



## **On the recovery of the gravity signal from the Sumatra-2004 earthquake using GRACE satellite gravity data**

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Studying of the global temporal variations of the Earth gravity field became possible recently thanks to the new satellite mission GRACE, launched in March 2002. Monthly gravity models starting from April 2002 are now available, with a resolution of about 300 km. In this context, the goal of our study is to investigate whether GRACE data can be used for recovery of the gravity signal from Sumatra earthquake and recognition of the best-fitting model among a number of equivalent models suggested by seismologists.

In our study (Mikhailov et al., EPSL 2004), we developed a statistical signal recognition technique to identify signals caused by displacement of unknown magnitude on fault planes of given position and dimension. We showed that gravity field variations caused by large earthquakes such as the Alaska 1964 or Chili-1960 could be recognized in GRACE data at the present-day GRACE accuracy level. We also showed that GRACE data permit to constrain the fault plane parameters at the present level of GRACE accuracy.

We calculated the gravity effect associated with different seismological fault plane models for the Sumatra earthquake. Vertical displacements were obtained using edge dislocation in an elastic media. Comparison of the gravity signal with accuracy of the

current GRACE models showed that the gravity signal associated with Sumatra-2004 earthquake can not be recognized visually, but can be extracted using our statistical signal recognition technique. We also obtained statistical estimates of the probability to recognize the “true” fault-plane model from the set of equivalent seismological models using the GRACE gravity data.

The main features of temporal variations of the Earth gravity field in GRACE data for the period April 2002 – July 2004 will be also discussed.