# Detection of active responses of the crust beneath Japan in 2003

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We investigated the active response of the crust by examining the triggering of earthquakes from stress changes of the Miyagi-oki earthquake (Mjma7.1) on 26 May and from stress perturbations due to wave propagation from the 2003 Tokachi-oki earthquake on 26 September.

1. 2003 Miyagi-oki earthquake (26 May)

The seismic activity of shallow earthquakes in the northern part of Miyagi prefecture increased immediately after the main event. Statistic-beta and z-value statistically support the increases, which might be explained by the static triggering since the Coulomb Failure Criterion (Delta_CFF) has postitive values on the order of 10e-3--10e-2MPa in these regions. We can not discount the possibility that the earthquakes were dynamically triggered in the region, where Delta_CFF values are small. Subsequent earthquakes (Mjma5.6, 6.2, 5.4) occurred in the area, where Delta_CFF had positive values, but there was little increase in the seismic activity during the two months after the event on 26 May. This suggests those earthquakes might have been statistically triggered with a time delay.

2. 2003 Tokachi-oki Earthquake (September 26)

We studied active response to the seismic waves from the Tokachi-oki earthquake in 2003. We used Hi-net data recorded by NIED at about 700 stations, and constructed RMS envelope waveforms, which were high-passed filtered to detect radiated waves in the neighborhood of the station. We compared amplitudes of the RMS envelope waveforms 1000 sec before and after the Tokachi-oki Earthquake. Large dynamic responses were found around Shikoku, Kii peninsula, and the Tokai region, where the epicentral distances are more than 1000km. The increases in seismicity consist mainly of deep low frequency tremor (DLFT) at depths of 30--40km. The stress changes produced by the teleseismic waves were on the order of 10e-4--10e-3 MPa at Shikoku. The seismic waves from the Tokachi-oki earthquake in 2003 are shown to have remotely triggered the DLFT.