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Report on archaeological reconnaissance of Aleipata east coast, 'Upolu, Sāmoa

Summary

Archaeological reconnaissance of the eastern coast of Aleipata indicates the possible presence of underground artefact layers dating to the initial colonization of Sāmoa. In cooperation with the National University of Sāmoa (NUS), the Centre for Sāmoa Studies (CSS) and the Museum of Sāmoa, I propose a two-stage research programme to find and describe these artefact layers. First, we will conduct minimally invasive archaeological coring to identify the precise location of artefact layers. Second, we will conduct archaeological excavations in these layers to recover materials such as pottery, stone tools, and food remains that will help address questions about Sāmoa's colonization. We expect training opportunities for students from NUS and other institutions, as well as opportunities for local cultural heritage development.

Background

From 20-23 June, Ethan Cochrane (University of Auckland) and Matiu Matavai Tautunu (NUS, CSS) conducted an archaeological reconnaissance of the east coast of Aleipata subdistrict, concentrating on the villages of Lalomanu to Aimale and the offshore island of Namu'a (Figure 1). The goal of the reconnaissance was to identify areas where intact Lapita ceramic layers may be present at recoverable depths. Lapita ceramics are the oldest ceramics in Sāmoa and date to the first colonization of the archipelago about 2800 years ago (Rieth and Hunt 2008). Previous archaeological research (Dickinson and Green 1998; Dickinson 2007) suggests that Lapita ceramic layers may only be easily recoverable from locations where the interaction between changes in sea level and island subsidence and uplift have left Lapita ceramic layers at inland positions with moderate amounts of overlying sediment. According to research by Dickinson (2007), there is a high likelihood of such layers on the east coast of Aleipata.

More generally, the archaeological research proposed here hopes to address questions concerning the initial colonization of Sāmoa. There is currently only a single Lapita ceramic layer in the entire archipelago. This is at Mulifanua and is dated to about 2800 years ago. Only two other ceramic layers, at To'aga, Ofu Island, and Tula, Tutuila Island are dated to within 300 years of Mulifanua (Cochrane et al. in review). The lack of cultural layers from the same time period as Mulifanua has led archaeologists to consider two hypotheses (Clark 1996; Cochrane et al. in review), that either (1) the colonization of

Sāmoa was undertaken by a very small group that possibly did not occupy the archipelago continuously, or (2) that Lapita ceramic layers from the same time as Mulifanua do exist, but have not been recovered due to their destruction and inaccessibility as a result of sea level change and island movement. Through proposed excavations this research aims to evaluate hypothesis (2) at Aleipata, the most likely place for intact Lapita ceramic layers to be found.

In addition to possible Lapita ceramic layers, there other significant archaeological resources in the area. Davidson (1974) previously documented archaeological features inland of Lalomanu Village, including star mounds (*tia*), stone platforms, and a sunken path with stone walls on either side. These features might be re-investigated (eg, mapped, excavated) as part of the proposed research.

Archaeology and reconstructing the 2800 year old Aleipata coastline

The primary goal of the archaeological reconnaissance was to reconstruct the 2800 year old Aleipata coastline to determine the likelihood and probable location of intact Lapita ceramic layers. This was accomplished through informal walking survey of the coastal villages to note elevation changes across the landscape, and recording of geological features that indicate past sea-level and coastal landforms.

First, two geological features suggest relatively higher sea-level on the Aleipata coast during the mid-Holocene. On Namu`a we identified a wave-cut notch on the island's south side (Figure 2). Notches above modern high tide are typically produced through wave action during past times of relatively higher sea level which, for Sāmoa, is estimated at 1.2 +/- 0.4 m above current sea level at approximately 2750 years ago, down from 2.1 +/- 0.5 m at 4000 years ago (Mitrovica and Peltier 1991). Second, ancient beachrock and possible paleoreef (ancient reef) structures on the southeast coast of `Upolu near Lalomanu also indicate higher sea level sometime in the past, relative to current island elevation (Figure 3). Although this beach rock and possible paleoreef is undated, it, like the wave-cut notch, likely formed during times of previously higher sea-level approximately 4000 years ago.

For our informal survey we walked inland from the beach on various village roads along the eastern Aleipata coast. Although the contour lines on Figure 1 are too gross (20 m) to indicate it, there is an elevation change from a flat coastal plain to a gentle to moderate slope that continues without a loss of elevation to the island interior. This elevation change occurs between 100 m to 270 m inland from the current beach. The elevation change typically occurs at a smaller distance inland at the southern end of the coastline, near Lalomanu and Vailua Villages, and at a greater distance toward the northern end of the coastline near Malaelā Village. Near Vailua Village the topography suggests one or more small low ridges projecting onto the coastal plain (also visible in the 20 m contour line on Figure 1). Near Malaelā village the coastal plain is swampy in places with currently active water courses (visible in Figure 1).

Combining the information from the informal survey with the geological indicators of relatively higher sea-level we can predict that approximately 2800 years ago the beachfront along the Aleipata east coast was inland from its current position, likely by

variable distances based on the rise in elevation that occurs from 100 m to 270 m inland. It is possible that this coastline was comprised of a small, low headland and beaches, predominantly at the southern end, and a coastal estuary or small brackish lagoon at the northern end near Malaelā Village, and which has since been transformed into swamp after coastal progradation (the movement of land toward the sea). This predicted coastal environment is similar to others where Lapita ceramic layers have been recovered in Fiji (eg, Cochrane et al. 2011), Tonga (eg, Dickinson 2007) and elsewhere (eg, Nunn and Ahikau 2009).

Proposed Further Research

Based on the reconnaissance findings, the Aleipata east coast is a good candidate both for settlement during the initial colonization of Sāmoa and for the preservation of cultural layers associated with colonization. We predict that ancient beach (paleobeach) layers possibly containing Lapita ceramics and other artefacts are located below the present ground surface near the initial increase in elevation from the flat coastal plain. These layers should be capped by inland sediments of unknown depth, but likely exceeding 1 meter. The likely paleobeach layers, possibly with Lapita ceramics, may be located below the subsurface water-table.

To test for the location of paleobeach layers and possible Lapita ceramics, we propose a small programme of archaeological coring using a hand-driven auger (Figure 4). Approximately 5 cores, spaced approximately 15 m apart, and excavated up to approximately 2.5 m deep will be set up in a 75 m transect line perpendicular to the current coastline and across the elevation change from the coastal plain (Figure 5). We propose three to five similar coring transects, in total, in the villages from Lalomanu to Malaelā. Coring transects can be set up near roads and in plantations to not disturb people in the villages. Data from the cores will include the changing depth of cultural materials and paleobeach layers at variable distance from the current coast and elevation change. These data will be used to select specific areas for a larger controlled excavation programme using, for example, 2 m² grids. This approach has been successfully undertaken in Fiji (Morrison and Cochrane 2008; Cochrane et al. 2011).

As part of the coring programme we propose to develop presentations on our research for people in the villages. These will be slide-show presentations delivered with a laptop and portable projector. Ethan Cochrane would deliver the presentation designed for a basic understanding, and Matiu Tautunu would simultaneously translate into Sāmoan.

National University of Sāmoa and University of Auckland students can be integrated into the proposed research to varying degrees, perhaps on day-trips or for longer periods. Student involvement may continue during the proposed excavation programme after the coring programme.

Future research, either during the excavation programme or later could include archaeological survey of features upland from the villages. The abundant features (Figure 6) reported by Davidson (1974), and other features to be found, could be cleared, mapped and some possibly excavated. This work could provide training for students and perhaps be developed into a "cultural site" administered by local groups.

Timeline

We propose to conduct the archaeological coring programme from approximately *September 1-14, 2013*. The timing of the excavation programme to follow will depend on the university schedules of those involved, but could be conducted over 3-4 weeks in February 2014 or later in the year. Additional research, for example an upland archaeological survey, could be attached to the excavation programme or conducted in the second half of 2014.

Funding

Cochrane currently holds a grant from the University of Auckland Faculty of Arts Research Development Fund that supports some direct research expenses and some associated costs (eg, local excavation assistants) through 2014.

Permissions

Governmental and local permissions for the proposed work will be undertaken with assistance from the National University of Sāmoa, the Centre for Sāmoan Studies, and the Museum of Sāmoa.

Disposition of Materials and Findings

Some cultural materials recovered (eg, pottery pieces, food remains) may be temporarily housed at the University of Auckland for analysis. These will be returned to Sāmoa, at the expense of the researcher, or curated at the University of Auckland if this is the request of the Museum of Sāmoa and other authorities. Research findings will be published in academic outlets and given to village groups in more basic formats, translated into Sāmoan.

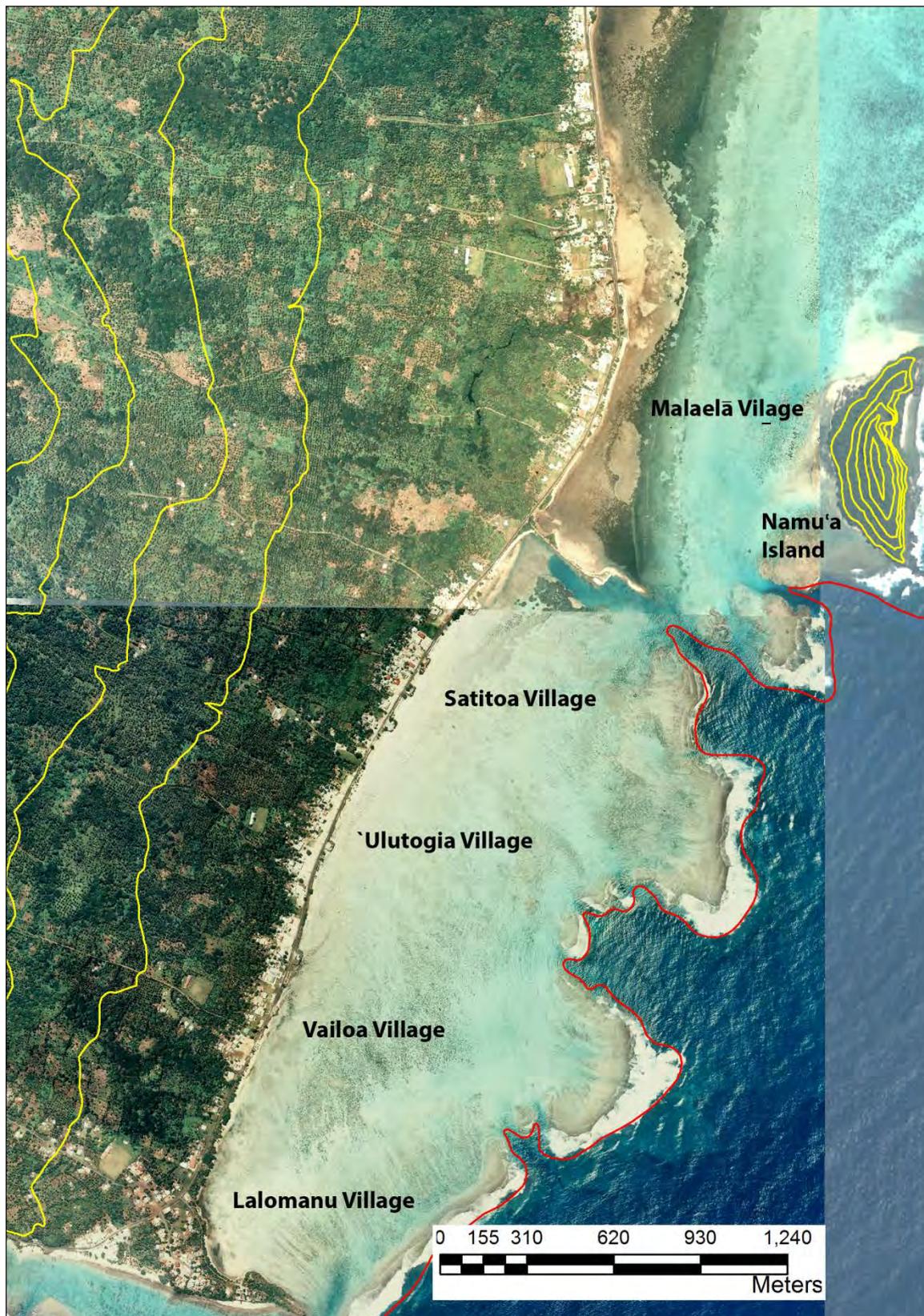


Figure 1. Map of east coast of Aleipata showing villages for proposed archaeological research. Yellow contours are 20 m intervals. Basemap comprised of IKONOS image and 2001 orthophotos.



Figure 2. Likely mid-Holocene (6000-3000 years ago) wave-cut notch on southern coast of Namua. Picture taken approximately 1.5 hours after low tide, 21 June 2013.



Figure 3. Southern shoreline of Lalomanu. This beachrock and/or paleoreef and indicates higher sea level in the past. Nu'utele Island visible in right background. Photo taken 1.5 hours before low tide, 27 June 2013.



Figure 4. Sediment auger used for subsurface archaeological testing in Fiji. Note the small bucket at the end of the auger that removes sediment for examination.

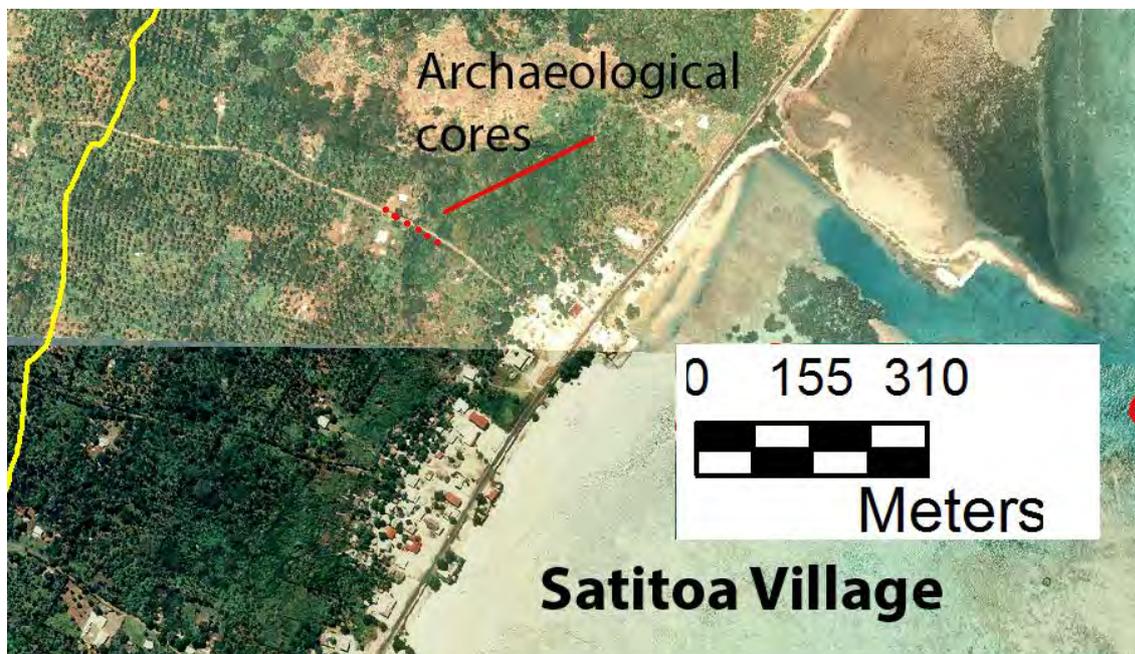


Figure 5. Possible location for archaeological cores in Satittoa Village. Line of cores is laid out across the elevation rise from the coastal plain (not identified by the 20 m contour intervals in yellow).

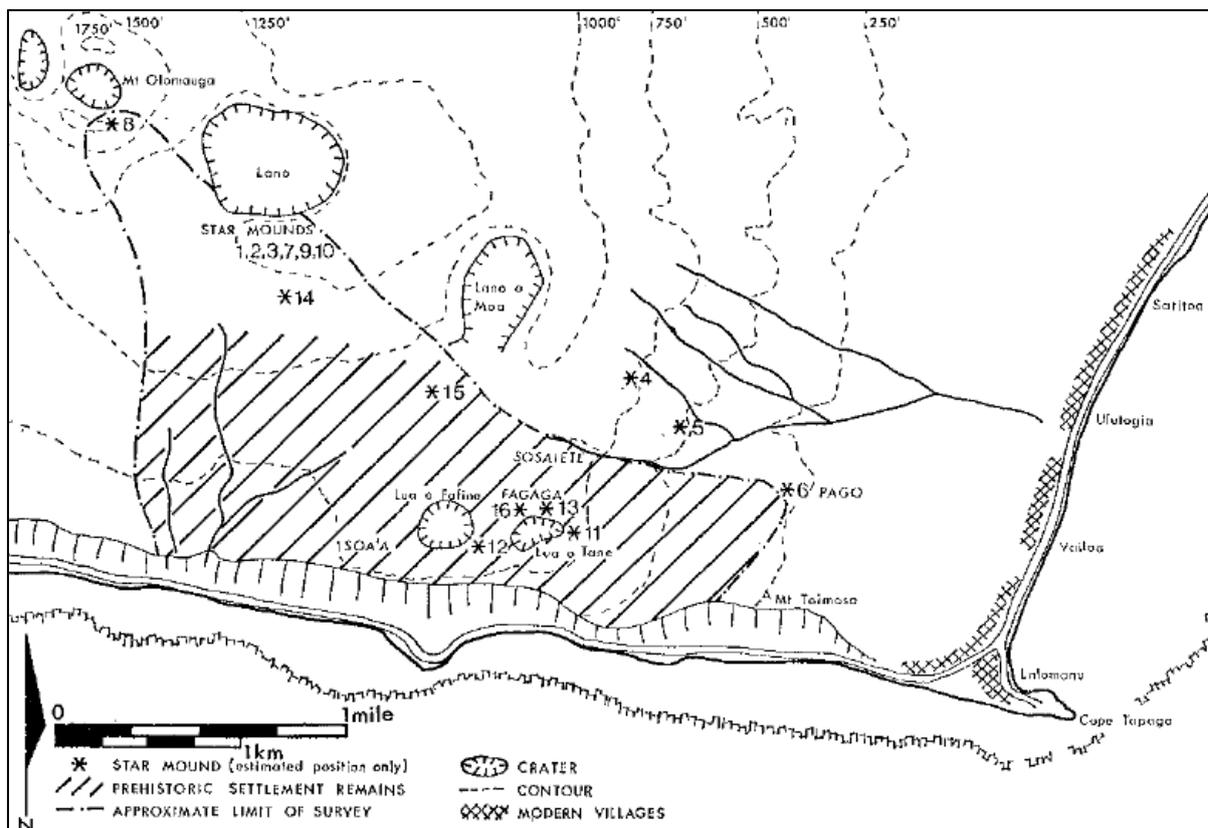


Figure 6. Archaeological features in the Lalomanu area recorded by Davidson. Figure from Davidson (1974:Fig. 77)

References

- Clark, J. T. (1996). Samoan Prehistory in Review. *Oceanic Culture History: Essays in Honour of Roger Green*. J. Davidson, G. Irwin, F. Leach, A. K. Pawley and D. Brown. Dunedin, New Zealand Archaeological Association: 445-460.
- Cochrane, E. E., T. M. Rieth, et al. (in review). "Plainware Ceramics from Sāmoa: Insights into Ceramic Chronology, Cultural Transmission, and Selection among Colonizing Populations." *Journal of Anthropological Archaeology*.
- Cochrane, E. E., I. C. Rivera-Collazo, et al. (2011). "New Evidence for Variation in Colonization, Cultural Transmission, and Subsistence from Lapita (2900 BP) to the Historic Period in Southwestern Fiji." *Journal of Pacific Archaeology* **2**(1): 40-55.
- Davidson, J. (1974). Site Surveys on Upolu. *Archaeology in Western Samoa*. R. C. Green and J. Davidson. Auckland Auckland Institute and Museum. **2**: 181-204.
- Dickinson, W. R. (2007). Paleoenvironment of Lapita Sites on Fanga 'Uta Lagoon, Tongatapu, Kingdom of Tonga. *Oceanic Explorations: Lapita and Western Pacific Settlement*. S. Bedford, C. Sand and S. P. Connaughton. Canberra, ANU Press: 177-186.

Dickinson, W. R. (2007). "Upolu (Samoa): Perspective on Island Subsidence from Volcano Loading." The Journal of Island and Coastal Archaeology **2**(2): 236 - 238.

Dickinson, W. R. and R. C. Green (1998). "Geoarchaeological Context of Holocene Subsidence at the Ferry, Berth Lapita Site, Mulifanua, Upolu, Samoa." Geoarchaeology **13**(3): 239-.

Mitrovica, J. X. and W. R. Peltier (1991). "On postglacial geoid subsidence over the equatorial oceans." Journal of Geophysical Research **96**: 20053-20071.

Morrison, A. E. and E. E. Cochrane (2008). "Investigating shellfish deposition and landscape history at the Natia Beach site, Fiji." Journal of Archaeological Science **35**(8): 2387-2399.

Nunn, P. D. and H. T. Ahikau (2009). Understanding the Place Properly: Paleogeography of Selected Lapita Sites in the Western Tropical Pacific Islands and its Implications. Lapita: Ancestors and Descendants. P. Sheppard, T. Thomas and G. Summerhayes. Auckland, New Zealand Archaeological Association. **28**: 235-254.

Rieth, T. M. and T. L. Hunt (2008). "A radiocarbon chronology for Samoan prehistory." Journal of Archaeological Science **35**(7): 1901-1927.