– ARTICLE –

Ruisasi 1 and the Earliest Evidence of Mass-produced Ceramics in Caution Bay (Port Moresby Region), Papua New Guinea

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ABSTRACT

The history of pottery use along the south coast of Papua New Guinea spans from Lapita times, here dated to 2900–2600 calBP, through to mass production of pottery associated with a number of ethnographically-known interaction (and exchange) networks. Understanding the antecedents and developmental histories of these interaction networks is of considerable importance to archaeological research from local to western Pacific geographical scales. The archaeological site of Ruisasi 1 located at Caution Bay near Port Moresby provides new insights into scales of pottery production before the development of the regional Motu *hiri* exchange system within the past 500 years. Here faunal remains indicate occupation by marine specialists who exploited a diverse range of local marine environments. Nearly 20,000 ceramic sherds are present in Square A, mostly from a 26 cm thick 'pottery midden'. A minimum of 45 red slip/plainware vessels based on conjoined sets of sherds plus two vessels with incised decoration are present; the maximum number of clay vessels based on Fabric Types is 146. The globular red slip/plainware pots have standardised shapes and sizes, consistent with mass pottery production. The concentration of sherds from these pots within the pottery midden reflects short-duration depositional events within the period of village life *c.* 1680–1180 calBP. Whether or not the pots were made locally or imported is the subject of ongoing research. Whatever the case, Ruisasi 1 raises the possibility of mass pottery production linked to a regional interaction network pre-dating the *hiri*.

INTRODUCTION

The south coast of mainland Papua New Guinea (PNG) is renowned for its long-distance maritime interaction networks of the ethnographic period, in particular the Mailu (centred on the island of Mailu) (e.g., Irwin 1985), Hula (centred at Hood Bay) (e.g., Davies 2012) and Motu *hiri* (centred in Port Moresby region) (e.g., Allen 1977) systems that together enchain much of the south coast into a geographically connected sphere of material trade and cultural influence. Among Mailu islander and Motu pottery manufacturers especially, highly standardised ceramic vessels of a limited range of shapes and sizes featured prominently in ethnographic trade transactions (e.g., Allen 1984; Frankel *et al.* 1994).

The south coast is also known for its long history of ceramics that goes back to Lapita times, some 2900 years ago at Caution Bay (David *et al.* 2011; McNiven *et al.* 2011, 2012) and perhaps slightly later beginning *c.* 2600 calBP in the Kouri lowlands further to the west (Skelly 2014; Skelly & David in press; Skelly *et al.* 2014). Over the past 2900

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years, however – and especially over the past 2000 years, the period from which ceramics have been documented in most regional sequences (see Summerhayes & Allen 2007) – along the south coast ceramic conventions have changed many times, sometimes in different ways between regions.

Taking these two factors into account – highly standardised trade ceramics of the ethnographic period, and a long and variable ceramic history – the question remains: At what time since the onset of Lapita ceramics did the Port Moresby region begin to manufacture pottery en-masse for purposes of external trade in long-distance sea ventures? Here we present new archaeological evidence from the site of Ruisasi 1, located at Caution Bay some 20 km northwest of Port Moresby, revealing remains of a previously unknown settlement by ceramic users, and probably ceramic manufacturers, arguably ancestral to the ethnographic Motu (Figure 1). This evidence sheds new light on the history of standardised ceramics in the Port Moresby region, presumably mass-produced for external consumption in endeavours distantly ancestral to the ethnographic *hiri* trade.

RUISASI 1

Ruisasi 1 (PNG National Museum and Art Gallery site code ABKO) is one of 122 archaeological sites excavated through the Caution Bay Archaeology Project in 2009–2010 (Richards *et al.* in press). The site is located at the southern end of Caution Bay, on the low-lying Boroko land system's grassy alluvial plain of the Coastal Hill geomorphological zone (Mabbutt *et al.* 1965: 37). The Boroko land system is characterised by 'dark cracking clay soils' (Mabbutt *et al.* 1965: 37).

Ruisasi 1 is only a few hundred metres inland from a large beach ridge dune containing the deeply stratified Bogi 1 and Tanamu 1 sites, among others (David *et al.* 2011; McNiven *et al.* 2011) (Figure 2). A band of mangrove forest begins 270 m to the west and continues for a further 477 m to the open ocean. Ruisasi Creek, the nearest permanent source of freshwater, is only 160 m from the site; the larger Vaihua River is some 1500 m due south.

The vegetation at Ruisasi 1 consists of open low-growth grassland dominated by *Themeda* spp. (Figure 3). Rowe *et al.* (2013) demonstrate through pollen research that the extensive mangroves fronting the extensive beach ridge dune containing Bogi 1 and Tanamu 1 formed or began to significantly expand around 2000 years ago, so that when Ruisasi 1 was occupied some 500 years later a mangrove belt was in place along the adjacent stretch of coastline.

Climatically this region experiences tropical monsoonal conditions combining a limited temperature range (mean maximum 28–32°C) with strong rainfall seasonality. Annual rainfall averages 1000 mm, 80% of which falls

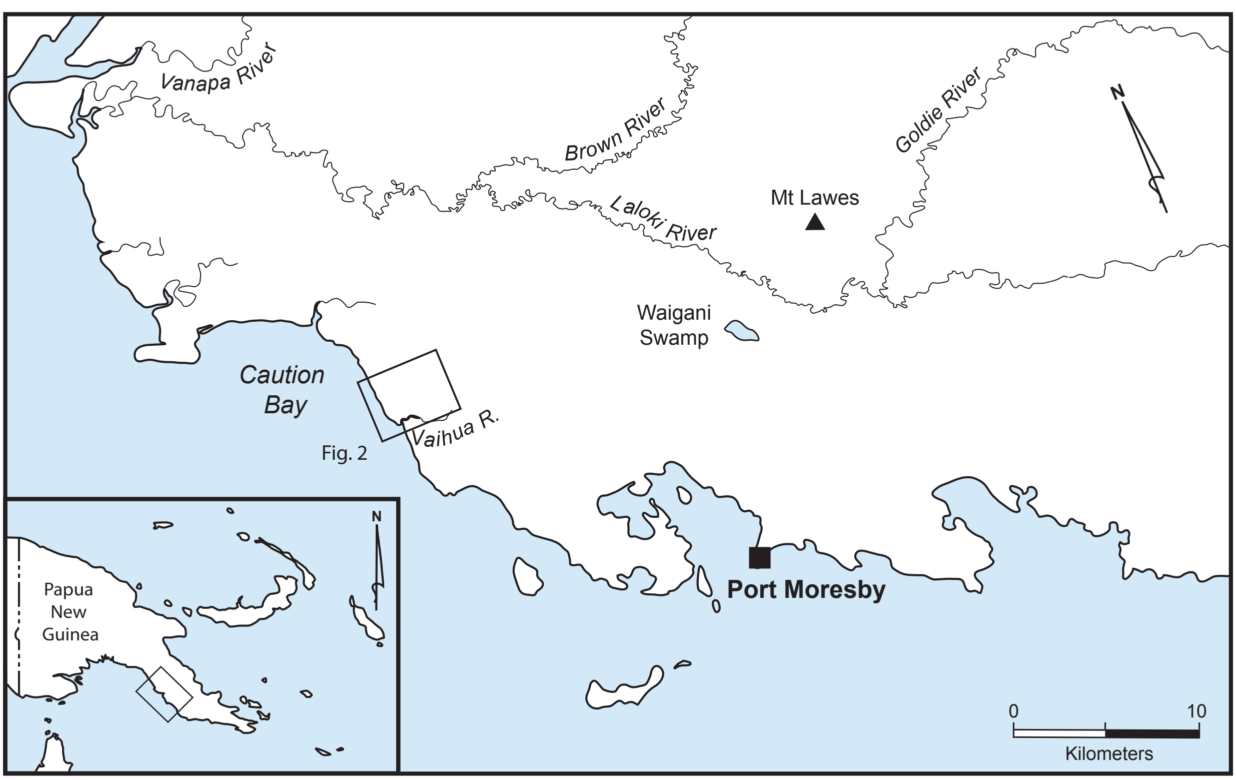

Figure 1. Location of Caution Bay study area, south coast of mainland PNG.

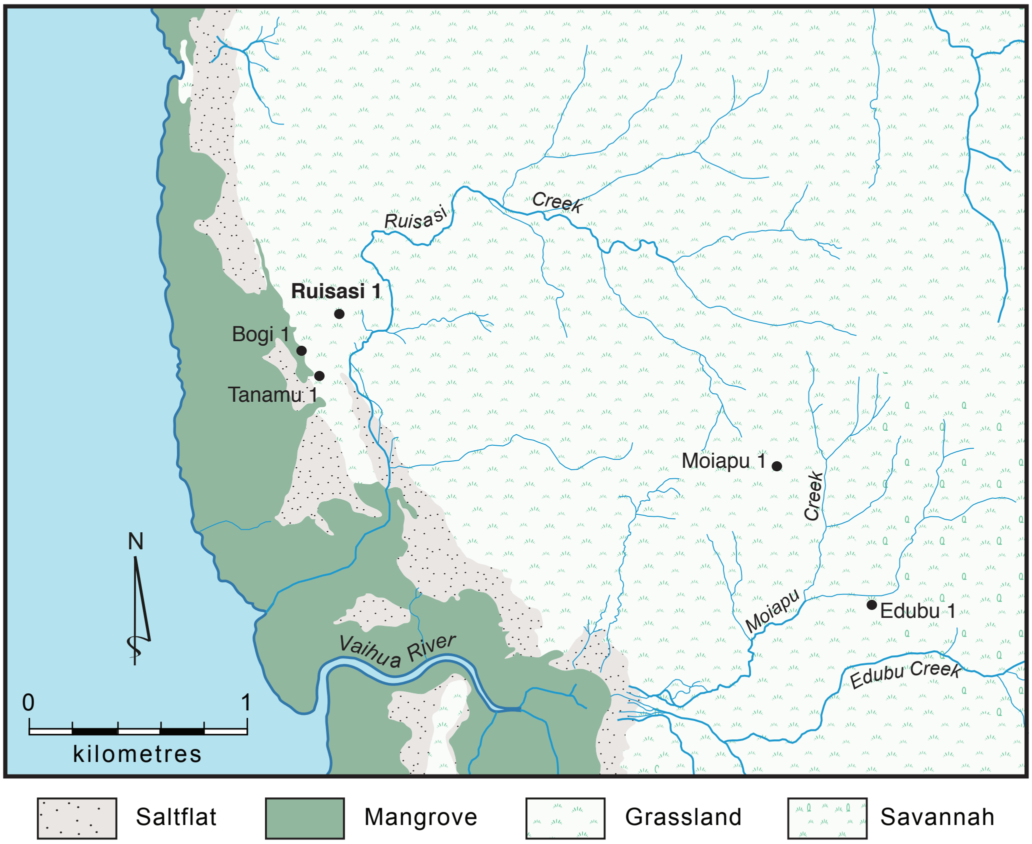

Figure 2. Location of Ruisasi 1 at Caution Bay, showing also the location of excavated Lapita and immediately post-Lapita sites that have already been analysed.

Figure 3. Ruisasi 1, Square A excavation in progress, 5 January 2010. Looking north across the coastal plains (photograph: Ian J. McNiven).

from December to April (McAlpine *et al.* 1983). Such extremes in rainfall result in some annual flooding of Ruisasi 1, but, it appears, not to the detriment of the site's overall spatial or stratigraphic integrity.

The surface of Ruisasi 1 averages 4 m above sea level. Site topography is predominately flat but features a 1 m rise at its western boundary (Figure 4). No eastward erosional movement and/or transport of cultural materials from the higher western reaches of the site are apparent. The area floods during the wet season.

The site was identified from a surface scatter of cultural materials spread over an area 25 × 15 m. Ceramic sherds average *c.* 15 sherds/m² and some shell was also evident on the surface. Surface ceramics include large rims, mostly plain but including some decorated sherds. Shells include both whole and fragmented specimens. These cultural materials occur on flat land which is part of the Ruisasi Creek flood plain, and are absent on the 1 m rise at the western extent of the site.

EXCAVATION METHODS

Two 1 × 1 m squares (Squares A and B) were excavated in 2010. The two squares were positioned 15 m apart. While Square A contains an abundance of cultural materials, Square B has minimal amounts, less than 100 g total cultural material. The present paper is largely concerned with Square A (containing 33.4 kg of cultural materials in total), although the radiocarbon dates from Square B are discussed below as they are relevant to the chronology of the site as a whole.

Square A was excavated following the stratigraphy where visible in Excavation Units (XUs) with a mean thickness of 2.2 ± 0.8 cm (Table 1). Excavation proceeded to 92 cm below the ground surface, well into culturally sterile sediment. Selected cultural materials had their *in situ* locations within the excavation square plotted in three dimensions and were then individually bagged; all other excavated sediments were wet-sieved through 2.1 mm mesh in the field laboratory at Caution Bay, air-dried, and air freighted to the Monash University archaeology laboratories in Melbourne, where they were lightly rinsed and again air-dried prior to sorting and analysis.

STRATIGRAPHY

Square A contains four major Stratigraphic Units (SU) (Figures 5, 6). Table 1 shows the relationship between SUs and XUs. SU1 is a thin, surface layer of cracking and friable, very dark gray (dry Munsell: 10YR 3/1) silty loam. It grades into the underlying, similar but slightly more moist, cracking very dark grayish brown (dry Munsell: 10YR 3/2) silty loam of SU2. SU3 consists of a well-demarcated, dense horizon of cultural materials, mainly ceramic sherds but also marine shell, minor amounts of non-molluscan faunal remains, and stone artefacts. The sediment matrix surrounding the SU3 cultural materials consists of light brownish gray (dry Munsell: 5Y 6/2) silty loam. The interface between SU2 and SU3 is mostly 2–3 cm thick. SU3 transitions to SU4, a pale yellow (dry Munsell: 5Y 8/3) silty loam 2–5 cm thick interface. SU4 contains numerous crab holes that have been infilled with dark, SU2–SU3 sediments; these

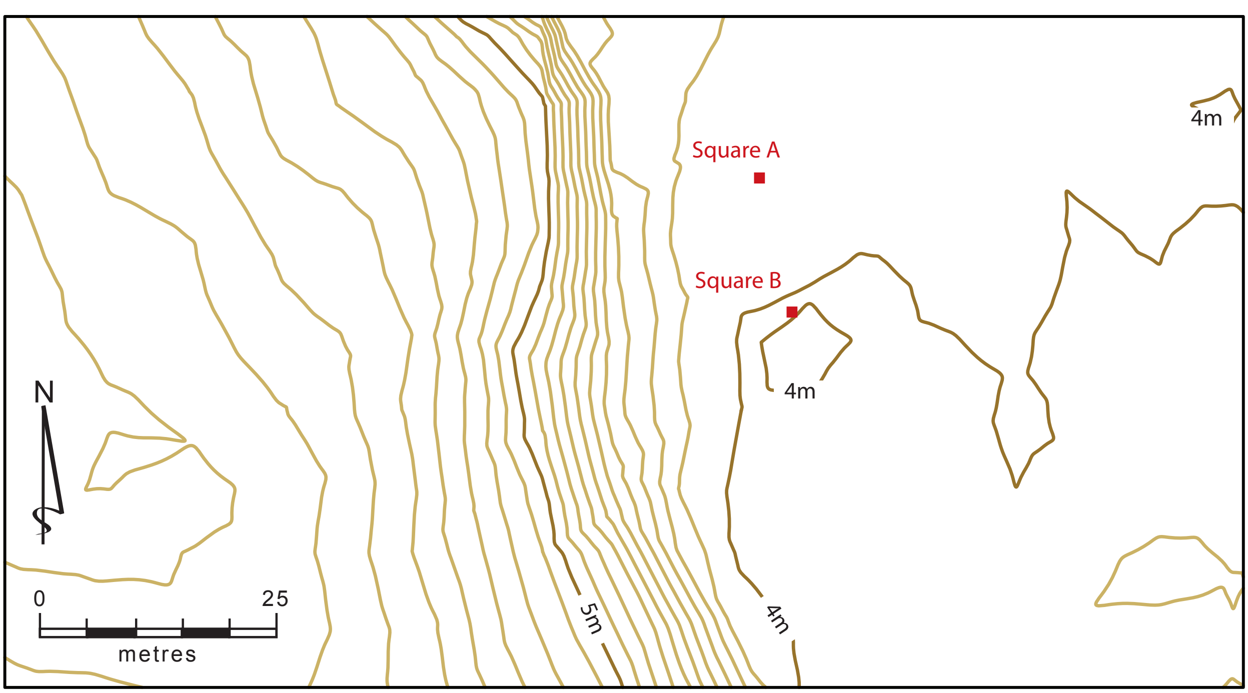

Figure 4. Map of Ruisasi 1.

infilled holes penetrate down some 35–40 cm into deeper levels of SU4. Soil pH values are neutral near the surface and become more basic with depth (see Table 1).

Table 1. *Details of each XU, Ruisasi 1, Square A.*

XU	SU	Mean Depth Below Surface at Base of XU (cm)	Mean Thickness of XU (cm)	Area (m^2)	Volume (litres)	pH
1	1	1.9	1.9	1.00	23.0	6.59
2	1+2	4.2	2.3	1.00	27.0	6.73
3	1+2	7.0	2.8	1.00	44.0	6.71
4	1+2	8.8	1.8	1.00	33.0	7.02
5	1+2	10.9	2.1	1.00	30.5	7.43
6	1+2	12.9	2.0	1.00	32.0	7.59
7	2	14.8	1.9	1.00	33.0	7.65
8	2	17.1	2.3	1.00	42.0	7.77
9	2	19.7	2.6	1.00	38.0	7.83
10	2	21.1	1.4	1.00	37.5	7.87
11	2	22.5	1.4	1.00	16.0	7.93
12	2	24.0	1.5	1.00	43.0	7.99
13	2	26.5	2.5	1.00	57.0	7.99
14	2	28.4	1.9	1.00	45.5	8.02
15	2	31.0	2.6	1.00	42.0	8.04
16	2+3	32.3	1.3	1.00	34.5	8.09
17	2+3	34.9	2.6	1.00	22.0	8.04
18	2+3	36.1	1.2	1.00	28.5	8.09
19	2+3	38.1	2.0	1.00	31.5	8.11
20	2+3	38.4	0.3	1.00	9.5	8.33
21	2+3	40.4	2.0	1.00	29.0	8.42
22	2+3	41.1	0.7	1.00	17.0	8.45
23	2+3	42.7	1.6	1.00	20.5	8.53
24	3+4	45.5	2.8	1.00	43.0	8.53
25	3+4	48.1	2.6	1.00	35.0	–
26	3+4	48.1	0.0	1.00	?	–
27	3+4	50.5	2.4	1.00	43.0	8.72
28	4	54.2	3.7	1.00	44.5	8.84
29	4	56.5	2.3	1.00	44.0	8.97
30	4	59.1	2.6	1.00	41.5	8.90
31	4	62.7	3.6	1.00	48.0	8.94
32	4	65.0	2.3	1.00	41.0	8.93
33	4	68.0	3.0	1.00	44.0	8.99
34	4	70.4	2.4	1.00	46.0	8.95
35	4	73.9	3.5	1.00	35.5	8.95
36	4	76.2	2.3	1.00	37.0	8.88
37	4	79.3	3.1	1.00	38.5	9.04
38	4	81.1	1.8	1.00	26.5	8.95
39	4	84.7	3.6	0.25	9.5	8.88
40	4	86.0	1.3	0.25	6.0	8.75
41	4	89.9	3.9	0.25	13.0	8.86
42	4	91.6	1.7	0.25	8.0	8.72

RADIOCARBON DATING

Eight radiocarbon dates were obtained from Squares A and B (Table 2). These were calibrated in OxCal v4.2 (Bronk Ramsey 2015) using the Marine13 and Intcal13 curves (Reimer *et al*. 2013). The following discussions of calibrated ages are based on the 68.2% probability distributions.

To refine our chronological interpretation we then utilized Bayesian statistical methods integrated into OxCal whereby ^{14}C ages are constrained by prior stratigraphic information, which indicated that a single phase of activity occurred at this location. To define the age of the onset, end and duration of site use, we modelled the radiocarbon dates from each square as two separate but overlapping sequences. Within these sequences the dates from Square A and those from Square B (Wk-27837 and Wk-27838) were constrained within separate phases, each bracketed by boundaries that provide an estimate for the start and end date of each phase. The overall model is assessed by the calculation of an agreement index (A_{model}) that tells us how well the model agrees with the observations. If A falls below 60% (equivalent to the 5% level of a χ^2 test), the model should be re-evaluated (Bronk Ramsey 1995).

The five Square A AMS dates fall within the modelled age range of 1680–1180 calBP (A_{model}: 102), while two dates from Square B, each on charcoal, provide age determinations within the range 1620–1330 calBP (Table 2). A charcoal sample dating to 2760–2720 calBP (unmodelled) from XU32 in Square B indicates (probably landscape) burning during earlier times at Ruisasi 1. The latter date is consistent with late Lapita occupation at Caution Bay, evident in many other sites located from 140 m to 2775 m from Ruisasi 1. In Square B, however, there is very little cultural material associated with that date.

Because of the limited number of radiocarbon dates and stratigraphic differentiation, the calculated span of occupation represented by shell remains from Square A spans from 190 to 310 years within the modelled age range 1680–1180 calBP. The broadness of this age range is almost certainly affected by the relatively young date Wk-29344, but this result is not statistically an outlier (A = 88%) in the model presented, and cannot be excluded. The chronological distribution of Square B is much tighter, with occupation spanning between 0 and 50 years duration, but here there are only two radiocarbon dates, so that estimate of duration is not very robust. Combining the radiocarbon dates of both squares (excluding the Lapita-age date of Wk-27839) in a single phase, Wk-29344 is still not an outlier, and the span for village occupation now indicates a duration of 170 to 290 years within the modelled age range 1630–1220 calBP.

CULTURAL MATERIALS

Cultural materials occur in most XUs in Square A (Table 3, Figure 7). However, their vertical distribution in-

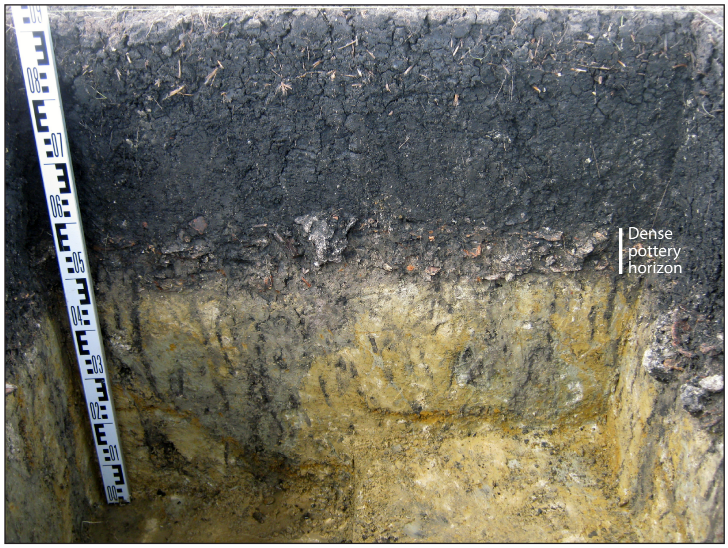

Figure 5. Ruisasi 1, Square A, north wall after completion of excavation, 18 February 2010 (photograph: Robyn Jenkins).

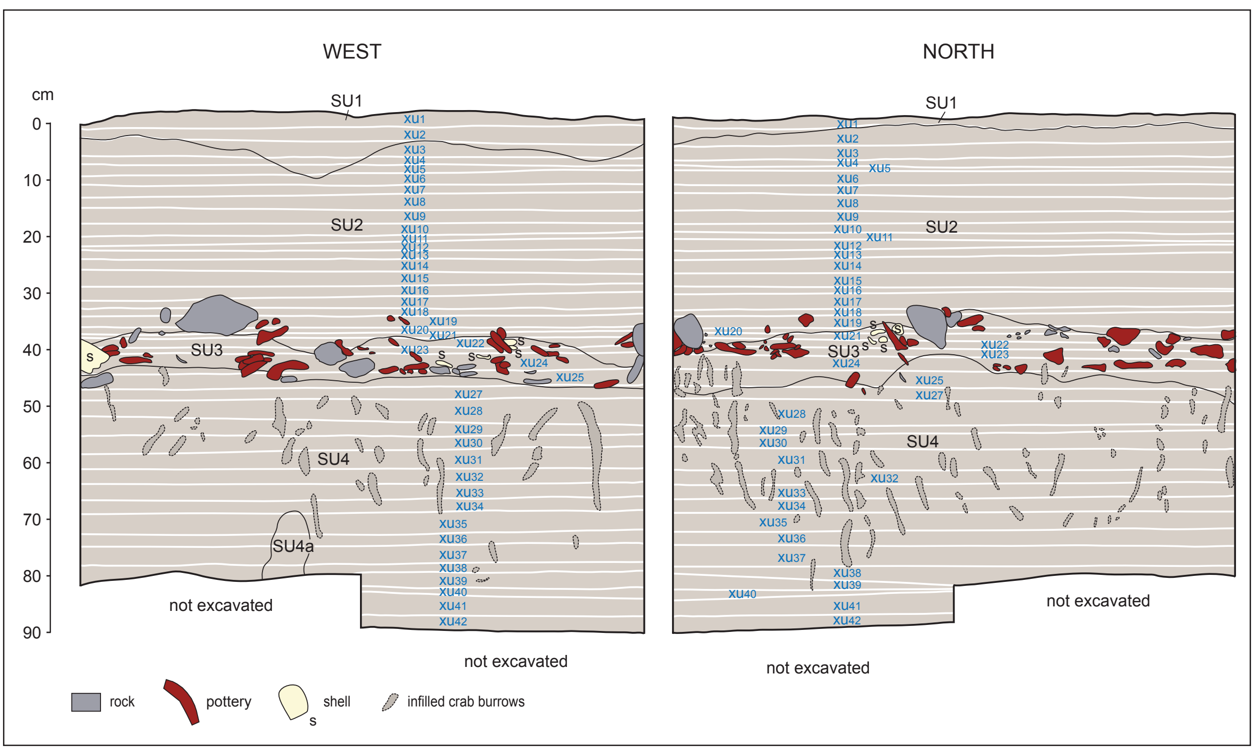

Figure 6. Ruisasi 1, Square A, west and north section drawings showing location of back-plotted XUs (XU26 does not reach as far as the west and north sections of the pit, i.e., that XU is not represented on Figure 6).

dicates a regular bell-curve with peak densities of most categories between XU15 and XU28, centred on SU3, with the underlying and overlying materials representing post-depositional vertical movement from the dense cultural horizon. Mechanisms for such movements mostly involve: 1) downward movement by burrowing crustaceans, as evident in the numerous infilled crabholes reported above and clearly visible in the sections of Square A; and 2) upward and downward movement through cracking of the clayey sediments in this alternating seasonally wet and dry tropical landscape, with flooding of low-lying areas such as Ruisasi 1 being common during the rainy season from December to April, and sediments cracking during the dry season months, especially from June to October

Table 2. *Ruisasi 1 radiocarbon determinations. All* ^{14}C *ages are AMS. All calibrations were undertaken with OxCal 4.2 (Bronk Ramsey 2015), on the INTCAL13 curve for charcoal samples and the MARINE13 curve for shell (Reimer* et al. *2013) (local Caution Bay ΔR values after Petchey* et al. *2012, 2013: Gafrarium ΔR = 67±16; Gafrarium sp. ΔR = 60±11). *$\delta^{13}C$ value measured by isotope ratio mass spectrometry.*

XU	Depth (cm)	Lab Code (Wk-)	Material Dated	% Modern	$\delta^{13}C$‰ (IRMS)*	^{14}C Age (years BP)	Unmodelled Calibrated Age BP (68.2% probability)	Unmodelled Calibrated Age BP (95.4% probability)	Unmodelled Median Calibrated Age BP
Square A									
15	28.4–31.0	29342	*Gafrarium* sp. shell	77.7±0.3	0.9±0.2	2031±31	1590–1470	1630–1400	1530
20	38.1–38.4	29343	*Gafrarium tumidum* shell	78.3±0.3	0.7±0.2	1969±31	1500–1390	1540–1340	1450
25	45.5–48.1	29344	*Gafrarium tumidum* shell	79.9±0.3	1.1±0.2	1807±33	1330–1250	1380–1210	1290
28	50.5–54.2	29345	*Gafrarium* sp. shell	77.8±0.2	1.2±0.2	2016±25	1560–1460	1600–1400	1510
30	56.5–59.1	29346	*Gafrarium tumidum* shell	77.3±0.2	0.8±0.2	2068±27	1610–1510	1680–1470	1560
Square B									
20	46.4	27837	charcoal	81.9±0.3	–29.2±0.2	1599±30	1540–1510 1500–1410	1560–1410	1480
24a	58.4	27838	charcoal	81.9±0.2	–21.3±0.2	1601±30	1550–1510 1500–1480 1470–1410	1560–1410	1480
32	74.5	27839	charcoal	72.5±0.2	–24.7±0.2	2588±30	2760–2720	2770–2700 2640–2610 2560–2540	2740

(Figures 5, 6). There is no evidence in the sediments, nor on the edges or surfaces of artefacts, that cultural materials have been post-depositionally redeposited from other parts of the landscape through colluvial or alluvial erosion; indeed, conjoin analysis shows that cultural materials were deposited on-site (see below).

Ruisasi 1, Square A stands out at Caution Bay for its dense horizon of ceramic sherds spanning 28–54 cm below the present ground surface (XU15–XU28): it is essentially a buried 'pottery midden'. While other cultural materials such as stone artefacts, marine shells and vertebrate faunal remains are present, ceramic sherds by far overwhelm all other materials numerically and by weight. The 1 m² excavation square revealed 19,558 sherds weighing 30.4 kg, equivalent to 91% of the total weight of all excavated cultural materials from that square (see Table 3).

The strongly correlated vertical distribution of the different categories of cultural materials indicates that they were all deposited during a single period of village occupation. This cultural material was deposited directly within SU3 on the basal silty loam of SU4; although a combination of crab holes and cracking soils have resulted in the post-depositional intrusion from above of lesser quantities of cultural items into these underlying sediments, there is no evidence of *in situ* cultural materials within SU4. We can thus conclude that people deposited all the cultural materials from the dense cultural horizon, and the tail ends of the distribution curve that centres on that dense horizon, within the period from 1680 to 1180 calBP. However, the bulk deposition of pottery in this locality, now identified as the dense pottery horizon, was an event of short duration, or a few short duration events, within the broader village occupation span (see below).

Stone artefacts

A total of 124 local chert artefacts and a single igneous artefact was recovered, mostly from the dense SU3 cultural horizon (Table 3). Stone artefacts are generally small, averaging 9.3 mm in length, with most measuring from 3 to 9 mm maximum length. By weight, stone artefacts range from <0.01 g to 138.75 g with a mean weight of 2.28 g. The

Table 3. *General list of excavated materials by XU, Ruisasi 1, Square A.*

XU	Marine Shell	Crustacea	Sea Urchin	Animal Bone	Charcoal	Ceramic Sherds		Stone Artefacts	
	g	g	g	g	g	#	g	#	g
1									
2	0.1					37	9.0	1	0.04
3	0.1					103	11.7	3	0.12
4	1.3					66	11.0		
5		0.01				91	11.5	2	0.07
6	0.3				0.13	177	12.3	1	0.00
7	3.3		0.01			29	8.6		
8	6.4	0.14	0.01			192	18.2	1	0.14
9	5.9		0.04			323	37.3	3	0.03
10	5.8	0.01	0.08			132	26.0	3	0.04
11	5.6	0.43	0.01			79	21.2		
12	13.2	0.04	0.14			244	70.6	1	0.03
13	21.6	0.01	0.32		0.01	201	140.5	2	0.05
14	30.0	0.11	0.21			260	202.4	4	0.11
15	52.4	0.03	0.33			686	409.6	4	0.07
16	96.5	0.05	0.25	0.01		745	661.3	4	8.78
17	160.9	0.56	0.08			1068	1307.8	10	4.85
18	291.5	1.46	0.68			2158	3527.9	14	30.70
19	518.1	1.68	2.64	0.26		2460	4883.7	4	0.26
20	78.6	0.44	1.59			635	1517.3	2	0.07
21	320.0	3.83	4.64			1944	3278.8	6	1.64
22	150.7	3.42	1.86			987	2145.2	4	0.29
23	273.3	1.79	2.99			1912	3636.3	4	0.13
24	127.7	1.57	1.59	0.02		1334	1983.4	22	5.10
25	97.6	1.77	0.84			690	1515.5	2	0.21
26	216.0	1.77	0.41			838	2495.5	13	199.38
27	86.7	0.86	0.71			551	897.4	1	0.03
28	52.3	1.09	0.40			303	342.4	3	0.11
29	29.3		0.61	0.23		202	170.3		
30	27.4	0.59	0.30			220	207.5	3	0.09
31	15.8		0.06	0.04		201	225.8	2	2.66
32	11.7	2.06				54	73.8		
33	13.5			0.15		127	120.4		
34	14.3		0.02	0.11		112	177.5	1	0.04
35	6.5	0.06				100	69.0		
36	4.6		0.03			57	25.7		
37	5.5					80	32.2	1	0.01
38	0.4			0.02		51	52.5	3	0.41
39	0.5					60	8.8		
40	0.1					12	4.5		
41	0.1	0.1				37	9.0		
42	0.3								
Total	**2746.0**	**23.88**	**20.85**	**0.84**	**0.14**	**19,558**	**30,359.5**	**124**	**255.46**

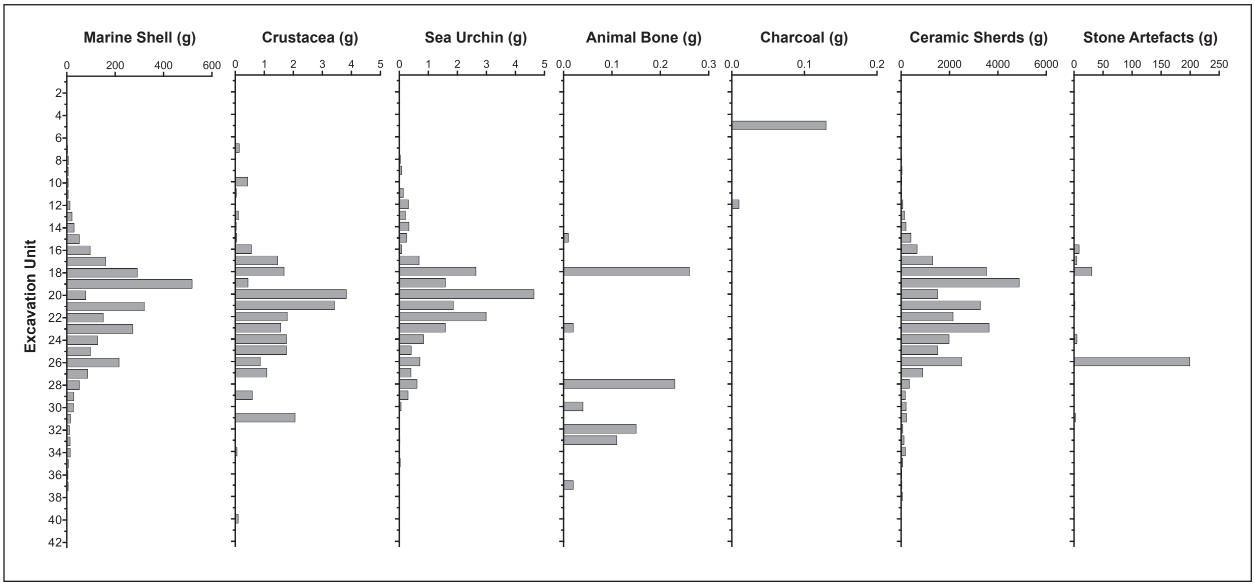

Figure 7. Distribution of cultural materials by XU, Ruisasi 1, Square A.

chert assemblage is highly fragmented, with flaked pieces representing 50.4% of the lithic assemblage, followed by broken flakes (40.7%), complete flakes (8.1%), and a single core (0.8%). All chert flakes and the single core were produced through unipolar freehand percussion. A low Minimum Number of Flakes (see Hiscock 2002) of 19 suggests the occurrence of a single knapping event involving chert at Square A. Flaked pieces were likely the result of heat alteration (possibly post-depositional), with nearly 60% displaying heat-altered colours.

The rarity of artefacts displaying cortex suggests that initial reduction stages took place off-site, while the small dimensions of flakes and high proportions of abrupt terminations suggest that much of the knapping performed on-site involved late reduction stages. Although based on a small number of complete flakes, chert reduction intensity is low with little evidence of more than one core rotation on complete flakes. Artefacts were rarely retouched.

These results indicate that the lithic assemblage likely represents a single episode of low-intensity stone tool manufacture involving late reduction stages.

Marine shells

Marine mollusc shell is present in all XUs except for the thin, surface XU1 (Tables 3, 4). Total shell weight is 2746.0 g (MNI = 930, comprised of 475.6 g of bivalves (MNI = 96), 1697.9 g of gastropods (MNI = 731), 48.3 g of chitons (MNI = 103) and 524.3 g of shell material that could not be identified to family, genus, or species level due to fragmentation and/or weathering (Table 4).

A total MNI of 641 bivalves and gastropods were identified from 41 species; these represent 68.9% of the total MNI and 77.5% of the assemblage by weight. Six species dominate the assemblage, each contributing more than 5% of the total MNI: *Terebralia sulcata* (MNI = 173, 27.0% of MNI); *Cerithideopsis largillierti* (MNI = 101, 15.8% of MNI); *Telescopium telescopium* (MNI = 87, 13.6% of MNI); *Nerita* cf. *chamaeleon* (MNI = 47, 7.3% of MNI); *Nerita albicilla* (MNI = 33, 5.2% of MNI); and *Conomurex luhuanus* (MNI = 33, 5.2% of MNI).

Five of the species that dominate the assemblage by MNI also each contribute 5% or more of the total weight of the shells identified to species: *Conomurex luhuanus* (304.9 g, 19.2% of total weight); *Telescopium telescopium* (297.0 g, 18.7% of total weight); *Terebralia sulcata* (273.8 g, 17.3% of total weight); *Nerita* cf. *chamaeleon* (91.2 g, 5.8% of total weight); and *Cerithideopsis largillierti* (80.9 g, 5.1% of total weight). A very small proportion of the assemblage (N = 11, 1.33% of total MNI) consists of intact small specimens <1 cm, suggesting a negligible non-economic component.

Stratigraphically, the shell is distributed in a bell-curve with a peak in XU19, consistent with the notion of a single phase of occupation.

A review of the ecological literature specified environmental preferences for 33 of the taxa identified. Of these, 18 species (MNI = 233) were recorded as restricted to a single type of environment. These single-environment molluscs were mostly obtained from muddy (MNI = 113, with 101 being *Cerithideopsis largillierti*) or rocky (MNI = 103, all chitons) environments, with shells from sandy (MNI = 11), seagrass (MNI = 2), mud-sand (MNI = 2), mangrove (MNI = 1), and on-rock (MNI = 1) habitat zones also occasionally present. No reef-only taxa are present. Omitted from the above discussion is a species strongly represented in the assemblage, *Conomurex luhuanus,* that is found in multiple habitats (seagrass, sand and reef), suggesting that

Table 4. *Distribution of marine mollusc shell by XU.*

XU	Gastropoda		Bivalvia		Chitons		Unidentified		Total Marine Mollusc	
	MNI	Weight (g)	MNI	Weight (g)	MNI	Weight (g)	MNI	Weight (g)	MNI	Weight (g)
1										
2								0.1		0.1
3								0.1		0.1
4	1	0.9						0.4	1	1.3
5										
6								0.3		0.3
7		1.1		0.2		0.1		1.9		3.3
8	1	2.9		0.7				2.8	1	6.4
9	1	0.8		0.1				5.0	1	5.9
10		1.4		0.2				4.2		5.8
11	3	3.9		0.2				1.5	3	5.6
12	2	5.9		1.2		0.1		6.0	2	13.2
13	2	7.1		1.1		0.5		12.9	2	21.6
14	3	10.8	1	3.5	1	0.2		15.5	5	30.0
15	8	28.2	2	5.6	2	1.2		17.4	12	52.4
16	15	52.6		15.2	2	0.4		28.3	17	96.5
17	26	83.1	3	36.3	2	2.9		38.6	31	160.9
18	79	191.3	9	45.3	19	6.4		48.5	107	291.5
19	121	327.1	20	106.5	16	10.0		74.5	157	518.1
20	21	40.5	5	18.3	12	3.9		15.9	38	78.6
21	77	185.3	15	67.0	23	8.6		59.2	115	320.1
22	56	109.8	5	14.1	9	3.7		23.1	70	150.7
23	90	191.5	9	39.1	5	2.3		40.4	104	273.3
24	38	94.5	4	11.5	3	0.9		20.8	45	127.7
25	25	54.3	6	18.7	2	1.5		23.1	33	97.6
26	46	136.5	9	58.3	1	0.8		20.4	56	216.0
27	42	65.1	1	4.0	2	0.9		16.7	45	86.7
28	15	33.4	2	7.6	1	1.0		10.3	18	52.3
29	16	14.0	3	7.1	1	0.8		7.4	20	29.3
30	7	13.4	1	6.9				7.1	8	27.4
31	12	8.3		1.0		0.9		5.6	12	15.8
32	3	6.4		2.4		0.3		2.6	3	11.7
33	7	9.7		0.04				3.8	7	13.5
34	7	10.5		0.8		0.3		2.7	7	14.3
35	1	3.4		0.4				2.7	1	6.5
36	3	3.1		0.6				0.7	3	4.4
37	1	1.0	1	1.3	1	0.2		2.8	3	5.3
38	2	0.1			1	0.4		0.3	3	0.8
39								0.5		0.5
40								0.1		0.1
41		<0.1		<0.1				0.1		0.1
42				0.3						0.3
Total	**731**	**1697.9**	**96**	**475.6**	**103**	**48.3**		**524.3**	**930**	**2746.0**

Ruisasi 1 shellfish did not only come from muddy or rocky environments.

Non-molluscan fauna

Very small quantities of non-molluscan faunal remains are present. Fragments of crustacean exoskeleton totalling 40.6 g were recovered from XU5, XU8, XU10–XU32, XU35, and XU41; fragments of sea urchin test and spine totalling 22.26 g from XU7–XU31, XU34 and XU36; and fragments of bone totalling 0.84 g occur intermittently from XU16–XU38.

The sea urchin remains are highly fragmented but all examples are consistent with the Collector Urchin, *Tripneustes gratilla*, a species that Pernetta and Hill (l981: 178) characterise as 'common on reef flat areas and in sea grass beds, wherever these occur along the coast', with the added note that it 'appears to have been widely used for food'.

The crustacean remains derive from at least eight crab species (see Table 5; taxon designations follow the usage in Aplin and Frost completed manuscript) including several kinds of portunid crabs and a Ghost Crab, *Ocypode* sp. A species of *Scylla* is represented in a few XUs. While these are presumably *S. serrata*, the Mud Crab, all of the crab remains are from small to medium-sized individuals and larger individuals are conspicuously absent.

Animal bone is limited to a few fragments of fish bone including one piece from XU16 that is referrable to the Family Scaridae, a single vertebra of a medium-sized python from XU34, a single molar fragment of a small wallaby (Family Macropodidae) from XU29, and a fragmentary rat tibia, Family Muridae, from XU38. All bone fragments are unburned save for one small burned fragment of fish bone in XU19. The wallaby molar fragment cannot be determined to species but it is most likely derived from either a Grey Dorcopsis (*Dorcopsis luctuosa*) or a Dusky Pademelon (*Thylogale brunii*); both are inhabitants of rainforest or gallery forest communities.

Despite the scarcity of vertebrate remains, all of the non-molluscan faunal material is generally well preserved and it seems unlikely that much has been lost through post-depositional degradation. However, other peri- or post-depositional processes such as scavenging of discarded animal remains by camp dogs or pigs cannot presently be ruled out as an explanation for the small quantities of remains. Alternatively, the inhabitants of the site simply may have not consumed and/or discarded the remains of vertebrates in the area of Square A.

Ceramic sherds

Within Square A, ceramics span 88 cm of the depth of the excavated sequence, from XU2 to XU41. Square A contains 19,558 ceramic sherds weighing a total of 30.4 kg (Table 3). Of these, 18,218 sherds (93.1% by number) are <3 cm long. The mean weight of all sherds is 1.6 g. It should be noted that the proportion of sherds ≥3 cm vs sherds <3 cm long is similar to that of other analysed sites at Caution Bay; there is no exceptional fragmentation of potsherds at Ruisasi 1, and the generally high proportion of small sherds in the Caution Bay sites is due to the recovery of all very small sherds following wet sieving of excavated sediments through 2.1 mm mesh sieves.

Of the total ceramic sherds from Square A, 16,311 sherds (83% of the total sherd assemblage by number) weighing 28.6 kg (94% of the total sherd assemblage by weight) came from the dense, 26 cm-thick ceramic horizon extending from XU15 down to XU28. In this ceramic horizon, sherds occur at an average density of 63,221 sherds/m³ or 111 kg of sherds/m³.

Ceramic sherds above and below the dense ceramic horizon have, for the most part, moved there post-depositionally from this horizon, as a result of crab-burrowing activities and through cracks in the sediment (as described above).

Analytical methods

The majority of excavated ceramic sherds are small to tiny fragments, too small to obtain meaningful data on vessel forms. Therefore, a 3.0 cm maximum length threshold was used when undertaking detailed analyses. The total number and weight of sherds <3.0 cm were recorded for each XU and, from this size fraction, only the weights of rim and decorated sherds were individually recorded. However, the nature of the decoration was recorded for every sherd irrespective of its size.

All 1340 sherds ≥3.0 cm long (6.9% of the assemblage) were analysed in greater detail. The recorded variables were aimed at retrieving information about vessel form and decoration (Table 6).

These variables broadly correspond to those utilised in previous archaeology projects along the PNG south coast (e.g., David *et al.* 2009; Frankel *et al.* 1994; Irwin 1985). The position of the orifice, orientation angle, inclination angle, lip, rim, body, neck, shoulder, carination and base are shown in Figure 8.

Clay and temper characteristics are not reported here. They form the subject of separate studies currently in progress and to be reported at a later stage.

Ceramic analysis results are presented below.

Manufacturing. In total 322 sherds ≥3 cm long (24.0%) have finger dimple marks on their interior surfaces, and ten body sherds ≥3 cm long (0.7%) exhibit paddle marks on their exterior surfaces. Of the rim sherds ≥3 cm long, nine (5.0%) have evidence of paddle edge marks on their external neck surfaces. Individually and together these marks indicate the use of paddle and anvil in manufacture.

Rims. In total 230 rim sherds are present (i.e., sherds with lips present). Of these 181 are ≥3 cm long. Orifice diam-

Table 5. *Taxonomic composition of the crustacean and vertebrate faunal remains from Ruisasi 1. Presence of each crab taxon is indicated for each XU. For the vertebrate groups, the values are the Number of Individual Specimens (NISP).*

XU	Crabs								Fish	Reptile	Mammal	
	Taxon B	Taxon F	Taxon G	Portunid sp. A	Portunid sp. B	Small Portunids	*Scylla* sp.	*Ocypode* sp.	Scaridae	Pythonidae	Small Macropodid	Small Murid
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11				+								
12		+										
13												
14												
15		+										
16									1			
17						+						
18						+	+					
19						+	+					
20						+	+					
21				+								
22												
23				+			+	+				
24				+			+	+				
25							+					
26	+			+	+							
27					+		+					
28	+						+					
29											1	
30	+				+							
31												
32	+											
33												
34										1		
35												
36												
37												
38												1

eters, reliably measurable on 157 sherds lacking incised decorations, range from 10 to 28 cm. The most common orifice diameter is 20 cm (24 rim sherds), with smaller concentrations at 15–16 cm, 18–19 cm and 24 cm diameters. These rim sherds all have rounded lips.

Following Frankel *et al.* (1994), rim courses and rim profiles were reliably recorded for all 181 rim sherds ≥3 cm long. Of these, 100 sherds (55.2%) have convex (Frankel *et al.*'s Rim Course 3) and 81 (44.8%) have straight rims (Frankel *et al.*'s Rim Course 2). No rims are concave (Frankel *et al.*'s Rim Course 1).

For rim profiles, 114 rim sherds (63.0%) have parallel-sided rims (Frankel *et al.*'s Upper Rim Profile 1), followed by 54 (29.8%) with gradually thickening (Frankel *et al.*'s

Table 6. *Variables recorded for each sherd ≥3.0 cm long (all measurements to within 2 decimal points unless otherwise indicated).*

Conjoins.
Weight (in grams).
Maximum length (in millimetres).
Presence of complete or partial pre-firing perforations.
Presence of internal anvil dimple impressions (indicating manufacture by paddle and anvil).
Presence of paddle patterns or paddle grooves on external surfaces (indicating manufacture or finish by paddle and anvil).
Presence of paddle edge marks on external vessel necks (indicating manufacture by paddle and anvil).
Presence of burnishing.
Techniques of body decoration (e.g., impression, incision, drilling, painting, slipping, infilling, modelling).
Presence of lime infill.
Colours of painting, slipping and infilling.
Tools employed to make body decoration (e.g., shell, comb, indeterminate).
Techniques, colours and tools used in lip decoration.
Location of decoration, as per the Decorative Fields of Frankel *et al*. (1994).
Maximum lip thickness (in millimetres).
Maximum rim thickness (in millimetres).
Maximum neck thickness (in millimetres).
Maximum carination thickness (in millimetres).
Maximum body (below rim, neck and carination) thickness (in millimetres).
Maximum indeterminate rim or body thickness (for non-lip sherds where rim and body cannot be differentiated; in millimetres).
Orientation angle.
Inclination angle.
Rim length (in millimetres).
Rim course (after Frankel *et al*. 1994).
Rim profile (after Frankel *et al*. 1994).
Lip profile.
Orifice diameter, measured across the mouth from the outer edge of the lip (to nearest centimetre).
Percentage of orifice circumference present (to nearest 5%).
Vessel shape: a dish is defined as a vessel whose width is larger than its depth; a bowl a globular vessel of similar width and depth; a jar a vessel deeper than it is wide; and a pot a vessel of indeterminate relative width and depth.

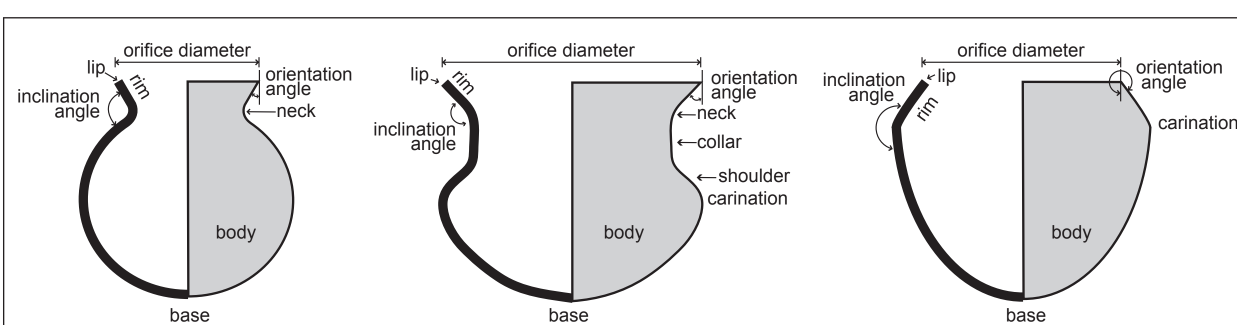

Figure 8. Terms used in this paper for pottery parts.

Upper Rim Profile 2) and 13 (7.2%) with gradually thinning rims (Frankel *et al.*'s Upper Rim Profile 3).

Decoration: red pigment. Of the 1340 sherds ≥3 cm long, 388 (29.0%) have red slip on one or both surfaces (91 on both surfaces, 202 on the exterior only, 84 on the interior only and 11 indeterminate). Fifteen sherds from XU18-XU28 have a band of red slip applied around the rim, usually extending from *c.* 2 cm below the interior neck, up the rim to the lip, sometimes continuing down the exterior rim surface. In such cases of red slip on the rim, the lower and upper (or internal and external) edges of the band of red slip tend to be well-defined, straight and regular, although in some areas there is evidence of dripping of the slip. The other 373 sherds with red slip show no clear line of termination, and therefore no evidence of formal design patterning, although red slip can cover extensive areas of the external surface of a pot (e.g., Figure 9A). Where large sections of a pot have been conjoined, the area of red slip appears to have been painted in distinct areas of the body, but the patterns are not clear due to varied degrees of post-depositional surface damage.

Decoration: body incisions. No rim sherd of any size has a decorated lip apart from red slip. There is a total of 13 sherds incised on their external surface, five <3 cm long and eight ≥3 cm long; of these two are rim sherds, the rest body sherds (Figure 10). All incised sherds except for a single rim sherd from XU38 (Figure 11) either conjoin or, in the case of two incised body sherds, almost certainly came from that same conjoined vessel but do not themselves conjoin. All incised sherds possess red slip on their external surfaces, with the incision in all cases occurring over rather than under the red slip. The 12 incised sherds from a single vessel came from XU18-XU28, suggesting that the peak ceramic horizon that contains these sherds was deposited in a single event of very short duration, or at most a few such events (see Jones-Amin, this volume).

This set of 12 incised sherds is noticeably finer in manufacture than the vast majority of the other excavated sherds, with an average maximum body wall thickness of 3.6 mm for the six incised sherds ≥3 cm long whose thicknesses could be measured below the neck. A small number of other sherds in the assemblage are similarly thin (2.8 mm thick), possessing also a similar smooth surface finish. Five of these thin, plain body sherds from XU20-XU26 conjoin with the incised ones.

The incised decoration commences along the shoulder and only occurs on the upper part of the body of the pot. The incised pattern consists of three decorative fields, each separated by two horizontal lines some 5 mm apart. From top to bottom, the decoration begins with two horizontal lines encircling the pot just below the base of the neck, beneath which is a row of circles (each *c.* 9 mm in diam-

Figure 9. Examples of conjoin sets. A: Conjoin set #21, showing presence of red slip (in this photograph, the conjoined sherds are tilted to show the area under the rim). B: Conjoin set #7 (photographs: Steve Morton).

Figure 10. Conjoined sherds from incised pot, Ruisasi 1 Square A, XU18–XU28 (photograph: Steve Morton).

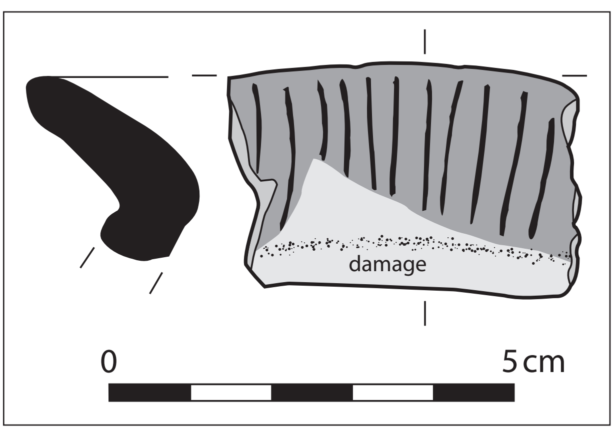

Figure 11. The incised rim sherd from Ruisasi 1 Square A, XU38.

eter) usually exhibiting a central dot. Below another set of two parallel lines, a middle field consists of vertical lines, each *c.* 15 mm in length and *c.* 5 mm apart, with each pair separated by *c.* 8 mm, spanning the entire length between the horizontal lines that divide the fields. Two horizontal lines then separate that middle field from a bottom field that consists of a row of paired semicircles connected to the lowermost of the dividing lines above it. The internal semicircle is typically *c.* 9 mm in diameter, the external *c.* 15 mm wide (Figure 10). No other sherds with this decorative pattern have yet been seen in any of the other 121 excavated Caution Bay sites.

The single XU38 incised sherd whose decoration is unlike all the other incised sherds in Square A contains closely spaced parallel vertical lines along the rim. The incised lines extend from just below the lip to the base of the rim. It is the lowermost excavated incised rim in the entire assemblage, and does not belong to the reconstructed pot with the other incised sherds from this site.

Conjoining the red slip and plain sherds

Conjoining was undertaken to better determine how many pots the sherds came from, the degree of variability in the shape of those pots, and whether the distribution of conjoining sherds down the deposit could shed further light on whether the ceramic assemblage came from a single or multiple depositional events spanning the entire period of village occupation or of shorter duration (for details, see Jones-Amin in preparation). During the excavation, no near-complete vessels or stacked conjoining sherds were found, unlike in Lapita deposits at sites Bogi 1 and Tanamu 1 where such artefacts occur (see David *et al.*, 2013).

As noted above, over a quarter of the ≥3 cm long sherds have red slip on one or both surfaces, in some cases faintly present, and in other cases where conjoins have been made, especially rims, red slip is present on limited portions of a vessel (i.e., around the rim, or on parts of the body only), leaving other parts of the vessel undecorated. It is thus suspected that most of the sherds described as 'plain' are either from unslipped portions of vessels that were partly decorated with red slip, or surface weathering has removed evidence of a red slip that was formerly present on these sherds. Therefore, we use the term 'red slip/plainware' to describe vessels without evidence of incised decoration.

Three types of association were found between the unincised Square A sherds:

1. Sherds that conjoin.
2. Sets of non-conjoining sherds with the same Munsell soil colour range and inclusions and, when present, red slip matches. Each set of sherds has a distinctive Fabric Type (See Jones-Amin, this volume for a description of the identification of Fabric Types).
3. Conjoining body sherds that form sets with additional, non-conjoining sherds that match in Munsell colour and temper. These sherds are possible matches and were sorted into Fabric Types.

All sherds other than those from the conjoined incised vessel and the isolated incised sherd come from standardised red slip/plainware globular pots with necks and everted rims. No open vessels (such as dishes with direct, everted rims) are present. No bases were identified, which although thicker, are often difficult to distinguish from body sherds. The configuration of the middle to lower sections of reconstructed pots indicate that all bases were curved, as per globular pots.

Of the 1340 sherds ≥3 cm long (including the incised sherds), approximately 50% were excluded from analysis because they could not be sorted into Fabric Type due to post-depositional surface and sherd-edge weathering, lack of distinctiveness, surface delamination and/or small sherd size (just over 3 cm long). The other 665 sherds (including the incised sherds) make up 146 different Fabric Types (comprising the conjoined incised vessel, conjoined rim and body sherd sets, plus non-conjoining sherds, including rim sherds). The number of Fabric Types, 146, is also the maximum number of vessels represented in Square A, as no two conjoined vessels share the same Fabric Type. Excluding the sherds from the incised wares, 645 sherds ≥3 cm long make up 144 Fabric Types from red slip/plainware pots. The minimum number of red slip/plainware vessels based on conjoining sets of sherds that span *c.* 19 cm (XU18–XU28) is 45, and the maximum number based on Fabric Types is 144 (conjoining plus non-conjoining sets of distinctive Fabric Types), spanning *c.* 42 cm (XU17–XU35).

Of the minimum 45 red slip/plainware pots, 23 are from vessels with conjoining sherds that incorporate rim segments. These 23 pots with rim segments have orifice diameters ranging from 17 to 29 cm, with a median frequency of 21 cm (48% of the 23 pots have orifice diameters of 21 to 23 cm). The discrepancy in the frequency distribution of orifice diameters for unincised sherds versus unincised pots (Figure 12) indicates either that in plan view orifices were imperfectly circular (with individual pots fragment-

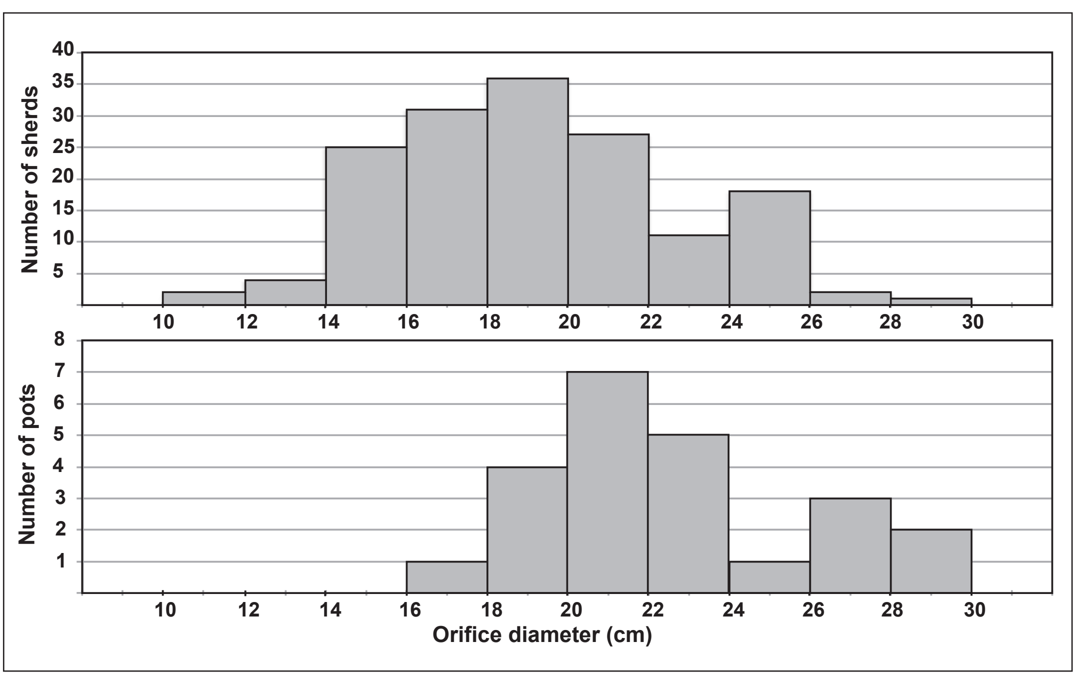

Figure 12. Frequency distribution of orifice diameters for: 157 unincised rim sherds (top) and 23 unincised pots reconstructed from refitted rim sherds (bottom).

ing into rim sherds of a range of orifice diameters), and/or that some pots have been more fragmented than others, as expected of paddle and anvil pots. Pots have regular orientation angles of between 30° and 70°, with all 23 pots except for one having orientation angles from 30° to 55° (Figure 13). Rims are short, ranging from 1.4 to 2.5 cm in length; all rims except for two are 1.4 to 2.2 cm long. Of these 23 pots, all have rounded lips, and all except for two have red slip on their rims.

A minimum of 45 red slip/plainware pots is an extraordinarily high number to be compressed in a horizontal area of 1 m^2 and vertical thickness of *c.* 19 cm (XU18–28). The conjoining sherds comprising the 45 pots do not always come from adjacent XUs: 21% of rim sherds and 43% of body sherds come from non-consecutive XUs. Indeed, sometimes there are spaces (representing missing sherds) between conjoining sets of sherds. Conjoining sherds sometimes show highly variable states of weathering (the conjoining incised sherds are a good example; see Jones-Amin, this volume). This vertical spread of conjoining (and missing) sherds along with patterns of weathering suggests that at least some pots were broken prior to deposition – they were not deposited and buried whole – and that the Ruisasi 1 pottery midden represents a short-duration ceramic assemblage within a longer-lived village site, probably one or a few depositional events (instant dumping of already broken pots). The lack of more or less completely conjoined pots, or sides of pots, indicates that it is unlikely that the ceramic deposit represents a set of intact pots (such as a stock of pots ready for trade) that

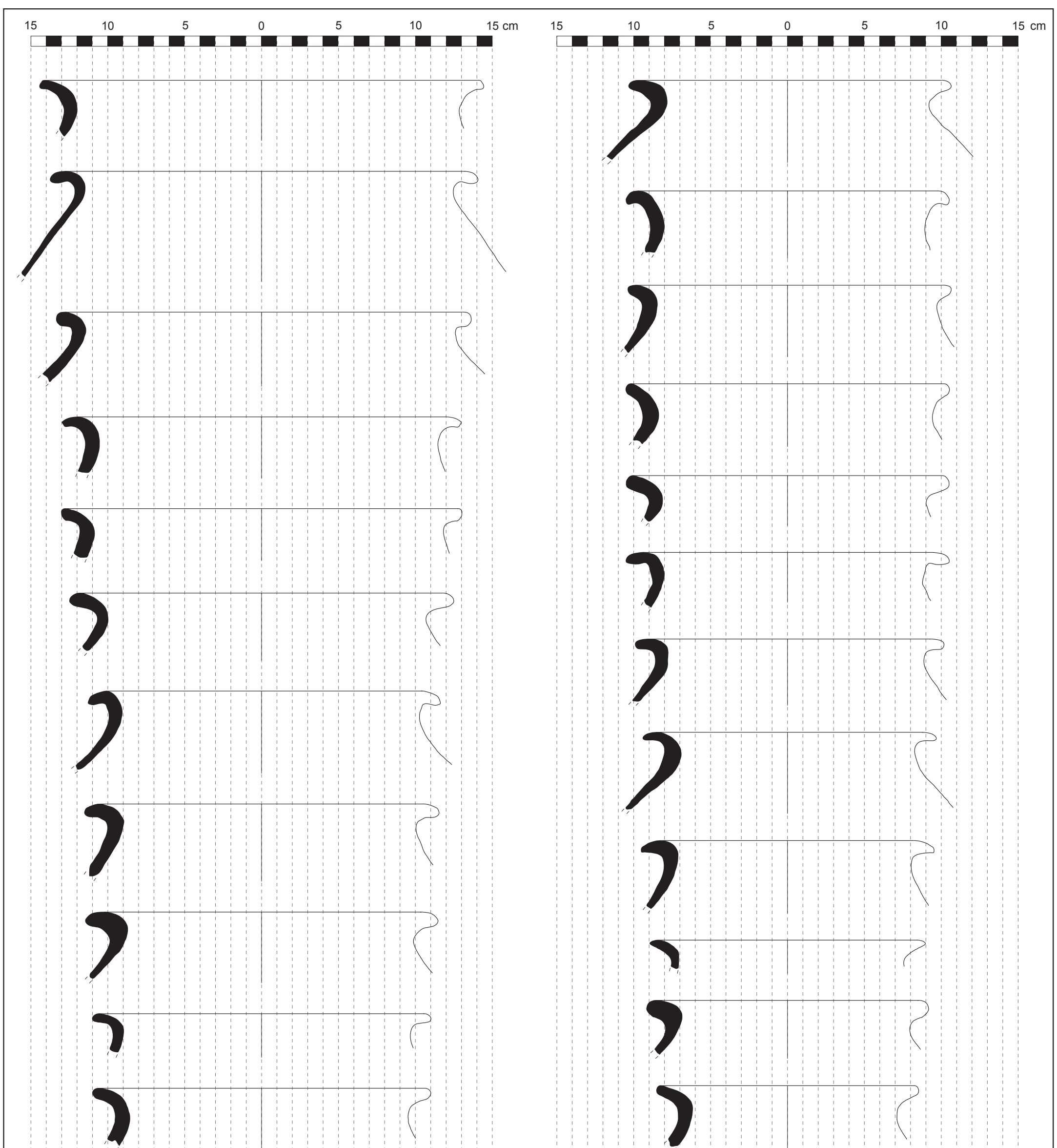

Figure 13. Cross-sections of the 23 unincised pots reconstructed from refitted rim sherds.

broke, or were deliberately broken, in their current location (Figure 14).

DISCUSSION

Ruisasi 1, Square A represents the earliest evidence for mass-produced standardised ceramics encountered at Caution Bay, an area where 122 archaeological sites have been excavated and *c.* 1000 AMS radiocarbon dates have been obtained. Earlier ceramic phases, such as Lapita, each contain a limited array of decorative conventions using a limited range of tools. For example, during the Lapita phase of 2900–2600 calBP, designs below the lips of pots consisted mainly of dentate impressions made with combs, and curved lines impressed with tools with continuous (non-tined) edges. While these decorations were made in a limited set of design elements, those design elements were combined in a range of ways both within and between individual pots, as is typical also of Lapita designs elsewhere. Vessel shapes and sizes were also varied, with carinations being relatively common. Archaeologically, at Caution Bay sherds (and represented vessels) are fairly common in Lapita horizons, but they are never found in especially high abundance. There is also no evidence at Caution Bay for the mass production of standardised decorated or plainware pots during Lapita times. After *c.* 2550 calBP, ceramics rapidly cease to exhibit body decoration, but lip decoration in the form of shallow notches continues. Again, there is no evidence for the mass production of pots in any of the excavated Caution Bay sites during this plain body-decorated lip phase of the immediate post-Lapita period. Then, around 2200 calBP, a new convention appears in many sites at Caution Bay, shell bivalve dentate impressions on bowls (the 'Linear Shell Edge-Impressed Tradition' of David *et al.* 2012, that ends *c.* 2000 calBP). Linear sets of shell indentations occur as rows, columns and diagonal arrangements especially on upper vessel bodies, and while variability in design between vessels both within and between sites is limited, and bowl shapes and sizes show considerable degrees of standardisation, there is no evidence for the kinds of mass production that we see at Ruisasi 1, Square A. Rather, this period of shell-indented ceramics – there is virtually no other kind of body decoration other than single finger-grooves below the lip and red slipping during this phase in any site at Caution Bay – suggests the application of a restricted range of decorative conventions on bowls rather than the mass production of standardised wares. Whether this means that the shell-indented ceramics dating from *c.* 2200 to 2000 calBP were made elsewhere and imported into Caution Bay, with the

Figure 14. Stock of trade pots ready for shipment, Hanuabada village within the period 1881–1891 (photograph: Reverend W. G. Lawes, printed by Henry King). ©Trustees of the British Museum.

later red slip/plainwares of Ruisasi 1 dated within *c.*1680–1180 calBP being made locally, will have to await the results of clay and temper analyses (in progress).

The archaeological evidence from Caution Bay thus indicates that the Lapita and post-Lapita ceramics had a limited range of design conventions and vessel forms, but it is not until much later, *c.*1680–1180 calBP, that we have evidence in the pottery midden at Ruisasi 1 for the mass production of standardised pot shapes. Those pots are very similar in shape and size to the ethnographic *uro* made by Motu (and to a lesser extent Koita) ceramicists for *hiri* trade, the major difference being that those from Ruisasi 1 tended to be red slipped and had slightly shorter, more curved and less upright rims. Yet the *hiri* pots relate to the ethnographic period of the nineteenth and early twentieth centuries, not to the mid-first millennium AD as is the case of those from Ruisasi 1. Ethnographic *hiri* pots are separated chronologically from the Ruisasi 1 pottery midden by centuries of ceramic transformations going back to about 800 calBP, then by the 'ceramic hiccup' where there is little evidence for the trade of ceramics westward, and before that by even earlier transformations in ceramic conventions. How the *c.*1680–1180 calBP standardised Ruisasi 1 indirect, everted pots culturally relate to the similar (but not identical) *hiri* indirect, everted pots of the ethnographic period, through more than a millennium of ceramic and cultural changes by which to bridge the temporal gap, now awaits further results of the intervening ceramic traditions for Caution Bay and beyond.

It is none-the-less of interest to note that elsewhere to the west of Port Moresby around 1500–1200 calBP (spanning the region from at least Yule Island-Hall Sound to the mid-reaches of the Kikori River), during the same period as that covered by the Ruisasi 1 ceramic assemblage, imported ceramics largely consist of heavily incised and red slipped bowls and dishes rather than globular cooking pots. These decorated bowls and dishes are remarkable as containers prominently displaying incised motifs and vibrant red slipped surfaces. The later *hiri* trade pots – predominantly *uro* – contrast with these earlier ones for being undecorated cooking pots. There is, therefore, a fundamental difference in the culture of trade and decorative investment between these two phases of ceramic attainment, with display value being of utmost importance during the early phase, and domestic function for cooking during the later, ethnographic phase. What Ruisasi 1 reveals is that while domestic cooking wares akin to the ethnographic *uro* were also produced during the early phase *c.*1680–1180 calBP, it is not these around which long-distance trade then revolved, but the intensely decorated wares. Decorative performance, and by implication the acquisition or demonstration of status through style (for traders and/or recipients), were of the essence during the long-distance ceramic exchanges of the early phase, despite relatively plain (red-slipped but otherwise undecorated) cooking wares also being available and as more standardised products than the decorated bowls and dishes. More will be made of this in a later paper.

The results presented here and taken in tandem with Jones-Amin (this volume) signal an important cultural event in the first mass-produced pottery, dated to *c.*1680–1180 calBP at Caution Bay. Here ceramics were deposited over a short period of time (based on conjoin analysis), within a village site that was probably occupied for somewhere between 170 and 290 years duration (based on the radiocarbon dates). In presenting Ruisasi 1, we have added a new and important element to the corpus of information on cultural trajectories at Caution Bay, with potentially far reaching effects for the entire Papuan coast particularly towards the Gulf to the west.

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