Geophysical Research Abstracts
Vol. 13, EGU2011-2588, 2011
EGU General Assembly 2011

The ocean bottom seismometer of the German instrument pool for amphibian seismology (DEPAS)

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DEPAS ("Deutscher Geraete-Pool fuer amphibische Seismologie" / "German instrument pool for amphibian seismology") is a German pool of long term broadband onshore and offshore seismological stations. The instrument pool actually contains 100 onshore stations which are operated by the GeoForschungsZentrum Potsdam (GFZ) as well as 80 ocean bottom seismometer (OBS) managed by the Alfred Wegener Institute Bremerhaven (AWI). German scientists can apply for the use of these instruments in national and international projects. All applications will handled by an external steering board. This contribution introduces the marine part of the pool. The technical configuration of the broadband ocean bottom seismometer will be outlined and data examples will be presented to show performance and limits of the OBS.

A DEPAS broadband ocean bottom seismometer consists of a stainless titanium frame, floating units made of syntactical foam and several titanium tubes. These tubes contain a digital data recording unit, batteries and an acoustic release transponder to communicate with the instrument and to release the iron anchor weight. A xenon flash light, a VHF radio beacon and a flag help to locate and recover the OBS after emerging at the sea surface. The OBS are equipped with a gimbal-mounted broadband seismometer (60 s - 50 Hz) and a hydrophone (100 s - 8 kHz). Therefore the OBS can be used both for active wide-angle seismics as well as passive earthquake seismology. The instruments normally will be deployed at the sea floor for one year at a maximum water depth of 6000 m. Some deep-water units were especially designed for investigations at subduction zones and deep-sea basins, these can be used at water depths up to 7300 m.

Until now 19 national and international projects using DEPAS OBS were completed. The projects range from one single OBS in the Baltic Sea to more than thirty units used in the Arctic with deployment times between a couple of days and one year. Data quality of most broadband ocean bottom stations is very good considering the special environmental conditions on the sea floor. Of course OBS records can not be compared to well installed onshore stations. Especially the noise level is much higher due to the lesser coupling of the seismometer. But data quality is sufficient enough e.g. for local seismicity studies or analysis of teleseismic events, even whale calls can be found. Therefore the DEPAS OBS provide a good opportunity to investigate regions which still are seismologically unknown. Especially the combination of broadband onshore and offshore stations allow to conduct large-scale amphibian experiments.