Title:	Biomarker analysis from a peat sequence to trace the organic matter sources and shift in the palaeoenvironment: A case study from Kedarnath sedimentary succession spanning the last 8000 years, Uttarakhand, India
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Abstract:	The Holocene epoch has witnessed several natural climate variations and these are well encoded in various geological archives. The present biomarker investigation in conjunction with previously published multi-proxy records were applied to reconstruct the organic matter sources forming the peat sequences and shift in the hydrological conditions. The molecular signatures are suggestive of a mixed biotic input that includes prokaryotes, Sphagnum spp. and gymnosperm flora resulting into the formation of the peat and organic-rich layers. The specific markers such as diterpane (ent-kaurane) indicate the contribution of gymnosperms into the formation of peat, whereas the hopanes are signatures of microbial input into the preserved organic matter. The mid chain alkanes viz. n-C 23 and n-C 25 suggest the presence of the typical peat forming Sphagnum moss biota. Previous multiproxy records have revealed the fluctuations in the precipitation pattern in the studied peat succession. Similarly, assessment of n-alkane proxies in the present study enabled retracing changes in the vegetation cover as a response to the shift in hydrological conditions. The low n-C 23 / n-C 31 accompanied with high ACL have revealed the depreciation of Sphagnum biota and prevalence of arid conditions since Sphagnum preferentially grows in humid and waterlogged conditions. The higher ACL values also corroborate this fact since longer chain alkanes are preferentially produced in drier conditions in order to protect the cellular apparatus. Intensified monsoon prevailed from ~4401 until ~7515 cal years BP but with frequent reversals to transient arid periods as revealed by the variability in n-C 23 / n-C 31 , ACL and P aq values during the interval. Alternate weakening and strengthening of the ISM can be inferred during ~3750 and ~2400 cal years BP, respectively. This is followed by a steady phase of diminished strength of the ISM until 369 cal years BP as confirmed by the consistent lower values of n-C 23 / n-C 31 and a concomitant increase in the ACL. Hence, the study testifies the utility of sedimentary biomarkers as an independent and robust tool for reconstruction of organic sources into the formation of peat and the fluctuations in palaeohydrological conditions in a peat-forming depositional system.
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