Changes in calcareous nannoplankton assemblages and the evolution of biomarkers in the Hungarian Palaeogene Basin (Central Paratethys)

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The Eocene–Oligocene climate transition (EOT) was a major greenhouse to icehouse shift that ended the warm, ice-free early Palaeogene world and ushered in Antarctic glaciation. The Paratethys was a unique epicontinental sea in a palaeogeographically complex area that was influenced by the ongoing Alpine Orogeny. This study focused on the Hungarian Palaeogene Basin in the Central Paratethys, aiming to characterise the effect of the global cooling event on microfossil assemblages and to reconstruct the palaeoenvironmental evolution of the region across the EOT. The Cserépváralja-1 (CSV-1) drill core was sampled at a ~20-cm spacing and studied using palaeontological and statistical analyses.

The calcareous nannoplankton biostratigraphy was focused on Zones CNE21 and CNO1 (NP 21), which include the Eocene–Oligocene boundary. The base of Zone CNE21 is drawn at the last common occurrences of *Discoaster saipanensis* and *D. barbadiensis*. The first common occurrence of *Clausiococcus subdistichus* may mark the base of Zone CNO1, and the top of *Ericsonia formosa* marks its upper boundary. Using hierarchical cluster analysis, we distinguished five successive assemblages in the studied core section. Our results show that taxa with a preference for oligotrophic and warm surface-waters dominated the oldest assemblage. Above this, at the onset of the EOT, were taxa indicative of oligotrophic conditions, but temperate surface-water. Nannoplankton abundances dropped to their minimum in the third phase, when taxa that were adapted to cool surface-waters gradually became dominant. We interpreted this as a combination of the effects of the cooling climate and local magmatic activity related to uplift of the Alps. A gradual rebound in nannoplankton abundance was observed in the fourth phase. After the end of the EOT, the youngest assemblage included mainly eurytopic taxa, which could tolerate increased fresh-water and terrestrial influxes.

As part of an ongoing project, the studied core was resampled at a lower resolution of an ~34–12 Ma interval, and the biostratigraphy of the organic-walled dinoflagellate assemblages are being studied. Furthermore, using calcareous nannoplankton and dinoflagellate data combined, with co-occurring biomarker distributions, we will be able to reconstruct the sea-surface temperature of the Central Paratethys and provide more information about the primary biomarkers in the marine sediment to support the expanding field of combined micropalaeontology and geochemistry.