



## **Spatiotemporal changes of the stress field in the Sunda Arc subduction zone after the 26 December 2004 Northern Sumatra earthquake inferred from inversions of earthquake focal mechanisms**

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The Sunda Arc is one of the worlds major subduction zones. It stretches over a length of more than 5000 km from the Arakan collision in the northwest to the Banda arc in the east. The disastrous magnitude 9 Northern Sumatra event of 26 December 2004 took place at the NW tip of Sumatra, where the rupture started and propagated over a length of more than 1000 km to the north embracing also the Andaman and Nicobar Islands.

In our study we use earthquake focal mechanisms to investigate the stress field in the particular region of NW-Sumatra, Andaman and Nicobar Islands. The final scope of our investigations is to resolve a three dimensional image of the stress field as well as possible temporal changes of the stresses due to the mega event.

For the calculation of the stress field we use moment tensor solutions of the Harvard moment tensor catalogue and apply the inversion method by Gephart & Forsyth (1984). The first dataset comprises 244 moment tensors from the time period before the mega event (1977 to 26-Dec-2004). The second dataset consists of the moment tensor of the 26 December 2004 mainshock and 701 aftershock moment tensors from the time period 26-Dec-2004 to 20-Apr-2006 covering magnitudes between  $M_w = 5.0$  to 8.9.

Up to now, the following results can be inferred from the inversions:

1. The region of NW Sumatra, the Andaman and Nicobar Islands shows a N-S to NNE-SSW orientation of the  $S_1$ -axis, which is in agreement with the NNE directed

subduction of the Indian plate underneath the Burma microplate. Thereby, the stress field is predominantly influenced by the direction of the plate motion, the geometry of the subduction zone seems to have minor influence on the stress field.

2. When comparing the inversion results from the earlier period of the aftershock sequence to the later one, a counterclockwise rotation of about  $30^\circ$  of the azimuth of S1-axis from NNE-SSW to N-S can be observed. If this is merely a temporal change in the stress field or also an effect of the southward migration of the aftershocks in the second period has still to be proved.