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Research Article

Obsidian in the Upper Palaeolithic of Iberia

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Sourced from the Tyrrhenian Islands and exchanged over long distances, obsidian was used widely across prehistoric Western Europe. An obsidian core and bladelets from a newly discovered rockshelter site in south-eastern Spain, however, raised the possibility of an unrecognised mainland source of obsidian. EDXRF analysis of the Early Magdalenian finds from La Boja links them to a source 125km to the south-west. The artefacts were discarded during two brief activity phases at the site, indicating that obsidian procurement was integral to the technological choices of the site's users. The specificities of the technocomplex may explain the unique nature of this occurrence.

Keywords: Spain, Early Magdalenian, obsidian, EDXRF, provenancing, rockshelter

Introduction

Obsidian was a raw material of choice for Stone Age peoples worldwide. Its well-developed conchoidal fracture and the hardness and sharpness of its knapped edges explain why, where available, this silica-rich volcanic glass was so widely used. Moreover, as the provenance of raw obsidian can be chemically finger-printed to specific sources, it is also a valuable material for tracing patterns of prehistoric mobility and exchange.

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In Eastern Europe and Western Asia examples of obsidian use are known from the Middle and the Upper Palaeolithic of Transcaucasia and the Carpathians, highlighting raw material movements across distances in excess of 100km (Le Bourdonnec *et al.* 2012; Dobrescu *et al.* 2018). Obsidian sourcing has also been instrumental in debates concerning Tardiglacial/Early Holocene sea voyaging and the tempo and mode of the emergence of farming in the Mediterranean Basin (Ammerman & Davis 2013–2014). For example, variation with distance to source in the number of obsidian finds and the representation of the different phases of its *chaîne opératoire* have been used to support the concept of maritime pioneer colonisation as the primary mode of dispersal of the Neolithic package along the northern shores of Western Mediterranean Europe (Lugliè 2009; Zilhão 2014; Isern *et al.* 2017).

In Iberia, however, the Early Neolithic obsidian trail eventually vanishes. Until now, the earliest occurrences were in Catalonian contexts dated to the transition between the fifth and the fourth millennia BC: a core, a blade and four bladelets, all of which have been traced to a source known as 'Sardinian A' (Terradas *et al.* 2014). This lack of obsidian use in Iberia has been explained by the apparent lack of local sources and the reasonable assumption that no obsidian imports could exist prior to the emergence in Sardinia—the closest island source—of a large-scale obsidian-extraction economy and associated networks of long-distance trading during the Middle Neolithic (Lugliè 2009).

In the course of our 2008–2018 excavation of the La Boja rockshelter at Mula, in Murcia, south-east Spain (Figure 1), seven obsidian items (one core and six blanks) were retrieved from the Early Magdalenian horizon. Given the lack of human settlement of the obsidian-bearing islands of the Tyrrhenian Sea prior to the Tardiglacial, this discovery implied the existence of a hitherto unknown Iberian source. Here, we report on the research conducted to identify that source and discuss why it does not appear to have been exploited either before or after the Early Magdalenian. First, however, we present an overview of the stratigraphy and dating of the site to demonstrate that the obsidian finds were recovered from secure contexts and to interpret them in light of the site's function and regional stone-tool economics.

The archaeological context

La Boja (38° 04′ 43.37″ north, 1° 29′ 23.17″ west) is a rockshelter formed in the Miocene calcarenite escarpment and exposed along the north side of the middle section of the Rambla Perea gorge, around 400m asl (Figure 2). The approximately 6m-thick sedimentary fill is capped by a dark Holocene soil horizon, around 0.5m thick. The Pleistocene deposit comprises yellow sands containing variable amounts of stone slabs derived from the degradation of the roof and walls; the occasional presence of silt lenses reflects aeolian inputs or post-depositional reworking by low-energy surface dynamics (e.g. run-off). The internal arrangement of this homogeneous deposit is revealed by the presence of major rock falls, stone-lines (thin beds composed of a single granular sheet), and discrete, well-preserved lenses of human occupation indicated by artefacts and hearths (Figure 3). We identified 31 occupation horizons (OH) in total, spanning from 10–60 kya: 24 horizons belong to the Upper Palaeolithic and seven to the Middle Palaeolithic. The integrity of the stone-tool assemblages is confirmed by the pristine preservation of hearth features, the stratigraphic ordering of the dates returned by radiocarbon measurements and the consistent spatial patterning of lithic scatters and refitting sets (Zilhão *et al.* 2017; Angelucci *et al.* 2018).

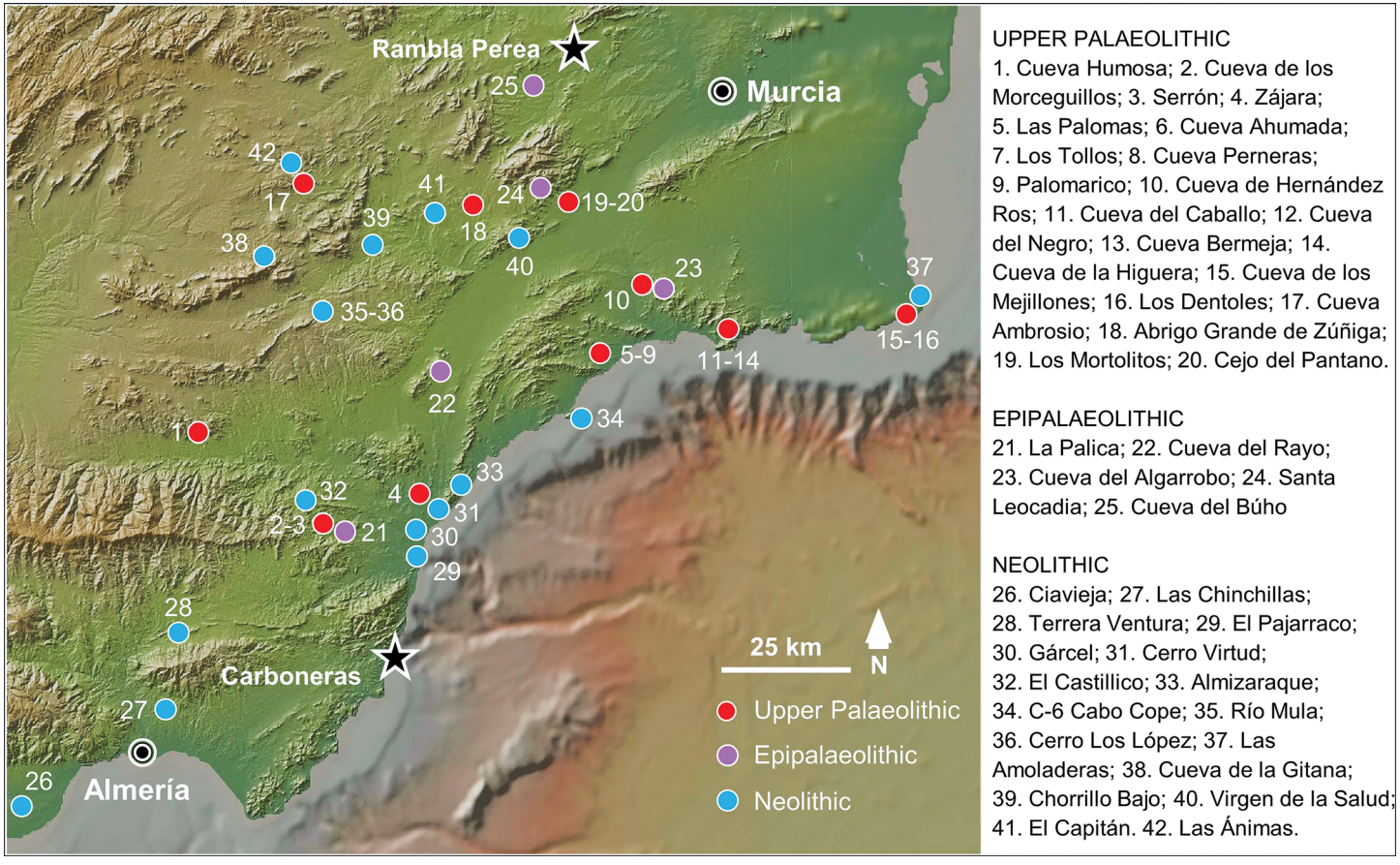

Figure 1. Geographic context showing the location of the Rambla Perea, where the site of La Boja is found, the Carboneras obsidian source, and the Upper Palaeolithic, Epipalaeolithic and Neolithic sites of eastern Andalucía and western Murcia (after the online databases maintained by regional heritage authorities: https://guiadigital.iaph.es/, https://cartarqueologica.carm.es/). Relief map: Global Multi-Resolution Topography Synthesis (https://www.gmrt.org/GMRTMapTool/; Ryan et al. *2009). Illustration by Ignacio Martín-Lerma and João Zilhão.*