Paleoclimate reconstruction of volume change in the GSL, UT using δD and $\delta^{18}O$ ratios of brine shrimp chitin

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The isotopic composition of the water in terminal lakes reflects evapoconcentration, preferentially removing light isotopes, of inputs (precipitation, groundwater, and overland flow) leaving behind water enriched in δD and $\delta^{18}O$. In such a simple system, reliable measurements of isotopic change can be used to quantitatively reconstruct volume, which can then be related to changes in climate. Since measurements of water isotopes are scarce and limited to the last few decades, we extend isotopic records using isotope proxies. The δD of algal n-alkanes record only the hydrogen isotopic composition of growth water and are influenced by salinity. The stable isotopic composition of hydrogen and oxygen in chitin, an aminated carbohydrate synthesized by brine shrimp (Artemia), are correlated to the isotopic composition of growth water and food. Brine shrimp thrive in the saline waters of the Great Salt Lake (GSL), located in the Great Basin of the western U.S. We will present a record of δD and $\delta^{18}O$ variations in brine shrimp cysts extracted from sediments of the GSL deposited over the past 8,000 years. Agreement between radiocarbon ages measured on multiple proxies (alkanes, brine shrimp cysts, and bulk TOC) suggest this system is suitable for a multiproxy reconstruction. Future work will include comparison of the chitin record with alkane δD record.