

Sea-bottom crustal deformation measurements along the Suruga-Nankai Trough

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Our group has developed a system for observing seafloor crustal deformation composed of the kinematic GPS positioning technique and acoustic ranging. We continue the long-term monitoring of seafloor crustal deformation from 2004. We installed three stations at the Kumano basin (KMN, KMS, and KME stations) and also two stations at the Suruga bay (SNW and SNE stations), along the Suruga-Nankai Trough.

We have performed the repeated observations 13, 17, 3, 11, and 11 times at KMN, KMS, KME, SNW, and SNE stations, respectively. The long time repeatability of this system is 1-2 cm in the both horizontal components at all the stations. We derived horizontal deformation vectors with relative to the Amurian plate from the results of the repeated observations. The components of the vectors are: (NS, EW)=(8+/-7, -58+/-13) mm/yr at KMN, (17+/-6 -50+/-10) mm/yr at KMS, (8+/-8, -29+/-15) mm/yr at SNW, (18+/-11, -28+/-14) mm/yr at SNE. We have not detected reliable site velocity at SNE station because we measured only three times at the station.

Variations in sound speed structure, which cause the bias to the sea-bottom position, are most effective error factor for the measurements of sea-bottom crustal deformation. We are developing a new system with two sea-surface stations using both observation vessel and buoy. We need to investigate effectiveness of a system with handling easy multiple sea-surface units.