

Seismic Quiescence and Activation prior to the 2003 Tokachi-Oki earthquake

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We have investigated seismicity prior to the 2003 M8.0 Tokachi-Oki earthquake based on a seismic catalog produced by the authors. We examined all waveform data from 8000 earthquakes with a magnitude of 3 or larger recorded by the Institute of Seismology and Volcanology, Hokkaido University (ISV) from January 1994 to September 2003, picked P and S wave arrival times and calculated hypocenters and magnitudes. In order to produce a temporally homogeneous seismic catalog we used only seventeen old seismographic stations installed before 1994 and we did not use new stations installed between 1994 and 2003. Earthquakes located within the Pacific plate were selected from the seismic catalog and ZMAP developed by Wiemer and Wyss (1994) was applied to the selected data. We found that the seismicity changed significantly 5 years prior to the 2003 Tokachi-Oki earthquake in and around the focal area. (1) Seismic quiescence was detected in the deeper edge of the focal area and within the Pacific plate at 150 km in depth. (2) Seismic activation was detected within the Pacific plate at 250 km in depth and in the neighboring areas northeast and southwest of the 2003 Tokachi-Oki earthquake.