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ABSTRACT

A closer look at Malaita's lithics

Preliminary results of a functional study of the lithic tools from Apunirereha and Ria, Solomon Islands

Sonja Tomasso, Johannes Moser

This paper presents the preliminary results of a functional analysis performed on the lithic assemblages of two archaeological sites from the Solomon Islands: the knapping workshop site of "Apunirereha" and the burial-living site "Ria rock shelter" (Malaita, Solomon Islands). The functional study included the analysis of wear traces and residues on a sample of lithic artefacts. All selected lithic artefacts were examined macro- and microscopically, adjusting the methodology according to the preservation state of individual artefacts and restricting the analysis to examination under low magnification in the case of extensive post-depositional alterations. The preliminary results obtained confirmed the presence of used and hafted artefacts and will contribute to a better understanding of the function of these tools from both sites.

KEYWORDS

Lithic technologies, functional studies, Solomon Islands

A closer look at Malaita's lithics

Preliminary results of a functional study of the lithic tools from Apunirereha and Ria, Solomon Islands

¹ With the aim of providing new data about the early settlement history of the Solomon Islands, the cooperative archaeological investigation “Prehistory of the Solomon Islands” has been undertaken on the island of Malaita since 2012 by the Commission for Archaeology of Non-European Cultures (KAAK) of the German Archaeological Institute (DAI) and the National Museum & Ministry of Culture and Tourism of the Solomon Islands. The investigation has been conducted at two locations: a knapping workshop site at Apunirereha and the burial-living site Ria-rock shelter, both in the province of East Are Are, Malaita.

² To address issues related to chronology, mobility, settlement and material culture, a variety of approaches have been used to gain the most reliable data. Among the methods used to study the lithic assemblages, the combination of technological, morphological and functional analyses have been used for a better understanding of the past human technologies. Functional studies attempt to provide new data about the nature of the tools and the way they were produced and used. The examination of wear traces and residues on the lithic materials are often the only method to gain insights about the activities related to the organic materials rarely preserved within the archaeological assemblages. Wear traces, which are sometimes combined with residual deposits, are diagnostic of the worked materials and the motions that have been exerted. Wear traces can be formed during the whole life cycle of a stone tool, during the knapping procedures, from the contact of the hammer and the blank, during use or hafting, and after it has been discarded. The examined traces or residues are produced by frictions between the used edge of the tool and the worked material (Keeley 1980). Similar to the worked material, the friction of a lithic tool within a handle creates diagnostic macro- and microscopic traces related to hafting technologies (Semenov 1964; Odell 1994; Rots 2002). The study of hafting technologies occupies an important position within functional studies. If a tool has been hafted or not is indeed crucial, as it determines how a tool has been manipulated during its use and in a broader frame it allows a better understanding of the technological choices and the technical system as a whole (Lemonnier 1993).

Made in Apunirereha

3 During a survey in 2012, the open-air site of Apunirereha, located in south-eastern Malaita, attracted the attention of the German and Solomon researchers (Moser – Kiko 2014). The surface artefact distribution consisted of an extensive accumulation of lithic artefacts, which led to further archaeological investigation between 2012 and 2016 (Fig. 1. 2).



Fig. 1: The open air site of Apunirereha in the tropical rainforest, southeastern Malaita

Fig. 2: Apunirereha. Excavation trench



Fig. 3: Apunirereha. Southwestern profile. Toplayer showing the accumulation of lithic materials



4 The excavations revealed an important chronological sequence, where the different layers of the stratigraphy indicated a variety of activities and different intensities of occupations. Based on radiocarbon dates, these occupations occurred between 8500 and 340 BP. The lower layers of the stratigraphy revealed the presence of severe altered and heavily weathered, decalcified lithic artefacts, mainly composed of knapping waste with flakes and chips, while the assemblages of the upper layers, dated between 650 and 340 BP, consisted of a variety of well-preserved retouched and unretouched lithic artefacts (Fig. 3). Aside the lithic artefacts also fireplaces interpreted as cooking structures have been discovered (Moser 2014; Moser 2018).

5 The functional study of the lithic material from Apunirereha was performed at the National Museum in Honiara (Fig. 4, 5). The artefacts (n=501) were first screened with the naked eye and then examined with a Zeiss stereomicroscope Stemi 2000C, to evaluate the preservation state of the material, to get an overview of morphological characteristics, and to assess the potential of a detailed functional analysis.



Fig. 4: Training in stone tool analysis at the National Museum (Honiara). Grinta Ale'eke looking through the binocular

Fig. 5: Chief Andrew Raroirae looking through the binocular during the field work at Makaura

6 Unfortunately, the lithic artefacts from the lower layers showed severe post-depositional edge damage and post-depositional surface alterations, which made a microscopic analysis of the tools impossible (Fig. 6; Grace 1990; Levi Sala 1986).



Fig. 6: Altered flakes with intense edge damage and patina, from the lower layers of Apunirereha

7 The upper layers, however, included a large amount of well-preserved artefacts showing evidence of all stages of the production processes, including nodules, cores, knapping waste, flakes, and a variety of finalised retouched tools. All artefacts were produced out of the primary raw material deposits, the locally available flint nodules that occurred in the limestone formations and as secondary sources in the riverbeds in the surroundings of the site (Fig. 7).



Fig. 7: Flint nodule discovered in the vicinity of the knapping site at Apunirereha

8 The macro and microscopic examinations of flaked adzes (the most frequent tool type) indicated that they were produced but not used at the site. Indeed, no traces related to use or to hafting could be observed (Fig. 8, 9).



Fig. 8: Adze from Apunirereha with very sharp and fresh edges. No macro and microscopic indication of use related traces. Pecking of the prominent dorsal ridge. Detail of the percussion mark (25.0x)

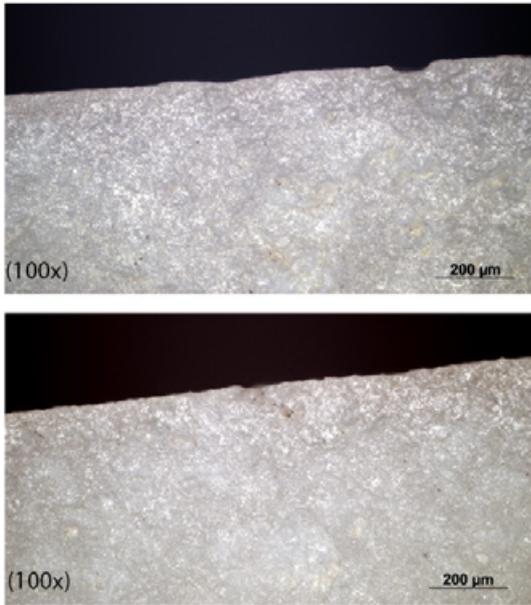


Fig. 9: Unused adze from Apunirereha. Microscopic detail of the unused edge (100x)

9 The functional results confirm that this place was used between 650 and 340 BP as a knapping workshop site. It is known that the archaeological distribution of chert adzes is limited for the Solomon Islands (see for e.g. Ross 1970; Hendren 1976; Ward 1976; Green 1978; Walter – Sheppard 2006; Walter – Green 2011), but given its favourable geological conditions and thanks to the results of the functional analysis, the site of Apunirereha is supposed to have been an important centre regarding mobility, trade and exchange of flaked adzes.

Ria rock shelter

10 Since 2013, excavations have been undertaken at the rock shelter “Ria” in southeastern Malaita, not far from the site of Apunirereha (Fig. 10. 11. 12. 13; Moser et al. 2017; Moser 2018). Archaeological materials here indicate that the rock shelter was repeatedly used as a habitation and burial space. So far, a total of 7 burials have been discovered in different chronological layers, dated between 720 and 480 BP. The lowermost layers of Ria are dating between 1670 and 1180. In addition to human remains,

Fig. 10: Ria rock shelter. General view from southeast

Fig. 11: Ria rock shelter. Easterly view





Fig. 12: Ria rock shelter. Excavation trench from northwest



Fig. 13: Ria rock shelter. Archaeologists from the Solomon Islands National Museum during excavation in progress

archaeological structures and findings have been brought to light, such as fireplaces, stone paving, lithic tools or shell ornaments. The shell artefacts include fragments of a polished pectoral ornament, fragments of a shell ring and several shell beads, which are known to be used as currency for special occasions or to demonstrate social status (Cooper 1971; Ross 1981; Guo 2006).

11 The lithic assemblage is mainly composed of knapping waste, cores, and unretouched flakes, but also a few retouched flakes and formal tools. Except for some adzes, such as a polished adze with unknown provenience, the lithic materials indicate on-site manufacturing, use and discard. Indeed, similar to the knapping site, the surroundings of the rock shelter were an advantage for the production of stone tools. However, the composition of the lithic assemblage is different than the one from Apunirereha, in that it represents the production of flakes and a tool maintenance industry. Also, the relatively small size of the artefacts, compared to the lithic assemblage from Apunirereha, might be explained by the fact that pebbles deposited in secondary position in the riverbed in front of the rock shelter were used for the manufacture of the artefacts. In addition, the primary raw materials, the chert embedded in the limestone formations of the rock shelter itself could potentially have been used.

12 In order to gain more insights about the activities performed at the site, a functional analysis was performed on a selection of stone artefacts. As with the analysis of Apunirereha, the artefacts from Ria rock shelter (n=736) were first screened by eye and then examined with a Zeiss stereomicroscope Stemi 2000C. Afterwards, a selection of used artefacts was exported for a detailed examination at the TraceoLab, University of Liège. The selected pieces consisted of retouched and unretouched lithic artefacts (n=16), and additional shell beads (n=3; Fig. 14).

13 The preliminary results of the functional analysis indicate that the adzes were mainly used for soft or fresh wood working activities. On the active tool edge well

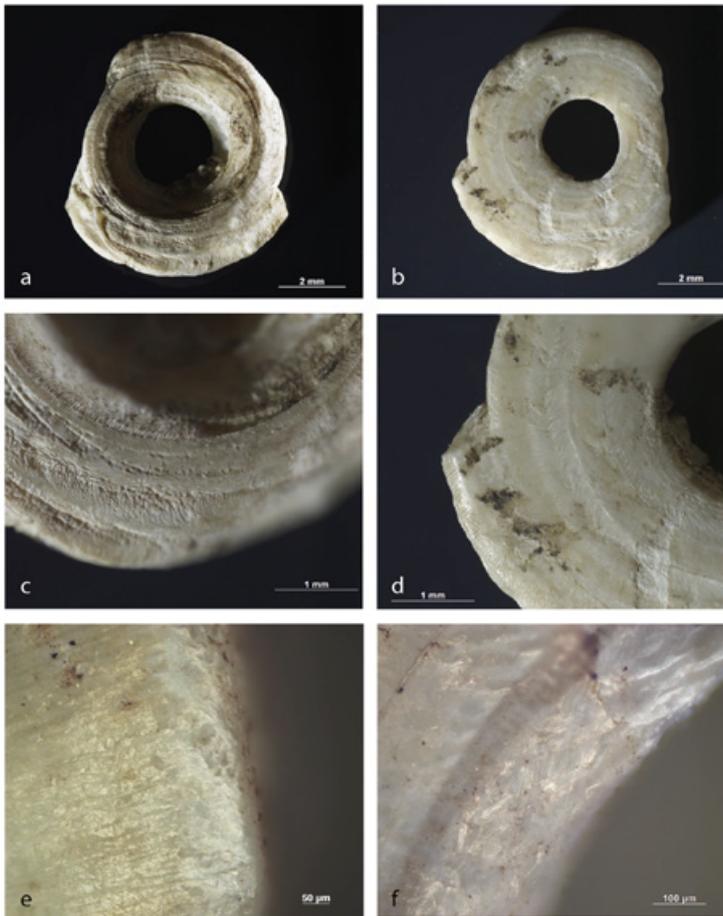
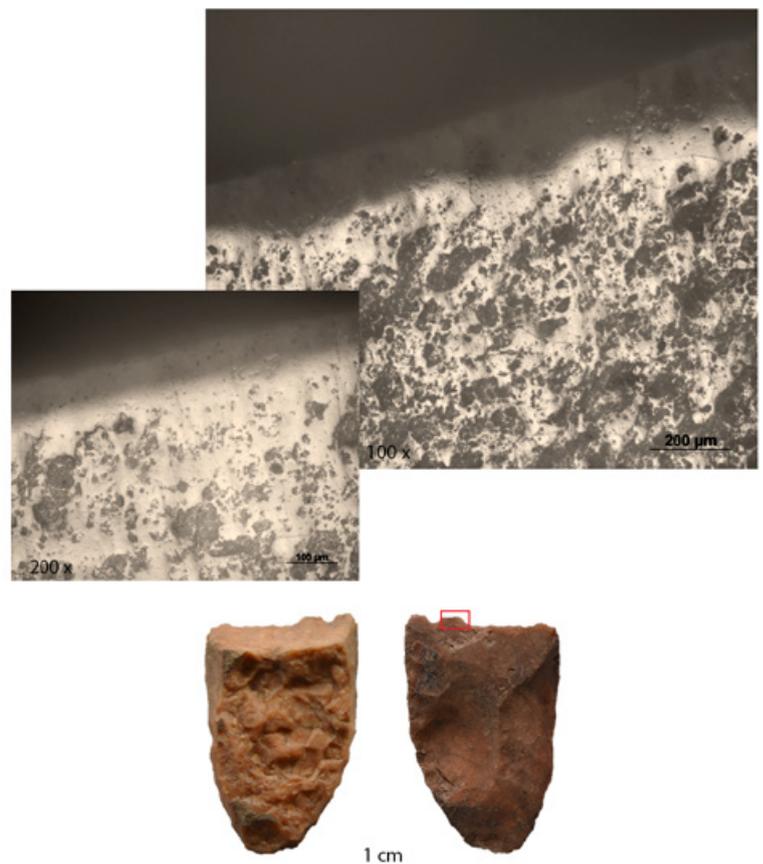


Fig. 14: a) +b) shell bead, macroscopic picture (20.0x); c) +d) macroscopic picture of the rounded and polished surface (50.0x); e) microscopic detail of the rounded edge (200x); f) microscopic detail of the glossy inner surface (200x)

Fig. 15: Adze from Ria rock shelter with heat altered surface: incipient cracks, fissures and flaking of the dorsal surface. Microscopic details of the polish and rounding related to use (on vegetal materials) (100x)+(200x)

developed use-related traces such as edge rounding or a bright domed polish were recorded. On a few adzes, the wear patterns were cut by posterior scarring or by post-depositional alterations. For instance, one examined adze was exposed to heat after its discard in or near the fireplace (Fig. 15). The impact of the heat caused incipient cracks, fissures, and the flaking of almost the complete dorsal surface.

14 As Sheppard (Sheppard 1993) stated, lithic studies in Melanesia have rarely addressed the non-formalized tools (opposed to adzes), probably because they have simply not been recognized. For this purpose, the examination of such small retouched and unretouched flakes is important in order to show the potential of a use-wear analysis and its contribution to the understanding of lithic assemblages. The retouched and unretouched flakes from the Ria rock shelter showed traces related to plant working activities (Fig. 16. 17). The combinations of bright smooth polishes, striations, and linear depressions within the polishes are characteristic of



use on siliceous plants (Vaughan 1985; Juel Jensen 1995). Thanks to the orientation of the polish, the motion used to work the plant materials could be determined. When wear patterns were observed on both dorsal and ventral surfaces of the edge and the micropolish on the active edge were oriented parallel to the edge, the tools were interpreted as being used for cutting or sawing motions. On other tools, the wear patterns indicated a transverse or scraping motion on highly siliceous plants. In those cases, the wear traces were observed on one surface, mainly composed of a bright smooth polish, edge rounding, and striations perpendicular to the edge.

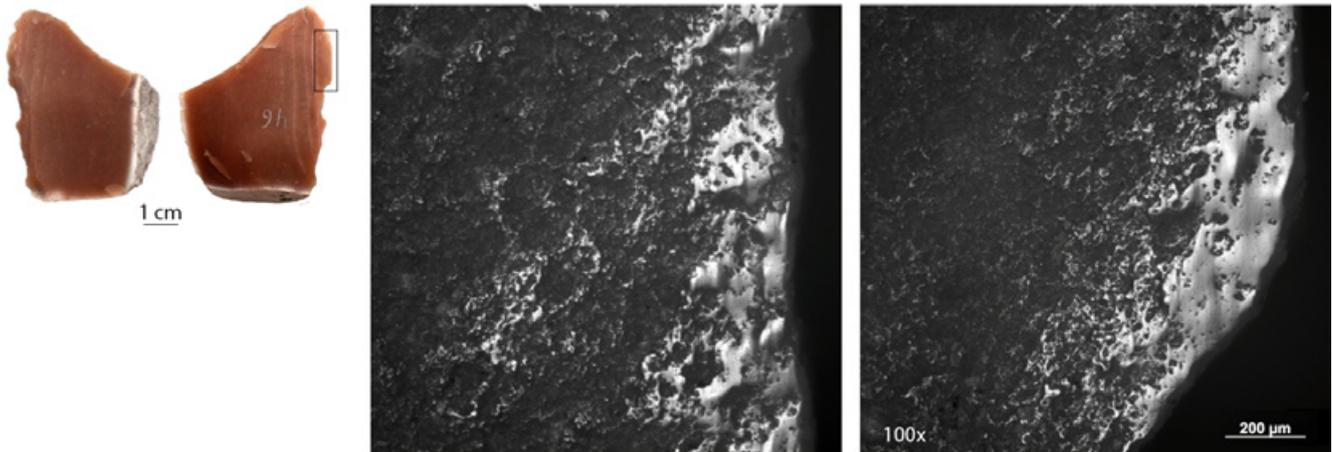
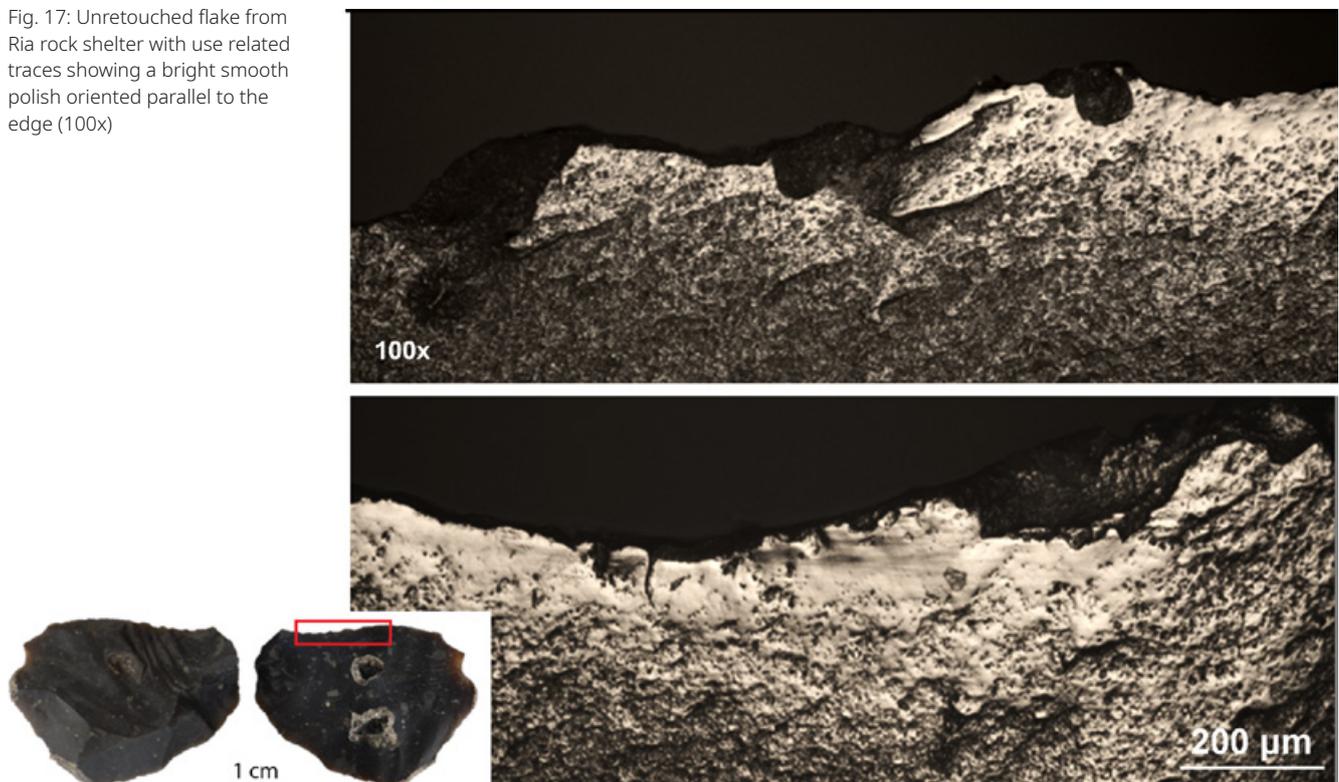


Fig. 16: Retouched flake from Ria rock shelter with a bright polish and rounding developed on the ventral surface of the used edge (100x)

Fig. 17: Unretouched flake from Ria rock shelter with use related traces showing a bright smooth polish oriented parallel to the edge (100x)



15 The record of intentional posterior removals (related to re-sharpening procedures on the active edges of the retouched flakes and adzes) is particularly important for a better comprehension of the tool's life cycle as they indicate at least more than one use. The combination of wear patterns attributed to tool use, hafting, and re-sharpening helps to reconstruct the stone tool's life cycles as completely as possible. For instance, the shape of the adzes might vary along their life cycle due to re-sharpening. Some of the analysed adzes with use and hafting-wear patterns decreased in size during their life cycle because they were used and re-sharpened up to the point of exhaustion (Fig. 18). However, to understand the morphological varieties among the adzes, further aspects need to be taken into consideration. The size of the adzes might also vary according to the size of the river pebbles from which they were manufactured. It has also to be noted that the morphology of the adzes could have been influenced by the designated use and/or by different hafting procedures. For instance it can be hypothesised that the variety of adze morphologies is a result of different hafting systems and handle morphologies. Each adze should therefore be analysed in its archaeological context in order to understand the potential technical relevance of the morphological changes.



Fig. 18: Variety of adze morphologies discovered at the open air site of Apunirereha and the rock shelter of Ria

16 Cooperation

- Solomon Islands National Museum (Director Tony Heorake und Deputy Director Lawrence Kiko).
- Ministry of Culture and Tourism Solomon Islands (Director of Culture Dennis Marita).
- TraceoLab, University Liège (Sonja Tomasso, Veerle Rots).
- Department of Natural Sciences, German Archaeological Institute (Julia Gresky).
- Logistic assistance and support from the Honorary Consul of the Federal Republic of Germany in Honiara (Gerald Stenzel).

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ZUSAMMENFASSUNG

A closer look at Malaita's lithics.

Preliminary results of a functional study of the lithic tools from Apunirereha and Ria, Solomon Islands

Sonja Tomasso, Johannes Moser

Diese Abhandlung liefert vorläufige Ergebnisse einer funktionalen Analyse, die an den lithischen Inventaren aus zwei Fundplätzen, dem Steinschlagatelier ‚Apunirereha‘ und vom Wohn- und Bestattungsort ‚Ria rock shelter‘ (Insel Malaita, Salomonen), durchgeführt wurden. Die funktionalen Studien widmen sich vornehmlich der Gebrauchsspuren- und Residuenanalyse an ausgewählten lithischen Werkzeugen. Alle Artefakte wurden in Abhängigkeit ihres individuellen Erhaltungszustandes sowohl makroskopisch als auch mikroskopisch untersucht. In Fällen ausgeprägter, postdepositional bedingter, Veränderungen beschränkten sich die Artefaktanalysen auf optische Beobachtungen mit geringeren Vergrößerungen. Die Ergebnisse bestätigen das Vorhandensein von benutzten und geschäfteten Werkzeugen und tragen somit zu einem besseren Verständnis des Funktionscharakters der verschiedenen Inventare aus den beiden Fundplätzen bei.

SCHLAGWORTE

Lithologische Technologien, Funktionelle Studien, Salomon-Inseln

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Fig. 18: Sonja Tomasso, DAI-KAAK

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