

BOUSSOLE Monthly Cruise Report

Cruise 182

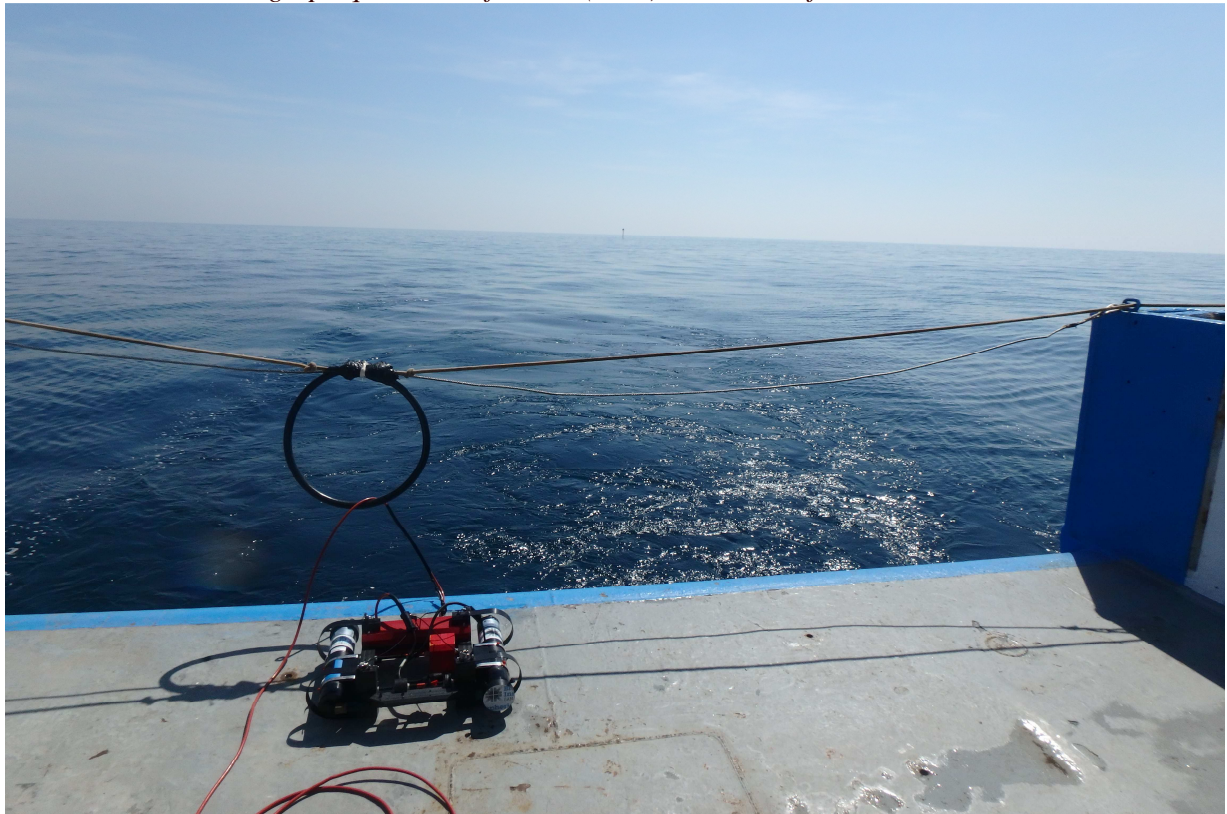
April 05-08, 2017

Duty Chief: Melek Golbol (golbol@obs-vlfr.fr)

Vessel: R/V Téthys II
(Captain: Dany Deneuve)

Science Personnel: Guillaume De Liège, Bastien Gaucher (diver), Melek Golbol, Didier Robin and Eduardo Soto Garcia.

Laboratoire d'Océanographie de Villefranche (LOV), 06238 Villefranche sur mer cedex, France



BOUSSOLE C-OPS on the deck of the R/V Téthys II before its deployment at the BOUSSOLE site.

BOUSSOLE project

ESA/ESRIN contract N° 4000119096/17/I-BG

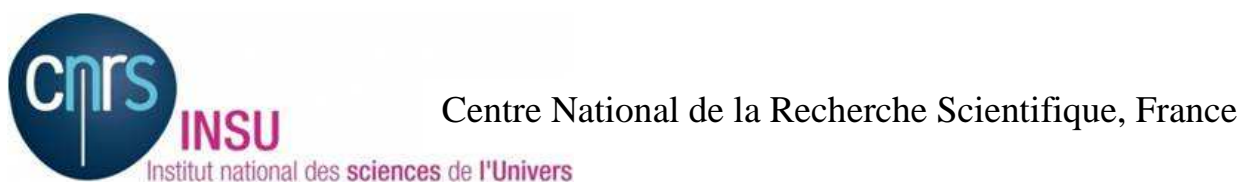
April 27, 2017



Foreword

This report is part of the technical report series that is being established by the BOUSSOLE project.

BOUSSOLE is funded and supported by the following Agencies and Institutions



Contents

1. Cruise Objectives
2. Cruise Summary
3. Cruise Report
4. Problems identified during the cruise

Appendices

Cruise Objectives

Routine operations

Multiple Biospherical's C-OPS (Compact Optical Profiling System) radiometric profiles are performed at the BOUSSOLE site around solar noon, under optimal conditions: clear blue skies and flat, calm sea surface. If the sky is clear and sea conditions are reasonably calm (no whitecaps or large swell), hand held CIMEL sun photometer measurements are to be performed consecutively where possible with C-OPS profiles. If sea conditions are poor but sky is good, hand held CIMEL sun photometer measurements can be made at intervals throughout the day to measure atmospheric optical thickness. CTD deployments are required at the start and the end of the C-OPS profiling day and around noon in the longer summer days or when there is a high possibility of a satellite matchup. The CTD package also includes a Chl fluorometer. Additional instrumentation for measurement of inherent optical properties has been added from December 2011. The package includes a hyperspectral absorption meter (Hobilabs a-sphere), a multispectral backscattering meter (Hobilabs Hydroscat-6) and a multispectral beam transmissometer (Hobilabs Gamma-4). Two CTD casts are to be performed at each data acquisition at the BOUSSOLE site: one cast with, and one cast without, a 0.2 μ m filter added on the a-sphere for the dissolved matter absorption measurements.

Seawater samples are to be collected, filtered and stored into liquid nitrogen for subsequent HPLC pigment and particle absorption spectrophotometric filter analysis in the lab. Three replicates samples are to be collected at surface for total suspended matter weighting in the lab.

Divers check the underwater state of the buoy structure and instrumentation, take pictures for archiving, clean the sensor optical surfaces, and then take again some pictures after cleaning. Divers also put a neoprene cap on the backscattering meter and on the transmissometers for acquiring dark measurements (started in April 2009).

In addition, water samples are to be collected at two depths (5 m and 10 m) for dissolved oxygen (DO), total alkalinity (TA) and total inorganic carbon (TC) analysis (from March 2014). This operation is part of the BIOCAREX ANR project, in collaboration with the LOCEAN in Paris (J. Boutin and collaborators). The TA/TC samples will be processed by the National service for such analyses (SNAPOCO – LOCEAN in Paris). The results will allow checking the data collected by the two pCO₂ CARIOCA sensors installed on the buoy at 3m and 10m.

Further details about these operations and the data collection and processing protocols are to be found in: Antoine, D. M. Chami, H. Claustre, F. D'Ortenzio, A. Morel, G. Bécu, B. Gentili, F. Louis, J. Ras, E. Roussier, A.J. Scott, D. Tailliez, S. B. Hooker, P. Guevel, J.-F. Desté, C. Dempsey and D. Adams. 2006, BOUSSOLE: a joint CNRS-INSU, ESA, CNES and NASA Ocean Color Calibration And Validation Activity. NASA Technical memorandum N° 2006 - 214147, 61 pp.

http://www.obs-vlfr.fr/Boussole/html/publications/pubs/BOUSSOLE_TM_214147.pdf

Additional operations

Two water samples for cytometry analysis were collected at 10 m depth in the frame of a collaboration with Collin Roesler (Bowdoin College, Maine, USA), about the installation of an ECO 3X1M multi-channel fluorimeter on the BOUSSOLE buoy at 9 m depth.

Divers installed newly calibrated pCO₂ CARIOCA and optode sensors at 3 m depth in replacement of the sensors deployed since August 12, 2016 for the pCO₂ sensors and since October 13, 2015 for the optode at 3 m. Divers also recovered the pCO₂ CARIOCA sensor at 10 m. All recovered sensors will be sent to LOCEAN for servicing and calibration.

Cruise Summary

The first day of the cruise, bad weather prevented the departure from the Nice harbour. So, only the last two days were used. The second day was used for diving operations and maintenance on the BOUSSOLE buoy, for downloading buoy data, for a CTD cast with water sampling optical profiles, for CIMEL measurements and for a

Secchi disk at the BOUSSOLE site. The second day was used for optical profiles, CTD casts with water sampling, CIMEL measurements and a Secchi disk at the BOUSSOLE site.

Wednesday 05 April 2017

Bad weather prevented departure from the Nice harbour.

Thursday 06 April 2017

Rotation of the R/V *Téthys II* crew

Friday 07 April 2017

The sea state was smooth with a light breeze on the morning and a light air on the afternoon. The sky was blue and the visibility was good. When arrived at the BOUSSOLE site, divers went at sea to remove the two pCO₂ CARIOCA sensors, located at 10 m and 3 m depth respectively. They also removed the optode at 3 m depth. Then, they installed at the same depth another pCO₂ CARIOCA sensor and an optode previously calibrated. They also cleaned the sensors, performed dark measurements of the transmissometers and backscattering meter, and took pictures. In the meantime, surface sensors of the buoy, solar panels and the ARGOS connector were cleaned. Buoy data were retrieved using the cable available on the top of the buoy. After the diving operations, 1 CTD cast with water sampling was performed at the BOUSSOLE site. The Rosette was deployed another time on the surface and without data acquisition for TSM sampling. Then, C-OPS balance tests were performed in order to check and adjust it during the descent phase of the profiles. Finally, 3 C-OPS profiles, 3 CIMEL measurements and a Secchi disk were performed before returning to the Port of Nice.

Saturday 08 April 2017

The sea state was smooth with a light breeze. When arrived at BOUSSOLE, the sky was hazy and there was no visibility, but the fog had lifted quickly. Then the sky was blue and the visibility was good. This day, 3 C-OPS profiles, 2 CTD casts with water sampling, 3 CIMEL measurements and a Secchi disk were performed at the BOUSSOLE site.

Pictures taken during this cruise can be found at:

https://get.google.com/albumarchive/114686870380724925974/album/AF1QipOvoiJ1ZJAH7QEuMEzhIVWtkkN_YZi9tpAOv-MM

Data from the BOUSSOLE cruises and buoy are available at:

http://www.obs-vlfr.fr/Boussole/html/boussole_data/login_form.php

Cruise Report

Wednesday 05 April 2017

Bad weather prevented departure from the Nice harbour.

Thursday 06 April 2017

Rotation of the R/V *Téthys II* crew

Friday 07 April 2017 (UTC)

People on board: Guillaume De Liège, Bastien Gaucher (diver), Melek Golbol, Didier Robin and Eduardo Soto Garcia.

0515 Departure from the Nice harbour.

0830 Arrival at the BOUSSOLE site.

0845 Diving operations: remove and installation of the pCO₂ and optode sensors, cleaning, dark measurements, pictures.

0900 Connection with the buoy and data retrieval.

0930 Cleaning of surface sensors, solar panels and ARGOS connector.
1105 CTD 01, 400 m with water sampling at 400, 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and a_p .
1210 Deployment of Rosette at 5 m for TSM.
1235 C-OPS balance tests.
1240 C-OPS 01, 02, 03.
1300 CIMEL 01, 02 03.
1315 Secchi 01, 17 m.
1335 Departure to the Nice harbour.
1640 Arrival at the Nice harbour.

Saturday 08 April 2017 (UTC)

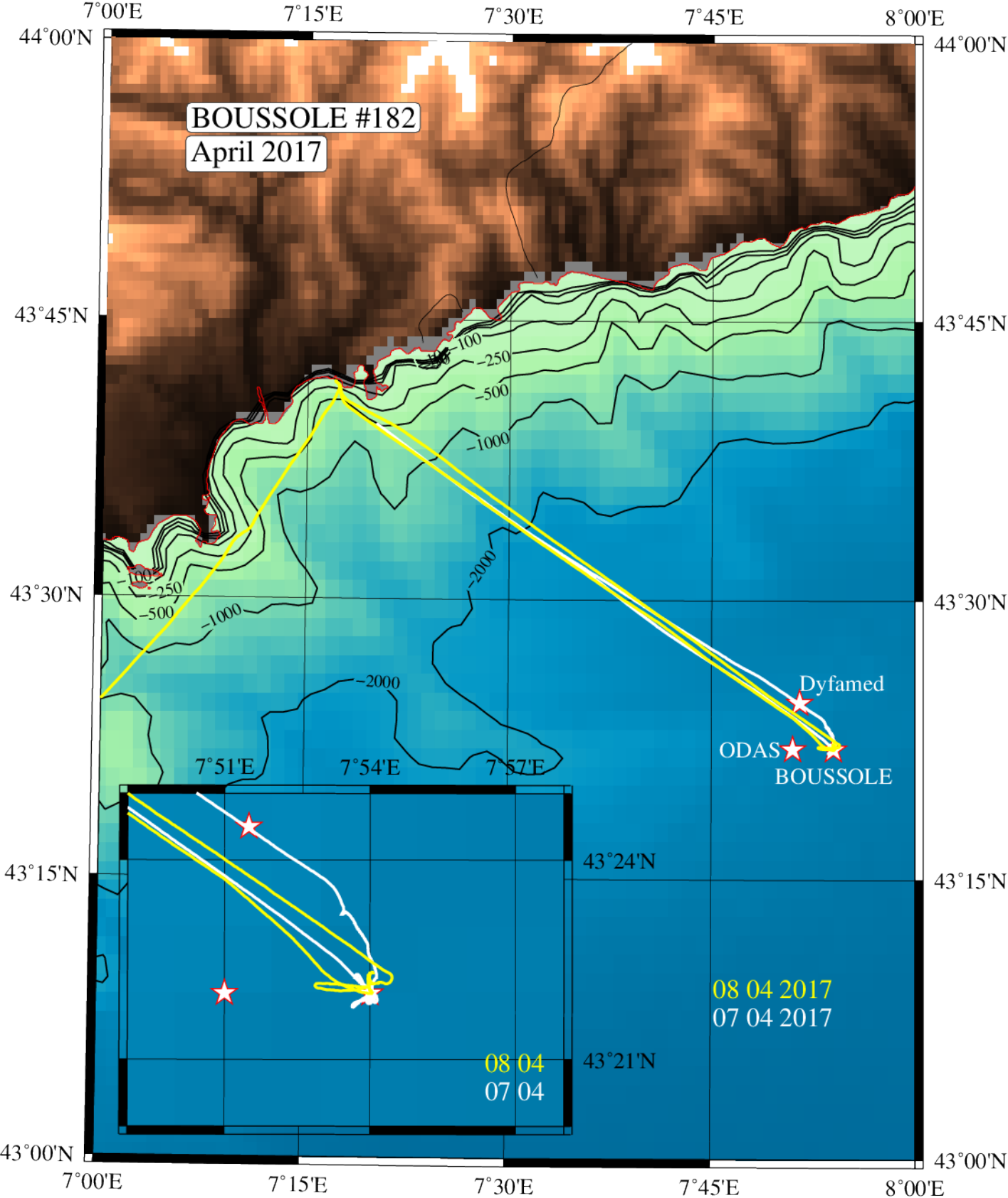
People on board: Melek Golbol and Eduardo Soto Garcia.

0600 Departure from the Nice harbour.
0930 Arrival at the BOUSSOLE site.
0935 C-OPS 04, 05, 06.
1020 CTD 02, 400 m with water sampling at 400, 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p and cytometry.
1110 Filtrations.
1205 CTD 03, 400 m with water sampling at 10 and 5 m for O_2 , TA/TC and TSM.
1210 CIMEL 04, 05, 06.
1230 Secchi 02, 17 m.
1240 Departure to the Nice harbour.
1605 Arrival at the Nice harbour.

Problems identified during the cruise

- It was not possible to perform IOP casts. The cable that connects the batteries to the hydroDAS (data logger of the IOP package) was broken. The connectors of the cable were corroded. It was probably due to the wear of the cable which is often connected and disconnected.

Appendices



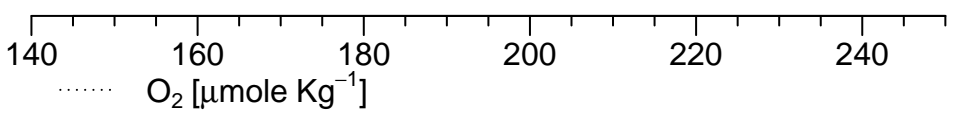
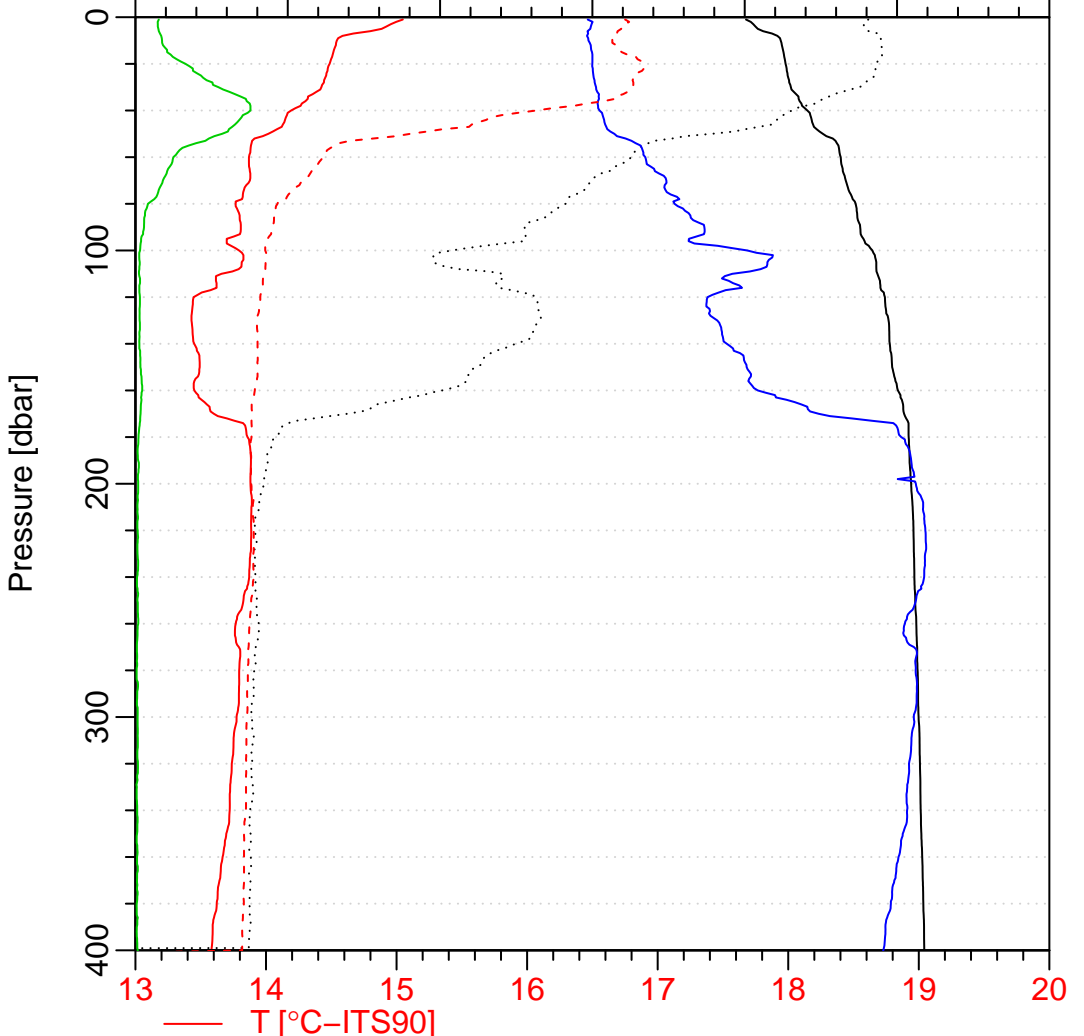
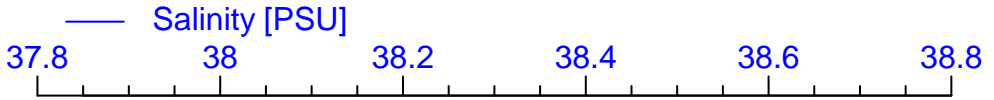
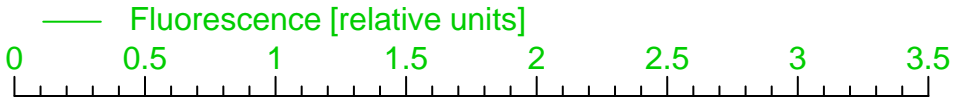
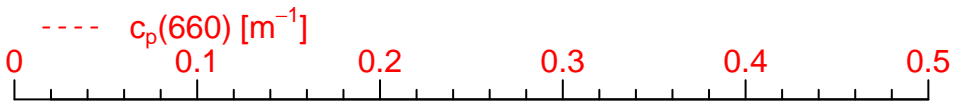
bous182_01

Date = 07/04/2017

Heure debut [TU] = 11:03

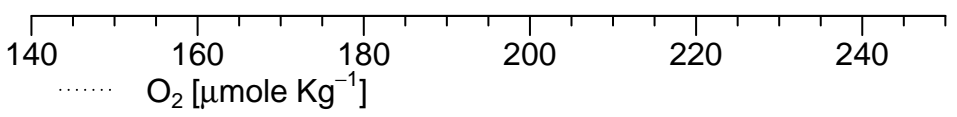
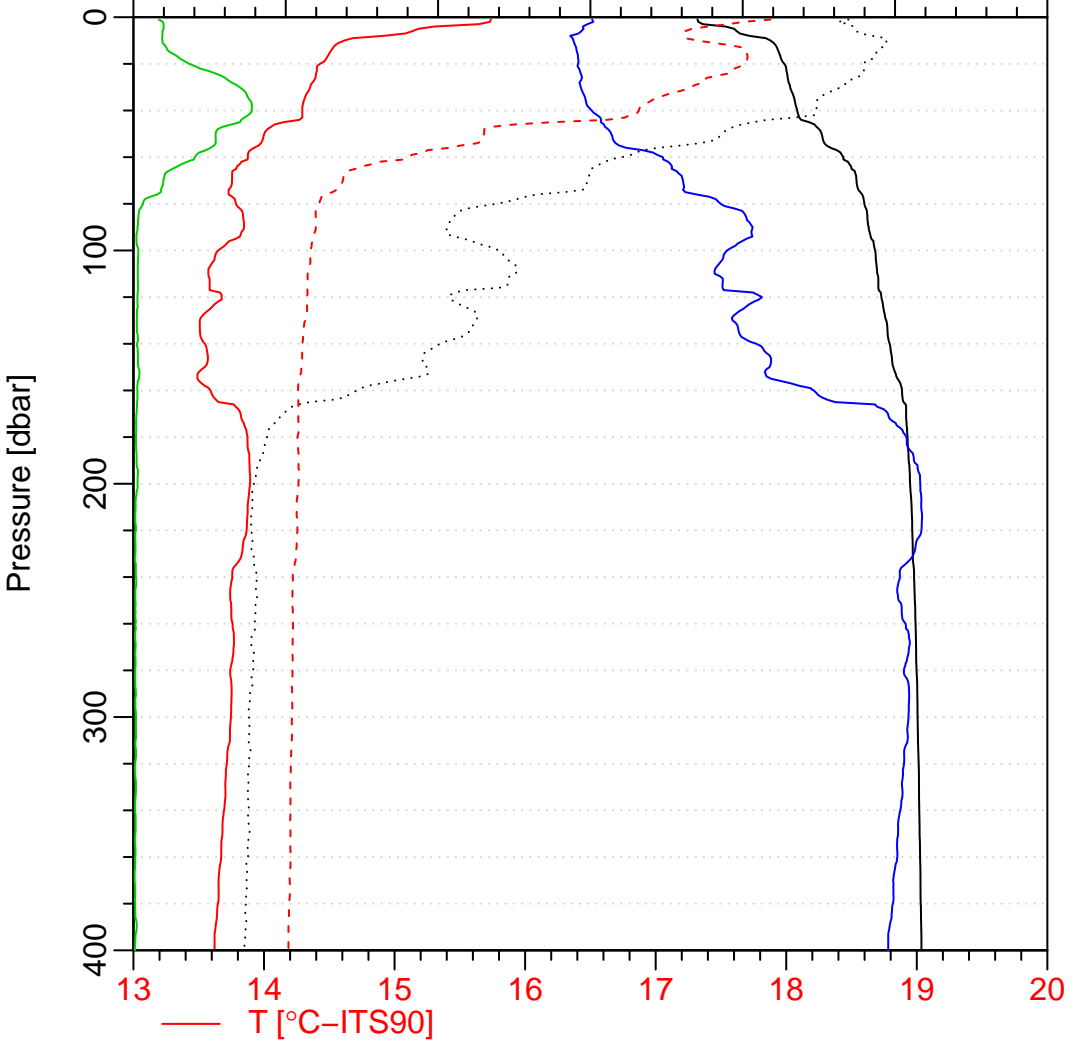
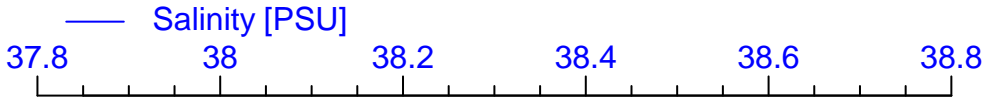
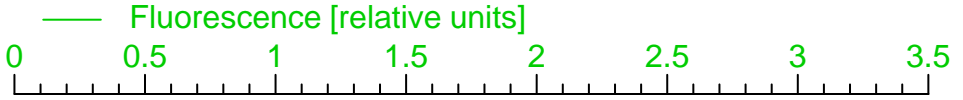
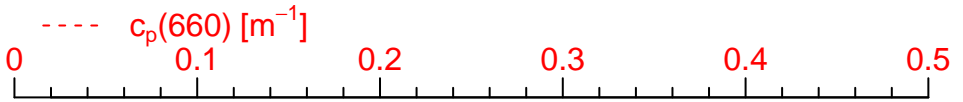
Longitude = 007 53.983 E

Latitude = 43 21.965 N



bous182_02

Date = 08/04/2017
Heure debut [TU] = 10:20
Longitude = 007 53.987 E
Latitude = 43 22.112 N



bous182_03

Date = 08/04/2017
Heure debut [TU] = 12:05
Longitude = 007 54.096 E
Latitude = 43 22.145 N

