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The Holocene archaeological research around Sierra de Atapuerca (Burgos, Spain) and its projection in a GIS geospatial database

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ABSTRACT

In recent decades, the area around Sierra de Atapuerca has been the focus of many archaeological excavations and surveys under research projects and also management or rescue archaeology. From 1999 to 2007, one such project analysed the evolution of prehistoric settlement around Sierra de Atapuerca during the Holocene. The fieldwork was based on ten archaeological surveys, eight of them using a full-coverage intensive systematic method in a 314 km^2 area (10 km radius around Mayor Cave, Sierra de Atapuerca), and two intensive systematic surveys of the sites. This paper presents a thorough, up-to-date cartography of every Holocene archaeological site in this area as at 2014: surveyed sites, excavated sites, caves and megalithic structures. We also discuss GIS mapping techniques and geoespatial databases applied to archaeological surveys, we evaluate the megalithic structures and the settlements excavated at other digs, and we assess the relevance and contributions of each archaeological operation. The results of our research project have proven highly successful, with an overall Holocene spatial distribution of more than 200 archaeological sites from the Neolithic to the Bronze Age: caves, open air sites and megalithic structures. These findings, combined with the GIS results, show that the area around Sierra de Atapuerca may be one of the best potential sources for deeper knowledge of Late Prehistory on the Northern Iberian Plateau.

1. Introduction

The rich Pleistocene and Holocene archaeo-palaeontological records in Sierra de Atapuerca (e.g. Arsuaga et al., 1997; Bermúdez de Castro et al., 1999; Díez et al., 2003; Carbonell et al., 2008) have aroused major interest in the evolution of the area's prehistoric settlement. Of particular relevance to this work are the karst contexts containing archaeostratigraphic levels dating from the VI to the II millennium cal. BC: Mayor Cave, El Mirador Cave, Galería del Sílex, Silo Cave, Ciega Cave, Peluda Cave and La Revilla Cave (Apellániz and Uríbarri, 1976; Apellániz and Domingo, 1987; Moral, 2002; Vergés et al., 2002, 2008; Abarquero et al., 2005; Carretero et al., 2008; Ortega et al., 2008a, 2008b, 2009). Although many past social practices rarely leave archaeological evidence in the landscape, records of inhabitation, cattle stabling, funerary rites, rock art, symbolic rituals and Cretaceous flint extraction have been found in this network of galleries. The first hypothesis of our research was that the deep karst archaeostratigraphy and its sedimentary diachrony should reflect an intense archaeological projection outside the caves as well, the form of the settlements and areas of complementary economic activity, especially considering that Sierra de Atapuerca was surrounded by megalithic funerary structures (Uríbarri, 1975; Moreno, 2004; Alonso, 2005, 2006; Marcos, 2006, 2008; Palomino et al., 2006a,b; Marcos and Díez, 2008). It is highly unlikely that the Sierra de Atapuerca caves were isolated spaces in the landscape. They must have been interrelated with numerous multifunctional open air sites.

We began to test this hypothesis in 1999 with a Research Project covering a 314 km^2, study area in a 10 km radius of Mayor Cave in Sierra de Atapuerca (Marcos and Díez, 2009). Little is known about the evolution of the Holocene prehistoric settlement on the Northern Iberian Plateau, with large gaps in 20th century historiography. This situation continues today, as clearly reflected in the lack or paucity of such studies presented at the recent Iberian archaeology congresses (e.g. Balbín and Bueno, 1997; Oliveira, 2000; Bicho and Carvalho, 2004; Arias et al., 2005; Hernández

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et al., 2008). Here, settlement studies are considered to be those which analyse settlement patterns and territorial distributions based on *Spatial Archaeology* at the mesoscale and macroscale (e.g. Clark, 1977; Hodder and Orton, 1990; Conolly and Lake, 2009), now know in the Iberian area as *Archaeogeography* or *Landscape Archaeology* (e.g. Vicent, 1991; Orejas, 1995; Ortega, 1998; Criado, 1999; Gojda, 2001; De Carlos, 2002; García, 2005; Grau, 2006; Marcos and Díez, 2008). Ignorance about the evolution of settlement patterns during the Holocene is even greater in the Burgos area, with the exception of the preliminary results of our research in the study area.

The main advance made by our research is precisely due to this paucity of Landscape Archaeology projects. The core aim of this study is to present the empirical basis of Holocene prehistoric sites in the Sierra de Atapuerca area, a geospatial database (hereinafter GDB), which will be an indispensable tool for future locational and spatial analyses and an essential documentary source for the socio-economic interpretation of historic processes in other research work. GIS techniques are used here for up-to-date mapping of all documented types of Holocene sites: surveyed sites, excavated sites, caves and megalithic funerary structures. We discuss the GIS techniques and GDBs used to map the survey sites, we evaluate the caves, megalithic structures and settlements excavated during other operations, and we compare the numerous archaeological operations. We also present the results of our systematic surveys and several unpublished maps showing the Holocene site distributions: diachronic distribution and by periods. Essentially, this study is an unprecedented mapping project that highlights the great archaeological wealth of this territory.

2. Regional setting

2.1. Geological, geomorphological and paleoecological context

The UTM coordinates 30N ED50 of the southern sector of Sierra de Atapuerca at the Alto de San Vicente trig point (1084 m a.s.l.) are X458030/Y4689125. The Sierra de Atapuerca area has great strategic and bioclimatic potential in the northern Iberian regional context. It received numerous cultural influences from the Northern Plateau and the Ebro Valley during the Holocene. Sierra de Atapuerca is the final Cretaceous spur in the north-western part of the Iberian Range, it is close to the Basque-Cantabrian Mesozoic boundary (Sierra de Ubierna and Sierra de Santa Casilda), the

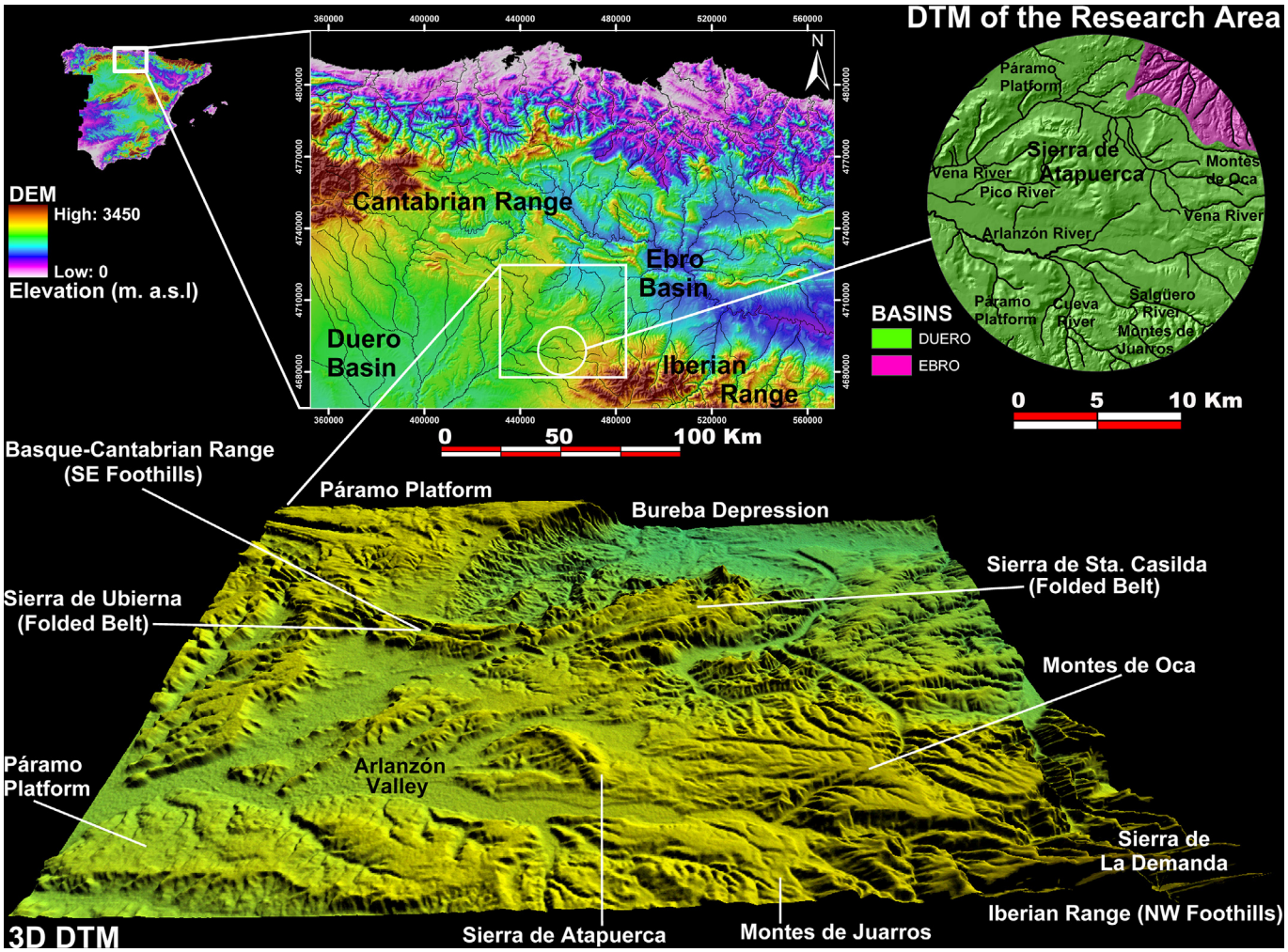

Fig. 1. Location of the study area in a 10 km radius around Mayor Cave, Sierra de Atapuerca, in the northern Iberian topographical context. Several interpolations of Digital Terrain Models (DTM) at different resolutions were used in the GIS mapping process: altitudinal DTM and azimuth and angular topographic shadow DTM at 1:200,000 (Iberian Peninsula) and 1:10,000 (study area).

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