

## Exploration of micro-tsunamis

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On the basis of statistics of tsunamis on coastal tide gauge records, moderate-sized earthquakes with about M6.3 can possibly generate a tsunami, and large earthquakes greater than M7.5 likely generate large tsunamis (Okada & Tanioka, 1998). In literatures, M6 class earthquakes can accompany a small tsunami, but this is very rare case. We are interested in (1) how small tsunami can be generated in ocean? and (2) How small earthquakes can generate tsunamis? Coastal tide gauge records are always masked by background noises other than tsunamis. On tide gauge records we are able to distinguish tsunamis from background noises if amplitudes of the small tsunamis reach 20-30 cm. It becomes difficult for us to do so if tsunami amplitudes are 10 cm or so.

Since 1980's offshore pressure gauges, which are linked with submarine cables or anchored buoys, have been installed on ocean floors in depths deeper than 1000 m [Meteorological Research Institute, 1980; Fujisawa et al., 1986; Gonzalez et al., 1991; Kanazawa and Hasegawa, 1997; Momma et al., 1997; Eguchi et al., 1998]. The resolution of pressure measurements with these pressure gauges goes into an order of small pressure level equivalent to 0.1 mm in water column height, which is much smaller than the lower-limit of tsunami heights observable at coastal tide gauges. Actually, from observations with offshore pressure gauges, small tsunamis with amplitudes from several millimeters to a few centimeters have been identified [Ritsema et al., 2005; Hino et al., 2001; Hirata et al., 2003; Baba et al., 2005], though examples are still a few.

In the source region of the September 26, 2003 Tokachi-oki earthquake (Mw8.0), two ocean-bottom pressure gauges, attached with a JAMSTEC cabled observatory, were being operated since the end of July, 1999 [Hirata et al., 2002]. Fig.1 (top) shows the aftershock distribution (including the mainshock of the 2003 Tokachi-oki earthquake) determined by JMA for over two years after the mainshock. Fig.1 (lower) represents the aftershocks of Mj over 4 (total 429 events). Many aftershocks occurred near the pressure gauges depicted by closed triangles. We expect that substantial fraction of the aftershocks may generate micro to small tsunamis that can be identified with nearby pressure gauge records. Over two years after the mainshock, we prepare continuous but sometimes-intermittent ocean-bottom pressure records from two pressure gauges. In our poster presentation, we are going to report preliminary results of exploring micro-tsunamis, which might occur near two ocean-bottom pressure gauges, by comparing observed time series of both pressure and seismicity.

Fig.1 (Upper) Aftershock distribution (including the mainshock of the 2003 Tokachi-oki earthquake) occurred between 04:50 September 26 2003 and 23:59 September 30 2005, picked up from JMA ftp site. Total number of plotted earthquakes is 24,386. Open squares indicate the seismic stations of JMA, Hokkaido Univ., NIED, and JAMSTEC. Closed triangles show ocean-bottom pressure gauges. (Lower) The same as the upper figure but only earthquakes of Mj greater than 4 are displayed. Total number of Mj greater than 4 earthquakes is 429.

