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ABSTRACTS

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ABSTRACTS

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Compositional and microstructural characterization of grave goods from Anta do Malhão and Soalheironas: An insight into the diachronic use of arsenical copper from the 3rd to the 2nd millennium BC

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The work presents the elemental and microstructural study of grave goods recovered during archaeological excavations at sites in Alcoutim County (south Portugal), namely Anta do Malhão and Soalheironas. The small megalithic monument of Anta do Malhão contained a single burial with a Palmela point and a long and narrow dagger, in addition to a carinated vase and a small cup with a spherical cap shape. The typology of metals and pottery assigns the inhumation to a late phase of the Horizon of Ferradeira, i.e. the last quarter of the 3rd millennium BC. On the other hand, the archaeological works at the necropolis of Soalheironas identified 32 cists although only 2 metallic artefacts were recorded. Cist 1 contained a throwing point with a riveting hole and a medium carinated vase, while the cist 4 showed a dagger and 2 ceramic vessels, an Atalaia-type cup being one of them. These grave goods allow ascribing the necropolis to an early phase of the Southwestern Bronze Age, namely to the first half of the 2nd millennium BC. A microanalytical methodology involving micro-EDXRF, reflected light microscopy and SEM-EDS was used to establish the alloy composition and the post-casting operations applied in the manufacture of these copper-based artefacts. The results of elemental analyses indicated arsenical copper alloys with comparable arsenic contents (2.0-3.4%) and low amounts of iron (<0.05%). The microstructural characterization identified the common presence of deformed equiaxial grains with annealing twins and slip bands. The manufacture of these weapons included hammering and annealing cycles and a final hammering of variable intensity, as suggested by the different density of deformed twins and slip bands. Moreover, in some microstructures the presence of the $\alpha+\gamma$ eutectic and segregation bands indicates that the thermomechanical operations were not efficient enough to fully homogenize the alloy. The similar technological features of these metallic grave goods suggest a metallurgical tradition shared by those communities inhabiting the Southwestern Iberian Peninsula during the Late Chalcolithic/Early Bronze and Middle Bronze Age. However, the integration of these results in a large assemblage of local artefacts discloses significant developments, such as the increased production of strain-hardened artefacts and the growing importance of arsenical copper alloys among prehistoric societies.

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