

Tsunami hazards in East Indonesia: the case of 14 November 2019 Mw7.1 earthquake and tsunami in Molucca Sea, Indonesia

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East Indonesia is characterized by an extremely complicated tectonic setting where a combination of curved subduction zones, submarine and land faults transformed the region to be among seismically active areas of the world. Although the region has experienced a number of deadly tsunamis such as those in 1629, 1674, 1852, and 1899, the tsunami hazard on east Indonesia is not well understood. Very few tsunami researches have been conducted for east Indonesia. Given the high tsunami risks associated with east Indonesia, it is essential that more researches to be conducted on tsunami hazards of this region. In this work, we study the earthquake (Mw 7.1) and tsunami of 14 November 2019 in the Molucca Sea in east Indonesia. Although the tsunami was small, its study helps to understand the characteristics of tsunami propagation in the region and predict potential high-risk areas. Here we obtained teleseismic waveforms of the earthquake and the tide gauge records of the tsunami and performed seismicity analysis to shed light on the magnitude and mechanisms of earthquakes in this area. The source model of the earthquake is extracted using teleseismic records. Tide gauge records showed that tsunami height was a few centimeters along the coastal areas. Tsunami simulations were conducted using our source model, which showed fairly good agreement with observed tide gauge data. We applied the validated tsunami model to study tsunami propagation patterns in the Molucca Sea and identified high-risk areas in terms of tsunami hazards. The results of this study contribute to a better understanding of tsunami risks in east Indonesia.

Keywords: Earthquake, Tsunami, Subduction Zone, East Indonesia, Tsunami simulations