

Aims and procedures of the thin section petrography carried out within the Minor Centres project

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I Aims

In the framework of the Minor Centres Project, c. 180 ceramic and geological samples were selected for thin section analysis. Main objective of the thin section petrography within the project is to:

- A) characterise the Roman pottery production identified within the project and understand the technology used in this production
- B) gain insight in the regional distribution of these local products.

Initially, these aims were met through the analysis of a selection of samples from ceramic wasters from production sites identified in the course of the project (e.g., Ad Medias, Forum Appii, site 12317 and site 11232) and from potential consumption contexts (e.g., small rural sites identified in the extensive surveys). This study was complemented by a clay sourcing campaign, which was carried out with the aim to identifying raw materials that may have been used for Roman pottery production.

However, during the Minor Centres Project it was decided to extend the program to also:

- C) characterise materials from the previously studied production site of Le Grottacce, situated on the Pontine coast, and compare these to materials from the nearby site 11232.
- D) to characterise the (variability in) fabrics of two commonly occurring jar types and a common type of black gloss bowl, and, by extension, to assess whether these may (partly) have been produced locally.

II Procedures

Ila Sample selection procedures

After laying out possible waster ceramics from the four production sites (Forum Appii, Ad Medias, site 12317 and site 11232), fragments were selected for sampling on the basis of morphological shape and where possible type in order to include the full range of shapes and types, including tiles (both *tegulae* and *imbrices*), amphorae and storage jars (*dolia*). For the site of Le Grottacce, sherds were selected from a very limited group of materials available at the GIA. It should be noted that for all sites extremely high- or over-fired samples would have caused difficulty in petrographic analysis. Therefore, such fragments were identified with the aid of a binocular microscope but not selected from the assemblages.

In addition, fragments were selected from the ceramic assemblages of small Roman farmsteads identified during the extensive field surveys, which were considered to represent consumption contexts. The selection aimed to cover the variability in shape (i.e. tiles, cover tiles, amphorae, and (storage) jars) and to include material from different consumption sites. Due to financial and time limitations only c. 50 fragments could be selected.

C. 60 samples of coarse Olcese olla types 2 and 3 and Black Gloss bowl type Morel 2783/84) were also selected from consumption contexts (small rural sites) for thin section analysis in the context of an MA-dissertation, with the aim of mapping the petrographic variability in these types and, by extension, whether these may (partly) have been produced locally.¹ The fragments were selected from the project database and intended to cover as many consumption contexts within the study area as possible.

During a coring campaign in march 2014, various clay beds that surface in the Pontine plain were sampled in order to identify the possible raw materials used for Roman pottery production. Using a geological map of the area specific areas around the pottery production sites were targeted and clay samples were collected from hand augerings and collected in plastic bags. Loose sandy deposits that may have represented suitable tempering materials were also collected in two locations. In total 13 samples were collected. Additional information on the coring campaign can be found in the report 2014_report_coring.pdf. The method used to prepare the samples are discussed in the report 2014_report_Clay_Sampling_Borgers.pdf.

I Ib Sample preparation procedures

The ceramic samples were first removed from the sherds with pliers and subsequently prepared as standard 30 µm thin sections at the *Massimo Sbrana servizi per la Geologia* laboratory at Piombino (Italy).

The clay samples were processed at the GIA's Laboratory for Conservation and Materials: they were crushed, re-hydrated, formed into briquettes and fired in the laboratory kiln at 800° C. The fired briquettes were thin sectioned at the *Massimo Sbrana servizi per la Geologia* laboratory at Piombino (Italy).

I Ic Thin section description and analysis procedures

All samples were analysed under a Leica polarising light microscope at the Laboratory for Conservation and Materials Studies of the GIA (www.lcm.rug.nl). The fabric grouping and petrographic description of the ceramic samples has been performed based upon the nature of the inclusions, clay matrix and voids.² Compositional, textural and shape criteria were used to detect the presence of specific practices, such as clay mixing and the addition of different types of temper.³

Micrographs of the thin sections have been taken at low magnification (x25) with the aim to illustrate representative views of the constituent minerals. The micrographs were either taken under crossed polars (XP) or in plane-polarised light (PPL): in various fabrics the same field of view is shown under both conditions. All the individual images of the micrographs have a width of 5.8 mm.

The clay sample thin sections were studied under the polarising light microscope, and compared with the ceramic thin sections. The thin sections were photographed in colour under crossed polars (XP).

I Id data processing procedures

Descriptions of the first 45 thin sections (analysed in 2013) were recorded in an excel file (2013_petrography_Borgers_appendix.xlsx). This document records the following attributes:

¹ Verhagen, F., 2016. *Production, distribution and consumption of Republican pottery. A petrographic study of coarse wares and black-gloss pottery from the Pontine Plain (Central Italy)*. MA-thesis, Rijksuniversiteit Groningen.

² Quinn, P.S., 2013. *Ceramic Petrography: the Interpretation of Archaeological Pottery and Related Artefacts in Thin Section*. Oxford Archaeopress, 73-79.

³ *Ibidem*, 156-171.

- An **ID** , e.g. an individual sample number (1, 2, ...).⁴
- The **unit ID**, e.g. the Id of the survey unit from which the fragment stems. For a few samples this fields records only the name of the site from which the fragment comes.
- The **type of material**, e.g. whether the sample represents a waster or rather material from a consumption context.
- The **shape** of the vessel to which the fragment originally belonged (e.g. tile, cover tile, amphora, dolium, ...)
- The **Fabric description**, a description of the fabric on the basis of an initial visual inspection
- The **measurements** of the fragment.⁵

The remainder of the samples was after microscopic analysis directly used (along with these first 45 samples) to compile general descriptions of the fabric groups by Borgers. These descriptions were made in separate MS Word documents and follow the set-up and codes described in Quinn (2016). These Word documents can be found in this archive in the folder 'fabric descriptions'.

A complete list of all samples is included in the file "MC_SampleSelection_Petrography.xls". Besides the ID's, it includes the siteID or UnitID of the Location of collection, the type/shape of the artefact it pertains to, and the fabric code – which are described in the documents in the folder "fabric descriptions".

While the clay sampling campaign is described in more detail in the report 2014_report_Clay_Sampling_Borgers.pdf, the fabrics have been described in the report 2015_petrography_Borgers.pdf and will also be published online on the website <http://minorcenters.gia-mediterranean.nl/>.

⁴ Note that in some files in the archive the individual sample ID also includes a code for the project and/or the year the sample was selected (e.g., MC 2013/1)

⁵ Besides the width (thickness) of the fragments, a series of (usually 4) measures is recorded; it is unclear how these measures were taken but they surely include the maximum length and width of the fragment.