Microfacies and biostatigraphical analysis on Paleogene-Neogene facies cropping out near Antrodoco (Central Apennines, Italy)

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INTRODUCTION

The Geological Survey of Italy (ISPRa-Istituto Superiore per la Protezione e Ricerca Ambientale) is carrying out the field mapping of the Sheet 348 “Antrodoco”, located between Latium and Abruzzi (Fig. 1). In the area different successions are exposed, ranging from the Upper Triassic to Upper Miocene interval. These successions, characterized by lateral and vertical facies variations of the stratigraphic successions, document the relationship between the different depositional settings and basin environments, characterizing different geodynamic frameworks.

This work aims to define some stratigraphic successions of Paleogene-Neogene age cropping out in the area of Sheet 348 “Antrodoco” (scale 1:50,000).

RESULTS

The 69 thin sections investigated are grouped into nine main clusters by a Q-mode hierarchical cluster analysis, based on a dataset of 49 semiquantitative parameters, by comparing the textural study of microfacies, relative abundance of clasts and tectonic recognition of the microfabrics. The cluster analysis allows you to group, as objective as possible, the samples in sets correlated to sedimentary environments and lithostratigraphic units, and it could hopefully help to compare the Paleogene-Neogene sedimentary successions of the Antrodoco area with those of the whole Central Apennines.

The nine clusters resulted after the Q-mode HCA (Fig. 2) are: Clusters A: bioclastic-bryozoan packstone-floatstone; B: unsorted packstone-wackestone-floatstone with common planktonic foraminifers, bryozoans and red algae; C: planktic foraminiferal wackestone-packstone; D: poorly sorted bioclastic lagerstätten packstone; E: poorly sorted bioclastic large foraminiferal packstone, with micritic lithoclasts; F: spongin packstone: G: unsorted larger foraminiferal packstone-grainstone; H: larger foraminiferal packstone-grainstone; I: Neomphalina-bearing packstone-floatstones.

The analysed larger foraminiferal assemblages appear mostly allochtonous and distorted, placed backwash by gravitational flows or turbidity currents, as for the so-called “biofacies a macrofossiliere”. The assemblage consists of benthic foraminiferal packstone-floatstone, rare to common planktonic foraminifers, fragments of bryozoans, algae and echinoderms, and are grouped in cluster D (in part), C, D, E, H, and I (in part).

The microfacies grouped in cluster A, B, and F, and G, resemble those described by BARBERI et al. (2004) for the “Guadagnola Formation”, both on the textural characteristics and on the fossil content. The identified microfacies are large foraminiferal packstone-floatstones (with frequent Mgysipora and Neomphalina), spongin packstones and Amphiopithecina-bearing packstone-grainstones, with scarce forien peloids and red algae.

As regards the micropalaeontological aspects, the occurrence of a new species of Mollusca from Selandian, not referable to any known and recently revived species (HÖTTINGER, 2009), is firstly reported. Osteichthyes gr. and Eleganctorina subglobula, easily recognizable in oriented and non-oriented thin sections, are confirmed as excellent marker for the Cretaceous (BENEDETTI et al. 2011). For the Cretaceous two forms, described by VEDOZO (2003) as Rolletia n. gen. 1 and Rolletia n. gen. 3, are reported.

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The work involves the microfacies and biostatigraphical analysis of 69 thin sections, obtained from 63 rock samples, belonging to Paleogene and Neogene sedimentary successions.

The analysis is focused on the study of the larger foraminiferal assemblages, the benthos fauna, the accompanying taxa and the relative abundances of these bioclasts and textural types.

We provide a taxonomic analysis of the benthic foraminiferal assemblages and of their accompanying taxa for biostatigraphic dating and palaeoenvironmental reconstruction. Future data are also integrated to the microparase observations and, furthermore, a statistical approach is attempted, through a semi-quantitative analysis based on the Q-mode Hierarchical Cluster Analysis (HCA). The investigated samples are related to the following formations: Scaglia Rossa, scaglia dolerita, Scaglia Cineria, scaglia cineraria dolerite, marne coni Cenomani. A particular attention was paid to the study of larger foraminifera often displaced in deep environments by gravity and turbiditic flows. The classification of the investigated taxa at specific rank, possible, allowed us to assign each sample to the shallow Benihic Zones (SBZ) of CAHUZAC & POIGNANT (1997), for the Oligo-Miocene, and SERRA-XIL et al. (1988) for the Eocene Paleocene to late Eocene.

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