

# **Mineralogical and geochemical research on prehistoric archaeometallurgy**

*(Proposer: Prof. Gilberto Artioli)*

The research group on ancient metallurgy at the University of Padova has contributed significantly in recent years to revise the concepts and interpretation of the metallurgical activities in the Alpine area and in the Central Mediterranean during the Copper and Bronze Ages (appx. IV-II millennia BC). The activities include (a) a revision of the geochemical and isotopic reference databases of known copper, lead and tin sources; (b) the definition of the discriminating protocols for metal provenancing, based on Euclidean distances and KDE modeling of the mineral deposits; and (c) the application of the developed methods to a number of case studies in prehistoric and protohistoric metallurgy.

A number of active projects are in progress, focused on the Western Alps (collaboration with the Soprintendenza per i beni e le attività culturali, Regione Autonoma Valle d'Aosta), The Po Valley (project ANR-ITINERIS, Agence Nationale de la Recherche, France), the links between the Eastern Alps and Central Italy in the Copper Age (Museo Archeologico dell'Alto Adige), the Friuli region (Museo Friulano di Storia Naturale), and the Ghassulian Chalcolithic in the Southern Levant (Ben Gurion University, University of Haifa, Israel Antiquity Authority).

The research activity will focus on the geochemical and isotopic evolution of specific deposits, the completion and integration of the reference database for statistical purposes, and the application of the developed interpretive strategies to selected case studies of prehistoric metallurgy.

## References

- Dolfini A., Angelini I., Artioli G.: Copper to Tuscany – Coals to Newcastle? The dynamics of metalwork exchange in early Italy. *PLoS-ONE* 15, e0227259, 2020.
- Artioli G., Canovaro C., Nimis P., Angelini I.: LIA of prehistoric metals in the Central Mediterranean area: a review. *Archaeometry* 62, Suppl. 1, 53–85, 2020.
- Yasur-Landau A., Cline E.H., Manning S., Artioli G.: An Anatolian-style lead figurine from the Assyrian Colony period found in the Middle Bronze Age palace of Tel Kabri. *Bulletin of the American Schools of Oriental Research*, on line, 2020.
- Angelini I., Canovaro C., Venturino M., Artioli G.: The silver treasure of Marengo: silver provenancing and insights into late antiquity Roman and Gallo-Roman hoards. *Archaeological and Anthropological Sciences* 11, 4959–4970, 2019.
- Ling J., Hjärthner-Holdar E., Grandin L., Stos-Gale Z., Kristiansen K., Melheim A.L., Artioli G., Angelini I., Krause R., Canovaro C.: Moving metals IV: swords, metal sources and trade networks in Bronze Age Europe. *Journal of Archaeological Science: Reports*, 26, 101837, 2019.
- Artioli G., Angelini I., Kaufmann G., Canovaro C., Dal Sasso G., Villa I.M.: Long-distance connections in the Copper Age: new evidence from the Alpine Iceman's copper axe. *PLoS ONE* 12, e0179263, 2017.
- Artioli G., Angelini I., Tecchiati U., Pedrotti A.: Eneolithic copper smelting slags in the Eastern Alps: local patterns of metallurgical exploitation in the Copper Age. *J. Arch. Sci.* 63, 78-83, 2015.