Identification of dominant phases as reflected waves in tsunami observed on Pacific Ocean-Application to the 2011 Tohoku Tsunami

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Abstract
Reflectors of tsunami are assumed in the Pacific Ocean and the travel times are calculated on refraction diagrams of the reflected waves in order to explain dominant phases as reflected waves in the following waves of tsunami. The travel times are compared with travel times of large-amplitude phases observed at tide stations and the phase is identified as the reflected wave from the consistency of travel time. The work is repeated for 21 assumed reflectors in the Pacific Ocean. This method was applied to the 2011 Tohoku tsunami. Starting times of the reflected wave were determined from the arrival times of large positive phases in tide gauge records in the neighborhood of the reflector. One to four arrival times between first and maximum waves are considered as possible origin times of reflected waves. Reflected waves from all the assumed reflectors were compared for all the arrival times of dominant phase. The reflected waves were identified for large-amplitude phases recorded at fifteen stations all over the Pacific. As the result almost all the dominant phases were identified as reflected waves from the assumed reflectors. Totally 118 answers of the reflect waves were obtained having the standard deviation of 0.52 hr. The identification of dominant phases as reflected waves recorded in Japan is show in Fig.1.

Keywords: 2011Tohoku Tsunami , Tide gauge records, Pacific Ocean, Reflected Waves, Reflectors

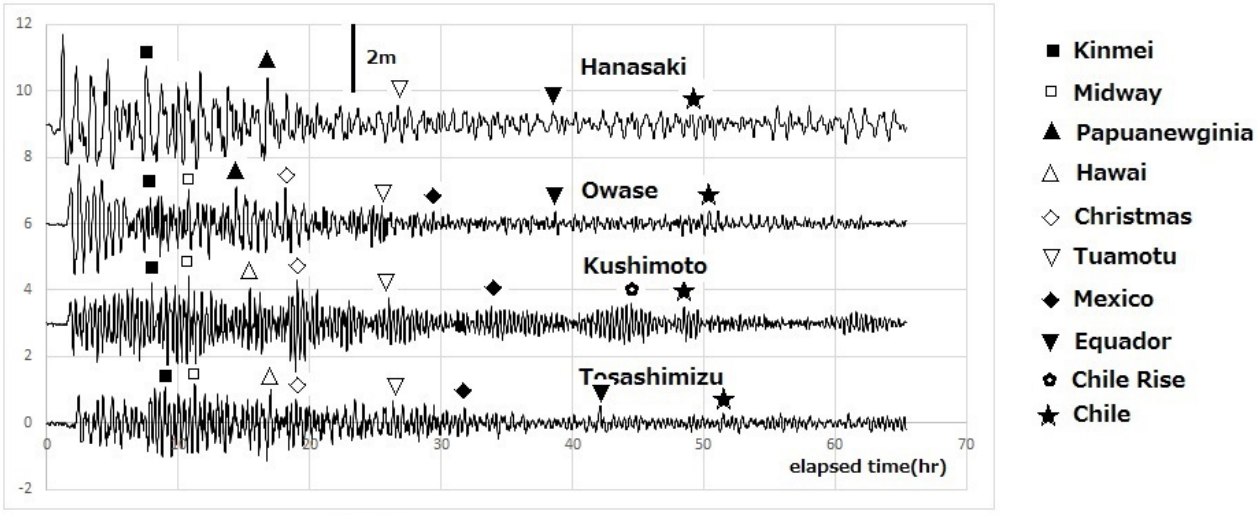

Fig.1

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