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2.4 EARLY SEDENTISM IN EAST ASIA: FROM LATE PALAEOLITHIC TO EARLY AGRICULTURAL SOCIETIES IN INSULAR EAST ASIA

JUNKO HABU

The Importance of Studying Early Sedentism in East Asia

East Asia is a treasury of archaeological information when examining the origins and development of early sedentism in human societies. Since the early 20th century, conditions, causes and consequences of sedentism have been major research foci of anthropological archaeology. Traditional archaeological approaches, which were heavily based on data from Europe and the Near East, tended to view the beginning of food production as the direct cause of sedentism (*e.g.*, Braidwood 1958, 1960; Childe 1942, 1951; MacNeish 1964, 1972). Developments in hunter-gatherer archaeology over the past several decades, however, have revealed that sedentism is not necessarily restricted to food-producing societies. In particular, the prehistory of the Japanese Archipelago and the Korean Peninsula (Map 2.4.1) does not fit into the conventional chronology of the "Palaeolithic-Neolithic-Bronze Age" sequence of West Eurasia: the Jomon Culture in Japan (c. 16,000–3000/2500 BP) and the Chulmun Culture in Korea (c. 11,500–3300 BP) are associated with large amounts of pottery but, unlike many other pottery-producing cultures, the primary subsistence strategy was hunting-gathering-fishing (*cf.* Jordan & Zvelebil 2009). An examination of the development of early sedentism in these regions will help us understand why historically unique trajectories of human sociopolitical and economic systems developed in different parts of the world.

Recent discussions on the origins of agriculture also indicate that the boundary between hunter-gatherers and agriculturalists is not as clear-cut as scholars once assumed. Many "hunter-gatherer" societies did/do practise plant cultivation or small-scale agriculture. The common practice of environmental management, in which important food resources, such as nut trees, are tended, is also known. The use of fire to periodically clear the land to maintain biodiversity is well documented as well (*e.g.*, Pyne 1999). Archaeological data from East Asia are critical for tackling these issues (*e.g.*, Bleed & Matsui 2010; Crawford 2006, 2008).

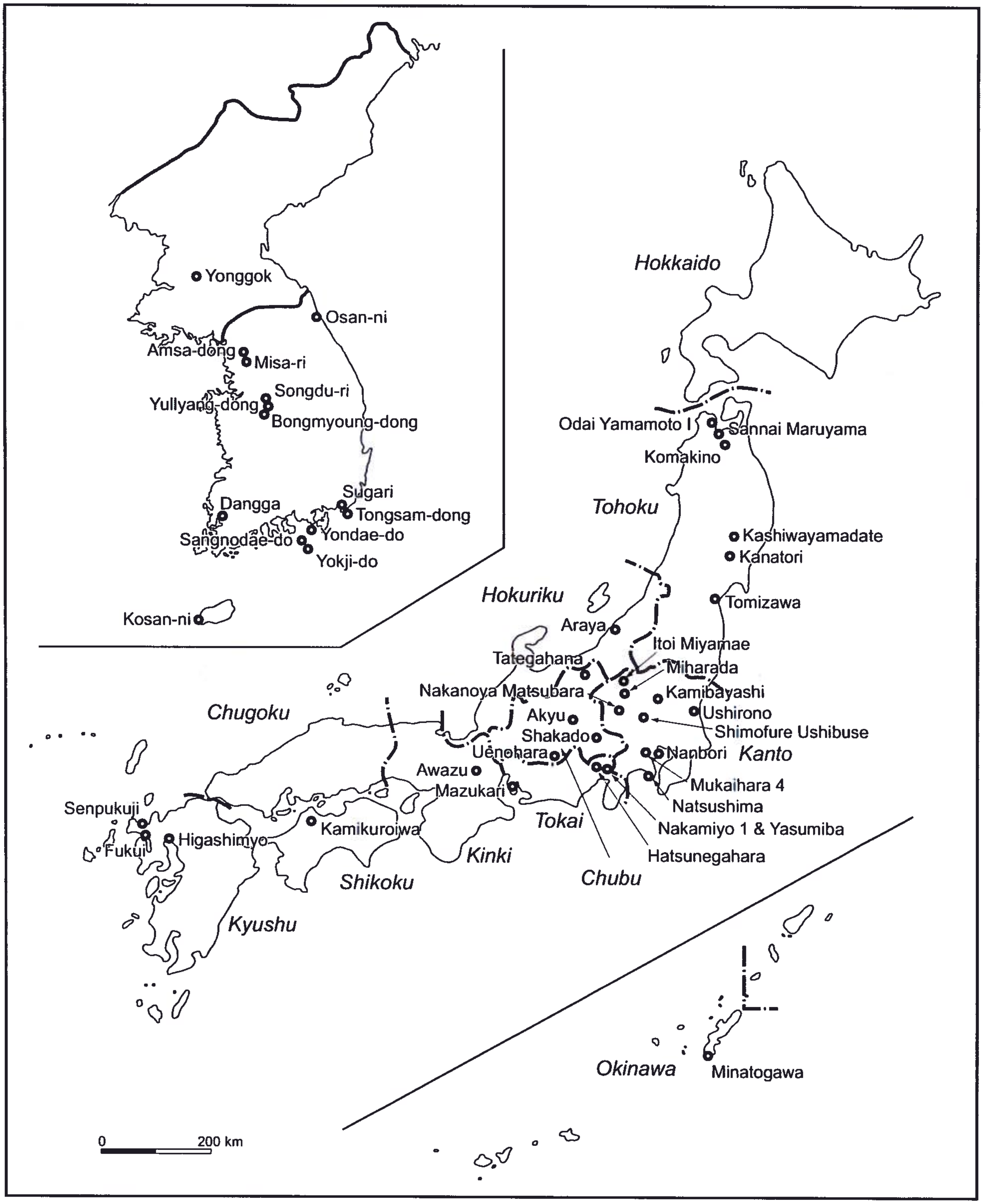
The definition of sedentism has also gone through many changes. Over the past years, the idea that the measurement of sedentism should be scalar and multifaceted, just like in the case of cultural and social complexity, has gained significant support (*e.g.*, Kelly 1995: 148–9).

Archaeological case studies from East Asia are instrumental in understanding the development of sedentary ways of life from the Late Pleistocene to Early Holocene. Rich archaeological data from this region provide us with an excellent opportunity for understanding the correlations between sedentism and other key elements of prehistoric societies. They include subsistence intensification, population increase, long-distance trade, craft specialisation and social inequality.

Changing human-environment interaction in relation to long-term changes in prehistoric societies is also a key to understanding the development of sedentary ways of life. With the development of historical ecology (*e.g.*, Balée 1998, 2006; Balée & Erickson 2006; Crumley 1994; Erlandson & Rick 2008; Kirch & Hunt 1997; see also Hayashida 2005), archaeologists have begun to pay closer attention to understanding dynamic human-environment relationships. These include the discussion of climate change, the impacts of human activities on the biosphere and the anthropic nature of past landscapes that surrounded prehistoric settlements. Detailed environmental and archaeological data from East Asia allow us to investigate these complex human-environment interactions by focusing on changing patterns of mobility and sedentism. (Because this is a review chapter, the Romanisation of place and site names in the Asian languages follows that of the original papers. As a result, both McCune-Reischauer Romanisation and Revised Romanisation of Korea are used for Korean place and site names.)

Sedentism, Mobility, and Subsistence Intensification in Archaeology

Before moving onto the discussion of data from East Asia, a brief overview of the study of sedentism is useful. Developments of hunter-gatherer archaeology over the past few decades have revealed several important points. First, in hunter-gatherer



MAP 2.4.1. East Asian archaeological sites discussed in the text.

studies, the definition of sedentism typically includes both seasonal sedentism (also called semisedentism) and full (or year-round) sedentism (*e.g.*, Kent 1989). Second, although the development of sedentary ways of life (including seasonal sedentism) was closely correlated with the development of cultural complexity, including subsistence intensification, long-distance trade, craft specialisation and social stratification (see Habu 2004: 15–16), this does not imply that sedentary societies were more advanced than nonsedentary ones. Third, developing a model to link archaeological data with the degree of sedentism is essential in examining past settlement systems. Following the last point, various formal and informal models have been proposed to infer the degree of sedentism and characteristics of subsistence-settlement systems from archaeological data (*e.g.*, Bettinger 1999; Binford 1980; Smith 1981; Winterhalder 2001).

A critical development in these discussions is the recognition that hunter-gatherer mobility is not one-dimensional. Binford (1980) distinguished residential mobility (the movement of a residential base from one locality to another) from logistical mobility (the movement of specially organised task groups on temporary excursions from a residential base). His review of ethnographic examples indicates that high residential mobility tends to be associated with low logistical mobility, and vice versa. Kelly (1995: 112–15) lists five criteria for measuring hunter-gatherer mobility: (1) the number of residential moves per year, (2) the average distance of residential move, (3) the total distance of residential move, (4) the total area of residential and logistical moves and (5) the duration of logistical mobility. Ethnographic records indicate that, in addition to these group movements, movements of individuals and families are also common. Through these discussions, Kelly emphasises the multifaceted nature of mobility.

The distinction between seasonal sedentism and full sedentism forms part of this multidimensional understanding of hunter-gatherer mobility. As discussed elsewhere (Habu 2004: 7–16), seasonal sedentism, in which members of a group stay at the same residential base for at least several months a year is characteristic of many hunter-gatherer groups. Ethnographic records indicate that the majority of so-called sedentary hunter-gatherers were seasonally sedentary as opposed to fully sedentary. Kent (1989: 2) states that hunter-gatherer groups who stay at the same settlement for more than six months per year should be considered as sedentary.

Causes and consequences of sedentism have been a topic of debate. The traditional assumption that sedentary ways of life are more suitable for the survival of human beings, and thus superior to mobile lifestyles, has been seriously challenged over the past few decades. For example, Kelly (1991) states that sedentary hunter-gatherers tend to spend more time on food acquisition than mobile hunter-gatherers, and that the reduction of residential mobility results in an increase in logistical mobility. In other words, sedentism does not decrease the amount of energy spent per person, but only reorganises the way energy is expended.

Another common assumption is the notion that sedentism developed in the areas where resources were abundant. While some researchers continue to support this traditional assumption (*e.g.*, Hayden 1995), others suggest that hunter-gatherer mobility is more closely tied to resource distribution: sedentary hunter-gatherers tend to be found in the areas where the distribution of critical resources is seasonally and/or spatially heterogeneous (*e.g.*, Bettinger 1999; Binford 1980, 2001).

An important question that is still under debate is how the width of diversity in subsistence activities was related to early sedentism. Traditionally, many scholars assumed that sedentism first occurred where a wide variety of food resources was available from a single settlement. According to this hypothesis, hunter-gatherers who are generalists (those relying on a wide variety of food resources) are likely to be sedentary. However, Binford's (1980) collector-forager model suggests that generalist strategies are often associated with residentially mobile hunter-gatherers, and that specialists (*i.e.*, those relying on a single resource, or a limited number of resources) are the ones who are more sedentary. Scholars have also argued that subsistence specialisation and intensification with a focus on plants, fish and/or shellfish and associated food storage are the keys to understanding the development of sedentism during the Early and Middle Holocene (*e.g.*, Jenkins, Connolly & Aikens 2004).

The debate on the diversity of food resources is not over yet. From the perspective of evolutionary ecology, Bettinger (1999), in his traveller-processor model, suggests that sedentary hunter-gatherers tend to rely on a wider range of food resources than mobile ones. This is because he perceives the reliance on plant food, such as nuts, as adding a new type of food that was not previously exploited. The two perspectives are not necessarily contradictory, however. Binford's (1980) collector-forager model focuses on the changes in the width of staple food, whereas Bettinger's (1999) perspective is tied to the optimal foraging model, in which richness (the number of different nominal classes of items; see McCartney & Glass 1990) is the primary criterion for measuring subsistence diversity.

In the case of insular East Asia, the process of sedentarisation seems to have involved both diversification in the richness of food resources and subsistence specialisation in terms of staple food. Diversification in the richness of food resources was critical in the initial stage of sedentarisation, when the bulk exploitation of plant and marine food was incorporated into existing food arrays. The development of large settlements during and after the Early Holocene was closely linked with subsistence specialisation, in which a limited number of food sources, such as nuts, tubers and fish, were intensively exploited and stored. This process was also associated with evidence of plant cultivation and environmental management, which further increased the overall diversity in the number of utilised species (*e.g.*, Crawford 2006, 2008).

Factors such as population increase, climate change, long-distance trade, craft specialisation and social inequality have been suggested as conditions, causes and consequences of the development of early sedentism. It is unlikely that a single factor was the sole cause that facilitated the phenomenon. Rather, a combination of multiple factors that were closely linked with local and regional environments and sociopolitical systems has resulted in the unique historical trajectories of subsistence-settlement practice in each region. In the following, I will outline key issues in the study of the Late Palaeolithic Period (c. 35,000–16,000 BP) and the Jomon/Chulmun periods (16,000–2500 BP), with a focus on the discussion of mobility and sedentism. A brief discussion about the transition to the following full agricultural periods (the Yayoi in Japan and the Mumun in Korea) is also included.

TABLE 2.4.1. Summary of debates over possible land bridges during the Late Palaeolithic Period.

Possible Land Bridges	Status of the Debate
Russian Far East-Sakhalin-Hokkaido	Connected during most of the Late Pleistocene (100,000–10,000 years ago) (Imamura 1996; Keally 2005).
Hokkaido-Honshu	On the basis of palaeofauna, Takahashi *et al.* (2004) indicate the presence of a land bridge during part of the Last Glacial Maximum. Possibly intermittent "ice-bridge" during the Late Palaeolithic Period.
Kyushu-Ryukyu-Taiwan-southern China	Until the mid-1990s, it was assumed that there was no land bridge after 1,500,000 years ago (Okinawa-ken Bunka Shinkokai & Kobunsho-kan Kanri-bu Shiryo-hensan-shitsu 1998: 46). Kawamura (1998) supports this based on Late Pleistocene fauna. However, Kimura (1996) suggests a land bridge as late as 20,000 years ago. Ujiie (1998), Ujiie and Ujiie (1999), and Ujiie *et al.* (2003) support the latter interpretation based on planktonic ^{18}O values and the frequency of the cold water group of planktonic foraminifera.
Northwest Kyushu-South Korea	Harunari's (1998) summary states no land bridge after 125,000 years ago (*cf.* Matsui, Tada & Oba 1998).

From Habu (2010).

Mobile Hunter-Gatherers in the Late Palaeolithic Period (c. 35,000–16,000 BP)

Migration and Sea Level Change

East Asia, and in particular China, is known for an abundance of skeletal remains of *Homo erectus* and archaic *Homo sapiens* that are dated to c. 200,000–100,000 BP (*e.g.*, Barnes 1993; Etler 1996). (In this chapter, uncal bp [lowercase] is used for uncalibrated radiocarbon dates [radiocarbon years before 1950]. Uppercase BP refers to calibrated or calendrical dates. For problems and limitations of absolute dates in East Asian archaeology, see Habu 2004: 26–7.) Reports of lithic tools in China before 100,000 BP are also abundant (Chen & Keates 2003; Dennell 2009; Keates 2000; see also Chapter 2.2). Curiously, however, the number of Chinese Palaeolithic sites that date after 100,000 BP is much smaller (see Chapter 2.3). This makes the Palaeolithic study of Japan and Korea an important research field for understanding Late Palaeolithic ways of life as well as the migration of *Homo sapiens sapiens*.

So far, the majority of Palaeolithic skeletal remains found in Japan are from the Ryukyu Islands (southwest of the main islands of Japan; present-day Okinawa Prefecture). These include well-preserved skeletal remains of four individuals from Minatogawa. Associated charcoal fragments are dated to 16,600 ± 300 uncal bp (TK-142) and 18,250 ± 650 uncal bp (TK-99) (Baba & Narasaki 1991; Kobayashi, Matsui & Suzuki 1971; Suzuki & Hanihara 1982). (These dates are apart from each other, and there is little overlap even in two sigma ranges [20,350–19,130 BP for TK-142 and 23,430–20,050 BP for TK-99]. Thus, the radiocarbon dates may represent two different episodes.) As indicated in Table 2.4.1, most Japanese archaeologists and anthropologists assume that, by that time, there was no land bridge to Ryukyu, and that the ancestors of the Minatogawa people had to use watercraft to arrive in Okinawa. In the context of the migration of anatomically modern humans, Baba (2001) suggests that the ancestors of the residents of Minatogawa, and at least partial ancestors of the Jomon people, may have been maritime-adapted voyagers who originally migrated from Southeast Asia. This hypothesis has an important implication in the discussion of the origins and migration of maritime-adapted people to the New World (*e.g.*, Erlandson 2002).

Palaeolithic human skeletal remains from the Korean Peninsula have been reported primarily from North Korea (Bae 2010). They include hominin fossils from Cultural Layer 2 of Yonggok Cave (Sangwon County, South Pyongan Province) near Pyongyang, dated to 44,300 ± 2000 and 49,000 ± 2000 years ago by uranium-series dating (Bae 2010). Bae (2010: 109), however, states that "fossil evidence in the peninsula is simply not sufficient to discuss the origin of modern humans in Korea".

Lithic Chronology

In addition to Minatogawa and several other sites with skeletal remains, over 10,000 Palaeolithic sites dated to c. 35,000–16,000 BP have been reported from the Japanese Archipelago (Nihon Kyusekki Gakkai 2010). This period is referred to as the Late Palaeolithic. Table 2.4.2 lists the number of Palaeolithic sites from nine regions in Japan. Numbers in parentheses indicate the counts when two or more cultural layers from a single site are counted separately. An abundance of sites in the Kanto region is likely to be a reflection of intensive rescue excavations in the region over the past few decades.

TABLE 2.4.2. Numbers of Palaeolithic sites and cultural layers in each region.

Region	Palaeolithic Sites (Cultural Layers)
Hokkaido	700 (861)
Tohoku	431 (481)
Kanto	3619 (6921)
Chubu	1677 (2009)
Kinki	957 (968)
Chugoku	463 (507)
Shikoku	269 (283)
Kyushu	2026 (2504)
Okinawa	8 (8)
Total	10,150 (14,542)

From Nihon Kyusekki Gakkai (2010).

An English overview of Palaeolithic cultures on the Japanese Archipelago is provided by Ikawa-Smith (2008). As indicated in her article, sites dated before 35,000 BP are extremely scarce. An exception is the Tategahana Site at the bottom of Lake Nojiri (Nagano Prefecture), from which fossilised remains of Naumann's elephant (*Palaeoloxodon naumanni*) and Yabe's giant deer (*Sinomegaceros yabei*), as well as stone and bone tools, were recovered. These remains were excavated from layers dated to at least 50,000–35,000 years ago (Inada 2001: 9). Many Japanese archaeologists suggest that this was a kill site. Stone tools from several other sites, such as the Kashiwayamadate and Kanatori Sites in Iwate Prefecture, are possibly older, but the quantity of lithics is too small to state anything conclusive (Inada 2001).

Lithic assemblages from Late Palaeolithic sites in Japan are defined by the presence of blade, and later micro-blade, technology. Chronologically, the Late Palaeolithic Period can be divided into two phases: the first half and the second half (Inada 2001). The first half of the Late Palaeolithic is dated to c. 35,000–29,000 BP. On the Musashino Plateau of the Kanto region, where Palaeolithic chronology is well established, this first phase corresponds to Tachikawa Loam Layers X to VII. This phase is characterised by an abundance of trapezoids and edge-ground stone axes along with so-called knife-shaped stone tools (a type of projectile point) and other tools made of blade technologies. No clear regional variability within the Japanese Archipelago is observable during this phase (Inada 2001: 52; Sato 1992).

The second half of the Late Palaeolithic is dated to c. 29,000–16,000 BP. This phase corresponds to Layers VI to III of the Tachikawa Loam. The beginning of this second phase is marked by the Aira-Tanzawa tephra that originated from a volcanic eruption in southern Kyushu dated to c. 26,000 uncal BP (Inada 2001: 50) or 29,000 BP (Inenaga *et al.* 2006; Okuno 2002). This is a distinctive pumice layer within Layer VI of the Tachikawa Loam.

During the second half of the Late Palaeolithic Period, regional variability in lithic assemblages became prominent. Assemblages from Honshu, Shikoku and Kyushu show unique, indigenous developments. They were characterised by the presence of regionally unique types of knife-shaped stone tools, and, later, bifacial spear points. Assemblages in Hokkaido seem to bear strong resemblances to those in Siberia (Inada 2001: 49), although examples that can be dated to 20,000 BP or earlier are limited (Terasaki 2006).

The blade technology of the Late Palaeolithic Period was replaced by a micro-blade technology at different times in different parts of the Japanese Archipelago. In Hokkaido, micro-blades made by the Yubetsu technique, which was characterised by boat-shaped bifacial cores (see Barnes 1993: 60), became dominant by 20,000 BP. In the southwestern half of Honshu, Shikoku and Kyushu, micro-blades characterised by the Yadegawa technique associated with conical cores appeared around 17,000 BP. Scholars suggest that the two techniques of micro-blade production, Yubetsu and Yadegawa, represent the northern and southern routes of the diffusion of micro-blade technology and migration from the continent.

Towards the end of the Palaeolithic Period, micro-blades with wedge-shaped cores, which originated in the Yubetsu technique from the north, spread throughout northern Honshu. The assemblage is called "northern type microliths" (Inada 2001: 122; Sato 1992: 313). Representative sites associated with this type of assemblage include the Araya Site (Niigata Prefecture) and the Ushirono Site (Ibaraki Prefecture).

The number of Palaeolithic sites from the Korean Peninsula is still small, but it has increased significantly over the past couple of decades. Kidong Bae (2010) reports sixty-nine sites dated to c. 50,000–10,000 BP from both South and North Korea. According to Bae (2010), sites dated to 50,000–35,000 BP include Bongmyoung-dong (Cheongju City, North Chungchong Province), Songdu-ri (Jincheon County, North Chungchong Province), Dangga (Naju City, South Cholla Province) and Yullyang-dong (Cheongju City, North Chungchong Province), all of which are associated with non-blade technology. Bae states that a blade technology from Siberia appeared in the Korean Peninsula at around 35,000 BP and coexisted with core and flake stone industries from southern China and Southeast Asia.

Features and Settlement Patterns

Most of the Late Palaeolithic sites in Japan consist of concentrations of three types of remains: lithics, burnt cobbles and charcoal. Lithic scatters imply multiple activities such as tool making and food processing. Burnt cobble clusters are likely to have been associated with stone boiling or steaming. Charcoal concentrations reflect the use of fire. Reliable reports of dwelling remains are scarce. This means that the archaeological data from which to infer the degree of sedentism of the residents of these sites are limited. Given the parsimonious nature of archaeological assemblages, and given the lack of the palimpsest use of the same location, Inada (2001) suggests that the

Palaeolithic people on the archipelago must have stayed at the same camp site for several days to weeks.

Inada (2001: 81–96) notes that some sites from the first half of the Late Palaeolithic Period are associated with clusters of stone tools, the layout of which forms a circular configuration. The diameter of the circle measures from 9 m (the Nakamiyo No. 1 Site, Shizuoka Prefecture) to 50 m (the Shimofure Ushibuse Site in Gunma Prefecture). At the Kamibayashi Site, Tochigi Prefecture, the configuration is oval-shaped, measuring 50 × 80 m. The number of stone-tool clusters varies from six clusters at the Nakamiyo No. 1 Site to thirty-three clusters at the Shimofure Ushibuse Site. Refitting of stone tools found at multiple clusters within a site indicates that many of these clusters were contemporaneous. Inada (2001: 86–7) suggests that these are the remains of camp sites, each of which was occupied by a single residential group, and that individual stone-tool clusters may have been associated with tents. He also suggests that the people during this first phase needed to form these large residential groups to defend themselves from outsiders, as they were moving around over a wide-ranging area, and regional territorialities were yet to be established (Inada 2001: 95–6).

Unlike the first half, the second half of the Late Palaeolithic Period is not associated with clusters of lithic scatters. While the reason for this is unclear, Inada (2001: 96) suggests that the development of regional territoriality, which can be inferred from the development of regionally unique tool types, freed people from the necessity to form a self-defensive large residential group.

Features from the second phase are scarce. Exceptions include shallow, dwelling-like features from the Mukaihara No. 4 Site (Kanagawa Prefecture) (Inada 2001: 41–2) and the Araya Site (Niigata Prefecture), and hearths ringed with stones from the Yasumiba Site (Shizuoka Prefecture) and the Uenohara Site (Nagano Prefecture) (Tsutsumi 2000). Tsutsumi (2000) suggests that the structure of most of the houses from this phase must have been simple, such as tents.

Subsistence and Mobility

Like in the cases of Late Palaeolithic archaeology in other parts of the world, archaeologists have discussed changes in Late Palaeolithic data in Japan in relation to the rapidly changing climate in the Terminal Pleistocene and associated changes in flora and fauna (*e.g.*, Harunari 1998; Tsutsumi 1998). In particular, the disappearance of large terrestrial mammals such as Naumann's elephant, Yabe's giant deer and bison (*Bison priscus*) after c. 20,000 BP is often attributed to the climate change. Several scholars believe that the changes in the fauna were accelerated by overkills. Many scholars suggest that the disappearance of these large mammals eventually led to the shift in hunting targets to middle-sized terrestrial mammals such as sika deer (*Cervus Nippon*) and wild boar (*Sus scrofa*).

Recent studies indicate that the origins of deer and boar hunting might go back as early as the first half of the Palaeolithic Period. For example, at the Hatsunegahawa Sites in Shizuoka Prefecture sixty features that were identified as trap pits were recovered. The plan of these pits is circular, and their diameters measure between 1 and 2 m. The average depth is about 1.4 m. The excavators suggest that these pits were placed to form several rows so that game herds could be driven into them. Inada (2001: 32) suggests that the target species was probably sika deer (*Cervus nippon*). If this were the case, it would imply that medium-sized mammals such as sika deer were important target resources as early as the first half of the Late Palaeolithic Period. Reports of trap pits during the second half of the Late Palaeolithic are more abundant than during the first half (Inada 2001: 33). It is assumed that most of these trap pits were targeting either sika deer or wild boar.

The conventional image of Late Palaeolithic people as hunters also met a serious challenge when the excavation results from the Tomizawa Site in Miyagi Prefecture were revealed (Sendai-shi Kyoiku Iinkai 1989; Ota, 1992). Dated to c. 23,000–20,000 BP and located on the coastal plain of Sendai, Tomizawa is a waterlogged site associated with a buried forest and traces of human activities. The forest remains consist primarily of coniferous species, such as spruce (*Picea*), larch (*Larix*) and fir trees (*Abies*). Pollen and phytolith analyses indicate that other coniferous trees, such as Korean pine (*Pinus koraiensis*), as well as a smaller quantity of broad-leaf deciduous trees, were also present. It is suggested that the excavation area included the coniferous forest as well as a marshy area with grasses. Judging from the flora, the temperature at that time is estimated to have been about 7–8° C lower than today (Inada 2001: 19). The site is associated with stone tools and charcoal concentrations as well as deer faeces, similar to those of sika deer. Nevertheless, no deer bones were recovered. Inada (2001: 20–2) suggests that, given the superb preservation of the organic materials at this site, it is logical to conclude that the Tomizawa residents did not rely on deer or other terrestrial mammals. He believes that the recovery of Korean pine remains from the site is indicative of the potential importance of plant food.

Related to the issue of hunting versus gathering is the potential importance of fishing. Sato (1992: 314) suggests that the Araya Site, which is located at the confluence of two large rivers, the Shinano and Uono Rivers, was a fishing camp where anadromous fish such as salmon and trout were processed. He further suggests that the micro-blades and scrapers/burins of the northern type of microlithic assemblage, including the Araya assemblage, represent blades for fishing spears and butchering tools, respectively. Thus, he proposes that Terminal Palaeolithic people in northern Japan began to exploit anadromous fish intensively, which led to the development of seasonal sedentism.

In summary, the residential mobility of the Late Palaeolithic people seems to have been generally high. Reports of residential structure are extremely limited, and thus they did not form large residential bases for intensively exploiting a specific type of food resource. This does not mean, however, that the Palaeolithic people were large mammal hunters. Evidence indicates that hunting medium-sized mammals was important, at least at several sites. The potential importance of plant food is still controversial. Some scholars such as Sato (1992) suggest the importance of fishing towards the end of the Palaeolithic Period. Judging from these lines of evidence, it seems that the Palaeolithic people were generalists who exploited a wide range of resources, some of which later became key food resources during and after the Early Holocene.

Jomon and Chulmun: Subsistence Intensification, Environmental Management and Sedentary Ways of Life

Overview

The period between the Palaeolithic and the fully agricultural Yayoi/Mumun periods is called the Jomon on the Japanese Archipelago (c. 16,000–2500 BP) and the Chulmun on the Korean Peninsula (c. 11,500?–3300 BP). These periods are characterised by the production of pottery, sometimes with ornate decoration. Pit dwellings and shell middens are also commonly reported from Jomon and Chulmun Sites. Many scholars believe that the peoples of the Jomon and Chulmun periods were primarily hunter-gatherer-fishers (*e.g.*, Matsui & Kanehara 2006; but see Crawford 2008). Evidence of plant cultivation exists, but none of the cultigens seems to have been used as staple food, at least not until the late phases.

The Jomon and Chulmun periods are divided into several subperiods. Table 2.4.3 shows approximate calendrical dates for these subperiods. Each subperiod can be further subdivided based on pottery typology. Because of a strong emphasis on pottery chronology, not all the phases are accompanied by reliable radiocarbon dates, and absolute dates of boundaries between phases/subperiods are still under investigation.

Since the 1980s, studies of the Jomon and Chulmun periods have been incorporated into the discussion of "complex" hunter-gatherers in Anglo-American archaeology (*e.g.*, Price & Brown 1985). Comparisons were made with prehistoric and historic hunter-gatherer cultures in other parts of the world (*e.g.*, Aikens & Rhee 1992; Habu 2004; Habu *et al.* 2003; Kobayashi 2004; Grier, Kim & Uchiyama 2006). Because of the evidence of plant cultivation, however, some scholars strongly oppose the label of hunter-gatherers (*e.g.*, Crawford 2006, 2008).

Significant climate changes have been reported from 16,000 to 2500 BP (*e.g.*, Kawahata *et al.* 2009; Matsushima 2006; Yasuda *et al.* 2003). The end of the Ice Age and the warming trend from the Late Pleistocene to the Early Holocene resulted in a rapid sea level rise as well as major changes in fauna and flora. According to Matsushima (2006), the sea level was relatively stable at around −40 m during the Incipient Jomon Period, and it then rose rapidly during the Initial Jomon Period (the Holocene or Jomon transgression). From the end of the Initial Jomon to the Early Jomon Period, the sea level became about 2–3 m higher than the present-day sea level (Matsushima 2006: 10). The temperature during this so-called Hypsithermal Period, or the Climatic Optimum, was also significantly higher than today, up to 2°C (Kawahata *et al.* 2009). The climate remained relatively stable and warm until the end of the Middle Jomon Period, when a temperature decrease of about 2°C is reported (ibid.).

TABLE 2.4.3. Approximate dates for the six Jomon and four Chulmun subperiods.

Subperiod	Jomon	Chulmun
Final	3300–2500 BP	N/A
Late	4300–3300 BP	4000–3300 BP
Middle	5500–4300 BP	5500–4000 BP
Early	7000–5500 BP	7000–5500 BP
Initial	11,000–7000 BP	N/A
Incipient	16,000–11,000 BP	11,500?–7000 BP

Dates for the Jomon subperiods are based primarily on radiocarbon dates from the Kanto and Tohoku regions. Dates for the Chulmun subperiods are modified from Im (1997). For slightly different dates for the Chulmun subperiods, see Norton (2007) and Lee (2006). The beginning of the Incipient Chulmun Period is based on Cho and Ko's (2009) tentative estimate.

Scholars suggest that these climate changes, which affected vegetation and the availability of both terrestrial and marine resources, must have been closely linked with the changes in the Jomon and Chulmun cultures. At the same time, human impacts on the landscape at both the local and regional levels should not be overlooked. In the following section, changing human-environmental relationships through the Jomon and Chulmun periods are discussed with a focus on the interrelationships among climate change, sedentism and various other cultural factors, including subsistence intensification, technological developments, rituals and trade.

Early pottery and the transition from the Palaeolithic to Jomon/Chulmun

Because of the presence of pottery, Japanese and Korean archaeologists have traditionally called the Jomon and Chulmun periods the "Neolithic" (for prehistoric Eurasian hunter-gatherers with pottery, see Jordan & Zvelebil 2009). Thus the beginning of these periods is defined by the presence of pottery. Currently, the oldest Jomon pottery is that of the Odai Yamamoto I Site in Aomori Prefecture of northern Honshu (Odai Yamamoto I Iseki Hakkutsu Chosa-dan 1999) (Fig. 2.4.1). Carbonised adhesions on potsherds excavated from Layer IV of this site

FIGURE 2.4.1. Potsherds recovered from Layers III and IV of the Odai Yamamoto I Site (from Odai Yamamoto I Iseki Hakkutsu Chosa-dan 1999). The sherd at top right measures 3.5 × 4 cm. (Photo courtesy Odai Yamamoto I Iseki Hakkutsu Chosa-dan [Excavation Team of the Odai Yamamoto I Site].)

were dated to c. 16,500 BP (13,780 + 170 uncal bp; NUTA-6510) (1 : 16,850–16,200 BP) by the accelerator mass spectrometry (AMS) radiocarbon method. This made the Odai Yamamoto I potsherds not only the oldest pottery in Japan, but also one of the oldest pottery containers in the world when looking at the calibrated radiocarbon dates (see Habu 2004: 26–37; Kuzmin 2006). Other Jomon sites with early pottery include Fukui Cave (12,700 ± 500 uncal bp; GaK-950) (1 : 15,850–14,250 BP) and Senpukuji Cave, both of which are located in Nagasaki Prefecture, Kyushu.

Together with reports of early pottery from the Russian Far East (*e.g.*, Kuzmin 2006; Kuzmin & Keally 2001; Zhushchikhovskaya 2009; and see Chapter 2.11) and China (*e.g.*, Boaretto *et al.* 2009; Kuzmin 2006; Pendergast, Yuan & Bar-Yosef 2008), the Odai Yamamoto I example indicates that East/Northeast Asia is a key area in understanding the emergence of pottery in the context of changing human-environmental interaction (*e.g.*, Kaner 2009). Figure 2.4.2 shows the calibration of the ^{14}C date from the Odai Yamamoto I Site in relation to the temperature data obtained from the GISP 2 ice core. As indicated in this diagram, the date of the Odai Yamamoto I pottery can be placed towards the end of the Late Glacial Maximum, before the repeated climatic oscillation that started with the cold period of the Oldest Dryas (Stuiver, Grootes & Braziunas 1995). Furthermore, based on their analysis of annually laminated sediments from Lake Suigetsu in Japan, Yasuda *et al.* (2003) suggest that 16,500 BP coincided with the colder climate period that is represented by an abundance of the pollen of coniferous trees. These data indicate that the appearance of pottery on the Japanese Archipelago predated the warming trends of the late glacial period (see also Taniguchi 1999). This negates the previous theory that the invention of pottery was a reflection of subsistence-settlement changes that occurred as a result of the warming climate of the Terminal Pleistocene (see also Hayden 2009: 20).

Hunting and processing tools show marked changes during this transitional period. In terms of lithic chronology, the Odai Yamamoto I Site corresponds to the Mikoshiba-Chojakubo phase that followed the latter half of the Late Palaeolithic microlith phase. Characterised by edge-ground adzes (called Mikoshiba-style adzes) and large bifaces, the bifaces of the Mikoshiba-Chojakubo lithic assemblages were soon replaced by tanged bifacial points, which are typically associated with sites of the linear-pottery phase such

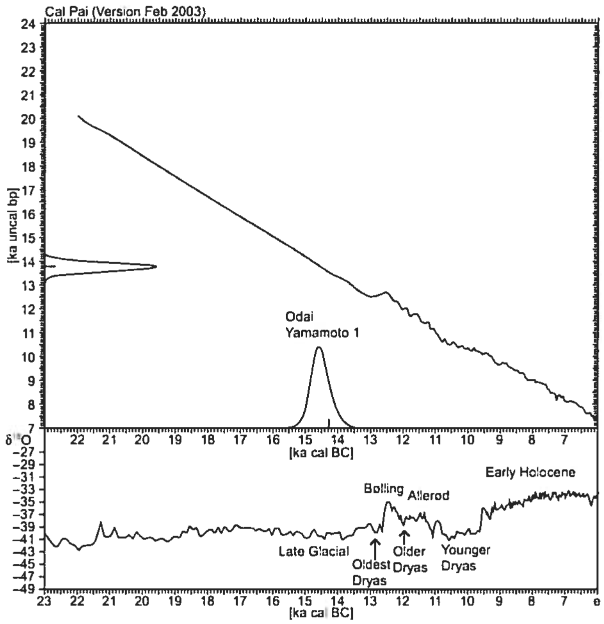


FIGURE 2.4.2. Calibration of the oldest ^{14}C date from the Odai Yamamoto I Site (NUTA-6510) using INTCAL 98 (Stuiver, Grootes & Braziunas 1995). (From Habu **2004**: 43.)

as Kamikuroiwa (Ehime Prefecture of Shikoku) (12,165 ± 320 bp; I-944) (1 : 15,350–13,450 BP). By the latter half of the Incipient Jomon Period, the tanged bifacial points were replaced by arrowheads. This implies that the pottery from Odai Yamamoto I occurred as part of the continuous changes in hunting strategies and technological developments reflected in lithic tools.

Despite these changes, residential mobility of the people of this transitional period is still likely to have been quite high. Many of the Incipient Jomon sites are either open-air sites or cave sites, associated with no, or very few, features. A small amount of pottery is almost always present at these sites, even at cave sites located high up in a mountainous area. Thus, the adoption of pottery itself was not a trigger to facilitate the development of more sedentary ways of life. It is likely that the function of pottery at this stage was different from that of the Early to Middle Holocene (*cf.* Hayden 2009). Subsistence intensification with a focus on plant or marine food was yet to occur (but see Sato 1992).

The oldest reliable date for Chulmun pottery in Korea is about 8000 BP (7050 ± 120 uncal bp, KSU-515) for raised design pottery from Locality B of the Osan-ni Site (Han 1995; Nelson 1993). Im (1997) suggests that pottery from the Kosan-ni (Gosan-ni) Site on Cheju Island might be older. More recently, Cho and Ko (2009) have suggested that the "archaic" plain ware found at Kosan-ni goes back to 10,000 uncal bp (c. 11,500 BP) or more, based on its stratigraphic context and its associated lithics. Radiocarbon dates from this site vary widely, however (Kuzmin 2006: 366). Since the total number of excavated sites in Korea is much smaller than that in Japan, it is likely that pottery with earlier dates will be found in the future.

Expansion of Target Resources and the Beginning of Subsistence Specialisation (c. 11,000–7000 BP)

The following phase is characterised by the incorporation of new types of resources into the list of Jomon and Chulmun food. In Japan, solid evidence of systematic exploitation of marine and plant food began to be found during the Initial Jomon Period (c. 11,000–7000 BP). The amount of pottery found at each site became larger than in the previous phase. It is likely that this change was closely linked with shifts in the types of staple food and cooking methods. An increase in the number of plant-food processing tools, such as grinding stones, indicates that the target food resources were expanded to plant food, some of which later became the focus of subsistence specialisation. Shell midden sites from the Tokyo Bay area, such as the Natsushima shell midden (Kanagawa Prefecture) (see Imamura 1996), indicate that, by the Initial Jomon, intensive exploitation of shellfish and fish was incorporated into the subsistence strategy of this region. In Korea, raised-design pottery dated to c. 8000–7000 BP is reported from eastern and southern coastal shell middens, some of which are associated with large numbers of composite fishhooks and harpoons (Cho & Ko 2009). This implies that a systematic exploitation of marine food took place by this time.

Because many of the Jomon shell middens are located on top of hills, most Japanese archaeologists assumed that rising sea levels did not affect the discovery rate of these sites. The discovery of the Mazukari shell midden (Aichi Prefecture) changed this traditional view (Minami-chita-cho Kyoiku Iinkai 1980; Yamashita 2008). Dated to c. 9000 BP of the Initial Jomon Period and located on the Utsumi Plain of Chita Peninsula, this lowland shell midden was found buried 10 m below the present-day sea level and under an accumulation of marine silt and sand deposits. This implies that not all the Jomon shell middens were located on top of hills, and thus more shell middens may have been lost due to the Holocene transgression. It is also important to note that this buried shell midden is dated to c. 9000 BP, when the sea level was about 40 m lower than at present. This has made scholars realise that, during the Holocene transgression, the sea water inundated the deep, coastal valleys even when the sea level was lower than at present (Yamashita 2008: 7). Matsushima (2006) also indicates that many of these inlets and coves provided ideal habitats for a wide variety of shellfish, which were intensively exploited by Initial and Early Jomon people.

Despite the signs of the increasing exploitation of marine and plant foods, the majority of Initial Jomon people seem to have remained residentially mobile. With the exceptions of southern Kyushu and part of Hokkaido (Habu 2004: 250;

FIGURE 2.4.3. Storage pit from the Higashimyo Site. (Photo courtesy of Saga-shi kyoiku Iinkai [Board of Education of Saga City].)

Pearson 2006), most Initial Jomon settlements are small and located on narrow ridges of hills, and are associated with only a few dwellings. Evidence of food storage is limited, but recent excavations of the Higashimyo shell midden (Saga Prefecture) have revealed the presence of 158 storage pits, many of which were associated with acorn remains (Fig. 2.4.3) (Habu et al. 2011; Saga-shi Kyoiku Iinkai 2006, 2008).

In my previous work (Habu 2004: 249–50), I have suggested that Initial Jomon people may have been "serial specialists" or "serial foragers" (*sensu* Binford 1980). Serial specialists refer to residentially mobile hunter-gatherers who exploit a series of seasonally available resources. Because the locations of these seasonal subsistence activities tend to be spatially apart, these hunter-gatherers typically move their residential bases seasonally, and as a result they were residentially mobile. Nevertheless, when we think of long-term changes in Jomon subsistence and settlement, the expansion of target resources and the initial stage of subsistence specialisation, even if still associated with high residential mobility, were important steps towards more sedentary ways of life in the later phase.

Subsistence Intensification and the Development of More Sedentary Ways of Life (c. 7000–4000 BP)

Jomon and Chulmun data from 7000–4000 BP show evidence of further subsistence specialisation and intensification, with a focus on plant and/or marine food. This is reflected in an increase in the number of nut remains, plant-food processing tools and shell middens. The possibility of tending or semi-cultivating chestnut trees has been suggested by many scholars (*e.g.*, Kitagawa & Yasuda 2004; Nishida 1983; Yoshikawa et al. 2006). In addition, incipient plant cultivation is reported from multiple sites, although it does not seem to have provided staple food. Cultigens reported from Early and Middle Jomon sites include egoma (*Perilla frutescens* var. *japonica*) and/or shiso mint (*P. frutescens* var. *crispa*), bottle gourd (*Lagenaria sp.*) and barnyard millet (*Echinochloa utilis*) (Yoshizaki 1995; Yamaguchi et al. 2007). Crop remains reported from Middle Chulmun sites include foxtail millet (*Setaria italica*) and broomcorn millet (*Panicum miliaceum*) (Crawford & Lee 2003). Based on these lines of evidence, Crawford (2006) uses the term "low-level food-resource producers" instead of hunter-gatherers.

Archaeological data from 7000–4000 BP indicate that regional and temporal variability was quite high. For the Jomon, both site density and average site size are significantly higher in northeastern than in southwestern Japan (Koyama 1978, 1984). Furthermore, changes through time in northeastern Japan indicate that site density and average site size increased by the middle of the Middle Jomon, and then decreased rapidly towards the end of the Middle Jomon. This is in marked contrast with temporal change in southwestern Japan, where site density and average site size show little change. Thus, the long-term trajectories of the Jomon cultures in northeastern and southwestern Japan are quite different from each other.

In northeastern Japan, three epochs in major changes in settlement patterns can be identified. These changes in settlements were closely linked with changes in other aspects of people's ways of life, including subsistence, mortuary practice, rituals, crafts and social structure. Furthermore, the long-term trajectory of changes in this region does not fit into a conventional progressive model.

The first epoch was the middle of the Early Jomon (c. 6000 BP), after which large settlements with dozens of, or sometimes over a hundred, pit dwellings appeared. Well-known examples include the Nanbori Site (Kanagawa Prefecture), the Nakanoya Matsubara Site, the Itoi Miyamae Site (Gunma Prefecture) and the Akyu Site (Nagano Prefecture). However, these large settlements consist of only a small portion of settlement sites of this period. Many other settlement sites are much smaller, associated with only a few pit dwellings (Habu 2001). This large intersite variability in settlement size, together with marked intersite variability in lithic assemblages, is consistent with a model of seasonally sedentary hunter-gatherers who occupied varying sizes of residential bases at different seasons. Furthermore, my analysis of Early Jomon regional settlement patterns (Habu 2001, 2002, 2004) indicates that residential mobility may have fluctuated significantly within a short period. In particular, for the southern Kanto region, the development of a seasonally sedentary system was followed by a mobile system with lower population density.

The second major change occurred during the middle of the Middle Jomon Period (c. 5000 BP), during which the presence of extremely large settlements with over 100 pit dwellings became prominent. During this phase, site density became the highest throughout the Jomon Period. Lithic assemblages from this phase are typically dominated by plant-food harvesting/processing tools, such as stone hoes (so-called chipped stone axes; see *e.g.*, Fujimori 1950) and grinding stones (see *e.g.*, Habu 2008; Imamura 1996: 107), suggesting a

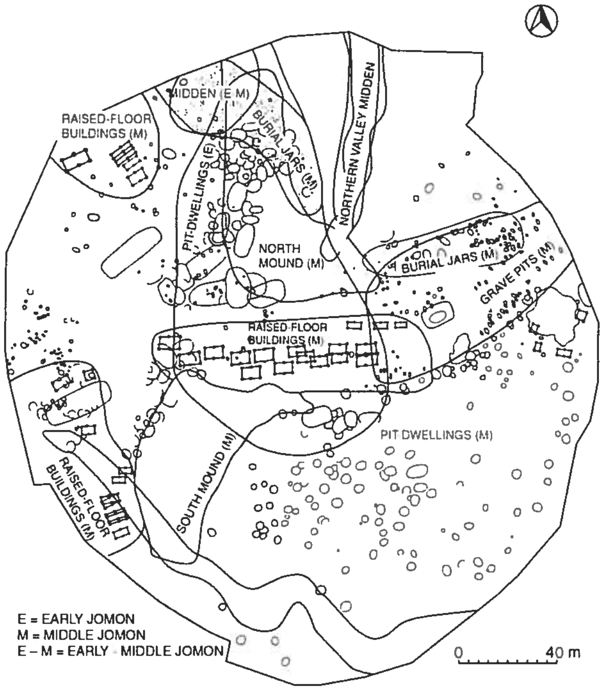


FIGURE 2.4.4. Distribution of Early and Middle Jomon features recovered at "the Stadium Area", the Sannai Maruyama Site. (From Okada & Habu 1995.)

FIGURE 2.4.5. Clay figurines excavated from the Sannai Maruyama Site, their sizes ranging from 3 to 15 cm. (Photo courtesy Aomori-ken Kyoiku-cho Bunka-ka [Board of Education of Aomori Prefecture].)

high level of subsistence intensification with a focus on plant food. Given the extremely large size of some settlements, such as Sannai Maruyama (Aomori Prefecture) (Fig. 2.4.4) and Miharada (Gunma Prefecture), many scholars assume that people of this phase were fully sedentary (*e.g.*, Imamura 2006; Okada 2003). However, the roles and functions of these large settlements in overall Jomon settlement systems need to be further examined. For example, in the case of Sannai Maruyama, most dwellings from this phase are very small (c. 2.5 and 4 m in the long axis), and thus they may not have been suitable for year-round occupation (Habu 2004: 108–32; 2008). This may indicate a special function of the site during this phase, such as trade centres or places of seasonal gathering. Recoveries of a large number of clay figurines from a limited number of sites such as Sannai Maruyama (Fig. 2.4.5) and Shakado (Yamanashi Prefecture) may also reflect a specific function of these sites.

The cause of the prosperity of the Middle Jomon Culture is a topic of debate. Many Japanese scholars have attributed this change to the progressive development of the Jomon Culture in general, or the development of the "forces of production" in the context of classical Marxist theory (*e.g.*, Okamoto 1975). For central Japan (the Kanto and Chubu regions), I have suggested that a system change in the Tokyo Bay area may have triggered a population movement to the Chubu Mountain area, which resulted in the intensification process in the latter area (Habu 2001, 2002). If that was the case, the importance of historically unique factors, including local resource declines and interregional population movement, should be seriously considered. For northern Japan (the Tohoku region), data from Sannai Maruyama and its neighbouring sites indicate that a high level of subsistence intensification with a focus on one or more types of plant food may have occurred due to multiple factors, such as a population increase, technological developments and climatic fluctuation (*e.g.*, Habu 2008; Habu & Hall 2013; Kawahata *et al.* 2009; Kitagawa & Yasuda 2004; Yoshikawa *et al.* 2006).

The third epoch was the end of the Middle Jomon Period (c. 4300 BP), at which point the number of large settlements and site density rapidly decreased. The timing of this change roughly coincided with the cooling climate dated to around 4200 BP. Yasuda (1989), who proposes that the cooling climate of the Little Ice Age led to the decline of civilisations and prosperous cultures in various parts of the world, suggests that the decrease in the number of the Middle Jomon sites is part of this worldwide phenomenon. This idea is supported by other Japanese scholars (*e.g.*, Kawahata *et al.* 2009; Kodama 2003; Okada 2003). Other scholars, while acknowledging the importance of this climate change, emphasise cultural choices and human impacts on the environment (*e.g.*, Tsuji 2002; Yoshikawa *et al.* 2006). My analysis at Sannai Maruyama indicates that the decline of subsistence specialisation, which was reflected in an abrupt change in lithic assemblages, was followed by the decline in the settlement size. Based on the results, I have suggested that the primary cause of the abandonment of large settlements at the end of the Middle Jomon Period was overspecialisation in subsistence, and that cooling climate was simply a trigger (Habu 2008; Habu & Hall 2013).

Unlike in northeastern Japan, changes in southwestern Japan during the Early and Middle Jomon periods were more gradual. Nevertheless, evidence for subsistence intensification can be observed at several sites. For example, the excavation of the Awazu shell midden, a waterlogged site at the bottom of Lake Biwa in Shiga Prefecture, revealed seasonally intensive subsistence activities by the Middle Jomon residents of this site: intensive shellfish collecting and fishing in the spring to early summer, and nut collecting in the autumn (Iba 2000; Iba, Matsui & Nakajima 1999).

Many scholars have assumed that Early and Middle Chulmun subsistence can be characterised as a "broad-spectrum" economy (*e.g.*, Kim 2006: 187; Norton 2007). Nevertheless, just like in the case of data from southwestern Japan, data from Early and Middle Chulmun sites indicate a certain level of subsistence intensification with a focus on bulk exploitation of plant and/or marine food. In particular, an abundance of shell midden sites on the southeastern coast, such as Tongsam-dong, Yondae-do, Sangnodae-do and Yokji-do, has attracted the attention of many scholars. The appearance of shellfish-processing locations during the Middle Chulmun Period (Lee 2006) indicates that, by then, an intensive exploitation of marine food was under way. Choy and Richards's (2010) work on Middle Chulmun data from Tongsam-dong suggests that, despite the presence of domesticated plants (*e.g.*, Crawford & Lee 2003) and terrestrial mammal bones (*e.g.*, Samples 1974) at the site, the diet of both humans and dogs at the site was heavily dependent on marine protein resources. Representative Early-Middle Chulmun sites from central-western Korea include Amsa-dong and Misa-ri near Seoul (Nelson 1993: 79–80). Reports of acorn (*Quercus*) remains from these sites (Lee 2001: 76) may indicate a subsistence focus on nut collecting. The presence of at least twenty pit dwellings at Amsa-dong is interpreted as the evidence of sedentism (*e.g.*, Norton 2007).

Diverging Paths (c. 4000–2500 BP)

Late and Final Jomon sites in Japan (c. 4000–2500 BP) and the Late Chulmun sites in Korea (c. 4000–3300 BP) show marked regional variability. This formed the foundation for the diverging paths to the following fully agricultural period.

The Late and Final Jomon periods of northeastern Japan pose a conundrum to many archaeologists. Scholars have noted that these periods are characterised by an increase in the number and kinds of ceremonial artifacts and features such as stone circles (*e.g.*, the Komakino Site in Aomori Prefecture; Fig. 2.4.6) (Habu 2004: 142–95; Kodama 2003) and the sophistication of craft products, including pottery and lacquerware. In addition, long-distance movements of items obtained from restricted sources, such as asphalt, became more common. Increased variability in the types of burials is also a characteristic of this phase. However, during the Late Jomon Period, there are fewer large settlements, and site density is lower than in the Middle Jomon Period. Overall, the level of organisational complexity in subsistence and settlement during the Late Jomon Period was roughly the equivalent of that of the Early Jomon. For the Final Jomon Period, the recovery rate of sites with dwellings is extremely low. Whether this is actually a reflection of a decline in the degree of sedentism or not is a topic of debate. However, given an abundance of lacquerware, the production of which must have required settling down for at least several months, it is unlikely that Final Jomon people were extremely mobile. Thus, other factors that would affect the recovery rate of settlement sites, such as changes in residential structure and site location, need to be further investigated (Habu 2004: 260).

In short, the archaeological evidence from northeastern Japan suggests decreasing organisational complexity in subsistence and settlement during and after the Late Jomon Period. This was associated with an evidence of continuing developments in rituals, crafts and trade. It is likely that organisational complexity in subsistence and settlement during the middle of the Middle Jomon Period, including subsistence specialisation and the formation of large settlements, triggered initial developments in rituals, crafts and trade. The decline of extremely specialised subsistence strategies at the end of the Middle Jomon may have resulted in further changes in rituals, craft production and social networks (see Habu 2004, 2008; Habu & Hall 2013; Underhill & Habu 2006).

The incongruity between declining organisational complexity in subsistence settlement systems and the continuing developments in rituals, crafts and trade is not observable in southwestern Japan or on the Korean Peninsula. In southwestern Japan, site density increased steadily through time, although the overall density was much lower than in northeastern Japan. Influences from continental Asia to southwestern Japan can be seen in the production of pottery and other types of material culture (*e.g.*, Matsumoto 1996). Systematic studies of Late Chulmun data are limited, but no decline in organisational complexity in subsistence and settlement is reported. Kim's (2006) settlement-pattern analysis of central-western Korea from 5500 to 3300 BP indicates no major changes through time. For southeastern Korea, June-Jeong Lee (2006) suggests that Late Chulmun people adopted two different strategies to cope with increasing resource stress: (1) replacing marine-oriented strategies with terrestrial-oriented ones (the eastern part of southeastern Korea including Tongsam-dong) and (2) intensifying marine food exploitation by procuring more diverse species (the western part of southeastern Korea, including Yondae-do, Sangnodae-do and Yokji-do). Reports of cultigens are more common than in the previous phase (Crawford 2006; Crawford & Lee 2003).

Transition to Yayoi/Mumun

The boundary between the Jomon/Chulmun and the following agricultural Yayoi/Mumun periods is still controversial. The Mumun Culture of Korea is characterised by plain pottery, wet-rice agriculture, ground stone tools, bronzes and megalithic tombs. It is clear that not all of these cultural elements appeared at the same time: plain pottery and wet-rice agriculture probably occurred at around 3500 BP or 1500 BCE (see Crawford 2006) or earlier, but most other elements appeared later.

Key elements of the Yayoi Culture were introduced from the Korean Peninsula, but the timing of the adoption of wet-rice cultivation into the Japanese Archipelago is still a topic of debate. For a long time scholars believed that the transition from the

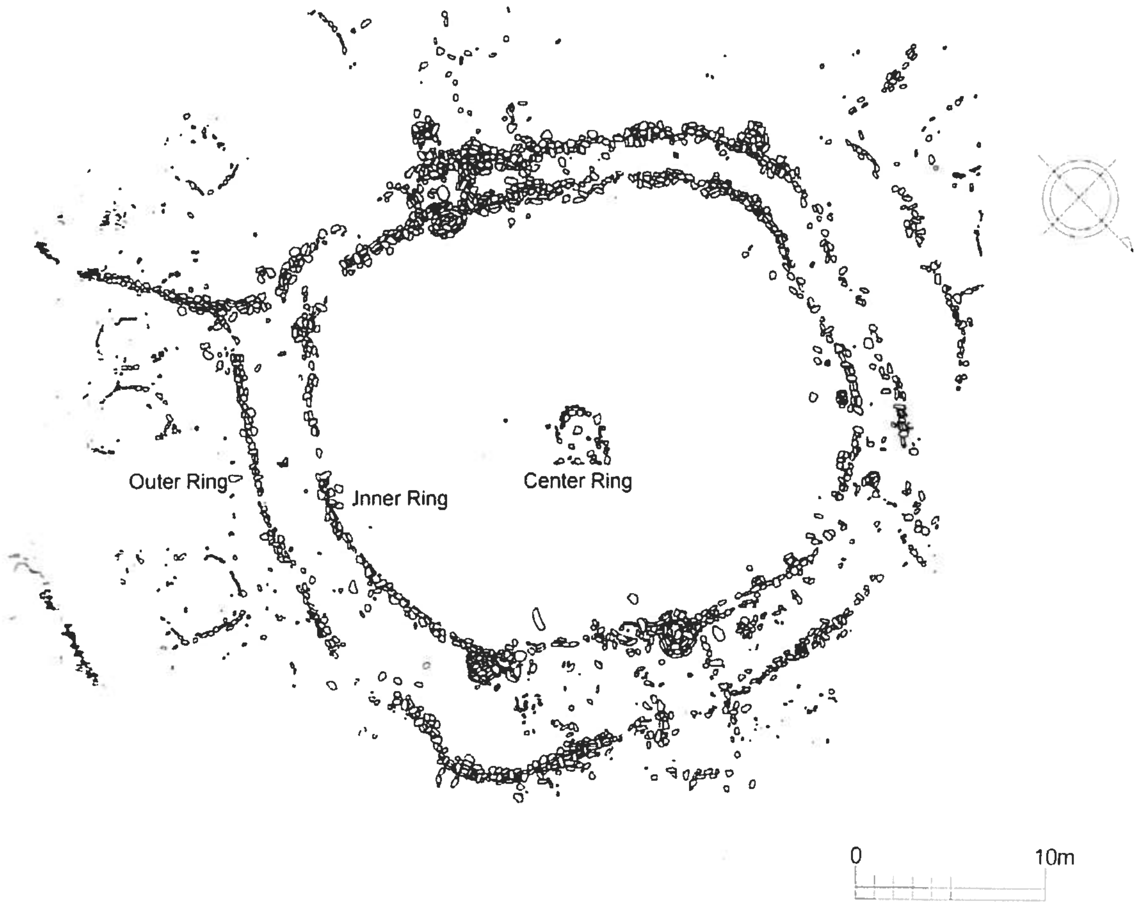


FIGURE 2.4.6. Late Jomon stone circle at the Komakino Site. (Modified from Aomori-shi Kyoiku Iinkai 2006.)

Final Jomon to Yayoi, which accompanied rice cultivation and a new type of pottery, had occurred at about 300 BCE in southwestern Japan, and 100 BCE in northwestern Japan. With new discoveries of rice paddy fields in northern Kyushu during the 1970s, the beginning of the Yayoi Period was pushed back to c. 500 BCE, with the designation of 500–300 BCE as the Initial Yayoi Period. The absolute dates were rough estimates, primarily on the basis of the dates of Chinese mirrors excavated from Yayoi sites. New AMS dates from Initial Yayoi sites in Kyushu indicate that the beginning of the Initial Yayoi Period might go back to as early as 1000–900 BCE (Harunari *et al.* 2003; Fujio, Imamura & Nishimoto 2005). These new dates have raised a number of new questions regarding the conditions, causes and consequences of the transition from Jomon/Chulmun to Yayoi/Mumun in relation to social and political changes in China (*e.g.*, Uno 2008).

An in-depth discussion of the Yayoi and Mumun ways of life is beyond the scope of this chapter. But scholars agree that the adoption of wet-rice agriculture with systematic irrigation technologies resulted in fundamental changes in settlement systems as well as in social structure (*e.g.*, Ando 2008; Matsuki 2008; Mizoguchi 2002). It is likely that fluidity in subsistence-settlement systems, which characterised most of the Jomon Period, was replaced by fully sedentary systems with a focus on rice agriculture with paddy fields. However, these changes did not imply that Yayoi settlement patterns became static. On the contrary, archaeological data indicate frequent relocation of settlements and expansion/reduction in settlement size (*e.g.*, Mametani 2008). Ando (2008) suggests that these changes were caused not only by economic reasons and social/political conflicts but also by large-scale population movements between regions. Furthermore, scholars (*e.g.*, Shitara 2009) have raised caution about the conventional assumption that wet-rice cultivation became the centre of Yayoi subsistence at the onset of the Yayoi Period (*e.g.*, Sato 2002: 111–3). Evidence of Early-Middle Yayoi acorn processing indicates that nut processing continued to be an important food source, at least up to the Middle Yayoi Period (Shitara 2009). Aikens and Akazawa's (1992) work on Yayoi cave sites in the Tokyo Bay area suggests that fishing and shellfish collecting played important roles in the diet of the Yayoi people. Further studies are necessary to examine temporal and regional variability in Yayoi settlement patterns in relation to changes in Yayoi subsistence and social structure.

Concluding Remarks

From this chapter, it is clear that insular East Asia is an important area in the study of the development of sedentary ways of life in early human history. It represents a historically unique trajectory, and the rich archaeological data from this region also provide an excellent opportunity to propose models of the development of early sedentism. In doing so, it is critical that we recognise the concept of sedentism to be scalar and multifaceted. Other key research themes that emerged from the discussion in this chapter include the dynamic human-environment interaction, the non-unilinear nature of long-term culture change, the boundary between hunting-gathering and agriculture in early small-scale societies, the development of early maritime cultures, origins and roles of early pottery and changing cultural landscapes at both local and regional levels. It is hoped that the discussion presented in this chapter will facilitate active incorporation of archaeological data from East Asia into the current theoretical and methodological debates in world archaeology.

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