

Rupture process of the 1952 and 2003 Tokachi-oki earthquakes (2)

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Along the Kuril Trench of the Pacific side of Hokkaido, many destructive earthquakes have occurred. Among those, the hypocenter of the 1952 Tokachi-oki earthquake (41.706°N, 144.151°E, depth: 52 km, JMA) and the 2003 Tokachi-oki earthquake (41.778°N, 144.078°E, depth: 45 km, JMA) were very close and it is highly possible that those two events were recurrent plate-boundary earthquakes.

In our previous study, we performed teleseismic waveform inversion of the 1952 and 2003 events using the inversion code of Kikuchi *et al.* (2003). We showed that the 1952 event had a larger M_w than that of the 2003 event, and rupture processes of those two events were slightly different from each other. In this study, we added some new waveform data of the 1952 event to the dataset and performed teleseismic inversion with the method of Yoshida *et al.* (1996). Moreover, we checked whether the estimated fault plane corresponds to the plate boundary of the JIVSM (Koketsu *et al.*, 2008). We used strike=230°, dip=20°, initial rupture depth=21 km for the 2003 event, and strike=238°, dip=20°, initial rupture depth=17 km for the 1952 event. The assumed fault planes consist of 17x14 subfaults at intervals of 10 km.

For the waveform dataset of the 1952 event, we collected the copies of historical seismograms which were recorded by the seismographs in those days. We digitized them and then resampled them at 0.5 s. Thereafter, we removed the instrument response of the seismograph from the resampled waveforms and bandpass-filtered at 0.01 (or 0.02) ~ 0.2 Hz to obtain the waveform data to be used for the inversion. We used P-waves of 19 components of 11 stations. For the 2003 event, we used the dataset from the IRIS DMC. When we selected the stations, we took care to include the stations which are near to those of the 1952 event. 34 P and SH components of 30 stations were used.

Our source inversions indicate that the 1952 event had M_w =8.3 with maximum slip 6.2 m and the 2003 event, M_w =8.2 with maximum slip 7.0 m. The place with maximum slip is almost the same each other. However, the 1952 event showed some slips at shallow part of the Kushiro-oki region where the 2003 event had little slip. This can be seen in the slip distribution of the tsunami waveform inversion (Satake *et al.*, 2006). This result suggests that the 1952 Tokachi-oki earthquakes included the rupture area of the 2003 Tokachi-oki earthquake as well as the shallow part of the Kushiro-oki region; this shallow slip may have contributed to tsunami generation.

We will perform joint inversion of strong-motion and teleseismic waves to investigate more detailed rupture process.

Keywords: source process, inversion, the 1952 Tokachi-oki earthquake, the 2003 Tokachi-oki earthquake, recurrent earthquakes