

Imaging of Central Java, Indonesia: Joint Inversion of the MERAMEX and MCGA Earthquake Data

We used the local MERapi AMphibious EXperiments (MERAMEX) data catalog that consists of 292 events from May to October 2004. The new data of regional events in the Java region were taken from the Meteorological Climatological and Geophysical Agency (MCGA) of Indonesia that consist of 882 events, which have at least 10 recording phases at each seismographic station from April 2009 to February 2011. We have conducted joint inversions of the combined data sets using double-difference tomography. Our tomographic inversions reveal a low velocity anomaly at the Lawu - Merapi zone, which is consistent with the results from previous studies. A strong velocity anomaly zone is identified between Cilacap and Banyumas. We interpret this anomaly as a fluid content material with large aspect ratio or sediment. This anomaly zone is in a good agreement with the existence of a large dome containing sediment in this area as proposed by previous geological studies. A low velocity anomaly zone is also detected in Kebumen, where it coincides with the extensional oceanic basin toward the land. Vertical cross sections of tomograms confirm that the Merapi's magma source is not vertically inclined but comes from the south of Merapi.

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