

Numerical investigation of the relationship between tsunami hydrodynamic features and the distribution of the deposits

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Considering about the magnitude, inundation and damaged area of the paleo-tsunamis is important for evaluating the risks of the low-frequency large-scale earthquakes and tsunamis that might occur in the future (Imamura and Goto, 2007). Sandy tsunami deposits extended to inland is used as evidence of minimum inundation limit of the paleo-tsunami (e.g. Sugawara et al., 2010; Satake et al., 2008) to estimate the earthquake magnitude and focal mechanism of the paleo-tsunami wave source. However, the source model of the 2011 Tohoku-oki tsunami showed unusual fault parameters (i.e. 50 m slip around the trench axis (Geospatial Information Authority of Japan, 2011)) in comparison with the AD869 Jogan tsunami source model. This suggests that if we use the landward extent of the sandy deposits as the minimum extent of the inundation distance of the 2011 Tohoku-oki tsunami, the results may underestimate the actual (observed) inundation distance (Hashimoto et al., 2013). Reconsidering the estimation accuracy such as the tsunami wave source model using tsunami deposits distribution is critically important for future tsunami risk evaluation.

Takashimizu et al. (2012) said that it is important to confirm the relationship between tsunami flow depth and the thickness of the tsunami deposits, so that they investigated the 2011 Tohoku-oki tsunami deposits distribution and flow depth to study relationship of them. Hashimoto et al. (2013) studied the relationship between the distribution of the tsunami deposits, and calculated tsunami hydrodynamic features (maximum flow depth and velocity). However, maximum flow depth and velocity are not necessarily the sole parameters to explain the sedimentation process of the tsunami deposits.

In this study, we reconsider the relationship between the distribution of the tsunami deposits at Sendai Plain and hydrodynamic features such as flux, integral value of the velocity or Froude number.

Keywords: Tohoku-oki tsunami, Tsunami deposit, Sendai Plain, Numerical simulation