ANT-XXIX/5 - Weekly Report No. 2
April 29, till May 5, 2013

OBS "fishing"

Weather is still fine at the beginning of the week. The waves are only 3 m, however, the fog is constantly surrounding our vessel. While the calm sea is perfect for recovering the ocean bottom seismometers (OBS), we are not able to spot the resurfaced instruments from the bridge due to the fog. The visibility is only a few hundred meters. For situations like these, the instruments are equipment with a transmitter and beacon, which are activated after the instrument has surfaced. A direction finder on the bridge allows us to detect the approximate position of the instrument even in dense fog. The vessel then approaches the OBS at a slow speed (5 km/h). The strong and variable ocean currents across the Falkland Plateau cause extra problems since the instruments often resurface at positions more than 2 km away from their deployment position.

On Tuesday, the search for one instrument became especially exciting. It was expected to surface during the last minutes of the champion league semi final soccer match Real Madrid vs Dortmund. Thus, we followed the match via a live satellite broadcast. As usual, the ship carefully approached the approximate position of the OBS, which had already surfaced. Two minutes before the end of the match the mate slightly changed the course of the vessel. As a result of the change the funnel of Polarstern shadowed the satellite antenna and the broadcast broke down. For more than 15 minutes we did not know which team actually won the match. As a consolation, we discovered the flashlight of the OBS right in that moment.

Parallel to the OBS recovery, the geophysicists intensively used the two Polarstern helicopters to map the Earth's magnetic field, whenever the weather permitted. To acquire these data, we towed a sensor 30 m below the helicopter. Depending on the weather conditions, we flew more than 100 km away from the ship parallel to the seismic line. Here, problems occurred as a result of variable weather conditions and decreasing hours of daylight.

At first glance, it is not obvious what we intend to measure. The magnetic field does not taste or smell, nor can it be heard or seen. The permanent magnetic field is generated deep in the Earth's crust at the core-mantle boundary, at a depth of more than 2000 km. A clear evidence for the existence of the magnetic field is the compass needle, which always points north. However, this global magnetic field displays variations, which e.g. are caused by crustal rock with different magnetization. The strength of the magnetic field in our research area is around 30000 nT (Nano Tesla). As to our helicopter measurements, however, we are only interested in variations ranging from 50 to 200 nT. These magnetic anomalies on the Falkland Plateau are caused by basaltic rock, formed during strong volcanic eruptions some 160 million years ago, when South America started to separate from Africa. The combination of both, the magnetic and seismic data sets, is essential to constrain our interpretation. In any case, we hope that weather will be good enough in the upcoming week to allow for more helicopter flights in order to extend our magnetic data set.

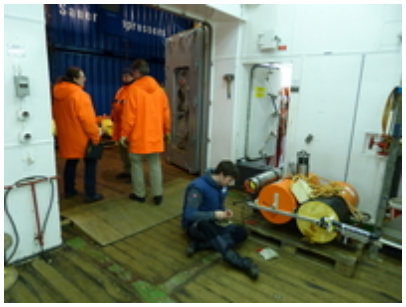


Fig. 1: Last preparations for an ocean bottom seismometer (OBS) in the wet-lab

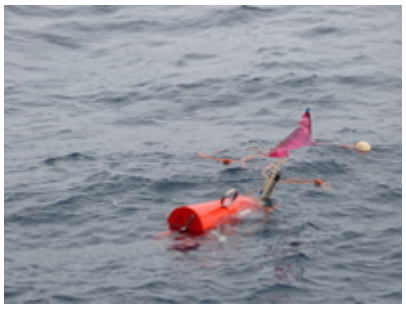


Fig. 2: Surfaced OBS. Note close to the flag the radio transmitter (Novatech) and beacon

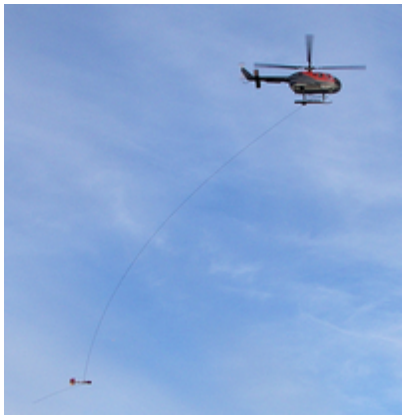
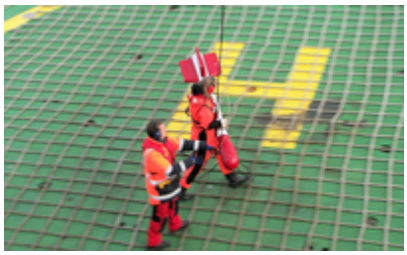


Fig. 3: The magnetic sensor is towed 30 m below the helicopter



Best wishes to the readers at home.

5. May 2013, Falkland Plateau
4°C
50°38’S 39°55’W

Wilfried Jokat