



Acute Asian cooling across the Eocene–Oligocene transition evidenced by ecosystem restructuring on the Tibetan Plateau

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The Eocene–Oligocene transition (EOT) represents a profound global climatic shift to a cool climate, but detailed environmental responses to this change are not yet well understood. High-resolution, well constrained terrestrial records spanning the EOT are comparatively rare, with most information deriving from the marine realm. Previous studies of Asian terrestrial ecosystems have employed pollen records as a powerful proxy for response to global climatic change in the Eocene. We present an updated and expanded Late Eocene palynological record for the Xining Basin on the northeastern margin of the Tibetan Plateau, that now extends into the lower Oligocene. Together with regionally significant high-resolution palaeoclimatic multi-proxy records, Early Oligocene palynological samples indicate profound ecosystem restructuring consistent with acute cooling and a possible increase in seasonality across Asian environments. Major vegetation turnover is linked to massive Antarctic ice sheet expansion during the EOT and thus suggests global climate may have modulated monsoonal systems driving Asian environmental change.