Reflectivity (discrete wavenumber) method for calculation of nearfield tsunami and seismic waves for horizontally layered media with a sea-water layer

*Hiroshi Takenaka[1], Tomotsugu Watanabe[1], Masanao Komatsu[1], Takeshi Nakamura[2]

1. Department of Earth Sciences, Okayama University, 2. Central Research Institute of Electric Power Industry

We propose a quasi-analytical method for calculating of nearfield tsunami and seismic waves for horizontally layered media including a sea-water layer, based on the reflectivity (reflection/transmission matrices) and the discrete wavenumber summation method. We use a gravitational surface water layer. We derive the Aki-and-Richards-like layer matrix for water layer including gravity and the reflection/transmission matrices for the sea surface and sea floor. This method can simultaneously model all of the seismic waves and static deformation in the solid earth and acoustic and tsunamis waves in sea from sub-oceanic earthquakes. It can also calculate pressure changes in the sea due to acoustic and tsunami waves and dynamic and static sea floor deformation, which may be extracted from the pressure, seismic, acoustic and/or strain (optical) sensor records at the sea floor.

Keywords: nearfield tsunami, gravity, synthetic seismogram, discrete wavenumber method, seismic waves

