BOUSSOLE Monthly Cruise Report

Cruise 92
November 12 - 15, 2009

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

Science Personnel: Floriane Desprez, Jean De Vaugelas, Emilie Diamond, Martina Ferraris, Olivier Javoy, Yves Lamblard, David Luquet, Marc Picheral, Didier Robin, Vincenzo Vellucci, Pierre.

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

Figure 1. Orange reflection of Tethys II on a stripped dolfin.

BOUSSOLE project

ESA/ESRIN contract N° 17286/03/I-OL

Deliverable from WP#400/200

November 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. From October to December 2009, another SPMR will be used for profiles (SN 008 instead of SN 006). It will measure upwelling radiance and downwelling irradiance instead of up and down welling E. The reference will also be another SMSR (SN 021 instead of SN 006) but with an identical sensor. 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

Since it was deployed on October the 27th, the new buoy does not work. Changing the battery will be a priority when divers will be on board. The hydrophone of the CRC (Marineland) for identification of cetaceans will also be removed from the buoy this day. One of the three days, Floriane Desprez will complete the MOOSE programs with a deep CTD cast and water 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. Martina Ferraris will be on board one day for sampling *Pelagia noctiluca* jellyfish.

Cruise Summary

All of the four cruise days were used. The first day, the CTD-rosette broke down and was out of order for the rest of the mission. All days were used for optical casts and water sampling with Niskin bottles at the BOUSSOLE site. The first and the third days were also used for diving to repair the buoy. The second day was also used for plankton net sampling and PVM cast.

Thursday 12 November 2009

The first day, sea state was good with low wind blowing and the sky was blue. During its installation, the CTD-rosette, broke down and was out of order to the end of the mission. So, all BOUSSOLE CTD and the deep MOOSE CTD planned were cancelled. When arrived on site, divers went at sea to change the buoy battery#2 with the battery recovered from the buoy system#1. During the diving, buoy optical sensors were also cleaned and the hydrophone was taken off. After the diving, the attempt of CISCO connection with the buoy failed. Then, 3 SPMR profiles and 1 Secchi disk were performed. The second attempt of CISCO connection also failed, so divers went at sea to reboot several times the Dacnet through the AK connector. But the attempt of direct connection with the buoy failed and the buoy still did not work. Before leaving, water samples were collected by closing a Niskin bottle with a messenger on the hydrologic cable.

Friday 13 November 2009

The second cruise day, sea state was good with low wind blowing and the sky was overcast. On site, 6 SPMR profiles, 1 Secchi disk and 1 PVM profile were performed. 2 plankton net samples and water samples with a Niskin bottle on the hydrologic cable were also collected.

Saturday 14 November 2009

The third cruise day, sea state was good with low wind blowing and the sky was blue. When arrived on site, divers went at sea to take off the buoy Dacnet. On board, the Dacnet was rebooted through the AK connector but no connection appeared so the micro drive on Dacnet was changed. Then, the Dacnet was once again rebooted and direct connection worked and the AK connector shut down correctly. During this operation, 1 Secchi disk and water sampling with Niskin bottles on the hydrologic cable were performed. Martina Ferraris also tried to sample *Pelagia noctiluca* jellyfish but unsuccessfully. Then, divers reinstalled the Dacnet on buoy but nothing happened and the following attempt of CISCO connection with the buoy failed. Then, 4 SPMR profiles and 1 Niskin water sample on surface were performed. A last time, divers went at sea to take off the CLC.

Sunday 15 November 2009

The last cruise day, sea state was good with low wind blowing and the sky was overcast. When arrived on site, 3 SPMR profiles and 1 Secchi disk were performed and water samples were collected by closing Niskin bottles with messengers on the hydrologic cable.

Cruise Report

Thursday 12 November 2009 (UTC)

People on board: Floriane Desprez, Emilie Diamond, Olivier Javoy, Yves Lamblard, David Luquet, Didier Robin and Vincenzo Vellucci.

0705 Departure from the Nice port.
1020 Arrival at the BOUSSOLE site.
1030 Diving on the buoy for taking off the battery #2.
1115 Diving on the buoy for installing the battery #1, for taking off the hydrophone and for cleaning instruments.
1215 Attempt CISCO connection with the buoy: unsuccessful.
1235 SPMR 01, 02, 03.
1240 Secchi disk 01 (24 m).
1330 CTD does not work: broken down.
1415 Attempt CISCO connection with the buoy: unsuccessful.
1430 Diving on buoy for rebooting system through AK connector (5 times) but the buoy still does not work. Cleaning of CISCO and ARGOS connections
1530 Niskin bottle 01 for water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and Ap.
1645 Departure to the Nice port.
1955 Arrival at the Nice port.

Friday 13 November 2009 (UTC)

People on board: Emilie Diamond and Marc Picheral.

0535 Departure from the Nice port.
0905 Arrival at the BOUSSOLE site.
0910 SPMR 04, 05, 06.
1015 Secchi disk 02 (20 m).
1025 PVM, 0-1000 m.
1115 2 x Plankton net, 0-100 m.
1150 Niskin bottle 02 for water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, Ap and TSM.
1305 SPMR 07, 08, 09.
1350 Departure to the Nice port.
1650 Arrival at the Nice port.

Saturday 14 November 2009 (UTC)

People on board: Jean De Vaugelas, Emilie Diamond, Martina Ferraris, Yves Lamblard, Vincenzo Vellucci and Pierre (diver).

0600 Departure from the Nice port.
0915 Arrival at the BOUSSOLE site.
0920 Diving on the buoy for taking off the Dacnet.
1010 Secchi disk 03 (24 m).
1015 On board, attempt of direct connection with Dacnet unsuccessful so substitution of the Dacnet micro drive: connection OK after substitution + “AK reboot”.
1020 Niskin bottle 03 for water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and Ap.
1110 Diving on the buoy for reinstalling the Dacnet: the buoy still does not work.
1215 Attempt CISCO connection with the buoy: unsuccessful.
1220 SPMR 10.
1250 Niskin bottle for water sampling at 5 m for TSM.
1315 SPMR 11, 12, 13.
1410 Diving for taking off the CLC.
1435 Departure to the Nice port.
1755 Arrival at the Nice port.

Sunday 15 November 2009 (UTC)

People on board: Emilie Diamond and Vincenzo Vellucci.

0605 Departure from the Nice port.
0920 Arrival at the BOUSSOLE site.
0925 SPMR 14, 15, 16.
1020 Niskin bottle 04 for water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, Ap and TSM.
1120 Secchi disk 04 (20 m).
1125 Departure to the Nice port.
1420 Arrival at the Nice port.

Calculated Swath paths for the MERIS Sensor (ESOV Software)

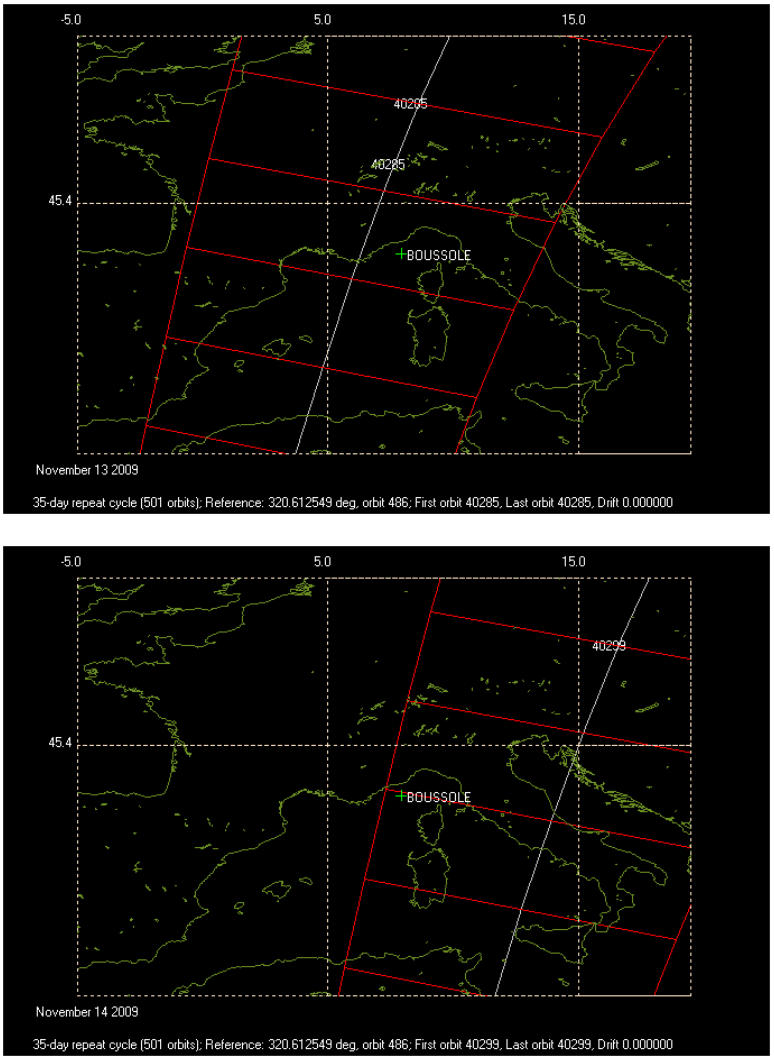
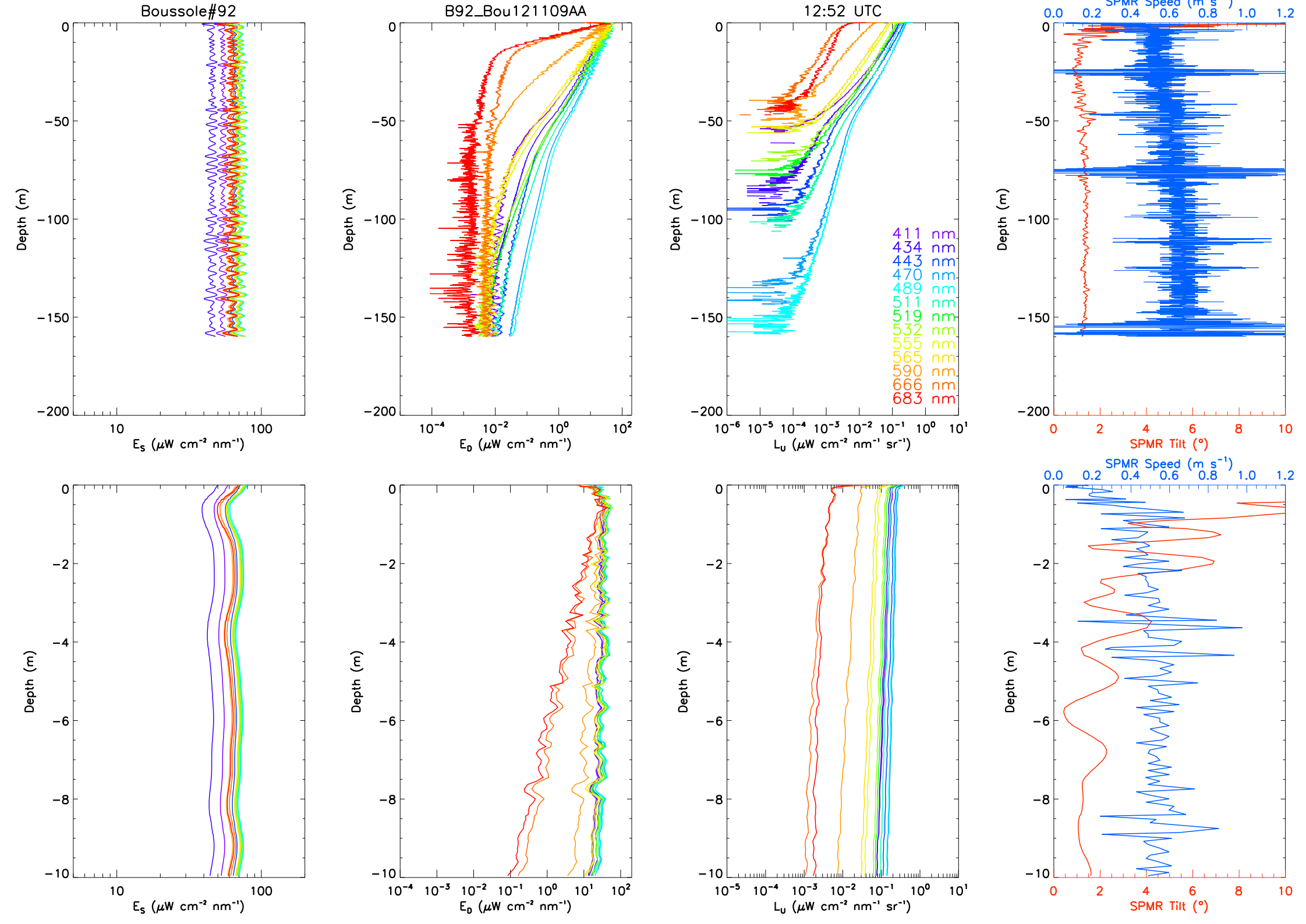


Figure 2. Calculated swath paths for MERIS (Esov software) above BOUSSOLE site for 13 and 14 November 2009.

Appendix

Cruise Summary Table for Boussole 92

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
	Bou121109black1				12:37	3:00																			
		Bou121109AA			12:52	4:23	160	43	22.168	7	53.963	blue	Ci	3	2	316	1013.9	60	good	16.1		calm	0.6		no
		Bou121109AB			13:03	4:30	160	43	22.184	7	53.896	blue	Ci	3	2	316	1013.9	60	good	16.1		calm	0.6		no
12/11/09		Bou121109AC			13:13	4:38	170	43	22.207	7	53.740	blue	Ci	3	2	316	1013.9	60	good	16.1		calm	0.6		no
	Bou121109black2				13:27	3:00																			
				Secchi01	12:40	4:00	24	43	22	7	54	blue		3					good			calm			no
				Niskin01: HPLC & Ap	15:30	75:00	5 to 200	43	21.998	7	53.816	overcast		7	5	300	1015.0	66		15.2		calm			no
	Bou131109black1				09:10	3:00																			
		Bou131109AA			09:16	4:27	144	43	22.374	7	53.646	overcast	St & Cu	5	6	48	1020.5	78	good	16.6		calm	0.3		no
		Bou091009AF			09:57	2:41	91	43	22.771	7	53.141	overcast	St & Cu	5	6	48	1020.5	78	good	16.6		calm	0.3		no
		Bou091009AG			10:03	4:32	168	43	22.81	7	53.028	overcast	St & Cu	5	6	48	1020.5	78	good	16.6		calm	0.3		no
	Bou131109black2				10:16	3:00																			
13/11/09				Secchi02	10:15	4:00	20	43	22	7	54	overcast		5					good			calm			no
				Niskin02: HPLC, Ap & TSM	11:50	75:00	5 to 200	43	22.419	7	52.977	overcast		6	8	49	1020.5	80		16.9		calm			no
	Bou131109black3				13:08	3:00																			
		Bou131109AH			13:15	4:12	143	43	22.131	7	53.767	overcast	Sc & St	4	8	277	1020.1	89	good	17.3		calm	0.3		no
		Bou131109AI			13:25	3:35	130	43	22.229	7	53.397	overcast	Sc & St	4	8	277	1020.1	89	good	17.3		calm	0.3		no
		Bou131109AJ			13:34	3:45	100	43	22.265	7	53.172	overcast	Sc & St	4	8	277	1020.1	89	good	17.3		calm	0.3		no
	Bou131109black4				13:46	3:00																			
				Secchi03	10:10	4:00	24	43	22	7	54	overcast		5					good			calm			no
				Niskin03: HPLC & Ap	10:20	40:00	5 to 200	43	21.978	7	53.804	overcast		4	7	90	1022.4	87	good	17.2		calm			no
	Bou141109black1				12:24	3:00																			
		Bou141109AA			12:32	1:59	61	43	22.373	7	53.913	blue	Ci & Cu	3	6	92	1020.9	85	good	17.1		calm	0.6		no
	Bou141109black2				12:49	3:00																			
14/11/09				Niskin: TSM	12:50	10:00	5	43	22	7	54	blue		3	6	92	1020.9	85		17.1		calm			no
	Bou141109black3				13:16	3:00																			
		Bou141109AD			13:25	2:32	82	43	22.442	7	54.043	blue	Ci & Cu	2	4	115	1020.7	85	good	17.3		calm	0.7		no
		Bou141109AE			13:31	4:35	156	43	22.448	7	54.123	blue	Ci & Cu	2	4	115	1020.7	85	good	17.3		calm	0.7		no
		Bou141109AF			13:42	4:11	148	43	22.582	7	54.339	blue	Ci & Cu	2	4	115	1020.7	85	good	17.3		calm	0.7		no
	Bou141109black4				14:06	3:00																			
	Bou151109black1				09:27	3:00																			
		Bou151109AA			09:40	4:47	173	43	22.225	7	53.780	overcast	Cb & Ns	7	3	229	1019.7	90	good	17.3		calm	0.9		no
		Bou151109AB			09:51	4:07	151	43	22.270	7	53.643	overcast	Cc & Cs	7	3	229	1019.7	90	good	17.3		calm	0.9		no
15/11/09		Bou151109AC			10:00	4:04	149	43	22.299	7	53.456	overcast	Cc & Cs	7	3	229	1019.7	90	good	17.3		calm	0.9		no
	Bou151109black2				10:16	3:00																			
				Niskin04: HPLC, Ap & TSM	10:20	55:00	5 to 200	43	22.550	7	53.130	overcast		7	10	327	1019.3	92		17.3		calm			no
				Secchi04	11:20	4:00	20	43	22	7	54	overcast		7					good			calm			no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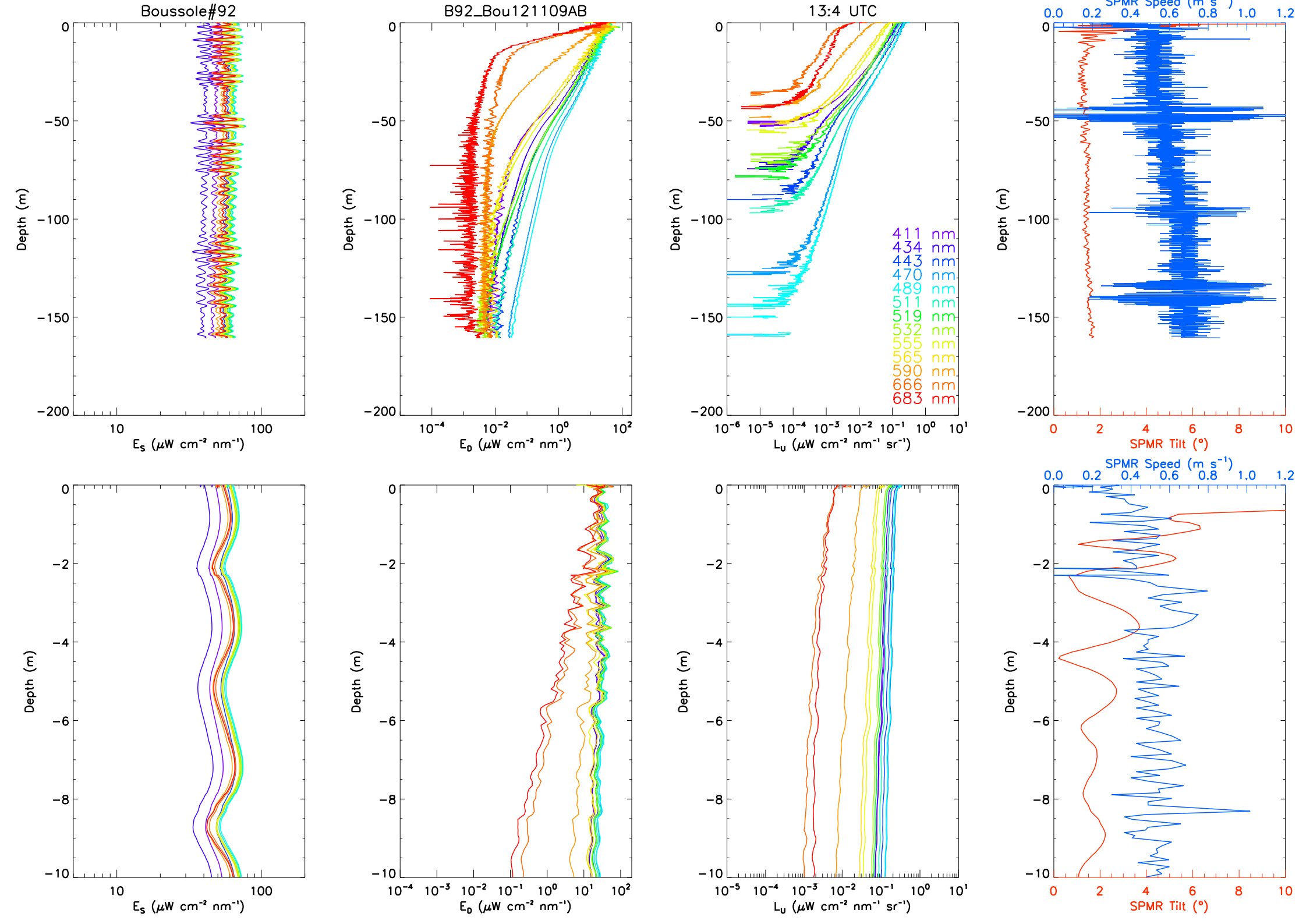
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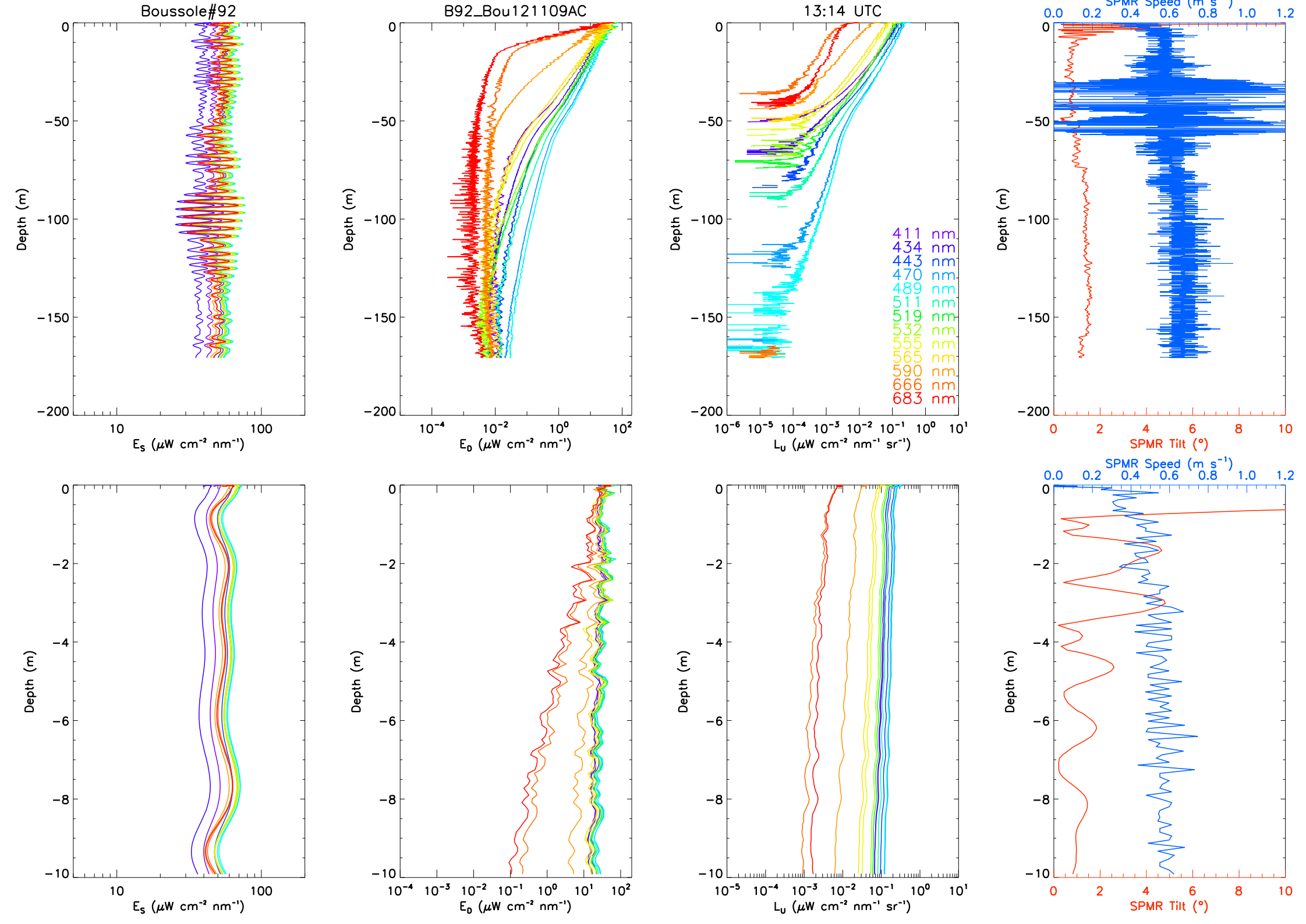
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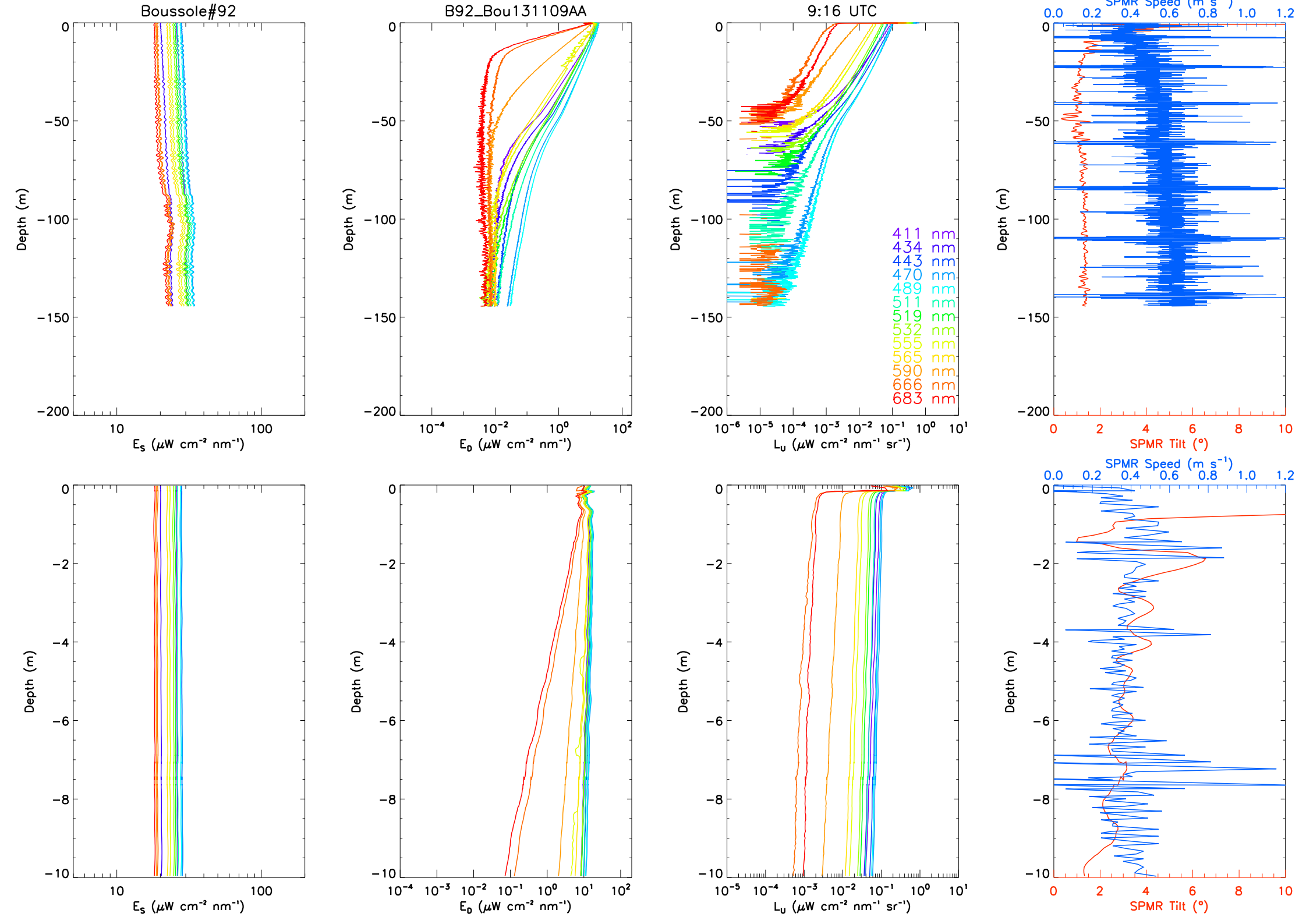
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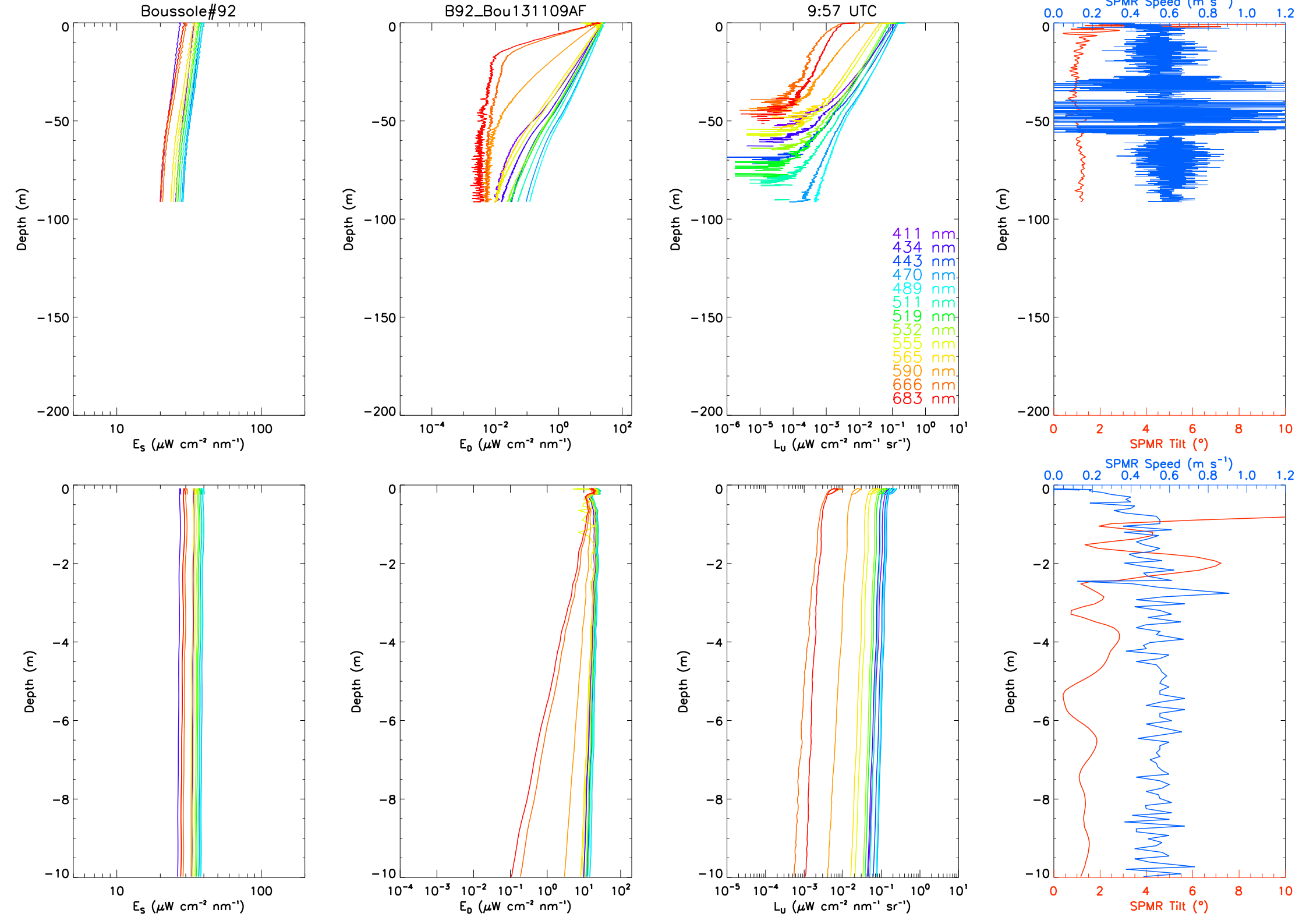
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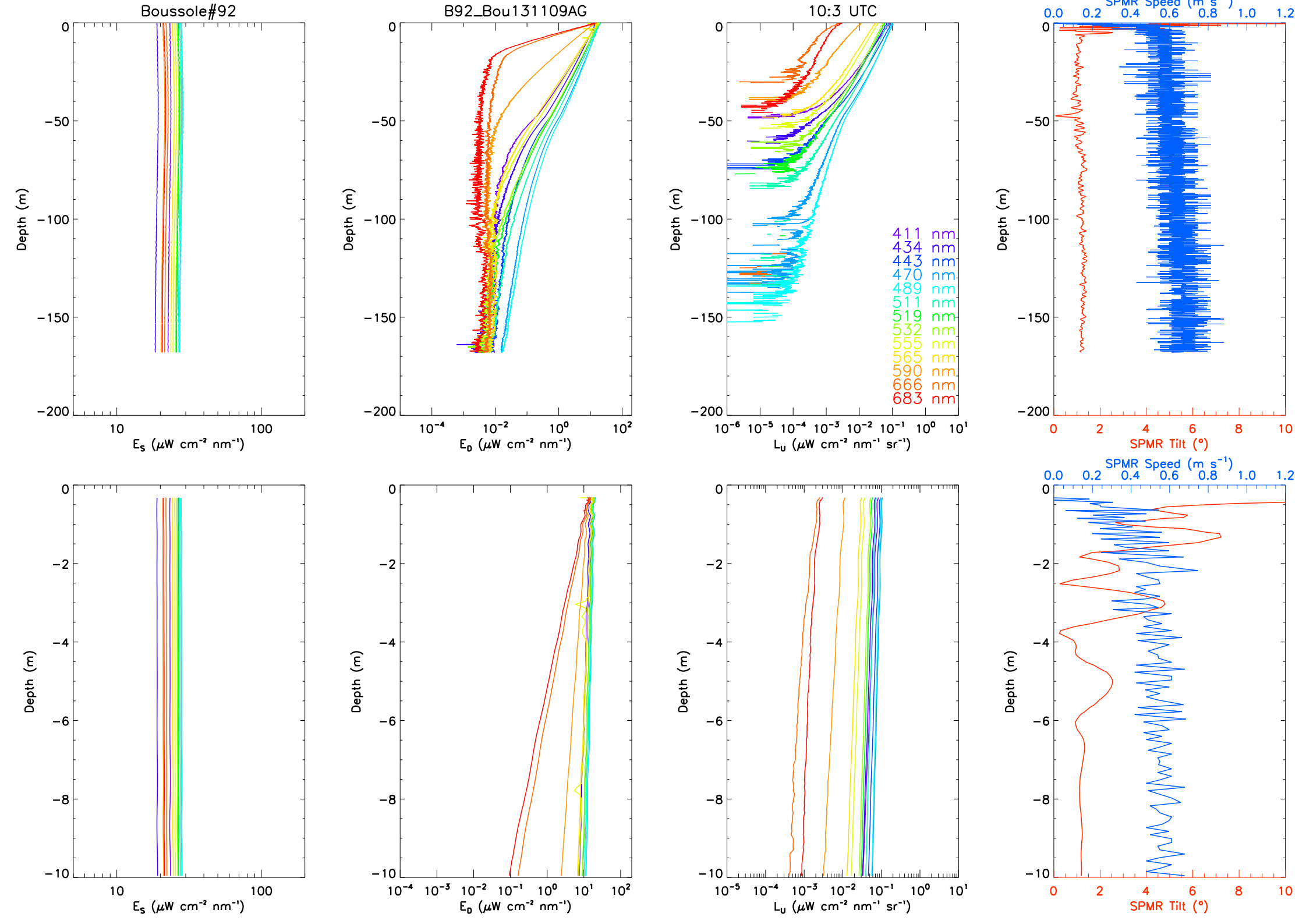
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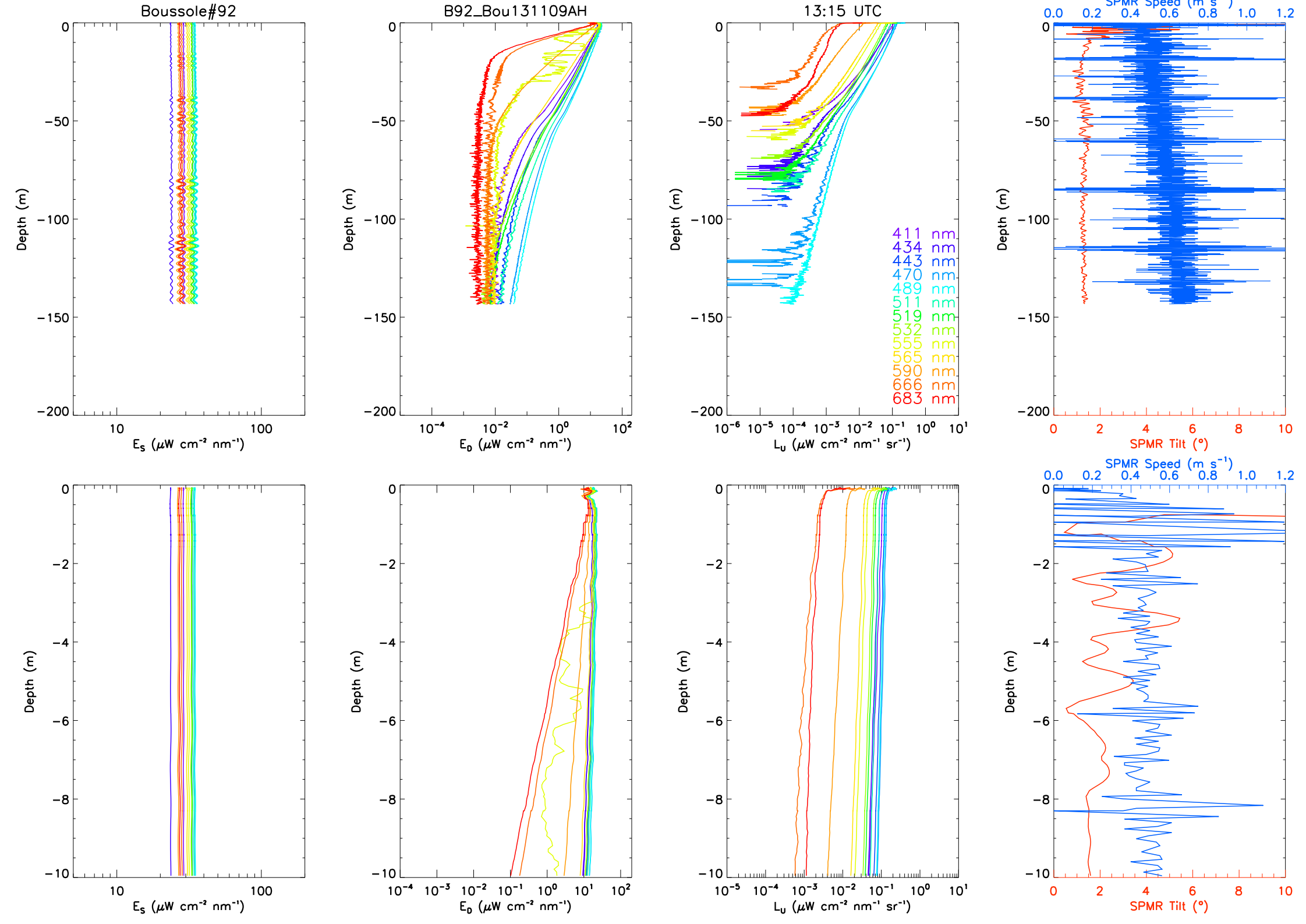
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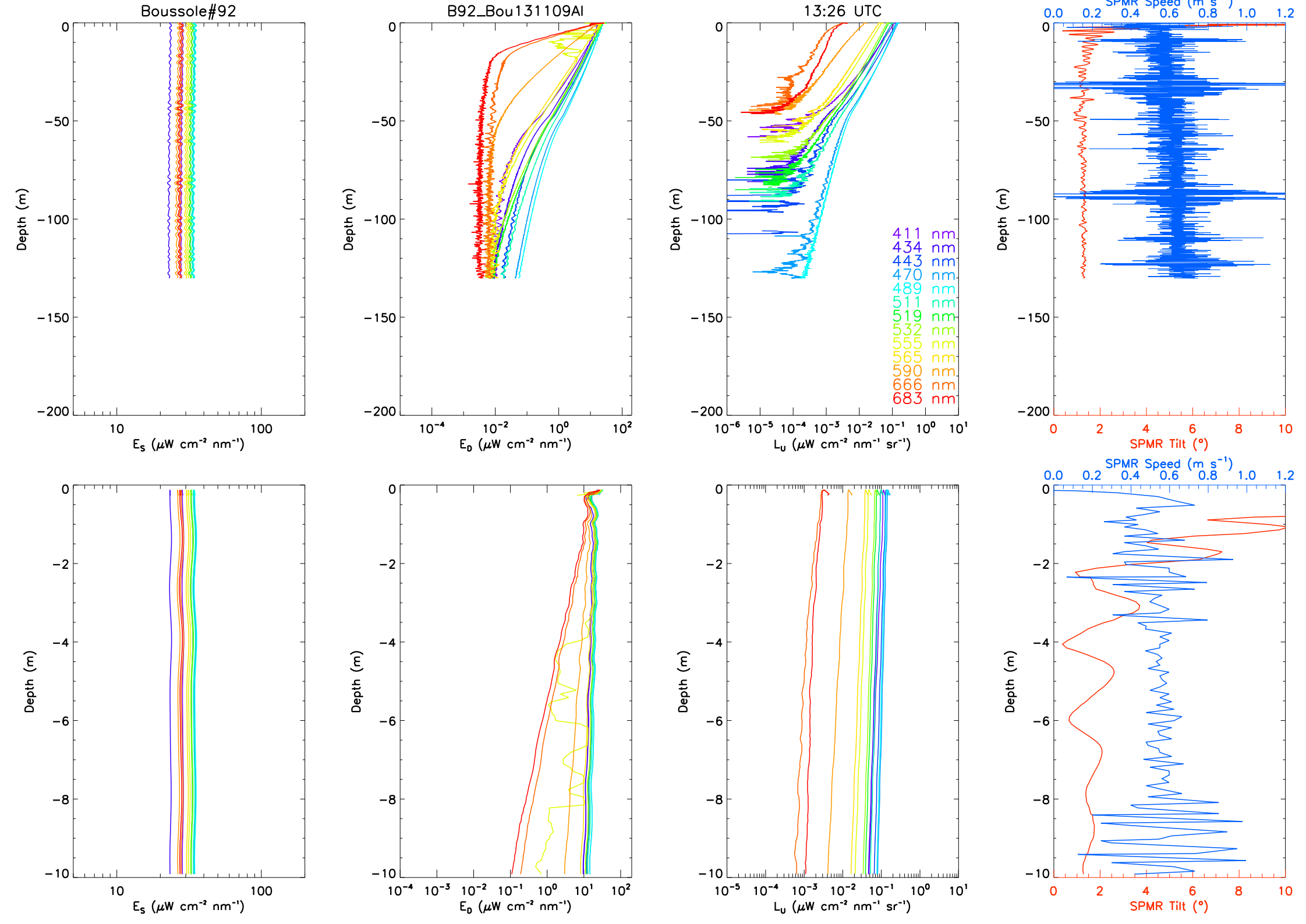
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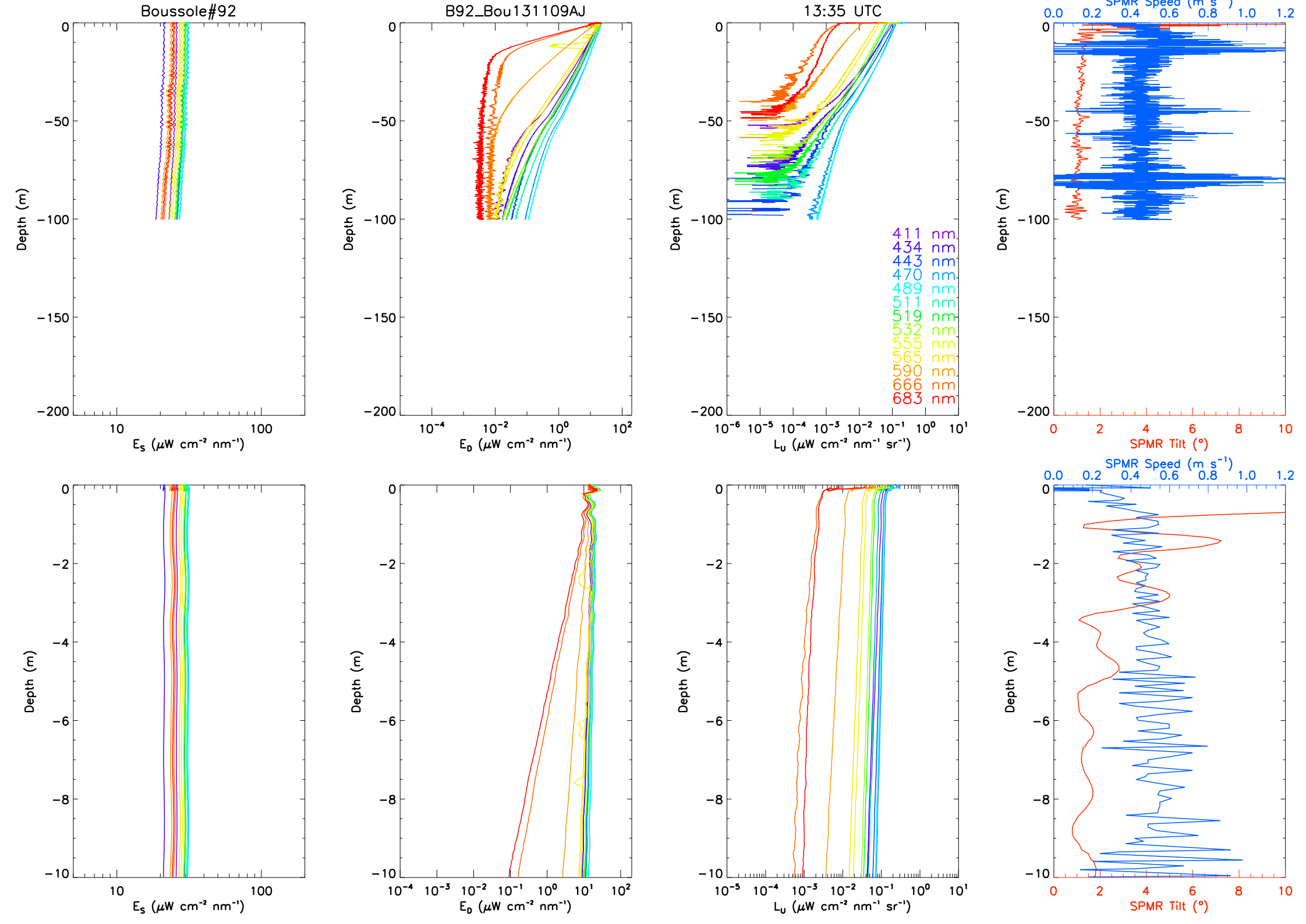
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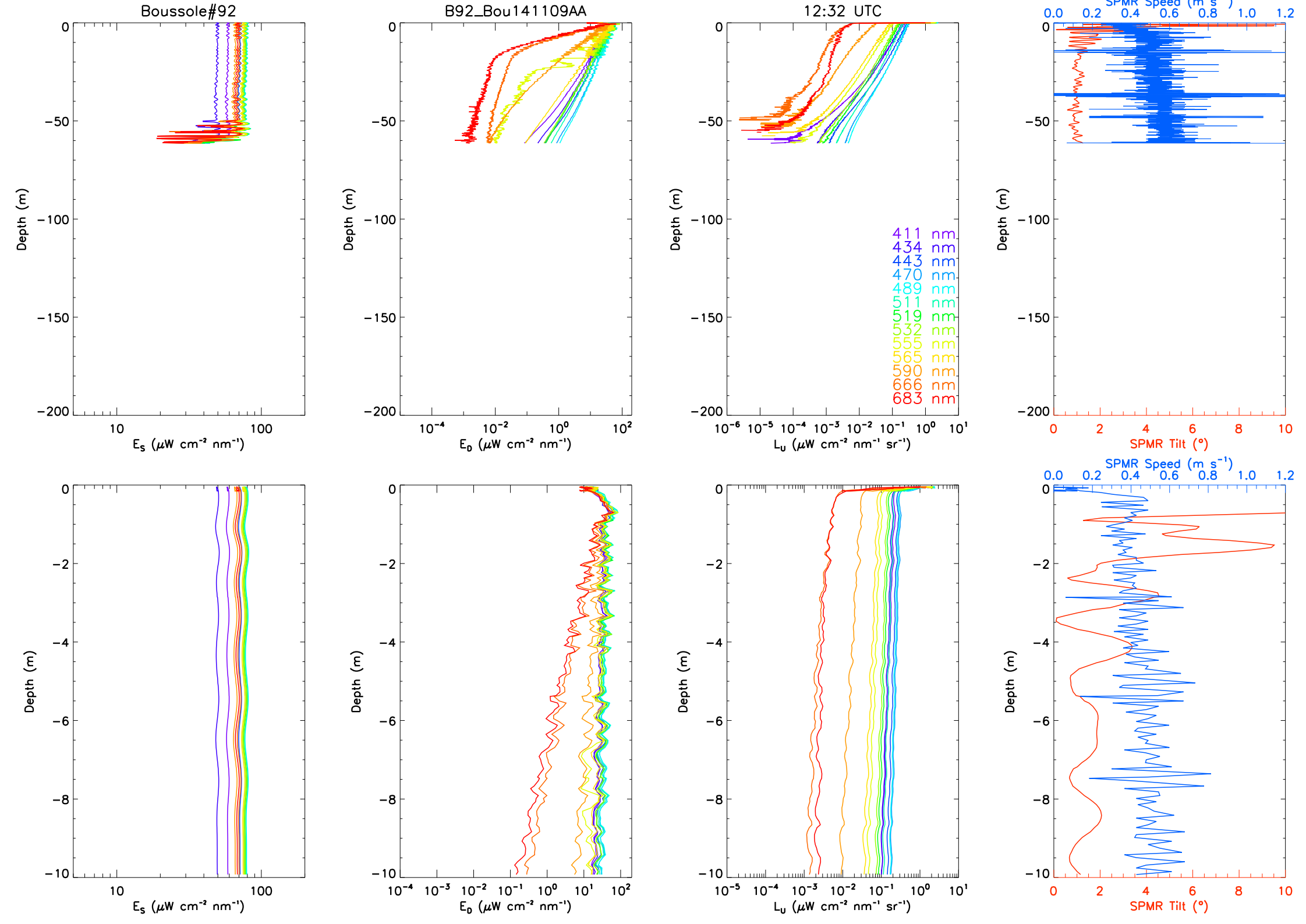
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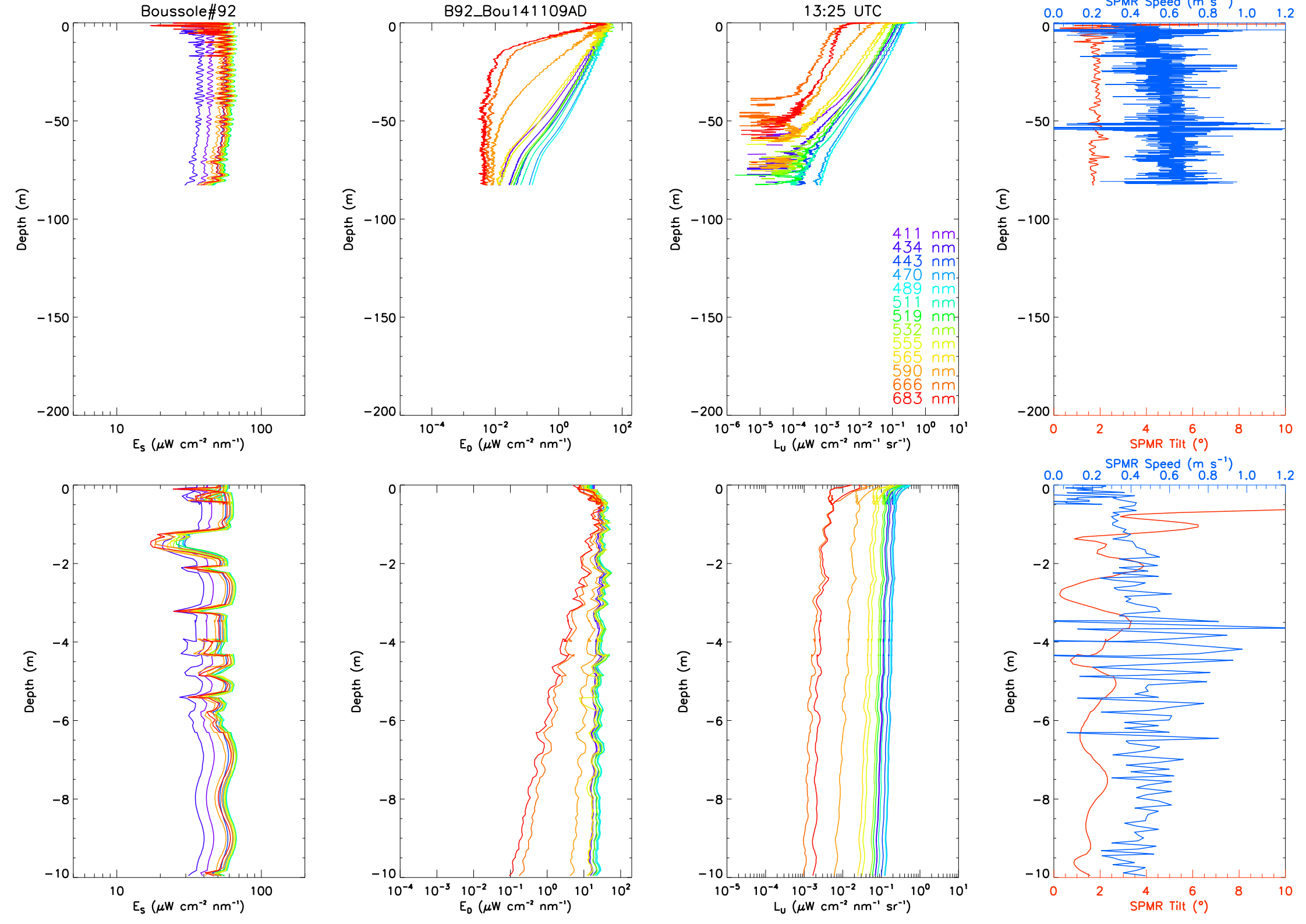
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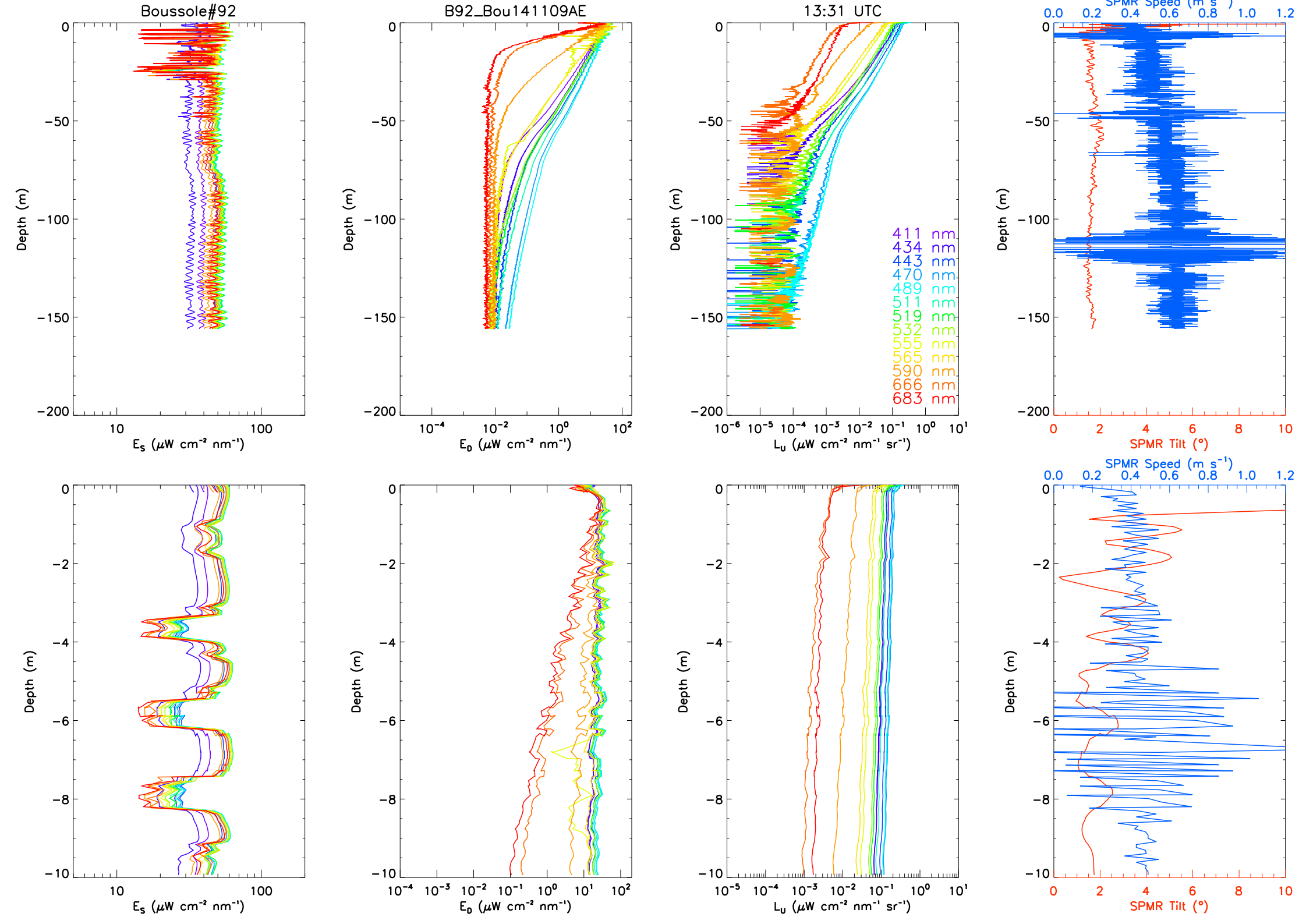
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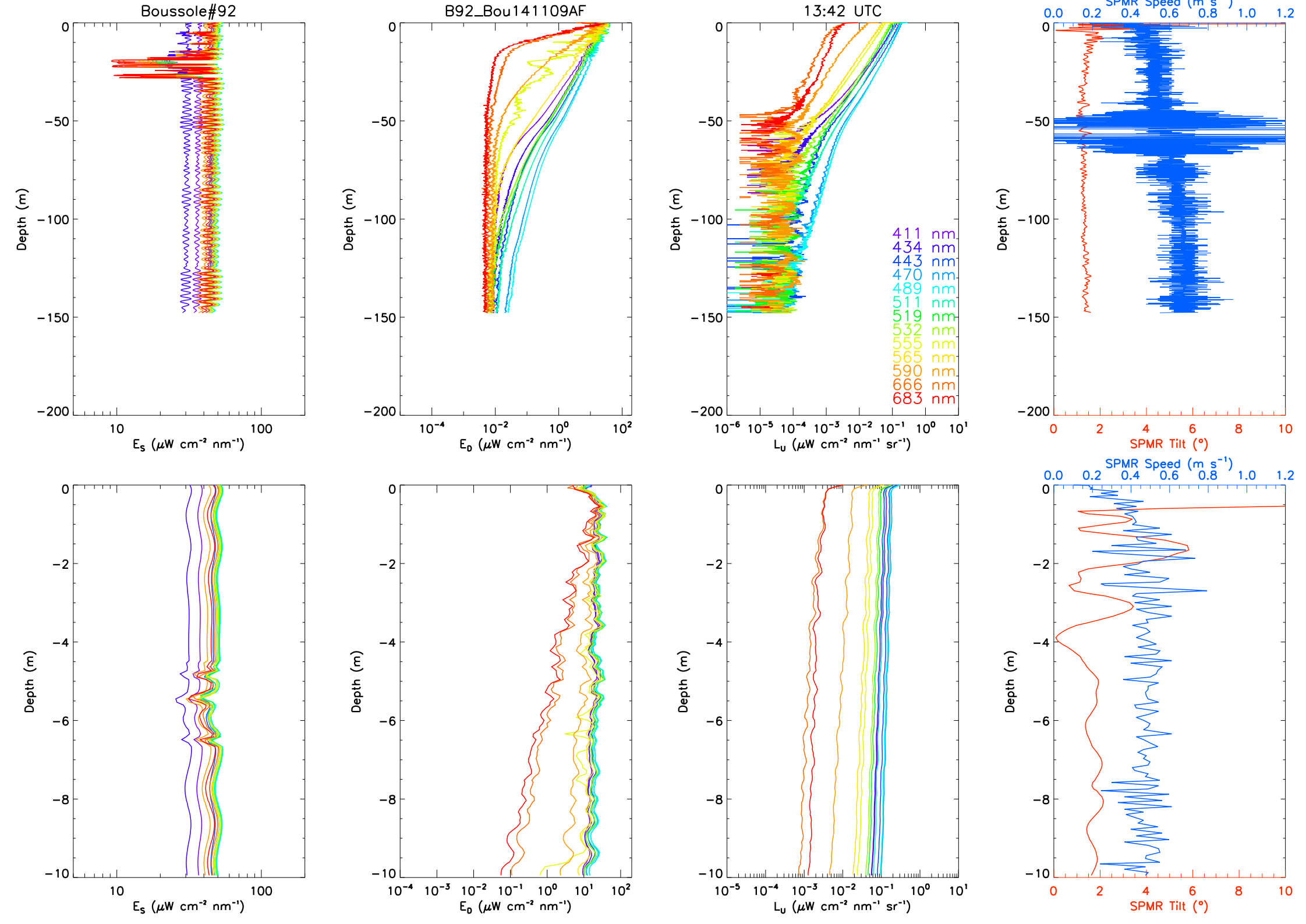
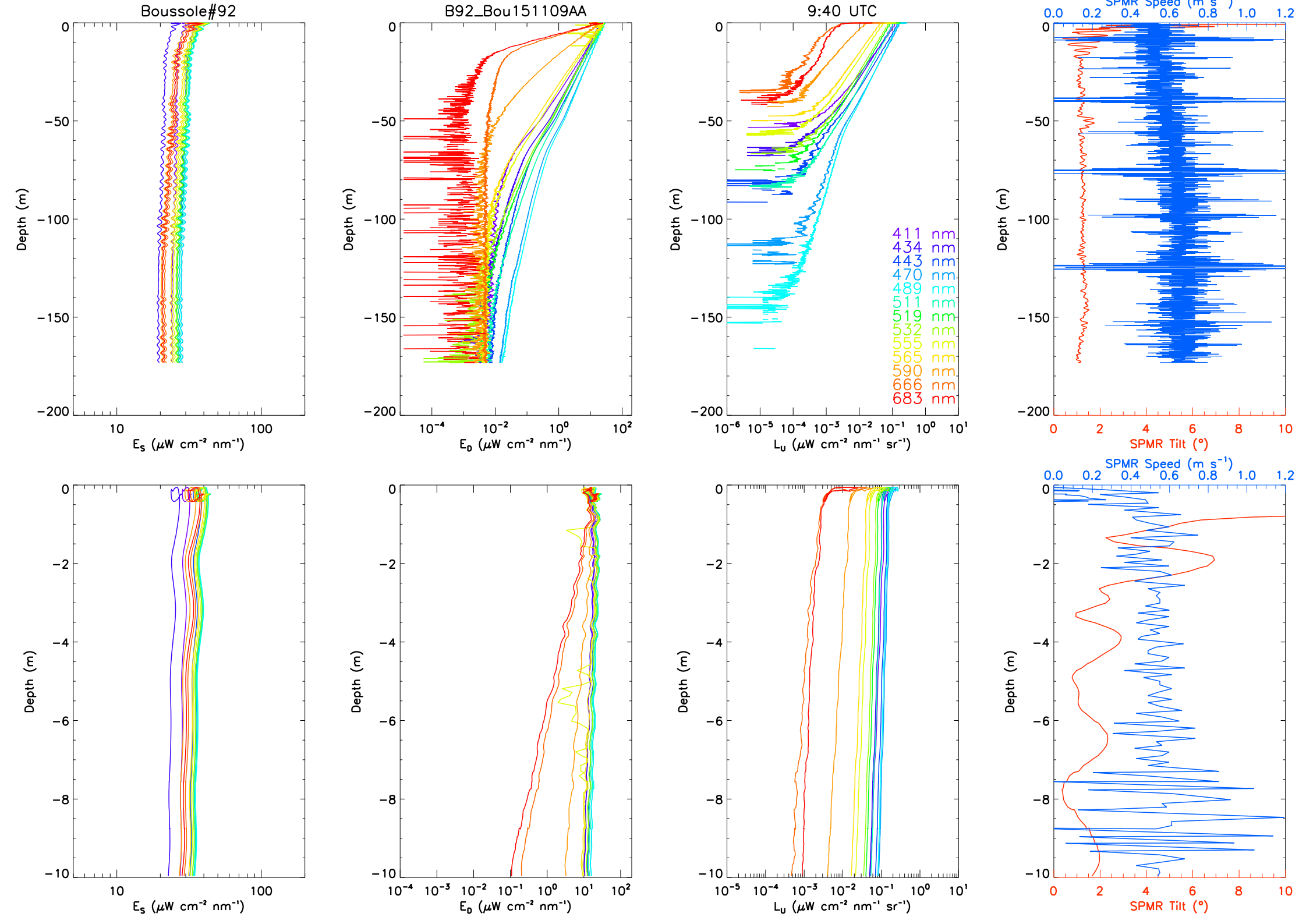
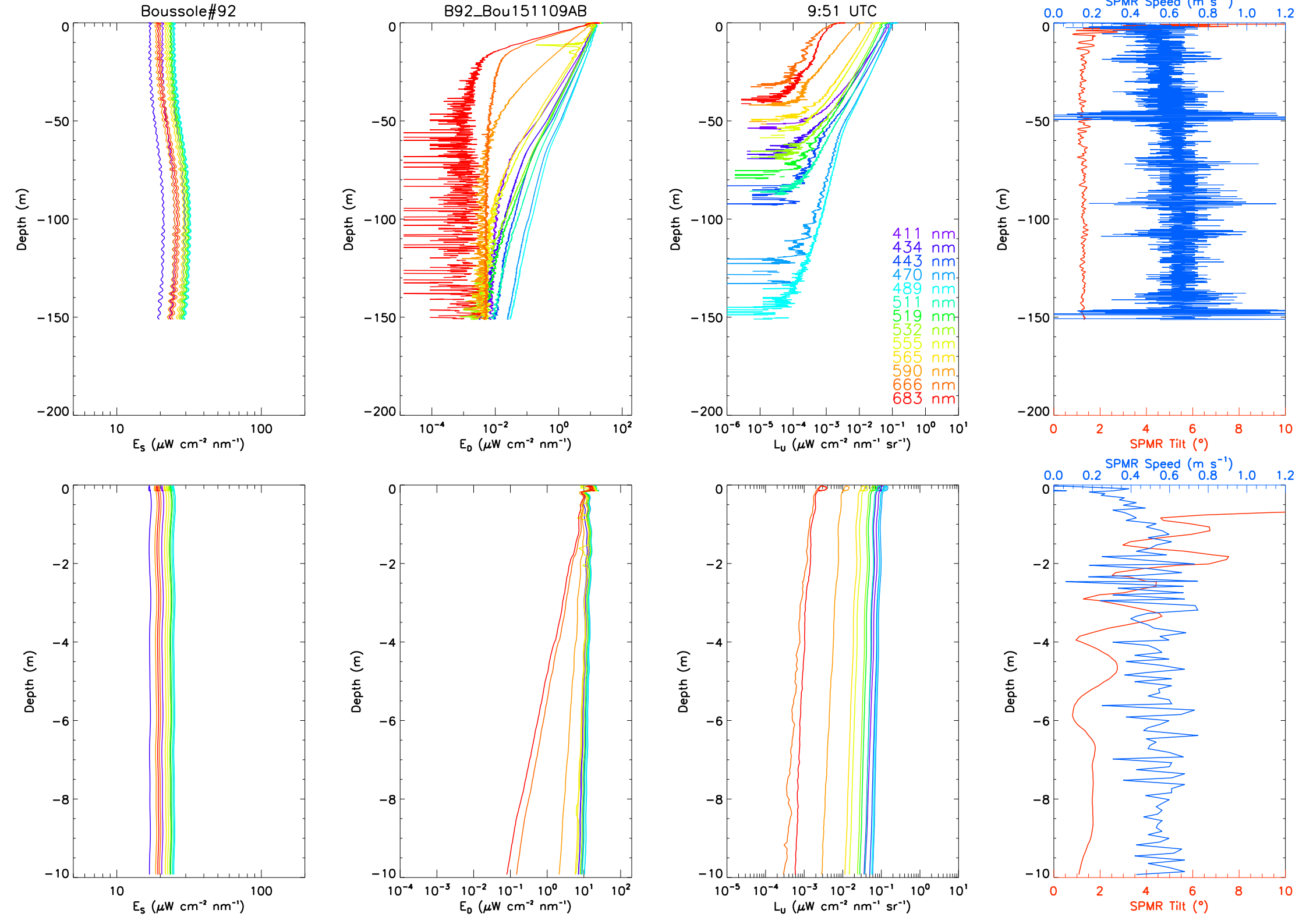
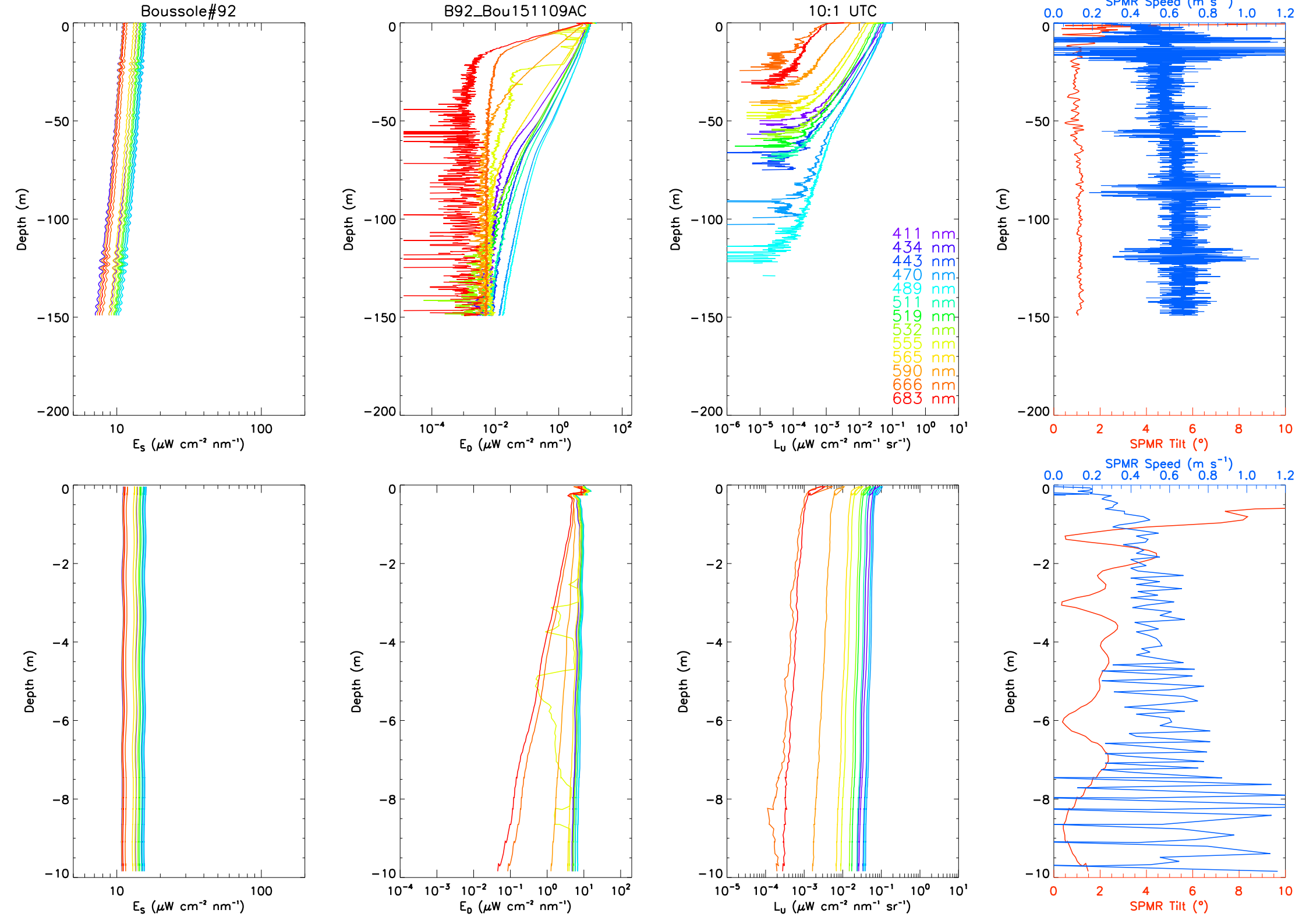
590 nm
666 nm
683 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)


Boussole#92
B92_Bou141109AF
13:42 UTC
SPMR Speed (m s⁻¹)
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
L_u (μW cm^{-2} nm^{-1} sr^{-1})
SPMR Tilt (°)
411 nm
434 nm
443 nm
470 nm
489 nm
511 nm
519 nm
532 nm
555 nm
565 nm
590 nm
666 nm
683 nm


Boussole#92
B92_Bou151109AA
9:40 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
L_u (μW cm^{-2} nm^{-1} sr^{-1})
411 nm
434 nm
443 nm
470 nm
489 nm
511 nm
519 nm
532 nm
555 nm
565 nm
590 nm
666 nm
683 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)


Boussole#92
B92_Bou151109AB
9:51 UTC
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
L_u (μW cm^{-2} nm^{-1} sr^{-1})
411 nm
434 nm
443 nm
470 nm
489 nm
511 nm
519 nm
532 nm
555 nm
565 nm
590 nm
666 nm
683 nm
SPMR Speed (m s^{-1})
SPMR Tilt (°)


Boussole#92
B92_Bou151109AC
10:1 UTC
SPMR Speed (m s⁻¹)
SPMR Tilt (°)
Depth (m)
E_S (μW cm^{-2} nm^{-1})
E_D (μW cm^{-2} nm^{-1})
L_u (μW cm^{-2} nm^{-1} sr^{-1})
411 nm
434 nm
443 nm
470 nm
489 nm
511 nm
519 nm
532 nm
555 nm
565 nm
590 nm
666 nm
683 nm