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A "globalization" of glazed pottery trade and production across the late medieval Mediterranean?

An integrated approach to Zeuxippus wares found at Corinth and Thebes, mainland Greece

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RESEARCH IN BRIEF

Aim: To characterize patterns of commercial, artistic, and techno-cultural interactions during a tumultuous period of Greek History, the 14th century, mostly known as a time of political conflicts, commercial and political expansion of the West, and increasing Turkish threat.

Method: An integrative approach to provenance and technology of lead-rich glazed pottery found at Thebes and Corinth, two strategic political and commercial centers in Latin Greece. The methods employed are thin section petrography (P), WD-XRF, and SEM-EDS.

Materials: Zeuxippus Ware, a quality type of ceramic tableware that originated from the Byzantine world, and which became popular throughout the late medieval Mediterranean.

HISTORICAL BACKGROUND

1204 AD: Sack of Constantinople and fragmentation of the Byzantine Empire by the Crusaders.

13th century: fragmentation and hybridity

Greece got fragmented into a mosaic of feudal territories and Venetian colonies. Local rulers introduced new systems of administration, economy, and social norms from western Europe. In the 1260s Byzantine Greeks reconquered Constantinople (briefly), Thessaly, parts of the Peloponnese.

14th century: troubles, conflicts, and consolidation

The fluxes of Latin populations and traditions that had prevailed for several generations in Greece, and had progressively merged with the local Byzantine heritage, got aggressively interrupted by two new Latin components:

- The Catalan invasion of Athens and Thebes (1311-1379), the Catalan sack of Corinth (1312).
- The Navarrese invasion of Thebes (1379).

This situation was stabilized by powerful leaders from Florence in Tuscany, who controlled Corinth (1358) then Athens and Thebes in central Greece (1380s). They increased commercial and cultural exchanges with the early Renaissance Italy, revived various aspects of Byzantine culture and arts, while also expanding their diplomatic and trade activities in the East.

Elsewhere in the Mediterranean, the 14th century is synonym of conflicts and political changes; the northern and eastern Aegean, in particular, witnessed an increasing pressure from the Turks.

INTERACTIONS IN TIMES OF TURMOIL: EVIDENCE FROM ZEUXIPPUS WARES

One of the finest Byzantine sgraffito wares

Discovered in great quantities in the Hippodrome of Constantinople (Megaw 1968). Incised decorations of two types:

- Zeuxippus Ware class I: concentric circles and spiral highlighting structural elements of the bowls (rim, bottom, center), covered with a yellow-brown glaze.
- Zeuxippus Ware class II: vegetal or figurative patterns in a central medallion, covered with transparent glazed and enriched with touches of brown.

Widespread diffusion and regional workshops

In the 13th century, some favorable economic conjectures in the Byzantine Empire, as well as technological advances in the way ceramics are stacked in a kiln, allow for mass-production of sgraffito wares, with various consequences by the 14th century:

- Zeuxippus and other sgraffito wares become affordable to a wider segment of the population.
- The production of Sgraffito wares became decentralized in a number of different workshops.
- In Greece, Thebes started to produce Zeuxippus Wares (Waksman et al. 2014).
- Imitations are widespread across the Aegean region (François & Waksman 2004-2005) and have been spotted in northern Italy (Lazzarini 1989).



Zeuxippus bowl discovered at Thebes, Ismenion Hill (ASCSA)

Terminology and its intricacies

The multiplication of archaeological finds, the regional confinement of medieval pottery studies, and the need to refine large stylistic categories in Byzantine ceramology, have put into question the need to distinguish between "Real" Zeuxippus Ware; "Zeuxippus imitations"; "Zeuxippus derivatives" (Waksman & François 2004-2005); Sgraffito "a spirale cercio" (Lazzarini 1989); Sgraffito with concentric circles (Waksman et al. 2014); "Novy Svet Wares" and "Glossy Wares" which also display the decorative scheme of Zeuxippus Ware class I (Waksman & Tenevsko 2010).

MATERIALS AND METHODS

Pottery assemblages

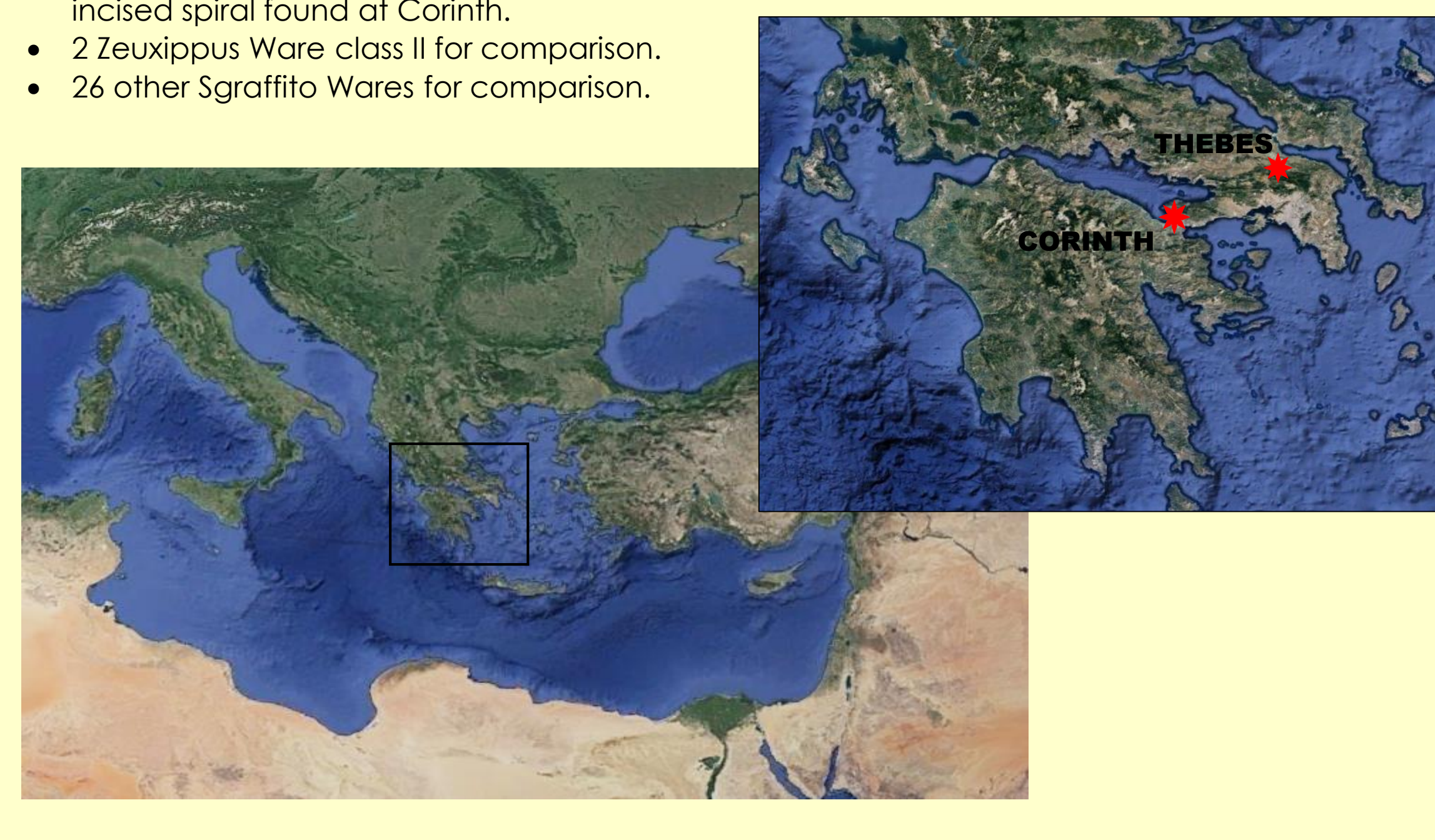
We selected samples among closed and homogeneous deposits that produced several hundred fragments of lead-rich glazed pottery:

- Thebes: Discarding pit on Ismenion Hill (ISM), early to mid-14th century, Frankish or Catalan domination. Excavations by Bucknell University and the Ephorate for Antiquities at Boeotia.
- Selected comparisons to finds from a nearby Byzantine habitation, 12th/13th century (KAR). Excavations by the Ephorate for Antiquities at Boeotia.
- Corinth: Destruction deposits and discarding pits at the so-called "Frankish Area" (COR), dated to the 14th century; some selected styles can be more precisely dated to the late 14th century. The later material is contemporary with the Florentine domination of the city. Excavations by the American School of Classical Studies at Athens.

Sampling criteria

50 samples were selected:

- 22 Zeuxippus Ware class I, considered in its largest sense, including low-quality derivatives with incised spiral found at Corinth.
- 2 Zeuxippus Ware class II for comparison.
- 26 other Sgraffito Wares for comparison.



ANALYSES AND RESULTS

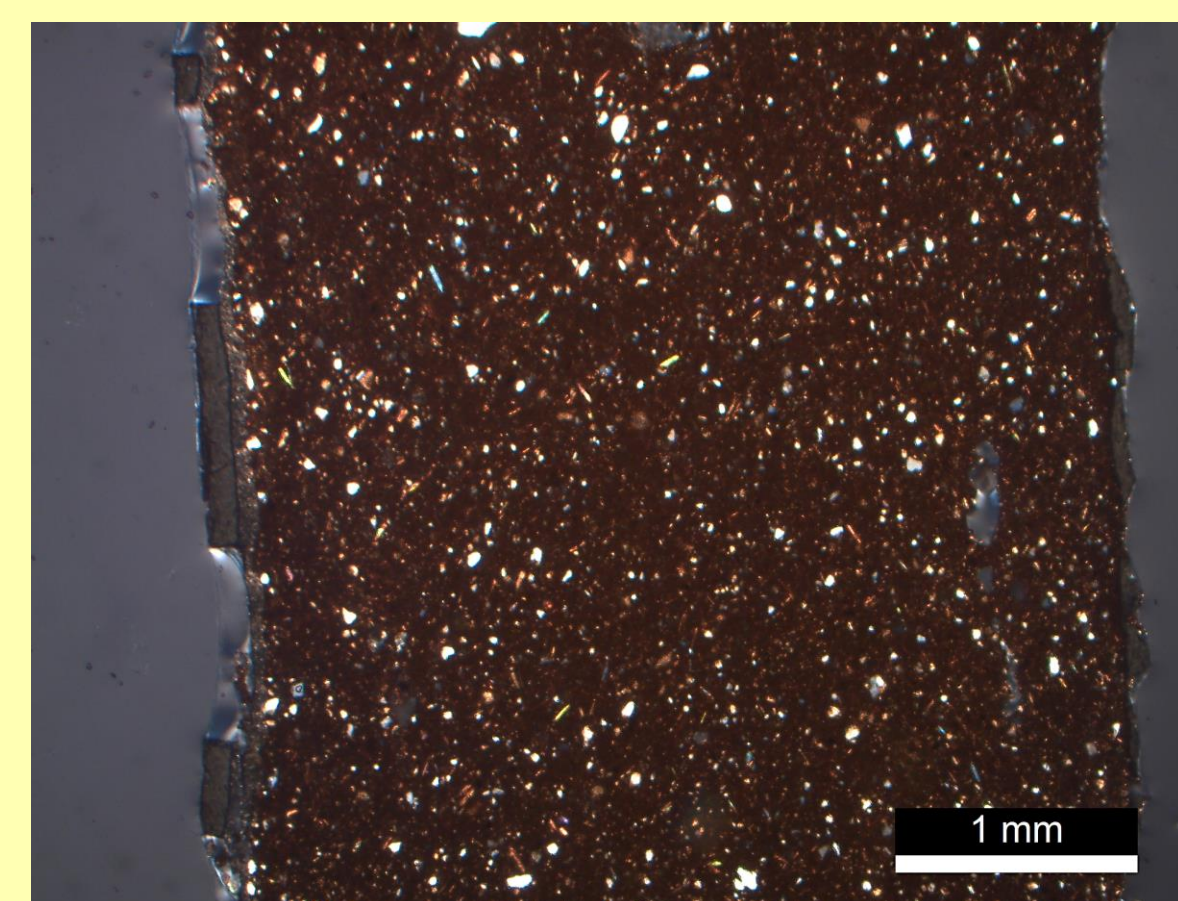
Sample	Style	P	WD-XRF	SEM-EDS	Provenance ascription (P)	Slip	Glaze			Pigment			Pottery chronology	Political regime contemporary to sampled pottery	Political regime when local pottery workshop developed	
							(Pb:Si)	(% ox)	(trace)	(trace)	(trace)	(trace)				
KAR04	Other	X		X	Attica	Granular, fine; thickness 0.16–0.20 mm	1.11	3.23				12th/13th c.	Byzantine	Byzantine		
ISM06	Zeuxippus, I	X		X			1.62	3.56	X				Early to mid-14th c.	Catalan?	Latin?	
COR120	Zeuxippus, I	X	X	X			1.4	2.81		X			Late 14th c.	Catalan	Latin?	
KAR02	Other	X		X	Corinth	Sheeted, fine; 0.04–0.16 mm	1.15	2.63	X			14th c.	Frankish/ Florentine	Byzantine		
COR45	Other	X		X			2.2	1.35		X					14th c.	
COR50	Other	X	X	X			1.85	3.39							14th c.	
COR43	Zeuxippus, I	X	X	X	NE Peloponnese	Sheeted, fine; 0.04–0.16 mm	0.74	3.56	X	X		14th c.	Frankish/ Florentine	?		
COR60	Zeuxippus, I	X		X			1.79	3.93		X					14th c.	
COR41	Other	X	X	X			1.24	2.66							Early to mid-14th c.	Catalan
COR37	Zeuxippus, I	X	X	X	1.3	4.28					Early to mid-14th c.					
COR79	Other	X		X	1.19	4.07	X				Early to mid-14th c.					
ISM01	Zeuxippus, I	X		X	Thebes	Granular, fine; 0.15–0.30 mm	1.33	3.42	X			Early to mid-14th c.	Catalan	Latin		
ISM03	Zeuxippus, I	X		X			1.66	2.56		X					Early to mid-14th c.	
ISM04	Zeuxippus, I	X		X			1.53	0.89		X					Early to mid-14th c.	Venetian
ISM08	Zeuxippus, I	X		X	Chalkida?	Sheeted, fine; 0.04 mm	1.21	2.51	X			Early to mid-14th c.	Byzantine	Byzantine		
ISM20	Zeuxippus, I	X		X			2.21	2.61							14th c.	
ISM13	Other	X		X			2.33	1.17							14th c.	
ISM14	Other	X	X	X	Thrace	Sheeted, fine; 0.18–0.20 mm	1.93	4.09				14th c.	Byzantine (Turkish?)	Byzantine		
COR55	Other	X		X			1.93	4.09							14th c.	
COR73	Other	X		X			1.93	4.09							14th c.	
COR135	Zeuxippus, II	X	X	X	Anatolia	Sheeted, very fine; 0.1 mm	1.93	4.09				14th c.	Byzantine (Turkish?)	Byzantine		
COR130	Other	X	X	X			1.93	4.09							14th c.	
COR117	Zeuxippus, I	X	X	X			1.26	4.6							14th c.	Byzantine (Turkish?)
COR137	Zeuxippus, I	X	X	X	1.28	4.2					14th c.					
COR27	Zeuxippus, I	X	X	X	1.32	3.88					14th c.					
COR57	Zeuxippus, I	X	X	X	Black Sea	Sheeted, very fine; 0.08–0.1 mm	1.53	4.44				14th c.	Byzantine (Turkish?)	Byzantine		
COR61	Zeuxippus, I	X	X	X			1.54	2.63							14th c.	
COR124	Zeuxippus, II	X	X	X			1.96	1.43	X						Late 14th c.	
COR95	Other	X	X	X	Liguria	Granular, coarse; 0.20–0.25 mm	1.79	4.62	X			Late 14th c.	Genoese	Genoese		
COR96	Other	X	X	X			0.93	2.37	X						Late 14th c.	
COR97	Other	X	X	X			1.73	2.52							Late 14th c.	
COR99	Other	X	X	X	Marche	Sheeted, coarse; 0.15–0.25 mm	2.64	3.29				Late 14th c.	Papal states	?		
COR81	Other	X	X	X			2.64	3.29							Late 14th c.	
COR82	Other	X	X	X			2.64	3.29							Late 14th c.	
COR84	Other	X	X	X	Veneto	No slip	1.01	4.45	X			Late 14th c.	Republic of Venice	Venetian		
COR87	Other	X	X	X			1.21	4.08							Late 14th c.	
COR07	Other	X	X	X			1.21	4.08							Late 14th c.	
COR12	Other	X	X	X	Veneto?	Sheeted, fine; 0.02–0.10 mm	1.42	3.46	X			Late 14th c.	Republic of Venice?	Venetian?		
COR13	Other	X	X	X			0.97	4.03	X						Late 14th c.	
COR19	Other	X	X	X			1.39	4.8	X						Late 14th c.	
COR32	Other	X	X	X	Veneto?	Sheeted, fine; 0.02–0.10 mm	1.15	4.24	X			Late 14th c.	Republic of Venice?	Venetian?		
COR46	Other	X	X	X			1.15	4.24	X						Late 14th c.	
COR08	Zeuxippus, I	X	X	X			4.99								Late 14th c.	
COR14	Zeuxippus, I	X	X	X	Veneto?	Sheeted, fine; 0.02–0.10 mm	1.62					Late 14th c.	Republic of Venice?	Venetian?		
COR24	Zeuxippus, I	X	X	X			1.62								Late 14th c.	
COR30	Zeuxippus, I	X	X	X			1.62								Late 14th c.	
COR34	Zeuxippus, I	X	X	X	Veneto?	Sheeted, fine; 0.02–0.10 mm	1.62					Late 14th c.	Republic of Venice?	Venetian?		
COR09	Zeuxippus, I	X	X	X			1.62								Late 14th c.	
COR72	Zeuxippus, I	X	X	X			1.62								Late 14th c.	

Fabric analysis

Petrographic analysis (P) identified 12 fabrics. For each of these, preliminary provenance ascription (see table) is based on comparisons with data published in the fields of geology and ceramic petrology.

Production centers of Zeuxippus wares and derivatives have been identified in the Late Byzantine Empire, in Latin-controlled Greece, as well as in the Veneto.

Preliminary results obtained from WD-XRF analysis of 22 selected samples indicate a good match with the petrographic groupings.



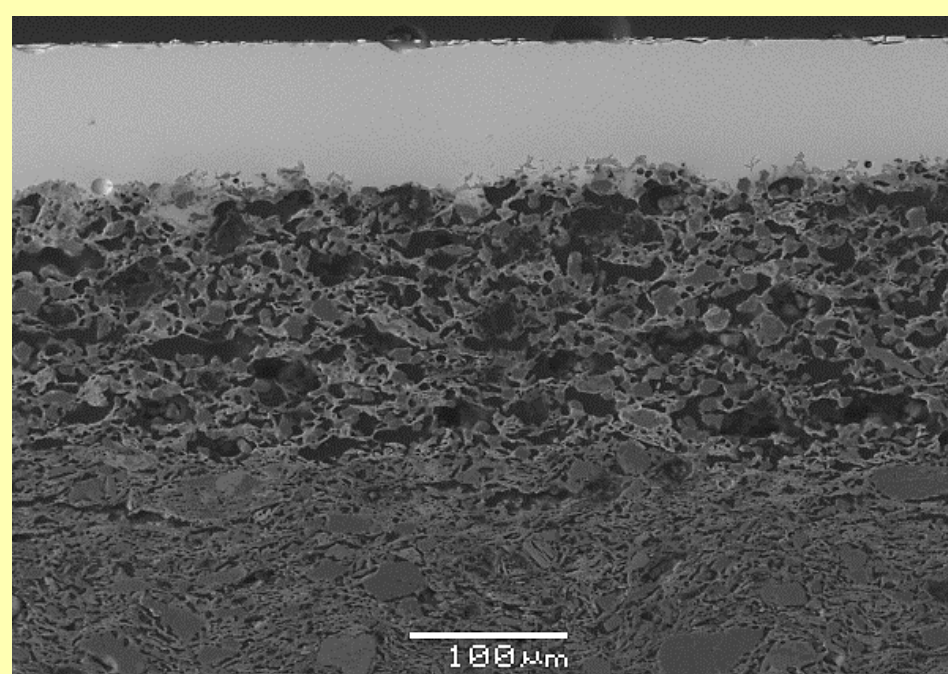
COR137, Zeuxippus Ware, class I, Black Sea area (petrography, XPL, x25) Fine, greenish brown fabric with illite and coarse chlorite, rubified biotite, quartz, feldspars and acid igneous rocks; very rare radiolarite and chert; rare depleted microfossils. Bimodal distribution of the inclusions with few coarse inclusions, 0.20–0.50 mm. Massive fabric, preferred orientation.

Slip analysis

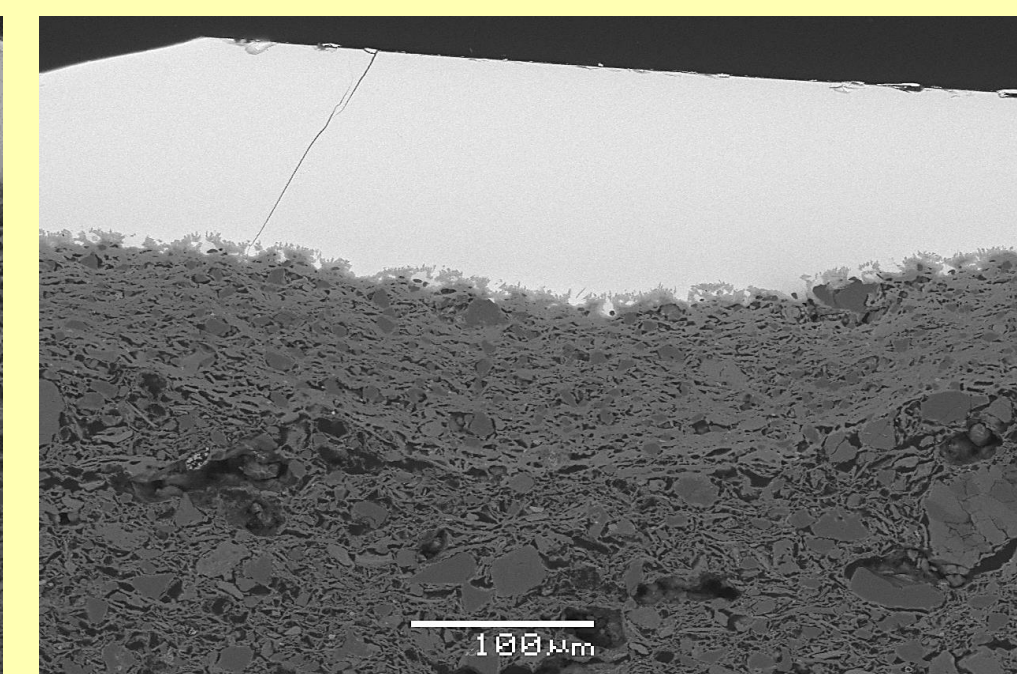
Two types of slips were identified through petrographic and SEM analyses:

- Microgranular slips with dominant siliceous inclusions
- Sheeted slips with dominant clay minerals - quartz, feldspars, micas

Each type of slip has very fine-, fine- and coarse-grained variations. Very fine slips are equigranular with granules < 0.01 mm; all other slips are inequigranular with granules < 0.01 mm, up to 0.08 mm.

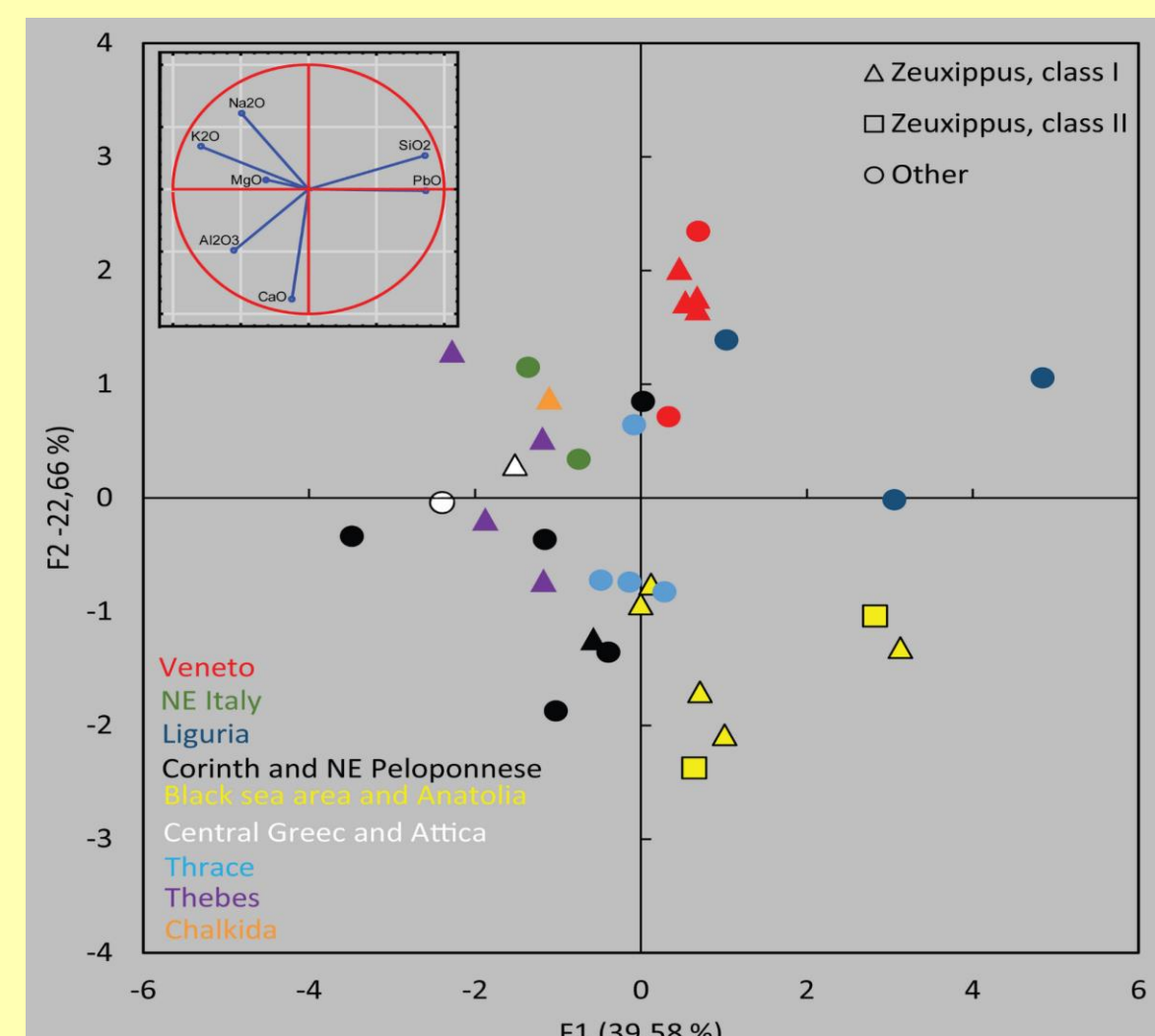


ISM08, Zeuxippus Ware, class I, Thebes (SEM, BSE, x230) Fine-grained siliceous slip, equigranular texture



COR137, Zeuxippus Ware, class I, Black sea area (SEM, BSE, x230) Fine-grained clay-rich slip, equigranular texture

Glaze analysis



EDS analysis identified that all samples are covered with a lead-rich glaze, but Pb:Si ratios are heterogeneous through the sample set. When all elements are considered, some composition trends appear at the macro-regional scale, with productions from the Byzantine Anatolia and Thrace, Liguria and the Veneto, and Latin Greece showing a tendency to plot. Moreover, Al-contents are high in productions from Latin Greece (7–12%), average in Byzantine productions (3.5–6%) and low in Italian productions (1.5–4.5%).

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HISTORICAL INTERPRETATIONS

Supply strategies

Our analysis indicates that Thebes had become a production center of high-quality Zeuxippus Wares by the time the city came into the hands of Frankish lords in the early 14th c., a result which confirms previous conclusions obtained from chemical analysis of Theban pottery (Waksman et al. 2014).

Corinth, in contrast, which hosted one of the main glazed pottery production industry in Byzantine Greece, produced low-quality Zeuxippus derivatives in the 14th c. It relied, to some extent, on an import activity of such wares from other Greek workshops (i.e. Attica) but the main source of supply in Zeuxippus wares seems to have been far-flung workshops located in the Byzantine world and in the Veneto.

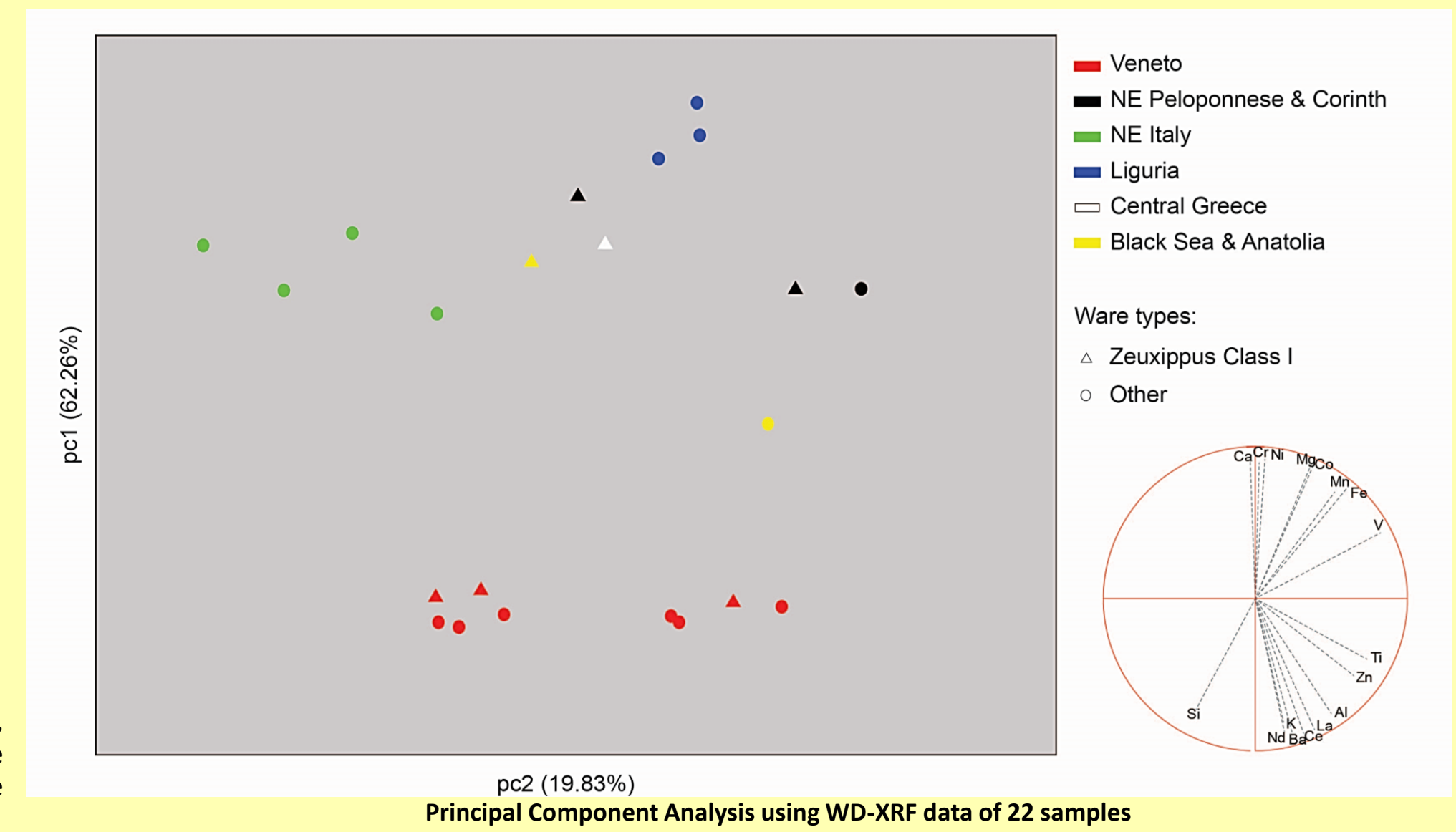
Production patterns

The production of Zeuxippus Wares class I and its derivatives was a « global » phenomenon by the 14th c., with workshops identified in the Byzantine World, Latin Greece, and the early renaissance northern Italy.

Technological traditions

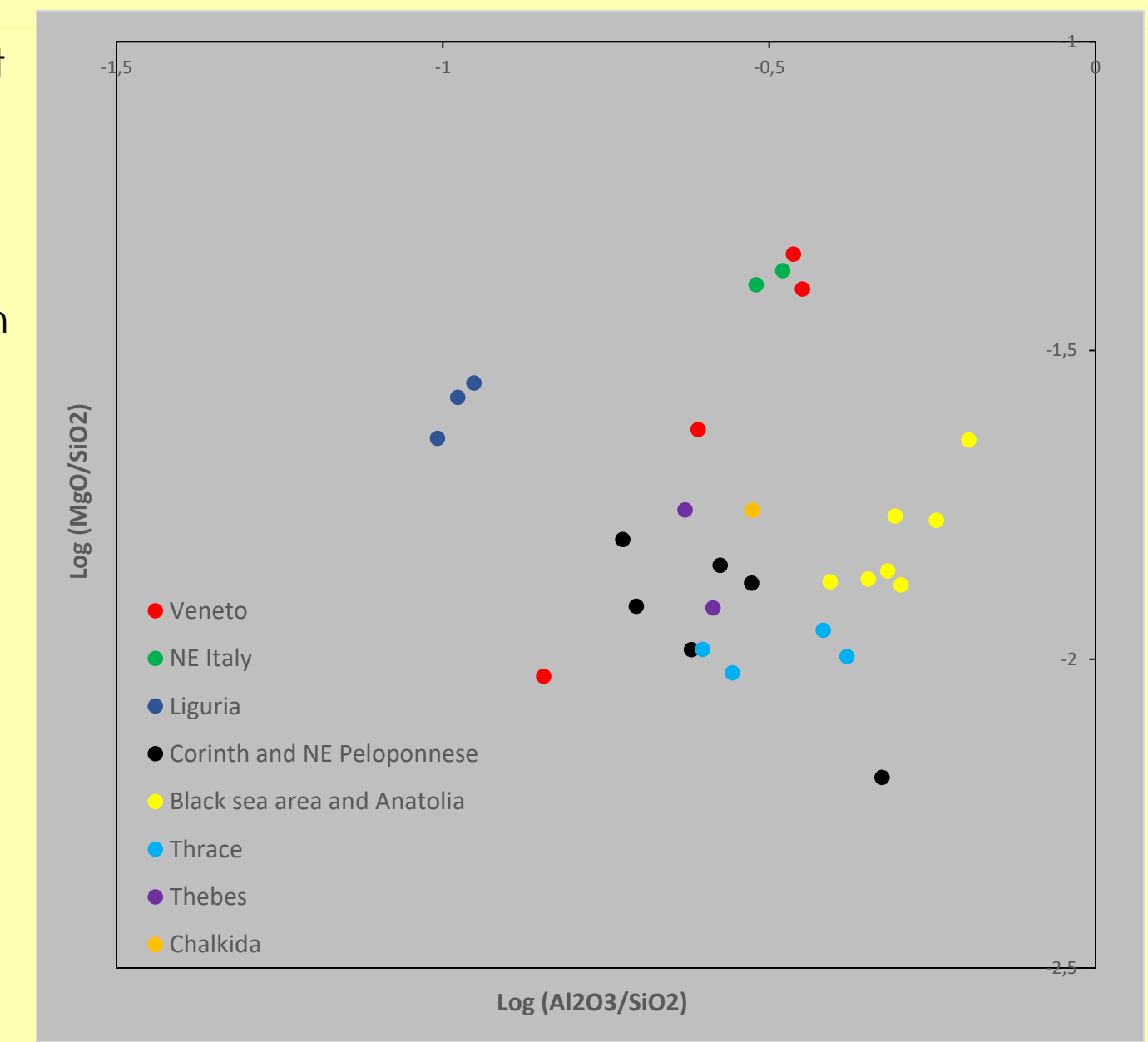
In most workshop productions identified in the study, Zeuxippus wares do not stand out by their decorative materials or techniques. The only exception to this pattern is the Zeuxippus imitations from Venice, which are characterized by high-quality kaolinic slips and by the use of Sb-based yellow pigments, both elements which seem to have a Byzantine origin.

Glaze composition patterns finds some good match with the geopolitical organization of the Aegean region, thereby indicating some « regionalism ». Indeed, some trends are specific to Late Byzantine lands (Thrace, Anatolia), to Latin territories in Greece, and to northern Italy. These trends suggest the use of different techniques of glaze preparation and application on the ceramic body. Therefore, these techniques may be - to a certain extent - culturally-oriented. This hypothesis is reinforced by the patterns of use of Sn-based pigments in Latin lands, and Sb-based pigments in Greek workshops of Byzantine tradition.



EDS analysis identified that all slips are Ca-poor (CaO < 1.5%) and made of kaolinic clays Al₂Si₂O₅(OH)₄ of various qualities. Al-contents are the highest in fine-grained slips (Anatolia, Black Sea).

High-quality kaolinic clay deposits occur in the Black Sea region, while they are harder to find in northern Italy. This explains the match between pottery provenance and slip textures. Venetian wares, nonetheless, display high-quality kaolinic slips.



Pigment analysis

SEM-EDS analyses identified three ways of obtaining yellow glazes among the sampled set:

- The occurrence of Fe³⁺ ions in all samples is responsible for yellow-brown tinges of the glazes, while transparency is not affected.
- The addition of crystalline pigments containing Sn and Sb (i.e. lead stannate, lead antimonate) is responsible for a lemon yellow glaze colour and can also lead to partial opacification, even at low concentrations (<1% oxide)

Sb-based pigments are identified among Greek productions of Byzantine tradition - Corinth, Thrace, Chalkida - but they are near-absent from productions from the Late Byzantine Empire - Black Sea area, Anatolia. Lead antimonate was also used by Venetian potters in the 14th c., at least for the production of Zeuxippus ware imitations. Sn-based pigments are identified among productions from Latin Greece - Thebes, Attica, Corinth. They have also been spotted among Genoese products, but in no other Italian imports.