

# BOUSSOLE Monthly Cruise Report

## Cruise 86

April 13 - 16, 2009

Duty Chiefs: Vincenzo Vellucci (enzo@obs-vlfr.fr)

Vessel: R/V Téthys II

(Captains: Alain Stephan)

Science Personnel: Céline Bachelier, Jean De Vaugelas, Emilie Diamond, Olivier Javoy, Yves Lamblard, David Luquet and Vincenzo Vellucci.

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Figure 1. Vincenzo Vellucci cleaning solar panels on the BOUSSOLE buoy.

## BOUSSOLE project

ESA/ESRIN contract N° 17286/03/I-OL

Deliverable from WP#400/200

April 17, 2009



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## 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<sub>2</sub> 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 gimbed 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

ARGOS data from the buoy VIII recently deployed indicated the possible presence of the cap or a malfunctioning on the 9 m Ed sensor, solving this problem will be a priority when divers will be on board. For the first time, a black neoprene cap will be put on the HS4 mounted on the buoy to acquire three series of measurements for dark corrections. The hydrophone of the CRC from Marineland will be again fixed to the buoy chain at about 20 m. One of the four days, Céline Bachelier will complete the MOOSE and DYCOMED programs with a deep CTD cast and water sampling.

## Cruise Summary

Three of the four cruise days were used. The last day was not used for bad weather and restrictions from the port authorities. Starting from this cruise, the SMSR measurements were taken with its "x" and "y" axes respectively perpendicular and parallel with respect to the ship major axis. In the previous cruises (at least from B#70) the instrument was instead turned by ~180°.

The first day was mainly used for optical and CTD casts at the BOUSSOLE site, for buoy data retrieval and for sampling at the DYFAMED station. The second day was used for optical and CTD casts at the BOUSSOLE site and for completing the transect. The third day was used for diving on the buoy, for optical and CTD casts at the BOUSSOLE site and for buoy data retrieval. The manual CIMEL is still not available.

### Monday 13 April 2009

The first day, sea state was good with very low wind blowing and blue sky. When arrived at the BOUSSOLE site, 3 SPMR profiles, 1 Secchi disk, 1 CTD cast with water sampling were performed. In the meantime two CISCO connections with the buoy were attempted unsuccessfully. Then a direct connection on the top of the buoy was attempted and data were retrieved correctly. The CISCO connectors and ARGOS connectors were cleaned. The JUNCTION BOX was inadvertently mounted with the switch on the wrong side. Retrieved data

showed that the problem on the Ed sensor at 9 m was just due to a cap forgotten on it. This day the MOOSE/DY sampling was completed too.

## Tuesday 14 April 2009

The second cruise day, sea state was good with very low wind blowing and blue sky. When arrived at the BOUSSOLE site, 3 SPMR profiles, 1 Secchi disk and 1 CTD with water sampling were performed before completing the transect on the way back to Nice.

## Wednesday 15 April 2009

The third cruise day, sea state was still good with no or very low wind blowing and blue sky. When arrived on site, divers went at sea for cleaning the instruments and removing the cap on the Ed at 9 m. A neoprene cap was put on the HS4 for acquiring three dark measurement. The divers also fixed the hydrophone to the buoy at 20 m. 3 SPMR profiles, 1 Secchi disk, 1 CTD cast with water sampling were performed. A CISCO connection with the buoy was established and data retrieved. Then sky conditions worsened and SPMR casts were not continued. 1 deep CTD cast with water sampling (for TSM) was also performed to test temperature sensors before going back to Nice..

## Thursday 16 April 2009

The last cruise day was cancelled because of bad weather and restrictions from port authorities.

## Cruise Report

### Monday 13 April 2009 (UTC)

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

0650 Departure from the Nice port and immediate return. Forgotten CTD connection cables in the lab.  
0740 Departure from the Nice port.  
1100 Arrival at the BOUSSOLE site.  
1105 CTD doesn't work.  
1115 Attempted CISCO connection with the buoy: unsuccessful.  
1130 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 CDOM.  
1205 SPMR 01, 02, 03.  
1300 Secchi disk 01 (18 m).  
1315 Attempted CISCO connection with the buoy: unsuccessful.  
1335 Water sampling at 5 m for TSM.  
1400 Zodiac at sea for climbing on the buoy. CISCO and ARGOS connections cleaned and retrieval data directly on buoy.  
1440 Departure to DYFAMED site.  
1505 CTD MOOSE, 2200 m.  
1630 Departure to the Nice port.  
1930 Arrival at the Nice port.

### Tuesday 14 April 2009 (UTC)

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

0515 Departure from the Nice port.  
0830 Arrival at the BOUSSOLE site.  
0840 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.  
0855 Secchi disk 02 (16 m).  
0855 SPMR 04, 05, 06.  
0945 Departure to Nice direction.  
1030 CTD 03, 400 m, station 01 (43°25'N 07°48'E).  
1125 CTD 04, 400 m, station 02 (43°28'N 07°42'E).  
1220 CTD 05, 400 m, station 03 (43°31'N 07°37'E).  
1315 CTD 06, 400 m, station 04 (43°34'N 07°31'E).  
1415 CTD 07, 400 m, station 05 (43°37'N 07°25'E).  
1500 CTD 08, 400 m, station 06 (43°39'N 07°21'E).  
1520 Departure to the Nice port.

1555 Arrival at the Nice port.

### Wednesday 15 April 2009 (UTC)

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

0445 Departure from the Nice port.

0750 Arrival at the BOUSSOLE site.

0800 Diving on the buoy for cleaning and general inspection. Remove a cap on the Es sensor at 9 m. Dark HS4 measurements at 08h30, 08h45 and 09h00. Fixed the hydrophone on the chain at 20 m.

0815 CISCO connection with buoy and data retrieval.

0940 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.

1015 SPMR 07, 08, 09.

1050 Secchi disk 03 (17 m).

1115 CISCO connection with buoy and data retrieval.

1155 CTD, 1000 m for testing T sensors, with water sampling at 5 m for TSM.

1350 Departure to the Nice port.

1750 Arrival at the Nice port.

### Thursday 16 April 2009

Bad weather, zonex 23, 26, 28 not allowed.

**Calculated Swath paths for the MERIS Sensor (ESOV Software)**

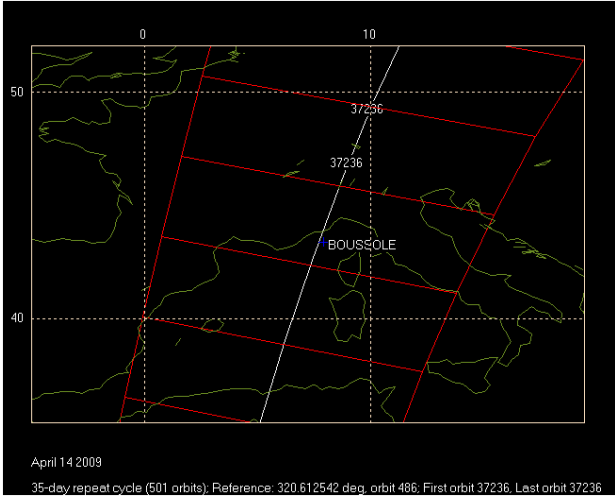


Figure 2. Calculated swath paths for MERIS (Esov software) above BOUSSOLE site for April 14 2009.

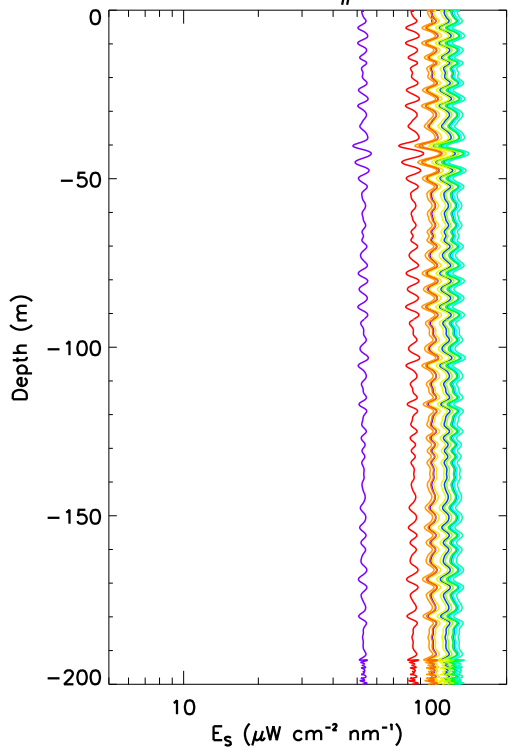
# Appendix

Cruise Summary Table for Boussole 81

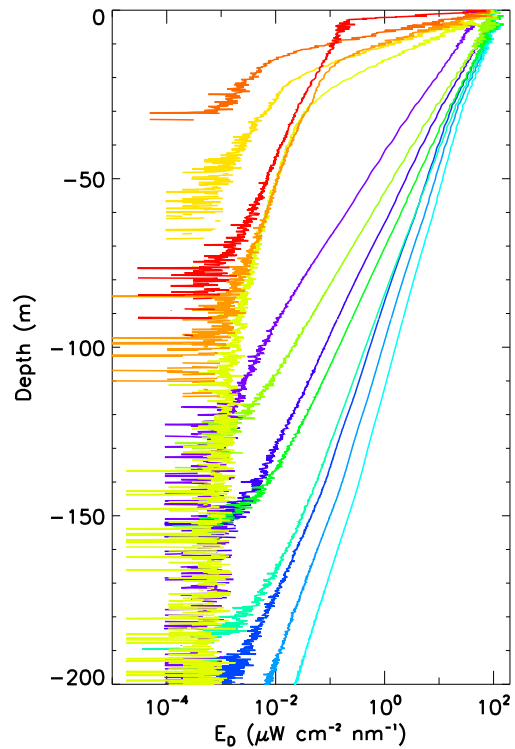
Date	Black names (file ext: ".raw")	Profile names (file extension: ".raw")	CTD notes / satellite overpass	Other sensors	Start Time		Depth max (meter)	Latitude (N)			Longitude		Sky	Clouds	Weather			Atm. Pressure (hPa)	Humidity (%)	Visibility	T air	T water	Sea	Sea Swell H (m)	Swell dir.	Whitecaps		
					GMT (hour:min)	(min:sec)		(Degree)	(Minute)	(Degree)	(Minute)	Quantity (#/8)			Wind sp. (kn)	Wind dir.												
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		Bou130409AA			12:05	3:00																						
		Bou130409AB			12:20	4:40	200	43	21.986	7	53.563	blue			1-2	7	258	1004.4	75	good	16.3		calm	0.8		no		
	Bou130409black2	Bou130409AC			12:33	4:02	192	43	22.001	7	53.546	blue			1-2	7	258	1004.4	75	good	16.3		calm	0.8		no		
					12:44	4:22	194	43	22.045	7	53.546	blue			1-2	7	258	1004.4	75	good	16.3		calm	0.8		no		
					12:58	3:00																						
					Secchi01	13:00	4:00	18	43	22	7	54	blue			1-2					good			calm			no	
			wat_samp.TSM	13:35	10:00	5	43	22	7	54												calm			no			
14/04/09			CTDBOUS002	HPLC & TSM	8:40	25:00	400	43	22.07	7	53.746	blue			0	9	68	1008.7	86		15.3	14.2	calm			no		
	Bou140409black1			Secchi02	8:55	4:00	16	43	22	7	54	blue			0					good			calm			no		
		Bou140409AA			8:56	3:00																				no		
		Bou140409AB			9:09	3:55	195	43	21.998	7	53.441	blue			0	8	77	1008.9	72	good	17.4		calm	0.6		no		
	Bou140409black2	Bou140409AD			9:20	3:45	180	43	21.966	7	53.361	blue			0	8	77	1008.9	72	good	17.4		calm	0.6		no		
					9:30	4:03	189	43	21.884	7	53.244	blue			0	8	77	1008.9	72	good	17.4		calm	0.6		no		
					9:43	3:00																				no		
					CTDBOUS003		10:36	19:00	400	43	25.089	7	47.842	blue			0	5	83	1009.0	80		16.2	15.0	calm			no
					CTDBOUS004		11:29	20:00	400	43	28.015	7	41.934	blue			0	7	72	1008.9	84		17.4	14.8	calm			no
				CTDBOUS005		12:21	22:00	400	43	30.945	7	36.922	blue			1	7	83	1009.0	75		16.6	15.3	calm			no	
				CTDBOUS006		13:17	24:00	400	43	34.016	7	30.860	blue			0-1	6	134	1009.0	80		16.3	15.5	calm			no	
			CTDBOUS007		14:16	20:00	400	43	37.029	7	25.075	blue			0	6	146	1008.8	79		16.7	14.9	calm			no		
			CTDBOUS008		15:03	16:00	400	43	39.058	7	21.046	blue			0	3	135	1008.8	83		16.5		calm			no		
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		Bou150409AB			10:33	4:00	177	43	21.845	7.000	53.384	blue		Cu	3	4	150	1014.2	80	good	15.0		calm	0.4		no		
	Bou150409black2	Bou150409AC			10:43	4:10	179	43	21.836	7.000	53.241	blue		Cu	3	4	150	1014.2	80	good	15.0		calm	0.4		no		
					11:00	3:00																				no		
				Secchi03	10:50	4:00	17	43	22	7	54	blue								good			calm			no		
			wat_samp.TSM	12:05	101:00	5	43	22	7	54												calm			no			
16/04/09																									Bad weather and zonex not allowec			



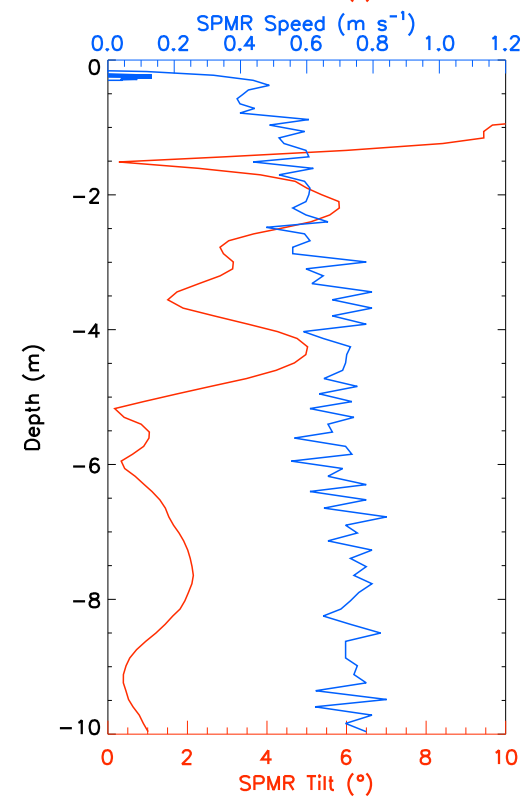
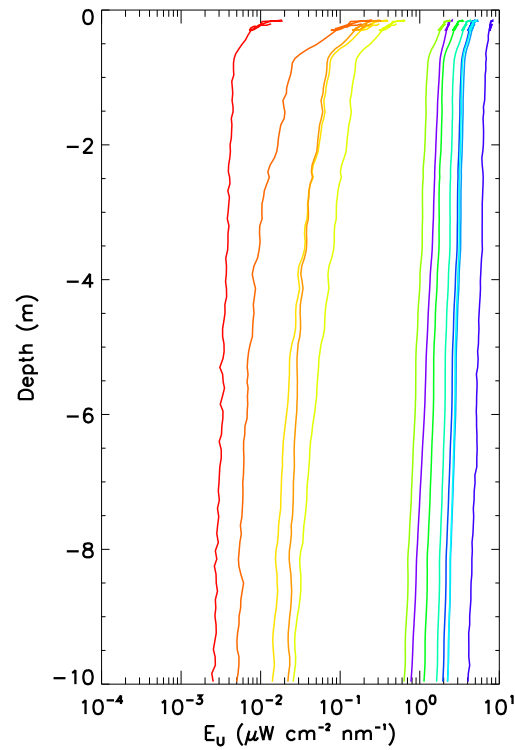
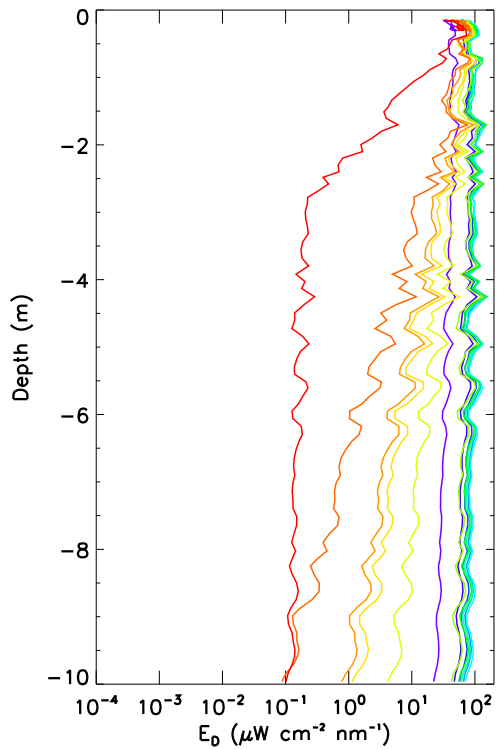
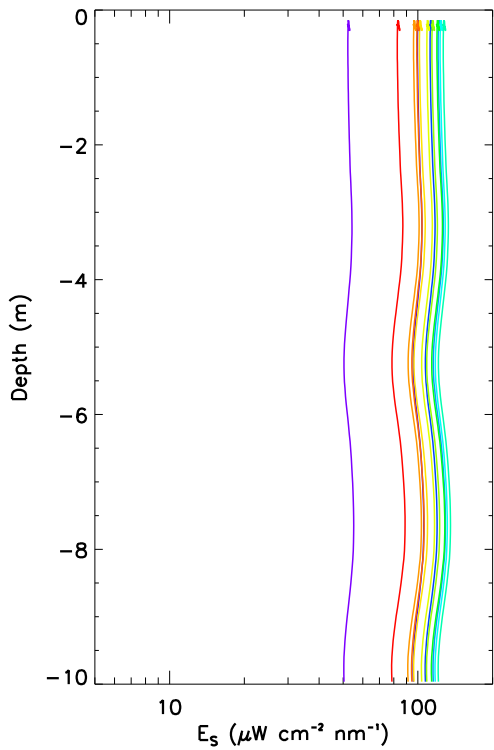
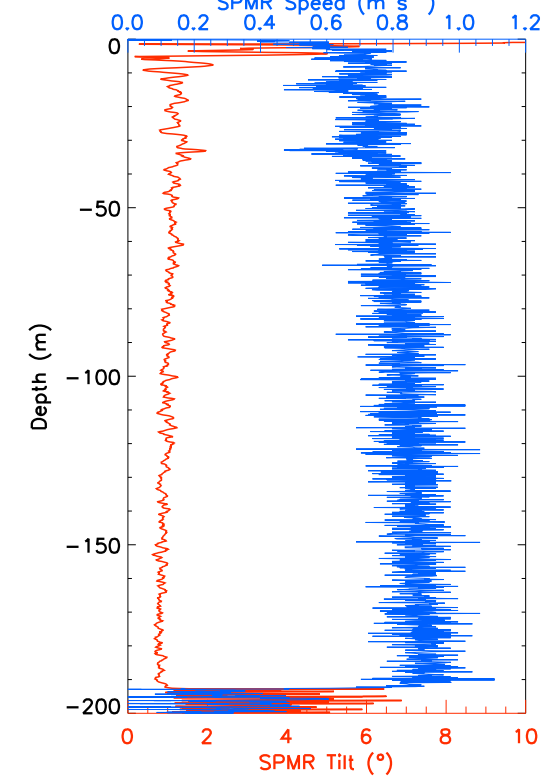
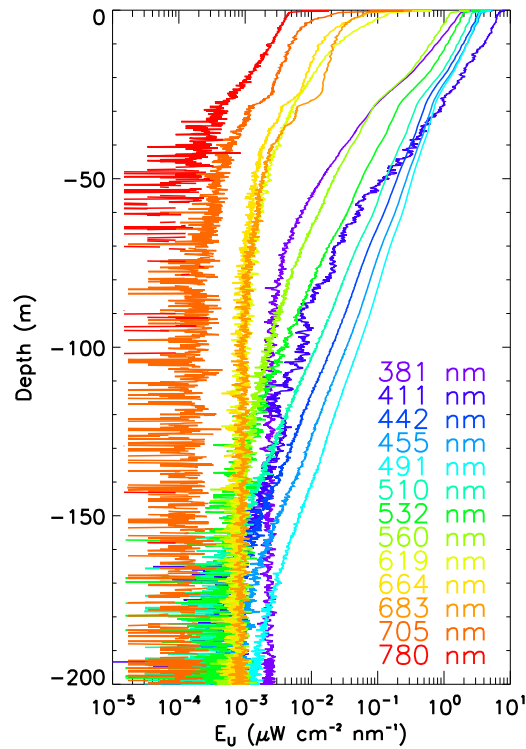
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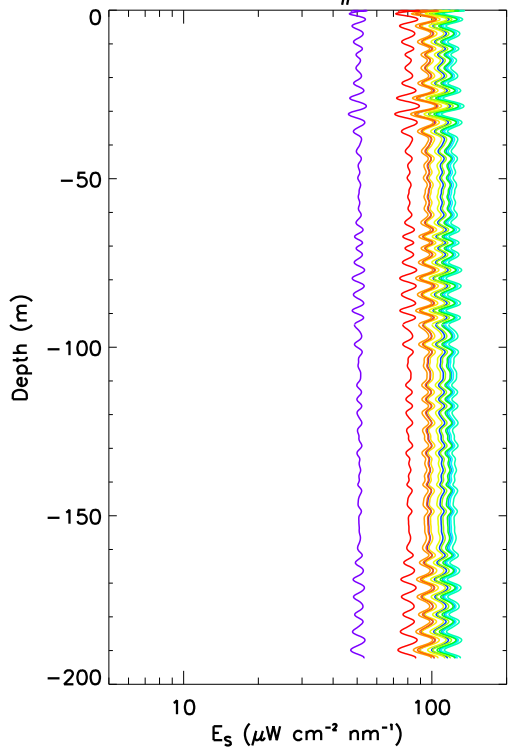
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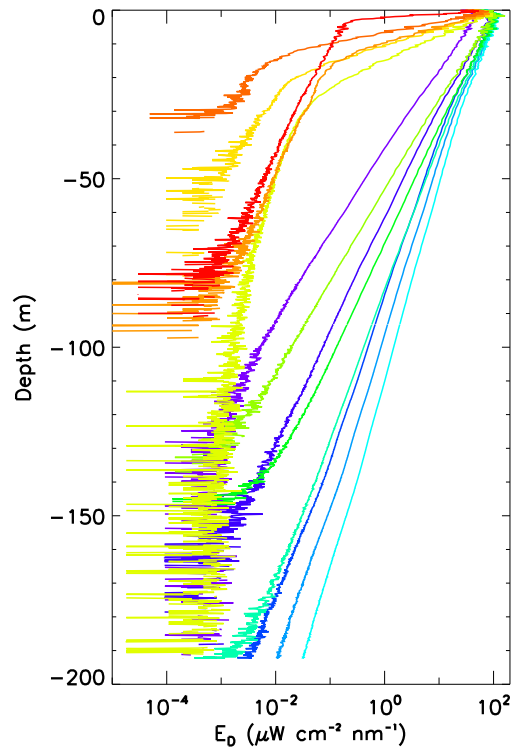
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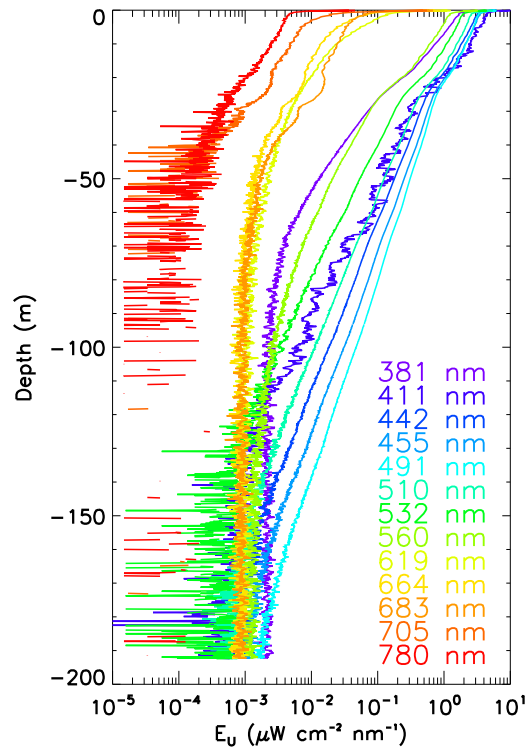
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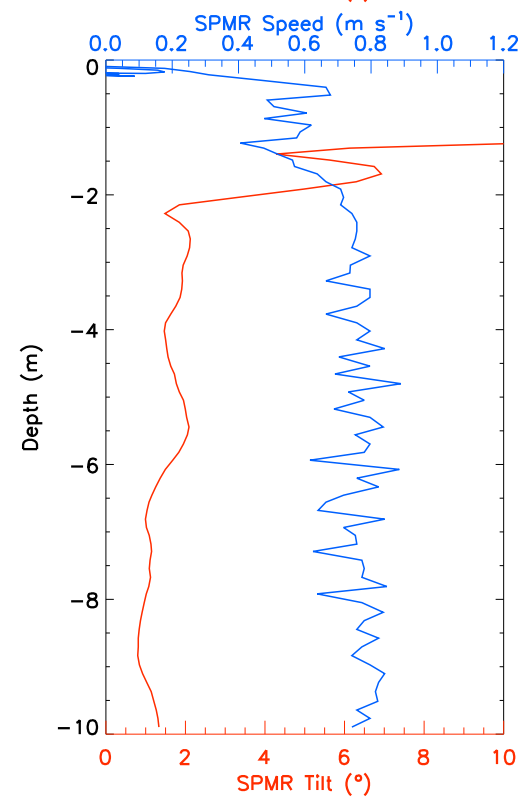
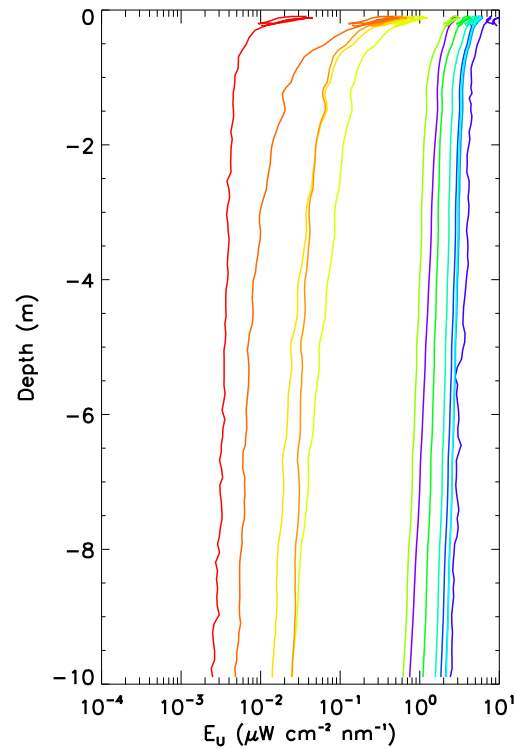
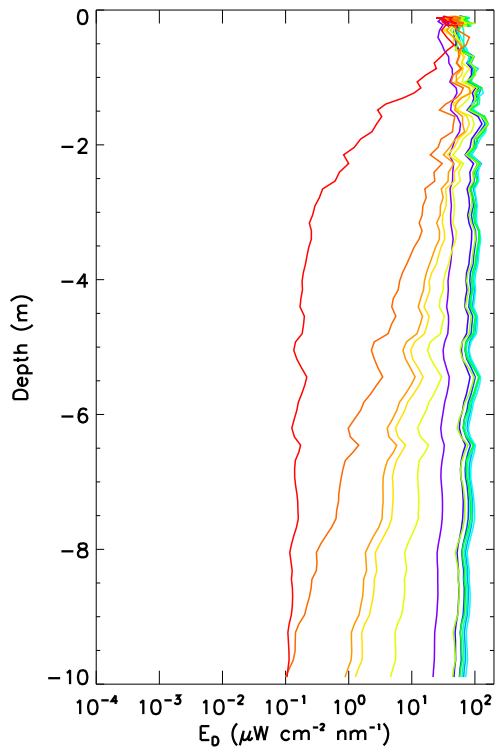
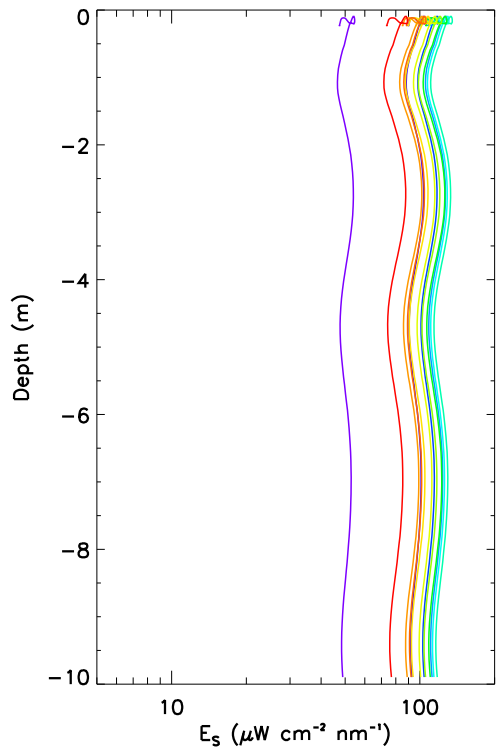
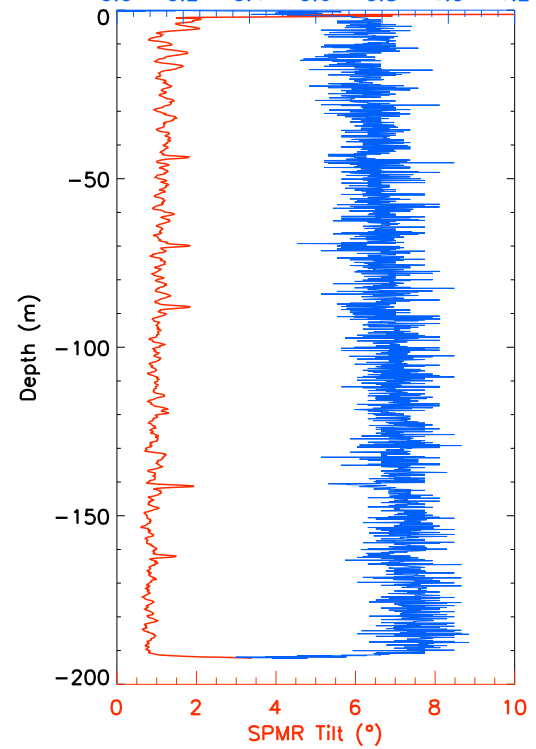
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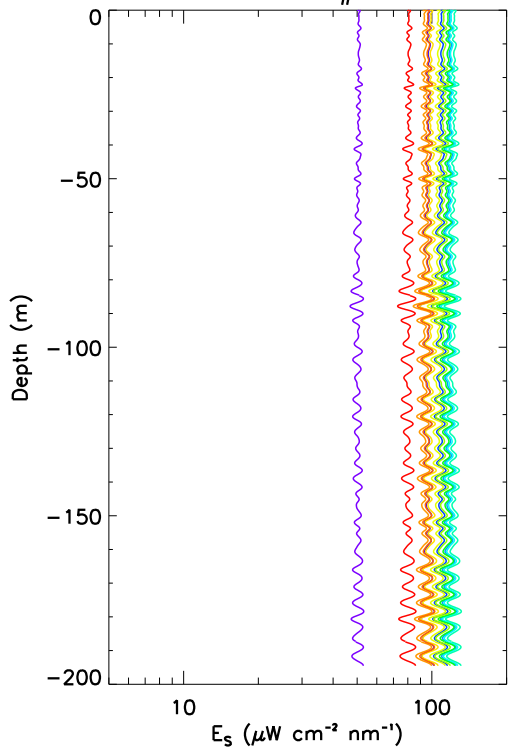
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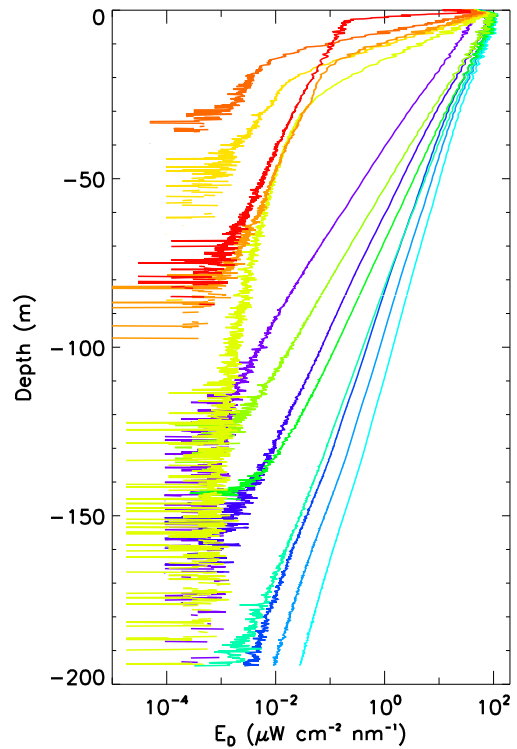
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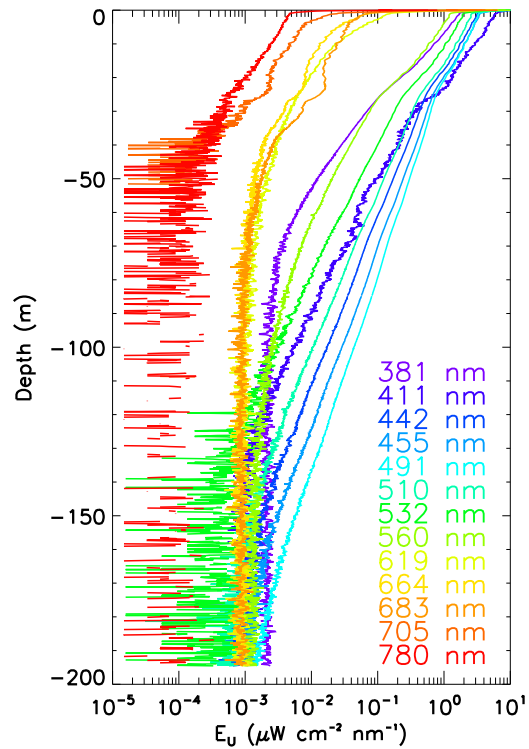
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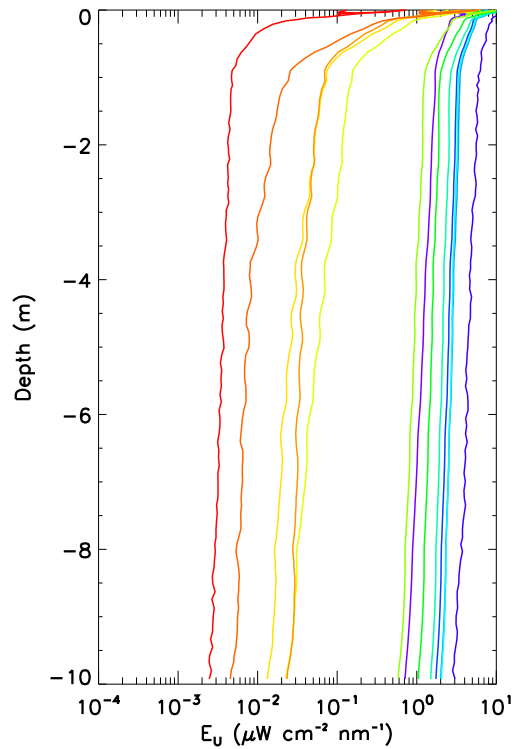
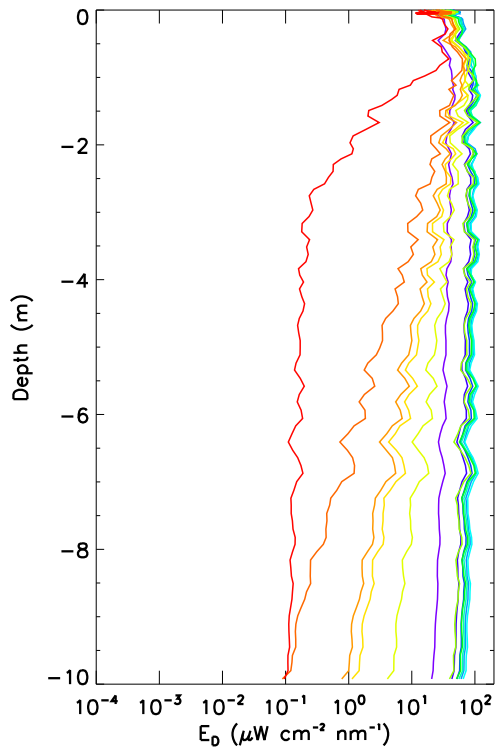
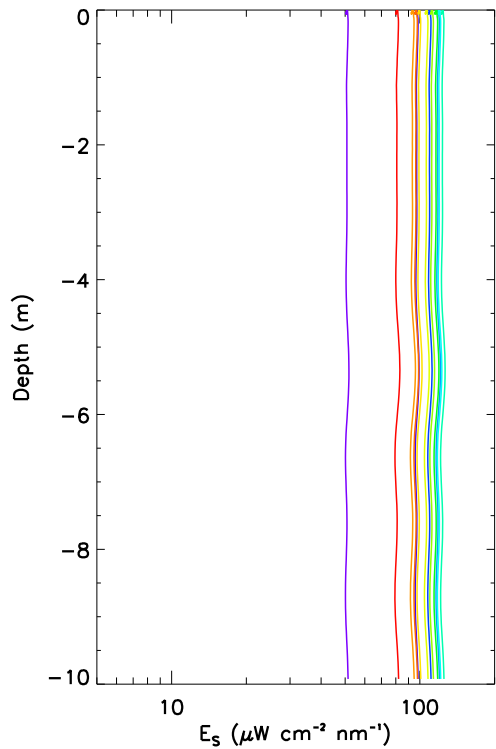
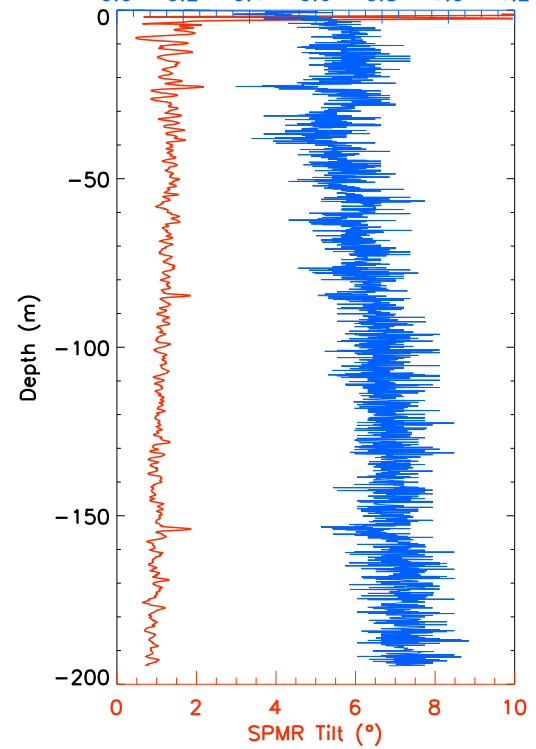
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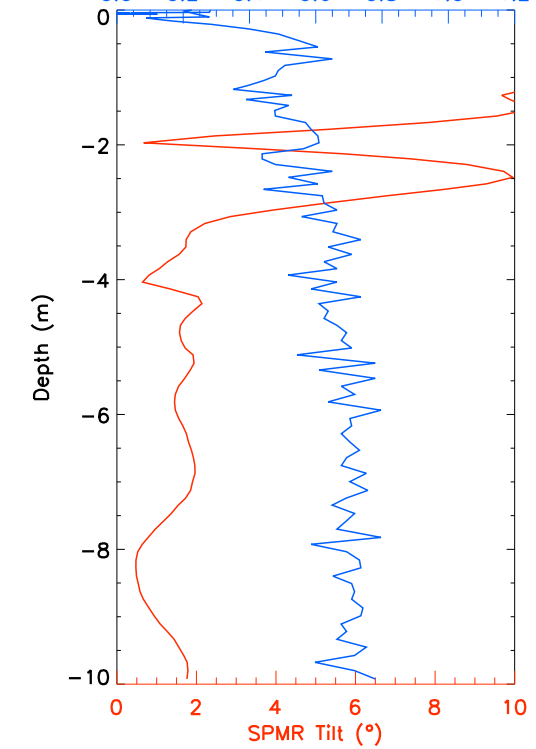
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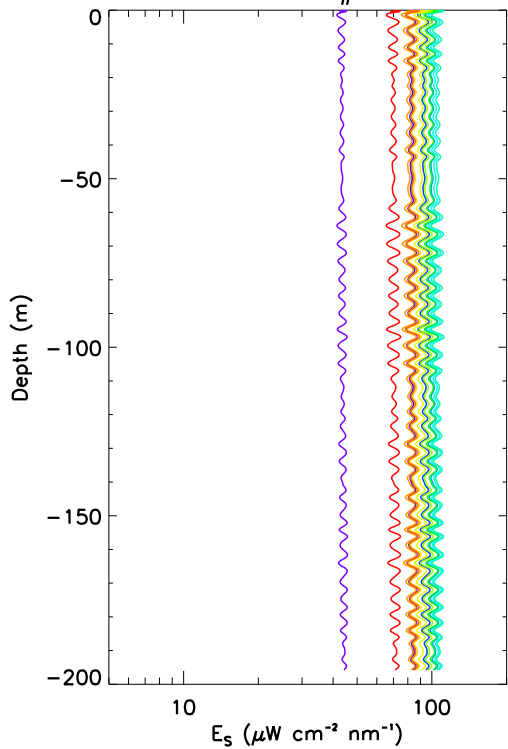
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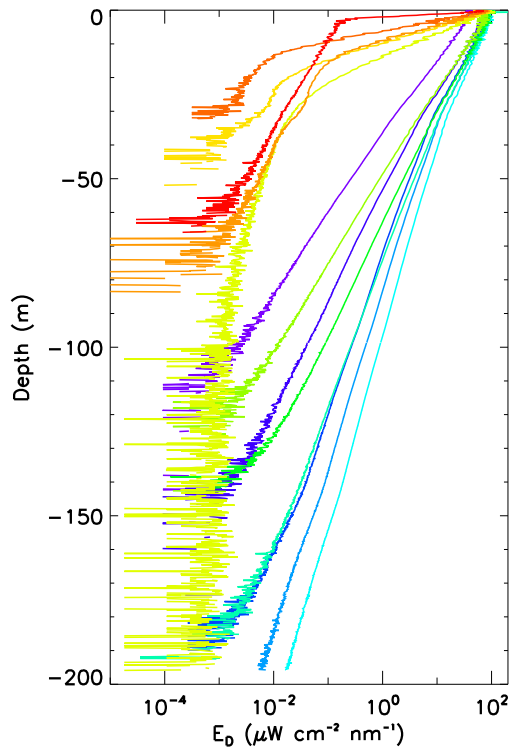
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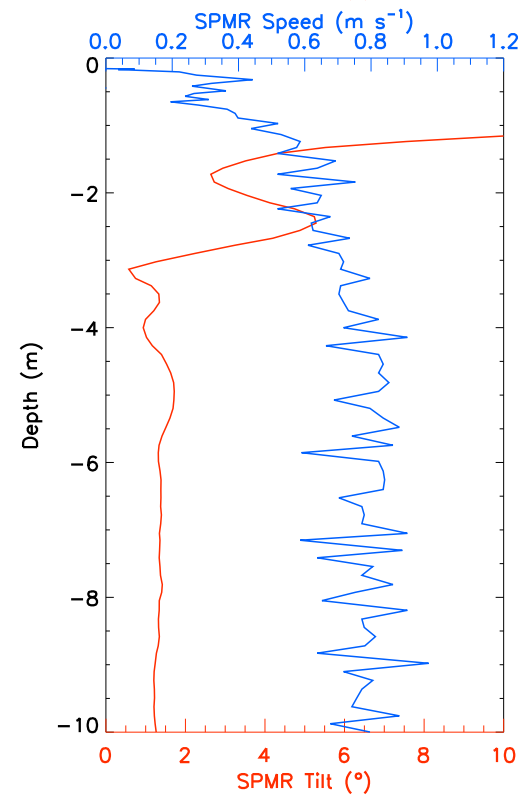
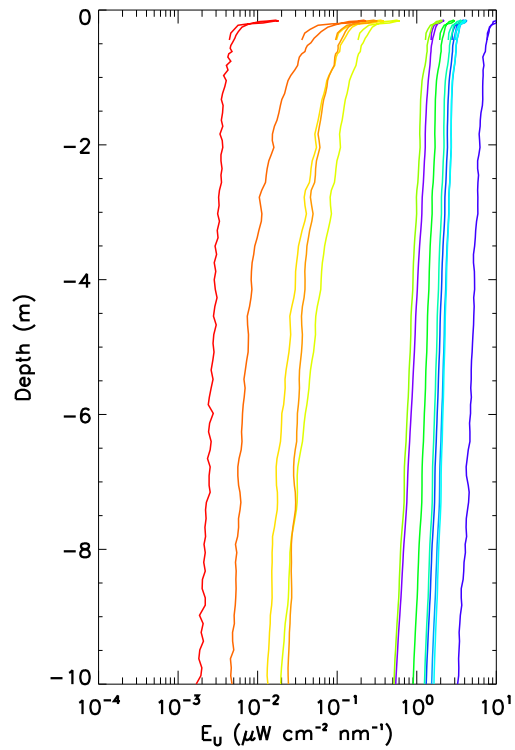
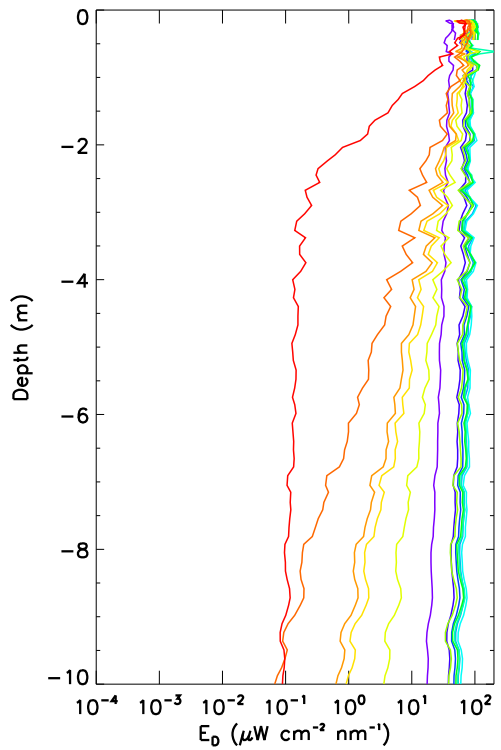
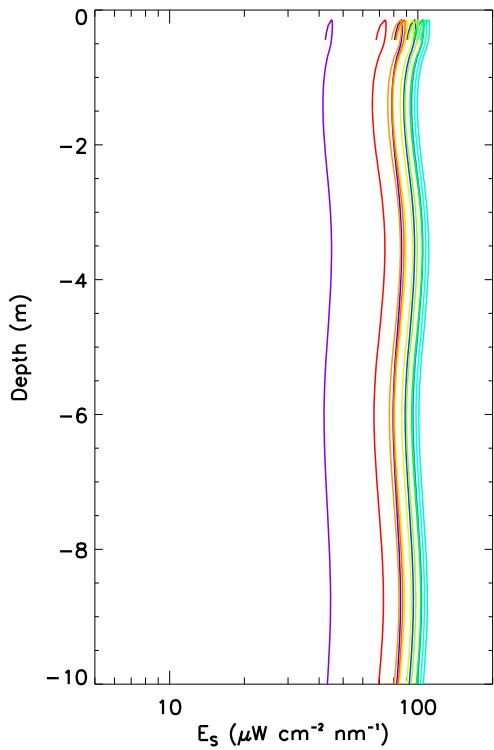
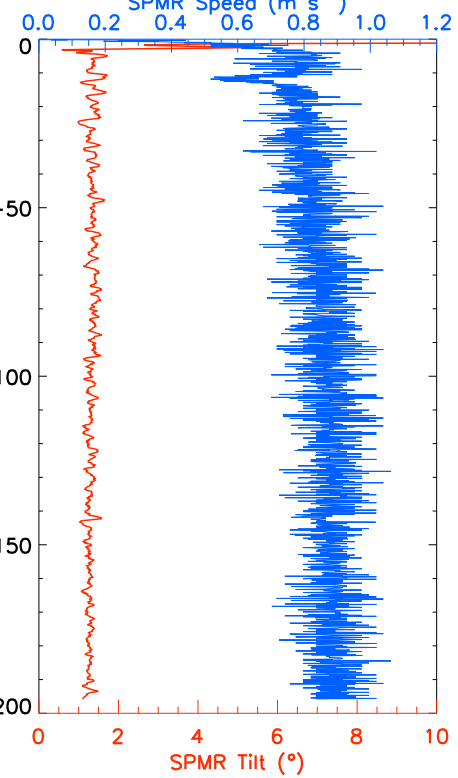
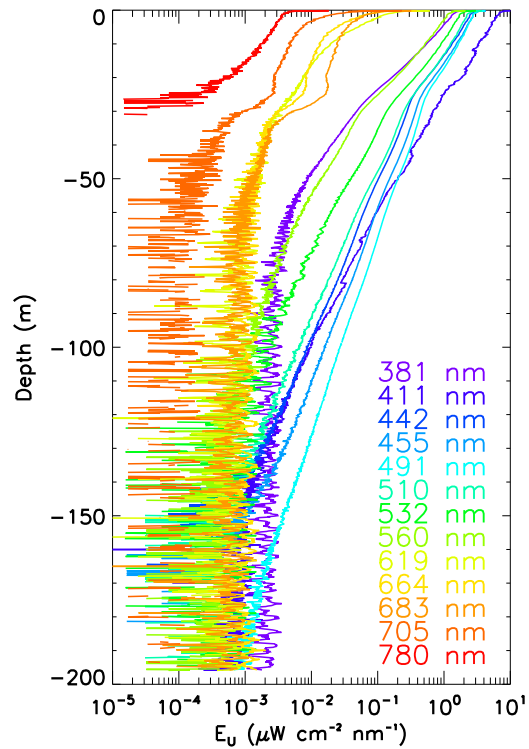
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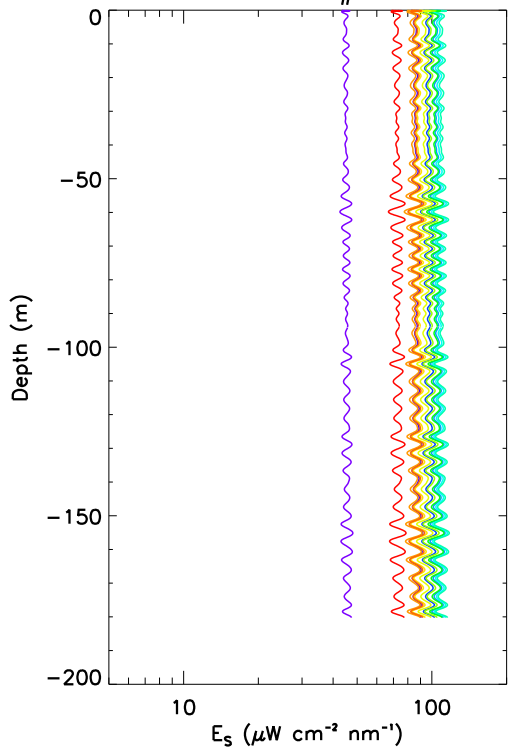
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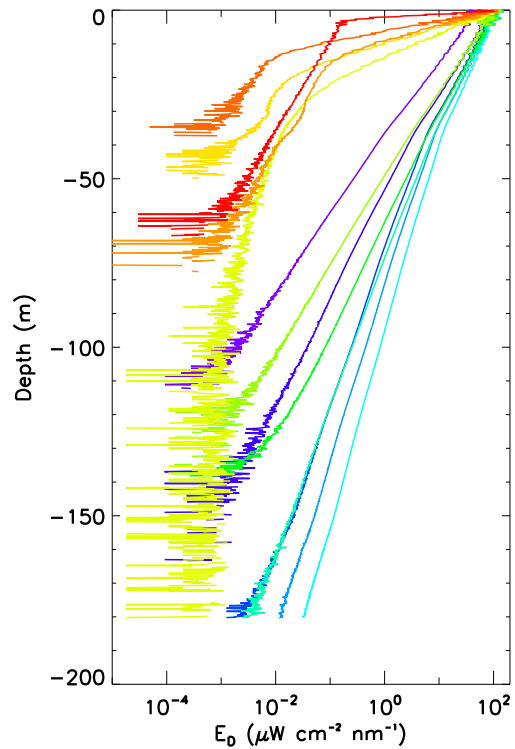
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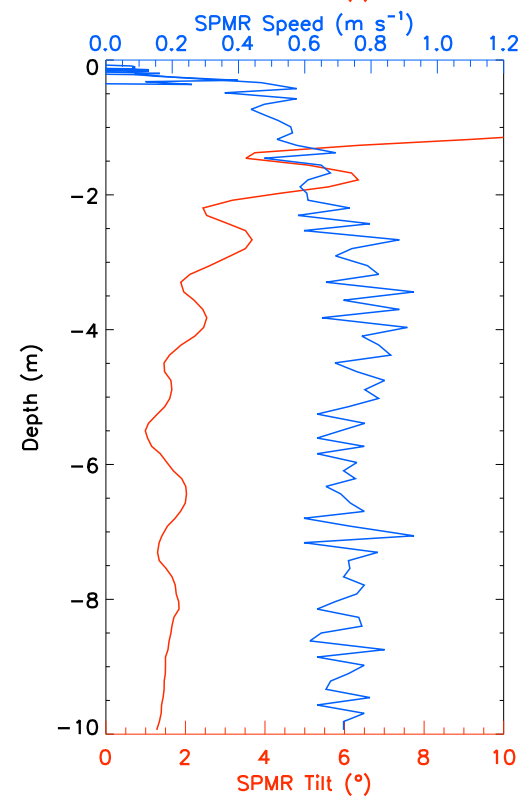
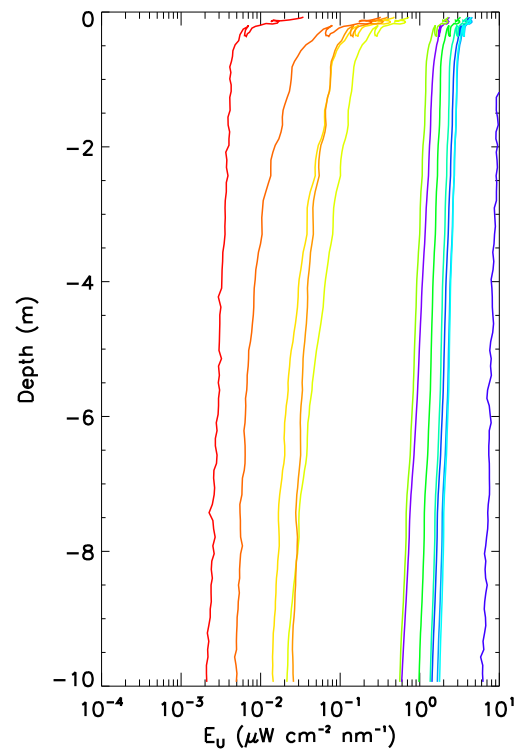
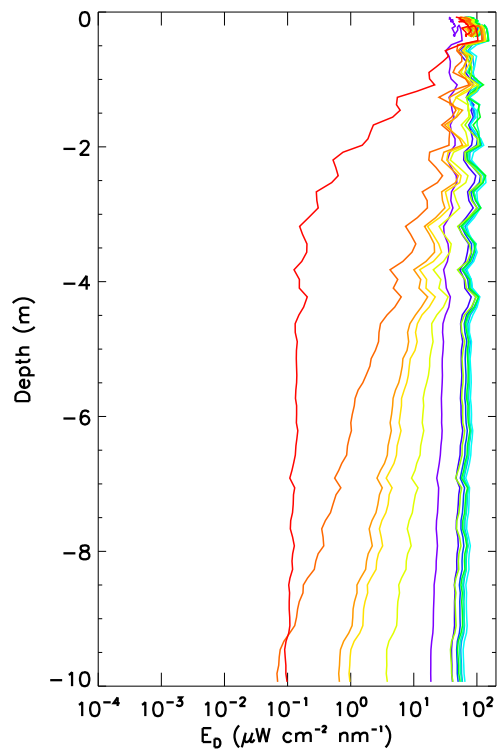
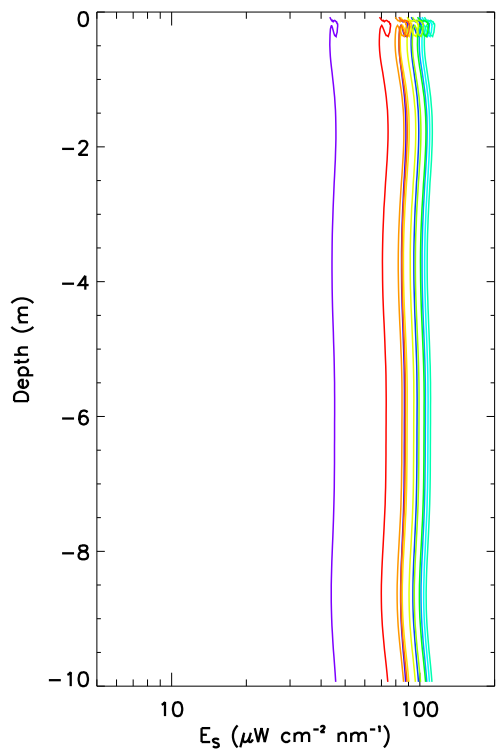
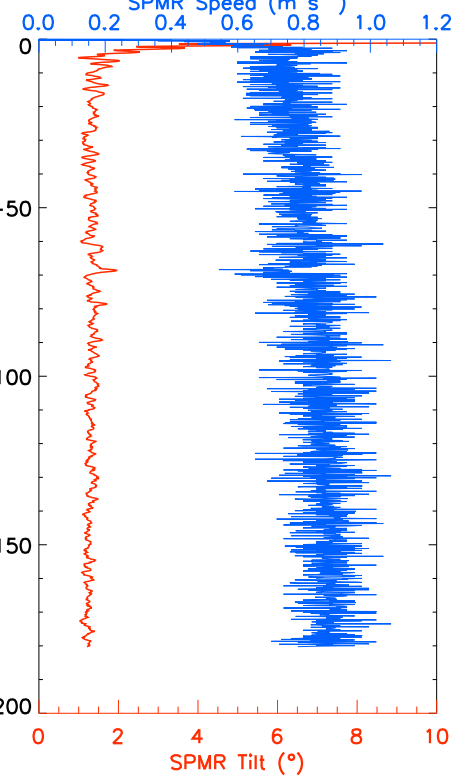
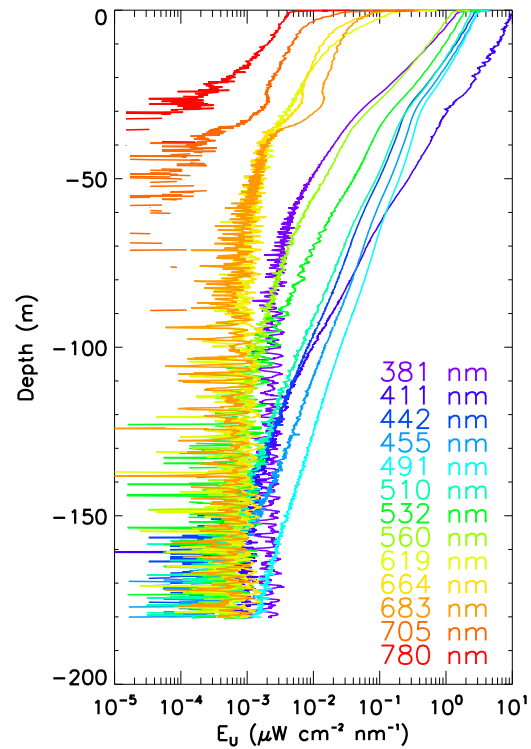
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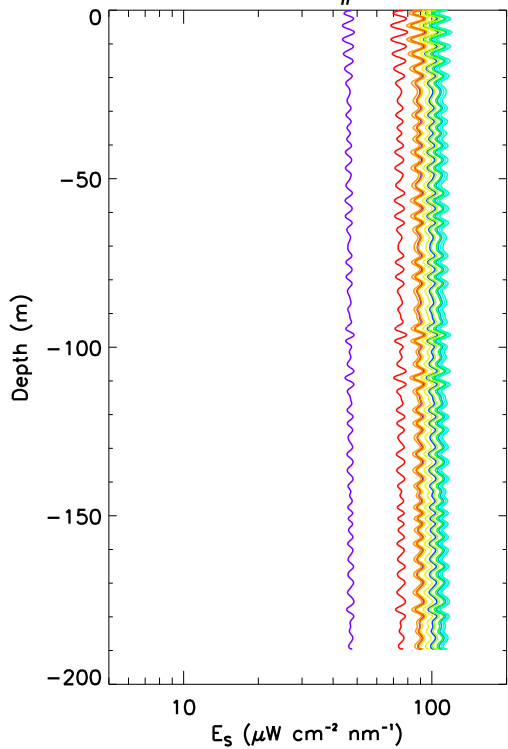
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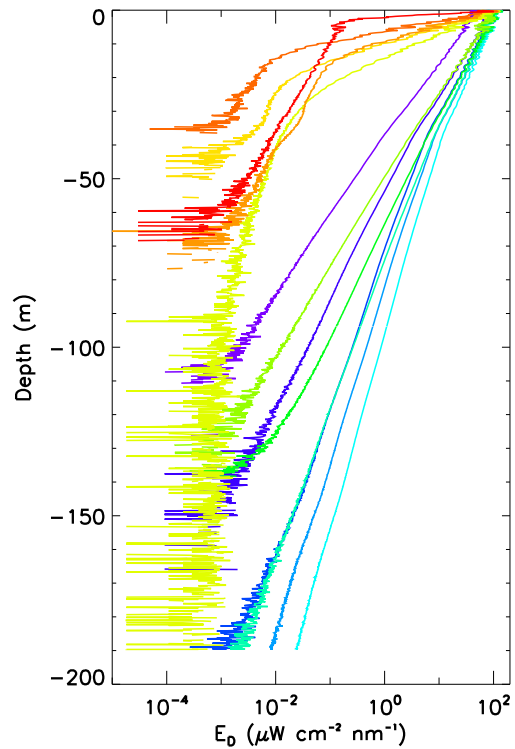
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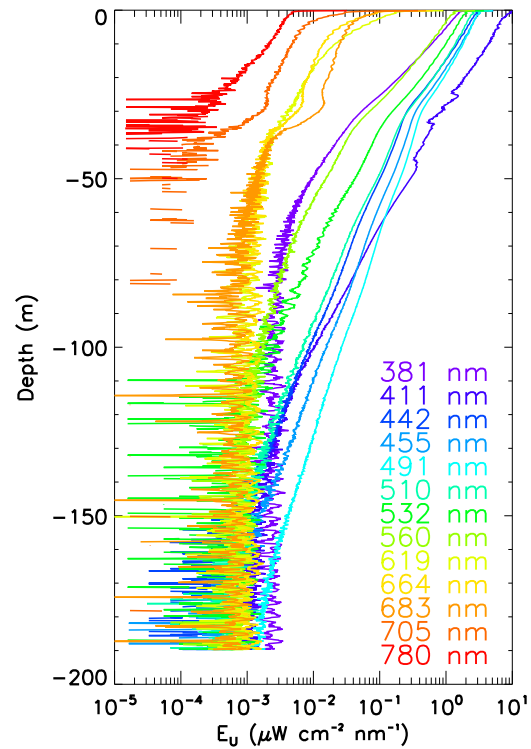
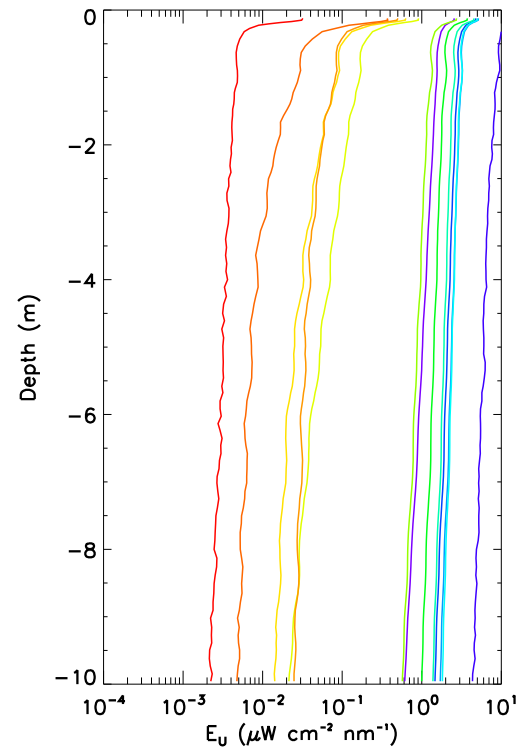
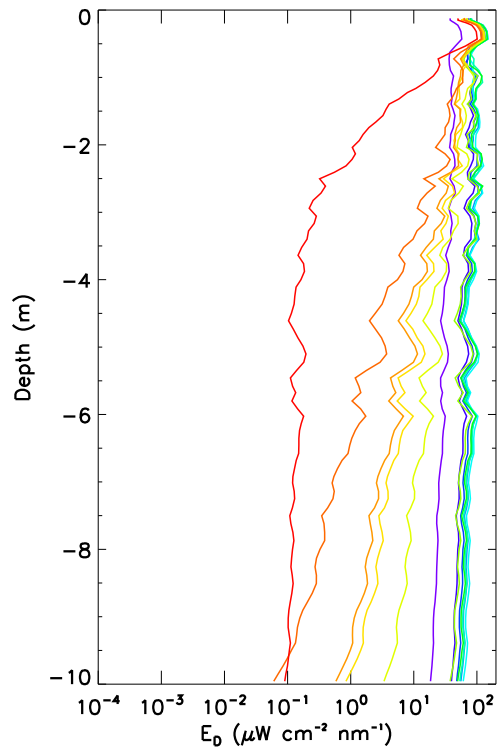
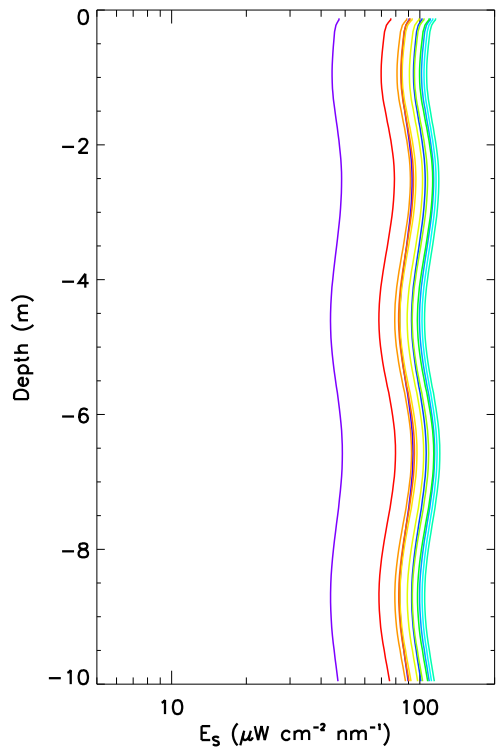
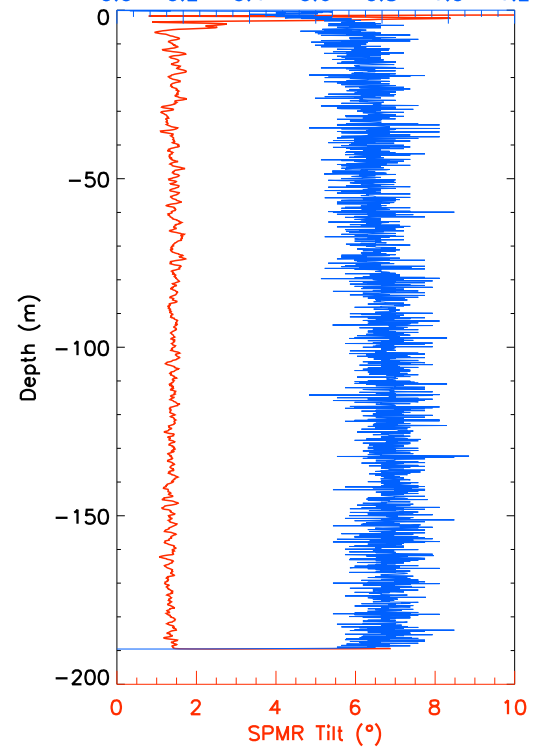
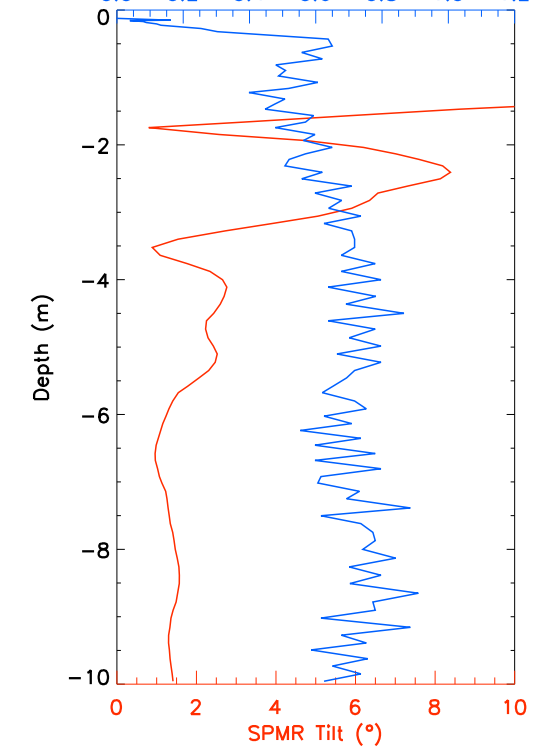
Boussole#86



B86\_Bou140409AD

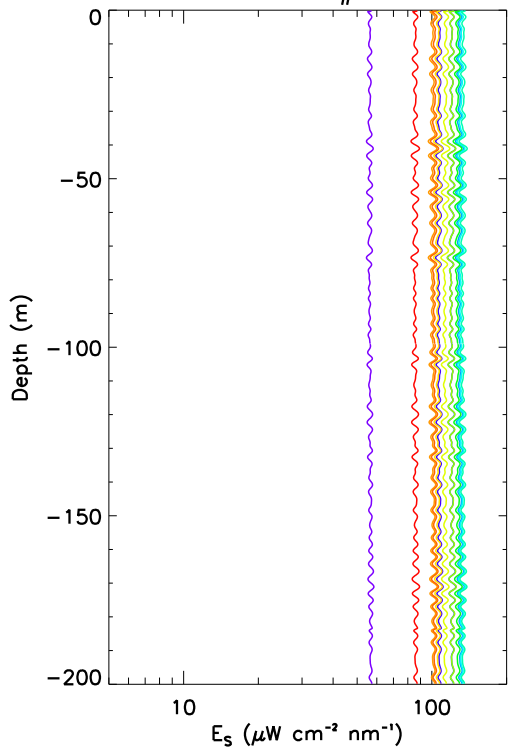


9:30 UTC

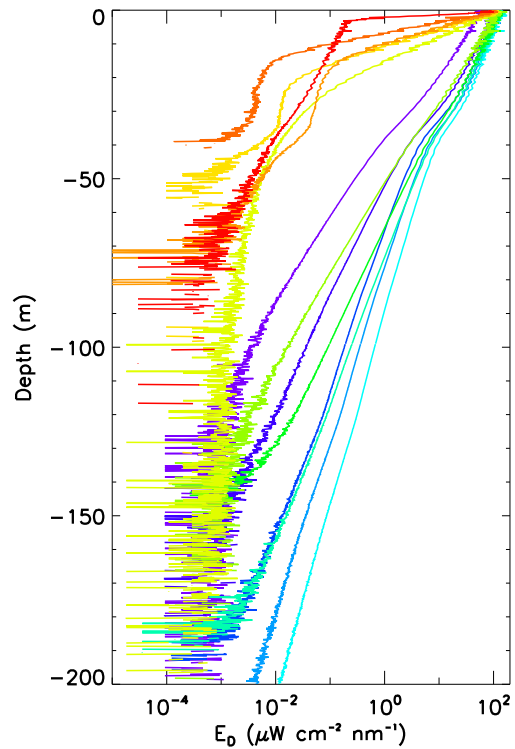
SPMR Speed ( $\text{m s}^{-1}$ )SPMR Speed ( $\text{m s}^{-1}$ )



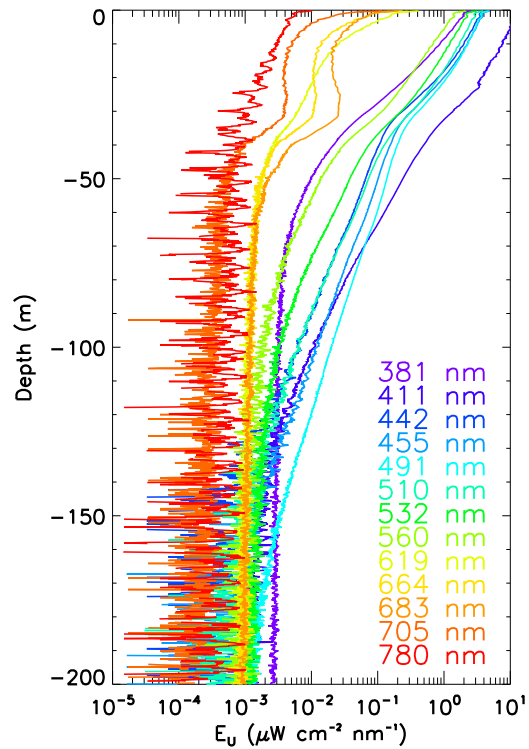
Boussole#86



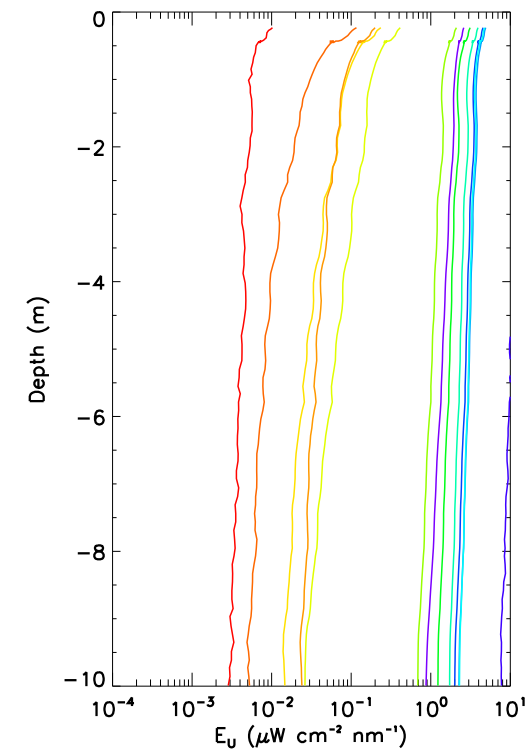
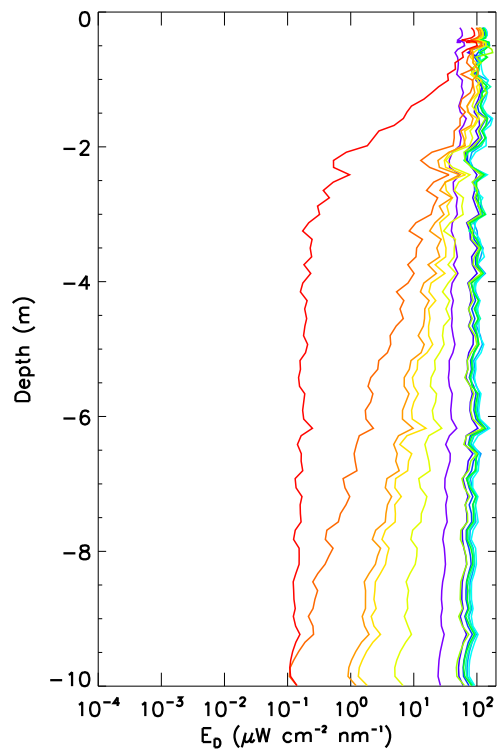
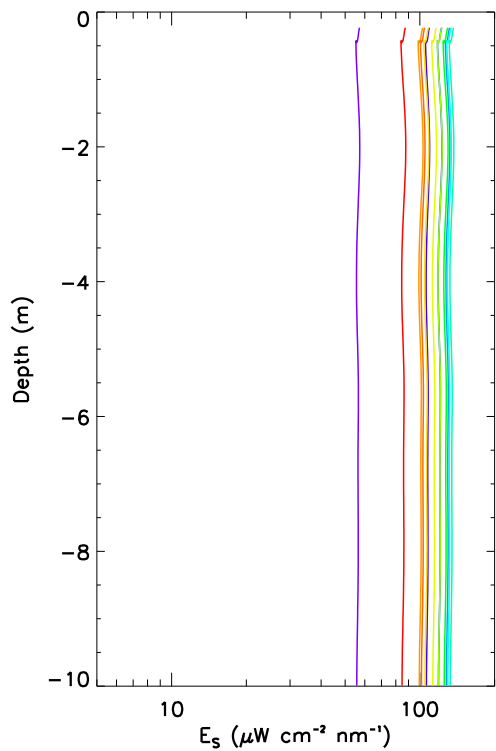
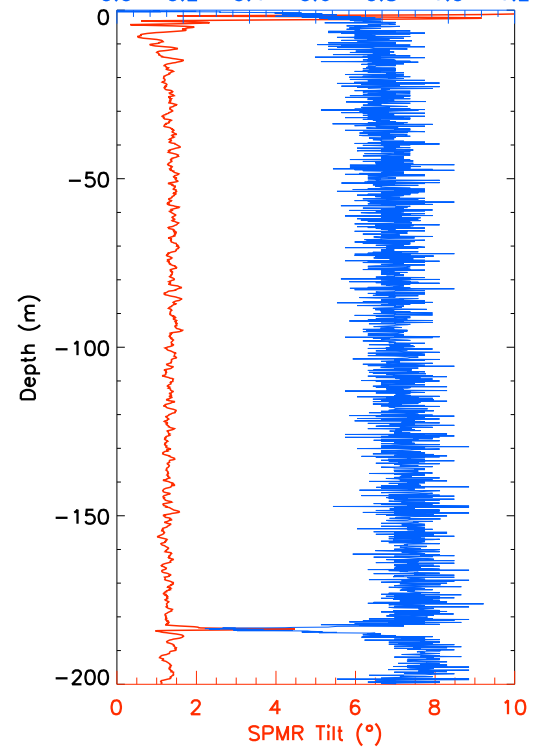
B86\_Bou150409AA



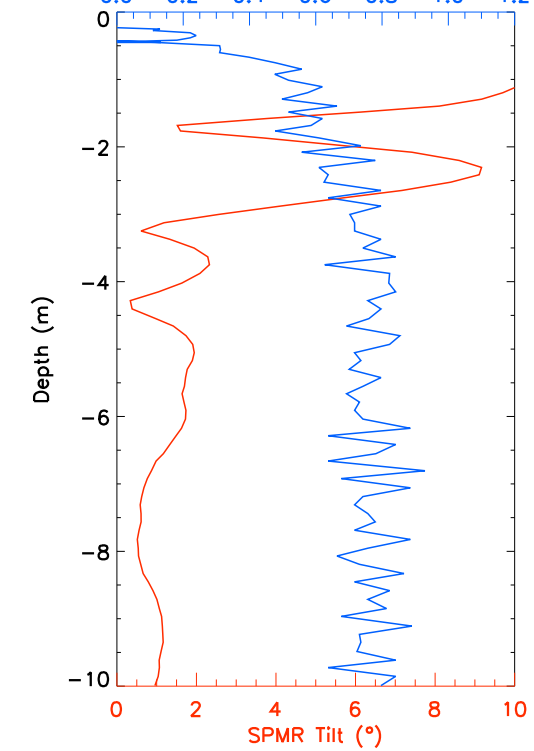
10:22 UTC



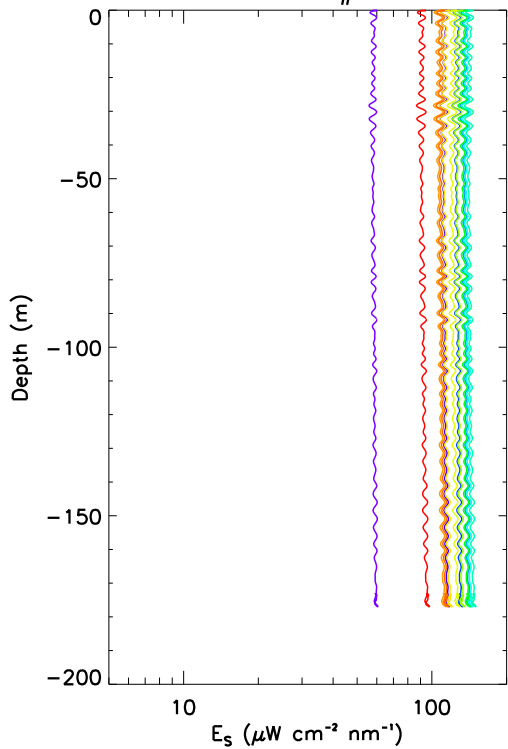
0.0 0.2 0.4 0.6 0.8 1.0 1.2



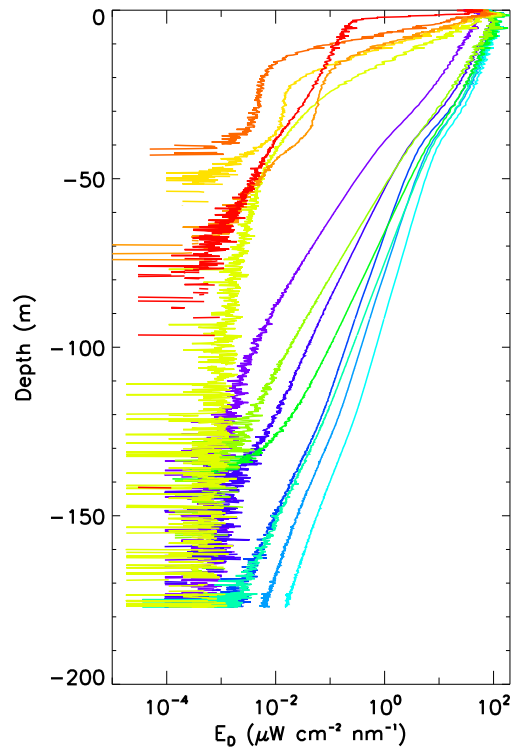
0.0 0.2 0.4 0.6 0.8 1.0 1.2



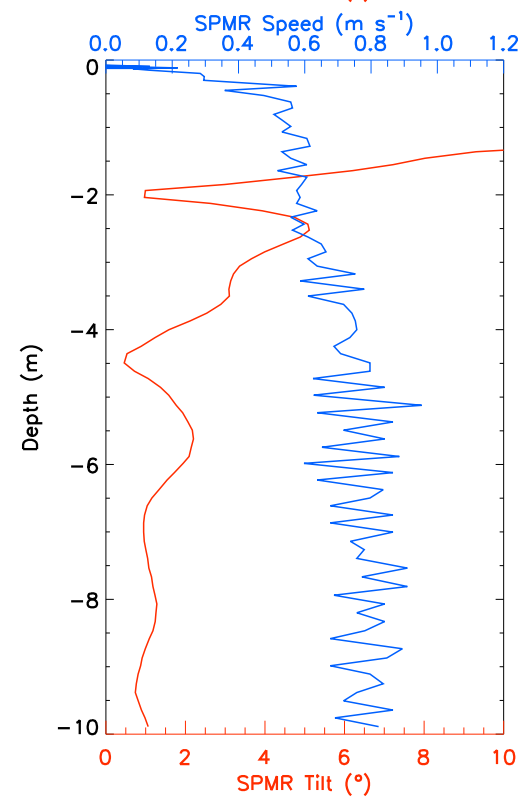
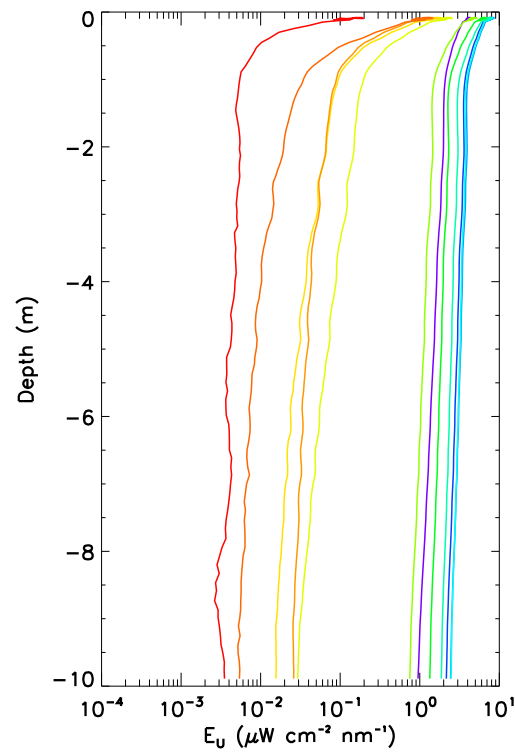
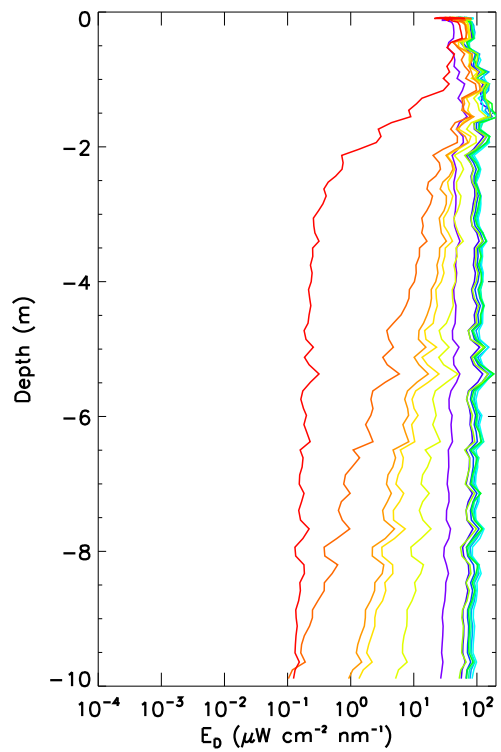
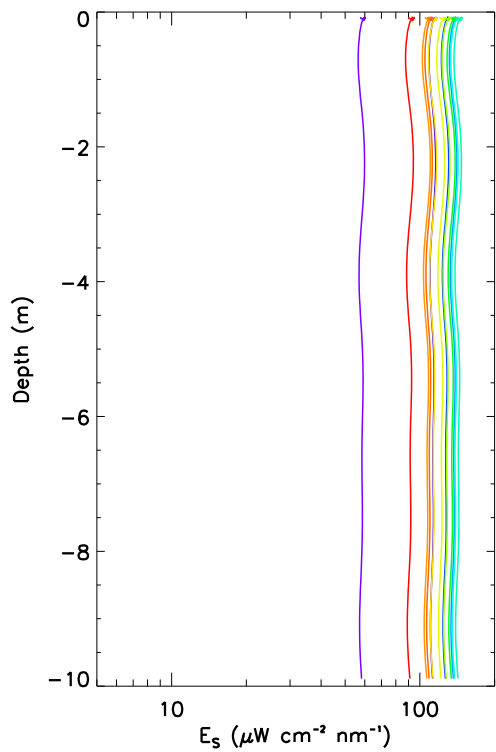
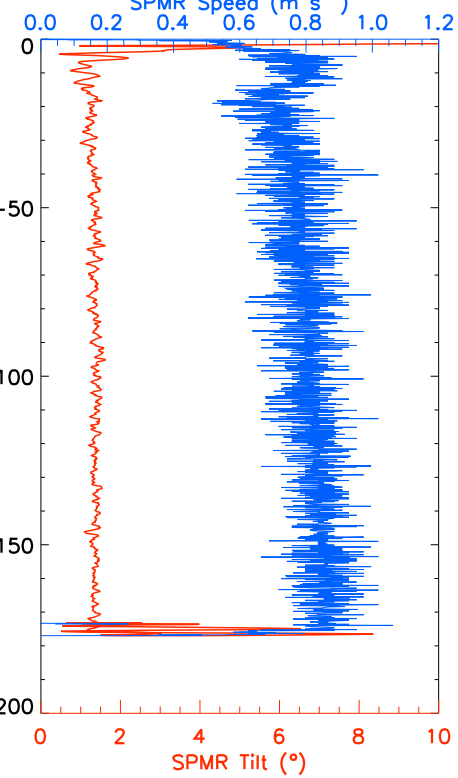
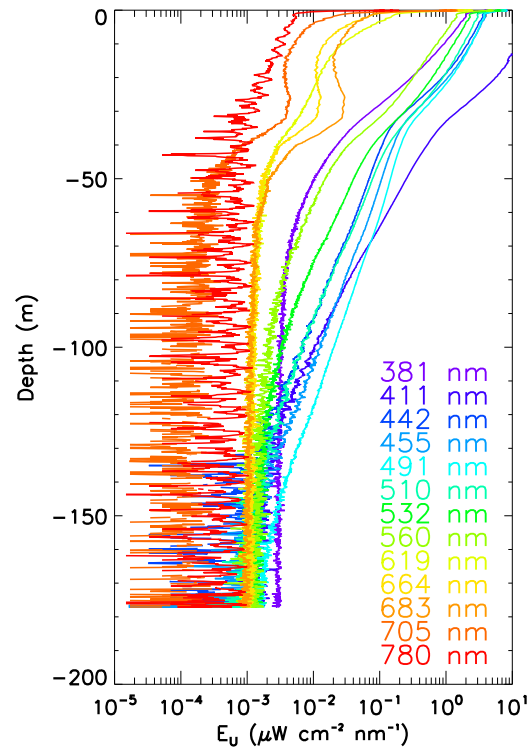
Boussole#86



B86\_Bou150409AB

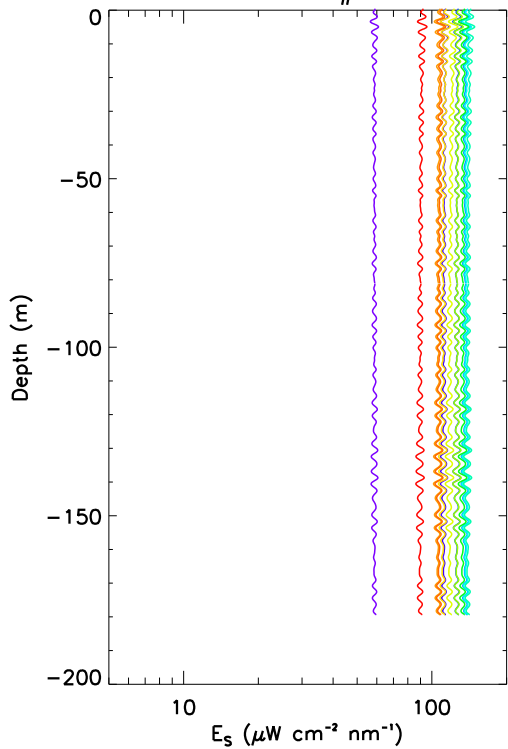


10:33 UTC

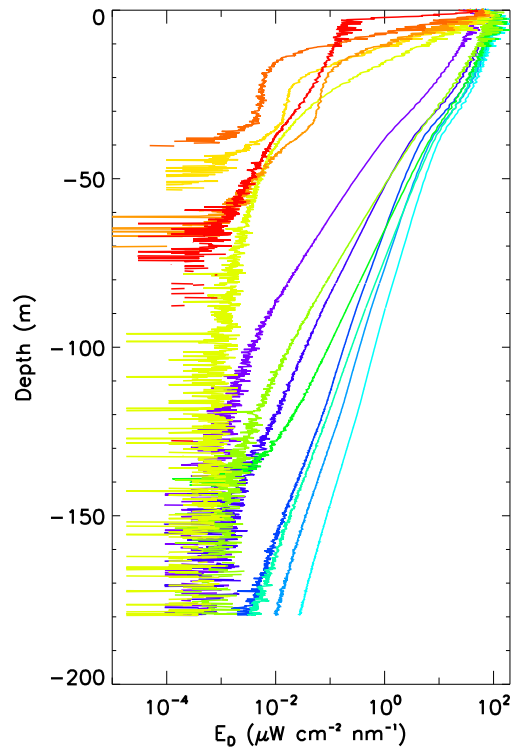




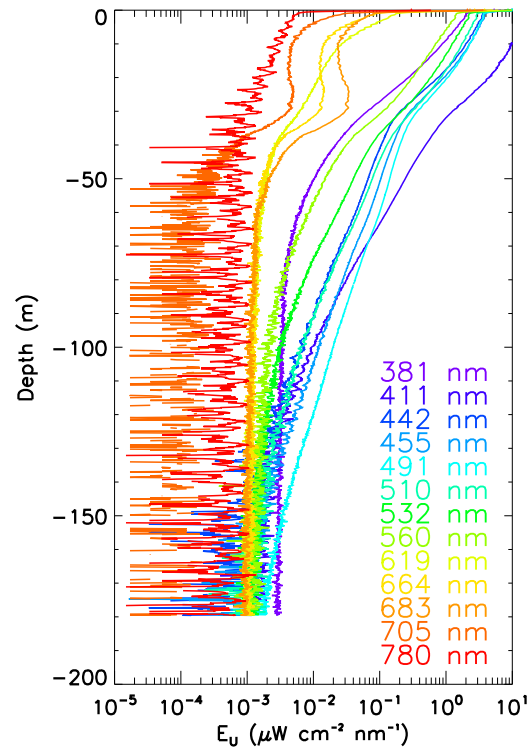
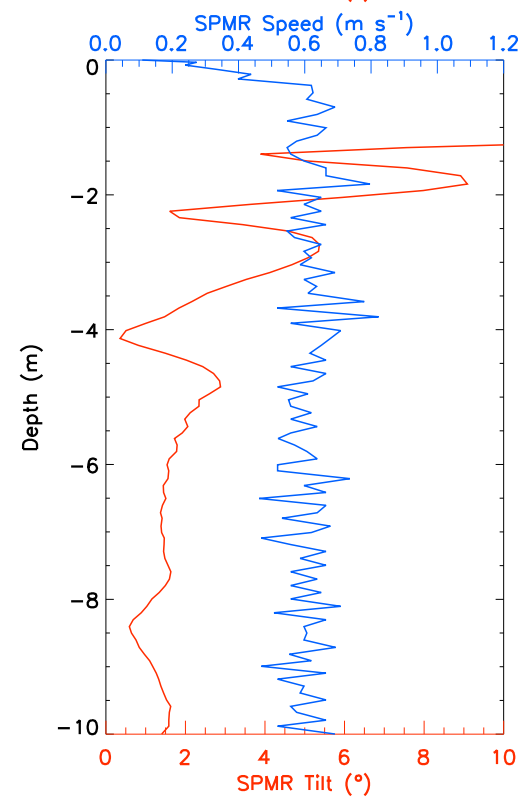
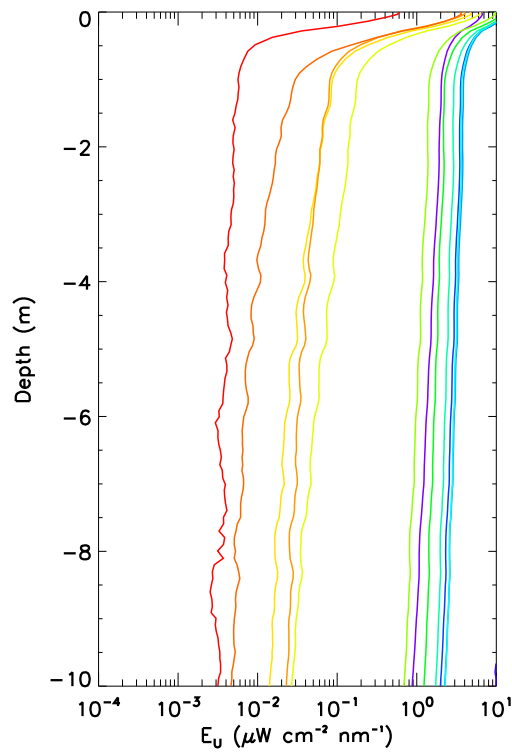
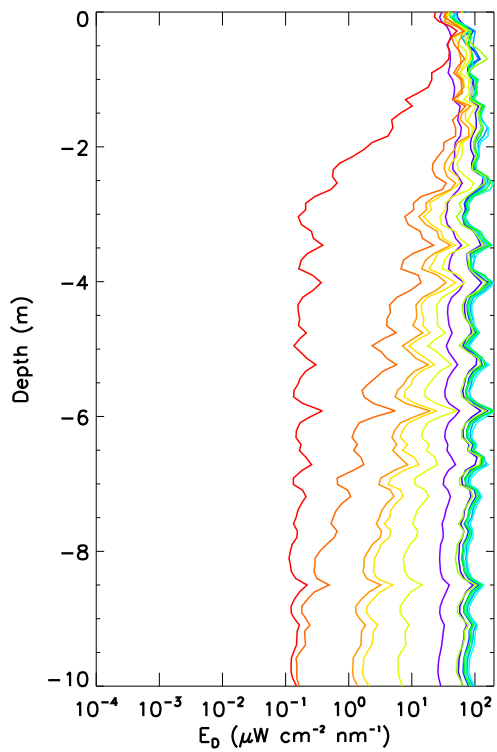
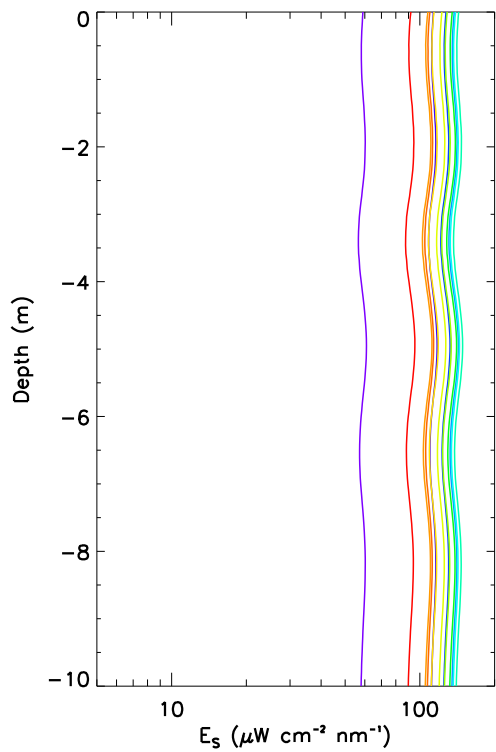
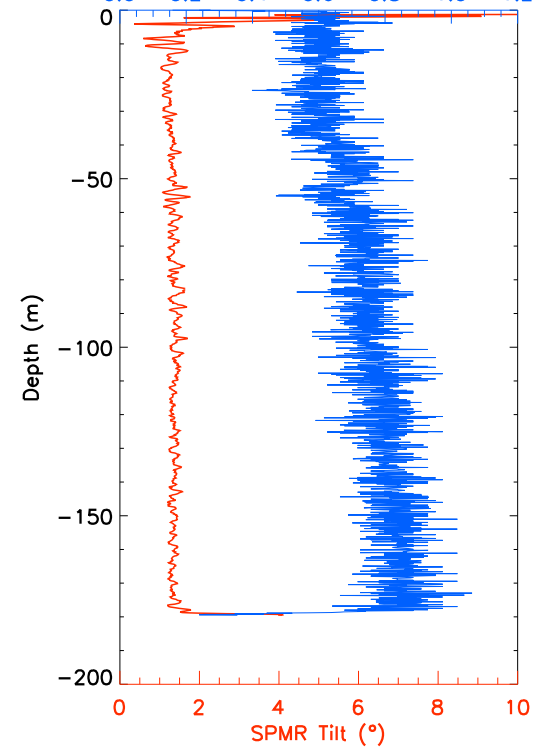
Boussole#86



B86\_Bou150409AC



10:44 UTC

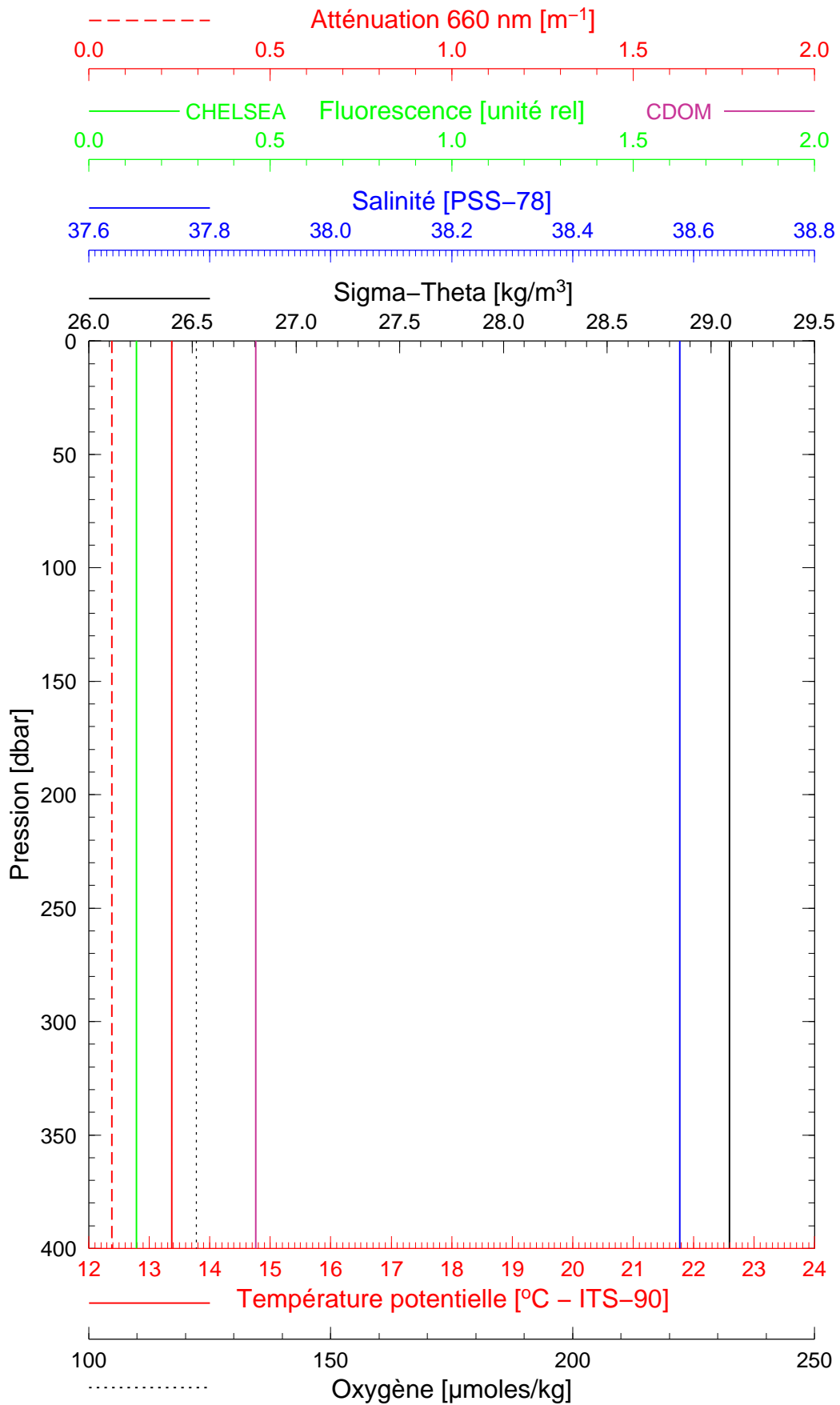
SPMR Speed ( $\text{m s}^{-1}$ )

BOUSSOLE 86

13/04/2009

BOUS090413\_01

BOUS001



Date 13/04/2009

Latitude 43°21.947

Heure déb 13h 40min [TU]

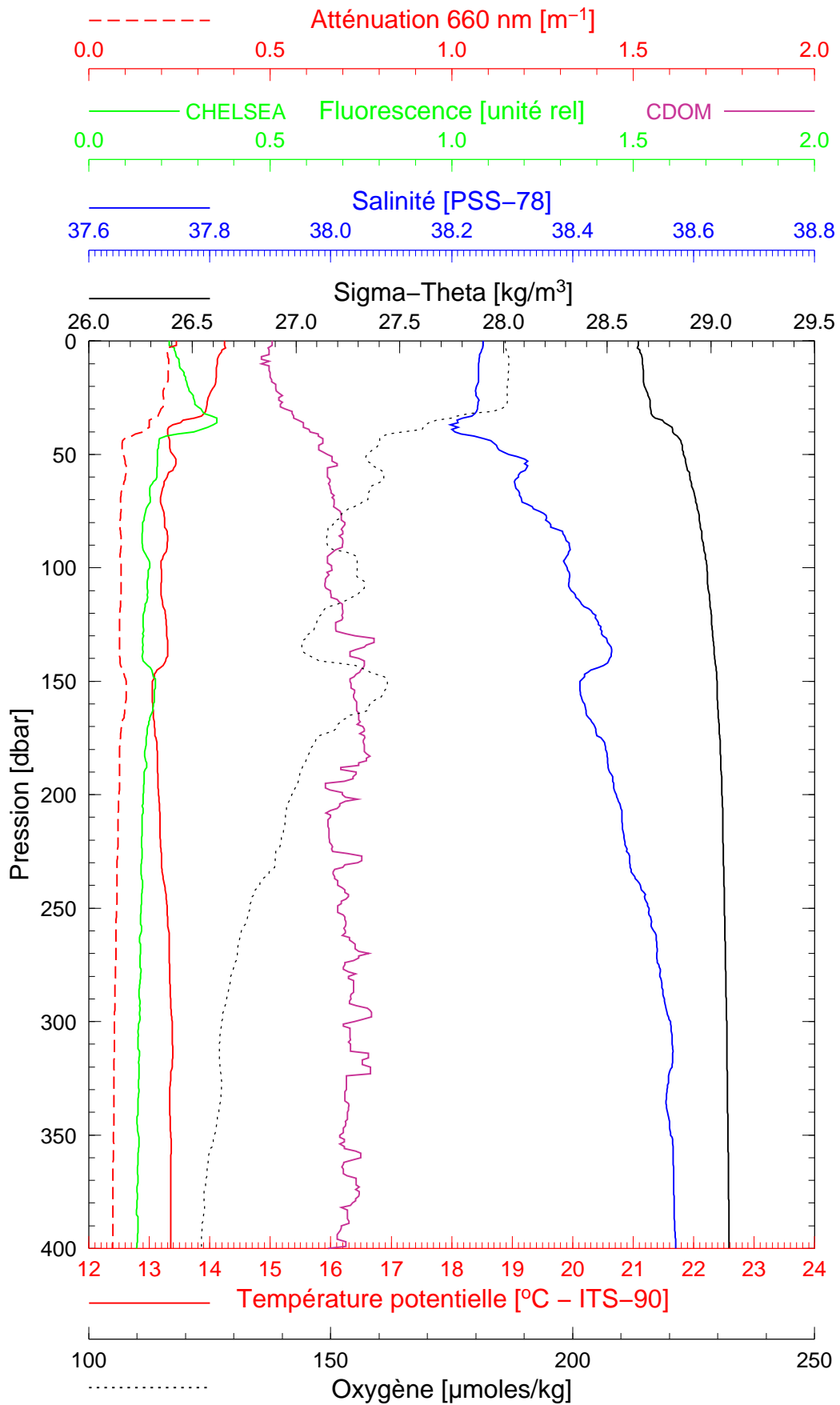
Longitude 07°53.742

BOUSSOLE 86

14/04/2009

BOUS090414\_01

BOUS002



Date 14/04/2009  
Heure déb 10h 40min [TU]

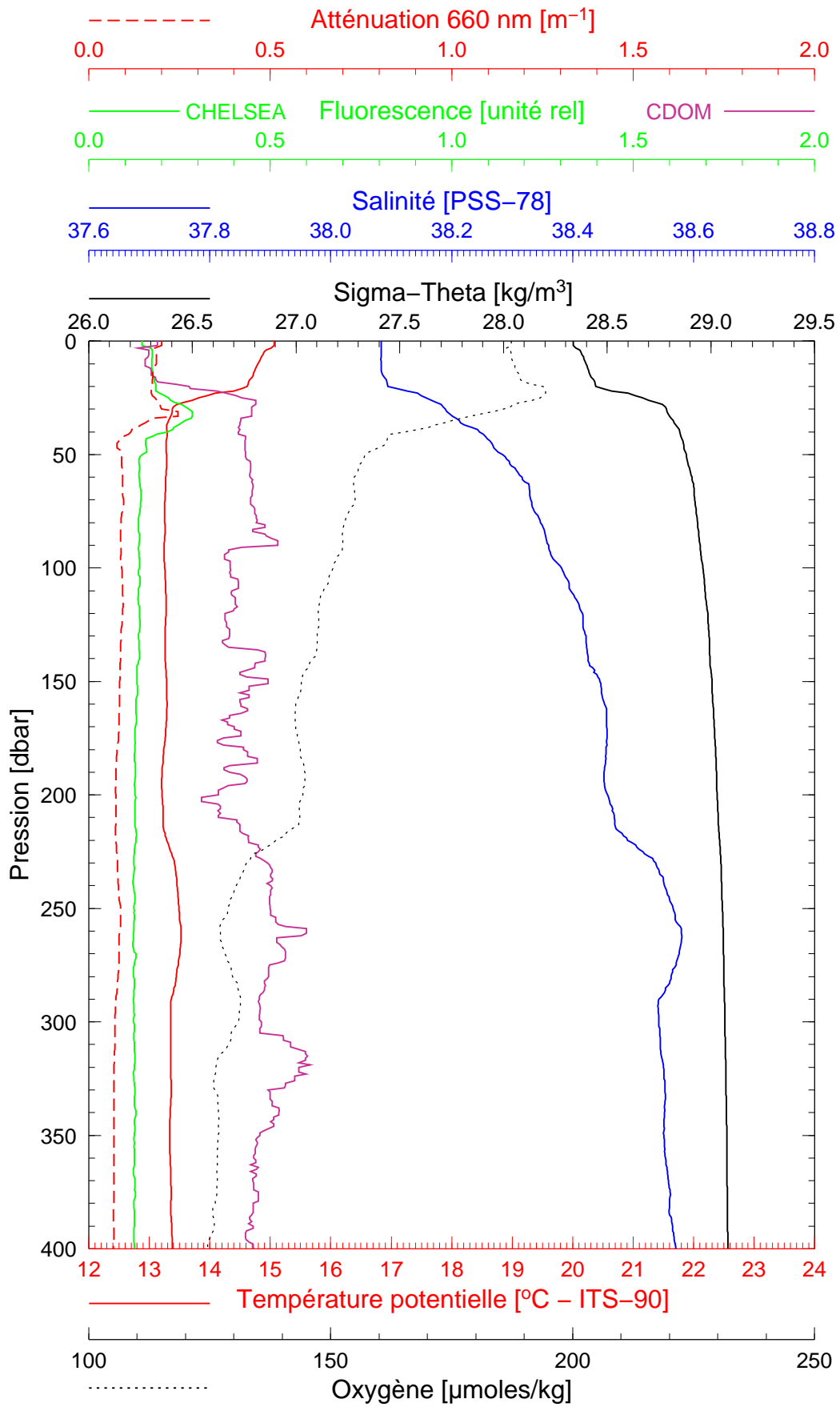
Latitude 43°22.070  
Longitude 07°53.746

BOUSSOLE 86

14/04/2009

BOUS090414\_02

BOUS003



Date 14/04/2009

Latitude 43°25.089

Heure déb 12h 36min [TU]

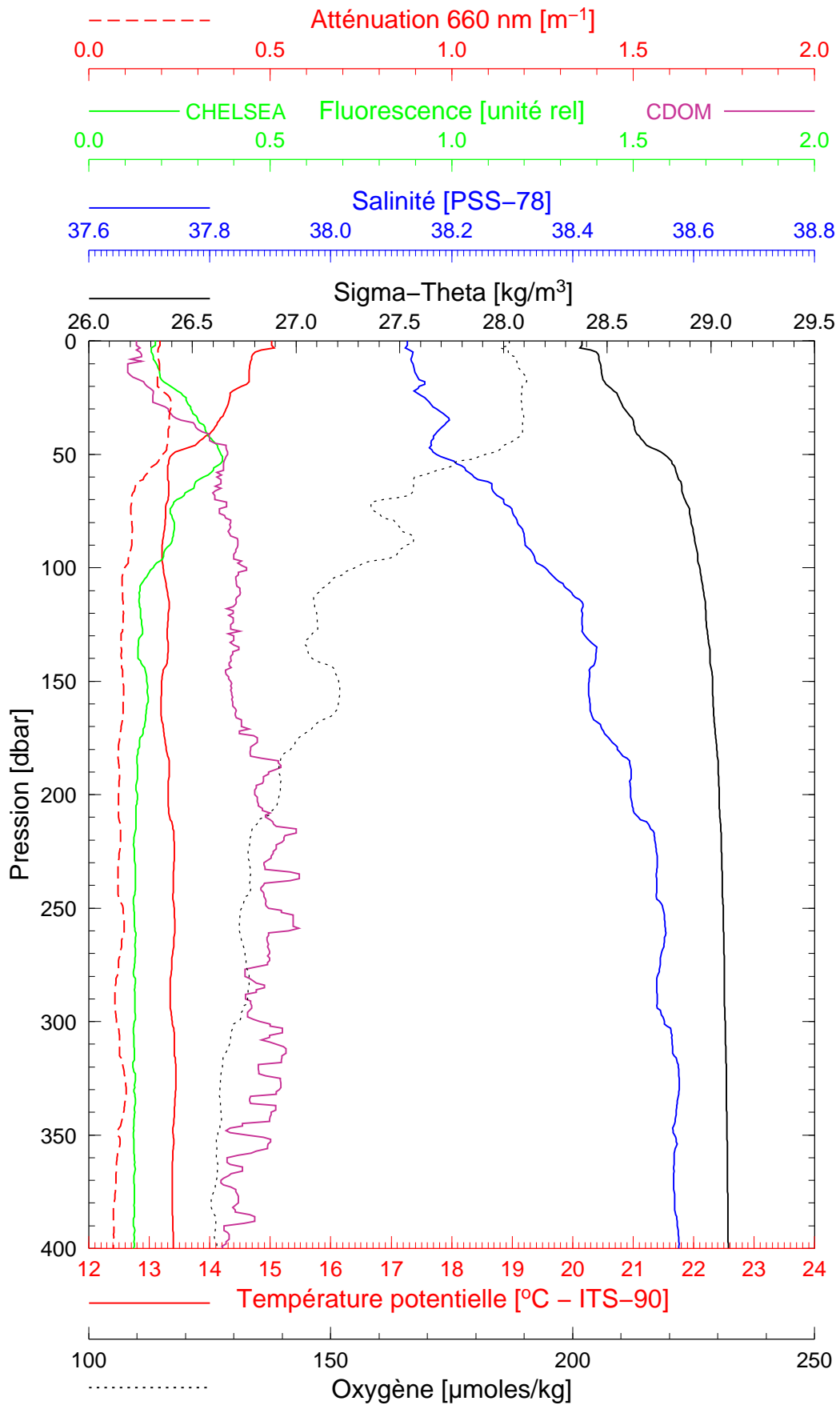
Longitude 07°47.842

BOUSSOLE 86

14/04/2009

BOUS090414\_03

BOUS004



Date 14/04/2009

Latitude 43°28.015

Heure déb 13h 29min [TU]

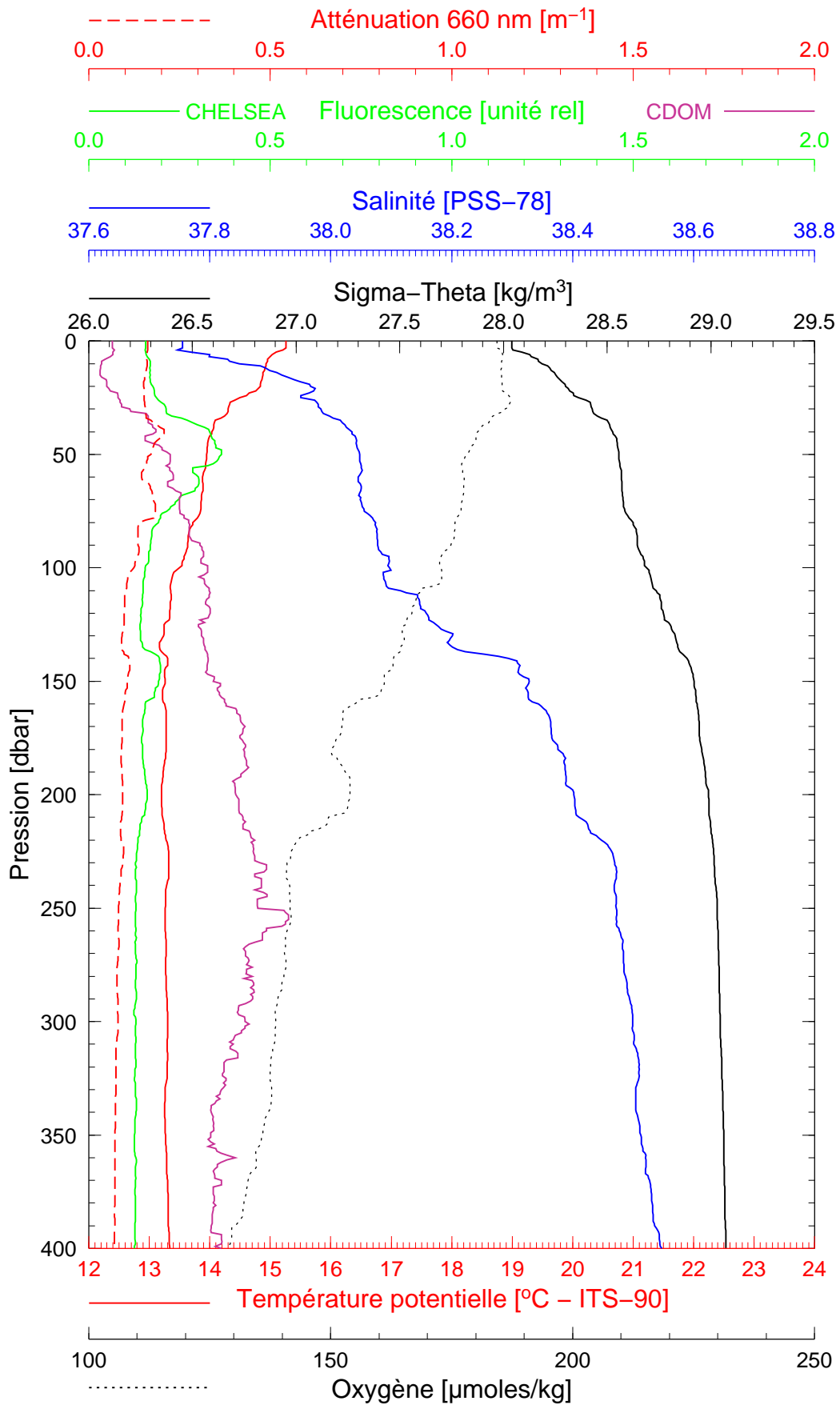
Longitude 07°41.934

BOUSSOLE 86

14/04/2009

BOUS090414\_04

BOUS005



Date 14/04/2009

Latitude 43°30.945

Heure déb 14h 21min [TU]

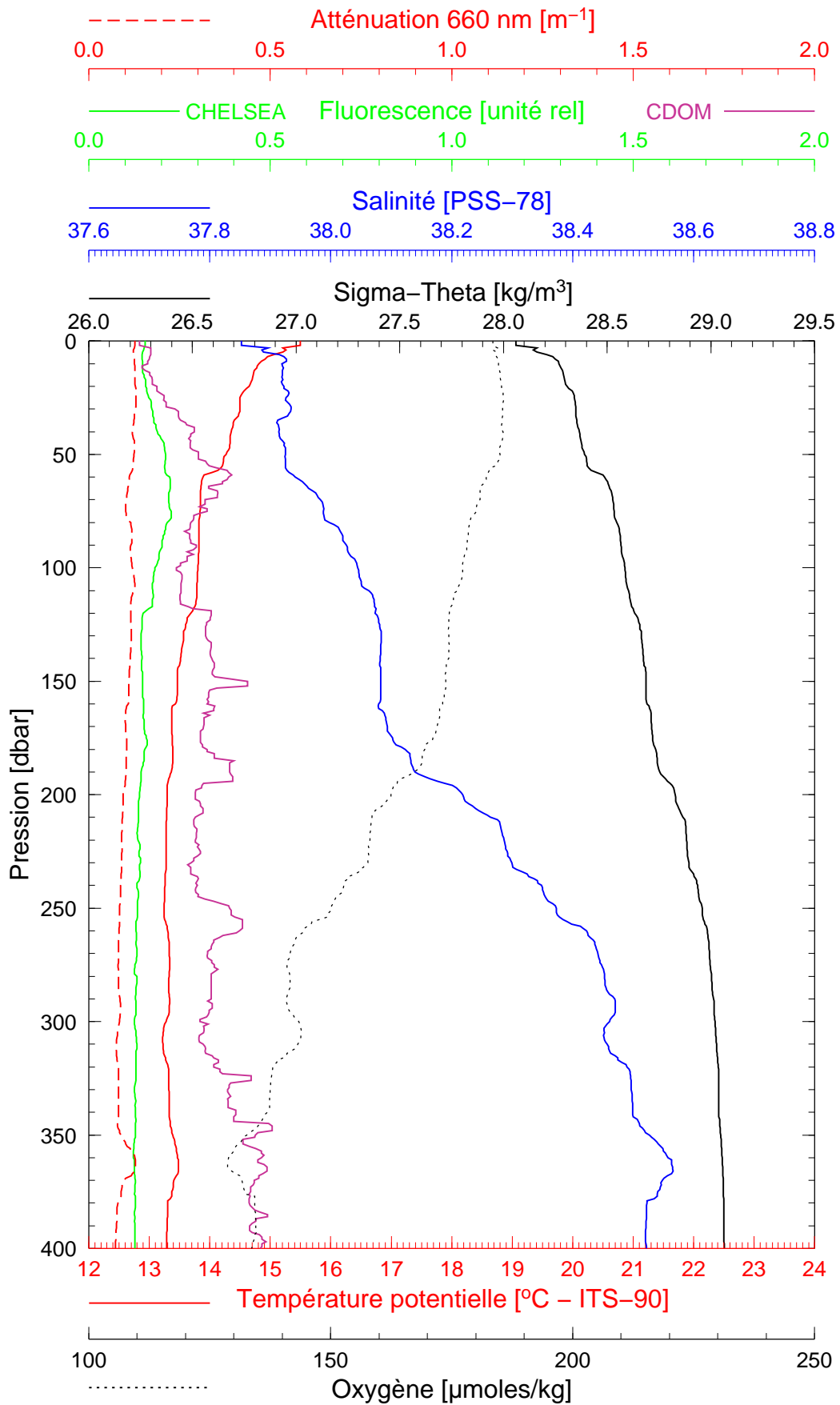
Longitude 07°36.922

BOUSSOLE 86

14/04/2009

BOUS090414\_05

BOUS006



Date 14/04/2009

Latitude 43°34.016

Heure déb 15h 17min [TU]

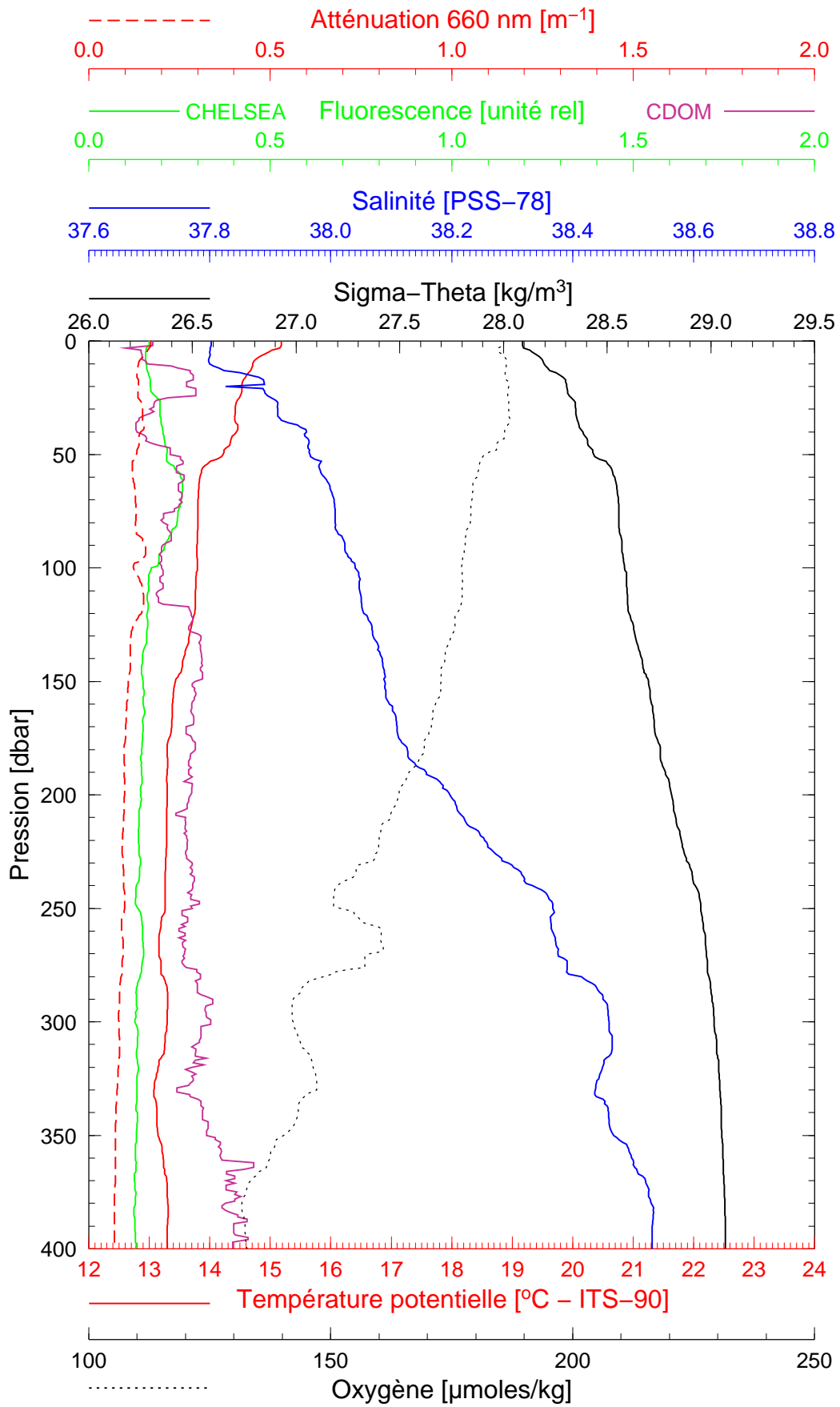
Longitude 07°30.860

BOUSSOLE 86

14/04/2009

BOUS090414\_06

BOUS007



Date 14/04/2009

Latitude 43°37.029

Heure déb 16h 16min [TU]

Longitude 07°25.075

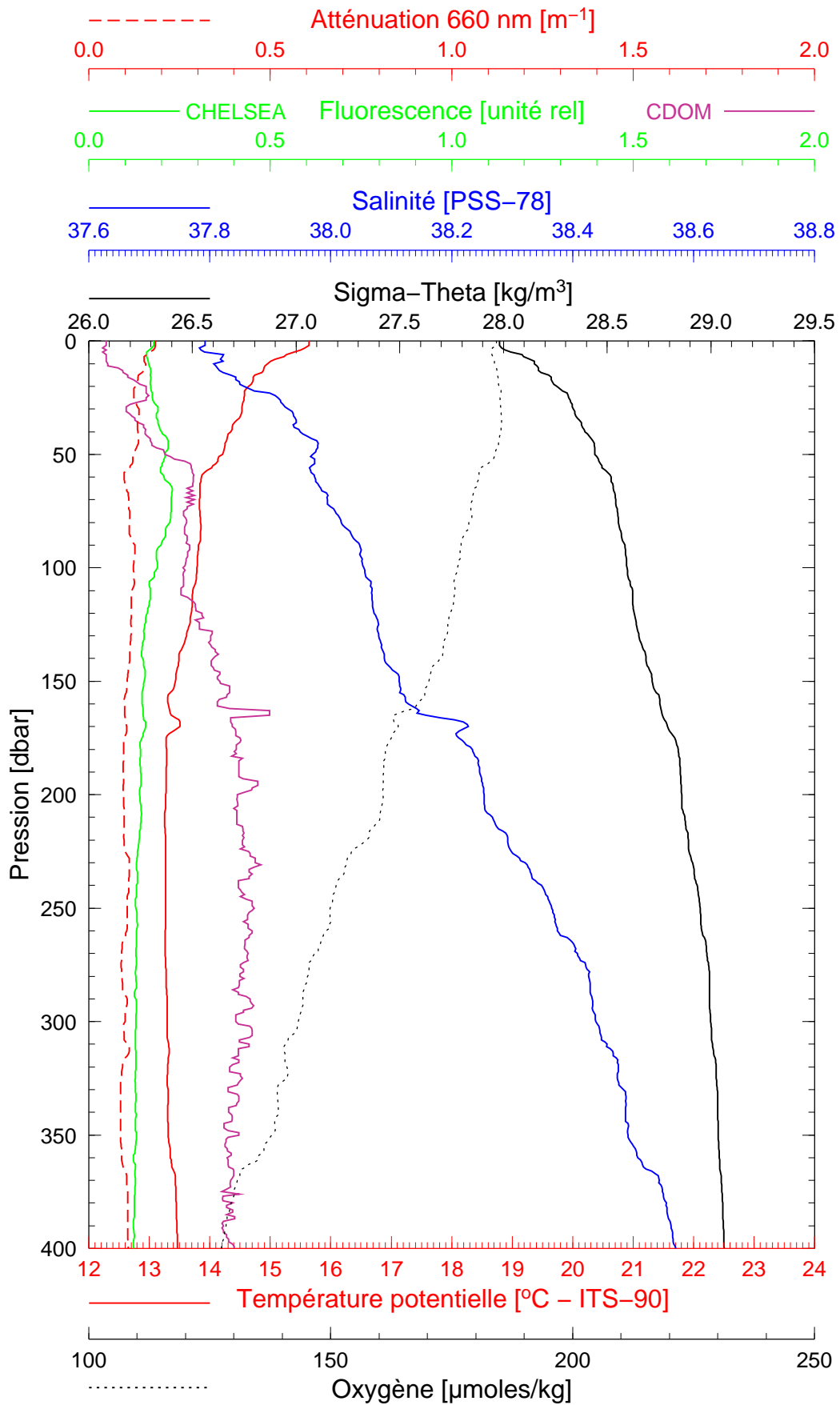


BOUSSOLE 86

14/04/2009

BOUS090414\_07

BOUS008



Date 14/04/2009

Latitude 43°39.058

Heure déb 17h 03min [TU]

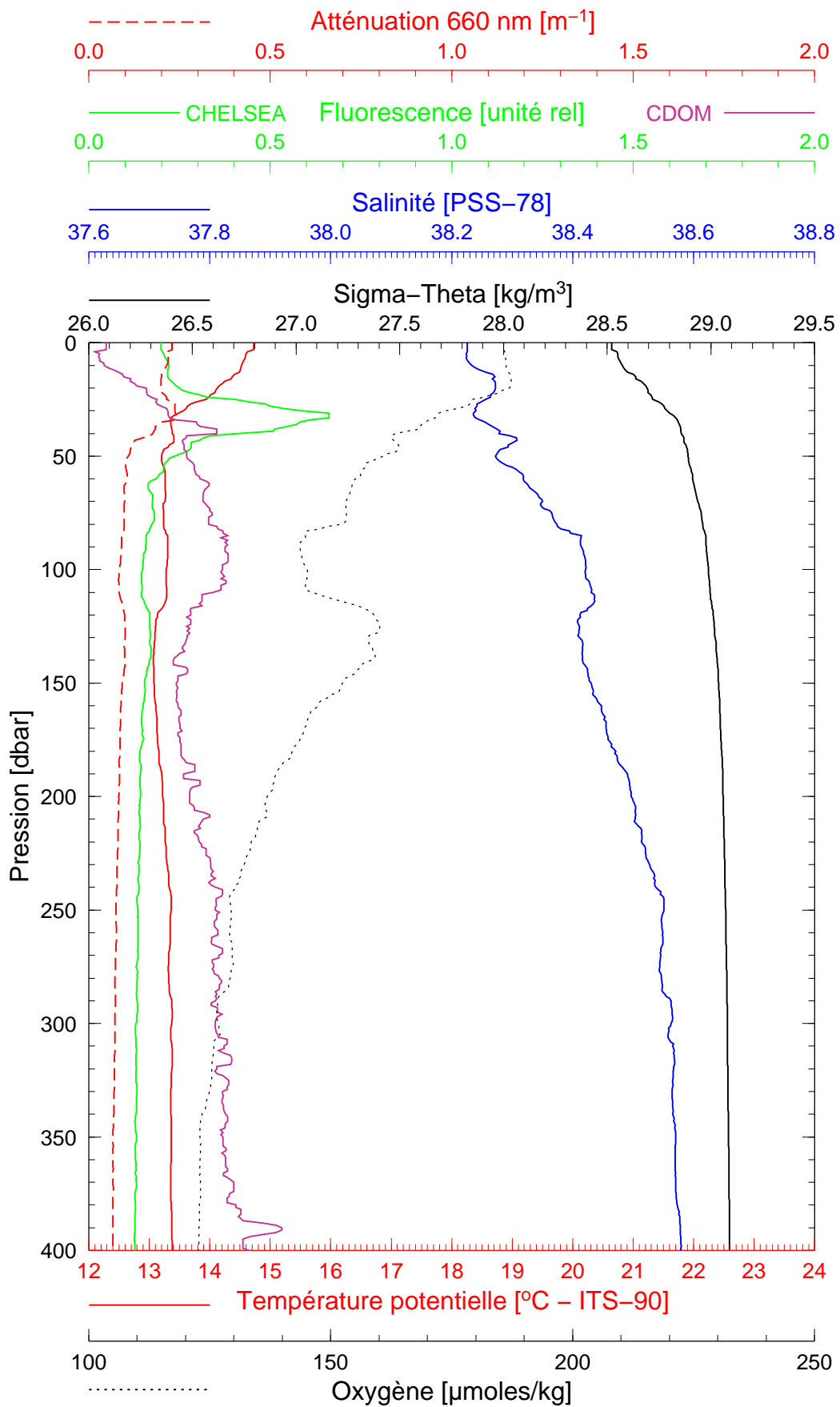
Longitude 07°21.046

BOUSSOLE 86

15/04/2009

BOUS090415\_01

BOUS009



Date 15/04/2009

Latitude 43°21.950

Heure déb 11h 49min [TU]

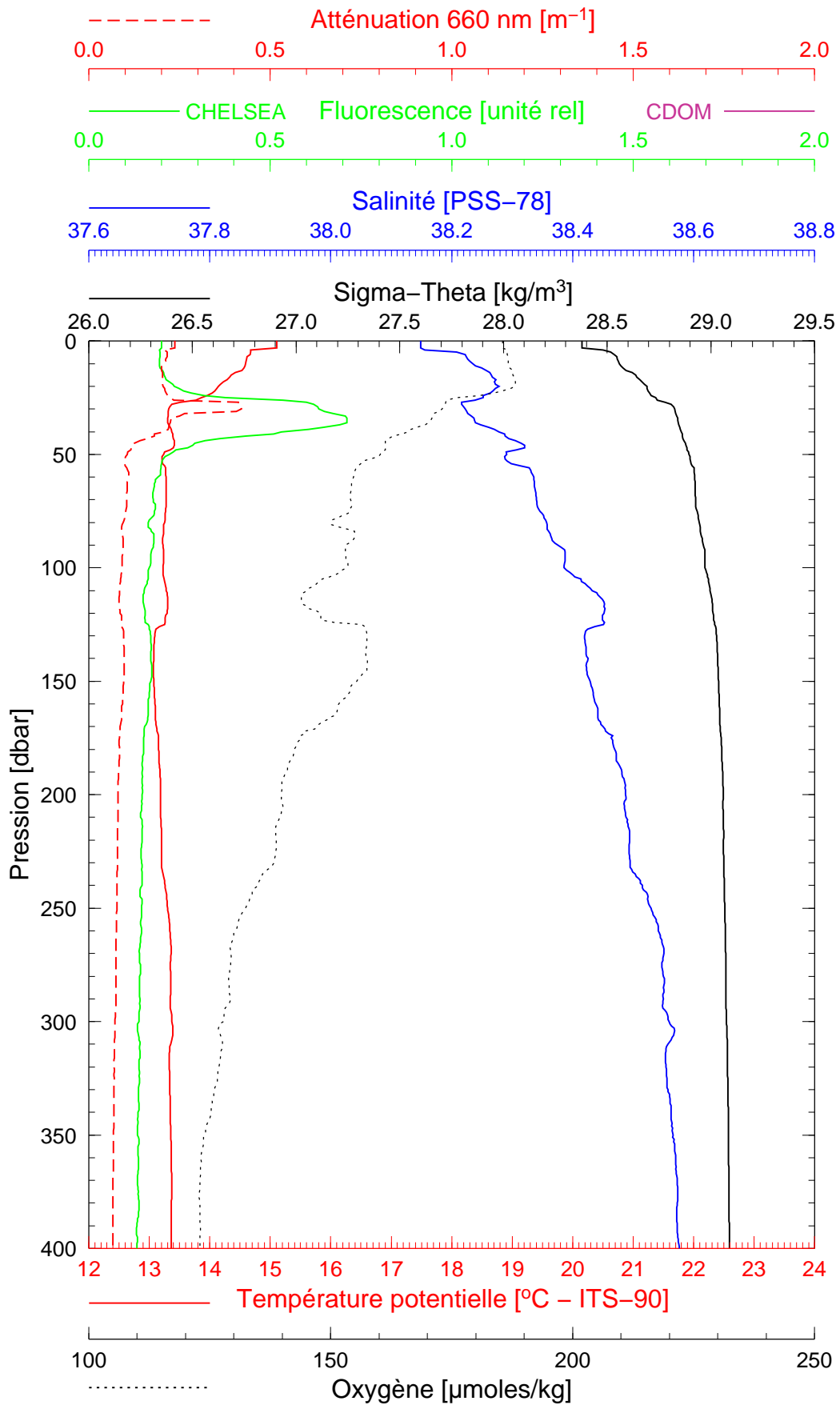
Longitude 07°53.785

BOUSSOLE 86

15/04/2009

BOUS090415\_02

BOUS010



Date 15/04/2009

Latitude 43°22.474

Heure déb 14h 05min [TU]

Longitude 07°53.335