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INVESTIGATIONS OF ANTHROPOGENIC SEDIMENTS IN QARANILACA, VANUABALAVU ISLAND, FIJI

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Introduction

Fieldwork throughout the Vanuabalavu group of islands in northeast Fiji in July 1999 by a team from the University of the South Pacific and the Fiji Museum focused on locating evidence for early (Lapita-age) settlement largely through the collection of potsherds from the surface and in test pits (Nunn and Matararaba, *forthcoming)*. Another site of especial interest was the large cave named Qaranilaca or 'sail cave' *(qara* = cave, *laca* = sail) at the southernmost tip of the main island, Vanuabalavu (Figure 1). The oral tradition states that a man named Ravuravu from Totoya Island in southeast Fiji travelled by outrigger canoe *(takia)* to Vanuabalavu and, upon arrival, put his sail in this cave to dry before going on to club a hunchbacked man to death farther north.

Nature of the Qaranilaca Cave Fill

Evidently the combined product of marine erosion and collapse of its limestone roof, this cave is large compared to others on these islands, but what makes it so unusual is the volume of its fill, exposed in section along the front of the cave (Figures 2 and 3). The floor of the cave - approximately 2.1-2.5 m above mean low-water spring (MLWS) tide level - is almost flat and composed largely of the black silt-clay characteristic of the uppermost part of the cave fill. Recent hearths and earth-oven (*lovo*) stones are found in a few places on the surface, suggesting the cave is still used occasionally in this manner although usage is reported to have declined in recent decades with the growth of Namalata village on the other side of the 60 m passage. Several potsherds were collected from on top and within the cave fill but none were decorated or were otherwise diagnostic of a particular period.

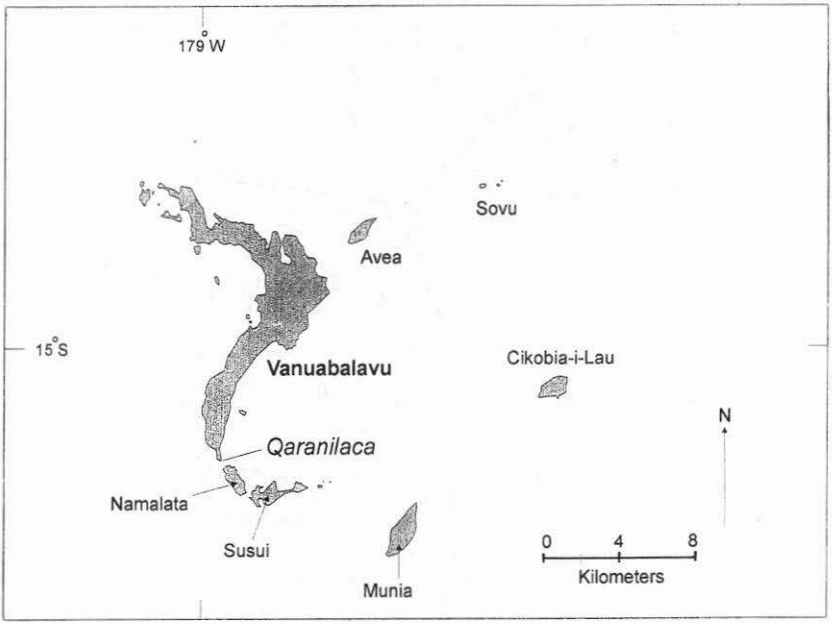

Figure 1. Location of Qaranilaca in the Vanuabalavu island group

What is striking is the thickness of the cave fill, the upper metre or so of which appears from the stratigraphy recorded in the test pits and along the cave front to be comprised mainly of anthropogenic material. Locations of test pits are shown on the map of the cave floor in Figure 2, the stratigraphy of the front of the cave fill is shown in Figure 3. The anthropogenic material overlies an archaeologically-sterile sand with some clay lenses and concentrations of gravel, especially close to the bottom of the section along the cave front.

It is likely that the front of the cave fill has been trimmed by the sea which, in this part of the Pacific, has been demonstrably rising in recent decades (Nunn 1998c). This erosion has produced a ~2 m cliff with concentrations of beach gravel (including pumice from underwater volcanoes in Tonga) banked up along its base. At the highest tides, the sea rises almost halfway up this cliff.

Origin of Qaranilaca and its Fill

Although it is clear that the ocean exceeded its present level in this region during the middle Holocene (about 4000 cal yr BP) (Nunn 1995), there is no clear evidence for this in the immediate area although, by analogy with other parts of Fiji (Nunn, 1998a), it is likely that the cave was initially excavated when the sea was at this high level (~1.5 m above present). Neither is there evidence - and the research team was also looking explicitly for this - that this area of Vanuabalavu has been tectonically unstable within the latest Quaternary.

The basal deposits appear to be wholly the products of marine deposition and were probably reworked many times when the sea was at its mid-Holocene high level. As in other parts of these islands, wave energy would have been greater on average than today at this time because many coral reefs would probably not have reached the ocean surface; in the phrase of Hopley (1984) for the Great Barrier Reef, a 'Holocene high-energy window' was open. As sea level fell in the later part of the Holocene, reefs gradually reached the ocean surface and broadened under the influence of a largely stable sea level about 1200 years ago. This period would have witnessed a gradual decrease in both the amount of marine sediment being supplied to Qaranilaca and the frequency of its reworking. To judge from the almost complete absence of marine sediment from the anthropogenic part of the cave fill, little marine sediment has been introduced or reworked within the cave since the anthropogenic fill began accumulating.

A charcoal sample from the lowest part of the anthropogenic fill (see inset, Figure 3) yielded an conventional radiocarbon age of 430±50 BP (Wk-7587) which has been calibrated to AD 1400-1640 (550-310 cal yr BP) using OxCal (version 3beta2) and the CALIB Marine93.14c curve with no *local* marine correction factor. This gives *maximum* rates for vertical accretion of the anthropogenic cave fill of 1.3-2.2 mm/yr.

Suggested Chronology of Cave Evolution/Usage Within the Last Millennium

There is evidence throughout the Pacific Basin for a rapid cooling event accompanied by rapid sea-level fall about AD 1300 (Nunn 1999). The magnitude of this sea-level fall may have approached one metre in parts of the South Pacific (Nunn 1998b) and is inferred to have had major effects on human settlement patterns on many Pacific Islands. Particularly noticeable is the abandonment of large, unprotected, commonly coastal, settlements in favour of

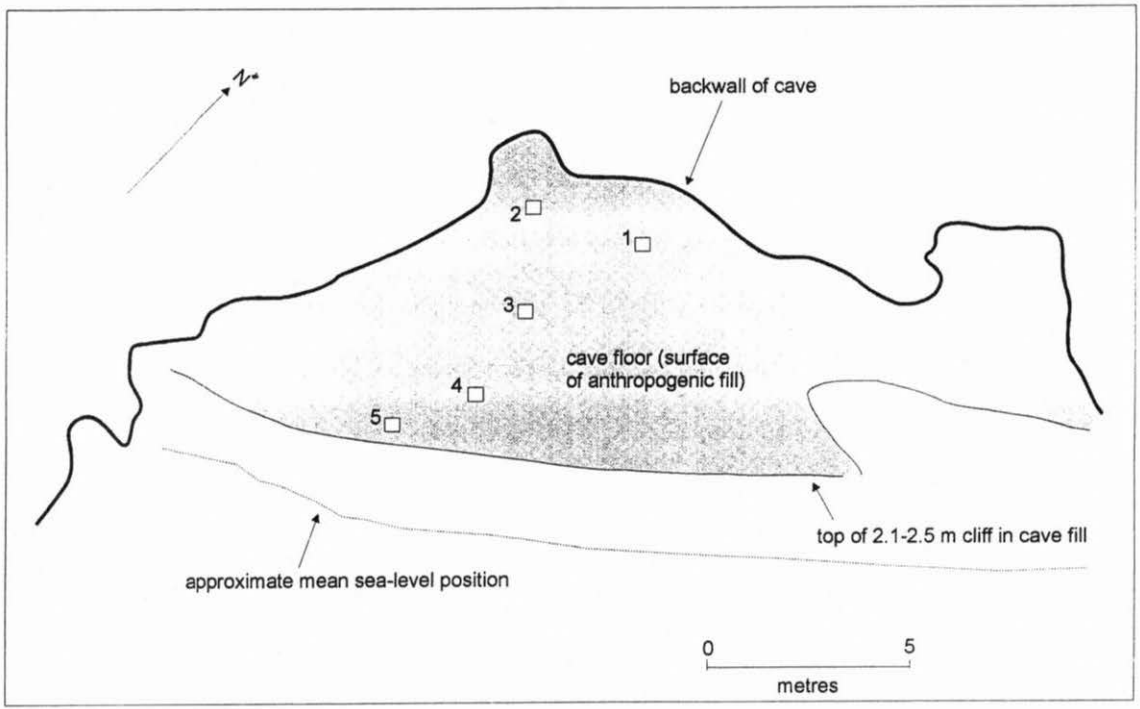

Figure 2. Map of the cave floor showing locations of test pits.

smaller, more readily defendable, commonly mountain-top, settlements (Nunn 1997, 1999).

It is plausible to suppose that the basal (non-anthropogenic) fill of Qaranilaca stabilized as a result of sea-level fall around AD 1300 and that this event also led to the cave becoming dry enough for human occupation. This is consistent with the date from the lowest part of the anthropogenic cave fill (see above).

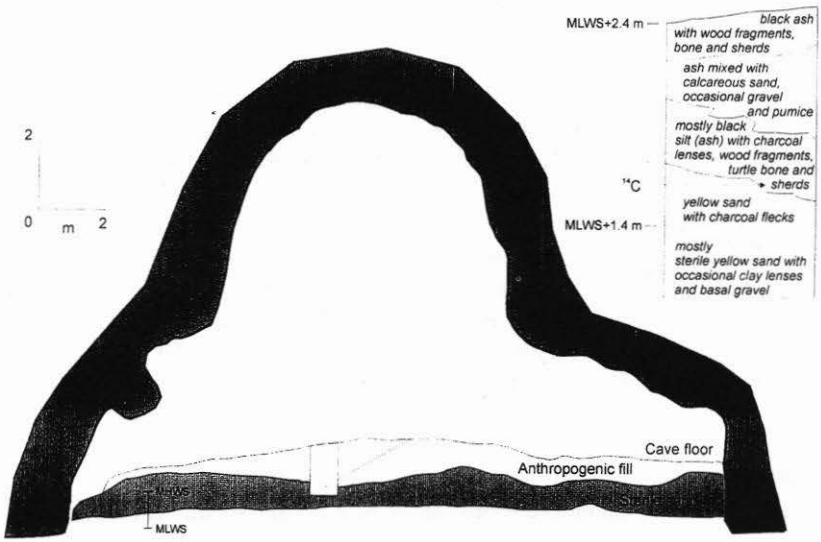

Figure 3. Vertical section through Qaranilaca showing detailed stratigraphy of the section along the front of the cave fill.

Most mountain-tops on the islands of the Vanuabalavu group were inhabited by people within the centuries preceding the arrival of missionaries (1850s). Many of these fortified sites were recorded by Lawlor (1981). Oral traditions indicate that they were abandoned about 150 years ago.

By analogy with other Pacific Islands, it is reasonable to infer that climate change and sea-level fall during the 'AD-1300' event led the people of Vanuabalavu to abandon coastal settlements in favour of mountain-tops just after this time, as on Lakeba Island 90 km to the south (Best 1984). In this context, the sheltered, well-hidden cave Qaranilaca could have become a place where seafood was cooked prior to being carried to nearby mountain-top settlements where most of the restricted space was otherwise utilized. This explanation is consistent with the reported fall into disuse of Qaranilaca with the re-establishment of coastal villages on Vanuabalavu and Namalata islands about 150 years ago.

Conclusions

It was originally hoped that the extraordinarily voluminous anthropogenic fill of Qaranilaca might contain a record of human occupation extending back further than the last millennium. Although 14 C dating has demonstrated this not to be so, there is undoubtedly a complex story preserved here which is worthy of more detailed excavation than was possible on this occasion.

Acknowledgements

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