

Groundwater Caused Surface Deformation in Central Valley, California Monitored by Multiple Space-geodetic Techniques

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ABSTRACT:

In Central Valley of California the groundwater depletion causes significant land subsidence, in particular during the dry years from 2007 to 2009. Such a mass loss and land subsidence are detected by multiple space geodetic techniques, saying gravity (GRACE), GPS and InSAR. The consistency of observed patterns between GRACE, GPS and InSAR indicates that such a pattern is likely signal rather than noise. Comparison with the hydrological data (rain record, water storage of reservoir, surface runoff, water surface elevation of water wells) further indicates that such a pattern is caused by the ground water depletion. The combination of multiple space geodetic techniques provides an effective monitoring system to detect and quantify the groundwater storage variations. We will discuss the observed patterns and give our explanations.