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Mid-late Holocene climate, demography, and cultural dynamics in Iberia: A multi-proxy approach

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ABSTRACT

Despite increasing interest in the relationship between culture transformation and abrupt climate change, their complexities are poorly understood. The local impact of global environmental fluctuations depends on multiple factors, and their effects on societal collapse are often assumed rather than demonstrated. One of the major changes in west European later prehistory was the Copper to Bronze Age transition, contemporaneous with the 4.2 ky cal. BP event. This article offers a multi-dimensional insight into this historical process in the Iberian Peninsula from a multi-proxy and comparative perspective. Three study areas, representative of diverse ecological settings and historical trajectories, are compared. Using radiocarbon dates, ^{13}C discrimination ($\Delta^{13}C$) values on C_3 plants, and high-resolution palynological records as palaeoclimatic and palaeodemographic proxies, this study tracks the uneven signals of Holocene climate. The wettest Northwest region features the most stable trend lines, whereas the Southwest exhibits an abrupt decrease in its demographic signals c. 4500 cal. BP, which is then followed by a subsequent rise in the neighbouring Southeast. These lines of evidence suggest the possibility, never previously noted, of demic migration from the Southwest to the Southeast in the Early Bronze Age as a contributing factor to the cultural dynamics of southern Iberia.

1. Introduction

The role of climate change on human behavior, particularly in ancient societies, is a field of significant debate, in part, because of its relevance to current discussions of global climate change. In recent years, archaeologists have played an important role in gauging the relationship between large-scale climatic changes and the cultural history of hierarchical societies (Moore and Hillman, 1992; Gill, 2000; Glantz, 2001; Hassan, 2002; Rosen, 2007; Mercuri et al., 2011; van der Plicht et al., 2011). This research points to the need for more analyses of the specific dynamics of past environments as well as the manifold causes and tempos of the social dynamics of change. Models used to understand the collapse of state-level societies with intensive agriculture in tropical or arid environments, such as the Classic Maya or Akkadian states, cannot be applied to terminal episodes in far less integrated (i.e. heterarchical or middle-range) societies in more temperate environments. Not only are regular cycles of socio-political collapse and fragmentation intrinsic features of these societies (Anderson, 1994; Hayden, 1995; Price and Feinman, 1995; Hall, 2001; Nelson and Schachner, 2002; Parkinson, 2002; Turchin, 2003; Schwartz and Nichols, 2006; Pauketat, 2007), but different ecosystems present human populations with varying degrees of vulnerability and different opportunities for adaptation and resilience (Muñoz et al., 2010).

This paper evaluates the contribution of environmental change and its complex and multifaceted relationship to the culture history of prehistoric Iberia. The environmental diversity and geographic barriers separating the Peninsula from continental Europe and the African continent render it a kind of laboratory for socioecological studies. Iberia can be divided into two biogeographical regions (Fig. 1A): a) the Eurosiberian or Atlantic façade, featuring abundant rainfall (between 1000 and 2500 mm per annum) and typified by a

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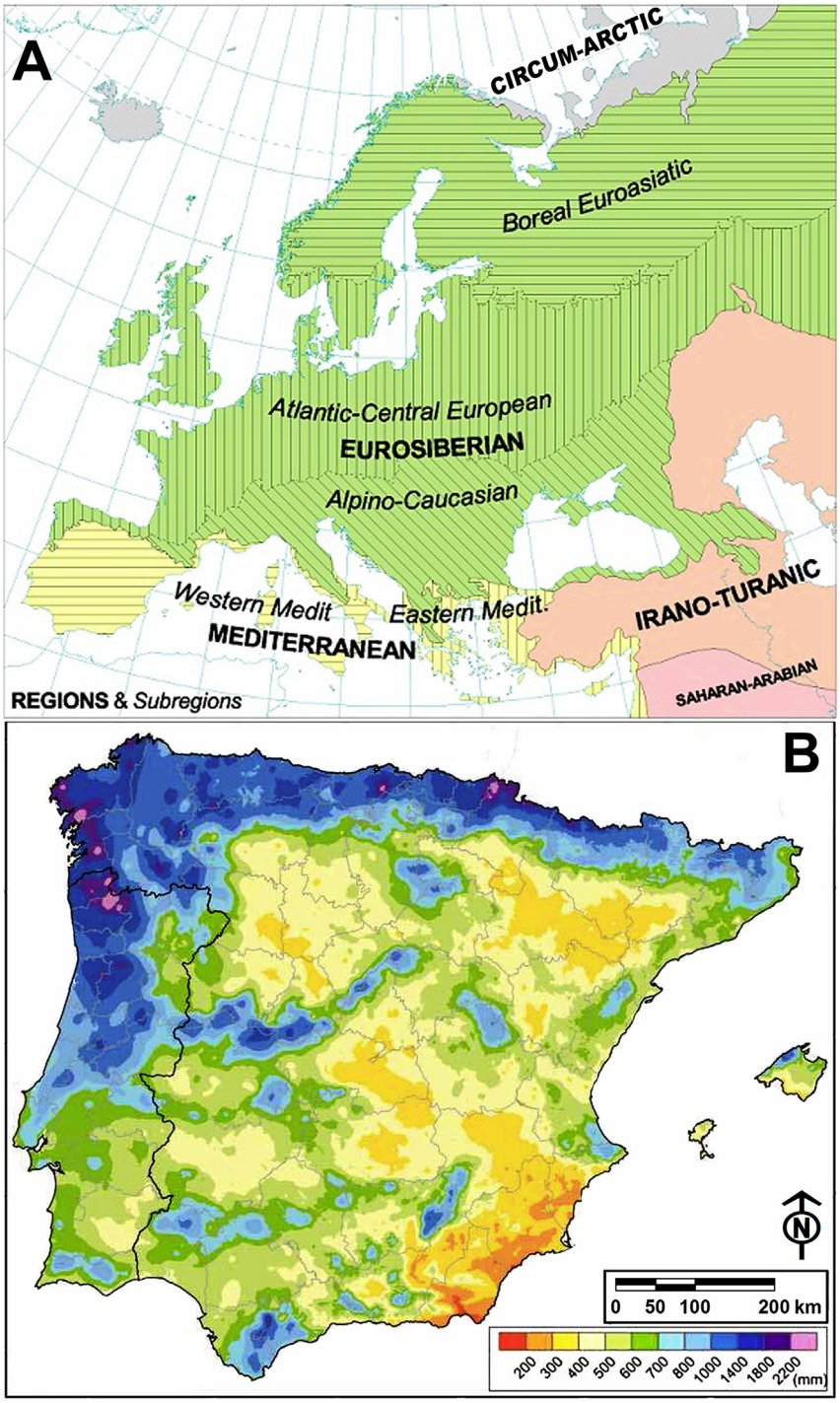

Fig. 1. A. Biogeographic map of Europe (Rivas-Martínez, 2007). B. Average total precipitation in Iberia (1971–2000) (Iberian Climate Atlas, 2010: fig. 69).

deciduous forest cover; and b) the continental, southern and eastern Mediterranean region, warmer and drier, whose natural forests have largely disappeared and been replaced by agricultural fields, vineyards, olive groves, or scrubland (Schütt, 2005; Rivas-Martínez, 2007). Southeast Spain is currently a subdesert; it is the most arid region of Europe (Fig. 1B), and there, soil erosion and other degradation processes that began in later prehistory have left barren, lunar-like badlands (Castro et al., 1998, 2000).

The fourth through second millennia cal. BC in Iberia was a dynamic period marked by different regional trajectories. According to conventional archaeological periodization, it corresponds to the Late Neolithic, Copper Age, and Bronze Age. Traditional accounts for these regional dynamics invoked the movement of eastern Mediterranean populations (e.g. Blance, 1961; Savory, 1968). With the application of radiocarbon dating from the 1970s, the primacy of exogenous factors was undermined, and only internal social dynamics were sought (Harrison, 1985; Chapman, 1991; Castro et al., 1999b; Gilman, 2001; Cruz Berrocal et al., 2013; Lull et al., 2011, 2013). Scholars now argue that during the Copper Age, economic intensification and social inequalities