BOUSSOLE Monthly Cruise Report

Cruise 101
August 4 - 7, 2010

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

Science Personnel: Kathryn Barker, Emilie Diamond, Yves Lamblard, David Luquet, Vincent Taillandier, Manu and Romain (divers).

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

Figure 1. Divers reinstalling one of both underwater Argos beacon on the buoy.

BOUSSOLE project

ESA/ESRIN contract N° 17286/03/I-OL

Deliverable from WP#400/200

August 31, 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

The diving day, the underwater ARGOS beacon was substituted by the one removed the month before for maintenance.

Cruise Summary

All of the three cruise days were used during this mission for optical and atmospheric measurements and CTD casts with water sampling at the BOUSSOLE site. The first day was also used for completing the transect and the last day for diving operations and for buoy data retrieval.

Wednesday 04 August 2010

The first day, the sea was slight, with low wind and the sky was blue. At the BOUSSOLE site, 1 CTD cast with water sampling, 1 set of CIMEL measurements, 3 C-OPS profiles and 1 Secchi disk were performed. Then the transect was completed.

Thursday 05 August 2010

Changing of the Téthys II crew.

Friday 06 August 2010

The second day, the sea was slight, with low wind and the sky was blue with an excellent visibility. At the BOUSSOLE site, 3 SPMR and 6 C-OPS profiles, 3 CTD casts (2 with water sampling), 1 Secchi disk and 4 set of CIMEL measurements were performed. Also, 2 attempts of CISCO connection failed.

Saturday 07 August 2010

The last day, the sea and the sky states were similar to the day before. When arrived at BOUSSOLE site, divers went at sea for cleaning the instruments and substituting the underwater ARGOS beacon by the one removed the month before. Divers also put neoprene caps on the HS4 and on the transmissometers for acquiring three dark measurements. A direct connection with the buoy was established for data retrieval and the CISCO and Argos connections were cleaned. On the top of the buoy, solar panels and instruments were covered of sea birds excrements. They were also cleaned. During this time, 1 CTD cast was performed but stopped at 100 m because of a game fishing boat coming too close. Then another CTD cast with water sampling was performed. After, 6 C-OPS profiles, 2 sets of CIMEL measurements, 1 CTD cast with water sampling and 1 Secchi disk were performed. 2 plankton net samples were also collected.

Cruise Report

Wednesday 04 August 2010 (UTC)

People on board: Kathryn Barker, Emilie Diamond and Vincent Taillandier.

0500 Departure from the Nice port.
0815 Arrival at the BOUSSOLE site.
0820 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.
0830 CIMEL 01.
0905 C-OPS 01, 02, 03.
1000 Secchi disk 01 (22 m).
1010 Departure to the first transect station.
1100 CTD 02, 400 m, station 01 (43°25'N 07°48'E).
1140 CTD 03, 400 m, station 01 (43°25'N 07°48'E): just after CTD 02 to check CDOM sensor.
1230 CTD 04, 400 m, station 02 (43°28'N 07°42'E).
1325 CTD 05, 400 m, station 03 (43°31'N 07°37'E).
1415 CTD 06, 400 m, station 04 (43°34'N 07°31'E).
1505 CTD 07, 400 m, station 05 (43°37'N 07°25'E).
1550 CTD 08, 400 m, station 06 (43°39'N 07°21'E).
1615 Departure to the Nice port.
1645 Arrival at the Nice port.

Thursday 05 August 2010

Changing of the Téthys II crew.

Friday 06 August 2010 (UTC)

People on board: Kathryn Barker, Emilie Diamond and Vincent Taillandier.

0550 Departure from the Nice port.
0920 Arrival at the BOUSSOLE site.
0925 SPMR 01, 02, 03.
1000 C-OPS 04, 05, 06.
1105 CTD 09, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and Ap.
1205 Secchi disk 02 (27 m).
1215 Attempt of CISCO connection with the buoy: unsuccessful.
1225 CIMEL 02.
1240 C-OPS 07, 08, 09.
1340 CTD 10, 400 m.
1345 CIMEL 03, 04.
1415 CTD 11, 400 m with water sampling at 5 m for TSM: just after CTD 10 to check CDOM sensor.
1430 CIMEL 05.
1515 Attempt of CISCO connection with the buoy: unsuccessful.
1520 Departure to the Nice port.
1835 Arrival at the Nice port.

Saturday 07 August 2010 (UTC)

People on board: Kathryn Barker, Emilie Diamond, Vincent Taillandier and 4 divers.

0430 Departure from the Nice port.
0755 Arrival at the BOUSSOLE site.
0800 Diving on the buoy for cleaning instruments, for removing one underwater ARGOS beacon and putting back another one. Dark HS4 and transmissometers measurements at 08:15, 08:30 and 08:45.
0810 CTD 12b, 200 m: stopped because of a game fishing boat coming too close.
0815 CTD 12, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and Ap.
0815 Direct CISCO connection with buoy and data retrieval. Solar panels, instruments, CISCO and ARGOS connections cleaned on the top of the buoy.
0915 C-OPS 10, 11, 12.
1010 CIMEL 06.
1015 C-OPS 13, 14, 15.
1100 CTD 13, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for CDOM and TSM.
1200 2 x Plankton net, 0-100 m.
1225 Secchi disk 03 (22 m).
1230 CIMEL 07
1240 Departure to the Nice port.
1610 Arrival at the Nice port.

Problems identified during the cruise

- The closing system of the 5th bottle Niskin on the CTD rosette was broken, so the Ac9 was at the place of the 5th bottle instead of 12th.
- There were a lot of game fishing boats around the buoy on Saturday. It was nearly dangerous for divers and during CTD casts and optical profiles because some of them came very close to the zodiac or the Téthys II in spite of horn and signals.

Calculated Swath paths for the MERIS Sensor (ESOV Software)

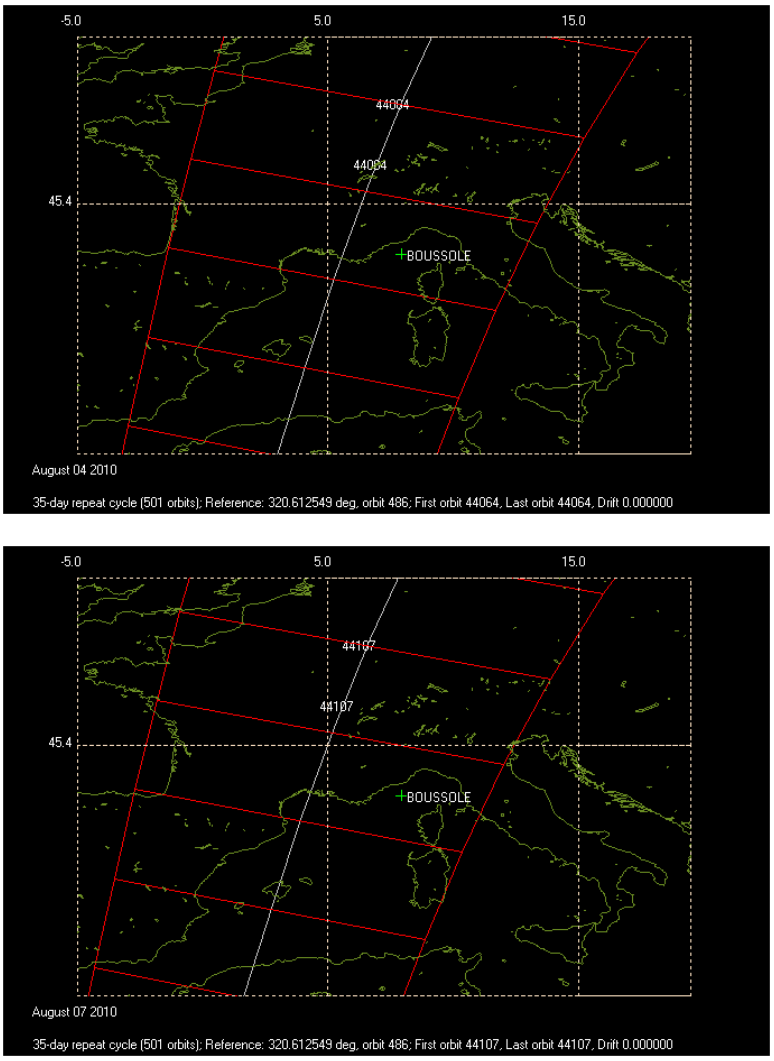
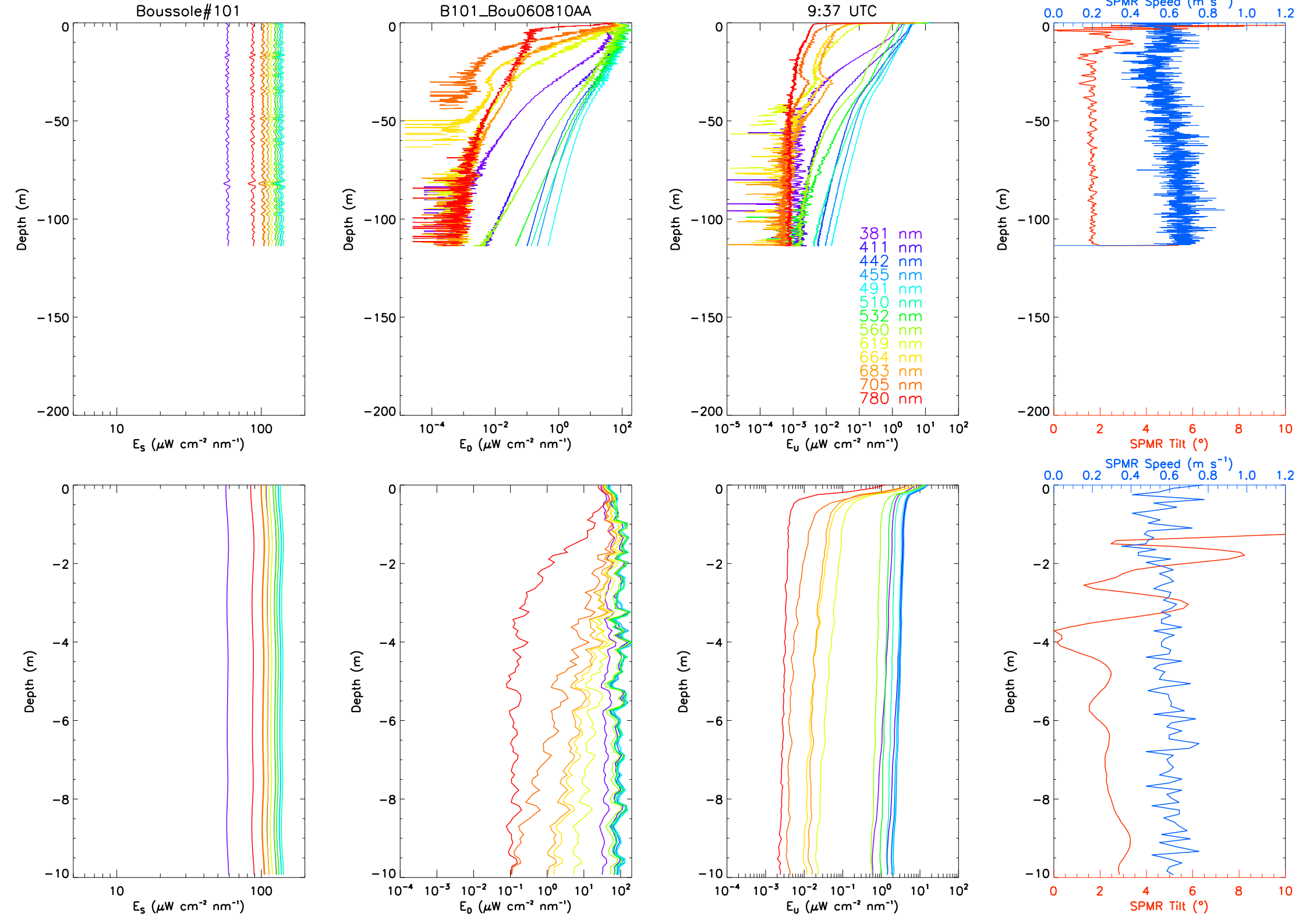


Figure 2. Calculated swath paths for MERIS (Esov software) above BOUSSOLE site for 4th and 7th August 2010.

Appendix

Cruise Summary Table for Boussole 101

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	08:28	30:00	400	43	21.705	7	54.114	blue		2	6	250	1009.4	79		24.4	25.1	calm			no
				CIMEL01	08:32	11:00		43	21.721	7	54.189	blue		1			1009.5		good						
	bou_c-ops_100804_0906_001_data				09:09	1:27																			
		bou_c-ops_100804_0906_002_data			09:16	4:41	108	43	21.713	7	54.200	blue	Cu	1	3	255	1009.5	77	good	25.4		calm	0.6		no
		bou_c-ops_100804_0906_003_data			09:28	4:04	93	43	21.614	7	54.119	blue	Cu	1	3	255	1009.5	77	good	25.4		calm	0.6		no
		bou_c-ops_100804_0906_005_data			09:50	3:04	66	43	21.585	7	53.272	blue	Cu	1	3	255	1009.5	77	good	25.4		calm	0.6		no
	bou_c-ops_100804_0906_006_data				10:06	1:26																			
04/08/10				Secchi01	10:00	3:00	22	43	22	7	54	blue		1					good			calm			no
			CTDBOUS002		11:18	20:00	400	43	25.024	7	48.081	blue		3	2	303	1009.1	73		26.2	25.3	calm			no
			CTDBOUS003		11:39	21:00	400	43	24.992	7	48.131	blue		3	2	303	1009.1	73		26.2	25.2	calm			no
			CTDBOUS004		12:35	19:00	400	43	27.970	7	42.014	blue		3	1	260	1008.7	73		25.5	24.8	calm			no
			CTDBOUS005		13:25	18:00	400	43	31.008	7	36.984	blue		3	5	251	1008.4	72		25.4	25.3	calm			no
			CTDBOUS006		14:16	19:00	400	43	34.000	7	31.019	blue		4	7	226	1008.2	73		25.6	25.2	calm			no
			CTDBOUS007		15:08	18:00	400	43	36.948	7	24.991	blue		2	5	88	1007.7	74		25.7	25.7	calm			no
			CTDBOUS008		15:51	21:00	400	43	39.059	7	20.939	blue		4	6	101	1007.3	73		25.7	25.3	calm			no
05/08/10	Changing of the crew																								
	Bou060810black1				09:28	3:00																			
		Bou060810AA			09:37	3:11	114	43	22.134	7	53.280	blue	None	0	3	353	1009.9	69	excellent	23.4		calm	0.8		no
		Bou060810AB			09:44	3:26	130	43	22.175	7	53.170	blue	None	0	3	353	1009.9	69	excellent	23.4		calm	0.8		no
		Bou060810AC			09:52	3:20	120	43	22.248	7	53.021	blue	None	0	3	353	1009.9	69	excellent	23.4		calm	0.8		no
	bou_c-ops_100806_0957_001_data				10:04	1:24																			
		bou_c-ops_100806_0957_002_data			10:14	4:28	103	43	22.089	7	53.470	blue	None	0	5	282	1010.3	69	excellent	23.5		calm	0.8		no
		bou_c-ops_100806_0957_003_data			10:27	4:36	99	43	22.160	7	53.070	blue	None	0	5	282	1010.3	69	excellent	23.5		calm	0.8		no
		bou_c-ops_100806_0957_004_data			10:39	4:43	106	43	22.300	7	52.720	blue	None	0	5	282	1010.3	69	excellent	23.5		calm	0.8		no
	bou_c-ops_100806_0957_005_data				10:55	1:26																			
			CTD009	HPLC & Ap	11:11	34:00	400	43	22.192	7	53.759	blue		0	5	246	1010.5	67		23.7	24.0	calm			no
06/08/10				Secchi02	12:05	4:00	27	43	22	7	54	blue		0					excellent			calm			no
				CIMEL02	12:25	8:00		43	22.203	7	53.938	blue		0			1010.8		excellent						
	bou_c-ops_100806_1242_001_data				12:44	1:28																			
		bou_c-ops_100806_1242_002_data			12:55	4:33	107	43	22.284	7	53.974	blue	None	0	5	146	1010.9	70	excellent	23.8		calm	0.7		no
		bou_c-ops_100806_1302_001_data			13:07	4:32	105	43	22.484	7	54.025	blue	None	0	5	146	1010.9	70	excellent	23.8		calm	0.7		no
		bou_c-ops_100806_1302_002_data			13:21	4:05	94	43	22.748	7	54.262	blue	None	0	5	146	1010.9	70	excellent	23.8		calm	0.7		no
	bou_c-ops_100806_1302_003_data				13:41	1:25																			
			CTD010		13:47	26:00	400	43	22.441	7	54.250	blue		0	10	157	1010.8	67		23.3	24.1	calm			no
				CIMEL03	13:47	11:00		43	22.524	7	54.319	blue		0			1010.8		excellent						
				CIMEL04	14:06	8:00		43	22.524	7	54.319	blue		0			1010.8		excellent						
			CTD011	TSM	14:13	25:00	400	43	22.660	7	54.476	blue		0	7	131	1010.8	68		23.6	24.9	calm			no
				CIMEL05	14:32	7:00		43	22.800	7	54.632	blue		0			1010.8		excellent						
			CTDBOUS012b		08:10	3:00	100	43	22.099	7	54.303	blue		0	6	246	1015.9	72		23.2	23.9	calm			no
			CTDBOUS012	HPLC & Ap	08:18	34:00	400	43	22.099	7	54.303	blue		0	6	246	1015.9	72		23.2	23.9	calm			no
	bou_c-ops_100807_0914_001_data				09:19	1:43																			
		bou_c-ops_100807_0914_002_data			09:25	5:22	125	43	21.874	7	53.824	blue	Cu	1	6	232	1016.3	72	excellent	22.9		calm	0.8		no
		bou_c-ops_100807_0914_003_data			09:38	4:12	96	43	21.923	7	53.630	blue	Cu	1	6	232	1016.3	72	excellent	22.9		calm	0.8		no
		bou_c-ops_100807_0914_004_data			09:49	4:46	110	43	21.890	7	53.710	blue	Cu	1	6	232	1016.3	72	excellent	22.9		calm	0.8		no
	bou_c-ops_100807_0914_006_data				10:11	1:56																			
07/08/10				CIMEL06	10:00	10:00		43	21.853	7	53.586	blue		1			1016.3		excellent						
	bou_c-ops_100807_0914_008_data				10:21	1:23																			
		bou_c-ops_100807_0914_009_data			10:25	5:07	116	43	21.770	7	53.630	blue	Cu	1	8	253	1016.4	73	excellent	22.9		calm	0.7		no
		bou_c-ops_100807_0914_010_data			10:40	4:18	100	43	21.700	7	53.920	blue	Cu	1	8	253	1016.4	73	excellent	22.9		calm	0.7		no
		bou_c-ops_100807_0914_011_data			10:51	4:24	102	43	21.674	7	54.287	blue	Cu	1	8	253	1016.4	73	excellent	22.9		calm	0.7		no
	bou_c-ops_100807_0914_012_data				11:07	2:46																			
			CTD013	CDOM & TSM	11:16	36:00	400	43	21.778	7	54.408	blue		1	7	102	1016.3	73		23.1	24.3	calm			no
				Secchi03	12:25	3:00	22	43	22	7	54	blue		1					excellent			calm			no
				CIMEL07	12:28	16:00		43	21.780	7	54.063	blue		1			1016.5		excellent						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E_U (μW cm^{-2} nm^{-1})
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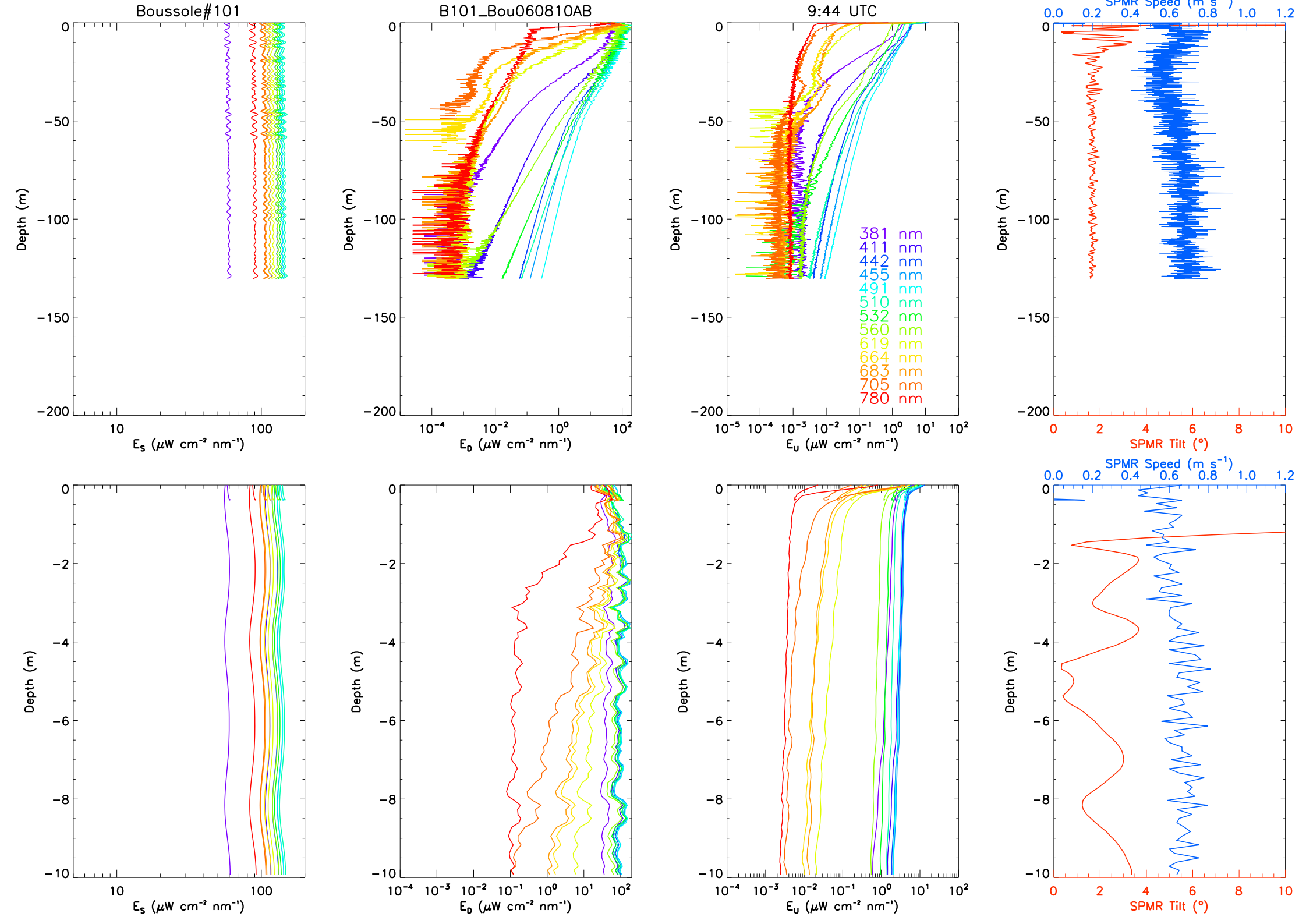
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)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411 nm
442 nm
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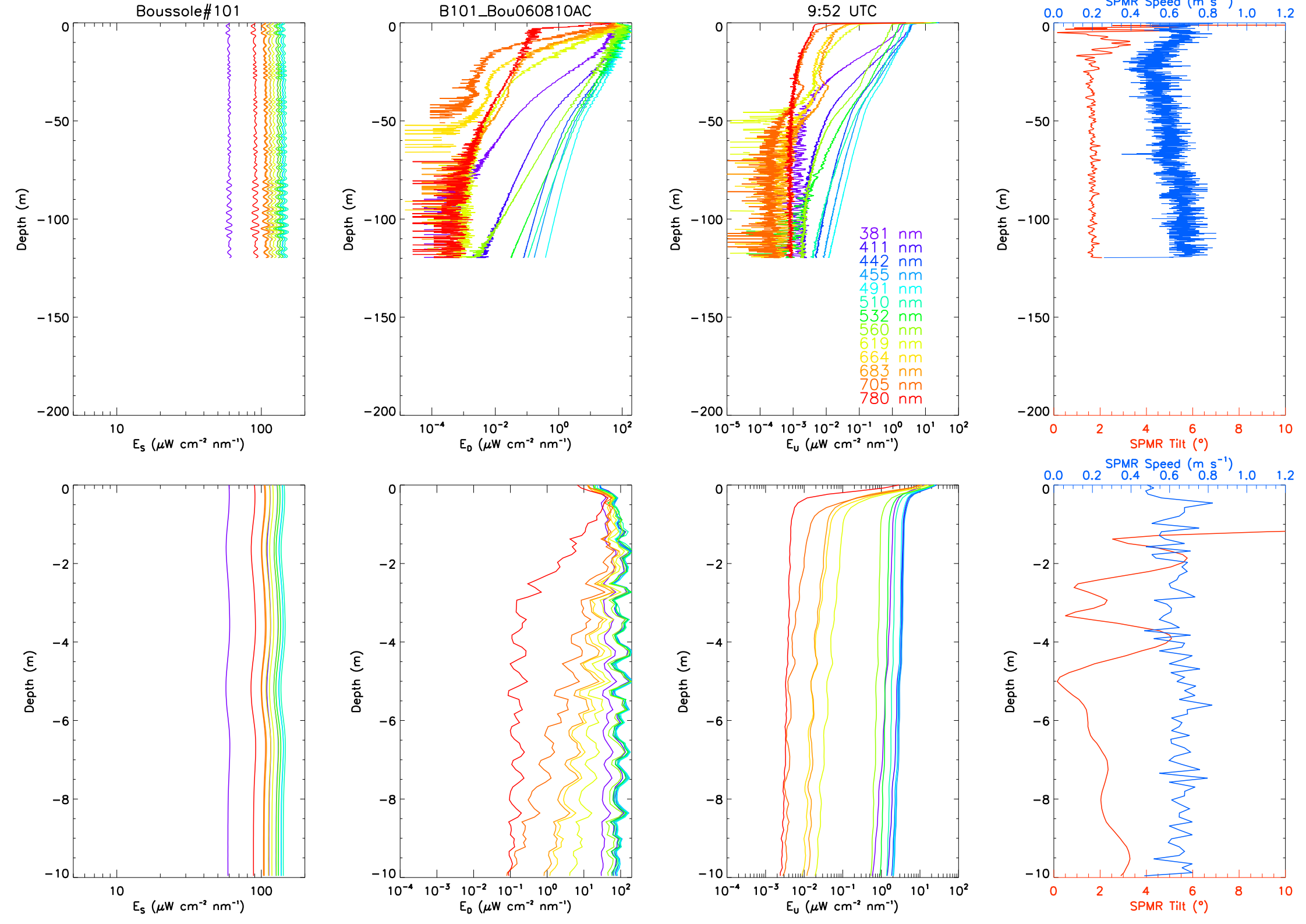
SPMR Speed (m s^{-1})
SPMR Tilt (°)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E_U (μW cm^{-2} nm^{-1})
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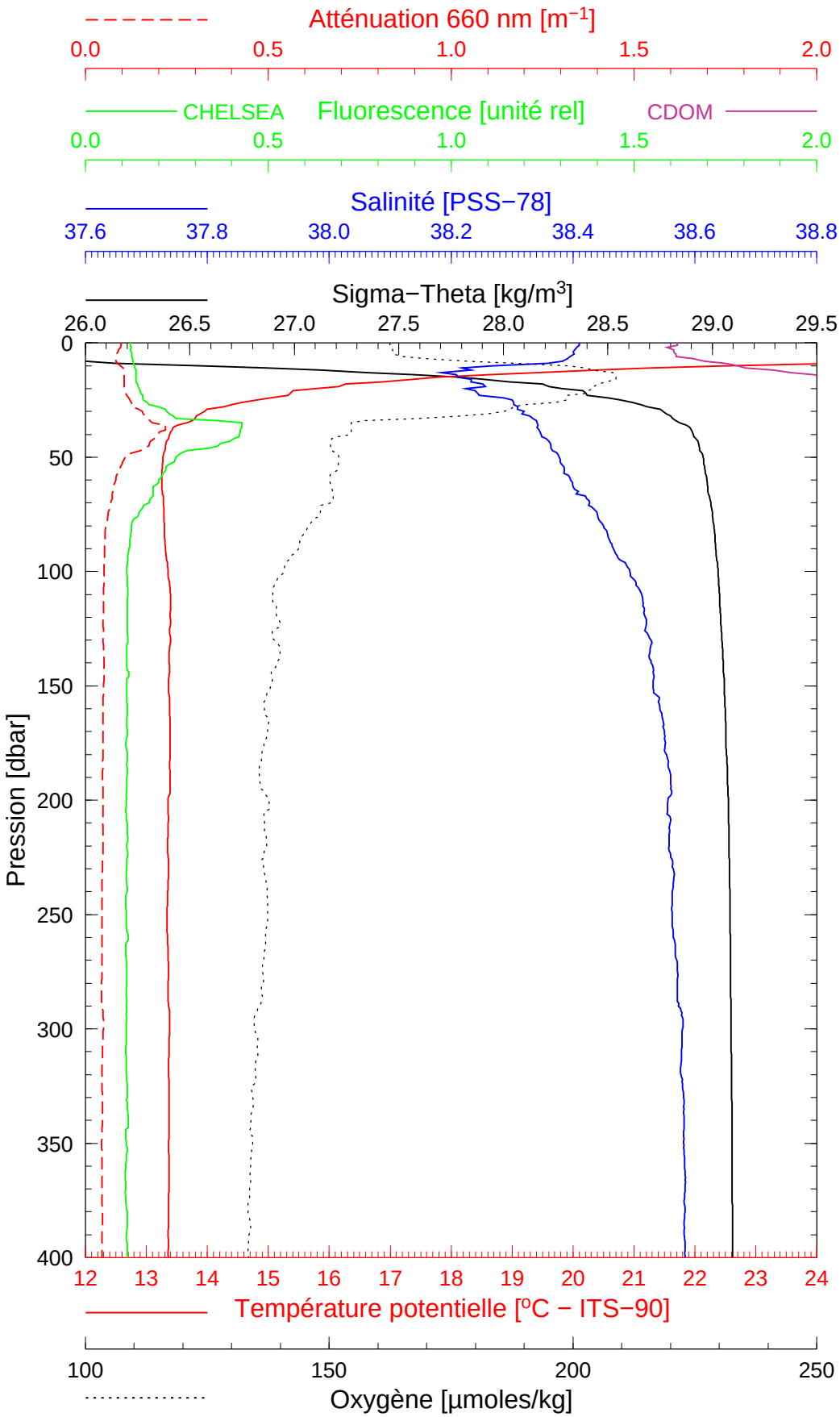
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)

BOUSSOLE 101 **04/08/2010** **BOUS100804_01**

BOUS001

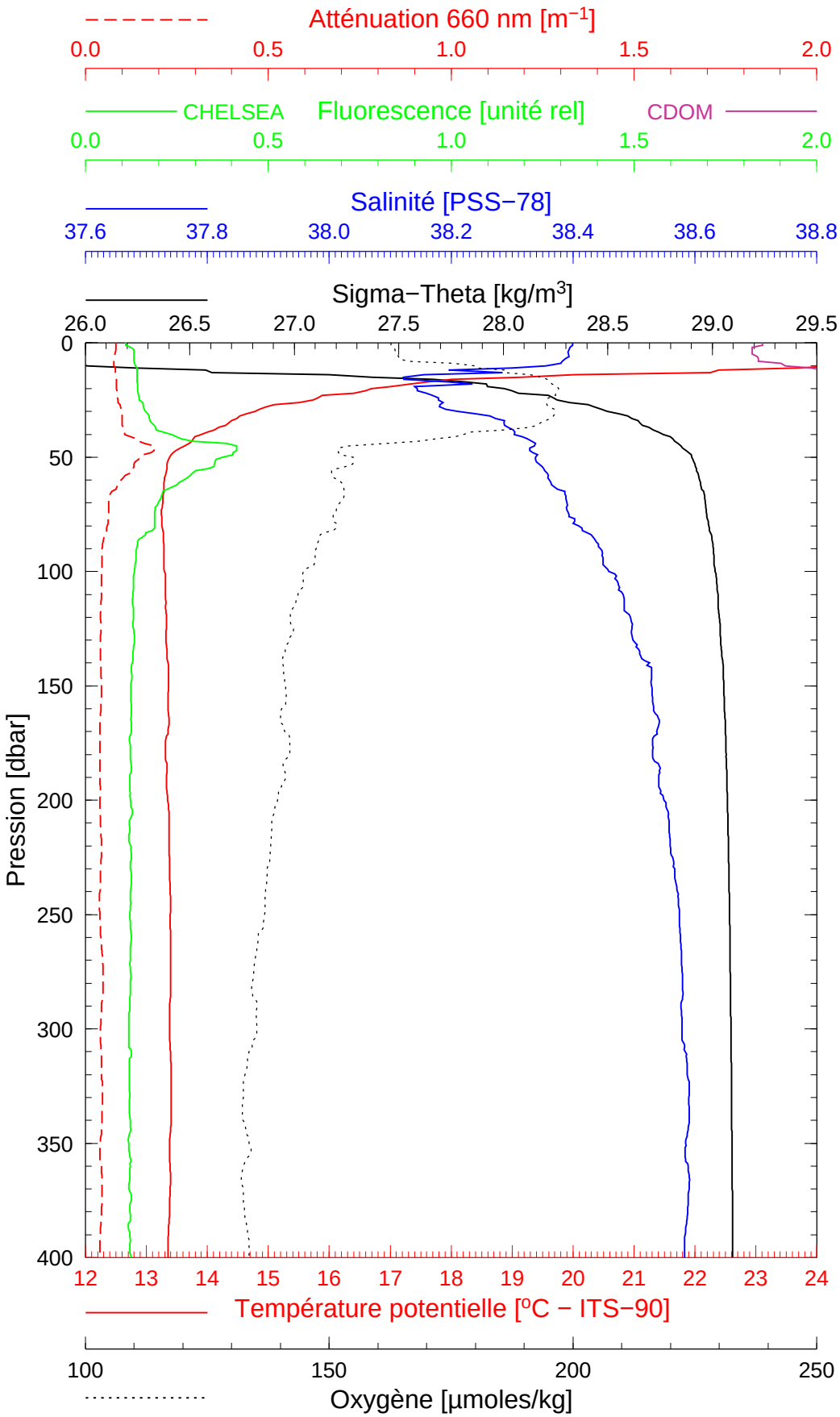


Date *04/08/2010* *Latitude* *43°21.705 N*

Heure déb *08h 28min [TU]* *Longitude* *07°54.114 E*

BOUSSOLE 101 **04/08/2010** **BOUS100804_02**

BOUS002

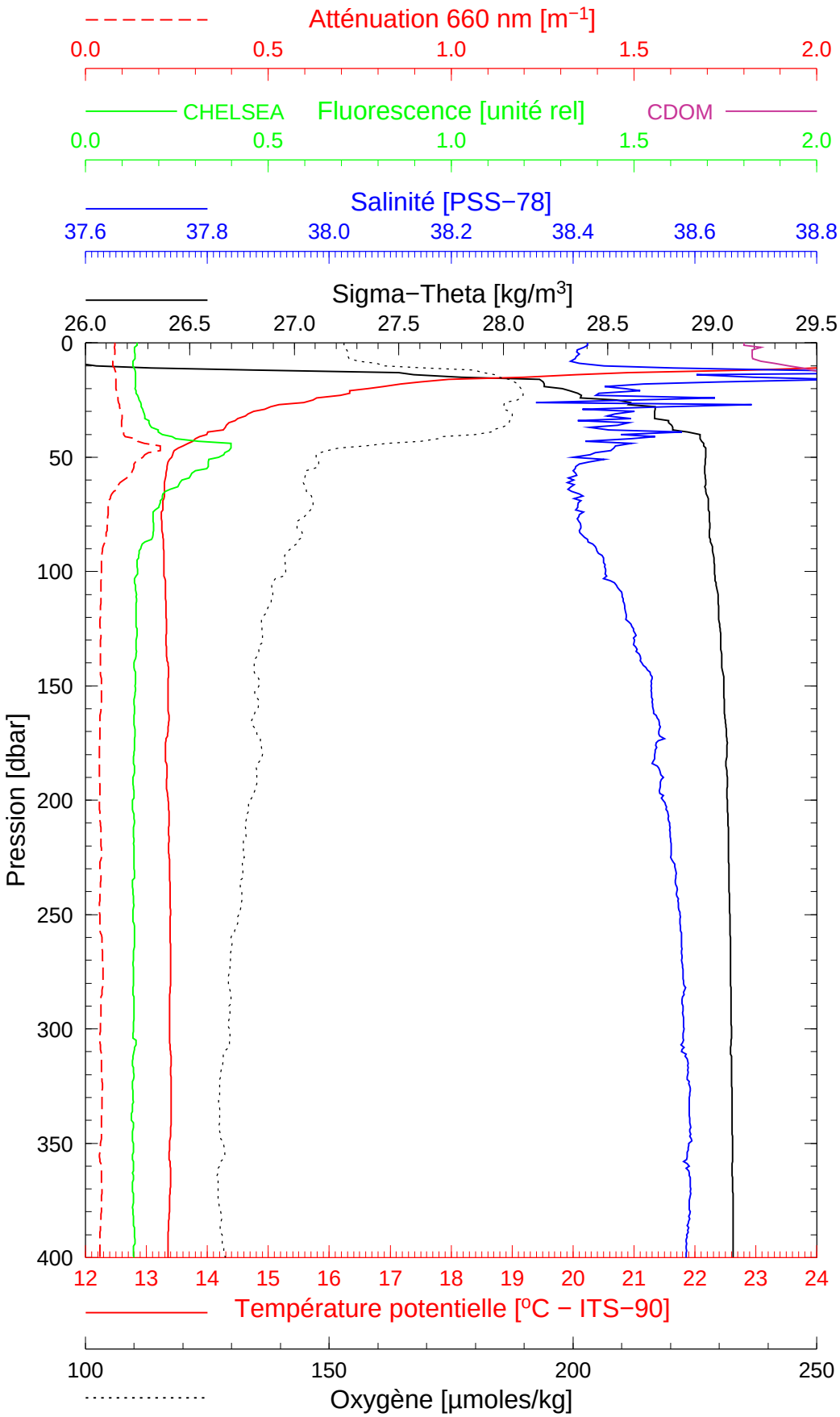


Date *04/08/2010* *Latitude* *43°25.024 N*

Heure déb *11h 18min [TU]* *Longitude* *07°48.081 E*

BOUSSOLE 101 **04/08/2010** **BOUS100804_03**

BOUS003

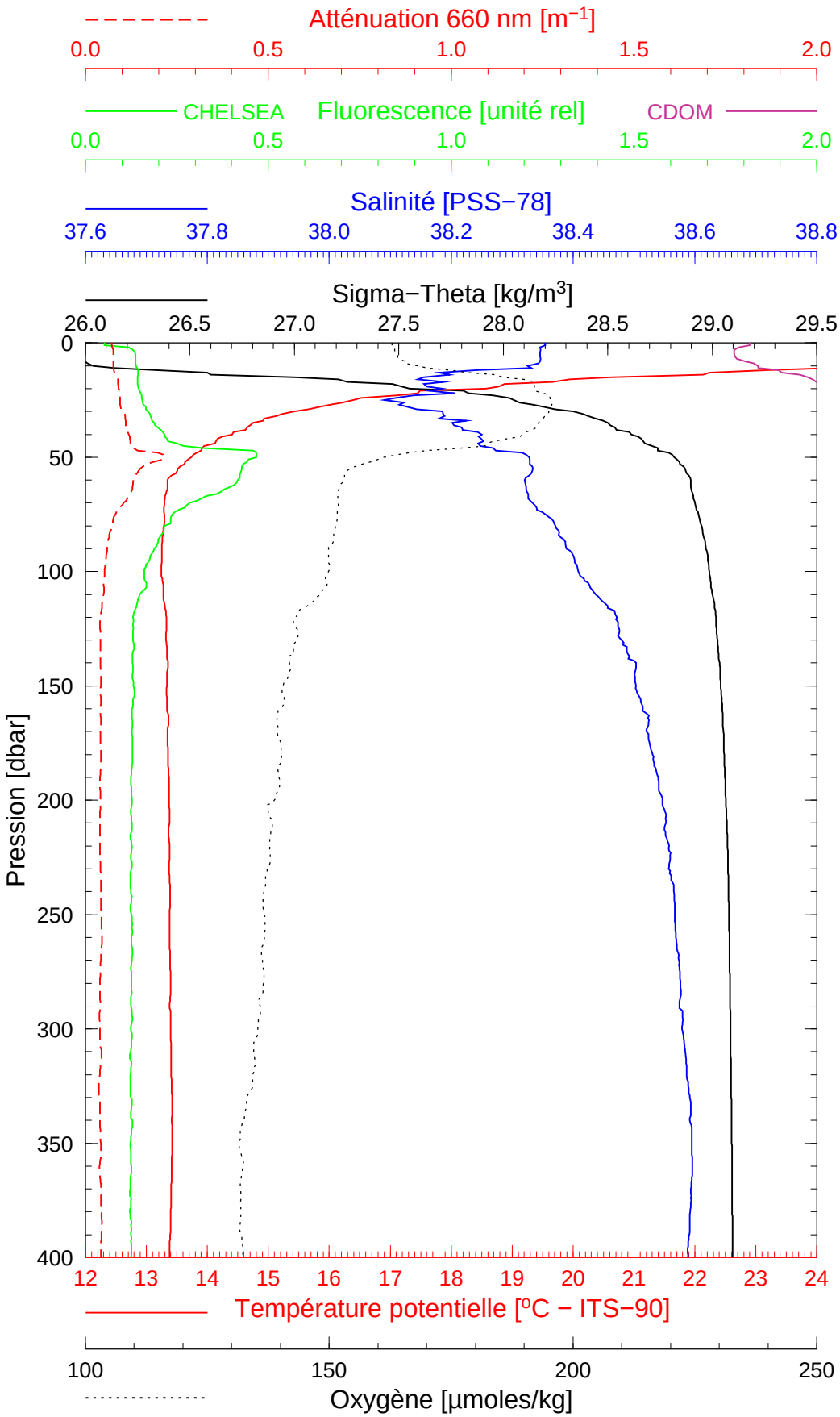


Date *04/08/2010* *Latitude* *43°24.992 N*

Heure déb *11h 39min [TU]* *Longitude* *07°48.131 E*

BOUSSOLE 101 **04/08/2010** **BOUS100804_04**

BOUS004

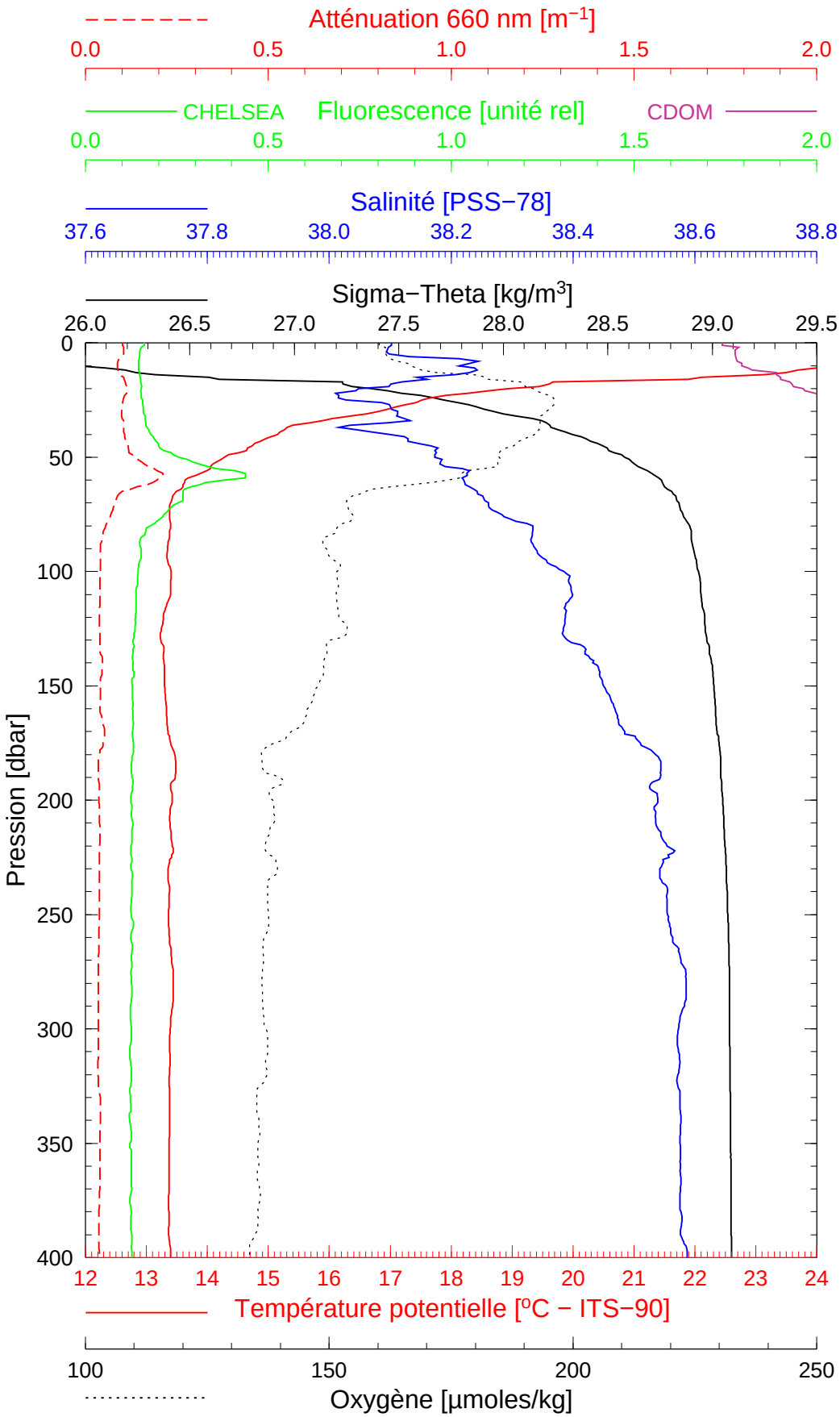


Date *04/08/2010* *Latitude* *43°27.970 N*

Heure déb *12h 35min [TU]* *Longitude* *07°42.014 E*

BOUSSOLE 101 **04/08/2010** **BOUS100804_05**

BOUS005



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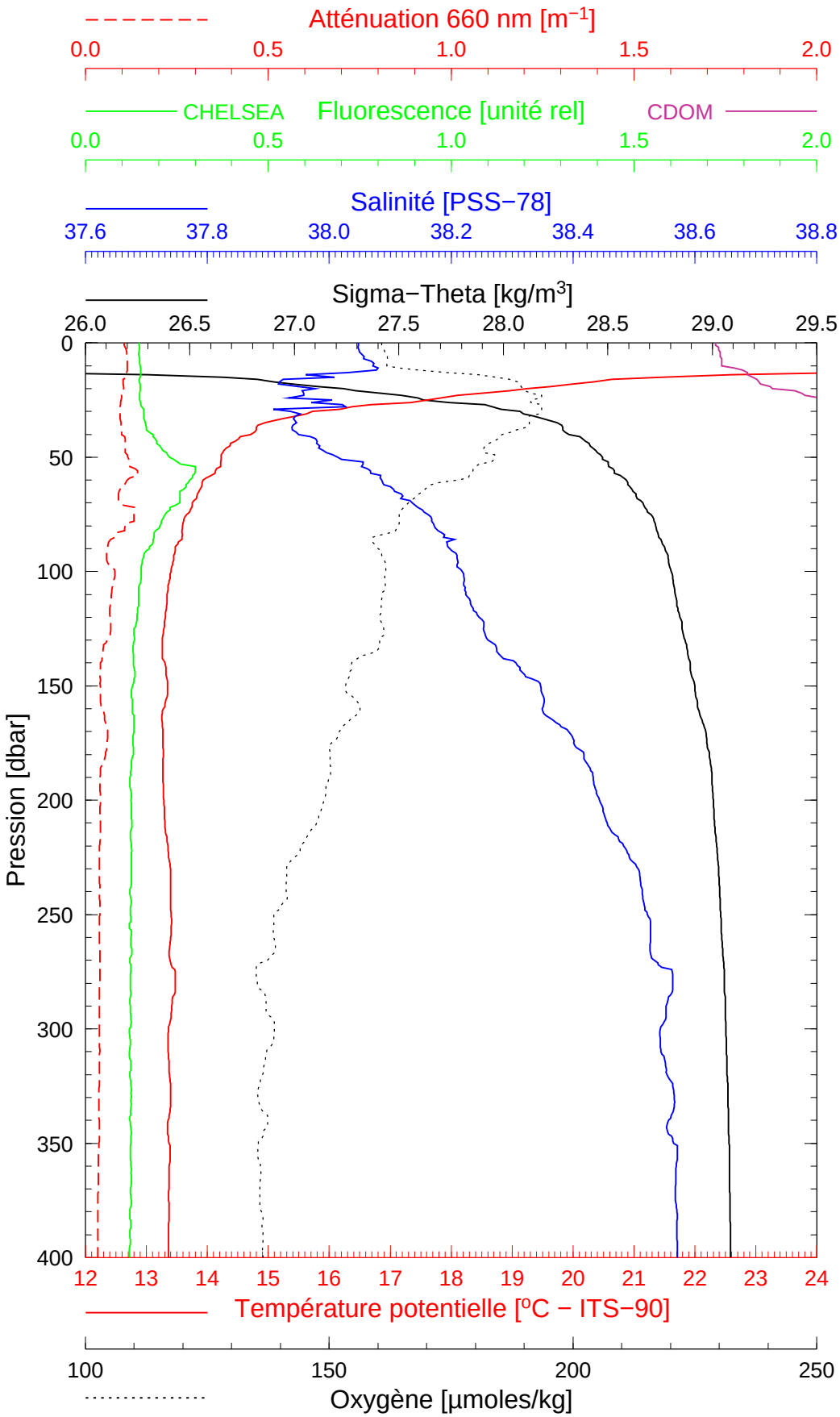
Heure déb *13h 25min [TU]* *Longitude* *07°36.984 E*

BOUSSOLE 101 **04/08/2010** **BOUS100804_06**

BOUS006



Date *04/08/2010* *Latitude* *43°34.000 N*

Heure déb *14h 16min [TU]* *Longitude* *07°31.019 E*

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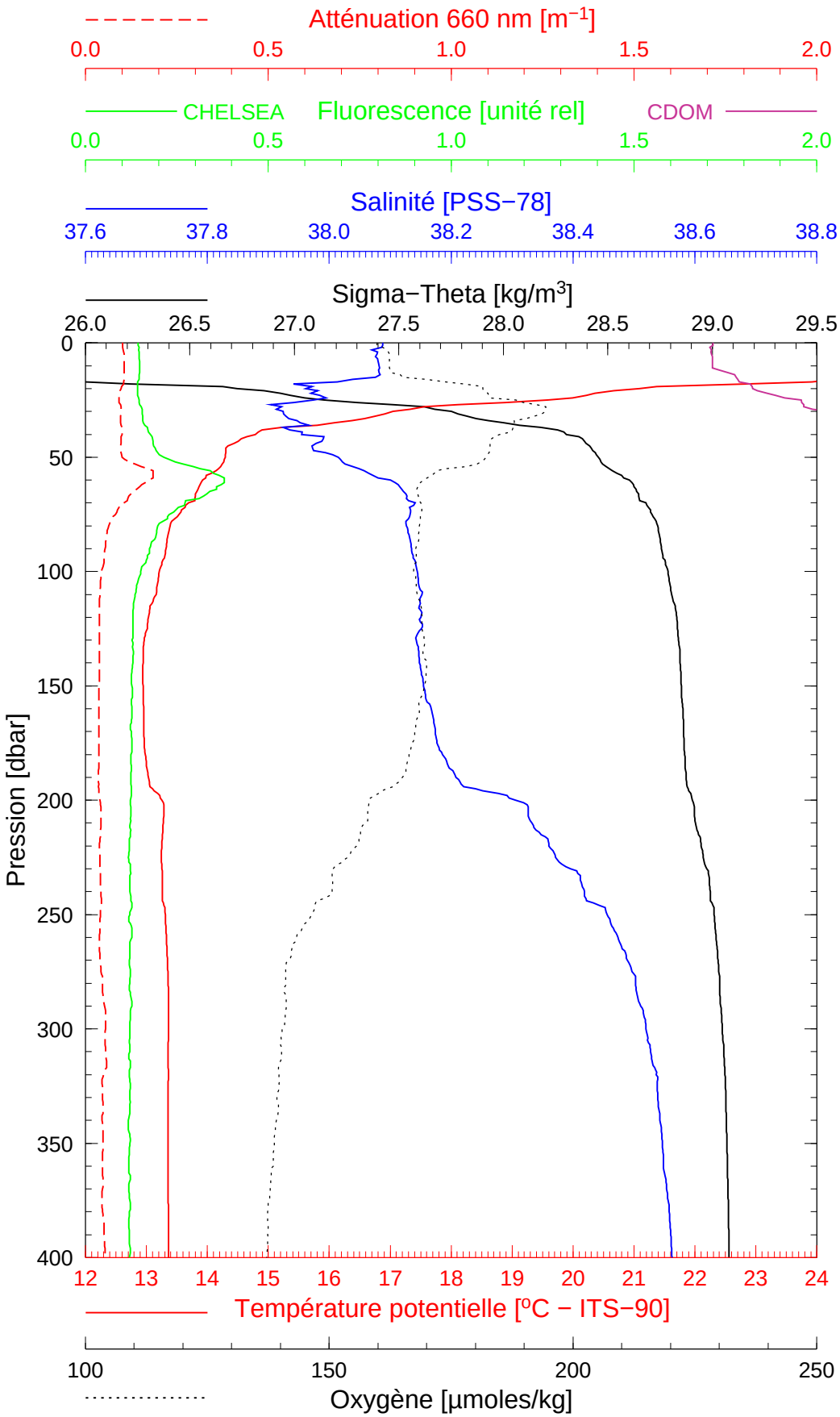
BOUS007

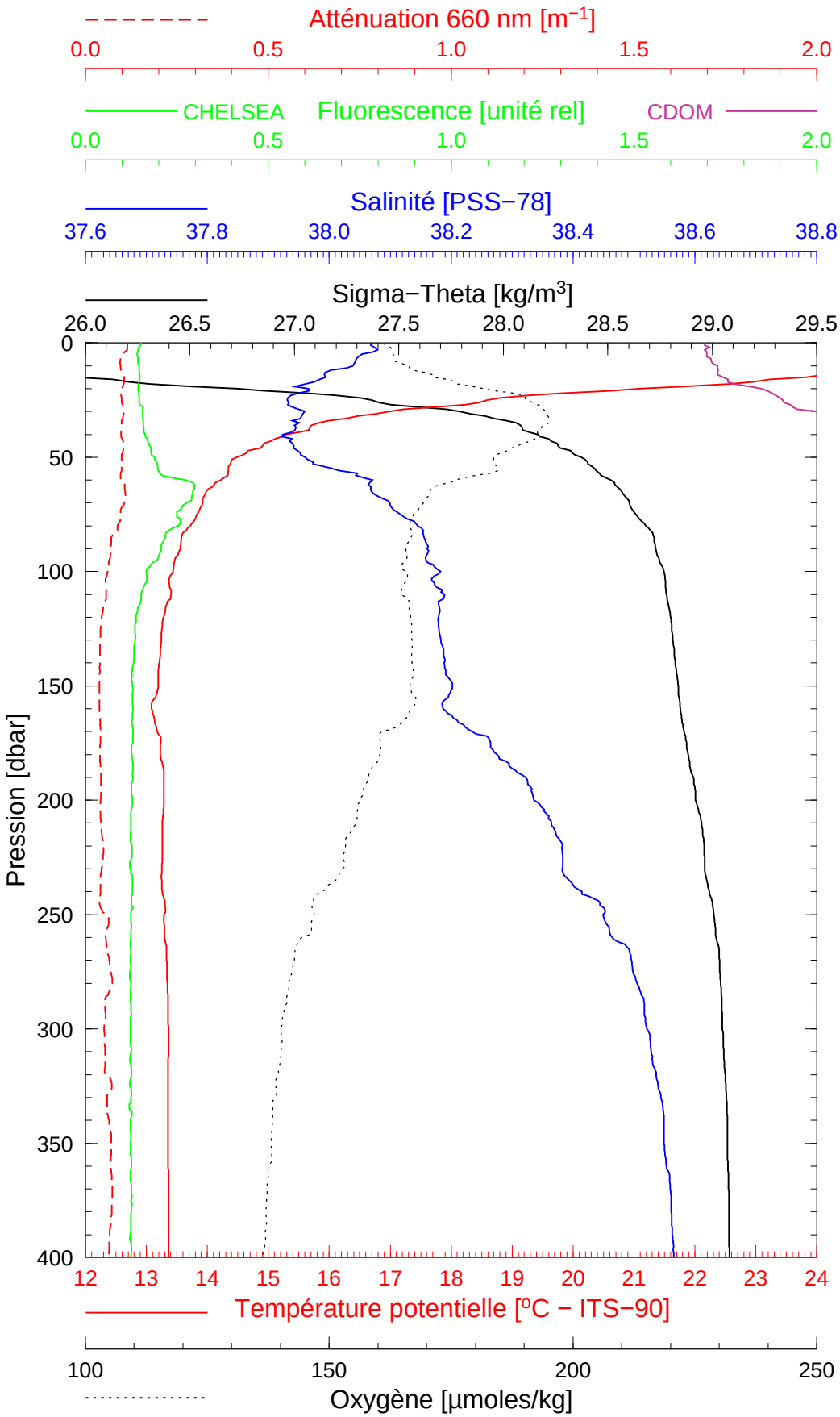


Date *04/08/2010* *Latitude* *43°36.948 N*

Heure déb *15h 08min [TU]* *Longitude* *07°24.991 E*

BOUSSOLE 101 **04/08/2010** **BOUS100804_08**

BOUS008

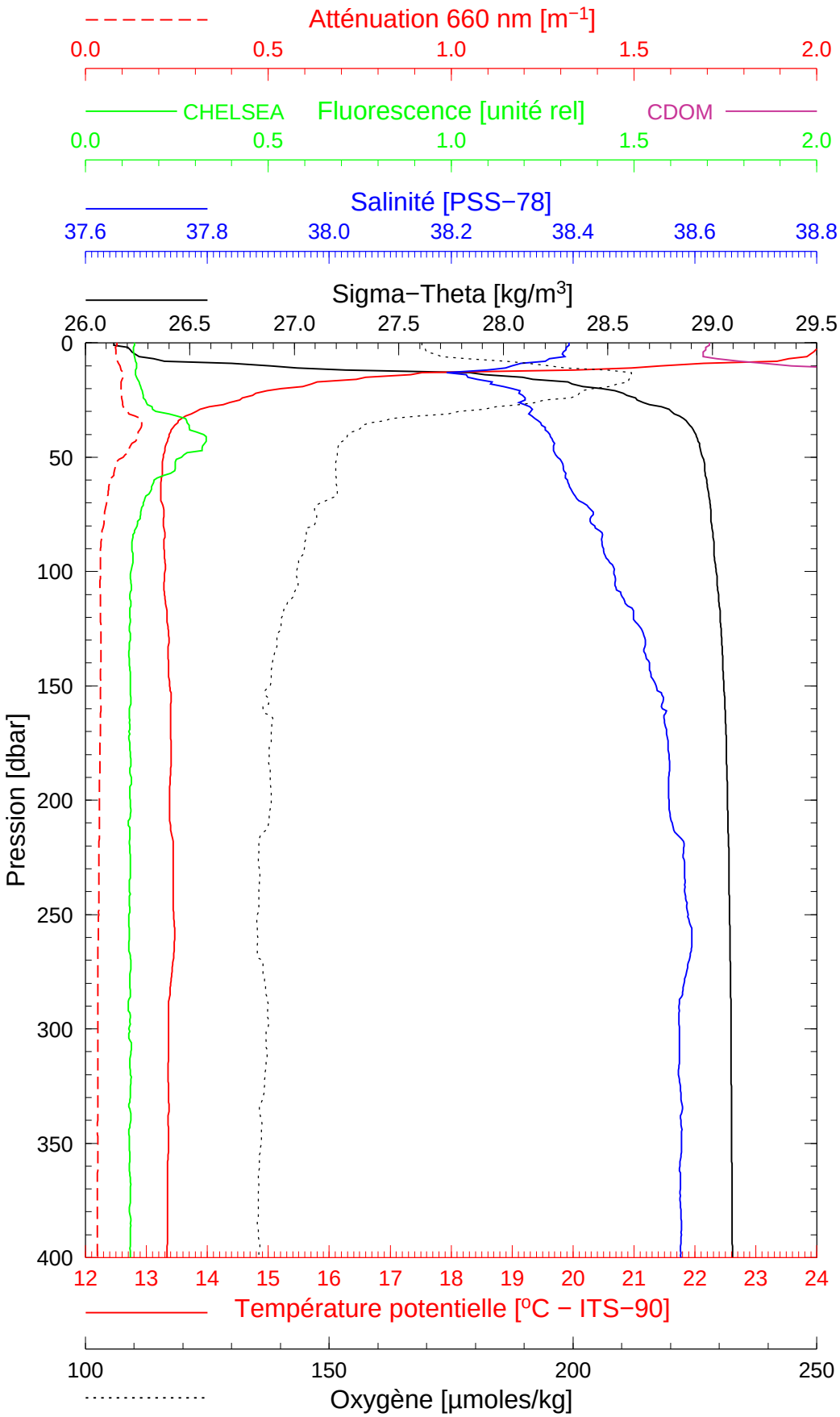


Date *04/08/2010* *Latitude* *43°39.059 N*

Heure déb *15h 51min [TU]* *Longitude* *07°20.939 E*

BOUSSOLE 101 **06/08/2010** **BOUS100806_01**

BOUS009

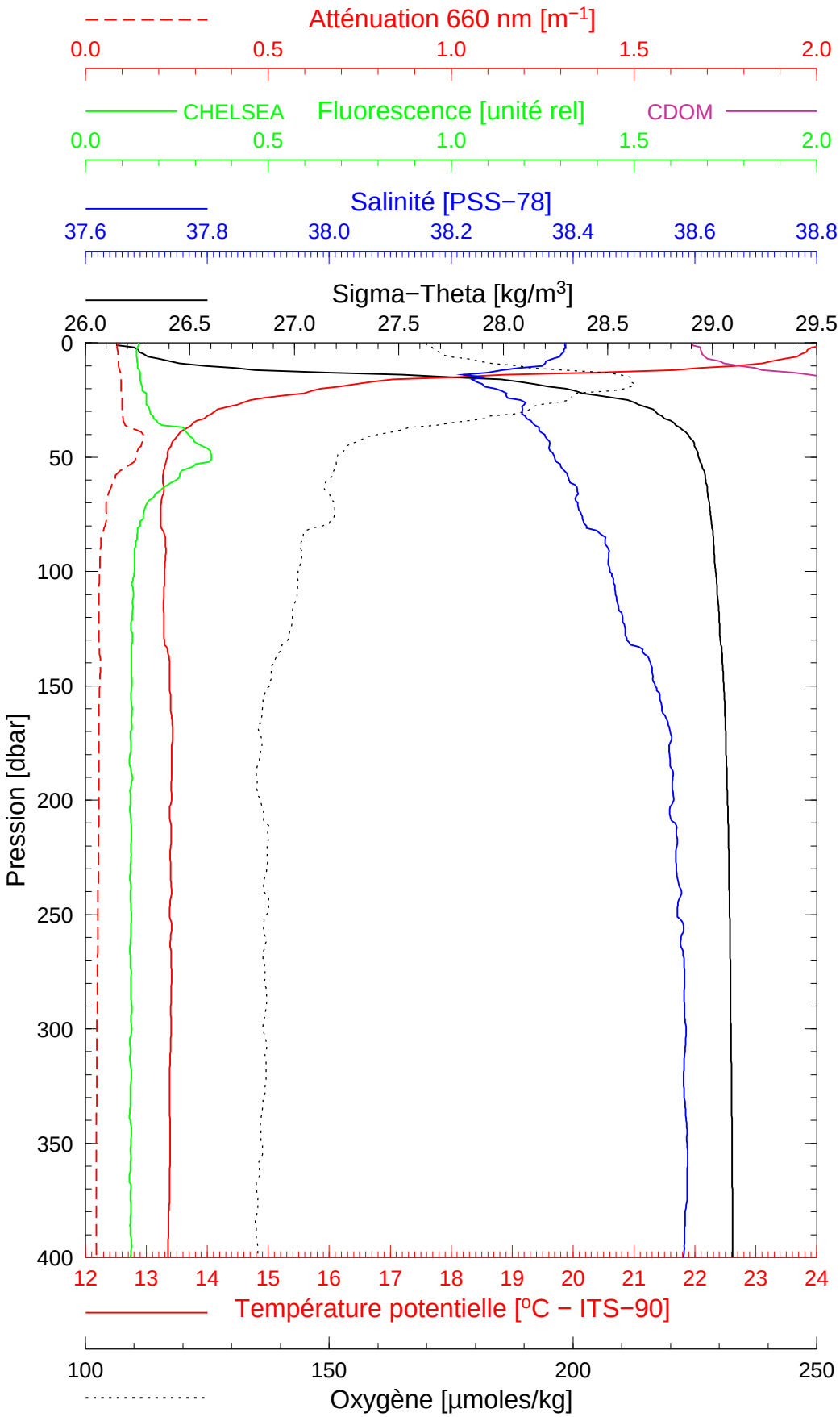


Date *06/08/2010* *Latitude* *43°22.192 N*

Heure déb *11h 11min [TU]* *Longitude* *07°53.759 E*

BOUSSOLE 101 **06/08/2010** **BOUS100806_02**

BOUS010

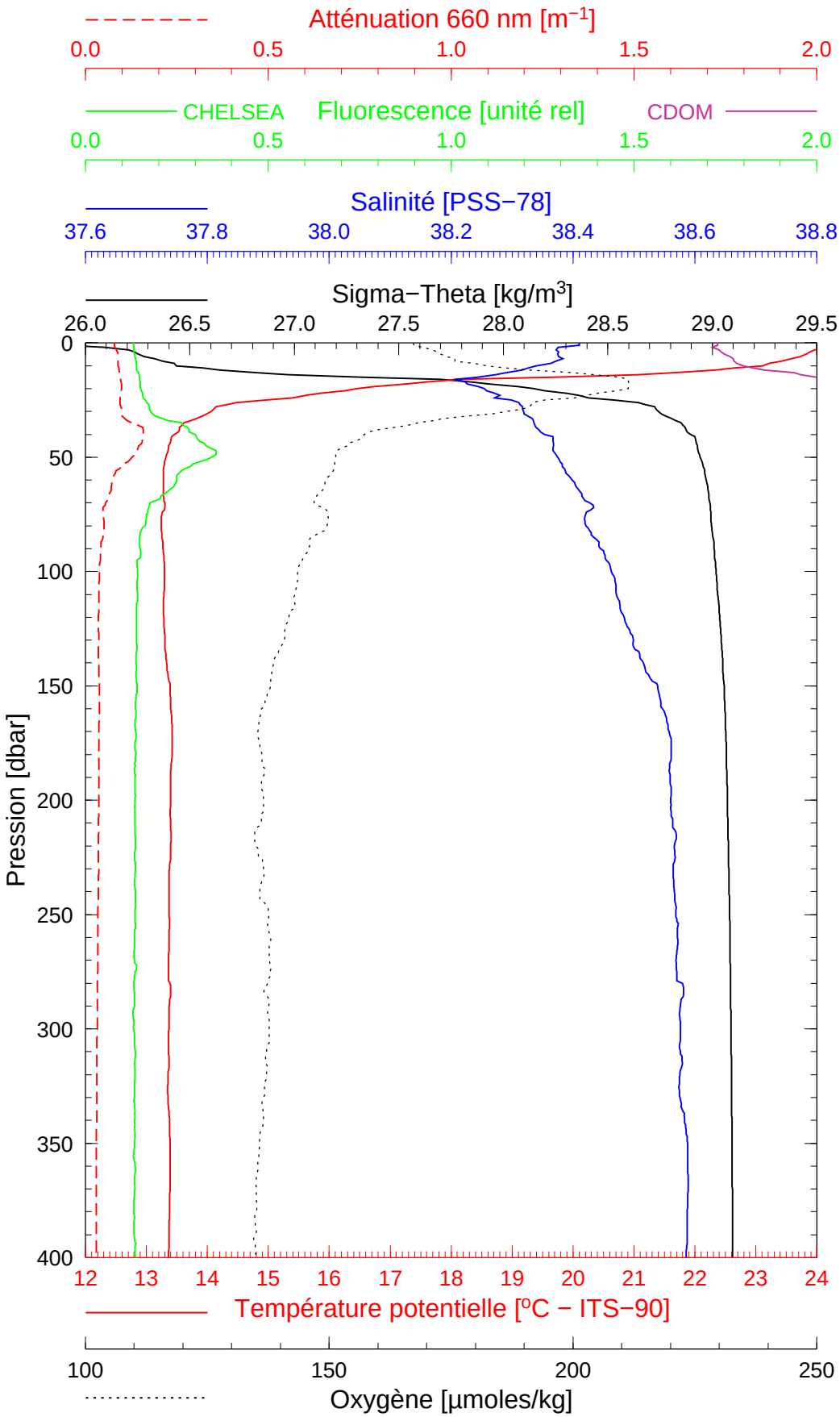


Date *06/08/2010* *Latitude* *43°22.441 N*

Heure déb *13h 47min [TU]* *Longitude* *07°54.250 E*

BOUSSOLE 101 **06/08/2010** **BOUS100806_03**

BOUS011

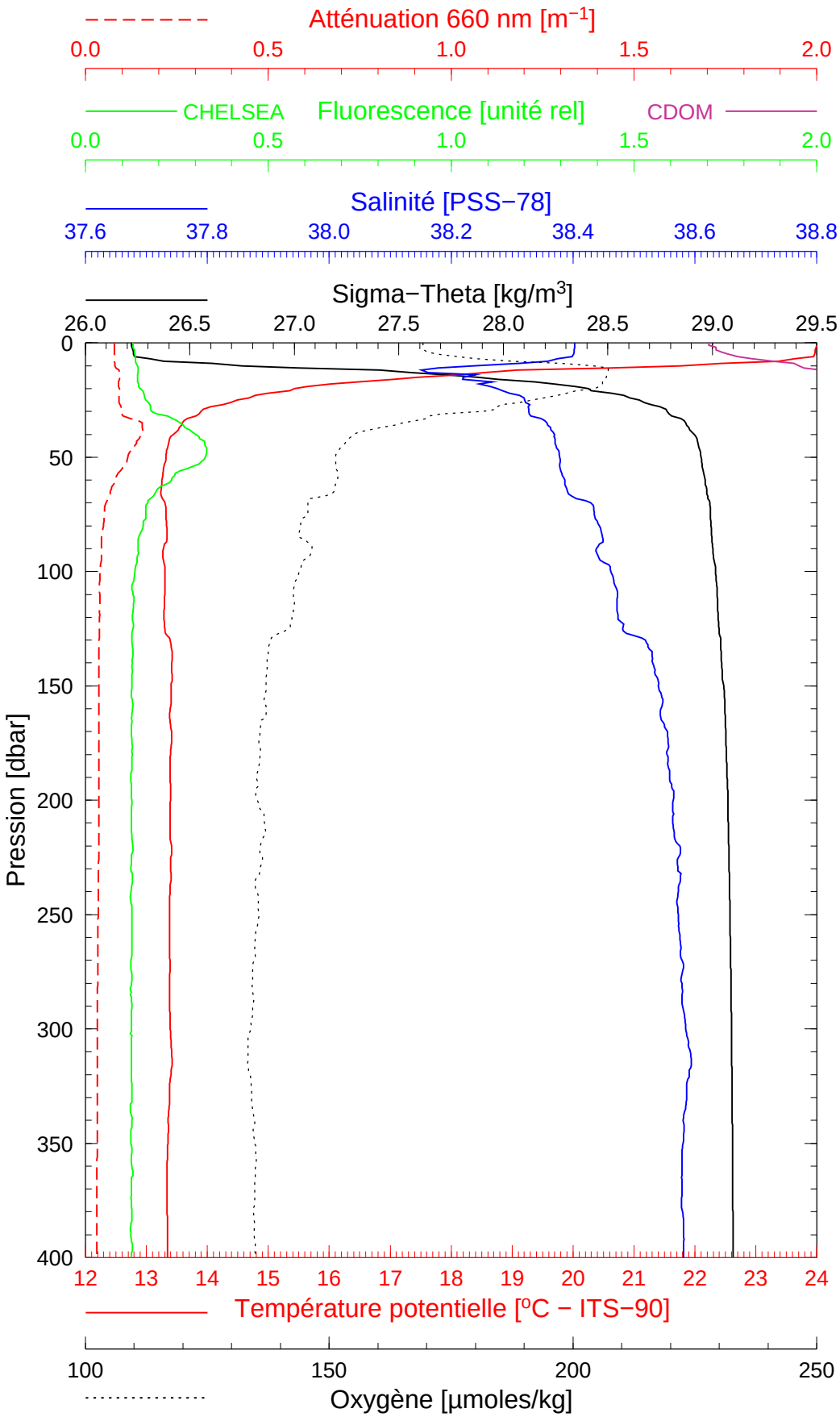


Date *06/08/2010* *Latitude* *43°22.660 N*

Heure déb *14h 26min [TU]* *Longitude* *07°54.476 E*

BOUSSOLE 101 **07/08/2010** **BOUS100807_01**

BOUS012

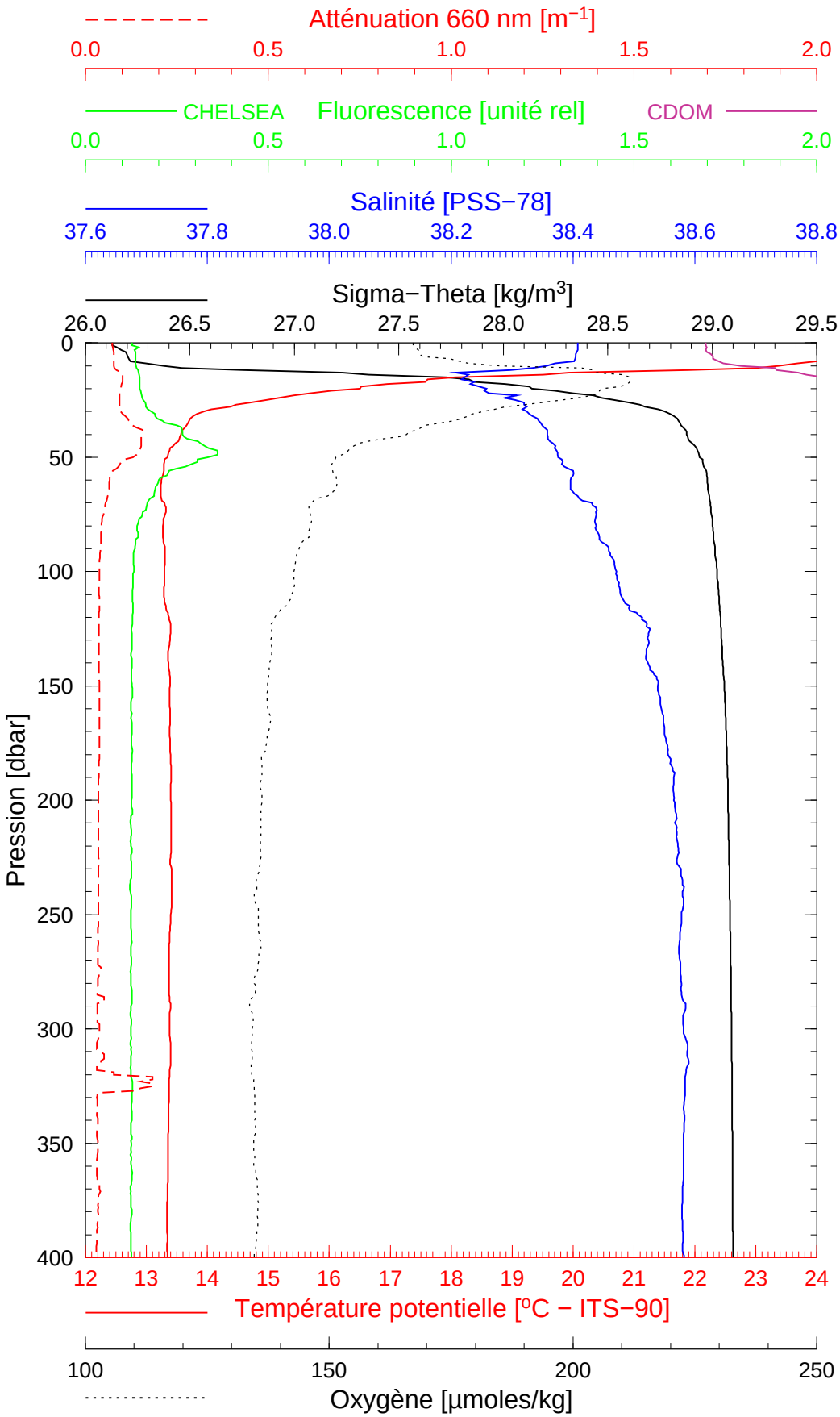


Date *07/08/2010* *Latitude* *43°22.099 N*

Heure déb *08h 18min [TU]* *Longitude* *07°54.303 E*

BOUSSOLE 101 **07/08/2010** **BOUS100807_02**

BOUS013



Date *07/08/2010* *Latitude* *43°21.778 N*

Heure déb *11h 16min [TU]* *Longitude* *07°54.408 E*