Re-evaluation of Probable Maximum Tsunamis for Korean Nuclear Power Plant Sites

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Most of tsunami-triggering earthquakes occur in subduction zones around the Pacific Ocean area including the East Sea surrounded by Korea, Japan and Russia. In the East Sea, there were three major historical tsunami events occurred in 1964, 1983 and 1993. Among them, the Central East Sea Tsunami occurred in 1983, in special, caused huge losses of human lives and property damage at Korean coastal communities.

There are several nuclear power plants under operation and several more plants will be built along the eastern coast of the Korean Peninsula. These historical tsunamis were considered individually to evaluate the probable maximum tsunamis for Korean nuclear power plant sites.

Recently, several catastrophic tsunamis have been occurred around the Pacific Ocean rim. Among them, the East Japan Tsunami occurred on March 11, 2011 has attracted social attention due to the accident at Fukushima Dai-ichi nuclear power plant site. The accident is still going on. Therefore, new approach to evaluate the probable maximum tsunamis for the Korean sites is investigated in this study. Joint rupture of historical tsunami sources and hypothetical tsunami sources is employed to define the new source parameters of the probable maximum tsunami. The hypothetical tsunamis are inferred from the seismic gap theories.

The numerical model using the modified leap-frog finite difference scheme is used to simulate the propagation of the new probable maximum tsunami across the East Sea and the numerical model simulating the associated run-up process of tsunamis is then employed to estimate the maximum run-up heights. Predicted results will be used to make a measure against unexpected tsunami attacks.