

Tsunami characteristics and sediment deposition in the Primorye coast, Russia, due to the Japan Sea earthquakes: a numerical study

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In this presentation, tsunami heights and periods in the coastal areas of Primorye, Russia, due to the Japan Sea earthquakes, are investigated based on tsunami numerical modeling. In addition, possibility of formation of sandy onshore tsunami deposits is discussed using sediment transport modeling.

The Japan Sea coasts from Hokkaido to Niigata, Japan, have repeatedly been affected by large-scale earthquakes and tsunamis from the eastern margin of Japan Sea, such as the 1993 southwest-off Hokkaido earthquake. Assessment of risks from earthquakes and tsunamis has been carried out over years based on historical materials and geological records. However, geological evidence is still too sparse to reconstruct the recurrence and magnitude of earthquakes and tsunamis in the Japan Sea coasts. Because of the geomorphological setting in the coast, including development of huge sand dunes and extensive anthropogenic land modification, suitable sites for tsunami deposit survey are quite limited in this region. On the opposite coast of Japan Sea, the tectonic and geomorphological settings of Primorye may offer a higher preservation potential of geological records. Recently, Japanese and Russian scientists carried out joint geological surveys in the coastal marshlands of Primorye and discovered sandy event layers from several locations (Ganzey et al., 2015). Tsunamis from the eastern margin of Japan Sea often reach the coasts of Primorye, Russia. For example, tsunami height of 5 m was recorded at the time of the 1993 southwest-off Hokkaido earthquake. The sand layers from Primorye are likely interpreted as the deposits of tsunami origin.

This study investigates the relationship between tsunami generation region in the eastern margin of Japan Sea and the tsunami characteristics in Primorye by means of numerical modeling. Nearshore tsunami heights and periods, as well as onshore sediment erosion and deposition, are examined based on numerical simulations of the tsunami hydrodynamics and sediment transport, to discuss possibility of formation of the sand layers by tsunamis from the Japan Sea earthquakes.

References

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