

## **Coseismic displacement due to the 2004 off Kii Peninsula earthquake and its fault model, detected by seafloor geodetic observation**

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<http://www.aob.geophys.tohoku.ac.jp/dmg/gpsa/>

Studies using seismic waveform analysis have revealed complex rupture process of the 2004 off Kii peninsula earthquake, which occurred on September 2004 at Kumano-nada. The proposed two-faults model is also supported by distribution of the aftershock activity observed by OBMs, and by crustal deformation measurement in terms of the land-based GPS network. However, detailed precise position of the faults is still controversial because of the long distance between observation sites and the fault. On the contrary, in-situ measurements of crustal deformation using the GPS/Acoustic technique, results of which were recently released, are anticipated to be a robust constraint on the estimate of the fault geometry.

Our research group, Tohoku Univ., installed five seafloor transponders and conducted GPS/Acoustic observations at Kumano-nada three times, August 2004, November 2004, and August 2005. Comparing the result obtained in August 2004, just before the earthquake, and November 2004 and August 2005, after the earthquake, we detected coseismic crustal displacement at this site. The displacement amounts to 25–30cm NNE-ward, which is much larger than that estimated from the land-based GPS observations.

Therefore, we present a new fault model, which simultaneously satisfy both in-situ and land-based observations. We employed trial-and-error forward method. The starting model consists of two faults, (A) a thrust fault parallel to the trench and (B) a strike-slip fault roughly perpendicular to the trench. Since our observation site is close to and may be sensitive to the north-edge of the fault B, we adjusted parameters associated only with this point. The obtained fault model well explains both the land-based and our in-situ observations as well as in-situ measurements reported by the Nagoya Univ. and the JHOD.

Our result shows that efficiency of in-situ measurements of crustal displacement on precise estimate of the fault model, though it is still difficult to fully describe the model from a few point of observation data.