

Possible submarine landslides as sources of the 2018 Sulawesi tsunami

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Tsunami struck coastal areas of Palu bay, Sulawesi Islands after an earthquake of Mw 7.5. Muhari et al. (2018) hypothesized that the tsunami was generated inside the Palu bay based on the evidence of tide gauge station records, videos, inundation distance, damage characteristics from post-tsunami surveys and so on. Furthermore, Arikawa et al. (2018) pointed out that subsidence of coastal areas may have related to tsunami generation, and that the tsunami heights were not high at the mouth of the Palu bay. While Heidarzadeh et al. (2018) reported that the tide gauge records in Palu bay were successfully simulated by the USGS' s finite fault model, they also pointed out the possibility of the submarine landslide, following extremely large tsunamis. In this study we assumed that the recorded tsunami was caused by a submarine landslide. We investigated the possible locations and size of the submarine landslide that could express the waveform at the tide gauge station and the possibility of the tsunami generation at the shallow depth by tsunami simulations.

Results of tsunami simulation showed that it was necessary that tsunami wave source was at the shallow depth to simulate the observed period of tsunami wave. Calculated tsunami waveforms that closely matches the observed waveform was obtained at three locations in the bay. By calculating the landslide source for several fluidities, we reached a conclusion sediments with low fluidity near coastal line was necessary for the landslide source.

Keywords: 2018 Sulawesi earthquake, submarine landslide, tsunami simulation