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Tsunami simulation for the Korean Peninsula using a Nankai-Tonankai earthquake scenario

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There is a Korean historical document which records an observation of anomalous tidal waves at Jeju Island in 1707. The date corresponds to the occurrence of the great 1707 Hoei earthquake (M8.4) which occurred in the Nankai trough off southwestern Japan. This record suggests a possibility that the tsunami waves caused by the Hoei earthquake reached the Korean peninsula. In this study, we investigate whether the tsunami caused by an anticipated Nankai-Tonankai earthquake will affect to the Korean peninsula or not. We conducted a tsunami simulation based on the nonlinear longwave equations with a dynamic rupture scenario that breaks the whole Nankai-Tonankai area as a single event. We used the dynamic rupture scenario computed by Hok et al. (2011, JGR). The simulation shows tiny tsunami arrivals in Jeju Island about 4 hours after the start of tsunami propagation. At 12 points around the Jeju Island and 2 points between China and Jeju, tsunami heights are computed. We obtained larger tsunami heights (˜0.08 m) at the western side of the Jeju than the eastern side (˜0.05 m), and we observed the largest amplitude (˜0.17 m) at the southwestern coast. Also, we found that a larger tsunami wave reaches the eastern coast of China, in contrast to the Korean peninsula. Small tsunami amplitudes are observed at Jeju Island because the first tsunami wavefronts attenuated while turning around Kyusyu Island. This kind of simulation would be useful to understand how tsunamis originating at southwestern Japan propagate to Korea, which will serve for the mitigation of tsunami disasters in the Korean peninsula.

キーワード: Tidal waves record at Jeju Island, Nankai-Tonankai earthquake, Numerical simulation
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