

# BOUSSOLE Monthly Cruise Report

## Cruise 126

August 11 - 15, 2012

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

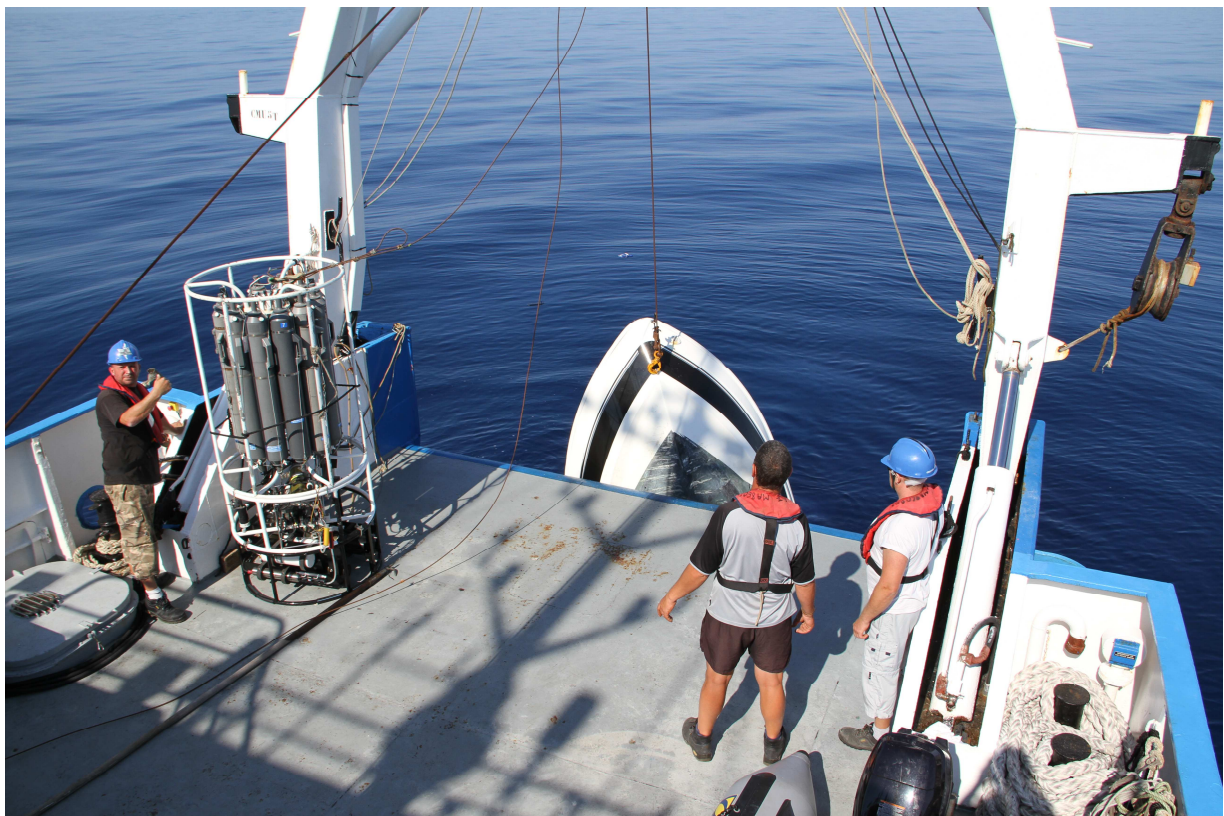
Report written by Melek Golbol ([golbol@obs-vlfr.fr](mailto:golbol@obs-vlfr.fr))

Vessel: R/V *Téthys II*

(Captain: Guy Le Falher then Rémy Lafond)

Science Personnel: Emilie Diamond, Johan Gironnet, Yves Lamblard, David Luquet, Emanuele Organelli, Laurie Perrot, Vincent Taillandier, Jade Vacquie-Garcia and Pierre (diver).

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



Little boat adrift found in the vicinity of the BOUSSOLE site.

**BOUSSOLE project**

**ESA/ESRIN contract N° 13226/10/I-NB**

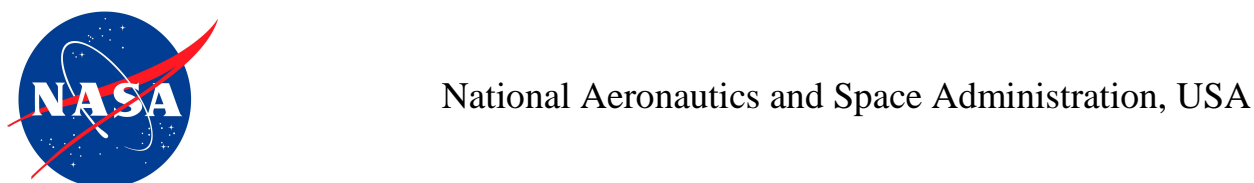
*August 29, 2012*



## 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



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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 Wetlabs CDOM fluorometer and a Chl fluorometer, an absorption-attenuation meter (Wetlabs AC9; from July 2002), and a backscattering meter (Wetlabs Eco-BB3, from June 2003). Additional instrumentation for measurement of inherent optical properties has been added from December 2011. The new package includes a hyperspectral absorption meter (Hobilabs a-sphere), a multispectral backscattering meter (Hobilabs Hydrosat-6) and a multispectral beam transmissometer (Hobilabs Gamma-4). The CDOM fluorometer, AC9 and Eco-BB3 have been withdrawn from the CTD package from March 2013. 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) and particulate organic carbon (from October 2011) analyses in the lab. Small quantities of seawater are to be fixed with glutaraldehyde for cytometric analysis (from December 2011).
- 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).

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

The two first days, several CTD beacons that are planned to be deployed on elephant seals (by the CEBC-Centre d'Etudes Biologiques de Chizé) were tested. They were installed on the CTD Rosette for comparison with the BOUSSOLE main CTD.

The third day, the pCO<sub>2</sub> CARIOCA sensor and the CTD located at 3 m depth on the buoy were removed by the divers. The anodes located on the painting part of the understructure of the buoy were moved to a part of the understructure with no painting (next to the sphere).

## Cruise Summary

The first day was used for CTD casts with water sampling, for optical profiles and for a Secchi disk at the BOUSSOLE site and for downloading data from the buoy. The second day was used for a CTD cast with water sampling and for optical profiles at the BOUSSOLE site and for the CTD transect. The third day was used for the diving operations, for downloading data from the buoy and for CTD cast with water sampling, for optical

profiles and for a Secchi disk at the BOUSSOLE site. The last day was used for optical profiles, for a Secchi disk, for a CTD cast with water sampling at the BOUSSOLE site and for downloading data from the buoy.

## Saturday 11 August 2012

This day the sea state was slight with a gentle breeze during the morning. The sky was hazy in the morning and blue in the afternoon. The visibility was good. 2 CTD casts with water sampling, 5 C-OPS profiles and 1 Secchi disk were performed at the BOUSSOLE site. Buoy data were download using the wireless CISCO connection from the ship.

## Sunday 12 August 2012

The second day, the sea state was smooth with a light air during the morning and a light breeze in the afternoon. The sky was overcast in the morning and blue in the afternoon. The visibility was medium. 1 CTD cast with water sampling was performed at the BOUSSOLE site. Then 1 C-OPS profile was performed but the series of profile had to be stopped because of the instability of the sky (sky cloudy with many sunny intervals). After lunch, 2 C-OPS profiles could be performed at the BOUSSOLE site. Finally, the CTD transect was completed.

## Monday 13 August 2012

This day, the sea state was slight with a gentle breeze. The sky was overcast during the CTD deployment and blue during the C-OPS profiles. The visibility was good. When arrived at the BOUSSOLE site, divers went at sea to clean the underwater sensors and perform dark measurements of the transmissometers and backscattering meter. They also removed the pCO<sub>2</sub> CARIOCA sensor and the CTD at 3m depth. The anodes located on the painting part of the understructure of the buoy were replaced on a part with no painting. Then a direct connection with the buoy was established using the cable available on the top of the buoy. The surface sensors, solar panels and the CISCO connector were cleaned. Then, 1 CTD cast with water sampling, 3 C-OPS profiles and 1 Secchi disk were performed at the BOUSSOLE site before returning to the Nice harbour.

## Wednesday 15 August 2012

The last day, the sea state was smooth with a light breeze. The sky was blue with a good visibility. A shipwreck was found during the way up to at 1 mile from the BOUSSOLE site. It was taken on board. When arrived at BOUSSOLE site, the afterdeck was reinstalled. Then 3 C-OPS profiles, 1 CTD cast with water sampling and 1 Secchi disk were performed at the BOUSSOLE site. A CISCO connection was attempted two times. The first attempt failed and the connection was got during the second attempt and data were downloaded.

## Cruise Report

### Saturday 11 August 2012

People on board: Emilie Diamond, Johann Gironnet, Emanuele Organelli, Vincent Taillandier and Laurie Perrot.

0530 Departure from the Nice harbour.  
0900 Arrival at the BOUSSOLE site.  
0915 CTD 01, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and ap.  
1000 CISCO connection with the buoy and data retrieval.  
1055 C-OPS 01, 02, 03, 04.  
1210 Secchi disk 01, 26 m.  
1230 CTD 02, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, ap, TSM.  
1330 C-OPS 05.  
1400 Departure to the Nice harbour.  
1630 Arrival at the Nice harbour.

### Sunday 12 August 2012 (UTC)

People on board: Emilie Diamond, Johann Gironnet, Emanuele Organelli, Laurie Perrot and Jade Vacque-Garcia.

0510 Departure from the Nice harbour.  
0840 Arrival at the BOUSSOLE site.  
0845 CTD 03, 400 m with water sampling at 400, 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and  $a_p$ .  
930 C-OPS 06.  
1000 Filtrations. Lunch.  
1100 C-OPS 07, 08.  
1215 Departure to the first transect station.  
1245 CTD 04, 400 m, station 01 (43°25'N 07°48'E).  
1355 CTD 05, 400 m, station 02 (43°28'N 07°42'E).  
1450 CTD 06, 400 m, station 03 (43°31'N 07°37'E).  
1550 CTD 07, 400 m, station 04 (43°34'N 07°31'E).  
1645 CTD 08, 400 m, station 05 (43°37'N 07°25'E).  
1735 CTD 09, 400 m, station 06 (43°39'N 07°21'E).  
1800 Departure to the Nice harbour.  
1840 Arrival at the Nice harbour.

## Monday 13 August 2012 (UTC)

People on board: Emilie Diamond, Yves Lamblard, David Luquet, Emanuele Organelli and Pierre (diver).

0500 Departure from the Nice harbour.  
0815 Arrival at the BOUSSOLE site.  
0830 Diving operations: cleaning of sensors, dark measurements, removing of the PCO<sub>2</sub> sensor and CTD at 3m and moving of the anodes on the buoy understructure.  
0900 Direct connection with the buoy and data retrieval.  
0915 Cleaning of surface sensors, solar panels and CISCO connector.  
1000 Lunch.  
1120 CTD 10, 400 m with water sampling at 400, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC,  $a_p$ , TSM, CDOM, POC and Cytometry.  
1230 C-OPS 09, 10, 11  
1330 Secchi disk 02, 26 m.  
1340 Departure to the Nice harbour.  
1650 Arrival at the Nice harbour.

## Wednesday 15 August 2012 (UTC)

People on board: Emilie Diamond and Johann Gironnet.

0510 Departure from the Nice harbour.  
0830 Arrival at the vicinity of the BOUSSOLE site. Shipwreck recovering.  
0900 Arrival at the BOUSSOLE site.  
0930 C-OPS 12, 13, 14.  
1025 CTD 11, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC,  $a_p$ , and TSM.  
1100 Attempt of CISCO connection: failed.  
1110 Filtrations.  
1200 CISCO connection with the buoy and data retrieval.  
1210 Secchi 03, 25m.  
1215 Departure to the Nice harbour.  
1530 Arrival at the Nice harbour.

## Problems identified during the cruise

- The third day, there was a leak on the Niskin bottle #4 (70 m) of the CTD 10.

# Appendices

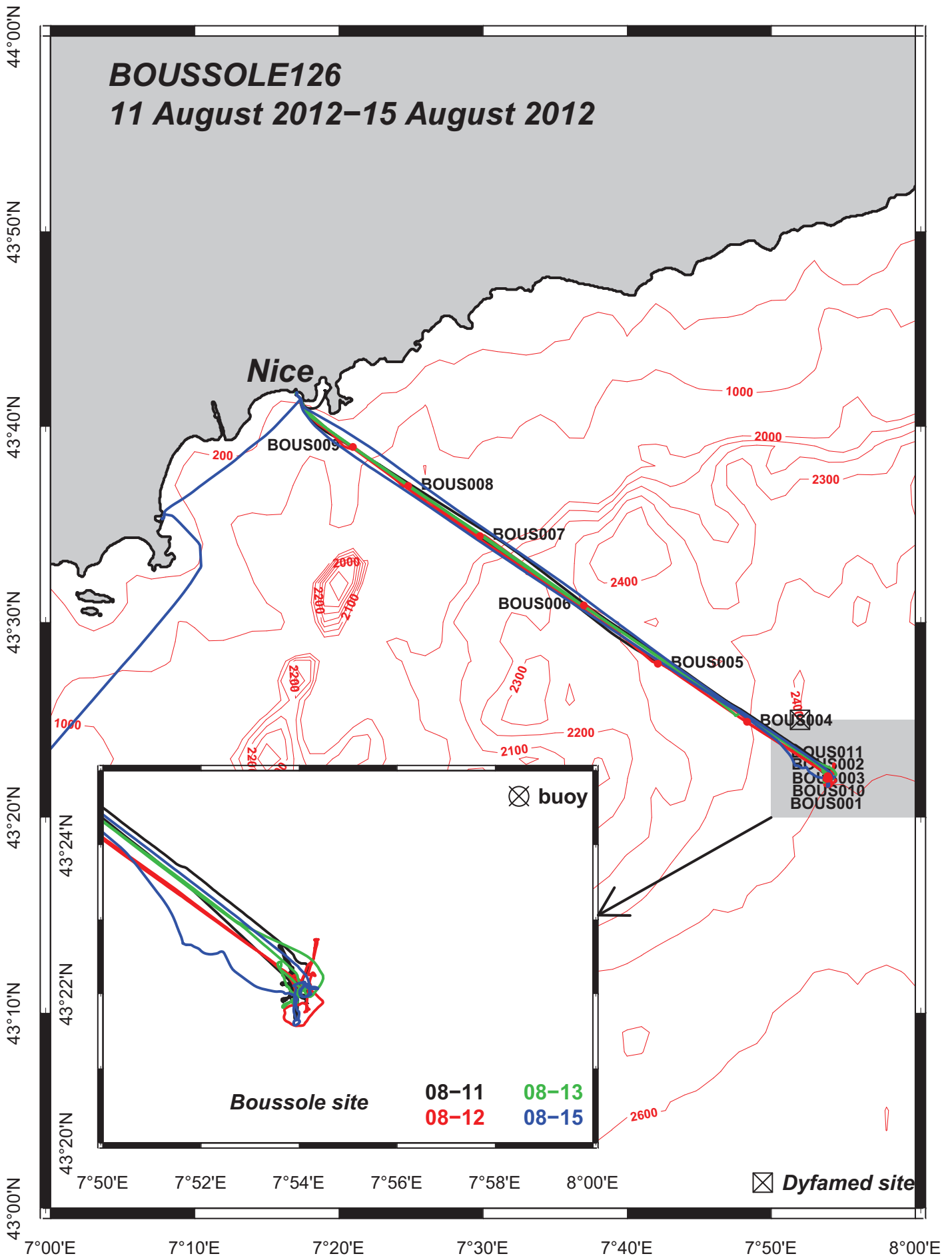
Cruise Summary Table for Boussole 126

Date	Black names (file ext: ".raw")	Profile names (file extension: ".raw")	CTD notes / 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	Sea Swell H (m)	Swell dir.	Whitecaps	
					GMT (hour.min)	(min.sec)		(Degree)	(Minute)	(Degree)	(Minute)				Wind sp. (kn)	Wind dir.										
11/08/12	bou c-ops 120811	0935_001_data.csv	CTDBOUS001	HPLC & Ap	09:13	41:00	400	43	21.982	7	53.848	hazy		1	11	119	1015.0	75		25.6	24.6	calm			yes	
		bou c-ops 120811 0935_002_data.csv				11:07	3:33	81.4	43	22.220	7	53.867	blue	None	0	10	104	1015.0	71	good	25.7		calm	0.6		yes
		bou c-ops 120811 1127_001_data.csv				11:33	3:26	77.0	43	22.302	7	53.879	blue	None	0	10	104	1015.0	71	good	25.7		calm	0.6		yes
		bou c-ops 120811 1127_002_data.csv				11:45	3:42	82.0	43	22.405	7	53.789	blue	None	0	10	104	1015.0	71	good	25.7		calm	0.6		yes
		bou c-ops 120811 1127_003_data.csv				12:00	3:49	90.7	43	22.555	7	53.643	blue	None	0	10	104	1015.0	71	good	25.7		calm	0.6		yes
			Secchi01			12:10	4:00	26	43	22	7	54	blue		0					good			calm			
		bou c-ops 120811 1336_001_data.csv	CTDBOUS002	HPLC, Ap & TSM		12:31	40:00	400	43	22.111	7	53.994	blue	None	0	8	90	1014.0	71		25.1	25.0	calm			no
	bou c-ops 120811 1336_002_data.csv				13:39	3:54	91.4	43	22.312	7	54.195	blue	None	0	7	90	1014.0	73	good	25.9		calm	0.5		no	
					15:12	2:09																				
12/08/12	bou c-ops 120812	0928_001_data.csv	CTDBOUS003	HPLC, Ap & TSM	08:45	31:00	400	43	22.032	7	53.979	overcast		8	2	189	1013.4	77		26.0	25.1	calm				
					09:33	1:19																				
		bou c-ops 120812 0928_002_data.csv				09:38	3:33	82.0	43	22.317	7	54.140	overcast	St&Sc	7-8	4	162	1013.0	82	medium	25.2		calm	0.2		no
		bou c-ops 120812 0928_004_data.csv				11:23	1:57	41.9	43	21.780	7	53.704	blue	Sc&Cs	3-6	4	279	1013.0	76	good	25.9		calm	0.2		no
		bou c-ops 120812 0928_005_data.csv				11:30	3:38	82.7	43	21.655	7	53.713	blue	Sc&Cs	3-6	4	279	1013.0	76	good	25.9		calm	0.2		no
		bou c-ops 120216 0928_008_data.csv				12:25	1:43																			
			CTDBOUS004			12:47	28:00	400	43	24.902	7	48.326	overcast		8	7	93	1012.0	78		26.4	26.3	calm			
			CTDBOUS005			13:56	26:00	400	43	27.874	7	42.137	overcast		8	5	69	1012.2	79		25.3	25.4	calm			
			CTDBOUS006			14:52	24:00	400	43	30.860	7	37.000	overcast		7	6	273	1012.0	78		25.2	25.5	calm			
			CTDBOUS007			15:54	24:00	400	43	34.407	7	29.792	overcast		8	5	293	1012.0	75		25.0	25.6	calm			
		CTDBOUS008			16:48	25:00	400	43	36.975	7	24.818	overcast		8	1	7	1012.0	79		24.9	25.5	calm				
		CTDBOUS009			17:38	23:00	400	43	38.969	7	20.980	overcast		8	7	151	1011.0	72		25.0	25.9	calm				
13/08/12	bou c-ops 1200813	1216_001_data.csv	CTDBOUS010	HPLC, Ap, TSM, CDOM, POC & Cyt	11:20	34:00	400	43	21.993	7	53.994	overcast		7	7	122	1012.0	69		25.8	25.3	calm				
					12:19	2:07																				
		bou c-ops 1200813 1216_002_data.csv				12:31	3:37	85.7	43	22.069	7	53.806	blue	Cl&Cs	2	6	136	1011.0	70	good	25.8		calm	0.6		no
		bou c-ops 1200813 1216_003_data.csv				12:46	3:28	84.5	43	22.200	7	53.703	blue	Cl&Cs	2	6	136	1011.0	70	good	25.8		calm	0.6		no
		bou c-ops 1200813 1216_006_data.csv				13:02	5:06	127.2	43	22.379	7	53.638	blue	Cl&Cs	2	6	136	1011.0	70	good	25.8		calm	0.6		no
	bou c-ops 1200813 1216_007_data.csv				13:33	4:16																				
				Secchi02	13:20	4:00	26	43	22	7	54	blue		2					good			calm			no	
15/08/12	bou c-ops 120815	0801_001_data.csv			08:19	1:21																				
			bou c-ops 120815 0801_003_data.csv		09:38	3:29	85.9	43	21.798	7	53.960	blue	None	0	3	37	1015.0	79	good	25.4		calm	0.2		no	
		bou c-ops 120815 0801_004_data.csv		09:49	4:28	111.0	43	21.673	7	53.992	blue	None	0	3	37	1015.0	79	good	25.4		calm	0.2		no		
		bou c-ops 120815 0801_005_data.csv		10:01	3:51	93.8	43	21.590	7	53.923	blue	None	0	3	37	1015.0	79	good	25.4		calm	0.2		no		
		bou c-ops 120815 0801_0016_data.csv		10:18	1:17																					
			CTDBOUS011	HPLC, Ap & TSM	10:27	29:00	400	43	22.111	7	53.893	blue	None	0	7	317	1015.0	78		25.1	25.1	calm				
			Secchi03	12:10	4:00	25	43	22	7	54	blue		0					good			calm					



# BOUSSOLE126

11 August 2012–15 August 2012

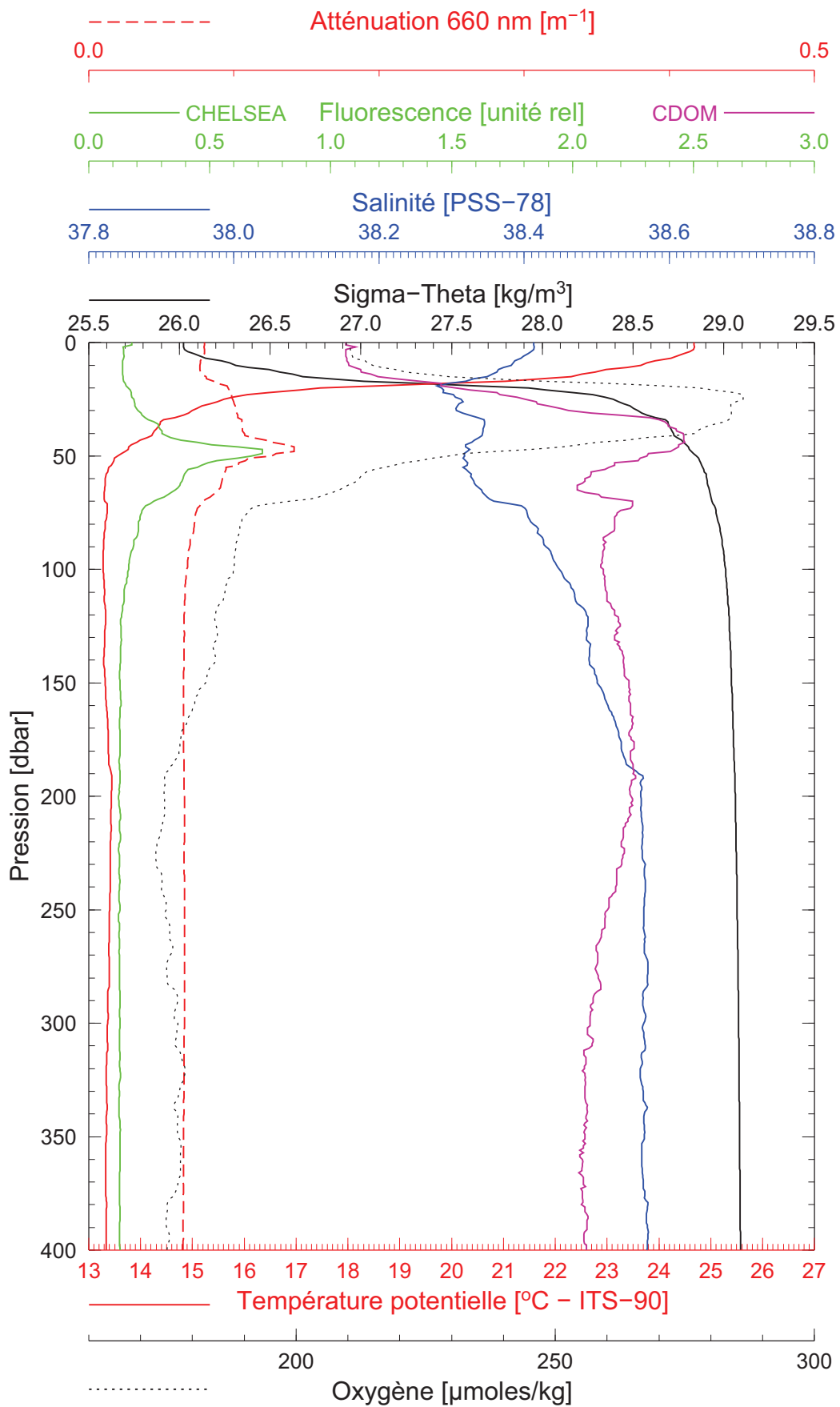


BOUSSOLE 126

11/08/2012

BOUS120811\_01

BOUS001



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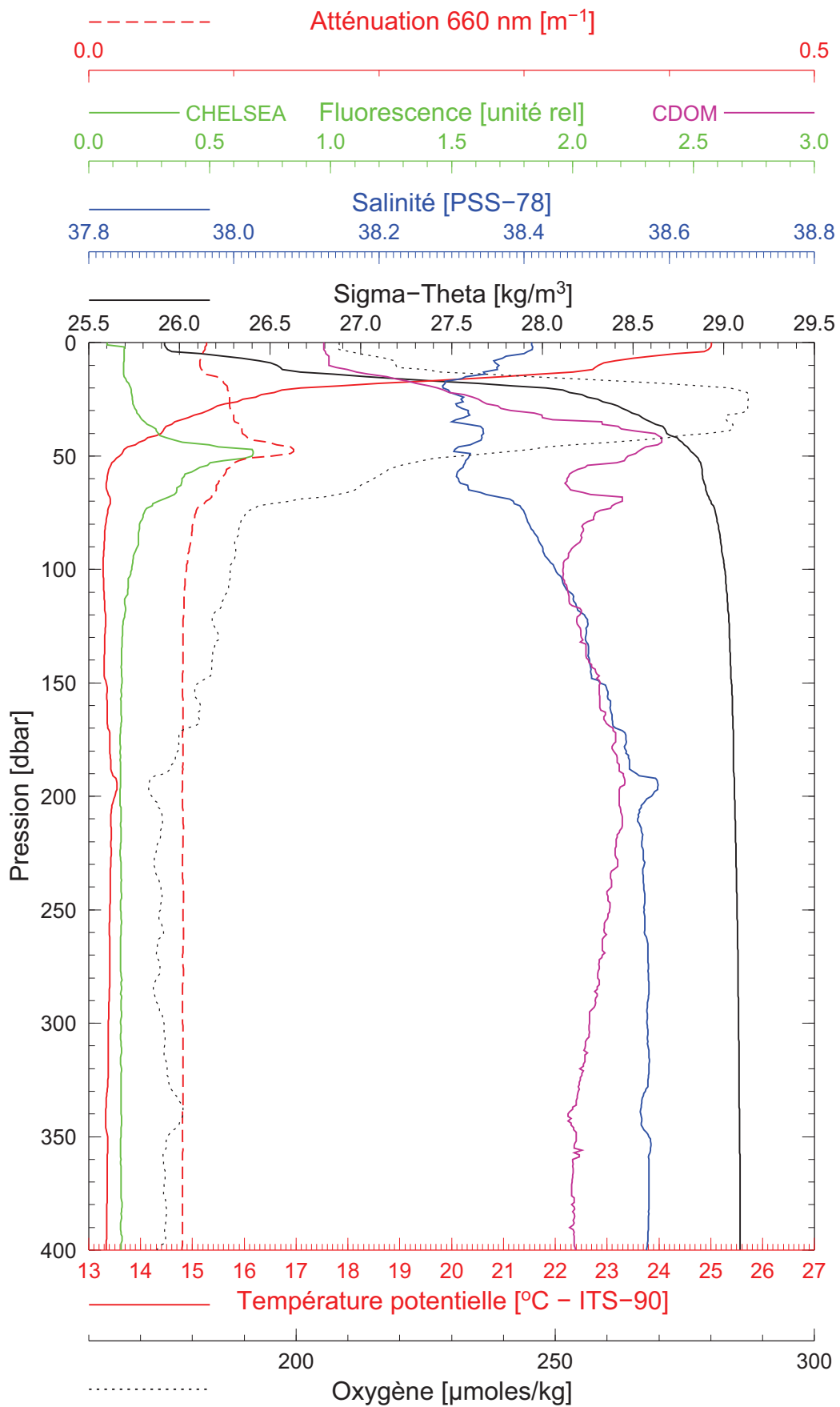
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BOUSSOLE 126

11/08/2012

BOUS120811\_02

BOUS002



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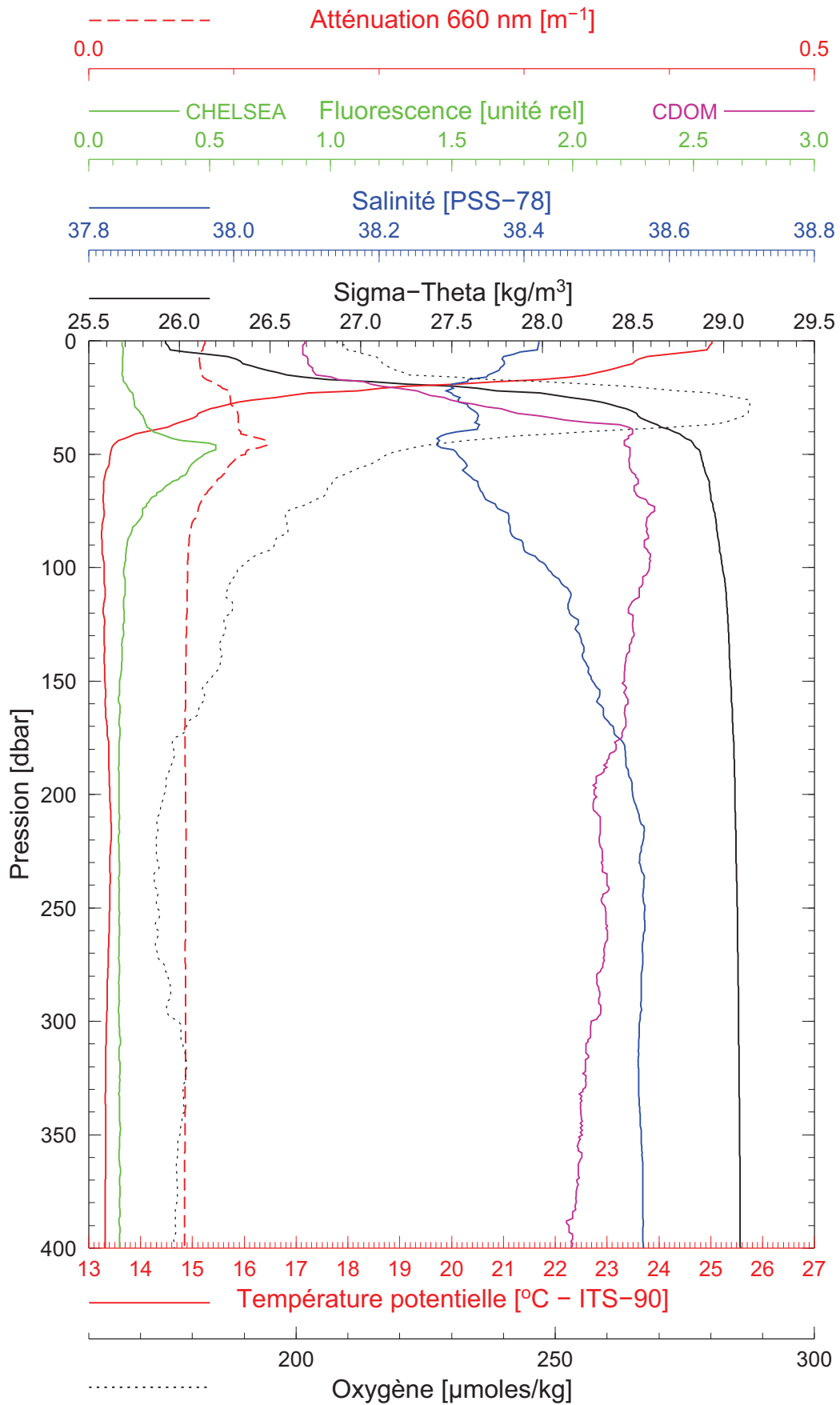
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BOUSSOLE 126

12/08/2012

BOUS120812\_01

BOUS003



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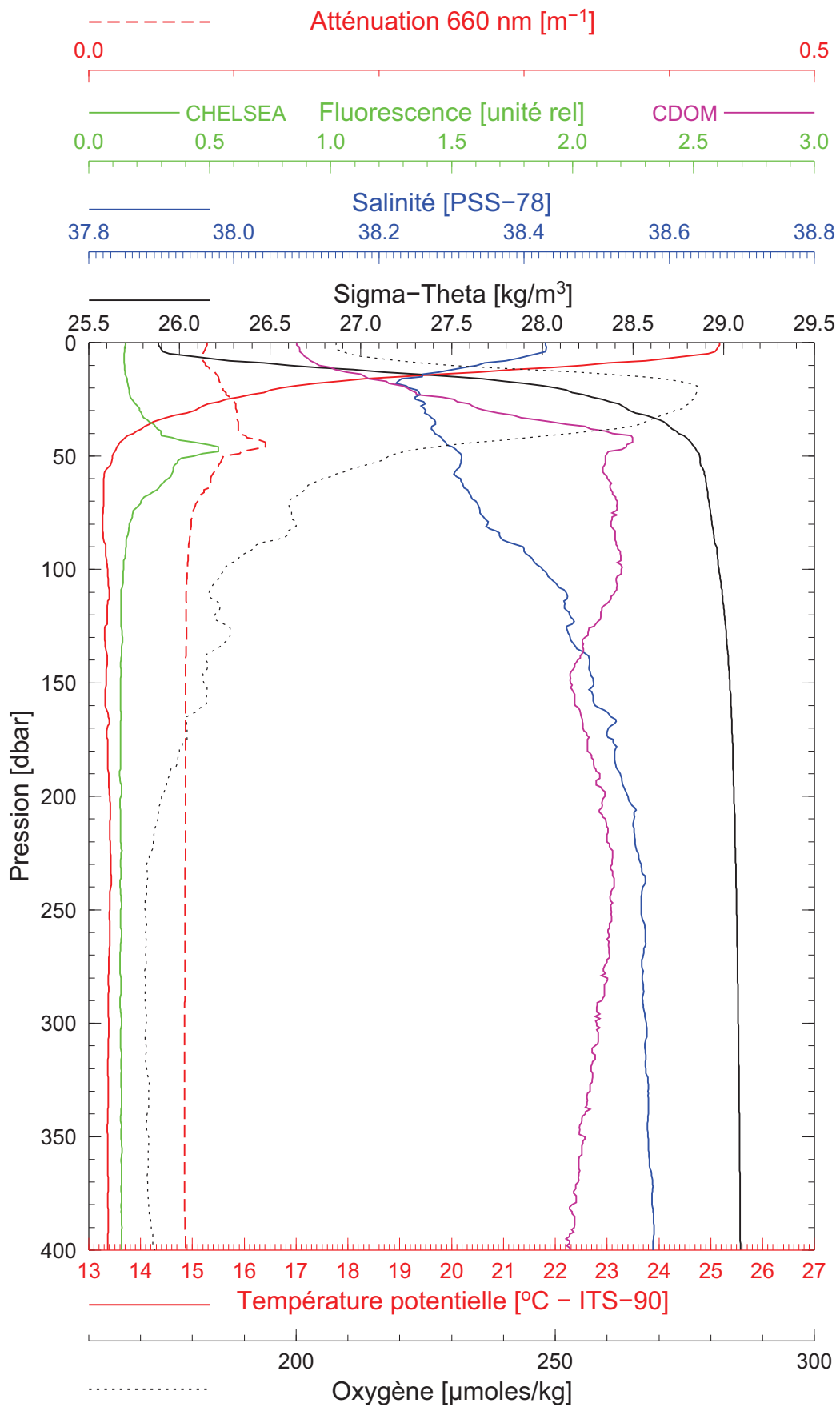
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BOUSSOLE 126

12/08/2012

BOUS120812\_02

BOUS004



Date 12/08/2012

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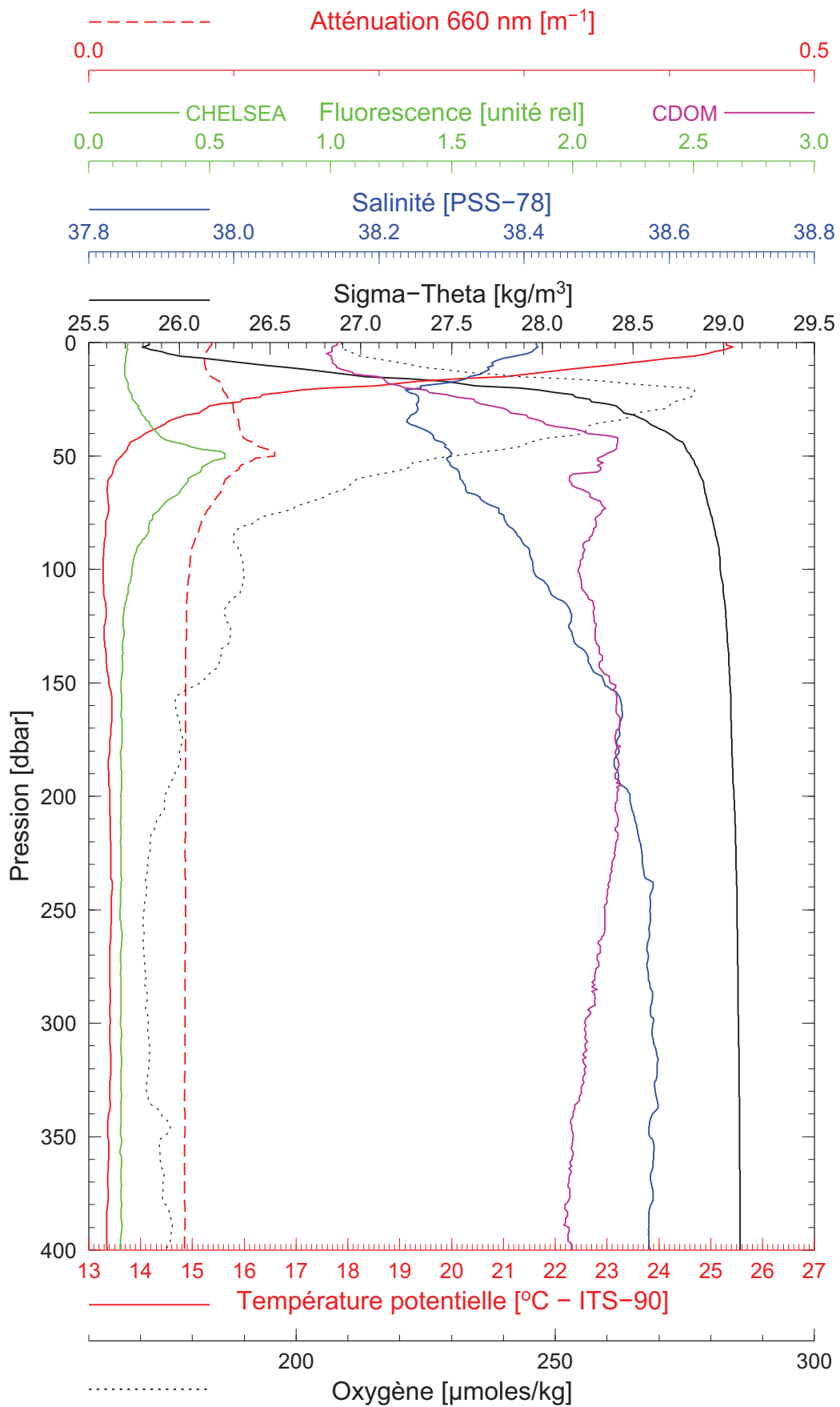
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BOUSSOLE 126

12/08/2012

BOUS120812\_03

BOUS005



Date 12/08/2012

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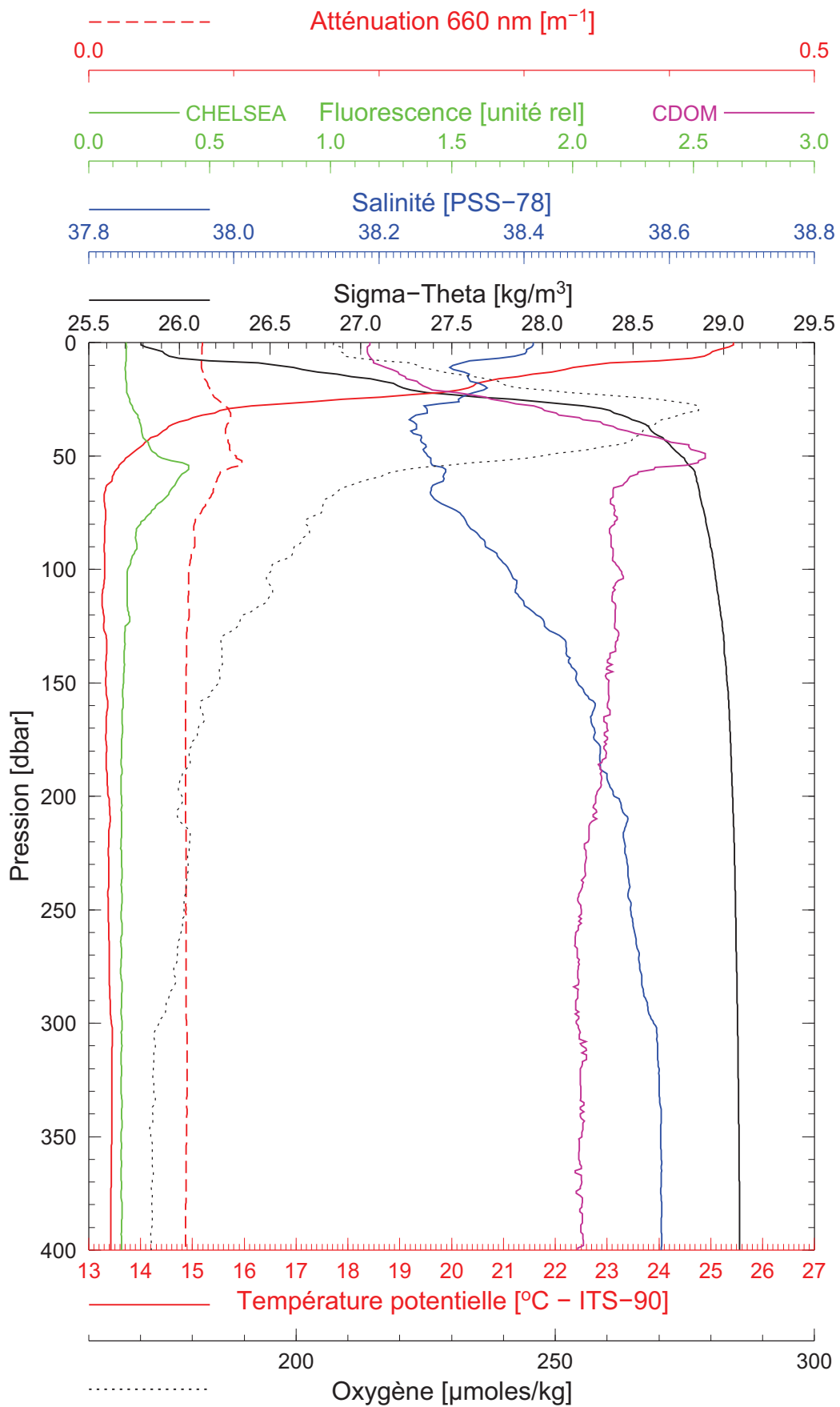
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BOUSSOLE 126

12/08/2012

BOUS120812\_04

BOUS006



Date 12/08/2012

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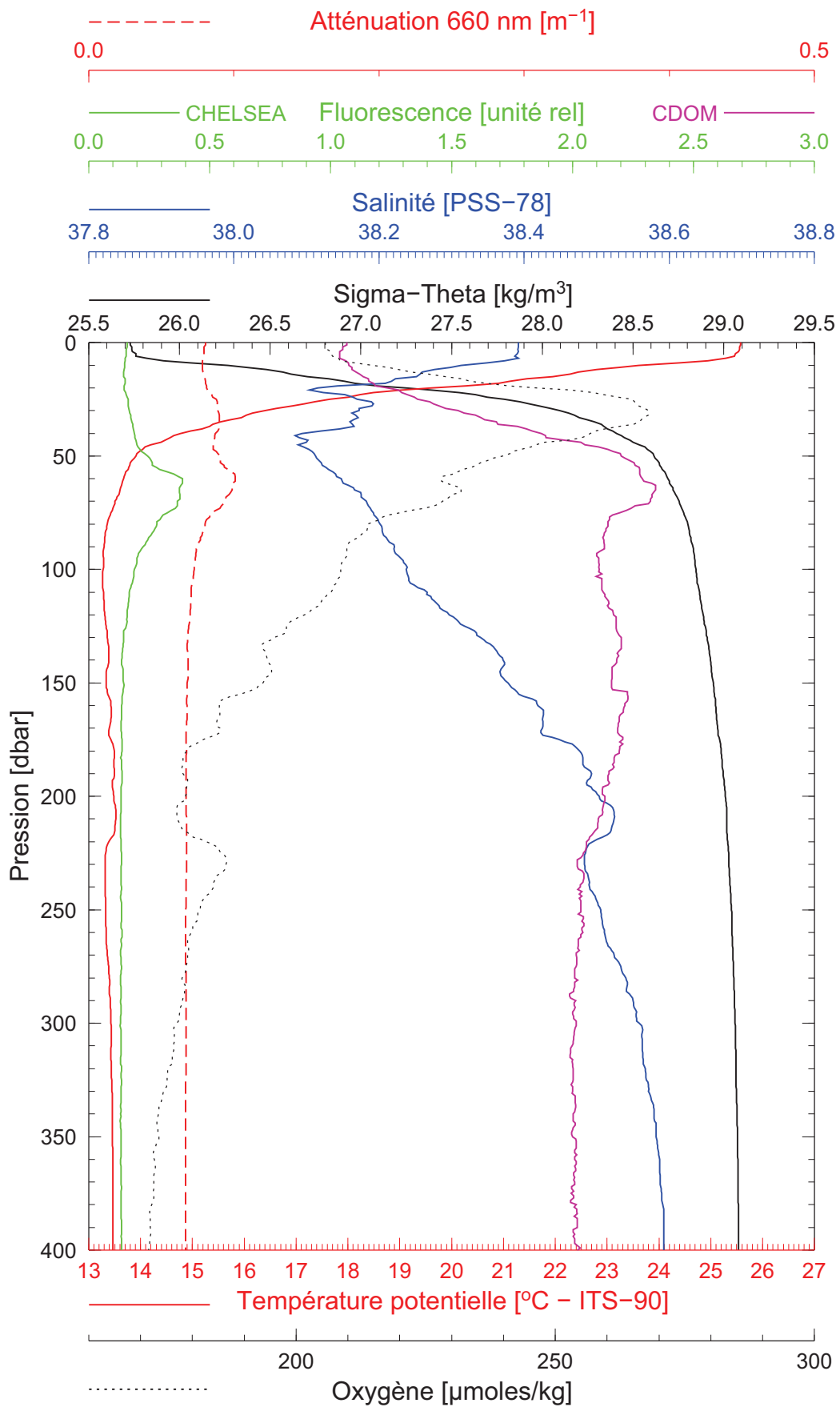
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BOUSSOLE 126

12/08/2012

BOUS120812\_05

BOUS007



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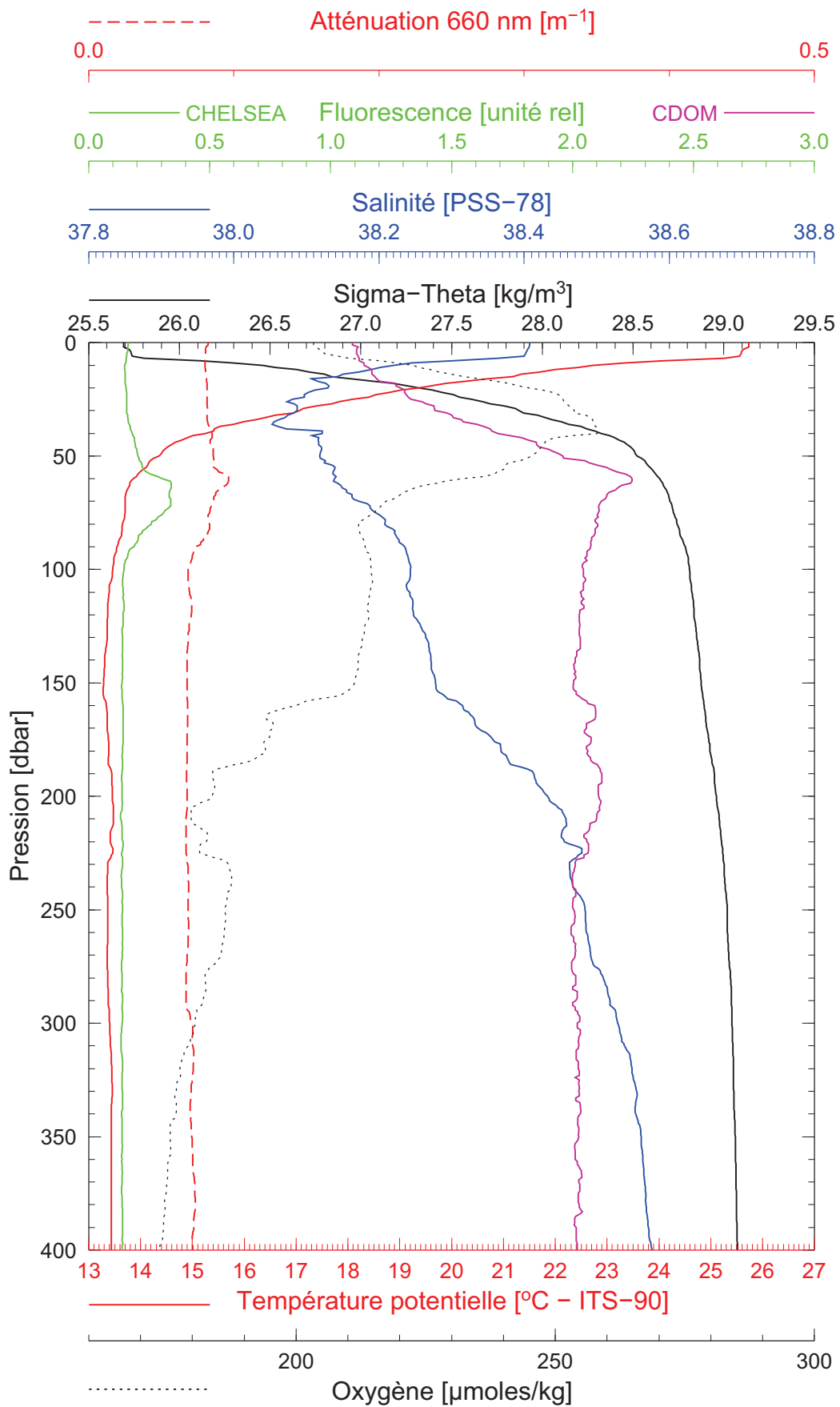


BOUSSOLE 126

12/08/2012

BOUS120812\_06

BOUS008



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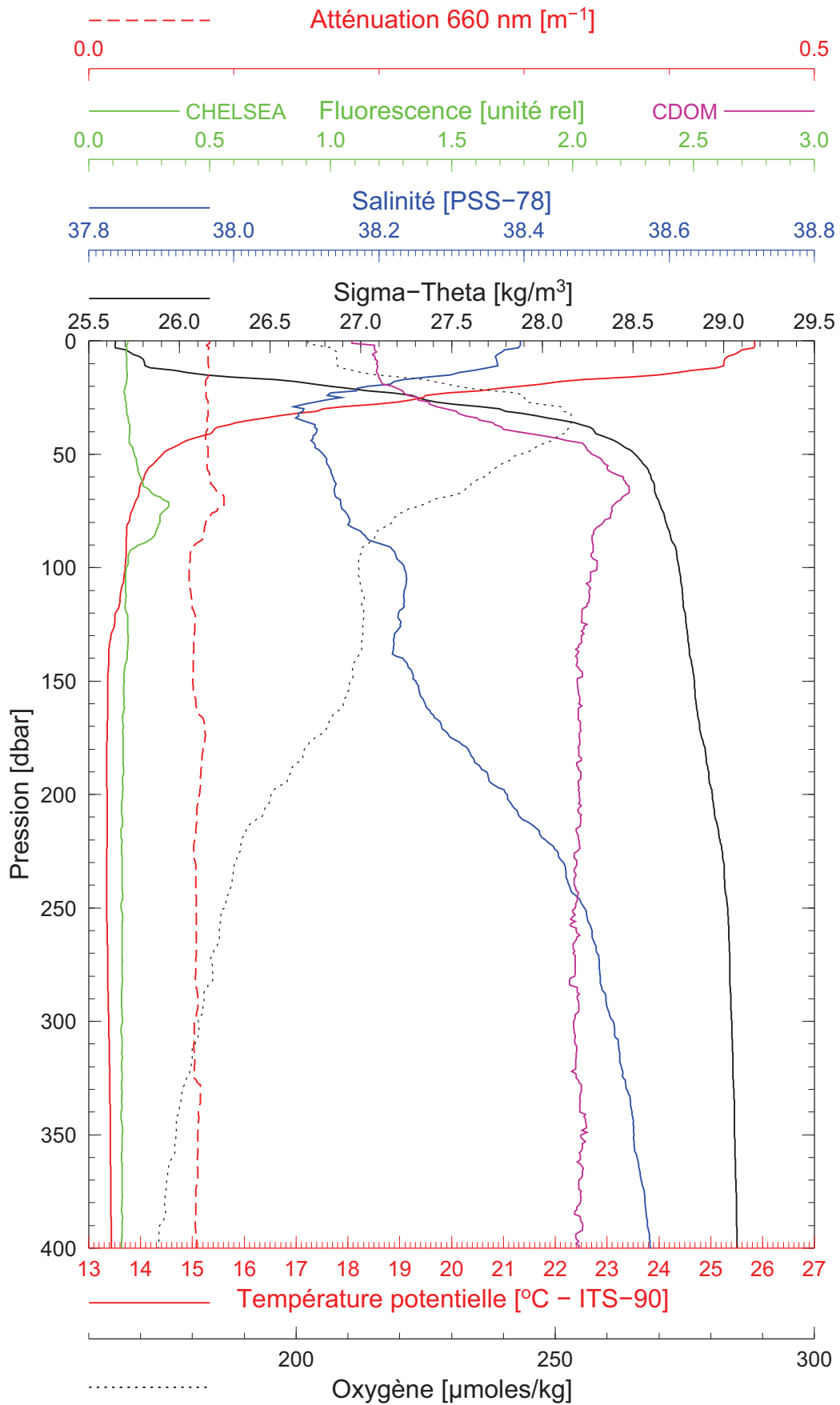
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BOUSSOLE 126

12/08/2012

BOUS120812\_07

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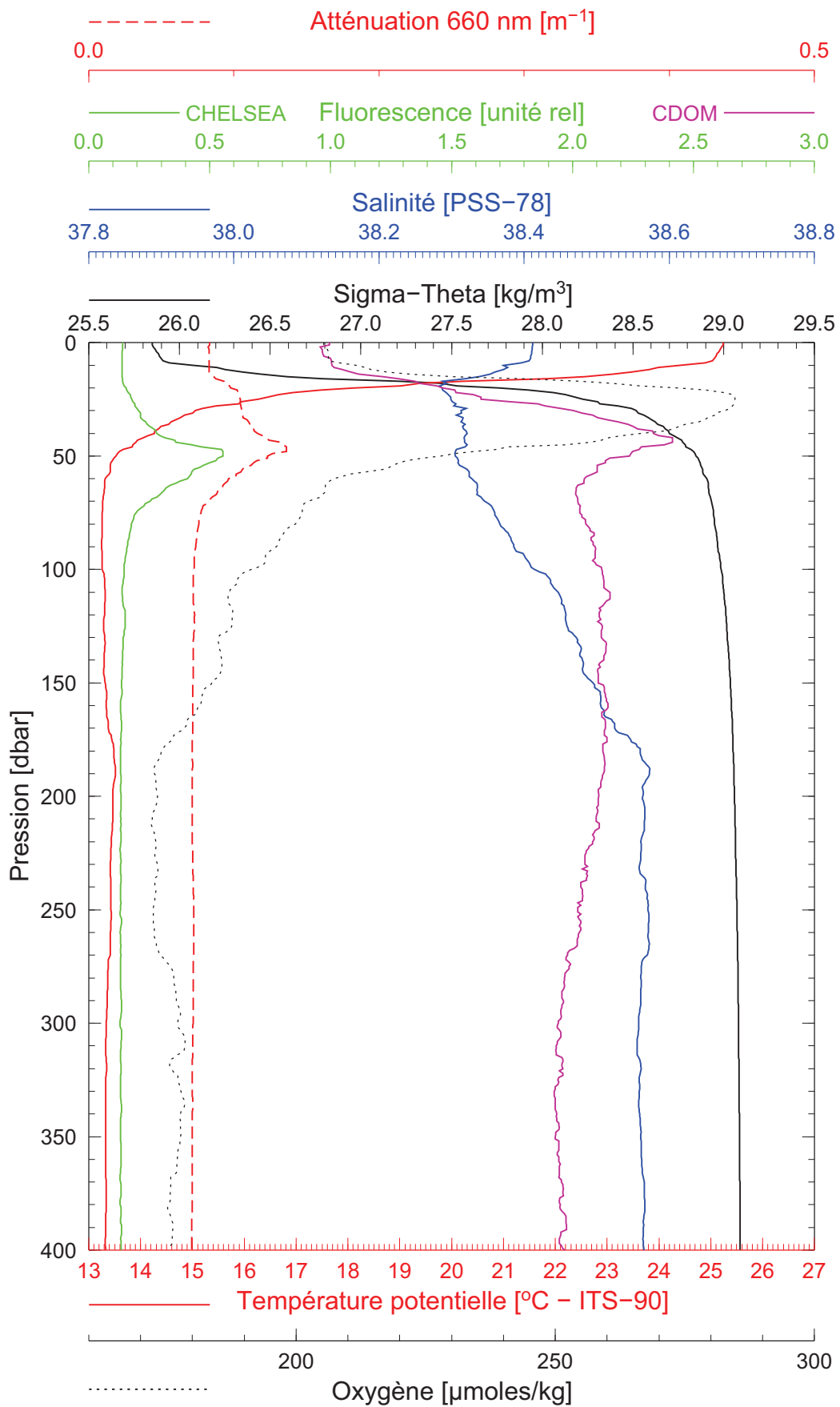
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BOUSSOLE 126

13/08/2012

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BOUS010



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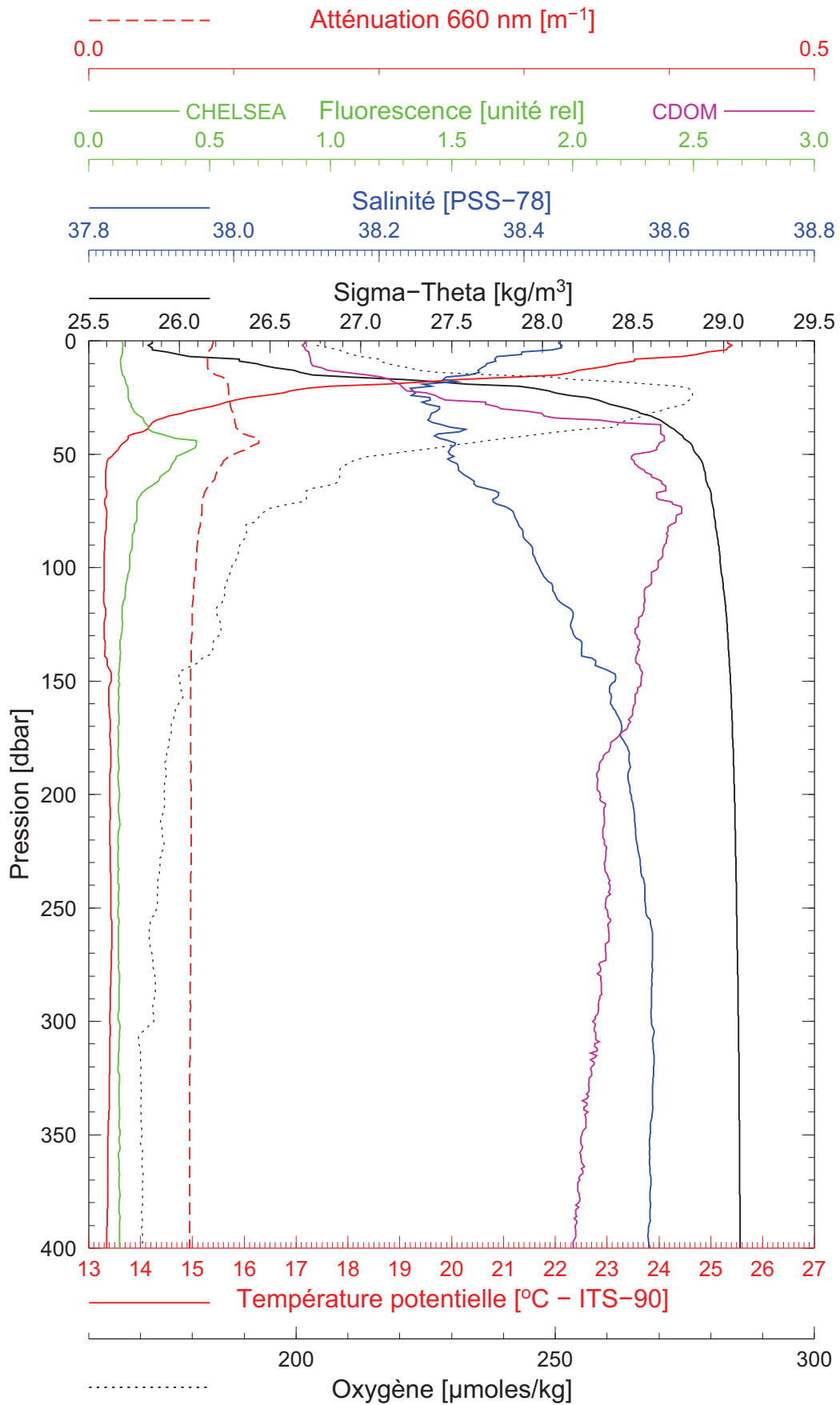
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BOUSSOLE 126

15/08/2012

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BOUS011



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