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Study for improving efficiency in seafloor geodetic observation by means of multi acoustic ranging

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Japan Hydrographic and Oceanographic Department (JHOD) and the Institute of Industrial Science, University of Tokyo, have been developing a system for precise seafloor geodetic observation with the GPS/Acoustic combination technique. In this observation, the movements of the seafloor reference points are measured with 2 - 3 centimeters precision. JHOD has been carrying out seafloor geodetic observations 2 - 4 times a year for each station and reported the inter-seismic deformation before and after the 2005 Miyagi-oki earthquake and the co- and post-seismic deformations of the 2005 Miyagi-oki earthquake and the 2011 Tohoku-oki earthquake and so on.

After the 2011 Tohoku-oki earthquake, this observation is expected to be broadened and densely-arranged with the objective of large-scale earthquake disaster prevention. In order to expand further seafloor geodetic observation, shortening of observation time, which is about one day for one campaign, is required. Therefore, we are considering a new acoustic ranging method. In this new method, we conduct the acoustic ranging for multi seafloor transponders not individually but sequentially. We report the details of this new multi acoustic ranging method and discuss how much efficiency will be improved by the introduction of the new method.

Keywords: seafloor geodetic observation, acoustic ranging