PALAEO-CLIMATIC RECONSTRUCTIONS AROUND LAKE VAN DURING THE LAST 600 KA BP USING MOLECULAR BIOMARKERS AND δD MEASUREMENTS

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Eastern Mediterranean paleoclimatic reconstructions during glacial/interglacial cycles are scarce and their resolution rather poor. Due to its key climatic position and morphometry, Lake Van (38.5°N, 43°E) was chosen in 2010 as the site of an International Continental Scientific Drilling (*Litt et al., 2014a*).

Located close to the border of Iran in Turkey, Lake Van is situated at the crossroad of the atmospheric south-western jet stream and the northern branch of the subtropical high-pressure belt. With a volume of 607 km^3, it is considered the fourth largest terminal lake and the largest soda lake of the world (pH_{water} of 9.8 and salinity of 22 g/kg). Before 500 ka, a tectonic event isolated the until then endorheic lake. Hence, Lake Van water level reflects the local precipitations to evaporation ratio (p/e ratio), offering a unique opportunity for reconstructing rainwater availability.

A long sediment record was retrieved in 350 m water depth at Ahlat Ridge (AR; 38˚40'N; 42˚40'E), in the northern edge of the deep central Tatvan Basin. An age-depth model was built using climatostratigraphic alignment, varve chronology, tephrostratigraphy, argon-argon single-crystal dating, radiocarbon dating, magnetostratigraphy and cosmogenic nuclides. The well-constrained composite profile retrieved from Lake Van spans the last 600 kyrs or 15 Marine Isotopic Stages (MIS; *Stockhecke et al., 2014a*).

Sedimentological and palynological analyses revealed changes in water availability and lake-levels, synchronous with the last five glacial/interglacial cycles (*Litt et al., 2014b; Stockhecke et al., 2014b*). These evidences include consistent and repeating patterns of varved clayey silts with high organic matter content and high concentrations of oak pollen during interstadials/interglacials, and $CaCO_3$-poor banded and mottled sediments with low organic matter content and herbaceous pollen during stadials/glacial. Those patterns reflect warm/wet interstadials/interglacials with lake-level rises and oak steppe-forest vegetation, and cold/dry stadials/glacials with low lake-level stands and dwarf-shrub/desert steppe vegetation.

However, questions about the intensities of temperature and hydrological changes during glacial/interglacial transitions remain still to be clarified. To address these questions, hydrogen isotope measurements (δD) were made on C_{29} *n*-alkanes and on C_{37} alkenones, at millennial scale resolution. These compounds have a clear biological source and their δD values can be used for the reconstruction of humidity, salinity and p/e ratio (*Sachse et al., 2012*). δD made on *n*-C_{29} alkanes, which derived from terrestrial plants (*Eglinton and Hamilton, 1967*), showed relatively higher values (≥ -165 ‰) between 90 and 30 ka BP. After

confrontation with recent meteorological data (annual local temperatures and recent values of δD_{precip}), it seems that the temperature is one of the main factor controlling the δDC_{29} values during the last 100 kyrs. However, variations in the source of the supplied moisture and the reduction of the p/e ratio need also to be considered here. In contrast to the terrestrial signal, δD analyses on C_{37} alkenones, produced by haptophytes (δDC_{37}, *Brassell et al., 1986*), provide information on H-isotope composition changes in the water column. The δD_{C37} values varied from -178 to -125 ‰, showing relatively heavy values during colder stages (MIS 6, 4, 3 and 2), similar to the δD_{C29}. This underlies a drier climate during the last 110 ka around Lake Van, probably due to a subtle p/e ratio change. Moreover, it seems that δD_{C29} variations are leading the ones of the δD_{C37}, especially from 90 ka until the Holocene, suggesting regional climatic changes to be first recorded by land plants.

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