

Estimation of tsunami propagation paths using the array analysis of tsunami simulation results

NAKATA, Kenji^{1*} ; MIYAOKA, Kazuki¹ ; KATSUMATA, Akio¹

¹Meteorological Research Institute, JMA

Background

A maximum wave often arrives several hours after a first wave in case of a distant tsunami.
Therefore, it is considered to be important to prepare to monitor the maximum tsunami wave, knowing its propagation path.

Purpose

The purpose of this study is to show the tsunami propagation path in a single figure.

Methodology

Simulated tsunami waveform data are regarded as waveform data of an array observation.
An incoming wave direction for a reference point are determined, estimating semblance values (Neidell and Taner, 1971).
Going back toward the direction of the incoming wave from the reference point.
This process is done repeatedly until the ray reach the tsunami source.
It is a kind of a backward ray analysis.

Result

This methodology was applied to the 2010 Chile earthquake.
The various backward propagation paths from a NOAA DART station near Japan are displayed in a single figure.
It shows that the each wave in the observed waveform at a DART station is associated with the those propagation paths and the waveform is derived from them.

Keywords: tsunami simulation, backward ray analysis, maximum wave, array analysis, propagation path, distant tsunami