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– RESEARCH REPORT –

Revised Radiocarbon Dates for Mwanihuki, Makira: a *ca.* 3000 BP aceramic site in the Southeast Solomon Islands

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ABSTRACT

Excavation of three middens on Mwanihuki, located on the north coast of Makira in the southeast Solomon Islands has returned radiocarbon dates that show an initial occupation bracket between 3351±42 BP and 2975±21 BP (uncalibrated). The material culture of this phase consisted of a small amount of subsistence shell and worked chert, and an absence of any ceramics. This date range, along with the absence of the distinctive Lapita type dentate stamped pottery has aligned phasing of this site with the contemporaneous aceramic Vatuluma Posovi cave site in central Guadalcanal.

Keywords: Solomon Islands archaeology, Lapita, radiocarbon dating

INTRODUCTION

Radiocarbon dates from the 1975 excavations at Mwanihuki (Makira, Solomon Islands) by Roger Green and Michael W. Kaschko had originally suggested initial occupation at *ca.* 900 BP (Kaschko 1979). However, recent excavations as part of Gibbs' Australian Research Council funded 'Beyond the New World' project (2008–2011), of which Blake's PhD research forms a part, now indicates an initial occupation pre-dating ca. 3000 BP. Evidence of this occupation is seen in low-density chert artefacts and subsistence shell, but an absence of ceramics. Below is a brief contextual review of the survey and excavations conducted during both phases of research, with emphasis on the three middens that have returned the earliest occupation dates for Makira, along with the context of the radiocarbon evidence and a brief consideration of related sites.

BACKGROUND

Makira (formerly San Cristobal) is an island on the south eastern end of the Solomon Islands chain, and at 140 km long and 12–40 km wide is the largest in the Makira/Ulawa province (Figure 1). Mwanihuki (Solomon Islands National Museum [SINM] site code SB-4-6) is located on a low-lying (2–3 m ASL) coastal headland situated on Tawapuna Point on the mid-north coast of Makira, between the modern villages of Pamua to the west and Tawapuna to the east. High limestone ridges are located immediately to the south of the site, rising to mountains of up to 650 m running the length of the island. Mwanihuki is bordered by a littoral zone to the west and coral outcroppings to the north and east. The latter reach a height of 6–7 m ASL near the modern village of Tawapuna (Figure 2). Immediately to the south of Mwanihuki is a low flat-topped ridge (*ca.* 30 m ASL) which includes further evidence of pre-European occupation and is considered part of the overall Mwanihuki site complex (SINM site code SB-4-4).

The area around Mwanihuki has a history of intensive use, with St Stephen's School located immediately to the west of the headland area. Continuous building since the school's foundation by missionaries in the early 20th century has resulted in a range of landscape adaptations, the most obvious being the buildings and extensive gardens that accommodate the increasing number of staff and students. Coconut plantations further to the west and to the east were established in the early 20th century and a hard-pack coastal road links the villages along the coast to the provincial capital, Kira Kira. The 1980s saw intensive logging in the region, with the switchback roads cut into the mountainous interior now used as walking trails that interlink the ridges behind the coast.

Previous archaeological work on Makira has been limited, but includes brief surveys along part of the northern coast (Miller and Roe 1982), and excavation of a late-prehistoric settlement at Star Harbour, located at the south eastern extremity of the island (Green 1976). Roger Green conducted an initial survey and test pitting at Mwanihuki in 1971 as a by-product of his investigations into the origins of the scatters of Spanish pottery there and at SB-4-4 which were potentially associated with the 1596 Mendaña expedition (Gibbs 2011; Green 1973). In 1975 Michael W.

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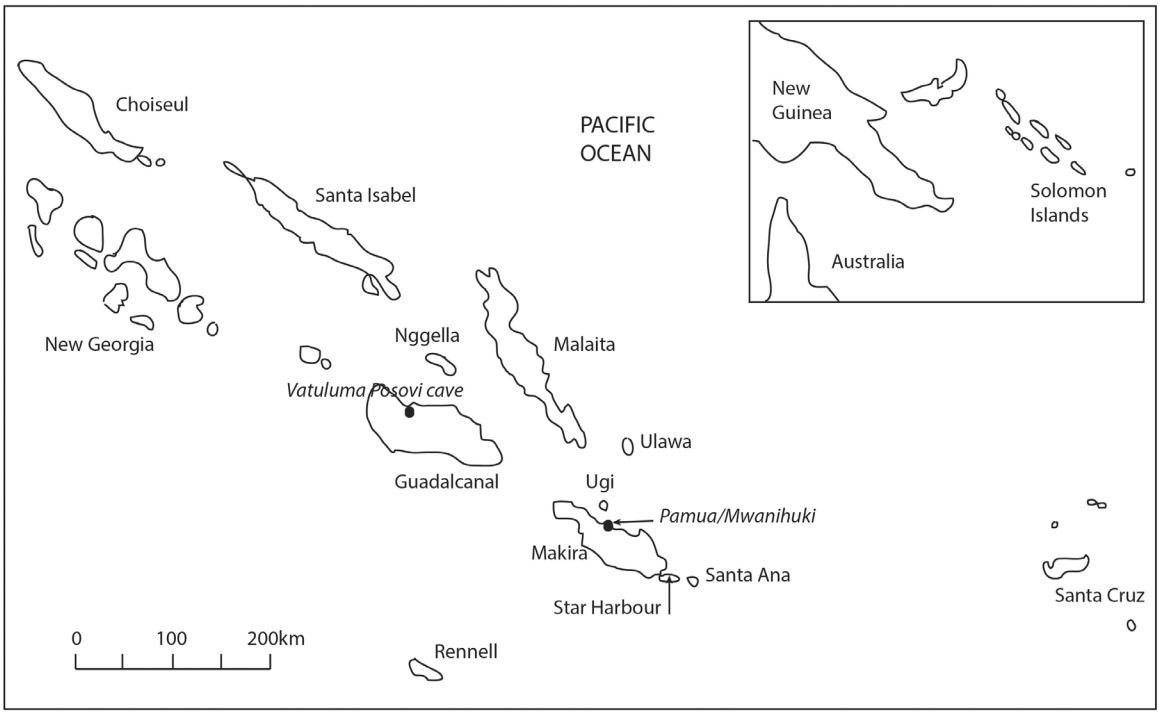

Figure 1. Solomon Islands and location of the study site.

Kaschko re-surveyed Mwanihuki, and identified 14 features including middens and rectangular coralline structures. He excavated two middens and two burial mounds on the western side (Kaschko 1979).

As part of the current project, a more intensive survey of Mwanihuki was undertaken. This employed north-south transects at 10 m intervals across the whole of the headland, combined with concentrated investigation in

Figure 2. Aerial image of Pamua/Mwanihuki site facing southwest. The school buildings are visible to the right.

areas of interest or greater visibility, as well as informant-led surveys. These processes identified a range of new coralline features and middens, in addition to re-locating the original 14 features surveyed by Kaschko. The numbering of new sites and features was done in continuity with Kaschko's 1975 system, with each Feature given a number, Feature 1, 2 and so on. (Figure 3). Modern landscape changes include a large gravel pit related to road construction close to the school and active gardens, which now occupy the eastern and western side of the headland and continue up the slope to the ridge (SB-4-4). These activities have clearly had significant impacts on the landscape since the 1971–75 investigations. Visibility was variable depending on the location and type of gardening but there were dense scatters of chert in association with fire-cracked rock, shell and a small number of basalt adzes, hammerstones, nut anvils and Trochus shell armband fragments. Spanish pottery was visible on the western side of Mwanihuki and on the ridge behind (Gibbs 2011; Kelloway *et al.* 2013) with a small amount uncovered on the eastern side of the headland, close to Tawapuna (given the site code of SB-4-6A post survey). A range of further features, including middens and coral and rubble lined structures were recorded on SB-4-6.The survey also extended several kilometres to the east and west of Mwanihuki, including the ridges behind the site although, as noted above, intensive logging, gardening and plantations have seriously disturbed the area. This wider survey only identified a few low-density artefact scatters and one low midden of 2 × 2.5 m abutting the current coastline of the modern village of Kaonasugu, 3 km to the east of Mwanihuki.

New excavations at Mwanihuki (SB-4-6 and SB-4-6A) comprised eight test pits completed in 2010 and 2011. Six middens were targeted with the aim of understanding the geomorphology of the area, the association of indigenous sites and features with the Spanish pottery scatters, and to provide additional context for the stratigraphy and artefacts from the two middens previously excavated by Kaschko. Two burial structures were re-excavated also (Blake & Gibbs 2013). All trenches were excavated by trowel and all material removed was sieved through a 5 mm mesh, with a subsample sieved through a 3 mm mesh. Due to active gardening, the visibly disturbed first 20 cm of deposit of each midden was removed as a single spit. After this first unit, when a stratigraphic layer exceeded a depth of 10 cm it was removed in 10 cm spits. All areas investigated in both major episodes of excavation conducted by Kaschko and the authors were excavated to the natural horizon, which was a combination of beach sand of an irregular depth overlying a matrix of decaying coral

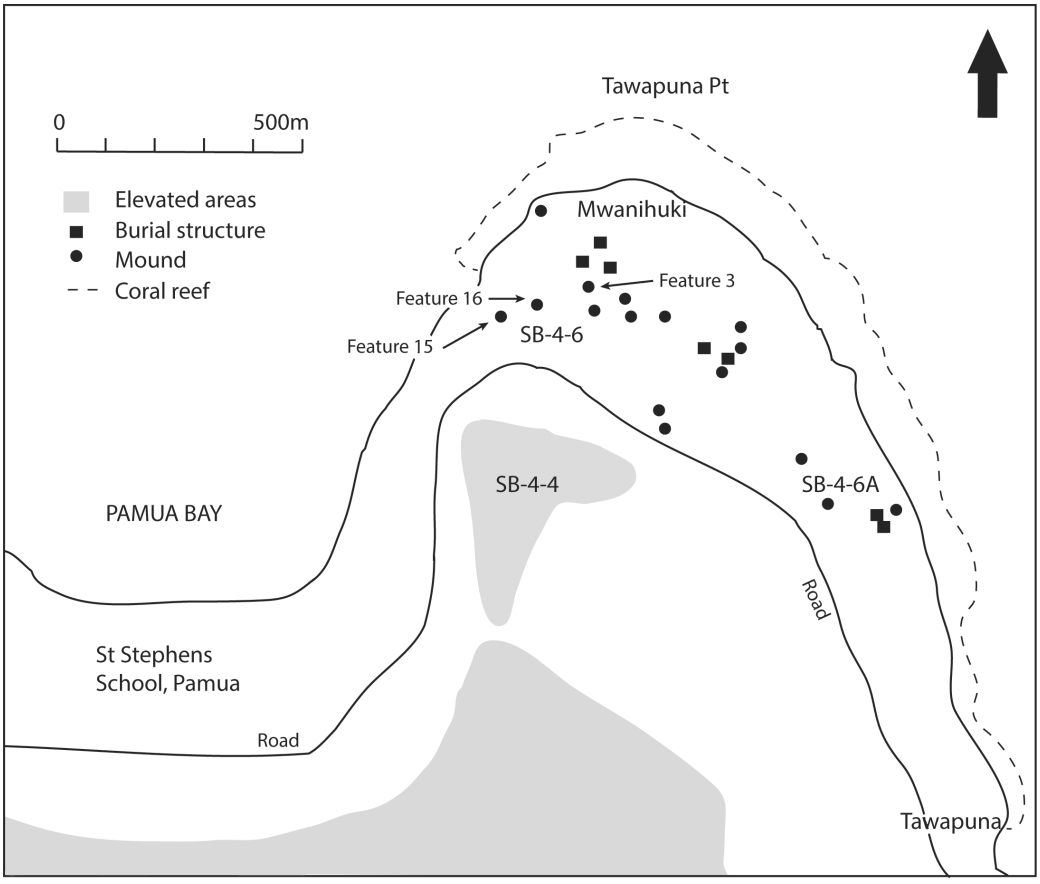

Figure 3. Study area showing SB-4-6, SB-4-6A and SB-4-4.

and rocky coral outcrop. Radiocarbon evidence from three middens returned dates of ca. 3000 BP; these three middens are the focus of the rest of this paper.

The earliest phase of occupation at Mwanihuki from the midden Features 3, 15 and 16 are marked by subsistence-focused shell and a chert-dominated artefact suite, and also includes a few objects of basalt (described in more detail below); no ceramics were recovered. The later, more intensive, occupation phases of Mwanihuki, while not discussed in this paper, exhibit a much broader range of artefacts. These include a variety of worked shell artefacts (such as shell beads and their preforms, armbands, fishhook preforms, and bivalve scrapers) as well as hammerstones, nut-cracking anvils, ground basalt adzes, and a high density of chert tools.

RADIOCARBON EVIDENCE

Five radiocarbon samples were recovered from contexts on the western side of the headland, three from the middens noted above, and two from Feature 5, one of the two coralline-bordered burial mounds investigated (Blake and Gibbs 2013, Figure 3). However, due to the comingled nature of the burials encountered during excavation, the two dates from this burial mound are being approached with caution and are not included in this discussion. Charcoal (carbonised seeds and wood) and bone were used for dating when sufficient and available, otherwise shell was submitted. Conventional radiocarbon ages were converted to calendar years using the CALIB (v7.0.2) calibration program (Stuiver and Reimer, 1993). A correction value of 44.74 was applied (this being an average of the known age shell data across the Solomon Islands F. Petchey pers comm) with acknowledgement that the clarification of regional specifics in the Pacific is continuing, with questions related to data variability connected to the complex geomorphological and marine environment of the western Pacific (http://calib.qub.ac.uk/marine/; Petchey *et al*. 2013, Sheppard *et al*. 2015).

Feature 3

Kaschko excavated Feature 3, a large 23 × 21 m midden (Figure 3), in 1975. No radiocarbon samples were submitted for analysis at the time. Kaschko's team recorded 5 stratigraphic contexts (Figure 4), with midden material from Layers 2–3 dominated by chert, shell, and fire-cracked rock within 'a dark brown-black moderately compact soil', with the occasional spit in the lower deposits (Layer 4) described as 'grainy' (Kaschko, 1975). Charcoal was present throughout the sequence in the form of carbonised nut shells, probably *Canarium* nut, but this material was no longer suitable for radiometric dating as it had been stored with paper tags. Layer 4 showed a similar

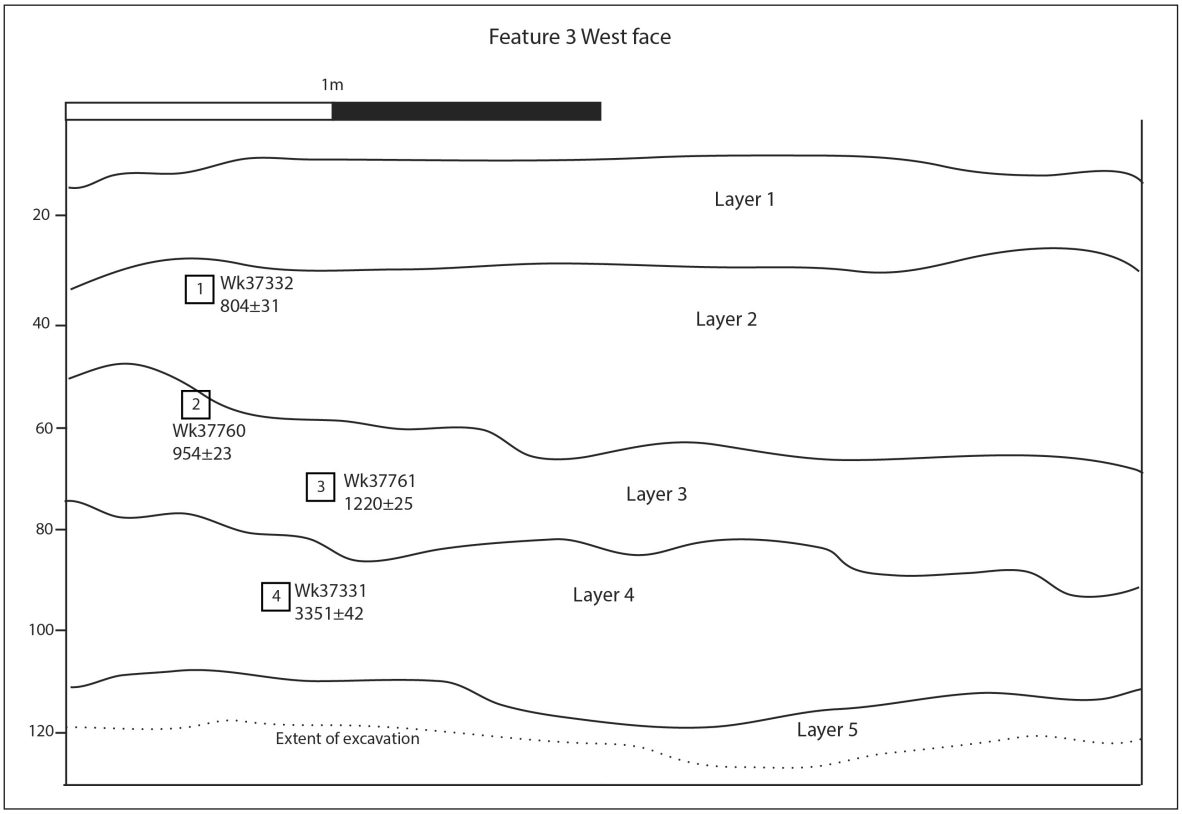

Figure 4. Section west face of Feature 3 with associated radiocarbon results.

range of artefacts as present in Layers 2 and 3, though fewer overall, and only small fragments of fire-cracked rock, with Layer 5 identified as the natural horizon, comprising decayed coral and sand. Kaschko's notes did not identify any evidence of re-working or natural disturbance during excavation of this feature.

Radiocarbon dates from the current work show first use of the midden at 3351 ± 42 BP (Wk37331, Table 1); the sample is from within Layer 4. The samples, one each from Layers 2 and 3, and one at their interface, are in sequence and reinforce the consistent nature of the stratigraphic profile as described by Kaschko and his team.

Feature 15

Feature 15, an 11 × 3 m midden excavated by the authors in 2010, had eight stratigraphic layers (Figures 3 & 5). The upper spits (Layers 1 & 2) included an abundance of chert, fire-cracked rock and fragmented shell, with small amounts of faunal material and charcoal. The 3 mm mesh sample for these upper layers showed a large quantity of shell grit and sub-circular angular gravel pebbles; a megapode egg was also found in situ *(*Layer 4*)*. Due to this, the top 60–70 cm of deposit was interpreted as being disturbed by a combination of megapode activity and a high sea inundation event. By the 70–75 cm level the shell grit was absent and separated from it by a discrete lens of sand (Layers 3 & 5). Below 70 cm there were large quantities of chert; fire-cracked rock; some charcoal; shell; and a small amount of faunal material (fish and pig). However, the bone was in the upper part of this layer only, within a matrix of brown to dark-brown silt with small coral and charcoal flecks and sandy lenses (Layer 6). The matrix in Feature 15 from the 60–70 cm level exhibited similar overall characteristics to those described by Kaschko in the notes of his 1975 excavations of the Feature 3 midden. The density of artefactual material decreased in the lower 30 cm of deposit. In the basal layer, artefact material was restricted to one broken basalt hammer, and small amounts of chert flakes, chert debitage and shell.

Two dating samples were selected from this trench. Sample 2, from Layer 6 at a depth of 80–95 cm, returned a radiocarbon age of 3127± 20 (Wk37341, Figure 5). It was difficult to obtain a useful sample from the upper stratigraphic layers due to the high fragmentation of the shell.

Feature 16

Feature 16 was a 7 × 4 m midden excavated by the authors. Four stratigraphic layers were identified (Figures 3 & 6). Layers 1 & 2 had an abundance of artefacts and did not show any evidence of shell and marine grit from the 3 mm sieve, although there was a limited amount of stratigraphic distinction noticed in the first 60–70 cm (see below). At the 60 cm level, a thick (15–30 cm wide), sterile, banded layer of clay was present (Layer 3). Below this layer, deposits consisted of brown to dark-brown loam, similar in plasticity to the lower deposits in Feature 15 and Feature 3. Chert flakes, one multidirectional core, a basalt nut-cracking anvil, fire-cracked rock, shells, a small amount of bone and charcoal flecking was found below the clay to the basal layer (Layer 4).

The stratigraphy of Feature 16 showed evidence of reworking and severe disturbance above the banded layer of clay. This mixing was confirmed with a paired charcoal and shell sample (Wk37926 and Wk37925). A modern date was also returned from the charcoal tested at the interface of Layers 2 and 3 (Wk37329), interpreted as movement of charcoal fragments through the soil column, above the clay layer. The deposit below the clay showed a consistent correlation with the other middens excavated, as well as a contemporaneous range of dates to the other two mid-

Table 1. *Radiocarbon dates from Mwanihuki (SB-4-6).*

Site Code	Feat.	No.	Depth (cm)	Lab Code	Sample type	$\delta^{13}C$‰	$F^{14}C$‰	^{14}C Age (years BP)	1σ calAge BP (68.3% probability)	2σ calAge BP (95.4% probability)	CalAge BP Median
SB–4–6	3	1	30–40	Wk37332	*Turbo* sp.	2.9±0.0	90.5±0.3	804±31	319–464	259–521	393
		2	50–60	Wk37760	*Turbo* sp.	2.3±0.2	88.8±0.3	954±23	466–570	393–653	523
		3	60–70	Wk37761 (AMS)	*Turbo* operculum	3.3±0.2	85.9±0.3	1220±25	650–796	606–904	732
		4	90	Wk37331	*Turbo* sp.	2.9±0.2	65.9±0.3	3351± 42	3022–3262	2914–3360	3144
	15	1	25–35	Wk37762 (AMS)	*Turbo* sp.	3.4±0.2	91.6±0.2	705±21	246–416	119–472	310
		2	80–95	Wk37341 (AMS)	*Barbatia* sp.	5.3±0.0	67.8±0.2	3127± 20	2761–2938	2715–3059	2864
	16	1	40–50	Wk37926	Charcoal	–28.2±0.2	117.2±0.2	117.2±0.2	Modern		
		2	40–50	Wk37925	*Barbatia* sp.	3.0±0.2	70.2±0.2	2844±23	2447–2674	2342–2716	2542
		3	95	Wk37329	Charcoal	–27.2±0.2	98.6±0.4	113±31	Modern		
		4	125	Wk37763 (AMS)	*Gafrarium* sp.	2.4±0.2	67.6±0.2	3143±22	2772–2958	2722–3080	2882
		5	137	Wk37330 (AMS)	*Verinidae* sp.	2.5±0.2	69±0.3	2975± 21	2604–2800	2460–2873	2701

Source: Calibration data from CALIB 7.0.2, marine04 (Hughen *et al.* 2004), ΔR 44.73 (F. Petchey pers. comm.)

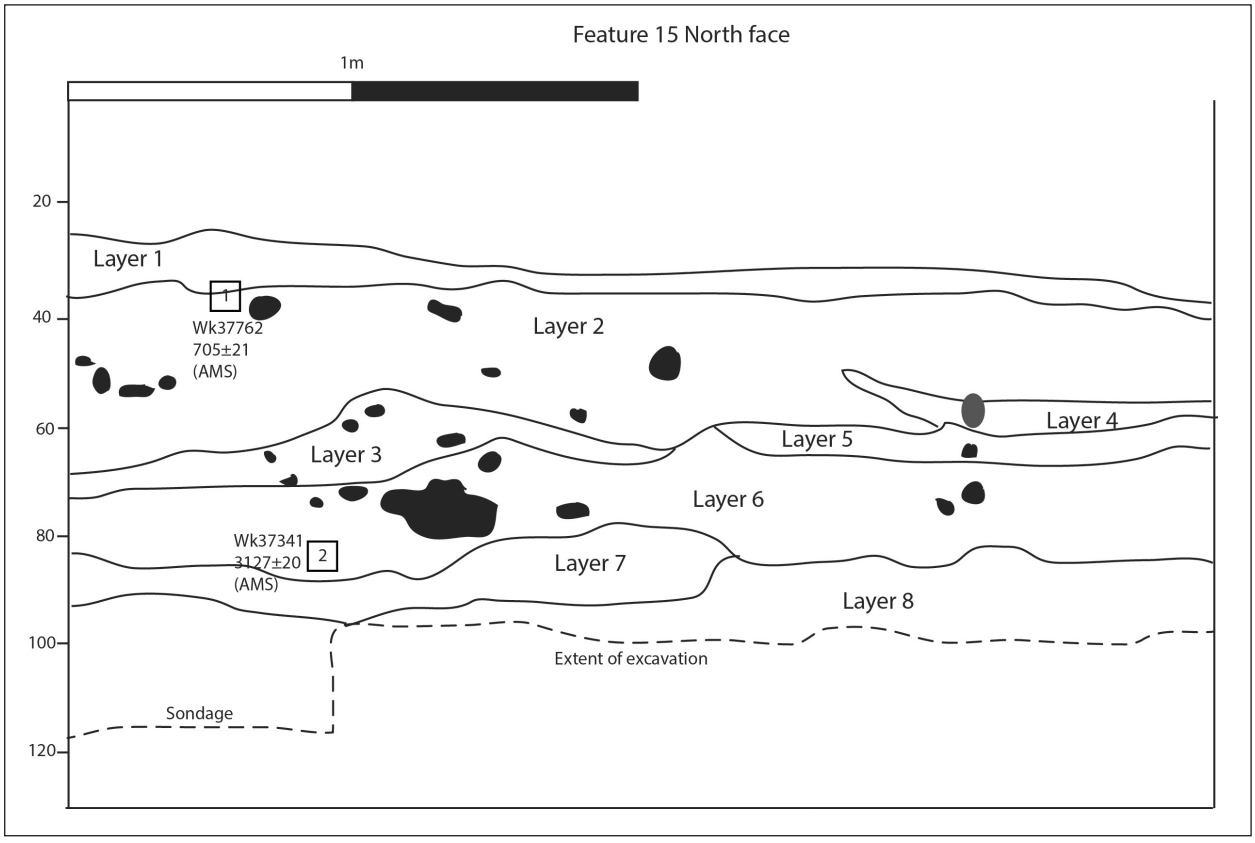

Figure 5. Section east face of Feature 15 with associated radiocarbon results.

dens. It was somewhat more difficult to get dateable samples from the upper layers of Feature 16 due to the high fragmentation of the shell, coupled with the stratigraphic evidence of re-working of the midden deposits. Feature 16's basal dates of 3143±22 BP (Wk37763) and 2975±21 BP (Wk37330) come from the same stratigraphic layer, and while one is slightly higher than the other, correlate well overall to the other two contemporaneously dated middens.

In the lower levels of all three middens the artefact assemblage was dominated by chert, including flakes, debitage and one multidirectional core, basalt and shell. Turbo spp. formed the major shell species, with 20% of the total midden material coming from these lower levels. None of the shell recovered from the lower stratigraphic units showed evidence of re-working for either tool or ornament manufacture.

The chert artefacts recovered from the lower layers of Features 3, 15 and 16 are generally red or white, with occasional examples of colours that range from dark grey to black, and are consistent with the range from mainland Makira as recorded in a recent geological survey (Petterson *et al*. 2009). This locally available chert is commonly in the form of cobbles (visible in the river systems near Pamua), with poor quality grain with frequent inclusions. The analysis of the chert materials from the excavations and surveys is ongoing.

REGIONAL PARALLELS

The earliest phase of Mwanihuki is synchronous with the second main occupation horizon of the aceramic Vatuluma Posovi cave in central Guadalcanal, originally excavated by Davenport and Russell in 1966 and re-excavated with new radiocarbon dates by Roe (1993). The five phase sequence at Vatuluma Posovi commences with initial occupation at *ca.* 6000 BP. Phase 2 dated to 3250–2900 BP and Phase 3 from 2750–2550 BP (separated by a limestone layer) are the occupation horizons which best align with those dates recovered from Mwanihuki. Of the material culture associated with Phases 2 and 3, Roe noted that while there was some consistency between the earliest occupation and that which followed, the addition of polished stone adzes, *Canarium* nut cracking anvils and shell beads distinguished the second phase from the initial one. Although the relevant comparative material culture from Guadalcanal is limited to the Vatuluma Posovi evidence, environmental data from a range of other sites provides very strong evidence that the material culture changes in Phases 2/3 in the cave sequence are indicative of a major change in the island's cultural and economic trajectories (Roe 1992, 1993).

The Feru II cave system located on the southern coast of Santa Ana, an island off the eastern tip of Makira, was

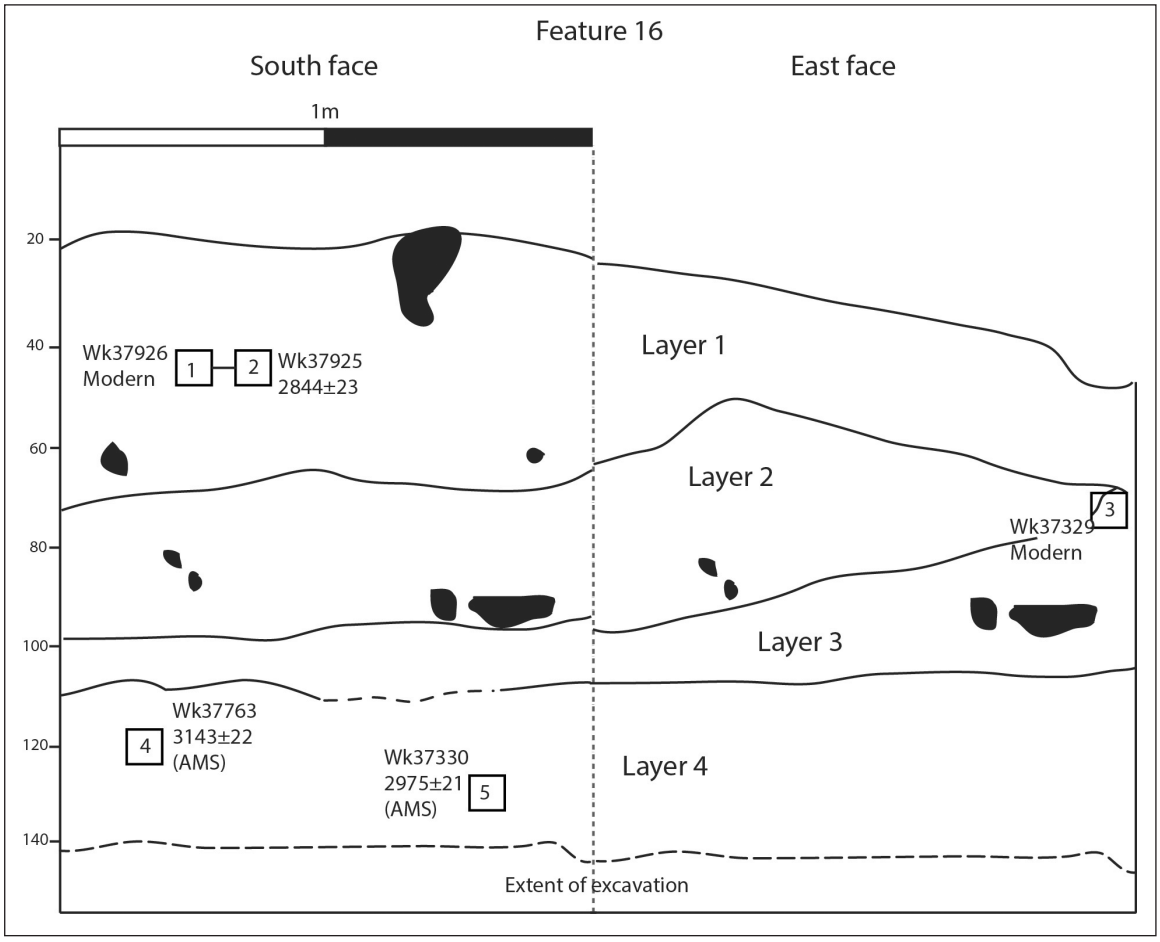

Figure 6. Section west face of Feature 16 with associated radiocarbon results.

originally excavated and published by Davenport (1972). The site is also contemporaneous with the early occupation phase of Mwanihuki. A stratigraphic profile of a fire pit located against the west wall of Feru II was examined and further radiocarbon sequencing obtained by Green; the results were subsequently reported by Swadling (2000). Radiocarbon dates of 2660±250 BP (SUA-113) on charcoal and 3050±70 BP (SUA-114) from a shell sample from Layer 3 were reported. New dates from charcoal originally excavated by Green returned an oldest calibrated 1σ range of 2752–2726 BP (Sheppard 2011: 834). The artefact assemblage from Layer 3, described as a light grey sand at a depth of approximately 60 cm, included pottery and a waterworn coral stone with evidence of burning (Swadling 2000: 366). While highly fragmented and poor quality ceramic was uncovered in the lower deposits of Feru, there are some questions regarding its precise provenance and the material has not been re-analysed since its original publication. It might be noted, however, that despite some new work no further ceramics have yet been recovered on Santa Ana (P. Sheppard pers. comm.).

IMPLICATIONS

The coastal location of the Mwanihuki site immediately raises concerns for possible disturbance of the archaeological deposits because of various natural processes, especially storm events, as well as an active tectonic and eustatic environment. Disturbance from natural and cultural events is an ongoing issue, though one which with balanced consideration of the evidence, can be reasonably mitigated (e.g. Attenbrow 1992). While there is some evidence of storm surge scouring within the upper stratigraphy of the middens on the western side of the site (in Features 15 and 16), the stratigraphic and radiocarbon evidence from below these disturbed layers provides an overall consistent sequence down to ca. 3200 BP. The 16th century Spanish pottery sherds recovered from the surface of the site since the first decade of the 20th century further suggests that serious inundation events have not significantly affected site integrity since then. Disturbance in the upper sequence here is interpreted as the product of localised modern gardening activity and localised movement through the soil column in the recent historic period rather than wider geomorphological processes.

Two of the radiocarbon samples were recovered from a stratigraphic depth close to the basal deposit of both trenches. These deposits were from a mixed soil horizon that contained cultural material. Deposits from the upper horizons had some disturbance (discussed above) however the lower stratigraphic units had no evidence of this post-deposition disturbance. The basal deposit layers on the eastern side of the headland, while not the focus of this paper, returned a different range of results which indicate a later initial occupation of this area (further explored in Blake's PhD thesis).

Although the Mwanihuki sites represent only one site complex for one small area of the southeast Solomon Islands, several implications emerge for our wider understanding of the prehistory of the region and the cultural markers of initial occupation. Their earliest layers are characterised by low density stone and shell cultural deposits similar to those seen on Guadalcanal in the same period, although with an absence of the shell ornaments recovered from the Vatuluma Posovi cave. The apparently near-contemporary assemblage from Santa Ana shows a different range of material recovered: for example, no basalt, some fish, pig and crocodile bone, and ceramic fragments, while the Mwanihuki material comprises one basalt hammer, only a few small fragments of unidentifiable bone and no ceramics. Further archaeological investigation is required to clarify the stratigraphy of Feru II and its dating, and consequently the dates of associated artefacts.

Archaeological research conducted on Mwanihuki demonstrated two broad cultural phases, the first of which bracketed the time of the Lapita cultural expansion but which lacked obviously Lapita-style ceramics or, indeed, other artefacts. The Mwanihuki site is, therefore, the second site in the Solomon Islands chain with evidence to suggest a non-Lapita presence when elsewhere in the archipelago Lapita is the dominant and possibly only culture present. It is important to note, however, that the Mwanihuki site is an open area in an exposed coastal location, unlike the Guadalcanal cave environment sites. As such the reservations expressed by Spriggs (1997) about the possible 'special use' of the Vatuluma Posovi cave (and perhaps, by extension, also Feru II) do not apply here.

Following initial use, Mwanihuki then showed a *ca.* 1500-year hiatus in occupation. A rapid re-occupation and settlement expansion followed this break; this expansion developed over an approximately 300-year period, and was associated with a complex settlement pattern. The surface evidence consists of middens, coralline-bordered burial mounds and house platforms present across the whole headland area with evidence of use of the elevated ridge immediately south of the site (SB-4-4) contemporaneously to the late phase of Mwanihuki. Excavation also demonstrated a rich material culture, consisting of worked shell and chert, basalt adzes, pumice abraders, hammerstones, and shell and chert scrapers. This research and the associated implications are the subject of Blake's PhD work.

Given that the aim of the excavations at Mwanihuki was to examine the evidence for late period social and economic intensification for the southeast Solomon Islands, detecting the much earlier presence was a fortunate by-product. Given its discovery late in the research program no attempt was made to further explore or define the extent or nature of the early occupation. Further test pitting in the western section of the site, and potentially towards the beach and reef, may provide further evidence. Bearing in mind the limited sample from the early period, the absence of ceramics at Mwanihuki does raise the question of this occupation's relationship to surrounding islands and to the wider network of occupation occurring concurrently through the rest of the Pacific (Szabo 2010). Lapita ceramics were not identified in the Vataluma Posovi sequence, while a question mark hangs over the origin and provenance of the plain ceramic fragments recovered from Feru II cave (Sheppard 2011). We note also, however, that the occupation sequences in the north-west Guadalcanal sites also exhibit major breaks in use of the cave sites and a later re-occupation accompanied by the establishment of coastal settlements marked by 'richer' artefact assemblages and evidence of inter-island trade.

Recent work in the southeast Solomon Islands includes re-appraisals of the previously accepted radiocarbon sequence describing the movement of people through the Reef/Santa Cruz group of islands using SE-SZ-8 (Nanggu). This work has demonstrated that movement of people from the Bismarck Archipelago into Remote Oceania (past the main Solomon's group of islands) occurred at a rate that would suggest an almost continuous expansion (Sheppard *et al.* 2015). Evidence from this recent work and the available evidence from Guadalcanal would suggest occupation of these islands at a broadly contemporaneous time, indicating a more dynamic, though perhaps transient population moving into this part of the western Pacific during this period. The rapidly changing nature of research in this part of the Pacific – and the intriguing new data from Makira – promises continued debate into the timing and nature of occupation in the region as a whole.

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