

BOUSSOLE Monthly Cruise Report

Cruise 176

October 10-12, 2016

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

Vessel: R/V *Téthys II*

(Captain: Dany Deneuve)

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

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



A view of the R/V *Téthys II* (on left) and the upper superstructure of the BOUSSOLE buoy (on right).

BOUSSOLE project

ESA/ESRIN contract N° 4000111801/14/I-NB

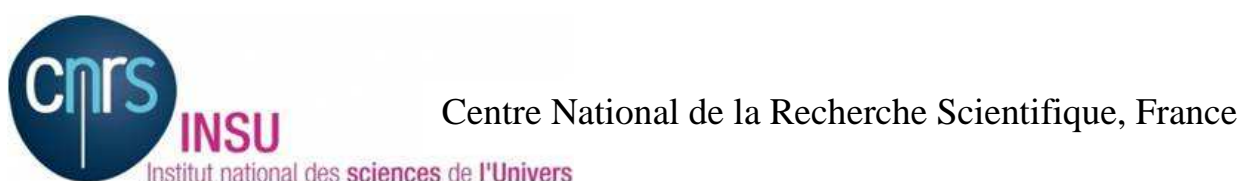
October 21, 2016



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



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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 (5m and 10m) 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 are to be collected at 10 m depth, in the frame of a collaboration with Collin Roesler (Bowdoin College, Maine, USA) concerning the installation of an ECO 3X1M fluorimeter on the BOUSSOLE buoy at 9 m depth.

This fluorimeter was removed by the divers in order to download the data. The configuration of the data acquisitions of the fluorimeter was changed in order to maximize the battery's capacity and to reduce the frequency of this operation. Then the fluorimeter was reinstalled at the same location.

A deep CTD cast and zooplankton nets were performed the last day to complete the MOOSE DYFAMED program because bad weather was predicted for the next day.

Cruise Summary

The two first days of the cruise, bad weather prevented departure from the Nice harbour. The last day was used for diving and maintenance operations on the buoy, for a Secchi disk and for CTD casts with water sampling at the BOUSSOLE site. The optical profiles could not be performed because of communication problems with the C-OPS. Then, a deep CTD cast and plankton nets were performed at the DYFAMED site to complete the MOOSE program, before returning to the Nice harbour.

Monday 10 October 2016

Bad weather prevented departure from the Nice harbour.

Tuesday 11 October 2016

Bad weather prevented departure from the Nice harbour.

Wednesday 12 October 2016

The sea state was smooth with a light breeze. The sky was overcast and the visibility was medium. When arrived at the BOUSSOLE site, divers went at sea to clean the sensors, to perform dark measurements of the transmissometers and backscattering meter, and to take pictures. The 3X1M-004 fluorimeter located at 9 m depth was removed and brought on board of the dinghy by the divers. Fluorimeter data were downloaded and the configuration of the sensor was changed before its reinstallation on the buoy: the sensor will acquire data every hour instead of every 15 min. This new configuration will allow decreasing the frequency of the fluorimeter maintenance operation. In the meantime, solar panels and surface sensors were cleaned, data were retrieved directly using the cable available on the top of the buoy.

A Secchi disk was performed and 2 CTD casts were performed with water sampling at the BOUSSOLE site. The first CTD cast was performed with a 0.2 μm filter on the a-Sphere absorption meter and with a cap on the backscattering meter. The C-OPS profiles could not be performed because it was not possible to communicate with the C-OPS systems: an error message appeared on the computer and the communication was always lost few minutes after the launch of the software.

Then, we went to the DYFAMED site to perform plankton nets and a deep CTD cast with water sampling for the MOOSE program, before returning to the Nice harbour.

Pictures taken during this cruise can be found at:

<https://get.google.com/albumarchive/114686870380724925974/album/AF1QipOJLjpRQNJCdus5gIXIm0ymDVQckkV1taQSSlBH>

Data from the BOUSSOLE cruises and buoy are available at:

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

Cruise Report

Monday 10 October 2016

Bad weather prevented departure from the Nice harbour.

Tuesday 11 October 2016

Bad weather prevented departure from the Nice harbour.

Wednesday 12 October 2016 (UTC)

People on board: Guillaume De Liège, Emilie Diamond, Bastien Gaucher, Melek Golbol, David Luquet, Guillaume Morin, Didier Robin and Eduardo Soto Garcia.

- 0500 Departure from the Nice harbour.
- 0825 Arrival at the BOUSSOLE site.
- 0840 Diving operations: remove of the fluorimeter, cleaning, dark measurements, pictures.
- 0900 Connection with the buoy and data retrieval.
Cleaning of solar panels and surface sensors.
Fluorimeter data retrieval.
- 0900 Secchi 01, 30 m.
- 0950 CTD 01, 400 m with water sampling at 10 and 5 m for TSM, TA/TC, O₂ (with 0.2 μm filter on a-Sphere and cap on HS-6).
- 1005 Reinstallation of the fluorimeter on the buoy.

1050 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.
1145 Attempts of C-OPS: problem of communication.
1240 Departure to the DYFAMED site.
1300 Deep CTD cast (MOOSE).
1440 Zooplankton nets (MOOSE).
1535 Departure to the Nice harbour.
1845 Arrival at the Nice harbour.

Problems identified during the cruise

- The last day, a C-OPS deployment was attempted but they were problems of communication between the computer and the C-OPS system: error messages appeared on the computer and the communication was always lost few minutes after the launch of the software. Maybe there was a contact failure with one of the C-OPS cables. After different tests, it appeared that the seawater cable was faulty. For the next cruise, it will be replaced by the spare one available at our lab.
- The filtration of HPLC, a_p took a long time as during the previous cruise. The system was checked in the lab before the cruise but maybe there was another leak on the filtration system. The filtration system was checked again: the connections were repositioned because one of the tubes was not well positioned and the fittings were tightened. After this maintenance, the filtration was better than before but there was still not enough pressure on the manometer. The system will be checked again and possibly changed for the next cruise.
- The surface fluorimeter of the R/V *Téthys II* was not operational for this cruise.

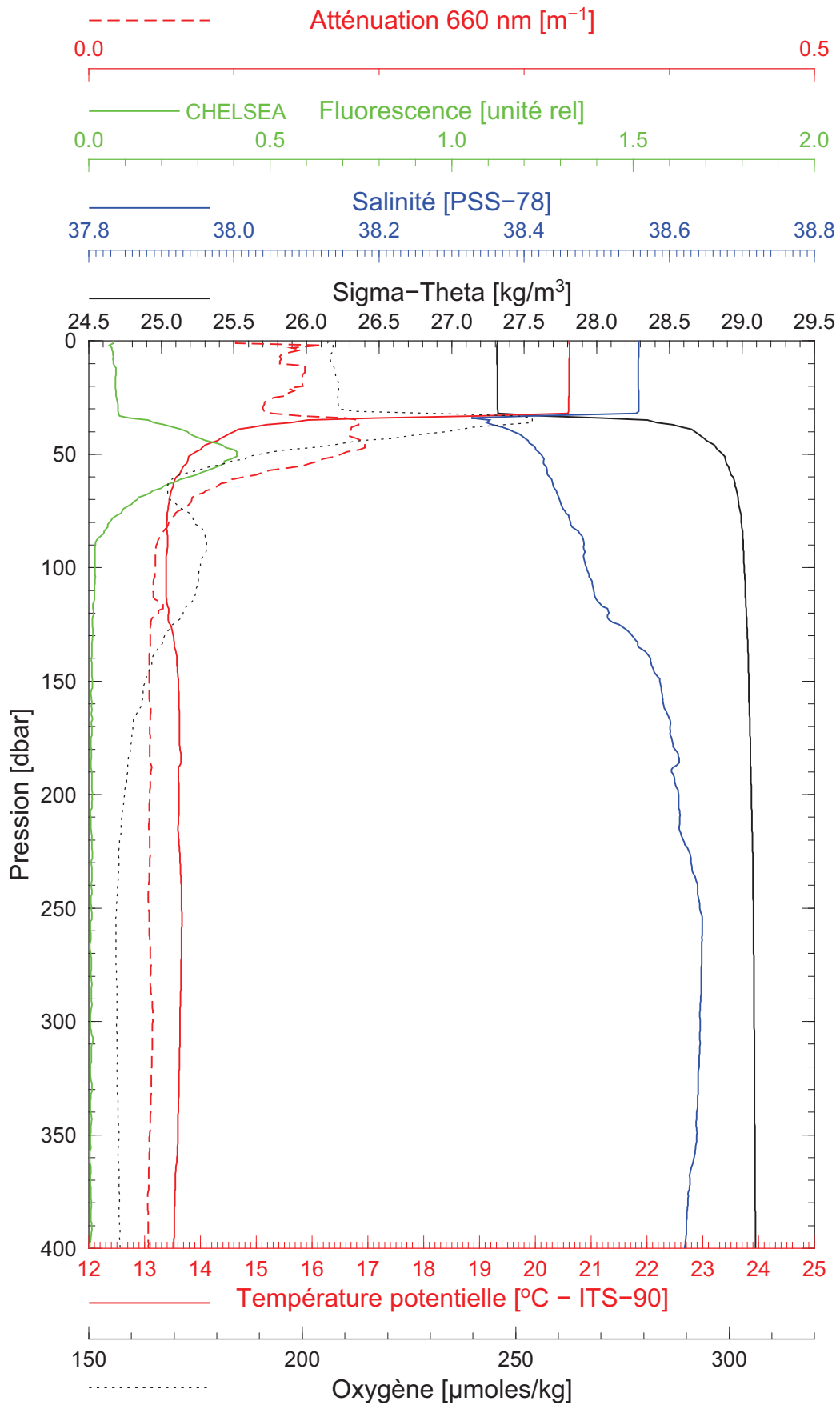
Appendices

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12/10/2016

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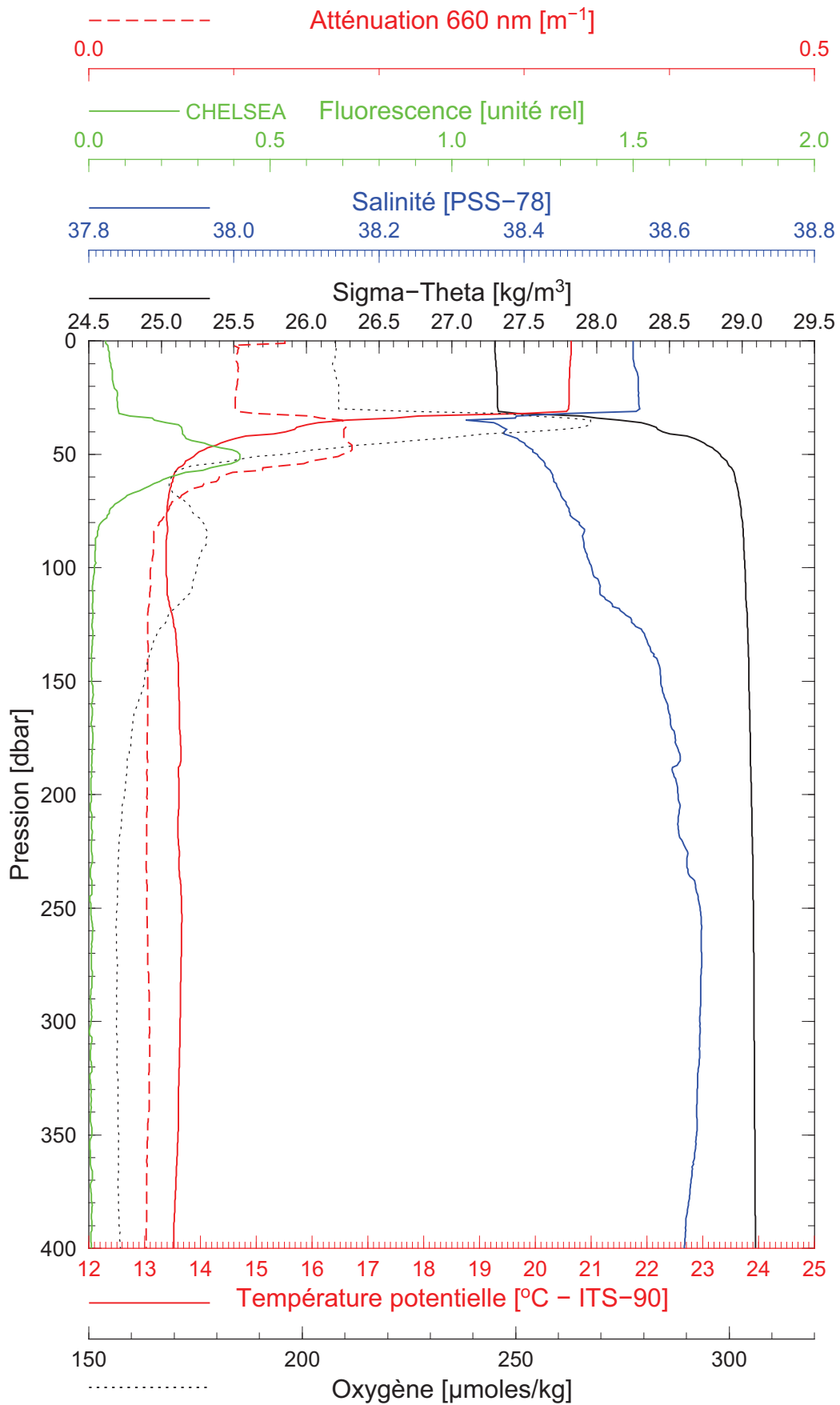


Date 12/10/2016

Latitude 43°21.997 N

Heure déb 09h 49min [TU]

Longitude 07°53.975 E



Date 12/10/2016

Latitude 43°22.072 N

Heure déb 10h 51min [TU]

Longitude 07°53.992 E