

BOUSSOLE Monthly Cruise Report

Cruise 120

February 15 - 18, 2012

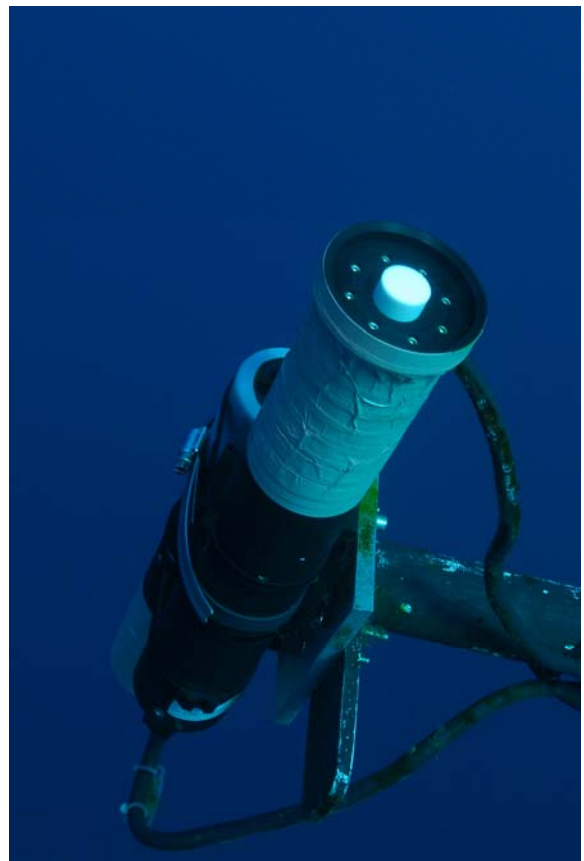
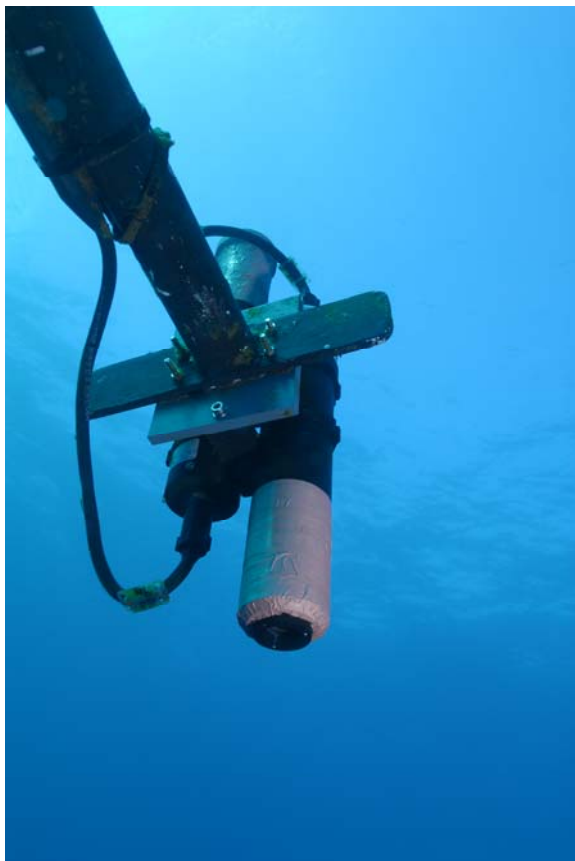
Duty Chief: Emilie Diamond (diamond@obs-vlfr.fr)

Vessel: R/V Antéa / IRD

(Captain: Roger Stephan)

Science Personnel: Emilie Diamond, David Luquet, Grigor Obolensky, Didier Robin and Vincenzo Vellucci.

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



The BOUSSOLE buoy hyperspectral radiometers - Satlantic HyperOCR - at 4 m.

BOUSSOLE project

ESA/ESRIN contract N° 13226/10/I-NB

February 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



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

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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

Since the 21th December 2011, the buoy OCP_4 m instruments started to send a constant signal. During the diving day, the previous OCP (changed at the beginning of January 2012) was re-installed and the OCP-DACNet cable and the DACNet were changed. The last day, an ARGO bio-optical profiling float of Emmanuel Boss, from the University of Maine in USA, was deployed in the vicinity of the BOUSSOLE buoy.

Cruise Summary

The four cruise days were used for optical profiles and CTD casts with water sampling at the BOUSSOLE site. The second day was also used for completing the transect, the third day for buoy data retrieval and diving operations and the last day for deploying the bio-optical profiling float. The first two days the buoy was completely underwater.

Wednesday 15 February 2012

The first day, the sea was slightly rough with a moderate breeze. The sky was blue with a good visibility. There was strong current so the BOUSSOLE buoy was completely underwater. This day, 2 CTD casts with water sampling, 3 C-OPS profiles and 1 Secchi disk were performed in the vicinity of the BOUSSOLE site.

Thursday 16 February 2012

The second day, the sea was slightly rough with a gentle breeze. The sky was blue with an excellent visibility. When arrived at the BOUSSOLE site, the buoy was still completely underwater. 1 CTD cast with water sampling and 3 C-OPS profiles were performed. Then the CTD transect was performed.

Friday 17 February 2012

The third day, the sea was smooth with a gentle breeze and the sky was blue. When arrived at the BOUSSOLE site, there was still some current but the buoy was visible though not till the floatation point. 4 C-OPS profiles were first performed. Then divers went at sea to clean buoy instruments. After the buoy was turned off and the previous OCP was re-installed and a new OCP-DACNet cable was installed. Then the buoy was restarted and data retrieved with a direct connection on the buoy through an AK reboot after an acquisition and again data from OCP 4 m instruments were not acquired. So the buoy was again turned off and the DACNet exchanged. In parallel to diving operations, optical sensors and ARGOS and CISCO connectors on the buoy head were cleaned. Then 1 CTD cast with water sampling was performed before leaving.

Saturday 18 February 2012

The last day, the sea was slightly rough with a moderate breeze. The sky was blue with a good visibility. At the BOUSSOLE site, 1 CTD cast with water sampling, 3 C-OPS profiles and 1 Secchi disk were performed. We also deployed an ARGO bio-optical profiling float of Emmanuel Boss in the vicinity of the BOUSSOLE site.

Cruise Report

Wednesday 15 February 2012 (UTC)

People on board: Emilie Diamond and Grigor Obolensky.

0710 Departure from the Nice harbour.

1030 Arrival in the front of the Villefranche Bay.

1100 CTD 01, 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.

1200 C-OPS balance tests.

1250 C-OPS 01, 02, 03.

1355 CTD 02, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p, TSM, POC, CDOM and cytometry.

1445 Secchi disk 01 (17 m).

1455 Departure to the Nice harbour.

1810 Arrival at the Nice harbour.

Thursday 16 February 2012 (UTC)

People on board: Emilie Diamond and Vincenzo Vellucci.

0610 Departure from the Nice harbour.

1040 Arrival at the BOUSSOLE site.

1055 CTD 03, 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 C-OPS 04, 05, 06.

1225 Departure to the first transect station.

1305 CTD 04, 400 m, station 01 (43°25'N 07°48'E).

1420 CTD 05, 400 m, station 02 (43°28'N 07°42'E).

1535 CTD 06, 400 m, station 03 (43°31'N 07°37'E).

1640 CTD 07, 400 m, station 04 (43°34'N 07°31'E).

1740 CTD 08, 400 m, station 05 (43°37'N 07°25'E).

1830 CTD 09, 400 m, station 06 (43°39'N 07°21'E).

1900 Departure to the Nice harbour.
19435 Arrival at the Nice harbour.

Friday 17 February 2012 (UTC)

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

0615 Departure from the Nice harbour.
0940 Arrival at the BOUSSOLE site.
0945 C-OPS 07, 08, 09, 10.
1120 Diving on the buoy for cleaning instruments and for installing a new OCP-DACNet cable and the previous OCP at 4 m.
1150 Cleaning of solar panels, sensors and ARGOS and CISCO connectors on the buoy head.
Direct connection with the buoy and data retrieval after a reboot through the AK connector: no data at 4 m so substitution of the DACNet.
1430 CTD 10, 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.
1520 Departure to the Nice harbour.
1840 Arrival at the Nice harbour.

Saturday 18 February 2012

People on board: Emilie Diamond and Grigor Obolensky.

0605 Departure from the Nice harbour.
0945 Arrival at the BOUSSOLE site.
1000 CTD 11, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and a_p .
1055 Bio-optical profiling float deployment.
1115 C-OPS 11, 12, 13.
1205 Secchi disk 02 (15 m).
1215 Departure to the Nice harbour.
1630 Arrival at the Nice harbour.

Problems identified during the cruise

- Oxygen data from the SBE 43 sensor SN #0378 were corrupted between 0 and 10 meters.
- Data from the WET Labs CDOM fluorometer were still corrupted.
- There was no C-Star transmissometer on the CTD-rosette during the two first days. One was re-installed on the rosette the third day.

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

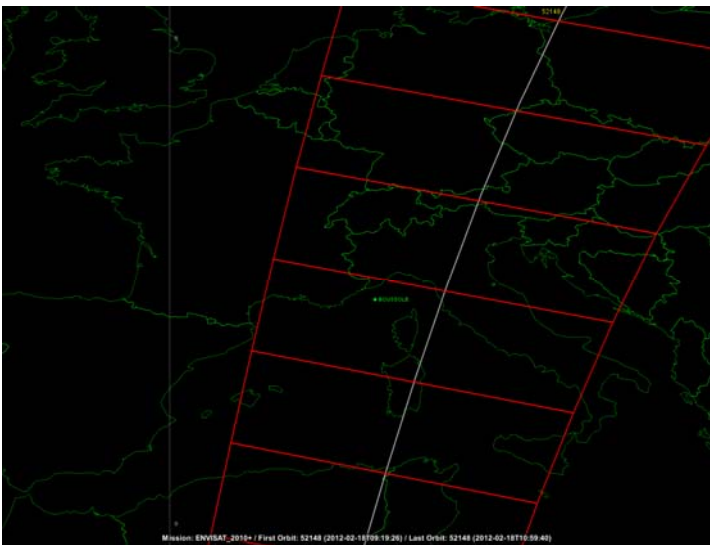
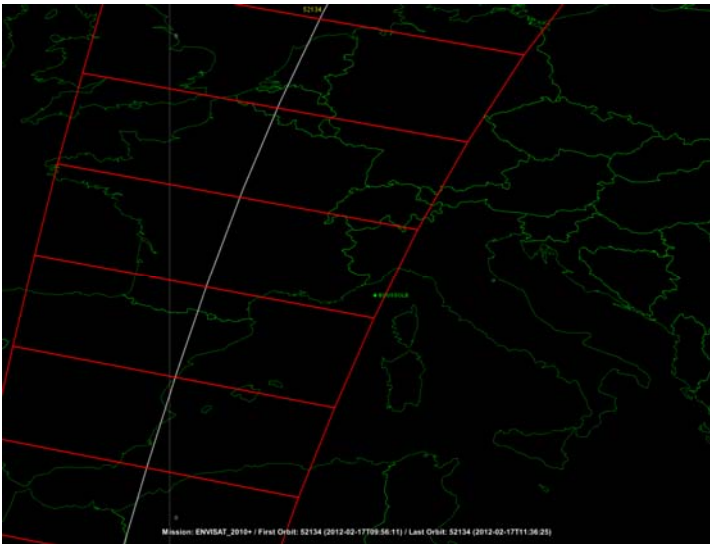
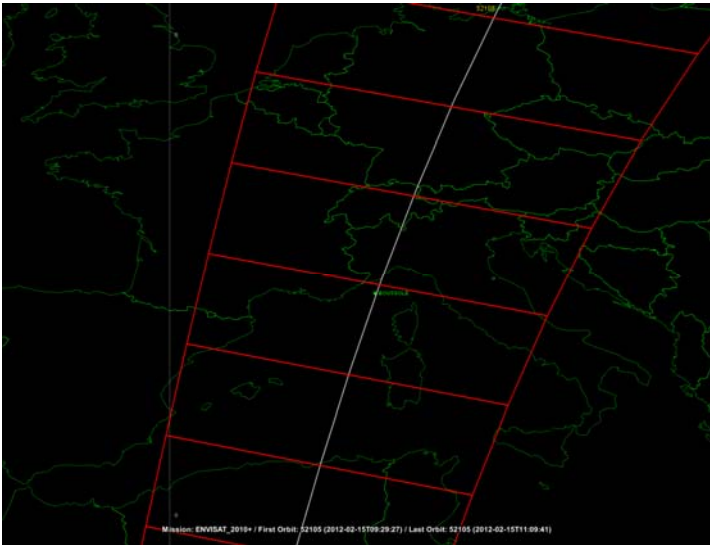


Figure 1. Calculated swath path for MERIS (Esov NG software) above the BOUSSOLE site for the 15th, 17th and 18th of February 2012.

Appendices

Cruise Summary Table for Boussole 120

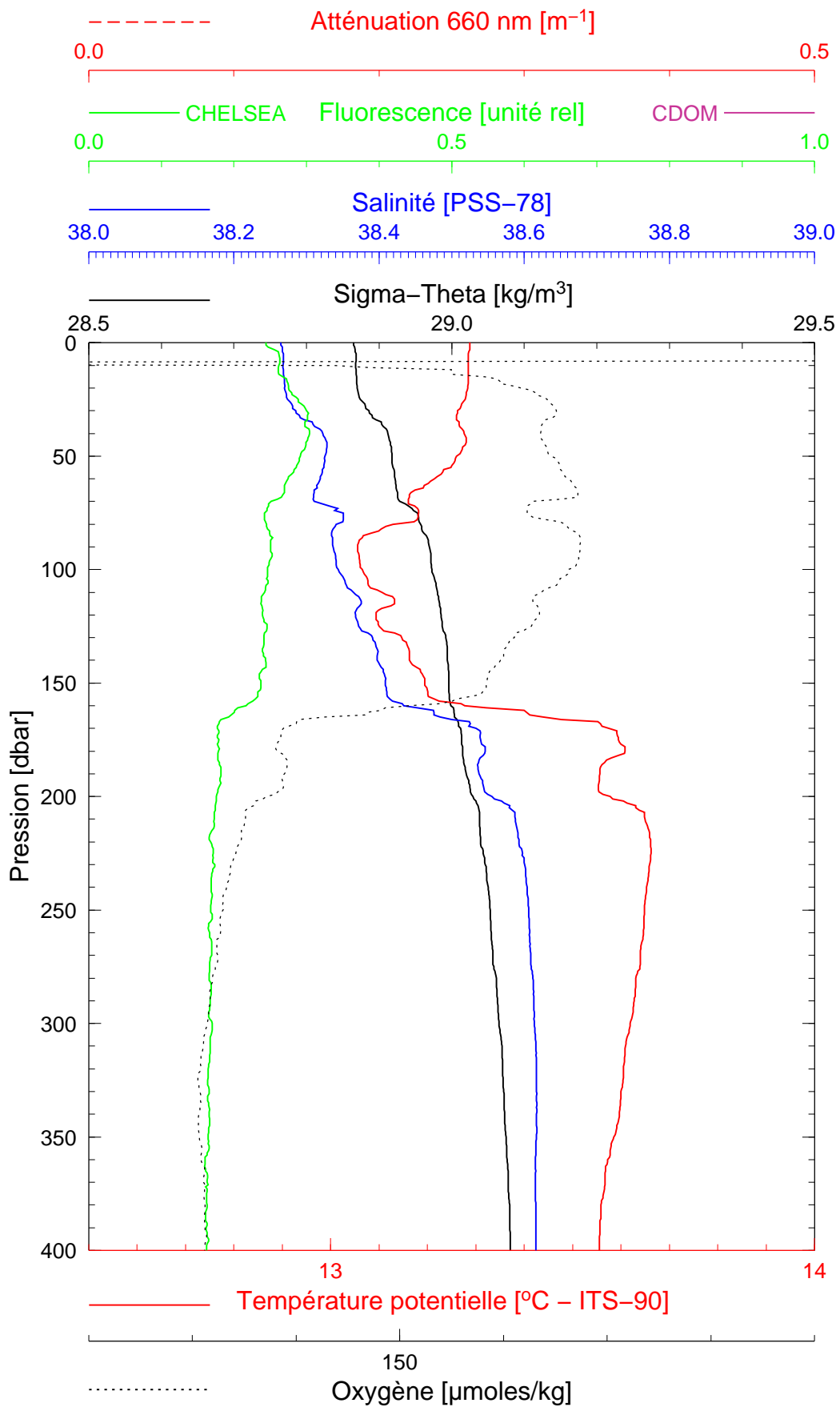
Date	Black names (file ext: ".raw")	Profile names (file extension: ".raw")	CTD notes / satellite overpass	Other sensors	Start Time		Depth max (meter)	Latitude (N)			Longitude		Sky	Clouds	Quantity (#/8)	Weather		Atm. Pressure (hPa)	Humidity (%)	Visibility	T air	T water	Sea	Sea Swell H (m)	Swell dir.	Whitecaps		
					GMT (hour.min)	(min.sec)		(Degree)	(Minute)	(Degree)	(Minute)	Wind sp. (kn)				Wind dir.												
15/02/12	bou c-ops 120215	1202_001_data.csv	CTDBOUS001	HPLC, Ap & TSM	11:04	40:00	400	43	21.752	7	51.808	blue			1	12	229	1010	49		9.3	13.3	calm			yes		
					12:03	1:19																						
		bou c-ops 120215_1202_002_data.csv			12:55	3:34	85.9	43	21.766	7	53.061	blue	None	0	15	211	1009.3	49	good	9.5			moved	1.0		yes		
		bou c-ops 120215_1202_003_data.csv			13:06	3:20	73.8	43	21.654	7	52.663	blue	None	0	15	211	1009.3	49	good	9.5				moved	1.0		yes	
		bou c-ops 120215_1202_004_data.csv			13:14	3:08	69.5	43	21.526	7	52.095	blue	None	0	15	211	1009.3	49	good	9.5				moved	1.0		yes	
	bou c-ops 120215_1202_005_data.csv			13:27	1:55																							
			CTDBOUS002	HPLC Ap TSM CDOM POC cyto Secchi01	13:58	40:00	400	43	21.606	7	52.668	blue			1	12	215	1008	51		9.7	13.3	moved			yes		
					14:45	4:00	17	43	22	7	54	blue			1					good						yes		
16/02/12	bou c-ops 120216	1056_001_data.csv	CTDBOUS003	HPLC, Ap & TSM	10:02	34:00	400	43	21.171	7	53.192	blue			0	2	210	1013	40		15.7	13.4	moved			no		
					11:25	2:21																						
		bou c-ops 120216_1056_003_data.csv			11:47	3:33	72.0	43	21.514	7	52.841	blue	None	0	11	170	1014.3	56	excellent	13.2			calm	1.0		no		
		bou c-ops 120216_1056_004_data.csv			11:56	3:32	76.6	43	21.321	7	52.499	blue	None	0	11	170	1014.3	56	excellent	13.2			calm	1.0		no		
		bou c-ops 120216_1056_005_data.csv			12:07	3:25	82.2	43	21.117	7	52.131	blue	None	0	11	170	1014.3	56	excellent	13.2			calm	1.0		no		
		bou c-ops 120216_1056_006_data.csv			12:35	7:54																						
					CTDBOUS004		13:09	30:00	400	43	24.980	7	48.105	blue			0	14	184	1014	69		13.2	13.5	calm			no
					CTDBOUS005		14:23	29:00	400	43	27.939	7	42.168	blue			0	7	179	1014	67		13.4	13.3	calm			no
					CTDBOUS006		15:38	23:00	400	43	31.034	7	36.925	blue			0	4	184	1015	54		15	13.5	calm			no
				CTDBOUS007		16:40	24:00	400	43	33.923	7	30.979	blue			0	2	199	1016	63		13	13.4	calm			no	
			CTDBOUS008		17:41	21:00	400	43	36.757	7	25.373	blue			0	2	255	1017	66		12	13.4	calm			no		
			CTDBOUS009		18:31	25:00	400	43	38.786	7	21.228	night			9	3	268	1017	68		12	13.3	calm			no		
17/02/12	bou c-ops 120217	0948_001_data.csv			09:56	3:14	75.6	43	21.554	7	53.952	blue	Cu&Ci		2	11	217	1022.7	64	good	13.4			calm	0.5		few	
		bou c-ops 120217_0948_002_data.csv			10:08	3:17	76.3	43	21.310	7	53.674	blue	Cu&Ci		2	11	217	1022.7	64	good	13.4			calm	0.5		few	
		bou c-ops 120217_0948_003_data.csv			10:20	2:38	60.9	43	31.105	7	53.437	blue	Cu&Ci		2	11	217	1022.7	64	good	13.4			calm	0.5		few	
		bou c-ops 120217_0948_004_data.csv			10:18	2:35	57.5	43	20.905	7	53.232	blue	Cu&Ci		2	11	217	1022.7	64	good	13.4			calm	0.5		few	
	bou c-ops 120217_0948_005_data.csv			10:39	1:14																							
			CTDBOUS010	HPLC, Ap & TSM	14:37	37:00	400	43	21.412	7	54.14	overcast			6	13	224	1021	58		12.4	13.2	calm			few		
18/02/12	bou c-ops 120218	1031_001_data.csv	CTDBOUS011	HPLC & Ap	10:06	37:00	400	43	22.127	7	55.023	blue			1	14	199	1021	60		12.4	13.2	calm			yes		
					10:33	1:28																						
		bou c-ops 120218_1031_003_data.csv			11:25	2:28	51.7	43	21.507	7	52.938	blue	Ci	1	14	207	1021.0	61	good	12.9			calm	0.7		yes		
		bou c-ops 120218_1031_004_data.csv			11:35	2:53	61.8	43	21.315	7	52.743	blue	Ci	1	14	207	1021.0	61	good	12.9			calm	0.7		yes		
		bou c-ops 120218_1031_006_data.csv			11:49	2:26	55.4	43	21.094	7	52.556	blue	Ci	2	14	207	1021.0	61	good	12.9			calm	0.7		yes		
	bou c-ops 120218_1031_008_data.csv			12:16	1:20																							
				Secchi02	12:05	4:00	15	43	22	7	54	blue			4					good				calm			yes	

BOUSSOLE 120

15/02/2012

BOUS120215_01

BOUS001



Date 15/02/2012
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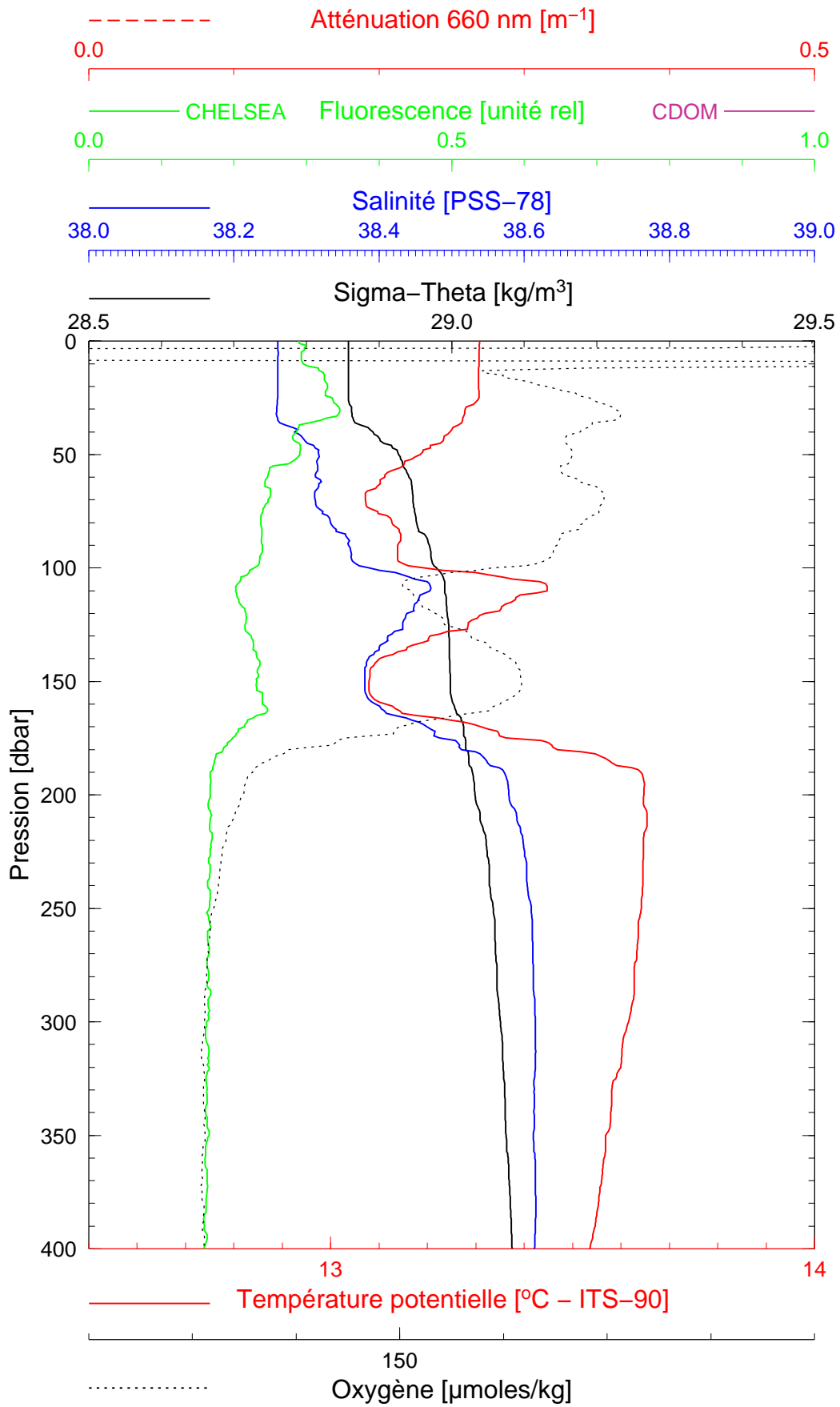
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BOUSSOLE 120

15/02/2012

BOUS120215_02

BOUS002



Date 15/02/2012
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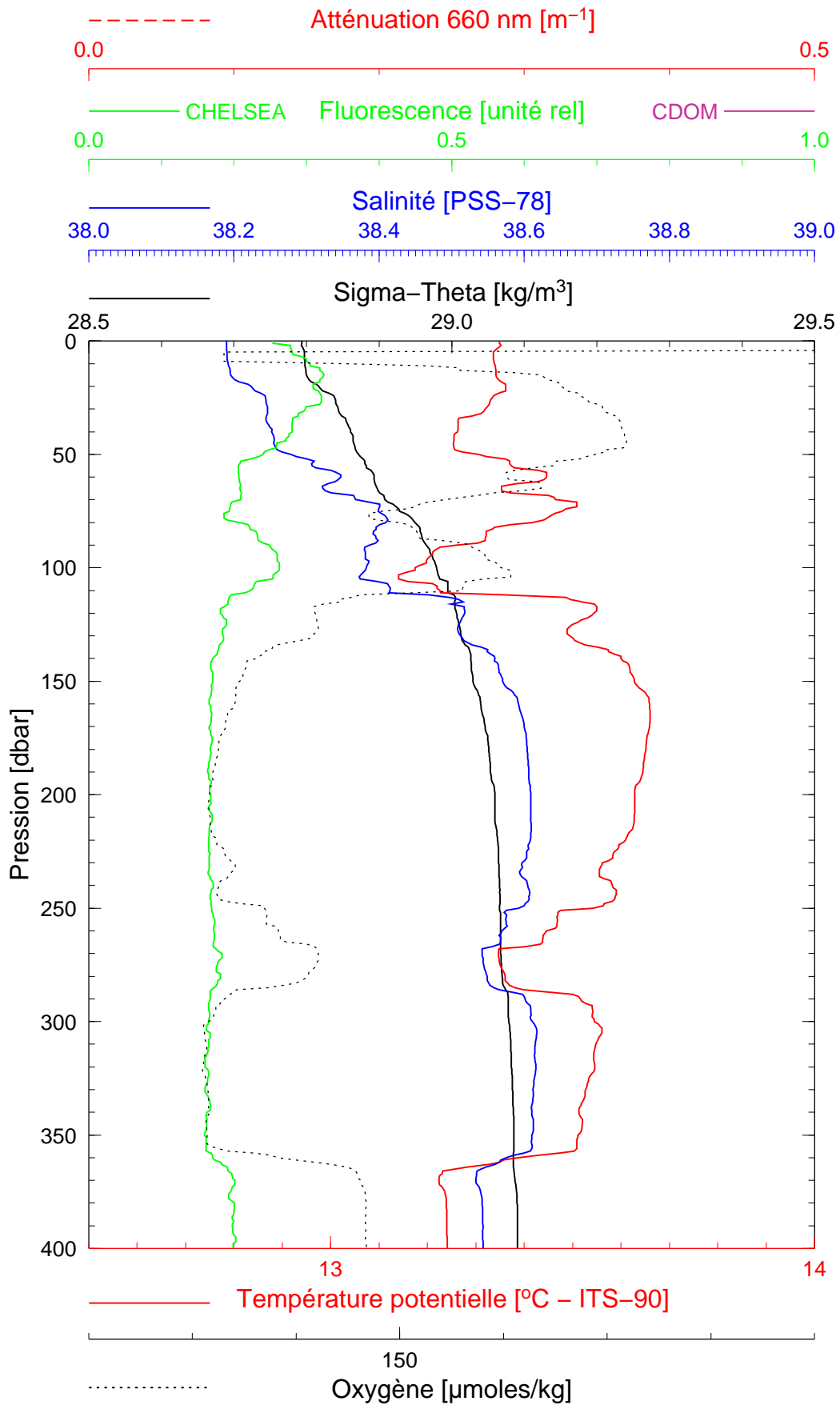
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BOUSSOLE 120

16/02/2012

BOUS120216_01

BOUS003



Date 16/02/2012
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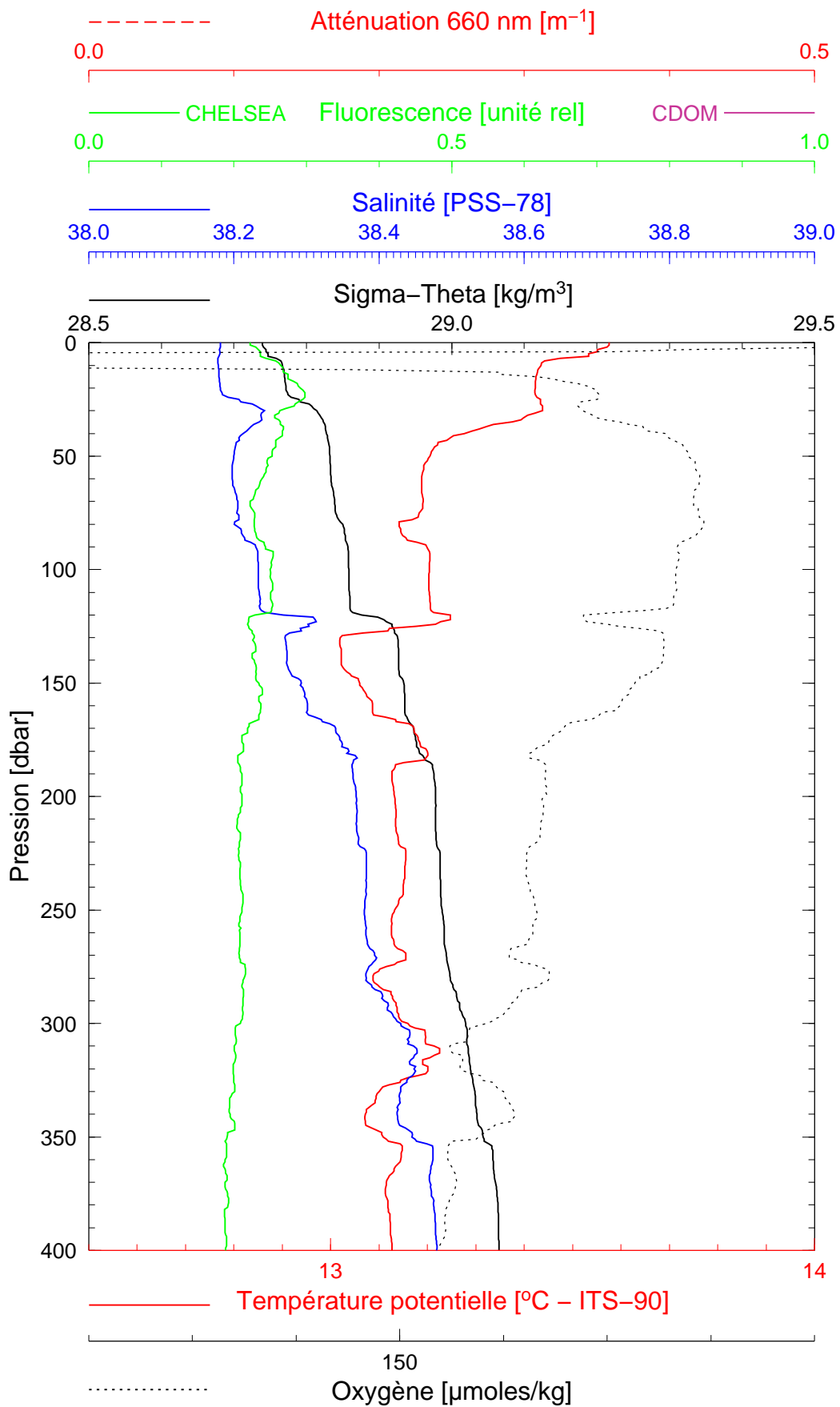
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BOUSSOLE 120

16/02/2012

BOUS120216_02

BOUS004



Date 16/02/2012
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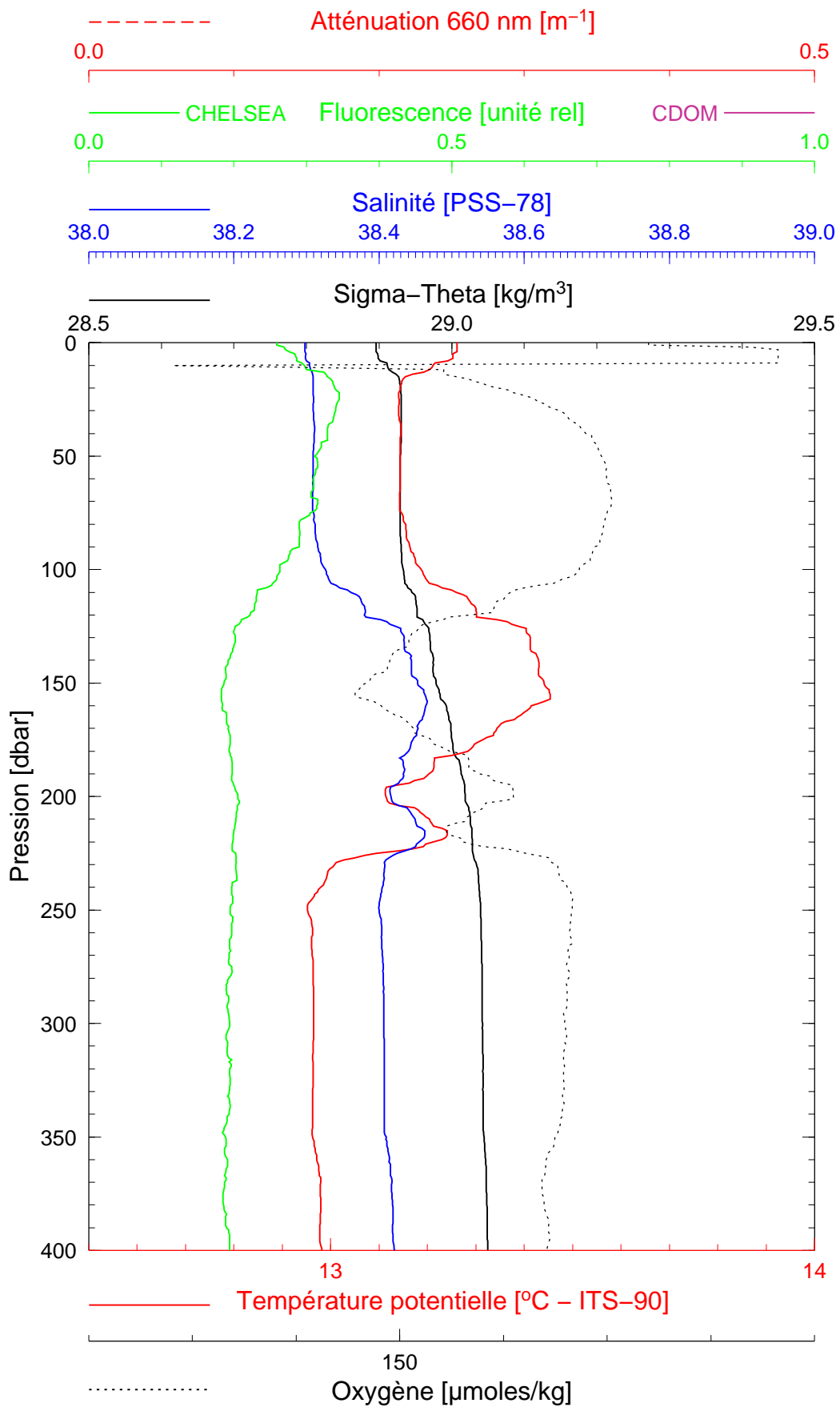
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BOUSOLE 120

16/02/2012

BOUS120216_03

BOUS005



Date 16/02/2012
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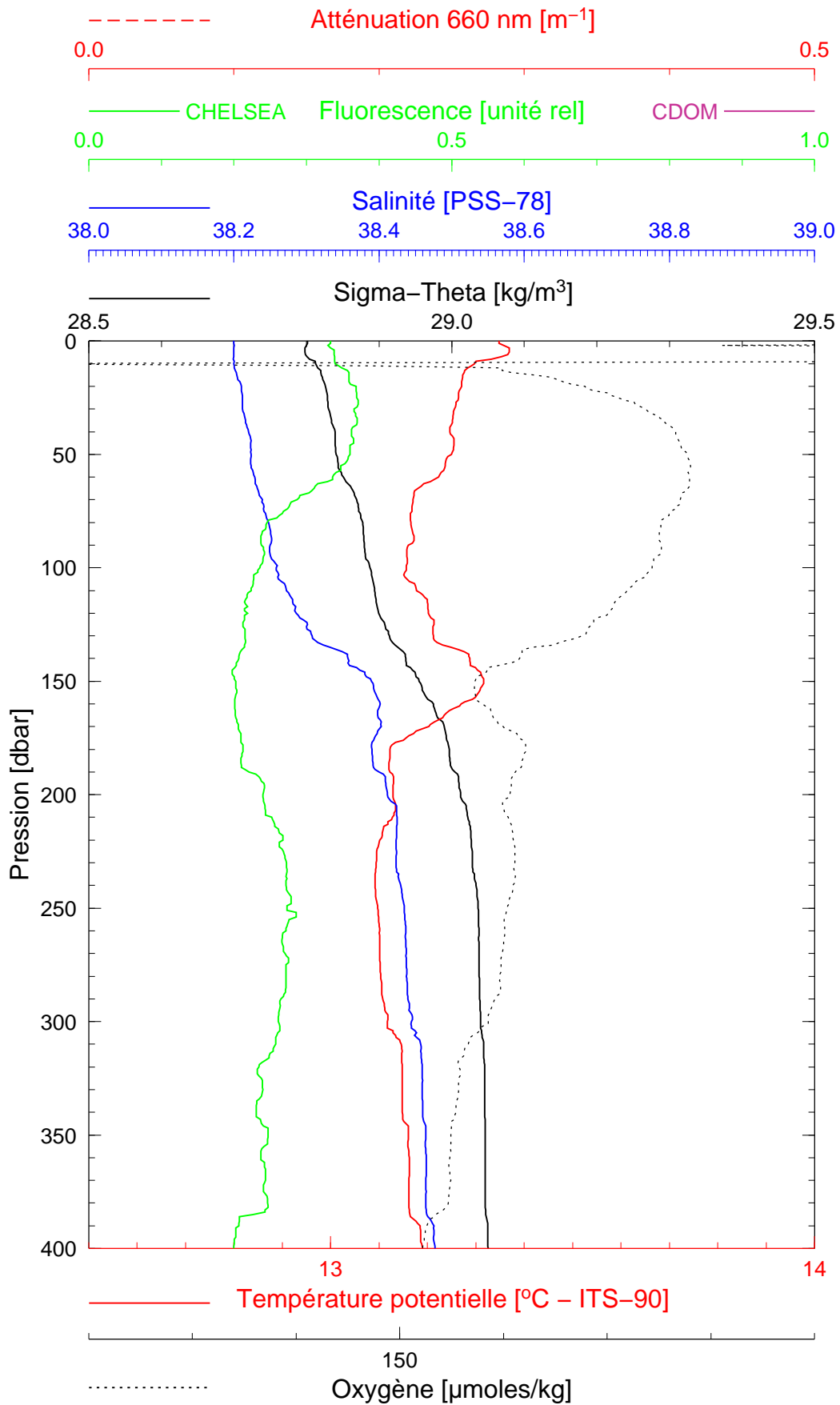
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BOUSSOLE 120

16/02/2012

BOUS120216_04

BOUS006



Date 16/02/2012
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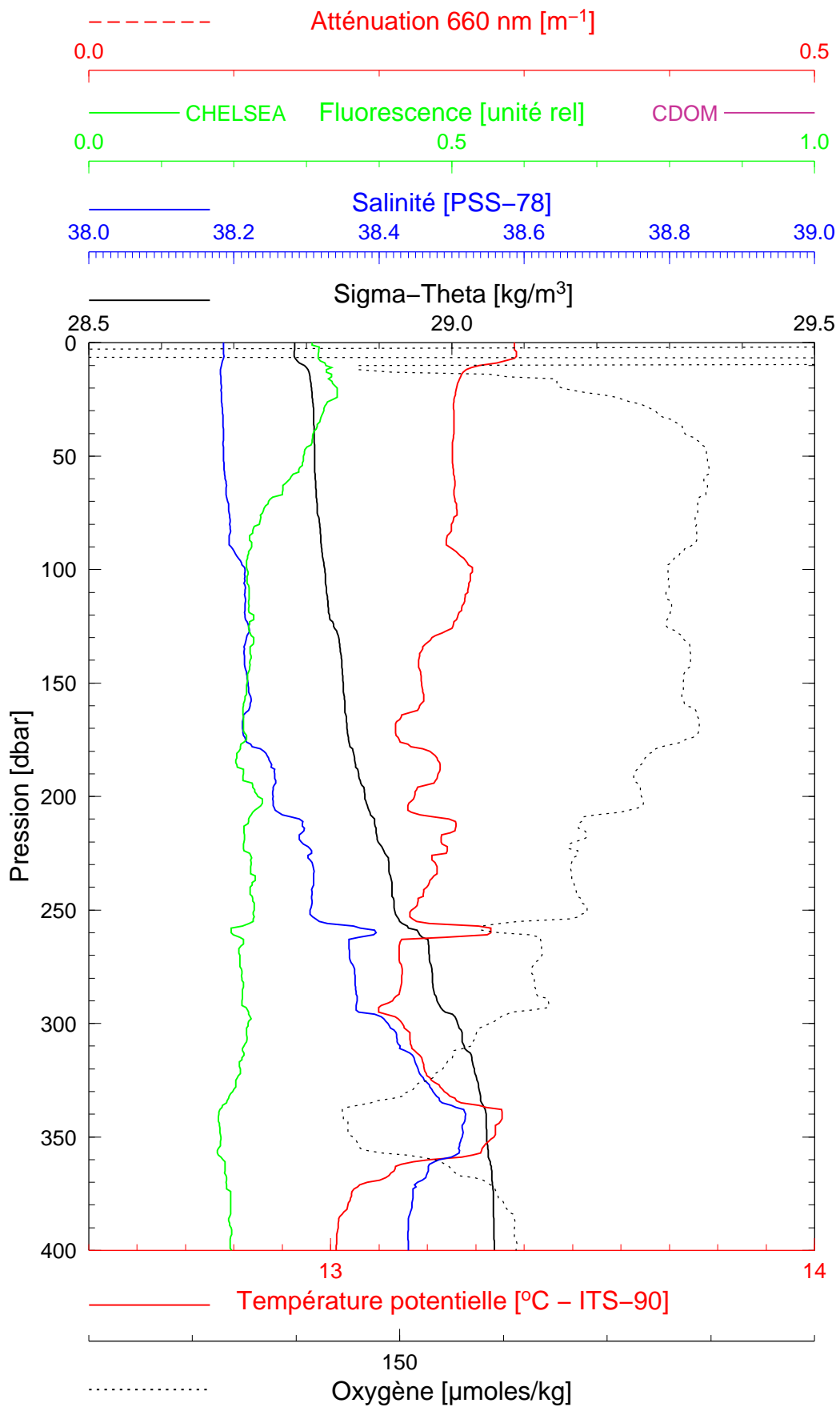
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BOUSSOLE 120

16/02/2012

BOUS120216_05

BOUS007



Date 16/02/2012
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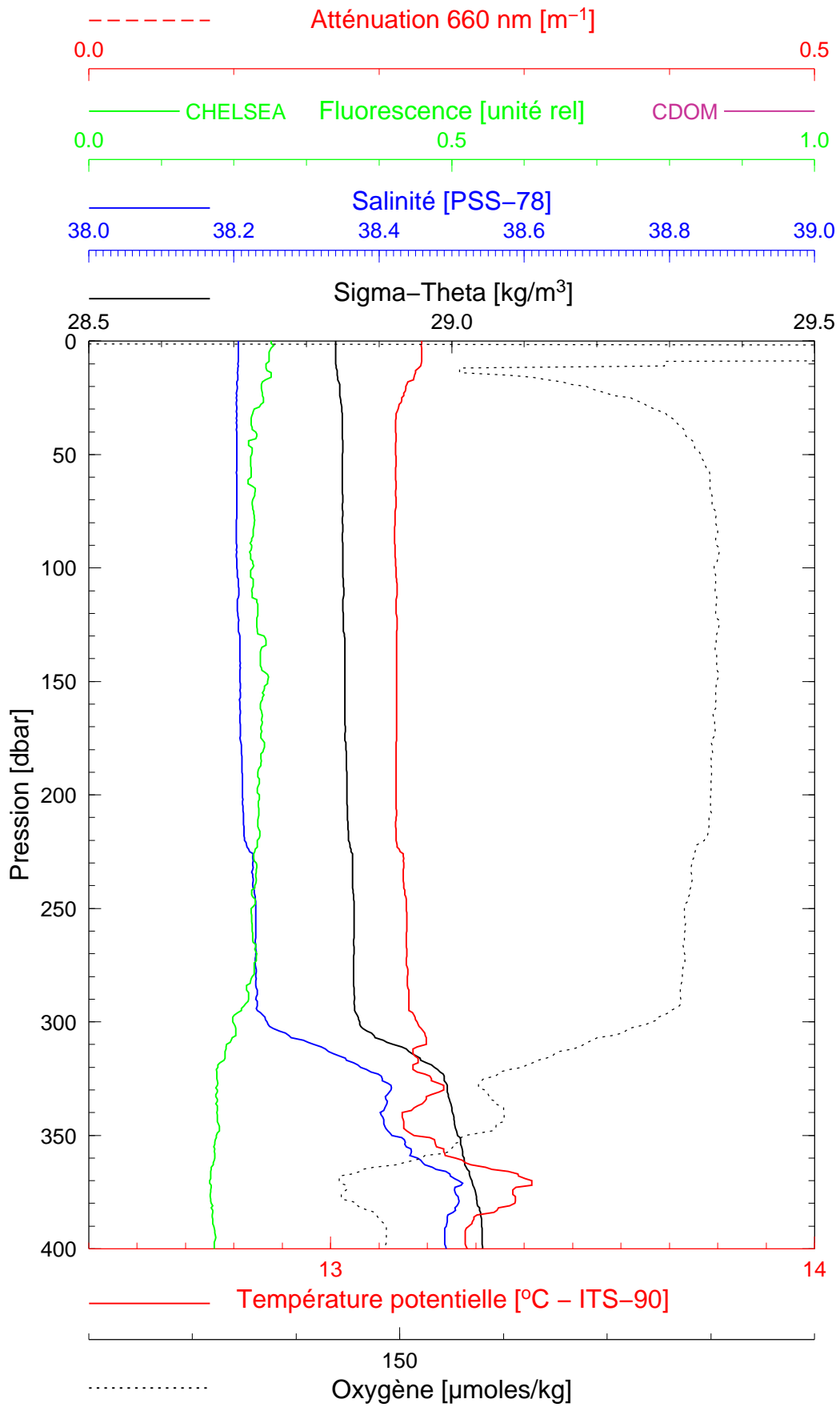
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BOUSOLE 120

16/02/2012

BOUS120216_06

BOUS008



Date 16/02/2012
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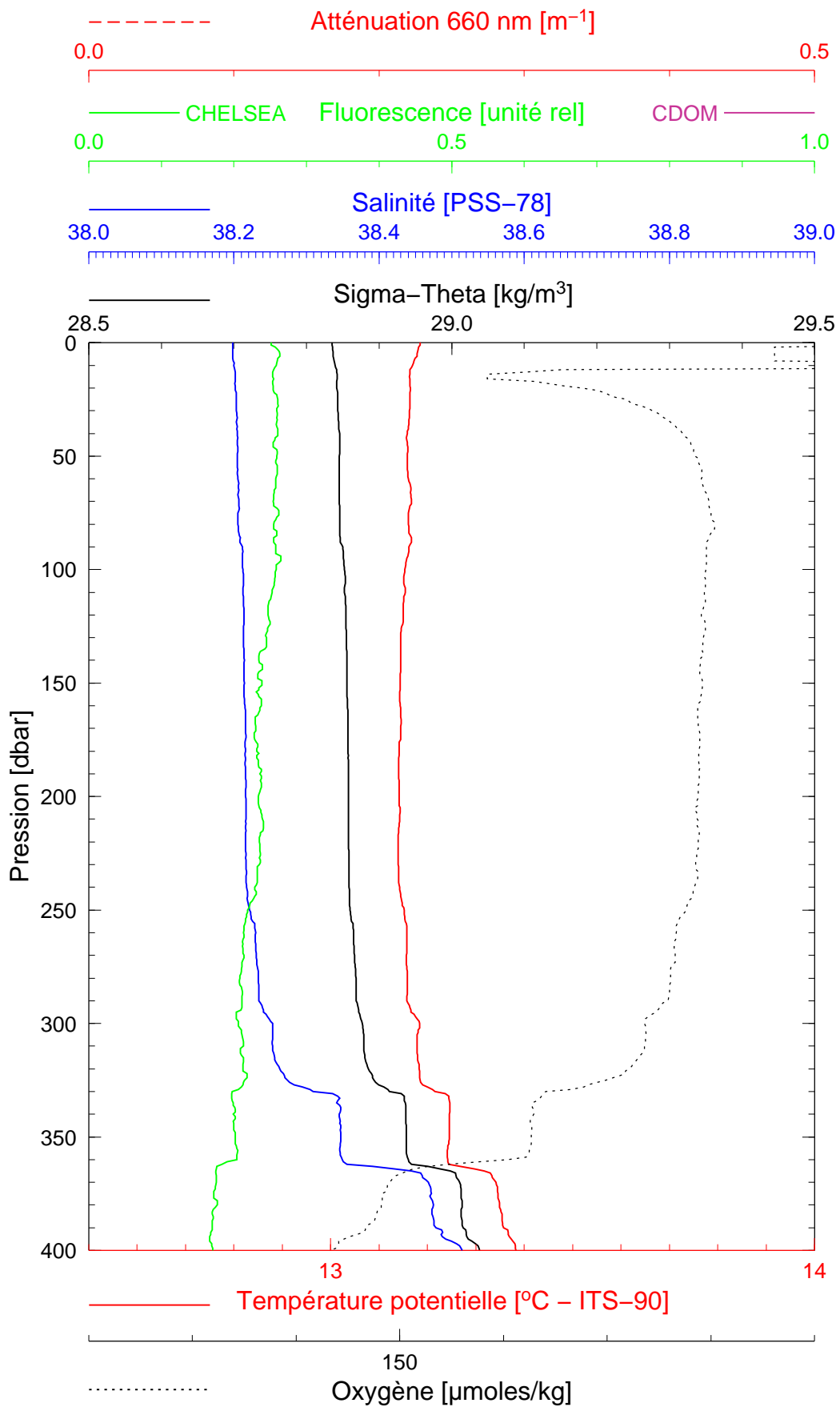
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BOUSSOLE 120

16/02/2012

BOUS120216_07

BOUS009



Date 16/02/2012
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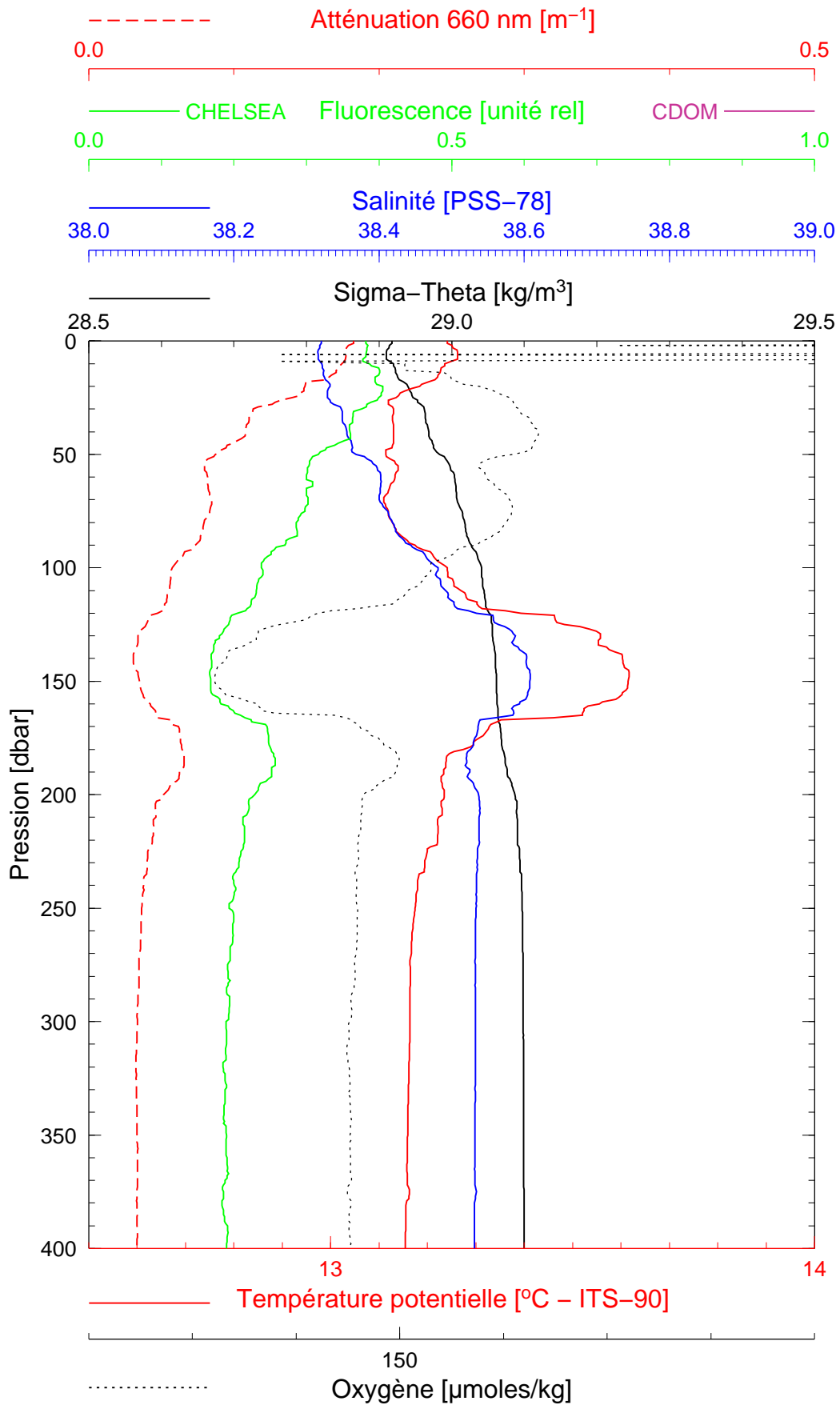
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BOUSSOLE 120

17/02/2012

BOUS120217_01

BOUS010



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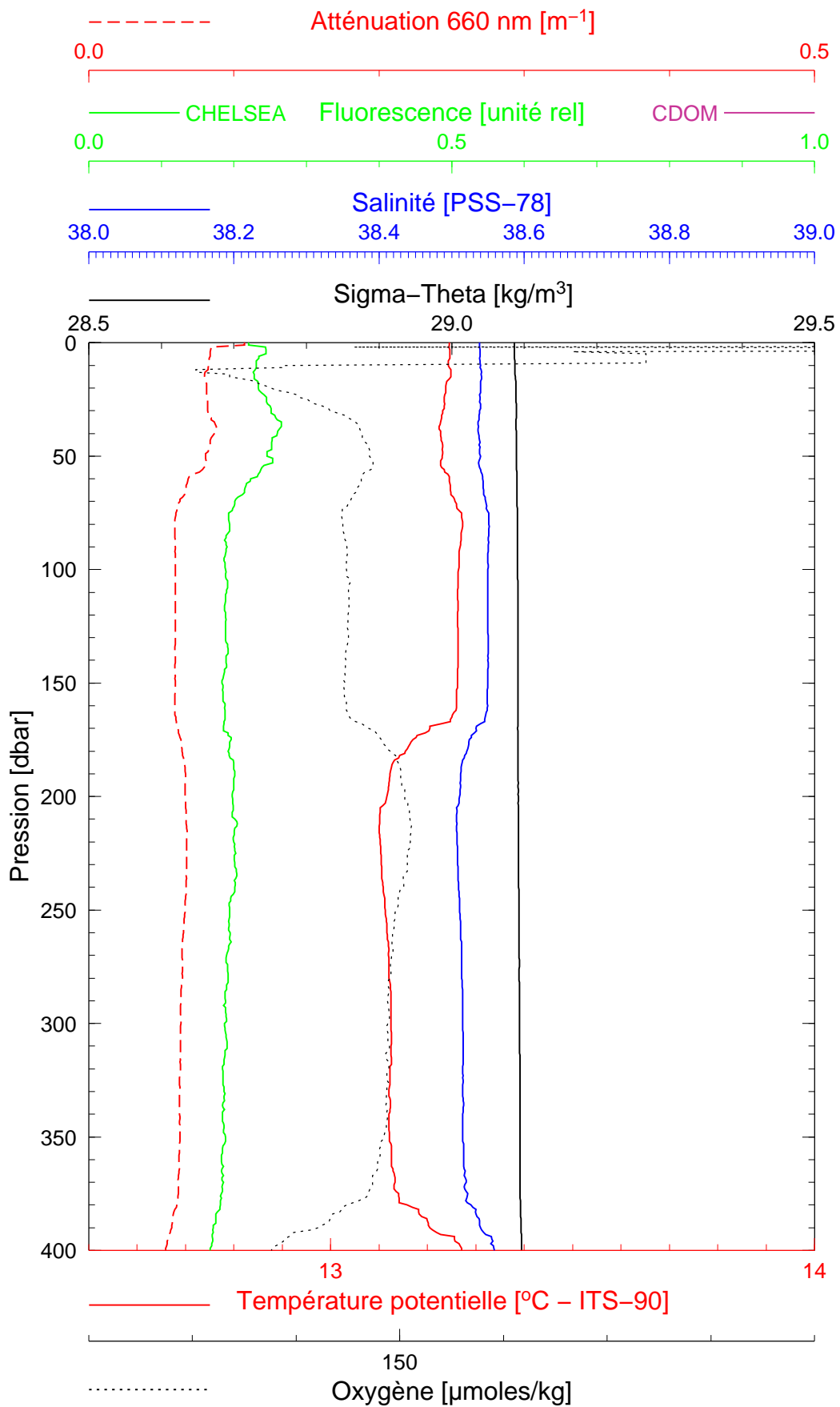
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BOUSSOLE 120

18/02/2012

BOUS120218_01

BOUS011



Date 18/02/2012
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