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The chronology of occupation at Teouma, Vanuatu: Use of a modified chronometric hygiene protocol and Bayesian modeling to evaluate midden remains

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ABSTRACT

A number of radiocarbon dates, both published and unpublished have been obtained from archaeological deposits across the Teouma site on the island of Efate in Vanuatu. These are on a range of materials from the midden and associated cemetery including charcoal (13) and shell (7) as well as a number of less commonly dated ^{14}C sample types including bone from 2 terrestrial giant tortoises (?*Meiolania damelipi*), 8 pigs (*Sus scrofa*) and 2 chickens (*Gallus gallus*). Thirty-six human bone collagen dates and 5 *Conus* sp. shell ring artifacts from the cemetery context have been discussed in detail elsewhere (Petchey et al., 2014). In this paper, we evaluate the radiocarbon data according to observed contextual associations and established understandings of ^{14}C offsets, and collate all available information in a Bayesian framework to establish the age and duration of the settlement at Teouma. This analysis provides a maximum age range for the Lapita deposits of between 3000 and 2560 cal BP and a most likely start date of 2920–2870 cal BP and end date of 2870–2750 cal BP (68.2% prob.). This is slightly younger age for the deposits than previously reported, but is in keeping with evaluation of the burials themselves, the majority of which are dated to between 2940 and 2720 cal BP. This age range indicates that the site was in use at the same time as colonization events in Tonga (2850–2830 cal BP) and Fiji (3020–2860 cal BP), and supports the hypothesis that Vanuatu was at the center of a region-wide interaction sphere for several generations after initial settlement.

1. Introduction

The Teouma site is located on the south coast of Efate Island, Vanuatu, 800 m from Teouma Bay (Fig. 1).

Excavations took place between 2004 and 2010 (Bedford, 2006; Bedford et al., 2009, 2010) during which 68 burial features, concentrated in a band running northeast to southwest, parallel to the former beach, were uncovered. There are two key zones of the site that have been extensively dated; the Cemetery Zone and the Midden Zone located to the east of the Lapita cemetery (Fig. 2). The Lapita midden contained a number of domesticated species (i.e., *Sus scrofa*, *Gallus gallus* and the commensal *Rattus exulans*), as well as a large number of bones from indigenous birds and animals, many now extinct, including fruit bats (Pteropodidae), flying fox (*Pteropus* sp.), land tortoise (?*Meiolania damelipi*), and crocodile (*Mekosuchus kalpokasi*) (Bedford et al., 2009; Valentin et al., 2010:1826). Layer 3 of the Midden Zone (MZ3) deposit was considered to be contemporary with Layer 3 of the cemetery (CZ3) because it largely respected the cemetery boundary and contained substantial amounts of extinct fauna as well as obsidian from New Britain deposited on top of an orange/yellow tephra (Spriggs and Bedford, 2013). Layer 2 of the Midden Zone (MZ2) seems to have been contemporary with the cemetery but also likely associated with terminal Lapita midden dumping that extended on top of the cemetery (i.e., Cemetery Zone Layer 2/3 transition [CZ2/3]). These thin deposits are considered to immediately post-date the cemetery because the midden caps the burials but still contains ceramics of Lapita affiliation and substantial quantities of extinct fauna. A later midden deposit (Layer 2 Cemetery Zone [CZ2]), up to 50 cm thick, covered the cemetery and extended downslope over the former beach. This is associated with Arapus and Early Erueti ceramics currently dated to c. 2800–2500 BP[1] (Bedford et al., 2009:219–221). Layer 1 from both zones has not been dated. It represents natural post-occupation

[1] Arapus ceramics are characterized as plain globular cooking pots with out-curving rims and notching on the lip, and are associated with immediately Post-Lapita settlements on Efate. Over time Arapus rims and associated lip form changed into very distinctive wide and flat forms that have been termed Early Erueti ceramics, a phase succeeded by Late Erueti ceramics at about 2500 BP (Bedford, 2006:161).

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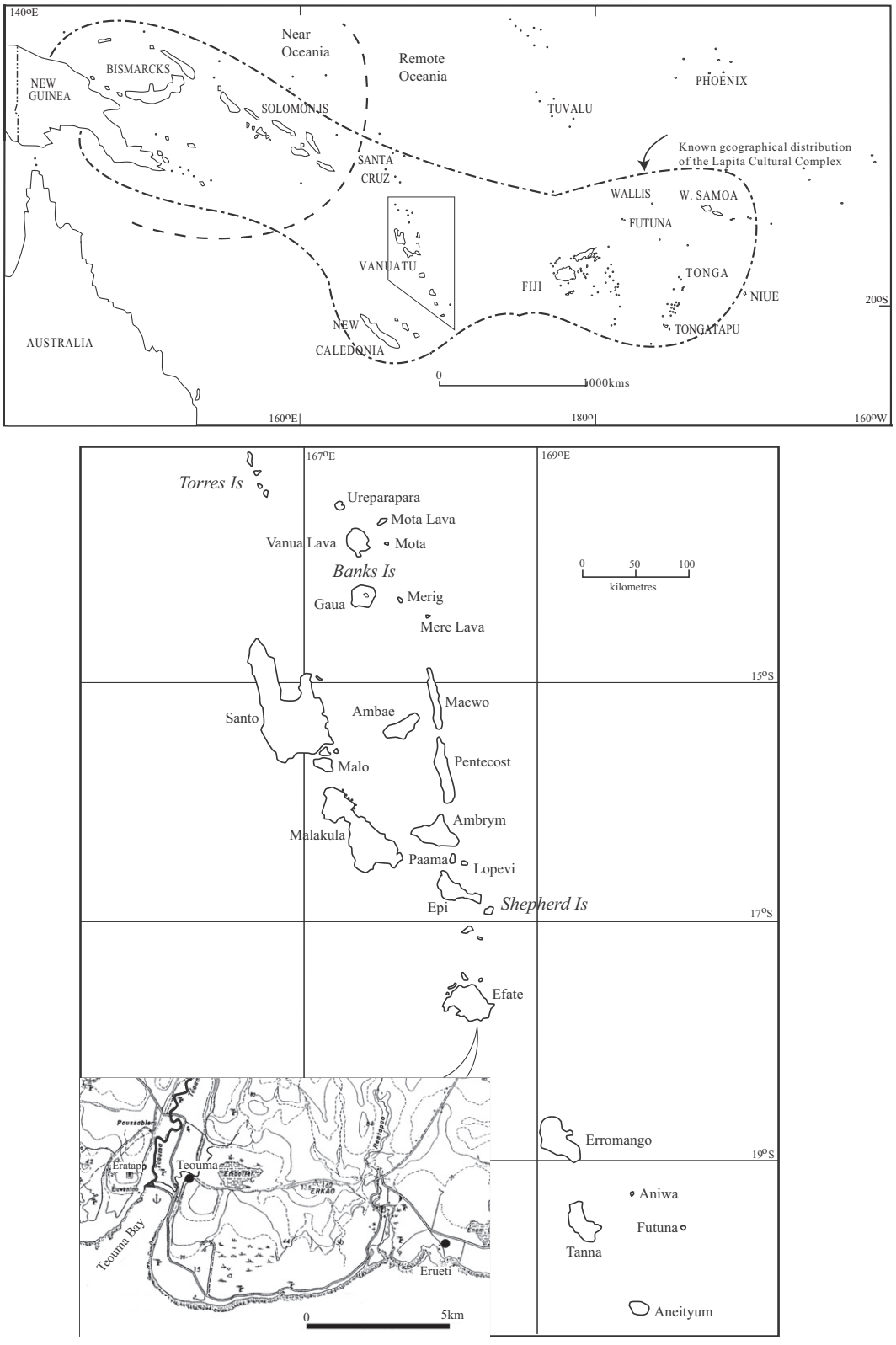

Fig. 1. Map of Remote Oceania showing location of Vanuatu. Insert: The Teouma archaeological site.

accumulation, rich in tephra, but also some earlier material brought up from lower levels of the site.

Preliminary dating of the site using charcoal suggested it was first used c. 3200–3000 cal BP (Bedford et al., 2006:818). Analysis of the Lapita ceramics indicated they were of Western or Middle Lapita style transitioning from Early or Far Western that had general similarities to ceramics from the Reef/Santa Cruz Group and New Caledonia, while in CZ2/3 there were some sherds with Late or Eastern style Lapita. The mix of older styles, exotic ceramics, simplified dentate-stamped designs and incised and shell impression wares all support the hypothesis that Teouma represents an early phase of expansion into Remote Oceania with some continued interaction with the wider region that was