BOUSSOLE Monthly Cruise Report

Cruise 89
July 15 - 18, 2009

Duty Chiefs: Emilie Diamond (diamond@obs-vlfr.fr) & Vincenzo Vellucci (enzo@obs-vlfr.fr)
Vessel: R/V Téthys II
(Captain: Alain Stephan)

Science Personnel: Céline Bachelier, François Bourrin, Cécile Cousin, Floriane Desprez, Emilie Diamond, Olivier Javoy, David Luquet, Stéphane Marchand, Elodie Martinez, Alexandre Mignot and Vincenzo Vellucci

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

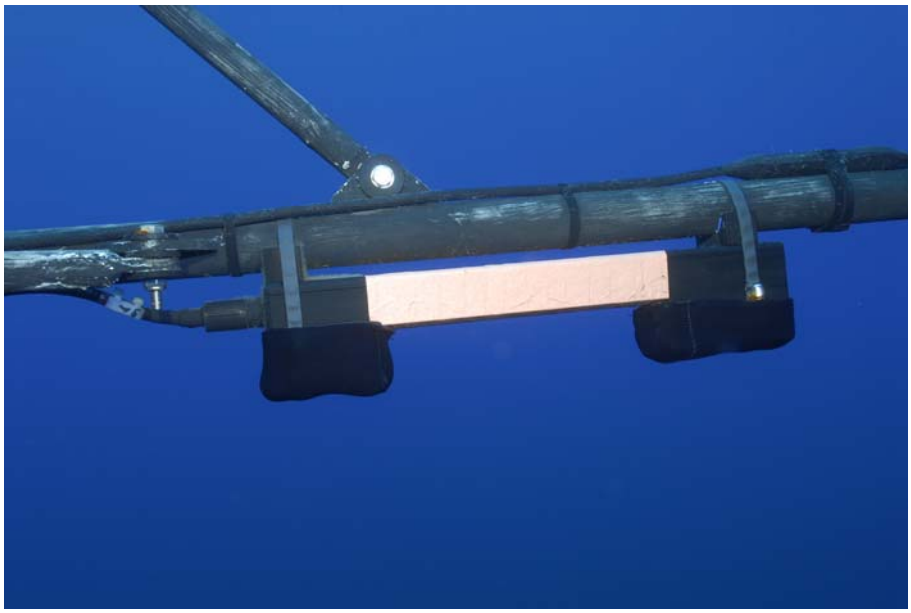


Figure 1. Neoprene caps on each transmissometer for acquiring three dark measurements.

BOUSSOLE project

ESA/ESRIN contract N° 17286/03/I-OL

Deliverable from WP#400/200

July 21, 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. Divers will also put a neoprene cap on the HS4 and on the transmissometers for acquiring three dark measurements.

Additional operations

From Thursday, Stéphane Marchand will be on board for testing several elephant seal CTD-fluorometer from the Centre d'Etudes Biologiques of Chizé. One of the four days, Céline Bachelier will also test four CTD SBE 37 once. One of the four days, Floriane Desprez will complete the MOOSE programs with a deep CTD cast with water sampling and three Plankton Net 0-100 m profiles at the DYFAMED site. The diving day, the hydrophone of the CRC (Marineland) for identification of cetaceans will be installed on the buoy.

Cruise Summary

Three of the four cruise days were used, due to bad weather on the last day. The first day was used for completing the transect. The second day was mainly used for cleaning the buoy optical sensors and performing dark measurements, for buoy data retrieval and for optical and CTD casts with sampling at the BOUSSOLE site. Also, the manual CIMEL was finally available. The third day was used for buoy data retrieval, for optical and CTD casts and for sampling at the BOUSSOLE site and at the DYFAMED site.

Wednesday 15 July 2009

The first day, weather conditions were not good enough for SPMR casts but allowed CTD casts, though not being optimal (H1/3 1.3 m, wind speed 16 kt and whitecaps). So when arrived at the BOUSSOLE site, operations this day was only CTD casts, 1 with water sampling performed on the BOUSSOLE site and 6 performed on the transect between the site and the port of Nice.

Thursday 16 July 2009

The second cruise day, sea state was good with very low wind blowing. The sky was blue to overcast. On the way, 1 set of CIMEL atmospheric measurements was performed. When arrived on site, 4 SPMR profiles and 1 CTD cast with water sampling were performed. During this CTD cast, 4 CTD sensors and 8 CTD-fluorometers were then tested on the rosette. Then, an attempt of CISCO connection with the buoy was made but failed. Divers went at sea for cleaning the instruments and for fixing the hydrophone to the buoy at 20 m. Neoprene caps were also put on the HS4 and on the transmissometers for acquiring three dark measurements. CISCO and ARGOS connectors on the head of the buoy were also cleaned. Then, 1 Secchi disk and 1 CTD cast (with the 8 CTD-fluorometers) with water sampling were performed. Another set of CIMEL measurements was performed on the way of back.

Friday 17 July 2009

The third cruise day, sea state was good with some wind blowing and blue sky. When arrived on site, a CISCO connection was established for data retrieval. Then, 3 SPMR profiles, 3 sets of CIMEL measurements, 1 Secchi disk and 1 CTD cast (with the 8 CTD-fluorometers) with water sampling were performed. Then, 3 plankton net samples were collected.

Saturday 18 July 2009

The last cruise day was cancelled because of bad weather.

Cruise Report

Wednesday 15 July 2009 (UTC)

People on board: Céline Bachelier, Elodie Martinez, Alexandre Mignot and Vincenzo Vellucci.

0650 Departure from the Nice port.
1020 Arrival at the BOUSSOLE site.
1030 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.
1110 Departure to the first transect station.
1150 CTD 02, 400 m, station 01 (43°25’N 07°48’E).
1255 CTD 03, 400 m, station 02 (43°28’N 07°42’E).
1345 CTD 04, 400 m, station 03 (43°31’N 07°37’E).
1435 CTD 05, 400 m, station 04 (43°34’N 07°31’E).
1540 CTD 06, 400 m, station 05 (43°37’N 07°25’E).
1625 CTD 07, 400 m, station 06 (43°39’N 07°21’E).
1645 Departure to the Nice port.
1715 Arrival at the Nice port.

Thursday 16 July 2009 (UTC)

People on board: Céline Bachelier, François Bourrin, Emilie Diamond, Olivier Javoy, David Luquet, Stéphane Marchand and Vincenzo Vellucci.

0415 Departure from the Nice port.
0535 CIMEL 01.
0745 Arrival at the BOUSSOLE site.
0800 CTD 08, 400 m with water sampling at 200, 150, 80, 70, 50, 40, 30, 20, 10 and 5 m for HPLC, Ap and TSM.
0845 SPMR 01.
0915 Attempt CISCO connection with the buoy: unsuccessful.
0920 SPMR 02, 03, 04.
1005 Diving on the buoy for cleaning instruments and for fixing the hydrophone on the buoy at 20 m. Dark HS4 and transmissometers measurements at 11:00, 11:15 and 11:30.
1105 Secchi disk 01 (17 m).
1130 CTD 09, 400 m with water sampling at 5 m for TSM.
1200 Departure to the Nice port.
1245 CIMEL 02.
1515 Arrival at the Nice port.

Friday 17 July 2009 (UTC)

People on board: Cécile Cousin, Floriane Desprez, Emilie Diamond, Stéphane Marchand and Vincenzo Vellucci.

0435 Departure from the Nice port.
0800 Arrival at the BOUSSOLE site.
0815 CISCO connection with buoy and data retrieval.
0830 SPMR 05, 06, 07.
0910 CIMEL 03, 04, 05.
0915 CTD 10, 400 m with water sampling at 200, 150, 70, 50, 40, 30, 20 and 10 for HPLC and Ap.
0950 Secchi disk 02 (19 m).
0955 Departure to DYFAMED site.
1045 CTD MOOSE, 2000 m.
1155 3 x Plankton net, 0-100 m.
1225 Departure to the Nice port.
1530 Arrival at the Nice port.

Saturday 18 July 2009 (UTC)

Bad weather.

Calculated Swath paths for the MERIS Sensor (ESOV Software)

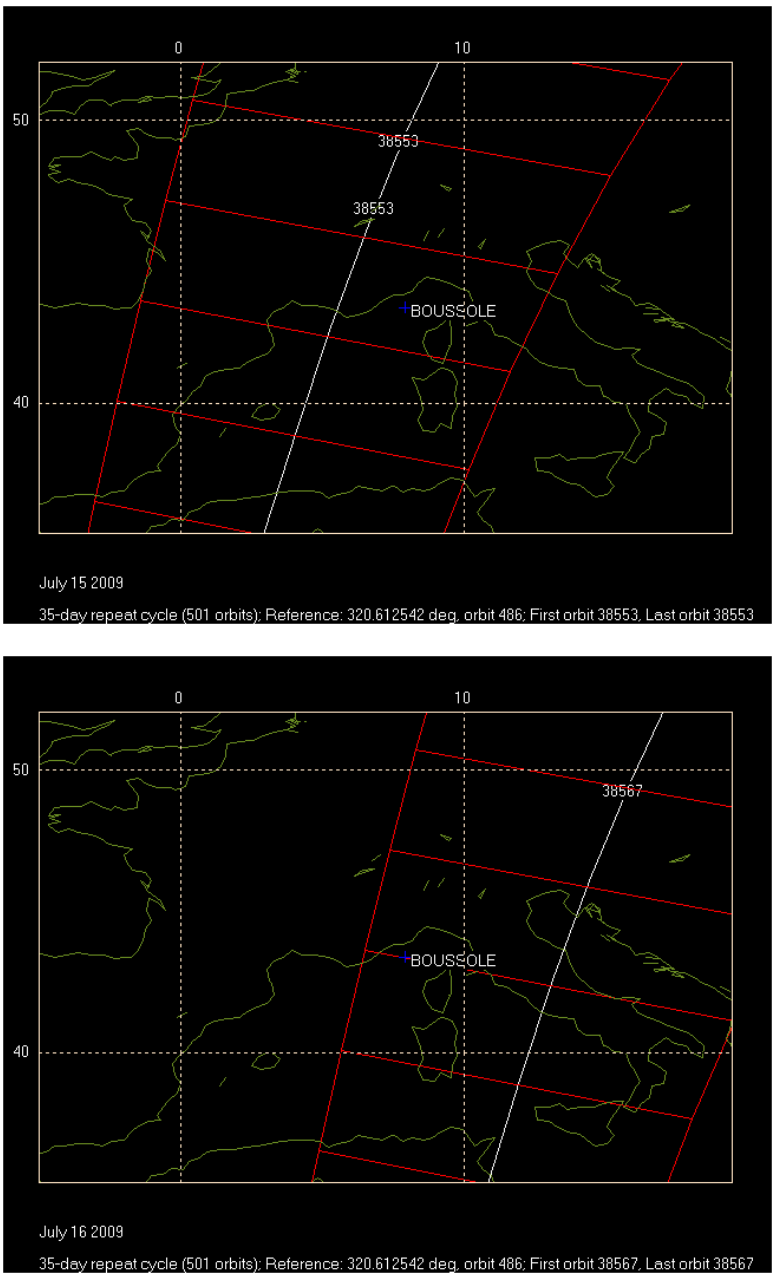
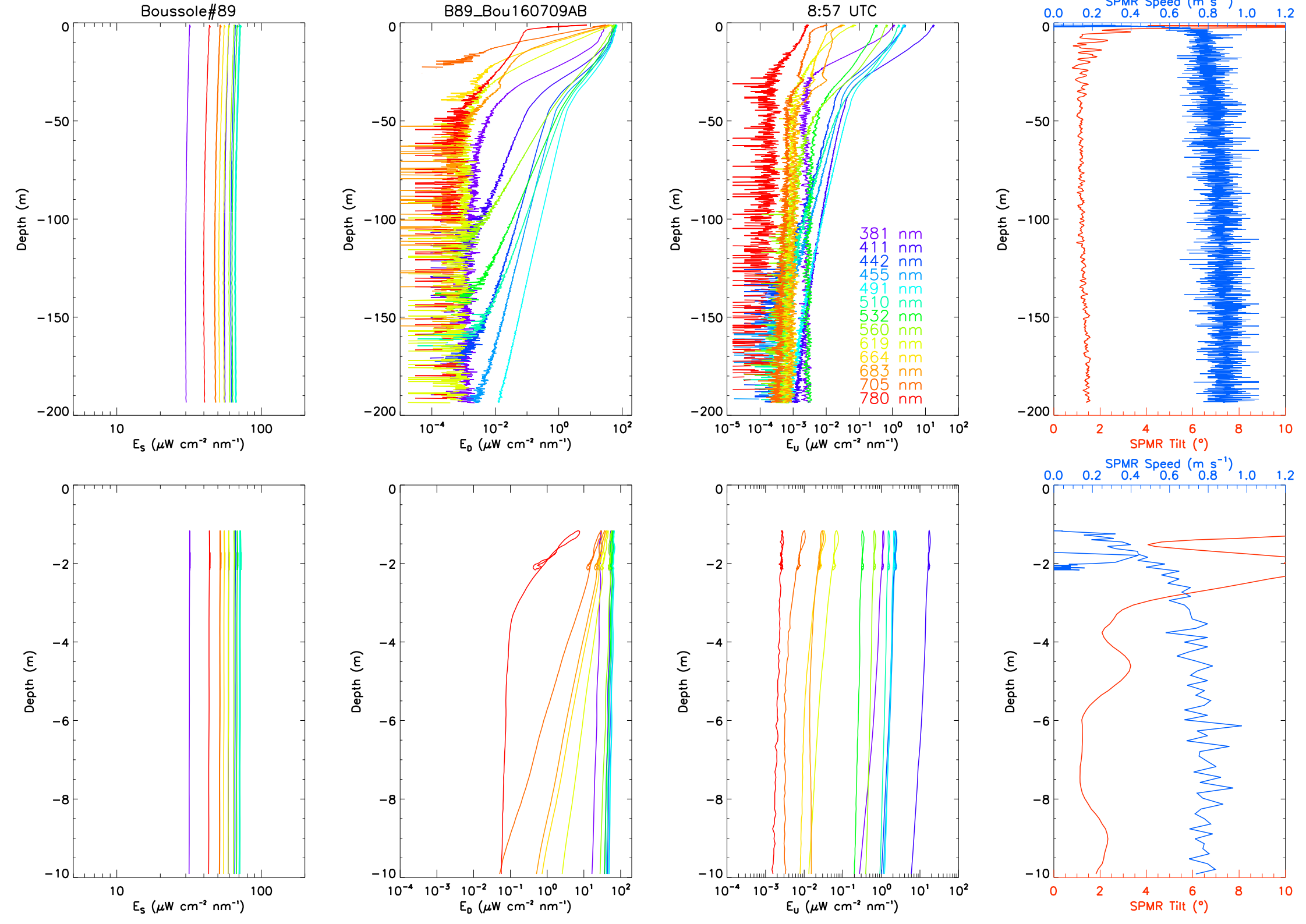


Figure 2. Calculated swath paths for MERIS (Esov software) above BOUSSOLE site for 15 and 16 July 2009.

Appendix

Cruise Summary Table for Boussole 89

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
15/07/09			CTDBOUS001	HPLC, Ap & TSM	10:40	28:00	400	43	22.078	7	53.582	blue		4	16	55	1018.0	89		23.4	22.0	moved			yes
			CTDBOUS002		11:54	24:00	400	43	24.941	7	47.901	blue		0	17	243	1018.0	87		23.7		moved			yes
			CTDBOUS003		12:57	19:00	400	43	28.026	7	41.764	blue		0	17	128	1018.0	88		23.9		moved			yes
			CTDBOUS004		13:47	18:00	400	43	30.992	7	36.817	blue		0	10	60	1018.5	86		23.8		moved			yes
			CTDBOUS005		14:39	20:00	400	43	34.034	7	30.767	blue		2	10	73	1018.9	86		23.9	23.1	moved			yes
			CTDBOUS006		15:43	20:00	400	43	36.970	7	24.746	blue		1	7	70	1019.0	82		24.4		moved			yes
			CTDBOUS007		16:29	20:00	400	43	39.024	7	20.850	blue		1	7	69	1019.0	73		25.9	24.3	moved			yes
16/07/09				CIMEL01	05:37	10:00		43	32.187	7	34.070	blue		0			1020.2								
			CTDBOUS008	HPLC, Ap & TSM	08:09	20:00	400	43	22.138	7	53.662	overcast		4	4	242	1020.5	87		23.3	24.7	calm			no
	Bou160709black1				08:46	3:00																			
		Bou160709AB			08:57	3:57	193	43	22.002	7	53.662	overcast	Ns	8	5	106	1020.5	88	good	23.4		calm	0.3		no
	Bou160709black2				09:10	3:00																			
	Bou160709black3				09:21	3:00																			
		Bou160709AC			09:27	3:33	161	43	21.909	7	53.843	overcast	Ns	8	4	168	1020.5	88	good	23.6		calm	0.3		no
		Bou160709AD			09:36	3:56	200	43	21.881	7	53.761	overcast	Ns	8	4	168	1020.5	88	good	23.6		calm	0.3		no
		Bou160709AE			09:46	4:00	206	43	21.893	7	53.675	overcast	Ns	8	4	168	1020.5	88	good	23.6		calm	0.3		no
	Bou160709black4				09:58	3:00																			
				Secchi01	11:05	4:00	17	43	22	7	54	blue		2					good			calm			no
			CTDBOUS009	TSM	11:33	22:00	400	43	21.986	7	53.899	blue		1	2	88	1019.8	86		24.0	25.2	calm			no
				CIMEL02	12:45	12:00		43	28.215	7	41.832	blue		2			1019.3								
17/07/09	Bou170709black1				08:26	3:00																			
		Bou170709AA			08:35	3:34	180	43	22.178	7	54.112	blue	Sc	2	12	223	1013.4	85	good	22.7		calm	0.5		yes
		Bou170709AB			08:44	3:30	169	43	22.277	7	54.165	blue	Sc	2	12	223	1013.4	85	good	22.7		calm	0.5		yes
		Bou170709AC			08:53	3:04	135	43	22.405	7	54.311	blue	Sc	2	12	223	1013.4	85	good	22.7		calm	0.5		yes
	Bou170709black2				09:05	3:00																			
				CIMEL03	09:10	10:00		43	22.109	7	54.120	blue		2			1013.4								
				CIMEL04	09:25	7:00		43	22.191	7	54.231	blue		3			1013.5								
				CIMEL05	09:36	8:00		43	22.311	7	54.377	blue		2			1013.4								
			CTDBOUS010	HPLC & Ap	09:17	24:00	400	43	22.073	7	54.089	blue		2	12	102	1013.4	83		22.8		calm			yes
				Secchi02	09:50	4:00	19	43	22	7	54	blue		2					good			calm			yes
18/07/09	Bad weather																								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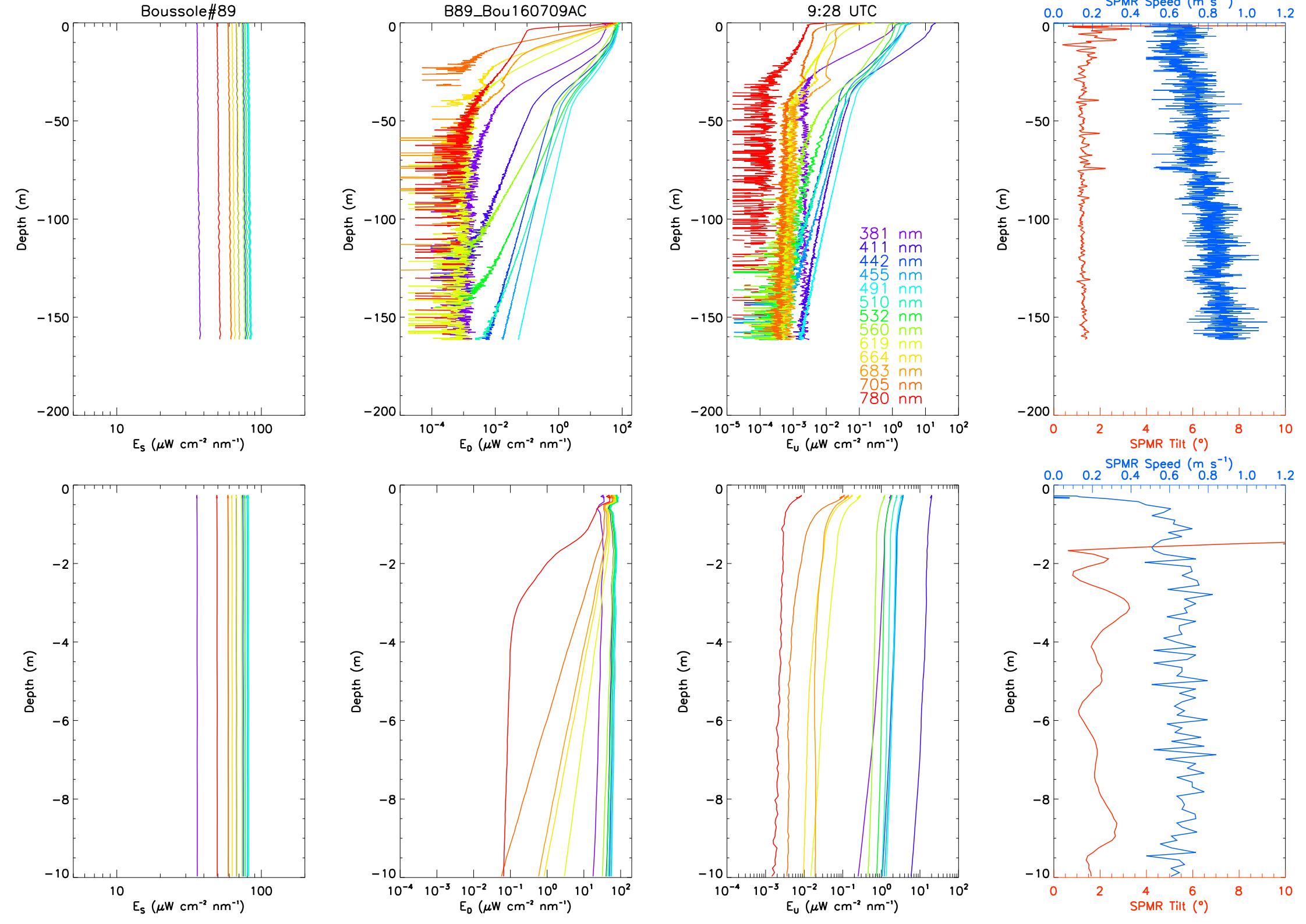
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)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E_U (μW cm^{-2} nm^{-1})
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442 nm
455 nm
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510 nm
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560 nm
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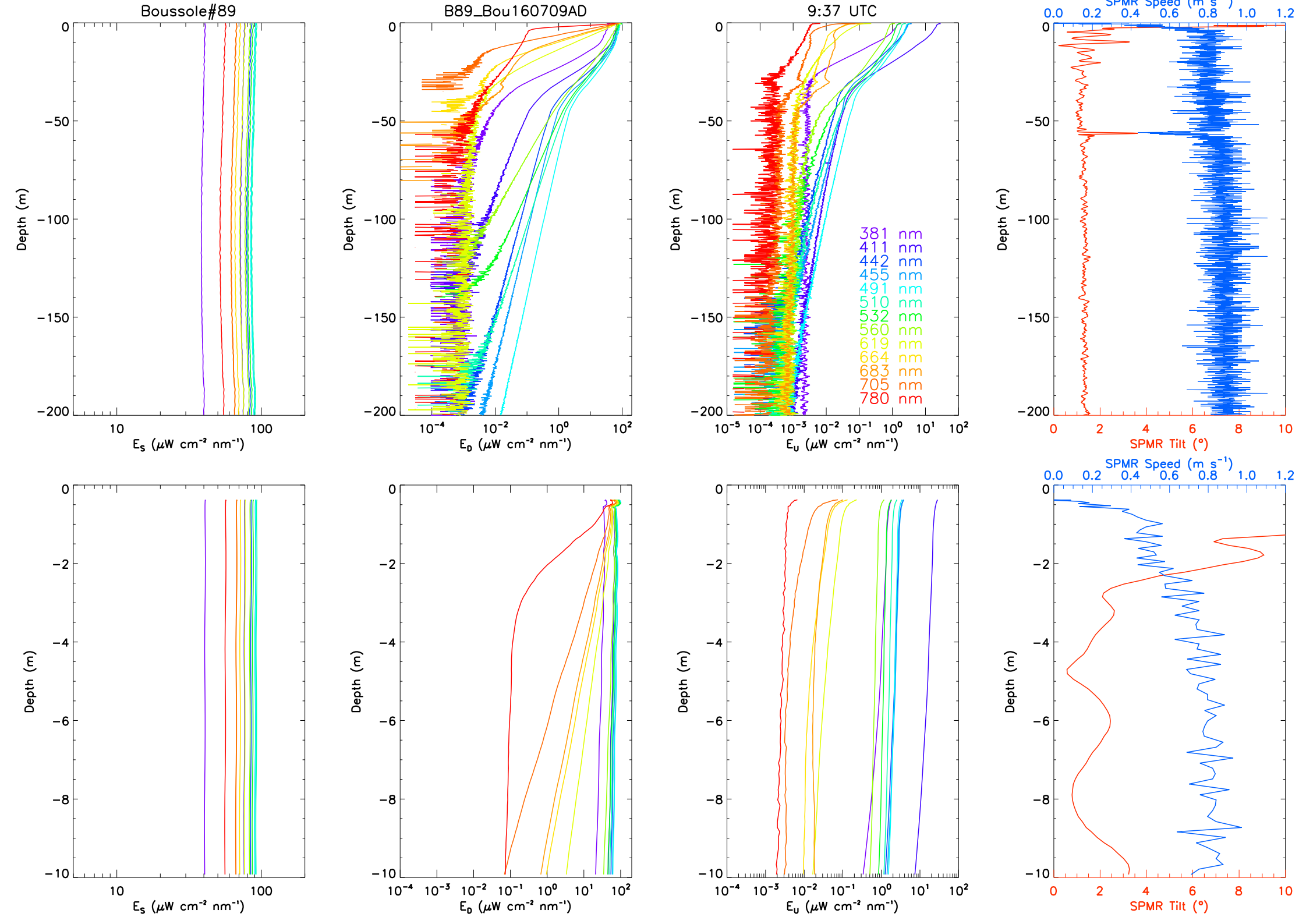
664 nm
683 nm
705 nm
780 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)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E_D (μW cm^{-2} nm^{-1})
E_U (μW cm^{-2} nm^{-1})
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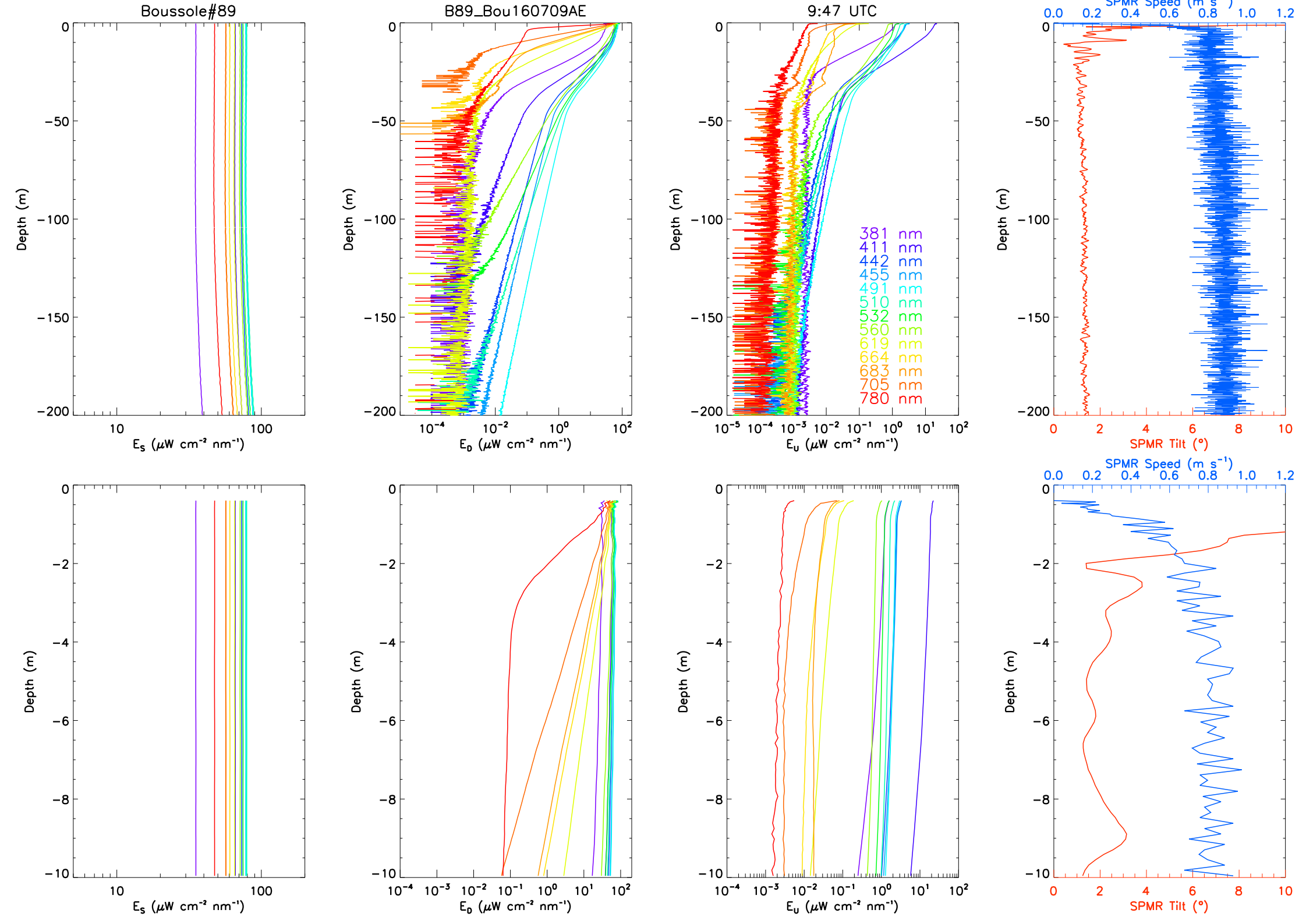
SPMR Speed (m s^{-1})
SPMR Tilt (°)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SPMR Speed (m s^{-1})
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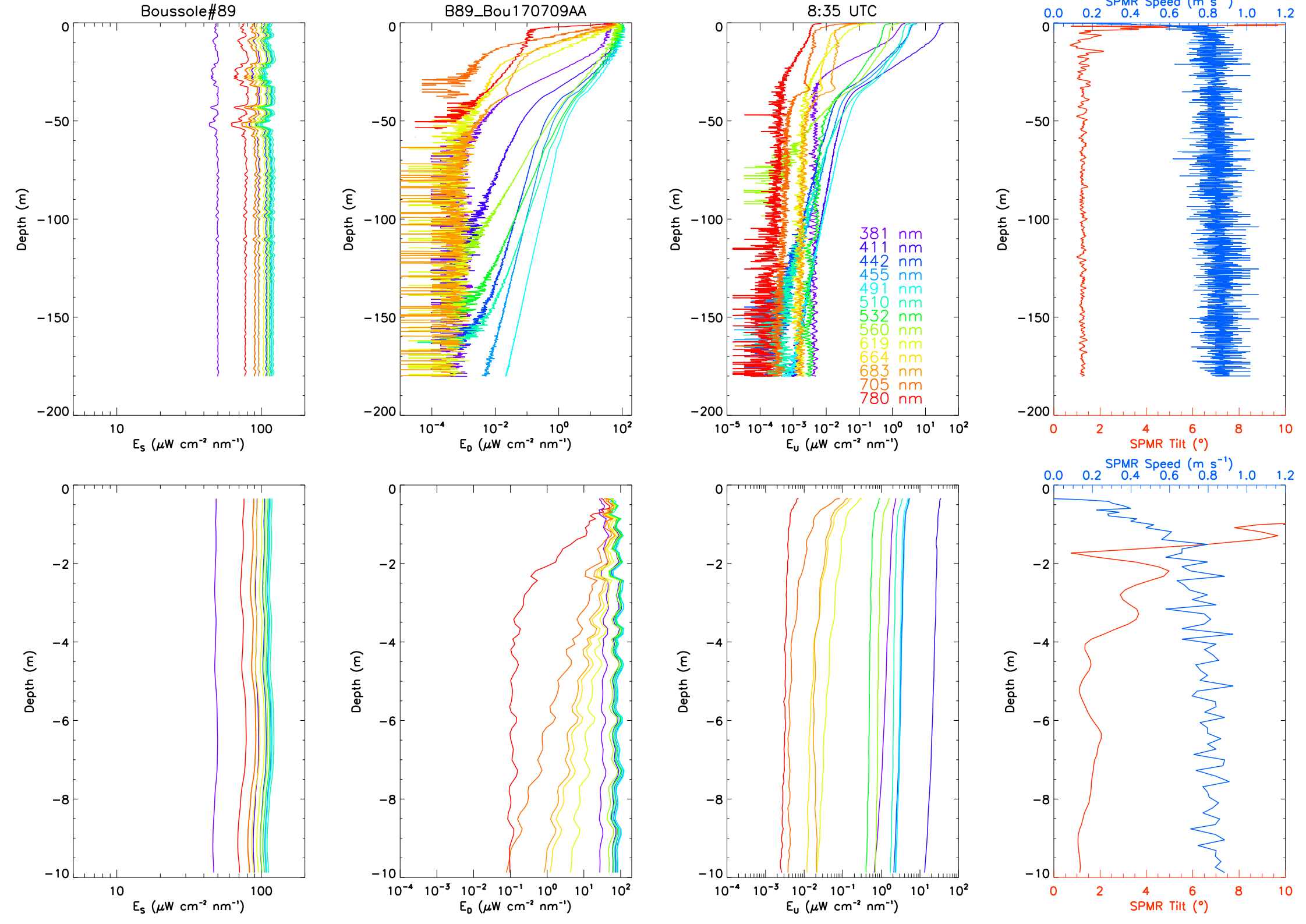
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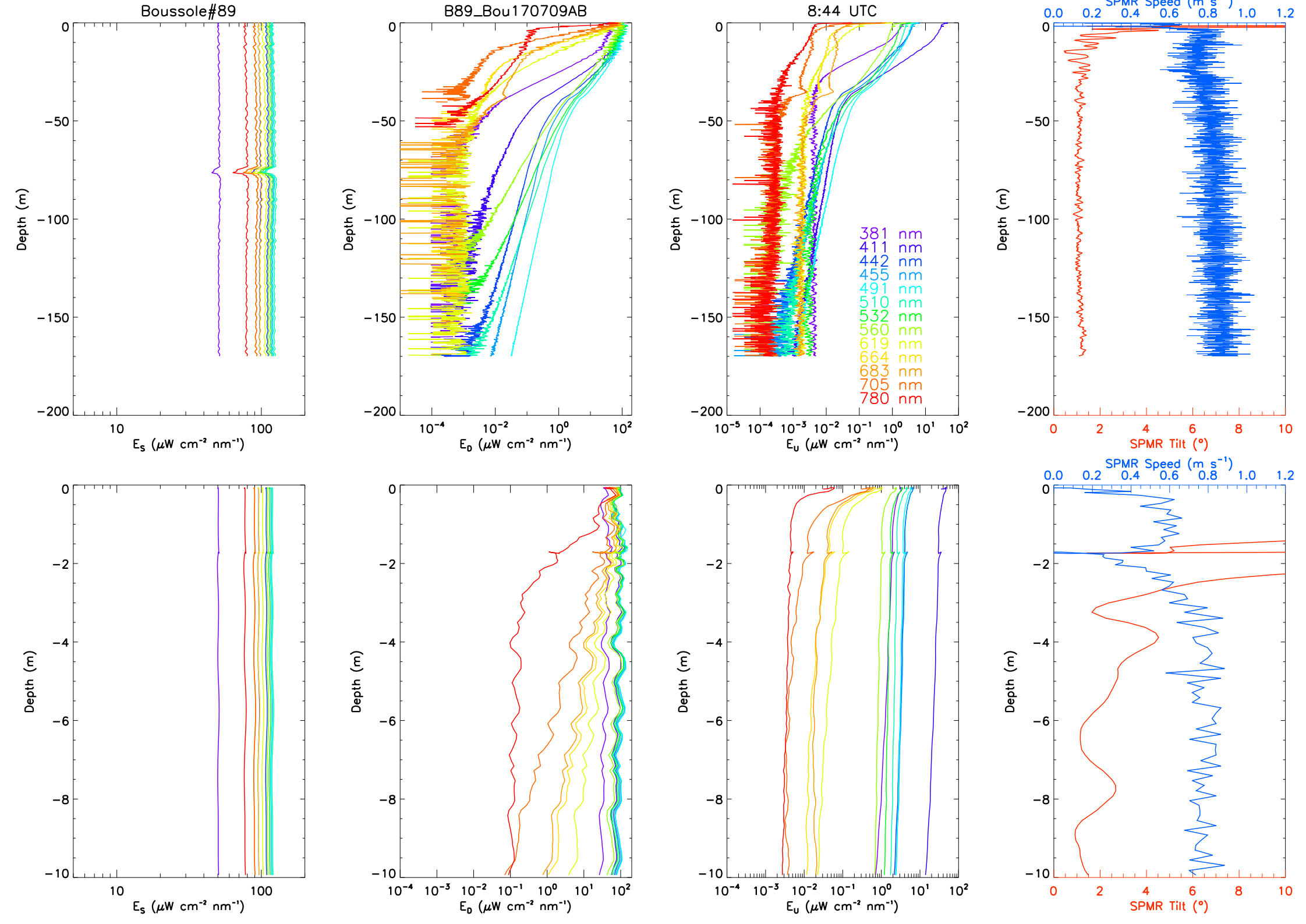
SPMR Speed (m s^{-1})
SPMR Tilt (°)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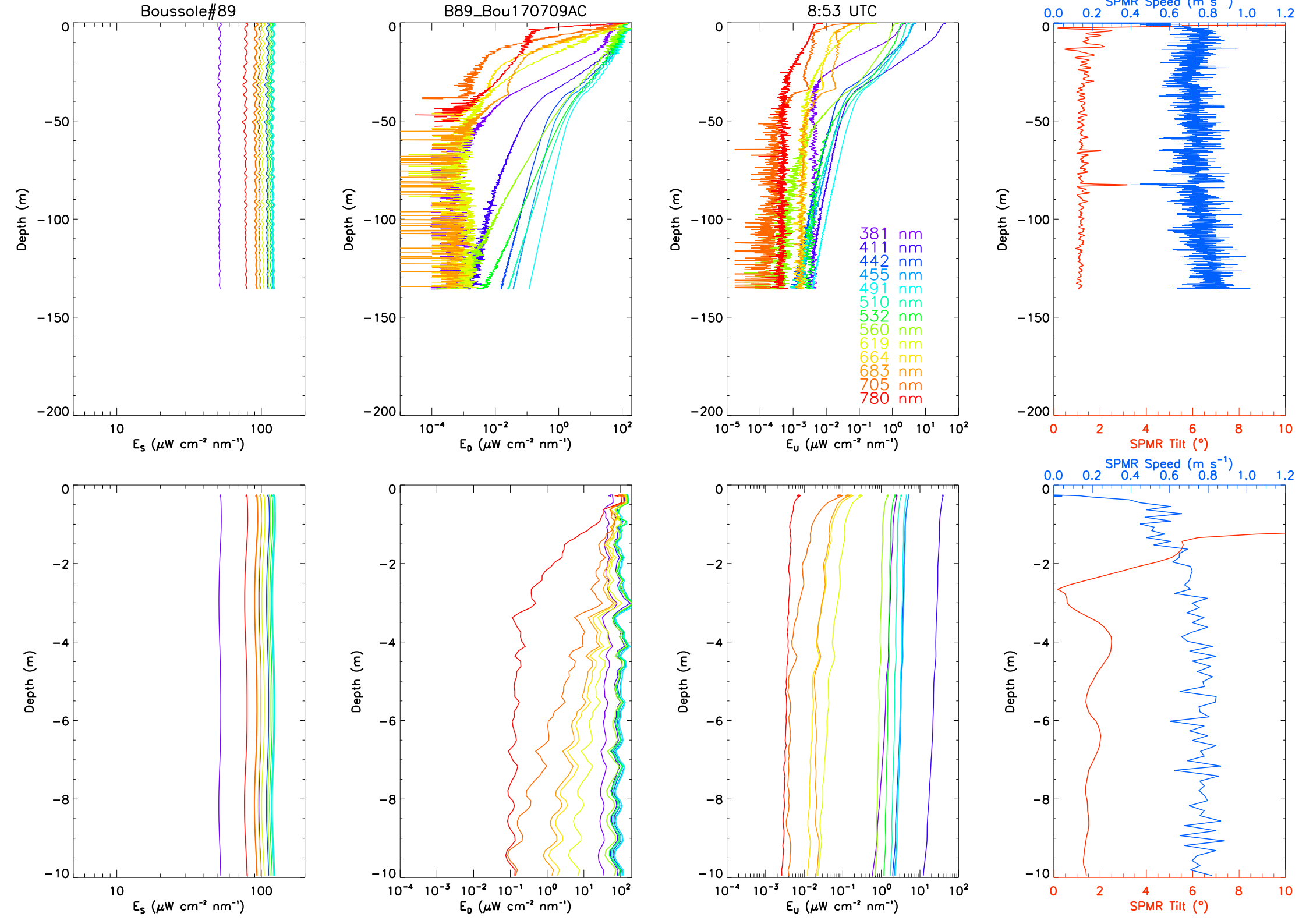
SPMR Speed (m s^{-1})
SPMR Tilt (°)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SPMR Speed (m s^{-1})
SPMR Tilt (°)