BOUSSOLE Monthly Cruise Report

Cruise 257
August 08-09, 2023

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

Science Personnel: Céline Dimier, Philippe Gassier, Melek Golbol, Léo Jimenez, Emmanuelle Martins and Anastasia Tarasenko

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

Recovery of the BOUSSOLE buoy lower superstructure and mooring line in the deck of the R/V *Téthys II*

BOUSSOLE project

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

August 28, 2023

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 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, the DO and pH sensors 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 second day of the cruise was used to recover the lower superstructure of the BOUSSOLE buoy and the mooring line. The upper superstructure had been already recovered on July 11th. There will therefore be no more diving operations, nor project-specific operations related to the buoy such as sampling for oxygen, TA-TC and pH analysis for this cruise and next cruises.

Cruise Summary

The first day was used to perform CTD casts with water sampling, optical profiles, and a Secchi disk at the BOUSSOLE site. The second day was used entirely for the recovery of the lower superstructure of the buoy and the mooring line.

Tuesday 08 August 2023

The sea state was slight with a gentle breeze. The sky was blue and the visibility was good. Firstly, a CTD cast with water sampling and three C-OPS profiles were performed at the BOUSSOLE site. Then, a CTD cast with water sampling was performed at the BOUSSOLE site with a cap put on the backscattering meter for dark

measurements and a 0.2 µm filter put on the a-Sphere absorption meter for the dissolved matter absorption measurements. This cast was stopped at 10 depths during the ascent of the CTD. Finally, a Secchi disk was performed before returning to the Nice harbour.

Wednesday 09 August 2023

The sea state was smooth with a light breeze.

The first operation consisted in releasing the BOUSSOLE mooring line by sending the appropriate command to the acoustic releases. The lower buoy superstructure and then the 12 Vitroflex floats came up at surface. The dinghy was deployed in order to attach floats to the buoy and to bring the mooring line at the stern of the ship. Finally, the mooring line was recovered on board, starting from the 12 Vitrovex floats and finishing with the lower buoy superstructure, before returning to the Nice harbour.

Pictures taken during this cruise can be found at:
https://photos.app.goo.gl/HhSgDax1iqLBd4Qe9

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

Cruise Report

Tuesday 08 August 2023 (UTC)

People on board: Céline Dimier, Melek Golbol, Emmanuelle Martins and Anastasia Tarasenko

0555 Departure from the Nice harbour.
0930 Arrival at the BOUSSOLE site.
0940 CTD 01, 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.
1100 C-OPS 01, 02, 03.
1200 CTD 02, 400 m with water sampling at 5 m for TSM (with a 0.2 µm filter on a-Sphere and with 2 minutes stop at 400, 150 m and 7 minutes stop at 80, 60, 50, 40, 30, 20, 10 et 5 m) (with cap on the HS6).
1330 Secchi 01, 19 m.
1340 Departure to the Nice harbour.
1700 Arrival at the Nice harbour.

Wednesday 09 August 2023 (UTC)

People on board: Céline Dimier, Melek Golbol, Philippe Gassier, Léo Jimenez, Emmanuelle Martins and Anastasia Tarasenko

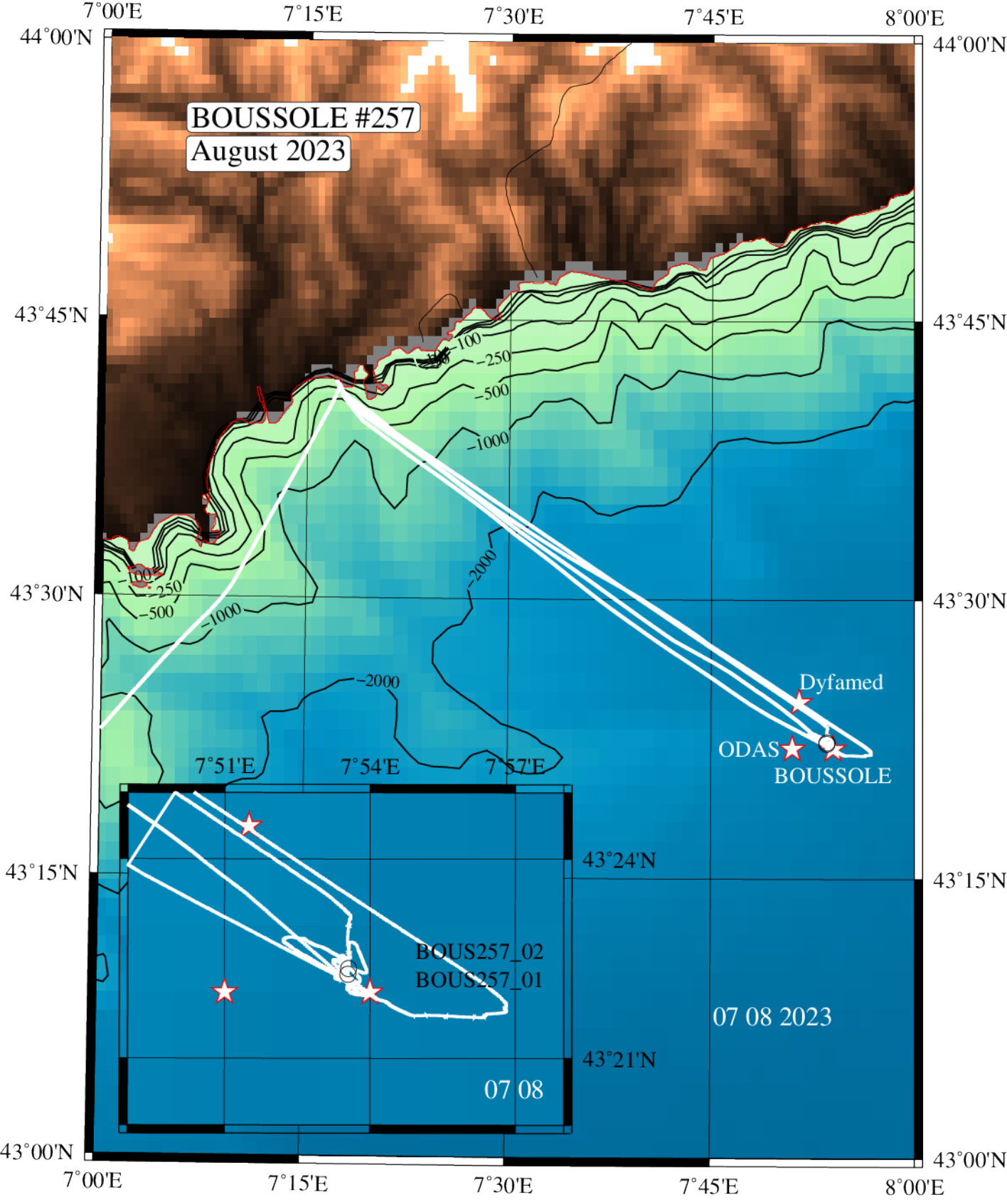
0630 Departure from the Nice harbour.
0945 Arrival at the BOUSSOLE site.
0950 Attempts of mooring line releasing: failed.
1030 Repositioning of the ship at 250 m from the BOUSSOLE position: mooring line releasing failed.
1045 Repositioning of the ship at 100 m from the BOUSSOLE position: mooring line releasing failed.
1130 Releasing of the mooring line: buoy lower superstructure at surface.
1200 Deployment of the dinghy. Floats attached on the buoy.
1210 Vitroflex floats at surface.
1215 Mooring line brought at the stern of the ship.
1235 Start of Kevlar cable recovery.
1345 Removing of a fishing line entangled in the Kevlar cable.
1405 End of removing of the fishing line.
1420 End of Kevlar cable recovery.
1435 Buoy lower superstructure on board.
1445 Departure to the Nice harbour.
1800 Arrival at the Nice harbour.

Problems identified during the cruise

Appendices

Cruise Summary Table for Boussole 257

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
08/08/23			BOUS257_01	HPLC & ap	9:40	0:33:00	400	43	22.267	7	53.547	blue		2	8	160	1016	75.5		21.9	21.7	slight	0.5		
		bou_c-ops_230808_1056_001_data.csv			11:01	0:03:11	76	43	22.539	7	53.340	blue	Ci	1	9	150	1016	73.8	good	22		slight	0.6		yes
		bou_c-ops_230808_1056_002_data.csv			11:11	0:03:36	88	43	22.68	7	52.986	blue	Ci	1	9	150	1016	73.8	good	22		slight	0.6		yes
		bou_c-ops_230808_1056_003_data.csv			11:20	0:03:17	81	43	22.781	7	52.670	blue	Ci	1	9	150	1016	73.8	good	22		slight	0.6		yes
			BOUS257_02	TSM	12:15	1:21:00	400	43	22.399	7	53.558	blue		2	7	120	1016	77.3		21.6	22.0	slight			
				Secchi 01	13:30	0:04:00	19	43	22	7	54	blue		0			1016	74.5	good	22		slight	0.6		
09/08/23	Buoy recovery (no routine operations)																							



GMT 2023 Oct 24 16:21:54

bous257_01

Date = 08/08/2023
Heure debut [TU] = 09:40
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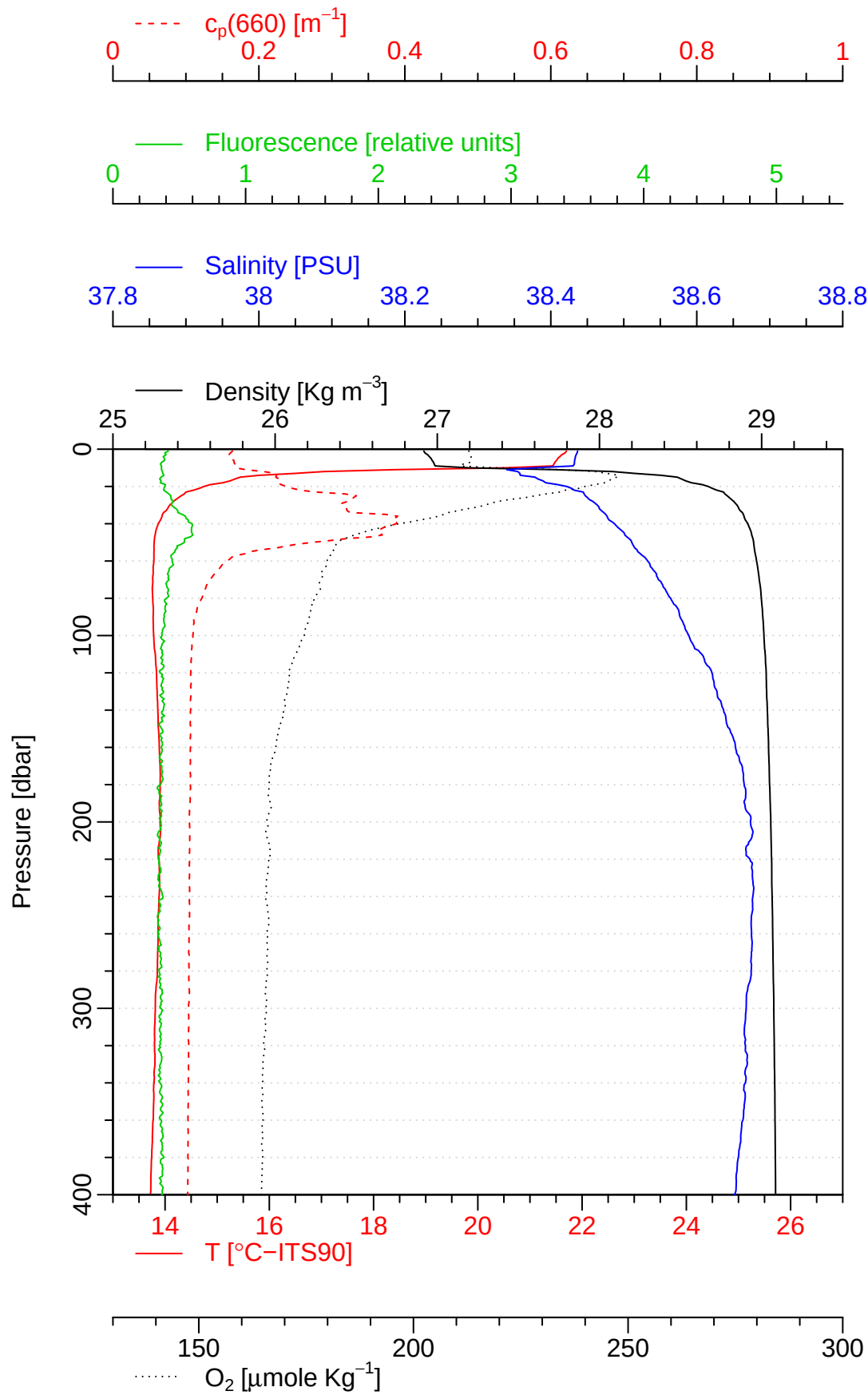
Latitude = 43 22.267 N



bous257_02

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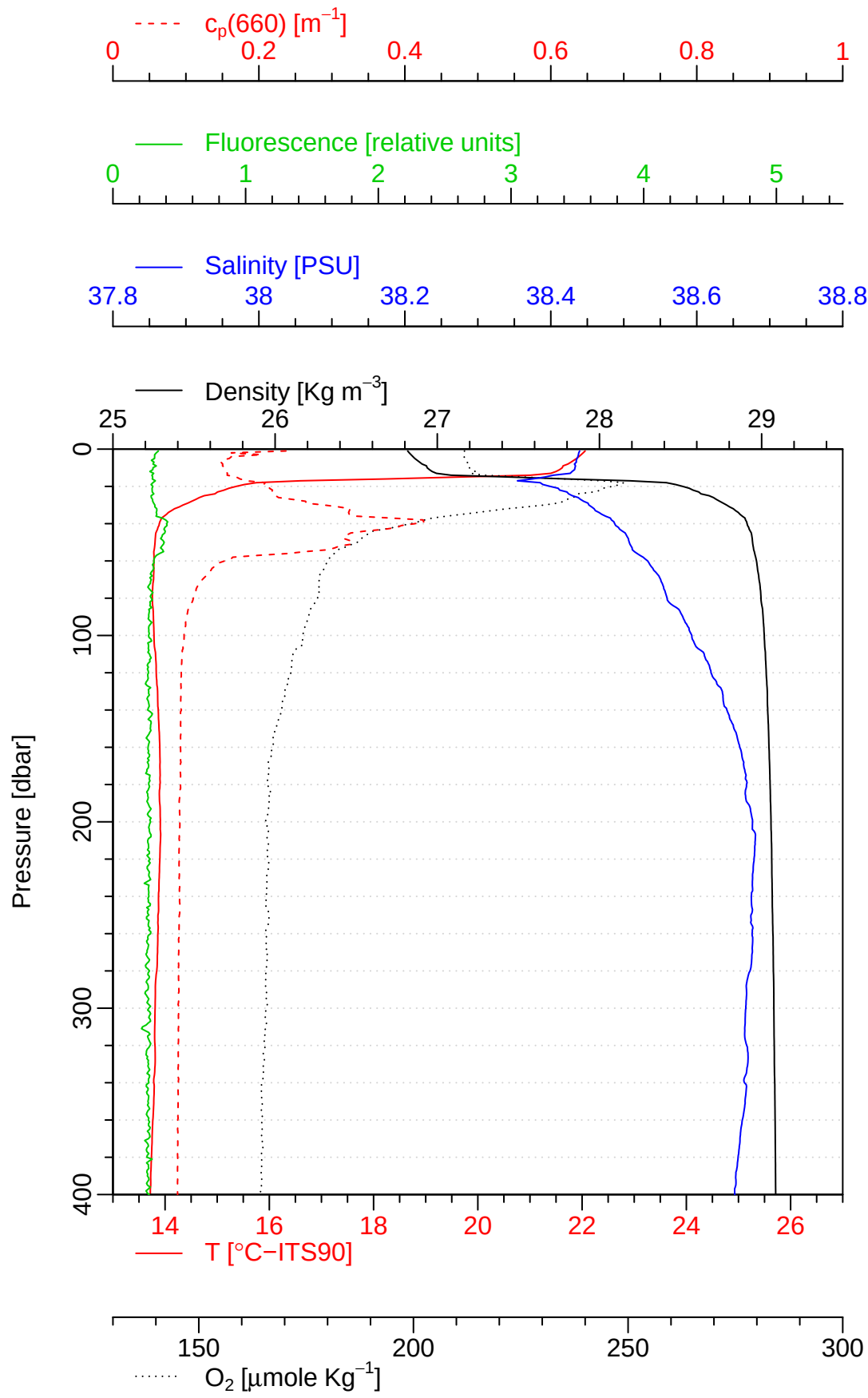
Longitude = 007 53.558 E
Latitude = 43 22.349 N



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