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## Applications of satellite remote sensing for hydrologic studies

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Various satellite geodetic instruments have been used with their own advantages and disadvantages to quantify terrestrial water dynamics. For example, satellite radar altimeter, which was originally developed for ocean circulation studies, has also been successfully used to observe water height changes over rivers, lakes, and wet-lands. However, it is a nadir-looking one-dimensional profiling instrument, and thus the satellite ground track must intersect with the water bodies. On the other hand, Inter-ferometric Synthetic Aperture Radar (InSAR) has been a unique technique to map two-dimensional water height changes beneath flooded forests between SAR acquisition dates with high spatial resolution (~40 m). However, InSAR can provide only spatially relative water height changes, and thus it requires a vertical reference to retrieve absolute water height changes. The Gravity Recovery and Climate Experiment (GRACE) mission has also been extensively used in many areas of hydrologic studies. GRACE has been successfully used to reveal Terrestrial Water Storage (TWS) changes, in terms of total changes in water stored in surface, soil, and ground water reservoirs, over large river basins. However, GRACE also has its own limitations, including its coarse spatial resolution (>300 km half wavelength) and its inability to separate a vertical structure of a TWS change into individual components. In this paper, we have discussed how we can integrate different types of satellite remote sensing observations to characterize and quantify terrestrial water dynamics in large river basins.

### Biography

Hyongki Lee from civil and environmental engineering is specialized in hydrologic remote sensing. His research interest spans from tackling fundamental science questions to implementing practical applications, including quantifying terrestrial water stores in large river basins and predicting floods in trans boundary river basins using satellite data. He has published 15 peer-reviewed articles as worked as a Co-author at top-ranked journals. He has been a recipient of NASA's new investigator award.

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