

The BOUSSOLE project technical reports; report # 10-134, issue 1.

# BOUSSOLE Monthly Cruise Report

## Cruise 151

September 16– 21, 2014

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

Vessel: R/V *Téthys II*

(Captain: Joël Perrot)

Science Personnel: Laurent Coppola, Jean De Vaugelas, Melek Golbol, Thomas Jessin, David Luquet, Luisa Mangialajo, Didier Robin, Vincent Taillandier and Samuel Wilson.

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



The BOUSSOLE buoy multispectral radiometers set measuring *Ed*, *Eu* and *Lu* at 4m depth, after cleaning by the divers.

## BOUSSOLE project

ESA/ESRIN contract N° 13226/10/I-NB

December 19, 2014



## 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). 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 (see map in appendix). 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 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 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

No additional operations.

## Cruise Summary

The first day was used for operations of the DYFAMED program. The diving operations were performed this day because the weather forecasts were better than for the following days. The second day, the bad weather did not allow performing the CTD cast and optical profiles. Only a Secchi disk could be performed at the BOUSSOLE site. The third and the fourth day, the bad weather prevented departure from the Nice harbour. Nevertheless, a cruise was programmed on the *Téthys* for training of graduate students. CTD casts at the BOUSSOLE site and transects stations were performed during two days (September, 20 & 21).

## Tuesday 16 September 2014

The sea state was slight with a gentle breeze. Before going to the DYFAMED site, divers went to the Meteo-France buoy to install a nitrate sensor at 40m depth. Unfortunately, it could not be installed. The fixation were not suitable. Then, a deep CTD cast was performed at the DYFAMED site. After finishing the operations for the DYFAMED program, divers went at the BOUSSOLE site to clean the buoy sensors, to take pictures and to perform dark measurements of the backscattering meter and transmissometers. They tried to change the anodes located next to the sphere on the metallic structure of the buoy. But the anodes were not suitable because their diameter was smaller than the diameter of the metallic structure.

## Wednesday 17 September 2014

The sea state was slight with a moderate breeze. The sky was blue. The CTD was tentatively deployed but was immediately put back on the deck of the *Téthys* because of the bad weather. The optical profiles were not performed (bad weather and instability of the sky: clouds and sun). Two wireless radio connections (CISCO connection) were attempted with the buoy but failed. Only a Secchi disk was performed at the BOUSSOLE site before returning to the Nice harbour. The CTD transect was not performed because of the bad weather.

## Tuesday 18 September 2014

Bad weather prevented departure from the Nice harbour.

## Friday 19 September 2014

Bad weather prevented departure from the Nice harbour.

## Saturday 20 September 2014

A cruise for training of graduate students was programmed this day. The sea state was slight with a light to gentle breeze. The sky was slightly cloudy. 6 CTD casts on 6 stations of the transect (stations 02, 03, 04, 05 and 06) were performed during this day.

## Sunday 21 September 2014

A cruise for education training was programmed this day. The sea state was slight with a light to a gentle breeze. The sky was slightly cloudy. 3 CTD casts on 3 stations of the transect (stations 01, 02 and 03) were performed during this day. A CTD cast with water sampling for HPLC analyses at 3 depths was performed at the BOUSSOLE site.

Pictures taken during this cruise can be found at:

<https://plus.google.com/photos/114686870380724925974/albums/6067839131358949265?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

### Tuesday 16 September 2014 (UTC)

People on board: Laurent Coppola, Jean De Vaugelas, David Luquet, Luisa Mangialajo and Didier Robin.

0520 Departure from the Nice harbour.  
0835 Arrival at the Meteo-France buoy site.  
0920 Diving on the Meteo-France buoy.  
0950 CTD MOOSE 78, 2400m, DYFAMED site (renamed CTD 001 for BOUSSOLE program)

1140 Plankton nets for DYFAMED program.  
1240 Departure to BOUSSOLE site.  
1315 Diving on the BOUSSOLE buoy for cleaning sensors, performing dark measurements, taking pictures.  
1405 Departure to the Nice harbour.  
1700 Arrival at the Nice harbour.

## Wednesday 17 September 2014 (UTC)

People on board: Melek Golbol, Thomas Jessin, Vincent Taillandier and Samuel Wilson.

0520 Departure from the Nice harbour.  
0840 Arrival at the BOUSSOLE site.  
0900 Attempts of CISCO connection with the buoy: failed.  
0915 Attempts of CTD cast: cancelled (bad weather).  
0930 No C-OPS: sky cloudy and unstable: no optical profiles.  
0940 Secchi disk 01 (17m).  
0950 No CTD cast: bad weather.  
1000 Attempts of CISCO connection with the buoy: failed.  
1010 Departure to the first transect station.  
1040 Station 01: no CTD cast (bad weather).  
1110 Station 02: no CTD cast (bad weather).  
1140 Station 03: no CTD cast (bad weather).  
1145 Departure to the Nice harbour.  
1320 Arrival at the Nice harbour.

## Tuesday 18 September 2014 (UTC)

Bad weather prevented departure from the Nice harbour.

## Friday 19 September 2014 (UTC)

Bad weather prevented departure from the Nice harbour.

## Saturday 20 September 2014 (UTC)

People on board: student and teachers of master of *Université Pierre and Marie Curie (UPMC)*

0745 CTD 02, 300m, station 06 (43°39'N 07°21'E).  
0935 CTD 03, 300 m, station 05 (43°37'N 07°25'E).  
1035 CTD 04, 300 m, station 04 (43°34'N 07°31'E).  
1210 CTD 05, 300 m, station 03 (43°31'N 07°37'E).  
1305 CTD 06, 300 m, station 02 (43°28'N 07°42'E).

## Sunday 21 September 2014 (UTC)

People on board: student and teachers of master *Université Pierre and Marie Curie (UPMC)*

1035 CTD 07, 150 m, station 03 (43°31'N 07°37'E).  
1135 CTD 08, 150 m, station 02 (43°28'N 07°42'E).  
1300 CTD 09, 150 m, station 01(43°25'N 07°48'E).  
1355 CTD 10, 150 m with water sampling at 95, 50 and 5 m for HPLC.

## **Problems identified during the cruise**

- Several attempts of wireless connection with the buoy failed.
- The divers tried to change the anodes located next to the sphere on the metallic structure of the buoy. But the anodes were not suitable because of their small diameters. The anodes must be changed for the next cruise.
- The CTD casts during the graduate training cruise were performed with different sensors than those commonly used on the BOUSSOLE cruises. The model of CTD was a SBE 25plus with additional sensors: O<sub>2</sub> sensor and Chl fluorometer. The calibration coefficient of these sensors are different than the ones used on the BOUSSOLE cruises.

## **Appendices**

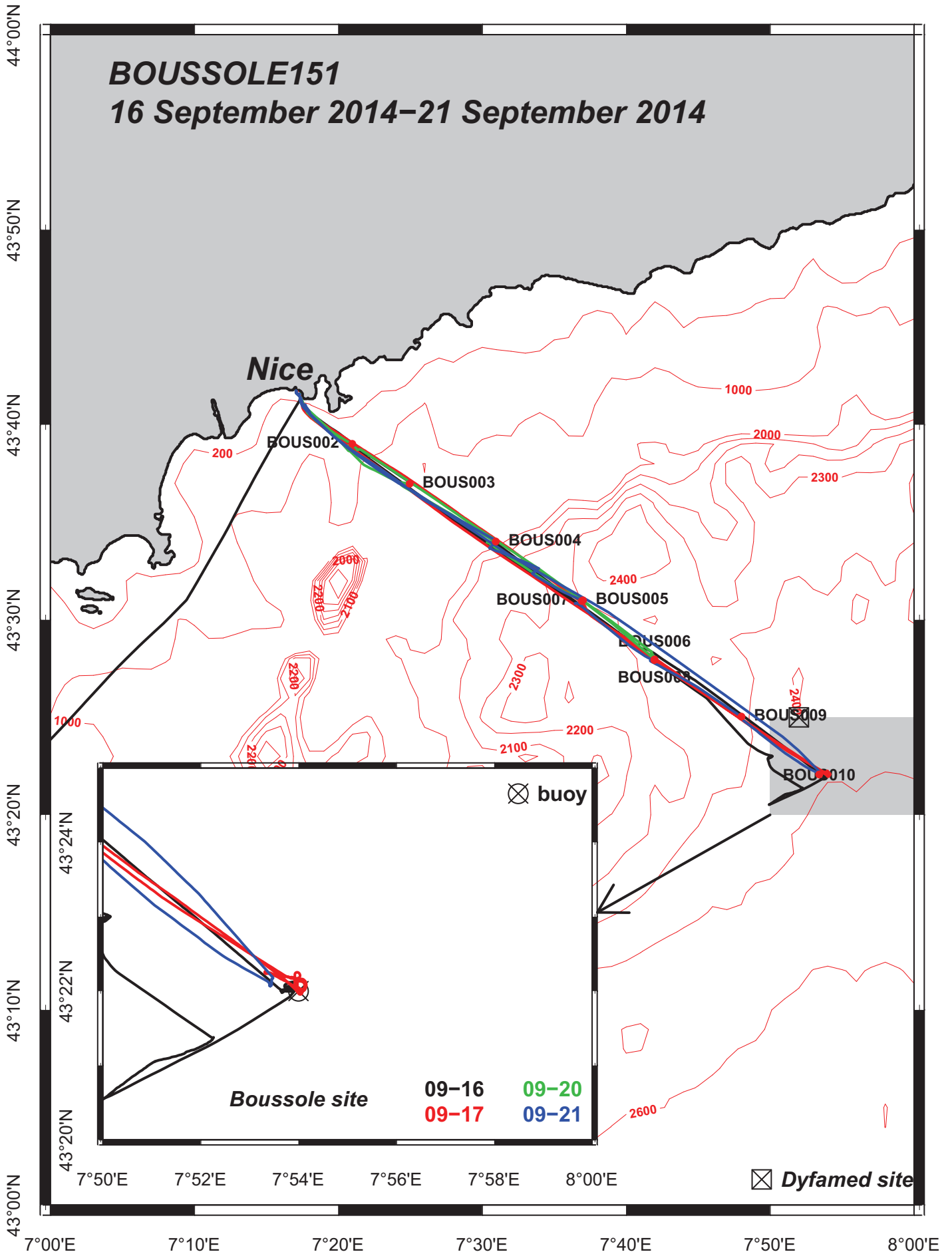


Cruise Summary Table for Boussole 151

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		Atm. Pressure (hPa)	Humidity (%)	Visibility	T air	T water	Sea		Swell dir.	Whitecaps	
								(Degree)	(Minute)	(Degree)	(Minute)				Wind sp. (kn)	Wind dir.						Swell H (m)	Swell dir.			
16/09/2014 (Dyflamed cruise)			CTDBOUS001		09:53	96:00	2400	43	21.363	7	53.252	blue		1	12	66	1014.5	76		22.7	22.50	calm				
17/09/14				Secchi01	09:40	4:00	17	43	22	7	54	overcast		7	15				medium			moved	1.0		yes	
18/09/14																										
Bad weather																										
19/09/14																										
Bad weather																										
20/09/2014 (Training cruise)			CTDBOUS002		07:43	14:00	300	43	39.024	7	20.970	cloudy		4	9	289	1015.0	NA		23.9	23.2	calm				
			CTDBOUS003		09:36	17:00	300	43	36.982	7	24.962	cloudy		4	5.1	231	1016.0	NA		23.7	23.1	calm				
			CTDBOUS004		10:39	15:00	300	43	34.016	7	30.942	cloudy		4	3.4	181	1016.1	NA		23.1	23.2	calm				
			CTDBOUS005		12:11	15:00	300	43	31.000	7	37.000	cloudy		4	6.1	178	1015.4	NA		22.6	22.6	calm				
			CTDBOUS006		13:07	19:00	300	43	27.970	7	41.973	blue		1	11.15	193	1014.9	NA		22.7	22.5	calm				
21/09/2014 (Training cruise)			CTDBOUS007		10:34	14:00	250	43	30.967	7	36.921	cloudy		4	2.8	213	1014.1	NA		22.9	23.1	calm				
			CTDBOUS008		11:32	15:00	250	43	27.940	7	41.962	cloudy		4	7.9	233	1014.0	NA		22.8	22.9	calm				
			CTDBOUS009		12:58	12:00	250	43	25.039	7	48.007	cloudy		4	8.2	228	1013.6	NA		22.4	22.6	calm				
			CTDBOUS010	HPLC	13:53	11:00	250	43	22.073	7	53.411	cloudy		4	7.4	195	1013.0	NA		22.4	22.8	calm				

# BOUSSOLE151

16 September 2014–21 September 2014

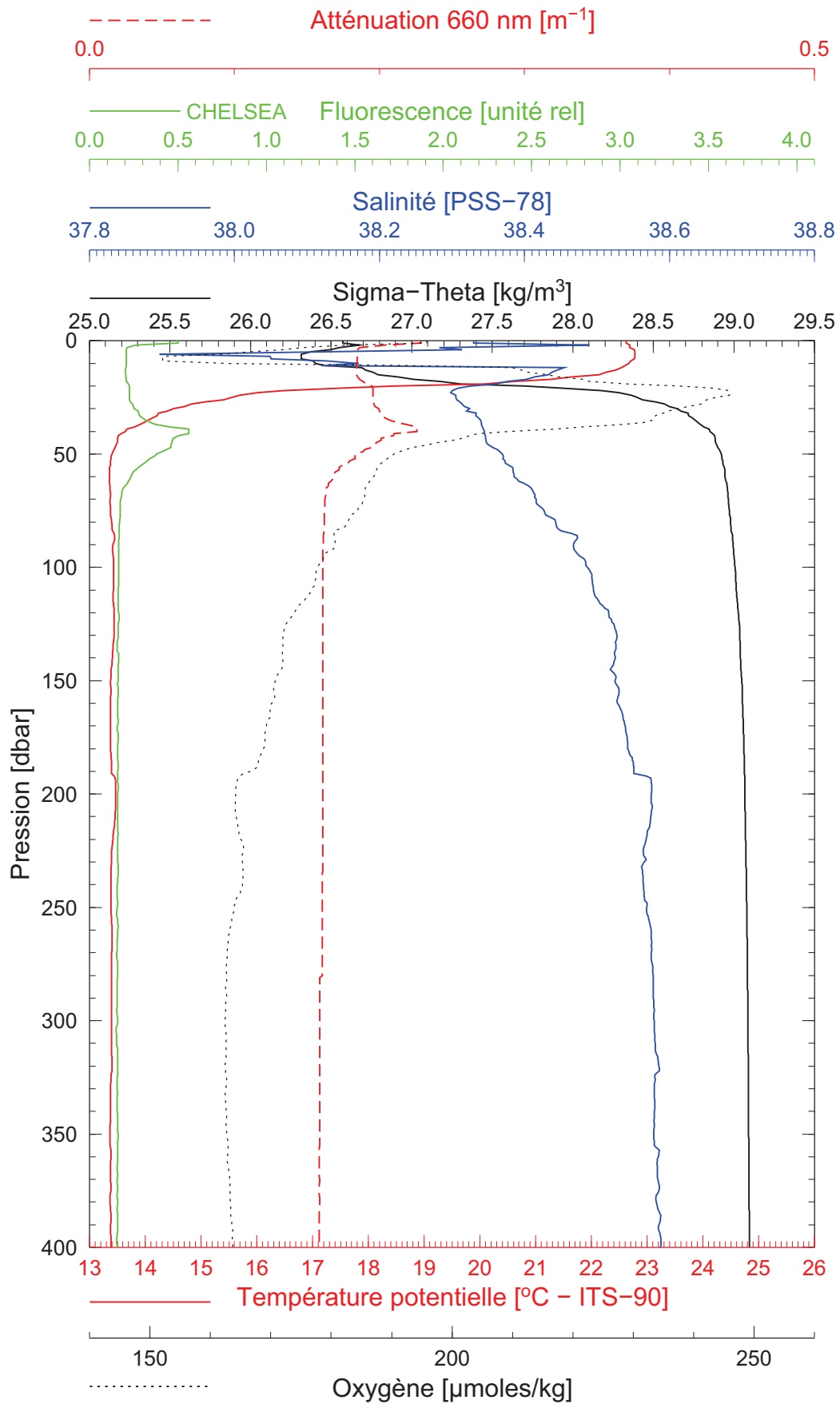


BOUSSOLE 151

16/09/2014

BOUS140916\_01

BOUS001



Date 16/09/2014

Latitude 43°21.363 N

Heure déb 09h 53min [TU]

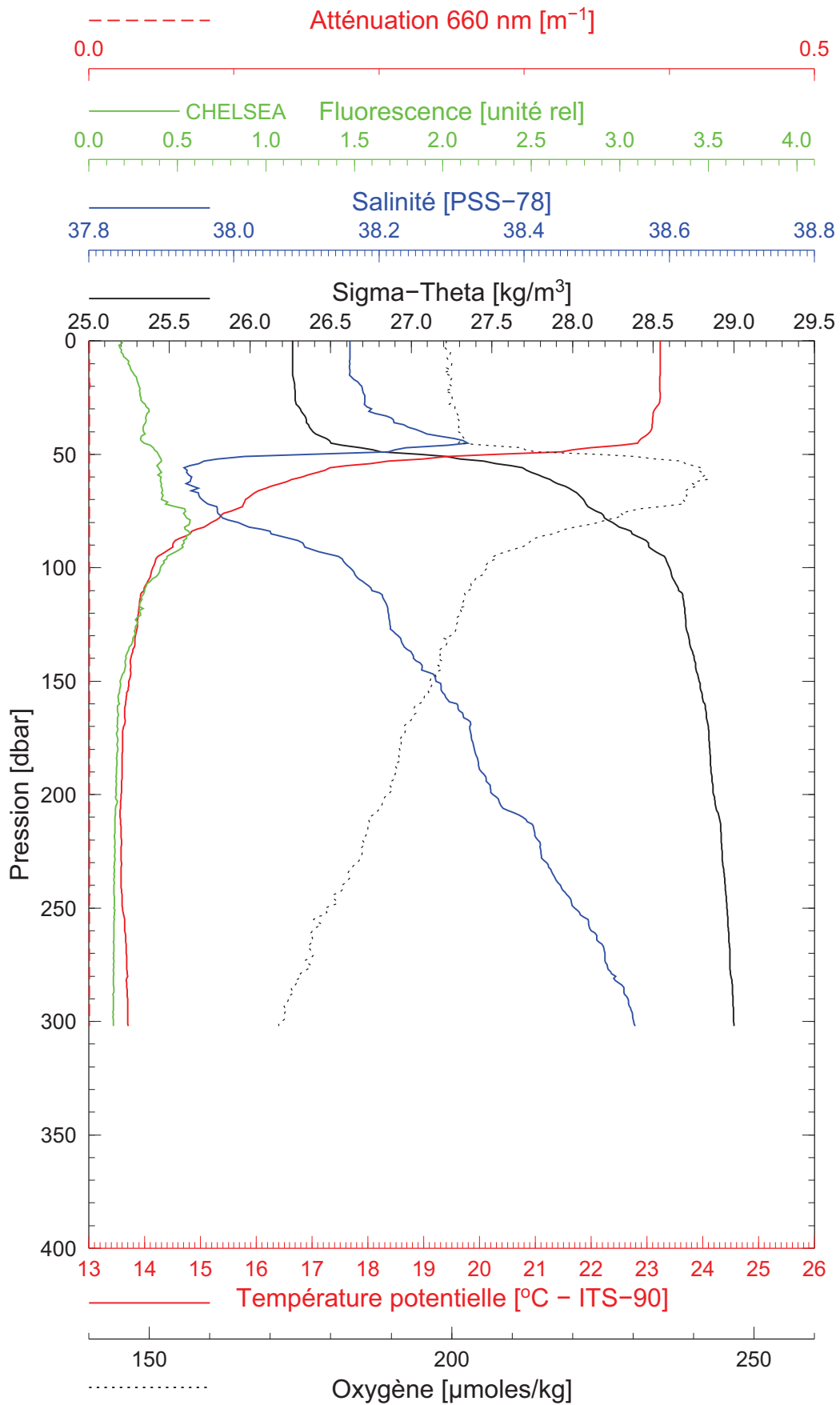
Longitude 07°21.008 E

BOUSOLE 151

20/09/2014

BOUS140920\_01

BOUS002

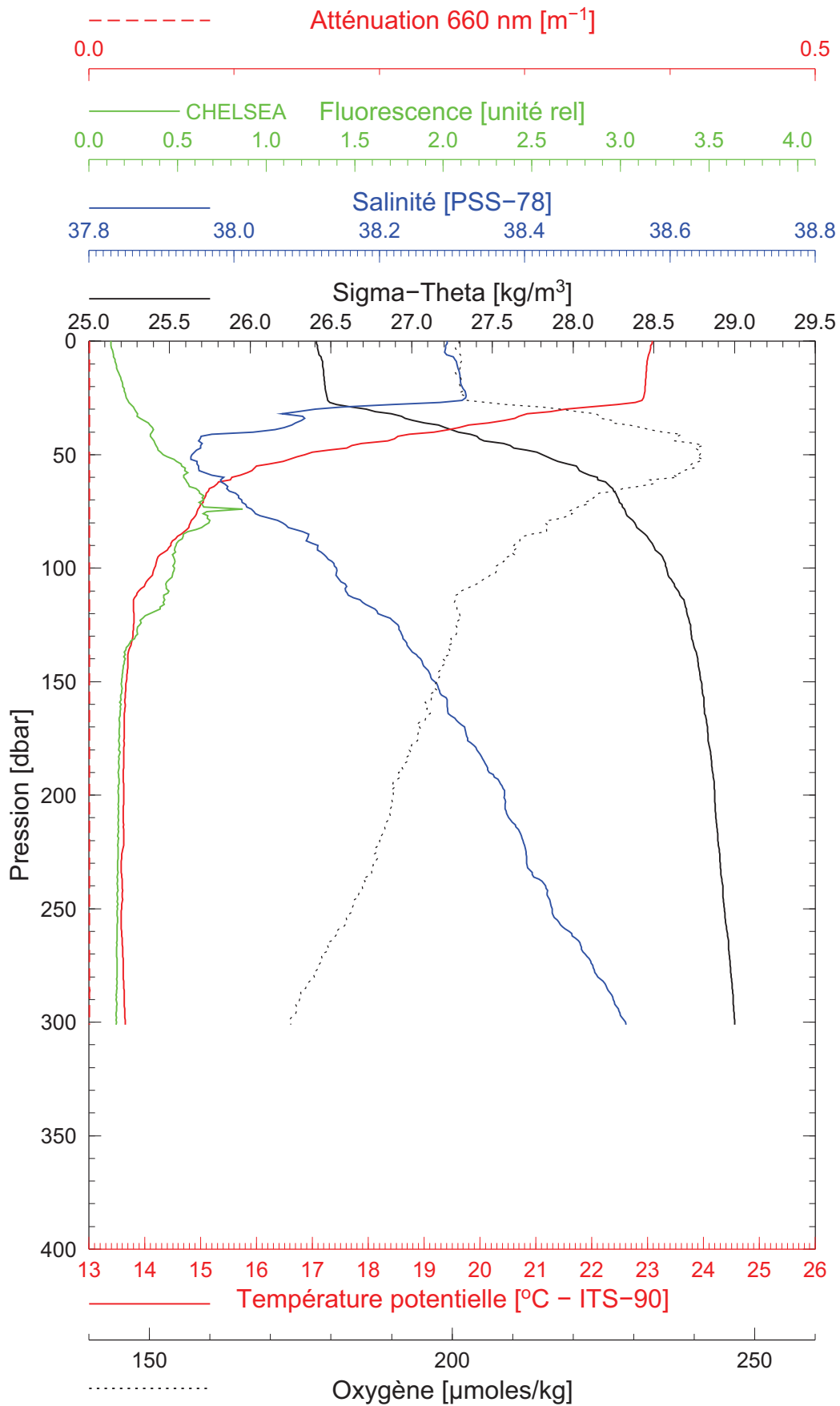


Date 20/09/2014

Latitude 43°39.024 N

Heure déb 07h 43min [TU]

Longitude 07°20.970 E



Date 20/09/2014  
Heure déb 09h 36min [TU]

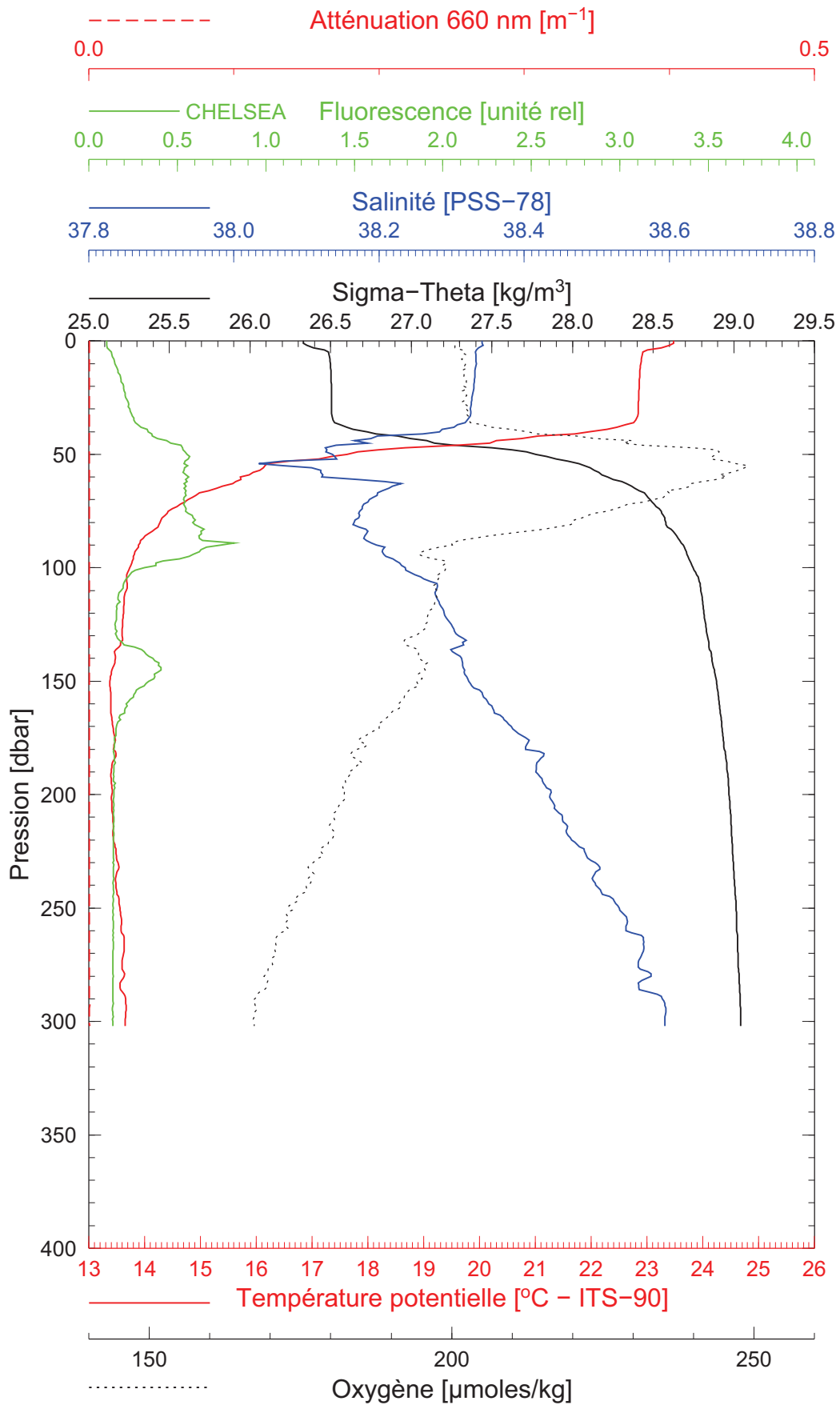
Latitude 43°36.982 N  
Longitude 07°24.962 E

BOUSOLE 151

20/09/2014

BOUS140920\_03

BOUS004



Date 20/09/2014  
Heure déb 10h 39min [TU]

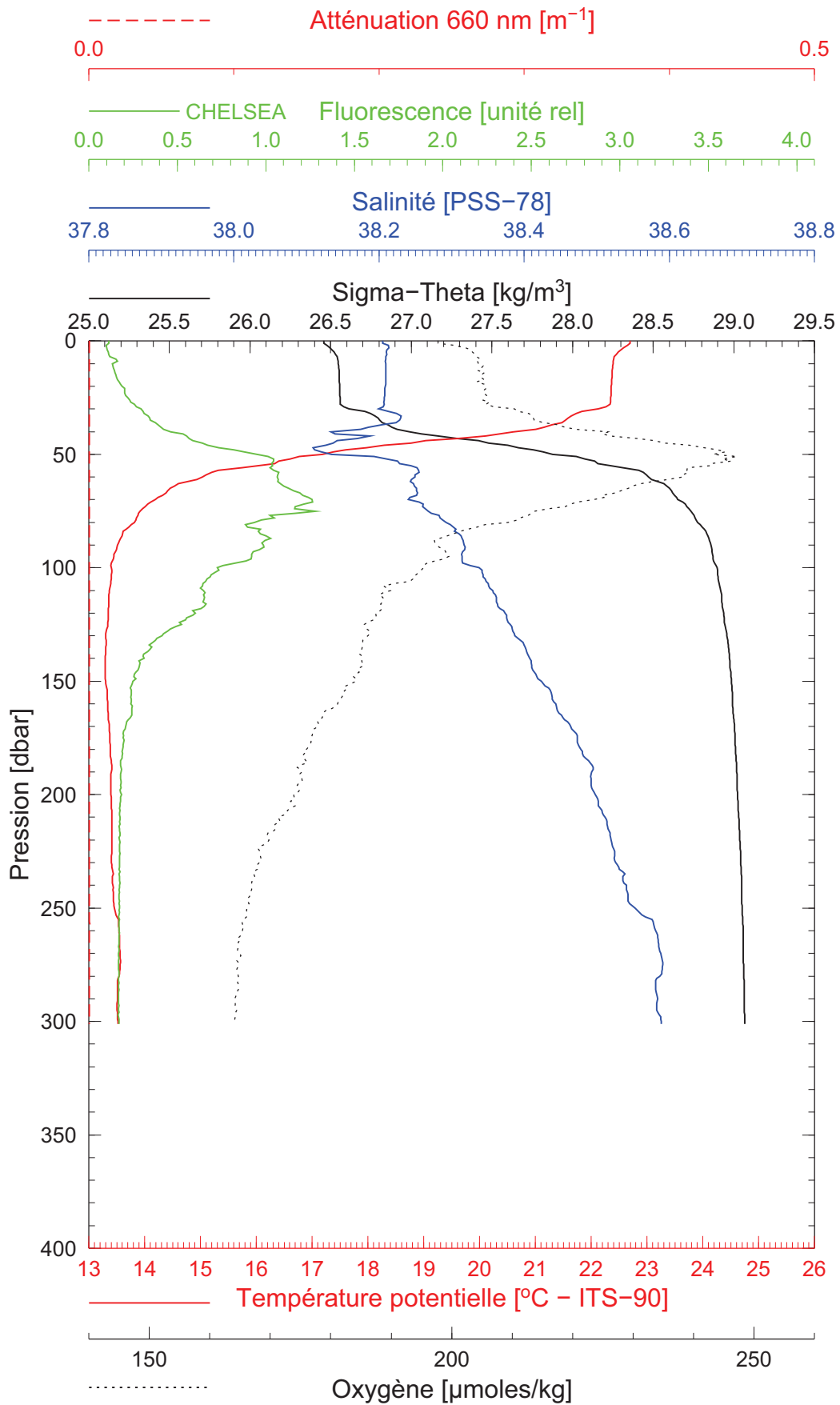
Latitude 43°34.016 N  
Longitude 07°30.942 E

BOUSSOLE 151

20/09/2014

BOUS140920\_04

BOUS005



Date 20/09/2014

Latitude 43°31.000 N

Heure déb 12h 11min [TU]

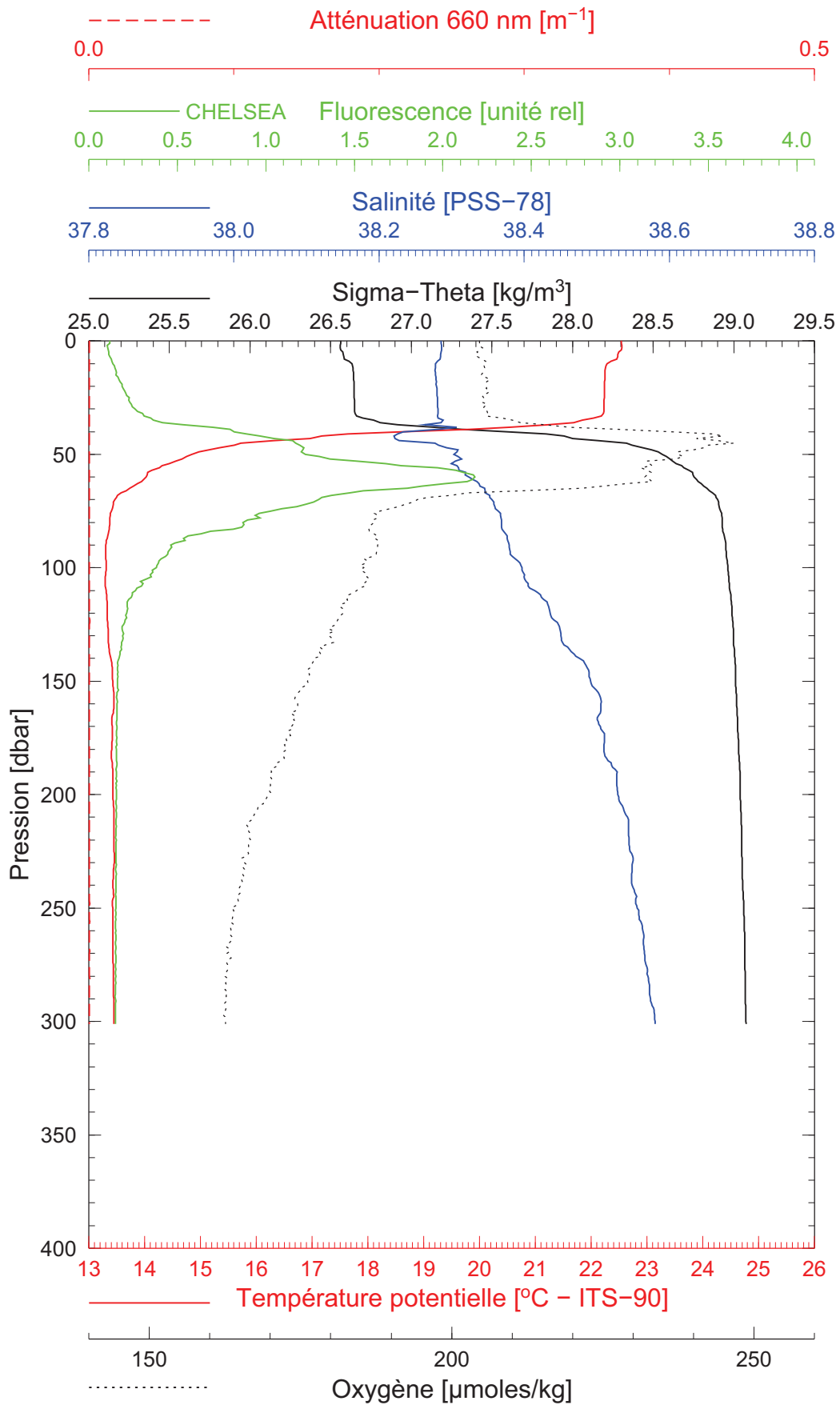
Longitude 07°37.000 E

BOUSOLE 151

20/09/2014

BOUS140920\_05

BOUS006



Date 20/09/2014

Latitude 43°27.970 N

Heure déb 13h 07min [TU]

Longitude 07°41.973 E

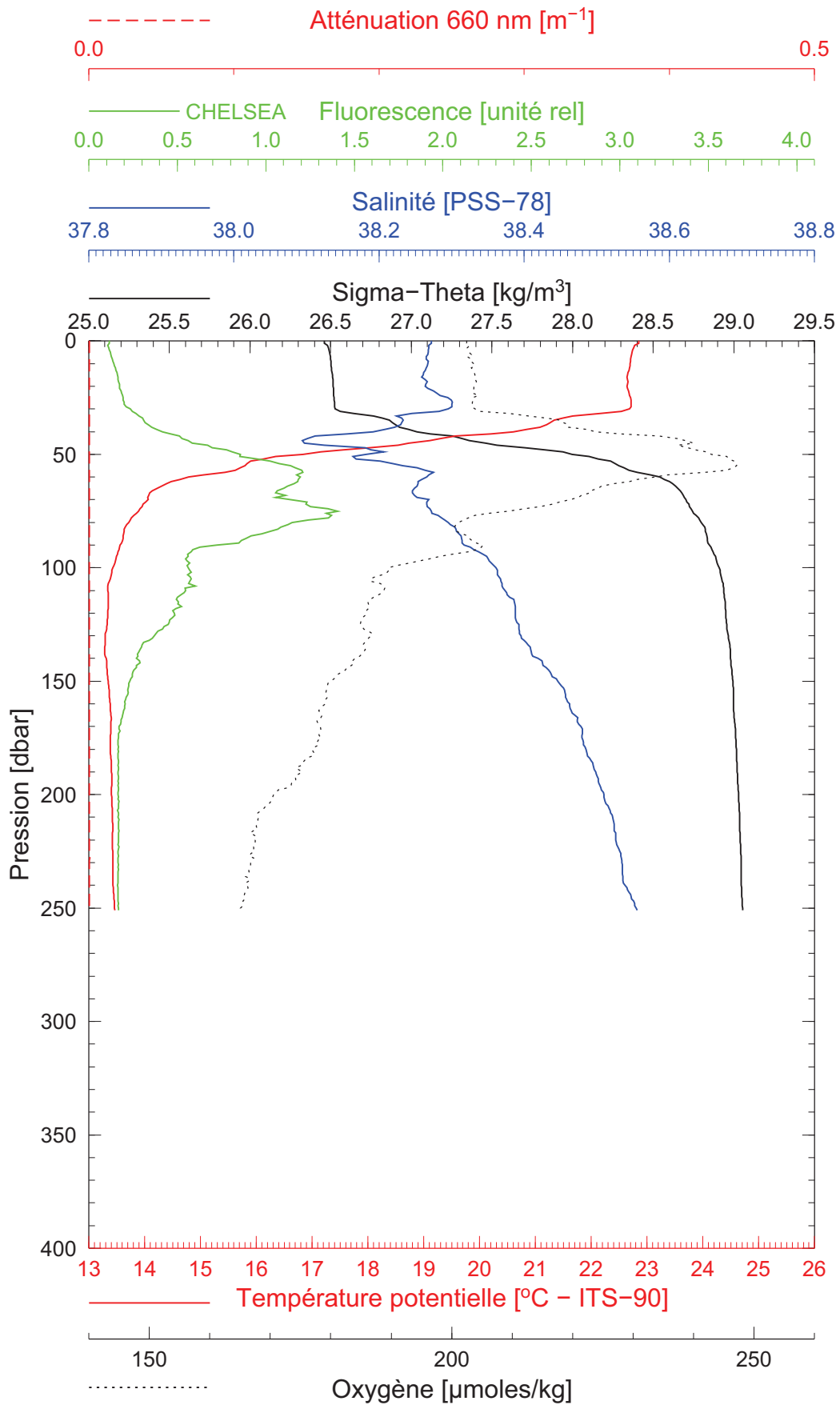


BOUSSOLE 151

21/09/2014

BOUS140921\_01

BOUS007



Date 21/09/2014

Latitude 43°30.967 N

Heure déb 10h 34min [TU]

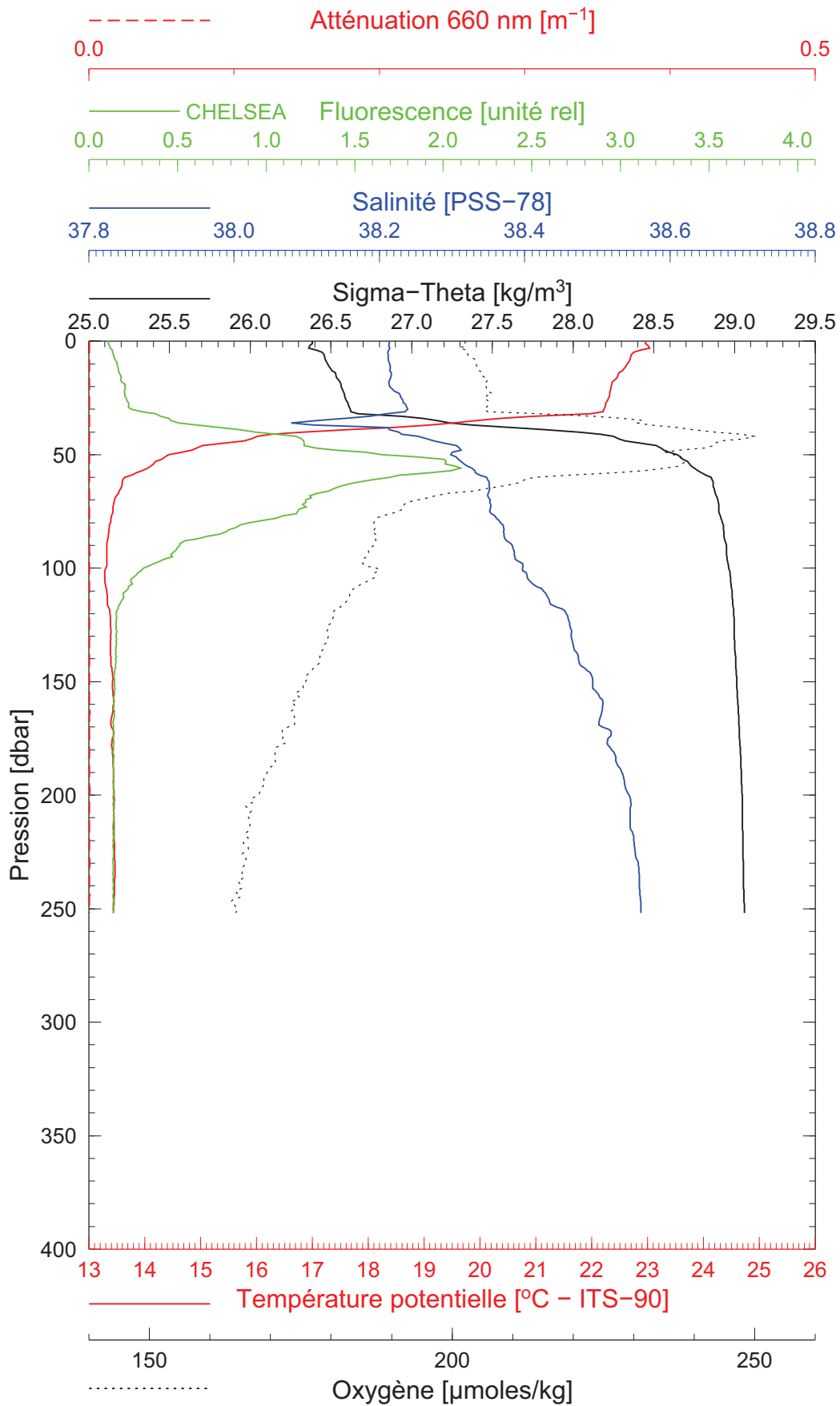
Longitude 07°36.921 E

BOUSSOLE 151

21/09/2014

BOUS140921\_02

BOUS008



Date 21/09/2014  
Heure déb 11h 32min [TU]

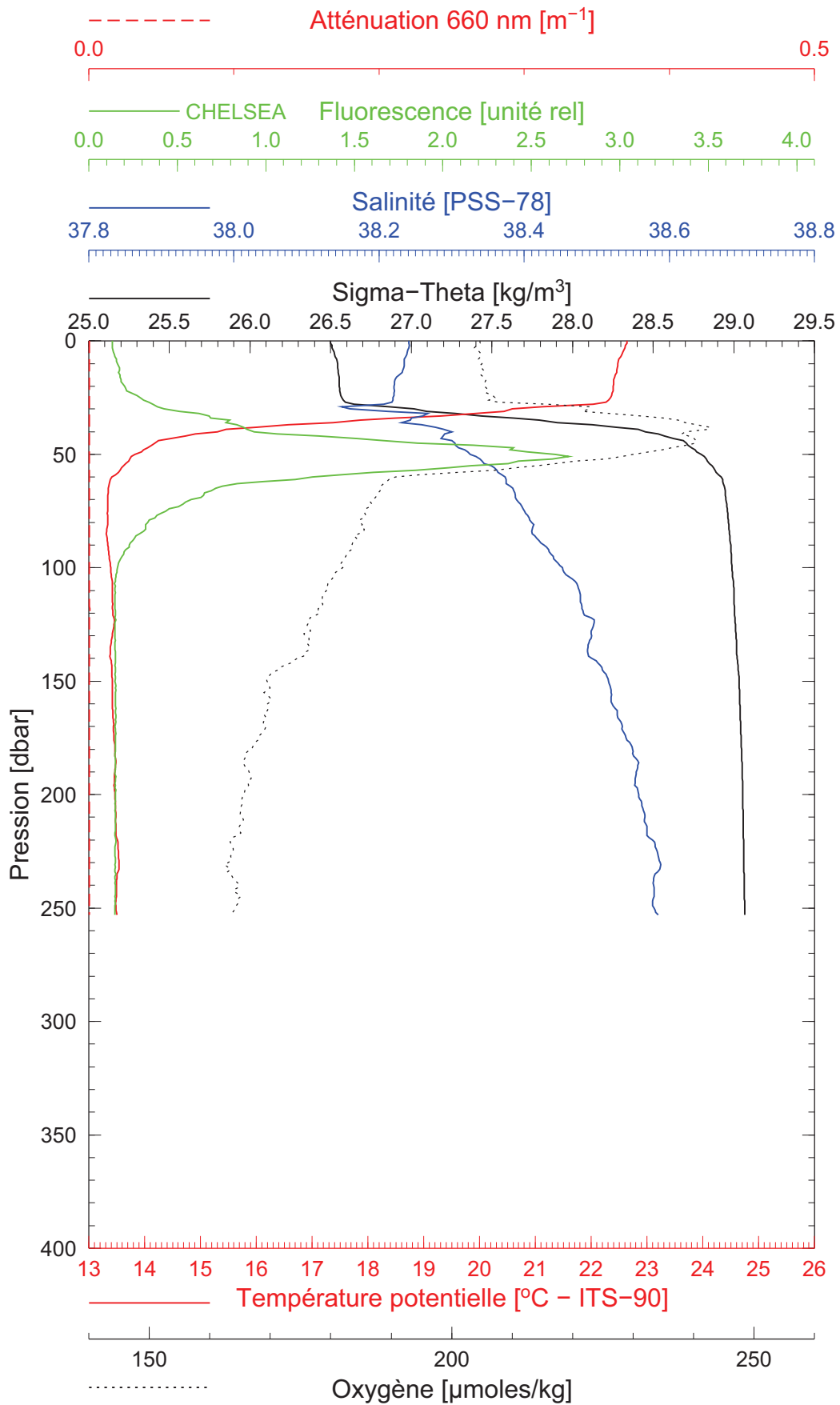
Latitude 43°27.940 N  
Longitude 07°41.962 E

BOUSSOLE 151

21/09/2014

BOUS140921\_03

BOUS009



Date 21/09/2014

Latitude 43°25.039 N

Heure déb 12h 58min [TU]

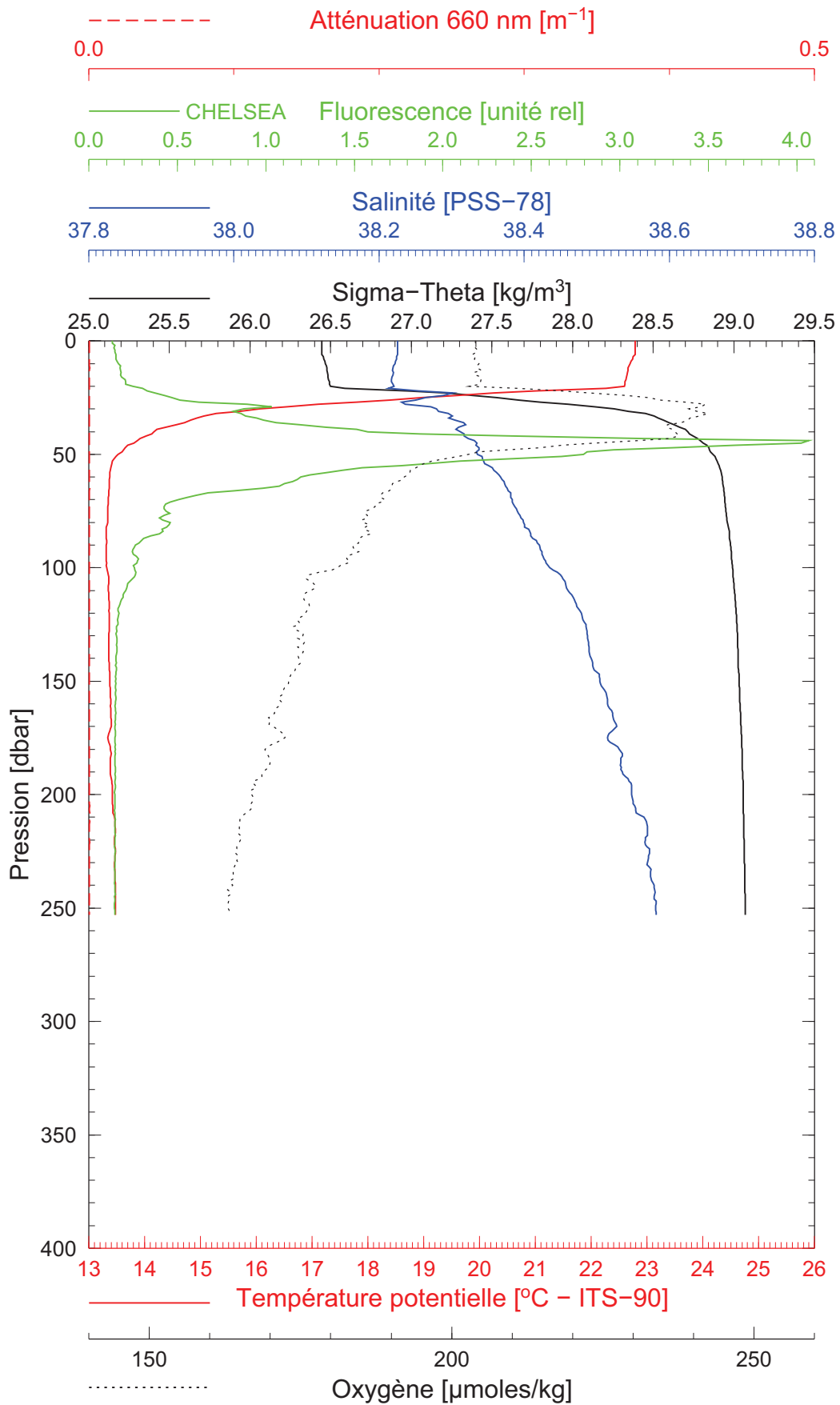
Longitude 07°48.007 E

BOUSSOLE 151

21/09/2014

BOUS140921\_04

BOUS010



Date 21/09/2014

Latitude 43°22.073 N

Heure déb 13h 53min [TU]

Longitude 07°53.411 E