Geophysical Research Abstracts
Vol. 14, EGU2012-4936-1, 2012
EGU General Assembly 2012


# An examination of organic molecular compounds of a lake sediment sequence to help explain organic carbon records of climate and environmental changes

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Stable organic carbon isotope ratios ($\delta$13C) of bulk organic matter (OM) are commonly used for environmental reconstructions in lacustrine sediment sequences as a tool for reconstructing palaeovegetation. This interpretation is underpinned by the assumption that variations of bulk $\delta$13C can discriminate between C3 and C4 plant materials and thus infer palaeoclimate change. However, when organic matters are mainly from C3 and freshwater aquatic plants, this method becomes less effective. Therefore, we have conducted a research to analyse organic molecular compounds of a lacustrine sedimentary sequence of a core from Tianyang Maar Lake, which archives OM accumulated under various depositional and climate conditions between glacial and interglacial periods. 80 selected sediment samples were analysed for n-alkanes, $\delta$13C and pollen, aiming to improve the organic geochemistry techniques. The n-alkanes results show some distributional patterns of acyclic hydrocarbon compounds with carbon numbers ranging from C15 to C39. These patterns indicate differences in OM sources and relative contributions from higher and lower plants. The results provide further insight to the variability in the $\delta$13C and pollen records, particularly details of varying contributions from C3 and C4 vegetation, a reflection of changes in climate and depositional conditions.