

Stress patterns of Hinagu fault region, Kumamoto, Japan, revealed by a stress tensor inversion method

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Futagawa-Hinagu active faults are running in central Kumamoto Prefecture, and seismic activity is active at the northern part and southern part, but it is not very active in the central part. It was pointed out with Shimizu et al. (2002) that the central part of Hinagu fault is seismic gap. According to the Headquarters for Earthquake Research Promotion, the local earthquake of M7.6 is assumed, and, as for getting to know the information about the earthquake source fault under the Hinagu fault trace, and the information on a stress field, it is very important for prediction of strong ground motion.

Institute of Seismology and Volcanology, Faculty of Sciences, Kyushu University has performed the extraordinary observation since 1999 in and around Hinagu fault region. Based on these data, we calculated accurate focus distribution, an earthquake mechanism solution, and stress patterns in and around Hinagu fault region.

The parameters of an earthquake source fault are assumed from accurate focus distribution. At northern part of Hinagu fault, earthquakes occur just under the Hinagu fault. Azimuth of earthquake source fault is parallel to Hinagu fault trace and dip is 90 degree. On the other hand, at southern part of Hinagu fault, earthquakes do not occur just under the Hinagu fault. Epicentral distribution have offset several km from the fault. Azimuth of earthquake source fault is N30E (almost parallel to Hinagu fault) and dip angle is 35 degree. There is no surface fault on extension of earthquake source fault. If Hinagu fault and earthquake source fault were connected, Hinagu fault must be more nearly perpendicular on the surface of the earth.

We calculate stress field of in and around Hinagu fault using stress tensor inversion method (Horiuchi et al. 1995). The direction of minimum principal stress (T) axis has same parameters between northern part and southern part of Hinagu fault. The azimuth of minimum principal stress (T) axis is almost north-south direction and dip angle is 0 degree. The direction of maximum principal stress (P) axis has same azimuth between northern part and southern part of Hinagu fault, but dip angle is different. Dip angle are 0 degree and 40 degree, respectively.

We used also data of Kagoshima University, Tokyo University, JMA, and NIED.