Geophysical Research Abstracts
Vol. 19, EGU2017-5129, 2017
EGU General Assembly 2017

Using ocean satellites altimetry to observe geoid change caused by large earthquakes

Hui Lun Chiang (1) and Benjamin Fong Chao (2)

(1) National Central University, Department of Earth Sciences, Taiwan (cathy40502@gmail.com), (2) Institute of Earth Sciences, Academic Sinica , Taipei , Taiwan (bfchao@earth.sinica.edu.tw)

The geoid is the gravitational equipotential surface that is closest to the shape of the real earth. Sea water, being fluid, flows to a lowest gravitational state such that the mean sea surface conforms to the geoid, while the dynamic height departure between them are caused by tides, winds, ocean currents, and other dynamic or even anthropogenic effects. Here we use the sea surface height data, from altimetry satellites of Topex/Poseidon, Jason-1 and Jason-2 to detect possible geoid changes due to three recent large earthquakes, namely the Sumatra-Andaman event of December 26 in 2004, Chile event of February 27 in 2010 and the Tohoku-Oki event of March 11 in 2011. Instead of applying directly the gridded sea surface height data processed by AVISO, we download the "along-track" altimetric data in the respective regions to take advantage of their detailed information content and higher resolutions. With the data, we constructed for 1-year each the pre- and post-seismic sea surface height maps in order to detect the coseismic geoid changes, and analyzing longer time series for postseismic phenomena. We found moderate geoid change signals that are above the noise level. We compared them with the observed geoid change from the GRACE satellite data and with those calculated by elastic dislocation theory given seismic rupture models. The comparison is encouraging and promises further studies.