

Long-period ground motion from large subduction-zone earthquakes at the Japan Trench

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Large earthquakes occurring in the Japan Trench often produce anomalously large and prolonged long-period surface waves at dominant period of about 10-20s. Such long-period surface wave propagates along the Japan Trench with a thick cover of low-velocity oceanic sediments amplify surface waves very efficiently. The surface wave is then propagating into the sedimentary basin converting to longer and larger surface waves. In order for predicting long-period ground motions from shallow subduction zone earthquakes occurring the Japan Trench, realistic simulation model including sea water and oceanic sediments are indispensable for accurate representation of boundary conditions for surface waves. We have been conducted 2D FDM simulation of seismic waves to see the contribution of oceanic sediments and thick sea water layers on the developments of surface waves from a shallow source. The results of computer simulation demonstrate how the surface wave is generating in the shallow source below sea. Such shallow sea event also generating large tsunami as observed during the Meiji Sanriku earthquake in 1896. During the earthquake the level of man-felt shaking was rather mild less than 3-4, but huge tsunami more than 38 m attack the coast of Sanriku.