

Effects of major error sources in the seafloor geodetic observation

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Hydrographic and Oceanographic Department of Japan Coast Guard and Institute of Industrial Science, University of Tokyo, have jointly developed the system of seafloor geodetic measurement. In this system, acoustic ranging and kinematic GPS (KGPS) positioning techniques are combined to determine precise positions of the seafloor reference stations. Fourteen seafloor stations have already been installed mainly on the landward slope of the major trenches around Japan. We have been carrying out the observations once or twice a year at each station.

In this technique, there are various error sources that can have substantial effects on the positioning of the seafloor stations, although our system is being gradually improved. Among them, major ones are the underwater acoustic speed structure and the KGPS positioning.

While it is crucially important to avoid these errors by technical development in observation and analysis, it is also necessary to examine their effects quantitatively on the accuracy of the positioning. In this presentation, we focus on these two error sources and examine their effects on the estimated positions of the seafloor station through numerical simulations. Based on the result, we discuss possible ways to deal with these errors in the analysis.