

Development of an ultra-deep seafloor acoustic ranging system

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The 11 March 2011 Tohoku-Oki earthquake ruptured the interplate boundary off the eastern shore Honshu, generated a devastating tsunami that swept the coastal area along the northeastern Japan. The seafloor geodesy brought important results that show that the large slip was near the Japan Trench and suggested the heterogeneity of the coseismic slip distribution in the plate interface. The maximum displacement region for interplate earthquake is mainly located offshore region. Therefore it is important to monitor the postseismic displacement and the stress accumulation process using seafloor geodesy. And if we can observe the postseismic displacement near the Japan Trench, we contribute to understand the coupling condition of plate boundary. There is a seafloor acoustic ranging system for direct observation of horizontal displacement on seafloor. The system is designed to measure distances of up to 1-2 km with a precision of less than centimeter. We plan to use these instruments to make time-series distance measurements across the faults to detect and quantify seafloor crustal movements. But this system doesn't use the axis of Japan Trench because this system does not adapt a deep-sea area. Therefore we improve this system that adapted for the axis of Japan Trench. We carried out the experiment toward the observation of Japan Trench on Feb. 2013 using RV Kairei. We reported the results of this experiment.

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