

# Aftershock observation of the 2003 Tokachi-oki earthquake by using dense ocean bottom seismometer network

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The Mj8.0 2003 Tokachi-oki earthquake (maximum JMA intensity is 6-) occurred off the southeastern coast of Hokkaido in northern Japan on 26 September 2003. The main event happened at 04:50 local time (19:50 GMT, 25 September 2003), followed by a Mj 7.1 event at 06:08 (21:08 GMT, 25 September 2003). Near the focal area of the event, an earthquake of Mj 8.2 occurred on March 4, 1952. The source processes of both the 2003 and the 1952 events indicate that they are interplate earthquakes associated with the subduction of the Pacific plate and that the asperity of the 1952 event was ruptured again during the 2003 event (Yamanaka and Kikuchi, 2003). It is useful to study these recurrent events for understanding the interplate earthquake system, and to obtain a precise aftershock distribution is important for understanding of mechanism of the earthquake generation.

Four days after the main shock, we started an aftershock observation using pop-up type ocean bottom seismometers (OBSs) to obtain a detailed aftershock activity of the 2003 Tokachi-oki earthquake. The observation lasted one and half month. We totally deployed forty-seven OBSs and two ocean bottom pressure gauges (OBPs) at thirty-eight sites. The observation array covered a 150 km x 100 km area, where a high aftershock activity was estimated from a land seismic network. For determining focal depth accurately, we deploy OBSs with a spacing of 15 km near the trench, in contrast to 20km in landward region. The OBPs were deployed in eastern area of the network where a large slip was not estimated during the main event. We used three types of the OBS system. Forty-five OBSs had a three-component seismometer with a natural frequency of 4.5 Hz, one OBS had a three-component seismometer with a natural frequency of 2 Hz, and the other was equipped with a broadband seismic sensor (Guralp CMG-3T).

Preliminary results using nine OBSs, which were retrieved from the source region three weeks after the main shock, show that most of aftershocks are located in a depth range of 15 - 20 km. This means that the aftershocks occurred close to the plate boundary, in the subducting oceanic crust and in the 5.5-km/s layer of the landward plate, indicating that no aftershocks existed in the mantle of the subducting Pacific plate.