



Gravity Changes Associated with the 2004 Sumatra-Andaman Earthquake: Comparison between GRACE data and SNREI Models

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Gravity change associated with the 2004 Sumatra-Andaman earthquake have been widely studied using GRACE satellite gravity data sets. Han et al. (2006), for the first time, revealed a ± 15 -microgalileo gravity change using GRACE level-1 data sets and compared the result with a theoretical value calculated by an elastic half-space model. Ogawa and Heki (2007) discussed postseismic gravity changes in connection with mantle water flow. On the other hand, Sun et al. (2006) enable us to calculate the gravity changes associated with coseismic deformations by spherical dislocation theory in the flame work of SNREI (a spherically symmetric, non-rotating, perfect elastic and isotropic Earth model). In this study, we therefore compare the gravity change revealed by GRACE data with model calculations based on the dislocation theory.

We employed about 30 months GRACE level-2 data sets and estimated the gravity change as the difference between the average values of before and after the earthquake. In this process, we eliminated the seasonal variations and corrected for nonseismic gravity signals using ocean and land water models. For the theoretical calculations, we employed 1066A and PREM models and two different fault parameters based on seismic wave data (Ammon et al., 2005) and GPS data (Banerjee et al., 2007).

Although the comparison results show that neither PREM nor 1066A models agree with the GRACE observations well, one of the important findings is that the results of

the model calculations are very sensitive to the uppermost layer of the Earth models. This means that GRACE observation can give a good constraint for the studies of the uppermost heterogeneity of the Earth structure.