Bronze Age Scandinavia's trading networks for copper settled

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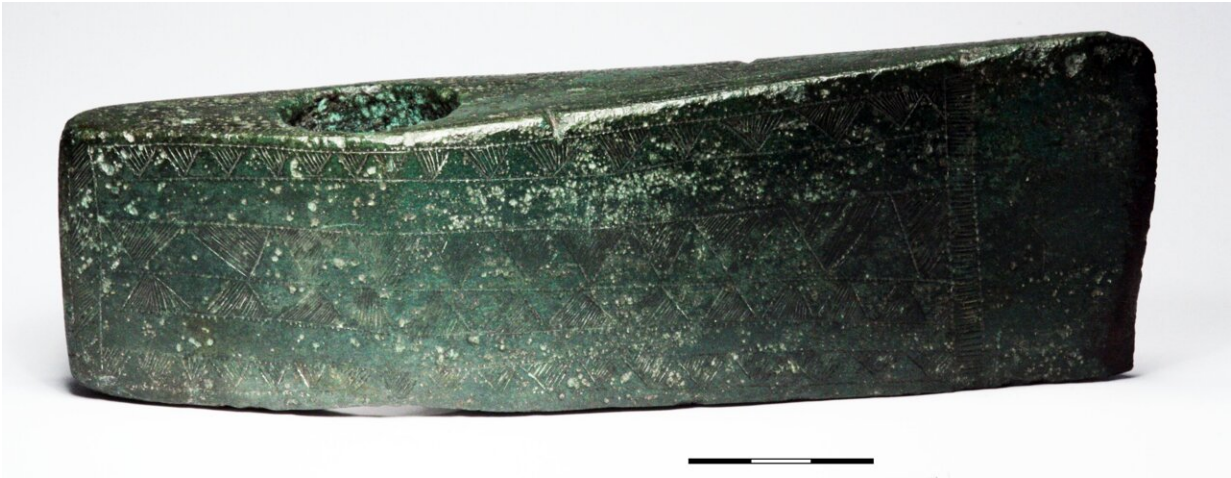


Shafthole axe type Fårdrup. This axe is of Nordic craftsmanship and hides information on the first attempt to establish trading networks with societies across the Alps. A small group of these Nordic crafted axes is made of northern Italian copper, so called AATV-copper (from the Alto Adige, Trentino and Veneto mining region in the Italian Alps) while the majority of these axes is made of British and Welsh or eastern Alpine metal. Credit: Heide W. Nørgaard, by permission of the National Museum, Copenhagen.

New research presents over 300 new analyses of bronze objects, raising the total number to 550 in 'the archaeological fingerprint project.' This is roughly two thirds of the entire metal inventory of the early Bronze Age in southern Scandinavia. For the first time, it was possible to map the

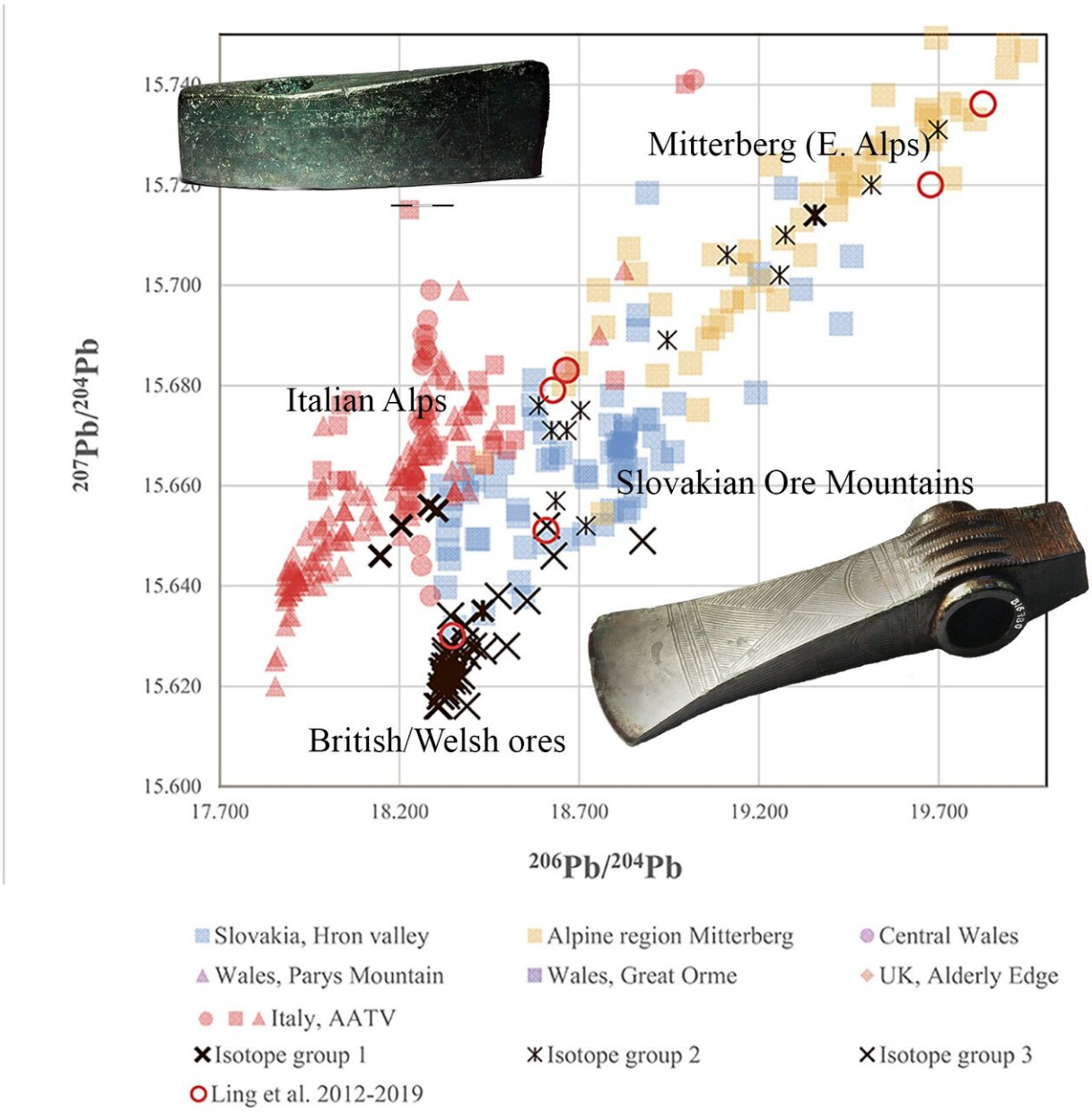
trade networks for metals and to identify changes in the supply routes, coinciding with other socio-economic changes detectable in the rich metal-dependent societies of Bronze Age southern Scandinavia.

The magnificent Bronze Age in southern Scandinavia rose from copper traded from the British Isles and Slovakia 4000 years ago. 500 years later these established trade networks collapsed and fresh copper was then traded from the southern Alps, the so-called Italian Alps. This large-scale study could show that during the first 700 years of the Nordic Bronze Age the metal supplying networks and trade routes changed several times. These 700 years of establishment and change led to a highly specialized metalwork culture boasting beautiful artwork such as the Trundholm Sun wagon and spiral decorated belt plates branding high-ranking women; even depicted on today's Danish banknotes.

The study by H. Nørgaard, Moesgaard Museum and her colleagues H. Vandkilde from Aarhus University and E. Pernicka from the Curt-Engelhorn Centre in Mannheim built on the so far largest dataset of chemical and isotope data of ancient bronze artifacts. In total 550 objects were used to model the changes that took place: These changes correlate with major shifts in social organization, settlements, housing, burial rites and long distance mobility.

Shafthole axe of Valsømagle type. Only a few axes of this type are known, and they are only distributed in northern Europe. These axes seem to be contemporary with the Fårdrup type axes as they are made of the same metal and not, if they would be slightly later, of the new Italian metal that is the main metal used in the period from 1500 BC. Credit: Heide W. Nørgaard, by permission of the National Museum, Copenhagen.

"Now, this multi-disciplinary approach—based jointly on conventional archaeological methods and novel scientific methodologies processing large data quantities—allows us to detect these correlating changes and identify contemporaneity with societal changes recognized by colleague researchers," says Heide Nørgaard the project´s PI.



The lead isotope plot of the over 65 shafthole axes analyzed in this study dating to the end of the first Bronze Age period 1600 BC. This amount of data exceeds the previous analyses by ten times and for the first time allows to compare both axe types and understand their development. Credit: No credit

"It is highly likely that both people and technologies arrived to Scandinavia and that Scandinavians traveled abroad to acquire copper by means of the Nordic amber, highly valued by European trading partners."

More information: Heide W. Nørgaard et al, Shifting networks and mixing metals: Changing metal trade routes to Scandinavia correlate with Neolithic and Bronze Age transformations, *PLOS ONE* (2021). DOI: 10.1371/journal.pone.0252376

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