Geophysical Research Abstracts, Vol. 7, 05783, 2005
SRef-ID: 1607-7962/gra/EGU05-A-05783

Directivity of large seismic wave caused by 2004 Sumatra earthquake based on the high-frequency GPS data

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We investigated directivity of large seismic wave caused by 2004 Sumatra earthquake based on high frequency GPS data. The 3 November 2002 moment magnitude 9.0 west coast of northern Sumatra earthquake generated large Tsunami, more than 160,000 people were killed by these disasters [USGS., 2005]. Yagi [2004] investigated rupture model of this earthquake based on teleseismic bodywave (P-waves) inversion method with ABIC (e.g.Yagi et al., 2003). He divided rupture process into two stages and pointed out the second rupture generated ultra long (several hundred seconds) period seismic wave. Larson et al., (2004) found a good agreement between strong ground-motion records integrated to displacement and 1-Hz Global Positioning System (GPS) position estimates collected more than several hundred kilometers from 2002 Denali earthquake epicenter. In these backgrounds, we processed GPS data using 1-Hz kinematic analysis. International GPS Service (IGS) operated more than 200 GPS stations in all around world for the earth science research (IGS 2004, see http://igscb.jpl.nasa.gov/). Most IGS sites record measurements at 0.033 Hz, however, several sites record with1-Hz sampling. We selected 5 GPS sites (YOGY, IISC, DGAR, BAN2, MEDN) for the kinematic GPS analysis around rupture area in this earthquake. Due to the limited number of 1-Hz GPS stations, however, we found directivity of rupture process in this earthquakes based on the high-frequency GPS data.