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Ceramic Production in the Plain of Paestum from the 7th-3rd c. BC – The Project (2016-2018)

Introduction

In the seventh edition of FACEM we present the first results of an interdisciplinary project on the ceramic production in the plain of Paestum, in particular the archaeological contexts and materials, together with a preliminary overview of the archaeometric analyses¹. The project started from a wide background of interdisciplinary research on ceramics from the Campania region of Italy that brought together scholars from Italian and Austrian universities² and from important museums of the area³ with geologists specialised on archaeometric studies from the Università di Napoli Federico II⁴ and the Università del Sannio⁵. The archaeometric research was mainly conducted by A. De Bonis at Vienna in the frame of a Lise Meitner project of the FWF Austrian Science Fund with a duration of two years⁶. Therefore, the key element of the project was the interplay between the geological expertise of Albert De Bonis and archaeologists at the Institut für Klassische Archäologie (Universität Wien) and cooperating Italian institutions.

The plain of the Sele River in the southern part of Campania in Italy represents one of the most important archaeological regions of the Mediterranean area. The southern part of the plain was dominated by the important Greek colony of Poseidonia, later an equally important Lucanian centre and then a Roman *colonia*, named Paestum, while in the area north of the Sele river there are situated the Etrusco-Italic sites of Pontecagnano and Fratte (Fig. 1). This plain was therefore an area with intense intercultural and socio-economic exchanges from the Archaic period until the Roman conquest, but until recently our knowledge of pottery production and the related workshops as well as of exchange activities remained limited, though they can be assumed in an area where artists such as Asteas were active and an early export oriented production of fine

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¹ Some of these results were already presented during a workshop organised by the authors in the Museo di Paestum in June 2018: *La produzione ceramica nella piana del Sele dal VII al III sec. a.C. – I contesti archeologici e primi risultati delle indagini archeometriche*. Museo Archeologico di Paestum, 8 June 2018. Our warmest thanks go to the director of the Parco Archeologico di Paestum, Gabriel Zuchtriegel, and his collaborators for their support.

² Giovanna Greco and Bianca Ferrara (Università di Napoli Federico II), Angela Pontrandolfo, Antonia Serritella and Carmine Pellegrino and Anna Rita Russo (Università di Salerno), Verena Gassner (Universität Wien).

³ Marina Cipriani (former director of the Museo Archeologico di Paestum), Gina Tomay (direttore del Museo Archeologico Nazionale di Pontecagnano).

⁴ Vincenzo Morra and his collaborators Alberto De Bonis and Vincenza Guarino.

⁵ Alessio Langella, Celestino Grifa and collaborator Chiara Germinario.

⁶ Project number: M 1918-G25. The project was developed by Alberto De Bonis (principal investigator) and Verena Gassner (co-applicant) in collaboration with Bianca Ferrara and Antonia Serritella as co-authors. Important for the success of the project was the splendid cooperation with the laboratories of Franz Ottner (Universität für Bodenkultur) and Theodoros Ntaflos (Universität Wien).

wares and amphorae has been confirmed by recent studies⁷. Important topics as the exact identification of the clay quarries used for the workshops in and around the cities and near the sanctuaries in the territory, or the technological processes that gave quality and aesthetics to the pottery were still open to discussion and it has to be stressed that questions of provenance often cannot be answered by using archaeological methods only like typology of vessel-forms or the classification of decoration.

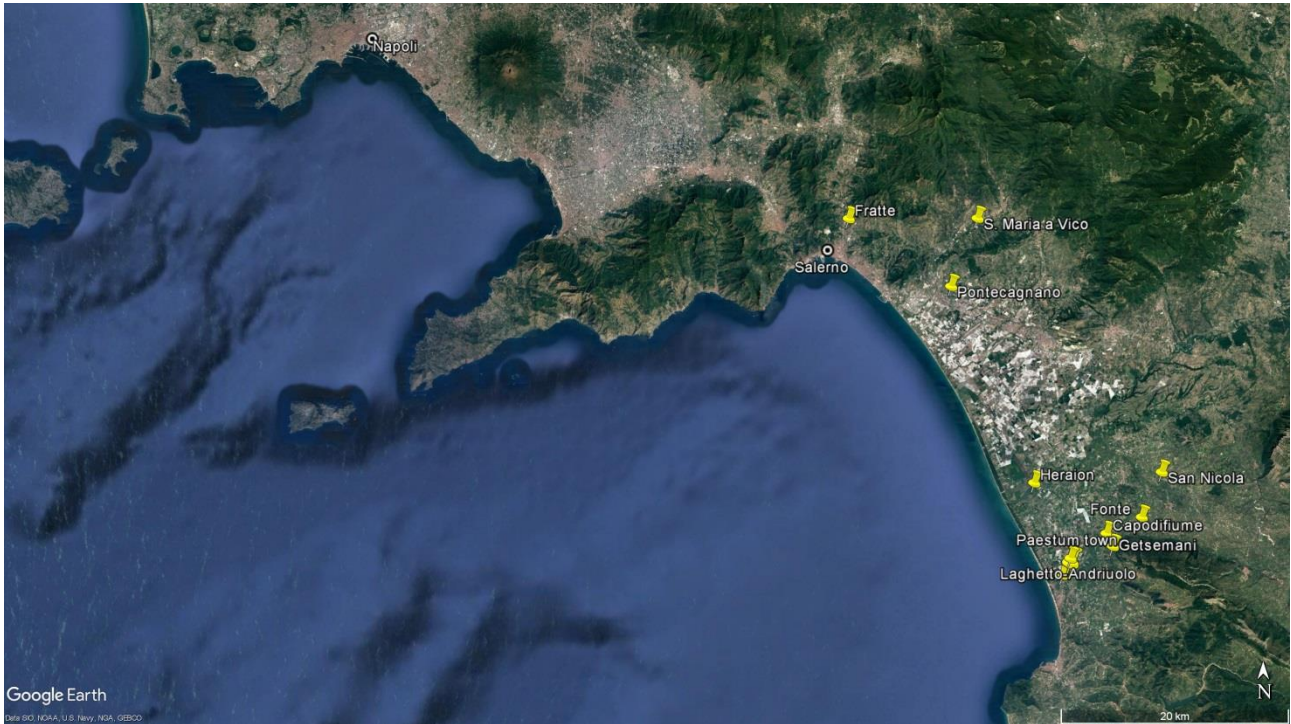


Fig. 1. Sampling sites of archaeological ceramics in the area of interest.

The project “Ceramic production in the plain of Paestum” aimed at answering these questions by an interdisciplinary approach which included the choice of relevant samples from all supposed production areas by the responsible archaeologists, their archaeological documentation and the description of fabrics according to the standards of FACEM, which was mainly done by M. Trapichler⁸. The archaeometric approach, comprising mainly mineralogical-petrographic techniques, represents a valid tool for identifying the production sites of pottery.

These interdisciplinary studies allowed us to identify several sites of clayey raw materials, used for ancient pottery production in the plain of the Sele River, and to deepen important aspects of the pottery production in this area with the important centre of Poseidonia/Paestum and the Etrusco-Italic settlements of Pontecagnano and Fratte⁹. On the other hand, this research also opened new

⁷ For pottery productions and workshops see e. g. Pontrandolfo 1996; Pontrandolfo – Santoriello 2011; Pellegrino – Serritella 2013; Rizzo 2016; for exchange activities Gassner 2003, 197-201; Bechtold 2018a; Bechtold 2018b.

⁸ See Trapichler 2018a and Trapichler 2018b in this edition

⁹ Some preliminary results related to this subject have been published in Abbas 1999; Gassner et al. 2003; Gassner – Trapichler 2011; Guarino et al. 2012; Ferrara et al. 2014; Gassner et al. 2014; Morra et al. 2014; Serritella – Monda 2014; Grifa et al. 2017; Pontrandolfo and Greco 1990; Cipriani 2012; Tomay et al. 2016.

questions regarding the circulation systems of ceramic products in the adjacent area of the so-called Bay of Naples and in general in Southern Italy and Sicily¹⁰.

The archaeometric research approach

Awareness of the geological context and resources of the area is fundamental for the problem of pottery provenance. For this reason the project has taken into account the identification of possible clay resources exploited in antiquity in the Sele River plain, an area rich in raw materials but also characterised by a complicated geological history. The Sele River plain is a large tectonic depression filled by alluvial sediments starting from the Pleistocene. The area is bordered by Meso-Cenozoic carbonate mountains to the north (Monti Picentini) and to the south-east (Monti Alburni). Terrigenous hills also border the plain to the east, while the predominantly siliciclastic-pelitic Miocenic formations of the Cilento area crop out further south (Fig. 2). All the area was covered in the quaternary by pyroclastic products from the Campanian volcanoes¹¹, especially in the northern sector of the Sele River plain (Fig. 2). Alluvial sediments (gravel and sands) and lagoon and lacustrine/marsh (silt and clays) deposits fill the plain, while Aeolian and coastal sands characterise the seaward portion of the plain. Travertine deposits have been formed in the area of Paestum and Pontecagnano since the upper Pleistocene¹². In such a complex geological framework raw materials used for pottery, both intended as clay and temper, can be found in several different geological formations of alluvial and marine origin. Clayey deposits located in the northern margin of the plain and are represented essentially by marine sediments cropping out in the Picentine area, as in San Cipriano Picentino, Montecrovino Rovella and Pugliano, Giffoni Valle Piana, as well as in Rufoli (Salerno) along the Grancano valley, in close proximity to the archaeological site of Fratte. Marine clays also outcrop in the eastern margin of the plain in the Serre-Persano area, and in the piedmont area of the Monte Soprano-Vesole ridge next to the towns of Capaccio and Trentinara. Alluvial/lacustrine clays are located in the sedimentary layers of the alluvial plain of the Sele River, in Albanella, in the area of Fonte di Roccadaspide, and Agropoli. The geological survey for identifying raw materials started by gathering information regarding the location of clay deposits. In previous studies¹³ we identified several clayey raw materials of different geological origin in the Campania region. However, the identification of clay outcrops in the area of the Sele River plain and surroundings was not completed, due to the geological complexity of the area and to the fact that it became clear that several places of interest needed to be explored more accurately. Preliminary and valuable information on the possible extraction sites has been acquired via geological literature and cartography¹⁴, as well as from historical and

¹⁰ See for example De Bonis et al. 2013; De Bonis et al. 2014; De Bonis et al. 2018a with the previous bibliography; Grifa et al. 2009; Grifa et al. 2013; Grifa et al. 2016; Morra et al. 2013; Greco et al. 2014. See more in general the books edited by G. Greco and L. Cicala 2014 and by A. Serritella 2017. For the distribution in Sicily see Bechtold 2018 in this edition.

¹¹ Amato et al. 2012.

¹² Bonardi et al. 1988, 2009; Vitale and Ciarcia 2018; Morra et al. 2014; Istituto Superiore per la Protezione e la Ricerca Ambientale (I.S.P.R.A.).

¹³ De Bonis et al. 2013.

¹⁴ Geological information on clay deposits come from Abbas (1999), Bonardi et al. (1988, 2009); Vitale and Ciarcia (2018), Istituto Superiore per la Protezione e la Ricerca Ambientale (I.S.P.R.A.) and more detailed cartography, aerial

ethnographic sources, in particular from traditional potters who still use local clays¹⁵. Another aspect that was considered is the accessibility of clay deposits, such as the proximity to ancient settlements and the location of trade routes along which raw materials could be transported.

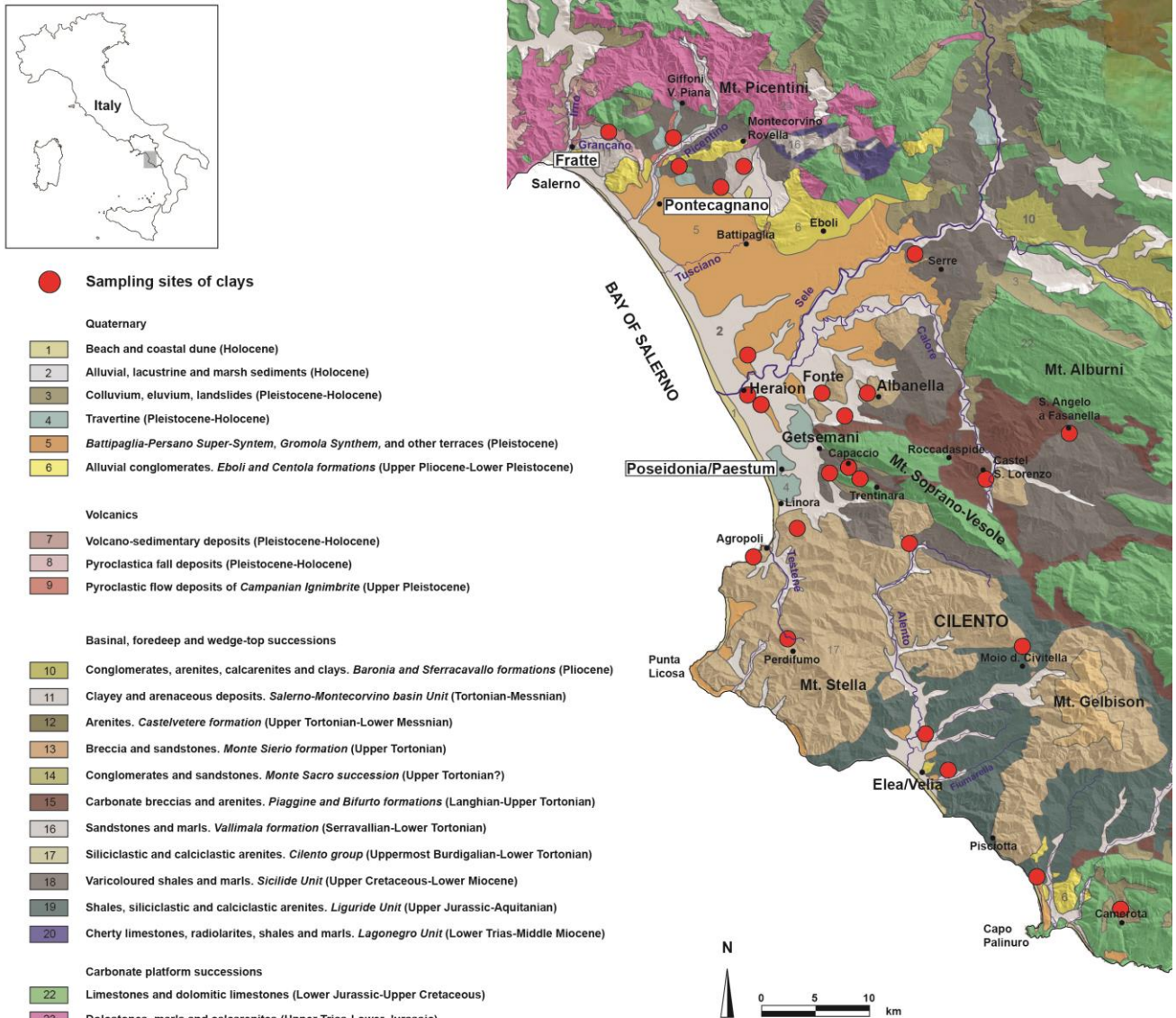


Fig. 2. Geological sketch map of the Sele River Plain and surroundings showing the sampling points of clays.

The sampling technique of clayey materials depended on the type of the outcrop. In the majority of cases, samples were collected by removing the surface layer of the deposit in order to minimize contamination from plant and faunal remains. In few cases, raw materials were collected in the alluvial plain via manual drilling to reach clayey sediments in historical levels (Fig. 3).

photography (IGM), and borehole logging. For their help in locating clays, we wish to thank the geologists Aldo Cinque, Pantaleone De Vita, Maurizio Capozzoli, Diego Rufo, and the archaeologist Carmine Di Biasi.

¹⁵ We wish to thank the ceramic artists Sandro Mautone and Sergio Vecchio and all potters and craftsmen from the area who are still using traditional techniques and local raw materials: Tanino Greco, Pino Fortunato, Giovanni Gorrasi, Franco Pellegrino, De Martino family owners of "Cotto Rufoli" workshop.



Fig. 3. Representative images showing the sampling of clay (a) via manual drilling, (b, c, d) directly on the outcrop.

During the project more than 370 ceramic and 35 clays samples from the major (Paestum, Pontecagnano, and Fratte) and minor sites in the territory (e.g., sacred areas as San Nicola di Albanella) have been investigated in order to identify local productions and connectivity¹⁶. These samples also included a few pottery samples constituting imports from Paestum to the neighbouring site of Velia. The selection of pottery was made taking into account the ceramic class and function of the pottery from the different contexts and periods. The analysed ceramic classes include common ware, fine pottery, building materials, *instrumenta*, and production indicators (i.e., kiln wastes, spacers, etc.).

All ceramic samples were described according to the standards of Facem (<http://facem.at/project/about.php#method>). This method represents a powerful tool for a first definition and classification of pottery productions based on the macroscopic examination of pottery, through the identification of homogeneous fabrics. It is thus very helpful for reducing the number of samples to be analysed by expensive and time-consuming instrumental analyses.

¹⁶ 289 pottery and 35 clay samples selected for the analyses carried out during the projects, along with 90 pottery samples from the existing database of the universities of Napoli and Sannio for comparison. We would like to thank Vincenzo Morra (Università degli Studi di Napoli Federico II), Alessio Langella and Celestino Grifa (Università degli Studi del Sannio) for providing the samples. We also thank Roman Sauer for having made thin sections of pottery sherds from Velia available.

The analytical techniques applied for the investigation of pottery are Polarised Light Microscopy (PLM) for petrographic analysis, X-ray fluorescence spectrometry (XRF) and ICP OES-MS for chemical analyses, X-ray powder diffraction (XRPD) for mineralogical analysis, Scanning Electron Microscopy (SEM) for microstructure observation and WDS for microchemical analyses¹⁷. Clay samples were analysed via XRF, PLM, grain size, and XRPD also for clay minerals analysis.

The application of mineralogical and petrographic archaeometric methods, previously only used in a limited way for the examination of ancient pottery in Austria, has allowed us to reach interesting results. Preliminary results were presented at workshops and conferences¹⁸, while a first overview is presented in this 7th edition of Facem¹⁹. However, the interpretation of the huge amount of data collected during the project is still ongoing and new and important insights are expected from a deeper and careful interpretation of the data, which will also consider microchemical, mineralogical, and microstructural analyses in order for us to obtain technological information on the ceramic process.

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¹⁷ PLM, XRF, SEM, and WDS analyses were carried out at the Department of Lithospheric Research, Universität Wien, Vienna, Austria in cooperation with Prof. Theodoros Ntafos. XRPD and grain size analyses were performed at the Institut für Angewandte Geologie (IAG), University of Natural Resources and Life Sciences (BOKU), Vienna, Austria in cooperation with Prof. Franz Ottner. ICP OES-MS was performed at Activation Laboratories Ltd., Ancaster, Ontario, Canada.

¹⁸ De Bonis et al. 2017a, 2017b, 2017c, 2018b, 2018c, 2018d.

¹⁹ Trapichler 2018a, 2018b ; De Bonis 2018.

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