

SCG086-02

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The replacement of seafloor reference point of seafloor geodetic observation

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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 land-ward slope of the major trenches around Japan, such as the Japan Trench and the Nankai Trough. The primary purpose of our observation is to detect and to monitor the crustal deformation caused by the subduction of the oceanic plate near the plate boundary.

A seafloor reference point consists of three or four battery driven acoustic transponders. To confirm the continuity of observation, it is necessary to replace transponders properly and to connect the observation results before and after the replacement by using the position difference information between old and new transponders.

The transponders are installed at seafloor by a free fall from sea surface. It is impossible to install at expected point accurately. Therefore the position difference between old and new transponders is estimated by analyzing the observation data.

An accuracy of this observation is effected from various environmental factors, such as undersea acoustic speed structure. The bias errors caused by environmental factor might have an adverse effect on estimated position. To estimate position difference accurately by eliminating such bias errors, observation should be carried out for new and old transponders simultaneously. Therefore it is necessary to replace transponders before battery gave out.

In 2009, we have replaced transponders at reference points KUMA and KAMN, which was installed at 1999-2000 and have observed new and old transponders simultaneously.

In this presentation, we will report the result of these observations.

Keywords: seafloor geodetic observation