

Estimation of the paleotsunami size using tsunami deposits along the eastern Nankai Trough

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Repeated great earthquakes (M8 class) and accompanying tsunamis occurred along the Nankai Trough have severely damaged the coastal areas along the trough. In response to the 2011 Tohoku-oki earthquake and tsunami, Cabinet office, Government of Japan came up with a new policy to the damage assumptions for the great earthquake and tsunami generated from this plate boundary. That is, a doctrine that gives serious consideration to the greatest class of earthquake and tsunami, which take every possibility into account, was announced.

The announced "greatest class of earthquake and tsunami" along the Nankai Trough by the Central Disaster Management Council of the Cabinet Office (2011, 2012) has a rupture zone covering the almost entirety of the Nankai Trough (Mw 9.1) and is much larger than formerly estimated one. As this great earthquake and tsunami would hit the area with clustered population and industries, disaster prevention measure for these catastrophes increasingly attracts public attention.

Japanese historical documents cover the past 1300 year records of the great tsunami-inducing earthquakes generated from the Nankai Trough, so called Nankai and Tokai/Tonankai earthquakes. However, M9-class mega earthquake as mentioned above has never reported in this area. In considering whether out-sized earthquake and tsunami announced for the Nankai Trough will do occur or not, it is necessary to verify whether unknown out-sized earthquake has occurred in the geological time scale. Paleoseismological studies including the tsunami deposit researches are also needed to expand the time range of the earthquake and tsunami records beyond the historical documents and to make the reliable and realistic size estimation for the plate boundary earthquakes and tsunamis based on their recurrence history.

In reconstructing the paleotsunami size, it is needed to consider the influence of coastal geomorphic developments in centennial to millennium time-scale. Seaward expansion of alluvial lowland (migration of coast line) and coastal uplift are primary factors for these topographic changes, which can function as "natural barrier" for the tsunami inundation. For this reason, the older tsunami deposits tend to distribute the deeper inland and higher altitude. If the effect of these natural barrier is not considered, there is a risk that will come into the over estimation for the size of paleotsunamis. In considering the effect of natural barrier, tsunami deposits suggesting the out-sized earthquake have not found from the sedimentary sequence formed along the Enshu-nada and Suruga Bay coast in the last 4000-5000 years.

Keywords: Nankai Trough, Tokai earthquake, Tsunami, Tsunami deposit