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High-resolution integrated Paleoceanographic record from a middle Eocene section in eastern Turkey

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The progressive closure of the Neotethys Ocean had a profound impact on the ocean- climate system during the Cenozoic. In this perspective, Turkey, being located at the gateway between the Neotethys and the Atlantic Ocean, represents a key area for understanding the Eocene climate evolution. Here, we present a high-resolution integrated magnetic, mineralogical, geochemical, and biostratigraphic record of the middle Eocene sedimentary Baskil section from the Elazığ Province (eastern Turkey). The continuous, undisturbed, and undeformed sedimentary record, together with preserved geomagnetic signals and microfossil assemblages, allow to define a detailed age model, which spans from the upper part of chron C19n.1r to the base of chron C17n.1n (42.4–37.8 Ma). A significant increase in silicate minerals combined with a shift in the clay mineral assemblages (smectite dominated) occurs from 40.5 to 40 Ma, which coincides with the time of the Middle Eocene Climatic Optimum (MECO). Thus, indicating a change in weathering regime and an intensification of the hydrological cycle coeval with a higher content of terrigenous input that diluted the biogenic carbonate fraction and was also accompanied by a slight increase in carbonate dissolution. Authigenic palygorskite rises from the middle to the uppermost portion ($\sim$ 40 to 37.3 Ma) of the section indicating favorable conditions in the water column and pore waters for its formation, which was promoted by a change to a warm and arid climate. Ocean circulation changed after $\sim$40 Ma by forming a stratified water column with warmer and more saline conditions at greater depths that might have favored both palygorskite and possibly authigenic dolomite precipitation. The mineralogical variations of the Baskil section reflect how detrital sources and weathering regimes changed in this area during the middle Eocene, and how these changes can be related to global, regional, and local processes. Our results show that the warming peak of the MECO coincides with a negative δ13C anomaly that is also followed by a δ13C increase. Although the mechanisms that triggered these events are not fully understood, they are likely different from those responsible for the most known global warming events in the geological past. We hypothesize that the MECO is related to major re-arrangement in the global oceanic circulation at the Milankovitch time scale.