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# Stable Isotopic Variability in Travertine-depositing Streams: Implications for Paleoclimate Interpretations

Suites of water samples (spring - mouth) collected through a 4 year period from Gorman Creek, central Texas, exhibit well-defined trends toward higher isotopic values downflow. Increases downflow of $\delta^{18}O$ values are less than 1 permil and $\delta^{13}C$ values average 2 permil. Water temperature at the spring averages 22$^{o}$C and changes downflow in response to seasonal and diurnal air temperature.

Calcite precipitates exhibit isotopic variability laterally (along flow) and vertically (within the water-column at individual stations). The isotopic values of precipitates are higher downflow (vs. upstream) as well as near the water surface (calcite rafts) compared to those formed on submerged substrates.

Similar trends of higher isotopic values downflow (and near the top of the water column) are known for other travertine-depositing systems, both ambient temperature (Tx, NY, Va, Okla, and NM) and thermal waters (Ariz, Mont, Co, Ca, and Italy). The precipitates in these systems are disequilibrium deposits. Equilibrium oxygen values calculated for theoretical carbonates on the basis of water temperature, in general, are lower than the measured values and this difference is greater for the thermal deposits than the ambient precipitates.

Stable isotopic values in waters and precipitates from central Texas and 14 other travertine systems clearly show variability depending on lateral and vertical positions within each system. On the basis of these trends caution is strongly suggested for paleoclimate interpretations based on ancient travertine deposits. Single sampling sites will not identify the lateral and vertical isotopic variability inherent in these systems.