

Submarine Landslide and Resulting Tsunami on the Continental Shelf Slope off Shikoku

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Submarine landslide occurs mainly due to earthquake shaking damaging marine infrastructure such as submarine communication and causing tsunami. The bathymetry in the Nankai Trough has traces of numerous submarine landslides. One of them is located on the continental shelf 24 km off the Shikoku coast. The submarine landslide off Shikoku would have a potential causing tsunami. Therefore, in this study, with the purpose revealing the topographical features of the submarine landslide off Shikoku in detail, multi-narrow beam surveys were conducted. We also discuss the tsunami potential of the submarine landslide from numerical simulations.

The multi-narrow beam surveys were conducted once in 2017 and twice in 2018 covering an area 30 km x 20 km by a training ship, Kobe University Graduate School of Maritime Sciences Attachment Practice Ship Fukae Maru. The acquired bathymetric map indicated four head scarps neighboring to each other (hereafter scarp A, B, C, D from the west). Sediment deposition was confirmed below scarp A. The scarp A seems to be younger than the other scarps. The slopes collapsed multiple times implying occurrence of a new collapse in the future.

Tsunami calculations were carried out for slump A, B and C. But, from the topographic features, slump B and C were assumed to be a simultaneous collapse. We also assumed new two submarine landslides (slump E and F) to the east of slump D with the same size of slump A. In the calculation results, the tsunamis arrive at about 15 min. after the initiation of slump A and the simultaneous slump B and C. For slump E and F, tsunami arrives at about 20 min. The maximum tsunami heights were estimated to be about 2 m, 2 m, 4.5 m and 5 m for slump A, B-C, E and F, respectively. We are going to conduct more simulations to evaluate risk of tsunami caused by the submarine landslide tsunamis in the study area.

Keywords: The submarine landslide off Shikoku, Tsunami simulation