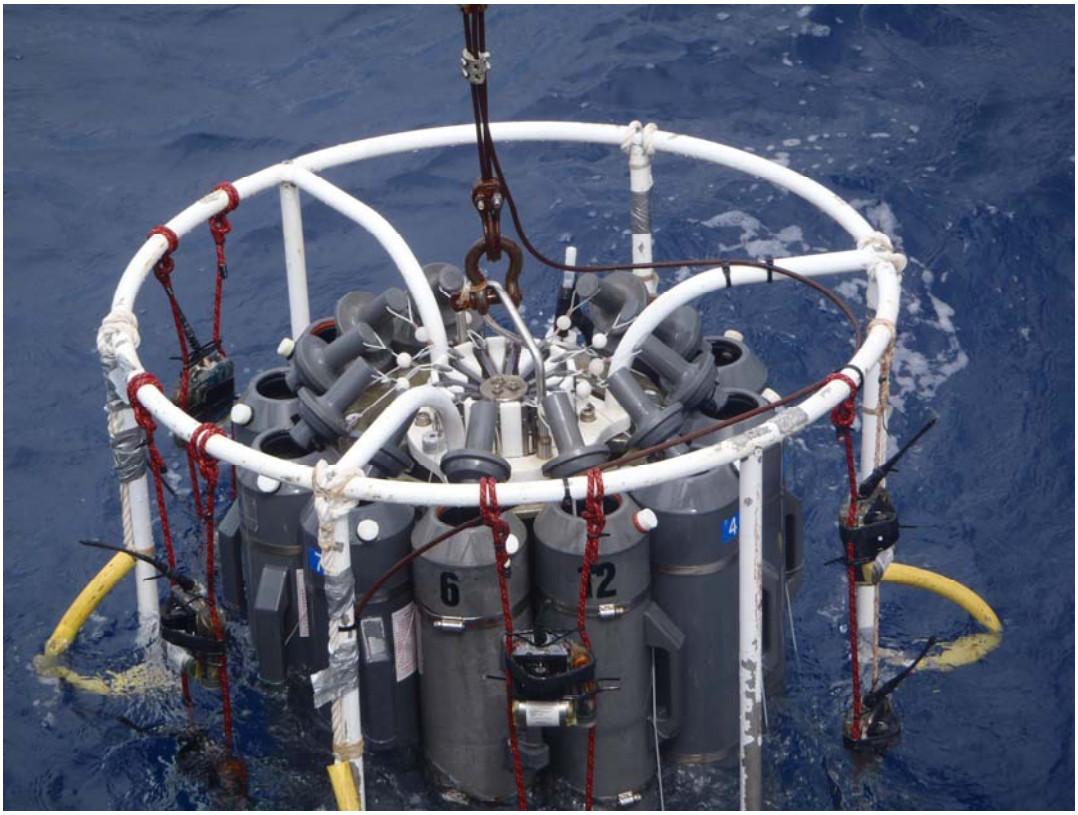
BOUSSOLE Monthly Cruise Report

Cruise 112
June 16 - 18, 2011

Duty Chief: Emilie Diamond (diamond@obs-vlfr.fr)
Vessel: R/V Téthys II
(Captain: Guy Le Falher)

Science Personnel: Emilie Diamond, Christophe Guinet, Yves Lamblard, Pascal Lapébie, David Luquet, Mustapha Ouhssain, Joséphine Ras, Vincent Taillandier, Vincenzo Vellucci and Emily Walker.

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



The rosette onto which miniaturized CTD-fluorometer beacons are installed in view of their intercalibration with the main BOUSSOLE CTD and fluorometer. These beacons are planned for deployment on elephant seals in the southern ocean (IPSOS-SEAL project).

BOUSSOLE project

ESA/ESRIN contract N° 13226/10/I-NB

June 30, 2011

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 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 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 in N_2 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 (TSM) weighting in the lab.

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 day of this transect should be similar for each cruise, if possible to minimise 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 surface, 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 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, Christophe Guinet (from "Centre d'Etudes Biologiques de Chizé") and Emily Walker (from "Institut National de la Recherche Agronomique") have tested several CTD-fluorometer beacons that are planned to be deployed on elephant seals. They were installed on the BOUSSOLE rosette for comparison with the main CTD and fluorometer. The last day, Joséphine Ras and Mustapha Ouhssain were on board to compare different types of filtration for HPLC analyses. During the diving day, the LISST-100X (a multi-parameter system for in-situ observations of particle size distribution) has been taken off.

Cruise Summary

The three cruise days were used for optical profiles and CTD casts with water sampling at the BOUSSOLE site. The first day was also used for diving operations and buoy data retrieval and the second day for completing the transect. Several CTD-fluorometer beacons planned for deployment on elephant seals were intercalibrated with the BOUSSOLE CTD and fluorometer during the two first days.

Thursday 16 June 2011

The first day, the sea was smooth with a moderate breeze, a blue sky and an excellent visibility. When arrived at the BOUSSOLE site, divers went at sea to take off the LISST-100X and to clean buoy instruments. A collar zinc anode above the buoy sphere was removed by divers because of the corrosion. It will have to be changed during the next cruise. They also put neoprene caps on the HS4 and on the transmissometers for acquiring dark measurements. In parallel to diving operations, solar panels, 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, 1 Secchi disk, 6 C-OPS profiles and 1 CTD cast with water sampling were performed. During this CTD cast, several miniaturized CTD-fluorometers were tested on the rosette.

Friday 17 June 2011

The second day, the sea was slightly roughened with a fresh breeze, a blue sky and a good visibility. When arrived at the BOUSSOLE site, 1 CTD cast with water sampling, 3 C-OPS profiles and 1 set of CIMEL measurements were performed. Then the CTD transect was performed. The miniaturized CTD-fluorometers were still installed on the rosette during this day.

Saturday 18 June 2011

The last day, the sea was also slightly roughened with a moderate breeze, a blue sky and a good visibility. Weather conditions were however not optimal for radiometry measurements (cirrus clouds and white caps). When on site, 2 CTD casts with water sampling, 6 C-OPS profiles and 1 Secchi disk were performed.

Cruise Report

Thursday 16 June 2011 (UTC)

People on board: Emilie Diamond, Christophe Guinet, Yves Lamblard, Pascal Lapébie, David Luquet, Vincent Taillandier, Vincenzo Vellucci and Emily Walker.

0530 Departure from the Nice harbour.
0850 Arrival at the BOUSSOLE site.
0855 Diving on the buoy for removing the LISST-100X and a corroded collar anode and for cleaning instruments. Dark HS4 and transmissometers measurements at 09:00, 09:15, 09:30 and 09:45.
0900 Cleaning of solar panels, sensors and ARGOS and CISCO connectors on the head of the buoy.
0915 Direct connection with the buoy and data retrieval
0925 Secchi disk 01 (21 m).
1030 C-OPS 01, 02, 03.
1125 C-OPS 04, 05, 06.
1205 CTD 01, 400 m with water sampling at 400, 200, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p, TSM and CDOM.
1300 Departure to Météo France weather buoy.
1320 Diving on the weather buoy.
1400 Departure to the Nice harbour.
1655 Arrival at the Nice harbour.
1830 End of TSM filtration.

Friday 17 June 2011 (UTC)

People on board: Emilie Diamond and Vincent Taillandier.

0505 Departure from the Nice harbour.
0825 Arrival at the BOUSSOLE site.
0830 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 and TSM.
0920 C-OPS 07, 08, 09.
1005 CIMEL 01.
1020 Departure to the first transect station.
1055 CTD 03, 400 m, station 01 (43°25'N 07°48'E).
1150 CTD 04, 400 m, station 02 (43°28'N 07°42'E).
1250 CTD 05, 400 m, station 03 (43°31'N 07°37'E).
1345 CTD 06, 400 m, station 04 (43°34'N 07°31'E).
1445 CTD 07, 400 m, station 05 (43°37'N 07°25'E).
1535 CTD 08, 400 m, station 06 (43°39'N 07°21'E).
1600 Departure to the Nice harbour.
1630 Arrival at the Nice harbour.

Saturday 18 June 2011 (UTC)

People on board: Emilie Diamond, Mustapha Ouhssain and Joséphine Ras.

0540 Departure from the Nice harbour.
0850 Arrival at the BOUSSOLE site.
0900 CTD 09, 400 m with water sampling at 40 and 5 m for HPLC and a_p tests.

0930 C-OPS 10, 11, 12.
1020 Secchi disk 02 (18 m).
1025 C-OPS 13, 14, 15.
1100 Lunch.
1150 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.
1230 Departure to the Nice harbour.
1540 Arrival at the Nice harbour.

Problems identified during the cruise

- During this cruise, data from the CDOM fluorometer were apparently corrupted in the upper 150m of down casts. The sensor will have to be check before the next cruise.
- A collar zinc anode was removed from the lower buoy superstructure (depth ~12m) by divers because it was nearly entirely consumed. It has been replaced on the 29th of June during an additional 1-day cruise on site (mainly organized for cleaning instrumentation).
- The first day, a cap was forgotten on the filtration system so the filtration took a long time before finishing.
- The last day, the sky conditions were not optimal for optical profiles (alternation between cirrus, cirrocumulus and cirrostratus).

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

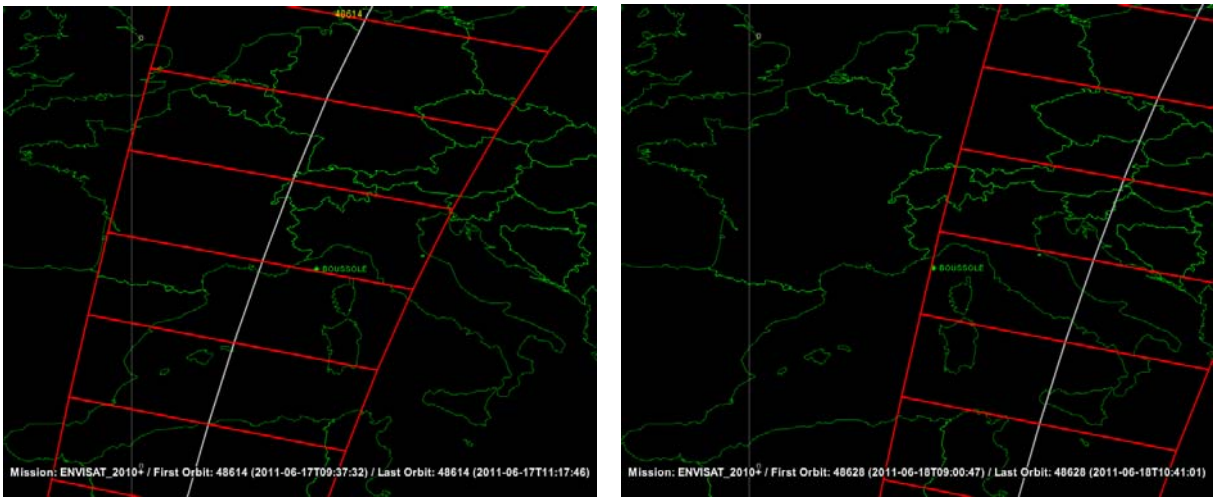
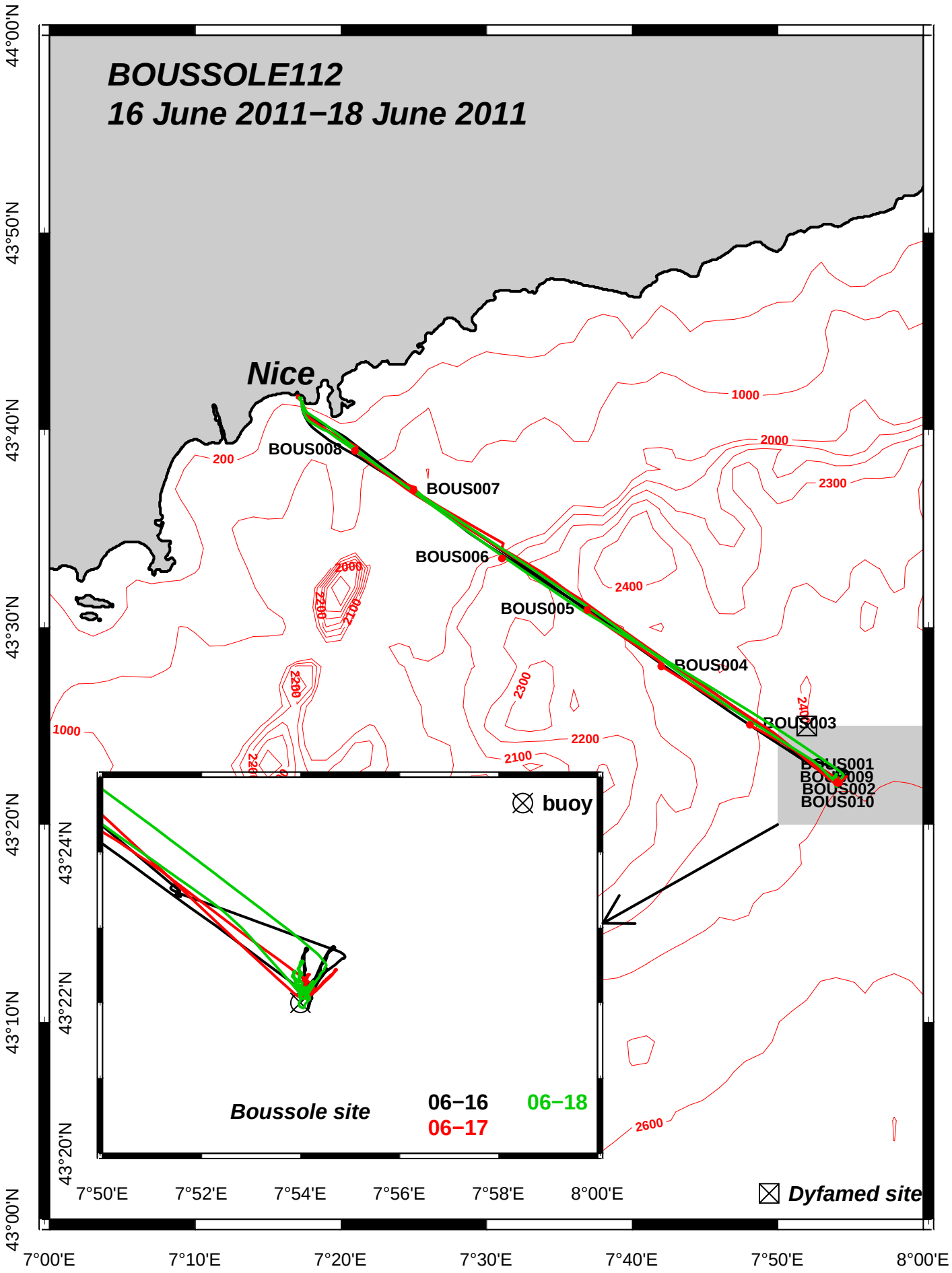


Figure 1. Calculated swath paths for MERIS (Esov NG software) above the BOUSSOLE site for the 17th and 18th of June 2011.

Appendices

Cruise Summary Table for Boussole 112

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
				Secchi01	09:25	4:00	21	43	22	7	54	blue		0					excellent			calm			no
	bou_c-ops_110616_1029_001_data.csv				10:32	1:18																			
		bou_c-ops_110616_1029_002_data.csv			10:47	4:37	90.5	43	22.172	7	54.010	blue	None	0	10	258	1017.7	82	excellent	21.8		calm	0.4		few
		bou_c-ops_110616_1029_003_data.csv			10:58	3:18	66.1	43	22.334	7	54.036	blue	None	0	10	258	1017.7	82	excellent	21.8		calm	0.4		few
16/06/11		bou_c-ops_110616_1029_005_data.csv			11:11	4:05	77.5	43	22.585	7	54.031	blue	None	0	10	258	1017.7	82	excellent	21.8		calm	0.4		few
		bou_c-ops_110616_1029_006_data.csv			11:32	4:08	80.5	43	22.252	7	54.213	blue	None	0	9	250	1017.6	80	excellent	22.3		calm	0.6		yes
		bou_c-ops_110616_1029_007_data.csv			11:46	3:00	56.7	43	22.466	7	54.406	blue	None	0	9	250	1017.6	80	excellent	22.3		calm	0.6		yes
		bou_c-ops_110616_1029_008_data.csv			11:54	3:10	60.9	43	22.644	7	54.511	blue	None	0	9	250	1017.6	80	excellent	22.3		calm	0.6		yes
	bou_c-ops_110616_1029_009_data.csv				12:12	1:40																			
			CTDBOUS001	HPLC, Ap, TSM & CDOM	12:17	37:00	400	43	22.160	7	54.104	blue		1	17	333	1017.4	79		22.0	22.1	calm			yes
			CTDBOUS002	HPLC, Ap & TSM	08:35	34:00	400	43	22.125	7	54.215	blue		3	14	262	1016.7	86		21.2	21.9	moved			yes
	bou_c-ops_110617_0849_001_data.csv				08:51	1:10																			
		bou_c-ops_110617_0849_002_data.csv			09:21	3:42	70.4	43	22.107	7	54.010	blue	As&Cu	3	14	261	1017.0	86	good	21.2		moved	1.0		yes
		bou_c-ops_110617_0849_003_data.csv			09:31	4:10	80.2	43	22.182	7	54.014	blue	As&Cu	3	14	261	1017.0	86	good	21.2		moved	1.0		yes
		bou_c-ops_110617_0849_004_data.csv			09:43	3:26	65.5	43	22.286	7	54.050	blue	As&Cu	3	14	261	1017.0	86	good	21.2		moved	1.0		yes
	bou_c-ops_110617_0849_005_data.csv				09:58	1:13																			
17/06/11				CIMEL01	10:02	8:00		43	22.096	7	54.051	blue		2			1017.2		good						
			CTDBOUS003		10:58	24:00	400	43	25.059	7	48.096	overcast		5	15	261	1016.8	83		21.3	22.0	moved			yes
			CTDBOUS004		11:56	23:00	400	43	28.021	7	42.012	overcast		6	18	259	1016.8	82		21.6	21.7	moved			yes
			CTDBOUS005		12:53	21:00	400	43	30.879	7	36.930	overcast		8	17	307	1016.6	79		21.7	21.9	moved			yes
			CTDBOUS006		13:48	25:00	400	43	33.988	7	31.072	overcast		8	19	298	1016.2	78		21.6	21.8	moved			yes
			CTDBOUS007		14:45	25:00	400	43	36.945	7	25.004	overcast		8	13	277	1016.0	79		21.8	21.8	moved			yes
			CTDBOUS008		15:36	20:00	400	43	38.946	7	20.978	overcast		7	10	249	1015.4	80		21.6	22.0	moved			yes
			CTDBOUS007	HPLC & Ap	09:00	27:00	400	43	22.14	7	54.059	overcast		6	6	108	1011.6	80		22.5	22.3	calm			few
	bou_c-ops_110618_0929_001_data.csv				09:31	1:12																			
		bou_c-ops_110618_0929_002_data.csv			09:46	2:13	41.3	43	22.195	7	53.980	overcast	Ci&Cc&Ac	5	12	276	1011.3	81	good	22.2		calm	0.5		few
		bou_c-ops_110618_0929_003_data.csv			09:53	3:43	77.2	43	22.251	7	53.890	overcast	Ci&Cc&Ac	5	12	276	1011.3	81	good	22.2		calm	0.5		few
		bou_c-ops_110618_0929_004_data.csv			10:02	3:21	65.5	43	22.341	7	53.839	overcast	Ci&Cc&Ac	5	12	276	1011.3	81	good	22.2		calm	0.5		few
18/06/11				Secchi02	10:20	4:00	18	43	22	7	54	overcast		5					good			calm			yes
		bou_c-ops_110618_0929_005_data.csv			10:27	3:27	69.6	43	22.226	7	54.006	blue	Ci	4	13	254	1011.3	83	good	22.1		calm	0.7		yes
		bou_c-ops_110618_0929_006_data.csv			10:35	3:30	67.4	43	22.309	7	53.982	blue	Ci	4	13	254	1011.3	83	good	22.1		calm	0.7		yes
		bou_c-ops_110618_0929_007_data.csv			10:45	3:13	60.7	43	22.433	7	53.968	blue	Ci	4	13	254	1011.3	83	good	22.1		calm	0.7		yes
	bou_c-ops_110618_0929_008_data.csv				10:59	1:14																			
			CTDBOUS010	HPLC, Ap & TSM	11:51	32:00	400	43	22.115	7	54.123	overcast		6	13	263	1010.1	86		22.2	22.3	calm			yes


BOUSSOLE112
16 June 2011−18 June 2011
Nice
BOUS008
BOUS007
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BOUS004
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200
1000
2000
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2100
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Boussole site
06−16
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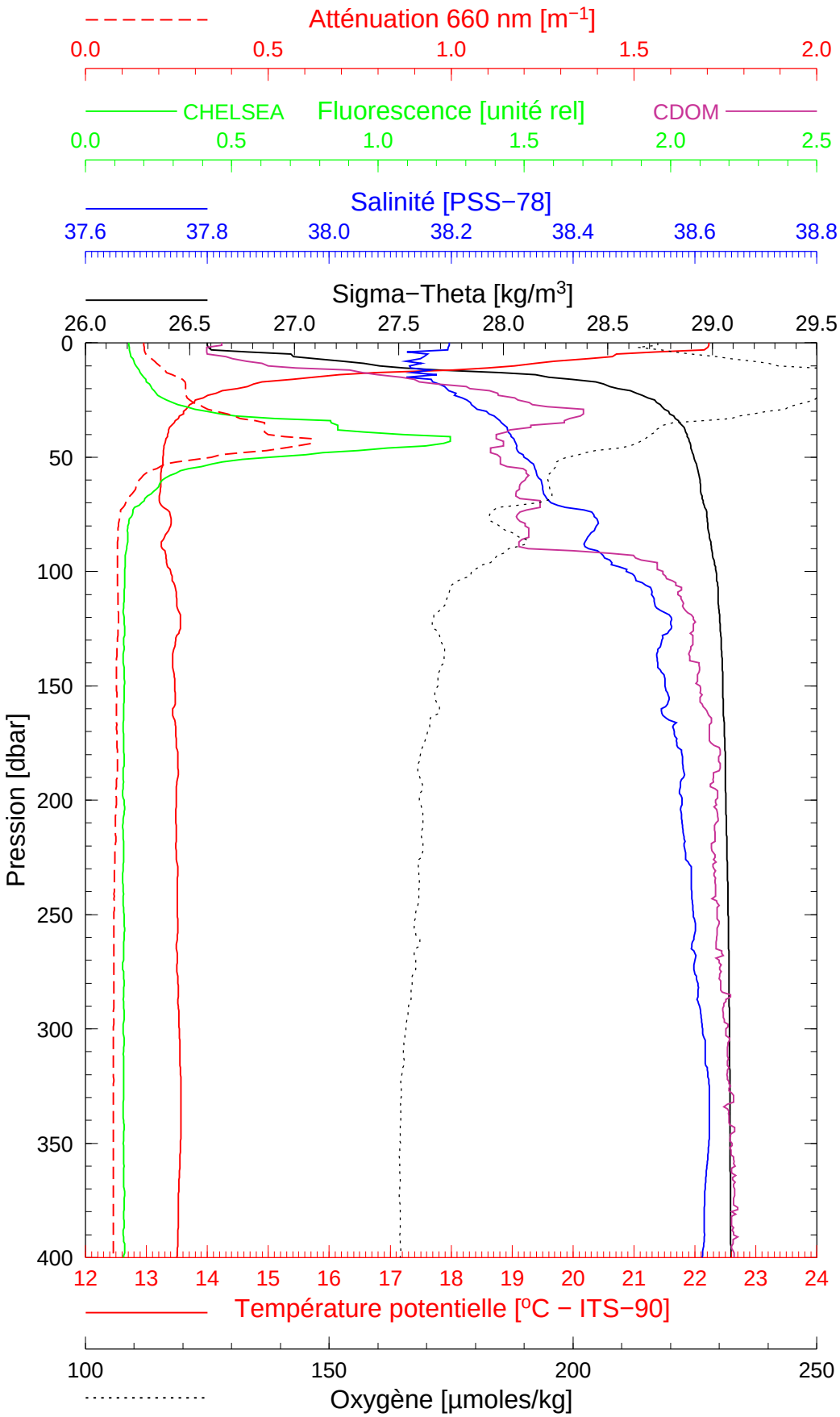
Dyfamed site
44°00'N
43°50'N
43°40'N
43°30'N
43°20'N
43°10'N
43°00'N
7°00'E
7°10'E
7°20'E
7°30'E
7°40'E
7°50'E
8°00'E
43°24'N
43°22'N
43°20'N
7°50'E
7°52'E
7°54'E
7°56'E
7°58'E
8°00'E

BOUSSOLE 112 **16/06/2011** **BOUS110616_01**

BOUS001



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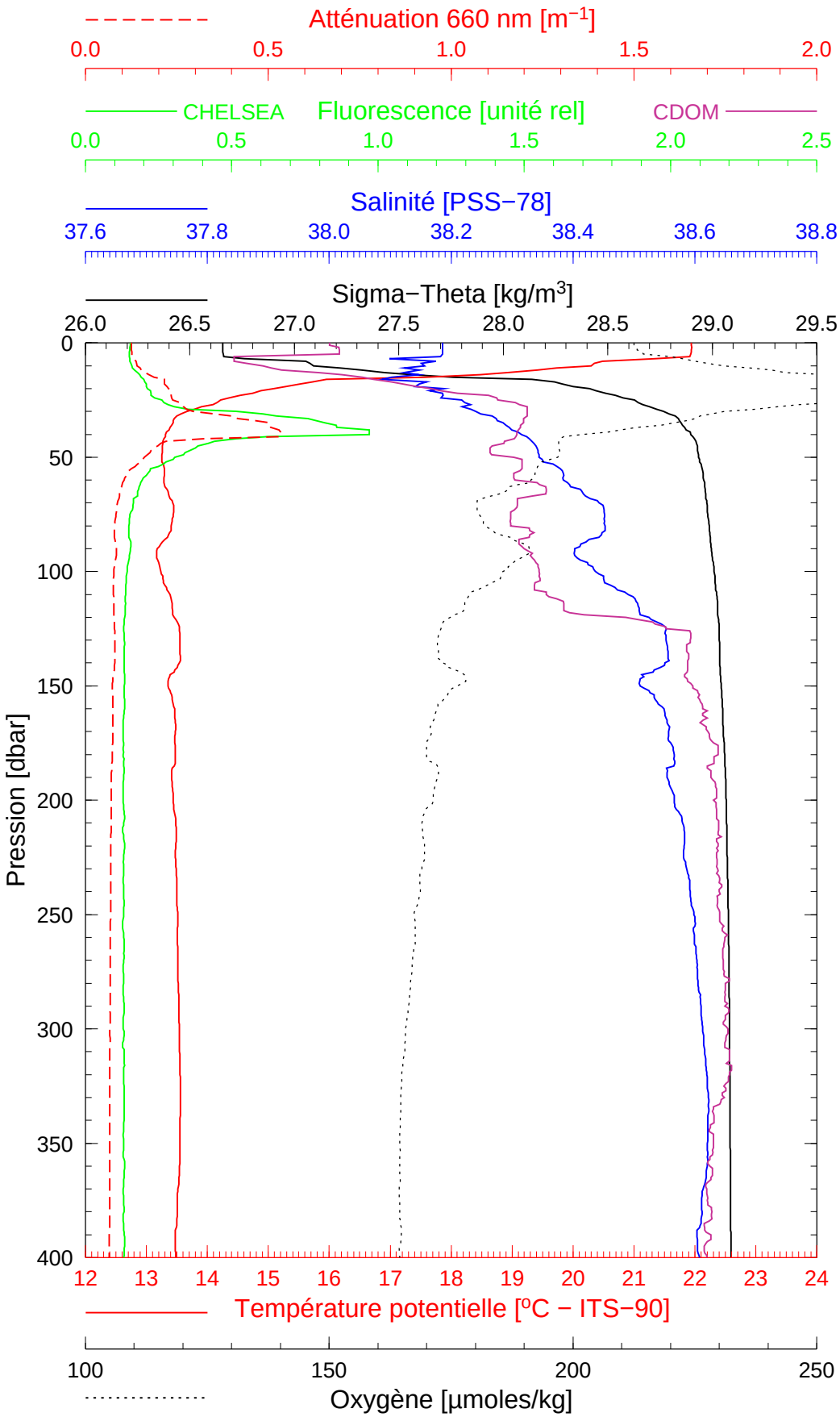
BOUS002



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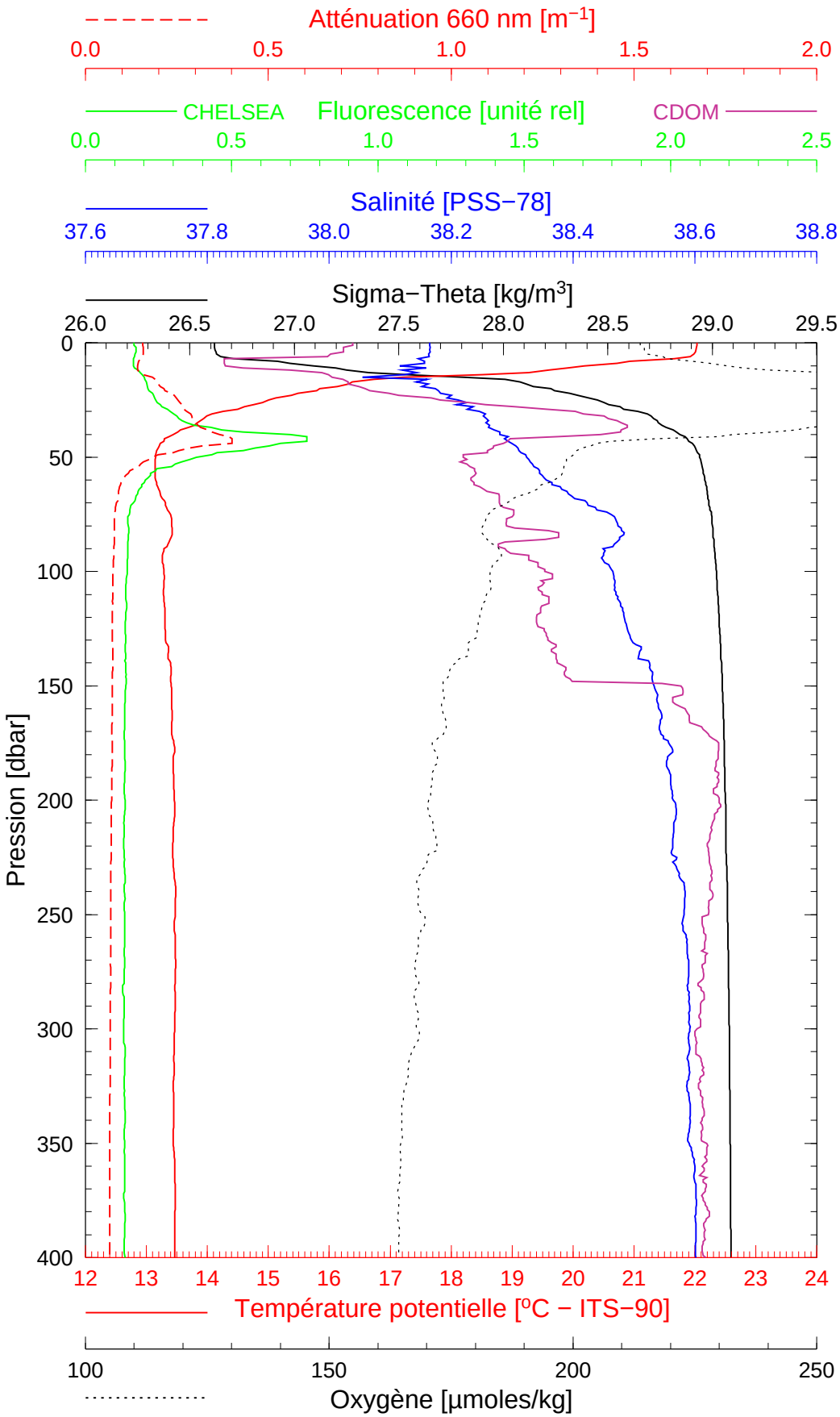

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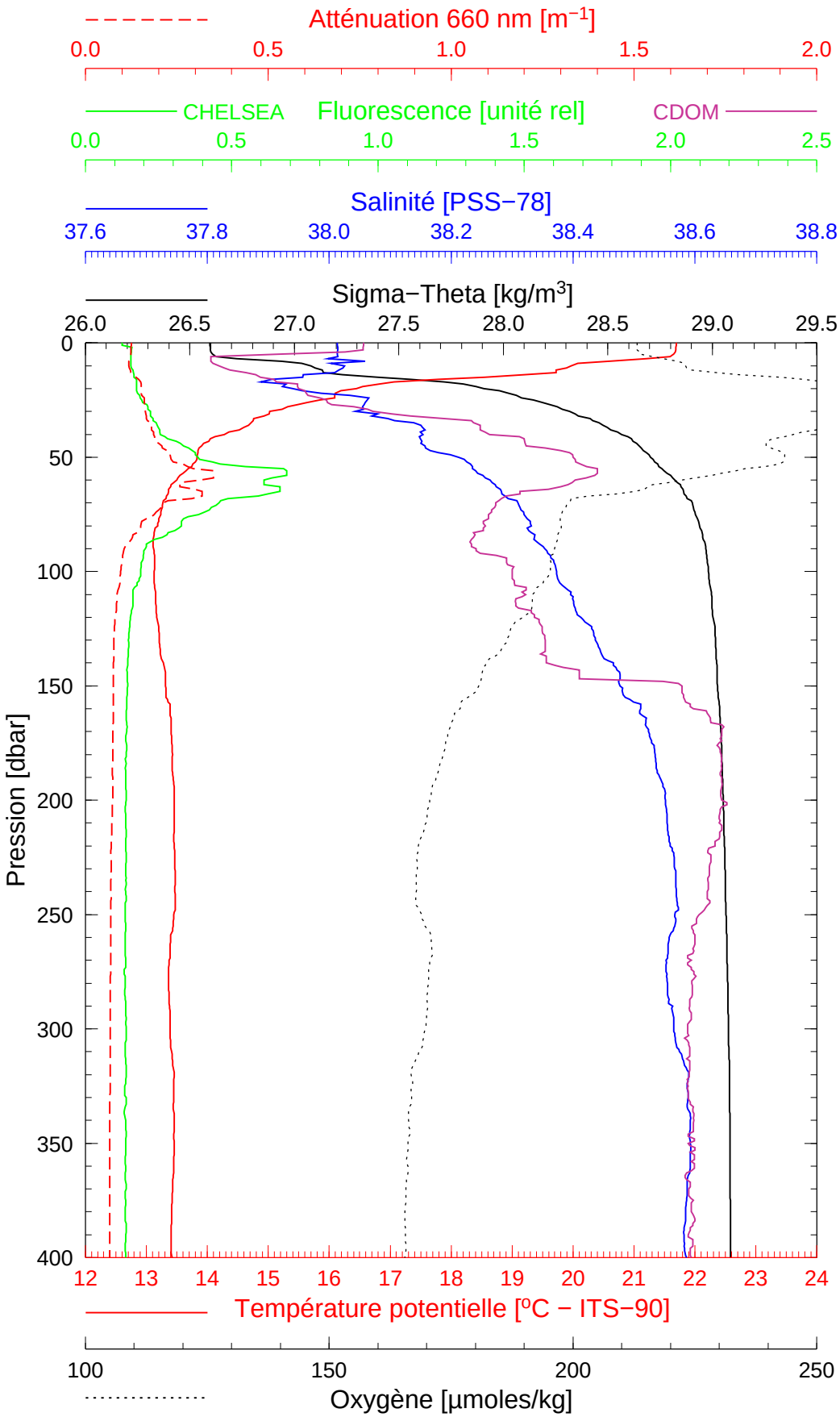

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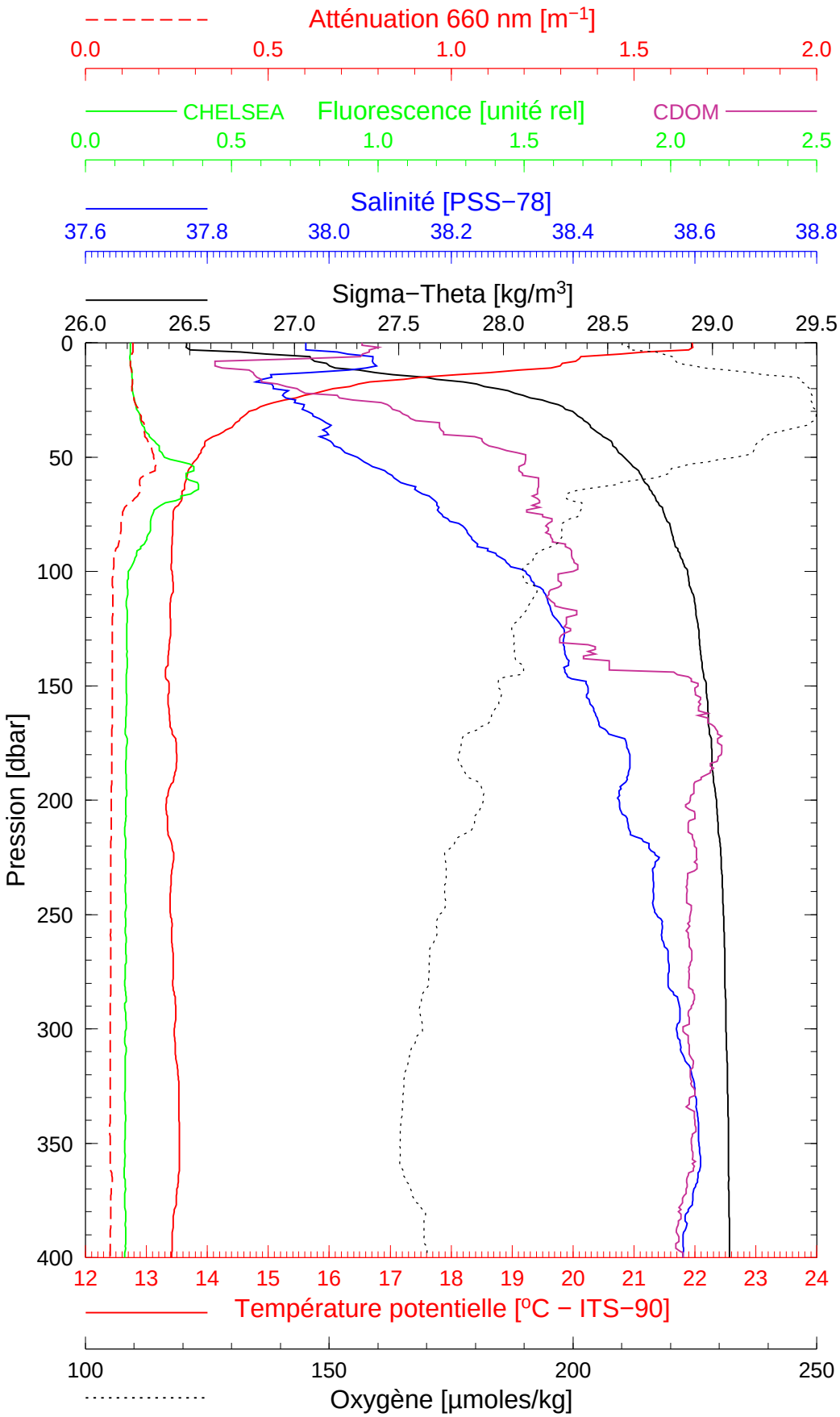
BOUS005



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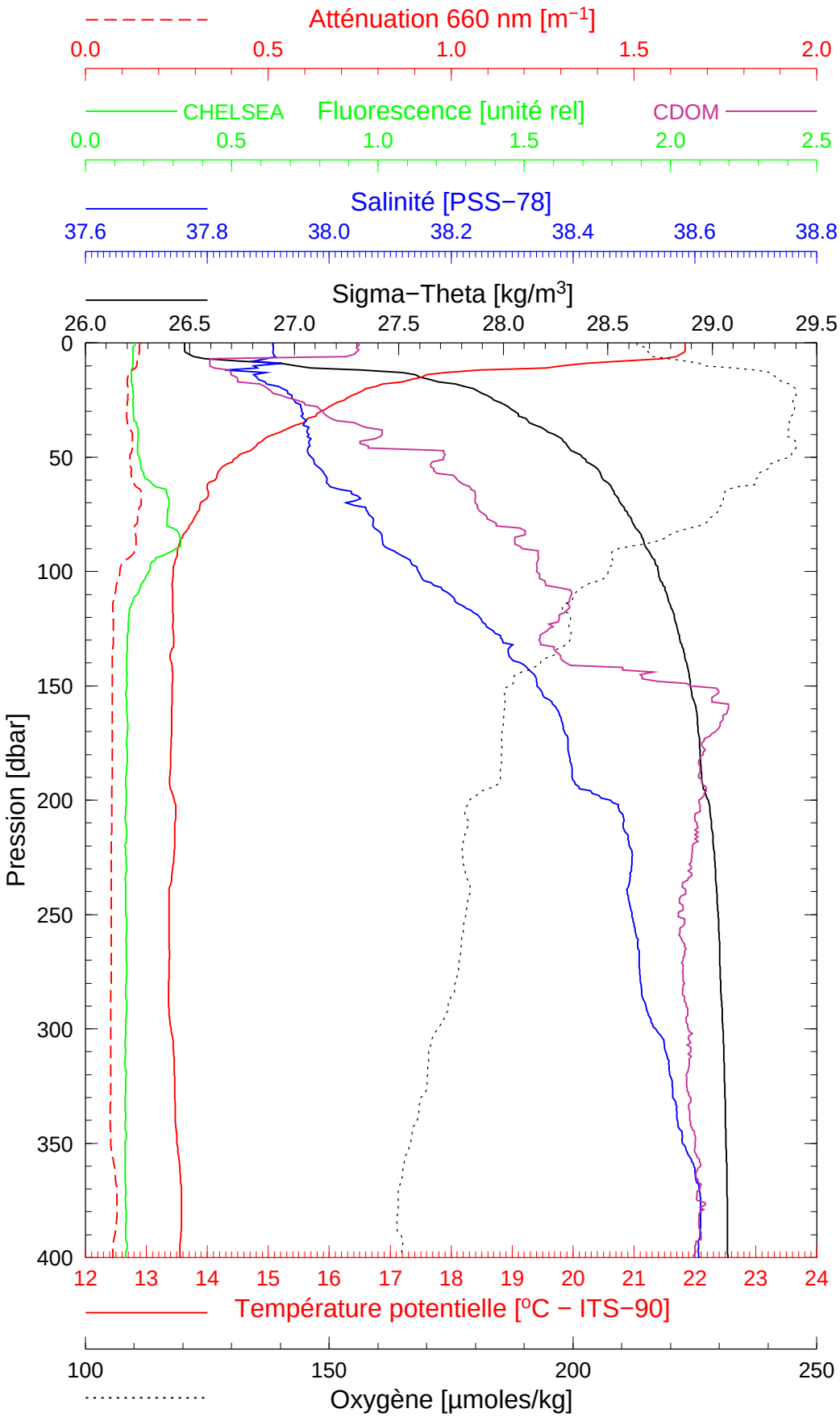
BOUSSOLE 112 **17/06/2011** **BOUS110617_05**

BOUS006



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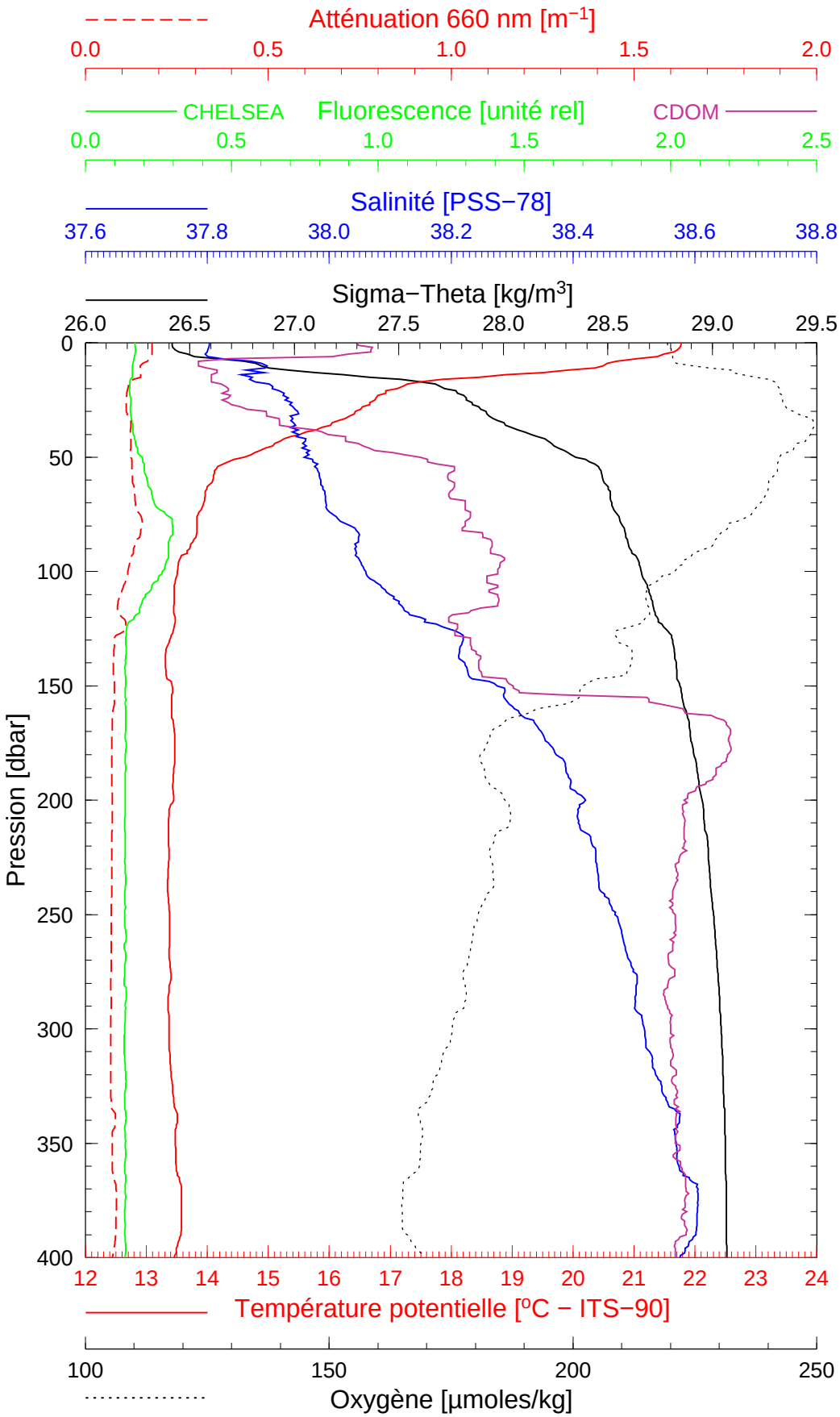

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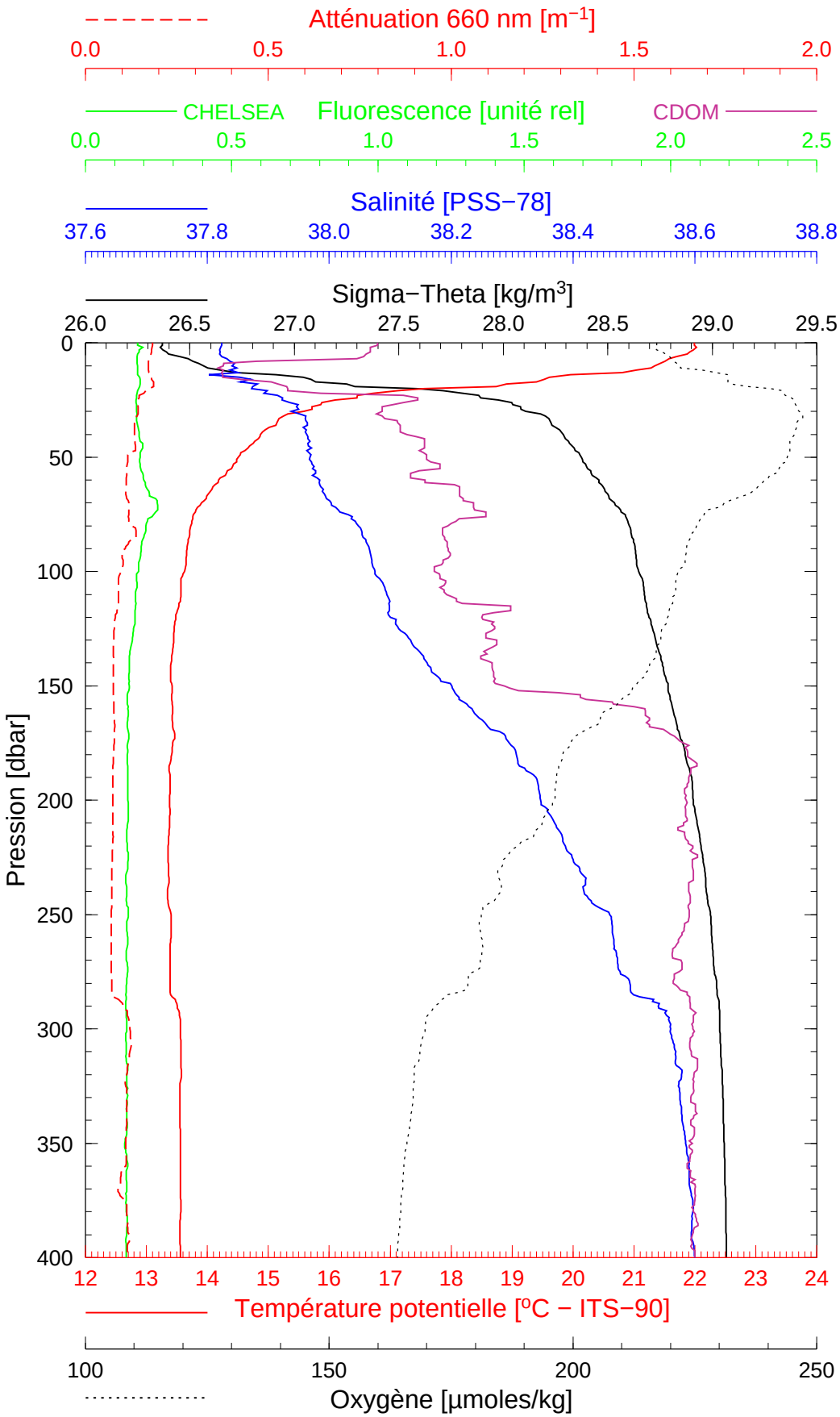

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BOUSSOLE 112 **18/06/2011** **BOUS110618_01**

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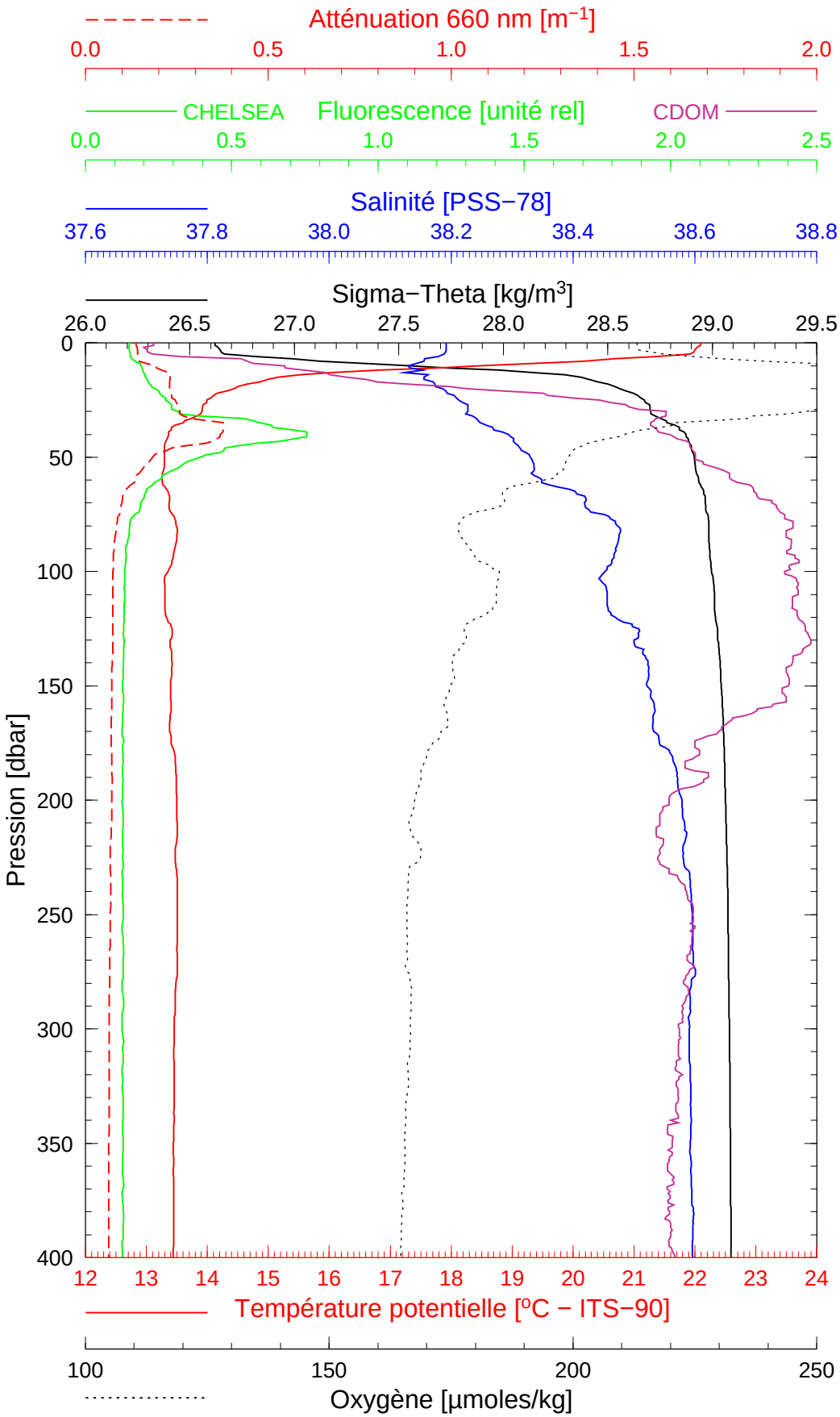

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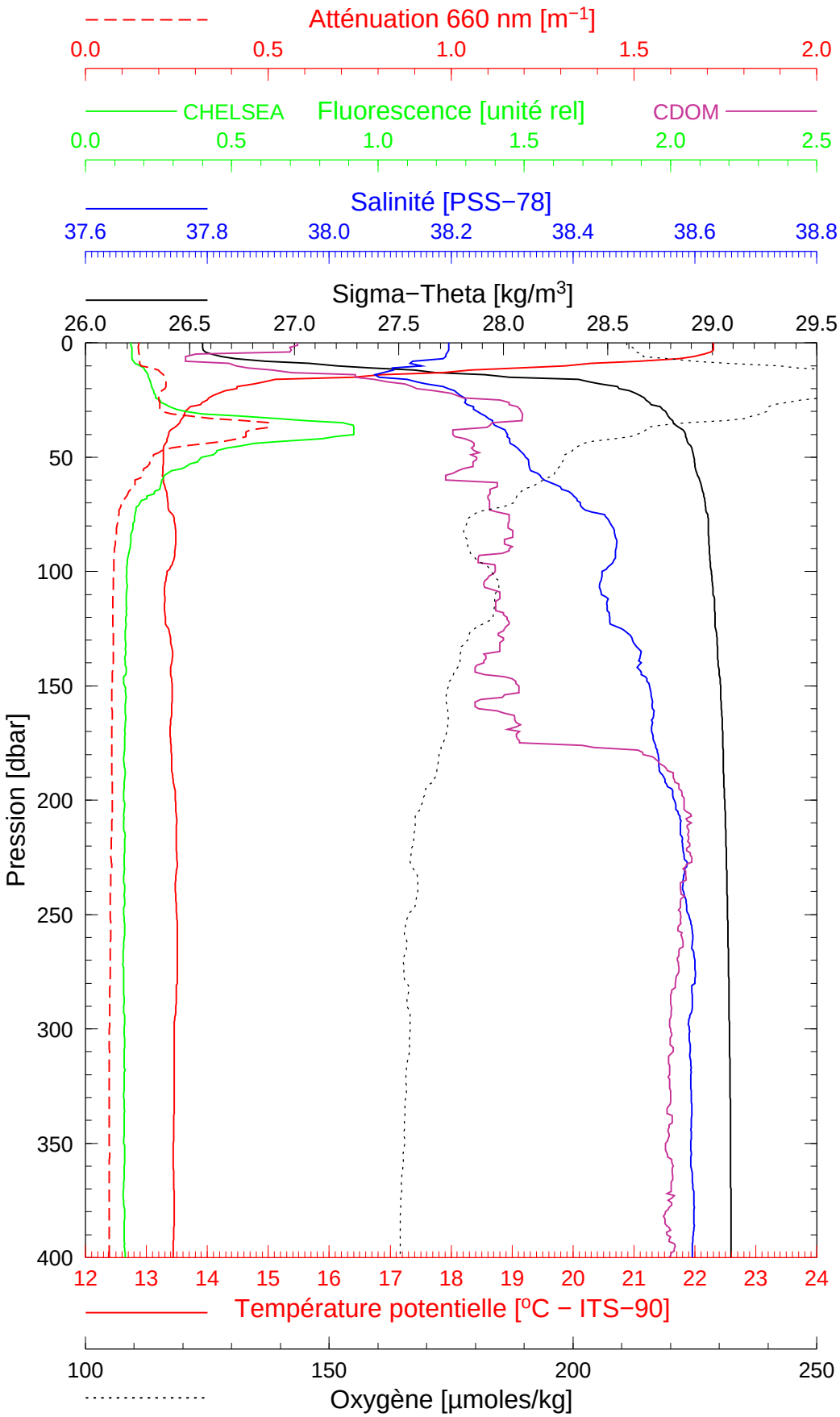

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