

Estimation of the magnitude of tsunami earthquakes along Japan Trench -Re-evaluation of the 1677 Enpo Boso-oki tsunami-

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Along the Japan Trench, unusual earthquakes sometimes trigger much larger tsunamis than expected from their seismic waves, which were called "Tsunami earthquake". The Enpo Boso-oki earthquake tsunami on November 4th of 1677 killed more than 500 persons was a so-called "Tsunami earthquake". The magnitude of this earthquake and tsunami has been estimated based on the historical documents which were recorded more than three hundred years ago. However, it is difficult to conduct accurate estimation for the magnitude of the 1677 earthquake and tsunami because the documents include ambiguous and insufficient descriptions. The aim of this study is to determine the magnitude of the 1677 earthquake and tsunami integrating the analysis of historical documents, field survey of tsunami deposit and numerical simulation. From field survey in Choshi city, Chiba prefecture, we found the candidate tsunami deposit in the Kobatke pond. Radiocarbon dating and tephra analysis indicated that the sand deposit was formed between AD1100 and AD1700. Based on these results as well as the interpretation of historical documents, we concluded the sand deposits were formed by the 1677 Enpo boso-oki earthquake tsunami. We further conducted numerical simulation to estimate the magnitude of the earthquake and tsunami and the magnitude of the 1677 earthquake was estimated as Mw=8.34. This magnitude is equivalent to that of the 1896 Meiji Sanriku earthquake tsunami which is well known as "Tsunami earthquake". Our results would be very important information to understand the magnitude and nature of "Tsunami earthquake" along Japan Trench.