



MABEL Seafloor Observatory in Antarctica

In the frame of the activities of the PNRA (Italian Programme for Researches in Antarctica), the first Antarctic seafloor observatory, called MABEL (Multidisciplinary Antarctic Benthic Laboratory), is now operative.

MABEL is a seafloor observatory designed for multidisciplinary, long-term missions in polar environment realised by INGV and Tecnomare-ENI.

MABEL is a GEOSTAR-class observatory, compatible with the infrastructures already developed for the management of the existing observatories of this class, including the special ROV MODUS (capable to handle payload up to 30 kN at 4000 m) and the winch equipped with an electro-opto-mechanical cable. Using such infrastructures it is possible to deploy the observatory in a controlled and accurate procedure, and subsequently recover it at the end of the mission. The concept is shown in Figure 1.

Once installed, the observatory is able to communicate to a ship of opportunity via a bi-directional acoustic modem, provided by SERCEL.

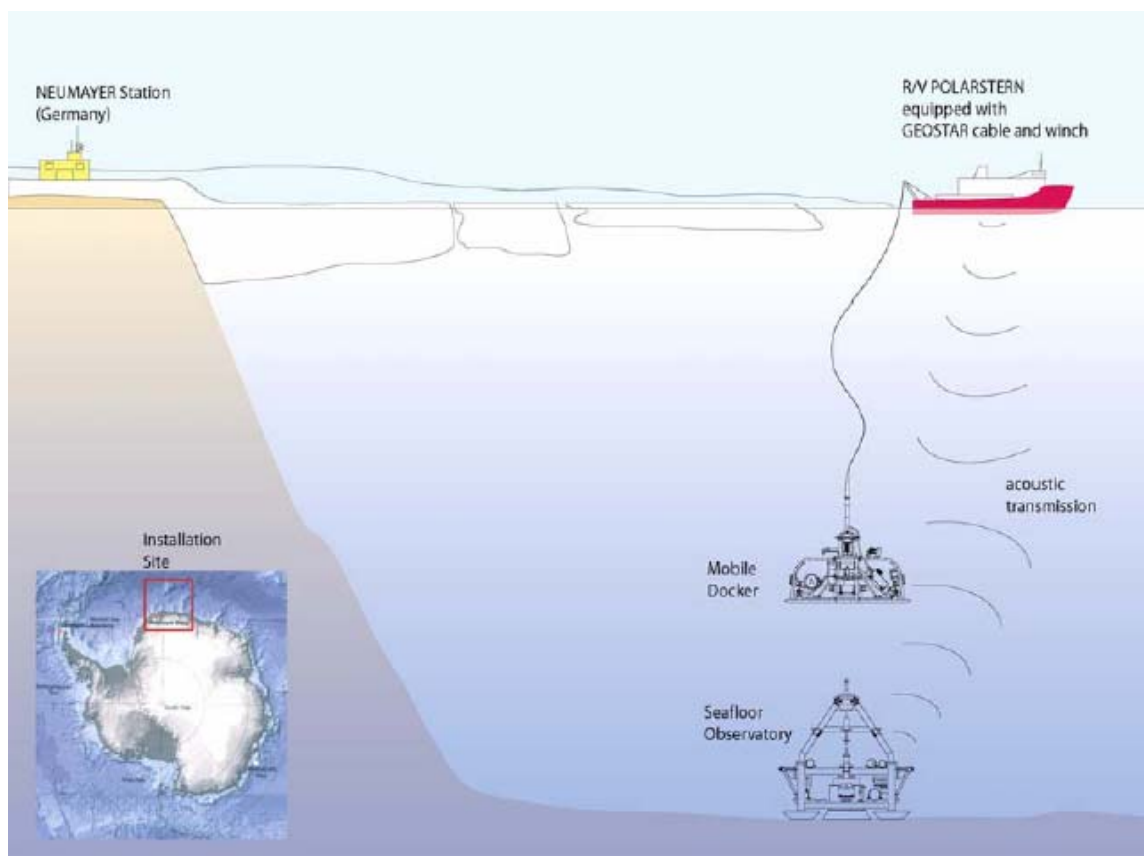


Figure 1 – MABEL concept

For the first deployment in Antarctica, the use of MODUS is not possible; for this reason MABEL will be equipped with a specific device to allow its deployment by means of an alternative solution, based on a mechanical cable and acoustic release. A sketch of this solution is shown in Figure 2.

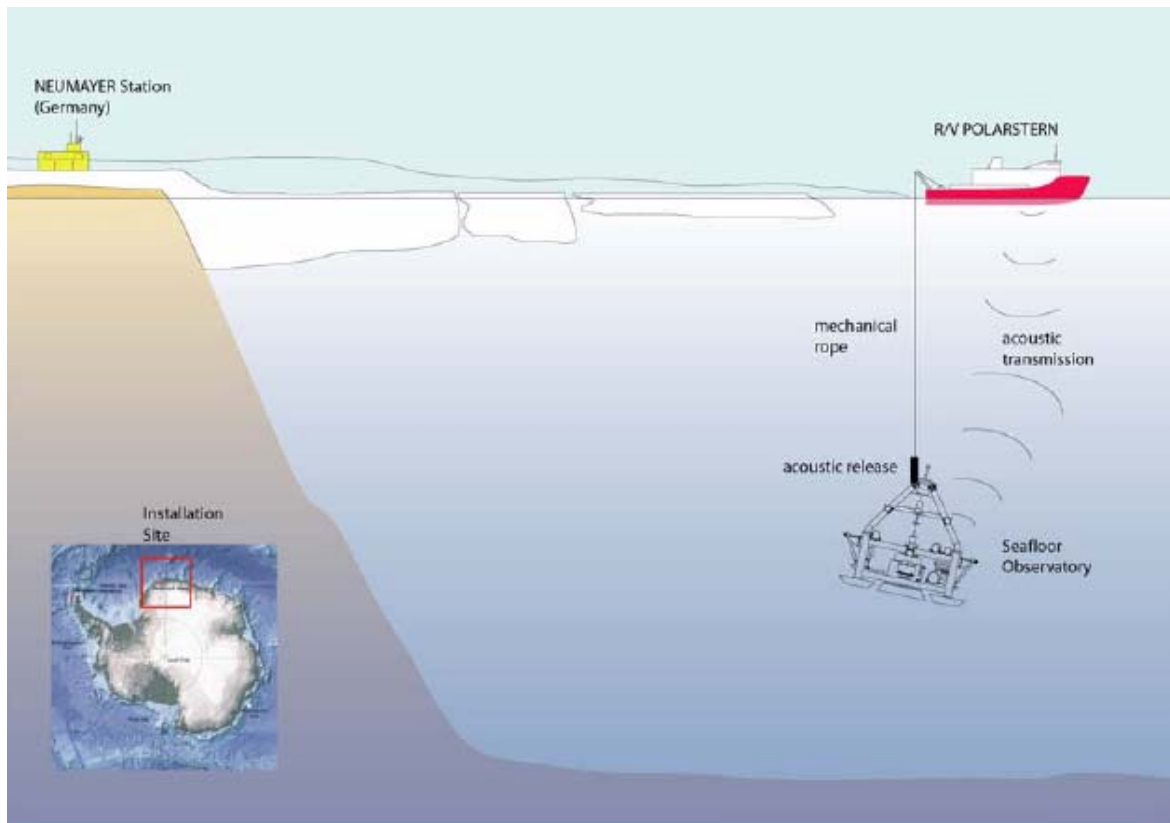


Figure 2 – MABEL alternative deployment solution

On the 05th December 2005 at 5.32 UTC, MABEL has been successfully deployed on the ocean bottom of the Weddell Sea at a depth of 1874 m. The deployment was performed in cooperation with the Alfred Wegener Institute (AWI) using their R/V Polarstern.

The deployment area was set in a wide flat seafloor with an average depth of around 1880 m. This area was chosen following a morfobathimetric survey made with the Hydrosweep and Parasound acoustic systems of the vessel. A photo of MABEL during the deployment operations is shown in Figure 3.



Figure 3 – Photo of MABEL during the deployment

MABEL observatory counts the following scientific sensors (and sampling rates):

- Three component broad band seismometer (100 Hz per channel);
- Vectorial current meter (2 Hz);
- CDT (1 sample/hour);
- Transmissometer (1 data/hour);
- Chemical electrode analyser, presently equipped with pH and redox electrodes (1 data/2 days);
- Water sampler (1 sample/week).

On 1st January 2006, the Polarstern came back on the deployment area and MABEL was interrogated by acoustics and the entire system, including all the sensors, was found fully operative.