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Middle to late Holocene climatic changes in the Dominican Republic, Caribbean Region, deduced from ostracode and coral stable oxygen and carbon isotope values

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The tropical hydrologic cycle plays a critical role in low-latitude climate dynamics as it provides one of the most significant moisture sources globally and has proven to influence high-latitude climate conditions, too. Our ability to predict future environmental changes benefits, therefore, from the understanding of timing and causes of precipitation variations in tropical areas during the past. Records of tropical hydroclimate variability are, however, insufficient in number, distribution, and temporal length and therefore limit the understanding of past precipitation changes in many tropical regions such as the Caribbean region. Also, proxy records reveal whether a coherent, interhemispheric pattern of millennial-scale precipitation variability that is linked to orbital forcing during the e.g., Holocene, or they reflect a more complex signal that is largely attributable to local-regional influences superimposing the large scale oceanic-atmospheric trend.

Our study area, the hyperhaline lake Lago Enriquillo, lies in a semi-arid region and is characterized by strong seasonal contrasts in precipitation, intense evaporation, and severe tropical cyclone impacts resulting in rapid lake level fluctuations and salinity changes. The lake is therefore anticipated to represent an ideal archive of hydroclimate variability recorded by stable oxygen and carbon isotopes ($\delta^{18}O$, $\delta^{13}C$). The present study aims on the understanding of controls on the $\delta^{18}O$, $\delta^{13}C$ composition of ostracode carbonate precipitated in Lago Enriquillo.

Modern ostracodes were collected by surface sediment sampling along different water depths in March and September 2022. Also, lake water was collected for measurements stable isotopes ($\delta^{18}O$, $\delta^{2}H$, $\delta^{13}C_{DIC}$) and major anions and cations. Stable oxygen and carbon isotopic signatures of ostracode valves were analysed of different ostracode species (*Cyprideis similis*, *C. edentata*, *Perissocytheridea cribrosa*, *Thalassocypria* cf. *sarbui*) which have been proven to show seasonal differences in their temporal-spatial distribution.

The results show that the variability of $\delta^{18}O$ and $\delta^{13}C$ values of modern ostracodes is large between the species, which can be explained by differences in spatial variability of the lake isotopic composition, difference in microhabitats, and/or life cycles of the species, but is low between the seasons similar to the lake water. If these data are compared with $\delta^{18}O$ and $\delta^{13}C$ records from fossil skeletal carbonates (ostracodes, corals) of single species and colonies, respectively, a long-term trend of decreasing $\delta^{13}C$ and increasing $\delta^{18}O$ values is shown. The $\delta^{18}O$ record is similar to $\delta^{18}O$ variations of the Haitian Lake Miragoane, which is interpreted to reflect a change from wetter climatic conditions during the early to middle Holocene followed by long-term drying trend in the late Holocene. This variation is explained by orbitally induced (Milankovitch) variations in seasonal insolation which modified the intensity of the annual (hydrological) cycle. Importantly, the trend in $\delta^{18}O$ (and $\delta^{13}C$) of Lake Enriquillo is independent to the considered organism group and whether fully marine conditions or lacustrine conditions prevailed during calcification. This probably results from a long residence time of the lake water of the closed basin lake Lago Enriquillo.

Session: DEUQUA Session: Terrestrial records of paleoenvironments and – climates
Keywords: Holocene, Tropics, lake, stable oxygen isotopes, biogenic carbonates