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# Performance comparison of mid-aperture broadband arrays at an ocean island and in the deep ocean

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Between 2011 and 2012, three mid-aperture broadband arrays were deployed on the island of Madeira, in western Portugal, and north of the Gloria fault in the Mid Atlantic within the DOCTAR (Deep Ocean Test ARray) project. Here, we compare performance parameters for the ocean island array on Madeira and the deep ocean array. The Madeira array consists of 24 temporary stations (12 broadband stations (8 Guralp 60s & 4 STS2), 12 temporary LE3D 5s stations). The mean inter-station distance is about 5 km and the array has an aperture of about 20 by 40 km on the island of Madeira if the broadband station(STS2) on the nearby island of Desertas is excluded. Furthermore, there are 3 permanent stations installed on Madeira (one Guralp 120s and 2 LE3D 5s) and 2 on the neighbouring island Porto Santo (one Guralp 120s and one LE3D 5S). The deep ocean array consists of 12 ocean bottom stations (broadband seismometer (Guralp 60s) combined with a HTI hydrophone (DEPAS type instruments)) and was deployed at the sea floor close to the Gloria fault between 5000 m and 4000 m water depth. The inter-station distance was about 10 km and the aperture about 70 km.

One purpose of the experiment is to test the possible advantage of ocean bottom arrays in comparison to ocean island installations. Therefore, we compare different aspects:
(1) the experimental effort and the specific problems of data processing (e.g. data loss, clock drift and station location problematic in case of the deep ocean array). Special emphasis will be given to the orientation of three component stations by waveform comparison methods and results from the use of a portable Gyrocompass on Madeira.
(2) the ambient noise spectra as a function of frequency and time,
(3) examples of fk analysis and the specific problems on the ocean floor and volcanic, oceanic islands (topography and scattering effects).
(4) detection thresholds and frequency content of local and regional events.

The presentation finally gives our preliminary conclusion on the potential and performance of seismic broadband arrays in the deep ocean.