Seafloor geodetic approach for the Nankai Trough megathrust source region

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Future source region along the Nankai Trough is located mainly under the seafloor. The previous onshore geodetic network could not catch up a coupling condition on this interplate boundary. After 2000, Hydrographic and Oceanographic Department, Japan Coast Guard (JHOD), has been preforming a seafloor geodetic observation and is measuring movements of seafloor positions with about 1 cm/year precision. This new data has ability to improve our understanding of the coupling condition in this region.
Along the Nankai Trough, fifteen sites, including original sites set before the 2011 Tohoku-oki earthquake, were set broadly and observed at 2 ~ 3 times a year. These data were affected by coseismic and postseismic deformations following the Tohoku-oki earthquake and corrected using calculations obtained by coseismic model of Iinuma et al. [2012, JGR] and afterslip and viscoelastic model [Sun and Wang, 2015, JGR] modified after Sun et al. [2014, Nature]. We derived deformation velocities by robust regression method for those corrected data. As a result, 2.0 ~ 5.5 cm/year of velocities were obtained.
Our observations indicate low-coupling regions that are consistent with distributions of subducting seamounts. Additionally, VLFE activities around these geological features are much corresponding to low-coupling regions, though we cannot discuss the shallowest regions near the trench axis which were predicted as tsunami generation zones due to a lack of seafloor network.
Our data introduced in this presentation was the last 4 ~ 9 year-results and were deficiency in discussion about a long-term crustal deformation and a temporal change. Our next plan is continuous decadal observation.
In the present methodology, observation frequency and precision are not enough to differentiate deformations due to slow slip events. We introduce new technological developments and analytical approaches for high-precision in this presentation.
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Keywords: Seafloor geodetic observation, Nankai Trough, Subduction zone megathrust earthquake

