Pottery raw material sources at the multi-period archaeological site of Jagodnjak – Krčevine, Croatia

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Pottery raw material sources at the multi-period archaeological site of Jagodnjak – Krčevine, Croatia

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Introduction

The paper presents the preliminary results of a case study focused on the multi-period (Neolithic, Bronze Age, Late Iron Age, Roman, Mediaeval) archaeological site of Jagodnjak – Krčevine located in the Baranja region of Eastern Croatia. The research aims to answer questions about potter preferences when choosing clay sources and tempering material through different periods of the past. These choices of raw materials could point not only to different technology but also to the various pattern of landscape use over a long period of time.

For the purpose of collecting research material, characteristic vessels from each archeological period were selected for the archaeometry of ceramics, while for obtaining the optimal data set related to the provenance of raw materials a field survey was conducted near the archaeological site.

Characteristic vessels from Neolithic, Bronze Age, Late Iron Age, Roman, Mediaeval (from up left to down right)

Research aims

- to identify the characteristics of archaeological ceramics
- to determine the provenance, availability, and types of the raw material

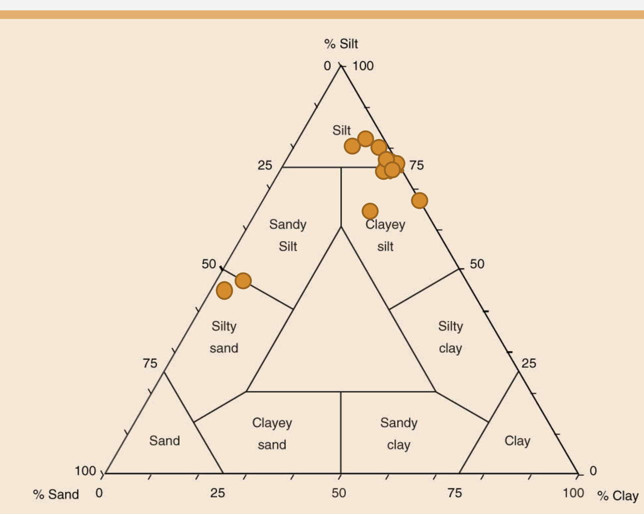
Materials and methods

Field sampling – clay sediments were collected near the archaeological site within a radius of 0.4, 1, 4 and 10 km, along the watercourses and near old clay pits, taken with drill from 0.3 and max. 1.5 meters in depth

Ceramic petrography – 53 samples of archaeological ceramics and 12 clay briquettes fired at 650 °C

X-ray diffraction analysis – 26 samples of archaeological ceramics, 16 samples of raw clay and 12 clay briquettes

Results



Grain size analysis of clay sediments indicates that most of the samples belongs to silt and clayey silt.

Clay sediments

X-ray diffraction analysis of clay sediments shows the presence of quartz, mica, K-feldspar, plagioclase, amphiboles, 7Å and 14Å clay minerals in all samples while calcite, dolomite, and aragonite are present in several samples. Results obtained by X-ray diffraction analysis of fired clay briquettes have the same mineral composition with absence of 7Å clay minerals.

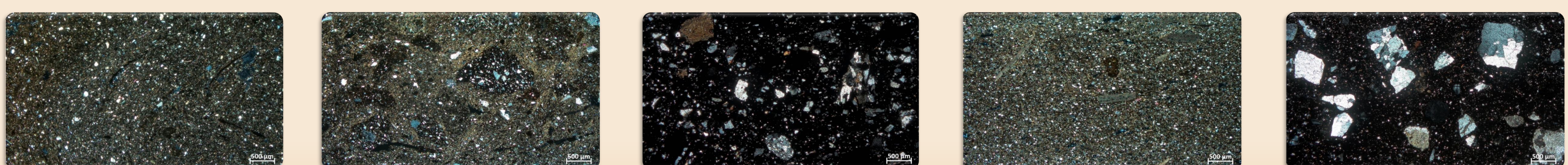
The mineral composition of fired clay briquettes determined by optical microscopy is dominated by angular-subangular mono-crystalline quartz inclusions with density varying from sparse to abundant depending on the different sources of raw materials.

COMPOSITION OF ARCHAEOLOGICAL CERAMICS	
CHRYSTALOCLAST and non-plastic inclusions	TEMPER MATERIAL
Quartz (Q) Mica (Mic) K-feldspar (Kfs) Plagioclasse (Pl) Iron nodules Shell fragments	LITHOCLASTS- metamorphic rocks (quartzite), igneous rocks, carbonate rocks, chert CHERAMOCLASTS- grog ORGANIC MATERIAL-chaff

Archaeological ceramics

The mineral composition of the matrix determined by optical microscopy is mainly composed of very fine (< 0,1 mm) quartz and mica chrystaloclast mineral inclusions. Therefore, two general groups of raw materials were observed. The first one is dominated by angular-subangular mono-crystalline quartz grains, while the second is dominated by mica minerals. By observing the density of fine (0,1-0,25 mm) and very fine mineral inclusions in the matrix, **ten main petrographic groups** have been determined with density varying from common (20%) to abundant (50%). Only one sample has less than 5% of chrystaloclasts inclusions in the matrix.

X-ray diffraction analysis of archaeological ceramics shows the presence of quartz, mica, K-feldspar, and plagioclase in all the samples while calcite, dolomite, Fe-oxides, amphibole, graphite, 7Å, and 14Å clay minerals are present in several samples.

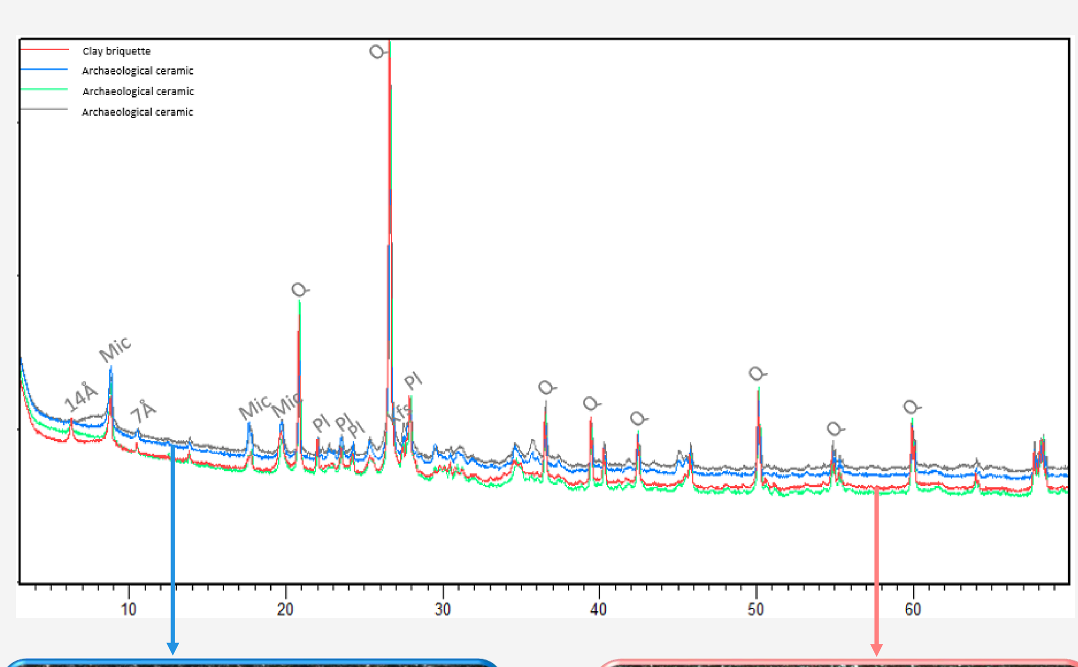


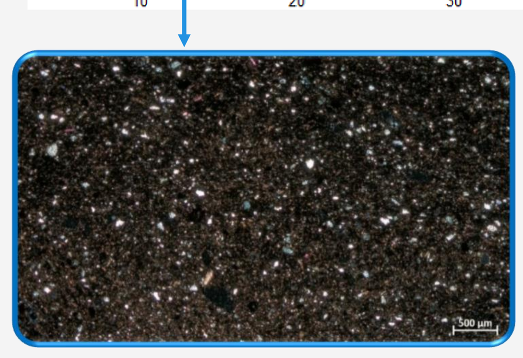
Neolithic, chaff tempered (XP); Bronze age, grog tempered (XP); Late Iron age, lithoclasts tempered with graphite (XP); Roman period, without temper material (XP); Mediaeval, lithoclasts tempered (XP)

Discussion and conclusion

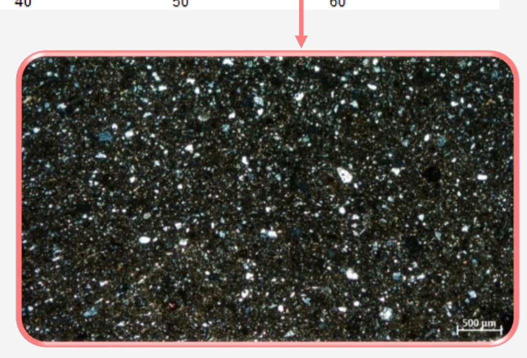
The results of this study indicate that good quality clayey material is easily accessible and was probably collected in the vicinity of the settlement. The research also shows that ancient communities preferred sandy clay or raw material with a higher amount of quartz and feldspar chrystaloclasts (80% of all samples) throughout all periods of the past. On the other hand, the selection of particular tempering material is preferred exclusively by a specific social group, that is, different communities use different tempering materials.

However, comparing the collected clay and archaeological ceramics we have managed to locate four sources of sandy clay. Most ceramics can be connected with the source located in a radius of 0.4 km, especially preferable source for the Bronze Age potters but also the Neolithic. It seems that the clay source locations with a distance of more than 4 km were also used but these cannot be related to the specific social group.





Thin section of archeological ceramic (XP)



Thin section of clay briquette (XP)

The raw material of good quality but less sandy (less than 20% of chrystaloclasts) is also easily accessible, located in the vicinity of the archaeological site but it is not recognized as a raw material used during studied periods of the past. These suggest on deliberate choice of clayey material dominated by quartz and feldspar chrystaloclasts located even at a greater distance from the archaeological site. Furthermore, field sampling did not reveal a source of mica-dominated clay, which is probably located at a specific still unknown location.

This opens the potential for future field research and connecting specific sources of raw materials with certain social communities. These data can be applied when considering diversity in the choice of raw materials, and technology, but also within wider considerations concerning patterns of landscape use over time.

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