Development of the Tsunami Prediction System using fault plane solution of W-phase inversion

*Seolhan You[1], Mikyung Choi[1], Sun-Cheon Park[1], Hye-Won Lee[1], Duk Kee Lee[1]

1. Korea Meteorological Administration

Tsunami is a long-wave caused by earthquakes, submarine volcanoes or coastal landslides. The Korean Peninsula experienced tsunami damage followed by 1983 and 1993 Japan earthquakes. To respond to possible tsunamis in the surrounding seas, the Korea Meteorological Administration has operated tsunami warning system based on tsunami scenario database. Tsunami scenario database was constructed with the results (tsunami height and arrival time) of simulating tsunami assuming virtual earthquakes at each grid point spacing with 0.2˚ interval in surrounding seas of the Korean peninsula(120˚~142˚E, 25˚~45˚N) . Earthquakes were assumed with magnitude 6.0 to 9.0 having intervals of 0.2 on the fault plane which is from known information or which is assumed to generate higher tsunami in the coastal area. Therefore tsunami scenario database has a limitation that does not reflect the characteristics of earthquakes when they actually occur because the fault plane will be different from assumed one.
In this study, we have developed an algorithm for tsunami prediction capable of analyzing fault plane solution using W phase and simulating tsunami using the fault plane information. We tested the performance of the developed algorithm applying into the case of 1993 Japan tsunami. W phase inversion results were as follows: moment magnitude=7.7, depth=25.5km, strike=170.2˚, dip=45.3˚ and rake=77.8˚. As a result of tsunami simulation using the inversion results, the difference between the numerical results (tsunami height and arrival time) and measured data at tide stations was small. Therefore the algorithm for tsunami prediction may be used for tsunami warning as a complement to tsunami scenario database.

Keywords: tsunami, tsunami scenario database, W phase, tsunami prediction system

