Pottery production in prehistoric cultures of Croatian and Austrian Danube regions

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Osijek 2015

Bilateral Croatian – Austrian Project:

Pottery production in prehistoric cultures of Croatian and Austrian Danube regions

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Institut za arheologiju
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Filozofski fakultet Sveučilišta u Zagrebu
Miloglav, I.

Goals:
to determine the availability and types of raw materials and the reconstruction of technological processes at selected archaeological sites

Purpose:
to determine to what extent Danube can be seen as a unique area in prehistoric times

(1) did the exchange of material goods included the exchange of technology (at the level of cultural horizon or at the level of smaller communities), or it is always related to the production center
(2) to which extent technological processes were conditioned by landscape (availability of raw materials), economic or social factors (matter of choice).

Spatial context

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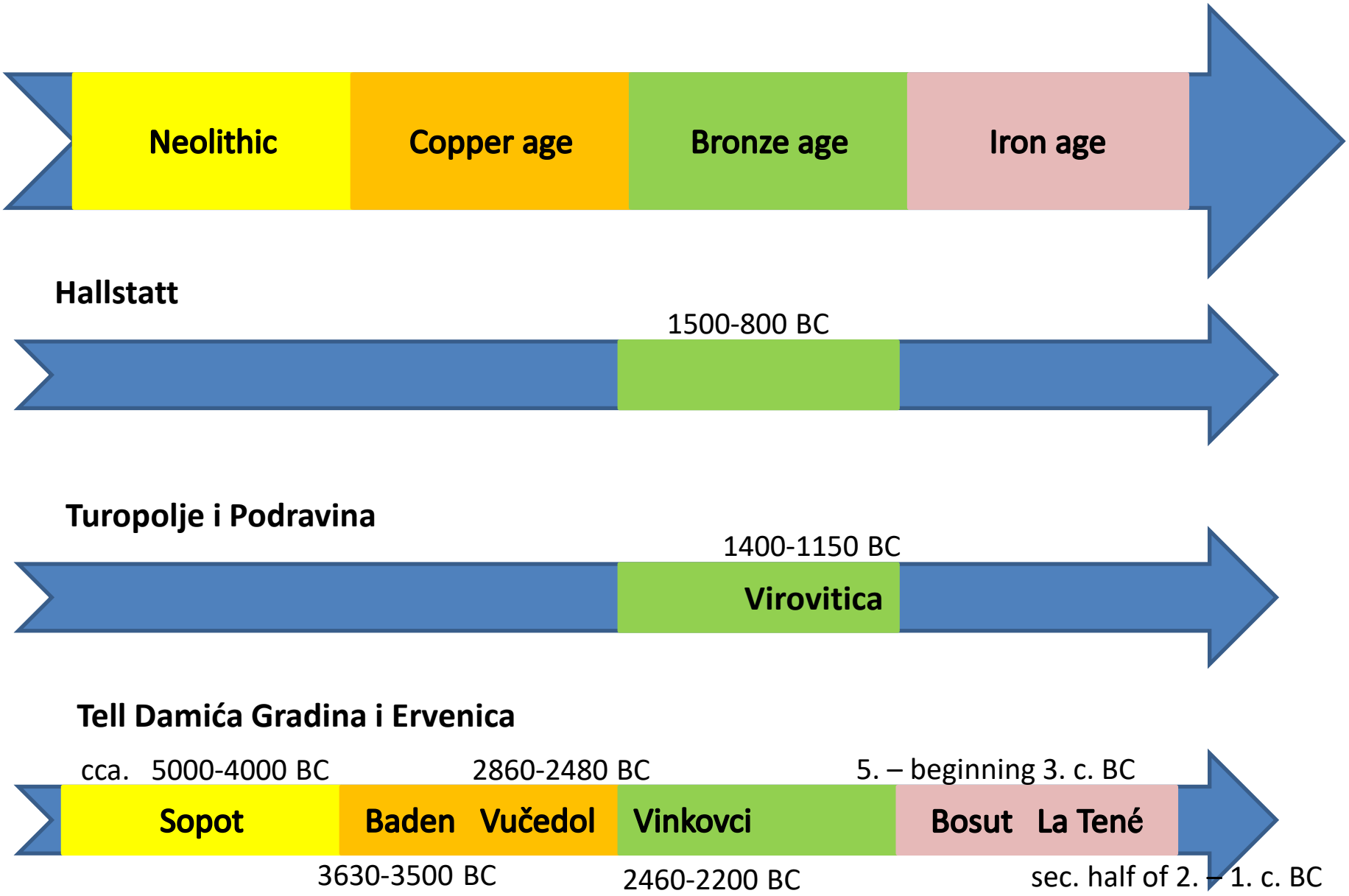
Arhiva Gradskog muzeja Vinkovci
voditeljica istraživanja: dr.sc. Ivana Iskra Janošić

CZECH REPUBLIC
Brno
Morava
Váh
Thaya
Danube
SLOVAKIA
UKRAINE
Lech
Isar
Inn
Augsberg
Munich
Vienna
Bratislava
AUSTRIA
Chernivitsi
Tisa
Debrecen
Siret
Prut
Budapest
HUNGARY
Buzau
SWITZERLAND
Mura
Marcal
Sio
Somes
Mures
Crisul Alb
MOLDOVA
Zala
Szeged
Drava
ROMANIA
Zagreb
Novi Sad
Galati
Sava
CROATIA
Braila
Arges
Ialomita
ITALY
BOSNIA &
HERZEGOVINA
Belgrade
Vedea
Olt
Craiova
Bucarest
Sarajevo
Great Morava
Black
Sea
Drina
SERBIA
Osam
Danube
BULGARIA
MACEDONIA
Aegean
Sea
About 1,000 miles (1,609 km) across

Temporal context



Steps in archaeoceramic investigations	Objectives
Typological classification and statistical analysis	• easier orientation during processing material and forming typology of the vessels
Chronological - typological analysis	• set ceramic material in the spatial and temporal context at the level of cultural groups
Macroscopic analysis of technology	• determine the composition and type of clay pastes and to determine pottery production techniques and methods of final processing vessels • determine firing methods
Archaeometry	• **Determine composition of ceramics – firing method; raw material**
Experimental archaeology	• **experimental studies**
Ethnoarchaeology	• ethnographic analogies

Types of analyses
Mineralogical analysis: . X-ray diffraction (XRD) . Fourier transform infrared spectroscopy (FTIR)
Petrographic analysis: . Thin section optical microscopy
Thermal analyses: . differential scanning calorimetry - DSC . thermogravimetry – TG
Grain size analysis: . wett sieving . sedimentation analysis (sedigraph)
Chemical analysis . Inductively coupled plasma mass spectroscopy (ICP-MS) . inductively coupled plasma optical emission spectrometry (ICP-OES)

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NEXT PRESENTATION!

Samples:
30 ceramic sherds
4 clayey sediments
4 experimental ceramic

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GERMANY
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SLOVAKIA
UKRAINE
AUSTRIA
HUNGARY
SWITZERLAND
ROMANIA
MOLDOVA
CROATIA
BOSNIA & HERZEGOVINA
SERBIA
BULGARIA
MACEDONIA
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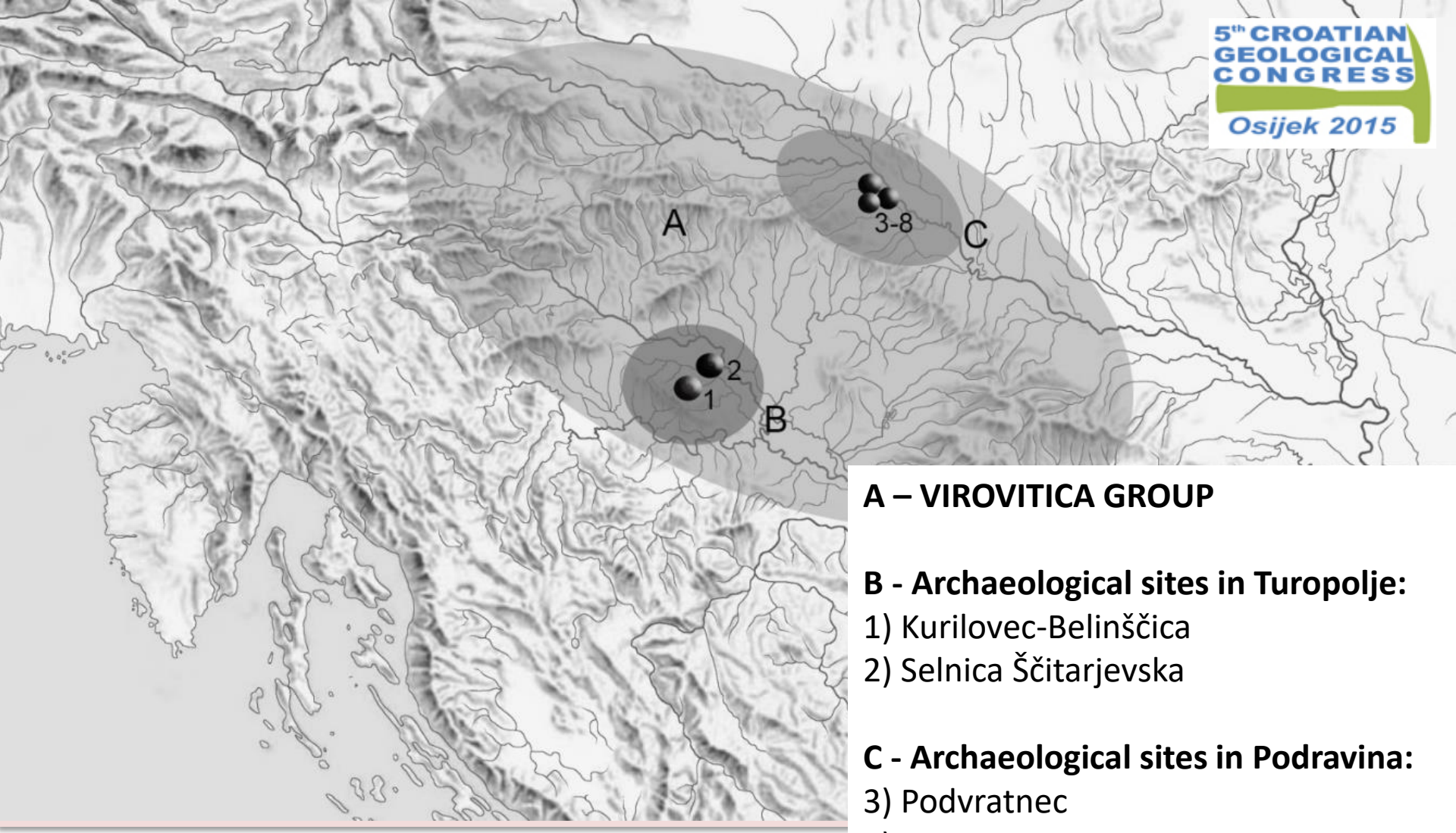
Braila
Arges
Ialomita
Bucarest
Olt
Vedea
Craiova
Belgrade
Sarajevo
Drina
Great Morava
Osam

Adriatic Sea
Black Sea
Tyrrhenian Sea
Aegean Sea

About 1,000 miles (1,609 km) across



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A – VIROVITICA GROUP

B - Archaeological sites in Turopolje:
1) Kurilovec-Belinščica
2) Selnica Ščitarjevska

C - Archaeological sites in Podravina:
3) Podvratnec
4) Vratnec
5) Podgorica
6) Podpanje
7) Močvar
8) Jablanec

Samples:
26 ceramic sherds
8 clayey material
21 experimental ceramics

PRELIMINARY CONCLUSIONS:

1) Raw material

- local material

2) Preparation of clay paste

- clays refined by decantation
- addition of temper material, dominantly grog!

3) Shaping of vessels

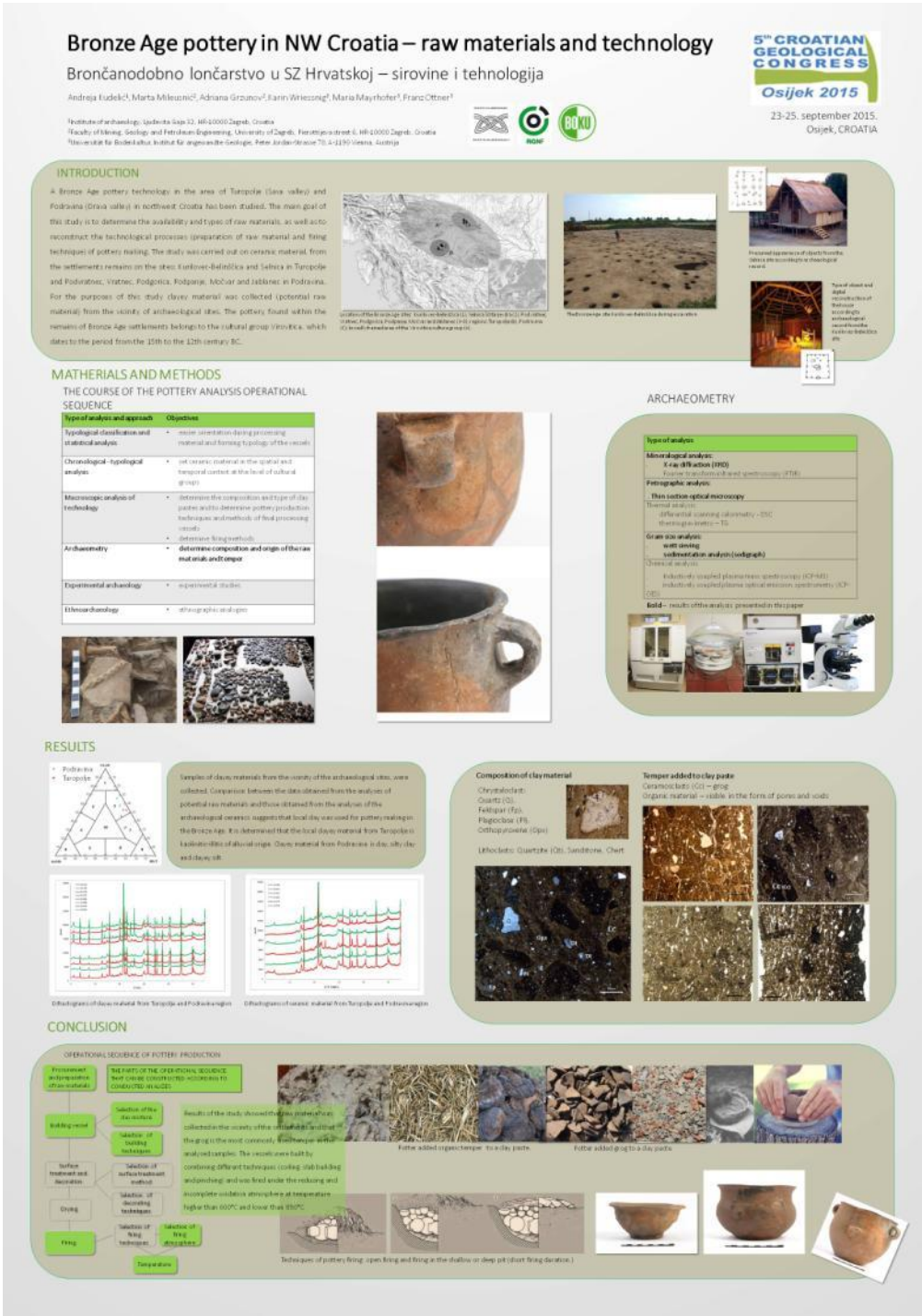
- combination of coilling, slab building, pinching

4) Firing conditions

-temperatures: 600-850°C

- firing atmosphere: oxidisable to oxidisable/reducible

VISIT POSTER: P-43



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Samples:
36 ceramic sherds (each culture 6)
2 clayey material

POLAND
GERMANY
CZECH REPUBLIC
UKRAINE
SLOVAKIA
AUSTRIA
HUNGARY
MOLDOVA
ROMANIA
SWITZERLAND
CROATIA
ITALY
BOSNIA & HERZEGOVINA
SERBIA
BULGARIA
MACEDONIA
Black Sea
Aegean Sea
Adriatic Sea
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Vedea
Craiova
Bucarest
Belgrade
Sarajevo
Drina
Great Morava
Osam
About 1,000 miles (1,609 km) across

Bosut La Tené

Vinkovci

Baden Vučedol

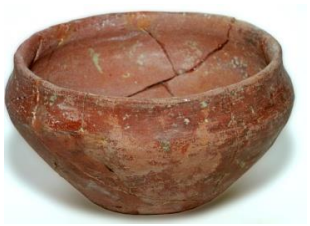
Sopot

Gradski muzej Vinkovci

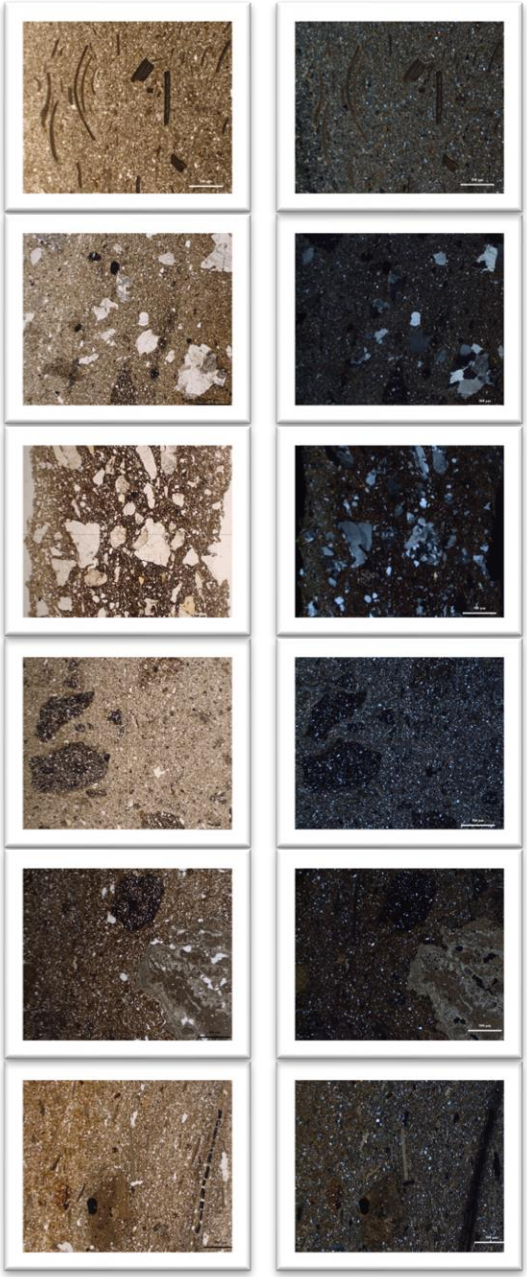
Gradski muzej Vinkovci

Gradski muzej Vinkovci

Muzej Slavonije Osijek



Gradski muzej Vinkovci



PRELIMINARY CONCLUSIONS:

1) Raw material

- should be local material

2) Preparation of clay paste

- big difference between cultures

VISIT POSTER: P-42

Preliminary investigations of changes in pottery technology through prehistory on the tell site Damića gradina

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Universität für Bodenkultur Wien

Introduction

Archaeological site Damića gradina is situated in the centre of Stari Mikanovci in eastern Slavonia. Rescue archaeological excavations were conducted by Vinkovci Town Museum in 1980. when an elementary school was build on the site. This multi-layered tell site represents a very good example of continous settlement on one place from the Neolithic to the beginning of the Roman period. It was occupied during Sopot, Eaden, Vučedol, Vinkovci and Eosut cultures and ends with fortified settlement in the last phase of the middle La Tene period (second half of the 1st century).

Tell Damića gradina - archives of the Vinkovci Town Museum

Archaeological profile from the excavation in 1980.

Pottery vessel from the Vučedol culture (displayed in Vinkovci Town Museum)

Aims and methods

Pottery, as other handmade artefacts, reveal a social context of man in the past – his behaviour and activities, as well as the social, economic and political context. The main goal of the study was reconstruction of technological processes of pottery production on tell site Damića gradina from different cultures who lived in the same place during cca 6000 years and who have used the same raw material. This tipe of analysis requires interdisciplinary approach and the cooperation of scientists from two completely different areas, natural sciences (geology) and the humanities (archaeology).
Technology of pottery production is considered:
(1) preparation of clay paste (mixing of clay with different temper material)
(2) modelling techniques
(3) firing methods,
(4) styles of decoration
The purpose of investigation was to determine different cultural recipes and to define to which extent technological processes were conditioned by economic, social or traditional factors, ie. to which extent they were matter of choice because the influance of the landscape (availability of raw materials) is reduced to the minimum.

Material and methods

The sherds for analysis are sampled from vessels of known type (pot, bowl, cup, jug), from different parts of the vessel (base, body, rim) and different surface treatment (polished and deep textured fragments).
Samples of possible raw material (clayey material) is collected at several locations in the proximity of the archaeological site. Detailed mineralogical (XRD - ceramic sherds and clayey material), petrographic (optical microscopy – ceramic sherds), grain size (wet sieving and sedimentation using sedigraph - clayey material) and chemical analyses (ceramic sherds and clayey material) were performed.

Examples of the sampled sherds

Preliminary results

Preliminary results suggests different recipes in pottery making which can be recognizable as potter's technological choice (a-f). Temper, or inclusions that have been artificially added to the clay, plays very important role in defining technological styles. Adding different kinds of temper with different size of particles may result in different thermal and physical properties of clay and fired pottery vessel. Technological choice of the potter is also related to the functional properties of the finished vessel (for cooking, storing or serving food) so the necessary performance characteristics of the vessel are thermal shock resistance, Strength and toughness to survive transport storage or high level of porosity.
Based on the analysed data differences in clay matrix are very recognisable between some cultures. Shell as temper was added only in Sopot (a) and La Tene culture (f) while in the pottery sherds from Eneolithic period (Eaden, Vučedol), Bronze age (Vinkovci) and Early Iron Age (Eosut culture) is missing. Grog, or crushed pottery sherds, together with organic material is the most common temper intentionaly added in the clay since the Neolithic. It can be observed as cultural (traditional) choice as well as technological (related to the function of the vessel). Grog has a lower thermal expansion coefficient than clay so it is usually added to the cooking pots to increase thermal stress resistance.
In the analysed sherds grog is added in the pottery from Eaden, Vučedol, Vinkovci and Eosut culture with the most predominant quantity in the Vučedol culture (c). Adding different amount of grog and different size of its particles in the pots showed certain differences in the clay mixture in comparison to bowls. Pots display a larger quantity of grog and its particles are coarser in comparison with bowls. This variability suggests that the utilisation of grog in the Vučedol culture was technological choice related to the functional use of a pot as a vessel for thermal processing of the food. Significant amount of larger quartz grains are characteristics of Vinkovci (d) and Eosut (e) culture. Quartz sand is probably intentionally added to the clay paste.
Sampled clayey material is clayey silt consisting mainly of quartz, calcite, plagioclase, K-feldspars, illitic material, smectite, kaolinite and small amount of chlorite.
Differences are also visible in firing conditions – while in Neolithic we have oxidation firing in the Copper and Bronze Age vessels are fired in reduction atmosphere. Styles and decoration diferantied from each other ragarding different cultural changes, trends and traditions.

Archaeometric analyses were conducted in the frame of the bilateral Austrian-Croatian project *"Pottery in prehistoric culture, with an emphasis on the Hallstatt culture, in the Croatian and Austrian Danube Region"*.

f) La Tene culture

e) Eosut culture

d) Vinkovci culture

c) Vučedol culture

b) Eaden culture

a) Sopot culture

OUTLOOK:

Tell Damića Gradina and tell Vinkovci (eastern Slavonia)

Span of cultures (from 7000 – 2000 years before present)

In addition to answering question „where?” and „how?” – test the dating using rehydroxilation

THANK YOU FOR YOUR ATTENTION