FROM EOCENE GREENHOUSE TO OLIGOCENE ICEHOUSE: THE MARINE RECORD OF THE PARATETHYS (EASTERN CARPATHIANS AND TRANSYLVANIAN BASIN, ROMANIA)

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Within the Eocene–Oligocene boundary interval, a global climate deterioration took place, mirrored in the transition from the Eocene Greenhouse to the Oligocene Icehouse. These modifications are associated with major environmental changes (i.e., Cramer et al., 2011; Miller et al., 2020), such as deep-ocean and surface-ocean cooling, ice-sheet growth, and sea-level drop. The Oligocene thus represents a pivotal shift from a tropical to a modern, cooler world, marked in the sedimentary record and biotic turnover.

Various causes of these changes were assumed (Prothero et al., 2003), such as decline in carbon dioxide, tectonics of those times, i.e., India collision to Asian coastline, separation of Antarctica from Australia, and the realignment of Pacific mid-ocean ridge. Concurrently, the Tethyan Ocean split into the Mediterranean and Paratethyan seas.

For investigating the changes spanning the Eocene–Oligocene boundary interval at the onset of the Paratethys, sections from the Eastern Carpathians and Transylvanian Basin were studied. In the Eastern Carpathians, the transition from Eocene turbidites to Lower Oligocene anoxic hemipelagites (comprising brownish marls, clays, and cherts) is accompanied by fluctuations in Total Organic Carbon (TOC) and CaCO3 content, along with shifts of δ13C and δ18O isotope values. Another studied area is placed in the NW Transylvania, where the Eocene carbonate platform was replaced by a hemipelagic anoxic sedimentation in the Lower Oligocene. A similar pattern of δ13C and δ18O isotope fluctuation with the one identified in the Eastern Carpathians was observed. The stable isotope record of the studied Paratethyan successions show a similar trend with the global one, but some regional differences were observed. Probably, the isolation of the Paratethys and the influence of the Alpine orogeny overprinted the global signals.

References

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