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Early-middle Eocene transition in calcareous nannofossil assemblages at IODP Site U1410 (Southeast Newfoundland Ridge, NW Atlantic)

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The early-middle Eocene interval documents the shift from the warmest greenhouse conditions occurred during the Early Eocene Climatic Optimum (EECO, 52-50 Ma) to the beginning of the cooling phase which led to the Oligocene icehouse regime. This important transition is well expressed as a reversal in the global oxygen and carbonate isotope trends (Zachos et al., 2001). Moreover, this interval was a time of remarkable transformation in the marine biosphere. Communities of calcareous nannoplankton, marine calcifying algae at the base of the oceans food chain, experienced transient and permanent profound changes. Calcareous nannofossil are regarded as remarkable tools both in biostratigraphy and paleoecology, with several taxa that show different responses to changes in physical parameters of surface waters. Here, we aim to document calcareous nannoplankton assemblage changes across the early-middle Eocene transition, in order to upset the biostratigraphic framework and to increase comprehension of how phytoplankton communities responded to paleoenvironmental changes at that time.

The sedimentary successions recovered at IODP Site U1410 (Exp. 342; 41˚19.6987′N; 49˚10.1995′W, Norris et al., 2012) on the Southeast Newfoundland Ridge (NW Atlantic) offer an expanded record of the early-middle Eocene interval that is marked by an increase in accumulation rate related to sedimentation of clay-rich nannofossil oozes. Quantitative analysis of calcareous nannofossil assemblages was conducted, encompassing calcareous nannofossil Zones NP12 –NP15 or CNE4-CNE10 (Martini, 1971; Agnini et al., 2014). The study interval records the appearance and proliferation of Noelaerhabdaceae family (i.e, *Reticulofenestra/Dictyococcites* group), which can be considered one of the most significant shifts in the assemblage structure of the Paleogene. This change was probably favored by modifications in surface water chemistry. The middle Eocene clay-rich sediments contain well preserved nannofossils, making this Site suitable for a comprehensive taxonomic revision of *Nannotetrina* and *Chiasmolithus*. Biohorizons related to species belonging to these two genera are used to mark middle Eocene biozone boundary, a better characterization of their taxonomy would thus improve their reliability as biostratigraphic tools. Furthermore, during the early middle Eocene a new evolutionary lineage, which includes *S. kempii* - *S. perpendicularis*- *S. furcatholitoides* morph. A - *S. cuniculus* - *S. furcatholitoides* morph. B occurred among sphenoliths. This plexus is characterized by progressive morphological changes which, if correctly identify, will allow for a very detailed subdivision of this interval. Even more interestingly, we would assess if there is any relationship between this evolutionary trend and the surrounding abiotic conditions.

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