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Carbon isotope of soil organic matter varies with temperature along an isoline of mean annual precipitation in China and their relevance to paleoprecipitation reconstruction

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Carbon isotope composition ($\delta^{13}C$) of bulk organic matter in sediments has been widely used to reconstruct past climate changes. However, the influence of temperature on soil organic carbon isotope has been poorly constrained; this impedes the reconstructions of paleoclimate and paleoecology using $\delta^{13}C$ records derived from sediments. With a considerable temperature gradient along the 400 mm isoline of mean annual precipitation (MAP) in China, the isoline provides ideal experimental sites for studying the influence of temperature on soil organic carbon isotope. In this study, the effect of temperature on surface soil $\delta^{13}C$ was assessed by a comprehensive investigation from 27 sites across a temperature gradient along the isoline. No significant relationships are found between surface soil $\delta^{13}C$ and mean annual temperature (MAT) and summer mean temperature (SMT) across the gradient; this suggests that temperature did not play a role in soil $\delta^{13}C$. Although latitude and longitude are related to soil $\delta^{13}C$, environmental factors including temperature, precipitation, altitude, latitude, longitude in total account for only 9% variability in soil $\delta^{13}C$. Based on the finding obtained in this present study, we evaluated 2 samples of the previous paleoprecipitation reconstructions, and conducted a sample reconstruction of paleoprecipitation at the western Chinese Loess Plateau during the Last Glaciation.

Biography

Yufu Jia is currently pursuing his PhD at China Agricultural University, Beijing, China. He focuses on climate and environment changes using stable carbon isotope and radiocarbon isotope in plants and soil. He is working in Guoan Wang's team now.

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