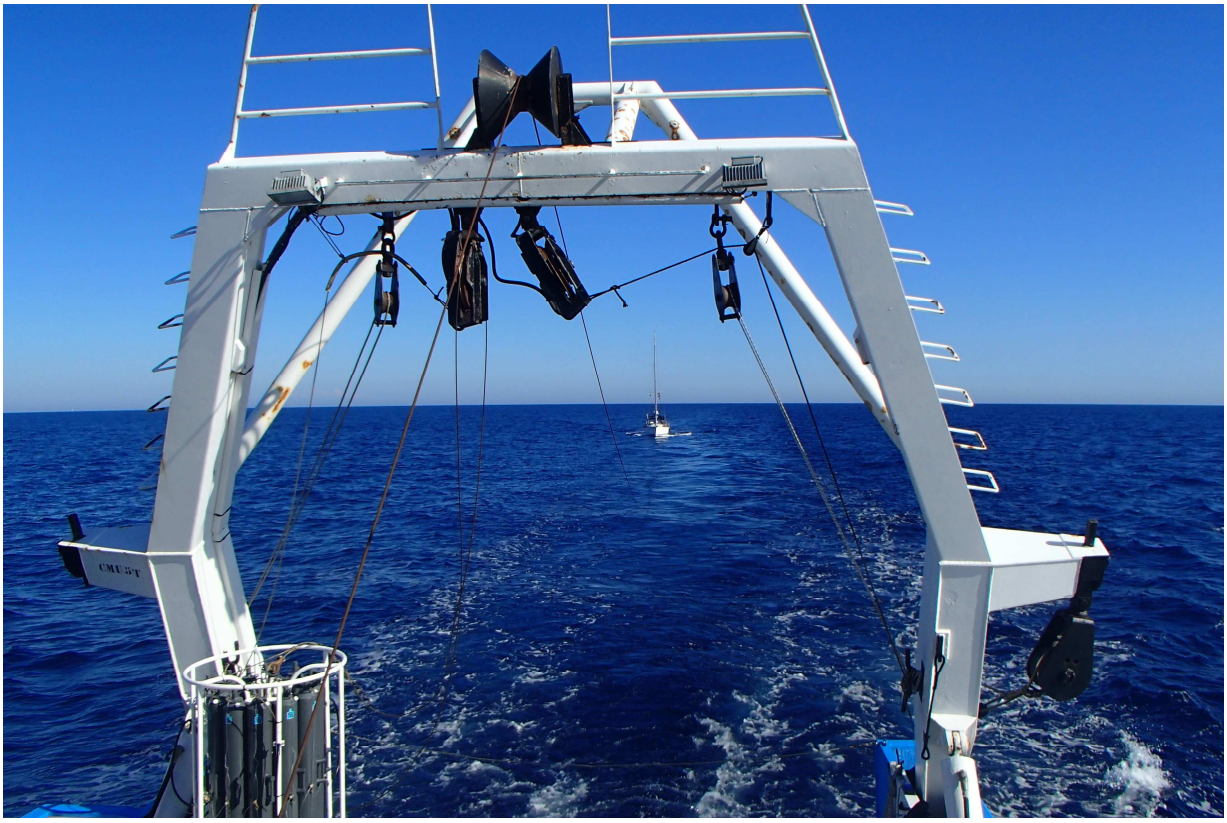
BOUSSOLE Monthly Cruise Report

Cruise 149
July 15 – 18, 2014

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

Science Personnel: Vlad Costache, Melek Golbol, Malika Kheireddine, David Luquet, Fabien Moullec, Grigor Obolensky, Baptiste Picard, Vincenzo Vellucci and Mehmet Yayla.

Laboratoire d'Océanographique de Villefranche (LOV), 06238 Villefranche sur mer cedex, France



A person fallen at sea from a sailing ship was rescued during the cruise. The sailing ship on the back of the *Téthys II* (picture) was towed to the Nice harbour.

BOUSSOLE project

ESA/ESRIN contract N° 13226/10/I-NB

September 24, 2014

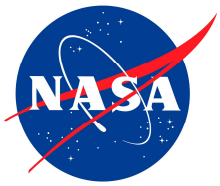
Foreword

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



National Aeronautics and Space Administration, USA

Centre National de la Recherche Scientifique, France

Université Pierre & Marie Curie, France

Observatoire Océanologique de Villefranche/mer, France

Contents

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). 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.

Operations that have to be performed in each cruise include:
- Collection and filtration of seawater samples for colored dissolved organic matter (from June 2005).

- One CTD transect is performed between the BOUSSOLE site and the Port of Nice. This transect consists of six fixed stations on-route from BOUSSOLE (see map in appendix). Whenever feasible, this transect should be performed at a similar time for each cruise, in order to minimise the influence of possible diurnal variability.

- 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 (5m and 10m) for 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 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

During the second day of the cruise, divers replaced the 4-m depth OCP (data logger of the radiometers and transmissometers) that did not work (no data transmission of sensors at 4m). The pCO2 carioca sensor at 10m was also not properly working, and was recovered and replaced with another one (data download via the telemetry cable that run to the top of the buoy failed during previous cruises).

Several CTD-fluorometer beacons that are planned to be deployed on elephant seals (by the CEBC-Centre d'Etudes Biologiques de Chizé) were tested during this cruise. They were installed on the CTD Rosette for comparison with the main CTD and fluorometer.

The third day, after completing the work at BOUSSOLE the profiling float CTS5 ProVal was recovered. The profiling float was still communicating but one of the radiometer was damaged.

The last day, the port authorities asked the *Téthys II* to participate to the rescue of a person fallen at sea from a sailing ship. Fortunately the person was found in good health and taken on board. The sailing ship was towed to the Nice harbour.

Cruise Summary

The first day was used to perform a CTD cast with water sampling, optical profiles and a Secchi disk at the BOUSSOLE site. Problems appeared with the communication between the CTD and the acquisition computer: the communication between the CTD and computer was often interrupted but we still got the cast. The second day was used to perform C-OPS balance tests before optical profiles, a CTD cast with water sampling at the BOUSSOLE site and the CTD transect. The third day was used to to retrieve data from the buoy, and to perform the diving operations, optical profiles, a CTD cast with water sampling and a Secchi disk at the BOUSSOLE site. A profiling float was recovered after the work at BOUSSOLE was completed. The last day was used to perform optical profiles, a CTD cast with water sampling and a Secchi disk at the BOUSSOLE site. At the end of the work at BOUSSOLE, a person fallen at sea from a sailing ship in the Ligurian sea was rescued by the crew of the *Téthys II*.

Tuesday 15 July 2014

The sea state was smooth with a light breeze. The sky was blue and the visibility was excellent. When we arrived at the BOUSSOLE site, we could not begin the work immediately because fishing longlines were found close to the buoy. The lines were cut and removed. Then, 1 Secchi disk, 2 C-OPS profiles and 1 CTD cast with water sampling were performed at the BOUSSOLE site. There were problems with the communication between CTD and the acquisition computer during the first cast: the communication was frequently interrupted but the cast was anyway performed. We thought initially that it was due to the USB serial port adapter which did not work correctly. Then, a CTD cast was performed at station 04 during the way back to test the CTD with using another USB serial port adapter: the problem persisted and the communication failed during the descent profiles. During this cast, dark measurements of the backscattering meter (Hydroscat-6) were performed with putting a neoprene cap on the sensor.

Wednesday 16 July 2014

The sea state was smooth with a light breeze. The sky was blue and the visibility was excellent. C-OPS balance tests were performed in order to check and adjust it during the descent phase of the profiles. Then, 4 C-OPS profiles and 1 CTD cast with water sampling were performed at the BOUSSOLE site. Another computer was used for the CTD cast and the system worked correctly. Finally, the CTD transect was almost completed: CTD cast at the station 01 could not be performed because fishing lines were present in this station.

Thursday 17 July 2014

The sea state was smooth with a light breeze. The sky was blue then overcast and the visibility was good. When arrived at BOUSSOLE divers went at sea to check the presence of longlines on the buoy. They replaced the OCP at 4m with another one. Then, they replaced the pCO_2 CARIOCA sensor at 10m and the telemetry cable that run to the top of the buoy was let on the buoy. Then, they cleaned the buoy sensors and, they took pictures and performed dark measurements of the backscattering meter and transmissometers. The above-surface irradiance and PAR sensors, the ARGOS and CISCO connectors and solar panels on the top of the buoy were cleaned. The data could not be downloaded with a direct connection to the buoy because the laptop used on the buoy stopped working. Nevertheless, data could be downloaded from the boat via the wireless radio connection. Data from the replaced pCO_2 CARIOCA at 10m were checked on board: a connection was got with this sensor but there were no data recorded during all the deployment. This day was also used to perform 3 C-OPS profiles, 1 CTD cast with water sampling and 1 Secchi disk at the BOUSSOLE site.

Friday 18 July 2014

The sea state was smooth with a light breeze. The sky was blue and the visibility was excellent. Six C-OPS profiles, 1 CTD cast with water sampling and 1 Secchi disk were performed at the BOUSSOLE site. After the work at BOUSSOLE was finished, we planned to perform the missing CTD cast at station 01 of the transect. During the way up to station 01, the port authorities asked the boat to participate to the rescue of a person fallen at sea from a sailing ship. The person was found in good health and taken on board few hours after. The sailing ship was towed by the *Téthys II* to the Nice harbour.

Pictures taken during this cruise can be found at:
https://plus.google.com/photos/114686870380724925974/albums/6062258311433917217?banner=pwa

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 July 2014 (UTC)

People on board: Melek Golbol and Grigor Obolensky.

0610 Departure from the Nice harbour.
0930 Arrival at the BOUSSOLE site.
0940 Cutting and recovering longlines.
1015 Lunch.
1025 Cutting and recovering longlines.
1130 Secchi disk 01 (29m).
1205 C-OPS 01, 02.
1255 CTD 01, 400 m with water sampling at 200, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p, and TSM.
1330 Departure to the Nice habour.
1545 CTD test, 400m, station 04 and dark measurement of the backscattering meter (IOP package).
1745 Arrival at the Nice harbour.

Wednesday 16 July 2014 (UTC)

People on board: Melek Golbol, Grigor Obolensky and Baptiste Picard.

0510 Departure from the Nice harbour.
0830 Arrival at the BOUSSOLE site.
0840 C-OPS balance tests.
0850 C-OPS 03, 04.
0940 CTD 02, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p, and TSM.
1025 C-OPS 05, 06.
1050 Departure to the first transect station.
1125 CTD cancelled at station 01 (fishing lines in the area).
1200 CTD 03, 400m, station 02 (43°28'N 07°42'E).
1305 CTD 04, 400m, station 03 (43°31'N 07°37'E).
1410 CTD 05, 400m, station 04 (43°34'N 07°31'E).
1510 CTD 06, 400 m, station 05 (43°37'N 07°25'E).
1600 CTD 07, 400 m, station 06 (43°39'N 07°21'E).
1625 Departure to the Nice harbour.
1650 Arrival at the Nice harbour.

Tuesday 17 July 2014 (UTC)

People on board: Vlad Costache, Melek Golbol, Malika Khereiddine, David Luquet, Fabien Moullec, Grigor Obolensky and Vincenzo Vellucci.

0545 Departure from the Nice harbour.
0925 Arrival at the BOUSSOLE site.
0945 Diving on the buoy for cleaning sensors, performing dark measurements, taking pictures.
OCP 4m and pCO2 CARIOCA 10 m replaced.
1000 Cleaning sensors and solar panels on the top of the buoy.
1100 Wireless radio connection with the buoy and data retrieval.
1210 C-OPS 07, 08, 09.

1300 CTD 08, 400 m with water sampling at 400, 200, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p, CDOM and TSM.
1335 Secchi disk 01 (29m).
1340 Departure to the site of recovering of the profiling float.
1520 Recovering of the profiling float.
1545 Departure to the Nice harbour.
1800 Arrival at Nice harbour.

Friday 18 July 2014 (UTC)

People on board: Melek Golbol, Grigor Obolensky and Mehmet Yayla.

0520 Departure from the Nice harbour.
0835 Arrival at the BOUSSOLE site.
0900 C-OPS 10, 11, 12.
0955 CTD 08, 400 m with water sampling at 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p, and TSM.
1110 Secchi disk 01 (28m).
1135 C-OPS 13, 14, 15.
1230 Departure to the first transect station.
1245 Departure to the site of rescue operation of a person fallen at sea.
1410 Arrival at the site of rescue operations.
1430 Person found in good health and recovered on board.
1500 Recovering of the second skipper on board and towing of the sailing ship.
1505 Departure to the Nice harbour.
2005 Arrival at the Nice harbour.

Problems identified during the cruise

- The first day, longlines were found at the BOUSSOLE site. These fishing lines were cut and removed to prevent any damaging of the buoy.

- The first day, problems appeared during the CTD cast: the communication between the CTD and acquisition computer was often interrupted. The computer was responsible for this problem, and was therefore replaced by another acquisition computer.

- There was no data transmission from radiometers at 4m. The OCP at 4m was consequently replaced by another one, but data transmission did not occur as well. The problem was probably due to a fuse blown in the Buoy DACNet (Data Acquisition and Control Network).

- The laptop used for downloading data stopped working on the top of the buoy, preventing a direct data download. The data were nevertheless downloaded from the boat through the wireless radio connection.

- The PCO_2 CARIOCA sensor at 10m was replaced by another one. The telemetry cable that runs to the top of the buoy for downloading data was left on the buoy. The old sensor was checked and connected directly to the computer on board. A connection was established but no data were recorded during all the deployment, just a new file was stored. This probably means that the telemetry cable left in the buoy was damaged. This cable will be removed during next cruise.

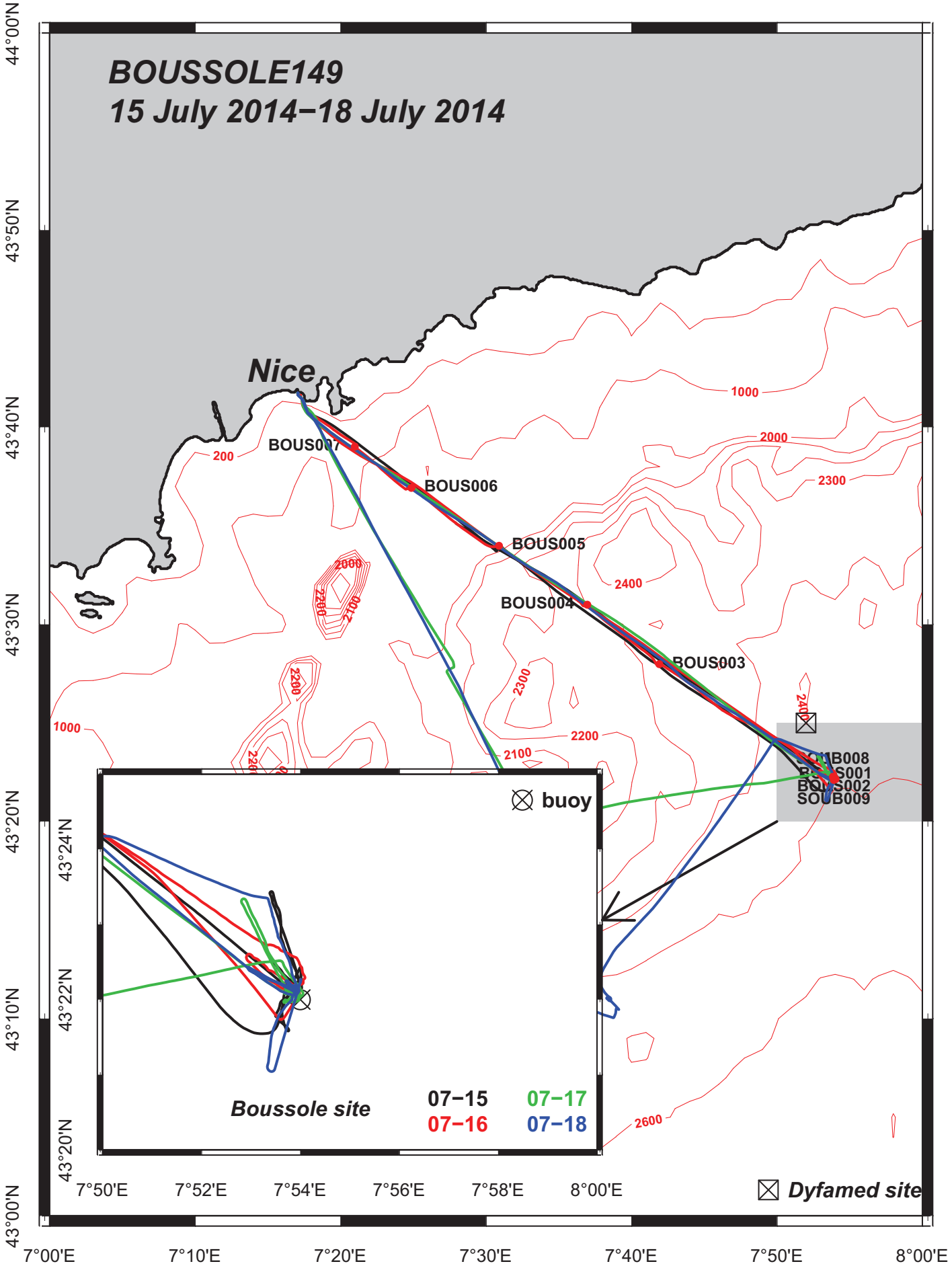
- The second day, it was not possible to perform a CTD cast at station 01 of the transect because of the presence of fishing lines.

- The water sampling for TA/TC analysis was not performed during this cruise.

Appendices

Cruise Summary Table for Boussole 149

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
				Secchi01	11:30	4:00	29	43	22	7	54	blue		0					excellent			calm			
	bou_c-ops_140715_0840_001_data.csv				09:21	1:19																		
15/07/14		bou_c-ops_140715_0840_005_data.csv			12:13	2:11	56,2	43	22,880	7	53,606	blue	none	0	4,7	245	1017,9	74	excellent	23,0		calm	0,2		no
		bou_c-ops_140715_0840_006_data.csv			12:22	3:20	82,6	43	23,186	7	53,570	blue	none	0	4,7	245	1017,9	74	excellent	23,0		calm	0,2		no
	bou_c-ops_140715_0840_007_data.csv				12:51	1:20																		
			CTDBOUS001	HPLC, Ap & TSM	12:53	33:00	400	43	22,153	7	54,034	blue		0	3,7	226	1017,9	71		24,0	22,17	calm			
	bou_c-ops_140716_0815_001_data.csv				08:18	2:28																		
		bou_c-ops_140716_0815_004_data.csv			08:53	2:56	74,1	43	22,263	7	53,702	blue	Cu	1	4	188	1018,9	88	excellent	23,1		calm	0,2		no
		bou_c-ops_140716_0815_005_data.csv			09:04	3:06	80	43	22,397	7	53,349	blue	Cu	1	4	188	1018,9	88	excellent	23,1		calm	0,2		no
	bou_c-ops_140716_0815_007_data.csv				10:02	1:43																		
			CTDBOUS002	HPLC, Ap & TSM	09:41	31:00	400	43	22,148	7	53,929	blue		0	1,5	120	1019,0	86		23,8	22,82	calm			
		bou_c-ops_140716_0815_009_data.csv			10:35	2:58	75,9	43	22,551	7	53,926	blue	none	0	4	201	1019,0	80	excellent	24,9		calm	0,2		no
16/07/14		bou_c-ops_140716_0815_010_data.csv			10:46	2:23	61,1	43	22,658	7	53,597	blue	none	0	4	201	1019,0	80	excellent	24,9		calm	0,2		no
	bou_c-ops_140716_0815_011_data.csv				11:07	1:19																		
			CTDBOUS003		12:02	25:00	400	43	27,985	7	41,915	blue		0	6	185	1018,5	76		24,5	22,90	calm			
			CTDBOUS004		13:04	26:00	400	43	31,001	7	36,963	blue		0	5	190	1018,3	75		24,7	23,33	calm			
			CTDBOUS005		14:08	25:00	400	43	33,990	7	30,894	overcast		7	2,5	211	1018,5	80		24,8	23,24	calm			
			CTDBOUS006		15:08	23:00	400	43	36,927	7	24,871	overcast		8	1,5	230	1018,5	72		25,1	23,76	calm			
			CTDBOUS007		15:57	23:00	400	43	39,014	7	20,982	overcast		8	12	277	1018,0	72		24,9	24,24	calm			
	bou_c-ops_140717_1144_001_data.csv				11:47	1:21																		
		bou_c-ops_140717_1144_002_data.csv			11:59	3:15	81,3	43	22,361	7	53,604	blue	Cu	1	3,8	183	1019,5	78	good	25,1		calm	0,2		no
		bou_c-ops_140717_1144_003_data.csv			12:11	3:19	84,2	43	22,688	7	53,320	blue	Cu	1	3,8	183	1019,5	78	good	25,1		calm	0,2		no
17/07/14		bou_c-ops_140717_1144_004_data.csv			12:24	3:14	83,8	43	23,042	7	53,098	blue	Cu	1	3,8	183	1019,5	78	good	25,1		calm	0,2		no
	bou_c-ops_140717_1144_005_data.csv				12:39	1:24																		
			CTDSOUB008	HPLC, Ap, CDOM & TSM	13:00	35:00	400	43	22,271	7	53,846	cloudy		6	4	207	1019,3	78		24,8	23,03	calm			
				Secchi02	13:35	4:00	29	43	22	7	54	cloudy		6					good			calm			
	bou_c-ops_140718_0837_001_data.csv				08:41	1:40																		
		bou_c-ops_140718_0837_002_data.csv			09:00	3:32	90,9	43	22,174	7	53,805	blue	Ci, Cc	1	7,8	212	1018,9	88	excellent	22,8		calm	0,4		few
		bou_c-ops_140718_0837_003_data.csv			09:10	3:21	85,5	43	22,227	7	53,540	blue	Ci, Cc	1	7,8	212	1018,9	88	excellent	22,8		calm	0,4		few
		bou_c-ops_140718_0837_004_data.csv			09:21	3:26	88,8	43	22,293	7	53,231	blue	Ci, Cc	1	7,8	212	1018,9	88	excellent	22,8		calm	0,4		few
	bou_c-ops_140718_0837_005_data.csv				09:38	3:22																		
18/07/14			CTDSOUB009	HPLC, Ap & TSM	09:56	31:00	400	43	22,111	7	53,912	blue		1	7	202	1018,5	88		23,1	23,38	calm			
				Secchi03	11:10	4:00	28	43	22	7	54	blue		1					excellent			calm			
	bou_c-ops_140718_1125_001_data.csv				11:28	1:27																		
		bou_c-ops_140718_1125_002_data.csv			11:37	3:08	79	43	22,241	7	53,896	blue	none	0	8,9	233	1018,0	84	excellent	23,6		calm	0,4		no
		bou_c-ops_140718_1125_003_data.csv			11:50	3:05	78,9	43	22,556	7	53,745	blue	none	0	8,9	233	1018,0	84	excellent	23,6		calm	0,4		no
		bou_c-ops_140718_1125_004_data.csv			12:00	2:56	76,1	43	22,802	7	53,567	blue	none	0	8,9	233	1018,0	84	excellent	23,6		calm	0,4		no
	bou_c-ops_140718_1125_005_data.csv				12:42	3:01																		


BOUSSOLE149
15 July 2014–18 July 2014
Nice
BOUS007
BOUS006
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BOUS004
BOUS003
SOUB008
SOUB009
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Dyfamed site
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43°50'N
43°40'N
43°30'N
43°20'N
43°10'N
43°00'N
7°00'E
7°10'E
7°20'E
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7°40'E
7°50'E
8°00'E
43°24'N
43°22'N
43°20'N
7°50'E
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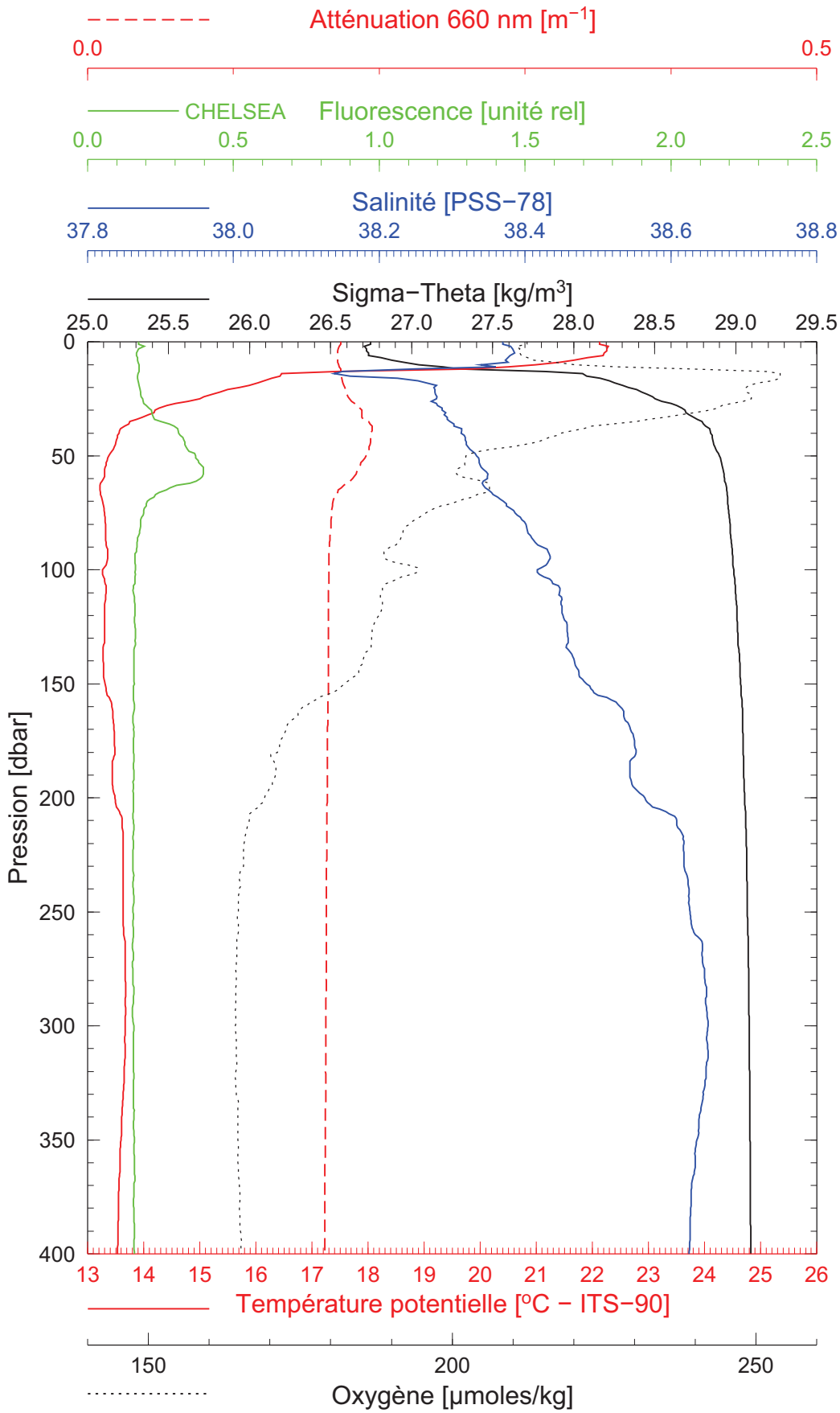
BOUSSOLE 149 **15/07/2014** **BOUS140715_01**

BOUS001

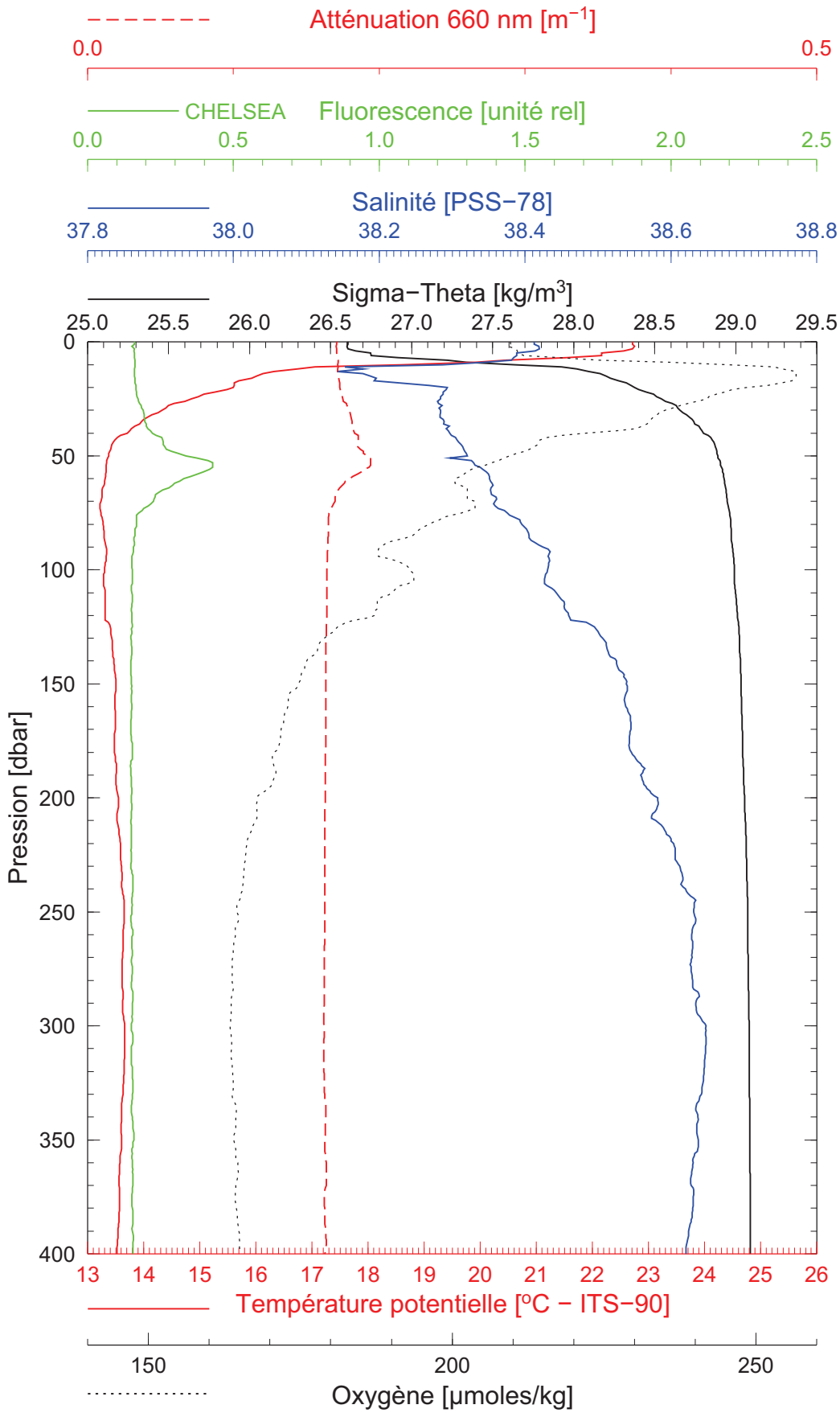


Date *15/07/2014* *Latitude* *43°22.153 N*

Heure déb *12h 53min [TU]* *Longitude* *07°54.034 E*

BOUSSOLE 149 **16/07/2014** **BOUS140716_01**

BOUS002



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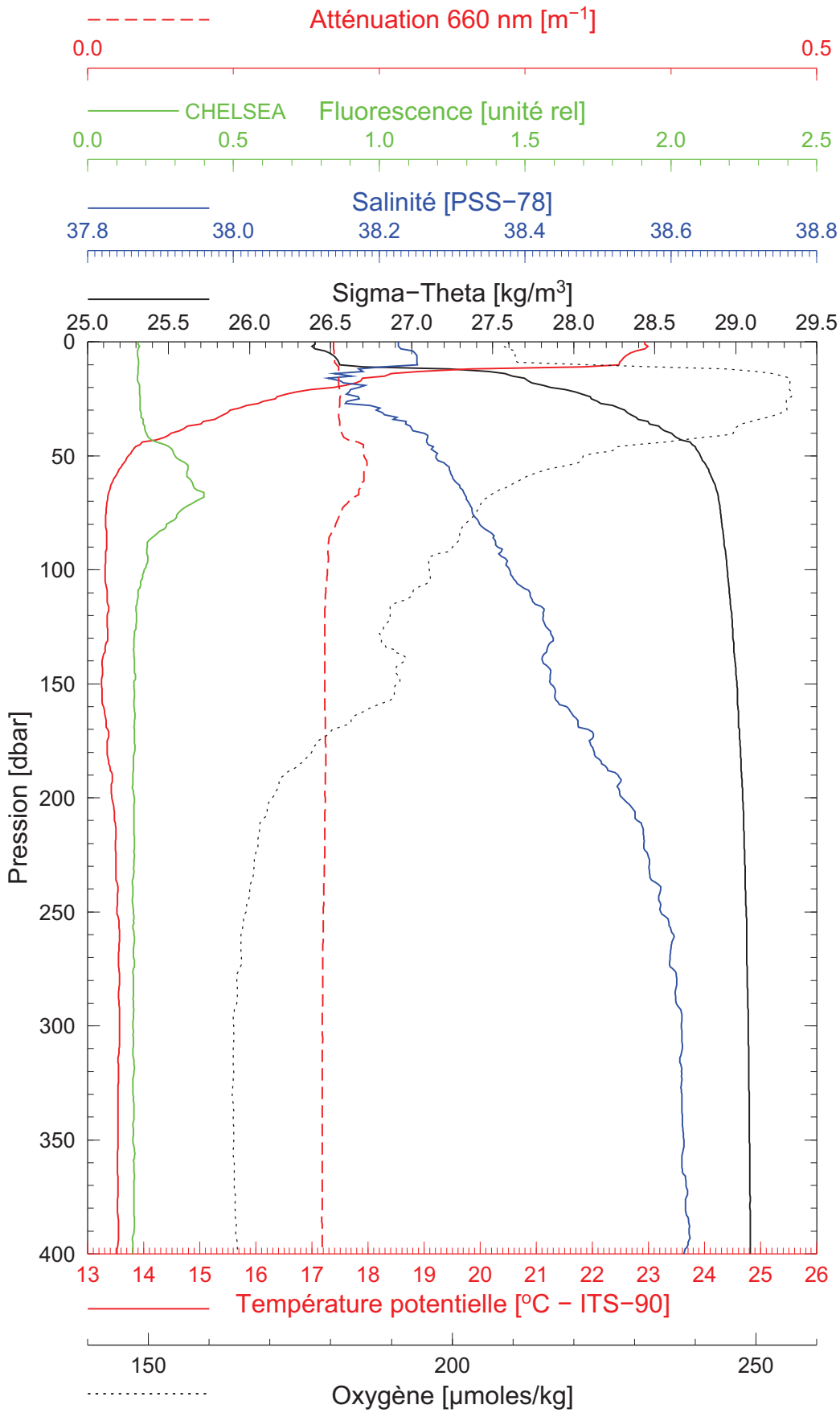
Heure déb *09h 41min [TU]* *Longitude* *07°53.929 E*

BOUSSOLE 149 **16/07/2014** **BOUS140716_02**

BOUS003



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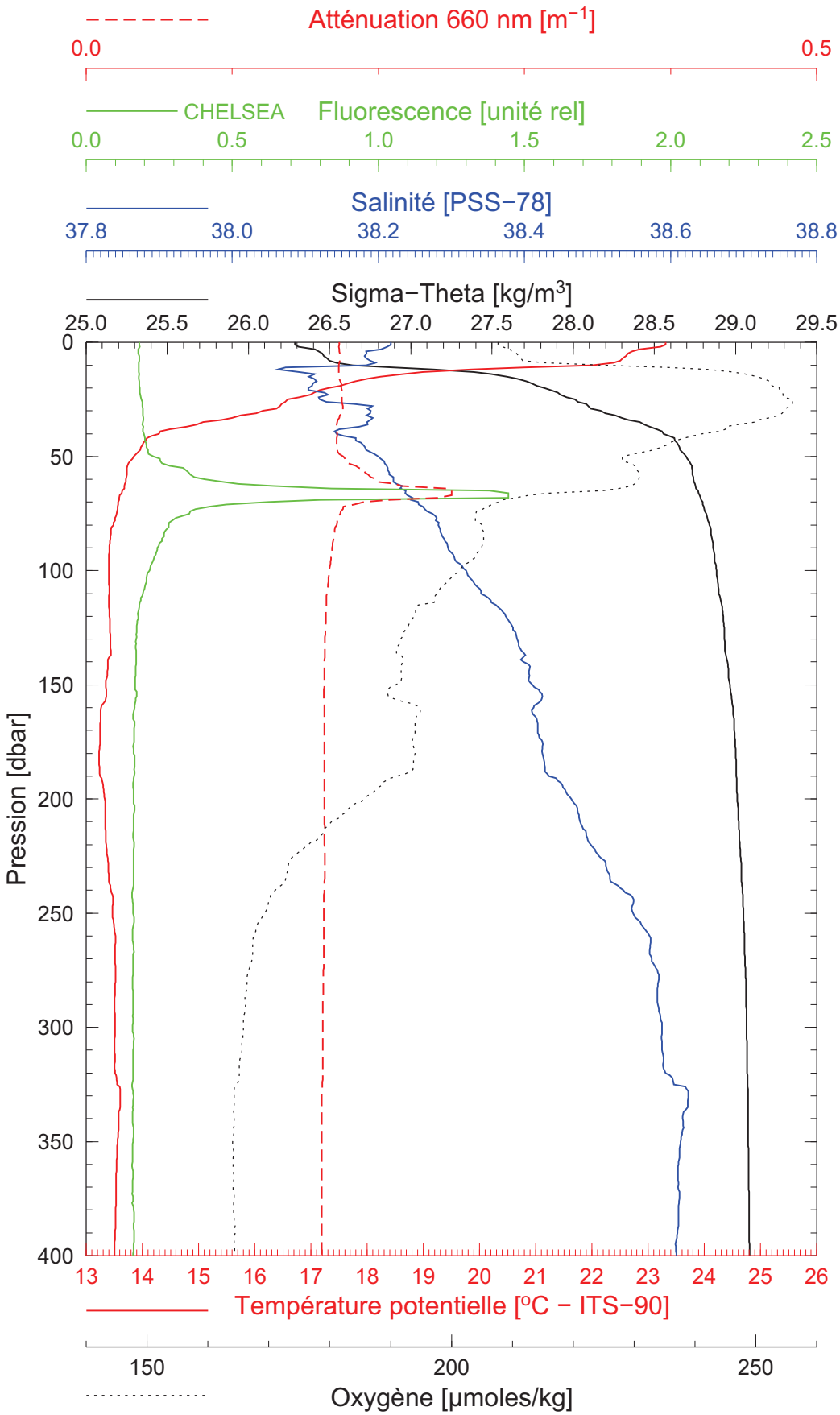
BOUS004



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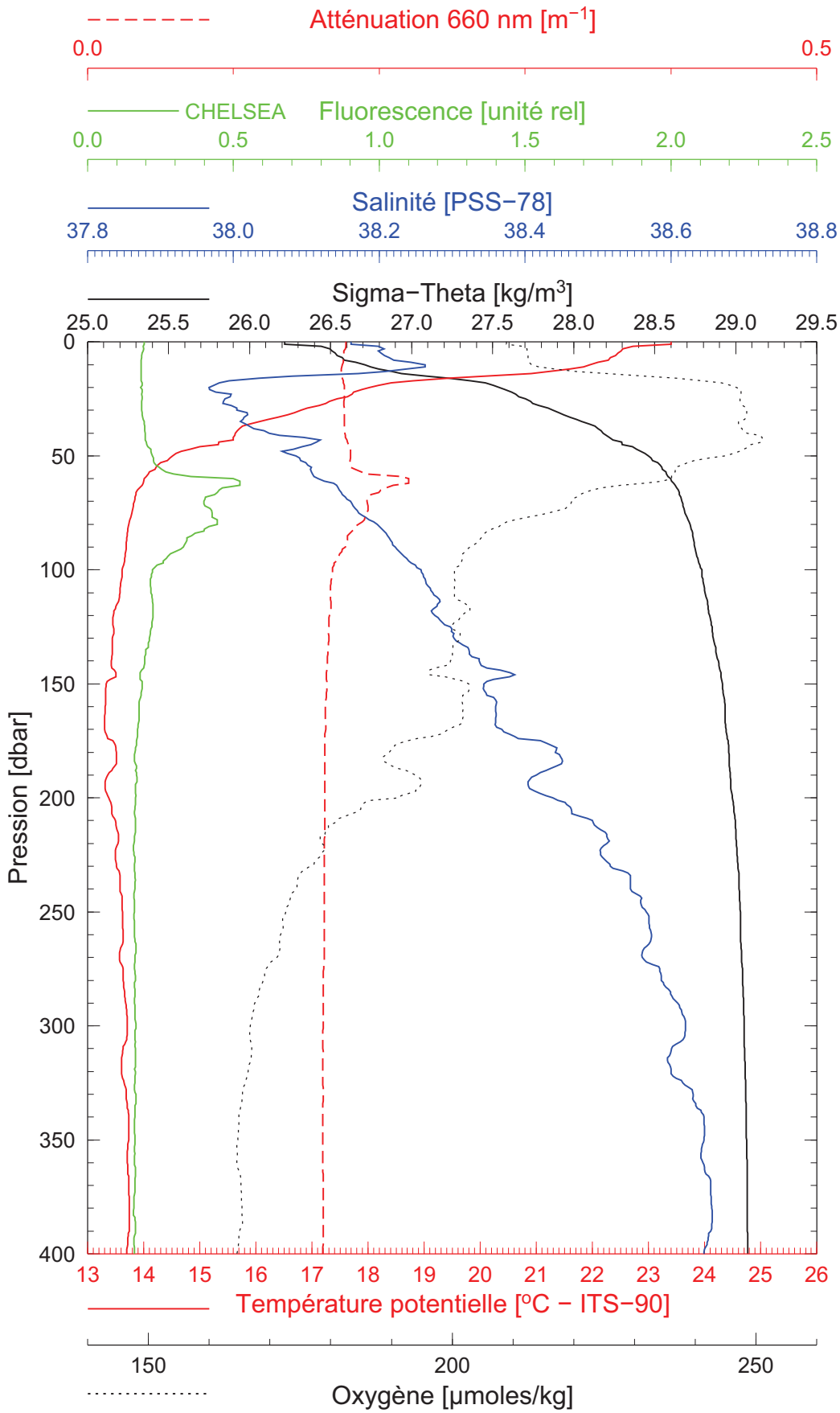
BOUSSOLE 149 **16/07/2014** **BOUS140716_04**

BOUS005

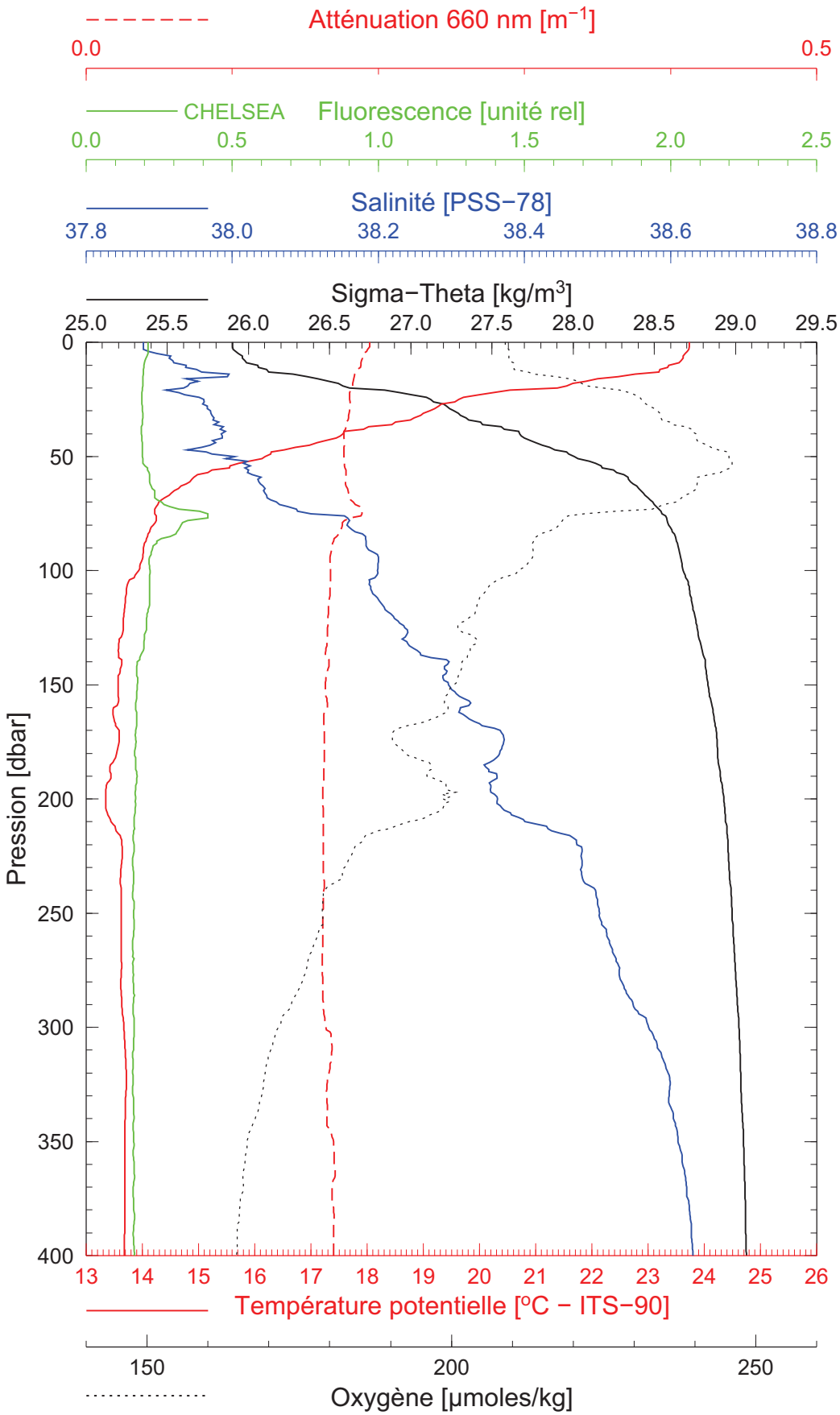


Date *16/07/2014* *Latitude* *43°33.990 N*

Heure déb *14h 08min [TU]* *Longitude* *07°30.894 E*

BOUSSOLE 149 **16/07/2014** **BOUS140716_05**

BOUS006

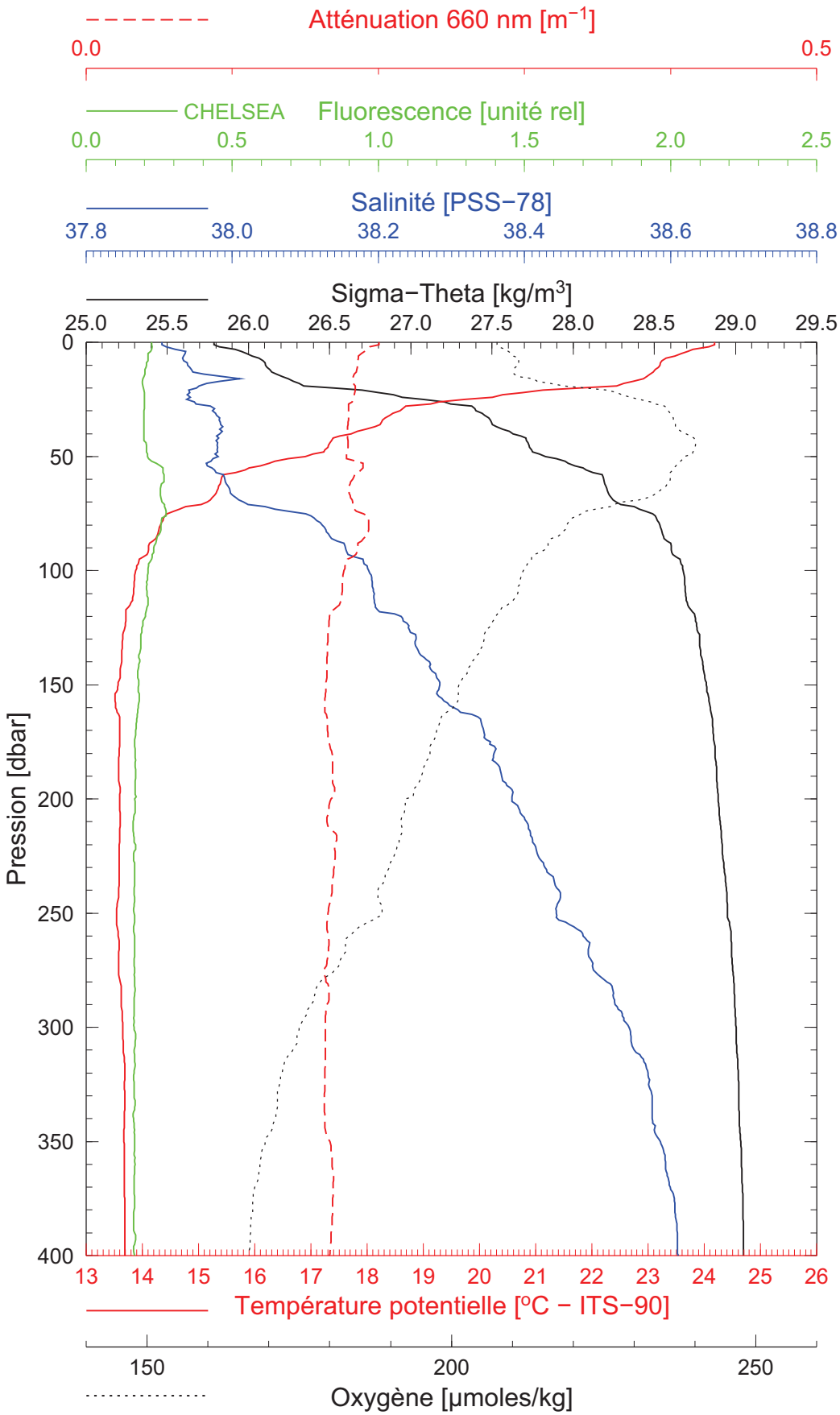


Date *16/07/2014* *Latitude* *43°36.927 N*

Heure déb *15h 08min [TU]* *Longitude* *07°24.871 E*

BOUSSOLE 149 **16/07/2014** **BOUS140716_06**

BOUS007

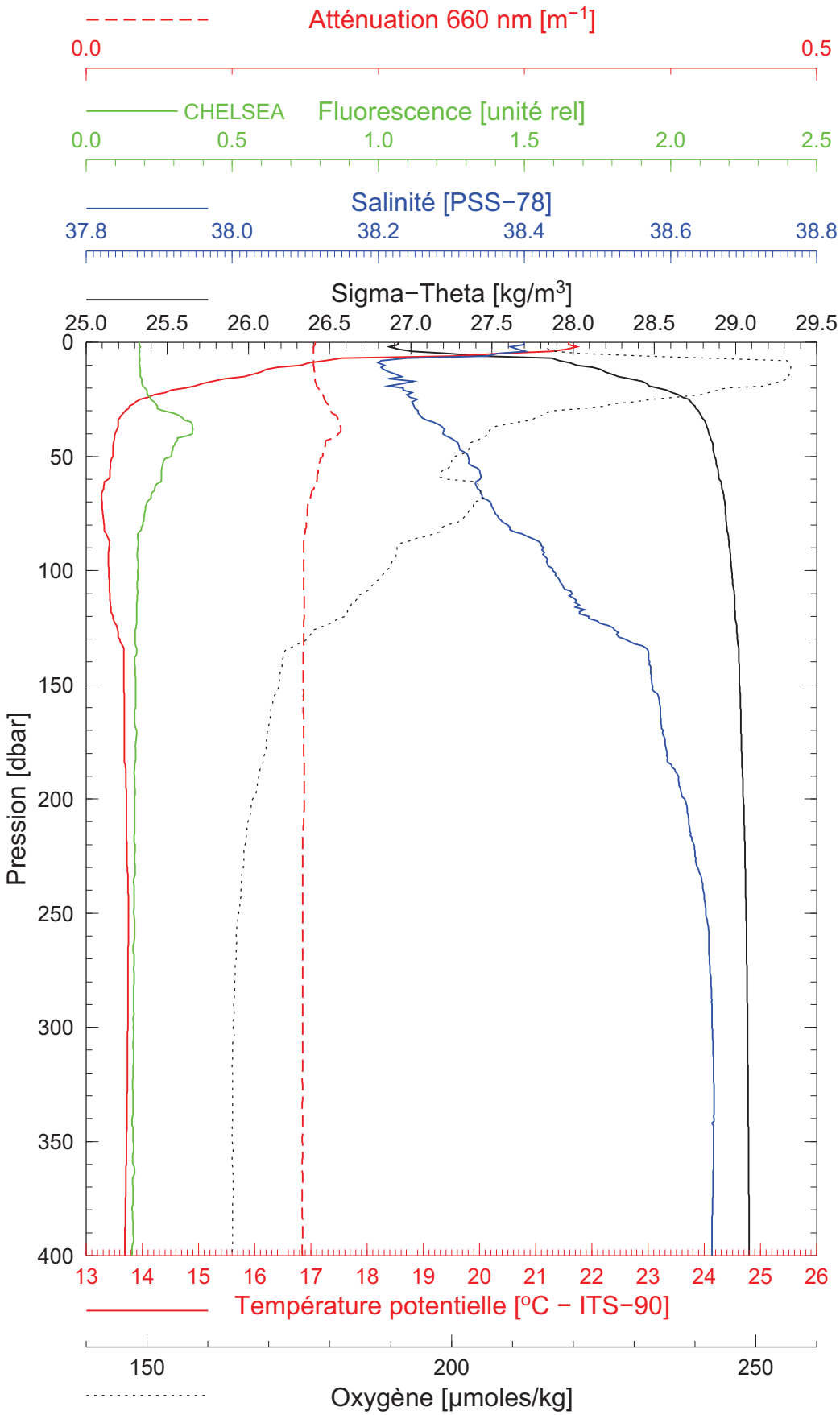


Date *16/07/2014* *Latitude* *43°39.014 N*

Heure déb *15h 57min [TU]* *Longitude* *07°20.982 E*

BOUSSOLE 149 **17/07/2014** **BOUS140717_01**

SOUB008

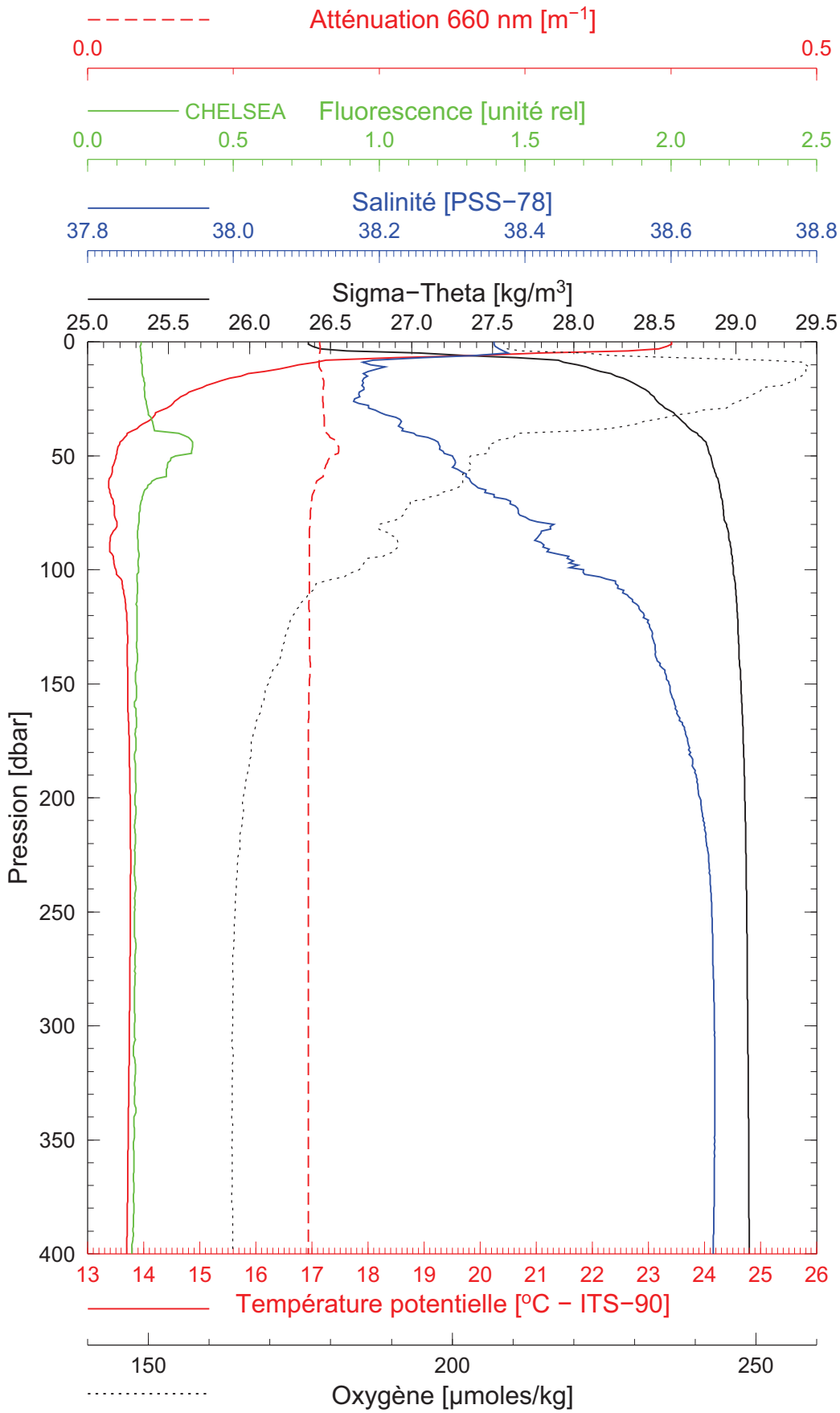


Date *17/07/2014* *Latitude* *43°22.271 N*

Heure déb *13h 16min [TU]* *Longitude* *07°53.846 E*

BOUSSOLE 149 **18/07/2014** **BOUS140718_01**

SOUB009



Date *18/07/2014* *Latitude* *43°22.111 N*

Heure déb *10h 10min [TU]* *Longitude* *07°53.912 E*