BOUSSOLE Monthly Cruise Report

Cruise 117
November 15 - 18, 2011

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

Science Personnel: Emilie Diamond, Yves Lamblard, David Luquet, Grigor Obolensky, Josephine Ras, Vincenzo Vellucci and Emmanuel (diver).

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

After the substitution of the buoy strain sensor cable and the check of its data, this sensor was finally removed at the end of the diving because of its dysfunction.

BOUSSOLE project

ESA/ESRIN contract N° 13226/10/I-NB

December 05, 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 liquid nitrogen for particulate organic carbon (POC from October 2011), 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. Seawater samples are to be collected and filtered one time during the cruise for colored dissolved organic matter (CDOM) analysis 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

Since the deployment of this buoy, there was a dysfunction of the strain sensor. The diving day, its cable was substituted but the data were still abnormal, so the strain sensor was finally removed at the end of the diving.

Cruise Summary

The electro-mechanical cable of the *Téthys II* was rusty on the first 200 m, so during this cruise no CTD cast was performed when the swell was higher than 0.8 m. The first and the third days were used for optical profiles and a CTD cast with water sampling at the BOUSSOLE site and for performing the CTD transect the third day. The second day, weather conditions were not good enough to sample with the rusty cable but the boat went anyway at sea for an attempt of CISCO connection with the buoy. The last day was used for buoy data retrieval, diving operations and for a CTD cast with water sampling at the BOUSSOLE site.

Tuesday 15 November 2011

The first day, the sea was slightly roughened with a gentle breeze. The sky was blue with some clouds and a good visibility. When arrived at the BOUSSOLE site, some adjustments on the Biospherical C-OPS were made for a better balance of the instrument during the descent phase of profiles. Then, 4 C-OPS profiles, 1 CTD cast with water sampling and 1 Secchi disk were performed.

Wednesday 16 November 2011

The second day, the sea was moderate with a fresh breeze and the sky was blue with a good visibility. When arrived at the BOUSSOLE site, the buoy was partly underwater: only the head of the buoy was visible. The captain of the *Téthys II* decided that the weather was not good enough to perform a CTD cast because of the electro-mechanical cable state. There were also too many whitecaps and current to perform good optical profiles. So only a CISCO connection was attempted but failed and 1 Secchi disk was performed before leaving.

Thursday 17 November 2011

The third day, the sea was slightly roughened with a gentle breeze, a blue sky and a good visibility. When on site, 4 C-OPS profiles, 1 CTD cast with water sampling and 1 Secchi disk were performed. A CISCO connection was established and interrupted before the end of data retrieval. Then the CTD transect was performed.

Friday 18 November 2011

The last day, the sea was smooth with a gentle breeze. The sky was overcast the morning then blue and the visibility was good. When arrived at the BOUSSOLE site, divers went at sea to clean buoy instruments. The strain cable was also substituted. After a direct connection with the buoy and data retrieval, the strain data were still abnormal, so the strain sensor was finally removed at the end of the diving. Divers also put neoprene caps on the HS4 and on the transmissometers for acquiring 1 set of dark measurements. In parallel to diving operations, solar panels, sensors and ARGOS and CISCO connectors on the top of the buoy were cleaned. Then 1 Secchi disk and 1 CTD cast with water sampling were performed.

Cruise Report

Tuesday 15 November 2011 (UTC)

People on board: Emilie Diamond and Vincenzo Vellucci.

0645 Departure from the Nice harbour.
1015 Arrival at the BOUSSOLE site.
1020 C-OPS balance tests.
1040 C-OPS 01.
1200 Lunch.
1300 C-OPS 02, 03, 04.
1405 CTD 01, 400 m with water sampling at 400, 200, 150, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p, POC and CDOM.
1500 CISCO connection with the buoy: unsuccessful.
1510 Secchi disk 01 (16 m).
1515 Bucket at surface for TSM.
1520 Departure to the Nice harbour.
1825 Arrival at the Nice harbour.

Wednesday 16 November 2011 (UTC)

People on board: Emilie Diamond, Grigor Obolensky and Josephine Ras.

0605 Departure from the Nice harbour.
0930 Arrival at the BOUSSOLE site.
1000 CISCO connection with the buoy: unsuccessful.
1015 Secchi disk 02 (27 m).
1020 Departure to the Nice harbour.
1350 Arrival at the Nice harbour.

Thursday 17 November 2011 (UTC)

People on board: Emilie Diamond and Grigor Obolensky.

0605 Departure from the Nice harbour.
0925 Arrival at the BOUSSOLE site.
0930 C-OPS 05.

1010 C-OPS 06, 07, 08.
1100 CISCO connection with the buoy: data retrieval interrupted.
1100 Lunch.
1200 CISCO connection with the buoy: unsuccessful.
1215 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.
1300 CISCO connection with the buoy: data retrieval interrupted.
1310 Secchi disk 03 (26 m).
1315 Departure to the first transect station.
1345 CTD 03, 400 m, station 01 (43°25'N 07°48'E).
1450 CTD 04, 400 m, station 02 (43°28'N 07°42'E).
1600 CTD 05, 400 m, station 03 (43°31'N 07°37'E).
1700 CTD 06, 400 m, station 04 (43°34'N 07°31'E).
1800 CTD 07, 400 m, station 05 (43°37'N 07°25'E).
1855 CTD 08, 400 m, station 06 (43°39'N 07°21'E).
1925 Departure to the Nice harbour.
1955 Arrival at the Nice harbour.

Friday 18 November 2011 (UTC)

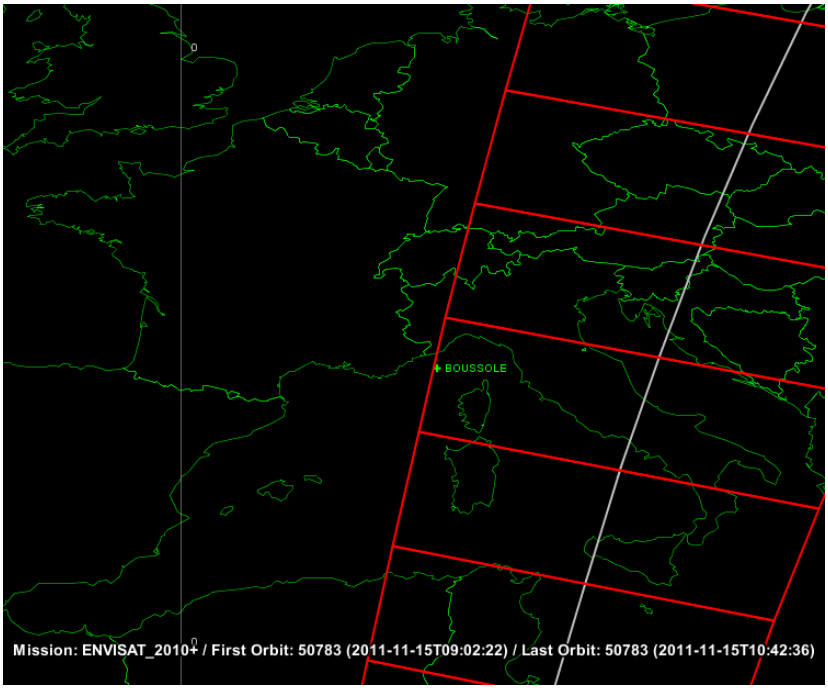
People on board: Emilie Diamond, Grigor Obolensky, Vincenzo Vellucci and 3 divers.

0610 Departure from the Nice harbour.
0920 Arrival at the BOUSSOLE site.
0930 Diving on the buoy for cleaning instruments and substituting twice the strain sensor cable. Dark HS4 and transmissometers measurements at 11:00.
1000 Direct connection with the buoy and data retrieval.
1100 Direct connection with the buoy and data retrieval: bad strain sensor data.
1110 Cleaning of solar panels, sensors and ARGOS and CISCO connectors on the head of the buoy.
1130 Secchi disk 04 (24 m).
1130 Lunch.
1230 Diving on the buoy for removing the buoy strain sensor.
1330 CTD 09, 400 m with water sampling 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and a_p.
1415 Departure to the Nice harbour.
1715 Arrival at the Nice harbour.

Problems identified during the cruise

- The electro-mechanical cable of the *Téthys II* was rusty on the first 200 m, so during this cruise no CTD cast was performed when the swell was higher than 0.8 m (decision of the captain).
- The moderate weather and the electro-mechanical cable state prevented sampling at the BOUSSOLE site the second day.
- During this cruise, data from the CDOM fluorometer were corrupted in the down casts of several CTD.

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



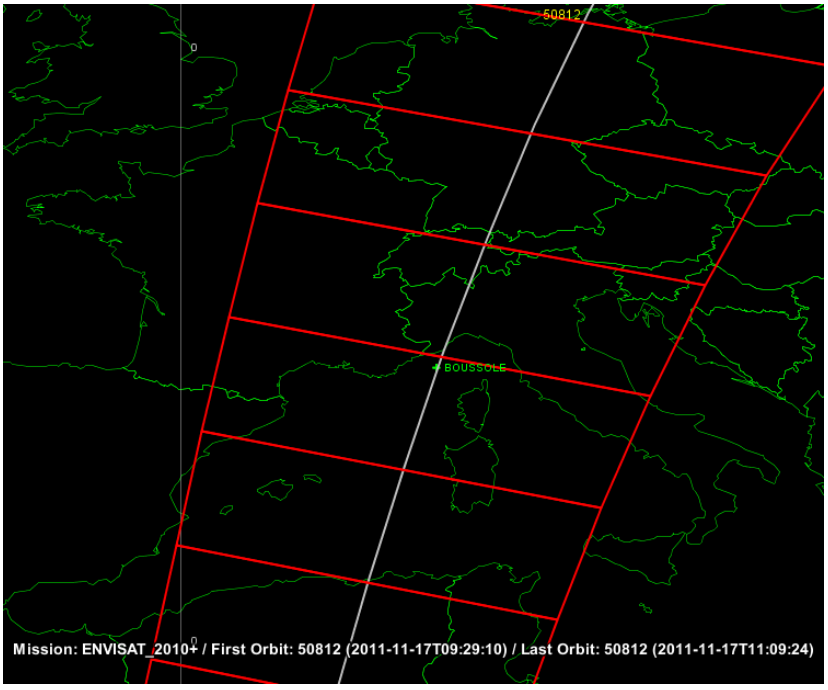
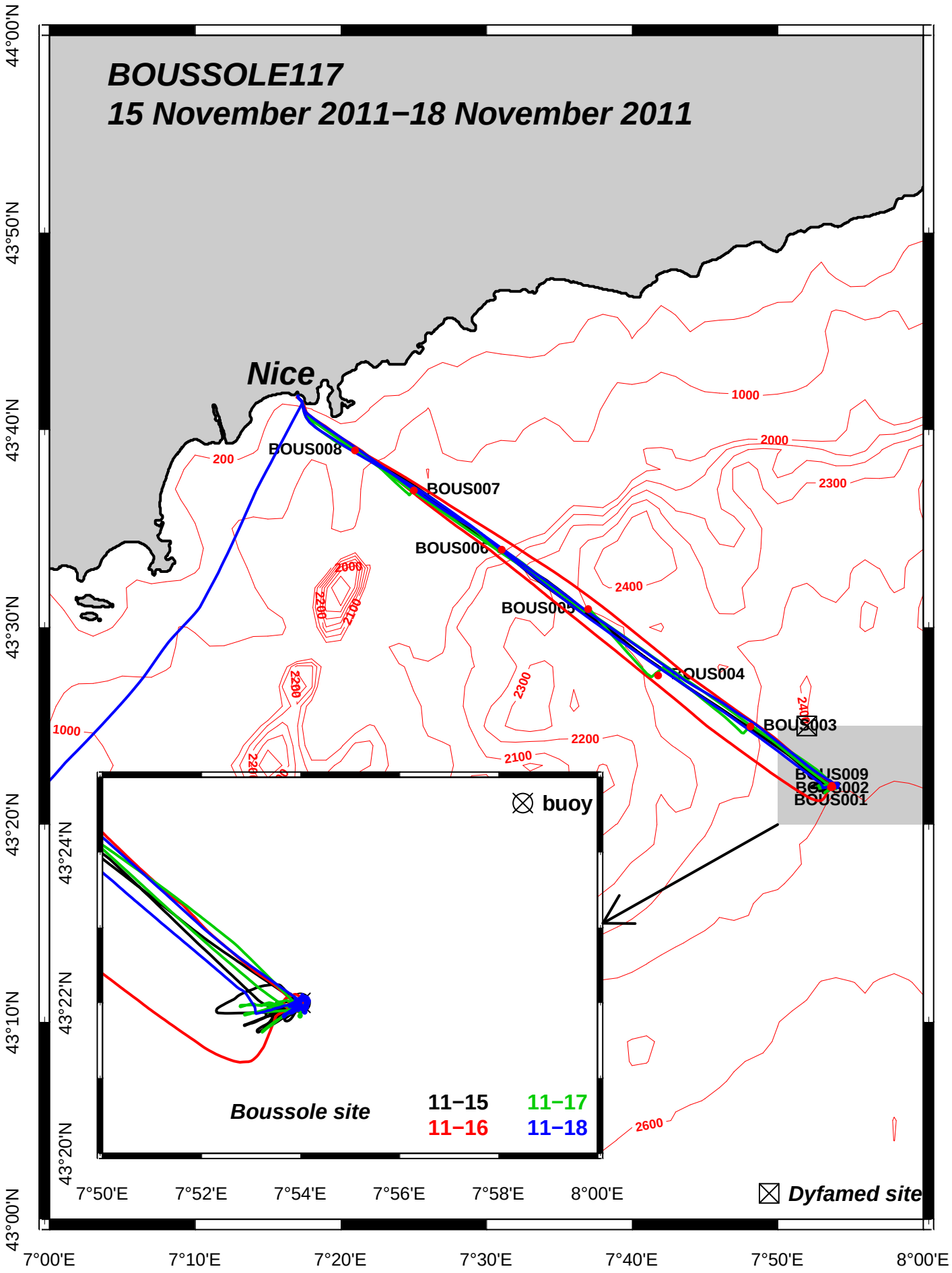


Figure 1. Calculated swath path for MERIS (Esov NG software) above the BOUSSOLE site for the 15th and 17th of November 2011.

Appendices

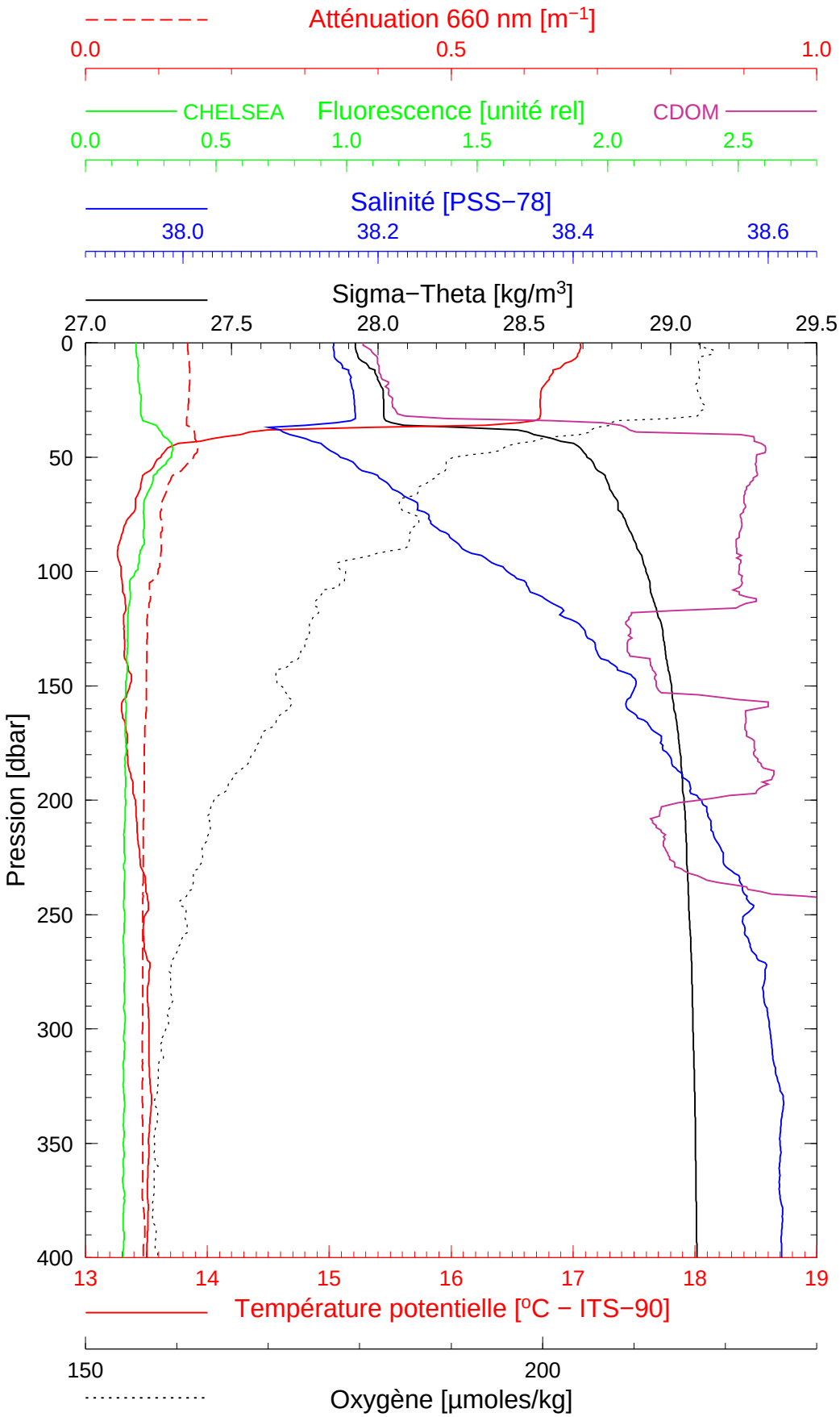
Cruise Summary Table for Boussole 117

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
	bou_c-ops_111115_1023_002_data.csv				10:28	1:14																			
		bou_c-ops_111115_1023_005_data.csv			11:48	4:10	87.6	43	21.895	7	53.658	blue	Cu&St	4	12	255	1017.8	54	good	15.9		moved	1.2		yes
		bou_c-ops_111115_1303_001_data.csv			13:15	3:46	81.2	43	22.242	7	53.513	blue	Cu&St	3	8	180	1017.0	50	good	16.7		calm	0.8		few
		bou_c-ops_111115_1303_002_data.csv			13:26	3:46	78.8	43	22.214	7	53.164	blue	Cu&St	3	8	180	1017.0	50	good	16.7		calm	0.8		few
15/11/11		bou_c-ops_111115_1303_003_data.csv			13:36	3:46	79.9	43	22.099	7	52.752	blue	Cu&St	3	8	180	1017.0	50	good	16.7		calm	0.8		few
	bou_c-ops_111115_1303_004_data.csv				13:54	1:13																			
			CTDBOUS001	HPLC, Ap, CDOM & POC	14:08	29:00	400	43	21.899	7	53.658	blue		2	10	160	1017	55		16.0	17.1	calm			few
				Secchi01	15:10	4:00	16	43	22	7	54	blue		2					good			calm			few
				Bucket: TSM	15:15	2:00	surface	43	22	7	54	blue		2	10	160	1017	55		16.0		calm			few
16/11/11				Secchi02	10:15	4:00	27	43	22	7	54	blue		0					good			moved			yes
	bou_c-ops_111117_0913_001_data.csv				09:16	1:14																			
		bou_c-ops_111117_0913_004_data.csv			09:48	3:26	70.6	43	21.910	7	53.276	blue	None	0	12	115	1023.5	56	good	15.7		calm	0.7		yes
		bou_c-ops_111117_0913_007_data.csv			10:18	4:14	84.3	43	22.029	7	53.692	blue	None	0	10	95	1023.5	54	good	16.0		calm	0.7		yes
		bou_c-ops_111117_0913_008_data.csv			10:30	3:05	61.0	43	22.157	7	54.177	blue	None	0	10	95	1023.5	54	good	16.0		calm	0.7		yes
		bou_c-ops_111117_0913_010_data.csv			10:42	3:15	63.1	43	22.235	7	54.184	blue	None	0	10	95	1023.5	54	good	16.0		calm	0.7		yes
	bou_c-ops_111117_0913_011_data.csv				13:35	1:52																			
17/11/11			CTDBOUS002	HPLC, Ap & TSM	12:17	32:00	400	43	21.903	7	53.757	blue		0	11	8	1023	54		15.8	16.9	calm			few
				Secchi03	12:50	4:00	26	43	22	7	54	blue		0					good			calm			few
			CTDBOUS003		13:50	26:00	400	43	24.970	7	48.131	blue		0	5	78	1023	52		16.4	18.0	calm			few
			CTDBOUS004		15:04	27:00	400	43	27.557	7	41.792	blue		0	3	228	1023	53		15.6	18.2	calm			no
			CTDBOUS005		16:02	26:00	400	43	30.922	7	36.988	blue		0	4	289	1023	50		15.5	18.3	calm			no
			CTDBOUS006		17:03	25:00	400	43	33.929	7	31.057	night		0	6	227	1024	50		15.7	18.2	calm			no
			CTDBOUS007		18:04	26:00	400	43	36.932	7	25.018	night		0	4	51	1024	43		15.7	18.4	calm			no
			CTDBOUS008		18:55	26:00	400	43	28.964	7	20.979	night		0	5	142	1024	48		15.6	18.5	calm			no
18/11/11				Secchi04	11:30	4:00	24	43	22	7	54	overcast		5					good			calm			few
			CTDBOUS009		13:43	30:00	400	43	21.967	7	53.718	blue		2	12	213	1023	68		16.6	16.9	calm			few


BOUSSOLE117
15 November 2011−18 November 2011
Nice
BOUS008
BOUS007
BOUS006
BOUS005
BOUS004
BOUS003
BOUS009
BOUS002
BOUS001
200
1000
2000
2300
2400
2600
2200
2100
buoy
Boussole site
11−15
11−16
11−17
11−18
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 117 **15/11/2011** **BOUS111115_01**

BOUS001

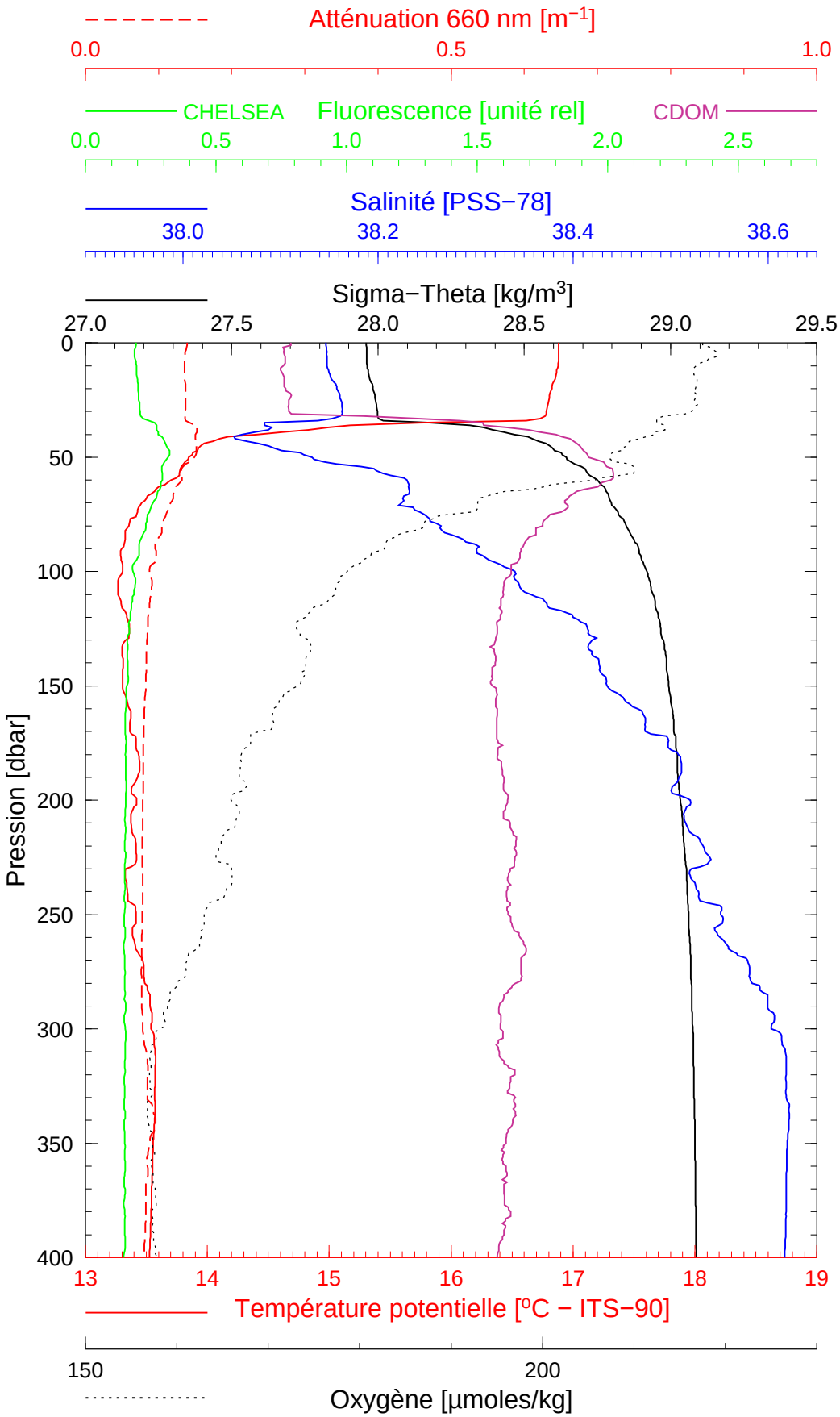


Date *15/11/2011* *Latitude* *43°21.899 N*

Heure déb *14h 08min [TU]* *Longitude* *07°53.658 E*

BOUSSOLE 117 **17/11/2011** **BOUS111117_01**

BOUS002

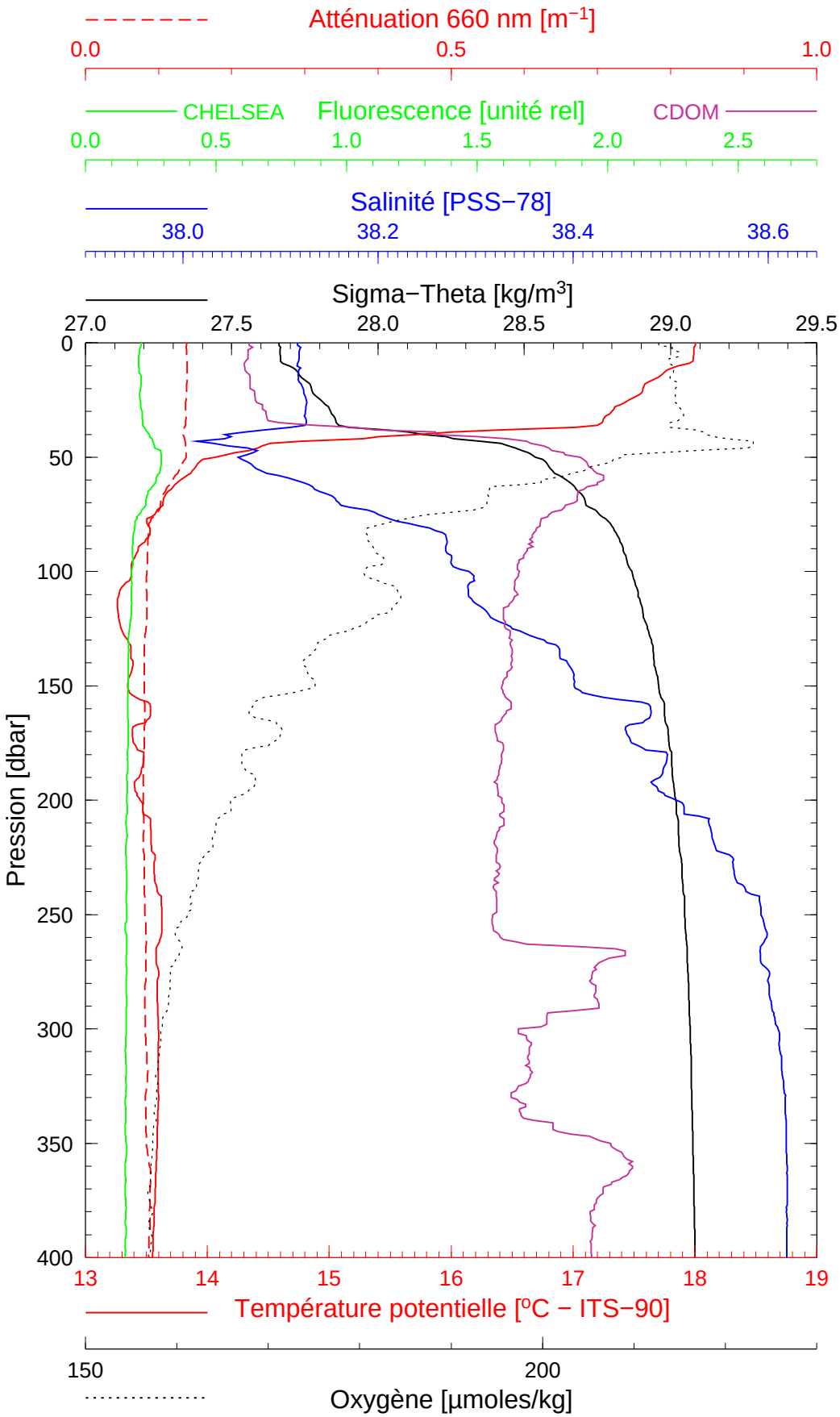


Date *17/11/2011* *Latitude* *43°21.903 N*

Heure déb *12h 17min [TU]* *Longitude* *07°53.757 E*

BOUSSOLE 117 **17/11/2011** **BOUS111117_02**

BOUS003

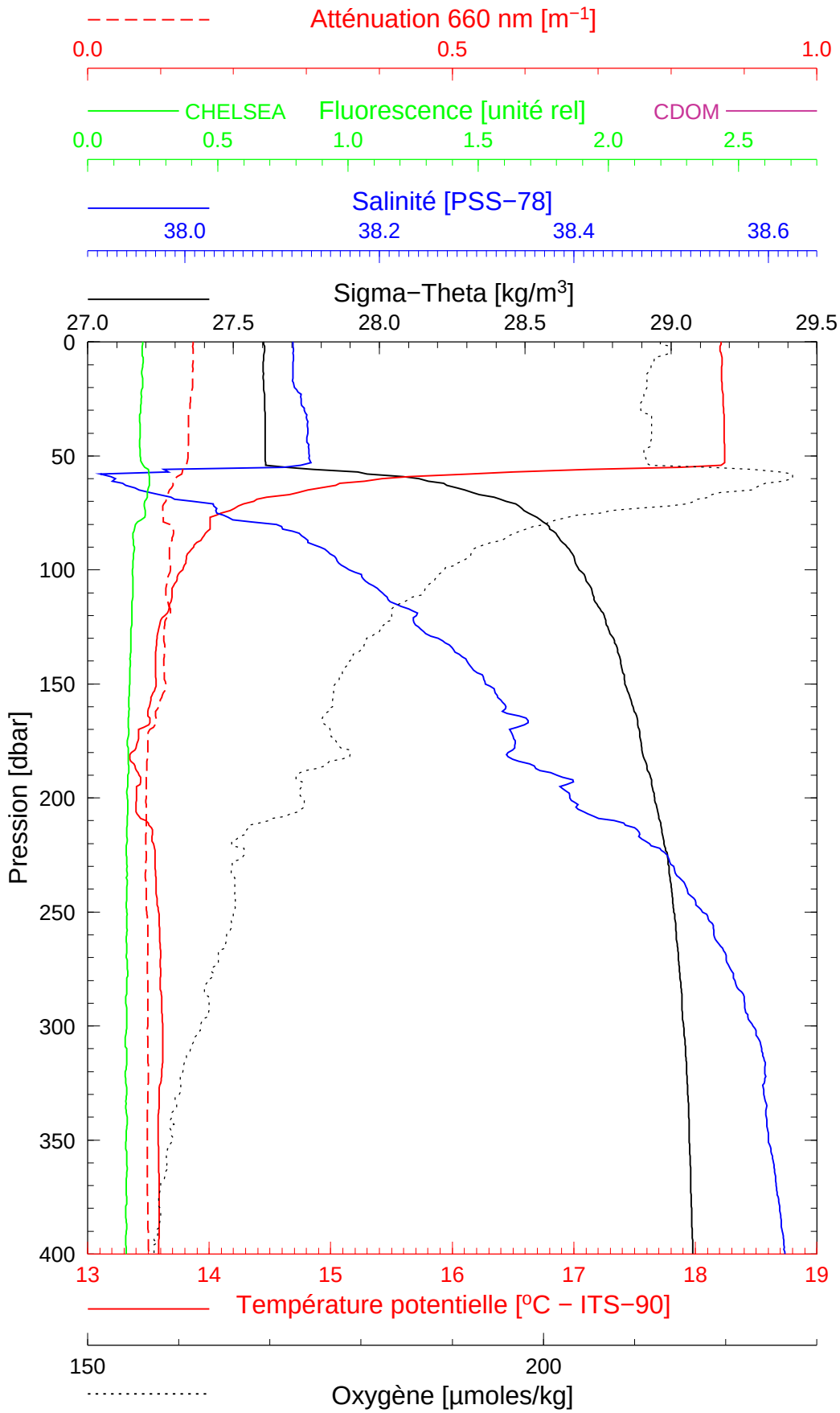


Date *17/11/2011* *Latitude* *43°24.970 N*

Heure déb *13h 50min [TU]* *Longitude* *07°48.131 E*

BOUSSOLE 117 **17/11/2011** **BOUS111117_03**

BOUS004



Date *17/11/2011* *Latitude* *43°27.557 N*

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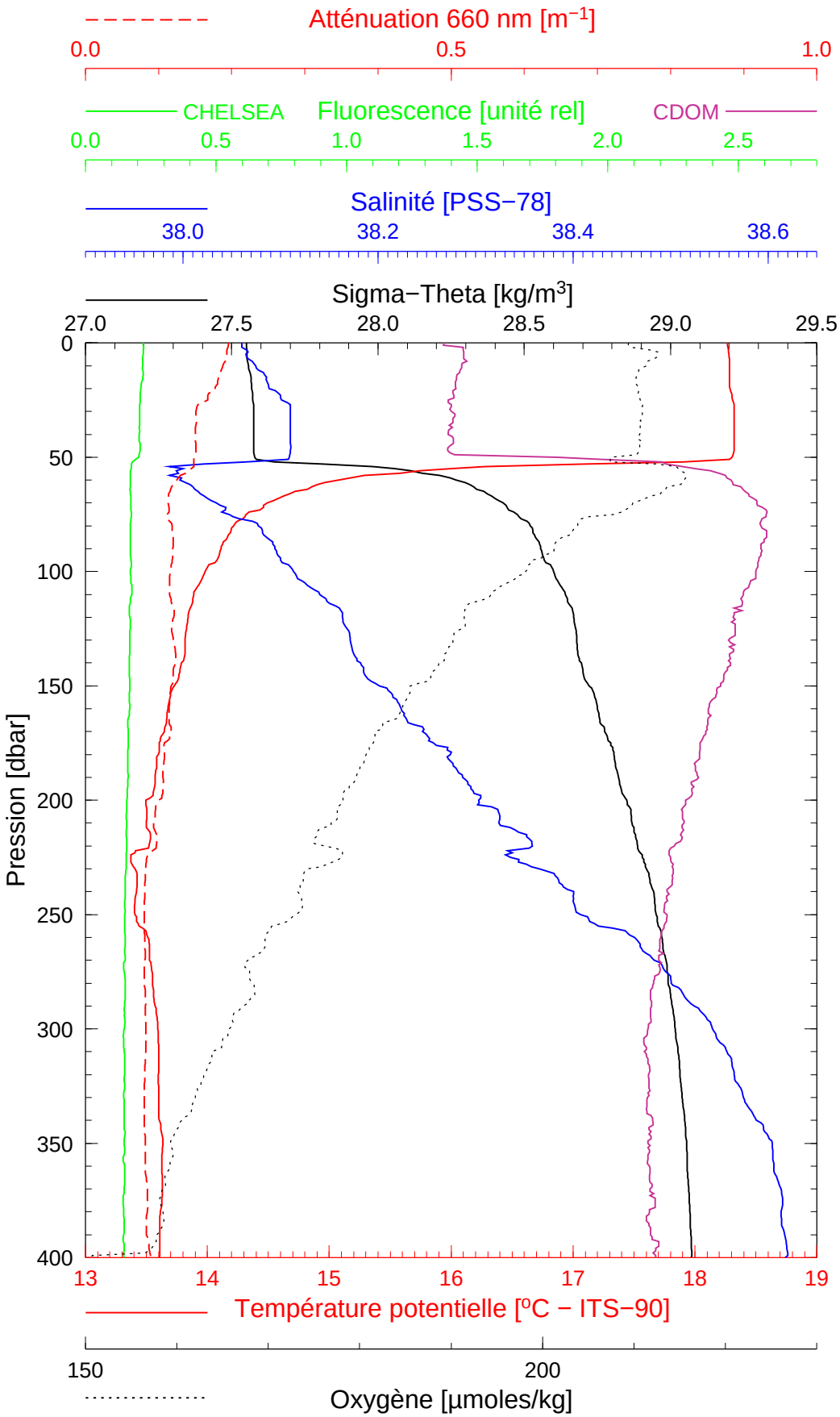
BOUSSOLE 117 **17/11/2011** **BOUS111117_04**

BOUS005

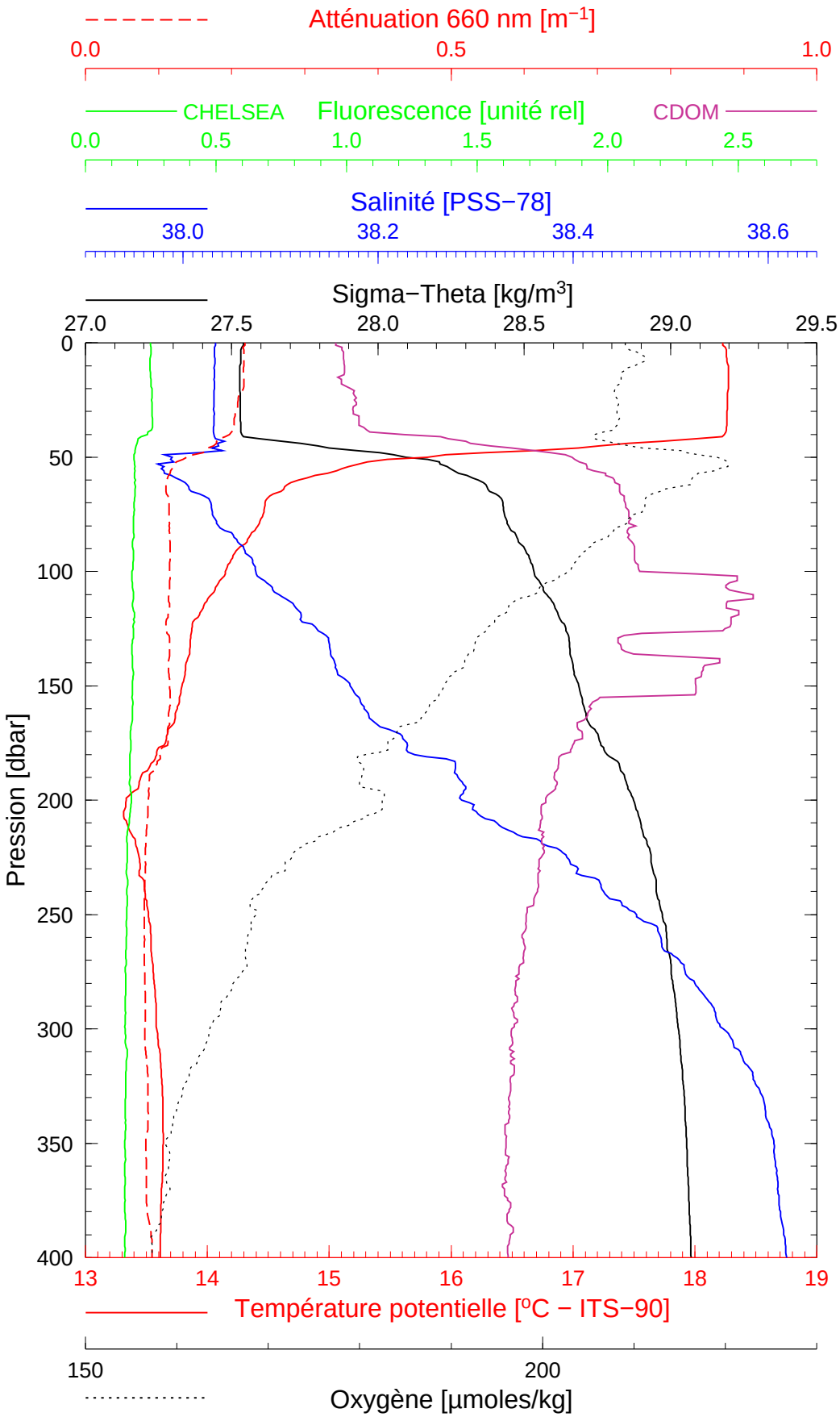


Date *17/11/2011* *Latitude* *43°30.922 N*

Heure déb *16h 02min [TU]* *Longitude* *07°36.988 E*

BOUSSOLE 117 **17/11/2011** **BOUS111117_05**

BOUS006

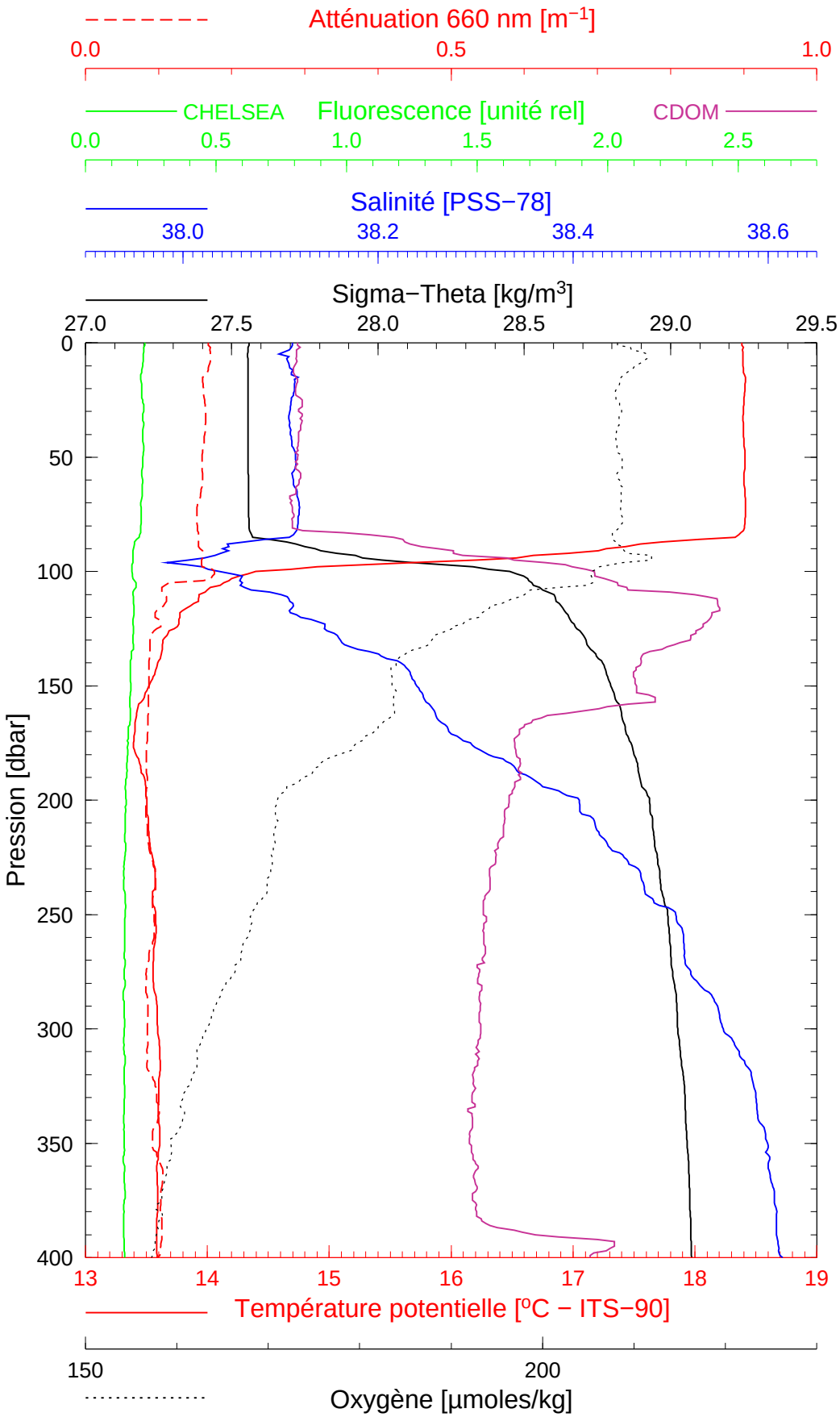


Date *17/11/2011* *Latitude* *43°33.929 N*

Heure déb *17h 03min [TU]* *Longitude* *07°31.057 E*

BOUSSOLE 117 **17/11/2011** **BOUS111117_06**

BOUS007



Date *17/11/2011* *Latitude* *43°36.932 N*

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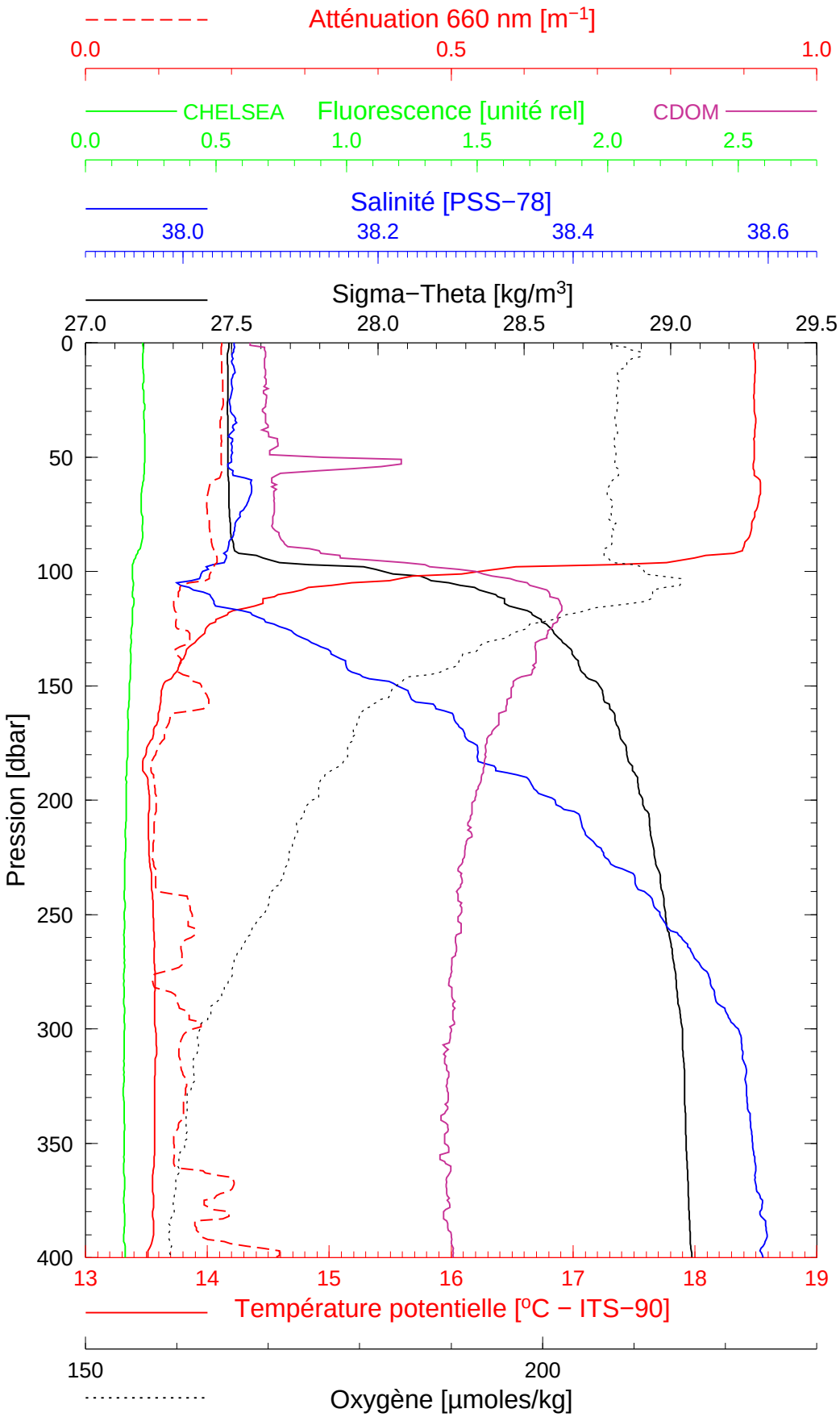
BOUSSOLE 117 **17/11/2011** **BOUS111117_07**

BOUS008

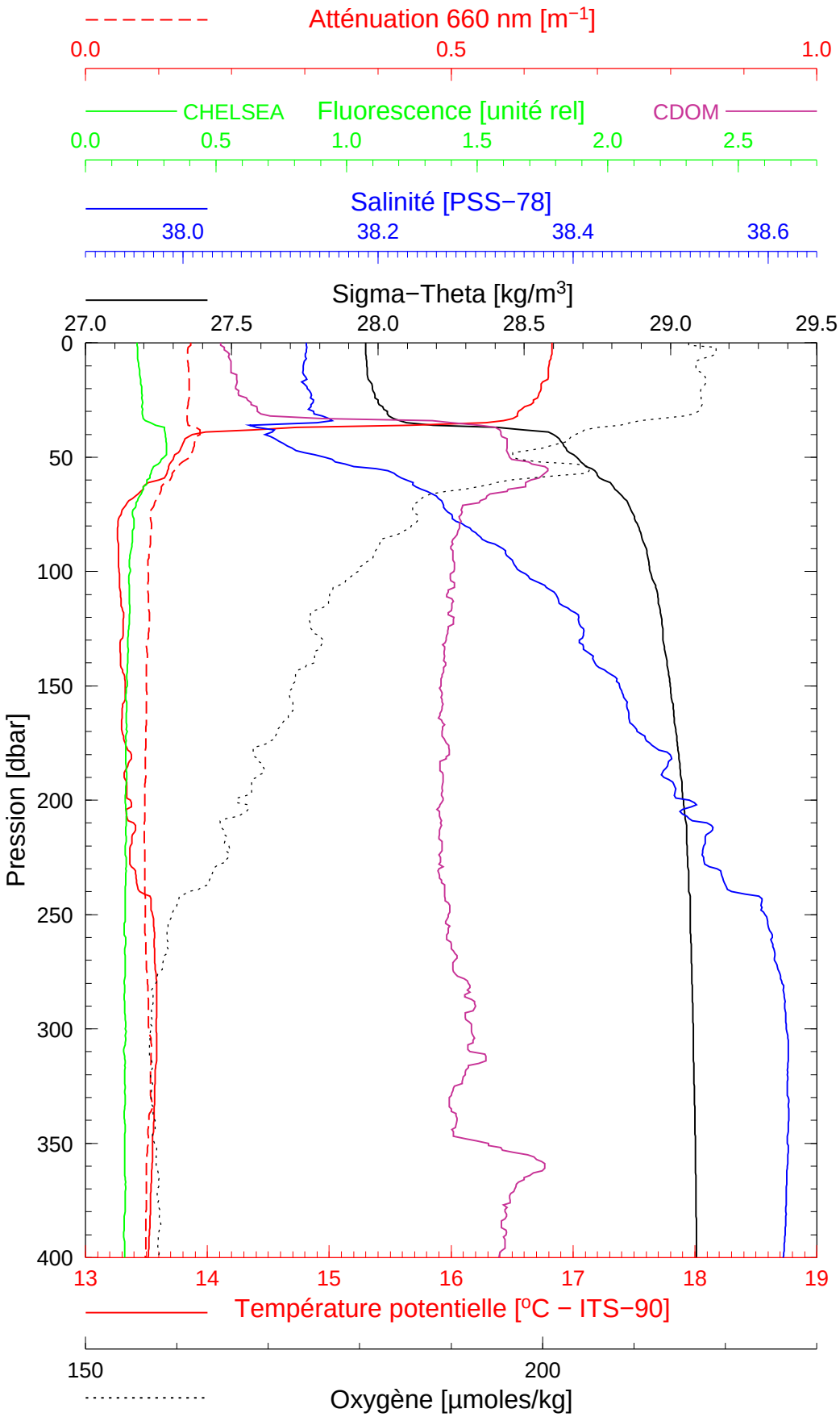


Date *17/11/2011* *Latitude* *43°38.964 N*

Heure déb *18h 55min [TU]* *Longitude* *07°20.979 E*

BOUSSOLE 117 **18/11/2011** **BOUS111118_01**

BOUS009



Date *18/11/2011* *Latitude* *43°21.967 N*

Heure déb *13h 43min [TU]* *Longitude* *07°53.718 E*