

Global climate dominating the terrestrial ecosystem evolution in the Lanzhou Basin, NE Tibetan Plateau during the late Paleocene-middle Miocene

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Paleoenvironmental change in Asia during Cenozoic was influenced by global environment change, however, was simultaneously accompanied by prominent regional environment events. How the terrestrial ecosystem response to those factors in this period remains unclear, yet deserves urgent and in-depth study. Lanzhou Basin locates at the northeast margin of the Tibetan Plateau and has deposited thick, continuous fluvial and lacustrine deposits during Cenozoic. In this study, $\delta^{13}\text{C}_{\text{TOC}}$ values of sediments (56.6~15.0 Ma) of Yongdeng section in Lanzhou Basin were obtained, valuing from -27.83‰ to -20.05‰. Combined with sediments C/N ratios and *n-alkanes* carbon distribution, we conclude that the major source of those sediment organic matter is terrestrial C₃ plants. Furthermore, either $\delta^{13}\text{C}_{\text{TOC}}$ or $\delta^{13}\text{C}_{n\text{-alkanes}}$ vary closely with global temperature in negative correlation. We propose that global temperature control sediment $\delta^{13}\text{C}$ values mainly by dominating rainfall volume, with the following effects of water on plants $\delta^{13}\text{C}$ value within the terrestrial ecosystem. That is increasing global temperature bring greater rainfall which can result in lighter plants $\delta^{13}\text{C}$ value while the decreasing global temperature bring less rainfall and finally lead to heavier plants $\delta^{13}\text{C}$ value. Therefore, the increasing $\delta^{13}\text{C}_{\text{TOC}}$ in Lanzhou Basin from 56.6 Ma to 25.8 Ma indicates that the regional climate there has gradually varied from warm and wet to cold and dry, and as the decreasing $\delta^{13}\text{C}_{\text{TOC}}$ during 25.8 Ma and 15.0 Ma shows, a rise in temperature and an increase in rainfall following occur after 25.8 Ma.