



# Late Pleistocene/early Holocene maritime interaction in Southeastern Indonesia – Timor Leste



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## ABSTRACT

This study analysed over 1000 obsidian stone artefacts excavated from two adjoining shelters at Tron Bon Lei on Alor Island Indonesia using portable XRF. The study showed an unambiguous separation of three different source locations (Groups 1, 2 and 3). Two sources (Group 2 and 3a, b, c) dominate the assemblage numerically. Group 1 and 2 indicate use of a single volcanic formation with a strong match between Group 1 artefacts and artefacts from sites in Timor Leste. Obsidian occurs in the earliest occupation layer in the Alor sites but does not include Group 1 artefacts which occur only after approx. 12,000 cal BP. Currently the geographical location of the Group 1 outcrop is unknown, however, based on the late appearance of the Group 1 artefacts in the Alor sequence it is likely that the location is not on Alor, but rather on another island of the Sunda chain. The dating of Group 1 artefacts in widely spaced sites on the never geographically connected islands of Timor and Alor indicates that maritime interaction between islands began by at least the terminal Pleistocene. The distribution of the obsidian in Tron Bon Lei shelter Pit B shows that there were periods of more intense interaction punctuated by periods when interaction declined or ceased.

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## 1. Introduction

Identifying social interaction in prehistory is notoriously difficult, being based largely on typological or stylistic comparison of different material expressions of assumed cultural identity (for example red-slipped pottery or flake-blade techno-complexes, Bellwood, 1997). Geochemically tracking the movement of raw materials provides the unique capability to cut through sometimes arbitrary archaeological classifications and provides direct evidence for maritime interaction if materials are sourced from off-island locations. The new evidence presented of terminal Pleistocene maritime transportation of raw materials adds to the global discourse about the beginnings of maritime interaction networks. Island Southeast Asia (ISEA) features very strongly in this debate, as well as new data from the Izu Islands, Japan (Kuzmin, 2016), the Northern Channel Islands, USA (Erlandson et al., 2011), and the Aegean, Eastern Mediterranean (Carter, 2016), now challenging old

paradigms about Pleistocene maritime capabilities of hunter-gatherer societies and initial raw material transportation being associated only with the spread of Neolithic cultures. Unfortunately, in ISEA, the data for correctly identifying off-island resource use is significantly under-researched as seen in a recent review paper suggesting that there are up to 10 additional, so far unknown, obsidian sources being utilised in ISEA (Reepmeyer et al., 2011b; Spriggs, et al., 2011).

Off-island resource use has important implications for the understanding of maritime capacity of hunter-gatherer societies. Until recently it has been assumed that seafaring technology during the Pleistocene and Early Holocene was simple and maritime interaction networks limited. In ISEA, the assessment of maritime capability has changed in the last decade with evidence showing Upper Pleistocene hunter-gatherers ability for pelagic fishing (O'Connor et al., 2011), increased social interaction between distant communities, including maritime transportation of raw materials being traced back to the terminal Pleistocene – early Holocene transition (Bulbeck, 2008; Neri et al., 2015; Pawlik et al., 2015; Torrence and Swadling, 2008), and indications that a 'community of practice' existed in pre-Neolithic societies connecting islands in shared

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'identities' (O'Connor et al., 2016b).

In this paper we present new data on two obsidian sources represented at the Tron Bon Lei rockshelters on Alor Island (Samper Carro et al., 2015). In addition, we will show that a further third obsidian source matches obsidian raw material utilised in Timor Leste (Reepmeyer et al., 2011a). The new data provides additional evidence for maritime raw material transportation during the terminal Pleistocene/early Holocene transition, and it will be discussed whether sea-level rise during this time might be an important factor stimulating increased social interaction between island communities in the region.

### 1.1. Site context

Today Alor has a land area of about 2100 km<sup>2</sup>. As one of the Wallacean islands, Alor has never been connected by a land bridge to Sunda (the enlarged southernmost extension of Eurasia) or Sahul (Australia, New Guinea and the Aru Islands) or to the larger islands of Timor or Flores (Kealy et al., 2015). During the last lower sea stand, when sea levels were about 130 m below present, it was merged with neighbouring Pantar, Pura, Kambing, Rusa, Ternate and Treweng islands; forming an island of about 3800 km<sup>2</sup> (accounting for uplift of ~0.5m/ka) (Fig. 1). It was at about this time that the Tron Bon Lei sites were first occupied (Samper Carro et al.,

2016).

Alor is largely volcanic in origin with a mountainous interior dropping steeply to a narrow coastal margin. The Tron Bon Lei shelters discussed here are formed in a ridgeline above the coastal village of Lerabain approximately 33 m above sea level and 160 m inland from today's seashore (Fig. 2). The shelters are formed in fine-grained, dark to light grey, basaltic to andesitic volcanic deposits known as the Alor Formation which are of a presumed Late Miocene-Early Pliocene age (Noya et al., 1997). The Alor Formation intersects with the calcareous Laka Formation and also contains volcanic breccias (Noya et al., 1997), presenting as intercalated sub-angular to rounded clasts measuring up to ~50 cm in diameter. Inside the shelter the floor consists of unconsolidated sediment with some large, fine-grained volcanic boulders on the surface that are of the same composition as those that can be seen in the shelter walls.

In 2014, three 1 m<sup>2</sup> test pits were excavated in two adjoining shelters (Fig. 2). Pit A was excavated to 70 cm when bedrock was encountered. Pit B was extended to 3.2 m before reaching bedrock. Pit A presented challenges for dating as little organic material was preserved and only modern dates for the upper part of the sequence were obtained. Obsidian artefacts were scarce in the Pit A assemblage where only one piece of a total 59 samples was allocated to Group 1. Here we focus on Pit B which contains the

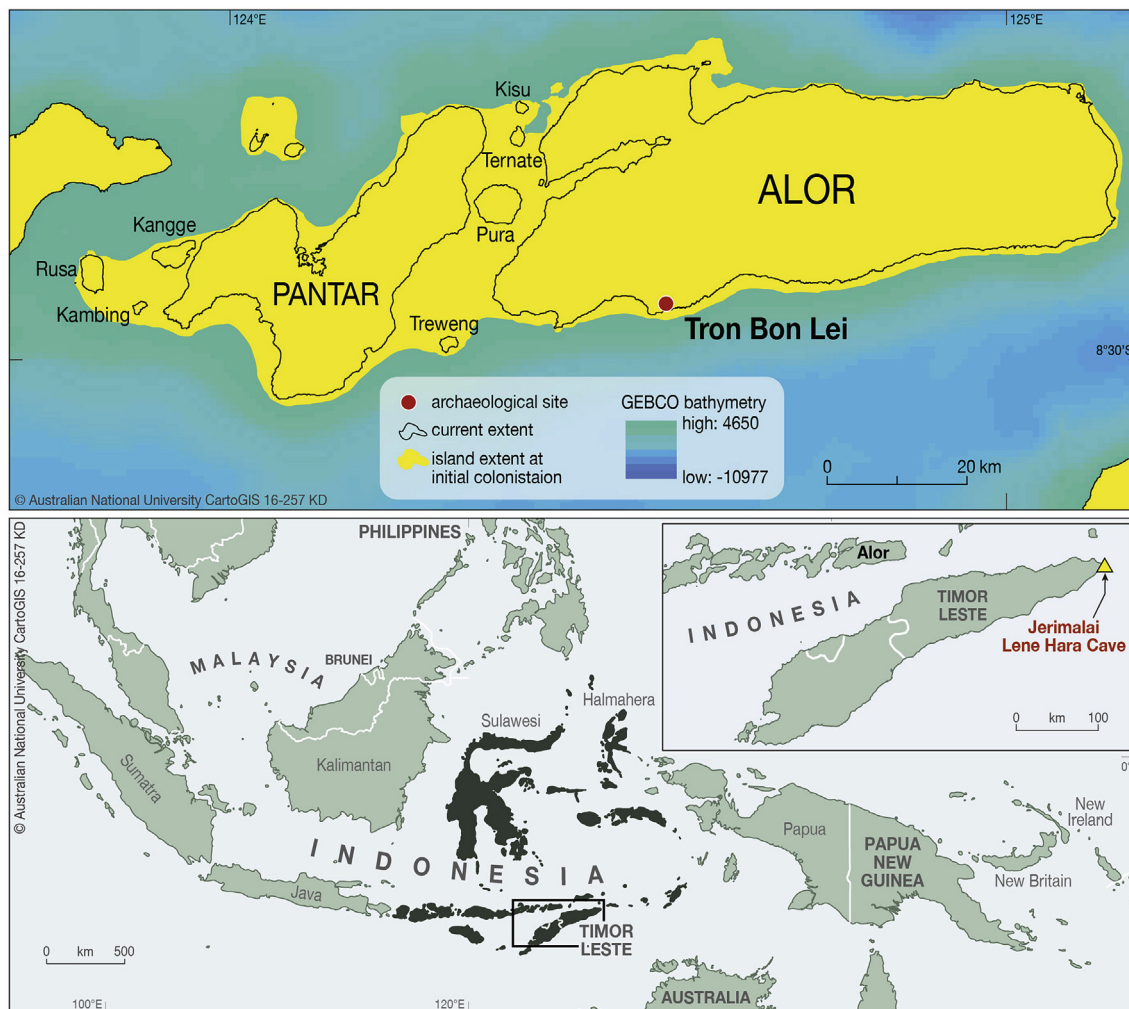


Fig. 1. Above: Location of the Tron Bon Lei rockshelter on Alor Island. Landmass extension during occupation history. Below: Location of research area, the darker shaded area shows the extent of the Wallace region.

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