Sand from the sealed Middle Byzantine amphorae of cape Stoba shipwreck

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approaches used to characterise the residues. Special attention will be given to compound-specific isotope analysis, which allows further distinction between terrestrial ruminant adipose fats, dairy fats, non-ruminant fats and even wild animals fats as well as fats from marine and freshwater sources based on the d13C signatures of the palmitic and stearic acids commonly found in archaeological residues. Complexities and limitations of the technique will also be discussed.

The results obtained from ORA on vessels recovered from the Late Bronze Age cemetery and settlement of Mačkovac-Crišnjevi, in Northern Croatia will be presented. The site is located on the left bank of the Sava River, near the town of Nova Gradiška and is dated to the BrC2 to HaA1 period (Barice-Gređani group). Lipids were extracted and characterised using Gas Chromatography-Mass Spectrometry (GC-MS) and Gas Chromatography - combustion - Isotope Ratio Mass Spectrometry (GC-c-IRMS). The results obtained were found to complement faunal data, and further show the use of dairy products.

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Locally produced or imported? Late-Copper-Age decorated bowls from the Trieste Karst (north-eastern Italy) and Deschmann’s pile-dwellings (central Slovenia) studied using non-destructive X-ray computed microtomography and Prompt gamma activation analysis

A group of Late-Copper-Age decorated cross-footed bowls from the Trieste Karst (NE Italy) and the Deschmann’s pile dwellings (Ljubljansko barje, Slovenia), has been investigated through a non-destructive approach combining X-ray computed microtomography (microCT) and Prompt gamma activation analysis (PGAA) in order to study the vessels-forming technique, to characterise their pastes and to test the hypothesis that some vessels from the Karst could have been imported.

Cross-footed bowls represent one of the most characteristic vessels of the 3rd millennium BC. In the Deschmann’s pile dwellings most bowls are attributed to Ljubljansko barje variant of the Vučedol Culture, corresponding to the first phase of the site. In the Karst, only a few bowls were discovered and, despite the small number, they are heterogeneous in terms of shape and decoration. According to their typology, the Karst bowls are associated to the Vučedol Culture but often referred to as an individual type. The PGAA results, combined with the microCT data, have shown that only one bowl from the Karst might have been imported from Ljubljansko barje, while other 4 Karst vessels were most probably imported but not from central Slovenia. In more detail, K2O contents, higher than values reported from local Karst and Slovenian soils, have been recorded in two of these Italian bowls. The Karst bowls represent, according to their shape and ornamentation mainly consisting of cord impressions, a special variant of cross-footed bowls with relevant typological comparisons in Hungary, Slovakia and the Czech Republic. A possible central European origin of some Karst bowls would be in agreement with high K2O soil contents in some areas of the Czech Republic. Cross-footed bowls from the Trieste Karst might be considered as evidence of long-distance connections, movements of ideas, artefacts and/or even movements of people.

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Early Neolithic oven building techniques at the territory of the Starčevo culture

Ovens are enclosed thermal structures typical for sedentary agricultural communities in the Middle East and Europe since the Neolithic Period. At the territory of the Central Balkans and Croatia, ovens have been built and used since the beginning of the Neolithic. In the published literature regarding the Starčevo culture settlements, four different types of enclosed thermal structures have been mentioned, some of which were interpreted as ovens and others as pottery kilns. It was assumed that all of the ovens/kilns were built from the same material – mud plaster and that all of them were free-standing above-ground structures located inside the dwellings. Several building techniques were proposed for their construction. The revision of the published data and unpublished field documentation from the excavations of the site of Lepenski Vir, has shown that not all of the thermal structures were constructed from the same material, only one type was a free-standing above-ground structure and one type should not have been interpreted either as an oven or as a kiln, but as an open fire installation. Based on the building material, three different building techniques were defined, and some of the previously presumed techniques were refuted. Also, the existence of pottery kilns during the Early Neolithic Starčevo culture was questioned. In order to test these hypotheses, several oven building and usage experiments were conducted. The aim of this presentation is to show different oven building techniques applied during the Early Neolithic in this region and introduce a typology for the Starčevo culture ovens.

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Sand from the sealed Middle Byzantine amphorae of cape Stoba shipwreck

The remains of cape Stoba shipwreck lies on the seabed near Mljet island at the depth between 21 and 28 m. The wreck-site is evidenced by a cargo of amphorae and glass dated back to the 10th-11th century AD. Five amphoras, located in the cargo part of the ship, as well as the small ceramic vessel which had to be placed in the ship’s kitchen, were found filled with sand and closed with a wooden stopper and resin. The aim of this study is a characterization of the sand which could help in the determination of its purpose.

Sand samples from amphorae and vessel, as well as from the sea bottom, were investigated. Mineralogical content was determined using X-ray diffraction and grain size distribution by wet sieving. From fine sand magnetic fraction is separated. All granulometric and magnetic fractions were examined by binocular magnifier. All sand samples are marine sediment of carbonate composition. Sand grains are mainly skeletons of the Mollusca, Corals, Foraminifera, Sponges and Echinoderms.

This investigation has neglected the archaeological assumption that sand was used as a raw material for glass manufacture. One of the assumptions is that sand could serve as dishwash as it was found in a small ceramic vessel inside the kitchen as well. But, the composition of sand is not suitable for this purpose. It is not possible that sand from the sea bottom entered in amphorae through a small hole at the center of the cap as the coarser grain size were found. Additionally, the depth at which the amphorae were found is below the base of the waves, and the sea currents in this area are not strong enough to produce a significant suspension of seabed material. This sand could serve as a ballast, although archaeologists have not encountered such a case so far.

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Provenance analysis of basaltic rock tools of Chalcolithic and Early Bronze Age I periods in Israel

The fact that vessels as well potter's wheels and spindle whorls in Chalcolithic and Early Bronze Age I were made selectively from basaltic rocks shows that this raw material played a major role for tool production as well as for craft specialization during these periods. These items obviously had a great value for the communities in the southern Levant, facing increasing social and economic changes.

The petrological definition of the raw material of the archaeologic finds, as well as the determination of the sources of basaltic rocks that were used for these tools, enables not only the mapping of the distribution of these items across the landscape and over time but also tracking possible trade routes and exchange mechanisms.

The value of basaltic rock tools as carriers for information is essential. In contrast to many other raw materials, the petrological characteristics of a basaltic tool correspond directly to the characteristics of its source.

To achieve more information about trade/ exchange systems, a geochemical database of the basaltic raw material is currently created to enable a geochemical affiliation of the archaeologic finds to their sources. For this reason, over 500 basaltic rock samples were collected in Israel and geochemically analyzed over the past years. The evaluation of the major and trace element analytical data supported by cluster analyses show that single basaltic rock deposits can be distinguished from each other as well as from other sources outside the borders of modern Israel. This permits an exact tracking of the origin of the archaeologic finds.

This presentation will give an overview of the geological background data as well as present a case study of a Chalcolithic and Early Bronze Age I assemblage in order to demonstrate the approach of the provenance determinations.

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The Earliest Evidence for the use of Emery in Toolmaking from Stelida, Naxos

The Cycladic island of Naxos, Greece is long renowned for its geology, and the range of lithic resources used in antiquity, not least marble, chert and emery. The latter raw material is particularly rare, with few sources in the larger region, and globally more generally. While its use as an abrasive from the later Neolithic to modern times is relatively well established, this paper focuses on its previously undocumented use as a resource for the production of flaked stone tools.

Emery consists mainly of blue corundum and is mixed with magnetic iron ore creating the rough granular abrasive stone. It is one of the hardest materials to knap being graded 6-9 on Mohs scale depending on the source. Here we detail the first evidence for an assemblage of flaked stone implements, knapping debris and hammerstones of emery stone from Stelida on the northwest coast of Naxos, a chert source and stone tool workshop (located at least 5km distant from the nearest emery outcrops) whose exploitation spanned ~9000 to ≥200,000 years ago. In the presentation we discuss the techno-typological characteristics of emery assemblage, discuss its distribution across the site and its potential chronological range of use, before then considering the exploitation of this material within the context of hominin and early human mobility on Naxos, and Palaeolithic behavioural studies more generally.

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Data archaeology in archaeometry and osteometry: can we simulate raw data from descriptive statistics?

In all scientific fields, the external validity of the studies is an indispensable condition to generalize the results. So, validation and cross-population studies are always of paramount importance. Although researchers are encouraged to provide and publish their raw data, it is still more exception than a rule. Also, many earlier studies contain valuable data, but it is not possible to access them. Recent anthropological studies provided a novel approach that employs algorithms used to recreate data from descriptive statistics. Using the assumption that skeletal metric data from a homogenous sample follow the normal distribution, they provided raw data and constructed metapopulation data. Although that approach showed promising results, it was not tested in detail if the original sample and simulated sample differed.