

The spatial distribution of focal mechanisms in and around the region of western Kanagawa Prefecture

Youhei Yukutake[1]; Toshikazu Tanada[2]; Ryou Honda[2]; Masatake Harada[3]; Hiroshi Ito[4]; Katsuhiko Shiomi[5]; Kazushige Obara[5]

[1] none; [2] Hot Springs Res. Inst. of Kanagawa Prefecture; [3] HSRI; [4] Hot Springs Res Inst of Kanagawa Pref; [5] NIED

In the region of western Kanagawa Prefecture, the significant large earthquakes have occurred at about 70 years intervals (Ishibashi, 1992). Thus, the several fault models for these earthquakes have been proposed. Moreover, since there is the collision boundary of the Izu-Ogasawara arc and Honshu arc in this region, it is thought that the tectonic settings are very complex. Yukutake (2006) determined the focal mechanisms by using the data of the Bulletin of the Hot Spring Research Institute of Kanagawa Prefecture (HSRI) observation network. Since the HSRI network stations are located only in the western Kanagawa region, however, we could not determine enough number of focal mechanisms. Thus, we tried to determine numerous focal mechanisms, by merging the data of Hi-net, TK-net (which is commissioned by the National Research Institute for Earth Science) and HSRI network. We tried to discuss the fault model and tectonic settings in this region, from the detail spatial distribution of stress field, which can be estimated from the focal mechanisms.

We used the events that occurred in the term from January 2000 to August 2006, in and around the region of western Kanagawa Prefecture (35.0N-35.75N, 138.75E-139.75E, -1-50km depth). We could determine the location of about 7000 events in this term by using the HSRI data. We could merge the P and S wave arrival times and the P wave polarities of the 2800 events into those of Hi-net and KT-net. We determined the location of these events by the hypomh method (Hirata and Mastu'ura, 1987). We determined the focal mechanisms by the method of Okada (1988).

Almost all the focal mechanisms in this region have the P axes, which are oriented to the northwest - southeast direction. The seismic plane becomes deeper as it advances eastward from the western Kanagawa region. From the characteristics of the hypocenter distribution, we divided the whole study area into 6 regions; Tanzawa region, Ashigara region, Hakone region, Izu region, Oiso region, Kawasaki region.

In Tanzawa region, the seismic activity is very high. The earthquakes distribute from 15 - 30 km depth. The type of focal mechanisms is mainly the intermediate type (61%) and the reverse fault type (23%). We classified the type of focal mechanisms, following the method in Yamanaka et al. (2002). The P axes of these focal mechanisms are oriented to the northwest - southeast direction. In Ashigara region, the earthquakes distribute from 10-20 km depth. The directions of P axes are similar to those in Tanzawa region. However, the ratio of the strike slip type (23%) and normal fault type (8%) is high compared with that in Tanzawa region. It is inferred from this result that the stress field spatially changes between these regions. In Hakone and Izu region, the ratio of strike slip type and normal fault type is high compared with that in Tanzawa and Ashigara region. Moreover, the reverse fault type event did not occur in Hakone and Izu region. From the geodetic data, it is found that the open crack exists in Hakone region (Daita et al., 2003). It is likely that the stress field in Hakone area is locally changed by this open crack. In Oiso region, the earthquakes distribute from 20-30km depth. The P axes are mainly oriented close to the north-south direction. There are many intermediate type events (50%), and the strike slip type event also occurred in this region (40%). In Kawasaki region, the earthquakes distribute from 20-30 km depth. The directions of P axes are similar to those in Oiso region. There are many intermediate type events (76%) as well as Oiso region. However the ratio of reverse fault type event is high (23%) compared with that in Oiso region. We found that the low-angle reverse fault type events occurred in regions, except Hakone and Izu region.

We will quantitatively estimate the stress field in each region by the stress inversion method.