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Development of GPS/acoustic survey sites along Japan Trench and getting started on their first measurement

Motoyuki Kido[1*], Yukihito Osada[1], Jumpei Yamamoto[1], Hiromi Fujimoto[1], Yusaku Ohta[2], Takashi NAKAYAMA[2], Toshiki Kaida[2], Keiichi Tadokoro[3], Tsuyoshi Watanabe[3], Satoru Nagai[3], Takashi OKUDA[3], Kenji Yasuda[3]

[1]IRIDeS, Tohoku Univ., [2]RCPEV, Tohoku Univ., [3]Graduate School of Environmental Studies, Nagoya Univ.

After the occurrence of the devastating M9.0 earthquake, MEXT, Japan promoted the development of seafloor geodetic stations, such as cabled pressure gauge and seafloor transponders for GPS/acoustic survey in order to monitor the crustal movement associated with the earthquake. Our group of Tohoku University and Nagoya University have constructed up 20 GPS/acoustic stations. Each station consists of at least three and at most six transponders, which results in 86 transponders in total. Most of them were installed near trench over 4000m depth, where is found to play an important role on the occurrence of low-frequent giant earthquake.

Transponders were installed on September 2012, using chartered vessel, Shinkai-maru, Shin-Nihon-Kaiji and the first observation including initial positioning has started this and subsequent cruises, using Tubasa, Dokai-Marine on November. We employ shipboard transducer system rather than towing buoy system. For the noise-level, S/N ratio of replied acoustic signal from seafloor over the ship-noise is still in good condition even in thrusting mode for shallow survey sites (<3000m), but S/N ratio getting worse for deeper sites, in where we have to declutch and keep drifting. Improving the software algorithm to handle acoustic waveform will reduce this problem. For the survey style, these cruises were good opportunity to compare the stationary and moving survey styles, because we sufficiently took both types of data. We consider new analytical algorithm to integrate or involve any kind data is needed to efficiently use all the data taken in various opportunity of ship-time. In this talk, as well as technical report addressed above, the result of these initial observation and expectation of precision are presented by introducing an example data.

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