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# Compact ocean bottom cabled seismometer system and installation plan to Japan Sea

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To install seismometers on the sea floor is necessary for monitoring seismic activities of a seismogenic zone. An ocean bottom cable seismometers system (OBCS) is most suitable for this purpose since data can be obtained in real-time. We have been developing a new OBCS system. The concepts of the development are a compact observation node and a low cost of the system. Utilization of the up-to-date Information and Communication Technologies enables to reduce a size of the observation node and a cost. Reliability of the system is kept by using redundant system. Historical large earthquakes have occurred in and around the Niigata-Kobe Tectonic Zone (NKTZ). Recently, there were three large earthquakes (the 2004 Chuetsu Earthquake, the 2007 Noto-Hanto Earthquake, and the 2007 Chuetsu-oki Earthquake). Therefore precise seismic activity which may be induced by the large strain rate should be understood. Although a coastal area in the central NKTZ is close to land where many seismic stations are installed, seismic stations in marine area are needed for acquisition of the precise seismic activities. From these reasons, we decided to install the first practical OBCS system in the marine area of the NKTZ. At the present, location of the deployment is planned to be the source region of the 1964 Niigata earthquake.
The practical OBCS system for the first field installation has a total length of 25 km and 4 Cabled Seismometers (CSs) with 5 km interval. Because the target area is small and earthquakes occur at shallow depths, the small size system is effective for earthquake observation in the NKTZ. Each CS has three-component accelerometers. There is only one landing station due to limitation of the cable length. Therefore the Ethernet channel is adopted to be turned at the end of the cable. Since the seafloor cable has 8 fibers, three pairs are used for the Ethernet cannels and two single fibers are employed for the clock module. The data transmission channel using the Ethernet is duplicated and one of the Ethernet channels is turned in the furthest CS from the landing station for ring configuration. The clock module also has duplicated channel for redundancy. The data from the CSs are transmitted to the landing station. At the landing station, the data are stored in a large disk array system. In the case that the Internet has enough capacity from the landing station to the data center, all the data from the CSs are transmitted to the data and control center at the Earthquake Research Institute, University of Tokyo in Tokyo. In the case that the capacity of the Internet is limited, the system status of the OBCS and a part of the data are sent to the ERI. If a remarkable event occurs, all the data of the event will be retrieved via the Internet. The system control commands will be sent from the ERI.