

## P-wave velocity structure at shallow depths around the northern limit of the 2011 Tohoku earthquake

ISHIHARA, Ken<sup>1\*</sup> ; MOCHIZUKI, Kimihiro<sup>1</sup> ; YAMADA, Tomoaki<sup>1</sup> ; YAMASHITA, Yusuke<sup>1</sup> ; SHINOHARA, Masanao<sup>1</sup> ; AZUMA, Ryosuke<sup>2</sup> ; HINO, Ryota<sup>3</sup> ; SATO, Toshinori<sup>4</sup> ; MURAI, Yoshio<sup>5</sup> ; YAKIWARA, Hiroshi<sup>6</sup>

<sup>1</sup>Earthquake Research Institute, The University of Tokyo, <sup>2</sup>Research Center for Prediction of Earthquake and Volcanic Eruption, Tohoku University, <sup>3</sup>International Research Institute of Disaster Science, Tohoku University, <sup>4</sup>Graduate School of Science, Chiba University, <sup>5</sup>Faculty of Science, Hokkaido University, <sup>6</sup>Faculty of Science, Kagoshima University

Before 2011 Tohoku earthquake, some seismic surveys had been conducted within the co-seismic slip area of the earthquake. However structures may have been changed after the earthquake due to the co-seismic slip. We need to compare the structures of the same area of different times in order to reveal changes caused by the 2011 Tohoku earthquake. Therefore, a refraction-reflection seismic survey was conducted in 2013 at the same area of the 1999 and 2001 surveys. Seven 100 km long profiles were surveyed parallel to the Japan Trench. Forty-four OBSs were deployed and hydrophone streamer was towed behind the shooting vessel. Air-gun array was used as controlled seismic sources. Because the area of 2013 survey includes the co-seismic slip area of the 2011 Tohoku earthquake, the changes of structure may be revealed by comparing results of 1999 and/or 2001 survey with that of the 2013 survey. Especially the profiles include the northern limit of the co-seismic slip area of the 2011 Tohoku earthquake in their north, so it may be possible to put constraints on the northern limit.

We could identify some differences on the seismic reflection sections and in the recorded waveforms between the 2001 and 2013 surveys. It is, then, expected to reveal some structural changes before and after the 2011 Tohoku earthquake.

We constructed 1-D V-p structures to about 2km depth beneath the seafloor for each OBS station by applying the Tau-P method. Then we constructed 2-D V-p structure models by referring to the 1-D V-p structures for profiles so that the models explain travel times of shallow P-wave arrivals.

Keywords: the northern limit of the 2011 Tohoku earthquake, controlled source seismic survey, ocean-bottom seismometer(OBS)