



## **Mass fluxes of the Earth from GRACE**

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Techniques to estimate regional time-variable gravity fields from GRACE low-low tracking data have been demonstrated in order to enhance both spatial and temporal mass flux signals. Here we show a number of geophysical applications of one technique, with some first-of-the-kind results, to observe tides underneath Antarctic ice shelves, hydrologic fluxes in the Amazon and polar regions, and the analysis of the coseismic displacement caused by the Mw=9.2 Sumatra-Andaman undersea earthquake in 2004. The multi-monthly GRACE gravity solutions before and after the earthquake showed that the coseismic displacement yielded permanent changes in gravity and geoid with a magnitude of a few tens microGal and several mm, respectively, and with a spatial scale of thousands of km. These observations are compared and validated with available models or in situ observations.