

PRE-ROMAN MINING WORKS IN 'EL MOLAR-BELLMUNT-FALSET' DISTRICT (TARRAGONA, SPAIN): INDIRECT PROOFS BASED ON LEAD ISOTOPE ANALYSES



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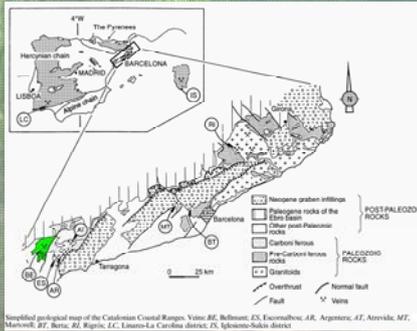
INTRODUCTION

The Molar-Bellmunt-Falset (MBF) mining district has been an important resource of lead and silver since Medieval times, however, earlier works has not been documented except for few fragments of Roman pottery. Nevertheless, some prehistoric sites of the region have evidences of lead metallurgy. This research based on Lead Isotope Analyses (LIA) tries to identify the provenance of preroman lead ores.

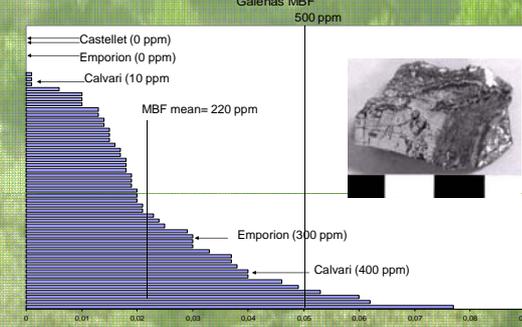
THE LANDSCAPE: A SURVEY OF THE 'MBF' REGION

GEOLOGICAL FRAMEWORK

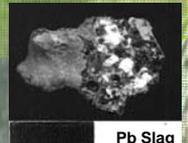
The Catalonian Coastal Ranges are made of Hercynian basement and Mesozoic to Cenozoic cover. Enclosed within the Paleozoic rocks are mineralized veins (lead, zinc, silver and copper) that locally cut across lower Triassic strata. Pb and Pb-Zn-rich veins with gangue predominantly carbonatic enclosed exclusively within the Hercynian basement (Canals and Cardellach, 1997). Surface veins were found mainly in the Molar area.



GALENA SAMPLING → LOW SILVER LEVELS



Some geological and archaeological Galena samples were analysed by XRF showing low silver levels. None of them has enough silver content for their beneficiation in antiquity (aprox. 500ppm following Tylecote), which implies their usage not in silver but in lead production processes. Moreover, some lead slags have been documented in El Calvari (8th-6th BC).



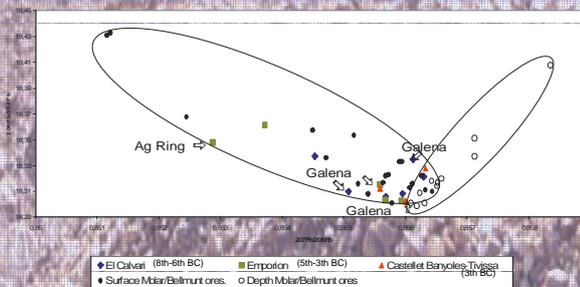
MINING EVIDENCES



Some mining works of historical periods were documented. We do not have specific dates but only scarce roman evidences and later structures. Prehistoric or Ancient mining works have not been documented due to the highly distorted landscape.

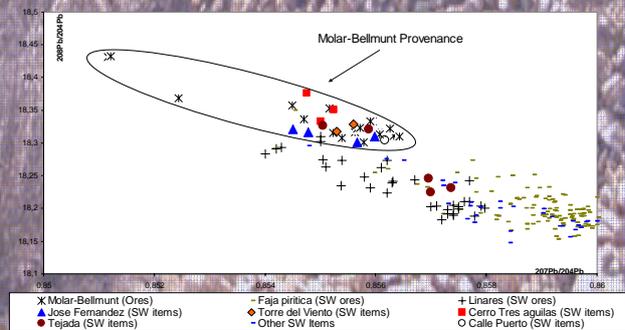
AN ARCHAEOLOGICAL APPROACH TO PREROMAN MINING WORKS: LEAD ISOTOPES

PROVENANCE OF LEAD ITEMS

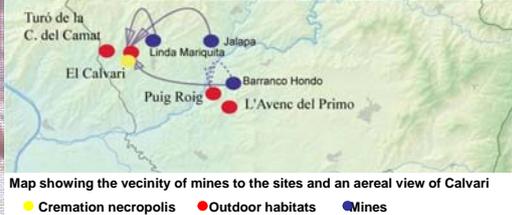


Our objective was to confirm the supplying of local lead resources due to the proximity of the ores to the sites. This study confirms the concordance between archaeological and geological samples. Archaeological galenas as well as slags and metallic lead are grouped in the same isotopic region of geological galena samples. None of the archaeological samples coincides with depth ores. There is not any coincidence with other isotopic regions either, so the provenance of archaeological materials has a high reliability.

CONTACTS WITH THE SW OF IBERIA



Lead imports from different Iberian regions have been widely documented in the Southwest of Iberia. This study suggest that the Molar-Bellmunt mining area could have been another lead supplying area at this time (8th-6th BC).



During the First Iron Age, the territorial control of the mining district of MBF is articulated around two main settlements (Calvari del Molar and Puig Roig) and two secondary (Turó de la Cova del Camat and Avenc del Primo). Those four sites are located strategically close to the ores although Calvari seems to play a leading role in the control and management of the mining works. This local network of settlement which controls the mining production during the First Iron Age is in crisis in the 6th BC, abandoning the sites of Calvari and Puig Roig. Mining works at MBF district last until the 3th BC although there are not other archaeological sites inside the mining area.

CONCLUSIONS:

This study has confirmed the importance of the MBF mining district in the beginnings of the Phoenician colonization which lost its importance at the end of the 3th century BC in favour of other minerals or provenances such as the SE of Iberia:

- Archaeological samples of Galena and lead items from El Calvari (8th BC-6th BC), Emporion (5th BC-3th BC) and Castellat Banyoles-Tivissa (3th BC) have proved the ore exploitation of the MBF mining district from the 8th century BC to the 3th century BC.
- Archaeological data shows that Galena beneficiation had a relevant significance during the First Millenium BC linked to lead production. Its usage in silver obtention was not suitable in antiquity due to their low silver levels.
- Galena from MBF mining district could have had a broader distribution, being a source of supply of the SW of Iberia

ACKNOWLEDGMENTS:

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