BOUSSOLE Monthly Cruise Report

Cruise 198
July 26-27, 2018

Duty Chief: Melek Golbol (golbol@obs-vlfr.fr)
Vessel: R/V Sagitta III
(Captain: Jean-Yves Carval)

Science Personnel: Melek Golbol, Loic Le Ster and Eduardo Soto Garcia.

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A fin whale was seen in the vicinity of the BOUSSOLE site.

BOUSSOLE project

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

August 09, 2018

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

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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 Hydroscat-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 0.2µm 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 pCO_2 CARIOCA sensors installed on the buoy at 3 m and 10 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

In the frame of the collaboration with the LOCEAN, divers installed a newly calibrated CTD at 3 m and a newly calibrated pCO_2 CARIOCA sensor at 10 m depth in replacement of the sensor recovered in 29th June 2018. All recovered sensors will be sent to LOCEAN for servicing and calibration.

Cruise Summary

The R/V *Téthys II* was not available in July 2018. So we decided to use the *R/V Sagitta III* to perform the BOUSSOLE operations. The first day was used to perform diving operations. The second day was used to perform optical profiles, CTD casts, deployments of the IOP package, a Secchi disk and water sampling at the BOUSSOLE site.

Thursday 26 July 2018

This day was used only for diving operations. When arrived at BOUSSOLE, divers went at sea to clean the instruments, to take photos and to install the CTD at 3 m and the pCO_2 CARIOCA sensor at 10 m depth, before returning to the Villefranche-sur-Mer harbour.

Friday 27 July 2018

The sea state was smooth with a light breeze. The sky was blue and the visibility was excellent. When arrived at BOUSSOLE, 3 C-OPS profiles and then 1 CTD cast and 2 IOPs profiles were performed at the BOUSSOLE site. The Rosette could not be used with the R/V *Sagitta III*. So, the IOP package was deployed separately from the CTD. For the first cast, a cap was put on the Hydroscat-6 for dark measurements and a 0.2 µm filter on the a-Sphere absorption meter for the dissolved matter absorption measurements. Then, seawater was sampled with a bucket for TSM measurement and a Secchi disk was performed at the BOUSSOLE site. Finally, seawater was sampled directly with Niskin bottles using a messenger to close the bottles for HPLC and a_p measurements before returning to the Villefranche-sur-Mer harbour.

Pictures taken during this cruise can be found at:
https://photos.app.goo.gl/EApcemQUd5QM6rHA6

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

Cruise Report

Thursday 26 July 2018 (UTC)

People on board: Guillaume De Liège and David Luquet.

0630 Departure from the Villefranche-sur-Mer harbour.
1030 Arrival at the BOUSSOLE site.
1040 Diving operations: cleaning of sensors, installation of the CTD at 3 m and PCO_2 sensor at 10 m.
1130 Departure from BOUSSOLE site.
1530 Arrival to the Villefranche-sur-Mer harbour.

Friday 27 July 2018 (UTC)

People on board: Melek Golbol, Loic Le Ster (student), and Eduardo Soto Garcia.

0655 Departure from the Villefranche-sur-Mer harbour.
1100 Arrival at the BOUSSOLE site.
1110 C-OPS 01, 02, 03.
1230 CTD 01, 400 m.
1255 IOP 01, 400 m (with 0.2 µm filter on a-Sphere and cap on HS-6).
1320 IOP 02, 400 m.
1330 Seawater sampling with bucket at surface for TSM.
1330 Secchi 01, 26 m.
1340 Seawater sampling with Niskin bottles at 55 m (DCM) and 5 m for HPLC and a_p.
1345 Departure from the BOUSSOLE site.
1715 Arrival to the Villefranche-sur-Mer harbour.

Problems identified during the cruise

- Diving and maintenance operations of the buoy were not carried out completely 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. Only cleaning sensors, photos and maintenance on the autonomous sensors (CTD and PCO_2 sensors) were performed.

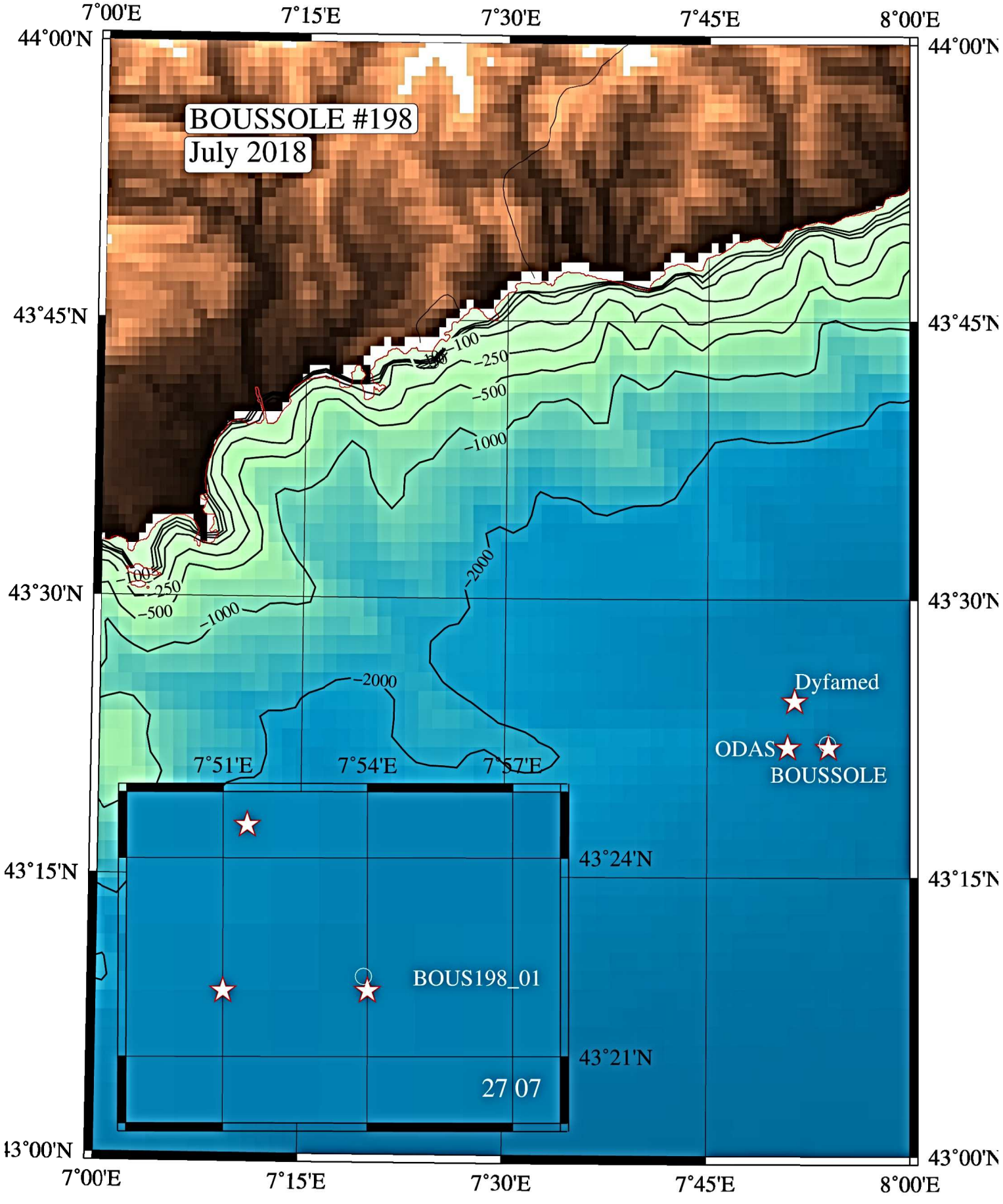
- It was not possible to use the main BOUSSOLE Rosette on the deck of the *Sagitta III*. So, the IOP package was deployed separately from the CTD and water sampling was performed directly with Niskin bottles and messengers.

- The navigation and meteorological files were not available for this cruise (so recording equipment onboard the Sagitta-III)

Appendices

Cruise Summary Table for Boussole 198

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)	(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
26/07/18	diving operations only																							
27/07/18		bou_c-ops_180727_1055_003_data.csv			11:09	7:59	186	43	22.221	7	53.800	blue	Sc	1	3.1	156	1012.0	NA	excellent	28.4		smooth	0.3		no
		bou_c-ops_180727_1055_004_data.csv			11:29	7:42	165	43	22.485	7	53.208	blue	Sc	1	3.1	156	1012.0	NA	excellent	28.4		smooth	0.3		no
		bou_c-ops_180727_1055_005_data.csv			11:45	6:57	152	43	22.642	7	52.954	blue	Sc	1	3.1	156	1012.0	NA	excellent	28.4		smooth	0.3		no
			BOUS198_01		12:28	12:00	400	43	22.209	7	53.923	blue		1	2	178	1011.0	73		27.9	26.54	smooth			
			IOP198_01		12:55	19:00	400	43	22.177	7	53.956	blue		1	2.4	173	1012.0	73		27.6	NA	smooth			
			IOP198_02		13:18	21:00	400	43	22.198	7	53.939	blue		1	3.7	86	1011.0	73		28.3	NA	smooth			
				Secchi01	13:30	4:00	26	43	22	7	54	blue		1					excellent			smooth			
				Niskin: HPLC, Ap	13:40	6:00	55	43	22	7	54	blue		1					excellent			smooth			



GMT 2018 Sep 11 05:27:54

bous198_01

Date = 27/07/2018
Heure debut [TU] = 12:28
Longitude = 007 53.923 E
Latitude = 43 22.209 N