

1D Seismic Velocity Modelling and Hypocenter Relocation around Central and East Java Region: Preliminary Result

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Central and East Java are part of Sunda Arc which has relatively high seismicity and complex geological system as a result of Indo-Australian plate that subducted under the Eurasian plate. The early stage of seismic tomography study in order to obtain a reliable geometry about the velocity structure beneath the study area is to define the precise earthquake location and 1D seismic velocity model. In this study, we manually picked P- and S-wave arrival time recorded by BMKG network for the time period from January 2009 to September 2017. We determined the hypocenter location around Central and East Java region by using an NLLoc program. We also conducted a velocity inversion using the VELEST program to obtain an updated 1D velocity model in the study area. Afterward, the hypocenters were relocated using the double-difference algorithm and the updated 1D velocity model to improve the accuracy of the hypocenter locations. Our results indicate that the seismicity around Central and East Java is generally distributed in the southern part of the island, such as in the south of Kebumen, Yogyakarta, Pacitan, Malang, and Banyuwangi that associated with the subduction activity. Moreover, the shallow seismicity is probably controlled by the presence of active inland faults, such as Opak Fault and Kendeng Thrust. As further studies, we will determine the focal mechanism of selected events related to the active inland fault in this region and conduct 3D seismic tomography imaging beneath Central and East Java region.

Keywords: Central Java, East Java, Hypocenter Relocation, 1D Velocity Model