## Hydroclimatic variability and change in Southwestern North America

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Among the more pronounced regional climate changes projected in the IPCC AR4 assessment (2007) is a trend toward more arid conditions in subtropical latitudes derived from CMIP3 simulations. Southwestern North America is among the regions particularly vulnerable to decreased water availability resulting from such a trend. Observational evidence (Keller and Gutzler, 2011) is shown that this trend is already significant in this region in terms of snowpack and soil moisture decreases over the past quarter century, using a new assimilated land surface data set, NLDAS-2. Downward trends in snowpack and snowmelt date are much more apparent at the margins of snowpack in the land surface data set than at higher elevations where direct in situ measurements are more numerous. Corresponding downward trends in spring season soil moisture, and associated surface fluxes (decreasing latent flux and increasing sensible flux) are also present in the land surface data. These trends are much more pronounced in the land surface data than in maximum snowpack or precipitation data, indicating that the strong temperature trends apparent in Southwestern North America during this period are driving the land surface variations, a result consistent with other assessments. We will describe a preliminary analysis of CMIP5 simulations, following the numerous analyses of CMIP3 output on drying trends across Southwestern North America. We plan to validate global models using the late 20th Century assimilated data, and revisit the projections of 21st Century drying trends across the Southwest that emerged from CMIP3-based research.