

## Monitoring Global Freshwater Resources with GRACE

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Freshwater resources include surface waters, groundwater, and seasonal snowpack. Given adequate ground based measurements, all of these can be monitored effectively, however, outside of the developed world such measurements often are not systematic and the data not centralized, and as a result reports of freshwater availability may be largely anecdotal. Even in the developed world it can be difficult to quantify changes in groundwater storage over large scales. Owing to its global coverage, satellite remote sensing has become a valuable tool for freshwater resources assessment. In particular, the Gravity Recovery and Climate Experiment (GRACE) has demonstrated an unequaled ability to monitor total terrestrial water storage including groundwater at regional to continental scales. In this presentation we will identify apparent trends in terrestrial water storage observed by GRACE over the past nine years and attempt to explain their origins and predict whether they are likely to continue. Trends in certain regions where groundwater extraction has significantly depleted aquifers, including northern India and California, will be discussed in detail.