AUSTRALIAN ARCHAEOLOGY
2023, VOL. 89, NO. 2, 97–114
https://doi.org/10.1080/03122417.2023.2238251

Routledge
Taylor & Francis Group

ARTICLE

Agila and the reanimation of seafaring on the south coast of Papua New Guinea after 770 cal BP

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ABSTRACT

Seafaring ceramicists connected widely spaced communities along the expanse of PNG's south coast for more than 1,500 years following the arrival of people using pots with Lapita decoration c.2,900 cal BP. Archaeological investigations at locations from the Gulf of Papua in the west to Mailu Island in the east suggest a major change occurred to seafaring and social relations after 1,200 cal BP. The following five centuries often referred to as the 'Ceramic Hiccup' were characterised by a contraction in the scale of formerly long-distance voyaging. Here we present results of recent archaeological excavations at the ancestral village site of Agila in Hood Bay east of Port Moresby. The decorations on older pot sherds at Agila are akin to those on ancestral Motu pottery known from Motupore Island to the west. The decoration changes on more recent sherds which have more in common with ancestral Mailu pottery from Mailu Island to the east. Details of changing seafaring relations – from west to east – at Agila were published in 2018 after our first field season. However, results from the first field season left questions about site antiquity unresolved. We returned to Agila in 2022 and continued excavations to address those questions. Our excavations revealed that initial settlement at Agila coincided with a reanimation of coastal seafaring after 770 cal BP. Results also show that the major pottery manufacturing and seafaring community of Motupore maintained relations with communities to both the east and west. An analysis of the ceramic assemblage allows us to historicise the emergence of social strategies which entrenched Hood Bay at a nexus between Motu and Mailu specialised trading and seafaring communities.

ARTICLE HISTORY
Received 15 May 2023
Accepted 15 July 2023

KEYWORDS
Seafaring; pottery; trade; Ceramic Hiccup; Motupore

Introduction

The earliest archaeological evidence for seafaring along the south coast of Papua New Guinea (PNG) comes from Caution Bay, where people using pots with Lapita decoration arrived c.2,900 cal BP (David et al. 2011, 2012, 2022; McNiven et al. 2011, 2012a, 2012b). The arrival of pottery via seafarers commenced a history of seafaring expansions, contractions and changing social relations variously involving communities occupying 1,200 km of coastal, island, and riverine environments from the Gulf of Papua in the west to beyond the eastern tip of mainland PNG (Figure 1). The geographic scale and intensity of intercommunity relations fluctuated over time during the period from 2,000 to 1,200 cal BP. This period is often called the Early Papuan Pottery (EPP) phase and is cast as a period of continuity in coastal relations (Summerhayes and Allen 2007). The EPP ended abruptly c.1,200 cal BP. What followed was a period often called the 'Ceramic Hiccup', when formerly thriving exchange interconnections on the south coast were dramatically curtailed (Irwin 1991:507–508). During the Ceramic Hiccup, archaeological evidence of occupation such as coastal villages along entire coastal landscapes ceases entirely. The impact of this disruption is most apparent in the Gulf of Papua. No pottery at all has ever been found dating to between c.1,200–1,000 cal BP and 800–500 cal BP signalling that pots ceased to reach the Gulf of Papua at that time (see David 2008:469; Skelly and David 2017). Yet east of Port Moresby the situation in Amazon Bay–Mailu differed. The pottery people used there did change although access to clay sources, local

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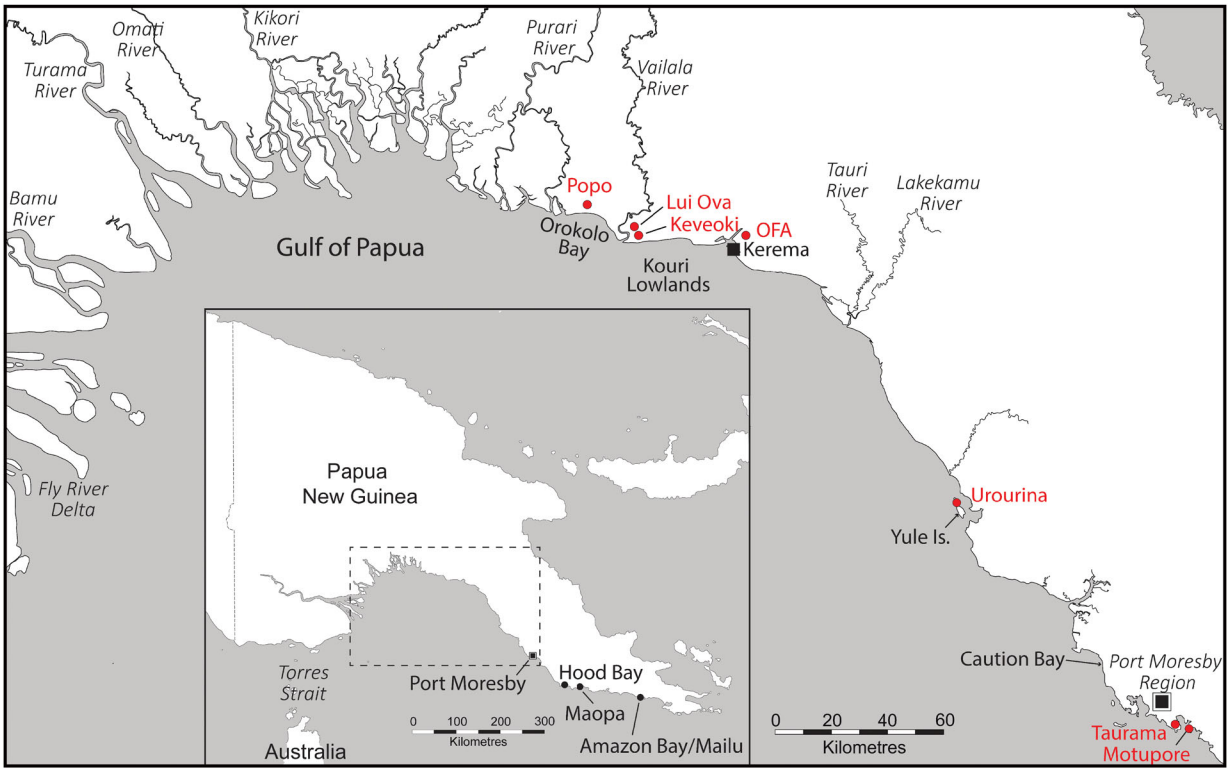

Figure 1. The south coast Papua New Guinea. Archaeological sites mentioned in text shown in red.

chert, imported obsidian and settlement patterns remained largely unchanged. Thus, 'local social continuity' prevailed in stark contrast to the situation west of Port Moresby (Irwin 1991:507–508). Then, around 800–500 cal BP, after some 500 years of reduced long-distance movement of pottery westward of Port Moresby, the Ceramic Hiccup came to an end and the beginning of the archaeologically distinctive ancestral *hiri* exchange network began (Skelly and David 2017:496). During this new trajectory, which continued to ethnographic times (early 1900s CE), seafaring and the transport of pots to the west was re-established. With this, new socio-economic relations were formed that became precursors to those of the ethnographically described Motu *hiri* and Mailu seafaring ventures.

The trajectories of social change and multilayered cultural exchanges involved in renewed long-distance trade were complex. New trade languages emerged, and villages were established at coastal locations to attract seafarers to places where they could moor their vessels (Dutton 2010:350; Dutton and Kakare 1977:9; Skelly and David 2017:530–535). In this paper, we present an archaeological analysis of events that took place in Hood Bay, 95 km east of Port Moresby, during a new phase of long-distance seafaring along the south coast after 770 cal BP. The aim of this paper is to describe the dynamics of ancestral exchange relations in Hood Bay. Through its location, roughly midway between the homelands of Motu and Mailu seafarers, Hood Bay was uniquely situated as a place of articulation between seafaring exchange networks. In our earlier paper on the Agila site (Skelly et al. 2018), we found that people turned attention away from the west and to the east. We proposed that they did so due to conflict amongst ancestral Motu villages disrupting seafaring relations with Hood Bay. In this paper we focus on the Agila ceramic assemblage to identify patterns of social interaction and change. Through an analysis of the ceramic assemblage we see the emergence of social strategies that entrenched Hood Bay as a place of negotiation at a nexus between Motu and Mailu specialised trading and seafaring communities. Our 2022 excavations also extend the site chronology to show that settlement coincided with the time when coastal seafaring and exchange recommenced following the Ceramic Hiccup.

Motu and Mailu seafaring

The social and cultural dynamics of Motu (Port Moresby region) and Mailu (far eastern end of the Central Province) seafaring are well-known through the writings of travellers, missionaries, colonial officials, and anthropologists (e.g. Barton 1910; Bevan 1890; Chalmers 1887a, 1887b; Malinowski 2001; Saville 1926). Motu *hiri* seafaring involved spectacular fleets of multihulled sailing craft called *lakatoi* riding the annual monsoon winds westward from Western Motu and affiliated villages near Port Moresby (Figure 2). *Lakatoi* flotillas were sailed for

Figure 2. *'Lakatoi* or Motu Trading Vessel Under Sail' (Lindt 1887:Plate 6).

up to c.400 km to the Gulf of Papua, annually carrying tens of thousands of pots and shell valuables that, upon arriving at the destination villages, were exchanged for sago and canoe hulls (Bevan 1890:138; Chalmers 1887b:70; Fort 1887:150). The preparation and conduct of the *hiri* trade voyages were steeped in ritual performance. Seri Bodibo, a Motu-Koita man from Porebada village (Port Moresby area), took part in many *hiri* voyages in the late nineteenth and early twentieth centuries. He described the voyages as 'a most satisfying experience. The school of life for men was the *lagatoi*. It was very hard work, but oh! so satisfying' (Gwilliam 1982:51). *Hiri* voyagers maintained ancestral *hetura* (friendships) with trading partners that transcended generations and referred to their trading partners as *varavara* (kin-relatives) (Gwilliam 1982:36).

Motu *hiri* maritime traders only voyaged westward of Port Moresby. However, Motuans also maintained relations at Hood Bay to the east. Keapara-speaking Hood Bay villagers also sailed west to the Motu villages to exchange fish and other products for sago that had been obtained in large quantities by Motu sailors on the *hiri* voyages (Chalmers and Gill 1885:30; Lawes 1879:370). Further to the east of those Hood Bay villages again, another, contemporary trade network emanating from the island of Mailu also existed. Here, the western reach of the Mailu maritime trade network ended at Maopa Village on the Aroma coast, c.25 km southeast of Hood Bay. Shells carved into rings and often worn on the arm ('armshells') were the main currency brought to Maopa by Mailu seafarers. Armshells were traded to Hood Bay, and from there re-traded by Hood Bay villagers to Motu villagers further to the west. Armshells became part of the *hiri* cargoes taken on the long-distance *hiri* voyages to the Gulf of Papua. Rather than merely items of trade, armshells were given as gifts by *hiri* expedition leaders to community leaders at recipient villages to reaffirm exchange relations (Allen 1977a:405; Oram 1982:13). In 1914, Bronislaw Malinowski observed that cultural influences emanating from the Gulf of Papua reached Port Moresby and Hood Bay but were not apparent further to the east. However, some items such as ceremonial blades from the Trobriand Islands and armshells were exchanged across the full span of the Motu *hiri* and Mailu seafaring (Malinowski 2001:249). Connecting Motu and Mailu seafaring ventures, Hood Bay was a place of cultural negotiation between Motu and Mailu influences.

Mailu (aka Magi) language speakers occupy c.100 km of coastline and offshore islands between Cloudy Bay (90 km east of Hood Bay) and Orangerie Bay (190 km east of Hood Bay), on the south coast of PNG (Dutton 1999:91). Mailu language takes its name after the influential village of the same name located on Mailu (aka Toulon) Island in Amazon Bay. Mailu Village has been described as the 'hub' of Mailu culture (Saville 1926:29) and as the 'most important' Mailu-speaking village whose residents enjoy an 'aristocratic prestige' among the wider Mailu-speaking community (Figure 3). The enhanced prestige of Mailu villagers was derived from their pottery-making, canoe manufacture and access to exotic items obtained through long-distance seafaring (Malinowski 2001:106). Pottery-making was the 'biggest industry' at Mailu Village. All pots used in Mailu-speaking coastal villages were made at Mailu Village or by former Mailu villagers who had relocated to the mainland (Saville 1926). Saville (1926:143) described how 'Mailu pots were found in every village in the [Abau] district'. Referring to seafaring and trade amongst 'tribes along the south-east coast', Saville (1926:161) proposed that Mailu villagers had 'introduced the culture of one people into that of another'. Archaeologist Geoff Irwin characterised Mailu as a 'point of articulation' for local and long-distance trade. Based on the local and regional archaeology, he proposed that Mailu Village became 'a central place' from which the Mailu villagers monopolised both pottery manufacture and its maritime distribution to Amazon Bay and westward to Cloudy Bay (Irwin 1985:240). The full domain of Mailu seafaring reached as far as Rossel Island c.560 km to the east, where armshells were obtained. Those armshells were then taken to Maopa, 150 km northwest of Mailu Village, where they were exchanged for pigs, strings of shell discs, dogs and feathers (Saville 1926). Maopa Chief Puana Voi explained that 'when they saw the big sails coming, they would prepare the pigs for exchange [*Veveni Avana*]' (Puana Voi is reported to be 98 years old. Translation by his son Voi Puana, pers. comm., 2023).

The archaeology

Detailed archaeological investigations of the south coast east of Port Moresby have been limited except for Geoff Irwin's research in Amazon Bay–Mailu (e.g. Irwin 1977, 1985, 1991, 2010a, 2010b). Anthropologist Nigel Oram travelled to Hood Bay in the early 1960s documenting a sequence of ancestral villages with informants from Hula and Makerupu villages (Johnston 1971). Archaeologist

Figure 3. Village of Mailu (Photograph: Frank Hurley, 1921. Courtesy of National Library of Australia nla.gov.au/nla.obj-149370623).

Ron Lampert (1966) inspected the ancestral villages recorded by Oram during a wide-ranging archaeological reconnaissance of coastal and island sites in southeast and northeast PNG. Lampert excavated several Hood Bay sites finding no 'obvious differences' between pottery sherds from different sites and no evidence of chronological change within site sequences. University of PNG affiliate Gabriel Johnston visited Hood Bay in 1971 in company with Nigel Oram and Susan Bulmer to investigate the archaeological potential of the ancestral village sites documented by Oram. Johnston returned for further surveys and documented 19 archaeological sites which were registered with the PNG National Museum and Art Gallery (NMAG). During those surveys Johnston excavated several test pits and found parallels between the decorations on Hood Bay sherds and decorations on sherds from sites in the Port Moresby area (Johnston 1971). However, with no radiocarbon sequence available the chronology of past relations and settlement in Hood Bay remained unknown.

In August 2015, we travelled to Hood Bay to investigate the area's potential for tracing the antiquity of coastal exchange connections with the Motu (to the west) and Mailu (to the east) (for initial results, see Skelly et al. 2018). Excavations at the ethnographic village site of Agila (NMAG site code: ABQL) revealed decorated sherds and vessel forms that suggested firstly westerly (Motu) and later easterly (Mailu) access to cultural materials, and thus socio-economic connectivities. We proposed that this archaeological signature signalled that Hood Bay residents shifted the focus of their relationships when villages in Bootless Bay were disrupted by conflicts flaring between Eastern and Western Motu speakers, as recalled in oral traditions (Oram 1981). The Agila excavations suggested that Agila villagers first pivoted their attention eastward 490–300 cal BP (based on Bayesian modelled radiocarbon dates, see discussion below) towards incoming Mailu seafarers and/or intermediate exchange partners on the Aroma Coast (as documented by Saville 1926:27 for the period from 1901 to the 1920s). The Aroma Coast (c.20–30 km east of Hood Bay) was the ultimate destination of Mailu seafarers voyaging to the west. Their interactions with people at Aroma perpetuated ancestral friendships. They referred to their trade partners as *emegi goina* (friends or relations) (Saville 1926:162). This historicised shift in trade relations from the west to the east 490–300 cal BP was based on changes in pottery decorations and vessel forms, as revealed by the original Agila excavations in 2015 (Skelly et al. 2018). The older pottery, from the lower levels of the excavation, was decorated and had rim forms like those of ancestral Motu sites to the west, particularly those from the island of Motupore (Allen 2017), but the pottery from the upper levels was like that from the island of Mailu to the east (Irwin 1985).

In 2015 the Agila excavations were cut short due to time constraints. The Agila sequence could not thus be published in full. On 25 March 2022, we returned to Agila, removed the backfill and completed the excavation. In this paper, we present the results of the 2015 and 2022 excavations (for further discussion about our 2015 excavations see Skelly et al. 2018).

Site description

Hood Bay is bisected by the Kemp Welch River which carries a heavy sediment load from the PNG Highlands and foothills to the coast, where prevailing sea currents carry the sediments westward. Over time, aeolian redeposition on beach-plains has formed a sandy promontory. This promontory terminates at Hood Point which separates Hood Bay to the east from Beagle Bay to the west. East of the Kemp Welch River, alluvial plains and tidal flats predominate. The alluvial plains terminate in a narrow, <200 m-wide isthmus that separates Hood Bay from Hood Lagoon further again to the east (Löffler 1977:115–118) (Figure 4).

The ancestral village site of Agila is 1.2 km inland from the Hood Bay coast. It is located on a northeast-southwest trending sand dune, vegetated with grasslands and clusters of coconut and pandanus palms (Grid Reference: 0583423/8889085 [AGD66]) (Figure 5). The fertile, well-drained beach plains are well-suited to root crops. Many areas of Hood Bay have been mechanically ploughed for crops to c.70 cm depth in recent years. The ancestral village of Agila was selected for excavation in 2015 because recent gardening activity had been limited to shallow manual disturbance of surface deposits, rather than involving deeper and more invasive mechanical ploughing as prevalent nearby. Returning in 2022, we found that little had changed during the years between the two phases of archaeological excavation. The original excavation square was covered in thick grasses, but the area had remained otherwise undisturbed.

Excavation

Here we focus on the results of the excavation of 1×1 m Square A at Agila. Square A was excavated in 96 excavation units (XUs) of a mean 2.5 cm thickness following the stratigraphy. XU1–XU36 were excavated in 2015. Stratigraphic Units (SUs) were differentiated based on sediment colour,

Figure 4. Hood Bay showing the location of Agila in relation to other archaeological sites excavated in 2022. Map created using Open Source QGIS. http://qgis.osgeo.org. (drafted by Georgina Skelly).

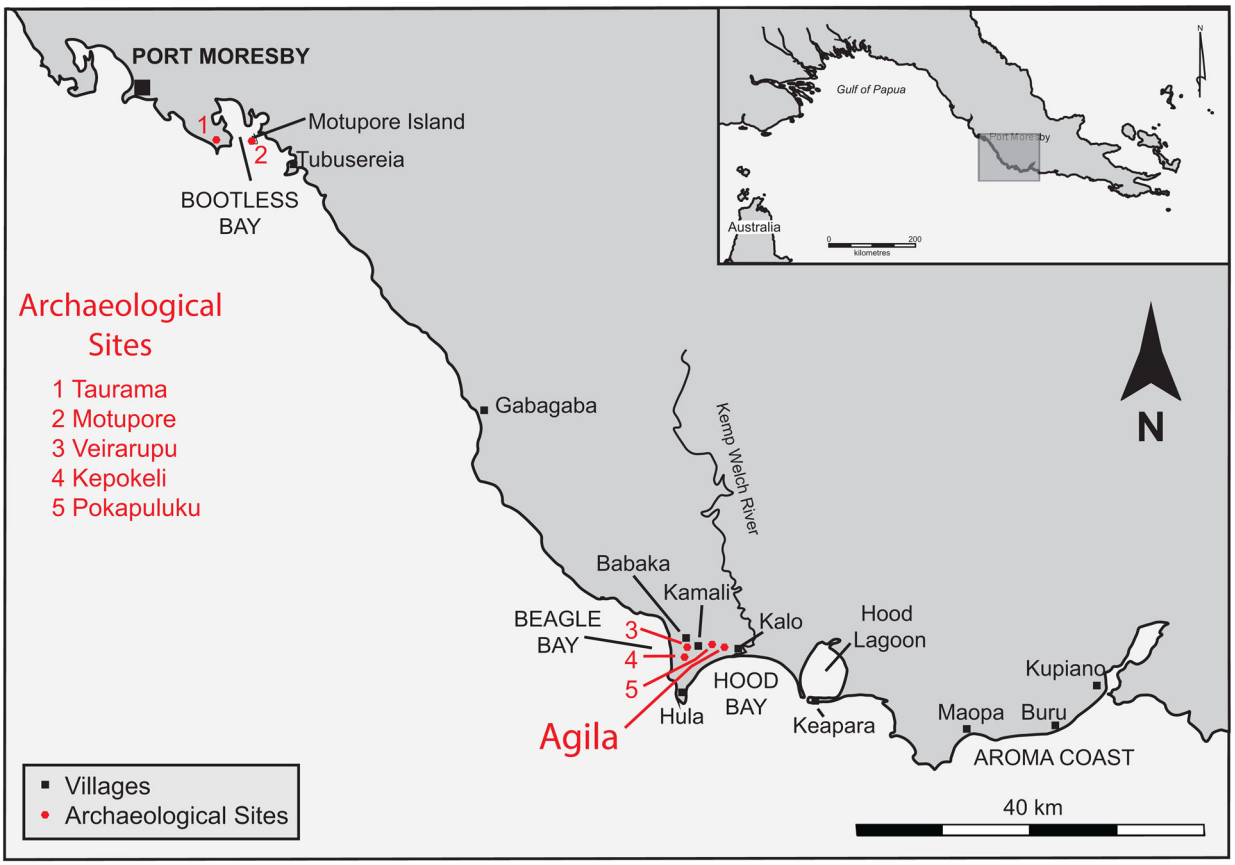

Figure 5. Agila, showing locations of Bootless Bay, Hood Bay and the Aroma Coast.

consolidation, compaction, grain size and contents. For safety reasons given the depth of the excavated deposits, four step-out squares were also excavated in coarser-grained, c.10 cm-thick XUs (Figure 6). Step-out squares B and C were excavated to 90 cm depth, step-out squares D and E to 20 cm depth to remove the looser surface and near-surface deposits. The excavated sediments from all five squares were dry-sieved on site using 2.0 mm mesh. All materials from Square A retained in the sieves were bagged

Figure 6. Squares A–E excavations completed. Square A is the deep, central square (Photograph: R. Skelly).

for laboratory wet sieving, sorting and analyses. For the step-out squares (B–E), the sorting was done in the field, with only the rim sherds, decorated body sherds other than those red-slipped, and stone artefacts being retained. A minimum of two charcoal samples were plotted in situ and individually bagged from each cultural XU in Square A. During the excavation, cultural materials were noted in situ down to c.280 cm depth. The excavation concluded in culturally sterile sand at maximum 317 cm depth.

Stratigraphy

After removing the 2015 backfill from Square A, the excavations continued from the base of XU36. SU1 is a grey (Munsell: 10YR 3/1), poorly consolidated humic sandy silt extending down to 20 cm depth. Sediments are increasingly fine-grained and dark grey (Munsell: 2.5Y 3/1) in SU2. SU3 is a light olive brown (Munsell: 2.5Y 5/4), charcoal-stained sand (Skelly et al. 2018). The 2022 excavations commenced in SU4, a light olive brown (Munsell: 2.5Y 5/3), charcoal-stained sand. The base of SU4 was reached at 111 cm maximum depth. SU5 is a humid, light yellow-brown (Munsell: 10YR 6/4) fine-grained aeolian sand almost entirely devoid of cultural materials. SU5 represents a period of more rapid sediment build-up, as evident from the radiocarbon dates (see below). The stratigraphic change to SU6 is then relatively sharp, the interface between SU5 and SU6 being 4 cm thick. SU6 is marked by a change to darker brown (Munsell: 7.5YR 4/4) sand, increased charcoal staining, and an increase in the number of larger (>3 cm) pottery sherds. Deeper again is a transition to SU7, a moist grey-brown (Munsell: 10YR 5/2) sand with a finer-grained fraction and rapid decline in the incidence of charcoal, shell, and pottery sherds. Moisture content decreases in SU8, a coarser and dark yellow-brown (Munsell: 10YR 5/4) sand. Five sherds observed lying horizontally flat during the excavation of SU8 have a mean weight of 12.7 g compared to 1.6 g mean weight for all sherds in SU8. SU9 is then a culturally sterile yellow-brown (Munsell: 10YR 6/4), medium-grained sand with lenses of grey clay increasingly prominent with depth. The excavation ended at 317 cm depth, in SU9 (Figure 7).

Radiocarbon dates

Nine AMS radiocarbon ages from Agila, Square A, are available. These include four *Anadara antiquata* shell samples from SU2-SU4 and five wood charcoal samples collected in situ from the lower layers of the site. *Anadara antiquata* may be impacted by hard water offsets if limestone is present in the vicinity, but additional research would be required to confirm if this was an issue at this location (Petchey et al. 2018). Calendar age estimates for these samples have been calibrated using the

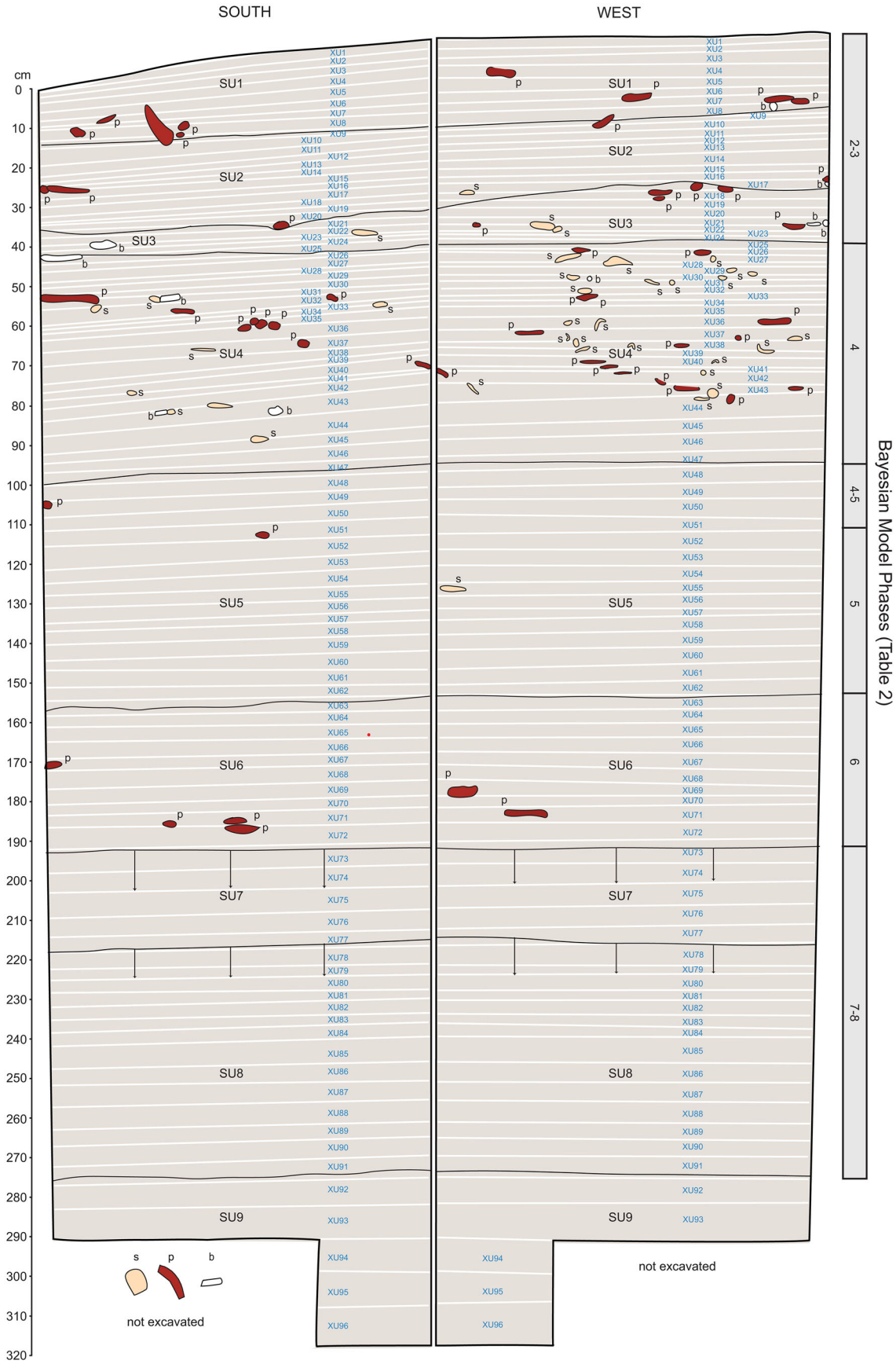

Figure 7. Agila 1, Square A, south and west sections with XUs superimposed. s = shell, p = pottery, b = bone.

Marine20 and Intcal20 datasets (Heaton et al. 2020; Reimer et al. 2020; Table 1). A regional marine reservoir offset (ΔR_{20}) of -127 ± 16 ^{14}C years is used for the *Anadara antiquata* samples based on research undertaken at Caution Bay dating to between 1,400 and 2,100 cal BP for this species (see Petchey et al. 2013) recalculated for use with Marine20. To calculate this ΔR_{20}, we used the

Table 1. Radiocarbon determinations for Agila, Square A.

XU	SU	Wk-laboratory code	Material dated	$\delta^{13}C$ ‰	^{14}C age BP	Unmodelled calibrated age BP (68.2% probability)	Unmodelled calibrated age BP (95.4% probability)
12	2	42519[a]	*Anadara antiquata*	−0.1 ± 0.1	743 ± 20	420–270	480–180
18	2	42520[a]	*Anadara antiquata*	1.2 ± 0.1	713 ± 20	400–240	450–140
23	3	42521[a]	*Anadara antiquata*	1.0 ± 0.1	713 ± 20	400–240	450–140
28	4	42522[a]	*Anadara antiquata*	1.2 ± 0.1	704 ± 20	400–230	450–140
32	4	42523[a]	Charcoal	*	379 ± 23	500–340	510–330
36	4	42524[a]	Charcoal	*	386 ± 23	500–330	500–320
47	4	54910	Charcoal	−26.4 ± 0.7	387 ± 17	500–330	510–320
65	6	54911	Charcoal	*	457 ± 17	520–500	530–490
85	8	54913	Charcoal	−26.5 ± 0.7	617 ± 17	650–550	650–550

[a]Determinations obtained following 2015 excavations at Agila (Skelly et al. 2018). All radiocarbon dates are AMS on individual pieces of charcoal or shell collected in situ. Calibrations undertaken using OxCal v4.4 Bronk Ramsey (2009a). Atmospheric data from Reimer et al. (2020). Shell dates calibrated using a marine reservoir correction (ΔR_{20}) of −127 ± 16 ^{14}C years (Petchey et al. 2013) using the Marine20 calibration curve (Heaton et al. 2020). $\delta^{13}C$ measured at the University of Waikato using a CO_2 isotope analyser Los Gatos Research model CCIA-46. *The $\delta^{13}C$ was measured on prepared graphite and is not shown.

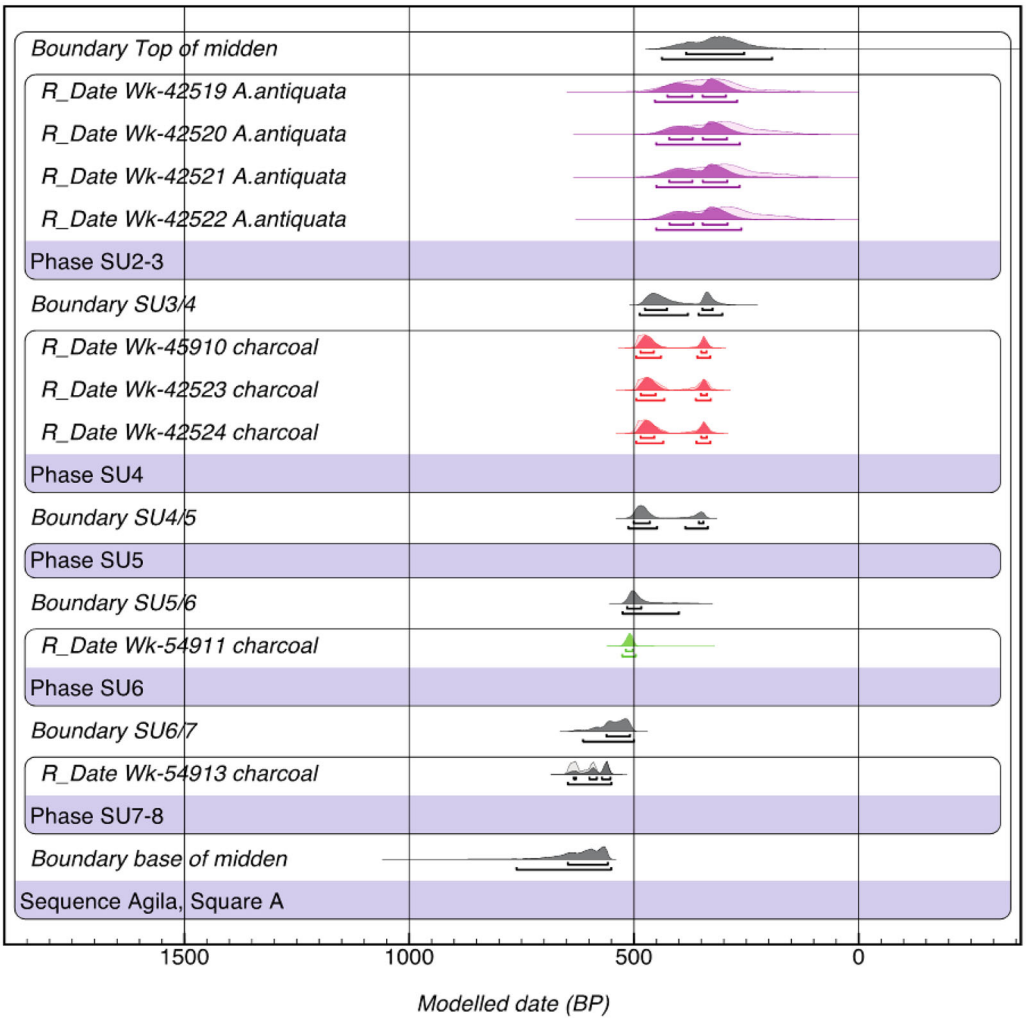

Figure 8. The Bayesian age model for radiocarbon dates from Agila, Square A. The outline distributions are the unmodelled calibrated dates. Solid distributions represent the results after Bayesian modelling. Determinations Wk-42519, Wk-42520, Wk-42521, Wk-42522, Wk-45923, Wk-42524 were obtained following 2015 excavations at Agila (Skelly et al. 2018).

online *deltar* program (https://calib.org) (Reimer and Reimer 2017). Although a change in ΔR over time has been noted for the South Pacific Ocean (Petchey 2020), we are not aware of any calculated ΔR correction for this coastline for the last ~500 years. To estimate the start ages for site occupation and each phase of site use, we used OxCal v4.4 to construct a stratigraphic Bayesian model (Bronk Ramsey 2009a). In this model (Figure 8; Table 2), we grouped the dates into four contiguous stratigraphic phases as each SU is clearly defined and their stratigraphic integrity is confirmed by the fact that conjoining pottery sherds were not found distributed across SUs. SU5 was not dated and is included as a gap in the sequence. We did not correct for inbuilt age in the wood samples because of

Table 2. Results of the Bayesian sequence model.

Agila Sq A								
	Unmodelled (cal BP)				Modelled (cal BP)			
Name	68.2%		95.4%		68.2%		95.4%	
Boundary Top of cultural deposit					390	250	440	190
R_Date Wk-42519 *A. antiquata*	420	270	480	180	430	290	460	270
R_Date Wk-42520 *A. antiquata*	400	240	450	140	430	290	460	260
R_Date Wk-42521 *A. antiquata*	400	240	450	140	430	290	450	260
R_Date Wk-42522 *A. antiquata*	400	230	450	140	430	290	460	260
				Phase SU2–SU3 Mayri				
Boundary SU3-SU4					480	320	490	300
R_Date Wk-45910 charcoal	500	340	510	330	490	330	500	330
R_Date Wk-42523 charcoal	500	330	500	320	490	330	500	320
R_Date Wk-42524 charcoal	500	330	510	320	490	330	500	330
	Phase SU4							
Boundary SU4-SU5					510	340	520	330
	Phase SU5							
Boundary SU5-SU6					520	480	530	400
R_Date Wk-54911 charcoal	520	500	530	490	520	500	530	490
	Phase SU6							
Boundary SU6-SU7					570	500	620	500
R_Date Wk-54913 charcoal	650	550	650	550	640	550	650	550
				Phase SU7–SU8				
Boundary base cultural deposit					650	550	770	550

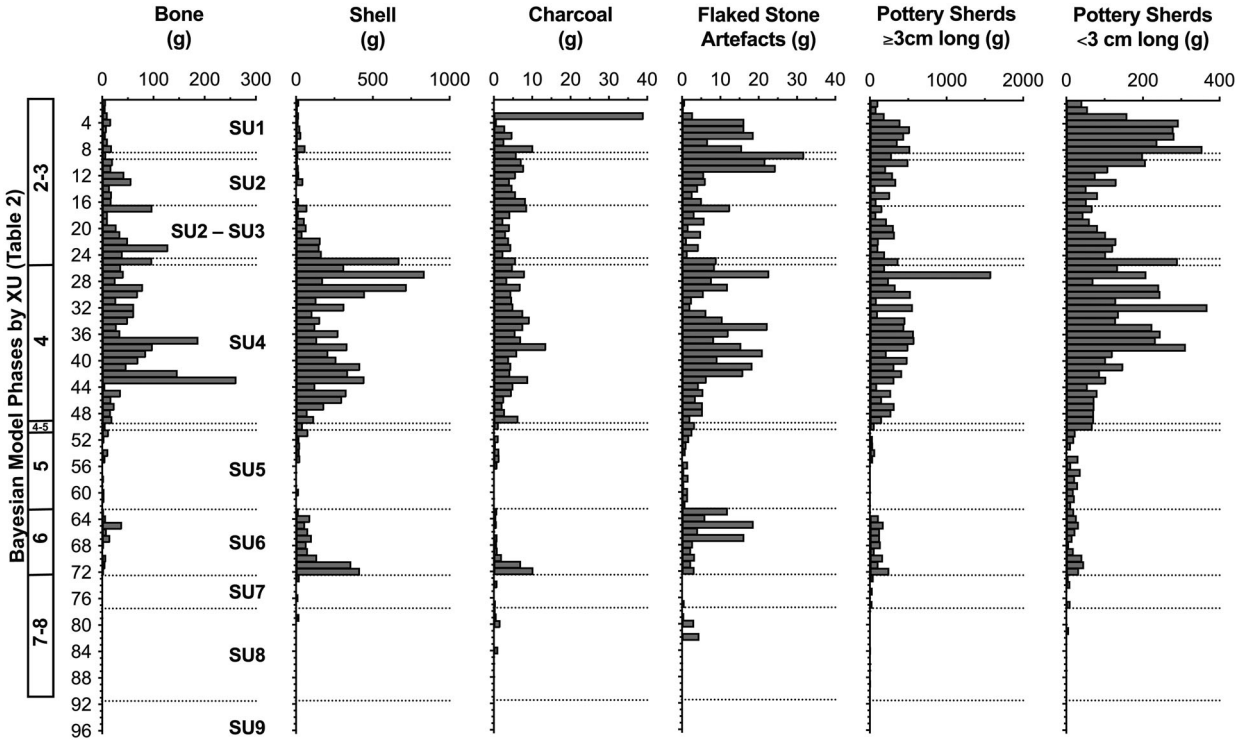

Figure 9. Agila Square A, vertical distribution of cultural materials by weight, by XU.

the limited constraints provided by the model (following Bronk Ramsey 2009b).

We report modelled ages and boundaries at 95.4% probability, with ages rounded to the closest 10 years. Bayesian modelling dates the base of the cultural deposit in SU7–SU8 to 770–550 cal BP. SU6 begins 620–500 cal BP and ends 530–400 cal BP. The base of SU4 dates to after 520 cal BP. Thus, the model generates an overlap between the end of SU6 and the beginning of SU4. The SU4–SU6 overlap suggests that the culturally depauperate aeolian sand in SU5 accumulated rapidly relative to SUs above and below. The base of SU2–SU3 (when connections with ancestral Motu villages to the west declined), dates to 490–300 cal BP. There followed a period during the formation of SU1–SU2 when the ceramics are more akin with those to the east. For this later period, we can therefore infer connections became oriented to the east until the site was abandoned before 190 cal BP (see discussion below).

Cultural materials

The deposition of cultural materials fluctuates in general alignment with SU1-SU8. There is a peak in cultural materials in SU1 and SU2, which tails off

towards the base of SU2. The largest quantities of pottery sherds, shell, non-molluscan fauna and pieces of chert by weight are from SU4. Quantities decline rapidly approaching the SU4–SU5 interface (Figure 9). Cultural materials are still present in SU5, but in much lower quantities than in SU4 above. They increase again in SU6 but decline abruptly at its base. Well-preserved pottery sherds are again present in SU7 and SU8. SU9 is culturally sterile.

Pieces of chert are present in all cultural SUs fluctuating by number in alignment with increases and declines in other cultural materials (Table 3). The nearest chert sources are found in the limestone hills inland from Hood Bay suggesting relations were likely maintained with inland as well as coastal groups. It is interesting to note that no obsidian was found at Agila particularly given that ceramic attributes show attention turned from west to east during latter occupation and obsidian was available on the Aroma Coast just 25 km to the east (Irwin 1991:506). Virtually all obsidian known from archaeological sites on the PNG south coast has been sourced to west Fergusson Island further again to the northeast (Mialanes et al. 2016). The apparent absence of obsidian at Agila and all contemporary sites further to the west suggests that Hood Bay as a place of negotiation was not permeable to the movement of all types of exchange items.

Pottery assemblage

Square A contains 15,030 pottery sherds >2 mm long (being the mesh size of the sieve), with a total weight of 25.2 kg. Of these, 1,533 sherds are ≥3 cm long. Patterns of sherd density by weight show peak sherd deposition aligning with SU1, SU2 and SU4, with a smaller peak in SU6 (Table 4). These same strata also have peak densities of other categories of cultural material, such as shell, animal bone and stone artefacts. Agila was used continuously from the formation of SU8 to SU1.

Table 3. Bone and shell (g), chert fakes/pieces (#) by SU and XU.

SU	XU	Bone (g)	Shell (g)	Chert Flakes/Pieces (#)
1	1–9	91.1	204.7	220
2	10–16	187.6	118.5	168
2/3	17–24	399.0	726.4	147
4	25–50	1,632.1	7,569.4	607
5	51–62	52.7	215.8	58
6	63–72	92.7	1,395.6	66
7	73–77	2.4	42.9	8
8	78–91	8.9	35.3	21
9	92–96	0	0	0

Incised and impressed body decoration: Detailed description for XU37–XU87

Detailed descriptions are provided below for the decorated sherds from Square A XU37–XU87, which were excavated in 2022. Further descriptions of the sherds from the higher levels can be found in Skelly et al. (2018). In sum, these higher decorated sherds (SU1, SU2 and the SU1–SU2 interface) are most often incised (78%), having V-shaped designs and combinations of incised, impressed and appliqué decoration. No decorated sherds were found in SU3. The two decorated sherds excavated from SU4, during 2015 excavations, have shell impressions made with the rippled margins of bivalve shells. Discussion of the full sequence (XU1–XU87) follows below.

The following refers to Square A, unless a different excavation square is specified. Fifteen sherds with incised and/or impressed decoration were excavated from XU37–XU87. Conjoin analysis shows that the 15 sherds are from nine separate vessels. One rim sherd from XU37 (SU4: 72.0–75.1 cm) has a row of triangular-shaped notches with apices oriented downward above six irregular incisions on the rim interior (Figure 10a). A conjoin pair from XU38 (SU4: 75.1–76.3 cm) has a band of angled incised lines above an exterior-swelling vessel wall. The base of the rim is delimited by an irregular row of punctations; the rim also has irregular notching outside the lip (Figures 10b–c). The better-preserved of the pair (Figure 10c) has what Allen (2017:283, Figure 8.11f) described from Motupore to the west as a 'sloping incised band motif'. A third sherd from XU38 has diagonal rippled bivalve margin impressions on top of the lip (Figure 10d). The same sherd has horizontal paddle-impressed lines and one rippled bivalve margin impression on

Table 4. Pottery sherd weights (g) per litre of sediment. Body and rim sherds, quantities and mean thickness by SU and XU.

					Body sherds (≥3 cm)		Rim sherds (of any size)	
SU	XU	Pottery sherds (g)	Sediment volume (l)	Pottery sherds (g/l)	(#)	Mean thickness (mm)	(#)	Mean thickness (mm)
1	1–9	4,323	221	19.6	277	9.1	26	9.5
2	10–16	2,953	184	16.1	155	9.1	14	9.6
2/3	17–24	2,438	166	14.7	115	8.5	18	9.4
4	25–50	13,040	486	26.8	755	7.3	47	9.2
5	51–62	638	349	1.8	22	7.1	3	9.5
6	63–72	1,550	234	6.6	67	7.6	13	10.5
7	73–77	161	136	1.2	9	8.2	3	10.3
8	78–91	107	427	0.3	7	10.5	2	6.8
9	92–96	0	86	–	0	–	0	–

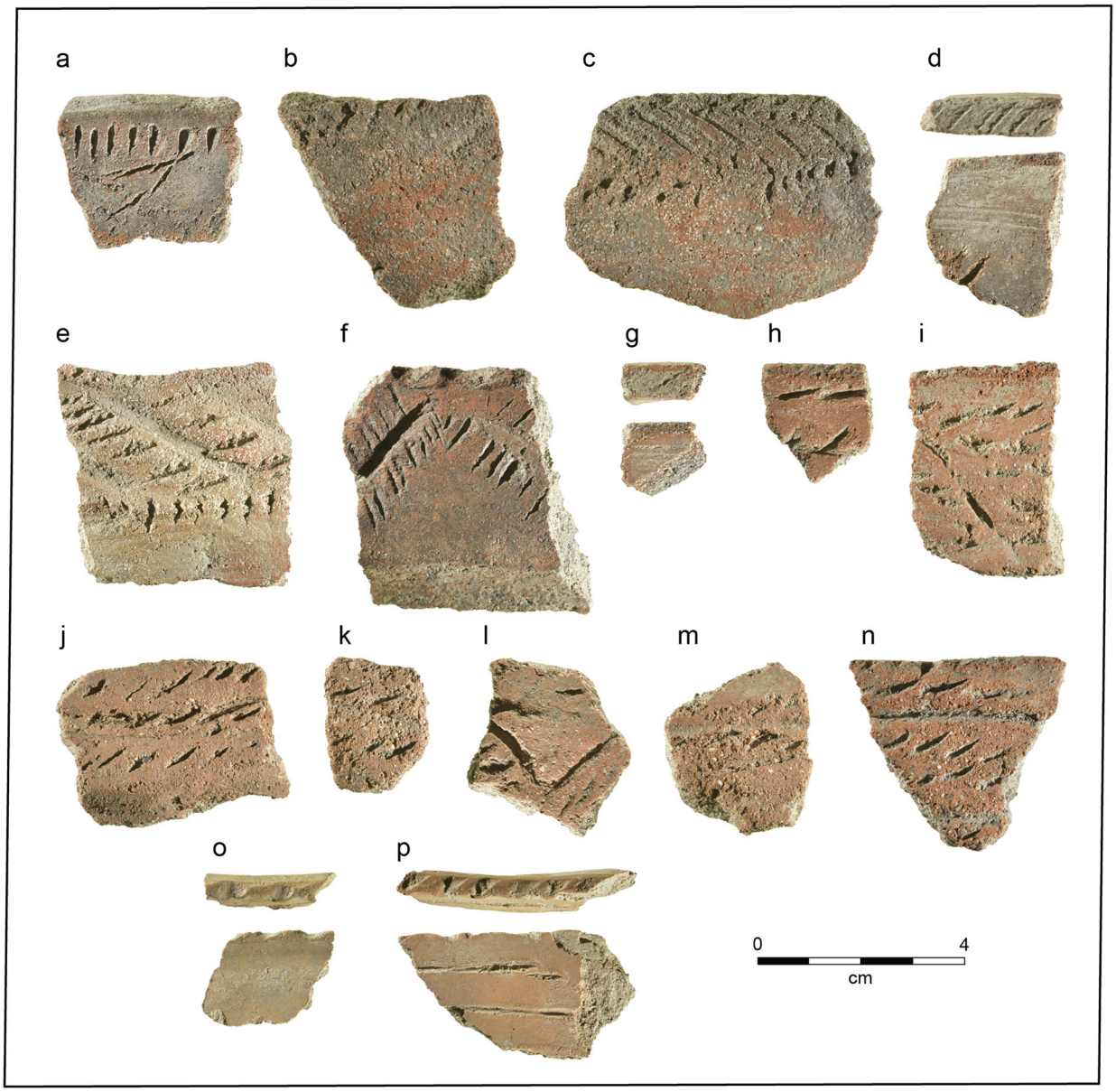

Figure 10. Agila impressed and/or incised sherds from Square A, XU37–XU85. (a) XU37, (b–d) XU38, (e) XU46, (f) XU65, (g) XU50, (h) XU70, (i–m) XU71, (n) XU73, (o–p) XU85 (Photographs: Steve Morton).

the vessel exterior. One sherd from XU46 (SU4: 95.5–99.1 cm) has decoration comparable to the 'vertical herringbone motif' (Figure 10e) of the early levels of Motupore (Allen 2017:275–278, Figures 8.4, 8.5 and 8.6a). The 'vertical herringbone' decoration is comprised of rippled bivalve margin impressions on raised relief created by grooves above a band of vertical bivalve margin impressions delimiting a slight swelling of the vessel's exterior wall. The irregularly formed rim also has notching on the outside edge of the lip (Figure 10e). One sherd from XU65 (SU6: 159.9–163.0 cm) has two incised lines forming an apex fringed with crescent-shaped impressions likely rendered with a bivalve margin devoid of radial ridges (e.g. *Batissa violacea*). The outside edge of the sherd's lip has a shallow crenulated profile formed by impressed/pinched notches (Figure 10f). The combination of a deeply notched lip profile and incised lines fringed with shell impressions is like the 'shell impressed chevron herringbone motif' from Motupore described by Allen (2017:280, Figure 8.8c). One sherd from XU50 (SU4 base: 107.5–110.7 cm) has two parallel paddle-edge impressions (manufacturing marks) on the rim exterior and rippled bivalve margin impressions on top of the lip (Figure 10g). Six sherds from SU6 have incised/impressed decorations. Five of these comprise a conjoin set from XU71 (SU6 base:180.0–183.7 cm). The sixth, from XU73 (SU7: 187.1–191.2 cm), has comparable decoration, sherd fabric and wall thickness, suggesting that it probably came from the same vessel (Figure 10i–n). Four of these six sherds show that the vessel had a flat lip profile and a slight swelling of its exterior surface. The set of six sherds has a variety of incised lines, some of which are fringed by crescent-shaped impressions rendered with an indeterminate single-pointed/edged tool. Two sherds

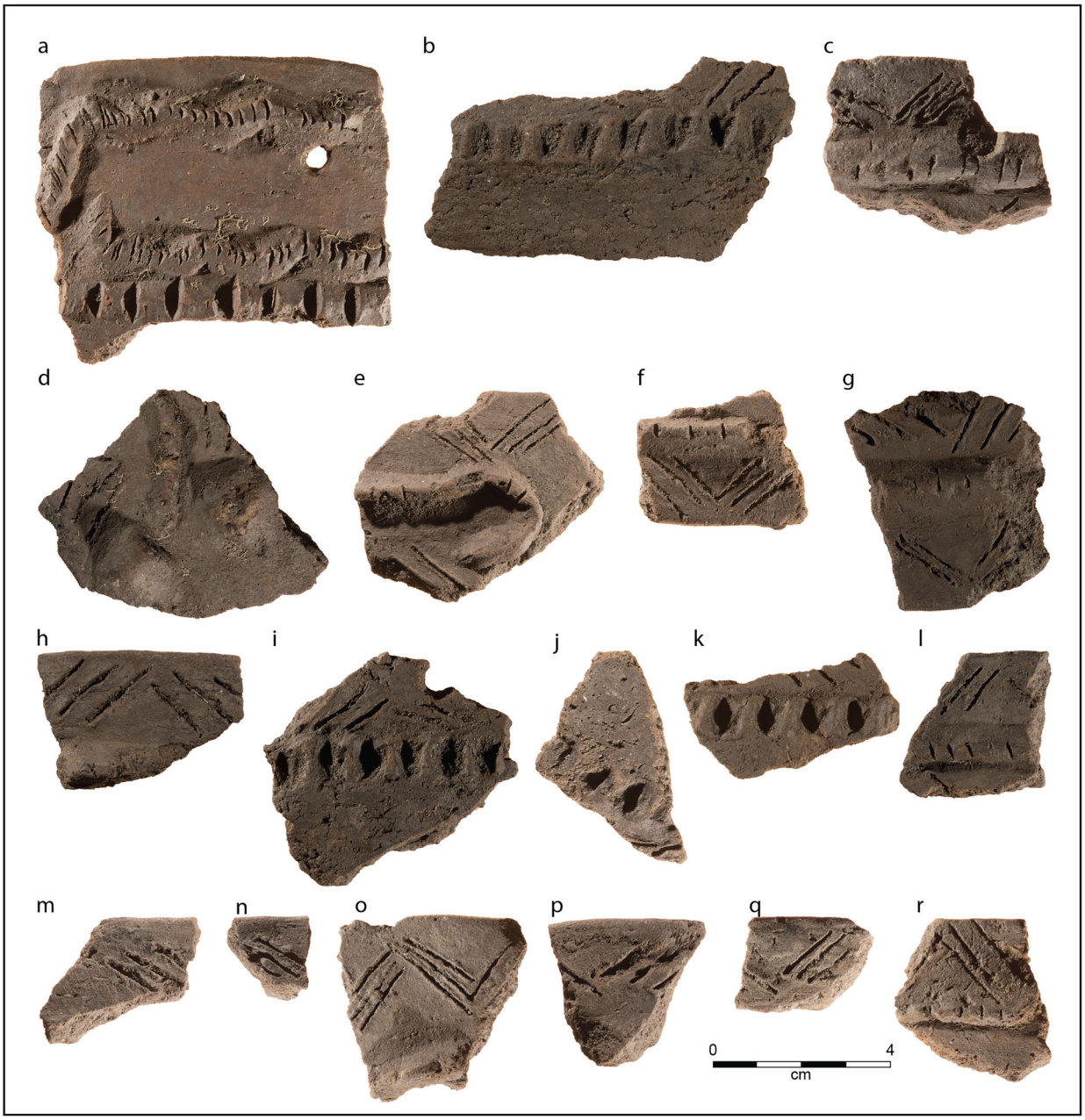

Figure 11. Representative body-decorated sherds, Agila upper phase (SU1 and the SU1–SU2 interface) (after Skelly et al. 2018:Figure 10) (Photographs: Steve Morton).

comprising a conjoin pair came from XU85 in SU8 (237.0–240.8 cm). The sherds came from a finely made, thin-walled vessel with irregularly aligned incised lines morphing into crescent-shaped impressions on the exterior surface, suggesting that the incised lines were made using the margin of a bivalve shell. The top of the sherd's thin lip is notched to form a shallow, crenulated profile (Figure 10o–p).

The Agila decorated sherd sequence: XU1–XU87

The Square A sherd assemblage (XU1–XU87) includes 49 sherds with body decoration, 47 of which are decorated on their exterior surfaces and two on interior rim surfaces. Thirty-seven sherds are incised, 20 are impressed, and four have appliqué (three sherds with appliqué are also impressed and incised; eight incised sherds are also impressed). Appliqué decoration is limited to SU1 and SU2. Decorated body sherds from SU1 include 11 that are incised, seven that are impressed and 11 that are both incised and impressed. SU2–SU3 contain five incised and two impressed sherds. SU4 has four incised, one impressed, and one incised and impressed sherds. In contrast to the similarities between the decorated sherds of Agila SU4–SU6 and those from the island of Motupore to the west, the decorated sherds in the upper levels (SU1–SU2) of Agila (Figure 11) have very different incised, impressed and appliqué decorations. Such

decorations are akin to those of the Mayri period (c.800 to 500/400 cal BP) of the Amazon Bay–Mailu archaeological sites to the east (Irwin 2010b:408; Skelly and David 2017:508; Skelly et al. 2018).

Incised and impressed lip decorations: XU1–XU87

Twenty-five rim sherds, representing 17% of all the rim sherds from Square A, have decorated lips. Seventeen have notches rendered using a single pointed/edged tool; 16 of these are notched outside the lip, one inside the lip. Five lips are shell-impressed, two of these being decorated on the top of the lip, one outside the lip and two are decorated both on top and outside the lip. Three rim sherds from the upper levels (SU1–SU3) have shell-impressed lips, as do two from SU4. The two SU4 rims have flat lip profiles, on top of which rippled lines were impressed with the margin of a bivalve shell.

Vessel forms: XU1–XU87

Terms used to describe vessel forms are dish, bowl, and pot. A dish is a vessel with an orifice diameter greater than the vessel depth, a bowl has an orifice diameter approximately equal to the vessel depth. A pot has an orifice diameter smaller than the vessel depth. A vessel is described as everted when the orientation angle of the rim is 0–90° and inverted when the rim orientation is 270–360° (after David et al. 2009:13). Twelve diagnostic sherds have paddle marks on external surfaces and four have paddle marks on internal surfaces. Two sherds have anvil dimple impressions on internal surfaces. No coiling fractures were identified on diagnostic sherds or body sherds ≥3 cm long. The assemblage is consistent with paddle and anvil construction, however, as paddles are also used in coil construction it remains possible that the assemblage includes sherds from coil constructed vessels.

The assemblage contains 150 rim sherds, 27 of which were analysed for vessel form. They include a conjoin pair from an inverted dish or bowl in SU4 (Figures 10c and 12a), two rim sherds from inverted carinated bowls (e.g. Figure 11b) and 23 rim sherds from everted indirect pots (e.g. Figure 12c–h). Seventeen of the rim sherds from everted indirect pots are from SU1–SU4, one is from SU5, and the remaining five are from SU6. One rim sherd from an inverted carinated bowl is from SU2 and the other is from SU4. The inverted carinated bowl represented by the sherd from SU2 had an orifice diameter of 32 cm, a 2.3 cm-long rim, and impressed/appliqué decoration on its body exterior. The inverted carinated bowl represented by the SU4 sherd had an indeterminate orifice diameter, a 3.1 cm-long rim, and an incised exterior body surface. A conjoin pair from an inverted dish or bowl (SU4) came from a vessel with an orifice diameter of 30 cm and an incised and impressed body exterior and outer lip (Figure 10b–c).

None of the 23 rim sherds from everted indirect pots have impressed or incised body decoration. Three from SU3–SU4 have decorated lips; one has a shell impression on top of the lip, one is notched outside the lip, and the third is notched outside and on top of the lip. Two rim sherds (a conjoin pair) from the lower levels of SU4 (XU42) have grooved lip profiles (e.g. Figure 12d). All six everted pot rim sherds from SU5–SU6 similarly have grooved lip profiles that vary from shallow to deeply grooved (e.g. Figures 12e–h). Grooved lips are not found in the upper, more recent levels (SU1–SU3) of the sequence, where lip profiles are varied but rounded profiles most common (53%). The rim courses of everted indirect pots are usually concave (74%) and

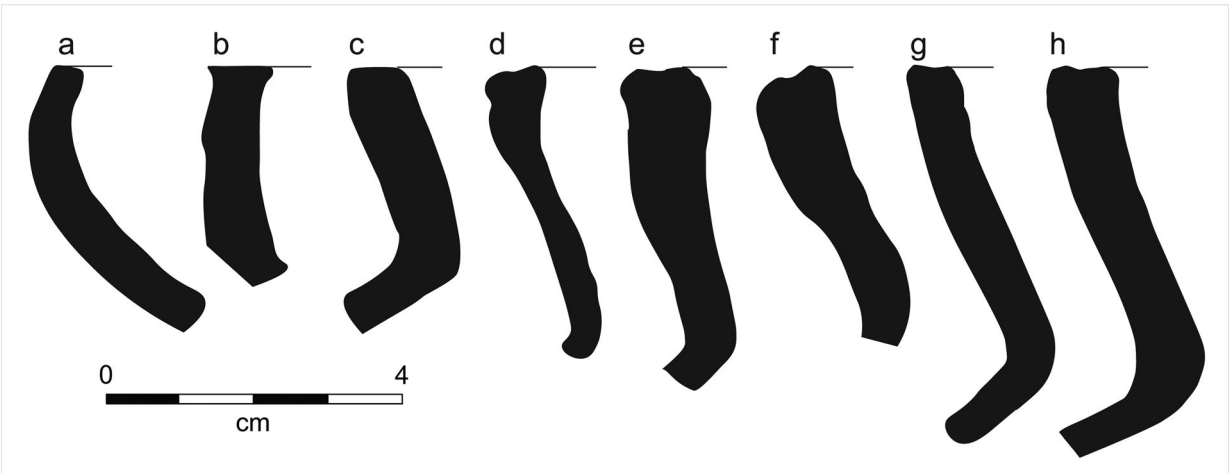

Figure 12. Representative rim forms from Agila Square A excavations. (a) Inverted dish/bowl, (b) Inverted carinated bowl, (c–h) Everted indirect pots (a–XU38, b–XU65, c–XU66, d–XU49, e–XU72, f–XU54, g–XU42, h–XU70).

less often straight (13%) or convex (13%). Rim profiles are mostly thickening (61%) and less often parallel (30%) or thinning (9%). The mean rim length for everted indirect pots is 36.4 ± 3.8 cm, and the mean orifice diameter is 22.0 ± 2.2 cm.

Discussion

Archaeological research along PNG's south coast has largely concentrated on the Port Moresby region and other coastal locations in the Gulf of Papua. An increasingly detailed radiocarbon chronology for the Gulf of Papua coast suggests that long-distance maritime trade recommenced 800–500 cal BP, following some 500 years (Ceramic Hiccup) of limited or retracted and more episodic contacts and trade with far-flung coastal communities west of Port Moresby (e.g. Allen et al. 2011; David 2008; David et al. 2009, 2010; Irwin 1991; Rhoads 1994; Skelly and David 2017; Urwin 2022). The timing for the end of this period of limited interaction varied from place to place, dating to c.500 cal BP in the mid-Kikori River region (David 2008). By the time long-distance maritime trade recommenced, ancestral Motu villages had become established on Motupore Island and likely also Taurama in Bootless Bay 16 km southeast of Port Moresby. Extensive archaeological excavations at Motupore (total area excavated $\geq$188 m^2) show that a highly productive centre of specialised pottery and shell bead manufacture developed there around 750 cal BP (Allen 1977b, 2017; Allen et al. 1997). Though Motupore's radiocarbon chronology is imprecise, we infer the chronology of Allen's Pottery Analytic Units (PAUs) as being c.750–600 cal BP (PAU 6), c.600–450 cal BP (PAU 5), and c.450–300 cal BP (PAU 4–1) (Urwin 2022:180). This is based on Allen's (2017:151, 620) preferred start date for the site, and the probability distribution of the most reliable Motupore dates (Urwin 2022:Table 3.3). Much of the early pottery (PAU 6) made at Motupore was painted, and the incised or impressed vessels were often decorated with herringbone motifs rendered by placing bands of bivalve margin impressions on raised relief created by horizontal or vertical grooves. Following the establishment of pottery-producing villages at Motupore and in Bootless Bay, new settlements began to appear to the west, on the coast of the Gulf of Papua. Some of these new coastal settlements (e.g. from east to west: Urourina, OFA, Keveoki, Lui Ova, Popo) had access to pots with unmistakeably Motupore-style herringbone and shell-impressed decoration (David et al. 2009; Frankel et al. 1994; Rhoads 1994; Skelly and David 2017; Urwin 2022; Vanderwal 1973). The timing of their establishment suggests these settlements were built in part to attract and welcome seafaring traders carrying cargoes of pottery and armshells west, as documented ethnohistorically in parts of the Gulf of Papua (Kakare 1976; see Skelly and David 2017:530–535 for discussion).

Pottery sherds with Motupore-style 'shell impression sloping band' decoration (Allen 2017:284, Figure 8.12) have been found a short distance east of the Vailala River (eastern Gulf of Papua) at Keveoki. Here they date to 620–300 cal BP (Skelly and David 2017:242–245). At the ancestral Orokolo Bay village of Popo, 30 km further west, excavations uncovered sherds decorated with highly distinctive 'vertical herringbone' and 'chevron herringbone' designs (Allen 2017:276) dating after the Bayesian modelled boundary 765–575 cal BP and before 495–395 cal BP. At the same site, pottery akin to Allen's (2017:284) 'incised sloping band motif' and makers' marks like those found at Motupore were found in layers dating after 430–285 cal BP and before 220–40 cal BP (Urwin 2022:185). Motupore-style shell-impressed decorations has also been described from site OFA (undated) near Kerema, 35 km east of the Vailala River. Some 125 km to the east of Kerema, at Urourina on Yule Island, Motupore-style pottery featuring shell impressed herringbone motifs dates to c.669 cal BP (median age), albeit from a single radiocarbon date (David et al 2009; Frankel et al. 1994: 28; Rhoads 1994:55, 67; Skelly and David 2017; Vanderwal 1973).

Whether pottery found in the Gulf of Papua with Motupore-style decoration originated from Motupore Island is yet to be unequivocally confirmed. However, vessels tempered using sands from the Bootless Bay region, where Motupore Island is located, did reach the Gulf of Papua during seafaring expansions before 1,000 cal BP (Bickler 1997; Marsaglia et al. 2016). Further, small shell tools (probably *Spondylus* sp.) used to 'scrape and/or decorate pottery' have been found at Motupore, and these may have been used to make the distinctive shell impressed motifs (Allen 2017:438). The establishment of Agila 770–550 cal BP probably slightly post-dates a seafaring renaissance along the south coast of PNG west of ancestral Motu villages including Motupore after 770 cal BP, ending the lull in long-distance western maritime trade (Ceramic Hiccup). That pots with Motupore-style decoration reached Agila to the east of Motupore confirms that ancestral Motu interactions during the reanimation of seafaring and trade were not limited to locations west of Port Moresby–Bootless Bay. Although Motu contact with Hood Bay is not in doubt, trade relations (and by implication regular social relations more broadly) may well have focused on Hood Bay villagers sailing westward, as they did during the

nineteenth century (Chalmers and Gill 1885:30; Lawes 1879:370).

Motupore was probably abandoned c.300 BP (Allen 2017:118), and Agila in the period 440–190 cal BP according to our Bayesian model. This potential temporal synchronicity raises questions about how ancestral Motu–Keapara (Bootless Bay–Hood Bay) relations were negotiated across this change in pottery availability and village life. Between 490–300 cal BP, Agila villagers ceased to import Motupore-style pottery. We interpret this change in archaeological pottery at Agila to mean that before Motupore had faded as a centre of pottery manufacture, relations between ancestral Motu and Keapara speakers had already diminished. By that time also, Agila villagers had either directly or through intermediaries developed socio-economic relations with peoples to the east, where an alternative source of pottery could be found. Contemporaneously (500–310 cal BP modelled boundary for site establishment at 95.4% probability), the village of Veirarupu in Hood Bay, located just 2.6 km east of Agila, maintained contact with the Motu, obtaining pottery directly or indirectly from Motu manufacturers. The social machinations and complexities of this nested network of connections will be explored elsewhere, following the analysis and publication of other sites in the Hood Bay region (in progress).

According to oral traditions, the ancestral Motu villages of Hanua Motu (on Motupore Island) and Taurama (on the coast adjacent to Motupore) were abandoned due to violent conflicts flaring with the Lakwaharu people (ancestral to the Eastern Motu at Tubuseriea) (Oram 1968). The abandonment of the village of Agila before 190 cal BP, potentially coinciding with such conflict, suggests that Hood Bay was not immune to events impacting ancestral Motu villages. Positioned on a low beach ridge close to the coast, Agila had no strategic defence potential, and the viability of such an exposed location depended on social order among coastal villages. Without direct or intermediary contact and communication with Motu seafarers by way of trade, Agila would have become increasingly vulnerable to social instability involving Motu seafarers. We suggest that the abandonment of the village of Agila was caused by difficulties in defending their exposed location after specialised exchange relationships with ancestral Motu villages to the west had ceased. Determining the extent of upheaval and whether people relocated to a nearby defendable locations or further afield will require further survey and excavation in Hood Bay.

Initial site use coinciding with the westward expansion of Motu seafaring implicates Agila in a reanimation of seafaring after 770 cal BP. Evidence of engagement with seafarers from the east does not appear till 490–300 cal BP. The realignment towards the east suggests the beginnings of autonomous decision-making which led to Hood Bay becoming a place of negotiation. During the nineteenth century, Hood Bay villages facilitated the flow of items such as armshells between Motu and Mailu seafaring networks. The Agila pottery assemblage provides an insight into the social dexterity that placed Hood Bay at a nexus between Motu and Mailu seafaring. The ceramics show that Hood Bay was in contact with Motu seafaring pottery manufacturers sometime after 770 cal BP but rotated to the east instead after 490 cal BP. Interactions may have involved eastward voyages by Motu seafarers, westward voyages by Hood Bay villagers, and/or myriad intermediary interactions. Regardless of the social dynamic involved, excavations at Agila show that the emergence of Hood Bay amidst 'the great chain of intertribal trading which encircled the whole of Papua' (Malinowski 2001:249) is traceable archaeologically to the reanimation of coastal seafaring after the Ceramic Hiccup. The Agila story has implications for understanding the history of seafaring and socially stabilising role played by specialised trade across the south coast of PNG. Detailed archaeological attention is now required across regions further to the southeast to further historicise the fluctuating social interconnectivities of Papuan, Oceanic and Australian seascapes.

Acknowledgements

We wish to thank Dr Andrew Moutu, Kenneth Miamba, Jemina Haro and Tommy Buga from the PNG National Museum and Art Gallery for their support and involvement preceding, during, and following our fieldwork. The time and effort that they spent on all aspects of project preparation and fieldwork was considerable. Without their commitment to cultural heritage and archaeological research the project would not have been possible. We also thank University of Papua New Guinea postgraduate participants Kylie Sesuki and Teppsy Beni, and also Linda Skelly for their contributions during our field season. In addition, we wish to acknowledge and thank Georgia Kaipu from the PNG National Research Institute for ongoing advice and the considerable time that she spent managing regulatory requirements. During our field season we were accommodated at Kamali Village. We are sincerely grateful and thank the people of Kamali for the warm welcome and hospitality provided by the community. We thank Alu Guise, Walu Pepe, Manu Friend, One Jati and Tau Guise for their insights into Kamali oral traditions and unwavering resourcefulness and hard work during excavations. We also thank the three anonymous referees whose insightful comments have made a significant contribution to the paper.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This research was funded by an Australian Research Council Discovery Early Career Researcher Award to RS [DE200100544]. Our first field season and BD's subsequent involvement was supported by the ARC Centre of Excellence for Australian Biodiversity and Heritage [CE170100015].

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