

Numerical simulation of debris avalanche and tsunami caused by the 2018 sector collapse of Anak Krakatau

*Hideaki Yanagisawa¹, Tatok Yatimantoro²

1. Department of regional Management, Faculty of Liberal Arts, Tohoku Gakuin University, 2. Indonesian Agency for Meteorology, Climatology and Geophysics

On 22 December 2018, a sector collapse was occurred by volcanic activity of the Anak Krakatau in Sunda Strait. The debris of sector collapse rushed into sea area and caused large tsunami that killed more than 400 people. After the collapse, some of Indonesian institutes such as Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG) measured tsunami heights and found more than 10 m heights. In this event, many of data is collected and the data is very important to clarify the physical processes of sector collapse and resulting tsunami. In this study, we simulate the event to clarify the physical processes of collapse and resulting tsunami. We use two-layer model with nonlinear long wave/dispersive wave model for tsunami waves induced by debris avalanche. For the bottom layer of soil mass, manning model/coulomb model are used to compare the effect of constitutive law of models. We assume volume of collapse as 0.2, 0.25 and 0.3 km³. As results of numerical simulations, we found that coulomb and nonlinear dispersive model with 0.25 km³ volume are required to reproduce all evidences of distribution of debris deposit, wave gauges and tsunami heights that observed in this event.

Keywords: Anak Krakatau, Tsunami, Sector collapse, Numerical simulation, Sunda Strait