

BOUSSOLE Monthly Cruise Report

Cruise 118

December 09 - 12, 2011

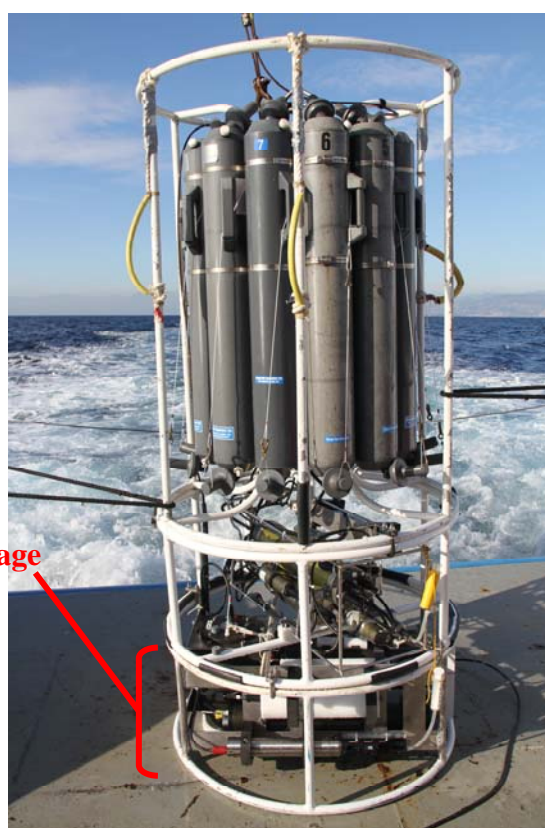
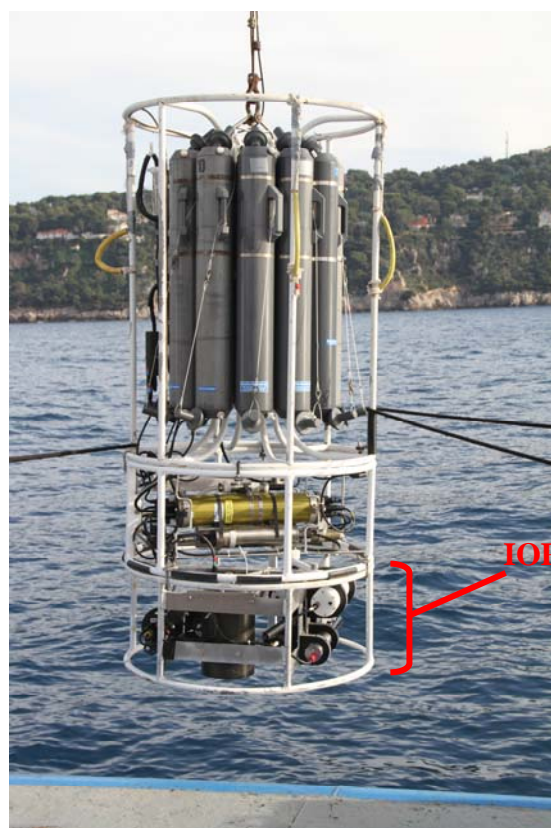
Duty Chief: Emilie Diamond (diamond@obs-vlfr.fr)

Vessel: R/V Téthys II

(Captain: Renaud Lebourhis)

Science Personnel: Emilie Diamond, Yves Lamblard, Grigor Obolensky, Vincenzo Vellucci and Dario (diver).

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



First deployments of the new HoboLabs bio-optical instruments package with the CTD rosette for the measurement of inherent optical properties of seawater during the BOUSSOLE monthly cruises.

BOUSSOLE project

ESA/ESRIN contract N° 13226/10/I-NB

January 10, 2012



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



European Space Agency



Centre National d'Études Spatiales, France

CENTRE NATIONAL D'ÉTUDES SPATIALES



National Aeronautics and Space Administration, USA



Centre National de la Recherche Scientifique, France



Université Pierre & Marie Curie, France



Observatoire Océanologique de Villefranche/mer, France

Contents

1. Cruise Objectives
2. Cruise Summary
3. Cruise Report
4. Problems identified during the cruise
5. Calculated Swath paths for MERIS Sensor

Appendices

Cruise Objectives

Routine operations

Multiple Biospherical's C-OPS (Compact Optical Profiling System) radiometric profiles are to occur on 0-150 m at the BOUSSOLE site within about 3 hours of satellite overhead passes (of MERIS in particular) 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. In addition to the depth profile from the CTD, CDOM fluorometer, Chl fluorometer, AC9 (from July 2002) and Eco-BB3 (from June 2003), seawater samples are to be collected, filtered and stored into liquid nitrogen for 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. From December 2011, hyperspectral absorption measurements are to be performed during the CTD deployments using a new "IOP package" including a Hobilabs hyperspectral absorption-meter (a-sphere), a backscattering meter (Hydroscat-6) and a spectral transmissometer (Gamma-4).

For one day of each cruise, in addition to a depth profile from the CTD, seawater samples are to be collected and filtered for colored dissolved organic matter (from June 2005) and particulate organic carbon (from October 2011) analysis in the lab. Small quantities of seawater are to be fixed with glutaraldehyde for cytometric analysis (from December 2011).

For one day of each cruise, at the end of the optics measurements on site, there will be one CTD transect between the BOUSSOLE site and the Port of Nice. This transect consists of six fixed locations on-route from BOUSSOLE (see map in appendix). The time of the day of this transect should be similar for each cruise, if possible to minimise the influence of diurnal variability.

For one day of each cruise, three divers will check the underwater state of the buoy structure and instrumentation, take some pictures for archiving, clean the sensor optical surfaces, and then take again some pictures after cleaning. Divers will also put a neoprene cap on the HS4 and on the transmissometers for acquiring three dark measurements (started in April 2009).

Further details about these operations and the 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

During this cruise, new measurements were put in place for the BIOCAREX project:

- the new bio-optical instruments package was deployed with the CTD rosette for the measurement of inherent optical properties of seawater during CTD casts. This new "IOP package" includes a Hobilabs hyperspectral absorption-meter (a-sphere), a backscattering meter (Hydroscat-6), a spectral transmissometer (Gamma-4) and the necessary ancillary sensors (temperature, salinity, pressure, Chl fluorescence) with a data acquisition system;
- seawater samples were collected and fixed with glutaraldehyde for cytometric analysis.

Cruise Summary

The first two days, weather conditions were not optimal and prevented work at the BOUSSOLE site the first day but this day was however used for testing the CTD rosette with the new IOP package in the front of the Villefranche-sur-mer Bay. The second day was used for performing the CTD transect. The third day was used for diving operations, optical profiles and a CTD cast with water sampling at the BOUSSOLE site and for completing the transect. The last day, the bad weather prevented the departure from the Nice harbour.

Friday 09 December 2011

The first day, the sea state prevented works on the BOUSSOLE site (H1/3 1.5 to 2m). This day was nevertheless used for testing the CTD rosette with the new IOP package in the front of the Villefranche-sur-mer Bay.

Saturday 10 December 2011

The second day, the sky was overcast and the weather conditions were not optimal on large but the sea slaked off gradually during the day (H1/3 1.7 to 1m at the BOUSSOLE site). The CTD transect was performed but from the coast to the BOUSSOLE site. At the station 01, the swell was still too high to perform a CTD cast.

Sunday 11 December 2011

The third day, the sea was smooth with a light breeze and the sky was overcast. When arrived at the BOUSSOLE site, divers went at sea to clean buoy instruments. They also changed 3 corroded collar zinc anodes above the buoy sphere. In parallel to diving operations, one of the two broken solar panels on the top of the buoy was changed. Then, 1 Secchi disk, 4 C-OPS profiles and 1 CTD cast with water sampling were performed. Before leaving, sensors and ARGOS and CISCO connectors on the top of the buoy were cleaned and a direct connection with the buoy was established for data retrieval. Then the CTD transect was completed.

Monday 12 December 2011

Bad weather prevented departure from the Nice harbour.

Cruise Report

Friday 09 December 2011 (UTC)

People on board: Emilie Diamond and Grigor Obolensky.

0950 Departure from the Nice harbour.
1015 Arrival in the front of the Villefranche Bay.
1040 CTD test001, 120 m for testing the IOP package.
1100 Lunch.
1240 CTD test002, 400 m for testing the IOP package.
1325 CTD test003, 400 m for testing the IOP package.
1805 Departure to the Nice harbour.
1835 Arrival at the Nice harbour.

Saturday 10 December 2011 (UTC)

People on board: Emilie Diamond and Grigor Obolensky.

0900 Departure from the Nice harbour.
0930 Arrival at the nearest transect station.
0950 CTD 01, 400 m, station 06 (43°39'N 07°21'E).
1040 CTD 02, 400 m, station 05 (43°37'N 07°25'E).
1150 CTD 03, 400 m, station 04 (43°34'N 07°31'E).
1255 CTD 04, 400 m, station 03 (43°31'N 07°37'E).
1405 CTD 05, 400 m, station 02 (43°28'N 07°42'E).
1505 No CTD at the station 01: greater swell.
1555 Arrival at the BOUSSOLE site.
1605 CTD 06, 400 m.
1640 Departure to the first transect station.
1710 No CTD at the station 01: greater swell.
1720 Departure to the Nice harbour.
2015 Arrival at the Nice harbour.

Sunday 11 December 2011 (UTC)

People on board: Emilie Diamond, Grigor Obolensky, Vincenzo Vellucci and 2 divers.

0530 Departure from the Nice harbour.
0850 Arrival at the BOUSSOLE site.
0900 Diving on the buoy for cleaning instruments and changing 3 corroded collar anodes.
0910 Changing of one of the two broken solar panels on the top of the buoy.
1000 Secchi disk 01 (24 m).
1040 C-OPS balance tests.
1100 C-OPS 01, 02, 03, 04.
1210 CTD 07, 400 m with water sampling at 400, 200, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p , POC, CDOM and cytometry.
1300 Bucket at surface for TSM.
1340 Cleaning of sensors and ARGOS and CISCO connectors on the head of the buoy
1400 Direct connection with the buoy and data retrieval.
1420 Departure to the first transect station.
1450 CTD 08, 400 m, station 01 (43°25'N 07°48'E).
1525 Departure to the Nice harbour.
1810 Arrival at the Nice harbour.

Monday 12 December 2011

Bad weather prevented departure from the Nice harbour.

Problems identified during the cruise

- The first two days, weather conditions were not optimal and prevented from working at the BOUSSOLE site the first day and finishing the CTD transect the second day.
- The last day, the bad weather prevented the departure from the Nice harbour.
- Just before the cruise, the CTD connector plugged with the O₂ sensor was broken, so this sensor was connected on channel 7 instead of channel 4. The connector was repaired after the cruise.

Calculated Swath paths for the MERIS Sensor (Esov NG Software)

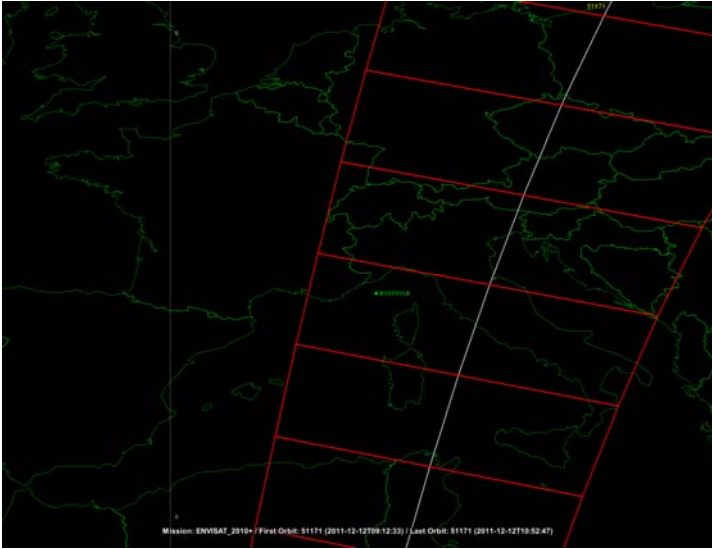
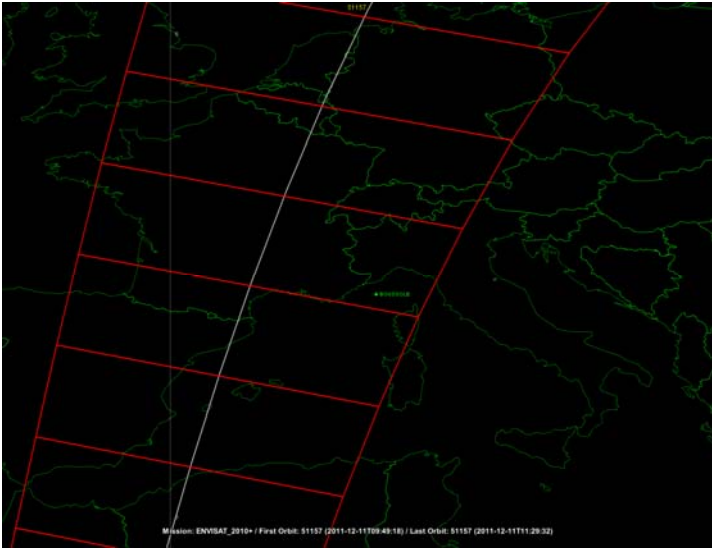
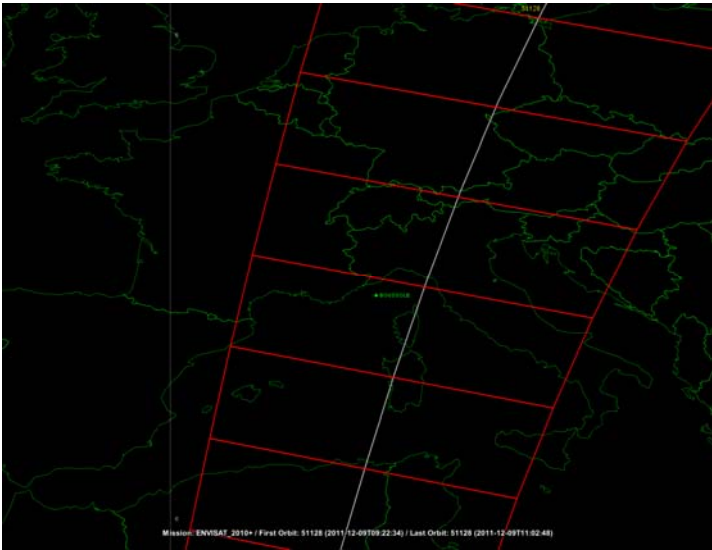


Figure 1. Calculated swath path for MERIS (Esov NG software) above the BOUSSOLE site for the 09th, 11th and 12th of December 2011.

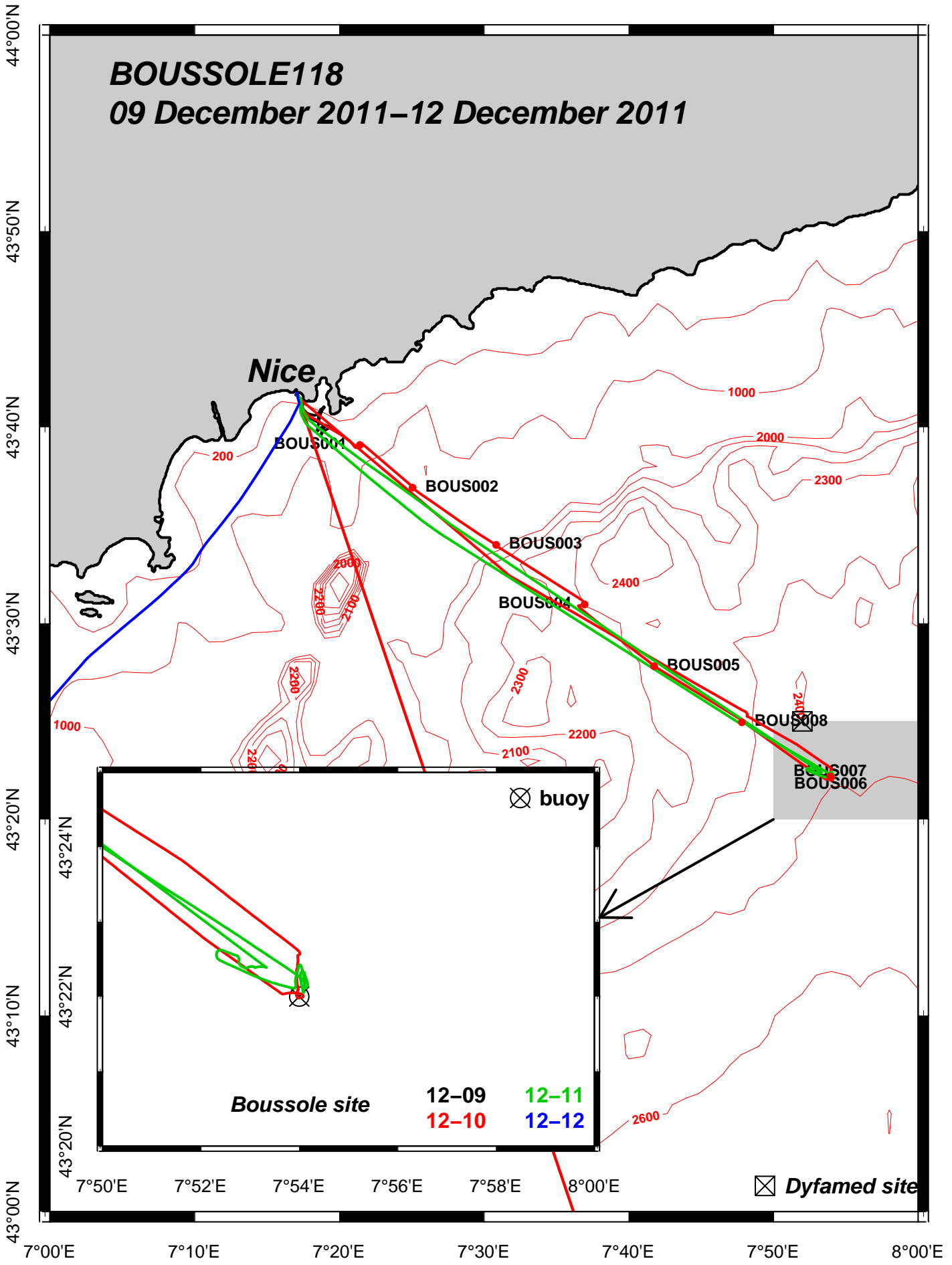
Appendices

Cruise Summary Table for Boussole 118

Date	Black names (file ext: ".raw")	Profile names (file extension: ".raw")	CTD notées / satellite overpass	Other sensors	Start Time		Depth max (meter)	Latitude (N)				longitude				Sky	Clouds	Quantity (#/8)	Weather		Atm. Pressure (hPa)	Humidity (%)	Visibility	T air	T water	Sea		Swell dir.	Whitecaps
					GMT (hour.min)	(min.sec)		(Degree)	(Minute)	(Degree)	(Minute)	Wind sp. (kn)	Wind dir.	Sea	Swell H (m)														
09/12/11			CTDtest001		10:41	10:00	120	43	40.955	7	18.833		hazy		7	11	262		1021	57		12.6	17.4	calm			no		
			CTDtest002		12:43	21:00	400	43	40.000	7	18.796		hazy		7	5	224		1019	56		14.5	17.6	calm			no		
			CTDtest003		13:28	36:00	400	43	39.659	7	18.745		hazy		7	10	292		1019	58		13.8	17.6	calm			no		
10/12/11			CTDBOUS001		09:55	23:00	400	43	39.096	7	21.425		overcast		6	3	262		1017	59		13.2	17.5	calm			no		
			CTDBOUS002		10:46	28:00	400	43	36.921	7	25.068		overcast		6	7	292		1017	64		12.6	17.5	calm			no		
			CTDBOUS003		11:51	31:00	400	43	34.002	7	30.844		overcast		6	12	278		1016	64		13.9	17.4	calm			few		
			CTDBOUS004		12:58	32:00	400	43	30.964	7	36.955		overcast		5	6	121		1016	65		14.3	17.1	moved			yes		
			CTDBOUS005		14:07	30:00	400	43	27.810	7	41.756		overcast		5	16	104		1015	68		15.4	16.9	moved			yes		
			CTDBOUS006		16:08	31:00	400	43	22.160	7	53.962		night		8	12	90		1016	76		15.4	15.7	moved			yes		
11/12/11				Secchi01	10:00	4:00	24	43	22	7	54		overcast		7						medium			calm			no		
	bou_c-ops_111211_1015_001_data.csv				10:30	2:39																							
	bou_c-ops_111211_1015_003_data.csv				11:20	2:49	66.2	43	22.384	7	53.348		overcast	As&Ns	7	2	300		1018.0	77	medium	15.1		calm	0.3		no		
	bou_c-ops_111211_1015_004_data.csv				11:29	3:32	86.6	43	22.398	7	53.162		overcast	As&Ns	7	2	300		1018.0	77	medium	15.1		calm	0.3		no		
	bou_c-ops_111211_1015_005_data.csv				11:41	3:01	73.9	43	22.393	7	52.963		overcast	As&Ns	7	2	300		1018.0	77	medium	15.1		calm	0.3		no		
	bou_c-ops_111211_1015_006_data.csv				11:50	2:56	71.1	43	22.417	7	52.797		overcast	As&Ns	7	2	300		1018.0	77	medium	15.1		calm	0.3		no		
	bou_c-ops_111211_1015_007_data.csv				12:02	1:23																							
				CTDBOUS007	HPLC, Ap, CDOM, POC & cyto	12:22	36:00	400	43	22.195	7	53.923		overcast		8	1	22		1017	77		15.1	15.7	calm			no	
				Bucket: TSM	13:00	2:00	surface	43	22	7	54		overcast		8	1	22		1017	77		15.1		calm			no		
			CTDBOUS008		14:53	29:00	400	43	24.954	7	47.816		overcast		7	3	273		1017	77		14.9	16.3	calm			no		
12/11/11					Bad weather																								

BOUSSOLE118

09 December 2011–12 December 2011

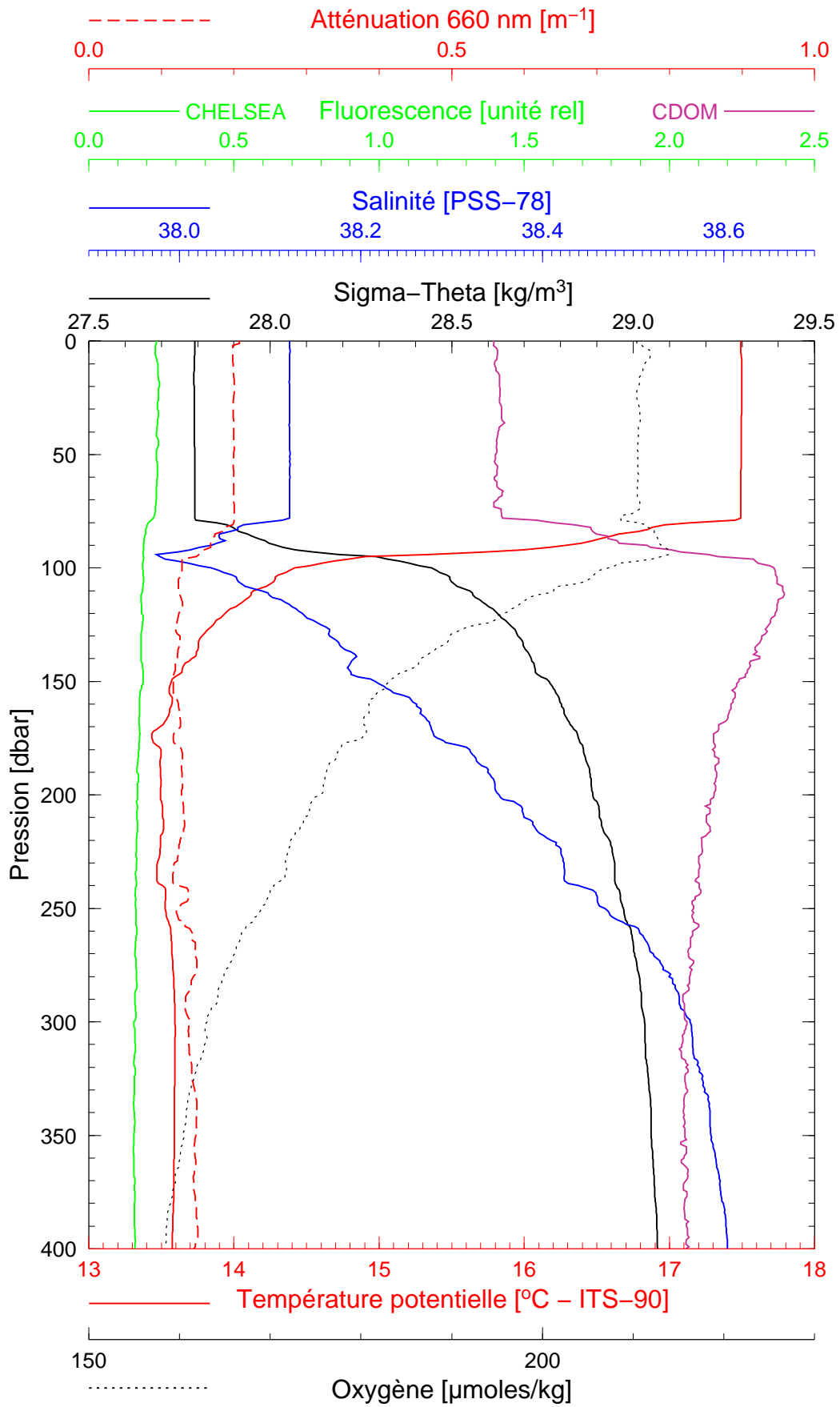


BOUSSOLE 118

10/12/2011

BOUS111210_01

BOUS001



Date 10/12/2011
Heure déb 09h 55min [TU]

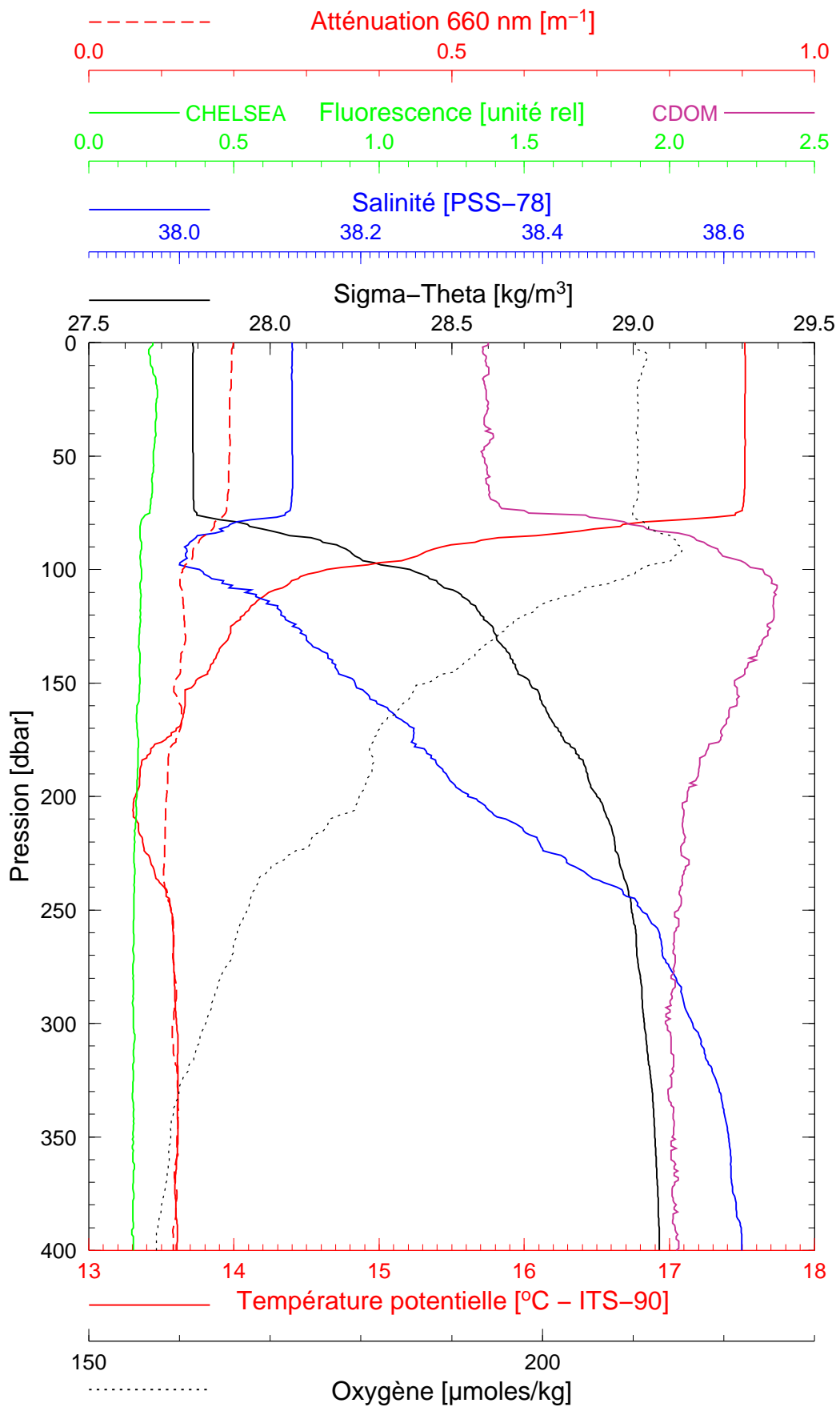
Latitude 43°39.096 N
Longitude 07°21.425 E

BOUSSOLE 118

10/12/2011

BOUS111210_02

BOUS002



Date 10/12/2011
Heure déb 10h 46min [TU]

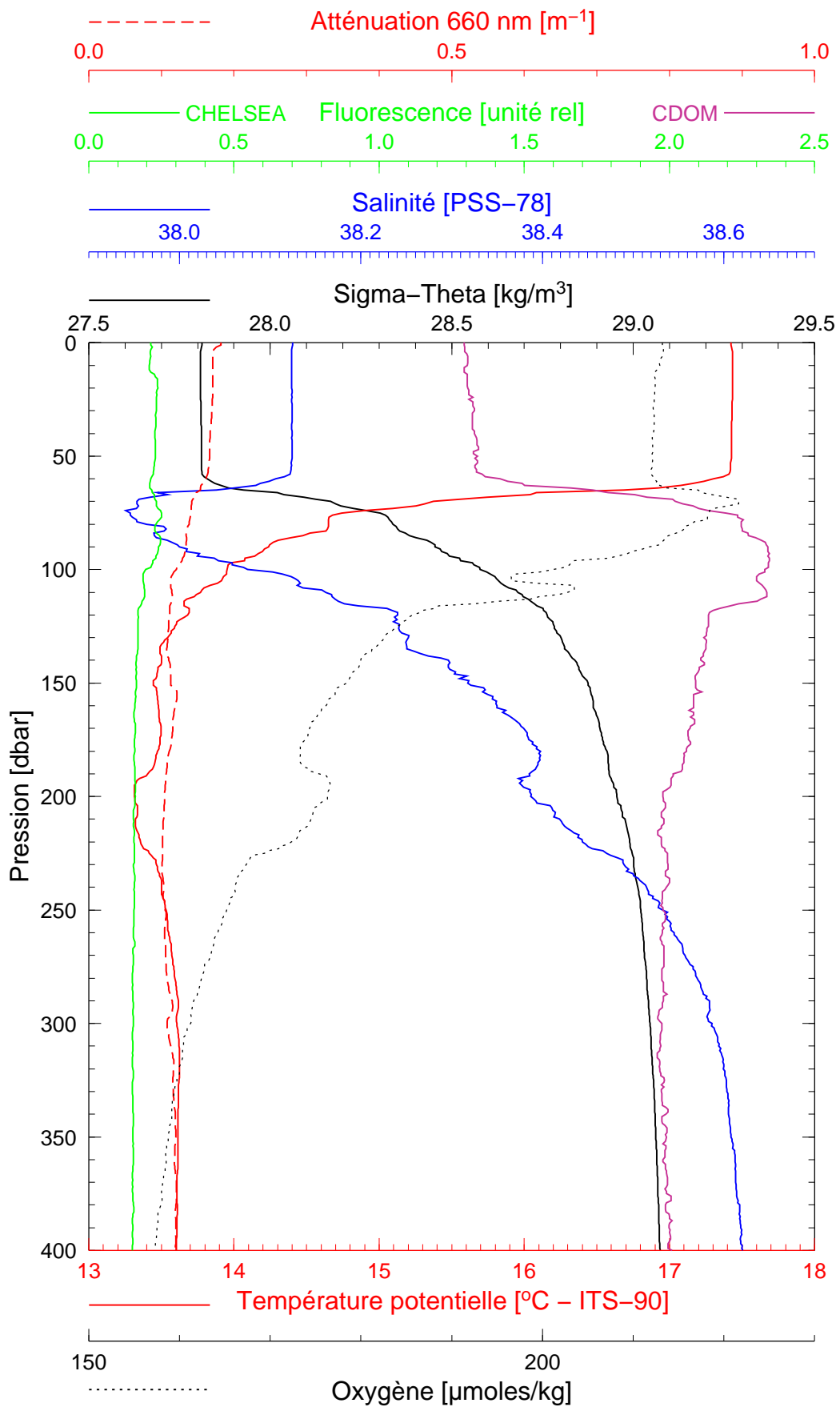
Latitude 43°36.921 N
Longitude 07°25.068 E

BOUSSOLE 118

10/12/2011

BOUS111210_03

BOUS003



Date 10/12/2011
Heure déb 11h 51min [TU]

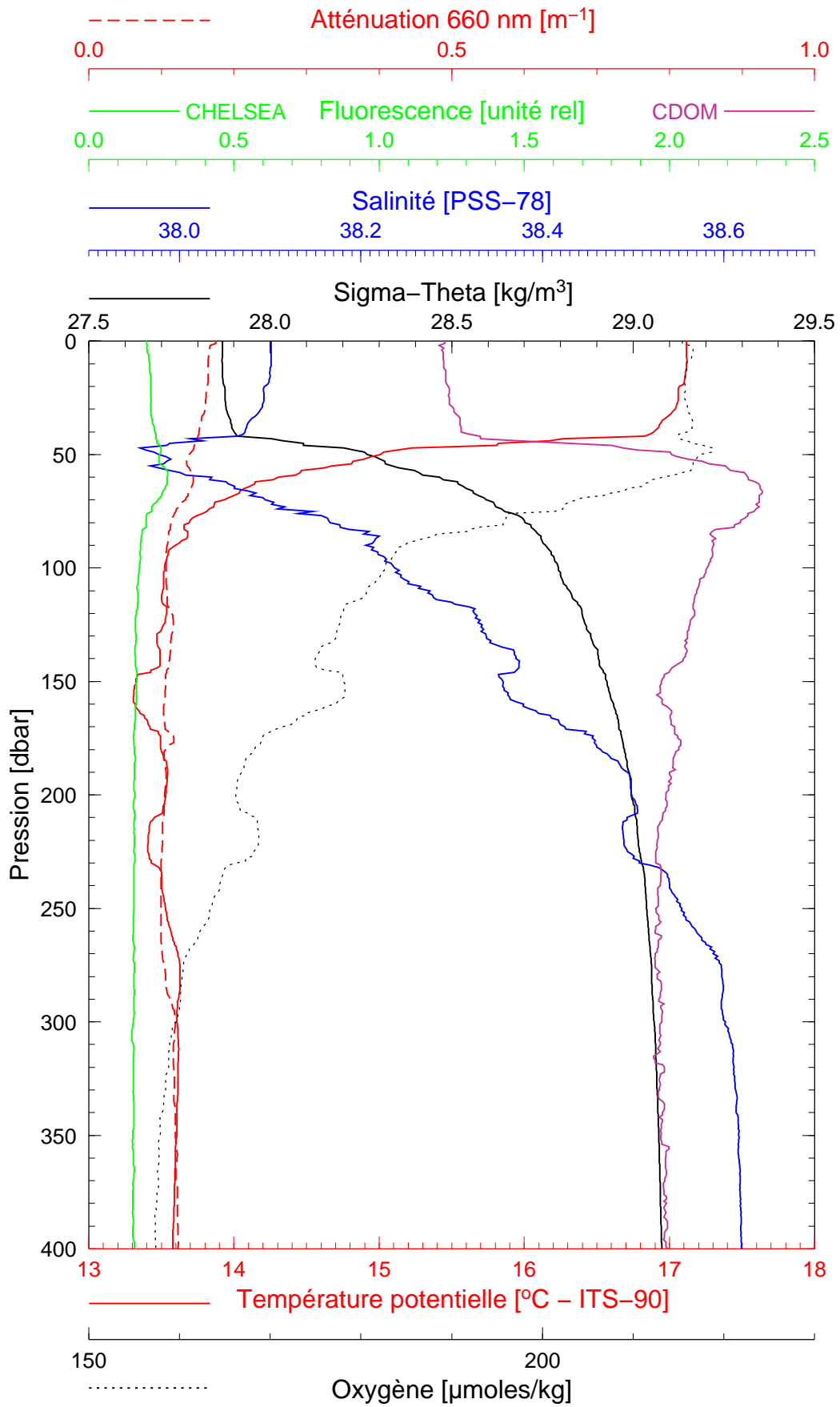
Latitude 43°34.002 N
Longitude 07°30.844 E

BOUSSOLE 118

10/12/2011

BOUS111210_04

BOUS004



Date 10/12/2011
Heure déb 12h 58min [TU]

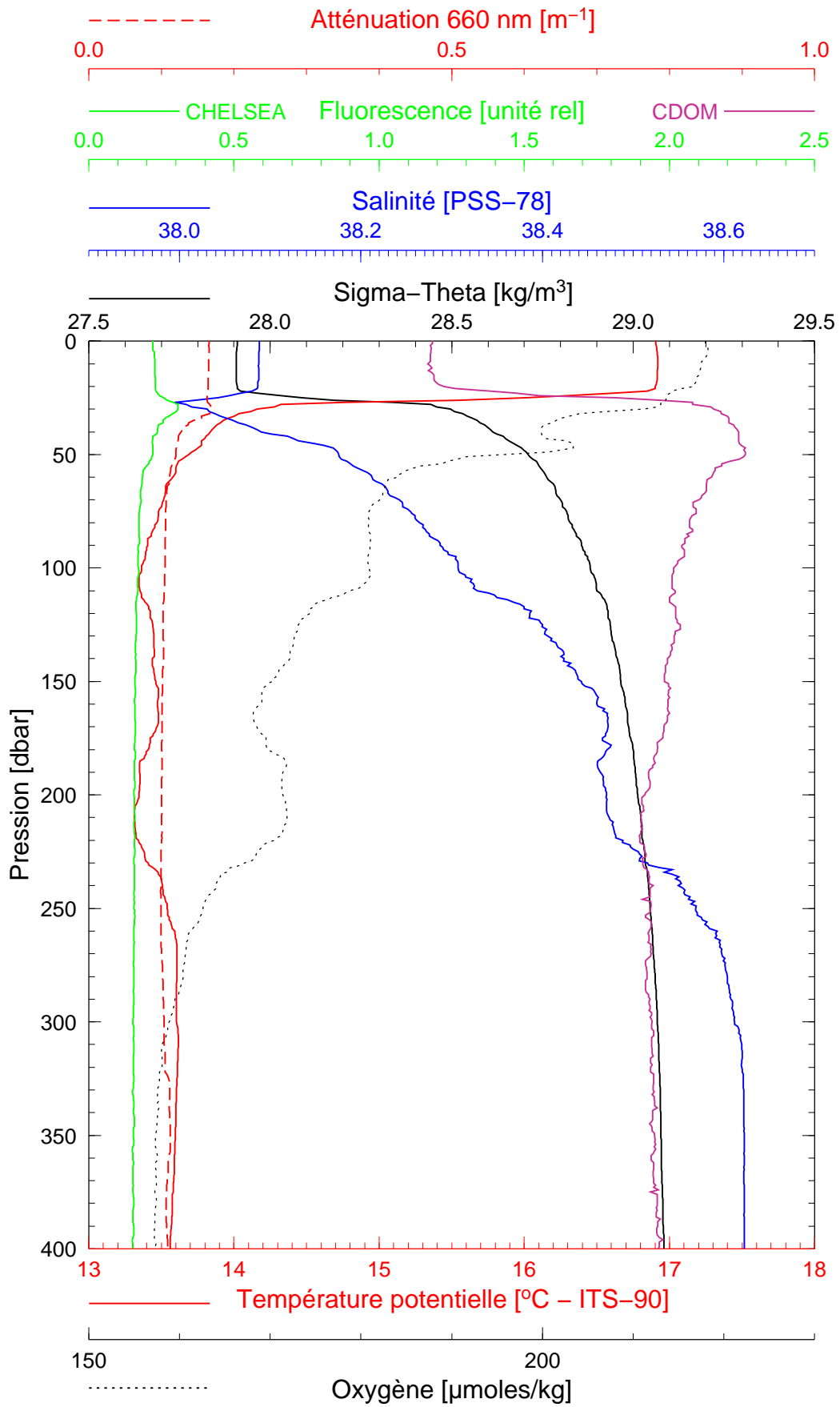
Latitude $43^{\circ}30.964 N$
Longitude $07^{\circ}36.955 E$

BOUSSOLE 118

10/12/2011

BOUS111210_05

BOUS005



Date 10/12/2011
Heure déb 14h 07min [TU]

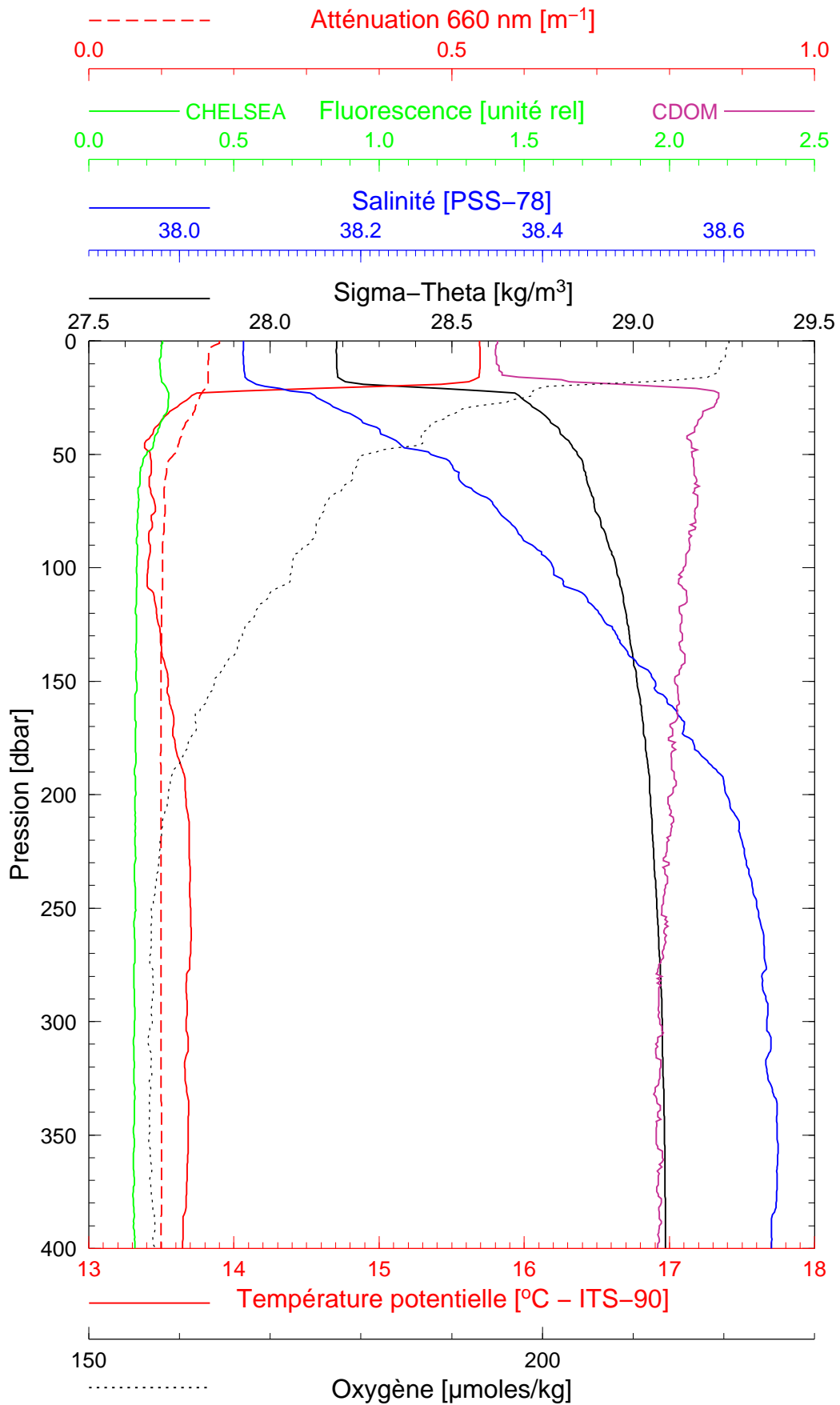
Latitude 43°27.810 N
Longitude 07°41.756 E

BOUSSOLE 118

10/12/2011

BOUS111210_06

BOUS006



Date 10/12/2011
Heure déb 16h 08min [TU]

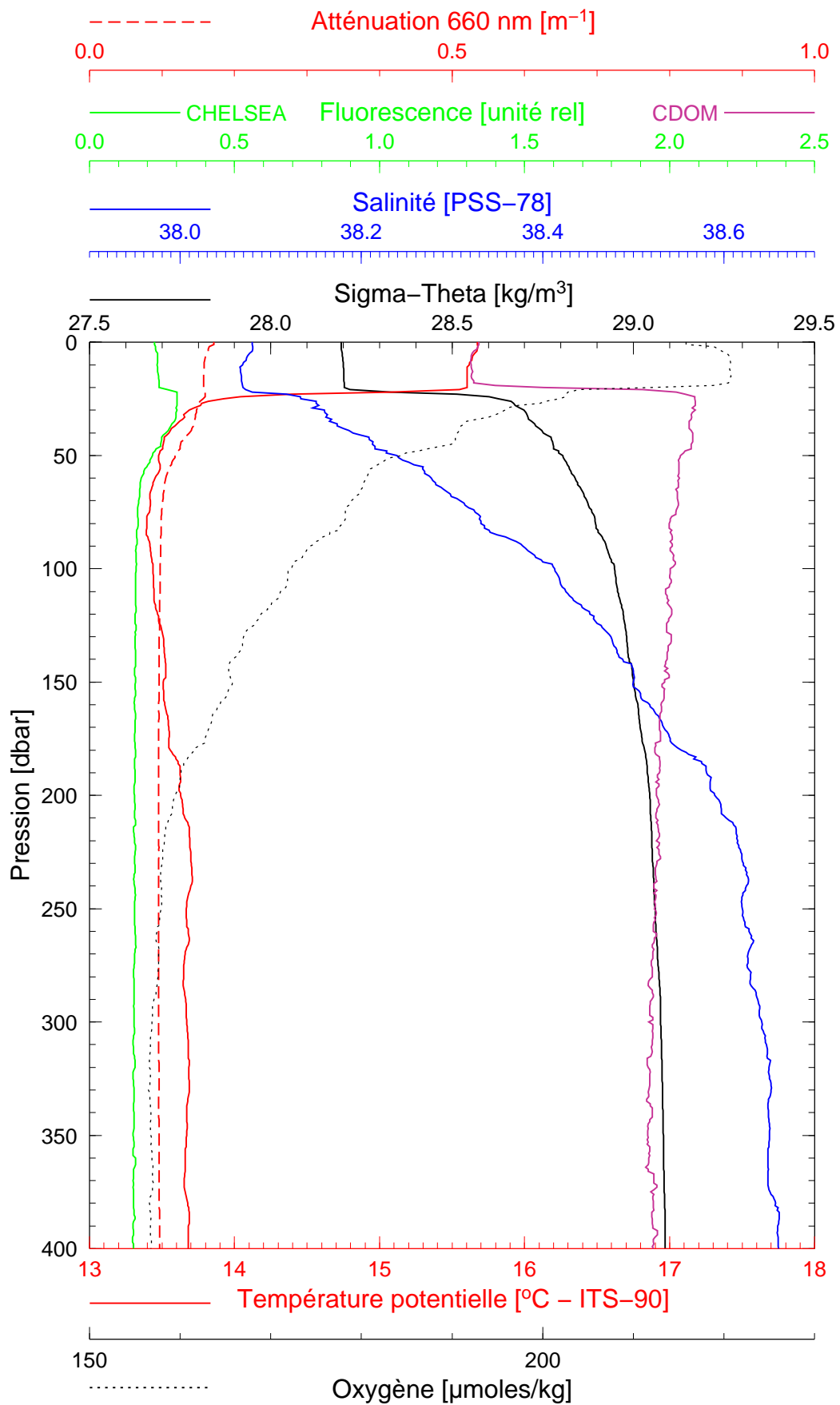
Latitude 43°22.160 N
Longitude 07°53.962 E

BOUSSOLE 118

11/12/2011

BOUS111211_01

BOUS007



Date 11/12/2011
Heure déb 12h 22min [TU]

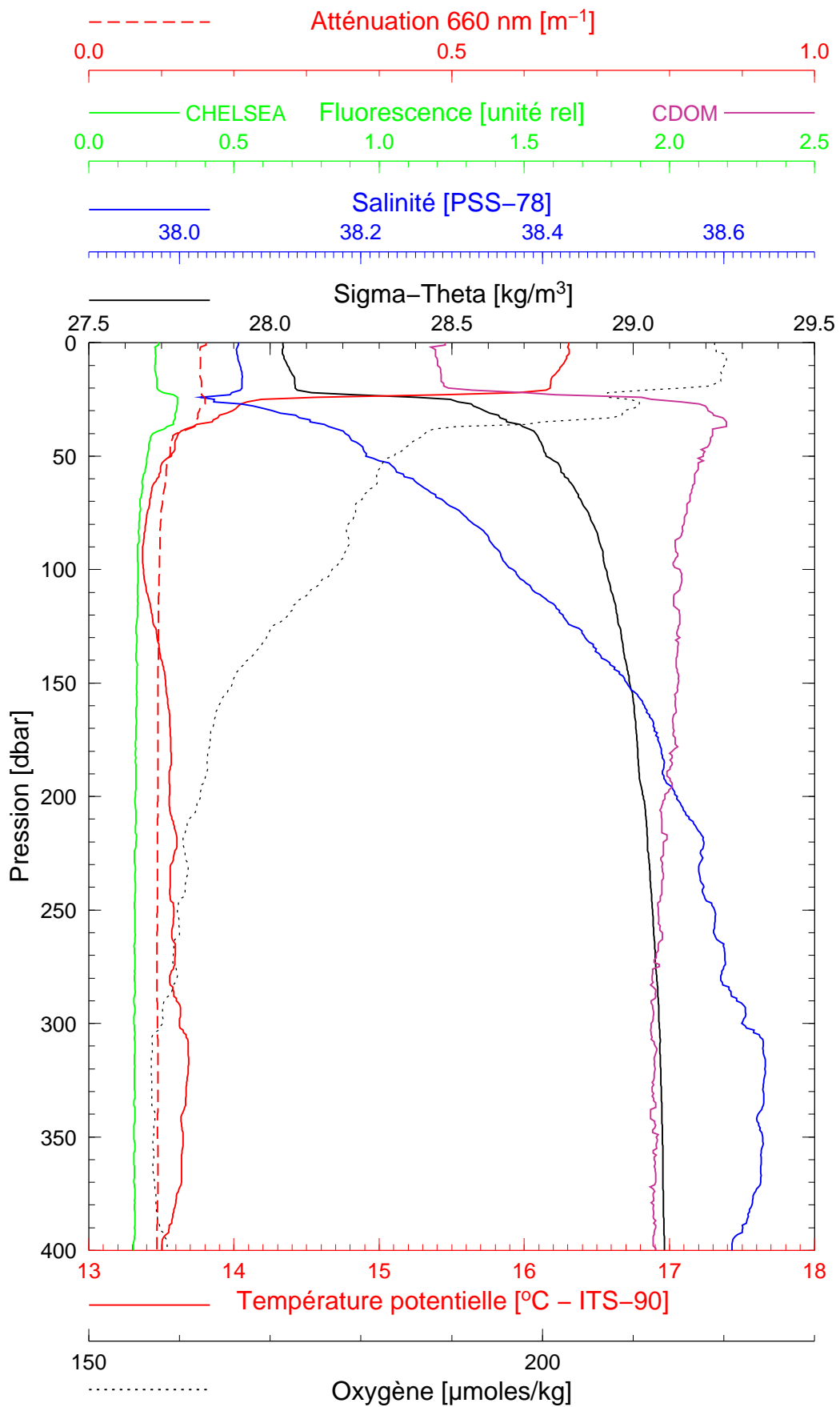
Latitude 43°22.195 N
Longitude 07°53.923 E

BOUSSOLE 118

11/12/2011

BOUS111211_02

BOUS008



Date 11/12/2011
Heure déb 14h 53min [TU]

Latitude 43°24.954 N
Longitude 07°47.816 E