

Dominant periods of the 2007 Kuril Tsunami derived from spectral differences between tsunami and background noise

Kuniaki Abe[1]; Shigeki Horiuchi[2]

[1] Niigata Junior College, Nippon Dental Univ; [2] NIED

<http://www.jpogu.org/meeting/>

The 2007 Kuril Tsunami was generated at the continental slope of Kuril islands on January 13, 2007. It was observed at tide stations facing to the Pacific Ocean, and the Sea of Okhotsk in Japan. At that time sea surface had been disturbed by strong wind characteristic to winter. To discriminate the tsunami from the sea level oscillation we used a sea level oscillation before the arrival as the reference and reduced the background spectra. For example we used total sampling time of 6 hours from 5h to 11h (UT) including the arrival time of 5h34m for tsunami and one from 23h (Jan. 12) to 5h (UT) for the background at Hanasaki tide station. Differences of the two amplitude spectra were estimated as the tsunami spectra for 25 stations and a period component corresponding to the maximum amplitude was defined as the maximum dominant period for each station.

On the other hand maximum dominant periods of seiche at bays and ports in this area had been observed by one of authors (Abe, 2005). We obtained the correlation relation between two as shown in Figure 1.

As the result the diagram showed a discrete distribution having three groups of 1, 1/2 and 1/3. Most of them were classified into the first group and it is explained as a resonance to fundamental mode of the proper oscillation. The third group is explained as a resonance to the first higher mode and the second one is explained as the fundamental mode having the node at a middle point of the bay length. The former one is observed at ports facing to outer sea like Hachinohe and Onahama. The latter is observed at curved bays like Owase. Frequently observed dominant periods were also plotted for twenty five stations. As the result three dominant periods are identified: 35, 22 and 15 minutes. From the distance dependence first, second and third ones are waves propagating along the continental shelf, propagating along the trench and propagating radiated toward outer sea, respectively.

