



## **High frequency temporal Earth gravity variations detected by GRACE**

### **satellites**

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High frequency temporal gravity variations on sub-monthly time scales are caused by Earth's surface mass variability, basically caused by tides and non-tidal atmospheric and oceanic motions. Using high-precision satellite-to-satellite ranging between two GRACE satellites, it becomes possible to monitor globally high-frequency temporal gravity variations with a considerable temporal and spatial resolution. A time series of Earth gravity models up to spherical harmonic degree and order 10 with daily resolution has been produced for the period 2003, July 2 to Sept. 30. While the solid Earth, ocean and atmosphere tidal potential induced force models are applied during processing, non-tidal variations in the gravitational potential can be recovered from the time series. Comparisons between the daily gravity field solutions and geophysical model predicted gravity variations prove that GRACE is able to trace geophysical signals at short time scales, and that these 'observations' can be used to validate model predicted large-scale atmospheric and oceanic mass re-distributions.