

Sediment Transport Modeling due to Tsunamis caused by the Nankai great earthquakes

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Tsunami that comes to the area in shallow water causes massive erosion and deposition of the coastal area. This causes damage such as collapse of coastal structures, burial of routes and blockage of water intakes at power stations. In the 2011 Tohoku Region Pacific Offshore Earthquake, collapses of coastal levees and burial of routes were caused by scouring. Damage caused by sediment transport will be prolonged, affecting recovery activities after the disaster. On the other hand, for disaster mitigations, it is necessary to accurately investigate the earthquakes and tsunamis back to the past as much as possible in order to estimate the maximum size of the earthquake and tsunami. Tsunami sediments are important information in studies of the historical earthquakes. Therefore, we simulated sediment transport using a numerical model developed by Takahashi et al. (1999, 2000, and 2011) for the great Nankai earthquakes.

The first study area is Tachibana-Bay classified as an important port having the rias coast in Shikoku, the southwestern Japan. In the simulation results, erosions were predicted in the straits between the islands, at the tip of the cape, near the estuary of the river and near the coastal levees. Sediment depositions were predicted in the vicinity. The maximum changes in erosion and sediment were about 10 m, about 6 m, respectively, for the great Nankai earthquakes (Mw 9.1). These were about 6 m and about 2 m, respectively, for the 1707 Hoei earthquake.

The other study area is a pond near the Cape Kamoda where tsunami sediment was found in the sediment layer about 2000 years ago (Okamura et al, 2012). However, all simulations we conducted in this study did not deposit sediment into the pond.

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