

## Project Summary

In April 2002, we installed a broadband three-component station on the sea-floor, in Monterey Bay, CA (Monterey Ocean Bottom Broadband, MOBB), 40 km off-shore and west the San Gregorio fault, in 1000m deep water and completely buried. This is a collaborative project of the University of California at Berkeley Seismological Laboratory (BSL) and the Monterey Bay Aquarium Research Institute (MBARI).

The MOBB station comprises a three-component seismometer package, a current-meter, a differential pressure gauge (DPG) and a recording and battery package. The station may be one of the first sensors linked to the planned MARS cable in Monterey Bay, which will allow real-time acquisition of data as well as continuous access to power. In the meantime, data are recorded on-site and recording systems and power units are exchanged every three months, through scheduled dives of the MBARI ROV *Ventana*. The data are archived at the Northern California Earthquake Data Center (NCEDC), an "on-line" archive.

Complementing the land-based network of broadband seismic stations is crucial to 1) provide better azimuthal coverage and thereby improve the characterization of moderate to large earthquakes occurring in northern California along the San Andreas system, 2) to improve understanding of the tectonics of this plate boundary and the structure of the continent/ocean transition. In the present proposal, we request funds towards the following collaborative tasks: 1) to characterize the three component background noise at MOBB at periods longer than 10 sec and developing post-processing methodologies to improve seismic data quality, as well as better understanding processes involved in the generation of infragravity waves; 2) to evaluate the improvement thus obtained for the study of seismic events, in particular through the determination of regional moment tensors and regional crustal structure and comparisons with data from near-by land based stations of the Berkeley Digital Seismic Network; 3) continue to operate MOBB and periodically retrieve data, as well as prepare the system for the connection to the MARS cable.

### Broader Impacts

MOBB is the first step towards extending the land-based broadband network in northern California off-shore to better characterize the seismicity, tectonics and structure of this region. The experience gained through MOBB can help design better future near-off-shore ocean floor broadband seismic systems to complement the land based networks in the western US or other similar settings, either permanently, or in the intermediate time scale (1-2 years), for example in the context of such programs as the USArray of Earthscope. It may also provide guidelines on optimal installation procedures, as well as prospects for post-processing noise reduction. Already, the MOBB instrument preparation and deployment experience acquired over the last 2 years has benefitted other planned broadband projects (i.e, collaboration on testing and conditioning of broadband systems for the Univ. of Washington KECK project).

This project will directly contribute to the training of a graduate student, as well as indirectly to that of 8-10 graduate students in Geophysics at UC Berkeley, through the sharing of results during weekly discussion meetings.