



Seismological observations of the experiment in Antarctica with MABEL seafloor multidisciplinary observatory

Giuseppe Falcone, Giuditta Marinaro, Giovanni Battista Cimini, Paolo Favali, Francesco Frugoni, Stephen Monna, and Caterina Montuori

Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy (giuseppe.falcone@ingv.it)

MABEL (Multidisciplinary Antarctic Benthic Laboratory) is an Italian PNRA (Programma Nazionale di Ricerche in Antartide) project carried out by INGV (Istituto Nazionale di Geofisica e Vulcanologia) in collaboration with AWI (Alfred-Wegener-Institute, Bremerhaven). MABEL is a deep-sea multidisciplinary observatory for long-term and autonomous observations. It was deployed by R/V Polarstern on December 5th, 2005 on the seafloor of Weddell Sea 69° 24, 29 S and 5° 32,2 W at 1884 m w.d.

Data have been acquired from December 6, 2005 until December 31, 2006, when the observatory automatically ended acquisition and the seismometer was switched off.

For logistic reasons, MABEL was recovered on December 16th, 2008 always using R/V Polarstern and with the aid of MODUS (Mobile Docker for Underwater Sciences) of the TFH Berlin and TU Berlin.

The seismic sensor installed in MABEL is a broad band instrument which allows the recording of weak ground motion in the frequency band ranging between 0.03 and 50 Hz. This instrument is time referenced with a high precision rubidium clock. The continuous record has provided a precious database which was analysed mostly to verify the existence of local and regional events. No clear evidence of local events (distance less than about 150 km from MABEL site) have been detected; on the other hand both regional and teleseismic events were recognized on the seismograms.

In particular, 117 teleseismic events were detected, most of them recorded during the austral winter season. In this period, the background noise level was less than the one recorded during the austral summer season. This observation could be related to the presence of the ice shelf that reduces the occurrence of marine micro-events.

We accurately picked the arrival times of the teleseismic phases recorded by the MABEL station and by some land stations operating in the surrounding area. In this study we show the background noise analysis performed over the MABEL observing period and the pattern of teleseismic traveltime residuals useful for studying crustal and upper mantle velocity anomalies beneath the region.

Acknowledgments:

A particular thank to the other Institutes and Companies participated to the activities:

- Tecnomare-ENI SpA;
- TFH/TU Berlin;
- Alfred-Wegener-Institute for Polar Sciences;
- OGS;
- PNRA (Programma Nazionale di Ricerche in Antartide);
- The Captain and the crew of R/V Polarstern;
- Capt. Emanuele Gentile and Marco Lagalante for marine logistics.