

## Seafloor vertical displacements related to the 2011 Tohoku-Oki earthquake observed by ocean bottom pressure gauges

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Seafloor vertical displacements related to the 2011 Tohoku-Oki earthquake were directly observed by in-situ ocean bottom pressure (OBP) measurements using autonomous gauges. In the vicinity of the hypocenter of the earthquake within a distance of 100 km, eight OBP gauges recorded OBP during several months including the time of the occurrence of the earthquake. In addition, we carried out several-months OBP observations after the earthquake at five sites on a landward slope of the Japan Trench between Miyagi and Aomori. The OBP observations starting before the Tohoku-Oki earthquake revealed coseismic seafloor vertical displacements of the mainshock (Mj9.0, 5:46 UT, 11 March), the largest foreshock (Mj7.3, 2:45 UT, 9 March), and the second largest foreshock (Mj6.8, 21:24 UT, 9 March), and associated slow displacements including postseismic displacements. This presentation summarizes these observational evidences. The observed coseismic displacements were meters, tens of centimeters, and centimeters for the mainshock, the largest foreshock, and the second largest foreshock, respectively. Detecting slow seafloor vertical displacements from OBP records seems difficult because OBP signals related to the slow displacements are contaminated by ubiquitous oceanic variations. The authors developed an ocean model based on a numerical simulation, and corrected the OBP data. As a result, a slow vertical displacement of centimeters was evident at a time from the largest foreshock to the mainshock. The postseismic displacements after the mainshock were evident as a subsidence at most sites near the hypocenter region. The subsidence was large at landward sites, and reached several tens of centimeters during several months. The OBP records starting after the earthquake will be examined considering a separation of postseismic displacements and instrumental drifts.

Keywords: ocean bottom pressure, seafloor vertical displacement, coseismic slip, slow slip, postseismic slip