

Application of compound specific hydrogen isotopes to reconstruct paleoclimate in Antarctica

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Biomarkers have become an increasingly common tool for reconstructing past climate and environmental conditions. Molecular analyses of lipid biomarkers from ocean, lake and bog sediments have been used to reconstruct palaeoclimate change. In particular, alkyl lipids have been extensively studied for palaeoclimatic purposes. This is because alkyl lipids, typical biomarkers of plankton and plants, are relatively resistant to microbial degradation and are abundant in natural environments. Compound-specific hydrogen isotope analysis is a powerful tool for studying the water cycle in modern and past environments. The technique has been applied extensively to palaeoclimate archives to reconstruct past changes in hydrology.

In a recent study, hydrogen isotope ratios of fatty acids were applied to marine sediments collected from the Antarctic margin [1]. The Holocene variation in C18 fatty acid hydrogen isotope ratios was interpreted as a record of meltwater input from isotopically depleted Antarctic glacial ice. In this study, we further explore the applicability of hydrogen isotope ratio analysis of biomarkers as a meltwater proxy by applying the technique to sediment cores collected during IODP Expeditions 374 and 382 in the Antarctic Zone, and attempt to reconstruct Antarctic ice sheet dynamics associated with glacial-interglacial cycles in the late Pleistocene, mid-Pliocene and mid-Miocene.

[1] Ashley et al. (2021) *Climate of the Past* 17, 1-19, doi.org/10.5194/cp-17-1-2021.