



Analysis of Coseismic Fault Slip Models of the 2012 Indian Ocean Earthquake: Importance of GPS Data for Crustal Deformation Studies

Endra GUNAWAN¹, Putra MAULIDA², Irwan MEILANO^{2,3},
Masyhur IRSYAM³, and Joni EFENDI⁴

¹Graduate Research on Earthquake and Active Tectonics, Faculty of Earth Science and Technology, Bandung Institute of Technology, Bandung, Indonesia
e-mail: endra@lppm.itb.ac.id

²Geodesy and Geomatics Engineering, Faculty of Earth Science and Technology, Bandung Institute of Technology, Bandung, Indonesia

³Research Center for Disaster Mitigation, Bandung Institute of Technology, Bandung, Indonesia

⁴Geospatial Information Agency, Cibinong, Indonesia

Abstract

Based on continuous GPS data, we analyze coseismic deformation due to the 2012 Indian Ocean earthquake. We use the available coseismic slip models of the 2012 earthquake, derived from geodetic and/or seismic waveform inversion, to calculate the coseismic displacements in the Andaman-Nicobar, Sumatra and Java. In our analysis, we employ a spherical, layered model of the Earth and we find that Java Island experienced coseismic displacements up to 8 mm, as also observed by our GPS network. Compared to coseismic offsets measured from GPS data, a coseismic slip model derived from multiple observations produced better results than a model based on a single type of observation.

Key words: the 2012 Indian Ocean earthquake, coseismic deformation, GPS displacement.