BOUSSOLE Monthly Cruise Report

Cruise 248
November 14-16, 2022

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Vessel: R/V Téthys II
(Captain: Dany Deneuve)

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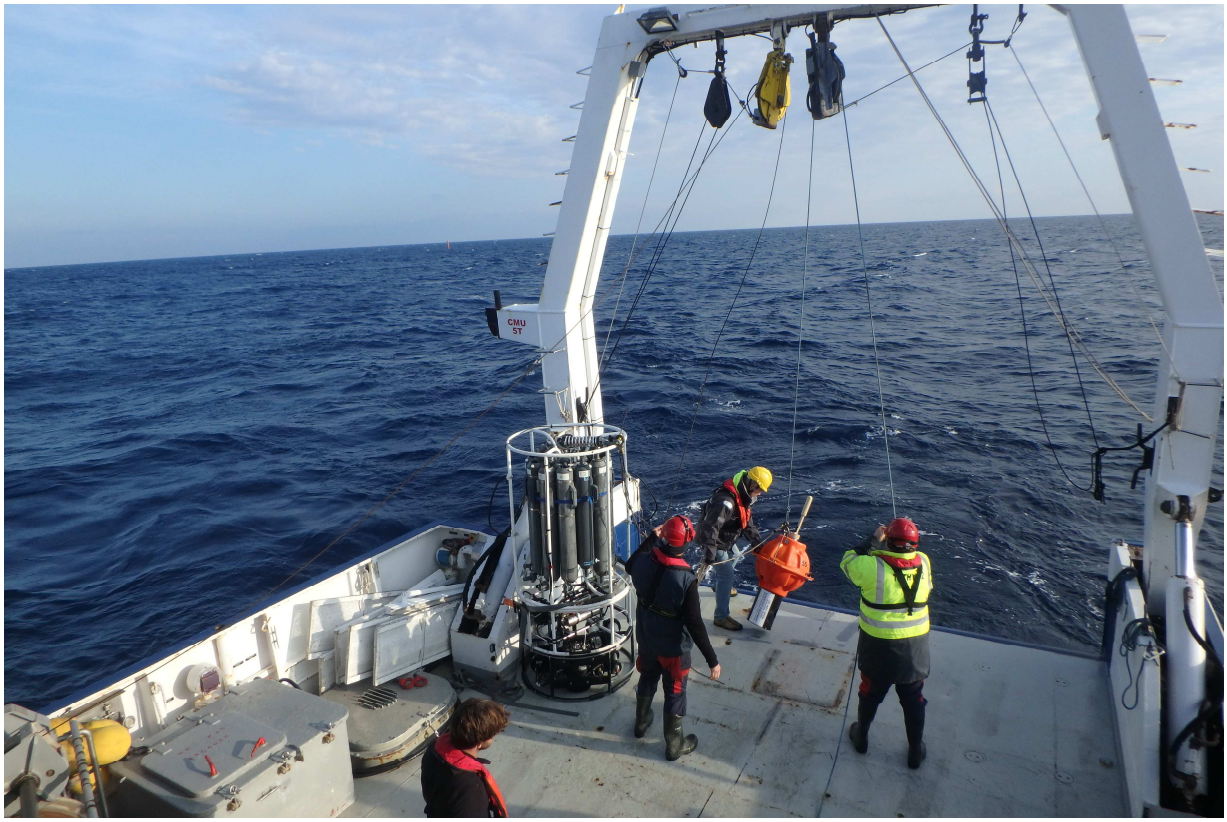

Deployment of a MERMAID profiling float at the BOUSSOLE site

BOUSSOLE project

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

November 21, 2022

Foreword

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

BOUSSOLE is funded and supported by the following Agencies and Institutions

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.

Divers check the underwater state of the buoy structure and instrumentation, take pictures for archiving, clean the sensor optical surfaces, and then take again some pictures after cleaning. Divers also put a neoprene cap on the backscattering meter and on the transmissometers for acquiring dark measurements (started in April 2009).

Projects-specific operations

In addition, water samples are to be collected at 5 m depth for dissolved oxygen (DO), total alkalinity (TA) and total inorganic carbon (TC) analysis (from March 2014) and pH analysis (from October 2021). The TA/TC samples will be processed by the National service for such analyses (SNAPOCO – LOCEAN in Paris). The DO and pH samples will be analysed in the *Institut de la Mer de Villefranche* by the MOOSE team. The results will allow checking the data collected by the pCO_2 CARIOCA sensors, the optode and the pH sensor installed on the buoy at 3 m.

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

The "MOOSE DYFAMED" cruise scheduled for 18th November was cancelled because of bad weather forecasts, so their operations were performed during the BOUSSOLE cruise.

A MERMAID profiling float (acoustic profiler) was deployed at the BOUSSOLE site by the Geoazur lab.

Cruise Summary

The first day was used for BOUSSOLE operations including CTD casts with water sampling, C-OPS profiles and a Secchi disk and for the deployment of the profiling float at the BOUSSOLE site. It was also used for MOOSE DYFAMED operations including zooplankton vertical nets and a deep CTD cast.

Monday 14 November 2022

The departure was delayed because of the bad weather in the morning. The sea state was slight with a moderate to fresh breeze. The sky was overcast/cloudy and the visibility was medium. Firstly, a CTD cast with water sampling and two C-OPS profiles were performed at the BOUSSOLE site. It was not possible to perform a third profile because the irradiance became unstable. Then a second CTD cast with water sampling and a Secchi disk were performed. For the second CTD cast (CTD 02), a cap was put on the backscattering meter for dark measurements. Then the MERMAID profiling float was deployed before the departure to the DYFAMED site. When arrived at DYFAMED, the deep CTD cast was performed and two vertical zooplankton nets were deployed before returning to the Nice harbour.

Tuesday 15 November 2022

Bad weather prevented departure from the Nice harbour.

Wednesday 16 November 2022

Bad weather prevented departure from the Nice harbour.

Pictures taken during this cruise can be found at:
https://photos.app.goo.gl/ovSjoKhUVzkDLrCH7

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

Cruise Report

Monday 14 November 2022 (UTC)

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

0835 Departure from the Nice harbour.
1200 Arrival at the BOUSSOLE site.
1210 CTD 01, 400 m with water sampling at 400, 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p, TA/TC, DO and pH.
1310 C-OPS 01, 02.
1355 CTD 02, 50 m with water sampling at 5 m for TSM (with cap on the HS6).
1400 Secchi 01, 22 m.
1410 Profiling float deployment.
1415 Departure to DYFAMED site.
1435 Arrival at the DYFAMED site.
1440 Deep CTD cast, 2370 m (MOOSE program).
1640 Zooplankton nets x 2, 100 and 200 m (MOOSE program)
1705 Departure to the Nice harbour.
1945 Arrival at the Nice harbour.

Tuesday 15 November 2022

Bad weather prevented departure from the Nice harbour.

Wednesday 16 November 2022

Bad weather prevented departure from the Nice harbour.

Problems identified during the cruise

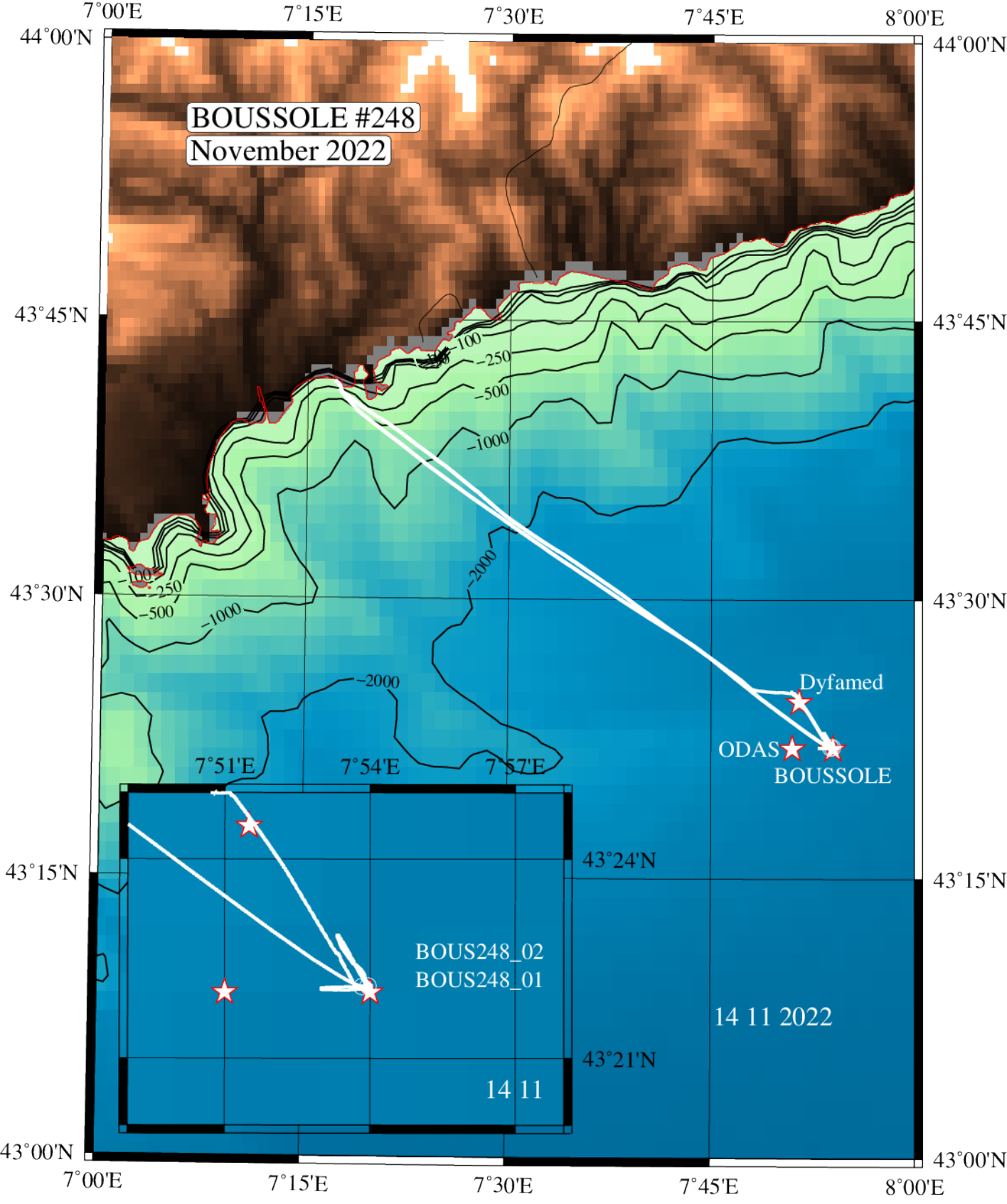
- Diving operations could not be performed during this cruise because of the bad weather.

- Because of the lack of time due essentially to bad weather, it was not possible to perform the CTD cast including a 0.2 µm filter installed on the inlet tube of the a-Sphere for the dissolved matter absorption measurements.

Appendices

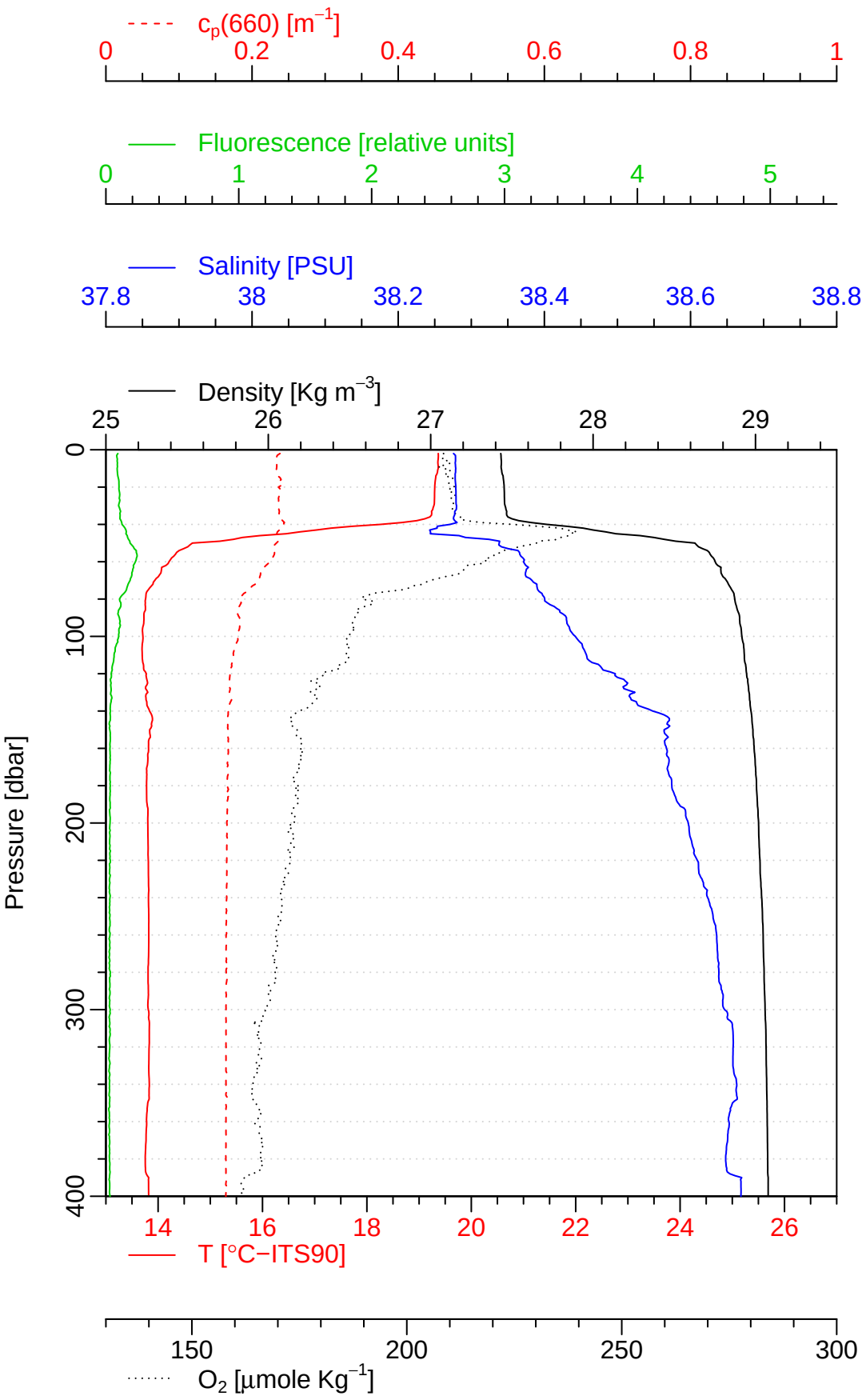
Cruise Summary Table for Boussole 248

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
14/11/22			BOUS248_01	HPLC, ap, TA/TC, O_2 & pH	12:10	0:39:00	400	43	22.08	7	53.834	overcast		7	17	58	1020	75.2		16.2	19.70	slight			
		bou_c-ops_221114_1244_001_data.csv			13:07	0:05:16	130	43	22.259	7	53.881	overcast	St, Cs, Ac	6	15.9	57	1020	73	medium	16.7		slight	0.8		yes
		bou_c-ops_221114_1244_002_data.csv			13:22	0:04:54	119	43	22.466	7	53.615	overcast	St, Cs, Ac	6	15.9	57	1020	73	medium	17.7		slight	1.8		yes
			BOUS248_02	TSM	13:54	0:04:00	50	43	22.092	7	53.963	cloudy		3	16	63	1019	73.1		16.9	19.80	slight			
				Secchi 01	14:00	0:04:00	22	43	22	7	54	cloudy		0					medium			slight			
15/11/22	Bad weather																								
16/11/22	Bad weather																								


BOUSSOLE #248
November 2022
7°00'E
7°15'E
7°30'E
7°45'E
8°00'E
44°00'N
43°45'N
43°30'N
43°15'N
43°00'N
-100
-250
-500
-1000
-2000
Dyfamed
ODAS
BOUSSOLE
7°51'E
7°54'E
7°57'E
43°24'N
43°21'N
BOUS248_02
BOUS248_01
14 11
14 11 2022
GMT 2022 Nov 29 08:24:33

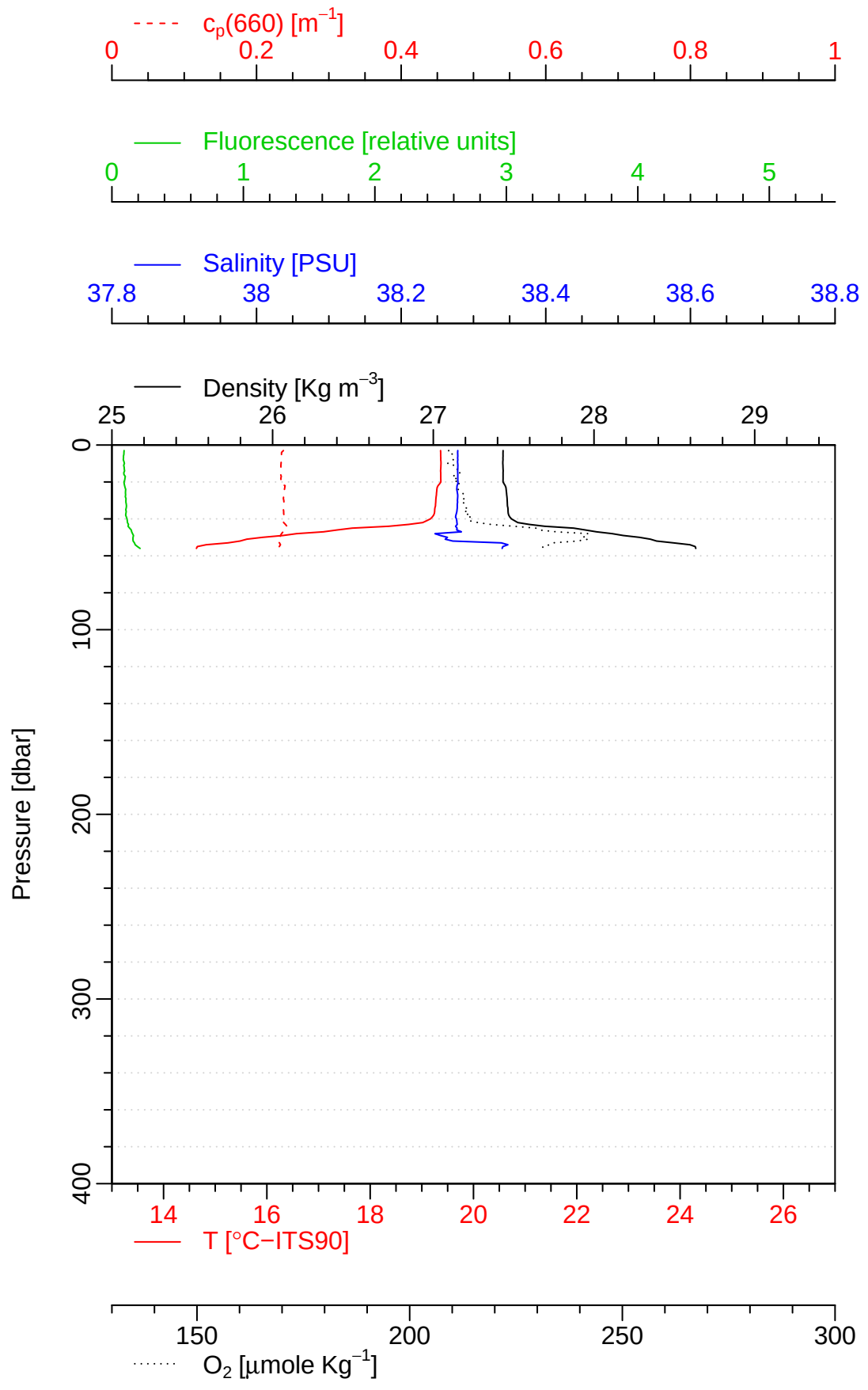
bous248_01

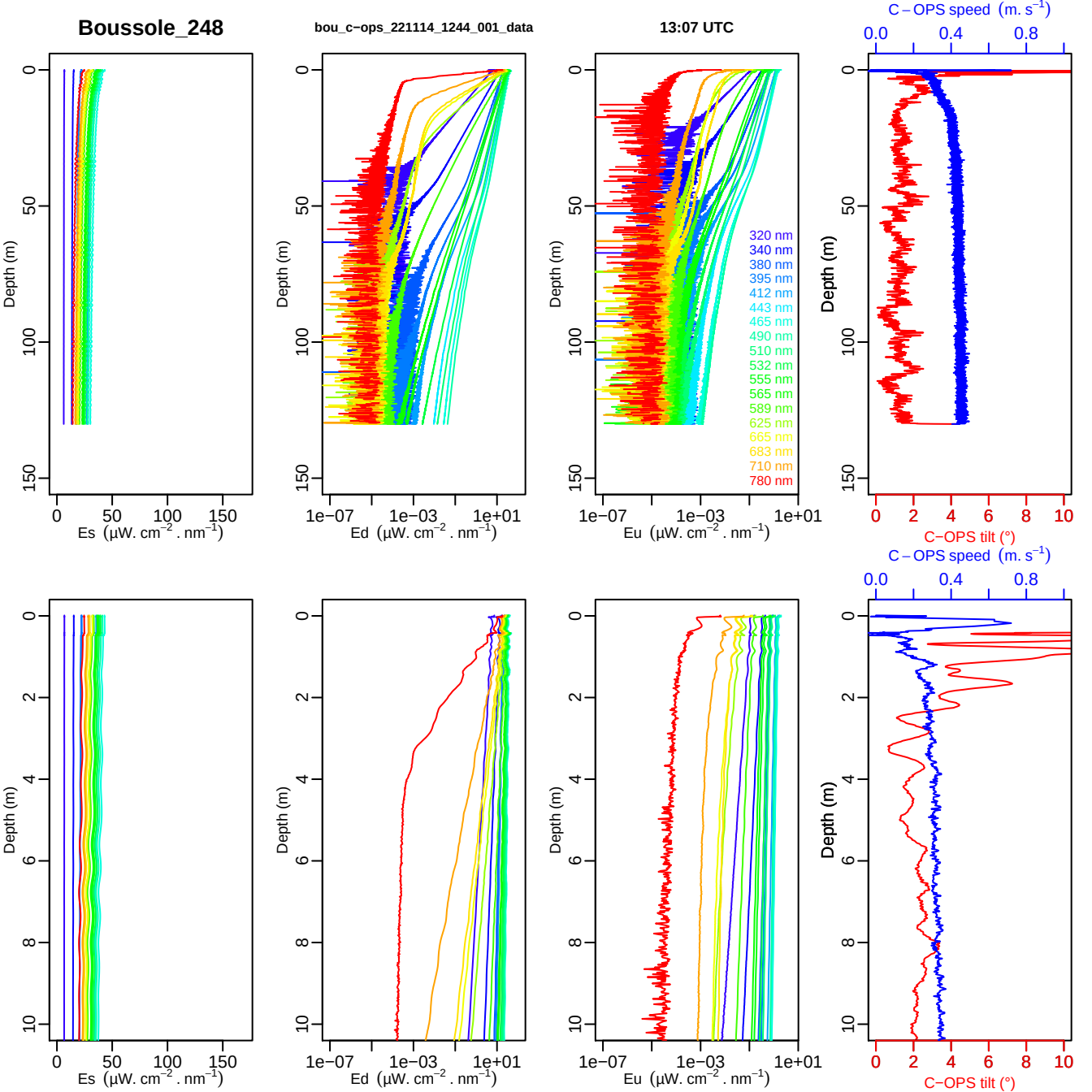
Date = 14/11/2022
Heure debut [TU] = 12:10
Longitude = 007 53.834 E
Latitude = 43 22.080 N

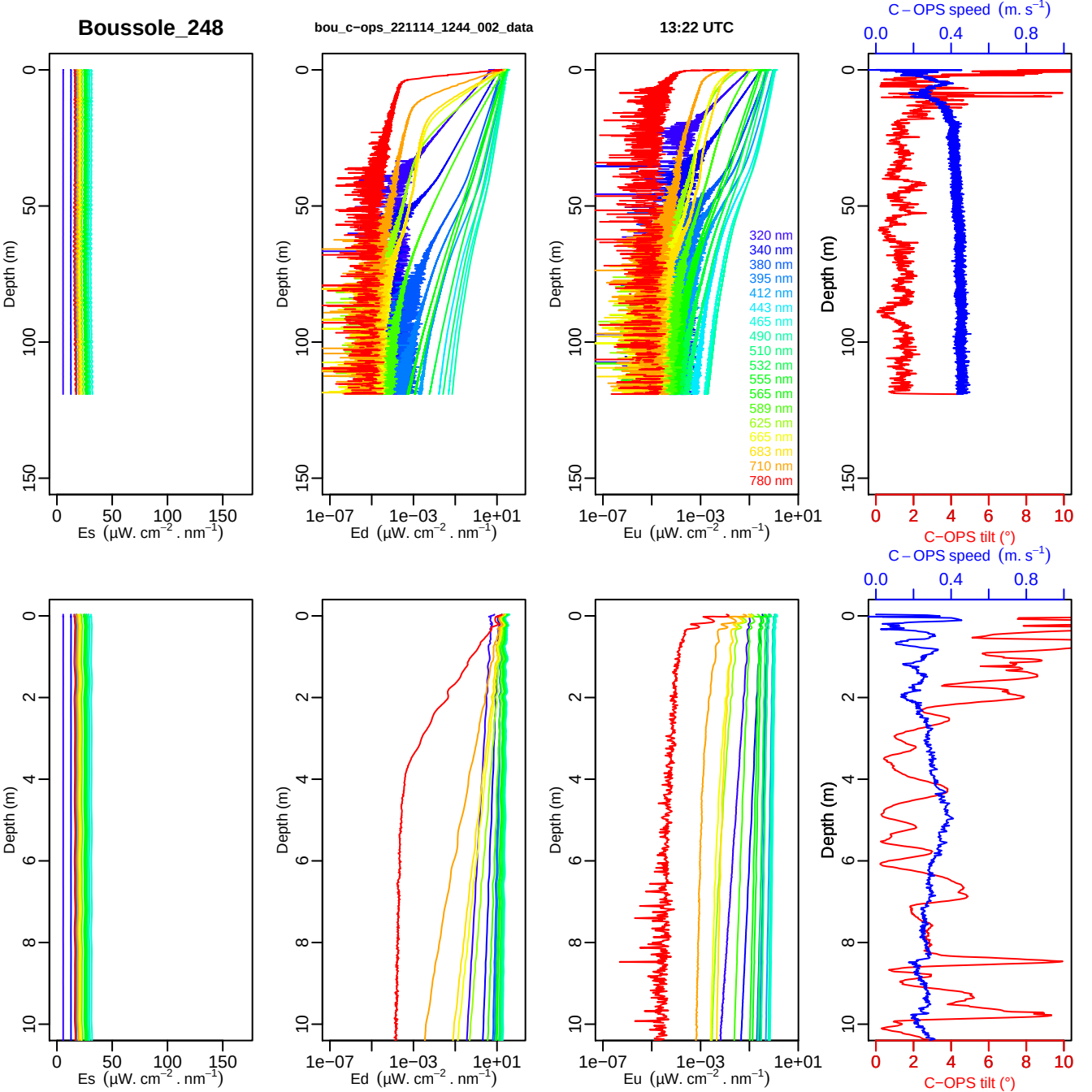


bous248_02

Date = 14/11/2022
Heure debut [TU] = 13:54
Longitude = 007 53.963 E
Latitude = 43 22.092 N




Boussole_248
bou_c-ops_221114_1244_001_data
13:07 UTC
C – OPS speed (m. s^{-1})
0.0
0.4
0.8
Depth (m)
0
50
100
150
0
50
100
150
Es (µW. cm^{-2}. nm^{-1})
1e−07
1e−03
1e+01
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
0
2
4
6
8
10
C−OPS tilt (°)


Boussole_248
bou_c-ops_221114_1244_002_data
13:22 UTC
C – OPS speed (m. s^{-1})
0.0
0.4
0.8
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