Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.29392

Terrestrial Sedimentary Records of the Eocene-Oligocene Transition (EOT) in the Lühe Basin: Insights from Sedimentary Facies, Palynology, Biomarkers, and Paleotemperature Proxies

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The Lühe Basin in Yunnan Province, China, provides a unique terrestrial sedimentary record of the Eocene-Oligocene Transition (EOT), a pivotal period of global climate change. This study integrates sedimentary facies analysis, palynology, biomarker data, and paleotemperature proxies to reconstruct the paleoenvironmental changes during the EOT in the Lühe Basin. Sedimentary facies analysis reveals a transition from braided river systems in the late Eocene to lacustrine and fluvial-swamp environments in the early Oligocene, indicating significant changes in hydrological conditions. Palynological data show a shift from subtropical evergreen broad-leaved forests to temperate mixed forests, reflecting a cooling trend during the EOT. Biomarker analysis, including n-alkanes and glycerol dialkyl glycerol tetraethers (GDGTs), further supports a decline in temperature and increased aridity. The combined data suggest that the Lühe Basin experienced a transition from a warm, humid climate in the late Eocene to a cooler, more seasonal climate in the early Oligocene, consistent with global cooling trends during the EOT. This study highlights the Lühe Basin as a key site for understanding terrestrial responses to the EOT and provides new insights into the regional climate dynamics of East Asia during this critical period.