Simulations of sediment movement for tsunami deposits in Kamoda Pond along the Nankai Trough

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One of the lessons learned from the 2011 off the Pacific coast of Tohoku Earthquake occurred in 2011 is a necessity to investigate the history of the occurrence of past earthquakes and tsunamis as old as possible. In this survey of past earthquakes, tsunami deposits give important information as physical evidence. After the 2011 off the Pacific coast of Tohoku Earthquake, tsunami sediment surveys have been vigorously conducted. Also, sediment movement simulation models for predicting tsunami deposits have been developed by Takahashi et al. (1999, 2000, 2011) and Fujii et al. (1998). However, comparisons between the survey results and the simulation results have been insufficient yet. The authors have compared tsunami deposits in coastal lakes along the Nankai Trough (Okamura et al., 2012) using the sediment transport model (STM) of Takahashi et al. For the source models, we used the largest class Nankai Trough earthquake assumed by the Cabinet Office and the 1707 Hoei earthquake (Furumura et al., 2011). But the difference from the survey results was observed at Kamoda Pond, one of the survey points by Okamura et al. They confirmed tsunami deposits at the sediment layer at two thousand years ago, but the all source models in the simulations didn’t cause any sediment movement in the pond. In this study, therefore, we focused on Kamoda Pond and examined whether tsunami inflow and sediment migration could occur in Kamoda Pond from three viewpoints: a submarine active fault, splay fault, and tsunami database.

The submarine active fault is the Kitan-Naruto strait section of the Median Tectonic Line fault zone, and the splay fault branches from the plate interface near Cape Muroto (Okamura, 1990). We examined whether each fault brings tsunami sediments in Kamoda Pond using STM. Also, from a tsunami database constructed by performing a large-scale tsunami calculation using 3967 earthquake scenarios of Hirata et al. (2017) and high-precision terrain data in the Nankai Trough. Scenarios that bring tsunami to Kamoda Point were searched from the tsunami database.

As a result of the investigation, Kamoda Pond was inundated in the case of considering the splay fault and in 13 scenarios of the tsunami database, in which a large slip area and a very large slip area were located in the area between the Kii Peninsula and Cape Muroto. The Cabinet Office's source model considered as "the largest class earthquake considering all possibilities" may not be the largest in some coast along the Nankai trough. However, we need more investigations to make sure that the Cabinet Office's source models do not inundate to Kamoda Pond by varying calculation conditions such as topography and tide level.

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Keywords: Nankai Trough Earthquake, Sediment Transport software, Tsunami deposits

