BOUSSOLE Monthly Cruise Report

Cruise 87
May 17 - 19, 2009

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

Science Personnel: Céline Bachelier, Jean De Vaugelas, Emilie Diamond, Lars Heimbuerger, Yves Lamblard, David Luquet, Alexandre Mignot, Christophe Mocquet, Marc Picheral, Joséphine Ras and Vincenzo Vellucci

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

Figure 1. A significant amount of H_2 bubbles blowing from the battery pressure relief valve.

BOUSSOLE project

ESA/ESRIN contract N° 17286/03/I-OL

Deliverable from WP#400/200

May 25, 2009

Contents

Cruise Objectives

Routine operations

Multiple SPMR profiles are to occur within 1 hour of satellite overhead passes of MERIS 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 SPMR 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 and AC9, 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.

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.

For one day of each cruise, 250 ml of sea water will be sampled at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 meters depth. For each sample, 125 ml will be filtered through a 0.2 µm GF/F filter and both total and filtered water samples will be analysed with the UltraPath for CDOM absorption determination.

Additional operations

Since April 29th, no ARGOS data were transmitted from the buoy; solving this problem will be a priority when divers will be on board. The diving day, a black neoprene cap will be put on the HS4 mounted on the buoy to acquire three series of measurements for dark corrections. One of the three days, Céline Bachelier will complete the MOOSE and DYCOMED programs with a deep CTD cast and water sampling. It will be the last DYCOMED sampling. One of the three days, Marc Picheral will be on board to perform a PVM 0-1000 m profile and two Plankton Net 0-100 m profiles at the BOUSSOLE site.

Cruise Summary

Sea state was calm for all of the three cruise days. The first day was mainly used for optical and CTD casts at the BOUSSOLE site, for buoy data retrieval test and for completing the transect. The second day was used for cleaning the buoy and for buoy data retrieval, for optical and CTD casts at the BOUSSOLE site and for sampling at the Dyfamed site. The third day was used for optical, CTD and PVM casts at the BOUSSOLE site. The manual CIMEL was still not available.

Sunday 17 May 2009

The first day, sea state was good with very low wind blowing and partly covered sky. When arrived at the BOUSSOLE site, an attempt of CISCO connection with the buoy was made but failed because of a wrong IP address. Then 3 SPMR profiles, 1 Secchi disk, 1 CTD cast with water sampling were performed. After, a second attempt of CISCO connection with the buoy was successful. However, the connection was lost during data retrieval, probably the antenna was hidden. This connection proved that the buoy worked during the whole ARGOS stop period. Then the transect was completed. The CTD 02 data (Station #1) inadvertently overwrote CTD 01 data.

Monday 18 May 2009

The second cruise day, sea state was good with low wind blowing and blue sky. When arrived on site, divers went at sea for cleaning the instruments and a neoprene cap was put on the HS4 for acquiring three dark measurements. A significant amount of H_2 bubbles were blowing from the battery pressure relief valve. The buoy presented evident signs of an impact with a small boat. One of the thin tubes reinforcing the structure was distorted towards the interior of the structure near the surface. Some peinture and colson used to fix the cables were missing Vincenzo Vellucci also climbed on the buoy to clean CISCO and ARGOS connectors. ARGOS system well worked after that. A CISCO connection with the buoy was also established to complete data retrieval. Then 6 SPMR profiles, 1 Secchi disk and 1 CTD with water sampling were performed before moving to DYFAMED station for MOOSE/DYCOMED sampling.

Tuesday 19 May 2009

The third cruise day, sea state was good with very low wind blowing and partly covered sky. When arrived on site, 1 SPMR profile was performed but cloud coverage was too variable and the measurements were interrupted. Then 1 CTD cast with water sampling, 1 Secchi disk and 1 PVM profile were performed and 2 plankton net samples were collected. After, 2 SPMR profiles were performed but, again, measurements were interrupted due to unfavourable sky conditions. So, 1 last CTD cast with water sampling was performed.

Cruise Report

Sunday 17 May 2009 (UTC)

People on board: Céline Bachelier, Emilie Diamond, Alexandre Mignot, Christophe Mocquet, Joséphine Ras and Vincenzo Vellucci.

0500 Departure from the Nice port.
0820 Arrival at the BOUSSOLE site.
0830 CTD doesn't work.
0915 Attempted CISCO connection with the buoy: unsuccessful.
0915 Secchi disk 01 (19 m).
0920 SPMR 01, 02, 03.
1010 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: CTD 01 data were overwritten by CTD 02 data.
1015 Attempted CISCO connection with the buoy: successful but data retrieval incomplete.
1040 Departure to Nice direction.
1110 CTD 02, 400 m, station 01 (43°25'N 07°48'E): data of CTD 02 recorded on CTD 01 file.
1200 CTD 03, 400 m, near station 01 (43°25.5'N 07°46.6'E) for AC9 data acquisition.
1255 CTD 04, 400 m, station 02 (43°28'N 07°42'E).
1400 CTD 05, 400 m, station 03 (43°31'N 07°37'E).
1500 CTD 06, 400 m, station 04 (43°34'N 07°31'E).
1600 CTD 07, 400 m, station 05 (43°37'N 07°25'E).
1645 CTD 08, 400 m, station 06 (43°39'N 07°21'E).
1710 Departure to the Nice port.
1745 Arrival at the Nice port.

Monday 18 May 2009 (UTC)

People on board: Céline Bachelier, Jean De Vaugelas, Emilie Diamond, Lars Heimbuerger, Yves Lamblard, David Luquet and Vincenzo Vellucci.

0450 Departure from the Nice port.
0815 Arrival at the BOUSSOLE site.
0840 Diving on the buoy for cleaning and general inspection. Dark HS4 measurements made at 09:00, 09:15 and 09:30.
10:15 CISCO connection with the buoy and data retrieval.
10:40 SPMR 04, 05, 06.
1125 Secchi disk 02 (19 m).
1130 CTD 09, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, Ap, CDOM and TSM.
1200 SPMR 07, 08, 09.

1240 Departure to DYFAMED site.
1340 CTD MOOSE, 2000 m.
1500 Departure to the Nice port.
1800 Arrival at the Nice port.

Tuesday 19 May 2009 (UTC)

People on board: Céline Bachelier, Emilie Diamond, Marc Picheral and Vincenzo Vellucci.

0500 Departure from the Nice port.
0830 Arrival at the BOUSSOLE site.
0830 SPMR 10..
0845 CTD 10, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and Ap.
0915 Secchi disk 03 (18 m).
0940 2 x Plankton net, 0-100 m.
1015 PVM, 0-1000 m, with 4 CTD attached on PVM structure to test them.
1110 SPMR 11, 12.
1200 CTD 11, 400 m with water sampling at 30, 20 and 5 m for HPLC, Ap and TSM.
1240 Departure to the Nice port.
1545 Arrival at the Nice port.

Calculated Swath paths for the MERIS Sensor (ESOV Software)

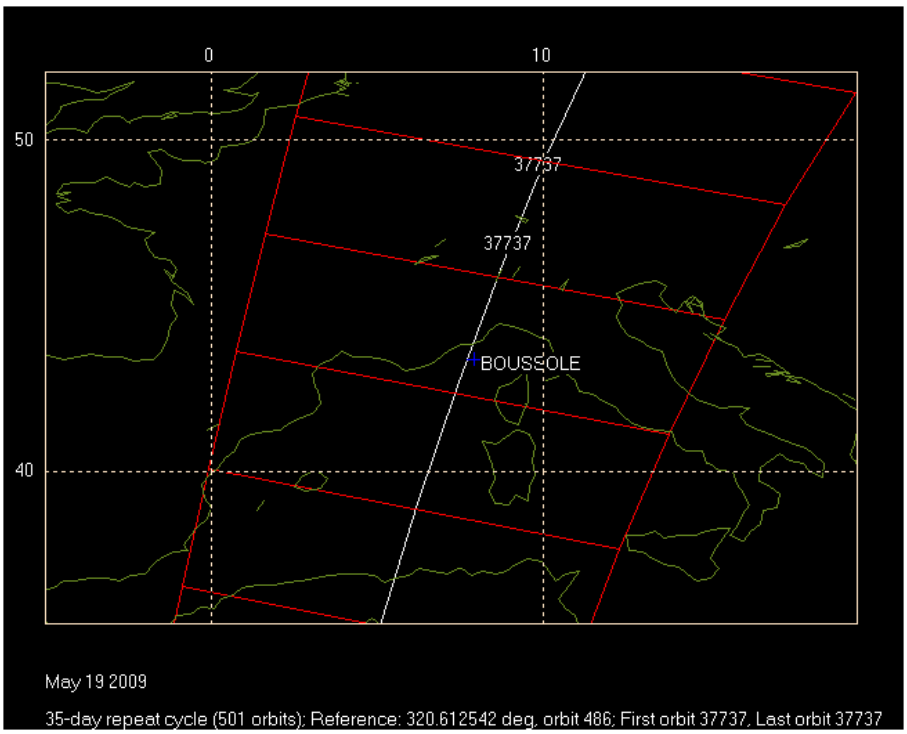
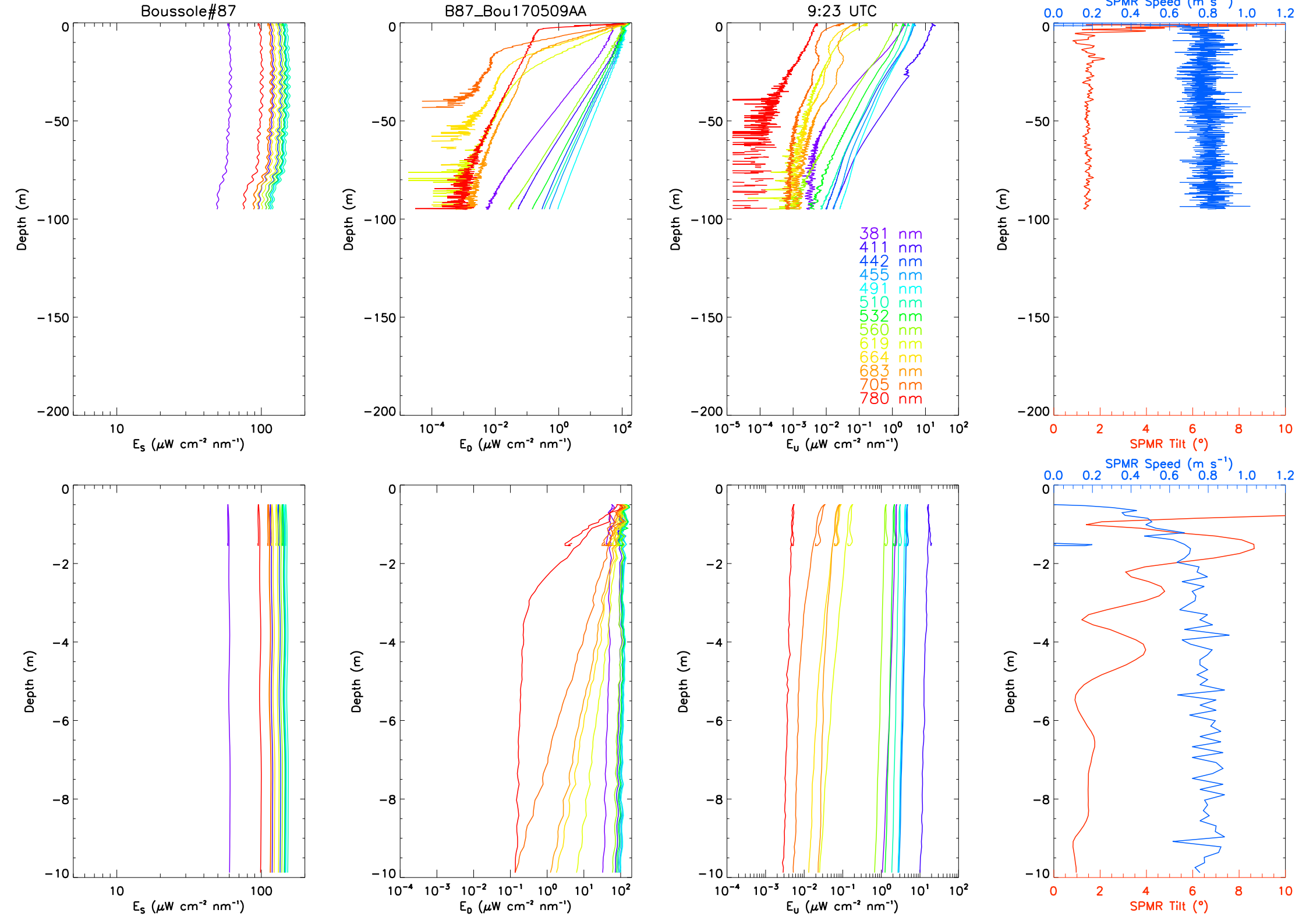


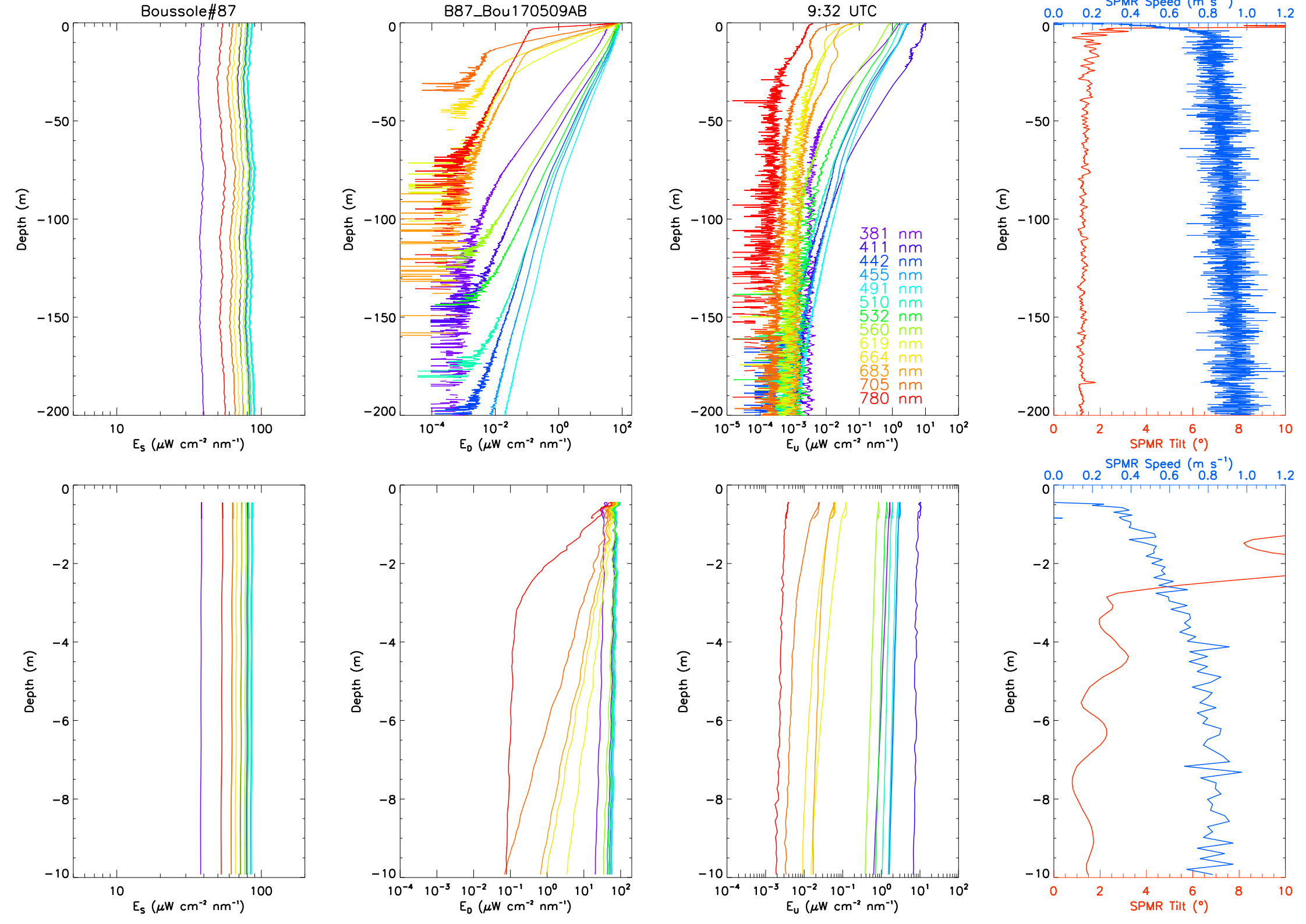
Figure 2. Calculated swath paths for MERIS (Esov software) above BOUSSOLE site for May 19 2009.

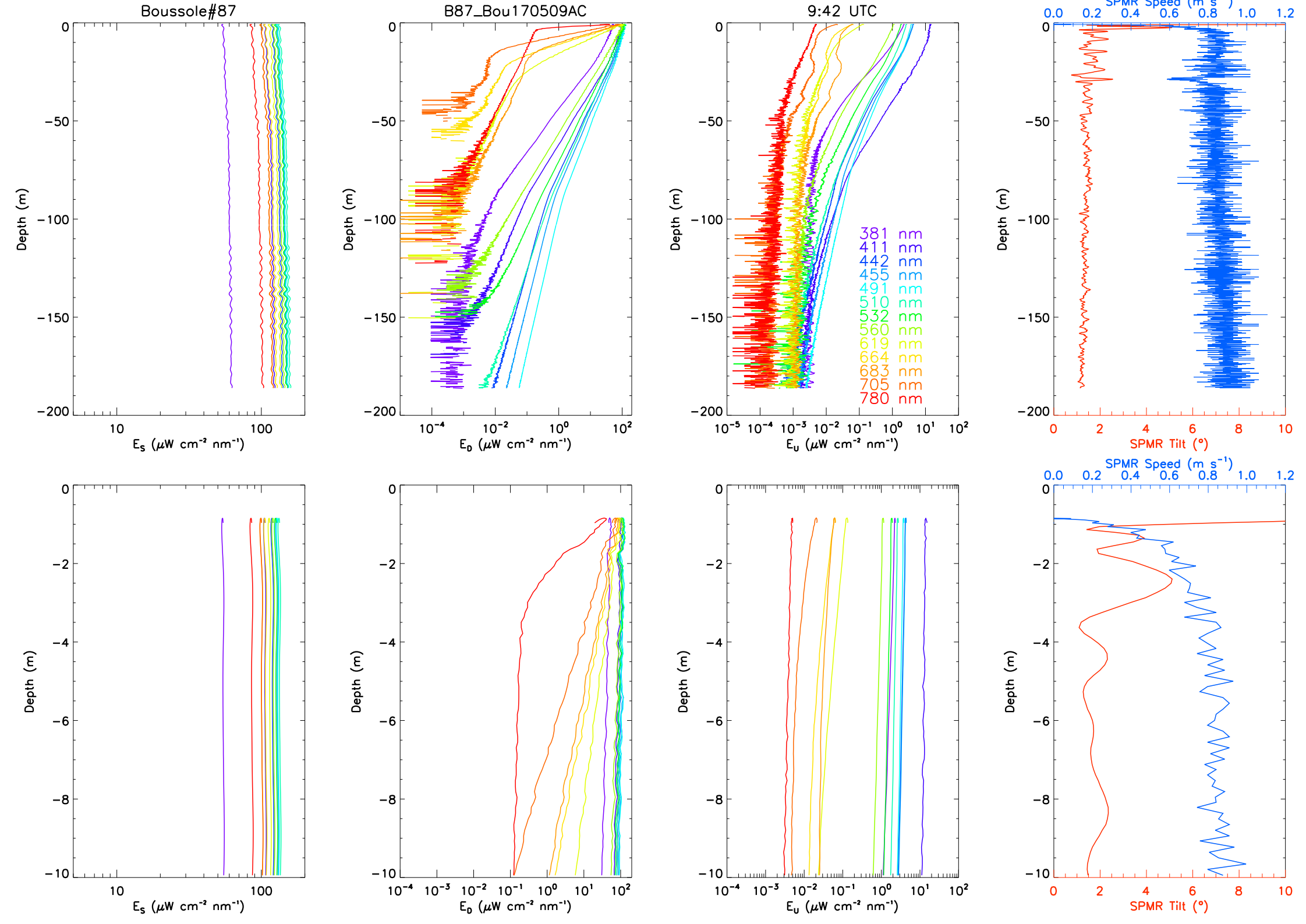
Appendix

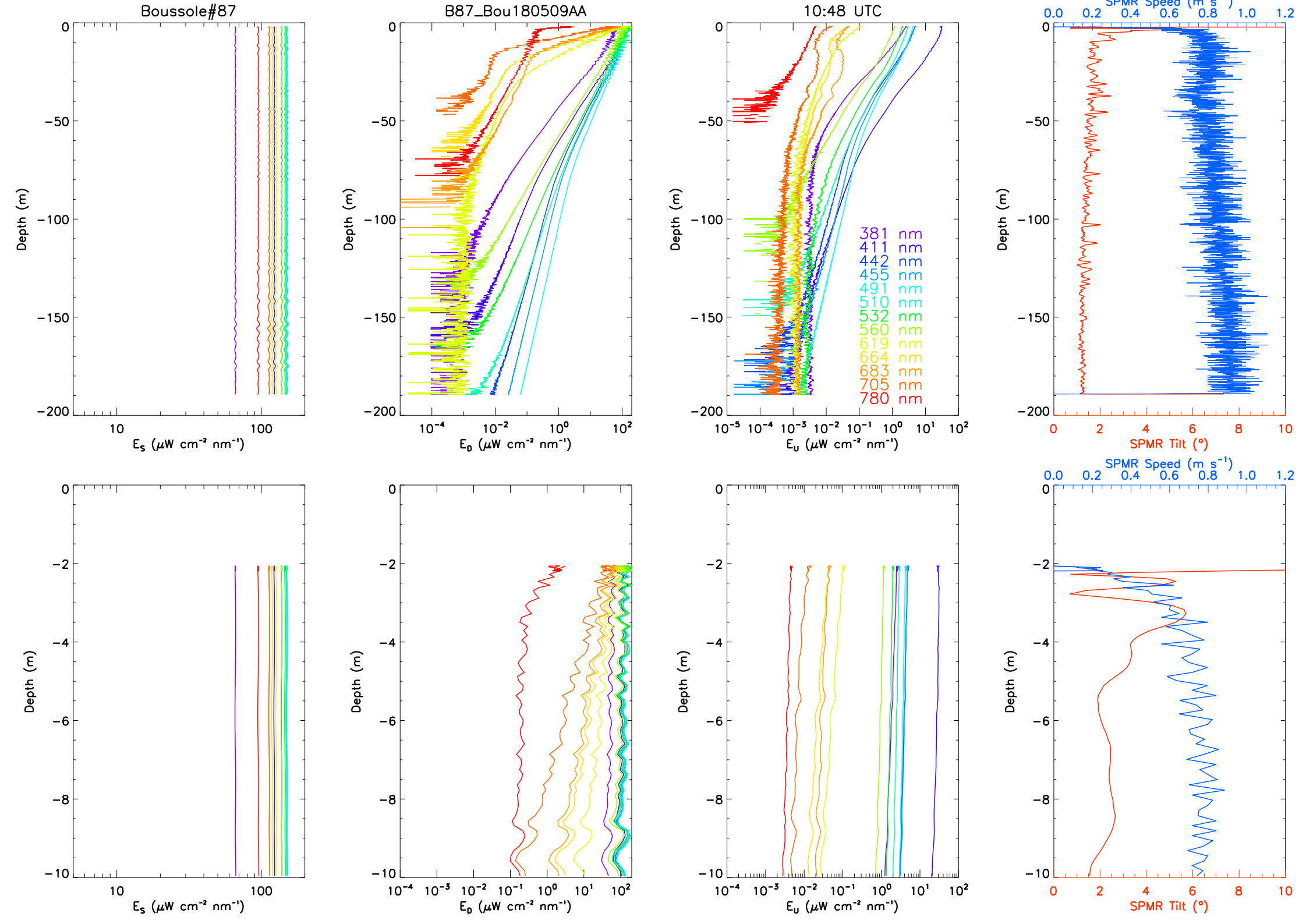
Cruise Summary Table for Boussole 87

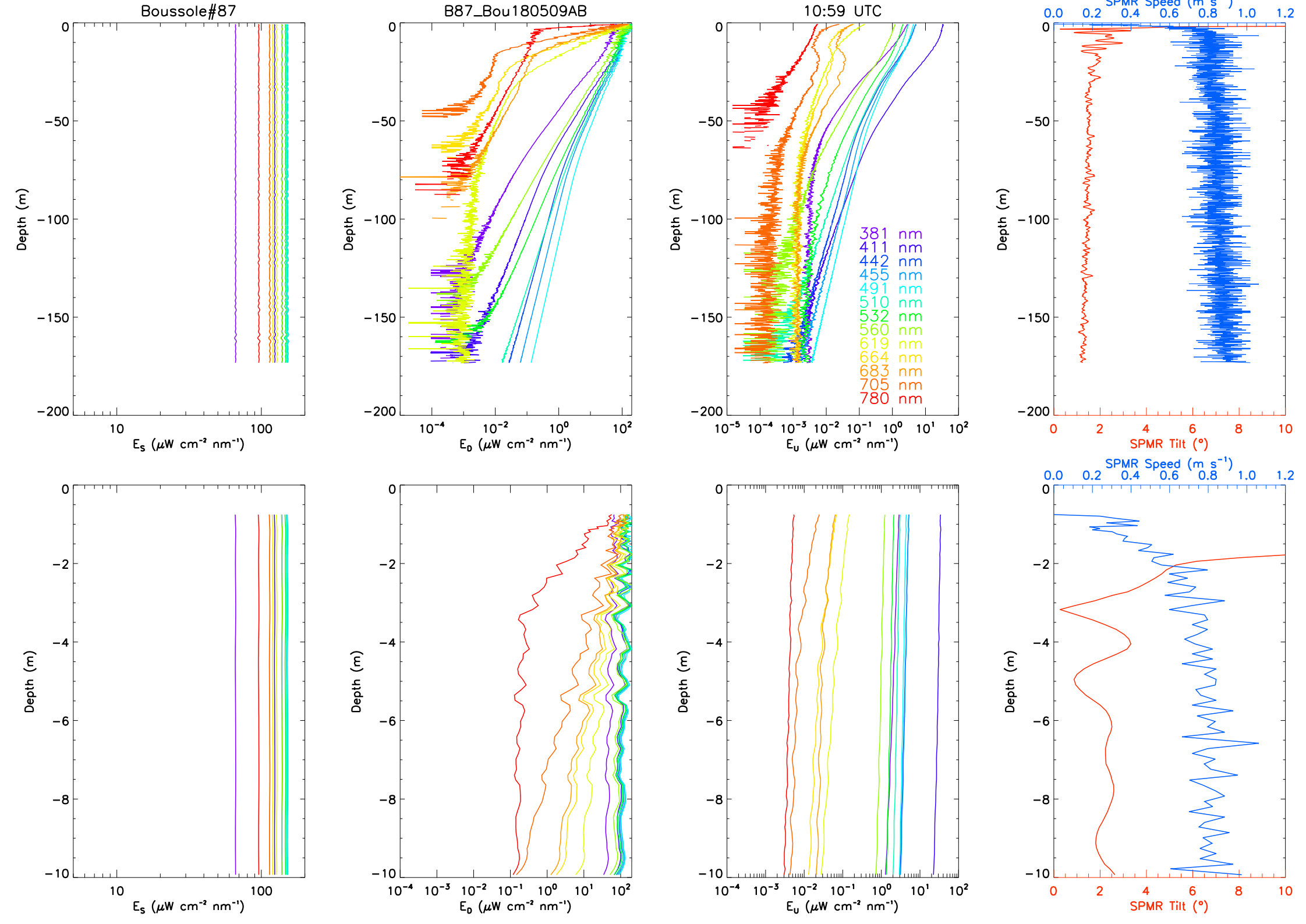
Date	Black names	Profile names	CTD notées /	Other sensors	Start Time	Duration	Depth max	Latitude (N)		longitude					Weather							Sea		
	(file ext: ".raw")	(file extension: ".raw")	satellite overpass		GMT (hour.min)	(min.sec)	(meter)	(Degree)	(Minute)	(Degree)	(Minute)	Sky	Clouds	Quantity (#/8)	Wind sp. (kn)	Wind dir.	Atm. Pressure (hPa)	Humidity (%)	Visibility	T air	T water	Sea	Swell H (m)	Swell dir.	Whitecaps
				Secchi01	9:15	4:00	19	43	22	7	54	partly covered		7					medium			calm			no
	Bou170509black1				8:47	3:00																			
		Bou170509AA			9:23	2:04	95	43	21.986	7	53.604	partly covered	Cs	7	6	153	1017.1	74	medium	20.7		calm	0.1		no
		Bou170509AB			9:31	3:50	200	43	21.979	7	53.482	partly covered	Cs	7	6	153	1017.1	74	medium	20.7		calm	0.1		no
		Bou170509AC			9:41	3:39	186	43	21.994	7	53.314	partly covered	Cs	7	6	153	1017.1	74	medium	20.7		calm	0.1		no
	Bou170509black2				9:54	3:00																			
17/05/09			CTDBOUS001	HPLC, Ap & TSM	10:10	29:00	400	43	21.887	7	53.701	partly covered		7	1-2	274	1017.3	72		20.8	19.0	calm			no
			CTDBOUS002		11:10		400	43	25	7	48	partly covered		7								calm			no
			CTDBOUS003		12:08	26:00	400	43	25.457	7	46.646	partly covered		6	7	107	1017.1	80		20.3	17.5	calm			no
			CTDBOUS004		13:06	23:00	400	43	27.942	7	41.97	partly covered		5	5	136	1017.0	80		20.1	18.1	calm			no
			CTDBOUS005		14:05	22:00	400	43	31.052	7	36.928	partly covered		4	6	120	1016.5	81		20.0	18.0	calm			no
			CTDBOUS006		14:59	24:00	400	43	33.987	7	30.967	blue		3	8	105	1016.3	77		19.7	19.5	calm			no
			CTDBOUS007		16:01	26:00	400	43	37.062	7	24.983	blue		3	5	148	1016.3	76		20.0	19.2	calm			no
			CTDBOUS008		16:53	25:00	400	43	39.05	7	20.993	partly covered		6	8	121	1016.2	75		19.6	18.8	calm			no
	Bou180509black1				10:40	3:00																			
		Bou180509AA			10:48	3:49	189	43	21.774	7	54.012	blue	Cu & As	1	9	98	1017.7	73	good	18.8		calm	0.5		few
		Bou180509AB			10:59	3:25	173	43	21.681	7	54.086	blue	Cu & As	1	9	98	1017.7	73	good	18.8		calm	0.5		few
		Bou180509AC			11:08	3:36	173	43	21.586	7	54.148	blue	Cu & As	1	9	98	1017.7	73	good	18.8		calm	0.5		few
	Bou180509black2				11:21	3:00																			
18/05/09				Secchi02	11:25	4:00	19	43	22	7	54	blue	Cu & As	1					good			calm			few
			CTDBOUS009	HPLC, Ap, CDOM & TSM	11:44	26:00	400	43	21.876	7	54.079	blue		1-2	10	110	1017.5	73		18.9	18.3	calm			few
	Bou180509black3				12:03	3:00																			
		Bou180509AD			12:09	3:41	176	43	21.816	7	54.122	blue	As	1	8	77	1017.4	75	good	18.9		calm	0.4		few
		Bou180509AF			12:19	3:24	172	43	21.785	7	54.151	blue	As	1	8	77	1017.4	75	good	18.9		calm	0.4		few
		Bou180509AG			12:28	3:32	178	43	21.722	7	54.225	blue	As	1	8	77	1017.4	75	good	18.9		calm	0.4		few
	Bou180509black4				12:40	3:00																			
	Bou190509black1				8:27	3:00																			
		Bou190509AB			8:35	2:58	148	43	22.150	7	53.395	partly covered	Cu	6	4	211	1019.2	86	good	19.0		calm	0.2		no
	Bou190509black2				8:48	3:00																			
			CTDBOUS010	HPLC & Ap	09:14	24:00	400	43	22.157	7	53.117	partly covered		6-7	4	69	1019.4	84		18.6	18.5	calm			no
19/05/09				Secchi03	9:15	4:00	18	43	22	7	54	partly covered							good			calm			no
	Bou190509black3				11:11	3:00																			
		Bou190509AD			11:37	1:36	73	43	22.122	7	53.609	partly covered	Cu	5	5	255	1019.4	85	good	19.2		calm	0.2		no
		Bou190509AE			11:46	1:11	56	43	22.185	7	53.335	partly covered	Cu	5	5	255	1019.4	85	good	19.2		calm	0.2		no
	Bou190509black4				11:57	3:00																			
			CTDBOUS011	HPLC, Ap & TSM	12:06	26:00	400	43	22.039	7	53.843	partly covered		6	4	90	1019.3	83		19.4	18.7	calm			no

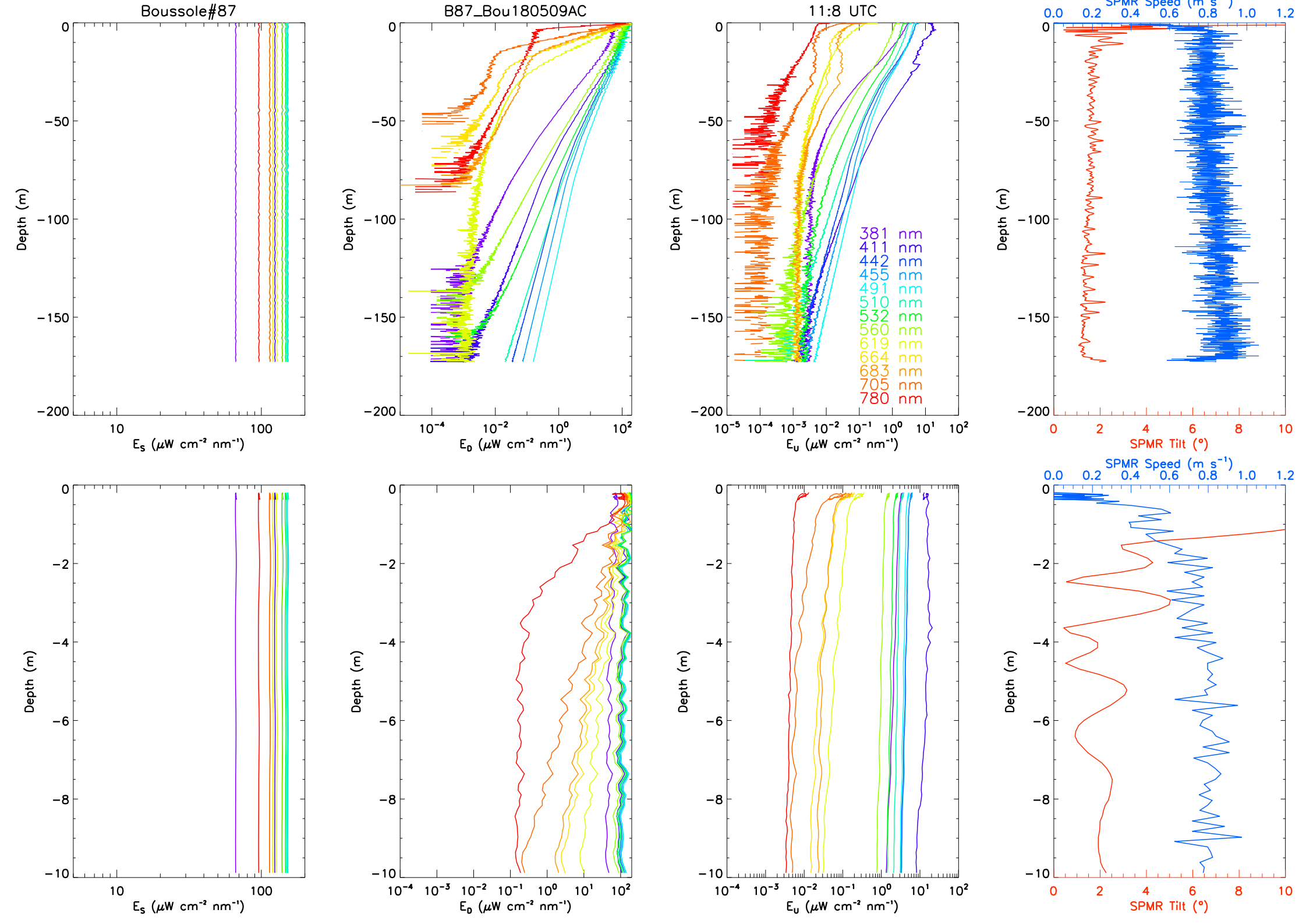

Boussole#87
B87_Bou170509AA
9:23 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
SPMR Speed (m s^{-1})
SPMR Tilt (°)
381 nm
411 nm
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm

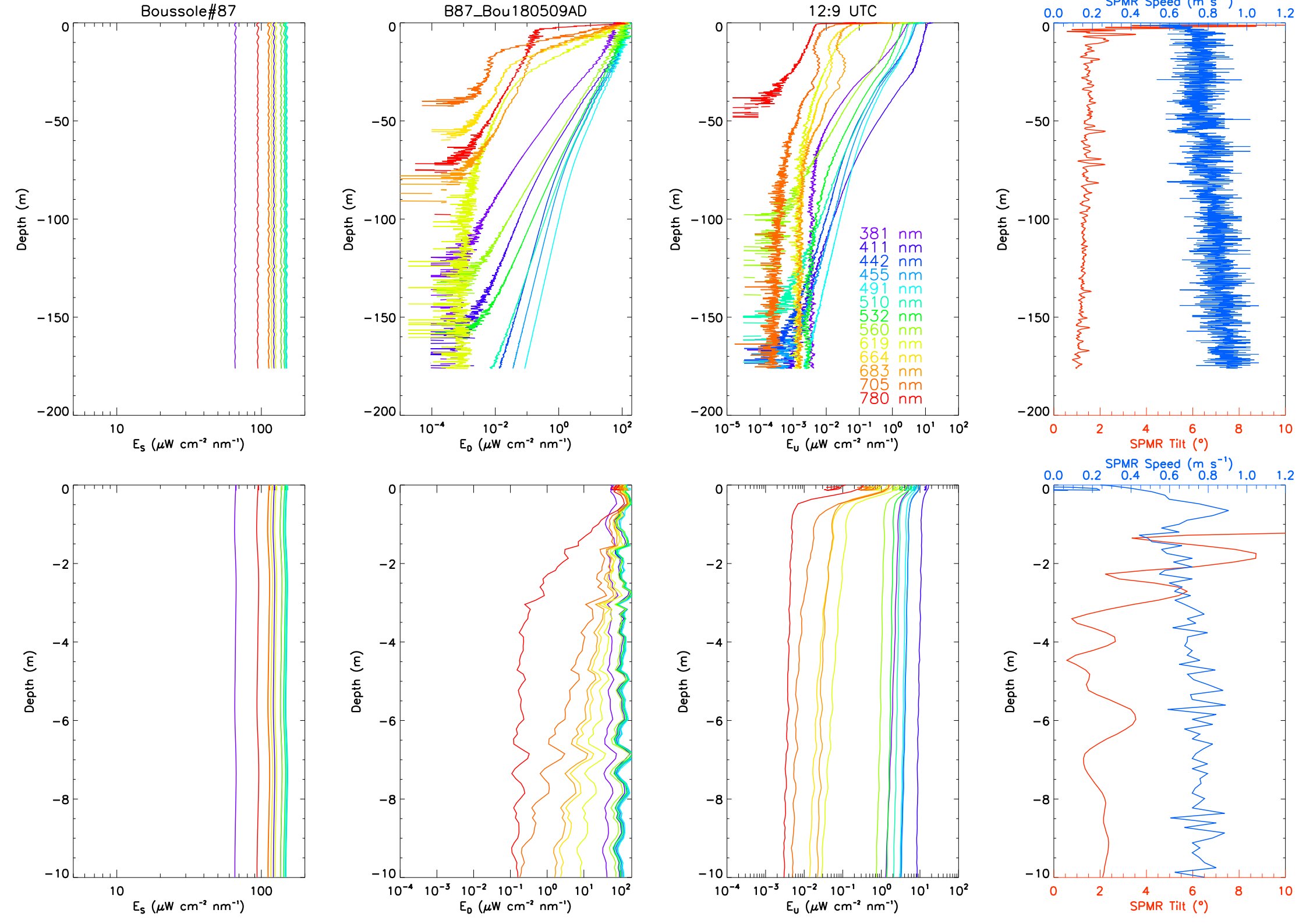

Boussole#87
B87_Bou170509AB
9:32 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
381 nm
411 nm
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)

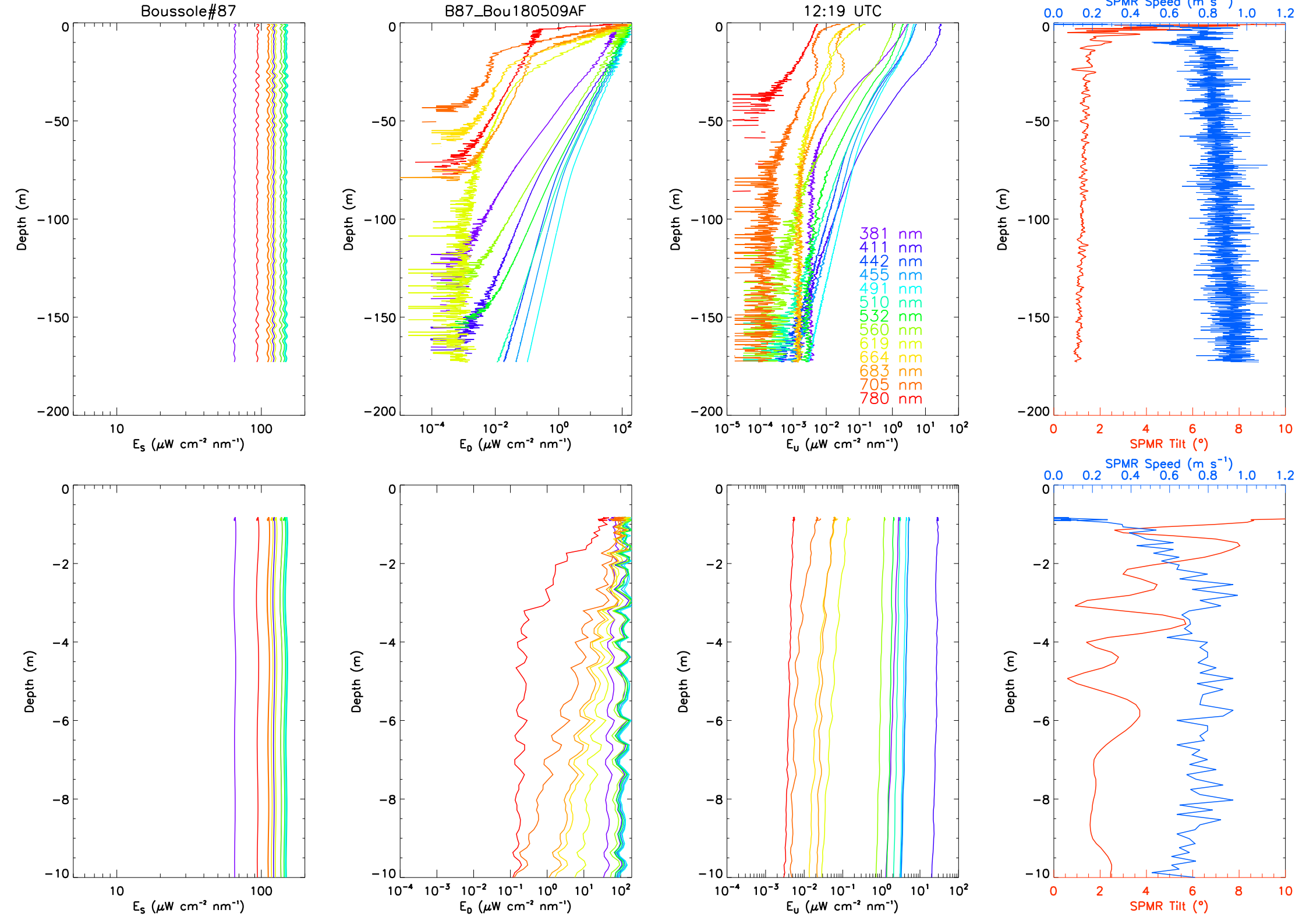

Boussole#87
B87_Bou170509AC
9:42 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
381 nm
411 nm
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)

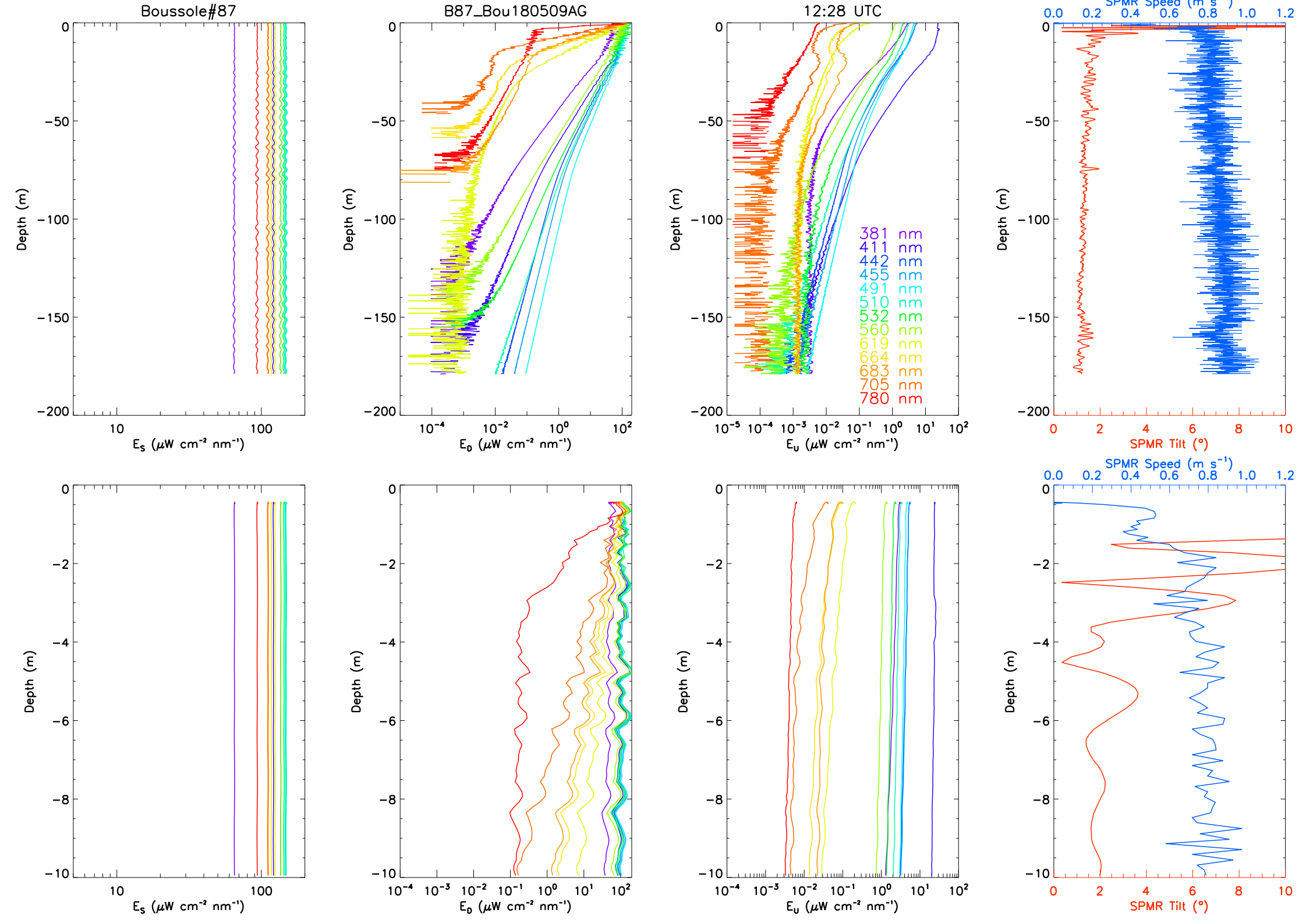

Boussole#87
B87_Bou180509AA
10:48 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
381 nm
411 nm
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)

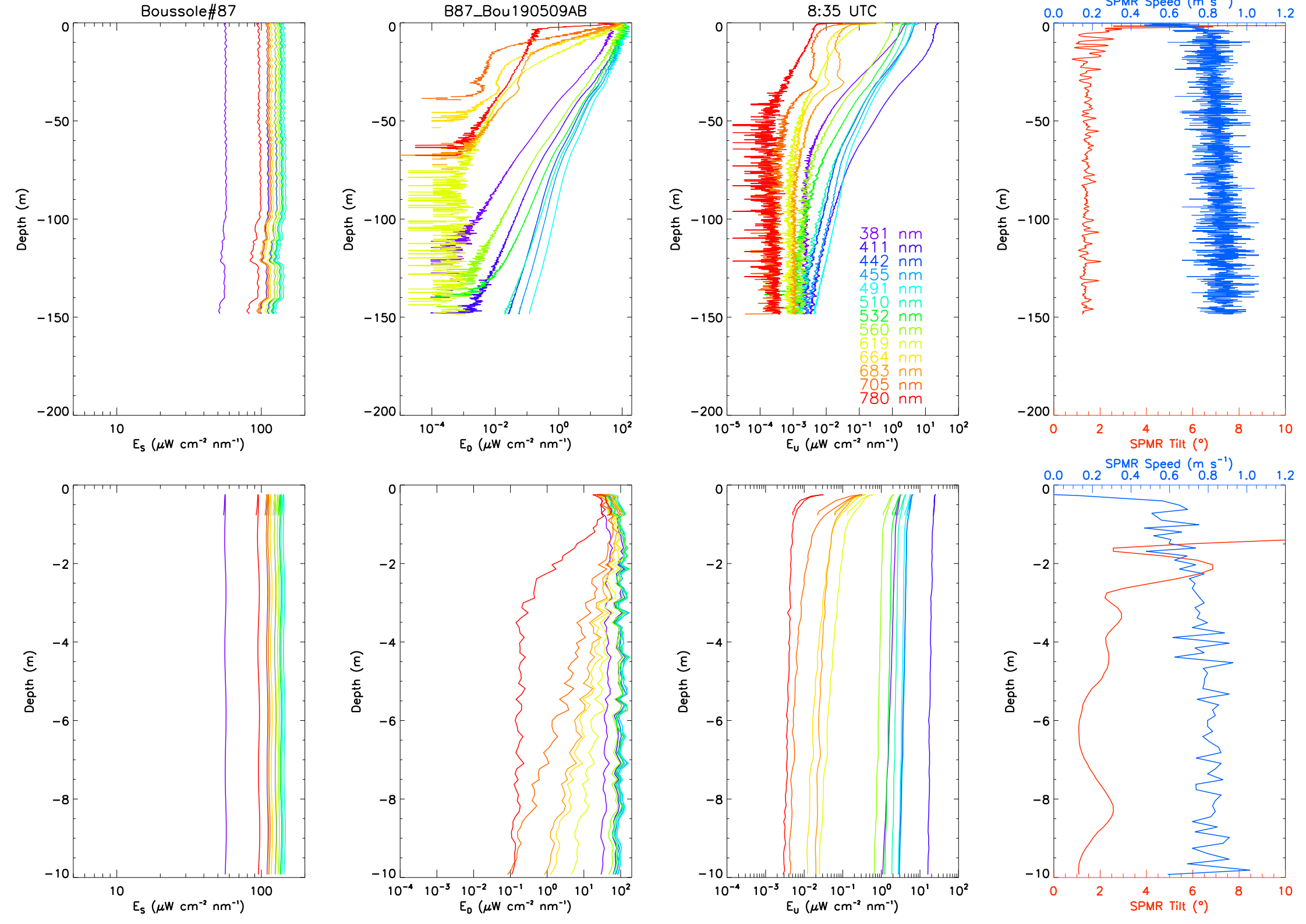

Boussole#87
B87_Bou180509AB
10:59 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
381 nm
411 nm
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)

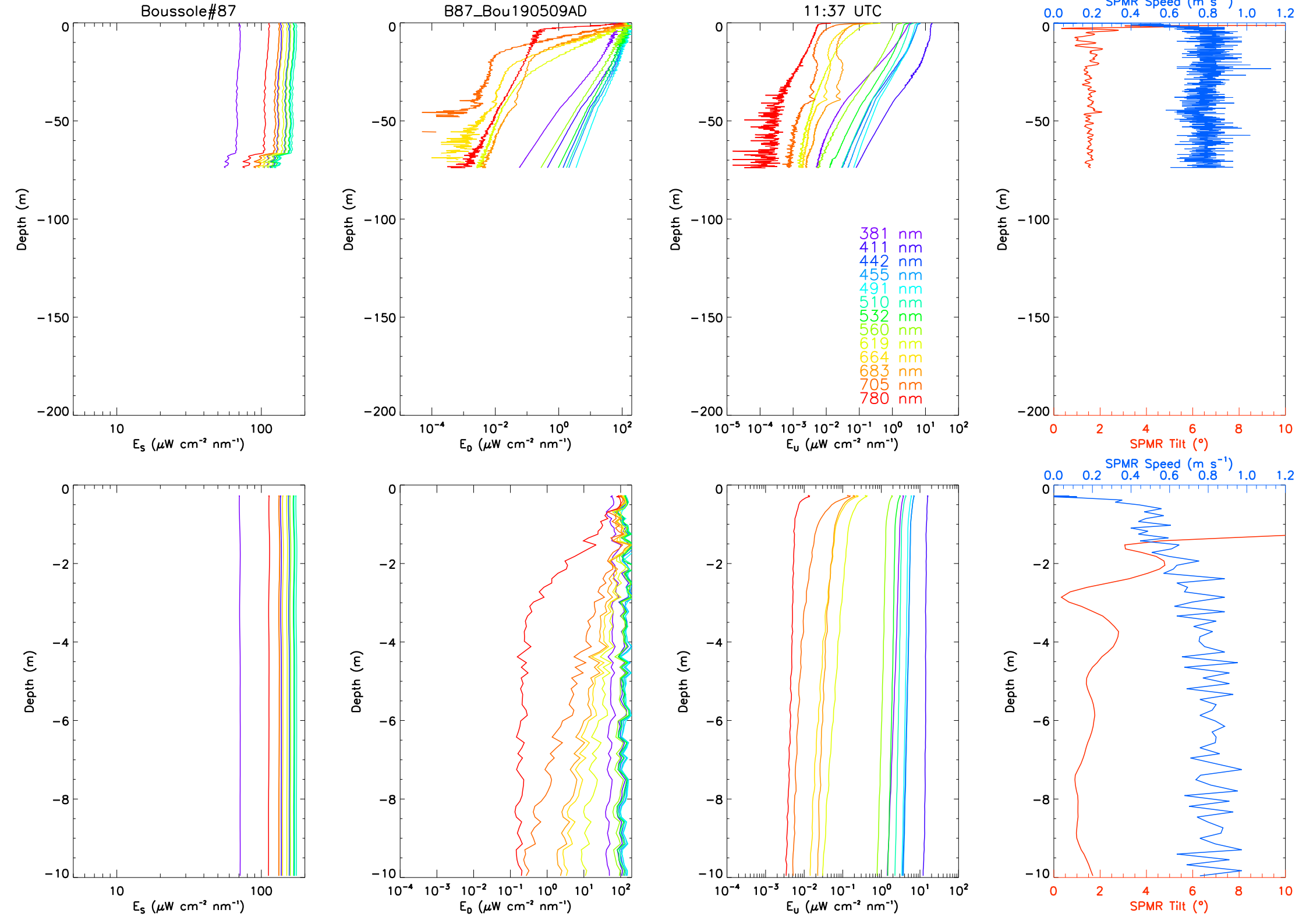

Boussole#87
B87_Bou180509AC
11:8 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
381 nm
411 nm
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)

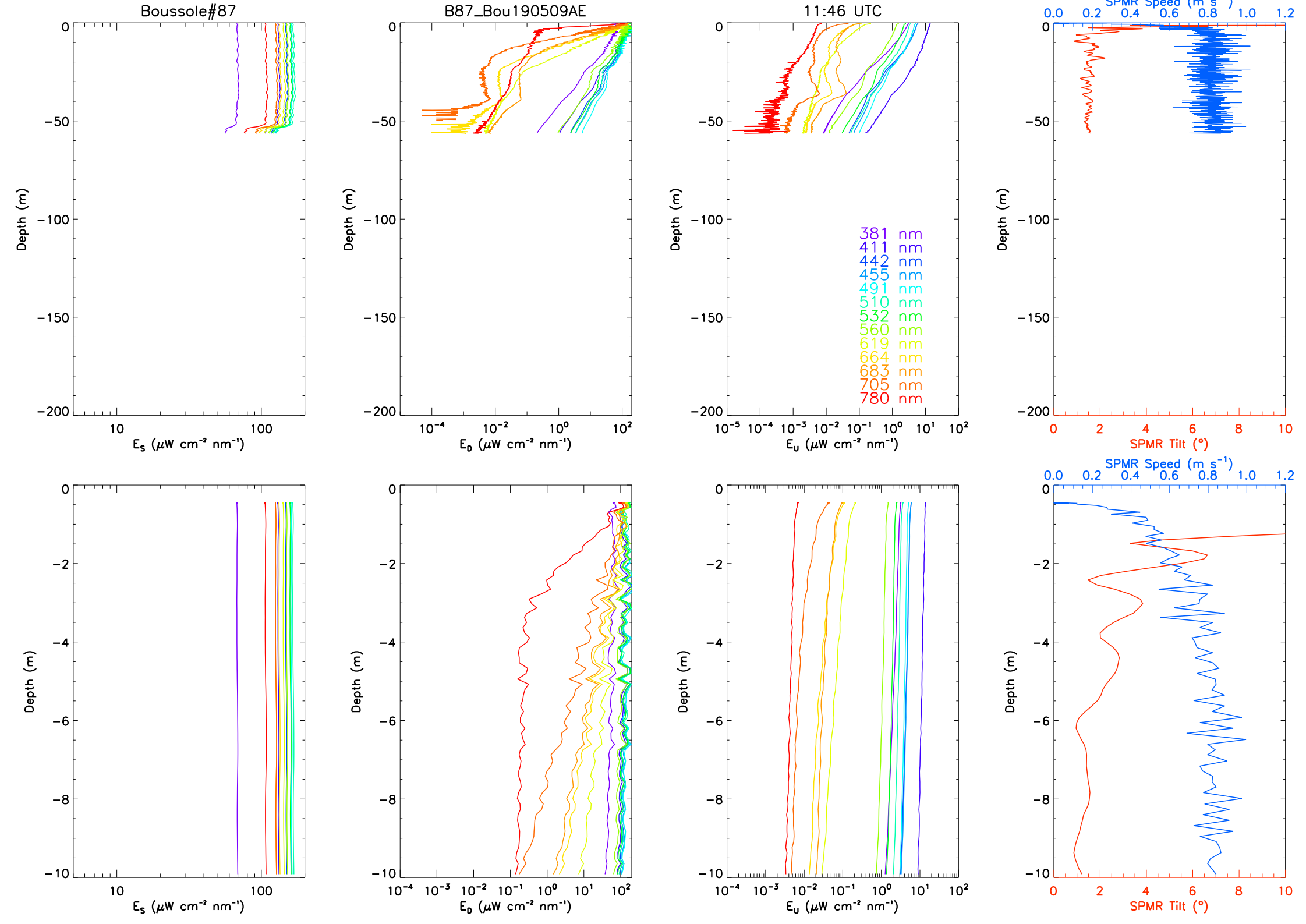

Boussole#87
B87_Bou180509AD
12:9 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
381 nm
411 nm
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)


Boussole#87
B87_Bou180509AF
12:19 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#87
B87_Bou180509AG
12:28 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 (°)

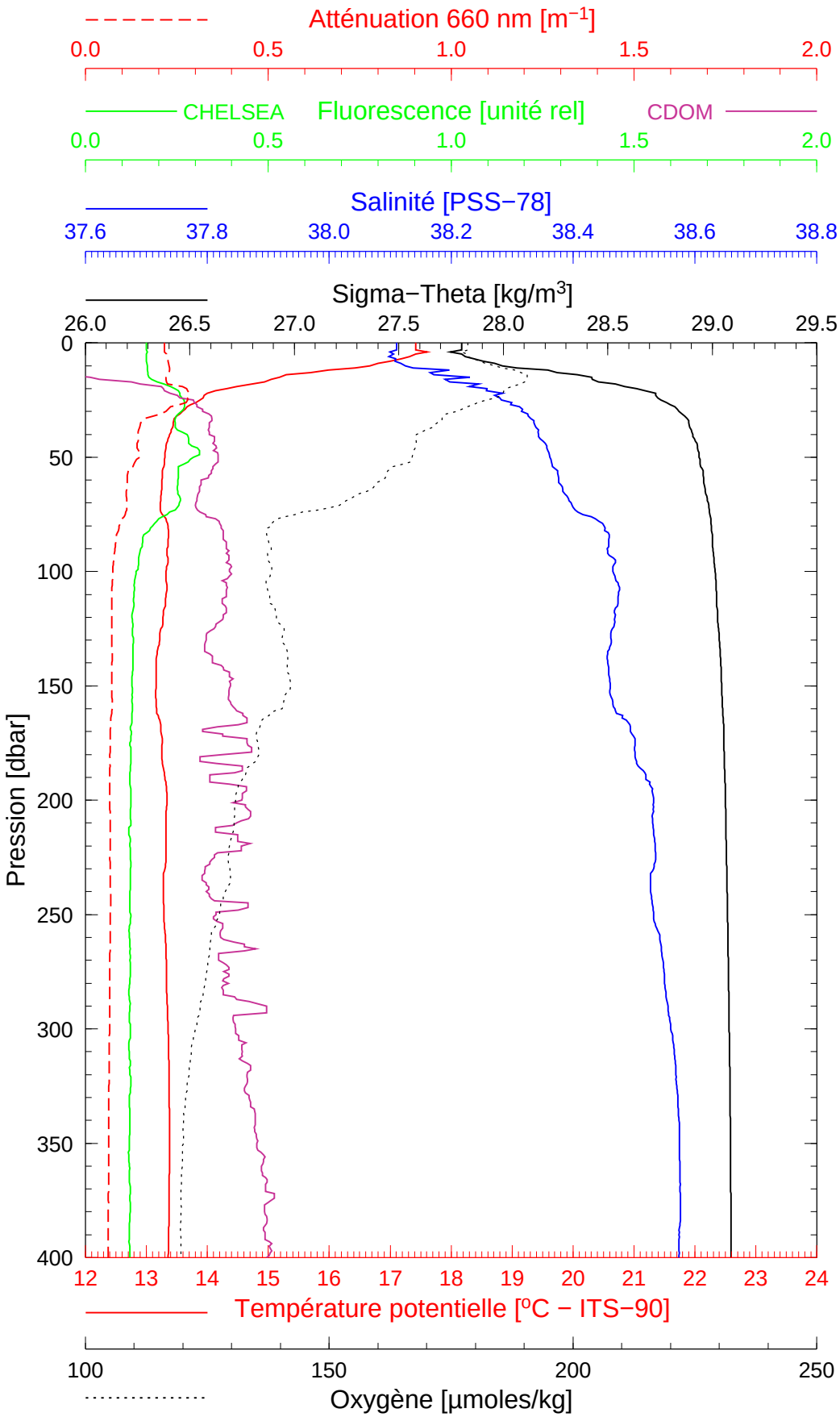

Boussole#87
B87_Bou190509AB
8:35 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
381 nm
411 nm
442 nm
455 nm
491 nm
510 nm
532 nm
560 nm
619 nm
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)


Boussole#87
B87_Bou190509AD
11:37 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#87
B87_Bou190509AE
11:46 UTC
SPMR Speed (m s⁻¹)
SPMR Tilt (°)
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

BOUSSOLE 87 **17/05/2009** **BOUS090517_02**

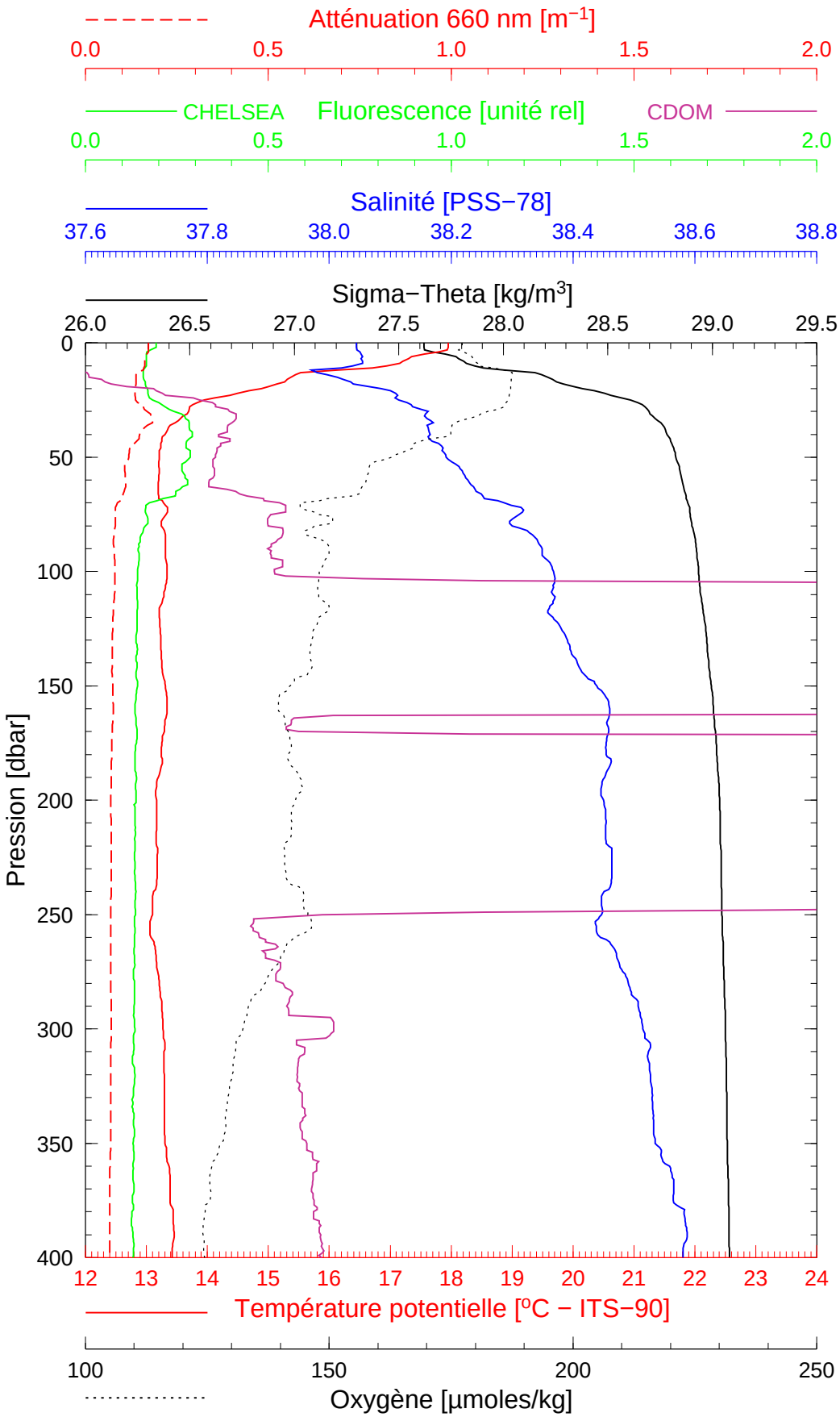
BOUS002



Date	*17/05/2009*	*Latitude*	*43°25.457*
Heure déb	*12h 08min [TU]*	*Longitude*	*07°46.646*

BOUSSOLE 87 **17/05/2009** **BOUS090517_03**

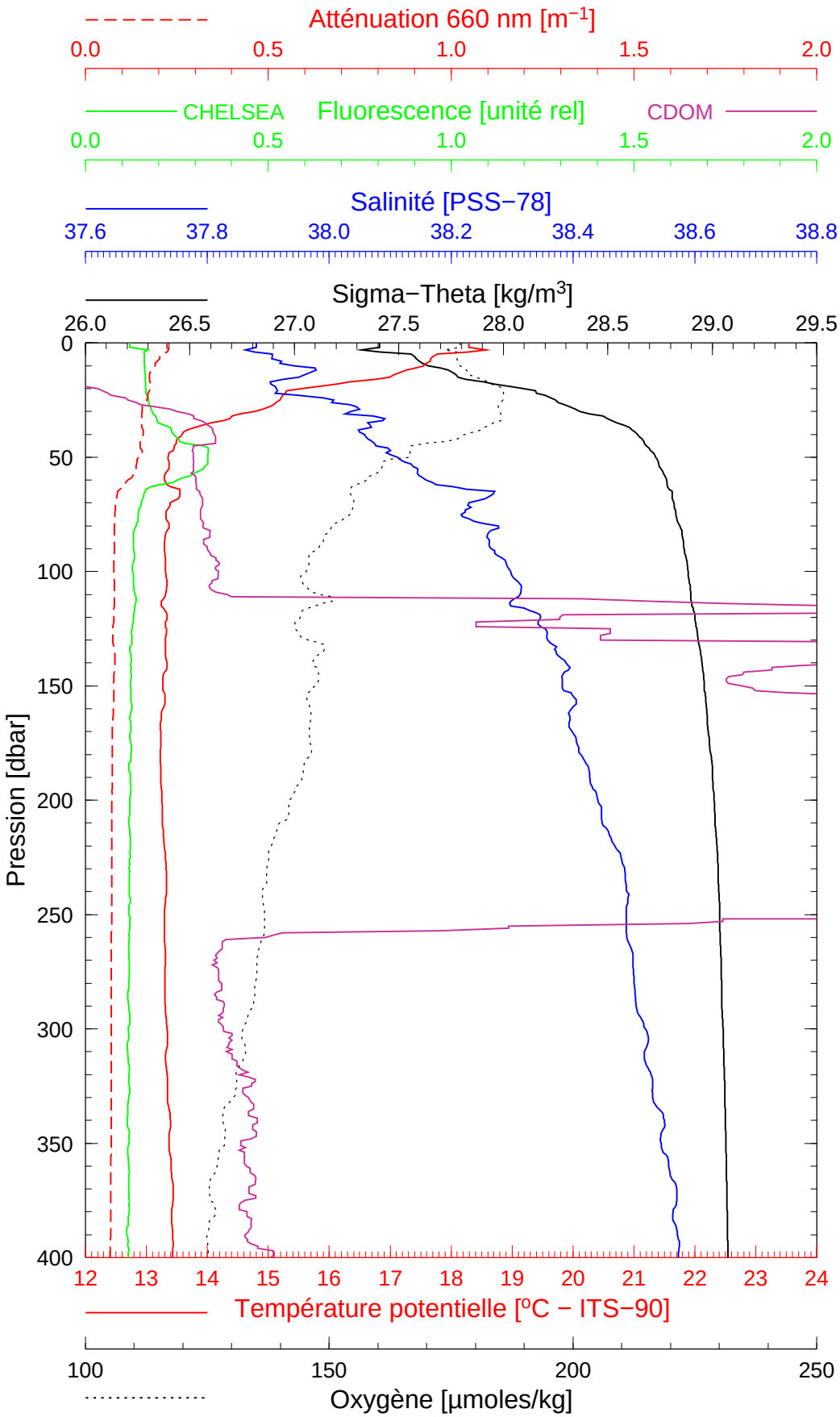
BOUS003



Date	*17/05/2009*	*Latitude*	*43°25.457*
Heure déb	*12h 08min [TU]*	*Longitude*	*07°46.646*

BOUSSOLE 87 **17/05/2009** **BOUS090517_04**

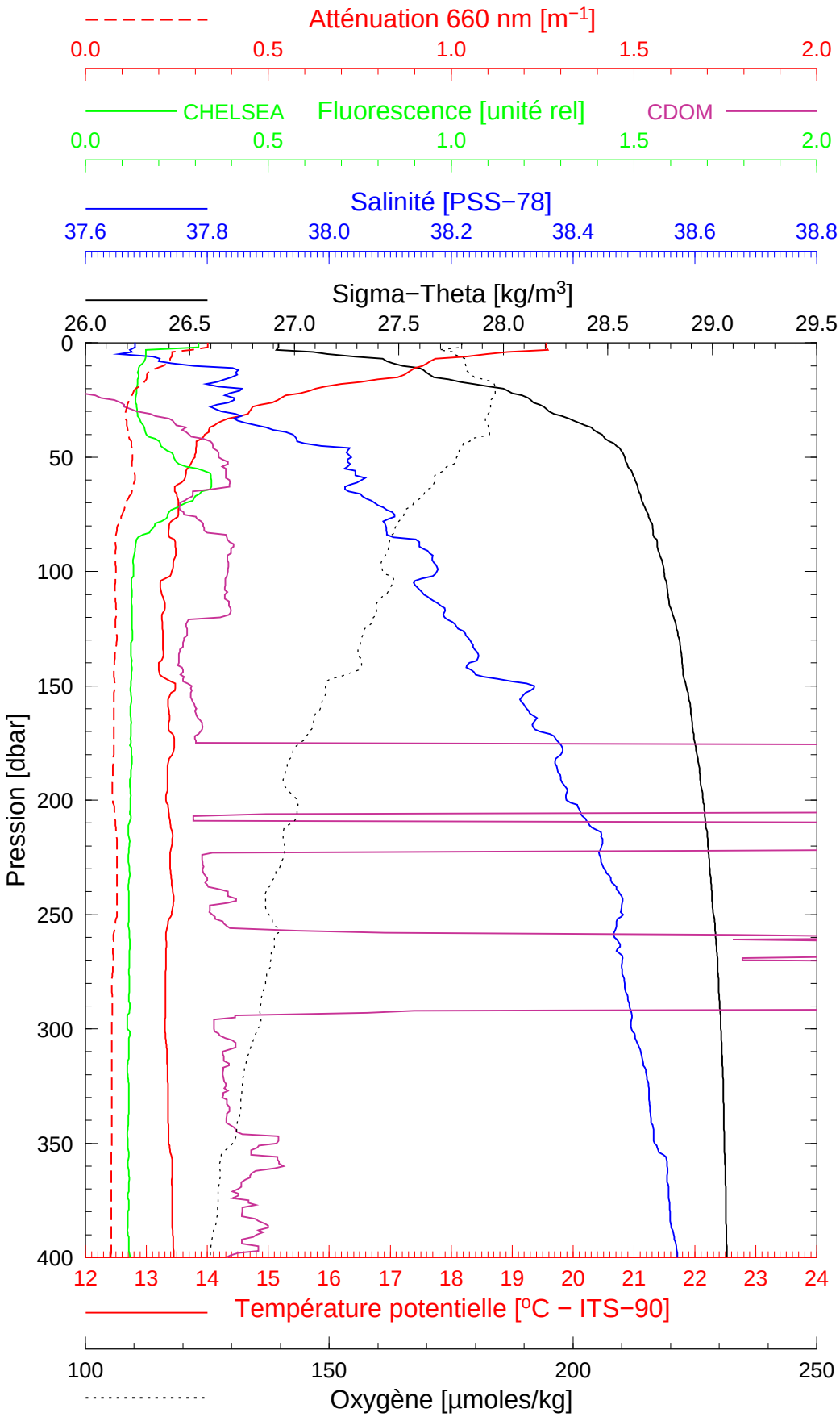
BOUS004



Date	*17/05/2009*	*Latitude*	*43°27.942*
Heure déb	*15h 06min [TU]*	*Longitude*	*07°41.970*

BOUSSOLE 87 **17/05/2009** **BOUS090517_05**

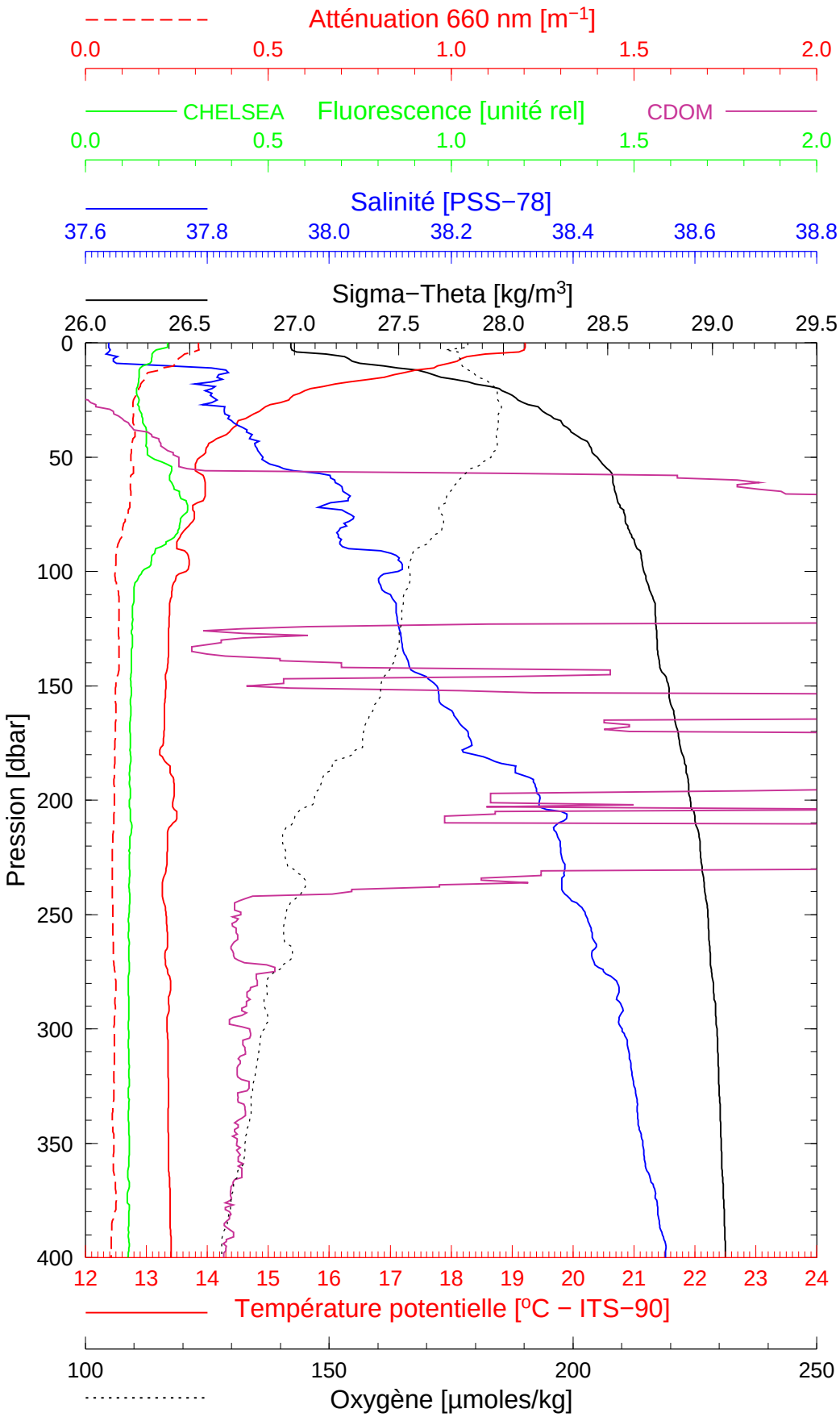
BOUS005



Date	*17/05/2009*	*Latitude*	*43°31.052*
Heure déb	*16h 05min [TU]*	*Longitude*	*07°36.928*

BOUSSOLE 87 **17/05/2009** **BOUS090517_06**

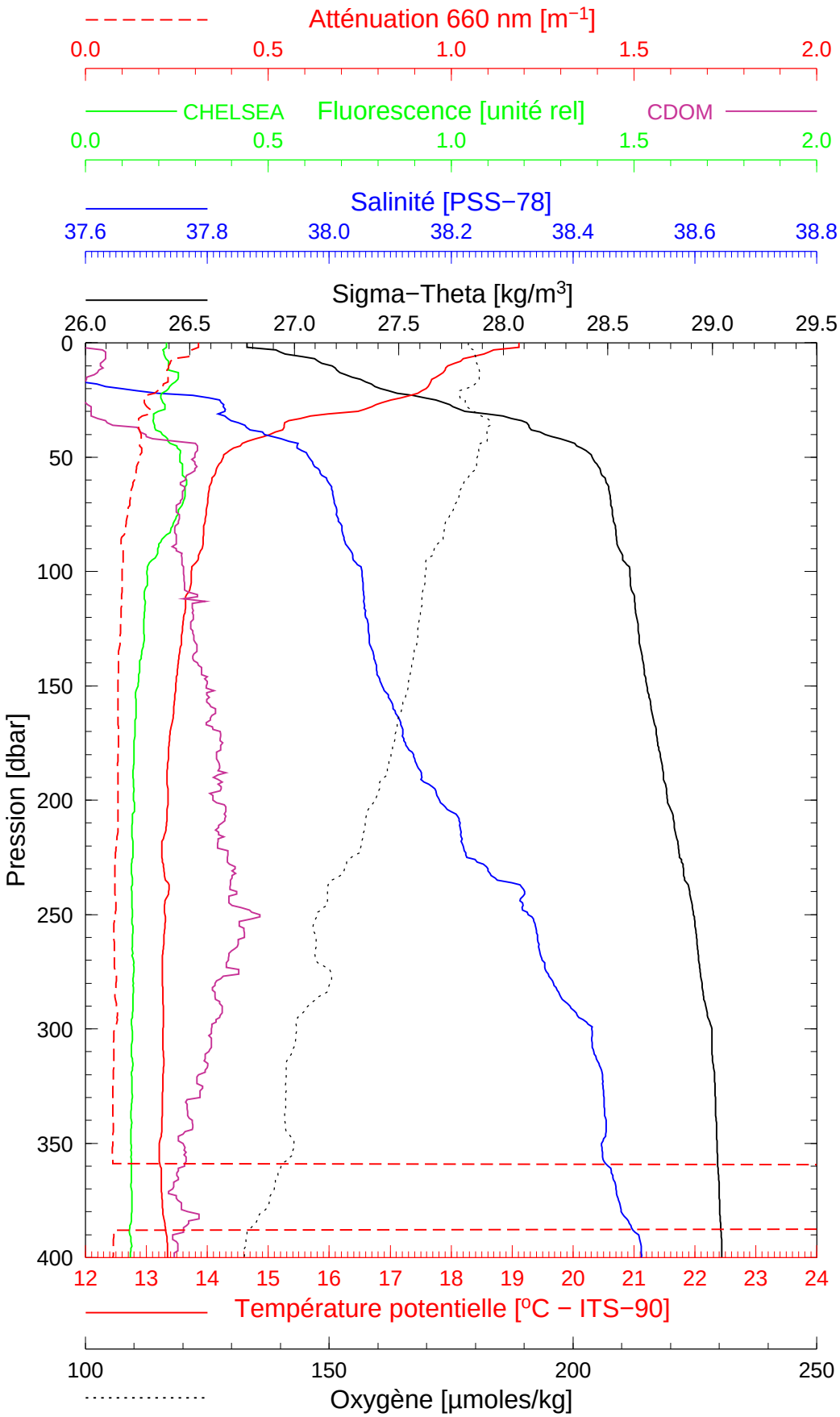
BOUS006



Date	*17/05/2009*	*Latitude*	*43°33.987*
Heure déb	*16h 58min [TU]*	*Longitude*	*07°30.967*

BOUSSOLE 87 **17/05/2009** **BOUS090517_07**

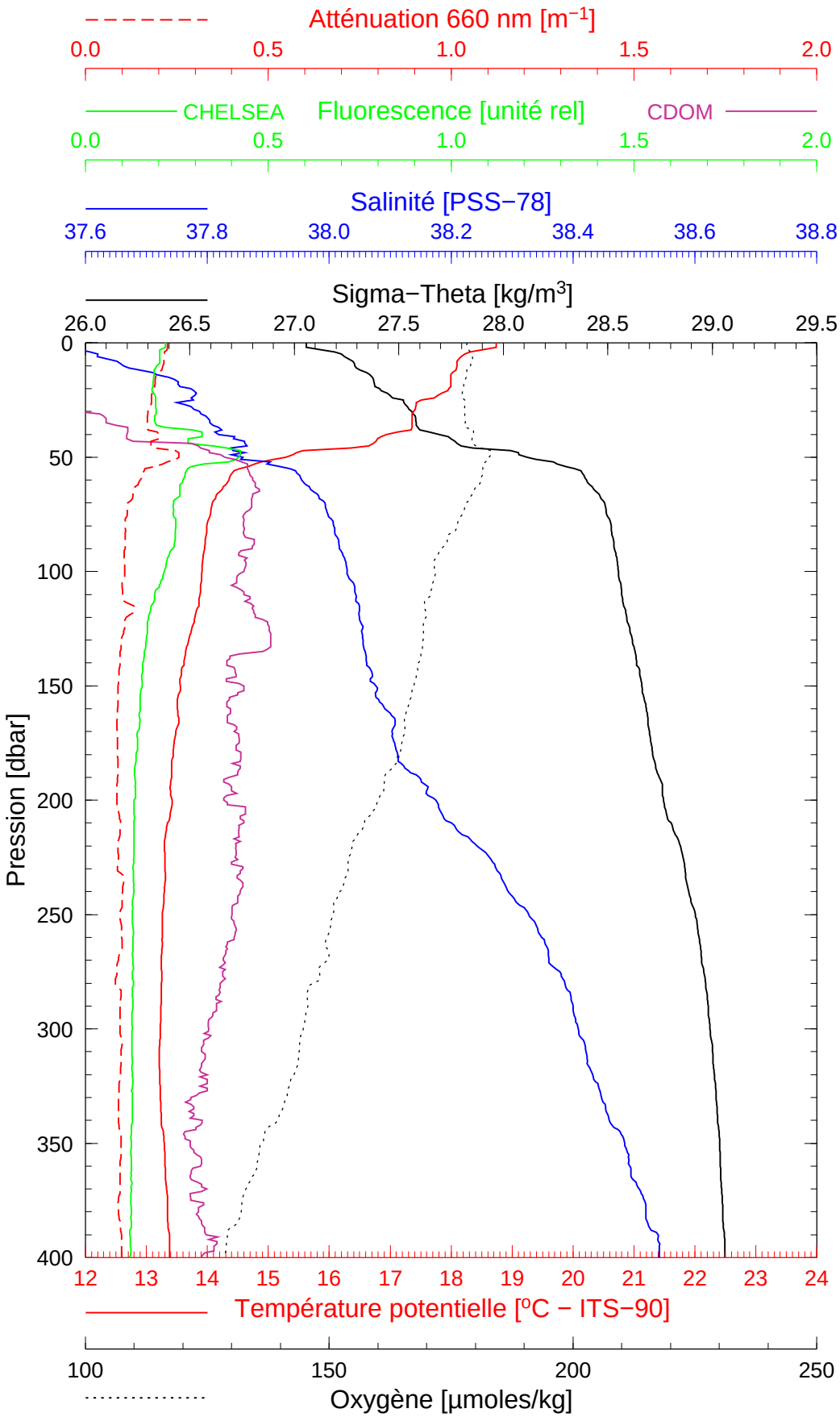
BOUS007



Date	*17/05/2009*	*Latitude*	*43°37.062*
Heure déb	*18h 01min [TU]*	*Longitude*	*07°24.983*

BOUSSOLE 87 **17/05/2009** **BOUS090517_08**

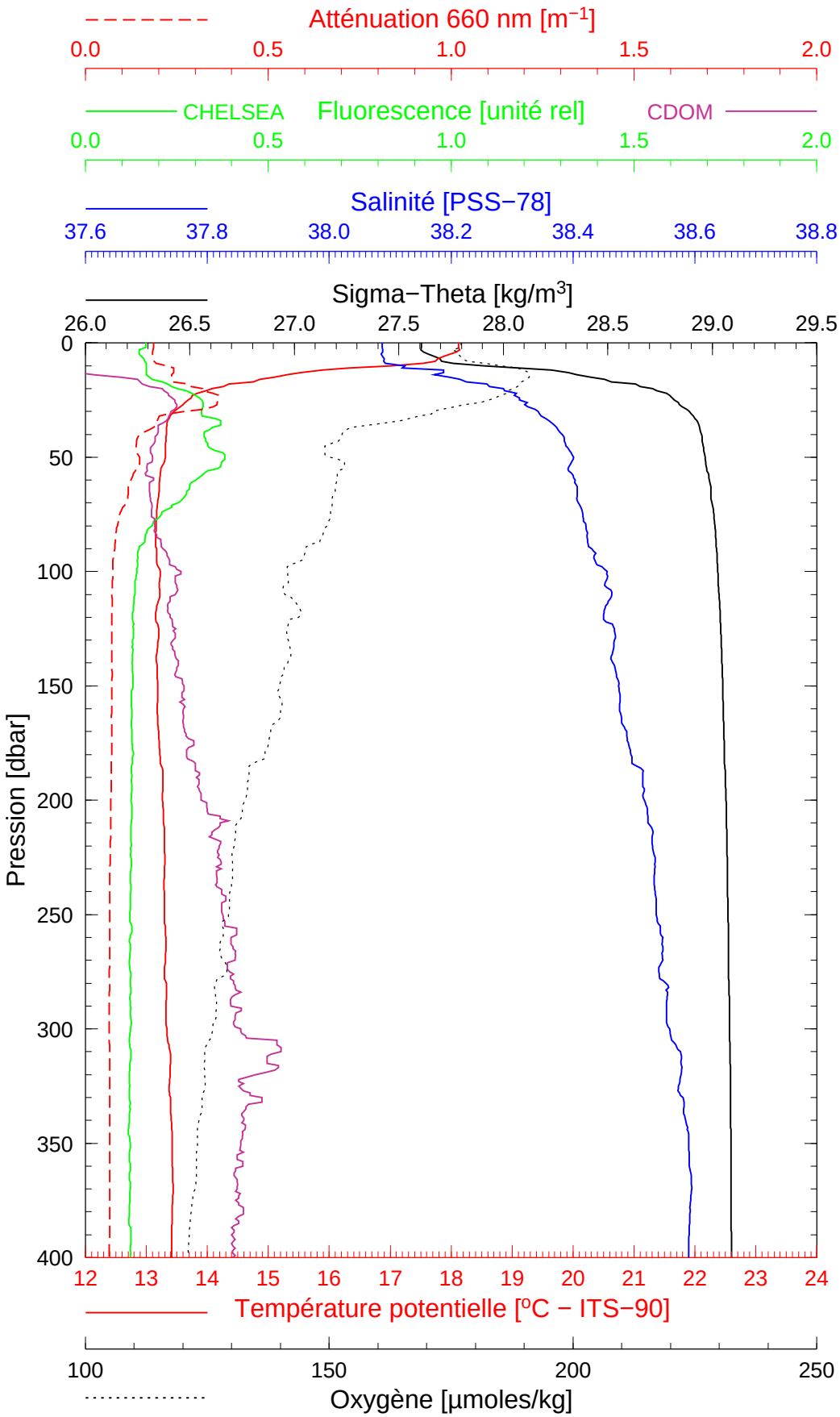
BOUS008



Date	*17/05/2009*	*Latitude*	*43°39.050*
Heure déb	*18h 53min [TU]*	*Longitude*	*07°20.939*

BOUSSOLE 87 **18/05/2009** **BOUS090518_01**

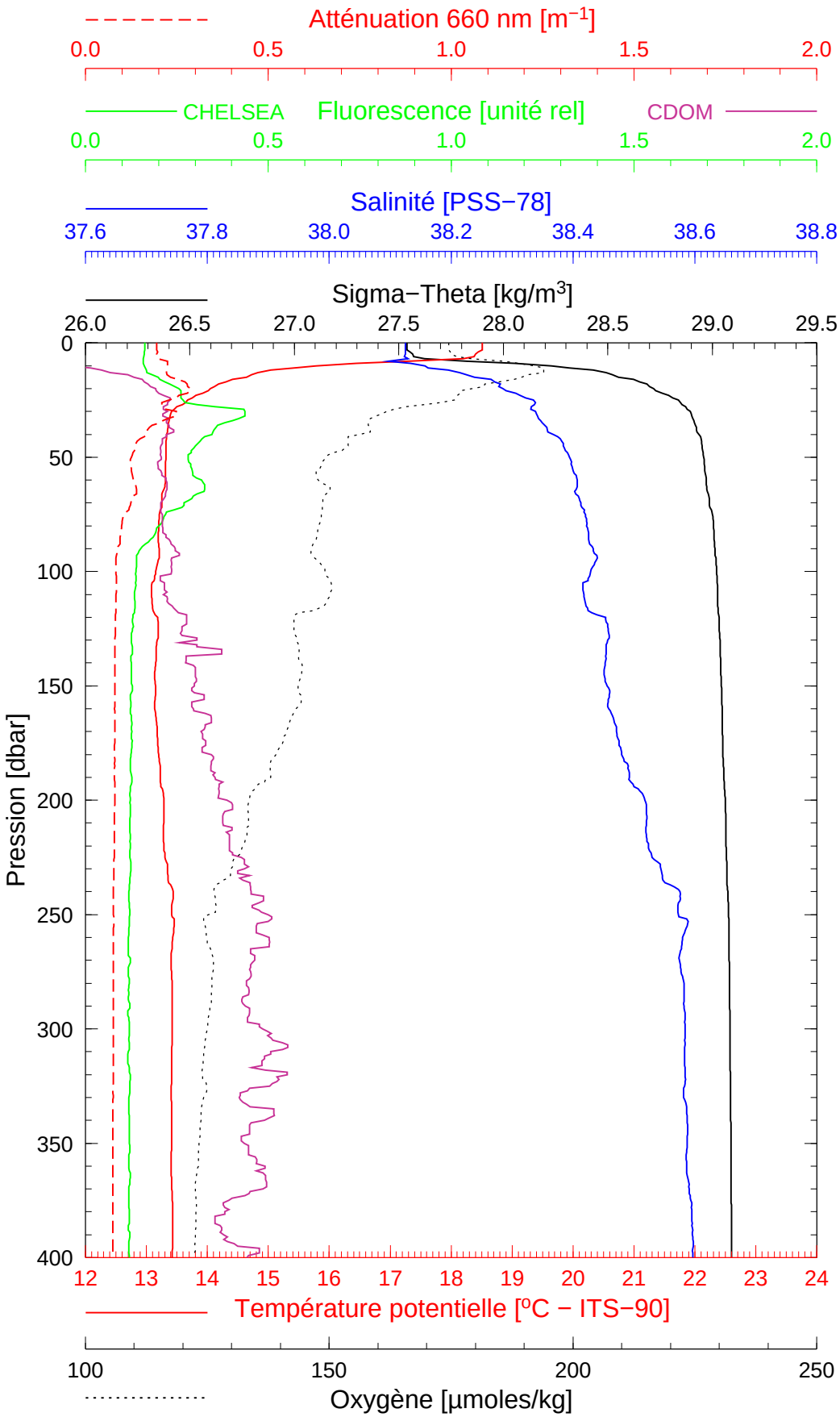
BOUS009



Date	*18/05/2009*	*Latitude*	*43°21.876*
Heure déb	*13h 44min [TU]*	*Longitude*	*07°54.079*

BOUSSOLE 87 **19/05/2009** **BOUS090519_01**

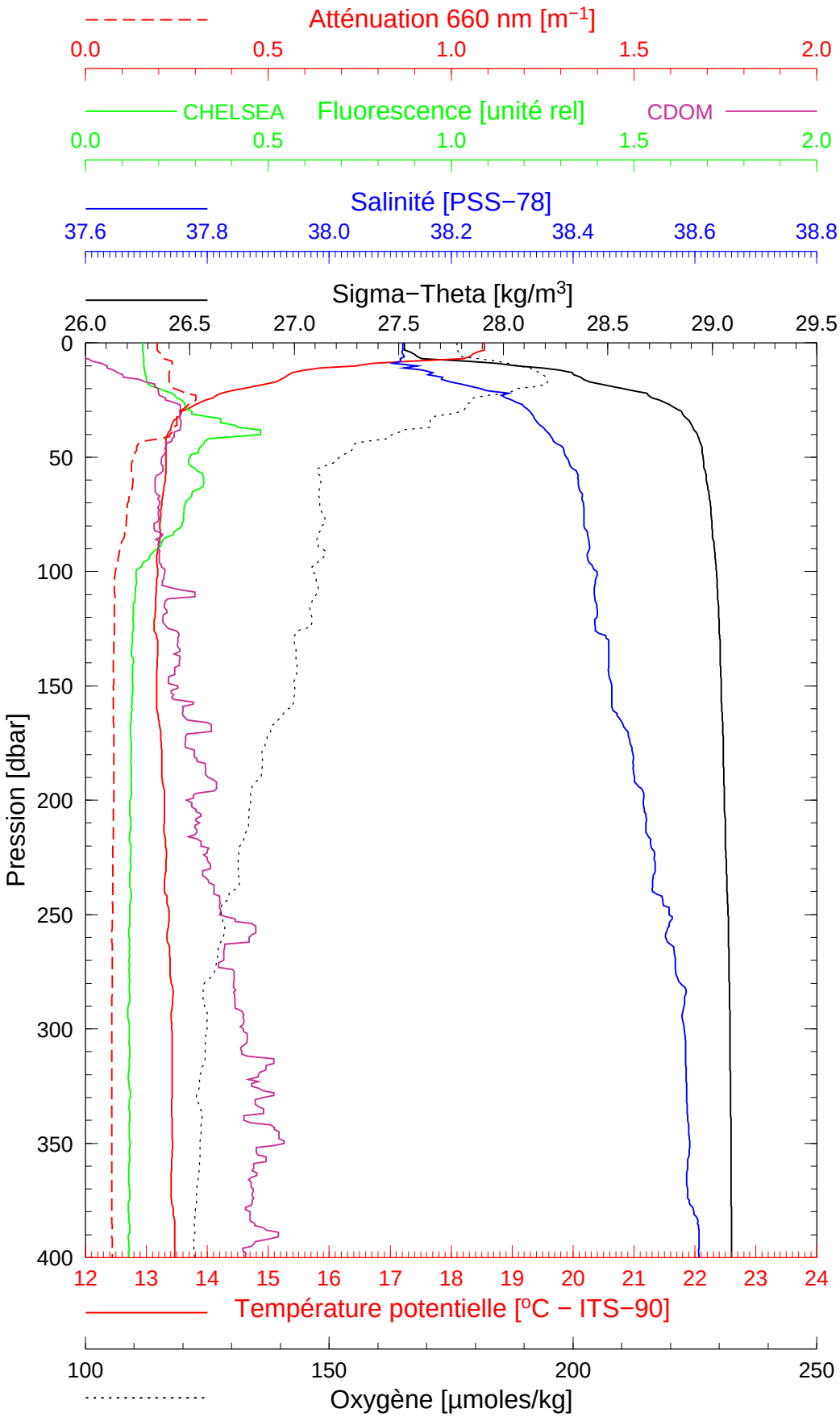
BOUS010



Date	*19/05/2009*	*Latitude*	*43°22.157*
Heure déb	*11h 14min [TU]*	*Longitude*	*07°53.117*

BOUSSOLE 87 **19/05/2009** **BOUS090519_02**

BOUS011



Date	*19/05/2009*	*Latitude*	*43°22.039*
Heure déb	*14h 06min [TU]*	*Longitude*	*07°53.843*