Maria S. Merian Cruise 2 leg 1

First weekly report: 22. - 28. 05. 2006

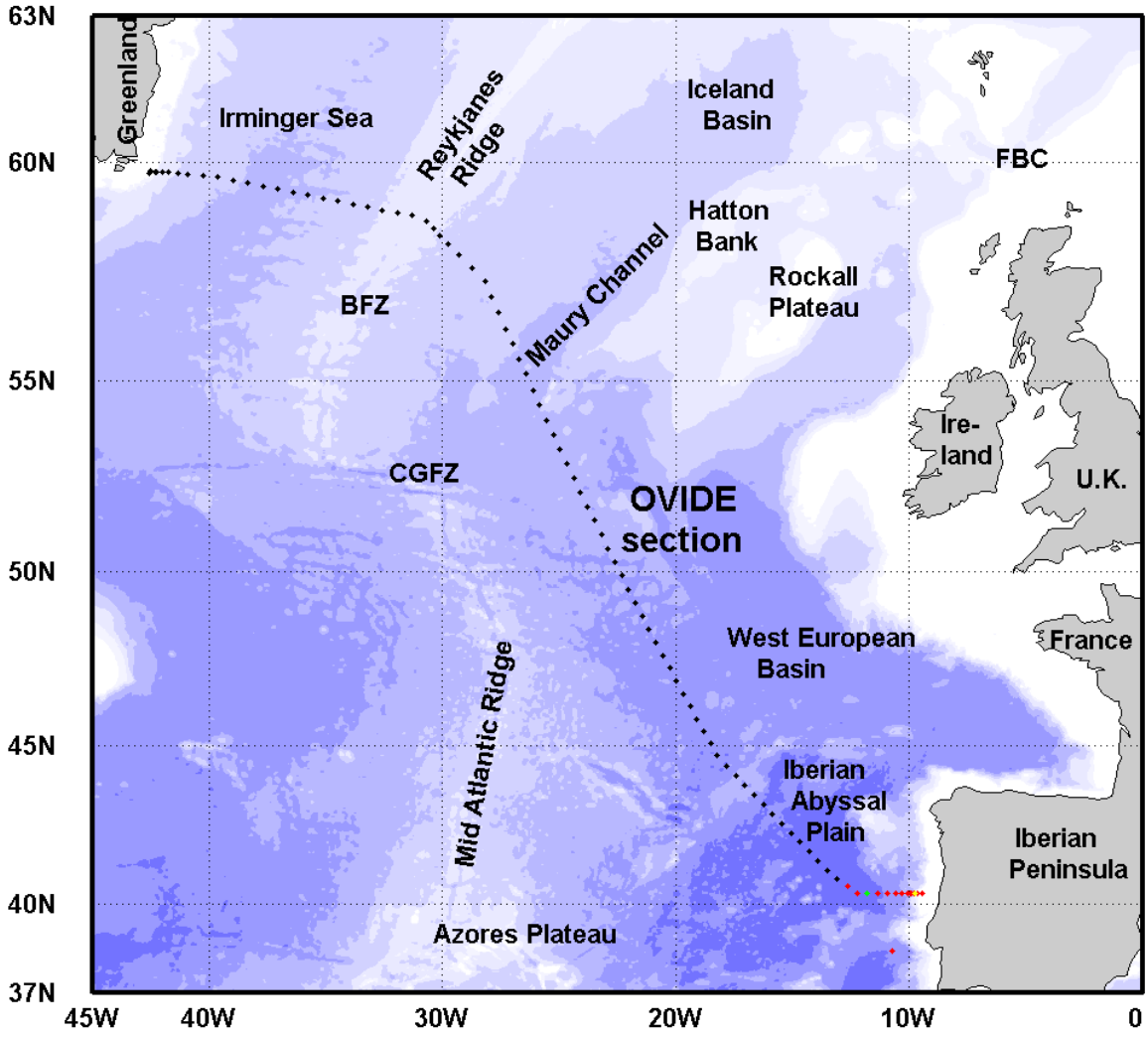


Figure 1*: Ovide section planned in 2006. Red dots indicate the hydrological stations performed from May 24 to 28. The yellow dot is the station where we added a VMP profile, and the green dot, the station where we also deployed a profiling float as soon as we realized that we were in the core of a meddy.*

Monday 22 May, Lisbon

On Monday morning, while scientists are settling down in their 6-week home, our six containers are loaded aboard. Then 36 hours are dedicated to connect the different waters, the electricity and network between the ship and the 3 containers that are used as laboratories, and to initialize the experiments.
A few of us immediately concentrate our efforts on the configuration of the ship ADCP, helped by Catherine Kermabon from Ifremer. In the deck lab, Thierry Terre (Ifremer) and Breck Owens (WHOI) are also finishing the preparation of the 2 SPRAY gliders, teaching us the last steps before deployment that should occur mid June near Greenland. A group of 4 people, Stephen Dye, Neil Needham (both from CEFAS, UK), Ulrich Drübbisch and Andreas Welsch (from IfM Geomar), come aboard to prepare their 2 pipe moorings that we plan to deploy at 63°N east of Greenland.

Tuesday 23 May, 22:00: "off we go"

It's always an exciting moment. Objective: the deep test station at 38° 26' N 10° 42'W. The long Atlantic swell welcomes us as soon as we exit from the Tage.

Wednesday 24 May: "Achtung...stop!"

6 a.m.: here we are, ready for the tests of our 2 CTDs. Usual adjustments, training or simply reminders for the 9 people on watch, first chemical analysis, many details to take care of... the day is fully booked until 9 p.m.. Then, a short debriefing is necessary to clarify the procedure and formalize the communication between the container where we collect the data, the winch control room and the bridge.

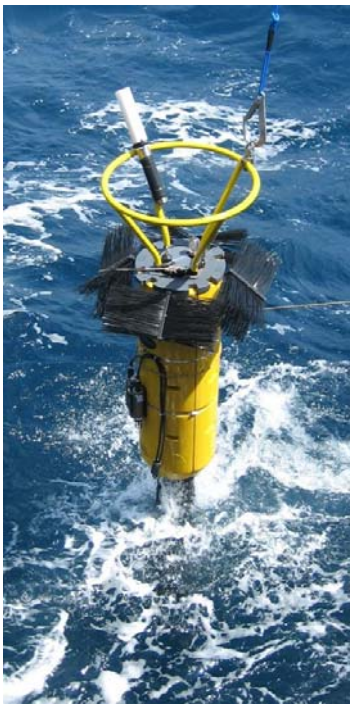
We discover the Posidonia system, that allows us to localize the CTD at depth. It will be very useful for the processing of the current data collected by our Lowered ADCP. We decide to use it for stations deeper than 1000 meters.

Using the ship sounders for detecting actual depth is not trivial. The objective is naturally to avoid hitting the CTD at the bottom of the downcast. It turns out that most of them work around 12kHz. So we must check the possible interferences between the EM120 (we only need the vertical beam of this multi-beam), the EA600, our own pinger mounted on the CTD, and the Posidonia system. We finally choose to use the EA600 as a receiver of our pinger, so that we can monitor the distance between our rosette and the sea-floor. The EM120 is used to evaluate the depth at the beginning of the station and during the upcast, but we have to switch it off during the downcast because it blurs the signal of our pinger. Then, we observe that Posidonia has no effect on all this. A backup system consists in a 15-meter chain attached at one end under the rosette, the "contacter", that rings in the container whenever the apparent weight of the chain decreases.

Thursday 25 May: "VMP in sight..."

Serious things begin. We are back on the shelf, at 150m depth. This is the first station of the Ovide section (fig. 1). Apart from a little surprise on the depth shallower than expected, everything turns out to be good. The upward looking 300kHz ADCP refusing to communicate, we have to install a spare for the following stations. Fortunately, our old downward looking BB150kHz is faithfully fulfilling our expectations.

First chemical analyses give satisfactory results. The team from the Université de Bretagne Occidentale measure CFCs and nutrients, while the team from CSIC Vigo gather information to better understand the carbon cycle.



The 4th station is placed on the upper continental slope at 800m depth. Therefore, the favorable meteorological conditions give us an excellent opportunity to test our new Vertical Microstructure Profiler. Deployed at 14:35 local time, it pops up half an hour later, and is easily localized by both VHF and captain's eyes. After a very smooth approach, the VMP is recovered with the starboard crane without difficulty. 3 hydrological stations close this very active day.

Figure 2*: deployment of the Vertical Microstructure Profiler on May 25.*

Friday 26 May: "a restless night at the bridge"

Night station work begins, and we are now more than 3000m deep. In the middle of the night, a failure occurs in the steering gear of a pumpjet, preventing any dynamical positioning. After a discussion with the scientists, the captain decides to come back to land to be delivered a spare part the following day. Meanwhile, we keep on working, until midnight, achieving five hydrological stations held manually at the bridge.

Saturday 27 May: "land, land"

Figuera da Foz looks nice from the sea, but we will not have a chance to visit it: the spare part is delivered by the pilot at 12:00, and we "immediately" return to the last station. By the time we reach it, the pumpjet is repaired. After measuring this profile again to check its variability, we resume our course a little before midnight. This day is also special. Franck Riedel finally discovered why the 75 kHz ship ADCP signal showed interferences: the DoLog is pinging at 78... and cannot be legally switched off.

A short test in station confirms the diagnosis, and shows the remarkable potential of this ADCP. Even with the DoLog pinging, we can get some information on the currents, but the calculated errors are big.

Sunday 28 May: "a Meddy for Mother's Day"

The influence of Mediterranean Water decreases slowly as we are steaming westward; but at station 15, a relative maximum of salinity at 1000 meters surprises us. Immediately warned by Nathalie, I make a careful comparison with the last 2 profiles and decide to launch a profiling float that is programmed to drift at 1000m depth. Following stations tend to confirm that we were dealing with a Meddy. Let's hope we will be able to follow its path with the float in the following months.

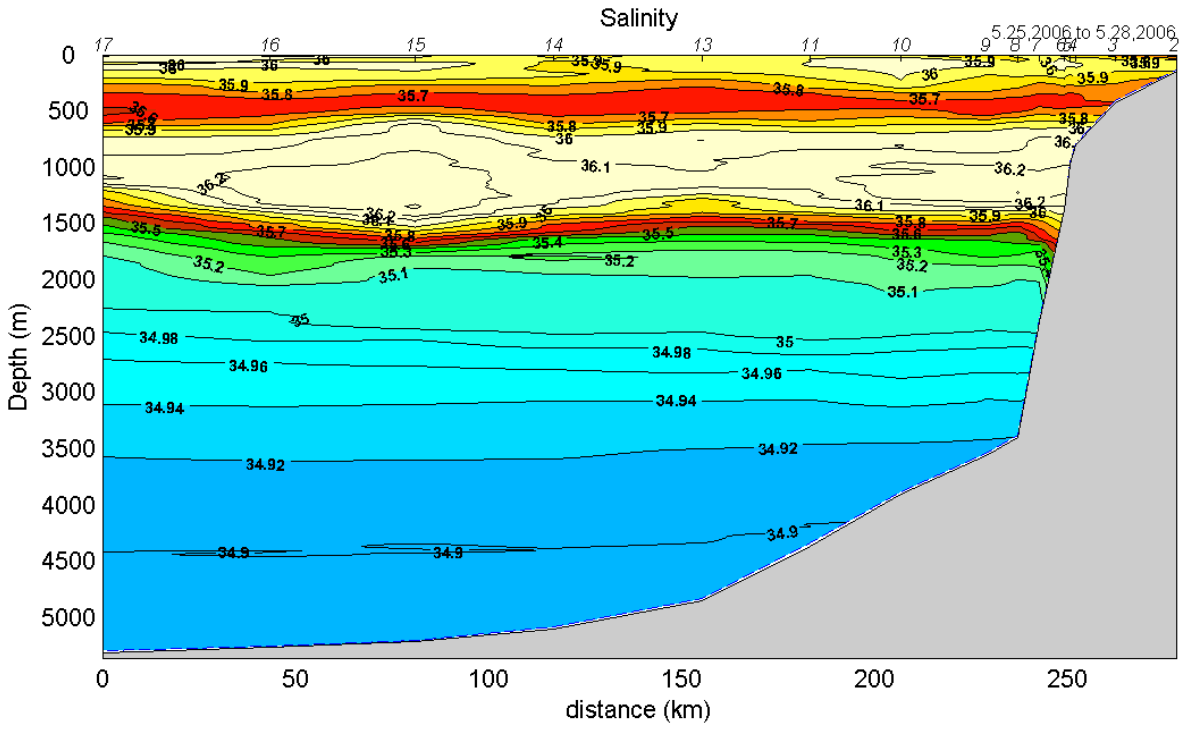


***Figure 3**: salinity section showing the Meddy at station 15 and the Mediterranean vein flowing northward along the Portuguese west coast, centered around 1000 meter depth.*

All the scientists of this mission are most grateful to Captain von Staa and to all the crew aboard the Maria S. Merian.

Bien sincèrement,
Pascale Lherminier und alle Fahrtteilnehmer