Climate as a Catalyst for Extinction: Insights from the Grande Coupure

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Résumé

The Grande Coupure represents a major episode of faunal turnover in Western Europe around the Eocene–Oligocene boundary, characterized by the decline of endemic European mammals and the influx of multiple Asian mammal clades. The relative roles of climate change versus biotic competition between endemic and immigrant species in driving this turnover remain poorly understood. In this presentation, we investigate the climatic context of the Grande Coupure using two new high-resolution paleoenvironmental records spanning the Eocene–Oligocene boundary, located in southern France and Anatolia. These records are precisely dated through integrated magnetostratigraphy and U–Pb geochronology. We reconstruct hydroclimatic evolution using a multiproxy approach that includes pollen assemblages, stable and clumped isotope analyses, and sedimentary facies interpretation. Both records reveal a coherent and approximately synchronous aridity peak during the late Priabonian (35–33.8 Ma), marked by elevated clumped isotope temperatures and lake regressions. Arid conditions persist into the early Oligocene glacial maximum (33.7–33.2 Ma), though this interval is associated with a regional rise in lake levels, likely driven by cooler temperatures altering lake water balances. Overall, our results demonstrate that, contrary to previous regional paleobotanical syntheses, high-resolution records reveal substantial paleoenvironmental changes across the Grande Coupure. These climatic shifts may have played a critical role in the extinction of endemic European species and set the stage for the establishment of Asian clades.

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Mots-Clés: Paleoclimate, Cenozoic, Biogeography, mammals, glaciation