BOUSSOLE Monthly Cruise Report

Cruise 260
November 01-04, 2023

Duty Chief: Melek Golbol (melek.golbol@imev-mer.fr)
Vessel: R/V Téthys II
(Captain: Dany Deneuve)

Science Personnel: Emilie Diamond Riquier, Melek Golbol and Paco Stil

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

Deployment of the CTD Rosette with UVP at the DYFAMED site from the deck of the R/V *Téthys II*

BOUSSOLE project

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

November 22, 2023

Foreword

This report is part of the technical report series that is being established by the BOUSSOLE project.

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European Space Agency

Centre National d'Etudes Spatiales, France

Centre National de la Recherche Scientifique, France

Sorbonne Université, France

Institut de la Mer de Villefranche, France

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Cruise Objectives

Routine operations

Multiple Biospherical's C-OPS (Compact Optical Profiling System) radiometric profiles are performed at the BOUSSOLE site around solar noon, under optimal conditions: clear blue skies and flat, calm sea surface. CTD deployments are required at the start and the end of the C-OPS profiling day and around noon in the longer summer days or when there is a high possibility of a satellite matchup. The CTD package also includes a Chl fluorometer. Additional instrumentation for measurement of inherent optical properties has been added from December 2011. The package includes a hyperspectral absorption meter (Hobilabs a-Sphere), a multispectral backscattering meter (Hobilabs Hydroscat-6) and a multispectral beam transmissometer (Hobilabs Gamma-4). A CTD cast including a 0.2 µm filter installed on the inlet tube of the a-Sphere is to be performed once per cruise at the BOUSSOLE site for the dissolved matter absorption measurements. This cast will be stopped at ten depths during 2 or 7 min depending on the depths in order to ensure that the integrating cavity of the a-Sphere be completely filled at each of these depths during the ascent of the CTD.

Seawater samples are to be collected, filtered and stored into liquid nitrogen for subsequent HPLC pigment and particle absorption spectrophotometric filter analysis in the lab. Three replicate samples are to be collected at surface for total suspended matter weighting in the lab.

Further details about these operations and the data collection and processing protocols are to be found in:
Antoine, D. M. Chami, H. Claustre, F. D'Ortenzio, A. Morel, G. Bécu, B. Gentili, F. Louis, J. Ras, E. Roussier, A.J. Scott, D. Tailliez, S. B. Hooker, P. Guevel, J.-F. Desté, C. Dempsey and D. Adams. 2006, BOUSSOLE: a joint CNRS-INSU, ESA, CNES and NASA Ocean Color Calibration And Validation Activity. NASA Technical memorandum N° 2006 - 214147, 61 pp.
(http://www.obs-vlfr.fr/Boussole/html/publications/pubs/BOUSSOLE_TM_214147.pdf)

Additional operations

No additional operations.

Cruise Summary

The weather forecast predicted bad conditions during the days allocated to BOUSSOLE and MOOSE DYFAMED cruises. So, all the priority operations for BOUSSOLE and MOOSE were anticipated and performed the day before the beginning of the cruise. This day was used for CTD casts with water sampling, optical profiles and a Secchi disk at the BOUSSOLE site. It was also used for a deep CTD cast with water sampling and two vertical zooplankton nets at the DYFAMED site for the MOOSE program.

Wednesday 01 November 2023

The sea state was slight with a light to gentle breeze. The sky was cloudy to overcast and the visibility was medium. Firstly, two CTD casts with water sampling and then, three C-OPS profiles were performed at the BOUSSOLE site. For the first CTD cast, a cap was put on the backscattering meter for dark measurements. Then, a Secchi disk was performed before the departure to the DYFAMED site. When arrived at the DYFAMED site, a deep CTD cast was performed. Finally, the vertical zooplankton net was deployed two times before the return to the Nice harbour.

Thursday 02 November 2023

Bad weather prevented departure from the Nice harbour.

Friday 03 November 2023

Bad weather prevented departure from the Nice harbour.

Saturday 04 November 2023

Bad weather prevented departure from the Nice harbour.

Pictures taken during this cruise can be found at:
https://photos.app.goo.gl/dMWrhdsL1Ecb9AJi8

Data from the BOUSSOLE cruises and buoy are available at:
http://www.obs-vlfr.fr/Boussole/html/boussole_data/login_form.php

Cruise Report

Wednesday 01 November 2023 (UTC)

People on board: Emilie Diamond Riquier, Melek Golbol and Paco Stil

0805 Departure from the Nice harbour.
1140 Arrival at the BOUSSOLE site.
1150 CTD 01, 400 m with water sampling at 5 m for TSM (with cap on the HS6).
1215 CTD 02, 400 m with water sampling at 400, 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC and a_p.
1320 C-OPS 01, 02, 03.
1420 Secchi 01, 16 m.
1425 Departure to the DYFAMED site.
1450 Arrival at the DYFAMED site.
1500 Deep CTD cast (MOOSE program).
1655 Zooplankton nets x 2 at 100 and 200 m (MOOSE program).
1720 Departure to the Nice harbour.
2015 Arrival at the Nice harbour.

Thursday 02 November 2023

Bad weather prevented departure from the Nice harbour.

Friday 03 November 2023

Bad weather prevented departure from the Nice harbour.

Saturday 04 November 2023

Bad weather prevented departure from the Nice harbour.

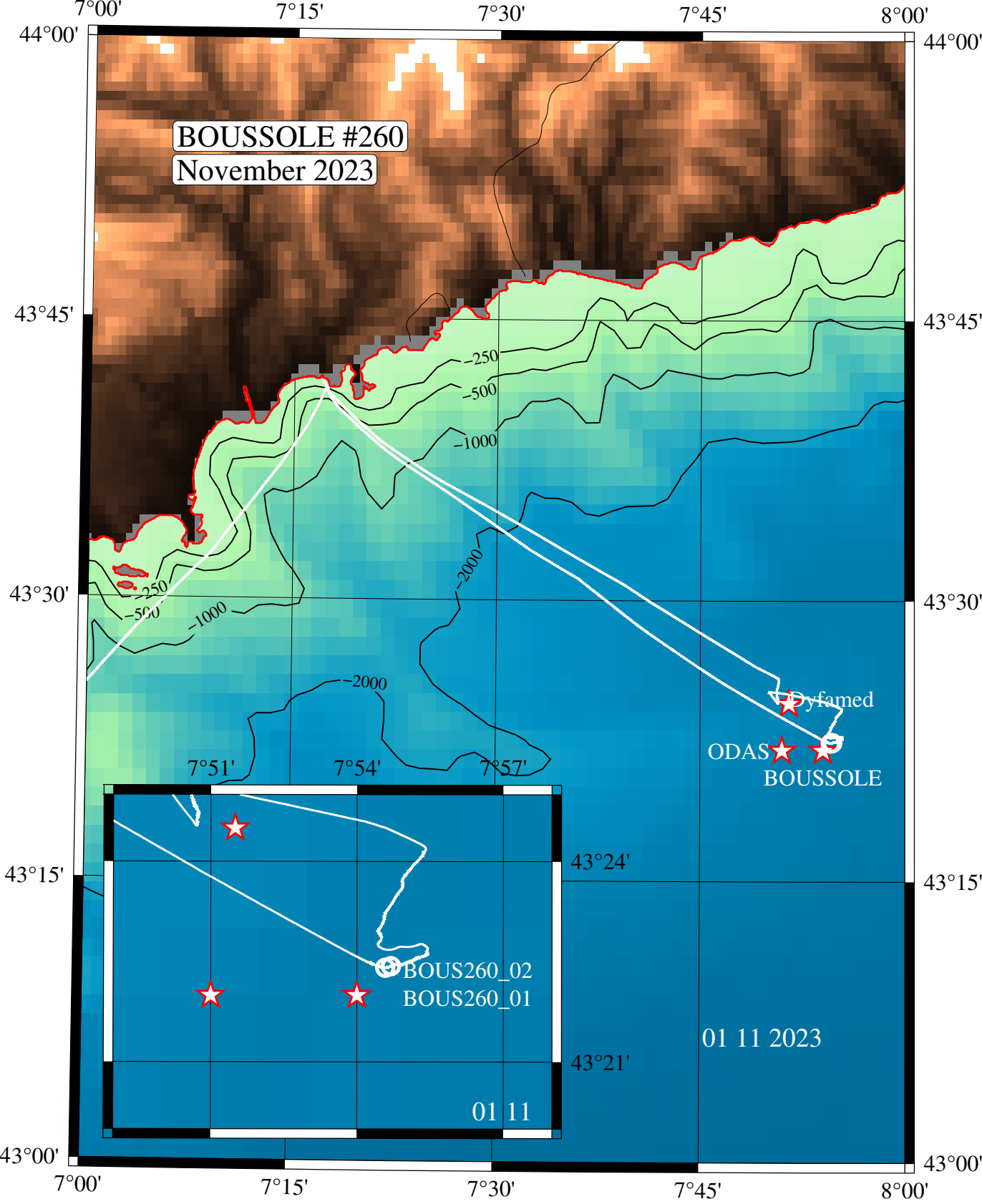
Problems identified during the cruise

- It was not possible to perform an IOP cast with a 0.2 µm filter installed on the inlet tube of the a-Sphere for the dissolved matter absorption measurements because of the lack of time.

Appendices

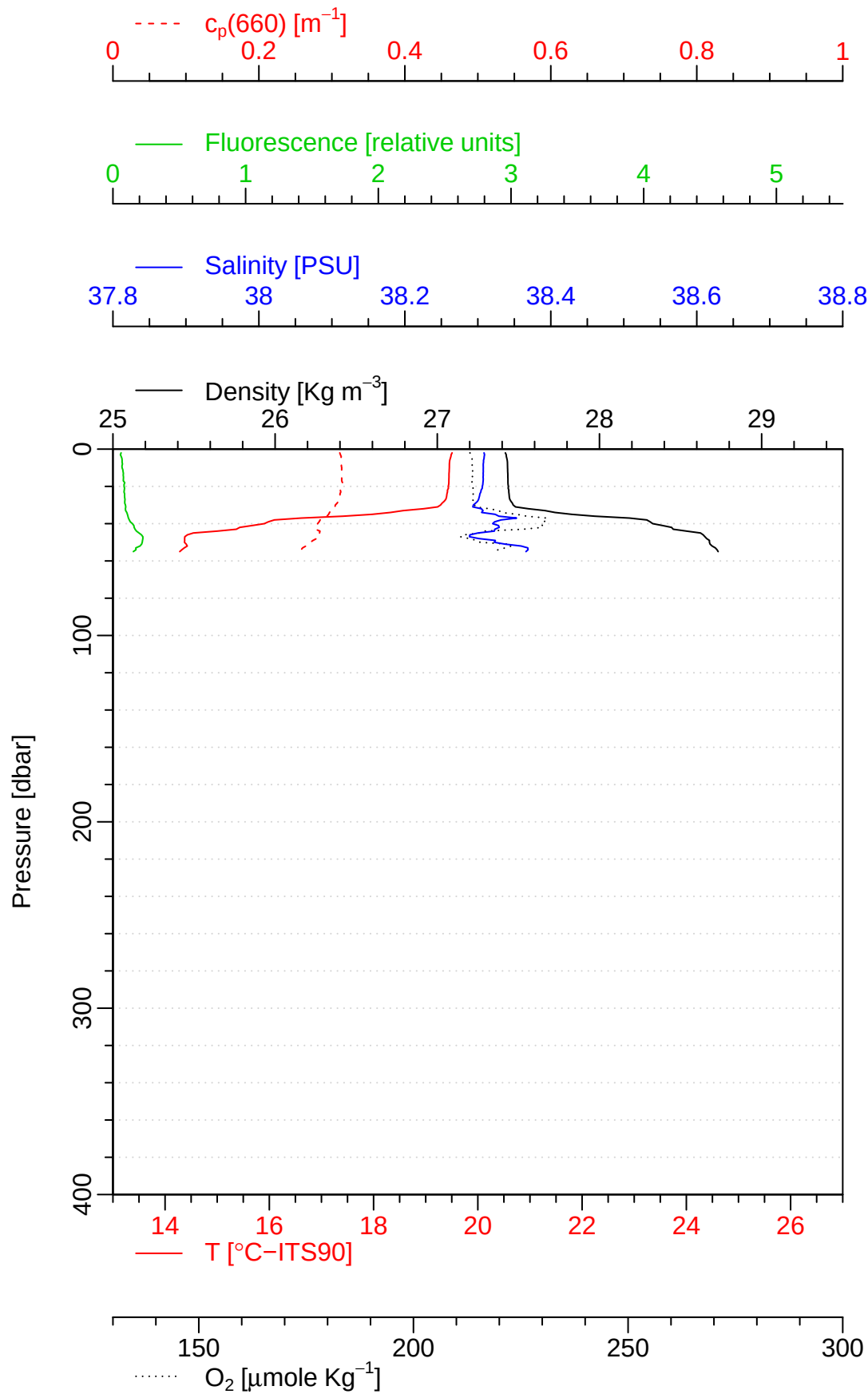
Cruise Summary Table for Boussole 260

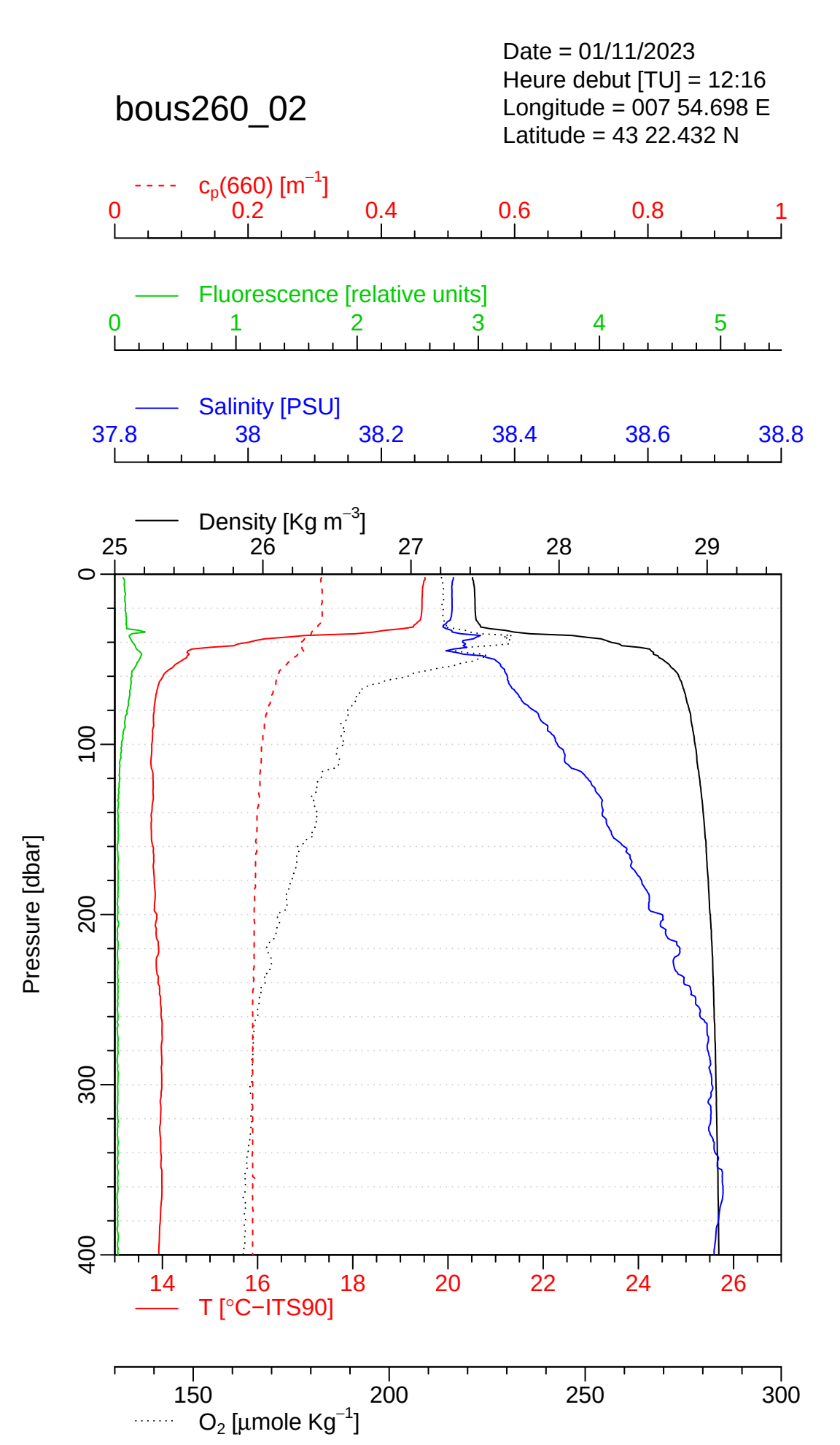
Date	Black names	Profile names	CTD notées	Other sensors	Start Time	Duration	Depth max	Latitude (N)		longitude					Weather							Sea		
	(file ext: ".raw")	(file extension: ".raw")			GMT (hour.min)	(hour.min.sec)	(meter)	(Degree)	(Minute)	(Degree)	(Minute)	Sky	Clouds	Quantity (#/8)	Wind sp. (kn)	Wind dir.	Atm. Pressure (hPa)	Humidity (%)	Visibility	T air	T water	Sea	Swell H (m)	Swell dir.	Whitecaps
01/11/23			BOUS260_01	TSM	11:52	0:07:00	400	43	22.41	7	54.580	cloudy		6	3.6	192	1012	65.3		18.5	19.4	slight			
			BOUS260_02	HPLC & a_ϕ	12:16	0:47:00	400	43	22.432	7	54.698	cloudy		6	6.4	140	1011	67.8		18.5	19.4	slight			
		bou_c-ops_231101_1244_004_data.csv			13:33	0:06:07	146	43	23.253	7	54.603	overcast	all	7	9.5	143	1011	70.7	medium	19		slight	0.7		no
		bou_c-ops_231101_1244_005_data.csv			13:49	0:04:01	85	43	23.667	7	54.933	overcast	all	7	9.5	143	1011	70.7	medium	19		slight	0.7		no
		bou_c-ops_231101_1244_006_data.csv			14:00	0:05:22	134	43	23.857	7	55.060	overcast	all	7	9.5	143	1011	70.7	medium	19		slight	0.7		no
				Secchi 01	14:20	0:04:00	16	43	22	7	54	overcast		7					medium			slight			
02/11/23	Bad weather																							
03/11/23	Bad weather																							
04/11/23	Bad weather																							

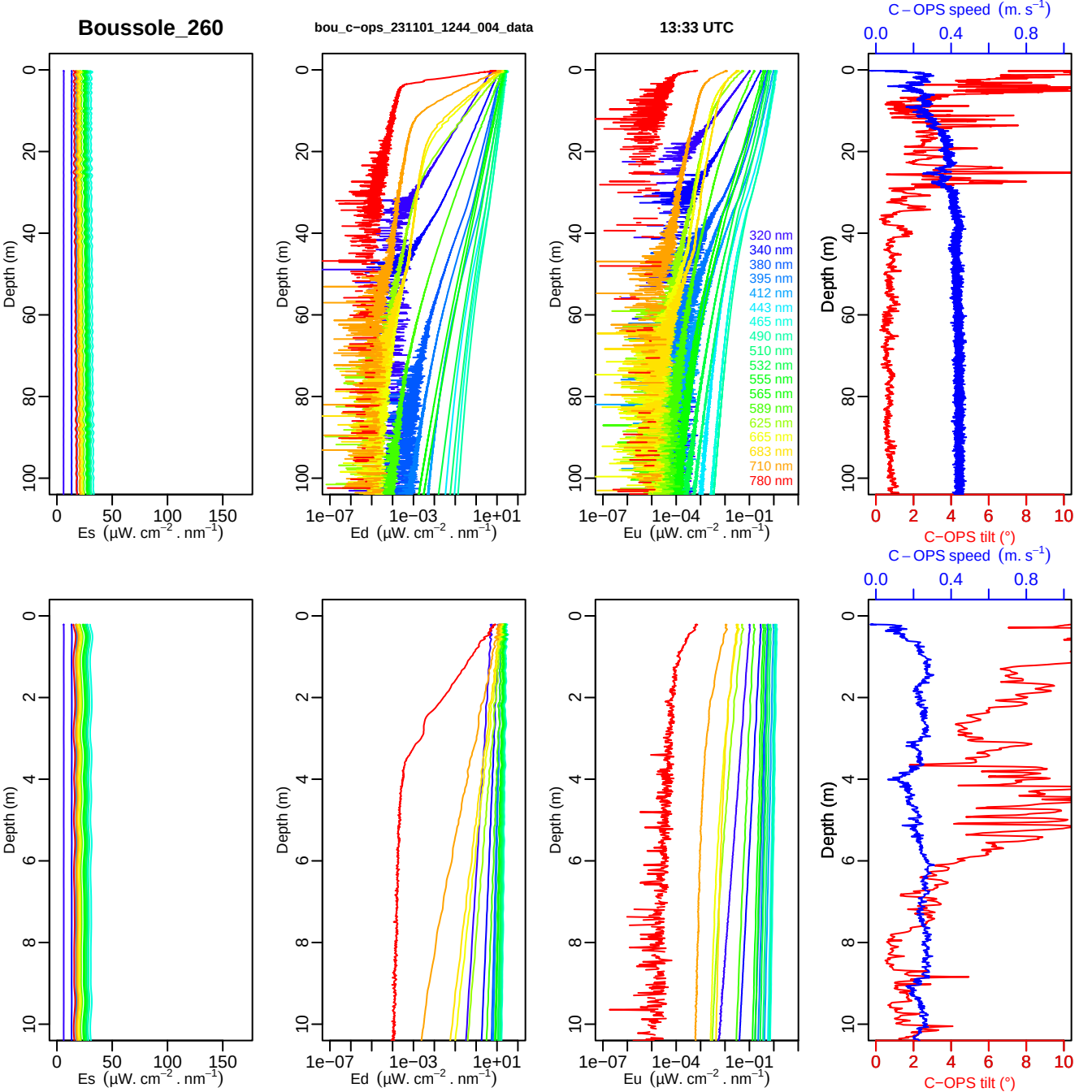

BOUSSOLE #260
November 2023
7°00'
7°15'
7°30'
7°45'
8°00'
44°00'
43°45'
43°30'
43°15'
43°00'
250
500
1000
2000
Dyfamed
ODAS
BOUSSOLE
7°51'
7°54'
7°57'
43°24'
43°21'
BOUS260_02
BOUS260_01
01 11 2023
01 11

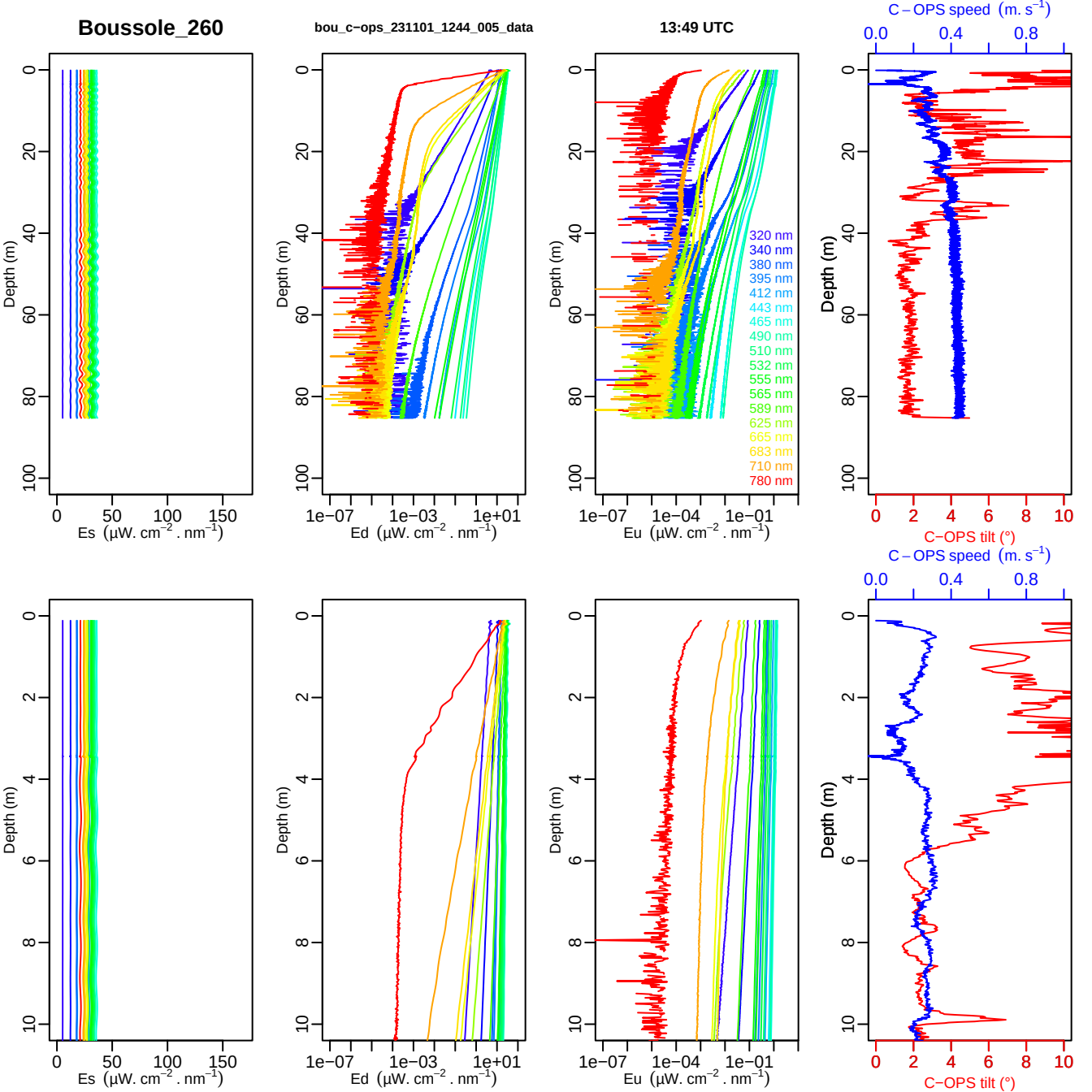
bous260_01

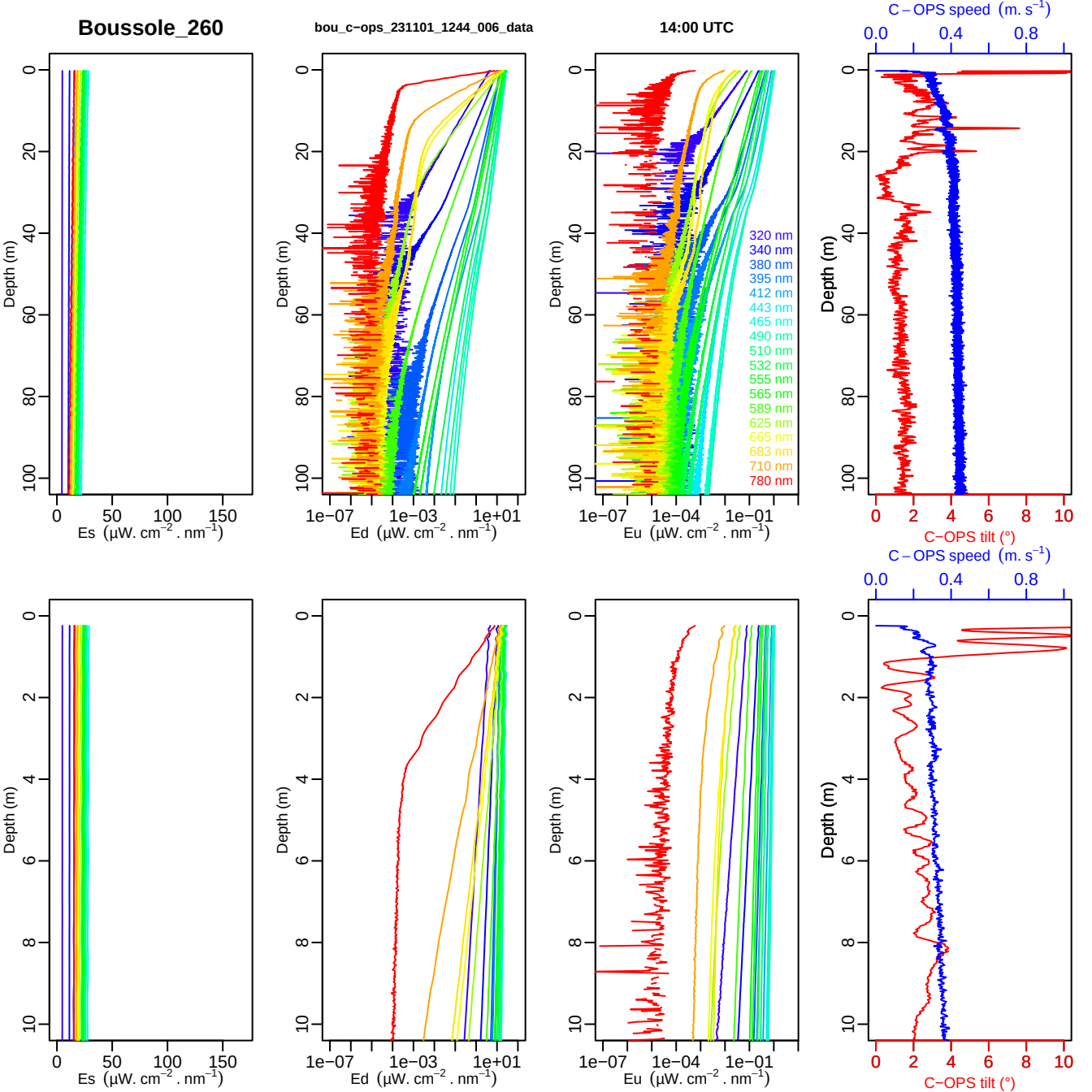
Date = 01/11/2023
Heure debut [TU] = 11:52
Longitude = 007 54.58 E
Latitude = 43 22.41 N




bous260_02
Date = 01/11/2023
Heure debut [TU] = 12:16
Longitude = 007 54.698 E
Latitude = 43 22.432 N
cp(660) [m−1]
0
0.2
0.4
0.6
0.8
1
Fluorescence [relative units]
0
1
2
3
4
5
Salinity [PSU]
37.8
38
38.2
38.4
38.6
38.8
Density [Kg m−3]
25
26
27
28
29
Pressure [dbar]
0
100
200
300
400
14
16
18
20
22
24
26
T [°C−ITS90]
150
200
250
300
O2 [µmole Kg−1]


Boussole_260
bou_c-ops_231101_1244_004_data
13:33 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_260
bou_c-ops_231101_1244_005_data
13:49 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_260
bou_c−ops_231101_1244_006_data
14:00 UTC
C − OPS speed (m. s−1)
0.0
0.4
0.8
Depth (m)
0
20
40
60
80
100
0
50
100
150
Es (µW. cm−2 . nm−1)
1e−07
1e−03
1e+01
Ed (µW. cm−2 . nm−1)
1e−04
1e−01
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
0
2
4
6
8
10
C−OPS tilt (°)