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Hydroclimate of eastern Anatolia during Marine Isotope Stage 2: New insights from Lake Van tufa carbonates using carbonate clumped isotopes

YOGARAJ BANERJEE[1], PROSENJIT GHOSH[2], RACHITA GHOSH[2], ÇETIN YEŞILOVA[3] AND CHUAN-CHOU SHEN[4]

[1]Department of Geosciences, National Taiwan University
[2]Indian Institute of Science
[3]Van Yüzüncü Yıl University
[4]National Taiwan University

Presenting Author: ybanerjee15@gmail.com

Lake Van, the fourth largest terminal lake and the largest soda lake on earth, is located on the high eastern Anatolian plateau in Turkey. The region experiences a semi-arid continental climate with cold and wet winters and warm and dry summers. The modern climatology of the region is governed by the strength and position of (i) mid-latitude westerlies, (ii) the sub-tropical high-pressure system, and (iii) the Siberian high-pressure system. The lacustrine sediments of Lake Van have provided valuable insights into the regional climate system (1,2). Mixing of Ca-rich river and groundwater with the lake water promotes calcium carbonate precipitation into this lacustrine system (3). Previous investigation by Yeşilova et al. 2019 provided information about the lake level fluctuations for the last 120 kyr using U-Th dated tufa carbonates. Here we have carried out clumped isotope analysis on a set of samples from Yeşilova et al. 2019 study covering the time span of marine isotope stage (MIS) 2, the latest glacial period. Our study shows a temperature variability of 10-28 °C (±2 °C), while the $\delta^{18}O_{water}$ varies from -6.3 to -0.03‰ (in VSMOW scale). Our $\delta^{18}O_{water}$ record matches with the coeval NGRIP $\delta^{18}O$ pattern. Probable mechanisms governing the hydrological fluctuations, amplitude, and timing of the last glaciation (LGM) will be discussed during the presentation.

Ref: [1] Tomonga et al. (2017), Sci. Rep 7:313; [2] Pickarski and Litt (2017), Clim Past 13, 689-710; [3] Kempe et al. 1991, Nature 349; [4] Ç. Yeşilova, et al. 2019, PPP 533.