SOUTHERN ITALY GREY LAYERS

PRELIMINARY DATA FROM BROGLIO DI TREBISACCE (CS, CALABRIA)

LAURA MATILDE MAGNO Università di Roma La Sapienza, matildemagno@gmail.com

RESUMEN La recurrencia de la definición de estratos "grises" o "grises-ceniza" se presenta en la literatura italiana al trazar capas antrópicas en el sur de Italia. Este tipo de estratos pueden tener espesor variable a lo largo de la estratigrafía, poseer un color gris o gris-beige y ser heterogéneas en su composición. Estos caracterizan a menudo la estratigrafía de muchos asentamientos de la Edad del Bronce en el sur de Italia.
Para investigar este tipo de depósitos y adscribirlos a una clase de suelos antrópicos, es esencial comprender la similitud y las diferencias formativas y establecer comparaciones. A fin de alcanzar este objetivo, el estudio de los suelos antrópicos grises requiere un considerable cambio de escala, en comparación con el utilizado hasta ahora en la historiografía. La micromorfología se tiene aplicado al estudio del sitio de Broglio di Trebisacce donde las capas grises se extienden desde la Edad del Bronce Medio y Reciente.
The results obtained show a general association between these anthropogenic layers and spherulites, as well as with calcium carbonates and combustion traces such as charcoal and possibly ash.
Los resultados obtenidos muestran una asociación general entre estas capas antropogénicas y esferulitas, así como con carbonatos de calcio y trazas de combustión tales como carbón vegetal y posiblemente ceniza.

PALABRAS CLAVE Micromorfología, estratos grises, suelos antrópicos, Edad del Bronce, Broglio di Trebisacce

ABSTRACT The recurrence of the definition "grey" or "ashy-grey" strata comes forward in Italian literature when tracing anthropic layers in Southern Italy. This kind of strata can be described as layers that have variable thickness, are grey or grey-beige in colour, and are heterogeneous in composition. They often characterize the stratigraphy of many Southern Italy Bronze Age settlements.
In order to investigate this kind of deposits and ascribe them to a class of anthrosoils, it is essential to understand the formative similarity and differences and to establish comparisons. To achieve this goal the study of the grey anthrosoils requires a considerable change of scale, compared to the one so far described in the literature. Micromorphology has been applied to the study of the site of Broglio di Trebisacce where grey layers span through the Middle and Recent Bronze Age phases.
The results obtained show a general association between these anthropogenic layers and the reconstruction phenomena occurring in the settlement during the recent Bronze Age.

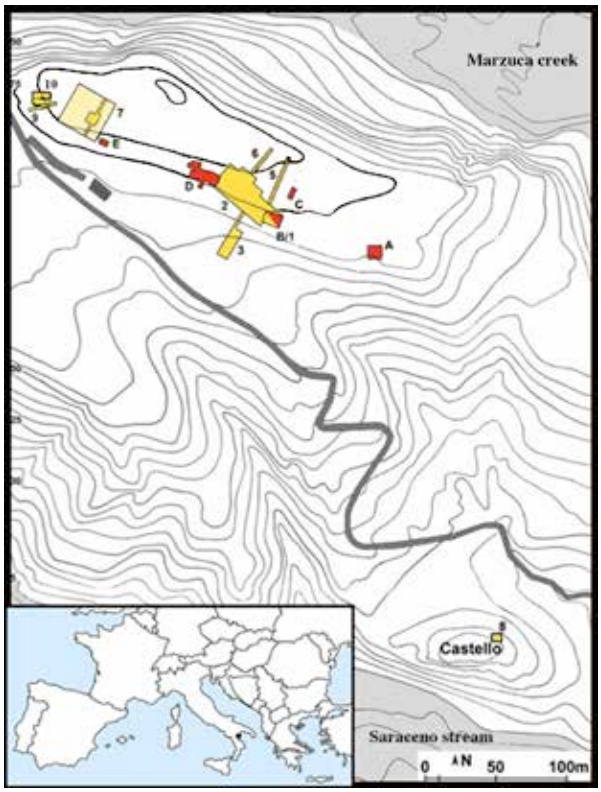
KEYWORDS Micromorphology, grey layers, anthrosoils, Bronze Age, Broglio di Trebisacce

INTRODUCTION

Thin section soil micromorphology is one of the most powerful archaeological methods available to bridge the gap between the macroscopic and the microscopic stratigraphic record: on one side, the undisturbed samples set in their macrostratigraphic position; on the other, a huge range of space below the millimetre scale, where a great amount of information is embedded (Weiner, 2010). Furthermore this method enables the examination of deposits at a high resolution providing constraints on possible interpretation at the field scale (Courty *et al*., 1989).
In this case, a micromorphological approach was applied to the investigation of the Eastern profile (square H) in the B/1 trench at Broglio di Trebisacce (hereafter 1H), the complete type-stratigraphy of the site. The trench deposit accumulated during the Bronze and Early Iron Age human occupation of the plateau. Through this method the composition and the formation processes of these "grey layers" were investigated. These layers, variable in stratigraphic thickness, are grey or grey-beige in colour and very heterogeneous in their composition.

CASE STUDY

Broglio di Trebisacce is a protohistoric settlement located in Calabria, Southern Italy (figure 1). The settlement, discovered in 1978, rises on the top of a hill and was inhabited by the Oenotrians, a society that bloomed for about a millennium. They occupied an area that runs from the South of Campania to Southern Calabria, showing an indigenous cultural character and a well developed trade-network, with relevant connections with the Aegean world (Peroni *et al*., 1994). Material evidences from Broglio show a continuous occupation. This continuity was probably encouraged by the potential for land exploitation, as the soil is



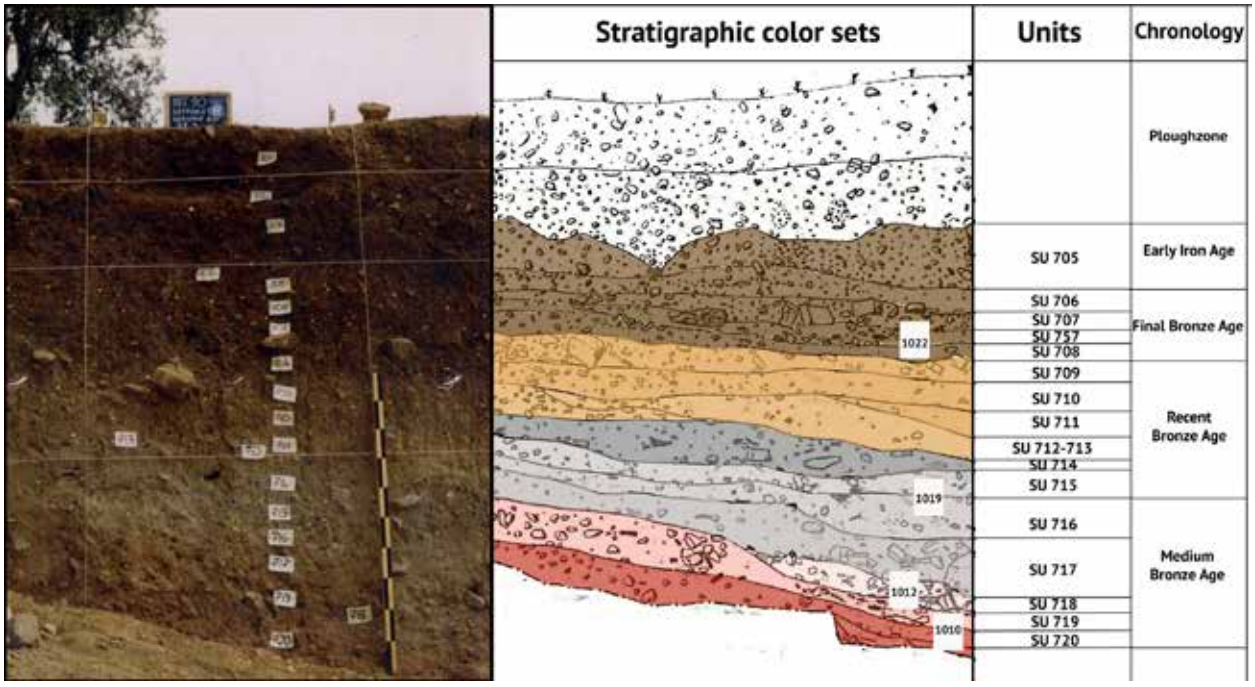
1. Location of Broglio in Italy (39°86'40.08"N, 16°50'41.44"E) and plan of the settlement showing the excavation areas. Plan by A. Vanzetti, used with the permission from the Broglio di Trebisacce archive.

well suitable for dry farming. Furthermore, the hill is a marine terrace with a dry and well drained surface, a reduced landslide risk, and landscape stability, all of which allowed for the construction of terraces on the slopes suitable for hut buildings and agriculture. The first occupation of the area dates to the Neolithic, and rests on the local Pleistocene Mediterranean red soil that characterizes the terrace. Late Middle Neolithic evidence was discovered on the upper plateau, where two pits uncovered pottery belonging to the *Serra d'Alto facies*. Findings of *Diana facies* pottery and a surface-scatter of flint and obsidian on the lower plateau testify the Final Neolithic. The main occupation phase of the site starts from the Medium Bronze age, until the Early Iron age (from about 1600 B.C. to about 720 B.C.).

The grey layers analysed in this research are from the main type-stratigraphy of the 1H profile. The analysed deposits started to form during the Middle Bronze Age and, through pottery sequencing, it has been possible to ascribe the remains of each archaeological unit to a relative chronological phase until the Early Iron Age. In the field, the layer characteristics were distinquished on the basis of the natural stratigraphic units. The whole set of grey layers were differentiated by colour into the following groups a basal pink-grey strata, a middle grey strata, and an upper beige-grey strata. The whole grey set rests on the basal red Pleistocene soil and is covered by upper brown reworked modern agricultural soil.

MATERIALS AND METHODS

During field work (September-October 2013) thirteen samples were collected from the main profile 1H, using a systematic continuous sampling strategy coupled with bulk sampling for chemical/physical (seventeen samples) and pollen (nineteen samples) analysis. The selected profile was located in the eastern end of the B/1 trench, running in a N-S direction, and was first completely exposed in 1980.



2. (A) Picture of the 1H trench in the B/1 East profile. (B) Section drawings showing the locations of the micromorphology blocks examined in this study, the units names and the related chronology.

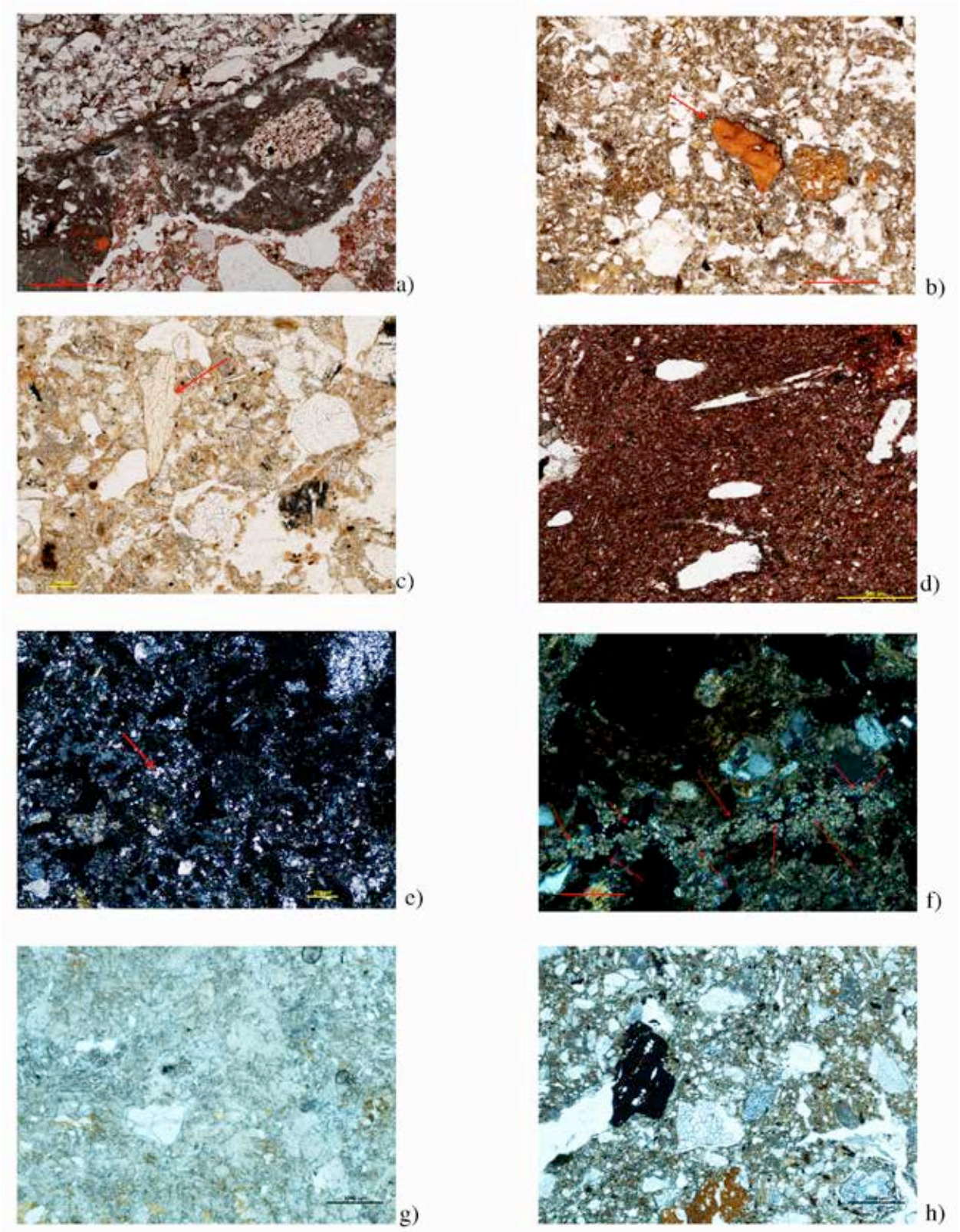
A sampling column located 2 m from the erosional Southern end of the trench was selected for profiling and cleaned by removing 4 to 20 cm of the profile face .
The sampling column was 50 cm wide and 145 cm high, spanning from the upper modern agricultural strata to the lowest Pleistocene strata.
Considering the extensive sampling conducted, only the four most significant blocks that document stratigraphic changes are presented here, including 1) Sample 1010, which captures the contact between the reddish basal strata and the pink strata, 2) Sample 1012, which encompasses the transition between the pink and the grey layers, 3) Samples 1019, which captures the contact between the grey and the brown strata, and 4) Sample 1022, which contains the brown stratum.

Samples were processed in the laboratories of the Institut für Naturwissenschaftliche Archäologie in the Eberhard Karls Universität of Tübingen. Once dried in an oven at 60° C for three days the blocks were impregnated. The polyester resin was blended mixing *styrene, polyester lamination resin, methyl ethyl ketone peroxide* liquid mixture as hardening agent, and some *cobalt* used as a catalyser. Once impregnated and dried, the blocks were cut in slices about 2 cm thick and polished to a smooth and perfectly flat surface. The sample slices were glued to glass and polished to a thickness between 15 and 25 micrometres for examination under the petrographic microscope. Thin sections were then described using Stoops method (Stoops, 2003).

3. (a) Picture of the sampling column in 1H trench. (b) Blocks sampling procedure; (c) Photomicrographs in XPL and PPL of unit 720 showing red clay pedofeatures.

DATA RESULTS AND DISCUSSION

Deposits are described from oldest to youngest and organized according to field units. Thin section analysis showed the archaeological deposit rests directly on the Mediterranean red soils. Unit 720 was identified as in-situ material unaffected by colluviation. A perfectly sorted, dominant red clay groundmass was apparent in the thin sections. This stratum is a Bt horizon characterized by red clay without limestone. In the profile area, where the sample was collected, the red layer appears as the local paleosol. No anthropogenic inclusions or alterations were present in these thin sections.



4. Photomicrographs PPL unless stated otherwise. (a) Calcite pendent in unit 717. (b) Rubified bone fragment in unit 716. (c) Unit 715: grey-beige micromass with a dotted appearance and a bone fragment. (d) Fragment of building material in unit 717. (e) Spherulites in unit 717, XPL. (f) Spherulites layer in unit 715, XPL. (g) Unit 708 groundmass. (h) Unit 757, groundmass with charcoal fragment.

The situation is different in stratigraphic unit 719, where pink-grey layers start. In the thin section, a vughy micromass and a dominant micritic calcite groundmass with some red clay is evident. It is characterized by poro- and grano-striated micritic calcite b-Fabric. There are clay laminated hypocoatings and depleted coatings. As testified by pedofeatures the stratum is colluviated although red clay is still present.
Stratigraphic unit 717 marks the passage from the pink--grey strata to the proper grey one. The thin section groundmass is characterized by a yellowish-grey micromass with a dotted appearance and a micritic calcite groundmass with crystallitic b-Fabric. Anthropogenic materials included in thin section are spherulites and bones as well as pottery. Furthermore spherulites are present. In thin sections from stratigraphic units 717, two big brown compact aggregate in the middle of the thin section can be identified as building material. Pedofeatures such as calcite infilling, coatings and calcite hypocoatings on clay-laminated coatings commonly occur in this stratum. The presence of weathered mica and pendents were also observed. In these pendents carbonates look affected by soil formation processes and appear partially degraded.
In thin sections from units 716 and 715, which represent the core of the grey strata bulk, micromass is grey--beige with a dotted appearance. Interference colour is usually of the 3rd order and the groundmass shows crystallitic b-fabric with dominant calcite pedofeatures. As for the anthropogenic inclusions, coarse to fine pottery fragments, spherulites, fine bone fragments (some burnt and rubified), as well as a few charcoal remains are present. Frequent chamber and channel voids testify to reworked and bioturbated material.
Thin sections from units 708 and 757 document the nature of the brown strata. Samples show a complex microstructure (subangular blocky microstructure and channel microstructure). Peds are usually unaccommodated. The micromass is light brown with a dotted appearance. The ground-mass looks equally composed by clay (both red and yellow) and micritic calcite with crystallitic b-Fabric. Shell remains are common as well as fresh roots within the channel voids. Anthropogenic materials include: common pottery fragments from coarse to fine size (some looks rubified and burnt), frequent bone remains (some are calcinated) and common charcoal remains. In these strata, the lack of spherulites and the presence of limestone nodules is remarkable. Clay pedofeatures are not present. A bubbled sliver has been identified and it may relate to forging activities.
Overall, if we look at the anthropogenic components spotted in the grey layers the most represented elements are pottery followed by spherulites, charcoal, bones and shell fragments. These elements are also very common in the archaeological record. They have the advantage of better preservation compared to other materials such as ash, which is liable to be alerted by diagenetic processes. In this regard, no ash has been identified in the thin sections of the grey layers or in the other thin sections from the B area. Nevertheless the presence of charcoal indicates that strong diagenetic activities together with the bioturbation and the PH condition might have altered the ash. Its absence in the colluvium is singular as there is significant other evidence for combustion present.
Spherulites are present only in the grey strata. The presence of spherulites, spread in the groundmass, could be explained as follows: i) by the use of animal dung as part of the dough for building; ii) by the use of animal dung as fuel; iii) by the presence of dung in the soil, later reworked and absorbed. All of these three hypotheses could be valid since, even if the spherulite distribution is random and not ssociated with building material, they are not present in the brown and red layers. The lack of spherulites in the analysed red layers could be attributed to the fact that this strata is the local ancient paleosol; however, the same explanation cannot apply to the brown layers where archaeological evidence testifies to an Early Iron Age occupation.

CONCLUSIONS

Throughout micromorphological analysis it was possible to deepen and enrich the bulk of information concerning grey layers. The formation of this anthropic deposit is due to human dumping and building practices. As micromorphology suggests, these layers are colluvial strata linked to the terracing and to the demolition and rebuilding activities that occurred on Broglio hill slope. In the site, limestone coming from the geological substratum was mobilized with the terracing activity that starts during the MBA.
Collected data suggest that grey layer colluvium enclose building material, too degraded to be identified in thin section, whereas in brown layers the building material is absent or somehow much less visible. This hypothesis would match with evidence of RBA and FBA reconstructions, testified by the archaeological remains. The common presence of spherulites in the MBA and RBA grey strata is important if compared to their absence in the brown layers even though the stratigraphy includes copious material from the Early Iron Age. This could reflect a cultural change in the economic organization of the community and a new way in organizing and managing the site area, especially focusing on waste middens and on the presence of animals inside the settlement.

BIBLIOGRAPHY

COURTY, M.-A.; GOLDBERG, P.; MACPHAIL, R. (1989) – *Soils and Micromorphology in Archaeology*. Cambridge: Cambridge University Press.

NODAROU, E.; FREDERICK, C.; HEIN, A. (2008) – Another (mud)brick in the wall: scientific analysis of Bronze Age earthen construction materials from East Crete. *Journal of Archaeological Science*, 35: 11, p. 2997-3015.

PERONI R.; TRUCCO F., eds. (1994) – *Enotri e Micenei nella Sibaritide*. Taranto: Istituto per la storia e l'archeologia della Magna Grecia.

PERONI, R.; VANZETTI, A., eds. (1998) – *Broglio di Trebisacce 1990-1994. Elementi e problemi nuovi dalle recenti campagne di scavo*. Soveria Mannelli: Rubbettino.

SHILLITO, L.-M.; MATTHEWS, W. (2013) – Geoarchaeological investigations of Midden-Formation Processes in the early to late ceramic Neolithic levels at Çatalhöyük, Turkey *ca*. 8550-8370 cal BP. *Geoarchaeology,* 28, p. 25-49.

SCHIFFER, M. (1987) – *Formation processes of the archeological record*. Albuquerque: University of New Mexico Press.

STOOPS, G. (2003) – *Guidelines for Analysis and Description of Soil and Regolith Thin Sections*. Madison: Soil Science Society of America.

STOOPS, G.; MARCELINO, V.; MEES, F. (2010) – *Interpretation of micromorphological features of soils and regoliths*. Amsterdam: Elsevier.

WEINER, S. (2010) – *Microarchaeology: beyond the visible archaeological record*. Cambridge: Cambridge University Press.