

Ceramic technology in the southeastern Alpine region in Late Antiquity and the Early Middle Ages: results of macroscopic and microscopic analyses

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Izvleček

Članek preučuje vprašanje, kako se v tehnologiji keramike izražata kontinuiteta ali diskontinuiteta na prehodu med pozno antiko in zgodnjim srednjim vekom v jugovzhodnih Alpah. V ta namen je bilo makroskopsko in mikroskopsko analiziranih 72 vzorcev lokalno proizvedene grobe keramike, ki izvira iz štirih naselbin. Določena je bila mineraloška sestava vzorcev in analize kažejo, da so tehnološke značilnosti in razlike posledica odločitev in načrtovanih postopkov, izoblikovanih med proizvodnim procesom. Na najdiščih Koper in Tonovcov grad analize dokazujejo močno kontinuiteto v izdelavi grobega posodja od pozne antike do zgodnjega srednjega veka. Nasprotno pa se je v istem obdobju na Tinju proizvodnja bistveno spremenila. Te ugotovitve se v veliki meri skladajo z zgodovinskimi predpostavkami o večji družbenoekonomski kontinuiteti v južnih in zahodnih delih regije ter o preobratih – domnevno zaradi slovanskih in avarskih vpadov ob koncu 6. stoletja – v vzhodnem delu.

Ključne besede: pozna antika, zgodnji srednji vek, keramika, petrografske analize, tehnologija, Slovenija

Abstract

This article examines issues of change and continuity from Late Antiquity to the Early Middle Ages in the southeastern Alps in terms of coarse-ware ceramic technology. Seventy-two samples of locally manufactured coarse-ware pottery drawn from four settlements were subjected to macroscopic and petrographic analyses in order to determine their mineralogical composition, which serves as a proxy indicator of choices made during the production process. These analyses demonstrate that coarse-ware pottery manufacture exhibited a high degree of continuity from Late Antiquity to the Early Middle Ages at the sites of Koper and Tonovcov grad, while it changed significantly during the same period at the site of Tinje. These results are largely congruent with historical expectations, which suggest greater socio-economic continuity in the southern and western sections of this region, and upheaval in the eastern portion, perhaps due to Slavic and Avar incursions beginning in the late 6th century.

Keywords: Late Antiquity, Early Middle Ages, pottery, petrographic analysis, technology, Slovenia

INTRODUCTION

Over the past four decades, historians and archaeologists of the southeastern Alpine region have examined elements of change and continuity between the Late Classical and Early Medieval worlds in terms of politics, economics, demography, settlement, ethnicity, and religion (among others).¹

¹ Noteworthy references include (but are not limited to) Bierbrauer 1979; Bratož 1996, 2005; Ciglencčki 1992, 2000; Grafenauer 1969; Ibler 1991; Ladstätter 2000, 2001;

This article offers a small contribution to this broad, multifaceted issue by focusing specifically on shifts in ceramic technological traditions across this important socio-historical transition.² Macroscopic and petrographic analyses were conducted on 72 locally produced coarse-ware (kitchenware) ceramic samples drawn from four Late Antique

Lotter et al. 2003; Mason 1998; Modrijan 2011a; Štih 2010; Ulbert 1979.

² These analyses were part of broader dissertation research; see Fazioli 2011a.

and/or Early Medieval settlements from across this region. Differences in the technological choices made by potters during the manufacturing process were assessed based on the mineralogical composition of these ceramics. This article begins with a brief description of the methodology and research design, followed by the results from the ceramic analysis, and finally provides a brief interpretation and some prospects for future research.

METHODOLOGY

Ceramic Petrographic Analysis

Coarse-ware pottery is the most prevalent material at many Late Antique and Early Medieval settlements in the southeastern Alps, yet it does not tend to receive as much attention in the archaeological literature as small finds (jewelry, fibulae, and weaponry) or fine-ware ceramics (amphorae, African Red Slip ware, oil lamps, etc.).³ This is likely because coarse-wares are not considered particularly useful for building site chronologies, establishing regional trade patterns, or studying expressions of social or ethnic identity. The kind of pottery made for daily use tends to be stylistically homogeneous, and lacks the wide variety of forms, decorations, glazing, and so on that often characterize fine-ware imports. However, if one adopts the proper analytical tools, coarse-ware pottery can provide a great deal of useful information for reconstructing daily life on settlements during this period. Ceramic compositional analyses – including macroscopic fabric description and petrographic microscopy – can address aspects of technological choice in ceramic manufacture at the local level.⁴

Ceramic petrography is an archaeological method for identifying and describing the fabric of materials made from clay. While a comprehensive explanation of this technique is beyond the scope of this article,⁵ a brief synopsis is provided below for those unfamiliar with this method. The analysis requires the creation of a ceramic “thin section”, in which a small sample (c. 2 × 3 cm) of a ceramic vessel is ground to approximately 0.03 mm in thickness and mounted on a glass slide. Since most of the

coarse-ware pottery in this analysis was relatively low-fired and therefore quite friable, a resin epoxy was impregnated into each sample to hold the fabric together during the grinding process. Some samples were also stained with alizarin red-S, which allows one to distinguish different types of carbonates in the pottery fabric.

The thin section is then observed under a polarizing light microscope. Three major components of the ceramic fabric can be assessed microscopically: the matrix, non-plastic inclusions, and voids. The term *matrix* (or groundmass) describes the very fine-grained materials (<30 μm fraction) in which coarser particles are embedded. It is characterized by fracture, color, and birefringence (i.e. anisotropic or optically active). The term *non-plastic inclusion* encompasses all coarser rock, mineral and organic materials present in the matrix, including those naturally present and artificially added (i.e. temper). Most mineral inclusions can be identified through a range of optical properties (e.g. shape, color, relief, cleavage, pleochroism, birefringence, extinction, opacity, etc.) under plane- and cross-polarized light.⁶ Once identified, the non-plastic inclusions can be described in terms of their abundance, roundedness, size, orientation, sortedness, and other meaningful qualities. Finally, the term *void* refers to pores in the matrix that once held non-plastic inclusions prior to firing; these can also be described in terms of their abundance and shape.

Site Selection and Sampling Strategy

Since this research project explored issues of continuity and change in terms of ceramic technology, only settlements with occupations during both Late Antiquity and the Early Middle Ages were selected for analysis. An assumption was made that most of the coarse-ware material was of local manufacture, and – in contrast to Roman fine-wares – was not extensively traded over great distances.⁷ The compositional analysis appeared to largely support this initial assumption, since the mineralogical composition of the coarse-ware material reflected the expected composition of the underlying bedrock (the parent material for clay) based on geological maps. This suggests that variation in the mineralogical composition

³ Notable exceptions include Rodriguez 1992, 1997.

⁴ Other examples of the eastern Alpine region include Gastgeb 1995, Herold 2009.

⁵ Refer to Mason 2004 or Whitbread 1995 for excellent summaries of this method.

⁶ Kerr and Rodgers (1977) provides a detailed description of identifying minerals in thin section.

⁷ See, for example, Modrijan 2011b, 122.

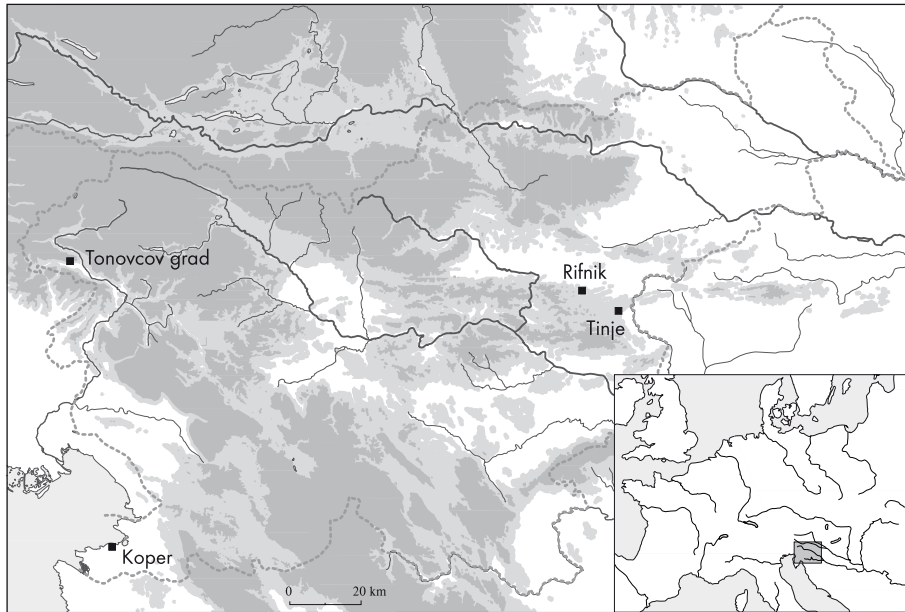


Fig. 1: Sites selected for ceramic compositional analyses in this study.
Sl. 1: Arheološka najdišča, izbrana za petrografsko analizo keramike.

of the ceramics can be attributed to shifts in the ceramic production process rather than changing patterns of trade.⁸

Four sites in the southeastern Alpine region were selected for analysis, all in Slovenia (see *fig. 1*):

- the coastal site of Koper (Capodistria) on the northern Adriatic,
- the upland fortified site of Tonovcov grad by Kobarid,
- the upland settlement of Tinje near Loka pri Žusmu and
- the upland fortified settlement at Rifnik near Šentjur pri Celju.

Although an early medieval phase has yet to be confidently identified at Rifnik,⁹ its geographical proximity to the site at Tinje merited its inclusion as a potentially interesting point of comparison, at least for the Late Antique period.

It should be noted that the terms “Late Antiquity” (LA) and “Early Middle Ages” (EM) do not exactly overlap at each of the four sites; chronologies at each site were independently established (see *fig. 2*). In the case of Tonovcov grad and Tinje, the division between Late Antiquity and the Early Middle Ages was based on temporary

settlement abandonments, while at Rifnik and Koper, chronological divisions were established in terms of different building phases at the sites.

Representative samples from each of these sites were selected on the basis of macroscopic fabric analyses rather than formal or decorative typologies. There were several reasons for this decision. Most of the coarse-ware sherds from these excavations were small, worn, and non-diagnostic, and therefore could not be stylistically identified or fit easily into a preexisting typology. Therefore, macroscopic fabric analysis proved a more effective and comprehensive means of creating meaningful categories. This technique divides the ceramic material into fabric groups based on color (surface and core), porosity, hardness, various characteristics of visible inclusions, surface treatments, and other qualities evident in hand sample or with a low-powered (e.g. 10 x) magnifying glass.¹⁰

Once macroscopic groups were established, representative samples were then ground into thin sections at a geology laboratory. Compositional categories were established based on the qualitative macroscopic and microscopic methods outlined above. It should be noted that creating a ceramic

⁸ In order to further strengthen this assumption, future analyses will also include samples of the natural clay as a baseline comparison.

⁹ Bausovac, pers. comm. 2010.

¹⁰ See Moody et al. 2003 for an overview of this technique. While Modrijan (2008, 2011b) already identified macroscopic groups Tonovcov grad by (see below), the author conducted this analysis for the sites of Koper, Tinje, and Rifnik.

| | Tonovcov grad | Koper | Tinje | Rifnik |
|-----|---------------|----------|----------|---------|
| 300 | | | | LR / PR |
| 400 | LA 1 / PA 1 | | LA / PA | |
| 500 | LA 2 / PA 2 | LA / PA | | LA / PA |
| 600 | | | | |
| 700 | EM / ZSV | EM / ZSV | EM / ZSV | |
| 800 | | | | |
| 900 | | | | |

Fig. 2: Comparison of phases from the various sites selected for analyses. LA = Late Antique; LR = Late Roman; EM = Early Medieval.

Sl. 2: Primerjava poselitvenih faz najdišč, izbranih za analizo keramike. PA = pozna antika; PR = pozna rimska doba; ZSV = zgodnji srednji vek.

compositional typology always includes a degree of subjectivity, since a range of variation always exists within each of the petrographic groups. The goal is to identify those differences among groups that are thought to be archaeologically meaningful; that is, they potentially reflect different technological choices made during the manufacturing process. The following sections outline the results of the ceramic petrographic analysis at each of these sites.

RESULTS

Koper

Rescue excavations in the 1980s uncovered an important Late Antique and Early Medieval settlement under the modern city of Koper on the northern Adriatic coast. The site chronology is divided into two broad phases: Late Roman/Early Byzantine (5th–7th/8th century AD) and Early Medieval (7th/8th–9th century AD). However, unlike most settlements in the southeastern Alpine region, Koper appears to have been continuously

settled from the 5th through 9th centuries. Distinct archaeological assemblages, based on the presence of fine-ware imports, have helped to establish a basic site chronology and phases of construction (see fig. 3).¹¹

The Late Antique contexts demonstrate a high frequency of Roman fine-wares imported from Northern Africa and the Eastern Mediterranean (e.g. African sigillata, oil lamps, cylindrical amphorae, etc.), indicating the continued integrity of trade networks along the Adriatic coast. Although the Early Medieval period witnessed a significant expansion in the settlement at Koper, there was also a significant drop in the presence of imported Roman ceramics, suggesting a disruption in trade that could be correlated with Arab expansion in northern Africa and the Eastern Mediterranean.¹² By the close of the 8th century, this part of Istria was politically integrated into the expanding Frankish Empire.

¹¹ Cunja 1996.

¹² Hodges, Whitehouse 1983.

Tab. 1: Fabric Groups from Koper – Kapucinski vrt.
Tab. 1: Faktorne skupine s Kapucinskega vrta v Kopru.

| Group Skupina | # Samples Št. vzorcev | Quartz % Kremen % | Carbonate % Karbonat % | Carbonate character Oblika karbonatnih zrn | Mica % Sljuda % |
|------------------|--------------------------|----------------------|---------------------------|---|--------------------|
| KP-A | 19 | 1–5 % | 20–25 % | Sparry / sparit | 0–2 % |
| KP-B | 2 | 10 % | 0 % | – | 2 % |
| KP-C | 2 | 10 % | 20 % | Sparry / sparit | 1 % |

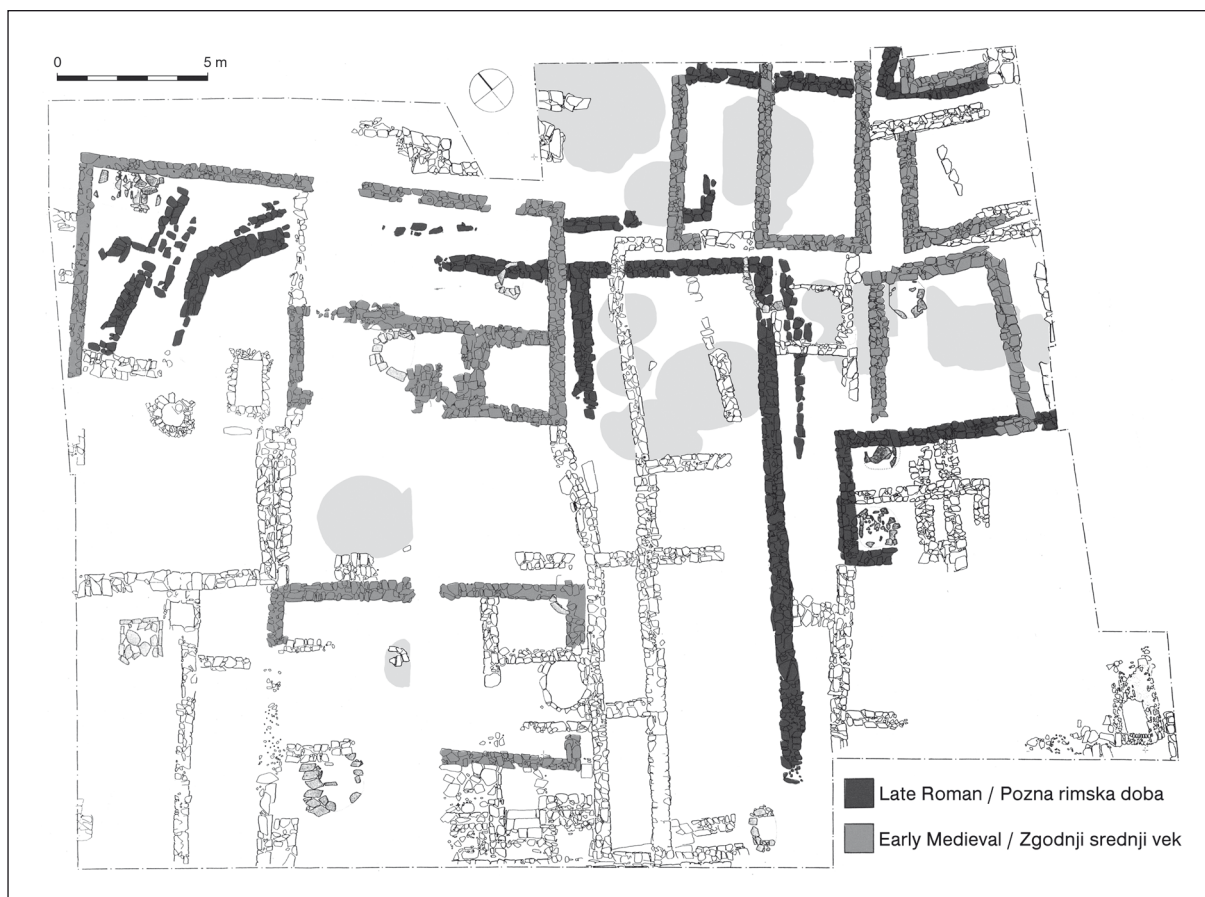


Fig. 3: Site Map of Koper – Kapucinski vrt showing building phases (adapted from Cunja 1996, insert 3).
Sl. 3: Gradbene faze na arheološkem najdišču Koper – Kapucinski vrt (prirejeno po Cunja 1996, pril. 3).

Ceramic samples were collected from the Koper excavations from both the Late Antique and Early Medieval phases. Twenty-three samples (12 from Late Antique and 11 from Early Medieval contexts) were collected from several different archaeological layers; compositional analysis divides these samples into three distinct mineralogical groups (see *tab. 1*).

Of all of the sites in this study, the samples from Koper were the most mineralogically homogeneous. Although the samples in Fabric Group KP-A can be subdivided based on fabric color, even these smaller groups were mixed between Late Antique and Early Medieval contexts (see *tab. 2*). Four of the samples demonstrated radically different mineralogy: two from the Early Middle Ages (KP-B) and two from Late Antiquity (KP-C). Although one should not make too bold an interpretation based on such small sample sizes, it merits mention that these two small groups only existed in one phase. Nevertheless, the general trend for the coarse-ware ceramics at Koper is unquestionably one of continuity and homogeneity from Late Antiquity to the Early Middle Ages.

Tab. 2: Fabric Groups from Koper – Kapucinski vrt by period.
Tab. 2: Zastopanost fakturnih skupin po fazah s Kapucinskega vrta v Kopru.

| Group Skupina | LA PA | EM ZSV |
|------------------|---------------------------------------|----------------------------------|
| KP-A1 | KP-2 KP-12 KP-8 | KP-21 KP-16 |
| KP-A2 | KP-5 KP-6 KP-10 KP-9 KP-3 | KP-13 KP-15 KP-18 KP-20 |
| KP-A3 | KP-7 KP-4 | KP-14 KP-17 KP-23 |
| KP-B | | KP-19 KP-22 |
| KP-C | KP-1 KP-11 | |

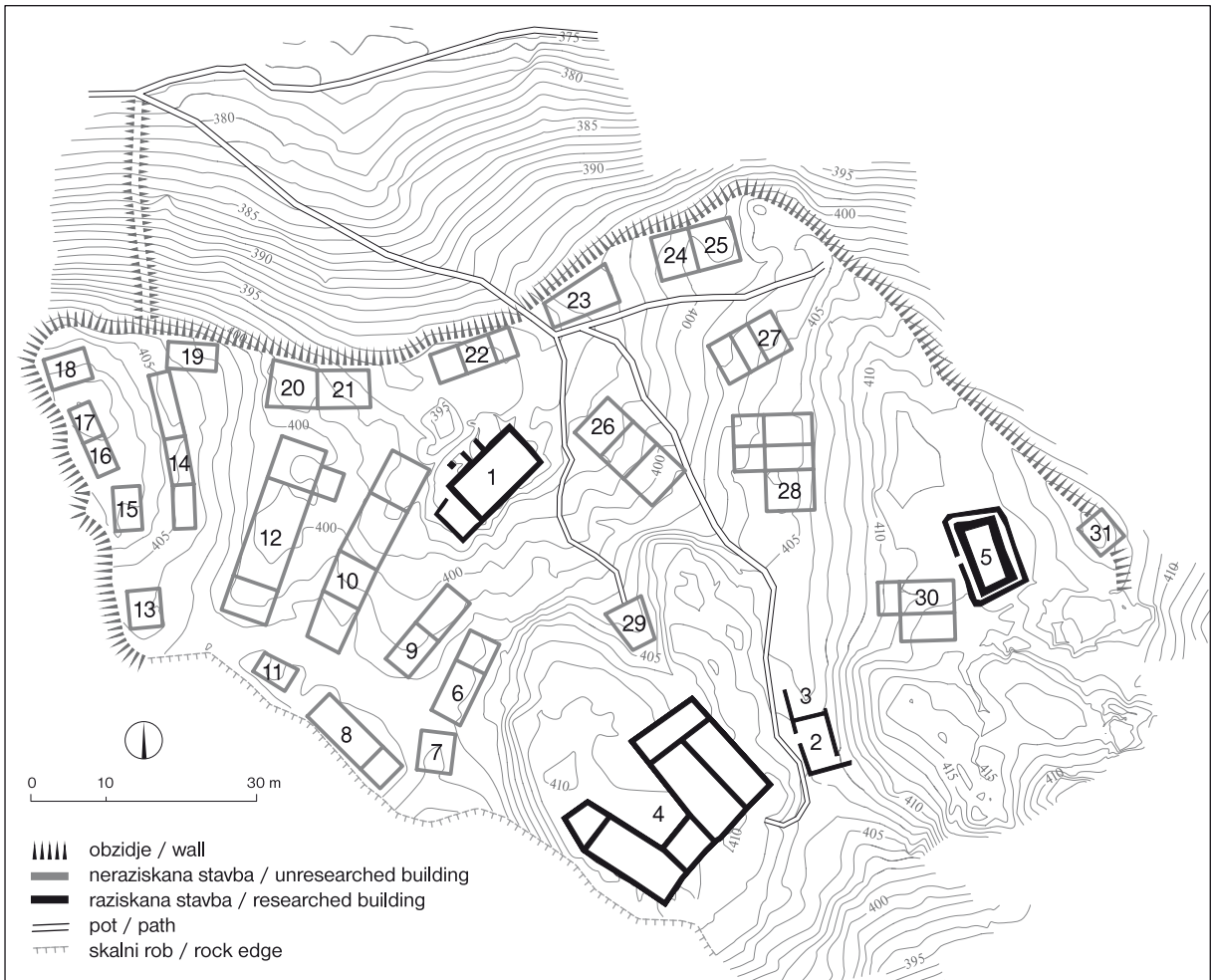


Fig. 4: Site Map of Tonovcov grad (Ciglencečki, Modrijan, Milavec 2011, fig. 1.7).
Sl. 4: Načrt najdišča Tonovcov grad (Ciglencečki, Modrijan, Milavec 2011, sl. 1.7).

Tonovcov grad¹³

The fortified upland settlement of Tonovcov grad lies near the modern town of Kobarid (Caporetto) near the Slovene-Italian border. The site, located on a well-protected hill overlooking the Soča (Isonzo) River, had been settled throughout much of prehistory, from the Mesolithic on. During the Late Antique 1 phase (c. 350–450), this site functioned as a settlement and military outpost that protected the rear of the *Claustra Alpium Iuliarum*.¹⁴ Although the architectural remains from this period are not well preserved, these layers are rich in imported ceramics, such as transport amphorae and African Red Slip Wares,

¹³ See Modrijan 2011b and Fazioli 2011b for more detailed analyses of the coarse-ware pottery at Tonovcov grad.

¹⁴ Šašel, Petru 1971.

probably connected to the organized state supply of the military during this period.¹⁵

During the Late Antique 2 phase (c. 475–625), the site function evolved from a small military outpost to a full-scale, multifunctional settlement; this period saw the construction of a defensive wall, additional residential structures, a water cistern, and three small parallel churches with narthexes. The presence of imported fine-wares (African Red Slip and amphorae) suggest that Tonovcov grad was still receiving imported Roman products to at least the beginning of the 7th century, and therefore must have still been connected to Mediterranean trade routes during this time.¹⁶

The Late Antique buildings were demolished and abandoned at some point in the early 7th

¹⁵ Modrijan 2010; Ciglencečki, Modrijan, Milavec 2011.

¹⁶ Modrijan 2007.

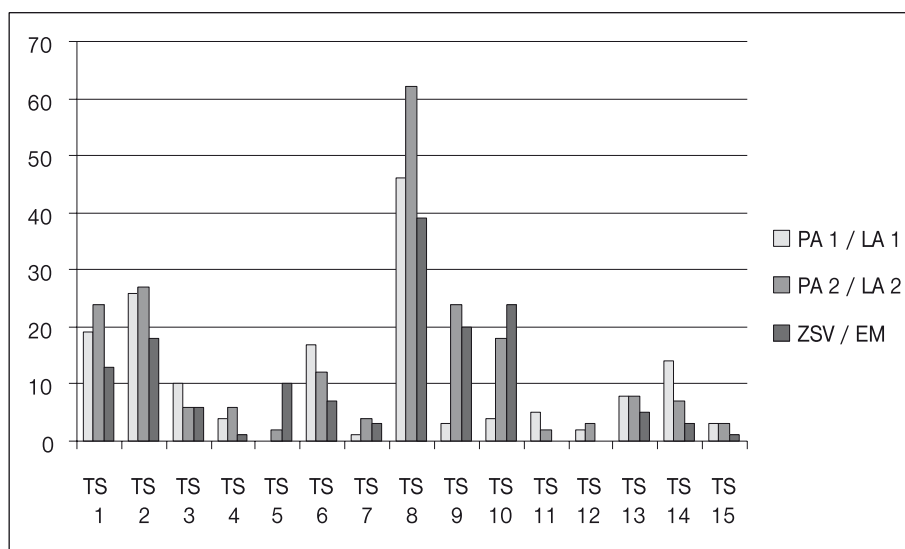


Fig. 5: Tonovcov grad. Relative Proportions of Macroscopic Fabric Groups (TS) by Phase (Modrijan 2011, fig. 4.11).
Sl. 5: Tonovcov grad. Zastopananost makroskopskih fakturnih skupin (TS) po fazah poselitve (Modrijan 2011, sl. 4.11).

century, when the increasing power of Lombard dukes broke Byzantine control over this region. The site remained uninhabited until a period of reoccupation before the 8th century. During the Early Medieval Period (c. 675–800), there is no evidence of long-distance trade and all ceramic production appears to be local coarse-ware with styles similar to other contemporary sites in central Slovenia and Friuli. Although a few small metal finds, such as Carolingian and Avar style belt fittings, have provided some chronological information, the precise duration of settlement during this phase is still poorly understood.

The compositional analysis was conducted on twenty-three ceramics, primarily from Building 1 (see fig. 4), which contained stratigraphic layers dating to each of the three primary occupation phases outlined above. Building 1 contained almost 88 % of all the excavated ceramic material from the settlement, based upon weight.¹⁷ Samples were chosen for petrographic analysis based upon previously established macroscopic fabric categories, in order to ensure a representative sample of the wider coarse-ware ceramic assemblage at the site. This macroscopic fabric analysis distinguished fifteen defined groups (as well as a sixteenth “undefined” group) on the basis of surface and core color, porosity, hardness, characteristics (i.e. type, size, shape, and frequency) of visible inclusions, surface treatment, and manufacturing style (hand built,

slow or fast wheel thrown).¹⁸ Figure 5 illustrates the proportion of these fabric groups at each of the three main settlement phases at the site.

Significantly, none of these fifteen fabric groups was restricted to a single occupational phase at the site; rather, each of the macroscopic fabric groups included ceramics from to least two (and often all three) of the phases, although often in markedly different proportions. A minimum of two ceramic sherds was chosen from those macroscopic fabric groups most prevalent during the 2nd and 3rd phases at the site. This included fabric groups 5 and 10, which had the greatest proportion of Early Medieval ceramics, as well as fabric groups 2, 8, 9, and 13, which were predominantly from the Late Antique 2 phase. Fabric groups 3 and 6, comprising of ceramics primarily from the Late Antique 1 phase, were also included as a point of comparison.

Four distinct mineralogical groups (A–D) were identified based on the presence/absence, proportion, and character of these different minerals (see tab. 3).

The petrographic analysis confirms the basic conclusion of the macroscopic analysis: there existed a high degree of continuity in ceramic technological traditions throughout the phases under consideration (see tab. 4). Petrographic groups TG-D and TG-B,

¹⁸ See Modrijan 2011b, 161–168 for a detailed explanation of the macroscopic analysis and the characteristics of each of the fabric groups.

¹⁷ Modrijan 2011b, 122.

Tab. 3: Fabric Groups from Tonovcov grad.

* Group TG-D has been further divided into three subgroups based on the paste color.

Tab. 3: Fakturne skupine s Tonovcovega gradu.

* Skupina TG-D je glede na barvo zmesi razdeljena še v tri podskupine.

| Group Skupina | # Samples Št. vzorcev | Quartz Kremen | Carbonate Karbonat | Mica Sljuda |
|------------------|--------------------------|------------------|-----------------------|----------------|
| TG-A | 3 | 0–< 1 % | 20–25 % | 0–1 % |
| TG-B | 4 | 2–5 % | 0–5 % | 0–2 % |
| TG-C | 2 | 8 % | 20 % | < 1–1 % |
| TG-D* | 14 | 2–6 % | 15–30 % | 1–3 % |

Tab. 4: Fabric Groups from Tonovcov grad by period. The Roman numerals indicate the macroscopic fabric group of each sample.

Tab. 4: Fakturne skupine s Tonovcovega gradu po fazah. Rimske št. označujejo makroskopsko fakturno skupino posamičnega vzorca.

| Group Skupina | LA 1 PA 1 | LA 1/2 PA 1/2 | LA 2 PA 2 | EM ZSV |
|------------------|---------------------------|--------------------------|---------------------------------------|-------------------------|
| TG-A | TG-14 (XIII) | TG-18 (XIII) | TG-15 (XIII) | |
| TG-B | | TG-21 (VI) TG-16 (IX) | | TG-11 (IX) TG-17 (X) |
| TG-C | | | | TG-12 (X) TG-13 (X) |
| TG-D1 | TG-23 (II) | TG-1 (II) | TG-2 (II) | |
| TG-D2 | TG-7 (VI) TG-19 (VIII) | | TG-9 (VIII) TG-8 (VIII) | TG-20 (V) TG-10 (IX) |
| TG-D3 | | TG-22 (III) | TG-6 (VI) TG-3 (III) TG-4 (III) | TG-5 (V) |

which constituted 78 % of the samples, included a roughly equal number of ceramics from different chronological phases, strongly suggesting continuity in ceramic technology from Late Antiquity to the Early Middle Ages. Some degree of discontinuity is perhaps indicated by group TG-A, which only contained ceramics from Late Antiquity, and TG-C, which only contained ceramics from the Early Middle Ages, although the relatively small sample size should be noted. The *table 4* divides the samples by mineralogical group and chronology; the Roman numerals indicate the macroscopic fabric group of each sample.

Table 4 also indicates similarities and differences when comparing the macroscopic and microscopic groupings. In some cases (e.g. Groups II and XIII), the macroscopic categories also proved to be mineralogically distinct groups; in others, groups that were distinguished macroscopically (e.g. Groups V and VIII) proved to be mineralogically indistinguishable. Moreover, in several cases (e.g. Group III and X) ceramics that were grouped together macroscopically proved to be of different mineralogical composition. This should not be regarded as a criticism of either methodology, but

highlights the importance of using an integrated approach to exploring mineralogical composition of pottery. While macroscopic analysis is the most cost-efficient and inexpensive way to examine the composition of a large volume of ceramic samples, petrographic analyses are also necessary for identifying mineralogical differences not apparent in hand sample.

Tinje

The third site in this analysis is Tinje, located on the eastern end of Slovenia in the municipality of Šentjur. The site was excavated from 1980–1981, and again in 1991, revealing evidence of both Late Antique and Early Medieval settlement on the side of a steep hill about 400 m above sea level.¹⁹ Although Tinje could be described as a fortified hilltop settlement, it differs quite significantly from most similar sites in the southeastern Alps (including Rifnik and Tonovcov grad). There was no evidence of other structures apart from the

¹⁹ Ciglencečki 2000.

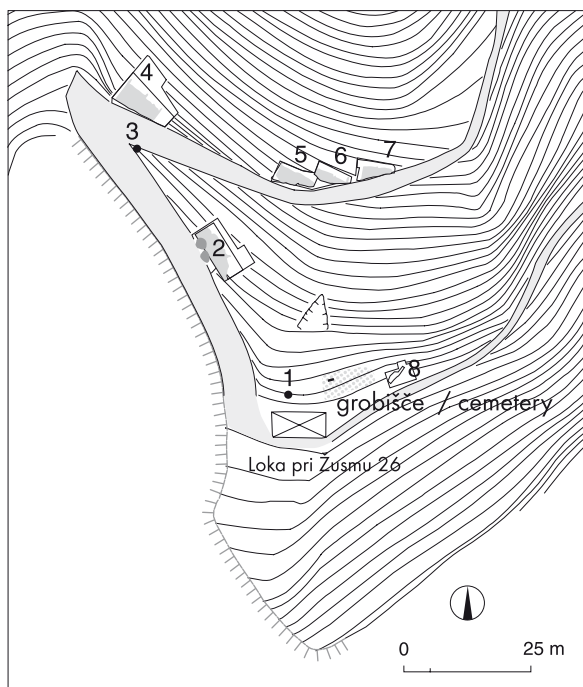


Fig. 6: Site Map of Tinje. Houses 1–8 (adapted from Ciglencečki 2000, fig. 9).

Sl. 6: Načrt najdišča Tinje. Objekti 1–8 (prirejeno po Ciglencečki 2000, sl. 9).

Tab. 6: Fabric Groups from Tinje by period.

* TI-12 appears to be from the base of a pot, which may account for an usually high % of inclusions.

Tab. 6: Faktorne skupine s Tinja po fazah.

* Vzorec TI-12 je z dna lonca, kar je lahko vzrok za neobičajno visok odstotek vključkov.

| Group Skupina | LA (House 4) PA (Objekt 4) | EM (House 5) ZSV (Objekt 5) |
|------------------|---|--------------------------------|
| TI-A | | TI-5 TI-6 TI-7 |
| TI-B | | TI-1 TI-2 TI-3 TI-16 |
| TI-C1 | TI-8 TI-9 TI-10 TI-11 TI-13 | |
| TI-C2 | TI-12* | TI-4 TI-14 TI-15 |

Tab. 5: Fabric Groups from Tinje.

Tab. 5: Faktorne skupine s Tinja.

| Group Skupina | # Samples Št. vzorcev | Quartz % Kremen % | Carbonate % Karbonat % | Carbonate character Oblika karbonatnih zrn | Mica % Sljuda % |
|------------------|--------------------------|----------------------|---------------------------|---|--------------------|
| TI-A | 3 | 10–15 % | 0 % | – | 2–6 % |
| TI-B | 4 | 10–15 % | 5–10 % | Micritic/rounded Mikrit/zaobljen | <1–2 % |
| TI-C1 | 5 | 5–6 % | 10–15 % | Sparry/angular Sparit/oglat | 1–2 % |
| TI-C2 | 4 | 6–8 % | 15–30 % | Sparry/angular Sparit/oglat | 2–4 % |

small houses (i.e. church, cistern, defensive wall). Unlike most of upland settlements, which are situated on the flat tops of steep hills, the houses at Tinje were cut directly into the side of the steep slope. They may have been defended by a ditch and wooden palisade. Excavations at this Late Antique settlement (c. 375–575?) uncovered five building structures, a small stone structure – tentatively interpreted as an altar – with an accompanying children's cemetery (see fig. 6). At the end of the 6th century, several of the larger buildings (2 and

4) were destroyed; it remains unclear whether the settlement was entirely abandoned, but a subsequent Early Medieval occupation (c. 575?–800) is evident in Buildings 5 and 7. Despite being the largest and most skillfully constructed houses, Buildings 2 and 4 were not reoccupied in the Early Middle Ages.

In order to compare ceramic technological traditions between Late Antique and Early Medieval phases, ceramic samples were taken from Buildings 4 and 5. Building 4 was the largest residence,

occupied *only* during the Late Antique phase. Building 5 was selected as a comparison because it produced material primarily of early medieval (Slavic) character. Although it is possible that these two buildings may have been simultaneously occupied for a brief period, their most intensive occupations appear quite distinct. Sixteen ceramic samples from Tinje were subjected to petrographic analysis, ten from Building 5 and six from Building 4. They were sorted into four mineralogical groups (*tabs. 5 and 6*).

Unlike at Koper or Tonovcov grad, these mineralogical groups divided quite neatly between the different archaeological contexts. All of the ceramics from House 4 are characterized as type TI-C1, while the ceramics from House 5 are divided among TI-A, TI-B, and TI-C2. What this seems to suggest is a distinct technological division between Houses 4 and 5 at this site, which roughly correlate to the period of Late Antiquity and the Early Middle Ages, respectively.

Rifnik

The archaeological hilltop fort of Rifnik is located at the eastern end of Slovenia, just south

of the modern town of Šentjur, about a dozen kilometers northwest of Tinje. Located on an easily defensible location overlooking an adjacent valley, there is evidence of settlement occupation deep into prehistory (primarily in the Neolithic and Hallstatt and La Tène Iron Age). Rifnik is one of the largest and best-studied upland fortified settlements in eastern Slovenia.²⁰

During the Late Antique phase (c. 450–600), an early Christian sacral complex, stonewalled residential structures, a cistern, and a defensive wall with rectangular towers were all constructed (see *fig. 7*). As at Tonovcov grad, the presence of Roman imported wares during this period – such as amphorae and spatheia from North Africa and the Western Mediterranean – indicate the persistence of trade contacts with the wider region during this period.²¹ Layers of ash in the church and associated structures suggest that the settlement may have been destroyed by fire at some point in the late 6th or early 7th century. From the current evidence, there does not appear to be an Early Medieval occupation of this site.

²⁰ Currently the most comprehensive publication on the site is Bolta 1981.

²¹ Bausovac 2010.

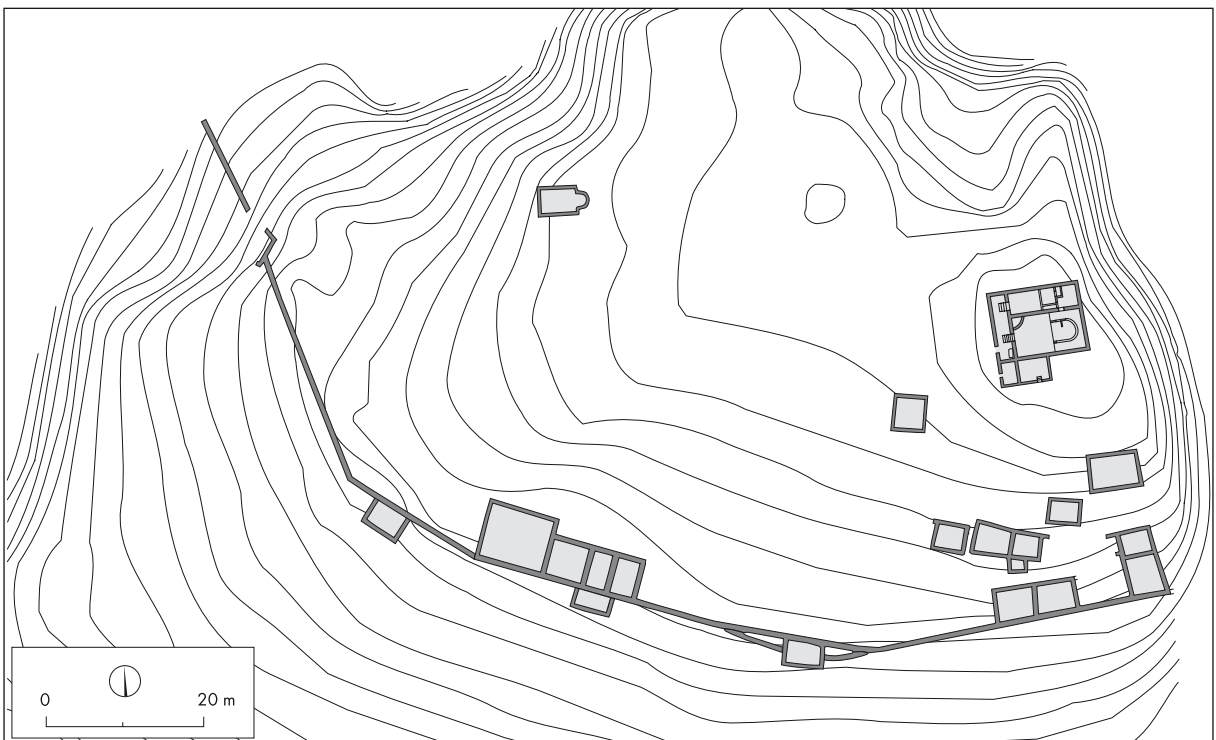


Fig. 7: Site Map of Rifnik (adapted from Ciglencečki 1999, fig. 5).

Sl. 7: Načrt najdišča Rifnik (prirejeno po Ciglencečki 1999, sl. 5).

Tab. 7: Fabric Groups from Rifnik.

Tab. 7: Fakturne skupine z Rifnika.

| Group Skupina | # Samples Št. vzorcev | Quartz % Kremen % | Carbonate % Karbonat % | Carbonate character Oblika karbonatnih zrn | Mica % Sljuda % |
|------------------|--------------------------|----------------------|---------------------------|---|--------------------|
| RF-A | 4 | 5–6 % | 20–30 % | Sparry/mixed Sparit/mešan | 1–3 % |
| RF-B | 2 | 6–9 % | 10–15 % | Sparry/rounded Sparit/zaobljen | 1 % |
| RF-C | 4 | 3–4 % | 20 % | Sparry/mixed Sparit/zaobljen | 1–2 % |

Ten ceramic samples from Rifnik were chosen for petrographic analysis. Since there are very few sealed contexts at this site, dating is somewhat problematic, but most of the ceramics came from features that seem to correspond to the Late Antique period. The ceramics were sorted into three main fabric groups (see *tab. 7*).

Due to the problems with dating contexts, the ceramics at Rifnik do not provide a perspective on the change in ceramic technology over time. However they are a useful comparison to nearby Tinje, which does have material from both the Late Antique and Early Medieval periods. When comparing the ceramic evidence at the two sites, similar mineralogical compositions are evident between the RF-A group and the TI-C group, the latter of which was most common to Late Antiquity. Significantly, the two other groups restricted to the very end of Late Antiquity and into the Early Middle Ages (TI-A and TI-B) have no parallels to any of the sampled materials from Rifnik.

SUMMARY AND INTERPRETATION

The results from this ceramic compositional analysis generally support much of what is already known about the southeastern Alpine region during the Late Antique – Early Medieval transition. For example, historical and archaeological evidence suggests a greater degree of continuity (in terms of settlement, trade, and political stability) in regions nearer the Adriatic coast and Italian peninsula than the more northern and eastern parts of the region.²² The high degree of continuity in ceramic technological traditions at Koper is not surprising, given that it appears to have been continuously settled from the 5th through 9th centuries. Future

research will be able to better determine whether Groups KP-B and KP-C do in fact indicate that some ceramic traditions may be restricted to either the Late Antique or Early Medieval phases at the site.

Ceramic technological traditions at Tonovc grad do not exhibit the same striking homogeneity as at Koper, but nonetheless indicate strong elements of continuity from the Late Antique to Early Medieval phases – a pattern already evident in the macroscopic fabric analysis.²³ The most common mineralogical group (TG-D) is evident in all three phases under investigation, but the suite of different ceramic traditions did change considerably from Late Antiquity to the Early Middle Ages. For example, TG-C was present only in the early medieval phases, while TG-A and TG-D1 were only present in the Late Antique phases.

The site of Tinje in eastern Slovenia presents a very different situation; here a significant discrepancy in ceramic technological traditions from Late Antiquity to the Early Middle Ages is evident. Two of the three petrographic groups (TI-A, TI-B) identified in House 5 (occupied during the Early Middle Ages) had *no* correlates to the material from House 4, occupied only during Late Antiquity. All the ceramics from House 4 were mineralogically homogeneous.²⁴ Despite small sample size ($n = 16$), the results from the analysis strongly indicate very little, if any, similarity between the ceramic materials from each of these two houses. This again adheres to historical expectations, since the eastern end of the southeastern Alps was the region most disrupted by Slavic and Avar migrations from the east during the transition from Late Antiquity to the Early Middle Ages.

²³ Modrijan 2008.

²⁴ The one anomaly (TI-12) was from part of a base rather than a body sherd (as with all other samples), which might explain why it had higher proportions of inclusions.

²² Lotter et al. 2003, Luthar 2008.

Finally, the ceramics sampled from the nearby Late Antique upland fortified settlement of Rifnik bear striking resemblance to the ceramics from (Late Antique) House 4 at Tinje, but not those mineralogical groups from (Early Medieval) House 5. This further indicates regional similarities before ceramic technological traditions during Late Antiquity in eastern Slovenia, before the significant changes in this region during the Early Middle Ages. Were these new technological traditions at Tinje brought in by migrating Slavic and/or Avar groups during this period? Perhaps future research that can integrate the ceramic compositional analysis with other categories of material culture will improve our understanding of this important issue at the advent of the Early Middle Ages in the southeastern Alpine region.

CONCLUSION

In conclusion, ceramic petrography has provided some important insights into the question of continuity and change from Late Antiquity to the Early Middle Ages in the southeastern Alpine

region. This article has focused mainly on similarities and differences among fabric groups, but did not examine what *specific* technological choices (clay selection, tempering, firing conditions, etc.) caused these differences, which is a more complex issue that will be dealt with in future publications. A follow-up research project is currently being formulated that will further explore the preliminary interpretations outlined in this article, and will continue to shed greater light on changes in ceramic technological traditions from Late Antiquity to the Early Middle Ages.

Acknowledgement

This research was funded by grants from the National Science Foundation and Mark Diamond Research Foundation. My sincere thanks are extended to Z. Modrijan, M. Bausovac, and R. Cunja for allowing me access to the ceramic material at these sites, and to R. Mason and H. Herold for their guidance and advice during the petrographic analyses. This article also received helpful comments from two anonymous reviewers and benefitted from the careful editing eye of R. Fazioli. However, all errors and omissions remain the sole responsibility of the author.

APPENDIX: PETROGRAPHIC FABRIC DESCRIPTIONS

Abbreviations

LA = Late Antiquity / PA = pozna antika
 LR = Late Roman period / PR = pozna rimska doba
 EM = Early Middle Ages / ZSV = zgodnji srednji vek

Notes

Petrographic description:

- quartz inclusions have been simply divided between “fine” and “coarse”, with the former being smaller than 0.25 mm and the latter being larger.
- some of the samples were stained in order to distinguish different carbonates, and all appear to be calcite.

Micrograph:

- scale: the approximate diameter of the field of view in the microphotographs is 4.25 mm.

TONOVCOV GRAD

Group TG-A (tab. 8; figs. 8a,b)

Samples:

| Sherd # Št. odlomka | Phase Faza | Macroscopic Fabric Group Makroskopska fakturna skupina | Provenance Izvor |
|------------------------|-----------------|---|-------------------------------------|
| 21168 | LA 1 / PA 1 | 13 | Building 1, SU 68 / Stavba 1, SE 68 |
| 21137 | LA 1/2 / PA 1/2 | 13 | Building 1, SU 21 / Stavba 1, SE 21 |
| 20533 | LA 2 / PA 2 | 13 | Building 1, SU 29 / Stavba 1, SE 29 |

Tab. 8

Fig. 8a: Photograph of Fabric Group TG-A.
Sl. 8a: Fotografija fakturne skupine TG-A.

Macroscopic description: Porous fired-clay body with numerous white inclusions (various sizes); Munsell: black core, black surface.

Petrographic description: Fired-clay matrix, with trace to no quartz inclusions, mostly coarse, well sorted, and rounded; 20–25 % carbonate inclusions of both sparry and micritic character, partially disintegrating into lime mud, well sorted, rounded to sub-angular, which run up to c. 2.0 mm in length; 0–1 % small fibrous muscovite mica; 3–5 % black opaques; and 5–10 % thin, elongated voids that run E-W (drying cracks).

Distinction: This fabric is most easily identifiable by the very low (or completely absent) quartz component, which distinguishes it from all other fabric groups at Tonovcov grad.



Micrograph:

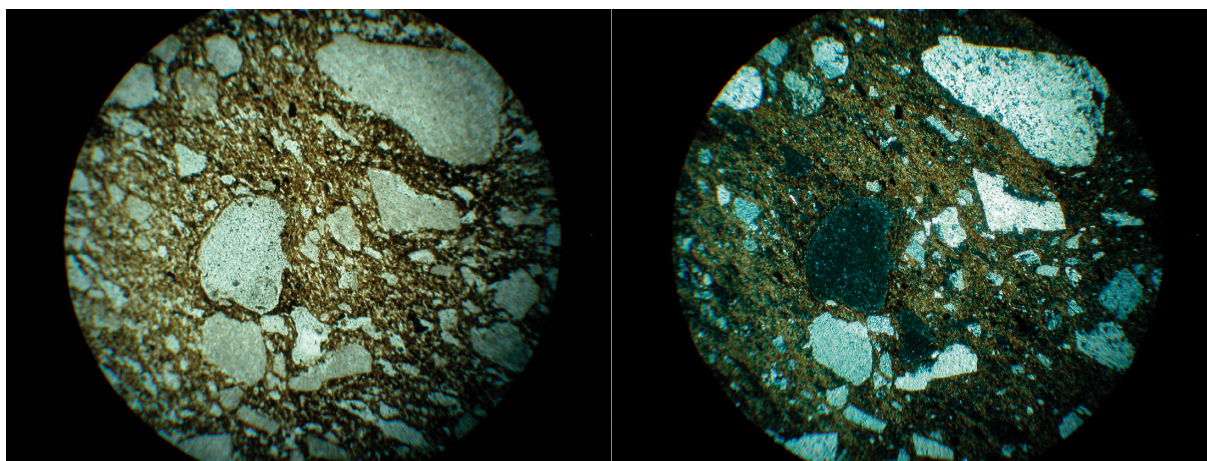


Fig. 8b: Example of Group TG-A in Thin Section (Sample TG-14); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 8b: Zbrusek primerka skupine TG-A (vzorec TG-14); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

Group TG-B (*tab. 9; figs. 9a,b*)*Samples:*

| Sherd # Št. odlomka | Phase Faza | Macroscopic Fabric Group Makroskopska fakturna skupina | Provenance Izvor |
|------------------------|-----------------|---|-------------------------------------|
| 20970 | LA 1/2 / PA 1/2 | 6 | Building 1, SU 24 / Stavba 1, SE 24 |
| 21262 | LA 1/2 / PA 1/2 | 9 | Building 1, SU 63 / Stavba 1, SE 63 |
| 20184 | EM / ZSV | 9 | Building 1, SU 10 / Stavba 1, SE 10 |
| 20063 | EM / ZSV | 10 | Building 1, SU 9 / Stavba 1, SE 9 |

Tab. 9

Macroscopic description: Porous fired-clay body, some with moderate white inclusions. Munsell: brown, reddish brown, or pale brown core; brown, reddish brown, very dark grey brown, and black surface.

Petrographic description: Fired-clay matrix, with 2–5 % quartz inclusions, mixture coarse and fine, well sorted and well-rounded to sub-rounded; 0–5 % rounded carbonate inclusions, which run up to 2.0 mm in length; 0–2 % small fibrous muscovite mica; 10–20 % large and circular and irregularly shaped voids.

Distinction: This fabric is distinguished from the other groups by the complete or partial burning out of carbonate inclusions during the firing process (as evidenced by the shape of the voids).



Fig. 9a: Photograph of Fabric Group TG-B.
Sl. 9a: Fotografija fakturne skupine TG-B.

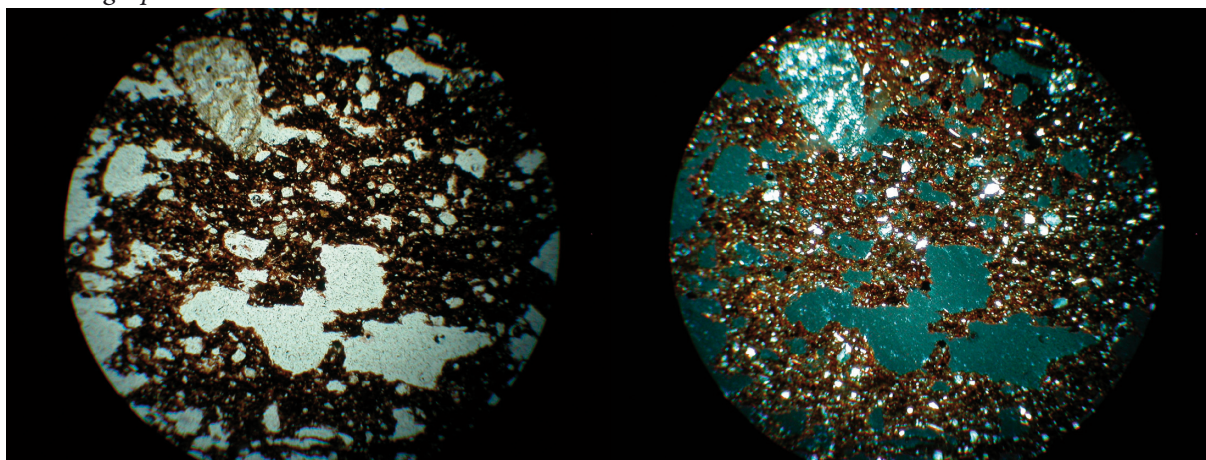
Micrograph:

Fig. 9b: Example of Group TG-B in Thin Section (Sample TG-16); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 9b: Zbrusek primerka skupine TG-B (vzorec TG-16); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

Group TG-C (*tab. 10; figs. 10a,b*)*Samples:*

| Sherd # Št. odlomka | Phase Faza | Macroscopic Fabric Group Makroskopska fakturna skupina | Provenance Izvor |
|------------------------|---------------|---|--|
| 05/3/2 | EM / ZSV | 10 | Building 5 (Water Cistern), SU 44 / Stavba 5 (cisterna), SE 44 |
| 20020 | EM / ZSV | 10 | Building 1, SU 9 / Stavba 1, SE 9 |

Tab. 10

Macroscopic Description: Porous fired-clay body with numerous white inclusions; Munsell: brown core, yellowish red surface.

Petrographic description: Fired-clay matrix, with 8 % quartz inclusions, mostly coarse, moderately sorted and well rounded to sub-rounded; 20 % rounded carbonates, micritic, and partially disintegrating into lime mud, poorly to moderately sorted, and rounded to sub-angular, up to c. 1.5 mm in length; trace to 2 % fine and fibrous muscovite mica; 2 % hematite inclusions; 10 % large and irregularly shaped voids.

Distinction: This fabric is distinguished from others at Tonovcov grad by a relatively high level of quartz inclusions.



Fig. 10a: Photograph of Fabric Group TG-C.
Sl. 10a: Fotografija fakturine skupine TG-C.

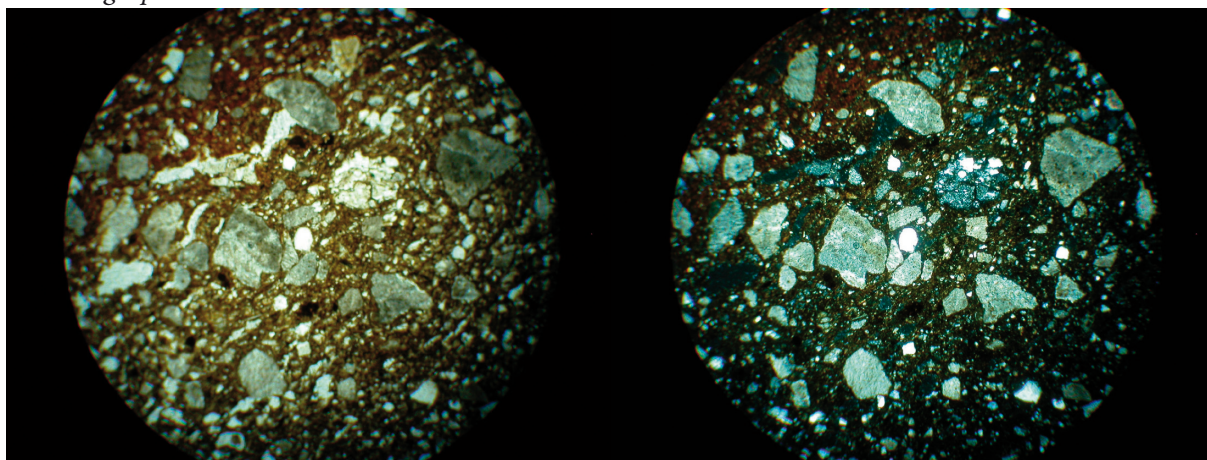
Micrograph:

Fig. 10b: Example of Group TG-C in Thin Section (Sample TG-12); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 10b: Zbrusek primerka skupine TG-C (vzorec TG-12); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

Group TG-D1 (tab. 11; figs. 11a,b)

Samples:

| Sherd # Št. odlomka | Phase Faza | Macroscopic Fabric Group Makroskopska fakturna skupina | Provenance Izvor |
|------------------------|-----------------|---|-------------------------------------|
| 20947 | LA 1 / PA 1 | 2 | Building 1, SU 30 / Stavba 1, SE 30 |
| 20906 | LA 1/2 / PA 1/2 | 2 | Building 1, SU 24 / Stavba 1, SE 24 |
| 20409 | LA 2 / PA 2 | 2 | Building 1, SU 29 / Stavba 1, SE 29 |

Tab. 11

Macroscopic description: Slightly porous fired-clay body with numerous white inclusions (varied sizes); Munsell: pink to light brown core, pink to light brown surface.

Petrographic description: Fired-clay matrix, with 3–5 % quartz inclusions, mostly fine, very well to moderately sorted and well rounded to sub-rounded; 15–20 % carbonates, well to poorly sorted, mostly micritic (showing mosaic extinction), rounded to well rounded, partially disintegrating into lime mud, and up to c. 2.0 mm in length; trace to 1 % fine and fibrous muscovite mica; 5–10 % voids, shaped like drying cracks.

Distinction: Group TG-D is the most common fabric type at in the sample with moderate levels of quartz and carbonate, and low mica. D1 is distinguished from the other D groups primarily by the fabric color (light red to pink), which indicates firing in an oxidizing atmosphere without organic material.



Fig. 11a: Photograph of Fabric Group TG-D1.

Sl. 11a: Fotografija fakturne skupine TG-D1.

Micrograph:

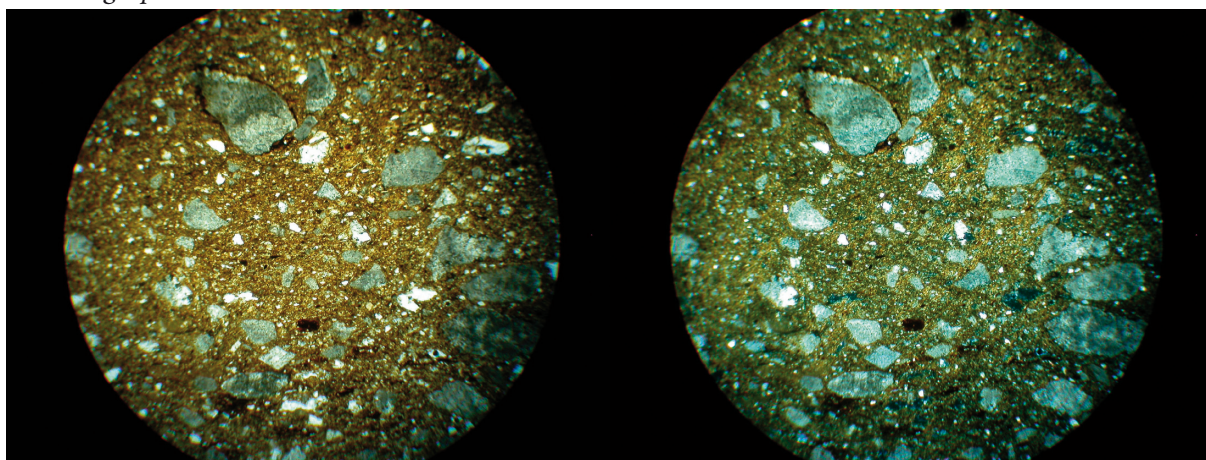


Fig. 11b: Example of Group TG-D1 in Thin Section (Sample TG-1); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 11b: Zbrusek primerka skupine TG-D1 (vzorec TG-1); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

Group TG-D2 (*tab. 12; figs. 12a,b*)*Samples:*

| Sherd # Št. odlomka | Phase Faza | Fabric Group Fakturna skupina | Provenance Izvor |
|------------------------|---------------|----------------------------------|--|
| 21415 | LA 1 / PA 1 | 8 | Building 1, SU 30 / Stavba 1, SE 30 |
| 21705 | LA 1 / PA 1 | 6 | Building 1, SU 29a / Stavba 1, SE 29a |
| 20540 | LA 2 / PA 2 | 8 | Building 1, SU 23 / Stavba 1, SE 23 |
| 21994 | LA 2 / PA 2 | 8 | Building 1* / Stavba 1 |
| 20365 | EM / ZSV | 5 | Building 1, SU 10 / Stavba 1, SE 10 |
| 05/3 | EM / ZSV | 9 | Building 5 (Water Cistern), SU 44 / Stavba 5 (cisterna), SE 44 |

* Exact SU unknown (bioturbation disturbance)

Tab. 12

Macroscopic description: Slightly porous fired-clay body with white inclusions (varied sizes); Munsell: very dark grey brown to dark grey to brown core, similar color on surfaces.

Petrographic description: Fired-clay matrix, with 2–6 % quartz inclusions, mixture coarse and fine, moderate to well sorted, and well rounded to sub-rounded; 20–25 % carbonates, poorly sorted, well rounded to sub-angular, mostly of micritic or mixed character, most partially or fully disintegrating into lime mud, up to 2.0 mm in length; trace to 2 % fine and fibrous muscovite mica; trace plagioclase feldspar in some; 2 % black or reddish opaques (hematite) in some; 5–15 % voids, mostly oriented E/W like drying cracks.

Distinction: Same as other TG-D groups, but uniform dark grey to brown fabric color, suggesting a reducing or neutral firing atmosphere with organic material present.

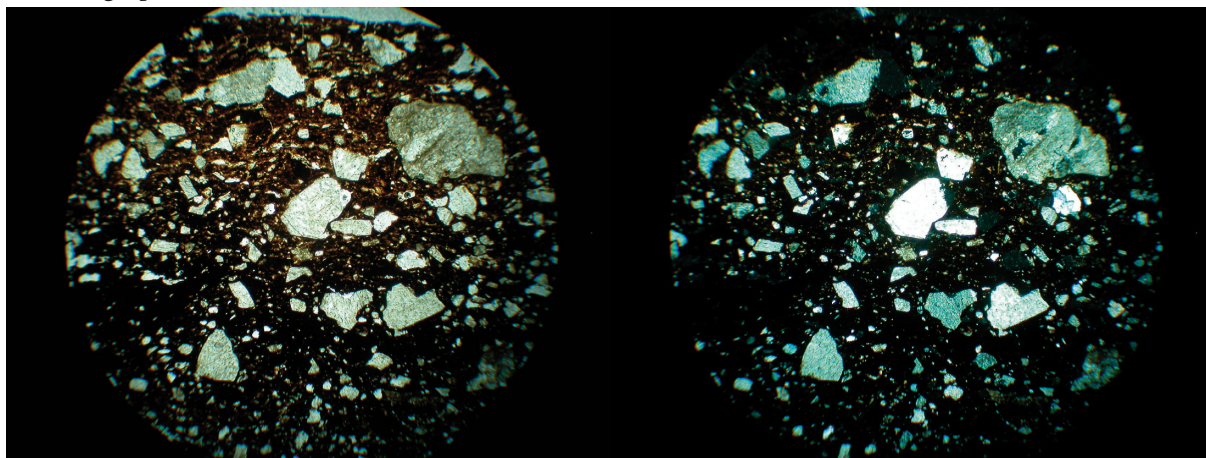
Micrograph:

Fig. 12a: Photograph of Fabric Group TG-D2.
Sl. 12a: Fotografija fakturne skupine TG-D2.

Fig. 12b: Example of Group TG-D2 in Thin Section (Sample TG-10); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 12b: Zbrusek primerka skupine TG-D2 (vzorec TG-10); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

Group TG-D3 (*tab. 13; figs. 13a,b*)*Samples:*

| Sherd # Št. odlomka | Phase Faza | Fabric Group Fakturna skupina | Provenance Izvor |
|------------------------|-----------------|----------------------------------|-------------------------------------|
| 21344 | LA 2 / PA 2 | 6 | Building 1, SU 23 / Stavba 1, SE 23 |
| 20312 | LA 1/2 / PA 1/2 | 3 | Building 1, SU 21 / Stavba 1, SE 21 |
| 20438 | LA 2 / PA 2 | 3 | Building 1, SU 11 / Stavba 1, SE 11 |
| 20195 | EM / ZSV | 5 | Building 1, SU 10 / Stavba 1, SE 10 |
| 20438 | LA 2 / PA 2 | 3 | Building 1, SU 11 / Stavba 1, SE 11 |

Tab. 13

Macroscopic description: Slightly porous fired-clay body with numerous white inclusions (varied sizes); Munsell: dark grey to brown core, various color surfaces (strong brown, yellowish red, dark grey, light red).

Petrographic description: Fired-clay matrix, with 4–6 % quartz inclusions, mixture coarse and fine, well sorted, well rounded to sub-rounded; 20–30 % carbonates, poorly to well sorted, well rounded to sub-angular, mostly micritic and disintegrating into lime mud; 1–2 % fine muscovite mica; trace plagioclase feldspar in some; 10–15 % voids, mostly oriented E/W like drying cracks.

Distinction: Same mineralogical content as TG-D1 and TG-D2, but different colors between core and surface reveal a different kind of firing atmosphere (oxidizing atmosphere with organic material present).



Fig. 13a: Photograph of Fabric Group TG-D3.
Sl. 13a: Fotografija fakturne skupine TG-D3.

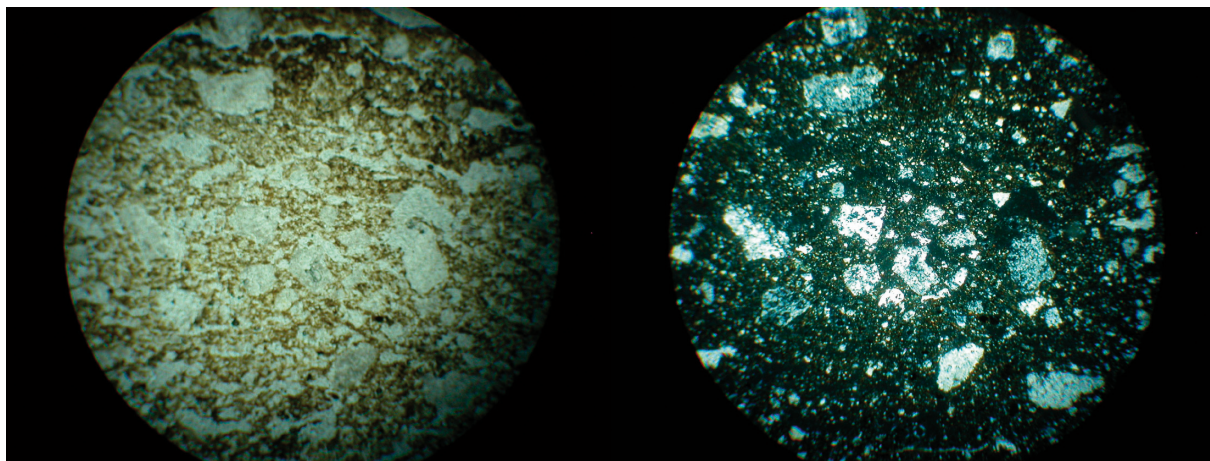
Micrograph:

Fig. 13b: Example of Group TG-D3 in Thin Section (Sample TG-4); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 13b: Zbrusek primerka skupine TG-D3 (vzorec TG-4); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

TINJE

Group TI-A (tab. 14; figs. 14a,b)

Samples:

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|---------------|-----------------------|
| 413 | EM / ZSV | Building 5 / Objekt 5 |
| 357 | EM / ZSV | Building 5 / Objekt 5 |
| 363 | EM / ZSV | Building 5 / Objekt 5 |

Tab. 14

Macroscopic description: Fired-clay body with few (very) small white inclusions; Munsell: very dark grey to dark grey core, very dark grey to pale brown surface.

Petrographic description: Fired-clay matrix, with 10–15 % quartz inclusions, mixture coarse and fine, poorly sorted and rounded to sub-angular; 2–6 % muscovite and biotite mica, mostly fine and fibrous with a few larger inclusions (especially biotite); 5 % voids, very small or drying cracks.

Distinction: This fabric is distinguished by a combination of high quartz, high mica, and the absence of carbonate inclusions



Fig. 14a: Photograph of Fabric Group TI-A.
Sl. 14a: Fotografija faktuorne skupine TI-A.

Micrograph:*

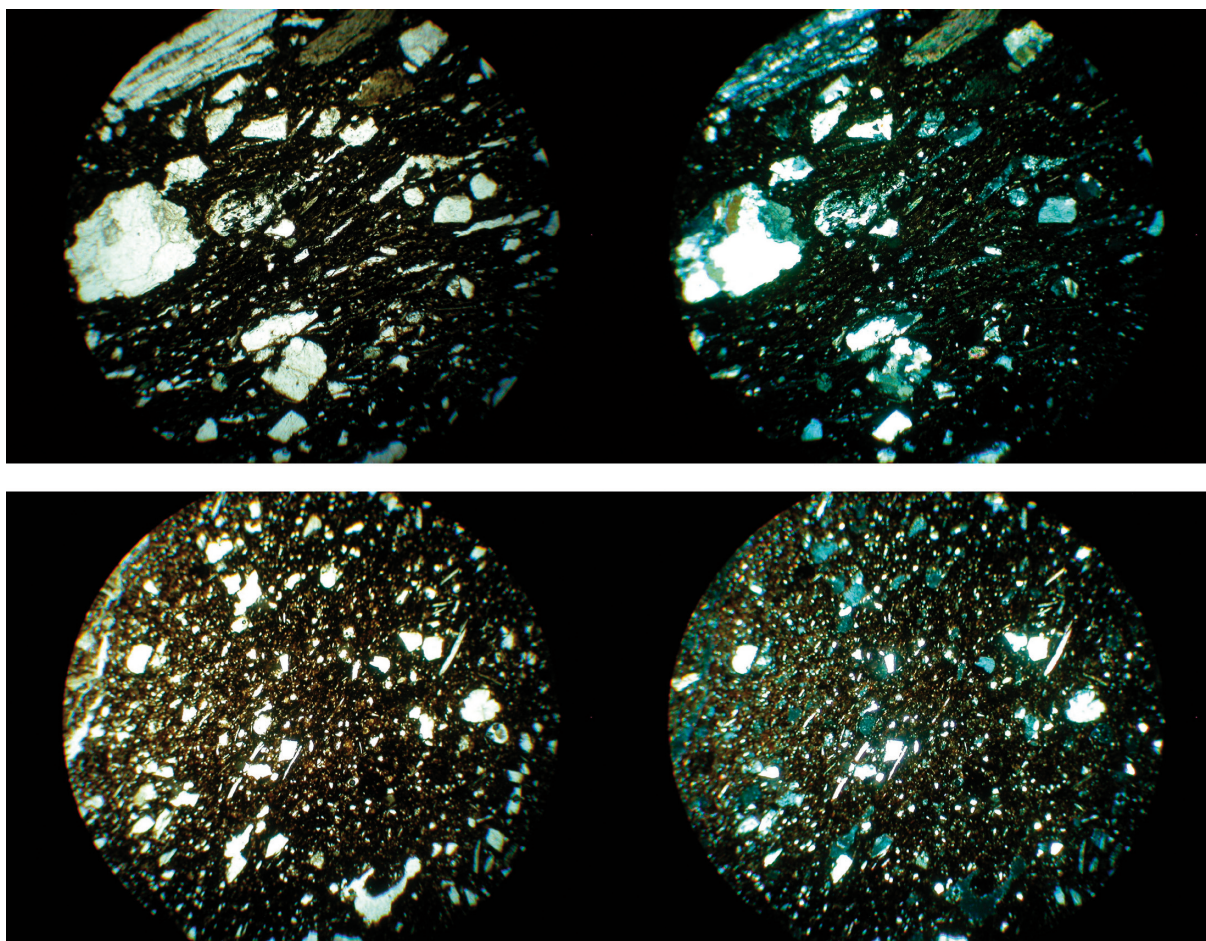


Fig. 14b: Two different examples of Group TI-A in Thin Section (TI-7 above, TI-6 below); Plane Polarized Light (left), Cross Polarized Light (right).

Sl. 14b: Zbruska različnih primerkov skupine TI-A (TI-7 zgoraj, TI-6 spodaj); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

* Since these two samples were quite distinct, microphotos of both are provided.

Group TI-B (*tab. 15; figs. 15a,b*)*Samples:*

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|---------------|----------------------------------|
| 142 | EM / ZSV | Building 5 / Objekt 5 |
| 549 | EM / ZSV | Building 5/1 / Objekt 5/1 |
| 388 | EM / ZSV | Building 5/2 / Objekt 5/2 |
| 142A | EM / ZSV | Building 5 east / Objekt 5 vzhod |

Tab. 15

Macroscopic description: Slightly porous fired-clay body with moderate density white inclusions (various sizes); Munsell: dark grey core, pale brown surface.

Petrographic description: Fired-clay matrix, with optically active groundmass; 10–15 % quartz inclusions, mixture coarse and fine, moderately sorted, rounded to sub-angular; 5–10 % micritic carbonates, poorly sorted and well rounded to sub-rounded, up to 1.0 mm in length; trace to 2 % fine and fibrous muscovite and biotite mica; 2–5 % red to dark red opaques; 5–10 % voids, very small or drying cracks.

Distinction: This group is distinguished from other fabrics at Tinje by a combination of high levels of quartz inclusions and low levels of rounded and micritic carbonates.



Fig. 15a: Photograph of Fabric Group TI-B.
Sl. 15a: Fotografija faktuorne skupine TI-B.

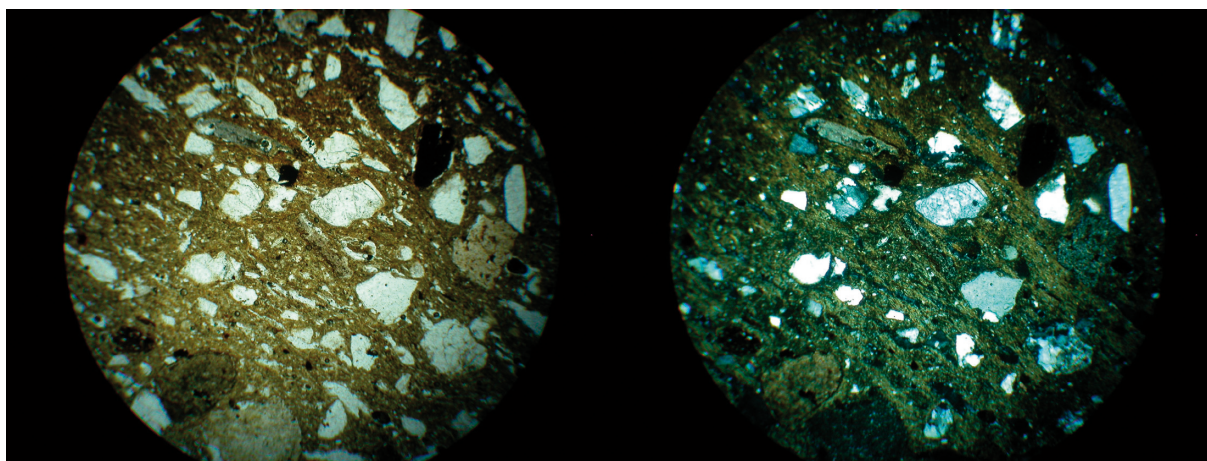
Micrograph:

Fig. 15b: Example of Group TI-B in Thin Section (Sample TI-3); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 15b: Zbrusek primerka skupine TI-B (vzorec TI-3); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

Group TI-C1 (*tab. 16; figs. 16a,b*)*Samples:*

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|---------------|---------------------------|
| 517 | LA / PA | Building 4/2 / Objekt 4/2 |
| 907 | LA / PA | Building 4 / Objekt 4 |
| 207 | LA / PA | Building 4 / Objekt 4 |
| 208 | LA / PA | Building 4 / Objekt 4 |

Tab. 16

Macroscopic description: Slightly porous fired-clay body with numerous white inclusions (varied sizes); Munsell: grey core, grey to light brown grey surface.

Petrographic description: Fired-clay matrix, with optically active groundmass; 5–6 % quartz inclusions, mostly fine, with some veins in corners, well sorted, well rounded to rounded; 10–15 % carbonate inclusions, mostly sparry and angular, some with partial disintegration into lime mud, poorly sorted, angular to sub-rounded, and up to 2.0 mm in length; 1–2 % fine and fibrous muscovite mica; 5–15 % voids, mostly small rounded or drying cracks.

Distinction: This group is distinguished from other fabric groups at Tinje by moderate, mostly fine quartz and moderate levels of angular, sparry carbonates.

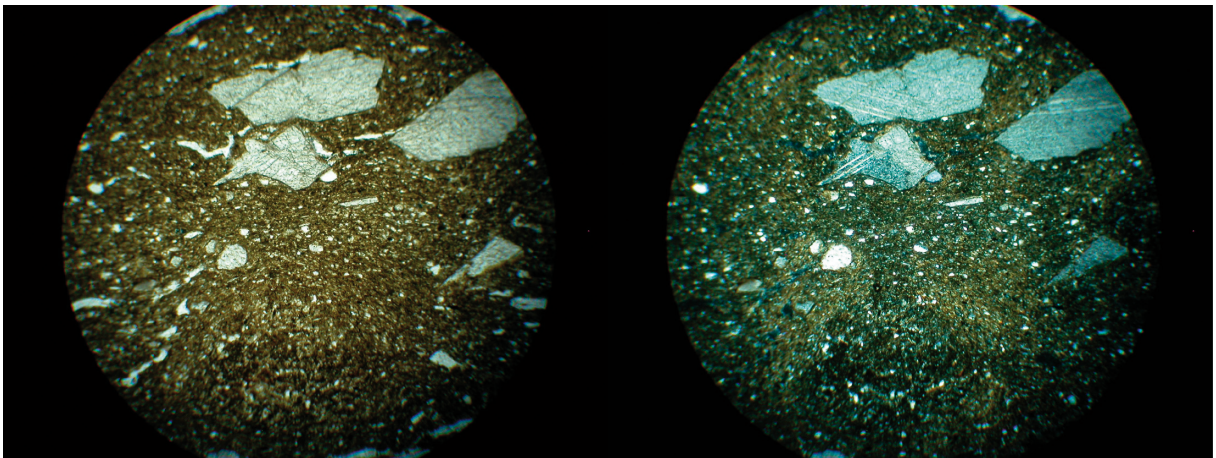
Micrograph:

Fig. 16b: Example of Group TI-C1 in Thin Section (Sample TI-9); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 16b: Zbrusek primerka skupine TI-C1 (vzorec TI-9); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.



Fig. 16a: Photograph of Fabric Group TI-C1.
Sl. 16a: Fotografija faktuorne skupine TI-C1.

Group TI-C2 (*tab. 17; figs. 17a,b*)*Samples:*

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|---------------|----------------------------------|
| 344 | EM / ZVS | Building 5 / Objekt 5 |
| 498 | LA / PA | Building 4 / Objekt 4 |
| 355 | EM / ZVS | Building 5 east / Objekt 5 vzhod |
| 278 | EM / ZVS | Building 5 / Objekt 5 |

Tab. 17

Macroscopic description: Slightly porous fired-clay body with numerous white inclusions (varied sizes); Munsell: very dark grey to grey core, grey to very pale brown surface.

Petrographic description: Fired-clay matrix, with optically active groundmass; 6–8 % quartz inclusions, mostly fine, moderately sorted and well rounded to rounded; 15–30 % sparry carbonates, with some partial disintegration into lime mud, poorly sorted, and angular to sub-rounded, up to 3.0 mm in length; trace feldspars in some; 5–10 % voids, mostly drying cracks, few larger and irregularly shaped.

Distinction: This group is mineralogically very similar to TI-C1, but can be distinguished by slightly higher levels of quartz, mica, and carbonate inclusions.

Micrograph:

Fig. 17a: Photograph of Fabric Group TI-C2.
Sl. 17a: Fotografija faktuorne skupine TI-C2.

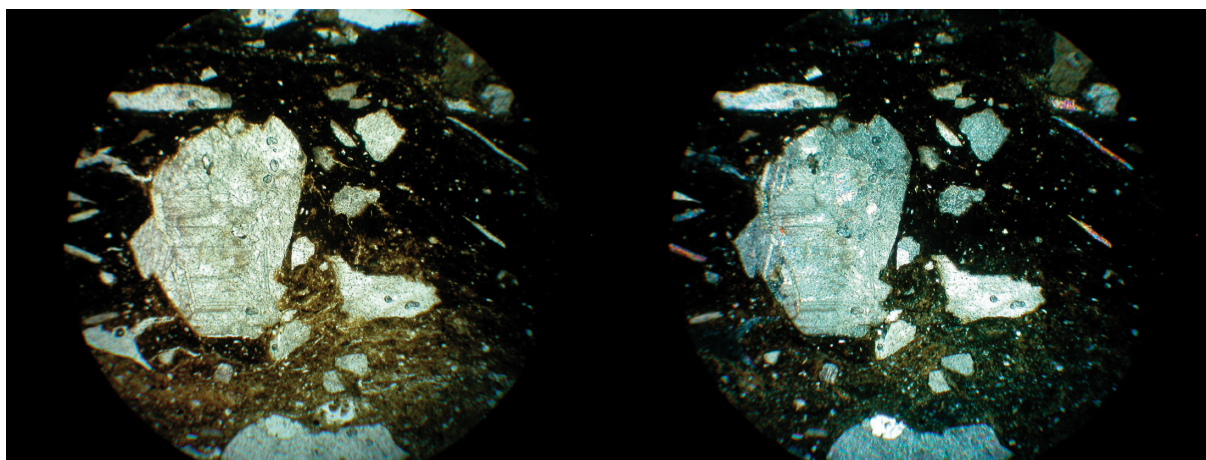


Fig. 17b: Example of Group TI-C2 in Thin Section (Sample TI-14); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 17b: Zbrusek primerka skupine TI-C2 (vzorec TI-14); (levo) v linearno in (desno) v navkrižno polarizirani svetlobi.

RIFNIK

Group RF-A (tab. 18; figs. 18a,b)

Samples:

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|------------------------------|--|
| PA - 1971 | LR/Antique PR/rimska doba | Late Roman defensive wall Poznorimski obrambni zid |
| PA - 1829 | LR/Antique PR/rimska doba | Late Roman ground flattening Poznorimska izravnava |
| PA - 2025 | LR/Antique PR/rimska doba | Building 4 / Hiša 4 |
| PA - 1674 | LR/Antique PR/rimska doba | Late Roman ground flattening Poznorimska izravnava |

Tab. 18

Macroscopic description: Slightly porous fired-clay body with numerous white inclusions (varied sizes); Munsell: very dark grey to light red brown core, very dark grey to very pale brown surface.

Petrographic description: Fired-clay matrix, with 5–6 % quartz inclusions, mostly coarse, moderately to well sorted, and well rounded to rounded; 20–30 % carbonates, mostly sparry, some disintegrating into lime mud, angular to rounded, up to 1.0 mm in length; 1–3 % muscovite mica, mostly fine with some larger inclusions up to 0.5 mm in length; trace orthoclase in some; 5–15 % voids, drying cracks or large and irregularly shaped.

Distinction: This group is distinguished from other fabrics at Rifnik by high levels of carbonates and moderate levels of coarse quartz.

Micrograph:

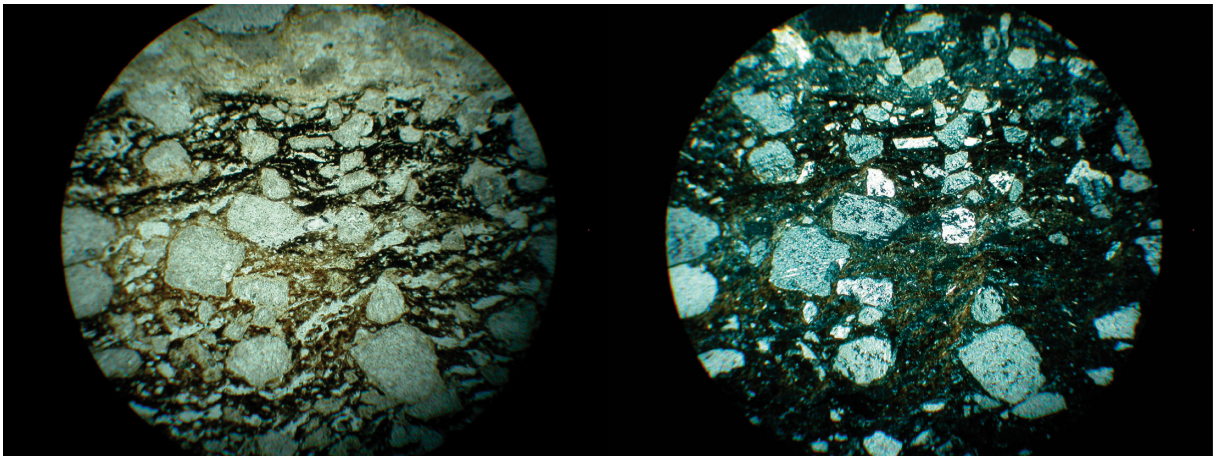


Fig. 18a: Photograph of Fabric Group RF-A.
Sl. 18a: Fotografija faktučne skupine RF-A.

Fig. 18b: Example of Group RF-A in Thin Section (Sample RF-8); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 18b: Zbrusek primerka skupine RF-A (vzorec RF-8); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

Group RF-B (tab. 19; figs. 19a,b)

Samples:

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|------------------------------|--|
| PA - 1662 | LR/Antique PR/rimska doba | Late Roman ground flattening Poznorimska izravnava |
| PA - 2115 | LR/Antique PR/rimska doba | Late Roman ground flattening Poznorimska izravnava |

Tab. 19

Macroscopic description: Slightly porous fired-clay body with moderate white inclusions (varied sizes); Munsell: grey core, grey surface.

Petrographic description: Fired-clay matrix, with optically active groundmass; 6–9 % quartz inclusions, mostly fine, very well to well sorted and very rounded; 10–15 % carbonates, mostly sparry with some disintegration into lime mud, poorly sorted and rounded to sub-angular, up to 2.0 mm in length; 1 % fine and fibrous muscovite mica; 1–2 % dark red opaques; 5–10 % large, irregular voids.

Distinction: This group is distinguished from other fabrics at Rifnik by high levels of fine quartz.

Micrograph:

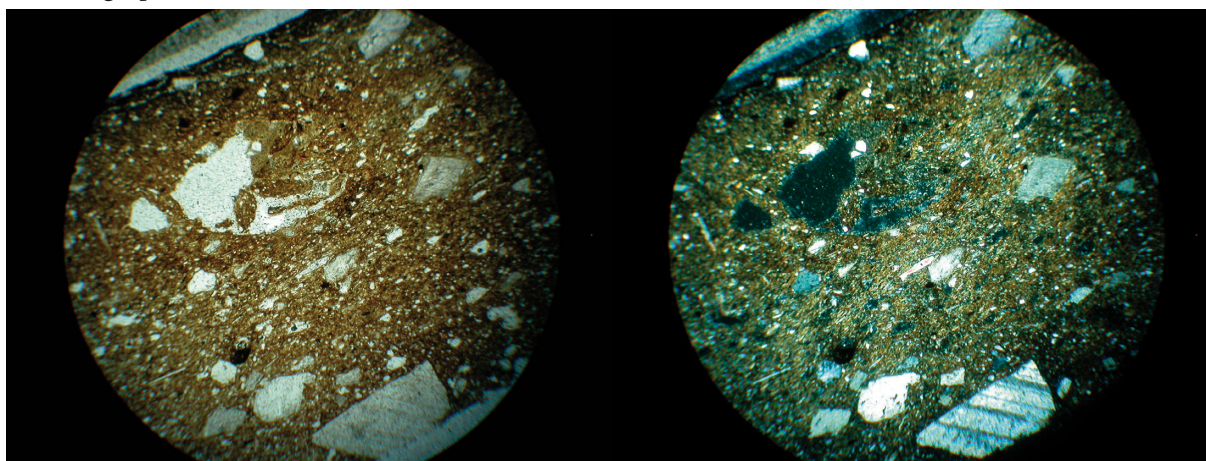


Fig. 19b: Example of Group RF-B in Thin Section (Sample RF-2); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 19b: Zbrusek primerka skupine RF-B (vzorec RF-2); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.



Fig. 19a: Photograph of Fabric Group RF-B.
Sl. 19a: Fotografija faktuorne skupine RF-B.

Group RF-C (tab. 20; figs. 20a,b)

Samples:

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|------------------------------|---|
| PA - 1843 | LR/Antique PR/rimska doba | Late Roman kiln Poznorimska peč |
| PA - 2024 | LR/Antique PR/rimska doba | Between Basilica and water cistern Med cerkvijo in cisterno |
| PA - 1909 | LR/Antique PR/rimska doba | Inner side of defensive wall Notranja stran obrambne- ga zidu |
| PA - 1953 | LR/Antique PR/rimska doba | Late Roman ground flattening Poznorimska izravnava |

Tab. 20

Macroscopic description: Slightly porous fired-clay body with numerous white inclusions (varied sizes); Munsell: very dark grey core, very dark grey to pale brown surface.

Petrographic description: Fired-clay matrix, with 3–4 % quartz inclusions, mixture coarse and fine, poorly to well sorted, well rounded to rounded, perhaps in a bimodal distribution; 20 % carbonates, sparry, mostly disintegrating into lime mud, poorly to moderately sorted, angular to rounded, up to 1.5 mm in length; 1–2 % chert inclusions in carbonates; 1–2 % fine and fibrous muscovite mica; trace plagioclase; 2 % dark red opaques; 10–15 % voids, drying cracks.

Distinction: This group is distinguished from others at Rifnik by the size of the quartz inclusions and also the type of carbonates (very small and fibrous).

Micrograph:



Fig. 20a: Photograph of Fabric Group RF-C.
Sl. 20a: Fotografija faktučne skupine RF-C.

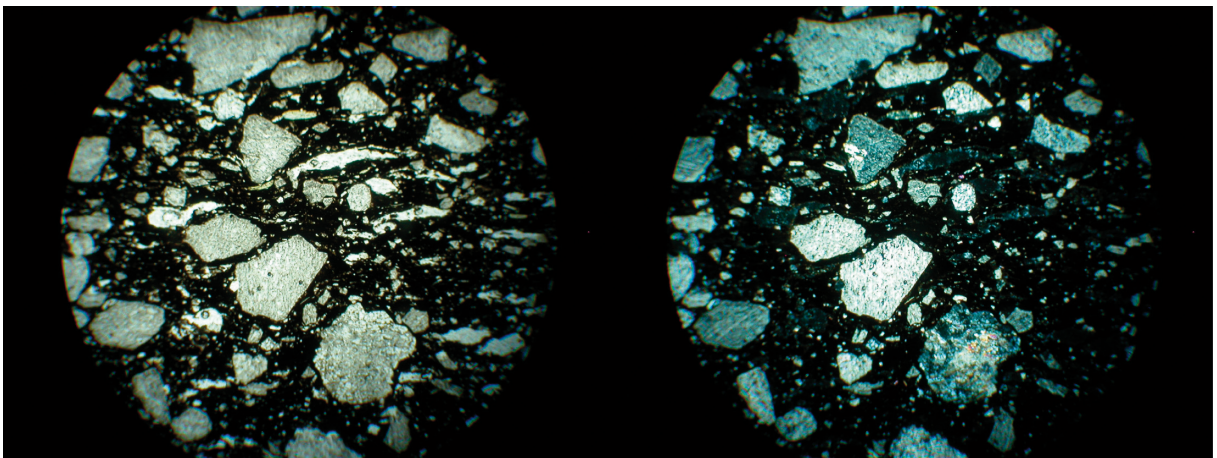


Fig. 20b: Example of Group RF-C in Thin Section (Sample RF-7); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 20b: Zbrusek primerka skupine RF-C (vzorec RF-7); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

KOPER

Note that the sherd numbers for Koper were assigned in laboratory analysis and do not reflect excavation data.

Group KP-A1 (*tab. 21; figs. 21a,b*)

Samples:

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|---------------|--|
| KP – 2 | LA / PA | IP 1, sektor 3, strat 2/3 (III/4/11); depth / globina: -1.55 to -1.7 m; x: -2.8 to -2.5 m; y: 0 to -2.5 m) |
| KP – 8 | LA / PA | IP 2, strat 1/2 |
| KP – 12 | LA / PA | IP 2, strat 1/2 |
| KP – 16 | EM / ZSV | IP 2, room / prostor 11 (VII/3/13); depth / globina: -1.76 to -1.96 m |
| KP – 21 | EM / ZSV | IP 1, sektor 2 (III/5/5) |

Tab. 21

Macroscopic description: Slightly porous fired-clay body with numerous white inclusions (varied sizes); Munsell: red to light red to red brown core, surface same color.

Petrographic description: Fired-clay matrix, with 2–5 % fine quartz inclusions, moderately to well sorted, rounded to sub-rounded; 20–25 % carbonate inclusions, mostly sparry, some with significant disintegration into lime mud, poorly sorted, and rounded to sub-angular, up to 2.0 mm in length; trace to 1 % fine and fibrous muscovite mica; 3–4 % dark red opaques (hematite); 3–5 % voids, mostly drying cracks, with few larger and irregularly shaped.

Distinction: This group is mineralogically similar to the other KP-A groups, but is distinguished by the fabric color (red to light red), indicating an oxidizing atmosphere without organic materials.



Fig. 21a: Photograph of Fabric Group KP-A1.
Sl. 21a: Fotografija faktuorne skupine KP-A1.

Micrograph:

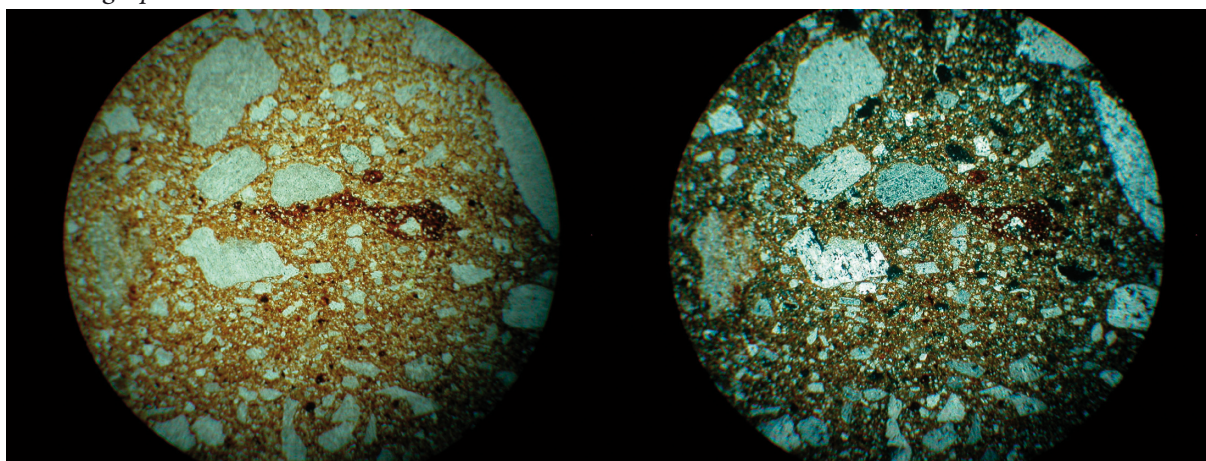


Fig. 21b: Example of Group KP-A1 in Thin Section (Sample KP-2); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 21b: Zbrusek primerka skupine KP-A1 (vzorec KP-2); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

Group KP-A2 (tab. 22; figs. 22a,b)

Samples:

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|---------------|---|
| KP - 3 | LA / PA | IP 1, sektor 3, strat 2/3 (III/4/11); depth / globina: -1.55 to -1.7 m; x: -2.8 to -2.5 m; y: 0 to -2.5 m |
| KP - 5 | LA / PA | IP 1, sektor 3, strat 2/3 (III/4/11) |
| KP - 6 | LA / PA | profile/cable trench / profil/kabelski jarek (XIII/2/9) |
| KP - 9 | LA / PA | IP 2, strat 1/2 |
| KP - 10 | LA / PA | IP 2, strat 1/2 |
| KP - 13 | EM / ZSV | IP 2, room / prostor 11 (VII/3/13); depth / globina: -1.76 to -1.96 m |
| KP - 15 | EM / ZSV | IP 2, room / prostor 11 (VII/3/13); depth / globina: -1.76 to -1.96 m |
| KP - 18 | EM / ZSV | profile/cable trench / profil/kabelski jarek (VII/2/9); depth / globina: -1.5 to -1.66 m |
| KP - 20 | EM / ZSV | IP 2, room / prostor 2 (IX/2/14) |

Tab. 22

Macroscopic description: Slightly porous fired-clay body with numerous white inclusions (varied sizes); Munsell: various combinations of red, light red, red brown, grey, etc.

Petrographic description: Fired-clay matrix, many with optically active groundmass, with 2–5 % fine quartz inclusions, moderately to well sorted, well rounded to rounded; 20–25 % carbonates, mostly sparry, some disintegrating into lime mud, poorly sorted, and rounded to sub-angular, up to c. 2.0 mm in length; trace to 2 % fine and fibrous muscovite mica; 3 % dark red opaques; 3–7 % voids, some drying cracks, and some large and irregularly shaped.

Distinction: This is distinguished from the other group KP-A fabrics by the difference in the fabric color between the core and surface, indicating an oxidizing firing atmosphere with organic material present.



Fig. 22a: Photograph of Fabric Group KP-A2.
Sl. 22a: Fotografija fakturne skupine KP-A2.

Micrograph:

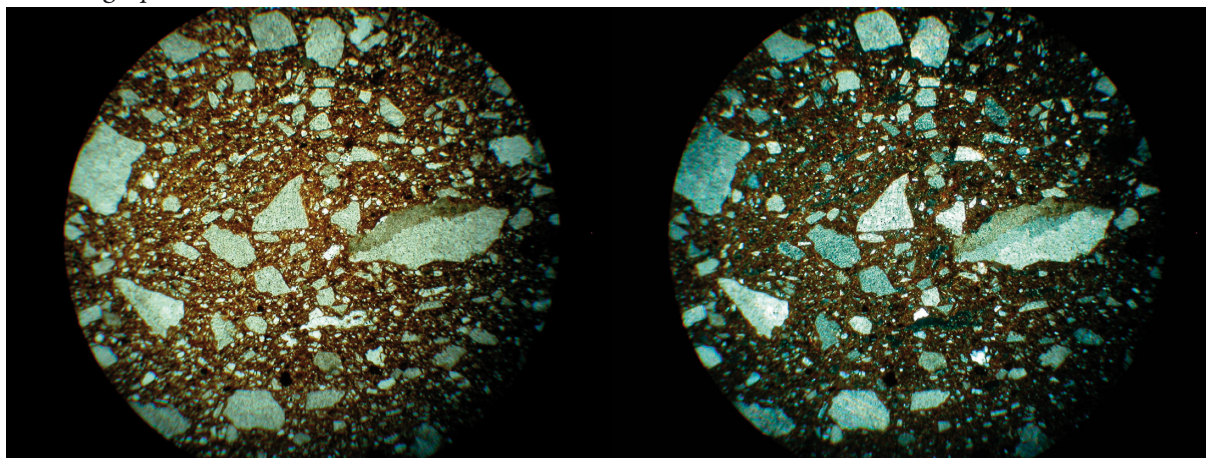


Fig. 22b: Example of Group KP-A2 in Thin Section (Sample KP-20); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 22b: Zbrusek primerka skupine KP-A2 (vzorec KP-20); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

Group KP-A3 (*tab. 23; figs. 23a,b*)*Samples:*

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|---------------|---|
| KP - 4 | LA / PA | IP 1, sektor 3, strat 2/3 (III/4/11); depth / globina: -1.55 to -1.7 m; x: -2.8 to -2.5 m; y: 0 to -2.5 m |
| KP - 7 | LA / PA | profile/cable trench / profil/kabelski jarek (XIII/2/9) |
| KP - 14 | EM / ZSV | IP 2, room / prostor 11 (VII/3/13); depth / globina: -1.76 to -1.96 m |
| KP - 17 | EM / ZSV | profile/el. Kabel (middle trench) (VII/2/2); depth / globina: -0.9 to -1.22 m |
| KP - 23 | EM / ZSV | IP 2, room / prostor 5 (VII/5/20); depth / globina: -1.5 to -1.61 m |

Tab. 23

Macroscopic description: Slightly porous fired-clay body with numerous white inclusions (varied sizes); Munsell: dark grey to very dark grey core, surface same color.

Petrographic description: Fired-clay matrix with optically active groundmass; trace to 5 % fine quartz inclusions, very well sorted and well rounded; 20–25 % sparry carbonates, some disintegrating into lime mud, poorly sorted and rounded to sub-angular, up to 1.0 mm in length; trace to 2 % fine and fibrous muscovite mica; 1–2 % dark red opaques; 5–7 % voids, drying cracks.

Distinction: This group is distinguished from the others group KP-A fabrics by the color (grey), indicating a reducing or neutral firing atmosphere, with organic material present.



Fig. 23a: Photograph of Fabric Group KP-A3.
Sl. 23b: Fotografija faktuorne skupine KP-A3.

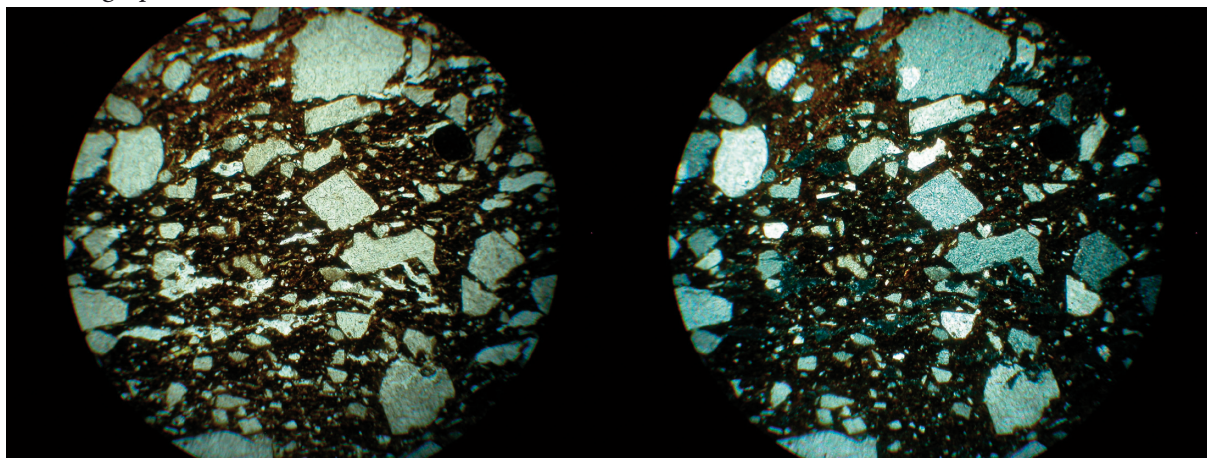
Micrograph:

Fig. 23b: Example of Group KP-A3 in Thin Section (Sample KP-7); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 23b: Zbrusek primerka skupine KP-A3 (vzorec KP-7); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

Group KP-B (tab. 24; figs. 24a,b)

Samples:

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|---------------|---|
| KP - 19 | EM / ZSV | IP 2, room / prostor 11 (VII/3/10); depth / globina: -2.05 m |
| KP - 22 | EM / ZSV | IP 2, room / prostor 5 (VII/5/20); depth / globina: -1.5 to -1.61 m |

Tab. 24

Macroscopic description: Fired-clay body with very small white inclusions; Munsell: red brown to grey core, red to reddish yellow surface.

Petrographic description: Fired-clay matrix, with optically active groundmass; 10 % quartz inclusions, one fine, one coarse (see images below), moderately sorted, and well rounded to rounded; 2 % fine and fibrous muscovite mica; 2 % dark red opaques; 2 % voids, drying cracks.

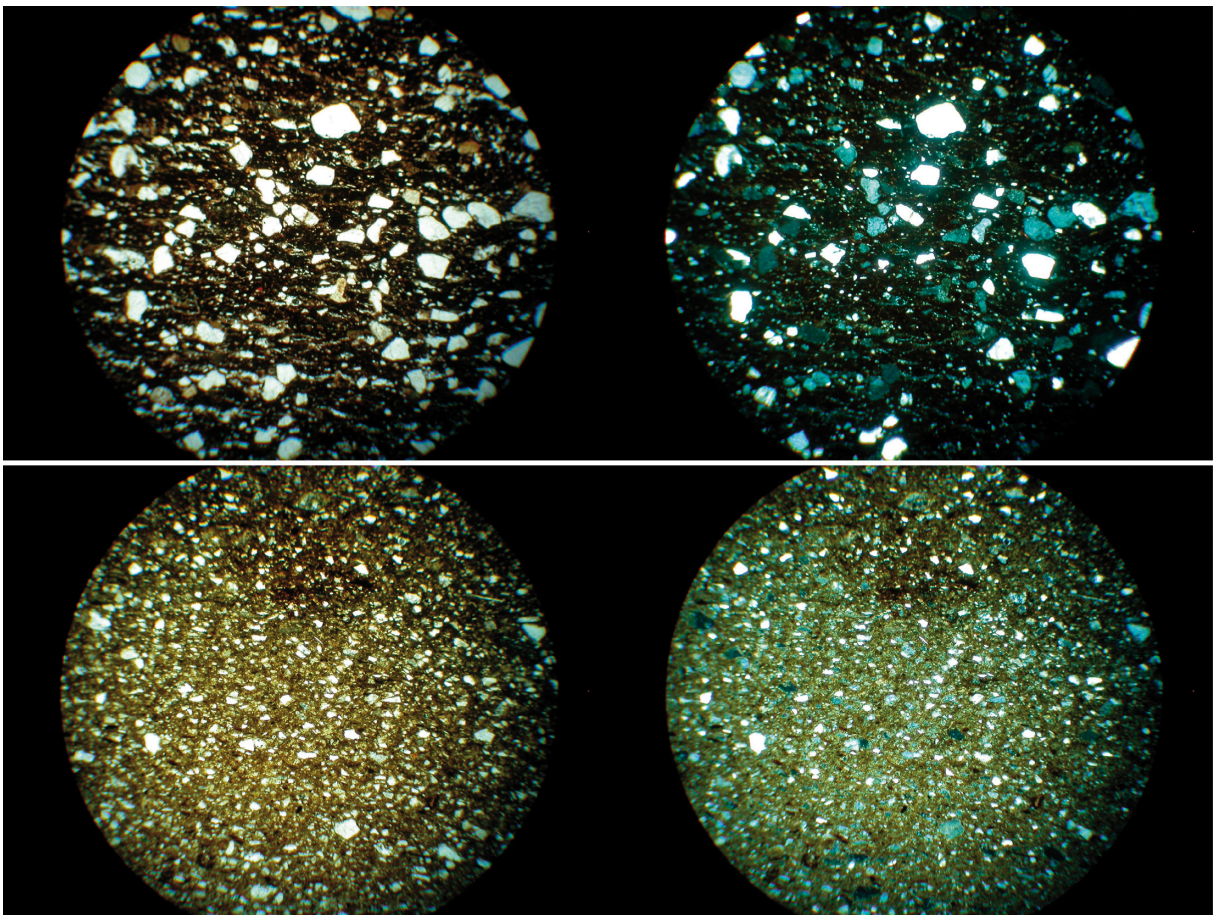
Distinction: This fabric is distinguished by a high level of quartz and the absence of carbonates.

Micrograph:*

* Since these two samples were quite distinct, micrographs of each are provided.



Fig. 24a: Photograph of Fabric Group KP-B.
Sl. 24a: Fotografija faktuorne skupine KP-B.



Group KP-C (*tab. 25; figs. 25a,b*)*Samples:*

| Sherd # Št. odlomka | Phase Faza | Provenance Izvor |
|------------------------|---------------|---|
| KP - 1 | LA / PA | IP 1, sektor 3, strat 2/3 (III/4/11); depth / globina: -1.55 to -1.7 m; x: -2.8 to -2.5 m; y: 0 to -2.5 m |
| KP - 11 | LA / PA | IP 2, strat 1/2 |

Tab. 25

Macroscopic description: Slightly porous fired-clay body with numerous white inclusions (medium to small); Munsell: red to brown core, red to light brownish grey surface.

Petrographic description: Fired-clay matrix, with 10 % fine quartz inclusions, well to moderately sorted and well rounded to rounded; 20 % sparry carbonates, some disintegrating into lime mud, poorly sorted and sub-rounded to sub-angular, up to 1.5 mm in length; 1 % chert inclusions in carbonates; 1 % fine and fibrous muscovite mica; 2–5 % dark red opaques; 5 % voids, some large and irregularly shaped or circular.

Distinction: This fabric is distinguished from others at Koper by high levels of fine quartz inclusions and carbonates.

Micrograph:

Fig. 25a: Photograph of Fabric Group KP-C.
Sl. 25a: Fotografija faktuorne skupine KP-C.

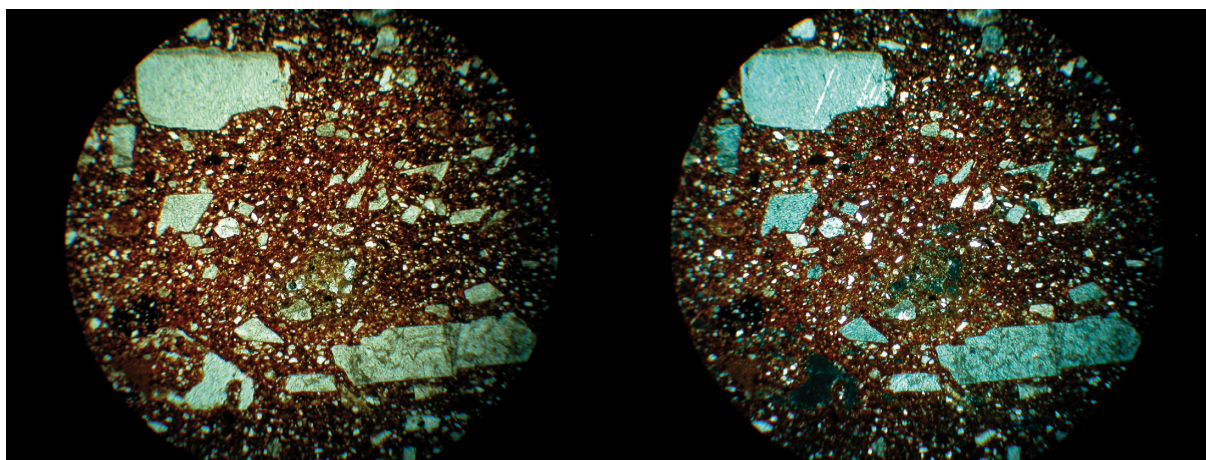


Fig. 25b: Example of Group KP-C in Thin Section (Sample KP-1); Plane Polarized Light (left), Cross Polarized Light (right).
Sl. 25b: Zbrusek primerka skupine KP-C (vzorec KP-1); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.



Fig. 24b: Two different examples of Group KP-B in Thin Section (Sample KP-19 above, KP-22 below); Plane Polarized Light (left), Cross Polarized Light (right).

Sl. 24b: Zbruska različnih primerkov skupine KP-B (KP-19 zgoraj, KP-22 spodaj); (levo) v linearno in (desno) v navzkrižno polarizirani svetlobi.

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Tehnologija keramike v pozni antiki in zgodnjem srednjem veku v jugovzhodnih Alpah: rezultati makroskopskih in mikroskopskih analiz

Povzetek

UVOD

V zadnjih štirih desetletjih so zgodovinarji in arheologi na območju jugovzhodnih Alp raziskovali elemente sprememb in kontinuitete med poznoantičnim in zgodnjersrednjeveškim svetom, med drugim na področju politike, gospodarstva, demografije, poselitve, narodnosti in religije.¹ Pričujoči članek – s poudarkom predvsem na premikih v lončarskih tehnoloških tradicijah – ponuja majhen prispevek k razrešitvi tega širokega, mnogovrstnega vprašanja v pomembnem obdobju družbenozgodovinske tranzicije.² Makroskopske in petrografske analize so bile izvedene na 72 keramičnih vzorcih, ki izvirajo iz štirih poznoantičnih

in/ali zgodnjersrednjeveških naselbin v regiji. Na osnovi prepoznavanja mineraloške sestave posod so bile ocenjene spremembe v tehnologiji in analize kažejo, da so tehnološke značilnosti in razlike posledica odločitev in načrtovanih postopkov, izoblikovanih med proizvodnim procesom.

METODOLOGIJA

Petrografska analiza

Keramična petrografija je arheološka metoda za opisovanje in definiranje fature izdelkov iz gline. Za analizo je potrebna izdelava keramičnih zbruskov, pri kateri se majhen fragment keramične posode (pribl. 2 × 3 cm) zbrusi do debeline pribl. 0,03 mm in pritrdi na stekleno ploščico. Zbrusek opazujemo pod mikroskopom v linearni in navzkrižno polarizirani svetlobi. Mikroskopsko je mogoče oceniti tri glavne komponente keramične zmesi:

¹ Bierbrauer 1979; Bratož 1996, 2005; Ciglencečki 1992, 2000; Grafenauer 1969; Ibler 1991; Ladstätter 2000, 2001; Lotter et al. 2003; Mason 1998; Modrijan 2011; Štih 2010; Ulbert 1979.

² Analize so del širše raziskave v okviru doktorske disertacije; glej Fazioli 2011.

osnovno zmes, neplastične vključke in praznine. Večino vključkov je mogoče identificirati s pomočjo značilnih optičnih lastnosti (npr. oblike, barve, cepitve, mnogobarvitosti ali pleohroizma, dvojnega loma, ohranjenosti, svetlobne neprepustnosti ...).³

Izbor najdišč in strategija vzorčenja

Ker je bila tema raziskovalnega projekta vprašanje kontinuitete in sprememb v zvezi s tehnologijo izdelave keramike, so bila za analizo izbrana le najdišča, poseljena tako v pozni antiki kot v zgodnjem srednjem veku. Izhodišče je bila predpostavka, da je bila večina grobe keramike izdelana lokalno in – v nasprotju s fino rimsko keramiko – ni bila predmet trgovanja na večje razdalje.⁴ Petrografska analiza je to v veliki meri potrdila, saj mineraloška sestava grobe keramike odraža glede na geološke karte obravnavanega območja pričakovano sestavo osnovne surovine. To kaže, da razlike v mineraloški sestavi lahko pripišemo spremembam v tehnološkem procesu, ne pa spreminjajočim se trgovskim vzorcem.⁵

Za analizo so bila izbrana štiri najdišča z jugovzhodnoalpskega območja, vsa iz Slovenije: mesto Koper na severni jadranski obali in višinske utrjene naselbine Tonovcov grad pri Kobaridu, Tinje nad Loko pri Žusmu in Rifnik pri Šenjuru (*sl. 1, 2*). Čeprav zgodnjerednjeveška faza najdišča na Rifniku še ni zanesljivo potrjena,⁶ lega v bližini naselbine na Tinju opravičuje vključitev Rifnika kot zanimive primerjalne točke vsaj za poznoantično obdobje.

Reprezentativni vzorci z omenjenih najdišč so bili bolj kot na podlagi oblikovne tipologije ali ornamenta izbrani na podlagi makroskopske analize faktur. Za tako odločitev je več razlogov. Večina odlomkov grobega posodja je majhna, obrabljena in neznačilna, tako da jih ni bilo mogoče oblikovno določiti ali jih preprosto prilagoditi prej obstoječi tipologiji. Zato se je makroskopska analiza fakture izkazala kot učinkovitejša in celovitejša sredstvo za določanje smiselnih kategorij.

Na koncu je treba poudariti, da izdelava tipologije na podlagi sestave keramike vedno vključuje določeno stopnjo subjektivnosti, saj znotraj skupin

vedno obstaja določena stopnja variabilnosti. Zato moramo izpostaviti in natančno opredeliti tiste razlike med skupinami, za katere domnevamo, da bi lahko bile arheološko pomembne, to je, da potencialno izkazujejo različne tehnološke odločitve, načrtovane med procesom izdelave.

REZULTATI

Koper

(*sl. 3; tab. 1, 2*)

(petrografska analiza: *sl. 21–25; tab. 21–25*)

Pod današnjim mestom Koper je bila ob zaščitnih izkopavanjih na Kapucinskem vrtu leta 1980 odkrita pomembna poznoantična in zgodnjerednjeveška naselbina. Kronologija najdišča je razdeljena v dve veliki fazi: poznorimsko/zgodnjebizantinsko (5.–7./8. st.) in zgodnjerednjeveško (7.–8./9. st.).⁷ Keramični vzorci so bili izbrani tako iz poznorimske kot zgodnjerednjeveške faze. Iz različnih arheoloških plasti je bilo izbranih 23 vzorcev (12 iz poznoantičnih in 11 iz zgodnjerednjeveških kontekstov), ki so bili s pomočjo analize sestave razvrščeni v tri različne mineraloške skupine (gl. *tab. 1*).

Vzorci iz Kopera so bili med vzorci z vseh izbranih najdišč tehnološko najbolj homogeni. Čeprav je bilo vzorcev v faktorni skupini KP-A na podlagi barve fakture mogoče razvrstiti še v dve manjši podskupini, so bili tudi vzorci iz teh podskupin zastopani tako v poznorimskih kot v zgodnjerednjeveških plasteh (glej *tab. 2*). Štirje od vzorcev – dva iz zgodnjega srednjega veka (KP-B) in dva iz pozne antike (KP-C) – pa so pokazali popolnoma drugačno mineraloško sestavo. Čeprav je lahko razlaga, temelječa na tako majhnem vzorcu, preveč drzna, je vendarle treba omeniti, da sta ti dve majhni skupini zastopani vsaka le v eni fazi. Vseeno pa grobo namizno posodje v Kopru v splošnem nakazuje kontinuiteto in homogenost od pozne antike do zgodnjega srednjega veka.

Tonovcov grad

(*sl. 4, 5; tab. 3, 4*)

(petrografska analiza: *sl. 8–13; tab. 8–13*)

Utrjena višinska naselbina Tonovcov grad pri Kobaridu leži na naravno zelo dobro zavarovanem

³ Natančen opis identificiranja mineralov v zbruskih podajata Kerr in Rodgers (1977).

⁴ Modrijan 2011, 122.

⁵ Da bi potrdili te predpostavke, bodo v prihodnje analize za primerjavo vključeni tudi vzorci naravnih ilovic.

⁶ Bausovac, ustno poročilo 2010.

⁷ Cunja 1996.

hribu, ki nadzoruje dolino reke Soče. Najdišče je bilo poseljeno v večini arheoloških obdobij, pričujoča obravnava pa se osredotoča na tri faze: poznoantično fazo 1 (pribl. 350–450), poznoantično fazo 2 (pribl. 475–625) in zgodnj srednjeveško obdobje (pribl. 675–800).⁸ Večina od triindvajsetih analiziranih vzorcev izvira iz stavbe 1 (glej *sl. 4*), kjer so bile prepoznane plasti iz vseh treh glavnih poselitvenih faz. Da bi bil izbrani vzorec reprezentativen za čim širši spekter grobega namiznega posodja, odkritega na najdišču, so bili vzorci za petrografsko analizo izbrani na podlagi predhodno določenih makroskopskih fakturnih skupin.⁹ Z vrednotenjem prisotnosti/odsotnosti določenih mineralov, njihovega deleža in lastnosti, predstavljenim na *tab. 3*, je bilo mogoče določiti štiri mineraloške skupine. Petrografska analiza je potrdila glavne ugotovitve makroskopske analize: v času vseh treh obravnavanih faz je obstajala visoka stopnja kontinuitete v tehnološki tradiciji izdelave keramike (glej *tab. 4*). V petrografski skupini TG-D in TG-B (pokrivata 78 % vseh pregledanih vzorcev) uvrščamo približno enako število keramičnih izdelkov iz različnih kronoloških faz, kar kaže na močno kontinuiteto tehnoloških postopkov med pozno antiko in zgodnjim srednjim vekom. Določeno stopnjo diskontinuitete morda izkazuje skupini TG-A (vsebuje samo keramiko iz pozne antike) in TG-C (vsebuje samo keramiko iz zgodnjega srednjega veka), čeprav je treba opozoriti, da gre pri obeh za relativno majhen vzorec.

Tinje

(*sl. 6; tab. 5, 6*)

(petrografska analiza: *sl. 14–17; tab. 14–17*)

Najdišče Tinje nad Loko pri Žusmu je izbrano v vzhodni Sloveniji. Zaščitna izkopavanja so potekala v letih 1980–1981 in 1991 in razkrivajo dokaze o obstoju tako poznoantične kot zgodnj srednjeveške naselbine, locirane na pobočju strmega hriba na približno 400 m nadmorske višine.¹⁰ Raziskave so razkrile pet stavbnih struktur in manjšo kamnito strukturo – pogojno interpretirano kot oltar – ter pripadajoče otroško grobišče (glej *sl. 6*). Konec 6 st. so bile nekatere večje stavbe (2 in 4) uničene.

Vprašanje, ali je bila naselbina popolnoma opuščena, pa ni razrešeno, v stavbah 5 in 7 so bili odkriti tudi sledovi zgodnj srednjeveške poselitve (pribl. 575(?)–800).

Za primerjavo tehnološke tradicije v izdelavi keramike med pozno antiko in zgodnjim srednjim vekom so bili izbrani vzorci iz stavb 4 in 5. Čeprav je mogoče, da sta bili ti stavbi kratek čas sočasno poseljeni, je njuna najintenzivnejša poselitev precej različna. Za petrografsko analizo je bilo izbranih 16 vzorcev, deset iz stavbe 5 in šest iz stavbe 4. Razvrščeni so bili v štiri mineraloške skupine (glej *tab. 5, 6*), ki se med različnimi arheološkimi konteksti precej razlikujejo – drugače kot v Kopru ali na Tonovcovem gradu. Vsa keramika iz stavbe 4 je bila uvrščena v skupino TI-C1, medtem ko je bila tista iz stavbe 5 razdeljena med skupine TI-A, TI-B in TI-C2. Iz tega je mogoče sklepati na izrazito tehnološko delitev gradiva med obravnavanima stavbama, kar v grobem ustreza poznoantičnemu in zgodnj srednjeveškemu obdobju na tem najdišču.

Rifnik

(*sl. 7; tab. 7*)

(petrografska analiza: *sl. 18–20; tab. 18–20*)

Za analizo je bilo izbranih deset vzorcev iz utrjene višinske naselbine Rifnik pri Šentjurju,¹¹ ki je le okrog 10 km oddaljena od Tinja. Ker je bilo na naselbini ugotovljeno le manjše število zaprtih kontekstov, je datacija nekoliko problematična, vendar pa večina keramičnih najdb izvira iz struktur, uvrščenih v pozno antiko (pribl. 450–600). Keramiko lahko razvrstimo v tri faktorne skupine (glej *tab. 7*). Zaradi težav z datiranjem kontekstov keramika z Rifnika ne omogoča prepoznavanja časovnih sprememb keramične tehnologije, je pa analiza kljub temu uporabna za primerjavo z bližnjim Tinjem, ki pa ima gradivo tako iz pozne antike kot iz zgodnjega srednjega veka. Če primerjamo značilnosti keramike z obeh najdišč, ugotovimo, da imata očitno podobno mineraloško sestavo rifniška skupina RF-A in skupina TI-C s Tinja, ki je bila najpogosteje zastopana v pozni antiki. Pomembno je, da preostali skupini s Tinja (TI-A in TI-B), ki sta omejeni na konec pozne antike in zgodnji srednji vek, med gradivom z Rifnika nimata primerjav.

⁸ Modrijan 2010; Ciglencečki, Modrijan, Milavec 2011.

⁹ Za natančnejše analize grobe keramike ter makroskopske analize in karakteristike posameznih tehnoloških skupin na Tonovcovem gradu glej Modrijan 2011b in Fazioli 2011b.

¹⁰ Ciglencečki 2000.

¹¹ Bolta 1981; Bausovac 2010.

POVZETEK IN INTERPRETACIJA

Rezultati pričujoče analize sestave keramike v veliki meri potrjujejo že znana dejstva o prehodu med pozno antiko in zgodnjim srednjim vekom v jugovzhodnoalpskem prostoru. Tako npr. zgodovinski in arheološki podatki dokazujejo večjo stopnjo kontinuitete (v poseljenosti, trgovini in politični stabilnosti) na območjih, ki so bližje jadranski obali in Apeninskemu polotoku, kot pa na tistih v notranjosti regije.¹² Ker stanje raziskav kaže, da je bil Koper neprekinjeno poseljen od 5. do 9. st., visoka stopnja kontinuitete v keramični tehnološki tradiciji ni presenetljiva. Tehnološka tradicija na Tonovcovem gradu ni tako očitno homogena kot v Koprju, vseeno pa so opazni močni povezovalni elementi med poznoantično in zgodnesrednjeveško fazo, kar je bilo vidno že pri makroskopski analizi fature.¹³ Najpogostejša mineraloška skupina (TG-D) je sicer zastopana v vseh treh obravnavanih fazah, vendar pa so med pozno antiko in zgodnjim srednjim vekom opazne tudi spremembe v vrsti keramičnih tradicij. Bistveno drugačno je stanje na Tinju; tu je jasno vidna razlika v tehnološki tradiciji med pozno antiko in zgodnjim srednjim vekom. Dve od treh petrografskih skupin (TI-A, TI-B), določenih na gradivu iz stavbe 2, ki je bila poseljena v zgodnjem srednjem veku, *nimata* primerjav z gradivom iz stavbe 4, poseljene v pozni antiki. Kljub majhnemu vzorcu ($n = 16$) rezultati analize kažejo zelo majhno (če sploh kakšno) podobnost med keramičnim gradivom iz omenjenih dveh stavb. Končno tudi vzorci z bližnjega Rifnika kažejo jasno podobnost s keramiko iz (poznoantične) stavbe 4 na Tinju, ne pa s tisto iz (zgodnesrednjeveške) stavbe 5. To kaže na regionalno sorodnost v keramični tehnološki tradiciji v vzhodni Sloveniji v pozni antiki, pa tudi na izrazito spremembo na tem območju v zgodnjem srednjem veku.

SKLEP

Petrografska analiza keramike je omogočila vpogled v problem kontinuitete in diskontinuitete med pozno antiko in zgodnjim srednjim vekom v jugovzhodnoalpskem prostoru. Članek se osredotoča predvsem na podobnosti in razlike med fakturnimi skupinami, ne raziskuje pa, katere *specifične* tehnološke odločitve (izbira glin, priprava zmesi, pogoji žganja) so povzročile te spremembe, saj gre za veliko bolj kompleksno vprašanje, ki bo obravnavano v prihodnjih raziskavah. Trenutno se namreč oblikuje raziskovalni projekt, ki bo nadaljeval raziskavo preliminarnih interpretacij, podanih v pričujočem članku, in osvetlil spremembe v tradiciji izdelave keramike v času med pozno antiko in zgodnjim srednjim vekom.

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¹² Lotter et al. 2003; Luthar 2008.

¹³ Modrijan 2008.