

## Stress and Strain Field in Japan (part 2)

# Yuzo Ishikawa[1], Koji Nakamura[2]

[1] Meteorological Res. Inst., [2] JMA

We redetermined the focal mechanism solutions determined by Ichikawa(1971), as old focal mechanisms by Ichikawa was not reliable.

Using new solutions, the temporal change of stress field was investigated. In Tohoku region east-west direction of compressional stress was predominant, but in Kitakami area the direction of P axes showed north-south direction. It is nearly same as the direction of the compressional strain by GPS data, though the long period geodetic data showed the extensional strain (N.Ishikawa and Hashimoto,1999). As GPS data is limited only these 3 years, there is a possibility that the stress field was changed by the great interplate earthquake which occurred near Kitakami area. It was known that M8.1 Off Sanriku earthquake occurred in 1933 and M7.5 Far off Sanriku earthquake occurred in 1994. Especially, this after slip near the source fault gave a large crustal displacement in Tohoku region. So, GPS data might include the influence of the after slip. But the focal mechanism denied this possibility. The earthquakes of which focal mechanisms were obtained occurred in 1931, 1965, 1996 and 2000. These showed the reverse faults with north-south P axes and no temporal change of the stress field in Kitakami area after 1931.

Then, the other cause is requested to explain the discrepancy between the strain field by geodetic data for 100 years to the strain field by GPS for about 3 years and the stress field by focal mechanism for 70 years. As no temporal change of the stress field were shown in these 70 years, the cause must be before 1930. In late 19th century, many earthquakes occurred in and around Tohoku region, as M8.5 Sanriku tsunami-earthquake along Japan trench in 1886, M7.2 Rikuu earthquake in 1896, M7.4 and M7.7 earthquakes off Sendai in 1897, M7.2 earthquake off Miyagi in 1898, M7.0 North Miyagi prefecture earthquake in 1900, and M7.1 Akita-senpoku earthquake in 1914. Though N.Ishikawa and Hashimoto excluded the influence of earthquakes from their data, we suppose that there still remained in their data, as the source fault parameters of these old events were not estimated well. So, we concluded that the strain field by geodetic data for 100 years included the after and coseismic effects of events in late 19th and early 20th centuries. Then, it was supposed that the stress field in Kitakami area was generally different from the one in the rest of Tohoku region and Kitakami area made one block in the crust.

In southwest Japan, Ichikawa pointed the possibility of the stress field change after 1946 great Nankai earthquake. But the result shows that the depth of the events are different between the events which occurred before 1946 and the ones occurred after 1946.