

## Long-term ocean-bottom seismometers in MRI/JMA and some related problems

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In 2011 to 2012, seismology and volcanology research department/MRI introduced eight long-term ocean-bottom seismometers (OBSs) by converting existing short-term ones so that we were able to conduct one-year-long, three-component seismographic observation. The conversion was made by changing the control circuit, the AD convert, and the data storage device into low-power consumption ones.

In November 2011, four long-term OBSs were deployed off Boso Peninsula, about 40 km east of Tokyo, to test them and to investigate seismicity in this region that adjoins the southern end of the mainshock rupture area of the March 11, 2011 Tohoku earthquake (Mw9.0). In September 2012, we tried to recover the four long-term OBSs that were deployed in 2011 and re-deploy other four long-term OBSs. However, all transponder units of four long-term OBSs to be newly deployed got out of order soon after the vessel left the port. So we declined to newly deploy other four long-term OBSs. Also, we could not recover two long-term OBSs among four that were deployed. We confirmed that two recovered long-term OBSs recorded ultra-micro earthquake activity successfully.

After the cruise, the OBS transponder units that became out of order were tested in manufacturer's laboratory so that the cause of the trouble was inferred to be (1) possible opening within the housing of transducer unit of OBS transponder due to thermal expansion/contraction thorough high temperature in summer and low temperature in winter, and (2) cavitation in silicon-oil within the housing of transducer unit of OBS transponder due to hull vibration. Countermeasures were devised as follows; (a) overhaul of electric circuits and transducer unit housing filled with silicon oil, (b) use of base-isolation floor-mat on which OBSs should be placed. Both of manufacturer's laboratory tests and actual onboard tests suggest that these countermeasures are effective.

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