Geochemical characteristics of sediments from the Mount Gongga of Sichuan Basin, China: Potential environmental implications

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Our study aimed to understand the soil geochemical characteristics of subalpine and alpine ecosystems in this region through measuring the soil carbon isotope composition and lipid biomarkers in Gongga Mountain. In this study, abundant n-alkanes, n-alkan-2-ones and fatty acids were identified in 22 surface soils collected across different altitude zones from 4600 m to 6700 m along the eastern slope of Mount Gongga, China. These extracts contain C_{11}-C_{33} n-alkanes and C_9-C_{33} 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*-C_{27} or *n*-C_{29}, suggesting they were derived mainly from higher plants, however the short-chain n-alkan-2-ones with a maximum at *n*-C_{17} or *i*-C_{18} (phytone, 6,10,14-trimethylpentadecan-2-one) showed no odd-even predominance, suggesting they were derived mainly from bacteria. In addition, there was a strong even-carbon-number predominance of fatty acids (*n*-C_6- *n*-C_{18}), with a maximum at *n*-C_{16}. These results suggest that organic matter in sediments was derived from mixed sources, including bacteria, algae and terrestrial plants. The source rock potential and paleoenvironment of the soil sediments in Gongga Mountain, were determined by Rock-Eval and stable carbon ($\delta^{13}C$) analyses. TOC, S_2, and hydrogen index (HI) values suggest a good organic richness in soil samples. Moreover, an immature state for all the samples is inferred based on the Rock-Eval and biomarker parameters. The lower $\delta^{13}C$ org values indicated that C_3 plants were the dominant input from 4600m to 6700m.

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