

Archaeological Explanation for the Diffusion Theory of the Japonic and Koreanic Language

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Archaeological Explanation for the Diffusion Theory of the Japonic and Koreanic Languages

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ABSTRACT

From a linguistic standpoint, it is assumed that the Japonic language family entered into the Korean Peninsula and from there spread to the Japanese archipelago at the beginning of the Yayoi period, around the 8th century BC, while the arrival of the Koreanic language family is associated with the advent of the Korean-style bronze dagger culture around 5th century BC (Whitman 2011). Evidence of demic diffusion in archaeological events (Miyamoto 2014) indicates the result of a linguistic founders effect, because both Koreanic and Japonic are relatively shallow language families (Whitman 2011). But Japonic has no vocabulary dedicated to rice (Whitman 2011). There is some contradiction between the absence of rice vocabulary in Japonic and the demic diffusion of rice farmers in the archeological evidence. In this paper, I would like to resolve this contradiction by offering a new explanation for the demic diffusion of Mumun culture, which possessed a Japonic language, on the Korean peninsula.

KEYWORDS: Yayoi culture, Jomon Culture, Yusu type pottery, Itatsuke type pottery, pottery production technique, Mumun culture, Pianpu culture, the Yan states, the Yinjiacun second stage, Japonic language, Koreanic language

1. Introduction

The author subscribes to the demic diffusion theory that there were four stages of development of agriculture in Northeast Asia (Figure 1, Table 1, Table 2) during prehistoric times (Miyamoto 2014). The first stage involved the spread of millet agriculture to the Korean Peninsula and to the southern Russian Far East (sRFE) in the middle of the fourth millennium BC (Figure 2). The second stage was the spread of wet-rice agriculture from the Shandong Peninsula to the Liaodong Peninsula in the latter half of the 3rd millennium BC. SEM silicon analysis on pottery indicated the earliest existence of rice in this period in the southern Liaodong Peninsula (Figure 3). At the same time, the Pianpu culture, located on the eastern Liaoxi district, diffused to Liaodong district and replaced the Wujiacun culture, which was originally distributed there. The subsistence system of the Pianpu culture was based on the same millet

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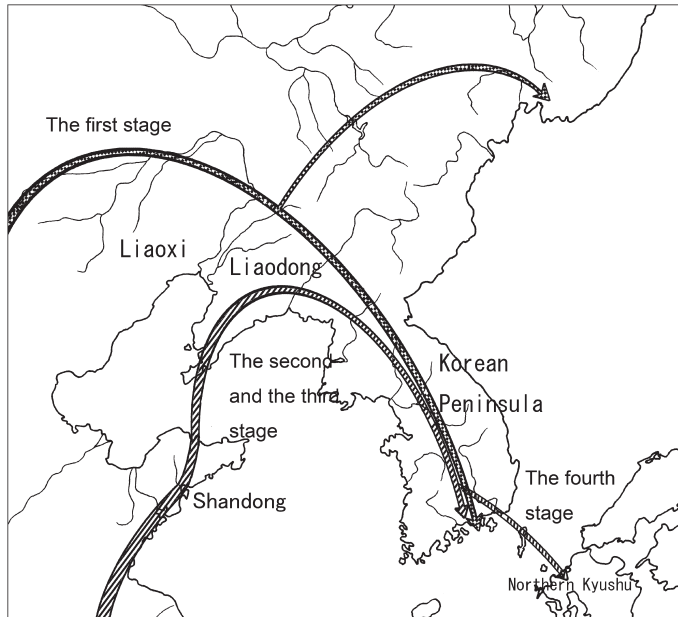


Figure 1. Four stages theory of agriculturalization in northeast Asia

Table 1. Cultural change in the four stages of agricultural development in Northeast Asia

	Stage 1	Stage 2	Stage 3	Stage 4
Time	c.3300 BC	c.2400 BC	c.1500 BC	8c BC
Crop	millet	wet-rice	irrig. wet-rice, millet, wheat	irrig. wet-rice
Tools	Stone mortar and pestle, hoe	pol. stone axe, adze, reaper	pol. stone axe, adze, reaper	pol. stone adze, reaper
From	NW KorPen	Shandong P.	Shandong P.	Southern KorPen
To	KorPen, sRFE	Liaodong P.	Liaodong P. >KorPen	N. Kyushu
Culture	Chulmun	Pianpu	Mumun	Yayoi
From	Middle western KorPen	Eastern Liaoxi district	Liaodong	Southern KorPen
To	Southern KorPen	Liaodong	Southern KorPen	Northern Kyushu
Replacing	Early Neolithic Korea	Wujiacun culture	Final Neolithic Korea	Jomon
Society	Horticulture	Millet farmer	Rice farmer and rise of chiefs	Rice farmer

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Table 2. Prehistoric chronology of North-east Asia

Dating	Central Plains	Liaodon Peninsula	Liaohe lower	Yalujiang lower	Western Korea	South Korea	Northern Kyushu	Agriculturalization
BC5000	Beligang						Initial Jomon	
BC4000	Baongbo	Shaozhushan lower	Xinle lower	Houwa lower	Chitamri	Initial Neolithic	Early Jomon	— First
	Shijia			Houwa Upper			Early Neolithic	
BC3000	Midogou	Shaozhushan middle	Machengzi	Mintuozi	Kimtamri 1	Middle Neolithic	Middle Jomon	— Second
	Bangbo 4	Wujiacun		Songhakri 1				
BC2000	Miaodigou 2	Pianpu	Pianpu	Songhakri 2	Namkyeong 1	Late Neolithic		— Third
	Wanwang 3	Shaozhushan upper		Songhakri 2	Namkyeong 2	Final Neolithic	Late Jomon	
BC1500	Xinzhai	Shuangtuozi 1		Sinamri 1				— Fourth
Earlitou	Shuangtuozi 2	Gaotashan					Final Jomon	
BC1000	Earligang	Shuangtuozi 3	Xinle upper	Sinamri 2	Paengni 1	Initial Mumun		— Fourth
Yinxu	Western Zhou	Shangmashi A		Sinamri 3		Early Mumun	Final Jomon	
BC450	Spring Autumn	Shangmashi B2	Zhengjiawazi	Misongri upper	Paengni 2	Konyol style pottery	Early Yayoi	— Fourth
				Mobangri	Paengni 3	Hyuamri	Initial Yayoi	
	Warring states	Yinjiajun 2			Paengni 4,5	Songgunni Jeomtoodae pottery		

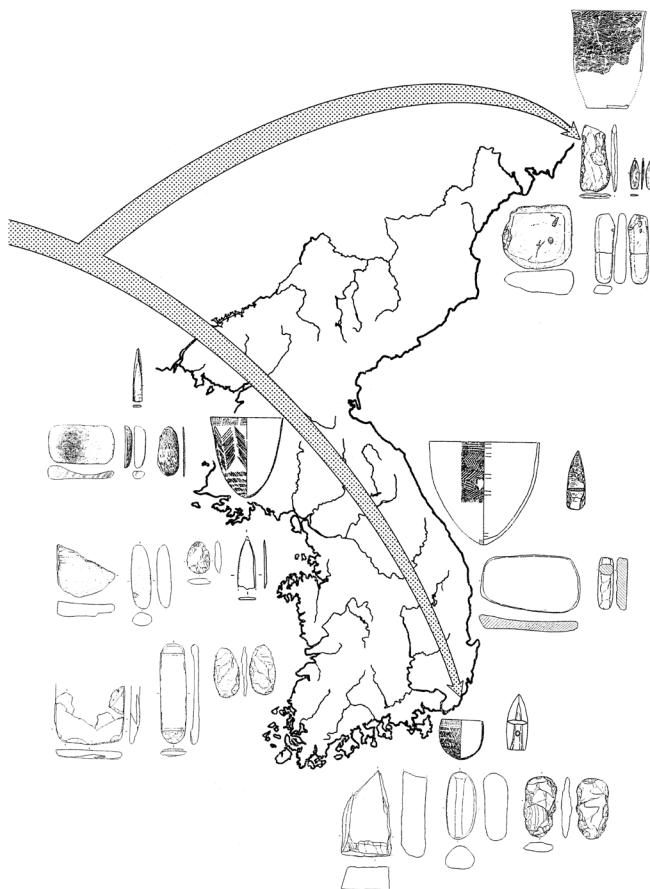


Figure 2. The first stage of agriculturalization in northeast Asia

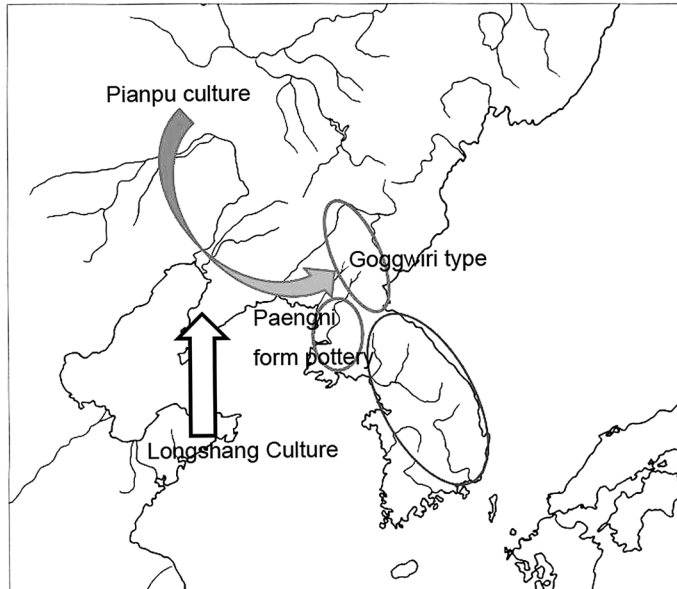


Figure 3. The second stage of agriculturalization in northeast Asia

agriculture as that of the previous period. The third stage, in the middle of the second millennium BC, involved a renewed spread of agriculture associated with new polished stone tools, such as the reaping knife and flat stone adze. The third agricultural system consisted of irrigated wet (rice) and dry (millet, wheat etc.) fields and spread from the Shandong Peninsula through the Liaodong Peninsula to the Korean Peninsula (Figure 4). Finally, the fourth stage involved the spread of irrigated agriculture from the southern Korean Peninsula to northern Kyushu, Japan, beginning about the 8th century BC. These four stages were triggered by immigrants due to cooler climatic conditions and the development of farming society. Thus, every stage of this demic diffusion was coincident with cooler climatic conditions.

Irrigated agriculture on the Korean Peninsula was triggered by the third phase of agriculture in northeast Asia; it began stably in the early period of Mumun Culture, and the population density was increasing. In addition, large settlements and chieftain graves began to appear, a result of the expansion of agricultural production. In this phase, cooler climatic conditions led to a small number of Mumun immigrants moving from the southern Korean Peninsula by demic expansion theory into northern Kyushu in search of new land for agriculture. These immigrants mixed with the Jomon people in northern Kyushu, following which the Yayoi culture emerged in this area, marked by the establishment of the Yusu 1 style of the Initial Yayoi in northern Kyushu (Miyamoto

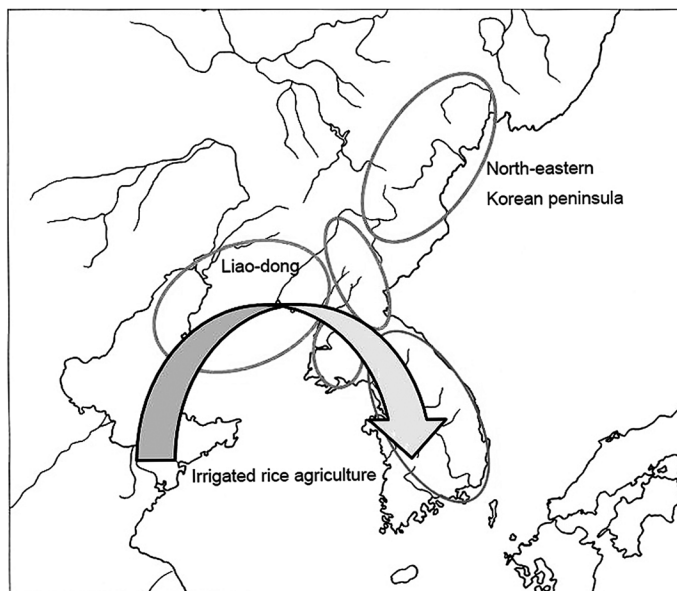


Figure 4. *The third stage of agriculturalization in northeast Asia*

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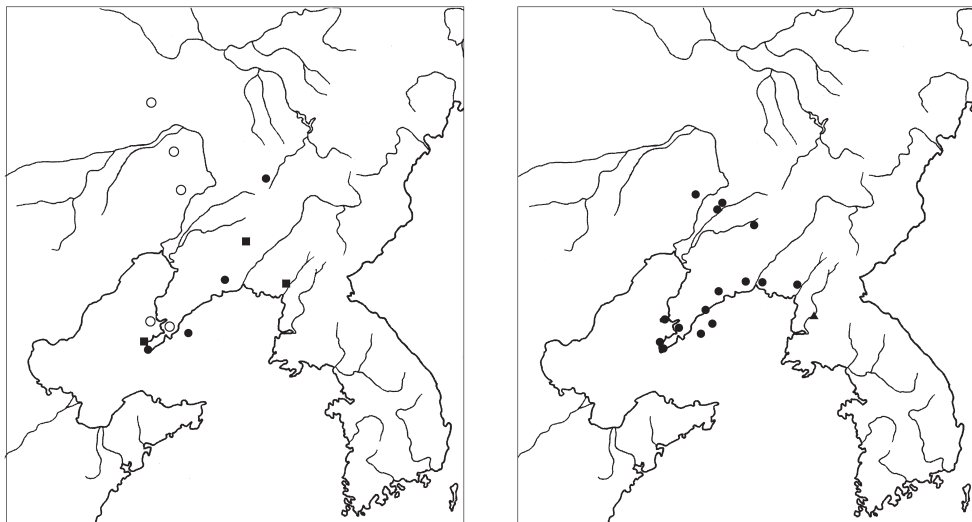
The physical differences between the Jomon and Yayoi in northern Kyushu are very clear, with Yayoi people in northern Kyushu being physically similar to continental (Mumun) people. The immigrants from southern Korea mixed with native Jomon people in northern Kyushu, and the resulting Yayoi people gradually became dominant in this area. At the beginning of Yayoi culture from 8th to 6th centuries BC in northern Kyushu, they possessed paddy rice fields, a form of irrigated agriculture, new polished agricultural tools like reaping stone knives, and a different pottery style including technical changes to the way pottery was made. In addition, circular moated settlements and new burial customs like dolmens and wooden coffin burials emerged.

Although immigrants and the influence of Mumun culture were very important factors in the transitional time between Jomon and Yayoi from 8th to 6th centuries BC, immigrants did not spread from the Korean Peninsula to northern Kyushu on just one single occasion. Periods of cooler climatic conditions indicated by the efficiency of ¹⁴C production have been identified as follows: 900 BC, 850–700 BC and 670 BC (Imamura & Fujio 2009). Cooler climatic conditions between 850 and 700 BC led to the most efficient production of ¹⁴C, and the duration of coolness was the longest among three periods of cooler climates. These cooler climatic conditions triggered several movements of immigrants from the southern Korean Peninsula.

2. The emergence mumun pottery in Korea

The second agricultural stage at around 2400 BC involved the spread of rice from Shandong Peninsula to southern Liaodong Peninsula. At the same time, the Pianpu culture which originated from the eastern Liaoxi district spread to Liaodong district (Figure 3). In this cooler climate period, the cultural trend in the whole of northern China had changed from a North–South connection to a West–East connection. At the same time there emerged a similar style of pottery at the end of the Neolithic in the Great Wall region, which includes central Inner Mongolia and Liaoxi districts. The Xiaoheyuan culture in the Liaoxi district joined the same pottery style with those in the Laohushan second period in central Inner Mongolia. The West–East connection in the Great Wall region triggered the production of the Xiaoheyuan culture in the Liaoxi district and the spread of the Pianpu culture originating in the eastern Liaoxi district eastward to the Liaodong district.

The Pianpu culture is divided into three phases: early, middle and late (Chen & Chen 1992). The early phase of Pianpu culture is distributed in the east of Liaoxi district according to the pottery chronology. However, the Wujiacun period of the middle layer of Shaozhushan culture is distributed in the Liaodong district, peripheral to the



1. Early Pianpu culture

(○Pianpu ●Wujiacun ■Pianpu+Wujiacun)

2. Middle and Late Pianpu Culture

(●Pianpu ▲Nangyon)

Figure 5. Changes in site distribution in the Pianpu culture

distribution of the Pianpu culture (Figure 5-1). the middle and late Pianpu culture replaced the Wujiacun and spread to the Liaodong district and the northwestern Korean Peninsula (Figure 5-2). There, the Pianpu culture influenced the Chulmun pottery of the northwestern Korean Peninsula, adding a new type of pottery (a necked jar) in the Chulmun pottery sequence (Figure 6). The necked jar influenced by the Pianpu culture consisted of Chulmun pottery Namkyeong 1 and Namkyeong 2 of the final Neolithic period on the western Korean Peninsula (Figure 7). This incident was also accorded to the second stage of agriculturalization of northeastern Asia in c. 2400 BC.

During this second stage, cultural influence from the Shandong Peninsula on the Liaodong Peninsula is also recognized in the Xiaozhushan upper layer culture in the southern Liaodong Peninsula, especially in the stone tools and black pottery. It is believed that rice agriculture spread to the southern edge of the Liaodong Peninsula based on the archaeological evidence of the rice kernel stamp on the pottery in Wenjiatun and Wangjiacun sites, Dalian, identified by SEM silicon analysis on pottery. This occurred at the same time as the Pianpu culture spread from the eastern Liaoxi district to Liaodong and northwestern Korean Peninsula (Figure 3).

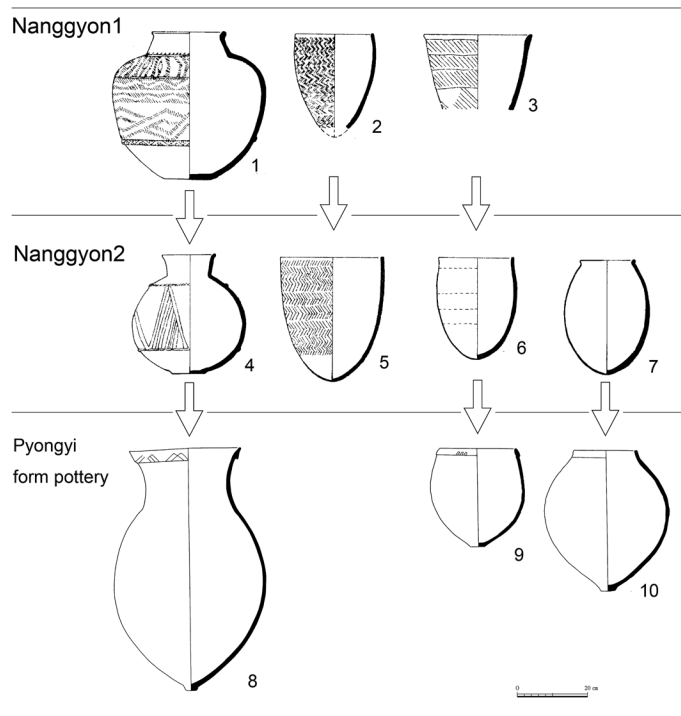


Figure 6. The transitional process of pottery between Chulmun and Paengni form pottery

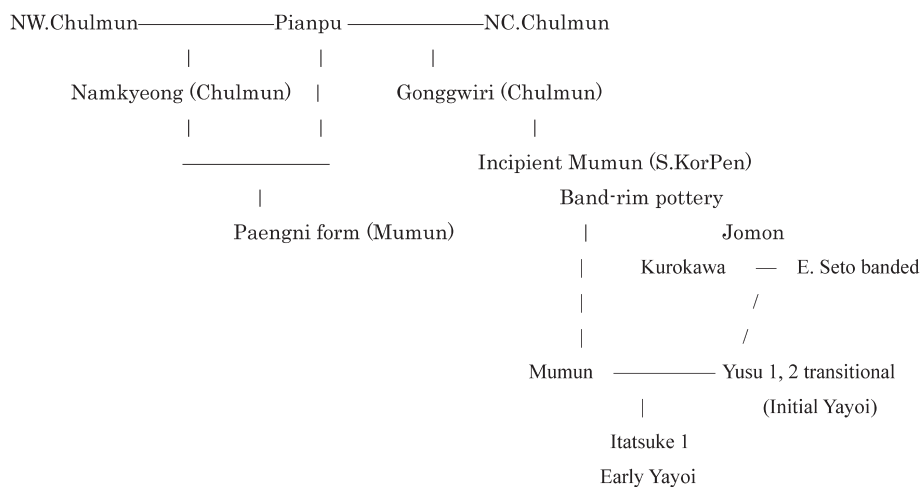


Figure 7. The spread of the Pianpu culture and its influence to the peripheral area

However, a time gap exists of about 900 years between the second stage of agriculturalization and the beginning of Mumun pottery on the southern Korean Peninsula at c. 1500 BC. On the northwestern Korean Peninsula, the influence of the Pianpu culture combined with Namkyeong Chulmun pottery to establish the Paengni form of pottery in the Mumun culture (Figure 7). In contrast, in the north-central Korean Peninsula, the influence of Pianpu culture produced the Gonggwiri pottery type (No.1 dwelling of the Simgwiri site) in the middle and upper valley of the Yalu River (Figure 8-1, 2). This Gonggwiri type directly evolved into the band-rim pottery of the initial Mumun pottery period on the southern Korean Peninsula (Figure 8-3, 4).

Mumun pottery on the Korean Peninsula was established when the pottery styles of the adjacent areas changed to those of the Pianpu culture through the process of diffusion and the influence on these areas by the Pianpu culture (Figure 7). Therefore, new pottery production techniques which were used in Pianpu cultural pottery were introduced to Mumun pottery by way of the Pianpu cultural influence on Gonggwiri type pottery. However, the transformation of these pottery styles took much time—around 900 years—and the beginning of the Mumun pottery culture started at c. 1500 BC on the southern Korean Peninsula. This is the point at which irrigated agriculture such as rice cultivation along with polished stone tools spread from Shandong Peninsula to the southern Korean Peninsula by way of the Liaodong Peninsula (Figure 4). Therefore, the establishment of the Mumun pottery culture in southern Korea consisted of a dual situation in that it formed from the foundations of such things as the Pianpu culture of the second stage of agriculturalization in Northeast Asia, but it was established by changes to the subsistence activities of the third stage of northeastern agriculturalization.

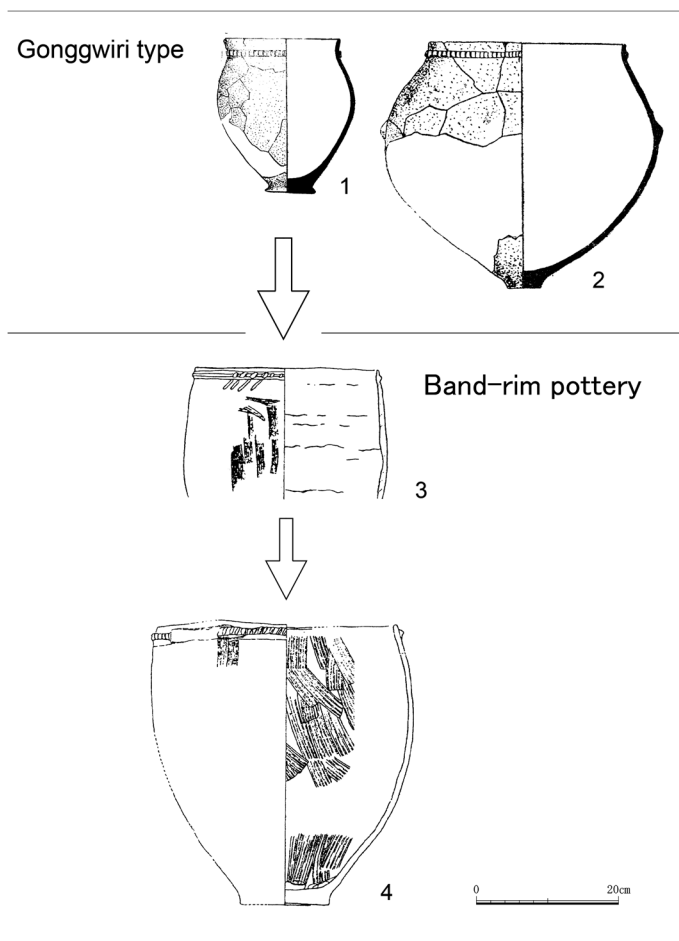


Figure 8. The transitional process of pottery between Gonggwiri type and banded pottery on the Korean peninsula

The earliest Mumun pottery in southern Korea is band-rim pottery in the incipient Mumun culture period from around 1500 BC. Band-rim pottery is supposed to be related to Gonggwiri pottery of the north-central Korean peninsula (Ahn 2010, Bae 2011), because of similarities in pottery designs and house plans, etc. So the Gonggwiri type pottery is believed to be related to band-rim pottery in the incipient Mumun culture in southern Korea. But the origin of the pottery production techniques of Mumun pottery, such as a relatively wide clay slabs, laid with clay slabs attached from the outside (Figure 9), and being smoothed with a wooden edge (Figure 10) and fired in a primitive clay kiln were not identified in the Neolithic pottery of Chulmun.

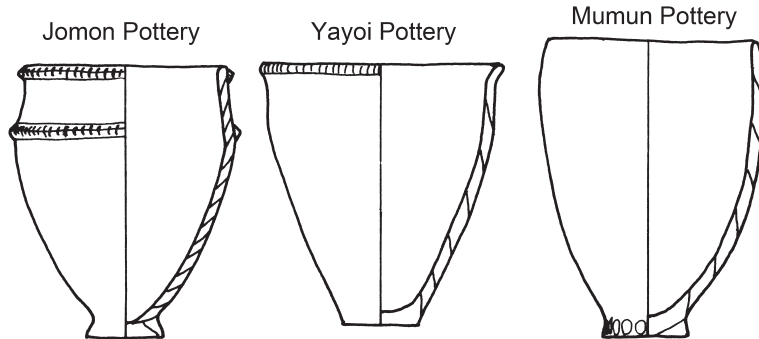
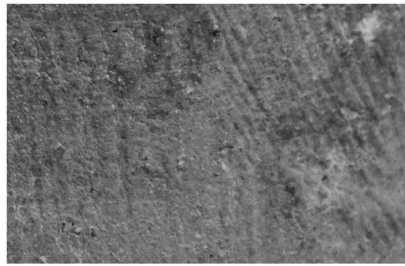


Figure 9. Jomon, Yayoi and Mumun pottery



1. Smoothing with shell



2. Smoothing with wood

Figure 10. Differences in smoothing techniques on pottery surfaces between the Jomon and Yayoi

3. Shangmashi excavation

3a. Relations between Pianpu and Mumun

Recently, we reanalyzed pottery from the Shangmashi shellmidden on the Liaodong Peninsula, which was excavated by a Japanese scholar in 1941 (Miyamoto 2015). This site covers from the early Neolithic to Bronze and early Iron Ages, except for Wujiacun period of middle Neolithic period which was missing from the stratigraphy. We focused on the production techniques of pottery found at this site. The analytical results show the existence of four attributes of pottery production skills such as 1) slab-built using relatively wide clay slabs, 2) attaching the clay slabs onto the exterior rather than interior surface, 3) smoothing with a wooden edge, and 4) firing the pottery in a primitive clay kiln on the ground. It is quite interesting that these four particular attributes of pottery production techniques are limited only to the Pianpu culture period in the chronological scheme from the Neolithic to the early Iron Age. Smoothing the clay surface with a wooden edge appears quite often in Pianpu culture pottery. The smoothing with a

wooden edge and firing technique using the primitive clay kiln in the Pianpu culture are also recognized at other sites besides the Shangmashi site. These results indicate that the Pianpu culture is connected with the emergence of new pottery production techniques in the Mumun pottery culture on the southern Korean Peninsula through the Gonggwiri type pottery.

3b. From Bronze to Iron Age

Analysis of the Shangmashi shellmidden site (Miyamoto 2015) also indicated that the pottery types changed in the mid-first millennium BC. A long-necked pot and clay-rimmed jar from the Yinjiacun Bronze Age at the 6th to 5th century BC (Figure 11-3, 4) was distributed Liaoxi to the Liaodong area (Figure 11). This new pottery came from the Liaodong Peninsula into the southern Korean Peninsula and developed into the Jeomtoda pottery (rolled-rim vessels, Figure 11-6, 7) of the early Iron Age, signifying that people from the Liaodong Peninsula migrated southward into the Korean Peninsula.

The reason why the immigrants moved from Liaodong to the Korean Peninsula in order to establish the Jeomtoda pottery (rolled rim vessel) culture was not due to the cooler climatic conditions. Rather, it was due to social and political reasons in society at the time, as the Yan state, which is located in the Beijing area, invaded eastward beyond the Yanshan Mountains. Yan made political contact with chieftains in the eastern Liaoxi district, imposing the hegemony of the Yan state. The eastward movement of people from the eastern Liaoxi to Liaodong at the Yinjiacun second stage triggered another migration from Liaodong to the Korean Peninsula. In this process, the Yinjiacun second stage culture spread to the Korean Peninsula and led to the establishment of the Jeomtoda pottery (rolled rim vessel) culture, which included the slender bronze dagger culture. At this time, rice farming settlements disappeared from the archeological record (Ahn 2010). This Jeomtoda pottery culture originating from eastern Liaoxi is clearly not associated with wet rice agriculture but with millet and wheat agriculture. This process resulted in a language change as well, as we shall see below. But first, let us return to the influence of the Mumun culture on the Japanese archipelago.

4. Transformations in North Kyushu

The interaction of Mumun culture with northern Kyushu at the beginning of the first millennium BC triggered the beginnings of rice agriculture and the formation of the Yayoi period in the Japanese archipelago. This is the fourth stage of agriculturalization in northeastern Asia, and Yayoi pottery was produced using pottery production techniques that had been transmitted from the Pianpu culture.

The transitional time from Jomon to Yayoi culture in northern Kyushu can be divided

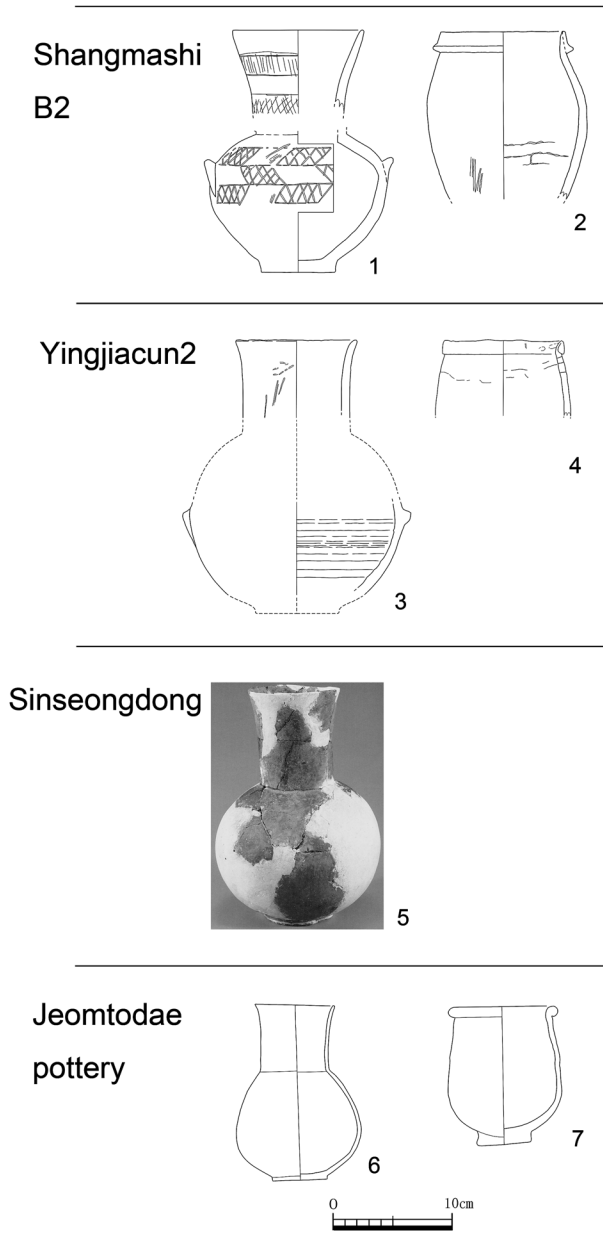


Figure 11. Spread of Jeomtodaepottery in northeast Asia

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Table 3. Cultural change in the transition from Jomon to Yayoi

Phase	Pottery	Language	Tools	Influence	Burials
Final Jomon	Kurokawa	Jomon		Konyol rim punctates	
Initial Yayoi	Yusu 1	Jomon/Japonic	New tools Stone dagger type 1	KorPen south coast	Dolmens
Initial Yayoi	Yusu 2	Jomon/Japonic	Stone dagger type 2	KorPen Hoam/ Yongnam	Wood coffins
Early Yayoi	Itatsuke 1	Japonic	Stone dagger type 2		Wood coffins

Table 4. Chronology of Tottaimon pottery during final Jomon period in western Japan

	Fukuoka Plain	Northern Kyushu	Seto Inland Sea	Kansai
Final Jomon	Middle Kurokawa	Middle Kurokawa	Tanjiri	Shinohara
	Latekurokawa	(Osayuki)	Maeike(Agata)	Shigasato 4
	(Etsuji SX-1)	(Etsuji SX-1)		Shigasato 4
Initial Yayoi	Yusu 1	Yusu 1		Kuchizakae
	Yusu 2a	Yusu 2a	Tsushima-Okadai	Hunahashi
	Yusu 2b	Yusu 2b	Sawada(*)	
Early Yayoi	Yusu 2b/Itatsuke 1 Itatsuke 1	Yusu 2b/Itatsuke 1 Itatsuke 1		Nagahara

into three phases which are in line with Tanaka & Osawa's migration model. Tanaka & Ozawa (2001) suggested that there were three phases of interaction between the Jomon and Mumun people from Final Jomon Kurokawa phase to Early Yayoi Itatsuke 1, resulting in the emergence of the Yayoi people (Table 4). The dating of the emergence of Yayoi is still controversial. But these phases are believed to represent the process of genetic integration between immigrants of the Mumun culture from the southern Korea and the Jomon people in northern Kyushu. The transitional period between Jomon and Early Yayoi in northern Kyushu took an estimated 300 years (Miyamoto 2012).

During the first cool phase at around 10th century BC in the Kurokawa Jomon phase (Table 3), there is a period of brief contact between southern Korea and northern Kyushu. Yoshiyuki Tanaka (1991) proposed that some migrants came from southern Korea to northern Kyushu during the Kurokawa period, based on archaeological evidence such as a row of punctuations under the rim of Kurokawa pottery, which imitated the Konyol

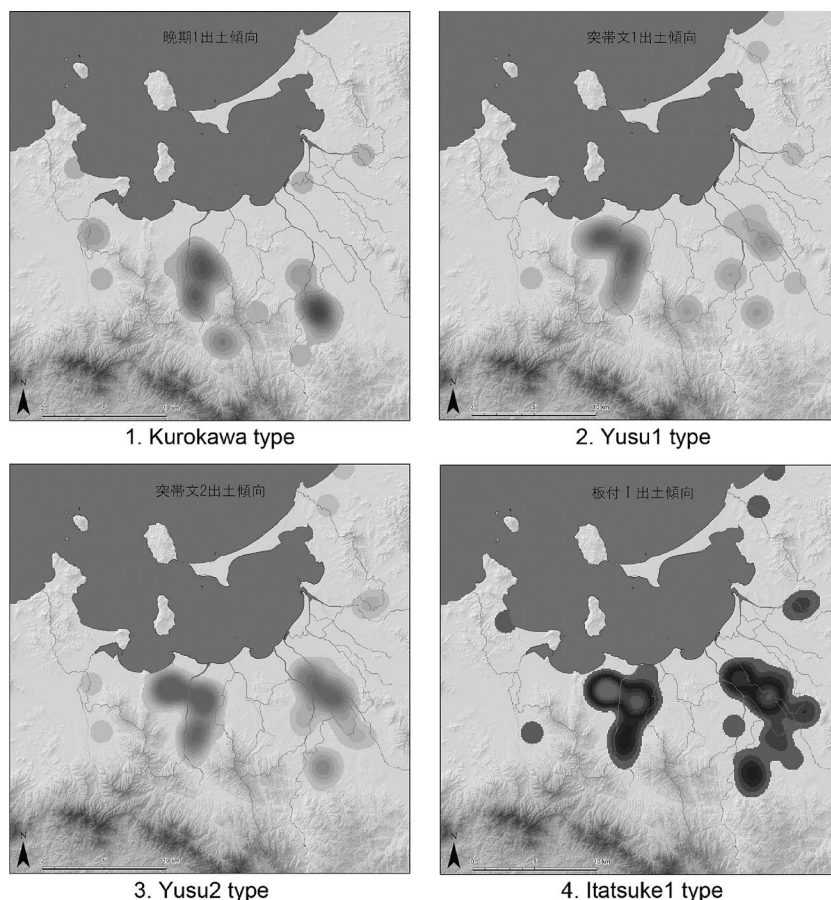


Figure 12. Changes in site distribution shown by kernel density between the Jomon and Yayoi

style pottery of Korea, and a reaping knife found at Nukigawa Site. This time is also related to cooler climatic conditions dating to c. 900 BC. Rice probably spread to Kyushu by this time at the latest, as indicated by evidence from SEM silicon analysis on pottery.

The archaeological site distribution on the Fukuoka Plains differs between the Kurokawa and Yusu time periods, and there are very few sites in the intermediate term between the two times. This change of archaeological site distribution is shown as the figure indicated by GIS with the coefficient of site densities (Figure 12). Archaeological sites at Kurokawa are located in the upper river basin or on hillsides (Figure 12-1). On the other hand, the archaeological sites of Yusu are located in the lower river basin or near coastlines (Figure 12-2, 3). This change in distribution of archaeological sites indicates marine regression due to the cooler climatic conditions. I propose that this time

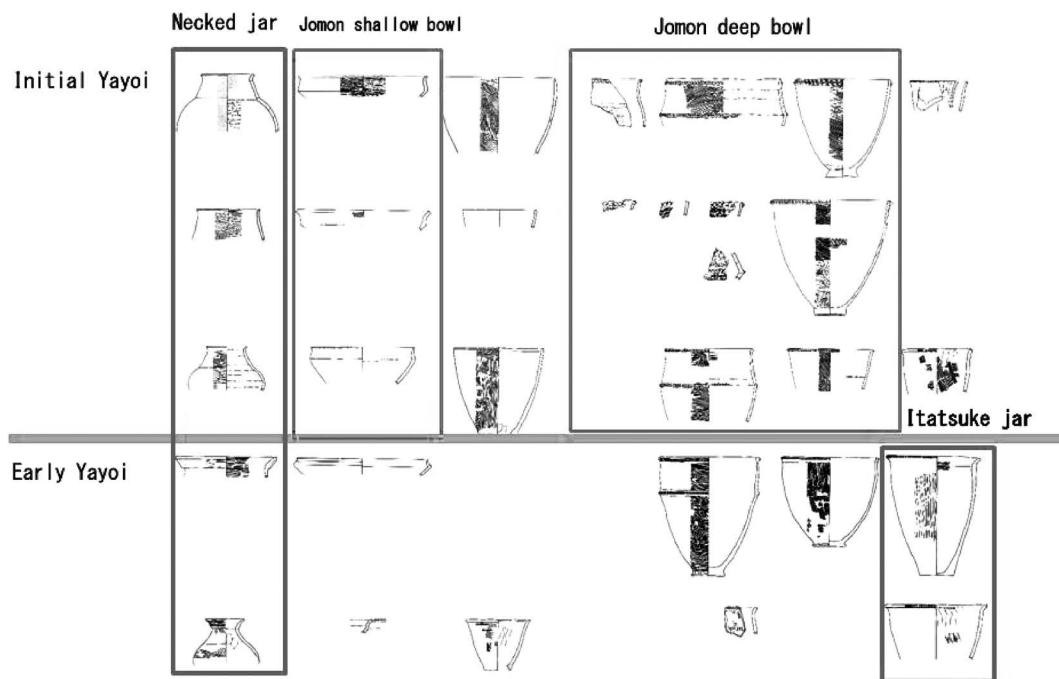


Figure 13. *Transitions in the pottery chronology between the Jomon and Yayoi*

of fewer site distributions coincided with the period when the climate was at its coolest, dating to c. 800–750 cal. BC. The ^{14}C production efficiency indicates cooler climatic conditions. During these cooler climatic conditions, the sea regressed and the alluvial fan was stable in the lower river basin, where rice paddy fields were located.

Kurokawa Jomon pottery was transformed into Yusu pottery by the spread of banded deep bowl culture [different from the band-rim Mumun pottery culture], originating in the Eastern Seto (Inland Sea area or Kinki) area and gradually spreading westward to northern Kyushu, replacing the Kurokawa pottery of the Final Jomon as Yusu pottery of Initial Yayoi. Yusu pottery consisted of a two-type series: a deep bowl based on Jomon and a necked jar based on Mumun culture (Figure 13). During Yusu 1 (c. 8th century BC) and Yusu 2 (c. 7–6th centuries), Mumun culture spread from two different locations on the Korean Peninsula (Figure 14). Yusu 2 preceded the development of the Itatsuke (Early Yayoi) pottery style on the Fukuoka Plains, its initial location. Thus, at around the 5th century BC, Itatsuke pottery influenced by Mumun ceramics replaced the deep bowls of the Jomon-style Yusu (Figure 13). In the following sections, the “transitional” period refers to Yusu 1 and Yusu 2 time periods. Although they are considered Yayoi because of the presence of wet-rice agriculture, full-fledged Yayoi culture did not coalesce until

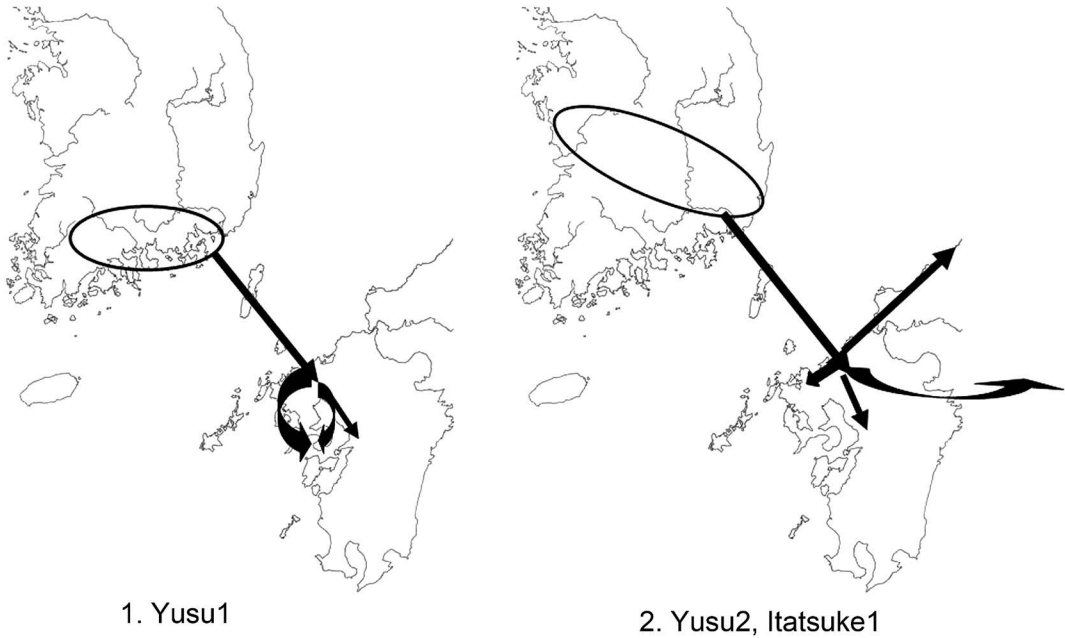


Figure 14. Processes of dual cultural spread from southern Korea

Itatsuke 1.

Not only the styles and sequences of pottery but also the pottery production techniques differ between the Yayoi and Jomon. The same differences can be seen between Neolithic pottery and Mumun pottery on the Korean Peninsula (Misaka 2012). Although the necked jar was added through the influence of Mumun pottery culture during the Yusu 1 type period, the deep bowl of the Jomon was still in use during the transitional phase between the Jomon and Yayoi. The Itatsuke jar pottery was established during the Itatsuke 1 period in the Early Yayoi (Figure 13). At this time, pottery production techniques totally changed from the Jomon period (Yane 1984, 1997; Misaka 2014). Relatively wide clay slabs were used to make Yayoi pottery, while relatively thin clay coils were used in Jomon pottery (Figure 9). The slabs of Yayoi pottery were attached on the outer surface of the previous slab, while the clay coils of Jomon pottery were laid up attached to the inner surface of the vessel. Smoothing on the surface of Yayoi pottery was conducted with edge of a piece of wood, while smoothing of pottery in the Final Jomon was performed with a shell (Figure 10). Yayoi pottery was fired in a primitive clay kiln on the ground, while Jomon pottery was in an open space (Kobayashi et al. 2000). These four attributes of different pottery production techniques clearly existed between Jomon and Yayoi pottery. The four attributes of new pottery techniques for Yayoi pottery

were adopted from Mumun pottery (Yane 1984, 1997; Misaka 2014). It is interesting that new techniques for pottery production were not established in the Yusu type, which was firstly influenced by Mumun culture, but in the Itatsuke type after the transitional period between the Jomon and Yayoi. The Itatsuke type pottery after the transitional period between Jomon and Yayoi at last was made by four attributes of new pottery production technique which was transmitted from Pianpu culture by way of Mumun culture.

Additional cultural changes beyond ceramic styles are also apparent in the transition from Jomon to Yayoi. Rice paddy fields, new pottery styles and new polished stone tools are found on the Fukuoka Plains in Yusu 1 after the Kurokawa period. Then, a circular moat settlement was established at the time of Yusu 2. New burial customs like wooden coffins started in the Fukuoka Plains around the time of Yusu 2 and Itasuke 1. Cultural attributes were added gradually in the time period between Yusu 1 and Yusu 2. And at the time of Itatsuke 1, a fully-fledged irrigated agricultural society was put in place (Figure 12-4). Although the dolmens were established at the time of Yusu 1, their distributions were concentrated in the Karatsu and Itoshima Plains. However, wooden coffins were introduced from the Korean Peninsula to the Fukuoka Plains and then spread eastward from there into other areas at the time of Yusu 2. Polished stone daggers accompanied the wood coffins as grave goods. Differences in the time of introduction and distribution area between the dolmens and wood coffins, along with differences in the distribution area by type of polished stone dagger on the Korean Peninsula, indicate the dual spread of culture from the Korean Peninsula (Miyamoto 2012). Thus, Yayoi culture was established with the diffusion of Mumun culture (Figure 14).

With the establishment of Yayoi culture, an independent farming society of Japanese archipelago was signified by the creation of the Itatsuke pottery style. The new farming people of the Yayoi in northern Kyushu moved into the Seto Inland Sea and Kansai area, where farming people and domestic Jomon people again mixed together.

5. Language and cultural diffusion

5a. Theoretical concerns

There are views that human dispersal in the prehistoric age is related with the spread of agriculture. One such view is the famous hypothesis by Colon Renfrew (Renfrew 1987) that the spread of Indo-European languages accompanied the diffusion of agriculture. He demonstrated archaeologically that agriculture people whose homeland was south central Anatolia spread to Greece by 7000–6500 BC. This dispersal continued until they reached Europe to form a subgroup of the Indo-European languages. In addition, he also showed that there was a large-scale exchange between migrant agricultural people and indigenous Mesolithic people during 3000 years: from 7000 BC when the Indo-European languages

spread to Greece to 4000 BC when they spread to the British Isles (Renfrew 1987, 1999).

Peter Bellwood has also hypothesized that the spread of agriculture was similarly linked with the spread of languages in East Asia (Bellwood 2005). According to this hypothesis, the Sino-Tibetan languages originated in the millet agriculture in the middle basin of the Yellow River, and the Hmong-Mien language family of the rice agriculturalists in the lower basin of the Yangtze River moved to south-east Asia to form the Austroasiatic language family. In addition, the Tai language family of people of rice agriculture in southern China moved to be a part of the Austroasiatic language family in Southeast Asia.

The Japonic and Koreanic languages belong to the Altaic language family. These languages are relatively shallow languages, and Japonic is earlier than Koreanic in the chronological scheme (Unger 2009). The Koguryo toponymic data indicates that a language cognate to Japonic was spoken on the Korean Peninsula (Whitman 2011), so Japonic languages are hypothesized to have originally been used on the Korean peninsula (Whitman 2011, Vovin 2013). Lee and Hasegawa estimate a date of 2,182 BP for the ancestor of proto-Japonic by using Bayesian phylogenetic analysis based on lexical data from 59 Japonic varieties (Lee & Hasegawa 2000). Because Japonic was spoken on the Korean Peninsula, it is believed that the Mumun culture on the Korean Peninsula and the Yayoi culture in the Japanese archipelago are both Japonic (Whitman 2011). It is believed by philologists that Japonic spread from the Korean Peninsula to the Japanese archipelago at the beginning of the Yayoi period with demic diffusion (Whitman 2011, Unger 2009, Vovin 2013). If this is true, Japonic was spoken by Yayoi people on the Japanese archipelago in the Yayoi period dating from the 8th century BC to the 3rd century AD.

5b. Archaeological explanation for the diffusion theory of Japonic languages

The question is, how and from where the Japonic language culture, which corresponds to the Mumun pottery culture, entered the Korean Peninsula. In order to resolve this issue, we need to focus on pottery production techniques to explain cultural contact which is unrelated to the spread of early agriculture.

First of all, where did Japonic languages originate from? Japonic languages were not colored by the influence of rice agriculture. Japonic is believed not to have included vocabulary dedicated to rice (Whitman 2011). The reason why there was no vocabulary dedicated to rice in Japonic is due to the fact that Japonic probably originated in eastern Liaoxi. The early Pianpu culture is mainly distributed in the eastern Liaoxi district (Figure 5-1). Because analysis of pottery production techniques suggests that Mumun pottery originated from the Pianpu culture, Japonic is also supposed to have originated from the Pianpu culture.

The Mumun culture was influenced afterwards c. 1500 BC by rice agricultural societies from the Shandong Peninsula through the Liaodong Peninsula, but it is assumed that the Mumun continued to speak Japonic. This is the third stage of agriculturalization in Northeast Asia. If Japonic languages spread to northern Kyushu *via* Mumun at the same time as the spread of rice agriculture in the fourth stage of agriculturalization in northeastern Asia, one can suppose that the transition between Jomon and Yayoi is the same as the transition in language between the traditional Jomon languages and Japonic. In this way, when the small number of Mumun culture people immigrated to northern Kyushu and mixed with the Jomon people, Japonic is also believed to have spread to northern Kyushu. But it is supposed that the transition between the original Jomon languages and Japonic in northern Kyushu took the same time as that of the pottery style from Yusu 1 to Itatsuke 1 pottery. It is supposed that the Jomon languages were replaced by Japonic by way of the same process, because the new pottery techniques discussed above were learned in Japonic, which was spoken by the Mumun people.

Japonic completely replaced the Jomon languages during the Itatsuke pottery period in northern Kyushu in the 5th century BC. Language replacement also took about 300 years during the Initial Yayoi period of northern Kyushu. In this case, the people did not necessarily change in terms of their genetic makeup. The Japonic language-speaking people which accompanied the Itatsuke type pottery originated from the Fukuoka Plains and migrated into western Japan, where Japonic gradually replaced the local Jomon languages during the early Yayoi period. After the Middle Yayoi period which started at the 3rd century BC, Yayoi culture became radically different from the Jomon culture still existing in southern Kyushu and in eastern Japan. Despite this, Japonic languages are supposed to have replaced the local Jomon languages in these areas.

5c. Archaeological explanation for the diffusion theory of the Koreanic language

In the 6–5th centuries BC, the Yan states of the Eastern Zhou period in China extended their territory across the Yanshan Mountains and politically influenced chieftains in Liaoxi district. From this time, immigrants of the Yinjiacun second stage made their way from eastern Liaoxi to Liaodong and then on to the Korean Peninsula, where they established the Jeomtodae (rolled rim) pottery. The Koreanic language is believed to have spread with this immigration to the Korean Peninsula to form the slender dagger (Korean type dagger) culture (Whitman 2011). Such a cultural influence from eastern Liaoxi district to the Korean Peninsula indicates the spread of proto-Koreanic with people fleeing due to the continuing territorial threat posed by the Yan states during the Warring States period of China. This cultural spread originated from the Liangquan Culture or the Yinjiacun second stage in the Liaodong district in Manchuria. And because this early

Iron Age is associated with the spread of Koreanic, it is assumed that the birthplace of the Koreanic language was also in eastern Liaoxi district.

6. Conclusion

The question posed by this paper was, how could rice agriculture have been introduced to the Japanese Islands by peoples from the Korean Peninsula who spoke a language (Japonic) that has no indigenous rice vocabulary? To answer this question necessitated tracing the diffusion of material culture across the landscape, beginning with the Pianpu culture in the south-central Manchurian Basin. The Pianpu culture possessed a Japonic language and millet agriculture at c. 2400 BC; it spread from eastern Liaoxi to Liaodong due to cooler climatic condition and produced Gonggwiri pottery in the middle and upper Yalu River. Gonggwiri pottery produced the band-rim pottery of Initial Mumun culture which possessed four attributes of new pottery production technique for Mumun pottery as same as those of Pianpu culture. In this process Japonic spread from Liaodong *via* northwestern Korea to southern Korea at the beginning of Mumun culture at c. 1500 BC.

Mumun pottery production techniques came from the Pianpu culture in the eastern Liaoxi district of Manchuria. The Pianpu culture spread from the eastern Liaoxi district to the Liaodong district and then to the northwestern Korean Peninsula at the second stage of Northeast Asian agriculturalization, c. 2400 BC. The Pianpu culture spread through areas adjacent to Liaodong and the northwestern Korean Peninsula, and local Chulmun in areas adjacent to Pianpu's cultural boundaries acculturated to it. Those acculturated cultures, e.g. having Gonggwiri type pottery in the middle and upper basin of the Yalu River, interacted with the southern Korean Peninsula, and produced the Initial Mumun culture. With this spreading of new pottery production techniques which originated from the Pianpu culture in the eastern Liaoxi, Japonic is believed to have spread from the eastern Liaoxi district to the Korean peninsula accompanied by the same pottery production techniques. It took about 900 years for the transition from the spread of the Pianpu culture to the northwestern Korean Peninsula to the beginning of the Mumun culture, the same as the transitional period from Neolithic languages to Japonic on the southern Korean Peninsula.

The third stage of Northeast Asian early agriculturalization, c. 1500 BC, is the spread of rice agriculture with rice paddy fields accompanied by polished stone tools, like reaping knives, from Shandong Peninsula through Liaodong Peninsula to the Korean Peninsula. The Mumun culture, which was based on the Pianpu culture, received irrigated rice agriculture along with polished stone tools. Therefore, the Mumun culture was established in this dualistic manner. This is the reason why although the Mumun

culture had Japonic language, it did not include vocabulary dedicated to rice, despite being used in a rice-based agricultural society.

Archaeologically, the beginning of the Yayoi period with rice agriculture was stimulated by the Mumun culture through demic diffusion based on the cooler climatic conditions (Miyamoto 2014). The pottery production techniques of Yayoi pottery were introduced from Mumun pottery. Mumun pottery changed from the Neolithic age in the same sense that pottery techniques change from the Jomon to the Yayoi period (Misaka 2012). Such pottery production techniques as those of the Mumun culture were not fully used at the beginning of the Yayoi period of Yusu 1 type but in the Early Yayoi period of Itatsuke type in northern Kyushu. The transitional period from Jomon to Yayoi accords with the transition from Yusu 1 and Yusu 2 types to Itatsuke type in northern Kyushu. It is believed that this transitional time from Jomon to Yayoi accords with the period of transition from Jomon languages to Japonic in northern Kyushu, because the pottery production techniques were learned not through imitation but through language.

During the Early Yayoi period, Itatsuke-style pottery spread to western Japan; at the same time, Jomon culture developed into Yayoi culture, with the adoption of rice agriculture in western Japan. In this way, Japonic spread to western Japan with Itatsuke pottery, and it gradually led to a shift from Jomon languages to Japonic in western Japan. Such a change in language along with change in pottery took place even in the Middle Yayoi period in southern Kyushu and in the eastern Japan.

Koreanic originated from the eastern Liaoxi district, the same as Japonic originating from the Pianpu culture. Koreanic and the Yinjiacun second stage culture spread to form the rolled-rim pottery in southern Korea in the 5th century BC, replacing Japonic in southern Korea. The archaeological evidence shows the probability that these two languages belong in the Altaic language group, and it accords with the linguistic idea that Japonic is earlier than Koreanic in the chronological scheme (Unger 2009). So, the homeland of both languages are the same and they are kin families of languages. But the time difference between development of the two languages was about two thousand years.

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