BOUSSOLE Monthly Cruise Report

Cruise 128
October 24 - 27, 2012

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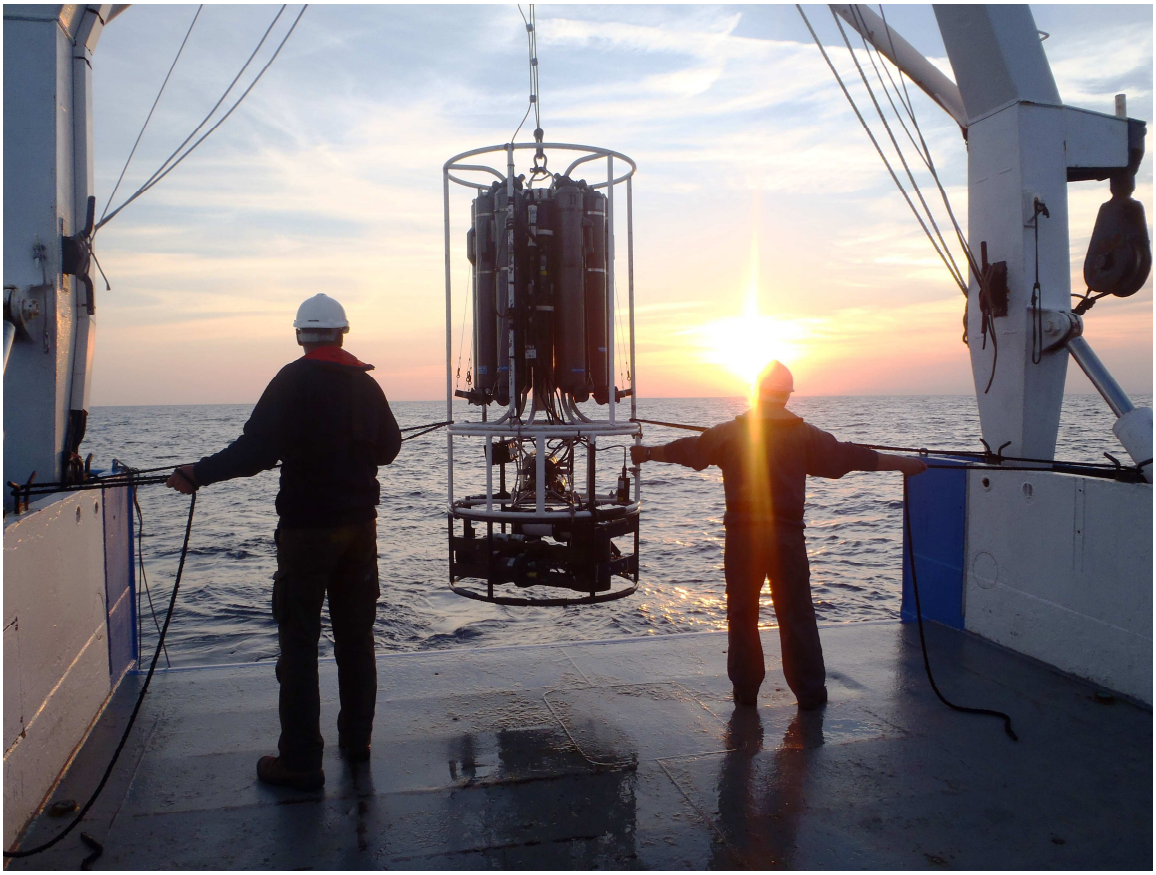
Vessel: R/V Téthys II
(Captain: Renaud Lebourhis)

Science Personnel: Stéphane Coffin, Emilie Diamond, Christophe Guinet, Yves Lamblard, Didier Robin, Vincent Taillandier, Pascal Veaux and Vincenzo Vellucci.

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



The BOUSSOLE CTD Rosette deployment at the fifth station of the transect.

BOUSSOLE project

ESA/ESRIN contract N° 13226/10/I-NB

November 12, 2012

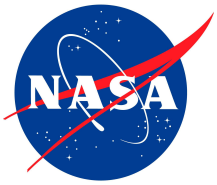
Foreword

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'Etudes Spatiales, France



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

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 Hydroscat-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 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

The second day, 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.

Maintenance operations were performed on the buoy: the cables between the hyperspectral sensors which are connected to the STOR-X (data logger of the hyperspectral and the PAR sensors) were inverted during the deployment of the buoy which took place on 7 September. So these cables were reconnected by the divers to their respective instruments.

Cruise Summary

The first day was used for optical profiles, for a CTD cast with water sampling, for a Secchi disk at the BOUSSOLE site and for the CTD transect. The second day was used for diving operations, for downloading data from the buoy and for CTD casts at the Station 04 of the transect in order to calibrate the CTD beacons.
The two last day were cancelled: the third day, restrictions from the port authorities prevented the work at the BOUSSOLE site. The last day bad weather prevented the departure from the Nice harbour.

Wednesday 24 October 2012

This day the sea state was slight with a moderate to fresh breeze. The sky was blue and the visibility was good. 3 C-OPS profiles, 1 CTD cast with water sampling and 1 Secchi disk were performed at the BOUSSOLE site. Then the CTD transect was completed.

Thursday 25 October 2012

The second day, the sea state was smooth with a light breeze. Restrictions from the port authorities not allowed the CTD and C-OPS deployments at the BOUSSOLE site. It was just allowed to perform the diving operations and to work at the Station 04 of the transect. When arrived at BOUSSOLE, divers went at sea to clean the buoy sensors, to perform dark measurements of the transmissometers and the backscattering meter. They swapped the cables of the hyperspectral sensors on the STOR-X before turning off the power supply of the buoy. Data were downloaded directly from the buoy using the cable available on the top of the buoy and the AK connector. Surface sensors, solar panels and ARGOS and CISCO connectors were cleaned.
Then, a bucket sample was collected at the BOUSSOLE site for TSM sampling and 2 CTD casts were performed at the Station 04 of the CTD transect in order to calibrate the CTD beacons which will be deployed on elephant seals by the CEBC. The second CTD was deployed directly after the first CTD without bringing it on board.

Friday 26 October 2012

Restrictions from the port authorities prevented the work at the BOUSSOLE site.

Saturday 27 October 2012

Bad weather prevented the departure from the Nice harbour.

Cruise Report

Wednesday 24 October 2012 (UTC)

People on board: Stephane Coffin, Emilie Diamond and Vincent Taillandier.

0540 Departure from the Nice harbour.
0905 Arrival at the BOUSSOLE site.
0910 C-OPS 01, 02, 03.
1020 CTD 01, 400 m with water sampling at 400, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and $a_{p,}$ CDOM, POC, Cytometry and TSM.
1105 Secchi 01, 26m.
1110 Departure to the first transect station.
1220 CTD 02, 400 m, station 01 (43°25'N 07°48'E).
1320 CTD 03, 400 m, station 02 (43°28'N 07°42'E).
1420 CTD 04, 400 m, station 03 (43°31'N 07°37'E).
1520 CTD 05, 400 m, station 04 (43°34'N 07°31'E).
1620 CTD 06, 400 m, station 05 (43°37'N 07°25'E).
1705 CTD 07, 400 m, station 06 (43°39'N 07°21'E).
1740 Departure to the Nice harbour.
1815 Arrival at the Nice harbour.

Thursday 25 October 2012 (UTC)

People on board: Emilie Diamond, Christophe Guinet, Yves Lamblard, Didier Robin, Pascal Veaux and Vincenzo Vellucci.

0505 Departure from the Nice harbour.
0830 Arrival at the BOUSSOLE site.
0845 Diving operations: cleaning of buoy sensors, dark measurements of transmissometers and backscattering meter. Swap of the cables of hyperspectral sensors.
1000 Bucket for TSM sampling.
1015 Direct connection with the buoy via AK connector. Cleaning of surface sensors, solar panels and ARGOS connector.
1100 Departure to the fourth transect station.
1315 CTD 08, 400 m, station 04 (with CTD beacons).
1345 CTD 09, 400 m, station 04 (with CTD beacons).
1410 Departure to the Nice harbour.
1715 Arrival at the Nice harbour.

Friday 26 October 2012

Restrictions from the port authorities prevented the work at the BOUSSOLE site.

Saturday 27 October 2012

Bad weather prevented the departure from the Nice harbour.

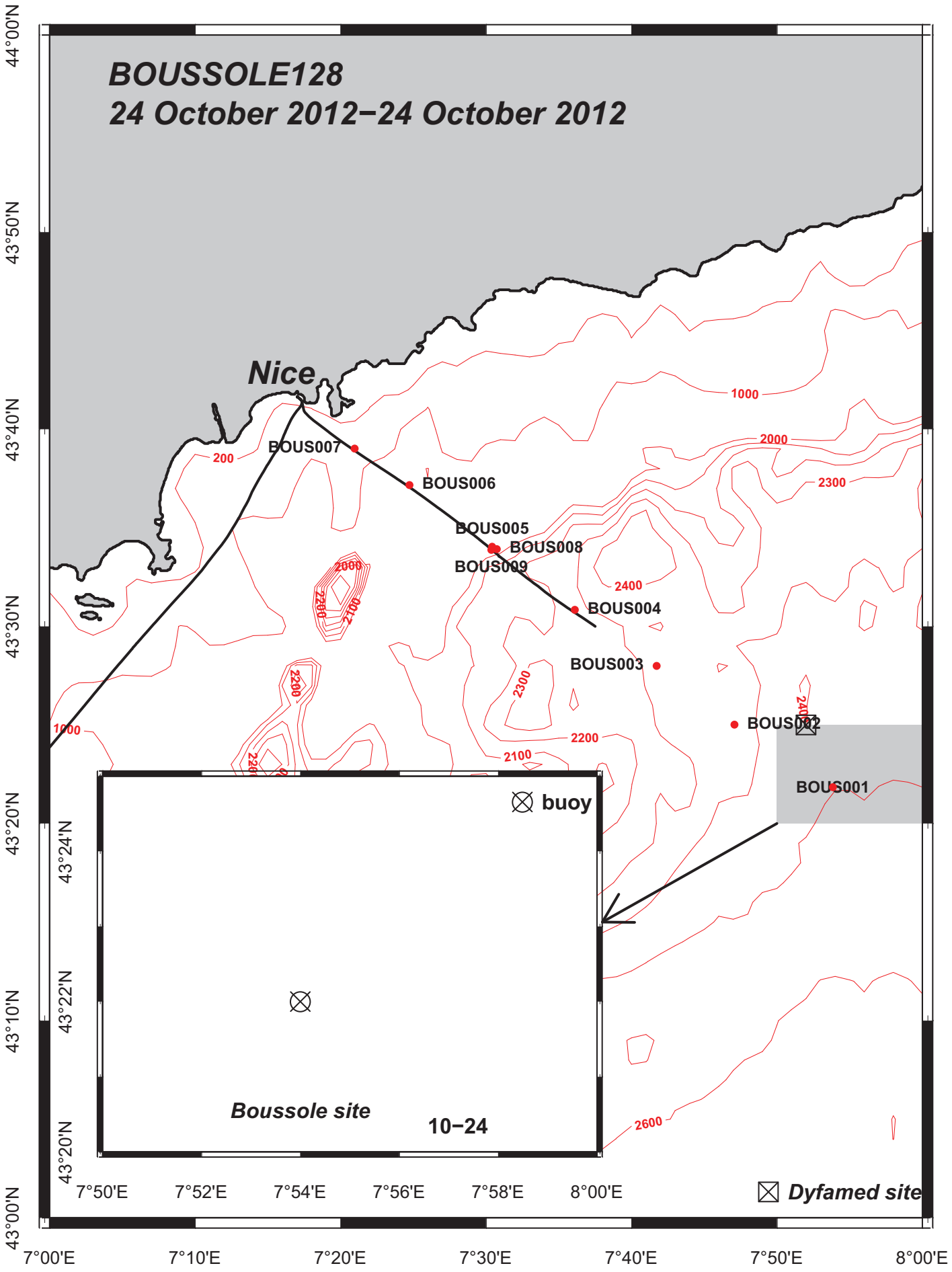
Problems identified during the cruise

- The second day, the TSM samples were left from the N_2 container but they had been forgotten in the lab at the return of the cruise. So, they had been put into the freezer two days after the cruise

Appendices

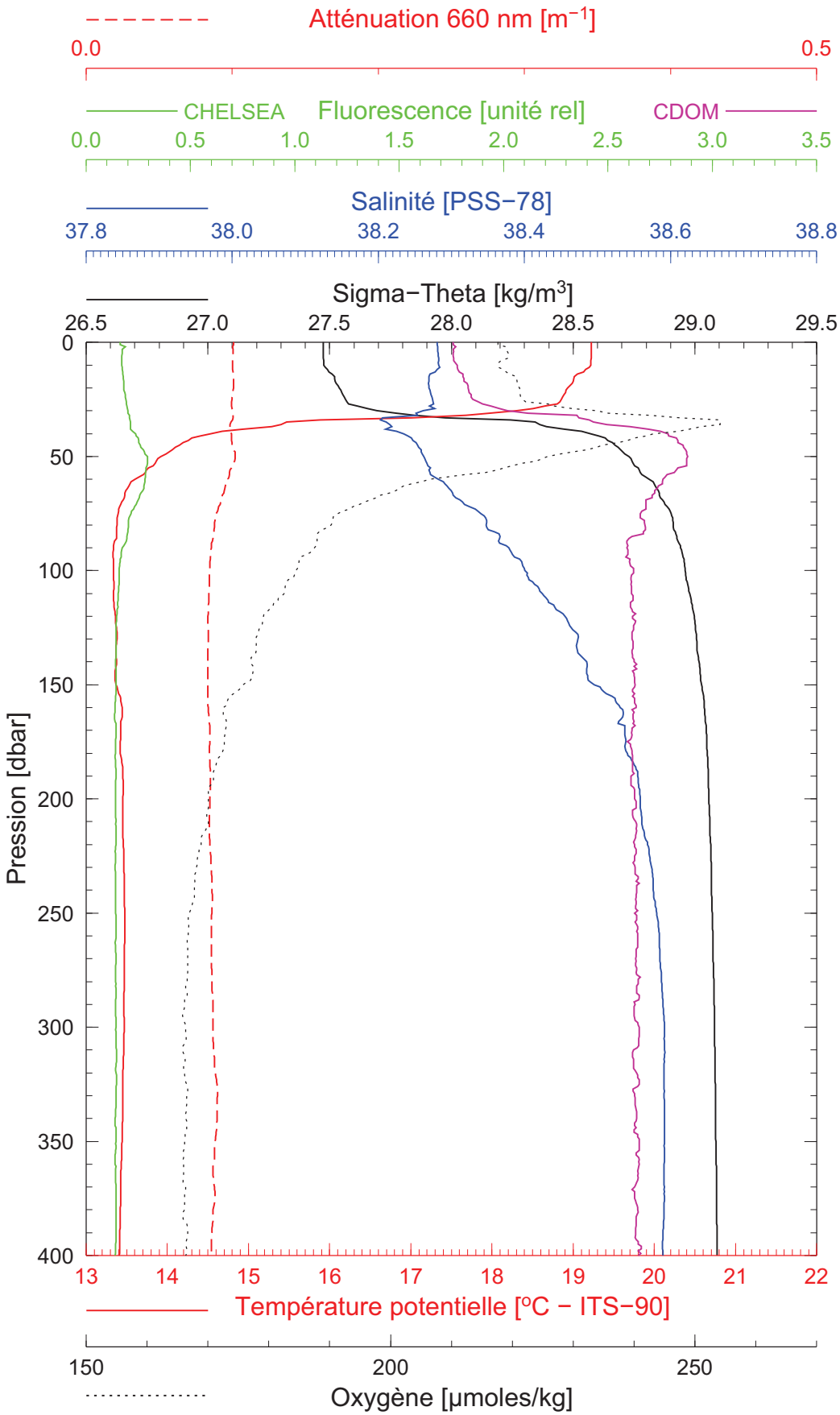
Cruise Summary Table for Boussole 128

Date	Black names	Profile names	CTD notées /	Other sensors	Start Time	Duration	Depth max	Latitude (N)		longitude					Weather							Sea		
	(file ext: ".raw")	(file extension: ".raw")	satellite overpass		GMT (hour,min)	(min,sec)	(meter)	(Degree)	(Minute)	(Degree)	(Minute)	Sky	Clouds	Quantity (#/8)	Wind sp. (kn)	Wind dir.	Atm. Pressure (hPa)	Humidity (%)	Visibility	T air	T water	Sea	Swell H (m)	Swell dir.	Whitecaps
24/10/12	bou_c-ops_121024_0908_001_data.csv				09:09	1:12																			
		bou_c-ops_121024_0908_002_data.csv			09:21	4:41	112.5	43	22.114	7	53.770	blue	Ci	4	18	115	1015.5	69	good	19.7		calm	1.0		yes
		bou_c-ops_121024_0908_004_data.csv			09:41	4:17	102.5	43	22.070	7	53.428	blue	Ci	4	18	115	1015.5	69	good	19.7		calm	1.0		yes
		bou_c-ops_121024_0908_005_data.csv			09:55	3:55	93.3	43	22.018	7	53.004	blue	Ci	4	18	115	1015.5	69	good	19.7		calm	1.0		yes
	bou_c-ops_121024_0908_006_data.csv				10:13	1:12																			
			CTDBOUS001	HPLC, Ap, TSM, CDOM, POC & Cyto	10:22	34:00	400	43	21.844	7	53.845	cloudy		5	15	115	1015.5	74		19.6	19.2	calm			
				Secchi01	11:05	4:00	26	43	22	7	54	cloudy		5					good			calm			
			CTDBOUS002		12:24	28:00	400	43	25.018	7	47.082	cloudy		5	11	132	1014.7	77		19.7	19.7	calm			
			CTDBOUS003		13:25	28:00	400	43	27.998	7	41.732	blue		2	11	115	1014.5	66		20.4	20.3	calm			
			CTDBOUS004		14:24	24:00	400	43	30.843	7	36.107	cloudy		4	11	122	1014.1	62		20.6	21.0	calm			
			CTDBOUS005		15:24	23:00	400	43	34.044	7	30.423	cloudy		4	10	200	1014.0	63		20.8	21.0	calm			
			CTDBOUS006		16:20	25:00	400	43	37.172	7	24.741	cloudy		4	7	100	1014.1	65		20.1	21.0	calm			
			CTDBOUS007		17:09	24:00	400	43	39.022	7	20.971	twilight		4	8	250	1014.2	63		20.5	20.8	calm			
25/10/12				Bucket TSM	10:00	2:00	surface	43	22	7	54														
			CTDBOUS008		13:16	28:00	400	43	33.921	7	30.744	overcast		6	6	210	1012.1	70		24.2	20.8	calm			
			CTDBOUS009		13:45	25:00	400	43	33.884	7	30.369	overcast		6	6	257	1011.9	66		22.6	20.9	calm			
26/10/12	Work on BOUSSOLE site not allowed																								
27/10/12	Bad weather																								


BOUSSOLE128
24 October 2012−24 October 2012
Nice
BOUS007
BOUS006
BOUS005
BOUS008
BOUS009
BOUS004
BOUS003
BOUS002
BOUS001
200
1000
2000
2300
2400
2200
2100
2600
buoy
Boussole site
10−24
Dyfamed site
44°00'N
43°50'N
43°40'N
43°30'N
43°20'N
43°10'N
43°00'N
43°24'N
43°22'N
43°20'N
7°00'E
7°10'E
7°20'E
7°30'E
7°40'E
7°50'E
8°00'E
7°50'E
7°52'E
7°54'E
7°56'E
7°58'E
8°00'E

BOUSSOLE 128 **24/10/2012** **BOUS121024_01**

BOUS001

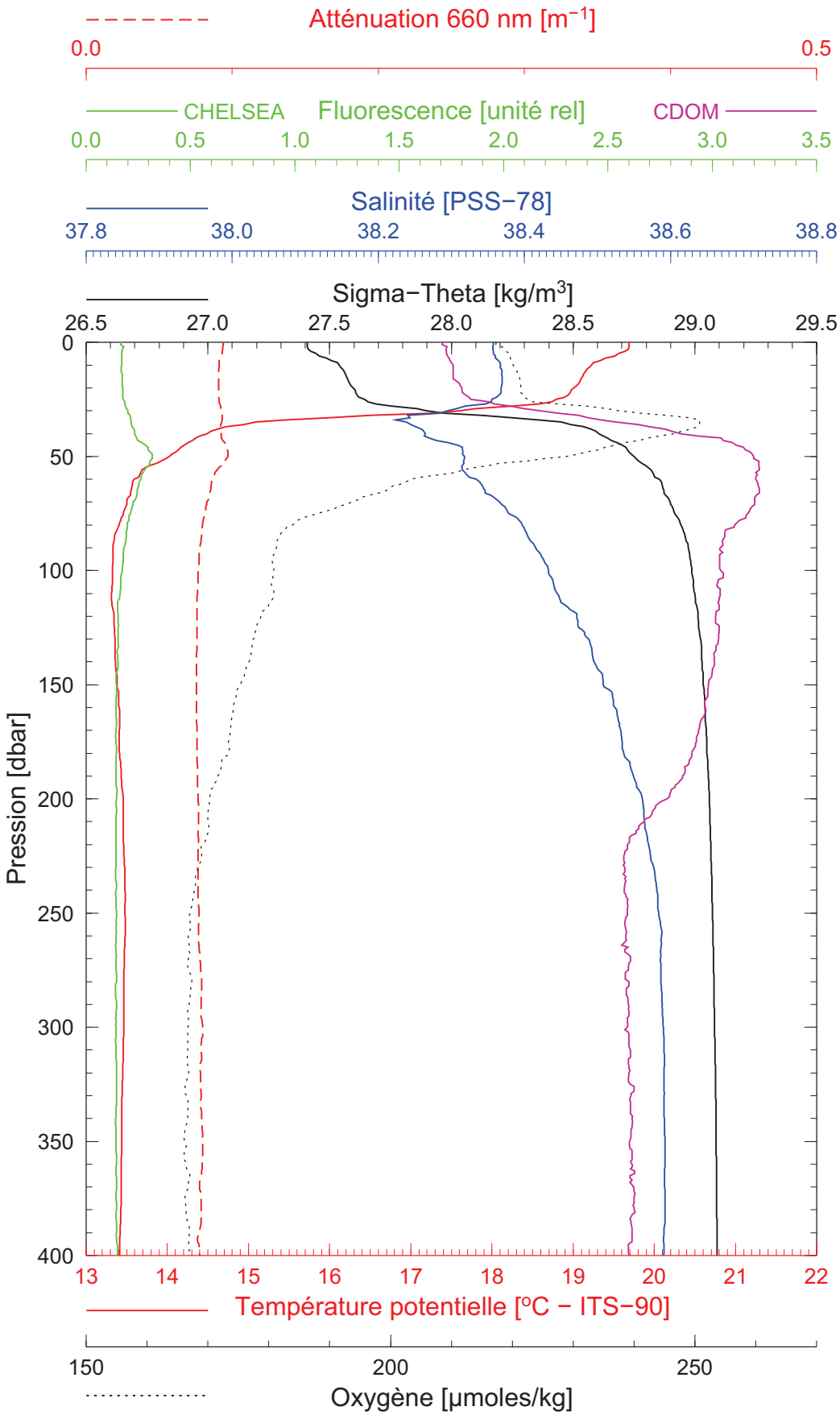


Date *24/10/2012* *Latitude* *43°21.844 N*

Heure déb *10h 22min [TU]* *Longitude* *07°53.845 E*

BOUSSOLE 128 **24/10/2012** **BOUS121024_02**

BOUS002

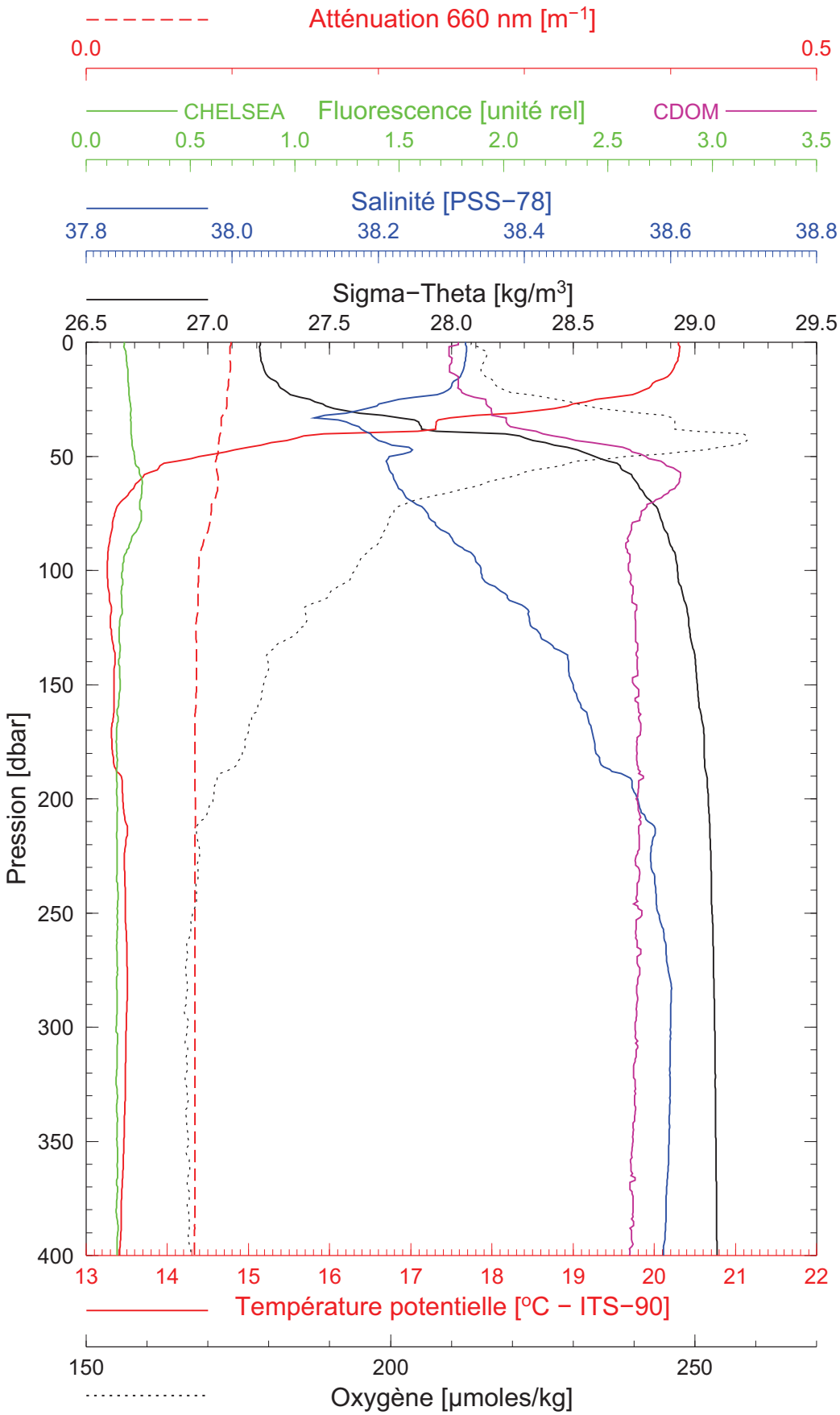


Date *24/10/2012* *Latitude* *43°25.018 N*

Heure déb *12h 24min [TU]* *Longitude* *07°47.082 E*

BOUSSOLE 128 **24/10/2012** **BOUS121024_03**

BOUS003

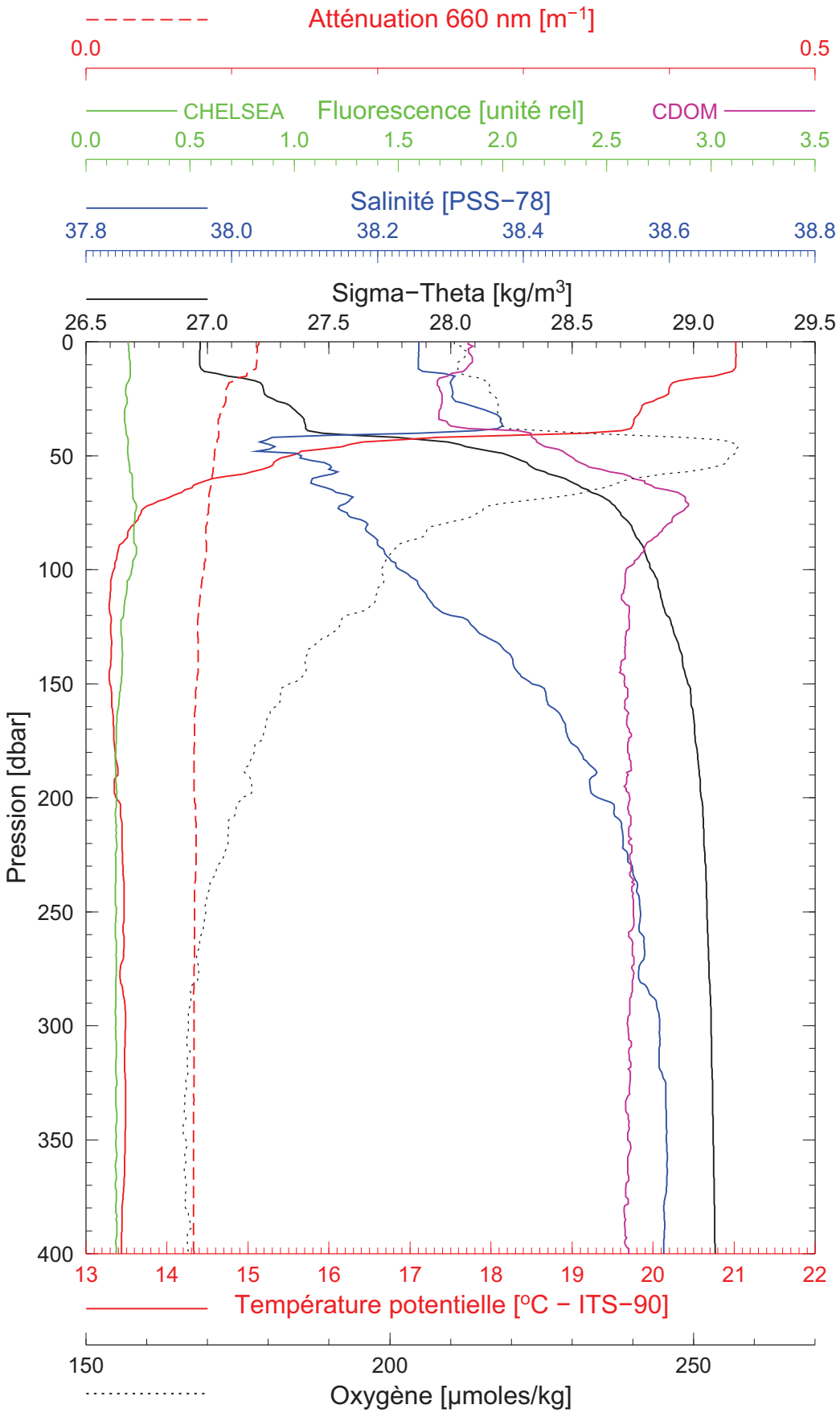


Date *24/10/2012* *Latitude* *43°27.998 N*

Heure déb *13h 25min [TU]* *Longitude* *07°41.732 E*

BOUSSOLE 128 **24/10/2012** **BOUS121024_04**

BOUS004

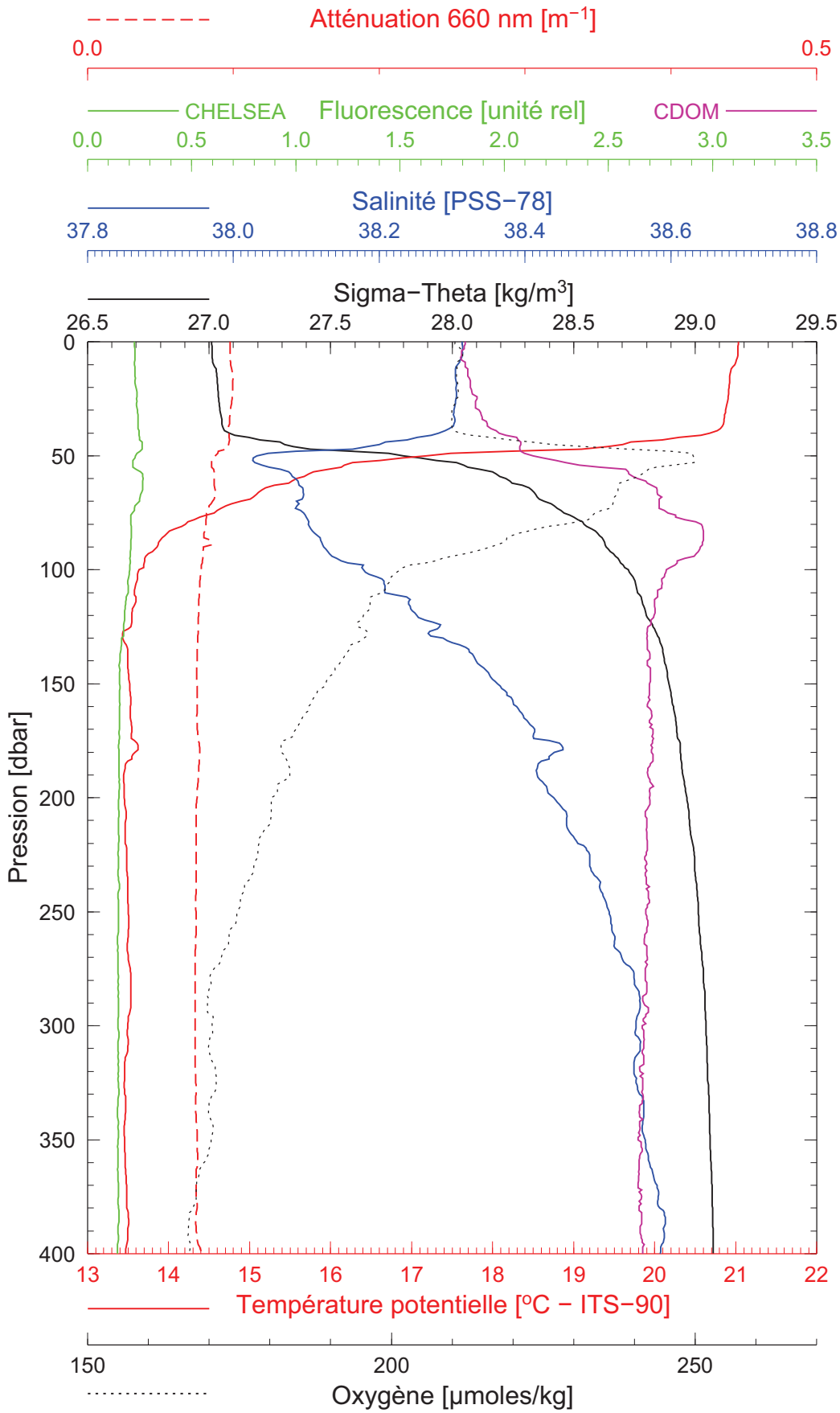


Date *24/10/2012* *Latitude* *43°30.843 N*

Heure déb *14h 24min [TU]* *Longitude* *07°36.107 E*

BOUSSOLE 128 **24/10/2012** **BOUS121024_05**

BOUS005



Date *24/10/2012* *Latitude* *43°34.044 N*

Heure déb *15h 24min [TU]* *Longitude* *07°30.423 E*

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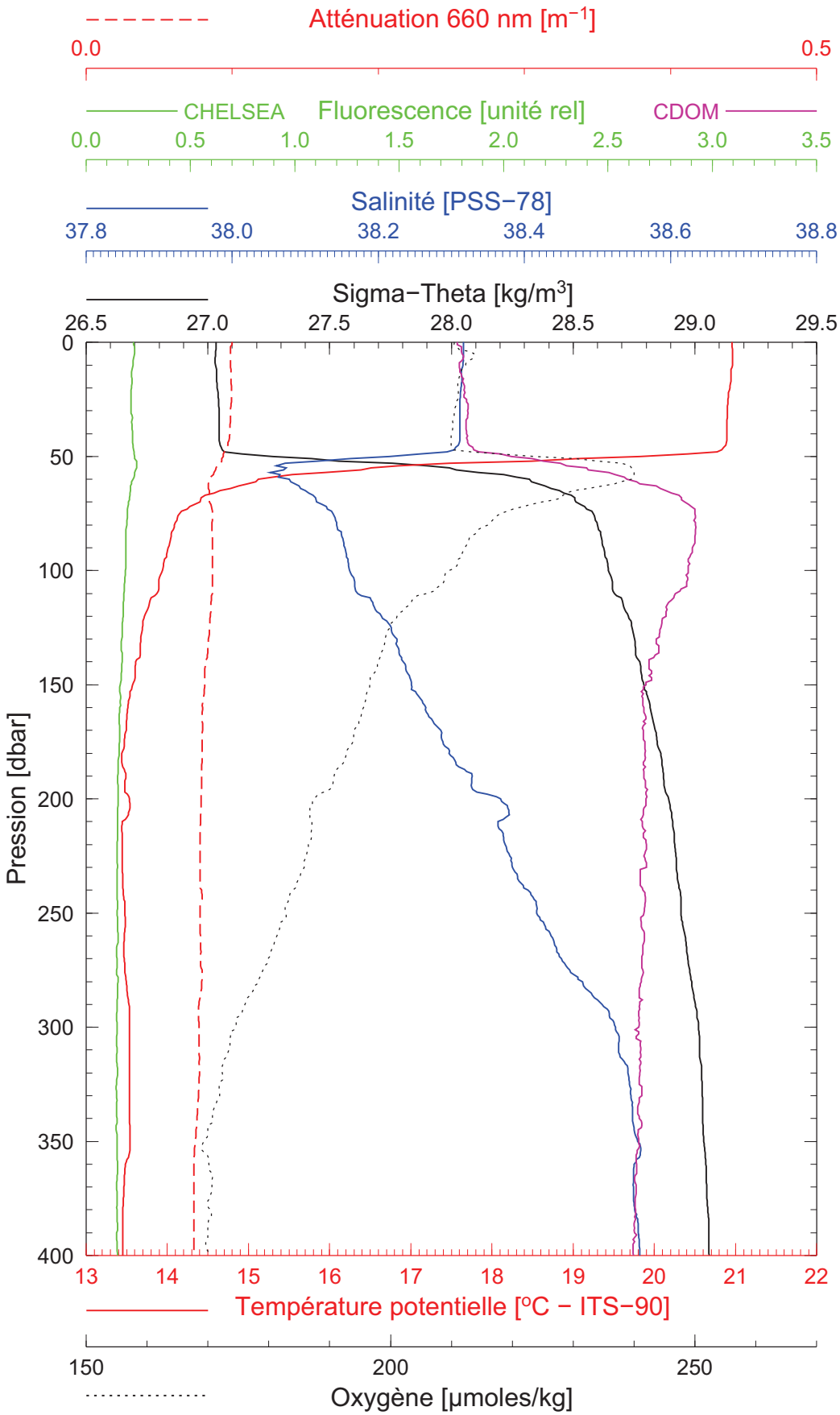
BOUS006



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Heure déb *16h 20min [TU]* *Longitude* *07°24.741 E*

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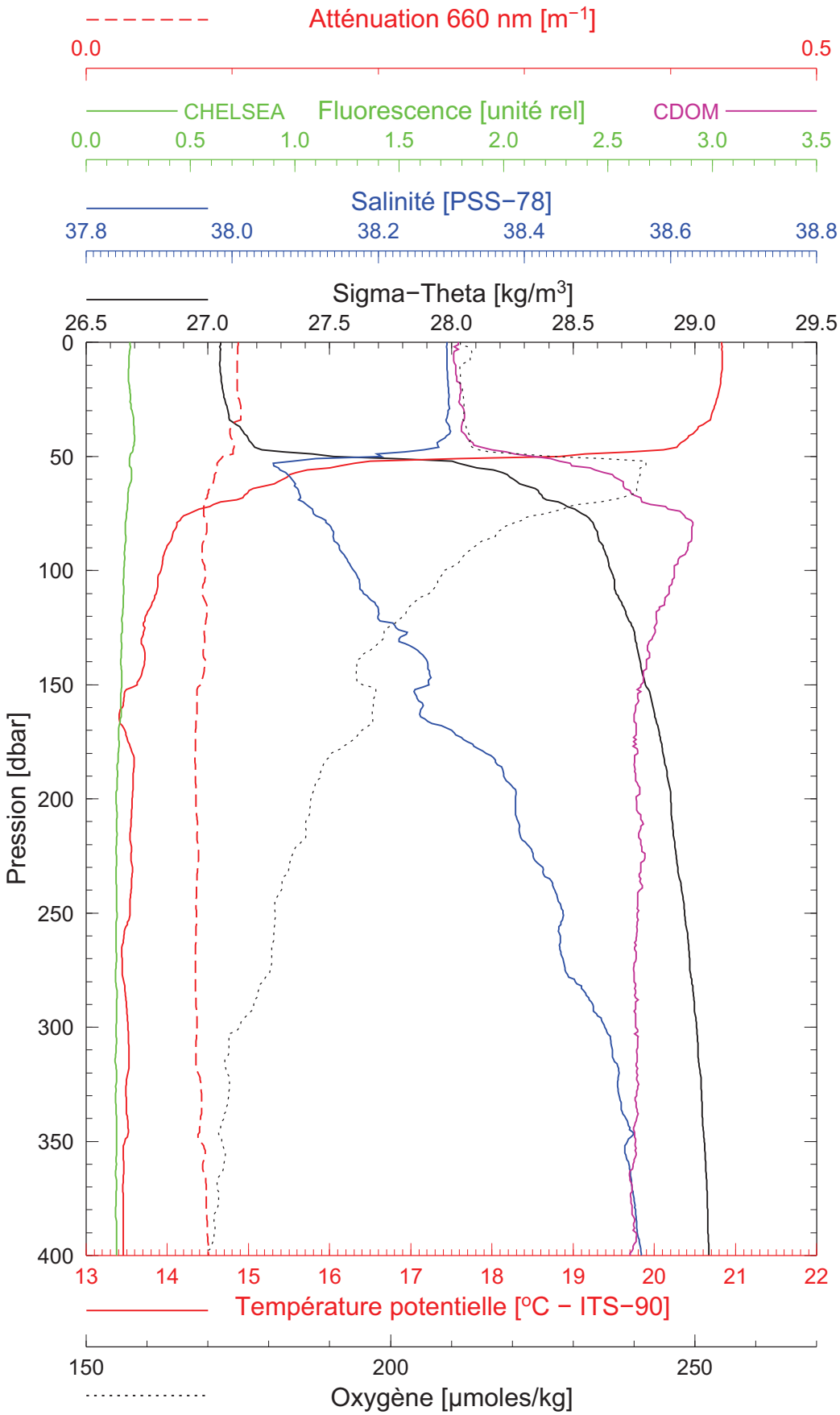
BOUS007



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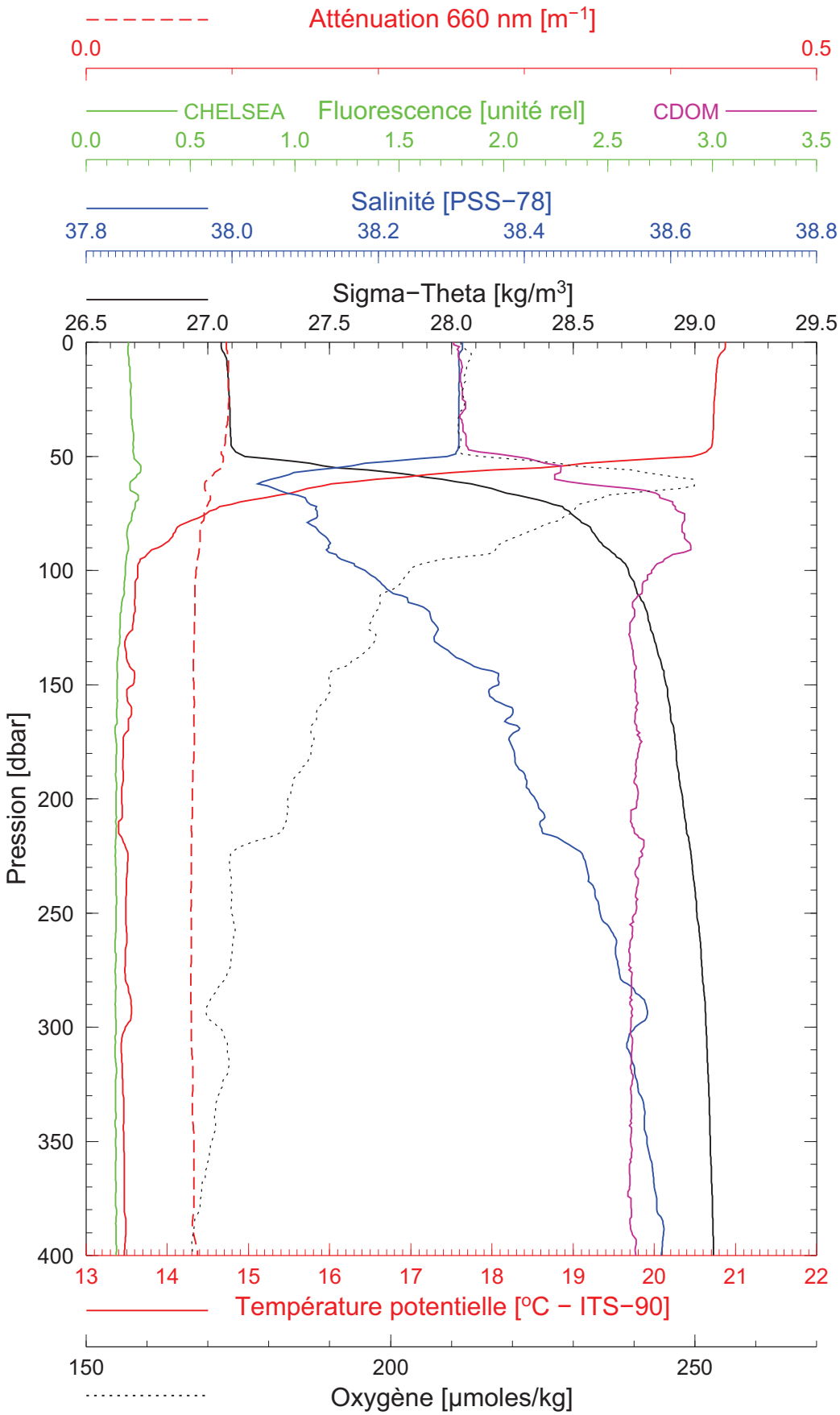
BOUSSOLE 128 **25/10/2012** **BOUS121025_01**

BOUS008

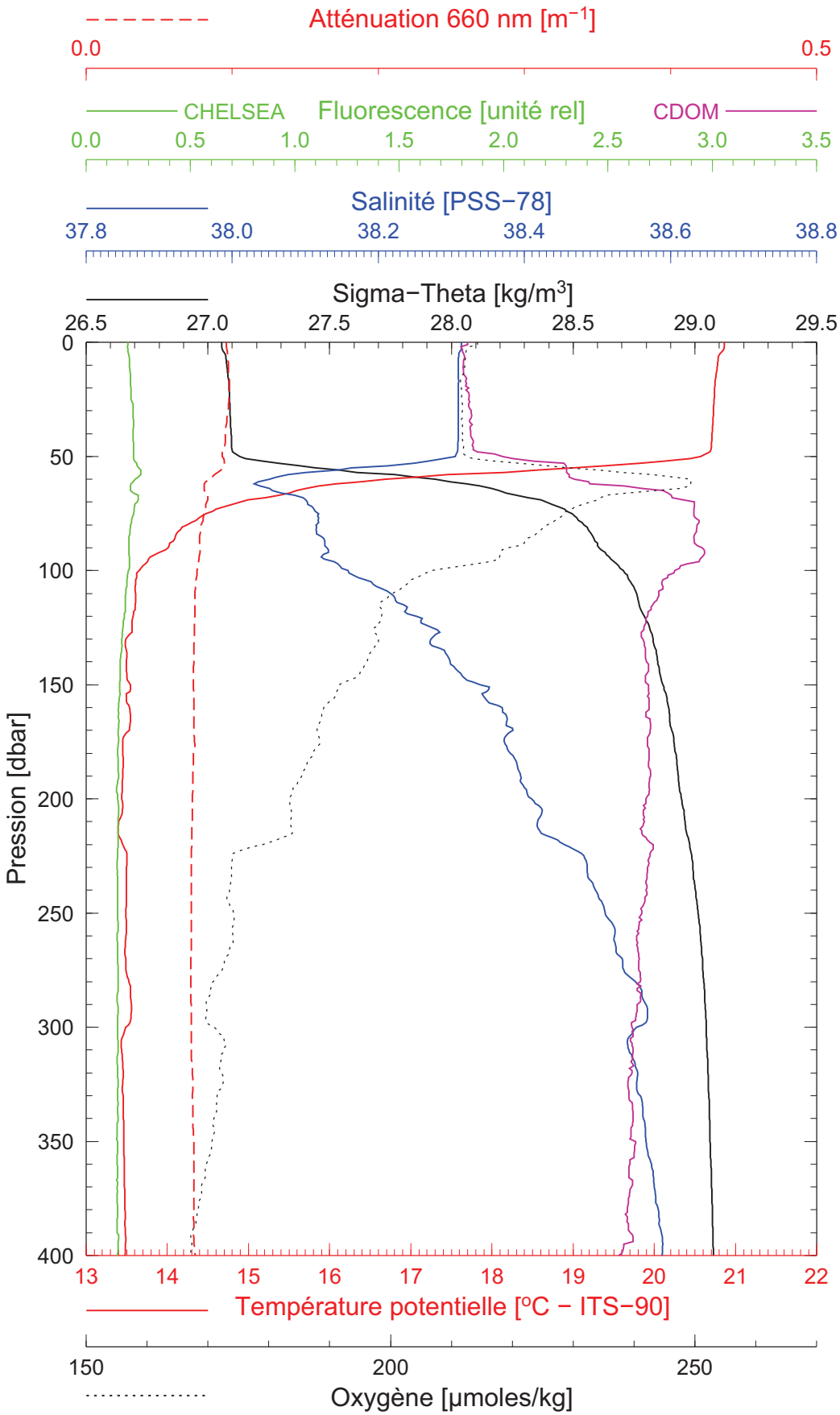


Date *25/10/2012* *Latitude* *43°33.921 N*

Heure déb *13h 16min [TU]* *Longitude* *07°30.744 E*

BOUSSOLE 128 **25/10/2012** **BOUS121025_02**

BOUS009



Date *25/10/2012* *Latitude* *43°33.884 N*

Heure déb *13h 45min [TU]* *Longitude* *07°30.369 E*