Fault parameters of intra-plate earthquakes in Hyuga-nada region

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In Hyuga-nada region, the Philippine Sea plate subducts northwest beneath the Eurasian plate at a rate of about 50-60mm/year, and large and medium-sised earthquakes have been caused frequently. Previous researchers had investigated a fault slip along the plate boundary, while Harvard CMT solutions showed that large and medium sised earthquakes occurred not only along plate boundary but also in the subducting plate.

We examined fault parameters of large and medium-sised intra-plate earthquakes. We applied the Double-Difference method using JMA seismological data, and estimated a precise hypocenter location during from 1984 to 2006 in Hyuga-nada region, which contained 4 large and medium-sised intra-plate earthquakes, (1984, 1987, 2002, 2006). We also estimated moment tensor solution of 3 earthquakes in 1984, 2002, 2006 using waveform inversion of near-source or teleseismic body-wave.

We found that 3 earthquakes in 1984, 2002, 2006 had occurred on vertical fault plane in the slab. Focal mechanisms of them showed down-dip tension type. And they were located in northwest side of an asperity of the largest earthquake(Mw7.5) in this region, where the dip angle of the subducting plate increased from 18 degree to 38 degree.