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Terminal Pleistocene and Early Holocene archaeology and stratigraphy of the southern Nejd, Oman



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ABSTRACT

Archaeological, geoarchaeological and geochronological research at the Terminal Pleistocene/Early Holocene sites of al-Hatab, Ghazal and Khamseen Rockshelters help to elucidate our understanding of the Late Palaeolithic occupation of the South Arabian Highlands. The stone tools found at these sites are attributed to the Nejd Leptolithic tradition; an autochthonous lithic culture found across Dhofar (Oman). The artifact-bearing deposits excavated within these rockshelters have been chronologically constrained by optically stimulated luminescence dating, while sedimentological analyses help to establish site formation processes. Together, these methods provide a chronological anchor for some Nejd Leptolithic archaeological findspots across Dhofar. The archaeological evidence from surface and stratified sites indicates a technological continuum across the shifting climatic regimes of the Terminal Pleistocene/Early Holocene. This technological continuity points to possible population persistence within one of the posited South Arabian refugia.

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1. Introduction

It has been previously suggested that the hyperarid conditions in Arabia during Marine Isotope Stage (MIS) 2 (ca. 30–10 ka) affected a discontinuity between Palaeolithic and Neolithic populations (e.g. Drechsler, 2007; Uerpmann et al., 2009; Bretzke et al., 2013). Archaeological and genetic data from the southern portion of the Peninsula indicate, however, that not only was there a Terminal Pleistocene human occupation in this area, but that distinct human groups may have coexisted in the region during the Early Holocene (Al-Abri et al., 2012; Hilbert et al., 2012; Hilbert, 2013, 2014; Rose et al., 2013; Zarins, 2013). Consequently, as our understanding of the South Arabian Palaeolithic grows, so does the need to develop local palaeoclimatic sequences that provide environmental contexts for the various lithic industries found across these territories. At present, the palaeoenvironmental resolution for much of this vast region, which encompasses all territories south of (and

including) the Rub' al-Khali remains coarse, as does our knowledge of the Terminal Pleistocene/Early Holocene human occupation of this area (e.g. Maher, 2009; Rose and Usik, 2009). The majority of sites attributed to the Late Palaeolithic (LP) are undated surface sites. The term LP was first used to describe the pre-Neolithic occupation of Arabia by Drechsler (2009) and is here considered to represent the time period between 15 and 8 ka. This term was deliberately chosen for use in Dhofar over "Epipalaeolithic" and "Mesolithic" given the specific techno-typological connotations associated with these names (Maher, 2009); both are characterized by bladelet production and microlithic technology, elements that are absent in the pre-Neolithic archaeological record of the Nejd ("plateau" in Arabic) (Hilbert et al., 2012; Hilbert, 2014).

To augment the available archaeological and palaeoclimatic data, this paper describes a series of local environmental proxy records and associated archaeological remains from Dhofar. The dated sites al-Hatab, Ghazal, and Khamseen Rockshelters are used to assess climatic fluctuations within this region during the Terminal Pleistocene/Early Holocene (TP/EH).

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2. Dhofar: contextual and environmental background

The Governorate of Dhofar is partitioned into six distinct ecological zones: the coastal plain; the summit grasslands; the seaward slopes and the southern draining wadis; the northern draining wadis on the northern face of the escarpment; the dry plateau; and the interior desert (Fig. 1) (Miller and Morris, 1988). These landscapes and their geological context will be described here in a north–south transect.

Northern Dhofar is classified as open desert, comprising flat gravel plains and the Rub' al-Khali sand sea, where sand dunes rise over 100 m in height and are superimposed over limestone plateau landscape features. Vegetation across the open desert is generally sparse. The dry plateau, also known as the Nejd, is a rocky, medium relief landscape. Elevation increases markedly to the south where it borders the watershed divide of the Dhofar Mountains. Northward draining wadis have carved long, river valleys that debouch from the Dhofar Mountains to the open desert in the north (Fig. 2). Although these valleys today are highly ephemeral and largely dry, the relict fluvial geomorphology suggests former perennial flows and wide, meandering channels. However, dense stands of vegetation can be found in wadi basins where moisture is directed following precipitation events, and in the southernmost areas where the monsoon rain shadow provides cooling winds during the summer. The Nejd dips gently in elevation towards the

northeast, stretching 250 km from the Yemen border to the Jiddat al-Harassis gravel plain, which marks the eastern edge of the plateau. The dry plateau is composed of two horizontally bedded, Paleocene to Late Eocene, shallow-marine carbonate shelf units, the Upper and the Lower Hadhramaut Group. These consist of alternating limestone and dolomitic chalk beds, containing several chert-bearing layers (Lepvrier et al., 2002).

The summit grasslands and seaward slopes form a partition between the monsoon-affected areas and the dry plateau. Grasses are the most common land cover on the summit, but trees and shrubs of the Somali-Masai phytogeographic zone are also found (Gallagher, 1977; Gazanfar and Fisher, 1998; Gazanfar, 1999). The seaward slopes are situated at the northern extent of summer monsoon rainfall and as a result are heavily vegetated. Forests are common on the seaward slopes and include characteristic tree species such as *Anogeissus dhofarica* and *Commiphora* spp. With the exception of a small area to the south-west of Jebel Qara, which comprises lacustrine and shallow marine limestone of the Dhofar Group, the mountain range is formed exclusively from rocks of the Hadhramaut Group. The coastal plain is mostly flat and covered by fluvial/alluvial sediment coming from the slopes of the Dhofar Mountains. In areas where the basement geology is exposed carbonate and conglomeratic deposits (Fars Group) are found, whilst to the east between Mirbat and Hasik, crystalline basement rocks are apparent (Platel et al., 1992; Lepvrier et al., 2002). Vegetation

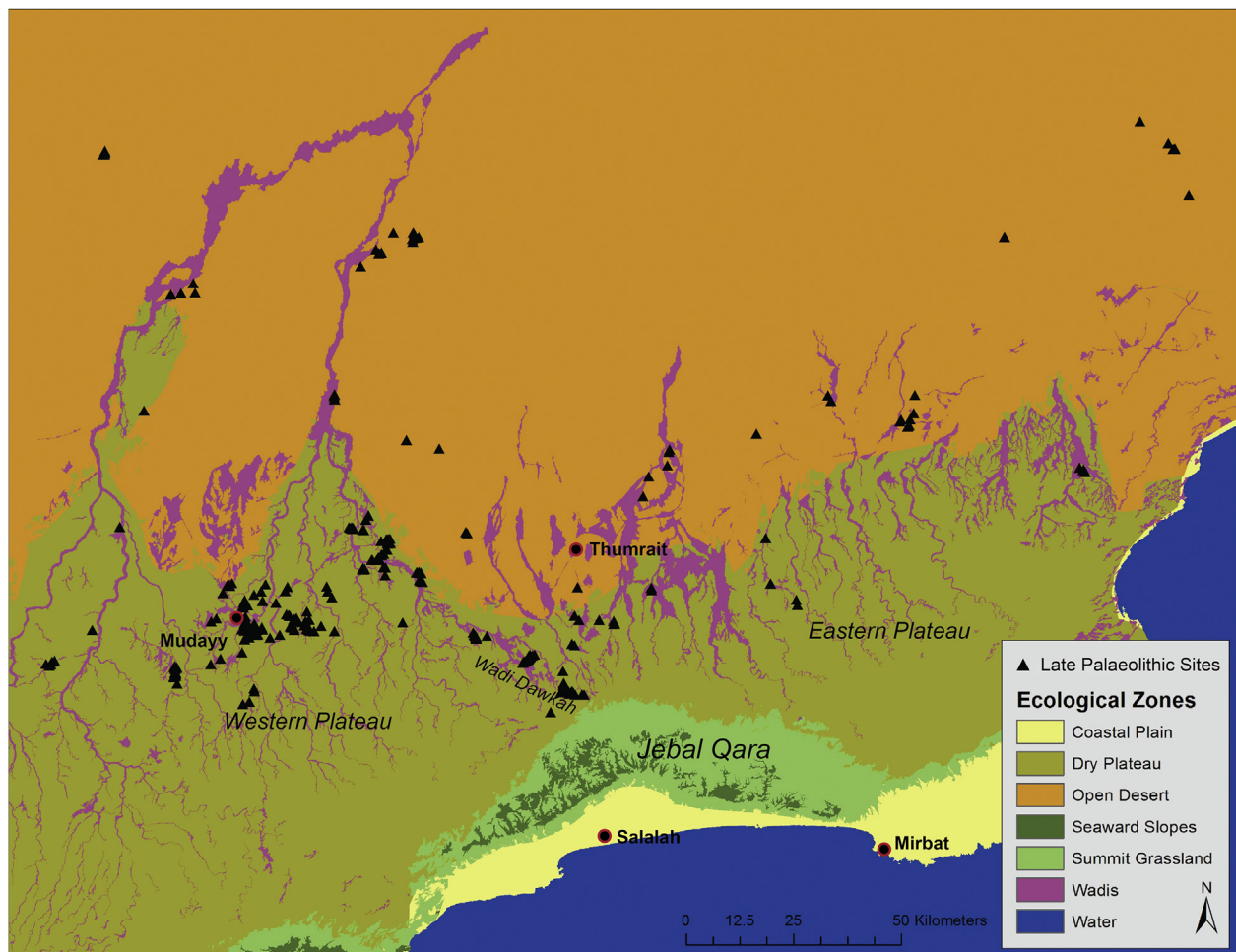


Fig. 1. Ecological zones of Dhofar. Map showing the different eco-zones and their distribution across Dhofar. Eco-zones are based on elevation, vegetation and hydrology (after Rose et al., 2011, Fig. 3).

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