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Seismic source process of 2006 (Mw 8.0) and 2009 (Mw 7.6) intra-plate earthquakes in the vicinity of Tonga trench

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On May 3, 2006 (Mw 8.0) and March 19, 2009 (Mw 7.6), two great intra-plate earthquakes occurred in the vicinity of Tonga trench, where the Pacific plate subducts below the Australian plate. The tectonic erosion is dominated in Tonga trench, and a number of major intra-plate earthquakes have occurred along this trench.
To understand source mechanism of great intra-plate earthquakes in this trench, we estimated high-resolution hypocenter location and coseismic slip distribution using the global seismic networks. We applied the Double-Difference method to Earthquake Data (EDR) Report of United States Geological Survey (USGS) for estimation of high-resolution hypocenter location, and applied waveform inversion to records of FDSN network station and GSN network station from Incorporated Research Institutions for Seismology Data Management Center (IRIS-DMC) for estimation of coseismic slip distribution.
As a result, it was found that earthquake of 2006 and 2009 started at bottom of seismogenic layer where compressive stress is dominated due to bending of oceanic plate, and seismic rupture cannot propagated to tensional stress area.