

Minutes of Meeting WP4-MFSTEP (MEDARGO)

IFREMER, Brest, France

24-25 June 2003

Participants: S. Le Bras, L. Petit de la Villeon, G. Loec and P.-M. Poulain

This meeting was organized to discuss some important details of MEDARGO, especially those concerned with technical developments (sensors, telemetry, deployment techniques), with the sampling and duty cycle characteristics, and with the data flow and management. Discussions were principally based on the Provor floats. The organization of the upcoming sea tests (with 4 floats in fall 2003) was also included in the discussions.

Sampling and Cycles

We are thinking of duty cycles of 3.5 days for the Apex, and 3 and 4 days for the Provor, in order to provide two T/S profiles per week to MFSTEP (to be confirmed/changed by numerical simulations of Task 4100. We might choose the 3-4 day cycles for the Apex in order to make sure that Argos transmissions occurs on same days. If we have 20 floats with typically 100 cycles/float, this would correspond to $20 \times 100 = 2000$ PTT-days or about 6 PTT-years (~\$24000). Hence, the floats are expected to be operational for more than a year. The cycles will typically include: descent to 350 m in 2 h, drift at 350 m for 3 days (2.5 ou 4 days), descent to 700 m in 2h, ascent to surface (2 h) and transmission at surface for 6 h (maybe reduced to 3-4 hours or less for Iridium floats).

Remarks: It would be interesting to have a few floats with 7-days cycles in order to guarantee a minimum population of floats in the Med after the TOP period. These floats would be operational over two years (e.g., 2004-2005). We might also consider programming a few floats to profile deeper (like down to 1400 m, for example).

The surfacing at the end of the second cycle should be on Monday morning, let's say between 2 and 6 GMT), for all floats. Synchronous surfacing should be coordinated with the switch on timing. On current Provors, days are relative and hours are absolute, so that we have to know a priori which day a specific float is going to be deployed before the shipment. But we have a 24-hour flexibility. Provor floats will be turned on by removing a magnet. Onboard mission modifications will be possible by scientific personnel only.

Provor samples one measurement per meter. These observations are averaged over specified layers. There is only two choices in layer thickness. 5 and 25 m for the surface and deep parts of the water column, respectively, are reasonable values. Provor also samples while descending and while drifting at its neutral depth. The layer thickness can be different for the ascent and descent profiles. It is interesting to take advantage of this to sample T/S while descending to 350 m and to sample, e.g., every 12 hours, at the neutral depth.

Remark: CSIC has to provide IFREMER and Webb with typical T/S profile values for the area where the floats will be operated during the fall 2003 tests. This information is needed in early July 2003.

Sensors

All floats will most likely be equipped with Sea-Bird CTDs. Pre-calibrations of the two CTD's to be installed on the two Provors will possibly be performed at IFREMER/SHOM in summer 2003. After the fall 2003 tests, the CTD's will be calibrated again at IFREMER/SHOM. The CTDs mounted on the Apex floats will only be calibrated after the sea tests at OGS (to be confirmed).

The four floats tested in fall 2003 will be refurbished (new batteries, etc) at IFREMER and OGS (or at Webb's) and eventually upgraded in order to use them during the TOP period.

Deployments

For the tests in fall 2003, IFREMER will develop deployment techniques to deploy the Provor with speeds of 10-15 knots (typical of ferry boats). This will include a cardboard box and a large sock to ease the float deployment (impact with water will be quasi-horizontal). Additional deployment techniques might be developed before the TOP period. The Apex will come in "ready-to-deploy" configuration and will be packaged in soluble cardboard boxes that are simply thrown from the ship's deck.

Telemetry

It is very uncertain that the Argos-2-way will be available and tested on Provor and Apex for the TOP period. IFREMER and Webb (through S. Riser, UW) are working on implementing the Iridium telemetry on the floats. First transmission tests with Iridium at IFREMER were proved promising in terms of energy consumption and data flow. It is hoped that at least two prototypes, one Provor and one Apex, with Iridium will be ready for the TOP. Protocols have to be developed for the data transmission and reception using Iridium, including acknowledgement of data receipt and upload of new configuration.

IFREMER is developing a new board that will be compatible with both Argos and Iridium telemetry. This should be ready in summer 2003.

With multi-satellite service, Argos has 7 satellites: NOAA 11, 12, 14, 15, 16 and 17 and ADEOS-2. This corresponds to about 48 passes/day in the Mediterranean environment (results obtained with a surface drifters in the Adriatic). So, in the mean sense, we can expect 2 passes/hour. Transmitting every 45 s, the number of Argos messages transmitted per pass is typically 6, with a maximum value of 12. Hence, we have typically 12 messages per hour.

Remark: We have to make sure that the individual floats transmit all their data on the same day in order to save on the Argos telemetry costs.

Tests in Catalan/Balearic Sea in Fall 2003

- 1) Ok for deployments on 21-22 September;
- 2) Participants: 3-4 people CSIC, 2 people OGS, 2 people IFREMER;
- 3) Floats should be programmed for only 16 cycles of 3.5 (3-4) days and to stay at surface thereafter. This will ease the recovery operations in late November. This capability has to be verified for both the Apex and Provor floats.
- 4) Inter-calibrations between shipboard CTD and floats: The first Provor descent down to 350 m (while profiling) should be accompanied with a CTD cast. We might consider the Apex to descent down to 700 m and rise to the surface immediately (no parking at intermediate depth) to obtain collocated and synchronous CTD casts and Apex T/S profiles (to be checked with Webb).
- 5) Parilla might deploy additional Apex floats during same cruise. We should interact with him to assure synergy between our tests and his program;
- 6) Recoveries are tentatively scheduled for mid-November (8-17?). IFREMER/OGS might or might not participate. Recoveries will be done using an Argos direction finder.

Miscellaneous

IFREMER has integrated the new Aanderaa oxygen sensor on the Provor. We might be interested to use one of these in the Mediterranean during the TOP.

IFREMER is also developing a new smaller and lighter profiler (PNG – Profileur Nouvelle Generation) that might be tested during the TOP (at no cost to MFSTEP).

Float data flow and management

We discussed the details of the data flow from the Argos system to the various end-users (Coriolis database, OGS database, GTS, INGV for assimilation).

Coriolis will assure the data processing and the data flow from end to end. Coriolis has experience in processing specific Argo project such as Gyroscope.

OGS will set up a new Argos program with the following options :

- ADS :
 - o delivery rate every 8 hours,
 - o delivery addresses : provor_5789@ifremer.fr (Provor) or palace5789@ifremer.fr (Apex) and a back up address at OGS
- multi-satellite service

OGS will request a new Argos program and new Argos PTT numbers for the floats. IFREMER will request WMO numbers and will provide them to OGS. IFREMER will notify all the MFSTEP/MEDARGO deployments to the Argo Information Centre (JCOMM/OPS)

Coriolis will deliver the data in the following modes:

- on a specific ftp site (restricted access) :
 - o decoded files (Ascii format .txt)
 - o updated on a daily rate (14:00 UT)
 - o one directory per float and one directory with all the profiles from the project
 - o with no quality control applied;

- on the GTS by the way of Meteo-France (within a 24 hours after float has popped-up
- through the general Coriolis web site
 - o graphics
 - o Ascii format (Medatlas)
 - o NetCDF format (Argo) ;

- through specific MEDARGO web pages hosted by the Coriolis web site
 - o graphics
 - o Ascii format (Medatlas)
 - o NetCDF format (Argo)

- through the general Argo data flow:
 - o on the 2 Global Data Centres within the following Argo directories
 - DAC Coriolis
 - Latest Data
 - Geographic
 - 4 different types of files will be available
 - one directory / float (1 file with the vertical profile / cycle) NetCDF Argo mono-profile format
 - one file with the vertical profiles updated at each pop-up (NetCDF Argo multiprofile format)
 - one file updated at each pop up with the drifting profiles(NetCDF Argo trajectories format)
 - one file with the Metadata (Argo NetCDF meta-data format)

To be defined :

- how the data will be delivered to MFSTEP through INGV
 - o Format (Medatlas, NetCDF ?)
 - o Delivery rate? Once a week every Monday evening or twice a week.
 - o From Coriolis or from Coriolis through OGS ?