

BOUSSOLE Monthly Cruise Report

Cruise 185

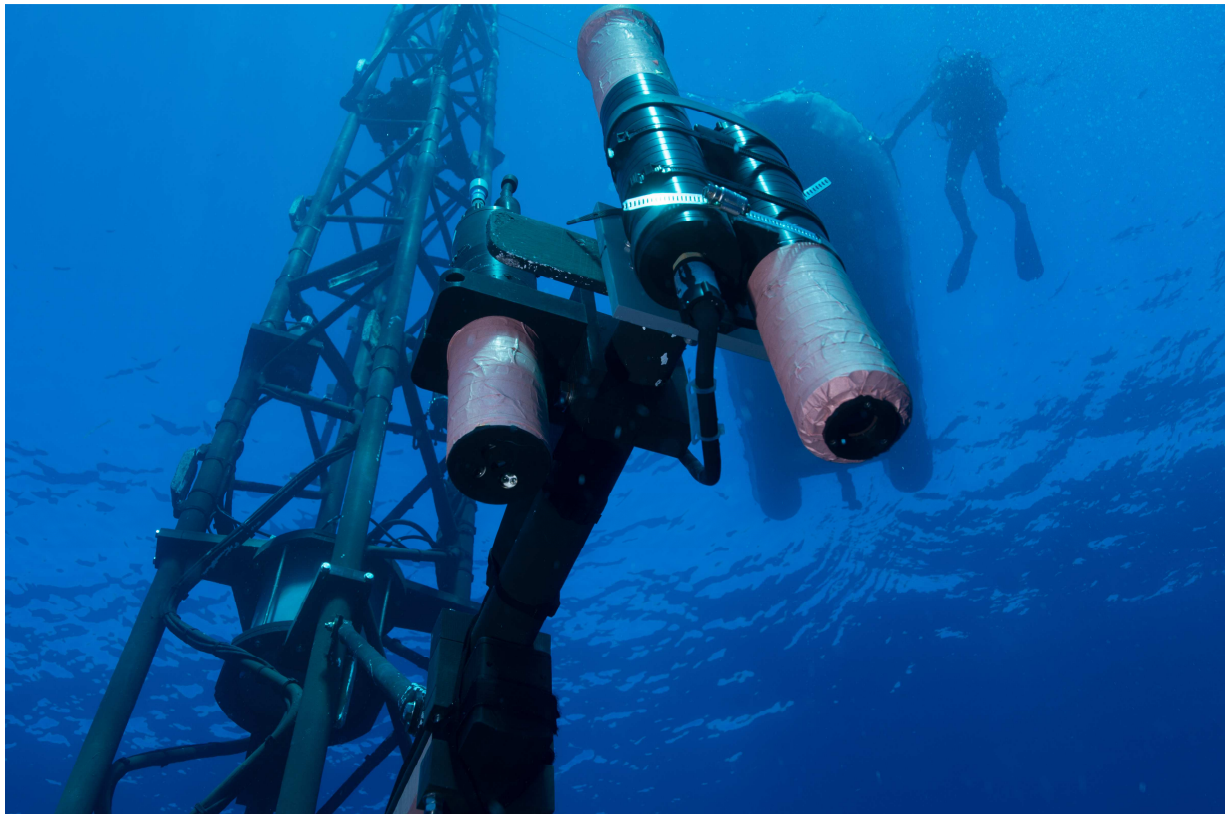
July 02-03, 2017

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

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

Science Personnel: Melek Golbol, David Luquet, Didier Robin, Judicaël Rivier, Eduardo Soto Garcia and Vincenzo Vellucci.

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



Multi-channel fluorimeter (instrument on the left side of the picture) and the hyperspectral radiometers (right) measuring E_d and L_u installed on the BOUSSOLE buoy at 9 m depth.

BOUSSOLE project

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

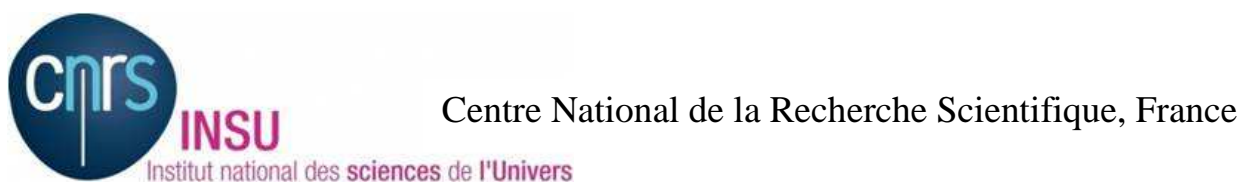
July 27, 2017



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 BIOCAREX 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

Two water samples for cytometry analysis were collected at 10 m depth in the frame of a collaboration with Collin Roesler (Bowdoin College, Maine, USA), about the installation of an ECO 3X1M multi-channel fluorimeter on the BOUSSOLE buoy at 9 m depth.

The first day of the cruise, a ProVal profiling float (developed by the marine optics and remote sensing group of the Laboratoire d'Océanographie de Villefranche) was recovered at 8 miles from to the BOUSSOLE site in order to be redeployed at the BOUSSOLE site the second day.

The second day, maintenance was performed on the BOUSSOLE buoy because problems had appeared on the buoy data:

- Cables of E_d and L_d radiometers, which connect these instruments to the STOR-X (data logger of hyperspectral radiometers), were inverted during the preparation of the upper superstructure of the buoy before its launch. So they were reconnected at their right locations by the divers.
- The configuration of the strain gauge was modified because no data were acquired since the launch of the buoy.
- The ARGOS beacon at the top of the buoy was replaced because it was not working.

Cruise Summary

The first day was used for optical profiles, for CIMEL measurements and for CTD casts with water sampling at the BOUSSOLE site. Then, a profiling float was recovered at 8 nautical miles from the BOUSSOLE site. The second day was used for diving operations, for CTD casts with water sampling, for CIMEL measurements and for optical profiles. The profiling float deployment was attempted and then cancelled after three failed attempts to communicate with the float. Zooplankton nets and a deep CTD cast were performed at the DYFAMED site for the MOOSE DYFAMED program.

Sunday 02 July 2017

The sea state was slight with a light breeze. The sky was blue and the visibility was good. This day, 3 C-OPS profiles, 2 CTD casts with water sampling, 3 CIMEL measurements and 1 Secchi disk were performed at the BOUSSOLE site. Then, the ProVal profiling float was recovered at 8 nautical miles from the BOUSSOLE site before returning to the Nice harbour.

Monday 03 July 2017

The sea state was slight with a light breeze. The sky was blue and the visibility was good. Divers went at sea to perform maintenance on the buoy. Firstly, the connectors of the STOR-X at 9 m depth were checked: cables of E_d and L_u were inverted before the launch of the buoy. So the divers reconnected the cables at their right locations. Then, underwater sensors were cleaned, dark measurements of the transmissometer and the backscattering meter were performed and pictures were taken. The ARGOS beacon at the top of the buoy was replaced. Buoy data were downloaded using the cable available at the top of the buoy and surface sensors were cleaned. The configuration of the strain gauge was modified because the sensor was not working since the deployment of the buoy. Then, 2 CTD casts with water sampling, 3 CIMEL measurements, 3 C-OPS profiles, and 1 Secchi disk were performed at the BOUSSOLE site. Finally 3 zooplankton nets and a deep CTD cast were performed at the DYFAMED site to complete the MOOSE DYFAMED program before returning to the NICE harbour.

Pictures taken during this cruise can be found at:

https://get.google.com/albumarchive/114686870380724925974/album/AF1QipPpDrsD5DL6V4zUflB8L8Vj9_2oWWhtuoUYhRe

Data from the BOUSSOLE cruises and buoy are available at:

http://www.obs-vlfr.fr/Boussole/html/boussole_data/login_form.php

Cruise Report

Sunday 02 July 2017 (UTC)

People on board: Melek Golbol and Eduardo Soto Garcia.

0645 Departure from the Nice harbour.
1045 Arrival at the BOUSSOLE site.
1110 C-OPS 01, 02, 03.
1200 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 .
1205 CIMEL 01, 02, 03.
1325 CTD 02, 50 m with water sampling at 10 and 5 m for TA/TC, O_2 and TSM.
1340 Secchi 01, 24 m.
1345 Departure to the site of profiling float recovery.
1515 Profiling float recovery.
1525 Departure to the Nice harbour.
1900 Arrival at the Nice harbour.

Monday 03 July 2017 (UTC)

People on board: Melek Golbol, David Luquet, Didier Robin, Judicaël Rivier, Eduardo Soto Garcia and Vincenzo Vellucci.

0515 Departure from the Nice harbour.
0835 Arrival at the BOUSSOLE site.
0845 Diving operations: maintenance, cleaning, dark measurements, pictures.
0850 CTD 03, 20 m with water sampling at 5 m for TSM.
0900 CIMEL 04, 05, 06.
0900 First connection with the buoy and data retrieval. Buoy data check.
Replacement of the ARGOS beacon on the top of the buoy.
Modification of configuration of the strain gauge.
1000 Second connection with the buoy and data retrieval.
Cleaning of surface sensors.
1025 CTD 04, 400 m with water sampling at 400, 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p and cytometry.
1125 C-OPS 04, 05, 06.
1210 First attempt of profiling float deployment: failed.
1225 Second attempt of profiling float deployment: failed.
1245 Third attempt of profiling float deployment: failed.
1250 Departure to the DYFAMED site.
1310 Arrival at the DYFAMED site.
1315 Zooplankton nets x 3 for MOOSE DYFAMED program.
1405 Deep CTD cast, MOOSE 110, 2350 m with water sampling for MOOSE DYFAMED program.
1635 Departure to the Nice harbour.
1900 Arrival at the Nice harbour.

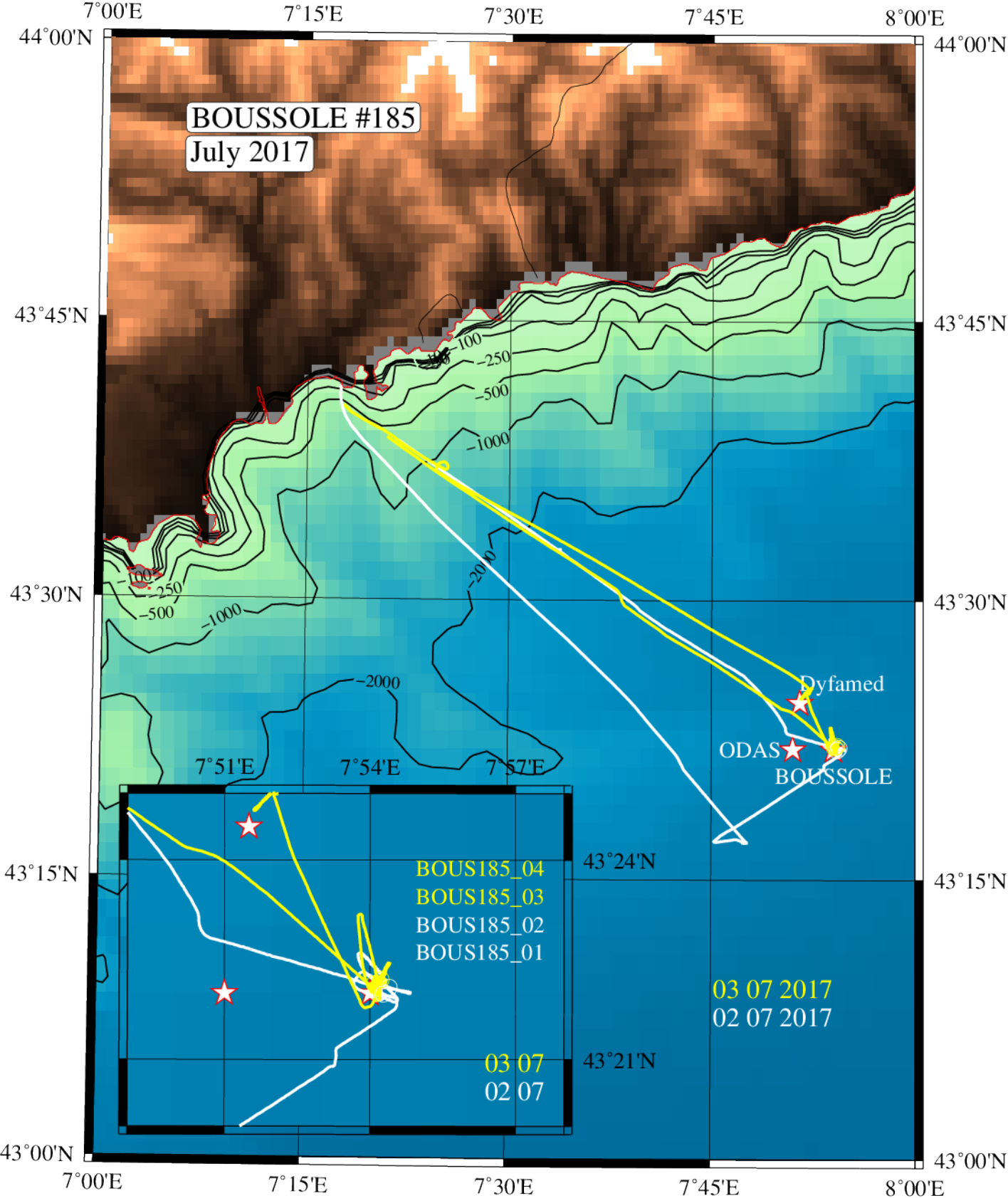
Problems identified during the cruise

- The IOP package was not available for this cruise because it was sent to the manufacturer for calibration and repair.
- Problems had appeared on the buoy data after the launch of the buoy. It seemed that the E_d and L_u cables, which connect these instruments to the STOR-X at 9 m depth, were inverted during the preparation of the upper superstructure of the buoy. E_d and L_u cables were reconnected on the STOR-X at their right location. It appeared that L_u data were good but there was no data for the E_d radiometer. This problem could be due to the connection between the E_d cable and the STOR-X. It was apparently difficult for the divers to manipulate the E_d cable. Maybe the cable is broken. This will have to be addressed at the next servicing cruise.
- Downloading data from the buoy with AK connector was attempted two times but failed. The data were retrieved using the automatically connection, which happen at every hour.
- The profiling float could not be deployed the second day of the cruise. Three deployments were attempted but failed because the system was not starting: no continuous beep were heard from the system according to the protocol.

Appendices

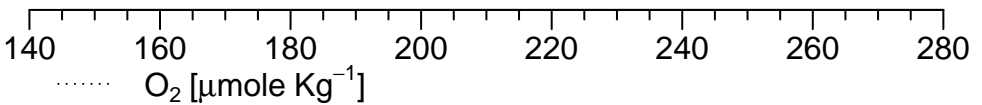
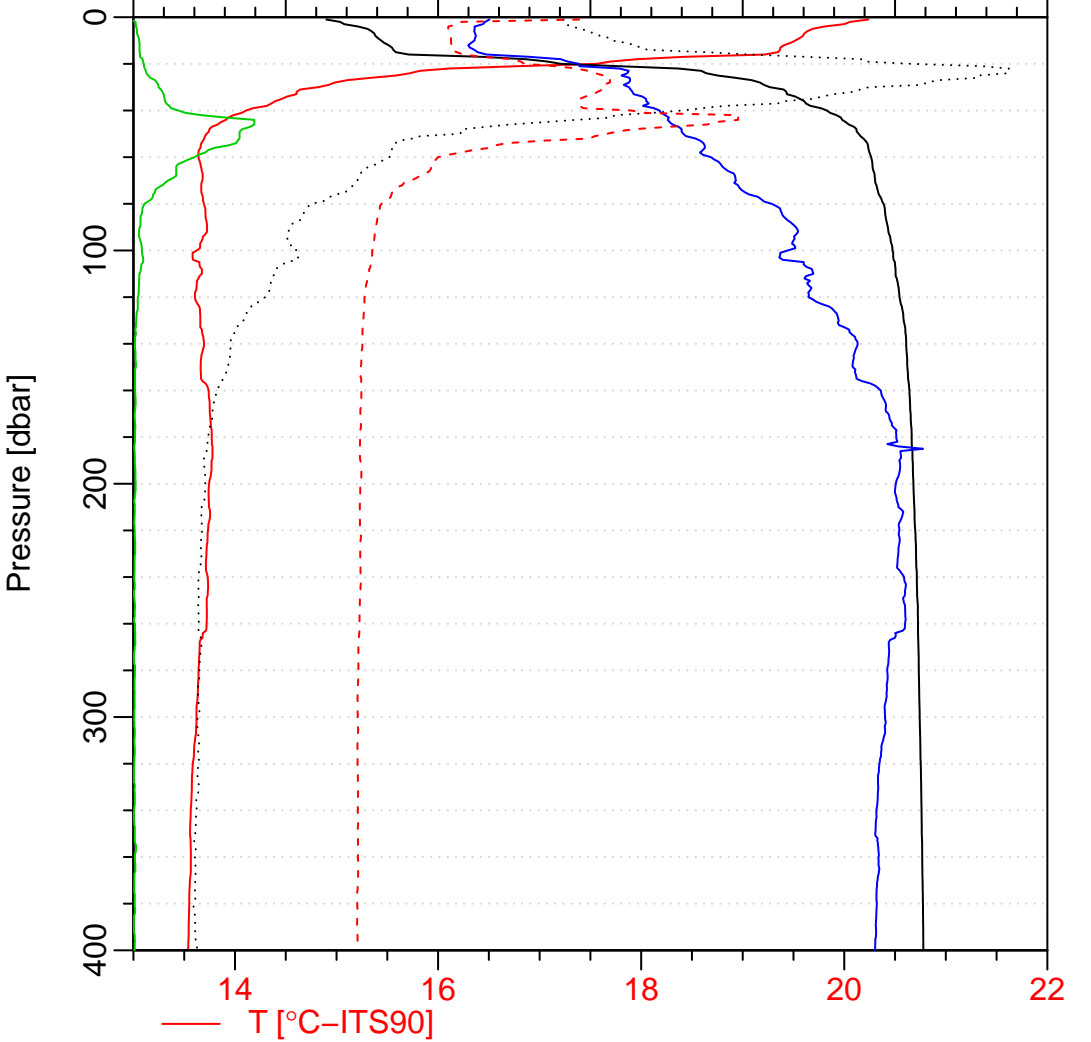
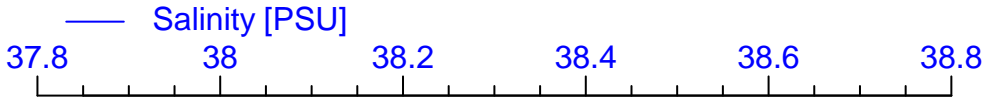
Cruise Summary Table for Boussole 185

Date	Black names (file ext: ".raw")	Profile names (file extension: ".raw")	CTD notées	Other sensors	Start Time		Depth max (meter)	Latitude (N)		Longitude		Sky	Clouds	Quantity (#/8)	Weather		Atm. Pressure (hPa)	Humidity (%)	Visibility	T air	T water	Sea		Whitecaps	
					GMT (hour.min)	Duration (min.sec)		(Degree)	(Minute)	(Degree)	(Minute)				Wind sp. (kn)	Wind dir.						Sea Swell H (m)	Swell dir.		
02/07/17		bou_c-ops_170702_1058_001_data.csv			11:09	4:32	111	43	22.268	7	54.241	blue	Cl, Cs	2	0	238	1016.5	79	good	21.1		calm	1	no	
		bou_c-ops_170702_1058_002_data.csv			11:20	4:22	108	43	22.373	7	54.121	blue	Cl, Cs	2	0	238	1016.5	79	good	21.1		calm	1	no	
		bou_c-ops_170702_1058_003_data.csv			11:31	4:52	122	43	22.464	7	54.002	blue	Cl, Cs	2	0	238	1016.5	79	good	21.1		calm	1	no	
			CIMEL01			12:07	6:00		43	22.09	7	54.365	blue		0			1016.4							
			CIMEL02			12:18	6:00		43	22.09	7	54.365	blue		0			1016.4							
			CIMEL03			12:27	5:00		43	22.09	7	54.365	blue		0			1016.4							
			BOUS185_01		HPLC & Ap	12:04	28:00	400	43	22.084	7	54.394	blue		2	4	267	1016.4	79		21.1	20.14	calm		
			BOUS185_02		O2_TA/TC & TSM	13:26	6:00	50	43	21.982	7	54.275	blue		3	5	282	1016.2	80		20.0	19.98	calm		
				Secchi01	13:40	4:00	24	43	22	7	54	blue		3					good			calm			
03/07/17				BOUS185_03	08:53	4:00	400	43	22.138	7	54.090	blue		2	5	131	1019.4	83		22.0	20.40	calm			
				TSM	09:03	4:00		43	22.174	7	54.106	blue		0			1019.5								
				CIMEL01	09:13	4:00		43	22.174	7	54.106	blue		0			1019.5								
				CIMEL02	09:21	2:00		43	22.174	7	54.106	blue		0			1019.5								
				CIMEL03	09:30	4:00	24	43	22	7	54	blue		0					good			calm			
				Secchi02	10:24	33:00	400	43	22.202	7	54.230	blue		2	6	164	1019.8	85		21.7	20.60	calm			
			BOUS185_04		HPLC, Ap & Cyto	11:23	4:02	96	43	22.352	7	54.108	blue		0	5	199	1019.8	84	good	22.1		calm	0.6	no
		bou_c-ops_170703_1058_001_data.csv				11:35	3:36	86	43	22.648	7	54.007	blue	None	0	5	199	1019.8	84	good	22.1		calm	0.6	no
	bou_c-ops_170703_1058_002_data.csv				11:35	3:36	86	43	22.648	7	54.007	blue	None	0	5	199	1019.8	84	good	22.1		calm	0.6	no	
	bou_c-ops_170703_1058_003_data.csv				11:45	3:17	78	43	22.909	7	53.915	blue	None	0	5	199	1019.8	84	good	22.1		calm	0.6	no	



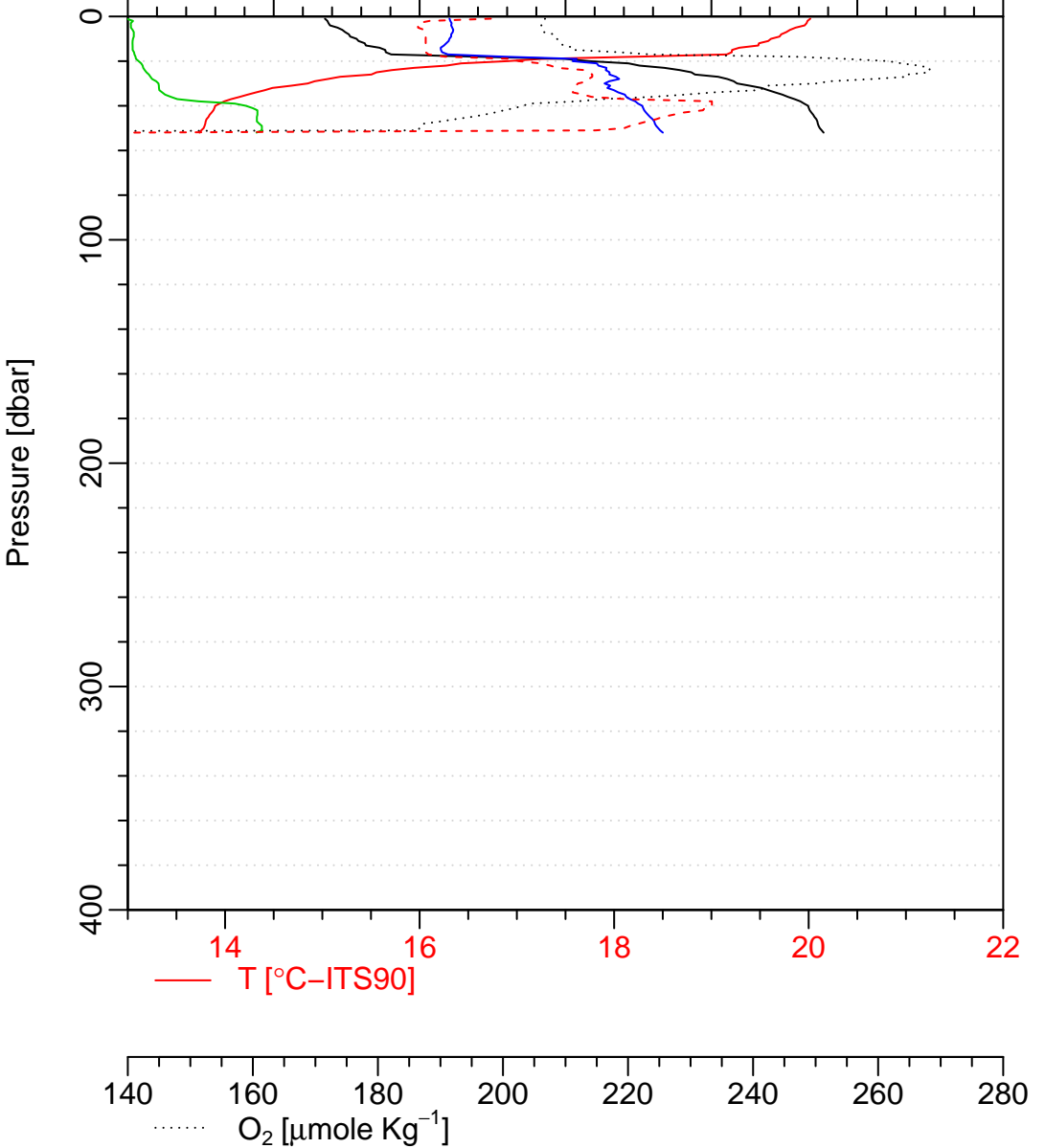
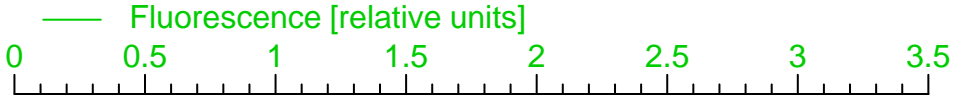
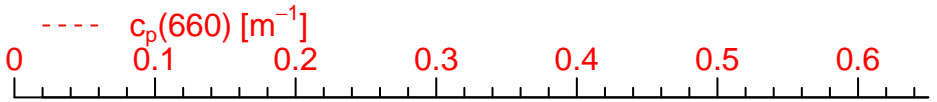
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Heure debut [TU] = 12:04
Longitude = 007 54.394 E
Latitude = 43 22.084 N



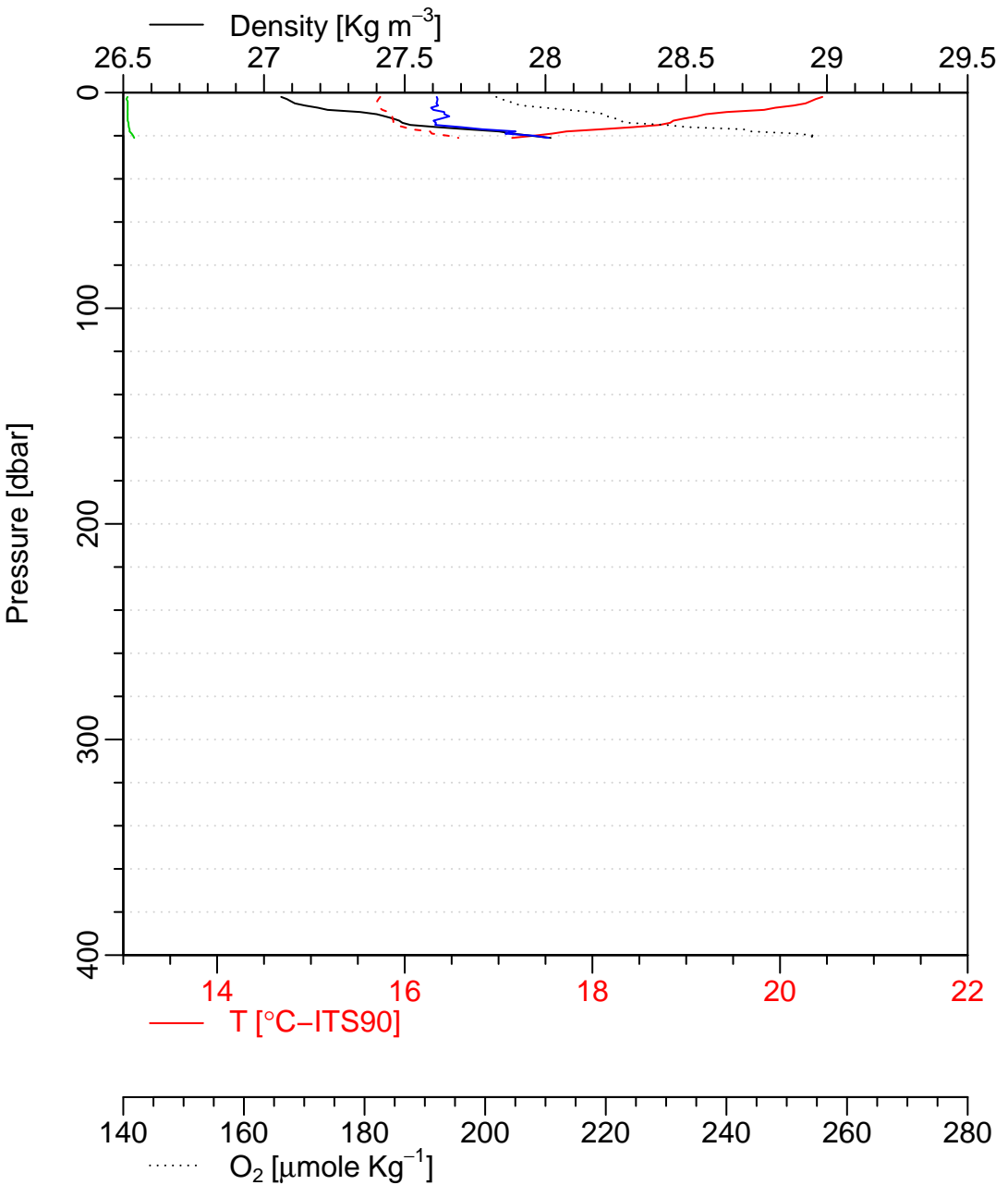
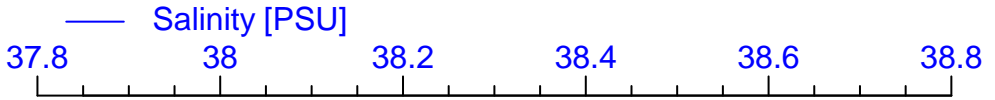
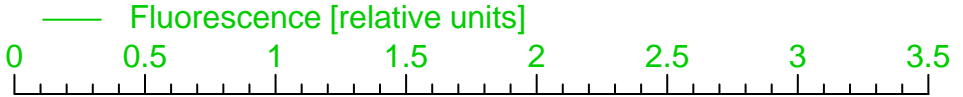
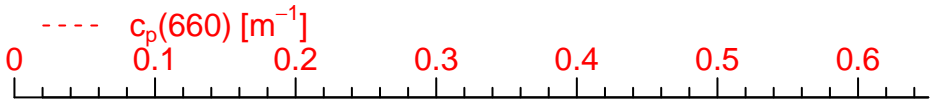
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Latitude = 43 21.982 N



bous185_03

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Heure debut [TU] = 08:53
Longitude = 007 54.090 E
Latitude = 43 22.138 N



bous185_04

Date = 03/07/2017

Heure debut [TU] = 10:24

Longitude = 007 54.230 E

Latitude = 43 22.202 N

