

BOUSSOLE Monthly Cruise Report

Cruise 195

May 15-16, 2018

Duty Chief: Melek Golbol (golbol@obs-vlfr.fr)

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

Science Personnel: Céline Dimier and Melek Golbol.

Laboratoire d'Océanographie de Villefranche (LOV), 06230 Villefranche-sur-Mer, France



A bird is sheltering under the CTD on the deck of the R/V Téthys II during the way to the BOUSSOLE site.

BOUSSOLE project

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

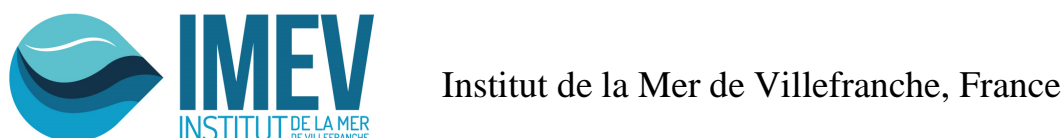
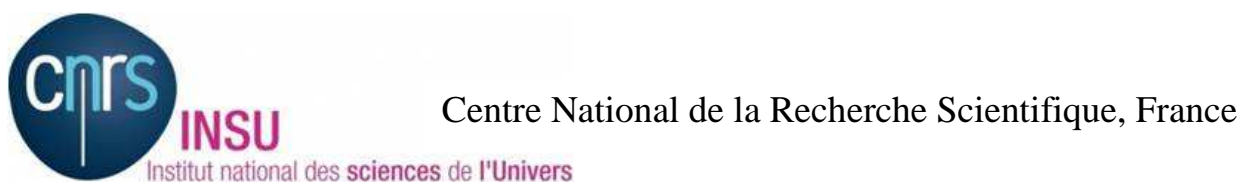
May 30, 2018



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



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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. 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 C-OPS 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. 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 Hydrosat-6) and a multispectral beam transmissometer (Hobilabs Gamma-4). Two CTD casts are to be performed at each data acquisition at the BOUSSOLE site: one cast with, and one cast without, a 0.2 μ m filter added on the a-sphere for the dissolved matter absorption measurements.

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 replicates 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).

In addition, water samples are to be collected at two depths (5 m and 10 m) for dissolved oxygen (DO), total alkalinity (TA) and total inorganic carbon (TC) analysis (from March 2014). This operation is part of the BIO CAREX ANR project, in collaboration with the LOCEAN in Paris (J. Boutin and collaborators). The TA/TC samples will be processed by the National service for such analyses (SNAPOCO – LOCEAN in Paris). The results will allow checking the data collected by the two pCO₂ CARIOCA sensors installed on the buoy at 3m and 10m.

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 first day was used for CTD casts with water sampling and for a Secchi disk at the BOUSSOLE site. Problems appeared during the third CTD deployment. The second day was used for CTD casts with water sampling, for optical profiles, for water sampling and for a Secchi disk at the BOUSSOLE site. Unfortunately, the problems on the CTD were not resolved. Maintenance on the top of the buoy was performed the last day.

Tuesday 15 May 2018

The sea state was slight with a gentle breeze. The sky was overcast and the visibility was good. A Secchi disk was performed. Then a CTD cast with water sampling was performed. A problem appeared with the pump,

which took a long time to turn on. A cap was put on the Hydrosat-6 for dark measurements and a 0.2 μm filter on the a-Sphere absorption meter for the dissolved matter absorption measurements.

A second CTD cast was performed but we had to stop it at 280 m because the ship drifted in direction of the buoy. Then, a third CTD deployment was attempted but failed because the pump did not turn on. The CTD was deployed again but the pump take a long time before turning on and there were spikes on the CTD profiles under 200 m. It was not possible to close the Niskin bottles from the software. So it was not possible to sample water. C-OPS profiles were not performed because the sky conditions were not optimal (many clouds and unstable irradiance).

Wednesday 16 May 2018

The sea state was slight with a moderate breeze. The sky was blue and the visibility was good. A CTD cast with water sampling was performed at the BOUSSOLE site. The same problems appeared as the day before, however, with spikes on the profile under 280 m and Niskin bottles not closing (so no water sampling). The electrocarrier cable was tested by the chief engineer during lunch time. It appeared that the resistance values were low but the chief engineer waited an information from his colleague. A second CTD cast was attempted after the lunch and failed. The CTD was tested on board with the test cable. It functioned correctly. It was tested again with the electrocarrier cable. The connection with the deck unit failed. It appeared that the electrocarrier cable of the board was faulty.

It was decided to perform an IOP cast without the CTD Rosette. A 0.2 μm filter was put on the a-Sphere absorption meter for the dissolved matter absorption measurements. Water was sampled with a bucket in surface for HPLC, a_p and TSM measurements. Then 2 C-OPS profiles were performed. The profiles had to be stopped because of many clouds and unstable irradiance. Then a Secchi disk was performed and the ARGOS beacon was cleaned on the top of the buoy before returning to the Nice harbour.

Pictures taken during this cruise can be found at:

<https://photos.app.goo.gl/FDLfybAdfH5TGp6F2>

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 15 May 2018 (UTC)

People on board: Céline Dimier and Melek Golbol.

0700 Departure from the Nice harbour.
1030 Arrival at the BOUSSOLE site.
1115 Secchi disk 01, 16 m.
1135 CTD 01, 400 m with water sampling at 5 m for TSM (with 0.2 μm filter on a-Sphere and cap on HS-6).
1215 CTD 02, 280 m.
1310 CTD 03, 400 m. Water sampling failed.
1350 No C-OPS (many clouds and unstable irradiance).
1400 Departure to the Nice harbour.
1715 Arrival at the Nice harbour.

Wednesday 16 May 2018 (UTC)

People on board: Céline Dimier and Melek Golbol.

0535 Departure from the Nice harbour.
0905 Arrival at the BOUSSOLE site.
0915 CTD 04, 400 m. Water sampling failed.
1000 Lunch
1100 CTD attempt: failed.
CTD tests
1200 IOP 05, 400m (with 0.2 μm filter on a-Sphere).

1215 Water sampling at surface with bucket for HPLC, a_p and TSM.
1240 C-OPS 01, 02.
1330 Secchi, disk 02, 15 m.
1330 Cleaning of ARGOS connector (top of the buoy).
1345 Departure to the Nice harbour.
1700 Arrival at the Nice harbour.

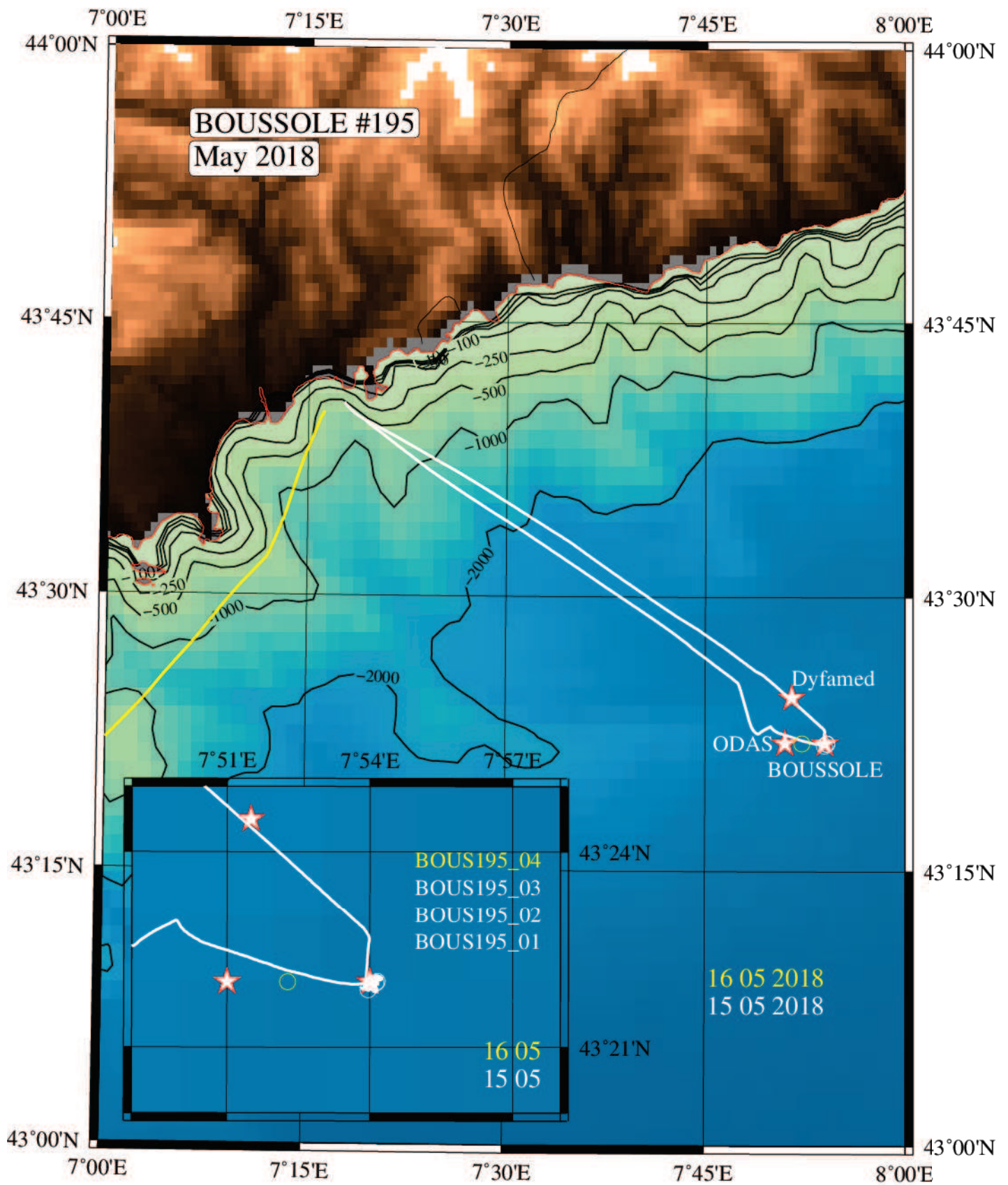
Problems identified during the cruise

- Diving and maintenance operations of the buoy were not carried out because the buoy is currently not functioning. The faulty data acquisition system will be replaced during the next rotation of the upper superstructure of the buoy.
- A problem appeared with the CTD. Firstly, the pump took a long time before turning on. For the CTD 03, the pump did not turn on at all. The connection between the pump and the CTD was checked and cleaned. But the problem persisted. The problem was solved the second day: sea water was injected in the pump circuit before the deployment. Another problem appeared during the CTD casts: there were spikes on the data under 200 m depth and it was not possible to close the Niskin bottles to sample water. The alarm of the deck unit sounded intermittently. Firstly, the problem was thought to originate from our CTD. But the problem persisted and the electrocarrier cable was tested. It appeared that it was faulty. It was repaired the last day during the way back to the Nice harbour.
- It was not possible to sample water for HPLC, a_p , O_2 and TA/TC due to the problem with the CTD Rosette. So only one sample was collected from the surface with a bucket for HPLC, a_p and TSM measurements.

Appendices

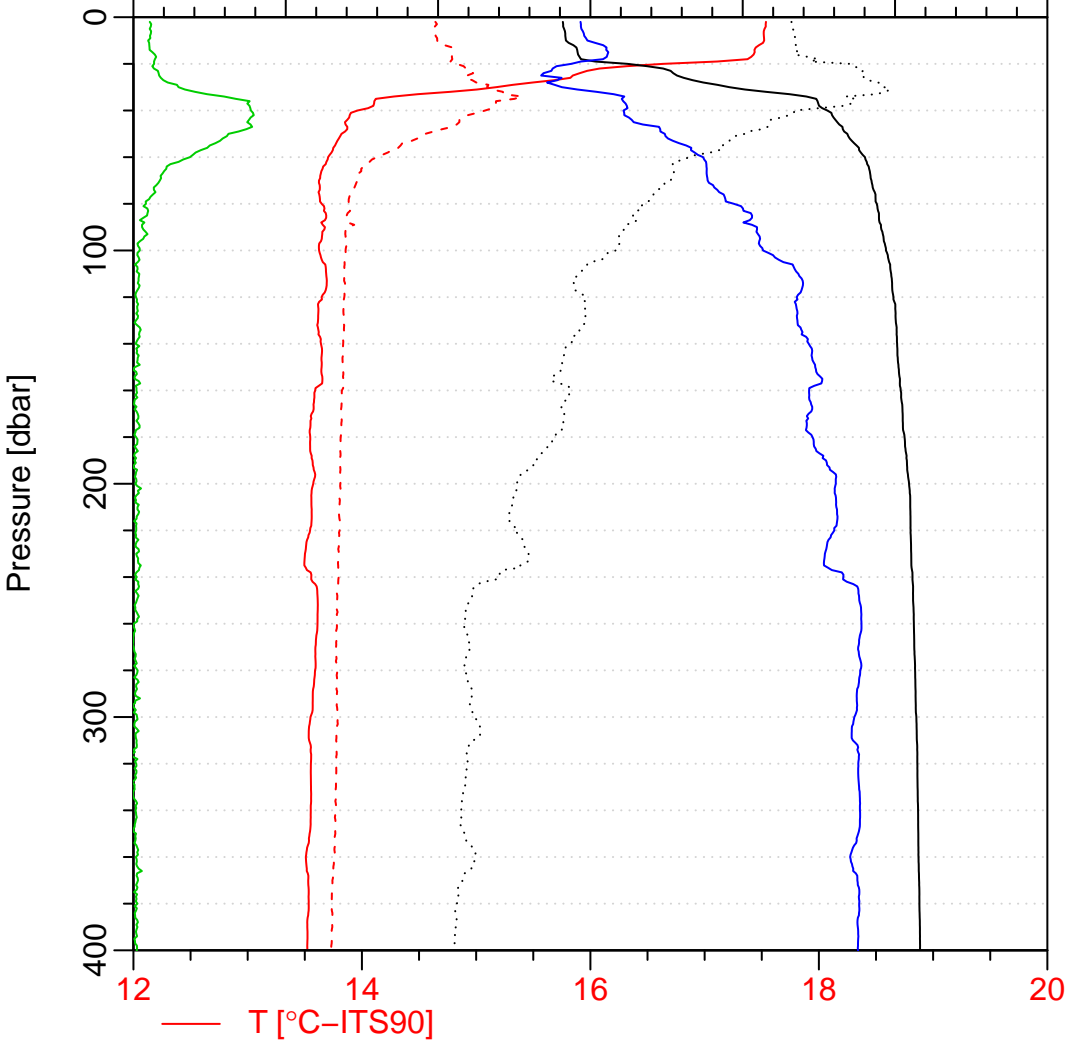
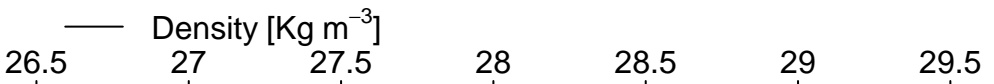
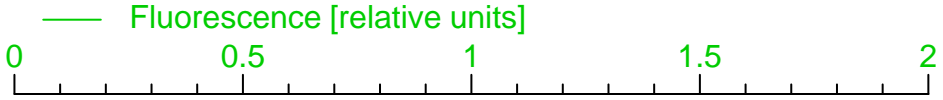
Cruise Summary Table for Boussole 195

Date	Black names (file ext: ".raw")	Profile names (file extension: ".raw")	CTD notes	Other sensors	Start Time		Depth max (meter)	Latitude (N)			Longitude			Weather		Atm. Pressure (hPa)	Humidity (%)	Visibility	T air	T water	Sea		Whitecaps	
					GMT (hour.min)	Duration (min.sec)		(Degree)	(Minute)	(Degree)	(Minute)	Sky	Clouds	Quantity (#/8)	Wind sp. (kn)						Wind dir.	Swell H (m)		Swell dir.
15/05/18				Secchi01	11:15	4:00	16	43	22	7	54	overcast		7			good							
			BOUS195_01	TSM	11:33	22:00	400	43	22.000	7	54.157	overcast		7	9	250	1011.1	75	15.1	17.52	slight			
			BOUS195_02		12:13	12:00	280	43	21.978	7	54.128	overcast		7	8	227	1011.1	73	14.9	17.60	slight			
			BOUS195_03		13:09	34:00	400	43	21.974	7	53.966	cloudy		5	5	224	1011.2	63	15.6	17.56	slight			
16/05/18			BOUS195_04		09:15	26:00	400	43	21.936	7	52.274	cloudy		6	5	183	1014.2	75	17.1	17.69	slight			
				IOP05	12:02	24:00	400	43	21.861	7	53.695	overcast		7	3	74	1014.7	75	17.5	19.00	slight			
				HPLC, Ap & TSM	12:15	5:00	0	43	22	7	54	overcast		7				good						
		bou_c-ops_180516_1224_001_data.csv			12:40	0:50	17	43	22.195	7	53.549	cloudy	St	5	3	106	1014.7	74	good	17.7		slight	0.9	no
		bou_c-ops_180516_1224_002_data.csv			12:44	1:35	35	43	22.264	7	53.471	cloudy	St	5	3	106	1014.7	74	good	17.7		slight	0.9	no
					Secchi02	13:30	4:00	15	43	22	7	54	cloudy		7			good						



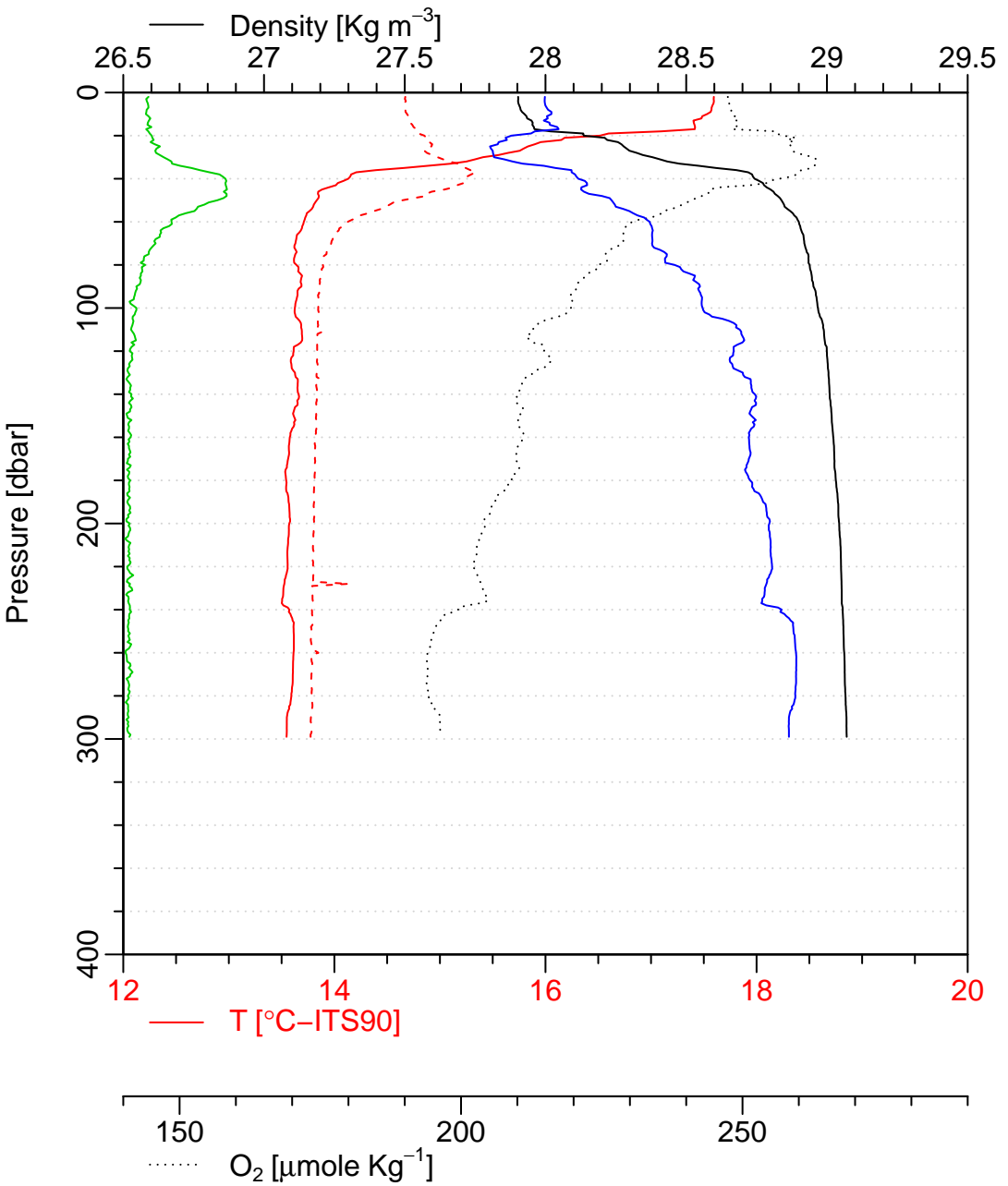
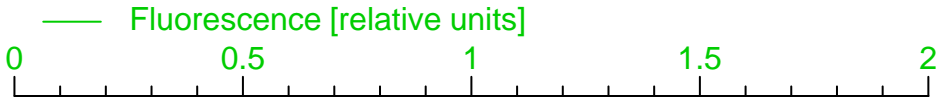
bous195_01

Date = 15/05/2018
Heure debut [TU] = 11:33
Longitude = 007 54.157 E
Latitude = 43 22.000 N



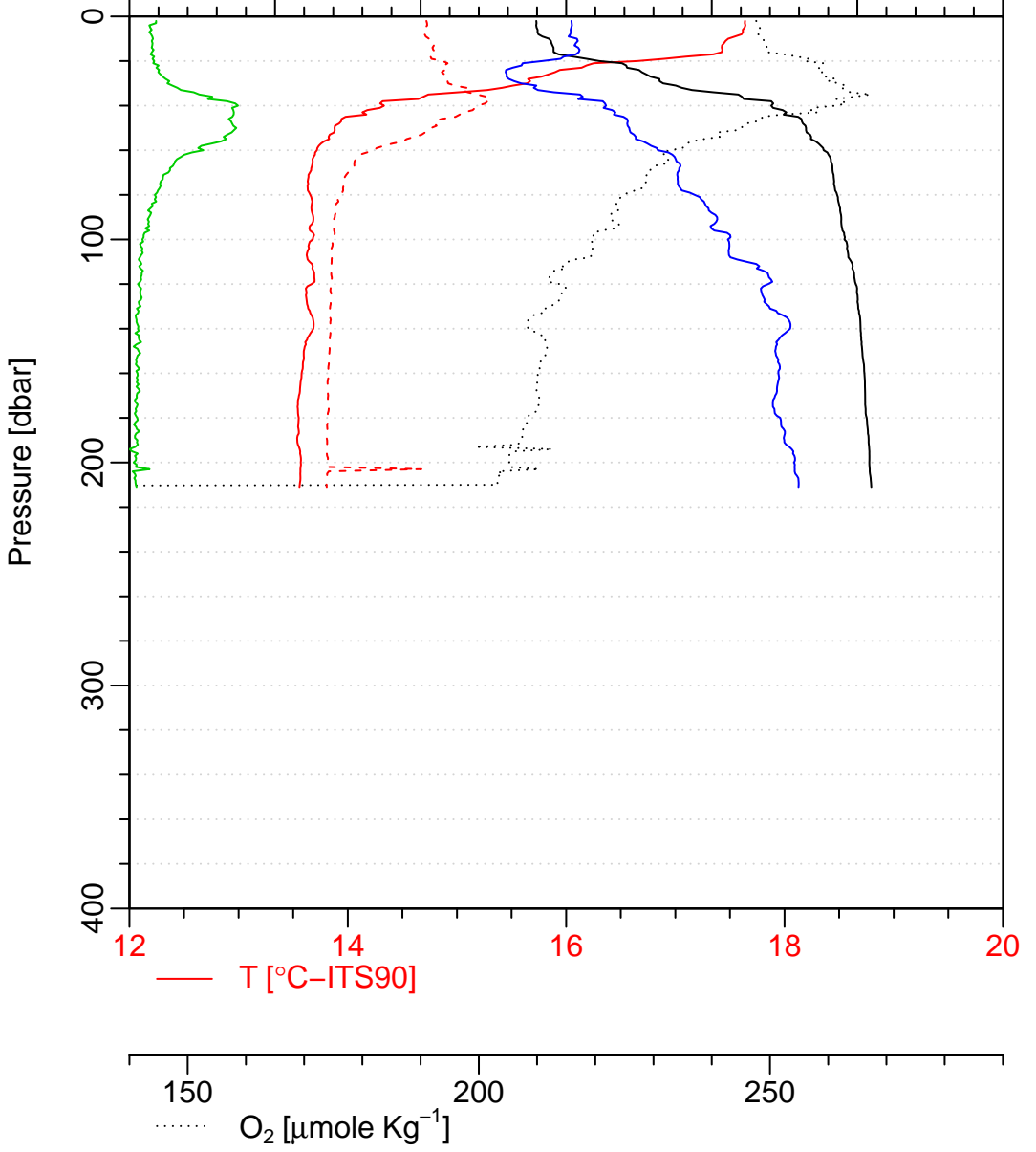
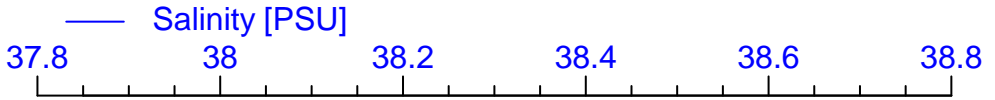
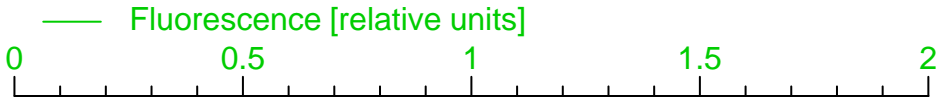
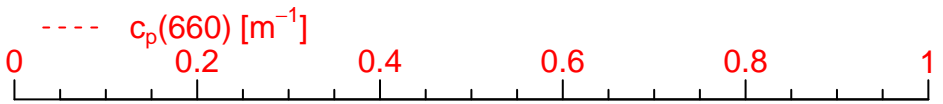
bous195_02

Date = 15/05/2018
Heure debut [TU] = 12:13
Longitude = 007 54.128 E
Latitude = 43 21.978 N



bous195_03

Date = 15/05/2018
Heure debut [TU] = 13:09
Longitude = 007 53.966 E
Latitude = 43 21.874 N



bous195_04

Date = 16/05/2018
Heure debut [TU] = 09:15
Longitude = 007 52.274 E
Latitude = 43 21.996 N

