A numerical analysis for the tsunami sedimentation considering the grain size

\# Yuji Fukuda[1]; Kazuhisa Goto[2]; Fumihiko Imamura[3]

[1] none; [2] DCRC, Tohoku Univ.; [3] Disaster Cntr. Res. Cntr., Tohoku Univ.

A tsunami can erode and transport a large amount of sediments on the ocean bottom. Sandy tsunami deposits, which are formed by the past tsunami events, are preserved in the geologic stratum. Much information (e.g., recurrence interval) of past tsunamis is possible to obtain from these deposits, but their sedimentary process and its relation to the fluid dynamics of the tsunami have not been well understood.

Transportation of sediments by the tsunami may depend on topography, hydraulic force of tsunami, and grain size of sediments. However, relation of these three factors has not been clarified yet. In this study, we firstly conducted a hydraulic experiment for the tsunami sedimentation and erosion by a bore using uniform-sized sands. Based on this experiment, we clarified that the transport mode of sand varies depending on the grain size. We then conducted the numerical calculation of tsunami sedimentation in consideration of the effect of grain size. According to our numerical results, the amount of the bed load sediment transport increased with increasing the grain size, although it decreased with increasing the grain size in the hydraulic experiment. Moreover, our numerical results show that the erosion rate of the sediments is significantly underestimated. In order to solve these problems, it is important to improve the numerical model to be able to reproduce the experimental results.