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Climate change, human population growth, or both? Upper Paleolithic subsistence shifts in southern Greece

Britt M. Starkovich [a, b, c, *], Maria Ntinou [d]

[a] Institute for Archaeological Sciences, University of Tübingen, Germany
[b] Senckenberg Center for Human Evolution and Paleoenvironment at Tübingen, Germany
[c] School of Anthropology, University of Arizona, Tucson, USA
[d] The Malcolm H. Weiner Laboratory for Archaeological Science, American School of Classical Studies at Athens, Soudias 54, 10676 Athens, Greece

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ABSTRACT

Changes in subsistence patterns during the Upper Paleolithic and Mesolithic at Klissoura Cave 1 in southern Greece indicate that some shifts track local climatic changes, while others do not. Specifically, increases in ungulate species diversity correlate with wetter periods, and greater abundance of certain dry-loving small game animals (e.g., great bustard) might correspond with dry periods. Other large-scale diachronic shifts, such as the increased importance of low-return hares and partridges, occur over the occupation of the site irrespective of environmental conditions. We hypothesized previously that this relates to local human population growth over the course of the Paleolithic. New data from a nearby site, Kephalari Cave, augment this hypothesis. The site complements the Aurignacian and Gravettoid occupations at Klissoura and also contains a robust late Upper Paleolithic component. Ungulate species diversity is high at Kephalari, and there is a greater reliance on low-return small animals (including fish) than at Klissoura. In this paper, we examine changes in the faunal spectra alongside preliminary charcoal data from the two sites. These data are analyzed in the context of regional environmental change in order to determine the extent to which climatic change or population growth drove subsistence shifts in southern Greece during the Late Pleistocene.

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1. Introduction

A main goal in archaeological research is understanding long-term shifts in human behavior on both a local and regional scale. Human behavioral patterns are a complex combination of social and cultural adaptations that exist within a larger framework of environmental constraints and demographic pressure. Separating environmental data and human factors, such as technological change or population growth, is central to interpreting shifts in the archaeological record. This is particularly relevant to Pleistocene Europe, which witnessed drastic climatic changes and the appearance and expansion of modern human populations from Africa. A continent-wide transition occurred from the relatively technologically static Middle Paleolithic to the dynamic and regionally variable Upper Paleolithic, though the driving forces behind this transition are not entirely clear.

Evaluating subsistence strategies during the Paleolithic is a useful way to frame the transition and understand the evolution of modernity. Subsistence patterns reflect a wide range of human behaviors and influences, from technology, to culture, to population pressure, and operate within the bounds of resource availability in a given environment. In many parts of the Mediterranean Basin, there is evidence for the intensified use of animals during the Late Pleistocene (e.g., Stiner et al., 2000; Stiner, 2001, 2003, 2005; Tortosa et al., 2002; Cochard and Brugal, 2004; Munro, 2004; Speth, 2004; Bar-Oz and Munro, 2005; Speth and Clark, 2006; Atici, 2009; Hockett and Haws, 2009; Jones, 2009; Stiner and Munro, 2011; Langlais et al., 2012; Starkovich, 2012a, 2014), which is often explained by large-scale human demographic growth. However, a more nuanced picture is often apparent in specific archaeological cases (e.g. Blasco and Peris, 2009; Manne and Bicho, 2009; Blasco and Fernández Peris, 2012; Cochard et al., 2012; Morin, 2012; Manne, 2014). These studies highlight the importance of considering Paleolithic sites within both local and regional

* Corresponding author. Rümelinstraße 23, 72070 Tübingen, Germany.
E-mail addresses: britt.starkovich@uni-tuebingen.de (B.M. Starkovich), maria.ntinou@uv.es (M. Ntinou).

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contexts, though the appropriate archaeological and paleoenvironmental data are not always available for addressing these questions.

One area where this type of integrative research has become increasingly possible is southern Greece. Over the last two decades, Paleolithic archaeology in Greece has fluoresced, with the excavation and reanalysis of key archaeological sequences, as well as the discovery and testing of new sites around the country (Bailey, 1997; Darlas and de Lumley, 1999; Kyparissi-Apostolika, 1999; Farrand, 2000; Manolis et al., 2000; Facorellis et al., 2001; Galanidou and Tzedakis, 2001; Karkanas, 2001; Kotjabopoulou, 2001; Koumouzelis et al., 2001a, 2001b, 1996; Karkanas et al., 2004; Panagopoulou et al., 2004; Roger and Darlas, 2008; Stiner and Munro, 2011; Strasser et al., 2011, 2010; Douka et al., 2012; Stiner et al., 2012; Harvati and Tourloukis, 2013; Harvati et al., 2013, 2003) (Fig. 1). This work has led to a better understanding of the cultural chronology of the region, and the environmental conditions in which Paleolithic hominins lived. It fits into the broader body of research on the Middle to Upper Paleolithic transition, and the origins of modern human lifeways in the Mediterranean, and in Europe more generally.

In southern Greece, arguably the most important Paleolithic sequence is found at Klissoura Cave 1 (Fig. 1, Koumouzelis et al., 2010, 2001a, 2001b, 1996). The site spans from about 100,000 to 10,000 years ago, and includes large Middle and Upper Paleolithic components, as well as a thin Mesolithic layer. Researchers have analyzed many aspects of the rich Upper Paleolithic and Mesolithic at the site (see Pawlikowski et al., 2000; Karkanas et al., 2004; Koumouzelis et al., 2010, 2001a, 2001b; Starkovich, 2014, 2012a, 2012b, 2009), and the results provide a baseline for understanding several cultural periods in Greece, along with the local environmental record. The situation at the nearby site of Kephalari Cave (Fig. 1) could not be more different. Excavated in the 1970s using methods that are impressive even by today's standard, very little is known about the site (but see Felsch, 1973; Reisch, 1980, 1976). Recently, archaeologists have begun to study the Kephalari materials, including the fauna (B. Starkovich), charcoal (M. Ntinou), ornaments (M. Stiner), and lithics (G. Marshall); radiocarbon dating attempts are currently underway (K. Douka). From the original analyses conducted by the excavators (Felsch, 1973; Reisch, 1980, 1976), it is apparent that the Kephalari and Klissoura sequences overlap significantly, and augment one another during several

Fig. 1. Map of Greece with key Paleolithic sites.

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