Evaluation of Late Pleistocene Ground-Water Discharge Deposits in the Mojave Desert, eastern California

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Ground-water discharge deposits, also called "paleowetland" or "spring" deposits, form in arid environments as water tables rise and breach the ground surface during periods of enhanced effective precipitation. In addition to providing an important water source for local fauna, emergent water tables support hydrophilic vegetation, which in turn acts as a natural catchment system for eolian sediments. The interplay between emergent water tables, ecological and biological systems, and wind-derived sediments results in a unique and complex depositional environment that contains information on the timing (age of deposits) and magnitude (faunal and ostracode assemblages, isotopic data) of past climate change. Spring deposits also clearly demarcate the position of past water tables on the landscape, which provides direct evidence of past hydrologic conditions.

Although much of the Mojave Desert is extremely arid today, during the Late Pleistocene the region supported a large, interconnected lake system, as well as numerous springs and wetland systems. Approximately 130 localities that contain fossil spring deposits have recently been identified in the Mojave Desert by David M. Miller and colleagues during mapping efforts supported by the U.S. Geological Survey. I have chosen three of these localities for study in the initial phase of this project - Valley Wells, Piute Valley, and Fenner Wash. At each locality, the primary goals are to:

- Establish a stratigraphic framework for the deposits
- Determine the ages and rates of deposition of the deposits
- Reconstruct local paleoenvironmental conditions using sedimentology, fossil ostracodes and gastropods, vertebrate remains, geochemistry, and/or stable isotopic analysis

These data and interpretations will then be evaluated to better understand the paleohydrologic response of local spring systems to regional and/or global climate change. The results of this study will also allow us to better understand the magnitude of natural variability in water table elevations in desert biomes in the American Southwest through time, and to improve our understanding of desert response to past climate change in order to facilitate management of this fragile ecosystem in light of future climate change.