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Observation of very low frequency earthquakes near the Nankai Trough by using broadband ocean bottom seismometers

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Recently, low-frequency earthquakes and slow slip events are recognized in deep region of the plate boundary between the landward plate and the subducting Philippine plate below the southwestern Japan [e.g., Obara, 2002; Kawasaki, 2004]. The very low frequency earthquakes (VLFEs) within the accretionary prism close to the Nankai Trough are also reported by using the broadband seismograph data monitoring system in the land area [e.g., Obara and Ito, 2005]. Such novel seismic events might reflect coupling properties at the plate boundary. It is important to understand such events for consideration of the subduction process and estimation of generation mechanism of the mega-thrust earthquake sequence in the Nankai Trough. Because the VLFEs in the Nankai Trough region occurred far from land seismic stations, earthquake observations using broadband Ocean Bottom Seismometers (BBOBSs) near the trough are needed to understand such VLFE activities.
In December 2008, we started the observation off Kii Peninsula, using three BBOBSs and six 1Hz type Long-term OBSs. We retrieved them in November 2009. The spatial intervals among OBSs were about 20km. The data recorded by each OBSs were merged and continuous records were created. The VLFEs with predominant frequency of 0.1-0.2 Hz were found from continuous records in March 2009. When the VLFEs occurred, seismicity of ordinary micro-earthquakes became high simultaneously.

Keywords: marine seismology, TonankaiNankai, low frequency earthquake