



The n-alkane distribution and nitrogen isotopic composition of surface sediments from Ahansar Lake, Kashmir valley (India): Assessment of organic matter sources and implications for understanding the past environmental changes

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Elemental (TOC, TN, C/N) and stable isotopic ($\delta^{15}\text{N}$) compositions coupled with n-alkane (n-C14–C38) and amino acids (AA) concentrations were measured on various potential organic matter (OM) sources such as aquatic and terrestrial plants, catchment and lake surface sediments from Ahansar Lake, Kashmir valley (India) to disentangle organic matter sources and evaluate their use for paleo-environmental reconstructions. The n-alkane distribution of catchment sediments and modern vegetation indicates a strong odd over even predominance characterized by the presence of higher chain lengths (n-C27 to n-C33), whereas the lake surface sediments show a high contribution (ca. 80%) of short chain (n-C15 to n-C21) n-alkanes derived from aquatic productivity. The spatial variability of n-alkane indices (P-aqueous (Paq) and terrestrial versus aquatic ratio) in Ahansar Lake demonstrate their applicability as proxies for both aquatic and terrestrial contribution. The relatively low C/N ratios with high AA content show the enhanced aquatic productivity of the lake. This also leads to good organic matter preservation as revealed by the amino acid spectra. $\delta^{15}\text{N}$ values are relatively low suggesting ample nitrogen supply from terrestrial sources. This study provides the utilization of coupled molecular organic geochemical proxies and stable isotopic composition to reconstruct past environmental changes from the region.