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Changes in calcareous nannofossil assemblages during the Middle Eocene Climatic Optimum in the central-western Tethys (Alano section, NE Italy)

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This study is focused on an oxygen and carbon isotope perturbation referred to as Middle Eocene Climatic Optimum. This event occurred at Chron C18r-C18n transition (ca. 40 Ma) lasting some 400-600 kyr and is interpreted as a significant temporary reversal in the middle-late Eocene long-term cooling trend (Bohaty and Zachos, 2003, Bohaty et al., 2009, Jovane et al., 2007, Sexton et al. 2006, Wade and Kroon, 2002). Our main goal is the shaping of the calcareous nannofossil assemblage before, during and after this transient episode of global warming. In fact, there is a general consensus that some nannofossil taxa are characterized by specific paleoecological affinities and thus would be utilized for palenviromental reconstructions. A high resolution sampling for micropaleontological analysis has been performed in Alano on-land section, located in NE Italy (Agnini et al., in press). Semi-quantitative and quantitative analyses on calcareous nannofossil assemblages have been carried out. Preliminary data show that the MECO interval seems to coincide with a significant shift in the relative abundance of calcareous nannofossil taxa, suggesting an intriguing relationship between biotic and abiotic signal (Spofforth et al., in press, Luciani et al, submitted). In particular, eutrophic/cold taxa, as for instance the reticulofenestrids, Cyclicargolithus and Coccolithus, increase in abundance during this warming phase, whereas oligotrophic/warm taxa, Sphenolithus and Zyghrablithus, decrease significantly showing peculiar anticovariant trends with respect to meso-eutrophic taxa. A marked increase in reworked, mainly Cretaceous, specimens is also observed during the MECO. The increase in eutrophic/cold taxa coupled with the decrease of oligotrophic/warm taxa is consistent with a transient enrichment in dissolved nutrients in warmer sea surface waters and suggests that enhanced nutrient availability could drive the make-up of the calcareous nannofossil assemblage. The increase in reworking may indicate an increase in terrigenous input, due to increased chemical weathering likely produced by an enhanced hydrological cycle. A further refinement of this dataset will hopefully evidence, even more strongly, for correlations among different taxa and between abundance patterns of calcareous nannofossil taxa and mineralogical/geochemical proxies.

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