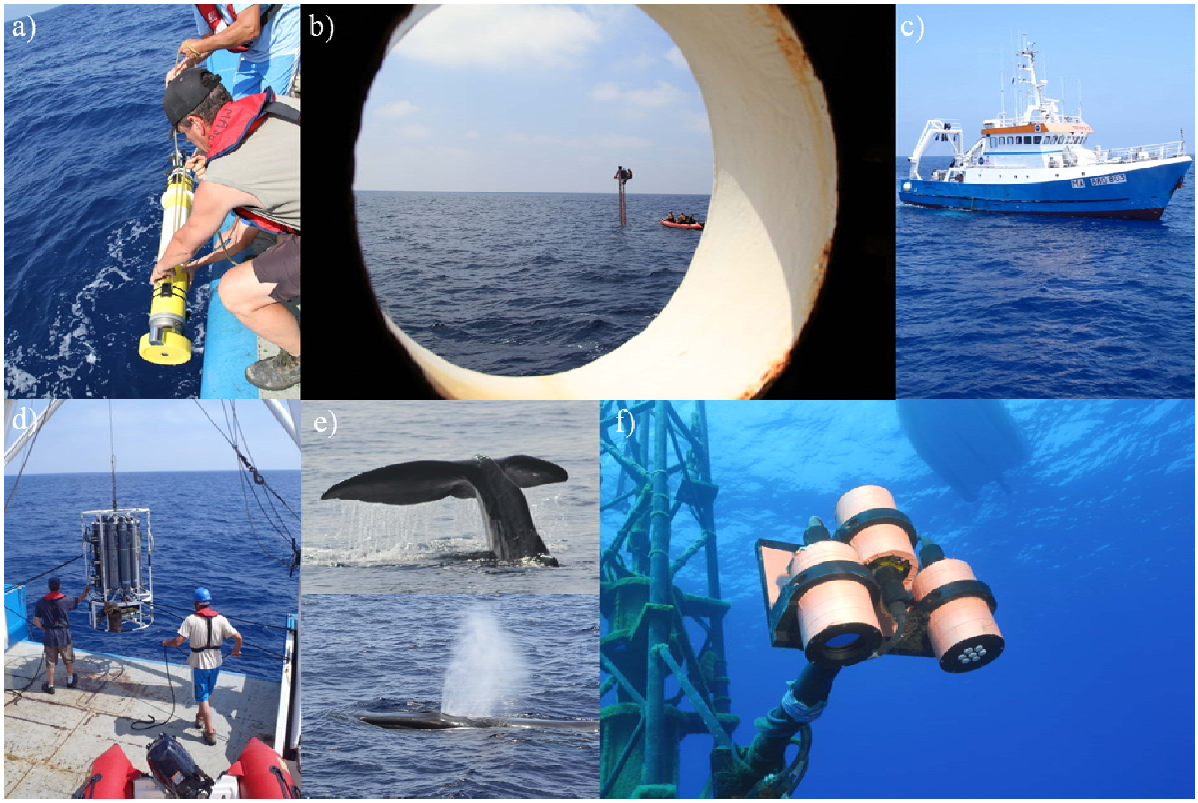
BOUSSOLE Monthly Cruise Report

Cruise 113
July 11 - 13, 2011

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

Science Personnel: Emilie Diamond, Gregory Gerbi, Yves Lamblard, David Luquet, Grigor Obolensky, Christophe Penkerc'h, Eric Pruvost, Fang Shen and Aila Stöckmann.

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



a) The deployment of the bio-optical profiling float. b) The BOUSSOLE buoy direct data retrieval in parallel to diving operations. c) R/V *Téthys II*. d) The deployment of the CTD-rosette. e) Several whales seen during this cruise: here the tail of a sperm whale and the blow of a fin whale. f) The BOUSSOLE buoy radiometers at 9 m.

BOUSSOLE project

ESA/ESRIN contract N° 13226/10/I-NB

July 22, 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

The ARGOS beacon on the head of the buoy stopped to transmit data since the 30th of June so its connector has been cleaned. The second cruise day, Gregory Gerbi (postdoctoral researcher at the University of Maine, USA) has deployed two bio-optical profiling floats in the vicinity of the BOUSSOLE buoy.

Cruise Summary

The two first 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 deploying two bio-optical profiling floats and for completing the transect. The last day was only used for a CTD cast with water sampling at the BOUSSOLE site.

Monday 11 July 2011

The first day, the sea was smooth with a light breeze, a blue sky and a good visibility. When arrived at the BOUSSOLE site, divers went at sea to clean buoy instruments. 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 CTD cast with water sampling and 4 C-OPS profiles were performed.

Tuesday 12 July 2011

The second day, the sea was smooth with a gentle breeze. The sky was hazy but blue around noon and there was a good visibility. When arrived at the BOUSSOLE site, 2 bio-optical profiling floats were deployed by Gregory

Gerbi; 1 CTD cast with water sampling, 3 C-OPS profiles and 1 set of CIMEL measurements were performed. Clouds prevented more CIMEL measurements. Then the CTD transect was performed.

Wednesday 13 July 2011

During the night, the ARGOS beacon on the head of the buoy seemed to stop transmitting data so when on site, the ARGOS connector was cleaned in despite of the sea state. The weather conditions were not good enough for C-OPS profiles but allowed to perform 1 Secchi disk and 1 CTD cast with water sampling, though not being optimal (H1/3 > 1 m, wind speed > 20 kt, grey sky and whitecaps).

Cruise Report

Monday 11 July 2011 (UTC)

People on board: Emilie Diamond, Yves Lamblard, David Luquet, Grigor Obolensky, Eric Pruvost and Fang Shen.

0535 Departure from the Nice harbour.
0845 Arrival at the BOUSSOLE site.
0900 Dinghy at sea.
0920 Diving on the buoy for cleaning instruments. Dark HS4 and transmissometers measurements at 09:30, 09:45 and 10:00.
0930 Cleaning of solar panels, sensors and ARGOS and CISCO connectors on the head of the buoy.
0940 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.
1015 Direct connection with the buoy and data retrieval
1020 Filtrations.
1100 Lunch.
1200 C-OPS 01, 02, 03, 04.
1315 CTD 02, 400 m with water sampling at 400, 200, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for CDOM.
1355 Departure to the Nice harbour.
1700 Arrival at the Nice harbour.

Tuesday 12 July 2011 (UTC)

People on board: Emilie Diamond, Gregory Gerbi, Grigor Obolensky, Christophe Penkerc'h and Aila Stöckmann.

0525 Departure from the Nice harbour.
0845 Arrival at the BOUSSOLE site.
0850 Deployment of the first bio-optical profiling float of Gregory Gerbi.
0855 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.
0930 Deployment of the second bio-optical profiling float of Gregory Gerbi.
0945 C-OPS 05, 06, 07.
1030 CIMEL 01.
1050 Waiting for floats news.
1100 Lunch.
1150 Departure to the first transect station.
1220 CTD 04, 400 m, station 01 (43°25'N 07°48'E).
1320 CTD 05, 400 m, station 02 (43°28'N 07°42'E).
1420 CTD 06, 400 m, station 03 (43°31'N 07°37'E).
1520 CTD 07, 400 m, station 04 (43°34'N 07°31'E).
1615 CTD 08, 400 m, station 05 (43°37'N 07°25'E).
1700 CTD 09, 400 m, station 06 (43°39'N 07°21'E).
1735 Departure to the Nice harbour.
1755 Arrival at the Nice harbour.

Wednesday 13 July 2011 (UTC)

People on board: Emilie Diamond and Grigor Obolensky.

0500 Departure from the Nice harbour.
0820 Arrival at the BOUSSOLE site.
0825 Dinghy at sea for climbing on the buoy. ARGOS connection cleaned.
0840 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.
0920 Secchi disk 01 (20 m).
0925 Departure to the Nice harbour.
1235 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 problem was solved after changing the tube above the sensor (just before the Station 02 and the CTD 05).
- C-OPS data were recorded in a ".mdb" data base format instead of a '.csv' ASCII format.
- The last day, the weather conditions were not optimal for radiometry measurements (H1/3 > 1 m, wind speed > 20 kt, grey sky and white caps).

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

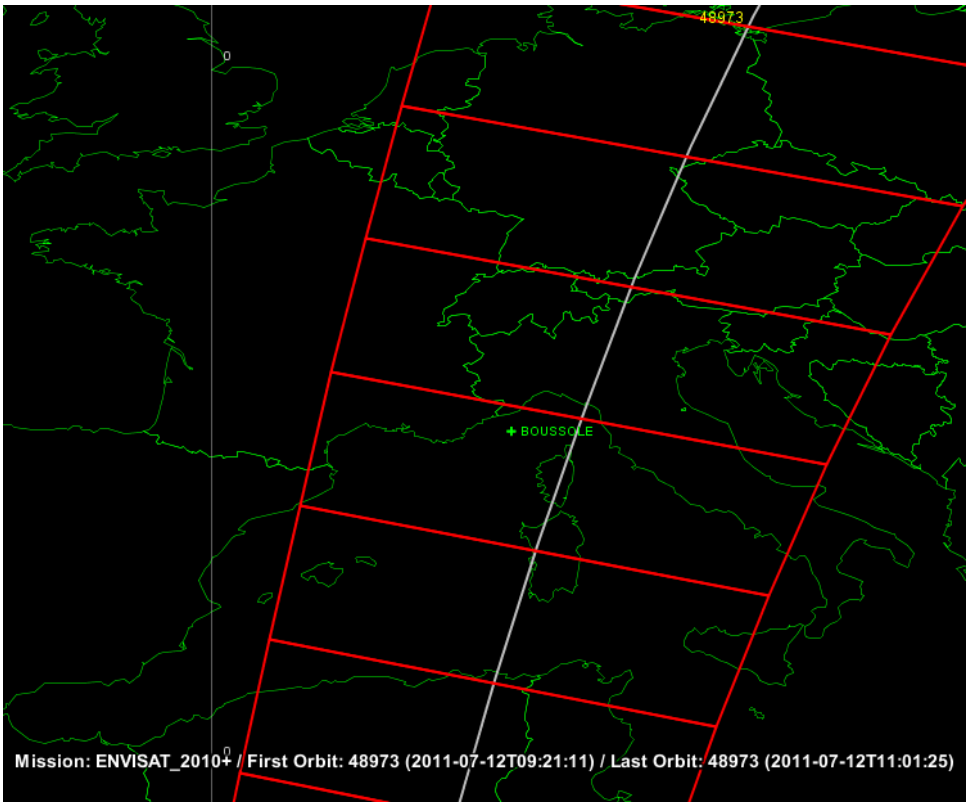
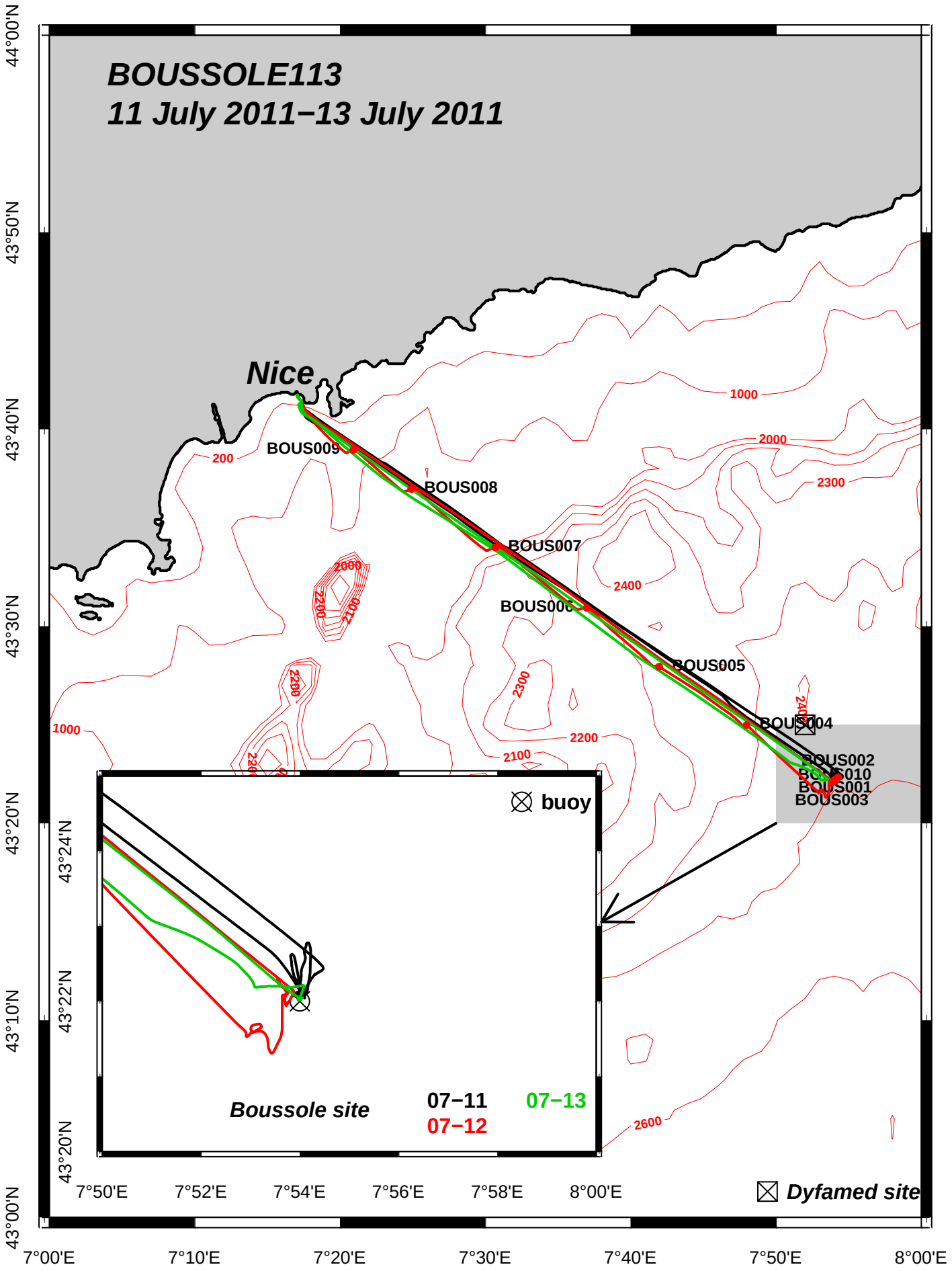


Figure 1. Calculated swath path for MERIS (Esov NG software) above the BOUSSOLE site for the 12th of July 2011.

Appendices

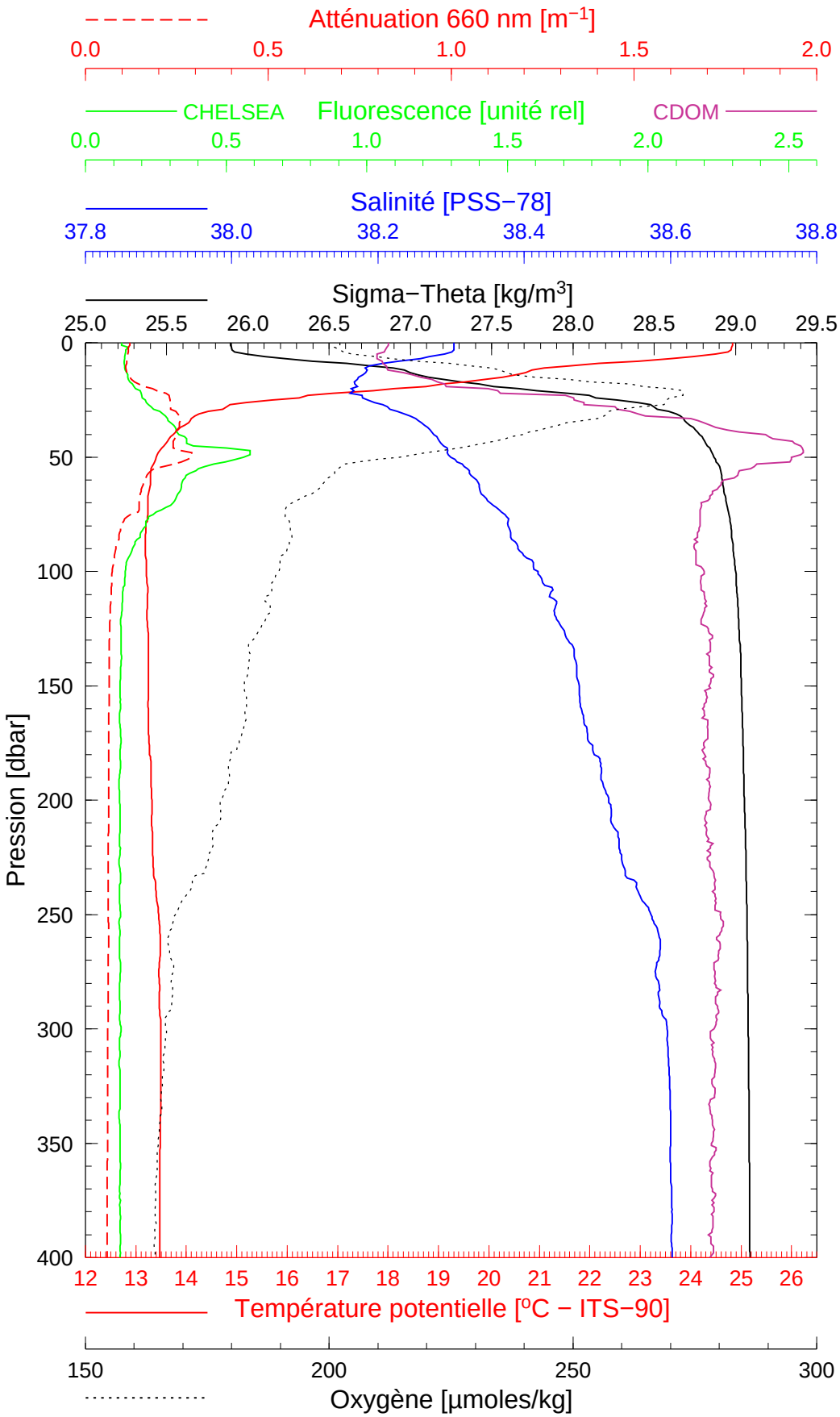
Cruise Summary Table for Boussole 113

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
			CTDBOUS001	HPLC, Ap & TSM	09:40	32:00	400	43	22.182	7	54.079	blue		2	8	252	1015	81		24.8	25.1	calm			no
	bou_c-ops_110711_1207_001				12:09	1:20																		
		bou_c-ops_110711_1207_002			12:17	5:00	100	43	22.252	7	54.015	blue	Ci&Cu	3	7	68	1014.8	82	good	24.9		calm	0.5		no
11/07/11		bou_c-ops_110711_1207_004			12:36	3:00	58	43	22.550	7	54.108	blue	Ci&Cu	3	7	68	1014.8	82	good	24.9		calm	0.5		no
		bou_c-ops_110711_1207_005			12:44	3:00	50	43	22.702	7	54.111	blue	Ci&Cu	3	7	68	1014.8	82	good	24.9		calm	0.5		no
		bou_c-ops_110711_1207_006			13:04	3:00	50	43	22.211	7	54.157	blue	Ci&Cu	3	7	68	1014.8	82	good	24.9		calm	0.5		no
	bou_c-ops_110711_1207_007				13:39	1:20																		
			CTDBOUS002	CDOM	13:21	31:00	400	43	22.339	7	54.281	overcast		6	6	94	1015	81		25.1	25.3	calm			no
			CTDBOUS003	HPLC, Ap & TSM	08:57	32:00	400	43	22.078	7	53.849	hazy		7	11	93	1014	85		24.8	25.2	calm			no
	bou_c-ops_110712_0900_001				09:03	1:20																		
		bou_c-ops_110712_0900_002			09:48	4:00	85	43	22.049	7	53.702	blue	None	0	11	95	1014	84	good	24.9		calm	0.6		no
		bou_c-ops_110712_0900_003			10:01	3:00	52	43	22.170	7	53.689	blue	None	0	11	95	1014	84	good	24.9		calm	0.6		no
		bou_c-ops_110712_0900_004			10:10	3:00	50	43	22.226	7	53.608	blue	None	0	11	95	1014	84	good	24.9		calm	0.6		no
	bou_c-ops_110712_0900_005				10:29	1:20																		
12/07/11				CIMEL01	10:36	7:00		43	22.091	7	53.712	blue		2			1014		good						
			CTDBOUS004		12:21	26:00	400	43	24.987	7	47.977	hazy		8	7	82	1013	78		25.8	25.1	calm			no
			CTDBOUS005		13:22	27:00	400	43	27.949	7	41.957	hazy		6	5	100	1013	76		26.2	25.3	calm			no
			CTDBOUS006		14:20	27:00	400	43	30.938	7	36.975	hazy		6	4	113	1013	71		27.1	25.7	calm			no
			CTDBOUS007		15:21	26:00	400	43	34.004	7	30.685	hazy		8	5	162	1012	76		26.2	26.1	calm			no
			CTDBOUS008		16:18	23:00	400	43	36.964	7	24.902	hazy		7	6	38	1012	73		26.7	26.1	calm			no
			CTDBOUS009		17:08	24:00	400	43	38.953	7	20.910	hazy		8	6	293	1013	68		26.7	25.7	calm			no
13/07/11			CTDBOUS010	HPLC, Ap & TSM	08:41	33:00	400	43	22.210	7	54.038	overcast		8	22	117	1007.0	86		25.1	25.3	moved			yes
				Secchi01	09:20	4:00	20	43	22	7	54	overcast		7					medium			moved			yes


BOUSSOLE113
11 July 2011−13 July 2011
Nice
BOUS009
BOUS008
BOUS007
BOUS006
BOUS005
BOUS004
BOUS002
BOUS010
BOUS001
BOUS003
200
1000
2000
2300
2400
2600
2100
2200
buoy
Boussole site
07−11
07−12
07−13
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 113 **11/07/2011** **BOUS110711_01**

BOUS001



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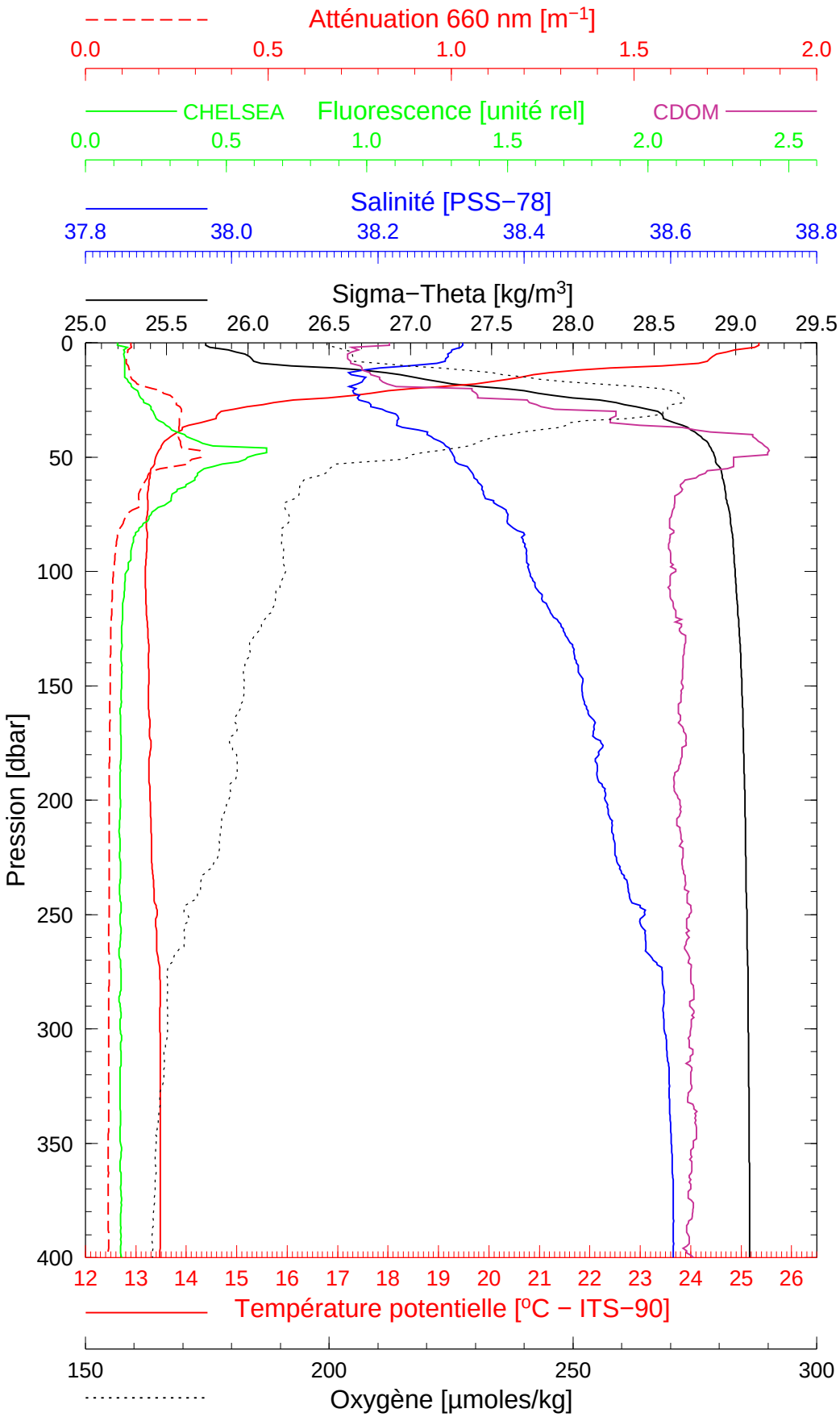
BOUSSOLE 113 **11/07/2011** **BOUS110711_02**

BOUS002



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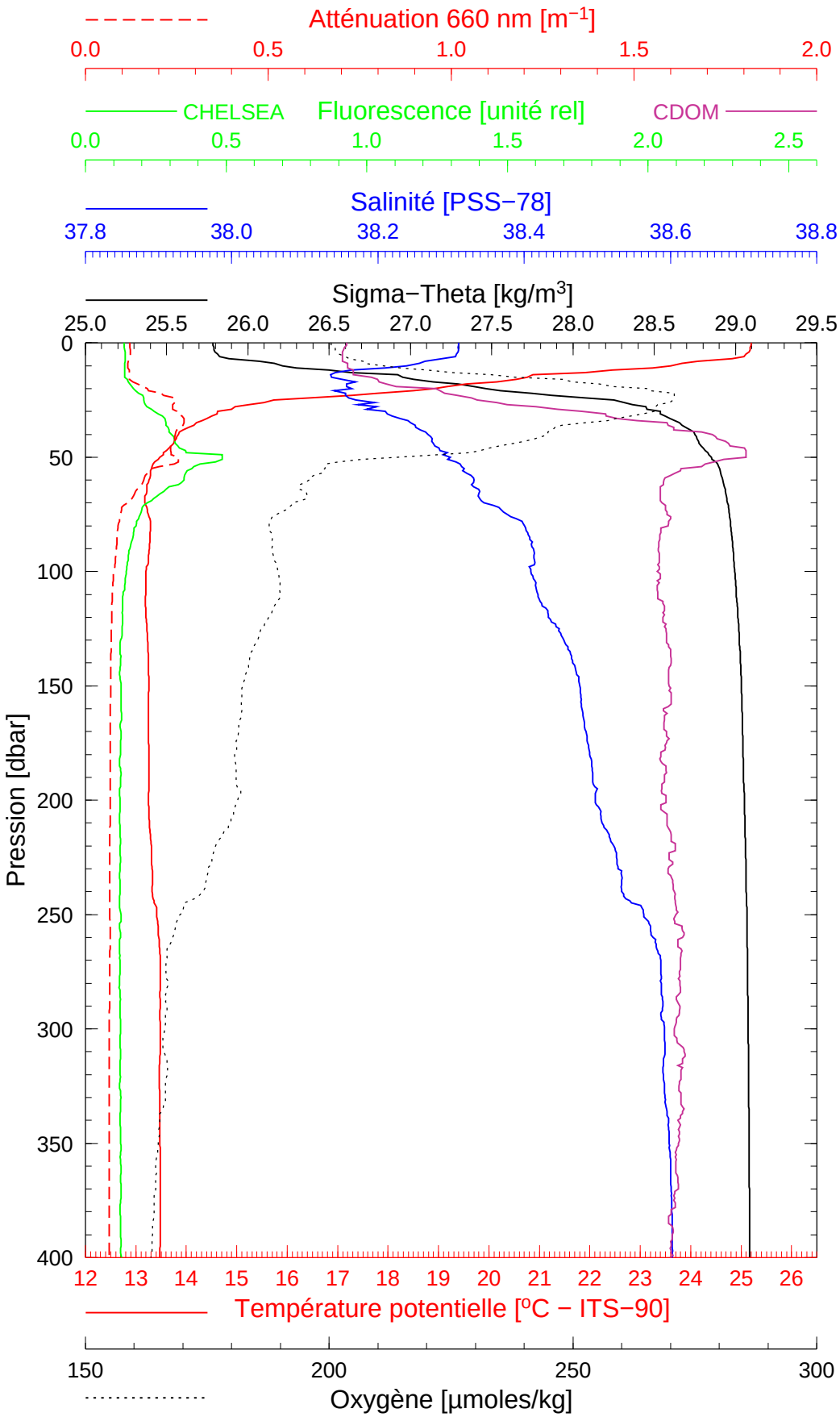
BOUSSOLE 113 **12/07/2011** **BOUS110712_01**

BOUS003



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BOUSSOLE 113 **12/07/2011** **BOUS110712_02**

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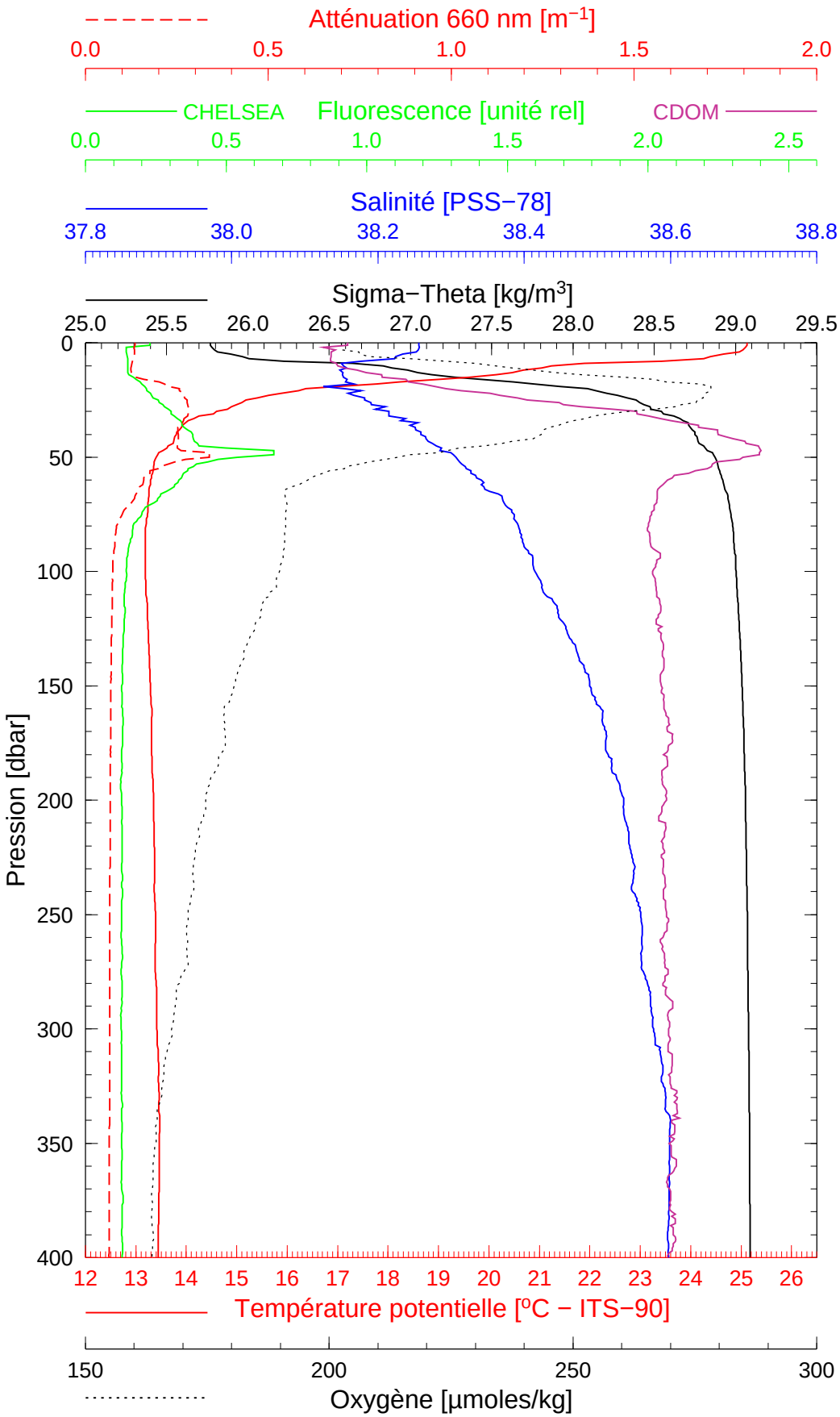

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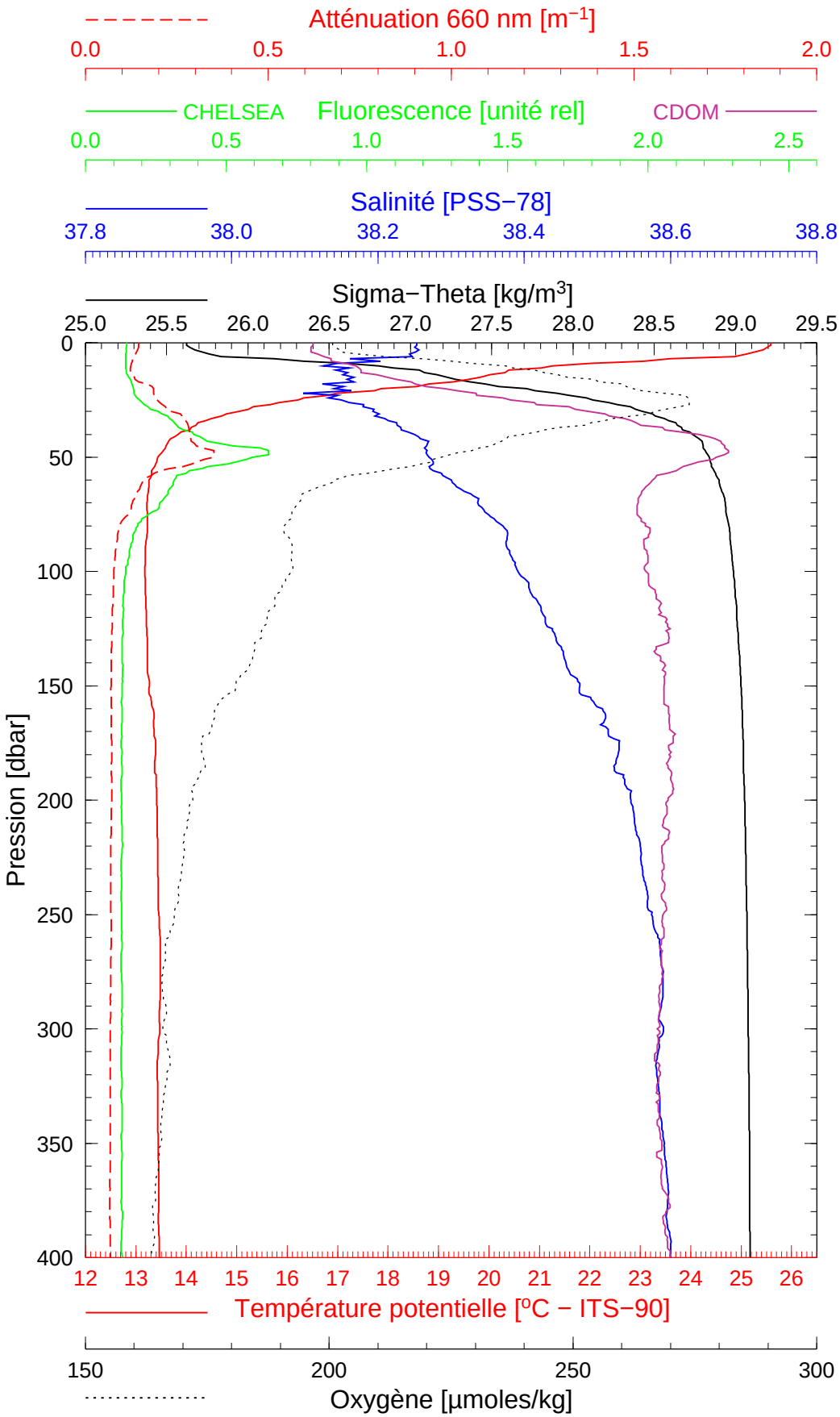
BOUS005



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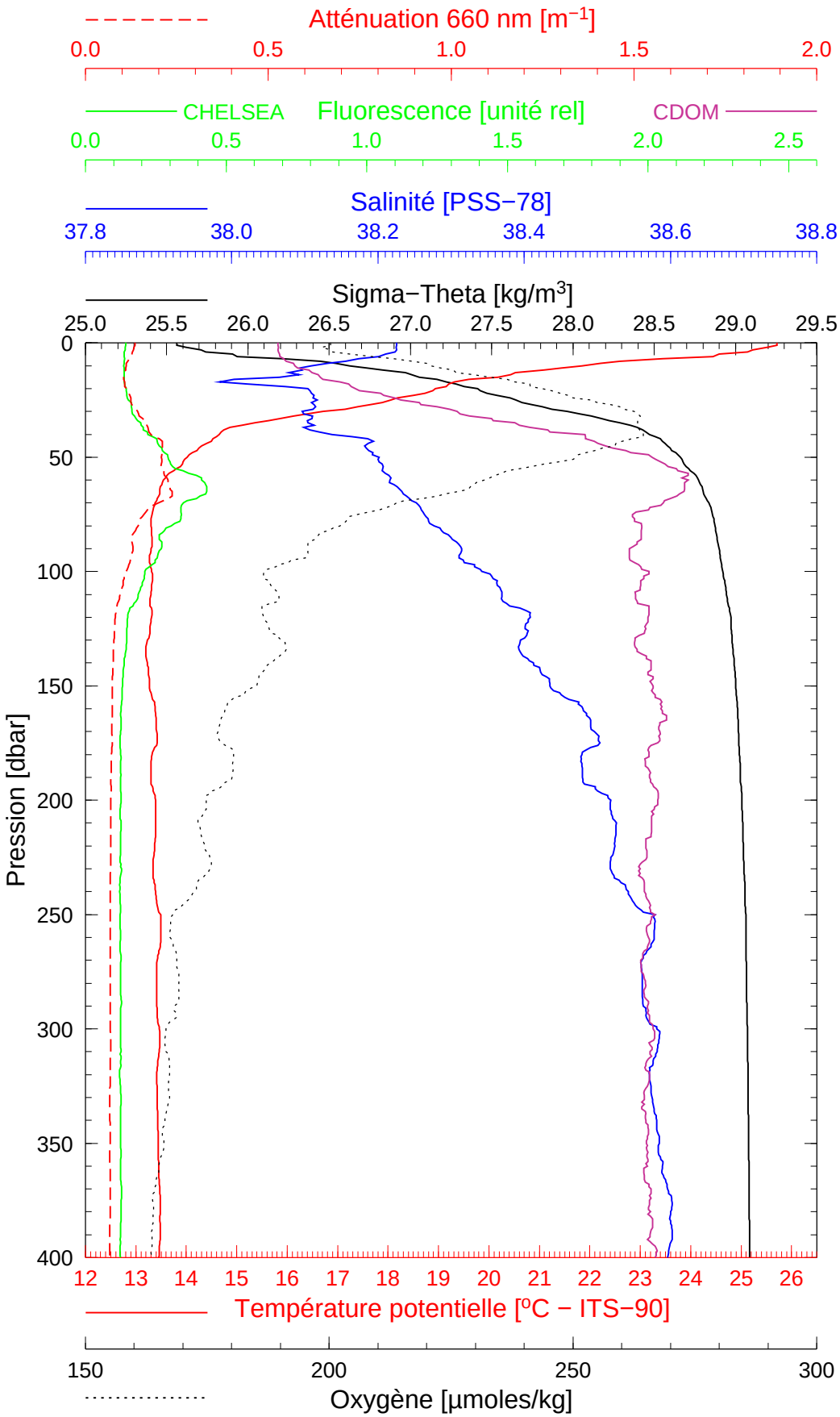
BOUS006



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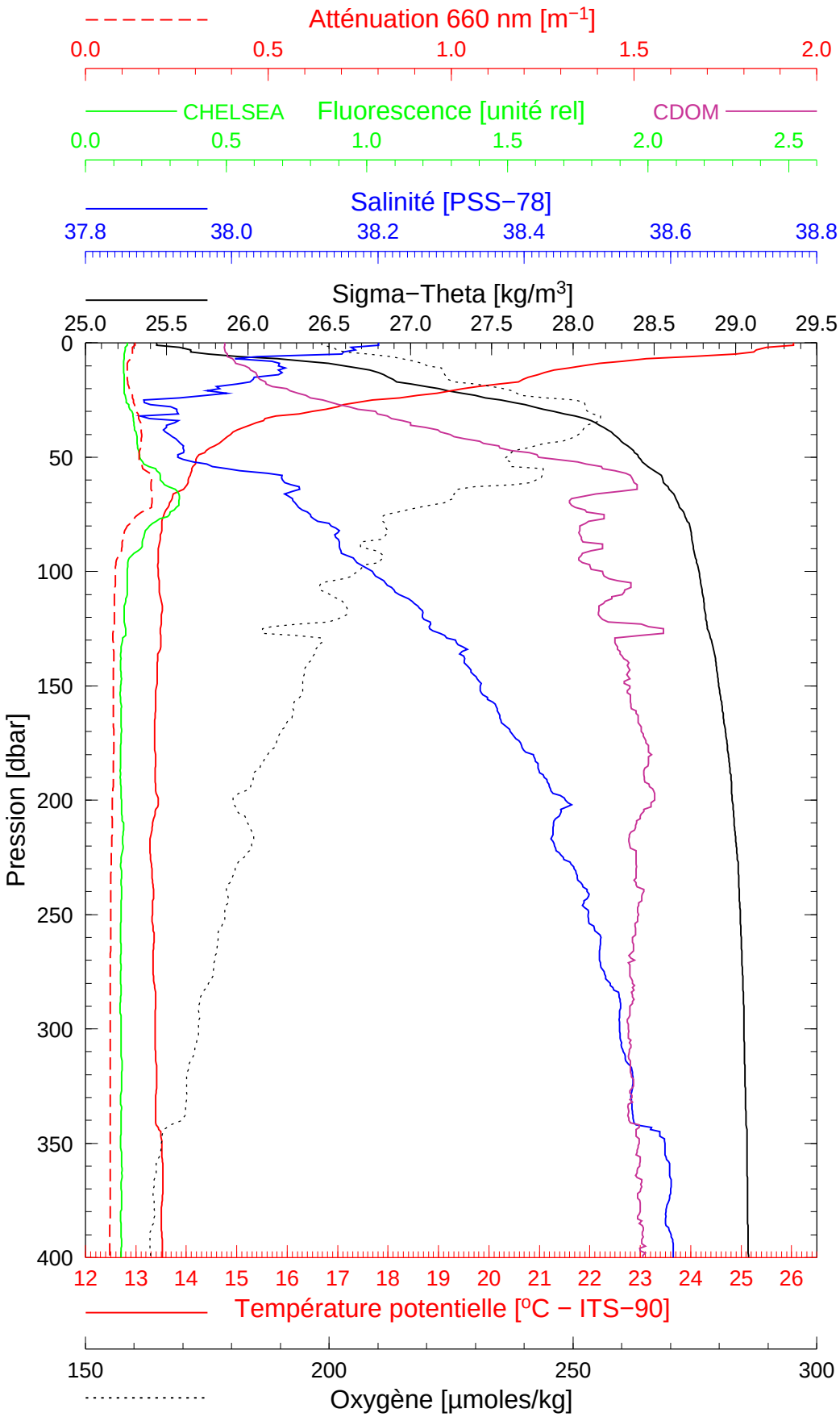
BOUS007



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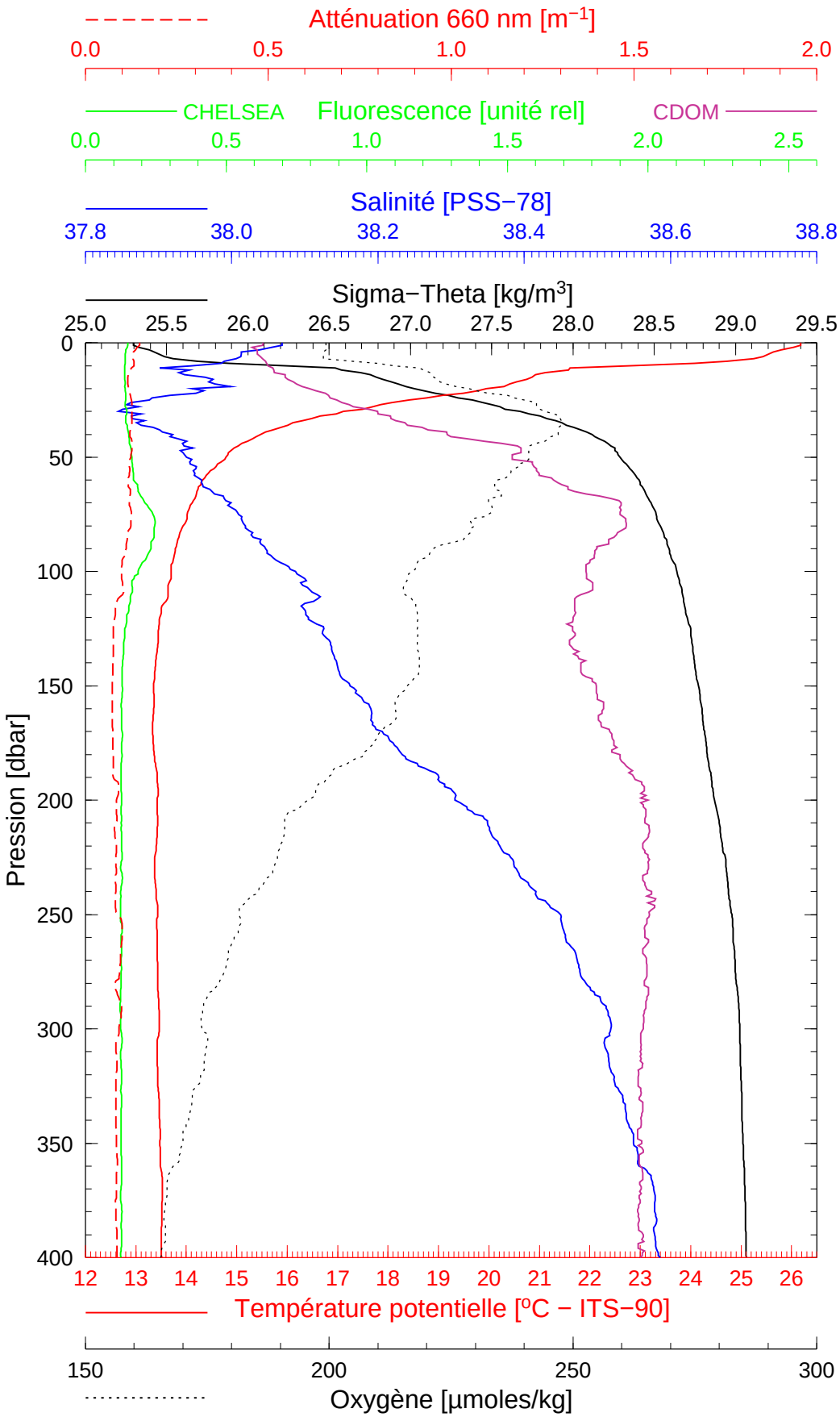
BOUS008



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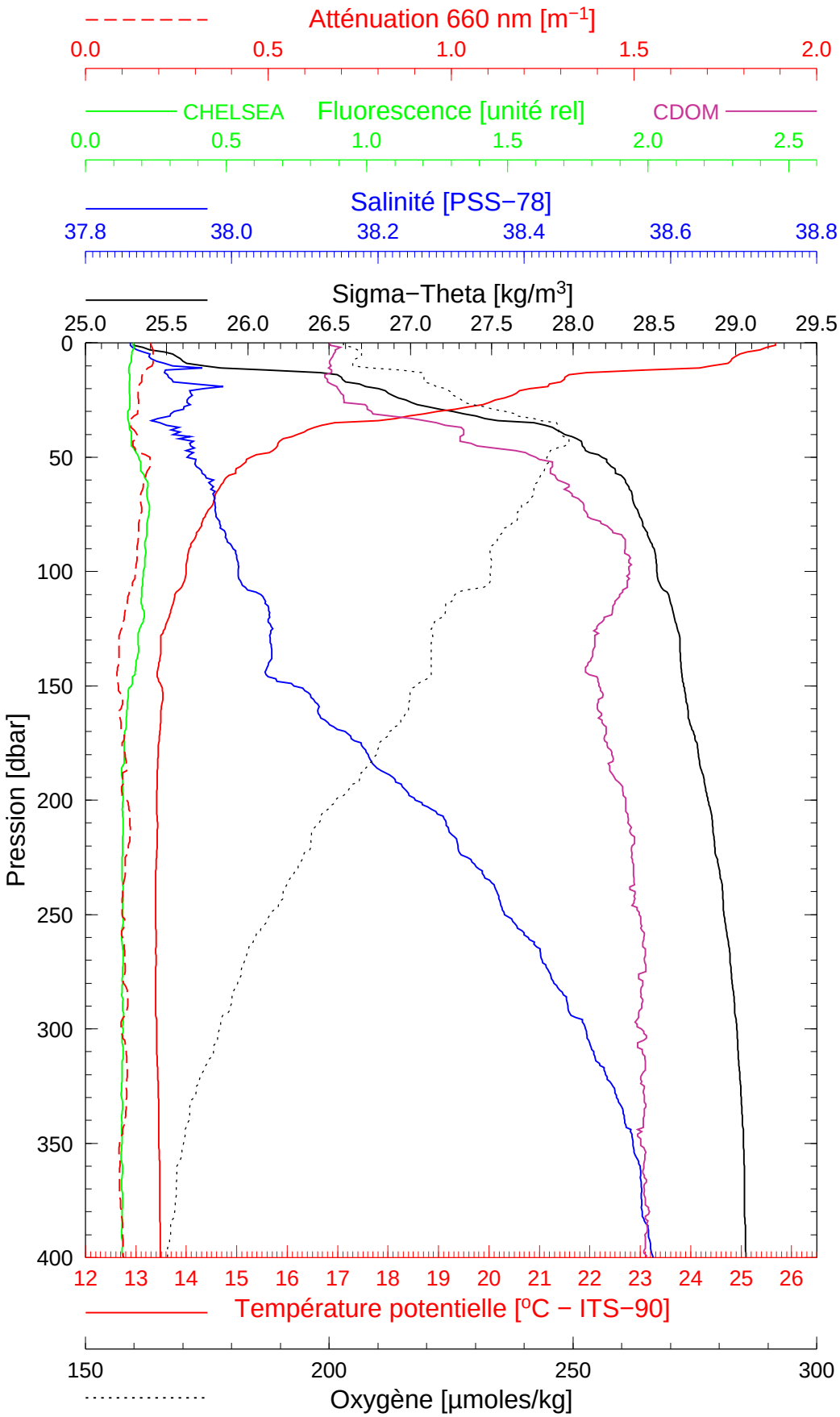

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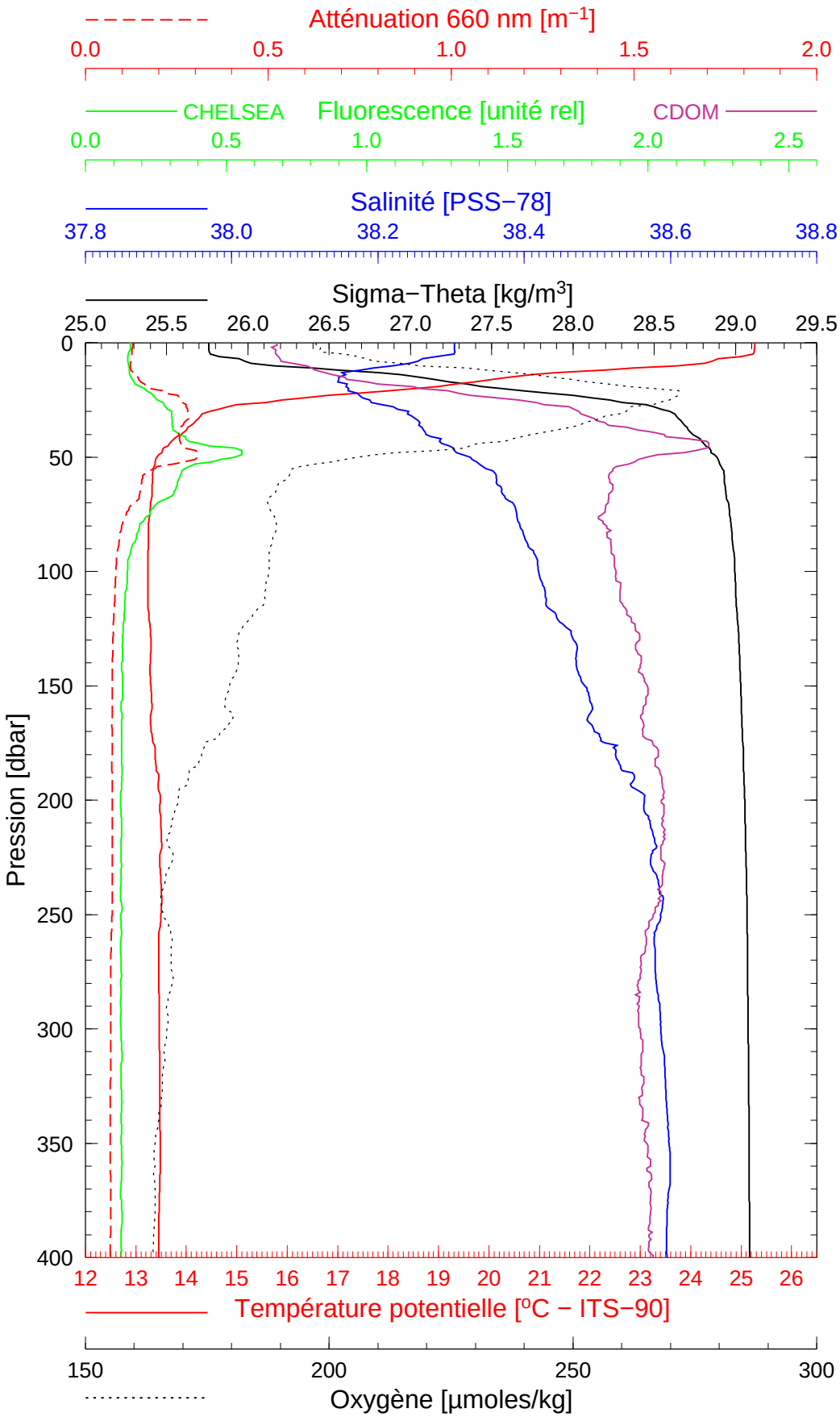

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