Chemical analysis of archaeological ceramics from the 8th – 7th century pre-Roman site of Falerii Veteres, northern Lazio, Italy

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Table of contents

Table of figures

1. Introduction

1.1 Research background

The research conducted on the earliest Faliscan *impasto*, the chief ceramic production during the Orientalizing period in the Etruscan and Latin areas, has significantly widened our knowledge about the early history of Falerii Veteres and the cities in its hinterland (Biella, 2007; 2008; 2010; 2013a; 2014; de Lucia Brolli et al., 1991; de Lucia Brolli et al., 2012). *Impasto* is a common term used in pottery studies to indicate a vessel of a coarse fabric with a fair amount of inclusions, which are visible with the naked eye (4 to ¼ millimetre in diameter). This characteristic made the clay not suitable for high speed wheel throwing, as the material would cut the potters' hands (Nijboer, 1998, p. 102). Impasto vessels were thus wheel thrown on a slow wheel, which, in Italy, continued at the same time as the production of vessels that were thrown on high speed wheels, which emerges around the 8th century BCE (Nijboer, 1998, p. 101). Extant evidence shows that Faliscan impasto ware largely dominated both in the household and in the several burial grounds discovered in and near the cities of the *Ager Faliscus*, or the Faliscan area. Within this ancient landscape multiple productive centres were active. Falerii Veteres, Narce, Nepi, Corchiano, Vignanello and Gallese all seem to have been represented by local productions or workshops (Biella, 2013a; Biella, 2014). Impasto ware is separated across production type, traditionally we distinguish incised, engraved and red-on-white vessels (Biella, 2013a, p. 107). Explicitly dominant at Falerii Veteres were the incised and red-on-white types (Biella, 2013a, p. 110). Over 650 of the incised impasto vessels from the Ager Faliscus have been published (Biella, 2014; see also Biella, 2018a, p. 308). Just over 220 find their origin directly in the main town of the Faliscan area: Falerii Veteres (Biella, 2014, p. 37-79). In general, Faliscan impasto ware stands out from other comparable wares produced in Lazio at this time due to the wide range of decorative motifs, inspired by the ceramic artefacts manufactured and circulated in the Greek colonies on the Tyrrhenian coast and southern regions of the Italian peninsula, known as the Orientalizing ware, and by the bucchero vessels produced in the Etruscan region to the north (see for the Orientalizing period below; for the comparison of the bucchero to the impasto: Biella, 2013b).

Based on form typology and decorative style, researchers suggest that the artefacts recovered from both domestic and funerary contexts of Falerii, belong to the same local artisanal recipe (Biella, 2008, p. 36; 2013a, p. 110; Carlucci, 1998, p. 13). This is argued to be true for all the different production centres of the cities of the Ager Faliscus, which seem to maintain typical local interpretations of incised impasto wares in the early to middle Orientalizing period (Biella, 2013a). At the same time the northern regions of Etruria and Veii quickly adopt and produce bucchero wares (Biella, 2013b). However, a systematic study of the physical and compositional characteristics through the application of archaeometric techniques on incised impasto is yet to be performed. Identifying the clay recipes used by Faliscan potters to produce such vessels, becomes then a necessary step in order to assess craft organisation and artisanal practices at Falerii Veteres and, more

broadly, to gain a better understanding of ceramic production, technological choices and raw material provenance in pre-Roman Etruria and Latium.

1.2 Research aims and questions

My thesis aims to contribute to fill such knowledge gap by applying analytical techniques available in materials science, which is broadly defined as the application of scientific techniques developed within the range of the natural sciences, such as biology, chemistry or physics, in order to answer archaeological questions (Britton & Richards, 2019, p. 4).

The research of this thesis revolves around the main question: "**How did potters' technological choices develop at Falerii during the Orientalizing period (8^{th} – 7^{th} centuries BCE) when it comes to the traditionally produced incised impasto ware?"** with the following sub-questions:

- What raw materials were used?
- How were the raw materials combined and processed to create the different coloured decorations?
- What can be said about the origins of the raw materials?
- What sort of changes in terms of raw material usage can be observed throughout the Orientalizing period?
- Do the raw materials and/or manufacturing processes differ if we compare those vessels found in the domestic and the funerary contexts?

The chronological focus of this thesis resides into what is labelled in relevant literature as the Orientalizing period. Cerasuolo (2016; 2019) separates the Orientalizing period into an early, middle and late period. These divisions are used in Italian literature, see table 1.1 as copied from Cerasuolo (2016, p. 29; 2019, p. 77). Most of the vessels in this thesis belong to an early or middle Orientalizing production, corresponding to the late 8^{th} – 7^{th} centuries BCE, see for a discussion of the periodization of the material **chapter 5.3**.

Table 1.1 Periodization of the Orientalizing period into three groups and their estimated chronologies.

Period	Chronology
antico / early Orientalizing	Ca. 720 – 675 BCE.
maturo / middle Orientalizing	Ca. 675 – 630 BCE.
recente / late Orientalizing	Ca. 630 – 575 BCE.

The Orientalizing period had a great impact on the history of the Mediterranean, being a period of major cultural and economic flourishing. The period is characterized by an intense connection of the Mediterranean coasts. The period saw widespread travelling of ideas (namely for this thesis: knowledge and fashion of decorative motifs on ceramics), objects, customs and even people. These people were responsible for the wave of knowledge and their trades which spread all over the Mediterranean (Cerasuolo, 2016, p. 29). The Orientalizing period as concept was first

introduced in the 1860s, when large groups of vases that showed similar decorative patterns were labelled as oriental, Orientalizing or Graeco-Asiatic (Gunter, 2009, p. 62). The grouping of ceramic vessels together as "Orientalizing" began in the 1870s, to designate works of Greek art influenced by eastern models, initially for vase painting (Gunter, 2009, p. 64). An example of such a tradition being imported west and inserted into a local tradition is given by Johnston (1993). A warrior and a rider are painted on a small oil-flask, a typical Greek scene, meanwhile, they are accompanied by a scene of animals which normally are only seen on vessels from the east; a deer, a lion and a floral tree (Johnston, 1993, p. 31). Animal violence also features often on Orientalizing vessels (Johnston, 1993, p. 32), of which vessel #350, incorporated in this thesis (see Appendix 2), is a prime example. It contains the leg-in-mouth motif, which is a typical decorative element during the Orientalizing period (Rasmussen, 2014). It has been argued that the Orientalizing wave of ceramic production hit central Tyrrhenian Italy between the second half of the 8th and the 7th centuries BCE, as then the Orientalizing influences on local impasto productions becomes visible (Biella, 2010, p. 141).

Within this period of change the Faliscan incised impastos maintained their local character, it continued to be created according to traditional morphology, using the same production process. However, potters were open to changes, as from the 8th century onwards they began widely adopting Orientalizing-style decorations. In fact, the decorative motifs attributed to such style distinguish the impasto traditionally produced in the Ager Faliscus from the Orientalizing impasto which dominates from the middle of the 8th century onwards (Biella, 2010, p. 141). Understanding the technology of such distinctive production, the provenance or raw materials and their different uses, is pivotal to shed light on what has been framed as thriving artisanal activity in 8th – 7th century Falerii.

To do so, I will first, in chapter two, outline the archaeological contexts from which the ceramic data are derived starting with a description of the history of the Ager Faliscus, the development of the city, its urban sanctuaries and the connected necropoleis. Chapter three will describe the relevant materials and applied methodology. Chapter four will present the results which were analysed using Excel and presented in bivariate plots. Chapter five then discusses these results. Finally, chapter six will provide a conclusion and will answer the research question.

2. The main town of the Ager Faliscus: Falerii Veteres

2.1 A brief history of the region

Archaeologically, we can trace the history of the Ager Faliscus back to the Late Bronze Age (LBA), with continuous occupation spanning into the Early Iron Age (EIA). The main centres that rise during the EIA are directly connected to LBA settlements (de Lucia Brolli et al., 1991, p. 8). This image of continuity of settlement location is similarly observed in north-eastern Italy in this period (Saracinoa et al., 2014, p. 92). From the 8th century onwards the settlement of Falerii Veteres is recognized as the main town of the Faliscan region. Geographically, the Ager Faliscus was bound to the east by the Tiber river, which characterized the landscape of the region, laying in its drainage basin (see figure 2.1).

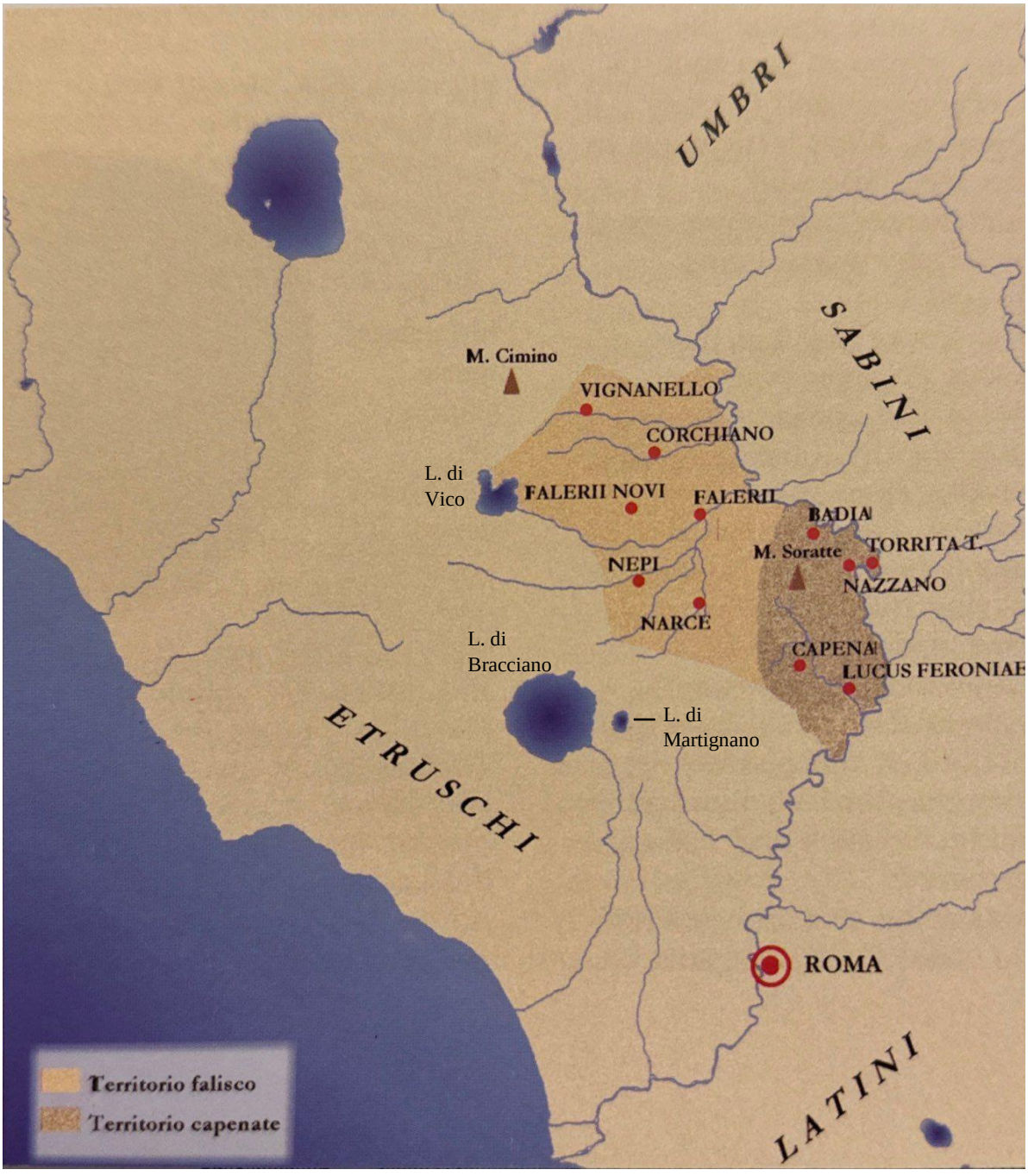


Figure 2.1 – The Faliscan territory wedged between their Etruscan, Latin, Capenate and Sabine neighbours – modified map after Carlucci (1998, p. 7).

The Faliscan territory stretched out from the Cimino massif south-east, following the river Tiber, incorporating the small lake Vico as its north-western border, up until lake Bracciano as the south-western border.

The Tiber river functioned as the main communication route within the earliest period of central and northern Italy. Communication also went over it, from the Sabine region, which lay on the eastern bank, into the Faliscan region laying on its western bank and vice versa. During the LBA, main towns develop either near or along tributaries flowing into this river (de Lucia Brolli et al., 1991, p. 7; p. 18). The river Treja was the main tributary that flowed through the Ager Faliscus. It supplied the two most important urban settlements in the region, these being Falerii Veteres, positioned furthest north, closest to the Tiber, and Narce, positioned further south, down the river Treja (de Lucia Brolli et al., 1991, p. 11; p. 18).

The Ager Faliscus was bordered on the east by the Sabines and the Capenates, on the south by the Latins and on the north by the Etruscans. In between these tribal powers the Faliscans seem a peripheral reality, acting as a sort of middle ground, absorbing all sorts of inputs from the various regions around her, while maintaining a local cultural identity (Biella, 2013a, p. 122; 2014, p. 30; 2020, p. 91). They were spatially well connected within their environment through rivers and valleys and also had access to the Roman road system (see figure 2.2).

This image of close connection is especially confirmed from the 8th century onwards (Biella, 2018b, p. 36). It is observed that the Faliscans were influenced by the Etruscan (Biella, 2013b), the Latin and the Capenate peoples living around them in terms of material culture and architecture. The Faliscan language has been observed to be a Latin dialect (Bakkum, 2009, p. 9), with inscriptions in the Ager Faliscus being written in local Faliscan alphabet. Interactions between Faliscans and their neighbours thus was intricate. Between the end of the 8th and beginning of the 7th century BCE, a process of gradual differentiation in "cultural" traits starts to emerge from the archaeological record (Biella, 2013a, p. 108; Carlucci, 1998, p. 12). A fine example is provided by the continued preference of Faliscan artisans and customers for local pottery – especially the incised and the red-on-white impasto productions, whose unique morphological, decorative and technological repertoire reflects such process particularly well (Biella, 2013a, p. 110). Above all other ceramic types, the incised ware dominated the artisanal landscape of Falerii Veteres itself, where the sample size is probably the largest and the presence of a unique decorative repertoire is also most extensive.

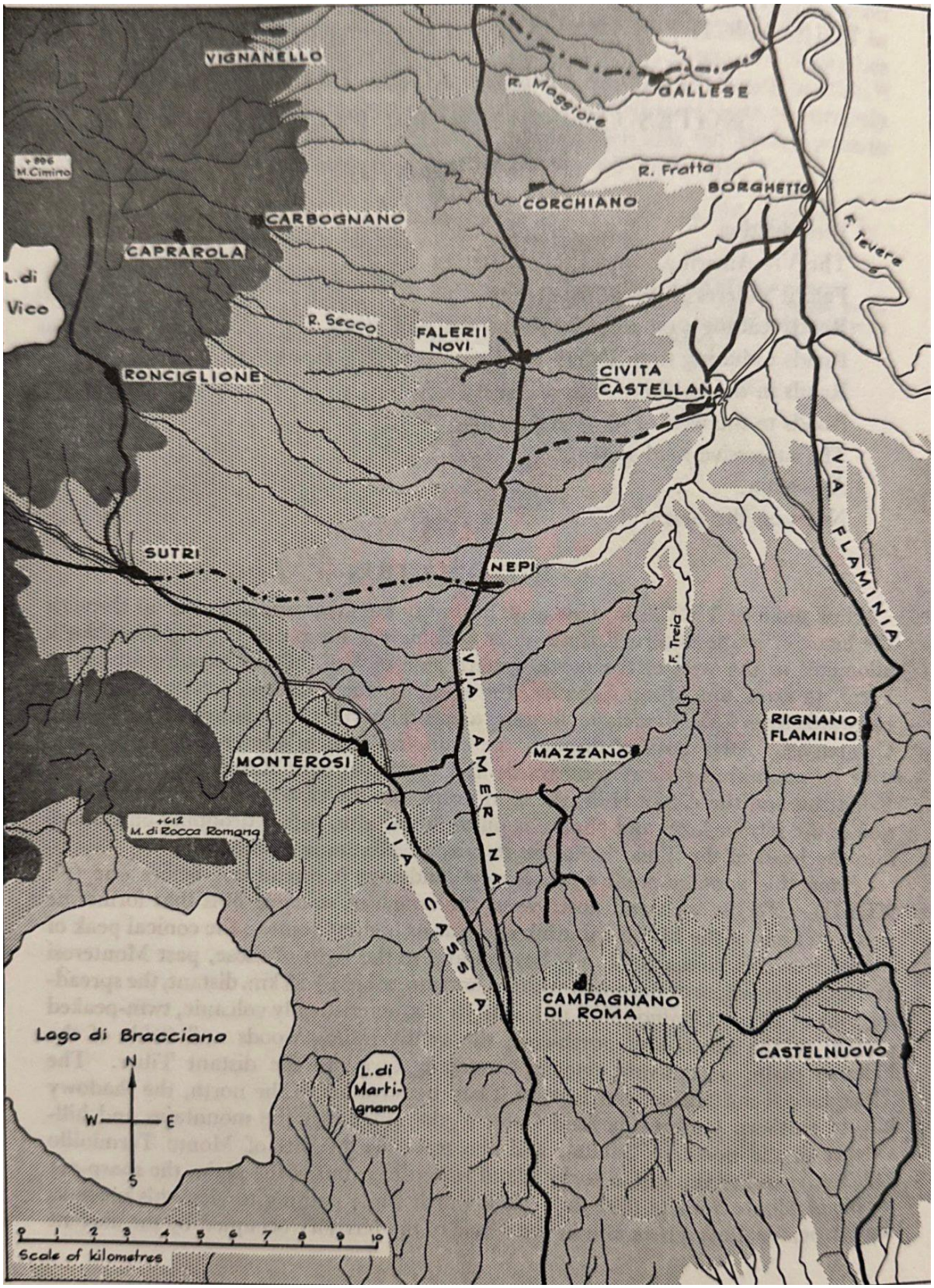


Figure 2.2 – Falerii Veteres (with its modern name Civita Castellana) as it was spatially connected within its environment via the Roman road system, the Ager Faliscus is indicated as Greyish blue, while the outside region is dotted black – map after Ward Perkins and Frederiksen (1957, p. 68).

2.2 The city of Falerii Veteres

Ancient Roman sources also described the *Falisci* (Faliscans in Latin) as the population living in the Ager Faliscus. Ovid, the classical poet writing early during Augustus' reign mentions how the Faliscans could trace back their origin to the Argive hero Halesus, a son of the great Greek leader Agamemnon (Ovid, 3, 13, 31). After returning from Troy, Agamemnon and his companions were surprised by Agamemnon's wife Clytaemnestra who had taken on a new husband. A fight ensued which led to the death of Agamemnon and the abandonment of the property by his son Halesus. He was forced to flee his country and finally found his way to Italy. Here, as Ovid states, he founded the main town of the Faliscans: Falerii (Ovid, 3, 13, 31). By the first century AD, it was clear that Falerii had lost its once powerful position as an independent city, at this time it was fully integrated into the Roman sphere of influence (Biella, 2018b, p. 36). Strabo (5, 2, 9) describes Falerii by mentioning it among a number of other minor and unimportant settlements.

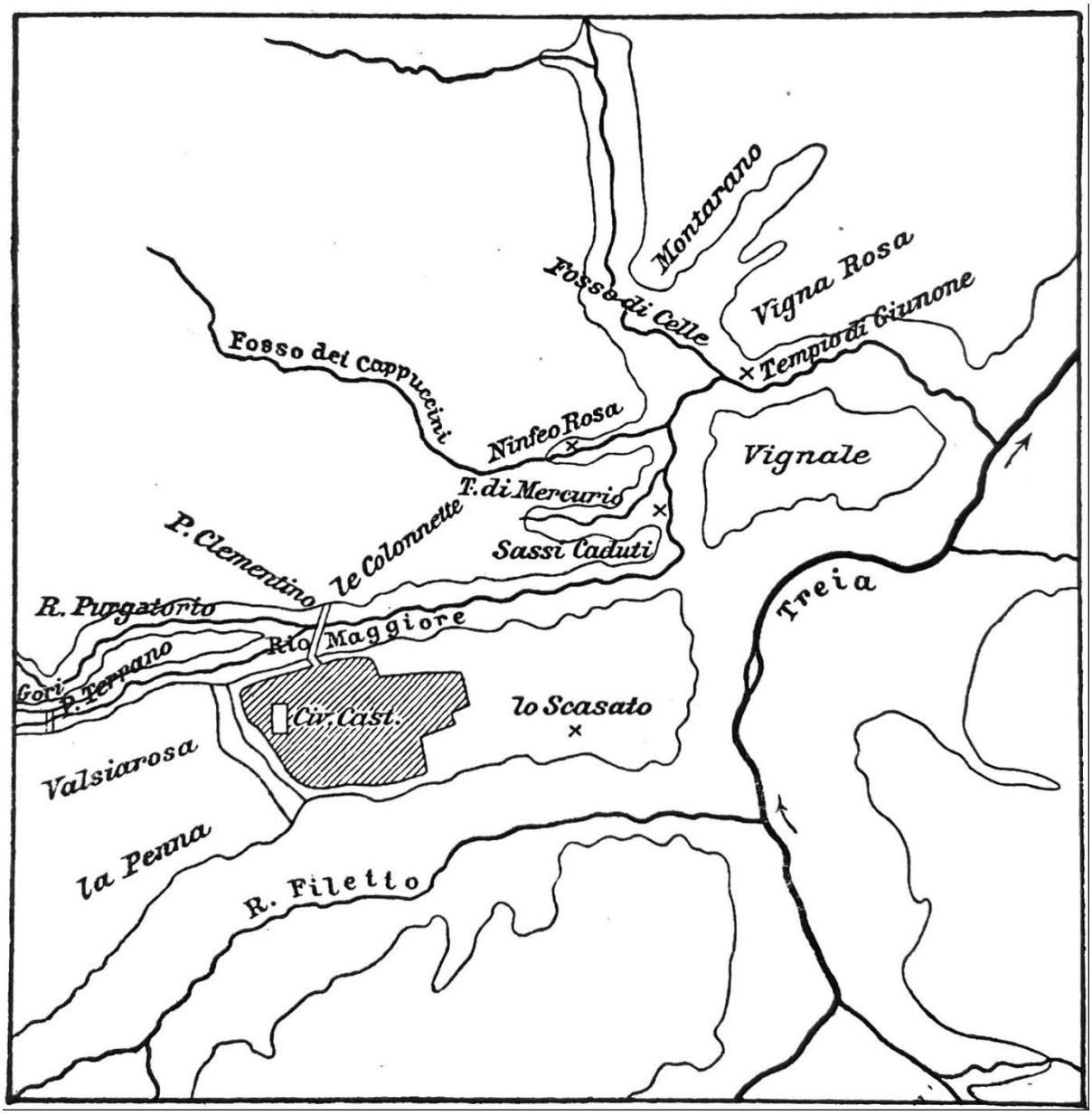


Figure 2.3 – Overview map of the Vignale hill and Medieval Civita Castellana (in dashed lines), showing the names of the important river Maggiore, the river Treja and lo Scasato, next to other geographical names, necropoleis and sacred areas (CIE, II.II.1, p. 5).

As the poetical description of a mythical past alludes to, Falerii had not always been such a minor or unimportant city. Falerii would emerge from the LBA settlement which had occupied the Vignale hill in the LBA. During the LBA, the settlement covered an extension between 11 – 13 hectares, on the surface of Vignale hill (Biella, personal communication, May 30, 2023). This settlement is associated with the necropolis known as "Montarano South", which housed burials dated to the early 8th century BCE (de Lucia Brolli et al., 2012, p. 62; de Lucia Brolli et al., 1991, p. 9). This necropolis fell out of use by the 7th century. In the early 7th century the settlement of Vignale expanded and incorporated the Civita Castellana plateau. The necropoleis of Penna, Montarano NNE, Montarano North and Cappuccini together with new burial practices were introduced in this period. The complex moment that marks the transition from the Bronze Age to the Iron Age, which sees much cultural development, is not fully understood for the Faliscan territory. The understanding of this period is especially problematic since neither Montarano South nor other known necropoleis have burials spanning the period before the 8th century BCE (de Lucia Brolli et al., 1991, p. 28).

However, the rich Orientalizing necropolis of Penna seems to clearly represent a development of the settled area starting in the early 7th century. By the 7th century the city incorporated the modern Civita Castellana plateau and the Vignale hill (see figure 2.3). The growth of the settlement and its city centre would continue to span 30 hectares by the 5th century, when the Civita Castellana plateau was enriched with a walled perimeter. Eventually the city would grow to a maximum of 44 hectares (Biella, 2018b, p. 34). The Vignale hill also had its own walls, and now fulfilled the function of acropolis, enriched with a significant sacred area (Biella, 2019, 29-30; de Lucia Brolli et al., 1991, p. 28). The walls that protected the city were built during the period of first hostilities with Rome, in the 5th century. Only small sections of the wall are still visible today, built in squared masonry using local tuff stones (de Lucia Brolli et al., 1991, p. 30). The considerable collective effort required to build masonry city walls allows us to imagine the socio-economic scope these projects must have had on the inhabitants of Falerii. Blocks needed to be quarried and, according to later Roman sources, laid out to weather for at least two years before they were useable as above ground building blocks (Vitruvius, *On Arch.*, 2, 7, 5; Pliny, *N.H.*, 36, 50, 170). The scale of this operation was immense and required well thought out urban planning (Biella & de Lucia Brolli, 2022, p. 130). Information to the layout of the urban area is judged from topographical names and archaeological survey, as well as from the testimonies relating to the many sanctuaries scattered around Falerii, of which two are described in more detail below as they produced three of the fragments recorded from the settled area incorporated within this research.

The Civita Castellana plateau was bound by the Rio Maggiore river to the north, by the Rio Filetto river to the south and the river Treja on the east. The Treja flowed northward, bending off eastward at the slope of Vignale hill to continue north around her (indicated by arrows on figure 2.3). The identification of Falerii as Falerii "*Veteres*" is a modern scholarly construct, to distinguish the 7th century settlement that grew out of the LBA settlement on Vignale hill, incorporating the Civita

Castellana plateau, from the later Roman settlement of Falerii "*Novi*", which was built by the Romans, west of the ancient city and housed the deported population that survived the final onslaught of 241 BCE (de Lucia Brolli et al., 1991, p. 28). In antiquity the settlement on Vignale hill was connected to the modern-day Civita Castellana plateau by a thin stretch of land (de Lucia Brolli et al., 1991, p. 28), which has completely eroded in modern times (see figure 2.4, below).

Figure 2.4 – A view of the Civita Castellana plateau from the northeast – picture taken from the Vignale hill access point looking southwest. Note how the thin stretch of land, which would have connected the Vignale hill and the Civita plateau on the right side of the picture, is completely gone – picture by me, taken February 2023.

The large eastern area of the Civita Castellana plateau, known as "Lo Scasato" in 19th century sources, housed a religious centre, which simultaneously was active as a productive quarter (de Lucia Brolli et al., 1991, p. 30). The sacred area of this religious centre was closely connected to the residential district of the town, on a main road axis and was built during the urban development of the 6th century. The other religious areas of the settlement were spread along the walled perimeter of the town. This connection of the religious centre near Lo Scasato with artisanal activities is also suggested for the most northern cistern of Vignale hill, due to the presence of moulds and terracotta remains. The town spread out all the way west following the Civita Castellana plateau, while its city walls separated the town from the Penna necropolis to its west (see also figure 2.6, on page 22, below).

2.3 The urban sanctuaries

Falerii had up to fourteen urban, semi-urban and rural sacred areas (Biella, 2019, p. 28) with a firm chronology spanning the 6th to 1st centuries BCE. Nine of these are recognized on the Civita Castellana plateau itself (Biella, 2019, p. 26). The other sanctuaries were dotted around the urban landscape. One on the Vignale hill, having two separate cisterns, another was located along the course of the Rio Maggiore river close to Celle, and one near the area of the ditch of the Cappuccini, boasting healing waters (de Lucia Brolli et al., 1991, p. 32-38). Biella and de Lucia Brolli (2022) have systematically studied the urban sacred contexts according to three proxies, for which the socio-cultural impact on those living and working in Falerii was analysed. These proxies were the physical ruins, the tools and moulds used to create the decorative and structural elements, and the decorated elements themselves (Biella & de Lucia Brolli, 2022, p. 127). Only a few ruined structures which had been excavated are still visible within the landscape today. Most had been excavated between 1887 and 1888 and traces were removed in favour of the expansion of the modern town (Biella & de Luca Brolli, 2022, p. 128). Especially the sacred area near Lo Scasato, on the Civita Castellana plateau, and the sacred area on the Vignale hill with the two cisterns, give insight into the peculiar connections of religious as well as productive activities that took place at these urban sanctuaries.

2.3.1 Lo Scasato

The area known as Lo Scasato, or simply Scasato (see figure 2.3) housed a number of different sanctuaries, whose existence is now only attested through the architectural decorations which remain preserved in the Museo Nazionale Etrusco di Villa Giulia in Rome and the Museo Archeologico dell'Agro Falisco, located in the 14th century Forte Sangallo in Civita Castellana. In the 1990s two sanctuaries were recognized and archaeologically explored and a third was identified (Biella, 2019, Fig. 1, p. 26; see also de Lucia Brolli et al., 1991, p. 32). The oldest sanctuary was accidentally discovered in 1924, located furthest south-east, on, what would have been, the edge of the settled area. This sanctuary had once held a temple with three cells, decorated by a pediment with a head of Zeus in high relief. The second sanctuary was located in a central position, oriented east to west, along a road axis which was identified on the basis of a subterranean water drainage tunnel. Excavations of 1887 – 1888 allowed the identification of a number of walls. It has later been hypothesised, based on the notes of these excavations, that the width of the temple was 17 meters (de Lucia Brolli et al., 1991, p. 32). The temple had a pronaos with decorated columns still having remains of painted stucco visible. These columns were 6 meters high, of which two have been reconstructed in the Villa Giulia museum (de Lucia Brolli et al., 1991, p. 32). An open air cistern with a 13 by 13 meter square plan has been ascribed to the sacred area. Its religious function is unclear, but water collection and management is confirmed by the identification of a drainage tunnel. In the first century BCE the temple fell out of use, elements of the architectural terracottas were thrown into the cistern and the area was covered with dirt (de Lucia Brolli et al., 1991, p. 32).

The peak of religious activity seems to date to the end of the 4th to the early 3rd centuries, based on the work of a workshop which created new sculptures in the latest Greek style during this time. The temple remained active, even though on a lower scale, after the Roman conquest of Falerii in 241 BCE, up until the 1st century BCE, when the structural elements were buried in the cistern. The workshop offered a centre for craft activity, not only when the new sculptures in Greek style were made, but possibly on the long term.

2.3.2 The sanctuary on the acropolis of Vignale hill

On Vignale hill lay a sanctuary provided with two different cisterns which also acted as both a religious and productive site. In recent years the southern part of the hill was used as a communal grazing pasture. Surveys in this area locate here the most ancient settlement area which had extended from the LBA into the EIA (Carlucci et al., 2007). Based on ground penetrating radar the most promising area with traces of the ancient settlement were mapped and during the summer of 2022 excavated for the first time. A second season is planned for the summer of 2023, enlarging the area of excavation. The excavations of 2022 resulted in the bulk of the ceramic material belonging to the settlement, which are analysed within this thesis. Early excavations spanning 1895 – 1896 had discovered two cisterns, one on the northern half of the hill and the other near, what is now understood as, the settled area, on the southern half of the hill. The northern half is now inaccessible as the land is now private property. The 19th century excavations identified these cisterns as belonging to a major and a minor temple. This hypothesis has more recently been questioned (de Lucia Brolli et al., 1991, p. 33). The architectural terracottas that were excavated in the northern cistern are now being interpreted as belonging to two phases of the same building (de Lucia Brolli et al., 1991, p. 34). Votives that were found relate often to parts of the human body, or children in swaddling clothes. These votives allude to the possibility of the identification of a deity related to fertility, birth and healing. A fragment of Attic-type ceramics, from the 2nd century BCE, bears an inscription in Faliscan script dedicated to the God Apollo, suggesting the temple might have similarly been dedicated to Apollo. Especially within the guise of healing, this God could have been venerated here (de Lucia Brolli et al., 1991, p. 35).

While a workshop area has not been found on Vignale hill, moulds designed to create decorative elements for temples, found within the northern cistern, suggests such activities took place here as well. It is clear that these moulds were not only used for the sacred area on Vignale hill, but for temple decorations all over the city (Biella & de Lucia Brolli, 2022, p. 135). This suggests that intentional effort was made to use these moulds explicitly careful, so as to not damage them. This would allow for them to be re-used during the construction of a different sacred project within the city. In this way the economic impact of the construction of decorative pieces needed during the construction of a sacred building could be lowered (Biella, 2019, p. 30; Biella & de Lucia Brolli,

2022, p. 135). We might also suggest then that if the moulds were re-used, so too were the artisans, who must in that case have been locals, or at least worked locally.

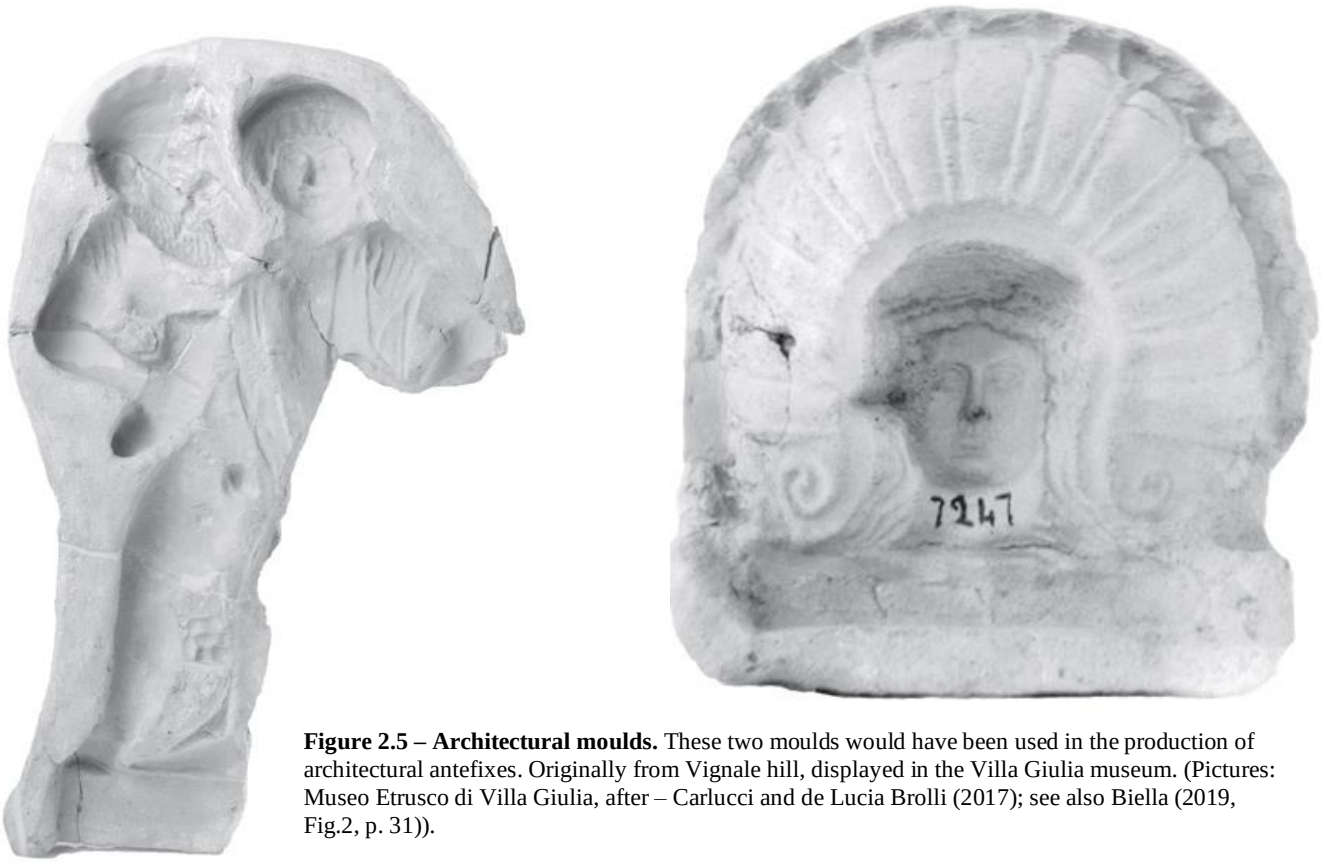


Figure 2.5 – Architectural moulds. These two moulds would have been used in the production of architectural antefixes. Originally from Vignale hill, displayed in the Villa Giulia museum. (Pictures: Museo Etrusco di Villa Giulia, after – Carlucci and de Lucia Brolli (2017); see also Biella (2019, Fig.2, p. 31)).

Moulds were used to create both architectural terracotta elements (e.g., figure 2.5), as well as votive elements to be offered to the Gods. The same artisans were probably employed for both purposes. If the temple at Vignale held the moulds, they could have regulated the economic activity of the production of votive materials, which are observed to be applied all over the urban sanctuaries of Falerii. For instance, the open-work cresting that was found at Scasato 1 was also used at the Scasato 2 sanctuary (Biella, 2019, p. 30). While the moulds were held at Vignale hill the temple regulated and controlled the productive economy of votive elements and would have reaped all the benefits of this production process (Biella, 2019, p. 29-30; Biella & de Lucia Brolli, 2022, p. 137). The main question for this control then becomes the supply of raw materials, for which clear answers are, as of yet, lacking. Raw material sources have been mapped by Augusto Ciarrocchi, relating to ceramic production at Civita Castellana in the 18th and 19th century. Based on this map, Letizia Ceccarelli aimed at providing information regarding which minerals were found in the mapped raw materials and the effect of different firing temperatures by testing samples of local clay using X-Ray Diffraction (published in the two appendices in Biella & de Lucia Brolli, 2022, p. 140-144).

A final important aspect of the city of Falerii Veteres were the many necropoleis that lay dotted around the ancient landscape. During the excavations of tombs found in these necropoleis

many impasto vessels with incised decorations filled in white, red or having no clear paste were recovered and published (Biella, 2014; Cozza & Pasqui, 1981; de Lucia Brolli, 1998). The rich remains found within these necropoleis can confidently place the settlement history between the 8th to the 3rd century BCE, ending with the Roman conquest and deportation of the citizens, as outlined above, in 241 BCE (de Lucia Brolli et al., 1991, p. 39). The sacred areas were maintained a bit longer, continuing into the 1st century BCE, as we have seen.

2.4 The necropoleis of Falerii Veteres

Falerii Veteres was associated with at least nine different necropoleis. A significant part of the vessels included in this thesis originate from six of them. The emergence of so many different necropoleis at the same time attests to the growth of the city during the late 8th – 7th centuries BCE. The six relevant necropoleis selected for this thesis are Penna, Celle, Montarano NNE, Montarano N., Cappuccini and Monte Paglietta (see figure 2.6 for their spatial location) and will be described below.

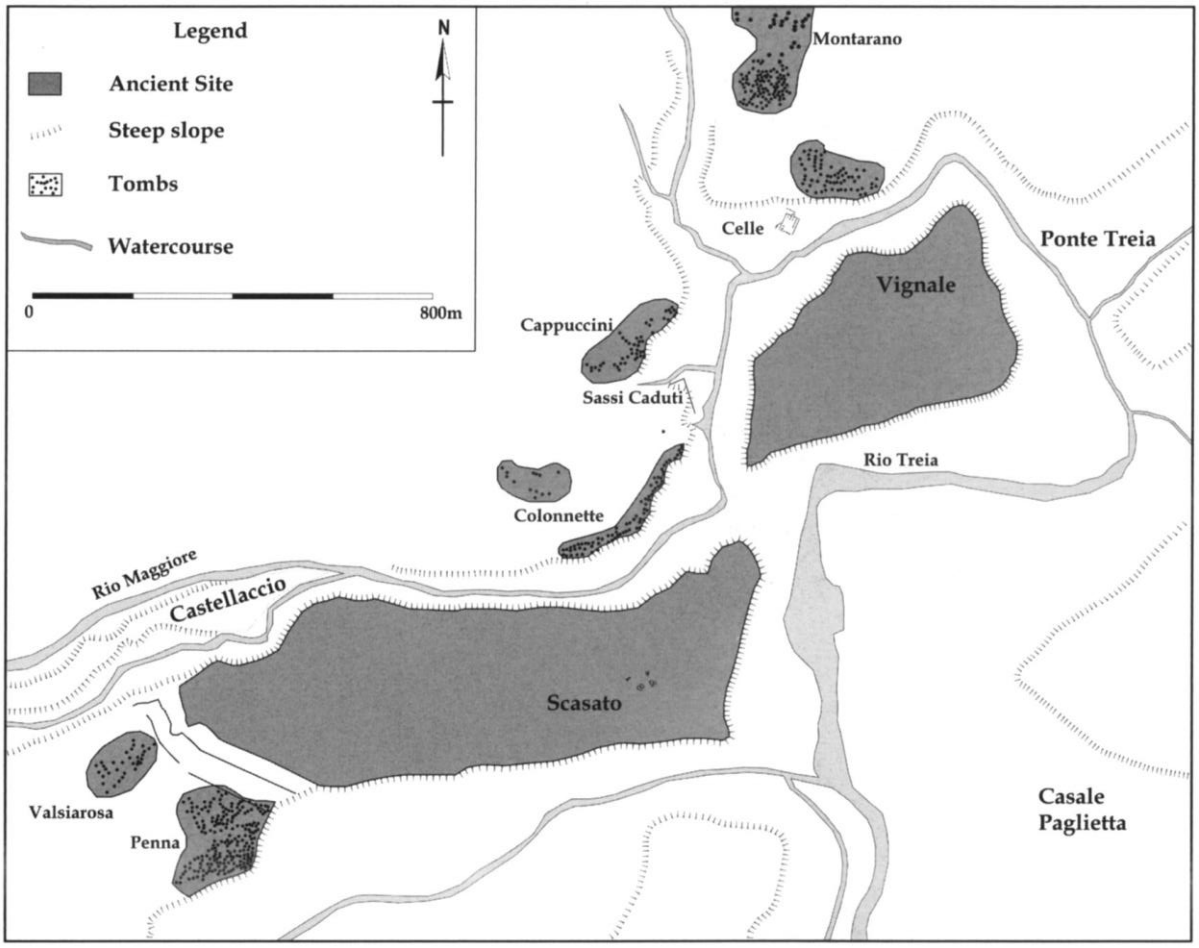


Figure 2.6 – A simplified map of the 7th century settlement of Falerii and its necropoleis. Next to the different necropoleis, indicated are Vignale Hill, the different Scasato sacred areas which lie on the Civita Castellana plateau and Casale Paglietta, which held an associated tomb nearby – map after Carlucci et al. (2007, p. 42).

2.4.1 The necropolis of Penna

The necropolis of Penna is located near the southwestern side of the Civita Castellana plateau (see figure 2.6, above). The necropolis was excavated between 1887 and 1890 and now lay largely destroyed in favour of the modern town – which has expanded westward and northward off the Civita Castellana plateau. The location of this necropolis has been crucial for the modern understanding of the western limits of Falerii in the 7th century BCE (de Lucia Brolli et al., 2012, p. 43). A city wall system separated the necropolis from the settlement. The necropolis was used between the 7th and the 3rd century BCE. The oldest tombs, pit tombs with one or two niches, were concentrated in the north-eastern sector of the burial area, closest to the perimeter wall. Following the ridge in south-western direction, toward the Rio Filetto river, would follow the perimeter wall and thus the settled area of Falerii (see figure 2.6 for the spatial location and figure 2.7, on the next page, for an overview of the necropolis).

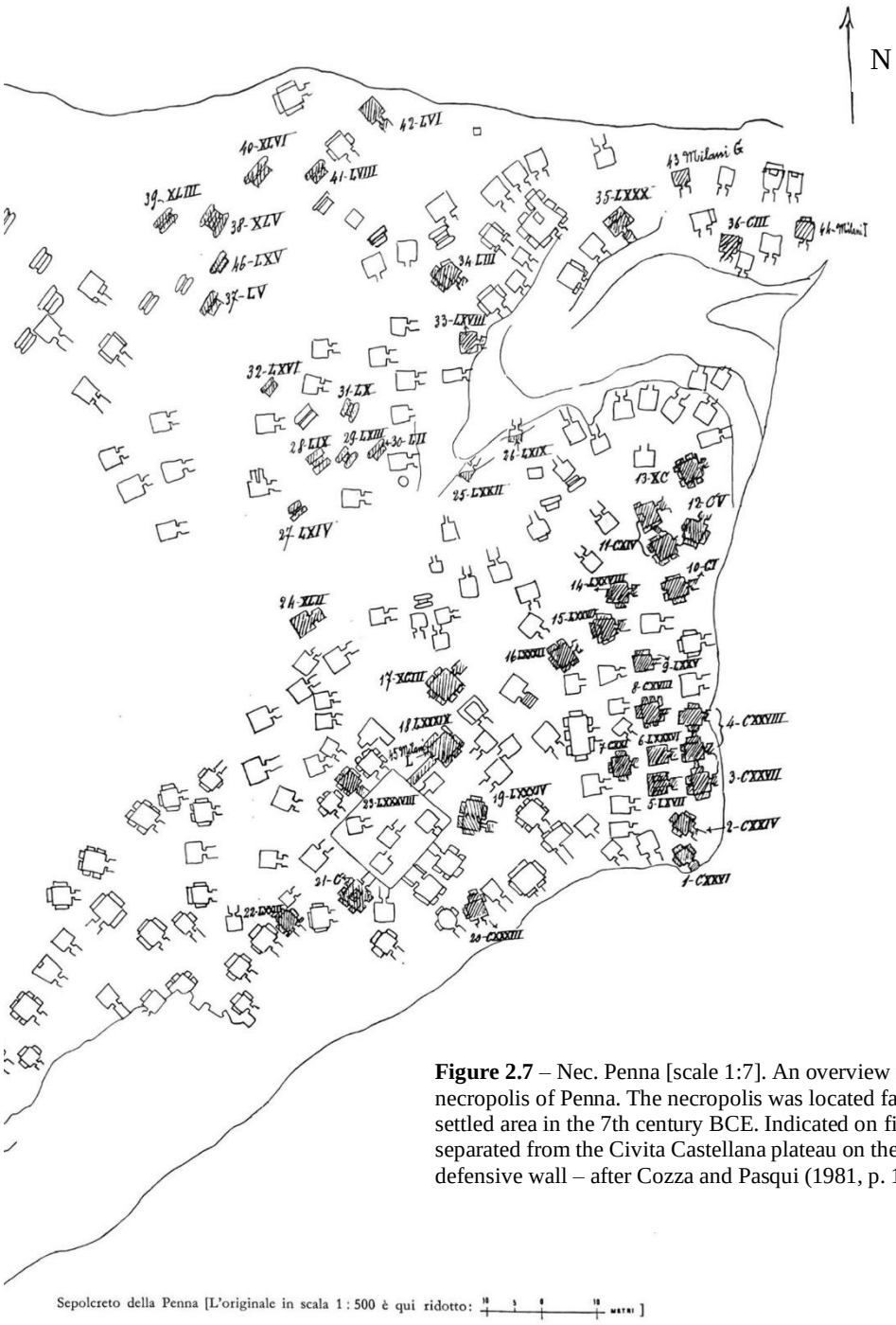


Figure 2.7 – Nec. Penna [scale 1:7]. An overview map of the necropolis of Penna. The necropolis was located far west of the settled area in the 7th century BCE. Indicated on figure 2.6, separated from the Civita Castellana plateau on the other side of a defensive wall – after Cozza and Pasqui (1981, p. 146).

This entire area was filled with tombs, with those furthest south being the youngest. From the 7th century onwards burials include simple chamber tombs, almost similar to pits, but also beginning to show social differentiation. Burying the dead in chamber tombs over pits is considered an important sign of a rapidly changing community, with individuals of higher-ranking preferring a more monumental style of burial (de Lucia Brolli, 1991, p. 29; de Lucia Brolli et al., 1991, p. 11). Some more richly decorated graves include burials in more complex articulation in large-sized chamber tombs with multiple chambers, sealed with blocks of tuff stone, often provided with a small niche for grave goods and a larger niche intended to contain the deceased (de Lucia Brolli et al., 1991, p. 11).

Some of the more elaborate burials were enriched with wooden tables, on which the

inhumated body lay. Entire tree trunks sometimes took this function, a custom which was already attested in the most ancient chamber tombs, finding comparison with Etruscan practices. Some of the richest tombs had a sarcophagus shaped from tuff stone, covered with a sloping roof lid, with burial gifts of prestigious objects, signifying the emergence of a clear upper class (de Lucia Brolli et al., 1991, p. 11). The transition from pit to chamber tombs went hand in hand with the transition from cremation to inhumation in this period (de Lucia Brolli et al., 2012, p. 43).

2.4.2 The necropoleis at Celle: Montarano South, North Northeast and North

The topographical indication of "Celle" within Falerii describes a plateau north of Vignale hill, where the Rio Maggiore river and the ditch of the Celle overlook the Vignale acropolis (see figure 2.6). The Celle plateau stretches from the similarly named ditch northwards into an elongated valley. East of this valley lay a stretch of land known as Montarano. At the end of the 19th century a number of necropoleis were discovered in this area. Two necropoleis were named by the excavators after the site of Montarano, respectively Montarano South and Montarano North-Northeast (NNE). More recent research of the late 20th century was able to add another necropolis to these two, which is known as Montarano North, laying just north of Montarano NNE. These names are essentially based on their spatial location within the Montarano stretch. When the larger Montarano South and Montarano NNE are compared we can recognize the same transition which we have seen taking place during the mid-8th to early 7th century at Penna also taking place here. Pit tombs more and more made way for chamber tombs, as this period of social change replaced cremation burials by inhumation burials.

As mentioned above, Montarano South was connected to the LBA settlement on Vignale hill, as part of a proto-Villanovan necropolis (de Lucia Brolli et al., 1991, p. 9; de Lucia Brolli et al., 2012, p. 62). The proto-Villanovans practiced cremation, which is attested in this necropolis. However, this necropolis seems only short lived. Abandonment set in from the early 8th century onward, continuing until its complete falling out of use between the middle of the 8th and the early 7th century in favour of the new necropolis Montarano North, further up north (de Lucia Brolli et al., 2012, p. 62-3). No Orientalizing impastos are known from this necropolis, as was mentioned, the Orientalizing wave of ceramic production had not yet hit central Tyrrhenian Italy before the second half of the 8th century, which strongly places the chronology of Montarano South prior to the mid-8th century BCE.

It becomes clear the community went through a period of social upheaval and changes during the final years of the 8th century BCE (de Lucia Brolli et al., 1991, p. 11). A simultaneous process of falling out of use of Montarano South and opening up of the new Montarano NNE and Montarano North emerges from the archaeological record. This transitional period, with the switch from cremation to inhumation, seems complete by the middle of the 7th century BCE. Almost all deceased were now buried in chamber tombs rather than pits, as the evidence from Penna, Montarano North and Montarano NNE indicate. However, recent excavations of a tomb in the necropolis of Cappuccini

shows how burial practices remained complex. The practice of cremation had not completely disappeared from Faliscan society, as will be shown below.

2.4.3 The necropolis of Cappuccini

The necropolis of Cappuccini had been known as early as 1883, as archival sources mention inscriptions related to a large chamber tomb with nineteen niches as well as two smaller tombs. de Lucia Brolli et al. (2012, p. 96) suggest that these inscriptions refer to infants. The necropolis was located on the south-eastern slope of the Cappuccini hill, which stands south-west of the Celle plateau and north of the Colonnette plateau (see figure 2.6). Looking east, on the opposite side of the ditch of the Rio Maggiore river, steeply rose Vignale hill (de Lucia Brolli et al., 2012, p. 69). Excavations of the south-eastern part of the Cappuccini slope were carried out in 1991, due to construction works for the laying of a new sewer system. This resulted in the discovery of a new tomb which was dated to the Orientalizing period. The tomb holds great interest for those studying the early impasto vessels from Falerii, because of its relatively undisturbed character (de Lucia Brolli, 1998, p. 181). Water had infiltrated the tomb, resulting in thick layers of mud containing archaeologically relevant materials. The burial chamber had an irregular L-shaped plan, which derived from an expansion which was carried out in the western sector (de Lucia Brolli, 1998, p. 186 and see figure 2.8, on the next page). It is presumed that during the first phase of use the burial chamber had a square plan with burial niches being closed off by tiles.

The tomb housed seven inhumation remains and a number of personal items; short swords, a larger slashing sword, daggers, knives and an object which morphology hints to a mount for a helmet or other type of headgear, which probably was originally made from leather. Another burial niche contained an iron javelin tip and leaf-formed blade. This burial niche also contained two iron fibulae and remains of an iron belt. The typology of this belt is not recognized as local Faliscan (de Lucia Brolli, 1998, p. 191). This type and its placement near the feet of the individual, hints to cultural practices of the Abruzzo region, on the other side of the Apennine mountains.

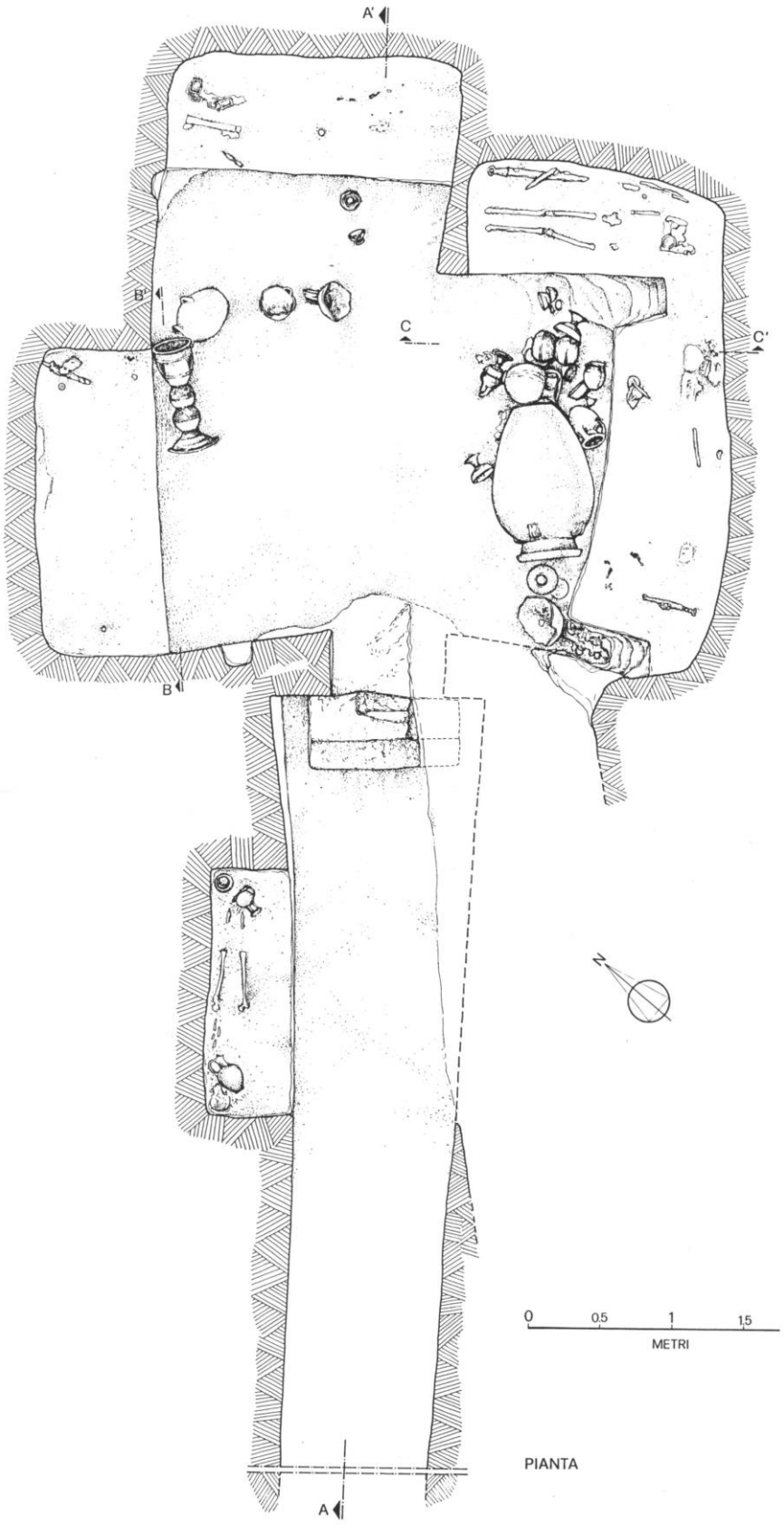


Figure 2.8 – Necropolis Cappuccini. Plan of the chamber tomb during excavation – after de Lucia Brolli (1998, p. 185).

Another interesting find hinting to one of the individuals' possible ethnic or cultural origin was an iron razor which had been placed inside a wooden case, in close relation to an iron dagger. This setup is again reminiscent to cultural practices with an origin on the other side of the Apennine mountains. In 7th century Abruzzo warriors were often accompanied by similar razors (de Lucia Brolli, 1998, p. 187, a complete study of these materials for central Italy was done by Bianco Peroni and Betzler (1979)). These finds are all taken to give conclusions regarding the sex and ethnic or cultural identity of the individuals, which allows de Lucia Brolli (1998, p. 194) to conclude that the individuals from phase 1 were probably buried during the middle of the 7th century and might have been immigrants. Phase 2 is dated to the late Orientalizing period (see table 1.1, above: 630 – 575 BCE). This same chronology applies to two other burials, a young adult adorned with many fibulae was buried together or slightly before a child (de Lucia Brolli, 1998, p. 193). In the final niche two individuals had been inhumated who were later carelessly moved over to make room for cremation remains of a 6 – 8 year old individual. This is identified as the last deposition before the tomb was closed (de Lucia Brolli, 1998, p. 194). The phenomenon of cremation burials within a community of inhumation burials is not unique for this tomb, it actually is observed sporadically into the 5th and 4th centuries. These cremations attest to some funerary belief differing from the by then common inhumation practice. The way the inhumated bones were carelessly pushed aside shows that this outside component of Falerii's society, had people with their own burial beliefs, who did not seem to care about the remains of those that practiced inhumation.

Finally, up to fifty pottery vessels were recovered, all relating to the cultural practice of banqueting (de Lucia Brolli, 1998, p. 198). The pottery vessels that were placed among the individuals were significantly moved around by the water that entered the tomb. It was thus not possible to identify which vessels belonged to which burials, with vessels spread out all around the floor (de Lucia Brolli, 1998, p. 194). Vessels #116760, #116780 and #116829 (see Appendix 2) are incorporated into the assemblage of this thesis.

2.4.4 The burials at Monte Paglietta

The hinterland of Falerii is much less understood than the settled area, its sanctuaries and necropoleis. Most 19th century excavations had focused on the sacred areas or the necropoleis surrounding the city. However, following the small road from Falerii leading south-east, toward the Roman road, the Via Flaminia (see figure 2.2), finds the site known as Monte Paglietta, which was excavated in the period 1887 – 1888. The exact location of this site has now sadly been lost, but it is known that it held a necropoleis which spanned the mid-7th to the first half of the 6th centuries. It is broadly identified as "Casale Paglietta" on figure 2.6 (on the other side of the Treja river, south of Vignale). The graves were richly adorned with grave goods, thus signifying the possibility of a yet unknown urban nucleus or, in the case of it being an isolated tomb, showing land ownage of a rich family (de Lucia Brolli et al., 2012, p. 71). Here and there along the Via Flaminia lay these isolated Faliscan style-tombs, with

wall niches and access corridors, sometimes connected to sections of cut roads which can still be identified, signify that the further countryside was also occupied by the Faliscans (de Lucia Brolli et al., 2012, p. 71). What chronological period we should assign to this extended sub-urban settlement practice can, in the light of the lack of evidence, not be concluded.

Excavations lasted from 1887 – 1888 and the recovered pottery vessels were identified to be from the Orientalizing period (de Lucia Brolli et al., 2012, p. 126). A study of the archival sources has shown that great interest went out to the materials that were excavated here. The Vatican Apostolic Library holds a list of a group of objects which were owned by a certain F. Pistola in Civita Castellana coming from the excavations of Monte Paglietta 1887 – 1888.

> "Gruppo di oggetti posseduti dal Sig. F. Pistola in Civita Castellana, provenienti dagli scavi 1887-88 di M.te Paglietta a sud di Vignale, presso la stazione tramviaria Ponzano-cave" (de Lucia Brolli et al., 2012, p. 127).

The list includes Orientalizing items which were later sold to the state and are now held in the Museo Archeologico dell'Agro Falisco in Civita Castellana. Until recently these materials were on display in the musem and some were described by de Lucia Brolli (1991, p. 33-34). The materials belonged to a period between the mid-7th to the first half of the 6th century (de Lucia Brolli, 1991, p. 34). One of the vessels that comes from this tomb is vessel #15765, which was added to the assemblage of this thesis.

3. Material and methods

Macroscopic fabric description and chemical compositional analysis were applied to a select assemblage of archaeological vessels and fragments from Falerii Veteres. The results are combined with those published in Ambrosini et al. (2009), who approached a vessel with an unknown origin by comparing it to a number of vessels (total n = 8) of the same typology with a known provenance, including one Faliscan vessel, from Nepi, and one from the Capenate region, from Nazzano. The elements Fe, Ca, K, Ti, Mn, Ni, Cr, Rb, Sr and Zr were recorded. Especially minor/trace elements were found indicative of source (Ambrosini et al., 2009, p. 97; see also Holmqvist, 2019, p. 372; Degryse & Braekmans, 2014, p. 193). Elements Fe, Ca, Ni, Cr and Sr were crucial in the identification of vessel #1514 to be of Attic origin. Especially the composition of the vessels from Nepi and Nazzano will provide valuable in a comparison with the here produced results (see **chapter 5.3**).

3.1 Analytical challenges

The materials which were selected for this research are currently kept in the storerooms and showcases of the Museo Archeologico dell'Agro Falisco, Forte Sangallo in Civita Castellana. The museum allows only analytical methods that do not compromise the integrity of the artefacts. A first macroscopic observation was made to select and describe specific objects, based on morphological, typological and contextual information. This data is extensively recorded and supplied in Appendices 2 and 3. The material includes both complete (or almost complete) vessels as well as fragments whose integrity the museum needs guaranteed, meaning the analytical technique could not require destructive sampling. The method of analysis had to be the least invasive, which is why it was decided to opt for **portable X-Ray Fluorescence, or pXRF**, an almost (see below) completely non-destructive technique that allows for compositional analysis directly on location.

The application of the analytical technique of X-Ray Fluorescence (XRF) in archaeology has many advantages, which Shackley (2018) has adequately illustrated. Most importantly are the speed and ease of analysis. Shackley (2018, p. 3) states how with specific settings and equipment it takes only three to four minutes for one sample to be processed (the beam time).

The beam time has in recent years been much improved over previous generations of pXRF machines, as times up to 3 minutes and longer had been preferred in the previous decade (180 seconds: Goren et al., 2011, p. 688; 400 seconds: Hunt & Speakman, 2015, p. 637). Shorter times have recently also been achieved, dependent on which elements were expected, with positive results (30 seconds: Ceccarelli et al., 2016, p. 256; and again in 2018: Ceccarelli et al., 2018, p. 416; 60 seconds: Ceccarelli et al., 2021, p. 260). The most recent generation of pXRF machines, such as used in this study, a Bruker Tracer 5 instrument, was acquired by the Lab of Material Culture Studies of Leiden University in November of 2022. It is able to give much more precise and accurate measurements while reducing the beam time significantly over previous generations of machines. The

best settings for studying ceramics, the "Mudrock Air" setting, sets a beam time of 90 seconds, leaving sufficient time for the machine to gather accurate and precise data. Application of XRF-analysis within pottery studies most often falls under one of three general headings, as described by Orton and Hughes (2013, p. 168-169). The analysis of only the fired vessels, for some or all of which the origin is known, is the most common technique. The bulk of the analysis and conclusions of this thesis will fall under this heading.

However, over the last decade, specialists applying XRF analysis to archaeological material have raised some concerns about studies relying on factory settings when processing XRF data, thus applying what has been framed as a "black box" approach. These settings were originally developed for mining and industrial practices, which often seeks qualitative over quantitative results (Shackley, 2018, p. 4), they did not suffice for archaeology. Factory settings were often not matrix matched for archaeologically relevant materials or elements of interest (Hunt & Speakman, 2015, p. 626). Many archaeologists wrongly sought and found "easy" analytical data. This data was unquestioningly incorporated into publications which has led to wrong conclusions. Thus, XRF had quickly found itself in an unreliable spot in archaeology.

Once the black box approach had been debunked, archaeologists had to face the limitations of XRF. At the same time, more positive approaches were also being developed, for example by Attaelmanan and Mouton (2014). Thus, methodologically, recent publications always properly describe what machine is used and what measures have been taken to counteract arising limitations. Such measures often advise proper calibration relative to the studied material (Ceccarelli et al, 2016, p. 253-254, Orfanou & Rehren, 2015, p. 387) and careful interpretation and quantification of results (Hunt & Speakman, 2015, p. 638, Orfanou & Rehren, 2015, p. 395-396). At the same time, technological developments have produced new generations of pXRF machines capable of much more accurate and precise analyses than were possible in the last decade. Some new machines have now been developed having settings which have been developed with archaeologists in mind. Thus, with the knowledge of limitations and due consideration of proper methodology in mind, it will be possible to, within a couple of minutes, select a sample, beam it for at least three times, and return it safely to its box or museum case without any physical alterations. The Bruker Tracer 5 instrument was found to be able to perform proper calibration *and* quantification using the settings provided by the developers.

Using pXRF elemental information from magnesium (Z = 12) to uranium (Z = 92) can be collected (Hunt & Speakman, 2015, p. 637). According to the manufacturers' brochure the device is capable of accurate and precise open air elemental analysis from sodium (Z = 11) to uranium with a wide range of factory calibrations offered (Bruker nano GmbH, 2022, p. 8). The best analytical protocol suggests focusing on high Z (≥ 26) elements for geochemical discrimination, to avoid precision and accuracy issues related to low Z element detection in non-destructive, open air analysis (Holmqvist, 2019, p. 368). The range of detectable elements can, however, be extended due to the

power of the Bruker Tracer 5 machine, confidently incorporating readings up to potassium (Z = 19) and calcium (Z = 20) (D. J. G. Braekmans, personal communication, May 1, 2023) and semiquantitative data up to magnesium (Z = 12).

Qualitative results are simply recorded, allowing statements such as whether or not an element is present at all in any beamed area. This can be done by quickly analysing the resulting graphs received from the machine. At the same time the Bruker Tracer 5 is able to quantify the data to a sufficiently accurate and precise degree, enough for application in this thesis. Quantification was necessary for this research as we are not only interested in showing whether a certain element is present, rather in being able to describe and compare artisanal recipes using very similar raw material combinations. The quantified data required to be 'translated' to element oxide weight percentage (wt%) using the element specific compound ratios, while the trace elements were kept as element part per million (ppm).

Having decided to use pXRF as the analytical tool to perform compositional analysis of the impasto ware from Falerii requires to be well aware of the limitations of this technique, including those described above. It has, however, been shown that upon applying a correct protocol for data collection, handling and translation, most limitations can be avoided or resolved (Hunt & Speakman, 2015, 637; Ceccarelli et al., 2016, 254).

While the physical characteristics of the ceramic body is not changed at all, this technique is not completely non-invasive (as mentioned above: *almost* completely non-invasive). Radiating a ceramic will "boost the clock" when it comes to thermoluminescence dating. Thermoluminescence is based on the natural build-up, over time, of radioactive material within the crystal structure of the clay. Shock events (thus most importantly for non-cooking vessels: the last time it was fired) reset the build-up of radiation to "0". After this event the ceramic will slowly accumulate radiation over time. However, applying X-Rays to a ceramic will increase the accumulation of radiation more than it would if X-Rays were not applied, resulting in an older date, when dating with thermoluminescence. This was pre-emptively communicated to all parties responsible. Dr. Maria Cristina Biella, who is responsible for the on-going excavations at Falerii and is in close contact with the museum in Civita Castellana and with the authorities in Rome, was able to confirm that thermoluminescence dating will not be required for this material. This slight methodological issue has thus been tackled successfully in this way:

> "As far as the thermoluminescence dating [goes], the provenance of all the materials is well-known, no doubt about their originality and therefo[r]e no necessity of thermoluminescence dating: the typological-stylistical one is definitely accurate." (M. C. Biella, personal communication, November 16, 2022).

3.2 Methodology

The new data provided in this work result from the use of a portable X-Ray Fluorescence instrument,

the Bruker Tracer 5. Gathering data using a pXRF is a relatively simple process (see the description by Shackley, 2018, p. 2-3). Results were gathered on the "Mudrock Air" pre-set mode. A high energy X-ray beam with a penetration depth of 30 micrometres (0.03 mm) and a surface diameter of 8 mm was shot at samples, exciting electrons within the sample into higher energy electron shells. High Z element data was collected during a 30 second analysis on high keV settings (up to 50 keV), with a microampere of 17.7 and low Z element data was collected over 60 seconds, on low keV settings (up to 15 keV), with a microampere of 22.2. The excited electrons quickly decay into more stable shells, losing energy in the form of emitted X-rays, this is the process of fluorescence, with unique characteristics for every element. These emitted X-rays were measured by an internal detection tube, with results plotted on a graph with keV on the X-axis and counts (number of photons measured by the device) on the Y-axis. As mentioned, the Bruker Tracer 5 has a built in quantification option, which was used to quantify the data. The data was then separated between major and trace elements, for which the major elements were 'translated' to element oxide weight percentage (wt%) using the element specific compound ratios, while the trace elements were kept as element part per million (ppm). The results have been incorporated with a description of the point specific location into table 4.2. A number of times a certified reference material (CRM), which was supplied by the developers, was also scanned, to monitor whether the accuracy and precision of the device maintained acceptable standards. These results are incorporated in Appendix 1.

Using this methodology the researcher was able to select an object, judge where a point was best taken and initiate a high energy X-Ray beam. After a 90 second beam time, analysis was finished and these steps could be repeated. This was done for any number of times, as seen necessary, but ultimately at least three points (p) were taken for each sample (n). In total 45 samples (n = 45) were taken, resulting in a total of 154 points (p = 154). The process unfolds as follows: a vessel or fragment was selected for analysis and a short macroscopic analysis was performed: noting down the form, apparent missing parts or damaged fragments, glaring details which were of interest (such as the state of preservation of the surface, or the like) and details of the decorations. All these macroscopic observations were recorded and were compiled with previous research by Cozza and Pasqui (1981), de Lucia Brolli (1991; 1998) and Biella (2010; 2013a; 2014; 2018), resulting in Appendices 2 and 3. Finally, the vessel was scanned up to three or four times, as necessary, after which another vessel was selected and the process was repeated.

3.3 The production of impasto ware

Impasto is a common term used in pottery studies to indicate a vessel of a coarse fabric with a fair amount of inclusions, which are visible with the naked eye (4 to ¼ mm in diameter). Figure 3.1, on the next page, shows some examples of impasto vessels which were incorporated in this thesis. The added inclusions made the paste not suitable for high speed wheel throwing, as the material would cut the potters' hands (Nijboer, 1998, p. 102). Impasto vessels were thus wheel thrown on a slow wheel,

which, in Italy, continued at the same time as the production of vessels that were thrown on high speed wheels (Nijboer, 1998, p. 101).

Figure 3.1 – Examples of some impasto vessels.
Top left: #116724, a goblet/chalice on a foot with four connecting stems attached to the body, decorations on the lip were made by incision. These were filled with a red paste, as is still varryingly visible.
Bottom left: #558, an amphora with, on the belly, on each side, incisions of elongated horses. These varyingly show red paste fillings still remaining. This vessel also clearly shows the effects of uncontrolled firing conditions, resulting in a red/black spotted pattern all over the body.
Top right: # 346, a plate on a high foot, here visible is the lip, which still shows some fish swimming to the right, clear white paste fillings remain in some incisions.
Bottom right: #350, a pyxis (small storage container for oils, unguents or other toiletries) which features incisions showing two winged horses in typical Orientalizing fashion, tearing apart a man, showing the legs hanging from their mouths (Rasmussen, 2014).

See Appendix 2 for more detailed descriptions and pictures of these and all the other vessels which were analysed in this thesis.

Impasto was produced in a technologically simple process, allowing the production to be done domestically (Nijboer, 1998, p. 40), which continued well into the 6th century BCE, especially in the more inland regions of the Italian mainland. Northwest of the Ager Faliscus, in coastal southern Etruria and in Veii, the traditional impasto was already, during the 7th century, replaced by bucchero wares (Biella, 2010, p. 141). The impasto wares do show clear influences from the bucchero, within the Capenate as well as the Faliscan productions from the 7th century onwards. The traditional impasto wares remained the most important vessels produced in the Faliscan area, while the decorations which were incised in them were influenced by those portrayed on the bucchero vessels, which had been quickly adopted in the Etruscan towns (Biella, 2010, p. 141; Biella, 2013b, p. 133).

The necropoleis, which dotted the ancient landscape, excavated over a century and a half ago, have resulted in an estimate of over 1500 incised impasto vessels (Biella, 2008, p. 32; 2010, p. 142). About 800 of them have been ascribed to the Capenate region (Rasmussen, 2014, p. 10). More recently, over 650 of the incised impasto vessels from Falerii Veteres, Narce, Nepi, Corchiano, Vignanello and Gallese – all part of the Ager Faliscus, have been published (Biella, 2014, p. 35; not many more samples are known since then: Biella, 2018a, p. 308). The productions from the Capenate and the Faliscan region are distinct and, especially in regards to their figurative decorations, are very easily distinguishable, a result of these impasto wares being products from workshops operating in different individual centres (Biella, 2014, p. 29). Awareness of the importance of these regional differences between different production sites, in light of recent research, is crucial. The importance of a regional approach going forward is crucial as it can help "illuminate the obscure relations of Italian cities" (Holland, 1925, p. 103). The preference for a regional approach focused on differences across culturally connected ancient landscapes is still maintained in recent research (Biella, 2013a; 2013b; 2014, p. 29) and is continued within this thesis.

Giving a full description of the incised impasto wares' technological traces is beyond the scope of this thesis, for which I refer the interested reader to the elaborate research carried out by Biella (2008; 2014). Another valuable source of information is the work by Nijboer (1998), who studied the transformation from household production to workshops from the LBA to EIA and effectively describes the production of impasto ware in the relevant era. Some notes relevant for a basic understanding of the sequence of gestures a potter had to make to create an impasto vessel are explored below.

Nijboer (1998, p. 90-114) distinguishes three different processes: raw materials were first collected and prepared, secondly, the vessel was formed and finished using a wide array of methods, and finally the vessel was fired, either in a kiln or an open fire. An important aspect for this thesis comes after the forming of the vessel, namely the vessel had to be dried and additional parts were modelled and connected to the thrown vessel to create the finished products, such as braided handles (e.g., among others: #3488 – see Appendix 2) or decorative elements such as the ram's heads (e.g., as on #3518 or FVI.22.1036.131 – Appendix 3) (Nijboer, 1998, p. 106). During the drying stage

incisions were made, on a dry surface, preferably softer than leather hard (Biella, 2014, p. 153; Biella, 2007, p. 94). After incision, they were most probably all filled with a coloured paste.

It is not known how the different colours related to each other. It could be possible that either a red or a white paste was used to finish the vessel. However, some vessels show both a white and red paste, where the red has degraded the white colour comes through, suggesting the white paste was used as a preparation before the red was added (Biella, 2014, p. 154). Rare cases are known where black paste seems to have been used as well (Biella, 2007, p. 95). A large number of "no clear paste" or unfilled vessels are also observed, it is however unknown whether this is due to post-depositional processes or rather part of the production process. Finally, the vessel was polished and allowed to fully dry. The state of preservation for the coloured pastes is, more often than not, very bad, resulting in Biella (2007, p. 95) hypothesising that the filling pastes might have been added after firing. This hypothesis is quite unlikely, as this would mean that the vessels were extremely delicate right from production, as the author also mentions. Especially in light of recent excavations of the settled area of the Vignale hill resulting in a number of sherds containing red traces, which seem better preserved than the ones from the necropoleis, suggests rather that the fillings were added before firing and degraded post-deposition.

The firing of ceramic vessels was crucial to the decorative aspect of the vessel as well, being a main aspect that determines the eventual colour of any vessel (Pérez-Monserrat et al., 2023, p. 2956). Control over firing conditions for central Italy is demonstrated from the second quarter of the 8th century BCE onwards (Nijboer, 1998, p. 113). Examples exist from tombs where identical impasto bowls with intentional colour difference accompany a deceased (Nijboer, 1998, p. 113). Some were fired in oxidising conditions, resulting in a reddish colour, while other bowls were fired in a reducing atmosphere, resulting in a dark colour. During the 7th century BCE mistakes were often made in relation to this control of the firing conditions of ceramics, resulting in the surface having a spotted red/black pattern. This spotted pattern was caused by inability to properly control the air-flow during firing. This resulted in the vessel having a more oxidized surface in some areas, turning iron traces in the clay into Fe2O3, red ferric iron, while other areas were baked in a more reducing atmosphere, which turned iron traces into a grey or even deep black magnetite iron, Fe3O4 (Orton & Hughes, 2013, p. 73; p. 152). The vessel came out of the kiln having the clear red/black spots, which is widely observed throughout the entire Ager Faliscus (M. C. Biella, personal communication, February 23, 2023). Vessels with red/black spots are also broadly observed within this thesis' assemblage, among others: #3518, #116724, #558 (see figure 3.1, top and bottom left) and #344. However, we should assume that the required knowledge of firing conditions was there, since the decorations of the impasto production is clearly influenced by the bucchero, for which the control of the firing conditions was critical. This knowledge was newly introduced in the 8th – 7th centuries, explaining the many mistakes that are observed for the earliest material.

4. Results

4.1 Macroscopic analysis and selection procedure

The first step was to select a representative, yet manageable assemblage, as the corpus of incised impasto ware from Falerii was found to consist of over 220 different vessels (Biella, 2014, p. 37-79). Excavations of the settlement at Vignale hill have only been realized in 2022, leaving mostly unpublished materials, kindly made available to me by Dr. Maria Cristina Biella. These materials form the bulk of the incised impastos for the settlement. Some fragments recovered during rescue operations of the via del Fontanile and near the Scasato area were added which, all together, supply a more complete image of the incised impastos from the settlement. Vessels were chosen based on their chronological period (8^{th} – 7^{th} century BCE), morphological and stylistic comparability to those fragments from the settled areas, decorative patterns and physical availability, or possibility to be taken out of their cases of the Museo Archeologico dell'Agro Falisco, where some were on display.

Particularly interesting are fragment FVI.22.1036.129, from Vignale hill, and vessel #3541, which both are interpreted as outliers in the Faliscan corpus of impasto ware and are unique specimens on stylistic grounds. The final tally of analysed vessels within this thesis amounts to 33 separately sampled vessels, from six different necropoleis and 12 fragments, of various shapes and sizes, from at least three inhabited contexts (described in Appendices 2 and 3), totalling to a sample size of 45. The selected vessels represent a plethora of different types of vessels and parts of vessels; chalices, *oenochoe*, *amphorae*, *olla*, plates on high feet, *kantharos*, cups and some fragments which were not identifiable to a certain form or vessel type. Some of the analysed material was complete, having only suffered minor damages during the near 3000 year burial. Other vessels only remained as fragments the size of the palm of a hand.

4.2 Chemical analysis using pXRF

The relevant material was analysed using Excel and bivariate plots were drawn up to compare elemental compositions among different variables. Vessels from the necropoleis were compared to fragments from the settled areas, based on observations, some groups of artisanal recipes can be argued and a comparison of the chemical composition of the white or red paste, used to fill in incised decorative patterns, is made. The different proposed groups were also compared to earlier results (Ambrosini et al., 2009) which had aimed to provenance a late 5^{th} – early 4^{th} century vessel, allowing for a comparison of local Faliscan vessels from this later period to the incised impasto wares from the 8^{th} – 7^{th} century BCE.

It has been observed that case-specific traces of heavy elements are most suitable for group discrimination (Degryse & Braekmans, 2014, p. 193; Holmqvist, 2019, p. 372). Especially the relationships of these trace elements are important to study differences between morphologically and geologically related materials and will potentially allow for the recognition of different raw material groups.

In a study which was able to cluster amphorae from Sicily into two groups, interpreted as the result of two distinct production areas, the elements Ti, Cr, Mn, Fe, Rb and Zr were selected (Barone et al., 2011, p. 335). Another study which performed Raman spectroscopy and laser ablation inductively coupled plasma spectrometry (LA-ICP-MS) found white slips and pigments to be enriched in anatase and kaolinite minerals, which were represented by Na, Mg, Al, Si, K, Ca and Ti (de Benedetto et al., 2010, 1318-1319). In this research K, Ca, Ti, Mn, Fe, Rb, Y and Zr are the most important elements. A careful analysis of Na, Mg, Al and Si provided potential as well, be it with the limitation that these elements are too light for pXRF to accurately measure (Hunt & Speakman, 2015, p. 629). Na was completely excluded, as analysis found too many samples below the instruments' detection range. Mg, Al and Si have been incorporated in the results, but only based on flawed semiquantitative data with a broad error range, allowing only broad suggestive interpretation to be given. The relevant elements were subdivided into major and minor, with the major elements translated into oxide weight percentage (wt%), being: MgO, Al2O3, SiO2, K2O, CaO, TiO2, MnO and Fe2O3. The minor elements were kept in ppm, being: Rb, Y & Zr.

The result of this process is presented in table 4.2, below. The information is presented discriminating between the variables "sample", macroscopically "observed details" and "context". The abbreviations provided in the tab "observed details" relate to the macroscopically observed colour of a paste which filled the incisions, specific to the direct location of the beam-area. Definitions of the different abbreviations are shown in table 4.1. Note also how colour coding of both tables has allowed for easy identification of visual colour of the paste inside an incision for different sample. "Context" of the vessels is separated according to the previously described necropoleis and the origins of the settlement fragments, using the abbreviations from table 4.1.

Table 4.1 Explanations of abbreviations used in table 4.1. The colour of the "Abbreviation" tab is incorporated in table 4.1. This colour scheme allows for quick and easy identification when reading the results. This categorization was performed according to visual observation.

Abbreviation	Meaning
S	"surface" – a scan taken from the surface of a vessel which holds "no clear traces".
S-R	"surface – red" – a scan taken from the surface of a vessel, which has incisions filled with red paste.
S-W	"surface – white" – a scan taken from the surface of a vessel, which has incisions in white.
NCT	"no clear traces" – Used for vessels which have incisions, but no clear traces are recognized at all.
NRTV	"no red traces visible" – Used for a vessel which has red incisions, but no red traces were visible within this particular scan.
NWTV	"no white traces visible" – Used for a vessel which has white incisions, but no white traces were visible within this particular scan.
LRT	"light red traces" – If red traces are slightly visible and the picture taken by the machine is not clearly reflecting the red colour.
CRT	"clear red traces" – Red traces recognized by Biella (2014), confirmed and expanded upon by

	observation and generally reflected by high Fe2O3 versus TiO2 wt% in the chemical analysis.
LWT	"light white traces" – If white traces are lightly visible and the picture taken by the machine is not clearly reflecting the white colour.
CWT	"clear white traces" – White traces recognized by Biella (2014), confirmed and expanded upon by observation, represented by high CaO wt% in the chemical analysis.
	The blue shaded columns correspond to vessels which were discussed in the **discussion** chapter and were re-assigned to a different category by use of data analysis rather than visual observations. The characterization in brackets is the old value, the new is displayed regular.
Nec. P.	Necropolis Penna
Nec. MNE.	Necropolis Montarano North-Northeast
Nec. MN.	Necropolis Montarano North
Nec. C.	Necropolis Celle
Nec. Cap.	Necropolis Cappuccini
Nec. Mt.P.	The tomb of Monte Paglietta
Set. V.	Settlement Vignale hill
Set. CC.	Settlement on the modern Civita Castellana plateau, being via del Fontanile and Lo Scasato

Table 4.2 Translated pXRF results of archaeological ceramics, the colour of the table correlates to the colour of the paste which fills the incisions. A blue colour indicates a change was made after chemical data had been interpreted and visual re-evaluation was performed.

Sample	Observed details	Context	MgO wt%	Al2O3 wt%	SiO2 wt%	K2O wt%	CaO wt%	TiO2 wt%	MnO wt%	Fe2O3 wt%	Rb ppm	Y ppm	Zr ppm
306_1	NCT	Nec. P.	1.1	5.1	20.6	1.8	2.4	0.7	0.01	5.5	198	58	328
306_2	NCT	Nec. P.	1.0	7.8	28.7	1.7	3.3	0.7	0.02	5.5	183	61	345
306_3	NCT	Nec. P.	1.0	7.1	28.8	1.3	2.6	0.6	0.01	5.3	186	59	332
307_1	NRTV	Nec. P.	1.2	2.5	15.6	1.5	3.7	1.0	0.05	7.3	257	58	367
307_2	LRT	Nec. P.	0.7	6.3	30.4	1.3	1.6	0.6	0.06	5.5	219	49	356
307_3	NRTV	Nec. P.	0.9	4.7	28.5	0.8	0.5	0.3	0.17	4.4	229	53	350
344_1	LWT	Nec. P.	1.2	10.1	27.3	1.8	2.8	0.8	0.19	7.7	313	61	373
344_2	S-W	Nec. P.	0.9	11.1	30.0	1.4	1.6	0.7	0.06	5.7	270	55	343
344_3	LWT	Nec. P.	0.8	7.2	21.8	1.8	2.9	0.7	0.19	6.2	337	62	334
344_4	CWT	Nec. P.	0.9	9.5	23.5	1.4	2.2	0.6	0.10	6.4	287	57	350
345_1	NRTV	Nec. P.	1.0	3.0	15.0	1.4	1.3	0.7	0.75	6.6	235	54	297
345_2	S-R	Nec. P.	1.0	7.2	25.8	1.0	0.9	0.5	0.64	4.9	237	62	304
345_3	NRTV	Nec. P.	1.0	2.0	10.4	0.7	0.7	0.3	0.61	4.4	222	60	295
345_4	NRTV	Nec. P.	1.0	4.1	14.9	0.9	0.8	0.4	0.42	4.1	227	51	304
346_1	NWTV	Nec. P.	1.0	8.9	30.9	1.0	1.4	0.4	0.18	6.1	385	67	319
346_2	CWT	Nec. P.	0.9	9.4	32.7	1.1	9.4	0.4	0.07	7.9	334	69	287
346_3	CWT	Nec. P.	1.0	11.1	36.2	0.9	5.8	0.4	0.12	4.6	379	72	310
349_1	NWTV	Nec. P.	1.1	5.1	20.6	1.8	1.1	0.8	0.08	6.4	331	62	337
349_2	NWTV	Nec. P.	0.9	8.1	30.5	1.4	1.1	0.8	0.05	5.5	272	65	331
349_3	NWTV	Nec. P.	0.9	6.0	26.7	1.5	1.1	0.7	0.07	5.9	298	62	334
350_1	NCT	Nec. P.	1.0	7.1	29.9	2.2	1.3	0.7	0.02	5.3	403	67	455
350_2	NCT	Nec. P.	1.0	2.5	15.6	1.9	1.0	0.6	0.02	5.4	405	72	432
350_3	NCT	Nec. P.	0.8	7.4	29.9	1.5	1.1	0.5	0.02	4.3	412	72	418
352_1	LRT	Nec. P.	0.9	5.9	27.4	1.9	1.9	0.5	0.02	5.7	267	55	352

Sample	Observed details	Context	MgO wt%	Al2O3 wt%	SiO2 wt%	K2O wt%	CaO wt%	TiO2 wt%	MnO wt%	Fe2O3 wt%	Rb ppm	Y ppm	Zr ppm
352_2	CRT	Nec. P.	1.0	8.5	35.8	2.1	1.8	0.7	0.03	5.7	281	57	381
352_3	NRTV	Nec. P.	0.9	6.3	23.2	1.3	1.1	0.4	0.02	4.8	291	58	390
366_1	LWT	Nec. P.	0.9	4.5	18.5	1.8	1.6	0.6	0.01	5.7	205	59	304
366_2	NWTV	Nec. P.	1.1	5.1	20.6	1.4	1.5	0.6	0.01	4.9	201	58	332
366_3	CWT	Nec. P.	1.0	7.8	28.7	1.5	2.5	0.6	0.01	6.1	204	60	294
366_4	NWTV	Nec. P.	1.0	7.1	28.8	1.1	0.9	0.5	0.01	3.8	201	59	330
370_boat_1	CRT	Nec. P.	0.9	6.8	22.6	1.7	1.8	0.8	0.03	8.8	293	52	370
370_boat_2	CRT	Nec. P.	1.0	12.4	33.7	1.2	1.3	0.6	0.03	6.6	281	50	343
370_boat_3	S-R	Nec. P.	1.0	12.9	35.8	1.9	1.5	0.8	0.03	6.2	306	54	367
370_dog_1	LRT	Nec. P.	1.0	10.0	34.6	1.8	1.3	0.7	0.05	6.8	295	50	363
370_dog_2	LRT	Nec. P.	1.0	10.4	34.5	1.9	1.3	0.6	0.04	6.5	283	49	344
370_dog_3	S-R	Nec. P.	1.0	12.1	35.5	2.1	1.3	0.8	0.03	6.3	304	48	364
370_horse_1	CRT	Nec. P.	0.9	9.3	33.1	2.0	1.8	0.9	0.04	8.5	304	56	365
370_horse_2	CRT	Nec. P.	0.9	8.7	29.7	1.8	1.5	0.7	0.05	7.4	304	57	388
370_horse_3	CRT	Nec. P.	1.1	12.7	39.0	1.6	1.3	0.7	0.04	7.2	301	53	376
370_horse_4	S-R	Nec. P.	1.1	7.7	28.1	1.7	1.4	0.6	0.02	5.2	326	55	382
370_man_1	CRT	Nec. P.	0.8	5.9	22.4	1.6	2.0	0.7	0.06	7.2	308	57	355
370_man_2	CRT	Nec. P.	1.1	9.8	30.5	1.6	1.9	0.7	0.03	7.0	284	55	360
370_man_3	CRT	Nec. P.	1.0	10.2	33.1	1.2	1.6	0.5	0.08	6.8	306	59	367
370_man_4	S-R	Nec. P.	0.9	13.7	37.2	1.9	2.5	1.0	0.11	6.7	287	56	360
370_rower_1	CRT	Nec. P.	0.9	8.1	26.3	1.7	1.7	0.7	0.07	8.7	283	48	384
370_rower_2	CRT	Nec. P.	0.9	10.0	30.5	2.3	2.0	0.8	0.03	7.6	293	55	394
370_rower_3	CRT	Nec. P.	0.9	12.2	40.5	1.5	1.5	0.6	0.03	7.4	263	47	353
370_rower_4	S-R	Nec. P.	0.9	12.8	37.1	2.2	1.5	0.9	0.03	6.8	287	50	377
372_1	LRT	Nec. P.	1.0	8.8	25.3	1.3	0.7	0.7	0.04	8.6	208	61	360
372_2	NRTV	Nec. P.	1.0	8.7	30.3	1.8	0.9	0.6	0.06	6.5	231	61	398
372_3	LRT	Nec. P.	0.8	7.9	25.5	1.5	0.7	0.6	0.04	6.3	222	59	422
372_4	LRT	Nec. P.	1.0	9.1	33.0	1.7	0.7	0.6	0.04	5.6	217	59	362
375_1	LRT	Nec. P.	1.0	6.1	20.7	1.3	3.6	0.6	0.05	7.6	217	50	348
375_2	CRT	Nec. P.	0.9	9.1	26.4	1.1	3.2	0.6	0.05	7.3	189	49	366
375_3	LRT	Nec. P.	1.0	9.3	30.3	1.6	3.2	0.8	0.02	5.9	190	51	415
376_1	LRT	Nec. P.	1.1	8.5	29.6	1.5	1.2	0.8	0.02	5.6	227	53	357
376_2	CRT	Nec. P.	1.1	6.9	25.4	1.5	1.2	0.6	0.02	5.5	199	48	342
376_3	NRTV	Nec. P.	1.0	3.5	17.1	1.4	2.1	0.6	0.02	5.5	219	53	349
377_1	NRTV	Nec. P.	1.0	3.5	16.8	1.3	3.1	0.6	0.02	5.6	252	83	361
377_2	NRTV	Nec. P.	1.0	6.9	22.4	1.0	1.9	0.5	0.01	3.5	231	83	353
377_3	NRTV	Nec. P.	1.0	6.6	22.8	1.0	1.6	0.4	0.01	3.4	252	105	369
378_1	LRT	Nec. P.	1.0	6.9	24.4	1.7	2.3	0.7	0.67	6.0	286	73	414
378_2	NRTV	Nec. P.	1.0	7.0	25.1	1.8	1.4	0.6	0.04	4.6	294	62	388
378_3	NRTV	Nec. P.	0.9	8.1	34.4	2.0	1.5	0.6	0.05	4.5	301	60	384
550_1	NCT	Nec. C.	0.8	5.3	43.4	1.6	1.9	0.6	0.22	7.3	374	70	417
550_2	NCT	Nec. C.	0.8	8.3	38.8	1.5	1.7	0.6	0.10	6.2	387	66	400
550_3	NCT	Nec. C.	0.8	6.6	44.6	0.7	0.9	0.3	0.01	3.2	368	57	394
557_1	CRT	Nec. C.	0.9	4.2	31.4	1.8	2.5	0.7	0.21	6.8	231	49	308
557_2	CRT	Nec. C.	1.0	8.7	30.3	1.5	1.4	0.5	0.05	4.3	196	50	281
557_3	(LRT) NRTV	Nec. C.	0.8	7.9	25.5	1.0	1.7	0.4	0.03	3.6	202	44	272
558_1	CRT	Nec. C.	1.0	9.1	33.0	1.5	2.1	0.7	0.03	6.3	183	49	325

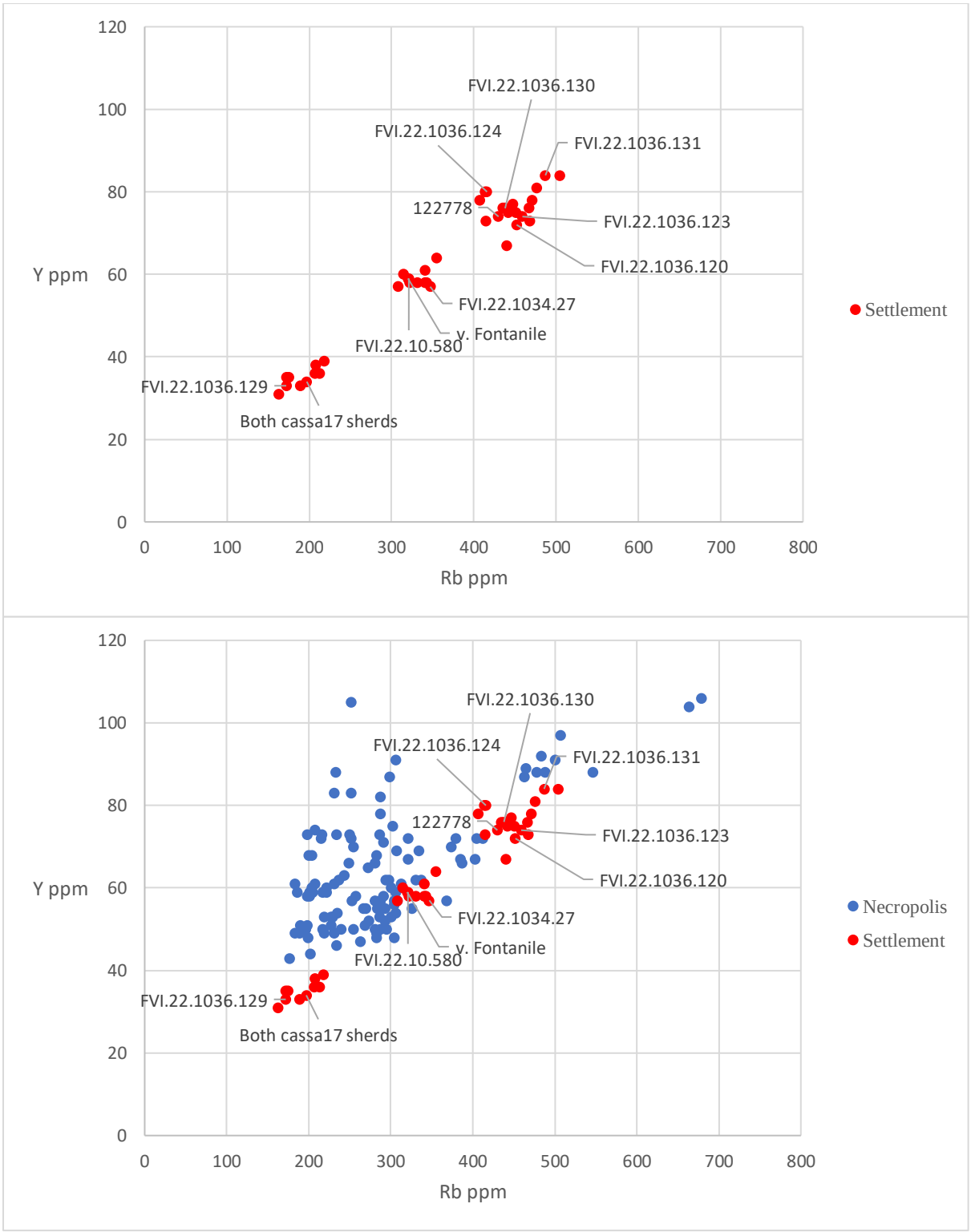
Sample	Observed details	Context	MgO wt%	Al2O3 wt%	SiO2 wt%	K2O wt%	CaO wt%	TiO2 wt%	MnO wt%	Fe2O3 wt%	Rb ppm	Y ppm	Zr ppm
558_2	LRT	Nec. C.	1.0	6.1	20.7	1.8	1.5	0.7	0.03	6.0	198	51	326
558_3	CRT	Nec. C.	0.9	9.1	26.4	1.3	1.4	0.5	0.04	5.1	177	43	296
572_1	NCT	Nec. C.	1.0	9.3	30.3	1.1	0.7	0.4	0.29	8.7	255	70	318
572_2	NCT	Nec. C.	1.1	8.5	29.6	1.6	1.1	0.6	0.59	9.7	252	72	319
572_3	(NCT) S	Nec. C.	1.1	6.9	25.4	2.1	0.8	0.8	0.30	7.8	283	68	324
3312_1	NCT	Nec. MNE.	0.8	9.3	27.9	1.4	1.6	0.8	0.07	6.7	253	57	360
3312_2	NCT	Nec. MNE.	0.8	10.7	29.3	1.4	1.6	0.7	0.12	5.7	234	46	319
3312_3	NCT	Nec. MNE.	1.0	1.8	9.1	0.6	0.6	0.3	0.03	3.0	240	50	347
3488_1	S	Nec. MN.	0.9	5.8	24.3	1.6	1.7	0.9	0.05	6.4	488	88	382
3488_2	NCT	Nec. MN.	0.9	8.4	33.9	1.8	2.2	0.8	0.05	6.6	463	87	375
3488_3	NCT	Nec. MN.	0.9	5.9	27.4	1.3	1.6	0.7	0.04	7.2	500	91	374
3488_4	NCT	Nec. MN.	1.0	8.2	35.0	1.2	1.7	0.7	0.03	5.3	478	88	362
3499_1	NCT	Nec. MN.	0.9	7.2	31.8	1.4	2.4	1.1	0.05	6.4	484	92	374
3499_2	NCT	Nec. MN.	0.9	6.2	24.3	1.4	1.8	0.8	0.08	7.2	507	97	362
3499_3	NCT	Nec. MN.	0.8	7.3	32.0	1.1	1.5	0.7	0.06	5.8	465	89	342
3518_1	S-W	Nec. P.	1.0	6.4	25.7	1.8	1.1	0.8	0.03	6.4	249	66	384
3518_2	LWT	Nec. P.	1.0	7.6	28.2	1.9	1.6	0.8	0.03	6.2	250	73	373
3518_3	NWTV	Nec. P.	1.0	9.2	32.7	1.6	1.1	0.7	0.03	5.5	243	63	376
3518_4	NWTV	Nec. P.	1.1	8.7	32.5	1.4	0.9	0.6	0.03	4.8	234	73	356
3519_1	S	Nec. MNE.	1.1	1.1	9.0	1.8	0.7	1.1	0.11	10.6	281	66	370
3519_2	NCT	Nec. MNE.	1.1	6.8	28.4	1.7	0.8	1.1	0.03	9.2	291	71	364
3519_3	NCT	Nec. MNE.	1.0	8.2	32.3	1.7	1.2	0.9	0.05	9.1	321	72	367
3519_4	NCT	Nec. MNE.	0.9	8.3	34.8	1.8	1.3	0.9	0.05	8.2	307	69	369
3519_5	NCT	Nec. MNE.	0.9	9.3	34.9	0.6	0.4	0.3	0.02	4.4	321	67	351
3541_1	S-R	Nec. MNE.	0.9	10.4	30.3	1.2	0.9	1.1	0.11	9.5	664	104	407
3541_2	S-R	Nec. MNE.	0.9	11.4	32.6	1.2	1.0	1.1	0.10	9.1	679	106	431
3541_3	S-R	Nec. MNE.	0.7	8.8	23.3	1.0	0.8	1.0	0.12	8.1	546	88	459
15765_1	NCT	Nec. Mt. P.	1.0	3.5	20.3	1.5	1.8	0.8	0.12	7.2	286	53	378
15765_2	NCT	Nec. Mt. P.	1.0	4.0	20.3	1.1	1.7	0.7	0.09	5.7	269	51	369
15765_3	S	Nec. Mt. P.	0.8	8.8	35.8	1.1	1.4	0.6	0.06	5.2	273	52	349
15765_4	NCT	Nec. Mt. P.	0.9	4.9	26.0	0.9	1.5	0.5	0.14	5.1	255	50	364
116724_1	LRT	Nec. Cap.	1.1	8.1	26.9	1.4	1.2	0.6	0.52	7.2	306	91	355
116724_2	LRT	Nec. Cap.	1.1	9.7	29.1	1.7	1.6	0.8	0.19	6.4	287	82	322
116724_3	LRT	Nec. Cap.	1.0	11.3	35.8	1.6	1.3	0.8	0.15	6.4	299	87	312
116724_4	S-R	Nec. Cap.	1.0	5.2	20.3	1.9	1.1	0.9	0.05	6.1	302	75	313
116724_5	NRTV	Nec. Cap.	1.2	10.4	35.6	1.1	0.8	0.6	0.07	4.4	287	78	314
116780_1	LRT	Nec. Cap.	1.0	3.1	17.5	1.2	0.9	0.4	0.04	6.1	198	73	349
116780_2	LRT	Nec. Cap.	1.2	8.6	37.6	2.2	2.5	0.6	0.06	8.3	200	68	357
116780_3	S-R	Nec. Cap.	1.1	3.2	17.2	2.1	1.3	0.6	0.37	5.7	208	74	343
116780_4	S-R	Nec. Cap.	1.1	8.7	34.6	1.2	0.6	0.4	0.02	4.3	204	68	341
116829_1	NRTV	Nec. Cap.	1.1	9.1	39.1	2.4	2.1	0.7	0.20	8.0	233	88	367
116829_2	NRTV	Nec. Cap.	1.2	9.9	40.4	2.1	2.8	0.7	0.05	7.3	216	73	345
116829_3	NRTV	Nec. Cap.	1.1	4.4	19.4	1.2	1.7	0.5	0.11	3.9	215	72	341
122778_1	S	Set. CC.	1.1	12.4	35.2	2.6	1.6	1.4	0.05	7.4	415	73	413
122778_2	NCT	Set. CC.	1.0	12.7	36.2	2.5	2.2	1.1	0.10	6.4	430	74	412
122778_3	NCT	Set. CC.	1.0	14.2	39.0	2.6	2.8	1.1	0.10	6.2	435	76	424
Cassa17_head_1	NCT	Set. CC.	1.0	14.0	41.6	2.5	2.2	0.9	0.08	6.8	207	36	231

Sample	Observed details	Context	MgO wt%	Al2O3 wt%	SiO2 wt%	K2O wt%	CaO wt%	TiO2 wt%	MnO wt%	Fe2O3 wt%	Rb ppm	Y ppm	Zr ppm
Cassa17_head_2	NCT	Set. CC.	1.0	10.9	38.6	2.3	1.8	0.7	0.06	5.9	213	36	244
Cassa17_head_3	NCT	Set. CC.	1.0	8.9	33.8	2.0	1.5	0.6	0.05	4.7	197	34	209
Cassa17_legs_1	NCT	Set. CC.	1.1	10.5	38.2	2.2	1.7	0.7	0.05	6.2	208	38	243
Cassa17_legs_2	NCT	Set. CC.	1.2	10.3	38.3	2.3	2.1	0.6	0.13	5.5	218	39	199
Cassa17_legs_3	NCT	Set. CC.	1.0	10.0	39.5	2.2	1.9	0.6	0.05	5.3	189	33	204
FVI.22.10.580_1	NCT	Set. V.	0.9	8.5	29.1	1.9	2.1	0.6	0.06	5.1	321	59	430
FVI.22.10.580_2	NCT	Set. V.	0.9	10.8	37.0	1.9	1.7	0.5	0.05	4.5	315	60	414
FVI.22.10.580_3	NCT	Set. V.	0.9	9.6	33.2	1.6	1.9	0.5	0.05	4.6	308	57	413
FVI.22.10.580_4	S	Set. V.	1.0	3.5	17.9	1.0	1.1	0.4	0.03	3.1	322	58	398
FVI.22.1034.27_1	S	Set. V.	1.1	6.8	29.0	2.0	1.5	0.9	0.09	6.3	343	58	327
FVI.22.1034.27_2	NCT	Set. V.	0.9	8.9	35.8	1.8	1.3	0.6	0.04	4.7	347	57	326
FVI.22.1034.27_3	NCT	Set. V.	1.0	11.9	40.3	1.5	1.0	0.5	0.03	4.2	341	58	328
FVI.22.1036.120_1	(LRT) NRTV	Set. V.	1.0	7.1	32.4	1.9	2.1	0.5	0.07	4.8	452	72	378
FVI.22.1036.120_2	S-R	Set. V.	1.0	3.4	19.8	1.8	1.4	0.6	0.13	4.8	442	75	390
FVI.22.1036.120_3	NRTV	Set. V.	1.0	7.0	32.2	1.9	1.3	0.6	0.09	4.8	471	78	394
FVI.22.1036.120_4	NRTV	Set. V.	1.0	7.7	34.0	1.2	1.1	0.3	0.07	3.0	440	67	370
FVI.22.1036.123_1	S	Set. V.	0.9	14.2	48.3	2.5	2.3	0.8	0.10	5.1	467	76	421
FVI.22.1036.123_2	NCT	Set. V.	0.9	10.7	38.3	3.0	2.4	0.8	0.15	5.5	459	74	427
FVI.22.1036.123_3	NCT	Set. V.	0.9	11.9	42.0	2.4	2.1	0.7	0.12	4.9	468	73	420
FVI.22.1036.124_1	CRT	Set. V.	1.2	11.6	45.4	2.2	2.0	0.7	0.25	7.7	416	80	327
FVI.22.1036.124_2	CRT	Set. V.	1.1	11.8	47.6	2.2	2.1	0.7	0.16	6.7	407	78	321
FVI.22.1036.124_3	S-R	Set. V.	1.1	11.7	50.2	2.1	2.2	0.7	0.20	6.2	414	80	317
FVI.22.1036.129_1	NCT	Set. V.	1.1	10.2	32.3	1.9	3.8	0.7	0.06	5.5	172	35	119
FVI.22.1036.129_2	NCT	Set. V.	1.2	10.1	33.1	1.8	3.9	0.6	0.06	4.8	175	35	119
FVI.22.1036.129_3	S	Set. V.	1.0	9.3	33.5	1.9	4.0	0.6	0.07	4.6	172	33	120
FVI.22.1036.129_4	S	Set. V.	1.2	7.3	24.7	1.5	2.8	0.6	0.05	4.2	163	31	111
FVI.22.1036.130_1	S	Set. V.	1.1	4.3	21.3	1.1	1.2	0.4	0.15	3.9	451	75	287
FVI.22.1036.130_2	S	Set. V.	1.1	4.5	23.9	1.0	1.3	0.4	0.14	4.1	447	77	302
FVI.22.1036.130_3	S	Set. V.	1.2	4.1	21.5	1.0	1.2	0.4	0.08	3.5	438	76	272
FVI.22.1036.131_1	S	Set. V.	0.9	10.8	35.0	1.6	3.1	0.8	0.15	6.0	504	84	320
FVI.22.1036.131_2	S	Set. V.	0.9	5.4	21.8	1.1	2.0	0.5	0.08	4.1	476	81	341
FVI.22.1036.131_3	S	Set. V.	1.0	2.9	13.8	0.7	1.7	0.4	0.10	3.7	487	84	334
v. Fontanile_1	(LRT) NRTV	Set. CC.	1.0	4.8	20.1	1.5	1.1	0.5	0.03	4.2	320	59	372
v. Fontanile_2	(LRT) NRTV	Set. CC.	0.9	8.4	30.8	1.6	1.2	0.5	0.03	4.5	331	58	370
v. Fontanile_3	S-R	Set. CC.	0.9	5.9	23.5	2.0	1.4	0.6	0.04	5.3	341	61	401
v. Fontanile_4	NRTV	Set. CC.	1.0	6.2	24.7	1.4	1.0	0.4	0.03	4.0	355	64	384

The results of the chemical analysis allows the creation of several bivariate plots which compare different vessels and fragments based on their chemical compositions. From the entire spectrum especially the scatter plots that compare Y versus Zr and Rb versus Zr (in ppm), as well as the comparison of the major element Fe2O3 wt% versus Zr ppm, allows the identification of four raw material groups.

4.2.1 Four identifiable artisanal recipes

Figure 4.1, on the next page, compares Y and Rb ppm for the fragments found in the settled areas using red dots. Figure 4.2 adds the vessels and fragments from the different necropoleis around the city in blue dots. A number of interesting observations can be made. Mainly, the following bivariate plots (figures 4.1 – 4.6) allow for the identification of significantly different production groups, not separated according to the context of excavation, rather, separated by the apparent artisanal recipes used in their creation. These groups are clearly differentiated on the amount of Y and Rb ppm (these variables are shown in figures 4.1, 4.2, 4.3 and 5.7, the different vessels and fragments are assigned to different groups in table 4.3). The clearest differentiating elements within the artisanal recipes are Rb, Y and Zr.



Figures 4.1 and 4.2 – **Both Y versus Rb ppm.** Figure 4.1 shows a comparison of the different settlement fragments, suggestive of three groups purely based on this part of the assemblage – the indicated names are the different fragments. Figure 4.2 shows the same settlement fragments, this time projected on top of the vessels from the different necropoleis – complicating the image, indicative of raw material groups.

The complexity of the image becomes clear if we compare the vessels from the different necropoleis versus the sherds which were excavated at the different inhabited contexts. Contrary to what is traditionally assumed, there is no clearcut connection between the settlement types and the

necropoleis. From figure 4.3 emerges a picture of artisanal recipes based on Y versus Rb.

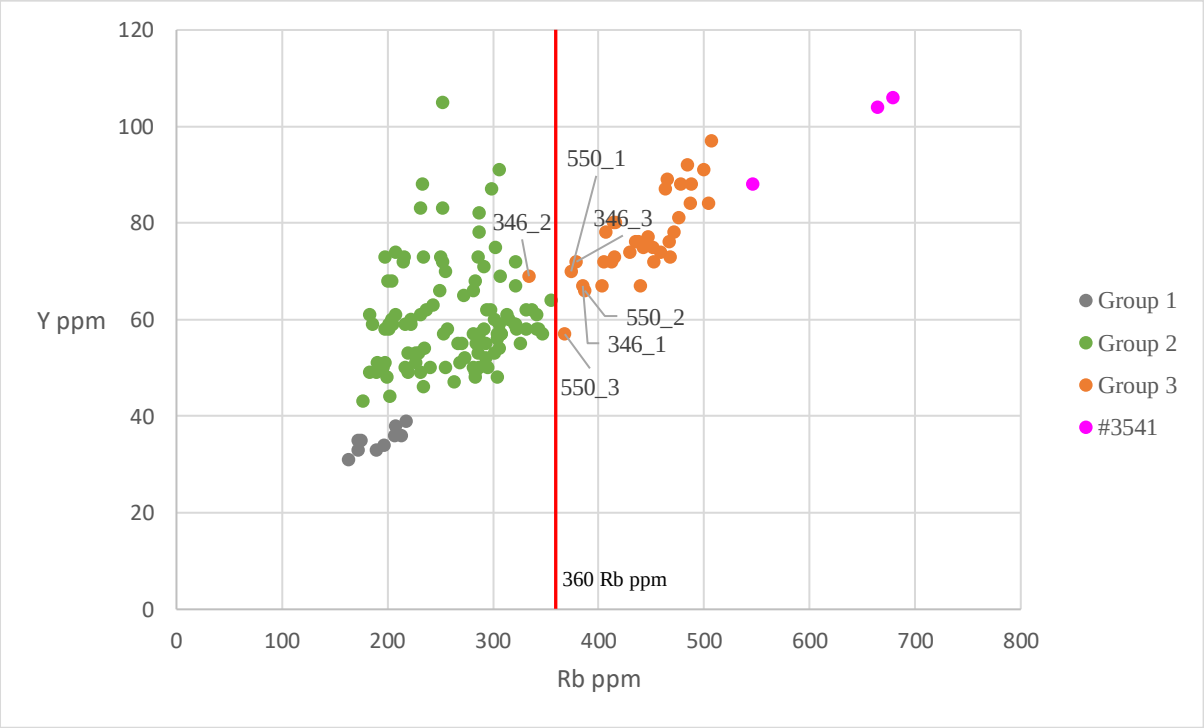


Figure 4.3 – **Y versus Rb ppm.** The four proposed groups as identified through the comparison of the settlement versus the necropoleis fragments. The separation between local Groups 2 and 3 is indicated by the red line on 360 Rb ppm. The scans of vessels #346 and #550, which are on the edge of Group 3, are indicated.

These four different groups are colour-coded throughout figures 4.4, 4.5, 4.6 and 4.19 on the next pages. Groups 2 and 3 contain some outlier scans, for which vessels belonging to Group 3 sometimes result in scans which contain values that correspond to Group 2. These scans have been named in figure 4.3, above. Note also the red lines in figures 4.3 and 4.4. In figure 4.3 the red line separates Group 2 from Group 3 by the exact point of 360 Rb ppm and in figure 4.4 by 65 Y ppm.

Table 4.3 Proposed groups of ceramic "recipes" of vessels based on the comparisons of Rb, Y and Zr.

Group	Vessels
1	FVI.22.1036.129, Cassa17_head, Cassa17_legs (belonging to the same vessel).
2	Represented by relatively low Rb ppm (≤ 359). Settlement: FVI.22.10.27, FVI.22.1034.580, Via Del Fontanile. Necropoleis (in order of sample number): #306, #307, #344, #345, #349, #352, #366, all #370 sherds, #372, #375, #376, #377, #378, #557, #558, #572, #3312, #3518, #3519, #15765, #116724, #116780 and #116829.
3	Settlement: #122778, FVI.22.1036.120, FVI.22.1036.123, FVI.22.1036.124, FVI.22.1036.130, FVI.22.1036.131 and some of the necropoleis vessels; having Rb values ≥ 360 (excluding one singular outlier, one scan of #346): Necropoleis (in order of sample number): #346, #350, #550, #3488 and #3499. These vessels fall between Y ≥ 65 – 100 and Rb ≥ 356 – 510 (excluding one singular outlier, one scan of #550, having a Y of 57 ppm.
#3541	#3541; the completely red vessel holds the three highest observed Rb values of 546, 664 and 679 ppm –

this vessel is morphologically and typologically unique for the Faliscan context and is likely a foreign import – and can, based on the three important trace elements Rb, Y and Zr be recognized as belonging to an outside group.

Table 4.3 indicates exactly which vessels belong to which groups. The relative chemical closeness of the groups is evident from both Y and Zr. Zr is the third element which indicates the different groups particularly well. The comparison of Y and Zr, in figure 4.4, shows the relative similarity of Groups 2 and 3. In the **discussion chapter**, I argue why the groups are still two different ones, even with the two outliers we can see in figure 4.3 and figure 4.4, scans 346_2 and 550_3. These two vessels fall on the border between Groups 2 and 3.

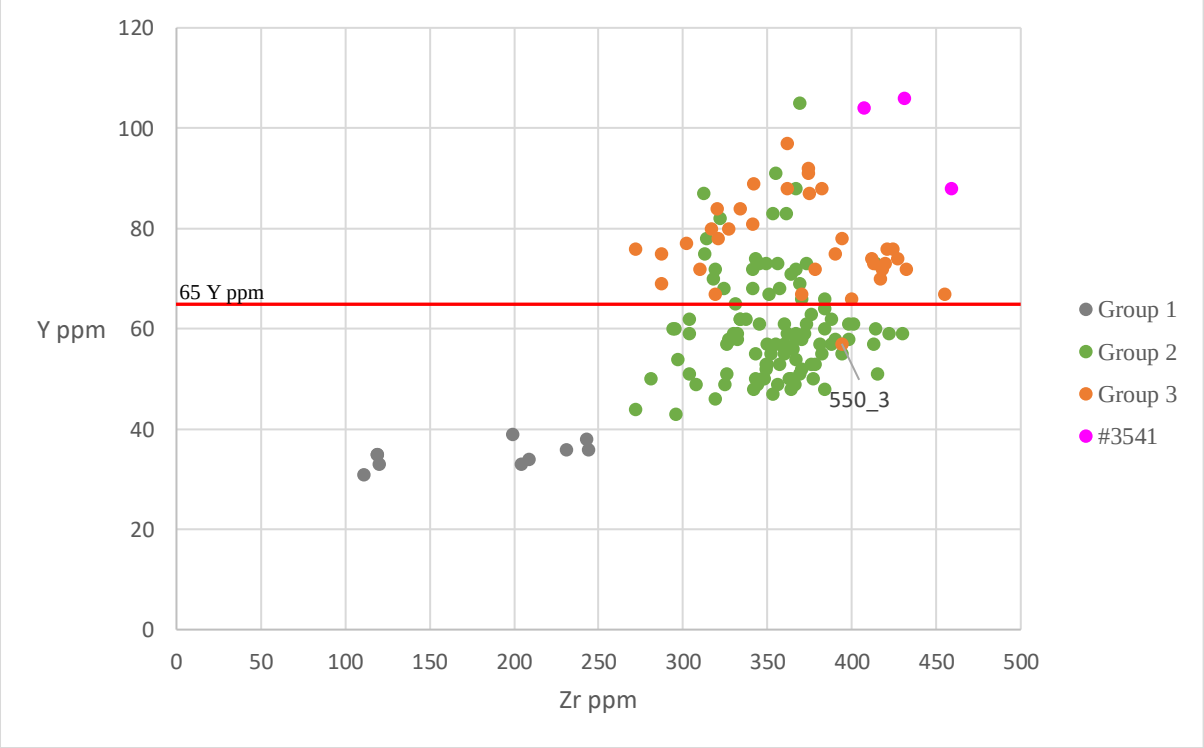


Figure 4.4 – **Y versus Zr ppm.** The four proposed groups, this time indicated is the red separation line of Y 65 ppm, separating local Groups 2 and 3. The outlier scan #550_3 is indicated.

Figure 4.4 shows that Group 2 seems to have a preference for relatively low Y values. While it does show a cloud overlapping with Group 3, calculations show that 75 % of the scans contain ≤ 65 Y ppm. Group 3, excluding the named scan of vessel #550, being uncharacteristically low, has 100 % of the scans containing a Y value of ≥ 66 ppm.

Figures 4.4 and 4.5 shows the problematic grouping of Group 1. Based on figure 4.3 the vessel FVI.22.1036.129 and the two Cassa17 sherds, belonging to one vessel, were grouped into Group 1. However, figures 4.4 and 4.5 clearly indicate the separation of the two Cassa17 sherds and FVI.22.1036.129. As we will see in **chapter 5.3**, Group 1 is not well understood and the grouping is unclear.

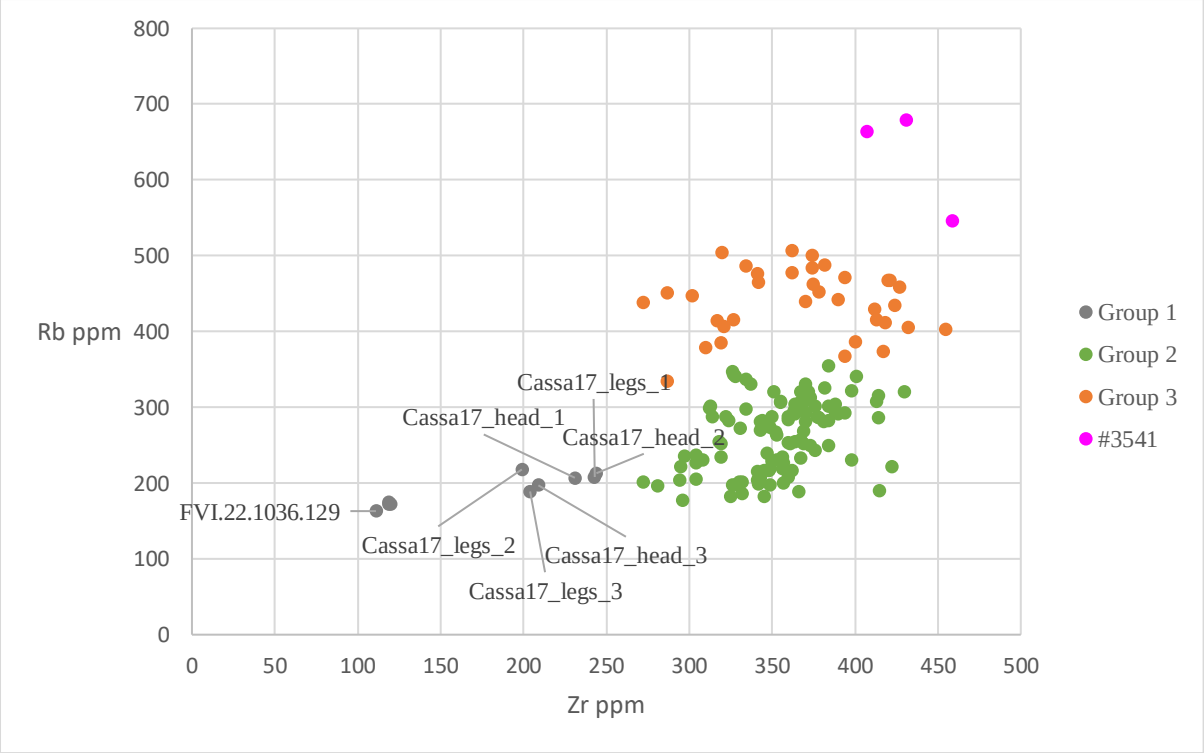


Figure 4.5 – **Rb versus Zr ppm.** The four proposed groups, this time indicated are the different scans of Group 1's Cassa17 fragments, interestingly enough the clear groupings are head1, head2 and legs1 versus legs2, legs3 and head3.

Figure 4.5 shows how FVI.22.1036.129 is grouped very tightly between Zr 111 – 120 ppm and Rb 163 – 175 ppm. It seems incised impastos have a preference to contain tightly grouped together Rb versus Zr contents, while some points seem significantly separated from others on the same sample. This strange phenomenon, based specifically on Zr, occurs for the Cassa17 fragments, which belong to the same vessel. Two of the scans for Cassa17_legs have a Zr of 204 and 209 ppm, grouped together neatly with a Cassa17_head scan of Zr 209 ppm. The other Cassa17_legs scan contains 243 Zr ppm, tightly grouped with the two remainder Cassa17_head scans of 231 and 244 Zr ppm. This peculiar anomaly cannot be explained in light of the prefered tight knit character of Zr for Group 1, it seems more sampling is required to shed light on this situation.

Figure 4.6, on the next page, compares MnO wt% versus Rb ppm, showing how only Group 2 occasionally shows raised MnO amounts.

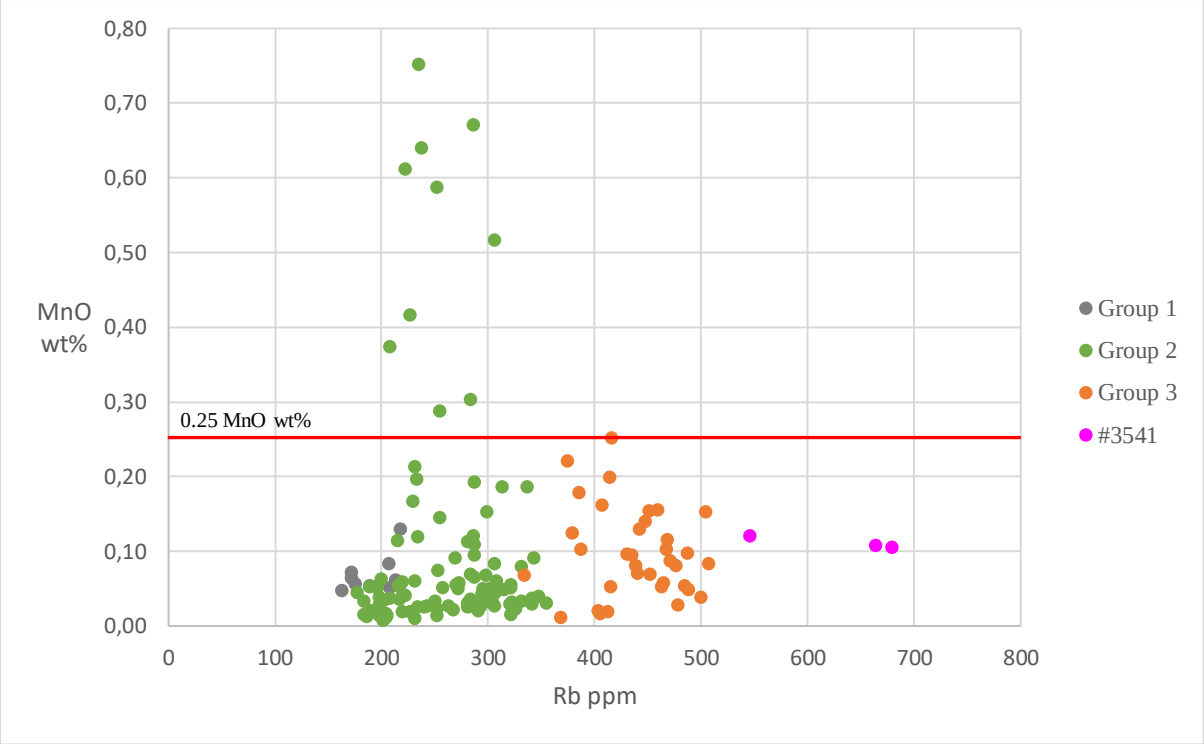


Figure 4.6 – **MnO wt% versus Rb ppm.** The four proposed groups, noteworthy seems the raised MnO contents of some of the scans from Group 2. The red line indicates the 0.25 MnO wt% line, which is only crossed by certain scans of Group 2.

Figure 4.6 shows that all of the scans from Groups 1 and 3, as well as vessel #3541 contain ≤ 0.25 wt% MnO. Group 2 is the only one observed to have some (10 %) of its scans containing ≥ 0.26 MnO wt%.

4.2.2 The colour of the paste which filled the incisions

A first macroscopic distinction emerges from just a general look at the vessels, more specifically from the colour of the pastes which fill the incised decorations. This allows the division of vessels with incisions filled with a red versus those filled with a white paste. Others do not have any clear paste remaining at all. Further analysis shows this is not only visually observable, but also confirmed by chemical composition. Thus, three separate nodes of red coloured incisions (red dots), white coloured ones (blue diamonds) and "no clear paste" (green squares) is charted using bivariate plots (figures 4.9, 4.11, 4.14, 4.15 and 4.16). This division is considered arbitrary as it is unknown whether the vessels grouped under "no clear paste" show no filling due to post-depositional processes or whether they were meant to be left unfilled (Biella, personal communication, May 10, 2023). As has already been mentioned in **chapter 3.1** above: the coloured paste was most likely added before firing. It is not known how the different colours related to each other. The selected assemblage does not contain any samples with either black or red on white pastes, which are known to exist (Biella, 2014, p. 154; Biella, 2007, p. 95).

A closer look at the colours of the pastes within the incisions allows for them to be distributed into different observable/visual degrees of red or white paste according to three categories: "no

red/white traces visible", "light red/white traces" and "clear red/white traces". Abbreviations were introduced and explained in table 4.1.

4.2.2.1 Incisions filled with a red paste

Research carried out in the 1970's (Roberts, 1974) studied a number of impasto vessels from tombs at Narce, Capena and a small settlement which was just over the Tiber, part of the Sabine region, known as Poggio Sommavilla. The author tested a sample of the red paste through destructive analysis at the Conservation Department of the Danish National Museum, revealing the composition to be enriched in Fe2O3 (Roberts, 1974, p. 103; also Biella, 2007, p. 96). In regards to the natural occurrence of Fe it is known to share a positive correlation with Ti (Ceccarelli et al., 2016, p. 258), with Ti being fractionated into Fe-Ti oxides and minerals (Degryse & Braekmans, 2014, p. 194). This expected positive correlation is confirmed for the incised impasto vessels, in figure 4.7, below. Similarly, a comparison of Fe2O3 versus MnO wt% (figure 4.8) shows a slight positive correlation between Fe and Mn. And indeed, it is known that these elements often occur in nature together, precipitating naturally in sediments with Ni (Degryse & Braekmans, 2014, p. 194).

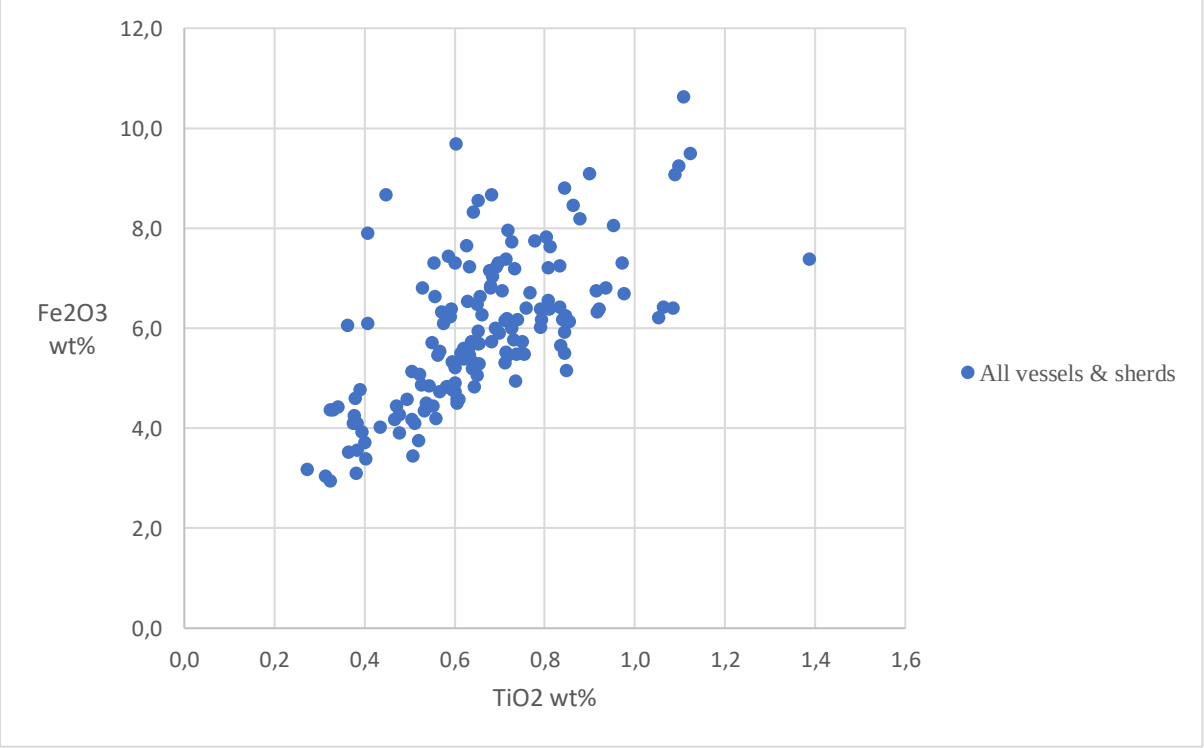


Figure 4.7 – **Fe2O3 versus TiO2 wt%.** This figure indicates the positive correlations of Fe2O3 and TiO2 wt% throughout the entire assemblage.

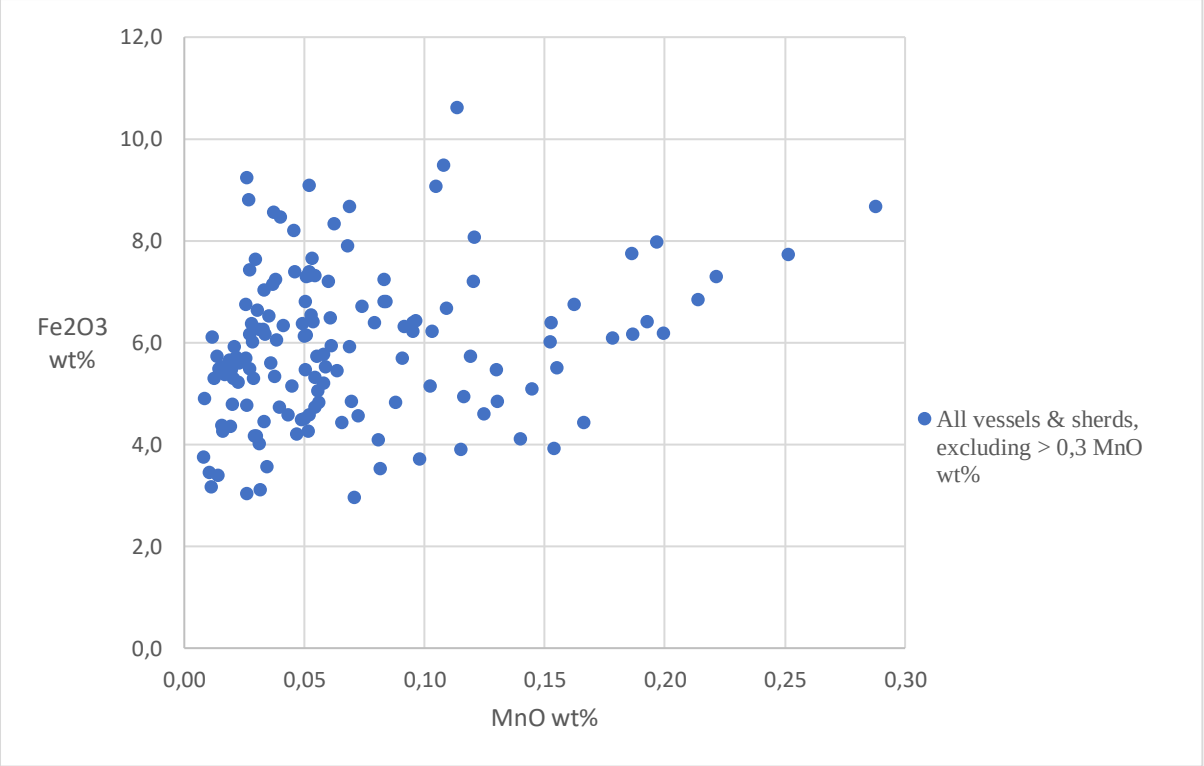


Figure 4.8 – **Fe2O3 versus MnO wt%.** This figure indicates the slight positive correlation of Fe2O3 and MnO wt% throughout the entire assemblage. Note how this figure has been limited to a maximum of 0.3 MnO wt%, otherwise the outliers of Group 2 drag the figure out too much.

A good approach for the red filled incisions is thus to start with a comparison of Fe2O3 and its positively correlated TiO2 (see figures 4.9 and 4.10, on the next page). Ti is less affected by weathering (Degryse & Braekmans, 2014, p. 194) and might thus stay elevated even when, due to post-depositional processes, the incisions do not show red traces anymore. Figure 4.11 shows the comparison of MnO wt% versus Rb ppm, naming one outlier in specific, vessel #572.

Red traces are expected to show raised Fe2O3 values, especially in comparison with white traces. This study contains, subjectively (compared to objectively, see **chapter 5.2.1**), n = 22 red filled vessels. The importance of incorporating enough Fe into the production of the red pastes becomes most clear in figure 4.10, on the next page. Figure 4.9, on the next page, shows the comparison of Fe2O3 versus TiO2 wt% in broad terms, indicating the clear preference of the vessels with red traces to incorporate on average 1 – 2 % more iron in their composition, compared to those vessels with white traces.

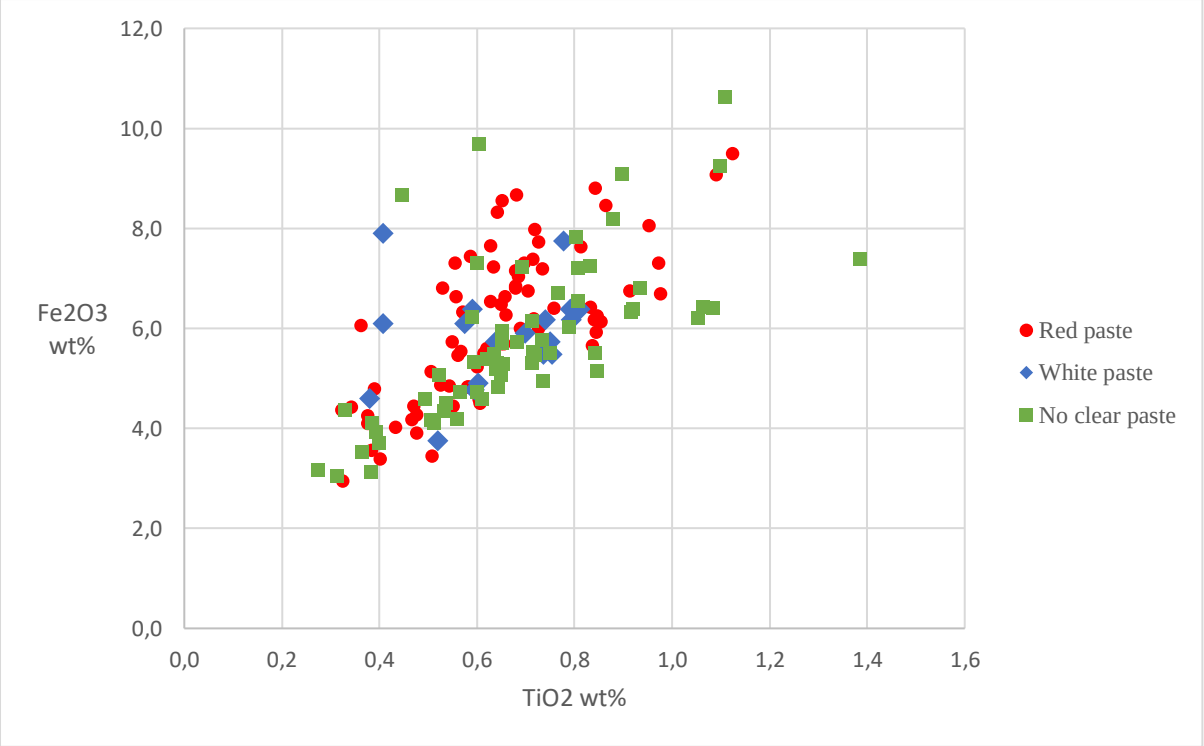


Figure 4.9 – **Fe2O3 versus TiO2 wt%.** This figure shows the positive correlation of all the vessels between Fe and Ti. It also is able to show that vessels with red pastes, in general, contain 1 – 2 % more iron in their compositions. Indicative of the incorporation of iron in the production process of red paste.

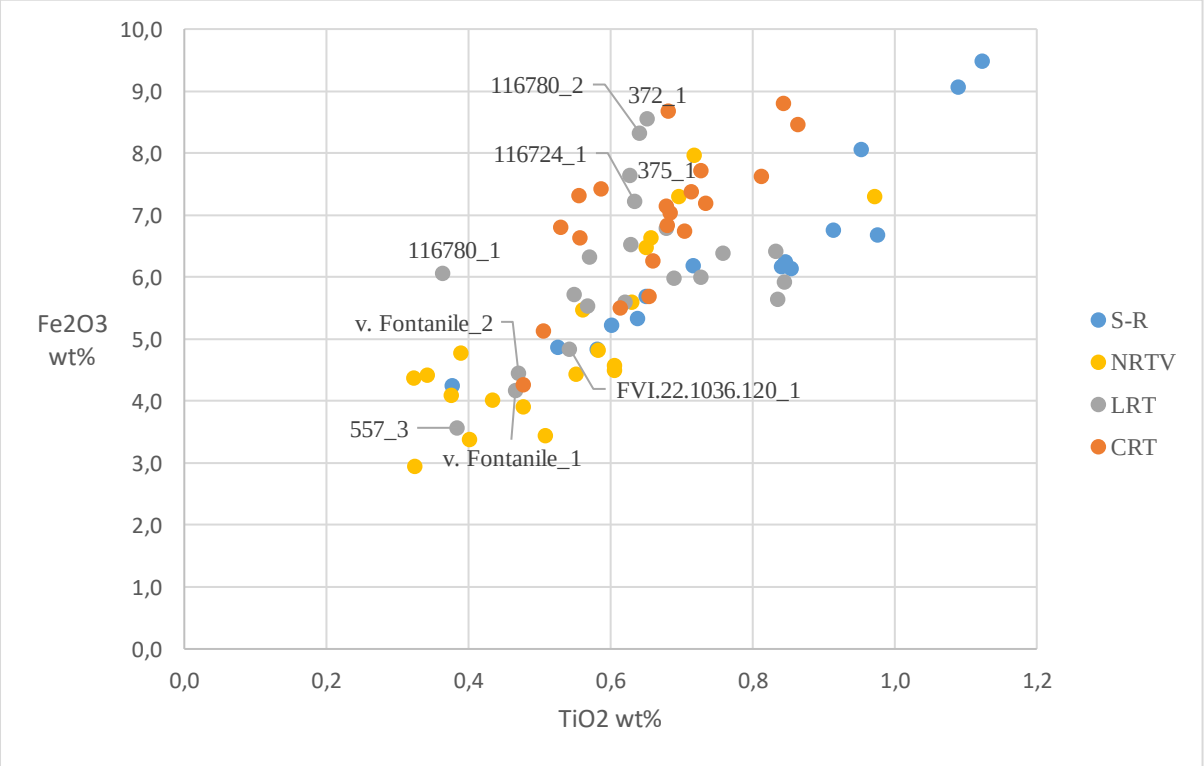


Figure 4.10 – **Fe2O3 versus TiO2 wt%.** Instead of a broad overview of red versus others, this figure indicates the degree of red traces visible per each scan. It also names a number of different scans which were indicated as LRT – "light red traces", but which have values falling, either whithin NRTV – "no red traces visible" or CRT – "clear red traces".

Figure 4.10, above, shows the complex picture that is dealt with for the comparison of Fe2O3 versus TiO2 when looking at the degree of red paste still visible according to the three categories as

explained in table 4.1. The figure is able to clearly show the importance of high Fe-Ti ratios for red fillings, by showing CRT – "clear red traces", as the category containing the most scans with such a ratio. Excluding S-R, which is simply the ceramic surface of some of the vessels which hold incisions in red paste, the different visual observations NRTV, LRT and CRT share similar Fe2O3 and TiO2 values. However, a number of interesting things stand out. Firstly, the category NRTV – "no red traces visible" seems to have a preference (65 % of the time) to contain ≤ 5.0 wt% Fe2O3 and contain significantly lower TiO2 amounts than the other categories. Even including the named outliers containing relatively low Fe-Ti ratios which are indicated as LRT – "light red traces", still 56 % of the scans below 5.0 wt% Fe2O3 and 0.5 wt% TiO2 are categorized as NRTV. Secondly, some scans subjectively identified to contain LRT share very similar values with CRT, which potentially has to do with the methodology, which is based on subjective identification of these categories. As will be discussed in **5.2.1**, based on the comparison of subjective visual analysis and objective data analysis, reclassification between these three categories is sometimes possible by help of chemical analysis. An important point regarding visual observation is the subjective character of it, which is prone to mistakes, while objective data analysis can reveal such mistakes.

Another interesting observation can be made if MnO wt% is compared to Rb ppm (figure 4.11, below) based on the arbitrary colours of paste groups, note especially the indicated vessel #572.

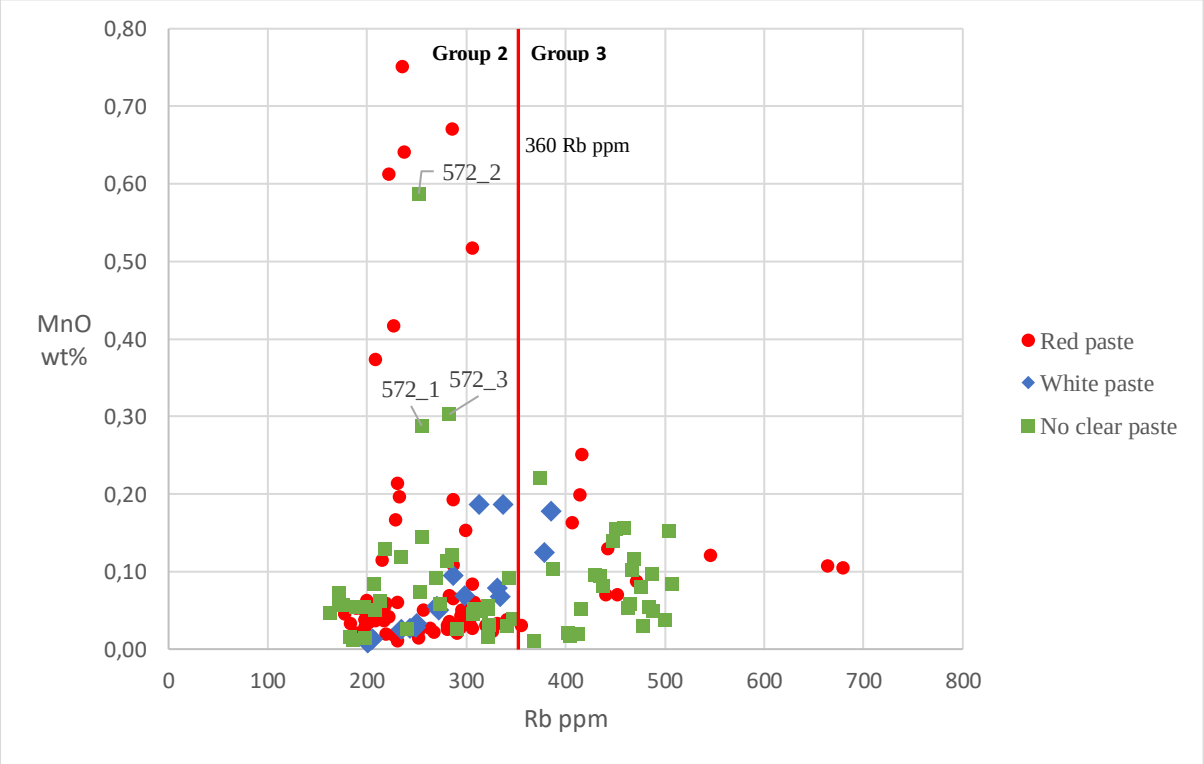


Figure 4.11 – **MnO wt% versus Rb ppm.** Vessel #572 is indicated in this comparison of MnO wt% versus Rb ppm as the only vessel with no clear traces, having high MnO values. Note again the red line, 360 Rb ppm, separating Groups 2 and 3.

The red line in the middle is the same as indicated before, 360 Rb ppm, separating on either sides Groups 1 and 2 versus Group 3 and vessel #3541. The figure shows how, within Group 2, a number of outliers contain significantly higher MnO values than are generally observed. Interestingly, vessels having a relatively high MnO content all belong to Group 2 (see figure 4.12, which zooms in on Group 2).

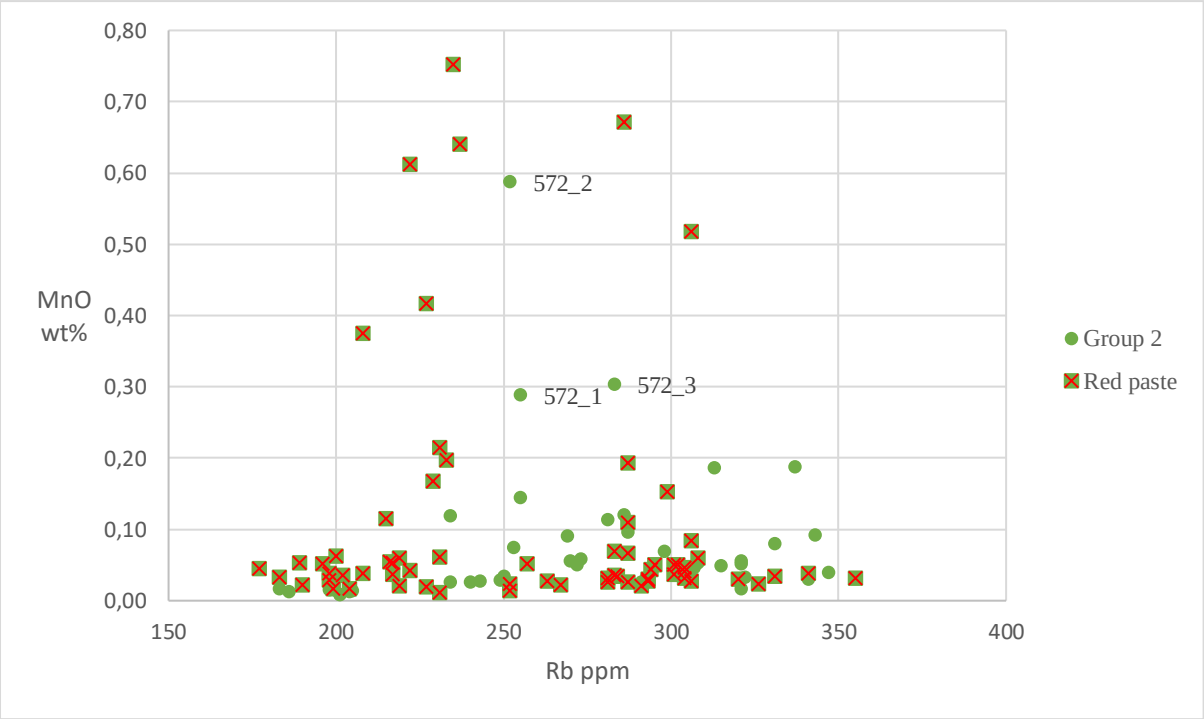


Figure 4.12 – **MnO wt% versus Rb ppm.** Group 2 with red traces highlighted. Vessel #572 is named, being an outlier containing high MnO wt% while visually indicated as not having red traces. Note how the range of Rb ppm was limited to 400 rather than 800 ppm, to zoom in on Group 2.

An important note to figure 4.12 is in order; this figure looks at the Rb values between 150 and 400 ppm, rather than the usual 0 to 800 ppm, distorting the expected image of Group 2 on the x-axis slightly. In this case it helps to distinguish between what are red crossed green dots (containing red traces) and what are green dots (vessels either with white or no clear traces). The named vessel #572 stands out, having relatively high MnO values compared to the bulk of the scans. The relationship between vessel #572, indicated as having no clear traces but having high MnO, with the red traces which often have a high Fe-Ti ratio, can be observed in figure 4.13 below.

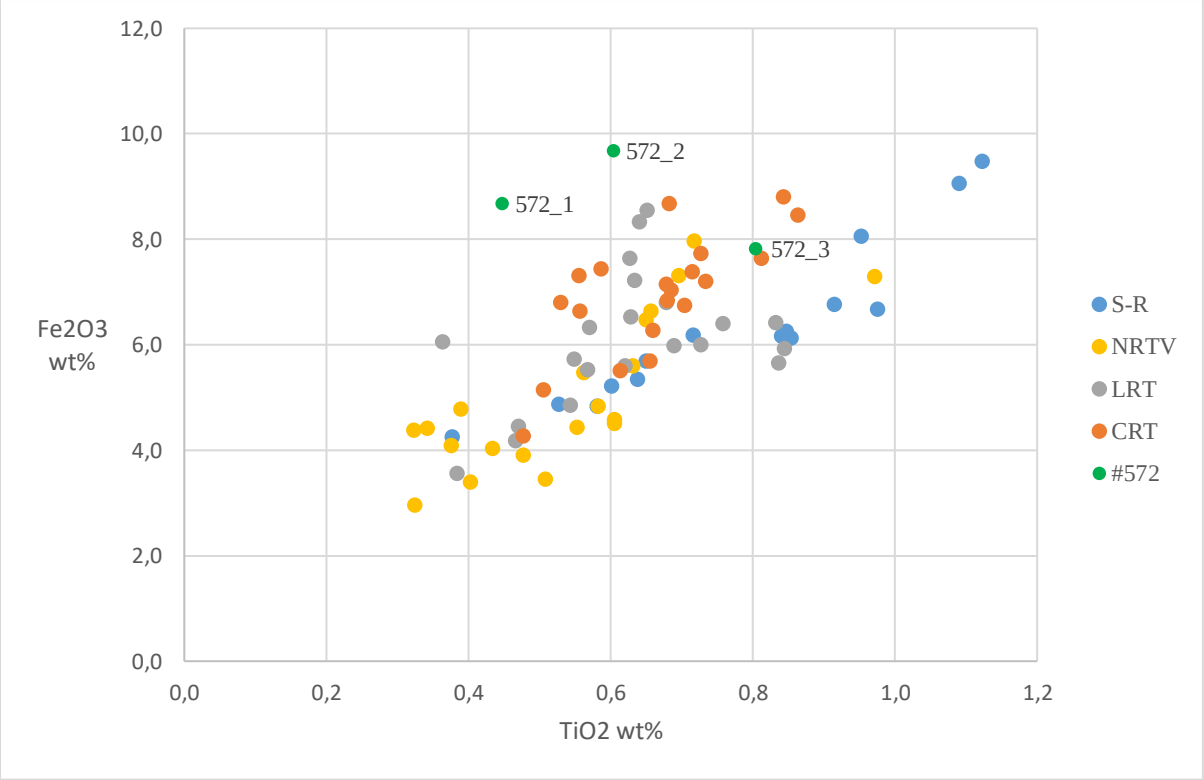
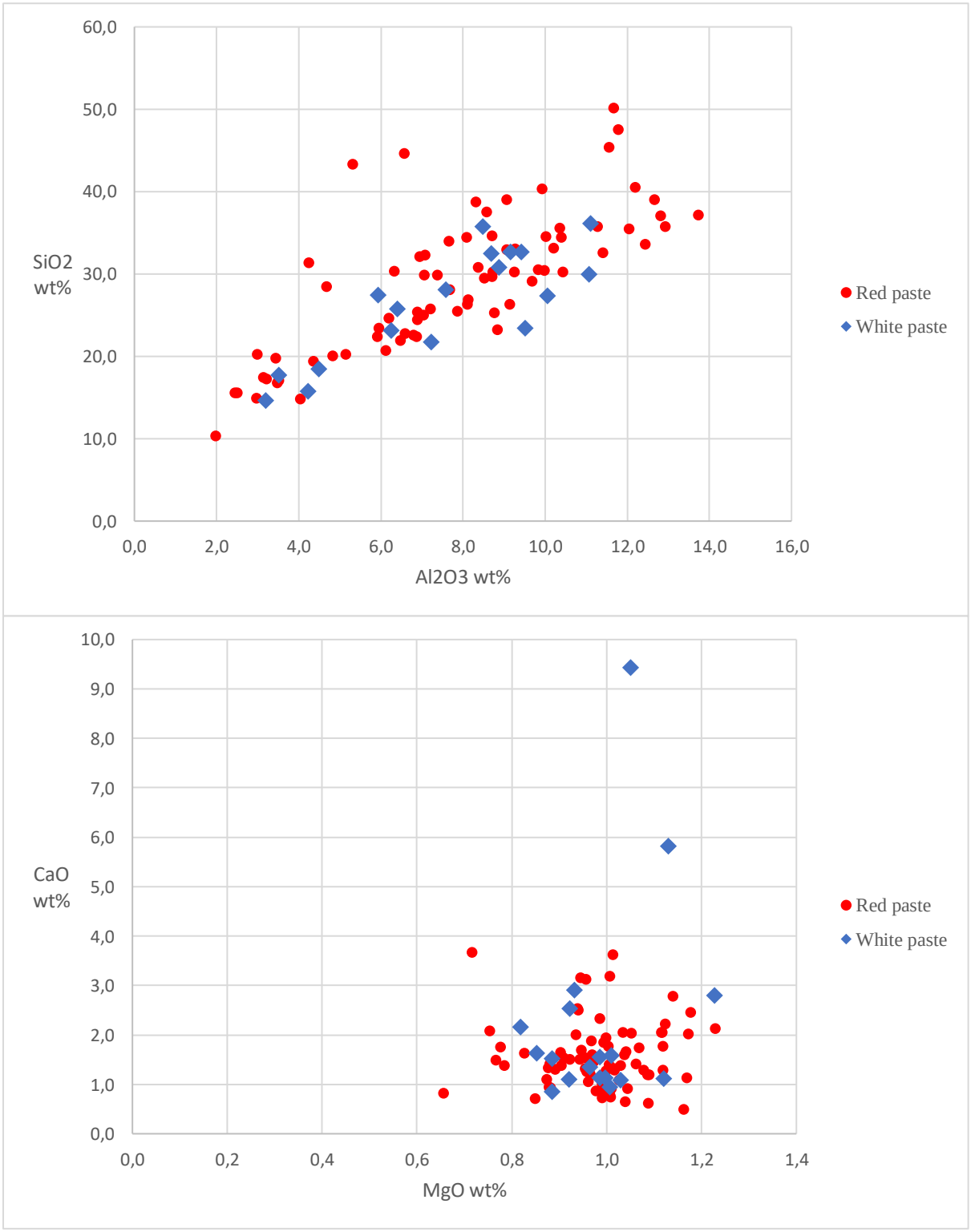


Figure 4.13 – **Fe2O3 versus TiO2 wt%.** Vessel #572, indicated as NCT, is inserted into the comparison of the degrees of red visible.

4.2.2.2 Incisions filled with a white paste

de Benedetto et al. (2010) performed Raman spectroscopy and laser ablation inductively coupled plasma spectrometry (LA-ICP-MS) on an assemblage of 7^{th} – 4^{th} century pigmented and slipped ceramics from Canosa, which is located in the fluvial basin of the Ofanto river in Puglia. The white-pigmented layers and white slips were found to be enriched in anatase – a natural mineral formation of TiO2 (de Benedetto et al., 2010, p. 1318). A previous research by de Benedetto and another group of researchers (1998, p. 173) had already showed, by use of X-Ray Photoelectron Spectroscopy (XPS), the prevalence of white pigments to contain kaolinite – a naturally occurring composition of Al2O3 and 2SiO2 (aluminosilicates) in clay, which is also naturally found packed together in marlstone. Many samples of the white slips and pigments contained both anatase and kaolinite, while all samples from all periods contained kaolinite (de Benedetto et al., 2010, p. 1318). Chemical analysis using LA-ICP-MS confirmed kaolinite as the main mineral for the white pigments, while the white slips incorporated kaolinite mixed with other aluminosilicate compounds, often those of the Mg-Ca or Na-K series (de Benedetto et al., 2010, p. 1319). Their analysis showed the potential of the low Z elements Na, Mg, Al, Si, K, Ca and Ti (all $Z \leq 22$) to be responsible for the white pigments and slips. This line of analysis will prove to be a problem for the XRF, as such low Z elements are not accurately or precisely recorded by pXRF (Holmqvist, 2019, p. 368). As was mentioned above, for these elements we were only able to provide unprecise semiquantitative data with broad error ranges. Na was excluded from the analysis entirely, as a significant number of points (more than 10 %) gave

results below the detection limit of the machine. Figures 4.14 and 4.15 show how the vessels still containing white traces are not clearly differing from the vessels with red traces, neither in regards to the Al-Si ratio (figure 4.14), nor in regards to the Mg-Ca ratio (figure 4.15).



Figures 4.14 and 4.15 – SiO2 versus Al2O3 wt% and CaO versus MgO wt%. The positive correlation of SiO2 and Al2O3 is clear from the figure 4.14. We should remember that the produced results have a clear error margin, higher than observed for the other elements and can only be described semi-quantitatively. Both red and white pastes have similar values. Figure 4.15 shows CaO versus MgO. It is not clear from the analysed samples whether red and white filled vessels are differentiated based on these elements. They seem to contain mostly similar values. The only outliers are the clear white fillings enriched in CaO.

Impasto vessels (either incised or engraved) containing white paste fillings are underrepresented in the context of the Ager Faliscus, in favour of the red filled vessels (Biella, 2007, p. 95). A proper analysis of white paste fillings for the incised vessels from the Ager Faliscus could be undertaken, but it would require a different sampling strategy and preferably another analytic methodology, such as LA-ICP-MS. This methodology is not viable for the assemblage from Falerii, as it is not entirely non-destructive. Another major limiting factor for proper conclusions regarding white fillings is the sample amount. Visually only five different vessels contained white traces (n = 5, p = 18), while red filled vessels were sampled at least four times as much (n = 22, p = 76). Of these five white filled incised vessels, four belong to Group 2 and one to Group 3. Of the eighteen points, two were surface (S-W) scans, four had clear white traces (CWT), four showed light white traces (LWT) while the remaining eight subjectively had no white traces visible (NWTV).

The results presented below are thus hindered by both the limited point and sample size of incisions with clear white traces and by the glaring problems stemming from the detection limit of the XRF, which is not able to accurately produce the expected elements related to anatase and kaolinite minerals, being the low Z elements Na, Mg, Al and Si. Out of the expected elements only K, Ca and Ti fall within the range for which this research can confidently produce results. The following bivariate plot compares CaO versus TiO2 (figure 4.16) on a broader scale, looking at the comparison of red and white vessels, the figures after that zoom in more to determine how the degree of visible white is represented in the composition of CaO, TiO2 and K2O (figures 4.17 and 4.18).

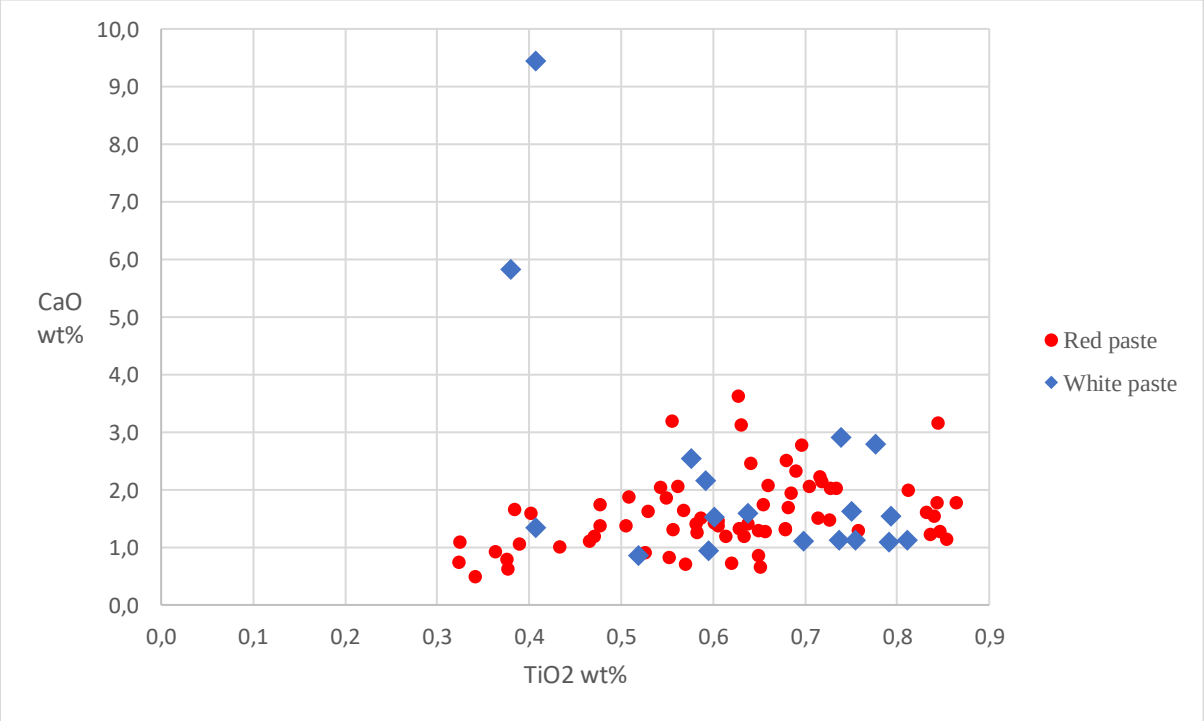
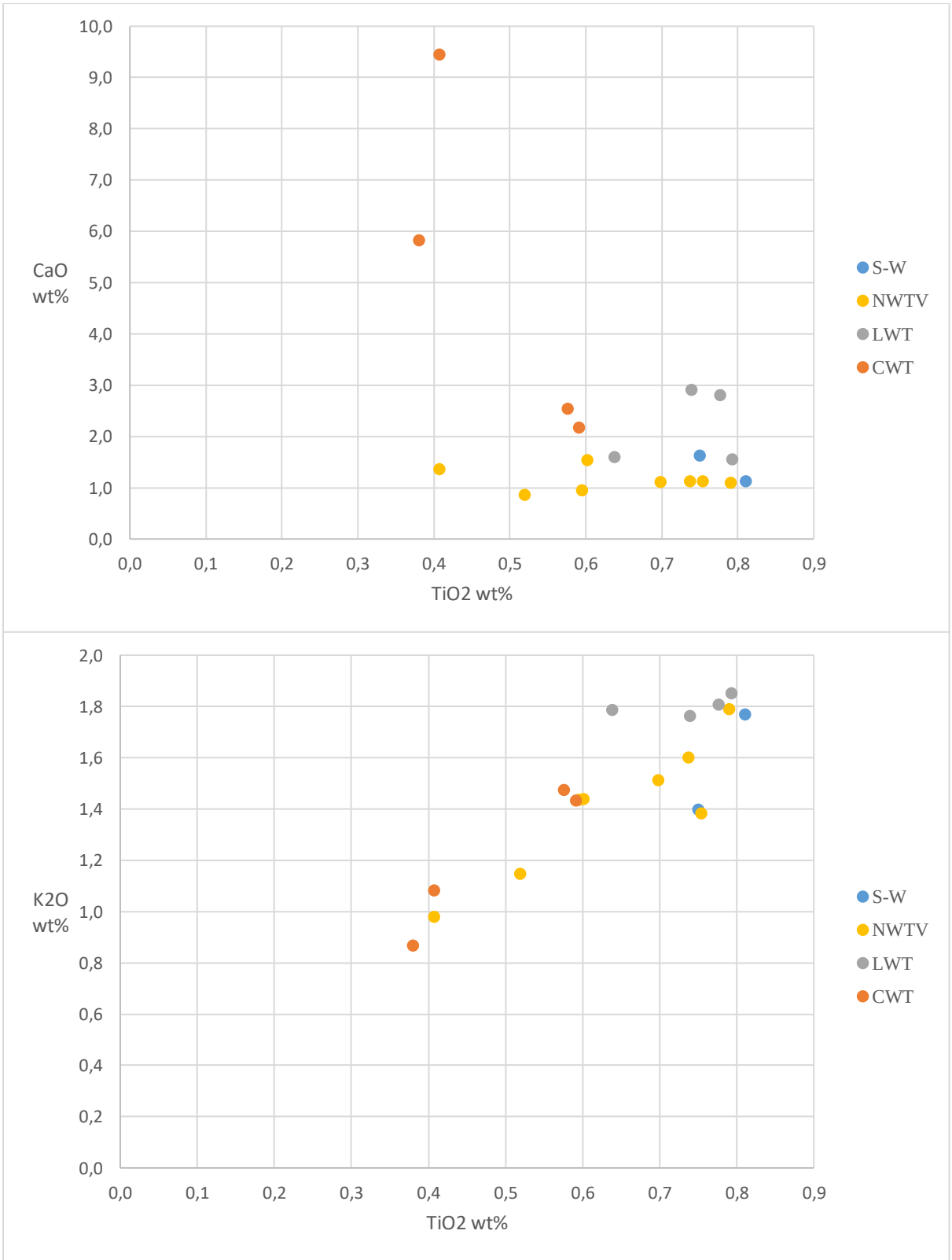


Figure 4.16 – CaO versus TiO2 wt%. Vessels with white paste versus vessels with red paste, a comparison of CaO versus TiO2, for which high CaO is expected to be accompanied by high TiO2. This is clearly not observed in our case.

Figure 4.16 mainly shows the variability of the entire assemblage based on the Ca-Ti ratio, at the same time it confirms the preference the white paste holds for high CaO values, even if only two scans rise far above the rest. Figure 4.17 is able to show that only LWT and CWT, if only occasionally, rise above 2.0 CaO wt%. Importantly, the degree of white paste visible has a clear effect on the amount of CaO present, as is shown in figure 4.17. The here presented results are primarily based on incised vessels which had once held white fillings, however, due to post-depositional processes, have a bad state of preservation. The results are thus only based on a too small amount of good quality samples. Indicative of this problem is that only in 55 % of the points the vessels which are indicated as having white traces show white traces at all.

Figure 4.18 shows the comparison of K2O versus TiO2 wt%, interestingly it seems they hold a positive correlation, with the lowest values represented by those vessels with the clear white traces or no white traces visible at all, yet never rising above 1.9 K2O wt%. This phenomenon is at this time, due to the explained problematic sample size, not well understood.



Figures 4.17 and 4.18 – CaO versus TiO2 wt% and K2O versus TiO2 wt%. The degree of white paste is analysed through these two figures. 4.17 looks at the Ca-Ti ratio, if white pastes were produced by adding anatase minerals, we should expect an enrichment of TiO2 for CWT and thus the relationship between CaO and TiO2 to be positive with the amount of paste visible, which is not the case. Figure 4.18 looks at the K-Ti ratio, which rather shows a negative correlation in terms of amount of white visible within the scans.

4.2.3 A comparison with late 5th to early 4th century Faliscan red-figure painted wares

An earlier case of pXRF research within the Ager Faliscus focused on a late 5th to early 4th century painted Faliscan vessel with unknown origin (Ambrosini et al., 2009). Data was collected for K, Ca, Ti, Cr, Mn, Fe, Ni, Cu, Zn, Rb, Sr, Zr and Pb. The authors were able to provenance the unknown vessel, which was found in the necropolis of Celle (vessel #1514), to be of Attic origin (Ambrosini et al., 2009, p. 100). The unknown vessel was compared to seven vessels with a known provenance (total n[1] = 8), including one from Nepi, a town which was part of the Ager Faliscus, and another from the Capenate region, from Nazzano, selecting Ca, Cr, Fe, Ni and Sr as the important distinguishing elements. As expected, especially the trace elements were found indicative of source (Ambrosini et al., 2009, p. 97). The publication of their data, allows the comparison of Rb and Zr for the two vessels from Nazzano and Nepi to be added to our data (see figure 4.19, below).

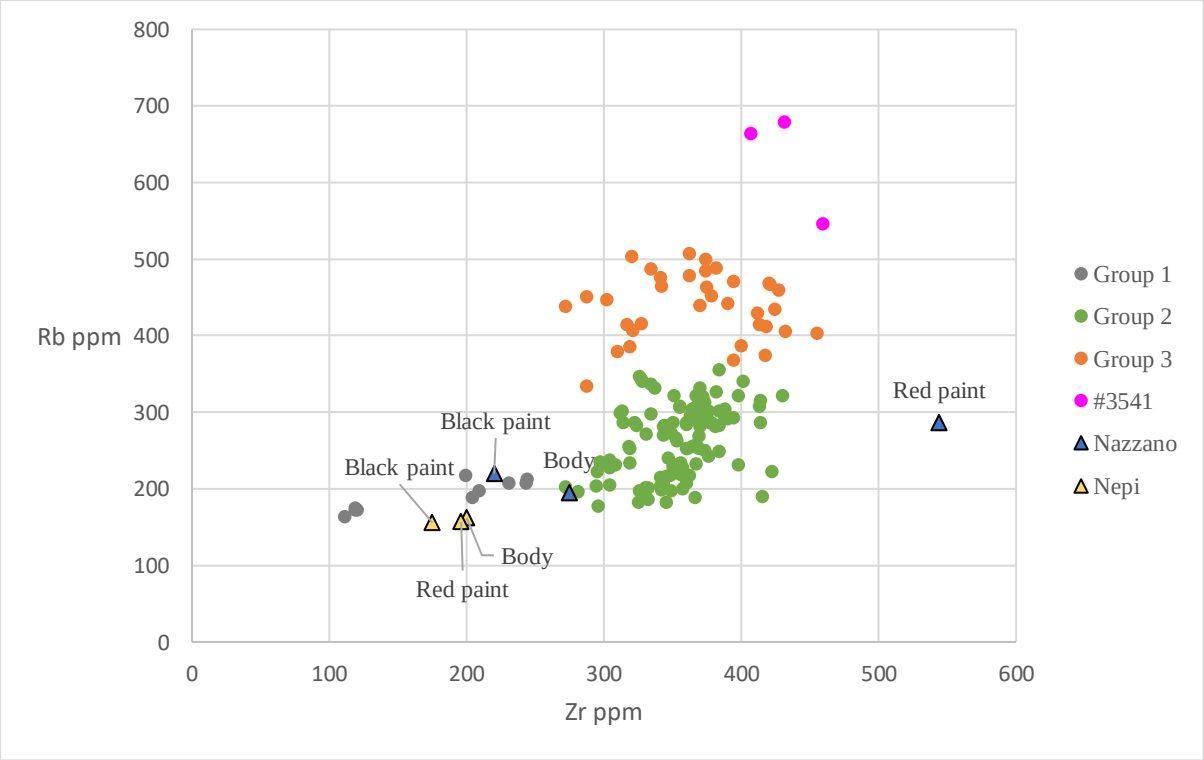


Figure 4.19 – Rb versus Zr ppm. A comparison of the four proposed groups to the late 5th – early 4th century painted vessels of two towns of the Capenate and Faliscan regions.

Since these vessels were painted, the ceramic body is of most interest in the comparison with the incised impastos, especially the red painted area of the Nazzano vessel is significantly different from the black painted area and the ceramic body and is to be excluded as an outlier. We cannot similarly recognize this preference for high Zr of the red painted area for the Nepi vessel.

[1] p = unknown. The authors do not mention how many points were recorded in the process, it is only mentioned that averages were made.

5. Discussion

Based on analyses of form typologies and decorative style, researchers suggested that the artefacts recovered from both the domestic and funerary contexts of Falerii, belonged to the same local artisanal recipe (Biella, 2008, p. 36; 2013a, p. 110; Carlucci, 1998, p. 13). It was argued that local productions from Falerii Veteres, Narce, Nepi, Corchiano, Vignanello and Gallese all contributed to the artisanal tradition of the Ager Faliscus. Taken together these impasto traditions were crucially local, maintained throughout the Orientalizing period by both artisan and consumer, determining the cultural tradition of what it meant to be Faliscan (Biella, 2013a, p. 111). The impasto wares that dominated the Faliscan countryside in the 8^{th} – 7^{th} century are separated into three decorative types: the incised, engraved or red-on-white productions. As was mentioned in the introduction above, the two types that dominated in Falerii were the incised and red-on-white wares, for which it is suggested their similarities might indicate similar hands/workshops producing these vessels at the same time (Biella, 2013a, p. 110; de Lucia Brolli, 1998, p. 201). Biella (2013a, p. 115-116) recognizes "at least one" large productive centre which was engaged in the creation of both these decorative types in Falerii, based on the dominating morphology of vessel form and the stylistic elements of horses and plant elements – which are similar across these types.

Based on the pXRF data this main hypothesis is seriously challenged, as significantly different ceramic "recipe" groups can be observed represented in the scans (see table 4.3). The ability of the pXRF to be able to distinguish the morphological outliers vessels #3541, which was assigned to its own group and FVI.22.1036.129, a fragment of a plate with decorations not known to exist at Falerii, indicates the precision of the pXRF in analyses of artisanal recipes based on clay composition.

The approach offered below is a discussion of the results in a connection with the stated sub-questions from the introduction, such that chapter **4.2.1** is connected to the sub-question "what raw materials were used?" and answered in **5.1** below. **4.2.2** was separated into **4.2.2.1** and **4.2.2.2**, separating the red and white incisions. These chapters were connected to the question "how were the raw materials combined and processed to create the different coloured decorations?", and will be answered in **5.2.1** and **5.2.2**. Chapter **4.2.3** was connected to the question "what can be said about the origins of the raw materials?", which is discussed in **5.3**. We can also offer a preliminary answer to the question "what sort of changes in terms of raw material usage can be observed throughout the Orientalizing period?" in **5.3**. Finally, the question "do the raw materials and/or manufacturing processes differ if we compare those vessels found in the domestic and the funerary contexts or throughout time?" will be evaluated in **5.4**. In this way the different sub-questions are answered in their respective sub-chapters below.

5.1 The raw materials used for potting

The selected assemblage of n = 45 samples contained thirty-three vessels which were excavated at the different necropoleis of Falerii, the remaining twelve samples were fragments excavated from the

contexts of the settled areas, mainly the Vignale hill. Impasto was made using a fair amount of inclusions, up to 4 millimetre in diameter, which are visible with the naked eye. The vessels from the necropoleis showed varying states of preservations, from completely intact and clean vessels to vessels with clear encrustations or for which the ceramic slip was peeling away, revealing the internal ceramic structure. It is known that non-plastic inclusions and encrustations can critically influence the results from the chemical analysis (Casale et al., 2020, p. 8), thus care was taken to avoid these anomalies. Multiple readings, at least three, were taken of each sample, with a final tally of p = 154 points taken.

The results of the compositional analysis reveal the importance of the elements **K, Ca, Ti, Mn, Fe, Rb, Y and Zr** and the potential of **Na, Mg, Al and Si**, be it with the limitation that these elements are too light for pXRF to accurately measure. Using Excel, a number of charts were plotted, comparing two elements to each other. The plotted figures 4.1 and 4.2 compared Y versus Rb and were plotted to analyse how the context of excavation related to the chemical composition of the different ceramics. What became clear is that not all vessels belong to the same artisanal recipe, such that three groups were at first recognized from these two figures. The picture that is dealt with is better represented by the comparison of the same variables in figure 4.3 and the comparison of Y versus Zr in figure 4.4. From these figures we can now confidently state there were at least four groups with similar, yet differing, artisanal recipes represented in the assemblage. Two of these groups were determined as including or being foreign imports, based on the combination of visual analysis focused on morphology and decorative style and objective analysis revealing their chemical make-up to be differing from Groups 2 and 3, which were local Falerii productions. The trace elements Rb, Y and Zr were shown to be clear indicators of these different groups of artisanal recipes within the context of the excavated incised impasto wares from Falerii. Groups 2 and 3 are differentiated by two red lines, drawn in figures 4.3 and 4.4, being the separating lines of Rb 360 ppm and Y 65 ppm. Table 4.3 indicated exactly which vessels belong to which groups.

Group 1 contains the morphological and typological outlier to the context of Falerii's necropoleis, the fragment of a plate with a broken low foot decorated with circular grooves (Appendix 3 – FVI.22.1036.129), excavated at the settled area of Vignale hill. It seemed possible two fragments of an earlier excavation (the Cassa17 fragments) from the Scasato area on the Civita Castellana plateau, are related to this fragment. Another fragment which was excavated at the same time from roughly this same location, #122778, does not fit the chemical profile of Group 1. Group 1 is characterized by the lowest Y values: < 40 Y ppm, low Rb values: < 220 Rb ppm and seriously varying Zr values, ranging between 100 – 250 ppm (read figures. 4.3 – 4.5). The Zr values of Group 1 especially provides potentials, as they are possibly indicative of yet two differing raw material sources, which is further discussed in **paragraph 5.3**, below. Based on this Zr range we might again separate FVI.22.1036.129 from the Cassa17 fragments found at Scasato. At this moment, for lack of sampling of more similarly related "Group1" vessels, this grouping remains.

Group 2 contains the bulk of the material (67 %), consisting of thirty out of the forty-five vessels. The group envelops the bulk of the necropoleis vessels (82 %) and some fragments from the settled areas: the fragment from the via del Fontanile (v. Fontanile) and two fragments uncovered at the Vignale hill. These being FVI.22.1034.27, the fragment with a stalk near the lip of the rim and fragment FVI.22.10.580, containing the fish body in white incision. Group 2 is characterized by variable Y values: scans range between Y 40 – 100 ppm (excluding one singular outlier, one scan of vessel #377, having a Y of 105 ppm), relatively low Rb values: ≤ 359 ppm and a range of Zr values between 270 – 430 ppm (read figures 4.3 – 4.5).

Group 3 contains five out of total eight fragments from Vignale hill, fragment #122778 from the Scasato area and five vessels from the necropoleis. Group 3 is differentiated from Group 2 by their explicitly high Rb values. Group 3 is characterized by having variable Y values on the higher end, ranging between ≥ 65 – 100 ppm (excluding again, one singular outlier, a scan of #550, having a Y of 57 ppm). While figure 4.4 does show how group 2 has a small cloud overlapping with the Y values of Group 3, calculations show that 75 % of the scans of Group 2 actually contain ≤ 65 Y ppm. Group 3, excluding the one scan of vessel #550 being uncharacteristically low, has 100 % of the scans containing a Y value of ≥ 66 ppm. Furthermore, Group 3 contains relatively high Rb values: ≥ 360 – 510 ppm and a similar Zr range as Group 2, fluctuating between 270 – 455 ppm (read figures 4.3 – 4.5).

Vessel #3541 is grouped separately, being typologically unique for the Faliscan context and clearly recognized as separate in the chemical analysis, with two scans containing almost 680 Rb ppm and one scan containing 546 Rb ppm, Y values above 88 ppm and containing relatively high Zr amounts, rising from 400 – > 450 ppm. It is likely a foreign import – belonging to an outside group that is on the other side of the chemical spectrum from Group 1.

From these figures it seems clear that the morphological and stylistic distinctions are viable in being able to separate different producing localities from each other (see also **chapter 5.3**, below). Chemical analysis was able to confirm what was already suspected regarding FVI.22.1036.129 and #3541. Their significantly differing values of Rb, Y and Zr confirm their foreign character in comparison with the locally produced vessels from Falerii, Groups 2 and 3. The separation of these two local groups, however, came as a surprise. From the clear morphology we know these are locally produced vessels, from Falerii, yet unexpectedly it seems the Faliscan artisans employed two recipes to create the exact same vessels. Based on morphology and the applied decorative repertoire modern authors could not distinguish these two groups from each other, rather, chemical composition seems now the only way to recognize how two different raw material resources were contemporaneously exploited in the creation of Falerii's Orientalizing incised impasto wares. Groups 2 and 3 overlap significantly, which I think rather strengthens than weakens the interpretation that they are two different, yet local, productions. It seems likely the artisans gathered from two resources which,

geologically, seem quite similar, suggesting they were both local. These raw material resources were found to be best distinguished based on Rb, Y and Zr.

5.2 The raw materials used for decorating

With the collection of the clay and the creation of the ceramic body, the partial drying and the incisions finished (the production process is described above, see **paragraph 3.1**), artisans turned their attention to another important aspect of the creation of an incised impasto vessel, the production of coloured pastes which were used to fill the incisions. The vessels were arbitrarily divided based on the degree of coloured fillings which visually remained (into table 4.3, p. 41). This division is considered arbitrary as it is unknown whether the vessels grouped as "no clear paste" show no filling due to post-depositional processes, or whether they were meant to be left unfilled (Biella, personal communication, May 10, 2023).

Thus, figures 4.9, 4.11, 4.14, 4.15 and 4.16 differentiate the different colours by red (red dots), white (blue diamonds) and no clear paste (green squares). While figures 4.10, 4.13 and 4.17 zoom in on the different degrees of colour still visible for either red or white coloured pastes.

5.2.1 The red coloured paste

The most popular filling of incised impasto vessels was the colour red. Out of the total forty-five vessels, twenty-two were found to be decorated with incisions filled with a red paste. Regarding the composition of the red paste this research was able to follow in the footsteps of a research from the 1970s which had found the red pastes of impastos from Narce, Capena and Poggio Sommavilla to be enriched in Fe_2O_3 (Roberts, 1974, p. 103). Fe is known to naturally occur with Ti, and their expected positive correlation was confirmed by figure 4.7. The results from Roberts (1974) were confirmed by figure 4.9, which shows specifically the red traces to generally contain 1 to 2 % more Fe_2O_3 than the scans which did not contain red pastes. This figure, however, is flawed by definition, as it treats "red traces" regardless of the degree of red paste actually visible, thus especially those categorized as red traces with low Fe-Ti ratios probably did not show much red paste anymore. A better approach, in this regard, was figure 4.10, which shows the comparison based on the degree of visual red paste.

A number of things become clear from this figure. Category NRTV – "no red traces visible" dominates ≤ 5.0 Fe_2O_3 wt% and ≤ 0.5 TiO_2 wt%, with most scans below these values belonging to this category. The category also shows to be variable, with values rising linearly with the rising amounts of Fe_2O_3 and TiO_2. This, however, is possibly an issue related to the methodology which was based on subjective analysis of visual degrees of "redness" by one person. Similarly, CRT – "clear red traces" dominates ≥ 6.0 Fe_2O_3 and ≥ 0.5 TiO_2 wt%. The observation that CRT and NRTV share similar TiO_2 values is related to the fact that most vessels have lost much of their red pastes in post-depositional processes. TiO_2 is known to be very resistant to weathering (Degryse & Braekmans, 2014, p. 194) and thus, vessels with incisions originally filled with red paste will remain high Ti values even when the Fe contents have weathered away.

The main issue with figure 4.10 is the subjective origins of the stated characteristics. The degree of colour visible was entirely based on the observations of one researcher and is thus prone to mistakes. This issue is exemplified by some important reclassifications of scans which were indicated as "LRT" – light red traces, while containing relatively low Fe2O3 versus TiO2 values. A combination of visual and thus subjective analysis with data-driven, objective analysis will be shown to be the best methodology in regards to this issue. This part of the discussion thus mainly proves the potential of pXRF analysis and the fact that the red coloured pastes are indeed enriched in Fe2O3, TiO2 and potentially MnO, as an analysis of figures 4.6 and 4.11 shall show.

Starting with those scans indicated as LRT, which contain relatively low Fe2O3 and TiO2 values, falling within the expected range of NRTV values. We can recognize four such examples, one scan of vessel FVI.22.1036.120, two scans of the fragment from the via del Fontanile and one scan of vessel #557 (named in figure 4.10).

The fragment FVI.22.1036.120 has been scanned four times, with one scan of the surface, which allows no identification of paste colour (grouping into S-R – "surface red") and two scans identified as NRTV and thus one scan under scrutiny here, indicated and named in figure 4.10 as LRT. The fragment belonged to a vessel which can be compared to vessel #378, both were plates filled with circular grooves, decorations reminiscent of the sun or a rose (Cozza & Pasqui, 1981, p. 166; Biella, 2014, p. 73; see also Appendices 2 and 3). A close-up picture (figure 5.1, on the right) shows the fragment having outward facing triangular forms filled with oblique lines. They are placed on three concentric circular lines forming two separate frames, the first frame being decorated with closely spaced dotted perforations. Interestingly, specks of red filling are still barely identifiable, lying deep within the uniquely perforated holes, in which this vessel's decorations differ from #378, which was not decorated with perforated holes and only with circular incised grooves.

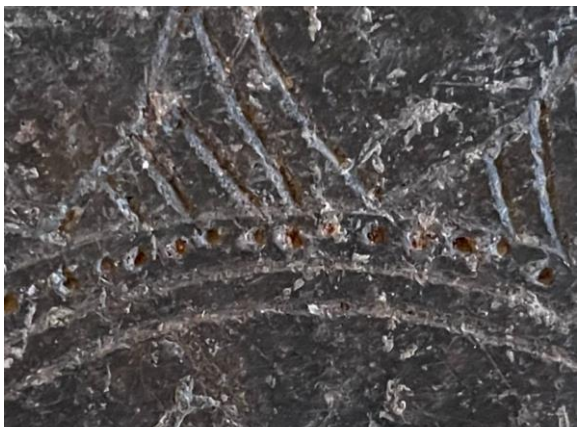


Figure 5.1 – A close-up of part of the decoration of fragment FVI.22.1036.120.

The one scan which was identified as containing light red traces contained 4.8 wt% Fe2O3 and 0.5 wt% TiO2. This, as we have seen, falls within the typical values of NRTV, which prefers ≤ 5.0 wt% Fe2O3 and ≤ 0.5 wt% TiO2. Figure 5.2, on the next page, shows three of the pictures that were taken during scanning.

Figure 5.2 – Three scans from fragment FVI.22.1036.120, from left to right categorized as: LRT, NRTV and NRTV.

The supposed visual distinction between the three pictures is not significant enough to warrant division, especially now, in light of the chemical results. It should thus be concluded that, based on the chemical analysis and re-evaluation of the photographs taken at the moment of scanning, we should rather assign these three scans as NRTV (the changed scan has thus been coloured blue in table 4.2 – signifying its reclassification).

A similar comparison between the registered chemical composition falling within the NRTV category yet indicated as LRT are v. Fontanile_1, v. Fontanile_2 and scan #557_3, warranting them to be re-evaluated using their pictures as well (figure 5.3, on the next page). As table 5.1 shows, they similarly contain both low Fe2O3 and TiO2 amounts, lower even, in the case of Fe2O3, than the scan of vessel FVI.22.1036.120.

Table 5.1 Selected results from the chemical analysis of vessels indicated as LRT based on Fe2O3 and TiO2, sorted on Fe2O3 highest to lowest, copied from table 4.2.

Vessel and scan number	Fe2O3 wt%	TiO2 wt%
#372_1	8.6	0.7
#116780_2	8.3	0.6
#375_1	7.6	0.6
#116724_1	7.2	0.6
#116780_1	6.1	0.4
FVI.22.1036.120_1	4.8	0.5
v. Fontanile_2	4.5	0.5
v. Fontanile_1	4.2	0.5
#557_3	3.6	0.4

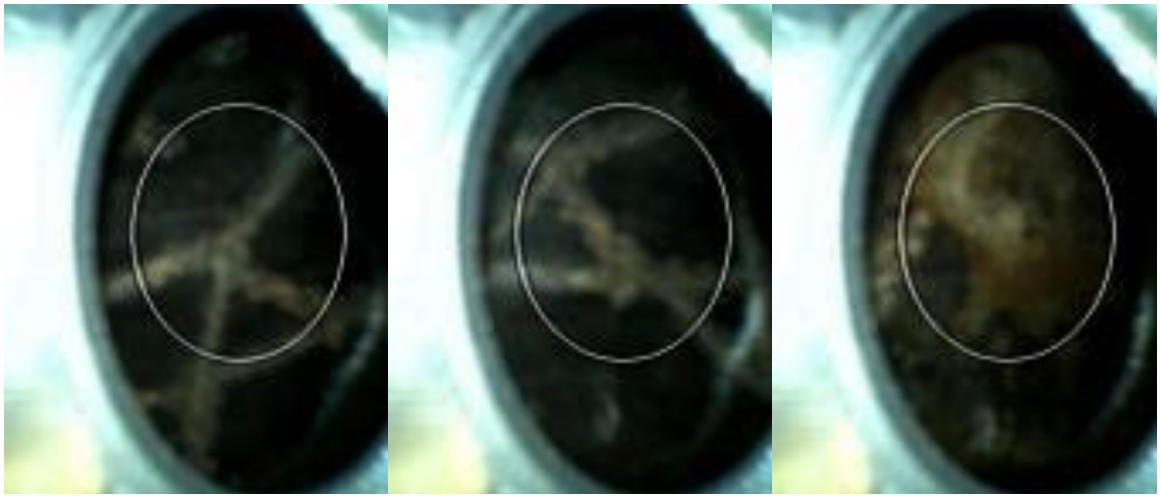


Figure 5.3 – The three scans under scrutiny, the two scans of the via del Fontanile vessel, from left to right: v. Fontanile_1, v. Fontanile_2 and scan #557_3, containing relatively low Fe2O3 and TiO2 values (see table 5.1).

We can now argue retrospectively that these vessels might indeed not really have red traces visible and should thus be re-assigned to the NRTV category (they have been made blue in table 4.2).

Fig. 5.4 – From left to right, organized from lowest to highest Fe-Ti ratios: the relevant scans of vessels #116780_1, #116724_1 and #375_1 indicated as LRT.

Similarly, those scans indicated as LRT, which contain relatively high Fe2O3 and TiO2 values, falling within the line of expected values for CRT, can be re-evaluated as well (see figure 5.4, above and figure 5.5, on the next page). However, from a re-evaluation of the pictures of the scans it does not seem the indication of LRT was wrong here. While the comparison between figure 5.2 and 5.3 versus 5.4 and 5.5 does allow broad visual identification of slightly more specks of red in the incisions for the fragments with higher Fe2O3 and TiO2, it does not warrant a reclassification to CRT. This holds especially true for #116780_2 and #372_1 (see figure 5.5, on the next page), which hold the highest observed Fe-Ti ratios. While their incisions do show some red specks, another reason must be sought explaining their elevated values, it is not those little specks of red paste, rather the ceramic body seems enriched in Fe2O3 and TiO2. The potential that a red coloured surface will show elevated

Fe-Ti ratios is best explained in a discussion of vessel #572, which is observed to have incisions with NCT – "no clear traces".

Figure 5.5 – From left to right, organized again from lowest to highest Fe-Ti ratios: the relevant scans of vessels #116780_2 and #372 indicated as LRT.

From figures 4.6, 4.11, 4.12 and 4.13 we can judge how visual analysis is a flawed methodology. Figures 4.6 and 4.11 show the interesting characteristic of Group 2 to sometimes incorporate vessels with anomalies of high MnO weight percentages. It is known Mn can have an effect on the colour of the ceramic body (Ceccarelli et al., 2016, p. 258). Furthermore, figure 4.8 shows the positive correlation between Mn and Fe, confirming, together with the already shown positive correlation of Fe and Ti in figure 4.7, that indeed the elements Ti, Mn and Fe often naturally precipitate in sediments together (Degryse & Braekmans, 2014, p. 194). Considering Fe-Ti are often 1 – 2% higher for vessels with red filled pastes, figure 4.13 is extremely suggestive in regards to vessel #572. This figure shows that vessel #572 clearly contains high amounts of Fe and Ti, often even more than vessels with known red filled incisions. Thus, it seems a re-evaluation is in order to determine whether, in fact, vessel #572 does not actually belong to vessels with red traces (indicated also in figure. 4.12).

The pictures on the next page, figure 5.6, show that this might actually be the case. Scan 572_1 and 572_2 are then to be indicated as visually showing LRT, while the third scan, 572_3, is best characterized as a surface scan. Furthermore, the hue of the ceramic body is indicative of perfect firing conditions. The vessel is fired under a reducing atmosphere, turning the iron traces on the surface into a black colour (10YR 2/1 on the Munsell chart – see Appendix 2 vessel #572). This explains why both 572_1 and 572_2 contain explicitly high amounts of Fe_2O_3 and TiO_2, rising far above what is generally observed for LRT. Since the incisions are relatively small, 1 – 2mm in width, the results of the scans, which are taken of an 8 mm concentric area, will bleed through some of the values of the ceramic body. This tells us that not only were the red pastes made with clay with a high Fe-Ti ratio, rather the ceramic body was as well.

The source of raw materials used for the red paste was rich in Fe and Ti, while also rarely

containing traces of Mn, at least in the case of Group 2. Whether Group 3 then did not use the same source for the red pastes cannot currently be ascertained. The sample size for Group 3 is too small to be able to falsify the statement that only Group 2 used a source for red paste containing traces of Mn.

Figure 5.6 – Three scans of vessel #572, from left to right: 572_1, 572_2, 572_3. As is known, high MnO values can be related to higher Fe2O3 versus TiO2 in the clay matrix, which seems to explain why very high Fe-Ti-Mn values are recorded for #572, while only determined as containing LRT. The ceramic body contained iron traces which turned black through the specific firing conditions.

5.2.2 The white coloured paste

Impasto vessels (either incised or engraved) containing white paste fillings are underrepresented in the context of the Ager Faliscus, in favour of the red filled vessels (Biella, 2007, p. 95). Out of the total forty-five vessels only five were found to be decorated with incisions filled with white paste. Furthermore, figures 4.17 and 4.18 showed a general lack of clear or even light white filled samples. Such that only eight out of the total eighteen scans (44 %) were identified as still containing any amount of white traces.

Being aware of the limiting characteristics related to this low sample size we are able to give suggestive results. The data suggests the white paste to be explicitly enriched in CaO. The clear and light white pastes are shown to contain more than 2.0 CaO wt%, rising to 9.4% in an extraordinary clear case. A comparison of these results with the results of de Benedetto et al. (2010), who studied 7th – 4th century white slips and pigments from the site of Canosa in Puglia is now possible. de Benedetto et al. (2010, p. 1318-1319) found anatase and kaolinite minerals which were related to an enrichment of Na, Mg, Al, Si, K, Ca & Ti. Out of these expected elements only K, Ca and Ti fall within the range for which this research can confidently produce results. Na was completely excluded and semiquantitative data was collected for Mg, Al and Si (see figures 4.14 – 4.15). Since raw data was not published by de Benedetto et al. (2010, Fig. 2, p. 1319), a rough read of the published box plots can give an estimated image of the oxide weight percentages of the relevant elements. Using LA-ICP-MS they measured ranges for MgO, Al2O3, SiO2, K2O, CaO and TiO2, which are compared to the ranges for these elements as recognized by pXRF in this research (see table 5.2, on the next page).

Table 5.2 A comparison of the oxide weight percentage of K2O, CaO and TiO2 of white coloured slips or pastes, based on the results of de Benedetto et al. (2010) and the results obtained here.

Elements recorded	Estimated weight percentages for white slips measured by LA-ICP-MS by de Benedetto et al. (2010, Fig. 2, p. 1319)	White pastes measured by pXRF in this research
MgO wt%	~ 1.5 – 3.0	0.8 – 1.2
Al2O3 wt%	~ 12.0 – 20.0	3.1 – 11.1
SiO2 wt%	~ 80.0 – 90.0	14.6 – 36.2
K2O wt%	~ 0.6 – 8.0	0.9 – 1.9
CaO wt%	~ 10.0 – 15.0	0.9 – 9.4
TiO2 wt%	~ 0.8 – 1.0	0.4 – 0.8

de Benedetto et al., (2010, p. 1322) based their analysis on LA-ICP-MS and were able to confirm anatase, because their white slips contained TiO2 nearing 1 %. Figure 4.15 has shown our assemblage rather hold a preference for clear white traces to contain lower than 0.6 % TiO2 and never containing more than 0.8 TiO2 wt% (see also table 5.2, above). Light white traces were among those containing the highest TiO2 values, but also never reaching the 1 weight percentage. This strange negative relationship of observed degree of white versus low TiO2 cannot be explained if anatase minerals were used to produce the white colour. Our results rather suggest that the white paste was created by limiting the amount of TiO2 in the production process. When higher TiO2 values are present while white paste is visible we are here scanning the ceramic body, which, as we have seen, was made with Fe-Ti(-Mn) rich clays, dependent on Group. Anatase is thus not a likely mineral used for the colouring of the white paste.

To produce the white slip other minerals were also incorporated at Canosa, combinations of magnesium-calcium (Mg-Ca) or sodium-potassium (Na-K) were found to be present. These combinations of elements into a kaolinite rich clay (based on high Al-Si ratios) was determined as the main raw material source of the white pigment used for the production of the slips (de Benedetto et al. 2010, p. 1322). As has been mentioned, Na had to be completely excluded from analysis, as the values often were too low for the detection limit of the XRF. Figure 4.14 compared SiO2 to Al2O3 and shows that the vessels with white incisions are not differentiated from the vessels with red incisions based on these elements. Especially SiO2, which was found to range between 80 and 90 wt% in the case of the white slips from Canosa, in our research does not come close to such values, having a maximum rather lower than 40 wt%, while the white slip which was made with kaolinite rich clays at Canosa contained over 80 % SiO2. Even the incapability of the XRF to produce accurate values for Mg, Si and Al does not explain these significant differences. It seems thus that kaolinite rich clays were also very unlikely to be used for the white pastes at Falerii.

The range the white slips of Canosa had for K2O went up to 8.0 wt%. Figure 4.16 has shown the white filled incised impastos to contain a maximum of 1.9 wt% K2O. Finally then, even while the

XRF produces problematic data for the relevant elements Mg, Al and Si, these, in combination with the analysis of K, Ca and Ti, allows us to conclude that it is unlikely either anatase or kaolinite were used to create the white pastes at Falerii. High CaO and limiting TiO2 values remain the only clear indicators which differentiate the production process of the white pastes from the red.

5.3 A first effort in determining raw material provenance and changes throughout time

This research is not able to provide a study of provenance of the raw clays used in the production of the different groups or the two coloured pastes represented in the assemblage. Provenancing is the comparison of the chemical composition of archaeological ceramics versus the composition of raw clay resources. This research has only focused on the archaeological ceramics with different coloured pastes, yet some step towards provenancing is possible in a comparison to vessels from Falerii and Capena from a later period for which the provenance is assumed (Ambrosini et al., 2009). While the authors studied a later period (5^{th} – 4^{th} century BCE), this data still proves valuable, as became visible in figure 4.19. The data which was accessible during the writing of this thesis was not enough to be able to give confident conclusions regarding a diachronic difference of raw material resources used across the different periods of the Orientalizing, as will be shown, below.

Figure 4.19 compared the different proposed Groups based on Rb and Zr, as was done when the four groups were recognized (compare figure 4.5). Two vessels were added to generate figure 4.19, one with a provenance from Nepi, and one from Nazzano. The best comparison is offered if we compare the proposed Groups to the ceramic bodies of the Nazzano and Nepi vessels. The ceramic body is most likely made of locally provenanced clay. Especially the red painted area of the Nazzano vessel is significantly different from the ceramic body, having an extremely large Zr value of 544 ppm, and is to be excluded. We cannot similarly recognize this preference for high Zr of the red painted area for the Nepi vessel. Interestingly, based on the composition of Rb to Zr, the body of the Nepi vessel is most comparable to Group 1. More specifically, the Nepi vessel is most similar to the Cassa17 fragments. With the addition of just one sample from 5^{th} century Nepi it seems more likely that FVI.22.1036.129 and the Cassa17 fragments were based on two separate raw material resources and should indeed be grouped separately. Based only on one singular sample we dare provide the possibility that the Cassa17 fragments, found together at the Scasato area, were produced in Nepi.

The clay matrix of the ceramic body of the Nazzano vessel and Falerii's Group 2 is judged from figure 4.19 to be quite similar. A comparison of the geography shows that Nazzano lay a bit downstream the river Tiber. Falerii did not lay on the Tiber as Nazzano did and while the collection of ceramic raw materials for Iron Age Italian impasto is often "local" (Pérez-Monserrat et al, 2023, p. 2974; Saracinoa et al., 2014, p. 91), we cannot exclude the Faliscan artisans could not have travelled to collect "better quality" clay samples from the Tiber river. Based on just the one sample of the composition of the ceramic body of the vessel from Nazzano it is possible that Falerii's Group 2 collected its raw materials from the Tiber river, similarly as Nazzano would have done, explaining

their similarity. What is interesting is that the local Group 2 from Falerii and the vessels from both Nazzano and Nepi are observed to be quite similar. This while a quick look at figure 2.1 (see p. 8, above) shows how far apart the three localities are. How we should then explain the big differences within Groups 2 and 3 in regards to their Rb contents is unclear. A possible source for the anomaly of the complete red vessel #3541 is at the same time not brought closer. A diachronic approach might be able to explain these differences. The potential for such an approach is there, but for lack of data we cannot, at this time, provide clear answers.

Only a small number of vessels within this study have a published estimated dating (see table 5.3, below).

Table 5.3 The estimated dating of some of the vessels within this study.

Vessel number	Estimated dating
#349	Second half of the 7th century BCE, middle Orientalizing
#350	Second half of the 7th century BCE, middle Orientalizing
#366	First half of the 6th century BCE, late Orientalizing
#3312	First half of the 7th century BCE, early Orientalizing
#3488	First half of the 7th century BCE, early Orientalizing
#3499	First half of the 7th century BCE, early Orientalizing
#3518	Mid-7th century BCE, middle Orientalizing
#3519	7th century BCE
#3541	Tomb dated to first half of the 7th century BCE, early Orientalizing
#15765	Materials in the tomb dated to mid-7th to first half of the 6th centuries BCE, middle to late Orientalizing

The image that these vessels draw indicates that the period of production could have had an effect on which raw material resources were used, even if the sample size at this time is problematically limited (see figure 5.7, on the next page).

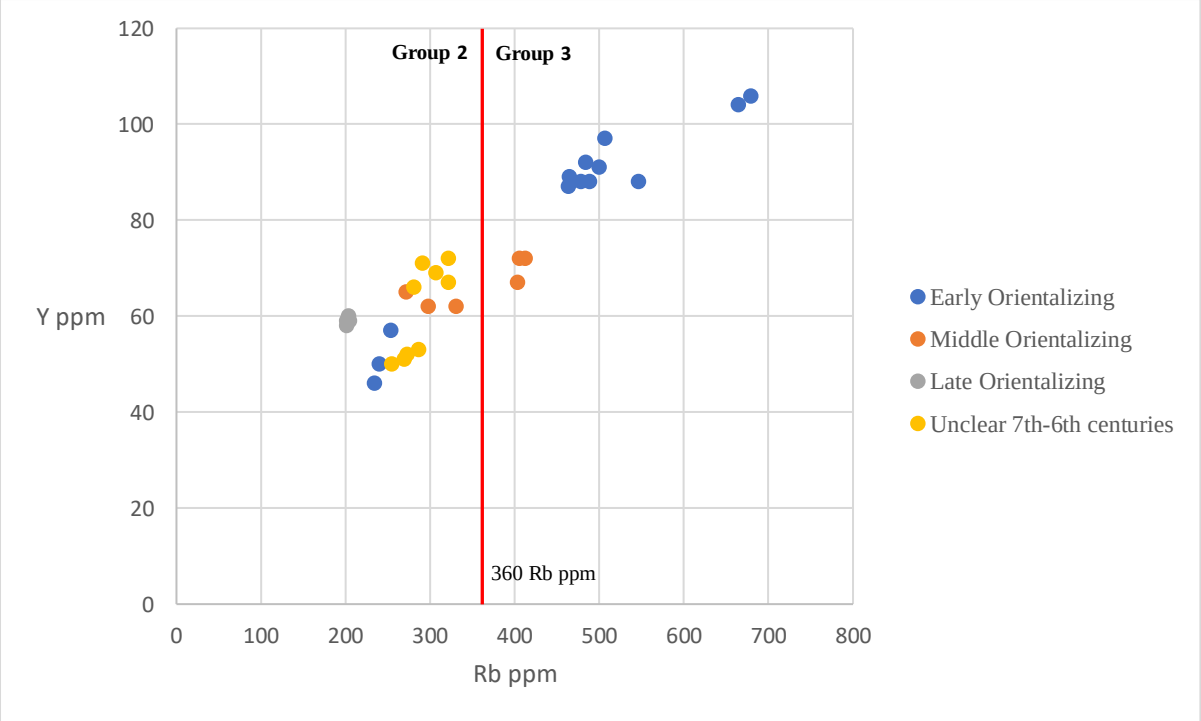


Figure 5.6 – Y versus Rb ppm. The picture that emerges when the vessels are grouped according to the period of the Orientalizing they were produced. Note how Group 3 seems only used during the early and (part of) the middle Orientalizing.

During the early Orientalizing period vessels seem to be made with varying raw materials, the two sources of Groups 2 and 3, seem in use at the same time. Group 3 contains much less vessels (n = 11), which seem made mostly during the early Orientalizing period. At some point it is possible the raw material source which we have called "Group 3" ran out, seemingly somewhere during the late early or middle Orientalizing period. This holds the potential of explaining why two local groups of raw material resources were used in the creation of the exact same morphological and stylistic vessels. At this time, due to the problematically limited sample size we cannot trace this development any better. We should remember that at least one of the vessels within the early Orientalizing group is vessel #3541, for which the outlying character is known from a chemical composition and from the morphological and stylistic analyses. For the middle Orientalizing period the three samples are grouped a bit nearer to each other, separated by the 360 Rb line. Are we here seeing the moment the raw material resource for Group 3 was depleted? Finally, the late Orientalizing period only has one sample, being made from the Group 2 source, again, are we to read that the Group 3 source had ran dry?

How we are to explain the two samples with unclear, or rather broader estimated dating ranges, is unknown. They seem clustered, similarly as the vessels from the middle Orientalizing period, within Group 2. Clear conclusions are not possible at this time, but the potential is there. An analysis of the diachronic change of raw material usage across the entire Orientalizing period could in the future be used to determine how the proposed Groups 2 and 3 relate to each other and how they might reflect a possible depletion of one raw material resource. At the same time then the other

remained in use, such a research would answer questions regarding early Italian raw material resource usage throughout time.

5.4 Comparing potters' traditions in domestic and funerary ceramic contexts

The answer was found to actually be more complex than at first assumed. Instead of different groups being represented by excavation contexts, the different vessels were grouped based on artisanal recipes which differed especially in regards to their Rb, Y and Zr contents.

The potential to distinguish between what is now proposed as two local Faliscan artisanal recipes using very similar, yet differing, clay compositions proves the potential the technique of portable X-Ray Fluorescence holds for the study of the different locally produced incised impasto vessels from the Ager Faliscus. These results were wholly unexpected. We are now able to clearly observe two local recipes for the same production from Falerii. A case can be made to widen the research area, starting with Nepi, as this site seems to offer potential answers to the questions which arise from Group 1, for which especially low samples has led this group to still be shrouded in mystery.

At the same time pXRF methodologies could be applied at the nearby necropoleis at Capena and Narce, which would allow for valuable comparative data of these centres. Based on the current results and the already accepted morphological and stylistic differences between these centres, it can be assumed that these centres will be compositionally separated from the here offered results. Surprising results could arise from these examinations once more, potentially revealing more local artisanal recipes within their own areas. Possibly vessel #3541, which stands clearly on its own within this thesis' research, can be excluded or connected to one of these nearby contexts, being an import from these regions – or it could be proven to be a vessel from even further afield.

6. Conclusions

Since the first excavations of the necropoleis of the Faliscan region, in the late 19th century, different local impasto wares with incised, red-on-white and engraved decorations were rediscovered. Studies (Biella, 2013a; 2014) have shown the unique local character of these vessels, which especially the incised vessels maintained at Falerii Veteres during the Orientalizing period, when artisans and knowledge from all over the Mediterranean spread rapidly over its long coasts. This Orientalizing wave of ceramic production hit central Tyrrhenian Italy between the second half of the 8th and the 7th centuries BCE (Biella, 2010, p. 141). This period saw the Etruscans rapidly adopt and produce the dark coloured, smoothly polished bucchero wares. The emergence of new decorations and forms gave rise to a wave of experimentation in the Faliscan region, which had a profound effect on the Faliscan potters, significantly enriching the decorative repertoire as inspired from the bucchero (Biella, 2013b). The various ceramic producing localities of the Ager Faliscus responded differently to this influx of ideas regarding ceramic production and decoration. The Faliscan potters decided, either by their own volition and/or by their customers' requests, to stick to their local incised impasto ware. At the same time they developed their decorative repertoire, incorporating Orientalizing influences as they saw fit. This regionally differing development has raised a number of questions regarding locally organized artisanal practices in the ancient landscape of the Ager Faliscus. In 2022 excavations of the Vignale hill at Civita Castellana, ancient Falerii, resulted in a small assemblage of incised impasto fragments, which by visual identification were related to the incised Faliscan vessels which were held in the Museo Archeologico dell'Agro Falisco. This striking similarity suggests the strong local production process at work, creating both vessels for the necropoleis and vessels for direct banqueting use in the homes of Falerii's inhabitants. Within such framework this research was placed, specifically asking the question: **How did potters' technological choices develop at Falerii during the Orientalizing period (8th – 7th BCE) when it comes to the traditionally produced incised impasto ware?**

The methodological approach of non-destructive portable XRF was applied to generate an image of the compositional characteristics of both vessels from the necropoleis and those excavated at Vignale hill and other settled areas. This approach allowed the identification of four different compositional groups which were differentiated on trace elements. These results confirmed the suspicion that two morphological and stylistic anomalies had belonged to outside production centres. Yet they were also surprising, as they allowed the possible identification of different raw material resources within what is seen as one local production from Falerii. The exploitation of two different raw material sources at the same time, or possibly throughout time, suggests intricate knowledge of the local landscape and confirms the image of Falerii as the capital of a small peripheral region, which acted as a middle ground incorporating aspects from the Etruscan, Latin and Capenate regions. However, at the moment we suggest the use of two raw material resources contemporaneously, which points to the possibility of two different groups at Falerii being engaged with the production of their

so preferred locally unique Faliscan incised impasto ware. This observation has serious effects on the image of economic and productive organization, adding another layer to discussions regarding whether consumers or professional artisans produced these ceramics (Biella, 2010, p. 156-157) and affecting the most recent discussions which have focused around the production capabilities of the sacred areas on Vignale hill and the Scasato area (Biella & de Lucia Brolli, 2022). A continuation and expansion of this type of research will be able to offer valuable discoveries in terms of ceramic production, technological choices and raw material provenance for the broader region of the Ager Faliscus, pre-Roman Etruria and Latium.

The potentials for pXRF to recognize different artisanal recipes which together created the local Faliscan incised impastos points also to the potential of higher resolution compositional techniques (such as XRD and LA-ICP-MS), which could be applied more broadly to the Ager Faliscus allowing for the connectivity between the separated localities to be further investigated. XRD analysis has already been applied on Faliscan material from a more recent period, related to the economic production activities of the sacred areas (Biella & de Lucia Brolli, 2022). This technique could also be applied to distinguish different clays within the same ceramic body, which could offer more clarification in terms of clay preparation and mixing technology (Casale et al., 2020, p. 12).

In light of these discoveries the recent archaeological project at Falerii, which has only seen its first season in the summer of 2022 and is planned for a second season in the summer of 2023, holds much potential. These excavations will hopefully uncover more decorated incised impastos from the settled area of the city, which will prove extremely valuable for future analyses. Concluding, this research has offered a first look into the chemical composition of the incised impasto wares from Falerii and offers high potential for the study of locally produced impasto for the entire region of the Ager Faliscus and beyond.

Abstract

Locally produced incised impasto ware is known to dominate the necropoleis and settlement contexts of Falerii Veteres, modern Civita Castellana, northern Lazio, during the Orientalizing period (8^{th} – 7^{th} centuries). Falerii Veteres is recognized as the main town of a small peripheral region, acting as a middle ground between the Sabine, Capenate, Latin and Etruscan regions. Within this well connected ancient cultural landscape the Faliscan incised impasto production remains crucially its own, adopting the decorative repertoire of the Orientalizing and bucchero wares as the artisans or consumers saw fit. The research of this thesis revolves around the main question "**How did potters' technological choices develop at Falerii during the Orientalizing period (8^{th} – 7^{th} centuries BCE) when it comes to the traditionally produced incised impasto ware?"**. Using techniques and methodologies developed by the Archaeological Sciences, pXRF analysis was performed on an assemblage of incised impastos (n = 45). The results confirmed suspected imported vessels, proving its validity, and offered surprising results, showing two different artisanal recipes were used, either contemporaneously or possibly throughout time. These results have offered a first look into the chemical composition of the incised impasto wares and the decorative pastes which filled their incisions from the city of Falerii Veteres and its necropoleis. The results offer high potential for the study of change throughout time of raw material usage and potential provenancing of locally produced impasto for the entire region of the Ager Faliscus and beyond.

Bibliography

Ancient sources

Ovid. *Heroides. Amores.* Translated by G. Showerman. Revised by G. P. Goold. Cambridge, MA: Harvard University Press (Loeb Classical Library), 1914.

Pliny. *Natural History, Volume X: Books 36-37*. Translated by D. E. Eichholz. Cambridge, MA: Harvard University Press (Loeb Classical Library), 1962.

Vitruvius. *On Architecture, Volume II: Books 6-10*. Translated by F. Granger. Cambridge, MA: Harvard University Press (Loeb Classical Library), 1934.

Strabo. *Geography, Volume II: Books 3-5*. Translated by H. L. Jones. Cambridge, MA: Harvard University Press (Loeb Classical Library), 1923.

Catalogues

Danielsson, O. A., Herbig, G. & Nogara, B. (1912). *Corpus inscriptionum Etruscarum*, volumen II, sectio II, fasciculus 1: *Ager Faliscus et Capenas*.

Secondary sources

Ambrosini, L., Felici, A. C., Fronterotta, G., Piacentini, M. & Vendittelli, M. (2009). Non-destructive analysis of a red figure vase of uncertain attribution from Falerii Veteres. In K. Biró, V. Szilágyi & A. Kreiter (Eds.), *Vessels inside and outside* (pp. 97-101).

Attaelmanan, A. G. & Mouton, M. (2014). Identification of archaeological potsherds excavated at Mleiha using XRF. *Journal of Archaeological Science, 42*, 519-524. https://doi.org/10.1016/j.jas.2013.12.001

Bakkum, G. C. L. M. (2009). *The Latin dialect of the Ager Faliscus: 150 years of scholarship*. Amsterdam University Press.

Barone, G., Crupi, V., Longo, F., Majolino, D., Mazzoleni, P., Spagnolo, G., Venuti, V. & Aquilia, E. (2011). Potentiality of non-destructive XRF analysis for the determination of Corinthian B amphorae provenance. *X-Ray Spectrometry, 40*, 333-337.

de Benedetto, G. E., Catalano, F., Sabbatini, L., Zambonin, P. G. (1998). Analytical characterisation of pigments on pre-Roman pottery by means of spectroscopic techniques. Part I: white coloured shards. *Fresenius Journal Analytical Chemistry, 362*, 170-175.

de Benedetto, G. E., Nicolì, S., Pennetta, A., Rizzo, D., Sabbatini, L. & Mangone, A. (2010). An integrated spectroscopic approach to investigate pigments and engobes on pre-Roman pottery. *Journal of Raman Spectroscopy, 42*, 1317-1323.

Bianco Peroni, V. & Betzler, P. (1979). *I rasoi nell'Italia continentale*.

Biella, M. C. (2007). *Impasti orientalizzanti con decorazione ad incavo nell'Italia centrale Tirrenica*. Giorgio Bretschneider Editore.

Biella, M. C. (2008). Impasti orientalizzanti con decorazione incisa di aree Falisca e Capenate: un primo bilancio. *Bollettino di Archeologia on line, 1*, 32-41.

Biella, M. C. (2010). Su di un vaso Falisco di età orientalizzante con scena di navigazione. *Römische Abteilung, 116*, 141-158.

Biella, M. C. (2013a). La polifonia dell'artigianato ceramico. Alcune considerazioni sulla specificità culturale della regione Falisca in età orientalizzante. In G. Cifani (Ed.), *Tra Roma e l'Etruria: cultura, identità e territorio dei Falisci* (pp. 107-133). Edizioni Quasar.

Biella, M. C. (2013b). La metamorfosi degli impasti in buccheri. Ovvero come gli artigiani Falisci si adattarono alla "moda del tempo". *Tra centro e periferia. Nuovi dati sul bucchero nell'Italia centrale Tirrenica – Officina Etruscologia*, *3*, 133-142.

Biella, M. C. (2014). *Impasti orientalizzanti con decorazione incise in Agro Falisco*.

Biella, M. C. (2018a). Archaic Faliscan titi – an obituary notice: An archaeological reply. *Zeitschrift für Papyrologie und Epigraphik, 207*, 308-312.

Biella, M. C. (2018b). *Giving voice to a preRoman city: The case of Falerii Veteres.* [Doctoral dissertation, University of Southampton] Eprints Soton. https://eprints.soton.ac.uk/450216/

Biella, M. C. (2019). Gods of value: Preliminary remarks on religion and economy in pre-Roman Italy. *Religion in the Roman Empire, 5*(1), 23-45.

Biella, M. C. (2020). 'Drawing' inscriptions: Preliminary remarks on writing artisans in 7th century BC Faliscan territory. *Etruscan Literacy in its Social Context, 18*, 91-101.

Biella, M. C. & Lucia Brolli, M. A. de (2022). Processi di strutturazione e gestione della categoria del sacro in una città preromana: Falerii. *Scienze dell'Antichità, 28*(2), 127-148.

Britton, K. & Richards, M. P. (2019). Introducing archaeological science. In K. Britton & M. P. Richards (Eds.), *Archaeological science: An introduction* (pp. 3-10). https://doi.org/10.1017/9781139013826.001

Bruker Nano GmbH (2022). Tracer 5: Portable XRF analyzer for cutting-edge researchers.

Carlucci, C. (1998). *Villa Giulia museum: The antiquities of the Faliscans*. L'Erma di Bretschneider.

Carlucci, C., Lucia Brolli, M. A. de, Keay, S., Millett, M., Strutt, K., Clogg, P. W., Moscati, P., Opitz, R. & The Cooperativa Parsifal (2007). An archaeological survey of the Faliscan settlement at Vignale, Falerii Veteres (province of Viterbo). *Papers of the British School at Rome, 75*, 39-121.

Casale, S., Donner, N., Braekmans, D. & Geurds, A. (2020). Geochemical and petrographic assessment of clay outcrops and archaeological ceramics from the pre-Hispanic site of Aguas Buenas (cal 400-1250 CE), central Nicaragua. *Microchemical Journal, 156*, 104829.

Ceccarelli, L., Rossetti, I., Primavesi, L. & Stoddart, S. (2016). Non-destructive method for the identification of ceramic production by portable X-rays Fluorescence (pXRF). A case study of amphorae manufacture in central Italy. *Journal of Archaeological Science: Reports, 10*, 253-262. https://doi.org/10.1016/j.jasrep.2016.10.002

Ceccarelli, L. Bellotto, M. P., Caruso, M., Cristiana, C., Dotelli, G., Stampino, P. G., Gasti, G. & Primavesi, L. (2018). Characterization of clays and the technology of Roman ceramics production. *Clay Minerals, 53*(3), 413-429. https://doi.org/10.1180/clm.2018.30

Ceccarelli, L., Guarneri, M., Romani, M., Giacopini, L., Francucci, M., Ciaffi, M., de Collibus, M. F., Puiu, A., Verona-Rinati, G., Colao, F. & Fantoni, R. (2021). Are the blue daemons really blue? Multidisciplinary study for the colours characterization of the mural paintings inside the *Blue Daemons* Etruscan tomb. *Journal of Cultural Heritage, 47*, 257-264. https://doi.org/10.1016/j.culher.2020.09.002

Cerasuolo, O. (2016). The Orientalizing period: Material and cultural connection. In N. T. de Grummond & L. Pieraccini (Eds.), *Caere* (pp. 27-39). University of Texas Press.

Cerasuolo, O. (2019). The Orientalizing period. In J. Tabolli & O. Cerasuolo (Eds.), *Veii* (pp. 77-86). University of Texas Press.

Cozza, A. & Pasqui, A. (1981). *Carta archeologica d'Italia. 1881-1897. Materiali per l'agro Falisco, Forma Italiae, Serie II, 2*. Firenze.

Degryse, P. & Braekmans, D. (2014). Elemental and isotopic analysis of ancient ceramics and glass. *Treatise on Geochemistry,* 191–207.

Goren, Y., Mommsen, H. & Klinger, J. (2011). Non-destructive provenance study of cuneiform tablets using portable X-ray fluorescence (pXRF). *Journal of Archaeological Science, 38*, 684-696.

Gunter, A. C. (2009). *Greek art and the orient*. Cambridge University Press.

Holland, L. A. (1925). *The Faliscans in prehistoric times*.

Holmqvist, E. (2019). Handheld portable energy-dispersive x-ray fluorescence spectrometry (pXRF). In A. M. W. Hunt (Ed.), *The Oxford handbook of archaeological ceramic analysis* (pp. 363-381). Oxford University Press. (Original work published 2016).

Hunt, A. M. W. & Speakman, R. J. (2015). Portable XRF analysis of archaeological sediments and ceramics. *Journal of Archaeological Science, 53*, 626-638. https://doi.org/10.1016/j.jas.2014.11.031

Johnston, A. (1993). Pre-classical Greece. In J. Boardman (Ed.), *The Oxford history of classical art* (pp. 11-83). Oxford University Press.

de Lucia Brolli, M. A. (1991). *Civita Castellana, il museo archeologico dell'Agro Falisco*.

de Lucia Brolli, M. A., Gallavotti, D. G. & Aiello, M. (1991). *L'Agro Falisco*.

de Lucia Brolli, M. A. (1998). Una tomba orientalizzante da "Falerii": Contributo alla conoscenza della necropoli dei Cappuccini. *Archeologia Classica, 50*, 181-211.

de Lucia Brolli, M. A., Biella, M. C. & Suaria, L. (2012). *Civita Castellana e il suo territorio ricognizioni archeologiche e archivistiche*.

Nijboer, A. J. (1998). *From household production to workshops: Archaeological evidence for economic transformations, pre-monetary exchange and urbanisation in central Italy from 800 to 400 BC*. Groningen: RUB, Department of Archaeology.

Orfanou, V. & Rehren, T. (2015). A (not so) dangerous method: pXRF vs. EPMA-WDS analyses of copper-based artefacts. *Archaeological and Anthropological Sciences, 7*, 387-397. https://doi.org/10.1007/s12520-014-0198-z

Orton, C. & Hughes, M. (2013). *Pottery in archaeology: Second edition* (2nd ed.). Cambridge University Press.

Pérez-Monserrat, E. M., Maritan, L., Baratella, V. & Vidale, M. (2023). Production technologies and provenance of ceramic materials from the earliest foundry of pre-Roman Padua, NE Italy. *Advances in Italian Research Applied to Cultural Heritage, 6*, 2956-2977.

Rasmussen, T. (2014). Leg-in-mouth: An Orientalizing motif.

Roberts, H. S. (1974). Five tomb groups in the Danish National Museum from Narce, Capena and Poggio Sommavilla. *Acta Archaeologica, 45*, 49-106.

Saracinoa, M., Maritan, L., Mazzoli, C. (2014). Ceramic technology between the final bronze age and the first iron age in NE Italy: The case of Oppeano (Verona). In M. Martinón-Torres (Ed.), *Craft and science: International perspectives on archaeological ceramics*. Bloomsbury Qatar Foundation.

Shackley, M. S. (2018). X-Ray Fluorescence Spectrometry (XRF). In S. L. López-Varela (Ed.), *The encyclopedia of archaeological sciences* (pp. 1-5). https://doi.org/10.1002/9781119188230.saseas0620

Ward Perkins, J. B. & Frederiksen, M. W. (1957). The ancient road systems of the central and northern Ager Faliscus. Notes on Southern Etruria, 2. *Papers of the British School at Rome, 25*, 67-204.

Appendix 1 – Measured vs. certified values

Upon every restart of the machine a certified reference material (CRM) was scanned and tested to assess the accuracy and precision of the machine. As can be seen from figure A1.1, on the next page, the results were always within an accepted range of expected results certified by multiple labs, the range is indicated in the figure by the red box.

Table A1.1 Measured untranslated (raw) pXRF results of the supplied "Mudrock Air" certified reference material.

Sample	Mg wt%	Al wt%	Si wt%	P wt%	S wt%	K wt%	Fe wt%	Result
CRM1	0.67	3.1	19.1	6.2	0.18	0.58	0.26	Passed
CRM2	0.67	3.0	18.6	5.9	0.19	0.58	0.26	Passed
CRM3	0.68	3.4	20.1	6.4	0.20	0.59	0.26	Passed
CRM4	0.54	3.0	18.9	6.1	0.19	0.56	0.25	Passed
CRM5	0.60	3.3	19.7	6.4	0.19	0.59	0.25	Passed
CRM6	0.65	2.9	18.4	5.9	0.19	0.57	0.25	Passed
CRM7	0.69	3.4	20.1	6.5	0.19	0.59	0.25	Passed
CRM8	0.70	3.0	18.6	5.9	0.20	0.59	0.26	Passed
CRM9	0.69	3.3	19.6	6.4	0.21	0.60	0.26	Passed

Table A1.2 Range of expected certified untranslated (raw) results for sample "MudRock".

Sample	Mg wt%	Al wt%	Si wt%	P wt%	S wt%	K wt%	Fe wt%
MudRock	0.403 – 1.047	2.70 – 4.47	17.13 – 25.50	5.210 – 8.243	0.125 – 0.244	0.456 – 0.687	0.193 – 0.315

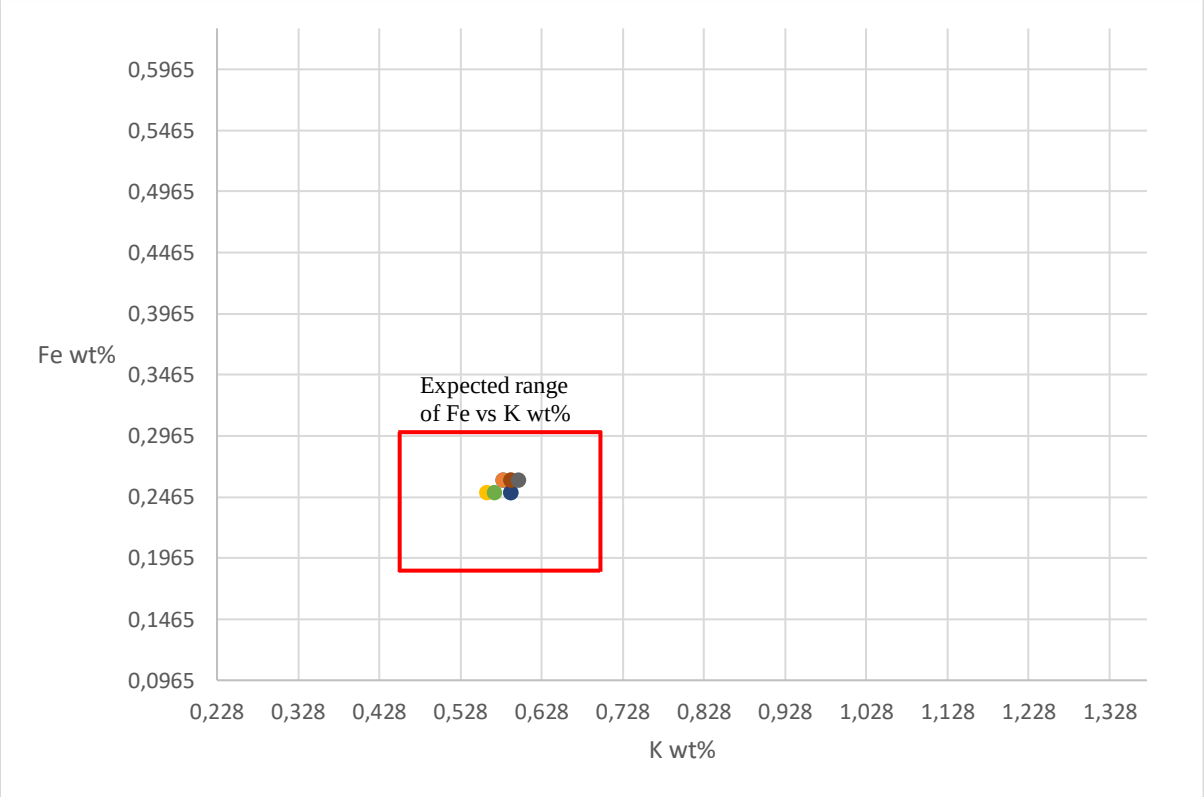
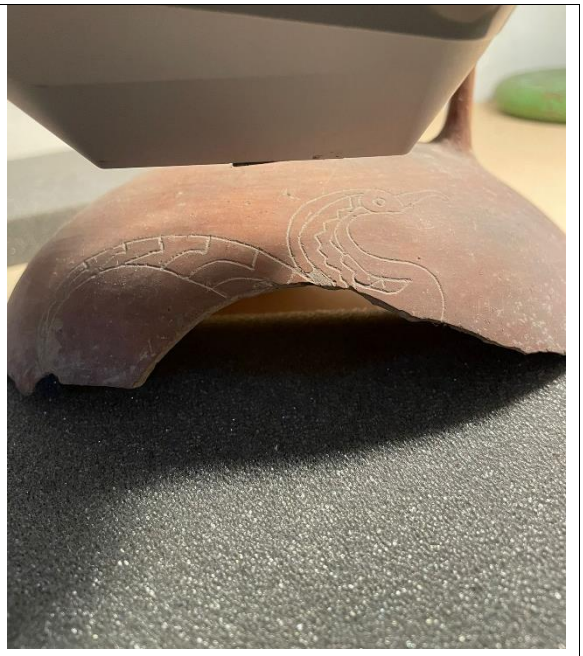
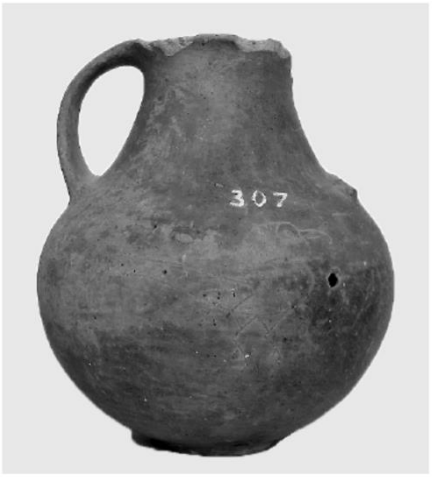


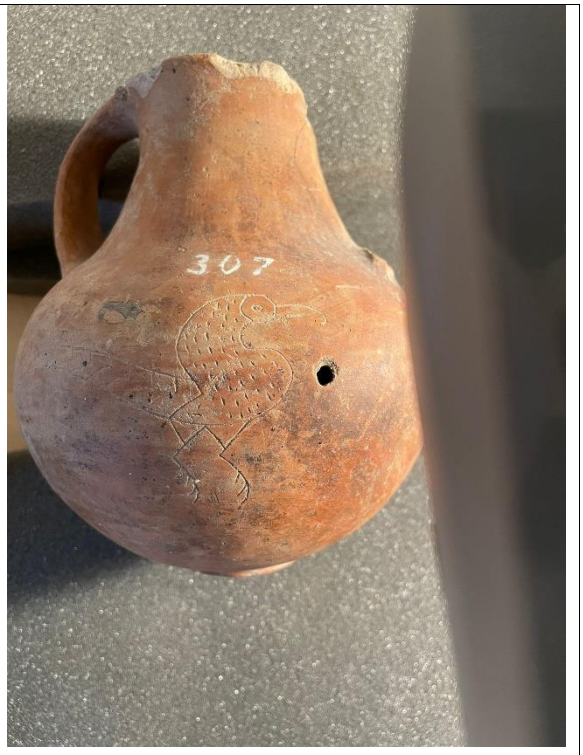
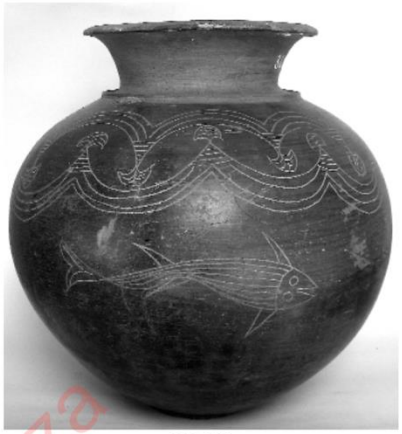
Figure A1.1 – Fe versus K untranslated wt%. This figure portrays, in a red square, the expected range of Fe and K wt% for the CRM. As is clear every CRM scan falls almost in the direct centre of what is expected, indicative of the broad range of expected values which the producer accepts as passing.

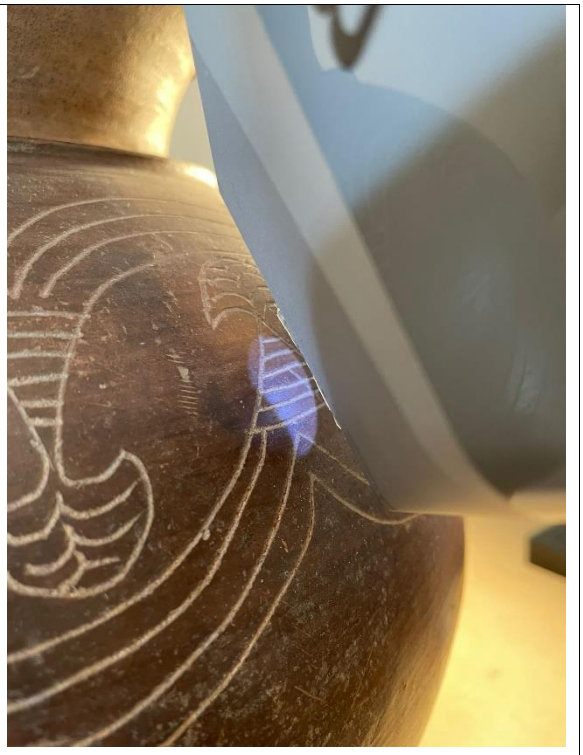
Appendix 2 – Description of the selected vessels from the necropoleis

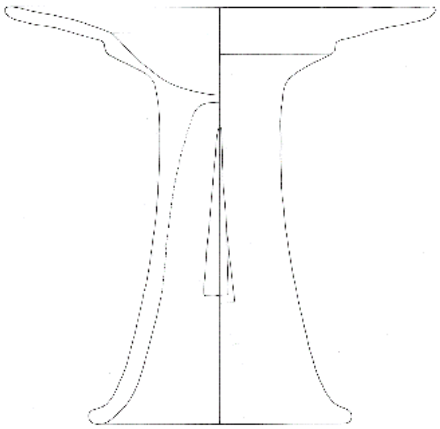
This Appendix supplies an extensive list of the context, description & archaeological macroscopic observations of the different selected vessels from the necropoleis. They have been ordered based on lowest to highest vessel number. Such that the list starts with #306 and ends with #116829. Where possible the interpretation of the decorative motifs was that of Biella (2014), supplied with information from other sources, furthermore, I have noted, where applicable, my own observations. Inventory numbers and references are mentioned, where known a direct dating was given and returning decorative elements are observed. The third and final box gives pictures of the vessel itself, most often taken by me personally. The archaeological observations and measurements, which are supplied under the heading "Arch. observations" are given in a highly stylized character, following Biella (2014). Surface or internal ceramic colours are given by Munsell chart colours and their translation in plain English. Some of the vessels showed varying surface colours, interpreted as a typical firing discolouration. This is signified in the table by mention that the surface colour ranges "from A to B", as is, for example, the case in vessel #3518. If known the size measurements are also supplied, together with the vessels' form. The measurements and abbreviations used for the form are those explained by Biella (2014, p. 157-191).

Context, description & archaeological observations	**Inventory # and references**	**Figures and pictures** (black and white pictures are courtesy of M. C. Biella, others taken by me).
Context: Falerii, loc. Penna, tb. 30 (LII). Excavated: 23/09/1887, type: -. Vessel-type: *oinochoe*. **Description:** Vessel #306 has part of the lip and the entire lower half missing. It is a big fragment of an *oenochoe* of just the neck, handle and top-part of the body. Decorations are still visible right underneath the neck of the vessel: a series of triangles with points facing downwards, also called inverted triangles (Cozza & Pasqui, 1981, p. 167), filled with parallel lines. On the belly of the *oenochoe* are still visible two top parts of birds, geese? (Cozza & Pasqui, 1981, p. 167), opposite each other on the vessel, facing right, seemingly following each other (Biella, 2014, p. 39). The fillings of the decorations have completely	#306, I.D.i.11. - Cozza & Pasqui, 1981, p. 167. - Biella, 2014, p. 39.	 I.D.i.11

faded, original colours red or white could not be verified. Instead the red slip of the surface of the vessel is removed, showing the internal ceramic colour underneath. **Arch. observations:** Internal ceramic: 10YR 5/2 (greyish brown), surface: 2.5YR 5/6 (red). Height: highest part of the preserved fragment: 200 mm. Form: 4Ac.		
Context: Falerii, loc. Penna, tb. 30 (LII). Excavated: 23/09/1887, type: -. Vessel-type: amphora. **Description:** Parts of the lip and one of the handles is broken off and missing. This reddish-brown slipped amphora is shaped like a sphere, having a simple handle. The body holds two engraved decorations of unidentified birds (geese? (Cozza & Pasqui, 1981, p. 167)), both facing right, on each side of the vessel. On the handle is decorated a particular plant motif, which returns on multiple vessels, a composition made by drawing a vertical line from which small curls and an asterisk motif with arched ends branch off on both ends of the vertical line (Biella, 2014, p. 47). **Arch. observations:** Internal ceramic: 7.5YR 6/4 (light brown), surface: 2.5YR 4/4 (reddish brown). Observed: incisions varyingly filled with red paste. Height: 166 mm, diam. at the hem: 76 mm, diam. at the bottom: 55 mm. Form: 6Ag.	#307, I.D.i.54. - Cozza & Pasqui, 1981, p. 167. - Biella, 2014, p. 47. - Particular plant motif on handle.	 I.D.i.54

		
Context: Falerii, loc. Penna, tb. 41 (LVIII). Excavated: 23/09/1887, type: -. Vessel-type: olla. **Description:** A beautifully preserved vessel. Almost completely undamaged, just the rim misses a couple of fragments, but for the most part the vessel is complete. The shoulder of the vessel has two complementary and interlocking chains of roughly heart-shaped palmettes. Four concentric lines interlock the palmettes to each other. Inverted and regular palmettes also interlock to create a closeknit pattern. Underneath this decorative scene is a second scene, not framed, with four large fish (Biella, 2014, p. 49), swimming to the right, seemingly following each other. **Arch. observations:** Surface: from 2.5YR 4/6 (red) to 5YR 3/1 (very dark grey). Observed: incisions varyingly filled with white paste. Height: 32 mm, diam. at the hem:	#344, I.D.i.66. - Cozza & Pasqui, 1981, p. 175. - Biella, 2014, p. 49.	 I.D.i.66

188-192 mm, diam. of the foot: 95 mm. Form: 8Ab*.		
Context: Falerii, loc. Penna, tb. 41 (LVIII). Excavated: 23/09/1887, type: -. Vessel-type: amphora. **Description:** A fragment of the neck of an amphora, previously interpreted as being made of Italic bucchero Cozza & Pasqui, 1981, p. 175). Decorated with the head of one fish, and just showing the tail of another fish, both would have faced right (Biella, 2014, p. 48). The entire amphora neck would have been circled by a number of fish. **Arch. observations:** Internal ceramic: 7.5YR 5/1 (grey), surface: 5YR 2.5/1 (black). Observed: incisions varyingly filled with red paste. Max. preserved height: 122 mm, reconstructed diam. of the hem: approximately 250 mm. Form: 6Ba.	#345, I.D.i.60. - Cozza & Pasqui, 1981, p. 174-5. - Biella, 2014, p. 48.	 I.D.i.60 

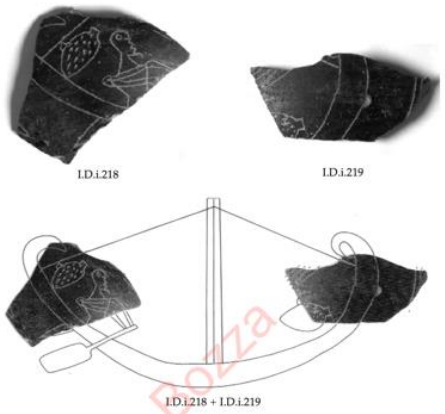
Context: Falerii, loc. Penna, 41 (LVIII). Excavated: 23/09/1887, type: pit tomb. Vessel-type: plate. Tomb 41 was looted prior to excavation. Some vessels remained, among which #346. It was found in the far north-west corner (Cozza & Pasqui, 1981, p. 175; see figure 2.7). **Description:** The vessel was reconstructed from several fragments supplemented with a number of modern reconstructions. It is named "limpet", after the distinctive shape, or plate on a high foot. A small part of the lip and foot is missing. Made with reddish brown slip. It was supported with a very tall hollow foot, with two triangular holes. Only the rim was decorated, being incised with three fish, swimming to the right, seemingly following each other, all were filled with a white paste (Biella, 2014, p. 72). **Arch. observations:** Surface: from 5YR 4/4 (reddish brown) to 5YR 2.5/1 (black). Observed: incisions varyingly filled with white paste. Height: 222 mm, diam. at the hem: 231 mm, diam. at the bottom: 140 mm. Form: 18A*.	#346, I.D.i.189. - Cozza & Pasqui, 1981, p. 175 - Biella, 2014, p. 72.	  
Context: Falerii, loc. Penna, 31 (LX). Excavated: 23/09/1887, type: pit tomb. Vessel-type: olla. Cozza describes the tomb located west of Falerii, within the necropolis of Penna, yet mentions	#349, I.D.i.67. - Cozza & Pasqui, 1981, p. 168. - Biella, 2014, p. 49.	

how the exact location is unknown. However, on figure 2.7 it is clearly located and Pasqui continues to describe the tomb, including drawing. Tomb 31 was a pit tomb, plundered before excavation started. The tomb was formed by hollowing out the tuff stone and was then equipped with two niches. After prior looting only three impasto vessels remained, among which this particularly decorated globular jar. **Description:** The vessel was restored from several fragments, which were supplemented with some modern reconstructions. Vessel was a large red slipped globular jar, used for storing liquids or other things. The body is completely spherical, having no foot. The body was decorated with two (or three? See: Cozza & Pasqui, 1981, p. 168) incised elongated winged horses both facing right, seemingly following each other (Biella, 2014, 49; de Lucia Brolli, 1991, p. 33). The neck rises vertically ending in a rim with a clear lip. The neck was not decorated. **Arch. observations:** Vessel shows some damage and yellow dirt encrustations. Surface: 5YR 4/6 (yellowish red). Observed: incisions varyingly filled with white paste. Height: 383 mm, diam. at the hem: 214 mm, diam. at the bottom: 119 mm. Form: 8Ab. Dating: Second half of the 7th century BCE (de Lucia Brolli, 1991, p. 33).	- De Lucia Brolli, 1991, p. 33. - Dating: second half of the 7th century BCE.	

Context: Falerii, loc. Penna, tb. 31 (LX). Excavated: 23/09/1887, type: -. Vessel-type: pyxis. **Description:** Vessel is complete. It is heavily decorated, the incisions almost fill the entire body. On the shoulders are palmettes. The complex decorations on the body is made using typical motifs of the Orientalizing repertoire: two winged lions tearing apart a man which has been described in detail as the "leg-in-mouth" motif (Rasmussen, 2014). The scene continues with a deer, a goat and a grazing horse with horns and a floral element (Biella, 2014, p. 76). A seemingly hectic scene compared to the other decorated vessels within this thesis. On the rim of the vessel are two squared small handles added (not visible in the picture), with two drilled holes, interpreted by Pasqui (Cozza & Pasqui, 1981, p. 168) which would allow a string to be passed through. The vessel was possibly used to store small fruits. The vessel is formed by an almost perfectly cylindrical body, with the foot being a very steeply truncated cone decorated with extra clay, formed into a long linear peapod-like pattern. **Arch. observations:** Surface: 10YR 3/1 (very dark grey). Height: 76 mm, diam. at the hem: 70 mm, diam. at the bottom: 46 mm. Form: 19C*.	#350, I.D.i.212. - Cozza & Pasqui, 1981, p. 168. - Biella, 2014, p. 76. - De Lucia Brolli, 1991, p. 33. - Rasmussen, 2014. - Dating: Second half of the 7th century BCE.	 I.D.i.212 

Context: Falerii, loc. Penna, tb. 29 (LXIII). Excavated: 10/03/1886, type: pit tomb. Vessel-type: *oinochoe*. Tomb 29 was in bad state of preservation, having both burial niches collapsed. Fragments of many vessels were found, all shattered and laying between the ruined boulders of tuff that had once closed off the niches, which would have been cemented shut with clay. Among the fragments one pouring vessel, an *oenochoe*, was found in the top-right corner, laying in fragments. **Description:** This vessel, #352, has approximately one-third (or one half) of the body and lip remaining, the bottom is partly restored in modern times. The neck of the vessel, a cone shape, tapered near the top is decorated where it meets the body with a strip of extra clay. The handle is formed by four sticks, having no openings where other handles on other vessels usually do have them. Finally the rim has a sharp lip and was once formed like an ivy leaf (Cozza & Pasqui, 1981, p. 167). Now of the body only one side partly remains. The body has an oval shape, with two incised decorations laying irregular and asymmetrical on the body. The two decorations are interpreted as two goats (wrong interpretation by Cozza & Pasqui (1981, p. 167): horses) moving right, facing backwards. Originally these must have been filled with red paste, yet only a sliver, between the third and the fourth leg of one of the goats, remains. This goat is	#352, I.D.i.33. - Cozza & Pasqui, 1981, p. 167. - Biella, 2014, p. 43.	 I.D.i.33 

complete, however of the other goat only the top part remains. Traces of red remain in some of the incisions (Biella, 2014, p. 43). **Arch. observations:** Internal ceramic: 5YR 6/4 (light reddish brown), surface: from 5YR 2.5/1 (black) to 5YR 4/4 (reddish brown). Observed: incisions varyingly filled with red paste. Height: 269 mm, diam. at the bottom: 71 mm. Form: 4Ea*.		
Context: Falerii, loc. Penna, tb. 34 (LIII). Excavated: 10/03/1886, type: chamber tomb. Vessel-type: amphora. The tomb was found evidently transformed, for successive burials in three distinct periods were recognized, with the here presented vessels and fragments belonging to the more ancient period. **Description:** *Olla* of which only fragments remained. Heavily reconstructed with a great quantity of modern reconstructions. Only pieces of the body and a slight horizontal connection to the neck remain original. The foot and great part of the body are all reconstructed. The body of the vessel is divided into smaller and larger squares, or rectangles, by the addition of clay ribs. The fragments barely still show incised decorations with no visual paste remaining, interpreted by Pasqui (1981, p. 170) as fringes, imagined trees and octopuses. In the smaller rectangles perhaps plant elements were incised, composed of a central "trunk" from which "leaves" branch off. In the larger rectangles the surface of the body is divided	#366, I.D.i.64. - Cozza & Pasqui, 1981, p. 170. - Biella, 2014, p. 48-9. - Dating: late Orientalizing/630 – 575 BCE.	 I.D.i.64 

into horizontal bands by a series of parallel incised lines. These bands are filled with dots. Between the different bands there are alternating series of wavy/trembling elements in continuous spring motifs (Biella, 2014, p. 48-9). My personal observation is that the incisions have faded, nearly entirely gone. **Arch. observations:** Internal ceramic: 10YR 6/4 (light yellowish brown), surface: 10YR 2/1 (black). Max. preserved height: ca. 390 mm. Observed: incisions themselves hardly visible, varyingly filled with white paste. Form: 6Ba2*. Dating: late Orientalizing/630 – 575 BCE (Biella, 2010, p. 155-156).		
Context: Falerii, loc. Penna, tb. 34 (LIII). Excavated: 10/03/1886, type: chamber tomb. Vessel-type: fragments. The tomb was found evidently transformed, for successive burials in three distinct periods were recognized, with the here presented vessels and fragments belonging to the more ancient period. The presented impasto fragments (**I.D.i.218-I.D.i.221**) are unique for the Ager Faliscus, for which the decorations have no known comparisons (Biella, 2010, p. 152). **Description:** These fragments all belonged to a vessel which cannot be identified to a certain form or vessel type. They are immensely important for the study of Orientalizing impasto ware as they represent the first fragments showing incised decorations representing human figures (Cozza & Pasqui, 1981, p. 170). We can	#370, I.D.i.218, I.D.i.219, I.D.i.220 and I.D.i.221. - Cozza & Pasqui, 1981, p. 170. - Biella, 2014, p. 77-8. - See the sherds below for specific references per sherd.	

link at least two sherds together representing the same scene (Biella, 2010, p. 146). We can (with some imagination) interpret this as a human scene in action: we see traders (military men? fishermen?: Biella, 2010, p. 147; note 12. p. 149) who are in the midst of a perilous journey across the water on a boat, a rower spots an impressive belt and is portrayed mid-action while some trading amphorae, of which one seems to be fastened to the riggings while the other is rolling around the hull of the boat are important enough to be portrayed. A truly imaginative scene. Another scene is possibly portrayed by the animals, on the two other sherds. Vessel #370 was broken into a number of sherds, all different ones were scanned separately. In this way the sherds from the (assumed) same vessel could be compared to each other, to see how the machine compares results for one vessel. In this way they served as a perfect test subject regarding the accuracy and precision of the machine. Clear red filling remains within most incisions.		
Context: Falerii, loc. Penna, tb. 34 (LIII). Excavated: 10/03/1886, type: chamber tomb. Vessel-type: fragment. The tomb was found evidently transformed, for successive burials in three distinct periods were recognized, with the here presented vessels and fragments belonging to the more ancient period. **Description:** From right to left: Two parallel curved lines are	370_boat, I.D.i.219. - Cozza & Pasqui, 1981, p. 170. - Biella, 2014, p. 78, the here supplied description of the vessel is copied from an earlier publication: Biella, 2010, 144.	

barely visible on the edge of the sherd, for which the interpretation is uncertain. In the middle of the vessel two parallel lines, which are identical to **I.D.i.218** and should be interpreted as the continuation of the hull of the ship. Another amphora similar to the previously described one lays here flat on the bottom of the boat. It has one handle and the surface of the amphora is similarly decorated with roughly parallel dots. This time the amphora is not leaning against the shroud of the boat. It has the opening laying horizontally on the surface of the boat, facing right. In contact with the hull, at the top of the sherd, is a similar oblique line to the one on **I.D.i.218**, again we interpret this as the shroud. Just above it is an undetermined curved line (Biella, 2010, p. 144; 2014, p. 78). **Arch. observations:** Internal ceramic: 10YR 5/3 (brown), surface: 10YR 3/2 (dark greyish brown). Observed: clear red filling remains within most incisions. Max. height: 45 mm, max. width: 93 mm, sherd thickness: 4-5 mm.		
Context: Falerii, loc. Penna, tb. 34 (LIII). Excavated: 10/03/1886, type: chamber tomb. Vessel-type: fragment. The tomb was found evidently transformed, for successive burials in three distinct periods were recognized, with the here presented vessels and fragments belonging to the more ancient period. **Description:** This sherd is decorated with a dog (Biella, 2014, p. 78), earlier interpreted as a goat	370_dog, I.D.i.221. - Cozza & Pasqui, 1981, p. 170). - Biella, 2014, p. 78, the here supplied description of the sherd differs slightly from the earlier publication: Biella, 2010, 145.	 I.D.i.221 

(Biella, 2010, p. 145) which seems incorrect, the body is filled with roughly parallel dots, similar as to the filling of the amphora from sherds **I.D.i.218** and **I.D.i.219**. The legs and head are not dotted. It faces right toward probably another four-legged animal (Biella, 2014, p. 78), of which only two hind-legs remain. This one is most probably not a dog, as the dots would have been visible before the break of the sherd and the legs would belong to a much larger animal. **Arch. observations:** Internal ceramic: 10YR 5/3 (brown), surface: 10YR 3/2 (dark greyish brown). Observed: Clear red filling remains within most incisions. Max. height: 34 mm, max. width: 93 mm, sherd thickness: 3-4 mm.		
Context: Falerii, loc. Penna, tb. 34 (LIII). Excavated: 10/03/1886, type: chamber tomb. Vessel-type: fragment. The tomb was found evidently transformed, for successive burials in three distinct periods were recognized, with the here presented vessels and fragments belonging to the more ancient period. **Description:** On the most left part of the sherd a portion of a head of some animal is recognized, having a circular eye and triangular ear, facing right. The rear part of a four-legged animal fills the rest of the sherd to the right. On the buttocks of the animal is drawn a figure '8', which often is portrayed on the buttocks of horses (e.g., vessels **I.D.i.114** & **I.D.i.56**, however, the elongated horse of **I.D.i.14** is of a different design!). The belly of the	370_horse, I.D.i.222. - Cozza & Pasqui, 1981, p. 170. - Biella, 2014, p. 78-9, the here supplied description of the vessel is copied from an earlier publication: Biella, 2010, 145-146, see also p. 150-151. - Figure '8' on buttocks.	 I.D.i.222 

animal has two parallel lines before the fresh break. Above the animal is interpreted a highly stylized vegetable element, which possibly relates to the animal rather being a centaur; a mythological creature associated with good luck in incised impasto productions, as known from two cases from Narce (Biella, 2010, p. 150-151). **Arch. observations:** Internal ceramic 10YR 5/3 (brown), surface: 10YR 3/2 (dark greyish brown). Observed: clear red filling remains within most incisions. Max. height: 34 mm, max. width: 93 mm, sherd thickness: 3-4 mm.		
Context: Falerii, loc. Penna, tb. 34 (LIII). Excavated: 10/03/1886, type: chamber tomb. Vessel-type: fragment. The tomb was found evidently transformed, for successive burials in three distinct periods were recognized, with the here presented vessels and fragments belonging to the more ancient period. **Description:** From left to right: we can trace the bust of a human figure, having a trapezoidal body and front-facing rendering. The figure has two well delineated, with two circles, nipples. The right arm is raised, while the left holds an oblique element, a line which has three oblique parallel lines flowing down from it, within, on the most far right of the sherd, stand three concentric circles, possibly forming a spiral. The human figure is visible to the waist and wears a belt with a squared design. The figure sits on an element that flows from the top-right of the sherd to the	370_man, I.D.i.220. - Cozza & Pasqui, 1981, p. 170. - Biella, 2014, p. 78, the here supplied description of the vessel is copied from an earlier publication: Biella, 2010, 144-145; see also: p. 149.	 I.D.i.220 

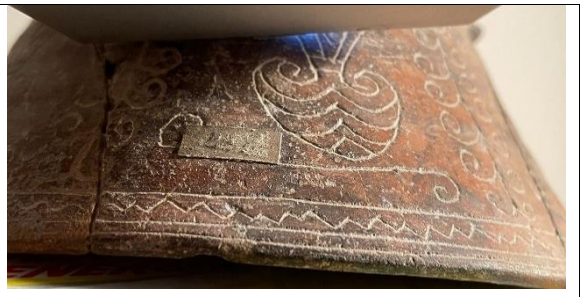
bottom-left. Above the neck, which is visible, the sherd breaks off, having some extra lines and a form on the right side of the head, these lines are all not clearly interpretable (Biella, 2010, p. 144-145; 2014, p. 78), maybe representing a fish-tail (Biella, 2010, p. 149)? **Arch. observations:** Internal ceramic 10YR 5/3 (brown), surface: 10YR 3/1 (very dark grey). Observed: clear red filling remains within most incisions. Max. height: 62 mm, max. width: 94 mm, sherd thickness: 3-7 mm.		
Context: Falerii, loc. Penna, tb. 34 (LIII). Excavated: 10/03/1886, type: chamber tomb. Vessel-type: fragment. The tomb was found evidently transformed, for successive burials in three distinct periods were recognized, with the here presented vessels and fragments belonging to the more ancient period. **Description:** From left to right: On the left side of the sherd is a curved element, in which the hull of the ship can be recognized. An oblique element can be traced along the development of the hull - in all probability a portion of the shrouds (rope riggings) of the boat - against which an amphora is placed, with a cylindrical mouth and one handle. The surface of the amphora is decorated with roughly parallel dots. Following the shape of the hull of the boat to the right a depiction of part of a human figure remains, with the torso leaning backwards. His face, with details of a beard near the chin, is in profile,	370_rower, I.D.i.218. - Cozza & Pasqui, 1981, p. 170. - Biella, 2014, p. 77-8, the here provided description of the vessel is copied from an earlier publication: Biella, 2010, p. 143.	

while the trapezoidal bust is rendered front facing. Under the keel of the boat a roughly triangular element, identifiable as an ancient spur is recognized (Biella, 2010, p. 143; 2014, p. 77). **Arch. observations:** Internal ceramic: 10YR 5/3 (brown), surface: 10YR 3/2 (dark greyish brown). Observed: clear red filling remains within most incisions. Max. height: 64 mm, max. width 99 mm, sherd thickness: 4-5 mm.		
Context: Falerii, loc. Penna, tb. 34 (LIII). Excavated: 10/03/1886, type: chamber tomb. Vessel-type: *oinochoe*. The tomb was found evidently transformed, for successive burials in three distinct periods were recognized, with the here presented vessels and fragments belonging to the more ancient period. **Description:** Vessel #372, another fragment of an *oenochoe*, is in bad shape of preservation, it was reconstructed from many fragments, with some portions supported by modern reconstructions. The vessel is peeling heavily all over, showing the internal colour of the ceramic as the slip is peeling away. Many little fragments also remain, some with incised decorations filled with red paste still visible. The handle is nicely decorated by hand modelling. Upon the handle, which is formed in a double stick design, having an opening in the middle, stands a simple ram's head. On the neck of the vessel is incised a palm tree from which four birds or geese? (Cozza & Pasqui, 1981, p.	#372, I.D.i.20. - Cozza & Pasqui, 1981, p. 170 - Biella, 2014, p. 40, the here supplied description of the vessel is copied from an earlier publication: Biella, 2010, 153.	 I.D.i.20 

170) feed, flying up and pecking at the lotus flowers. Two birds fly up on each side. In the lower portion of the neck, where the neck is separated from the body, within two horizontal parallel lines, a motif of zig-zagging lines was incised. On the remaining part of the body is still visible a human figure holding a horse by the muzzle. Both images, of the bird-scene and the horse-scene show the surface decorated with dots. Two sherds which belong to this vessel were also decorated, both have horses' heads, facing right. Traces of red filling are visible in some incisions (Biella, 2014, p. 40). **Arch. observations:** Internal ceramic: 7.5YR 6/4 (very dark grey), surface: 7.5YR 6/4 (light brown). Observed: incisions varyingly filled with red paste. Height: highest part of the preserved fragment: 174 mm. Form: 4Ag.		 
Context: Falerii, loc. Penna, tb. 28 (LIX). Excavated: 10/03/1886, type: pit tomb. Vessel-type: chalice/goblet. Tomb 28 was in a bad state of preservation. Due to landslides and poor quality of the clay many vessels had broken or disappeared. Some vessels had survived (in fragments) as they lay protected by a cavity that had survived the landslides, vessels were protected behind some big tuff stones (Cozza & Pasqui, 1981, p. 166). **Description:** The vessel was reconstructed using mainly original fragments found during excavation, missing the foot, parts of the basin	#375, I.D.i.103. - Cozza & Pasqui, 1981, p. 166. - Biella, 2014, p. 56.	 I.D.i.103

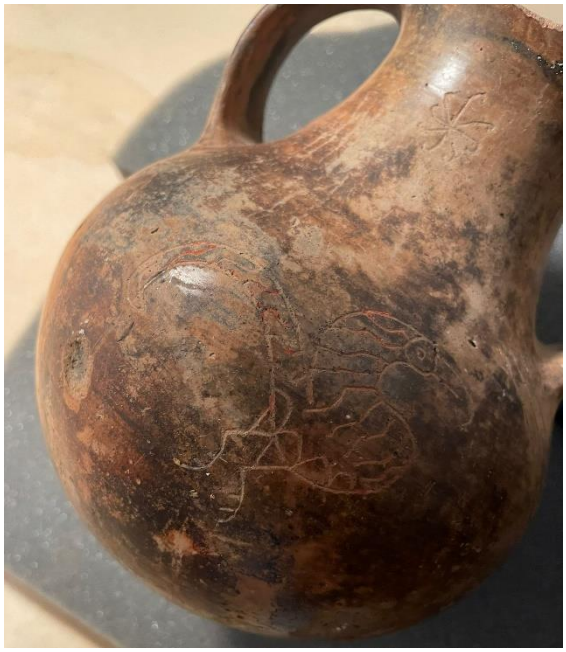
and lip. It is a heavily decorated low mixing bowl or chalice, missing its foot. It was decorated all around the body with a chain of connecting heart-shaped palmettes, connected by half circular lines. The two outer lines are drawn straight, while the middle line is wavey or "trembling" (Biella, 2014, p. 56). Between one palmette and the other stand stylized birds, geese? (Cozza & Pasqui, 1981, p. 166) facing right, with their bodies filled with parallel lines. Traces of red filling are visible within some incisions (Biella, 2014, p. 56). The decoration is framed at the top part of the vessel with three horizontal concentric lines framing the decorations below. The body of the vessel holds a thick lip of extra clay toward the bottom, this extra clay has been decorated by regular thick cuts, generating a peapod-like pattern interrupted in the middle with a circular groove. **Arch. observations:** Surface: 5YR 2.5/1 (black). Observed: incisions varyingly filled with red paste. Max preserved height: 79 mm, diam. at the hem: 176 mm. Form: 10An*.		
Context: Falerii, loc. Penna, tb. 28 (LIX). Excavated: 10/03/1886, type: pit tomb. Vessel-type: chalice/goblet. Within tomb 28 another similar mixing vessel or chalice was found. Similar to vessel #375. **Description:** Similar to vessel #375 this one has two parallel horizontal lines within which a wavey or trembling line flows. It also misses its foot and is similarly	#376, I.D.i.104. - Cozza & Pasqui, 1981, p. 166. - Biella, 2014, p. 56.	 I.D.i.104

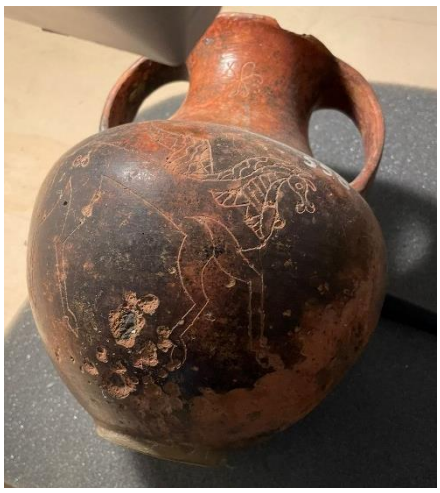
decorated, having heart-shaped palmettes all around the body, connected to each other with three half circular decorated lines. Stems of a certain plant rise up from the middle of the half circular lines which connect the palmettes. The stems are made with two straight lines, and one wavey or trembling line in the middle. From these plants curly branches are drawn on both sides of the plant. Traces of red slip remain in some incisions (Biella, 2014, p. 56). The bottom of the body again has a lip of extra clay, with thickly cut away peapod-like pattern. Out of the three chalices found in tomb 28, #376 is the most complete one available in the museum. **Arch. observations:** Internal ceramic: 7.5YR 4/2 (brown), surface: 7.5YR 2.5/1 (black). Observed: incisions varyingly filled with red paste. Max preserved height: 86 mm, diam. at the hem: 177 mm. Form: 10An.		 
Context: Falerii, loc. Penna, tb. 28 (LIX). Excavated: 10/03/1886, type: pit tomb. Vessel-type: chalice/goblet. **Description:** Vessel #377, from the same tomb as vessels #375 & #376 is similarly made and decorated as vessel #376. Heart-shaped palmettes are connected with three half circular lines, having stems of a certain plant in the middle, sprouting up. Differing from #376,	#377, I.D.i.108. - Cozza & Pasqui, 1981, p. 166. - Biella, 2014, p. 57.	 I.D.i.108

these stems are just singular straight lines that rise up from which small curls branch off on both sides (Biella, 2014, p. 57). A simpler plant motif than on vessel #376. Some extra decorative lines and attention is however present, above the palmettes for example. The three lined frame, which both vessels #375 & #376 have, has been transformed into a four lined frame (missed in the description by Biella, 2014, p. 57) with the extra line being wavey, inserted after the second horizontal line from the top. The foot is missing, and the peapod-like decorations with extra clay adorn the bottom of the body of this mixing chalice, as was the case with the others. **Arch. observations:** Internal ceramic: 7.5YR 6/3 (light brown), surface: 5YR 4/4 (reddish brown). Observed: incisions varyingly filled with red paste. Max preserved height: 90 mm, diam. at the hem: 162 mm. Form: 10Ao.		
Context: Falerii, loc. Penna, 28 (LIX). Excavated: 10/03/1886, type: pit tomb. Tomb 28 was in a bad state of preservation. Due to landslides and poor clay quality many vessels had broken or disappeared, some lay protected by a cavity that had survived, protected, behind some big tuff stones. **Description:** Vessel #378 is in a good state of preservation, nearly intact, showing no cracks, having only suffered partial peeling damage to the surface slip. The lip has two drilled holes, which were made in antiquity so the vessel could be hung on a wall (Biella,	#378, I.D.i.196. - Cozza & Pasqui, 1981, p. 166. - Biella, personal communication, February 20, 2023. - Biella, 2014, p. 73.	

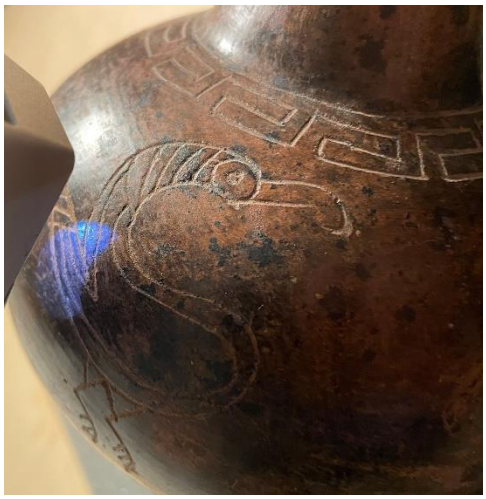
personal communication, February 20, 2023). Where the slip is peeling away the brown colour of the clay with which the vessel was made can be seen. This Italic bucchero plate was completely decorated on the bottom, with incisions filled with a red paste. Within a round frame are connected triangles filled with parallel lines, they are faced outwards to form the round frame. The rest of the centre of the vessel contains many more concentric circles (Biella, 2014, p. 73). The most central piece, in the middle, is a spiralling line which continues into the centre. The motif resembles the sun, or a rose (Cozza & Pasqui, 1981, p. 166). **Arch. observations:** Internal ceramic: 7.5YR 6/4 (light brown), Surface: 2.5Y 2.5/1 (black). Observed: incisions varyingly filled with red paste. Height: 26 mm, diam. at the hem: 207 mm, diam. at the bottom: 162 mm. Form: 18Ca*.		
Context: Falerii, loc. Celle, tb. 9 (XLVIII). Excavated: 17/08/1888. Type: chamber tomb. Vessel-type: chalice/goblet. The tomb seemed to be preserved in a fragmentary state, having at least three archaeological stratifications, which were recognized during the excavation. The dating of these stratifications shows how the tomb span from the archaic to the 3rd century BCE, when the tomb was assumed to had fallen into disrepair. The entrance of the tomb was a rectangular doorway, entering the tomb from the south. The large burial chamber	#550, I.D.i.93. - Biella, 2014, p. 54. - Biella, 2018.	 

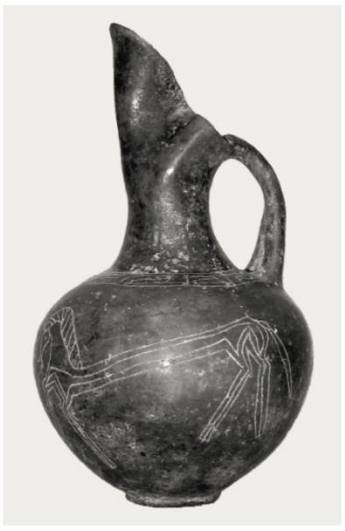
extended in a square from the entrance. At least three different burial niches were dug out of the tuff. The room measured 2.4m wide and 2m deep. A large number of items were found within the tomb, some in a fragmentary state, at least 116 different vessels were recognized by Pasqui (Cozza & Pasqui, 1981, p. 121-124). Object itself not published in Cozza & Pasqui, 1981. **Description:** The tall foot has broken. Or the picture here incorporated is a restoration. In any case; the scanned vessel was in two pieces, foot and bowl. Part of the foot was reassembled, multiple broken sherds are in the collection. The vessel is decorated with a chain of stylized lotus flowers on the lip, alternating with elements looping into itself. A small inscription reads “titi” (Biella, 2014, p. 54). This inscription has been interpreted as original 7th century BCE (Biella, 2018a). **Arch. observations:** Surface: 10YR 2/1 (black). The restored height: 115 mm, diam. at the hem: 142 mm, diam. at the bottom: 92 mm. Form: 10Ad.		

Context: Falerii, loc. Celle, tb. 9 (XLVIII). Excavated: 17/08/1888, type: chamber tomb. Vessel-type: amphora. The tomb seemed to be preserved in a fragmentary state, having at least three archaeological stratifications, which were recognized during the excavation. The dating of these stratifications shows how the tomb span from the archaic to the 3rd century BCE, when the tomb was assumed to had fallen into disrepair. The entrance of the tomb was a rectangular doorway, entering the tomb from the south. The large burial chamber extended in a square from the entrance. At least three different burial niches were dug out of the tuff. The room measured 2.4m wide and 2m deep. A large number of items were found within the tomb, some in a fragmentary state, at least 116 different vessels were recognized by Pasqui (Cozza & Pasqui, 1981, p. 121-124). **Description:** The vessel is completely whole, missing only part of the lip, both sides of the body are decorated with the same decoration. First an asterisk motif with arched ends. On the belly were two unidentified birds (geese?) incised, both facing right. On both handles is decorated a particular plant motif, which returns on multiple vessels, a composition made by drawing a vertical line from which small curls and an asterisk motif with arched ends branch off on both ends of the vertical line. Clear traces of red paste remain inside certain	#557, I.D.i.55. - Cozza & Pasqui, 1981, p. 123. - Biella, 2014, p. 47 - Asterisk motif on body, particular plant motif on handles.	 I.D.i.55 

incisions (Biella, 2014, p. 47). It is clear how one of the sides has the cross in a better state of preservation, with the red filling more intact than on the other side. **Arch. observations:** Internal ceramic: 5YR 6/4 (light reddish brown), surface: from 2.5YR 5/6 (red) to 5YR 2.5/1 (black). Observed: incisions varyingly filled with red paste. Height: 182 mm, diam. at the hem: 80 mm, diam. at the bottom: 54 mm. Form: 6Ag*.		
Context: Falerii, loc. Celle, tb. 9 (XLVIII). Excavated: 17/08/1888, type: chamber tomb. Vessel-type: amphora. The tomb seemed to be preserved in a fragmentary state, having at least three archaeological stratifications, which were recognized during the excavation. The dating of these stratifications shows how the tomb span from the archaic to the 3rd century BCE, when the tomb was assumed to had fallen into disrepair. The entrance of the tomb was a rectangular doorway, entering the tomb from the south. The large burial chamber extended in a square from the entrance. At least three different burial niches were dug out of the tuff. The room measured 2.4m wide and 2m deep. A large number of items were found within the tomb, some in a fragmentary state, at least 116 different vessels were recognized by Pasqui (Cozza & Pasqui, 1981, p. 121-124). **Description:** Slight fracture on the lip and part of the foot has been restored in modern times. Similar to vessel #557 it holds	#558, I.D.i.56. - Cozza & Pasqui, 1981, p. 123. - Biella, 2014, p. 47. - Biella, 2013a, tav. IV, a, p. 116. - Asterisk motif on the belly, particular plant motif on handles. Figure ‘8’ on the horses’ buttocks.	 I.D.i.56 

incised decorations filled with red paste. The decorations start on both ends of the neck with an asterisk motif with arched ends. On the belly, on each side, two elongated winged horses, facing right (Biella, 2014, p. 47; Cozza & Pasqui, 1981, p. 123). I note how a figure '8' adorns their backsides, on the body close to the tails, a typical motif which I observe often being related to horses. One side still has some red paste remaining, especially within the figure '8', the other side however has survived less well, only showing the incision and having suffered considerable damage to the slip and thus decoration. On the handles was decorated a particular plant motif, which returns on multiple vessels, a composition made by drawing a vertical line from which small curls and an asterisk motif with arched ends branch off on both ends of the vertical line. Traces of red filling are visible within some incisions. **Arch. observations:** Internal ceramic: 5YR 5/6 (yellowish red), surface: from 5YR 2.5/1 (black) to 2.5YR 4/6 (red). Observed: incisions varyingly filled with red paste. Height: 197 mm, diam. at the hem: 84-86 mm, diam. at the bottom: 60 mm. Form: 6Ag.		

Context: Falerii, loc. Celle, tb. 9 (XLVIII). Excavated: 17/08/1888. Type: chamber tomb. Vessel-type: *oinochoe*. The tomb seemed to be preserved in a fragmentary state, having at least three archaeological stratifications, which were recognized during the excavation. The dating of these stratifications shows how the tomb spanned from the archaic to the 3rd century BCE, when the tomb was assumed to had fallen into disrepair. The entrance of the tomb was a rectangular doorway, entering the tomb from the south. The large burial chamber extended in a square from the entrance. At least three different burial niches were dug out of the tuff. The room measured 2.4m wide and 2m deep. A large number of items were found within the tomb, some in a fragmentary state, at least 116 different vessels were recognized by Pasqui (Cozza & Pasqui, 1981, p. 121-124). **Description:** Vessel #572 was an *oenochoe* made of italic bucchero. The rim was broken off and part of the lip is missing. The body has a spherical shape decorated with incised scratches, which were originally filled with red paste, I was not able to visually confirm this. The body was decorated with three birds, seemingly following each other. Cozza & Pasqui (1981) repeatedly interpret these birds as geese (e.g., Cozza & Pasqui, 1981, p. 123), while Biella (2014, p. 38) just calls them birds, in any case the birds with hooked beaks, as de Lucia Brolli (1991) describes them,	#572, I.D.i.7. - Cozza & Pasqui, 1981, p. 123. - Biella, 2014, p. 38. -	 I.D.i.7 

were a very common animal used in the Faliscan repertoire of the Orientalizing period. Above the birds is a meandering frame connecting the body of the vessel to the neck. I noticed especially how the middle bird is of a slightly different design than the two flanking. The flanking birds are a bit smaller and simpler while the middle bird is larger and more intricate. The handle was formed by twisting the clay into a single braided handle (Cozza & Pasqui, 1981, p. 123). **Arch. observations:** Surface: 10YR 2/1 (black). According to the Mn content of this vessel, it might have been filled with red paste – not visible anymore. Height: 191 mm, diam. of the bottom: 60 mm. Form: 4Ab*.		
Context: Falerii, loc. Montarano NNE, tb. 19 (XXXIV). Excavated: 10/07/1890, type: pit tomb. Vessel-type: *oinochoe*. Rectangular pit tomb with a depth of 2.2 m, 2.5 m long, 0.9 m wide. Including a large burial niche 0.78 m wide, wooden chest still survived (Cozza & Pasqui, 1981, p. 51). The tomb, a pit with a sepulchral niche, contained a burial in a wooden coffin, which the presence of the bronze objects characterizes as pertaining to a female. Among the objects were personal ornaments, a small bell pendant in bronze, a collection of rich fibulae, pendants, a bronze clasp originally part of the belt and a ring. The ceramics that were supplementing this burial were placed in a kit at the head of the	#3312, I.D.i.14. - Cozza & Pasqui, 1981, p. 53. - Biella, 2014, p. 39. - De Lucia Brolli, 1991, p. 32. - Dating: first half of the 7th century BCE.	 I.D.i.14

deceased. It is interesting to note that the vessels, all belonging to a different type, form a homogenous 'service' in terms of technical and decorative features, among which this vessel #3312. **Description:** Vessel is complete. It is a pouring vessel (*oenochoe*) with large bulging body, thin neck and high vertical standing spout, the handle was formed in a double stick design, having two separate sticks with a hole in the middle. Between the neck and shoulder is a continuous meandering design. On the body are two elongated horses, facing each other (Biella, 2014, p. 39). These horses are of a clearly different style compared to other horses observed within this thesis' material. It also does not have a figure 8 on its' buttocks. **Arch. observations:** Surface: 5YR 4/4 (reddish brown). Height: 230 mm, diam. at the bottom: 45 mm. Form: 4Ae*. Dating: first half of the 7th century BCE (de Lucia Brolli, 1991, p. 32).		
Context: Falerii, loc. Montarano North, tomb. 3 (XLIX). Excavated: 10/07/1890, type: pit tomb. Vessel-type: *oinochoe*. Pit tomb with two burial niches, a type of tomb particularly wide spread in the first half of the 7th century BCE in the Faliscan and Capenate countryside as well as in the area around Veii, and the hinterland of the Vulsci. This type of tomb seems to be a transitional phase between the pit tombs and the chamber tombs (de Lucia Brolli, 1991, p. 27). The two burial chambers are sometimes	#3488, I.D.i.9. - Cozza & Pasqui, 1981, p. 94. - Biella, 2014, p. 38. - De Lucia Brolli, 1991, p. 27. - Dating: first half of the 7th century BCE.	 I.D.i.9  I.D.i.9

distinguished in scholar debate by major and minor burial chambers (Cozza & Pasqui, 1981, p. 94). Vessel #3488 was found in the minor burial chamber. **Description:** Part of the lip of this vessel is missing. This pouring vessel, or *oenochoe*, lay in fragments during excavations and was restored in the museum. The vessel is made from italic bucchero, attached with a braided handle. Decorative pattern of this vessel falls within what is typical for the Ager Faliscus; often seen are fish and birds with hooked beaks. Although this specific vessel does show in part an unusual scene; the elongated pouring mouth is decorated with an incised bird, identified by de Lucia Brolli (1991, p. 27) as a duck, a bird by Biella (2014, p. 38), who however also mentions the typical identification by Cozza & Pasqui (1981; this vessel p. 94) of geese. Finally, the large spherical body is decorated with an incised two-headed snake with a trilobed mouth, its' body filled with dots. The vessel has a pair of holes on the neck and a pair on the body, testifying to an ancient reparation (Biella, 2014, p. 38). **Arch. observations:** Surface: 2.5YR 3/1 (very dark grey). Height: 279 mm. Form: 4Abl. Dating: tomb dated to first half of the 7th century BCE (de Lucia Brolli, 1991, p. 27).		

Context: Falerii, loc. Montarano North, tomb. 3 (XLIX). Excavated: 10/07/1890, type: pit tomb. Vessel-type: cotyle. Pit tomb with two burial niches, a type of tomb particularly wide spread in the first half of the 7th century BCE in the Faliscan and Capenate countryside as well as in the area around Veii, and the hinterland of the Vulsci. This type of tomb seems to be a transitional phase between the pit tombs and the chamber tombs (de Lucia Brolli, 1991, p. 27). The two burial chambers are sometimes distinguished in scholar debate by major and minor burial chambers (Cozza & Pasqui, 1981, p. 94). Vessel #3499 was found in the major burial chamber. **Description:** Vessel #3499 is reconstructed from several fragments. It is a large drinking vessel (*skyphos*) with a deep black colour, previously described as black bucchero (Cozza & Pasqui, 1981, p. 95), clearly taking inspiration from the bucchero productions (Biella, 2010, p. 141). During excavation it only bore a single handle, thus the second handle has been restored in modern times. It is slightly depressed on the top. The vessel was decorated with two simple, short decorations, on each on the neck, or near the rim is a rectangular framing motif. On the body are two stylized birds with the typical hooked beaks, opposite each other, facing right (Biella, 2014, p. 71). These decorations of birds with hooked beaks fall within the typical Faliscan decorative	#3499, I.D.i.185. - Cozza & Pasqui, 1981, 95. - Biella, 2014, p. 71. - De Lucia Brolli, 1991, p. 27. - Dating: first half of the 7th century BCE.	 I.D.i.185

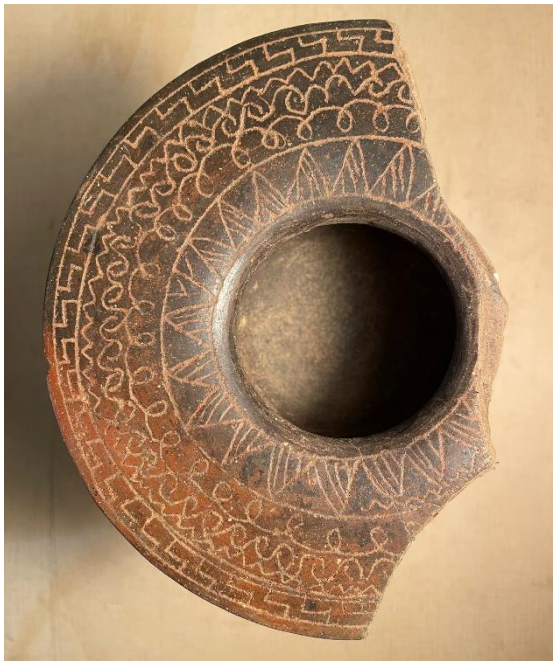
repertoire (de Lucia Brolli, 1991, p. 27). **Arch. observations:** Surface: 5YR 2.5/1 (black). Height: 74 mm, diam. at the hem: 89-92 mm, diam. at the bottom: 30 mm. Form: 17Ae. Dating: first half of the 7th century BCE (de Lucia Brolli, 1991, p. 27).		
Context: Falerii, loc. Penna, tb. 34 (LIII). Excavated: 10/03/1886, type: chamber tomb. Vessel-type: kantharos. Correct tomb number given by de Lucia Brolli (1991, p. 31) and Biella (2014, p. 58), wrong notation by Cozza & Pasqui (1981, p. 175-176). This vessel was purchased together with others by some American museums under accountability of prof. Arthur L. Fröthingham (or Frothingham? Compare Cozza & Pasqui, 1981, p. 175 versus p. 176 – most authors use Frothingham: Biella, 2014, p. 58; de Lucia Brolli, 1991, p. 31) of the university of Princeton. Only this specific vessel #3518 was recorded in the inventory by Frothingham. The tomb was found evidently transformed, for successive burials in three distinct periods were recognized, with the here presented vessel belonging to the more ancient period. **Description:** A large *kantharos* with a cup-shaped bottom. Part of the lip is restored. Highly cylindrical to concave walls and two handles, which are both separated in the middle to form two stems per handle (Cozza & Pasqui, 1981, p. 176). They are decorated from the top down: hand shaped rams' heads are placed on top of	#3518, I.D.i.114. - Cozza & Pasqui, 1981, p. 175; p. 176. - Biella, 2014, p. 58. - de Lucia Brolli, 1991, p. 31. - Dating: mid-7th century BCE.	 I.D.i.114

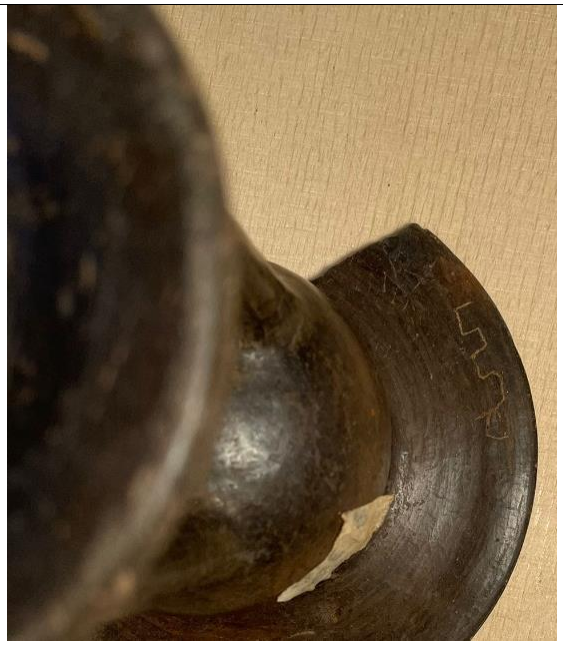
the handles. On the lip, just below the rim are a series of triangles filled with parallel lines. The central portion of the body is decorated with two horses facing each other in front of an inverted-squared U-shape, interpreted as a manger. On the protrusion, which is formed in decorative triangular shapes, are also some extra vertical lines (Biella, 2014, p. 58). **Arch. observations:** Surface: from 5YR 4/1 (dark grey) to 2.5YR 4/3 (reddish brown). Observed: incisions varyingly filled with white paste. Height: 305 mm, bottom diam.: 69 mm. Form: 11Af. Dating: mid-7th century BCE (de Lucia Brolli, 1991, p. 31).		
Context: Falerii, loc. Montarano NNE, tb. 43 (LVII). Excavated: 10/07/1890, type: pit tomb. Vessel-type: olla. The grave, a pit with a niche containing pottery as well as heavily eroded bronzes, can be dated to the 7th century BCE. The deceased was buried with objects that are seen as objects of personal belonging or equipment. The deceased was dressed in a garment which was sewn together with two fragments of circular gold plates, clearly signifying the wealth of the grave. The aristocratic character of the burial is also documented in the way the different pottery vessels were placed in the grave. The set constitutes a table service with a particular fondness for the type of pottery used in libations, among which also vessel #3519, a globular impasto jar encased in a reddish-brown slip next to, for example, an	#3519, I.D.i.68. - Cozza & Pasqui, 1981, p. 86. - Biella, 2014, p. 49. - Bakkum, 2009, p. 414. - De Lucia Brolli, 1991, p. 31-32. - Dating: 7th century BCE. - Contains the first known epigraphic attestation in the region.	 I.D.i.68

expensive painted vessel (de Lucia Brolli, 1991, p. 31). **Description:** The conservation of the surface slip of this particular vessel is in bad shape, heavily peeling off. Especially on one side of the vessel, which is clearly visible on the picture. Vessel #3519 is a reddish-brown engobed *olla*. Near the neck is a circular strip made out of an extra strip of clay. The body bears two primitively incised horse decorations. The style is clearly different from the other horses of the 7th century. The body also, uniquely, bears an inscription in the Faliscan script, spelling "eitam", scratched from left to right (CIE. 8001; Bakkum, 2009, p. 414). This inscription constitutes one of the oldest epigraphic attestations in the area. The noble classes thus seem to also constitute their status by the knowledge and importance of the art of writing in an age in which this was part of the cultural practice of only a few (de Lucia Brolli, 1991, p. 32). **Arch. observations:** Internal ceramic: 10YR 5/3 (brown), surface: 5YR 4/4 (reddish brown). Height: 178 mm, diam. at the hem: 119 mm, diam. at the bottom: 66 mm. Form: 8Ab.		 

Context: Falerii, loc. Montarano NNE., tb. 4 (LXI). Excavated: 10/07/1890, type: pit tomb. Vessel-type: plate. The grave was a rectangular pit, 1.7 m deep, 2 m long and 0.5 m wide. The depository niche had already been looted prior to excavation. Only some of the ceramics that belonged to the grave goods remained. They were placed near the head of the deceased. Among others vessel #3541.The burial niche was closed off by a low wall of squared tuff, closed shut cemented with clay. **Description:** This vessel is a completely red plate on a high foot, having yellow encrustations. Clear white and black inclusions, with a significant size are visible, with the naked eye, consistent with slow wheel turned impasto ware technology (Nijboer, 1998, p. 102). The upper part of the rim holds concentric streaks (Cozza & Pasqui, 1981, p. 29). **Arch. observations:** Within the context of the Ager Faliscus this vessel is quite unique, being completely red, no clear comparisons known.	#3541 - Cozza & Pasqui, 1981, p. 29. - Dating: tomb is dated to the first half of the 7th century BCE.	

Context: Falerii, loc. Monte Paglietta, tb. a camera. Excavated: 1887-1888, type: chamber tomb. Vessel-type: olla. The materials found in this grave cover a period of time from the mid-7th century until the first half of the 6th century BCE (de Lucia Brolli, 1991, p. 33). Particularly significant for the chronology of the region are the materials which imitate Corinthian balsam jars, which are present in significant numbers in this tomb. Next to these different Corinthian type vessels is also found this particular one, vessel #15765, which is made in impasto in line with the local tradition (de Lucia Brolli, 1991, p. 34). **Description:** This vessel is mostly intact, with some restorations to the lip. On the shoulder is a continuous spring motif, with lines looping over themselves, forming a horizontal frame together with the bottom band which is comprised of two continuous parallel horizontal lines, with the empty space filled with zigzagging lines creating a pattern. Within the frame are typical 7th century birds with, in this case exceptionally large hooked beaks, facing right (Biella, 2014, p. 50). **Arch. observations:** Surface: 2.5YR 3/1 (dark reddish grey). Height: 280 mm, diam. at the hem: 182 mm, diam. at the bottom: 102 mm. Form: 8Ac*.	#15765, I.D.i.72. - Biella, 2014, p. 50. - De Lucia, 1991, p. 33-34. - Dating: materials span mid-7th to the first half of the 6th century.	 I.D.i.72

Context: Falerii, loc. Cappuccini 1991. Excavated: 1991, type: chamber tomb. Vessel-type: cup. This specific vessel is very similar to vessels #116780 and #116829, and in reality, they were made as a special set, specific to this grave. **Description:** Vessel #116724 has a large part of the lip missing, some fragments of the lip, not connecting to the rest, were recovered and are in storage, however. The decorations are all on the rim, describing from the outside of the vessel in: three different concentric circle frames can be recognized. In the first frame a broken squared meander was incised. The second frame has zig-zag lines, continuous waves and lines looping over itself – in a sort of spring motif. The third circular frame is filled with series of triangles facing outward, filled with parallel lines. Slight traces of red paste are still visible filling the decorative lines of this vessel (Biella, 2014, p. 67). This vessel is, similar to the other two from this tomb from the necropolis of Cappuccini decorated in the same style. But this one seems to be made by someone with much less experience. The triangles were not all fully extended correctly to the border - resulting in some extra zig-zag lines added to fill the voids. Another mistake was made: two of the triangles were filled incorrectly. The vessel itself is smaller than the other two from the same set and has the distinctive red-black spotted character which has been described before the table in this Appendix. Finally, on the bottom	#116724, I.D.i.165. - Biella, 2014, p. 67. - The context is published in de Lucia Brolli (1998), but misses this exact vessel.	 

of the vessel it seems the artisan tried to practice some square decorations, which fill the outer border. This particular vessel can tell us much about the production process and possibility that artisans of different skill levels worked together, it seems likely that a trainee sat next to a more experienced artisan who was meant to teach a student how the art of decorating impasto vessels was to be done! **Arch. observations:** Internal ceramic: 10YR 5/3 (brown), surface: from 10YR 2/1 (black) to 5YR 4/4 (reddish brown). Observed: incisions varyingly filled with red paste. Height: 142 mm, diam. at the hem: 135 mm, diam. of the foot: 81 mm. Form: 14Ba*.		
Context: Falerii, loc. Cappuccini 1991. Excavated: 1991, type: chamber tomb. Vessel-type: cup. The supplied figure is figure 13 in de Lucia Brolli (1998, p. 196). This specific vessel is very similar to vessels #116724 and #116829, and in reality, they were made as a special set, specific to this grave. **Description:** This impasto goblet or chalice has a hemispherical bowl with a brimmed lip and foot which is connected to the body by three stems. The fourth stem was broken, and the connecting piece not found. The vessel was partly reconstructed by the museum, as signs of repair are visible, glue used. It is made of impasto with a glossy black surface, having incised decorations on the broad rim filled with a red paste. The decorations on the rim are similar yet different from vessel	#116780, I.D.i.166. - Biella, 2014, p. 67. - De Lucia Brolli, 1998, p. 196.	MARIA ANNA DE LUCIA BROLLI  Fig. 13. *Falerii*, necropoli dei Cappuccini, tomba a camera: calice d'impasto con piede a steli multipli dalla banchina.

#116724. The decorations are all on the rim, here describing from the outside of the vessel in: three different concentric circle frames can be recognized. In the first frame, which is delineated from the rest of the decorations by two concentric lines is a zig-zagging line, described as a continuous wave motif or wavey/trembling line by de Lucia Brolli (1998, p. 196). The second frame has a line looping over itself – in a sort of spring motif. The third and final concentric frame is filled with series of triangles facing outward which are filled with parallel lines (a very common decorative style). Slight traces of red paste are still visible, filling the decorative lines of this vessel (Biella, 2014, p. 67). **Arch. observations:** Surface: 2.5YR 2.5/1 (reddish black). Observed: incisions varyingly filled with red paste. Restored height: 140 mm, diam. at the hem: 156 mm, diam. of the foot: 99-100 mm. Form: 14Ba.		
Context: Falerii, loc. Cappuccini 1991. Excavated: 1991, type: chamber tomb. Vessel-type: cup. This specific vessel is very similar to vessels #116724 and #116780, and in reality, they were made as a special set, specific to this grave. **Description:** This vessel has an identical decoration pattern as vessel #116780, the part of the description that supplies the decorative element of the vessels is thus exactly copied from that description (compare Biella, 2014, p. 67, n. 166 & n. 167). As has been mentioned; they were made as	#116829, I.D.i.167. (identical decorative pattern and form as #116780). - Biella, 2014, p. 67. - Biella, personal communication, February 22, 2023. - The context is published in de Lucia Brolli (1998), but misses this exact vessel.	

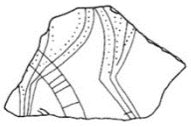
a set of three (Biella, personal communication, February 22, 2023). This vessels misses the part below the body. The long flat rim with the incised decoration remains, with a significant fragment broken off on one end. Part of the foot was found in fragments, and partly restored, without the connecting piece above the foot (coincidentally the missing piece is exactly the piece that was excavated from the Vignale settled area – FVI.22.1036.130, see the table below). The vessel was thus not restored, and remains broken. Now for the decorations; as mentioned this part is an exact copy of the information above. The decorations are all on the rim, here describing from the outside of the vessel in: three different concentric circle frames can be recognized. In the first frame, which is delineated from the rest of the decorations by two concentric lines is a zig-zagging line, described as a continuous wave motif or wavey/trembling line. The second frame has a line looping over itself – in a sort of spring motif. The third and final concentric frame is filled with series of triangles facing outward which are filled with parallel lines (a very common decorative style). However, slightly less traces of red paste remain on this vessel compared to #116780 are still visible, filling the decorative lines of this vessel (Biella, 2014, p. 67). **Arch. observations:** Surface: 2.5YR 2.5/1 (reddish black). Observed: incisions varyingly filled		

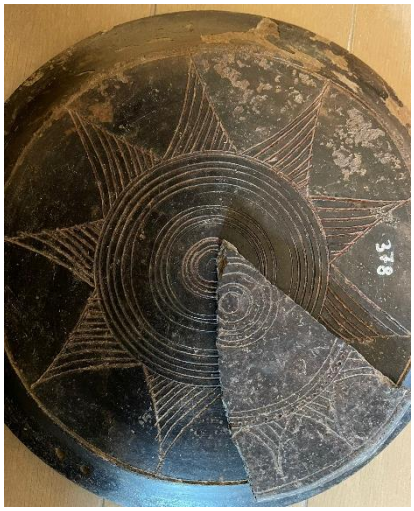
with red paste. Slightly smaller than #116780, height: 139 mm, diam. at the hem: 154 mm, diam. at the foot: 102 mm. Form: 14Ba.		

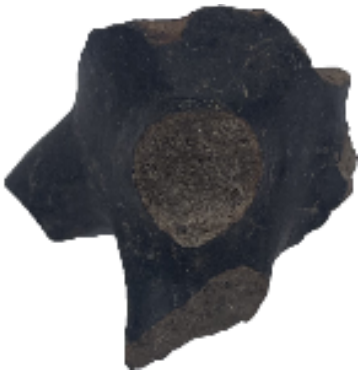
Appendix 3 – Description of the selected vessels from the settled area

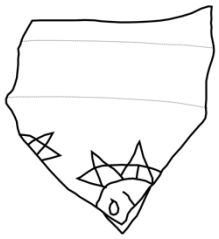
This third Appendix supplies an extensive list of the incised impasto fragments that were excavated throughout the settled area. Most of them originate from Vignale hill (FVI) and were excavated in 2022, these are as of yet unpublished. The other fragments come from the Scasato area and from the via del Fontanile, which is located very near to the Scasato area.

Context & description	**Inventory # and references**	**Figures and pictures**	**Morphologically comparable to**
Context: Loc. Lo Scasato. Excavated: 1992. **Description:** The sherd was kept in a bag with other sherds, all belonging to the excavation that took place at "Scasato", on the east side of the Civita Castellana plateau (see map prior to this table). This sherd is a diagnostic. A rim of a certain vessel. Broken in a sort of square or rather rectangular shape. Visible in the middle of the vessel are two parallel lines running toward the upper left, possibly having a looping, as comparable to vessels #FVI.22.1036.123 and #550 (?). Although, #FVI.22.1036.123 shows the looping on the lip of the vessel, near the rim, while this sherd #122778 has the looping downwards, away from the rim.	#122778 - Biella 2019, fig. 955, c.		#FVI.22.1036.123 and #550.
Context: Loc. Lo Scasato. Excavated: 1992. **Description:** The sherd was kept in a bag with other sherds, all belonging to the excavation that took place at "Scasato", on the east side of the Civita Castellana plateau (see figure 2.3). The sherds are black slip,	Cassa17_head (Biella 2019, fig. 9, c). No inventory numbers present.		

with the incisions showing the grey clay underneath.			
Context: Loc. Lo Scasato. Excavated: 1992. **Description:** The sherd was kept in a bag with other sherds, all belonging to the excavation that took place at "Scasato", on the east side of the Civita Castellana plateau (see figure 2.3). The sherds are black slip, with the incisions showing the grey clay underneath. This fragment was actually broken in two, as the picture shows, which fit neatly together.	Cassa17_legs (Biella 2019, fig. 9, c). No inventory numbers present.	 	
Context: Loc. Vignale_Scavo2022. Excavated: June, 2022. **Description:** A clear fish body remains on this sherd. The sherd itself is a diagnostic, a rim. The rim itself also holds decorations, ">", or triangular forms pointing in the opposite direction the body of the fish is facing.	FVI.22.10.580	 	
Context: Loc. Vignale_Scavo2022. Excavated: June, 2022. **Description:** Diagnostic sherd: fragment of a rim. Clear is the stem of some plant, similar to the plants often decorated on handles of vessels. The position in the oven was not optimal, resulting in more a more oxidizing environment and not completely turning black of the slip, the sherd is thus rim-down reddish->black->reddish. No clear red or white paste visually remains within the incised decoration. Singular line stalk	FVI.22.1034.27		Similar decoration as on the handles of vessel #557 or #307. Or the stems such as on the body of #376 and identical to #377.

of a certain plant which sprouts on both ends (identical to #377).			
Context: Loc. Vignale_Scavo2022. Excavated: June, 2022. **Description:** Big sherd originally part of a plate. Observed: the incised decoration originally were filled with red paste, only the deeper perforations/holes still have some fragments of red paste left. The decoration is very similar to #378, but originally belonged to a smaller plate. Hypothetically this is the reason why the decoration is a little different, having perforated holes and less circular grooves going all around the vessel. The middle circles also do not spiral as they do for vessel #378. It seems #378 is an example of a better performed center decoration, the spiral is performed much more cleanly than it is for FVI.22.1036.120.	FVI.22.1036.120	 Similarity with #378: 	Penna #378
Context: Loc. Vignale_Scavo2022. Excavated: June, 2022. **Description:** This vessel has a very homogenous (to the naked eye) black slip, the picture showing it as almost blue is incorrect. The incisions don't seem to have remained any red or white paste, thus only showing the inside of the clay material; yellow-grey coloured.	FVI.22.1036.123		#122778, Nec. Celle #550.
Context: Loc. Vignale_Scavo2022. Excavated: June, 2022.	FVI.22.1036.124		Similar vessel as: Nec. Cappuccini: **#116780**, #116829 & #116724.

Description: This sherd originally belonged to a vessel similar to #116780, #116829 & #116724. The deep red paste within the incisions cut out of the completely black slip show most resemblance to #116780. Observed: incisions varyingly filled with red paste.			Same vessel (?) as: FVI.22.1036.130
Context: Loc. Vignale_Scavo2022. Excavated: June, 2022. **Description:** A sherd which has no known vessel equivalent in the necropoleis of Falerii. Must have been a relatively flat plate with a low foot. Of the foot only the attachment to the body remains. The inside of the plate was decorated with double circle incisions. Four seem centred in the middle, while a number of them are concentrically positioned around them. The circled decorations don't seem to have any visual red or white paste filling.	FVI.22.1036.129		No comparison known for Falerii.:
Context: Loc. Vignale_Scavo2022. Excavated: June, 2022. **Description:** This sherd is not decorated, however, it possibly belongs to the same vessel as sherd FVI.22.1036.124, this is however not visually confirmable, especially since the black slip that cover both sherds is a slightly darker tint for #130, while #124 is a little more on the reddish side. However again, comparing to #116780, the closest comparison for sherd #124 also	FVI.22.1036.130		Similar vessel as: Nec. Cappuccini: **#116780**, #116829 & #116724. Same vessel (?) as: FVI.22.1036.124

shows a slight discontinuity in the tint of the respective parts to which these sherds belong. In any case, both sherds belong to the same type as #116780, #116829 & #116724. This sherd is part of the connection between the body and the legs for the foot. Just a stump remains, with the main footrest and three separate stick attachment points remain. The black surface is glossy and visually homogenous.			
Context: Loc. via del Fontanile. Excavated: 2005. **Description:** Small fragment. A head of what seems to be a horse is looking downwards. Part of the ear and mane of a second horse is also visible just on the left-most edge of the fragment. Both incisions still show varying degrees of red paste. Decorations are similar to the large *kantharos* excavated from tb. 34 (LIII) of the necropolis of Penna. As we have seen this vessel held a central portion on the body decorated with two horses facing each other in front of an inverted-squared U-shape, interpreted as a manger. (Biella, 2014, p. 58).	v. Fontanile or via del Fontanile. (Biella 2019, fig. 9, a)	 	Penna #3518