Fault model estimation of Postseismic slip following the 2005 West Off Fukuoka Prefecture earthquake

Akihiko Hirao[1]; # Takeshi Matsushima[2]; Yuhki Kohno[1]; Shigeru Nakao[3]; Hiroaki Takahashi[4]; Masayoshi Ichiyanagi[4]

[1] Grad. Sch. Sci., Kyushu Univ.; [2] SEVO, Kyushu Univ.; [3] Kagoshima Univ.; [4] ISV, Hokkaido Univ

After a larger earthquake more than magnitude six, diastrophism of several cm/month might be observed for several months by displacement measurements of GPS s, this diastrophism is called postseismic deformation. Postseismic slip and viscoelastic relaxation are thought as cause of the postseismic deformation. If the postseismic deformation is mainly generated by the postseismic slip we can estimate a fault model of the slip using the displacement data observed by GPS.

It is very important to research postseismic slip so to examine overall mechanism of earthquakes such as the stress changes around the fault. The 2005 West Off Fukuoka Prefecture Earthquake (M_{jma}=7.0) occurred on March 20, 2005 in the northern part of Kyushu, Japan, and big damage was caused in and around Fukuoka city.

Immediately after the earthquake, a continuous GPS observation was executed by deploying 13 temporary GPS sites as Kyushu University, Hokkaido University, and Kagoshima University cooperated. And we calculated dense and accurate crustal movements using our GPS data, the GEONET and other fixed-point GPS data of the Geographical Survey Institute.

As a result, it has been understood the postseismic deformation of about 3cm in three months after the earthquake is observed only around the observation points of the main shock neighborhood. In addition, no premonitory deformation of the size that can be detected by the GPS observation is generated around the Kego fault that move down through Fukuoka city where the occurrence of the severe earthquake will be forecast in the future. , and it becomes small gradually. When this change curved in the fitting, this variation approximated by postseismic slip model is more suitable than approximated by viscoelastic relaxation model.

Uehira et al. (2006) observed the aftershock of the West Off Fukuoka Prefecture Earthquake with ocean-bottom seismometers, and calculated precise hypocenter distribution. We assumed the position of the fault based on the hypocenters distribution,and calculated fault width, slip and depth the best as it explained the observed postseismic deformation best. As the result, the movement of postseismic slip was a left-lateral strike-slip fault just like the main shock fault. Also, the shallow part of the main shock fault had mainly slipped as the postseismic slip.