

Biostratigraphy of Middle-Upper Eocene Rocks at North Eastern Desert of Egypt: a Quantitative Microfossils Approach

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Abstract

Biostratigraphic investigations of the Middle-Upper Eocene rock units in the North Eastern Desert specifically; Wadi Degla and Gebel Abu-Shama sections have been improved by integration study of both foraminifera and calcareous nannofossils. A total of 83 representative samples from three Eocene rock units namely; Observatory, Qurn, and Maadi formations were collected at intervals of 30cm to 2m, based on variations in lithology, bed thickness and contact, and specific fossil content. The microfossils such as; benthic and planktic foraminifera as well as calcareous nannoplanktons were extracted from the rock samples by specific techniques in order to prepare them for fossil and biozones identification. Based on the biostratigraphic analysis, there are three detected planktic biozones, *Globigerinatheka kugleri/Morozovella aragonensis* (E9), *Morozovelloides crassatus* (E13), and *Turorotalia cerroazulensis pomeroli /Turorotalia cerroazulensis cerroazulensis*. While, the calcareous nannofossils *Reticulofenestra dictyoda*, *Pontosphaera multipora*, and *Reticulofenestra umbilica* were found within the *Morozovelloides crassatus* Zone (E13) and attributed to the *Discoaster saipanensis* Zone (NP17). Regarding the quantitative analysis of the benthic foraminifera; there are four benthic assemblages (abundance zones) that correlated with their equivalents in the area under consideration and neighboring areas. Consequently, the Observatory Formation is assigned to the early Bartonian (≈ 45.8 Ma). Whereas, the Qurn Formation is dated back to the late Bartonian-early Priabonian. The Lutetian/Bartonian and Bartonian/Priabonian stage boundaries have been precisely determined and a paraconformity (≈ 3.6 Ma) was recorded between the Observatory and Qurn formations as a result of a tectonic instability in the late Lutetian. The environment became shallower and was not favorable for planktic foraminifera, therefore, the entirety of the recorded planktic species discontinued at the upper Eocene Maadi Formation of Priabonian age.