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Detailed seismic imaging in the Japan trench axis region

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The rupture of the Tohoku earthquake occurred in 2011 was propagated through the very shallow portion of the plate boundary megathrust fault, and the seismic reflection profiles illustrated the shallowest part of the plate boundary faults in the trench axis area near the epicenter of the Tohoku earthquake off Miyagi area. We have conducted reflection seismic surveys using small volume of cluster air guns and a 1200-m-long streamer cable in these 5 years after the Tohoku earthquake to obtain detailed images of the deformation structure around the Japan trench axis region. Seismic profiles along more than 100 survey lines were acquired to cover off Fukushima to off Aomori area in the Japan trench. Time migrated profiles clearly show the detailed structure in the vicinity of the trench axis area, including the bend-related normal faults on the incoming Pacific plate, deformation of the sediment within the frontal prism. The profiles revealed the structural variation in the trench axis area along the Japan trench. The geological structure of the frontal prism sediment beneath the lower-most landward slope and trench axis is different between off Miyagi, the central part of the Japan trench and off Iwate, northern part of the Japan trench. Thickness of the sediments and the distribution of the bend-related normal faults on the incoming Pacific plate also show the difference between these two areas. Thickness of the incoming sediments is very thin ($\sim$ 50 m) and the slope failure of the trench inner slope is observed in the vicinity of the trench axis around the 39.5 N, where corresponds to the northern edge of the large slip zone of the Tohoku earthquake.