

From Field to Museum Studies from Melanesia in Honour of Robin Torrence

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Avanata: A Possible Late Lapita Site on Fergusson Island, Milne Bay Province, Papua New Guinea

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ABSTRACT. West Fergusson obsidian has been identified in a number of Lapita and Early Papuan pottery (EPP) sites on the south coast of Papua New Guinea and wider afield in the Pacific. Yet, the archaeological history of the island and its obsidian sources remains mostly unknown. Recent fieldwork aimed at establishing a chronological sequence for human occupation of the island, identified the site of Avanata, on the south coast of the Kukuia Peninsula. It has a pottery assemblage decorated with shell impression and paint, techniques not previously recorded on Massim pottery. Although no dateable material was obtained from the site, we argue that archaeological correlates on the Papuan mainland indicate that Avanata belongs to an early ceramic occupation of Fergusson Island dating > 1000 years ago and possibly to the late Lapita period.

Introduction

Papua New Guinea is home to four different, geochemically distinct obsidian regions: the Admiralties, West New Britain (WNB), East Fergusson and West Fergusson (Fig. 1). Of these, the WNB and Admiralties sources both have histories of use during the Late Pleistocene (Fredericksen, 1997; Torrence *et al.*, 2004; Summerhayes and Allen, 1993). In the late Holocene, new patterns emerged for the Admiralties and WNB sources with the arrival of the Lapita peoples. Obsidian from these two regions is found in the earliest Lapita sites in the Bismarck Archipelago and is also part of the material cultural package that is transported into the Western Pacific as part of the Lapita migration into this previously uninhabited region (Reepmeyer *et al.*, 2010). Because of their long history of use, most previous research on obsidian sources in Papua New Guinea has focused on the Admiralties and WNB. This includes Robin Torrence's

seminal work in WNB where she mapped the spatial extent of the different obsidian sources, and described their physical nature, quality and accessibility to better understand how these factors impacted obsidian source selection (Torrence, 2004; Torrence *et al.*, 1992; Torrence *et al.*, 1996).

While Fergusson Island obsidian does not occur in Lapita sites as commonly as the Admiralty and WNB sources, it had a wide distribution along the Papuan south coast, being present in Lapita sites (Mialanes *et al.*, 2016; Skelly *et al.*, 2016) and later EPP sites (Irwin, 1991; Allen *et al.*, 2011). However, little is yet known about the archaeology of Fergusson Island itself, including whether there is possible Lapita occupation. Evidence for Lapita presence within the Massim region is growing, with two sites now dated: Wari Island (Chynoweth *et al.*, 2020; Negishi and Ono, 2009) and Malakai on Nimowa Island (Shaw *et al.*, 2020), and a third site identified based on the presence of Late Lapita pottery styles (site BQN on Tubetube Island) (Shaw, 2016a).

Keywords: Fergusson Island; Massim; Papua New Guinea; Lapita; pottery; obsidian

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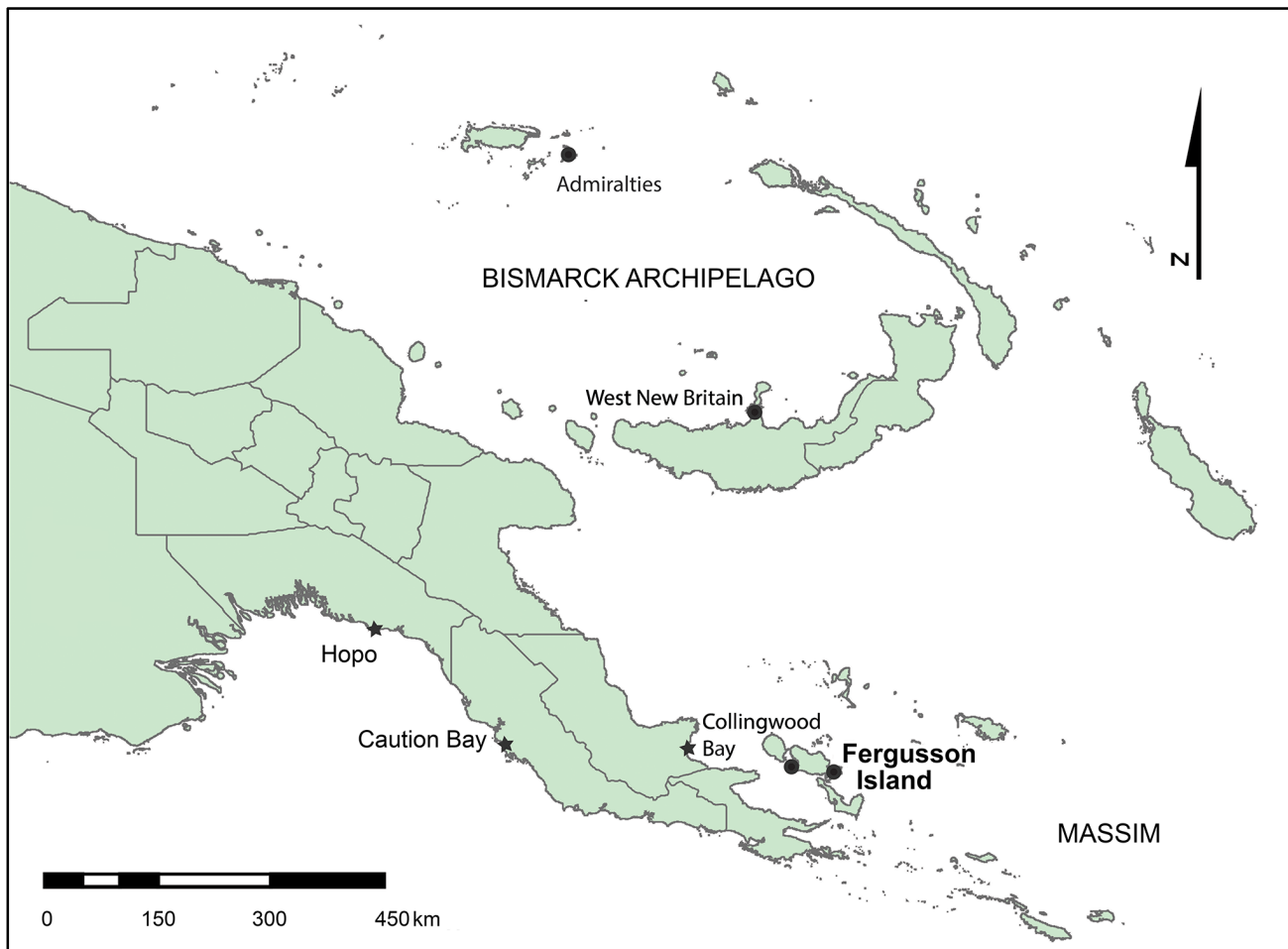


Figure 1. Location of obsidian sources in Papua New Guinea (marked by circles) and key archaeological regions discussed in text (marked by stars). The westernmost source on Fergusson Island, Avanata, is shown in detail in Fig. 2.

Ambrose visited both the West Fergusson and East Fergusson obsidian sources (Fig. 1) in 1974 to collect samples for geochemical sourcing, obtaining four samples from two sources (Fagalulu and Kukuia) in West Fergusson, and six samples from three sources (Numanuma Bay, Dobu Island and Sanaroa Island) on East Fergusson (Ambrose, 1976; Bird *et al.*, 1991). These samples have remained the sole Fergusson references for all geochemical analyses of obsidian completed up until now.

There has been little additional survey completed for any part of Fergusson Island beyond these obsidian studies. Lauer (1974), as part of his ethnographic research into pottery production on Goodenough and the Amphlett Islands, recorded three surface scatters of pottery (NMAG site codes: BFE, BFF and BFG) on Bwaioa Peninsula, which is located on the eastern side of Fergusson Island, directly to the west of Numanuma Bay. A fourth pottery scatter, NMAG site code: BFC, was located at Yayavana, on the north western point of Fergusson Island and also home to the clay source used by Amphlett Islanders to produce pottery (Lauer, 1974: 143).

A four-week field season was completed in January–February 2017 that aimed to map, describe and sample the obsidian sources to expand our understanding of their geochemical complexity and to record other archaeological sites. Survey concentrated on the Kukuia and Fagalulu obsidian sources and also inland at Niobua to ascertain whether obsidian outcrops were also present in this area. The archaeological survey involved both surface survey and extensive village consultation to establish potential locations for archaeological sites. Subsurface survey was completed in

areas where stratified archaeological deposits were thought likely to be present. A large number of sites contained pottery that was stylistically similar to pottery produced on Goodenough or the Amphletts islands. However, the Avanata site contained an assemblage that clearly sat outside of this group, identified by distinctive shell impressed and painted decoration. No dates could be obtained for the site because no charcoal or other organic materials were present.

Because the pottery decoration is so different to other known Massim assemblages it appears likely to pre-date them. If so Avanata may provide insights into the earliest phase of occupation of Fergusson Island by ceramic-using peoples.

The site of Avanata, Kukuia Peninsula

The site of Avanata (NMAG Site Code: BALZ) is found at Avanata village on the south side of the Kukuia Peninsula, approximately 100 m inland from the coast (Fig. 2A,B). Avanata village is the most easterly village on the Kukuia Peninsula that belongs to the Minavega language group, and marks the boundary between the Igwageta and Toagesi district wards. Continuing to the east from here means passing into the Molima language group, which marks an important cultural and linguistic boundary. For example, the people of the Kukuia Peninsula traditionally traded with people on Goodenough Island and the mainland, while the Molima people were aligned with the southern D'Entrecasteaux island groups (Jenness and Ballantyne, 1920). Ross (1992) records that the Minavega language group is associated with other language groups located from Cape Vogel to East Cape, on the mainland.

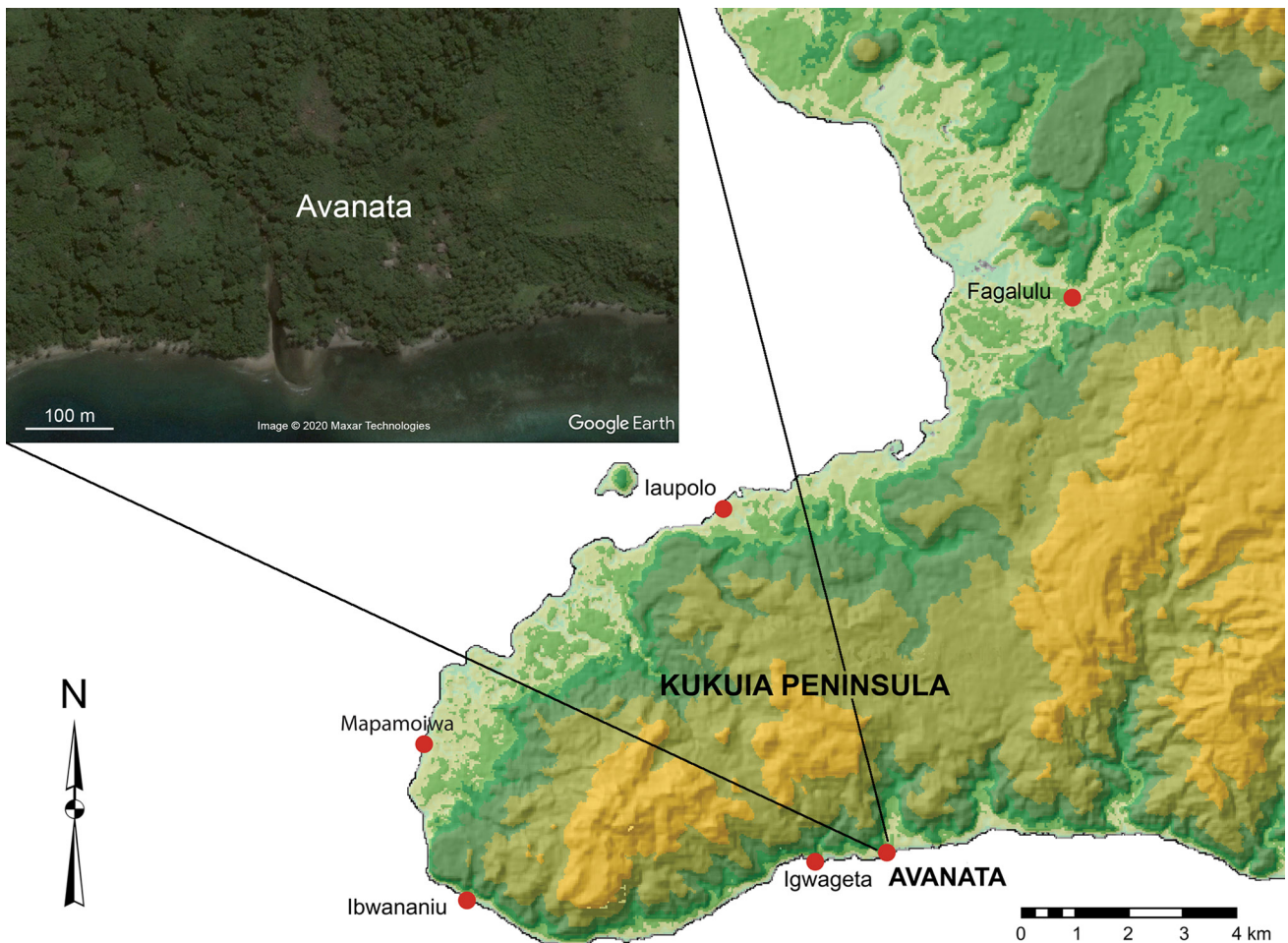


Figure 2. West Fergusson Island. (A) Kukuia Peninsula with key villages marked; (B) location of Avanata (site BALZ).

In February 2017 the field team visited Avanata village and were shown a pottery scatter by Peter Tauduba, which he had found digging post holes for a house. This pottery scatter was visible on the surface, located between Peter's two houses. A collection of surface pottery was made by the field team and a small test pit (measuring 66 cm N/S, 80 cm E/W) was excavated to assess sub-surface deposits. This test pit was excavated by spade according to stratigraphic layer, with all sediment sieved through 6 mm sieves. Artefacts were plotted according to the stratigraphic layer from which they were excavated.

The sediments from the test pit reflect the site's location on the floodplain of the Waguva River and primarily comprise river sands (Fig. 3). Pottery and obsidian were found in the top 46 cm of the site, which corresponds to Layers 1–3 of the test pit. In Layers 4 and 5 only obsidian was present. No artefacts were found within Layer 6, which is a very loose, golden brown, coarse river sand, although obsidian artefacts were recorded at the base of the transitional Layer 5. The test pit was excavated to a total depth of 95 cm, with no artefacts found below 75 cm. Unfortunately, no charcoal or bone was found in the test pit. Because of time constraints further excavation was postponed until the following season. Planned field seasons for late 2017 and 2018 had to be cancelled because of piracy in the area and no further excavations have yet been undertaken. Because the Avanata pottery is unlike any of the other surface or excavated material collected on Fergusson Island, we report it here in advance of further excavations.

The Avanata pottery

The collection contains 38 pottery sherds. Eight of these are from surface collections and include a rim found by Peter Tauduba while digging post-holes (Fig. 4J). The remainder were obtained from Avanata Test Pit 1. As the surface material is clearly related to the assemblage from the test pit, it is included in this analysis.

Of the eight surface sherds, five have rims, two are sherds with carinations and one is a body sherd. From Test Pit 1, seven rim sherds were excavated, two of which conjoin (Fig. 4C), plus 23 body sherds, one with a carination. Of the 12 identifiable vessels, eight are open bowls with direct rims. The other four are dishes/bowls, two of which have horizontal rims with flat lip profiles (Fig. 4C,D), one has a direct rim with a round lip (Fig. 4G), and the fourth has a flat everted rim (Fig. 4E). For the open bowls, lip profiles are predominately round, with the exception of one flat lip with a pointed edge and one flat lip with a round edge.

Decoration is remarkably consistent across the assemblage and includes the application of red paint, long wavy lines of shell impression in different motifs and carinations with notching. Ten rim sherds have decoration, with only one plain rim present, while 14 body sherds have decoration.

Four sherds, including one rim (S1) and three sherds with carinations (S3, S7 and TP1-7) have exterior decorations that include long wavy lines of shell impression, with red paint applied between the shell impressions, that lie above a notched carination (Fig. 4A,B,H,K). This notch is cut out to form a diamond shape, with straight sides leading down

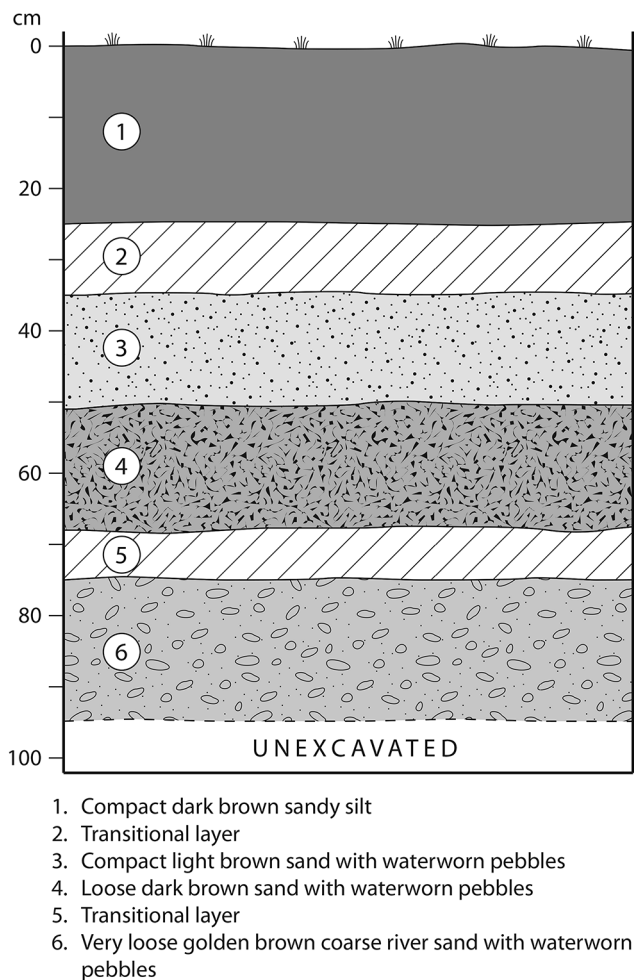


Figure 3. Stratigraphic profile of Avanata Test Pit 1, South wall.

to the base of the cut. Two of the sherds also have horizontal lines of red paint applied beneath this carination. On one of these, a nubbin is also present that sits above the carination and adjacent to the shell impression (Fig. 4H). For the rim and one of the carinations (Fig. 4B) which is clearly broken just below the rim, there is also another horizontal band of red paint applied on the interior of the rim. The lines of shell impression vary in motif between these four sherds and include V-shaped motifs, horizontal and vertical joins, as well as horizontal lines. Although the motifs vary, the lines are consistent in that they are always multiple when forming the design, varying from two to three lines of impression applied together. Of the two sherds that can be used to assess vessel form, these are both open bowls with direct rims.

The other rim sherds of open bowls vary slightly in decoration. Three of these (S5, TP1-6, TP1-29) have the same long wavy multiple lines of shell impression in horizontal and diagonal decorations, with red paint included on the exterior of TP1-29. A fourth sherd (PT1) also has lines of shell impression but these are in horizontal and vertical lines, forming a T-intersection (Fig. 4J). This sherd also has horizontal bands of red paint on the interior and exterior of the rim. One open bowl is plain in terms of decoration but with a flat lip profile (TP1-4). The final open bowl is much thicker than the other bowls and has red paint on the inside of the rim in vertical lines, as well as short shell impressions along the lip (Fig. 4G).

The dishes/bowls with the horizontal lips do not have any shell impression but all are marked by red paint (S4, TP1-1, TP1-2, TP1-18/19), particularly on the lip. S4 has paint in vertical lines on the interior surface (Fig. 4D), TP1-1 has red paint on the lip and the entire interior surface (Fig. 4E) and TP1-2 has red paint on the lip and interior as well as notching on the lip (Fig. 4F). TP1-18/19 are two rim conjoins that have red paint on the lip, in a horizontal band at the top of the inside rim, and then vertical lines running down the interior of the dish (Fig. 4C). This rim conjoin also has triangular cut-outs present on the horizontal lip.

For the body sherds (exclusive of the carinations described above), decoration is again split between six sherds with red paint only and four sherds with shell impression, similar to the decorations described above. There is no clear difference in decorations based on the stratigraphic layer that the sherds come from (Table 1). The pottery is also relatively thin, ranging from 3-8 mm in thickness (with the exception of S2 which has a body thickness of 14 mm). The average thickness is 6.4 mm.

Sourcing and technology of obsidian

There are a total of 103 obsidian artefacts within Test Pit 1. All obsidian artefacts were shot with a Bruker Tracer III-SD pXRF, using optimal settings for the mid-Z elements (40 kV, 30 μ A) with a filter (12 mil Al + 1 mil Ti + 6 mil Cu), for a 300-second run time, and compared to 42 obsidian source samples from Papua New Guinea, including West Fergusson, East Fergusson, Admiralties (Pam and Lou Islands), and West New Britain (Mopir, Kutau/Bao, Baki and Gulu) which were shot using the same settings. Calibration to parts per million (ppm) for the obsidian artefacts and sources was processed using Bruker's obsidian (OB40) calibration in SICalProcess.

A pelletised international standard (BHVO-2) was analysed to understand the accuracy of the instrument before each run and after 15 samples during a run. The results of this analysis are presented in Table 2. Not surprisingly, all of the obsidian sources to West Fergusson (Fig. 5). In terms of appearance, the obsidian is mostly black or banded black in colour, with two pieces of red-black obsidian and one piece of banded translucent obsidian.

Sixty-one percent of the obsidian shows cortex that appears to be largely water-rolled (Fig. 6A). During the pedestrian survey of the southern side of the Kukuia Peninsula, from Ibwaniu to Avanata, all waterways were examined for presence of obsidian cobbles. The only river where we identified water-rolled obsidian is the nearby Waguva River, where large cobbles occur. Obsidian is also locally available at Naimatu Ridge as a scree slope, which is the only place recorded during survey that obsidian was present in this form. In addition, obsidian cobbles were also recorded as present on the beach at Igwageta, both by the current field team and by Wal Ambrose in his survey (Bird *et al.*, 1981).

Although our survey terminated at this language boundary between Minavega and Molima, it is at least clear that on the southwestern side of the Kukuia Peninsula, Avanata is located at a point where obsidian could be sourced from a number of locations. It is not clear if obsidian is also available locally on the unsurveyed coast to the east of Avanata. On the evidence of the cortex it seems likely that the Waguva River was the source for the obsidian from all stratigraphic layers.

The Avanata obsidian assemblage comprises large pieces, with an average maximum length of complete flakes of 28.76 mm, which likely reflects proximity to source. Artefact types are split between cores, angular fragments, flakes and retouched flakes. Of the four cores, one is bipolar. The

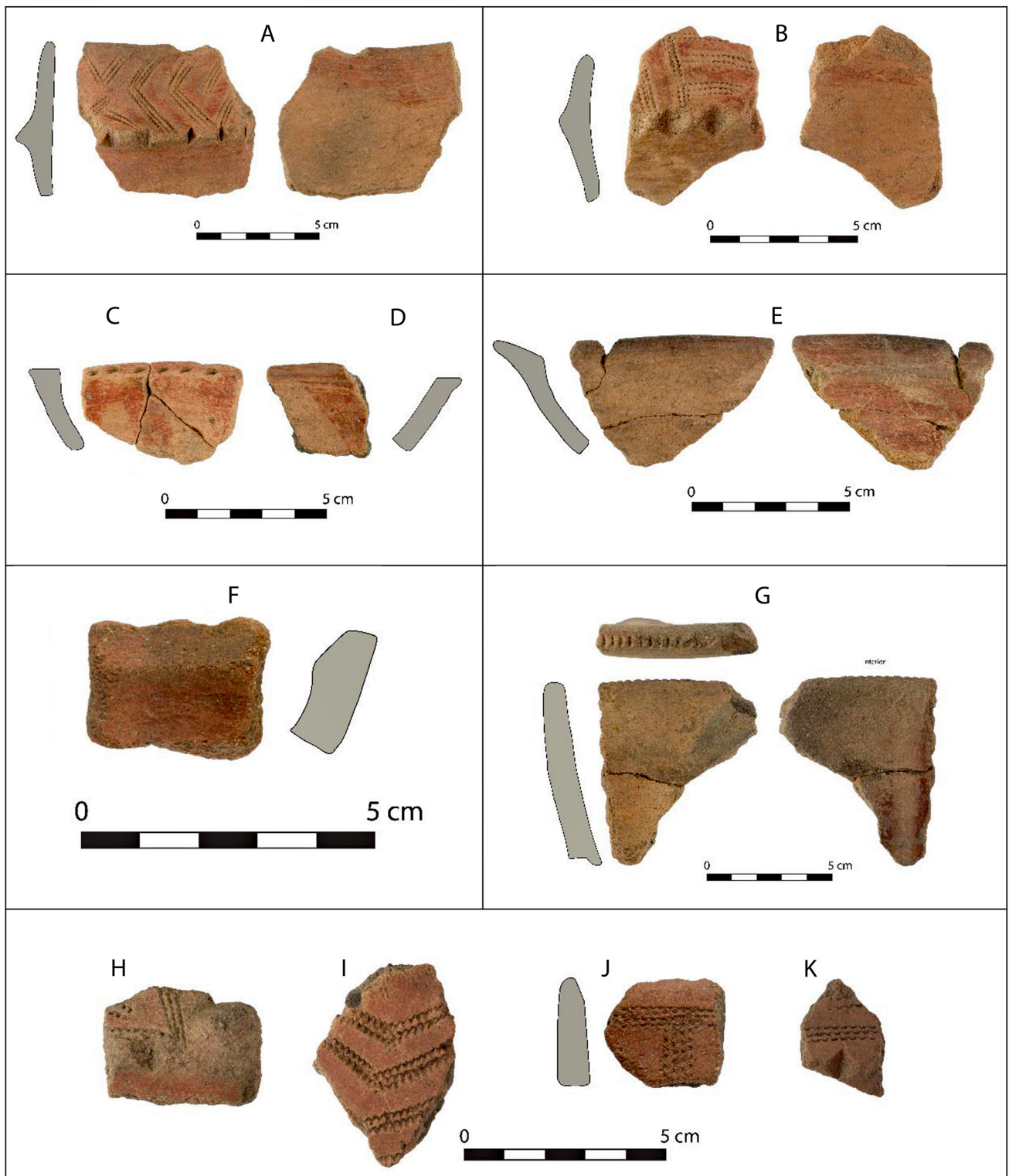


Figure 4. Decorated pottery from Avanata (surface and Test Pit 1). (A) S1; (B) S3; (C) TP1-18/19; (D) S4; (E) TP1-1; (F) TP1-2; (G) S2; (H) S7; (I) TP1-3; (J) PT1; (K) TP1-7.

presence of cores, three platform removal flakes, angular fragments and cortical surfaces all suggest on-site flaking. There is also a considerable amount of usewear. Of the 63 flakes (including the three platform removal flakes), 25 (40%) are used (e.g., Fig. 6D). Nine flakes (Fig. 6A) and three fragments are also retouched; of the discernable tool types, two are possible burins (Fig. 6G,H) and one is a notched scraper (Fig. 6C). There is also evidence for the presence of a blade technology, with seven used and one retouched blade (Fig. 6B,E,F).

Comparing Avanata to known Massim pottery assemblages

Situating the Avanata pottery assemblage within the cultural sequences of the Massim is hampered by the small number of archaeologically derived pottery assemblages and associated radiocarbon dates. There are currently no obvious parallels between Avanata pottery and the known assemblages from either the Southern or Northern Massim, which have a good coverage of styles back to approximately 500 years ago

Table 1. Diagnostic features of the Avanata (site BALZ) pottery assemblage.

sherd number	layer	sherd type	vessel form	red paint	shell impression	notched band	lip notching	triangulars cut outs	nubbin
S1	surface	rim	open bowl	●	●	●	—	—	—
S2	surface	rim	open bowl	●	—	—	● (shell)	—	—
S3	surface	carination	open bowl	●	●	●	—	—	—
S4	surface	rim	dish/bowl	●	—	—	—	—	—
S5	surface	rim	open bowl	—	●	—	—	—	—
S6	surface	body		●	●	—	—	—	—
S7	surface	carination		●	●	●	—	—	●
TP1-1	1	rim	dish/bowl	●	—	—	—	—	—
TP1-2	1	rim	dish/bowl	●	—	—	●	—	—
TP1-3	1	body	—	●	●	—	—	—	—
TP1-4	1	rim	open bowl	—	—	—	—	—	—
TP1-5	1	body		●	—	—	—	—	—
TP1-6	1	rim	open bowl	—	●	—	—	—	—
TP1-7	1	carination		—	●	●	—	—	—
TP1-12	1	body		—	●	—	—	—	—
TP1-14	1	body		●	—	—	—	—	—
TP1-16	1	body		●	●	—	—	—	—
TP1-17	3	body		●	—	—	—	—	—
TP1-18/19	2–3	rim	dish/bowl	●	—	—	—	●	—
TP1-23	2–3	body		●	—	—	—	—	—
TP1-25	2–3	body		●	—	—	—	—	—
TP1-28	2–3	body		●	—	—	—	—	—
TP1-29	2–3	rim	open bowl	●	●	—	—	—	—
PT1		rim	open bowl	●	●	—	—	—	—

(Bickler, 1998; Egloff, 1972, 1979; Irwin *et al.*, 2019; Lauer, 1974; Shaw, 2016b; Shaw *et al.*, 2020). Irwin *et al.* (2019) specifically identify a lack of shell impression in the Massim, which is the dominant decoration style for the Avanata assemblage. As the other pottery sites identified during our Fergusson fieldwork largely fit within the currently recorded Northern Massim sequence of pottery from Goodenough and Amphletts, with some mainland and Southern Massim styles also present, it would suggest that the Avanata assemblage is likely to predate the current sequences.

Within the Massim, the closest match for the Avanata assemblage is Egloff's (1972) Group P pottery which he identified in Collingwood Bay, the Trobriand Islands and from Lauer's assemblages from Goodenough Island. Egloff attributed Group P to an Early Ceramic Phase, dated to more than 1000 years ago. This pottery includes triangular cut-outs or impressions on the labial flanges of the rims of pedestalled bowls (Egloff, 1979) and has been considered to be a possible Lapita assemblage. A pottery sherd that Egloff associated with Group P is decorated with shell impression in rectilinear designs above a medial flange with triangular cut-outs (Egloff, 1972: plate 8c), which mimics at least the use of shell impression of Avanata. However, there are also distinct differences with Egloff's Group P, including the addition of painting and the wider use of shell impression in the Avanata assemblage.

Shell impression is a common Papuan pottery decoration technique beyond the Massim. It occurs, for example, in EPP assemblages along the south coast of Papua New Guinea, in Style H from Nebira 4 (Allen, 1972) and Style A from Oposisi (Vanderwal, 1973, fig.VI-6) However, the shell impression from these sites is largely short and dense in application, rather than the multiple long wavy lines of Avanata. Apart from shell impression, there appears little to connect the EPP assemblages with the Avanata assemblage in terms of pottery, although obsidian from West Fergusson is present in a range of EPP sites, from Mailu to Oposisi (Summerhayes and Allen, 2007).

Three sites in the Gulf of Papua, Hopo (OJS), Kaveharo (OJV) and Hohelavi (OJT) contain similar pottery decoration in terms of the long wavy lines of shell impression (Skelly and David, 2017). These include two red-slipped/painted rim sherds (OJV-A-35-1; OJV-B-27-13) from bowls that date to 2185-2708 cal. BP and two body sherds (OJT-A-27-4; OJT-A-22-1) that date to 1932-2701 cal. BP. OJS has one rim sherd (OJS-B-33-2) from a bowl that has a horizontal finger groove running beneath the rim and then a pattern of long wavy shell impressed lines beneath the groove; this sherd dates to 1632-2748 cal. BP. The main difference between these sherds and the Avanata collection is that while the style of decoration is similar, with horizontal and diagonal lines forming simple motifs, the Avanata assemblage always

Table 2. Error ranges of BHVO-2 geological standard shot at University of Otago.

elements	Mn	Fe	Rb	Sr	Y	Zr	Nb
USGS standard median (ppm)	1290	86300	9.8	389	26	172	18
Otago pXRF average (ppm) (n = 16)	1105	79980	14.86	338	23	152	16
Otago Standard Dev.	60.37	823.67	0.75	4.08	0.89	2.75	0.76
Otago RSD (%)	5.46	1.03	5.06	1.21	3.86	1.81	4.62

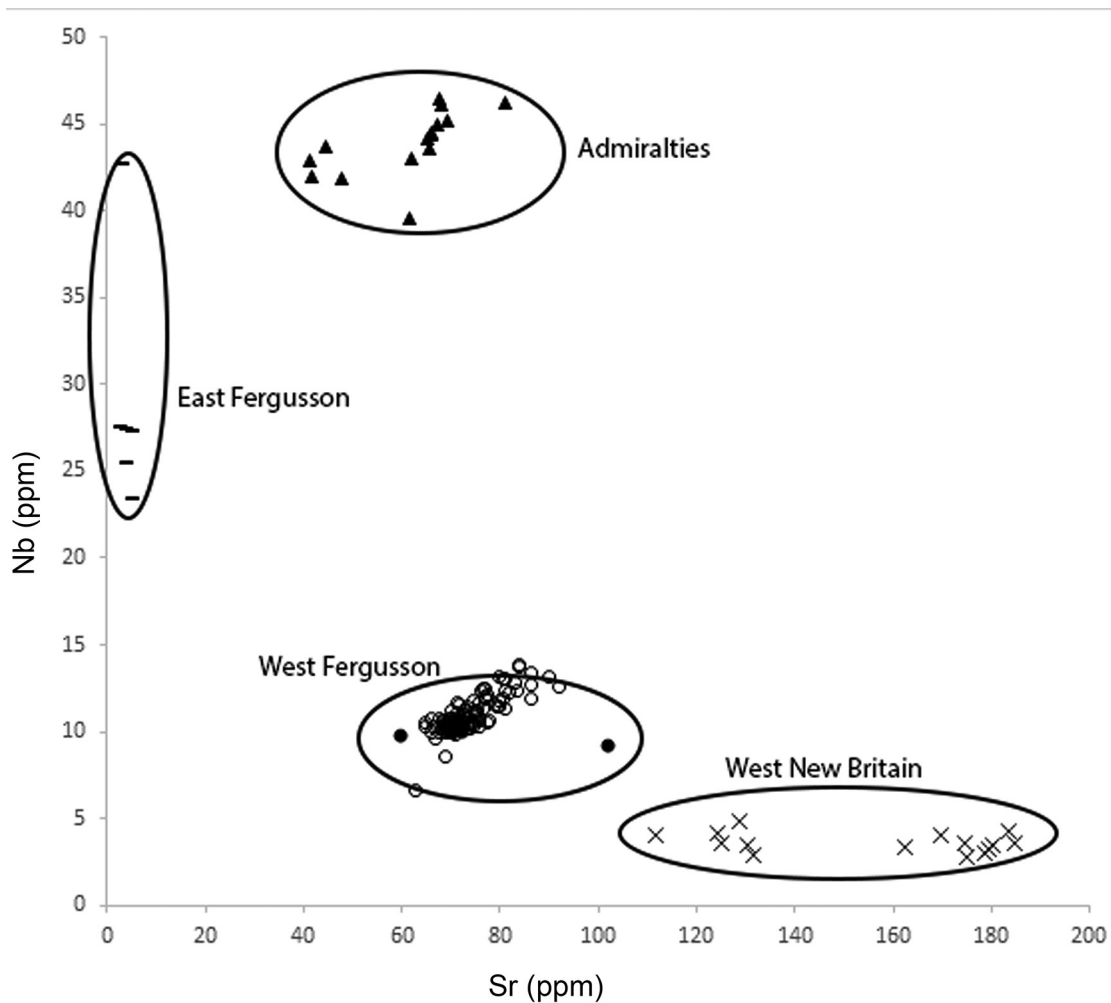


Figure 5. pXRF analysis of Avanata artefacts (open circles) compared to PNG obsidian source material.

comprises multiple lines impressed together, whereas in the Gulf assemblages they are usually single. While the Gulf of Papua may appear to be an unusual location to investigate parallels to the Avanata assemblage, it is noted that two of the sites with shell impressed sherds (OJS and OJT) also have West Fergusson obsidian in associated layers (Skelly *et al.*, 2016).

Similar wavy shell impressed lines occur in pottery decoration at Edubu 1 and Moiapu 3, two Caution Bay sites near Port Moresby. While Caution Bay has Lapita pottery assemblages with dentate-stamped designs from c. 2600-2900 cal. BP (McNiven *et al.*, 2011), the wavy lines of shell impression are limited to the end of the Lapita phase, with the Edubu 1 assemblage dating between 2350-2650 cal. BP (McNiven *et al.*, 2012) and Moiapu 3 dating between 2410-2630 cal. BP (David *et al.*, 2019). Edubu 1 has two sherds with parallel shell impressed lines, and one sherd with a more complex design that includes central horizontal lines of shell impression, with inverted triangles beneath this centre, and V-shapes turned on their side above (McNiven *et al.*, 2012: fig. 7e). This design, while largely completed in singular wavy lines rather than multiple, is similar in expression to Avanata Fig. 4A. It is also worth noting here that dentate designs from this site are also similar in design to some of the Avanata examples, with multiple lines of dentate forming both horizontal lines and inverted V-shapes (McNiven *et al.*, 2012: fig. 6). The design is comparable in style to that seen in Avanata Fig. 4J, although the Avanata sherd is shell impressed rather than dentate-stamped. However, while the tool used in the impression is different,

the intent and overall effect is arguably the same.

At Moiapu 3, there are seven sherds with wavy lines created by shell impression, one of which is described as a single line and the others as parallel lines. Although the sherds are small and it is difficult to identify patterns, at least one sherd (David *et al.*, 2019: fig. 3.12C) has multiple shell impressed lines similar to the Avanata sherds. As with the Gulf sites, both Edubu 1 and Moiapu 3 also contain obsidian sourced to West Fergusson. In the matter of single lines being more common at Caution Bay and multiple lines more common at Avanata, the Fergusson site is more similar to traditional Lapita dentate style decorations which usually employ multiple lines of dentate-stamping to produce motifs (McNiven *et al.*, 2012). Painting is also not distinguished at any of the Gulf/Caution Bay sites, although this may be partly because these assemblages have ‘red-slipped’ and ‘painted’ combined as a single category. Also, the notched carination does not occur at Caution Bay, although fingernail/stick-impressed decorations are present at both OJS and Edubu 1, superficially similar to Avanata.

Further comparison can be made with the Linear Shell Edge-Imprinted Tradition, a pottery style slightly later in time at 2150-2100 cal. BP that is also found at Caution Bay and the Gulf sites. Although overlapping in time with the EPP shell impressed sherds discussed above, David *et al.* (2012) note differences between EPP shell impressed and Linear Shell Edge-Imprinted, where the edges of *Anadara* shells have been impressed into the surface of the pottery, leaving largely triangular indentations in a range of patterns, including columns and lines. Some of the patterns described in David

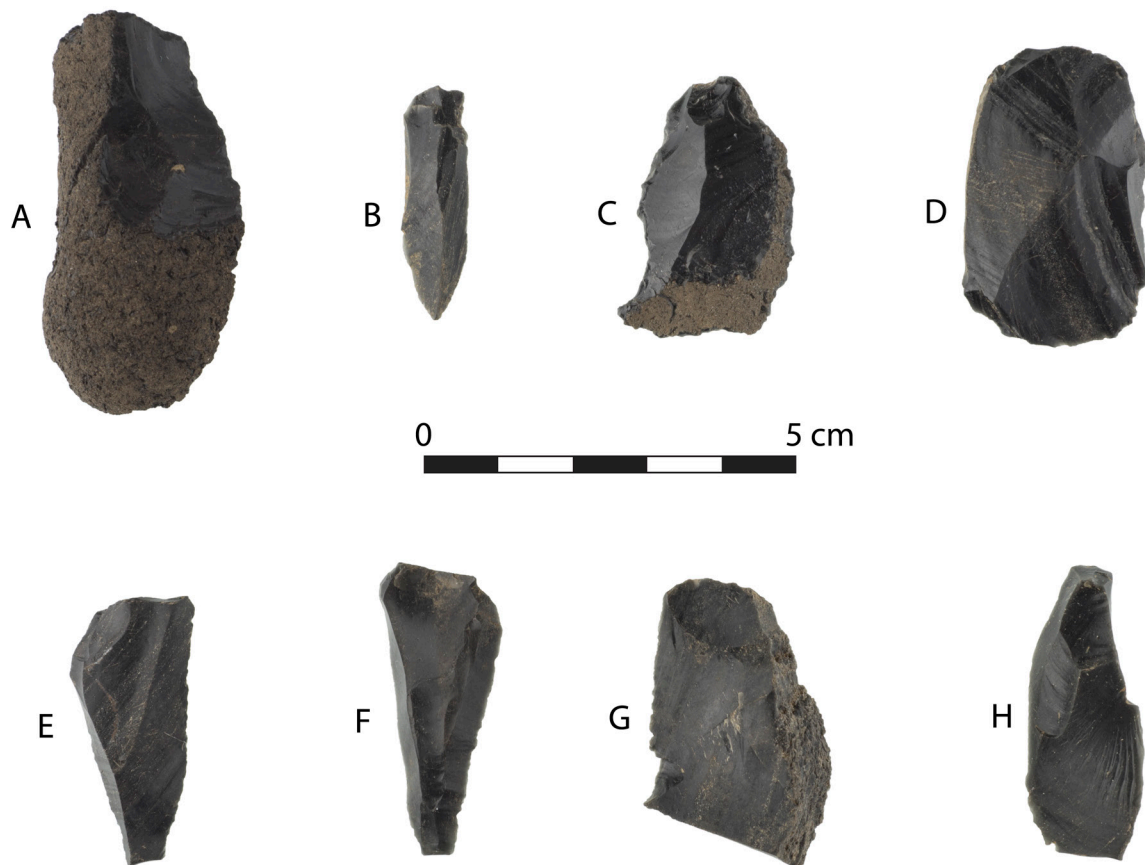


Figure 6. Obsidian artefacts from Avanata Test Pit 1. (A) retouched flake with cobble cortex; (B) used blade; (C) notched scraper; (D) used flake; (E) used blade; (F) used blade; (G) possible burin; (H) possible burin.

et al. (2012) are reminiscent of the Avanata assemblage, including the use of multiple lines and the style of applying ‘angled lines meeting angled lines at an obtuse angle’ (David *et al.*, 2012: 86) (see Fig. 4A,I). However, there are also distinct differences. For most of the rim sherds identified at Bogi 1 and the Gulf sites of OKA and OJS, a finger groove was present above the shell impression, which is a decoration not seen at Avanata. Bogi 1 and the Gulf sites also lack the notched carination described for Avanata. The triangular nature of the Linear Shell Edge-Impression (see David *et al.*, 2012: fig. 6; Skelly and David, 2017: fig. 115m-q) is also largely different from the long wavy lines of the Avanata shell impression. The use of the shell impression to create ‘short’ lines (see David *et al.*, 2012: fig. 6I-K) is also unlike its application at Avanata. Finally, in comparison to Bogi 1, there is a greater diversity in decoration types at Avanata. Apart from the 275 shell impressed sherds in Bogi 1 Squares A and B, there are only nine contemporary sherds with other decorative types, including dentate stamping and incision.

This discussion indicates that there are no clear parallels between the Avanata assemblage and the pottery sequences recorded within the Northern or Southern Massim for the past 500 years and that there are stronger links with pottery styles located on the south coast of mainland Papua New Guinea that date to either late/terminal Lapita or immediately post-Lapita. Connections with these sites are based on the presence of shell impressed decoration, as well as the use of West Fergusson obsidian at these sites. However, none of the south coast mainland assemblages are exact matches for the Avanata assemblage, a fact that emphasises the difficulty of comparing assemblages on the presence or absence of particular decoration techniques and their different applications.

Discussion and conclusion

The Avanata pottery assemblage does not match any of the currently recorded sequences for the Northern and Southern Massim that date back to at least 500 years ago. Therefore it is argued that this assemblage must be older than this date. Indeed, the collection differs significantly from all previously recorded prehistoric Massim pottery, with the possible exception of Egloff’s Group P, which has been described as resembling Lapita assemblages and is itself largely undated and not well described. The Avanata assemblage also shares little with EPP pottery along the Papuan south coast. Instead, we argue that the pottery decoration is most similar to assemblages from the Gulf and Caution Bay that have been described as terminal to transformative Lapita, and that also contain West Fergusson obsidian. Shell impression and the simplification of dentate-stamped motifs into simple geometrics have been noted in other Late Lapita assemblages in Papua New Guinea and the Pacific (Bedford, 2015; Kirch, 1997: 155; Summerhayes, 2000) as well as evidence for painting (Bedford, 2006). Further excavation may show Avanata to be a terminal Lapita site, associated with feeding West Fergusson obsidian into networks extending along the south coast of Papua New Guinea.

The location of Avanata is an important part of the hypothesis. The main purpose of the Fergusson fieldwork was to map the obsidian sources on the western part of the island and to describe their physical nature, in a similar way to that completed by Torrence for West New Britain (Torrence, 2004; Torrence *et al.*, 1992; Torrence *et al.*, 1996). During the survey, Avanata was the only place where large amounts of obsidian occurred near the coast. Here, obsidian is abundant on the beach and in the Waguva River,

which appears to be the main source for the obsidian in the Avanata test pit. The nearby Naimatu Ridge is the only other place observed where obsidian effectively ‘outcrops’ as a scree slope directly onto the coast, although as this was the boundary for our field survey, it is possible that this also happens further to the east. The coincidence of a possible early site based on pottery style, the known use of West Fergusson obsidian from Lapita and later sites at Caution Bay and the Gulf, and the abundance of obsidian at this location, especially when compared to the remainder of the survey, lends weight to the possibility that Avanata formed part of the network that transported West Fergusson obsidian to the south coast of Papua New Guinea from Lapita time onwards. This hypothesis can be tested by future fieldwork that dates the Avanata site.

What is obvious from the available Massim pottery assemblages is that we do not yet understand the role of pottery in the Massim prior to 500 years ago. This obviously limits the use of pottery decoration or vessel forms as comparative chronological tools. Further fieldwork needs to be completed at potentially early sites in the Massim region, including on the mainland in Collingwood Bay, to provide better pottery sequences and a deeper understanding of the nature of obsidian sources and the chronology and nature of human occupation in the Massim region.

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