

# BOUSSOLE Monthly Cruise Report

## Cruise 160

June 12–14, 2015

Duty Chief: Vincenzo Vellucci

Report written by Melek Golbol (golbol@obs-vlfr.fr)

Vessel: R/V *Téthys II*

(Captain: Joël Perrot)

Science Personnel: Emilie Diamond, Grigor Obolensky, Foucaut Tachon, Manon Tonnard and Vincenzo Vellucci.

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A view from the deck of the R/V *Téthys II* in stormy weather during the way up to BOUSSOLE.

## BOUSSOLE project

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

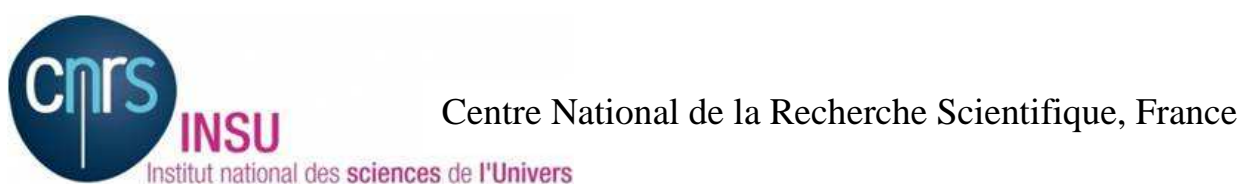
July 16, 2015



## 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). 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.

Operations that have to be performed in each cruise include:

- Collection and filtration of seawater samples for colored dissolved organic matter (from June 2005).
- One CTD transect is performed between the BOUSSOLE site and the Port of Nice. This transect consists of six fixed stations on-route from BOUSSOLE. Whenever feasible, this transect should be performed at a similar time for each cruise, in order to minimise the influence of possible diurnal variability.
- 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

During this cruise, a deep CTD cast was performed for the MOOSE DYFAMED program, which was cancelled because of bad meteorological forecasts for the next day. This cast could be also used for the CTD cast of the first station of the BOUSSOLE CTD transect.

A new sensor ("Master REM A") was added to the IOP package and connected to the CTD. This sensor is identical to the ones installed on the Bio-Argo floats, and is planned to be used as a "gold standard" to inter-calibrate sensors among the Bio-Argo fleet. This sensor measures fluorescence of Chl<sub>a</sub>, fluorescence of Coloured Dissolved Organic Matter (CDOM), and backscattering at 700nm. The objective is to evaluate what this instrument provides in terms of Chl and CDOM fluorescence, by comparing its measurements to those from the BOUSSOLE Chl and CDOM fluorometers (the ones installed on the BOUSSOLE IOP package), to the chlorophyll concentrations from the HPLC analyses, and to the CDOM absorption measurements from the CDOM analyses.

Manon Tonnard from LEMAR (Brest) was on board to sample at the DYFAMED site for studies on trace metals.

## Cruise Summary

The first and the second day, the cruise was cancelled because of bad weather. Only the last day was used for operations at the BOUSSOLE and DYFAMED sites. A CTD cast with water sampling, optical profiles and a Secchi disk were performed at the BOUSSOLE site. A new cable was used for C-OPS profiles. Then, a CTD cast with water sampling was performed and water was pumped from 20m depth and filtered at the DYFAMED site and at the station 02 of the CTD transect. Finally the CTD transect was completed.

The diving operations were not performed during this cruise because of bad weather. These operations and the downloading of data from the buoy were postponed to another cruise the week after.

### Friday 12 June 2015

Bad weather prevented departure from the Nice harbour.

### Saturday 13 June 2015

Bad weather prevented departure from the Nice harbour.

### Sunday 14 June 2015

The sea state was smooth with a light breeze. The sky was overcast and the visibility was medium. 1 CTD cast with water sampling, 3 C-OPS profiles and 1 Secchi disk were performed at the BOUSSOLE site. Then a CTD cast with water sampling was performed at the DYFAMED site for the DYFAMED program. This cast replaced the cast of station 01 of the CTD transect. Then, water was pumped at 20m at the DYFAMED site and at station 02 of the CTD transect. Finally the CTD transect was completed.

Pictures taken during this cruise can be found at:

<https://plus.google.com/photos/114686870380724925974/albums/6169143709609799265?banner=pwa>

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 June 2015

Bad weather prevented departure from the Nice harbour.

### Saturday 13 June 2015

Bad weather prevented departure from the Nice harbour.

### Sunday 14 June 2015 (UTC)

People on board: Emilie Diamond, Grigor Obolensky, Foucaut Tachon, Manon Tonnard and Vincenzo Vellucci.

0555 Departure from the Nice harbour.  
0910 Arrival at the BOUSSOLE site.  
0915 CTD 01, 400 m with water sampling at 400, 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC,  $a_p$ , TSM, CDOM, TA/TC and  $O_2$ .  
1000 C-OPS 01, 02, 03.  
1105 Secchi 01, 19m.  
1110 Departure to DYFAMED site.  
1140 Arrival at the DYFAMED site.  
1150 Water pumping at 20m, DYFAMED Site.  
1220 CTD 02, 1000m, DYFAMED site (43°25'N 07°52'E).  
1515 CTD 03, 400m, station 02 (43°28'N 07°42'E).  
1530 Water pumping at 20m, station 02.

1700 CTD 04, 400m, station 03 (43°31'N 07°37'E).  
1800 CTD 05, 400m, station 04 (43°34'N 07°31'E).  
1900 CTD 06, 400 m, station 05 (43°37'N 07°25'E).  
1950 CTD 07, 400 m, station 06 (43°39'N 07°21'E).  
2010 Departure to the Nice harbour.  
2050 Arrival at the Nice harbour.

## **Problems identified during the cruise**

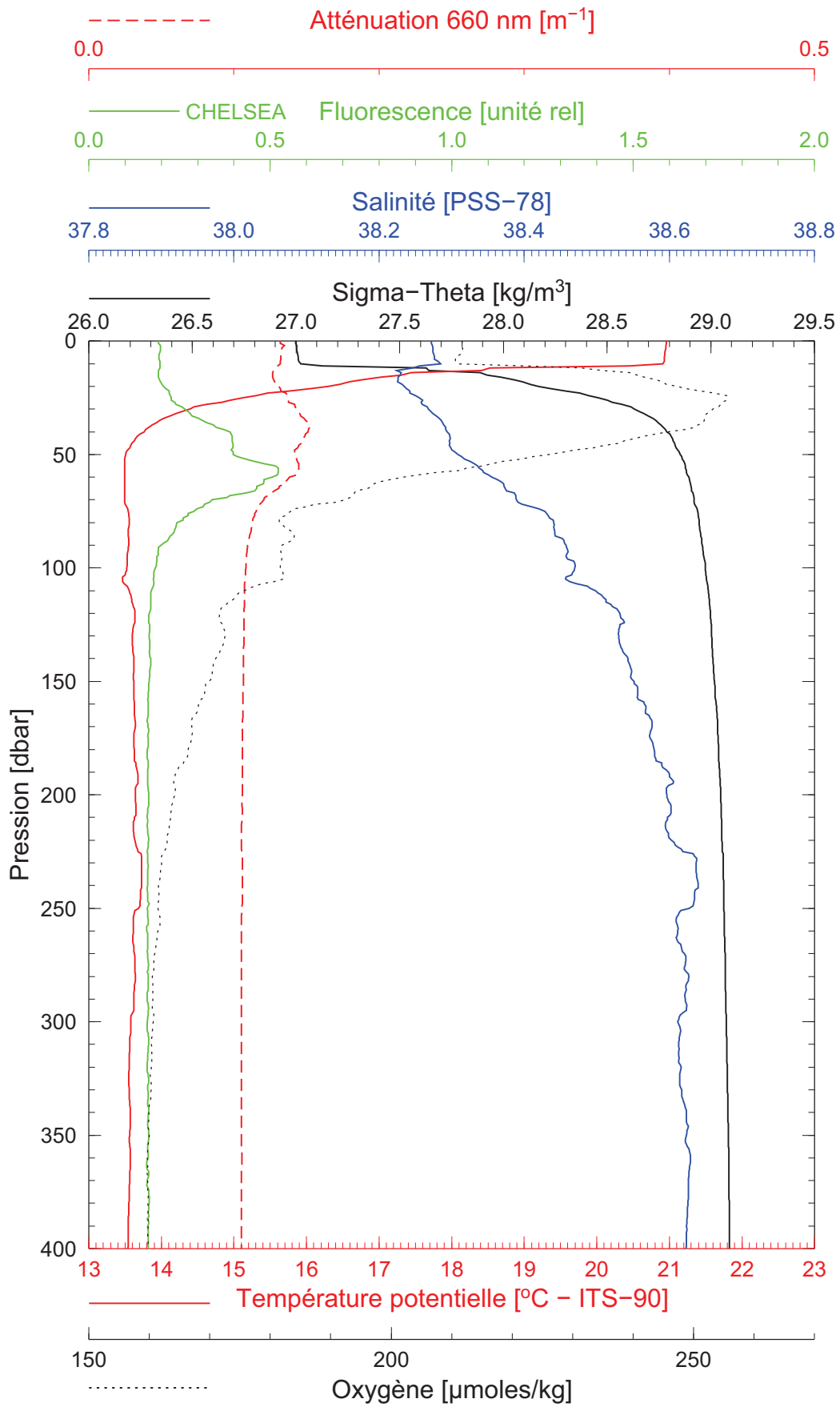
- The Niskin bottles #2 did not close during the CTD 01 cast, so there was no sampling at 200m.

# **Appendices**

Cruise Summary Table for Boussole 160

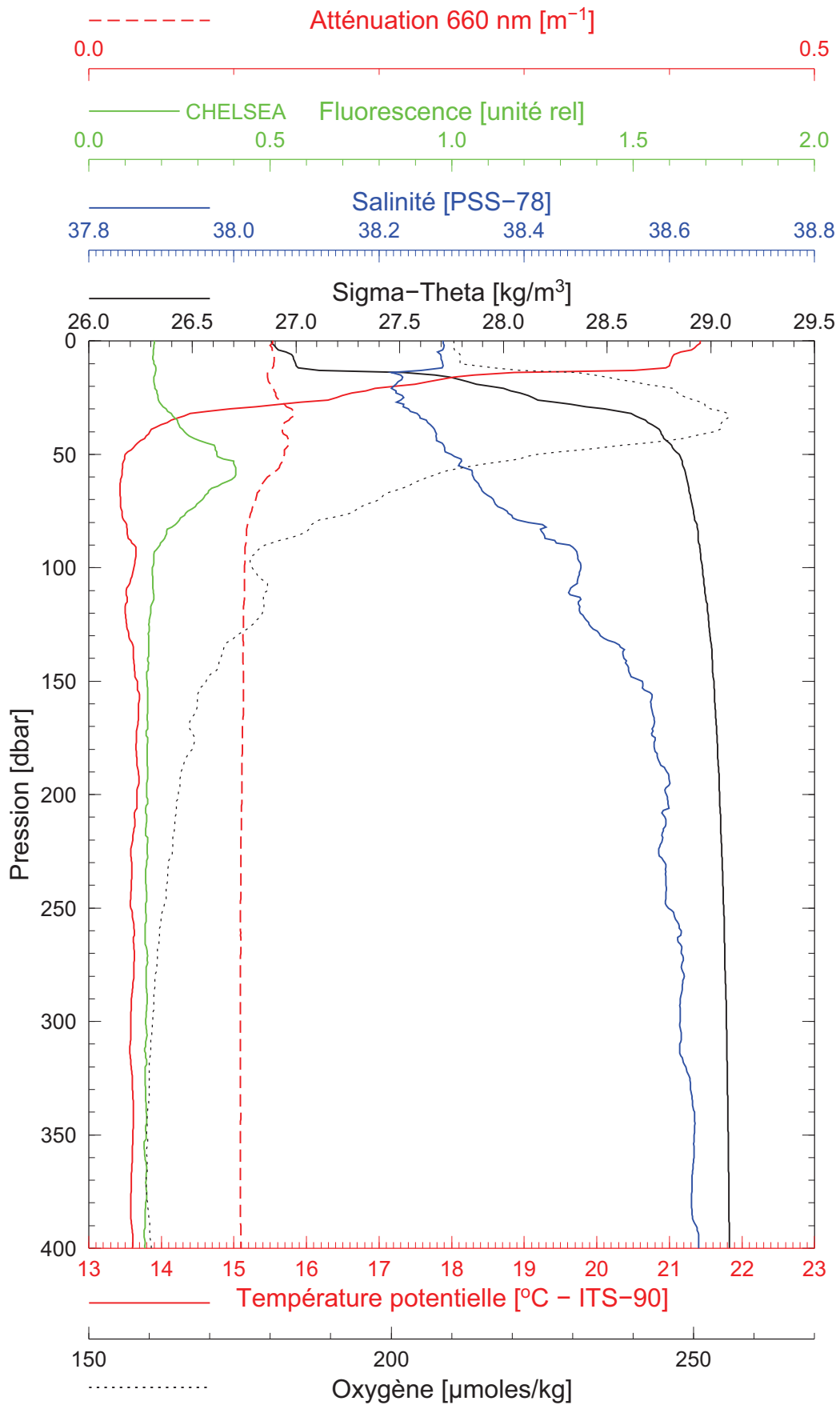
Date	Black names (file ext: ".raw")	Profile names (file extension: ".raw")	CTD notées	Other sensors	Start Time GMT (hour.min)	Duration (min.sec)	Depth max (meter)	Latitude (N)		Longitude		Sky	Clouds	Quantity (#/8)	Weather Wind sp. (kn)	Wind dir.	Atm. Pressure (hPa)	Humidity (%)	Visibility	T air	T water	Sea	Sea Swell H (m)	Swell dir.	Whitecaps
12/06/15																									
13/06/15																									
14/06/15																									
			CTDBOUS001	HPLC, TSM, CDOM, TA/TC & O <sub>2</sub>	09:19	34:00	400	43	22.182	7	54.028	overcast		8	8.6	210	1010.3	75		21.2	20.95	calm			
		bou_c-ops_150614_0955_001_data.csv			10:21	5:38	153.3	43	22.435	7	53.778	cloudy	all (C+)	5	12	295	1010.3	76	medium	21.2		calm	0.5	few	
		bou_c-ops_150614_0955_002_data.csv			10:35	5:13	137.4	43	22.501	7	53.533	cloudy	all (C+)	5	12	295	1010.3	76	medium	21.2		calm	0.5	few	
		bou_c-ops_150614_0955_003_data.csv			10:48	5:15	142.2	43	22.539	7	53.267	cloudy	all (C+)	5	12	295	1010.3	76	medium	21.2		calm	0.5	few	
			Secchi01		11:05	4:00	19	43	22	7	54	cloudy		5					medium			calm	0.5		
			CTDBOUS002		12:23	50:00	1000	43	25.117	7	25.408	blue		3	12	217	1010.3	79		21.4	21.34	calm	0.8		
			CTDBOUS003		15:13	23:00	400	43	28.076	7	42.016	blue		3	17	212	1010.1	80		22.4	21.74	calm			
			CTDBOUS004		16:58	24:00	400	43	30.992	7	36.900	blue		2	12	219	1010.6	84		21.8	22.10	calm			
			CTDBOUS005		18:00	24:00	400	43	33.925	7	30.887	cloudy		4	14	221	1010.9	86		21.7	21.98	calm			
			CTDBOUS006		19:01	21:00	400	43	37.027	7	27.919	overcast		8	11	220	1011.2	86		21.8	22.72	calm			
			CTDBOUS007		19:49	20:00	400	43	39.060	7	21.070	twilight		5	12	209	1011.5	85		22.0	22.52	calm			





Date 14/06/2015  
Heure déb 09h 19min [TU]

Latitude 43°22.182 N  
Longitude 07°54.028 E



Date 14/06/2015  
Heure déb 12h 23min [TU]

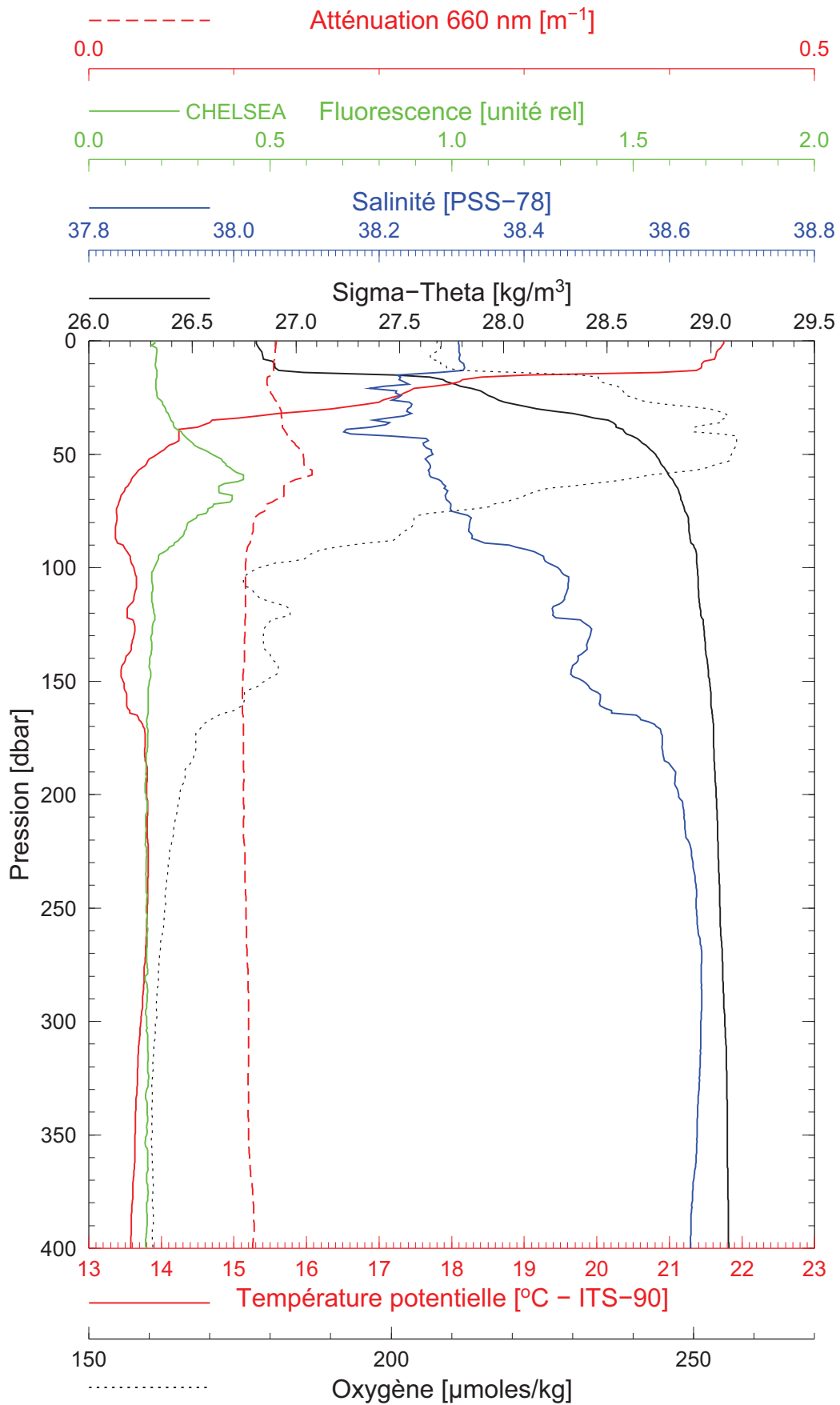
Latitude 43°25.117 N  
Longitude 07°51.196 E

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14/06/2015

BOUS150614\_03

BOUS003



Date 14/06/2015

Latitude 43°28.076 N

Heure déb 15h 13min [TU]

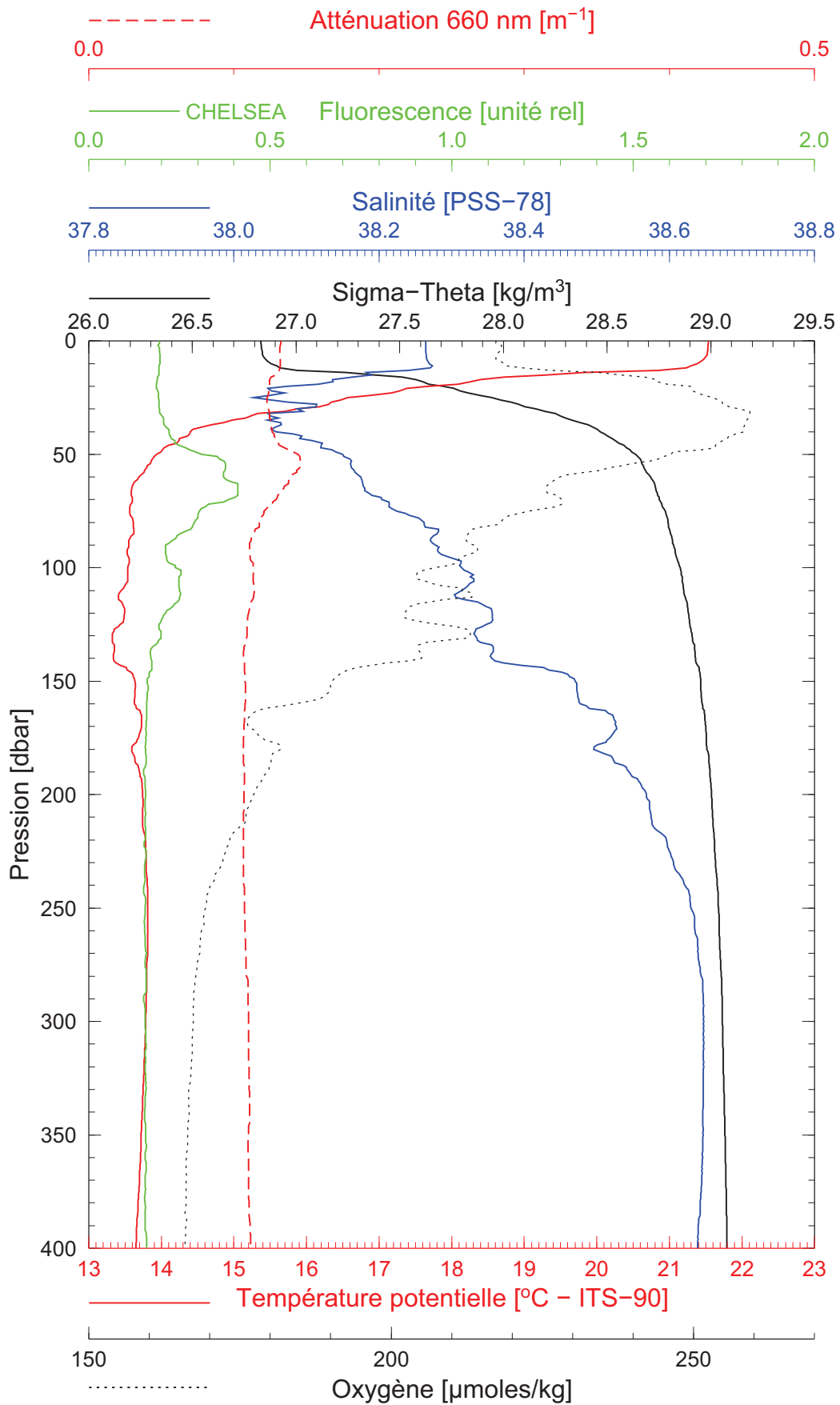
Longitude 07°42.016 E

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14/06/2015

BOUS150614\_04

BOUS004



Date 14/06/2015

Latitude 43°30.992 N

Heure déb 16h 58min [TU]

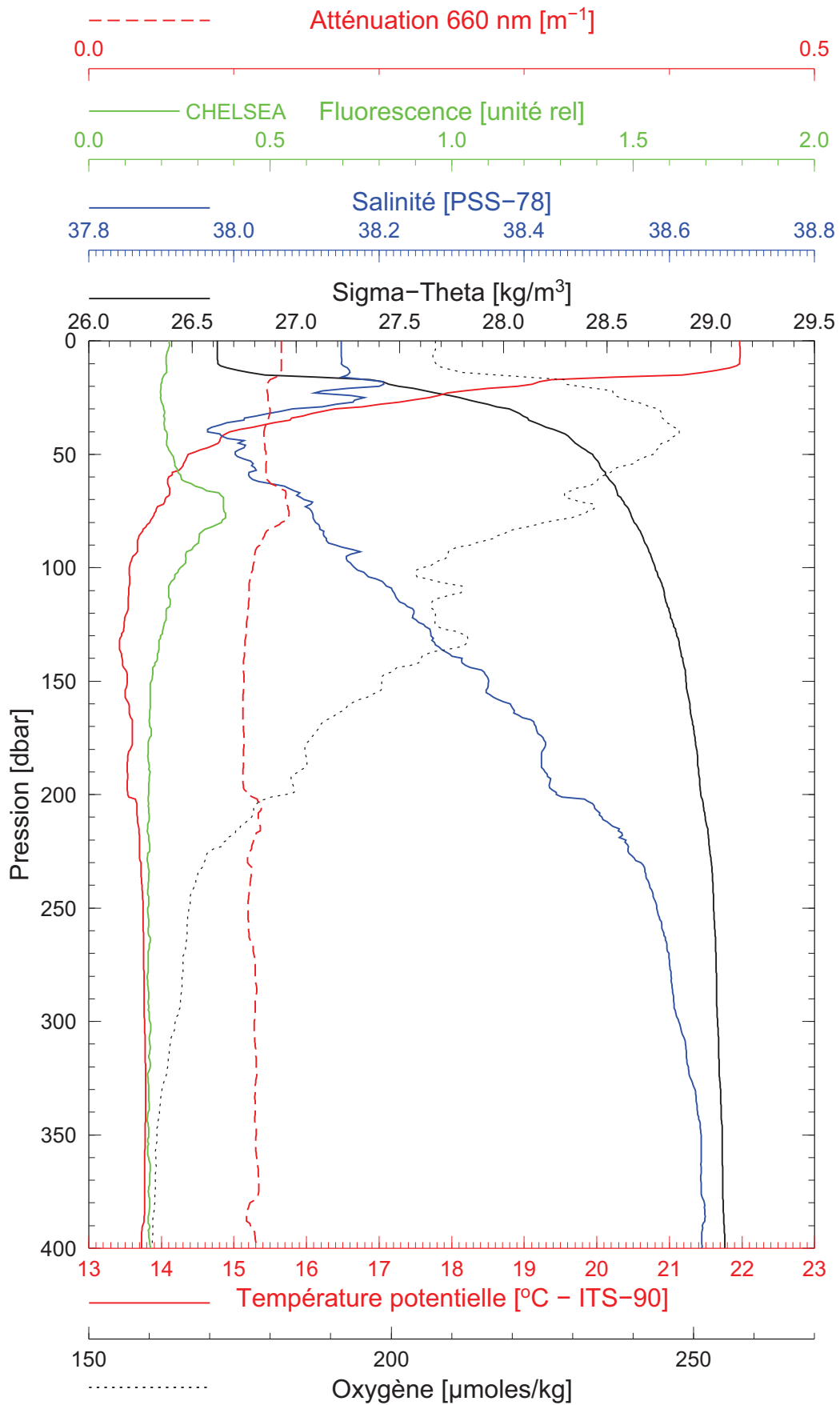
Longitude 07°36.900 E

BOUSSOLE 160

14/06/2015

BOUS150614\_05

BOUS005



Date 14/06/2015

Latitude 43°33.925 N

Heure déb 18h 00min [TU]

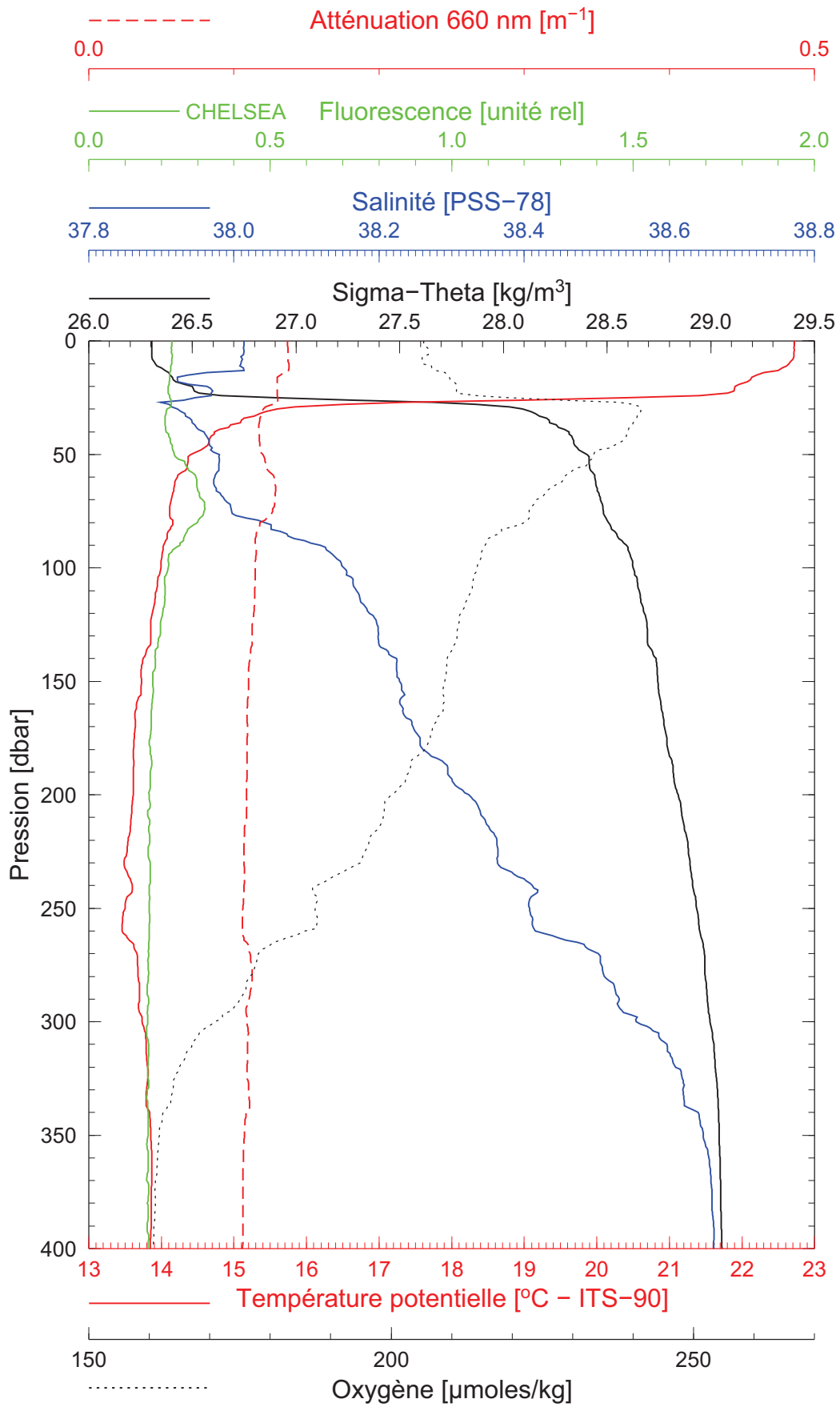
Longitude 07°30.887 E

BOUSSOLE 160

14/06/2015

BOUS150614\_06

BOUS006



Date 14/06/2015

Latitude 43°37.027 N

Heure déb 19h 01min [TU]

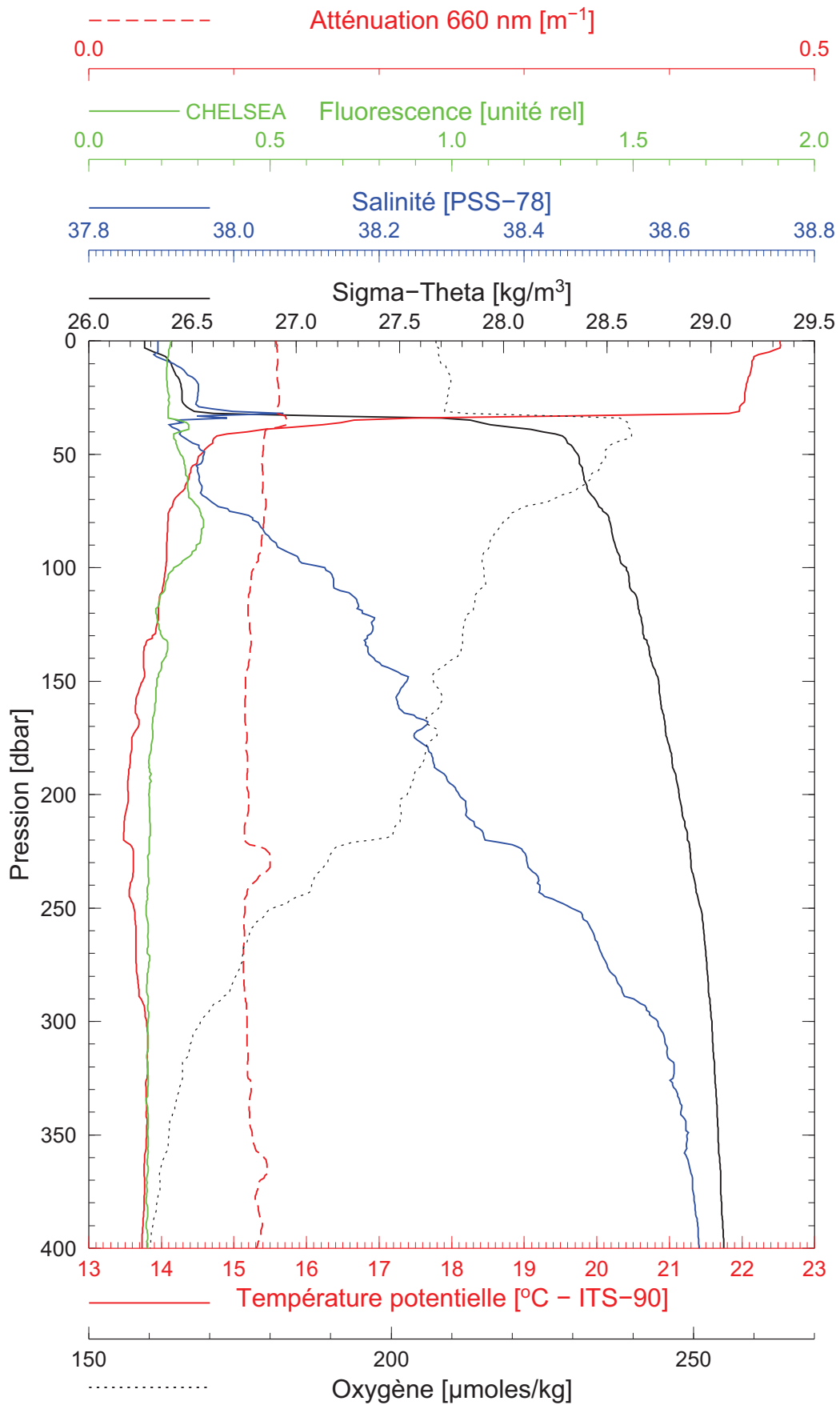
Longitude 07°24.919 E

BOUSSOLE 160

14/06/2015

BOUS150614\_07

BOUS007



Date 14/06/2015

Latitude 43°39.060 N

Heure déb 19h 49min [TU]

Longitude 07°21.070 E