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# The Palaeolithic record of Greece: A synthesis of the evidence and a research agenda for the future

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ABSTRACT

The Palaeolithic record of Greece remains highly fragmented and discontinuous in both space and time. Nevertheless, new surveys and excavations, along with the revisiting of known sites or old collections, and the conduction of lithic and faunal laboratory analyses, have altogether enriched the Greek Palaeolithic dataset with important new evidence and novel interpretations. The goal of this paper is threefold: 1) to critically review the most important aspects of the Greek Pleistocene archaeological record, from the Lower to the Upper Palaeolithic; 2) to provide a synthesis of current knowledge about the Palaeolithic of Greece and in the framework of broader discussions in human evolution research; and 3) to put in prospect the Greek record by addressing a research agenda for the future. The review of the evidence shows that Palaeolithic research in Greece has expanded its focus not only geographically but also temporally: it now includes investigations at previously under-studied areas, such as the insular settings of the Aegean and Ionian Seas, as well as formerly overlooked targets, such as Lower Palaeolithic open-air sites. The synthesis and discussion which follows offers a state-of-the-art perspective on how the primary Palaeolithic data can be assessed within local or regional geomorphic, paleoenvironmental and chronological contexts; here, our focus is on spatio-temporal discontinuities, trends in subsistence strategies and lithic technology, as well as potentially emerging biogeographical patterns. Finally, we highlight the complex topography and mosaic landscapes of the Greek peninsula in order to address two major themes for a future research agenda: the potential role of Greece as a glacial refugium, and how the Greek record could contribute to our knowledge of early hominin mobility patterns.



## 1. Introduction

The Palaeolithic period is generally understudied in Greece, because research has traditionally focused on the later parts of prehistory (Neolithic, Bronze Age) and the Classical times. Nevertheless, significant advances have been achieved during the last years and the record has been enriched with new material, collected mostly in the framework of regional surveys but also through systematic or rescue excavations. Not only new caves and rockshelters (Darlas and Psathi, 2016), but also recently discovered and important open-air sites are now being excavated (Panagopoulou et al., 2015; Galanidou et al., 2016). A seemingly growing interest on the latter type of sites may be signalling the onset of a long-awaited paradigm shift in Greek Palaeolithic research, which will help remedy the imbalance towards Middle and Upper Palaeolithic sheltered contexts. It is noteworthy that the excavation works currently being conducted at two Lower Palaeolithic open-air sites, Marathousa 1 and Rodafnidia, are the first ones in Greece to target open-air sites of this period. The Palaeolithic record of Greece has been expanded also geographically and includes now areas that would have been largely ignored a few decades ago, such as the highlands of the Pindus Mountain Range (Efstratiou et al., 2006), or the insular settings of the Aegean Sea (e.g. Carter et al., 2014; Runnels, 2014; Runnels et al., 2014b). Furthermore, alongside critical reviews (e.g. Papoulia, in press), a number of new specialized and/or interdisciplinary studies have

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appeared, which either examine lithic or faunal assemblages (e.g. Ligkovanlis, 2011; Papoulia, 2011; Starkovich, 2014) or integrate the archaeological signatures within local or regional paleoenvironmental, climatic, geological and chronological frameworks (e.g. Karkanas, 2002; Ntinou, 2010; Kuhn et al., 2010; Athanassas et al., 2012; Tsartsidou et al., 2015; Karkanas et al., 2015).

Our aim here is not to provide a detailed account of the substantial body of evidence that has accumulated in recent times. Rather, the goal is to distill from it a synthesis of the Palaeolithic of Greece, which has been missing from the literature for over twenty years, since the publications of Darlas (1994), Kourtessi-Philippakis (1995) and Runnels (1995); with regard to the relevant paleoanthropological material, we refer the reader to the reviews by Harvati et al. (2009) and Harvati 2016). In this study, we first assess the most important sites per period, including new data from our own on-going field work. Then, we contextualize this corpus of both older and more recent material, by focusing on the spatio-temporal distribution of sites and related gaps in the record, the emerging biogeographical patterns, and the knowledge gained about subsistence strategies and hominin adaptations in the mosaic landscapes of the Greek peninsula. Finally, in suggesting an agenda for the future, we briefly address research questions and hypotheses that we consider worthwhile to be further investigated and tested against the empirical record.

## 2. The Lower Palaeolithic record

Lower Palaeolithic sites and findspots are extremely few, ill-dated and scattered on disparate locations across the mainland and the Aegean islands. A critical assessment of the Greek Lower Palaeolithic record has been detailed elsewhere (Tourloukis, 2010) and demonstrated the lack of archaeological material that can be securely attributed to the Early Pleistocene. If we exclude finds and sites with questionable stratigraphic associations and/or lacking good chronological control, there are currently only four sites that can be assigned to this period on chronostratigraphic grounds: Marathousa 1 in Megalopolis (Peloponnese), Rodafnidia (Lesvos), Kokkinopilos (Epirus) and some of the Plakias localities (Crete) (Fig. 1). Besides Marathousa 1, which dates to around 500–400 ka BP (see below), the rest of the sites have yielded minimum ages that place them at the latest parts of the Middle Pleistocene.

The important cranium from the Petralona Cave has been dated to ca. 150–250/350 ka BP (Grün, 1996). The original stratigraphic position of the specimen is unknown and it cannot be associated with any of the rich faunal assemblages. Some lithic material that is claimed to derive from inside the cave lacks any provenience data, it has not been published properly and its artificial character is questionable, especially because the purported 'industry' is made on quartz and includes basically amorphous 'cores' and 'tools' made on debris (Darlas, 1995; Harvati et al., 2009).

Marathousa 1 (MAR-1) is an open-air site located in one of the lignite mines of the Megalopolis basin, which has long been known for its rich Pleistocene paleontological localities (e.g. Melentis, 1961). A hominin tooth that was collected in the 1960's as a surface find (Sickenberg, 1975), as well as a report on possible Middle Palaeolithic finds (Darlas, 2003) indicated the potential of the area for yielding paleoanthropological finds. Nevertheless, the first systematic archaeological investigations in the basin began only recently by a collaboration between the Ephoreia of Paleoanthropology and Speleology (Greek Ministry of Culture) and the University of Tübingen in the framework of the PaGE Project (Harvati and Tourloukis, 2013; Panagopoulou et al., 2015). MAR-1 was discovered in 2013 during survey, when lithic artifacts and elephant skeletal remains were observed eroding out of a profile. Thus far, systematic excavations during two field seasons (2014, 2015) have revealed the presence of lithic artifacts in stratigraphic association with elephant and other faunal remains, such as carnivores, bovids, cervids, micromammals, turtles and birds. An elephant cranium and several postcranial elements were found in close anatomical association and most likely belong to a single individual, which has been attributed to *Elephas (Palaeoloxodon) antiquus* on the basis of the cranio-dental morphological characteristics (Fig. 2). Some of the elephant bones, as well as remains from middle-sized mammals, bear striations that have been preliminary interpreted as anthropogenic cut-marks (Harvati et al., 2016). A detailed taphonomic analysis of those specimens is underway. The lithic assemblage is composed of small-sized flakes and flake fragments, cores, retouched tools and chunks/shattered pieces (Fig. 3; Panagopoulou et al., 2015; Harvati et al., 2016). Platforms are mainly plain, cortical or dihedral, and indicate hard hammer percussion. Flake scar patterns, core reduction modes and other technological traits suggest relatively simple operational sequences, which aimed mostly at the production of flake blanks. Possible traces of use wear have been macroscopically identified in a number of retouched tools, but also on plain flakes, suggesting that the latter could have been used directly for tasks such as cutting, without further modification. Overall, a key aspect of the industry refers to its 'microlithic' character: in their majority, debitage products are ca. 2 cm-long or less. So far, there are no indications of bifacial debitage and Large Cutting Tools are absent; this is all the more interesting, considering that the very first report on Palaeolithic finds from Greece referred to a handaxe from Megalopolis, which was reportedly found in association with elephant bones (Lenormant, 1867). Nevertheless, the lithic industry recovered up to now from MAR-1 fits well in a group of important sites with flake-based, small-tool, non-handaxe assemblages, such as Ficoncella, Isernia and La Polledrara (Italy), Schöningen and Bilzingsleben (Germany), Vértesszőlős (Hungary), Caune de L'Arago (France), and Revadim (Levant), many of which, like MAR-1, also preserve evidence for elephant or other mega-fauna exploitation by early humans (see e.g. Rocca et al. in press; Aureli et al., 2016 and references therein). Preliminary observations suggest that the small size of the specimens is related to raw material attributes, namely the original (small) size of radiolarite and flint pebbles, as well as the mediocre quality of the raw materials, which bear a lot of cleavage plains and impurities. The find-bearing layers occur between two lignite seams and are composed of silty sands. The context of the site likely represents a low-energy depositional environment, such as a shallow-water swamp close to the shore of a lake. Fast burial in a very fine-grained matrix ensured extraordinary preservation conditions for the faunal and lithic material, but also for paleobotanical micro- and macro-remains (Panagopoulou et al., 2015; Harvati et al., 2016). The find-bearing strata of MAR-1 belong to the Marathousa Member of the Choremi Formation and are part of the detrital interval that occurs between Lignite seams II and III (Löhnert and Nowak, 1965; Vinken, 1965). According to the chronostratigraphic model of van Vugt et al. (2000) those deposits between Lignite II and III correlate to marine isotope stage (MIS) 16, while according to Okuda et al. (2002) they date to MIS 14. ESR dating of a mollusk sample from a unit overlying the find-bearing layers provided a minimum age for this unit at 414 ± 42 ka, while five subsamples of a cervid tooth excavated from the find horizon gave an age of 484 ± 13 ka (Blackwell et al., 2016). Consequently, first results from radiometric dating place the site at ca. 500–400 ka, making it currently the oldest dated open-air site in Greece and South East Europe.

The site of Rodafnidia, in Lesvos, was discovered by chance by Charisis and colleagues, who reported in 2000 on the wealth of Middle and Lower Palaeolithic finds that they observed lying on the surface of an olive grove. The site is located 2 km South-West from

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