BOUSSOLE Monthly Cruise Report

Cruise 107
February 12 - 15, 2011

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

Science Personnel: Jean De Vaugelas, Emilie Diamond, David Doxaran, Olivier Javoy, Malika Kheireddine, Héloïse Lavigne, Thomas Lorthiois, David Luquet, Grigor Obolensky, Didier Robin, Vincent Taillandier and Vincenzo Vellucci.

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

Figure 1. Top of the buoy, partly underwater because of strong currents, inspected from divers.

BOUSSOLE project

ESA/ESRIN contract N° 17286/03/I-OL

Deliverable from WP#400/200

February 25, 2011

Contents

Cruise Objectives

Routine operations

Multiple SPMR profiles are to occur within about 1 hour of satellite overhead passes of MERIS around solar noon, under optimal conditions: clear blue skies and flat, calm sea surface. From last mission, we restart deploying the SPMR SN 006 and its SMSR reference SN 006. From April 2010, we perform optical profiles with a Biospherical's C-OPS (Compact Optical Profiling System) on 0-200 m at the BOUSSOLE site. It will replace the SPMR/SMSR system at short-term. 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 SPMR or 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. A floating platform is to be used to support the SPMR Eu sensor approximately 20cm below the surface for up to 3 minutes of stable light field before a release mechanism triggers the release of the profiler to start a descent as normal. Multiple descents ideally will be started in this way and the data will be used to assess near-surface Eu extrapolation model calculations. CTD deployments are required at the start and end of the SPMR 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. A gimbled PAR sensor positioned on the foredeck and operated from the CTD computer serves as a light field stability indicator during SPMR profiling (until summer of 2007).

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. 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).

Additional operations

A PAOLA float, from SHOM (Service Hydrologique et Océanographique de la Marine) has been deployed near BOUSSOLE site. The diving day, the hydrophone of the CRC (Marineland), installed on the buoy for identification of cetaceans, has been taken off. A LISST-100X (a multi-parameter system for in-situ observations of particle size distribution) should be put on the buoy that day but the current was too strong to do it.

Cruise Summary

The first day, weather conditions were not optimal but one CTD cast with water sampling was performed. The second and third cruise days were used for optical measurements and CTD casts with water sampling at the BOUSSOLE site. The second day, the buoy was completely underwater. The transect was completed that day and diving operations were done the day after. The last day, weather conditions were not good enough to sample but the boat went anyway at sea for attempts of CISCO connection with the buoy.

Saturday 12 February 2011

The first day, the sea was slight to moderate with a moderate to fresh breeze and the sky was overcast. As the buoy stopped to send ARGOS messages the night before, a cleaning of the ARGOS beacon connector was planned but it was not possible to go on the top of the buoy to clean it because of the sea state. Weather conditions were not optimal, with too many whitecaps to perform optical profiles, but allowed to perform 1 CTD cast with water sampling. After, the wind blew stronger so only attempts of CISCO connection with the buoy were possible but they were unsuccessful.

Sunday 13 February 2011

The second day, the sea was slight and the sky was overcast, with a medium visibility and a gentle breeze. When on site, the buoy was completely underwater so ARGOS and CISCO connectors could not be cleaned once again. Near the BOUSSOLE site, 1 CTD cast with water sampling, 3 C-OPS profiles (after balance tests) and 1 Secchi disk were performed. Then a PAOLA float, from SHOM has been deployed. After, the transect was completed.

Monday 14 February 2011

The third day, the sea was slight with a gentle breeze and the sky was blue with some clouds and a good visibility. When arrived at the BOUSSOLE site, the buoy was partly underwater and it was hard to find it: only sensors on the top of the buoy were visible. Divers went at sea to clean instruments (which were quite dirty) and to take off the hydrophone of the CRC. They also put a neoprene cap on the HS4 for acquiring one dark measurement. They had to put a LISST-100X (a multi-parameter system for in-situ observations of particle size distribution) on the buoy but strong currents prevented to do it. After the diving, 5 C-OPS profiles and 1 CTD cast were realized before leaving the site.

Tuesday 15 February 2011

The last day, weather conditions were not good enough to sample but the boat went anyway at sea for attempts of CISCO connection with the buoy but unsuccessfully. 1 Secchi disk was performed and 1 sample of water was taken at surface with a bucket for HPLC, Ap and TSM measurements

Cruise Report

Saturday 12 February 2011 (UTC)

People on board: Emilie Diamond, Héloïse Lavigne and Vincent Taillandier.

0605 Departure from the Nice port.
0925 Arrival at the BOUSSOLE site.
0930 CTD 01, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, Ap and TSM.
1015 CISCO connection with the buoy: unsuccessful.
1115 CISCO connection with the buoy: unsuccessful.
1215 CISCO connection with the buoy: unsuccessful.
1220 Departure to the Nice port.
1530 Arrival at the Nice port.

Sunday 13 February 2011 (UTC)

People on board: Emilie Diamond, David Doxaran and Vincenzo Vellucci.

0600 Departure from the Nice port.
0915 Arrival at the BOUSSOLE site: the buoy completely underwater.
0930 CTD 02, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, Ap and TSM.
1030 C-OPS balance tests.
1100 C-OPS 01, 02, 03.
1200 PAOLA float deployment.
1205 Secchi disk 01 (12 m).
1210 Departure to the first transect station.
1255 CTD 03, 400 m with water sampling at 10 m for HPLC and Ap, station 01 (43°25’N 07°48’E).
1350 CTD 04, 400 m, station 02 (43°28’N 07°42’E).
1440 CTD 05, 400 m, station 03 (43°31’N 07°37’E).
1535 CTD 06, 400 m, station 04 (43°34’N 07°31’E).
1625 CTD 07, 400 m, station 05 (43°37’N 07°25’E).
1710 CTD 08, 400 m, station 06 (43°39’N 07°21’E).
1740 Departure to the Nice port.
1810 Arrival at the Nice port.

Monday 14 February 2011 (UTC)

People on board: Emilie Diamond, Malika Kheireddine, Thomas Lorthiois, Vincenzo Vellucci and 4 divers.

0530 Departure from the Nice port.
0840 Arrival at the BOUSSOLE site: attempt to find the buoy.
0910 The buoy found: only sensors on the top of the buoy above the water.
0920 Diving on the buoy for cleaning instruments and taking off the hydrophone. Dark HS4 measurements at 10:00. Too much current to install the LISST.
1030 C-OPS 04, 05, 06, 07, 08.
1215 CTD 09, 400 m with water sampling at 200, 150, 80, 70, 50, 40, 30, 20, 10 and 5 m for HPLC, Ap, TSM and CDOM.
1245 Departure to the Nice port.
1530 Arrival at the Nice port.

Tuesday 15 February 2011 (UTC)

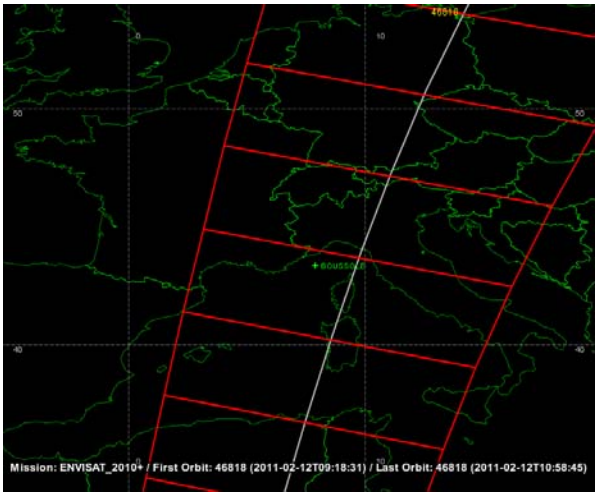
People on board: Emilie Diamond and Grigor Obolensky.

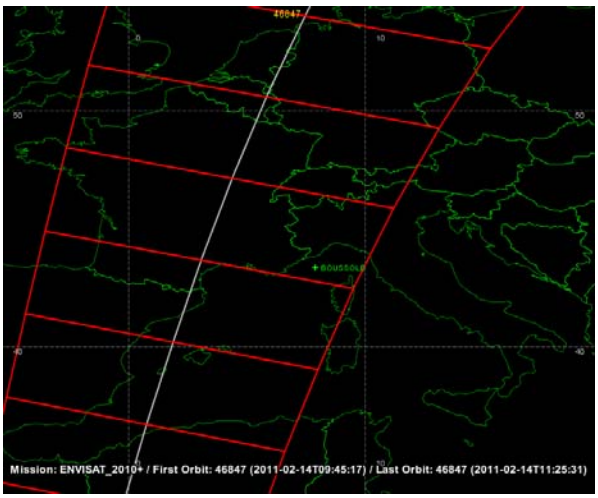
0610 Departure from the Nice port.
0930 Arrival at the BOUSSOLE site: the buoy in normal position.
0945 Secchi disk 02 (11 m).
1355 Bucket at for HPLC, Ap and TSM.
1015 CISCO connection with the buoy: unsuccessful.
1115 CISCO connection with the buoy: unsuccessful.
1120 Departure to the Nice port.
1430 Arrival at the Nice port.

Problems identified during the cruise

- Bad weather prevented good work on BOUSSOLE site for two days.
- Since the 11th of February, the buoy did not send any ARGOS data. The ARGOS connector on the top of the buoy should be cleaned but because of the bad weather or the buoy underwater it was not possible to do it during this cruise.
- The diving day, a LISST-100X (a multi-parameter system for in-situ observations of particle size distribution) should be put on the buoy but currents were too strong to install it.
- The fastening of the CTD pump pipe slid at the beginning of the CTD 01 up cast and at the end of the CTD 02 down cast in spite of new collars fixed each time. So oxygen measurements were noisy.
- On Monday, we had to come back earlier because the captain needs to see a doctor for his knee hurt just before the mission. For the last cruise day, Dany Deneuve replaced Rémy Lafond as captain.

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





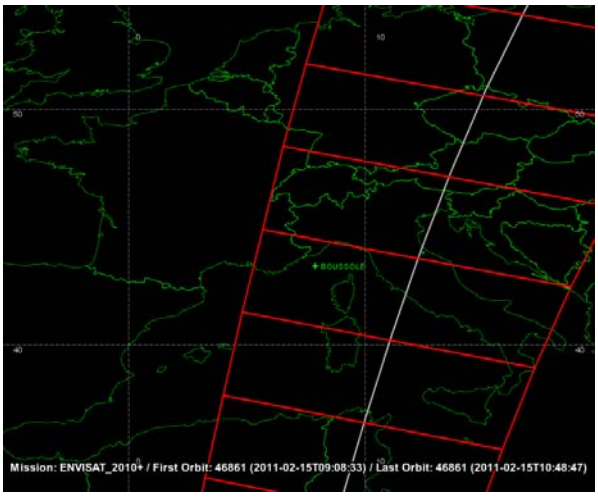


Figure 2. Calculated swath paths for MERIS (Esov NG software) above BOUSSOLE site for 12th, 14th and 15th February 2011.

Appendix

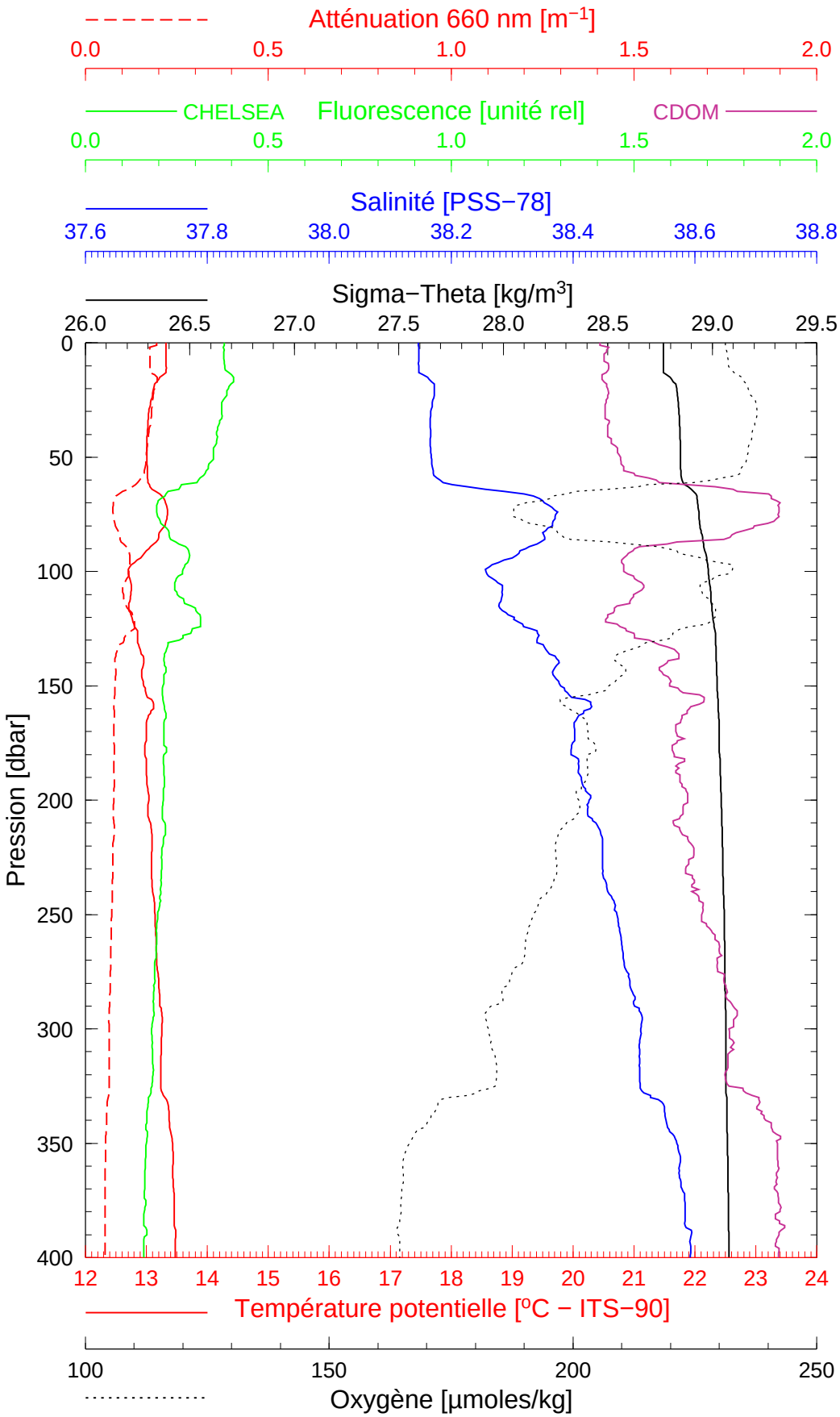
Cruise Summary Table for Boussole 107

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
12/02/11			CTDBOUS001	HPLC, Ap & TSM	09:36	29:00	400	43	22.475	7	53.578	overcast		8	13	88	1017.4	77		12.6	13.3	moved			yes
			CTDBOUS002	HPLC, Ap & TSM	09:48	29:00	400	43	22.732	7	52.545	overcast		8	6	177	1014.7	84		13.1	13.5	calm			no
	bou_c-ops_110213_1025_001_data				10:30	1:19																		
		bou_c-ops_110213_1025_002_data			11:08	4:31	88.5	43	22.953	7	52.000	overcast	Ns&Cb	8	8	259	1014.0	82	medium	12.3		calm	0.7		no
		bou_c-ops_110213_1025_003_data			11:22	3:46	69.9	43	23.134	7	51.646	overcast	Ns&Cb	8	8	259	1014.0	82	medium	12.3		calm	0.7		no
		bou_c-ops_110213_1025_004_data			11:33	4:38	84.4	43	23.292	7	51.383	overcast	Ns&Cb	8	8	259	1014.0	82	medium	12.3		calm	0.7		no
	bou_c-ops_110213_1025_005_data				11:48	1:20																		
13/02/11				Secchi01	12:05	3:00	12	43	22	7	54	overcast		8					medium			calm			no
			CTDBOUS003	HPLC & Ap	12:57	22:00	400	43	25.121	7	47.357	overcast		7	8	284	1012.9	83		12.5	13.4	calm			no
			CTDBOUS004		13:52	21:00	400	43	28.214	7	41.794	overcast		4	10	300	1012.4	81		12.5	13.6	calm			no
			CTDBOUS005		14:41	21:00	400	43	31.042	7	36.786	blue		1	10	102	1012.0	80		12.1	13.5	calm			no
			CTDBOUS006		15:35	21:00	400	43	34.074	7	30.884	blue		2	11	258	1011.6	80		12.2	13.5	calm			no
			CTDBOUS007		16:29	20:00	400	43	37.036	7	24.908	blue		3	11	113	1011.5	82		12.1	13.5	calm			no
			CTDBOUS008		17:14	25:00	400	43	39.022	7	20.993	night		3	8	127	1011.7	82		12.4	13.5	calm			no
	bou_c-ops_110214_1032_001_data				10:33	2:46																		
		bou_c-ops_110214_1032_003_data			11:02	3:23	59.5	43	22.609	7	53.188	blue	Cu&Sc&Cc	5	12	302	1023.0	82	good	11.5		calm	0.6		no
		bou_c-ops_110214_1032_005_data			11:11	2:48	50.5	43	22.649	7	53.153	blue	Cu&Sc&Cc	5	12	302	1023.0	82	good	11.5		calm	0.6		no
14/02/11		bou_c-ops_110214_1032_007_data			11:20	3:42	67.2	43	22.703	7	53.141	blue	Cu&Sc&Cc	4	12	302	1023.0	82	good	11.5		calm	0.6		no
		bou_c-ops_110214_1032_008_data			11:28	2:17	38.7	43	22.818	7	53.102	blue	Cu&Sc&Cc	4	12	302	1023.0	82	good	11.5		calm	0.6		no
		bou_c-ops_110214_1032_010_data			11:45	4:33	83.7	43	23.033	7	52.970	blue	Cu&Sc&Cc	2	12	302	1023.0	82	good	11.5		calm	0.6		no
			CTDBOUS009	HPLC, Ap, TSM & CDOM	12:17	23:00	400	43	22.689	7	52.947	blue		4	8	68	1009.8	80		12.2	13.5	calm			no
15/02/11				Secchi02	09:45	3:00	11	43	22	7	54	overcast		8					medium			moved			yes
				Bucket : HPLC, Ap & TSM	09:50	28:00	surface	43	22	7	54	overcast		8	16	273	1003.3	88		10.7		moved			yes

Note : Ligth conditions more similare between:
* bou_c-ops_110214_1032_003_data, 007_data and _010_data
* bou_c-ops_110214_1032_005_data and _008_data

BOUSSOLE 107 **12/02/2011** **BOUS110212_01**

BOUS001

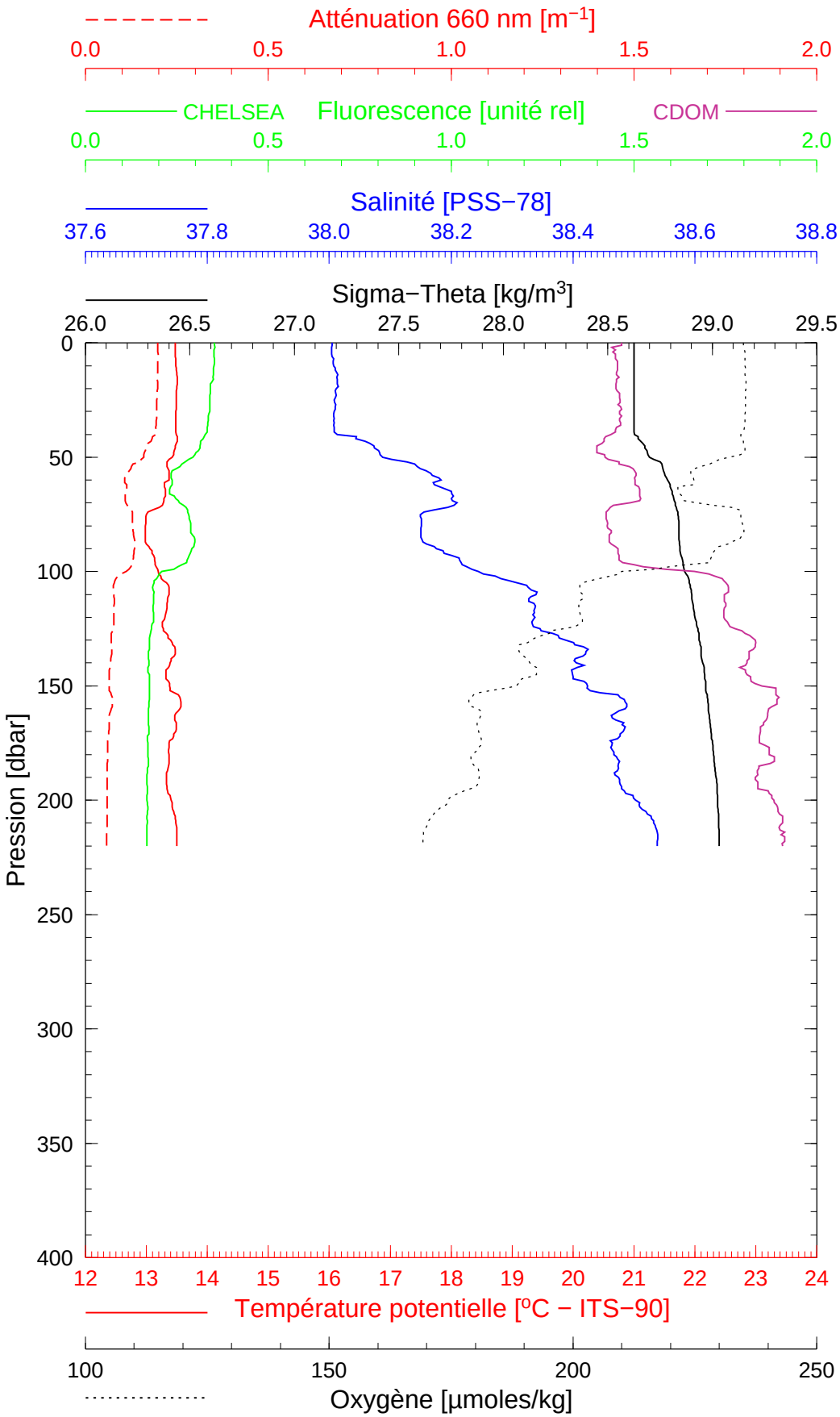


Date *12/02/2011* *Latitude* *43°22.475 N*

Heure déb *09h 36min [TU]* *Longitude* *07°53.578 E*

BOUSSOLE 107 **13/02/2011** **BOUS110213_01**

BOUS002

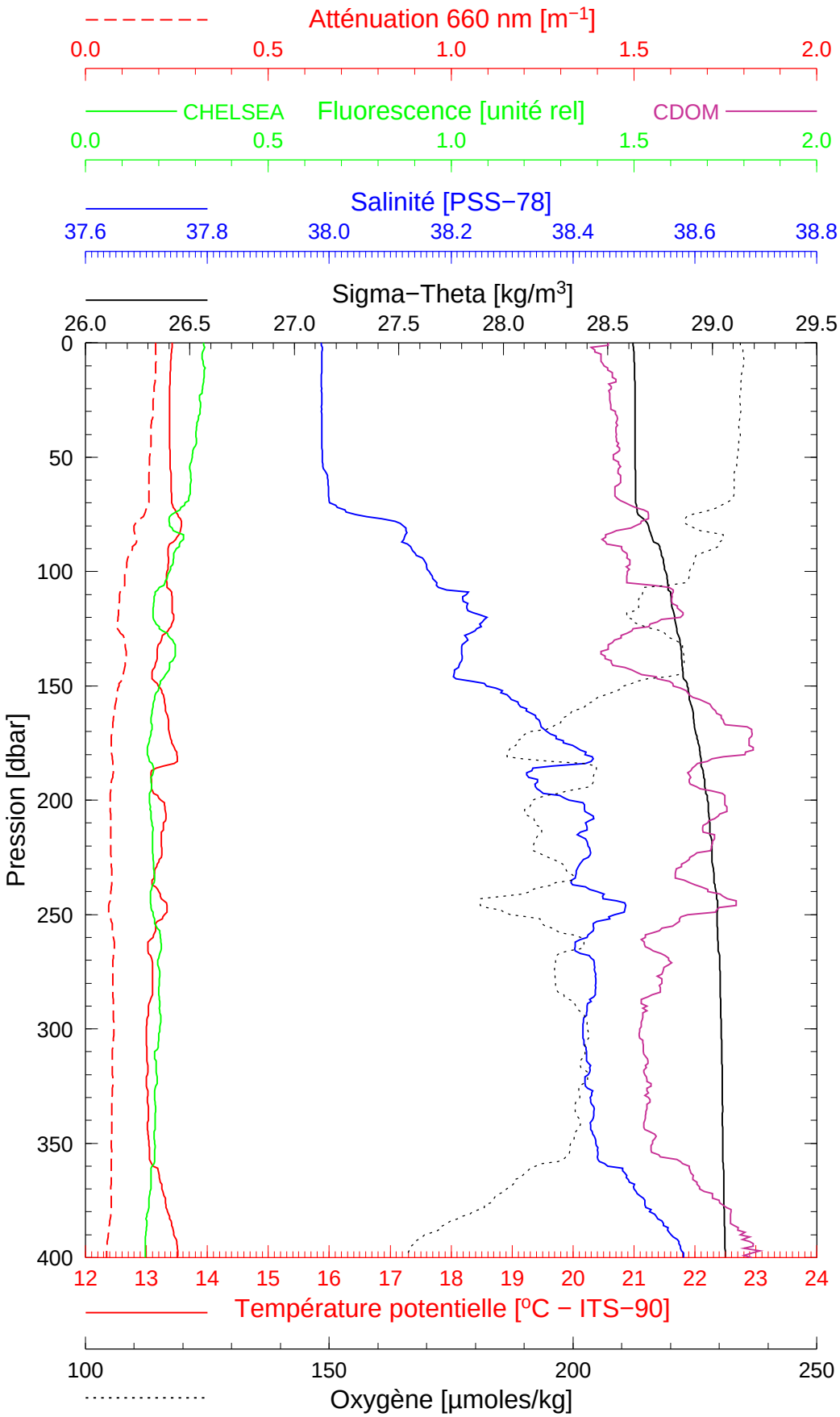


Date *13/02/2011* *Latitude* *43°22.732 N*

Heure déb *09h 48min [TU]* *Longitude* *07°52.545 E*

BOUSSOLE 107 **13/02/2011** **BOUS110213_02**

BOUS003

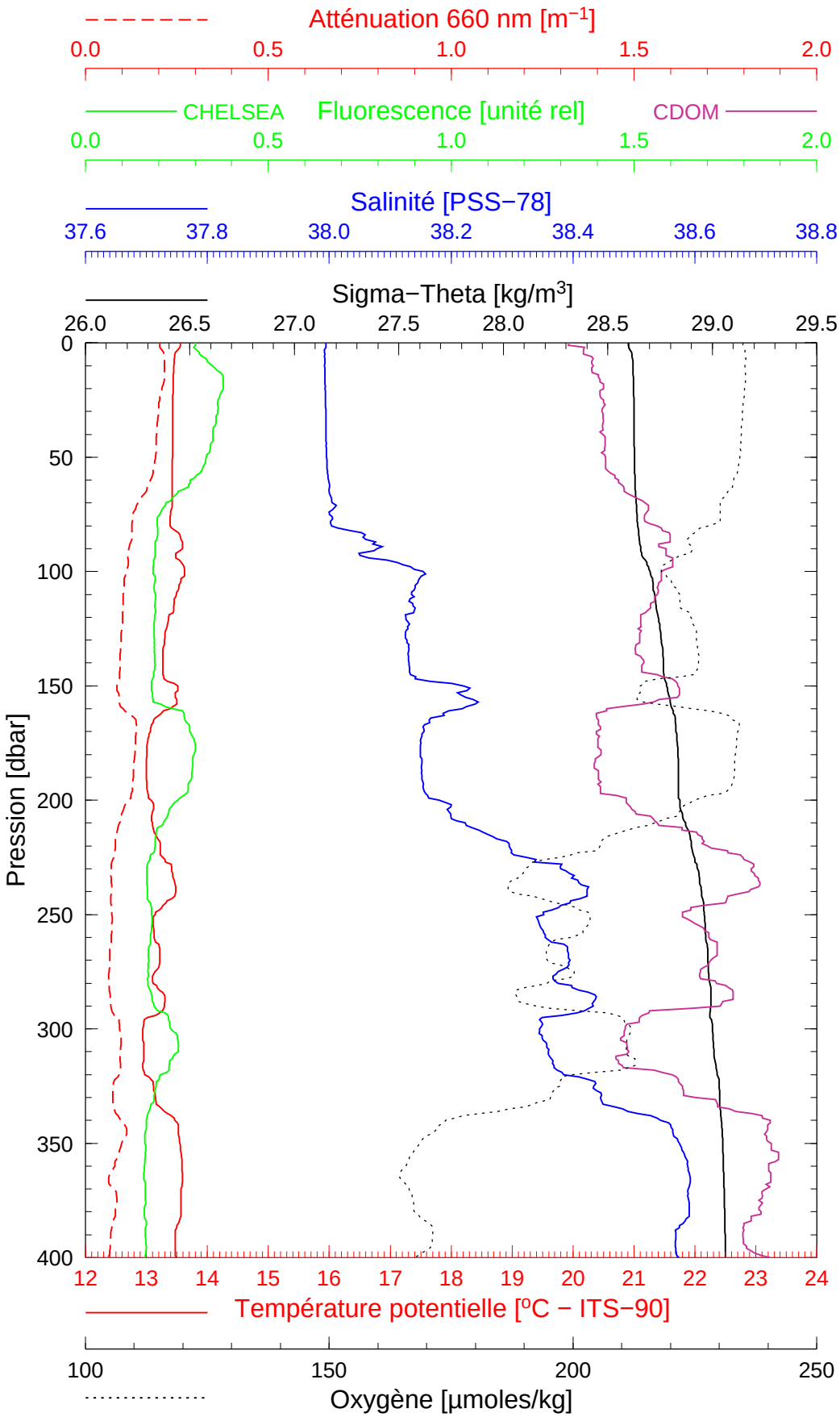


Date *13/02/2011* *Latitude* *43°25.121 N*

Heure déb *12h 57min [TU]* *Longitude* *07°47.357 E*

BOUSSOLE 107 **13/02/2011** **BOUS110213_03**

BOUS004

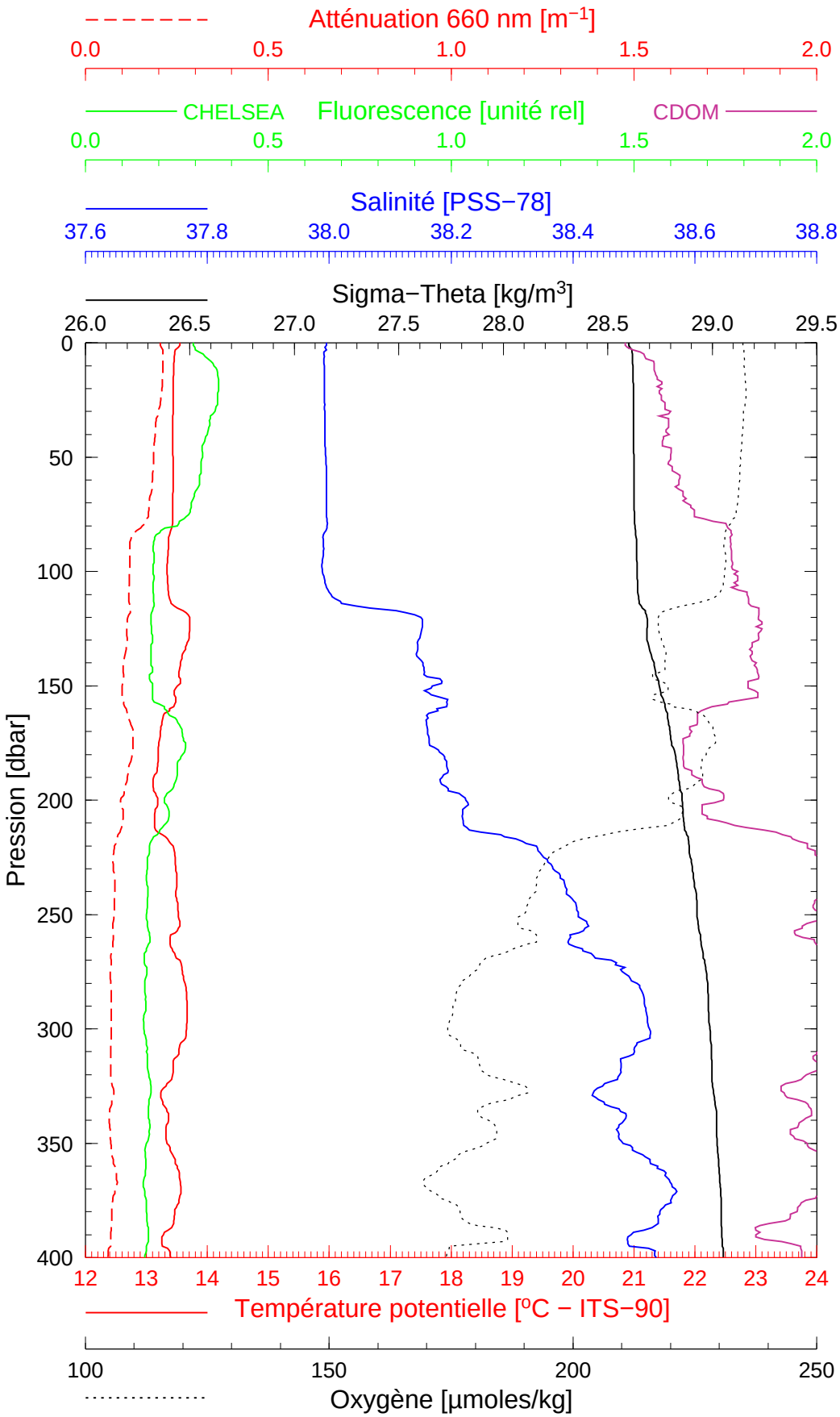


Date *13/02/2011* *Latitude* *43°28.214 N*

Heure déb *13h 52min [TU]* *Longitude* *07°41.794 E*

BOUSSOLE 107 **13/02/2011** **BOUS110213_04**

BOUS005

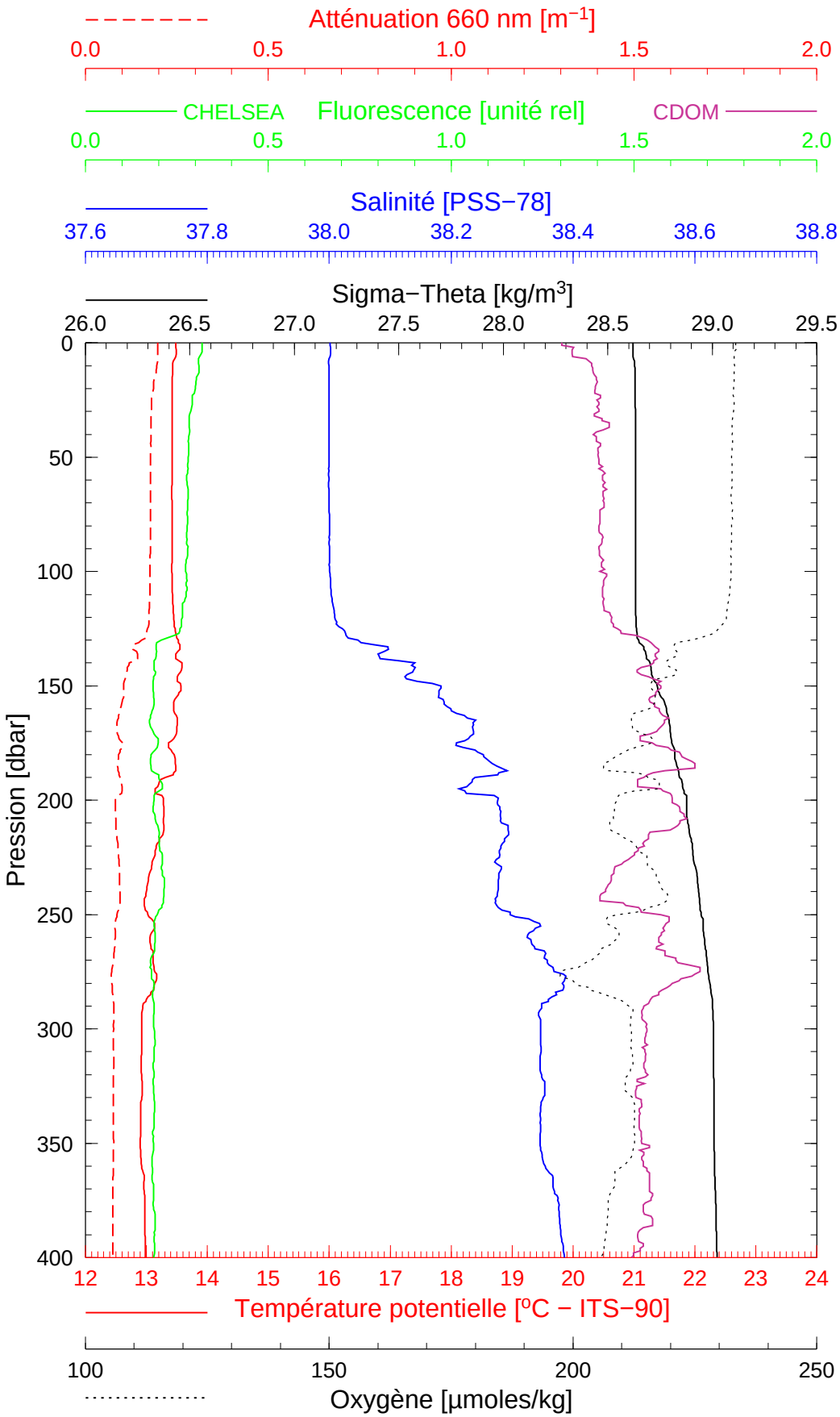


Date *13/02/2011* *Latitude* *43°31.042 N*

Heure déb *14h 41min [TU]* *Longitude* *07°36.786 E*

BOUSSOLE 107 **13/02/2011** **BOUS110213_05**

BOUS006

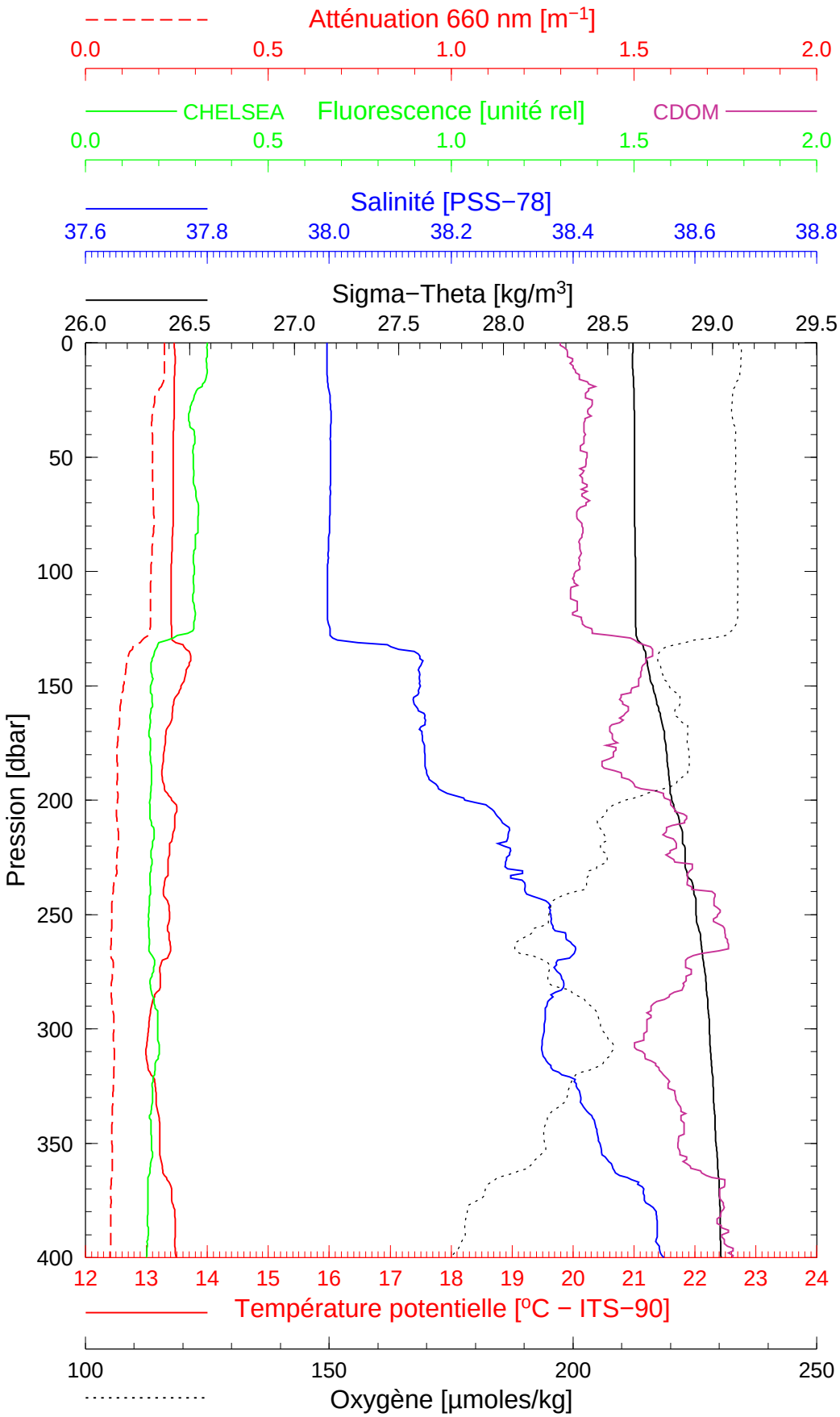


Date *13/02/2011* *Latitude* *43°34.074 N*

Heure déb *15h 35min [TU]* *Longitude* *07°30.884 E*

BOUSSOLE 107 **13/02/2011** **BOUS110213_06**

BOUS007

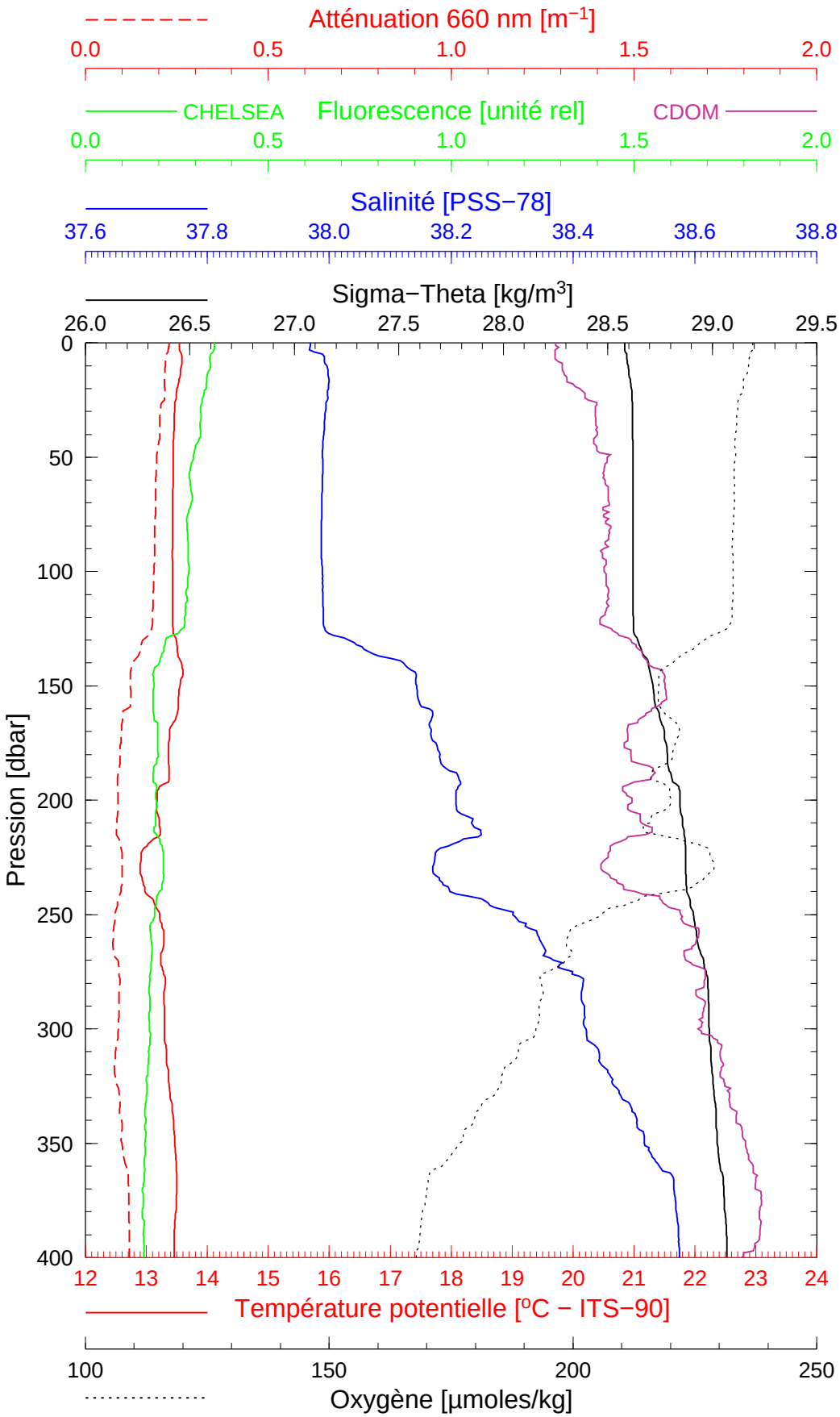


Date *13/02/2011* *Latitude* *43°37.036 N*

Heure déb *16h 29min [TU]* *Longitude* *07°24.908 E*

BOUSSOLE 107 **13/02/2011** **BOUS110213_07**

BOUS008

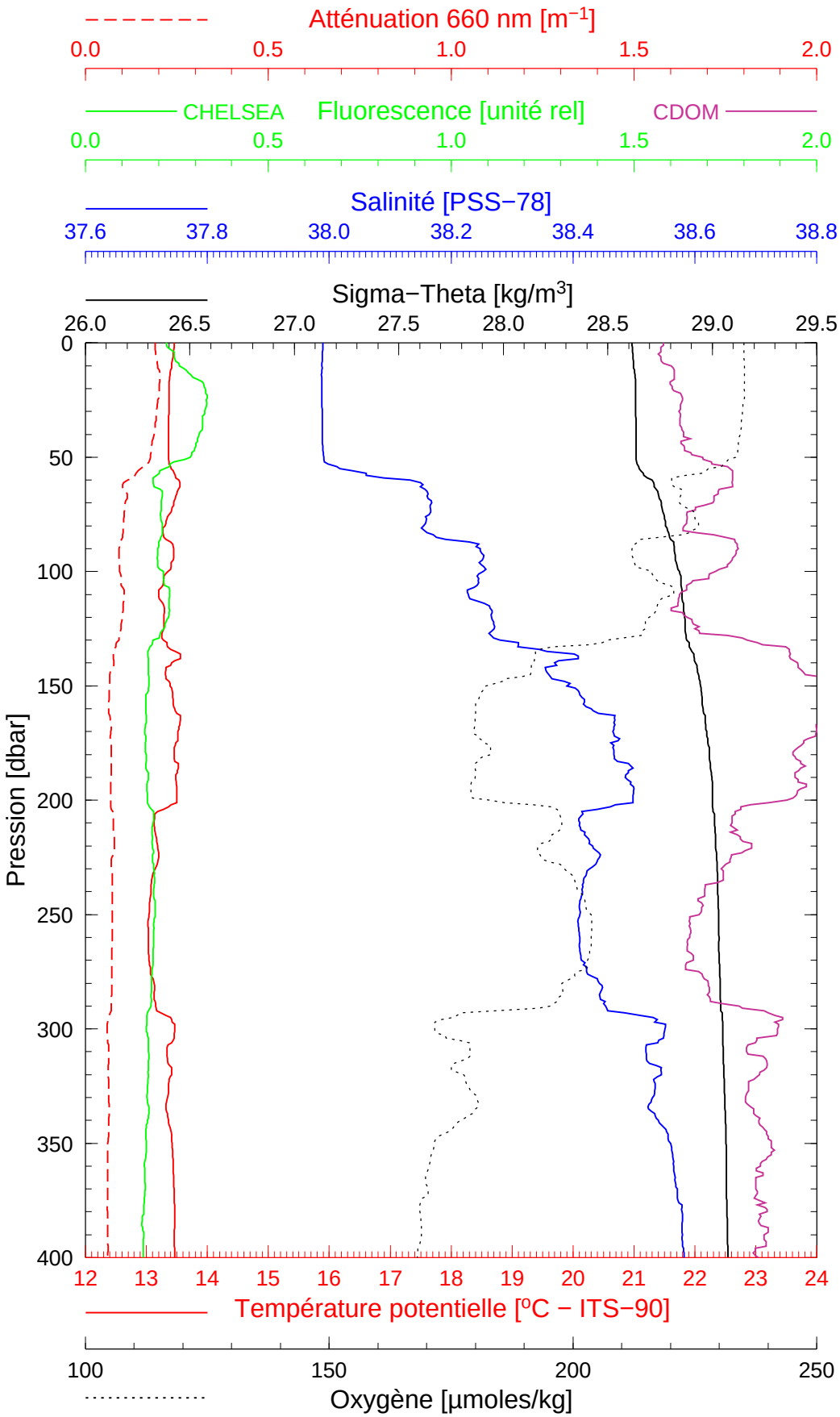


Date *13/02/2011* *Latitude* *43°39.022 N*

Heure déb *17h 14min [TU]* *Longitude* *07°20.993 E*

BOUSSOLE 107 **14/02/2011** **BOUS110214_01**

BOUS009



Date *14/02/2011* *Latitude* *43°22.689 N*

Heure déb *12h 17min [TU]* *Longitude* *07°52.947 E*