

SCG086-03

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## Evaluation of sailing seafloor geodetic observation using a hull-mounted acoustic transducer

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We have been developing a system for precise seafloor geodetic observation with the GPS/Acoustic combination technique and deploying seafloor reference points on the landward slope of the major trenches around Japan, such as the Japan Trench and the Nankai Trough.

By the past observations, we detected intra/interplate crustal movements at seafloor reference points installed off Miyagi Pref., off Fukushima Pref., Sagami Bay and off Tokai region, with the precision of less than 1cm/year. In addition, we detected the co-seismic seafloor movement associated with the 2005 off Miyagi Prefecture Earthquake(M7.2), and after the earthquake, we detected a series of crustal movements indicating the beginning of the reaccumulation after the release of crustal strain in the sea area for the first time in the world.

However, we had some problems for achieving more efficiency and precision. Because of drifting observation to avoid the noises from the vessel, we had to consume much time for transiting to the next survey line after finishing one line survey. In addition, we can't control configuration of survey lines. Then, to improve observation efficiency and precision, we permanently mounted observation equipment on the vessel in 2008. An acoustic transducer was mounted on the bottom of the vessel's hull and a GPS antenna was mounted at the mast.

Actually, the observation time in a seafloor reference point has been shortened from 2days to 16 hours by sailing observation, and the efficiency has been dramatically improved. In addition, by the observation during Jul 2008 - Mar 2009, we confirmed that the new system enables us to carry out acoustic ranging observation while sailing at a speed up to 11 knots and that the positions by sailing observation are much more stable than those by drifting observation even if the ocean condition is bad, such as over 15m/s wind speed. But on the other hand, there are things to be considered, such as the evaluation of the influence to seafloor positioning when the directions of wind and water flow are constant during observation.

In this presentation, we will report the evaluation of sailing seafloor geodetic observation by the latest results.

Keywords: seafloor geodetic, GPS/A, seafloor reference point, transducer, acoustic ranging