

Postseismic deformation of the 2011 Tohoku Earthquake using GPS/acoustic observations

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Large interplate earthquake repeatedly occurred in Japan Trench. Recently, the detail crustal deformation revealed by the nation-wide inland GPS network called as GEONET by GSI. However, the maximum displacement region for interplate earthquake is mainly located offshore region. Based on this background, we has been developed a GPS/Acoustic observation (GPS/A) system for the seafloor crustal deformation monitoring. A major earthquake struck in Japan Trench on March 11, 2011, named as the 2011 off the Pacific coast of Tohoku earthquake (here after 2011 Tohoku earthquake). Kido et al (2011) investigated the coseismic seafloor deformation by the GPS/A system. They reported the 15 and 31m coseismic displacements in GJT4, and GJT3, respectively. Both sites moved toward ESE direction, which is opposite direction of the plate subduction. These results suggested the heterogeneity of the coseismic slip distribution in the plate interface [e.g. Inuma et al. submitted].

After the such large earthquake, the large postseismic deformation is also expected which may be caused by the afterslip for short (~several year) time period. The spatial coverage of the GPS/A sites is still not enough because of we have only two sites in and around the focal area. For more detail information for the postseismic deformation, we has been deployed one more GPS/A site from 2011July. We observed 3 times for the GJT3 for postseismic deformation in 2011 April, August, and October. As the result, we obtained 1.2 m displacement toward the ENE direction in GJT3. It is clearly larger than the displacement expected from the afterslip inferred from inland GEONET time series (<http://www.gsi.go.jp/cais/topic110314-index.html>). It suggests that the estimated afterslip based on the inland GPS data may underestimate the actual afterslip amount in the offshore region. Inuma et al. (this meeting) constructed a preliminary afterslip distribution using onshore and seafloor displacement (GPS/Acoustic observations, pressure gauges). They pointed out the large postseismic on the shallow part of plate boundary. We will have more detail discussion for the postseismic deformation in the meeting.

Keywords: Postseismic deformation, seafloor crustal movement, the 2011 off Pacific coast of Tohoku Earthquake