

SEISMIC AND MAGNETIC IMAGES AT THE SUMATRA-ANDAMAN MEGA THRUST SUBDUCTION ZONE EARTHQUAKE (M_w 9.3)

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The December 26, 2004 Sumatra-Andaman earthquake (M_w 9.3), the fourth largest event ($M \geq 9.0$) in the world during the last 100 years, occurred by thrust faulting at the subducting India plate. The main shock rupture, ~1200 km long and ~200 km wide, propagated from north of Sumatra to Andaman–Nicobar Islands; the slow rupture generated Tsunami which killed about 300,000 people. The mega thrust event was followed by an intense aftershock activity spreading over the rupture area. Seismotectonic processes suggest predominant thrust faulting in the fore arc region, and normal/strike slip faulting in the back arc region, consistent with the regional tectonics. Pre- and Post- earthquake marine geophysics surveys show changes in magnetic (100 – 150 nT) as well as in bathymetry (15-25 m) of the ocean floor. The transient geomagnetic filed variations and the seismic tomography results are reviewed to shed a new light on the regional seismic structures of the Andaman-Sumatra subduction zone. The sediment filled fore arc basin as well as the volcanic arc is well reflected as high conducting and low seismic velocity zone compared to outer non-volcanic island arc. The high conductivity and low seismic velocity are attributed to conducting magma materials and or trapped fluid due to subduction process, and the images revealed the subducting tectonic features.

subduction zone, fore arc, volcanic arc, geomagnetic variation, seismic tomography

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