



Human occupation of Iberia prior to the Jaramillo magnetochron (>1.07 Myr)



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ABSTRACT

The first migration out of Africa undertaken by the genus *Homo* is documented in Georgia at 1.8 Myr (Dmanisi) and some 0.4 Myr afterwards in the Middle East ('Ubeidiya). However, the debate on when the European continent was populated for the first time remains open. The first human presence in Europe prior to the Jaramillo subchron (1.07–0.99 Myr) is evidenced at Fuente Nueva 3 and Barranco León D (Orce) and at Sima del Elefante (Atapuerca), an occupation that seems to have continued through the Jaramillo at Gran Dolina TD3–4 and TD5 (Atapuerca), at Vallparadís (Barcelona), and up to the Matuyama–Brunhes boundary at Gran Dolina TD6. Even so, those who still defend a 'short chronology' espouse an intermittent early population limited to the Mediterranean area, delaying the first occupation until after the Jaramillo. These hypotheses fail to explain what factors were behind the absence of population in Europe prior to this period, bearing in mind that there were populations of hominins at the gates of Europe between 1 and 0.5 Myr before the first archaeological record documented in Western Europe. Paleomagnetic analyses of the archaeological sites are rarely able to detect the Jaramillo subchron due to its short duration, while the radiometric dating methods (U-series/ESR) usually applied are limited in the accuracy they can achieve for the chronologies in question. These limitations make it necessary to depend on the biostratigraphy of small and large mammals to ascertain with precision the time of the first colonization of the continent. Accordingly, in the present article we discuss the chronological data from the older Iberian archaeological sites using biostratigraphic data to establish an archaeological sequence that demonstrates the expansion of the first hominin occupation of Southern Europe prior to Jaramillo.

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1. Introduction

The hypothesis of a 'short chronology' for the first human population of Europe has recently been championed by Muttoni et al. (2013), who argue that the first European settlements must be chronologically constrained to the short period of time from 0.85 to 0.78 Myr. However, the human occupations detected at the Spanish sites of Fuente Nueva 3 and Barranco León D (Orce) and Sima del Elefante TE9 (Atapuerca) have been associated with a

chronology prior to the Jaramillo subchron (1.07–0.99 Myr; Carbonell et al., 2008; Toro-Moyano et al., 2009, 2011, 2013; Barsky et al., 2010; Ollé et al., 2013). Moreover, the archaeological sequence shown by the oldest archaeological Spanish sites has suggested that this occupation was continuous throughout the late Early Pleistocene (García et al., 2011), persisting from before the Jaramillo to the Matuyama–Brunhes boundary (0.78 Myr) (Fig. 1). A combination of radiometric, magnetostratigraphic and biostratigraphic methods has made it possible to date the earliest occupation in the Iberian Peninsula at Barranco León D and Fuente Nueva 3 to ca 1.3 Myr and at Sima del Elefante to ca 1.2 Myr (Agustí et al., 1999, 2010; Cuenca-Bescós and García, 2007; Cuenca Bescós et al., 2013). The lower levels of the Gran Dolina sequence (TD3–4 and TD5) and Vallparadís (EVT7) are located close to the upper limit of the Jaramillo (between 1 and 0.9 Myr), whereas level TD6 of Gran Dolina is close

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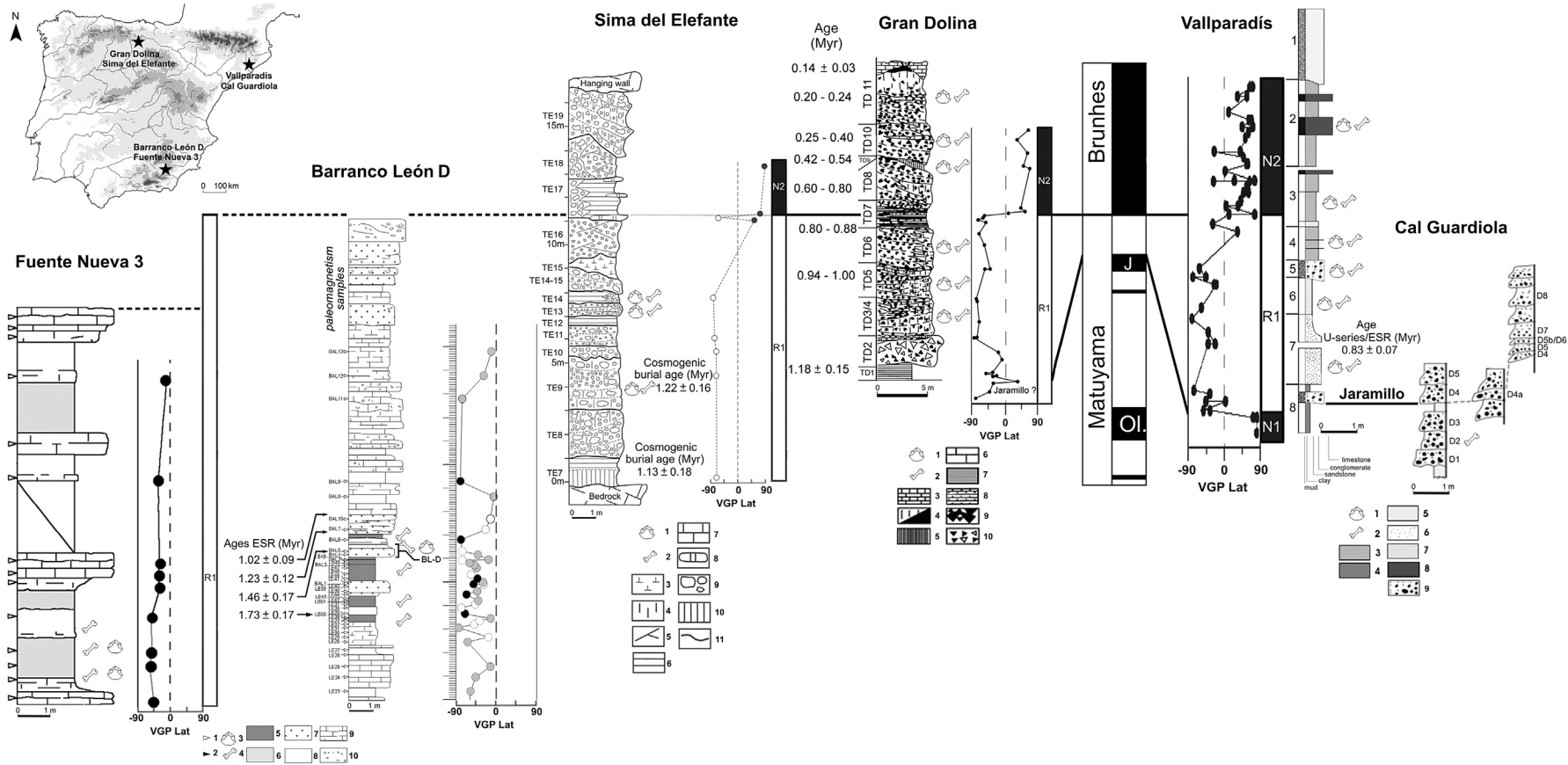


Fig. 1. Geographical situation and key chronostratigraphic sections of the first human occupation of the Iberian Peninsula, together with the respective radiometric and paleomagnetic datings of the sites of the Early Pleistocene. Fuente Nueva 3 and Barranco León D: 1: paleomagnetic sampling site, 2: ESR sampling site, 3: lithic industry, 4: faunal remains, 5: dark colored mudstones, 6: green-red mudstones, 7: white sandstones, 8: white calcareous silts, 9: white limestones and 10: breccia (Oms et al., 2000; Toro-Moyano et al., 2013). Sima del Elefante: 1: lithic industry, 2: faunal remains, 3: marls, 4: lutite/clay, 5: cross-lamination, 6: clay and laminated sandy silts, 7: Mesozoic limestone, 8: speleothem, 9: gravels and boulders, 10: bat guano and 11: main stratigraphic discontinuity (Carbonell et al., 2008). Gran Dolina: 1: lithic industry, 2: faunal remains, 3: speleothem, 4: lutite/terra-rossa, 5: bat guano, 6: Mesozoic limestone, 7: clays and laminated silts, 8: calci-lutite or calci-arenite, 9: clastic flow of gravel and boulders and 10: downfall gravel and boulders (Parés and Pérez-González, 1995, 1999; Falguères et al., 1999, 2001; Berger et al., 2008; Moreno-García, 2011). Vallparadis composite section: 1: lithic industry, 2: faunal remains, 3: clays and muds with gastropods, 4: red clays and muds, 5: Upper Pleistocene terrace, 6: unit 7 (levels 10 and 10c), 7: brown clays and muds, 8: paleo-floor and 9: conglomerates (Madurell-Malapeira et al., 2010; Martínez et al., 2010; Duval et al., 2011, 2012b). VGP Lat, latitude of the virtual geomagnetic pole.

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