

# Archaeometry of ceramics from the second half of the 6th and the first half of the 7th century in Podravina – case study Torčec and Hlebine

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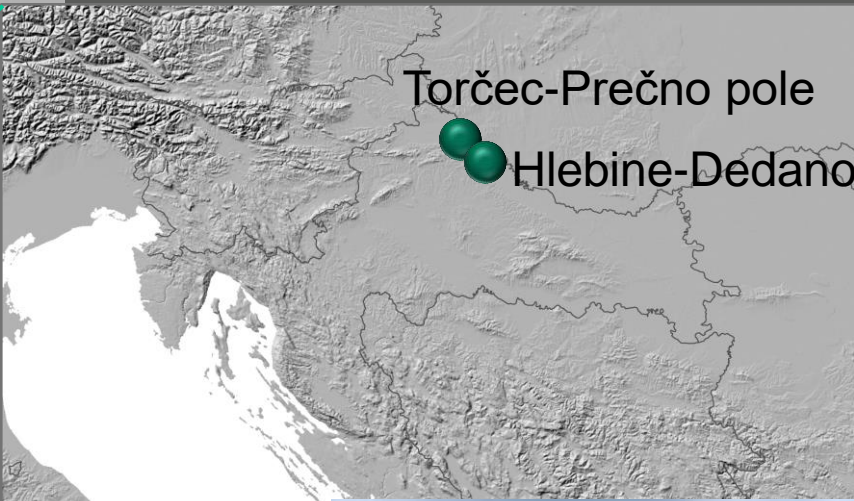
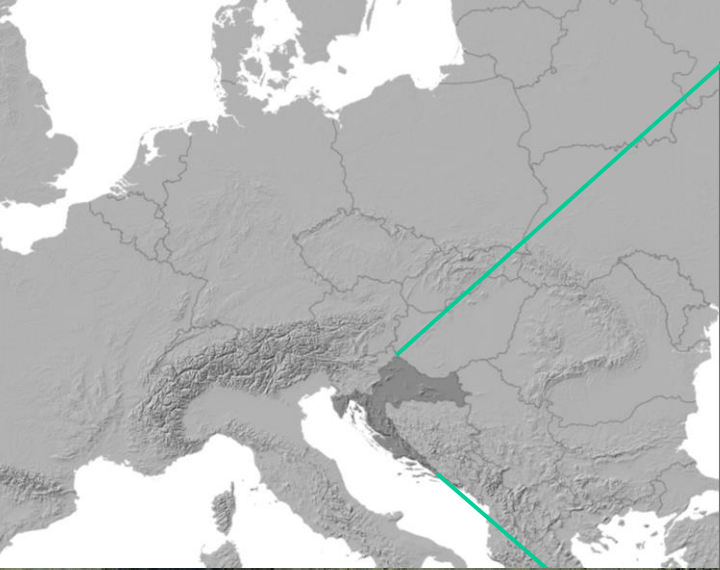
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9<sup>th</sup> International Scientific Conference on Mediaeval Archaeology  
of the Institute of Archaeology

***Ceramics, People and Places***  
***The Significance of Ceramics for the Study of Social  
Relations in the Middle Ages***

Zagreb, 6 — 7 June 2024



Torčec-Prečno pole

Hlebine-Dedanovice



The continuity of the settlement of this area is documented from the turn of the 6th and the beginning of the 7th century to the end of the 13th and the beginning of the 14th century.





# PHASE 1

## Date

- second half of the 6th and beginning of the 7th century

## Characteristics of pottery

- coarse fabric pots, sometimes hollow fabric
- some decorated by incising multiple wavy and parallel lines
- hand-build, by drawing technique (vertical finger marks on inner walls)

Site	SU	Lab code	Radiocarbon age (BP)	1 $\sigma$ (68.3%) cal AD	2 $\sigma$ (95.4%) cal AD	Median cal AD
Torčec-Prečno pole I	085/2	KIA 37482	1471 $\pm$ 19	581–607 (49.1%) 625–637 (19.2%)	569–642 (95.4%)	601
Hlebine-Dedanovice	10	CHRONO UBA-39593	1317 $\pm$ 32	660–688 (33.2%) 742–772 (35.1%)	653–775 (95.4%)	706



Torčec Prečno pole 1

Hlebine-Dedanovice

# PHASE 2

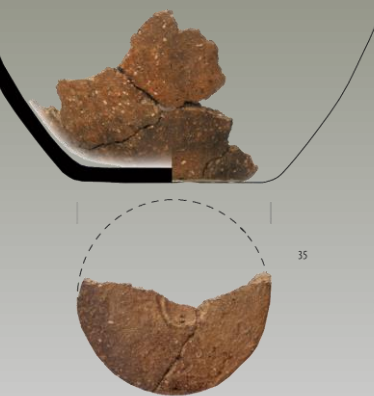
## Date

- first half and mid-7th /to mid-8th century

## Characteristics of pottery

- coarse fabric pots
- decorated by incising multiple waves and parallel lines with a brush
- Made by using rotation (circular imprint on base, wheel-coiled)

Site	SU	Lab code	Radiocarbon age (BP)	1σ (68.3%) cal AD	2σ (95.4%) cal AD	Median cal AD
Torčec-Prečno pole I	096b	KIA 37484	1465±24	584-610 (36.6%) 617-640 (31.6%)	568-645 (95.4%)	607
	037	KIA 28648	1439±22	605-642 (68.3%)	591-652 (95.4%)	622
	104	KIA 37483	1433±34	604-646 (68.3%)	576-658 (95.4%)	622
	094	KIA 41462	1365±21	650-665 (68.3%)	641-680 (93.5%) 750-759 (1.9%)	658
Hlabine-Dedanovi ce	27	CHRON O UBA-39591	BP 1363±29	645-675 (68.3%)	606-625 (4.4%) 636-689 (79.3%) 742-774 (11.8%)	660



# Sampling strategy

- For the archaeometric analysis, 42 vessels from two sites Torčec-Prečno pole I (20 samples) and Hlebine-Dedanovice (22 samples) were selected.
- The sampling is based on vessels' technological and morphological characteristics categorised into phase 1 (27 samples) and phase 2 (15 samples).
- It includes 40 samples of coarse fabric pots and 2 samples of shallow platters.



## Research objectives

- to determine the mineral and petrographic features of ceramic matrix,
- the type and characteristics of temper material deliberately added by potter,
- determine the availability of raw materials,
- determine if there is variability in pottery recipes.



# Analytical method



Optical  
microscopy

Determination of  
mineral composition  
and matrix microtexture

Determination of  
temper material

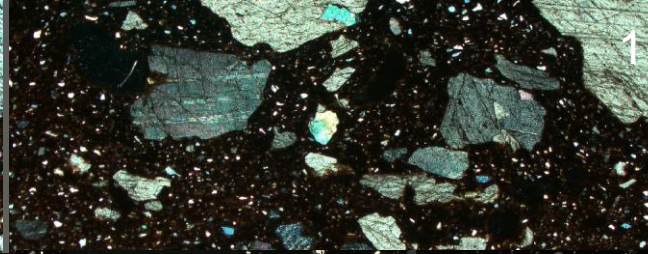
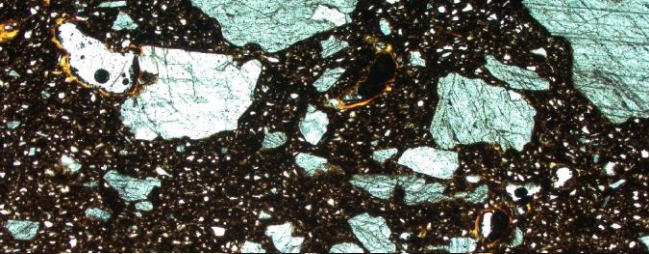
Fabric groups

Fabric subgroups



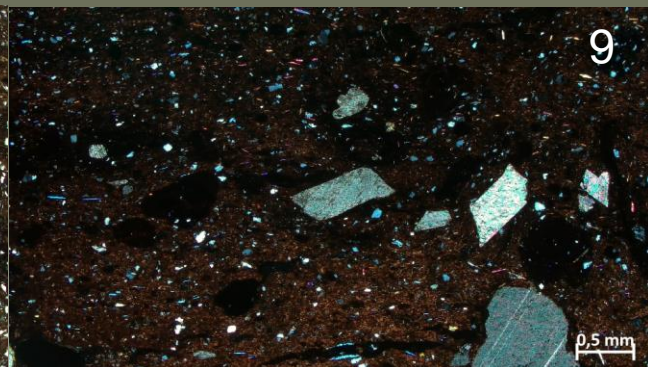
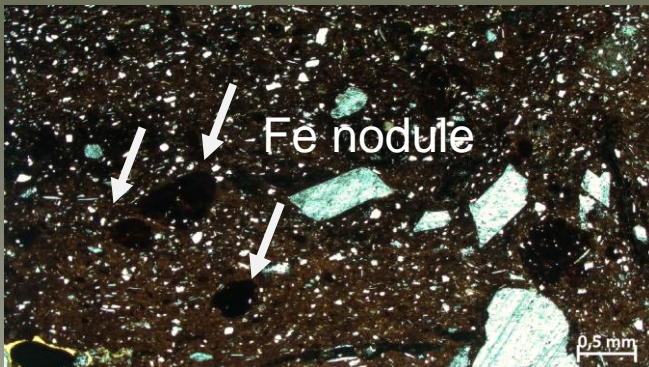
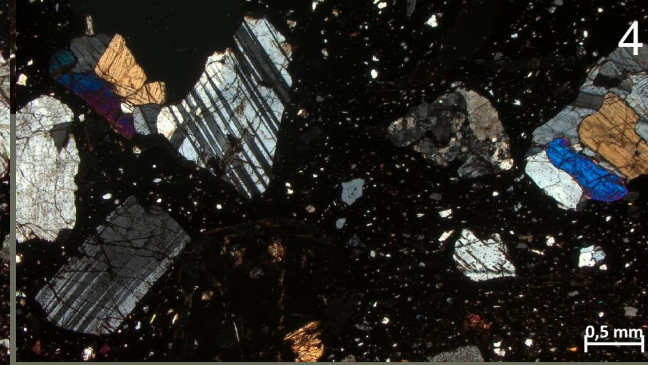
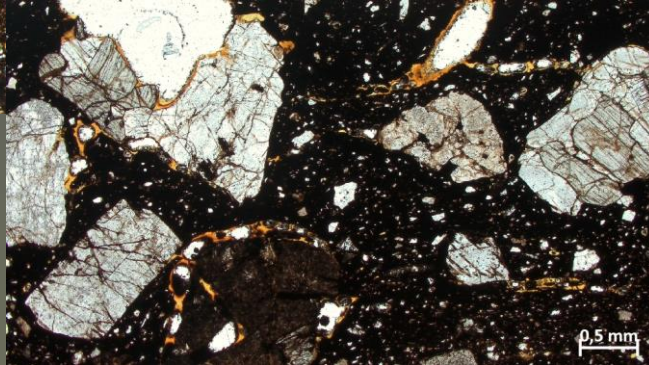
*Thin sections were prepared at the Laboratory for the analysis of geological materials at the Department of Mineralogy, Petrology and Mineral Resources at the Faculty of Mining, Geology, and Petroleum Engineering in Zagreb.*



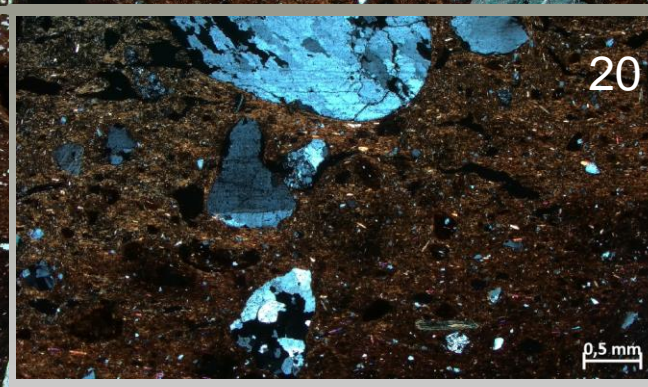
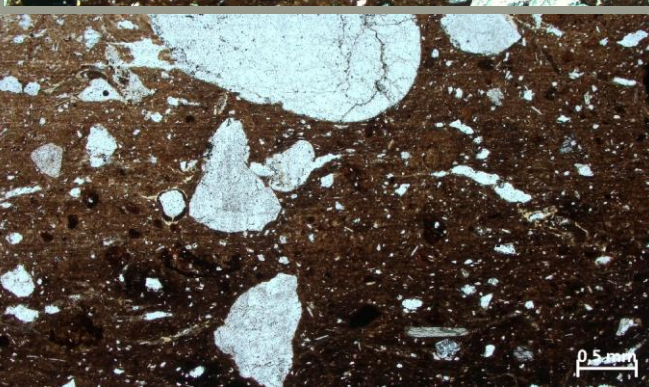


Fabric group 1

Matrix



Fabric group 2

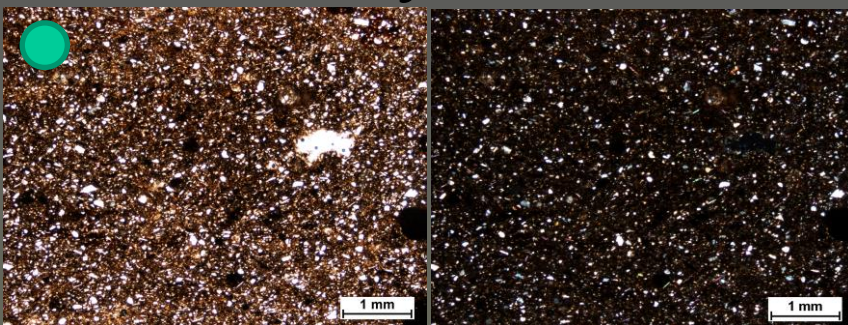


Fabric group 3

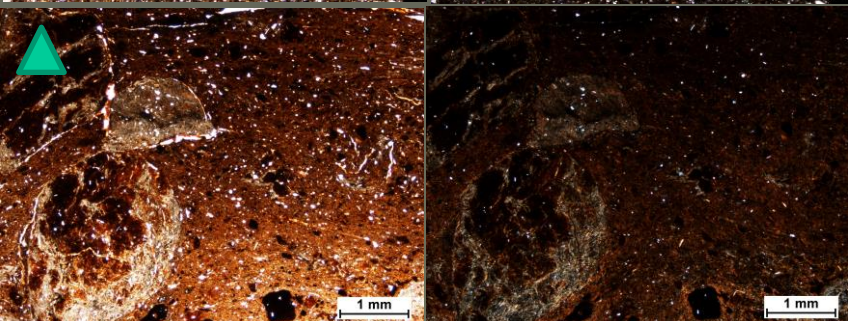
Photomicrographs of thin-sections from the Torčec site (right photo XPL)



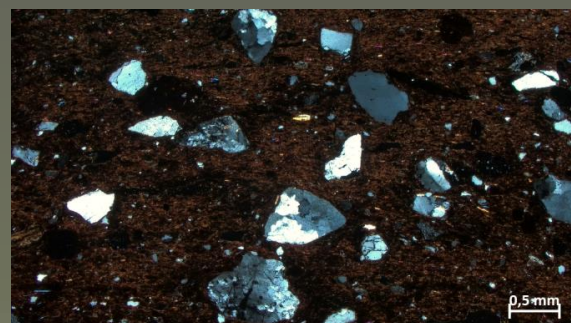
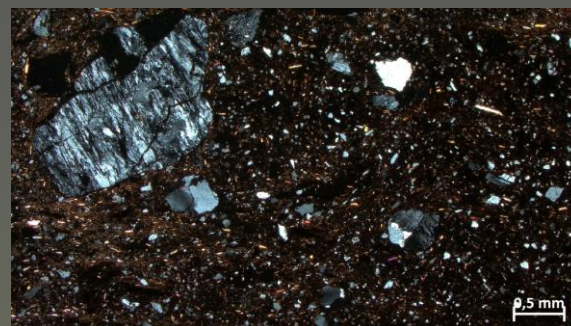
# Availability of raw material – CLAY



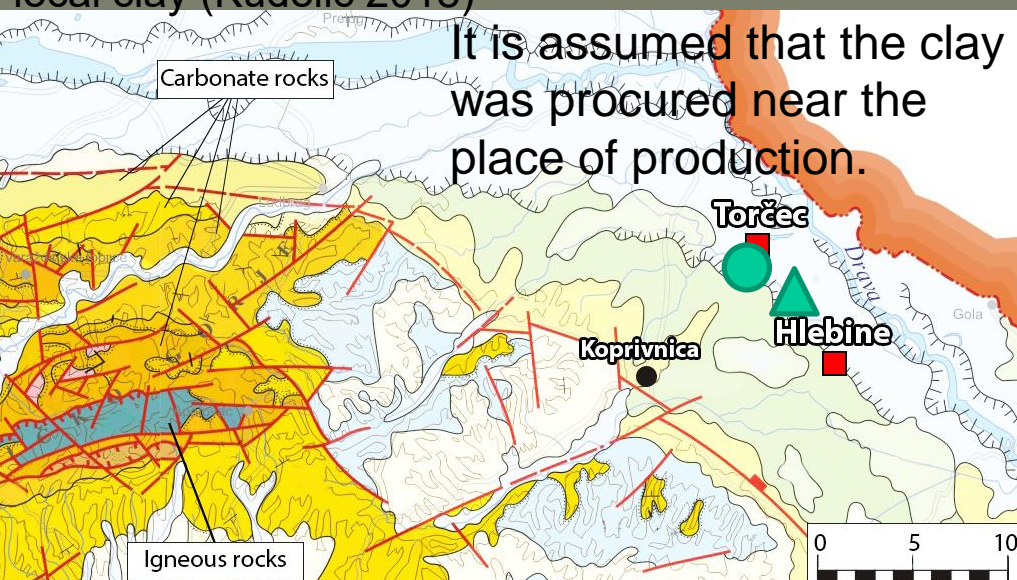
Sandy clay



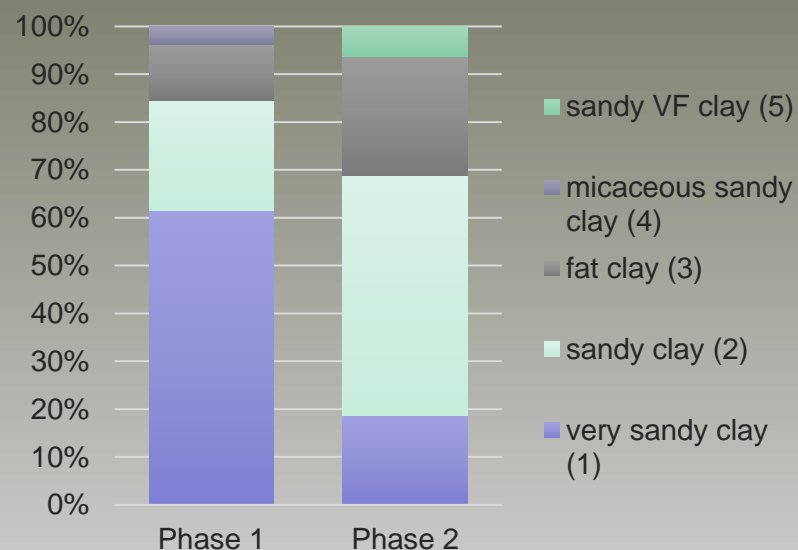
Inclusions poor (fat) clay



Photomicrographs of fired briquets made of local clay (Kudelić 2018)

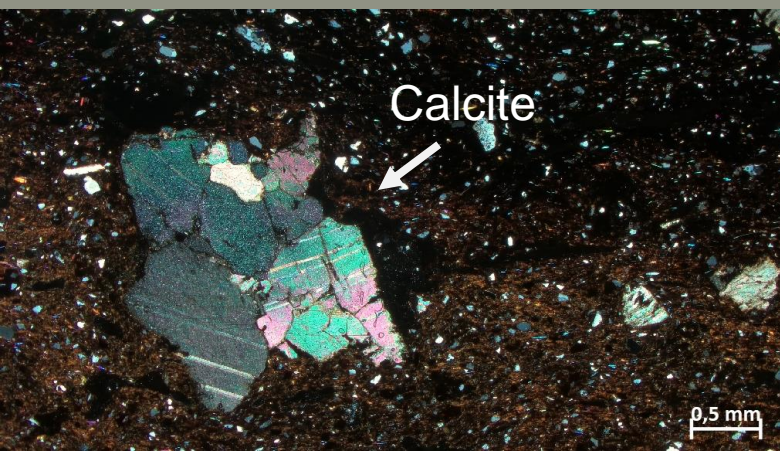
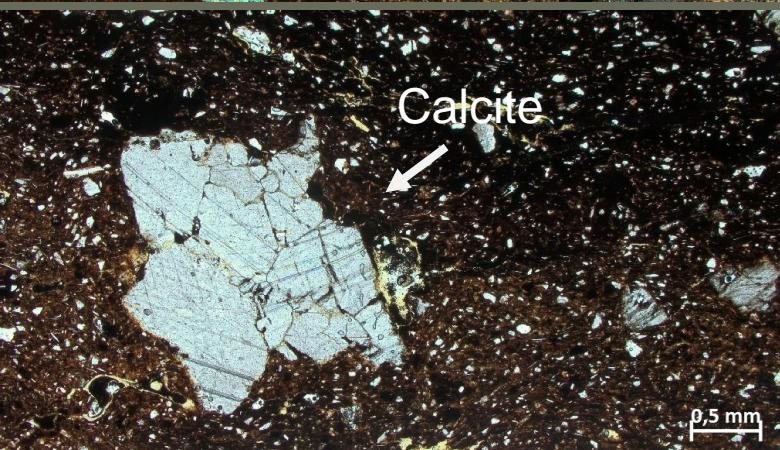


Early medieval ceramics from Torčec and Hlebina





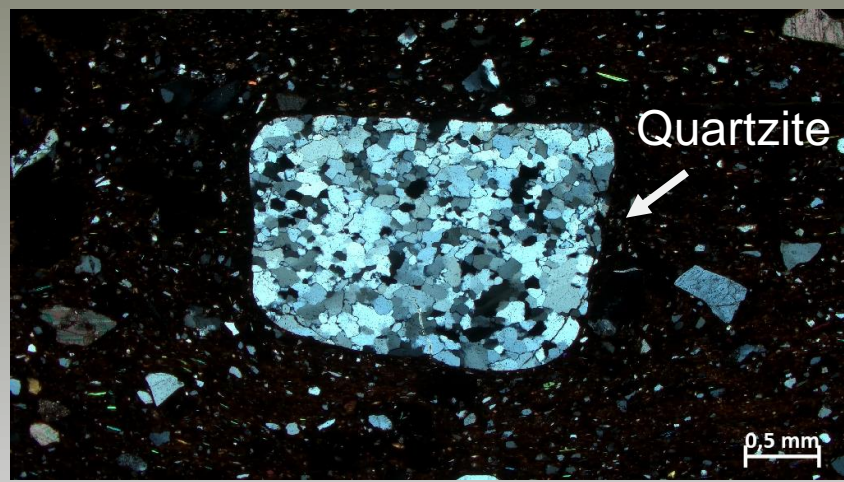
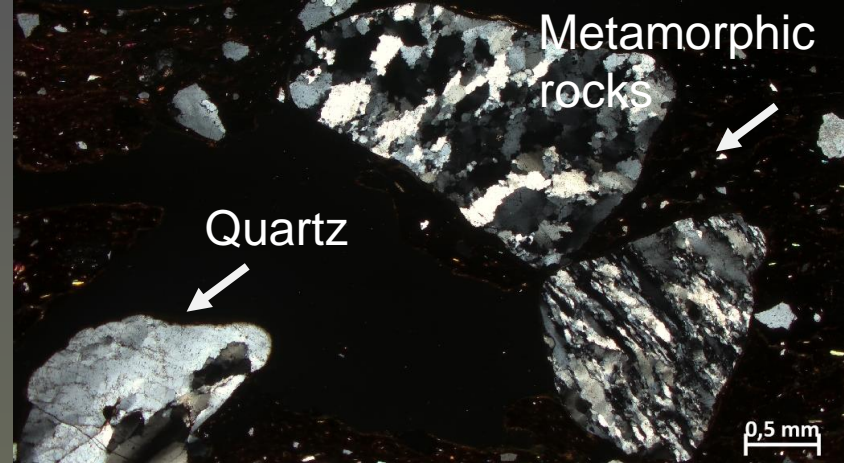
# Temper material



Subangular  
calcite  
fragments



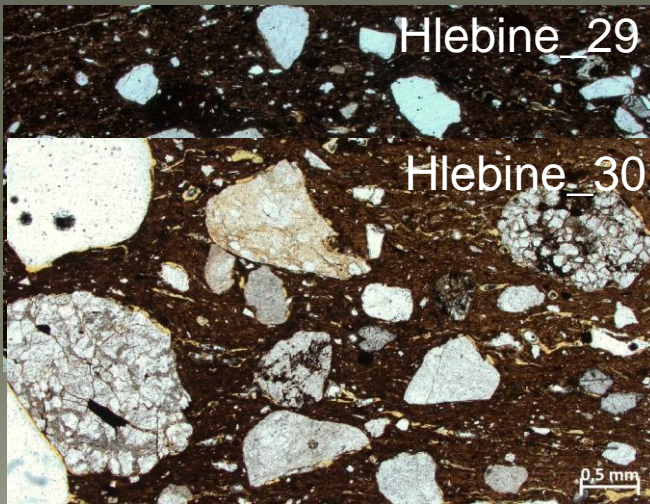
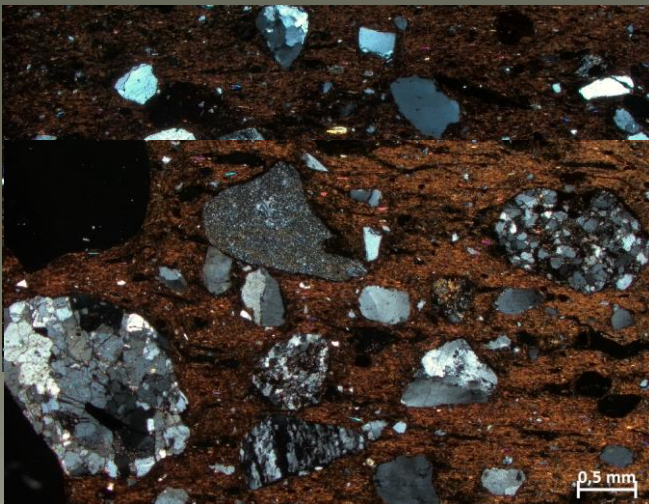
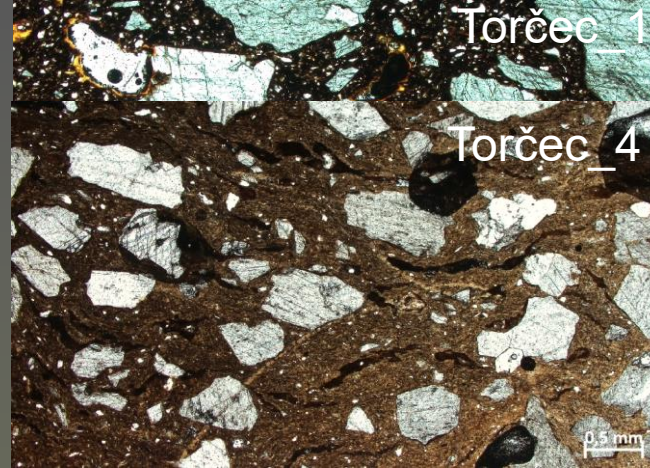
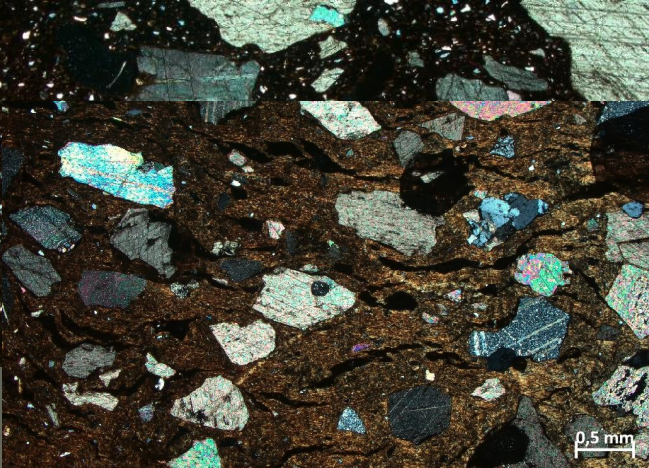
Igneous  
rocks



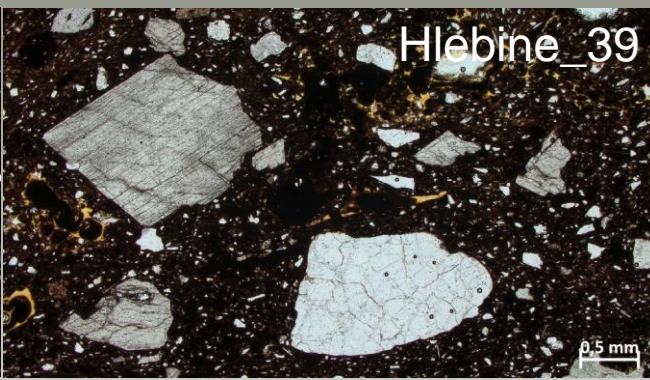
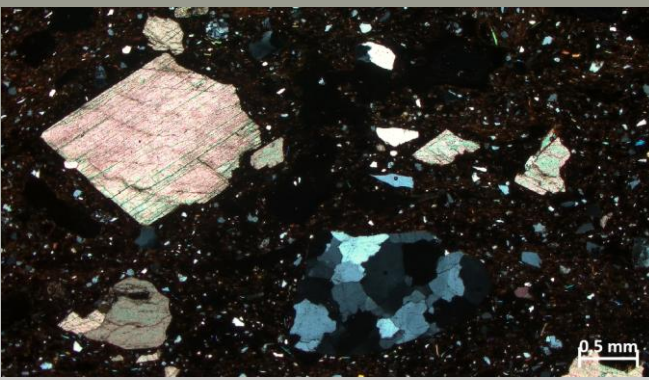


# Pottery recipes

Calcite tempered



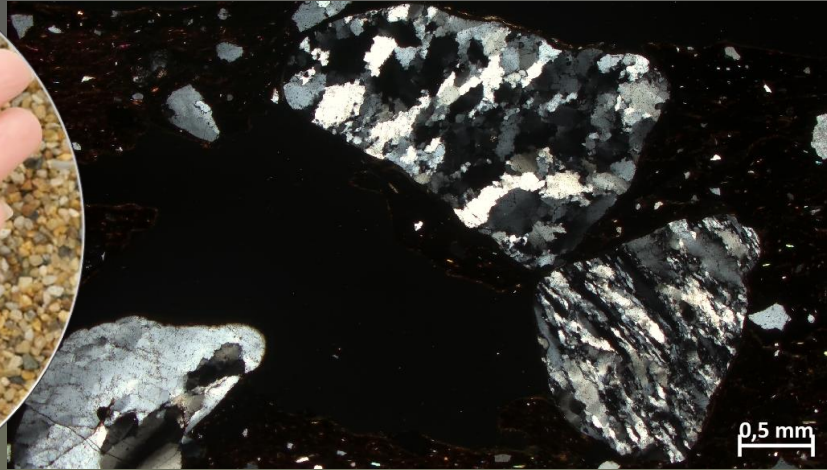
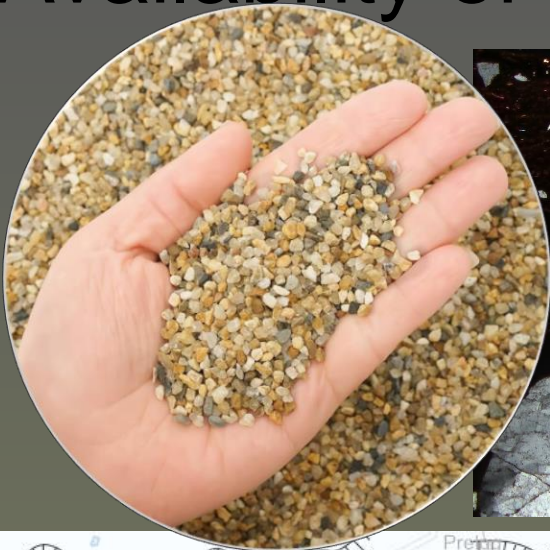
Lithoclast tempered



Calcite and  
Lithoclast  
tempered

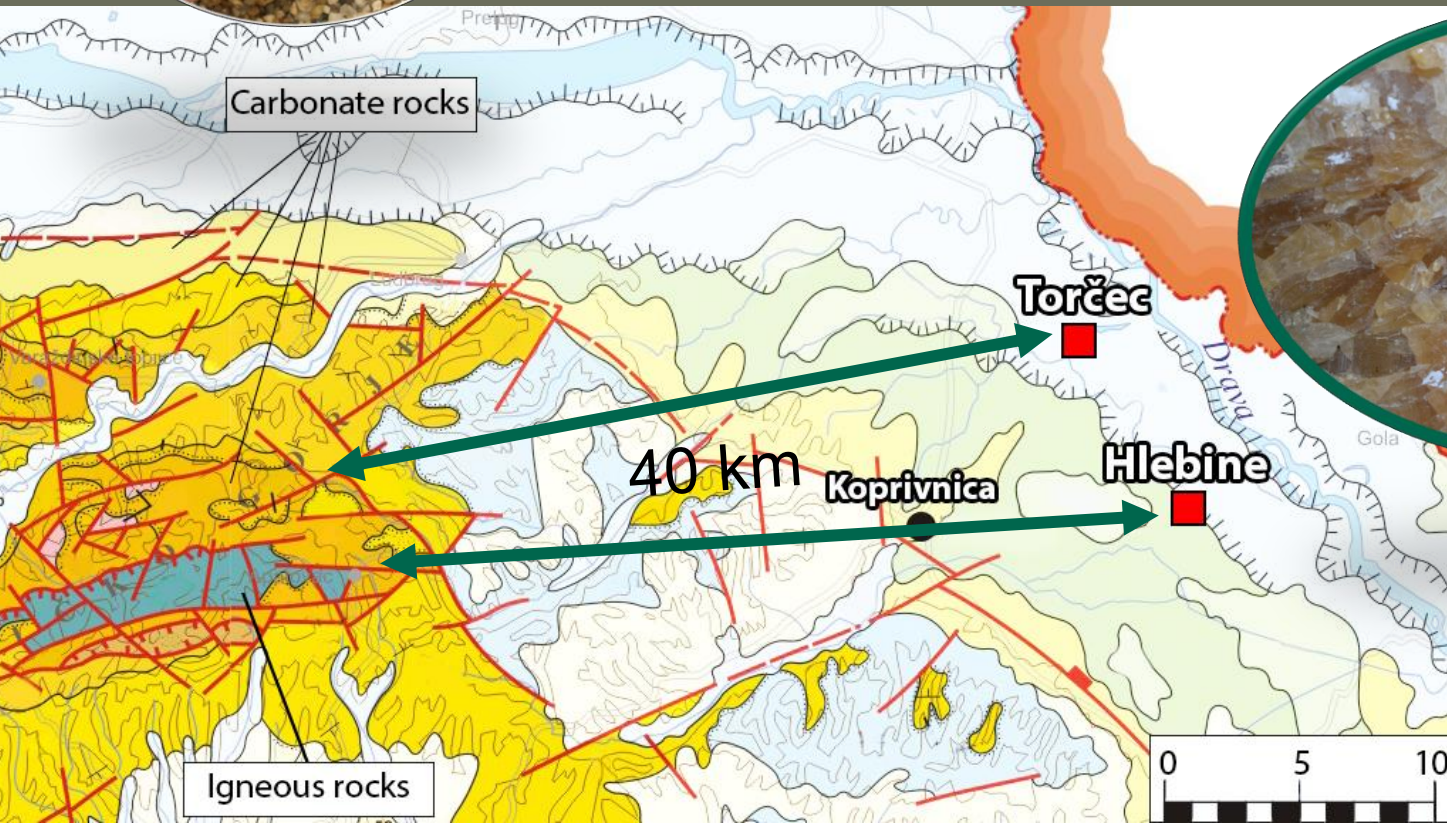


# Availability of raw material – TEMPER

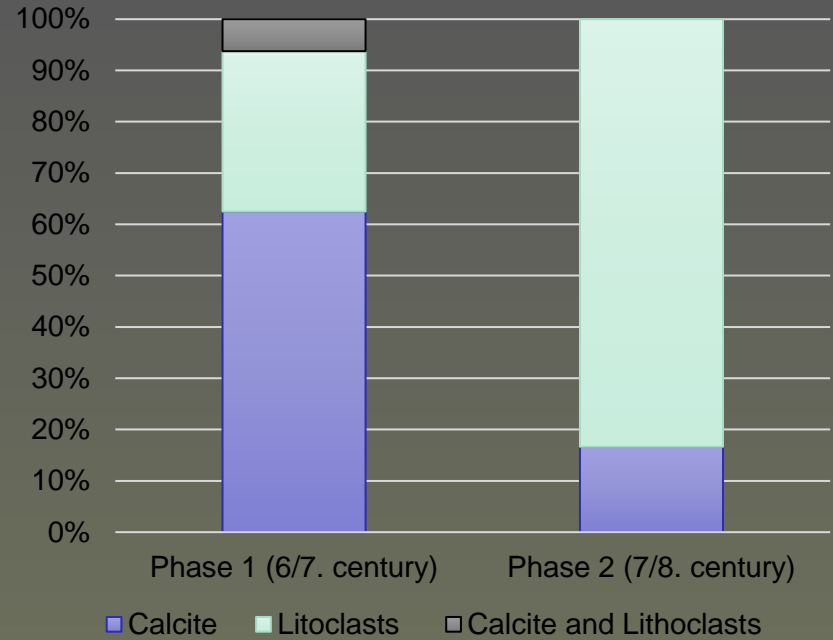
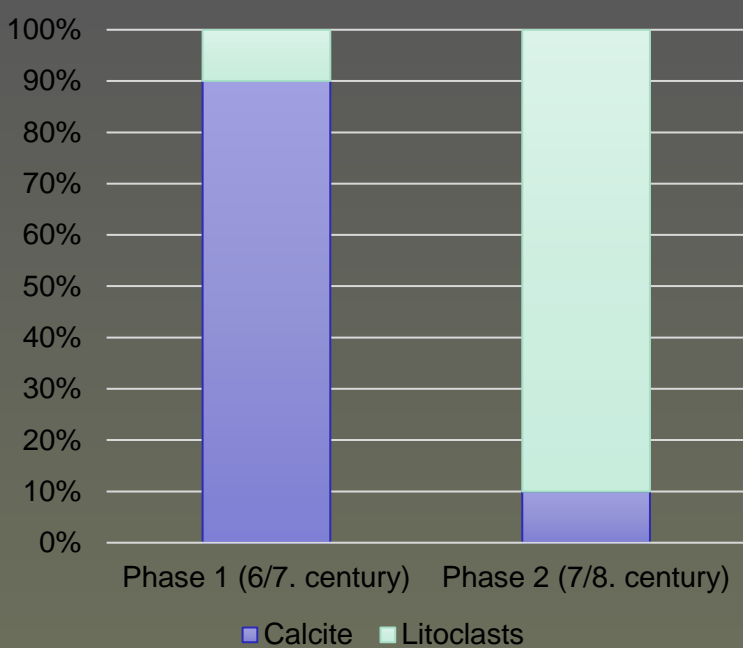


## Lithoclast

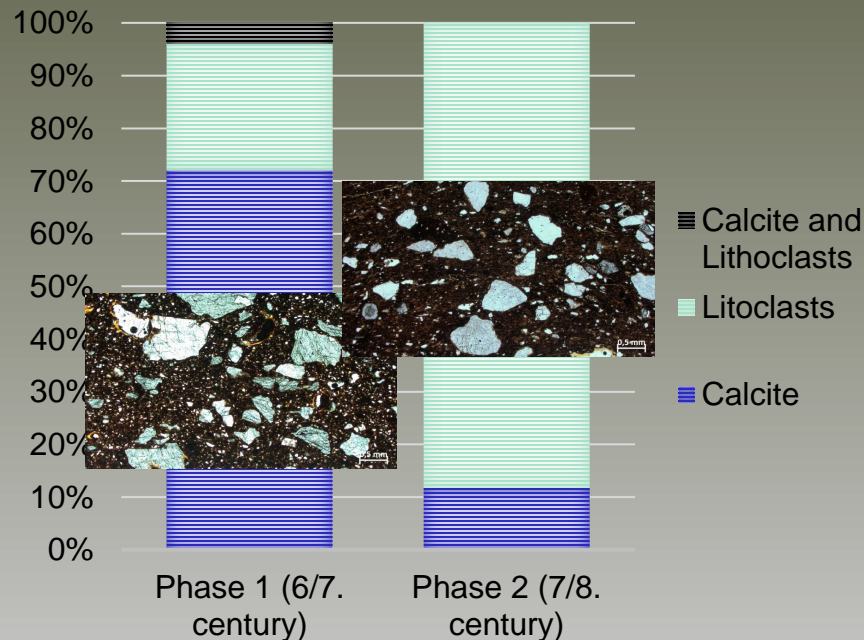
Lithoclast variability and sub-rounded shape indicate sand and gravel, transported from nearby rivers and small watercourses.



## Calcite



Proportion of a particular potters recipe in ceramic sample from Torčec (left) and Hlebine (right)



Proportion of a particular potters recipe in ceramic sample from both sites



# ACKNOWLEDGMENTS

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