

Structure and Stress Field in the Western Nagano Prefecture Region - by the Dense Seismic Observation -

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In the Western Nagano prefecture region, the MJMA6.8 earthquake occurred in 1984, about 10km southeast of the summit of Mt. Ontake, which erupted in 1979. Even about 25 years after the earthquake, seismic activities are still very high. A lot of earthquakes occur not only near the earthquake fault but also a wide area mainly northeast of the earthquake fault.

A seismic network with extremely high resolution is installed in this region. The network was first operated with six stations in June 1995, and stations were added year by year, now about forty stations are operated in summer, while in winter, about quarter of them were temporally deactivated because of excessive snow depth. The recorder, EDR6600 (Kinkei system Inc.) has a flat response for ground velocity up to 4,000Hz (-3dB point), and the sampling frequency of 10kHz. The recorders are mainly operated by batteries, since almost none of the stations have electricity. The clock is adjusted to the GPS time signal every two hours within a precision of 1 ms. Average noise levels of each station are quite small, 1-10x10⁻⁸ m/s and event trigger files are stored on CF cards.

In 2008, about thirty continuous recording stations are added. The system (we call it manten system) is newly developed and now the sampling frequency is set as 250 Hz.

By using precise arrival data that were manually examined, we estimated the detailed velocity structure and stress field in and around the source region. 3D velocity structures are estimated by a seismic tomography for grid points of 1km spacing. Low velocity anomalies are detected near a planar distribution of hypocenters. It seems that hypocenters are distributed around the low velocity anomalies. The stress field in and around the earthquake fault is inferred from focal mechanisms. It is inferred from P-axis distributions that a local stress anomaly exists around the low velocity anomaly. These observations suggest that water is related to microearthquake activities in the Western Nagano prefecture earthquake region.