南海トラフC0002G長期孔内観測点における孔内水圧計校正
Calibration of the borehole pressure gauges installed in the C0002G observatory in the Nankai trough

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In the Nankai Trough region, several large interplate earthquakes with magnitudes of 8 have occurred repeatedly due to a subduction of the Philippine Sea Plate beneath the Eurasian Plate at a rate of 4-6 cm/year. In this area, Japan Agency for Marine-Earth Science and Technology (JAMSTEC) deployed a long-term borehole monitoring system (LTBMS) into the C0002G boreholes during the IODP expedition 332 in 2010 to understand a seismogenic process of large interplate earthquakes. The LTBMS incorporates four pressure sensors, a volumetric strainmeter, a tiltmeter, a geophone, a broadband seismometer, accelerometers, and a thermistor string. Among the sensors, the pressure measurements are important for detections of long-term and small crustal deformations associated with the occurrence of large earthquakes. However pressure measurements contain instrumental drifts in the sensors in addition to the pressure changes associated with crustal deformations. Therefor calibrations for the pressure sensors are indispensable.
All pressure sensors are deployed on the ROV platform of the C0002G observatory, but each pressure sensor measure different water pressure depending on its pressure port depth (0 ~ 948 mbsf). One pressure port is located on the ROV platform (seafloor), the others are distributed inside the C0002G borehole and are connected by steel hydraulic lines with valve systems. The valve systems are manually operated by ROV manipulator, and switch target pressures from the pore fluid pressure in the C0002G borehole to the pressure on the seafloor. The valve systems are used for calibrations of the pressure sensors. Changes in relative instrumental drifts are estimated using the data during recording the seafloor pressure, because all the pressure sensors measure a reference seafloor pressure.
We repeatedly calibrated the pressure sensors in the C0002G borehole in the KY14-04, the KY15-05, and the KY15-16 cruise. Because all valve system were not switched during the cruises, instrumental drifts of the two pressure sensors in the borehole were estimated relative to the seafloor pressure sensor. The relative drift rates were estimated to be -3.88 and 2.37 hPa/year, respectively.
Absolute instrumental drifts are necessary to understand long-term and small pressure change. We are developing a mobile pressure gauge to calibrate a pressure sensor on the seafloor. A target accuracy of the gauge is less than 1 hPa. The absolute instrumental drift rates of all pressure sensors in the borehole will be estimated using the data.

キーワード：長期孔内観測システム、C0002、南海トラフ、水圧計、校正
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