



Post-seismic signatures of the Sumatra December 2004 and March 2005 earthquakes from GRACE satellite gravity

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The GRACE satellite mission has been measuring the time variations of the gravity field at 400 km resolution since 2002. Those temporal variations are mainly due to the mass displacements within the Earth's fluid envelopes, but also arise from local mass redistributions associated with large earthquakes. Those local variations can be isolated and enhanced applying wavelet analyses to gravity field variations stacked over varying periods. Following this approach, we evidence a clear post-seismic signal associated to the Sumatra 2004 and 2005 earthquakes, with an important relaxation in the Indian Ocean, west of the trench. We interpret the observed gravity variations and discuss their geodynamic implications by comparing the observations with the signal predicted from afterslip and visco-elastic relaxation models. Finally, this study shows the importance of satellite gravity as a complement to the surface geodetic and geophysical networks for understanding the seismic cycle.