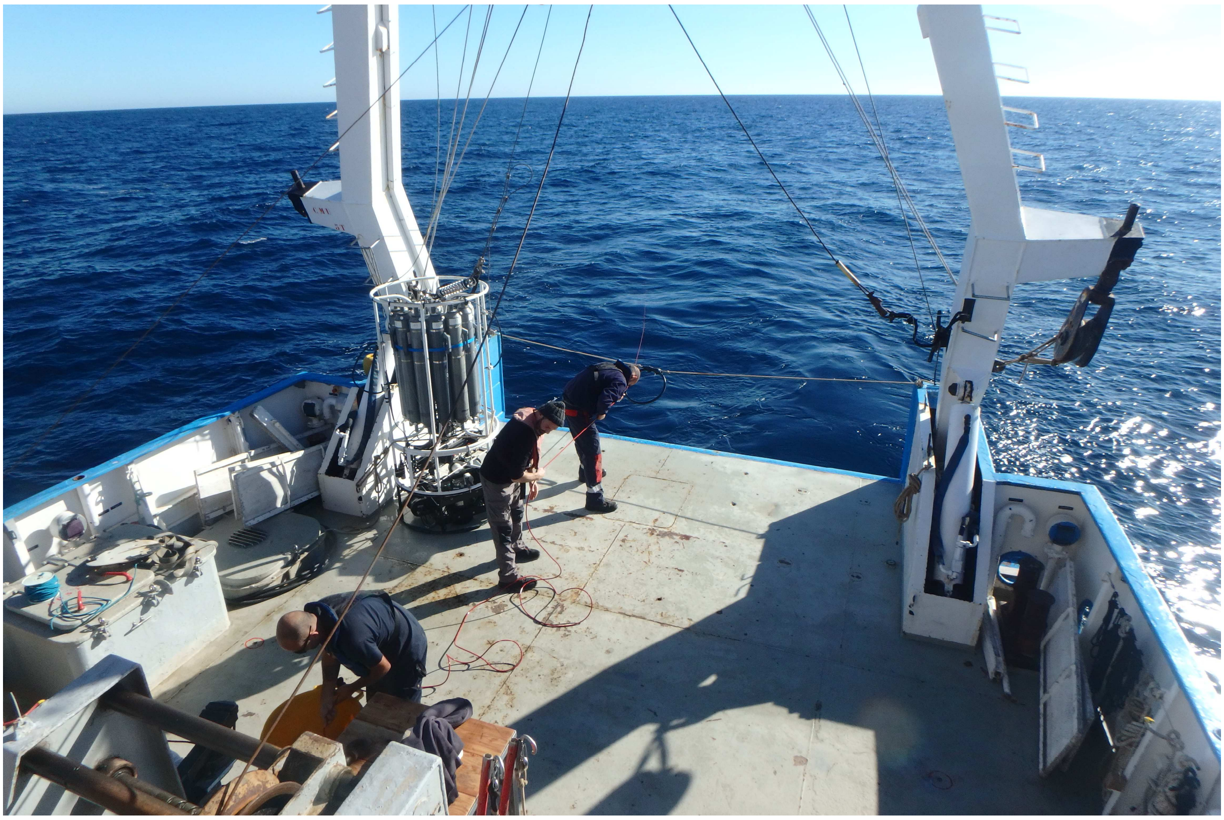
BOUSSOLE PROJECT

C-OPS Data catalogue for 2020
Cruise 216 to cruise 225

Institut de la Mer de Villefranche (IMEV), 06230 Villefranche sur mer, France



Recovery of the Biospherical C-OPS free-fall underwater radiometer on the deck of the R/V *Téthys II* after its deployment at the BOUSSOLE site.

ESA/ESRIN contract N° 4000119096/17/I-BG

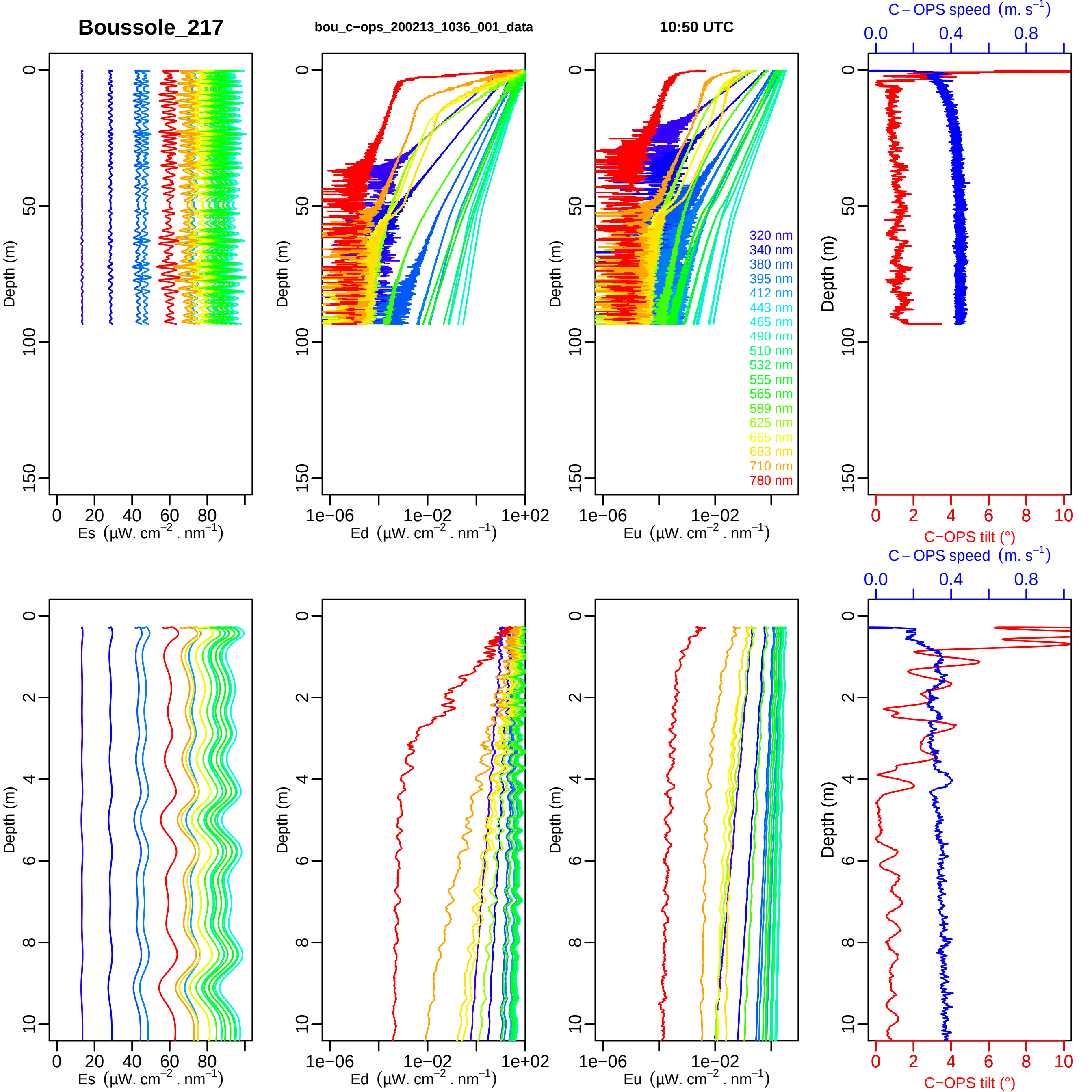
C-OPS parameters

The C-OPS used during the BOUSSOLE cruises is equipped with Es, Ed and Eu* sensors.

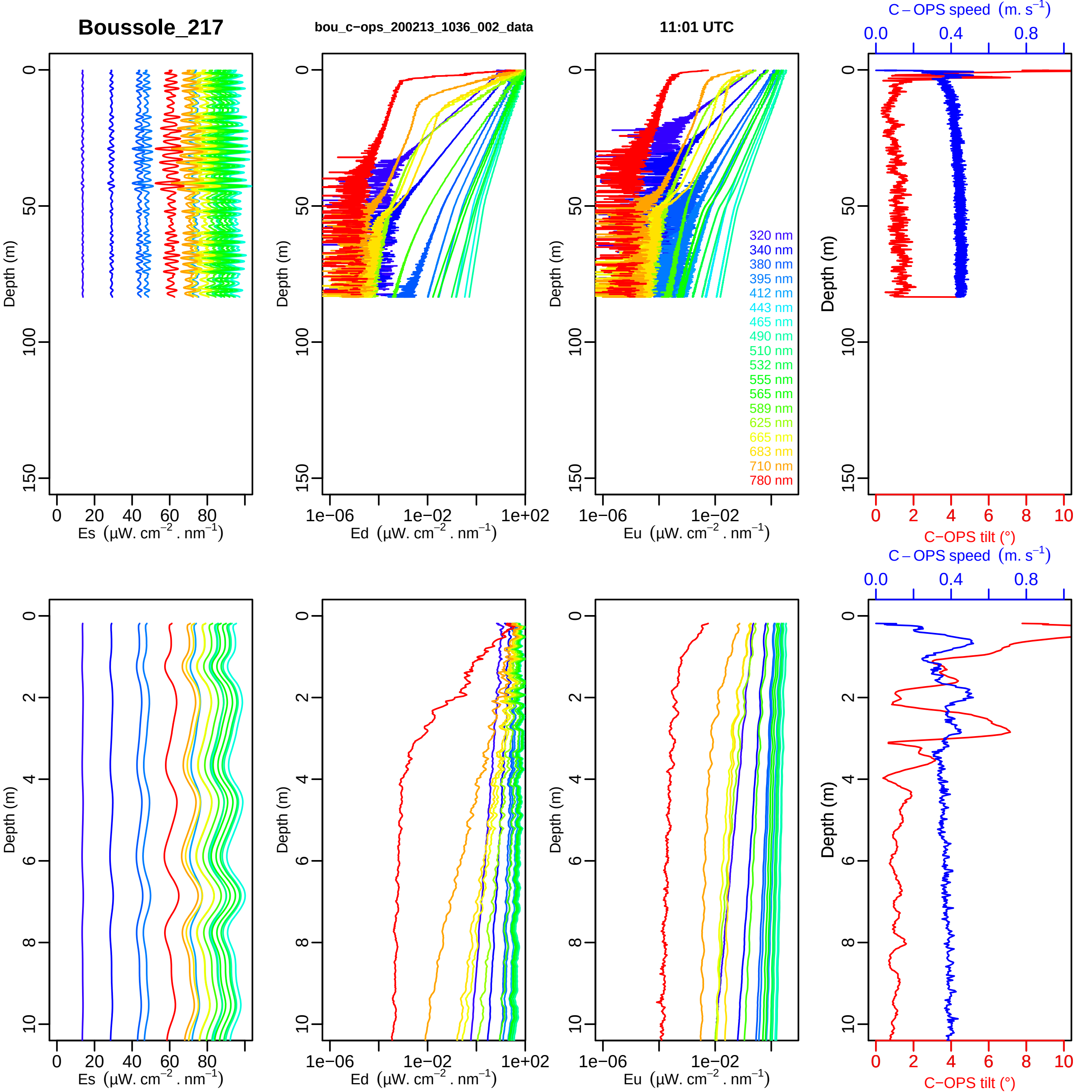
This C-OPS system measures downward and upward irradiance at 18 wavelengths + PAR:
320, 340, 380, 395, 412, 443, 465, 490, 510, 532, 555, 565, 589, 625, 665, 683, 710, 780 nm and PAR.

The plots presented in this catalogue are obtained from raw data and show the radiometric profiles in log scale, the absolute tilt records in water and the descent rate of the C-OPS.

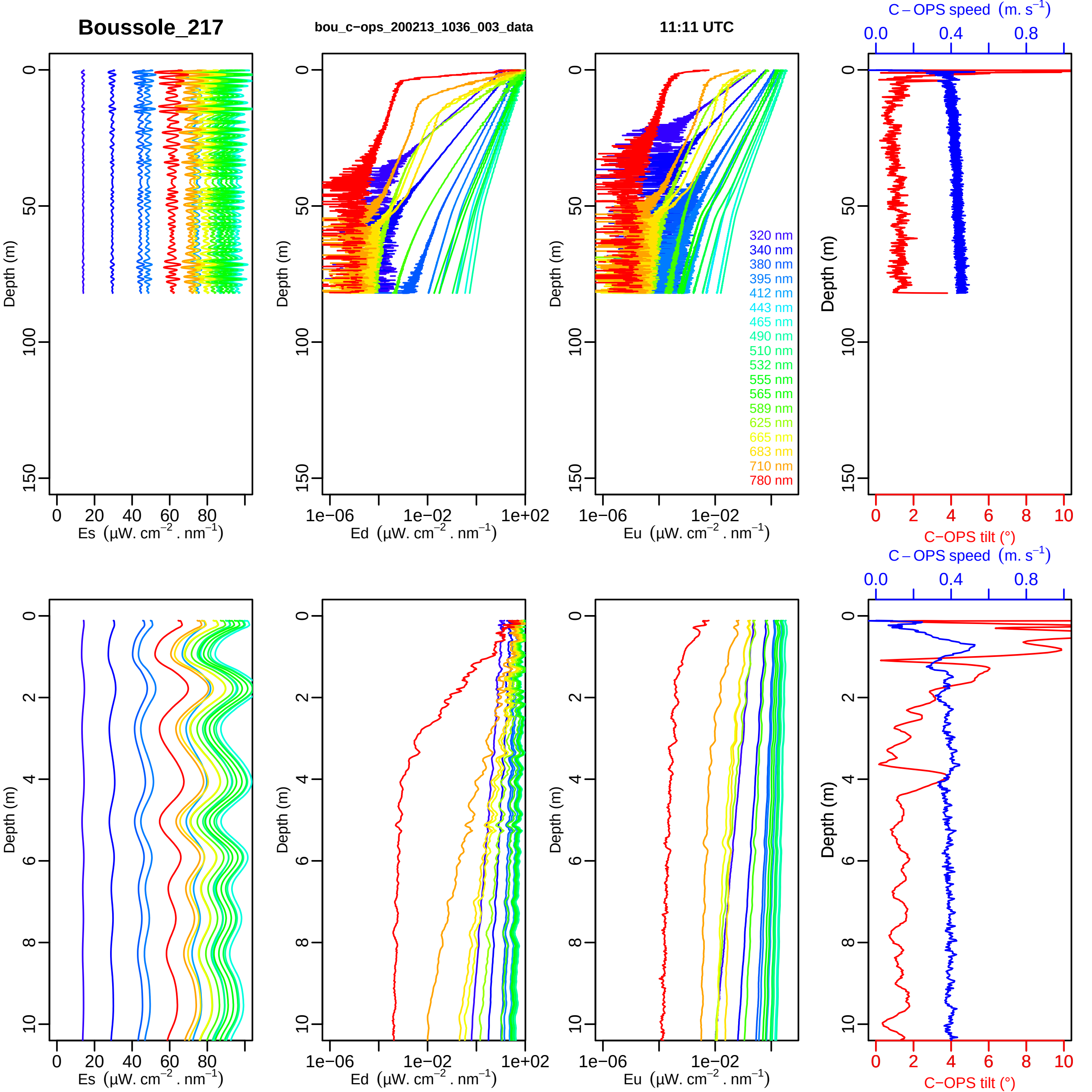
*Es: downward surface irradiance
Eu: upward irradiance
Ed: downward irradiance

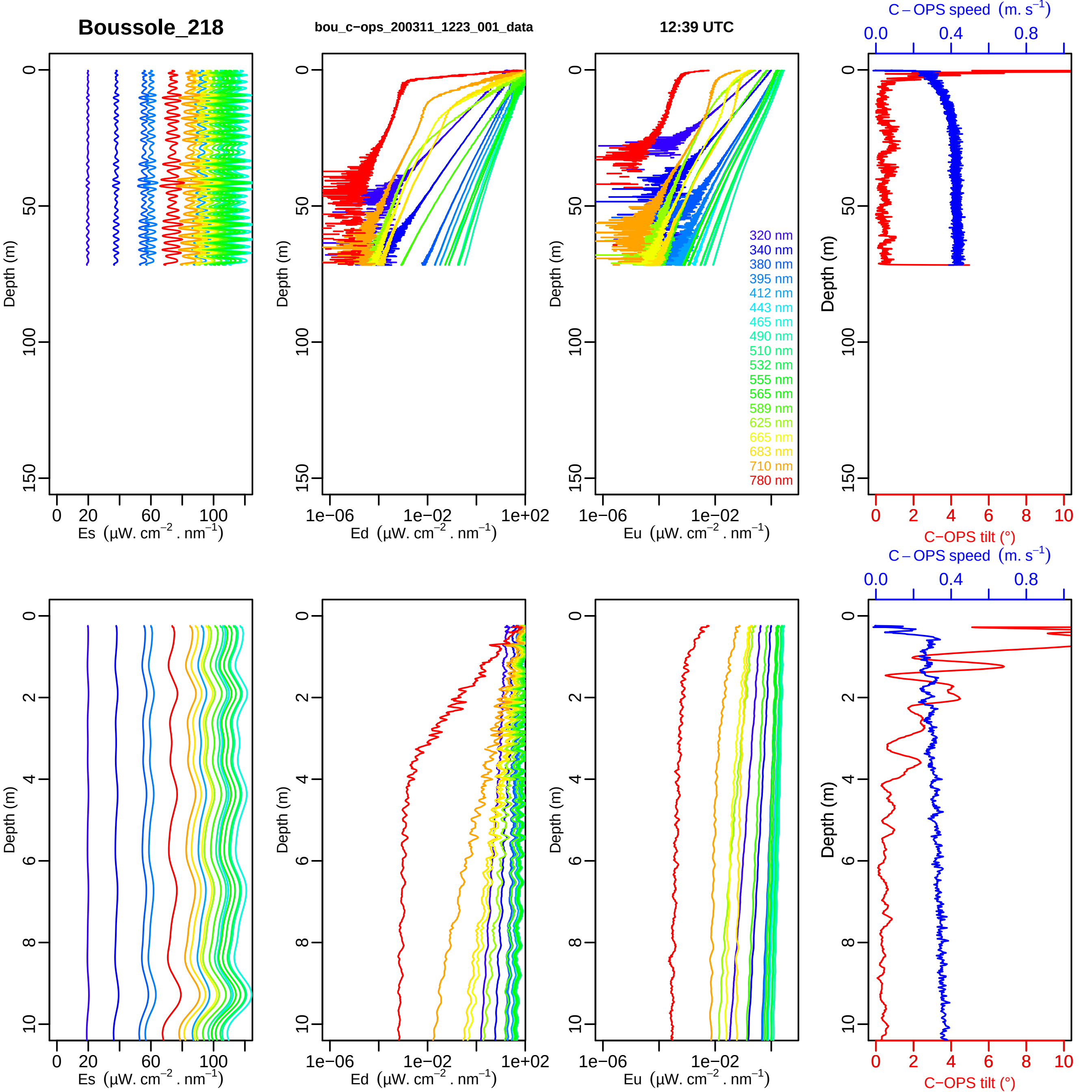


Boussole_217
bou_c−ops_200213_1036_001_data
10:50 UTC
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C − OPS speed (m. s−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

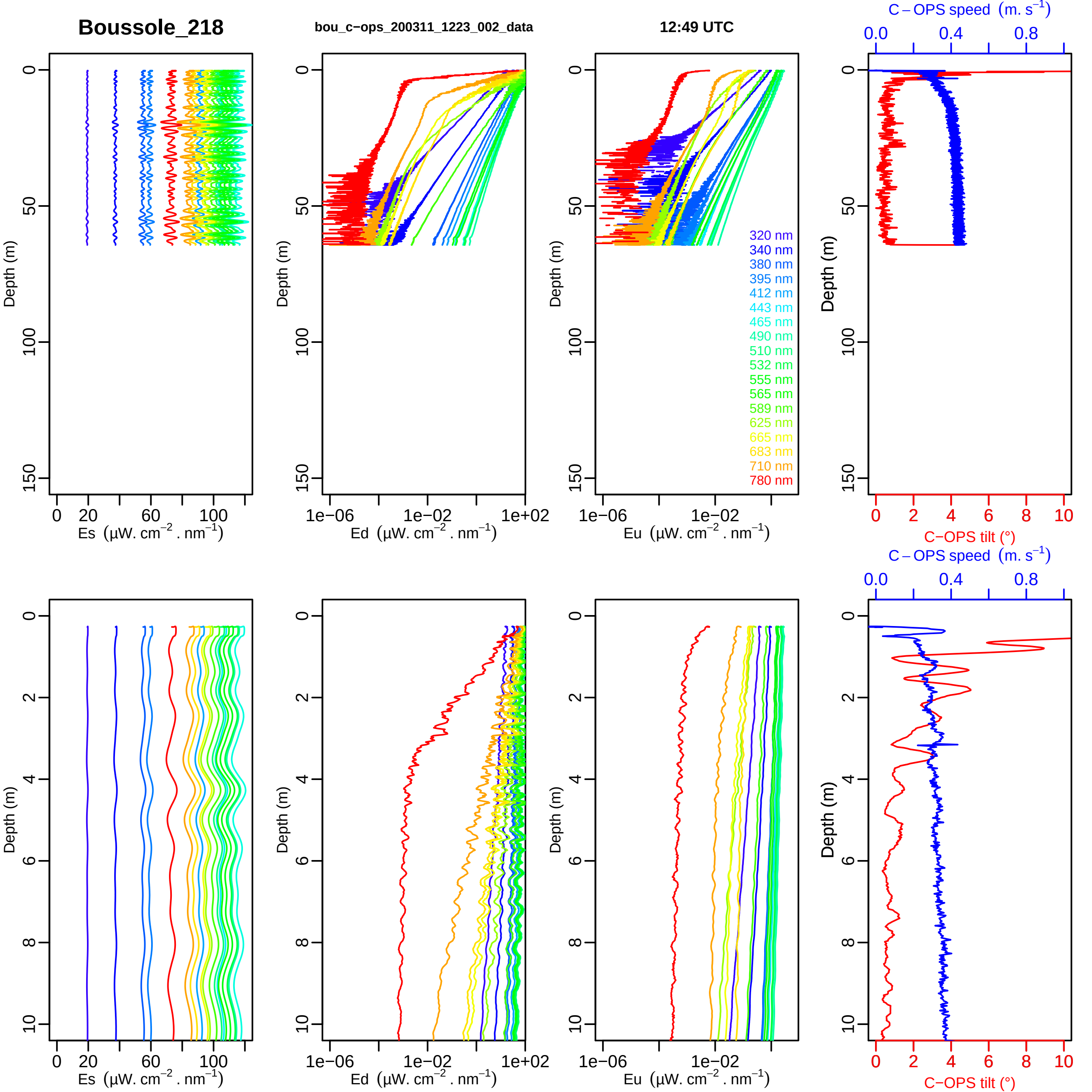


Boussole_217
bou_c−ops_200213_1036_002_data
11:01 UTC
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C − OPS speed (m. s−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

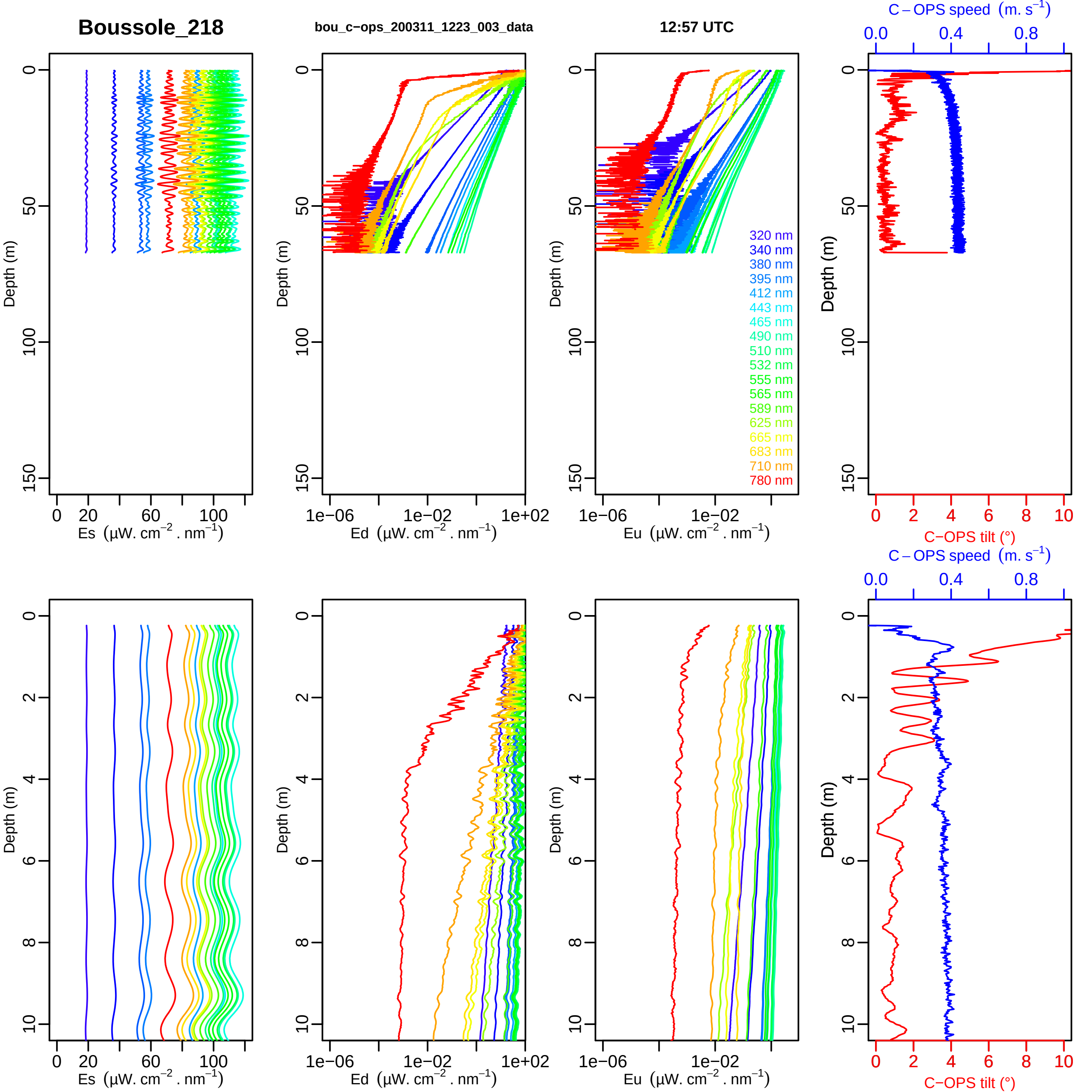

Boussole_217
bou_c−ops_200213_1036_003_data
11:11 UTC
C − OPS speed (m. s−1)
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

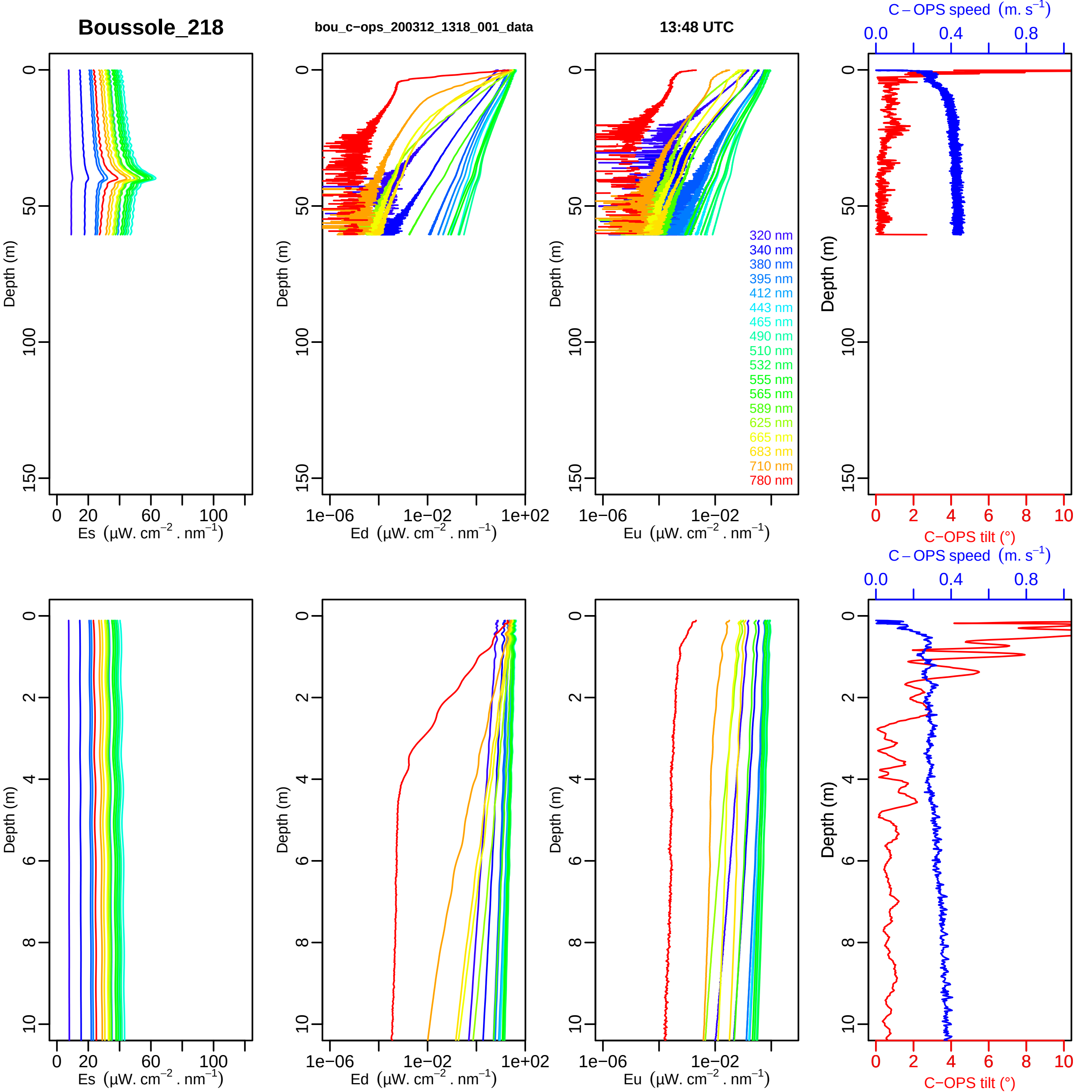


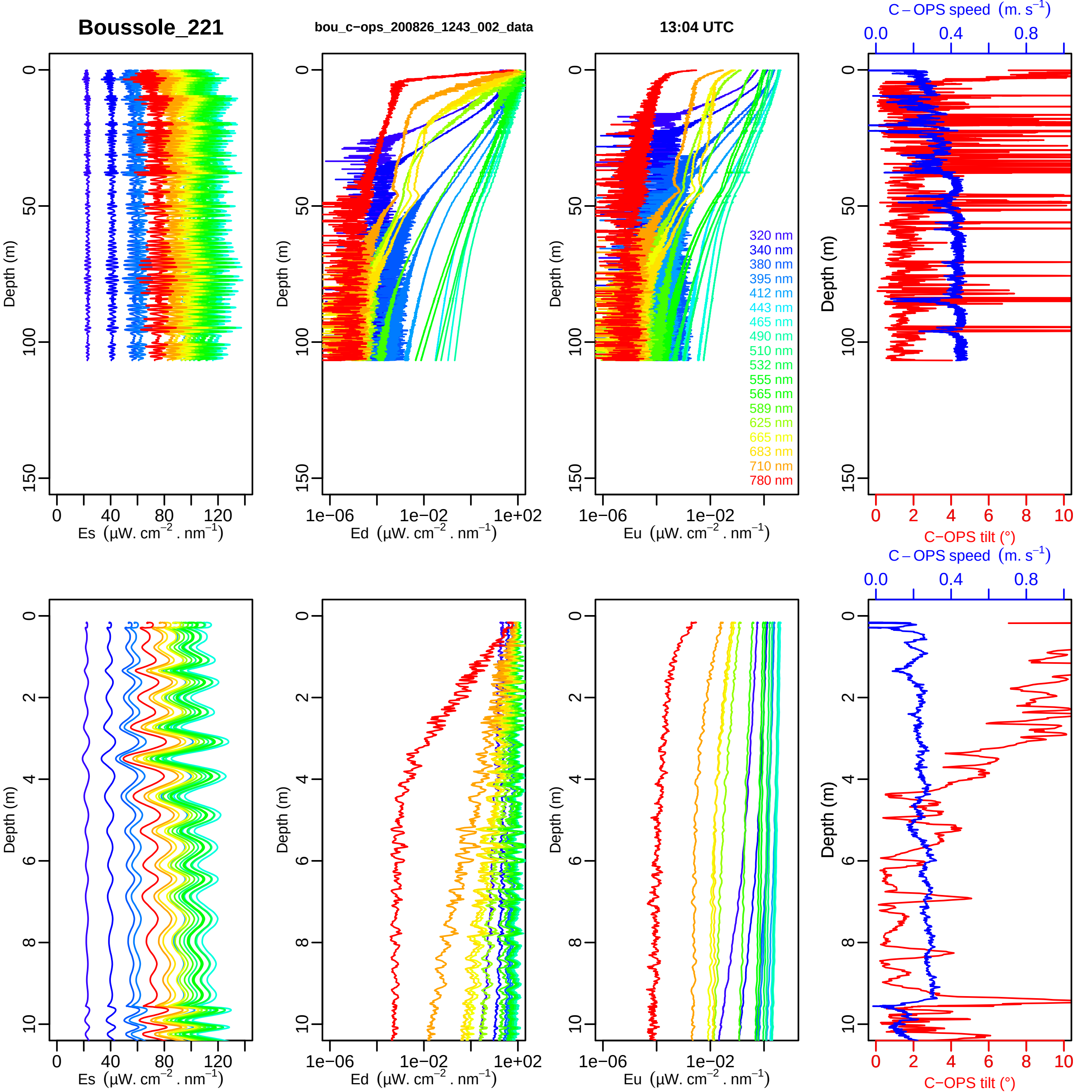
Boussole_218
bou_c−ops_200311_1223_001_data
12:39 UTC
C − OPS speed (m. s^{-1})
Depth (m)
Es (μW. cm^{-2} . nm^{-1})
Ed (μW. cm^{-2} . nm^{-1})
Eu (μW. cm^{-2} . nm^{-1})
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm



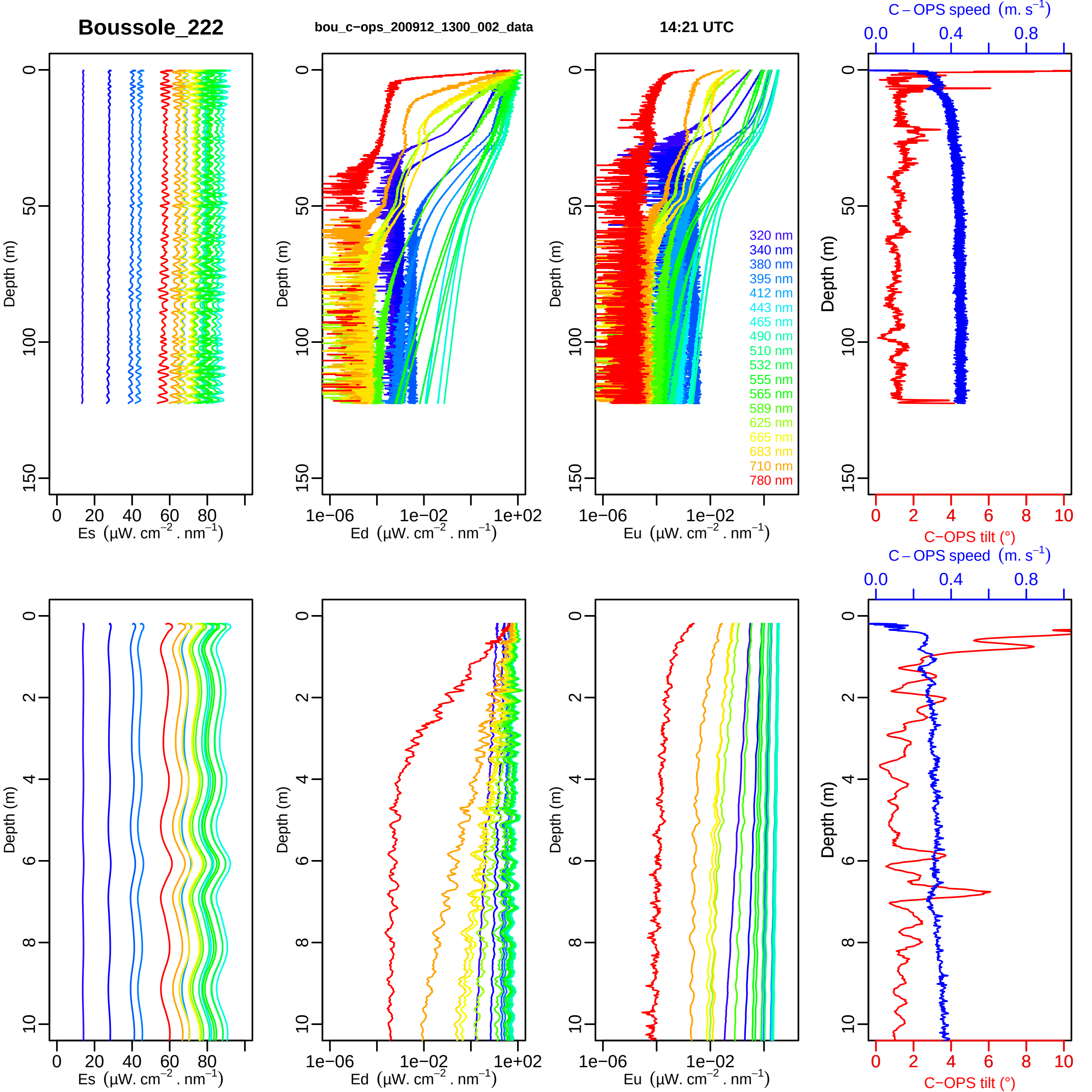
Boussole_218
bou_c−ops_200311_1223_002_data
12:49 UTC
C − OPS speed (m. s^{-1})
C−OPS tilt (°)
Depth (m)
Es (µW. cm^{-2} . nm^{-1})
Ed (µW. cm^{-2} . nm^{-1})
Eu (µW. cm^{-2} . nm^{-1})
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm


Boussole_218
bou_c−ops_200311_1223_003_data
12:57 UTC
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C − OPS speed (m. s−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

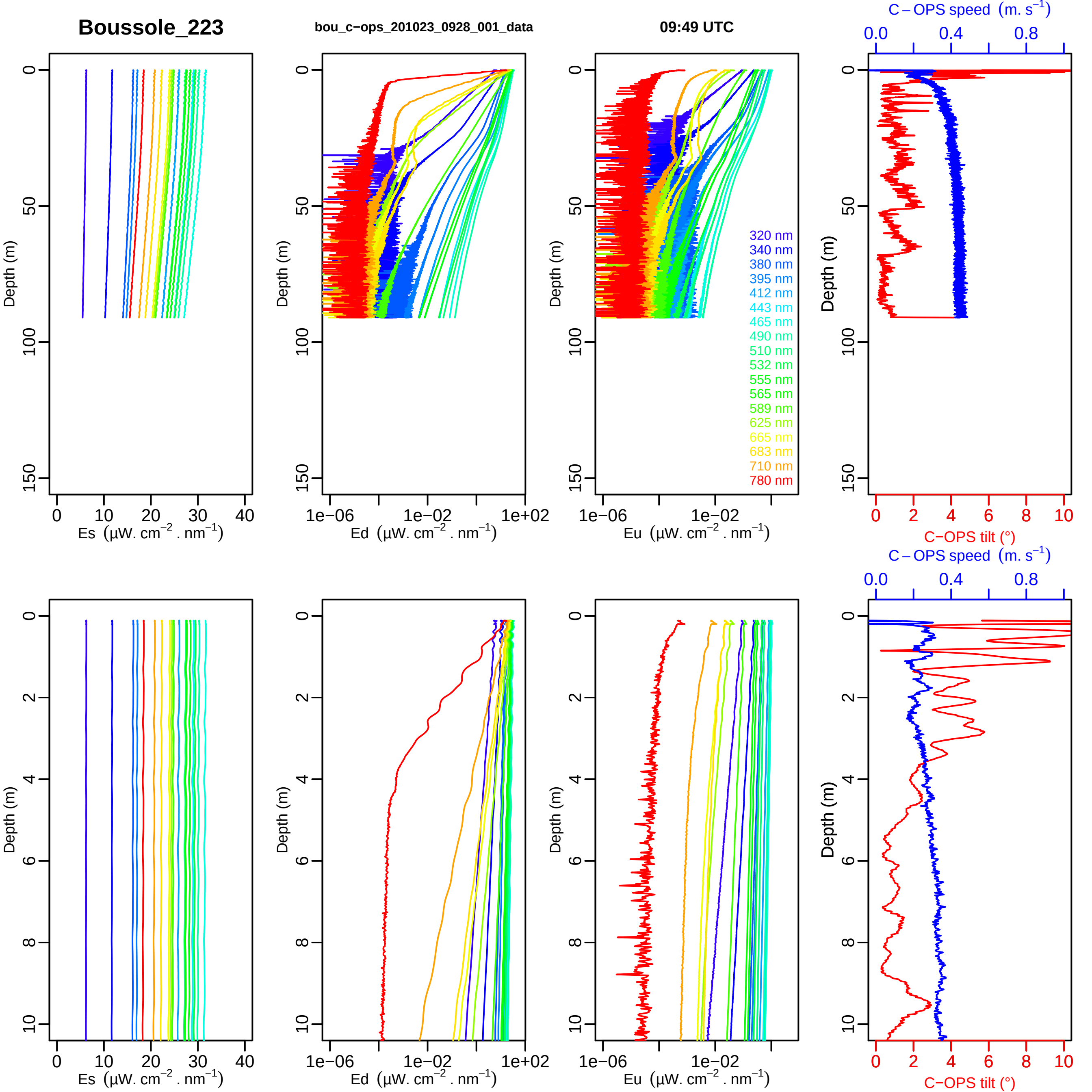

Boussole_218
bou_c−ops_200312_1318_001_data
13:48 UTC
Depth (m)
Es (μW. cm−2 . nm−1)
Ed (μW. cm−2 . nm−1)
Eu (μW. cm−2 . nm−1)
C − OPS speed (m. s−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

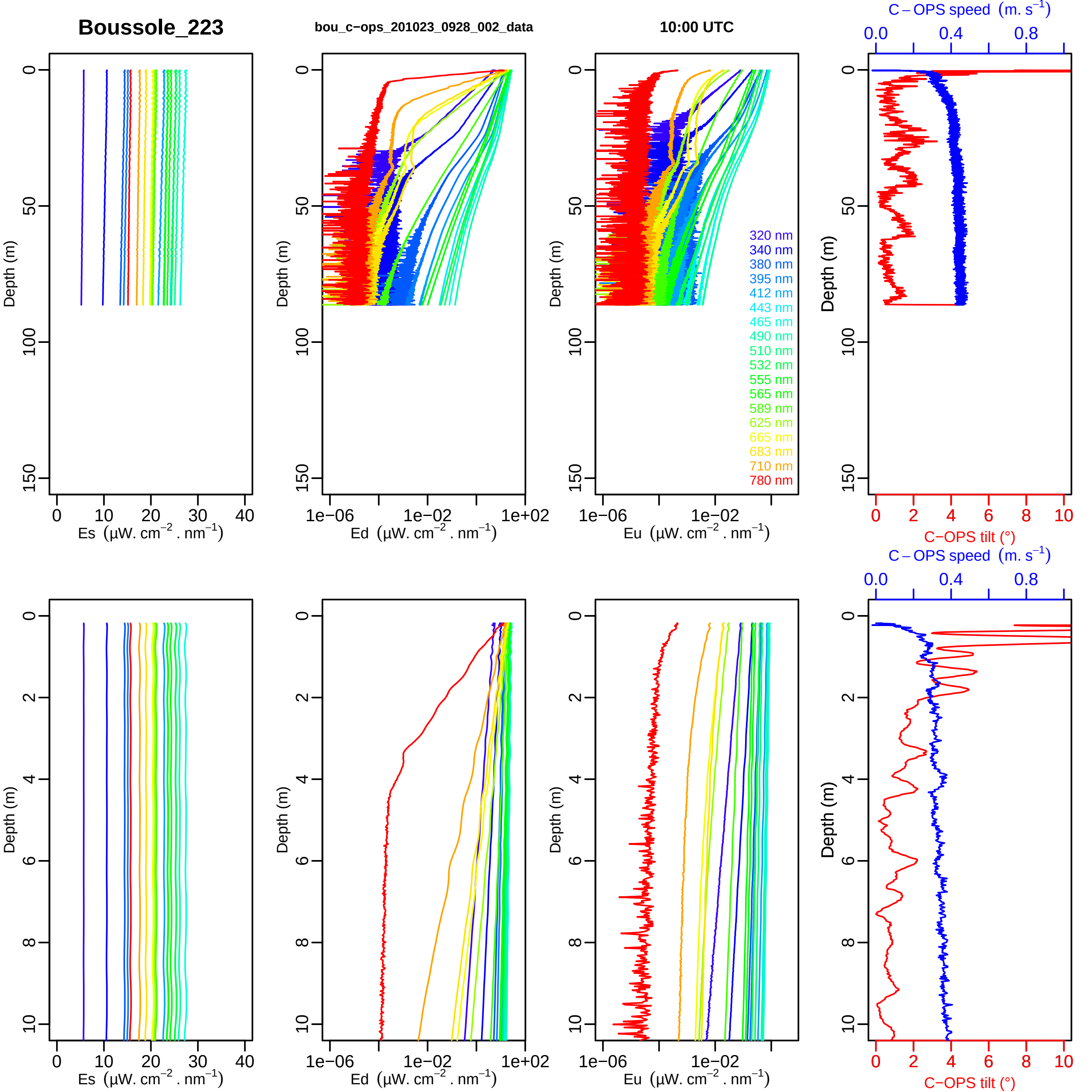


Boussole_221
bou_c−ops_200826_1243_002_data
13:04 UTC
C − OPS speed (m. s−1)
C−OPS tilt (°)
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

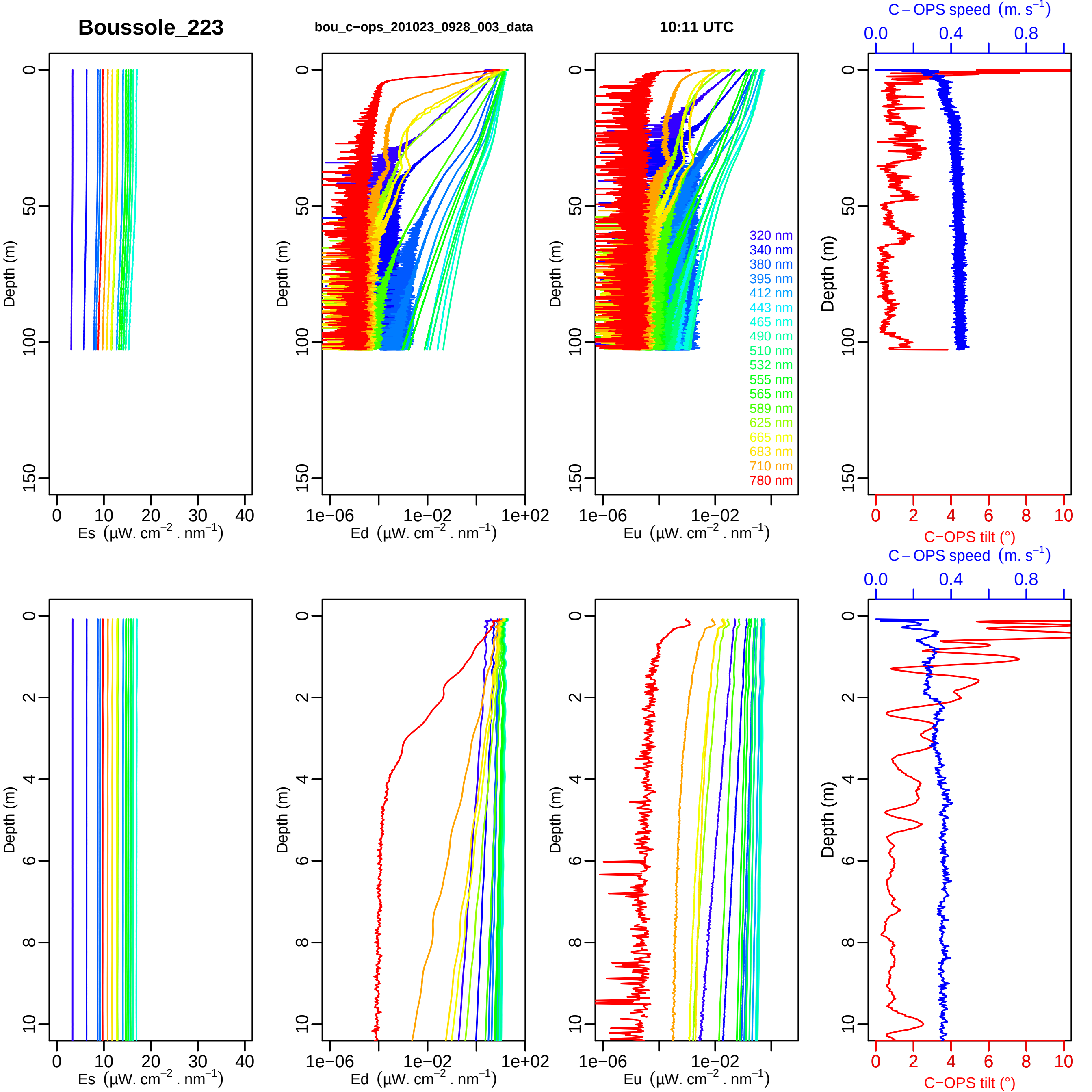


Boussole_222
bou_c−ops_200912_1300_002_data
14:21 UTC
C − OPS speed (m. s^{-1})
Depth (m)
Es (µW. cm^{-2} . nm^{-1})
Ed (µW. cm^{-2} . nm^{-1})
Eu (µW. cm^{-2} . nm^{-1})
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

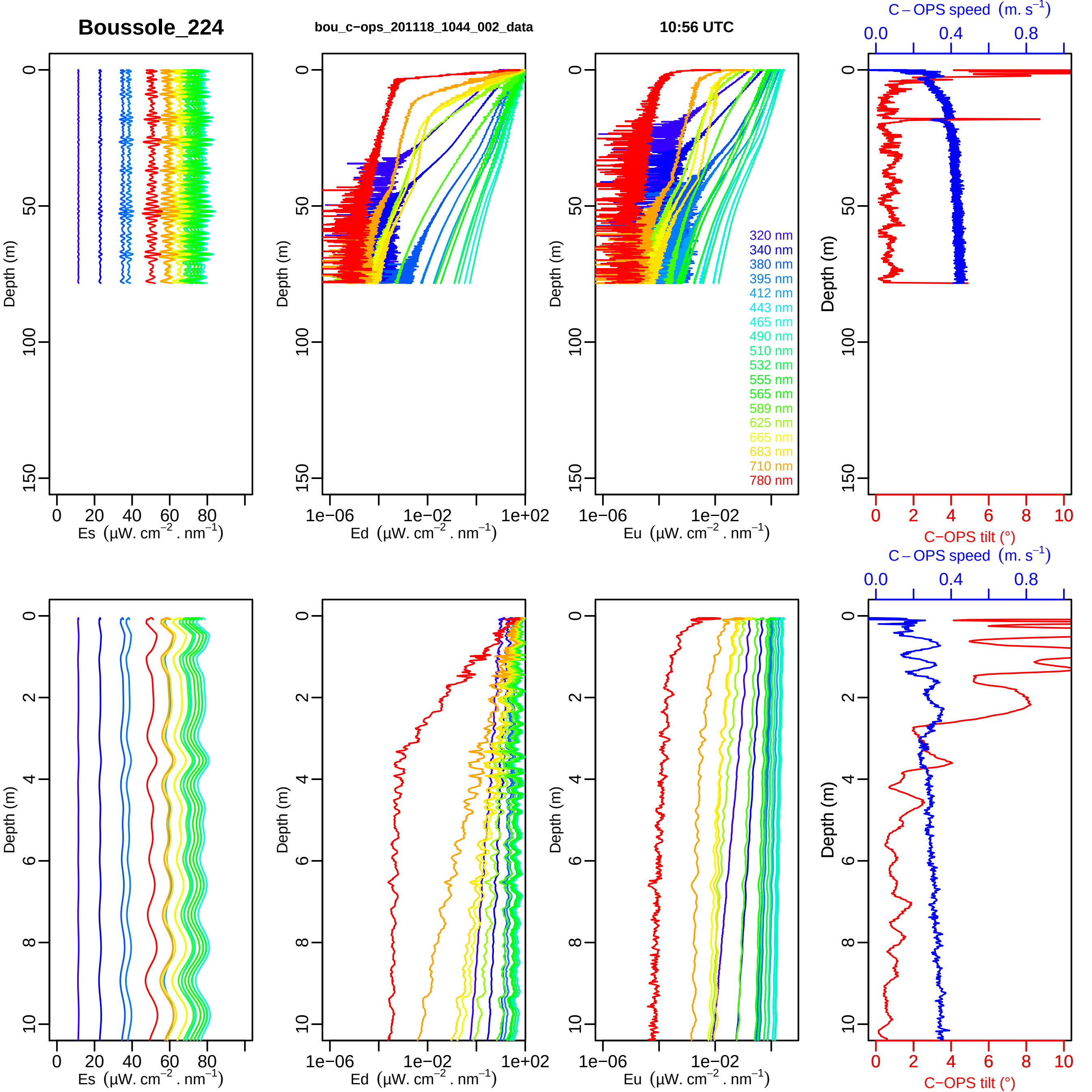

Boussole_223
bou_c−ops_201023_0928_001_data
09:49 UTC
C − OPS speed (m. s−1)
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm



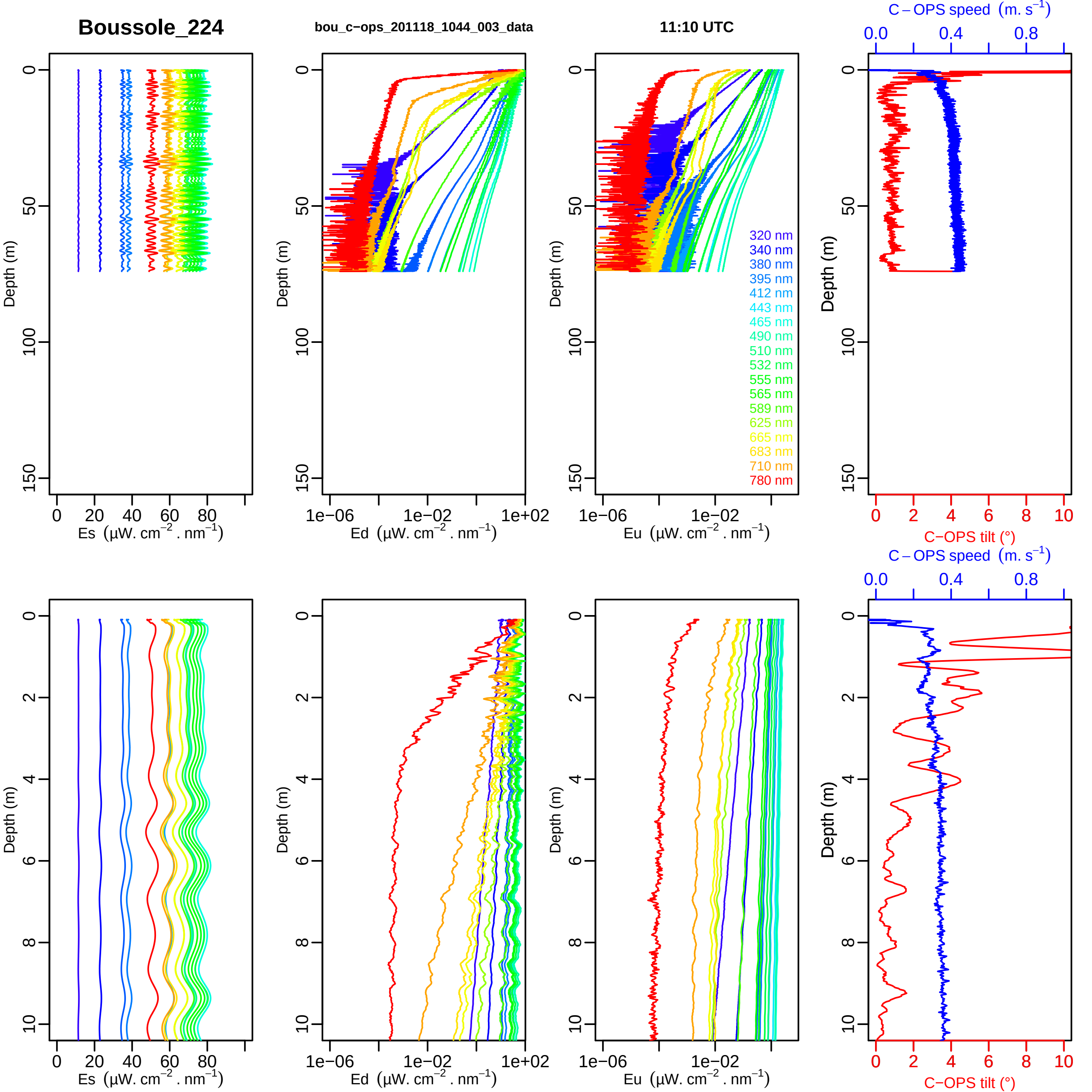
Boussole_223
bou_c−ops_201023_0928_002_data
10:00 UTC
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C − OPS speed (m. s−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

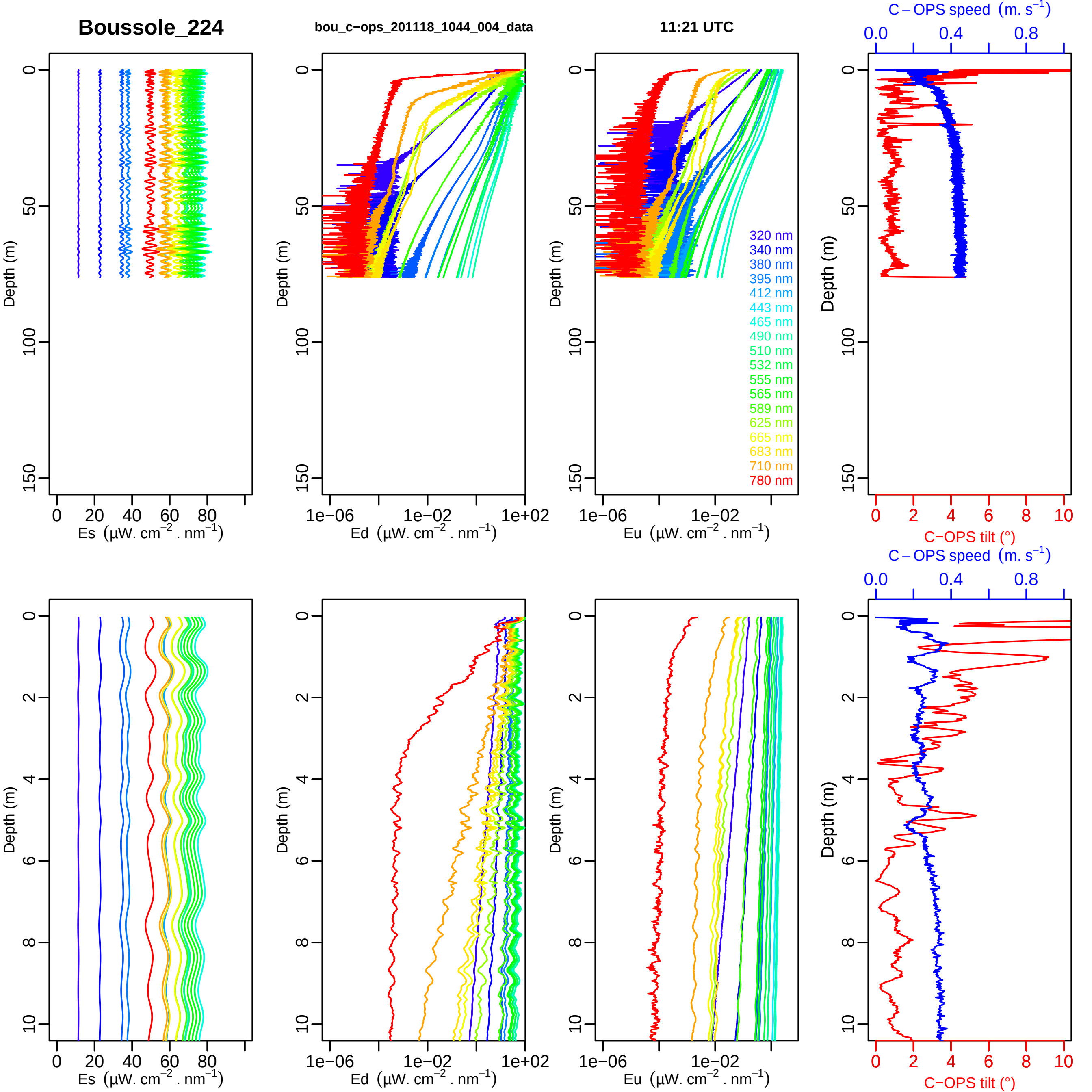


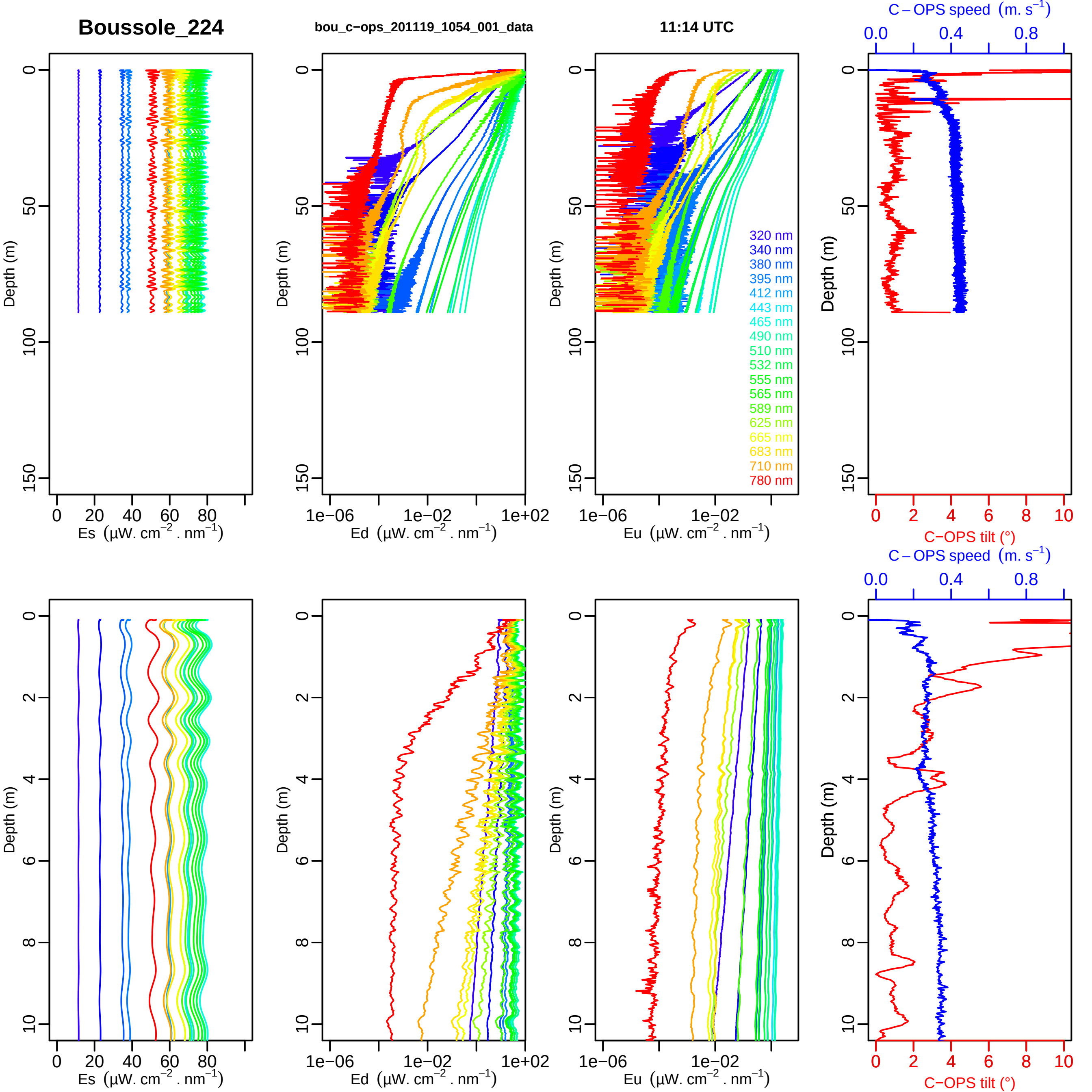
Boussole_223
bou_c−ops_201023_0928_003_data
10:11 UTC
C − OPS speed (m. s−1)
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm



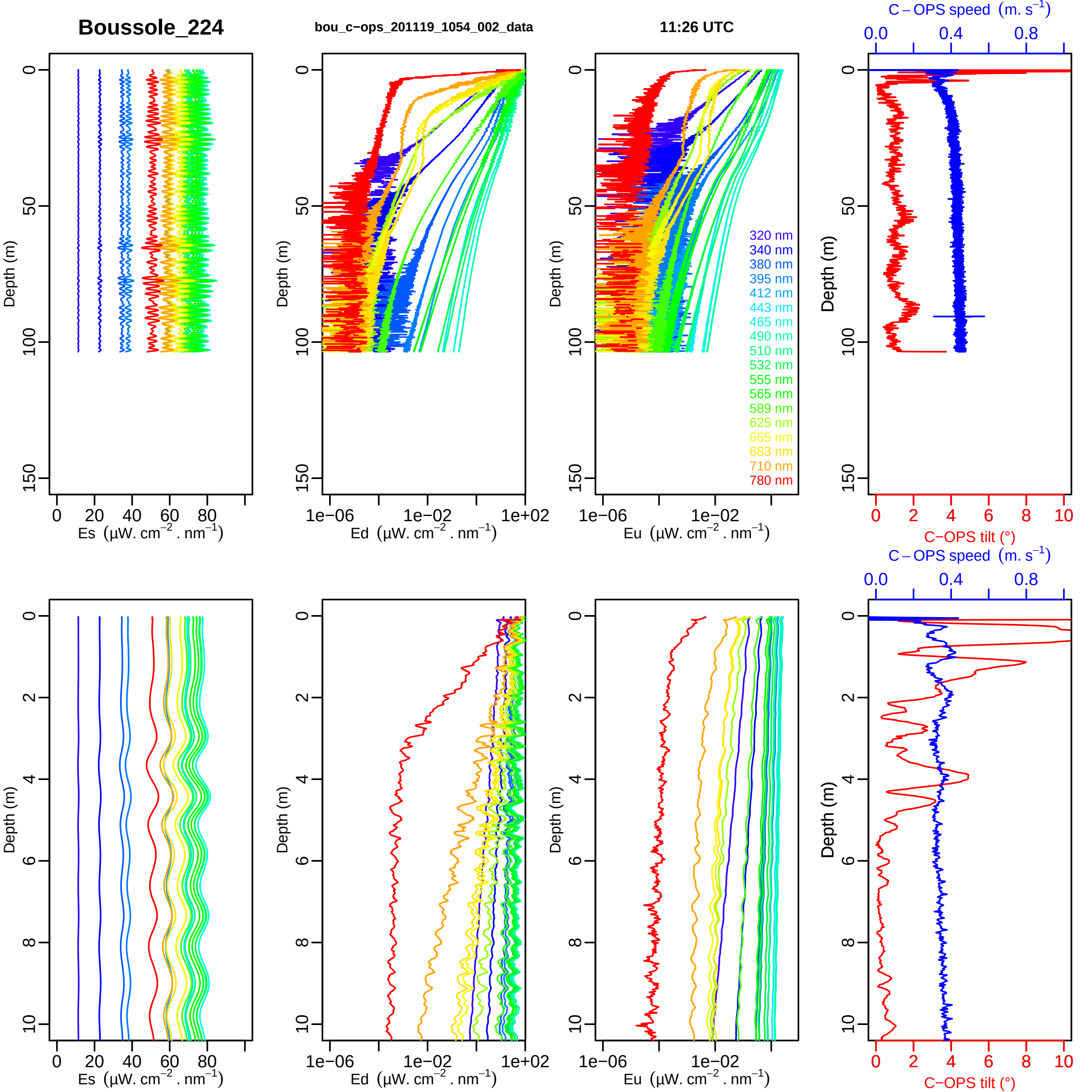
Boussole_224
bou_c−ops_201118_1044_002_data
10:56 UTC
C − OPS speed (m. s−1)
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm


Boussole_224
bou_c−ops_201118_1044_003_data
11:10 UTC
C − OPS speed (m. s−1)
C−OPS tilt (°)
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

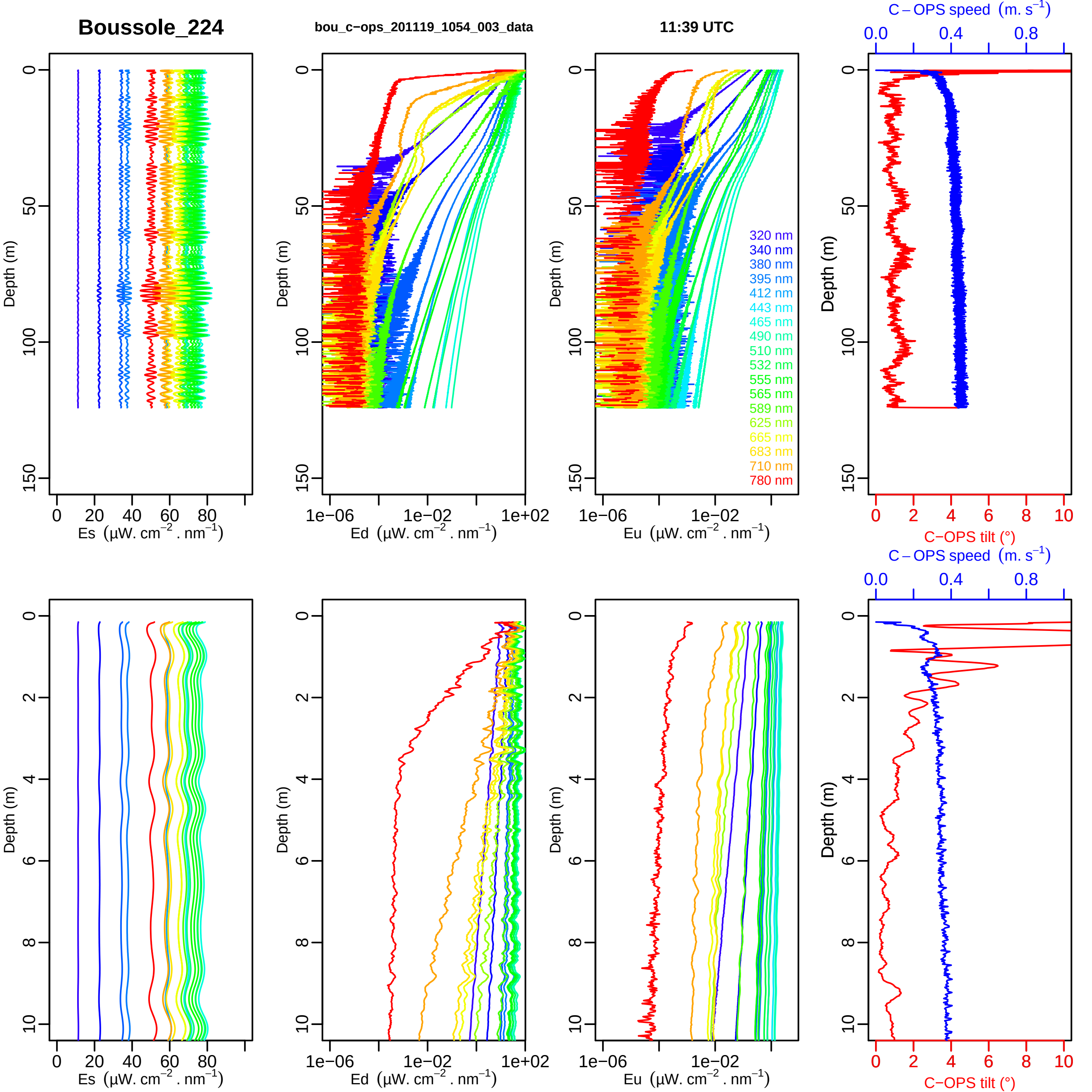

Boussole_224
bou_c−ops_201118_1044_004_data
11:21 UTC
C − OPS speed (m. s−1)
C−OPS tilt (°)
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm



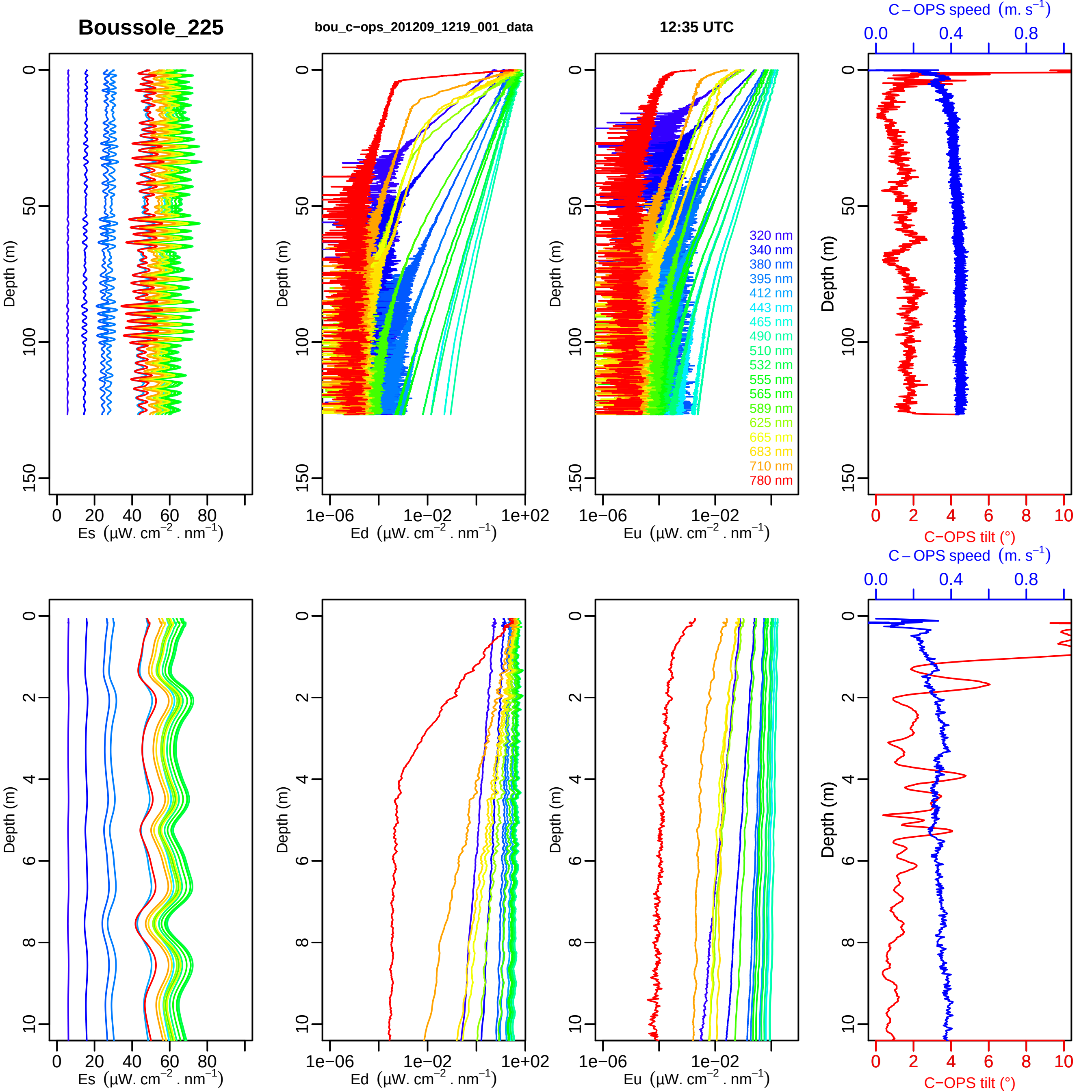
Boussole_224
bou_c−ops_201119_1054_001_data
11:14 UTC
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C − OPS speed (m. s−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm



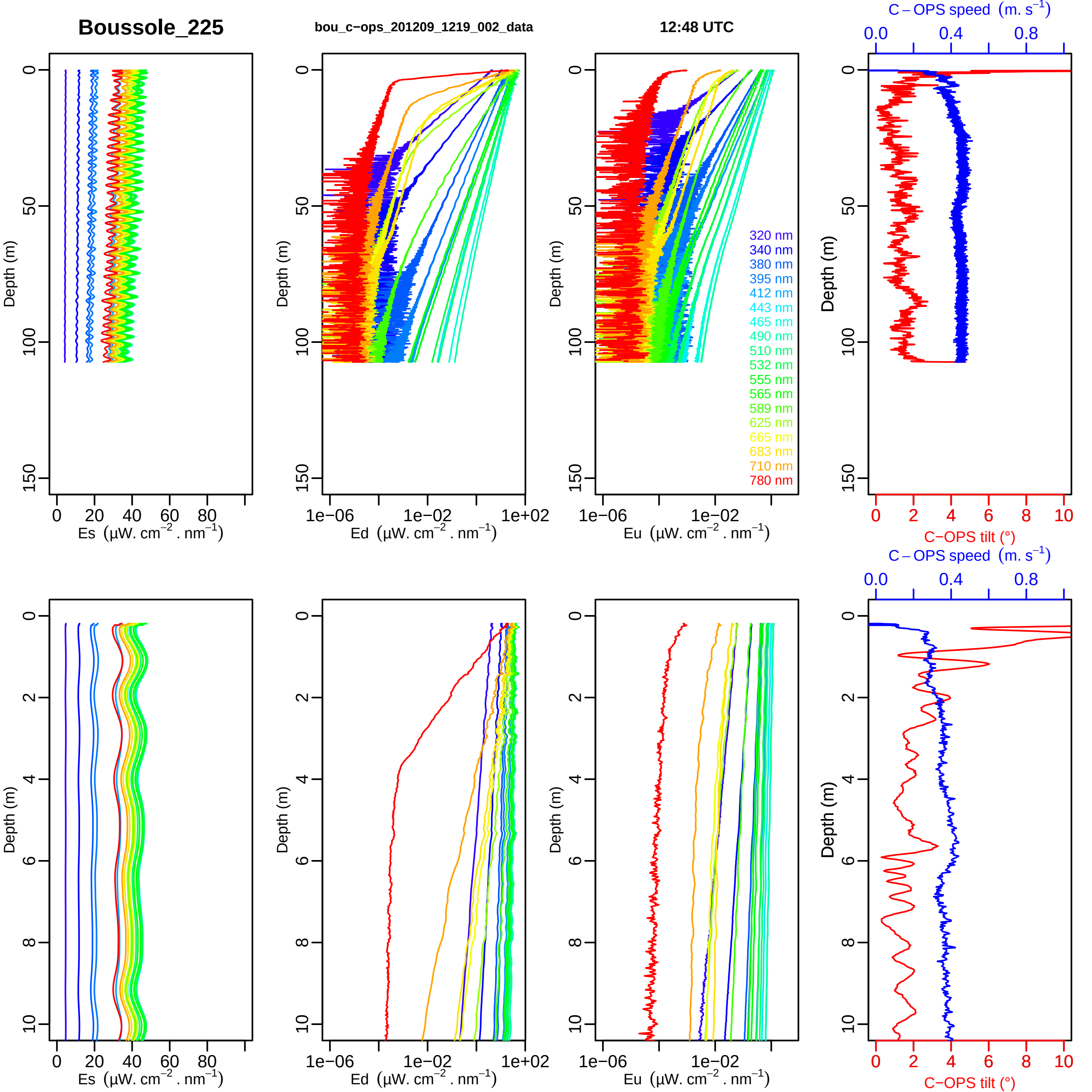
Boussole_224
bou_c−ops_201119_1054_002_data
11:26 UTC
C − OPS speed (m. s−1)
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

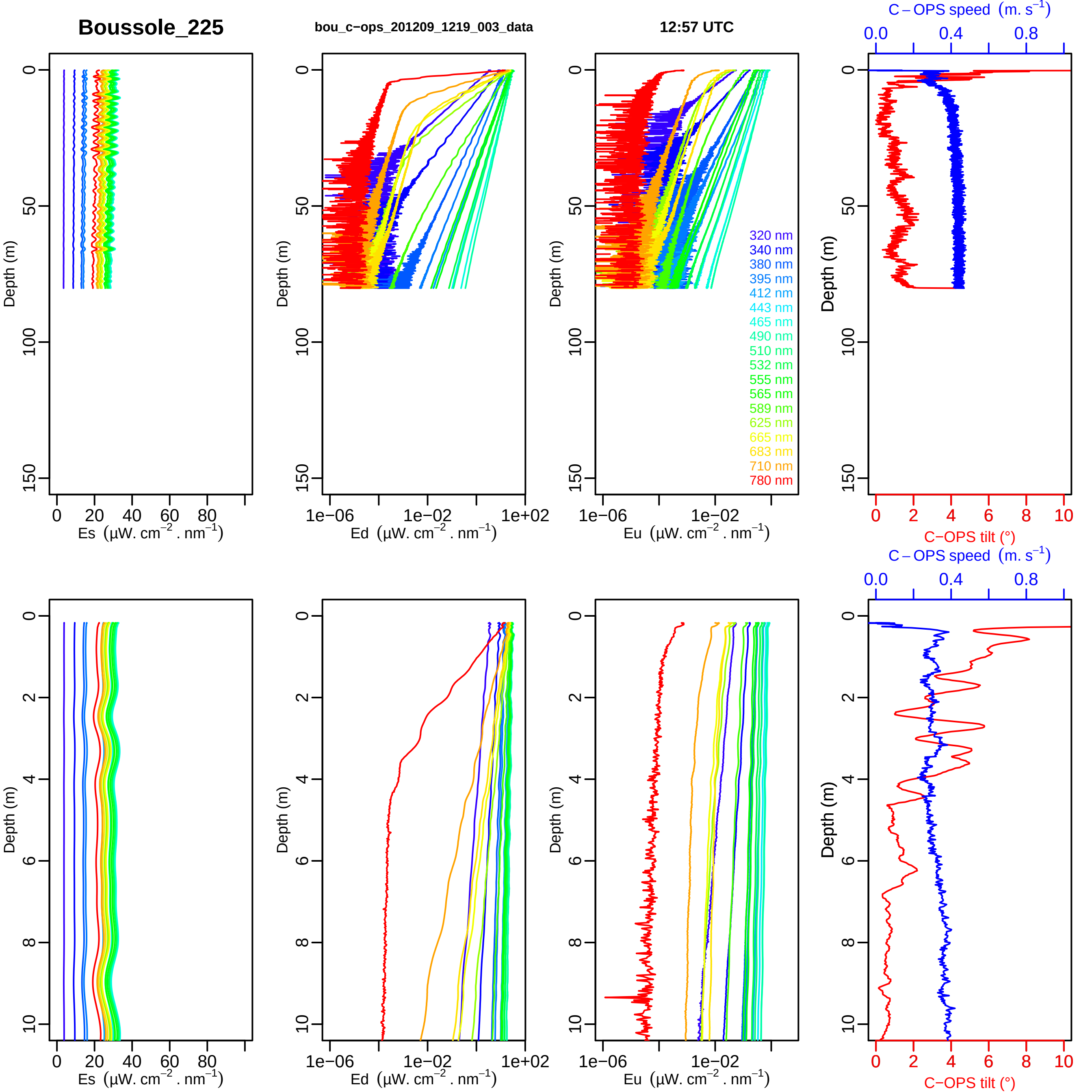


Boussole_224
bou_c−ops_201119_1054_003_data
11:39 UTC
C − OPS speed (m. s−1)
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm



Boussole_225
bou_c-ops_201209_1219_001_data
12:35 UTC
C – OPS speed (m. s⁻¹)
C–OPS tilt (°)
Depth (m)
Es (µW. cm⁻² . nm⁻¹)
Ed (µW. cm⁻² . nm⁻¹)
Eu (µW. cm⁻² . nm⁻¹)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm


Boussole_225
bou_c−ops_201209_1219_002_data
12:48 UTC
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C − OPS speed (m. s−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm


Boussole_225
bou_c−ops_201209_1219_003_data
12:57 UTC
Depth (m)
Es (µW. cm−2 . nm−1)
Ed (µW. cm−2 . nm−1)
Eu (µW. cm−2 . nm−1)
C − OPS speed (m. s−1)
C−OPS tilt (°)
320 nm
340 nm
380 nm
395 nm
412 nm
443 nm
465 nm
490 nm
510 nm
532 nm
555 nm
565 nm
589 nm
625 nm
665 nm
683 nm
710 nm
780 nm

<u>Problems identified during the cruises</u>

BOUSSOLE #216
This BOUSSOLE cruise was cancelled due to unexpected delays in the technical stop work of the R/V *Téthys II*: the ship was not ready in time to complete the mission.
The cruise was rescheduled on the R/V *Sagitta III* the 27th or 29th January depending on the weather. Unfortunately, the cruise was cancelled again because of bad weather during this period.

BOUSSOLE #217
No problems.

BOUSSOLE #218
The second day, because of a lack of time, only one C-OPS profile could be performed at the BOUSSOLE site.

BOUSSOLE #219
Monthly servicing cruises could not be carried out as normal on the R/V *Téthys*-II from April to May 2020 because of the restrictions due to the Covid-19 pandemic (all activities on the R/V *Téthys II* were cancelled until September). We were allowed to use the R/V *Sagitta III* instead, for joint operations of the BOUSSOLE and MOOSE programs during 2 days per month from June. The first day was dedicated to BOUSSOLE and DYFAMED operations and the second day to BOUSSOLE and its current adjunct operations (OBOO and EFFICACY project).

The R/V *Sagitta-III* engine overheating led to cancelling of the BOUSSOLE operations.

BOUSSOLE #220
The problem of the engine overheating of the R/V *Sagitta III* was not solved so that a low ship's speed had to be maintained, reducing the available work time on site. C-OPS profiles and sampling for the EFFICACY and OBOO projects could not be performed.

BOUSSOLE#221
Two C-OPS profiles were performed at the BOUSSOLE site but only one profile was kept because the first profile had to be stopped during the acquisition (unstable irradiance) and the profiler was too tilted.

BOUSSOLE#222
Two C-OPS profiles were performed at the BOUSSOLE site but only one profile was kept because the first profile had to be stopped during the acquisition because the profiler was too much tilted.

BOUSSOLE#223
No problems.

BOUSSOLE #224
No problems.

BOUSSOLE #225
No problems.