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Recent progress on early tsunami detection by offshore observatory

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Offshore tsunami observation technologies have been developed and their related instruments have been deployed in the last few decades, which are traditional bottom pressure gauges, DART buoys, and kinematic GPS buoys, etc. We report the recent tsunami observations by our JAMSTEC's offshore cabled observatory off Hokkaido, Japan, which consists of two bottom pressure gauges using oscillating beam-shaped quartz crystal. We have decoded 10 Hz dataset by using numerical filtering technique to let tsunami signals be prominent for both the far- and the near-field tsunamigenic earthquakes. In this study, we introduce the 2006 Kuril Is. earthquake (Mw8.3) as a far-field event. About one hour later from the earthquake origin, a series of the tsunami signals were detected by two bottom pressure gauges. Tsunami amplitudes observed offshore were about 3 cm, while those observed at the coast were a few tens of centimeters. On the other hand, as a near-field event, the 2008 off Tokachi earthquake (Mw6.8) whose source was located beneath the observatory is introduced. As a result, a tsunami signal could be detected simultaneously with the earthquake origin with its amplitude of about 4 cm in the source. We also carried out 3D tsunami computation to reproduce hydro-pressure for both the tsunamigenic earthquakes. The first wave could be well reproduced in our tsunami computation, but there are still some discrepancies about the arrival time and the amplitude for the second or later waves. In conclusion, our JAMSTEC's offshore observatory off Hokkaido possibly becomes one of the key facilities for early tsunami detection from the Kuril trench, if an appropriate dataset's processing would be established.