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Inversion of acoustic velocity structure models to develop observing seafloor crustal deformation.

Shuhei Eto[1*], Satoru Nagai[2], Keiichi Tadokoro[2], Tsuyoshi Watanabe[2], Ryoya Ikuta[3]

[1]Grad. Sch. Env. Studies, Nagoya Univ., [2]RCSVDM, Nagoya Univ., [3]Faculty of Science, Shizuoka university,

Along the Suruga-Nankai trough, major earthquakes have occurred repeatedly. Therefore we should construct a system for monitoring the behavior on plate boundary zones. Although very dense routine geodetic GPS network (GEONET) has been developed, we cannot observe beneath ocean with enough resolution. So our group has tried to develop a system for observing seafloor crustal deformation.

The system becomes possible to observe seafloor benchmarks by combining two techniques; acoustic ranging and kinematic GPS. Using this system, we have achieved an accuracy of about 1-5 cm of horizontal positioning in each observation, but it is not enough to discuss behavior on plate boundary zones. We need to develop our system and consider variations of acoustic velocity structure.

Acoustic velocity structure in ocean varies largely in shallower parts. In present analysis, we assume homogeneous acoustic velocity model with temporal change. To obtain high-resoluted crustal deformation, we estimate with considering the variation of acoustic velocity structure.

Although ray paths of our acoustic ranging are not good to invert full 3-dimensional acoustic velocity structure with temporal variation, we can invert 1-dimension velocity variation with depth for a given short time through some prior information, like a snapshot in some time.

We apply the simple Joint Hypocenter Determination method in seismology [Kissling et al., 1994]. This method allows acoustic velocity structure to exist low-velocity layer such as thermocline. Acoustic ranging data observed by Nagoya University group both in Suruga Bay and Kumano Basin. This paper focused on results and related remarks to Suruga Bay. Another is presented by Nagai et al. [This meeting].

Keywords: acouctic velocity structure, 1-dimensional structure, Variation of space and temporal