Nakadake Sanroku: The Southernmost Sue-Ware Kiln Site Center in Ancient Japan

Naoko Nakamura

Abstract: The Nakadake Sanroku Kiln Site Center was installed by the ancient Japanese state at the beginning of the ninth century AD in its southern border region. Unlike other Sue kiln site centers, Nakadake Sanroku is geographically separated from sites related to the ancient province administration, and the area around the site had been the center of a local group of indigenous people until a few decades earlier and a hub for trade with the southern islands over the centuries. After subjugation by the Japanese state, state administration was weak and the need for Sue ware for state administration as well as Buddhist temples was low, but Sue ware from Nakadake is found on the southern islands, outside the realm of the state. The chapter introduces the background of the kiln site center and recent research in a large international and interdisciplinary project.

Keywords: Nakadake Sanroku Kiln Site Center, Sue-ware production center, periphery of the Ancient Japanese state, South Kyūshū, Ryūkyū archipelago, long-distance trade, economic strategy

17.1. Introduction

The Nakadake Sanroku kiln site center – which will be called “Nakadake Sanroku” for convenience in this chapter – was installed around or shortly after 800 AD by the ancient Japanese state as one of the last Sue production centers and is the southernmost kiln site center of its kind.

Nakadake Sanroku is located at the foot of Mt. Nakadake (hence its name), on the western coast of the Satsuma peninsula in Kagoshima prefecture (Fig. 17.1). The site extends from the mountain towards the estuary of the Manose River (Fig. 17.2). This area was a hub of trade with the Ryūkyū islands from prehistoric times, and later its trade routes extended as far as Song Dynasty China and South East Asia, and this southern trade route paved the way for the Western world’s contact with Japan from the sixteenth century onwards.

Nakadake Sanroku is unique and fascinating in the Japanese context for several reasons:

• It was set up in a region that is related to the Hayato, the indigenous people who inhabited southern Kyūshū and who had been subjugated by the Japanese state only a few decades earlier. The kilns that should have served the provincial government in the north of the province were instead set up further south, in the former center of that powerful local group.

• Its geographical location and the archaeological evidence suggest that the region had been a hub of exchange between the north and south of the Japanese archipelago from prehistoric times down to the Middle Ages. Thus, the location of the production center – which should have been a purely administrative site in the context of the ancient Japanese state – adds another aspect to its interpretation.

• Distribution of Sue ware from this site can be traced to as far south as Tokunoshima, which later became home to the Kamuiyaki kiln site center that will be introduced in the next chapter. Although there is no evidence of a direct relation between the two, Nakadake Sanroku and the distribution of its pottery illustrate the beginnings of resurgent exchange with the south that led to vibrant trade in the Middle Ages.

• From the discovery of the first kiln sites in 1984, and as a result of recent prospections, the overall size has been estimated to exceed the norm expected from Satsuma Province – a poor, small province in the periphery of the ancient state.

• International and interdisciplinary research on this site was funded in two large research projects by the JSPS KAKENHI Grant Number 25580170 and 15H01902 starting in 2013, adding new methods and ideas to the well-established toolbox for research on Sue kiln site centers.

This chapter gives an overview of this background and introduces the interdisciplinary research of recent years;
a comprehensive report is being prepared, and as of 2022, updates on new developments can be found on our website at https://nakadake-kilns.netlify.app.

The site is of particular interest because of its geographical and historical setting between “Japan” and the “Ryūkyū islands,” between state administration and trade activities, and between the central state and indigenous local powers.

### 17.2. Historical and geographical background

#### 17.2.1. Kyūshū: between the Korean peninsula and Honshū

Mt. Nakadake is located near the southwestern coast of Kyūshū, one of the largest islands in the Japanese archipelago (Fig. 17.1). The northwestern part of this
island is close to the Korean peninsula, and therefore was
the main contact point for exchange with the continent and
China from prehistoric times. Wet-field rice agriculture
entered the archipelago via northwestern Kūshū from the
ninth century BC (Miyamoto 2019: 206), bronze and iron
tools from China and the Korean peninsula can be found
in elite burials from of the third century BC (Fukuoka City
Museum 2015: 17), and from the Yayoi period to the sixth
century, most of the iron resources in Japan came from the
Korean peninsula (e.g. Murakami 2017: 9).

From the third century on, the Yamato administration,
which was a coalition of chiefs based in the Kinki region
of Honshū, began to spread its influence over the Japanese
archipelago. By the seventh century, it had become the core
of the ancient Japanese state. The Yamato administration
was actively engaged in diplomacy with the Korean
peninsula in order to acquire the newest technologies,
such as those used in the production of metal crafts and the
hard fired ceramics that later came to be called Sue ware
in Japan (Tsude 2010: 109), which were later produced in
Nakadake Sanroku.

Developing from the Yamato administration, a centralized
state was formed in the seventh century, and subsequently
provinces were established in each region of the Japanese
islands. There were three tiers of local administration:
provincial, district and township. A provincial governor
was deployed from the capital to each province, a local
magistrate appointed in each district and a township
head set up in each village. In the latter half of the
seventh century, Dazaifu was established in Chikuzen
Province in northwest Kūshū as an administrative and
judiciary organ of the government in Kūshū, as well
as for diplomacy with and defense against the Kofun period (Satō 2019: 198). Like other administrative
centers of that time, kilns for production of hard fired
Sue ware were located close to Dazaifu, which formed
the largest kiln cluster on the island of Kūshū and one
of the largest Sue kiln site clusters in Japan. The area
around Nakadake was not part of these developments
for centuries, and to understand the case of Nakadake
Sanroku, it is essential to know that the production of
Sue ware was closely related to the ancient state and that
the South of Kūshū was late in being incorporated into
the ancient state.

17.2.2. Southern Kūshū and the Ryūkyū islands

There are two peninsulas in southern Kūshū, separated to
the north of Kūshū and the territory of the ancient state by
a central mountain ridge: Satsuma in the west and Ōsumi
in the east. The Ryūkyū archipelago stretches to the south.

The small-scale plains and volcanic soils of southern
Kūshū are not suitable for paddy-field rice cultivation, the
main occupation in Japan from the Yayoi period onward
and subject to taxation in the ancient state. According
to the tax records of Satsuma Province written in the
early eighth century just shortly after its installation, this
province had significantly lower storage of rice than other
provinces (Nakamura A. 2006: 545–46).

Despite that, southern Kūshū was an active hub of trade,
which included shell trade with the Ryūkyū islands. Large
shells, gathered in the central part of the Ryūkyū islands,
were processed as bracelets and horse accessories during
the preceding Yayoi and Kofun periods (e.g. Kinoshita
1996) and traded as prestige goods to the elite in other
areas of Kūshū and to Honshū.

During the Yayoi period, a trade route existed along the
western coast of Kūshū (Kinoshita 1996: 188). Not far
from where Nakadake Sanroku was to be built, along the
lower reaches of the Manose River, several sites show the
importance of this region as a trading hub. The Takahashi
site revealed large shells and Nakabaru-type potteries
from the Ryūkyū islands, as well as Itazuke-type potteries
from the northwestern part of Kūshū (Kawaguchi 1963).
At the Shimoshōji site, a jar-coffin was unearthed, which
is a type of burial commonly found in northwestern
Kūshū (Kawaguchi et al. 1976). The corpse also wore
shell bracelets that were typical of the style found in
northwestern Kūshū, and so it is suggested that the buried
person was a local chief who had been active in trading
e.g. Nakazono 2004: 308). Sherds of pottery produced
in southern Kūshū have been found in sites in the central
Ryūkyū islands, suggesting active trade during the middle
Yayoi period (Shinzato T. 1999: 101, R. Nakazono 2004:
533). A new route along the east coast of Kūshū was
added during the Kofun period. There are several large
tumuli from the fourth and fifth centuries along the eastern
coast of the Ōsumi peninsula, and the elite buried in these
tumuli may have obtained power through trade activities
with the Ryūkyū islands (Hashimoto 2012: 23).

As the discussion of the kiln site center in Nakadake
Sanroku will show, trade along the West coast of Satsuma
to the southern islands started to flourish again in the eighth
century, and later in medieval times the lower reaches of
the Manose River evolved into a flourishing center for
domestic trade and a hub between China and all of Japan
(Yanagihara 2007: 71, Miyashita 1998, Shinzato A. in this
volume).

17.2.3. Process of incorporation into the ancient
Japanese state

17.2.3.1. State administration and the Hayato

The incorporation of southern Kūshū into the ancient
Japanese state started with the establishment of Hyūga
Province in southeast Kūshū in the middle of the
seventh century. Satsuma Province was separated from
Hyūga Province in 702. Ancient records show that the
districts of Satsuma Province were smaller than those
in other provinces (Nakamura A. 2006: 541), one of the
many peculiarities in this small and poor province. The
former capital of the province was located in what is now
Satsuma Sendai City in the north (Kagoshima Prefecture
Board of Education 1975). The site of the accompanying provincial temple complex revealed that the buildings were constructed in the latter half of the eighth century and that they were relatively small compared to those in other provinces (Sendai City Board of Education 1981, Obara 2005: 277).

Ōsumi Province on the Ōsumi peninsula was established in 713. The site of the capital and the provincial temple is thought to have been located in what is now Kirishima City, but details such as the size of the buildings are not known (Fukano 2019: 204).

The indigenous people of southern Kyūshū were known as the “Hayato” before they were incorporated into the ancient Japanese state. They were described in the first historical documents, written in the seventh century, as barbarians with a different ethnic identity who paid tribute to the Yamato imperial court. Often mentioned in a similar context is a population from northern Honshū called the “Emishi.” Like the Hayato, they were under the control of the Yamato imperial court as a separate ethnic group. For the Yamato court, the existence of distant, tribute-paying barbarians had political effect and indicated the extent of Imperial power (e.g. Nakamura A. 2006, Nagayama 2009).

The Hayato rose up against the Yamato imperial court in 701 and 713, and in 720 they carried out the largest uprising, which lasted several years until it was ruthlessly crushed. The efforts of the central state to control the south are exemplified by the relocation of people from other regions of Kyūshū to the Hayato domain, as told in the written sources (Nakamura A. 2006: 540, Nagayama 2009: 78) and the archeological record (e.g. Miyata & Hirakoba 2005). Participation in a large uprising in North Kyūshū in 740 on both the government’s side and on the rebellious side (Nagayama 2009: 80–95) shows that the unsecure situation in South Kyūshū continued long after the establishment of the provinces.

Archeological remains in southern Kyūshū from the latter half of the eighth century indicate that the use of the local type of pottery had declined rapidly. At that time, the lifestyle of the locals had begun to conform to that of the general Japanese population. Archeological findings from the ninth century show an increase in the number of industrial remains such as Sue kilns and those from iron production, suggesting that new and intensive technologies had been introduced (Ikehata & Kawaguchi 2006: 611).

In AD 800, later than in other provinces, the handen shāju law of periodic reallocation of rice land was implemented in southern Kyūshū, and the tribute paid by the Hayato was halted. “Hayato” as the name of the people of southern Kyūshū disappeared (Nagayama 2009: 145). It is during these years, at the beginning of the ninth century, that Sue production in Nakadake Sanrōku was established.

17.2.3.2. Ata in Satsuma

Mt. Nakadake is located in the Ata District of Satsuma Province. Because the Hayato population on the Satsuma peninsula were called “Ata Hayato,” it is thought that Ata had been the seat of local power in Satsuma until the eighth century (Yanagihara 2007: 151). According to the Wamyō Ruijūsho from the tenth century, there were four townships in Ata District, which is estimated to have been the most populous district in Satsuma Province.

At the Konakabaru site, 1.5 km from Nakadake Sanrōku, a piece of Haji ware engraved with the Chinese characters for Ata (阿多) was found (Ushinohama ed. 1991: 177). The Ata district dates back to before the establishment of Satsuma Province, and the Konakabaru site is probably the location of the former district office.

17.2.3.3. The Ryūkyūs: part of state territory and beyond

The islands of Tanegashima and Yakushima south of the Ōsumi peninsula form the main part of the northern region of the Ryūkyū archipelago. Tane Province was established in 702, but by 824, it was incorporated into Ōsumi Province. Historical and archeological data show that these islands were home to an agrarian society (Torao 2006: 4). The central and southern Ryūkyū islands were home to hunter-gatherer societies, each with their own distinctive culture, and were outside the territory of the ancient Japanese state. The border of the territory of Japan was between the northern and central parts of the Ryūkyū islands.

However, from the ninth to the twelfth century, the relationship of the Ryūkyū islands with the ancient Japanese nation became closer, as seen in the trade of the great green turban shell, the raw material for mother-of-pearl inlay work. The Gusuku site cluster on Kikai Island in the central Ryūkyū region, which dates from the ninth to the fifteenth century, has revealed evidence of widespread trade. Artifacts found in the site cluster include ceramics made at the Yuezhou kilns in southeastern China, celadon and unglazed ceramics produced on the Korean peninsula, and Haji and Sue ware. Some large buildings with eaves found in the site group show a style of architecture that was used in the ancient Japanese state (Matsubara et al. 2015: 77–78). Kikai Island thus differs significantly from other islands of the central and southern Ryūkyū islands, where local potteries were dominant. Part of the Gusuku site cluster is presumed to have been the residence of a local leader’s family that was connected with southern Kyūshū society (Kōmoto 2015: 58). As we will see below, Sue ware from Nakadake can be found in this site cluster as well, and it is distributed further to the south.

From the eleventh century on, under the influence of the Song Dynasty and a policy that encouraged trade and interaction, commerce at sea flourished for many centuries (Shinzato A. 2018: 159). During the medieval period, the central and southern Ryūkyū islands became important
hubs along the trade routes to and from South China and South East Asia. The first Westerners also came to Japan via this very route in 1543, then again in the middle of the nineteenth century, when Japan opened to the West after centuries of self-isolation.

17.2.4. Sue production in the ancient Japanese state and Kyūshū

17.2.4.1. The transition of Sue ware in Japan

The technology of Sue production was introduced to Japan from several regions on the Korean peninsula by the end of the fourth century. Under the Ritsuryō system of the emerging centralized state during the seventh century, Sue kilns were established in most provinces. Sue ware was supplied to government offices and temples in the form of storage containers for water or alcoholic drinks and as tableware for officials and Buddhist monks. It is thought that the production and distribution of Sue ware were controlled by the provincial or district offices. By the eighth century, Sue ware was being produced in Kyūshū, Shikoku and Honshū, an area that encompassed the entirety of the ancient Japanese state, but in the last half of the century, the popularity of Sue ware declined in and around the capital due to the nobles’ demand for Chinese ceramics, green-glazed ware and Haji ware, a type of tableware fired in an oxidizing atmosphere with firing temperatures significantly below that of Sue ware. As a result, traditionally gray Sue ware diversified and kilns that produced green-glazed ware appeared (Kitano 2007: 267).

17.2.4.2 Main Sue kiln site centers in Kyūshū

Dazaifu was established in the late seventh century in Northwest Kyūshū, and the Ushikubi Sue kilns supplied the necessary Sue ware (Funayama & Ishikawa eds. 2006: 30; Ishiki 2010: 300). They were located about 3 km from Dazaifu and were used for 300 years, from the middle of the sixth to the middle of ninth century. During the latter half of the seventh century, production of Sue ware at other kilns in Chikuzen Province was discontinued and moved to Ushikubi (Ishiki 2010: 51). The kiln cluster consisted of a large number of sub-clusters and is estimated to have contained more than 500 kilns (Funayama & Ishikawa eds. 2006: 5), thus being by far the largest kiln site center in Kyūshū.

From the latter half of the eighth century, the Ushikubi kilns shifted to producing small-sized products, and production was suspended by the middle of the ninth century. During the same time, Sue-ware kiln centers in Higo Province became large-scale. Thus, during the latter half of the eighth century, the center of Sue-ware production in Kyūshū moved from Ushikubi to Higo Province, and at the same time the main Sue ware produced in Kyūshū shifted to storage containers (Ishiki 2007: 309; Kitano 2007: 263). The most important were the Arao kiln center, with an estimated 120 kilns (Amita 2012: 131), and the Uki kiln center, with an estimated 23 kilns (e.g. Yamamoto 2018: 125).

The Arao kiln center produced Sue ware from the sixth century to the ninth century, with its peak of prosperity from the late eighth century to the early ninth century (Amita 2003: 361). The Kitu-Urayama-A kiln site in the Arao center was an underground-type kiln and probably in use during the late ninth century (Ishiki 2004: 128). Because the kiln collapsed during the firing process, 20 pots and 30 pieces of tableware remained in the kiln. On the floor of the kiln, there were seven steps for holding Sue ware made from rocks that were held in place by a mixture of clay and straw (Matsumoto ed. 1980: 51–66), similar to the kiln excavated in Nakadake Sanroku.

17.2.4.3. The role of Sue ware at the southern border of the ancient state

During the eighth century, Sue-ware production began in southern Kyūshū. It may have served three different purposes.

The first was the standard supply of Sue ware to local government facilities, such as the provincial offices and the provincial temples. Given the small quantities of Sue ware in southern Kyūshū earlier, it is clear that there was a need for Sue-ware products at local government facilities. Objects used for ceremonies and other necessities were made of Sue ware. This included the essential writing tool of inkstones, which, during the Heian period, were generally made of Sue ware (Nakatani 2020).

The second was to supply settlements. Narikawa pottery had been used in southern Kyūshū from the Kofun period. This style of pottery reflected the unique lifestyle of the residents of southern Kyūshū. After the Hayato people were subjugated by the Japanese state, Narikawa pottery disappeared and was replaced by Haji ware and Sue ware (Nakamura 2015: 29). The demand for Sue ware increased with the Hayato people’s change in lifestyle.

The third was to supply containers for trade. Since prehistoric times, southern Kyūshū had been a hub of active trade with the Ryūkyū islands. The Ryūkyū islands did not produce hard, durable ceramics, such as Sue ware, until the eleventh century, and Sue-ware items were both traded and used as containers for shipping.

17.2.4.4. Sue-ware kiln sites in southern Kyūshū

Besides Nakadake Sanroku, three other Sue-ware kiln site clusters have been identified in the southern half of Kyūshū. All of these started production at the time of the establishment of Satsuma and Ōsumi Provinces or thereafter. Two sites are in Satsuma Province and one site is in Ōsumi Province. Furthermore, the Sagariyama kiln sites in Higo Province north of Satsuma Province are close...
to the kiln sites from Ōsumi Province and are estimated to have been used from the late eighth to the ninth centuries.

The Okano kilns in Ōsumi Province were located in Isa City, in the former Hishikari District, bordering Higo Province. Five kiln remains have been found at this site, all of which were used for the production of Sue ware from the late eighth to the early ninth century. Four kilns and an ash heap have been excavated. The kilns were the underground type. The best-preserved kiln, OK-III, shows similarities to a kiln in the Sagariyama kiln site cluster, underground type. The best-preserved kiln, OK-III, shows similarities to a kiln in the Sagariyama kiln site cluster, had an upright flue at the rear of the kiln and a bunen chū a pillar located in the center of the kiln (Aosaki et al. 1983: 10). It is assumed that the pillar was for spreading the heat of the fire evenly throughout the kiln (Ishiki 2004) or for supporting the ceiling of the kiln (Aosaki et al. 1983: 10).

The Tsurumine kiln site cluster is located near the former Satsuma provincial capital and, about 1 km from the site of the former provincial temples. During the early eighth century, one kiln produced Sue ware, and two kilns produced roof tiles (Oda & Kawaguchi 1975). The remains show that this kiln cluster was built with the purpose of supplying roof tiles and Sue ware to the Satsuma provincial offices and the provincial temple. The kiln site for Sue ware was the semi-underground type and had two pillars, one located in the center and the other against the wall of the kiln.

Nakadake Sanroku was in operation from the ninth century through the early tenth century (Kamimura 2005: 246). It was located 50 km away from the Satsuma provincial capital (Fig. 17.2), far from where kilns would be situated if their purpose was to provide Sue ware to the provincial offices and the provincial temple. The site is located in Ata, the seat of local power in Satsuma prior to the establishment of the province, near the Manose River estuary, an important area for trade from prehistoric times until the fifteenth century. The location raises some interesting research questions about the power of the local elite, the kilns’ proximity to the Manose River port, and the environmental conditions for pottery production.

17.3. The Nakadake Sanroku Sue Kiln Site center

17.3.1. Research history

Nakadake Sanroku is located along the lower southwest side of Mt. Nakadake, a 287 m sandstone hill. The hillsides are etched with gullies, a topography which is well suited for Sue-ware kilns (Fig. 17.2). It was discovered in 1984 (Kamimura 1984: 191) when erosion due to intensive rainfall began to reveal ash heaps and kiln sites. However, no excavation had taken place in the 30 years since its discovery, and the last field-walking prospection for more than 30 years was in 1985. Therefore, the entire size of the kiln site center, the period that it was in operation and the construction style of the kilns, as well as the kinds of pottery produced there, were not understood until recently.

When field-walking prospections were carried out in 1984 and 1985, five kiln site sub-clusters were confirmed. At one of these, sub-cluster Arahira 1, remains of five kilns were identified on a slope, artifact finds were reported, and a topographical map of the sub-cluster area was created (Kamimura 1984, Kamimura & Tsubone 1985).

In 2012, tentative prospections showed that erosion had increased significantly and had almost completely destroyed some of the reported kiln sites in the Arahira 1 sub-cluster, but some potential kiln site areas reported in 1985 were confirmed again, and additional sites were discovered (Nakamura 2014: 283–85). Concentration of sherds, kiln furniture and wall fragments in a wider region on Mt. Nakadake hinted at a larger number of kilns in the cluster and an even wider extension of the whole production center than originally estimated.

Since 2013, the JSPS has supported a new approach of systematic research on an international and interdisciplinary level that was new to Sue-ware research and to kiln research in Japan. Excavations were carried out five times from 2013 to 2019, during which the structure of one of the kilns and artifacts found in a nearby ash pile were fully investigated (Nakamura 2020). Systematic analyses of samples from the excavation and prospections, as well as geographical investigations, are still being carried out, and a preliminary report is available (Nakamura & Shinoto eds. 2015), and a comprehensive report in English is in preparation.

17.3.2. Historical context and research hypotheses

Considering the historical context of southern Kyūshū as explained in the previous sections, the following questions are of particular interest: (1) From where did the technique and craftsmen come? (2) Why was the kiln site center set up at the foot of Mt. Nakadake?

To answer these questions, attention must be given to the following interrelated issues:

- The subjugation of the Hayato and the role of Ata.
- The role of the central administration in provincial governments.
- Immigration from other regions.
- The process of incorporating the southern regions into the Japanese state.
- The development and intensification of trade and exchange with the Ryūkyū islands.

The next two sections cover earlier research which played an integral part in the formation of our hypotheses.

17.3.2.1. Craftsmen and technology

From the time the kiln sites were discovered until 2013, numerous artifacts were collected at the site and surrounding areas which hinted at specific techniques that had been used at Nakadake Sanroku (Fig. 17.3).
Figure 17.2. Structure and size of the Nakadake Kiln Site Center as revealed by ground-walking surveys in 1985, 2012, 2014 and 2015 to 2019 (top). Estuary of the Manose River, related harbor sites and the ancient access to the sea (bottom). Created from DEM Nr. 4730-12 (2016-10-01) (https://fgd.gsi.go.jp, downloaded 2020-02-23) by M. Shinoto (top) and (bottom) by the author with KASHMIR 3D from the same data source. Information about the former river location was taken from Yanagihara (2017: fig. 1).
Figure 17.3. Sue vessels from Nakadake Sanroku (collected in surveys in Nakadake Sanroku in 1985, 2012, and excavated at Shibahara site (Seki et al. 2012)) (1–6, 8 from Nakamura & Shinoto eds. 2015: fig. 6, 8, 12, 16; 10–14 from Seki et al. 2012: fig. 54, 58, 68, 69; 13, 14 (photos) from Seki et al. 2012: beginning of the book).
These artifacts had four similarities with those found at the Arao kiln site center in Higo Province, which led to the hypothesis that potters immigrated from Arao and introduced their techniques.

First, the main vessels produced at both sites were storage containers, like jars and pots. At the Arao kilns, by the nineteenth century, more storage containers were being produced than tableware. Likewise, the sherds of Sue ware collected at Nakadake Sanroku were only from storage containers. In examining the typology, the shapes of Sue ware found at both sites were similar, namely pots (kame) and jars (tsubo). Furthermore, Nakadake Sanroku is estimated to have been in operation from the second half of the ninth century (Amita 2003: 366).

Second, the flat bottoms of the pots that have been found in both kiln site centers show traces of anvil markings (Kamimura & Tsubone 1985: 170). The high ratio of anvil marking on flat-bottomed pots is characteristic of artifacts found at the Arao kiln site center (Amita 2003: 366).

Third, the shapes of the pots and the designs of the anvil marks are similar. To make it easier to remove the paddle and anvil from the surface of the Sue ware, the surfaces of the paddle and anvil were carved with patterns, such as parallel lines, concentric circles, and in one rare case, a wheel design. This wheel design was found both at Nakadake and at the Arao kilns (Amita 2003: 366).

Fourth, clay that contained straw was used for the kiln walls and stands (Fig. 17.5). Many lumps of clay that had been mixed with straw have been found at the Nakadake and Arao kiln sites (Kamimura & Tsubone 1985: 162; Becker et al. 2015). While this is also seen at other kiln site clusters, it is a common method both in Arao and Nakadake Sanroku.

To sum up the observations, the similarities both in kiln materials and in the process of molding the Sue ware suggest an exchange of technical knowledge and even a dispatch of craftsmen from Arao to Nakadake. Since the Arao kiln site center predates the Nakadake kilns, Kamimura (2005) concluded that Arao potters immigrated to Ata and started Sue-ware production in Nakadake Sanroku under the management of the Ata district offices.

This leads to the second set of hypotheses regarding Nakadake-Sanroku’s relation to the provincial government in northern Satsuma Province and to the nearby district administration.

17.3.2.2. Location and size of the Nakadake Sanroku kiln site center

Since its discovery, the number of potential sub-clusters has led to a relatively high estimated number of kilns that were in operation at the site, around 30 according to Kamimura at an early stage of research (Kamimura & Tsubone 1985; see fig. 2). Such a number is too high for district-level administration, so a relation to the provincial capital could not be ruled out, despite its distant location and the number of kilns, which far outnumber what would have been expected in a poor and small province like Satsuma. These factors have led to three alternative hypotheses as to why Nakadake Sanroku was chosen:

a. Good conditions for pottery production: clay, water, firewood.
b. Political power of the Ata region in contrast to the provincial administration.
c. Convenience for trade to the south, being near the active port of Shibahara site and its trading experts.

In southern Kyūshū, fuel and water are relatively easy to procure because the land is covered by mountains and forests, so these should not have been of concern when searching for a location for a pottery production center. The availability of raw materials could have been the main consideration. A geological map of Kagoshima Prefecture (Committee for the Edition of the Geological Map of Kagoshima Prefecture 1991) shows that the soil found in the area within 10 km of the Satsuma provincial capital is the same type of sandstone of which Nakadake is made. The project was set up to investigate the soil at Nakadake Sanroku in more detail.

As for the second hypothesis, it must be remembered that Ata was the seat of local power in Satsuma prior to the establishment of the province. When deciding where to establish Sue-ware production in Satsuma Province, the political and economic power of the various districts may have been taken into consideration, but this is difficult to investigate with the current archeological record.

Various archeological studies prior to the beginning of the recent Nakadake Sanroku project back up the third hypothesis: One of the most notable features of Mt. Nakadake is its location near the Manose River estuary, with its important role in trade. Earlier XRF analyses of a number of main and minor elements showed chemical overlaps with sherds from Nakadake Sanroku in sherds unearthed as far away as Tokunoshima and other Ryūkyū islands (Mitsuji 1985, Ikehata et al. 2008). This is interpreted as evidence for a distribution of products from Nakadake Sanroku far to the south and outside the borders of the ancient Japanese state.

Ports related to Mt. Nakadake have also been identified. The Shibahara site is located on the bank of the Manose River, 2 km from Nakadake Sanroku (Seki et al. 2012). Many kinds of storage containers produced at Nakadake Sanroku have been unearthed at the Shibahara site. Since Nakadake Sanroku is a production center from which complete vessels were exported while only fragments of rejects were left on site, we do not find fully preserved products in the kiln site center itself. However, many larger pieces of Sue ware with the same typological characteristics as those produced at Nakadake Sanroku have been excavated from the Shibahara site.
In addition, the remains of buildings considered to be warehouses have been found, as well as a sekitai—a decorative stone belt worn by low-level officials. These findings indicate that Shibahara was an administratively managed port facility (Seki et al. 2012: 484).

In the Mottaimatsu site adjacent to the Shibahara site, a large quantity of ceramics from China and South East Asia which were produced from the eleventh to fourteenth century have been excavated (Miyashita 1998, Nukumizu et al. 2007). It has been pointed out that the port administrative facilities from the ninth and tenth centuries found in the Shibahara site might have developed as a base for foreign trade in the medieval period (Seki et al. 2012: 486).

Although it is currently difficult to prove the second hypothesis with archeological methods alone, provenance studies and other scientific methods seem promising in solving the first and third hypotheses accompanying excavations, prospections and other archeological studies.

### 17.4. Recent international research at Nakadake Sanroku

#### 17.4.1. Overview of the progress since 2012

Since 2012, the Nakadake Sanroku kiln site center and its surroundings have been subject to intensive and thorough research. While trying to find answers to the hypotheses described above, the investigations will also confirm the extent of the site. Excavations were conducted at the sub-cluster in Arahira 2, which was discovered in 1984. The excavations were an international joint research project involving researchers and students mainly from Japan and Germany.

In the 2012 field survey (Fig. 17.2), many Sue sherds were found in sub-clusters Arahira 1 and 2, where Arahira 2 was relatively well preserved in comparison to the sub-cluster Arahira 1. Since 2013, our research team has received JSPS KAKENHI Grants for seven years and has been able to conduct five excavations in Arahira 2.

In 2014, since most finds had thus far been concentrated on the western slope of the valley, trenches were mainly dug in the western area, and in one such trench part of a kiln was unearthed (Nakamura and Shinoto eds. 2015: 10, Becker et al. 2015, Shinoto et al. 2015). This kiln was named “kiln site No. 1.” Sherds of Sue ware and burned lumps of earth and clay were found in another trench below kiln site No. 1. They were debris from an ash heap (haibara).

From 2016 to 2019, excavations focused on a thorough investigation of kiln site No. 1 as well as locating and then excavating kiln ruins on the eastern slope.

Since Kamimura & Tsubone (1985) had identified kiln ruins on the eastern slope, magnetic surveys were conducted to search for kilns at the second Arahira kiln site cluster in 2017 (Hatakeyama et al. 2019). Anomalies in the earth’s magnetic field were detected on the eastern slope, so seven trenches were opened on that side. Burned bedrock and burned rocks were found in four of the trenches that were dug across the line of magnetic anomalies. Since the burned area was spread in a continuous belt, it is presumed that there had been a kiln and that its ruins had been scattered.

In order to determine the scale of the kiln center, along with the excavations, several field surveys were conducted throughout Mt. Nakadake (Nakamura & Shinoto eds. 2015: 7, Matsusaki 2018). The remains were hard to detect in the densely forested, mountainous area. Therefore, LiDAR data analysis was considered the method of choice for effectively identifying additional kiln sites. In 2018, with the cooperation of Nakanihon Air Service Co., Ltd., a LiDAR survey covering an area of 0.5 km² at the southwest foot of Mt. Nakadake was conducted (Shinoto et al. 2019), and in 2016 and 2017, geological and mineralogical surveys were also conducted in order to find suitable places for kilns and to research clay used for Sue ware (Steup 2017).

#### 17.4.2. Surface investigation and LiDAR

As a result of surface investigation, artifacts have been found at 23 points covering an area of 4 km² on Mt. Nakadake. These points are concentrated in the southwest section of Mt. Nakadake, but new finds from 2019 hint at kilns in a separate valley in the southeast (Fig. 17.2). There are pieces of kiln walls at 15 of these points, which are therefore considered part of the kiln site cluster. Five kiln sites have been discovered at the first Arahira kiln site cluster (Kamimura & Tsubone 1985), and if the other site groups have the same number of kilns, it is estimated that there are over 70 kilns at Nakatake Sanroku.

In 2018, LiDAR data analysis on a 0.5 km² test area in the center of the area covered by ground-walking surveys earlier succeeded in identifying some characteristic landforms that determine buried kiln sites in the first stages of interpretation of various visualizations. Tentatively, 65 elongated depressed topographies found on several slopes were deemed potential kiln sites, but a significant number may be natural depressions. Verification of the sites by ground-walking surveys could only be performed in one smaller valley, but at least two kiln sites, ash heaps and pieces of Sue ware could be verified as a result of the LiDAR findings (Shinoto et al. 2019, Doneus et al. 2019, Herzog et al. 2021).

Taking into consideration the results of surface investigation and the LiDAR data analysis, the number of kilns is large considering other sites that are typically found in rural provinces. It is estimated that this site operated on a larger scale than most other local Sue-ware production areas.
17.4.3. New discovery of artifacts

Many of the artifacts collected after 2012 were similar to those found in the past, such as pots and jars of Sue ware, fragments of kiln walls and clay stands, but there were some new discoveries. One is a piece of the shoulder of a jar on which a character is engraved (Nakamura & Shinoto eds. 2015: fig. 8-21), and the other is a piece of an inkstone made of Sue ware (Nakamura & Sträter 2017: fig. 4). Both were collected from the first Arahira kiln group.

About two-thirds of a Chinese character was engraved on the surface of the jar, which can be interpreted as “真 (shin)” or “貢 (kō).” However, the reason why the character was engraved is unknown. The “貢” character was found to be written in black on three pieces of Haji ware found at the Hashimuregawa site in the southern part of the Satsuma peninsula. If the character was “貢,” it could be related to taxation.

From the eighth to the tenth century, many pieces of Haji and Sue ware were found to have characters written on them, but some of them were not accurate characters. Although a part of the character mentioned above is missing, it is an accurate character and was inscribed before the Sue ware was fired. This shows that some potters were able to write characters, and it is a sign of the social position of the potters and their leaders.

Inkstones are tools used by government officials and priests. The discovery of an inkstone in Nakadake indicates that Sue ware produced there was supplied to government offices and temples.

17.4.4. Excavation of a kiln and related structures

17.4.4.1. Kiln 1

Kiln site No. 1 (Fig. 17.4, 17.5) was found on the western slope of the second Arahira kiln site cluster, with a gradient of the firing chamber of 45 degrees. Kiln site No. 1 is the only kiln that has been excavated and analyzed at Nakadake Sanroku, and it is from this that we have learned the details of the kiln structure.

Fortunately, the kiln was well preserved. The whole form except the ceiling was uncovered, revealing the ruins of an underground kiln. The inside of the kiln was filled with earth and sand, and the ceiling of the kiln had collapsed; the floor and some of the walls remained intact. The lower half of the kiln had a sandstone base, as the kiln had been made by hollowing out a bed of sandstone.

The surface shape of the kiln is long and narrow, with a length of 6 m and a maximum width of 1.8 m. The height difference between the floor of the entrance and the flue was 4.5 m. The width of the furnace opening was 1 m. It is the largest kiln among Sue-ware kilns discovered in southern Kyūshū.

The floor of the 2 m long firebox was inclined slightly so as to rise toward the firing chamber. The floor of the firing chamber had a length of 5 m with an inclination of 40–45 degrees.

Clay stands, used to hold the pottery in place during firing, remained in place at the rear of the kiln, but in the center, the stands had become displaced and tumbled to the bottom of the incline. The clay stands at the rear of the kiln were small, with a width of 0.2 m and a length of 0.15 m. They were used for small-sized Sue ware. There were large stands among the tumbled stands which were for large Sue ware, and they were presumed to have been placed in the front half of the firing chamber. It is presumed that large Sue ware and small Sue ware was placed in the front and the back respectively, and that they were fired in the same way as at the Kita-Urayama A kiln in the Arao kiln site center in Higo region.

There was an upright flue at the rear of the kiln. It was about 0.8 m long and its inner diameter was 0.5 m. The flue opening and the brittle rock surface surrounding it were flat. The surrounding rock seems to have been smoothed to provide a workspace. Holes for roof supports were not found around the flue opening.

Two layers of walls have been identified on either side of the entrance. The two wall layers of this kiln show that the kiln entrance was walled off at least two different times. This indicates that kiln No. 1 was not a single-use kiln. The entrance was filled with stands. It seems that when the kiln was abandoned, the potter closed the entrance with stands from nearby abandoned kilns.

A hole was found under the floor from the entrance to the firing section. The hole was not completely excavated, but a sub-trench 0.3 m in width was placed along the center axis of the kiln. From the section confirmed in the sub-trench, the length of the hole was 2.3 m, and the depth was estimated to be over 0.5 m, though the bottom could not be confirmed.

This type of hole is called a boat-bottom pit due to its shape. The hole was filled with soil and covered with charcoal, and so it is thought to have been dug shortly before the kiln was fired. It is assumed to have been made so that the potters would have more room in which to maneuver to place the Sue ware in the kiln. Systematic analyses of the kiln construction, materials used and firing technology are still ongoing.

17.4.4.2. Artifacts found in the kiln and its ash heap

There were few sherds of Sue ware inside the kiln. The artifacts found in the kiln were clay stands and fragments of the kiln. Some of the fragments contained large amounts of organic temper. X-ray investigation of a fragment with a thickness of 0.2 m showed the layers of soil bending like an arch from side wall to ceiling (Becker et al. 2015). Since the lower side wall remained intact and was not covered...
An ash heap was found in a trench located 5 m to the northeast of kiln site No. 1. The upper side of the ash heap was destroyed by cultivation during the late modern period. However, a 0.3 m thick portion of the ash heap remained, and many sherds of Sue ware, stands and kiln walls were found. Because of the relative positions of kiln site No. 1 and the ash heap, the ash heap was presumed to have held the waste from kiln site No. 1.

Radiocarbon dating of charcoal collected from the ash heap showed Cal AD 775–890 (1σ) (Kokankyō Kenkyūjo 2015). Thermoluminescence dating of the kiln wall determined that it had been used in the ninth century (Shitaoka et al. 2018), which is consistent with the results of radiocarbon dating.
The sherds of Sue ware excavated in the kiln and the ash heap are considered to have been fired in kiln No. 1. Most of them were containers such as jars and pots, and less than one-tenth of them were bowls.

17.4.5. Geology and analyses of raw materials and products

Mineralogical studies using the typical set of methods, XRF (X-ray fluorescence analysis) and XRD (X-ray diffraction) for sherds, soil samples and parts of kilns, and SEM and several other methods of analysis for thin sections of the sherds, have been carried out, and a detailed geological map was created. The soil surrounding the kilns is a ubiquitous yellow layer of sandstone containing clusters of rock, soil and good quality clay at various stages of weathering (Steup 2017). Among the various types of soil found in Nakadake, weathered sandstone is the most suitable material for Sue ware. As a result of analysis, it was determined that the clay has features similar to Sue ware but is not exactly the same. The raw material was probably processed in several ways (Raith & Hoffbauer 2015, 88) to increase its plasticity, which led to the different properties of the sherds. In addition, mineralogical analysis revealed traces of high temperatures (1050–1150°C) in all sherds.

An experiment in Sue-ware firing was conducted with the cooperation of a potter who produces ceramics with clay from the southern Satsuma region. For the experiment, clay dug from the second Arahira kiln site cluster was used. The results showed that the freshly dug clay has a low heat-shrinkage percentage and was suitable for use in high-temperature kilns, yet it was not suitable for Sue ware, due to its lack of plasticity making it difficult to shape. However, after one year of storage, the clay viscosity increased enough for it to be used in Sue ware. This experiment also tested weathered clay, and showed that it was not the best material for Sue ware but that it could be used if it was improved through storage and/or the addition of other material.

Figure 17.5. The kiln almost fully excavated in 2019 (left), and fragment of the kiln wall excavated in 2014. Plaster with organic material, top right; X-ray photo showing the arc of the tunnel (Photos and X-Ray by LVR-Landesmuseum Bonn, 2014; Becker et al. 2015).
17.4.6. Provenancing

From 2014, the application of Neutron Activation Analysis (NAA) has been carried out on sherds, kiln fragments and soil (Sterba 2015, see Sterba in this volume). NAA of sherds from the Nakadake Sanroku kiln site center unveiled “chemical fingerprints” of the pottery, and analysis of sherds found on the Ryūkyū islands was conducted to find matches with these fingerprints.

The analysis of sherds from the Nakadake Sanroku kiln site cluster produced several groups, which may hint to the existence of several workshops in the kiln cluster, or perhaps to other reasons, such as differentiation in raw material selection or preparation or simply change in raw material over time.

Sherds of Sue ware which fit into the NAA groups found at the Nakadake Sanroku kiln site cluster have been found southwards down to the central part of the Ryūkyū islands, particularly on Kikai Island, and matching sherds were found at the Matsubara site on Tanegashima (Sterba 2015), which was part of Ōsumi Province in the ninth century. As mentioned above, the distribution of Sue ware from Nakadake Sanroku to the Ryūkyū islands had been suggested by XRF analysis earlier, and the rigid NAA analyses reinforced this.

NAA can minimize the destruction of artifacts because only a small amount of sample (50–150 mg) is used for analysis. Because many of the sherds found at Nakadake and on the southern islands are small, it is difficult to estimate their provenances typologically. Through NAA, we expect to obtain results on the provenance of many of these small sherds of Sue ware, and NAA studies on a larger scale are ongoing. Recent research suggests the fine-grained chemical groups based on NAA analyses may be used for chronological classification of sherds that are so fragmented that chronological identification based on archeological typology is impossible (Sterba et al. 2020).

17.4.7. Intermediate results from recent research

Because Sue ware from Nakadake Sanroku was distributed widely to the south beyond the ancient Japanese state and has been found in locations known to be trading centers, I am led to conclude that the purpose of establishing the Nakadake Sanroku kiln center was mainly for trade.

17.5. Conclusion

This chapter started with a description of the geographical and historical background of the Nakadake Sanroku kiln site center and then covered research that relates to the unique role and location of the site.

The Nakadake Sanroku kiln center was built in the Ata district, 50 km away from the provincial capital and Kokubunji temples, which were considered to be the main places to which Sue ware was supplied after the establishment of the provinces in the eighth century. Ata was the center of the indigenous Hayato on the Satsuma peninsula and the only site producing Sue-ware kilns in Hayato territory. The Hayato were considered a separate ethnic group until the end of the eighth century. The Nakadake Sanroku kiln center started producing Sue ware in the ninth century. This means that soon after the Hayato became incorporated into the Japanese state, the Nakadake kilns were purposely built far from the provincial capital, the stronghold of the local Japanese government. It is assumed that the Nakadake Sanroku kiln center was not only set up in order to supply the state administration, as is generally seen in local Sue-ware production areas, but also with exchange with the southern islands in mind.

Including the intermediate results of recent Nakadake Sanroku kiln site center research projects, the following four points can be summarized regarding the purpose of installation and the characteristics of this kiln center:

1. The topography and geology of Mt. Nakadake are suitable for Sue-ware production, although the clay is not ideal. In addition, the same geology and geography existed near the Satsuma provincial capital, so it cannot be said that geography and geology were the primary reasons for its establishment.
2. The structure of the kilns, the types and forms of the Sue ware produced, and the molding techniques are all highly similar to those of kiln sites in the Higo region, and so it is assumed that Higo craftsmen settled in the Nakadake area.
3. The number of Sue kilns verified in the Nakadake Sanroku amounts to 30 based on the surveys in the 1980s, but an estimate may well go beyond 70 kilns. This is large scale for local production of Sue ware in the ninth and tenth centuries. On the other hand, the governmental offices and temples in Satsuma Province, which are considered to be the main places supplied with Sue ware, are small in scale and therefore could not have factored in such a large production of Sue ware.
4. The distribution of Sue ware from the Nakadake Sanroku kiln site center covers a wide area that has been confirmed up to the central part of the Ryūkyū islands. The remains of a harbor were also found in the vicinity of Mt. Nakadake. This harbor later became a base for foreign trade in the medieval period.

From the above, it can be concluded that the main purpose of establishing a Sue-ware production area in Mt. Nakadake was to produce Sue ware for trade. The reason why the kiln was purposely built in Ata, which had been the center of local government, was not only because it was geographically and geologically suitable, but also because it was a base for trade with the Ryūkyū islands from prehistoric times and the people there already had the necessary experience with trade and seafaring.

The most interesting part is the role that Nakadake Sanroku played in the growth of trade centered in the Japanese
south. The trade route for Sue ware from the Nakadake Sanrou kiln center developed into a foreign trade route that became active after the eleventh century and eventually led to the connection with Western societies in the sixteenth century.

In understanding eras for which written sources are virtually nonexistent, the Sue ware from Nakadake distributed to the islands can provide an important source of information. The distribution of Nakadake Sue ware sheds light on ancient sea trade routes to the south, as well as the development of trade in southern Kyūshū and the Ryūkyū islands from the eighth century through the flourishing Middle Ages.

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Production at the Kamuiyaki Kiln Site Cluster and the Connection of the Ryūkyū Archipelago to Surrounding Societies During the Eleventh Through Fourteenth Centuries

Akito Shinzato

Abstract: Kamuiyaki is a stoneware that was produced in Kamuiyaki on the Ryūkyū island of Tokunoshima in the southwest of Japan between the eleventh and fourteenth centuries. In this chapter, the technological roots, production, distribution, consumption and typology of Kamuiyaki are introduced and the background of its formation, development and decline are discussed. While the technology was transferred from overseas, the production trend is related not only to the economic development in medieval East Asia but also the upgrading hierarchical organization on the Ryūkyūs. Besides kiln technology, Kamuiyaki offers important information about the state formation of Ryūkyū in a time for which written documents are scarce on the islands.

Keywords: Ryūkyū archipelago, Kamuiyaki, Gusuku period, Japanese Middle Ages, Goryeo stoneware, status-symbol culture

18.1. Introduction

The Kamuiyaki kiln site cluster in Tokunoshima is the oldest stoneware industry site in the Ryūkyū Islands. It was not based on the techniques for production of the local earthenware or the ancient Sue ware of southern Kyūshū, but was established on the basis of the stoneware technology of the Korean peninsula during the Goryeo period (918–1392). The emergence of Kamuiyaki signals that the Ryūkyū Islands had entered into the commercial area of East Asia, and this was the first step of the Ryūkyū archipelago in becoming connected with international societies. The Kamuiyaki kiln site cluster was designated as a National Historic Site of Japan in February 2007 because of its importance for understanding the Ryūkyū society and economy in an era when no texts were recorded.

18.2. The geographical environment of the Ryūkyū Islands and Tokunoshima

The Ryūkyū archipelago is the southernmost part of Japan, and consists of about 200 islands scattered between Kyūshū and Taiwan (Fig. 18.1a). It is characterized mostly by coral reefs in this subtropical climate area. The Ryūkyū Islands are divided into the Ōsumi Islands, the Tokara Islands, the Amami Islands, the Okinawa Islands and the Sakishima Islands, the proximate location of which is on the map (Fig. 18.1b). These islands are composed of volcanic islands (kōtō high islands) and of coral reef islands (teitō low islands). The former roughly corresponds to the area from the Ōsumi Islands to the Tokara Islands, and many of the latter are to the south of the Tokara Islands.

Volcanic islands are characterized by rich water and wood resources (Mesaki 1985: 12–21, Takanashi 2001: 221–30). Tokunoshima, included in the Amami Islands, is classified as a kōtō type island. On the central axis of Tokunoshima, there are six mountains with an altitude of over 400 m, and they are surrounded by terraces and dunes of Ryūkyū limestone (Fig. 18.1c). Isen Town, where the Kamuiyaki kiln sites were discovered, is located in the southern part of Tokunoshima, and its main industry is agriculture. The west coast of Isen Town has a wide, raised plateau of Ryūkyū limestone, and cliffs have been formed due to sea erosion. Coastal terraces and dunes have been formed from the south to the southeast. Contrasting topography can be seen in the east and west area of Isen Town. There are six rivers in Isen Town, which start from a high terrace close to the kiln site and flow radially into the sea through underground caves and valleys (Fig. 18.1c). Its highest mountainous area is composed of slate, tuff and diabase, and the surrounding plateau corresponds to the granite, Ryūkyū limestone and gravel zone. This means that topographical features are closely associated with its geology. According to a survey of natural vegetation (Terada 2015), the flora of the mountainous areas was similar to that of the Ryūkyū Aoki (Psychotria rubra (Lour.) Poiret)-Sudajji (castanopsis Sieboldii Subsp.) community. These results show that the plant distribution corresponds to the particularities of topography and geology.

18.3. The historical background of the emergence of the Kamuiyaki kilns

The Ryūkyū archipelago has a different history from its Japanese counterparts. First, the age of hunter-gatherers...