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Towards marine seismological Network: real time small aperture seismic array

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Most powerful and dangerous seismic events are generated in underwater subduction zones. Existing seismological networks are based on land seismological stations. Increased demands for accuracy of location, magnitude, rupture process of coming earthquakes and at the same time reduction of data processing time require information from seabed seismic stations located near the earthquake generation area. Marine stations provide important contribution for clarification of the tectonic settings in most active subduction zones of the world.
Early warning system for subduction zone area is based on marine seabed array which located near the area of most hazardous seismic zone in the region. Fast track processing for location of the earthquake hypocenter and energy takes place in buoy surface unit. Information about detected and located earthquake reaches the onshore seismological center earlier than the first break waves from the same earthquake will reach the nearest onshore seismological station.
Implementation of small aperture array is based on existed and shown a good proven performance and costs effective solutions such as weather moored buoy and self-pop up autonomous seabed seismic nodes. Permanent seabed system for real-time operation has to be installed in deep sea waters far from the coast. Seabed array consists of several self-popup seismological stations which continuously acquire the data, detect the events of certain energy class and send detected event parameters to the surface buoy via acoustic link. Surface buoy unit determine the earthquake location by receiving the event parameters from seabed units and send such information in semi-real time to the onshore seismological center via narrow band satellite link. Upon the request from the cost the system could send wave form of events of certain energy class, bottom seismic station battery status and other environmental parameters. When the battery life of particular seabed unit is close to became empty, the seabed unit is switching into sleep mode and send that information to surface buoy and father to the onshore data center. Then seabed unit can wait for the vessel of opportunity for recovery of seabed unit to sea surface and replacing seabed station to another one with fresh batteries. All collected permanent seismic data by seabed unit could than downloaded for father processing and analysis.
In our presentation we will demonstrate the several working prototypes of proposed system such as real time cable broad band seismological station and real time buoy seabed seismological station.