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Early settlement and subsistence on Tongatapu, Kingdom of Tonga: Insights from a 2700–2650 cal BP midden deposit

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ABSTRACT

The first significant Neolithic migration of people into the Pacific was the dispersal of Lapita culture at 3200–2850 cal BP that involved the colonization of previously uninhabited and large island groups. Population expansion was accompanied by the introduction of domesticated plants and animals, but the location and content of Lapita deposits frequently suggests that early subsistence focused on the collection of wild resources. The tension between models that advocate Neolithic migration as sustained by agricultural yields and archaeological data that disclose rapid dispersal and a reliance on indigenous resources is particularly acute in the Kingdom of Tonga. Lapita settlements located on the palaeoshoreline of Tongatapu are associated with extensive shell midden deposits suggesting the establishment of permanent settlements that were located in proximity to marine resources before human predation or a declining sea-level fall led to resource collapse and site abandonment. Analysis of a shell midden sample associated with ancient burials from Talasiu on Tongatapu suggests a small sedentary occupation that lasted a few generations ~2700–2650 cal BP. Site abandonment does not appear to have been caused by a decline in marine yields and identified starch from eight food plants is the first direct evidence for a broad-spectrum mixed economy. While human predation of marine resources was substantial, sea-level fall is likely to have led to the closure of the Fanga 'Uta Lagoon at ~2500 cal BP resulting in the loss of benthic habitats and the reduction of economically important marine taxa that sustained and structured early sedentism.

1. Introduction and associated

The degree to which large-scale prehistoric population dispersals were sustained by the collection of wild foods relative to agricultural yields during the Neolithic is a long-standing issue in the Indo-Pacific (Bellwood, 2008; Donohue and Denham, 2010). Around 3500–3000 years ago human populations left Island Southeast Asia and began to colonize distant islands in the Pacific Ocean (Clark et al. 2010). The oldest of these dispersals is associated with Lapita culture found over 4500 km from Manus Island in the west to Samoa in the east (Fig. 1). Lapita expansion is identified primarily by sites with decorated ceramics marked with distinctive tooth-stamped and incised designs, and while the migration chronology is under constant revision, current estimates suggest that most Pacific islands in the Lapita range were occupied 3200–2850 years ago (Denham et al. 2012; Burley et al. 2015).

Dickinson (2003) noted that Lapita settlement of Oceania occurred after a mid-Holocene hydro-isostatic highstand suggesting that colonization of Pacific Islands was aided by a sea-level fall of 1–2 m. A declining sea-level caused the emergence of coastal flats on high islands, protected lagoons and stable islets that were new and attractive environments for human settlement (Dickinson et al. 1994; Dickinson, 2003:498; Nunn, 2007a; Nunn, 2007b:121). The transformation of near-shore environments facilitated human occupation of Pacific islands, yet sea-level fall over several centuries also had the potential to reduce the productivity of littoral marine zones that were heavily utilized by early prehistoric people for subsistence such as embayments, reef flats, estuaries and lagoons (Nunn and Carson, 2015). Lapita sites typically contain substantial quantities of shellfish and finfish, especially the remains of inshore reef and lagoon taxa (Kirch, 1997; Kirch, 2010; Szabó and Amesbury, 2011), and many sites are located on former shorelines that are now stranded by sea-level fall and coastal progradation (Best, 1984).

The effects of a sea-level fall on marine dietary regimes and settlement location is especially evident on the island of Tongatapu – the largest island in the Kingdom of Tonga – where dense marine shell and ceramic midden deposits are concentrated along palaeoshorelines formed during the mid-Holocene highstand (Spennemann, 1987:82; Spennemann, 1989a; Spennemann, 1989b:178; Dickinson, 2007). Introduced plants and animals were clearly important to the economy elsewhere in the Lapita range (Horrocks and Bedford, 2004; Horrocks

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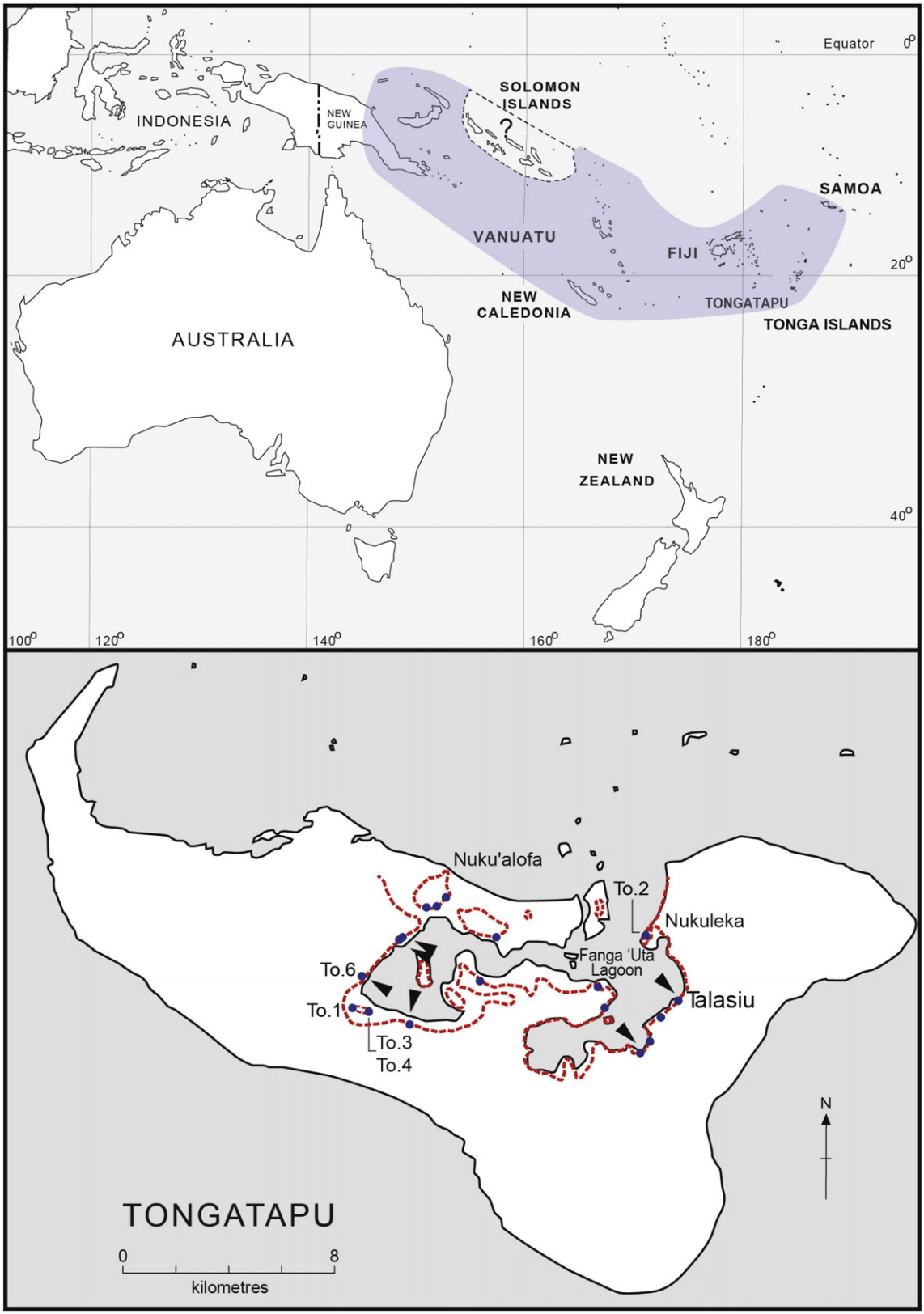

Fig. 1. Top. Distribution of the Lapita expansion and location of Tonga. Bottom. Location of the Talasiu site on Tongatapu and position of early sites marked by blue circles on the palaeoshoreline (red dashed line). Black arrows indicate the position of ground water solution channels.

and Nunn, 2007), but on Tongatapu researchers have repeatedly commented on the significance of marine resources. Burley et al. (2001:102) noted that massive populations of *Anadara antiquata* and *Gafrarium tumidum/pectinatum* were a critical variable in the early settlement distribution and Dickinson (2007:184) has suggested that the rich shellfish resources and sheltered palaeoshorelines of northern Tongatapu may have attracted: "one of the densest Lapita populations in the ancient Pacific world".