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REAL AND APPARENT TIME CLUES TO THE SPEED OF DIALECT DIFFUSION

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Abstract

In contrast with the traditional dialect atlas, the glottogram simultaneously displays geographical differences and age differences in language usage.[1] There are two techniques for ascertaining the absolute chronology of linguistic change: real time and apparent time techniques. The typical technique for the apparent time is the comparison of two dialect maps of different age groups. There is another technique for considering geographical and age differences at the same time. This technique, called the "glottogram", has the merit of offering clues for the speed of diffusion.

In this paper, several examples of dialect maps and glottograms showing speed of diffusion will be observed. The speed of diffusion within one community may be somewhat more than three generations or around 100 years. In the same period of one century, the changes typically proceed 100 km from the community.

Keywords
New dialect, language standardization, geographical diffusion, speed of diffusion, Japanese dialect

1. Methods of linguistic reconstruction

There are two purposes for this paper. One is to introduce the "glottogram" technique as a convenient tool for showing geographical differences and age differences at the same time. The other is an attempt at calculating the speed of the geographical diffusion of dialectal phenomena. In this paper, after theoretical consideration, conclusions are drawn about geographical diffusion and these are illustrated with examples from contemporary Japanese dialectology.

[1] This paper was presented at Methods in Dialectology XII in Moncton, New Brunswick, in 2005 and was graciously offered for publication upon invitation by the editor. However, figures were lost during editing and publication became impossible.

1.1. Relative chronology and unreal time in dialect geography (0)

First, let us theoretically arrange several dialectological techniques in Figure 1. The starting point, dialect (or linguistic) geography, is shown as 0 in Figure 1. Dialect geography has two aspects, the first as a technique for displaying dialectal differences and the second as a method for reconstructing the past history of a language.[2]

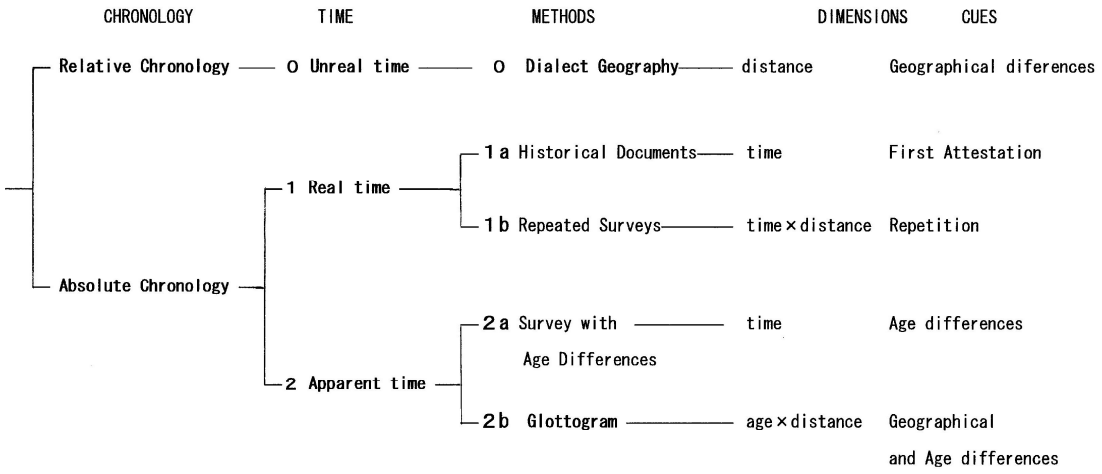

Fig 1. Relative / absolute chronologies and real / apparent times of linguistic change

However, dialect geography as a branch of historical linguistics has one disadvantage. The ordinary method of dialect geography offers inferences only for the relative chronology of word-forms as shown in Figure 1. Consequently, the absolute chronology, or actual time of a linguistic change which is displayed in dialect atlases, is not accessible. As is shown as 0 in Figure 1, this is a survey without actual time length, which we can call a technique of **unreal time**.

1.2. Absolute chronology in real time differences (1)

There are two techniques for ascertaining the **absolute chronology** of linguistic change: real time techniques (1) and apparent time techniques (2). The first, **real-time**

[2] The first one corresponds with space and the second one with time. In dialect geography, a phenomenon in space is interpreted as a reflection of time.

techniques, offers information about the absolute chronology of linguistic change based on historical documents (1a) or on repeat surveys (1b), represented as 1 in Figure 1.

1.3. Historical documents (1a)

The absolute chronology of word-forms can sometimes be determined if the actual time of change is reflected in historical documents, as is shown as 1a in Figure 1. In some ideal cases, both the absolute time of appearance in historical documents and the geographical distribution of a word-form can be determined, so that the speed of dialect diffusion can be inferred. The rate of geographical diffusion of dialectal phenomena can be calculated when both geographical distribution and date of appearance in historical documents have been determined. In this case the speed of geographical diffusion can be calculated by comparing:

(a) distances from the center of diffusion to the farthest ends of distribution, and

(b) the number of years between first appearance and the present.

There are some problems, and it is necessary to exercise care here. New dialect forms which originated in the countryside and were adopted later in the cultural centers are amply attested in modern Japan, even in the past several decades (Inoue, 1993; 2003). The same process of retrogression of dialectal forms must have also occurred in the past. Thus, the year of appearance in historical documents does not always reflect the first appearance of the form in history. Also, the first attestation of forms in dictionaries always lags behind actual usage. However, these problems can be avoided if we suppose simply that actual usage of the forms in question is earlier than their first appearance in historical documents. When large numbers of words are processed or treated as a group, individual deviations are not extremely important.

Scholars of Japanese language history have recently begun paying attention to similar phenomena as dialectologists, and a comparison of historical data with dialect geographical data has become possible, with the result that the absolute chronology of usage has become clearer for many words. This means that the real time dimension has been introduced into dialectological study.

This technique can be applied only to dialects which have past written records. If we want to know a long history over a wide geographical range, the number of languages for which dialect history can be elucidated is limited. Perhaps the Chinese language is the most appropriate example because it has the oldest dialect dictionary,

the “Fang Yan”, compiled by Yang Xiong (53BC~18AD). The present realizations of the forms in this dictionary were shown in maps through a computational method by Japanese scholars (Matsue, 1999). The Romance languages must be the second candidate for this type of analysis, with their rich written traditions and geographical spread. The Japanese language is not an inadequate subject of study because the first rich written documents appeared in the 8th century, and its geographical spread is about 2,000 kilometers from cultural centers.

The calculation of speed is based on the **real-time** survey in a wider sense. However, there is another technique for inferring speed of dialectal diffusion.

1.4. Real-time differences by repeat surveys (1b)

The next technique makes use of the real time survey in a narrower sense. It is shown as 1b in Figure 1. The introduction of the time dimension can also be realized by repeating geographical surveys many years later. This is a comparison of dialect surveys conducted at different points in time. If a survey from the past is available, the survey can be repeated and the geographical distribution of word-forms over time can be compared. As the second technique for reconstructing past history, real-time differences can also be utilized, by repeating the same survey years or decades later.

In order to acquire this kind of comparable data, we must first look for a dialect geographical survey conducted many years ago, and repeat the same survey; or else conduct a survey first and wait until the data has become old enough. The problem is that the scholar himself may have become old too by the time he intends to conduct the repeat survey.

The rate of diffusion can be calculated by comparing:

(a) differences in the distribution of linguistic forms, and

(b) the number of years between the two surveys.

2. Absolute chronology in apparent time differences (2)

The second technique, apparent time technique, makes use of age differences. There are two sub-techniques used to acquire apparent time information.

2.1. Age differences in a dialect geographical survey (2a)

The typical technique is the comparison of two dialect maps of different age groups, that is, 2a in Figure 1. Typically, dialect maps of old and young age groups are utilized. If the geographical distribution of a word-form has been ascertained for different age groups, the recent rates of diffusion between two age groups can be calculated. There are some problems, and care is also necessary in the use of apparent time. Age differences cannot be interpreted as a simple reflection of linguistic change, because adults often adopt new words and expressions, showing that language acquisition continues even into adulthood. To add to this, children may learn older words from parents and other adults around them.

2.2. Age differences in glottogram survey (2b)

As a development of the techniques above, there is another technique for considering geographical differences and age differences (or apparent time) at the same time. It is shown as 2b in Figure 1. This technique, called the "**glottogram**" or "age-area graph", was developed in Japan (Inoue, 1983; 1993), and has the merit of offering clues for the rate of diffusion by showing age-differences and geographical distribution on the same graph. As average life expectancy is becoming longer, it is expected that linguistic changes observable within a lifetime will become more abundant. If the researcher is lucky, dialectal data from speakers in their teens to their nineties, a time span of 80 years can be obtained. However, the speed of dialectal diffusion seems to have increased in modern societies in the 20th century, as will be discussed later.

3. A general map of diffusion rates

There are at least two techniques (dialect maps and glottograms) to determine the speed of the geographical diffusion of dialectal phenomena. In this paper, several examples of dialect maps and glottograms which have been carried out in various areas

in Japan (Inoue, 2003) will be presented, and the speed of dialect diffusion will be calculated. Among many published maps, we can sometimes find recent diffusion of new dialect forms, that is, changes which are not examples of the standardization of the language. Among these maps, we can find ones for which the calculation of diffusion speed is possible making use of historical documents. Also glottogram surveys have been adopted by several young scholars, and executed in various areas in Japan. The overall results of the dialect maps and the glottogram surveys are shown on a map of Japan in Figure 2.

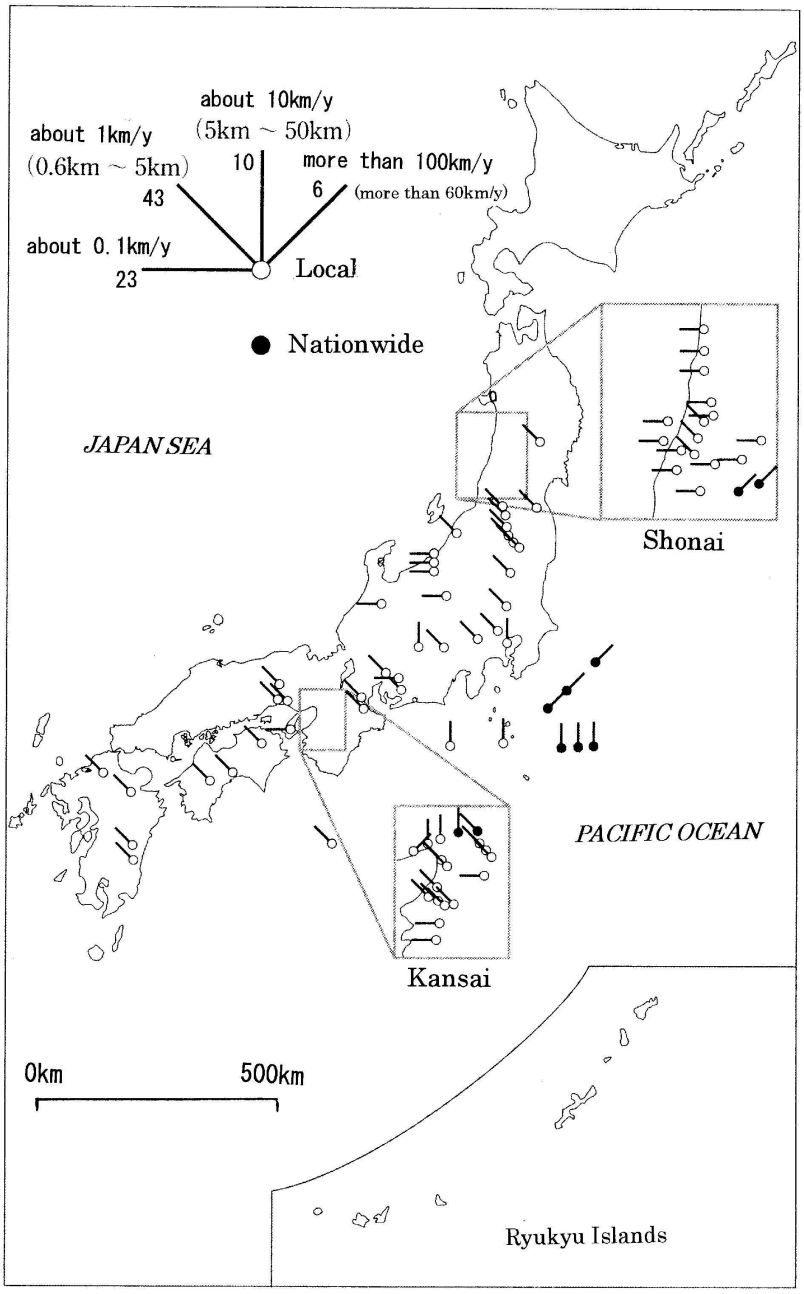

Fig. 2. Speed of Dialectal Diffusion in Japan

In Figure 2 the angles of the bars show the speed of diffusion. As in the speedometer of a car, bars leaning left show slow diffusion, and bars leaning right indicate fast diffusion. As the observed speed shows great differences, the angles of bars are divided into four groups: from around 0.1 km/year, around 1 km/year, around 10 km/year, to more than 100 km/year. Local and nationwide diffusion are distinguished by the darkness of the circles. White circles show local diffusion, and black circles show nationwide diffusion. Those which are diffused over wider areas are plotted in the Pacific Ocean. The overall results show that, on average, 1 km/year, or 100 km per century, is the usual or typical speed of geographical diffusion in Japan. Of the 82 phenomena observed, more than half of the total, forty-three, showed a speed of around 1 km/year as is shown in Table 1. Twenty-three showed a speed of approximately 0.1 km/year, ten approximately 10 km/year, and six approximately 100 km/year.

		Local	Nationwide	Total
0.1	km/y	23	0	23
1	km/y	42	1	43
10	km/y	6	4	10
100	km/y	1	5	6
Total		72	10	82

Table 1. Local and nationwide speed of diffusion

Geographical differences are also observed. In the areas near Tokyo and on the Pacific Ocean side of the Japan archipelago with many big cities, forms which have spread at around 10 km/year are found in ample number, while in the areas on the Japan Sea side, a slower spread of around 0.1 km/year is found. On the other hand, some nationwide diffusions show a speed of more than 100 km/year. These are plotted in the Pacific Ocean. To summarize, diffusion is fast where transportation is flourishing, and slow where transportation is sparse. In conclusion, we can say that the typical rate of diffusion averages 1 km/year, though there are many exceptions and these figures are only approximate with a variation of ten-fold or more often observed.[3]

[3] Figuratively speaking, the spread of dialectal forms is like a group of rabbits and tortoises. Some forms spread very quickly to the ends of the country and others spread quickly but stop at a border or obstacle. Others spread slowly to the ends of the country without interruption, and still others stop spreading at some point. However, if taken as a large group, regular tendencies of speed of rabbits and tortoises may appear.

4. Real and apparent time example: re-insertion nationwide

Hereafter, individual examples showing speed of diffusion will be observed. The first example is based on **real-time** differences, that is, nationwide surveys carried out in different eras. By comparing the results of the original survey with those of a repeat survey carried out many years later, the speed of nationwide diffusion will be ascertained. The first example is concerned with a recent change in Japanese grammar, re-insertion. Ability is expressed in Japanese by verbs with *-eru* forms, like *yom-eru* 'can read'. Recently young Japanese have begun saying *yom-ereru*, inserting a superfluous *-re-*. This grammatical formation seems to have originated more than a century ago in local dialects, as is shown in Figure 3.

Figure 3 is a simplified map from GAJ ("Grammar Atlas of Japanese Dialects") (NLRI 1989〜2006). At least two loci of origin can be observed in central and western Japan. The informants were born mostly in the first decades of the 20th century.

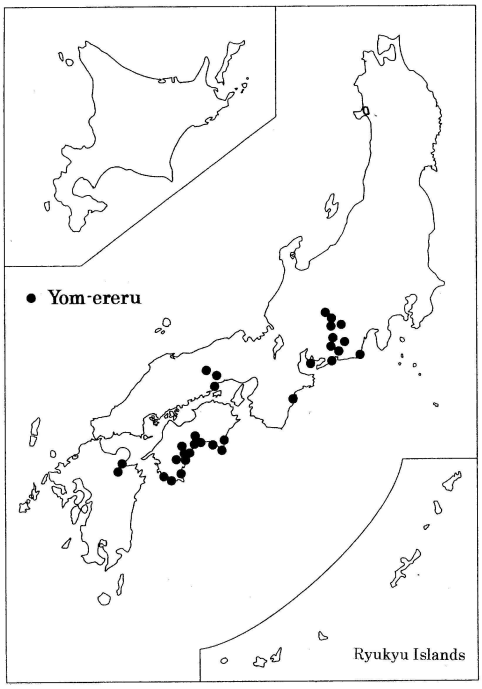

Fig. 3. *Yom-ereru* (*yom-eru*) 'can read' in GAJ (informants born around 1910)

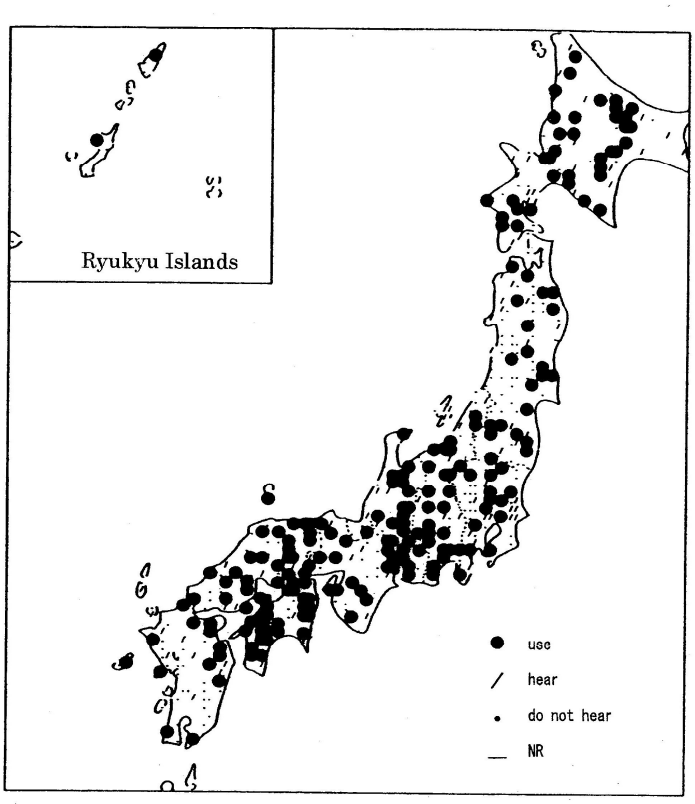

Fig. 4. *Nom-ereru* (*nom-eru*) 'can drink' of adults (born in the 1940s)

Figure 4 is a map of data collected by the author through a postal survey. Most of the informants were born in the 1940s. The lengthened expression *nom-ereru* (for standard *nom-eru*) is widely used in Japan, especially in western Japan. If we compare the average year of birth for the two surveys, the "re" insertion form must have spread over about 30 years. These two maps show real time difference, though the methods of research are slightly different.

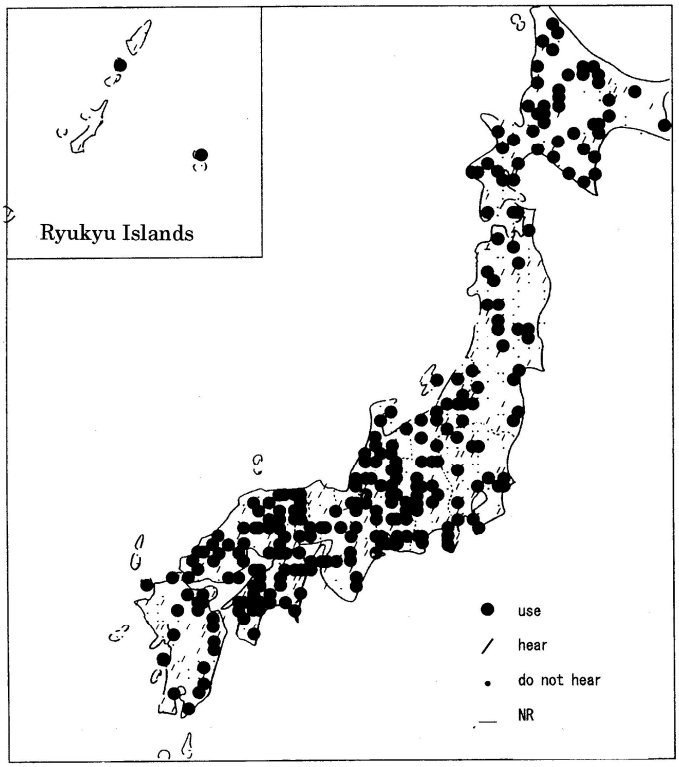

Fig. 5. *Nom-ereru* (*nom-eru*) 'can drink' of young adults (born around 1970)

Figure 5 shows the result of the same postal survey among pupils of junior-high schools. *Nom-ereru* is more densely used in the western half of Japan. These two maps show apparent time differences or age differences. The new expression seems to have spread at a speed of 10-30 km per year. This is an example shown in the ocean in Figure 2. Linguistically, frequent usage of this grammatical expression may have been an influencing factor. Non-linguistically, modern developments of communication and transportation seem to have had an effect.

Other nationwide disseminations are also ascertained and collected in Inoue (1998, 2003). The grammatical change of so-called "ra-deletion" is another typical example of nationwide diffusion over a time-dimension of several centuries. Speed of diffusion is more than 100 km per century, or 1 km/y. Most of the nationwide diffusion according to the real time difference is as fast as more than 1 km/year.

5. Real and apparent time example: *ganpo* in Shonai survey

Examples of lexical data will be discussed in this section. This is an example of the utilization of real time differences based on historical documents and present age differences to chart the speed of diffusion in a local area. In order to ascertain the basic mechanism of diffusion in local dialects, small-scale surveys are important. However, historical documents are not amply found for local dialects, and the repetition of a dialect geographical survey is not attempted very often. A rare case is the study of the Shonai district of Yamagata Prefecture in northern Japan. The area corresponds to the square inlet in the upper half of Figure 2.

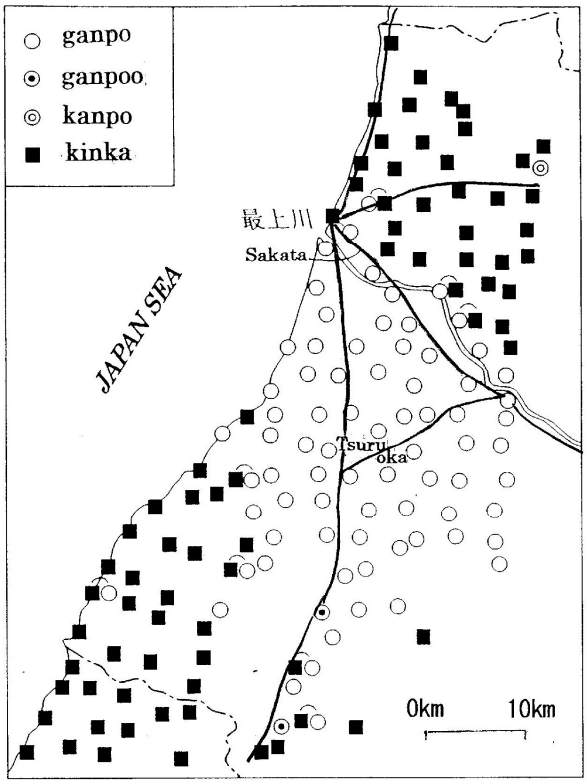

Fig. 6. Dialect Atlas of the Shonai District 1969 *ganpo* 'deaf'

Figure 6 shows the results of a dialect geographical survey conducted in 1969 by the author. The informants were mostly people over 70 years old, or people who were born in the late 19th century. As the map shows, *kinka* (represented by black squares) is distributed separately in the north and south of the district. White round symbols show

ganpo which is used in areas around central Tsuruoka city, an old castle town, constituting a typical focal area of dialect diffusion. Based on principles of dialect geography, the relative chronology of the forms can be inferred. This is a typical example where the central form *ganpo* is newer, and the outlying form *kinka* is older. Actually, the form *kinka* (black squares) is recorded in an old dialect dictionary compiled in 1767 in the central town Tsuruoka. In 1891 another dialect dictionary was published and the newer form *ganpo* was recorded in that dictionary. This suggests that the change must have occurred between the 18th century and the 19th century.

The average diameter of the *ganpo* area is about 20 km, and the farthest end is 30 km from Tsuruoka city. Calculation on the basis of these figures shows that the speed of diffusion is from 0.1 km/year to 0.4 km/year. This is a fairly slow speed compared to the nationwide diffusion presented earlier on. This is one example of the real time difference method; next I will describe an example of this area using glottograms.

Shortly after this dialect geographical survey, a new survey technique combining both geography and age was applied to the same area. This "glottogram" technique[4] can show patterns of geographical dissemination using the age of informants. As glottograms usually show age differences along a geographical line, another technique was further applied in order to ascertain age differences over a wider area. This is the result of the "Z survey". This is called the "Z survey", as the area of investigation is not a straight line but lines in a zigzag form[5] as is shown by zigzag lines in Fig. 6.

The results of the two glottogram surveys are shown side by side in Figure 7 (Shonai glottogram survey, left and Z survey, right). The age of informants on the horizontal axis (left, older and right, younger) symbolizes only **apparent time** differences. However, as clues for geographical diffusion in the past in this local dialect are so scarce, these should be utilized rather boldly. *Kinka* (black square symbols) are distributed in the northern (upper) and southern (lower) end of this district, and also show a declining trend among younger informants. The white round form of *ganpo* seems to be spreading from the central city Tsuruoka even now. Approximation lines on the edges of the old *Kinka* form are added on the graph in order to simulate the speed of diffusion in Figure 7.

[4] Direct observation of linguistic change in progress is made possible in time and space at the same time using the glottogram technique. Linguistic age differences can be interpreted as a continuation of long-term linguistic changes in past history.
[5] This is called Z, although the shape is a Z reflected on a vertical axis.

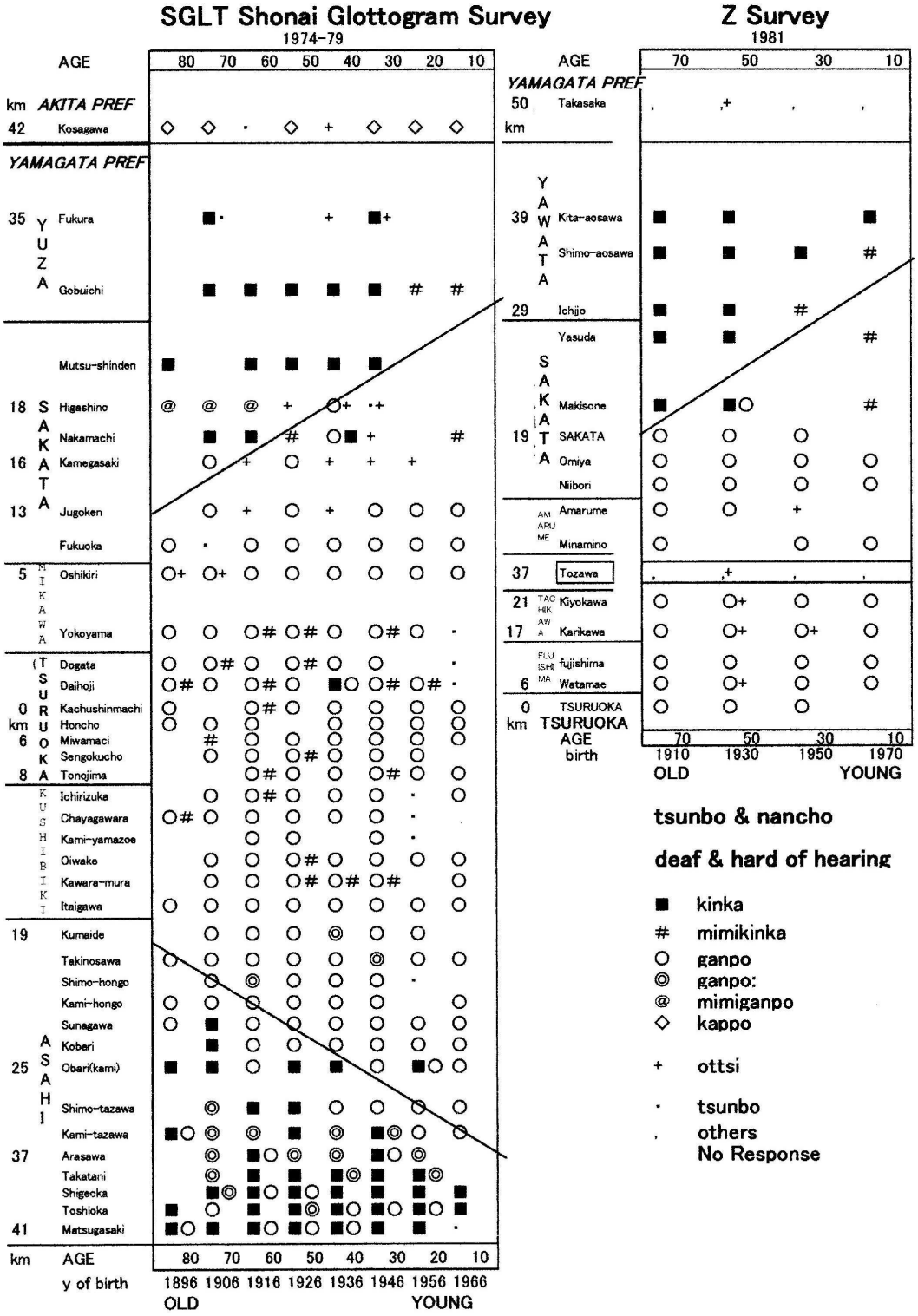

Fig. 7. Glottograms of the Shonai District *ganpo* 'deaf'

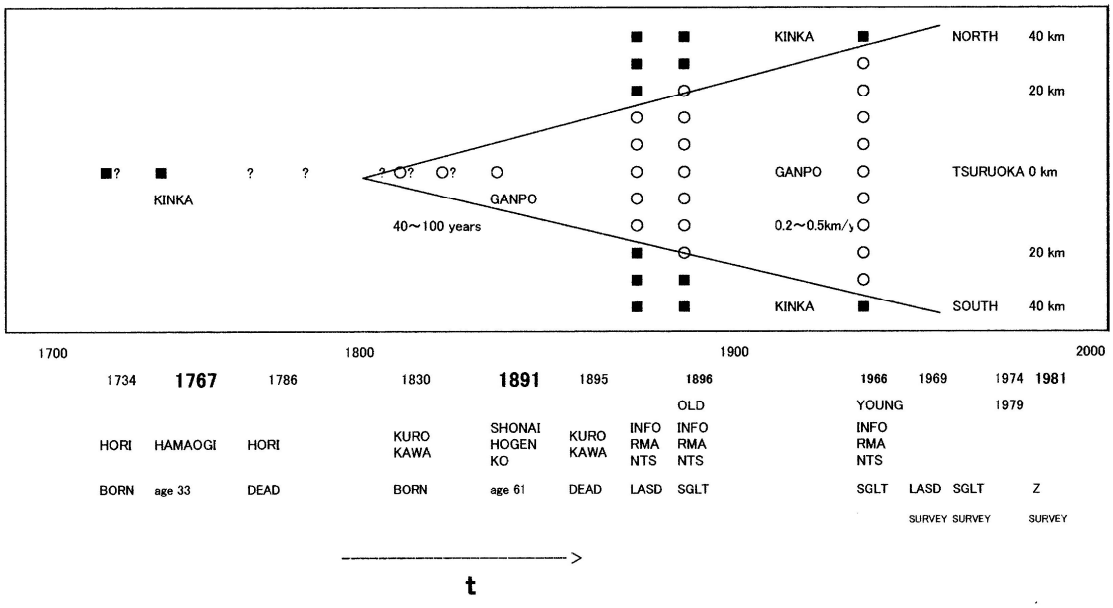

Figure 8. Pattern of diffusion of *ganpo* 'deaf'

Figure 8 shows a simplified pattern of diffusion of the newer *ganpo* by combining geographical distribution and age differences. The two sources, historical documents (in 1767 and 1891) and present age differences (based on Shonai glottogram survey and Z survey), do not contradict one another. The newer form *ganpo* seems to have appeared in the18th or the early 19th century. Approximation lines are again added on the graph in order to simulate the speed of diffusion in Figure 8. A reconstruction of dialectal history with approximate absolute chronology was thus made possible by making use of historical documents and age differences.

As a result, it can be surmised that the speed of diffusion of the new dialect form *ganpo* must be about 0.3 or 0.4 km/year, much slower than the nationwide examples discussed above. This reconstruction of dialectal history with approximate absolute chronology is consistent with the figure acquired from the comparison between premodern and modern dialect dictionaries. We have thus made use of the real time data of documents of the past and also apparent time data of age differences of the present on the basis of the glottogram technique. Many other words have been analyzed on the basis of the glottograms in Shonai and other areas in Japan as shown in Figure 2.

6. Apparent time diffusion of *uzattai* in Tokyo

Some of the examples shown above in Figure 2 are concerned with language in Tokyo showing retrograde movement into this cultural center (Inoue, 1983, 1993, 1998, 2003). We will next observe a typical case of "inverse" diffusion of an individual word. This is an example of "Tokyo new dialect", or a local form introduced into Tokyo. All information available is **apparent time** or age differences.

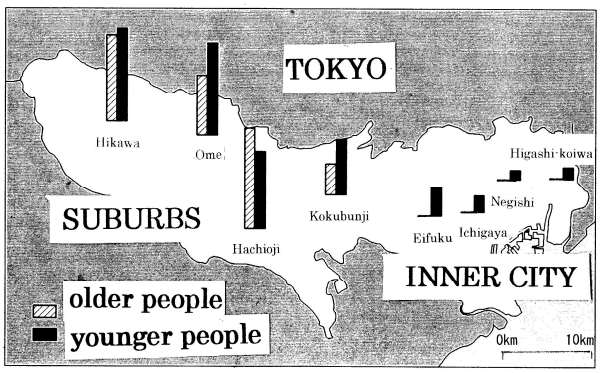

Figure 9. Geographical and age distribution of uzattai 'uncomfortable' in Tokyo

Uzattai 'uncomfortable' is a form that was originally used only in the western suburbs of Tokyo. Figure 9 shows the distribution of the informants born in the first decades of the 20th century. This map shows the usage rate of old (left) and young (right) generations in eight localities of Tokyo Metropolis. This shows that young people in the western half of inner city Tokyo began adopting the western suburban form *uzattai* in the 1980s. Considering the distance by railway, the speed of diffusion must have been around 1 km/year. This is one of the arrows shown in the western suburbs of Tokyo in Figure 2.

Later, *uzattai* propagated to almost all young people in inner city Tokyo, and then it diffused nationwide through the mass media.[6] As it diffused among young people nationwide in about 10 years, the speed of diffusion may have been more than 100 km/year. This is one representative example of recent diffusion with faster speed. Several other cases of diffusion which have been observed are shown in Figure 2.

[6] The form was later shortened to *uzai*, and *uzattai* became rather old-fashioned.

7. The umbrella model of diffusion

We will next discuss a general theory of diffusion on the basis of the actual research data above. It has been a kind of simplified superstition concerning the standardization of the Japanese language that the new dialect forms appeared only during the feudal ages, and that standardization progressed only after Japan entered the modern age in 1868. However, many new dialect forms have been found to be created and propagating in the 20th century and even in the 21st century. I have previously proposed (Inoue, 1993) an "umbrella model" of diffusion for new dialect forms in modern Japanese, as shown in Figure 10. The speech or vernacular of Tokyo can be considered to be similar in status to other dialects in the sense that it is used colloquially in daily activities. It is only natural that dialectal forms from the countryside are introduced to the cultural center of Tokyo in the form of colloquial speech. The prestige of large cities is not always the decisive factor for a form to be adopted by speakers. The so-called covert prestige may be working for the diffusion of the new dialect forms.

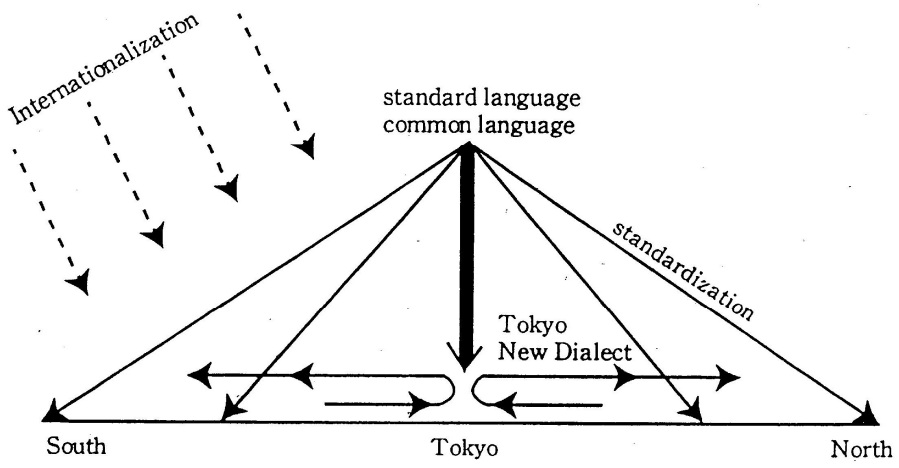

Figure 10. Umbrella model of geographical diffusion of new dialect forms

In the "umbrella model" it can be shown that the diffusion occurring on the fringe of an umbrella or in local dialects is slow, but that the diffusion quickens, once the form is adopted in the speech of Tokyo. Dissemination from Tokyo is quick, partly because the form is used in the mass media. The practicality of this umbrella model is

confirmed on the basis of observation of individual examples of diffusion through glottograms, as shown above.

In this connection it is interesting that the speed of diffusion within one community may be somewhat more than three generations or around 100 years (Inoue, 1996). This is attested in language shift of immigrants in many areas of the world, including Japanese emigrants in Hawaii and South American countries. The same time-span is observed also in dialect shift in Hokkaido and Okinawa in Japan. According to recent studies (Inoue, 2004, 2006), language standardization in many other dialectal areas of Japan seems to proceed by similar steps.

This will lead to a much simplified idea that one century is necessary for a language change which has occurred among the young generation in a community to become pervasive among all members in the community. In the same period of one century, the change may proceed 100 km from the community (to younger and early adopters).

8. Variation in diffusion speed

Several typical examples of speed of diffusion have been discussed so far. They are only a fraction of the 82 phenomena shown in the general map (Figure 2) at the beginning of this paper. More concrete examples are presented in Inoue (2003). They do not contradict the conclusion of typical speed of 1 km/year. Though there are many exceptions, they can be individually explained. Further consideration shows that the rate or speed of diffusion is influenced by several linguistic and non-linguistic factors.

8.1. Linguistic factors influencing diffusion speed

Linguistically, the speed of propagation is a function of the frequency of usage of the form in question; and also domains or situations of the form influence the speed of diffusion.

8.2. Non-linguistic factors influencing diffusion speed

Non-linguistically, historical era and geography are essential considerations bearing on the speed of diffusion (Inoue, 2006, 2008). In the old days when communication between localities was sparse, the speed of diffusion was slow. Diffusion is faster in modern times, and is slower in countryside areas where no modern transportation is available. When mass-communication developed owing to radio and later to television, the speed increased. These factors are also connected with language standardization. When a form is adopted as standard and used in print or in mass-communication, the form has a better chance of diffusion nation-wide (Inoue, 2004).

9. Examples of diffusion in other languages

The speed of diffusion of standard Japanese forms in the past (actual geographical distribution and year of first attestation in historical documents) was also taken into consideration, showing similar results. This idea of speed of diffusion can be applied both to individual forms in dialect maps (Kobayashi, 2004, Abe, 2001) and to local dialects as a whole (Inoue, 2000, Kawaguchi and Inoue, 2002). The speed of diffusion was first calculated by Tokugawa (1972, 1993), and some other attempts have been making use of standard Japanese forms (Inoue, 2004, 2006, 2008, 2009).

This conception of constant speed of diffusion is based on the idea that human beings behave similarly in any place at any time. The basic idea is similar to the Constant Rate Hypothesis (Kroch, 1989).

Finally, it should be stated that the glottogram technique can be applied in any country. The speed of dialectal diffusion per year can be calculated in other countries. By taking the speed of geographical diffusion of 1 km/year as a starting point, general trends in other linguistic areas can be compared.

Dialectology has a natural tendency to be of domestic interest. However, an international viewpoint is necessary for the future development of this area of study, which will also contribute to pan-linguistic interest.

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