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Highland Potsherds and Post-Sriwijaya Pottery Industry in Lampung, Indonesia: A Granulometric Analysis
Analisis Granulometri Tembikar di Dataran Tinggi dan Industri Tembikar Pasca Sriwijaya di Provinsi Lampung, Indonesia

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Abstract

Potsherds fragments or earthenware pottery are a type of archaeological evidence frequently discovered in surveys and excavations. These fragments represent pottery in many forms such as containers and crafts with decorated or plain surfaces. Earthen pottery has distinct characteristics and frequently represents the identity of a specific community. Sriwijaya was a famous kingdom in Sumatra from the 7th to the 10th century. Lampung is in the far south of Sumatra, and highland potsherds from this region are intriguing. However, the highland region is arguably not the origin of these potsherds, geologically or historically. This paper examines the origin of these potsherds through granulometric analysis and ethnography. This research shows the potsherd's granulometric from the highlands is similar to the lowlands of Lampung, and they might adopt the same technique on making pottery from 1000 to 200 years ago. The development of the pottery industry changed in the last 100 years, following the implementation of the Dutch transmigration in 1905 when the Javanese potters began to produce earthen ware techniques from their homeland. The results of this study support the idea that the lowlands have been the main suppliers of pottery for the highlands and surrounding areas, from the post-Sriwijaya era until the present.

Tembikar adalah bukti arkeologi yang sering ditemukan dalam bentuk pecahan dalam survei dan penggalian. Artefak ini berbentuk wadah dan non-wadah dengan permukaan yang dihias atau polos. Tembikar memiliki karakteristik yang berbeda dan mewakili identitas kelompok tertentu. Sriwijaya merupakan kerajaan terkenal di Sumatera dari abad ke-7 hingga abad ke-10. Lampung adalah wilayah terjauh Sriwijaya di selatan, di mana tembikar di dataran tingginya mengundang pertanyaan yang tidak didukung oleh data geologi dan sejarah. Tulisan ini meneliti asal tembikar dataran tinggi melalui analisis granulometri dan etnografi. Penelitian menunjukkan granulometri tembikar dari dataran tingi sama dengan di dataran rendah Lampung. Kemungkinan mereka telah mengadopsi teknik pembuatan tembikar yang sama sejak 1000 hingga 200 tahun yang lalu. Perkembangan industri tembikar mulai berubah sejak 100 tahun terakhir atau saat diterapkannya program transmigrasi oleh Belanda pada 1905, di mana para pendatang dari Jawa mulai membuat

tembikarnya sendiri yang sama dengan asalnya. Hasil penelitian ini mendukung hipotesa dataran rendah sebagai pemasok utama gerabah untuk dataran tinggi dan sekitarnya sejak pasca Sriwijaya hingga sekarang.

Keywords: pottery, Sriwijaya, Lampung, ethnoarchaeology | Bakungudik, Kayuagug

Introduction

The production of earthenware pottery (potsherds) is an old tradition that has been going on since the rise of agriculture, around 10,000 years ago. In Southeast Asia, earthenware pottery has been used as a ceremonial tool for 2000 years, and in Indonesia from 1500 BC to around 400 years ago (Gardner 1978 and Weinhold 1983; Soegondho 1995). The distribution of earthenware pottery in Indonesia from prehistory to the present has expanded. In Sumatra, the oldest earthenware pottery from Soegondho's (1995) map dates to the classical period (7th to 14th CE) and has been found on the east coast of the land in Kota Cina, Muara Jambi, and Lemah Abang (Wibisono 1982).

The Kingdom of Sriwijaya is well-known for its abundance of archaeological remains. In 1025, this kingdom was attacked twice by the King of Chola (Susanti 2009). The evidence of earthenware pottery (potsherds) is plentiful, but research is still ongoing due to various other interests regarding Sriwijaya, such as the wetland region (M. Fadlan 2015). The dispersal of potsherds has been found in many Sriwijayan archaeological sites, from the east coast to the southern part of Sumatra.

Lampung is the farthest region of Sriwijaya in the south. There have been at least seven inscriptions identified which are thought to relate to Sriwijaya which are datable to the 7th-14th centuries CE (Utomo 2007). Many potsherds have been found in Lampung, both in the highlands and the lowlands. Tanjung Raya and Hujung Langit were two sites from the 10th and 14th centuries in the highland of Liwa which have yielded an abundance of potsherds laid on the surface and under the ground up to 80cm deep (Rusyanti et al. 2019). Thousands of potsherds were found in the highlands in surveys conducted between 2013-2018. Most of these represent containers with plain surfaces and rough textures (Rusyanti 2013). The geography of the highlands was influenced by tectonic activities of the Semangko fault zone which triggered the Ranau eruptions in the past (Bellier et al. 1999). Most of the highlands in Liwa are characterized by tuff layers from 20 to 40 meters thick. This is not suitable for clay deposits. The peoples of Liwa are not familiar with any local pottery tradition and are accustomed to obtaining the pottery from the southern district in the lowlands (Rusyanti, Purwoarminta, and Krama 2021).

Geologically, the lowland region is suitable for clay deposits. Four great rivers seasonally enrich the floodplain with clay sediments covering the river basin. There are at least 22 settlements along the riverbank where an abundance of potsherds has been found. Among these sherds, 11 samples have been dated using thermoluminescence, indicating their age to be from the 10th to 21st century CE (Rusyanti et al. 2021). Although geologically well supported for clay deposits, F.G. Steck in Amran (2011), a Dutch infantryman, in the 19th CE said that pottery, along with rice, porcelain, salt, iron, textiles, and ceramics, was among commodities imported from the outside the region (Amran 2014). This begs the question of where these potsherds originated.

Geoarchaeological research, petrography, and ICP-MS analysis for the 22 samples from the lowlands showed the potsherds mineralogy to be similar to the east coast of the Menggala Quadrangle in Lampung Province (Rusyanti, Setiawan, and Satrio 2022). According to Verstappen, this area lies within the eastern Sumatra lowlands, an area characterized by plains and low-lying

hills with a maximum elevation not exceeding 100 meters above sea level. The rivers of Mesuji, Tulangbawang, and Seputih, all drain from west to east, forming a sub-parallel meandering drainage pattern (Burhan, Gunawan, and Noya 1993). In this quadrangle, there is a river mentioned in the ancient history of the Liang Dynasty in the 5th century CE as *to lang po hwang* (Poesponegoro and Notosusanto 1993). Five archaeological sites with potsherds were identified along this riverbank, dating from 700 years ago to 100 years ago, based on thermoluminescence dating (Rusyanti et al. 2021).

Distinct from the highlands, where no ancient kilns have been found, in Tulangbawang in the lowland there is an ancient village of Bakungudik that has been recognized as the oldest known kiln in Lampung. Their famous jars (*kendis or kibuk)* are part of a well-known earthenware pottery tradition, evidence of which is found here and is kept in the Ruwa Jurai Museum (Kherustika, Purwanti, and Fesdian 2003). This typical form of the jar is thought to be reminiscent of the the Kayuagung earthenware pottery type from Palembang (Sriwijayan), although these correlations have not yet been confirmed by archaeological data. Our hypothesis suggests that highland potsherds came from Bakungudik and Kayuagung in the lowland. Nevertheless, this hypothesis remains to be proven.

Methodology

The origin of ancient potsherds in the highlands of Lampung can arguably be determined through the granulometric analysis of potsherd samples, which can indicate the kiln sites from where they were fabricated. Since lowland potsherds are known to be made from clay from the Menggala Quadrangle, samples from highland potsherds, the origin of which are determined, were compared with the clay-sherds from five possible locations: the Kayuagung from the north of Lampung (now Palembang, formerly Sriwijaya kiln), the Bakungudik (Menggala Quadrangle of Lampung), and three kiln sites in the Lampung lowlands: Sidoredjo, Podomoro, and Negara Ratu (Figure 1). The thermoluminescence dating from our previous study was used to reframe when the production of earthenware pottery began. The overall result of these integrations was utilized to draw the history and development of the ancient ceramic industry in Lampung.

Results and Discussion

The main issue that has yet to be resolved is from where the potsherds in the highlands were produced. In 2021, the 22 potsherds previously sampled from the lowlands were examined through geoarchaeological research, petrography, and ICP-MS analysis. The clay fabric showed a soil type similar to that from the Menggala Quadrangle, in Lampung. Our hypothesis suggests whether the highlands potsherds could be from the Menggala Quadrangle, with its oldest kiln in Bakungudik, or came from the Tulang Selapan Quadrangle, with its oldest Sriwijayan kiln in Kayuagung, or from some other place in the Lampung lowlands.

For this study, we examined samples from two highland sites, Tanjung Raya and Hujung Langit, to compare the granulometry from the clay taken from the five possible kilns sites: the Kayuagung (from the Tulang Selapan quadrangle, Palembang), the Bakungudik (from the Menggala Quadrangle, Lampung), Podomoro, Negara Ratu, and Sidoredjo (from the lowlands).

The grain analysis can give a better comparison for assessing the relations between the potsherd samples and the origin of the supposed clay fabric and can be compared with ethnographic correlations regarding how they were made (Sunarningsih 2011). The results were integrated to help draw out the history of the post-Sriwijaya earthenware pottery industry in Lampung Province.

Fig. 1 The dispersal of ancient potsherds in Lampung and the five kiln sites (represented in yellow boxes). The two northernmost kilns (Kayuagung and Bakungudik, from the Sriwijaya era) are more ancient than the three southern kiln sites (from the post-Sriwijaya era) Map by Harry Octavianus.

Granulometric analysis is the analysis of grain size and composition of potsherds fragments using a binocular microscope. It is a sedimentological analysis used to determine the shape, size, and texture of different particles, both organic and inorganic (Lopez 2017). This does not reveal the kinds of minerals in potsherds, as is the case with petrography. This analysis does not require expensive laboratory equipment, but the results are suitable for examining the basic fabric of potsherds which can be compared. It requires only two primary devices: a furnace and a microscope. Granulometric analysis requires sample preparation and microscopy.

Sample preparation

We used 24 sherd samples from highland archaeological sites (12 from Tanjung Raya and 12 from Hujung Langit) to compare the grains characteristics with clays from five supposed kilns in the lowlands, as a reference (Table 1). Based on the low fabric method principal analysis practiced at Leiden University, the clay references (5 clays) should be mixed with 10%, 20%, and 50% grains (sand), make like pieces of shards (clay shards), have it dried, and burnt it at furnace from gradually from 0 ºC to maximum 750 ºC to 10 minutes, then cooled them down. This refiring was also conducted for the compared shards (from the highland). This will put them all in a fully scorched state before examining under the microscope (As 2004; Sunarningsih 2011).

Sample Microscopy

The focus of microscopy analysis is on the particle size and distribution, colour, and voids that are observable on the surface. We assessed 24 highland potsherds (12 samples were from Tanjung Raya and 12 samples were from Hujung Langit) to compare with five (5) clays-shards reference, from the five proposed kilns in the lowland. 22 samples have the same grains characteristics with the clay

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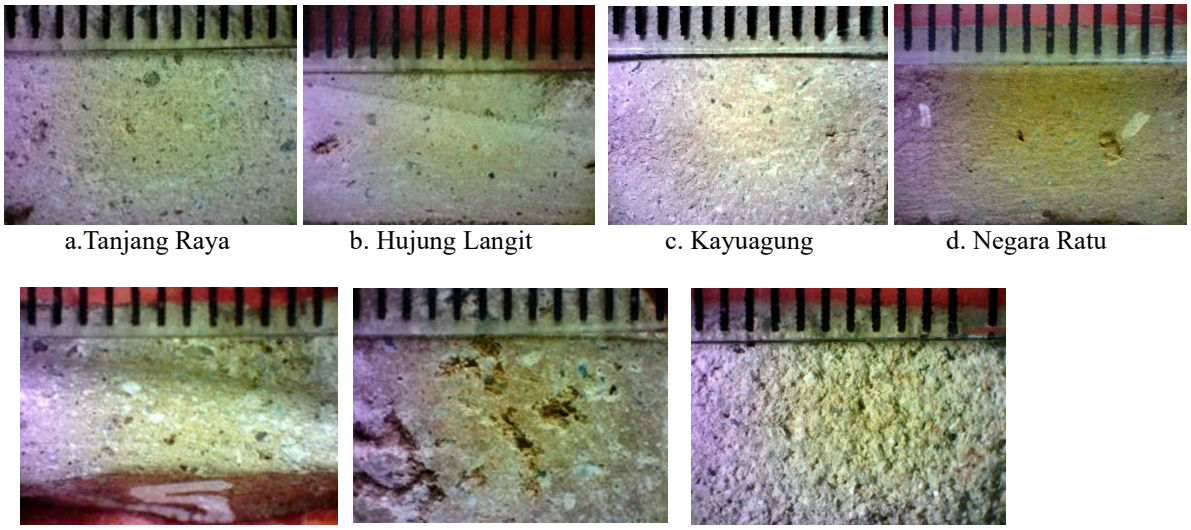
taken from the three (3) locations; in Kayuagung, Podomoro, and Negara Ratu. Those shards have 10% grains, <0.01 cm size in angular and subrounded, and the shards have major milky whites and dark colours and minor shiny quartz. Nevertheless, the rest of two samples have 50% grains similar with the clay taken from Bakungudik. None of the highland potsherds has 20% grains and 0.1 cm sizes as in Sidoredjo. The varied results are listed below (Table 1 and Figure 2).

Table 1. The granulometric results

No.	Samples	Measurements			Descriptions and Color	Amount
	Highland sherds	Grain	Sizes (cm)	Shapes		Similar / Dissimilar
1.	Tanjung Raya	10%	<0.01	angular and subrounded	major milky whites and dark colors and minor shiny quartz	11 similar
2.	Hujung Langit	10%	<0.01	angular and subrounded	major milky whites and dark colors and minor shiny quartz	11 similar
	Lowland sherds					
1.	Kayuagung	10%	<0.01	angular and subrounded	major milky whites and dark colors and minor shiny quartz	similar
2.	Bakungudik	50%	<0,01	angular and subrounded	major milky whites, minor shiny quartz, and dark colors	2 dissimilar
3.	Sidoredjo	20%	0.1	angular and subrounded	major milky whites and dark colors and minor shiny quartz	none
4.	Podomoro	10%	<0.01	angular and subrounded	major milky whites and dark colors and minor shiny quartz	similar
5.	Negara Ratu	10%	<0.01	angular and subrounded	major milky whites and dark colors and minor shiny quarts	similar

Source: Sunarningsih, Katrynada J, and Adi Dian observations on the shards 2022.



a.Tanjang Raya b. Hujung Langit c. Kayuagung d. Negara Ratu

e. Podomoro f. Sidoredjo g. Bakungudik

Fig 2. Potshards from the highlands (a,b) has similar percentage and color grains to those from the kiln of Kayuagung (c), negara ratu (d), and Podomoro (e). None of them has 20% grains as in Sidoredjo, and two them has 50% grains similar to Bakungudik.

The result of the microscopic analysis shows three interesting notes. The first of these, was that the clay from the Bakungudik kiln in the Menggala Quadrangle has major grains of shiny quarts and minor grains of other grains with milky white and dark colors. The grain percentage is 50%, the size is <0.01cm, and there are in angular and subrounded shaped grains. It seems the clay was used without sorting or sieving the clay from other organic material (used to said as bad sortir). The varied grain in bad sortir makes the shards texture feel rough. This is the same with lowland

potsherds, where 97.07% have a rough texture (Rusyanti et al. 2021; Rusyanti et al. 2022). However, these rough shards texture is also more common in the Kota Cina sites (Wibisono 1982). This adds to the common opinions that Sumatran shards have a typically rough texture. Whether the texture has a correlation with the degree of porosity or not, this has not yet been examined. The 40–50% porosity in the shards means they absorbs liquids easily (Intan 2017). Potsherds which have a high porosity is typically used for non-liquid content or for dry materials. This rough texture was also seen in Sidoredjo shards. Sidoredjo has 20% grain in major milky whites and dark colours and minor shiny quarts. The grain size is 0.1 cm in angular and subrounded shapes with bad sortir. Sidoredjo uses a traditional technique in an open-fire kiln, like Bakungudik. This technique tends to create uneven heat distribution; the quartz minerals are not melted entirely, causing the texture to feel rough.

The second was shown by the microscopic analysis. The clay shards from the lowlands contain 10% grains in major shiny quarts and minor milky whites and dark colours and <0.01 grained sizes. This indicates a better sortir than the rough one with the higher grain percentage. Unlike Sidoredjo and Bakungudik, whose sherds are rough and traditionally were made in an open firing, shards from Podomoro and Negara Ratu use a built-in kiln, which makes them at the optimum temperature. As well as in Kayuagung, Palembang.

Last, the shards from the highland (Tanjung Raya and Hujung Langit) show the same grain as the clay shards from Kayuagung, Podomoro, and Negara Ratu in the lowland. This supports the local people's testimony in the highlands of Lampung, who do not recognise any ancient or traditional kilns around them. They used to buy the earthenware pottery from the Lowlands kiln.

The Origin of the Potsherds

Kayuagung is one of the most well-known ancient kiln sites in Palembang. Potters from this kiln performed the same fabric, firing temperature of 650º- 900ºC, tempering, and processing techniques with the Sriwijayan potsherds from the 8th to the 13th CE. In the 1990s, Kayuagung earthenware was still being delivered to the southern part of Sumatra along the rivers of Musi and Komering, Jambi, and Lampung by perahu kajang (the kajang boat) (Rangkuti 2015). The kiln is still existed now but, in less production, than the last decade. Archaeologists in 2022 found interesting features and forms of a jar (*kibuk*) in Bakungudik (Figure 3a).

The sites of Kayuagung and Bakungudik located in the east coast of Sumatra and connected by the Komering River, it could probably be that the dispersals of Kayuagung earthenware reached Bakungudik. Rangkuti (2011) said in the 1990s, Kayuagung earthenware reached Lampung by boat, perahu kajang. Another alternate possibility is that Bakungudik might have a contact with Kayuagung. Aside from Kayuagung and Bakungudik, there might be other kiln sites somewhere in the southern lowlands which are yet unknown, from where earthenware was produced and then traded to the highlands. This presumption is based on the map from Manguin (2014) illustrating the sea route to the river in the hinterland in the Siwijaya times in the 7th to 15th CE.

The lowland has a wide alluvial and andosol plains, rich in clay deposits. Andosol is a volcanic soil that typically has a glassy composition, is highly porous, and contains both organic matter and clays of the amorphous type. Lahars, breccias, and tuffaceous sandstones, which are all products of volcanic weathering, are examples of this type of soil. This andosol type lends support to the idea that the lowlands served as the primary source of earthenware that the highlanders acquired.

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Dating the production

It is still unknown when exactly the earthenware industry in Lampung began. Since the region of Lampung received influence from Sriwijayan from the 7th to the 14th century, the only known traditional kiln from the Sriwijaya era in Kayuagung has become an important point. From the ethnographic source, *kibuk* or traditional Lampung style jars have been known since 1884 (Adhyatman 1987), whereas the results of the thermoluminescence dating taken from the samples of potsherds discovered in the archaeological survey varied, with the oldest dating from 1000-170 years ago in Way Seputihs archaeological sites, 700-10 years ago in Way Tulangbawang archaeological sites, and less than 100 years in Way Semangka archaeological sites (Table 2). Samples were taken from between 2019-2021 (Rusyanti et al. 2021; Rusyanti, Setiawan and Satrio 2022).

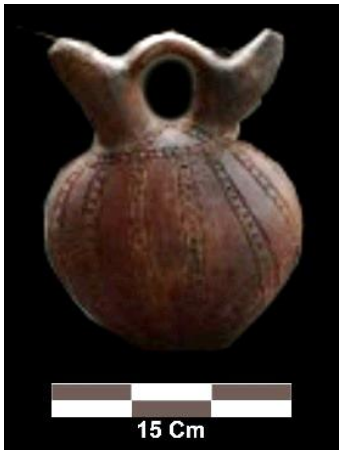
The Way Seputih (Lowland)	Thermoluminescence (TL) Dating	The Way Tulangbawang (lowland)	TL Dating	The Way Semangka (Highland)	TL Dating
Keramat Teluk	600-1000*	Benteng Sabut	500-700	Hujung Langit	<100
Pugung Rahardjo	600-1000	Keramat Gemol	200-320	Tanjung Raya	unidentified
Bojong	550-850	Gunung Terang	<100		
Tambah Luhur	400-600	Gunung Tapa	400-600		
Periki	250-400				
BentengSari	200-300				
Blambangan Umpu	170-300				

* Years ago

Table 2. The range of thermoluminescnece dating (TL dating) of the Lampung's potsherds (Rusyanti et al. 2021; Rusyanti, Setiawan, and Satrio 2022).

The range has provided evidence that earthenware pottery from over the centuries has been found throughout this region. Since there are no clues of older kiln sites existing elsewhere other than Kayuagung, in the southern part of Sriwjaya, this supports the assumption that this earthenware seems to have been dispersed from markets in the north (Kayuagung) to Lampung. Although the thermoluminescence dating above is helpful, knowing the precise kiln where earthenware was produced is still difficult to determine. Potters in Bakungudik said they have been making the earthenware from 1945 to the 1970s, though the traditional jars, *kibuk,* can be traced from the early 18/19th centuries (Adhyatman 1987; Kherustika, Purwanti and Fesdian 2003)

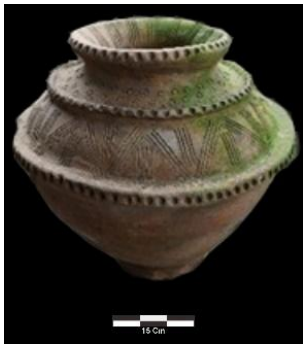
However, in 2003, the people of Bakungudik still had examples of *kibuk* (earthenware) from the 18th to 20th centuries (Kherustika et al. 2003), and in the 2022 survey, there were only five potter families left who did not make the *kibuk* anymore and only made the product of *kekep* or cake coverings by request, in addition to earthenware for religious purposes such as *ari ari* jugs for storing baby umbilical cords, and water jugs to place in the *wuwungan* (wood roof). All three forms of earthen ware are remnants of ancient earthen ware that is still made in Bakungudik today by Lampung natives. However, the discontinued pottery forms from Bakungudik, those still sold in markets, and their differences from southern pottery are shown in Figures 3-5.



(a) *Kibuk* with decorative patterns (traditional clay jug)

(b) *Kendi wuwungan* (clay jug, often used as a symbolic element on the roof or ceiling as part of cultural or ceremonial practices)

(c) *Kendi* (traditional clay jug)



(d) Large Jar with decorative patterns

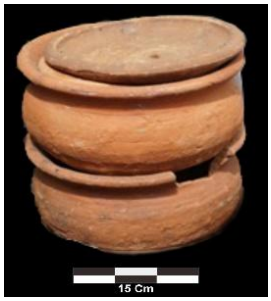
(e) Large Jar with decorative patterns and lid

(f) Tungku sepatu (A brazier-shoes like device, resembling a small stove, used for cooking on a boat)

Fig. 3 (a–f) Traditional pottery from Bakungudik, which is no longer produced. The ornamentation is still clearly visible, with various shapes (Rusyanti et al. 2022).

(a) *Kendi wuwungan* (jar placed on the roof/ceiling of a new house)

(b) *Kekep* (pottery cover/lid)



(c) *Kendi ari-ari* (placenta jar for storing the umbilical cords of newborn babies)

(d) *Anglo* (Brazier stove)

Fig 4. (a-d) Traditional Bakungudik style pottery, still produced today and sold in local markets. The details of the ornamentation are no longer visible, and the design has become simpler (Rusyanti et al. 2022).

(a) Large jug (b) *kekep* (cover/lid) (c*) kendi ari-ari* (placenta jar) (d) *Anglo* (Brazier stove)

Fig 5. (a-d) Traditional products from southern kilns (post-Sriwijaya era). The ornamental details are no longer visible, the shape has become simpler, yet it is distinct from the Bakungudik type. This pottery from the south is heavily influenced by potters from Java (Rusyanti et al. 2022).

Kilns, Then and Now

Something surprising about the history of the earthenware industry in Lampung is that it was later overtaken by newcomers. After Kayuagung's heyday from the Sriwijaya (7th-14th CE), the grand tradition of Kayuagung making was thought to have stopped at the Bakungudik kiln in northern Lampung in the 19th CE. Following the Dutch colonial influence at the end of the 20th century, the Lampung region began to be resided by many transmigrants from Java who began to settle in 1905 (Elmhirst 2018). Some began to make earthenware like that produced in their native Java and Sundanese lands.

The migrants from Java are still spreading in the southern Lampung region until now, where the soil is more fertile and there are more clay resources than in the highlands. They make household utensils from clay, such as barrels, jugs, *cowet* (clay plates), stoves, piggy banks, *jambangan* (large pot), and so on, with typical Javanese shapes and plain without motifs. In Sidoredjo, potters made earthenware with a simple technique using paddle-anvil and open-firing. In Podomoro, they develop the skill by using the same paddle-anvil, adding red polished clay as a second layer, and burning it in a built-in kiln at higher temperatures.

Probably the most advanced techniques in the earthenware industry in Lampung are found in the Negara Ratu kiln in South Lampung. This kiln was initiated by the transmigrants from Plered, Purwakarta, West Java, the Sundanese. The family once learned the techniques from the Javanese, as well. They made earthenware with fine paste; they made the clay dough by sieving it so that it was finer, spinning it with iron wheels, and burnt it in a huge, closed kilns. They also practiced decorative techniques using wall paint and glass applications on the surface of the pottery. With a wider market, various shapes, and shifting locations inside and outside Lampung province, the Negara Ratu kiln is currently the most famous earthen ware ceramic industry icon in Lampung.

(a) (b) (c)

Fig 6. The newcomers in earthenware industry in the lowlands of Lampung post-Sriwijaya. (a) Sidoredjo kiln, (b) Podomoro kiln, and (c) Negara Ratu kiln (Rusyanti et al. 2022).

Conclusion

The granulometric analysis of Lampung potsherds has shown two types: the angular and subrounded shape with major milky whites and dark colors and minor shiny quarts, and the angular and subrounded shape with major shiny quartz, minor milky white grains, and dark shades. The first granulometric type were mostly found in highland and lowland sites with 10% to 20% grains (in <0.01cm sizes) compositions. The second type was only found at Bakungudik sites in the lowlands. The granulometric analysis helps describe the grain characteristics, which can be grouped to demonstrate likely origins. Furthermore, this helps describe our assumption of the history of earthenware in Lampung which began over 1000 years ago. At that time, Srivijayan earthenware came from the Kayuagung kiln. More recently, potters from Bakungudik began as well, for which their jars seem to date to the 18th-19th centuries. The lowland is rich in clay sediments, and was likely the source of earthenware for the highland region. Potsherds in Tanjung Raya and Hujung Langit (highland) from the 10th to 14th centuries seem to correspond with the date of when the river was accessible to the hinterland, from the 7th to the 14th CE. As this become the land for newcomers from Java, potsherds dating from 100 years ago in Hujung Langit were probably made in a later period and taken from lowland kilns. This results of this study correlate with the reality that the lowlands are still the primary supplier of earthenware to the highlands and neighboring areas, during and after the Sriwijaya era until Dutch colonization and even today.

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References

Adhyatman, S. (1987) Kendi: Wadah Air Minum Tradisional [Jug Traditional Drinking Water Container]. Jakarta: Himpunan Keramik Indonesia.

Amran, F. (2014) *Mencari Jejak Masa Lalu Lampung* [*Tracing the Lampung Past*]. U.Z. Karzi (ed). Lampung: LaBRAK.

As, A. van (2004) Leiden Studies in Pottery Technology. *Leiden Journal of Pottery Studies* 20: 7-21.

Bellier, O., Bellon, H., Sébrier, M., Suntanto and Maury, R. (1999) K-Ar age of the Ranau Tuffs: Implications for the Ranau caldera emplacement and slip-partitioning in Sumatra (Indonesia). *Tectonophysics* 312(2-4): 347-359. https://doi.org/10.1016/S0040-1951(99)00198-5

Burhan, Gunawan, W. and Noya, Y. (1993) Peta Geologi Lembar Menggala, Sumatera. Skala 1: 100.000 [Geological Map of Menggala Sheet, Sumatra. Scale 1:100,000]. Bandung: Pusat Penelitian dan Pengembangan Geologi.

Fadlan M. S. (2015) Eksplorasi Geoarkeologi di Wilayah Air Sugihan, Sumatera Selatan [Geoarchaeological Exploration in Air Sugihan Region, South Sumatra]. In: B.B. Utomo (ed.) *Kehidupan Purba di Lahan Gambut. Cetakan 1*. Surakarta: PT Aksara Sinergi Media, 11-33.

Intan, M. F. S. (2017) Analisis Teknologi Laboratoris Tembikar Tembikar dari Situs Gua Bulu Sumi, Kabupaten Pangkep, Provinsi Sulawesi Selatan [Technological Analysis of Pottery from Bulu Sumi Cave Site, Pangkep Regency, South Sulawesi Province]. *Walennae* 15(1): 31-42. https://doi.org/10.24832/wln.v15i1.11

Kherustika, Z., Purwanti and Fesdian, F. (2003) Gerabah Koleksi Museum Negeri Propinsi Lampung Ruwa Jurai [Ruwa Jurai Museum Collection Pottery]. B.Y. Barmawi (ed). Bandar Lampung: Dinas Pendidikan Propinsi Lampung.

Lopez, G. L. (2017) "Grain Size Analysis." In: A. S. Gilbert (ed.) *Encyclopedia of Earth Science Series*. Springer: 341-348. Available at: https:///doi.org/10.1007/978-1-4020-4409-0_18

Manguin, P. Y. (2014) Sifat Amorf Politi-Politi Pesisir Asia Tenggara Kepulauan: Pusat-Pusat yang Terbatas, Pinggiran-Pinggiran yang Meluas [The Amorphous Nature of Southeast Asian Coastal Island Polities: Limited Centres, Expanding Peripheries]. In: V. Degroot (ed.) *Kedatuan Sriwijaya: Kajian Sumber Prasasti dan Arkeologi*. Edisi kedu. Depok: Komunitas Bambu, 315-342.

Poesponegoro, M. D. and Notosusanto, N. (1993) *Sejarah Nasional Indonesia II* [*Indonesian National History II*, updated edition]. B. Sumadio (ed.) Jakarta: Balai Pustaka.

Rangkuti, N. (2011) Tungku Perahu Kayuagung: Jejak Tradisi Penjelajah Bahari Austronesia [Tungku Perahu Kayuagung: Traces of the Tradition of Austronesian Maritime Explorers] (Makalah Pada Seminar Arkeologi "Asia Tenggara Dalam Perspektif Arkeologi" Balai Arkeologi Palembang. Tidak Diterbitkan [Papers on the Seminar "Southeast Asia in Archaeological Perspectives"]. Palembang: Palembang Center for Archaeology, 1-15. (Unpublished).

Rangkuti, N. (2015) Tungku dan Perahu Kayuagung: Tradisi Bahari di Pesisir Timur Sumatra [Tungku Perahu Kayuagung: Maritime Traditions on the East Coast of Sumatra]. In: B. B. Utomo (ed.) *Kehidupan Purba di Lahan Gambut*. Surakarta: PT Aksara Sinergi Media: 97-109.

Rusyanti (2013) Tembikar-tembikar di Situs Hujung Langit, Lampung Barat [Pottery at Hujung Langit Site, West Lampung]. *Purbawidya* 2(2): 206-217. https://doi.org/10.24164/pw.v2i2.49

Rusyanti et al. (2019) The Ancient Settlements in the Semangka Fault Line of Liwa, West Lampung, Indonesia. In: N. H. Tan (ed.) *Advancing Southeast Asian Archaeology: Selected Papers from the Third SEAMEO SPAFA International Conference on Southeast Asian Archaeology, Bangkok, Thailand*. Bangkok: SEAMEO SPAFA Regional Centre for Archaeology and Fine Arts: 350-358.

Rusyanti et al. (2021) Laporan Penelitian Arkeologi Bentuk, Kronologi, dan Asal Tembikar WS Seputih-Sekampung dan WS Mesuji-Tulangbawang di Provinsi Lampung [Archaeological Research Report on the Form, Chronology, and Origin of Pottery from the Seputih-Sekampung and Mesuji-Tulangbawang WS in Lampung Province]. Bandung: Balai Arkeologi Jawa Barat.

Rusyanti et al. (2022) Laporan Penelitian Menelusuri Jejak Industri Tembikar di Lampung [Research Report Tracing the Pottery Industry in Lampung]. Jakarta: Badan Riset dan Inovasi Nasional.

Rusyanti, Purwoarminta, A. and Krama, A. V. (2021) Stay or Leave? Dinamika Lanskap Arkeologi di Sesar Semangko Provinsi Lampung (Stay or Leave? Archaeological Landscape Dynamics on the Semangko Fault in Lampung Province). Jakarta: LIPI PRESS.

Rusyanti, Setiawan, I. and Satrio, A. A. (2022) Bentuk, Kronologi, dan Asal Tembikar Kuno di Dataran Rendah Lampung [Form, Chronology and Origin of Ancient Pottery in Lowland Lampung]. *Naditira Widya* 16(2): 107-123. https://doi.org/10.24832/nw.v16i2.505

Soegondho, S. (1995) Tradisi Gerabah di Indonesia Dari Masa Prasejarah Hingga Masa Kini [Pottery Tradition in Indonesia from Prehistory to Today]. E.E.M. Kinnon and M. Sidharta (eds.) Jakarta: Himpunan Keramik Indonesia.

Sunarningsih (2011) Pottery from one Neolithic and three Riverbank Settlement Sites in Kalimantan: A Technological Approach to the Study of Continuity and Distribution of Ceramic Production Traditions. Leiden University.

Utomo, B.B. (2007) *Prasasti-prasasti Sumatera* [*Sumatran Inscriptions*]. Jakarta: Pusat Penelitian dan Pengembangan Arkeologi Nasional.

Wibisono, S. (1982) Tembikar Kota Cina: Sebuah Analisis Pendahuluan [Chinese City Pottery: A Preliminary Analysis]. *Amerta* 6: 13-26.