The Application of Seismology in Disaster Mitigation and Natural Resource Exploration

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Abstract. Indonesia is surrounded by the subduction zone, where tsunamigenic earthquakes normally occur, caused by the penetration of the Indo-Australian plate beneath the Sunda Land. Earthquake parameters including magnitudes and hypocentres are still used to determine the potential of tsunami occurrences. After the 2004 Aceh megathrust earthquake followed by the destructive tsunami, GFZ-Potsdam has supported the Indonesian government in the development of the tsunami warning system including capacity building of the BMKG staff. Seismology could also be used to understand geological features of a region which is important for exploration and exploitation of natural resources. We show the use of seismic tomography techniques to study the geothermal system in Tarutung, North Sumatra, Indonesia. The accurate seismicity hypocentres and the focal mechanisms were used to investigate the detailed fault structure of the area. In the Wayang Windu Geothermal area, West Java, we used both the induced and the natural seismicity to investigate the changes of the characteristic of geothermal reservoir during exploitation.

Keywords: subduction zone, earthquakes, plate