

Geodynamics Analysis of Sumatra before and after the 2004 Sumatra-Andaman earthquake from Satellite Altimetry and Tide Gauge

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Satellite altimetry is one of alternative method to studying geodynamics of the earth from space by measuring the distance between the satellite spacecraft and sea surface. The TOPEX/Poseidon satellite has a long record data covering almost all the sea including at Sumatra area. Tide gauge is also a good recording tool to measure the sea surface height (SSH) relative to land. By comparing the SSH from T/P and tide gauge data in one GPS reference system, we get the geodynamic condition of Sumatra area.

The MGDRB TOPEX/Poseidon data (1992-2005) is used in this research, and corrected by dry troposphere, wet troposphere, ionosphere and electromagnetic bias. 4 tide gauge stations, Sibolga (1989-2005), Belawan (2004-2005), Panjang (1989-2005) and Bengkulu (2004-2005) have a sea level rise -0.4 cm/yr, -11 cm/yr, -0.8 cm/yr and -12 cm/yr respectively. Two campaigns of GPS measurement in bench mark of tide gauge is used as a leveling reference of tide gauge data. The SSH height in Sibolga from tide gauge record shows unstable record after 1998 and rising up until 2004. The SSH different in Sibolga which is closest station to 2004 Sumatra earthquake source shows an average different of 6 meter in sea surface height from both tide gauge and altimetry data. This is probably caused by tides of the sea, change location of the tide stuff and also noise of altimetry data in coast region.