



## Geochemistry of Lake Van pore water and sediment, or How to distinguish climatic from diagenetic signals?

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Lake Van is a terminal soda lake located in a semiarid region (eastern Anatolia, Turkey). Its geographical setting makes Lake Van a superb archive of paleoenvironmental changes. One of the aims of the ICDP PALEOVAN project is the reconstruction of the hydrological and climatic variability in the eastern Mediterranean region and the Near East on glacial/interglacial and millennial time scales.

We applied a multi-proxy approach to distinguish the environmental synsedimentary imprint and the postsedimentary diagenetic changes. Microfaunal evidence, carbonate isotopic composition ( $d^{18}\text{O}$ ,  $d^{13}\text{C}$ ), molecular proxies (BIT, ACE) and isotopic composition of lipid biomarkers ( $d\text{D}$ ) are matched with isotopic and elemental composition ( $d^{18}\text{O}$ ,  $d\text{D}$ , Mg, Ca, Sr, Cl, salinity) of sediment pore-water. An excellent correspondence between these proxies indicates that the elemental composition of pore water in Lake Van does not result from diagenetic changes, but, unlike in many cases known from marine environment, represents to some extent relicts of 'paleolake-water'. On the contrary, the stable isotopic composition of the pore water ( $d^{18}\text{O}$ ,  $d\text{D}$ ) seems to reflect more recent hydrological regime dominated by precipitation/evaporation changes. As salinity and chlorine concentration changes mimic the isotopic composition of biomarkers for the last 140 ka, we use pore-water data to quantify changes in the lake level. Our reconstruction (Tomonaga et al., in review) is in line with previous studies on lake terraces (Kuzucuoglu et al., 2010) and seismic surveys (Cukur et al., 2012) showing a major transgression of up to 105 m with respect to the current lake level during the last interglacial (MIS5e), and a major regression of  $\sim 145$  m at  $\sim 30$  ka BP during the last glacial.

Kuzucuoglu et al. (2010) Formation of the Upper Pleistocene terraces of Lake Van (Turkey). *Journal of Quaternary Science* 25, 1124–1137.

Cukur et al. (2012) Sedimentary evolution of Lake Van (Eastern Turkey) reconstructed from high-resolution seismic investigations. *International Journal of Earth Sciences* 102, 571–585

Tomonaga et al. (in review) Porewater salinity reveals past lake-level changes in the Earth's largest soda lake.