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Episodic uplifts of the southeastern Tibet Plateau since Neogene contribute to the regional biodiversity

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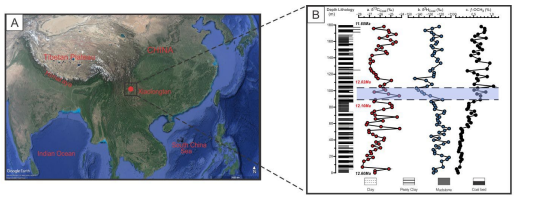


Figure1. Tectonic background settings and the location of the coal seam and bulk coal carbon/hydrogen isotope and methoxyl-related parameters distribution along the coal seam of the Xiaolongtan section.. (A) Topographic map showing the Tibetan Plateau region from Google Earth (B)a. Stable carbon isotopes of the bulk coals (VPDB ‰); b. Stable hydrogen isotopes of the bulk coals (SMOW ‰); c. Methoxyl carbon fraction in coals (%)

The orogeny of the Qinghai-Tibet Plateau represents a significant geologic event with profound implications for the evolution of Earth's ecological systems, whereas the intricacies of the plateau's episodic uplift during the Neogene period remain insufficiently understood. Regarding the Xiaolongtan coal seam located in the southeastern rim of the plateau, our findings indicate that the synchronous excursions of the bulk coal stable hydrogen isotopes, as well as methoxyl content and its carbon isotopes, take place around 12.1 Ma within the coal seam.

Phylogenetic reconstructions of biome and geographic range evolution show that extant temperate alpine flora lineages emerged by the early Oligocene and diversified first in the southeastern Tibet Plateau [1]. In the late Miocene, active tectonic movement and differentiated uplift around the Tibetan Plateau, coinciding with an intensified East Asian monsoon, gave rise to numerous temperate montane flora-dominated small basins rich in organic matter along its southeastern margin. The coal seams rich in organic matter preserve a variety of animal and plant fossils [2-4]. Several small organic-rich basins in the southeastern margin of the Qinghai-Tibet Plateau help to reconstruct the growth and diversity of paleo-vegetation in the region, and establish the relationship between sedimentary tectonic system, climate change and biodiversity development.

Three basins developed with different uplifting stages in the southeastern margin of the Qinghai-Tibet Plateau show a gradient in the percentage of tropical genera and enhanced biodiversity [2]. It is proposed that the episodic uplifts of the southeastern Tibet Plateau since Neogene contribute to the regional biodiversity.

References

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