making. This subsection accounts for the steps undertaken in the glosses, along with a discussion of issues that arise in the process.

3.4.2.1 Romanisation

The very first step of glossing concerns the romanisation of the texts written in Japanese graphology. There are a number of conventions for romanising Japanese including '*hyoojunshiki*' (standard) and '*kunreeshiki*' (official) (Tsukishima 1964). For instance, 'し' is romanised as '*shi*' in the former convention and '*si*' in the latter. In this study, the *hyoojunshiki* (standard) convention is chosen because it better reflects the way Japanese is pronounced in relation to how the romanised version is pronounced by English speakers. Concerning long vowels[28], this thesis adopts the principle of duplication of the first vowels for all five vowels, i.e. '*aa*', '*ii*', '*uu*' '*ee*'[29], '*oo*'. This reflects that a long vowel in Japanese consists of two mora[30] syllables.

3.4.2.2 Segmenting the text and providing equivalent

The next two steps, i.e. segmenting the original text into significant units and assigning an English equivalent to each unit, constitute the most important part of the glossing process. Identifying significant units for analysis in Japanese is not straightforward. Determining a word in Japanese can be ambiguous because Japanese graphology does not use space as a word boundary. Defining a morpheme is even more problematic. A

[28] There are multiple conventions for transcribing long vowels. One of them is adding an over bar, with which the moraic characteristic of vowel lengthening in Japanese is not represented. Long '*o*' is often transcribed as 'oh' or 'o' in some proper nouns. For instance, Tokyo will be romatised as '*tookyoo*' by following the principle of this thesis.

[29] Many English mediated works on Japanese transcribe the long '*e*' as '*ei*', reflecting how it is pronounced when the pronunciation of the second mora is exaggerated such as in singing popular songs. In normal speech in Japanese, the long vowel of '*e*' does not involve closing of the mouth. Some recent sociolinguistic works (Okamoto 2004, Inoue 2004, Ide 2005) adopt the duplication convention for 'e' as well.

[30] A 'mora' is 'a subsyllabic prosodic constituent or "timing unit" that generally consists of a vowel, or vowel plus following consonant' (Clark, Yallop & Fletcher 1990/2007, p. 340). According to Clark et al., MORA-TIMING 'is used traditionally to describe the characteristic rhythm of Japanese' (p. 340).

morpheme is generally understood as a minimal unit of meaning below word rank (Teruya 2007a, p. 19). However, works on Japanese morphology, for instance, disagree in determining what a morpheme is in so-called *jukugo*, or *kanji* compounds, i.e. lexical resources composed of multiple *kanji* (Morioka 1969, Kageyama 1989, Okimori 2012). Morioka (1969), based on his descriptive work on the development of modern vocabulary, particularly of *kanji* compounds, proposed 'graphomorphology', distinguishing between perfect kanji morphemes and imperfect *kanji* morphemes. Kageyama (1989), from a word formation perspective of a formalist approach, considered that one *kanji* constitute a morpheme. Okimori (2012), from the *kokugogaku* tradition (see Chapter 2), purports that a *kanji* is a minimal linguistic unit in that it has a literal meaning, and in that it can become components in word formation. Similar issues are seen in other languages. For instance, McDonald (2008) problematises 'the whole issue of identifying words in a language' (p. 44) from his exploration of syntactic units in Chinese. The disagreement about morpheme boundaries among morphological studies of Japanese can be seen as reflecting the very arbitrary nature of the concepts of 'morpheme' and 'word'.

Then, coming back to the question of how to define significant units for glossing data in this study, the first criterion in McDonald (2008), i.e. be contingent on the purpose of the study, is useful. With this respect, McDonald proposes two approaches to address the issue. The first is the 'one-for-one' (p. 31) approach in which one word of the original language is represented by one word of English. The second is a highly technical approach which more accurately represents the features of the language under description.

In the case of *kanji* compounds, it was reasonable that morphological studies such as Kageyama and Okimori took the latter approach. They theorised each *kanji* as constituting a significant unit because they are interested in the internal structures of vocabulary composed of multiple *kanji*. However, in the present study, the internal structure of *kanji* compounds is relevant only regarding a limited number of items. For instance, in the nuclear crisis time, the meaning of the technical term '半減期 *hangen.ki*' (half-life) [31] was largely interpreted in terms of the meanings of the three *kanji*

[31] The glossing of *hangen.ki* is discussed later in this section.

components, ‘half’, ‘decrease’ and ‘period’. In this particular case, providing a detailed representation of each *kanji* is informative in understanding how lay readers of Japanese interpreted technical meanings in the time of a nuclear crisis. However, there are a substantial number of non-everyday terms composed of multiple *kanji* characters in the data set, the meanings of which would be difficult to interpret if each *kanji* is notated with a meaning in the glossing. For instance, ‘物理 *butsuri*’ (physics) is composed of two *kanji*, ‘thing’ and ‘reason’, but Japanese readers do not read the meaning of each *kanji* analytically in order to get the meaning of ‘physics’ in 物理. It would then be reasonable to consider ‘物理 *butsuri*’ as one unit of meaning, rather than dividing it into two distinct *kanji* units. Taking these into consideration, the present study basically takes the one-for-one approach in glossing the data texts in Japanese, and attends to the internal structure of the items only in case there is relevance.

Considering the ambiguity of the technical terms ‘word’ and ‘morpheme’, it would be reasonable to avoid these terms when segmenting Japanese texts into significant units for glossing. In this study, the term ‘item’ is used instead to refer the segmented unit for glossing. This corresponds to what McDonald refers to as ‘significant unit’ (p. 21). In the research that takes a systemic functional perspective, ‘significant’ means ‘involving choice’ and ‘bearing a function’ (McDonald 2013).

These segments for glossing, or items, are then classified into three subcategories, i.e. lexical items, grammatical items and grammaticalised lexical items (McDonald 2013). A lexical item corresponds to what is generally considered a lexical word in (Brown 2006), i.e. an item ‘having a lexical meaning’. A grammatical item is what is often called a grammatical word, i.e. an item ‘without significant lexical meaning that functions to express grammatical relationships’ (Brown 2006). The latter category is likely to comprise bound morphemes, containing ‘a finite number of elements in contrast at a particular place in the structure, e.g. following verbs or nominal groups’, expressing ‘relatively abstract/general meanings’ (McDonald 2013). Ideally, a lexical item in Japanese is notated with a lexical item in English, whereas a grammatical item is notated with an abbreviation of a glossing label of an abstract grammatical term. The third category, a grammaticalised lexical item is one that involves grammaticalisation, or items that went through the process of ‘losing lexical meaning and gaining

grammatical meaning' (Brown 2006). It is noted that, while Brown (2006) provides an example of 'may' in English, which went through this process historically, this research attends to grammaticalisation from a synchronical perspective. That is, the item is considered a grammaticalised lexical item when the same item is used as a lexical item in other instances in modern Japanese.

For instance, '*koto*' (thing) in the following extract of [P2-1] '*kai.te.nai koto.made*' is a lexical item.

書いてない	事まで	読める
kai.te.nai	*koto.made*	*yom.eru*
write.ASP:rsl(CONTR).NEG	thing.LOC:till	read.POT
not written	up to things	can read
can read even the things that are not written		

However, in the following extract of [J1-1], '*koto*' is grammaticalised, i.e. functioning as part of a non-finite clause, '*genjiru.koto.naku*' (without reducing).

減じることなく、
genjiru.koto.naku、
reduce.THING.NEG/SUS,
without reducing

In the glossing, a grammaticalised lexical item is presented in upper case, as in 'THING', in order to distinguish it from when the same item is used as a lexical item.

In terms of boundary symbols, the current study distinguishes three kinds of boundaries, i.e. lexical boundary '+', non-lexical boundary '.' and conflation '/'. With regard to grammatical items, ':' is used when a grammatical label is followed by a more delicate category or an equivalent in English. For instance, in the above instance, the glossing, 'ASP:rsl' indicates that the function of '.te' is 'Aspct: resultative'. In addition, '-' is used in the English part of the glossing when one item in Japanese corresponds to more than one word in English glossing (McDonald 2013).

A lexical boundary is a boundary between two free morphemes, i.e. items that 'can enter into syntactic relations by themselves' (McDonald 2008, p. 47). For instance, '核

実験’ (nuclear experiment) is composed of two free morphemes ‘*kaku*’ (nucleus) and ‘*jikken*’ (experiment)[32]. In this case, the lexical boundary is notated with the symbol ‘+’ in this study as in ‘*kaku+jikken*’.

Non-lexical boundaries include all other kinds of boundaries, and is notated with the symbol ‘.’. The first type of non-lexical boundary occurs between a lexical item and a grammatical item or a grammaticalised lexical item. In ‘書いてない *kai.te.nai*’, ‘*kai*’ represents a lexical item ‘write’, followed by a grammatical item, ‘*.te*’[33], representing resultative aspect, and then ‘*.nai*’ representing negation.

The second type of non-lexical boundary is that between two lexical items when one of them is not a free morpheme. For instance, in ‘半減期 *hangen.ki*’, or half-life, ‘*hangen*’ (reduction-into-half) is a free morpheme, but ‘*.ki*’ (period) is a bound morpheme, delivering a lexical meaning of ‘period’. Lastly, as the English equivalent of ‘hangen’ has more than one item, the boundary ‘-‘, is used in the English part of the glossing. The resulting gloss of ‘半減期 *hangen.ki*’ is ‘reduction-into-half.period’.

半減期
hangen.ki
reduction-into-half.period
half-life

Distinction between a lexical boundary and a non-lexical boundary is decided item by item. Boundaries differ, for instance, in the following compounds that have the same lexical item ‘放射 *hoosha*’ (radiation).

放射能
hoosha.noo
radiation.ability
radioactivity

[32] Both *kaku* (nucleus) and *jikken* (experiment) can enter a syntactic relation, for instance, by adding an adnomial particle ‘*.no*’ as in *‘kaku.no kasa*’ (nuclear umbrella), and ‘*jikken.no kekka*’ (result of the experiment).
[33] See Subsection 3.4.2.3 for the glossing of so-called *te*-form.

放射性物質
hoosha.see+busshitsu
radiation.character+material
radioactive material

放射線防御
hoosha+sen+boogyo
radiation+line+protection
protection against radiation

In the last example above, the boundary between '*hoosha*' and '*sen*' is in '+' because '*sen*' is a free morpheme in Japanese.

The third kind of boundary is conflation, which indicates that more than one meaning is fused in one item (McDonald, 2013)[34]. Take the following extract of [P1-4] to illustrate the case of conflation.

作業される	方
sagyoo.s.areru	*kata*
work.DO.RES	person/RES
do m(’。’@)m[35] work	person m(’。’@)m
people m(’。’@)m who do m(’。’@)m the work	

In the verbal group '*sagyoo.s.areru*' there is a boundary between the lexical item '*sagyoo.s*' (work.DO) and the grammatical item '*.areru*', the latter delivering the meaning of 'respect' (see Chapter 5). However, in the nominal group '*kata*', the lexical meaning of 'person' and the grammatical meaning of 'respect' is fused in the realisation, '*kata*'. Conflation refers to the latter case, and notated with the symbol '/' between the two meanings mixed in one item.

3.4.2.3 Issues with group and item boundaries

With these general principles and symbols for items and item boundaries, there are still issues in drawing group and item boundaries. One of them has to do with the so-called

[34] Note that in Teruya (2007a), 'conflation' is used in Matthiessen's (1995) terms, i.e. as 'realization operator used to specify the identity of two functions, as in Agent / Subject' (p.778).
[35] See Subsection 3.4.2.2.

te-form of verbs and adjectives. In SFL accounts of Japanese, the notation 'SUS' is often assigned to this particular form (Thomson 2005, Teruya 2007, Hayakawa 2013). However, this can be confusing because the term 'suspensive' does not necessarily carry a function of 'suspending'. The term 'suspensive' came from *kokugogaku* (see Chapter 2), or the Japanese linguistic tradition. In Teramura (1984), it is defined as a type of *muudo* (mood) which suspends the mood choice until in a later clause. However, as Teramura himself pointed out, *te*-form also has other functions aside from 'suspensive mood' (p. 59) [36]. Then, the glossing needs to be done in the way that it reflects the other functions of *te*-forms.

In the present study, *te*-forms are glossed in three different ways depending on the functions the form realises in relation to other resources. The first type is to gloss *te*-form as realising 'suspensive *muudo*'. It is defined as 'non-finite, tactic verb form' in Sato (Suto) and Barton (2013, p. 194). For instance, in the following extract from [P1-5], the mood is suspended in *dashi.te* (give out), until the indicative mood is provided in the next clause in *hookai.suru* (decay.DO).

α線を	出して	崩壊する	Pu
arufa+sen.o	*dashi.te*	*hookai.suru*	*piiyuu*
alpha+line.ACC	give-out.SUS	decay.DO	Pu
alpha ray	giving out	decays	Pu
Pu that decays giving out alpha ray			

The second is the case in which the verb '*te*-form' is followed by '*iru*'. In this case, the combination functions as an aspect marker, indicating either continuous, meaning 'action in progress', or resultative, meaning 'the state resulting from the action' (Kaiser et al. 2001, p. 489). One instance is found in [J2-1].

プルトニウムを	検出する	機器を	持っていない。
purutoniumu.o	*kenshutsu.suru*	*kiki.o*	*mot.tei.nai*。
plutonium.ACC	detection.DO	apparatus.ACC	have.ASP:rsl[37].NEG.
plutonium	detect	apparatus	do not have
(We) don't have apparatus to detect plutonium.			

[36] Thomson (2001) attends to the different functions of te-form in terms of rank and taxis.
[37] See Kaiser et al. (2001, p. 490).

In this case, the glossing boundary is located between the verb stem '*mot.*' (have) and '*.te*'[38]. When there is a 'contraction'[39], the realisation '*.te*' can represent the aspect meaning in the case of grammatical contraction, as in the following extract of [P2-2].

P1 先生も	いってたけど、
P1+sensee.mo	*it.te.ta.kedo*、
P1+teacher.HIL:too	say.ASP:cont(CONTR).PST.but,
Prof. P1 too	was saying but,
As Prof. P1 was also saying,	

If there is no contraction in this clause, the boundaries in the glossing would be '*it.tei.ta.kedo*'.

The last type is the case of verb compounds in which a verb in '*te*-form' is followed by another verb, the latter functioning as a grammaticalised lexical item[40]. In this case, it is more reasonable to consider that the boundary is located between '*te*' and the second, grammaticalised verb, because the kind of contraction that can happen with '*.teiru*' does not happen in the third case. One example of verb compound is the following extract from [J1-1].

放散されてしまった	プルトニウム
hoosan.s.arete.shimat.ta	*purutoniumu*
dissipation.DO.PSV.END.PST	plutonium
has ended up being dissipated	plutonium
the plutonium that has ended up being dissipated	

Here, '*shimat*' does not represent the lexical meaning of 'end' but what Teramura (1984) referred to as 'secondary aspect' (p. 123) of completion[41].

[38] Sato (Suto) and Barnard (2013) also take the item boundary before *.te* when the item represent aspect.
[39] In the glossing, the term 'contraction' is used in a general linguistic term to refer to 'a phonological reduction or merging of a sequence of forms' (Brown 2006).
[40] Thomson (2001) discusses the issue with the same kind of structure with the example of '*nobotte ikimashita*'. This structure would be glossed in the present study as follows.

nobotte.iki.mashi.ta
climb.GO.POL.PST
┌|∵|┘went climbing

[41] Proposing different boundary positions for 'te iru' and 'te shimau' which are both considered to represent 'secondary aspect' in Teramura (1984) would have impact on how to describe aspectal resources in Japanese lexicogrammar, but it goes beyond the scope of this study to elaborate on that.

Another instance of the verb compounds containing *te*-form is what Teruya (2007b) categorises as processes of benefaction, in which expressions of give-&-receive serve 'as auxiliary verbs' (pp. 303–307). An example is the following extract from [P1-6].

誰か	やってくれる？
dareka	*yatte.kureru*？
someone	do.GIVE-ME？
someone	do for me？
Can anybody do (it) for me?	

Another challenge concerning the deciding of boundaries between items is related to modality. In modern Japanese, many modality resources are metaphorically realised, i.e. as combinations of a number of grammatical items and/or grammaticalised lexical items, except for a limited number of items such as '*beki*.*da*' (MODU:should.PLN). For instance, 心配することはない in the extract of [J1-1] can be glossed in two ways, either by packing up the modality meaning by:

心配することはない
shinpai.suru.kotowanai
anxiety.DO.need-not
need not be anxious

or providing segmenting the items that make up the modal meaning metaphorically realised in the following way.

心配することはない
shinpai.suru.koto.wa.nai
anxiety.DO.THING.TOP.NEG
need not be anxious

In addressing the issue, there are two things to be recognised. Firstly, the same meaning can be realised by different wording such as in the following way.

心配しなくていい
shinpai.shi.nakute.ii
anxiety.DO.NEG.GOOD/be
need not be anxious

Secondly, the same structure, 'することはない' may have different meanings. In addressing the issue, there are two things to be recognised. Firstly, the same meaning can be realised by a different wording such as in the following way.

心配することは	ない
shinpai.suru.koto.wa	*nai*
anxiety.DO.THING.TOP	non-existent/be
It never happens that (someone) is anxious	

The same structure can mean that 'there is nothing to worry about'. In that case, the glossing will be as follows[42].

心配する	ことは	ない
shinpai.suru	*koto.wa*	*nai*
anxiety.DO	thing.TOP	non-existent/be
There is nothing to be anxious about		

These multiple meanings of the same realisation can be illustrated. Then, with respect to McDonald's (2008) criterion of contingency, it potentially meets the purpose of the study to attend to the internal structure of these resources. Therefore, as far as modality resources are concerned, the present study segments the resources into smaller items as in the instance below.

心配することはない
shinpai.suru.koto.wa.nai
anxiety.DO.THING.TOP.NEG
need not be anxious

3.4.2.4 Notating *joshi*, or postpositional particles

The third issue has to do with resources classified traditionally as *joshi*, or postpositional particles, particularly those that are classified as *kaku joshi* (case particles) in traditional grammar of Japanese. Many English-mediated SFL accounts of Japanese had the convention of notating these 'case' particles in upper case alphabets

[42] In this last case, '*shinpai.suru'* (anxiety.DO) is embedded to '*koto*' (thing). The glossing in this research does not pay attention to clause boundaries. Hayawaka (2013) deals with the issue by attending to whether '*koto*' functions as Nominal Group Head.

such as GA, O, and NO, instead of grammatical labels such as nominative and accusative. In some studies, grammatical functions of these items are provided either in the body of the work. For instance, Teruya (2007a) provides grammatical explanation of *joshi* as follows:

> The class of noun embodies both lexical meaning and grammatical function. Here our perspective 'from below' is synthetical rather than analytical in the we interpret particles or postpositions such as *ga* が (nominative), *o* を (accusative) and *no* の (genitive) that follow nouns, (…) as bound 'morphemes' that make up words rather than words themselves (p. 35).

However, he does not adopt these grammatical functions for his notation labels.

The present study is concerned about the glosses of GA, O and NO. Unless readers have some previous knowledge of the language of Japanese, or have been exposed to studies of Japanese that use this kind of convention, this kind of glossing would tell no information about the functions of the items, *.ga*, *.o* and *.no* in Japanese. Since glossing is aimed at providing information about the original text for readers without knowledge of Japanese, that aim should be reflected in the glossing of these particles, unless there is any particular reason for not doing so. One possible reason for not using grammatical labels such as nominative and accusative may be to avoid confusion caused by using these technical terms that come from 'Latin translations of original Greek terms' (McDonald 2008, p. 192), which do not represent the functions of *.ga*, *.o* and *.no* in Japanese perfectly. However, it should also be noted that, as McDonald mentions, any glossing is in one way or another 'a representation, and thus a distortion, of the original' (p. 31).

Outside SFL, some linguistic studies on Japanese take a different approach. For instance, in Miyagawa and Saito (2008), the compilation of works on various aspects of Japanese linguistics from cognitive approaches, many authors adopt these terms such as nominative and accusative in their notation. The exception is Heycock (2008) in which 'wa' and 'ga' are notated with small caps as in WA and GA. In the case of Heycock (2008), the paper discusses the various functions of *wa* and *ga*. It is then reasonable not to provide any general labels but to discuss the variety of meanings and functions in the

body of the study. The contingency criterion is at work here. However, in this study, the functions of these particles are not focused on. Then it would be more adequate to provide the grammatical labels that somehow represent the functions of these items, while acknowledging the inevitable distortion of meaning involved in choosing labels from traditional grammar of Latin and classical Greek.

A substantial part of discussion so far has focused on how to divide texts into significant units and how to notate them. After this part of the glossing process is done, English translation of these items are presented at the group rank and the clause (complex) rank. One issue at this stage is when the group boundary differs between Japanese and English. In such cases, different boundaries are indicated as different boundaries of boxes in the respective rows in the glossing. For instance, in the following extract of [P2-3], the difference of group boundaries in Japanese[43] and English are reflected as below.

体の	中に
karada.no	*naka.ni*
body.ADN	inside.LOC:in
inside the body	

Having introduced and discussed these principles of glossing adopted for this study, the list of glossing symbols and of notations are introduced in the next subsection.

3.4.2 Symbols and notations for glossing

Although glossing is distinct from linguistic analysis, it inevitably involves an initial theorising based on which analytical claims are made about the text. As the present study is based on systemic functional linguistic theory (see Subsection 3.4.1), the glossing notations are made with respect to SFL terminology as much as is possible.

[43] Defining 'group boundary' in Japanese is another issue that goes beyond the scope of this research to provide detail account for. In this study, 'group boundary' refers to a unit that is made up of a lexical item and a (sequence of) lexical item(s).

3.4.2.1 List of glossing and translation symbols

Table 3.5 is the list of glossing symbols with meanings and examples used in this study.

Table 3.5 List of glossing symbols

symbol	**meaning**	**example**
+	lexical boundary, i.e. between two free morphemes	*hoosha+sen+boogo* radiation+line+protection
.	non-lexical boundary, all combination other than two free morphemes	*hoosha.noo* radiation.ability
/	conflation, when two meanings are fused in one item	*kata* *person/RES*
-	when one item in Japanese is more than one word in English	hatsuden power-generation
:	when grammatical label is followed by another label or English equivalent	.te .ASP:rsl
( )	additional information about the item	(ACR), (CNTR), (COL), etc
{ }	proper name	{family-name+given-name}
acronym in upper case	grammatical label	.TOP, .NOM
lexical item in upper case	grammaticalised lexical item	*(yatte).kureru* (do).GIVE-ME

In addition to the glossing symbols listed above, the following symbols on Table 3.6 are used in Chapter 5 in the English translation of Japanese texts to indicate choice involving lexicogrammatical resources of Japanese referred to as *keego* (honorifics).

Table 3.6 Emoticon symbols for the realisation of *keego* (honorifics)

emoticon	**SYSTEM: OPTION**
m('。'@)m	HONORIFICATION: respect
m(_ _)m	HONORIFICATION: defer
┌|･̀|┘	POLITENESS: polite
|-.-|	POLITENESS: plain

3.4.2.2 List of notations

Presented in Table 3.7 is the list of notations adopted in the glosses of the texts in the present study, followed by their meanings and examples.

Table 3.7 List of glossing notations

notation	meaning	example(s)
ACC	accusative	*.o*
ACP: with	accompaniment[44]: with	*.to*
ACR	acronym	*.toodai* etc.
ADJ	adjective	*.teki*
ADN	adnominal[45]	*.no*
AGT	agent	*.ni*
ANG:about	angle[46]: about	*.nitsuite*
ASP:cont	aspect: continuous	*.teiru* etc.
ASP:rsl	aspect: resultative	*.teiru* etc.
ATTR	attribute	*.ni*
ATTR:from	attribute: from	*.kara*
BEAU	beautify[47]	*o. etc.*
BEN:to	benefactory:to[48]	*.e*
CAS	casual	*.kun* etc.
CAUS	cause[49]	*.ni*
CIR	circumstance, verb modifying	*.ni*
CNT:document	counter:document	*.tsuu*
COL	colloquial	*.tte* etc.
COMP: as	comparison[50]: as	*.to*
COMP:than	comparison: than	*.yori*
CONJ	conjectural[51]	*.oo etc.*
CONTR	contraction[52]	*.te* etc.
CST	causative	*.aseru* etc.
DAT	dative	*.ni*
DEF	defer[53]	*o. ... .suru etc.*
DLT	dialect	*.n*
EPI	epithet	*.na*
EVI:seem	evidentiality[54]: seem	*.yoo*
HIL:as-much-as	highlighting particle[55]: as much as	*.mo*
HIL:emp	highlighting particle: emphasis	*.shimo*
HIL:etc.	highlighting particle: etc.	*.nado*
HIL:only	highlighting particle: only	*.bakari* etc.

[44] see Teruya (2007b, p. 324).
[45] The term 'adnominal' is a temporary label proposed over 'genetive', considering the variety of functions of '*.no*' that go beyond what the term 'genetive' in Western traditional grammar indicates. In SFL, Thomson, E. (2001) consiers .no as non-finite tactic ending of the nominal group (p. 71). The perspective is shared by Kaiser et al. (2001) in which .no is included as part of the conjugation of the copula, *.da* (.be). Further exploration is needed to determine the different functions of *.no*, which goes beyond the scope of this research.
[46] see Teruya (2007b, p. 324).
[47] see Chapter 5.
[48] see Teruya (2007b, pp. 324-325).
[49] see Teruya (2007b, p. 323)
[50] see Teruya (2007b, p. 324).
[51] see Teruya (2007a, p. xxiii).
[52] see Martin (1992, p. 532).
[53] see Chapter 5.
[54] see Teruya (2007a, p. 219).
[55] see Numata (1989) and the explanation below the list.

notation	meaning	example(s)
HIL:too	highlighting particle: too	*.mo*
HPOL	hyper polite[56]	*.degozaimasu* etc.
IMP	imperative	*.kudasai* etc.
LNG	vowel lengthening[57]	*.nee* etc.
LOC: in	location[58]: in	*.ni*
LOC: until	location: till	*.made*
LPLN	learned plain[59]	*.dearu* etc.
LPOL	learned polite[60]	*.dearimasu* etc.
MAN:by	manner[61]: by	*.de*
MAS	masculine	*boku* etc.
MODA:should	modalisation: should[62]	*.hazu*
MODU:should	modulation: should	*.beki*
NEG	negation	*.nai* etc.
NEGO:conf	negotiatory marker[63]: confirmation	*.ne*
NEGO:incl	negotiatory marker: inclination	*.na*
NEGO:ins	negotiatory marker: insistence	*.yo*
NEGO:intr	negotiatory marker: interrogation	*.ka* etc.
NEV	non-everyday	*honjitsu* etc.
NMN	nominalisation	*.no, .n*
NOM	nominative	*.ga, .no*
OPT	optative[64]	*.tai etc.*
POL	polite[65]	*.masu* etc.
POT	potential	*.eru* etc.
PROJ	projection	*.to*
PST	past	*.ta*
PSV	passive	*.areru* etc.
RES	respect[66]	*o. ... .ninaru* etc.
SCP	scope[67]	*.o*
SUS	suspensive[68]	*.te* etc.
TIT	title	.san
TIT(MAS/CAS)	title (masculine, casual)	*.kun*
TOP	topic	*.wa*

[56] see Chapter 5.
[57] see Chapter 4.
[58] see Teruya (2007, pp. 320-323).
[59] see Chapter 5.
[60] see Chapter 5.
[61] see Teruya (2007, p 323).
[62] Teruya (2007) considers 'hazu.da' a resource of EVIDENTIALITY: reasoning. Discussing its adequacy goes beyond the scope of this study.
[63] see Teruya (2007, p. 144).
[64] see Teruya (2007, p. xxiii).
[65] see Chapter 5.
[66] see Chapter 5.
[67] see Halliday and Matthiessen (2014, p. 236).
[68] see Teramura (1984, p. 58).

3.4.2.3 Unresolved issues

Many of the notations are tentative and provisional. Below are some of the unresolved issues that need further attention and discussion, with tentative solutions adopted in this study. The first issue has to do *kaku joshi* (case particles) plus the topic particle, *.wa*. In subsection 3.4.1, the matter to do with so-called *kaku joshi* in Japanese traditional grammar was discussed in relation to the grammatical labels such as nominative and accusative, originated from the Western traditional grammar. Another issue with *kaku joshi* in Japanese is that this category covers some items whose meanings are not 'cases' in the Western traditional grammar's terms. These include what represents Attribute and Projection in SFL terms, as well as particles that realise Circumstantial options (Teruya 2007b, p. 320–325). In these cases, grammatical labels are chosen from an SFL perspective, adopting Teruya (2007).

Another issue has to do with the two traditional categories *kee joshi* (except *.wa*) and *fuku joshi*. They are covered here in the name of 'highlighting particles', or *toritate shi* in Numata's (1989) terms. For this group of items, the grammatical label of HIL is followed by the word-by-word English translation, while admitting that this is a tentative choice that needs revision from an SFL perspective.

The other issue has to do with the category in Japanese called *setsuzoku joshi* (conjunctive particles). Since it is a grammatical category, a grammatical label is supposed to be supplied. Teruya (2007b) does that in the names of 'binder' and 'conditional'. The issue also involves tactic relations of Japanese, which goes beyond the scope of this study. Since the present study is unable to propose an alternative grammatical label suitable for the grammatical items covered in this category, these items are presented in the same way as the lexical items. This is an exceptional and compromising case that does not meet the glossing principles discussed in Subsection 3.4.1. Some examples are given on Table 3.8.

Table 3.8 Some exemplar notations of so-called ‘conjunctive particles’

notation	Japanese
.because	*.kara*
.and-so	*.shi*
.if	*.to*
.and-so-on	*.toka*

3.4.3 Summary

This section introduced glossing as text processing of original texts in Japanese. Glossing is aimed at making linguistic meanings in the original texts in Japanese accessible with minimal distortion of meaning in this English-mediated study. The principles adopted here were discussed in relation to the purposes of the present research, followed by the lists of glossing symbols and notations, along with the explanation of the choices of the labels and their tentative and provisional nature. The discussion of this section is not so much intended to provide a model as to shed light on this aspect of linguistic research which has largely relied on conventions although they actually involved theoretical decision making. Finally, the next section introduces and discusses the last stage of research design, consisting of the frameworks for the discourse analysis.

3.5 Frameworks for discourse analysis

The present study draws on systemic functional linguistics (see Chapter 1) to explore the linguistic contributions in the community formation on Twitter in a time of nuclear crisis. Having introduced the architecture of SFL relevant to this study to some extent (see Chapters 1 and 2), this section provides more detailed accounts on the frameworks in the discourse semantic stratum that will be the major foci of analyses in Chapters 4 and 5.

3.5.1 Discourse semantic stratum

In Chapter 1, the hierarchy of realisation was introduced in terms of different levels of abstraction. Stratification consists of layers of phonology/graphology, lexicogrammar and discourse semantics. Based on the assumption that it is not a clause but a text that constitutes 'a semantic unit' (Martin 1992, p. 19), discourse semantics is defined as a stratum that 'focusses on text-size rather than clause-size meanings' (p. 1). The discourse semantic stratum complements 'the metafunctionally organised grammatical descriptions' (p. 14), by generalising 'across grammatical resources and account[ing] for relations between as well as within clause complexes' (p. 19).

Martin (1992) proposed four discourse systems, namely, NEGOTIATION, IDENTIFICATION, CONJUNCTION and IDEATION, constituting the discourse semantic stratum. Further, Martin and Rose (2007) proposed two additional systems, i.e. APPRAISAL and PERIODICITY. In terms of trinocular perspective (see Chapter 1), the systems of IDEATION and CONJUNCTION deal with the ideational metafunction, NEGOTIATION and APPRAISAL, the interpersonal, and IDENTIFICATION and PERIODICITY, the textual. In the present study that bases on the hierarchy of individuation to explore community formation, focus is drawn on the ideational and interpersonal meanings and their coupling, which forms the basic unit of affiliation (see Chapter 2). Focus is therefore on the following three systems – IDEATION, NEGOTIATION and APPRAISAL.

The following subsection begins by discussing the adequacy of adopting the discourse semantic frameworks of SFL in the analysis of Japanese. After that, the discourse systems relevant to the present study will be introduced, which will base the discourse analyses of the data in the following two chapters. The accounts are exemplified by extracts from the data of this study.

3.5.2 Cross-linguistic interpretation of discourse semantic systems

In exploring meanings in the Twitter discourse written in Japanese, a question arises about adopting the SFL systems of discourse semantics. It concerns whether systems and functions at the stratum of discourse semantics operate across differently, or there are specific systems and functions at the level of discourse for each language. SFL approaches language typology based on the assumption that, in terms of lexicogrammatical description, each language has its systems and choices 'in its own right' (Caffarel et al. 2004a, p. 7). Caffarel, Martin and Matthiessen (2004b) compile descriptions of a number of languages including Japanese based on this assumption. Teruya (2007a, 2007b) provides a lexicogrammatical description of Japanese from the same perspective. However, for the level of discourse semantics, there is no such clearly stated assumption as to whether systems operate across languages or differently in different languages. The current discourse systems have largely been built on the English language. The challenge that the present study is facing in adopting these systems to analyse texts in Japanese is potentially shared in any study that explores discourse semantics of any language other than English.

One approach to address this issue is to understand that discourse systems are theories that have different realisations in different languages. Sano (2011a, 2011b, 2012) takes this stance by considering a discourse system a theory with which linguistic descriptions are provided. Sano (2011), for instance, considers appraisal a theory, which is realised differently in different languages. He provides a description of Japanese system of ATTITUDE (see Subsection 3.5.4) by employing appraisal theory (see Sano 2011 p. 5). Then he explores attitudinal lexis collected from Iwanami Japanese Dictionary to propose JAppraisal as a system of ATTITUDE in Japanese.

Martin (2013b) takes a different approach, considering that discourse systems, here APPRAISAL (see Subsection 3.5.4), are descriptions in themselves. He gives rationale for theorising the APPRAISAL system in discourse semantics by pointing out that 'we cannot in lexicogrammar generalise the kinds of attitude that may be realised across different lexicogrammatical systems' (p. 75). Martin's approach is exemplified by Thomson and White's (2008) compilation of works on journalistic discourse in various languages

including Japanese. The discourse system of APPRAISAL was explored in multiple languages other than English.

The thesis takes Martin's approach in approaching meanings in discourse systems. It assumes that, unlike lexicogrammatical perspective whereby systems are necessarily identified from a language-specific perspective, from a discourse semantic perspective the general categories of semantic systems are abstracted to a level where they stand above language-specific realisations. The discourse semantic systems assume the potential to be realised across multiple lexicogrammatical systems, and this can be assumed to include their potential to be realised in both similar and different systems in different languages. For instance, the study of JAppraisal focuses on inventories in a dictionary rather than exploring meanings in the discourse. In this sense, JAppraisal can be better conceptualised as one way of classifying Japanese lexical items that express evaluation, and thus residing in lexicogrammar rather than in discourse semantics.

The present study also takes a stance that if text analysis of any language reveals anything that does not fit into an existing discourse system, it may not give a rationale for proposing a distinct discourse system only applied for that particular language. The study proposes that such seemingly 'counter-examples' may be a potential contributor to the evolution (Martin 2014) of the existing systems which have most often been informed by English for the time being. An attempt to impact an existing discourse system is made with respect to ENGAGEMENT in Chapter 5 of this thesis. Having noted that, the following subsections introduce the discourse systems that constitute the analytical framing of the present study – IDEATION, APPRAISAL and NEGOTIATION.

3. 5.3 Field and IDEATION

The first system is IDEATION, which is introduced together with the register variable of field. IDEATION belongs to the realm of ideational metafunction in discourse semantics, along with CONJUNCTION. In the realisation hierarchy, the ideational metafunction at the discourse semantic stratum realises field, one of the register variables concerning what is happening (see Chapter 1). In other words, field focuses on the aspect of the context where experience and knowledge are construed.

According to Martin and Rose (2007), ‘a field is a set of activity sequences that are oriented to some global purpose within the institutions of family, local community or society as a whole’ (p. 306). Field varies depending on the global institutional purpose behind the sequences of activities, from a local domestic institution, to a ‘broader societal institution such as bureaucracy, industry or academia’ (Martin & Rose 2008, p. 14). A ‘provisional mapping of field-type’ is given in Figure 3.2. The SFL conceptualisation of field is classified in relation to the cline between common sense and uncommon sense.

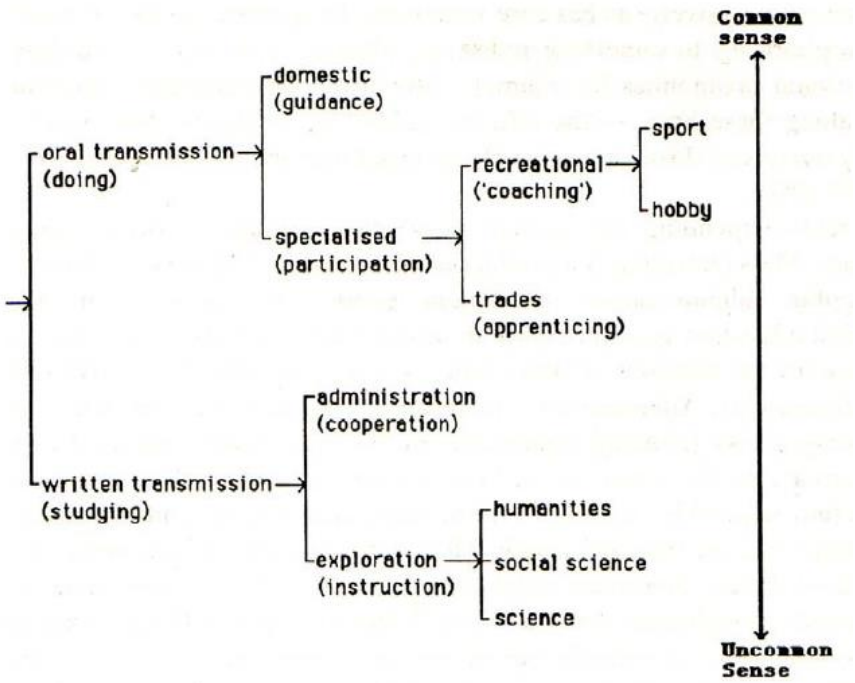


Figure 3.2 A provisional classification of fields (Martin 1992, p. 544)

On the discourse semantic stratum, field is realised in the ideational metafunction as IDEATION. According to Martin and Rose (2007), the system of IDEATION is defined as follows.

> Ideation focuses on the content of a discourse – what kinds of activities are undertaken and how participants undertaking these activities are described and

> classified. These are ideational kinds of meaning, that realises the field of a text. (p. 17)

IDEATION has to do with construing experience. It focuses on the lexical relation between 'particular people, things, processes, places and quality that build the field of a text' (p. 75). IDEATION is composed of three systems, i.e. TAXONOMIC RELATIONS, 'NUCLEAR RELATIONS' and ACTIVITY SEQUENCES. TAXONOMIC RELATIONS deal with 'the chains of relations between elements as a text unfolds', and 'includes relations such as repetition, synonymy and contrast' (p. 75). NUCLEAR RELATIONS attend to the 'unfolding of the process' with the 'configurations of elements within each clause' (p. 76). ACTIVITY SEQUENCES attend to 'the relations from one process to the next' (p. 76), unfolding of a series of activities construed by sequencing of clauses.

Apart from these three systems, IDEATION can be addressed from a perspective of how different kinds of elements, e.g. process, quality and thing, are classified. Among them, 'things and people' constitute 'classes of entities' about which different kinds of experience can potentially be construed. In the present research that explores how different kinds of crisis-related issues were attended to by tweeters, it is useful to examine the classes of elements that construe things and people in different manners. In Martin and Rose (2007), entities are classed into concrete, abstract and metaphoric, which are further broken down as in Table 3.9.

Table 3.9 Kinds of entities in Martin and Rose (2007, p. 114)

concrete	everyday	man, girlfriend, face, hands, apple, house, hill
	specialized	mattock, lathe, gearbox
abstract	technical	inflation, metafunction, gene
	institutional	offence, hearing, applications, violation, amnesty
	semiotic	question, issue, letter, extract
	generic	colour, time, manner, way, kind, class, part, cause
metaphoric	process	relationship, marriage, exposure, humiliation
	quality	justice, truth, integrity, bitterness, security

In a preliminary work of the present study (Inako 2014), some modifications from the Martin and Rose (2007) version were made, in order to illustrate the cross-professional differences in the choice of entities. Firstly, it was found useful to distinguish between human or non-human entities. Secondly, technical entities were further divided into

'concrete technical' and 'abstract technical' entities, depending on whether or not the thing referred to is a physical substance that 'can potentially be pointed to and named through instruments' (Martin & Rose 2007, p. 113). For instance, in this thesis, 'plutonium' is considered to be a concrete entity although it is technical.

Figure 3.3 represent the network of kinds of entities adopted in Inako (2014) to analyse tweets posted by P1 and J1.

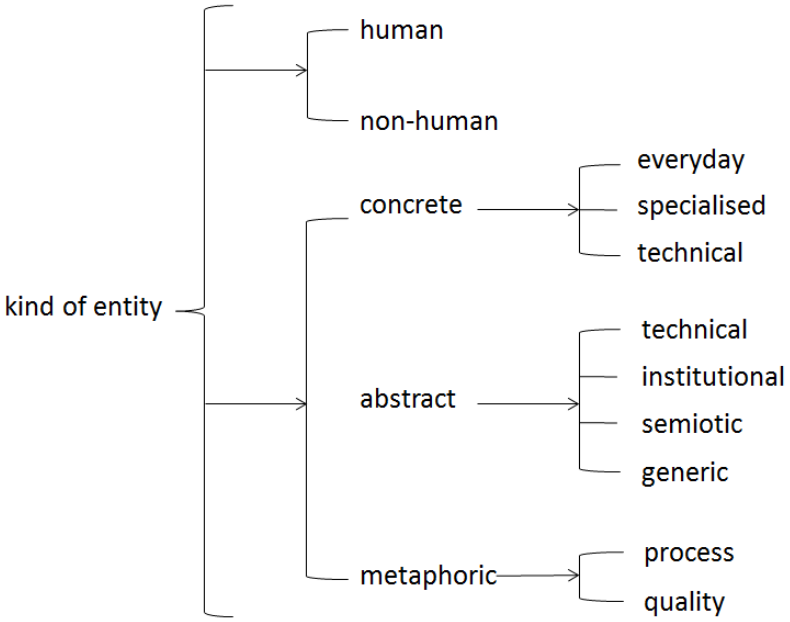


Figure 3.3 Kinds of entities in Inako (2014)

Then, Table 3.10 shows the kinds of entities with which GRADUATION (see Subsection 3.5.4) were coupled in one of P1's tweets and another of J1's tweets in Inako (2014).

Table 3.10 Kinds of entity in P1 and J1's tweets (Inako 2014, p. 19)

tweet	ideational meaning	kind of entity
P1	飛散 *hisan* (dispersal)	non-human metaphoric: process
	Pu 大量飛散を心配しておられる方 *piiyuu+tai.ryoo+hisan.o shinpai.shi.teorarru kata* Pu+large.amount+dispersal.ACC anxiety.DO.ASP:cont/RES person/RES (people who are **m('。')@)m** anxious of large dispersal of plutonium)	human concrete: everyday
	定量的な議論 *teeryoo.teki.na giron* quantityADJ.EPI discussion (quantitative discussion)	non-human metaphoric process
J1	プルトニウム *purutoniumu* (plutonium)	non-human concrete: technical
	影響力 *eekyoo.ryoku* influence.power influencing power	non-human metaphoric: process
	この御用学者の発言 *ko.no goyoo+gakusha.no hatsugen* this.ADN official-business+scholar.ADN remark (This opportunist scholar's remark)	human abstract: semiotic

There is challenge in understanding 'metaphoric' entities in Japanese. In English, uncommon sense fields are typically realised by the key linguistic resources of grammatical metaphor, nominalisation in particular (see Chapter 2). In Japanese lexicogrammar, uncommon sense fields developed largely around *kanji* (Chinese character) compounds (Morioka 1969, see also Section 3.4). A large amount of these resources are in nominal groups, and are 'verbalised' by adding a grammaticalised lexical item *.suru* (.DO). For instance, the resources *hisan* (dispersal) and *giron* (discussion), classified here as metaphoric entities are nominal resources, that are then 'verbalised' into verbs such as *hisan.suru* (disperse) and *giron.suru* (discuss).

As discussed in Subsection 3.5.2, the thesis addresses the challenge by distinguishing between lexicogrammatical and discourse semantic perspectives in understanding these realisations in Japanese. From a lexicogrammatical perspective, *hisan* and *giron* are not grammatical metaphors in Japanese, because these nouns do not 'derive' from verbs. However, they are understood as metaphorical entities at the discourse semantic level,

because they represent processes as if they are things. From this latter perspective, *hisan* and *giron* are understood as realising metaphorical entities.

In the present study, the entities and activities instantiated in the tweets are focused on in order to identify the kinds of fields that are construed in the tweets. As the nuclear crisis was a meeting point of common sense and uncommon sense knowledge, the meaning in the IDEATION system is addressed in terms of the kinds of the knowledge that the two professional groups construed on Twitter, with which interpersonal meanings are coupled.

3.5.4 APPRAISAL

This and the next subsections explain two discourse systems that enact interpersonal meatafunctions. The first one is the system of APPRAISAL, followed by NEGOTIATION.

According to Martin and Rose (2007), the discourse system of APPRAISAL 'is concerned with evaluation' (p. 17). Martin and White (2005) provide a detailed account of the APPRAISAL, which forms the framework for analysing discourse in this study together with Hood (2010).

APPRAISAL consists of three systems, ATTITUDE, ENGAGEMENT and GRADUATION. According to Martin and White (2005), ATTITUDE 'is concerned with our feelings, including emotional reactions, judgements of behaviour and evaluation of things' (p. 35). ENGAGEMENT is the system to deal with the source of the attitude and the play of different propositional voices. GRADUATION focuses on the grading of ATTITUDE. Figure 3.4 represents the APPRAISAL system modelled in Hood (2010).

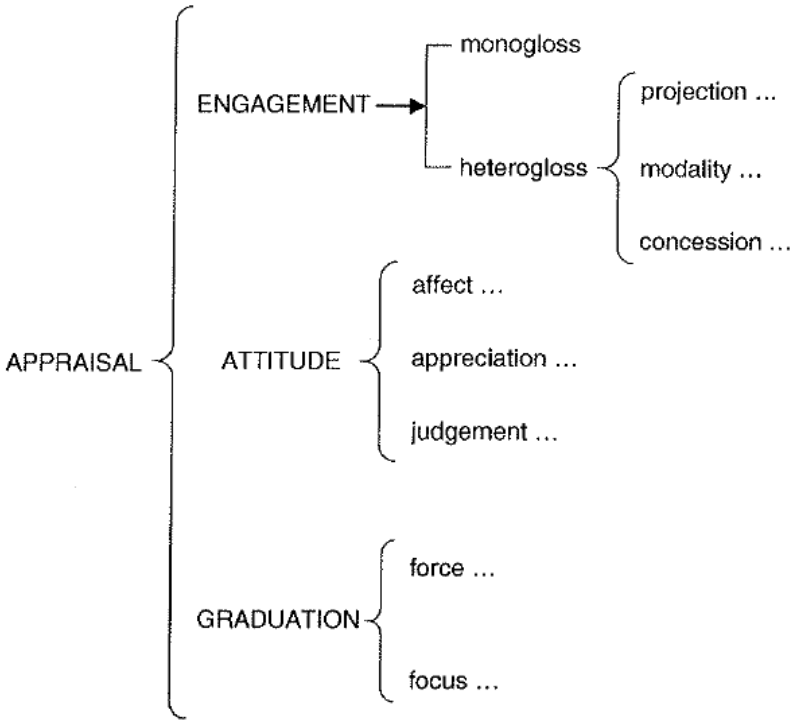


Figure 3.4 The APPRAISAL system (Hood 2010, p. 24)

3.5.4.1 ATTITUDE

ATTITUDE concerns feelings. It can be realised by resources of various lexicogrammatical classes including adjectives, e.g. 'sad' (Martin & White 2005, p. 42), adverbs, e.g. 'hypocritically' (p. 43) and nouns, e.g. 'beauty' (p. 42). ATTITUDE can be either positive or negative, and involves 'gradable meanings, which have the potential to be intensified and compared' (p. 44). It consists of three regions of meaning that have to do with feeling, i.e., AFFECT, JUDGEMENT and APPRECIATION.

The first of these regions, AFFECT, has to do with emotions, or 'reacting to behaviour, text/process, phenomena' (p. 43). In other words, AFFECT deals with feeling as reaction, for instance being 'happy or sad, confident or anxious, interested or bored' (p. 42) and so on. AFFECT has four options, i.e. un/happiness, in/security, dis/satisfaction and dis/inclination. In the following extract of [P1-3], '*tsukarete.ki.mashita*' (am getting tired), is an instance of AFFECT: dissatisfaction, ennui.

（そろそろ	**疲れて**きました.
(*sorosoro*	***tsukarete.****ki.mashi.ta*.
(little-by-little	**get-tired.**COME.POL.PST.
(gradually	have become **tired.**
((I) am getting tired now.	

In the same tweet, AFFECT: inclination is instantiated in '*biiru.mo nomi.tai*' (want to drink beer too.)

ビールも	**飲みたい.**
biiru.mo	***nomi.tai.***
beer.too	**drink.OPT.**
beer too	**want to drink.**
Want to drink beer too.	

In the following extract from [P1-7], '*shinpai.shi.teoruareru*' (be anxious) is an instance of AFFECT: insecurity.

Pu 大量飛散を	**心配しておられる**	方
piiyuu+tairyoo+hisan.o	***shinpai+shi.teorareru***	*kata*
Pu+large-amount+dispersal.ACC	**anxiety+DO.ASP:cont/RES**	person/RES
large dispersal of Pu	**are m(’。’@)m anxious about**	people**m(’。’@)m**
people**m(’。’@)m** who are **m(’。’@)m** anxious about large dispersal of plutonium		

While AFFECT deals with feeling as reaction, the next two regions of ATTITUDE namely, JUDGEMENT and APPRECIATION are two ways of 'institutionalised feelings' (p. 45). The first of these, JUDGEMENT, is a way of institutionalising feelings 'as proposal' (p. 45), or in terms of ethics by evaluating human character and behaviour. This is done either as 'social esteem' or as 'social sanction' (p. 52). According to Martin and White, social esteem is the kind of evaluation found more in 'oral culture', and is 'critical in the formation of social networks', (p. 52). There are three options in social esteem. 'Normality' concerns 'how unusual someone is', 'capacity' concerns 'how capable they are', and 'tenacity' 'how resolute they are' (p. 52). In the following extract from [P2-4], '*oroka.da*' (foolish) is an instantiation of JUDGEMENT: social esteem: - capacity, evaluating the behaviour of being twisted around by the catchphrase attached by people in the past.

でも	昔の	人の	つけた	キャッチフレーズに
demo	*mukashi.no*	*hito.no*	*tsuke.ta*	*kyacchifureezu.ni*
but	past.ADN	person.NOM	attach.PST	catchphrase.AGN
but	person in the past		attached	by catchphrase
But (to be twisted around) by the catchphrase that people in the past attached				

振り回されるのは	**愚かだ。**
furimawas.areru.no.wa	***oroka.da*。**
twist-around.PSV.NMN.TOP	**foolish.be/PLN.**
to be twisted around	**is foolish.**
(It) is foolish to be twisted around.	

Social sanction ‘is more often codified in writing’ and is shared in the areas that ‘underpins civic duty and religious observances’ (Martin & White 2005, p. 32). There are two options in social sanction. ‘Veracity’ concerns ‘how honest someone is’, and ‘propriety’, ‘how ethical someone is’. In this extract from [J1-2],

この	**御用学者**の	発言は、
kono	***goyoo+gakusha.****no*	*hatsugen.wa*、
this/ADN	**official-business.scholar**.ADN	remark.TOP
this opportunist scholar’s		remark
This opportunist scholar’s remark		

‘*Goyoo+gakusha*’ (opportunist scholar) is an instantiation of JUDGEMENT: social sanction: - propriety.

The third category of ATTITUDE, and the second way of institutionalising feeling, is APPRECIATION. According to Martin and White (2005), APPRECIATION institutionalises feeling ‘as propositions about the values of things’ including natural phenomena (p. 45). In APPRECIATION, there are three options, i.e. ‘reaction’ concerning whether things catch our attention or please us, ‘composition’ concerning ‘balance and complexity’ and ‘valuation’ concerning the value of things (p. 56). An instance of APPRECIATION: + reaction is found in the following extract [P1-3].

同業者の	方,	時々	お助けくださると	有り難いな-
doogyoo .sha.no	*kata,*	*tokidoki*	*o.tasuke .kudasaru.to*	***arigatai .na–***
same-business .person.ADN	person /RES,	sometimes	RES.help .GIVE-ME/RES.if	**appreciated/be** .NEGO:incl(LNG)
person **m(’。’@)m** in the same business		sometimes	if (you) help **m(’。’@)m** me	is appreciated
People in the same business, (it) |-.-| would be appreciated if (you) could help **m(’。’@)m** (me) sometimes.				

An instance of APPRECIATION: - composition is found in the following extract from [J1-2].

厳しい	爆発は？
kibishii	*bakuhatsu.wa*？
severe	explosion.TOP?
Severe explosion?	

APPRECIATION: - valuation is instantiated in [P1-4].

急務.
kyuu*mu.*
urgent-task.
urgent task.

The next focus is on strategies for realising ATTITUDE in discourse. ATTITUDE can be either ‘inscribed’ (directly realised) or ‘invoked’ (indirectly realised). In the above instances, all ATTITUDE resources are inscribed. One example of invoked ATTITUDE is found in ‘saras.are’ (be exposed) the following extract from [J1-1].

この	御用学者の	発言は、	全世界に	さらされ、
kono	*goyoo+ gakusha.no*	*hatsugen.wa* 、	*zen.sekai.ni*	***saras .are*****、**
this/ADN	official-business+ scholar.ADN	remark.TOP ,	all.world.LOC:to	**expose. PSV/SUS,**
this opportunist scholar’s		remark	to the whole world	**be exposed**
This opportunist scholar’s remark (should) be exposed to the whole world, and				

In Japanese, ‘*sarasu*’ is frequently used to provoke an attitudinal meaning of negative JUDGEMENT, and in the case of J1’s tweet, it invokes social sanction: - propriety.

However, this lexical item can be used without an attitudinal meaning in some contexts. For instance, in the cooking field, '*sarasu*' is used in the following way without any attitudinal implication.

tamanegi.o	*mizu.ni*	***sarasu***
onion.ACC	water:LOC:in	**expose**
onion	in water	**expose**
keep (sliced) onion sinked in water (to make the taste mild)		

In other cases, invoking of ATTITUDE can be done by flagging it, i.e. by using a GRADUATION resource (see Subsection 3.5.2.2). Such cases are included in the discussion of the GRADUATION system below.

3.5.4.2 GRADUATION

In the system of APPRAISAL, GRADUATION complements ATTITUDE by focusing on 'grading phenomena whereby feelings are amplified and categories blurred (Martin & White 2005, p. 35). As discussed in 3.5.2.1, GRADUATION can function in two terms in relation to ATTITUDE. It can either grade an inscribed ATTITUDE, or can flag an ATTITUDE indirectly by the deployment of a grading resource. An example of the first kind is found in the following extract of [J1-2]. Here, '*yori*' (more) intensifies the meaning of an ATTITUDE 'kibishii' (severe, serious).

プルサーマルの、	BOX 燃料は、	プルトニウムを	含んでいるから、
purusaamaru .no、	*bokkusu.nenryoo .wa*、	*purutoniumu .o*	*fukun.deiru.kara*、
plu-thermal .ADN	BOX.fuel .TOP	plutonium .ACC	contain.ASP:cont.because
plu-thermal's BOX (mistype of MOX) fuel		plutonium	because … contain
MOX fuel in plu-thermal, because (it) contains plutonium			

より	厳しいのではないか。
yori	*kibishii.no.de.wa.nai.ka*、
more	severe.NMN.be.TOP.NEG.NEGO:intr
wouldn't it be **more** serious	
could be more serious.	

The latter kind can be exemplified by the following extract of [J1-3].

気の	遠く	なる	遠い	歳月。
ki.no	***tooku***	***naru***	*tooi*	*saigetsu*、
mind.NOM	**distant**	**become**	distant	year-and-month.
mind-boggling		**become**	distant	years.
mind-bogglingly distant years.				

Here, the expression 'distant years' refers to the length of half-life of plutonium, which is 24,000 years. The quality '*tooi*' (distant), which does not inscribe any attitudinal meaning in itself, is intensified by '*ki.no tooku.naru*' (mind becoming distant, or mind-boggling). However, in the context where the length of the half-life of plutonium is amplified, '*ki.no tooku.naru*' (mind-boggling) invokes a meaning that plutonium, which is problematic, will stay with us for a very long time. In this way, a GRADUATION resource here flags a negative APPRECIATION: composition.

Within the system of GRADUATION, there are 'two senses in which attitude may be graded' (Hood 2010, p. 85), i.e. GRADUATION as FORCE, and GRADUATION as FOCUS. The present study adopts Hood's (2010) network presented in Figure 3.5.

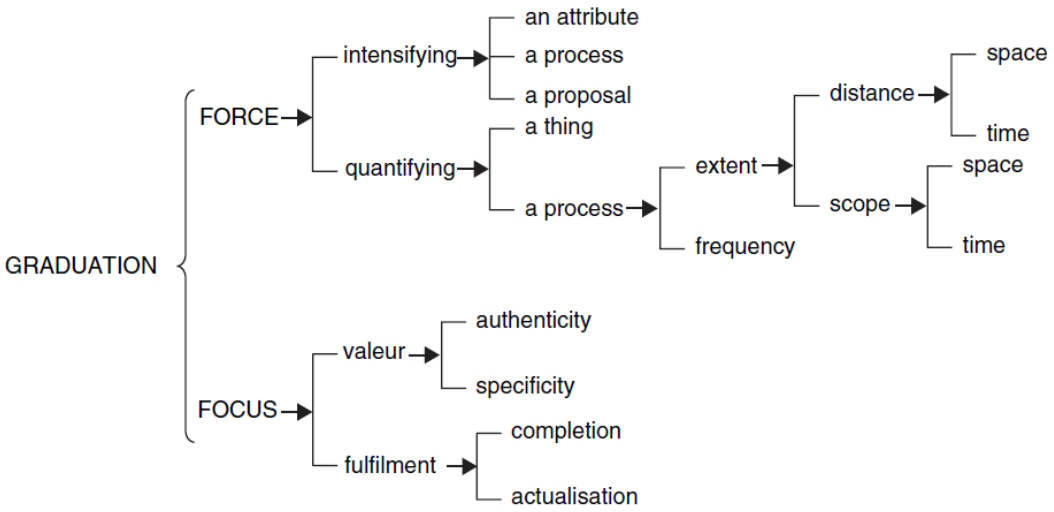


Figure 3.5 The network of GRADUATION as FORCE and FOCUS (Hood 2010, p. 105)

According to Hood, GRADUATION as FORCE has to do with 'degrees of intensity' (p. 85). Grading is done either by 'intensifying' an attribute, a process, or a proposal, or by 'quantifying' a thing or a process. Below is an instance of GRADUATION as FORCE: intensifying a process, invoking an attitudinal meaning of 'not a problem', or, APPRECIATION: + valuation, in the extract from [P2-5].

あれは	そんなに	飛散しない。
are.wa	***sonnani***	*hisan.shi.nai*。
that.TOP	**so/CIR**	dispersal.DO.NEG.
that	**so (widely)**	doesn't disperse.
That (plutonium) doesn't disperse so widely.		

GRADUATION as FOCUS concerns 'strengthening or softening the categorical boundaries around an experiential phenomenon' (Hood 2010, p. 101). The first type of GRADUATION as FOCUS concerns the strengthening or softening of the boundaries around 'experiential entities' (p. 101). They are done in terms of either 'authenticity' or of 'speciality'. The second type of GRADUATION as FOCUS concerns the grading of the boundaries of a process, or 'completion'. For example, in the following extract of [J1-1], '*hoosan.s.arete.shimat.ta*' (has ended up being dissipated) is an instance of GRADUATION: as FOCUS: fulfilment: completion, in which the boundary of the process of being dissipated is strengthened.

放散されてしまった	プルトニウム
*hoosan.s.arete.**shimat.ta***	purutoniumu
dissipation.DO.PSV.**END.PST**	plutonium
has **ended up** being dissipated	plutonium
plutonium that has ended up being dissipated	

Finally, the boundary of the experiential meaning of a whole proposition can be graded, which is referred to as GRADUATION: as FOCUS: fulfilment: actualisation', exemplified in the following extract from [P1-7].

定量的な	議論が	可能に	なります.
teeryoo.teki.na	*giron.ga*	***kanoo.ni***	***nari.masu.***
quantification.ADJ.EPI	discussion.NOM	**possible.CIR**	**become.POL.**
quantitative	discussion	**possible**	**become**
quantitative discussion becomes possible			

In the system of APPRAISAL, GRADUATION provides grading resources of the feelings. Grading of feelings can be done at the level of attribute, process or an entity, or, at the level of proposition, by sharpening or softening the boundary of the whole proposition.

3.5.4.3 ENGAGEMENT

ENGAGEMENT, the third system in APPRAISAL, deals with the evaluation at the level of proposition in relation to other propositions. The theorisation of ENGAGEMENT draws on the assumption that 'all utterances are seen as in some way stanced or attitudinal' (Martin & White 2005, p. 92). It attends to whether speaker/writers 'present themselves as standing with, as standing against, as undecided, or as neutral with respect to these other speakers and their value positions' (p. 93). In Hood's (2004) terms, ENGAGEMENT deals with 'options for bringing other voices into texts, and for positioning those voices in relation to each other' (p. 206).

The present study begins by adopting the ENGAGEMENT network presented in Martin and White (2005) in Chapter 4, and proposes an additional option in Chapter 5.

According to Martin and White, the first distinction in the ENGAGEMENT system is done between 'monoglossia' and 'heteroglossia'. 'Monoglossia' refers to a 'barely asserted

proposition' (Martin & White 2005, p. 99), whereas in 'heteroglossia' voices and value positions that are different from the author's are involved. Hood (2004) conceptualises heteroglossic resources as functioning 'in managing heteroglossic space', by 'introducing and negotiating with other voices' (p. 207). Such management of heteroglossic space can be done either by 'contract' or closing down of the heteroglossic space, or by 'expand', or opening up space for other voices.

The 'contract' option of ENGAGEMENT is further divided into two options, 'disclaim' and proclaim'. The former covers 'those formulations by which some prior utterance or some alternative position is invoked so as to be directly rejected, replaced, or held to be unsustainable' (Martin & White 2005, p. 118). Disclaim are broken down into two options, 'deny' and 'counter'. The deny option rejects the alternative position, and is lexicogrammatically realised by negation. One example is '*nai*' (is non-existent) in the following extract of [P1-5].

現時点で	Pu 大量飛散は	**無い.**
gen.jiten.de	*piiyuu+tai.ryoo+hisan.wa*	***nai.***
present.moment.LOC:at	Pu+large.amount+dispersal.TOP	**non-existent/be.**
at this moment	large dispersal of Pu	**there is not**
There is no large dispersal of Pu at this moment.		

Here, the positive position, 'there is a large dispersal of Pu', is rejected by negation.

The counter option replaces an alternative position, and is often realised by conjunctions including *but, however* and so on. In the following extract of [P2-5], the alternative position represented by 'there is chemical toxicity' is replaced by the position that 'there is no problem unless in large amount', and in doing so the expression of counter-expectancy, '*.ga*' (but) is used.

化学毒性は	あるが、
kagaku+doku.see.wa	*aru.**ga***、
chemistry+poison.character.TOP	be.**but**,
chemical toxicity	there is…, **but**
There is chemical toxicity, but	

もちろん	量が	ないと	問題は	ないし。
mochiron	*ryoo.ga*	*nai* *.to*	*mondai* *.wa*	*nai.shi。*
of-course	amount.NOM	non-existent/be .if	problem .TOP	non-existent/be.and-so.
of course	amount	if there is not	problem	there is no …, so
of course there is no problem if there is not in (a large) amount, and so.				

The second option in the heteroglossic contract is 'proclaim', which covers 'formulations which, rather than directly rejecting or overruling a contrary position, act to limit the scope of dialogistic alternatives in the ongoing colloquy' (Martin & White 2005, p. 121). Within proclaim, there are three options. The first option, 'concur', covers 'formulations which overtly announce the addresser as agreeing with, or having the same knowledge as, some projected dialogic partner' (p. 122). The second option, 'endorse', refers to 'formulations by which propositions sourced to external sources are construed by the authorial voice as correct, valid, undeniable or otherwise maximally warrantable' (p. 126). The third option, 'pronounce' concerns 'formulations which involve authorial emphases or explicit authorial interventions or interpolations' (p. 127). Some examples of these options come from P2's tweet in which two instantiations of '*mochiron*' (of-course) function differently.

もちろん	量が	ないと	問題は	ないし。
mochiron	*ryoo.ga*	*nai* *.to*	*mondai* *.wa*	*nai.shi。*
of-course	amount.NOM	non-existent/be .if	problem .TOP	non-existent/be.and-so.
of course	amount	if there is not	problem	there is no …, so
of course there is no problem if there is not in (a large) amount, and so.				

もちろん	現場では	問題だが。
mochiron	*genba.de.wa*	*mondai.da.ga。*
of-course	site.at.TOP	problem.be/PLN.but.
of course	at the site	is a problem …, but.
Of course it is a problem at the site though.		

The first one is pronouncement, emphasising the authorial position that there is no problem. In the second one, it is used as a resource for concession with a combination

with a countering resource, admitting that plutonium is a problem at the accident site, and yet implying that it is not a problem elsewhere.

The 'expand' option of ENGAGEMENT can either be 'entertain' or 'attribute'. The 'entertain' option involves 'wordings by which the authorial voice indicates that its position is but one of a number of possible positions and thereby, to greater or lesser degrees, makes dialogic space for those possibilities' (Martin and White 2005, p. 104). This option covers lexicogrammatical resources referred to as modality, and is exemplified by the following extract from [P2-6].

泥	なめてた**のかもしれないねぇ**。
doro	*name.te.ta.**no.ka.mo.shire.nai*** *.nee*。
mud	lick.ASP:cont.**NMN.NEGO:intr.HIL.too.BE-KNOWN.NEG .**NEGO:conf(LNG)
mud	may have been licking
Maybe (they=cows) were licking mud, huh?	

Here, the propositional stance that the cows were licking mud is presented as one of the possible reasons why radioactive caesium was detected from its beef. '*ka.mo.shir.e.nai'* (may) is one of the many metaphorical realisations of modality in Japanese (see Section 3.4).

The other option in heteroglossic expand is 'attribute', dealing with 'those formulations which dissociate the proposition from the text's internal authorial voice by attributing it to some external source' (Martin and White 2005, p. 111). There are two options in 'attribute'. In the first, 'acknowledge', 'there is no overt indication, at least via the choice of framer, as to where the authorial voice stands with respect to the proposition' (p. 112). 'Distance', by contrast, 'is where there is an explicit distancing of the authorial voice from the attributed material' (p. 113). The following extract from [P2-2] is an example of attribute: acknowledge, where she refers to another voice, that of P1, in '*P1+sensee.mo it.te.ta.kedo*' (as Prof. P1 was also saying).

P1 先生も	いってたけど、
P1+sensee.mo	***it.te.ta.kedo***、
P1+teacher.HIL:too	**say.ASP:cont(CONTR).PST.but,**
Prof. P1 too	|-.-| **was saying but,**
As Prof. P1 was also saying,	

気体に	なりやすくて、	こういう	中途半端な	物質が	問題なんです。
kitai .ni	*nari .yasuku.te*、	*koo .iu*	*chuutohanpa .na*	*busshitsu .ga*	*mondai .na.n.desu*。
gas .ATTR	become .EASY.SUS,	this-way .SAY	halfway .EPI	material .NOM	problem .be.NMN.be/POL.
gas	easy to become and	like this	halfway	materials	are the problems
these halfway materials easy to become gas are the problems.					

This subsection has overviewed APPRAISAL, the discourse system that deals with evaluation. ATTITUDE deals with various kinds of feeling. GRADUATION handles the grading of these feelings, and ENGAGEMENT positions different propositional voices in relation to each other. Overall, APPRAISAL can be summarised a system in the interpersonal metafunction that has to do with evaluation at the level of proposition (see Subsection 3.5.5).

3.5.5 NEGOTIATION

The third discourse system focused in the present study is NEGOTIATION, the system in the realm of interpersonal metafunction along with APPRAISAL. Martin and Rose (2007) define NEGOTIATION as follows.

> NEGOTIATION is concerned with interaction as an exchange between speakers, how speakers adopt roles and assign them to each other in dialogue, and how moves are organized in relation to one another' (p. 17).

NEGOTIATION may be confused with the APPRAISAL system of ENGAGEMENT for having to do with dialogue. However, what is meant by 'dialogistic positioning' (Martin & White 2005. p. 98) in ENGAGEMENT has to do with propositional voices, and the positioning of the speaker/writer's voices in relation to the voices of 'others'. In

ENGAGEMENT, it does not matter whether the voices are those of the interactants or not. By contrast, in NEGOTIATION, the focus is on the interactive aspects of dialogue between the speaker/writer and his/her addressee.

Accumulation of work on conversational structure (Berry 1981, Ventola 1987, Martin 1992) forms the basis of the current theorisation of NEGOTIATION (Martin & Rose 2007), on which the present study draws.

Addressing the system of NEGOTIATION involves two perspectives, i.e. that of SPEECH FUNCTION, and of EXCHANGE STRUCTURE. The system of SPEECH FUNCTION attends to the 'three basic parameters of negotiation – what it is we are negotiating, whether we are giving or demanding it, and whether a move initiate the exchange or responds' (Martin & Rose 2007, p. 223). Table 3.11 is the classification of basic SPEECH FUNCTIONS.

Table 3.11 Basic speech functions in Martin and Rose (2007, p. 224)

	initiating	responding
giving information	statement	acknowledgement
demanding information	question	answer
giving goods-and-services	offer	acceptance
demanding good-and-services	command	compliance

The basic unit of NEGOTIATION is a 'move'. According to Ventola (1987), 'moves are generated by SPEECH FUNCTION network (…) and are assigned to various speech function classes accordingly (p. 97). In other words, a move 'carries the SPEECH FUNCTION' and can be 'of whatever length' (p. 96). Then, the system of EXCHANGE STRUCTURE attends to the sequencing of the moves. Martin (1992) gives the following example of 'Birmingham school exchange structure' (see Figure 3.6) composed of 'three moves: Initiation ^ Response ^ Feedback' (p. 47).

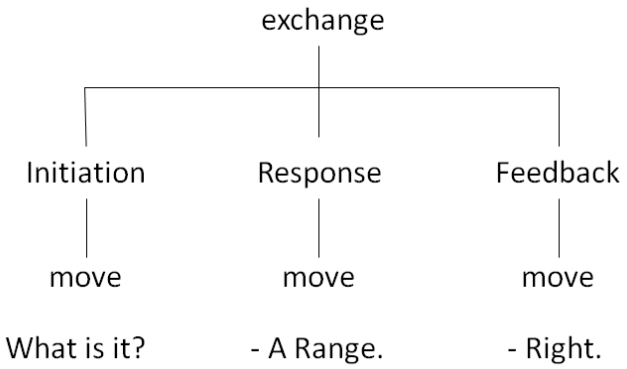


Figure 3.6 Birmingham school exchange structure (redrawn from Martin 1992, p. 46)

Informed by Berry (1981), these moves in EXCHANGE STRUCTURE are assigned with a label such as A1 and K2, depending on what is exchanged. For instance, an action exchange is a negotiation of goods-and-services, whereas a knowledge exchange is a negotiation of knowledge. This kind of exchange involves two kinds of interactants. 'The primary actor' is 'the person responsible for offering goods or performing a service' (Martin & Rose 2007, p. 238). This type of interactant is labelled as A1. 'The secondary actor' is the person who requests goods-and-services, labelled as A2. An example of A2's move can be found in the following extract from [P1-6], in which he requests someone to make graphs of radiation measurement data of two monitoring posts at the nuclear plant in accident.

誰か	やってくれる？
dareka	*yatte.kureru*？
someone	do.GIVE-ME？
someone	do for me?
Can anyone do (it) for me?	

A knowledge exchange involves the following two kinds of interactants. 'The primary knower', or 'K1' is 'the person who has the authority to adjudicate information' (Martin & Rose 2007, p. 238). 'The secondary knower', or K2, is the person who requests information. K1 moves are frequently found in the physicists' tweets, such as in the following extract of [P2-2] is one of such instances, giving information addressed to another Twitter user.

P1 先生も	いってたけど、
P1+sensee.mo	*it.te.ta.kedo*、
P1+teacher.HIL:too	say.ASP:cont(CONTR).PST.but,
Prof. P1 too	|-.-| was saying but,
As Prof. P1 was also saying,	

気体に	なりやすくて、	こういう	中途半端な	物質が	問題なんです。
kitai .ni	*nari .yasuku.te*、	*koo .iu*	*chuutohanpa .na*	*busshitsu .ga*	*mondai.na .n.desu*。
gas .ATTR	become .EASY.SUS,	this-way. SAY	halfway .EPI	material .NOM	problem.be .NMN.be/POL.
gas	easy to become and	like this	halfway	materials	are the problems
these materials (that are) halfway and easy to become gas are the problems.					

An instance of K2 move is found in the following extract of [J1-2], in which he asks a question to a technology expert at a press conference.

厳しい	爆発は？
kibishii	*bakuhatsu.wa?*
severe	explosion.TOP?
Severe (serious) explosion?	

三号機は？
sangoo.ki.wa?
third.machine.TOP?
(How about) Reactor 3?

In addition to these four basic moves, A1, A2, K1 and K2, there are other kinds of moves before and after these basic moves. Moves that come before the basic moves can be ‘anticipatory’ moves. They are ‘initiated by primary actors and knowers who anticipate proffering goods or performing service by offering first to do so, or anticipate professing information by first alerting their addressee that it is coming’ (Martin & Rose 2007, p. 238). These kinds of moves are referred to as dA1 and dK1, or ‘delayed’ A1 and ‘delayed’ K1, respectively. A dK1 move is found in the following extract of [P2-7].

@J2 さんは	これは	読まれましたか？
@J2.san.wa	*kore.wa*	*yom.are.mashi.ta.ka ?*
@J2.TIT.TOP	this.TOP	read.RES.POL.PST.NEGO:intr?
Mr. @J2	this	did you read(RES) …?
Mr. @J2, did you read(RES) this?		

同じ図ですが、
onaji.zu.desu.ga、
same.diagram.be/POL.but,
is the same diagram but,
It's the same diagram, and

上が	セシウム	下が	プルトニウムですが。
ue.ga	*seshiumu*	*shita.ga*	*purutoniumu.desu.ga*。
upper.NOM	caesium	lower.NOM	plutonium.be/POL.but.
upper (one)	caesium	lower (one)	is plutonium, but.
the upper is caesium and the lower is plutonium, but (what does it say)?			

After basic moves of A1 or K1, additional 'follow-up' moves can be made by the secondary actor or knower. One of such exemplar A2f move is [P1-8], expressing gratitude for making graphs for radiation measurement data at the accident site.

感謝.
kansha.
gratitude.
Appreciated.

There are also challenging moves, referred to as 'ch' (Martin 1992, pp. 71-76). In Chapter 5, an exchange of challenges between P2 and a Twitter user will be explored. Here is an extract from [P2-3] in which P2 challenges another Twitter user who relates plutonium to immediate death.

即死って	なんの	話って感じ。
soku+shi.tte	*nan.no*	*hanashi.tte* *.kanji*。
immediate+death.PROJ/TOP(CONTR)	what.ADN	story.PROJ/say(CONTR) .FEELING.
immediate death	what story kind of like	
but like immediate death, what kind of story (is that?)		

The perspective up to present was the different kinds of moves in the EXCHANGE STRUCTURE. In addition to this perspective, Martin (1992), following Burton (1985), provides the internal structure of moves. That is composed of Signal, Pre-Head, Head and Post-Head. Figure 3.7 is an expanded action exchange in Martin (1992, p. 54).

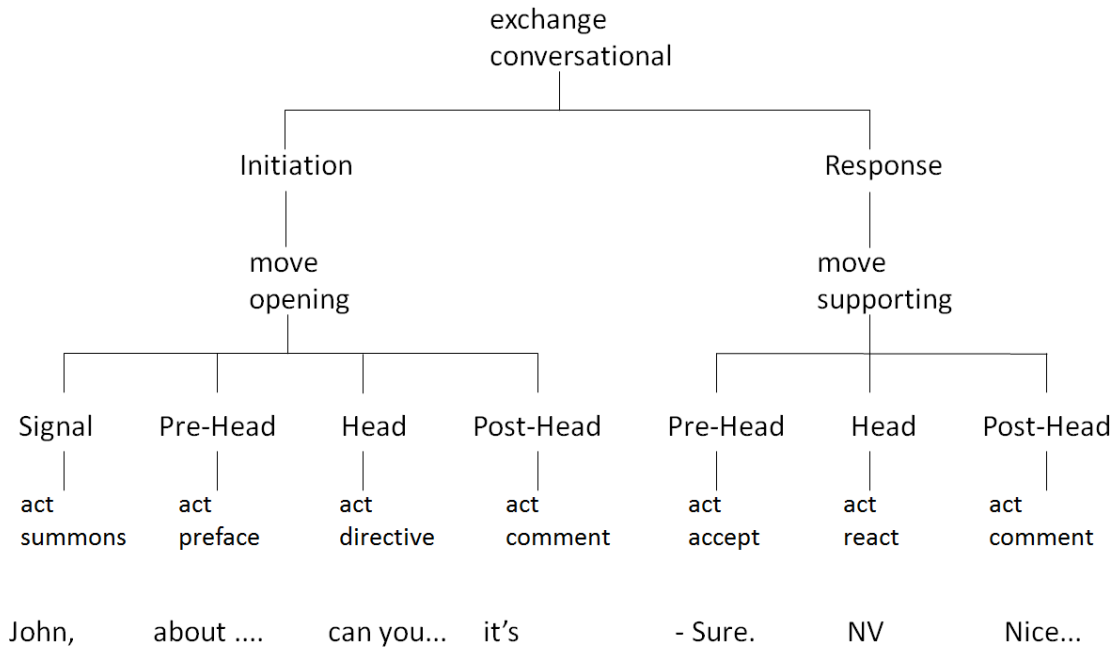


Figure 3.7 An expanded action exchange (redrawn from Martin 1992, p. 54)

For instance, the internal structure of the A2 move in [P1-6] is analysed as in Table 3.12.

Table 3.12 Internal structure of A2 move in [P1-6]

move	Japanese	English translation
Pre-Head act	これまでは正門のグラフを出して来ましたが,	Up to now (I) ┌|·|┘ have been putting out graphs of the main gate (data) but,
	MP2, MP4 のグラフも必要.	Graphs of MP2 and MP4 |-.-| (are) necessary too.
directive	誰かやってくれる？	Can anybody |-.-| do (it) for me?
Post-Head act	http://bit.ly/dV00K7(hyperlinktoTEPCOpage)	

This compositional structure is used in Chapter 5, when analysing in relation to lexicogrammatical choice in POLITENESS.

These frameworks from SFL introduced in this section are applied in analysing Twitter discourse in Chapters 4 and 5. Chapter 4 explores couplings of ideational and interpersonal meaning, focusing on the systems of IDEATION and APPRAISAL. In Chapter 5, the discourse semantic functions of Japanese resources referred to as *keego* are accounted for with reference to the systems of APPRAISAL and NEGOTIATION.

3.6 Conclusion

The fundamental function of this chapter has been to account for key aspects of the research design and of the analytical frameworks that inform the study. As such, the chapter has introduced the medium of Twitter, explained the data set and its collection process, and discussed ethical issues. The issue of processing the data written in Japanese to be presented in English is also discussed, with an explanation of the process of glossing (McDonald 2008). Finally, the discourse systems in SFL that are relevant to this study have been introduced and exemplified with some extracts from the data set. Discussion addressed the issue of applying these systems for the analysis of Japanese.

Beyond this account, some significant contributions have been made at this design stage. The first concerns the process of glossing in addition to providing translation. It involves segmenting of the original text into meaningful units, and providing item-by-item equivalents in English. By making explicit choices in this process, the study aims to address meanings realised in Japanese lexicogrammar with minimal distortion of meaning caused by translation. In the process of establishing the glossing principles for this particular research, a number of unresolved aspects of the SFL description of Japanese have been discussed as well. A further contribution has been the additional use of emoticons in this process, as a means to make more accessible certain meanings of the lexicogrammatical resources of *keego* in Japanese in the English translation. The glossing proposed here is not definitive, but one that aimed to show the contingent nature of the process, and how this applies in the present study. Acknowledging that it is

open for further refinement, the significance here lies in shedding light on this important part of the text processing.

Another contribution arises from exploring discourse semantic meanings realised in lexicogrammar of Japanese. The challenge faced is how to conceptualise discourse semantic systems in relation to lexicogrammatical systems in different languages. The present study takes the position that the two strata are distinguished as relative on a hierarchy of abstraction (Martin 1992, Martin & Rose 2007), with the more abstracted level of meanings in discourse realising across different systems in the lexicogrammar of different languages. This assumption forms the bases for analysing discourse semantic choices made in texts written in Japanese.

Having attended to the design and the challenges implicated in in the exploration of linguistic contribution to community formation on Twitter in Japanese, Chapters 4 and 5 present the findings of this exploration. Chapter 4 takes the first step into an exploration and comparison of the communities that form around two professional groups – physicists and freelance journalists – with a focus on a particular shared field. Chapter 5 extends that analysis and interpretation with close attention to the functions in Japanese referred to as *keego.* This is particularly relevant to the negotiation of affiliation in the community formed around the physicists.

Chapter 4 Bonding around plutonium

4.1 Introduction

This chapter begins to explore linguistic contributions to the formation of two specific Twitter communities in the immediate aftermath of the nuclear crisis in Japan in 2011, a time of crisis and high anxiety (see Chapter 1). The data analysed come from the tweets of four professionals whose fields were seen as highly relevant to the unfolding crisis – those of physicists and of freelance journalists. Each of these four tweeters is viewed from the perspective that they constitute the *hub* of a specific community (Chapter 3). Data from each hub are then compared across the two professional groups, that is, the physicist group (P Group) and freelance journalist group (J Group). The tweets come from the month immediately following the nuclear accident, and are selected on the basis that they addressed the issue of plutonium. This was a matter that had social significance in Japan in the post nuclear-accident period. The analysis and discussion presented here is an extension and elaboration of a preliminary analysis reported in Inako (2014). Focus is drawn on couplings of values with experience (Knight 2010a, 2010b).

To contextualise the data, Section 4.2 begins with a brief account of events relating to plutonium during the immediate aftermath of the nuclear accident. Additionally, a quantitative perspective is given on the four sets of tweets posted by the four professionals. In Section 4.3, the tweets posted by these hubs are examined in terms of how they construe the field of plutonium and any sub-fields that are represented. The issue of plutonium emerged over one month of the nuclear crisis, and came to a head with a press conference provided by TEPCO concerning leakage of plutonium. Beyond an analysis of the way the field of plutonium is construed, the tweets are also analysed for evaluative meanings that couple with the field. The analysis of evaluative meanings refers to the discourse semantic system of APPRAISAL in SFL (Martin and White 2005). Analyses then explore the extent to which couplings accumulate over a month on

Twitter, and the kinds of couplings that emerge as dominant. These are compared across the two professional groups (P Group and J Group). The aim is to explore the extent to which each professional group establishes a shared basis for community formation in the context of the nuclear crisis, that is, a shared basis for affiliation, what the nature of that *bonding orientation* (see Section 4.4) is, and whether and how it differs across the two groups.

4.2 Contextualising the plutonium issue

Nuclear accidents are generally considered to be different from other kinds of accidents and disasters. Their potential scope of destruction and danger in place and time are conceived of as beyond what is visible or sensible. Additionally, they implicate highly technical scientific knowledge that is not accessible to the population at large. Nonetheless, from the earliest period of the nuclear crisis at Fukushima Daiichi, the information provided by the mainstream media had considerable scientific content. That included names of different radioactive materials, such as iodine 131, caesium 137 and plutonium, different units for measuring radioactivity, including Sievert and Becquerel, and devices for measuring radioactivity such as Geiger counters. Scientific knowledge of this kind, new to most people lay in science, flooded into Japanese society as the nuclear accident was reported via media, confusing the minds of people.

The explosions of reactors also had a dramatic impact on people. Live or video-recorded images of smoke emerging from them were repeatedly broadcast. Throughout one year, media were filled with news about detection of high radioactivity or of radioactive materials from various places, and about contamination of life supplies including water and different kinds of food (e.g. milk, fish, rice, vegetables and beef). The heightened sense of insecurity was further intensified by a comment from a government

spokesperson referring to a 'level which does not have an immediate impact on health'. At the same time, dissatisfaction and distrust with 'official'[69] information also spread.

In this context, online media, including Twitter, were filling a perceived void, generating all kinds of information from the more optimistic to the extremely pessimistic. Situated in this context, this study is interested in how the nuclear crisis, which inevitably involves some understanding of science, was engaged with on Twitter, and how communities of different kinds formed in the process.

Among new technical terms that people frequently encountered in the aftermath of the accident were the names of radioactive materials including caesium, iodine and plutonium. Retrospectively, it came to be understood that caesium and iodine were the elements that were dispersed in larger amounts and would have the major impact on society. Radioactive iodine 131, with a short half-life of 8 days, was detected in tap water in Tokyo, and caused panic in the second week after the accident. Caesium was dispersed to larger areas and caused contamination for a longer period. Some other materials, including strontium and xenon, were temporarily of news value during the course of the first year, but were later found not to have a major impact. Prior to the Fukushima accident, the word plutonium had probably been more widely recognised amongst the population as one of fuels used in major nuclear power generators alongside uranium. It was also recognisable for some people for its association with the atomic bomb dropped on Nagasaki in 1945. However, this recognition was not widely shared in Japanese society, nor did it imply any knowledge about the scientific characteristics of plutonium except a vague perception that it would probably be more dangerous than uranium, another major nuclear fuel.

One reason for taking up the topic of plutonium as a focus for a comparative analysis of community formation was because of the social impact that this was having on Japanese society at that time. The following quote from *Nature News Blog* posted one year after the accident suggests what people's perception of plutonium was at that time.

[69] The information largely perceived as 'official' at that time included press conferences by the government, the governmental institute of 'Nuclear Industrial Safety Agency' and the owner of Fukushima Daiichi Nuclear Power Plant, TEPCO (Tokyo Electric Power Company).

> Even for those who worry about low-dose radiation, it's safe to say that this additional plutonium exposure won't have an impact. (…) But the news of plutonium, no matter how small, will no doubt be dispiriting to the residents of Fukushima (Brumfiel 2012).

Here, the writer couples 'plutonium' with negative APPRECIATION of impact 'dispiriting', suggesting that this coupling is shared by the residents of Fukushima. In other words, the coupling of the impact of plutonium with 'dispiriting' is interpreted as a shared coupling, or bond (Knight 2010). How bonds around plutonium come to function in the building of communities is explored in this chapter.

From this perspective, thid chapter examines how the issue of plutonium was communicated at the early stage of the nuclear crisis. Retrospectively, it was the period in which Japanese society began being exposed to the field of nuclear crisis. Different kinds of couplings began to accumulate on Twitter along with and in reaction to revelations of new facts about the nuclear accident broadcast by the media. Concerning plutonium, there was a significant event in the middle of the first month of the crisis (see Chapter 4.3). Around this time plutonium became a hot topic on Twitter. The tweeters from the two professional groups of this study were all actively involved in communicating about this topic. It is then interesting to explore how different kinds of couplings were accumulated during this earliest period of the crisis in relation to the 'dispiriting' bond that took shape in one year. The dynamic aspect of affiliation can then be revealed.

4.3 Analysing tweets about plutonium

The analysis of tweets about plutonium is approached from two perspectives. The first one is quantitative, comparing the frequency and the temporal distribution of tweets posted by the two professional groups in the first month of nuclear crisis. This is followed by coupling analysis from a qualitative perspective. Selected tweets from the four tweeters are analysed in detail, in order to explore patterns.

4.3.1 A quantitative account of tweets about plutonium

The data of this quantitative analysis are tweets written by the four tweeters in the first month after the nuclear accident was made public, i.e. from 12/03/2011 to 11/04/2011. This is an expanded version of the analysis conducted in Inako (2014, p. 8-9), and is composed of two parts. The first one attends to the number of tweets that refer to plutonium compared to those referring to two other important materials, i.e. caesium and iodine. The second part compares the temporal distribution of tweets about plutonium posted by the four tweeters.

The analysis first considers the number of tweets that include the wording of three different kinds of radioactive materials, i.e. '*purutoniumu*' (plutonium), '*seshiumu*' (caesium), or '*yooso*' (iodine). Tweets which contained chemical symbols for these materials 'Pu' for plutonium, 'Cs' for caesium and 'I-131' for 'iodine 131' are also considered. Those tweets are selected either in their own tweets, or in the parts written by another tweeter quoted by the author in the case of retweets (see Chapter 3). If more than one material is mentioned in one tweet, all the types of radioactive materials in a tweet are counted. Tweets that refer to these radioactive materials without explicitly mentioning them are excluded. This is done because the aim of the analysis is not to identify the precise number of times the tweeters wrote about these radioactive materials, but to compare the relative frequency with which each writer tweeted on the topics of one of these isotopes, in order to see if there is any similarity or difference within/across professional groups.

Table 4.1 shows the total number of tweets during the first month, and the ones that contain one of these materials with the percentage in relation to the total numbers of tweets. Figure 4.1 shows the proportion of these numbers in relation to the total number of tweets in pie charts.

Table 4.1 Numbers of tweets on different radioactive materials in the first month

	Tweets about Plutonium	Tweets about Caesium	Tweets about Iodine	Total Tweets
	No (%)	No (%)	No (%)	No (%)
P1	29 (1.4)	58 (2.8)	111 (5.4)	2065 (100)
P2	69 (1.4)	90 (1.9)	135 (2.8)	4760 (100)
J1	19 (1.7)	6 (0.5)	9 (0.8)	1138 (100)
J2	27 (3.4)	2 (0.3)	1 (0.1)	798 (100)

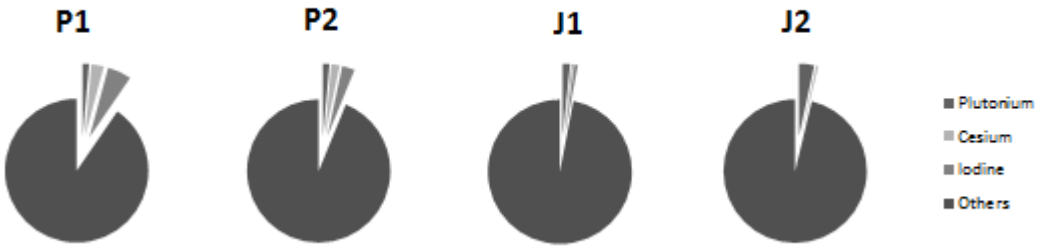


Figure 4.1 The proportion of tweets about plutonium and about other materials in the first month

The analysis shows interesting differences between the two groups. While the physicists tweeted more frequently on iodine and caesium during the first month, the freelance journalists did not tweet as frequently about these two materials as about plutonium. This tendency is particularly evident in J2. He tweeted 27 times on plutonium while only three times on the two other materials that were of issue in the first month of crisis. The different frequency patterns across the two professional groups suggest that the two groups may have placed a different degree of importance on these radioactive materials that were emitted into the environment due to the accident.

A temporal distribution of tweets in the two professional groups also shows contrast. During the third week after the nuclear accident, a milestone event occurred which made plutonium a major concern. Late night 28/03/2011 to early morning 29/03/2011, TEPCO, the company that owns Fukushima Daiichi Nuclear Power Plant, gave a press conference in which they informed the public that reactor-originated plutonium was detected in soil at the site of the nuclear plant. Several days before the conference,

Twitter ambience (see Chapter 3) began to be filled with suspicious tweets about plutonium being emitted. The four professional tweeters became involved in conversations about plutonium during the course of events.

Figure 4.2 and 4.3 illustrate the temporal distribution of tweets about plutonium written by the physicists and by the journalists respectively.

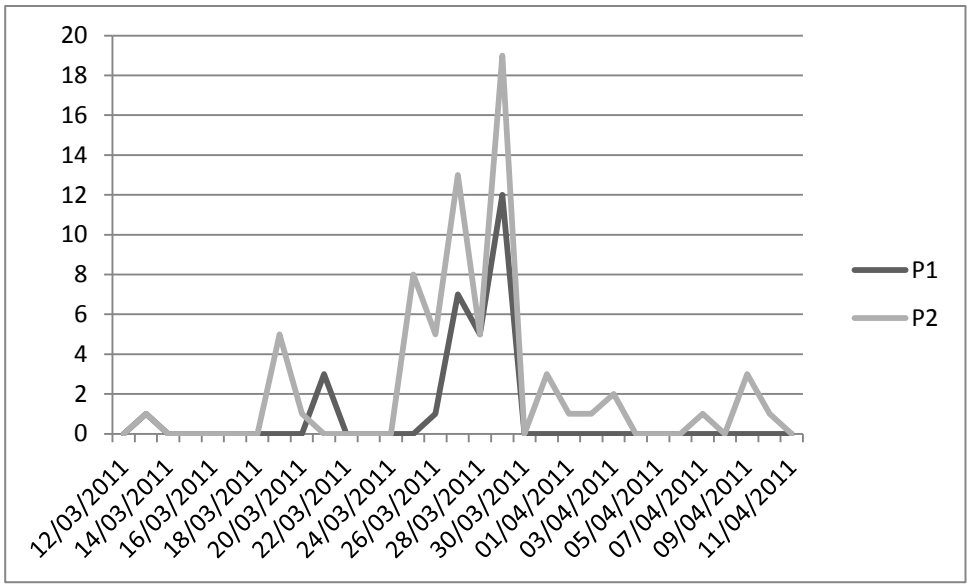


Figure 4.2 Temporal distribution of tweets on plutonium by P1 and P2

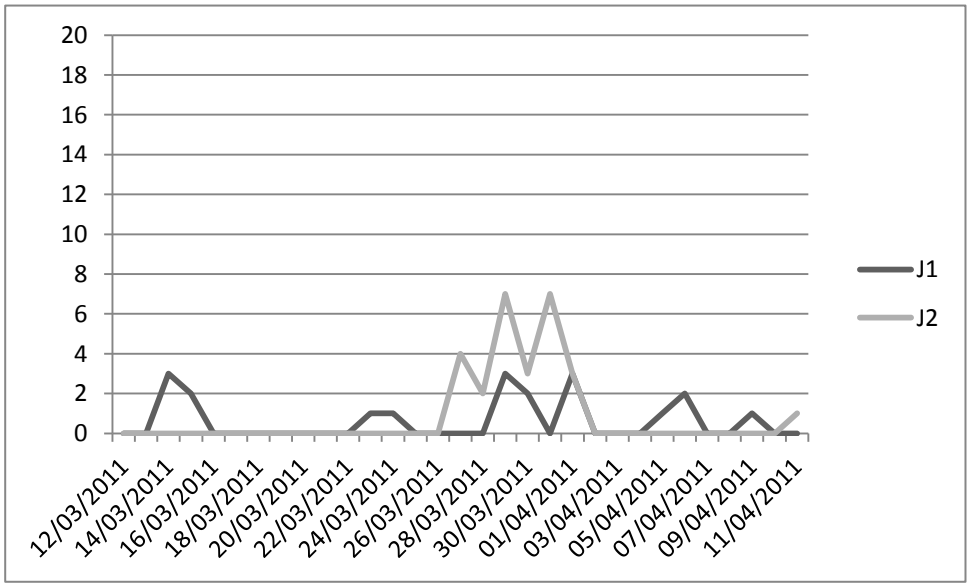


Figure 4.3 Temporal distribution of tweets on plutonium by J1 and J2

It is interesting to explore tweets on plutonium in relation to the milestone event mentioned above, TEPCO's press conference. From a few days before this event, considerable suspicion was generated on Twitter about the leakage of plutonium from the nuclear reactors. The distribution pattern of tweets in relation to this unfolding of events was similar for the two physicists. They both tweeted on plutonium a few times in the earliest period of the accident, but most of their plutonium tweets are concentrated around the day of TEPCO's press conference. Particularly, P1 posted 16 tweets in 17 minutes around 7:30 on the morning after the conference, 11 of which are known as 'Sequential tweets on plutonium in the nuclear plant site'.

The journalists' tweets on plutonium follow a different pattern. While both journalists also tweeted most frequently around the time of TEPCO's conference, J1's tweets on plutonium are rather scattered compared to those of the other three tweeters. J2's tweets are condensed around the time of the press conference. However, J2 did not tweet on plutonium as frequently as the physicists.

This quantitative perspective on tweets that contain the word 'plutonium' or 'Pu' provides contrastive patterns between the physicist tweeters and the freelance journalist tweeters. The main difference concerns frequency in relation to two other radioactive materials which had a significant impact on Japanese society in the post nuclear accident period. Some difference was also seen in terms of the distribution of tweets in relation to the unfolding of the events concerning plutonium, particularly in relation to the press conference where the leak of plutonium was made public. This overview suggests that the difference may also apply to coupling patterns, which may in turn suggest different bonding orientations (see Section 4.4) across professional groups.

In order to confirm this possibility, a more detailed investigation into the meanings construed in tweets is necessary. This is where coupling analyses from a discourse semantic perspective come into play, which is presented in the next section.

4.3.2 Coupling in plutonium tweets

From an individuation perspective, couplings of ideational and interpersonal meanings, and their accumulation over multiple tweets to form a recurring cluster of bonds, provides a basis for understanding communities (see Chapter 2). In this research context, a nuclear crisis, the focus is on how the four tweeters from two professional groups coupled different kinds of evaluative meanings with kinds of knowledge in relation to the unfolding of the events over the one month. Through this process, the kinds of bonds that the two professional groups offered to their readership are expected to be revealed.

4.3.2.1 Categorising tweets on plutonium

For this coupling analysis, a selected number of the tweets are taken up. The objective of the analysis here is to reveal the kinds of couplings and how they accumulated over time in relation to the unfolding of the events and highlighted issues at the time. Bearing that in mind, the first step of analysis consists of the selection of tweets to analyse from the data set of the first month.

Selection is based on a number of subtopics regarding plutonium with respect to two perspectives, i.e. science and impact on society. Attention is paid to the time flow in which the events and issues unfolded. In the earliest period, when the news of the nuclear accident had just been disseminated, some tweeters were already mentioning plutonium in terms of its potential impact. However, as previewed in Section 4.2, the plutonium issue became foregrounded in the Twitter ambience about two weeks after the accident, beginning from prevailing suspicion about a plutonium leak, reaching its peak at the time of TEPCO's midnight press conference on the detection of plutonium from the soil of the plant. In the course of one month, plutonium was mentioned on Twitter in terms of various aspects.

The following seven subtopics refer to particular aspects of the plutonium issue on which both physicists and freelance journalists tweeted in the one month:

- the potential impact of the leakage of plutonium in the earliest period after the accident;
- the issues that became highlighted with the reported unfolding of events around the time of TEPCO's press conference including:
    - the long half-life of plutonium;
    - dispersal of plutonium;
    - a device for measuring plutonium;
    - the presence of plutonium in the world;
    - the significance of the plutonium leakage in Fukushima;
- Tweets that laugh at couplings about plutonium.

Tweets from each group for each subtopic of plutonium were selected as a basis for comparing coupling patterns. The numbers of tweets selected for this exploration are shown on Table 4.2.

Table 4.2 Numbers of tweets on plutonium

	Tweets on plutonium posted in one month	**Tweets examined in Chapter 4**
P1	29	5
P2	69	4
J1	19	4
J2	27	3

The original texts are in Japanese, and their glossing and English translation is provided in Appendix 2 as it appears in this chapter.

In the following subsections, the tweets associated with each subtopic of plutonium are analysed for the couplings of interpersonal meanings with the ideational meaning associated with plutonium. In terms of ideational meanings, the study focuses on kinds of fields construed and on choices in the system of IDEATION in terms of kinds of entities referred to. In terms of interpersonal meanings, the focus of this chapter is on APPRAISAL, consisting of the systems of ATTITUDE, ENGAGEMENT and GRADUATION to explore the different kinds of values coupled with different kinds of ideational meanings in the tweets. Patterns of couplings are then compared across the two professional

groups. These patterns are then discussed in relation to the different kinds of communities formed around the different kinds of professional tweeters.

4.3.2.2 Plutonium and its potential impact

The major concern in the earliest stage of the nuclear accident was that the reactors had lost control of their cooling system due to the tsunami. From a nuclear technology perspective, the issue was about how to prevent further disasters such as recriticality[70]. However, people were also anxious about the possible impact of the radioactive materials emitted into the environment due to the hydrogen explosions (see Chapter 1) and in terms of the threat they posed for human life and the environment. Plutonium was one such radioactive material, and tweeters began to mention this at this earliest stage. The tweets of [P1-2], [P2-1] and [J1-1] are examined here.

P1 was the first to refer to plutonium. He did so on the second day after news of the accident was made public. He mentioned plutonium in terms of the kinds of radioactive materials used in a particular reactor at Fukushima Daiichi, and the possible impact it might have. The field is that of nuclear technology. In the last part of the tweet, the occurrence of '*tokubetsu.na jitai*' (special matter) is negated.

プルサーマルだからと言って	**特別な**	**事態は**	生じません.
purusaamaru.da.kara.to .it.te	***tokubetsu .na***	***jitai .wa***	*shooji.mas.en.*
plu-thermal.be.because.PROJ .SAY.SUS	**special .EPI**	**state-of-affairs .TOP**	arise.POL.NEG
because it is plu-thermal	**special matter**		does not arise
special matters do not arise because (it) is a plu-thermal.			

Negation, in terms of APPRAISAL, is an ENGAGEMENT resource of heteroglossic contraction. It presupposes a claim or belief that special matter would occur with plu-thermal reactors, and responds to it by denying it. Then, the attitudinal meaning coupled

[70] 'Recriticality' in physics, means 'a return to a point at which a nuclear reaction becomes self-sustaining' (Web-Definition.com n.d.)

with plutonium here can be analysed as ‘not special’, or not likely to be grave, invoking in this case APPRECIATION: + valuation’.

P2 mentioned plutonium in [P2-1] on 13/03/2011 as well. She mentioned it in terms of the general characteristics of various kinds of radioactive materials and the possible impact that plutonium might have. The field of this tweet is scientific. Then, like P1, P2 also uses negation in coupling of the potential impact of plutonium, denying the propositional stance, ‘plutonium is a problem’, claiming that plutonium is not a problem at this stage.

ウランとか、	**プルトニウムとか**	燃料	そのもの、ってのは
uran .toka、	***purutoniumu .toka***	*nenryoo*	*sono.mono*、*.tte .no.wa*
uranium .and-so-on,	**plutonium .and-so-on**	fuel	it/ADN.THING、.PROJ/SAY(CONTR) .NMN.TOP
like uranium	**like plutonium**	fuel	thing that is … itself
Those materials that are fuels themselves, like uranium and plutonium,			

この	段階で	問題に	しなくていいですね。
kono	*dankai.de*	***mondai.ni***	***shi.nakute.ii.desu.ne***
this/ADN	stage.LOC:at	**problem.ATTR**	**do.NEG.GOOD.be/POL.NEGO:cnf**
at this stage		**do not need to make it a problem**	
do not need to be problematised at this stage, right?			

The value coupled with plutonium here is APPRECIATION: composition: + balance.

J1 mentioned plutonium in his tweet [J1-1] on 14/03/2011, referring to plu-thermal reactors as P1 did. The field is also nuclear technology. The evaluative meaning of plutonium appears in a projected speech of Mr. {family-name} replying to J1’s question about Reactor 3.

プルサーマルの、	BOX 燃料は、	**プルトニウムを**	含んでいるから、
purusaamaru .no、	*bokkusu+nenryoo .wa*、	***purutoniumu .o***	*fukun.deiru.kara*、
plu-thermal .ADN,	BOX+fuel .TOP,	**plutonium .ACC**	contain.ASP:cont.because,
plu-thermal's BOX (mistype of MOX) fuel		**plutonium**	because (…) contain
BOX(mistype of MOX) fuel in a plu-thermal, because it contains plutonium,			

より	厳しいのではないか。
yori	***kibishii.no.de.wa.nai.ka*。**
more	**severe.NMN.be.TOP.NEG.NEGO:intr**
wouldn't it be more serious?	
could be more serious.	

.No.de.wa.nai.ka is a kind of rhetorical question that is commonly used to indicate modalisation. Plutonium is coupled with a value '*kibishii*' (severe) in Japanese, whose more appropriate English translation in this context would be 'serious'. This is is an instance of inscribed APPRECIATION: composition: - balance. The attitudinal meaning is amplified by '*yori*' (more), a GRADUATION resource as FORCE.

Further, the existence of '*mo*' (too) in '*moeru ondo.mo hikui*' (Burning temperature is low too.) functions as another amplifier. It supports the seriousness of MOX fuel containing plutonium in plu-thermal reactors.

燃える	温度も	低い
moeru	*ondo.mo*	*hikui*
burn	temperature.HIL:too	low/be
burning temperature also		low
The burning temperature is low too.		

The three tweets analysed above show that two professional groups couple opposing evaluative meanings with plutonium. While the physicists regard it as unproblematic and of little potential impact, the journalist proposed a serious, and thus potentially problematic, value to be attached to plutonium. P1 and J1 couple these values to plutonium in the field of technology, while P2 does it in the field of science. These couplings at the early stage of the nuclear crisis form a point of departure from which the two professional groups tweeted on the issue of plutonium in the course of one

month. They will be revisited in the following subsections in exploring the accumulated coupling patterns, to be summarised in Section 4.3.3.

4.3.2.3 Plutonium and its long half-life

From this subsection on, coupling analyses deal with tweets posted from the third week on after the nuclear accident. It was the period in which the plutonium issue became highlighted in the Twitter ambience toward the milestone event of TEPCO's press conference. This subsection's focus is plutonium's 'half-life'.

Hangenki (half-life) was one of the technical terms that became familiar to non-scientists in Japan after the nuclear crisis. In English, 'half-life' is defined as 'the time required for half of the atoms in a radioactive material to undergo decay' (Collins English Dictionary 2009). In Japanese, '半減期 *hangen.ki*' (reduction-into-half.period) is composed of three *kanji* or Chinese characters which mean 'half', 'reduce' and 'period' respectively (see Chapter 3). In terms of ideational metafunction, 'half-life' is a metaphoric entity (Martin and Rose 2007, p. 114) in which a process of decreasing is infused. It involves an amount of a concrete, technical entity (Inako 2014, p. 12) in relation to time. The topic is selected here, because the word attracted people's interest since the early stage of the nuclear crisis. It concerned the speed with which the power-plant-generated radioactive materials dispersed in the environment would disappear. People were keen to know about the topic in order to understand the impact of the emitted radioactive materials on their lives. In lay people's understanding, a long half-life meant that the radioactive material would stay in their environment for a longer time, and thus was 'scary'[71].

The tweets selected for this topic, [P1-2] and [J1-2], were respectively posted on 27/03/2011 and 29/03/2011. They are now examined to compare the different evaluative implication of the ideational meaning of 'half-life'. The half-life of plutonium is 24,000 years. Both the physicist P1 and the freelance journalist J1 relativise this length of time

[71] See Section 4.3.8 for the discussion of [P2-4], posted on 20/03/2011 in which P2 laughs at the coupling of 'long half-life' with an attitudinal meaning of 'scary'.

as long rather than short. However, they flag different kinds of values to the long half-life of plutonium.

As for [P1-2], in the following clause complex, the half-life of plutonium is taken as long, with an amplifier '*.mo*' (as long as).

半減期が	2 万 4000 年も	あり,	α 線を	出して	崩壊する	Pu は,
hangen .ki.ga	*ni+man+ yon+sen .nen* ***.mo***	*ari,*	*arufa+ sen .o*	*dashi .te*	*hookai .suru*	*piiyuu .wa,*
reduction-into-half .period.NOM	two+tenthousand+ four+thousand .year .**HIL:as-much-as**	be/ SUS,	alpha+ line .ACC	give-out .SUS	decay .DO	Pu .TOP,
half-life	**as much as** 24 thousand years	be,	alpha ray	giving out	decays	Pu
Pu, whose half-life period is as long as 24 thousand years and which decays by giving out α rays						

ドッサリ	ない限り	検出できない.
dossari	*nai.kagiri*	*kenshutsu.deki.nai.*
a-heap(COL)	non-existent/be.LIMIT	detection.DO/POT.NEG.
a heap	unless there is	cannot detect
cannot be detected unless there is a heap.		

This comes along with another scientific characteristic of plutonium, i.e. that it decays emitting alpha rays. These two characteristics are then taken up to support a claim that Pu cannot be detected unless there is 'a heap'. In this last part, in the feasibility of detection of Pu is evaluated in relation to the amount of plutonium. Overall, the ideational meanings construed here belong to the field of science.

In terms of APPRAISAL, the whole clause complex invokes an attitudinal meaning of difficulty to detect a small amount of plutonium. The length of the half-life of plutonium presented as '*ni+man+yon+sen.nen.mo*' (as long as 24,000 years) functions as a GRADUATION resource as FORCE, quantifying the extent of distance in terms of time. This flags the ATTITUDE, 'difficulty', which is APPRECIATION: composition: - complexity. In terms of ENGAGEMENT, heteroglossic contraction: deny, i.e. *nai* (non-existent, or

negation), is used, distancing the writer's propositional stance from the possibility of detecting a small amount of plutonium. At the end of the tweet P1 closes down the possibility of a large dispersal of plutonium using negation.

現時点で	Pu 大量飛散は	無い.
gen.jiten.de	*piiyuu+tai.ryoo+hisan.wa*	***nai.***
present.moment.LOC:at	Pu+large.amount+dispersal.TOP	**non-existent/be.**
at this moment	large dispersal of Pu	**there is not**
There is no large dispersal of Pu at this moment.		

Attention now turns to [J1-2]. This is a so-called 'unofficial retweet' (see Chapter 3) containing a quote written by another user @user3. This tweet was posted while the milestone event of TEPCO's conference was on-going. It replied to another tweet written by @user3 who quotes an exchange between a newsperson asking a question at the press conference and TEPCO's vice president replying to it. As such, the tweet contains a number of voices, and therefore interesting to see how the writer positions these different voices.

The first voice is that of @user3 in the latter half of this tweet. This part consists of two quotes and a hyperlink to an online video site in which TEPCO's press conference was broadcast live at the time when the tweet was posted. The first quote is a question asked by the newsperson. It is followed by the answer given by TEPCO's vice president as follows.

「2 万 4 千年であったかと」
『*ni+man.yon.sen.nen.**deat.ta.ka.to***』
two+ten-thousand.four.thousand.year.**be/LPLN.PST.NEGO:intr.PROJ'**
'whether (it) was 24 thousand years'

Here, '*deat.ta.ka.to*' in is understood as a modality resource. It is comprised of '*dearu*.' an equivalent to 'be' in learned-plain option (see Chapter 5) followed by ' .*ta*' which indicates past, '.*ka*', negotiatory marker[72] of interrogation and a projection particle, '.*to*'. Having '.*to*' at the end of the clause indicates that it is supposed to be followed by a mental process such as '*omou*' (think), which is read as being omitted.

[72] Teruya (2007, p. 144). See also Chapter 3.

In APPRAISAL terms, modality can function both as a GRADUATION and ENGAGEMENT resource. In terms of GRADUATION, it blurs the FOCUS: fulfilment: actualisation. In terms of ENGAGEMENT, it opens up space for other possibilities by entertaining. However, in this case, it is rather strange from a scientific perspective that the actualisational value of the proposition 'the half-life of plutonium is 24,000 years' is blurred. The half-life of plutonium is a scientifically defined truth. In terms of ENGAGEMENT, it is a heteroglossic expand: entertain. However, it is rather strange that space for an alternative voice is open for the half-life of plutonium, which is scientifically defined. This leads to an interpretation of this quote from another perspective. In other words, when modality is found in this quote of the vice president of TEPCO, it means that the company responsible for the nuclear crisis is uncertain, or unconfident, of a scientific characteristic of a radioactive material it needs to handle. As such, an evaluative meaning of JUDGEMENT: - capacity is invoked, targeted to the company TEPCO. Field is now on the corporate world.

The first part of [J1-2] written by J1 himself is monoglossic and represents his own subjective voice. In this part, the length of the half-life is associated with the title of a song for a TV commercial, indicating that the field is that of popular culture. Readers may or may not know this particular song, but can still infer that the title amplifies the temporal distance of the half-life encoded as '*tooi*' (distant). The meaning is amplified with a common metaphoric amplifier in Japanese, '*ki.no tooku naru*' (mind-boggling). This expression does GRADUATION work as FORCE by flagging a negative attitudinal meaning. The expression in Japanese contains the word 'distant' in itself.

気の	遠く	なる	遠い	歳月。
ki.no	**distant**	**become**	*tooi*	*saigetsu*。
mind.NOM	***tooku***	***naru***	distant	year-and-month.
mind becomes distant			distant	years.
Mind-bogglingly distant ages.				

However, it is not possible to retrieve what kind of ATTITUDE flagged from this tweet only. J1 leaves the readers to infer the kind of ATTITUDE that had been inscribed elsewhere, for instance from [J1-1] posted 15 days prior. This is a matter of intertextuality, which is revisited in Section 4.3.3.

To summarise this section, different fields were construed in terms of the half-life of plutonium. While P1 mentioned the detection of plutonium from a scientific perspective, J1's tweets involves the corporate field and the popular culture field. In terms of the interpersonal meaning, both P1 and J1 consider that the half-life of plutonium is long. They both used GRADUATION and ENGAGEMENT resources to evaluate this long half-life. However, the values they coupled with it are strongly contrasted. In terms of GRADUATION, while P1 relates its long half-life to the difficulty of detecting small amounts of it, J1 invokes a negative attitudinal meaning by amplifying the length. Also, in J1's tweet, a modality resource is used as GRADUATION as FOCUS to blur TEPCO's voice, leaving the readership uncertain about its voice. By contrast, P1 uses ENGAGEMENT resources of heteroglossic contraction, closing down the feasibility of detecting a small amount of plutonium.

4.3.2.4 Dispersal of plutonium: matter by degree or matter of whether or not

The next issue concerns dispersal of plutonium. Here, the physicists and the freelance journalists construed different ideational meanings and then coupled different values with them. In terms of the ideational meaning, the focus is on the construal of scientific meaning as 'a matter by degree' as opposed to non-scientific construal of meaning 'a matter by kind' (Lemke 2004, p. 34, see also Chapter 2). Three tweets [P2-2], [P1-3] and [J2-1] are examined in the order in which they were posted.

[P2-2] was tweeted on 25/03/2011, when tweets expressing suspicion about plutonium leakage were on the increase in P2's Twitter ambience. At the beginning of the tweet, a dot '.' followed by a user account '@user1' indicates that it is addressed to @user1, and that the tweet is shown on the timeline of all who follow P2. This suggests that the tweet was written as a reply to @user1 even though there is no quotation from @user1's tweet.

P2 begins the tweet as follows:

あれは	**そんなに**	飛散しない。
are.wa	***sonna.ni***	*hisan.shi.nai*。
that.TOP	**so.CIR**	dispersal.DO.NEG.
that	**so (widely)**	does not disperse.
That (plutonium) does not disperse so (widely).		

'*Sonna.ni*', in Japanese, is a grading resource that can co-occur with various circumstances or attributes, or isolately as in this case, to function differently depending on context. In this context where P2 writes in the latter part of the tweet,

あちこち	飛ぶかもしれないが、
achikochi	*tobu.ka.mo.shire.nai.ga*、
here-and-there	fly.NEGO:intr.HIL:too.BE-KNOWN.NEG.but,
here and there	may fly, but
it may fly here and there, but	

'*sonna.ni*', modifying '*hisan.shi*' (disperse), is interpreted as expressing the relative spread, corresponding to '*achikochi*' (here and there) in the latter clause. '*Achikochi tobu*' (fly here and there) is understood as a recontextualisation of a technical meaning of 'disperse widely' using an everyday expression. This kind of choice is made in other tweets posted by P1, and is interpreted as being intended to attract lay readers' attention.

In terms of ENGAGEMENT, numerous uses of heteroglossic contraction are noticeable in this tweet, particularly the options of deny, counter and concede. Table 4.3 illustrates the deployment of ENGAGEMENT resources in [P2-2], indicated in bold letters in the English translation of the tweet.

Table 4.3 ENGAGEMENT in [P2-2]

English translation	ENGAGEMENT: contraction
. @user1	
That (plutonium) **doesn't** disperse so (widely).	disclaim: deny
I (MSC) **don't** understand why everyone makes a fuss with a metallic strain (like plutonium).	disclaim: deny
It may fly here and there if (one) makes the fuel go to an unthinkable temperature, **but** it is a bit hard to suppose.	disclaim: counter
There is chemical toxicity, **but of course** there is **no** problem if it is **not** in (a large) amount...	disclaim: counter proclaim: pronounce disclaim: deny disclaim: deny
Of course it is a problem at the site, **but**…	proclaim: concur: concede disclaim: counter

Note that in the below two clause complexes, the same linguistic item '*mochiron*' (of course) functions differently (see also Chapter 3).

もちろん	量が	ないと	問題は	ないし。
mochiron	*ryoo.ga*	*nai* *.to*	*mondai* *.wa*	*nai* *.shi。*
of-course	amount.NOM	non-existent/be .if	problem .TOP	non-existent/be .and-so.
of course	amount	if there is not	problem	there is no …, so
of course there is no problem if it is not in (a large) amount...				

もちろん	現場では	問題だが。
mochiron	*genba.de.wa*	*mondai.da.ga。*
of-course	site.LOC:at.TOP	problem.be/PLN.but.
of course	at the site	problemis …, but
Of course it is a problem at the site, but…		

The first one is used as a pronouncement resource to emphasise the authorial position (Martin and White 2005: 129) that 'there is no problem (with plutonium)'. In the second one, it is used as a resource for concession in combination with a countering resource, while admitting that plutonium is a problem at the nuclear accident site. In terms of ATTITUDE, as '*mondai*' (problem) is denied, the attitudinal meaning enacted here is APPRECIATION: + valuation. The contraction resources illustrated prosodically construct

P2's voice as a challenge to the suspicious voice about plutonium leakage, enacting an evaluative meaning that dispersal of plutonium is not a problem.

In arguing that the possibility of dispersal of plutonium is unlikely, she mentions characteristics of plutonium in relation to gradable entities. Plutonium being '*kinzoku.kee*' (metallic strain) is related to '*ondo*' (temperature) of the reactors, implying that metallic materials such as plutonium are unlikely to disperse widely in the current temperature of the reactors. '*Kagaku+doku.see*' (chemical toxicity) of plutonium is referred to in relation to its '*ryoo*' (amount), implying that even if plutonium was leaked from a reactor in Fukushima, the amount would be such that it would not be a matter of chemical toxicity. With this regard, the grading resources '*sonnani*' (so (widely)) and '*achikochi*' (here and there) in this tweet are interpreted as GRADUATION: FORCE, the same attitudinal meaning towards the coupling that plutonium is unproblematic except at the nuclear accident site.

In terms of GRADUATION, there is another thing to consider in terms of modality. In the following part of [P2-2],

あちこち	飛ぶかもしれないが、
achikochi	*tobu.**ka.mo.shire.nai**.ga*、
here-and-there	fly.**NEGO:intr.HIL:too.BE-KNOWN.NEG**.but,
here and there	**may** fly, but
it may fly here and there, but	

ちょっと	想定しがたい。
chotto	*sootee.shi.**gatai**。*
a-bit	supposition.DO.**DIFFICULT/BE**.
a bit	**is difficult to** suppose
it is a bit hard to suppose.	

there are two expressions of modality, '*tobu.ka.mo.shire.nai*' (may fly) and '*sootee.shi.gatai*' (is difficult to suppose). In ENGAGEMENT, modality is a heteroglossic expansion, which opens up space for alternative voices. The space opened up by the first one, '*tobu.ka.mo.shire.nai*' (may fly), is closed down by the counter '*.ga*' (but). In the second one, the space is considered in ENGAGEMENT terms as opening up for supposing the possibility that plutonium flies here and there if the temperature inside the reactor becomes tremendously high. From a prosodic perspective, this is the only place

where propositional space is opened up for the possibility of wide dispersal of plutonium in [P2-2]. Then, the function of '*sootee.shi.gatai*' (is difficult to suppose) can also be considered in this prosodic orientation. That is, this expression may not have so much to do with expanding propositional space for other voices as doing with the scientific construal of 'a matter by degree', in which any possibility cannot be excluded by 100%.

Finally, the wording 'people who make a fuss about metallic strain' invokes JUDGEMENT: - capacity, because these people focus on an unproblematic issue due to their lack of knowledge. Further, there is another invoked AFFECT: insecurity coupled with people making a fuss presumably because they are anxious.

Now, turning attention to the next tweet, [P1-3] was posted in the morning after the press conference on 29/03/2011 in which TEPCO made public that plutonium had leaked from the reactor. It is one of P1's 'sequential tweets on plutonium' (see Section 4.3.7). In this tweet, he writes,

【7.プルトニウムは	**遠くに**	飛びにくい】
[7.purutoniumu.wa	***tooku.ni***	*tobi.**nikui**]*
[7.plutonium.TOP	**long-distance.LOC:to**	fly.**HARD/BE**]
[7.plutonium	**far**	**is hard to** fly]
[7.Plutonium is unlikely to fly far]		

By using the Circumstance '*tooku.ni*' (far), P1 also mentions the dispersal of plutonium as a matter by degree. *Tooku.ni*' quantifying a process 'disperse'. In this case where dispersal of plutonium invokes a negative attitude of 'problematic', this expression can be considered as GRADUATION as FORCE. '*.Nikui*' in '*tobi.nikui*' (is hard to fly) is a modality item expressing unlikelihood. In terms of ENGAGEMENT, it is a heteroglossic expansion: entertain, which opens up space for alternative possibilities in which plutonium disperses presumably to a certain extent. However, in terms of GRADUATION, it blurs the FOCUS as actualisation. Then, here, '*tobi.nikui*' can be interpreted as arguing that the possibility of wide dispersal of plutonium is unlikely, admitting that the argument is made as 'a matter by degree'. This is the same as '*sootee.shi.gatai*' (is difficult to suppose) in [P2-2]. As a whole, these GRADUATION and ENGAGEMENT resources are deployed to flag the value that plutonium is unproblematic.

Further, in the tweet [P1-3], P1 provides a hyperlink to Plixi[73] in which a diagram from an annual research report published by the Geochemical Research Department of MRI[74] is provided to support his claim. Figure 4.4 is the hyperlink he posted, which illustrates the measurement data for caesium and plutonium fall out in Japan since the 1950s.

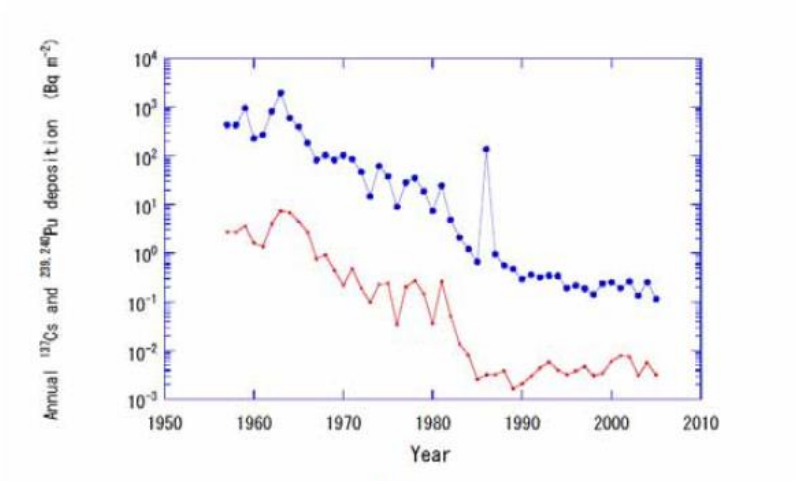


Fig. 18: Annual deposition of $^{239,240}Pu$ observed in the MRI, Japan

Figure 4.4 Geochemical Research Department (2007)

With the hyperlink to this figure, P1 pointed out that as compared to volatile isotopes such as caesium which increased significantly in the year of the Chernobyl nuclear accident, there was no significant increase of plutonium. These measurement data constitute another ideational construal of dispersal of plutonium as a matter by degree. Then the data are taken up as a GRADUATION resource as FORCE quantifying a thing, i.e. amount of plutonium to argue that unlikely to fly far, flagging the value that plutonium is unlikely to be problematic. Overall, both P1 and P2 construe the dispersal of plutonium as a matter by degree. Then they use these GRADUATION resources to invoke the evaluative meaning, unproblematic, coupled with plutonium.

A freelance journalist's tweet construes dispersal of plutonium differently. [J2-1] was posted four hours after [P1-3] on the same day. It is an 'unofficial' retweet where J2

[73]Plixi was an API, or application programming interface (Wikipedia, n.d.) provided by Lockerz, a media sharing service. The service stopped on 22th April 2013. Unfortunately, the author failed to correct the slide that P1 posted on Plixi, but was able to confirm with P1 himself that Figure 4.4 would very likely be the diagram he used as link to [P1-3] through personal communication.
[74] Meteorological Research Institute, Japan.

quotes another user @user4 who wrote the part after the 'RT'. In the retweeted part, @user4 suspects that the remark that plutonium doesn't disperse is an '*anzen dema*', or a false rumour designed to promote a sense of safety. He/she put '*anzen dema*' between quote marks '「' and '」'. The URL http://bit.ly/eXnB1N is the hyperlink to the same annual report series published annually by MRI as the one that P1 referenced in [P1-3], but of a different year. The diagram corresponding to the one referenced by P1 comes from Figure 4.5.

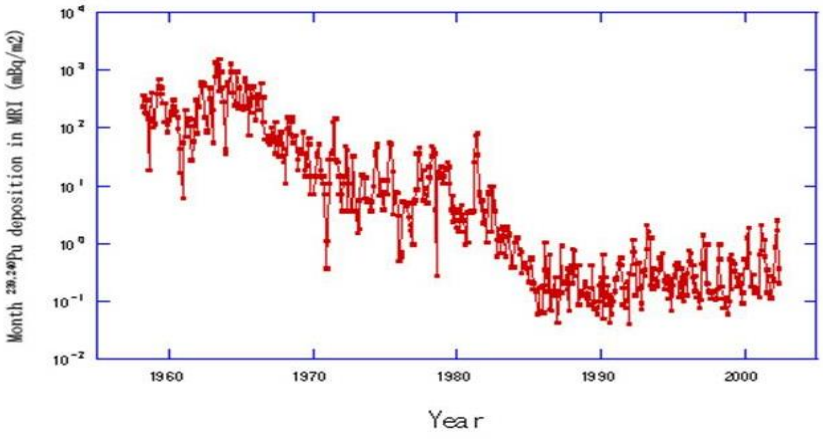


Figure 4.5 Monthly deposition of Pu measured in MRI, in Geochemical Research Department (2004)

However, @user4 does not provide a link to the diagram but to the whole report. Then, after the hyperlink to the report, he/she writes,

チェルノブイリからの	飛来を	示す	データ
cherunobuiri.kara.no	*hirai.o*	*shimesu*	*deeta*
Chernobyl.LOC:from.ADN	coming-flying(NEV).ACC	show	data
transportation from Chernobyl		show	data
(These are the) data that show the transportation (of plutonium) over from Chernobyl			

Here, @user4 interprets that the data show *hirai* (transportation) of plutonium from Chernobyl. There's no clues other than reading the report linked on the tweet in order to verify the connection between the data in the report and @user4's interpretation. Most importantly, in contrast to the physicists, there is no mentioning of the amount of plutonium or the width of dispersal. In other words, @user4 construed the experiential

meaning of the dispersal of plutonium not by degree but by kind. In other words, in this tweet, the question about whether plutonium flies or not is conceived of as similar to asking whether a bird flies or not, if a dog flies or not and so on. As data show that plutonium does fly, @user4 concludes that it is strongly possible that the statement 'plutonium does not fly because it is heavy' is a demagogy.

どうやら	「安全デマ」が	濃厚です。
dooyara	「***anzen+dema***」***.ga***	***nookoo.desu***。
apparently	**'safety+demagogy'.NOM**	**dense.be/POL.**
apparently	**safety demagogy**	**is strong (in possibility).**
apparently 'safety demagogy' is strongly possible.		

In terms of ATTITUDE, '*Anzen dema*' (safety demagogy) is an inscribed APPRECIATION: - valuation, targeted to the proposition that is plutonium does not disperse. It then invokes a JUDGEMENT: - propriety towards the source of the 'demagogy', the scientists. Also, if safety is a demagogy, as @user4 claims strongly likely, unsafety would be the reality, invoking APPRECIATION: - valuation. These evaluative works are done not by J2 but by @user4.

Now, attention shifts to the part J2 wrote, only the emoticon (-_-). Figure 4.6 is a screenshot of [J2-1], showing how the emoticon is presented in the tweet.

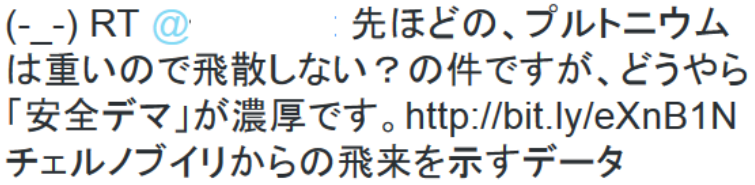


Figure 4.6 Screenshot of [J2-1]

In the literature, emoticons are regarded as an expansion of punctuation to 'indicate more interpersonal meanings such as speech functions and attitude' (Knox 2009, p. 161). Zappavigna (2012) observes that emoticons frequently 'support interpersonal connection and solidarity' (p. 76), but that in order to understand its interpersonal meaning, we should examine how it works 'in tandem with evaluative meanings made

in the verbiage', since emoticons in themselves 'display a high degree of "fuzziness"' (p. 80).

Here, in order to analyse the interpersonal meanings of emoticons, Zappavigna's (2012) 'articulation network for facial emoticons' (p. 74) and Tian's (2010) account of facial affect are adopted. In terms of articulation, in (-_-) eyes are closed and the mouth is closed flat, and the aspect is vertical. There are also a set of parentheses that represent the face outline, which could be added to the network. In terms of interpersonal meaning, a flat mouth, without curving, can be interpreted as realising neutral, non-expressive affect (Tian 2010, p. 122, p. 129). The emotion enacted by the emoticon with closed eyes is fuzzy, and could be interpreted differently depending on the context. A way to approach the meaning realised by the eyes articulated in (-_-) would be to compare it with another common Asian emotion (^_^), which has double eyes squinting (Zappavigna 2012, p. 75). The latter is thought to represent a smiley face and thus is interpreted as construing positive facial affect.

Comparing the two emoticons, (-_-) and (^_^), the position of the eyes is lower in the former than in the latter. In Tian (2010), the head and facial feature orientation 'down' is understood as construing negative facial affect. This interpretation will be compatible with verbiage in the tweet that enacts negative evaluative meanings coupled with the scientific claim that plutonium does not fly. Then, the affect expressed by the emoticon (-_-) would be interpreted as realising AFFECT: dissatisfaction: ennui, expressing a feeling of flatness or indifference. The target is the matter of whether plutonium flies or not, which is evaluated as 'safety demagogue'.

In dealing with the issue of dispersal of plutonium, the physicists and the freelance journalist took contrastive approaches. Both physicists addressed the matter by degree, in terms of how much plutonium was likely to disperse and to what extent. The physicists construed wide dispersal of plutonium as unlikely in this situation, and flagged the value 'unproblematic'. In terms of engagement, P2 used heteroglossic contraction for the most part, closing down the possibility that plutonium disperses widely. However, both P1 and P2 also used heteroglossic expansion for the alternative possibility i.e. that plutonium disperses to a certain extent. While P2 mentioned the characteristics of plutonium as a material, P1 provided a multimodal resource of a

diagram of a measurement data from a past event to support his claim. By contrast, the freelance journalist, together with @user4, construed dispersal of plutonium as meaning by kind, i.e. whether plutonium flies or not. Then, P2 and @user4 together enacted negative attitudinal meanings, i.e. distrust and indifference to science and scientists, as well as indifference.

4.3.2.5 A device for measuring the leaked plutonium

Attention now turns to another matter of scientific knowledge that lay people had difficulty understanding in the time of nuclear crisis, that of measuring radiation. When thinking about a device for measuring radiation, people might imagine something similar to a thermometer. However, measuring radiation in the atmosphere or of any particular kinds of radioactive materials is not as simple as people might think. In the time of the Fukushima nuclear crisis, this was one of the things that caused discrepancy between the scientists and lay people. In order to examine how the two professional groups construed and enacted different meanings on the issue of measuring plutonium, the [J2-2] and [P1-4] tweets written on 28/03/2011 are compared in the order that they were written.

First, [J2-2] was posted in sequence with another tweet reporting that it revealed that TEPCO does not have a device to measure plutonium. In terms of textual organisation, [J2-2] looks like an 'unofficial' retweet in which J2 responds to another Twitter user who wrote the part after the atmark @. However, this is not the case here. @kantei_saigai is the official governmental site for disaster information. As confirmed in the storage of tweets on Twilog for @Kantei_Saigai, which can be found on the public domain on the internet, there was no tweet on this account corresponding to this tweet as worded in [J2-2]. This means that all parts of this tweet were written by J2, and that @kantei_saigai is what is called '@mentions' (Zappavigna 2012: 34-35), using the account name for a particular tweet to be read on the timeline of the user of the account.

After @kantei_saigai, a question about plutonium detection asked at a press conference is followed by TEPCO's answer saying,

プルトニウムを	検出する	機器を	持っていない。
purutoniumu.o	*kenshutsu.suru*	*kiki.o*	*mot.tei.**nai**。*
plutonium.ACC	detection.DO	apparatus.ACC	have.ASP:rsl.**NEG**.
plutonium	detect	apparatus	do **not** have
(We) don't have an apparatus to detect plutonium.			

よって	測っていない」
yotte	*hakat.tei.**nai**」*
therefore	measure.ASP:rsl.**NEG**'
therefore	have **not** measured
Therefore, (we) have not measured (it).	

Negation item '*.nai*' (not) is repeated, contracting the alternative possibility about measuring plutonium leakage.

Then, the beginning of the tweet, before @kantei_saigai, is organised as a request based on the exchange at the press conference after @kantei_saigai. Textually organised as such, the tweet appears as if it consists of multiple voices of report and comment, even though both came from the same writer, J2.

Bearing that in mind, the first part of [J2-2] is examined.

【緊急】
[kinkyuu]
[urgency]

菅首相へ。	政府は	**非常**事態宣言を。
Kan+shushoo .e。	*seefu .wa*	***hijoo**+jitai+sengen .o。*
Kan+prime-minister. REC:to.	government .TOP	**emergency**+state-of-affairs+proclamation .ACC.
To Prime Minister Kan.	the government	proclamation of state of **emergency**
Dear Prime Minister Kan, and your government, (please announce) the proclamation of a state of emergency.		

This part of the tweet is a request to Prime Minister Kan for the government to proclaim a state of emergency. There are inscribed ATTITUDE: APPRECIATION: - valuation in '*kinkyuu*' (urgency) and '*hijoo*' (emergent). The target of the attitudinal meaning is the answer given by TEPCO at a press conference that it did not have a plutonium detection device, and therefore had not measured any leakage of plutonium. The ideational

meaning resides in the corporate field. Then it is recontextualised into politics when the answer is related to his request to Prime Minister Kan. J2 does not give any further argument to support his claim. By mentioning an apparatus for measuring plutonium in relation to the prime minister and the governmental Twitter account on disaster, J2 presents the matter of a measurement device of plutonium as a matter of corporate and political responsibility.

Now, a physicist's tweet is examined in comparison. [P1-4] was written on 28/03/2011, next day from [J2-2]. In this tweet, he is also making a request, addressed to someone who has a particular detecting device to conduct a particular measurement. Apparently, the request is addressed to experts who possess a highly specialised measuring device. As a lay reader in science going through the nuclear crisis, the researcher could not tell what kind of device a 'Ge detector for X ray with beryllium window etc.' is, or what kind of activity 'U's characteristic X ray measurement' would involve.

However, from the latter part of the tweet in which P1 gives two rationales for this request, a number of things can be inferred from a non-scientific perspective. Firstly, it is inferred that the request was made in response to non-scientists' anxiety about plutonium. There is an inscribed AFFECT: insecurity '*shinpai.shi.teorareru*' (are anxious) coupled with '*kata*' (person), which refers to 'many (lay) people' in this context. A grading resource '*tai.ryoo*' (large amount) is associated with '*hisan*' (dispersal) of plutonium, which is the target of the *shinpai* (anxiety).

Pu 大量飛散を	心配しておられる	方が	多い.
piiyuu+tai.ryoo+hisan .o	***shinpai.shi .teorareru***	*kata.ga*	*ooi.*
Pu+large.amount+dispersal .ACC	**anxiety.DO .ASP:cont/RES**	person/RES.NOM	many/be.
large dispersal of Pu	**is anxious**	person	are many
There are a lot of people who are anxious about large dispersal of Pu.			

He then argues that the '*suuchi+deeta*' (numerical data) would enable '*teeryoo.teki.na giron*' (quantitative discussion). '*Teeryooteki.na*' (quantitative) functions as an Epithet of 'giron' (discussion).

数値データが	あれば	定量的な	議論が	可能に	なります.
***suuchi+ deeta**.ga*	*are.ba*	***teeryoo. teki.na***	***giron .ga***	***kanoo .ni***	***nari.masu.***
numerical-value+ data.NOM	be.if	**quantification. ADJ.EPI**	**discussion .NOM**	**possible .CIR**	**become.POL.**
numerical data	if there is	**quantitative**	**discussion**	**possible**	**become**
If there are numerical data, quantitative discussion becomes possible.					

Here, '*kanoo.ni nari.masu*' (is made possible) functions as a GRADUATION resource. Functioning as a resource of FOCUS: actualisation, it flags an APPRECIATION: + valuation, positively evaluating a quantitative kind of discussion.

Comparing these two tweets written by J2 and P1, [P1-4] forms a counter to a position including J2's in which discussion on the issue of plutonium is not quantitative but political. When J2 mentions 'apparatus to detect plutonium' he takes it for granted that electricity companies that own nuclear power plants such as TEPCO should possess such a device, and the fact that TEPCO does not have one is something as serious to call for a state of emergency. On the contrary, P1, by requesting another kind of radiation measurement from someone who possesses a special kind of detecting device, implies the complexity of measuring plutonium leakage. Then the request was meant to fill in the gap between people who were anxious about plutonium and the actual amount of plutonium which they did not need to be anxious about. In [J2-2], the field is political, as opposed to P1's tweet which remains in the science field. The recontextualisation of fields was also observed in J1's tweet in Section 4.3.3. This is one of the commonalities of the freelance journalists' tweets which is worth revisiting in understanding the kinds of bond proposed by the tweeters of this professional group.

4.3.2.6 The presence of plutonium in the world

The 3/11 disaster and the following nuclear accident in Fukushima caught worldwide attention. This subsection analyses two tweets in which plutonium is mentioned in relation to its presence the world.

The first one is [P2-3] written by P2 while TEPCO's press conference on the plutonium leak was on-going 29/03/2011. She mentions the distribution of plutonium in the world

and in human bodies around the world. The propositional voice is attributed to Wikipedia. and there is no attitudinal meaning. Numerous grading resources are used, in terms of scope of time and space, and of amount of plutonium, as shown in italics in the English translation of the tweet.

English translation of [P2-3]
From wiki
Since 1945, *approximately 10 tons of* plutonium has been emitted on the earth through nuclear experiments.
Due to the fallout from nuclear experiments, *1-2 pico-curie of* plutonium is already contained in the human body throughout the world.
Fall-out-originated plutonium exists *by 0.01-0.1pCi/g* in the soil on the earth's surface.

These grading resources primarily function ideationally, i.e. in construing experiential meaning by degree (Lemke 2004, p. 34, see also Subsection 4.3.4), and providing scientific facts about plutonium present in the world. However, they also invoke an evaluative meaning. It implies that since some amount of plutonium is already present in the world and in the human body, an additional leak of plutonium from a nuclear reactor would not make a big difference. As such, P2 invokes that the plutonium leakage is not a problem, coupling the attitudinal meaning of APPRECIATION: + valuation with plutonium.

[J1-3] was posted on the next day, 30/3/2011. As in many of the journalists' tweets, this is also an 'unofficial' retweet where J1 comments on another tweet written by @user2, presumably tweeting while watching NHK when it was broadcasting a scholar interpreting the impact of plutonium leaked from nuclear reactors.

Beginning by the retweeted part after 'RT', there are a number of instances of inscribed ATTITUDE. The scholar from the University of Tokyo that @user2 quotes is called '*goyoo gakusha'* (opportunist scholar), enacting JUDGEMENT: – propriety. In the @user2's quotation of the scholar, '*shinpai.suru.koto.wa.nai*' (not to be anxious about) enacts APPRECIATION: + valuation is targeted to '*purutoniumu.no eekyoo*' (influence of plutonium). However, in terms of ENGAGEMENT, @user2 distances from this coupling, because the quotation is attributed to a '*goyoo gakusha*' (opportunist scholar). As such, the evaluative meaning coupled with the influence of plutonium is that of APPRECIATION: - valuation, or 'something to be anxious about'.

Then, in the first part of the tweet written by J1, numerous linguistic resources, including lexical and grammatical, are orchestrated towards leading the reader to a particular set of evaluative meanings.

放散されてしまった	プルトニウムは、
hoosan.s.arete.shimat.ta	*purutoniumu.wa*、
dissipation.DO.PSV.END.PST	plutonium.TOP,
has **ended up being dissipated**	plutonium
Plutonium that has ended up being dissipated	

The first focus concerns the first lexis, 放散 *hoosan*, which is translated here as 'dissipation'. This is actually a tricky lexical choice. In the field of this tweet, nuclear technology, a more common technical term would be 放出 *hooshutsu* (emission). Researching these two entries in a number of Japanese-English dictionaries of science and technology, the term *hoosan* was found to be used in much more limited contexts than *hooshutsu*. In Fujioka (1981a, 1981b, 1981c), a dictionary series with different volumes for different domains of science and technology, , there was no entry for *hoosan* in the volumes for technology devoted to physics, nuclear energy or electricity and electronics. Some other dictionaries have *hoosan* as a technical term, but its usage is limited to particular domains of science, used in specific contexts to mean. For instance, *hoosan* can refer to radiation of heat and electromagnetic energy (Tomii 2012, p. 1675). It can also be used as part of some compounds including *hoosan.tsuu* (radiating pain) (Shizen Kagakukee Waee Daijiten 2009, p. 1989), and *hoosan.chuu* (radiolarian), the latter refering to a kind of protozoa (Nichigai Associates 2001, p. 1829). From a number of possible translations provided in these dictionaries include 'exhale', 'radiate', 'diffuse', 'emanate' and 'evaporate'. The word 'dissipate' was chosen for *hoosan* in this tweet, so that the rareness of this lexical choice in the relevant discipline, nuclear technology, is reflected. 'Dissipate' can also be used in passive voice. From the discourse semantic perspective, what this dictionary search has revealed is that *hoosan*, in terms of IDEATION, does not construe a technical entity. It just looks like a technical term for it is written in two Chinese characters. Then, this choice made by J1 can be interpreted as his construal of 'fake' technicality.

Now, turning attention to the grammatical items attached to *hoosan*, the first thing to notice is the choice of passive '*s.arete*' (DO.PSV) instead of ergative '*shite*' (DO). According to Halliday and Matthiessen (2013), a transitive choice represents a process as 'engendered from outside' (p. 342), or having external agency (p. 343). In this instance, the Agent of the passive is not explicitly stated but rather is implied. By the deployment of the passive voice, implied here is the existence of somebody who dissipated the plutonium, or somebody who is responsible for the leakage of plutonium. The passive is followed by '…*te.shimau*' (end up …ing), which, according to Teramura (1984), expresses a feeling that 'the event has happened, and it is no longer possible to return to the state before it happened' (p. 153). According to Fujii (1992), in Kato's (2011) citation, when used for a third person, it expresses the speaker's 'dissatisfaction, disappointment and lament' (p. 203). In terms of APPRAISAL, '.*te.shimau*' is an instantiation of GRADUATION: FOCUS: fulfilment: completion[75]. It amplifies the meaning that plutonium was already dissipated and that there is no returning to the time before it was dissipated, thereby flagging negative ATTITUDE to the event of plutonium dissipation. The clause '*hoosan.s.arete.shimat.ta*' (ended up dissipated) is then embedded to the Participant, '*purutoniumu*' (plutonium).

In the following clause, J1 denies the scholar's voice quoted in the reporter's voice in '*eekyooryoku.o genjiru.koto.naku*', (without reducing the influencing power).

影響力を	**減じることなく、**
eekyoo.ryoku.o	***gen.jiru.koto.naku*、**
influence.power.ACC	**reduction.DO.THING.NEG/SUS,**
influencing power	**without reducing**
without reducing its power to influence	

In the ENGAGEMENT terms, a negation '*naku*' (not) distances the author's voice from the scholar's voice. Further, this clause can be understood as non-finite[76], which, according

[75] In Inako (2014), it was mistakenly analysed as 'FORCE: quantifying a thing'. (19)
[76] Finite clause in English is defined to 'have either modal deixis or temporal deixis' (Matthiessen et al. 2010: 97). Though it is beyond the scope of this research to determine finite clauses and non-finite clauses in Japanese lexicogrammar, the researcher's current interpretation is that a finite equivalent of this clause would be as follows.

to Butt et al. (2000), 'is a way of making meanings unavailable for argument or discussion' (p. 127). In this case, it is made unarguable and thus taken for granted that 'plutonium does not reduce its influencing power'. It invokes APPRECIATION: - valuation, as something that would cause bad effect.

Then, J1 ends the first clause complex by two GRADUATION resources. The first one, '*yagate*' (by and by) emphasises the distance of time, and '*zen.sekai.e.to*' (to the whole world) emphasises the scope of the diffusion of plutonium with its influencing powerflagging the negative impact would go spreading worldwide.

やがて	全世界へと	拡散してゆく。
yagate	***zen.sekai.e.to***	*kakusan.shite.yuku*。
by-and-by	**all.world.to.PROJ**	diffusal.DO.GO
by and by	**to the whole world**	go diffusing
will eventually be diffused to the whole world.		

In the second clause complex, an analogy is made between the plutonium leaked and the scholar's remark quoted by @user2. Here, J2 inscribes negative JUDGEMENT by saying, '*goyoo gakusha*' (opportunist scholar), '*boogen*' (violent language) and '*hihan.s.areru.beki*' (should be criticised). The attitudinal meaning is further amplified by the repetition of '*zen.sekai*' (whole world), realising GRADUATION as FORCE: quantifying a process by scope: space.

全世界に	さらされ、	**全世界**から	批判されるべき、
zen.sekai*.ni*	*saras.are*、	***zen.sekai****.kara*	*hihan.s.areru .beki*、
all.world.LOC:to	expose.PSV/SUS,	**all.world**.LOC:from	criticism.DO.PSV .MODU:should
to **the whole world**	be exposed	from **the whole world**	should be criticised

---

影響力を	減じることがなく、
eekyoo.ryoku.o	*genjiru.koto.ga.naku*、
influence.power.ACC	reduce(NON-EVR).THING.NOM.NEG/SUS,
influencing power	not ever reduce, and
(something) does not ever reduce the power to influence, and	

The distinction between the two is that a modal or temporal element can co-occur in the latter. The issue is related to Hayakawa's (2013) and Hayakawa et al.'s (2011) discussion of grammaticalisation of *koto* (thing).

Note that the scholar's name is not provided in this tweet, but is presented as '*toodai.no goyoo gakusha*' (Tokyo Uni's opportunist scholar) speaking on NHK. Both '*toodai*' (Tokyo Uni), or the University of Tokyo, and NHK represent the 'official' source of information about which the public was becoming more and more sceptical in the aftermath of the accident in Fukushima. By contrast, in [J1-1] (see Subsection 4.3.2) and [J1-4] (see Subsection 4.3.7), the proper names of the expert, whose voice is reported in the tweets, are provided. This means that J1 distinguishes two types of experts by the linguistic choice he makes[77], mentioning only those belonging to one of the groups by the proper name. On the contrary, those without a name from 'official' sources of information are the target of negative JUDGEMENT.

Table 4.4 summarises the resources attended here in [J1-3] in the order that they appeared in the original text in Japanese.

[77] This is compatible with Stocking's (1998) observation that 'journalists have been found to pit scientist against scientist (…) often without mention of the relative degree of scientific acceptance of the differing views' (p. 29).

Table 4.4 Resources instantiated in [J1-3]

Japanese	**English translation/gloss**	**discourse semantic meaning and interpretation**
hoosan	dissipation	fake 'technicality'
(hoosan).s.arete	(dissipation).DO.PSV	Passive implies the existence of Agency, who is responsible for the leakage of plutonium
shimat.ta	END.PAST (ended up (being dissipated))	GRADUATION: FOCUS: actualisation (meaning that it already happened, and there is no returning)
eekyoo.ryoku	influencing power	invoked APPRECIATION: - valuation (causing bad effect) invoked AFFECT: insecurity
gen.jiru.koto.naku	reduction.DO.THING.NEG (without reducing the influencing power)	non-finite clause, making the proposition unarguable.
yagate	by-and-by	GRADUATION: FORCE: quantify: distance
zen.sekai	the whole world	GRADUATION: FORCE: quantify: scope (further amplified by repetition)
goyoo.gakusha	opportunist scholar	inscribed JUDGEMENT: - propriety
saras.are	expose.PSV (be exposed)	invoked JUDGEMENT: - propriety
hihan.s.areru	criticism.DO.PSV (be criticised)	inscribed JUDGEMENT: - propriety
boogen	violent language	inscribed JUDGEMENT: - propriety
toodai.no goyoo.gakusha	opportunist scholar from Tokyo Uni	scholar with no name (distinguished from scholars with their proper name)

With this table, it is possible to see that particular linguistic resources are instantiated repeatedly in this tweet. These include the passive structure, the structure '(noun in kanji).DO', which is often used to construe in non-everyday discourse, the repetition of '*zen.sekai*' (the whole world), and negative ATTITUDE both inscribed and invoked. In Martin (2008b), this kind of 'the amount of meaning potential activated in a particular process of instantiation' is referred to as 'commitment' (p. 45)[78]. In this term, this tweet is characterised as a highly committed text. Ideationally, the text construes a 'fake' technical world. The passive structure implies the existence of an Agent, someone who is responsible for the leakage of plutonium. Then the interpersonal meaning of negative

[78] See also Chapter 1.

JUDGEMENT is coupled with a high degree of commitment, with the deployment of GRADUATION resources as FORCE and as FOCUS.

Comparing these two tweets written by P2 and by J1, contrast is clear, as in the tweets on other topics. As for [P2-3], P2 construed the presence of plutonium in the world as meaning by degree. The whole text was presented as a heteroglossic attribute. No attitudinal meaning is inscribed. However, the scientific facts about the amount of plutonium already present in the world can invoke an evaluative meaning that an additional leakage of a small amount of plutonium from the accident site would not be problematic. By contrast, in [J1-3], evaluative meanings were more committed. There were negative AFFECT, negative JUDGEMENT and negative APPRECIATION, either inscribed or invoked. These values were orchestrated with variety of linguistic resources including fake technicality, Passive, Non-finite as well as GRADUATION as FORCE and FOCUS, and repetition of the GRADUATION resources. By relating the plutonium leakage in Fukushima and its worldwide influence with the language of an expert called 'opportunist scholar', he also construed the event of plutonium leakage as a human issue.

4.3.2.7 The significance of the plutonium leakage from Fukushima

After TEPCO's press conference about the plutonium leakage from a reactor in Fukushima Daiichi power plant, some tweets were posted which mentions the significance of the leaked plutonium. [P1-5] and [J1-4] are examined from this perspective.

[P1-5] was written in the morning after the midnight conference on the plutonium leakage by TEPCO that went from late evening 28/03/2011 until the early morning 29/03/2011. The tweet is numbered [1.], and is the second of 11 tweets posted in sequence labelled by P1 himself as '*genpatsu.shikichi.nai purutoniumu.ni.kan.suru renzoku+tsuiito*' (sequential tweets on plutonium inside the nuclear plant site) with numbers from [0.] to [9.] plus [note on 8.]. In the tweet number one of this sequence of tweets, P1 provides his 'conclusion' of the sequential tweets that follow. He begins, in

1), by mentioning that Pu together with iodine and caesium, as radioactive materials leaked from the plant.

1)核燃料棒が	破損し,
1)kaku+nenryoo+boo.ga	*hason.shi,*
1)nucleus+fuel+rod.NOM	breakage.DO/SUS,
1)nuclear fuel rod	broke, and
1)The nuclear fuel rod(s) broke, and	

ヨウ素,	セシウムとともに,	Pu も	漏れた.
yooso,	*seshiumu.to.tomoni*	*piiyuu.mo*	*more.ta.*
iodine,	caesium.ACC:with.TOGETHER	Pu.HIL:too	leak.PST.
together with iodine and caesium,		Pu too	leaked.
together with iodine and caesium, Pu leaked too.			

In 2), he assesses the density of plutonium leaked as the same level as that in the environment.

2)その	濃度は	**環境レベル.**
2)so/no	*noodo.wa*	***kankyoo+reberu.***
2)it/ADN	density.TOP	**environment+level.**
2)its density		**environment level.**
2) Its density (is at the) environment level.		

Then in 3), an evaluative voice begins with the inscribed AFFECT: inclination, '*nozom.areru*' (is hoped for) targeted at Pu measurement outside the site. But that propositional voice is countered by '*.ga*' (but),

3)敷地外の	サンプルでも	Pu 測定が	**望まれる**が,
3)shikichi.gai.no	*sanpuru.de .mo*	*piiyuu.sokutee.ga*	***nozom.areru**.ga,*
3)site.outside.ADN	sample.ANG:with .HIL:too	Pu.measurement.NOM	**hope.PSV**.but,
3)with the sample outside the site too		Pu measurement	**is hoped**, but
3) the Pu measurement is hoped for via samplings outside the site as well but			

and in 4) he provides an inscribed APPRECIATION: + valuation, '*kyuumu*' (urgent task), targeted to the protection against radiation of site workers and the cooling down of the plant.

4)作業される	方の	放射線防護を	し,
4)sagyoo.s.areru	*kata.no*	*hoosha.sen+boogo.o*	*shi,*
4)work.DO.RES	person/RES.ADN	radiation.line+protection.ACC	do/SUS,
4)do(RES) work	person(RES)	radiation protection	do(ing), and
4)To provide protection of people who do the operation, and			

原発を	冷やすことの方が	**急務.**
genpatsu .o	*hiyasu.koto.no.hoo.ga*	***kyuumu.***
nuclear-power-plant(ACR) .ACC	cool-down.THING.ADN.SIDE.NOM	**urgent-task.**
nuclear power plant(ACR)	cooling down more	**urgent task.**
to cool down of the NPP (is the) more urgent task.		

From these evaluative items, an assumption can be made that plutonium's density of '*kankyoo reberu*' (environment level) flags an APPRECIATION: - valuation, 'less urgent'. Overall, in [P1-5], the significance of the plutonium leak is argued to be less important to the society than other tasks. In terms of field, this tweet begins from science field and then is recontextualised into the field of risk management in which decisions are made in terms of expectancy and urgency of society.

[J1-4] is contrastive. The tweet was written on 01/04/2011, three days after TEPCO's conference. The hashtag with J1's proper name, followed by a hyperlink to his own online broadcasting site on Ustream at the end, means that the tweet is related to what was broadcast on the video site. This tweet is a live report of the online interview with an assistant professor whose proper name was provided in the original tweet text.

Presented as quotes from an expert, the tweet begins with denying the possibility and significance of attempting to identify which of the nuclear reactors had emitted the detected plutonium. '*Imi.mo nai*' (it doesn't matter either) is an APPRECIATION: - valuation. Then, '*purutoniumu+kenshutsu.no imi*' (the meaning of plutonium detection) is identified as '*peretto.no yooyuu.ga ichibu hajimat.teiru.ten*' (that the melting(NEV) of pellet has partially started). '*Hajimat.teiru*' here is translated as 'has started', '*.teiru*' coded as resultative aspect, indicating that the result of the momentary action is on-going. In this case, the expression entails that the melting of pellet is on-going, which is the significance of the detection of plutonium according to the expert in the tweet.

プルトニウム検出の	意味は、
purutoniumu+kenshutsu.no	***imi.****wa*、
plutonium+detection.ADN	**meaning.**TOP,
of plutonium detection	**meaning**
The meaning of plutonium detection,	

ペレットの	溶融が	一部	始まっている	点。
peretto.no	*yooyuu.ga*	*ichibu*	***hajimat.teiru***	*ten。*
pellet.ADN	melting(NEV)	part	**begin.RSL**	point.
of pellet	melting	partially	**has begun**	respect.
(is) that melting of pellet(s) has partially begun.				

Then, there is a minor clause '*kakujitsu.ni*' (certainly) with an exclamation mark.

確実に！
***kakujitsu.ni*！**
certain.CIR!
Certainly!

It should be noted that the position of *kakujitsu.ni*' in this tweet in Japanese is more marked, or rare, than the English translation would suggest. Moreover, its position leaves the meaning of '*kakujitsu.ni*' (certainly) ambiguous. It could either mean that it is certain that the melting of pellet has partially started, or that it is certain that the significance of plutonium detection is that the melting of pellet has partially started. While the scope of what is '*kakujitsu*' (certain) is blurred due to its position, the meaning of '*kakujitsu.ni*' is amplified by the exclamation mark. This leads the readers to believe that something was certainly happening, while leaving it uncertain as to what exactly was happening. In these terms '*kakujitsu.ni*' is interpreted as functioning as GRADUATION as FOCUS: fulfilment: actualisation, flagging the evaluative meaning of seriousness of the problem, which is APPRECIATION: - valuation.

Comparing the two tweets, we can see how P1 and J1 construed the significance of the detection of plutonium leaking from the site in a contrastive manner. P1's tweet involves recontextualisation of field from science to risk management. He used inscribed AFFECT and APPRECIATION to couple the plutonium issues with 'less urgent' compared to other tasks including cooling down the reactors and assuring radiation protection of the site workers. J1's tweet, consisting of a quote from a named expert,

was in the field of technology, and was related to another material event, the melting of pellets. While there is no attitudinal inscription coupled with this event, the deployment of a GRADUATION resource is interpreted as flagging a certain evaluative orientation. Its marked position also has a rhetorical effect of amplifying the invoked ATTITUDE, probably that of seriousness of the problem and of insecurity, as these were the kinds of ATTITUDE that had already been accumulated intertextually in the tweets posted prior to [J1-4].

4.3.2.8 Laughing at plutonium couplings

The final subsection of coupling analysis investigates tweets that involve humour or play. Knight (2010a) conceptualises laughter as 'an explicit signal that couplings are being presented in the conversation and that they are negotiated as *discordant* in relation to the communities that the conversational participants can co-construe together (p. 162). In other words, laughter comes about when couplings are 'inappropriately combined' (p. 162) in reference to the culture or community of which interactants are a part. Conversation participants can either 'laugh at the contrast of values' (p. 180), or 'laugh off those values that create tension with their aligned communities' (p. 201). The latter relates to a coupling that 'creates only a minor tension', or 'a wrinkle'. These are then 'seen as nonserious or humorous' (Knight 2010b, p. 52).

On the channel of Twitter, laughter can be graphologically expressed by way of onomatopoeia or emoticons. However, even when there is no graphological realisation of laughter, tweeters can 'invite' the readership to laugh at or laugh off some couplings that create a discordance or tension. This subsection examines two such tweets, one posted by P2 and the other posted by J2.

[P2-4] was posted on 20/03/2011, before the plutonium issue became a highlighted topic on Twitter from 25/03/2011 on. The tweet has two retweets, indicating that there are three voices involved in this tweet. The first voice is the last part of the tweet, written by @user6. In this part, the half-life period of plutonium is explicitly coupled with APPRECIATION: reaction, '*kowai*' (scary), yet it is presented as a projected voice

with which @user6 does not necessarily concur, as inferred from a counter marker '*.kedo*' (but) at the end of the clause.

プルトニウムの	半減期が	24000 年だから
purutoniumu.no	*hangen .ki.ga*	*ni+man+yon+sen.nen .da.kara*
plutonium.ADN	reduction-into-half .period.NOM	two+ten-thousand+four+thousand.year .be.because
plutonium's	half-life	because …is twenty four thousand years
because plutonium's half-life is twenty four years		

怖いって	言うけど、
***kowai**.tte*	*iu.**kedo**、*
scary.PROJ(COL)	say.**but**,
that (…) is scary	(one) says but
(they) say that (plutonium) is scary	

The second part begins from RT @user5, which responds to @user6 by mentioning a kind of material, bismuth 209, whose half-life is 21 quintillion years. He/she also provides the same inscribed ATTITUDE '*kowai*' (scary), followed by a lengthened negotiatory marker '*.nee*' indicating confirmation (Teruya 2007, p. 144).

こわい[79]ですねー	**(棒読み)**
kowai**.desu.**nee	***(boo+yomi)***
scary.POL.**NEGO:conf(lengthened)**	**(stick+reading)**
scary isn't (it)!	(monotone reading)

A horizontal bar '一' following '*.ne*' in Japanese is a graphological indicator of a phonological lengthening of a vowel. A lengthened vowel at group or clause endings could function in various ways depending on context[80], but when marked this way in written language, it is assumed that there is a kind of markedness of meaning, presumably one of exaggeration. In this instance, the lengthened vowel is attached to the negotiatory marker of confirmation, suggesting that the writer @user5 is inviting

[79] Note the graphological shift from *kanji* (怖い) to *hiragana* (こわい) here and in the part written by P2 in the same tweet.
[80] It is beyond the scope of this research to discuss the various possibilities of vowel lengthenings at group or clause endings.

readers to agree with, or affiliate with, the coupling of a long half-life with the value 'scary', and doing that with exaggeration. However, this is followed by a bracketed note saying that this is to be articulated in '*boo+yomi'* (flat reading), or to be read aloud flatly without intonational rise or fall or rhythmic stress. The note suggests the writer's indifference, or lack of commitment to the content of what he/she writes[81]. In terms of ENGAGEMENT, the writer does not proclaim but distances from the coupling in the proposition. '*Boo+yomi*' can be also interpreted as 'characterisation' in terms of Knight (2010b, p. 291) 'that allows speakers' (or 'writers' in the case of Twitter) 'to distance themselves from a message by pretending to be the attributable other, thereby acting out the message and making it more explicitly playful'. Thus, the graphological exaggeration with '一' along with a seemingly contradictory note about flat reading is interpreted as inviting the readership to laugh at the coupling of "plutonium + scary", or "long half-life + scary".

Finally, coming back to the top of the tweet of [P2-4] written by P2 herself, P2 mentions another substance, proton, whose half-life period is even longer. She begins her tweet with a repetition of '*anone*' (you-know-what), a very casual type of summons, which 'indicates speaker wants to get hearer's attention in order to introduce a topic' (Martin 1992, p. 54).

あのね、	あのね、
***ano.ne*、**	***ano.ne*、**
that/ADN.NEGO:conf,	**that/ADN.NEGO:conf,**
you know what,	you know what,
You know what, you know what,	

In Japanese, it is often used in child language when the child wants to boast about his/her knowledge in particular. This is interpreted as another instantiation of 'characterisation'.

There are other items typical of casual spoken language including '*.tte*' instead of '*.wa*' (.TOPIC), the PLAIN '*da*' accompanied by lengthened '*yo*', a negotiatory marker indicating insistence (Teruya 2007, p. 144). There is another vowel lengthening in '*kowai.deshoo*' (scary.be/CONJ), which indicates exaggeration.

[81] Halliday and Greaves (2008) suggests that 'tone choice can (…) realise different interpersonal relationships between the speaker and the listener(s)' (p. 48).

陽子の	半減期**って**	10^34 年より	ながい[82]んだ**よー**。
yooshi *.no*	*hangen* *.ki.**tte***	*10^34.nen* *.yori*	*nagai.n.da* ***.yoo***。
proton .ADN	reduction-into-half .period.**TOP(COL)**	10^34.year .COMP:than	long.NOMS.be **.NEGO:ins(LNG).**
proton's half-life		than 10^34 years	is longer
proton's half-life is longer than 10^34 years!			

こわいでしょー
*kowai.**deshoo***
scary.POL/CONJ**(LNG)**
Isn't (it) scary!

With these indicators, P2 gets involved in the game proposed by @user5, by playing a child who boasts that she knows a substance that is even more 'scary' because of its even longer half-life. By doing so P2 also distances herself from the coupling of the long half-life being scary, laughing at the coupling by playing a childish character. It can then be interpreted that the three tweeters in this tweet share and rally around the same bond, that is, the bond that a long half-life is NOT scary.

Attention now turns to the journalist's tweet, [J2-3]. Entitled '[prompt report]' or newsflash, the tweet has a disguise of prompt hard news story. However, it is not too difficult for readers to interpret it as a 'mock' news story. There are a number of cues in the tweets that allow such an interpretation. The first cue is non-linguistic: the tweet was posted on the first day of April known as April Fool's Day. On the discourse semantic level, a number of un-realistic ideational meanings are construed including, '「*purutoniumu*」 *.no shishoku*' (test eating of 'plutonium'), and a fictional character '*Purutokun*[83]' (Pluto-kun) scheduled to attend the conference. On the other hand, some

[82] Here there is a graphological shift from *kanji* '長い', which is more congruent, to *hiragana*, the script that people learns first among the multiple scripts in the writing system of Japanese. Graphological contributions in the physicists' tweets to community building would be an interesting area to explore, but it exceeds the scope of this research.

[83] *Puruto kun*, or 'Pluto-kun', is an anime character in a promotional video created in 1991 by former Power Reactor and Nuclear Fuel Development Corporation, a public organisation which was reorganised as Japan Atomic Energy Agency in 2005. The video itself had been abolished before the reorganisation, as confirmed by email (JAEA 2014). Also confirmed was that the video was used on the internet sites including youtube, and was deleted upon request from JAEA. Below is the image of Pluto-kun, retrieved from the public domain of the internet.

of the linguistic clues are typically journalistic, including non-everyday lexical choices including *honjitsu* (today(NEV)) instead of *kyoo* (today), *akiraka.ni shi.ta* (disclosed) instead of *it.ta* (said).

東電関係者が	明らかに	した。
tooden+kankeesha.ga	*akiraka.ni*	*shi.ta*。
TEPCO+related-person.NOM	clear.ATTR	do.PST.
TEPCO-related person	clear	made.
A TEPCO-related person disclosed (it).		

Also characteristics of journalistic Japanese are grammatical choices including the plain option in the POLITENESS system (see Chapter 5), conjunction *koto.kara*,

首相は	過去にも	「カイワレ大根」で	成果を	出していることから、
shushoo .wa	*kako.ni .mo*	*'kaiwaredaikon' .de*	*seeka .o*	*dashi.teiru koto.kara*、
prime-minister .TOP	pastLOC.in .HIL:too	'daikon-sprout' .AGN:with	achievement .ACC	come-out.ASP:rslt .THING.because,
Prime minister	in the past too	with 'daikon-sprout'	because … came out with achievement	
As the prime minister came out with achievement with 'daikon sprouts' in the past, too,				

and the evidentiality item of hearsay (Teruya 2007, p. 219) *.to.iu*.

Pluto-kun first appeared on J2's Twitter site on 31/03/2011, the day before April Fool's Day. On that day, he posted 6 tweets with a link to Pluto-kun's video on YouTube. Two other posts on the same day had the linguistic encoding of プルト君, or *Puruto kun* (Pluto-kun). Further, an account called @Plutokun_Bot was created on Twitter on 02/042011 (meyou 2014), which began interacting with J2 from that date.

周囲に	「必ず	完食する」と	自信を	見せているという。
shuui .ni	*'kanarazu*	*kanshoku .suru'.to*	*jishin .o*	*mise.teiru .to.iu。*
surrounding .DAT	'surely	eating-completion .DO'.PROJ	confidence .ACC	show.ASP:cont .PROJ.SAY.
to surrounding people	'surely	that (…) eat (it) all up'	confidence	is said to show
(he) is said to show confidence to the surrounding people (saying), '(I) will surely eat (it) all up.'				

These numerous linguistic characteristics representing journalistic register make a mismatch to the presence of the fictional character *Purutokun*. The tension created by this mismatch affords readers to interpret the whole tweet as mock journalism.

The field of [J2-3], written as a fake news report about the prime minister's press conference, is primarily political. The test eating of parenthesised 'plutonium' is compared with test eating of 'daikon-sprout'[84], which was a political event conducted by Mr. Kan in the past. '*Kaiware daikon*' (daikon-sprout) is also parenthesised, which can be interpreted as involving some shift of meaning. Then, the part 'Pluto-kun scheduled to attend' can be understood as involving multiple fields. Plutonium belongs to the science field, and 'Pluto-kun' was originally created for an animation movie aimed at promoting understanding of nuclear energy in the 1990s. This was a kind of 'popularisation' of science. Being an *anime* character, it also touches on the popular culture field. Further, Pluto-kun attending the prime minister's press conference means that Pluto-kun was now recontextualised as belonging to the field of politics.

Turning to the couplings instantiated and laughed at in [J2-3], there are two examples of inscribed ATTITUDE instantiated in this tweet. The first one, *seeka* (achievement), is a JUDGEMENT: + capacity coupled with the Prime Minister. The second one *jishin* (confidence) is also interpreted here as a JUDGEMENT: + capacity in that he is capable of doing the test eating of 'plutonium'. Since the positive evaluation toward the prime minister in terms of capacity is laughed at, the kind of bond invited toward the

[84] Test eating of daikon sprout was an event that Mr. Kan performed in 1996 as Minister of Health and Welfare. He was held responsible for the false rumour that daikon sprouts was the cause of the epidemic of escherichia coli 157. During that hassle, Kan ate sprout salad at a press conference in order to promote its safety to the public (Wikipedia).

readership will then be negative, namely, the incapacity of the head of the national government.

One more thing to note is the way the imaginary entity of Pluto-kun had been introduced on the Twitter site of J2. From 31/03/2011 to 11/04/2011, 24 tweets out of 299 posted by J2 contained the explicit wording '*Puruto.kun*' (Pluto-kun). Their distribution is shown below in Figure 4.7, illustrating how frequently 'Pluto-kun' was mentioned on the day before and on April Fool's Day. Then on 02/04/2011, a Twitter account 'Plutokun_Bot' emerged and began being retweeted in J2's tweets. It would be reasonable to infer that the introduction of Pluto-kun was done at this particular time in order to promote a particular kind of value[85].

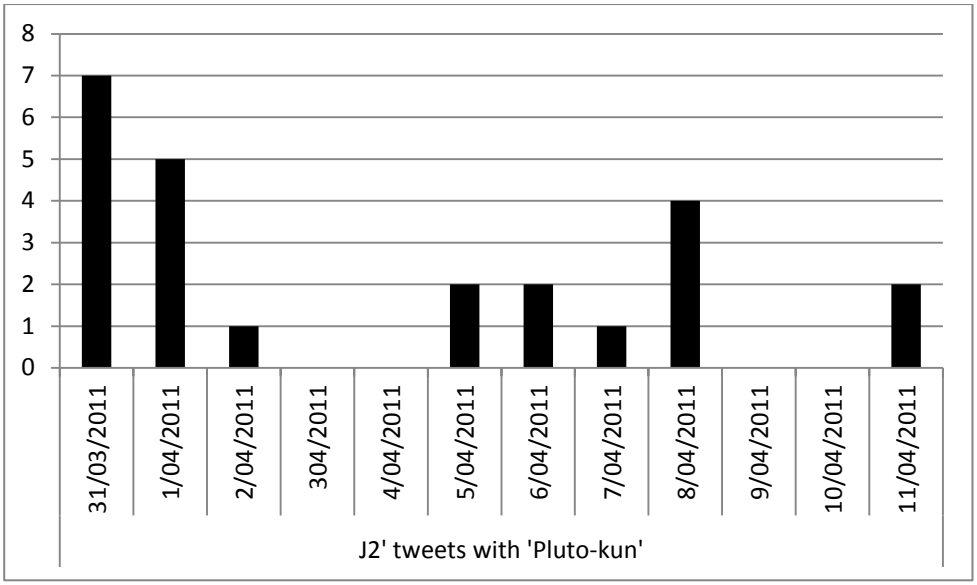


Figure 4.7 Distribution of J2's tweets with '*Puruto.kun*'

In this subsection, two tweets that involve humour have been examined. The analyses identified what kinds of coupling are laughed at. In the physicist's tweet, the coupling of the ideational meaning 'long half-life' and the evaluative meaning 'scary' was laughed at by listing substances which have an even longer half-life. Linguistic clues,

[85] The way Plutokun was introduced and utilised in the community around J2 beyond Twitter would be an interesting topic to explore in terms of bondicon (Stenglin and Martin 2007, Martin 2008intermodal), defined as 'objects which invoke values encapsulating the ideologies of the people they belong to' (Martin 2008intermodal, p. 130), or more specifically as 'repellent bondicon' or 'anti-bondy' (Martin 2010. p. 26). However, exploring it exceeds the scope of this thesis.

including contradictory indications of exaggeration, monotone reading, and childish expressions, were provided so the reader would interpret the text as humour. In this way, the tweet invited the readers to distance themselves from the kind of bond that associated the value of scariness to long half-life, and to affiliate with their bond, or the coupling pattern of 'long half-life' and the value 'not problematic'. In this sense, P2's tweet still remained in the scientific field in the same way as the other physicists' tweets examined in this chapter. By contrast, the journalist J2, in his mock journalism tweet posted on April Fool's Day, with an imaginary entity of Pluto-kun standing by, laughed at the couplings of 'prime minister' with 'achievement' and 'confidence'. The positive capacity of the prime minister and the positive sense of security were laughed at in the tweet, inviting the reader to bond with the exactly opposite kind of coupling, i.e. the incapacity of the government. The field is recontextualised into politics and popular culture, which is compatible with the patterns seen in other tweets written by the freelance journalists.

4.3.3 Intertextuality: accumulation of coupling towards the creation of bonds

The findings of the coupling analysis are summarised for each of the two professional groups according to the subtopics on Table 4.5.

Table 4.13 Couplings in tweets on the issue of plutonium

subtopic	P Group		J Group	
	ideational	interpersonal	ideational	interpersonal
potential impact	plu-thermal (technology field)	**not special** [app: + composition]	plutonium (technology field)	*more* **serious** [app: - composition]
	plutonium (science field)	**not a problem**: [app: + valuation]		
half-life	half-life (science field)	*very long [app: +valuation]*	half-life (pop culture field)	*very long* [app: - valuation]
	plutonium (science field)	difficult to detect: [app: - composition]	TEPCO (corporate field)	invoked: [jud: -incapacity]
plutonium dispersal	plutonium (science field)	invoked: [app: + valuation]	the matter of 'plutonium does not fly' (meaning by kind)	**'safety demagogue**' [jud: - propriety] [appr: - valuation] (-_-) [aff: dissatisfaction]
	people people who make fuss (everyday field)	invoked: [aff: insecurity] [jud: - capacity]		
	chemical toxicity (science field)	**not a problem**: [app: + valuation]		
	plutonium unlikely to fly (science field)	invoked: [app: + valuation]		
measuring device	people (everyday field)	**anxious** about plutonium: [aff: insecurity]	TEPCO (corporate field)	invoked: [jud: -capacity]
	quantitative discussion (science field)	*become possible* [app: + valuation]	'TEPCO not possessing a device for measuring plutonium' (politics field)	**urgency state of emergency** [app: - valuation]

subtopic	P Group		J Group	
	ideational	interpersonal	ideational	interpersonal
presence of plutonium in the world	plutonium present in the world (science field)	*amount* [app: + valuation]	plutonium that was dissipated (global society)	*ended up being dissipated* [app: - valuation]
				to the whole world [app: - valuation]
			influencing power	*no reducing* [app: -valuation]
			scholar (academia field)	**opportunist**: [jud: - propriety]
				violent language: [jud: - propriety]
			language of the scholar (social field)	**criticised:** [jud: - propriety]
				by the whole world [jud: - propriety]
			influence of plutonium (science field)	**to be anxious about**: [app: - valuation]
significance of plutonium leak	density (science field)	*environment level [app: + valuation]*	reactor from which plutonium leaked (technology field)	**no meaning**: [app: - valuation]
	plutonium measurement (science field)	**expected** [aff: inclination]	melting of pellets	*has started partially* [app: - valuation]
	radiation protection of workers and cooling of plutonium (risk management field)	**urgent task**: [app: - valuation]	(ambiguous) either melting of the pellet, or the significance of the plutonium being that melting of the pellet has partially started (technology field)	*Certainly!* [app: - valuation]
laughing at	long half-life (science field)	**scary**: [app: - reaction]	prime minister (politics field)	**achievement**: [jud: + capacity]
			prime minister (politics field)	**confidence**: [jud: + capacity]

Note: **bold**: inscribed ATTITUDE; *italics*: GRADUATION; no bold: invoked ATTITUDE.

The findings show different patterns between the two professional groups in a number of ways. In P Group's tweets, field mostly remains in the realm of science, with occasional recontextualisation into nuclear technology and risk management. Coupling also shows particular patterns. Couplings such as "plutonium + not a problem", "detecting plutonium + difficult" and "people + anxious" are found repeatedly in both

P1's and P2's tweets. Some tweets do not have inscribed ATTITUDE, e.g. [P1-3] and [P2-3]. These tweets concern scientific facts about plutonium based on published information. In [P1-3], P1 states that there is no significant increase of Pu, or plutonium. From the patterned couplings in his and P2's other tweets, the GRADUATION resource as FORCE: quantification is interpreted as flagging "plutonium + not a problem". In [P2-3], P2 mentions the amount of plutonium which exists in soil and human bodies in the world, and so this tweet can also be interpreted as flagging "plutonium + not a problem". In short, the physicists' tweets without inscribed ATTITUDE can be interpreted as sharing the same coupling pattern as the other tweets with ATTITUDE inscription.

The tweets written by J Group were different in terms of both field and coupling. The fields were not so often of science as to other fields including technology, corporate world, politics and popular culture. Different patterns emerged in terms of coupling too. In the journalists' tweets, plutonium is coupled with the interpersonal meaning 'serious', forming a "plutonium + serious" coupling.

Another difference is in the evaluation coupled with human entities. While in P Group, there is a pattern of coupling of 'people' with negative insecurity as 'anxiety', J Group's tweets have different kinds of human entities with whom values are coupled. They include 'TEPCO', 'opportunist scholar' and 'the prime minister'. These human entities can be generalised as representing the authorities. The overriding attitudinal meanings coupled with them are negative JUDGEMENT in terms of capacity and propriety. These couplings can be summarised as "authorities + incompetent" and "authorities + dishonest".

J Group's tweets are more varied in terms of GRADUATION. In [J1-4], the graduation resource as force amplifies the meaning of the length of the half-life of plutonium, flagging the coupling, "plutonium + problem". There are resources of GRADUATION as FOCUS: completion ([J1-3]) and actualisation [J1-4], amplifying the meaning that something has happened and there is no returning, or something is going to happen certainly.

The analyses conducted in this section revealed contrastive kinds of patterning in the tweets written by the two professional groups, the physicists and the freelance journalists. The distinct patterns are shown below on Table 4.6.

Table 4.6 Coupling patterns across professional groups

	P Group		J Group	
field	science, technology, risk management		technology, politics, popular culture	
meaning	ideational	evaluative	ideational	evaluative
non-human entity	plutonium	not a problem	plutonium	serious problem
	detecting a small amount of plutonium	difficult		
human entity	people	anxious about plutonium	authorities	incompetent dishonest

In some tweets, couplings are not explicit, but the implicit values are retrievable intertextually, i.e. from other tweets written by the same authors. This means that, according to the theory of individuation hierarchy (see Chapter 2), the accumulation patterned couplings are now formed into bonds, basic units for affiliation towards community building.The next section will discuss these patterned couplings examined in this section from the perspective of affiliation.

4.4 Bonding orientation

The contrastive coupling patterns that emerged through the coupling analysis presented in section 4.3 now provide bases for understanding these different kinds of affiliation. In the individuation hierarchy, the patterned couplings are considered to create a bond, a basic unit for affiliation, and then clustered into what Knight (2010, p. 45) calls ‘bond networks’ (see Chapter 2). However, the present study concerns a retrospective understanding of the formation of new communities on Twitter at a time of a national crisis. We are exploring, for instance, how a negative evaluation of plutonium (see Section 4.1) became a shared social bond during the first year of the nuclear crisis. In

order to explore the formation of these communities, a dynamic nature of the creation of bonds, as well as their clustering, needs to be considered. In this sense, this study takes a different approach to dynamism from that of Knight (2010a, 2010b). Knight's work refers to the logogenetic negotiation of bonds between interactants in conversation. The present study takes a wider perspective, beyond logogenesis where couplings are instantiated, encompassing the intertextual accumulation of patterned couplings. The concept of *bonding orientation* refers to the dynamic creation and clustering of bonds across multiple texts in the service of community formation.

The present study provides a valuable context for exploring bonding orientations. It is situated in a society being exposed to new kinds of information or new fields of knowledge associated with the nuclear accident. Couplings that invite affiliation accumulate as events unfold. This section reviews the patterned couplings examined in Section 4.3 in the light of bonding orientation.

4.4.1 Physicists: negotiating science with people who are afraid

The first to be examined is P Group. In the tweets of this group, the field of plutonium was construed around science with occasional recontextualisation into nuclear technology and managerialism in terms of risk management. The repeated couplings were those of "plutonium + not a problem", "plutonium detection + difficult" and "people + anxious about plutonium". Each of them, with the intertextual accumulation of the same coupling, is now understood as forming a bond. Then, in order to understand the bonding orientation proposed by the physicists, the relationship between these bonds is examined.

The first two bonds, "plutonium + not a problem" and "plutonium detection + difficult" come from the field of science, and represent the scientific values that the physicists affiliate with. The third bond "people + anxious about plutonium" is different. While the coupling appeared repeatedly in the tweets, the physicists do not necessarily share the same values with people who are anxious about plutonium. In fact, in terms of propositional voice, the physicists overtly distance themselves from fearful people, or people who consider plutonium a problem. There are numerous uses of heteroglossic

contraction denying such a voice. One tweet by P2 invokes negative JUDGEMENT towards people who make a fuss of plutonium. However, though the physicists distance themselves from the propositional voice of these people, they do not exclude these people from their community. Rather, these 'fearful people' constitute potential readers to whom the physicists' tweets are addressed. Their tweets invite readers to abandon their "plutonium + a problem" bond and to affiliate with the scientific bond that they propose. Contextualised as occurring during the nuclear crisis, this indicates that the community offered by P Group is not only constituted by those who share scientific understanding, but involves people who are anxious due to the nuclear crisis.

From these findings and the discussion, the bonding orientation offered by P Group's tweets can be summarised as concerning negotiating of scientific knowledge with lay people who are fearful of the nuclear crisis. To persuade readers to their orientation, they provided scientific evidence to support their claims. Their bonding orientation has to do with science and related areas relevant in a nuclear crisis, inviting the readership to affiliate with a scientific understanding of the nuclear crisis.

4.4.2 Freelance journalists: humanising science and rallying around values

In the tweets of J Group, the field of plutonium was recontextualised into that of nuclear technology, the corporate world, politics and popular culture. Negative attitudinal meanings prevail in terms of recurrent coupling patterns, including "plutonium + a problem", "authorities + incompetent" and "authorities + dishonest". These patterned couplings are now understood as accumulated into bonds, to form a particular bonding orientation to invite readers into their community.

The bonds offered by J Group differ from that of the physicist in a number of ways. Firstly, plutonium is presented as a serious and problematic issue. Unlike P Group, very little explanation is provided to support this coupling. The negative coupling with plutonium does not reflect the scientific understanding of the nuclear accident, but rather represents the negative evaluation of the ongoing nuclear crisis, the bonding orientation towards which J Group invite the readership to affiliate with. The coupling

is more often invoked than inscribed. In other words, the negative value about plutonium is presented as taken for granted.

Another recurrent pattern concerns human entities. J Group distinguishes between two types of people. The first is a group of experts from nuclear technology. Their proper names are provided in the tweets and no JUDGEMENT is coupled with them. The second type includes the authorities, such as the vice president of TEPCO, an academic from Tokyo University appearing on NHK and the prime minister of the time. They do not share the bonds of J Group. Inscribed negative JUDGEMENT is coupled with these latter people. In addition, unlike P Group, J Group does not attempt to negotiate their bonds with the authorities. Rather, the authorities are there to be evaluated negatively, presented as lacking confidence, incapable of managing the crisis and dishonest, and therefore as needing to be condemned. As with the plutonium coupling, very little explanation is provided as to why the authorities are to be condemned.

While negotiation of bonds is not observed in J Group's tweets, their tweets are often committed in terms of ATTITUDE when coupled with the authorities (e.g. [J2-3]). Negative attitudinal meanings are often amplified by the deployment of various resources including GRADUATION (e.g. [J1-2]). This foregrounds the evaluative aspect of the bonding orientation of J Group, offering the readership to just accept their bonds as they are without questioning them, and to rally around them.

As such, J Group's bonding orientation is not towards scientific knowledge. Plutonium is recontextualised into a social world with more human entities, in which negative evaluation about the nuclear crisis prevail. The authorities are also problematised. In order to persuade readers to their orientation, they do not negotiate it by providing arguments. Instead, they amplify the evaluative meanings with instantiation of various kinds of meaning. The bonding orientation of J Group is one that foregrounds values and that backgrounds scientific knowledge, offered to the readership to be accepted without questioning.

4.4.3 Ontogenetic development of bonding orientations

So far in this chapter, the tweets posted by the two groups have been compared as forming two distinct communities with distinct bonding orientations. Linguistic exploration has revealed the nature of the two communities in terms of the different bonds they offered around a matter of science. These now provide the bases for interpreting the relationship of these bonding orientations to each other from a temporal perspective of one month of nuclear crisis.

Right after the accident, P Group excluded plutonium from the problem. From their scientific perspective, other materials such as caesium and iodine 131 were potentially more problematic because they could disperse to the environment to a larger extent (see Section 4.2). In the course of one month, however, the physicists needed to react to the matter of plutonium which was problematised in their Twitter ambience. Seeing that lay people became anxious about plutonium, they needed to counter that view, repeating that it is not a problem. The physicists provided scientific explanation and evidence to support their claims.

What J Group did in the meantime was to take part in providing an opposing view about science. From the very early stage, J1 problematised plutonium. After that, they began problematizing the authorities, including scientists, mainstream media and the government. They invited readers not to trust but to distance from them. The bonding orientation proposed by J Group was something P Group countered against, most intensively around the time of TEPCO's press conference, when the issue of plutonium became a hot topic. These tweets posted by P Group in that period were not picked up by J Group. Instead of countering P Group, J Group kept on with their bonding orientation that includes negative JUDGEMENT about 'opportunist scholars'.

This perspective of bonding orientation can further be conceptualised from an individuation perspective. Knight (2010a) explored logogenetic (see Chapter 1) negotiation of bonds between interactants in conversation. In this study, orientations took shape in relation to each other in a longer time span of one month. The bonding orientations examined here thus provide an ontogenetic perspective of affiliation in terms of expanding *repertoires* of meaning potential (See Chapter 2).

The perspective of bonding orientation also encapsulates the conceptualisation of the readership. On Twitter, bonds are not only negotiated with the interactants (see Chapter 5) but also are offered to followers and other readers who access their tweets. In other words, bonds are presented on Twitter with the intention to be reciprocated, or to be shared with a large readership, a readership beyond interactants that are visible in the tweets. The concept of bonding orientation captures this aspect of inviting a diverse readership (beyond direct interactants) to affiliate with the bonds offered by the community.

Further, the findings of this chapter provide a more general understanding of discourse of particular communities such as journalism. Journalistic discourse is characterised for its ideological nature in the literature (see Chapter 2). The taken-for-grantedness of values in the text is discussed in terms of 'putative readers' (Martin & White 2005) or in terms of 'allusion' (Caple 2010). This can now be discussed from a more general perspective of bonding orientation. In this study, the concept of bonding orientation provides a basis for comparing tweets of two professional groups, physicists and freelance journalists in the first month of the 3/11 nuclear crisis. Likewise, discourse of different professional groups may be explored or compared from this general and dynamic perspective of bonding orientation.

4.5 Conclusion

The chapter has compared the formation of Twitter communities they offer in matters of science. Focusing on the issue of plutonium, accumulation of patterned couplings in the first month of the nuclear crisis was explored in terms of bonding orientation, offering a basis for affiliation around hub tweeters from two professional groups.

The analyses revealed similar patterns within each professional group and distinct patterns across professional groups. In the tweets examined in this chapter, both physicists construe plutonium in the fields of science, technology or risk management consisting primarily of non-human entities. Plutonium is coupled with the inscribed

positive APPRECIATION, ‘not a problem’. Grading resources primarily construe topological meaning or ‘meaning by degree’, characteristic of the discourse of science (Lemke 1998, 2004), and also function as GRADUATION as FORCE. ENGAGEMENT resources close down negative evaluation coupled with plutonium. Human entities are mentioned in the coupling of “people + anxious of plutonium”, but no JUDGEMENT is inscribed or invoked.

The freelance journalists recontextualise the matter of plutonium into a social world, in the fields of politics and popular cultures. The human entities construed include politicians and experts. Plutonium is coupled with the negative APPRECIATION, as ‘a problem’. The value coupled with plutonium is more often invoked than inscribed. Some human entities, typically those belonging to the authorities, are coupled with inscribed negative JUDGEMENT, and sometimes are highly committed in terms of instantiation of the interpersonal meaning. On the other hand, other experts who reciprocate their bonding orientation are not coupled with any evaluative meaning. The last finding is compatible with observation from a science communication perspective of journalism which attend to the ‘scientists whose work supports the interests of’ (Stocking 1998, p. 29) a particular group.

The coupling patterns examined in this chapter are observed in most other tweets on plutonium. The only exception is P2, who sometimes couple inscribed negative JUDGEMENT with particular kinds of human entities. This kind of tweet was not selected for the analysis of this chapter because the focus was on the subtopics on plutonium that emerged with the unfolding of the nuclear crisis. However, in [P2-6], a negative JUDGEMENT is invoked when mentioning people who make a fuss about a metallic strain such as plutonium. A tweet of this type, one that couple negative JUDGEMENT with a human entity, is examined and further discussed in Chapter 5.

The findings of this chapter are also consistent with other tweets of the data set that concern scientific aspects of the nuclear crisis throughout one year. As new facts about the nuclear crisis, such as detection of high radioactivity, were broadcast on the mainstream media, both P Group and J Group reacted to the news in manners similar to what has been observed in this chapter. While P Group headed towards scientific

explanation of the facts, J Group construed the news as a human matter, foregrounding negative evaluation.

As such, these findings provide the basis for understanding communities from a perspective of professional groups. With regard to P Group, the bonds evident from both tweeters concern negotiation of scientific understanding of the nuclear crisis. As for J Group, knowledge of science is backgrounded to values. Negative evaluation prevails as bonding orientation. The coupling analysis of tweets on plutonium reveals the nature of contrastive communities formed around P Group and J Group in this respect.

In addition, the analyses inform a different aspect of the affiliation, in terms of community boundaries. This is a particular issue with regard to the tweets of J Group. In their tweets, one key coupling concerns negative evaluation of the authorities and some experts. Their bonds are not negotiated with those authorities. This infers that people in the authorities are excluded from the community of J Group, unless those experts reciprocate the bonds offered. Further, taken-for-grantedness of their plutonium coupling suggests that people with opposing views about the nuclear crisis are also excluded. In other words, the community offered by J Group is one in which participation is restricted to those who readily accept the bonding orientation offered by the freelance journalists. In other words, community boundaries are strictly maintained in the community of J Group. This provides a picture of a more exclusive community in terms of its potential participation (see Chapter 5).

This last aspect is less apparent for P Group. It implies a more open community, but it is not evident from examining the tweets on plutonium only. For the physicists, there is a need to explore other kinds of tweets in order to understand the nature of their community in terms of boundary maintenance and potential participation. The issue is addressed in Chapter 5, where a larger subset of tweets from the data set written by the two physicists are drawn upon, in particular tweets that refer to human entities and involve negotiation of horizontal tenor relationship in terms of solidarity. As will become evident, this particular lens on the data opens up interesting new perspectives on particular linguistic resources in Japanese

Chapter 5 That voice is heard: negotiating community participation with *keego*

5.1 Introduction

In Chapter 4, the focus was on the coupling of ideational and evaluative meanings in the tweets written by P Group and J Group. Analyses compared the manners in which the two groups addressed a matter of nuclear science, plutonium, during the first month of the nuclear crisis. From there emerged the different kinds of bonding orientation towards which the two groups invited readers to reciprocate for both P Group and J Group. Whereas the bonding orientation of P Group forms around scientific knowledge, that of J Group foregrounds values over knowledge. In addition to identifying difference in bonding orientation, which forms the basis for affiliation in each community, the analyses also revealed ways in which J Group in particular maintained community boundaries through exclusion and non-negotiation of values. This strategy of non-negotiation was less apparent in the data from P Group. This implies that P Group may represent a more open community. However, a broader set (beyond tweets on plutonium) and further analysis is required to explore the extent to which the P Group do in fact allow space for negotiation of their basis in scientific knowledge.

This chapter narrows the focus to the community formed around the physicists, and explores more closely the linguistic resources that contribute to the formation of the community. While Chapter 4 focused on the field and examined the tweets which contained the content word '*purutoniumu*' (plutonium) or 'Pu', Chapter 5 attends to tweets that contain particular lexicogrammatical resources in Japanese, namely, those that are typically referred to as *keego* or honorifics (see Chapter 2). The goal of the chapter is to explain how the deployment of these resources functions in negotiating potential participation in the P Group community. In other words, it explores who are construed as belonging to this community. The exploration complements the findings in

Chapter 4 by exploring the bases of affiliation offered by P Group in terms of potential participation.

To this end, the chapter begins by redefining *keego* from an SFL perspective. This is done in two terms. In terms of lexicogrammar, a number of systems are proposed in the interpersonal metafunction. These accounts are exemplified with tweets from the data set or with made-up examples in Japanese. The lexicogrammatical accounts are taken up in the stratum of discourse semantics, in which the meanings of these resources are explored at a more abstract level. Once the dual stratal accounts for the resources are made, it is possible to explore of the roles that the resources played in the physicists' tweets in negotiating solidarity with Twitter readers in the context of the nuclear crisis.

5.2 Lexicogrammar of *keego* in Japanese

Keego, or 'honorifics', is a set of resources in Japanese which can be literally translated as 'respect words' or 'respect language' in English. As discussed in Chapter 2, it is a category of linguistic resources that average educated Japanese people know about and talk about, commonly understood as expressing respect to other people. An SFL profile of these resources is set up in this section as the basis for exploring the discourse semantic meanings realised by these resources. It is done by redefining the resources in question in SFL terms, including the taxonomy and their functions.

5.2.1 *Keego* and systems in SFL

SFL literature on Japanese does touch on the resources referred to as *keego* (honorifics), although a detailed account of the systems is not provided. From the lexicogrammatical perspective, Teruya (2007a) mentions two systems, those of HONORIFICATION and POLITENESS, proposed as resources for negotiating vertical or horizontal tenor relationships among the interactants. Likewise, Fukui (2013) conceptualises two systems, FORMALITY and HONOURIFICATION, alongside but separate from the system of

MOOD. In both accounts, the resources in question are classified in the realm of the interpersonal metafunction. They both mention choice between *keego* and non-*keego* resources. These previous accounts provide a sound point of departure toward a systemic functional account of these resources.

However, a number of issues still remain unresolved. Firstly, *keego* in Japanese includes not just those resources that negotiate the interpersonal relationships between interactants, but also relationships between the speaker-writer and non-interactants[86]. This is one of the characteristics that need to be included in the proposed account. Secondly, the two systems, POLITENESS, or FORMALITY in Fukui (2013), and HONORIFICATION, are treated 'interrelatedly' (Teruya 2007a, p. 58) or in parallel (see the system network of Mood type in Fukui 2013, p. 78). However, findings about the two distinct set of resources from non-SFL works (see Chapter 2) have not yet been incorporated in the SFL accounts. Further, there are subcategories of *keego* that recent Japanese linguists propose, with the labels of *bikago* (beautification word) and *teechoogo* (courtesy word) (see Chapter 2). An SFL account of keego needs to include these resources that are presently ignored.

One thesis chapter does not suffice to provide a thorough account of the systems and functions of these resources in Japanese, nor is it the goal of this chapter. The objective of this chapter is to understand how these resources functioned in the tweets written and posted by the physicists, in order to better understand the community that formed around them at a time of nuclear crisis. To this end, a systemic functional account of these resources is needed. A lexicogrammatical profile that focuses on the clause-level function will not be sufficient. Beyond that, the study needs to identify the discourse semantic functions of these resources at the text level (see Chapters 1 and 3). In this sense, this chapter is expected to take a first step in the exploration of a more comprehensive SFL account of the so-called *keego* in Japanese. This is done from the dual stratal perspective of lexicogrammar and discourse semantics.

The first focus is the lexicogrammatical profile of *keego*. In order to redefine *keego* and other related resources from a systemic functional perspective, the study proposes three

[86] Some non-SFL work accounts for the distinction in terms of 'addressee honorifics' and 'referent honorifics'. See also Chapter 2.

systems, HONORIFICATION, POLITENESS and BEAUTIFICATION. The functional profile of each system is introduced in the following subsections, exemplified by tweets from the data set when applicable, or by made-up examples of typical Japanese usage.

5.2.2 Lexicogrammar and HONORIFICATION

The first system comprises the resources commonly referred to as *sonkeego* (respect word) and *kenjoogo* (humble word) (see Chapter 2). These resources are now redefined in terms of the system of HONORIFICATION.

The system of HONORIFICATION operates at the clause rank or at the nominal group rank interdependently, and enacts particular interpersonal meanings by vertically uplifting or lowering down the vertical position of one of the human Participant, or a human noun group in the clause. The resources of HONORIFICATION are either realised as a grammatical item such as prefix and suffix, or as a conflation with another lexical item (see Chapter 3). The HONORIFICATION system operates either at finite or non-finite level, unlike the system of POLITENESS examined in 5.2.3[87]. There are two options in the system, *sonkeego* and *kenjoogo*. These options are respectively referred to as 'respect' and 'defer' in this thesis. The choice is optional, with the 'neutral' feature, as is also posited in Teruya (2007a) and Fukui (2013).

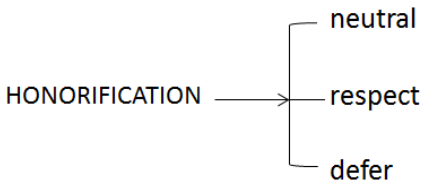


Figure 5.1 System of HONORIFICATION in Japanese

[87] There is no space to discuss the differences between the systems of HONORIFICATION and of POLITENESS in terms of rank beyond literature reviewed in Chapter 2. Relevant references for further discussion would include Tokieda (1941), S. Martin (1975/2004) and Harada (1976).

The following are made-up examples, possible in a corporate setting, that illustrate how HONORIFICATION resources function in Japanese. (1) is where the HONORIFICATION choice is neutral.

(1)

私が	部下に	話した。
watashi.ga	*buka.ni*	*hanahsi.ta*。
I.NOM	subordinate.DAT	speak.PST.
I	to subordinate	spoke
Sayer	Receiver	Process
I spoke to (my) subordinate.		

In (2) one of the two options of HONORIFICATION, respect and defer respectively, is enacted.

(2)

取引先の	方が	社長に	お話になった。
torihikisaki.no	***kata**.ga*	*shachoo.ni*	***o.hanashi.ninat**.ta*。
client-company.ADN	**person/RES**.NOM	president.DAT	**RES.speak.RES**.PST.
person m(’。’@)m from client company		to president	**spoke** m(’。’@)m
Sayer		Receiver	Process
Someone m(’。’@)m from the client company **spoke** m(’。’@)m to the president (of our company).			

(3)

うちの	部の	者が	社長に	お話しした。
uchi .no	*bu .no*	***mono .ga***	*shachoo.ni*	***o.hanashi.shi**.ta*。
inside .ADN	department .ADN	**person/DEF** .NOM	president.DAT	**DEF.speak.DEF**.PST.
person m(_ _)m in our department			to president	**spoke** m(_ _)m
Sayer			Receiver	Process
Someone m(_ _)m in our department **spoke** m(_ _)m to the president.				

In the instance (2), two resources from the respect option are instantiated, one in the participant, ‘*torihikisaki.no kata’* (someone from the client company), which is a Sayer (Teruya 2007b, p. 228), and in the Process of saying ‘*o.hanashi.ninat.ta*’ (spoke), done by someone from the client company. The meaning of the resources of the respect

option is to uplift the vertical position of the Actor (Halliday and Matthiessen 2014, p. 76) of the Process or the noun group to which a resource is attached. The resources can be attached to a nominal group that is either a Participant or part of a Circumstance. In (2), the meaning of the vertical uplifting of the position of 'someone from the client company' is enacted by two resources, one in '*kata*' in which 'respect' is conflated in the lexical item '*hito*' (person), and the grammatical attachment, '*o….ninaru*' to the Process '*hanasu*' (speak). In the English translation, the emoticon **m(_ _@)m** after a noun group or a Process indicates that there is an instantiation from the respect option of the HONORIFICATION system in the original text in Japanese.

Defining the defer option is more complex. In (3), two resources from the defer option is used, in the Sayer '*uchi.no bu.no mono*' (someone in my department) and the Process '*o.hanashi.shi.mashi.ta*' (spoke). The defer option is chosen most typically when the Actor is the first person 'I', or the third person who belongs to the same group. In the case of instance (3) above, the Actor of the process is 'someone from my department', who belongs to the same group. As with the respect option, the defer resources can be used at the clause level with Processes, or at the nominal group level either as a Participant or in a Circumstance.

The defer choice has dual functions. The primary function is to lower the position of the Actor. In the case of (3), it lowers the position of 'someone in my department'. It is done by two resources, one in the conflation in the noun group '*mono*' (person/DEF), and in the grammatical attachment of '*o…suru*' to the Process '*hanasu*' (speak). The second function of the defer option is, as a result of lowering down the position of the Actor, to uplift the position of the Receiver or the Recipient of the Process. In (3), the defer resources uplift the position of the president vertically, who is the recipient of the Process of speaking.

The defer option typically goes along with the Material Process, Verbal Process, or Mental Process that involves a Benefactor, Receiver or Recipient participant (Teruya 2007b, p. 228). In each of these cases, the position of the human Participant in the Actor

is lowered down and as a result the position of the Benefactor, Receiver or Recipient is uplifted[88].

The system of HONORIFICATION is summarised in terms of its functions with exemplar realisations in Table 5.1.

Table 5.1 The HONORIFICATION system, emoticons, with its functions and exemplar realisations

option	function	clause rank	ng rank
respect **m(゜’@)m**	uplifting the position of Actor or ng	***o**.hanashi.**ninaru*** **RES**.speak.**RES**	***kata*** person/**RES**
		meshiagaru eat/**RES**	
defer **m(_ _)m**	lowering the position of the Actor or ng (uplifting the position of Benefactor, Receiver or Recipient, or the position of the addressee)	***o.**hanashi.**suru*** **HUM**.speak.**HUM**	***mono*** person/**HUM**
		itadaku receive/**HUM**	

5.2.3 Lexicogrammar and POLITENESS

Attention now shifts to the system of POLITENESS. This system covers resources referred to as *teeneego* (polite word) in the literature of *keego* (see Chapter 2). The category corresponds to POLITENESS in Teruya (2007a) and FORMALITY in Fukui (2013), but a more delicate account of the system is proposed in this subsection. The proposed label POLITENESS comes from an English translation of the Japanese term *teeneego* (polite word), a commonly used term for a subset of resources in Japanese *keego* including *.desu* and *.masu* (see Chapter 2). However, the term POLITENESS S does not correspond to the common sense understanding of what is meant by ‘polite’ in English. As in the case of HONORIFICATION, the term ‘POLITENESS’ is used as a technical term to refer to a system of options in an SFL lexicogrammacal framework of Japanese. As Fukui (2013) posits, the POLITENESS system is set up as operating separately from, but along with the system of MOOD. As opposed to HONORIFICATION, which functions both

[88] In some other cases, the position of the addressee is uplifted. However, it goes beyond the scope of the research to provide further account of these resources.

at both finite and non-finite clause rank, POLITENESS ‘plays a role only if the clause is … finite’. (Teruya 2007b, p. 340).

In the system of POLITENESS, the first choice is made between two options, i.e. plain and polite[89]. The latter option concerns the resources that are covered in the commonly-held category of *teeneego* (polite word). For the word class commonly held as verbs[90], the polite option is realised as marked in verbs by attaching a grammatical item ‘*.masu*’ after the verb inflection. An instance where the polite option is realised in a physicist’s tweet [P1-1] is the following. The emoticon ┌|･|┘ encoded at the beginning of the Finite elements (Halliday and Matthiessen 2013, p. 140) in the English translation indicates that the finite clause has a polite encoding in Japanese.

（そろそろ	疲れてきました.
(*sorosoro*	*tsukarete.ki.**mashi**.ta*.
(little-by-little	get-tired.COME.**POL**.PST.
(gradually	have become tired.
((I) ┌|･|┘ am getting tired now.	

The polite option is widely observed in various kinds of spoken modes, e.g. in conversation between adults without involved CONTACT (Martin 1992: 532). Written genres in which the polite option is largely found include some novels, children’s narratives and primary school textbooks.

As for the plain option, it is usually realised as ‘unmarked’, or without explicit wording other than inflection in verbs and many other grammatical items[91]. One exception is the case of *da*, which has more delicate options. These will be described later in this subsection. Below is an example of the unmarked realisation of the plain option. There

[89] Both Teruya and Fukui use the terms ‘formal’ and ‘informal’ to refer to these options. These terms are avoided in this thesis for two reasons. Firstly, ‘formal’ is not a possible translation of ‘*teenee*’. Secondly, the choice of wording in the system is not necessarily a matter of what ‘formality’ would indicate in the common sense meaning.

[90] Thomson (2002) proposes that the word class commonly held as *i*-adjectives are included in verbs, opening up the possibility to revisit word classes in Japanese from a systemic functional perspective. However, *i*-adjectives are not included when referring to ‘verbs’ here.

[91] There could be a number of possibilities in accounting for how the plain feature is realised in verbs and how it can be glossed. One possible account is that the plain feature is realised in ‘*-u*’, or that it is conflated in the inflection. Broader consideration in the description of the grammar of Japanese would be needed to form an adequate description of this aspect of Japanese lexicogrammar, which exceeds the research scope of the thesis.

is no wording for the polite choice after the grammatical item of optative, '*.tai*', which means 'want to'. In the glossing and the translation, the emoticon |-.-| at the beginning of the predicate indicates that the POLITENESS choice is plain in this finite clause, as in the following extract from [P1-1].

ビールも	飲みたい.
biiru.mo	*nomi.tai.*
beer.too	drink.OPT.
beer too	|-.-| want to drink.
(I) |-.-| Want to drink beer too.	

The plain option is widely used in conversation. Reciprocal choices are typically observed between interactants with involved CONTACT. Non-reciprocal realisation may occur when STATUS is unequal between interactants (see Chapter 2). Plain is also largely chosen in various written genres including novels and magazine articles.

The gross system of POLITENESS up to this point is presented as in Figure 5.2.

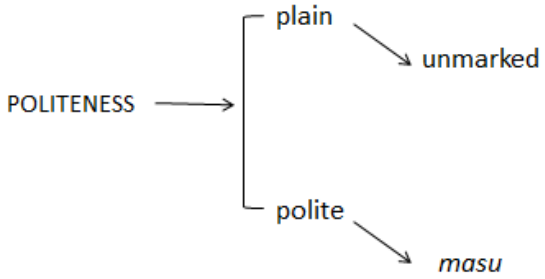


Figure 5.2 System of POLITENESS for verbal groups, gross

Now, attention turns to the case of *da*. This is a grammatical resource often referred to as 'copula' (Teruya 2007a, p. 35). One of its functions is the Relational Process, corresponding to '*be*' in English. There are more delicate POLITENESS options for this resource. The first one is 'plain', which is realised as *.da* as in the following instance of a P2's tweet [P2-1].

でも	昔の	人の	つけた	キャッチフレーズに
demo	*mukashi.no*	*hito.no*	*tsuke.ta*	*kyacchifureezu.ni*
but	past.ADN	person.NOM	attach.PST	catch-phrase.AGT
but	person in the past		attached	by catch-phrase
But (to be twisted around) by the catch phrase that people in the past attached				

振り回されるのは	愚かだ。
furimawas.areru.no.wa	*oroka.**da***。
twist-around.PSV.NOMN.TOP	stupid.**be/PLN**.
to be twisted around	|-.-| is foolish.
(It) |-.-| is foolish to be twisted around.	

Another delicate plain option is 'learned plain'[92]. Its realisation is '*.dearu*', which is seen in the following extract of [P1-2]. The same emoticon, |-.-| is used for this and other delicate options of plain.

Pu 239 の	「親」である	239Np の
piiyuu+ni+san+kyuu.no	*⌜oya⌟* ***.dearu***	*ni+san+kyuu.+enupii.no*
Pu+two+three+nine.ADN	'parent'.**be/LPLN**	two+three+nine+Np.ADN
|-.-| is the 'parent' of Pu 239		239Np's
(…) of 239Np that |-.-| is Pu 239's 'parent'		

This option is often seen in some written registers including academic and journalistic articles[93]. Mio (1942/1995) attended to the stylistic effect of *.dearu*, mentioning that the difference between *.da* and *.dearu* is not simply a matter of how to end sentences, but that it is related to other choices of words, usages and expressions in the text. The account provides a perspective to be reinterpreted in SFL terms (see Chapter 6). In this extract of [P1-2], the field is that of science. The instantiation of the learned plain option in *⌜oya⌟ .dearu* (is the 'parent' of) is a congruent one in the academic field. The lexical item '*oya*' (parent) is also used as a technical term in this clause.

In addition to these two overt options in the PLAIN subsystem, the option 'absent' is proposed here. One of such instance is the following extract of [P1-3].

[92] The label owes to Kaiser, Ichikawa, Kobayashi and Yamamoto's (2002) description of Japanese grammar for learners of Japanese.
[93] Mikami (1963) refers to *.dearu* as '*bunshootai*' or 'written style' (p. 23).

いつもは	外人が	多い	都心の	パブ.
itsumo.wa	*gaijin.ga*	*ooi*	*toshin.no*	*pabu*.
always.TOP	foreigner.NOM	many/be	metropolitan-centre.ADN	pub.
usually	foreigners	many	metropolitan pub.	
|-.-| A metropolitan pub that typically has many foreigners.				

In the tweet data set, *.da* is often realised as absent. This is explained by the limitation of the number of characters afforded in one tweet. However, in Japanese, *.da* can be absent for other contextual motivations. For instance, as Kadooka (2007) points out, the plain option of *.da* is absent when followed by the interrogative negotiatory marker *.ka* (p. 21). The combination *.da.ka* is ungrammatical in finite clauses in standard Japanese except in some dialectal varieties. This suggests that the absence of *.da* may be taken as one of the options with its own function. This is why the study proposes to refer to this as 'absent' rather than 'ellipsis'.

It should also be noted that other verbs, such as the grammaticalised lexical item '*.suru*' (.DO), are also often absent in the data set of tweets. One of such instances is the extract below from [P1-4], in which '*.shi.ta*' (.DO.PST) after '*sokutee*' is omitted. In this study, this kind of case is also considered to be the realisation of plain: absent in the POLITENESS system.

ガイガーカウンターで	人々の	頭髪や	衣服などを	測定.
gaigaakauntaa.de	*hitobito.no*	*toohatsu .ya*	*ifuku.nado .o*	*sokutee.*
Geiger-counter.MAN	people.ADN	head-hair .and-so-on	clothes.HIL:etc .ACC	measurement.
with Geiger counter	people's hair, clothes and so on			measure(ed).
|-.-| measur(ed) people's hair, clothes and so on				

The delicate plain options are shown in Figure 5.3.

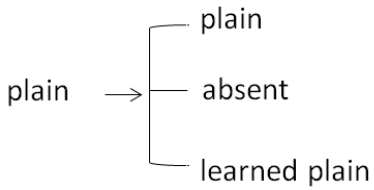


Figure 5.3 Delicate options of plain

Attention now turns to the other option, polite. The 'polite' realisation of *.da* is *.desu*. It is seen in the following instance in [P2-2].

だいぶ	フォロワーが	増えているようです。
daibu	*forowaa.ga*	*fue.teiru.yoo.**desu**。*
greatly	follower.NOM	increase.ASP:cont.EVI:seem.**POL**.
greatly	followers	┌|·|┘ seems to be increasing
I found the number of followers ┌|·|┘ seems to be increasing a great deal.		

Another delicate option is 'hyper polite'[94]. One instance is found in the following extract of the tweet [P2-3] written in February 2012. This part is a quote of another tweeter announcing that the day was Cats' Day.

本日は、	2 月	22 日	（にゃんにゃんにゃん）の	猫の	日でございます。
honjitsu .wa	*ni .gatsu*	*ni+juu+ni .nichi*	*(nyan+ nyan+ nyan).no*	*neko.no*	*hi.**degozaimasu**。*
today(NEV) .TOP	two .month	two+ten+two .day	(meow+ meow+ meow).ADN	cat.ADN	day.**be/HPOL**.
Today ┌|·|┘is 22nd Feb (meow meow meow), Cats' Day.					

Hyper polite is an option often deployed in so-called formal spoken modes including ceremonial speeches. The choice involves performance of a 'formal' or 'official' kind of identity, and is used by high-ranked hotel clerks or department store clerks, for

[94] Some grammatical accounts take *gozaimasu* as polite realisation of the verb *gozaru*, the humble form of *aru* (an existential process equivalent to *be*) (Kaiser et al. 2002). In modern Japanese, however, the realisation does not necessarily realise the meaning of deference (See 5.2.2). Martin (1975/2004) calls *.degozaimasu* 'super polite'. The label 'hyperpolite' is taken from Harada (1976).

instance.[95]. In [P2-3], the choice of hyper polite in the announcement of this 'special' day makes the whole instance sound more 'official' in a way, although this is not a common day for most of the Japanese population.

The third option in this subsystem is 'learned polite'. This option is seen in [P2-2].

できるだけ	資料に	もとづいて	発言することは	可能**でありますが**、
dekiru .dake	shiryoo .ni	motodzui.te	hatsugen.suru.koto .wa	kanoo.**dearimasu** .ga、
do/POT/PLN .HIL:only	document .LOC:on	base.SUS	remark.DO.THING .TOP	possible.**be/LPOL** .but,
as much as possible	based on documents		to make remarks	is possible to (…) but,
it ╔∵╝ is possible to make remarks based on documents as much as possible, but				

Learned polite is often found in some spoken genres including political speeches and ceremony speeches, or to perform a stalwart kind of identity. In [P2-2], however, this option is chosen presumably not in order to perform a particular identity, but in relation to other clause complexes where be/POL is accompanied by negation, as in:

必ずしも	コンスタントに	見識の	ある	発言が	できるものではありません。
kanarazu .shimo	*consutanto .ni*	*kenshiki .no*	*aru*	*hatsugen .ga*	*dekiru.mono.**de.wa .ari.mase.n**。*
always .HIL:emp	constant .CIR	insight .NOM	be	remark .NOM	do/POT.THING.**be.TOP .be.POL.NEG.**
always constantly		insightful		remark	cannot (always) do
I ╔∵╝ cannot always constantly make insightful remarks.					

These three delicate options of polite are shown below on Figure 5.4.

[95] Among shop clerks of younger generations, *.gozaimasu* is now getting replaced by other expressions such as *.ninarimasu* or *.tonarimasu*, which literally mean '╔∵╝ become', in some professional registers such as shop clerk speaking to customers. This is a live area of resources in Japanese where new expressions are being borne. However, it goes beyond the scope of the thesis to explore this and other phylogenetic aspects of the system of POLITENESS.

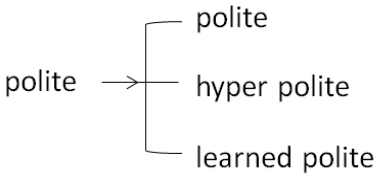


Figure 5.4 Delicate options of polite for *da*

Having gone through all the features in the POLITENESS system, they can be integrated into the following system network of POLITENESS on Figure 5.5.

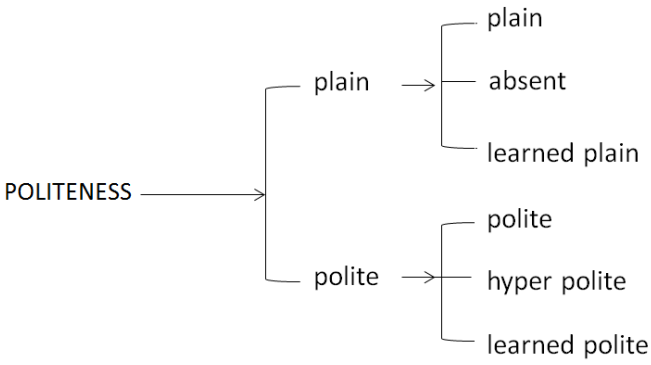


Figure 5.5 System network of politeness (delicate)

The genres and registers in which these options are typically used are summarised in Table 5.2. As mentioned in Chapter 2, mixed choices from the POLITENESS system is commonly found in many kinds of registers. Shift between plain and polite frequently occur in the data tweets as well.

Table 5.2 Options in the POLITENESS system and genres/registers in which they are typically used

POLITENESS option	**typical genres/registers**
plain	conversation in involved CONTACT, magazine articles
absent	Twitter, performing particular identity
learned plain	newspaper article, academic writing
polite	adult-adult conversation in uninvolved CONTACT, children's narrative, primary school textbook
hyper polite	ceremony speech, performing particular identity
learned polite	political speech, performing particular identity
mixed choice	adult-adult conversation, lecture, Twitter, blog

In order to explain the shift between plain and polite choices in one text, the functions of POLITENESS need to be addressed from a discourse semantic perspective. That will be one of the issues to be revisited in Section 5.3.

5.2.4. Lexicogrammar and BEAUTIFICATION

The third system that relates to *keego* is that of BEAUTIFICATION. The present study does not focus on this system, but it is briefly described below. This system comprises what is called *bikago* (beautification word) and *teechoogo* (courtesy word) or *kenjoogo II* (humble word II) in Council of Cultural Affairs (2007) [96]. The proposed system uses the same resources as those in the HONORIFICATION system, but is treated as a distinct system in that the resources from BEAUTIFICATION system are not attached to human Participants or Processes, and in that its function is not to uplift or lower the position of any Participants[97].

[96] Note that some scholars including Miyaji define *teechoogo* differently. See Nishida (2001) for further discussion.

[97] With regard to the category *teechoogo* (also labelled *kenjoogo II*), it is hard to distinguish the resources from those of the defer option in the HONORIFICATION system. Some linguists (Nishida 2002, Watanabe 1971) consider this kind of usage as part of addressee honorifics, expressing respect towards the addressee(s). The difficulty lies in drawing a clear boundary between the functions of uplifting of the position of the Participant/addressee and that of performing of a particular persona. The issue is left aside for future exploration, for it is less relevant to the questions asked in the present study.

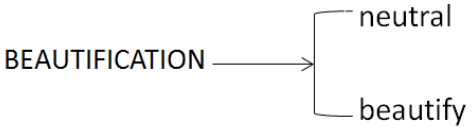


Figure 5.6 System of beautification

For instance, in the following example in P2's tweet [P2-4],

そんな	すごい	お水	きいたことないんだよねぇ。
sonna	*sugoi*	***o**.mizu*、	*kii.ta.koto.nai.n.da .yo.nee*。
such	terrible (COL)	**BEAU**.water,	hear.PST.THING.NEG.NOMN.be/PLN .NEGO:ins.NEGO:conf(LNG).
such terrible water m(’。’@)m			|-.-| have never heard of it, right
Such terrible water m(’。’@)m, (I) |-.-| have never heard of it right?			

the grammatical item '*o*', is attached to '*mizu*', a nominal group representing a non-human entity, water. In this case, '*o*' does not function to uplift the position of water above that of the speaker's, but rather has to do with a particular persona. [P2-6] is actually an artificial conversation between P2 and another Twitter account that P2 runs in the name of her cat Miiya. It presents P2's identity as a mother who explores a scientific question about radioactive contamination of water with her cat child. The existence of the beautifying prefix '*o*' before '*mizu*' (water), together with other resources, functions in making the tweet sound like a mother talking to her child. A beautify choice enacts a *persona* of a 'mother researcher gently talking with her child cat' in this instance.

This kind of '*o.*' affixation to non-human entities is largely observed across registers including those that involve young children or those of professional settings. Watanabe (1971) observes that for young users of Japanese, '*o.*' is their first exposure to the set of resources categorised as *keego* (see Chapter 2 for Watanabe's account of ontogenetic development of *keego*). In adult speech, these resources can enact an elegant identity of a speaker that features a category labelled as 'high status persons' in Ide (2005)[98].

[98] Ide accounts for *keego* in terms of *wakimae*, or appropriateness from a sociolinguistic perspective.

The beautify option can be realised at clause rank as well[99]. One of such examples is a public announcement at train stations. For instance, in (4),

(4)

まもなく	電車が	参ります
mamonaku	*densha.ga*	***mairi**.masu*。
soon	train.NOM	**come/BEAU**.POL.
soon	train	comes m(_ _)m
The train ┌|∵|┘is arriving m(_ _)m soon.		

'*mairu*' is the so-called '*kenjoogo*' (humble word) of the verb 'come'. In classical Japanese, *mairu* was used to indicate the process of going or coming to a place of respected existence including a temple and a noble person's residence. However, in this modern example, *mairu* does not indicate that the station toward which the train is approaching is a place of noblesse. Rather, the choice of *mairu* functions in the register as performing a professional identity of a station attendant that officially announces the arrival of a train. This kind of resource is often chosen in professional discourses.

The function of the BEAUTIFICATION system is different from that of HONORIFICATION. It does not uplift or lower the position of a human Pariticipant or the addressee, but performs particular kinds of *persona* or identity, such as a child, a mother, an elegant person, and a station attendant, depending on the register. A summary of the BEAUTIFICATION system is provided in Table 5.3.

Table 5.3 BEAUTIFICATION system and its exemplar realisations

option	function	clause rank	ng rank
beautification	present particular speaker/writer identity	*mairi.masu* come/BEAU.POL	*o.mizu* BEAU.water

5.2.5 Summary

In this section, a set of resources commonly held as *keego* (honorifics) in Japanese was re-examined from a systemic functional perspective by focusing on its lexicogrammatical functions. They were redefined in terms of three systems,

[99] This corresponds to what is classified as *teechoogo* in recent *kokugogaku* accounts (see Chapter 2).

POLITENESS, HONORIFICATION and BEAUTIFICATION. The system of HONORIFICATION functions at finite and non-finite clause level, and thus independently from the system of POLITENESS. The system consists of two options – respect and defer – and its function is to uplift or lower the position of a Participant or nominal group in the clause. The POLITENESS system functions at the finite clause level along with the system of MOOD. It consists grossly of two options, plain and polite, then is broken into six options for further delicacy. The third system, BEAUTIFICATION, uses the same resources as HONORIFICATION. The difference is that the BEAUTIFICATION resources are deployed to perform particular identities.

These lexicogrammatical accounts are not enough for explaining the solidarity work of these resources in the physicists' tweets. They do not explicate why and how these resources, instantiated in the physicists' tweets in the time of a nuclear crisis, could function in inviting the readership to affiliate beyond professional boundaries in the way it did. To that end, the same resources need to be addressed from a discourse semantic perspective.

In the next section, the focus narrows down to POLITENESS and HONORIFICATION, and explores the functions of resources in these systems at a more abstracted level of meaning in discourse. The accounts made in the next section will provide the basis for exploring the functions of these resources in the physicists' tweets in negotiating affiliation.

5.3 Discourse semantics and HONORIFICATION and POLITENESS

Discourse semantics is a stratum that deals with meanings in the text. In the realisation hierarchy, it is located at the intersection between grammar and context, or 'social activity' (Martin & Rose 2007, p. 4) (see Chapters 1 and 3). The present study draws on the assumption that in order to understand the linguistic contribution to the community formation in the tweets, meanings in the texts need to be explored at the discourse semantic level. In Chapter 4, it was done in terms of couplings of ideational and

evaluative meanings in the texts. This chapter aims to do the same thing for the Japanese resources of HONORIFICATION and POLITENESS.

This section is aimed at providing a discourse semantic account of these resources, which may provide a basis to understand the community formation around the physicists. Previous SFL accounts did not focus on discourse semantic functions of HONORIFICATION and POLITENESS, but rather related lexicogrammar directly to context. The limitations of such an approach are discussed in the first subsection. This gives a rationale for conceptualising an intermediate level of meaning, namely, discourse semantics.

5.3.1 Interfacing wording and context

In previous literature, the meanings of resources comprised in *keego* are largely accounted for by directly relating the functions of the resources with context (see Chapter 2). SFL accounts are no exception.

For instance, Teruya (2007a) draws on an anthropological account from Nakane (1970/1974), and conceptualises two axes defining tenor relations, 'vertical and horizontal' (Teruya 2007a, p. 179). The vertical axis was defined as organising 'the social domain into the two relatively well-defined territories, which are divided according to the socially conceived superiority or inferiority among interactants' (p. 179). The horizontal axis organises the social domain 'with respect to the social distance that can be conceptualised as consanguinity, affinity, loyalty and the like' (p. 179). Then, in analysing the text, he argues that the Predicator marked in HONORIFICATION 'co-defines the status of the Subject/addressee as superior to the speaker' (p. 180). Further, the choices are considered interrelated with the system of POLITENESS as well, saying, 'once the clause is marked in politeness, it can negotiate tenor relationships according to such hierarchical relationships' (p. 58).

Taking this conceptualisation as a starting point, the next step is to consider whether this can account for the deployment of HONORIFICATION resources in physicists' tweets. The tweet examined for this purpose is [P1-5]. Here, respect resources from the

HONORIFICATION system are deployed to uplift the position of two kinds of human participants. The first of the participants is ‘anyone who has a Ge detector’, an unspecified addressee of the tweet. The respect option is attached to the Process and the nominal group ‘person’, indicating that the position of ‘anyone who has a Ge detector’ is uplifted.

ベリリウム窓付 X 線用 Ge 検出器等を	お持ちの	方,
beririumu+mado+tsuki+ekkusu+sen.yoo+ jiiii+kenshutsu.ki .too.o	*o.mochi .no*	*kata*,
beryllium+window+attach+X+line.USE+ Ge+detection.device .etc.ACC	RES.have .ASP:rsl/RES	person/RES,
Ge detector for X ray with beryllium window etc.	person m(’。’@)m who has m(’。’@)m	
(If there is) anyone m(’。’@)m who has m(’。’@)m a Ge detector for X rays with a beryllium window etc.,		

The second is ‘people who are anxious about large dispersal of plutonium’. Here, the same kinds of resources from the HONORIFICATION system are instantiated. This indicates that the position of ‘people who are anxious about large dispersal of plutonium’ is uplifted to the same degree as that of ‘someone who has a Ge detector’.

Pu 大量飛散を	心配しておられる	方が	多い.
piiyuu+tai.ryoo+ hisan.o	*shinpai+shi.teorareru*	*kata.ga*	*ooi*.
Pu+large.amount+ dispersal.ACC	anxiety+DO.ASP:cont/RES	person/RES.NOM	many/be.
large dispersal of Pu	are m(’。’@)m anxious about	people m(’。’@)m	many/be.
Many people m(’。’@)m |-.-| are anxious m(’。’@)m about the large dispersal of Pu.			

Now, the question is whether it is possible to explain the deployment of these resources in one tweet by the vertical or horizontal relationship. In the SFL architecture, the vertical relationship has to do with power (see Chapter 2), whereas the horizontal relationship can be addressed from an individuation perspective of affiliation.

In terms of power, the two kinds of Participants are different. Someone who has a technical measurement device is likely to be a knower, and thus has power in terms of

AUTHORITY (see Chapter 2). By contrast, 'people who are anxious about Pu' are anxious about it because they lack scientific knowledge to assume that plutonium is not a problem in this crisis. Unlike the person who has a Ge detector, 'people who are anxious about Pu' is classified as a non-knower. These two Participants, who differentiate in terms of AUTHORITY, are both encoded with HONORIFICATION resources to the same degree. P1, the writer of this tweet, is also a knower, as compared to the non-knowers who are anxious about plutonium. The vertical relationship, in this case AUTHORITY, cannot explicate this reciprocal use of HONORIFICATION for these contrastive kinds of Participants.

How about the second axis of horizontal tenor relationship? One way of addressing it, from an SFL perspective of individuation, is to examine whether the tweeter affiliates with these Participants in terms of 'coupling disposition' (Zappavigna 2014a, p. 154, see also Chapter 2). With regard to the first Participant 'anyone who has a Ge detector', there is no explicit coupling of ideational and interpersonal meanings. The tweet just mentions what the Participant possesses. However, it is possible to assume that some bonds are shared between the writer P1 and the potential addressee of this tweet, as a person who has this kind of technical device may share scientific knowledge and values with P1. However, this is not the case for the other Participants, 'people who are anxious about large dispersal of plutonium'. It is clear that there is no sharing of bonds between P1 and these people. The coupling, "plutonium + something to be anxious about" is exactly the kind of coupling that that P1 was trying to deny (see Chapter 4). In other words, P1 does not affiliate with these people in terms of coupling. Then, the axis of horizontal relationship cannot explicate the same manner and degree of HONORIFICATION instantiated to these contrastive kinds of Participants in one tweet.

Regarding POLITENESS, previous studies already show that POLITENESS choices are often mixed in one text in various registers (see chapter 2). In some cases, shift can be interpreted as shift of the perceived tenor relationship in a text. For instance, in the neighbourhood quarrel that Cook (1998) observed, one of the interactants shifted his POLITENESS choice from plain to polite once he recognised that the other party was his landlord. However, in many instances, it is unlikely that tenor is negotiated each time there is a shift between polite and plain in a conversation.

In addition, there are cases in which choices from the HONORIFICATION and POLITENESS systems are not interrelated. Take [P1-1] for example. The POLITENESS choice is plain whereas HONORIFICATION is encoded in the addressee of the tweet, '*doogyoosha.no kata*' (person **m('。')m** in the same business) and his/her Process of helping.

同業者の	方,	時々	お助けくださる と	有り難いな-
doogyoosha .no	*kata,*	*tokidoki*	*o.tasuke .kudasaru .to*	*arigatai .na–*
same-business-person .ADN	person /RES,	sometimes	RES.help .GIVE-ME/RES .if	appreciated/be .NEGO:incl(LNG)
person **m('。')m** in the same business		sometimes	if you help **m('。')m** me	|-.-| is appreciated–
People **m('。')m** in the same business, (it) |-.-| would be appreciated if (you) could help **m('。')m** (me) sometimes.				

There is an apparent mismatch between the plain choice in the POLITENESS system and the respect choices in the HONORIFICATION system here. This cannot be explained by conceptualising both POLITENESS and HONORIFICATION as realising tenor relationships, whether vertical or horizontal. This is another limitation to relate wording directly to context.

With these limitations, it is now clear that another stratum between wording and context is needed in order to understand the functions of HONORIFICATION and POLITENESS in the texts. These are now dealt with in the discourse semantic stratum. That is the objective of the next subsection, which will begin after a brief reintroduction to the interpersonal discourse systems in the SFL architecture.

5.3.2 Interpersonal discourse semantics revisited

In Martin and Rose (2007), interpersonal discourse semantics is theorised as consisting of two complementary systems, i.e. NEGOTIATION, and APPRAISAL (see also Chapter

3)[100]. According to Martin and White (2005), NEGOTIATION focuses 'on interactive aspects of discourse, speech function and exchange structure' (p. 33). APPRAISAL attends to 'the linguistic mechanisms for the sharing of emotions, taste and normative assessments' (p. 1). The goal of this subsection is to relate the two lexicogrammatical systems of HONORIFICATION and POLITENESS to some of these discourse systems.

Before proceeding, it is again emphasised that this abstract level of meaning operates in any language (see Chapter 3). For the same token, any language has the potential to contribute to the elaboration of the systems at this level of meaning. This study attends to some of the aspects of meaning potential in Japanese which have not yet been attended to from a discourse semantic perspective. In fitting the resources into the existing systems, adjustment to the existing systems is done when needed. That involves proposing the addition of another option in the existing system. Once the functions of these resources are conceptualised on the discourse semantic stratum, the next task will then be to apply them to analyse some of the physicists' tweets in terms of interpersonal meanings enacted in particular instances with a particular set of contextual variables. From such analyses, discussion of the kinds of solidarity work enacted by the two physicists in the tweets is made possible.

5.3.3. Legitimate: HONORIFICATION in the service of ENGAGEMENT

The first focus is HONORIFICATION. In Section 5.2, it was shown that on the lexicogrammatical stratum, the HONORIFICATION system functions at clause and/or nominal ranks and functions in uplifting or lowering of the position of a Participant or a nominal group in a Circumstance in the clause. Clauses are the level where propositional meanings are construed. In discourse semantics, positioning of propositional voices is dealt with in the system of ENGAGEMENT in APPRAISAL (see Chapter 3).

[100] In Martin and White (2005), there is another system, INVOLVEMENT, which is conceptualised as 'non-gradable resources for negotiating tenor relations, especially solidarity' (p. 33). According to Martin (2008a), exploration of the system is left unopened as a 'pandora's box' (p. 57). The Japanese resources dealt with in this chapter may well not be unrelated to this last system, because it has to do with identity. However, it goes beyond the scope of the research to explore this issue further here.

ENGAGEMENT is defined as 'the resources of dialogistic positioning' (Martin and White 2005, p. 97). According to Hood (2010), it is a set of resources for the writer to either align with or distance from 'propositions and values expressed' (p. 173) in texts. In other words, ENGAGEMENT concerns positioning different kinds of non-authorial voices in relation to the author's. In [P1-5] discussed in Subsection 5.3.1, HONORIFICATION was at play with two human entities, i.e. an expert who has a Ge detector and people who are anxious about plutonium. If we consider that these two entities constitute non-authorial voices, it may then be reasonable to begin exploring the discourse semantic function of HONORIFICATION in terms of ENGAGEMENT.

In the current architecture, the taxonomy of the ENGAGEMENT system consists of two gross options, monogloss and heterogloss. The former is defined as 'the barely asserted proposition' in which intersubjectivity is construed as 'neutral, objective or even "factual"' (Martin and White 2005, p. 99). The latter involves 'overtly dialogistic locutions' (p. 102). The system network of ENGAGEMENT: heterogloss is provided in Figure 5.7.

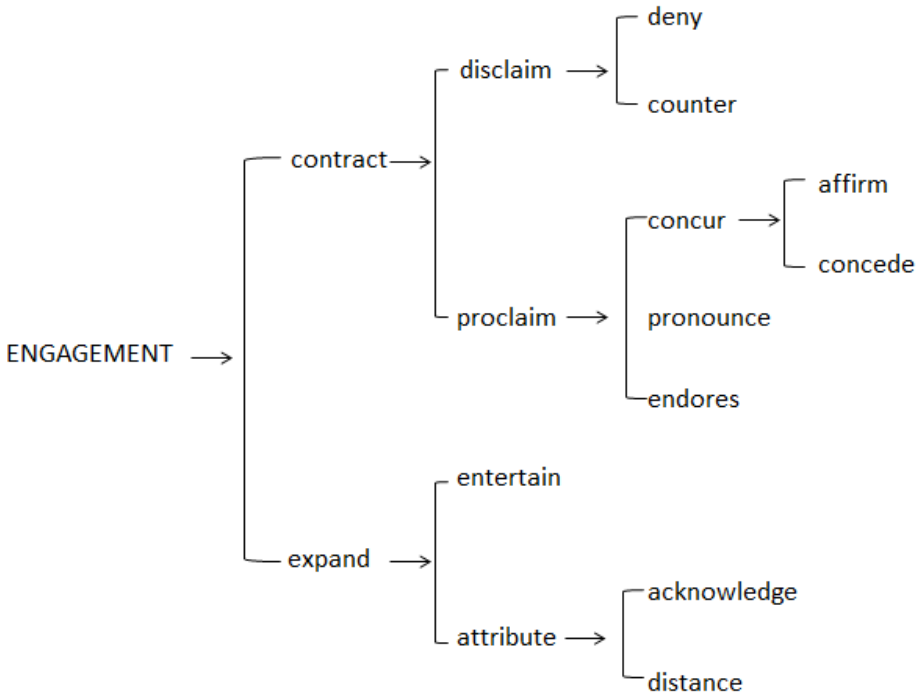


Figure 5.7 Current system network of ENGAGEMENT (redrawn from Martin and White 2005, p. 134)

Heteroglossic options are divided into two, namely contract and expand. The contraction resources close down 'the space for dialogic alternative' (p. 103) and 'construe a dialogistic backdrop for the text of other voices and other value positions' (p. 117). This category consists of disclaim options of deny and counter, and of proclaim options of concur, pronounce and endorse. The expansion resources are those that open up 'the dialogic space for alternative position' (p. 103). These include options of entertain, which provides the worded proposition as 'one of the possible positions' (p. 104), and of attribute, which 'disassociates the proposition from the text's internal authorial voice by attributing it to some other source (p. 111). The latter option is further distinguished between acknowledge and distance depending on whether the author positions him/herself close or distant to the non-authorial voice (see also Chapter 3).

With regard to the HONORIFICATION system in Japanese, the first question is to identify which of the options in ENGAGEMENT it may function as. [P1-5] is examined in detail again from this perspective. Here, the respect options are encoded for two kinds of human entities and their activities. The first is the intended addressee of the tweet, 'anyone who has a Ge detector for X ray with a beryllium window etc.'. The other is the third person, 'people who are anxious about large dispersal of Pu (plutonium)'.

ベリリウム窓付 X 線用 Ge 検出器等を	お持ちの	方,
beririumu+mado+tsuki+ekkusu+sen.yoo+jiiii+ kenshutsu.ki.too.o	*o.mochi .no*	*kata*,
beryllium+window+attach+X+line.USE+Ge+ detection.device. etc.ACC	RES.have .ASP:cont/RES	person/RES,
Ge detector for X ray with beryllium window etc.	person m('。')m who has m('。')m	
(If there is) anyone m('。')m who has m('。')m a Ge detector for X rays with a beryllium window etc.,		

Pu 大量飛散を	心配しておられる	方が	多い.
piiyuu+tairyoo+hisan .o	*shinpai+shi.teorareru*	*kata.ga*	*ooi*.
Pu+large-amount+dispersal .ACC	anxiety+DO.CONT/RES	person/RES.NOM	many/be.
large dispersal of Pu	are m('。')m anxious about	people m('。')m	many/be.
Many people m('。')m |-.-| are anxious m('。')m about the large dispersal of Pu.			

As these two entities constitute two distinct propositional voices other than the author's, HONORIFICATION has then to do with heterogloss rather than monogloss.

Admitting that the HONORIFICATION realises heterogloss, the next question is to decide which gross option it operates, contract or expand. That is to determine, in the case of [P1-5], whether the author P1 fends off or allows in the two non-authorial voices. By uplifting the position of these non-authors in the text, P1 certainly opens up space for these non-authorial voices of others rather than fending them off. That excludes the possibility of heteroglossic contract. In other words, the HONORIFICATION resource is now taken as functioning as heteroglossic expansion in the ENGAGEMENT system.

If HONORIFICATION is a heteroglossic expansion resource, the next question to ask is whether it is an entertain or an attribute option. The function of HONORIFICATION is not to present the authorial voice as among a number of possibilities, as defined in Martin and White (2005). It involves a particular non-author whose voice is given space for consideration. Therefore, HONORIFICATION is not a heteroglossic: entertain. It is not a subset of attribute either, because attribute resources necessitate a proposition that is then attributed to an external voice. In [P1-5], P1 does not share the propositional value of 'people who are anxious about plutonium'.

In fact, the propositional value of a non-authorial voice does not matter. HONORIFICATION is encoded to a person who has a Ge detector without mentioning his/her propositional value, which means that the encoding does not focus on the proposition. Rather, by uplifting the position of a Participant, the focus is drawn on the holder of the propositional voice rather than the voice itself. No matter what the content of the voice is, what HONORIFICATION does is to uplift the position of non-authorial voice holder. It highlights the voice-holder. That is like saying that this non-authorial voice is worth being heard, worth being considered. In other words, the HONORIFICATION encoding is saying that the holder of the voice is legitimate.

The existing system of ENGAGEMENT does not theorise this type of meaning option. However, this is what HONORIFICATION does in this text. Since, this function is different from any other options in the current system of ENGAGEMENT, it may be considered to form a new option.

In order to examine if the account above applies to other texts, the following extract from [P1-3] is examined. There are both respect and defer options instantiated in this text.

常連さんが	「お疲れ様」と	声を	かけて下さり,
jooren.san .ga	*「o.tsukare.sama」 .to*	*koe.o*	*kakete .kudasari,*
regular-customer.TIT .NOM	'RES.tiredness.TIT' .PROJ	voice.ACC	hang .GIVE-ME/RES/SUS,
regular customer	'|-.-| thanks for your m(。'@)m effort'	speak m(。'@)m up to me and	
A regular customer spoke m(。'@)m to me saying '|-.-| thanks for your m(。'@)m effort' and			

一杯	おごってくださいました.
ippai	*ogotte.kudasai.mashi.ta.*
one-glass	treat.GIVE-ME/RES.POL.PST.
one glass	┌|･|┘ treated m(。'@)m me
┌|･|┘ treated me one glass.	

ありがたく	お受けします.
arigata.ku	*o.uke.shi.masu.*
be-thankful.CIR	DEF.receive.DEF.POL.
thankfully	receive m(_ _)m
(I) ┌|･|┘ accept m(_ _)m (it now) with gratitude.	

In the first clause complex, HONORIFICATION: respect is encoded to the regular customer who spoke to the writer P1 and treated him a glass. Then, in the second clause, the defer option is encoded to the Actor, P1, who does the act of receiving the treat. As mentioned in Section 5.2, the defer option lowers down the position of the Actor and, as a result, the position of the Benefactor is uplifted. In this case, the Participant whose position is uplifted is the regular customer who treated a glass to P1. As a whole, in this extracted part of this tweet, the same person's position is uplifted lexicogrammatically. This explanation is compatible with the character of the interpersonal metafunction that is realised prosodically, or to 'spread across a clause or group' (Martin 1992, p. 11). Another way of characterising interpersonal meanings is to say that the 'same type of meaning is saturated' (Martin and White 2005, p. 24).

Hence, a new option 'legitimate' is hereby proposed in the system of ENGAGEMENT. It is proposed in the gross category of expand, alongside entertain and attribute. This option

opens up space for a non-authorial voice, whether or not the author aligns with or distances from the proposition value of the non-authorial voice. Rather, what the legitimate option does in ENGAGEMENT is to focus on the voice holder, rather than the propositional content of the voice, opening up space for other propositional options with respect to the source of the voice. In [P1-3], the defer option:

ありがたく	お受けします.
arigata.ku	*o.uke.shi.masu.*
be-thankful.CIR	DEF.receive.DEF.POL.
thankfully	receive **m(_ _)m**
(I) ┌|∵|┘ accept **m(_ _)m** (it now) with gratitude.	

takes the same function as the respect option in terms of legitimating a non-authorial voice holder, the regular customer who treated P1 a glass. The label 'legitimate' refers here to an option in the ENGAGEMENT system[101].

With another option introduced in the heteroglossic expansion, a revision is proposed in the system of ENGAGEMENT 'legitimate' as presented on Figure 5.8.

[101] The term 'legitimate' is used in other linguistic accounts (e.g. Van Leeuwen 2007, Don 2011), but they conceptualise the term from different perspectives than this study. Also, 'legitimate' in this study is different from the sociological conceptualisation of the term in LCT.

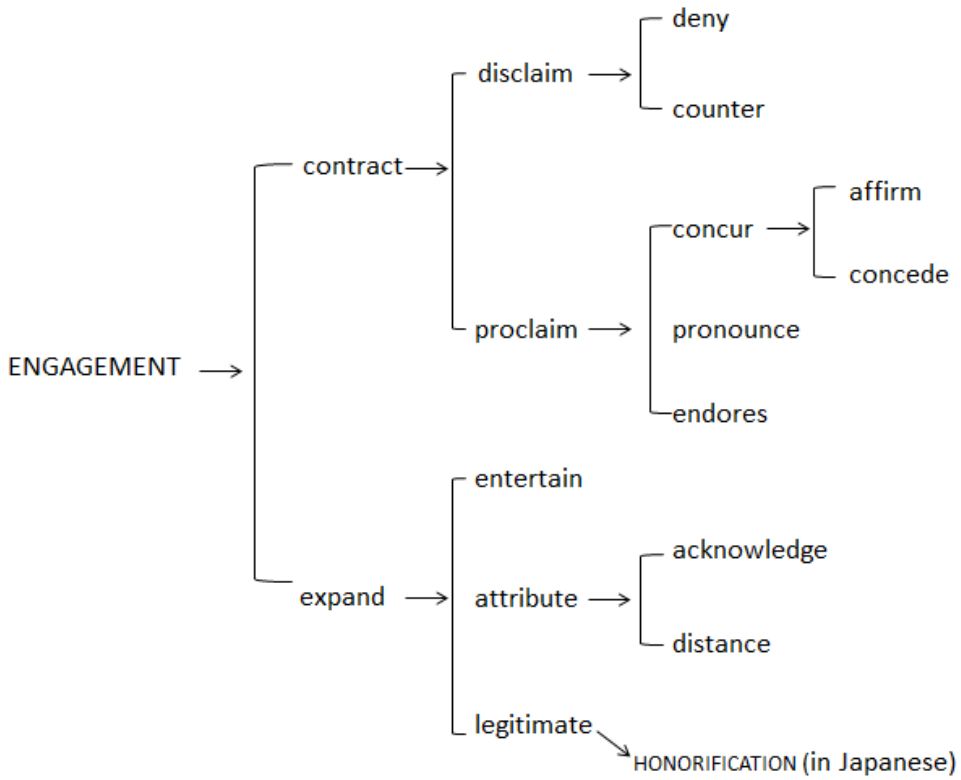


Figure 5.8 Proposed system of ENGAGEMENT, including legitimate option

Proposing a new option in a system involves potentially impacting the whole system. However, it goes beyond the scope of this study to discuss how the entry of this new option will impact the system of ENGAGEMENT in relation to other options. It is also beyond the goal of this thesis to examine whether and how this new option of legitimate will be realised in other languages. Future exploration will reveal how this option is realised across languages, either linguistically or by way of other semiotic resources. In this thesis, the major interest lies in exploring the contributions of these and other resources for the community formation around the physicist tweeters. These further issues are put aside for future discussion and exploration (see Chapter 6).

5.3.4 POLITENESS along with NEGOTIATION

The focus now shifts to another set of resources, the POLITENESS system, and its discourse semantic functions. The first step is determining the discourse system in which POLITENESS resources function.

As accounted for in Section 5.2, the POLITENESS system in Japanese functions at the finite clause rank along with the system of MOOD. In English, MOOD typically functions as NEGOTIATION resources in the discourse semantics (Martin and White 2005: 33). This gives a starting point for exploring the discourse semantic function of the POLITENESS system of Japanese in terms of NEGOTIATION.

However, it should also be noted that relating POLITENESS with NEGOTIATION may not be as straightforward as relating MOOD in English with it. Choice in the POLITENESS system is complex, and is made in relation to contextual factors including genre and register, as pointed out in Section 5.2.

As mentioned in Chapter 2 and Section 5.2, mixed POLITENESS choices in the same text are frequently observed across various genres and registers. A number of non-SFL text-based approaches focused on this aspect in conversation (see Chapter 2), including Makino (1983), Maynard (1993), Cook (1998) and Yoshida and Sakurai (2005). The accounts made in these works are summarised in Table 5.4. They somehow mention the interactive aspects between the speaker and listener.

Table 5.4 Non-SFL accounts of mixed POLITENESS choice

Author (publication year)	account
Makino (1983)	speaker/listener orientation
Maynard (1993)	awareness of the situation
Cook (1998)	foregrounding between the speaker and the addressee
Yoshida and Sakurai (2005)	role-performing

From an SFL perspective of register, Martin's (1992) account on mode provides a useful viewpoint. According to Martin, mode has two dimensions, experiential and interpersonal. While experientially mode mediates the semiotic space between action and reflection, interpersonally it 'mediates NEGOTIATION' (p. 509). In another term, mode deals with 'the semiotic space between monologue and dialogue' (p. 509). Martin

takes the interview as an exemplar genre that involves changes of modes between dialogue and monologue. Cook (1998) also attended to interviews in her study. This and other non-SFL accounts may be re-articulated from the perspective of mode in terms of space between monologue and dialogue. This suggests, then, from a contextual perspective, that the discourse semantic functions of the POLITENESS system are likely to lie in 'the interactive aspects of discourse' (Martin & White 2005, p. 33), which is the realm of NEGOTIATION.

In SFL, NEGOTIATION attends to the interactive aspect in terms of the system of EXCHANGE STRUCTURE and the system of SPEECH FUNCTIONS (see Chapter 3). EXCHANGE STRUCTURE consists of moves, and can be an action exchange (goods-and-service negotiation) or a knowledge exchange (information negotiation) (Martin & Rose 2003/2007). In a knowledge exchange, the dialogue partners are the primary knower 'K1', who has the knowledge, and the secondary knower 'K2', who requests the information. An action exchange occurs between an adjacent pair, 'A1' and 'A2'. A1 is the primary actor, or the person who offers goods or performs the service, and A2 is the secondary actor, or the person who receives the goods or service. An A2 move structure is broken down into further delicacy, namely, 'Pre-Head act', 'directive' which is the head of the A2 move, and 'Post-Head act' (Martin 1992).

In order to see whether POLITENESS choices in the texts are related to different kinds of moves in the EXCHANGE STRUCTURE, the following tweet, [P1-6], is examined. Table 5.5 shows the choice of move and the choice of POLITENESS, with the English translation.

Table 5.5 Moves and POLITENESS in tweet [P1-6]

move		**POLITENESS**	**Japanese**	**English translation**
K1		plain: absent	福島第一原子力発電所の放射線計測データ，6 am まで公開.	The radiation measurement data of the Fukushima Daiichi Nuclear Power Plant, ⊦-.-⊦ (have been) made public up until 6 am.
		plain: absent	MP-2 で 400 マイクロ Sv/h，正門で 5.144 マイクロ Sv/h.	⊦-.-⊦400 micro SV/h at MP-2, (and) 5.144 micro SV/h at the front gate.
		plain: absent	風向き西北西.	Wind direction ⊦-.-⊦ (was) west-northwest.
A2	**Pre-Head act**	**polite**	これまでは正門のグラフを出して来**ま**したが,	**Up to now (I) ┌⊦·⊦┘have been putting out graphs of the main gate (data), but**
		plain: absent	MP2, MP4 のグラフも必要.	graphs of MP2 and MP4 (data) ⊦-.-⊦ (are) necessary too.
	directive	plain	誰かやってくれる？	⊦-.-⊦ Can anyone do (it) for me?
	Post-Head act	NA	http://bit.ly/dV00K7(hyperlinktoTEPCOpage)	

From a NEGOTIATION perspective, this tweet is composed of two moves, i.e. K1 and A2. The first three finite clauses constitute a K1 move in which the author P1 provides radiation measurement data at Fukushima Daiichi Nuclear Power Plant. Throughout this K1 move, the POLITENESS choice is plain: absent. Then, in the fourth clause, the move shifts to A2, in which P1 requests a service of making graphs for two different measuring points, MP2 and MP4. This is where POLITENESS shifts from plain to polite.

これまでは	正門の	グラフを	出して来**ま**したが,
kore.made.wa	*seemon.no*	*gurafu.o*	dashite.ki.**mashi**.ta.ga,
this.EXT:until.TOP	main-gate.ADN	graph.ACC	put-out.COME.**POL**.PST.but,
up to now	graph of the main gate		┌⊦·⊦┘have been putting out …, but
Up to now (I) ┌⊦·⊦┘ have been putting out graphs of the main gate (data), but			

However, POLITENESS returns to plain: absent again in the next clause, and the directive itself is also plain.

MP2,	MP4 の	グラフも	必要.
emu+pii+ni,	*emu+pii+yon.no*	*gurafu.mo*	hitsuyoo.
MP2,	MP4.ADN	graph.HIL:too	necessary.
graphs of MP2 and MP4 too			necessary.
graphs of MP2 and MP4 (data) |-.-| necessary too.			

誰か	やってくれる？
dareka	*yatte.kureru?*
someone	do.GIVE-ME?
someone	do for me?
|-.-| Can anyone do (it) for me?	

This instance suggests that POLITENESS choice is not contingent on particular speech functions such as K1 and A2. It would therefore be misleading to conclude that POLITENESS functions as NEGOTIATION resources in discourse semantics. However, the shift from plain to polite along with the shift from K1 to A2 still suggests that something to do with NEGOTIATION is at play in POLITENESS choice. It may be reasonable to focus on this part first.

In this respect, Cook's (1998) account of POLITENESS shift in interviews provides a useful perspective. She suggested that a shift to plain occurs when the focus on the addressee is backgrounded, and the information content is foregrounded. This account applies, in this tweet instance, to the shift from plain to polite along with the shift from K1 to A2. The first part of the tweet focuses on the information about the measurement values in the accident site, whereas a shift to polite occurs when P2 begins to foreground the addressee-focus. In other words, the writer shifts from 'telling something' to 'telling someone'. In Martin's (1992) terms of mode, the first K1 move is monologic presentation, whereas the shift to polite signals the foregrounding of dialogic presentation which corresponds to the shift to A2.

Now, attention is on the latter part of the tweet where POLITENESS shifts from polite to plain. How is it possible to explain the plain choice in the last two clauses? As for the first of these clauses, 'graphs of MP2 and MP4 (data) necessary too', this is where the tweeter is giving a rationale for the request. It is then possible to consider that the plain

choice in this part expresses focus on the information content, backgrounding the addressee-focus. Then, it is interpreted as another shift toa monologic presentation.

However, how can the plain choice in the last part '*dareka yatte.kureru ?*' (|-.-|Can anybody do it for me?) be explained? This cannot be explained by monologic presentation with the graphological realisation of the question mark ' ? '[102]. This is rather interpreted as a casual request. As shown in Table 5.2, the plain choice can be made in involved CONTACT. Then, in this tweet, the directive can be interpreted as being addressed to people who are close to the tweeter, such as his students. This interpretation is supported by another tweet [P1-9], in which P1 reported that a student from another university cooperated in this particular request (see Section 5.4).

The shifts of POLITENESS in tweet [P1-6] can be summarised as follows. The tweet began by presenting a K1 move as a monologue, foregrounding the informational content. Then, as the move shifts to A2, the dialogic presentation is foregrounded, presenting that the tweet is addressed to the whole readership. Then, the focus goes back to the information content, in which the monologic presentation is foregrounded in the plain choice. In the directive, plain is chosen due to another factor, tenor. The plain choice of POLITENESS S represents a casual request to an addressee with involved CONTACT.

The examination of tweet [P1-6] suggests that the monologic/dialogic presentation of the text is one potential factor involved in the lexicogrammatical choice of POLITENESS. Also, the choice between monologic/dialogic presentations should be understood as a cline. All tweets, in a sense, are somehow dialogic in the sense that they are posted on Twitter to be read. Therefore, the shift to plain does not indicate that there is no more interaction in the text. As more interactive genres such as interviews can shift between monologue and dialogue, a text with mixed POLITENESS can be understood as a text in which focus shifts more or less on the interactive aspect of discourse, along with NEGOTIATION.

The account provided so far about POLITENESS is different from one provided for HONORIFICATION. For the latter, the discourse semantic function is identified as an

[102] It should also be noted that use of '?' is congruent in 'casual' discourses in Japanese.

ENGAGEMENT option. However, while it has been mentioned that POLITENESS functions along with NEGOTIATION in discourse, the account of its functions had to draw on register variables of mode and tenor. Ultimately, a more consistent and comprehensive discourse semantic account is hoped for. Acknowledging that the present study has not been able to reach that point, perspectives for future exploration are discussed in Chapter 6.

While admitting its limitations, the account provided in this subsection does shed light on the functions of these resources beyond previous SFL accounts. The important point is that it overcomes the widespread conceptualisation of the POLITENESS system as 'addressee honorifics' (see Chapter 2). From this perspective, it is not possible to account for why the polite option is chosen in genres such as children's narrative and primary school textbooks, whereas academic and journalistic discourses widely use plain. In the former case, it is not that children, as readers of narratives or textbooks, are 'honorified'. Rather, the polite choices in these genres foreground the social aspect of 'telling the readers' rather than the knowledge aspect of 'telling something'. In academic and journalistic discourse, knowledge is more foregrounded, resulting in the wide use of plain and learned plain. Thus, the perspective proposed in this subsection is not limited to explaining choices in the tweets, but has potential for accounting for POLITENESS choices in texts in Japanese from a more general perspective.

Most importantly, the cline of shifts between monologic/dialogic presentations provides the basis on which to explore how these resources functioned in negotiating solidarity in the tweets of the physicists. What is revealed here suggests that P1 made strategic choices from options in the POLITENESS system in interacting with Twitter readers. It is also foreseen that the strategy went along with choices from the HONORIFICATION system.

5.3.5 Summary

This section attended to the discourse semantic functions of HONORIFICATION and POLITENESS. The HONORIFICATION resources function in the ENGAGEMENT system as part of expanding resources. Specifically, these resources function in legitimating a non-

authorial voice. On the other hand, choice in the POLITENESS system has been found to go along with the NEGOTIATION system, and particularly in managing the cline between monologic and dialogic presentation of the text. This discourse semantic perspective enables, and provides the basis for, exploring the service of HONORIFICATION and POLITENESS in negotiating affiliation in the time of nuclear crisis in Japan.

5.4 Solidarity work of HONORIFICATION and POLITENESS

In order to explore the functions of HONORIFICATION and POLITENESS in the physicists' tweets in the negotiation of affiliation, three sets of selected tweets are examined. The first set focuses on tweets posted at the earliest period of the nuclear crisis that concern a collaborative 'data visualisation project'. It attends to how the two systems of resources functioned in interplay with each other in negotiating actions with other Twitter users. The second part focuses on P1's tweets in which various kinds of voices were legitimated by the deployment of HONORIFICATION. Thirdly, two sequences of tweets that form an interaction with other tweeters are attended to, focusing on choices of linguistic resources with respect to the 'realisation principles' for tenor negotiation. Discussion about the solidarity work of these resources in the physicists' tweets follows.

5.4.1 The interplay of HONORIFICATION and POLITENESS in exchange as action: the 'data visualisation project'

The first focus is drawn to a selective number of tweets that concern the exchange of actions in the collaboration project referred to as the 'data visualisation project'. It was initiated by P1. P1's request was made late in the evening of 12/03/2011, the day when the nuclear accident at Fukushima Daiichi Nuclear Power Plant was made public.

At the time of the 3/11 nuclear crisis, a prevailing conception was that the government was not making public all the information about the accident. In fact, it was the case for SPEEDI, or 'the System for Prediction of Environment Emergency Dose Information'.

The system had been developed in 1993, but was not made accessible to the public until 23/03/2011 (Wikipedia). However, other kinds of information were provided on the public domain on the internet. This included data of radiation measurements at different monitoring posts around the site of the nuclear accident provided by TEPCO. However, such information was difficult for lay people to read and to understand (Hayano 2011). P1 called for collaboration of experts, aiming to 'popularise', or make accessible to lay people, this kind of highly technical information about the nuclear accident in more accessible modalities such as graphs and animation. From the next day onward, P1 began receiving replies from numerous people. This collaboration that emerged on and around Twitter initiated by P1 was referred to as the 'data visualisation project', and engaged experts and students in science, as well as people from other professional groups.

Here, four of tweets written by P1 that concern this data visualisation project are examined at the earliest period, from 12th to 14th March. They are examined from the NEGOTIATION perspective, in order to understand how actions were negotiated in these tweets. Analyses focus on how lexicogrammatical resources of HONORIFICATION and POLITENESS resources functioned in interplay with each other in different moves.

The first tweet to examine is [P1-1], the tweet in which P1 initiated the request for collaboration. This tweet was the first request that P1 made after the nuclear accident was made public. As such, this tweet is an A2 move (see Chapter 3). The tweet was broken down into four clause complexes, each of which encode different choices from the POLITENESS system Table 5.6 illustrates the shift in relation to the unfolding of the A2 move.

Table 5.6 Moves and POLITENESS in tweet [P1-1]

move		POLITE-NESS	Japanese	English translation
A2	**Pre-Head act**	polite	（そろそろ疲れてきました.	((I) ┌|･･|┘ am getting tired now.
		plain	ビールも飲みたい.	(I) |-.-| want to drink beer too.
	directive	plain	同業者の方，時々お助けくださると有り難いな -	People **m('。')m** in the same business, (it) |-.-| would be appreciated if (you) could help **m('。')m** (me) sometimes.
	Post-Head act	plain	世の中には私よりももっと原子力本流の専門家もおられる筈なので)	Because in this world there |-.-| should be **m('。')m** more mainstream nuclear power experts than me)

The tweet begins with a polite choice, opening up a Pre-Head act of an A2 move. However, POLITENESS shifts to plain then, although it is also part of the Pre-Head act (see Chapter 3). The choice remains plain for the rest of the tweet, including the directive and the Post-Head Act. However, HONORIFICATION is encoded in the latter two clause complexes, as indicated by the emoticons **m('。')m** on Table 5.6. The focus is particularly drawn to the directive.

同業者の	方,	時々	お助けくださると	有り難いな–
doogyoo .sha.no	*kata,*	*tokidoki*	*o.tasuke .kudasaru.to*	*arigatai .na-*
same-business .person.ADN	person /RES,	sometimes	RES.help .GIVE-ME/RES.if	appreciated/be .NEGO:inc(LNG)
person **m('。')m** in the same business		sometimes	if (you) help **m('。')m** me	is appreciated-
People in the same business, (it) |-.-| would be appreciated if (you) could help **m('。')m** (me) sometimes.				

As suggested from the English translation, this is an instance of an interpersonal grammatical metaphor, whereby an A2 move is not made in Imperative but as a statement. However, in Japanese, this instance is characterised further from a perspective which is in plain here. As accounted for in Section 5.3, the plain option in POLITENESS backgrounds the dialogic presentation and foregrounds the monologic

presentation. Applying that, the directive in this tweet is interpreted as monologically presented.

There is another resource that supports this interpretation. That is the encoding of the negotiatory marker (see Chapter 3) *.na*. In Japanese, this so-called sentence-final particle *.na* has multiple functions. These include confirmation and exclamation that Teruya (2007a) mentions (pp. 144–145). '*.Na*' can also deliver the meaning of inclination (Kubota 2001, p. 545), and in this meaning, *.na* is often used as a monologue. From this lexicogrammatical perspective, the choice of *.na* in this part of P1's tweet is compatible with the plain choice of POLITENESS in that both choices are typically made in a monologue. All in all, the directive part of this tweet is understood as being presented as a monologue. In other words, P1 made this initial request of collaboration as if it were a monologue.

The focus now shifts to HONORIFICATION. Respect is encoded in the directive and the following Post-Head act clause. The participants with HONORIFICATION encoding include 'anyone in the same business' and 'more mainstream nuclear power experts than me'. These are both scientists. As has been shown in Section 5.3, the function of HONORIFICATION in discourse is heteroglossic: expand: legitimate. In this tweet, P1 legitimates the voices of human entities who are knowers.

The question remains as to why this request was presented as if it were a monologue rather than dialogically. In order to explain that, it is helpful to consider the time this tweet was posted. [P1-1] was posted at nearly midnight on 12/03.2011, the next day after the 3/11 quakes and tsunami, and the very day when the nuclear accident at Fukushima Daiichi was made public. At the very early stage of the nuclear crisis, many people were facing difficulties. Taking this situation into account, it is possible to understand the monologic presentation of this request as a strategy that P1 took. If, in this situation, he had used polite choice to foreground the dialogic presentation in the directive as in below, the request would have sounded very directly addressed to the readers.

お助けくださると	有り難いです
o.tasuke.kudasaru.to	*arigatai.desu*
RES.help.GIVE-ME/RES.COND	appreciated.be/POL
if (you) help **m('。')m** me	┌|∵|┘ is appreciated
(it) ┌|∵|┘ is appreciated if (you) help **m('。')m** me.	

Then, considering P1's social status and expertise, readers of his tweet might have felt obliged to cooperate, which might mean adding another difficulty in the immediate aftermath of the 3/11 disaster. By presenting his A2 move as a monologue, P1 created some space between him and the intended addressees. That provided them with an option 'not to listen to' his monologue, so that each Twitter reader could make their own decision whether to 'help' P1 or not, without being urged to collaborate. At the same time, he did not forget the HONORIFICATION encoding, so that the voices of the intended addressees, who would be potential collaborators, were all legitimated. In short, the tweet [P1-3] was an A2 move in which a request for collaboration was made as a monologue, addressed to experts whose voices were legitimated.

Attention now shifts to three tweets posted in 14/03/2011, [P1-7], [P1-8] and [P1-9]. They all concern collaborations he received in response to the request he had posted on 12/03/2011. Tables 5.7, 5.8 and 5.9 show the POLITENESS choices in relation to the kind of moves in [P1-7], [P1-8] and [P1-9] respectively.

Table 5.7 Moves and POLITENESS in tweet [P1-7]

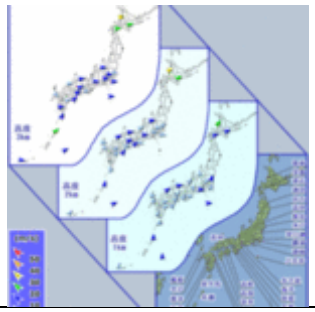
move	POLITE-NESS	Japanese	English translation
K1 (A2f)	polite	ロンドン在住の @user8 君が，13 日 1 時から 14 日 9 時までの風向風速を気象庁 (http://bit.ly/gNDaXv)からアニメにしてくれました.	@user8 living in London ┌|·|┘made an animation of the wind direction and wind speed from 1 o'clock 13th to 9 o'clock 14th from the Meteorological Agency (http://bit.ly/gNDaXv) for me.
A2f	plain	ありがとう.	|-.-| Thanks.
K1	polite	風向は我々に味方してくれているようです.	The wind direction ┌|·|┘seems to be aligned with us.
	plain	http://twitpic.com/49a8pv 	

Table 5.8 Moves and POLITENESS in tweet [P1-8]

move	**POLITE-NESS**	**Japanese**	**English translation**
K1	polite	米国 NASA の専門家, {family-name+first-name} 博士と議論させていただきました.	((I) ┌|･|┘ received m(_ _)m the favour of discussing with Dr.{family name first name}, an expert from NASA, USA.
	polite	氏が計算して下さった福島第一原発からの空気塊の流れを示します.	(I will) ┌|･|┘ show the flow of air cluster from Fukushima Daiichi NPP (that) he calculated m('。'@)m.
	polite	この計算にによれば, 陸上への影響はほとんどありません.	According to this calculation, there ┌|･|┘ is almost no influence on the land.
	polite	注意書きも含め, じっくりご覧下さい[103].	Please watch m('。'@)m carefully including the notes too.
	plain	http://plixi.com/p/83867543	

Table 5.9 Moves and POLITENESS in tweet [P1-9]

move	**clause complex**	**Japanese**	**English translation**
K1 (A2f)	polite	東京理科大 理学部物理 {family name}さんが, 福島第一原発の 2 箇所のモニタリングポストでの測定値，本日 14:00 までの値をグラフ化して下さいました.	Mr. (or Ms.) {family name} of Physics (undergraduate student) in the Faculty of Sciences, Tokyo University of Science ┌|･|┘ has graphed m('。'@)m the measurement values at two monitoring posts of the Fukushima Daiichi NPP, (covering) the values up until 14:00 today.
A2f	plain	感謝.	|-.-| Appreciated.
K1	plain	http://plixi.com/p/83950003	

In terms of NEGOTIATION, common to these tweets is that they begin with a K1 move. They all inform Twitter readers of the collaboration that P1 received from three

[103] '下さい *kudasai*' here is understood as a polite imperative of '*kudasaru*' .

different people. In [P1-7] and [P1-9], there is also an A2f, or the follow-up for demanding goods-and-service (see Chapter 3). P1 expresses his gratitude to the collaborator of each tweet in this move.

The first focus is on the K1 move of these three tweets. In terms of POLITENESS, the K1 moves are all in polite, indicating that the dialogic presentation is foregrounded. In other words, P1 is 'telling someone' rather than 'telling something'. In these tweets, the addressee of the K1 move is the Twitter readers. However, in terms of HONORIFICATION, the choice is different in [P1-7]. HONORIFICATION is encoded in [P1-8] as in:

議論させていただきました.
giron.s.asete.itagaki.mashi.ta.
discussion.DO.CST.RECEIVE/HUM.POL.PST.
(I) ╔⁖╝ received m(_ _)m the favour of discussing

計算して下さった
keesan.shite.kudasat.ta
calculation.DO.GIVE-ME/RES.PST
calculated m('。'@)m for me

and in [P1-9] as in:

グラフ化して**下さい**ました.
*gurafu.ka.shite.**kudasai.**mashi.ta.*
graph.change.DO.**GIVE-ME/RES**.POL.PST.
╔⁖╝ **made** m('。'@)m into graph for me

but not in [P1-7]:

アニメにしてくれ**まし**た.
*anime.ni.shite.kure.**mash**i.ta.*
animation.ATTR.DO.GIVE-ME.**POL**.PST.
╔⁖╝ made an animation for me.

Regarding the A2-f move in [P1-7] and [P1-9], they are both plain: absent in terms of POLITENESS. However, the former is more casual than the latter. In Japanese *kanji* compounds typically construe non-everyday lexis (see Chapter 3).

[P1-11]
ありがとう.
arigatoo.
|-.-| thanks.

[P1-13]
感謝.
kansha.
gratitude.
|-.-| Appreciated.

Comparison of these three tweets reveals a number of things. Firstly, relatively casual resources deployed in [P1-7] including absence of HONORIFICATION suggests that @user8 is presumably a former student of P1, now residing in London. This interpretation is also suggested from the casual title '*.kun*' attached to the name of the collaborator. If that is the case, a tenor relationship of involved CONTACT has already been constructed between P1 and the collaborator. Without any other particular motivation to legitimate the collaborator, P1 may well have deployed the choices he usually makes in interacting with his students.

On the other hand, HONORIFICATION is encoded in [P1-8] and [P1-9]. It is an indicator of heteroglossic legitimate (see Section 5.3) in ENGAGEMENT terms. In [P1-8], the legitimated voice is that of an expert working for NASA. In another tweet, P1 reveals that he was introduced to this expert via a follower of his tweets, suggesting that P1 had not developed involved CONTACT with this doctor. In [P1-9], the legitimated voice is that of a student from a different university from where P1 works, presumably an undergraduate[104]. Suggested from the comparison with [P1-7], it is presumed that in [P1-9], the student collaborator is someone that P1 had not known before this collaboration. The significant point is that in both [P1-8] and [P1-9], two people, who are different in terms of AUTHORITY and STATUS, are legitimated as voice holders. That means, P1 legitimated the voices of collaborators regardless of AUTHORITY or STATUS, unless there are other contextual factors, such as involved CONTACT in the case of [P1-7].

[104] This interpretation comes from '*gakubu*' (faculty) in Japanese, which normally refers to the undergraduate school of the university, as opposed to '*kenkyuuka*', which refers to 'faculty' in the graduate school.

In this subsection, selected tweets concerning the Twitter collaboration proposed by P1 in the earliest period of the nuclear crisis were examined, in order to understand how POLITENESS and HONORIFICATION resources were deployed in the exchange of collaboration. In making the initial request at the earliest stage of the nuclear crisis, P1 chose plain instead of polite. This functioned in presenting the request as if it was a monologue, so that space was created for readers to make their own decision about whether to collaborate or not. This was interpreted as strategic considering that the request was made in the immediate aftermath of 3/11. On the other hand, in the tweets that informed the collaborations made by other people, polite resources were deployed. This foregrounded the dialogic presentation, or the 'telling the readers' aspect of NEGOTIATION. The finding contrasts with [P1-6] for instance in which the K1 move is presented in plain, foregrounding the 'telling something' aspect of NEGOTIATION.

In this way, in terms of POLITENESS, P1 made patterned, strategic choices in presenting particular kinds of moves, such as K1 or A2, by foregrounding the 'telling someone' aspect, and other kinds of moves by foregrounding the 'telling something' aspect. In terms of HONORIFICATION, the voices legitimated by P1 included not only of those who have power in terms of AUTHORITY or STATUS, but also non-knowers and people of lower STATUS, such as undergraduate students and people who are anxious about plutonium.

This last finding about HONORIFICATION is implicational. It opens space for exploring the kinds of voices legitimated in P1's tweets. If any pattern is found in the way P1 legitimated different kinds of voices, there may be clues for understanding how solidarity was negotiated by the deployment of HONORIFICATION resources in the tweets posted during the nuclear crisis. That is the focus of the next subsection.

5.4.2 Voices legitimated by P1

Findings in the above subsection suggested that the kinds of voices legitimated in P1's tweets potentially have clues for understanding the negotiation of solidarity. On this basis, this subsection explores the kinds of voices legitimated by P1's tweets, focusing on the tweets posted in the first month of the nuclear crisis.

In P1's tweets posted in the first month of the crisis, HONORIFICATION was encoded in a constant and patterned manner in P1's tweets. Some tweets with HONORIFICATION concern a more personal register, such as greetings to old acquaintances. Excluding those, HONORIFICATION was consistently encoded to human entities belonging to the following categories that are related to the nuclear crisis.

- collaborators (unless involved CONTACT);
- the sufferers of the disaster;
- accident site operators;
- people having difficulty.

Exemplar tweets below compare how the voices of these people were legitimated in relation to other kinds of voices.

The first category of voices that were legitimated in P1's tweets is those of the collaborators. The exemplar tweets of this type have already been examined in the above sections. In Subsection 5.4.1, we have examined three kinds of collaborators, an expert from NASA, an undergraduate student from a different university and a (presumably) former student of P1. Except the last one where CONTACT was involved, the voices of the collaborators were legitimated regardless of AUTHORITY or STATUS. This category also includes the voices of the potential expert collaborators in [P1-3], and the potential addressee of the request who has a Ge detecting device. P1 presented these voices of the collaborators who engaged in his 'data visualisation project' as legitimate, important voices to be heard.

The second category of people whose voices were constantly legitimated over one month was those of the sufferers of the 3/11 disaster. Three tweets are examined to compare how different voices are either legitimated with HONORIFICATION or not.

[P1-10] is one example that illustrates the contrast. In this tweet, P1 compares two groups of people in terms of the level of radiation they were exposed to, one group due to the accident in Fukushima, the other due to nuclear experiments in the past. HONORIFICATION is encoded for the first group as in:

福島の	病院で	被曝された	方々と	同程度以上,
fukushima .no	*byooin .de*	***hibaku .s.are.ta***	***katagata****.to*	*doo.teedo.ijoo,*
Fukushima .ADN	hospital .LOC:in	**exposure .DO.RES.PST**	**people/RES**.COM:as	same.extent.above,
hospital in Fukushima		**got** m(’。’@)m **exposed**	as **people** m(’。’@)m	|-.-| same extent or above
|-.-| same or above with (those) of people m(’。’@)m who got m(’。’@)m exposed (to radiation) in the hospital(s) in Fukushima.				

but not in the second group.

都民の	多くが	被爆したはずだが,
tomin .no	*ooku.ga*	*hibaku.shi.ta.hazu.da.ga,*
metropolitan-resident .ADN	many.NOM	exposure.DO.PST.MODU:should.be/PLN.but,
many of metropolitan residents		should have got exposed, but
Many of metropolitan residents |-.-| should have got exposed to radiation, but		

P1 is selective in legitimating the voices of people who were exposed to radiation in the hospital(s) in Fukushima only, and not those of metropolitan residents in 1974. In other words, he differentiates the voices of two kinds of people, legitimating only the voice holders that are involved in this particular disaster.

Another two tweets show the same pattern. The first tweet, [P1-11], mentions students of Tohoku University, which is located in the area devastated by the 3/11 disaster. He tweets that in the academic year starting from April 2011, the University of Tokyo accepts students from Tohoku University to study on their campus. The HONORIFICATION here indicates that the voices of students of Tohuku University are legitimated.

講義の	聴講を	希望された
koogi.no	*chookoo.o*	*kiboo.s.**are**.ta*
lecture.ADN	auditing.ACC	wish.DO.**RES**.PST
auditing of lecture		**wished** m(’。’@)m
(who) have expressed their wish m(’。’@)m to audit of lectures		

東北大物理の	学部生・	院生の	**方々**を	受け入れます
toohokudai+butsuri.no	*gakubu.see・*	*in .see.no*	*katagata.o*	*ukeire.masu*
Tohoku-Uni+physics.ADN	undergraduate-student・	graduate-school.student.ADN	people/RES.ACC	accept.POL
undergraduate and graduate students m(’。’@)m of Tohoku Uni Physics				accept
(we) ┌|∵|┘ accept undergraduate and graduate students m(’。’@)m of Tohoku Uni Physics				

This is contrastive to [P1-12]. Here, P1 mentions his own students who are engaged in making graphs of the measurement data of tap water, and there is no HONORIFICATION encoded.

うちの	学生が	すべて	手作業で	やってくれています.
uchi.no	*gakusee.ga*	*subete*	*te+sagyoo .de*	*yatte.kure.tei.masu.*
inside.ADN	student.NOM	all	hand+work.MAN:by	do.GIVE-ME.ASP:cont.POL.
my	student	all	by hand work	┌|∵|┘ do (it) for me.
my students ┌|∵|┘ do it for me all manually.				

These patterns show that the voices of people who experienced the 3/11 disaster are selectively legitimated. With HONORIFICATION, P1 expressed that these voices are legitimate, or in other words, voices that are worth being heard and considered.

The next group of people whose voices were legitimated are the operators at the accident site at Fukushima Daiichi Nuclear Power Plant. [P1-13] examined in Chapter 4 is revisited as one of such instances. The field of this tweet is science and risk management (see Chapter 4). The POLITENESS choice is either plain or plain: absent throughout the tweet, which is congruent with the field, and smaller in terms of the number of characters. Ideational and interpersonal meanings are packed up in *kanji* compounds as in 放射線防御 *hoosha+sen+boogyo* (radiation protection) and ‘急務 *kyuumu*’ (urgent task), which also take fewer characters. In this tweet where many other meanings are packed up, the HONORIFICATION encoded here by spending an extra number of characters attracts particular attention.

作業さ**れる**	**方**
*sagyoo.s.**areru***	***kata***
operation.DO.**RES**	person/**RES**
people **m('。')m** who do **m('。')m** the operation	

P1 could have used another *kanji* compound, '作業者 *sagyoo.sha*' (operator), which would have been more compatible with the field, i.e. risk management, and smaller in number of characters. With HONORIFICATION, P1 legitimated the voices of the operators who were fighting at the forefront of the ongoing nuclear accident in order prevent the worst scenario. He did it constantly and consistently in his tweets from the earliest time when the accident was made public.

P1 also legitimated voices of people facing difficulty. This category covers sufferers of the disaster and the operators fighting against the nuclear accident at Fukushima Daiichi Power Plant. Another instance of this kind is [P1-14]. In this tweet, posted during a press conference, the voice of the spokesperson of a governmental agency is legitimated with HONORIFICATION.

（原子力安全保安院の	**方**も,
（genshi.ryoku+anzen+hoan.in.no	***kata**.mo,*
（atom.power+safety.security.institution.ADN	**person/RES**.HIL:too,
(Nuclear and Industrial Safety Agency's	**person m('。')m too**
The **person m('。')m** of Nuclear and Industrial Safety Agency too	

100%と	言い切るのは	躊躇さ**れ**た.
hyaku+paasento.to	*iikiru.no.wa*	*chuucho.s.**are**.ta.*
hundred+percent/PROJ	assert.NMN.TOP	hesitation.DO.**RES**.PST.
'a hundred percent'	to assert	|-.-| **hesitated m('。')m**
|-.-| hesitated **m('。')m** to assert '100%'.		

P1 often tweeted on ongoing press conferences particularly during the earliest aftermath of the nuclear accident. Except on the first day of the crisis, he usually did not encode HONORIFICATION to spokespersons at press conferences. In this sense, P1's encoding of HONORIFICATION to this spokesperson is marked. Here, the clause above is followed by a comment showing the writer's empathy toward the spokesperson having difficulty:

どんな	場合でも	100%と	言い切るのは	難しいですよね)
donna	*baai.de* *.mo*	*hyaku+* *paasento* *.to*	*iikiru.no.* *wa*	*muzukashii.desu* *.yo* *.ne)*
how	occasion.LOC:in .HIL:too	hundred +percent .PROJ	assert.NMN. TOP	difficult.be/POL .NEGO :ins .NEGO :conf)
in whatever occasion		that 100%	to assert	is difficult isn't it
(It) ┌|·|┘'s difficult to assert 100% in whatever occasion, isn't it?				

It is also noted in this tweet that the POLITENESS choice of the first clause complex is plain, while that of the second is polite. This means that the first part of the tweet is presented as a monologue, and then the second part is presented as a dialogue. The sequence of the negotiatory markers '*.yo.ne*' functions in a similar way as tagging in English. It is interpreted as inviting the readership to share the value of difficulty, coupled with the ideational meaning of 'asserting 100%'. What this tweet does as a whole is to legitimate the voice of a spokesperson at a conference who hesitated to assert 100% when answering a question, and to then reciprocate the coupling of "asserting 100% + difficult". Likewise, P1 made selective and patterned choices in legitimating particular kinds of people having difficulty.

Having gone through the kinds of voices which P1 legitimated in his tweets in a patterned manner, it is now possible to address how this patterned legitimation of voices functioned in negotiating affiliation. The tweets examined above were posted when the whole country of Japan was suffering in one way or another from the devastation of 3/11 quakes and tsunami disasters followed by a nuclear accident. The kinds of voices that were legitimated by P1 are those of different kinds of the people who were going through the same experience, the 3/11 disaster and nuclear crisis. These voices include people who suffer due to the disaster in one way or another and people who were doing something for the society in crisis, including operators at the accident site who fought against the nuclear accident. The collaborators who engaged in P1's 'data visualisation project' also fall into this group. The legitimated voices further include non-knowers such as people who are anxious about plutonium because of lack of knowledge, or someone he met at a metropolitan pub without foreign customers who treats a glass to P1 (see Section 5.3). While P1 positioned himself as a knower in terms of AUTHORITY in negotiating scientific knowledge on Twitter (see Chapter 4), he also legitimated

different kinds of voices that constitute the population in crisis. In this way, P1 presented himself as one of the members in the same community, composed of various kinds of voices but sharing the same experience of a nuclear crisis. By doing so, he negotiated a horizontal tenor relationship, or solidarity, with not only the interactants, but also with the readership behind the scene who also shared the same nuclear crisis.

5.4.3 Negotiating tenor in exchange as challenge

In the exploration of solidarity work of HONORIFICATION, foci so far were on P1's tweets. Now, the attention shifts to P2, attending to how she negotiated solidarity focusing on tweets that involve interaction. P2's tweets in one year of nuclear crisis can be characterised as interactive. She engaged actively in interaction with other Twitter users on issues about the nuclear crisis. In this section, attention is focused on two such cases: one a case of exchange as challenge (Martin 1992), and another as an attempted interaction of challenge in an exchange. These interactions both concern the topic of plutonium leakage. Linguistic choices made by P2 in these tweets are examined from a perspective of realisation principles for tenor negotiation (see Chapter 2).

The realisation principles of tenor consist of the following. In terms of STATUS, the principle is that of reciprocity of choice, or whether equal choice is available among interlocutors. In CONTACT terms, two principles, proliferation and contraction are at play. Proliferation is a matter of the range of choices available in relation to the degree of CONTACT, whereas contraction has to do with the degree of explicitness in the realisation of meaning. These principles involve a range of linguistic choices including colloquial[105] resources, and contraction of lexical or grammatical items. The latter is often realised by conflation of more than one item. In examining an interaction of tweets posted by P2, attention is particularly drawn to the principle of reciprocity of choices. The analyses focus not only on HONORIFICATION and POLITENESS, but also on colloquial resources and lexicogrammatical contraction that realises involved CONTACT.

[105] A more systemic functional definition of what is meant by 'colloquial' will need to be provided in the future, which goes beyond the present research scope. For the present, the study takes a crude understanding of 'colloquial', 'used in ordinary or familiar conversation; not formal or literary' (OED).

The first focus is a sequence of tweets between the physicist tweeter P2 and another tweeter @user1 that took place in the evening of 25/03/2011. It was the time when P2 began reacting to the rumour of a leak of plutonium from the accident site that was prevailing on her Twitter ambience (see Chapter 4 for detailed context). @user1 is a Twitter user who had already interacted with P2 on Twitter since before the nuclear accident. He/she also stores all his/her tweets on Twilog (see Chapter 3).

On that evening, @user1 began addressing P2 by expressing his suspicion about plutonium measurement. P2 responded to him in [P2-5]. In this tweet, P2 closed down the possibility that plutonium would disperse to the extent that would be a matter of chemical toxicity in ENGAGEMENT terms (see Chapter 4). While P2 and @user1 were exchanging a couple of tweets after this, another user @userX popped in the interaction by mentioning 'immediate death' in relation to plutonium. P2 replied to @userX by providing two hyperlinks to a relevant internet site. Then, @user1 picked up one of the sites that P2 had introduced, i.e. that of a governmental research organisation. The flow of interaction between @user1 and P2, with an intervention from yet another user @userX, is summarised in Figure 5.9. In @user1's tweet in h. of Figure 5.1, there is an anaphora '*kore* (this)' that references back a webpage mentioned by P2 in e. This anaphoric identification is indicated by an arrow in the figure.

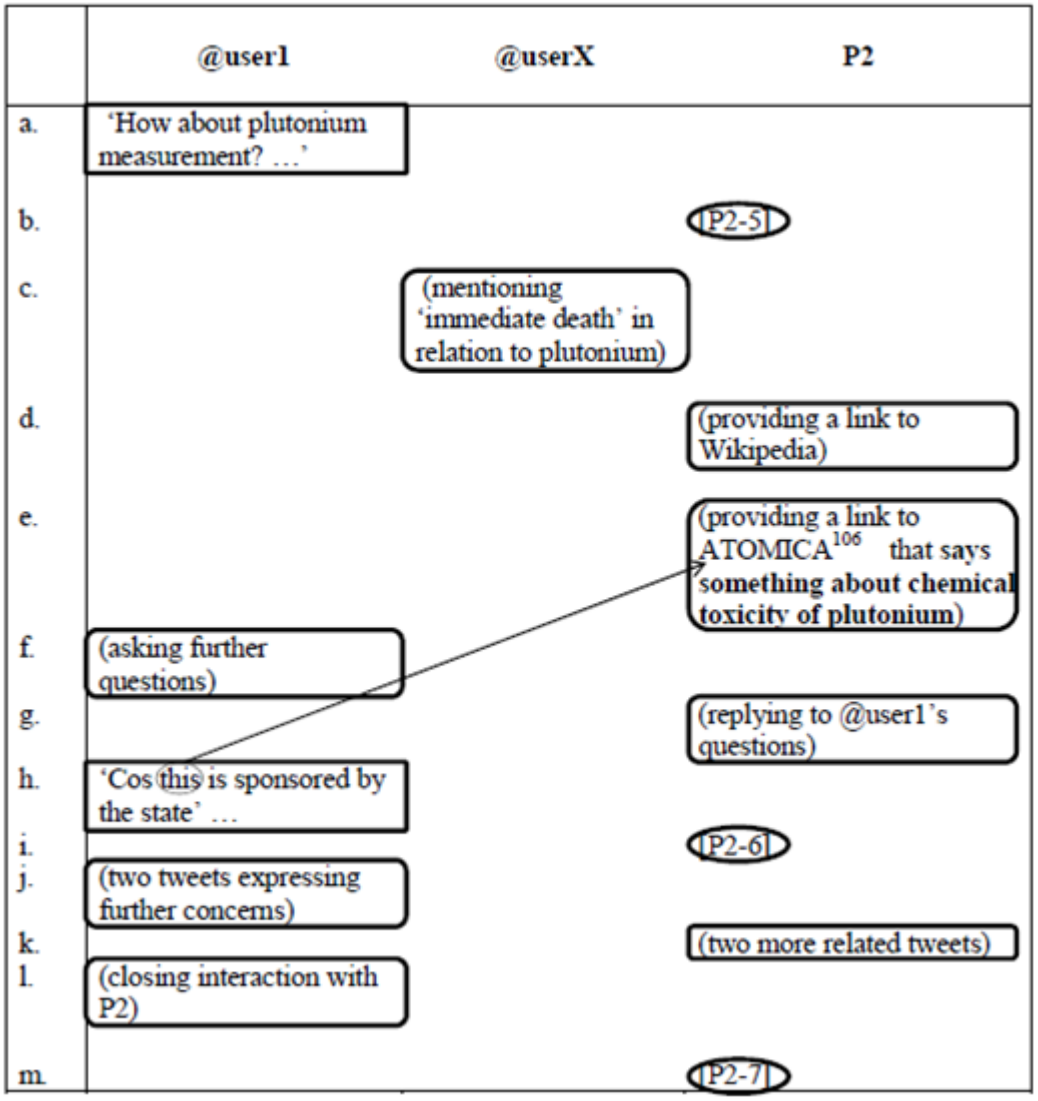


Figure 5.9 Flow of interaction about plutonium between @user1, @userX and P2

Here, two of the tweets posted by P2 in the course of interaction are analysed in detail. [P2-6] was posted in the middle of the interaction in response to a tweet of @user1, and [P2-7] was the last tweet of the interaction in which P2 replied to@user1. The two tweets are both 'unofficial' retweets, in which part or all of @user1's tweets are quoted, and to which P2 responded. Since linguistic choices made by @user1 are accessible in P2's tweets, it is possible to analyse whether reciprocity between P2 and @user1 was realised or not within the data set for the present research.

The first tweet to examine is [P2-6]. The excerpt below was written by @user1.

RT@user1:	これって	スポンサーが	国だし
RT@user1:	*kore.tte*	*suponsaa.ga*	*kuni.da.shi*
RT@user1:	this.TOP(COL)	sponsor.NOM	state.be.and-so
RT@user1:	regarding this	sponsor	is the state and so
RT@user1:	Cos this one |-.-|'s sponsored by the state		

There are two colloquial resources here. The topic particle is *.tte* instead of *.wa*. Also, *.da.shi* is more colloquial than saying '*.na.node*' or '*.desu.kara*'.

Turning now to P2' response, there are also numerous colloquial resources. There are three in the first clause complex, for instance.

体の	中に	どんだけ	エネルギーを	ほり込むかって	話で、
karada *.no*	*naka* *.ni*	*dondake*	*enerugii* *.o*	*horikomu* *.ka* *.tte*	*hanashi* *.de*、
body .ADN	inside .LOC:in	how-much (CONTR)	energy .ACC	throw-in/COL .NEGO:intr .PROJ/say(CONTR)	story .be/SUS,
inside the body		how much	energy	to throw in	is a story, and
It|-.-|'s a matter of how much energy is thrown into the body, and					

Firstly, '*dondake*' (how much) is a contraction of '*dore.dake*' (which.HIL:only). '*Horikomu*' (through in) is a dialectal resource which is also colloquial. Further, '*.tte*', is a conflation of the projection particle '*.to*' and the grammaticaitalised .SAY, or '*.iu*'.

There are also colloquial resources in the last clause complex.

即死って	なんの	話って感じ。
soku+shi *.tte*	*nan.no*	*hanashi.tte.kanji*。
immediate+death .PROJ/TOP(CONTR)	what.ADN	story.PROJ/SAY(CONTR).FEELING.
immediate death	what story kind of like	
but like immediate death, what kind of story |-.-| (is that?)		

There are two '*.tte*'. The first one is the conflation of the projection and topic particles, *.to.wa,* and the second is equivalent to '*.to.iu*', the projection particle followed

by the grammaticalised lexical item ‘say’. Further, the second one is followed by a grammaticalised lexical item ‘*.kanji*’ (.FEELING). ‘*.Tte.kanji*’ as a whole is an expression generally conceived of as typical language of young generations.

In terms of the realisation principles, the two tweeters’ choices are reciprocal. Also, the deployment of colloquial expressions and contractions are understood as realising involved CONTACT. At the same time, from a NEGOTIATION perspective, the interaction between P1 and @user1 is that of a challenge exchange. While @user1 claims a political understanding of the issue by saying, ‘This is sponsored by the state’, implying that it cannot be trusted, P2 counters him by proposing a scientific understanding over the political interpretation. In short, [P2-6] is an instance in which an equal and involved tenor relationship is negotiated in the middle of challenge exchange.

[P2-7] was posted after a number of further exchange of tweets following [P2-6]. Here, the whole part of @user1’s tweet is retweeted by P2, to which she adds her reply. What stands out in this tweet is the HONORIFICATION choice. Let us begin from the retweeted part written by @user1.

わざわざ	お付き合い頂いて	すみませんでした。
wazawaza	***o****.tsukiai.****itadai****.te*	*sumimasen.deshi.ta*。
purposely	**DEf.**go-along.**RECEIVE/HUM**.SUS	I’m-sorry.be/POL.PST.
by taking time	receive**m(_ _)m** (the favour of) going along (with me)	╭ᑊ•́ Sorry for having….
╭ᑊ•́ Thank you for spending your time for me **m(_ _)m.**		

Here, an HONORIFICATION option of defer is deployed. The lexicogrammatical function of the defer option is to lower down the vertical position of Actor. In this case, the Actor is @user1, who is the Recipient of a favour. As a result of lowering down the position of the Recipient, the resource uplifts the position of the Benefactor, who is P2. In terms of discourse semantics, it legitimates the voice of the Benefactor, P2. *Sumimasen* (I’m sorry) is an expression for apology in Japanese, but is widely used in occasions where people would say ‘Thank you’ in English.

In replying to @user1 who legitimated P2’s voice, P2 also encodes HONORIFICATION with a respect option as below, legitimating the voice of @user1.

気になさらず
*ki.ni.**nasara**.zu*
mind.ATTR. **DO/RES**.NEG
please ⊦-.-⊦ don't mind **m('。')@m**

As in [P2-6], the P2 and @uesr3 show reciprocity here. The difference is that here, the reciprocity does not concern colloquial resources, but HONORIFICATION encoding. In ENGAGEMENT terms, they legitimate each other's voices. In terms of NEGOTIATION, this tweet forms the reconciliation stage of the exchange of challenges. In the part written by @user1, he explained the reason why he challenged P2, and then thanked her. P2 replied to that with HONORIFICATION encoding, legitimating the voice of the challenger as one which is worth being heard and considered.

The reciprocal choices in [P2-6] and [P2-7] show that an equal tenor relation is negotiated throughout the exchange. This makes an interesting contrast to field, in which P2 consistently presented herself as a knower. This is implied in her description of her own interaction as '*keemoo katsudoo*' (enlightening activity) in [P2-7]. However, this inequality in terms of AUTHORITY is not reflected in the way P2 negotiated tenor with @user1 through realisation principles. Rather, she negotiated equal STATUS and involved CONTACT, even though the interactant did not share the same bonding orientation at the early stage. She continued being reciprocal in her choice until the last stage of the challenge exchange in which the challenger expressed his gratitude to P2.

The findings from the analysis of this interaction support that solidarity in terms of involved CONTACT is negotiated between P2 and @user1. Another thing to note here is that solidarity is not only negotiated with the interactant but is meant to be *reciprocated* with a larger set of readership. P2 herself makes it explicit as below.

他に	見ている	ひとも	いるから	やっているので、
hoka.ni	*mi.teiru*	*hito.mo*	*iru.kara*	*yat.teiru.node*、
other.CIR	watch.ASP:cont	person.HIL:too	be.because	do.ASP:cont.because ,
other (than you)	is watching	person too	because there is	am doing … so
(I) ⊦-.-⊦ do (this) because other people are also watching (it), so				

During the course of one year of crisis, P2 actively engaged in this kind of challenge exchanges every time an issue about radioactive materials arose in the media and Twitter ambience, including plutonium, strontium and xenon.

The interaction examined above was an instance where P2's attempt to negotiate was successful. However, it was not always the case that interaction finished with reconciliation. The last sequence of tweets to examine in this chapter is one in which the attempt was not successful, which was more often the case. This sequence involves one of the freelance journalists whose tweets were examined in Chapter 4, J2.

The two tweets were posted in the afternoon of 29/03/2011, on the day of TEPCO's early morning press conference on the plutonium leakage. Prior to P2's tweets, P1 had posted his 'sequential tweets on plutonium' (see Chapter 4). In one of them, [P1-15], he had provided a hyperlink to a diagram showing plutonium fallout in the past. The freelance journalist tweeter J2 had reacted to the tweet in [J2-1]. As examined in Chapter 4, indifference or flatness was the value coupled with a safety demagogy.

P2 posted [P2-8] in reaction to this tweet. Here, she initiated a challenge to J2 by asking him a question with a quote from [P1-15]. She encoded HONORIFICATION. In terms of ENGAGEMENT, this opened up space for J2 as a legitimate voice holder.

@J2 さんは	これは	読まれましたか？
@J2.san.wa	*kore.wa*	*yom.**are**.mashi.ta.ka ?*
@J2.TIT.TOP	this.TOP	read.**RES**.POL.PST.NEGO:intr?
Mr. @J2	this	┌|･|┘ did you **read** m(’。’@)m …?
Mr. @J2, ┌|･|┘ did you read m(’。’@)m this?		

She addressed J2 another two tweets in a sequence. However, J2 didn't reply to either within a few minute's interval. Then, P2 posted [P2-9].

残念な	ジャーナリスト	(~~)
zannen.na	*jaanaristo*	(~~)
regrettable.be	journalist	(~~)
|-.-| Regrettable journalist (~~)		

知らん。
shira.n。
know.NEG(DLT[106]).
(I) ⊦-.-⊦ don't care.

Here, there is an inscribed JUDGEMENT: - capacity, '*zannen.na*' (regrettable). When used colloquially, '*zannen*' can deliver a nuance of 'pathetic'. This is followed by an emoticon of frowning eyes, expressing AFFECT: dissatisfaction. Figure 5.10 is the screenshot of [P2-9], showing how the emoticon is presented on the tweet.

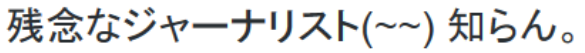


Figure 5.10 Screenshot of [P2-9]

These kinds of inscribed ATTITUDE are also found in some of the other tweets on plutonium that was not examined in Chapter 4.

Further, in terms of ENGAGEMENT, she closes down the space that had been opened for J2 in a previous tweet by a dialectal choice of negation, *shira.n* (don't care). Without the account name @J2, this tweet is interpreted as no longer being addressed to J2, but rather to her other readers to whom P2 expressed her negative AFFECT and JUDGEMENT.

In this sequence, P2 attempts to interact with J2 in order to negotiate her scientific knowledge about plutonium to J2, with whom P2 does not share bonding orientations. However, in spite of this gap, P2 approached J2 by opening up space for J2 as a legitimate voice holder. However, when she does not receive a reply in a short interval, the space opened for J2 is closed down with negation and a negative inscribed JUDGEMENT. What is suggested from this tweet sequence with J2, in comparison with the interaction including [P2-5], [P2-6] and [P2-7], is that P2's negotiation of tenor through reciprocity was only at play as long as there was room for negotiation of scientific knowledge, which is her bonding orientation.

[106] Dialectal variety in Japanese is yet another set of resources which deserves revisiting in relation to tenor negotiation across genres and registers in future research.

In this subsection, two interactions of tweets that involve challenge between P2 and other Twitter users were examined. The first interaction was one in which P2 was challenged by another user, @user1. She countered him back with reciprocal choice of colloquial expressions, and when the reconciliation was reached in terms of negotiation of knowledge, she replied reciprocally with HONORIFICATION choice. By doing so, she not only negotiated solidarity with the interactant @user1, but also with other readers of the interaction on Twitter behind the scenes. In the latter interaction, P2 was the one who initiated the challenge to the freelance journalist J2. She began by legitimating the voice of J2 even though she did not share bonds with him. However, when her attempt of negotiation turned out to be unsuccessful, P2 quickly shut the space down, enacting negative JUDGEMENT and frustration with the interactant.

5.4.4 Potential community participants

This section has explored how two tweeters from P Group negotiated a horizontal tenor relationship with the readership. It examined how resources including HONORIFICATION and POLITENESS as well as other tenor negotiation resources are deployed in the service of solidarity negotiation in three sets of selected resources. The findings of this section are now interpreted from a perspective of affiliation in terms of potential participation in the community offered by the two physicist tweeters.

The perspective of potential participation was introduced in Chapter 4. In discussing the bonding orientation offered by J Group, the taken-for-granted way of offering values was interpreted in terms of the exclusive nature of the community. Potential participation was limited to those who readily accept the values offered by J Group without question. In other words, J Group's community is one in which a boundary is strictly maintained. The exploration of the deployment of the POLITENESS system and the HONORIFICATION system in P Group's tweets reveals a different kind of community from this perspective.

The first concerns the foregrounding and backgrounding of dialogic presentation of moves along with choice in the POLITENESS system. It is made strategically in P1's tweets. For instance, information about collaboration is made accessible to the

readership, highlighting the 'telling someone' aspect of K1 move. This implicates a large readership with whom his bonding orientation is reciprocated. This suggests an open kind of community.

The findings about P1's deployment of HONORIFICATION also inform the nature of the community. The legitimated voices have the commonality of experiencing the same 3/11 disaster and nuclear crisis, including collaborators in his project (unless involved contact), sufferers of the 3/11 disaster, operators at the nuclear accident site, and other people having difficulty. They further include people who do not necessarily share the same bonding orientation such as people who are anxious about plutonium. From a perspective of community, these constitute voices of potential participants of the community offered by P1. It is a community that is open for participation to these various kinds of voice holders experiencing a common disaster.

The findings about P2's interactive tweets provide a similar picture. In an exchange as challenge, HONORIFICATION and other tenor negotiation resources are deployed in a reciprocal manner with the interactant. This legitimates the voice of the challenger as well as enacting involved CONTACT. P2's comment 'enlightening activity' suggests that her bonding orientation is not only offered to the interactant, but also a larger set of readership who attends to the interaction. Again, this reveals an open nature of the community offered by J2.

The same orientation applies when she approaches J2 with a challenge move. At first, P2 legitimates the voice of J2, even though her bonding orientation is not shared. However, the space is shut down when negotiating science is unsuccessful. In other words, the community offered by P2 is one that is open as long as there is space for negotiating science.

The analyses of this section reveal the nature of the community offered by P Group in terms of potential participation and boundary maintenance. It is a community that potentially involves various kinds of voices of people who share the common context of the 3/11 disaster and nuclear crisis. Its boundaries are not strictly restricted, unlike the community offered by J Group. As for P Group, the community boundaries are open as long as there is potential for negotiating their bonding orientation around science.

5.5. Conclusion

The functions of linguistic resources referred to as *keego* in the tweets of P Groups has been explored, in order to understand the nature of their community from a perspective of potential participation. To that end, the chapter began by reinterpreting these resources from an SFL perspective, attending to the strata of lexicogrammar and discourse semantics. The dual stratal accounts were then taken up as the basis for understanding the functions of these resources in the physicists' tweets in the service of affiliation or solidarity building.

The first contribution of this chapter concerns lexicogrammar. *Keego* is revisited in terms of three systems, HONORIFICATION, POLITENESS and BEAUTIFICATION. The first system, HONORIFICATION, operates at clause rank or nominal group rank. Choices in HONORIFICATION encode uplifting of the position of a human Participant in a clause or a human nominal group. BEAUTIFICATION deploys some of the same resources as HONORIFICATION. The difference is that the function is to perform a particular *persona* or identity. POLITENESS operates at non-finite clause rank along with MOOD. It consists of an obligatory choice between plain and polite, with four more delicate options. Choice depends on various contextual factors including genre and register. Exploring detailed functions of these systems in a broader range of texts goes beyond the scope of this study, but these profiles provide bases on which to explore the functions of these resources at a more abstracted level of meaning in discourse.

Focus is drawn to two of the systems – HONORIFICATION and POLITENESS – that are more relevant in the present study than BEAUTIFICATION. The system of HONORIFICATION was proposed as functioning as an ENGAGEMENT resource in APPRAISAL, functioning as a heteroglossic expand: legitimate. This proposes an extension of the current system of ENGAGEMENT proposed in Martin and White (2005). The functions of the POLITENESS system were attended to along with the system of NEGOTIATION in terms of the cline between monologic and dialogic presentation of the

text. This perspective is expected to provide a more comprehensive account of choices in this system in relation to genre and register, which goes beyond the scope of the present study.

Based on these dual stratal accounts, the last section this chapter explored how these resources functioned in the formation of the communities around P Group. Three sets of resources have been examined. The first set examined HONORIFICATION and POLITENESS around P1's collaborative 'data visualisation project'. The second set focused on various kinds of voices legitimated by P1 in the first month of the crisis. Thirdly, P2's exchanges of challenges with other Twitter users were examined in terms of choices of HONORIFICATION as well as other kinds of resources for negotiating tenor such as colloquial expressions.

The examination has revealed a number of ways in which solidarity is negotiated in P Group's tweets. The POLITENESS resources are deployed strategically by P1 to negotiate knowledge and actions. In terms of ENGAGEMENT, both P1 and P2 legitimate various kinds of voices relevant in the 3/11 disaster and Fukushima nuclear crisis, including sufferers from the disaster, nuclear site operators, collaborators to P1's project and interactants on Twitter in challenge exchanges. These voices are legitimated regardless of their social positions, or whether they agree or disagree with the scientific bonds, including people who are anxious about plutonium. The heteroglossic space is only closed down when negotiation of science is unsuccessful. In other words, participation in their community is open as long as space for negotiating scientific knowledge is open.

The examinations reveal the nature of P Group's community in terms of potential participation in comparison to J Group (Chapter 4). In contrast to J Group's, P Group's community is not an exclusive one in which participation is only restricted to those who readily accept and reciprocate their bonding orientation. It is a more open kind of community in which various kinds of voice holders in the context of this particular nuclear crisis are legitimate participants, as long as there is a potential for negotiating scientific knowledge.

Chapter 4 and Chapter 5 have revealed the comparative nature of two communities in the following two terms. First, in terms of bonding orientation, P Group highlights

knowledge whereas J Group highlights values. Second, in terms of potential participation in their communities, P Group's community is more open to various kinds of people in the nuclear crisis, whereas J Group's community is a more exclusive one that restricts its participation to those who readily reciprocate their bonds. The linguistic analyses conducted in these two chapters have revealed the bases of affiliation of the communities that formed around Twitter at the time of the nuclear crisis in 2011 Japan.

Chapter 6 Conclusion

6.1 Introduction

The present study was initially motivated by my observation, as a resident of Japan, of interaction on Twitter at the time of 3/11 disaster and the subsequent nuclear crisis in 2011 Japan. I noted the emergence of Twitter as a significant medium through which a growing proportion of an anxious population sought information, assurance and solidarity in a time of crisis. Particularly noticeable was the formation of communities around some key professionals in different fields – physicists and around freelance journalists – and that these communities differed in the kinds of messages they shared. Drawing on SFL theory, a theory that conceptualises language as social semiotic, the study has closely explored the Twitter discourse of four key tweeters from two professional fields. Two are influential physicists and two are well-known freelance journalists.

The key tweeters from the two professional fields are conceptualised in the following manner. At the most local level, an exploration of the formation of community is implicated in the analysis of every single tweet, constituting potential affiliation with the readership. That is taken up to the perspective of each tweeter as a local *hub*, from which the basis for affiliation can be explored. However, the focus of this thesis is toward understanding of community formation beyond individual to 'kinds' of individuals, or what LCT refers to as 'knowers' (Maton 2014). In the context of a society in the grip of a nuclear accident, the two key kinds of knowers that emerged on Twitter were physicists and freelance journalists (see Chapter 1). The formation of Twitter communities are analysed and compared around two physicists (as P Group) and two freelance journalists (as J Group). Analyses explore, from a linguistic perspective on meaning, the extent to which different communities are evident and on what bases, or in other words, how the communities differ in their bases for affiliation.

With reference to the hierarchy of realisation in SFL theory, I approach the texts from the stratum of discourse semantics (see Chapters 1 and 2). Identification of system choices at this level necessarily implicates a range of systems and choices in lexicogrammar. In this study choices in graphology are also implicated (see Chapter 3).

A second hierarchy in the architecture of SFL, that of individuation (see Chapters 1 and 2), is also relevant to this study. A key informing concept in the movement along the cline form individual to culture is that of *affiliation* (Knight 2010a, 2010b, Martin 2009, 2010), and associated concepts are those of *couplings* and *bonds* (see Chapter 2). Analyses of couplings reveal the ways in which communities affiliate. In this study, the central issue is whether and in what ways Twitter communities that formed around the discourse of the physicists and the freelance journalists, at a time of a nuclear crisis, affiliate on different bases. This is explored in terms of different orientations to information and the values attached – what I refer to as a bonding orientation.

This chapter consolidates significant contributions of this thesis in a number of domains with respect to theory and to the design and presentation of research and with respect to the object of study. First, in terms of research design, the study responds to the challenge that arises from the need to present discourse analytic studies in one language (here in Japanese) in a second language (here in English). While this is an issue that has been faced by many previous studies in linguistics, the contribution here is making explicit choices in the process of *glossing* (McDonald 2008, see also Chapter 3), that is, segmentation of texts in Japanese into meaningful units and providing notation for each unit, by being contingent on the purpose of the study. This is an aspect that has largely relied on convention without detailed explication of the processes involved.

In terms of the application of SFL theory to Japanese, the study contributes to an expanded description of the system of APPRAISAL in Japanese, especially in the APPRAISAL sub-system of ENGAGEMENT. Finally, in relation to the object of study, the thesis reveals interesting differences in the kinds of communities that form on Twitter a time of nuclear crisis. Two key bases of affiliation emerge from the patterns of choices of the physicists and the freelance journalists.

These are discussed in more details in the sections to follow. The chapter concludes with social implications that the present study offers, followed by a discussion of future directions for research that emerge from this thesis.

6.2 Contributions to theory and research design

Contributions discussed in this section focus on issues of theory and on practices in research design, in particular the presentation of data.

6.2.1 Implications from a discourse semantic perspective on meaning

There has been some lack of consistency within SFL based study around the question of the extent and justification for applying systems and choices described for English to studies of other languages. Literature assumes that the lexicogrammatical systems and choices of English will not apply to other languages (e.g. Caffarel et al. 2004b, Teruya, 2007a, 2007b, see also Chapter 3). However, there is some confusion with respect to systems at the stratum of discourse semantics. For example, while some works apply the discourse semantic system of APPRAISAL in analysing multiple languages (e.g. White & Thomson 2008), another approach has proposed the need for a language-specific system for interpersonal meaning at the level of discourse semantics. This has been the case in some studies in Japanese. Sano (2012) conceptualises 'appraisal' as theory and 'Jappraisal' in effect as realisation in Japanese lexicogrammar. This constitutes a different theoretical interpretation from that taken in this thesis.

The position taken in this study is argued for in the following terms. In SFL, the stratum of lexicogrammar and of discourse semantics are distinguished as relative on a hierarchy of abstraction, with the stratum of discourse semantics constituting the more abstracted level of meaning (Martin 1992, Martin & Rose 2007). While it is assumed that systems and functions in different languages differ at the level of lexicogrammar,

there is no such assumption for systems at the level of the abstract stratum of discourse semantics. Just as any choice in a discourse semantic system can be realised across diverse systems in the lexicogrammar of any one language, so too can choices be realised in different systems in the lexicogrammar of different languages. The discourse of Twitter interactions are explored in this study by applying the discourse systems and their abstract realms of semantic choices to an analysis of Japanese texts, in the process exploring Japanese specific systems of lexicogrammar.

By approaching affiliation and community formation in Japanese from this perspective of discourse semantics, this thesis also offers a model for similar studies in other languages.

6.2.2 The challenge of meaning equivalence: glossing of Japanese

The study has presented a number of challenges for the analysis of discourse semantic meanings in the Twitter texts. The tweets are in Japanese, and the analyses are undertaking on the choices made in Japanese. Yet the thesis is written and argued for in English.

The process of translation from one language to another, as is required in the presentation of the thesis, is a most complex process. From the SFL perspective, translation has been explained as involving 'interlingual re-instantiation' (de Souza 2012, see also Chapter 3). More or less equivalent kinds of meanings from the source language to the target language may be realised in different linguistic systems and system choices, or may not be available in the target language. Distortion of meaning is inevitable in the process.

In order to meet these challenges and to present the data and discourse analyses, meanings made in the original texts are available in English to the readers of the thesis with a minimal level of distortion. To this end, the present study has adopted the concept of glossing (McDonald 2008, 2013), and proposes a glossing of Japanese for the present study. The glossing process involves segmenting the text into functional

items, and annotating the items and the boundaries in a manner that is contingent on the purpose of the study. After the glossing, a translation of the text is provided.

To date, the majority of SFL works on Japanese do provide notation keys (e.g. Teruya 2007, Thomson & Armour 2013). However, this study has aimed to shed more light on this important process between the original text and its translation in English by drawing on McDonald's (2008) concept of glossing. The significance here is that glossing actually involves 'the initial theorising' (McDonald 2008, p. 20), which deserves explicit attention.

In building up the glossing for the present study, a number of unresolved issues in the current SFL description of Japanese are addressed. One of the issues has to do with the so-called *te*-form. Instead of considering the *te*-form as one item with one function, it is considered in terms of three different types of items with different boundaries. Another issue concerns so-called *joshi*, or postpositional particles. Some temporary labels are proposed, to make accessible the general functions of these resources to the readers of the study without knowledge of Japanese.

It should also be acknowledged that the glossing proposed in this study does not assure consistency in all terms. For instance, it does not provide consistent notations for so-called *setsuzoku joshi* (conjunctive particles), and leave the issue aside for future exploration. It is not an almighty glossing that can be applied to any linguistic description of Japanese either. More or less delicate segmentation may be possible depending on the purpose of the study. For instance, MOOD resources are glossed in a delicate manner in the present study, but *kanji* compounds are presented more grossly, without breaking them down into the meaning of each *kanji*. SFL descriptions of languages including Japanese are evolving, and through the attention to glossing, the present study sheds light on one relatively unattended area of the process of the linguistic analysis.

Most importantly, glossing makes the resources in Japanese investigated in this study accessible to readers without knowledge of Japanese. In the present study, a further step is taken in the process of translation that comes after the glossing by providing

emoticons for lexicogrammatical resources in the systems of HONORIFICATION and POLITENESS, namely **m(_ _)m, m('。'@)m,** ┌|∵|┘ and |-.-|.

The process has allowed this study to present the discourse semantic functions of these resources in Japanese as deployed in the tweet texts in English (see Section 6.3).

6.3 Understanding the bases of formation of the Twitter communities

The research questions of this thesis are reiterated at this point, as they provide points of reference for a discussion of key contributions with respect to the object of study. The present research addresses the following general question:

What does a linguistic analysis reveal about the comparative bases of affiliation in the discourse of Twitter users who are professional physicists and freelance journalists at a time of a nuclear crisis?

This general question is further specified as the following sub-questions:

1. In a comparative study of Twitter discourse around a specific aspect of nuclear science:
    a) What patterns in the construal of the field are evident for each group?
    b) What values couple with the construal of the field for each group?
    c) What bonds are offered as the basis for affiliation for each group?

2. In the Twitter discourse of physicists:
    a) What are the lexicogrammatical functions of linguistic resources in Japanese referred to as *keego*?
    b) How can the functions of these resources be interpreted from the perspectives of discourse semantic systems of APPRAISAL and NEGOTIATION?

c) From the perspectives of APPRAISAL and NEGOTIATION, how do *keego* choices function in the physicists' tweets to negotiate scientific knowledge in the interests of building a community?

6.3.1 Dealing with a scientific matter

The first research question specified in 1 above is addressed in Chapter 4. A comparative analysis of tweets from the physicists (P group) and the freelance journalists (J group) were undertaken. While the tweets of each individual can be seen as the hub of community formation at a local level, the focus is on the ways in which community formation can be explored at the level of a group of professionals, here in relation to a specific contextualizing social crisis.

The basis for comparison across the groups is the determination of a field focus that is shared by all tweeters, and the delimitation of data sets on that basis. In each set the focus is on an issue of significance in relation to the nuclear crisis, that of plutonium. This issue arose as significant in the first month after the nuclear accident. The comparative analyses focus on the ways in which the field of plutonium is construed in choices in the system of IDEATION, and the values enacted in choices in the system of APPRAISAL in the tweets of each group. The analyses of the couplings of choices in IDEATION and APPRAISAL around the issue of plutonium reveal contrastive patterns (Knight 2010a, 2010b). These contrastive patterns constitute different bases for affiliation in the two groups, that is, they are foundational in movement up the individuation hierarchy (Martin 2009, 2010) in the service of community formation. The nature of the couplings defines the kind of community formed. Here the analyses identify the basis for understanding the Twitter communities formed around physicists and the freelance journalists.

6.3.1.1 Patterns in the couplings of the physicists

The tweets on plutonium posted by the physicists reveal relatively consistent patterns in terms of the representation of the field, as well as in terms of the values that are enacted.

In terms of field (Question 1a) the physicists' tweets, not surprisingly, primarily construe plutonium from the perspective of the science of physics. One of such instances is the following extract of [P1-1].

Pu239 の	「親」である	239Np の	崩壊ガンマ線が	見えていない.
(At KEK) decay gamma ray of 239Np which is the 'parent' of Pu239 is not seen.				

Grading resources such as the half-life of plutonium and measurement data of radiation are presented as primarily construing topological meaning, or 'meaning by degree' (Lemke 1998, 2004). An example is the following extract of [P1-1].

半減期が	2 万 4000 年も	あり,
half-life (of which) is as long as 24 thousand years and		

Occasionally science is recontextualised into the fields of nuclear technology, as in the following extract of [P1-2].

格納容器が	守られれば,
If the container is protected	

or into the managerialism as risk management as in [P1-3].

原発を	冷やすことの方が	急務.
to cool down of the NPP (is the) more urgent task.		

Human entities are not often seen, except in cases where people who are anxious about plutonium are mentioned such as in the following extract of [P1-4].

Pu 大量飛散を	心配しておられる	方が	多い.
There are a lot of people who are anxious about the large dispersal of Pu.			

The values enacted around the field of plutonium are also patterned (Question 1b). In terms of ATTITUDE, evaluative meaning of "not a problem" is consistently coupled with the ideational meaning of "plutonium' as in the following extract of [P2-1].

もちろん	量が	ないと	問題は	ないし。
of course there is no problem if it is not in (a large) amount...				

Grading resources that construe ‘meaning by degree’ are deployed as GRADUATION as FORCE, flagging the positive evaluation coupled with plutonium. In terms of ENGAGEMENT, recurring instantiation of heteroglossic contract: disclaim closes down propositional options that couple negative ATTITUDE with plutonium, as in another extract from [P2-1].

.@user1	あれは	そんなに	飛散しない。
.@user1 That (plutonium) does not disperse so (widely).			

6.3.1.2 Patterned coupling in the freelance journalists

The tweets posted by the freelance journalists about the matter of plutonium reveal contrastive patterns. The field of plutonium, while intrinsically a scientific phenomenon, is recontextualised in the tweets of the journalists into nuclear technology, and more significantly into social fields including those of corporate world, politics and popular culture (Question 1a) as in the following extracts from [J1-1], [J1-2], [J2-1] and [J1-2] respectively.

ペレットの	溶融が	一部	始まっている	点。
(The meaning of plutonium detection) is that melting of pellet has partially begun.				

「2 万 4 千年であったかと」	（東電副社長）
‘(I think it) would have been 24 thousand years’ (TEPCO Vice President)	

政府は	非常事態宣言を。
The government, (please announce) the proclamation of a state of emergency.	

「一万年と	二千年前から」という	CM ソングを	思い出す。
I remember a commercial song called ‘since ten thousand years and two thousand years ago’.			

Additionally, there is a much greater presence of human entities in their discourse around plutonium compared with the tweets of the physicists as in the below extract from [J1-2].

「2 万 4 千年であったかと」	（東電副社長）
‘(I think it) would have been 24 thousand years’ (TEPCO Vice President)	

Contrasts also appear with respect to values (Question 1b). In the freelance journalists’ tweets, plutonium is coupled with a negative ATTITUDE, as in [J1-3].

プルサーマルの、	BOX 燃料は、	より	厳しいのではないか。
BOX (mistype of MOX) fuel in a plu-thermal (…) could be more serious.			

Some of the human entities in their tweets are also coupled with negative values in terms of lack of trustworthiness and incompetence. One instance is the following extract from [J1-4].

この	御用学者の	発言は、
This opportunist scholar’s remark		

The following extract of [J2-2] is mocked journalism in which the positive evaluation is reversed into negative.

首相は	過去にも	「カイワレ大根」で	成果を	出していることから、
As the prime minister came out with achievement with ‘daikon sprouts’ in the past, too,				

By contrast, no evaluative meanings are enacted for other human entities that constitute a group of people that the freelance journalists quote, as in [J1-3].

{name}さんの	回答。
Mr/Ms. (name)’s reply.	

In terms of GRADUATION, more variety of options are instantiated in [J1-4] including GRADUATION as FOCUS.

放散されてしまった	プルトニウムは、
Plutonium that has ended up being dissipated	

Some of these tweets are highly committed (see Chapter 3) in terms of interpersonal meaning. For instance, in [J1-2], a number of discourse semantic systems are

instantiated, including inscribed and invoked ATTITUDE and GRADUATION, as well as lexicogrammatical systems including passive and non-finite clause.

In the ENGAGEMENT terms, more heteroglossic: expand options are used, quoting different voices as in the following extract of [J1-4].

@user2	「プルトニウムの	半減期を」	(記者)
@user2	'(Tell us) plutonium's half-life' (newsperson)		

These findings for each group are compared in relation to each other along with the unfolding of the events about plutonium in the first month of the nuclear crisis.

6.3.1.3 Comparative bases for the Twitter communities

Having identified the kinds of couplings that accumulate across the different groups, the focus shifted to that of bonds and bonding orientations (Question 1c). A bond infers a coupling pattern that is accumulated over time, and reciprocated by others, constituting the basis for affiliation. This study focuses on the dynamic formation of communities along the timeline of the nuclear accident, explored from the perspective of *bonding orientations* (see Chapter 4). This dynamic creation is shaped along with unfolding facts about the nuclear accident, as well as with an evolving 'Twitter ambience' (see Chapters 3 and 4) in the first month of nuclear crisis.

The bonding orientation offered by the physicists concerns scientific understanding of events, negotiating this with a readership including those who may hold opposing views about the crisis. The physicists provide scientific evidence to invite a readership to negotiate reciprocation. With regard to the freelance journalists, they offer a bonding orientation which highlights values over knowledge. Negative evaluations on the issues of plutonium as well as the authority are taken for granted and are amplified.

Another aspect of the basis for affiliation revealed from the bonding orientation offered by the freelance journalists concerns potential participation into their community. The taken-for-grantedness of the values, along with negative JUDGEMENT coupled with authorities, implies that participation in the J Group community is restricted to those

who reciprocate the values of their bonding orientation. The freelance journalists display a stronger sense of boundary maintenance in terms of potential participation. However, as for the physicists, this aspect of the community was not made explicit by examining tweets on plutonium.

This feature was less apparent for P Group, implying a more open community. However, to further explore this issue with respect to the physicists, a further sub-set of the data were needed, in particular, tweets that made reference to human entities. This opened up new perspectives on particular linguistic resources.

6.3.2 Reinterpreting *keego* in negotiating science and solidarity

The second research questions are restated here.

In the Twitter discourse of physicists:

a) What are the lexicogrammatical functions of linguistic resources in Japanese referred to as *keego*?

b) How can the functions of these resources be interpreted from the perspectives of discourse semantic systems of APPRAISAL and NEGOTIATION?

c) From the perspectives of APPRAISAL and NEGOTIATION, how do *keego* choices function in the physicists' tweets to negotiate scientific knowledge in the interests of building a community?

Each sub-section is addressed in Chapter 5. The contributions of the thesis in addressing each part of the questions are consolidated below.

6.3.2.1 Reinterpreting *keego* in grammar and discourse

Analysis and interpretation of meanings in the physicists' tweets in Chapter 4 highlighted the need for further exploration of other kinds of interpersonal meanings, in order to understand the nature of their community from a perspective of boundary maintenance and potential participation. This has drawn attention to the use of a set of linguistic resources in Japanese referred to as *keego*. The present study proposes a dual

stratal account of these resources in Japanese, at the stratum of lexicogrammar, and the in terms of their contribution to meanings in discourse semantics.

Importantly, an SFL profile of three different systems at the lexicogrammatical level is proposed in this thesis to account for the meanings encompassed by resources currently categorised as *keego* (Question 2a). These are the systems of HONORIFICATION, POLITENESS and BEAUTIFICATION. Further, meanings from these systems are presented with an emoticon from the following list.

Table 6.1 Emoticon symbols for the realisation of *keego* (reiterated from Chapter 3)

emoticon	**system: option**
m('。'@)m	HONORIFICATION: respect
m(_ _)m	HONORIFICATION: defer
┌|･ω･|┘	POLITENESS: polite
|-.-|	POLITENESS: plain

The first system is HONORIFICATION. It operates at the clause rank in terms of Process, or nominal in terms of Participant or a nominal group in Circumstance or as term of address. The function of this system is to uplift the vertical position of a human Participant, a human nominal group in Circumstance, or the addressee. In the following extract of [P1-4],

原子力本流の	専門家も	おられる筈なので)
genshi.ryoku+honryuu .no	*senmon.ka .mo*	*orareru.hazuna.node*)
atom.power+mainstream .ADN	speciality.person .HIL:too	be/RES.MODA:should.because)
Because … there |-.-| should be **m('。'@)m** … nuclear power mainstream experts)		

the Process '*orareru*' (be) has an encoding of HONORIFICATION: respect. The following extract from the same tweet is an example of an encoding of HONORIFICATION: respect to a nominal group.

同業者の	方,
doogyoo.sha.no	kata,
same-business.person.ADN	person/RES,
person **m('。'@)m** in the same business	

The second system is POLITENESS. It functions as an obligatory choice between polite and plain, with six delicate options. POLITENESS functions independently from HONORIFICATION at the finite clause rank along with MOOD. The term '*teenee*' or 'polite' does not necessarily reflect how the system functions in discourse. The choice depends on contextual variables of genre and register, and it is not rare to find mixed choices in one text. In the following extract of [P1-4], the POLITENESS choice in the first clause is polite, and that in the second is plain.

（そろそろ	疲れてきました.
((I) ┌|･|┘am getting tired now.	

ビールも	飲みたい.
(I) |･.･| want to drink beer too.	

The third system, BEAUTIFICATION, deploys some of the resources as HONORIFICATION and functions at the same rank of clause and nominal group. The difference from HONORIFICATION is that the former does not involve uplifting of the vertical position of a human Participant. BEAUTIFICATION is encoded to non-human Participants, and typically implicates performing of a particular *persona* or identity. An example is a persona of a mother talking to a cat child in the following extract of [P2-2].

そんな	すごい	お水	きいたことないんだよねぇ。
Such terrible water **m('。'@)m**, (I) |･.･| have never heard (of it) OK?		

A further contribution lies in interpreting the function of lexicogrammatical choices in HONORIFICATION and POLITENESS from the perspective of the interpersonal discourse semantic systems in SFL, – as semantic options in APPRAISAL (as ENGAGEMENT) and in NEGOTIATION (Question 2b).

Choices in the system of HONORIFICATION are seen to function from the perspective of APPRAISAL as an option of heteroglossic expansion in ENGAGEMENT. That is, they function to open up space for the voice of a non-author by means of encoding that voice as *legitimate*, i.e. as a voice that deserves to be heard and considered. This suggests an extension of the options for heteroglossic expansion in the ENGAGEMENT network as articulated in Martin and White (2005). This thesis proposes a new option *legitimate* in

the system of ENGAGEMENT. The proposed system of ENGAGEMENT is open for further refinement as it is applied to other languages in the future exploration.

Regarding POLITENESS, the study proposes that choices at the level of lexicogrammar can be reinterpreted from a discourse semantic level as functioning in the service of NEGOTIATION (Martin 1992). They can be seen to foreground or background the dialogic/monologic presentation of the text in relation to mode. This is not to say that a choice in POLITENESS necessarily corresponds to a particular kind of move in the NEGOTIATION system. For instance, a primary knower (K1) move in an exchange can be realised either as a plain or a polite choice, depending on whether the 'telling something' aspect of the move is foregrounded, or the 'telling someone' aspect is in focus. The POLITENESS choice is plain in the following extract of [P1-5],

福島第一原子力発電所の	放射線計測データ,	6am まで	公開.
The radiation measurement data of the Fukushima Daiichi Nuclear Power Plant, ꞏ-.-ꞏ (have been) made public up until 6am.			

but is polite in the following extract of the same tweet.

これまでは	正門の	グラフを	出して来**ま**したが,
Up to now (I) ꞏ˖ꞏ have been putting out graphs of the main gate (data), but			

Reflecting on the above, we can say that resources of HONORIFICATION function to enact options in ENGAGEMENT with non-authorial voices in the discourse. In a complementary relationship, resources in the POLITENESS system function at the discourse level to enact different roles in NEGOTIATION.

To date, accounts of the interpersonal work of *keego* resources have been conceptualised as enacting either vertical or horizontal tenor relationships (Teruya 2007), in other words, in relation to power or social distance in terms of CONTACT. However, when explored from a discourse semantic perspective in this thesis, these resources are shown to function in the service of solidarity, that is, as enacting horizontal tenor relationships in terms of closed CONTACT. As such, choices in the systems of HONORIFICATION and POLITENESS are seen to contribute to the dynamic process of community formation (Question 2c). This finding also has broader implications in that the management of *keego* resources continues to constitute an

important aspect of the literacy education in Japanese (Council for Cultural Affairs 2007, see Chapter 2).

While this reinterpretation of *keego* will no doubt continue to be refined, the present study sheds light on this under-explored area in the application of SFL in Japanese. It contributes to the SFL scholarship in the description of Japanese by taking a first step towards a more comprehensive, systemic functional account of the resources previously referred to as *keego* in Japanese.

6.3.2.2 The strategic deployment of resources in the physicists' tweets

Based on the accounts of the discourse semantic functions of HONORIFICATION and POLITENESS proposed above, the last stage of exploration examined a number of tweets written and posted by the physicists, in order to understand how solidarity is negotiated in the instantiations of these resources in the texts (Question 2c). The exploration focused on three sets of tweets. The first set examined how collaboration is negotiated with the strategic use of HONORIFICATION and in POLITENESS in P1's tweets in the exchange of collaborations in the first week of the crisis. The second set focused on the kinds of voices legitimated by HONORIFICATION in P1's tweets. The third set examined two interactions in which P2 negotiated science and solidarity with two different interactants by the deployment of HONORIFICATION, POLITENESS as well as other resources for tenor negotiation.

Analyses reveal the strategic ways in which these resources are deployed in order to negotiate solidarity. POLITENESS choices, shifting between monologic/dialogic presentations of the text, are one of P1's strategies. In [P1-4], the initial request for collaboration to P1's 'data visualisation project' is presented with plain choice, in addition to being an interpersonal grammatical metaphor.

時々	お助けくださると	有り難いな-
(it) |-.-| would be appreciated if (you) could help **m('。')@)m** (me) sometimes.		

In other words, the request is presented as if it were a monolog, affording readers to choice whether or not to help him. This is interpreted as P1's strategy of creating space between him and potential addressees, and thus negotiating space between the writer and the addressee at the very first stage of the nuclear crisis when people were supposed to be facing difficulty.

By contrast, K1 moves that inform the collaborations he received are presented largely in the polite choice, foregrounding the dialogic presentation as in the extract from [P1-6].

本日	14:00 までの	値を	グラフ化して下さいました.
(Mr./Ms. {family name} of physics department, Faculty of Science of Tokyo University of Science) ┌|･|┘ has graphed₥(’。’@)₥ (…), (covering) the values up until 14:00 today.			

Choices in HONORIFICATION are also seen as strategic. Previous literature that relates HONORIFICATION with hierarchical positioning may expect instantiations to depend on the contextual variables of AUTHORITY and STATUS. These are not in play in the physicists' choices. HONORIFICATION is instantiated in a patterned way to legitimate various kinds of voices who are involved in the disaster and crisis facing the Japanese community. They include people who distressed and suffering, workers at the nuclear accident site, collaborators of P1's 'data visualisation project' (other than those who share involved CONTACT), and people who are lacking relevant knowledge of science. These voices are all constructed as legitimate. Even where bonds may not be reciprocated there is an assumption of space for negotiating the bonds. The voices are legitimated not in terms of the value of what they propose, but rather in terms of the fact that they are participants in the context of a crisis. The deployment of these resources in negotiating tenor is reciprocal. While presenting themselves as key knowers of science, the scientists participate in interaction as members of a community in crisis by legitimating different kinds of voices in that society. However, this is not to suggest that their community is necessarily open to anybody. Their primary objective is to negotiate science, as suggested from P2's comment 'enlightening activity' in [P2-3].

（啓蒙活動）
(enlightening activity)

Space for negotiation is closed down when negotiation of science is unsuccessful, as in [P2-4].

知らん。
(I) |-.-| don't care.

These examinations reveal the nature of affiliation offered by the physicists in terms of its potential participation. P Group's community legitimates various kinds of voice in the context of this particular nuclear crisis, and is open to those various kinds of potential participants as long as there is potential for negotiating scientific knowledge.

6.3.3 Contributions to the understanding of community

The individuation hierarchy models the relationship between cultural affordance of resources for meaning making and individual users' distribution and acquisition of such resources (Chapter 2). Significant studies in SFL have focused on issues of individuation from a top-down perspective, that is, on how resources are distributed differently to individuals (Cloran 1989; Hasan 1986/2005, 1989, 2002; Williams 2005). A theorisation from the bottom-up, that is, on how communities form, constitutes a relatively more recent body of work (Martin 2004a, 2005, 2008a, Martin and Stenglin 2007, Knight 2010a, 2010b, Martin et al. 2013). Here, the question to be researched and theorised is how individuals mobilise social semiotic resources to align with others.

By focusing on coupling of ideational and interpersonal meanings (Chapter 4) around the issue of plutonium, the present study provides supportive evidence of the individuation hierarchy as theorised by Martin and colleagues (Chapters 1 and 2). The accumulation of couplings of ideational and interpersonal meanings reveals the basis for the formation of two contrasting communities on Twitter. The findings of the present study provide significant evidence of new community formation around shared bonds over a period of heightened nuclear crisis.

The findings of the present study about the communities around two professional groups can be summarised in terms of bonding orientation and boundary maintenance. The community around P Group foregrounds knowledge, and is an open community in

terms of boundaries. In contrast, the community around J Group foregrounds values, and is an exclusive community where the boundaries are strictly maintained.

From an individuation perspective, the present study also provides a useful example for understanding the intermediate levels of the cline of individuation between individuals and culture conceptualised as 'subculture' and 'master identity' (Martin 2009, p. 564, see also Chapters 1 and 2). This study exemplifies the formation of communities where two subcultures are identified on one hand as one of affiliating around scientific knowledge and reasoning, and on the other hand as one of affiliating around problematising the authorities. At the same time, these two subcultures share the same locality, i.e. a shared experience of a nuclear crisis. This perspective elaborates the theorisation of subculture in the literature.

With regard to the community of journalism (see Section 2.3), the findings of the present study are compatible with the findings in the literature (e.g. Iedema et al. 1994; White 1997; Thomson and White 2008; Caple 2010). The journalist tweeters of the present study are shown to disseminate their ideological stance by problematising authorities. The negative value on plutonium is scarcely inscribed. These values are taken for granted to be rallied around with those referred to in Martin and White (2005) as 'putative readers'. The taken-for-grantedness of values is characterised as 'allusion' in Caple (2010). In this study, such characteristics of the discourse of journalism has been further discussed from a more general perspective of bonding orientation, and in terms of the way in which the freelance journalist group orients the readership towards affiliation to their community.

In addition, as suggested from the literature (Stocking 1998), the freelance journalists in this study are also found to divide 'scientists' into two groups. They introduce so-called 'fringe' experts 'whose work supports the interests' (Stocking 1998, p. 29) of their ideology, while other scientists are condemned as being 'opportunistic'. In the latter sense, the observation of the present study is also compatible with the findings on the journalism of science in which scientific error is condemned as incompetence or lies (Myer 1994, Hunston 2000).

As for the physicists (Section 2.2), the findings of the study partically reflect the literature. From an ideational perspective, the findings are compatible with those of Lemke (2004) in that the field construed in the physicists' tweets concerns topology, or 'meaning by degree', rather than 'meaning by kind' (p. 34). In public science, Myer's (1994) observation was that the topological aspect disappears, but it is not the case in the physicists' tweets, which do constitute a public version of science addressed to lay readers. Myer (1994) and Fuller (1995) pointed out that public science is not so much a matter of argument as a discovery event. However, the findings about the tweets on plutonium (Chapter 4) do not support these findings either. In terms of the field, the tweets of the physicists do not construe public science but retain a profile of technical science in that they do focus on 'meaning by degree'. This implies necessity for further clarification in terms of how the authors define the concept of *popular* or *public* (see Chapter 2).

With regard to the interpersonal aspect of scientific discourse, the findings of the present study are not totally compatible with the literature either. Literature has acknowledged solidarity (Myer 1989) or communal development (Hunston 1993) of the scientific world within the community of science, but also highlighted the authoritative (Halliday 1994) or normative (Hyland 1998) aspects, particularly in the case in public versions of science (Fuller 1995). In the present study, although the physicists did present themselves as authoritative in terms of their expertise of science, they negotiated solidarity rather than presenting themselves as normative.

The tweets posted by the two physicists reflect more features of the discourse of technical science rather than of public science. This can be explained by attending to some contextual variables. Firstly, the writers of the tweets are both academic scientists, whose main job is not the popularisation of science. Although their motivation for doing Twitter relates to making science accessible to lay people, their main job is not to write public science but to do science. Also, these tweets were addressed to lay people at a time of a crisis. This context differs from the contexts referred to in the literature where public science is addressed to a more general readership without strict specification about motivations for reading science. It would be reasonable to consider that sharing of

the same experience of nuclear crisis affects the way tenor is enacted in this public version of science.

6.4 Social implications

The present study provides implications beyond the discipline of linguistics in understanding disaster communication on social media. In particular, the study provides an important perspective about the roles of experts at a time of disaster or crisis.

The two physicists, while acknowledging that they are not experts in the most relevant field of nuclear technology, responded to lay people who were seeking credible information. Particularly in the earliest period of the crisis, the information that was made public was in a form that was inaccessible to mot of the population, such as the measurement data of radiation in various places. What the physicists did at that time was to share the knowledge they had, attempting to make information as accessible as possible to people. Their initial engagement pushed other experts to be involved in the collaboration of revelation and explanation. The fruit of this endeavour is seen in the organisation of the big data workshop of Project 311 (see Chapter 2).

At the same time, the study reveals how a disaster or a crisis can open a space for the negotiation of ideology. The analyses and findings in Chapter 4 reveal the manner in which negative ATTITUDE is amplified in the discourse of freelance journalists. In the case of the nuclear crisis in 2011, their influence appears to have functioned to reinforce a sense of fear and doubt. This is implicative, considering the fact that the kinds of discourse disseminated by the freelance journalists had more impact on Japanese society in the time of the nuclear crisis (Brumfiel 2012, see also Chapter 4).

However, we may miss some points if these two communities are conceptualised in terms of two distinct bonding orientations. The two communities are contrastive in terms of values, and yet both reflect the kinds of needs that arise from the nature of the crisis. People want to know about it and gain reassurance, but they also need to share

fear and anger. In this sense, the different bonding orientations explored in this study may not be alternative choices that people make, but are better understood in terms of tension between the two that are implicated in an experience of a crisis.

These findings have emerged by way of detailed linguistic analyses of data on Twitter. By taking a social semiotic approach, instead of a quantitative one taken by the majority of studies of Twitter at the time of 3/11 disaster, the study offers a complementary perspective to the understanding of disaster communication on Twitter, and thereby shedding light on the kinds of values that can emerge from a society at a time of crisis, and on how people affiliate around shared values on this prevailing mode of social media.

6.5 Future directions

The present study opens space for further explorations in terms of a number of directions. First, the glossing proposed in this study is not exhaustive. It leaves aside numerous issues in the lexicogrammar of Japanese. The issues are now open to be revisited, with an aim to further refine SFL-based description of Japanese. With regard to *keego*, the account proposed in this study is a starting point for this ongoing project. In particular, the conceptualisation of the three systems – HONORIFICATION, POLITENESS and BEAUTIFICATION – now needs to be examined in a broader range of data from a number of perspectives. As suggested by Mio (1942/1995), contextual variables including genre and register need to be taken into consideration. Identity is also a relevant perspective. That includes a gender perspective in the discourse of scientists (Lemke 2004) that the present study did not focus on. Reinterpreting what sociolinguistics accounted for as *women's language* (Chapter 2) from an SFL perspective is one dimension that this thesis opens up. Hood's (2014, in press) work on body language is relevant in this area of future exploration. Further, an ontogenetic perspective implicated in Watanabe (1971) (see Chapter 2) is also an interesting orientation to explore.

The relationship between the description of interpersonal meaning in Japanese at the stratum of lexicogrammar and that at the more abstract stratum of discourse semantics is made clearer in a number of ways in this study. The clarification offered in this study, with reference to alternative interpretations in the literature, will hopefully offer a guide and a reasoning to support other scholars wrestling with similar problems. The support may extend beyond the descriptions of interpersonal meaning to encompass the other metafunctional realms including ideational and textual meanings.

The proposal of a new option in the system of ENGAGEMENT as heteroglossic expansion, that of *legitimate*, responds to the kinds of meanings enacted in these data. It also opens a space for discussion of linguistic arguments around another possible option 'de-legitimate' (Don 2011)[107]. However, once again the robustness of this option needs to be further explored in wider and more diverse sets of data, hopefully encompassing other languages.

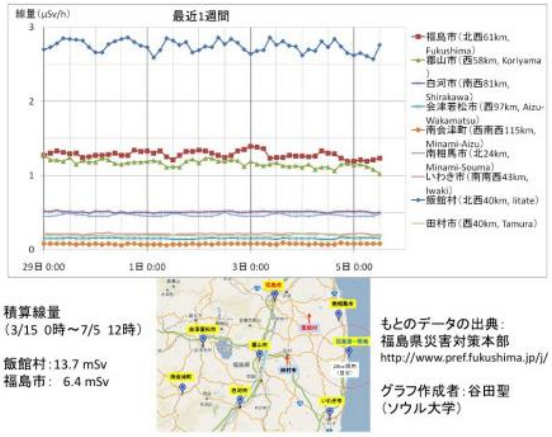
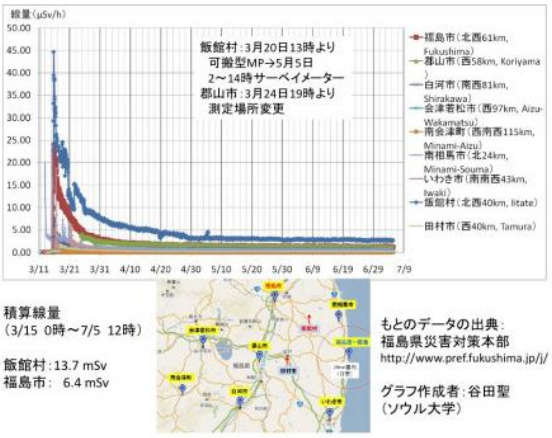
Contributions to the theorisation of POLITENESS and NEGOTIATION also need to be further explored in different genres and registers. Future research in this regard may well relate to recent development in SFL that revisit the context dependency from a metafunctional perspective of 'presence' (Martin & Matruglio 2013, Hood & Lander in press). Particularly relevant in the future exploration of POLITENESS is what Martin refers to as '*negotiability'* (Martin & Matruglio 2013).

Mode is also at play. This is particularly relevant for the physicists' tweets. As opposed to traditional media of public science (see Chapter 2 and Section 6.3), which are largely monologic written texts, Twitter is more dialogic. It affords interaction with lay people and experts in the same medium and the same texts; they are accessed by everybody in the public domain of the internet. For its ubiquitousness (Chapter 2) and accessibility at the time of disaster (Chapter 3), Twitter provides an important basis from which to explore disaster communication and the building of communities.

[107] In Don (2011), 'de-legitimate' does not refer to an ENGAGEMENT option, but from her perspective of tenor.

Appendix 1

Tweets for Chapter 3

[P1-1] 6th July 2011 01:16:24
【グラフ更新 福島県内の放射線量 7/5 まで】上半分は最近 1 週間，下半分は全期間．福島市の積分線量 6.4mSv． http://twitpic.com/5lnfsx    
[graph update amount of radiation in Fukushima prefecture until 5/7] The upper (is the graph of) the recent one week, and the below (is the graph of) the whole period. Integral dose in Fukushima city (is) 6.4mSv. http://twitpic.com/5lnfsx

【グラフ	更新
[gurafu	*kooshin*
[graph	update
[Graph updates	

福島県内の	放射線量	7/5 まで】
fukushima+ken .nai.no	*hoosha+sen+ryoo*	*shichi.gatsu.itsu.ka.made]*
Fukushima+prefecture .inside.ADN	radiation+line+amount	seven.month.five.date.LOC:until]
in Fukushima prefecture	dose	until 5/7
dose in Fukushima prefecture until 5/7]		

上半分は	最近	1 週間,
ue+hanbun.wa	*saikin*	*is.shuukan,*
above+half/TOP	recent	one.week,
upper half	recent	one week
The upper half (is the graph of) the most recent week,		

下半分は	全期間.
shita+hanbun.wa	*zen.kikan.*
below+half.TOP	all.period.
below half	the whole period
the below half (is the graph of) the whole period.	

福島市の	積分線量	6.4mSv.
fukushima.shi.no	sekibun+sen+ryoo	roku.ten.yon.miri.shiiberuto.
Fukushima.city.ADN	integral-calculus+line+amount	six.point.four.mili.Sievelt.
of Fukushima city	integral dose	6.4mSv.
The integral dose in Fukushima city (is) 6.4mSv.		

http://twitpic.com/5lnfsx

[P1-2] 13 March 2011 10:43:39
福島第一原子力発電所 3 号機はいわゆるプルサーマルですが，プルトニウムは通常炉内にもある．排気などに伴い外部に放出される放射性物質の種類には違いは生じない．格納容器が守られれば，プルサーマルだからと言って特別な事態は生じません．
Fukushima Daiichi Nuclear Power Plant Reactor 3 is a so-called plu-thermal reactor, but plutonium exists in regular furnaces as well. There is no difference in the kinds of radioactive materials emitted outside along with ventilation and so on. If the container is protected, special matters do not arise because (it) is a plu-thermal.

福島第一原子力発電所 3 号機は	いわゆる	プルサーマルですが,
Fukushima+dai.ichi+genshi.ryoku+ hatsuden.sho+sangoo.ki.wa	*iwayuru*	*purusaamaru.desu.ga*
Fukushima+number.one+atom.power+ power-generating.place+third.machine.TOP	so-called	plu-thermal.be/POL.but,
Fukushima Daiichi Nuclear Power Plant Third Reactor	so-called	is plu-thermal, but
Fukushima Daiichi Nuclear Power Plant Third Reactor is a so-called plu-thermal reactor, but		

プルトニウムは	通常炉内にも	ある.
purutoniumu.wa	*tsuujo+.ro.nai.ni.mo*	*aru.*
plutonium.TOP	regular+furnace.inside.LOC:in.HILtoo	be.
plutonium	inside regular reactor too	is.
plutonium exists inside regular furnaces as well.		

排気などに	伴い	外部に	放出される	放射性物質の	種類には
haiki .nado .ni	*tomonai*	*gaigu .ni*	*hooshutsu .s.areru*	*hoosha .see+ busshitsu.no*	*shurui .ni .wa*
ventilation .HIL:and-so-on .ACP	accompay /SUS	outside .LOC:to	emission .DO.PSV	radiation .character+ material.ADN	kind .ANG:in .TOP
along with ventilation and so on		outside	is emitted	radioactive material	in the kind
in the kinds of radioactive materials emitted outside along with ventilation and so on.					

違いは	生じない.
chigai.wa	*shooji.nai.*
difference.TOP	arise.NEG.
difference	doesn’t arise
there is no difference .	

格納容器が	守られれば,
kakunoo.yooki.ga	*mamor.arere.ba,*
storing.container.NOM	protect.PASS.if,
containter	if … is protected
If the container is protected	

プルサーマルだからと言って	特別な	事態は	生じません.
purusaamaru.da.kara.to .it.te	*tokubetsu.na*	*jitai .wa*	*shooji.mas.en.*
plu-thermal.be.because.PROJ .SAY.SUS	special.EPI	state-of-affairs .TOP	arise.POL.NEG
because it is plutonium-thermal	special matter		does not arise
special matters do not arise because (it) is a plu-thermal.			

[P1-3] 12 March 1　23:37:23
（そろそろ疲れてきました．ビールも飲みたい．同業者の方，時々お助けくださると有り難いな － 世の中には私よりももっと原子力本流の専門家もおられる筈なので）
((I) ┌|∵|┘am getting tired now. (I) |-.-| want to drink beer too. People in the same business, (it) |-.-| would be appreciated if (you) could help **m('。')m** (me) sometimes. Because in this world there |-.-| should be **m('。')m** more mainstream nuclear power specialists than me)

（そろそろ	疲れてきました.
(*sorosoro*	*tsukarete.ki.mashi.ta*.
(little-by-little	get-tired.COME.POL.PST.
(gradually	┌|∵|┘ have become tired.
((I) ┌|∵|┘ am getting tired now.	

ビールも	飲みたい.
biiru.mo	*nomi.tai.*
beer.too	drink.OPT.
beer too	|-.-| want to drink.
(I) |-.-| want to drink beer too.	

同業者の	方,	時々	お助けくださると	有り難いな–
doogyoo .sha.no	*kata,*	*tokidoki*	*o.tasuke .kudasaru.to*	*arigatai .na–*
same-business .person.ADN	person /RES,	sometimes	RES.help .GIVE-ME/RES.if	appreciated/be .NEGO:incl(LNG)
person **m('。')m** in the same business		sometimes	if you help **m('。')m** me	|-.-| is appreciated–
People in the same business, (it) |-.-| would be appreciated if (you) could help **m('。')m** (me) sometimes.				

世の中には	私よりも	もっと	原子力本流の	専門家も	おられる筈なので）
yononaka .ni .wa	*watashi .yorimo*	*motto*	*genshi.ryoku+ honryuu .no*	*senmon .ka .mo*	*orareru .hazuna.node*）
world .LOC:in .TOP	I .COMP:than	more	atom.power+ mainstream .ADN	speciality .person .HIL:too	be/RES.MODA :should.because）
in the world	than me	more	mainstream nuclear expert too		because (…) should be
Because in this world there |-.-| should be **m('。')m** more mainstream nuclear power experts than me)					

[P2-1]　25 March 2011　23:58:13
いやこれは他に見ているひともいるからやっているので、気になさらず（啓蒙活動）RT @user1: 一見理屈の通った文章に落とし穴があることは良くあり書いてない事まで読めるような情報量が欲しい。そこまで行かないと安心出来ない。わざわざお付き合い頂いてすみませんでした。
No, I |-.-| do this because there are also other people watching (it), so |-.-| please don't mind m('。')m (enlightening activity) RT@uesr1: (It) |-.-| is often the case that there are pitfalls in texts that are seemingly logical, and I |-.-| want enough information so as to read what isn't written between the lines. I |-.-| can't feel secure unless I get to that point. ┌|･ｰ･|┘ Thank you for spending your time for me m(_ _)m .

いや	これは
iya	*kore.wa*
no	this.TOP
no	this
No, (I do) this	

他に	見ている	ひとも	いるから	やっているので、
hoka.ni	*mi* *.teiru*	*hito* *.mo*	*iru.kara*	*yat.teiru* *.node*、
other.CIR	watch .ASP:cont	person .HIL:too	be.because	do.ASP:cont .because,
other (than you)	is watching	person too	because there is	am doing … so
(I) |-.-| do (this) because other people are also watching (it), so				

気になさらず
ki.ni.nasara.zu
mind.ATTR. DO/RES.NEG
|-.-| please don't mind m('。')m

（啓蒙活動）
(keemoo+katsudoo)
(enlightment+activity)
(enlightening activity)

RT @user1:	一見	理屈の	通った	文章に
RT @user1:	*ikken*	*rikutsu.no*	*toot.ta*	*bunshoo.ni*
RT @user1:	at-first-sight	logic.NOM	pass.PST	text.LOC:in
RT @user1:	at first site	logical		in text
RT @user1: in texts that are seemingly logical				

落とし穴が	あることは	良く	あり
otoshi+ana.ga	*aru.koto.wa*	*yoku*	*ari*
fall+hole.NOM	be.THING.TOP	often	be/SUS
pitfall	that there is	often	there is … and
It is often the case that there are pitfalls (in the text which is seemingly logical)			

書いてない	事まで	読めるような	情報量が	欲しい。
kai *.te* *.nai*	*koto* *.made*	*yom.eru* *.yoona*	*joohoo+ryoo* *.ga*	*hoshii。*
write .Asp:rsl(CONTR) .NEG	thing .LOC:till	read.POT .COMP	information+amount .NOM	want.
not written	up to things	so can read	information amount	(I) want.
(I) ⊢.-⊣ want enough information so as to read between the lines that aren't written.				

そこまで	行かないと	安心出来ない。
soko.made	*ika.nai.to*	*anshin.deki.nai。*
there.until	go.NEG.if	security.DO/POT.NEG.
up to there	if not go	cannot feel secure
(I) ⊢.-⊣ can't feel secure unless I get to that point.		

わざわざ	お付き合い頂いて	すみませんでした。
wazawaza	*o.tsukiai.itadai.te*	*sumimasen.deshi.ta。*
purposely	DEF.go-along.RECEIVE/DEF.SUS	I'm-sorry.be/POL.PST.
by taking time	receive m(_ _)m the favour of going along (with me)	┌|∵|┘ Sorry for having….
┌|∵|┘ Thank you for spending your time for me m(_ _)m .		

[J1-1] 30 March 2011 04:42:18
放散されてしまったプルトニウムは、影響力を減じることなく、やがて全世界へと拡散してゆく。この御用学者の発言は、全世界にさらされ、全世界から批判されるべき、暴言だと思う。RT @user2: ＮＨＫで、東大の御用学者が「プルトニウムの影響もそう心配することはない」との見解。
The plutonium that ended up being dissipated, without reducing its power to influence, will eventually be diffused to the whole world. This opportunist scholar's remark is violent language that should be exposed to the whole world and be criticised by the whole world. RT @user2: On NHK, (I heard) Tokyo Uni's opportunist scholar's view that 'the influence of plutonium is nothing to be anxious about so much either.'

放散されてしまった	プルトニウムは、	影響力を	減じることなく、
hoosan.s .arete.shimat.ta	purutoniumu.wa、	*eekyoo.ryoku .o*	*gen.jiru.koto .naku*、
dissipation.DO .PSV.END.PST	plutonium.TOP,	influence.power .ACC	reduction.DO.THING .NEG/SUS,
has ended up being dissipated	plutonium	influencing power	without reducing
Plutonium that has ended up being dissipated, without reducing its power to influence			

やがて	全世界へと	拡散してゆく。
yagate	*zen.sekai.e.to*	*kakusan.shite.yuku*。
by-and-by	all.world.LOC:to.PROJ	diffusal.DO.GO
by and by	to the whole world	go diffusing
will eventually be diffused to the whole world.		

この	御用学者の	発言は、
kono	*goyoo+gakusha.no*	*hatsugen.wa*、
this/ADN	official-business.scholar.ADN	remark.TOP
this opportunistic scholar's		remark
This opportunist scholar's remark		

全世界に	さらされ、	全世界から	批判されるべき、	暴言だと	思う。
zen.sekai .ni	*saras .are*、	*zen.sekai .kara*	*hihan.s .areru .beki*、	*boogen. da.to*	*omou*。
all.world .LOC:to	expose .PSV/SUS,	all.world .LOC:from	criticism.DO. PSV. MODA:should	violent-language. be.PROJ	think.
to the whole world	be exposed	from the whole world	should be criticised	that (…) is violent language	think.
(I) think (…) is violent language that should be exposed to the whole world and be criticised by the whole world.					

RT @uesr2:

ＮＨＫで、	東大の	御用学者が
enuechikee.de	*toodai.no*	*goyoo+gakusha .ga*
NHK.LOC:on	Tokyo-University(ACR).ADN	official-business.scholar .NOM
on NHK	Tokyo Uni's opportunist scholar	
On NHK, (I heard) Tokyo Uni's opportunist scholar		

「プルトニウムの	影響も	そう	心配することはない」との	見解。
⌜purutonium.no	*eekyoo .mo*	*soo*	*shinpai.suru.koto.wa .nai⌟ .to.no*	*kenkai*。
'plutnoium.ADN	influence .HIL:too	so/CIR	anxiety.DO.THING.TOP .NEG'.PROJ.ADN	remark.
'plutonium's	influence too	so (much)	that (…)need not be anxious'	remark.
…'s view that 'plutonium's influence is nothing to be anxious about so much either'.				

[P1-4] 29 March 2011 07:36:20
【1.結論を先に言えば】1)核燃料棒が破損し，ヨウ素，セシウムとともに，Pu も漏れた．2)その濃度は環境レベル．3)敷地外のサンプルでも Pu 測定が望まれるが，4)作業される方の放射線防護をし，原発を冷やすことの方が急務.
[1. If (I) say the conclusion first] 1) nuclear fuel rod(s) broke, and together with iodine and caesium, Pu leaked too. 2) Its density (is at) the environment level. 3) The Pu measurement is hoped for via samplings outside the site as well but 4) to provide radiation protection of the people who do the operation, and to cool down the NPP (is the) more urgent task.

【1.結論を	先に	言えば】
[1.ketsuron.o	*saki.ni*	*ie.ba]*
[1.conclusion.ACC	beforehand:LOC:at	say.if]
[1.conclusion	first	if say]
[1.If (I) say the conclusion first]		

1)核燃料棒が	破損し,
1)kaku+nenryoo+boo.ga	*hason.shi,*
1)nucleus+fuel+rod.NOM	breakage.DO/SUS,
1)nuclear fuel rod	broke, and
1)The nuclear fuel rods broke, and	

ヨウ素,	セシウムとともに,	Pu も	漏れた.
yooso,	*seshiumu.to.tomoni*	*piiyuu.mo*	*more.ta.*
iodine,	caesium.ACC:with.TOGETHER	Pu.HIL:too	leak.PST.
together with iodine and caesium,		Pu too	leaked.
together with iodine and caesium, Pu leaked too.			

2)その	濃度は	環境レベル.
2)so/no	*noodo.wa*	*kankyoo+reberu.*
2)it/ADN	density.TOP	environment+level.
2)its density		environment level.
2)Its density (is at) the environment level.		

3)敷地外の	サンプルでも	Pu 測定が	望まれるが,
3)shikichi.gai.no	*sanpuru .de.mo*	*piiyuu.sokutee.ga*	*nozom.areru.ga,*
3)site.out.ADN	sample.MAN:with .HIL:too	Pu.measurement.NOM	hope.PASS.but,
3)with the sample outside the site too		Pu measurement	|-.-| is hoped, but
3) A Pu measurement |-.-| is hoped for via samplings outside the site as well, but			

4)作業される	方の	放射線防護を	し,
4)sagyoo.s.areru	*kata.no*	*hoosha.sen+boogo.o*	*shi,*
4)operation.DO.RES	person/RES.ADN	radiation.line+protection.ACC	do/SUS,
4)do(RES) operation	person(RES)	radiation protection	do(ing), and
4)To provide protection of people who do the operation, and			

原発を	冷やすことの方が	急務.
genpatsu .o	*hiyasu.koto.no.hoo .ga*	*kyuumu.*
nuclear-power-plant(ACR) .ACC	cool-down.THING.ADN.DIRECTION .NOM	urgent-task.
nuclear power plant(ACR)	cooling down more	urgent task.
to cool down of the NPP (is the) more urgent task.		

[J2-1] 27 March 2011 12:43:25
【緊急】菅首相へ。政府は非常事態宣言を。 @kantei_saigai 質問した。３号炉のプルトニュウム検出が表にないが？東電「プルトニウムを検出する機器を持っていない。よって測っていない」 http://bit.ly/eJI3As #nicojishin
[Urgency] Dear Prime Minister Kan, and your government, (please announce) the proclamation of a state of emergency. @prime minister-official-residence_disaster (I) asked a question. There is no plutonium detection from reactor 3 in the table, but (why is that so)? TEPCO '(We) don't have an apparatus to detect plutonium. Therefore (we) haven't measured (it)' http://nicovideositeofTEPCOconferenceon26March #nicovideosite-earth-quake

【緊急】
[kinkyuu]
[urgency]

菅首相へ。
Kan+shushoo.e。
Kan+prime-minister.REC:to.
Dear Prime Minister Kan.

政府は	非常事態宣言を。
seefu.wa	*hijoo+jitai+sengen.o*。
government.TOP	emergency+state-of-affairs+proclamation.ACC.
the government	proclamation of state of emergency
The government, (please announce) the proclamation of a state of emergency.	

@kantei_saigai
@prime minister-official-residence_disaster

質問した。
shitsumon.shi.ta。
question.DO.PST.
(I) asked a question.

３号炉の	プルトニュウム検出が	表に	ないが？
sangooro.no	*purutonyuum+kenshutsu.ga*	*hyoo.ni*	*nai .ga?*
third-reactor.ADN	plutonium+detection.NOM	table.LOC:on	non-existent/be .but?
plutonium detection of third reactor		on the table	there isn't (…) but?
There is no plutonium detection from reactor 3 in the table, but (why is that so)?			

東電
tooden
TEPCO(ACR)

プルトニウムを	検出する	機器を	持っていない。
purutoniumu.o	*kenshutsu.suru*	*kiki.o*	*mot.tei.nai*。
plutonium.ACC	detection.DO	apparatus.ACC	have.ASP:rsl.NEG.
plutonium	detect	apparatus	do not have
(We) don’t have an apparatus to detect plutonium.			

よって	測っていない」
yotte	*hakat.tei.nai* /
therefore	measure. ASP:rsl.NEG’
therefore	have not measured
Therefore, (we) haven’t measured (it).’	

’ http://nicovideositeofTEPCOconferenceon26March #nicovideosite-earth-quake

[P2-2] 13 March 2011 17:39:17
P1 先生もいってたけど、気体になりやすくて、こういう中途半端な物質が問題なんです。ヨウ素は昇華（固体から直接気体になる）しやすい。セシウムも沸点低いです。ウランとか、プルトニウムとか燃料そのもの、ってのはこの段階で問題にしなくていいですね。 @user
As Prof. P1 was also saying, the halfway materials like these that are easy to become a gas are the problem. Iodine is easy to sublimate (become a gas directly from solid). Caesium also has a low boiling point. Those materials that are fuels themselves, like uranium and plutonium, do not need to be problematised at this stage, right? @user

P1 先生も	いってたけど、
P1+sensee.mo	*it.te.ta.kedo*、
P1+teacher.HIL:too	say.ASP:cont(CONTR).PST.but,
Prof. P1 too	was saying but,
	言ってたけど、
As Prof. P1 was also saying,	

気体に	なりやすくて、	こういう	中途半端な	物質が	問題なんです。
kitai.ni	*nari.yasuku.te*、	*koo.iu*	*chuutohanpa.na*	*busshitsu.ga*	*mondai.na.n.desu*。
gas.ATTR	become.EASY.SUS、	this-way.SAY	halfway.EPI	material.NOM	problem.be.NMN.be/POL
gas	easy to become and	like this	halfway	materials	are the problem
the halfway materials like these that are easy to become a gas are the problem.					

ヨウ素は	昇華	（固体から	直接	気体に	なる）	しやすい。
yooso.wa	*shooka*	*(kotai.kara*	*chokusetsu*	*kitai.ni*	*naru)*	*shi.yasui*。
iodine.TOP	sublimation	(solid.ATTR:from	directly	gas.ATTR	become)	DO.EASY/BE
iodine	sublimate	(from solid	directly	gas	become)	is easy to
Iodine is easy to sublimate (become a gas directly from solid).						

セシウムも	沸点	低いです。
seshiumu.mo	*futten*	*hikui.desu*。
Caesium.HIL:too	boiling-point	low.be/POL.
Caesium too	boiling point	is low.
Caesium also has a low boiling point.		

ウランとか、	プルトニウムとか	燃料	そのもの、ってのは
uran .toka,	*purutoniumu .toka*	*nenryoo*	*sono.mono*、*.tte. no.wa*
uranium .and-so-on	plutonium .and-so-on	fuel	it/ADN.THING、.PROJ/SAY(CONTR). NMN.TOP
like uranium	like plutonium	fuel	thing that is … itself
Things that are fuels themselves, like uranium, or plutonium			

この	段階で	問題に	しなくていいですね。
kono	*dankai.de*	*mondai.ni*	*shi.nakute.ii.desu.ne*。
this/ADN	stage.LOC:at	problem.ATTR	do.NEG.GOOD.be/POL.NEGO:cnf.
at this stage		do not need to make it a problem	
do not need to be problematised at this stage, right?			

[P1-6] 14 March 11:09:44
福島第一原子力発電所の放射線計測データ，6am まで公開．MP-2 で 400 マイクロ Sv/h，正門で 5.144 マイクロ Sv/h．風向き西北西．これまでは正門のグラフを出して来ましたが，MP2, MP4 のグラフも必要．誰かやってくれる？ http://bit.ly/dV00K7
The radiation measurement data of the Fukushima Daiichi Nuclear Power Plant, |-.-| (have been) made public up until 6am. |-.-|400 micro SV/h at MP-2, (and) 5.144 micro SV/h at the front gate. Wind direction |-.-| (was) west-northwest. Up to now (I) have been putting out graphs of the main gate (data), but graphs of MP2 and MP4 |-.-| (are) necessary too. |-.-|Can anybody do (it) for me? http://bit.ly/dV00K7(hyperlinktoTEPCOpage)

福島第一原子力発電所の	放射線計測データ,	6am まで	公開.
Fukushima+daiichi+genshi .ryoku+hatsuden.sho .no	*hoosha+sen+ keesoku+deeta,*	*roku+ee+emu .made*	*kookai.*
Fukushima+daiichi+atom .power+power-generating.place .ADN	radiation+line+ measurement+data,	6+a+m .LOC:until	making-public.
radiation measurement data of Fukushima Daiichi Nuclear Power Plant		up to 6 am	|-.-| made public.
The radiation measurement data of the Fukushima Daiichi Nuclear Power Plant, |-.-| (have been) made public up until 6am.			

MP-2 で	400 マイクロ Sv/h,
emupii-ni.de	*yon+hyaku+maikuro.shiiberuto+paa+awaa,*
MP-2.LOC:at	four+hundred+micro.sievelt+per+hour,
at MP-2	400 micro Sv/h,
|-.-|400 micro SV/h at MP-2,	

正門で	5.144 マイクロ Sv/h. .
seemon.de	*go+ten+ichi+yon+yon+maikuro.shiiberuto+paa+awaa,.*
main-gate.LOC:at	five+point+one+four+four+micro.sievelt+per+hour.
at the main gate	5.144 micro Sv/h.
(and) 5.144 micro SV/h at the front gate.	

風向き	西北西.
kaza+muki	*seehokusee.*
wind-direction	west-north-west.
wind direction	west-northwest
Wind direction |-.-| (was) west-northwest.	

これまでは	正門の	グラフを	出して来ましたが,
kore.made.wa	*seemon.no*	*gurafu.o*	*dashite.ki.mashi.ta.ga,*
this.EXT:until.TOP	main-gate.ADN	graph.ACC	put-out.COME.POL.PST.but,
up to now	graph of the main gate		have been putting out …, but
Up to now (I) have been putting out graphs of the main gate (data), but			

MP2,	MP4 の	グラフも	必要.
emu+pii+ni,	*emu+pii+yon.no*	*gurafu.mo*	*hitsuyoo.*
MP2,	MP4.ADN	graph.HIL:too	necessary.
graphs of MP2 and MP4 too			|-.-| necessary.
graphs of MP2 and MP4 (data) |-.-| (are) necessary too.			

誰か	やってくれる？
dareka	*yatte.kureru*？
someone	do.GIVE-ME？
someone	do for me?
|-.-| Can anyone do (it) for me?	

http://bit.ly/dV00K7(linktoTEPCOpage)

[P2-3] 25 March 23:09:19
Pu は α 線をだして崩壊するのですが、確実に体の中に止まるので危ないわけです。体の中にどんだけエネルギーをほり込むかって話で、あまり工夫はない。化学毒性については詳しくないですが、即死ってなんの話って感じ。RT @user1: これってスポンサーが国だし
While Pu ┌|·|┘ decays by giving out α rays, (it) ┌|·|┘ is dangerous because it certainly stays inside the body. It |-.-| 's a matter of how much energy is thrown into the body, and there |-.-| is not much devising. (I) ┌|·|┘ am not familiar with chemical toxicity, but like immediate death, what kind of story |-.-| (is that?) RT @user1: Cos this one |-.-|'s sponsored by the state

Pu は	α 線を	だして	崩壊するのですが、
piiyuu.wa	*arufa+sen.o*	*dashi.te*	*hookai.suru.no.desu.ga*、
Pu.TOP	alpha+line.ACC	give+out.SUS	decay.DO.NOMN.be/POL.but,
Pu	alpha ray	giving out	┌|·|┘ decay …, but
While Pu ┌|·|┘ decays by giving out alpha rays,			

確実に	体の	中に	止まるので	危ないわけです。
kakujitsuni	*karada.no*	*naka .ni*	*tomaru.node*	*abunai.wake.desu*。
certain	body.ADN	inside .LOC:in	stop.because	dangerous.REASON.be/POL.
certainly	inside the body		stay so	is dangerous
it ┌|·|┘ is dangerous because it certainly stays inside the body.				

体の	中に	どんだけ	エネルギーを	ほり込むかって	話で、
karada .no	*naka .ni*	*dondake*	*enerugii .o*	*horikomu .ka.tte*	*hanashi .de*、
body .ADN	inside .LOC:in	how-much (CONTR)	energy .ACC	throw-in(COL) .NEGO:intr .PROJ/say(CONTR)	story .be/SUS,
inside the body		how much	energy	to throw in	is a story and
It|-.-|'s a matter of how much energy is thrown into the body, and					

あまり	工夫は	ない。
amari	*kufuu.wa*	*nai*。
(not)so-much	device.TOP	non-existent.
so much	devising	does not exist.
there |-.-| is not much devising.		

化学毒性については	詳しくないですが、
kagaku+doku.see.nitsuite.wa	*kuwashiku.nai.desu.ga*、
chemistry+poison.character.about.TOP	familiar.NEG.be/POL.but,
regarding chemical toxicity	am not familiar but
(I) ┌|･|┘ am not familiar with chemical toxicity, but	

即死って	なんの	話って感じ。
soku+shi *.tte*	*nan.no*	*hanashi.tte.kanji*。
immediate+death .PROJ/TOP(CONTR)	what.ADN	story.PROJ/say(CONTR).FEELING.
immediate death	what story kind of like	
but like immediate death, what kind of story |-.-| (is that?)	

RT@user1:これって	スポンサーが	国だし
RT@user1: *kore.tte*	*suponsaa.ga*	*kuni.da.shi*
RT@user1: this.TOP(COL)	sponsor.NOM	state.be.and-so
RT@user1: regarding this	sponsor	is the state and so
RT@user1: Cos this one |-.-|'s sponsored by the state		

[P1-7] 28 March 2011 09:30:51
【X 線スペクトル募集】ベリリウム窓付 X 線用 Ge 検出器等をお持ちの方，Pu の α 崩壊後に出る U[108]の特性 X 線測定できませんか．Pu 大量飛散を心配しておられる方が多い．数値データがあれば定量的な議論が可能になります．
[X-ray spectrum recruited] (If there is) anyone who has a Ge detector for X rays with beryllium window etc., could you do the characteristic X ray measurement of U produced after Pu's α decay? There are a lot of people who are anxious about the large dispersal of Pu. If there are numerical data (then) quantitative discussion becomes possible.

【X 線スペクトル募集】
[ekkusu+sen+supekutoru+boshuu]
[x+line+spectrum+recruitment]
[x ray spectrum wanted]

ベリリウム窓付 X 線用 Ge 検出器等を	お持ちの	方,
beririumu+mado.tsuki+ekkusu+sen.yoo+jiiii+kenshutsu.ki .too.o	*o.mochi .no*	*kata,*
beryllium+window.attach+x+line.USE+Ge+detection.device .etc.ACC	RES.have .ASP:rsl/RES	person/ RES
Ge detector for X ray with beryllium window etc	has	
(If there is) anyone who has a Ge detector for X ray with beryllium window etc.,		

Pu の	α 崩壊後に	出る	U の	特性 X 線測定	できませんか.
piiyuu .no	*arufa+hookai .go.ni*	*deru*	*yuu .no*	*tokusee+ekksusu+sen+ sokutee*	*deki.mas .en .ka.*
Pu .ADN	alpha+decay .after.LOC:in	come-out	U .ADN	characteristic+X+line+ measurement	do/POT.POL .NEG NEGO:intr
after Pu's alpha decay		come out	U's	characteristic X ray measurement	could you do?
could you do the characteristic X ray measurement of U produced after Pu's α decay?					

[108] 'U' is the chemical symbol of uranium.

Pu 大量飛散を	心配しておられる	方が	多い.
piiyuu+tai.ryoo+ hisan.o	*shinpai.shi .teorareru*	*kata.ga*	*ooi.*
Pu+large.amount+ dispersal.ACC	anxiety.DO .ASP :cont/RES	person/RES.NOM	many/be.
large dispersal of Pu	is anxious	person	are many
There are a lot of people who are anxious about the large dispersal of Pu.			

数値データが	あれば	定量的な	議論が	可能に	なります.
suuchi+ deeta.ga	*are.ba*	*teeryoo .teki.na*	*giron .ga*	*kanoo .ni*	*nari.masu.*
numerical-value+ data.NOM	be.if	quantification .ADJ.EPI	discussion .NOM	possible .CIR	become.POL.
numerical data	if there is	quantitative	discussion	possible	become
If there are numerical data quantitative discussion becomes possible					

[P2-4] 25 March 23:16:45
原子は全部陽子と中性子と電子でできている。プルトニウムは原子核の一種で、特別な魔法はないよ。比較として放射能が高いってだけの話。あとβ崩壊核よりたちは悪い。でも昔の人のつけたキャッチフレーズに振り回されるのは愚かだ。
Atoms |-.-| are all made up of protons and neutrons and electrons. Plutonium is one kind of atomic nucleus, and there |-.-| is no special magic. |-.-| Only a matter that it has higher radioactivity as a comparison. Also it|-.-|'s more vicious than the β decay nucleus. But it |-.-| is foolish to be twisted around by the catch phrase that people in the past attached to it.

原子は	全部	陽子と	中性子と	電子で	できている。
genshi.wa	*zenbu*	*yooshi.to*	*chuuseeshi.to*	*denshi.de*	*deki .teiru。*
atom.TOP	all	proton.and	neutron.and	electron.ATTR	be-made-up-of .ASP:rsl
atoms	all	proton and	neutron and	with electron	|-.-| is made up of
Atoms |-.-| are all made up of protons and neutrons and electrons.					

プルトニウムは	原子核の	一種で、
purutoniumu.wa	*genshi+kaku.no*	*isshu.de*、
plutonium.TOP	atom+nucleus.ADN	one-kind.be/SUS,
plutonium	atomic nucleus	is one kind … and,
Plutonium is one kind of atomic nucleus, and		

特別な	魔法は	ないよ。
tokubetsu.na	*mahoo.wa*	*nai.yo 。*
special.EPI	magic.TOP	non-existent/be.NEGO:ins.
special	magic	there |-.-| is no
there |-.-| is no special magic.		

比較として	放射能が	高いってだけの	話。
hikaku .to.shi.te	*hoosha.noo.ga*	*takai.tte .dake.no*	*hanashi。*
comparison .PROJ.DO.SUS	radiation.ability.NOM	high.PROJ/SAY(CONTR) .HIL:only.ADN	story.
as comparison	radioactivity	only story that … is high	
|-.-| Only a matter that it has higher radioactivity as a comparison.			

あと	β崩壊核より	たちは	悪い。
ato	*beeta+hookai+kaku.yori*	*tachi.wa*	*warui。*
after	beeta+decay+nucleusCOMP:.than	nature.TOP	bad/be.
Also	than beeta decay nucleus	vicious.	
Also, it |-.-| is more vicious than the β decay nucleus.			

でも	昔の	人の	つけた	キャッチフレーズに
demo	*mukashi.no*	*hito.no*	*tsuke.ta*	*kyacchifureezu.ni*
but	past.ADN	person.NOM	attach.PST	catch-phrase.AGN
but	person in the past		attached	by catch-phrase
But (….) by the catch phrase that people in the past attached (to it)				

振り回されるのは	愚かだ。
furimawas.areru.no.wa	*oroka.da*。
twist-around.PSV.NMN.TOP	foolish.be/PLN.
to be twisted around	|-.-| is foolish.
to be twisted around (…) |-.-| is foolish.	

[J1-2] 14 March 20112 20:38:32
私の質問。厳しい爆発は？ 三号機は？{name}さんの回答。「三号機は、一号機より。より大量の水素が漏れた。ブラントの出力の違いもある。プルサーマルの、BOX 燃料は、プルトニウムを含んでいるから、より厳しいのではないか。燃える温度も低い」
My question. Severe explosion? Reactor 3? Mr. (name)'s reply. 'From Reactor 3, a larger amount of hydrogen leaked out than from reactor 1. There is also a difference in the *buranto* (mistype of plant?)'s power output. BOX (mistype of MOX) fuel in a plu-thermal, because it contains plutonium, could be more serious. The burning temperature is low too'

私の	質問。
watashi.no	*shitsumon*。
I.ADN	question.
My question.	

厳しい	爆発は？
kibishii	*bakuhatsu.wa*？
severe	explosion.TOP?
Severe explosion?	

三号機は？
sangoo.ki.wa？
third.machine.TOP?
(How about) Reactor 3?

{name}さんの	回答。
{name}*.san.no*	*kaitoo*。
{name}.TITL.ADN	reply.
Mr/Ms. (name)'s reply.	

「三号機は、	一号機より。	より	大量の	水素が	漏れた。
「*sangoo.ki .wa*、	*ichigoo.ki .yori*。	*yori*	*tai.ryoo .no*	*suiso .ga*	*more.ta*。
third.machine .TOP,	first.machine .COMP:than	more	large.amount .ADN	hydrogen .NOM	leak.PST.
'Regarding Reactor 3,	than Reactor 1	larger amount of hydrogen			leaked.
'From Reactor 3, a larger amount of hydrogen leaked out than from reactor 1.					

ブラントの	出力の	違いも	ある。
buranto.no	*shutsuryoku.no*	*chigai.mo*	*aru。*
plant(mistype?).ADN	power-output.ADN	difference.HIL:too	be.
difference of output of the *buranto* (mistype of plant?)			is.
There is also a difference in the *buranto* (mistype of plant?)'s power output.			

プルサーマルの、	BOX 燃料は、	プルトニウムを	含んでいるから、
purusaamaru .no、	*bokkusu+nenryoo.wa*、	*purutoniumu.o*	*fukun.deiru .kara*
plu-thermal .ADN,	BOX+fuel.TOP,	plutonium.ACC	contain.ASP:cont .because
plu-thermal's BOX (mistype of MOX) fuel		plutonium	because (…) contain
BOX(mistype of MOX) fuel in a plu-thermal, because it contains plutonium,			

より	厳しいのではないか。
yori	*kibishii.no.de.wa.nai.ka。*
more	severe.NMN.be.TOP.NEG.NEGO:intr
wouldn't it be more serious?	
could be more serious.	

燃える	温度も	低い」
moeru	*ondo.mo*	*hikui」*
burn	temperature.HILtoo	low/be」
burning temperature also		is low'
The burning temperature is low too'		

[J1-3] 29 March 2011 04:43:45
「一万年と二千年前から」という CM ソングを思い出す。気の遠くなる遠い歳月。@user3: 「プルトニウムの半減期を」（記者）「2 万 4 千年であったかと」（東電副社長） (#(J1'sname) live at http://linktoJ1's ustreamsite)
I remember a commercial song called 'since ten thousand years and two thousand years ago'. Mind-bogglingly distant ages. @user5 '(Tell us) the half-life of plutonium' (newsperson) '(I think it) would have been 24 thousand years' (TEPCO Vice President) (#(J1'sname) live at http://hyperlinktoJ1's ustreamsite)

「一万年と	二千年前から」という	CM ソングを	思い出す。
⌈*ichi+man.nen .to*	*ni+sen.nen.mae .kara*⌋ *.to.iu*	*shiiemu+songu.o*	*omoidasu*。
'one+ten-thousand.years .and	two+thousand.year.before .LOC:from'PROJ.SAY	CM+song.ACC	remember.
called 'since ten thousand years and two thousand years ago'		commercial song	remember
I remember a commercial song called 'since ten thousand years and two thousand years ago'.			

気の	遠く	なる	遠い	歳月。
ki.no	*tooku*	*naru*	*tooi*	*saigetsu*。
mind.NOM	distant	become	distant	year+and+month
mind becomes distant			distant	years
Mind-bogglingly distant ages.				

@user3	「プルトニウムの	半減期を」	(記者)
@user3	⌈*purutoniumu.no*	*hangen.ki.o*⌋	*(kisha)*
@user3	'plutonium.ADN	reduction-into-half.period.ACC'	(newsperson)
@user3	'plutonium's half-life'		(newsperson)
@user3	'(Tell us) plutonium's half-life' (newsperson)		

「2 万 4 千年であったかと」	（東電副社長）
⌈*ni+man.yon.sen.nen.deat.ta .ka.to*⌋	*(tooden +fuku.shachoo)*
'two+ten-thousand.four.thousand.year.be/LPLN.PST .NEGO:intr.PROJ'	(TEPCO+vice.president)
'whether (it) was 24 thousand years'	(TEPCO vice president)
'(I think it) would have been 24 thousand years' (TEPCO Vice President)	

(#(J1'sname) live at http://hyperlinktoJ1's ustreamsite)

[P2-5] 25 March 20:47:23
. @user1 あれはそんなに飛散しない。僕はなんでみんなが金属系で騒ぎのか（プルトニウムとか）分からない。燃料をとんでもない温度にしたらあちこち飛ぶかもしれないが、ちょっと想定しがたい。化学毒性はあるが、もちろん量がないと問題はないし。もちろん現場では問題だが。
. @user1 That (plutonium) does not disperse so (widely). I (MSC) don't understand why everyone makes a fuss with a metallic strain (like plutonium). It may fly here and there if (one) makes the fuel go to an unthinkable temperature, but it is a bit hard to suppose. There is chemical toxicity, but of course there is no problem if it is not in (a large) amount... Of course it is a problem at the site, but…

.@user1	あれは	そんなに	飛散しない。
.@user1	*are.wa*	*sonna.ni*	*hisan.shi.nai。*
.@user1	that.TOP	so.CIR	dispersal.DO.NEG.
.@user1	that	so (widely)	does not disperse.
.@user1 That (plutonium) does not disperse so (widely).			

僕は	なんで	みんなが	金属系で	騒ぎのか
boku .wa	*nande*	*minna .ga*	*kinzoku.kee .de*	*sawagi(mistyping sawagu?) .no.ka*
I(MAS) .TOP	why(COL)	everyone .NOM	metal.strain .ANG:with	make-a-fuss .NMN.NEGO:intr
I	why	everyone	with metal strain	make a fuss
I (MSC) don't understand why everyone makes a fuss with a metallic strain (like plutonium).				

（プルトニウムとか）	分からない。
(purutoniumu.toka)	*wakar.anai。*
(plutonium.and-so-on)	understand.NEG.
such as plutonium	don't understand
[translation included above]	

燃料を	とんでもない	温度に	したら
nenryoo.o	*tondemonai*	*ondo.ni*	*shi.tara*
fuel.ACC	unthinkable	temperature.ATTR	DO.if
fuel	unthinkable temperature		if … make
If (one) makes the fuel go to an unthinkable temperature,			

あちこち	飛ぶかもしれないが、
achikochi	*tobu.ka.mo.shire.nai.ga、*
here-and-there	fly.NEGO:intr.HIL:too.BE-KNOWN.NEG.but,
here and there	may fly, but
it may fly here and there, but	

ちょっと	想定しがたい。
chotto	*sootee.shi.gatai。*
a-bit	supposition.DO.DIFFICULT/BE.
a bit	is difficult to suppose
it is a bit hard to suppose.	

化学毒性は	あるが、
kagaku+doku.see.wa	*aru.ga*、
chemistry+poison.character.TOP	be.but,
chemical toxicity	there is…, but
There is chemical toxicity, but	

もちろん	量が	ないと	問題は	ないし。
mochiron	*ryoo.ga*	*nai/be* *.to*	*mondai* *.wa*	*nai.shi。*
of-course	amount.NOM	non-existent*/be* .if	problem .TOP	non-existent/be.and-so.
of course	amount	if there is not	problem	there is no …, so
of course there is no problem if it is not in (a large) amount...				

もちろん	現場では	問題だが。
mochiron	*genba.de.wa*	*mondai.da.ga。*
of-course	site.LOC:at.TOP	problem.be/PLN.but.
of course	at the site	problem …, but
Of course it is a problem at the site, but…		

[P2-6] 11 July 7:10:09
そんなすごいお水、きいたことないんだよねぇ。泥なめてたのかもしれないねぇ。RT @My{name}: お水もあぶないの？
Such terrible water m(’。’@)m, (I) |-.-| have never heard (of it) OK? Maybe (they=cows) |-.-| were licking mud, huh? RT @ My{name}: |-.-| Is the water m(’。’@)m dangerous as well?

そんな	すごい	お水	きいたことないんだよねぇ。
sonna	*sugoi*	*o.mizu*、	*kii.ta.koto.nai.n.da .yo.nee.*
such	terrible(COL)	BEAU.water,	hear.PST.THING.NEG.NOMN.be/PLN .NEGO:ins.NEGO:conf (LNG)
such terrible water m(’。’@)m			|-.-| have never heard of it, right
Such terrible water m(’。’@)m, (I) |-.-| have never heard (of it) OK?			

泥	なめてたのかもしれないねぇ。
doro	*name.te.ta.no.ka.mo.shire.nai .nee。*
mud	lick.ASP:cont.NMN.NEGO:intr.HIL.too.BE-KNOWN.NEG .NEGO:conf(LNG)
mud	may have been licking
Maybe (they=cows) |-.-| were licking mud, huh?	

RT @ My{name}:	お水も	あぶないの？
RT @ My{name}:	*o.mizu.mo*	*abunai.no?*
RT @ My{name}:	BEAU.water.HIL:too	dangerous.NEGO:intr?
RT @ My{name}:	the water m(’。’@)m too	is dangerous?
RT My{name}: |-.-| Is the water m(’。’@)m dangerous too?		

[P2-7] 29 March 2011 14:10:22
@J2 さんはこれは読まれましたか？同じ図ですが、上がセシウム下がプルトニウムですが。RT @P1: 【7.プルトニウムは遠くに飛びにくい】チェルノブイリ事故後「(中略) http://plixi.com/p/87687577
Mr. @J2, ┌|·.·|┘did you read m(’。’@)m this? It ┌|·.·|┘’s the same diagram, and the upper ┌|·.·|┘is caesium and the lower is plutonium, but (what does it say)? RT @P1: [7.Plutonium is hard to fly] After the Chernobyl accident’(omission) http://plixi.com/p/87687577

@J2 さんは	これは	読まれましたか？
@J2.san.wa	*kore.wa*	*yom.are.mashi.ta.ka ？*
@J2.TIT.TOP	this.TOP	read.RES.POL.PST.NEGO:intr?
Mr. @J2	this	┌|·.·|┘ did you read m(’。’@)m …?
Mr. @J2, ┌|·.·|┘did you read m(’。’@)m this?		

同じ図ですが、
onaji.zu.desu.ga、
same.diagram.be/POL.but,
is the same diagram but,
It ┌|·.·|┘’s the same diagram, and

上が	セシウム	下が	プルトニウムですが。
ue.ga	*seshiumu*	*shita.ga*	*purutoniumu.desu.ga*。
upper.NOM	caesium	lower.NOM	plutonium.be/POL.but.
upper (one)	caesium	lower (one)	is plutonium, but.
the upper ┌|·.·|┘ is caesium and the lower is plutonium, but (what does it say)?			

RT @P1:	【7.プルトニウムは	遠くに	飛びにくい】
RT @P1:	*[7.purutoniumu.wa*	*tooku.ni*	*tobi.nikui]*
RT @P1:	[7.plutonium.TOP	far.to	fly.HARD/BE]
RT @P1:	[7.plutonium	far	├-.-┤ is hard to fly]
RT @P1: [7.Plutonium ├-.-┤ is unlikely to fly far]			

チェルノブイリ事故後	「(中略)
cherunobuiri+jiko.go	*「(chuuryaku)*
Chernobyl+accident.after	‘(middle-omission)
after Chernobyl accident	‘(omission)
After the Chernobyl accident’(omission)	

http://plixi.com/p/87687577

[P1-8] 14 March 21:29:14
東京理科大 理学部物理{family name}さんが，福島第一原発の 2 箇所のモニタリングポストでの測定値，本日 14:00 までの値をグラフ化して下さいました．感謝．http://plixi.com/p/83950003
Mr. (orMs.) {family name} of Physics (undergraduate student) in the Faculty of Sciences, Tokyo University of Science ┌|･ᴥ･|┘ has graphed m(’。’@)m the measurement values at two monitoring posts of the Fukushima Daiichi NPP, (covering) the values up until 14:00 today. |-.-| Appreciated. http://plixi.com/p/83950003(hyperlinktograph)

東京理科大	理学部	物理	{family name} さんが,
tookyoo+rika.dai	*ri.gakubu*	*butsuri*	*{family name} .san.ga,*
Tokyo+science.university(ACR)	science.faculty	physics	{family name} .TIT.NOM,
Tokyo University of Science	Science Faculty	physics (department)	Mr/Ms. {family name}
Mr./Ms. {family name} of physics department, Faculty of Science of Tokyo University of Science			

福島第一原発の	2 箇所の	モニタリングポストでの	測定値,
fukushima+daiichi+ genpatsu.no	*ni+kasho .no*	*monitaringuposuto .de.no*	*sokutee.chi,*
Fukushima+Daiichi+ nuclear-power-plant.ADN	two+point .ADN	monitoring-post .LOC:at.ADN	measurement.value,
of the Fukushima Daiichi NPP	at two monitoring posts		measurement value
the measurement values at two monitoring posts of the Fukushima Daiichi NPP,			

本日	14:00 までの	値を	グラフ化して下さいました.
today(NEV)	*14:00 .made.no*	*atai.o*	*gurafu.ka.shite.kudasai .mashi.ta.*
today(NEV)	14:00 .LOC:till.ADN	value.ACC	graph.change.DO.GIVE-ME/RES .POL.PST.
today	until 14:00	values	┌|･ᴥ･|┘ made m(’。’@)m into graph for me
(Mr./Ms. {family name} of physics department, Faculty of Science of Tokyo University of Science) ┌|･ᴥ･|┘ has graphed m(’。’@)m (…), (covering) the values up until 14:00 today.			

感謝.	http://plixi.com/p/83950003
kansha.	http://plixi.com/p/83950003
gratitude.	http://plixi.com/p/83950003
|-.-| Appreciated.	http://plixi.com/p/83950003

Appendix 2

Tweets for Chapter 4

[P1-1] 13 March 2011 10:43:39
福島第一原子力発電所 3 号機はいわゆるプルサーマルですが，プルトニウムは通常炉内にもある．排気などに伴い外部に放出される放射性物質の種類には違いは生じない．格納容器が守られれば，プルサーマルだからと言って特別な事態は生じません.
Fukushima Daiichi Nuclear Power Plant Reactor 3 is a so-called plu-thermal reactor, but plutonium exists in regular furnaces as well. There is no difference in the kinds of radioactive materials emitted outside along with ventilation and so on. If the container is protected, special matters do not arise because (it) is a plu-thermal.

福島第一原子力発電所 3 号機は	いわゆる	プルサーマルですが,
Fukushima+dai.ichi+genshi.ryoku+ hatsuden.sho+sangoo.ki.wa	*iwayuru*	*purusaamaru.desu.ga*
Fukushima+number.one+atom.power+ power-generating.place+third.machine.TOP	so-called	plu-thermal.be/POL.but,
Fukushima Daiichi Nuclear Power Plant Third Reactor	so-called	is plu-thermal, but
Fukushima Daiichi Nuclear Power Plant Third Reactor is a so-called plu-thermal reactor, but		

プルトニウムは	通常炉内にも	ある.
purutoniumu.wa	*tsuujo+.ro.nai.ni.mo*	*aru.*
plutonium.TOP	regular+furnace.inside.LOC:in.HILtoo	be.
plutonium	inside regular reactor too	is.
plutonium exists inside regular furnaces as well.		

排気などに	伴い	外部に	放出される	放射性物質の	種類には
haiki .nado .ni	*tomonai*	*gaigu .ni*	*hooshutsu .s.areru*	*hoosha .see+ busshitsu.no*	*shurui .ni .wa*
ventilation .HIL:and-so-on .ACP	accompay /SUS	outside .LOC:to	emission .DO.PSV	radiation .character+ material.ADN	kind .ANG:in .TOP
along with ventilation and so on		outside	is emitted	radioactive material	in the kind
in the kinds of radioactive materials emitted outside along with ventilation and so on.					

違いは	生じない.
chigai.wa	*shooji.nai.*
difference.TOP	arise.NEG.
difference	doesn’t arise
there is no difference.	

格納容器が	守られれば,
kakunoo.yooki.ga	*mamor.arere.ba,*
storing.container.NOM	protect.PASS.if,
containter	if … is protected
If the container is protected	

プルサーマルだからと言って	特別な	事態は	生じません.
purusaamaru.da.kara.to .it.te	*tokubetsu.na*	*jitai .wa*	*shooji.mas.en.*
plu-thermal.be.because.PROJ .SAY.SUS	special.EPI	state-of-affairs .TOP	arise.POL.NEG
because it is plutonium-thermal	special matter		does not arise
special matters do not arise because (it) is a plu-thermal.			

[P2-1] 13 March 2011 17:39:17
P1 先生もいってたけど、気体になりやすくて、こういう中途半端な物質が問題なんです。ヨウ素は昇華（固体から直接気体になる）しやすい。セシウムも沸点低いです。ウランとか、プルトニウムとか燃料そのもの、ってのはこの段階で問題にしなくていいですね。 @user1
As Prof. P1 was also saying, the halfway materials like these that are easy to become a gas are the problem. Iodine is easy to sublimate (become a gas directly from solid). Caesium also has a low boiling point. Those materials that are fuels themselves, like uranium and plutonium, do not need to be problematised at this stage, right? @user1

P1 先生も	いってたけど、
P1+sensee.mo	*it.te.ta.kedo*、
P1+teacher.HIL:too	say.ASP:cont(CONTR).PST.but,
Prof. P1 too	was saying but,
	言ってたけど、
As Prof. P1 was also saying,	

気体に	なりやすくて、	こういう	中途半端な	物質が	問題なんです。
kitai .ni	*nari .yasuku.te*、	*koo .iu*	*chuutohanpa .na*	*busshitsu .ga*	*mondai.na .n.desu*。
gas .ATTR	become .EASY.SUS,	this-way .SAY	halfway .EPI	material .NOM	problem.be .NMN.be/POL.
gas	easy to become and	like this	halfway	materials	are the problem
the halfway materials like these that are easy to become a gas are the problem.					

ヨウ素は	昇華	（固体から	直接	気体に	なる）	しやすい。
yooso .wa	*shooka*	*(kotai .kara*	*chokusetsu*	*kitai .ni*	*naru)*	*shi .yasui*。
iodine .TOP	sublimation	(solid .ATTR:from	directly	gas .ATTR	become)	DO .EASY/BE
iodine	sublimate	(from solid	directly	gas	become)	is easy to
Iodine is easy to sublimate (become a gas directly from solid).						

セシウムも	沸点	低いです。
seshiumu.mo	*futten*	*hikui.desu*。
Caesium.HIL:too	boiling-point	low.be/POL.
Caesium too	boiling point	is low.
Caesium also has a low boiling point.		

ウランとか、	プルトニウムとか	燃料	そのもの、ってのは
uran .toka、	*purutoniumu .toka*	*nenryoo*	*sono.mono*、*.tte .no.wa*
uranium .and-so-on	plutonium .and-so-on	fuel	it/ADN.THING、.PROJ/SAY(CONTR) .NMN.TOP
like uranium	like plutonium	fuel	thing that is … itself
Those materials that are fuels themselves, like uranium and plutonium,			

この	段階で	問題に	しなくていいですね。
kono	*dankai.de*	*mondai.ni*	*shi.nakute.ii.desu.ne*。
this/ADN	stage.LOC:at	problem.ATTR	do.NEG.GOOD.be/POL.NEGO:cnf
at this stage		do not need to make it a problem	
do not need to be problematised at this stage, right?			

[J1-1] 14 March 20112 20:38:32
私の質問。厳しい爆発は？ 三号機は？{name}さんの回答。「三号機は、一号機より。より大量の水素が漏れた。ブラントの出力の違いもある。プルサーマルの、BOX 燃料は、プルトニウムを含んでいるから、より厳しいのではないか。燃える温度も低い」
My question. Severe explosion? Reactor 3? Mr. (name)'s reply. 'From Reactor 3, a larger amount of hydrogen leaked out than from reactor 1. There is also a difference in the *buranto* (mistype of plant?)'s power output. BOX (mistype of MOX) fuel in a plu-thermal, because it contains plutonium, could be more serious. The burning temperature is low too'

私の	質問。
watashi.no	*shitsumon*。
I.ADN	question.
My question.	

厳しい	爆発は？
kibishii	*bakuhatsu.wa*？
severe	explosion.TOP?
Severe explosion?	

三号機は？
sangoo.ki.wa？
third.machine.TOP?
(How about) Reactor 3?

{name}さんの	回答。
{name}.*san.no*	*kaitoo*。
{name}.TITL.ADN	reply.
Mr/Ms. (name)'s reply.	

「三号機は、	一号機より。	より	大量の	水素が	漏れた。
「*sangoo.ki .wa*	*ichigoo.ki .yori*。	*yori*	*tai.ryoo .no*	*suiso .ga*	*more.ta*。
third.machine .TOP	first.machine .COMP:than。	more	large.amount .ADN	hydrogen .NOM	leak.PST.
'Regarding Reactor 3,	than Reactor 1	larger amount of hydrogen			leaked.
'From Reactor 3, a larger amount of hydrogen leaked out than from reactor 1.					

ブラントの	出力の	違いも	ある。
buranto.no	*shutsuryoku.no*	*chigai.mo*	*aru*。
plant(mistype?).ADN	power-output.ADN	difference.HIL:too	be.
difference of output of the *buranto* (mistype of plant?)			is.
There is also a difference in the *buranto* (mistype of plant?)'s power output.			

プルサーマルの、	BOX 燃料は、	プルトニウムを	含んでいるから、
purusaamaru .no、	*bokkusu+nenryoo .wa*、	*purutoniumu.o*	*fukun.deiru.kara*、
plu-thermal .ADN,	BOX+fuel .TOP,	plutonium.ACC	contain.ASP:cont.because,
plu-thermal's BOX (mistype of MOX) fuel		plutonium	because (…) contain
BOX(mistype of MOX) fuel in a plu-thermal, because it contains plutonium,			

より	厳しいのではないか。
yori	*kibishii.no.de.wa.nai.ka*。
more	severe.NMN.be.TOP.NEG.NEGO:intr.
wouldn't it be more serious?	
could be more serious.	

燃える	温度も	低い」
moeru	*ondo.mo*	*hikui」*
burn	temperature.HILtoo	low/be」
burning temperature also		is low'
The burning temperature is low too'		

[P1-2] 27 March 2011 12:40:42
半減期が短く，特徴的なガンマ線を出す放射性物質はすぐに同定できるが，半減期が 2 万 4000 年もあり，α線を出して崩壊する Pu は，ドッサリない限り検出できない．(KEK では) Pu239 の「親」である 239Np の崩壊ガンマ線が見えていない．現時点で Pu 大量飛散は無い．
Radioactive materials whose half-life is short and which give out characteristic gamma rays can be identified immediately, but Pu, the half-life of which is as long as 24,000 years and which decays by giving out α rays cannot be detected unless there is a heap. (At KEK) decaying gamma rays of 239Np, which is the 'parent' of Pu239, are not seen. At this moment there is no large dispersal of plutonium.

半減期が	短く,	特徴的な	ガンマ線を	出す	放射性物質は
hangen .ki.ga	*mijikaku,*	*tokuchoo .teki.na*	*gamma+ sen.o*	*dasu*	*hoosha .see+ busshitsu.wa*
reduction-into- half .period.NOM	short/be/ SUS,	character .ADJ.EPI	gamma+ line.ACC	give-out	radiation .character+ material.TOP
half-life	short and	characteris tic	gamma ray	give out	radioactive material
Radioactive materials whose half-life is short and which give out characteristic gamma rays					

すぐに	同定できるが,
suguni	dootee.dekiru.ga,
immediately	identification.DO/POT.but,
immediately	can be identified, but
can be identified immediately, but	

半減期が	2 万 4000 年も	あり,	α線を	出して	崩壊する	Pu は,
hangen .ki.ga	*ni+man+ yon+sen .nen .mo*	*ari,*	*arufa+ sen .o*	*dashi .te*	*hookai .suru*	*piiyuu .wa,*
reduction-into-half .period.NOM	two+tenthousand+ four+thousand .year .HIL:as-much-as	be/ SUS,	alpha+ line .ACC	give-out .SUS	decay .DO	Pu .TOP,
half-life	as much as 24 thousand years	be,	alpha ray	giving out	decays	Pu
Pu, whose half-life period is as long as 24 thousand years and which decays by giving out α rays						

ドッサリ	ない限り	検出できない.
dossari	*nai.kagiri*	*kenshutsu.deki.nai.*
a-heap(COL)	non-existent/be.LIMIT	detection.DO/POT.NEG.
a heap	unless there is	cannot detect
cannot be detected unless there is a heap.		

(KEK では)
(keeiikee.de.wa)
(KEK.LOC:at.TOP)
(at KEK)

Pu239 の	「親」である	239Np の	崩壊ガンマ線が	見えていない.
piiyuu+ni+ san+kyuu.no	「*oya*」*.dearu*	*ni+san+ kyuu+enupii.no*	*hookai+ganma+ sen.ga*	*mie .tei .nai*
Pu+two+ three+nine.ADN	'parent' .be/LPLN	two+three+ nine+Np.ADN	dacay+gamma+ line.NOM	be-seen .ASP:cont .NEG
Pu239's	is 'parent'	239Np's	decay gamma ray	is not seen
(At KEK) decay gamma ray of 239Np which is the 'parent' of Pu239 is not seen.				

現時点で	Pu 大量飛散は	無い.
gen.jiten.de	*piiyuu+tai.ryoo+hisan.wa*	*nai.*
present.moment.LOC:at	Pu+large.amount+dispersal.TOP	non-existent/be.
at this moment	large dispersal of Pu	there is not
There is no large dispersal of Pu at this moment.		

[J1-2] 29 March 2011 04:43:45
「一万年と二千年前から」という CM ソングを思い出す。気の遠くなる遠い歳月。@user3: 「プルトニウムの半減期を」（記者）「2 万 4 千年であったかと」（東電副社長） (#(J1'sname) live at http://hyperlinktoJ1's ustreamsite)
I remember a commercial song called 'since ten thousand years and two thousand years ago'. Mind-bogglingly distant ages. @user3 '(Tell us) the half-life of plutonium' (newsperson) '(I think it) would have been 24 thousand years' (TEPCO Vice President) (#(J1'sname) live at http://hyperlinktoJ1's ustreamsite)

「一万年と	二千年前から」という	CM ソングを	思い出す。
⌜*ichi+man.nen .to*	*ni+sen.nen.mae .kara*⌟ *.to.iu*	*shiiemu+songu.o*	*omoidasu*。
'one+ten-thousand.years .and	two+thousand.year.before .LOC:from'PROJ.SAY	CM+song.ACC	remember.
called 'since ten thousand years and two thousand years ago'		commercial song	remember
I remember a commercial song called 'since ten thousand years and two thousand years ago'.			

気の	遠く	なる	遠い	歳月。
ki.no	distant	become	*tooi*	*saigetsu*。
mind.NOM	*tooku*	*naru*	distant	year-and-month
mind becomes distant			distant	years
Mind-bogglingly distant ages.				

@user3	「プルトニウムの	半減期を」	(記者)
@user3	⌜*purutoniumu.no*	*hangen.ki.o*⌟	*(kisha)*
@user3	'plutonium.ADN	reduction-into-half.period.ACC'	(newsperson)
@user3	'plutonium's half-life'		(newsperson)
@user3	'(Tell us) plutonium's half-life' (newsperson)		

「2 万 4 千年であったかと」	（東電副社長）
⌜*ni+man.yon.sen.nen.deat.ta .ka.to*⌟	*(tooden +fuku.shachoo)*
two+ten-thousand.four.thousand.year.be/LPLN.PST .NEGO:intr.PROJ	(TEPCO+vice.president)
'whether (it) was 24 thousand years'	(TEPCO vice president)
'(I think it) would have been 24 thousand years' (TEPCO Vice President)	

(#(J1'sname) live at http://hyperlinktoJ1's ustreamsite)

[P2-2] 25 March 20:47:23
. @user1 あれはそんなに飛散しない。僕はなんでみんなが金属系で騒ぎのか（プルトニウムとか）分からない。燃料をとんでもない温度にしたらあちこち飛ぶかもしれないが、ちょっと想定しがたい。化学毒性はあるが、もちろん量がないと問題はないし。もちろん現場では問題だが。
. @user1 That (plutonium) does not disperse so (widely). I (MSC) don't understand why everyone makes a fuss with a metallic strain (like plutonium). It may fly here and there if (one) makes the fuel go to an unthinkable temperature, but it is a bit hard to suppose. There is chemical toxicity, but of course there is no problem if it is not in (a large) amount... Of course it is a problem at the site, but…

.@user1	あれは	そんなに	飛散しない。
.@user1	*are.wa*	*sonna.ni*	*hisan.shi.nai。*
.@user1	that.TOP	so.CIR	dispersal.DO.NEG.
.@user1	that	so (widely)	does not disperse.
.@user1 That (plutonium) does not disperse so (widely).			

僕は	なんで	みんなが	金属系で	騒ぎのか
boku .wa	*nande*	*minna .ga*	*kinzoku.kee .de*	*sawagi(mistyping sawagu?) .no.ka*
I(MAS) .TOP	why(COL)	everyone .NOM	metal.strain .ANG:with	make-a-fuss .NMN.NEGO:intr
I	why	everyone	with metal strain	make a fuss
I (MSC) don't understand why everyone makes a fuss with a metallic strain (like plutonium).				

（プルトニウムとか）	分からない。
(purutoniumu.toka)	*wakar.anai。*
(plutonium.and-so-on)	understand.NEG.
such as plutonium	don't understand
[translation included above]	

燃料を	とんでもない	温度に	したら
nenryoo.o	*tondemonai*	*ondo.ni*	*shi.tara*
fuel.ACC	unthinkable	temperature.ATTR	DO.if
fuel	unthinkable temperature		if … make
If (one) makes the fuel go to an unthinkable temperature,			

あちこち	飛ぶかもしれないが、
achikochi	*tobu.ka.mo.shire.nai.ga、*
here-and-there	fly.NEGO:intr.HIL:too.BE-KNOWN.NEG.but,
here and there	may fly, but
it may fly here and there, but	

ちょっと	想定しがたい。
chotto	*sootee.shi.gatai。*
a-bit	supposition.DO.DIFFICULT/BE.
a bit	is difficult to suppose
it is a bit hard to suppose.	

化学毒性は	あるが、
kagaku+doku.see.wa	*aru.ga、*
chemistry+poison.character.TOP	be.but,
chemical toxicity	there is…, but
There is chemical toxicity, but	

もちろん	量が	ないと	問題は	ないし。
mochiron	*ryoo* *.ga*	*nai* *.to*	*mondai* *.wa*	*nai.shi。*
of-course	amount .NOM	non-existent/be .if	problem .TOP	non-existent/be.and-so.
of course	amount	if there is not	problem	there is no …, so
of course there is no problem if it is not in (a large) amount...				

もちろん	現場では	問題だが。
mochiron	*genba.de.wa*	*mondai.da.ga。*
of-course	site.LOC:at.TOP	problem.be/PLN.but.
of course	at the site	problem …, but
Of course it is a problem at the site, but…		

[P1-3] 29 March 2011 07:40:37
【7.プルトニウムは遠くに飛びにくい】チェルノブイリ事故後「137Cs 等揮発性核種とは異なり，日本で顕著な Pu 増加無し．Pu が Cs よりも大きな粒径の粒子に含まれ，輸送の間に大気中から除去されたためである」（気象研） http://plixi.com/p/87687577
[7.Plutonium is unlikely to fly far] After the Chernobyl accident '(There were) no salient increases of Pu in Japan, as opposed to volatile isotopes such as 137Cs. This is because Pu was encapsulated in particles of larger diameter than Cs, and was eliminated from the atmosphere during the transport (from Chernobyl).' (MRI) http://plixi.com/p/87687577

Cf. MRI is the acronym for Meteorological Research Institute, Japan.

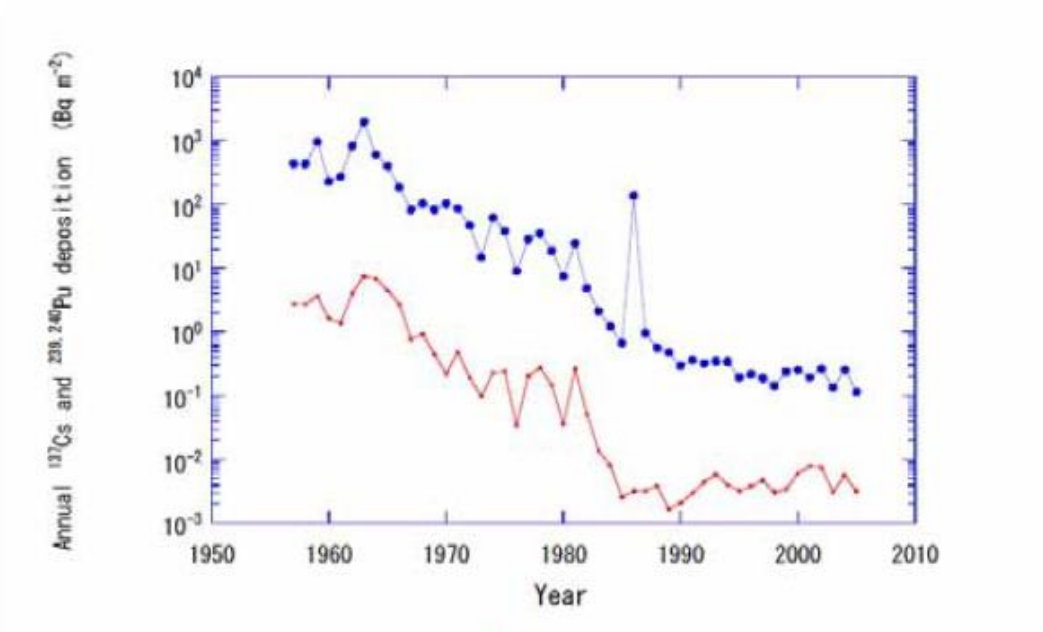


Fig. 18: Annual deposition of ^{239,240}Pu observed in the MRI, Japan

【7.プルトニウムは	遠くに	飛びにくい】
[7.purutoniumu.wa	*tooku.ni*	*tobi.nikui]*
[7.plutonium.TOP	long-distance.LOC:to	fly.HARD/BE]
[7.plutonium	far	is hard to fly]
[7.Plutonium is unlikely to fly far]		

チェルノブイリ事故後	「137Cs 等	揮発性核種とは	異なり,
cherunobuiri+jiko .go	「*Ichi+san+nana+ shiiesu.etc*	*kihatsu.see+ kakushu.to.wa*	*kotonari,*
Chernobyl+accident .after	'one+three+seven+ Cs.etc	volatalisation.character+ isotope.COMP:from.TOP	differ/SUS,
after Chernobyl accident	from volatile isotope such as 137Cs		differ,
After Chernobyl accident, 'as opposed to volatile isotope such as 137Cs,			

日本で	顕著な	Pu 増加	無し.
nihon.de	*kencho.na*	*piiyuu+zooka*	*nashi.*
Japan.LOC:in	salient.EPI	Pu+increase	non-existent/be.
in Japan	salient	increase of Pu	(there is) no
(there were) no salient increases of Pu in Japan.			

Pu が	Cs よりも	大きな	粒径の	粒子に	含まれ,
piiyuu.ga	*shiiesu .yorimo*	*ookina*	*ryuukee .no*	*ryuushi .ni*	*fukum .are,*
Pu.NOM	Cs .COMP:than	big	particle-diameter .ADN	particle .AGENT	include .PSV/SUS,
Pu	bigger than Cs		diameter's	in particle	be included
(This was because) Pu was encapsulated in particles of larger diameter than Cs, and					

輸送の間に	大気中から	除去されたためである」	（気象研）
yusoo.no .aida .ni	*taiki.chuu .kara*	*jokyo.s.are .ta.tame.dearu*」	*(kishooken)*
transport.ADN .INTERVAL .LOC:in	atmosphere.inside .LOC:from	removal.DO.PASS .PST.SAKE.be/LPLN'	(Meteorological-Research-Institute-Japan(ACR))
during transport	from atmosphere	because …was removed	(MRI)
because (…) was eliminated from the atmosphere during the transport (from Chernobyl).' (MRI)			

[J2-1] 29 March 2011 11:11:49
(-_-) RT @user4: 先ほどの、プルトニウムは重いので飛散しない？の件ですが、どうやら「安全デマ」が濃厚です。http://bit.ly/eXnB1N チェルノブイリからの飛来を示すデータ
(-_-) RT @user4: Regarding the recent issue of ‘plutonium is heavy so it doesn’t disperse?’, apparently ‘safety demagogy’ is strongly possible. http://bit.ly/eXnB1N (These are the) data that show the transportation (of plutonium) over from Chernobyl

(-_-)

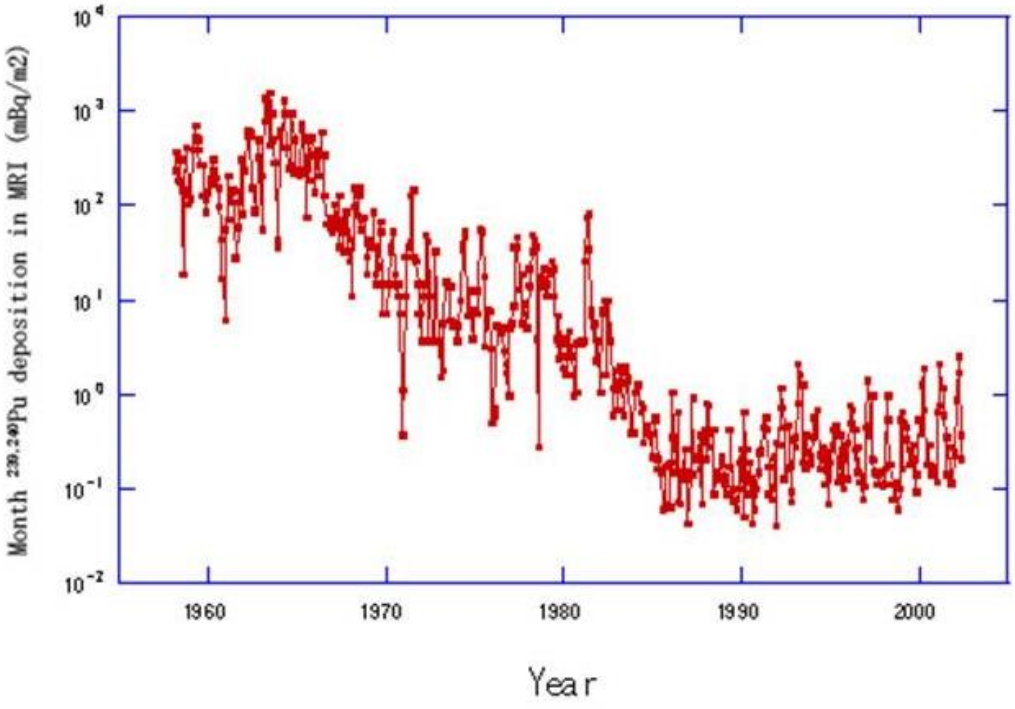
RT @user4:

先ほどの、	プルトニウムは	重いので	飛散しない？の	件ですが、
saki.hodo.no,	*purutoniumu.wa*	*omoi.node*	*hisan.shi.nai?.no*	*ken.desu.ga*、
earlier.about.ADN	plutonium.TOP	heavy.because	dispersal.DO.NEG?.ADN	matter.be/POL.but,
earlier	‘plutonium	because heavy	of (‘…) does not disperse?’	concerning the matter (of ….),
Regarding the recent matter of ‘plutonium is heavy so it doesn’t disperse?’,				

どうやら	「安全デマ」が	濃厚です。
dooyara	「*anzen+dema*」*.ga*	*nookoo.desu*。
apparently	‘safety+demagogy’.NOM	dense.be/POL.
apparently	safety demagogy	is strong (in possibility).
apparently ‘safety demagogy’ is strongly possible.		

http://bit.ly/eXnB1N
Hyperlink to ‘Artificial Radionuclides in the Environment 2003’ (Geochemical Research Department, Meteorological Research Institute, Japan 2004).

チェルノブイリからの	飛来を	示す	データ
cherunobuiri.kara.no	*hirai.o*	*shimesu*	*deeta*
Chernobyl.LOCLfrom.ADN	coming-flying(NEV).ACC	show	data
transportation from Chernobyl		show	data
(These are the) data that show the transportation (of plutonium) over from Chernobyl			


Month 239,240Pu deposition in MRI (mBq/m2)
10^4
10^3
10^2
10^1
10^0
10^-1
10^-2
1960
1970
1980
1990
2000
Year

[J2-2] 27 March 2011 12:43:25
【緊急】菅首相へ。政府は非常事態宣言を。 @kantei_saigai 質問した。３号炉のプルトニュウム検出が表にないが？東電「プルトニウムを検出する機器を持っていない。よって測っていない」 http://bit.ly/eJI3As #nicojishin
[Urgency] Dear Prime Minister Kan, and your government, (please announce) the proclamation of a state of emergency. @prime minister-official-residence_disaster (I) asked a question. There is no plutonium detection from reactor 3 in the table, but (why is that so)? TEPCO '(We) don't have an apparatus to detect plutonium. Therefore (we) haven't measured (it)' http://nicovideositeofTEPCOconferenceon26March #nicovideosite-earth-quake

【緊急】
[kinkyuu]
[urgency]

菅首相へ。
Kan+shushoo.e。
Kan+prime-minister.REC:to.
Dear Prime Minister Kan.

政府は	非常事態宣言を。
seefu.wa	*hijoo+jitai+sengen.o*。
government.TOP	emergency+state-of-affairs+proclamation.ACC.
the government	proclamation of state of emergency
The government, (please announce) the proclamation of a state of emergency.	

@kantei_saigai
@prime minister-official-residence_disaster

質問した。
shitsumon.shi.ta。
question.DO.PST.
(I) asked a question.

３号炉の	プルトニュウム検出が	表に	ないが？
sangooro.no	*purutonyuum+kenshutsu.ga*	*hyoo.ni*	*nai .ga?*
third-reactor.ADN	plutonium+detection.NOM	table.LOC:on	non-existent/be .but?
plutonium detection of third reactor		on the table	there isn't (…) but?
There is no plutonium detection from reactor 3 in the table, but (why is that so)?			

東電
tooden
TEPCO(ACR)

プルトニウムを	検出する	機器を	持っていない。
purutoniumu.o	*kenshutsu.suru*	*kiki.o*	*mot.tei.nai*。
plutonium.ACC	detection.DO	apparatus.ACC	have.ASP:rsl.NEG.
plutonium	detect	apparatus	do not have
(We) don’t have an apparatus to detect plutonium.			

よって	測っていない」
yotte	*hakat.tei.nai*」
therefore	measure. ASP:rsl.NEG’
therefore	have not measured
Therefore, (we) haven’t measured (it).’	

’ http://nicovideositeofTEPCOconferenceon26March #nicovideosite-earth-quake

[P1-4] 28 March 2011 09:30:51
【X 線スペクトル募集】ベリリウム窓付 X 線用 Ge 検出器等をお持ちの方，Pu の α 崩壊後に出る U の特性 X 線測定できませんか．Pu 大量飛散を心配しておられる方が多い．数値データがあれば定量的な議論が可能になります.
[X-ray spectrum recruited] (If there is) anyone who has a Ge detector for X rays with beryllium window etc., could you do the characteristic X ray measurement of U[109] produced after Pu's α decay? There are a lot of people who are anxious about the large dispersal of Pu. If there are numerical data (then) quantitative discussion becomes possible.

【X 線スペクトル募集】
[ekkusu+sen+supekutoru+boshuu]
[x+line+spectrum+recruitment]
[x ray spectrum wanted]

ベリリウム窓付 X 線用 Ge 検出器等を	お持ちの	方,
beririumu+mado.tsuki+ekkusu+sen.yoo+jiiii+kenshutsu.ki .too.o	o.mochi .no	kata,
beryllium+window.attach+x+line.USE+Ge+detection.device .etc.ACC	RES.have .ASP:rsl/RES	person/ RES
Ge detector for X ray with beryllium window etc	has	
(If there is) anyone who has a Ge detector for X ray with beryllium window etc.,		

Pu の	α 崩壊後に	出る	U の	特性 X 線測定	できませんか.
piiyuu .no	*arufa+hookai .go.ni*	*deru*	*yuu .no*	*tokusee+ekksusu+ sen+sokutee*	*deki.mas .en.ka.*
Pu. ADN	alpha+decay .after.LOC:in	come-out	U .ADN	characteristic+X+ line+measurement	do/POT.POL .NEG.NEGO:intr
after Pu's alpha decay		come out	U's	characteristic X ray measurement	could you do?
could you do the characteristic X ray measurement of U produced after Pu's α decay?					

Pu 大量飛散を	心配しておられる	方が	多い.
piiyuu+tairyoo+ hisan.o	*shinpai.shi .teorareru*	*kata.ga*	*ooi.*
Pu+largeamount+ dispersal.ACC	anxiety.DO .ASP :cont/RES	person/RES.NOM	many/be.
large dispersal of Pu	is anxious	person	are many
There are a lot of people who are anxious about the large dispersal of Pu.			

[109] 'U' is the chemical symbol of uranium.

数値データが	あれば	定量的な	議論が	可能に	なります.
suuchi+ deeta.ga	*are.ba*	*teeryoo .teki.na*	*giron .ga*	*kanoo .ni*	*nari.masu.*
numerical-value+ data.NOM	be.if	quantification .ADJ.EPI	discussion .NOM	possible .CIR	become.POL.
numerical data	if there is	quantitative	discussion	possible	become
If there are numerical data quantitative discussion becomes possible					

[P2-3] 29 March 00:10:24
wiki から 1945 年以来、約 10 トンのプルトニウムが、核実験を通じて地球上に放出された。核実験のフォールアウトのために、既に世界中の人体中に 1～2 ピコキュリーのプルトニウムが入っている。フォールアウト起源のプルトニウムが地表面の土壌に 0.01～0.1 pCi/g 存在する。
From wiki Since 1945, approximately 10 tons of plutonium have been emitted on the earth through nuclear experiments. Due to the fallout from nuclear experiments, 1-2 pico-curie of plutonium is already contained in the human body throughout the world. Fall-out-originated plutonium exists by 0.01-0.1pCi/g in the soil on the earth's surface.

wiki から
wiki.kara
wiki.ANG:from
from wiki

1945 年以来、	約 10 トンの	プルトニウムが、
sen+kyuu+hyaku+yon+juu+go .nen+irai,	*yaku.jut+ton .no*	*purutoniumu.ga*、
thousand+nine+hundred+four+ten+five .year+since	approximately.ten+ton .ADN	plutonium.NOM
Since 1945,	approximately ten tons of	plutonium
Since 1945, approximately 10 tons of plutonium		

核実験を通じて	地球上に	放出された。
kaku+jikken.o.tsuuji.te	*chikyuu.joo.ni*	*hooshutsu.s.are.ta*。
nucleus+experiment.ACC.PASS.SUS	earth.above.LOC:on	emission.DO.PSV.PST.
through nuclear experiments	on the earth	emitted
have been emitted on the earth through nuclear experiments.		

核実験の	フォールアウトのために、
kaku+jikken.no	*fooruauto.no.tame.ni*、
nucleus+experiment.ADN	fallout.ADN.SAKE.CAUS,
of nuclear experiments	due to fallout
Due to fallout from nuclear experiments,	

既に	世界中の	人体中に	1〜2 ピコキュリーの	プルトニウムが	入っている。
sudeni	*sekai .juu .no*	*jintai .chuu.ni*	*ichi.kara.ni .pikokyurii .no*	*purutoniumu .ga*	*hait .teiru。*
already	world .all-over .ADN	human-body .inside.LOC:in	one.to.two .pico-currie .ADN	plutonium .NOM	enter .ASP:rsl.
already	all over the world	inside human body	one to two pico-curie of	plutonium	is contained.
1-2 pico-curie of plutonium is already contained in the human body throughout the world.					

フォールアウト起源の	プルトニウムが	地表面の	土壌に	0.01〜0.1 pCi/g	存在する。
fooruauto+ kigen.no	*purutoniumu .ga*	*chihyoo+ men.no*	*dojoo .ni*	*0.01〜0.1 pCi/g*	*sonzai .suru。*
fall-out+ origin.ADN	plutonium .NON	land-surface+ face.ADN	soil(NEV) .LOC:in	0.01〜0.1 pCi/g	existence .DO.
fall-out originated	plutonium	of land surface	in the soil	0.01〜0.1 pCi/g	exists.
Fall-out-originated plutonium exists by 0.01-0.1pCi/g in the soil on the earth’s surface.					

[J1-3] 30 March 2011 04:42:18
放散されてしまったプルトニウムは、影響力を減じることなく、やがて全世界へと拡散してゆく。この御用学者の発言は、全世界にさらされ、全世界から批判されるべき、暴言だと思う。RT @user2: ＮＨＫで、東大の御用学者が「プルトニウムの影響もそう心配することはない」との見解。
The plutonium that ended up being dissipated, without reducing its power to influence, will eventually be diffused to the whole world. This opportunist scholar's remark is violent language that should be exposed to the whole world and be criticised by the whole world. RT @user2: On NHK, (I heard) Tokyo Uni's opportunist scholar's view that 'the influence of plutonium is nothing to be anxious about so much either.'

放散されてしまった	プルトニウムは、	影響力を	減じることなく、
hoosan.s .arete.shimat.ta	purutoniumu.wa、	*eekyoo.ryoku .o*	*gen.jiru.koto .naku*、
dissipation.DO .PSV.END.PST	plutonium.TOP,	influence.power .ACC	reduction.DO.THING .NEG/SUS,
has ended up being dissipated	plutonium	influencing power	without reducing
Plutonium that has ended up being dissipated, without reducing its power to influence			

やがて	全世界へと	拡散してゆく。
yagate	*zen.sekai.e.to*	*kakusan.shite.yuku*。
by-and-by	all.world.LOC:to.PROJ	diffusal.DO.GO
by and by	to the whole world	go diffusing
will eventually be diffused to the whole world.		

この	御用学者の	発言は、
kono	*goyoo+gakusha.no*	*hatsugen.wa*、
this/ADN	official-business.scholar.ADN	remark.TOP
this opportunistic scholar's		remark
This opportunist scholar's remark		

全世界に	さらされ、	全世界から	批判されるべき、	暴言だと	思う。
zen.sekai .ni	*saras .are*、	*zen.sekai .kara*	*hihan.s .areru .beki*、	*boogen .da.to*	*omou*。
all.world .LOC:to	expose .PSV/SUS,	all.world .LOC:from	criticism.DO .PSV .MODU:should	violent-language .be.PROJ	think.
to the whole world	be exposed	from the whole world	should be criticised	that (…) is violent language	think.
(I) think (…) is violent language that should be exposed to the whole world and be criticised by the whole world.					

RT @uesr2:

ＮＨＫで、	東大の	御用学者が
enuechikee.de	*toodai.no*	*goyoo+gakusha.ga*
NHK.LOC:on	Tokyo-University(ACR).ADN	official-business.scholar.NOM
on NHK	Tokyo Uni's opportunist scholar	
On NHK, (I heard) Tokyo Uni's opportunist scholar		

「プルトニウムの	影響も	そう	心配することはない」との	見解。
「purutonium.no	*eekyoo .mo*	*soo*	*shinpai.suru.koto.wa .nai」 .to.no*	*kenkai*。
'plutnoium.ADN	influence .HIL:too	so/CIR	anxiety.DO.THING.TOP .NEG'.PROJ.ADN	remark.
'plutonium's	influence too	so (much)	that (…)need not be anxious'	remark.
…'s view that 'plutonium's influence is nothing to be anxious about so much either'.				

[P1-5] 29 March 2011 07:36:20
【1.結論を先に言えば】1)核燃料棒が破損し，ヨウ素，セシウムとともに，Pu も漏れた．2)その濃度は環境レベル．3)敷地外のサンプルでも Pu 測定が望まれるが，4)作業される方の放射線防護をし，原発を冷やすことの方が急務.
[1. If (I) say the conclusion first] 1) nuclear fuel rod(s) broke, and together with iodine and caesium, Pu leaked too. 2) Its density (is at) the environment level. 3) the Pu measurement is hoped for via samplings outside the site as well but 4) to provide radiation protection of the people who do the operation, and to cool down the NPP (is the) more urgent task.

【1.結論を	先に	言えば】
[1.ketsuron.o	*saki.ni*	*ie.ba]*
[1.conclusion.ACC	beforehand:LOC:at	say.if]
[1.conclusion	first	if say]
[1.If (I) say the conclusion first]		

1)核燃料棒が	破損し,
1)kaku+nenryoo+boo.ga	*hason.shi,*
1)nucleus+fuel+rod.NOM	breakage.DO/SUS,
1)nuclear fuel rod	broke, and
1)The nuclear fuel rod(s) broke, and	

ヨウ素,	セシウムとともに,	Pu も	漏れた.
yooso,	*seshiumu.to.tomoni*	*piiyuu.mo*	*more.ta.*
iodine,	caesium.ACC:with.TOGETHER	Pu.HIL:too	leak.PST.
together with iodine and caesium,		Pu too	leaked.
together with iodine and caesium, Pu leaked too.			

2)その	濃度は	環境レベル.
2)so/no	*noodo.wa*	*kankyoo+reberu.*
2)it/ADN	density.TOP	environment+level.
2)its density		environment level.
2)Its density (is at) the environment level.		

3)敷地外の	サンプルでも	Pu 測定が	望まれるが,
3)shikichi.gai.no	*sanpuru .de.mo*	*piiyuu.sokutee.ga*	*nozom.areru.ga,*
3)site.out.ADN	sample .MAN:with.HIL:too	Pu.measurement.NOM	hope.PSV.but,
3)with the sample outside the site too		Pu measurement	|-.-| is hoped, but
3) A Pu measurement |-.-| is hoped for via samplings outside the site as well, but			

4)作業される	方の	放射線防護を	し,
4)sagyoo.s.areru	*kata.no*	*hoosha.sen+boogo.o*	*shi,*
4)operation.DO.RES	person/RES.ADN	radiation.line+protection.ACC	do/SUS,
4)do m(’。’@)m operation	person m(’。’@)m	radiation protection	do(ing), and
4)To provide protection of people m(’。’@)m who do m(’。’@)m the operation, and			

原発を	冷やすことの方が	急務.
genpatsu .o	*hiyasu.koto.no.hoo .ga*	*kyuumu.*
nuclear-power-plant(ACR) .ACC	cool-down.THING.ADN.DIRECTION .NOM	urgent-task.
nuclear power plant(ACR)	cooling down more	urgent task.
to cool down of the NPP (is the) more urgent task.		

[J1-4] 1 April 2011 16:54:57
{family-name}助教の続き。検出されたプルトニウムが、1〜4 号機のどこから放出されたものか、特定できないし、意味もない。プルトニウム検出の意味は、ペレットの溶融が一部始まっている点。確実に！ (#{J1'sname}7 live at http://{hyperlinktoJ1'sustreamsite}
Assistant Professor {name} continuing. It is not possible to identify which reactor 1-4th the plutonium detected was emitted from, and it doesn't matter either. The meaning of plutonium detection is that melting of pellet(s) has partially begun. Certainly! (#{J1'sname}7 live at http://{hyperlinktoJ1'sustreamsite}

The hashtag with J1's name with number 7, followed by the hyperlink to J1's own video site on an online video site called Ustream.

{family-name}助教の	続き。
{family-name}+*jokyoo.no*	*tsuzuki*。
{ family-name}+assistant-professor.ADN	continuation.
Assistant professor { family-name} continuing	

検出された	プルトニウムが、	1〜4 号機の	どこから	放出された	ものか、
kenshutsu .s.are .ta	*purutoniumu .ga*、	*ichi.kara .yongoo.ki .no*	*doko .kara*	*hooshutsu .s.are .ta*	*mono .ka*、
detection .DO.PSV .PST	plutonium .NOM	one.from .fourth.machine .ADN	where .LOC:from	emission .DO.PSV .PST	thing .NEGO: intr
(that) was detected	plutonium	of one to fourth reactor	from where	was emitted	one
which reactor 1-4th the plutonium detected was emitted from,					

特定できないし、	意味も	ない。
tokutee.deki.nai.shi、	*imi.mo*	*nai*。
identification.DO/POT.NEG.and,	meaning.HIL:too	non-existent/be.
cannot identify and	meaning either	there is no
It is not possible to identify (which reactor 1-4th the plutonium detected was emitted from), and it doesn't matter either.		

プルトニウム検出の	意味は、
purutoniumu+kenshutsu.no	*imi.wa*、
plutonium+detection.ADN	meaning.TOP,
of plutonium detection	meaning
The meaning of plutonium detection,	

ペレットの	溶融が	一部	始まっている	点。
peretto.no	*yooyuu.ga*	*ichibu*	*hajimat.teiru*	*ten。*
pellet.ADN	melting(NEV)	part	begin.ASP:rsl	point.
of pellet	melting	partially	has begun	point
(is) that melting of pellet(s) has partially begun.				

確実に！
kakujitsu.ni！
certain.CIR!
Certainly!

(#{J1'sname}7 live at http://{hyperlinktoJ1'sustreamsite}

[P2-4] 20 March 2011 08:19:50
あのね、あのね、陽子の半減期って 10^34 年よりながいんだよー。こわいでしょーRT @user5 ビスマス 209 の半減期は 2100 京年クラス こわいですねー(棒読み) @user6 プルトニウムの半減期が 24000 年だから怖いって言うけど、
You know what, you know what, the half-life of a proton is longer than 10^34 years! Isn't (it) scary! RT @user5 The half-life period of a bismuth 209 is 21 in the quintillion year class, scary isn't (it)! (monotone reading) @user6 (They) say plutonium is scary because it's half-life period is 24,000 years, but

あのね、	あのね、
ano.ne、	*ano.ne*、
that/ADN.NEGO:cnf,	that/ADN.NEGO:cnf,
you know what,	you know what,
You know what, you know what,	

陽子の	半減期って	10^34 年より	ながいんだよー。
yooshi.no	*hangen* *.ki.tte*	*10^34.nen* *.yori*	*nagai.n.da* *.yoo。*
proton.ADN	reduction-into-half .period.TOP(COL)	10^34.year .COM:than	long.NMN.be .NEGO:ins(LNG)
proton's half-life		than 10^34 years	is longer
the half-life of a proton is longer than 10^34 years!			

こわいでしょー
kowai.deshoo
scary.be/POL/CONJ(LNG)
怖いでしょー
Isn't (it) scary!

RT @user5

ビスマス 209 の	半減期は	2100 京年	クラス
bisumasu+ni+ree+kyuu *.no*	*hangen* *.ki.wa*	*ni+sen+hyaku+* *kee.nen*	*kurasu*
bismuth+two+zero+nine .ADN	reduction-into-half .period.TOP	two+thousand+hundred+ ten-quadrillion.year	class
bismuth209's	half-life	21 quintillion year	class
The half-life period of a bismuth 209 is in the 21 quintillion year class,			

こわいですねー	(棒読み)
kowai.desu.nee	*(boo+yomi)*
scary.be/POL.NEGO:conf(LNG)	(stick+reading)
scary isn't (it)!	(monotone reading)

@user6

プルトニウムの	半減期が	24000 年だから
purutoniumu .no	*hangen.ki .ga*	*ni+man+yon+sen .nen.da.kara*
plutonium .AND	reduction-into-half.period .NOM	two+ten-thousand+four+thousand .year.be.because
plutonium’s	half-life	because …is twenty four thousand years
because plutonium’s half-life is twenty four years		

怖いって	言うけど、
kowai.tte	*iu.kedo*、
scary.PROJ(COL)	say.but(COL)
that (…) is scary	(one) says but
they say that (plutonium) is scary, but	

[J2-3] 1 April 13:17:35
【速報】本日午後５時 30 分からの内閣総理大臣記者会見で、菅首相が「プルトニウム」の試食に挑戦することがわかった。東電関係者が明らかにした。首相は過去にも「カイワレ大根」で成果を出していることから、周囲に「必ず完食する」と自信を見せているという。同会見にはプルト君も立ち会う予定。
[Prompt report] At the Prime Minister's Press Conference from 5:30 today, (it) has become known that Prime Minister Kan is going to take the challenge of test-eating of 'plutonium'. A TEPCO-related person disclosed (it). As the prime minister came out with an achievement with 'daikon radish sprout' in the past too, he is said to show confidence to the surrounding people (saying) '(I) will surely eat (it) all up.' At the same conference, Pluto-kun (is) scheduled to attend too.

【速報】
[sokuhoo]
[prompt-report]
[prompt report]

本日	午後	５時	30 分からの	内閣総理大臣	記者会見で、
honjitsu	*gogo*	*go* *.ji*	*san.jup.pun* *.kara* *.no*	*naikaku+* *soori-daijin*	*kisha+* *kaiken* *.de*、
today (NEV)	afternoon	five .o'clock	three.ten.minute .LOC:from .ADN	cabinet+ prime-minister	newsperson+ conference .LOC:at,
today	p.m.	five thirty		prime minister	at press conference
At the Prime Minister's Press Conference from 5:30 pm today,					

菅首相が	「プルトニウム」の	試食に	挑戦することが	わかった。
Kan+ *shushoo* *.ga*	*「purutoniumu」* *.no*	*shishoku* *.ni*	*choosen.suru* *.koto.ga*	*wakat* *.ta。*
Kan+ prime-minister .NOM	'plutonium' .ADN	test-eating .ACC	challenge.DO .THING.NOM	become-known .PST
Prime minister Kan	test eating of 'plutonium'		that … take a challenge of	became known.
(it) has become known that Prime Minister Kan is going to take a challenge of test-eating of 'plutonium'.				

東電関係者が	明らかに	した。
tooden+kankeesha.ga	*akiraka.ni*	*shi.ta。*
TEPCO+related-person.NOM	clear.ATTR	do.PST.
TEPCO-related person	clear	made.
A TEPCO-related person disclosed (it).		

首相は	過去にも	「カイワレ大根」で	成果を	出していることから、
shushoo .wa	*kako.ni .mo*	「*kaiwaredaikon*」*.de*	*seeka .o*	*dashi.teiru. koto.kara*、
prime-minister .TOP	pastLOC.in .HIL:too	'daikon-sprout' .AGN:with	achievement .ACC	come-out.ASP:rslt .THING.because,
Prime minister	in the past too	with 'daikon-sprout'	because … came out with achievement	
As the prime minister came out with achievement with 'daikon sprouts' in the past, too,				

周囲に	「必ず	完食する」と	自信を	見せているという。
shuui .ni	「*kanarazu*	*kanshoku .suru*」*.to*	*jishin .o*	*mise.teiru .to.iu。*
surrounding .DAT	'surely	eating-completion .DO'.PROJ	confidence .ACC	show.ASP:cont .PROJ.SAY.
to surrounding people	'surely	that (…) eat (it) all up'	confidence	is said to show
(he) is said to show confidence to the surrounding people (saying), '(I) will surely eat (it) all up.'				

同会見には	プルト君も	立ち会う	予定。
doo.kaiken .ni.wa	*puruto.kun.mo*	*tachiau*	*yotee。*
same.conference. LOC:at.TOP	pluto.TIT(CAS/MAS) .HIL:too	stand-by	schedule.
at the same conference	Pluto-kun too	attend	scheduled.
At the same conference Pluto-kun (is) scheduled to attend too.			

Appendix 3

Tweets for Chapter 5

[P1-1] 12 March 1　23:37:23
（そろそろ疲れてきました．ビールも飲みたい．同業者の方，時々お助けくださると有り難いな - 世の中には私よりももっと原子力本流の専門家もおられる筈なので）
((I) ┌|∵|┘am getting tired now. (I) |-.-| want to drink beer too. People **m('。')m** in the same business, (it) |-.-| would be appreciated if (you) could help **m('。')m** (me) sometimes. Because in this world there |-.-| should be **m('。')m** more mainstream nuclear power experts than me)

（そろそろ	疲れてきました.
(*sorosoro*	*tsukarete.ki.mashi.ta*.
(little-by-little	get-tired.COME.POL.PST.
(gradually	┌|∵|┘ have become tired.
((I) ┌|∵|┘am getting tired now.	

ビールも	飲みたい.
biiru.mo	*nomi.tai.*
beer.too	drink.OPT.
beer too	|-.-| want to drink.
(I) |-.-| want to drink beer too.	

同業者の	方,	時々	お助けくださると	有り難いな-
doogyoo .sha.no	*kata,*	*tokidoki*	*o.tasuke .kudasaru.to*	*arigatai .na–*
same-business .person.ADN	person /RES,	sometimes	RES.help .GIVE-ME/RES.if	appreciated/be .NEGO:incl(LNG)
person **m('。')m** in the same business		sometimes	if you help **m('。')m** me	|-.-| is appreciated–
People **m('。')m** in the same business, (it) |-.-| would be appreciated if (you) could help **m('。')m** (me) sometimes.				

世の中には	私よりも	もっと	原子力本流の	専門家も	おられる筈なので)
yononaka .ni .wa	*watashi .yorimo*	*motto*	*genshi.ryoku+ honryuu .no*	*senmon .ka .mo*	*orareru .hazuna.node*)
world .LOC:in .TOP	I .COMP:than	more	atom.power+ mainstream .ADN	speciality .person .HIL:too	be/RES .MODA:should .because)
in the world	than me	more	mainstream nuclear expert too		because (…) should be m(’。’@)m
Because in this world there |-.-| should be m(’。’@)m more mainstream nuclear power experts than me)					

[P2-1] 25 March 23:16:45
原子は全部陽子と中性子と電子でできている。プルトニウムは原子核の一種で、特別な魔法はないよ。比較として放射能が高いってだけの話。あとβ崩壊核よりたちは悪い。でも昔の人のつけたキャッチフレーズに振り回されるのは愚かだ。
Atoms |-.-| are all made up of protons and neutrons and electrons. Plutonium is one kind of atomic nucleus, and there |-.-| is no special magic. |-.-| Only a matter that it has higher radioactivity as a comparison. Also it|-.-|'s more vicious than the β decay nucleus. But it |-.-| is foolish to be twisted around by the catch phrase that people in the past attached to it.

原子は	全部	陽子と	中性子と	電子で	できている。
genshi.wa	*zenbu*	*yooshi.to*	*chuuseeshi.to*	*denshi.de*	*deki .teiru*。
atom.TOP	all	proton.and	neutron.and	electron.ATTR	be-made-up-of .ASP:rsl
atoms	all	proton and	neutron and	with electron	|-.-| is made up of
Atoms |-.-| are all made up of protons and neutrons and electrons.					

プルトニウムは	原子核の	一種で、
purutoniumu.wa	*genshi+kaku.no*	*isshu.de*、
plutonium.TOP	atom+nucleus.ADN	one-kind.be/SUS,
plutonium	atomic nucleus	is one kind … and,
Plutonium is one kind of atomic nucleus, and		

特別な	魔法は	ないよ。
tokubetsu.na	*mahoo.wa*	*nai.yo* 。
special.EPI	magic.TOP	non-existent/be.NEGO:ins.
special	magic	there |-.-| is no
there |-.-| is no special magic.		

比較として	放射能が	高いってだけの	話。
hikaku .to.shi.te	*hoosha.noo.ga*	*takai.tte .dake.no*	*hanashi*。
comparison .PROJ.DO.SUS	radiation.ability.NOM	high.PROJ/SAY(CONTR) .HIL:only.ADN	story.
as comparison	radioactivity	only story that … is high	
|-.-| Only a matter that it has higher radioactivity as a comparison.			

あと	β崩壊核より	たちは	悪い。
ato	*beeta+hookai+kaku.yori*	*tachi.wa*	*warui*。
after	beeta+decay+nucleusCOMP:.than	nature.TOP	bad/be.
Also	than beeta decay nucleus	vicious.	
Also, it |-.-| is more vicious than the β decay nucleus.			

でも	昔の	人の	つけた	キャッチフレーズに
demo	*mukashi.no*	*hito.no*	*tsuke.ta*	*kyacchifureezu.ni*
but	past.ADN	person.NOM	attach.PST	catch-phrase.AGN
but	person in the past		attached	by catch-phrase
But (….) by the catch phrase that people in the past attached (to it)				

振り回されるのは	愚かだ。
furimawas.areru.no.wa	*oroka.da*。
twist-around.PSV.NMN.TOP	foolish.be/PLN.
to be twisted around	|-.-| is foolish.
to be twisted around (…) |-.-| is foolish.	

[P1-2] 27 March 2011 12:40:42
半減期が短く，特徴的なガンマ線を出す放射性物質はすぐに同定できるが，半減期が 2 万 4000 年もあり，α 線を出して崩壊する Pu は，ドッサリない限り検出できない．(KEK では) Pu239 の「親」である 239Np の崩壊ガンマ線が見えていない．現時点で Pu 大量飛散は無い.
Radioactive materials whose half-life is short and which give out characteristic gamma rays can be identified immediately, but Pu, the half-life of which is as long as 24,000 years and which decays by giving out α rays cannot be detected unless there is a heap. (At KEK) decaying gamma rays of 239Np, which is the 'parent' of Pu239, are not seen. At this moment there is no large dispersal of plutonium.

半減期が	短く,	特徴的な	ガンマ線を	出す	放射性物質は
hangen .ki.ga	*mijikaku,*	*tokuchoo .teki.na*	*gamma+ sen.o*	*dasu*	*hoosha .see+ busshitsu.wa*
reduction-into- half .period.NOM	short/be/ SUS,	character .ADJ.EPI	gamma+ line.ACC	give-out	radiation .character+ material.TOP
half-life	short and	characteris tic	gamma ray	give out	radioactive material
Radioactive materials whose half-life is short and which give out characteristic gamma rays					

すぐに	同定できるが,
suguni	dootee.dekiru.ga,
immediately	identification.DO/POT.but,
immediately	can be identified, but
can be identified immediately, but	

半減期が	2 万 4000 年も	あり,	α 線を	出して	崩壊する	Pu は,
hangen .ki.ga	*ni+man+ yon+sen .nen .mo*	*ari,*	*arufa+ sen .o*	*dashi. .te*	*hookai .suru*	*piiyuu .wa,*
reduction-into-half .period.NOM	two+tenthousand+ four+thousand .year .HIL:as-much-as	be/ SUS,	alpha+ line .ACC	give-out .SUS	decay .DO	Pu .TOP,
half-life	as much as 24 thousand years	be,	alpha ray	giving out	decays	Pu
Pu, whose half-life period is as long as 24 thousand years and which decays by giving out α rays						

ドッサリ	ない限り	検出できない.
dossari	*nai.kagiri*	*kenshutsu.deki.nai.*
a-heap(COL)	non-existent/be.LIMIT	detection.DO/POT.NEG.
a heap	unless there is	cannot detect
cannot be detected unless there is a heap.		

(KEK では)
(keeiikee.de.wa)
(KEK.LOC:at.TOP)
(at KEK)

Pu239 の	「親」である	239Np の	崩壊ガンマ線が	見えていない.
piiyuu+ni+san+kyuu .no	「*oya*」*.dearu*	*ni+san+kyuu+enupii.no*	*hookai+ganm+sen.ga*	*mie .tei.nai*
Pu+two+three+nine .ADN	'parent' .be/LPLN	two+three+nine+Np.ADN	dacay+gamma+line.NOM	be-seen .ASP:cont.NEG
Pu239's	is 'parent'	239Np's	decay gamma ray	is not seen
(At KEK) decay gamma ray of 239Np which is the 'parent' of Pu239 is not seen.				

現時点で	Pu 大量飛散は	無い.
gen.jiten.de	*piiyuu+tai.ryoo+hisan.wa*	*nai.*
present.moment.LOC:at	Pu+large.amount+dispersal.TOP	non-existent/be.
at this moment	large dispersal of Pu	there is not
There is no large dispersal of Pu at this moment.		

[P1-3] 19 March 18:17:30
いつもは外人が多い都心のパブ．今日は日本人客ばかり．こんなの初めてかもしれない．常連さんが「お疲れ様」と声をかけて下さり，一杯おごってくださいました．ありがたくお受けします．乾杯！
|-.-| A metropolitan pub that typically has many foreigners. Today (there |-.-| are) only Japanese customers. This |-.-| may be the first time. A regular customer spoke m(’。’@)m to me saying, ‘|-.-| thanks for your m(’。’@)m effort’ and ┌|･|┘ treated m(’。’@)m me a glass. I ┌|･|┘ accept m(_ _)m (it now) with gratitude. Cheers!

いつもは	外人が	多い	都心の	パブ.
itsumo.wa	*gaijin.ga*	*ooi*	*toshin.no*	*pabu*.
always.TOP	foreigner.NOM	many/be	metropolitan-centre.ADN	pub.
usually	foreigners	many	metropolitan pub.	
|-.-| A metropolitan pub that typically has many foreigners.				

今日は	日本人客ばかり.
kyoo.wa	*nihonjin+kyaku.bakari*.
today.TOP	Japanese+customer.HIL:only.
today	only Japanese customers
Today, (there **|-.-|** are) only Japanese customers.	

こんなの	初めてかもしれない.
konna.no	*hajimete.ka.mo.shire.nai*.
this-kind.NMN	first-time.NEGO:intr.HIL:too.BE-KNOWN.NEG.
thing like this	**|-.-|** may be the first time.
This **|-.-|** may be the first time.	

常連さんが	「お疲れ様」と	声を	かけて下さり,
jooren.san .ga	*「o.tsukare.sama」 .to*	*koe.o*	*kakete .kudasari,*
regular-customer.TIT .NOM	‘RES.tiredness.TIT’ .PROJ	voice.ACC	hang .GIVE-ME/RES/SUS,
regular customer	‘|-.-| thanks for your m(’。’@)m effort’	speak m(’。’@)m up to me and	
A regular customer spoke m(’。’@)m to me saying ‘|-.-| thanks for your m(’。’@)m effort’ and			

一杯	おごってくださいました.
ippai	*ogotte.kudasai.mashi.ta.*
one-glass	treat.GIVE-ME/RES.POL.PST.
one glass	┌|･|┘ treated m(’。’@)m me
┌|･|┘ treated me one glass.	

ありがたく	お受けします.
arigata.ku	*o.uke.shi.masu.*
be-thankful.CIR	DEF.receive.DEF.POL.
thankfully	receive **m(_ _)m**
(I) ┌|∵|┘ accept **m(_ _)m** (it now) with gratitude.	

乾杯！
kanpai!
Cheers!

[P1-4] 14 March, 01:59:29
【参考】1974 年に中国が大気圏核実験を行い，東京に雨とともに放射性物資が降った．学生だった私はガイガーカウンターで人々の頭髪や衣服などを測定．その数値は，福島の病院で被曝された方々と同程度以上，都民の多くが被爆したはずだが，それによる健康被害は現在にいたるまで報告されていない．
[reference] China conducted atmospheric nuclear testing in 1974, and radioactive materials |-.-| fell along with rain in Tokyo. I, who was a student, measure(ed) the hair and clothes of people with a Geiger counter. The values |-.-| (were recorded as) the same extent or above (that of) people m('。')m who got exposed m('。')m (to radiation) at hospital(s) in Fukushima. Many of the metropolitan residents |-.-| should have been exposed (to radiation), but the health damage due to it |-.-| has not been reported up to present.

【参考】
【sankoo】
[reference]

1974 年に	中国が	大気圏核実験を	行い,
sen+kyuu+hyaku+ nana+juu+yo.nen .ni	*chuugoku .ga*	*taikiken+kaku+ jikken.o*	*okonai,*
thousand+nine+hundred+ seven+ten+four.year .LOC:in	Cnina .NOM	atmosphere-range+nucleus+ experiment.ACC	conduct/SUS,
in 1974	China	atmospheric nuclear testing	conduct(ed),
China |-.-| conducted atmospheric nuclear testing in 1974, and			

東京に	雨とともに	放射性物資が	降った.
tookyoo.ni	*ame.to.tomoni*	*hoosha.see+ busshi.ga*	*fut.ta.*
Tokyo,LOC:in	rain.ACP:with.TOGETHER	radation.character+ material.NOM	fall.PST.
in Tokyo	along with rain	radioactive material	fell.
radioactive materials |-.-| fell along with rain in Tokyo.			

学生だった	私は
gakusee.dat.ta	*watashi.wa*
student.be.PST	I.TOP
was a student	I
I who|-.-| was a student	

ガイガーカウンターで	人々の	頭髪や	衣服などを	測定.
gaigaakauntaa .de	*hitobito.no*	*toohatsu .ya*	*ifuku.nado .o*	*sokutee.*
Geiger-counter .MAN:with	people.ADN	head-hair .and-so-on	clothes.HIL:etc .ACC	measurement.
with Geiger counter	people's hair, clothes and so on			measure(ed).
|-.-| measur(ed) people's hair, clothes and so on with a Geiger counter				

その	数値は,
sono	*suuchi.wa,*
that/ADN	numeric-value.TOP
Those numeric values	

福島の	病院で	被曝された	方々と	同程度以上,
fukushima .no	*byooin .de*	*hibaku .s.are.ta*	*katagata.to*	*doo.teedo.ijoo,*
Fukushima .ADN	hospital .LOC:in	exposure .DO.RES.PST	people/RES.COM:as	same.extent.above,
hospital in Fukushima		got m(’。’@)m exposed	people m(’。’@)m	|-.-| same extent or above
|-.-| same or above with (those) of people m(’。’@)m who got m(’。’@)m exposed (to radiation) in the hospital(s) in Fukushima.				

都民の	多くが	被爆したはずだが,
tomin .no	*ooku.ga*	*hibaku.shi.ta.hazu.da.ga,*
metropolitan-resident .ADN	many.NOM	exposure.DO.PST.MODU:should.be/PLN.but,
many of metropolitan residents		should have got exposed, but
Many of metropolitan residents |-.-| should have got exposed to radiation, but		

それによる	健康被害は	現在にいたるまで	報告されていない.
sore.ni.yoru	*kenkoo+higai.wa*	*genzai.ni .itaru.made*	*hookoku.s.are .tei.nai.*
that.CAU:by.CAUSE	health+damage.TOP	present.LOC:to .REACH.LOC:until	report.DO.PSV .ASP:rsl.NEG.
due to that	health damage	up to present	has not been reported
health damage due to that |-.-| has not been reported up to present			

[P2-2] 12 March 19:01:58
ふと見るとだいぶフォロワーが増えているようです。私は素粒子理論の研究者で原子力関係の専門家ではありません。原子核理論、物理学一般、学部レベルの理学について、できるだけ資料にもとづいて発言することは可能でありますが、必ずしもコンスタントに見識のある発言ができるものではありません。
As I happened to look (I found the number of) followers ╔∵╝ seems to be increasing a great deal. I ╔∵╝ am a researcher in elementary particle theory, and ╔∵╝ not an expert in (matters) related to nuclear energy. It ╔∵╝ is possible to make remarks about atomic nuclear theory, physics in general, and undergraduate level science based on documents as much as possible, but I ╔∵╝ cannot always constantly make insightful remarks.

ふと	見ると
futo	*miru.to*
by-chance	look.if
by chance	as (I) look
As (I) ├.-┤ happen to look	

だいぶ	フォロワーが	増えているようです。
daibu	*forowaa.ga*	*fue.teiru.yoo.desu*。
greatly	follower.NOM	increase.ASP:cont.EVI:seem.POL.
greatly	followers	╔∵╝ seems to be increasing
(I found the number of) followers ╔∵╝ seems to be increasing a great deal.		

私は	素粒子理論の	研究者で
watashi.wa	*soryuushi+riron.no*	*kenkyuu.sha.de*
I.TOP	elementary-particle+theory.ADN	research.person.be/SUS
I	of elementary particle theory	am a researcher
I ╔∵╝ am a researcher in elementary particle theory and		

原子力関係の	専門家ではありません。
genshi.ryoku+kankee.no	*senmon.ka.de.wa.ari.mase.n*。
atom.power+relation.ADN	speciality.person.be.TOP.be.POL.NEG.
nuclear energy related	am not an expert
╔∵╝ am not an expert in (matters) related to nuclear energy.	

原子核理論、	物理学一般、	学部レベルの	理学について、
genshi+kaku+riron、	*butsuri.gaku+ippan*、	*gakubu+reberu.no*、	*rigaku.nitsuite*、
atom+nucleus+theory,	physics.study+general,	faculty+level.ADN	science.ANG:about,
atomic nucleus theory,	physics in general,	undergraduate level of	about science
about science, atomic nucleus theory, physics in general, undergraduate level science			

できるだけ	資料に	もとづいて	発言することは	可能でありますが、
dekiru .dake	*shiryoo .ni*	*motodzui .te*	*hatsugen.suru.koto .wa*	*kanoo.dearimasu.ga*、
do/POT/PLN .HIL:only	document .LOC:on	base .SUS	remark.DO.THING .TOP	possible.be/LPOL.but,
as much as possible	based on documents		to make remarks	is possible to (…) but,
it ╔∵╝ is possible to make remarks based on documents as much as possible, but				

必ずしも	コンスタントに	見識の	ある	発言が	できるものではありません。
kanarazu .shimo	*consutanto .ni*	*kenshiki .no*	*aru*	*hatsugen .ga*	*dekiru.mono.de.wa.ari.mase.n。*
always .HIL:emp	constant .CIR	insight .ADN	be	remark .NOM	do/POT.THING.be.TOP.be.POL .NEG.
always constantly		insightful		remark	cannot (always) do
I ╔∵╝ cannot always constantly make insightful remarks.					

[P2-3] 22/02/2012 06:08:32
にゃんにゃにゃん。RT @user7: @P2 おはようございます。本日は、2 月 22 日（にゃんにゃんにゃん）の猫の日でございます。
Meow meow meow. RT @user7: @P2 ┌┤·├┘ Good morning. Today ┌┤·├┘ is Feb 22th (meow meow meow), Cats' Day.

にゃんにゃにゃん。
nyan+nyan+nyan。
meow+ meow+ meow.

RT @user7:	@P2	おはようございます。
RT @user7:	@P2	*ohayoogozaimasu.*
RT @user7:	@P2	good-morning/HPOL
RT @user7:	@P2	┌┤·├┘ Good morning.

本日は、	2 月	22 日	（にゃんにゃんにゃん）の	猫の	日でございます。
honjitsu .wa	*ni .gatsu*	*ni+juu+ ni.nichi*	*(nyan+nyan+ nyan).no*	*neko .no*	*hi .degozaimasu。*
today(NEV) .TOP	two .month	two+ten+ two.day	(meow+ meow+ meow).ADN	cat .ADN	day .be/HPOL.
Today ┌┤·├┘ is 22th Feb (meow meow meow), Cats' Day.					

[P2-4] 11 July 7:10:09
そんなすごいお水、きいたことないんだよねぇ。泥なめてたのかもしれないねぇ。RT @My{name}: お水もあぶないの？
Such terrible water m(’。’@)m, (I) |-.-| have never heard (of it) OK? Maybe (they=cows) |-.-| were licking mud, huh? RT @ My{name}: |-.-| Is the water m(’。’@)m dangerous as well?

そんな	すごい	お水	きいたことないんだよねぇ。
sonna	*sugoi*	*o.mizu*、	*kii.ta.koto.nai.n.da .yo.nee.*
such	terrible(COL)	BEAU.water,	hear.PST.THING.NEG.NOMN.be/PLN .NEGO:ins.NEGO:conf(LNG).
such terrible water m(’。’@)m			|-.-| have never heard of it, right
Such terrible water m(’。’@)m, (I) |-.-| have never heard (of it) OK?			

泥	なめてたのかもしれないねぇ。
doro	*name.te.ta.no.ka.mo.shire.nai .nee。*
mud	lick.ASP:cont.NMN.NEGO:intr.HIL.too.BE-KNOWN.NEG .NEGO:conf(LNG).
mud	may have been licking
Maybe (they=cows) |-.-| were licking mud, huh?	

RT @ My{name}:	お水も	あぶないの？
RT @ My{name}:	*o.mizu.mo*	*abunai.no?*
RT @ My{name}:	BEAU.water.HIL:too	dangerous.NEGO:intr?
RT @ My{name}:	the water m(’。’@)m too	is dangerous?
RT My{name}: |-.-| Is the water m(’。’@)m dangerous too?		

[P1-5] 28 March 2011 09:30:51
【X 線スペクトル募集】ベリリウム窓付 X 線用 Ge 検出器等をお持ちの方，Pu の α 崩壊後に出る U の特性 X 線測定できませんか．Pu 大量飛散を心配しておられる方が多い．数値データがあれば定量的な議論が可能になります.
[X-ray spectrum recruitment] (If there is) anyone m(’。’@)m who has m(’。’@)m a Ge detector for X rays with a beryllium window etc., ┌|･|┘could you do the characteristic X ray measurement of U^{110} produced after Pu’s α decay? There |-.-| are a lot of people m(’。’@)m who are m(’。’@)m anxious about the large dispersal of Pu. If there are numerical data (then) quantitative discussion ┌|･|┘becomes possible.

【X 線スペクトル	募集】
【*ekkusu+sen+supekutoru*	*boshuu*】
[X+line+spectrum	recruitment]
[X ray spectrum	recruitment]
[X ray spectra wanted]	

ベリリウム窓付 X 線用 Ge 検出器等を	お持ちの	方,
beririumu+mado+tsuki+ekkusu+sen.yoo+ jiiii+kenshutsu.ki.too.o	*o.mochi .no*	*kata,*
beryllium+window+attach+X+line.USE+ Ge+detection.device. etc.ACC	RES.have .ASP:rsl/RES	person/RES,
Ge detector for X ray with beryllium window etc	person m(’。’@)m who has m(’。’@)m	
(If there is) anyone m(’。’@)m who has m(’。’@)m a Ge detector for X rays with a beryllium window etc,		

Pu の	α 崩壊後に	出る	U の	特性 X 線測定	できませんか.
piiyuu .no	*arufa+hookai .go.ni*	*deru*	*yuu .no*	*tokusee+ekksusu+ sen+sokutee*	*deki.mas .en.ka.*
Pu .ADN	alpha+decay .after.LOC:in	come-out	U .ADN	characteristic+X+ line+measurement	do/POT.POL .NEG.NEGO:intr
after Pu’s alpha decay		come out	U’s	characteristic X ray measurement	could you do?
┌|･|┘could you do the characteristic X ray measurement of U produced after Pu’s α decay?					

[110] ‘U’ is the chemical symbol of uranium.

Pu 大量飛散を	心配しておられる	方が	多い.
piiyuu+tairyoo+ hisan.o	*shinpai+shi.teorareru*	*kata.ga*	*ooi.*
Pu+large-amount+ dispersal.ACC	anxiety+DO.CONT/RES	person/RES.NOM	many/be.
large dispersal of Pu	are m('。')m anxious about	people m('。')m	many/be.
Many people m('。')m ├-.-┤ are anxious m('。')m about the large dispersal of Pu.			

数値データが	あれば	定量的な	議論が	可能に	なります.
suuchi+deeta .ga	*are .ba*	*teeryoo.teki .na*	*giron .ga*	*kanoo .ni*	*nari .masu.*
numeric-value+data .NOM	be .if	quantification.ADJ .EPI	discussion .NOM	possible .CIR	become .POL.
If there are numerical data quantitative discussion ┌|･･|┘ becomes possible.					

[P1-6] 14 March 11:09:44
福島第一原子力発電所の放射線計測データ，6am まで公開．MP-2 で 400 マイクロ Sv/h，正門で 5.144 マイクロ Sv/h．風向き西北西．これまでは正門のグラフを出して来ましたが，MP2, MP4 のグラフも必要．誰かやってくれる？ http://bit.ly/dV00K7
The radiation measurement data of the Fukushima Daiichi Nuclear Power Plant, |-.-| (have been) made public up until 6am. |-.-|400 micro SV/h at MP-2, (and) 5.144 micro SV/h at the front gate. Wind direction |-.-| (was) west-northwest. Up to now (I) have been putting out graphs of the main gate (data), but graphs of MP2 and MP4 |-.-| (are) necessary too. |-.-|Can anybody do (it) for me? http://bit.ly/dV00K7(hyperlinktoTEPCOpage)

福島第一原子力発電所の	放射線計測データ,	6am まで	公開.
Fukushima+daiichi+genshi .ryoku+hatsuden.sho .no	*hoosha+sen+ keesoku+deeta*,	*roku+ee+emu .made*	*kookai*.
Fukushima+daiichi+atom .power+power-generating.place .ADN	radiation+line+ measurement+data,	6+a+m .LOC:until	making-public.
radiation measurement data of Fukushima Daiichi Nuclear Power Plant		up to 6 am	|-.-| made public.
The radiation measurement data of the Fukushima Daiichi Nuclear Power Plant, |-.-| (have been) made public up until 6am.			

MP-2 で	400 マイクロ Sv/h,
emupii-ni.de	*yon+hyaku+maikuro.shiiberuto+paa+awaa,*
MP-2.LOC:at	four+hundred+micro.sievelt+per+hour,
at MP-2	400 micro Sv/h,
|-.-|400 micro SV/h at MP-2,	

正門で	5.144 マイクロ Sv/h. .
seemon.de	*go+ten+ichi+yon+yon+maikuro.shiiberuto+paa+awaa,.*
main-gate.LOC:at	five+point+one+four+four+micro.sievelt+per+hour.
at the main gate	5.144 micro Sv/h.
(and) 5.144 micro SV/h at the front gate.	

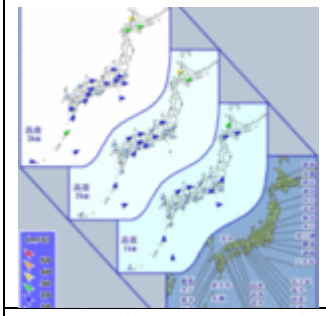
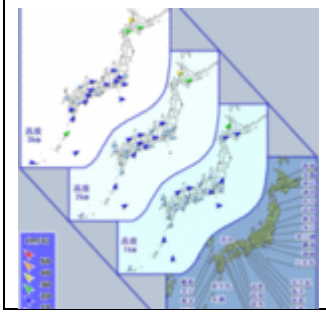
風向き	西北西.
kaza+muki	*seehokusee.*
wind-direction	west-north-west.
wind direction	west-northwest
Wind direction |-.-| (was) west-northwest.	

これまでは	正門の	グラフを	出して来ましたが,
kore.made.wa	*seemon .no*	*gurafu.o*	*dashite.ki.mashi.ta.ga,*
this.EXT:until.TOP	main-gate .ADN	graph.ACC	put-out.COME.POL.PST.but,
up to now	graph of the main gate		have been puttng out …, but
Up to now (I) have been putting out graphs of the main gate (data), but			

MP2,	MP4 の	グラフも	必要.
emu+pii+ni,	*emu+pii+yon.no*	*gurafu.mo*	*hitsuyoo.*
M+P+2,	M+P+4.ADN	graph.HIL:too	necessary.
graphs of MP2 and MP4 too			|-.-| necessary.
graphs of MP2 and MP4 (data) |-.-| (are) necessary too.			

誰か	やってくれる？
dareka	*yatte.kureru*？
someone	do.GIVE-ME？
someone	do for me?
|-.-| Can anyone do (it) for me?	

http://bit.ly/dV00K7(hyperlinktoTEPCOpage)

[P1-7] 14th March 10:42:02
ロンドン在住の @user8 君が，13 日 1 時から 14 日 9 時までの風向風速を気象庁 (http://bit.ly/gNDaXv)からアニメにしてくれました．ありがとう．風向は我々に味方してくれているようです．http://twitpic.com/49a8pv 
@user8 living in London ┌|･|┘made an animation of the wind direction and wind speed from 1 o'clock 13th to 9 o'clock 14th from the Meteorological Agency (http://bit.ly/gNDaXv) for me. |-･-| Thanks. The wind direction ┌|･|┘seems to be aligned us. http://twitpic.com/49a8pv 

ロンドン在住の	@user8 君が,
rondon+zaijuu.no	*@user8.kun.ga,*
London+residence.ADN	@user8.TITL(MSC/CAS).NOM,
living in London	@user8
@user8 living in London	

13 日	1 時から	14 日	9 時までの	風向風速を
juu+san.nichi	*ichi.ji .kara*	*juu+yok.ka*	*ku.ji .made.no*	*fuukoo+ fuusoku.o*
ten+three.day	one.o'clock .LOC:from	ten+four.day	nine.o'clock .LOC:until.ADN	wind-direction+ wind-speed.ACC
13th	from 1 o'clock	14th	till nine o'clock	wind direction and wind speed
(@user8 living in London) (…) the wind direction and wind speed from 1 o'clock 13th to nine o'clock 14th				

気象庁(http://bit.ly/gNDaXv)から	アニメにしてくれました.
kishoochoo(http://bit.ly/gNDaXv) *.kara*	*anime.ni.shite.kure* *.mashi.ta.*
Meteorological-Agency(http://bit.ly/gNDaXv) .LOC:from	animation.ATTR.DO.GIVE-ME .POL.PST.
From Meteorological Agency	made an animation for me.
(@user8 living in London) ┌|･|┘ made an animation … from the Meteorological Agency ((http://bit.ly/gNDaXv) for me.	

ありがとう.
arigatoo.
├-.-┤ Thanks.

風向は	我々に	味方してくれているようです.
fuukooo.wa	*wareware.ni*	*mikata.shite.kure.teiru* *.yoo.desu.*
wind-direction.TOP	we.DAT	supporter.DO.GIVE-ME.ASP:cont .EVI:seem.POL.
wind direction	us	┌|･|┘seems to be aligned with us
The wind direction ┌|･|┘seems to be aligned with us.		

[P1-8] 14th March 10:52:24
米国 NASA の専門家，{family-name+first-name}博士と議論させていただきました．氏が計算して下さった福島第一原発からの空気塊の流れを示します．この計算にによれば，陸上への影響はほとんどありません．注意書きも含め，じっくりご覧下さい． http://plixi.com/p/83867543
(I) ┌|･|┘received m(_ _)m the favour of discussing with Dr.{family name first name}, an expert from NASA, USA. (I will) ┌|･|┘show the flow of air cluster from Fukushima Daiichi NPP (that) he calculated m('。'@)m. According to this calculation, there ┌|･|┘is almost no influence on the land. Please watch m('。'@)m carefully including the notes too.

米国	NASA の	専門家,	{family-name+first-name}+博士と	議論させて いただきました.
beekoku	*nasa .no*	*senmon .ka,*	*{family-name+first-name}+ hakase.to*	*giron.s.asete .itagaki.mashi .ta.*
USA	NASA .ADN	speciality .person,	{family-name+first-name}+ doctor.ACP:with	discussion.DO.CST .RECEIVE/DEF.POL .PST
expert of NASA, USA,			with Dr. {family-name+first-name}	received m(_ _)m the favour of discussing
(I) ┌|･|┘ received m(_ _)m the favour of discussing with Dr.{family name first name}, an expert from NASA, USA.				

氏が	計算して下さった
shi.ga	*keesan.shite.kudasat.ta*
Mr/RES.NOM	calculation.DO.GIVE-ME/RES.PST
he	calculated m('。'@)m for me
(that) he calculated m('。'@)m (for us)	

福島第一原発からの	空気塊の	流れを	示します.
fukushima+daiichi+ genpatsu.kara.no	*kuuki.kai .no*	*nagare.o*	*shimeshi.masu.*
Fukushima+Daiichi+ nuclear-power-plant(ACR).from.ADN	air.cluster .ADN	flow.ACC	show.POL.
from Fukushima Daiichi NPP	of air cluster	flow	show
(I will) ┌|･|┘ show the flow of air cluster from Fukushima Daiichi NPP.			

この	計算にによれば,
kono	*keesan.ni.ni.yore.ba,*
this/ADN	calculation.CAU.BASE.if
according to this calculation	

陸上への	影響は	ほとんど	ありません.
rikujoo.e.no	*eekyoo.wa*	*hotondo*	*ari.mase.n.*
on-land.LOC:to.ADN	influence.TOP	almost	be.POL.NEG
influence on the land		almost	there is no
there ┌|･|┘ is almost no influence on the land.			

注意書きも	含め,	じっくり	ご覧下さい.
chuui.gaki.mo	*fukume,*	*jikkuri*	*goran.kudasai.*
note.WRITING.HIL:too	include/SUS,	carefully	look/RES.GIVE-ME/RES/IMP.
notes too	including	carefully	please watch
Please watch **m('。'@)m** carefully, including the notes too.			

[P1-9] 14 March 21:29:14
東京理科大 理学部物理{family name}さんが，福島第一原発の 2 箇所のモニタリングポストでの測定値，本日 14:00 までの値をグラフ化して下さいました．感謝．http://plixi.com/p/83950003
Mr. (or Ms.) {family name} of Physics (undergraduate student) in the Faculty of Sciences, Tokyo University of Science ┌|･|┘has graphed ｍ('。')ｍ the measurement values at two monitoring posts of the Fukushima Daiichi NPP, (covering) the values up until 14:00 today. |-.-| Appreciated. http://plixi.com/p/83950003(hyperlinktograph)

東京理科大	理学部	物理	{family name} さんが,
tookyoo+rika.dai	*ri.gakubu*	*butsuri*	*{family name} .san.ga,*
Tokyo+science.university(ACR)	science.faculty	physics	{family name} .TIT.NOM,
Tokyo University of Science	Science Faculty	physics (department)	Mr/Ms. {family name}
Mr./Ms. {family name} of physics department, Faculty of Science of Tokyo University of Science			

福島第一原発の	2 箇所の	モニタリングポストでの	測定値,
fukushima+daiichi+ genpatsu.no	*ni+kasho .no*	*monitaringuposuto .de.no*	*sokutee.chi,*
Fukushima+Daiichi+ nuclear-power-plant.ADN	two+point .ADN	monitoring-post .LOC:at.ADN	measurement.value,
of the Fukushima Daiichi NPP	at two monitoring posts		measurement value
the measurement values at two monitoring posts of the Fukushima Daiichi NPP,			

本日	14:00 までの	値を	グラフ化して下さいました.
today(NEV)	*14:00 .made.no*	*atai.o*	*gurafu.ka.shite.kudasai .mashi.ta.*
today(NEV)	14:00 .LOC:till.ADN	value.ACC	graph.change.DO.GIVE-ME/RES .POL.PST.
today	until 14:00	values	┌|･|┘ made ｍ('。')ｍ into graph for me
(Mr./Ms. {family name} of physics department, Faculty of Science of Tokyo University of Science) ┌|･|┘ has graphedｍ('。')ｍ (…), (covering) the values up until 14:00 today.			

感謝.	http://plixi.com/p/83950003
kansha.	http://plixi.com/p/83950003
gratitude.	http://plixi.com/p/83950003
|-.-| Appreciated.	http://plixi.com/p/83950003

[P1-10] 14 March, 01:59:29
【参考】1974 年に中国が大気圏核実験を行い，東京に雨とともに放射性物資が降った．学生だった私はガイガーカウンターで人々の頭髪や衣服などを測定．その数値は，福島の病院で被曝された方々と同程度以上，都民の多くが被爆したはずだが，それによる健康被害は現在にいたるまで報告されていない．
[reference] China conducted atmospheric nuclear testing in 1974, and radioactive materials |-.-| fell along with rain in Tokyo. I, who was a student, measure(ed) the hair and clothes of people with a Geiger counter. The values |-.-| (were recorded as) the same extent or above (that of) people **m('。')@)m** who got exposed **m('。')@)m** (to radiation) at hospital(s) in Fukushima. Many of the metropolitan residents |-.-| should have been exposed (to radiation), but the health damage due to it |-.-| has not been reported up to present.

【参考】
【sankoo】
[reference]

1974 年に	中国が	大気圏核実験を	行い,
sen+kyuu+hyaku+ nana+juu+yo.nen.ni	*chuugoku .ga*	*taikiken+ kaku+jikken.o*	*okonai,*
thousand+nine+hundred+ seven+ten+four.year.LOC:in	Cnina .NOM	atmosphere-range+ nucleus+experiment.ACC	conduct/SUS,
in 1974	China	atmospheric nuclear testing	conduct(ed),
China |-.-| conducted atmospheric nuclear testing in 1974, and			

東京に	雨とともに	放射性物資が	降った.
tookyoo.ni	*ame.to.tomoni*	*hoosha.see+ busshi.ga*	*fut.ta.*
Tokyo,LOC:in	rain.ACP:with.TOGETHER	radation.character+ material.NOM	fall.PST.
in Tokyo	along with rain	radioactive material	fell.
radioactive materials |-.-| fell along with rain in Tokyo.			

学生だった	私は
gakusee.dat.ta	*watashi.wa*
student.be.PST	I.TOP
was a student	I
I who|-.-| was a student	

ガイガーカウンターで	人々の	頭髪や	衣服などを	測定.
gaigaakauntaa .de	*hitobito.no*	*toohatsu .ya*	*ifuku.nado .o*	*sokutee.*
Geiger-counter .MAN:with	people.ADN	head-hair .and-so-on	clothes.HIL:ect .ACC	measurement.
with Geiger counter	people's hair, clothes and so on			measure(ed).
|-.-| measur(ed) people's hair, clothes and so on with a Geiger counter				

その	数値は,
sono	*suuchi.wa,*
that/ADN	numeric-value.TOP
Those numeric values	

福島の	病院で	被曝された	方々と	同程度以上,
fukushima .no	*byooin .de*	*hibaku .s.are.ta*	*katagata.to*	*doo.teedo.ijoo,*
Fukushima .ADN	hospital .LOC:in	exposure .DO.RES.PST	people/RES.COM:as	same.extent.above,
hospital in Fukushima		got m('。')@)m exposed	people m('。')@)m	|-.-| same extent or above
|-.-| same or above with (those) of people m('。')@)m who got m('。')@)m exposed (to radiation) in the hospital(s) in Fukushima.				

都民の	多くが	被爆したはずだが,
tomin .no	*ooku.ga*	*hibaku.shi.ta.hazu.da.ga,*
metropolitanresident .ADN	many.NOM	exposure.DO.PST.MODU:should.be/PLN.but,
many of metropolitan residents		should have got exposed, but
Many of metropolitan residents |-.-| should have got exposed to radiation, but		

それによる	健康被害は	現在にいたるまで	報告されていない.
sore.ni.yoru	*kenkoo+higai.wa*	*genzai.ni .itaru.made*	*hookoku.s.are .tei.nai.*
that.CAU:by.CAUSE	health+damage.TOP	present.LOC:to .REACH.LOC:until	report.DO.PSV .ASP:rsl.NEG.
due to that	health damage	up to present	has not been reported
health damage due to that |-.-| has not been reported up to present			

[P1-11] 5th April 2011 06:38:02
【東大&東北大 物理 限定】東北大は震災のため当分の間休講．その間，東大物理では，講義の聴講を希望された東北大物理の学部生・院生の方々を受け入れます（手続き〆切済）．本日 9:00 よりガイダンス.
[Tokyo Uni & Tohoku Uni Physics limited] Tohoku Uni lectures ꞵ-.-ꞵ (will be) cancelled for a while due to the quake disaster. During that period, (we) at Tokyo Uni Physics (department) ┌|･|┘ will accept undergraduate and graduate students m(’。’@)m of Tohoku Uni Physics who have expressed their wish m(’。’@)m to audit of lectures (application ꞵ-.-ꞵ already closed). Guidance ꞵ-.-ꞵ (will be) from 9:00 today.

【東大&東北大	物理	限定】
【toodai.&.toohokudai	*butsuri*	*gentee】*
[Tokyo-Uni(ACR). &.Tohoku-Uni(ACR)	physics	limitation]
[Tokyo Uni & Tohoku Uni Physics limited]		

東北大は	震災のため	当分の間	休講.
Tooohokudai.wa	*shinsai .no.tame*	*toobun.no.aida*	*kyuukoo.*
Tohoku-Uni(ACR).TOP	earthquake-disaster .ADN.SAKE	while.ADN.INTERVAL	lecture-cancellation.
Tohoku Uni	due to earthquake disaster	for a while	ꞵ-.-ꞵ lectures cancelled.
Tohoku Uni lectures ꞵ-.-ꞵ (will be) cancelled for a while due to the quake disaster.			

その間,	東大物理では,
sono. aida,	*toodai+butsuri.de.wa,*
that/AND.INTERVAL,	Tokyo-Uni+physics.LOC:at.TOP,
that period	at Tokyo Uni Physics (Department),
During that period, at Tokyo Uni Physics (Department)	

講義の	聴講を	希望された
koogi.no	*chookoo.o*	*kiboo.s.are.ta*
lecture.ADN	auditing.ACC	wish.DO.RES.PST
auditing of lecture		wished m(’。’@)m
(who) have expressed their wish m(’。’@)m to audit of lectures		

東北大物理の	学部生・	院生の	方々を	受け入れます
toohokudai+ butsuri.no	*gakubu .see・*	*in.see .no*	*katagata .o*	*ukeire.masu*
Tohoku-Uni+ physics.ADN	undergraduate .student・	graduate.student .ADN	people(RES) .ACC	accept.POL
undergraduate and graduate students m(’。’@)m of Tohoku Uni Physics				┌|･|┘accept
(we) ┌|･|┘ will accept undergraduate and graduate students m(’。’@)m of Tohoku Uni Physics				

（手続き	〆切済）.
(tetsuzuki	*shimekiri.zumi).*
(procedure	closing.finishing).
(procedure	|-.-| closed already).
(application |-.-| already closed).	

本日	9:00 より	ガイダンス.
honjitsu	*9:00.yori*	*gaidansu.*
today(NEV)	9:00.LOC:from	|-.-| guidance.
|-.-| Guidance from 9:00 today.		

[P1-12] 24 March 2011 23:09:11
（水道水のグラフなど，東京都が発表数値を都や水道局の HP から拾って，うちの学生がすべて手作業でやってくれています．自動化できないかな．）
Regarding the tap water graphs and so on, my students ┌|·|┘ do it all manually by picking up numerical data that the Tokyo metropolitan government publishes from the HP of the metropolitan government and the water department. (I |-.-| wonder) if it can be automised.)

（水道水の	グラフなど,
(suidoo.sui.no	*gurafu.nado,*
tap-water.water.ADN	graph.HIL:and-so-on.,
tap water graphs and so on,	

東京都が	発表	数値を
tookyoo+to.ga	*happyoo*	*suuchi.o*
Tokyo+metropolitan-government.NOM	publication	numeric-data.ACC
numeric data the Tokyo metropolitan government publish(es)		

都や	水道局の	HP から	拾って,
to.ya	*suidoo.kyoku .no*	*eichipii.kara*	*hirot.te,*
metropolitan-government.and	tap-water.department .ADN	HP.LOC:from	pick-up.SUS
by picking up from the HP of the metropolitan government and the tap water department			

うちの	学生が	すべて	手作業で	やってくれています.
uchi.no	*gakusee.ga*	*subete*	*te+sagyoo .de*	*yatte.kure.tei.masu.*
inside.ADN	student.NOM	all	hand+work .MAN:by	do.GIVE-ME.ASP:cont.POL.
my	student	all	by hand work	┌|·|┘ do (it) for me.
my students ┌|·|┘ do it for me all manually.				

自動化できないかな．）
jidoo.ka.deki.nai.kana.)
automation.change.DO/POT.NEG.NEGO:int(COL).)
(I |-.-| wonder) if it can be automated.

[P1-13] 29 March 2011 07:36:20
【1.結論を先に言えば】1)核燃料棒が破損し，ヨウ素，セシウムとともに，Pu も漏れた．2)その濃度は環境レベル．3)敷地外のサンプルでも Pu 測定が望まれるが，4)作業される方の放射線防護をし，原発を冷やすことの方が急務.
[1. If (I) state the conclusion first] 1) nuclear fuel(s) rod broke, and together with iodine and caesium, Pu also |-.-| leaked. 2) Its density (is) the environment level. 3) A Pu measurement |-.-| is hoped for via samplings outside the site as well but 4) to provide radiation protection of the people m(’。’@)m who do the operation m(’。’@)m , and to cool down the NPP |-.-| (is) the more urgent task.

【1.結論を	先に	言えば】
[1.ketsuron.o	*sakini*	*ie.ba]*
[1.conclusion.ACC	before-something	say.if]
[1.conclusion	first	if say]
[1.If (I) state the conclusion first]		

1)核燃料棒が	破損し,
1)kaku+nenryoo+boo.ga	*hason.shi,*
1)nucleus+fuel+rod.NOM	breakage.DO/SUS,
1)nuclear fuel rod	broke, and
1)Nuclear fuel rod(s) broke, and	

ヨウ素,	セシウムとともに,	Pu も	漏れた.
yooso,	*seshiumu.to.tomoni*	*piiyuu.mo*	*more.ta.*
iodine,	caesium.with.TOGETHER	Pu.HIL:too	leak.PST.
together with iodine and caesium,		Pu too	leaked.
together with iodine and caesium, Pu also |-.-| leaked.			

2)その	濃度は	環境レベル.
2)sono	*noodo.wa*	*kankyoo+reberu.*
2)it/ADN	density.TOP	environment+level.
2)its density		|-.-| environment level.
2)Its density |-.-| (is) the environment level.		

3)敷地外の	サンプルでも	Pu 測定が	望まれるが,
3)shikichi.gai.no	*sanpuru.de .mo*	*piiyuu.sokutee.ga*	*nozom.areru.ga,*
3)site.out.ADN	sample.MAN:with .HIL:too	Pu.measurement.NOM	hope.PSV.but,
3)with the sample outside the site too		Pu measurement	|-.-| is hoped, but
3) A Pu measurement |-.-| is hoped for via samplings outside the site as well, but			

4)作業される	方の	放射線防護を	し,
4)sagyoo.s.areru	*kata.no*	*hoosha.sen+boogo.o*	*shi,*
4)operation.DO.RES	person/RES.ADN	radiation.line+protection.ACC	do/SUS,
4)do m('。')m operation	person m('。')m	radiation protection	do(ing), and
4)To provide radiation protection of people m('。')m who do m('。')m the operation, and			

原発を	冷やすことの方が	急務.
genpatsu .o	*hiyasu.koto.no.hoo .ga*	*kyuumu.*
nuclear-power-plant(ACR) .ACC	cool-down.THING.ADN.DIRECTION .NOM	urgent-task.
nuclear power plant(ACR)	cooling down more	urgent task.
to cool down the NPP |-.-| (is) the more urgent task.		

[P1-14] 15th March 08:36:44
（原子力安全保安院の方も，100%と言い切るのは躊躇された．どんな場合でも100%と言い切るのは難しいですよね）
(The person m(’。’@)m of Nuclear and Industrial Safety Agency also ǀ-.-ǀ hesitated m(’。’@)m to assert ‘100%’. (It) ┌ǀ∵ǀ┘’s difficult to assert 100% in whatever occasion isn’t it?)

（原子力安全保安院の	方も，
（genshi.ryoku+anzen+hoan.in.no	*kata.mo,*
（atom.power+safety.security.institution.ADN	person/RES.HIL:too,
(Nuclear and Industrial Safety Agency’s	person m(’。’@)m too
The person m(’。’@)m of Nuclear and Industrial Safety Agency too	

100%と	言い切るのは	躊躇された.
hyaku+paasento.to	*iikiru.no.wa*	*chuucho.s.are.ta.*
hundred+percent.PROJ	assert.NOMN.TOP	hesitation.DO.RES.PST.
‘a hundred percent’	to assert	hesitated m(’。’@)m
ǀ-.-ǀ hesitated m(’。’@)m to assert ‘100%’.		

どんな	場合でも	100%と	言い切るのは	難しいですよね）
donna	*baai.de* *.mo*	*hyaku+* *paasento* *.to*	*iikiru.no* *.wa*	*muzukashii.desu* *.yo* *.ne)*
how	occasion.LOC:in .HIL:too	hundred +percent .PROJ	assert.NMN .TOP	difficult.be/POL .NEGO :ins .NEGO :conf)
in whatever occasion		that 100%	to assert	is difficult isn’t it
(It) ┌ǀ∵ǀ┘’s difficult to assert 100% in whatever occasion, isn’t it?				

[P2-4] 13 March 2011 17:39:17
P1 先生もいってたけど、気体になりやすくて、こういう中途半端な物質が問題なんです。ヨウ素は昇華（固体から直接気体になる）しやすい。セシウムも沸点低いです。ウランとか、プルトニウムとか燃料そのもの、ってのはこの段階で問題にしなくていいですね。 @user1
As Prof. P1 was also saying, the halfway materials like these that are easy to become a gas are the problem. Iodine is easy to sublimate (become a gas directly from solid). Caesium also has a low boiling point. Those materials that are fuels themselves, like uranium and plutonium, do not need to be problematised at this stage, right? @user1

P1 先生も	いってたけど、
P1+sensee.mo	*it.te.ta.kedo*、
P1+teacher.HIL:too	say.ASP:cont(CONTR).PST.but,
Prof. P1 too	was saying but,
	言ってたけど、
As Prof. P1 was also saying,	

気体に	なりやすくて、	こういう	中途半端な	物質が	問題なんです。
kitai .ni	*nari .yasuku.te*、	*koo .iu*	*chuutohanpa .na*	*busshitsu .ga*	*mondai.na .n.desu*。
gas .ATTR	become .EASY.SUS,	this-way .SAY	halfway.EPI	material .NOM	problem.be ..be/POL.
gas	easy to become and	like this	halfway	materials	are the problem.
the halfway materials like these that are easy to become a gas are the problem.					

ヨウ素は	昇華	（固体から	直接	気体に	なる）	しやすい。
yooso .wa	*shooka*	*(kotai .kara*	*chokusetsu*	*kitai .ni*	*naru)*	*shi.yasui*。
iodine .TOP	sublimation	(solid .ATTR:from	directly	gas .ATTR	become)	DO.EASY/BE
iodine	sublimate	(from solid	directly	gas	become)	is easy to
Iodine is easy to sublimate (become a gas directly from solid).						

セシウムも	沸点	低いです。
seshiumu.mo	*futten*	*hikui.desu*。
Caesium.HIL:too	boiling-point	low/be/POL.
Caesium too	boiling point	is low.
Caesium also has a low boiling point.		

ウランとか、	プルトニウムとか	燃料	そのもの、ってのは
uran .toka,	*purutoniumu .toka*	*nenryoo*	*sono.mono*、*.tte .no.wa*
uranium .and-so-on	plutonium .and-so-on	fuel	it/ADN.THING、.PROJ/SAY(CONTR) .NMN.TOP
like uranium	like plutonium	fuel	thing that is … itself
Those materials that are fuels themselves, like uranium and plutonium,			

この	段階で	問題に	しなくていいですね。
kono	*dankai.de*	*mondai.ni*	*shi.nakute.ii.desu.ne*。
this/ADN	stage.LOC:at	problem.ATTR	do.NEG.GOOD.be/POL.NEGO:cnf.
at this stage		do not need to make it a problem	
do not need to be problematised at this stage, right?			

[P2-5] 25 March 20:47:23
. @user1 あれはそんなに飛散しない。僕はなんでみんなが金属系で騒ぎのか（プルトニウムとか）分からない。燃料をとんでもない温度にしたらあちこち飛ぶかもしれないが、ちょっと想定しがたい。化学毒性はあるが、もちろん量がないと問題はないし。もちろん現場では問題だが。
. @user1 That (plutonium) does not disperse so (widely). I (MSC) don't understand why everyone makes a fuss with a metallic strain (like plutonium). It may fly here and there if (one) makes the fuel go to an unthinkable temperature, but it is a bit hard to suppose. There is chemical toxicity, but of course there is no problem if it is not in (a large) amount... Of course it is a problem at the site, but…

.@user1	あれは	そんなに	飛散しない。
.@user1	*are.wa*	*sonna.ni*	*hisan.shi.nai*。
.@user1	that.TOP	so.CIR	dispersal.DO.NEG.
.@user1	that	so (widely)	does not disperse.
.@user1 That (plutonium) does not disperse so (widely).			

僕は	なんで	みんなが	金属系で	騒ぎのか
boku .wa	*nande*	*minna .ga*	*kinzoku.kee .de*	*sawagi(mistyping sawagu?) .no.ka*
I(MAS) .TOP	why(COL)	everyone .NOM	metal.strain .ANG:with	make-a-fuss .NMN.NEGO:intr
I	why	everyone	with metal strain	make a fuss
I (MSC) don't understand why everyone makes a fuss with a metallic strain (like plutonium).				

（プルトニウムとか）	分からない。
(purutoniumu.toka)	*wakar.anai*。
(plutonium.and-so-on)	understand.NEG.
such as plutonium	don't understand
[translation included above]	

燃料を	とんでもない	温度に	したら
nenryoo.o	*tondemonai*	*ondo.ni*	*shi.tara*
fuel.ACC	unthinkable	temperature.ATTR	DO.if
fuel	unthinkable temperature		if … make
If (one) makes the fuel go to an unthinkable temperature,			

あちこち	飛ぶかもしれないが、
achikochi	*tobu.ka.mo.shire.nai.ga*、
here-and-there	fly.NEGO:intr.HIL:too.BE-KNOWN.NEG.but,
here and there	may fly, but
it may fly here and there, but	

ちょっと	想定しがたい。
chotto	*sootee.shi.gatai。*
a-bit	supposition.DO.DIFFICULT/BE.
a bit	is difficult to suppose
it is a bit hard to suppose.	

化学毒性は	あるが、
kagaku+doku.see.wa	*aru.ga、*
chemistry+poison.character.TOP	be.but,
chemical toxicity	there is…, but
There is chemical toxicity, but	

もちろん	量が	ないと	問題は	ないし。
mochiron	*ryoo.ga*	*nai/be .to*	*mondai .wa*	*nai.shi。*
of-course	amount.NOM	non-existent/be .if	problem .TOP	non-existent/be.and-so.
of course	amount	if there is not	problem	there is no …, so
of course there is no problem if it is not in (a large) amount...				

もちろん	現場では	問題だが。
mochiron	*genba.de.wa*	*mondai.da.ga。*
of-course	site.LOC:at.TOP	problem.be/PLN.but.
of course	at the site	problem …, but
Of course it is a problem at the site, but…		

[P2-6] 25 March 23:09:19
Pu は α 線をだして崩壊するのですが、確実に体の中に止まるので危ないわけです。体の中にどんだけエネルギーをほり込むかって話で、あまり工夫はない。化学毒性については詳しくないですが、即死ってなんの話って感じ。RT @user1: これってスポンサーが国だし
While Pu ┌|·|┘ decays by giving out α rays, (it) ┌|·|┘is dangerous because it certainly stays inside the body. It |-.-| 's a matter of how much energy is thrown into the body, and there |-.-| is not much devising. (I) ┌|·|┘am not familiar with chemical toxicity, but like immediate death, what kind of story |-.-| (is that?) RT @user1: Cos this one |-.-|'s sponsored by the state

Pu は	α 線を	だして	崩壊するのですが、
piiyuu.wa	*arufa+sen.o*	*dashi.te*	*hookai.suru.no.desu.ga,*
Pu.TOP	alpha+line.ACC	give+out.SUS	decay.DO.NMN.be/POL.but,
Pu	alpha ray	giving out	┌|·|┘ decay …, but
While Pu ┌|·|┘decays by giving out alpha rays,			

確実に	体の	中に	止まるので	危ないわけです。
kakujitsuni	*karada.no*	*naka .ni*	*tomaru.node*	*abunai.wake.desu*
certain	body.ADN	inside .LOC:in	stop.because	dangerous.REASON.be/POL
certainly	inside the body		stay so	is dangerous
it ┌|·|┘ is dangerous because it certainly stays inside the body.				

体の	中に	どんだけ	エネルギーを	ほり込むかって	話で、
karada .no	*naka .ni*	*dondake*	*enerugii .o*	*horikomu .ka .tte*	*hanashi .de*
body .ADN	inside .LOC:in	how-much (CONTR)	energy .ACC	throw-in/COL .NEGO:intr .PROJ/say(CONTR)	story .be/SUS
inside the body		how much	energy	to throw in	is a story and
It|-.-|'s a matter of how much energy is thrown into the body, and					

あまり	工夫は	ない。
amari	*kufuu.wa*	*nai.*
(not)so-much	device.TOP	non-existent/be.
so much	devising	does not exist.
there |-.-| is not much devising.		

化学毒性については	詳しくないですが、
kagaku+dokusee.nitsuite.wa	*kuwashiku.nai.desu.ga*
chemistry+toxicity.about.TOP	familiar.NEG.be/POL.but
regarding chemical toxicity	am not familiar but
(I) ┌|･|┘ am not familiar with chemical toxicity, but	

即死って	なんの	話って感じ。
soku+shi.tte	*nan.no*	*hanashi.tte.kanji.*
immediate+death.PROJ/TOP(CONTR)	what.ADN	story.PROJ/say(CONTR) .FEELING.
immediate death	what story kind of like	
but like immediate death, what kind of story |-.-| (is that?)	

RT@user1:これって	スポンサーが	国だし
RT@user1: *kore.tte*	*suponsaa.ga*	*kuni.da.shi*
RT@user1: this.TOP(COL)	sponsor.NOM	state.be.and-so
RT@user1: regarding this	sponsor	is the state and so
RT@user1: Cos this one |-.-|'s sponsored by the state		

[P2-7]　25 March 2011　23:58:13
いやこれは他に見ているひともいるからやっているので、気になさらず（啓蒙活動）RT @user1: 一見理屈の通った文章に落とし穴があることは良くあり書いてない事まで読めるような情報量が欲しい。そこまで行かないと安心出来ない。わざわざお付き合い頂いてすみませんでした。
No, I |-.-| do this because there are also other people watching (it), so |-.-| please don't mind m('。')m (enlightening activity) RT@uesr1: (It) |-.-| is often the case that there are pitfalls in texts that are seemingly logical, and I |-.-| want enough information so as to read what isn't written between the lines. I |-.-| can't feel secure unless I get to that point. ┌|･ｰ･|┘ Thank you for spending your time for me m(_ _)m .

いや	これは
iya	*kore.wa*
no	this.TOP
no	this
No, (I do) this	

他に	見ている	ひとも	いるから	やっているので、
hoka.ni	*mi* *.teiru*	*hito* *.mo*	*iru.kara*	*yat.teiru* *.node*、
other.CIR	watch .ASP:cont	person .HIL:too	be.because	do.ASP:cont .because,
other (than you)	is watching	person too	because there is	am doing … so
(I) |-.-| do (this) because other people are also watching (it), so				

気になさらず
ki.ni.nasara.zu
mind.ATTR. DO/RES.NEG
|-.-| please don't mind m('。')m

（啓蒙活動）
(keemoo+katsudoo)
(enlightment+activity)
(enlightening activity)

RT @user1:	一見	理屈の	通った	文章に
RT @user1:	*ikken*	*rikutsu.no*	*toot.ta*	*bunshoo.ni*
RT @user1:	at-first-sight	logic.NOM	pass.PST	text.LOC:in
RT @user1:	at first site	logical		in text
RT @user1: in texts that are seemingly logical				

落とし穴が	あることは	良く	あり
otoshi+ana.ga	*aru.koto.wa*	*yoku*	*ari*
fall+hole.NOM	be.THING.TOP	often	be/SUS
pitfall	that there is	often	there is … and
It is often the case that there are pitfalls (in the text which is seemingly logical)			

書いてない	事まで	読めるような	情報量が	欲しい。
kai *.te* *.nai*	*koto* *.made*	*yom.eru* *.yoona*	*joohoo+ryoo* *.ga*	*hoshii*。
write .ASP:rsl(CONTR) .NEG	thing .LOC:till	read.POT .COMP	information+amount .NOM	want.
not written	up to things	so can read	information amount	(I) want.
(I) ⊢.-⊣ want enough information so as to read between the lines that aren't written.				

そこまで	行かないと	安心出来ない。
soko.made	*ika.nai.to*	*anshin.deki.nai*。
there.until	go.NEG.if	security.DO/POT.NEG.
up to there	if not go	cannot feel secure
(I) ⊢.-⊣ can't feel secure unless I get to that point.		

わざわざ	お付き合い頂いて	すみませんでした。
wazawaza	*o.tsukiai.itadai.te*	*sumimasen.deshi.ta*。
purposely	DEF.go-along.RECEIVE/DEF.SUS	I'm-sorry.be/POL.PST.
by taking time	receive m(_ _)m the favour of going along (with me)	┌|･|┘ Sorry for having….
┌|･|┘ Thank you for spending your time for me m(_ _)m .		

[P1-15] 29 March 2011 07:40:37
【7.プルトニウムは遠くに飛びにくい】チェルノブイリ事故後「137Cs 等揮発性核種とは異なり，日本で顕著な Pu 増加無し．Pu が Cs よりも大きな粒径の粒子に含まれ，輸送の間に大気中から除去されたためである」（気象研） http://plixi.com/p/87687577
[7.Plutonium is unlikely to fly far] After the Chernobyl accident '(There were) no salient increases of Pu in Japan, as opposed to volatile isotopes such as 137Cs. This is because Pu was encapsulated in particles of larger diameter than Cs, and was eliminated from the atmosphere during the transport (from Chernobyl).' (MRI) http://plixi.com/p/87687577

Cf. MRI is the acronym for Meteorological Research Institute, Japan.

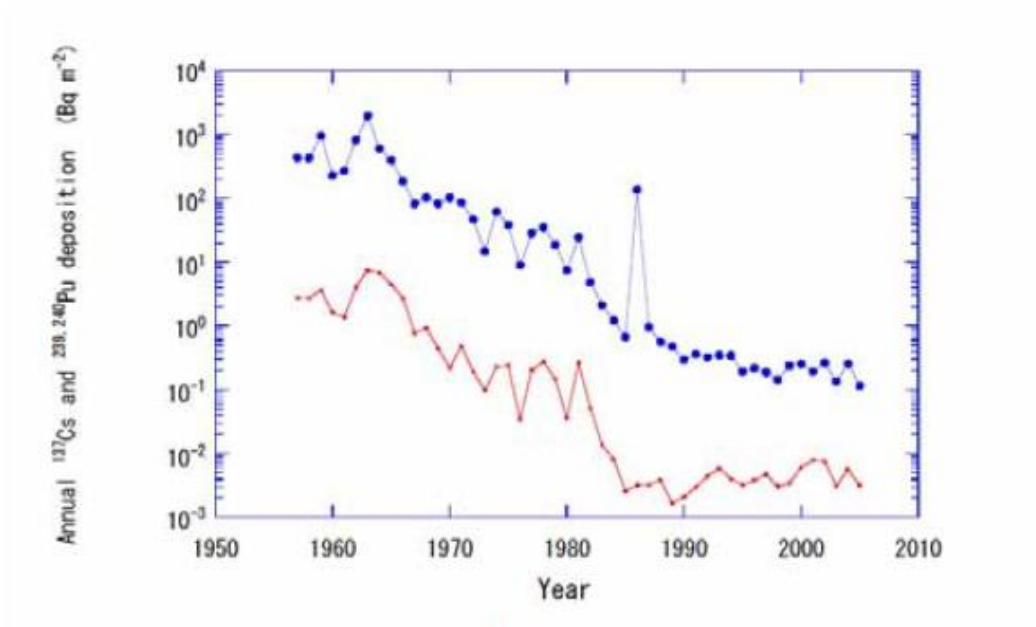


Fig. 18: Annual deposition of ^{239,240}Pu observed in the MRI, Japan

【7.プルトニウムは	遠くに	飛びにくい】
[7.purutoniumu.wa	*tooku.ni*	*tobi.nikui]*
[7.plutonium.TOP	long-distance.LOC:to	fly.HARD/BE]
[7.plutonium	far	is hard to fly]
[7.Plutonium is unlikely to fly far]		

チェルノブイリ事故後	「137Cs 等	揮発性核種とは	異なり,
cherunobuiri+jiko .go	*'Ichi+san+nana+ shiiesu.etc*	*kihatsu.see+ kakushu.to.wa*	*kotonari,*
Chernobyl+accident .after	'one+three+seven+ Cs.etc	volatalisation.character+ isotope.COMP:from.TOP	differ/SUS,
after Chernobyl accident	from volatile isotope such as 137Cs		differ,
After Chernobyl accident, 'as opposed to volatile isotope such as 137Cs,			

日本で	顕著な	Pu 増加	無し.
nihon.de	*kencho.na*	*piiyuu+zooka*	*nashi.*
Japan.LOC:in	salient.EPI	Pu+increase	non-existent.
in Japan	salient	increase of Pu	(there is) no
(there were) no salient increases of Pu in Japan.			

Pu が	Cs よりも	大きな	粒径の	粒子に	含まれ,
piiyuu.ga	*shiiesu .yorimo*	*ookina*	*ryuukee. no*	*ryuushi .ni*	*fukum .are,*
Pu.NOM	Cs .COMP:than	big	particle-diameter. AND	particle .AGENT	include .PAS/SUS,
Pu	bigger than Cs		diameter's	in particle	be included
(This was because) Pu was encapsulated in particles of larger diameter than Cs, and					

輸送の間に	大気中から	除去されたためである」	（気象研）
yusoo.no. aida.ni	*taiki.chuu .kara*	*jokyo.s.are .ta.tame.dearu'*	*(kishooken)*
transport.ADN. INTERVAL.LOC:in	atmosphere.inside .LOC:from	removal.DO.PASS .PST.SAKE.be/LPLN'	(Meteorological-Research-Institute-Japan(ACR))
during transport	from atmosphere	because …was removed	(MRI)
because (…) was eliminated from the atmosphere during the transport (from Chernobyl).' (MRI)			

[J2-1] 29 March 2011 11:11:49
(-_-) RT @user4: 先ほどの、プルトニウムは重いので飛散しない？の件ですが、どうやら「安全デマ」が濃厚です。http://bit.ly/eXnB1N チェルノブイリからの飛来を示すデータ
(-_-) RT @user4: Regarding the recent issue of 'plutonium is heavy so it doesn't disperse?', apparently 'safety demagogy' is strongly possible. http://bit.ly/eXnB1N (These are the) data that show the transportation (of plutonium) over from Chernobyl

(-_-)

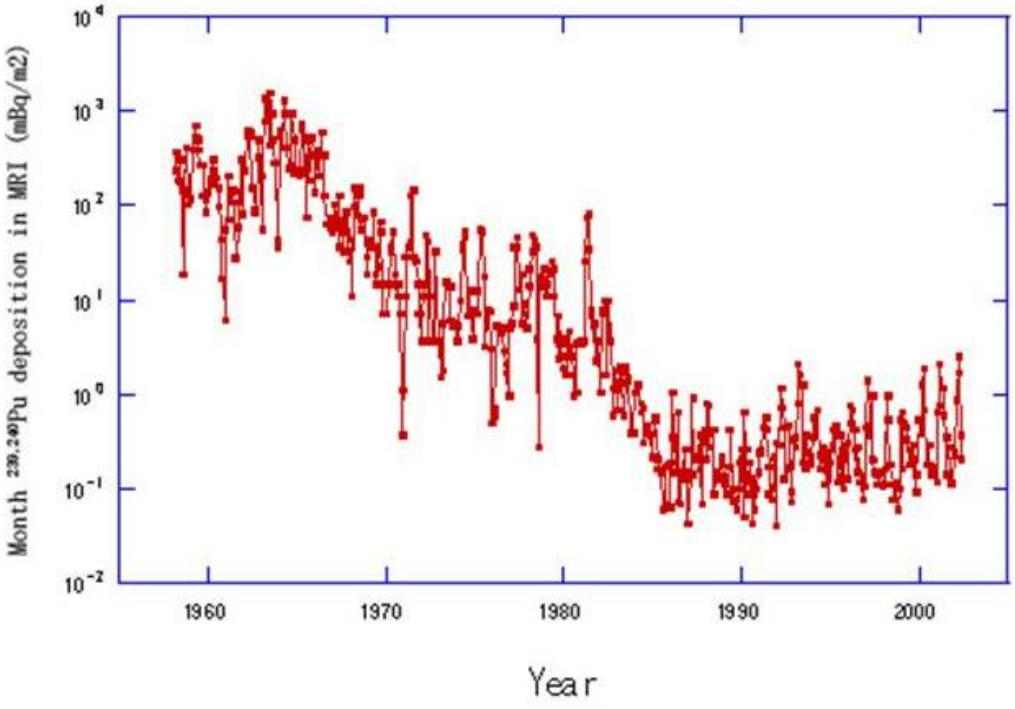
RT @user4:

先ほどの、	プルトニウムは	重いので	飛散しない？の	件ですが、
saki.hodo .no、	*purutoniumu .wa*	*omoi .node*	*hisan.shi.nai? .no*	*ken.desu.ga*、
earlier.about .ADN	plutonium .TOP	heavy .because	dispersal.DO.NEG? .ADN	matter.be/POL.but,
earlier	'plutonium	because heavy	of ('…) does not disperse?'	concerning the matter (of ….),
Regarding the recent matter of 'plutonium is heavy so it doesn't disperse?',				

どうやら	「安全デマ」が	濃厚です。
dooyara	「*anzen+dema*」*.ga*	*nookoo.desu*。
apparently	'safety+demagogy'.NOM	dense.be/POL.
apparently	safety demagogy	is strong (in possibility).
apparently 'safety demagogy' is strongly possible.		

http://bit.ly/eXnB1N
Hyperlink to 'Artificial Radionuclides in the Environment 2003' (Geochemical Research Department, Meteorological Research Institute, Japan 2004).

チェルノブイリからの	飛来を	示す	データ
cherunobuiri.kara.no	*hirai.o*	*shimesu*	*deeta*
Chernobyl.LOCLfrom.ADN	coming-flying(NEV).ACC	show	data
transportation from Chernobyl		show	data
(These are the) data that show the transportation (of plutonium) over from Chernobyl			


Month 239,240Pu deposition in MRI (mBq/m2)
10^4
10^3
10^2
10^1
10^0
10^-1
10^-2
1960
1970
1980
1990
2000
Year

[P2-8] 29 March 2011 14:10:22
@J2 さんはこれは読まれましたか？同じ図ですが、上がセシウム下がプルトニウムですが。RT @P1: 【7.プルトニウムは遠くに飛びにくい】チェルノブイリ事故後「(中略) http://plixi.com/p/87687577
Mr. @J2, ┌|·.·|┘did you read m(’。’@)m this? It ┌|·.·|┘’s the same diagram, and the upper ┌|·.·|┘is caesium and the lower is plutonium, but (what does it say)? RT @P1: [7.Plutonium is hard to fly] After the Chernobyl accident’(omission) http://plixi.com/p/87687577

@J2 さんは	これは	読まれましたか？
@J2.san.wa	*kore.wa*	*yom.are.mashi.ta.ka ?*
@J2.TIT.TOP	this.TOP	read.RES.POL.PST.NEGO:intr?
Mr. @J2	this	┌|·.·|┘did you read m(’。’@)m …?
Mr. @J2, ┌|·.·|┘did you read m(’。’@)m this?		

同じ、	図ですが
onaji、	*zu.desu.ga*、
same,	diagram.be/POL.but,
is the same diagram but,	
It ┌|·.·|┘’s the same diagram, and	

上が	セシウム	下が	プルトニウムですが。
ue.ga	*seshiumu*	*shita.ga*	*purutoniumu.desu.ga*。
upper.NOM	caesium	lower.NOM	plutonium.be/POL.but.
upper (one)	caesium	lower (one)	is plutonium, but.
the upper ┌|·.·|┘ is caesium and the lower is plutonium, but (what does it say)?			

RT @P1:	【7.プルトニウムは	遠くに	飛びにくい】
RT @P1:	*[7.purutoniumu.wa*	*tooku.ni*	*tobi.nikui]*
RT @P1:	[7.plutonium.TOP	far.to	fly.HARD/BE]
RT @P1:	[7.plutonium	far	|-.-| is hard to fly]
RT @P1: [7.Plutonium |-.-| is unlikely to fly far]			

チェルノブイリ事故後	「(中略)
cherunobuiri+jiko.go	「(chuuryaku)
Chernobyl+accident.after	‘(middle-omission)
after Chernobyl accident	‘(omission)
After the Chernobyl accident’(omission)	

http://plixi.com/p/87687577

[P2-9] 29 March 14:12:25
残念なジャーナリスト(~~) 知らん。
|-.-| Regrettable journalist (~~) (I) |-.-| don’t care.

残念な	ジャーナリスト	(~~)
zannen.na	*jaanaristo*	*(~~)*
|-.-| regrettable.EPI	journalist	face emoticon with frowning eyes
|-.-| Regrettable journalist (~~)		

知らん。
shira.n。
know.NEG(DLT).
(I) |-.-| don’t care.

Appendix 4

Tweets for Chapter 6

[P1-2] 27 March 2011 12:40:42
半減期が短く，特徴的なガンマ線を出す放射性物質はすぐに同定できるが，半減期が 2 万 4000 年もあり，α線を出して崩壊する Pu は，ドッサリない限り検出できない．(KEK では) Pu239 の「親」である 239Np の崩壊ガンマ線が見えていない．現時点で Pu 大量飛散は無い．
Radioactive materials whose half-life is short and which give out characteristic gamma rays can be identified immediately, but Pu, the half-life of which is as long as 24,000 years and which decays by giving out α rays cannot be detected unless there is a heap. (At KEK) decaying gamma rays of 239Np, which is the 'parent' of Pu239, are not seen. At this moment there is no large dispersal of plutonium.

半減期が	短く,	特徴的な	ガンマ線を	出す	放射性物質は
hangen .ki.ga	*mijikaku,*	*tokuchoo .teki.na*	*gamma+sen .o*	*dasu*	*hoosha .see+ busshitsu.wa*
reduction-into- half .period.NOM	short/be/ SUS,	character .ADJ.EPI	gamma+ line.ACC	give-out	radiation .character+ material.TOP
half-life	short and	characteris tic	gamma ray	give out	radioactive material
Radioactive materials whose half-life is short and which give out characteristic gamma rays					

すぐに	同定できるが,
suguni	dootee.dekiru.ga,
immediately	identification.DO/POT.but,
immediately	can be identified, but
can be identified immediately, but	

半減期が	2 万 4000 年も	あり,	α 線を	出して	崩壊する	Pu は,
hangen .ki.ga	*ni+man+ yon+sen .nen .mo*	*ari,*	*arufa+ sen .o*	*dashi .te*	*hookai .suru*	*piiyuu .wa,*
reduction-into-half period.NOM	two+tenthousand+ four+thousand .year .HIL:as-much-as	be/ SUS,	alpha+ line .ACC	give-out .SUS	decay .DO	Pu .TOP,
half-life	as much as 24 thousand years	be,	alpha ray	giving out	decays	Pu
Pu, whose half-life period is as long as 24 thousand years and which decays by giving out α rays						

ドッサリ	ない限り	検出できない.
dossari	*nai.kagiri*	*kenshutsu.deki.nai.*
a-heap(COL)	non-existent/be.LIMIT	detection.DO/POT.NEG.
a heap	unless there is	cannot detect
cannot be detected unless there is a heap.		

(KEK では)
(keeiikee.de.wa)
(KEK.LOC:at.TOP)
(at KEK)

Pu239 の	「親」である	239Np の	崩壊ガンマ線が	見えていない.
piiyuu+ni+ san+kyuu .no	*'oya' .dearu*	*ni+san+kyuu+ enupii.no*	*hookai+ganma+ sen.ga*	*mie .tei.nai*
Pu+two+ three+nine .ADN	'parent' .be/LPLN	two+three+nine+ Np.ADN	dacay+gamma+ line.NOM	be-seen .ASP:cont.NEG
Pu239's	is 'parent'	239Np's	decay gamma ray	is not seen
(At KEK) decay gamma ray of 239Np which is the 'parent' of Pu239 is not seen.				

現時点で	Pu 大量飛散は	無い.
gen.jiten.de	*piiyuu+tai.ryoo+hisan.wa*	*nai.*
present.moment.LOC:at	Pu+large.amount+dispersal.TOP	non-existent/be.
at this moment	large dispersal of Pu	there is not
There is no large dispersal of Pu at this moment.		

[P1-2] 13 March 2011 10:43:39
福島第一原子力発電所 3 号機はいわゆるプルサーマルですが，プルトニウムは通常炉内にもある．排気などに伴い外部に放出される放射性物質の種類には違いは生じない．格納容器が守られれば，プルサーマルだからと言って特別な事態は生じません．
Fukushima Daiichi Nuclear Power Plant Reactor 3 is a so-called plu-thermal reactor, but plutonium exists in regular furnaces as well. There is no difference in the kinds of radioactive materials emitted outside along with ventilation and so on. If the container is protected, special matters do not arise because (it) is a plu-thermal.

福島第一原子力発電所 3 号機は	いわゆる	プルサーマルですが,
Fukushima+dai.ichi+genshi.ryoku+ hatsuden.sho+sangoo.ki.wa	*iwayuru*	*purusaamaru.desu.ga*
Fukushima+number.one+atom.power+ power-generating.place+third.machine.TOP	so-called	plu-thermal.be/POL.but,
Fukushima Daiichi Nuclear Power Plant Third Reactor	so-called	is plu-thermal, but
Fukushima Daiichi Nuclear Power Plant Third Reactor is a so-called plu-thermal reactor, but		

プルトニウムは	通常炉内にも	ある.
purutoniumu.wa	*tsuujo+.ro.nai.ni.mo*	*aru.*
plutonium.TOP	regular+furnace.inside.LOC:in.HILtoo	be.
plutonium	inside regular reactor too	is.
plutonium exists inside regular furnaces as well.		

排気などに	伴い	外部に	放出される	放射性物質の	種類には
haiki .nado .ni	*tomonai*	*gaigu .ni*	*hooshutsu .s.areru*	*hoosha .see+ busshitsu.no*	*shurui .ni .wa*
ventilation .HIL:and-so-on .ACP	accompay /SUS	outside .LOC.to	emission .DO.PSV	radiation .character+ material.ADN	kind .ANG:in .TOP
along with ventilation and so on		outside	is emitted	radioactive material	in the kind
in the kinds of radioactive materials emitted outside along with ventilation and so on.					

違いは	生じない.
chigai.wa	*shooji.nai.*
difference.TOP	arise.NEG.
difference	doesn’t arise
there is no difference .	

格納容器が	守られれば,
kakunoo.yooki.ga	*mamor.arere.ba,*
storing.container.NOM	protect.PASS.if,
containter	if … is protected
If the container is protected	

プルサーマルだからと言って	特別な	事態は	生じません.
purusaamaru.da.kara.to .it.te	*tokubetsu.na*	*jitai .wa*	*shooji.mas.en.*
plu-thermal.be.because.PROJ .SAY.SUS	special.EPI	state-of-affairs .TOP	arise.POL.NEG
because it is plutonium-thermal	special matter		does not arise
special matters do not arise because (it) is a plu-thermal.			

[P1-4] 29 March 2011 07:36:20
【1.結論を先に言えば】1)核燃料棒が破損し，ヨウ素，セシウムとともに，Pu も漏れた．2)その濃度は環境レベル．3)敷地外のサンプルでも Pu 測定が望まれるが，4)作業される方の放射線防護をし，原発を冷やすことの方が急務.
[1. If (I) say the conclusion first] 1) nuclear fuel rod(s) broke, and together with iodine and caesium, Pu leaked too. 2) Its density (is at) the environment level. 3) the Pu measurement is hoped for via samplings outside the site as well but 4) to provide radiation protection of the people who do the operation, and to cool down the NPP (is the) more urgent task.

【1.結論を	先に	言えば】
[1.ketsuron.o	*saki.ni*	*ie.ba]*
[1.conclusion.ACC	beforehand:LOC:at	say.if]
[1.conclusion	first	if say]
[1.If (I) say the conclusion first]		

1)核燃料棒が	破損し,
1)kaku+nenryoo+boo.ga	*hason.shi,*
1)nucleus+fuel+rod.NOM	breakage.DO/SUS,
1)nuclear fuel rod	broke, and
1)The nuclear fuel rods broke, and	

ヨウ素,	セシウムとともに,	Pu も	漏れた.
yooso,	*seshiumu.to.tomoni*	*piiyuu.mo*	*more.ta.*
iodine,	caesium.ACC:with.TOGETHER	Pu.HIL:too	leak.PST.
together with iodine and caesium,		Pu too	leaked.
together with iodine and caesium, Pu leaked too.			

2)その	濃度は	環境レベル.
2)so/no	*noodo.wa*	*kankyoo+reberu.*
2)it/ADN	density.TOP	environment+level.
2)its density		environment level.
2)Its density (is at) the environment level.		

3)敷地外の	サンプルでも	Pu 測定が	望まれるが,
3)shikichi.gai.no	*sanpuru .de.mo*	*piiyuu.sokutee.ga*	*nozom.areru.ga,*
3)site.out.ADN	sample.MAN:with .HIL:too	Pu.measurement.NOM	hope.PASS.but,
3)with the sample outside the site too		Pu measurement	|-.-| is hoped, but
3) A Pu measurement |-.-| is hoped for via samplings outside the site as well, but			

4)作業される	方の	放射線防護を	し,
4)sagyoo.s.areru	*kata.no*	*hoosha.sen+boogo.o*	*shi,*
4)operation.DO.RES	person/RES.ADN	radiation.line+protection.ACC	do/SUS,
4)do m(’。’@)m operation	person m(’。’@)m	radiation protection	do(ing), and
4)To provide protection of people m(’。’@)m who do m(’。’@)m the operation, and			

原発を	冷やすことの方が	急務.
genpatsu .o	*hiyasu.koto.no.hoo .ga*	*kyuumu.*
nuclear-power-plant(ACR) .ACC	cool-down.THING.ADN.DIRECTION .NOM	urgent-task.
nuclear power plant(ACR)	cooling down more	urgent task.
to cool down of the NPP (is the) more urgent task.		

[P1-7] 28 March 2011 09:30:51
【X 線スペクトル募集】ベリリウム窓付 X 線用 Ge 検出器等をお持ちの方，Pu の α 崩壊後に出る U の特性 X 線測定できませんか．Pu 大量飛散を心配しておられる方が多い．数値データがあれば定量的な議論が可能になります．
[X-ray spectrum recruited] (If there is) anyone who has a Ge detector for X rays with beryllium window etc., could you do the characteristic X ray measurement of U[111] produced after Pu's α decay? There are a lot of people who are anxious about the large dispersal of Pu. If there are numerical data (then) quantitative discussion becomes possible.

【X 線スペクトル募集】
[ekkusu+sen+supekutoru+boshuu]
[x+line+spectrum+recruitment]
[x ray spectrum wanted]

ベリリウム窓付 X 線用 Ge 検出器等を	お持ちの	方,
beririumu+mado.tsuki+ekkusu+sen.yoo+jiiii+kenshutsu.ki .too.o	*o.mochi .no*	*kata,*
beryllium+window.attach+x+line.USE+Ge+detection.device .etc.ACC	RES.have .ASP:rsl/RES	person/ RES
Ge detector for X ray with beryllium window etc	has	
(If there is) anyone who has a Ge detector for X ray with beryllium window etc.,		

Pu の	α 崩壊後に	出る	U の	特性 X 線測定	できませんか.
piiyuu .no	*arufa+hookai .go.ni*	*deru*	*yuu .no*	*tokusee+ekksusu+ sen+sokutee*	*deki.mas .en.ka.*
Pu. ADN	alpha+decay .after.LOC:in	come-out	U .ADN	characteristic+X+ line+measurement	do/POT.POL .NEG.NEGO:intr
after Pu's alpha decay		come out	U's	characteristic X ray measurement	could you do?
could you do the characteristic X ray measurement of U produced after Pu's α decay?					

Pu 大量飛散を	心配しておられる	方が	多い.
piiyuu+tai.ryoo+ hisan.o	*shinpai.shi .teorareru*	*kata.ga*	*ooi.*
Pu+large.amount+ dispersal.ACC	anxiety.DO .ASP :cont/RES	person/RES.NOM	many/be.
large dispersal of Pu	is anxious	person	are many
There are a lot of people who are anxious about the large dispersal of Pu.			

[111] U' is the chemical symbol of uranium.

数値データが	あれば	定量的な	議論が	可能に	なります.
suuchi+deeta .ga	*are .ba*	*teeryoo .teki.na*	*giron .ga*	*kanoo .ni*	*nari .masu.*
numeric-value+data .NOM	be .if	quantification .ADJ.EPI	discussion .NOM	possible .CIR	become .POL.
numerical data	if there is	quantitative	discussion	possible	become
If there are numerical data quantitative discussion becomes possible					

[P2-1] 25 March 20:47:23
. @user1 あれはそんなに飛散しない。僕はなんでみんなが金属系で騒ぎのか（プルトニウムとか）分からない。燃料をとんでもない温度にしたらあちこち飛ぶかもしれないが、ちょっと想定しがたい。化学毒性はあるが、もちろん量がないと問題はないし。もちろん現場では問題だが。
. @user1 That (plutonium) does not disperse so (widely). I (MSC) don't understand why everyone makes a fuss with a metallic strain (like plutonium). It may fly here and there if (one) makes the fuel go to an unthinkable temperature, but it is a bit hard to suppose. There is chemical toxicity, but of course there is no problem if it is not in (a large) amount... Of course it is a problem at the site, but…

.@user1	あれは	そんなに	飛散しない。
.@user1	*are.wa*	*sonnani*	*hisan.shi.nai*。
.@user1	that.TOP	so/CIR	dispersal.DO.NEG.
.@user1	that	so (widely)	does not disperse.
.@user1 That (plutonium) does not disperse so (widely).			

僕は	なんで	みんなが	金属系で	騒ぎのか
boku .wa	*nande*	*minna.ga*	*kinzoku.kee .de*	*sawagi(mistyping sawagu?) .no.ka*
I(MAS) .TOP	why(COL)	everyone.NOM	metal.strain .ANG:with	make-a-fuss .NMN.NEGO:intr
I	why	everyone	with metal strain	make a fuss
I (MSC) don't understand why everyone makes a fuss with a metallic strain (like plutonium).				

（プルトニウムとか）	分からない。
(purutoniumu.toka)	*wakar.anai*。
(plutonium.and-so-on)	understand.NEG.
such as plutonium	don't understand
[translation included above]	

燃料を	とんでもない	温度に	したら
nenryoo.o	*tondemonai*	*ondo.ni*	*shi.tara*
fuel.ACC	unthinkable	temperature.ATTR	DO.if
fuel	unthinkable temperature		if … make
If (one) makes the fuel go to an unthinkable temperature,			

あちこち	飛ぶかもしれないが、
achikochi	*tobu.ka.mo.shire.nai.ga*、
here-and-there	fly.NEGO:intr.HIL:too.BE-KNOWN.NEG.but,
here and there	may fly, but
it may fly here and there, but	

ちょっと	想定しがたい。
chotto	*sootee.shi.gatai。*
a-bit	supposition.DO.DIFFICULT/BE.
a bit	is difficult to suppose
it is a bit hard to suppose.	

化学毒性は	あるが、
kagaku+dokusee.wa	*aru.ga、*
chemistry+toxicity.TOP	be.but,
chemical toxicity	there is…, but
There is chemical toxicity, but	

もちろん	量が	ないと	問題は	ないし。
mochiron	*ryoo.ga*	*nai* *.to*	*mondai* *.wa*	*nai.shi。*
of-course	amount.NOM	non-existent/be .if	problem .TOP	non-existent/be.and-so.
of course	amount	if there is not	problem	there is no …, so
of course there is no problem if it is not in (a large) amount...				

もちろん	現場では	問題だが。
mochiron	*genba.de.wa*	*mondai.da.ga。*
of-course	site.LOC:at.TOP	problem.be/PLN.but.
of course	at the site	problemis …, but
Of course it is a problem at the site, but…		

[J1-4] 1 April 2011 16:54:57
{family-name}助教の続き。検出されたプルトニウムが、1〜4 号機のどこから放出されたものか、特定できないし、意味もない。プルトニウム検出の意味は、ペレットの溶融が一部始まっている点。確実に！ (#{J1'sname}7 live at http://{hyperlinktoJ1'sustreamsite}
Assistant Professor {name} continuing. It is not possible to identify which reactor 1-4th the plutonium detected was emitted from, and it doesn't matter either. The meaning of plutonium detection is that melting of pellet(s) has partially begun. Certainly! (#{J1'sname}7 live at http://{hyperlinktoJ1'sustreamsite}

The hashtag with J1's name with number 7, followed by the hyperlink to J1's own video site on an online video site called Ustream.

{family-name}助教の	続き。
{family-name}+*jokyoo.no*	*tsuzuki*。
{ family-name}+assistant-professor.ADN	continuation.
Assistant professor { family-name} continuing	

検出された	プルトニウムが、	1〜4 号機の	どこから	放出された	ものか、
kenshutsu .s.are .ta	*purutoniumu .ga*、	*ichi.kara .yongoo.ki .no*	*doko .kara*	*hooshutsu .s.are .ta*	*mono .ka*、
detection .DO.PSV .PST	plutonium .NOM,	one.from .fourth.machine .ADN	where .LOC:from	emission .DO.PSV .PST	thing .NEGO: intr
(that) was detected	plutonium	of one to fourth reactor	from where	was emitted	one
which reactor 1-4th the plutonium detected was emitted from,					

特定できないし、	意味も	ない。
tokutee.deki.nai.shi、	*imi.mo*	*nai*。
identification.DO/POT.NEG.and,	meaning.HIL:too	non-existent/be.
cannot identify and	meaning either	there is no
It is not possible to identify (which reactor 1-4th the plutonium detected was emitted from), and it doesn't matter either.		

プルトニウム検出の	意味は、
purutoniumu+kenshutsu.no	*imi.wa*、
plutonium+detection.ADN	meaning.TOP,
of plutonium detection	meaning
The meaning of plutonium detection,	

ペレットの	溶融が	一部	始まっている	点。
peretto.no	*yooyuu.ga*	*ichibu*	*hajimat.teiru*	*ten。*
pellet.ADN	melting(NEV)	part	begin.ASP:rsl	point.
of pellet	melting	partially	has begun	point
(is) that melting of pellet(s) has partially begun.				

確実に！
kakujitsu.ni！
certain.CIR!
Certainly!

(#{J1'sname}7 live at http://{hyperlinktoJ1'sustreamsite}

[J2-1] 27 March 2011 12:43:25
【緊急】菅首相へ。政府は非常事態宣言を。 @kantei_saigai 質問した。３号炉のプルトニュウム検出が表にないが？東電「プルトニウムを検出する機器を持っていない。よって測っていない」 http://bit.ly/eJI3As #nicojishin
[Urgency] Dear Prime Minister Kan, and your government, (please announce) the proclamation of a state of emergency. @prime minister-official-residence_disaster (I) asked a question. There is no plutonium detection from reactor 3 in the table, but (why is that so)? TEPCO '(We) don't have an apparatus to detect plutonium. Therefore (we) haven't measured (it)' http://nicovideositeofTEPCOconferenceon26March #nicovideosite-earth-quake

【緊急】
[kinkyuu]
[urgency]

菅首相へ。
Kan+shushoo.e。
Kan+prime minister.REC:to.
Dear Prime Minister Kan.

政府は	非常事態宣言を。
seefu.wa	*hijoo+jitai+sengen.o*。
government.TOP	emergency+state-of-affairs+proclamation.ACC.
the government	proclamation of state of emergency
The government, (please announce) the proclamation of a state of emergency.	

@kantei_saigai
@prime minister-official-residence_disaster

質問した。
shitsumon.shi.ta。
question.DO.PST.
(I) asked a question.

３号炉の	プルトニュウム検出が	表に	ないが？
sangooro.no	*purutonyuum+kenshutsu.ga*	*hyoo.ni*	*nai .ga?*
third-reactor.ADN	plutonium+detection.NOM	table.LOC:on	non-existent/be .but?
plutonium detection of third reactor		on the table	there isn't (…) but?
There is no plutonium detection from reactor 3 in the table, but (why is that so)?			

東電
tooden
TEPCO(ACR)

プルトニウムを	検出する	機器を	持っていない。
purutoniumu.o	*kenshutsu.suru*	*kiki.o*	*mot.tei.nai*。
plutonium.ACC	detection.DO	apparatus.ACC	have.ASP:rsl.NEG.
plutonium	detect	apparatus	do not have
(We) don’t have an apparatus to detect plutonium.			

よって	測っていない」
yotte	*hakat.tei.nai /*
therefore	measure.ASP:rsl.NEG’
therefore	have not measured
Therefore, (we) haven’t measured (it).’	

’ http://nicovideositeofTEPCOconferenceon26March #nicovideosite-earth-quake

[J1-2] 29 March 2011 04:43:45
「一万年と二千年前から」という CM ソングを思い出す。気の遠くなる遠い歳月。@user3: 「プルトニウムの半減期を」（記者）「2 万 4 千年であったかと」（東電副社長） (#(J1'sname) live at http://hyperlinktoJ1's ustreamsite)
I remember a commercial song called 'since ten thousand years and two thousand years ago'. Mind-bogglingly distant ages. @user5 '(Tell us) the half-life of plutonium' (newsperson) '(I think it) would have been 24 thousand years' (TEPCO Vice President) (#(J1'sname) live at http://hyperlinktoJ1's ustreamsite)

「一万年と	二千年前から」という	CM ソングを	思い出す。
⌜ichi+man.nen .to	*ni+sen.nen.mae .kara⌟ .to.iu*	*shiiemu+songu.o*	*omoidasu。*
'one+ten-thousand.years .and	two+thousand.year.before .LOC:from'.PROJ.SAY	CM+song.ACC	remember.
called 'since ten thousand years and two thousand years ago'		commercial song	remember
I remember a commercial song called 'since ten thousand years and two thousand years ago'.			

気の	遠く	なる	遠い	歳月。
ki.no	distant	become	*tooi*	*saigetsu。*
mind.NOM	*tooku*	*naru*	distant	year+and+month
mind becomes distant			distant	years
Mind-bogglingly distant ages.				

@user3	「プルトニウムの	半減期を」	(記者)
@user3	*⌜purutoniumu.no*	*hangen.ki.o⌟*	*(kisha)*
@user3	'plutonium.ADN	reduction-into-half.period.ACC'	(newsperson)
@user3	'plutonium's half-life'		(newsperson)
@user3	'(Tell us) plutonium's half-life' (newsperson)		

「2 万 4 千年であったかと」	（東電副社長）
⌜ni+man.yon.sen.nen.deat.ta .ka.to⌟	*(tooden +fuku.shachoo)*
two+ten-thousand.four.thousand.year.be/LPLN.PST .NEGO:intr.PROJ	(TEPCO+vice.president)
'whether (it) was 24 thousand years'	(TEPCO vice president)
'(I think it) would have been 24 thousand years' (TEPCO Vice President)	

(#(J1'sname) live at http://hyperlinktoJ1's ustreamsite)

[J1-3] 14 March 20112 20:38:32
私の質問。厳しい爆発は？ 三号機は？{name}さんの回答。「三号機は、一号機より。より大量の水素が漏れた。ブラントの出力の違いもある。プルサーマルの、BOX 燃料は、プルトニウムを含んでいるから、より厳しいのではないか。燃える温度も低い」
My question. Severe explosion? Reactor 3? Mr. (name)'s reply. 'From Reactor 3, a larger amount of hydrogen leaked out than from reactor 1. There is also a difference in the *buranto* (mistype of plant?)'s power output. BOX (mistype of MOX) fuel in a plu-thrmal, because it contains plutonium, could be more serious. The burning temperature is low too'

私の	質問。
watashi.no	*shitsumon*。
I.ADN	question.
My question.	

厳しい	爆発は？
kibishii	*bakuhatsu.wa*？
severe	explosion.TOP?
Severe explosion?	

三号機は？
sangoo.ki.wa？
third.machine.TOP?
(How about) Reactor 3?

{name}さんの	回答。
{name}*.san.no*	*kaitoo*。
{name}.TITL.ADN	reply.
Mr/Ms. (name)'s reply.	

「三号機は、	一号機より。	より	大量の	水素が	漏れた。
「*sangoo.ki .wa*、	*ichigoo.ki .yori*。	*yori*	*tai.ryoo .no*	*suiso .ga*	*more.ta*。
third.machine .TOP,	first.machine .COMP:than.	more	large.amount .ADN	hydrogen .NOM	leak.PST.
'Regarding Reactor 3,	than Reactor 1	larger amount of hydrogen			leaked.
'From Reactor 3, a larger amount of hydrogen leaked out than from reactor 1.					

ブラントの	出力の	違いも	ある。
buranto.no	*shutsuryoku.no*	*chigai.mo*	*aru*。
plant(mistype?).ADN	power-output.ADN	difference.HIL:too	be.
difference of output of the *buranto* (mistype of plant?)			is.
There is also a difference in the *buranto* (mistype of plant?)'s power output.			

プルサーマルの、	BOX 燃料は、	プルトニウムを	含んでいるから、
purusaamaru .no、	*bokkusu+nenryoo .wa*、	*purutoniumu.o*	*fukun.deiru.kara*、
plu-thermal .ADN,	BOX+fuel .TOP,	plutonium.ACC	contain.ASP:cont.because,
plu-thermal's BOX (mistype of MOX) fuel		plutonium	because (…) contain
BOX (mistype of MOX) fuel in a plu-thermal, because it contains plutonium,			

より	厳しいのではないか。
yori	*kibishii.no.de.wa.nai.ka*。
more	severe.NMN.be.TOP.NEG.NEGO:intr.
wouldn't it be more serious?	
could be more serious.	

燃える	温度も	低い」
moeru	*ondo.mo*	*hikui」*
burn	temperature.HILtoo	low/be」
burning temperature also		is low'
The burning temperature is low too'		

[J1-4] 30 March 2011 04:42:18
放散されてしまったプルトニウムは、影響力を減じることなく、やがて全世界へと拡散してゆく。この御用学者の発言は、全世界にさらされ、全世界から批判されるべき、暴言だと思う。RT @user2: ＮＨＫで、東大の御用学者が「プルトニウムの影響もそう心配することはない」との見解。
The plutonium that ended up being dissipated, without reducing its power to influence, will eventually be diffused to the whole world. This opportunist scholar's remark is violent language that should be exposed to the whole world and be criticised by the whole world. RT @user2: On NHK, (I heard) Tokyo Uni's opportunist scholar's view that 'the influence of plutonium is nothing to be anxious about so much either.'

放散されてしまった	プルトニウムは、	影響力を	減じることなく、
hoosan.s .arete.shimat.ta	purutoniumu .wa、	*eekyoo.ryoku .o*	*gen.jiru.koto .naku*、
dissipation.DO .PSV.END.PST	plutonium .TOP,	influence.power .ACC	reduction.DO.THING .NEG/SUS,
has ended up being dissipated	plutonium	influencing power	without reducing
Plutonium that has ended up being dissipated, without reducing its power to influence			

やがて	全世界へと	拡散してゆく。
yagate	*zen.sekai.e.to*	*kakusan.shite.yuku*。
by-and-by	all.world.LOC:to.PROJ	diffusal.DO.GO
by and by	to the whole world	go diffusing
will eventually be diffused to the whole world.		

この	御用学者の	発言は、
kono	*goyoo+gakusha.no*	*hatsugen.wa*、
this/ADN	official-business.scholar.ADN	remark.TOP
this opportunistic scholar's		remark
This opportunist scholar's remark		

全世界に	さらされ、	全世界から	批判されるべき、	暴言だと	思う。
zen.sekai .ni	*saras .are*、	*zen.sekai .kara*	*hihan.s .areru .beki*、	*boogen .da.to*	*omou*。
all.world .LOC:to	expose .PSV/SUS,	all.world .LOC:from	criticism.DO .PSV. MODA:should	violent-language .be.PROJ	think.
to the whole world	be exposed	from the whole world	should be criticised	that (…) is violent language	think.
(I) think (…) is violent language that should be exposed to the whole world and be criticised by the whole world.					

RT @uesr2:

ＮＨＫで、	東大の	御用学者が
enuechikee.de	*toodai.no*	*goyoo+gakusha.ga*
NHK.LOC:on	Tokyo-University(ACR).ADN	official-business.scholar.NOM
on NHK	Tokyo Uni's opportunist scholar	
On NHK, (I heard) Tokyo Uni's opportunist scholar		

「プルトニウムの	影響も	そう	心配することはない」との	見解。
「purutonium.no	*eekyoo .mo*	*soo*	*shinpai.suru.koto.wa .nai」 .to.no*	*kenkai*。
'plutnoium.ADN	influence .HIL:too	so/CIR	anxiety.DO.THING.TOP .NEG'.PROJ.ADN	remark.
'plutonium's	influence too	so (much)	that (…)need not be anxious'	remark.
…'s view that 'plutonium's influence is nothing to be anxious about so much either'.				

[J2-2] 1 April 13:17:35
【速報】本日午後５時 30 分からの内閣総理大臣記者会見で、菅首相が「プルトニウム」の試食に挑戦することがわかった。東電関係者が明らかにした。首相は過去にも「カイワレ大根」で成果を出していることから、周囲に「必ず完食する」と自信を見せているという。同会見にはプルト君も立ち会う予定。
[Prompt report] At the Prime Minister's Press Conference from 5:30 today, (it) has become known that Prime Minister Kan is going to take the challenge of test-eating of 'plutonium'. A TEPCO-related person disclosed (it). As the prime minister came out with an achievement with 'daikon radish sprout' in the past too, he is said to show confidence to the surrounding people (saying) '(I) will surely eat (it) all up.' At the same conference, Pluto-kun (is) scheduled to attend too.

【速報】
[sokuhoo]
[prompt-report]
[prompt report]

本日	午後	５時	30 分からの	内閣総理大臣	記者会見で、
honjitsu	*gogo*	*go* *.ji*	*san.jup.pun* *.kara* *.no*	*naikaku+soori+* *daijin*	*kisha+* *kaiken* *.de*、
today (NEV)	afternoon	five .o'clock	three.ten.minute .LOC:from .ADN	cabinet+prime+ minister	newsperson+ conference .LOC:at,
today	p.m.	five thirty		prime minister	at press conference
At the Prime Minister's Press Conference from 5:30 pm today,					

菅首相が	「プルトニウム」の	試食に	挑戦することが	わかった。
Kan+ *shushoo* *.ga*	*「purutoniumu」* *.no*	*shishoku* *.ni*	*choosen.suru* *.koto.ga*	*wakat* *.ta*。
Kan+ prime-minister .NOM	'plutonium' .ADN	test-eating .ACC	challenge.DO .THING.NOM	become-known .PST
Prime minister Kan	test eating of 'plutonium'		that … take a challenge of	became known.
(it) has become known that Prime Minister Kan is going to take a challenge of test-eating of 'plutonium'.				

東電関係者が	明らかに	した。
tooden+kankeesha.ga	*akiraka.ni*	*shi.ta。*
TEPCO+related-person.NOM	clear.ATTR	do.PST.
TEPCO-related person	clear	made.
A TEPCO-related person disclosed (it).		

首相は	過去にも	「カイワレ大根」で	成果を	出していることから、
shushoo .wa	*kako.ni .mo*	「*kaiwaredaikon*」*.de*	*seeka .o*	*dashi.teiru .koto.kara*、
prime-minister .TOP	pastLOC.in .HIL:too	'daikon-sprout' .AGN:with	achievement .ACC	come-out.ASP:rslt .THING.because,
Prime minister	in the past too	with 'daikon-sprout'	because … came out with achievement	
As the prime minister came out with achievement with 'daikon sprouts' in the past, too,				

周囲に	「必ず	完食する」と	自信を	見せているという。
shuui .ni	「*kanarazu*	*kanshoku .suru*」*.to*	*jishin.o*	*mise.teiru .to.iu。*
surrounding .DAT	'surely	eating-completion .DO'PROJ	confidence.ACC	show.ASP:cont .PROJ.SAY.
to surrounding people	'surely	that (…) eat (it) all up'	confidence	is said to show
(he) is said to show confidence to the surrounding people (saying), '(I) will surely eat (it) all up.'				

同会見には	プルト君も	立ち会う	予定。
doo.kaiken .ni.wa	*puruto.kun.mo*	*tachiau*	*yotee。*
same.conference. LOC:at.TOP	pluto.TIT(CAS/MAS) .HIL:too	stand-by	schedule.
at the same conference	Pluto-kun too	attend	scheduled.
At the same conference Pluto-kun (is) scheduled to attend too.			

[P1-3] 12 March 1　23:37:23
（そろそろ疲れてきました．ビールも飲みたい．同業者の方，時々お助けくださると有り難いな - 世の中には私よりももっと原子力本流の専門家もおられる筈なので）
((I) ┌|∵|┘am getting tired now. (I) |-.-| want to drink beer too. People in the same business, (it) |-.-| would be appreciated if (you) could help **m(’。’@)m** (me) sometimes. Because in this world there |-.-| should be **m(’。’@)m** more mainstream nuclear power experts than me)

（そろそろ	疲れてきました.
(*sorosoro*	*tsukarete.ki.mashi.ta*.
(little-by-little	get-tired.COME.POL.PST.
(gradually	┌|∵|┘ have become tired.
((I) ┌|∵|┘ am getting tired now.	

ビールも	飲みたい.
biiru.mo	*nomi.tai.*
beer.too	drink.OPT.
beer too	|**-.-**| want to drink.
(I) |**-.-**| want to drink beer too.	

同業者の	方,	時々	お助けくださると	有り難いな-
doogyoo .sha.no	*kata,*	*tokidoki*	*o.tasuke .kudasaru.to*	*arigatai .na–*
same-business .person.ADN	person /RES,	sometimes	RES.help .GIVE-ME/RES.if	appreciated/be .NEGO:incl(LNG)
person **m(’。’@)m** in the same business		sometimes	if you help **m(’。’@)m** me	|-.-| is appreciated–
People in the same business, (it) |-.-| would be appreciated if (you) could help **m(’。’@)m** (me) sometimes.				

世の中には	私よりも	もっと	原子力本流の	専門家も	おられる筈なので)
yononaka .ni .wa	*watashi .yorimo*	*motto*	*genshi.ryoku+ honryuu .no*	*senmon .ka .mo*	*orareru .hazuna .node*)
world .LOC:in .TOP	I .COMP:than	more	atom.power+ mainstream .ADN	speciality .person .HIL:too	be/RES .MODA:should .because)
in the world	than me	more	mainstream nuclear expert too		because (…) should be
Because in this world there |-.-| should be **m(’。’@)m** more mainstream nuclear power experts than me)					

[P2-2] 11 July 7:10:09
そんなすごいお水、きいたことないんだよねぇ。泥なめてたのかもしれないねぇ。RT @My{name}: お水もあぶないの？
Such terrible water m(’。’@)m, (I) |-.-| have never heard (of it) OK? Maybe (they=cows) |-.-| were licking mud, huh? RT @ My{name}: |-.-| Is the water m(’。’@)m dangerous as well?

そんな	すごい	お水	きいたことないんだよねぇ。
sonna	*sugoi*	*o.mizu*、	*kii.ta.koto.nai.n.da .yo.nee*。
such	terrible(COL)	BEAU.water,	hear.PST.THING.NEG.NMN.be/PLN .NEGO:ins.NEGO:conf(LNG).
such terrible water m(’。’@)m			|-.-| have never heard of it, right
Such terrible water m(’。’@)m, (I) |-.-| have never heard (of it) OK?			

泥	なめてたのかもしれないねぇ。
doro	*name.te.ta.no.ka.mo.shire.nai .nee*。
mud	lick.ASP:cont.NMN.NEGO:intr.HIL.too.BE-KNOWN.NEG .NEGO:conf(LNG).
mud	may have been licking
Maybe (they=cows) |-.-| were licking mud, huh?	

RT @ My{name}:	お水も	あぶないの？
RT @ My{name}:	*o.mizu.mo*	*abunai.no?*
RT @ My{name}:	BEAU.water.HIL:too	dangerous.NEGO:intr?
RT @ My{name}:	the water m(’。’@)m too	is dangerous?
RT My{name}: |-.-| Is the water m(’。’@)m dangerous too?		

[P1-5] 14 March 11:09:44
福島第一原子力発電所の放射線計測データ，6am まで公開．MP-2 で 400 マイクロ Sv/h，正門で 5.144 マイクロ Sv/h．風向き西北西．これまでは正門のグラフを出して来ましたが，MP2, MP4 のグラフも必要．誰かやってくれる？ http://bit.ly/dV00K7
The radiation measurement data of the Fukushima Daiichi Nuclear Power Plant, |-.-| (have been) made public up until 6am. |-.-|400 micro SV/h at MP-2, (and) 5.144 micro SV/h at the front gate. Wind direction |-.-| (was) west-northwest. Up to now (I) have been putting out graphs of the main gate (data), but graphs of MP2 and MP4 |-.-| (are) necessary too. |-.-|Can anybody do (it) for me? http://bit.ly/dV00K7(hyperlinktoTEPCOpage)

福島第一原子力発電所の	放射線計測データ,	6am まで	公開.
Fukushima+daiichi+genshi .ryoku+hatsuden.sho .no	*hoosha+sen+ keesoku+deeta*,	*roku+ee+emu .made*	*kookai.*
Fukushima+daiichi+atom .power+power-generating.place .ADN	radiation+line+ measurement+data,	6+a+m .LOC:until	making-public.
radiation measurement data of Fukushima Daiichi Nuclear Power Plant		up to 6 am	|-.-| made public.
The radiation measurement data of the Fukushima Daiichi Nuclear Power Plant, |-.-| (have been) made public up until 6am.			

MP-2 で	400 マイクロ Sv/h,
emupii-ni.de	*yon+hyaku+maikuro.shiiberuto+paa+awaa,*
MP-2.LOC:at	four+hundred+micro.sievelt+per+hour,
at MP-2	400 micro Sv/h,
|-.-|400 micro SV/h at MP-2,	

正門で	5.144 マイクロ Sv/h．.
seemon.de	*go+ten+ichi+yon+yon+maikuro.shiiberuto+paa+awaa,.*
main-gate.LOC:at	five+point+one+four+four+micro.sievelt+per+hour.
at the main gate	5.144 micro Sv/h.
(and) 5.144 micro SV/h at the front gate.	

風向き	西北西.
kaza+muki	*seehokusee.*
wind-direction	west-north-west.
wind direction	west-northwest
Wind direction |-.-| (was) west-northwest.	

これまでは	正門の	グラフを	出して来ましたが,
kore.made.wa	*seemon.no*	*gurafu.o*	*dashite.ki.mashi.ta.ga,*
this.EXT:until.TOP	main-gate.ADN	graph.ACC	put-out.COME.POL.PST.but,
up to now	graph of the main gate		have been puttng out …, but
Up to now (I) have been putting out graphs of the main gate (data), but			

MP2,	MP4 の	グラフも	必要.
emu+pii+ni,	*emu+pii+yon.no*	*gurafu.mo*	*hitsuyoo.*
MP2,	MP4.ADN	graph.HIL:too	necessary.
graphs of MP2 and MP4 too			|-.-| necessary.
graphs of MP2 and MP4 (data) |-.-| (are) necessary too.			

誰か	やってくれる？
dareka	*yatte.kureru*？
someone	do.GIVE-ME？
someone	do for me?
|-.-| Can anyone do (it) for me?	

http://bit.ly/dV00K7(hyperlinktoTEPCOpage)

[P1-6] 14 March 21:29:14
東京理科大 理学部物理{family name}さんが，福島第一原発の 2 箇所のモニタリングポストでの測定値，本日 14:00 までの値をグラフ化して下さいました．感謝．http://plixi.com/p/83950003
Mr.(orMs.) {family name} of Physics (undergraduate student) in the Faculty of Sciences, Tokyo University of Science ┌|･ᴥ･|┘ has graphed m(’。’@)m the measurement values at two monitoring posts of the Fukushima Daiichi NPP, (covering) the values up until 14:00 today. |-.-| Appreciated. http://plixi.com/p/83950003(hyperlinktograph)

東京理科大	理学部	物理	{family name} さんが,
tookyoo+rika.dai	*ri.gakubu*	*butsuri*	*{family name} .san.ga,*
Tokyo+science.university(ACR)	science.faculty	physics	{family name} .TIT.NOM,
Tokyo University of Science	Science Faculty	physics (department)	Mr/Ms. {family name}
Mr./Ms. {family name} of physics department, Faculty of Science of Tokyo University of Science			

福島第一原発の	2 箇所の	モニタリングポストでの	測定値,
fukushima+daiichi+ genpatsu .no	*ni+kasho .no*	*monitaringuposuto .de.no*	*sokutee.chi,*
Fukushima+Daiichi+ nuclear-power-plant(ACR) .ADN	two+point .ADN	monitoring-post .LOC:at.ADN	measurement.value,
of the Fukushima Daiichi NPP	at two monitoring posts		measurement value
the measurement values at two monitoring posts of the Fukushima Daiichi NPP,			

本日	14:00 までの	値を	グラフ化して下さいました.
today(NEV)	*14:00 .made.no*	*atai.o*	*gurafu.ka.shite.kudasai .mashi.ta.*
today(NEV)	14:00 .LOC:till.ADN	value.ACC	graph.change.DO.GIVE-ME/RES .POL.PST.
today	until 14:00	values	┌|･ᴥ･|┘ made m(’。’@)m into graph for me
(Mr./Ms. {family name} of physics department, Faculty of Science of Tokyo University of Science) ┌|･ᴥ･|┘ has graphed m(’。’@)m (…), (covering) the values up until 14:00 today.			

感謝.	http://plixi.com/p/83950003
kansha.	http://plixi.com/p/83950003
gratitude.	http://plixi.com/p/83950003
|-.-| Appreciated.	http://plixi.com/p/83950003

[P2-3] 25 March 2011 23:58:13
いやこれは他に見ているひともいるからやっているので、気になさらず（啓蒙活動）RT @user1: 一見理屈の通った文章に落とし穴があることは良くあり書いてない事まで読めるような情報量が欲しい。そこまで行かないと安心出来ない。わざわざお付き合い頂いてすみませんでした。
No, I |-.-| do this because there are also other people watching (it), so |-.-| please don't mind m('。')m (enlightening activity) RT@uesr1: (It) |-.-| is often the case that there are pitfalls in texts that are seemingly logical, and I |-.-| want enough information so as to read what isn't written between the lines. I |-.-| can't feel secure unless I get to that point. ┌|･ｰ･|┘ Thank you for spending your time for me m(_ _)m .

いや	これは
iya	*kore.wa*
no	this.TOP
no	this
No, (I do) this	

他に	見ている	ひとも	いるから	やっているので、
hoka.ni	*mi .teiru*	*hito .mo*	*iru.kara*	*yat.teiru .node*、
other.CIR	watch .ASP:cont	person .HIL:too	be.because	do.ASP:cont .because,
other (than you)	is watching	person too	because there is	am doing … so
(I) |-.-| do (this) because other people are also watching (it), so				

気になさらず
ki.ni.nasara.zu
mind.ATTR. DO/RES.NEG
|-.-| please don't mind m('。')m

（啓蒙活動）
(keemoo+katsudoo)
(enlightment+activity)
(enlightening activity)

RT @user1:	一見	理屈の	通った	文章に
RT @user1:	*ikken*	*rikutsu.no*	*toot.ta*	*bunshoo.ni*
RT @user1:	at-first-sight	logic.NOM	pass.PST	text.LOC:in
RT @user1:	at first site	logical		in text
RT @user1: in texts that are seemingly logical				

落とし穴が	あることは	良く	あり
otoshi+ana.ga	*aru.koto.wa*	*yoku*	*ari*
fall+hole.NOM	be.THING.TOP	often	be/SUS
pitfall	that there is	often	there is … and
It is often the case that there are pitfalls (in the text which is seemingly logical)			

書いてない	事まで	読めるような	情報量が	欲しい。
kai *.te* *.nai*	*koto* *.made*	*yom.eru* *.yoona*	*joohoo+ryoo* *.ga*	*hoshii*。
write .ASP:rsl(CONTR) .NEG	thing .LOC:till	read.POT .COMP	information+amount .NOM	want.
not written	up to things	so can read	information amount	(I) want.
(I) ⊢.-⊣ want enough information so as to read between the lines that aren't written.				

そこまで	行かないと	安心出来ない。
soko.made	*ika.nai.to*	*anshin.deki.nai*。
there.until	go.NEG.if	security.DO/POT.NEG.
up to there	if not go	cannot feel secure
(I) ⊢.-⊣ can't feel secure unless I get to that point.		

わざわざ	お付き合い頂いて	すみませんでした。
wazawaza	*o.tsukiai.itadai.te*	*sumimasen.deshi.ta*。
purposely	DEF.go-along.RECEIVE/DEF.SUS	I'm-sorry.be/POL.PST.
by taking time	receive m(_ _)m the favour of going along (with me)	┌|·̀·́|┘ Sorry for having….
┌|·̀·́|┘ Thank you for spending your time for me m(_ _)m .		

[P2-4] 29 March 14:12:25
残念なジャーナリスト(~~) 知らん。
|-.-| Regrettable journalist (~~) (I) |-.-| don’t care.

残念な	ジャーナリスト	(~~)
zannen.na	*jaanaristo*	*(~~)*
|-.-| regrettable.EPI	journalist	face emoticon with frowning eyes
|-.-| Regrettable journalist (~~)		

知らん。
shira.n。
know.NEG(DLT).
(I) |-.-| don’t care.

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