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Research insight

WESTERN MEDITERRANEAN ENVIRONMENT AND CLIMATE DURING THE LATE QUATERNARY USING SMALL-MAMMAL ASSEMBLAGES

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The knowledge of palaeoenvironment and palaeoclimate during the late Pleistocene and the beginning of the Holocene is one of the main studied topics of the last decades by multitude of disciplines, including the research on small mammals (Fig. 1).

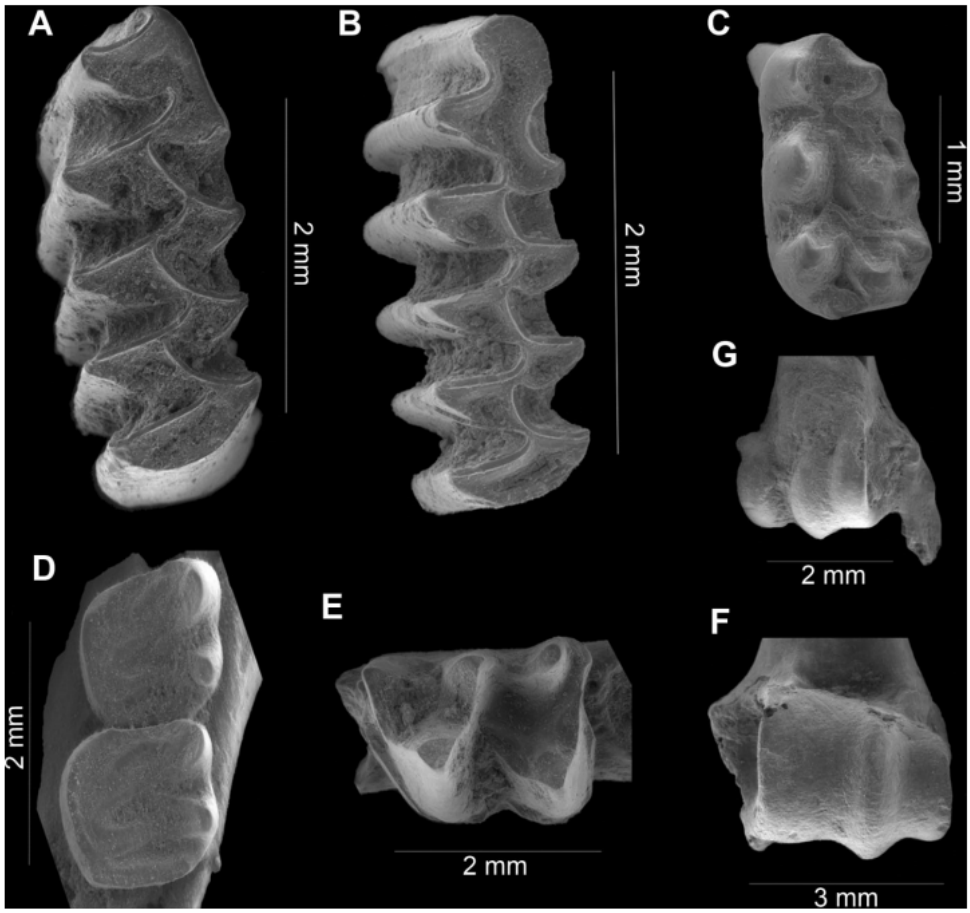

Figure 1. Example of the small mammal assemblage from the Cova del Gegant (Sitges, Barcelona, Norheastern Iberia). (A) m1 right Iberomys cabrerae; (B) m1 right Microtus arvalis; (C) M1 right Apodemus sylvaticus; (D) P4–M1 left Eliomys quercinus; (E) m1 left Rhinolophus ferrumequinum; (F) humerus Myotis myotis; (G) humerus Miniopterus schreibersii. The material represented comes from layer V with the exception of the Microtus arvalis tooth, which comes from layer III. Modified from [9]

It is widely demonstrated that micromammals (insectivores, bats and rodents), thanks to the fact that they are mostly susceptible to changes in temperature, precipitation and

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environment, are good indicators of the changes in landscape and climatic fluctuations produced in the past. [López-García, et al., 2014; Lopez-García, et al., 2014].

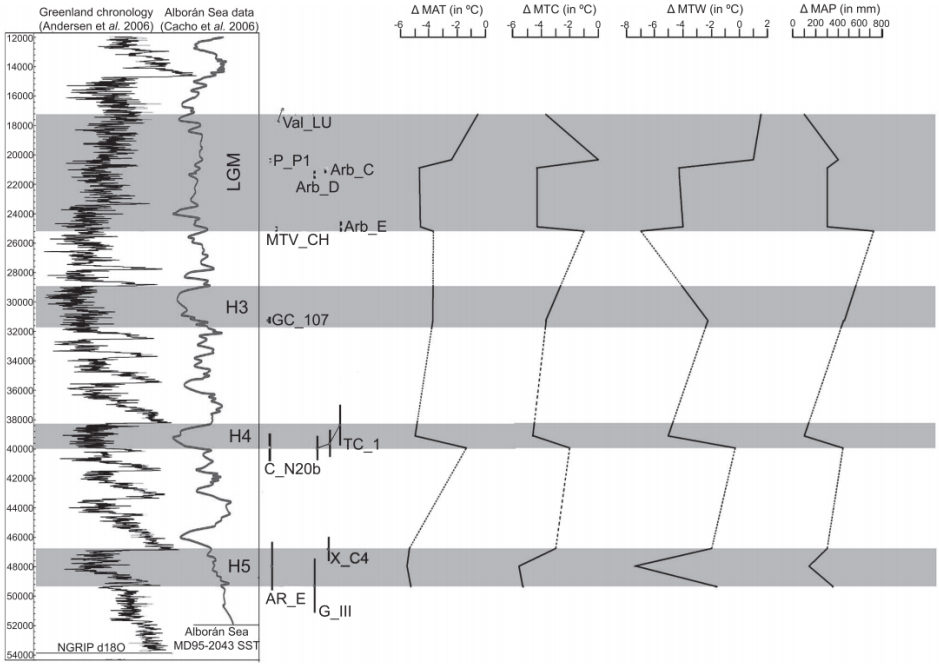

Figure 2. Example of approximate correlation between the average (D) mean annual temperature (MAT), mean temperature of coldest month (MTC), mean temperature of warmest month (MTW) and mean annual precipitation (MAP) obtained with small-vertebrate assemblages of the studied sites and the NorthGRIP isotope oxygen curve and the Albora´n sea surface temperatures. H, Heinrich Events, LGM, Late Glacial Maximum; G, Gegant level III; AR, Abric Romanı ´; X, Xaragalls level C4; C, Cueva del Conde level N20b; Arb, l'Arbreda cave; TC, Canyars; GC, Galls Carboners; MTV-CH, Maltavieso-Chimeneas; P, El Portalon level P1; Val, Valdavara 1 lower unit. Modified from [6]

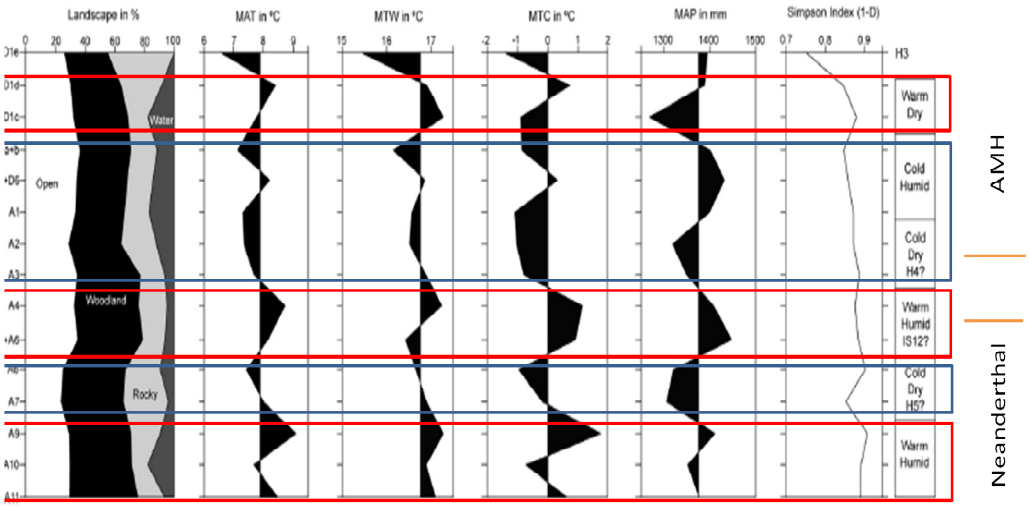

Figure 3. Example of representation of landscape percentages, mean annual temperature (MAT), mean temperature of the warmest month (MTW), mean temperature of the coldest month (MTC), mean annual precipitation (MAP) and the small-mammal Simpson diversity

Index (1-D), from the Fumane cave (Verona, Northeastern Italy) sequence. Red rectangles represents warm conditions; Blue rectangles represents the cold conditions. Modified form [López-García, et al., 2012].

The interest for the development of these studies during this period lies in two main issues closely related: 1) detect the rapid fluctuations produced during the late Quaternary; 2) observed how the environmental and climatic changes affected the hominin populations. Taking into account this context, various methods (such as Habitat Weighting, Mutual Ecogeographic Range, Bioclimatic Model, Diversity Index or Chorotypes method) [Andrews, 2006; Blain et al., 2016; Hernandez, 2001; Magurran & McGill, 2011; Sans-Fuentes et al., 2000] are applied to small-mammal assemblages to try to reconstruct the environment and climate in western Mediterranean region, mainly focused on a score of late Pleistocene and early Holocene archaeo-paleontological sites, coming from the Italian and the Iberian peninsulas. The results obtained applying these methods to the small-mammal assemblages allow us to detect various climatic fluctuation, such as various cold Heinrich Events, the Bølling-Allerød interstadial or the late Pleistocene-Holocene transition (Fig. 2)

Moreover, the environmental and climatic data obtained using the small-mammal assemblages allow us to observe how our ancestors lived, showing for example that independently of climatic fluctuations Neanderthals and Anatomic Modern Humans (AMH) inhabited, in general, in landscapes surrounded by forest formations (Fig. 3) [López-García, et al., 2015].

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