Geophysical Research Abstracts
Vol. 15, EGU2013-11869, 2013
EGU General Assembly 2013
© Author(s) 2013. CC Attribution 3.0 License.

# Broadband ocean bottom seismometer in the Gulf of Cadiz (offshore SW Iberia and NW of Moroccan margin): Characterization of ambient noise and tomographic model of the crustal structure.

Carlos Corela (1), Graça Silveira (1,2), Luis Matias (1), Martin Schimmel (3), and Wolfram Geissler (4)

(1) Instituto Dom Luiz (IDL), University of Lisbon, Lisbon, Portugal (ccorela@fc.ul.pt), (2) Instituto Superior de Engenharia de Lisboa (ISEL), Lisbon, Portugal (mdsilveira@fc.ul.pt), (3) Instituto de Ciencias de la Tierra Jaume Almera", CSIC, C/Lluis Solé I Sabaris s/n, 08028 Barcelona Spain (schimmel@ictja.csic.es), (4) Alfred-Wegener Institut Bremerhaven, Germany (Wolfram.Geissler@awi.de)

In this study we use the continuous data recording performed by 24 ocean bottom seismometers (OBS), wide band (BB), deployed in the Gulf of Cadiz in the framework of the NEAREST project from September 2007 to July of 2008 to study the ambient seismic noise recorded in the bottom of the ocean. Our goals are: i) to understand the instrument and the environmental conditions that control the observed seismic noise; ii) and to obtain reliable broadband surface wave dispersion measurements.

The noise sources are investigated through the probability density functions (PDFs) of power spectral density (PSDs) which provides insights on the generation and propagating of seismic noise in the Gulf of Cadiz.

We show the results of the Rayleigh wave group velocity tomography performed using ambient seismic noise observed on 24 broadband OBS in the Gulf of Cadiz and 7 broadband land stations south of Portugal. The time-series for the 11 months were cross-correlated to obtain empirical Rayleigh wave green's functions between the components OBS vertical-OBS vertical, OBS vertical-land station vertical, OBS hydrophone-OBS hydrophone and between OBS hydrophone-Land station vertical. The results are based on the analysis of two spectral bands corresponding to the primary (10-20s) and secondary (5-10s) microseism peak. The stack of the station-to-station cross correlograms was done to increase the signal-to-noise ratio. In addition to the usual stack, we have also have applied a phase-weighted stack to avoid local noise contamination and so enable the detection of weak coherent signals. These cross-correlograms enabled us to compute short-period surface-wave group-velocity measurements on interstation paths. We used these measurements to construct maps of Rayleigh-wave group-velocity lateral variations at different periods at the Gulf of Cadiz and south of Portugal. Despite the great difference in the crustal structure below the OBS (thin continental or oceanic type) and the land stations (typical continental crust, 30 km thick) we were able to derive high S/N cross-correlations between these two types of sensors.

This study was co-sponsored by several projects namely the NEAREST FP6-2005-GLOBAL-4 (OJ 2005 C177/15), WILAS (PTDC/CTE-GIX/097946/2008), TOPOMED (TOPOEUROPE/0001/2007) and Pest OE/CTE/LA0019/2011.