

Crustal and mantle velocity structures of the Sulawesi Island from multi-scale seismic tomography.

*Bagus Adi Wibowo^{1,2}, Ling Bai², Supriyanto Rohadi¹, Muzli -¹, Andry Syaly Sembiring¹, Rahmat Triyono¹, Muhamad Sadly¹, Suko Prayitno Adi¹

1. Meteorological, Climatological, and Geophysical Agency, Indonesia, 2. ITP Institute of Tibetan Plateau Research, Chinese Academy of Sciences, China

We did multi-scale seismic tomography in and around the Sulawesi Island, Indonesia, to acquire better seismic velocity structures and to discuss its tectonic implications of the area. We used a regional-scale double-difference tomography method to invert the body wave (P and S-wave) phases of earthquakes from InaTEWS' (Indonesia' s Tsunami Early Warning System) earthquake catalog from 2017 to 2018. The data included some important seismic events occurred in this time period, such as The Palu Earthquake, the West Sulawesi (Mamasa) swarm earthquake and other seismic activity related to tectonic setting among research area.

From Vp and Vs velocity anomalies, we found signs of magmatic activity below volcanoes along the Northern Arm of Sulawesi, the activity of the left-lateral strike-slip fault of Palu-Koro, and signs of upward tectonic activity between lower crust and upper mantle boundary that may have caused the West Sulawesi (Mamasa) earthquake swarm. These findings explained the implication to local tectonic conditions after these significant seismic events and added a more critical understanding of tectonic interaction in lithosphere beneath the Sulawesi Island.

Keywords: Sulawesi Island, seismic tomography, earthquake swarm, volcanoes