

Intricacies of organic hydrogen and carbon isotope proxies for past hydroclimate

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Compound-specific hydrogen isotope (δD) analysis is increasingly being used as a paleohydrological tool [1]. However, there are many other secondary physical and biological (fractionation) factors that can significantly complicate interpretation. Secondly, sedimentary plant-wax $\delta^{13}C$ values may reflect a balance between C3/C4 plant vegetation, but water stress, changes in dominant vegetation and plant-wax production rates, or even carbon source $\delta^{13}C$ contents (in case of aquatic plants), may also influence any sedimentary plant wax $\delta^{13}C$ record. Several compound-specific δD records extracted from lake sediments will be presented covering the last 30,000 years, partially with high resolution. Multiple proxies have been used allowing the best paleohydrological interpretation of these δD records, while we also show that the δD -record has cross-informed about the interpretation of partially confounding compound-specific $\delta^{13}C$ data. In particular, work done on two sedimentary sequences from Thailand will be presented [2,3], as well as from two Southern African wetlands. Moreover, δD records from two paleolakes in Southern Sweden [4] and one in Tristan da Cunha (S.Atlantic) are presented, highlighting δD as a useful tool to trace changing climate conditions, water sources or rainfall amount. The records will also be used to evaluate the suitability of the difference between terrestrially and aquatically-sourced biomarkers ($\Delta\delta D(\text{terr-aq})$) as a proxy for relative humidity.

[1] Sachse et al. *Ann. Rev. Earth Planet. Sci.* 40, 221–249

[2] Yamoah et al. *Quat.Sci.Rev.* 148, 44-53

[3] Wohlfarth et al. *The Holocene* 26, 1875-1886

[4] Muschitiello et al. *Nat Comm.* 6, 8939