

$\delta^{13}\text{C}$ of snail shells indicating the paleoenvironment fluctuation in Chinese loess sequences

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Previous research has shown that the snail shells developed in continental loess and soil sequences are a good source of information for studying periodic paleoclimatic changes [1]. The variations in chemical characteristics of snail shells have been used as parameters in the paleoenvironment and paleoclimatic reconstruction [2-3]. In this study, a high-resolution measurement on the $\delta^{13}\text{C}$ of snail shells was applied to reveal the temporal variations in paleo-vegetation over the last 0.35 Ma in Luochuan section at the Loess Plateau, north China.

Based on the equation provided by the reference 4, the C_4 vegetation contents at Luochuan area were calculated from the $\delta^{13}\text{C}$ of snail shell (*Pupilla* cf. *cryptodo*) and increased from 40% at the beginning of L_4 (0.35 Ma BP) to 60% at the Last Glacial Maximum (0.018 Ma BP), denoting that the precipitation in Luochuan areas decreased gradually during the past 0.35 Ma. Comparing with the $\delta^{13}\text{C}$ of pedogenic carbonate at the same depth, we point out the decreases of precipitation is induced by the temporally intensified winter monsoon. Still, results showed that there is a systematic deviation in $\delta^{13}\text{C}$ between the aragonite in snail shell and calcites in pedogenic carbonate. Such deviations are suggested to be caused by the difference in isotopic fractionation mechanism associated with different crystallization process in different phase of calcium carbonate. The conclusions also confirmed the previous study focused on the malacofauna analysis, which indicating the winter monsoon intensified gradually since 0.11Ma BP at Luochuan area [5].

References

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