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Moment Tensor Determination of the September 2, 2009 Tasikmalaya, West Java Earthquake Using the Waveform Inversion Method of Near Field Data

The source mechanism of the September 2, 2009 Tasikmalaya, West Java earthquake is not consistent with the characteristic of the tectonic stress in this region in which the strike direction in general parallels to the present-day trench. In fact, the strike of the September 2, 2009 Tasikmalaya earthquake is nearly perpendicular to the trench. We determined the moment tensor using the near field data from the regional network of the Meteorological, Climatological and Geophysical Agency (MCGA) of Indonesia, and from the IRIS-DMC seismic network. The frequency of band pass filter and the velocity structure model are determined by referring to previous study results, as well as by trial and error. The band pass filter and the velocity structure model that produce the smallest variance of 0.2402 is 0.01 to 0.03 Hz and the Jeffreys-Bullen model, respectively. The Green's functions were calculated using the extended reflectivity method for the near field data. Our inversion results show that the earthquake is an interplate earthquake type, which is located at the border around the plate interface at a depth of 44 km. The strike is almost perpendicular to the trench, which may be related to a strong slab pull beneath the region.

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