BOUSSOLE Monthly Cruise Report

Cruise 104
November 15 – 19, 2010

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

Science Personnel: Céline Bachelier, Florent Besson, Emilie Diamond, Yves Lamblard, David Luquet, Grigor Obolensky, Vincent Taillandier, Vicenzo Vellucci and Pascal (diver).

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

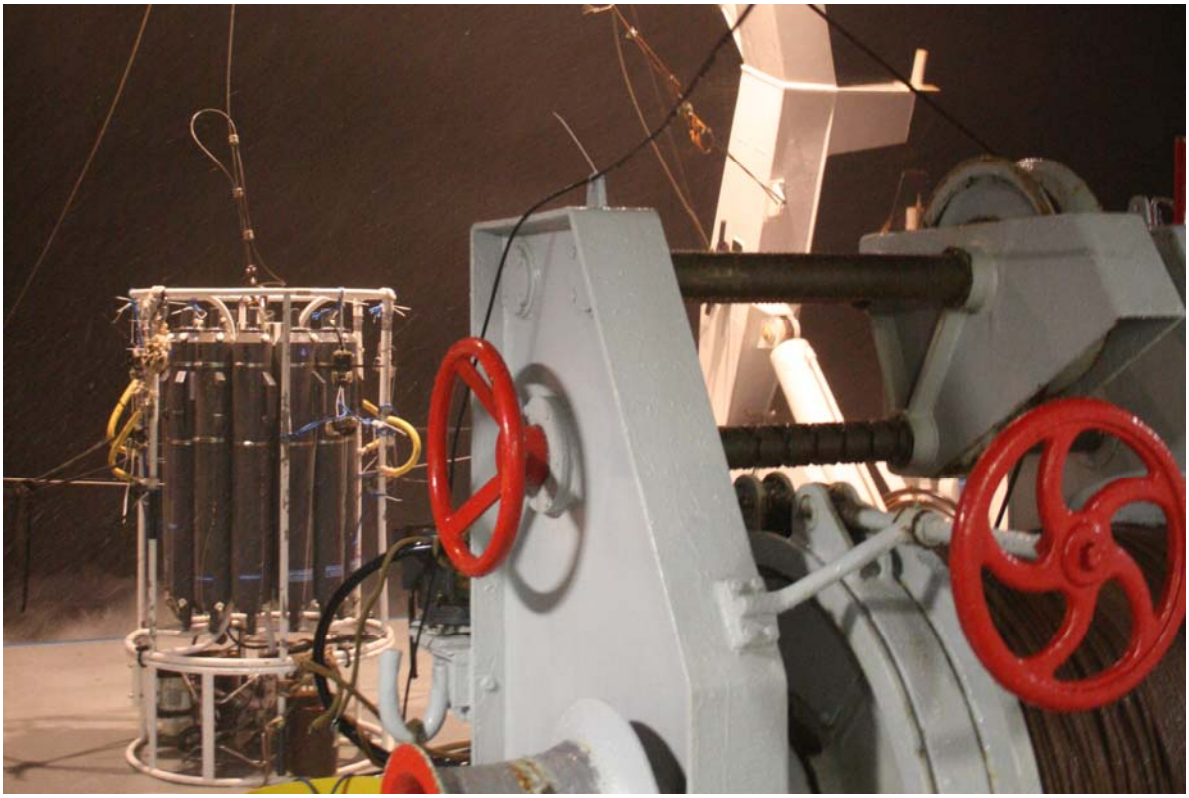


Figure 1. Heavy rain on the way back during the first cruise day.

BOUSSOLE project

ESA/ESRIN contract N° 17286/03/I-OL

Deliverable from WP#400/200

December 07, 2010

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

During the cruise, several elephant seal CTD-fluorometer from the Centre d'Etudes Biologiques of Chizé have been tested on the CTD-rosette. The first day, divers took off the strain sensor from the BOUSSOLE buoy.

Cruise Summary

Three of the four cruise days were used due to the bad weather on the last day. The first cruise day was used for diving operations, balance tests during C-OPS profiles and CTD cast with sampling at the BOUSSOLE site. The second day was used for repairing the CTD deck-unit and for beginning the transect. The third day was used for buoy data retrieval, optical and CTD casts with sampling at the BOUSSOLE site and for completing the transect.

Monday 15 November 2010

The first day, the sea state was slight and the sky was overcast with a gentle breeze. When on site, divers went at sea to clean the instruments and to take off the strain sensor. They also put neoprene caps on the HS4 and on the transmissometers for acquiring three dark measurements. Adjustments on the Biospherical C-OPS were made for a better balance of the instrument during the descent phase of profiles. Then 1 CTD cast with water sampling was performed with the MOOSE CTD probe and without optical sensors because of bad configuration of the BOUSSOLE CTD deck-unit.

Tuesday 16 November 2010

The second day, the oxygen sensor SN 787, arrived from calibration andwas installed on the BOUSSOLE CTD. The morning was mainly used for repairing the deck-unit of the BOUSSOLE CTD which came back from Seabird maintenance with some changes. In fact, the jumpers position was not well configured. When the

solution was found, it was already late so only one CTD cast was performed at the Station 6 of the transect. The sea state was slight with some wind blowing and the sky was overcast.

Wednesday 17 November 2010

The third day, the sea state was moderate and the sky was blue with a gentle breeze. When on site, 2 SPMR and 3 C-OPS profiles were performed. A CISCO connection with the buoy was established for data retrieval. After, 1 CTD cast with water sampling, 1 Secchi disk and 2 sets of CIMEL measurements were performed. Then the transect was completed.

Thursday 18 November 2010

Changing of the Téthys II crew.

Friday 19 November 2010

Another diving was planned for this day, but bad weather prevented departure from the Nice port.

Cruise Report

Monday 15 November 2010 (UTC)

People on board: Florent Besson, Emilie Diamond, Vincenzo Vellucci and 3 divers.

0635 Departure from the Nice port.
1005 Arrival at the BOUSSOLE site.
1010 Diving on the buoy for cleaning instruments, for taking off the strain sensor. Dark HS4 and transmissometers measurements at 10:15, 10:30 and 10:45.
1025 C-OPS tests.
1100 Lunch.
1215 Attempt of CISCO connection with the buoy: unsuccessful.
1225 C-OPS tests.
1355 C-OPS 01, 02.
1600 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.
1630 Departure to the Nice port.
1930 Arrival at the Nice port.

Tuesday 16 November 2010 (UTC)

People on board: Emilie Diamond and Vincent Taillandier.

0730 Tests on CTD deck-unit (check of jumpers, fuses, channels).
1330 Solution found.
1430 Departure from the Nice port.
1455 Arrival at the sixth transect station.
1500 CTD 02, 400 m, station 06 (43°39’N 07°21’E).
1540 Departure to the Nice port.
1605 Arrival at the Nice port.

Wednesday 17 November 2010 (UTC)

People on board: Céline Bachelier, Emilie Diamond and Vincent Taillandier.

0605 Departure from the Nice port.
0920 Arrival at the BOUSSOLE site.
0925 SPMR 01, 02.
1030 C-OPS 03, 04, 05.
1115 Attempt of CISCO connection with the buoy: unsuccessful.
1120 Lunch.
1215 CISCO connection with buoy and data retrieval.
1230 CTD 03, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, Ap, TSM and CDOM.
1235 CIMEL 01, 02.

1305 Secchi disk 01 (16 m).
1310 Departure to the first transect station.
1400 CTD 04, 400 m, station 01 (43°25'N 07°48'E).
1450 CTD 05, 400 m, station 02 (43°28'N 07°42'E).
1540 CTD 06, 400 m, station 03 (43°31'N 07°37'E).
1635 CTD 07, 400 m, station 04 (43°34'N 07°31'E).
1725 CTD 08, 400 m, station 05 (43°37'N 07°25'E).
1745 Departure to the Nice port.
1830 Arrival at the Nice port.

Thursday 18 November 2010

Changing of the Téthys II crew.

Friday 19 November 2010

Bad weather prevented departure from the Nice port.

Problems identified during the cruise

- The deck-unit of the CTD came back from Seabird maintenance with some changes included the jumpers position not well configured. It took times to find the problem so the first day the MOOSE CTD was used for a profile at BOUSSOLE site. The solution was found during the second day.
- The BOUSSOLE oxygen sensor arrived from calibration the 2nd cruise day. From CTD 02, it was SN 787.
- After the 2nd SPMR profile, the connection was lost with the instrument.
- Bad weather prevented departure from the Nice port the last day.

Calculated Swath paths for the MERIS Sensor (ESOV Software)

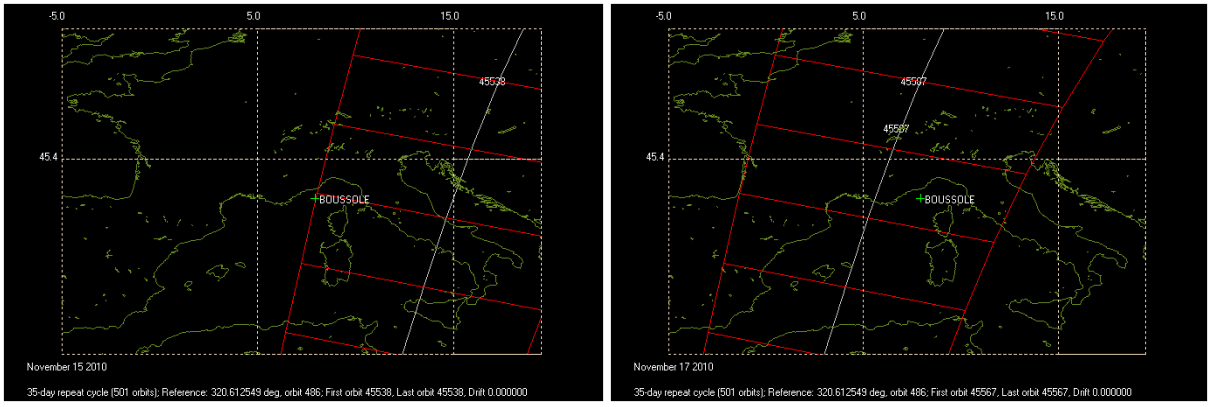
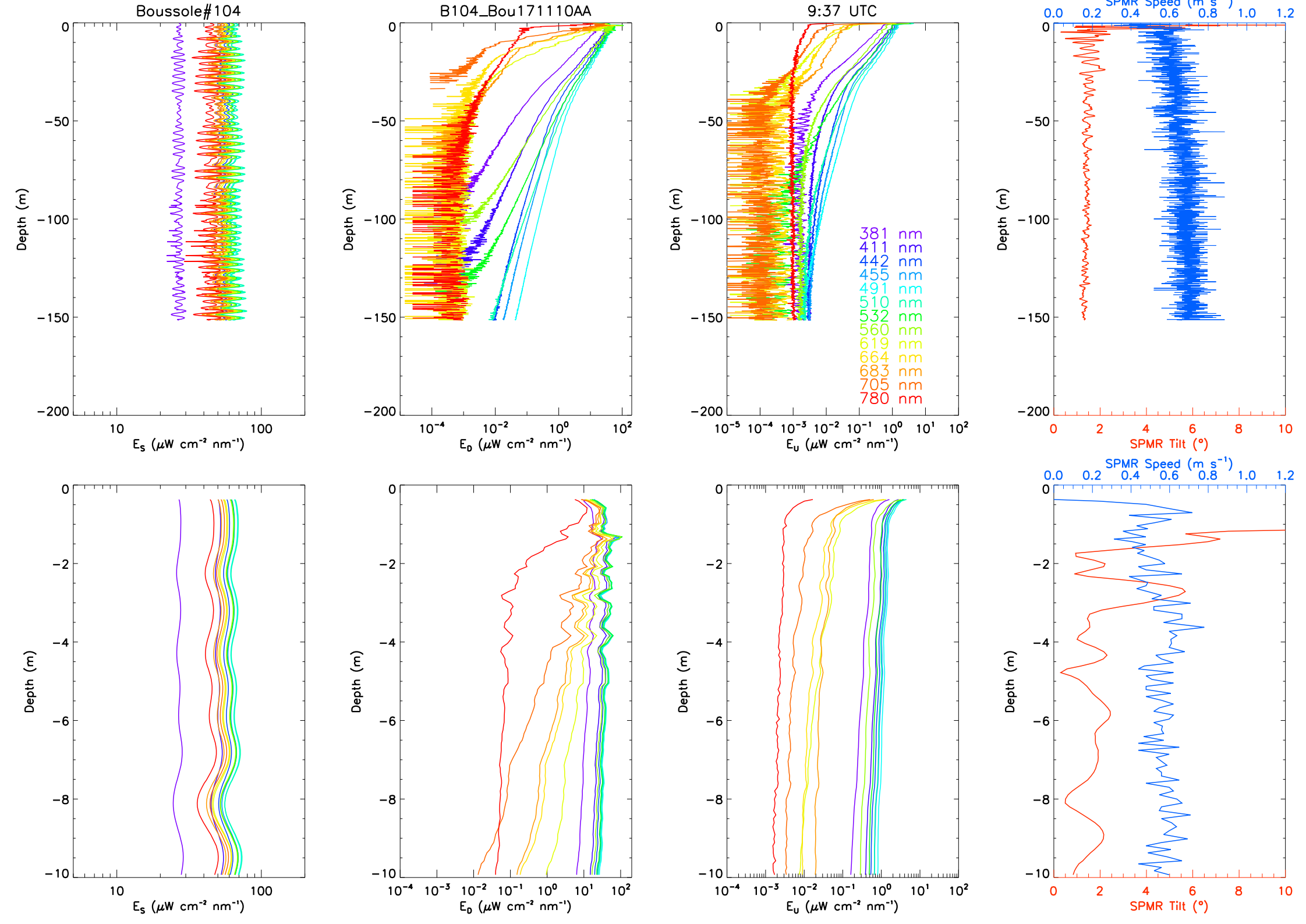


Figure 2. Calculated swath paths for MERIS (Esov software) above BOUSSOLE site for 15th and 17th November 2010.

Appendix

Cruise Summary Table for Boussole 104

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_101115_1225_015_data			13:51	5:57	93	43	22.345	7	55.020	overcast	Sc	8	9	142	1010.0	90	medium	16.7		calm	0.8		no
15/11/10		bou_c-ops_101115_1407_010_data			15:31	4:03	78	43	22.357	7	54.825	overcast	Sc	8	9	142	1010.0	90	medium	16.7		calm	0.8		no
			CTDBOUS001		16:11	19:00	400	43	22.159	7	54.51	overcast		8	11	123	1009.1	94		16.6	16.4	calm			no
16/11/10			CTDBOUS002	HPLC, Ap & TSM	15:04	26:00		43	39.033	7	21.068	overcast		6	1	343	1004.8	71		14.3	18.0	calm			no
	Bou171110black1				09:25	3:00																			
		Bou171110AA			09:37	3:51	151.5	43	22.268	7	53.613	blue	None	0	11	123	1008.2	70	good	14.9		moved	1.5		yes
		Bou171110AE			10:13	4:04	150.5	43	22.227	7	53.048	blue	None	0	11	123	1008.2	70	good	14.9		moved	1.5		yes
		bou_c-ops_101117_1026_001_data			10:34	4:22	78	43	22.259	7	52.698	blue	None	0	11	127	1008.1	68	good	14.9		moved	1.3		yes
		bou_c-ops_101117_1026_002_data			10:45	5:04	99	43	22.316	7	52.532	blue	None	0	11	127	1008.1	68	good	14.9		moved	1.3		yes
		bou_c-ops_101117_1026_003_data			10:57	5:04	100	43	22.407	7	52.346	blue	None	0	11	127	1008.1	68	good	14.9		moved	1.3		yes
	bou_c-ops_101117_1026_004_data				11:21	1:14																			
17/11/10			CTDBOUS003	HPLC, Ap, TSM & CDOM	12:36	26:00	400	43	22.023	7	53.706	blue		1	3	250	1007.7	62		16.6	15.4	moved			yes
				CIMEL01	12:38	8:00		43	21.985	7	53.602	blue		1			1007.6		good						
				CIMEL02	12:50	8:00		43	21.965	7	53.515	blue		1			1007.6		good						
				Secchi01	13:05	3:00	16	43	22	7	54	blue		1					good			moved			yes
			CTDBOUS004		14:03	19:00	400	43	25.230	7	47.722	blue		1	3	71	1007.2	64		15.9	15.5	moved			yes
			CTDBOUS005		14:54	20:00	400	43	28.085	7	42.058	blue		1	4	342	1007.1	69		15.5	15.7	calm			no
			CTDBOUS006		15:44	19:00	400	43	30.944	7	36.792	blue		1	8	296	1007.1	71		14.2	16.8	calm			no
			CTDBOUS007		16:35	19:00	400	43	33.897	7	30.600	night		1	10	276	1007.3	72		14.9	17.8	calm			no
			CTDBOUS008		17:25	16:00	400	43	37.024	7	24.935	night		1	6	74	1007.4	72		15.0	18.0	calm			no
18/11/10	Changing of the crew																								
19/11/10	Bad weather																								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Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
SPMR Speed (m s^{-1})
SPMR Tilt (°)
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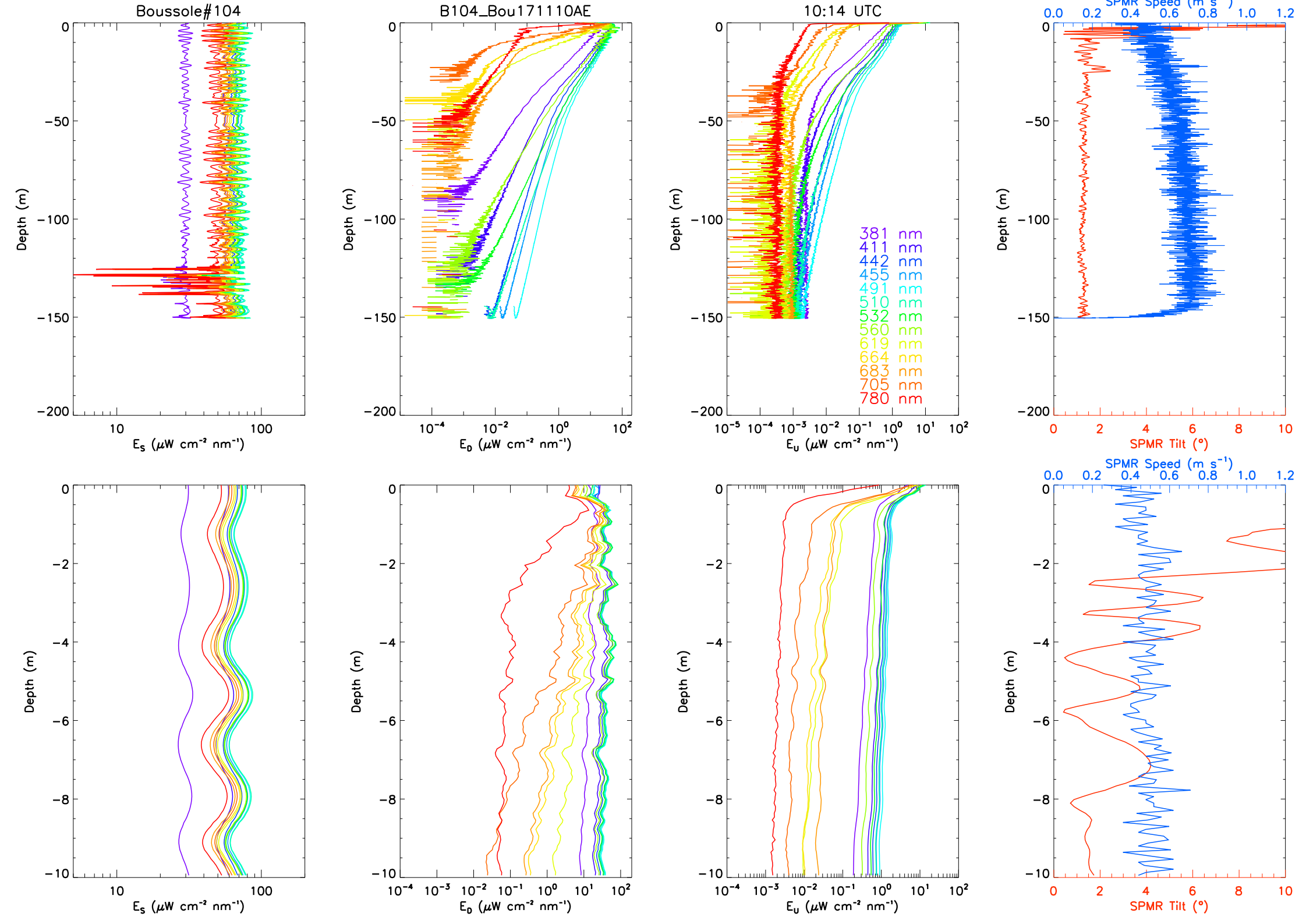
411 nm
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm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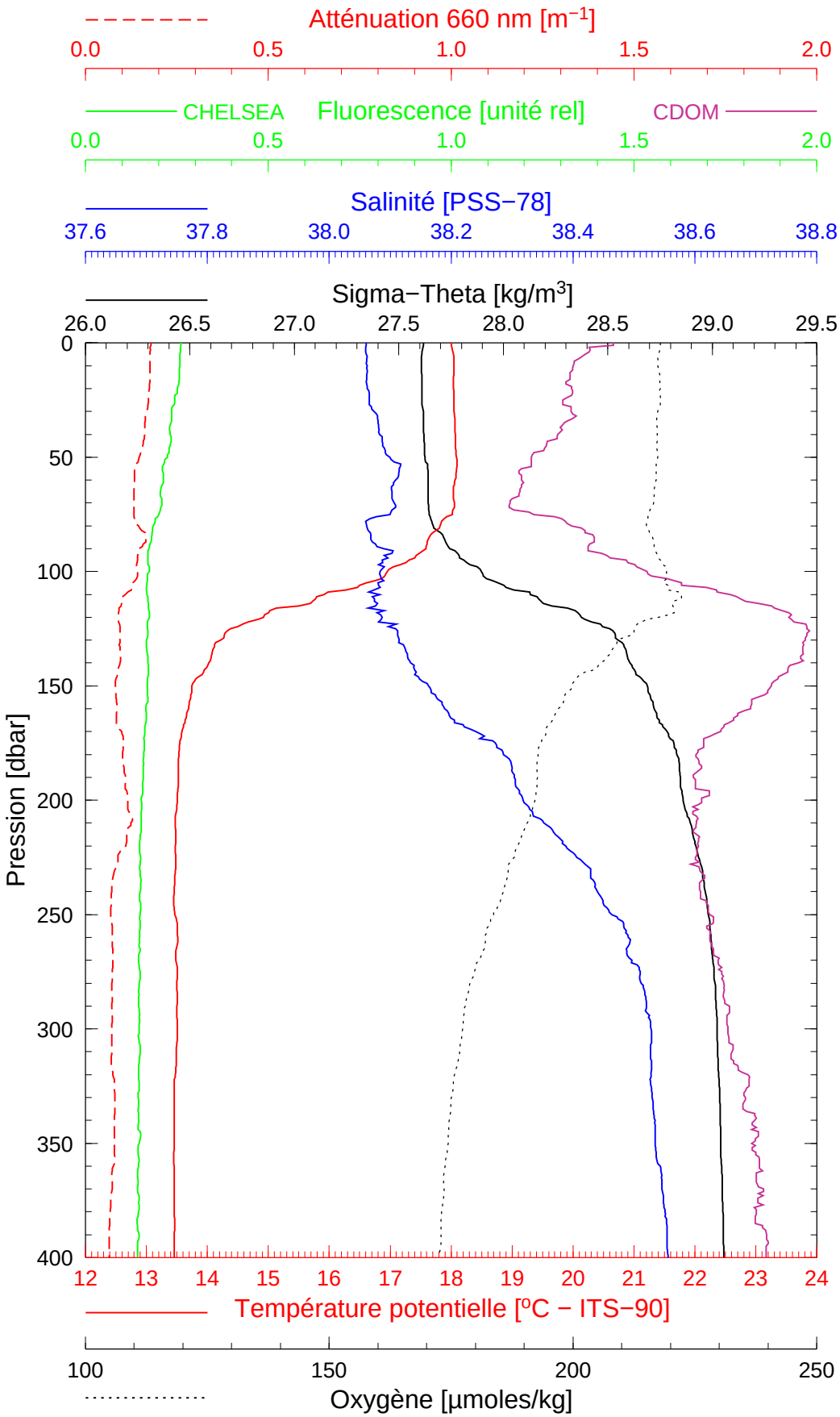
B104_Bou171110AE
10:14 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
381 nm
411 nm
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)

BOUSSOLE 104 **16/11/2010** **BOUS101116_01**

BOUS002

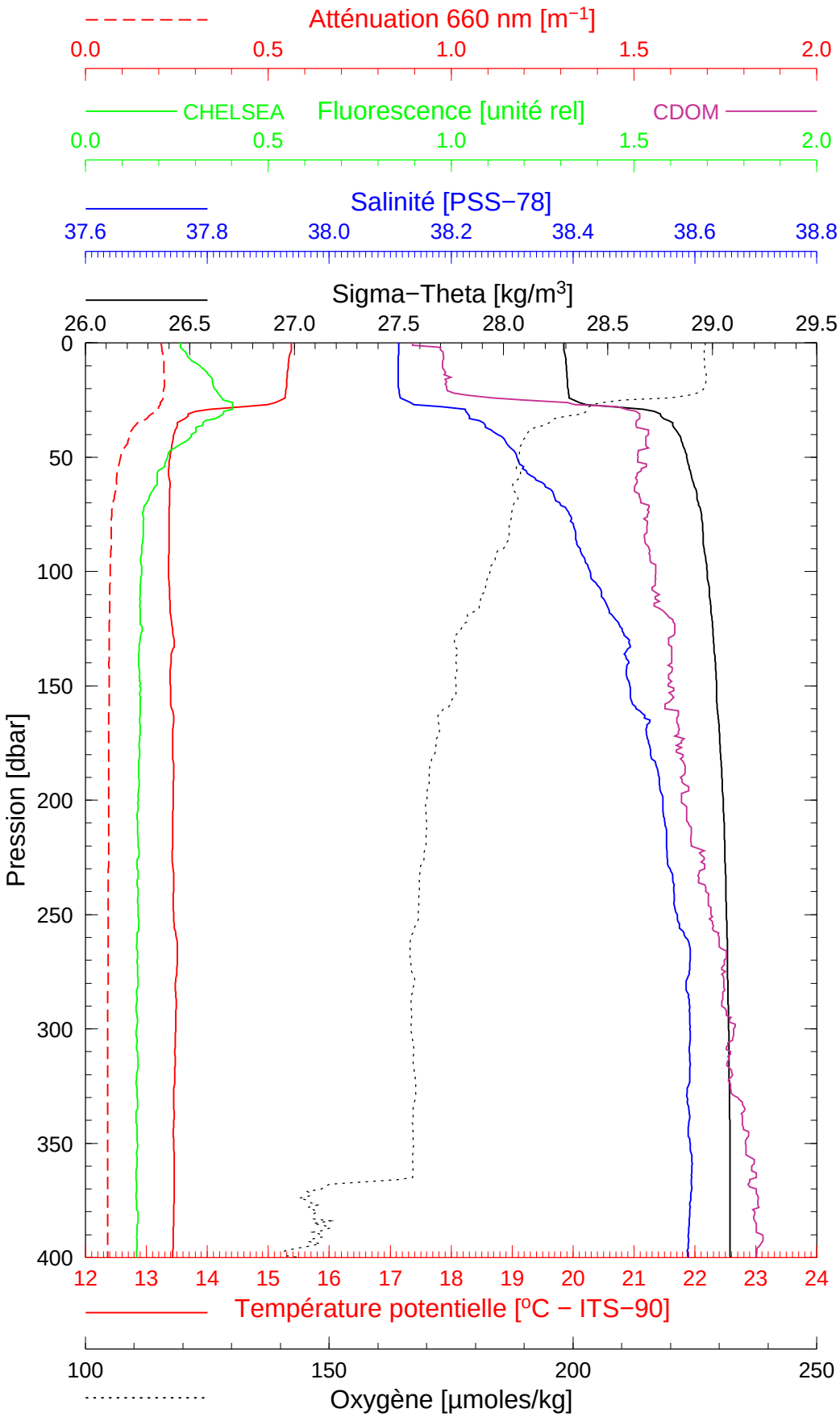


Date *16/11/2010* *Latitude* *43°39.033 N*

Heure déb *15h 04min [TU]* *Longitude* *07°21.068 E*

BOUSSOLE 104 **17/11/2010** **BOUS101117_01**

BOUS003

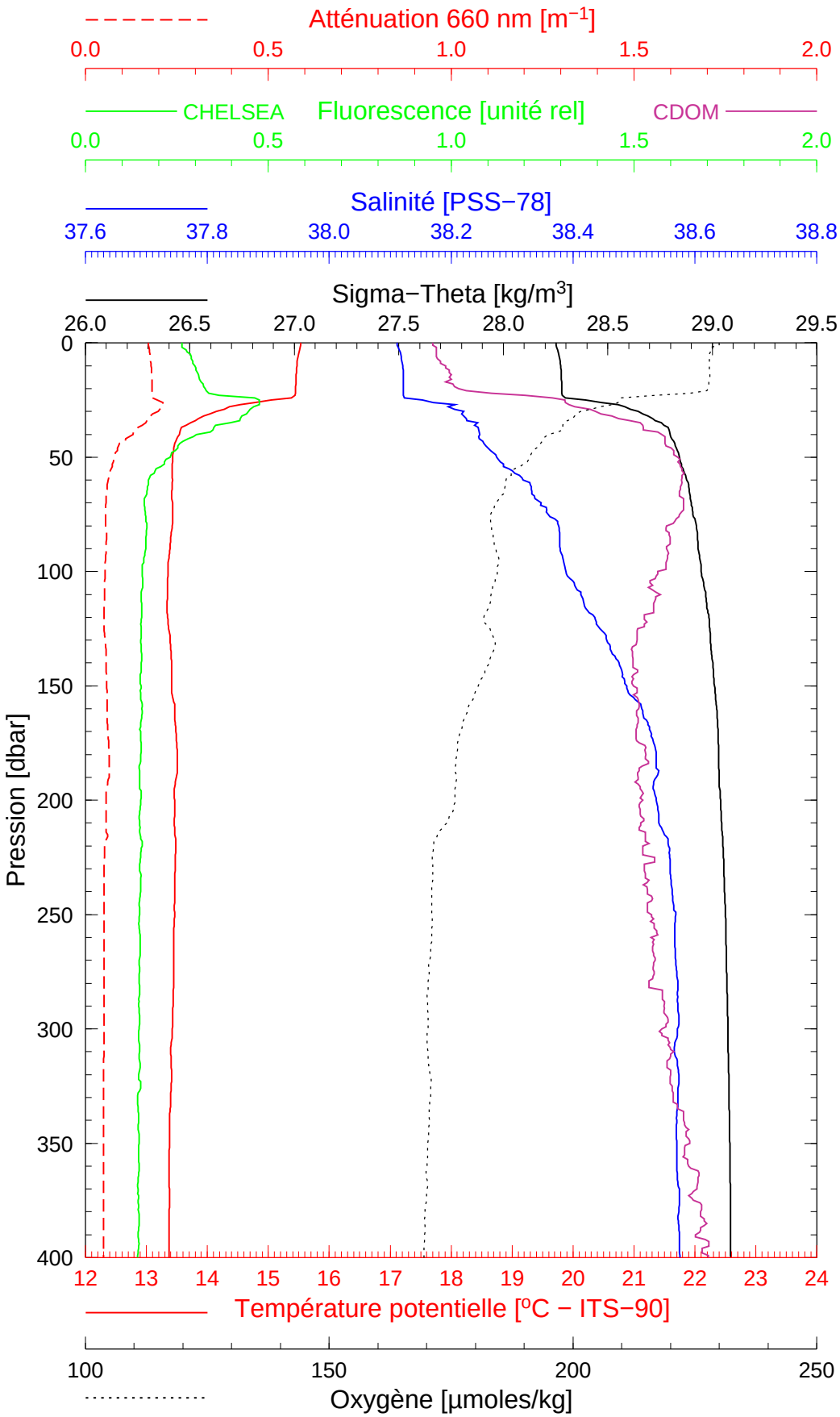


Date *17/11/2010* *Latitude* *43°22.023 N*

Heure déb *12h 36min [TU]* *Longitude* *07°53.706 E*

BOUSSOLE 104 **17/11/2010** **BOUS101117_02**

BOUS004



Date *17/11/2010* *Latitude* *43°25.230 N*

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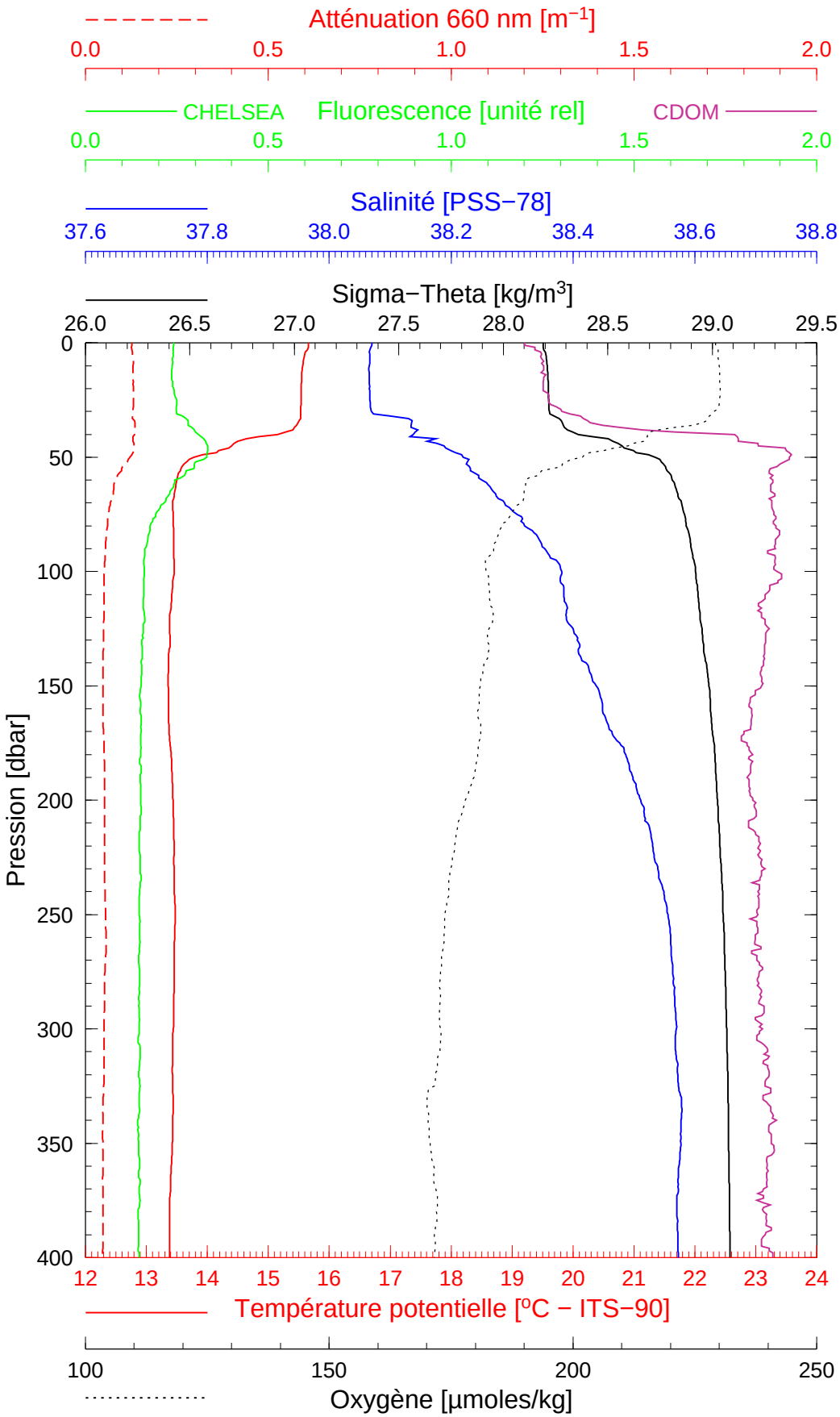
BOUSSOLE 104 **17/11/2010** **BOUS101117_03**

BOUS005



Date *17/11/2010* *Latitude* *43°28.085 N*

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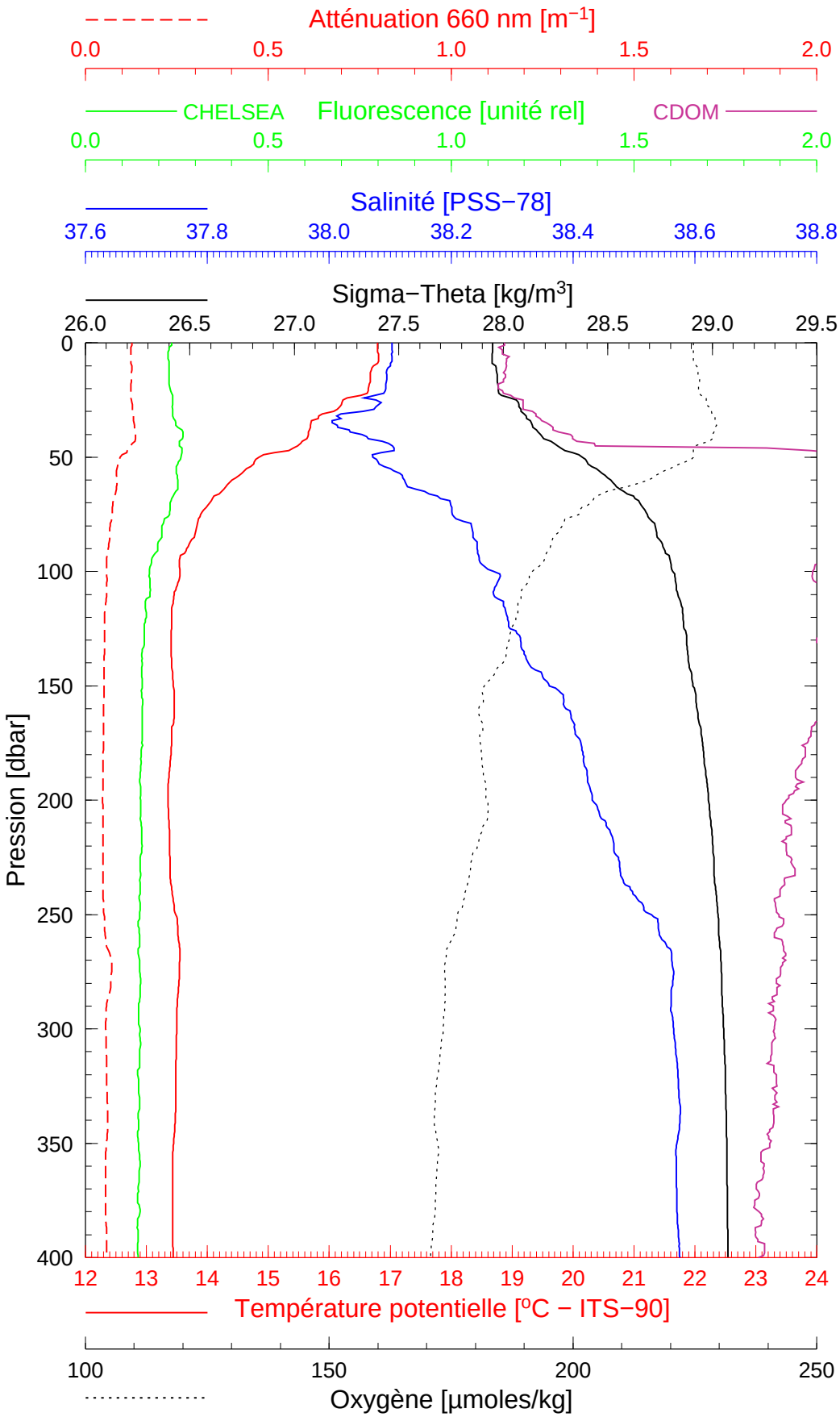
BOUS006



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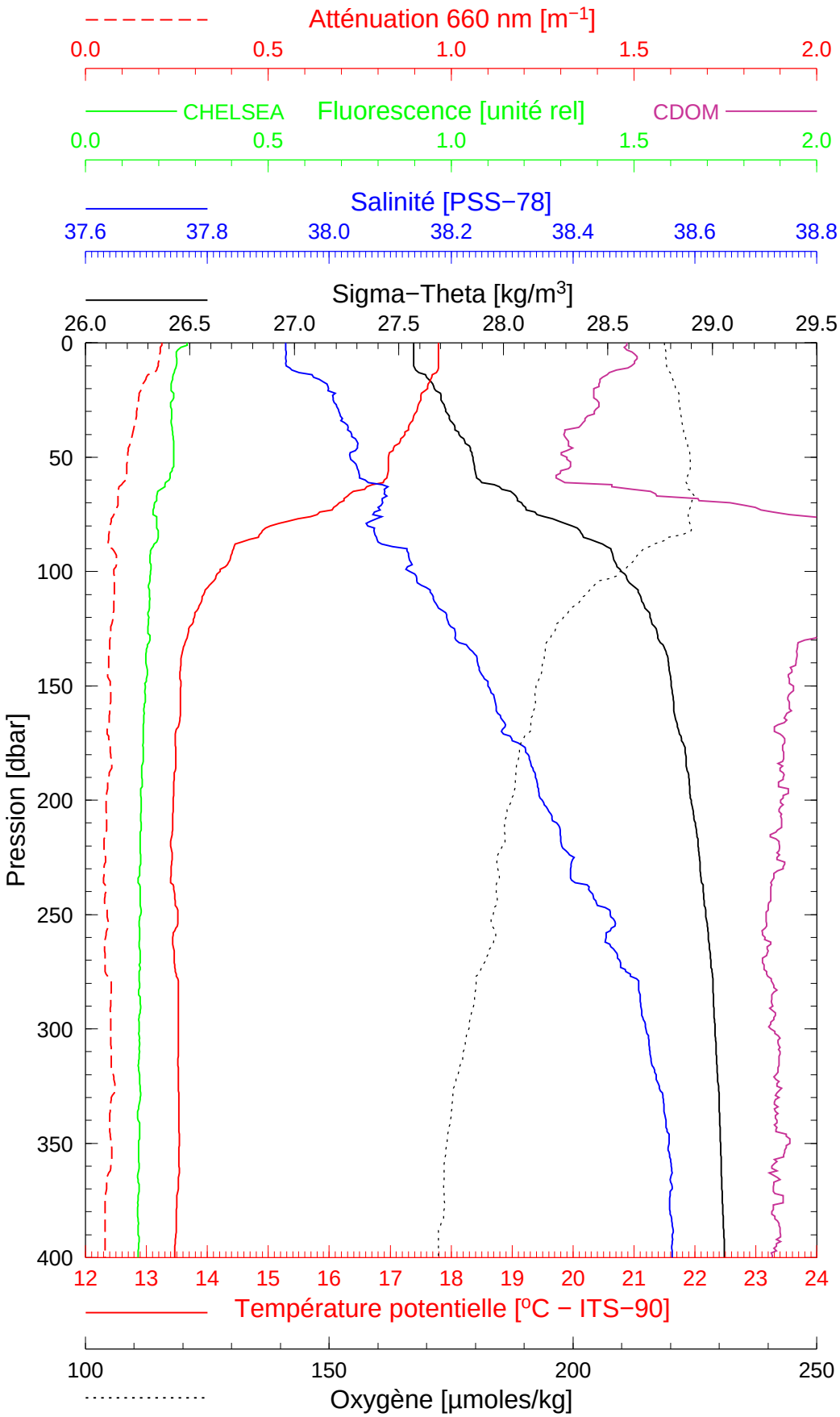
BOUSSOLE 104 **17/11/2010** **BOUS101117_05**

BOUS007



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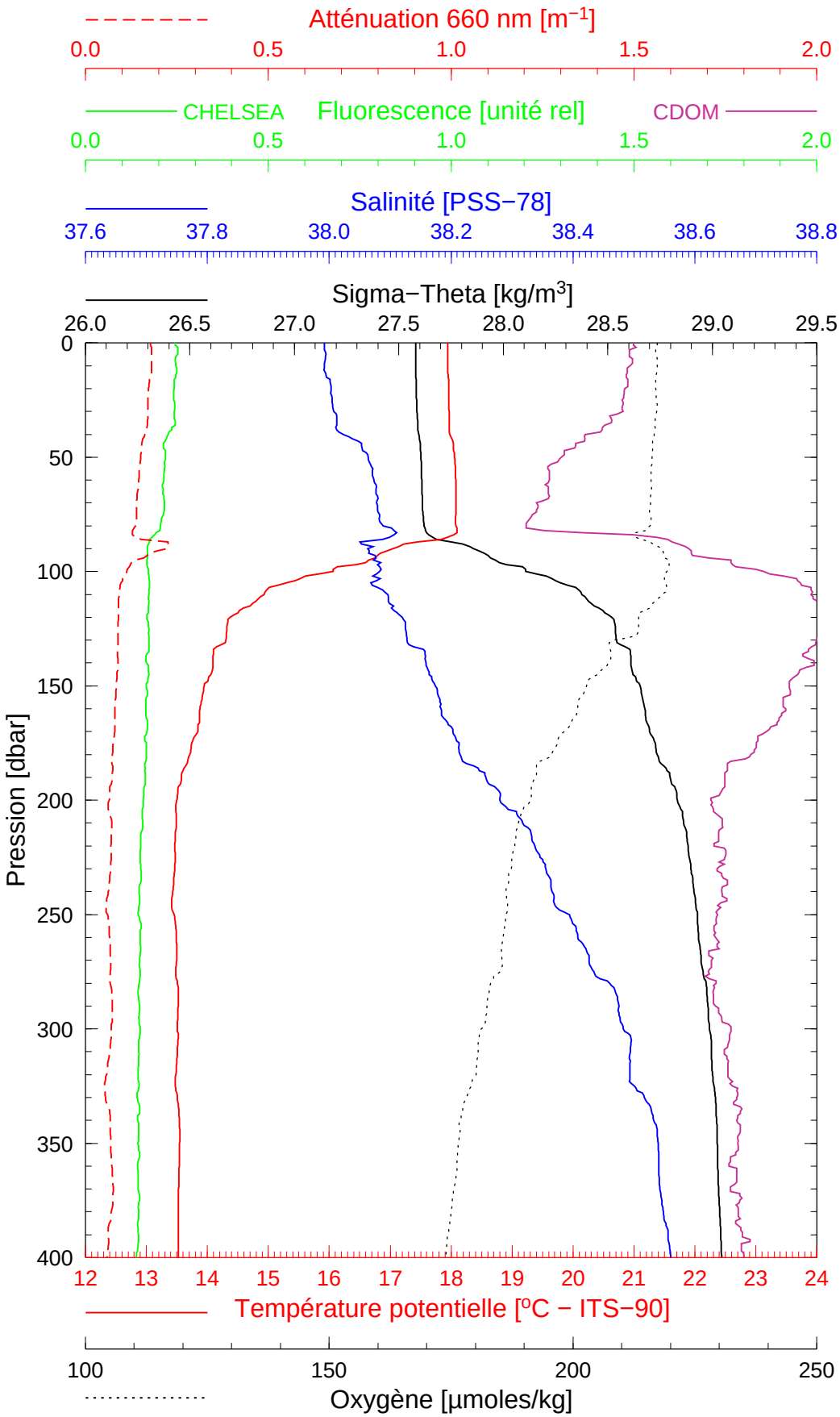
BOUSSOLE 104 **17/11/2010** **BOUS101117_06**

BOUS008



Date *17/11/2010* *Latitude* *43°37.024 N*

Heure déb *17h 25min [TU]* *Longitude* *07°24.935 E*