

ANTHROPOLOGY

Genomic transformation and social organization during the Copper Age–Bronze Age transition in southern Iberia

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The emerging Bronze Age (BA) of southeastern Iberia saw marked social changes. Late Copper Age (CA) settlements were abandoned in favor of hilltop sites, and collective graves were largely replaced by single or double burials with often distinctive grave goods indirectly reflecting a hierarchical social organization, as exemplified by the BA El Argar group. We explored this transition from a genomic viewpoint by tripling the amount of data available for this period. Concomitant with the rise of El Argar starting ~2200 cal BCE, we observe a complete turnover of Y-chromosome lineages along with the arrival of steppe-related ancestry. This pattern is consistent with a founder effect in male lineages, supported by our finding that males shared more relatives at sites than females. However, simple two-source models do not find support in some El Argar groups, suggesting additional genetic contributions from the Mediterranean that could predate the BA.

INTRODUCTION

During the last centuries of the third millennium BCE, the societies of Europe, the Near East, and Egypt experienced large-scale social and political upheavals. Settlement abandonment, depopulation, the disappearance of communication networks, and major political disruptions at the end of the Akkadian empire and the Old Kingdom in Egypt have often been interpreted in the light of a climatic crisis,

known as the 4.2k event (1–3). Recently, the possibility of substantial population movements, causing social instability during the third millennium BCE, has been proposed as a further explanation for the changes observed at the end of the Copper Age (CA) in central and western Europe (4–7). Signs of social and economic turnover are particularly marked in the southern half of the Iberian Peninsula (8), where the CA is associated with exceptional demographic growth, a diversity of monumental settlements and funerary structures, widespread copper metallurgy, and a sophisticated, large-scale manufacture and exchange of symbolic goods, among others [e.g., (9, 10)]. Moreover, this period is characterized by a diversity of settlement types, including fortified sites, ditched enclosures, and so-called megasites, some of which exceeded 100 ha in size (e.g., Valencina de la Concepción and Marroquíes Bajos) and all of which were formed at around 3300 to 2800 BCE, therefore predating the Bell Beaker horizon.

This period is also associated with a major increase in interconnectedness and mobility. On the basis of available radiogenic (Sr) isotope studies, the percentage of southern Iberian individuals who were buried in locations other than where they grew up ranges between 8 and 74% (11, 12). Ivory from Africa and the Near East (13–15), amber from Sicily (16), and ostrich eggshells from Africa (17) are indicative of transregional connections. However, evidence of a strong political centralization and economic inequality remains elusive or inconclusive (18–21).

Archaeogenetics has suggested that the remarkable development during the (south) Iberian CA was coupled with a strong population continuity attested since the Neolithic [e.g., (4, 6, 7, 22–27)]. However, the Late CA anthropological and archaeological records from the north and central Iberia show the first individuals carrying “steppe-related ancestry” by ~2400 calibrated (cal) BCE, which are

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