

Seismicity change in the inter-seismic period in the rupture area of the 1994 Sanriku-Oki Earthquake revealed by OBS survey

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From fall 2000 to summer 2001, we observed microseismicity in the rupture area of the 1994 Sanriku-Oki Earthquake (Mw7.7) using an Ocean Bottom Seismometer (OBS) network with 30 instruments (25 running for the first 40 days and five for 10 months). Land GPS network data shows that the ultra-slow post seismic failure has ceased, and interplate coupling is recovering in the Sanriku region. We expect that the present seismicity pattern is different from that of the aftershock activity reflecting such change, and seek temporal changes in spatial distribution of micro earthquakes in this area by comparing the hypocenter distribution of 2000 with the aftershock distribution (Hino et al., 2000).

The aftershocks were distributed over the whole rupture area forming many clusters, except a gap in the central part corresponding to an asperity with the largest coseismic moment release. The result of the OBS observation between 2000 and 2001 shows that the seismicity in the gap of aftershock activity is still remarkably low at present and that many earthquakes are located within clusters whose positions are almost identical to those of the aftershocks, indicating that the seismicity pattern has not changed significantly. However, the shallow earthquakes occurring in the overriding plate, which were active during the aftershock period, are not found in the present activity, suggesting that this shallow seismicity is peculiar to the aftershock activity. Several similar earthquakes, taking places repeatedly in this region for more than 10 years (Igarashi et al., 2001), are contained in the aftershock clusters along the plate boundary but not in the shallow intra-crust activity. This also indicates that the shallow seismicity may not be active in steady state. The shallow events during the aftershock activity may be triggered by the stress change due to the rupture of the largest asperity of the 1994 mainshock.