



Palaeohabitat of first settlement sites 1500–1000 B.C. in Guam, Mariana islands, western Pacific

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ARTICLE INFO

Article history:

Received 25 January 2011

Received in revised form

12 March 2011

Accepted 17 March 2011

Keywords:

Palaeohabitat

Guam

Mariana islands

Archaeology

Austronesian population dispersal

ABSTRACT

Based on computer-aided models and geoarchaeological excavations, palaeohabitat renderings can account for ancient site locations and contexts much different from today in terms of sea level, coastal dynamics, slope erosion, nearshore ecosystems, native forests, and other factors. A case study illustrates this research in Guam of the Mariana Islands of the western Pacific, with specific reference to the 1500–1000 B.C. time interval. This time interval includes the oldest known archaeological sites in the Mariana Islands, directly relevant for understanding the context of ancient Austronesian population dispersals in the larger western Pacific region. The results also help toward larger understanding of coastal adaptations in dynamic settings.

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The present work coordinates the results of geoarchaeological excavations with a series of computer-aided renderings of site settings during the period 1500–1000 B.C. in Guam, Mariana Islands, western Pacific (Fig. 1). This particular time period is of special interest because it refers to first settlement of the remote Pacific Islands during a time of somewhat higher sea level than today (+1.8 m) and just prior to a number of environmental changes related to sea-level drawdown combined with contemporaneous human population growth and impacts on local resources. This early settlement period also relates to larger patterns in exploration of the Asia-Pacific region by Austronesian Neolithic people.

The case study in Guam may be viewed as representative of a broader region of the Remote Oceanic islands in the western Pacific, where first human settlement occurred around 1500–1000 B.C. (Bellwood, 1997; Kirch, 2000, 2010; Spriggs, 2007), generally at sites that today are broad sandy beaches but once had been small offshore islets, sand berms or spits, narrow beach fringes, and strand-like swampy settings around the end of a mid-Holocene highstand of sea level about 1.5–2 m above the present level (Carson, 2008a, 2008b; Dickinson and Burley, 2007; Gosden and Webb, 1994; Kirch, 1997; Nunn, 2005, 2007; Wickler, 2001). These findings suggest an ancient preference for coastal habitats that no longer exist today, masked not only by sea-level fall but also

by several centuries of coastal progradation, accumulated sediments, and other transformations.

Shortly after first settlement in the Remote Oceanic region, sea-level drawdown to modern level began around 1000 B.C. but with some regional variation (Dickinson, 2000; Grossman et al., 1998), thereby creating new conditions of expanded coastal plains, disruption of mangroves, and altered nearshore ecosystems that previously had been targeted as presumably the preferred ecological support base for the founding and formative populations (Nunn, 2005, 2007). Adjustment to these new conditions coincided with a substantive change in material culture (Fig. 2), specifically the elimination of very thin-walled and finely decorated burnished blackware and red-slip-ped pottery in the Mariana Islands (Carson, 2008a) and the disappearance of dentate-stamped Lapita pottery in Melanesia and Polynesia (Carson, 2008b). The human populations of course persisted, but their modes of interaction with their environments needed to change in accordance with new conditions and challenges.

1. Data and methods

Perhaps most important in this model is the latest information about sea-level change (Fig. 3). Specifically in Guam and the Mariana Islands, measurements of wave-cut notches and emerged reefs indicate +1.8 m higher sea level dated 3400 through 1050 B.C., followed by drawdown over several centuries lasting perhaps until A.D. 200 (Dickinson, 2000, 2003; Kayanne et al., 1993). This directly observation-based average value of +1.8 m matches nicely with

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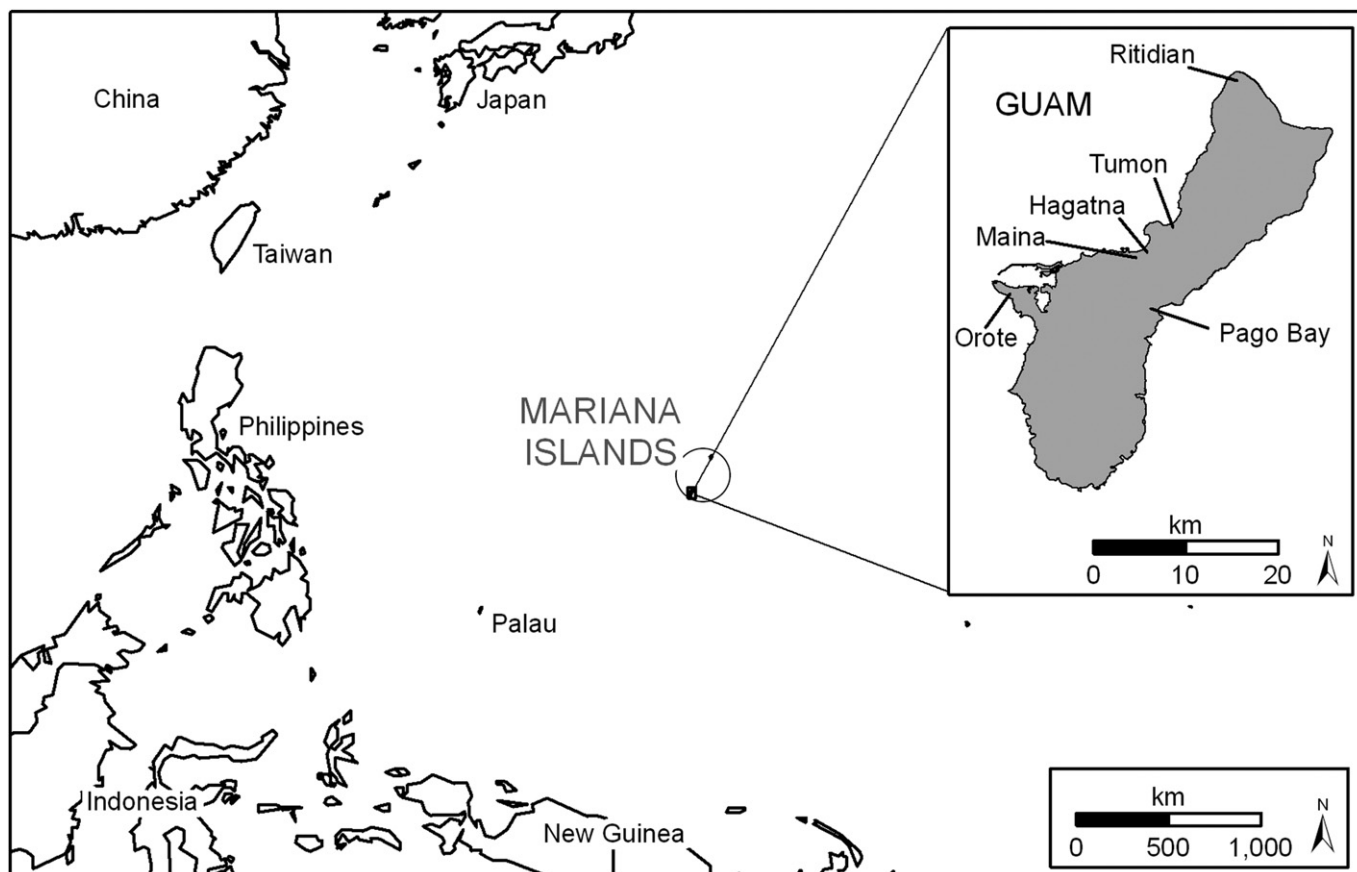


Fig. 1. Location of study sites in Guam, Mariana Islands, western Pacific.

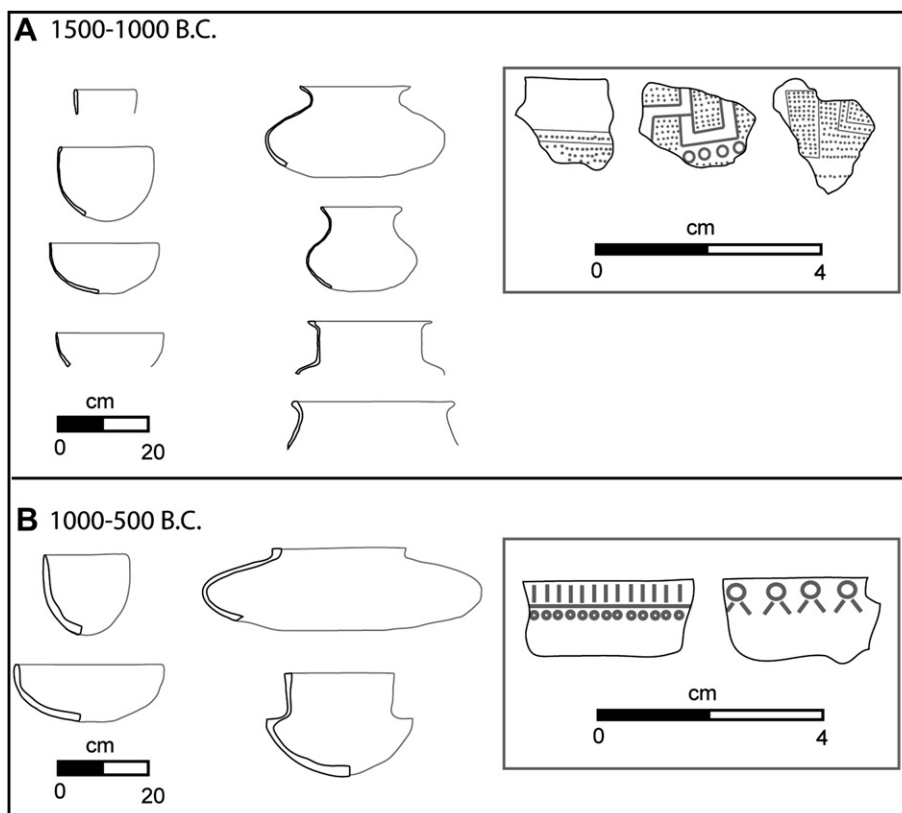


Fig. 2. Early pottery types in the Mariana Islands, including: examples of: a) 1500–1000 B.C.; and b) 1000–500 B.C. Graphic is modified from Carson (2008a), with minor updating.

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