

The Potential environmental implications of sediments from the Gongga Mountain of Sichuan Basin, China

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Our study aimed to understand the geochemical characteristics of subalpine and alpine ecosystems in this region through measuring the sediments carbon isotope composition and lipid biomarkers. In this study, abundant n-alkanes and n-alkan-2-ones were identified by GC/MS/MS in 22 surface soils collected across different altitude zones from 4,600 m to 6,700 m along the eastern slope of Gongga Mountain, China. These extracts contained C₁₁-C₃₃ n-alkanes and C₉-C₃₃ n-alkan-2-ones with a predominance of odd carbon numbers in long-chain n-alkanes and long-chain n-alkan-2-ones, both with a maximum at n-C₂₇ or n-C₂₉, suggesting they were derived mainly from terrestrial higher plants, however the short-chain n-alkan-2-ones with a maximum at n-C₁₇ or i-C₁₈ (phytone, 6,10,14-trimethylpentadecan-2-one) showed no odd-even predominance, suggesting they were derived mainly from bacteria and algae. Therefore, generally these results suggested that organic matter in Gongga Mountain was derived from mixed sources, including bacteria, algae and terrestrial higher plants. In addition, the source rock potential and paleoenvironment of the sediments, were determined by Rock-Eval and stable carbon ($\delta^{13}\text{C}$) analyses. TOC, S₂, and hydrogen index (HI) values showed a good organic richness in the soil samples. Moreover, an immature state for all the samples was inferred based on the Rock-Eval and biomarker parameters. The lower $\delta^{13}\text{C}$ org values indicated that C₃ plants were the dominant input. HI, Tmax and $\delta^{13}\text{C}$ results revealed that all samples were characterized by a mixture of amorphous organic matter (Types II - III) with relatively high percentages of terrigenous organic matter.

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