










Project Gallery

Kalba: research on trade networks of a prehistoric coastal community on the Gulf of Oman, United Arab Emirates

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This project investigates the prehistoric coastal site of Kalba on the Gulf of Oman in the context of exchange networks between maritime waterways and land-based caravan routes on the south-eastern Arabian Peninsula. In addition to favourable environmental conditions, raw-material procurement strategies were important for the economy of this multi-crafting community.

Introduction

Extensive trade networks extending from the Indus Valley to the Aegean Sea can be detected for the first time approximately 4500 years ago. Within these networks, the key role of land routes and maritime waterways is attested by the discovery of objects made of exogenous and precious raw materials at numerous sites occupying important nodes along possible routes (Rahmstorf 2022). It is highly likely that the Gulf region served as a nexus between East and West during this time.

As it is today, the northern part of the south-eastern Arabian Peninsula was important for exchange networks in prehistory, not least because of its favourable location for trade. The importance of regional and inter-regional exchange for this geographical area has recently been emphasised by focusing on imported pottery from Mesopotamia, Bahrain, southeast Iran and the Indus Valley (Eddisford 2022). Resource management strategies and participation in exchange networks became crucial in the increasingly arid climatic conditions from c. 3000 BC onwards (L zine *et al.* 2017).

The site of Kalba is investigated as a node of these early trade networks within the framework of Early Bronze Age sites on the south-eastern Arabian Peninsula (Figure 1). Based on archaeological excavations, geo-archaeological surveys and interdisciplinary scientific analyses, the aim is to clarify the environmental conditions under which the inhabitants lived,

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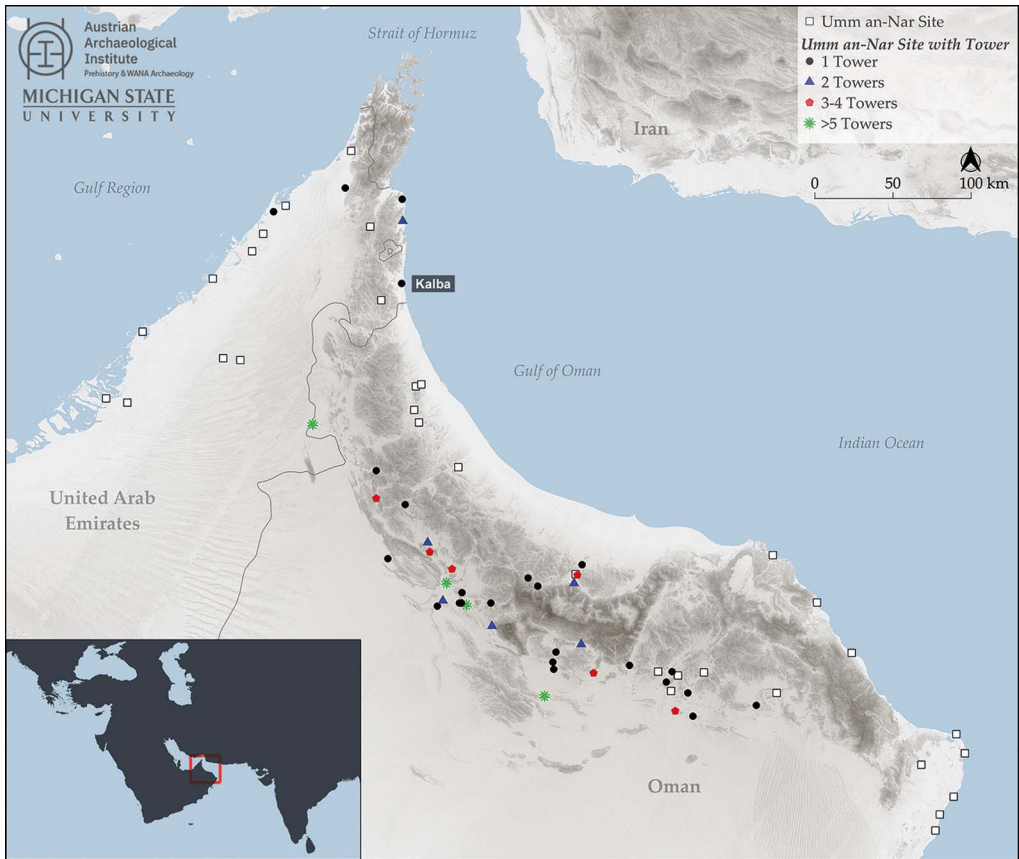


Figure 1. Map showing Early Bronze Age sites on the south-eastern Arabian Peninsula (map after Schwall et al. 2022; figure by C. Schwall & M. Börner).

which local resources they used and which resource management strategies they employed to overcome climatic adversities.

The coastal site of Kalba

Kalba was first investigated during the 1990s (Eddisford & Phillips 2009). The Austrian Archaeological Institute of the Austrian Academy of Sciences, in co-operation with the Sharjah Archaeology Authority, recommenced excavations in 2019 (cf. Schwall & Jasim 2020; Schwall et al. 2022, 2023).

Kalba is a multi-period site situated in the Emirate of Sharjah, United Arab Emirates, on the Gulf of Oman (Figure 2), and dates from the Early Bronze Age to the Iron Age (c. 2500–600 BC). The site’s location, close to Wadi Ham, links the eastern coast and the desert through the mountains, making it favourable for exchange.

Nowadays, a small mound of about 50m in diameter and an elevation of about 2.5m is visible. During the Early Bronze Age Umm an-Nar period, a massive sub-circular ‘tower’ construction was positioned on top of the mound (Figure 3) and surrounded by a huge



Figure 2. Aerial photograph of the excavations at Kalba (photograph: Sharjah Archaeology Authority; figure by K. Kamyab).

ditch. In general, this area of the site was the focus of building activities, attested by massive constructions that expanded its surface area, until the Iron Age.

Environmental conditions

The site was continuously inhabited for around 2000 years, despite significant local environmental deterioration—part of wider changes resulting from an increasingly drier climate from the third millennium onwards—that is attested by results of the local marine reservoir effect at Kalba. Recent analyses of charcoal used as fuel at the site provide insights into this persistence. Use of mangrove species that grow in fresh or brackish water conditions rather than species related to saltwater conditions indicates that fresh water was available in the vicinity of the site at least between 2500 and 1000 BC (Schwall *et al.* 2022). The annual monsoon probably brought rain and possibly filled a natural reservoir in the eastern part of the Hajar Mountains. This assumption is supported by the analysis of fish bones from species that live in brackish water (Lidour *et al.* 2023). For these reasons, the region around Kalba can be considered an ecological niche at least until the early Iron Age.

Being part of the game: location, mineral resources and craft activities as key factors for prehistoric trade networks

Besides favourable environmental conditions, the geostrategic location of Kalba also offered ideal conditions as a gateway between maritime waterways and land-based caravan routes.

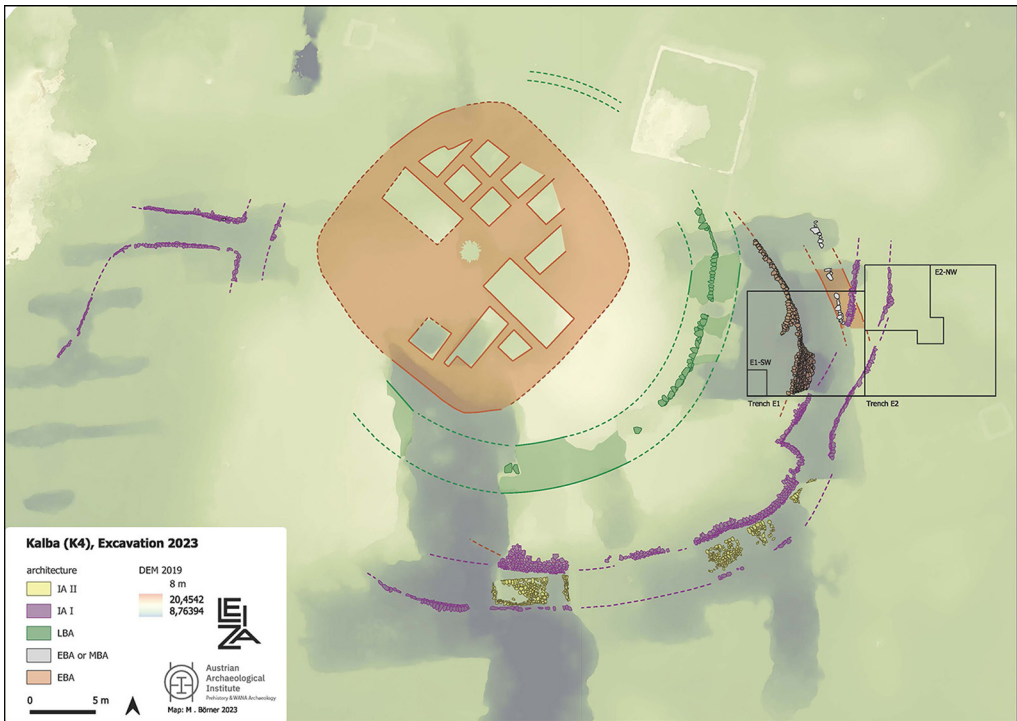


Figure 3. Plan showing the excavated architecture and the location of the trenches (plan: Austrian Academy of Sciences, Austrian Archaeological Institute; figure by M. Börner).

Wadi Ham, a geological fault zone that runs to the north-west, seems to have been crucial for the diachronic occupation of the site. It is still a convenient passage for crossing the Hajar Mountains today and enables the exchange of goods with the interior of the south-eastern Arabian Peninsula.

However, it is important to consider the question of which objects or raw materials were brought to Kalba, which were produced and used at the site, and which presumably served as trade goods. All indications point to a special relevance of mineral resources. Excavations have thus far revealed evidence for copper processing, with ore most likely coming from deposits in the nearby Hajar Mountains. Artefacts made of chert, jasper and chalcedony were also found, but such mineral resources are not available in the immediate vicinity of the site (Schwall *et al.* 2023). In the search for possible deposits, suitable raw material was found beyond the Hajar Mountains on the western foothills at the transition to the desert (Figure 4). Initial geochemical analyses revealed that chert used to produce chipped stone objects was brought to the site from sources in the Buhais mountains, approximately 50km to the west. Mineral resources of the mountains seem to have been an important economic factor for the inhabitants of Kalba in general. This is also demonstrated by stone vessels (Figure 5). The use of local stone sources for their production is

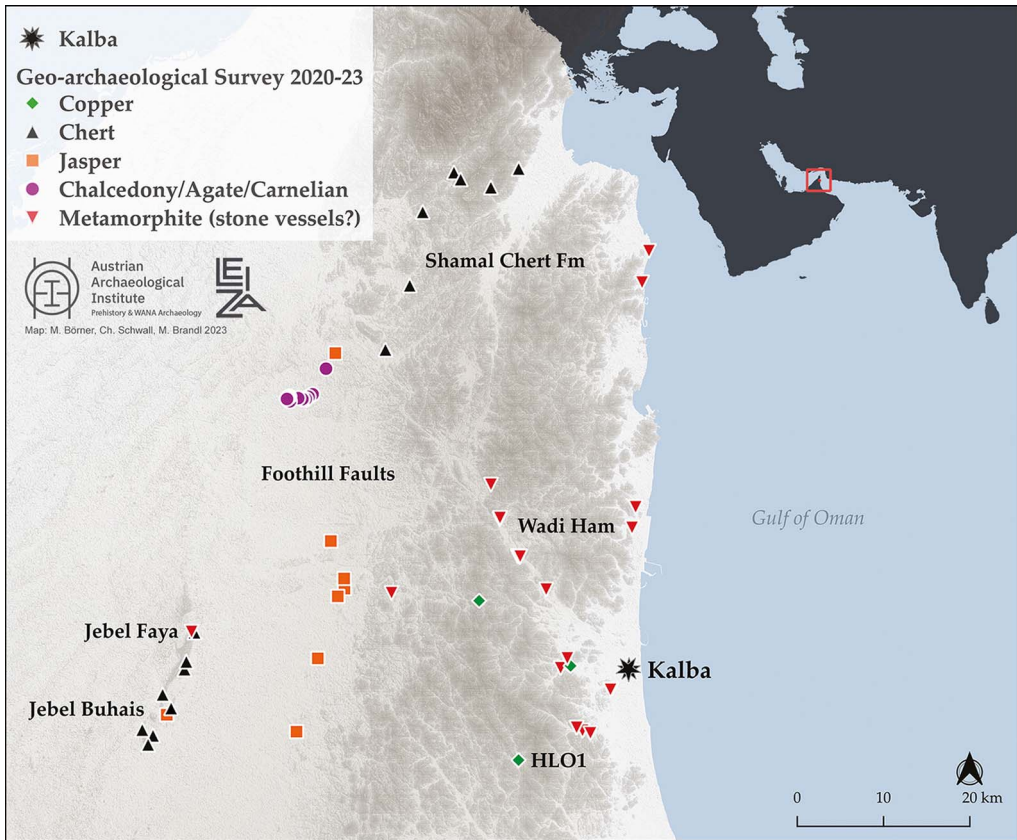


Figure 4. Map showing the location of the sampled raw-material sources (map: Austrian Academy of Sciences, Austrian Archaeological Institute & Leibniz-Zentrum für Archäologie; figure by C. Schwall, M. Börner & M. Brandl).

evidenced through geological studies and the presence of unfinished stone vessel fragments at the site.

In addition to occupying a favourable ecological niche, the research results demonstrate the sophisticated and versatile raw-material procurement strategies of a multi-crafting coastal community. Moreover, the participation of Kalba in extended exchange and trade networks is evidenced by a ‘Gulf type’ seal (Figure 6).

This seal type, originally produced in the Dilmun region, can be dated to the end of the third millennium BC (Laursen 2010). The seal depicts a bull and what is possibly a lion in attacking poses. The bull motif, widely recognised on similar seals, is clearly influenced by the iconography found on seals in the Indus Valley. The lion, however, is intriguing as it is not depicted on Indus seals but is rather known as a motif on cylinder seals in the more western Mesopotamian region. Consequently, the motifs presented on the ‘Gulf type’ seal from Kalba appear to be a possible fusion of eastern and western motif traditions within a unique local-seal type on the south-eastern Arabian Peninsula, highlighting the unifying character of this coastal trading site.



Figure 5. Fragment of an Umm an-Nar-style stone vessel (KAL21/55/3/1) (3D model: Austrian Academy of Sciences, Austrian Archaeological Institute & Leibniz-Zentrum für Archäologie; figure by M. Börner & C. Schwall).



Figure 6. 'Gulf type' seal (KAL23/709/3/1) made of softstone (figure by H. David-Cuny).

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References

- EDDISFORD, D. 2022. Exchange networks of the Early Bronze Age Gulf: the imported ceramics from Kalba 4 (United Arab Emirates). *Arabian Archaeology and Epigraphy* 33: 23–48. <https://doi.org/10.1111/aae.12208>
- EDDISFORD, D. & C. PHILLIPS. 2009. Kalbā in the third millennium (Emirate of Sharjah, UAE). *Proceedings of the Seminar for Arabian Studies* 39: 99–112.
- LAURSEN, S.T. 2010. The westward transmission of Indus Valley sealing technology: origin and development of the 'Gulf Type' seal and other administrative technologies in Early Dilmun, c.2100–2000 BC. *Arabian Archaeology and Epigraphy* 21: 96–134. <https://doi.org/10.1111/j.1600-0471.2010.00329.x>

- LÉZINE, A.-M., S.J. IVORY, P. BRACONNOT & O. MARTI. 2017. Timing of the southward retreat of the ITCZ at the end of the Holocene Humid Period in Southern Arabia: data-model comparison. *Quaternary Science Reviews* 164: 68–76.
<https://doi.org/10.1016/j.quascirev.2017.03.019>
- LIDOUR, K., M.J. BEECH, D. EDDISFORD, C.S. PHILLIPS, C. SCHWALL & S.A. JASIM. 2023. A Bronze to Iron Age fishing economy at Kalbā' 4 (Emirate of Sharjah, United Arab Emirates). *Arabian Archaeology and Epigraphy* 34: 44–62.
<https://doi.org/10.1111/aae.12227>
- RAHMSTORF, L. 2022. *Studien zu Gewichtsmetrologie und Kulturkontakt im 3. Jahrtausend v. Chr.* (Universitätsforschungen zur prähistorischen Archäologie 379). Bonn: Habelt.
- SCHWALL, C. & S.A. JASIM. 2020. Assessing Kalba: new fieldwork at a Bronze Age coastal site on the Gulf of Oman (Emirate of Sharjah, UAE). *Proceedings of the Seminar for Arabian Studies* 50: 321–32.
- SCHWALL, C. et al. 2022. Kalba: new insights into an Early Bronze Age trading post on the Gulf of Oman. *Proceedings of the Seminar for Arabian Studies* 51: 329–52.
- 2023. The 2021 field season at Kalba: results of the excavations and geoarchaeological surveys. *Proceedings of the Seminar for Arabian Studies* 52: 305–23.