



## **A new hybrid method towards improving hydrological-induced vertical deformation estimation from GRACE and a hydrological model: An exploration into Central North America**

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The Gravity Recovery and Climate Experiment (GRACE) satellite observations are extensively used to model water mass loading in Global Navigation Satellite System (GNSS) position time series at global and regional scales. While various filtering techniques are quite effective in reducing noise in GRACE Total Water Storage (TWS) data, they can damp geophysical signals and change their size and shape. To account for these effects, we describe a new hybrid approach which combines the spherical harmonic approach and the Green's function approach, improving the estimate of the elastic response of Earth's crust. The proposed hybrid approach offers a flexible opportunity to combine TWS data from GRACE, with limited spatial resolution and a hydrological model with more detailed spatial resolution, allowing a better fit with GNSS height time series. We use the new approach to investigate vertical crustal changes in the continental interior of North America, a region that is experiencing spatially variable stress due to variable fluid loading.