Multidecadal isotope analysis of *Encelia farinosa* from Death Valley, California

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The isotope ratios of plant tissues contain information of past environmental conditions and climate. However, they also hold information about plant-specific physiological controls that further modify these isotopic ratios. In order to develop proxies of past environmental conditions, we often examine temporally-restricted "snapshots" of isotopic signatures from modern plants. Here, we broaden this modern examination to encompass a nearly 20 year serial collection of leaf wax *n*-alkane hydrogen isotope values and bulk carbon and nitrogen isotope values from leaves of individuals within a monitored population of the drought-deciduous common desert shrub *Encelia farinosa*. Tagged individuals of *E. farinosa* located near Death Valley, California (~35.92°N, 116.50°W, 480 m elevation), were analyzed from an annual collection of leaves sampled in March between 1991 and 2014. A perennial shrub, *E. farinosa* develops leaves and leaf waxes after the region receives the majority of its precipitation from November to March. Collected leaves and leaf wax isotope signals reflected growth conditions and the isotopic signature of winter precipitation with a certain biosynthetic offset. We observed patterns in $\delta^{13}C$ and $\delta^{15}N$ values of bulk leaf tissue and in δD values of *n*-alkanes that may be related to winter precipitation patterns associated with El Niño Southern Oscillation variability in this region. Sampling multiple individuals of the same species at the same location and date over serial growing seasons illustrates how populations of plants respond to and record climate events and refines how these plant materials can be used for paleoecologic and paleoclimatic reconstructions.