

## **Tracking gulf surge moisture using stable isotopes of water vapor**

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There has been a long-standing controversy regarding the oceanic source(s) of atmospheric moisture over New Mexico during the summer months of the North American monsoon. While monsoonal moisture over Arizona has mainly been attributed to periodic “gulf surges” from the Gulf of California, it has been argued that much of this low-level moisture may not reach New Mexico due to obstructing mountain belts in eastern Arizona and western New Mexico. At the University of New Mexico we have developed a system to analyze the stable isotopic composition of atmospheric water vapor. The stable isotopic composition of water vapor is controlled by many variables, including the surface conditions of the oceanic source (e.g., temperature, relative humidity, and wind), contributions from evapotranspiration, rainout history of the air mass, and precipitation recycling. By monitoring the stable isotopic composition of water vapor in central New Mexico for three monsoon seasons (2005-2007), we note variability in the deuterium content of water vapor that at times coincides with gulf surge events in southwestern Arizona. Further air sampling in Arizona during 2006 and 2007 suggests that at least some of the gulf surge events transport moisture into central New Mexico. Quantifying the relative importance and variability of moisture sources during the summer monsoon could be very helpful in validating dynamical models and, ultimately, monsoon forecasting.

**FORECASTING AND QUANTITATIVE PRECIPITATION ESTIMATION**