Introduction of A Tsunami Source Estimation Database Based on Tsunami Deposits

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Tsunami measures, such as, hazard maps and evacuation plans, are based on tsunami inundation estimations, and reliable estimates require information on paleo-tsunamis. Many paleo-tsunami studies have used historical documents and monuments, as well as tsunami deposits, which contain extensive information on tsunamis. For example, the thickness and grain size of the sand layer are related to the Shields number (non-dimensional tractive force) and the form of sediment transport. However, tsunami deposits have been used mainly to indicate tsunami occurrence, and the associated dynamical information has not been used extensively. In this research, to make better use of tsunami deposits, we developed a database that enables an estimate of the tsunami source that formed the tsunami deposits based on field investigations.

Even if a tsunami deposit is identified in an area, there are many potential tsunami sources that could have formed the tsunami deposits. However, identifying tsunami deposits in other areas caused by the same event helps reduce the list of potential sources. A tsunami sediment transport simulation (Takahashi et al., 2000, 2010) was carried out with multiple tsunami scenarios along the Japan Trench (NIED, 2015), and the distributions of deposition and erosion were estimated along the Pacific coast of Tohoku District. The data on tsunami sources and deposits were stored in the database, and a function to search the related tsunami sources from the tsunami deposits was implemented. The database provides a list of tsunami sources that formed multiple tsunami deposits identified in field investigations. Furthermore, it is also possible to sample the potential area in a field investigation to narrow down the list of potential sources.

Keywords: historical tsunami, Japan trench, sediment transport simulation, multiple tsunami scenarios

