

Inerastic deformation around focal area of the 2000 Western Tottori EQ (M7.3) detected by “0.1 manten” Hyper Dense Seismic Observation (2)

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Seismic observation with high resolution and sensitivity is a key to solve a question how the crust deforms inelastically and accumulate stress in the seismogenic zone. We have completed a seismic observation for one year at one thousand sites (0.1 Manten seismic observation) in an aftershock area of the 2000 Western Tottori earthquake (M7.3). The seismic network with radius of about 18 km covered entire aftershock area of the M7.3 event. Automatic-detecting procedure was applied to the seismograms in order to detect small earthquakes. Over 5000 events of natural earthquakes were obtained during the observation. Sensitivity of the network is high and its detection limit for small earthquake was about magnitude of -1.0. Focal mechanism of the earthquake with magnitude range below zero could be determined. In this study, we showed inelastic deformation due to seismic activity of the small earthquake around the fault of the main shock.

The detected aftershock activity is higher at north of the large slip area of the main shock than at other area. Taking into account the activity just after the main shock, we found inelastic strain rate inferred from the aftershock reveals spatial heterogeneous distribution. The rate is smaller than inverse of the lapse time from the main shock, indicating that inelastic deformation due to the aftershock continue long duration compared with other part of the fault. This area corresponds to the hypocentral area of the preceding activity toward the main shock of the Western Tottori earthquake. These suggests that the high inelastic strain rate area at the north of the asperity of the main shock behaved as low strength area relaxing stress at the part and resulted stress loading to the asperity. Comparing the rate with it estimated from the preceding activity to the main shock, the rate at present is similar order to one before the mainshock. It suggests a possibility that loading processes exists below the low-decay rate zone where seismic activity observed prior to the main shock.