Title:	Apportioning sedimentary organic matter sources and its degradation state: Inferences based on aliphatic hydrocarbons, amino acids and δ15N
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Abstract:	The sources and state of sedimentary organic matter (SOM) in fresh water aquatic systems are important to understand the carbon cycling in terrestrial environments. The composition of organic matter in the lake sediments demonstrates the physical and chemical condition of the lake ecosystems. However, the systematic and structured investigations focussed on to understand the source and fate of organic matters within eutrophic lakes is still far from clear. The present study is focusing on the implications of amino acids (AA), aliphatic hydrocarbons and bulk geochemical (C/N, δ15N) proxies to understand the distribution, sources and state of sedimentary organic matter in Ahansar Lake from Kashmir valley, India. The relatively low C/N ratios along with high AA contents indicate enhanced aquatic productivity in the lake system. Likewise, the dominance of the mid-chain monomethyl alkanes (MMAs), highly branched isoprenoids (HBIs), botryococcenes, steroids and triterpenoids suggest OM sourced from periphyton remains. Furthermore, the presence of C27, C28 and C29 diagenetically altered steroids also reflects a major algal contribution. The spatial variability of Paq demonstrates their applicability as a proxy for the contribution of aquatic vegetation. The ratio of individual amino acids (oxic/anoxic ratio) and low Pr/Ph (pristane/phytane) values indicate anoxic nature of the current depositional environment. This also leads to significant organic matter preservation as revealed by amino acid indices (e.g., degradation index – DI and reactivity index - RI). These data collectively demonstrate the systematic investigation and comprehensive understanding of source of sedimentary organic matters and respective depositional condition via multiple indicators. Overall, understanding the OM molecular composition and its spatial heterogeneity in a lake system is important to better constrain the fate of organic carbon, and assess the pollution risks as well as adopt relevant management strategies.
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