

Co-Seismic Gravity Gradient Changes of the 2006-2007 Great Earthquakes in the Central Kuril Islands from GRACE Observations

Authors : Armin Rahimi

Abstract : In this study, we reveal co-seismic signals of two combined earthquakes, the 2006 Mw8.3 thrust and 2007 Mw8.1 normal fault earthquakes of the central Kuril Islands from GRACE observations. We compute monthly full gravitational gradient tensor in the local north-east-down frame for Kuril Islands earthquakes without spatial averaging and de-striping filters. Some of the gravitational gradient components (e.g. ΔV_{xx} , ΔV_{xz}) enhance high frequency components of the earth gravity field and reveal more details in spatial and temporal domain. Therefore that preseismic activity can be better illustrated. We show that the positive-negative-positive co-seismic ΔV_{xx} due to the Kuril Islands earthquakes ranges from -0.13 to $+0.11$ milli Eötvös, and ΔV_{xz} shows a positive-negative-positive pattern ranges from -0.16 to $+0.13$ milli Eötvös, agree well with seismic model predictions.

Keywords : GRACE observation, gravitational gradient changes, Kuril island earthquakes, PSGRN/PSCMP

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