Heterogeneous velocity structure around the asperity of the 2003 Tokachi-oki earthquake deduced from ocean bottom seismograph

Yuya Machida [1]; Tetsuo Takanami[2]; Yoshio Murai[3]; Masanao Shinohara[4]; Tomoaki Yamada[5]; Toshihiko Kanazawa[6]; Naoshi Hirata[4]; Shin'ichi Sakai[7]; Kimihiro Mochizuki[8]; Hajime Shiobara[9]; Minoru Nishino[10]; Ryota Hino[10]; Kenji Uehira[11]; Hiroshi Shimizu[11]; Yoshiyuki Kaneda[12]; Hitoshi Mikada[13]; Kiyoshi Suyehiro[14]; Tomoki Watanabe[14]; Narumi Takahashi[15]; Takeshi Sato[16]; Eiichiro Araki[14]; Kohichi Uhira[17]

[1] Earth and Planetary Sci., Hokkaido Univ; [2] ISV, Hokkaido Univ; [3] Institute of Seismology and Volcanology, Hokkaido Univ.; [4] ERI, Univ. Tokyo; [5] ERI, Univ. of Tokyo; [6] ERI, Tokyo Univ; [7] Earthquake Research Institute, Univ. of Tokyo; [8] EOC, ERI, Univ. of Tokyo; [9] OHRC, ERI, Univ. Tokyo; [10] RCPEV, Graduate School of Sci., Tohoku Univ.; [11] SEVO, Kyushu Univ.; [12] JAMSTEC,Frontier,IFREE; [13] Kyoto Univ.; [14] JAMSTEC; [15] IFREE, JAMSTEC; [16] Deep Sea Research Dep., JAMSTEC; [17] JMA

The 2003 Tokachi-oki Earthquake (M=8.0) has occurred in the area off the southeastern coast of Hokkaido on September26, 2003. In the south off Hokkaido region, seismic activity is very high and the large earthquakes occurred repeatedly because the Pacific plate is subducting beneath the North America plate. In the off Tokachi area, the 2003 Tokachi-oki earthquake occurred at the plate boundary and ruptured the same asperity as the 1952 Tokachi-oki earthquake (M=8.2).

We deployed about 40 sets of Ocean Bottom Seismometer (OBS) immediately after the earthquake in the focal area to observe aftershocks. Although the recording period was not same for all OBSs, we conducted the aftershock observation October 1 until 20, 2003.

Although some results were obtained from this aftershock observation and the precise aftershock distribution was reported (Shionhara et al., 2004 , Yamada et al ., 2005 etc) , a fine structure of Vp and Vp/Vs in the source region has not estimated. It is important to clarify the relation between the occurrence of an earthquake and subsurface structure in the source region in order to understand the mechanism of the occurrence of an earthquake. We select P and S arrival times with high accuracy and relocate the aftershocks. We also estimate Vp, and Vp/Vs structure by using SIMULPS13Q (Eberhart-Phillips, 1990), we focus on the velocity structure around the asperity of the 2003 Tokachi-oki earthquake.