



Moho Depth Estimation beneath Sumatera and Mentawai Islands Using Receiver Functions Recorded with a Temporary Array

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The temporary installation of seismic stations in West Sumatera and Mentawai islands in collaboration with UK universities, the British Geological Survey, the GFZ Potsdam, and Indonesian institutions led us to conduct a study on identifying the crustal structure beneath the area mentioned above. The stations consisted of 10 broadband (CMG-3T) and 70 short period (CMG-6T) seismometers and were installed during April 2008 and March 2009. In total, waveforms from 56 teleseismic events with M_w of 6 - 7.7 yielded usable data.

The method used in this study is the teleseismic receiver functions. To estimate the receiver function, we use an iterative deconvolution approach. This approach minimizes the difference between observed seismogram and predicted signals with least-square principle. In order to determine crustal thickness and average crustal V_p/V_s , we employ the $H\kappa$ stacking method by summing amplitudes at predicted arrival times of the Moho Ps conversion phase and its multiples for different crustal thickness (H) and V_p/V_s ratio (κ).

Migrated receiver functions images of the mainland of Sumatera show a clearer reflectivity than those below the island. A negative reflection is obtained below mainland station B50B, due to the location of this station is close to a volcano. An ambiguity exists on the island images, a semi-coherent phase at 50 km might be interpreted as Moho without any geological information. The other shows negative polarity with low consistency. This can be an effect of shallow structure or serpentinization. From the best stacked receiver function images, the average Moho depth is 30 km, varying from 22 to 40 km. Generally, the Moho is deepest under the volcanic arc.