Speleothem Records of Glacial/Interglacial Climate from Iran Forewarn of Future Water Availability in the Interior of the Middle East

SEVAG MEHTERIAN[1*], ALI POURMAND[1], ARASH SHARIFI[1], HAMID A.K. LAHIJANI[2], MAJID NADERI[2], PETER K. SWART[1]

[1]Department of Marine Geosciences, Rosenstiel School for Marine and Atmospheric Science (RSMAS), University of Miami, 4600 Rickenbacker Causeway. Miami, Fl. 33149 (sevagmehterian@miami.edu)

[2]Iranian National Institute for Oceanography and Atmospheric Science (INIOAS), Marine Geology Division, P.O. Box 14155-4781 Tehran, Iran

This study presents the first absolute-dated record of climate variability constructed by oxygen isotopes ($\delta^{18}Oc$) from stalagmites in the interior of West Asia (Middle East) that encompass the last interglacial and early glacial periods (73,000-127,000 Before Present, BP) and early Holocene (6,500-7,500 BP). Variations in $\delta^{18}Oc$ of two stalagmites from Qal'e Kord (QK) cave in central NW Iran show significant agreement and follow the solar insolation curve at 30°N closely, indicating the fidelity of these records as climate signals. The stalagmites capture millennial-scale Dansgaard/Oeschger stadial and interstadial events (19-25) observed in the North Greenland Ice Core Project (NGRIP). These observations point to the presence of a strong atmospheric teleconnection between the north Atlantic climate and the Middle East region. Variations in $\delta^{18}Oc$ from QK cave also agree with the main features of Marine Isotope Stage 5 (MIS5), climate reconstructions from Soreq Cave, Israel, and Sanbao Cave in East Asia. This suggests propagation of a pan-Eurasian climate signal via interplay between changes in solar insolation, strength and position of the mid-latitude Westerly Jet, and strength of the Asian Monsoon. More negative $\delta^{18}Oc$ from QK stalagmites are representative of wetter conditions when JJA insolation is at maximum, supporting a hypothesis that winter precipitation should increase in the Mediterranean storm tracks over the interior of West Asia when seasonality is at maximum. This record of water availability from central NW Iran across past glacial cycles suggests precipitation increased with higher solar insolation, an orbital configuration that will not return for another 10,000 years.