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

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INTRODUCTION

The Geological Survey of Italy (ISPRA-Istituto Superiore Protezione e Ricerce Ambientale) is carrying on the field mapping of the Sheet 348 “Antrodoco”, located between Latium and Abruzzi (Fig. 1).

The related research activities lead to the collection of a great amount of data useful for the reconstruction of the geological evolution of this part of the Central Apennines, characterized by lateral and vertical facies variations of the stratigraphic successions, and occurrence of regional tectonic elements (e.g., the Olevano-Antrodoco line). In the area different successions are exposed, spanning from the Upper Triassic to Upper Miocene interval. These successions document the sedimentation on carbonate platform, platform-basin-transition and basin environments, in different geodynamical frameworks.

This work aims to define some stratigraphic succession of Paleogene-Neogene age cropping out in the area of Sheet 348 "Antrodoco" (scale 1:50000).

MATERIAL

The work involves the micropalaeontological and biostratigraphical analysis of 69 thin sections, obtained from 63 rock samples, belonging to paleogene and neogene sedimentary successions.

The analysis was carried out through an optical microscope for the recognition of the larger foraminiferal assemblages, the benthic fauna, the accompanying taxa and the relative abundances of these bioclasts and textural types.

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We provide a taxonomic analysis of the benthic foraminiferal assemblages and of their accompanying faunas for biostratigraphic dating and paleoenvironmental reconstructions. These data are integrated with microfacies observation 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 detritica, Scaglia Cinerea, scaglia cinerea detritica, unità spongolitica, marne con Cerrognola. Particular attention was paid to the study of larger foraminifers often displaced in deep environments by gravity and turbiditic flows. The classification of the investigated taxa at specific rank, when possible, allowed us to assign each sample to the Shallow Benthic Zones (SBZ) of CAHUZAC & POIGNANT (1997), for the Oligo-Miocene, and SERRA-KIEL et alii (1998) for the thethyan Paleocene to late Eocene.

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 combining the textural study of microfacies, relative abundance of constituents and taxonomic recognition of the microfaunas.

The cluster analysis allow us 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:

A: biodetritic bryozoans packstone-floatstone; B: unsorted packstone-wackestone-floatstone with common planktic foraminifers, bryozoans and red algae; C: planktic foraminiferal wackestone-packstone; D: poorly sorted biodetritic larger foraminiferal packstone; E: poorly sorted biodetritic larger foraminiferal packstone with micritic lithoclasts; F: spongolitic packstone; G: unsorted larger foraminiferal packstone-grainstone; H: larger foraminiferal packstone-wackestone; I: Nephrolepidina-bearing packstone-floatstone.

The analysed larger foraminiferal assemblages appear mostly allochtonous and displaced basinward by gravitative flows or turbidity currents, as for the so-called “brecciole a macroforaminiferi”. These consist of benthic foraminiferal packstone-wackestone-floatstones, rare to common planktonic foraminifers, fragments of bryozoans, algae and echinids, and are grouped in cluster B (in part), C, D, E, H and I (in part).

The microfacies grouped in cluster A, B (in part), F and G, resemble those described by BARBIERI et alii (2004) for the "Guadagnolo Formation", both based on the textural characteristics and on fossil content. The identified microfacies are larger foraminiferal wackestone-floatstones (with frequent Miogypsina and Nephrolepidina), spongolitic packstones and Amphistegina bearing packstone-grainstones, with scarce to frequent peloids and red algae.

As regards the micropaleontological aspects, the occurrence of a new species of Miscellanea from Selandian, not referable to any known and recently revised species (HOTTINGER, 2009), is firstly reported. Ornatorotalia granum, O. spinosa and Granorotalia sublobata, easily recognizable in oriented and non oriented thin sections, are confirmed as excellent marker for the Cuisian (BENEDETTI et alii, 2011). For the Cuisian two forms, described by VECCHIO (2003) as Rotaliidae n. gen. 1 and Rotaliidae n. gen. 3, are reported.
REFERENCES


BENEDETTI A., DI CARLO M. & PIGNATTI J. (2011) - New Late Ypresian (Cuisian) rotaliids (Foraminiferida) from Central and Southern Italy and their biostratigraphic potential. Turkish J. Earth Sci., 20 (6), 701-719.


