

# BOUSSOLE Monthly Cruise Report

**Cruise 174**

**August 12-13, 2016**

Duty Chief: Emilie Diamond Riquier ([diamond@obs-vlfr.fr](mailto:diamond@obs-vlfr.fr))

Vessel: R/V Téthys II

(Captain: Joël Perrot)

**Science Personnel:** Joshua Bac (student), Agnieszka Bialek, Guillaume De Liège, Emilie Diamond Riquier, Jean-Michel Grisoni, David Luquet and Eduardo Soto Garcia.

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



During the second day of the cruise, only the wake of the R/V Téthys II marred the smooth surface of the Mediterranean at the BOUSSOLE site.

**BOUSSOLE project**

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

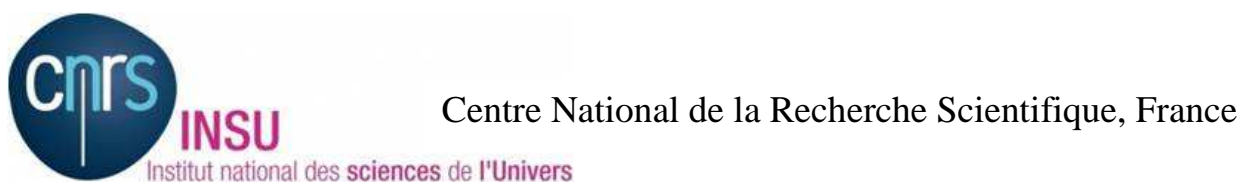
*September 08, 2016*



## 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



## 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 $\mu$ 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 pCO<sub>2</sub> 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](http://www.obs-vlfr.fr/Boussole/html/publications/pubs/BOUSSOLE_TM_214147.pdf)

### Additional operations

Two water samples for cytometry analysis was 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.

The first day of the cruise, the divers removed this fluorimeter sensor in order to download the data, and they reinstalled it at the same location. They also installed the two pCO<sub>2</sub> CARIOCA sensors at 3 m and 10 m.

The second day was partly used for MOOSE-DYFAMED operations (deep CTD cast and zooplankton nets) because the DYFAMED cruise was cancelled two days before, because of bad weather.

## Cruise Summary

The first day was used for the diving operations, CTD casts with water sampling, a Secchi disk and optical profiles at the BOUSSOLE site. The second day was used for optical profiles, CIMEL measurements, CTD casts with water sampling, a Secchi disk at the BOUSSOLE site and also for plankton nets and a deep CTD cast at the DYFAMED site.

## Friday 12 August 2016

The sea state was smooth with a gentle breeze. The sky was blue and partially cloudy. The visibility was good. When arrived at the METEO-FRANCE buoy, divers went at sea to check the ISUS V3 (sensor for nitrate measurements) fixation at 45 m depth, as well as other sensors that are affixed on the chain of the mooring. Then, we went to the BOUSSOLE site. Divers went at sea to clean sensors, to perform dark measurements of the transmissometers and backscattering meter and to take pictures. They recovered the 3X1M-004 fluorimeter in order to download the data and they installed the two pCO<sub>2</sub> CARIOCA sensors at 3 m and 10 m. Meanwhile, buoy data were retrieved directly using the cable available on the top of the buoy. Solar panels and surface sensors were also cleaned. Then, 1 CTD cast with water sampling, 3 C-OPS profiles and 1 Secchi disk were performed at the BOUSSOLE site. Before leaving, divers reinstalled the 3X1M-004 fluorimeter at 9 m on the buoy.

## Saturday 13 August 2016

The sea state was smooth with a light breeze. The sky was blue and the visibility excellent. When arrived at the BOUSSOLE site, 3 C-OPS profiles, 1 CTD cast with water sampling, 1 Secchi disk and 2 CIMEL measurements were performed. 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/AF1QipPkM0voElo-D5iL53cQeK6dg00BEB5u3DpGplXT>

Data from the BOUSSOLE cruises and buoy are available at:

[http://www.obs-vlfr.fr/Boussole/html/boussole\\_data/login\\_form.php](http://www.obs-vlfr.fr/Boussole/html/boussole_data/login_form.php)

## Cruise Report

### Friday 12 August 2016 (UTC)

People on board: Agnieszka Bialek, Guillaume De Liège, Emilie Diamond Riquier, Jean-Michel Grisoni, David Luquet and Eduardo Soto Garcia.

0515 Departure from the Nice harbour.  
0805 Arrival at the Météo-France buoy.  
0815 Diving operations: ISUS nitrate sensor inspection at 45 m.  
0850 Departure to the BOUSSOLE site.  
0910 Arrival at the BOUSSOLE site.  
0915 Diving operations: remove of the fluorimeter, installation of the pCO<sub>2</sub> sensors, cleaning, dark measurements and pictures.  
1000 Direct connection with the buoy and data retrieval.  
1040 Fluorimeter data retrieval on board.  
1215 CTD 01 (without the IOP package), 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a<sub>p</sub>, TSM, DO, TA/TC and cytometry.  
1220 C-OPS 01, 02, 03.  
1310 Diving operations: installation of the fluorimeter (switch ON at 13:15).  
1320 Secchi 01, 23 m.  
1325 Departure to the Nice harbour.  
1630 Arrival at the Nice harbour.

### Saturday 13 August 2016 (UTC)

People on board: Joshua Bac, Emilie Diamond Riquier and Eduardo Soto Garcia.

0500 Departure from the Nice harbour.  
0810 Arrival at the BOUSSOLE site.  
0815 C-OPS 04, 05, 06.  
0855 CTD 02, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and a<sub>p</sub>.

0915 Secchi 02, 22 m.  
0920 CIMEL 01, 02.  
0945 Departure to the DYFAMED site.  
0955 MOOSE-DYFAMED operations.  
1345 Departure to the Nice harbour.  
1630 Arrival at the Nice harbour.

## **Problems identified during the cruise**

- The C-OPS pressure sensor drift to 1 m at the surface between the different profiles. The pressure values varied between -0.2 m and -0.9 m when the C-OPS came back at the sea surface after the first profile of each series of C-OPS measurements.
- The *Hobilabs* IOP package was not available during this cruise, because the instruments were sent to *Hobi Instruments service* for the annual calibrations and maintenance.
- The Thermosalinograph of the R/V *Téthys II* was not operational for this cruise.

# **Appendices**



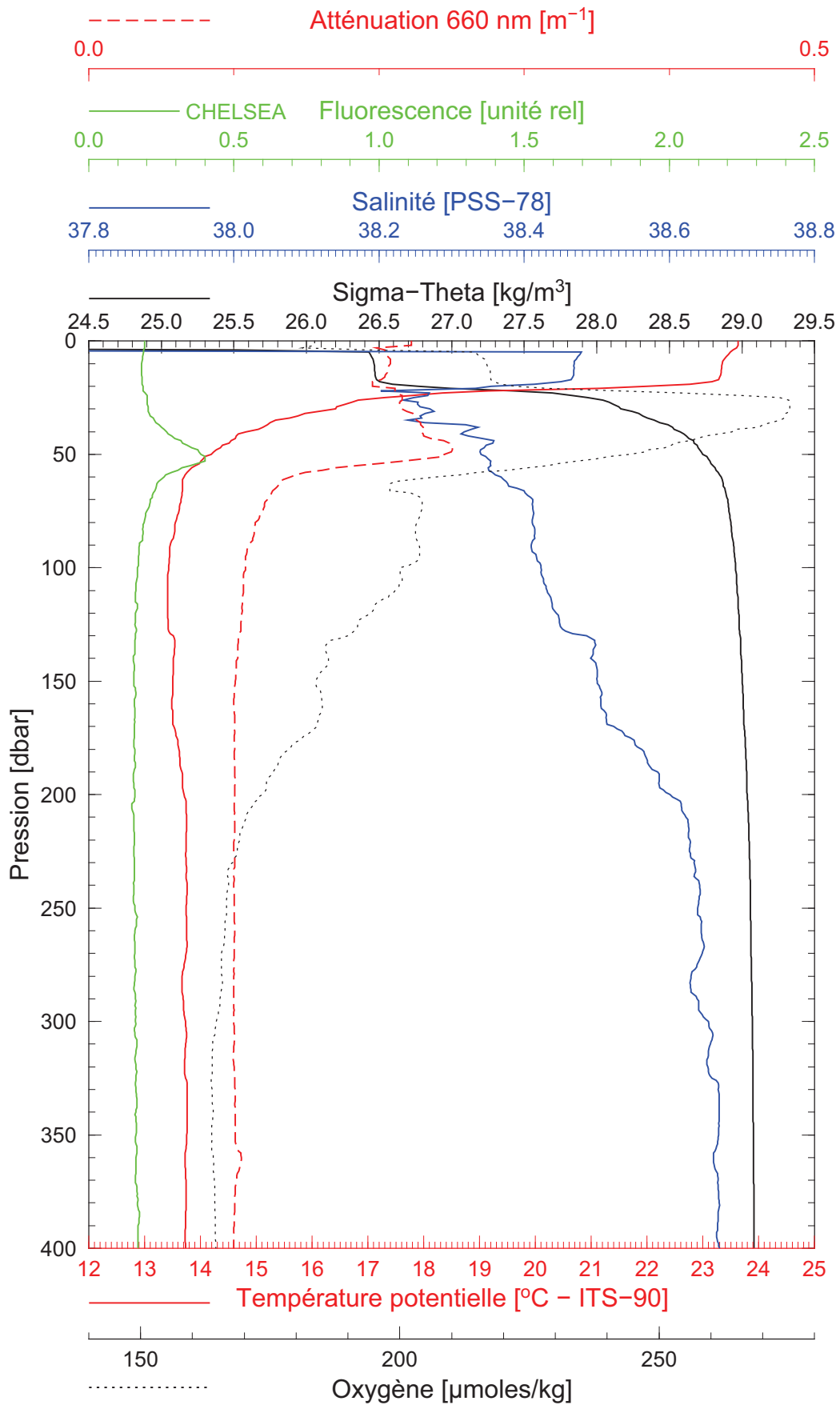


BOUSSOLE 174

12/08/2016

BOUS160812\_01

BOUS001



Date 12/08/2016

Latitude 43°22.064 N

Heure déb 11h 27min [TU]

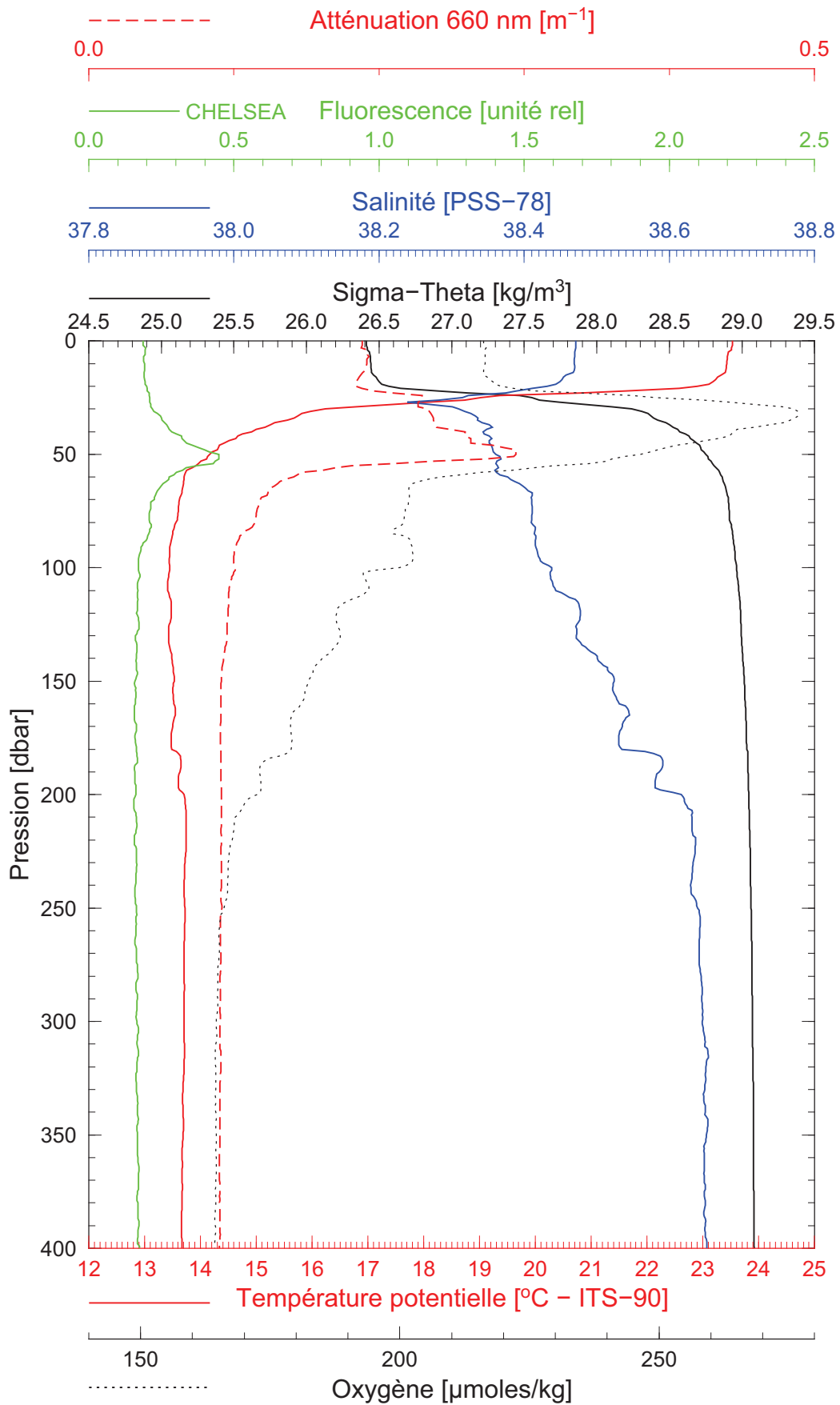
Longitude 07°53.627 E

BOUSSOLE 174

13/08/2016

BOUS160813\_01

BOUS002



Date 13/08/2016

Latitude 43°22.019 N

Heure déb 08h 59min [TU]

Longitude 07°53.900 E