

Possible slow slip event on the plate interface induced by the largest aftershock of the 2005 Miyagi-oki earthquake

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We found possible episodic slow slip event on the plate interface between the subducting Pacific plate and the overriding continental plate beneath Northeastern Japan by analyzing GPS time series after the Miyagi-oki Earthquake (M7.2) on 16 August 2005.

The source area of the 2005 Miyagi-oki Earthquake overlapped with the southeast portion of the rupture area of the 1978 Miyagi-oki Earthquake (M7.5), which is expected to reoccur in the near future. The largest and second largest aftershocks (M6.6 on 2 December 2005 and M6.1 on 17 December 2006) and post-seismic slip occurred after the main shock.

GPS time series after the largest aftershock suggest that another aseismic slip event might start immediately after the largest aftershock at some area north of its hypocenter. Thus, we applied time dependent inversion analysis based on Yagi and Kikuchi (2003) to the GPS time series to estimate the distribution and evolution of aseismic slip on the plate interface.

The result shows that a slow slip event occurred around the hypocenter of the second largest aftershock which occurred 15 days after the largest aftershock at a distance of about 40 km to the north. This slow slip event might be induced by seismic motion or static stress change due to the largest aftershock. Stress accumulation by this slow slip event might affect the occurrences of the second largest aftershock and small repeating earthquakes which occurred on January 2006 in the hypocentral region of the second largest aftershock.