# *A comparison of groundwater storage using GRACE data, groundwater levels, and a hydrological model in California's Central Valley*

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The Gravity Recovery and Climate Experiment (GRACE), a NASA satellite sensor, measures changes in total water storage (TWS) and may provide additional insight to the use of well-based data in California's Central Valley, an important agricultural region. Under current California law, well owners are not required to report groundwater extraction rates, making estimation of total groundwater extraction difficult. As a result, other groundwater change detection techniques must be used. GRACE was used to map changes in TWS between October 2002 and September 2009 for the three hydrological regions (the Sacramento River Basin, the San Joaquin River Basin, and the Tulare Lake Basin) encompassing the Central Valley aquifer. Net groundwater storage changes were calculated from the changes in TWS for each of the three hydrological regions and by incorporating estimates for additional components of the hydrological budget including precipitation, evapotranspiration, soil moisture, snow pack, and surface water storage. The calculated changes in groundwater storage were then compared to simulated values from the California Department of Water Resource's Central Valley Groundwater-Surface Water Simulation Model (C2VSIM) and their Water Data Library (WDL) Geographic Information System (GIS) change in storage tool. Downscaling GRACE data into 21 smaller Central Valley sub-regions included in C2VSIM was also evaluated. This work has the potential to improve California's groundwater measurements and existing hydrological models for the Central Valley.

***Biography:*** Michelle Newcomer is the student manager of the NASA Ames DEVELOP program at NASA Ames Research Center. Michelle runs a student internship program that provides 18 internships per year to students across the country. Michelle is also currently a graduate student at San Francisco State University in the Department of Geosciences earning a Master of Science degree in Geosciences. Her academic interests range from hydrogeology, including analyzing recharge, understanding processes of water flow, and her thesis work is analyzing recharge for low-impact design rain gardens in San Francisco. Michelle is also interested in remote sensing and Geographic information systems as demonstrated by her work with NASA. Currently the team at NASA is assessing groundwater changes in California's Central Valley using the NASA GRACE satellite.