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Last Interglacial (MIS 5) ungulate assemblage from the Central Iberian Peninsula: The Camino Cave (Pinilla del Valle, Madrid, Spain)

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ABSTRACT

The fossil assemblage from the Camino Cave, corresponding to the late MIS 5, constitutes a key record to understand the faunal composition of Central Iberia during the last Interglacial. Moreover, the largest Iberian fallow deer fossil population was recovered here. Other ungulate species present at this assemblage include red deer, roe deer, aurochs, chamois, wild boar, horse and steppe rhinoceros; carnivores and Neanderthals are also present. The origin of the accumulation has been interpreted as a hyena den.

Abundant fallow deer skeletal elements allowed to statistically compare the Camino Cave fossils with other Pleistocene and Holocene European populations. The morphological comparison of the dentition and morphometrical analyses of the metapodials suggest that the fallow deer from the Camino Cave are closer to the subspecies *Dama dama geiselana* and *Dama dama tiberina* than to the recent *Dama dama dama*.

Estimations of the age at death in several fallow deer young individuals provided information on seasonality, suggesting that the cave was occupied by the hyenas almost all year round.

The ungulate composition provides a clear example of an interglacial faunal complex which agrees with the published pollen, charcoal and small vertebrate data that indicate a continental Mediterranean climate. This interglacial character was also registered at other Iberian MIS 5 sequences coming from the Mediterranean margin.

1. Introduction

Marine Isotope Stage (MIS) 5, often referred to as the last interglacial sensu lato, was a period of minimum ice volume that expanded from c. 130 to 75 ka BP (Sánchez Goñi, 2007). This period was first defined by Harting (1852), who called it Eemian. This term, equivalent to the Ipswichian (for the Birtish Isles) or Riss-Würm (for the Alps), is widely used by many authors to refer to the last interglacial. Shackleton (1969), based on the correlation between marine and terrestrial records, proposed that only the first ^{18}O minimum values of MIS 5, named MIS 5e, had to be considered the equivalent of the Eemian as identified on land (Sánchez Goñi, 2007). Analyses of pollen, dinocyst and isotopic data from marine sediments of the Iberian marine margin indicate that North Atlantic sea surface temperatures were in phase with Iberian climate during the Last Interglacial (Sánchez Goñi et al., 1999).

The archaeo-palaeontological site of the Camino Cave, integrated in the Pinilla del Valle archaeological complex (Madrid, Central Spain, Fig. 1), is located in the mountainous area of the Guadarrama Mountain Range, at 1114 m above sea level. Information regarding geology, stratigraphy, taphonomy and other features of the site is widely discussed by Arsuaga et al. (2012).

Investigations at the Camino Cave were first carried out during the 1980s decade (Alférez et al., 1982; Alférez and Iñigo, 1990; Buitrago, 1992). A large amount of fossil remains, along with two human molars (Alférez et al., 1982; Alférez, 1985; Alférez and Iñigo, 1990; Alférez and Roldán, 1992; Buitrago, 1992; Maldonado, 1996) identified as representing Neanderthals (Arsuaga et al., 2010, 2011, 2012), were then recovered.

Recent excavations carried out between 2002 and 2009 provided relevant information from archaeological, palaeobotanical, palaeontological, geological and palaeoanthropological points of view (Arsuaga et al., 2012). The origin of the fossil accumulation has been interpreted as a hyena den (Díez, 1993; Arsuaga et al., 2010). A great assemblage of large mammal fossils, mostly ungulates, was recovered during these last field campaigns. The Camino Cave sequence is composed of four sectors (Fig. 2; Arsuaga et al., 2012). Most of the fossils come from the denominated North sector, concretely from the Layer 05, dated by TL (thermoluminescence) to 90.961 ± 7881 ka BP (Pérez-González et al., 2010). Other part of the fossils was recovered in the Central sector. It is assumed that, most probably, fossils from both sectors are of the same or very similar age, although deposited

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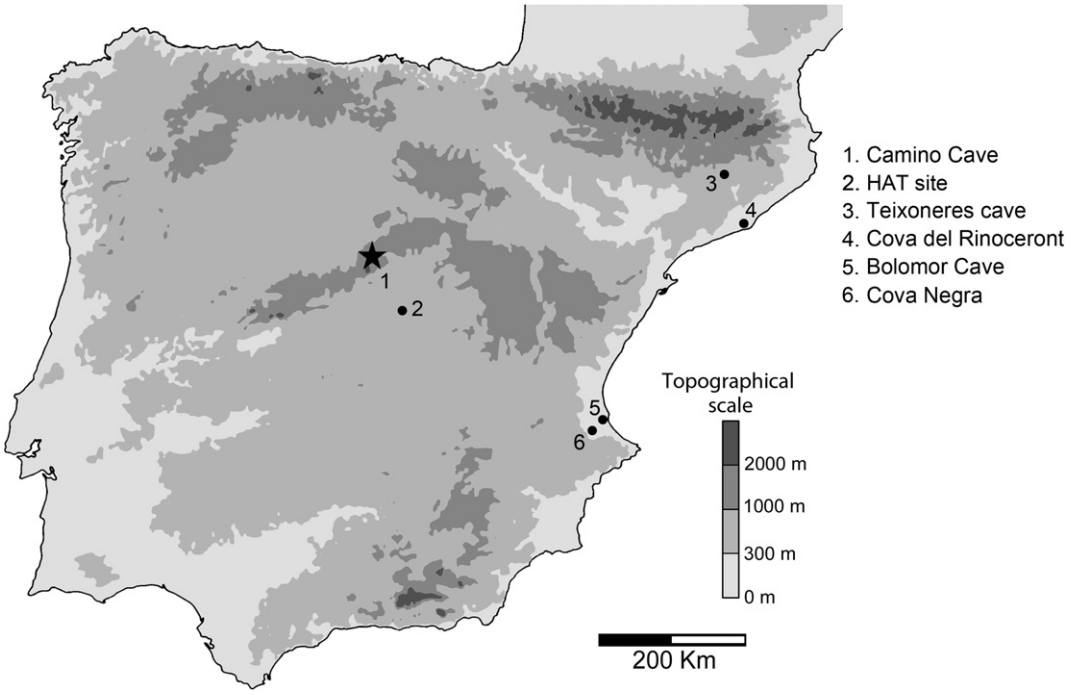

Fig. 1. Situation of Iberian sites of MIS 5 age mentioned in the text. The Camino Cave is represented with a black star.

under different sedimentary processes, since they were placed at the same topographic level and there are not significant differences in faunal composition and taxa proportions between them. The faunal assemblage was therefore studied as a whole.

Chronology of the Layer 05 corresponds to MIS 5c, a temperate phase recorded in marine and continental sequences from Europe and Siberia, also known as St. Germain 1 or Börup interstadial (Caspers et al., 2002; Prokopenko et al., 2002; Sánchez Goñi et al., 2005; Müller and Sánchez Goñi, 2007; Rousseau et al., 2007; Väliranta et al., 2009; Laukhin, 2011). However, since the range of the date is wide (±7881 years) we cannot reject the possibility that the fossil assemblage corresponds to the previous temperate phase, the MIS 5a.

Palaeontological and palaeoenvironmental information from MIS 5 is much less abundant than those corresponding to MIS 3 and 2. Most of this information comes from a number of sites from central and northern Europe (Turner, 2000; van Kolfschoten, 2000; Kahlke, 2002; von Koenigswald, 2007), whereas at southern Europe this period is less known. A number of works including MIS 5 palaeoenvironmental

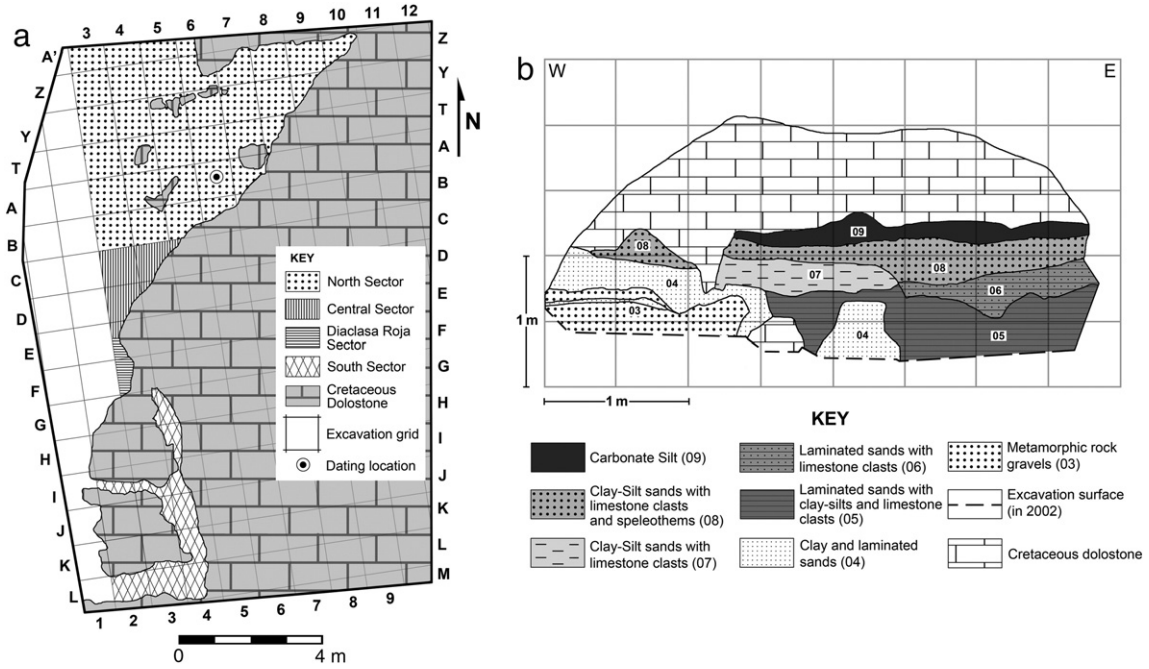

Fig. 2. Site map showing the four sectors defined for the excavated areas and the location of the dating mentioned in the text (a), and stratigraphic section throughout the squares Z6–Z9 (b).
Modified from Pérez-González et al. (2010) and Arsuaga et al. (2012).