Reconstructing the History of Dauar Island through Soil Micromorphology

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Introduction

Soil micromorphology studies intact sediment samples which are kept in context by targeting boundaries within the archaeological stratigraphy (County et al., 1989). The analysis of the thin sections gives information of singular depositional and post-depositional events, as well as the relative chronology of the sedimentary context (Goldberg & Macphail, 2006). Despite that, this technique has only recently started to be integrated into archaeological investigations within the Australian and the Indo-Pacific context (Denham, 2003; Grono, 2020; Morley & Goldberg, 2017; Prossor et al., 2022; Vannieuwenhuyse, 2016; Ward et al, 2017). This study aims to (i) develop a more detailed methodology for the analysis of coastal sites in Torres Strait Islands and, (ii) to recontextualise and provide evidence for integrity or disturbance of sedimentary events and past human occupation at Ormi 3 in comparison with previous research (Figure 1).

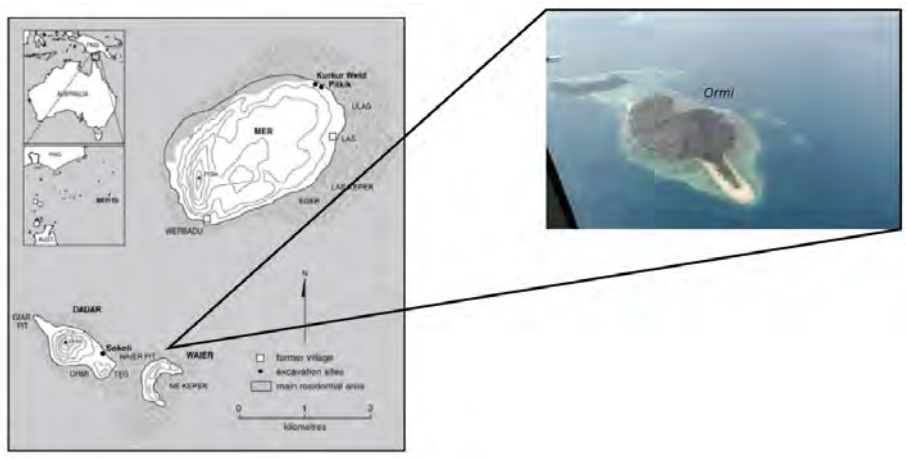

Figure 1: Islands of Mer, Daur and Wair, showing the archaeological sites excavated in 1988 and 2000 (adapted from Carter et al. 2004a) and the proposed excavation site at Ormi.

Future Research

Future analyses such as phytoliths extraction on the bulk sediments may reveal insights about preservation of biogenic silica on site (Vrydaghs, 2023; Figure 3;4).

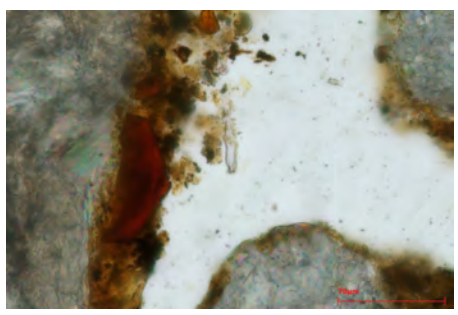

Figure 3:Isolate Elongate entire phytolith observed for Torres B; x500 PPL; sponge spicule partly embedded in the grain coating. Torres C, x500, PPL (Vrydaghs, 2023).

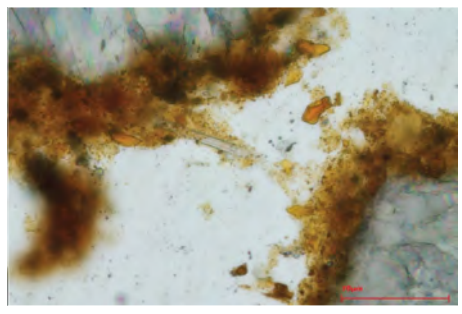

Figure 4:Perfectly preserved sponge spicule partly embedded in the grain coating. Torres C, x500, PPL. (Vrydaghs, 2023).

Methods

We sampled three monoliths targeting the boundaries across the stratigraphic layers. Analysis on 3 thin sections were performed. All the thin sections were observed using ZEISS Aksioscope under PPL (Polarized Light), XPL (Cross Polarized Light) and OIL (Oblique Incident Light) at magnifications x2, x5, x10, x20, x40 and x63 at the Australian National University.

Discussion

- What was the nature of early occupation at the site? *Layers 5-4*: increase of fine fraction upwards, increase of cultural material. Interpretation: **Phases of low occupation***/ sporadic visits (Figure 2).
- Can we track the intensity of site use over time and document the variation?*Layers 4-3*:uptake of the fine fraction in Layer 4 and observation of phytoliths potentially suggests an ancient soil formation layer directly below the shell midden (Layer 3). Interpretation: **Phase of higher occupation**-paleosol
- Is there evidence of site abandonment?*Layers 2-1*: high bioactivity, burnt loam/burnt sediment, fishscales. Interpretation: **Phase of Low Occupation/ Potential Site Abandonment/ Beach disturbance caused by high tides and turtles nesting across time.**

Results

Thin Section A (TS A): crumby to intergrain soil microstructure, burnt loam, root intrusion, meso-fauna activity,fishscales, unidentified bone fragments, parasite eggs (Figure 2).

Thin Section B (TS B): crumby to intergrain soil microstructure,charcoal, meso-fauna activity, fishcales, unidentified bone fragments, dusty clay coatings, iron nodules.

Thin Section C (TS C): intergrain microstructure,charcoal, meso-fauna activity, fish vertebra, unidentified bone fragments.

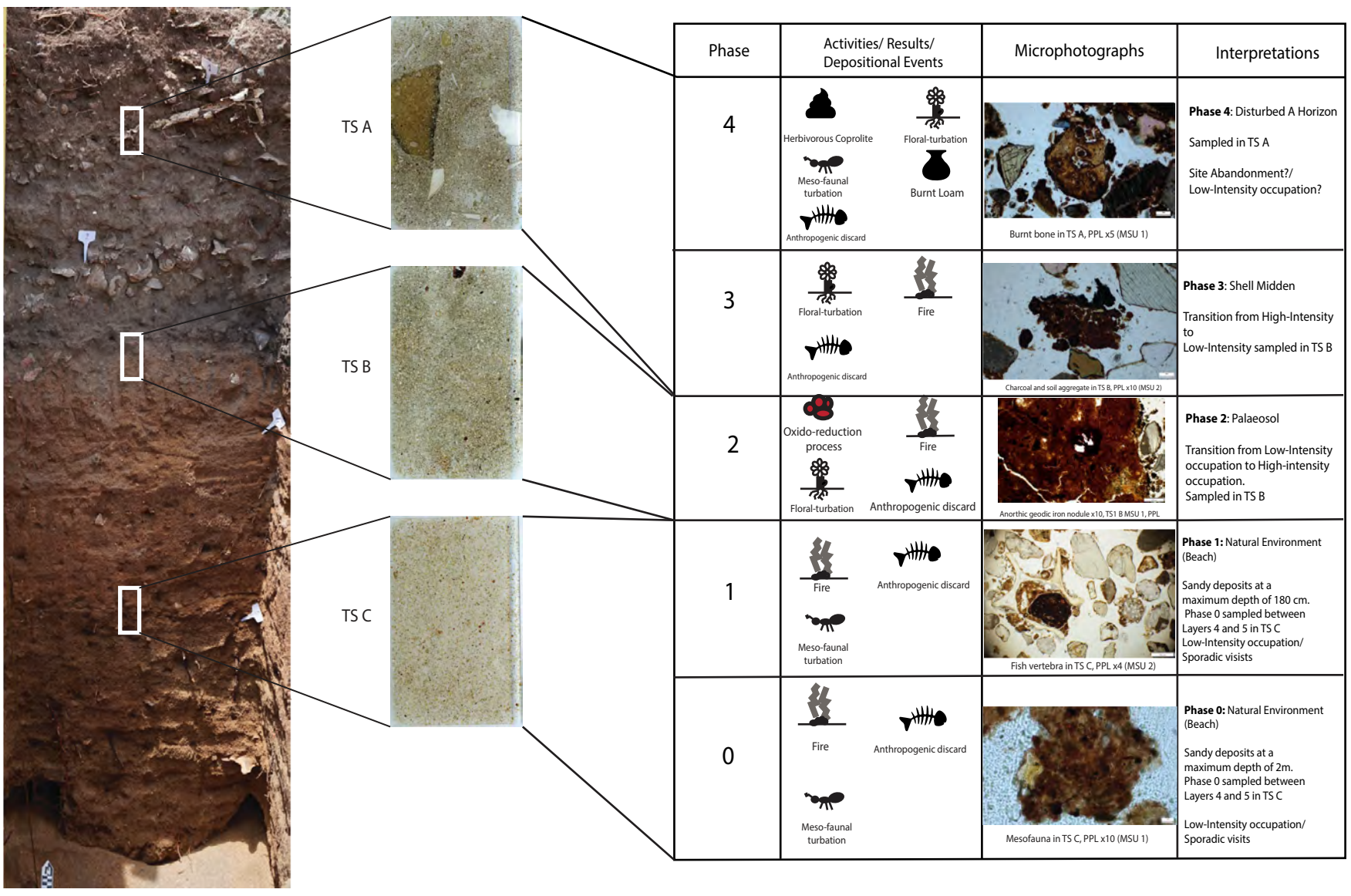

*Figure 2: The figure shows the analysis and interpretation of depositional events and related activities across each layer of Ormi 3 (Adapted from Prossor, 2023). The figure displays Phase 0, the bottom of the profile, and continue in the order in which the deposits were laid down over time (Phase 1-2-3-4). Phase 0 correspond to Layer 5; Phase 1 to Layer 4, Phase 2 to Layer 3, Phase 3 to Layer 2 and Phase 4 to Layer 1, * 'Phase of low/high occupation' refers to the frequency/continuity/discontinuity of observation of individual features within the deposits (Matthews, 2018).*

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