Biostratigraphic Reappraisal of the Nummulitic Marine Transgression in the Arc de Castellane (SE France) around the Eocene-Oligocene Transition: palaeoenvironmental and palaeoclimatic implications

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Résumé

Paleogene sediments of the Arc of Castellane (South East France) were deposited within a foreland flexural basin and record the Nummulitic marine transgression surrounding the Eocene–Oligocene Transition. To date, the stratigraphy of the nummulitic transgression in the Arc of Castellane is based on micropaleontological studies established in the 1970's, and essentially on the basis of foraminifera (and some ostracods). Shallow-coastal settings usually contain rare pelagic taxa so that it can be challenging to anchor in time shallow-marine records to deep-sea records. Little work has been undertaken in the Nummultic deposits of the Arc de Castellane of the Barrême/Blieux syncline on the basis of calcareous nannofossils. In particular, no study combining a revised biostratigraphic approach with chemostratigraphic data is yet available. The distribution pattern of calcareous nannofossils was studied through semi-quantitative and relative abundance counts, to depict precisely stratigraphical ranges and the reliability of the biohorizons used in the standard biozonations schemes. 87Sr/86Sr dating conducted on marine oyster shells, such as Pycnodonta gigantica, provides an age between 34.05 Ma and 36.30 Ma. Calcareous nannofossils within the Nummulitic limestones and Globigerina (Blue) Marls of the studied section are characterized by moderately well-preserved assemblages consisting largely of low-middle latitude taxa. The Sauzeries section of the Barréme syncline covers the Base common (Bc) of Ismolithus recurvus , the base of NP 19, CP 15b and CNE 18 (36.13 Ma) to the Bc of Clausioccolithus subdistichus , the top of NP 21, CP 16b and CNE 21 (33.88 Ma). A shift in the nannofossil assemblage, starting before the inception of the Eocene-Oligocene Transition (EOT), is documented in the interval below the Ville Sandstone formation, and is evidenced by an increased in eutrophic species along with a decrease in oligotrophic and warm taxa. These preliminary results open new perspectives for (i) the chronostratigraphic framework of the Nummulitic marine series during the late Eocene-Oligocene by highlighting prominent paleoenvironmental changes across the EOT, and (ii) intra- and inter-basin correlations in the Arc of Castellane and surroundings.

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Mots-Clés: Calcareous nannofossils, Biostratigraphy, Chemostratigraphy, Eocene–Oligocene Transition, Arc of Castellane.