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Biomarker analysis in 500 kyrs sediment record of Lake Van - potential implications for paleoclimate in eastern Anatolia

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Biomarkers are organic molecules indicative of specific organisms and/or specific conditions such as salinity, oxygen or temperature. Preserved in the sediment, these molecules represent unique tools for investigating paleoenvironments. The biomarker study presented here is part of the ICDP PALEOVAN project. The main objectives are to distinguish between allochtonous and autochtonous organic fractions and to reconstruct paleotemperatures in eastern Anatolia over glacial-interglacial timescales.

Allochtonous and autochtonous organic fractions can be differentiated on the molecular level using lipids typical for land plants and algae. Concentration of fatty acids, sterols and n-alkanes are determined on 60 samples distributed over the entire 219 meters sediment profile. The results are interpreted with the help of the lithostratigraphy and two other proxies measured with a relatively high depth resolution. Total organic carbon (TOC) is indicative of productivity and/or preservation whereas potassium (K) XRF intensity is indicative of detrital input.

Temperature reconstructions are widely performed in marine system using a lipid produced by haptophyte algae, so-called alkenones. Alkenones are found in most of the analyzed samples. In order to find an appropriate calibration curve, equations from the literature are tested on sediment trap material. Obtained temperatures are compared with actual measurements from the water column over the years 2008-2011.