BOUSSOLE Monthly Cruise Report

Cruise 143
January 20 – 23, 2014

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

Science Personnel: Jean De Vaugelas, Melek Golbol, Yves Lamblard, Grigor Obolensky and Vincenzo Vellucci.

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

The CTD Rosette on the R/V *Tethys II* deck and V.Vellucci on the top of the BOUSSOLE buoy for data retrieval, on the background.

BOUSSOLE project

ESA/ESRIN contract N° 13226/10/I-NB

February 10, 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

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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). 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).

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

Sampling for analyses of particulate organic carbon (started October 2011) and cytometric analysis (started December 2011) were performed during two years until cruise #142, and therefore were not carried out on this cruise (#143). This sampling was part of the BIOCAREX ANR project.

The third day bad weather prevented working at BOUSSOLE. The weather was better next to the coast, so we took advantage of this day to test and adjust the C-OPS in the bay of Villefranche-sur-mer. The C-OPS used for this cruise was different than the one commonly used on the BOUSSOLE missions, wich was still under calibration at Biospherical. The C-OPS used for this cruise was the one shared among the marine optics and remote sensing group at LOV. The instrument is similar to the BOUSSOLE one, yet has a Lu sensor instead of a Eu one**.** This C-OPS need probably to be adjusted during the descent phase of the profiles: the tilt angles and the descent rate must be checked and adjusted if necessary by adding or removing weights and compressible bladders.
The CTD was also tested in the bay of Villefranche-sur-mer during this day.

The telemetry cable of the pCO2 carioca sensor at 3m was recovered during the diving operation. This cable rises to the head of the buoy and allows data downloading at surface. So the pCO2 carioca sensor was recovered by the divers and then reinstalled at the same location after retrieving this cable. This operation was done in order to prepare the next deployment of the buoy: this cable will be installed on another pCO2 carioca sensor in the new buoy before the deployment.

Cruise Summary

The three first days, bad weather prevented working at BOUSSOLE. The third day was used to test the C-OPS and the CTD Rosette in the bay of Villefranche-sur-mer. There were many problems with the communication between the CTD, the deck unit and the computer.
The last day, the problem with the CTD has been solved on the way up to the BOUSSOLE site. This day was used for diving operations: cleaning of buoy sensors, performing dark measurement, recovering and replacing the pCO2 carioca sensor at 3m after retrieving the telemetry cable. Buoy data were retrieved from physical connection to the buoy computer, via the cable available on top of the buoy, instead of using the wireless radio connection. pCO2 data from the pCO2 sensor at 10m were also downloaded. Then, 1 CTD cast with water sampling at the BOUSSOLE site, optical profiles and 1 Secchi disk were performed at the BOUSSOLE site. Finally, the CTD transect was performed.

Monday 20 January 2014

Bad weather prevented departure from the Nice harbour.

Tuesday 21 January 2014

Bad weather prevented departure from the Nice harbour.

Wednesday 22 January 2014

The third day, bad weather prevented working at the BOUSSOLE site. This day was used to test and adjust the C-OPS in the bay of Villefranche-sur-mer. The CTD Rosette was also tested. There were many problems with the communication between the CTD, the deck unit and the computer: the CTD either not worked at all or worked erratically. Several tests were made but this problem was not solved during this day.

Thursday 23 January 2014

The last day, the sea state was slight with a moderate breeze. The sky was overcast, and conditions sometimes rainy. The visibility was medium.
The CTD was tested again during the way up to the BOUSSOLE site: the system continued to not work correctly. This problem has been solved just before arriving at the BOUSSOLE site. When arrived at BOUSSOLE, divers went at sea to clean the sensors and to perform dark measurements of the backscattering meter and transmissometers. They recovered and reinstalled the pCO2 carioca sensor at 3m after retrieving the telemetry cable. A “start” connector was placed on the sensor in place of the cable. A direct connection with the buoy was established for data retrieval and pCO2 data of the pCO2 sensor at 10m were downloaded. The CISCO and ARGOS connections, the solar panels and the sensors on the top of the buoy were cleaned.
Then, 1 Secchi disk, 3 C-OPS profiles, 1 CTD cast with water sampling at the BOUSSOLE site were performed. Surface water was collected with a bucket for TSM analysis. Finally, the CTD transect was performed.

Cruise Report

Monday 20 January 2014 (UTC)

Bad weather prevented departure from the Nice harbour.

Tuesday 21 January 2014 (UTC)

Bad weather prevented departure from the Nice harbour.

Wednesday 22 January 2014 (UTC)

People on board: Melek Golbol, Grigor Obolensky, Vincenzo Vellucci.
0920 Departure from the Nice harbour.

0935 Arrival in the bay of Villefranche-sur-mer.
1030 C-OPS Test.
1230 CTD test.
1500 Departure to the Nice harbour.
1515 Arrival at the Nice harbour.

Thursday 23 January (UTC)

People on board: Jean De Vaugelas, Melek Golbol, Yves Lamblard, Grigor Obolensky and Vincenzo Vellucci.

0530 Departure from the Nice harbour.
0915 Arrival at the BOUSSOLE site.
0930 Diving on the buoy for cleaning sensors, performing dark measurement and recovering of the pCO2 carioca sensor at 3m. Reinstalling the pCO2 carioca sensor after retrieving the telemetry cable.
1000 Direct connection with the buoy and data retrieval.
Data retrieval from the pCO2 carioca sensor at 10m.
1005 Secchi disk 01 (11m).
1115 C-OPS 01, 02, 03.
1145 CTD 01, 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 CDOM.
1210 Bucket at surface for TSM.
1255 CTD 02, 400m, station 01 (43°25'N 07°48'E).
1345 CTD 03, 400m, station 02 (43°28'N 07°42'E).
1425 CTD 04, 400 m, station 03 (43°31'N 07°37'E).
1510 CTD 05, 400 m, station 04 (43°34'N 07°31'E).
1600 CTD 06, 400 m, station 05 (43°37'N 07°25'E).
1635 CTD 07, 400 m, station 06 (43°39'N 07°21'E).
1650 Departure to the Nice harbour.
1715 Arrival at the Nice harbour.

Problems identified during the cruise

- Problems appeared with the communication between the CTD, the deck-unit and the computer. Firstly, the problem was difficult to identify because the CTD either not worked at all or worked erratically.

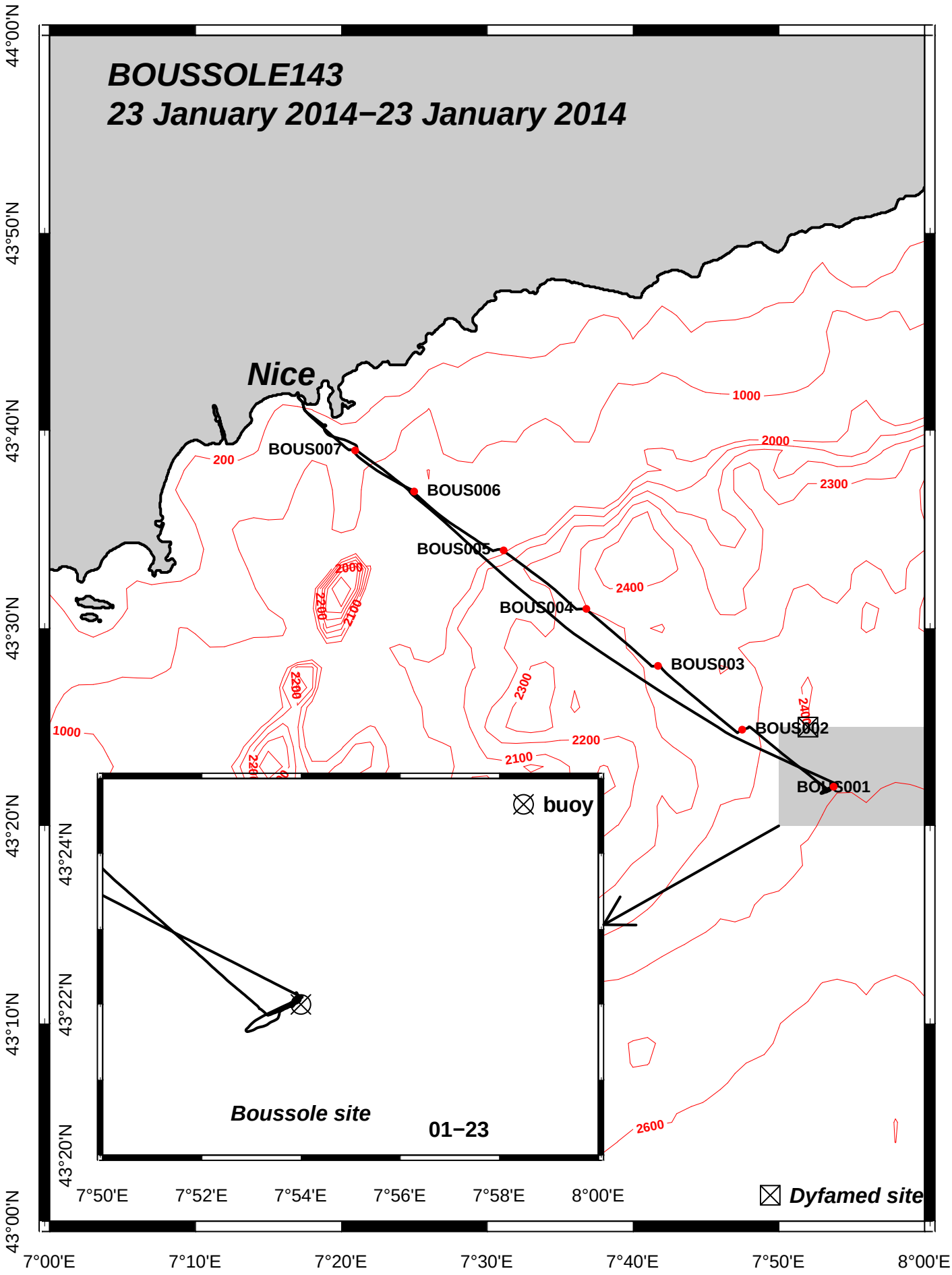
The problem was solved after many tests: on the third day, the CTD was tested with the CTD cable test of the Téthys II. The system worked correctly. The connectors of the CTD and the electrocarrier cable were cleaned and reconnected. The CTD was tested again and the system continued to work. Finally, the problem was probably due to a poor connection between the CTD and the electrocarrier cable.

- The IOP package was not available because the instruments were sent to Hobi Instruments service for calibrations. The instruments were not returned in time for this cruise.
- Data from the pCO2 carioca sensor located at 3m could not be downloaded.

Appendices

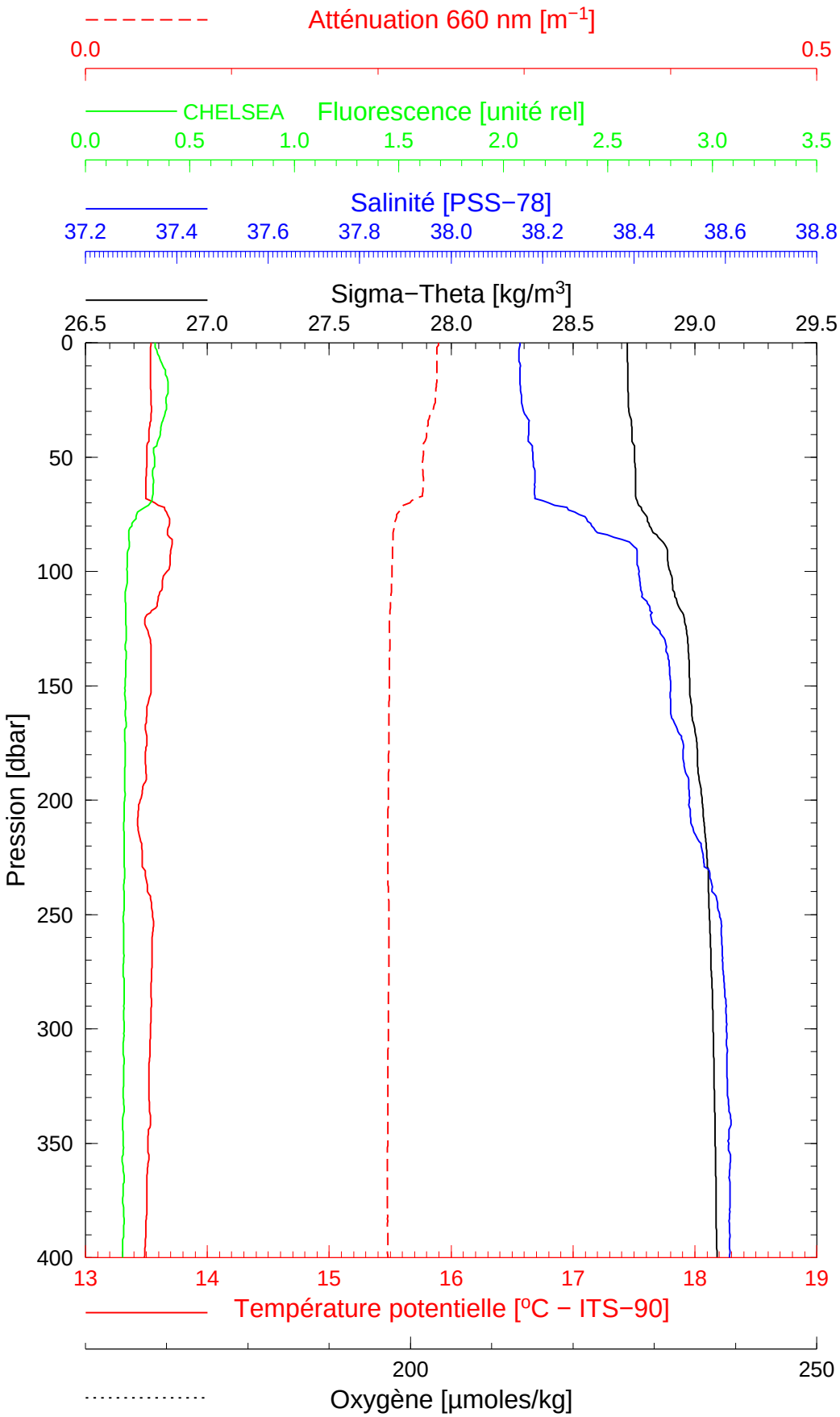
Cruise Summary Table for Boussole 143

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
20/01/14	Bad weather																								
21/01/14	Bad weather																								
22/01/14	Bad weather																								
				Secchi01	10:05	4:00	11	43	22	7	54	overcast&rainy		7					Medium			calm	0.7		
	bou_c-ops_140123_0956_001_data.csv				10:00	1:21																			
		bou_c-ops_140123_0956_002_data.csv			11:13	1:10	26.4	43	21.747	7	53.345	overcast&rainy	Sc	7	13	NA	1015.0	79	Medium	11.6		calm	0.7		few
		bou_c-ops_140123_0956_003_data.csv			11:17	1:15	27.4	43	21.708	7	53.230	overcast&rainy	Sc	7	13	NA	1015.0	79	Medium	11.6		calm	0.7		few
		bou_c-ops_140123_0956_004_data.csv			11:21	1:05	23.5	43	21.691	7	53.065	overcast&rainy	Sc	7	13	NA	1015.0	79	Medium	11.6		calm	0.7		few
	bou_c-ops_140123_0956_005_data.csv				11:42	01:27																			
23/01/14			CTDBOUS001	HPLC, Ap & CDOM	11:42	21:00	400	43	21.983	7	53.763	overcast		8	16	332	1015.0	78		11.5	13.5	calm			
				Bucket TSM	12:10	2:00	surface	43	22	7	54	overcast										calm			
			CTDBOUS002		12:55	14:00	400	43	24.869	7	47.493	overcast		8	14	129	1015.0	74		11.5	13.6	calm			
			CTDBOUS003		13:43	14:00	400	43	28.097	7	41.719	overcast		8	13.7	1	1015.0	73		11.5	13.9	calm			
			CTDBOUS004		15:25	16:00	400	43	30.983	7	36.806	overcast		8	10.5	350	1015.0	73		11.5	14.4	calm			
			CTDBOUS005		15:12	15:00	400	43	33.938	7	31.138	overcast		6	8.7	331	1015.0	71		11.6	14.6	calm			
			CTDBOUS006		15:57	14:00	400	43	36.920	7	25.001	overcast		7	12.4	23	1015.0	74		11.6	14.4	calm			
			CTDBOUS007		16:34	15:00	400	43	38.999	7	20.957	overcast		7	11.6	145	1015.0	73		12.0	14.1	calm			


BOUSSOLE143
23 January 2014−23 January 2014
Nice
BOUS007
BOUS006
BOUS005
BOUS004
BOUS003
BOUS002
BOUS001
200
1000
2000
2100
2200
2300
2400
2600
buoy
Boussole site
01−23
Dyfamed site
44°00'N
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
7°30'E
7°40'E
7°50'E
8°00'E
43°24'N
43°22'N
43°20'N
7°50'E
7°52'E
7°54'E
7°56'E
7°58'E
8°00'E

BOUSSOLE 143 **23/01/2014** **BOUS140123_01**

BOUS001

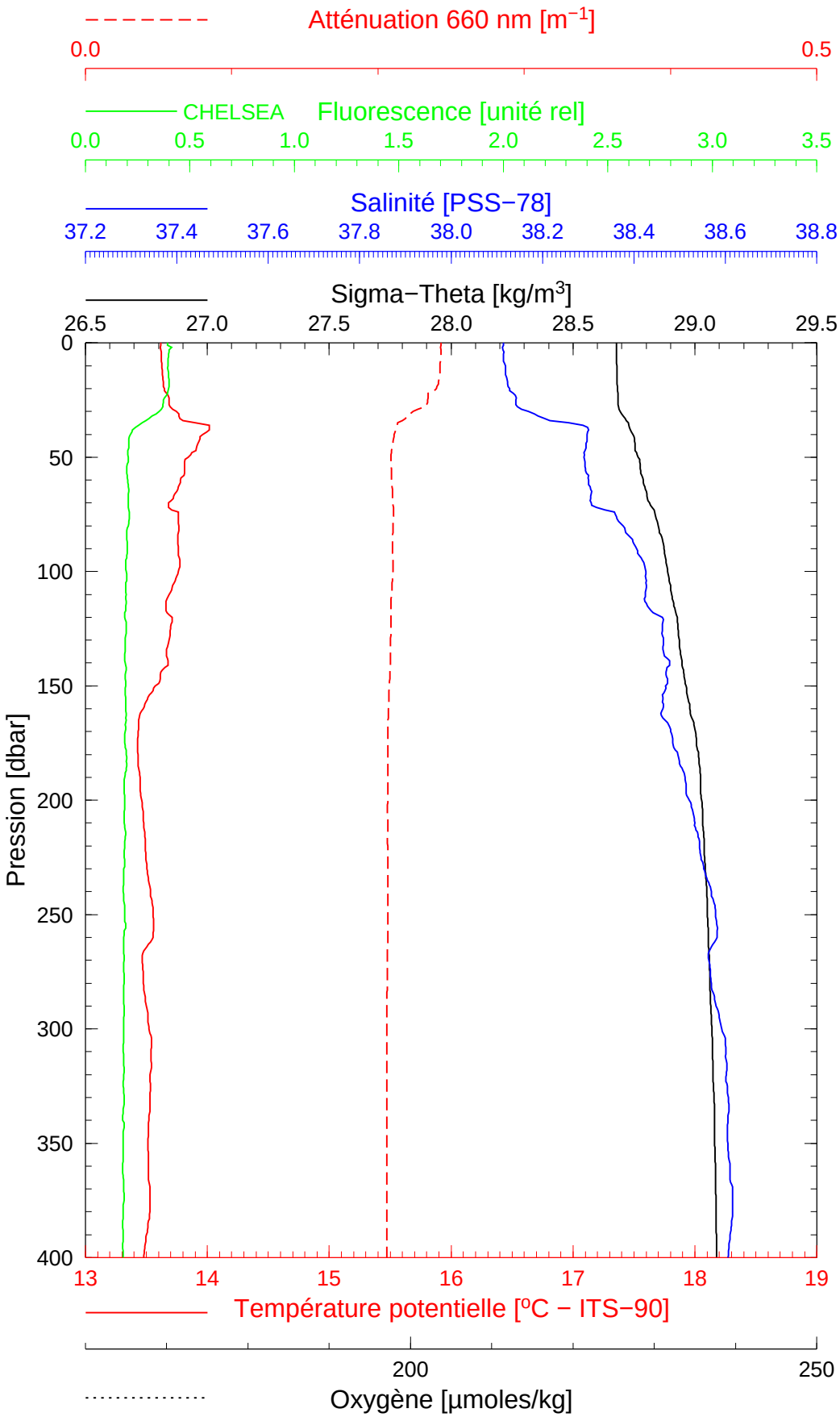


Date *23/01/2014* *Latitude* *43°21.983 N*

Heure déb *11h 42min [TU]* *Longitude* *07°53.763 E*

BOUSSOLE 143 **23/01/2014** **BOUS140123_02**

BOUS002

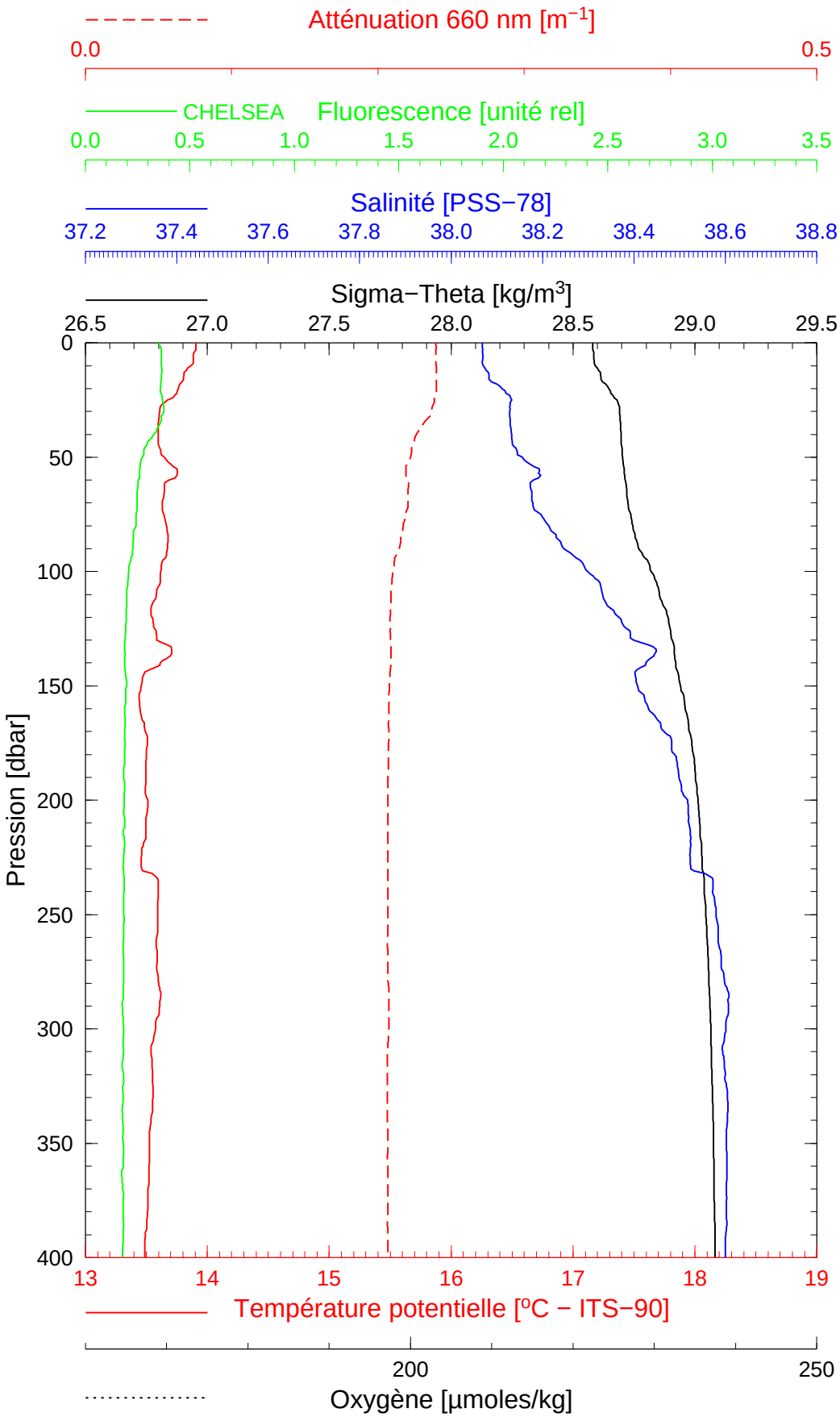


Date *23/01/2014* *Latitude* *43°24.869 N*

Heure déb *12h 55min [TU]* *Longitude* *07°47.493 E*

BOUSSOLE 143 **23/01/2014** **BOUS140123_03**

BOUS003

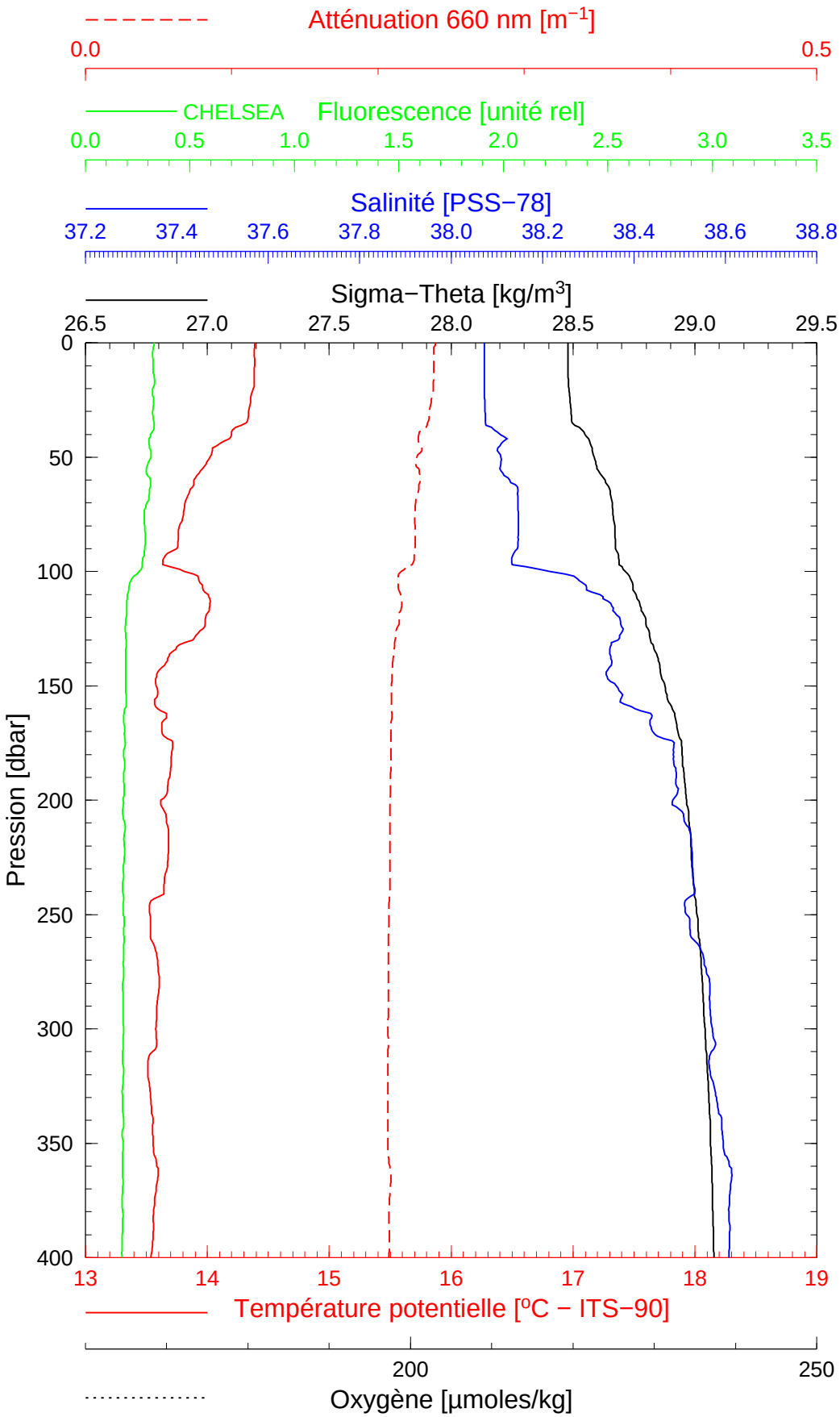


Date *23/01/2014* *Latitude* *43°28.097 N*

Heure déb *13h 43min [TU]* *Longitude* *07°41.719 E*

BOUSSOLE 143 **23/01/2014** **BOUS140123_04**

BOUS004

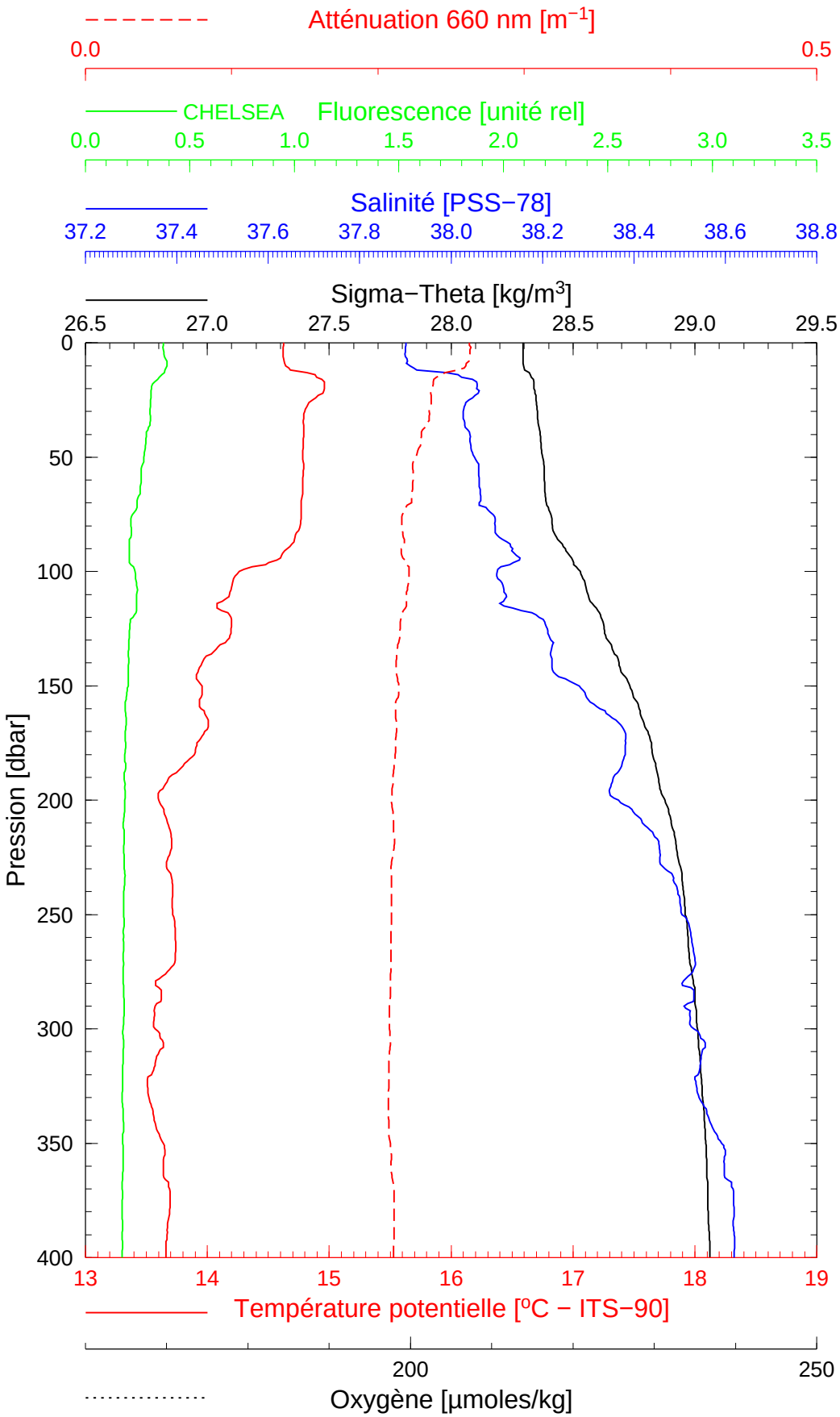


Date *23/01/2014* *Latitude* *43°30.983 N*

Heure déb *14h 25min [TU]* *Longitude* *07°36.806 E*

BOUSSOLE 143 **23/01/2014** **BOUS140123_05**

BOUS005

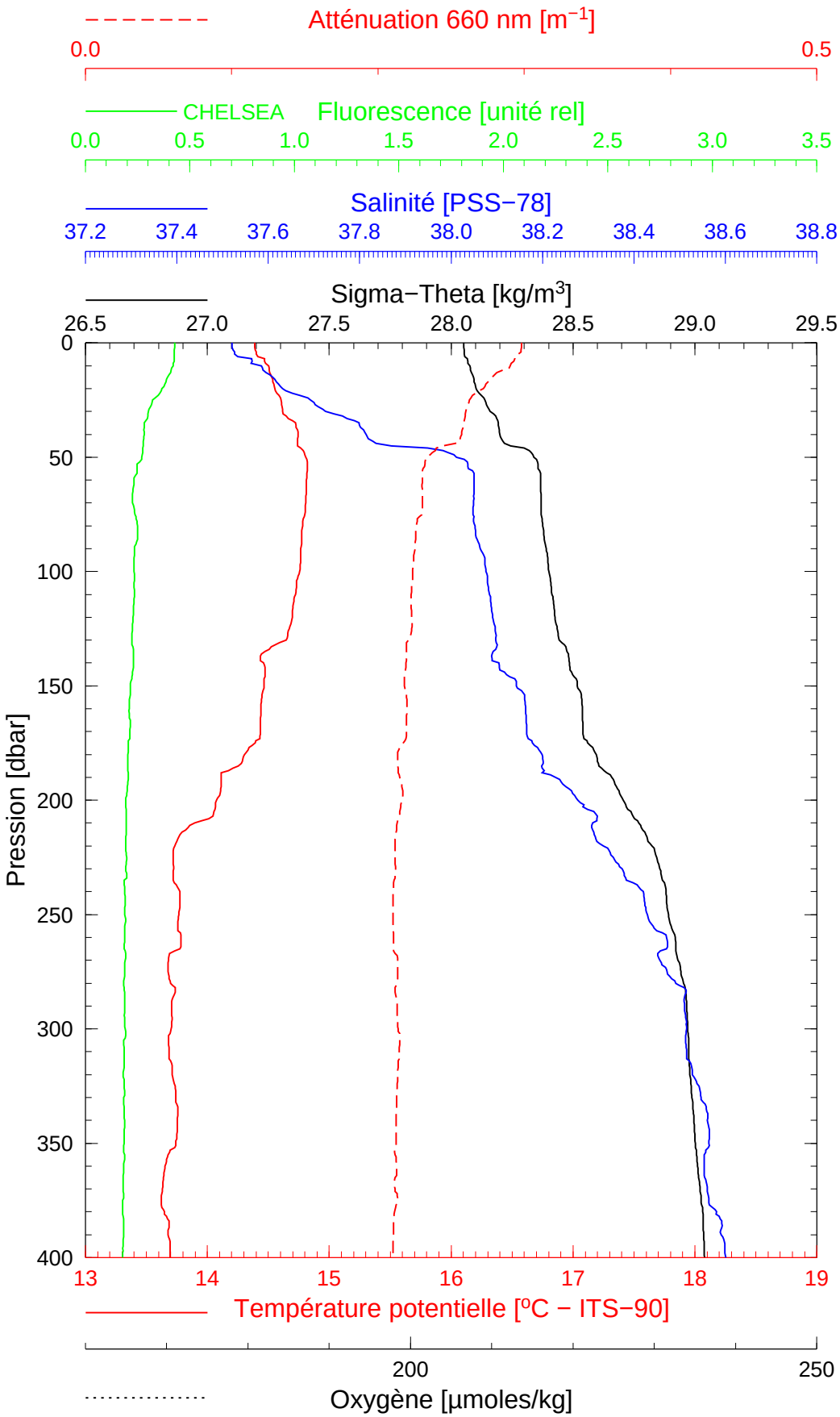


Date *23/01/2014* *Latitude* *43°33.939 N*

Heure déb *15h 12min [TU]* *Longitude* *07°31.138 E*

BOUSSOLE 143 **23/01/2014** **BOUS140123_06**

BOUS006

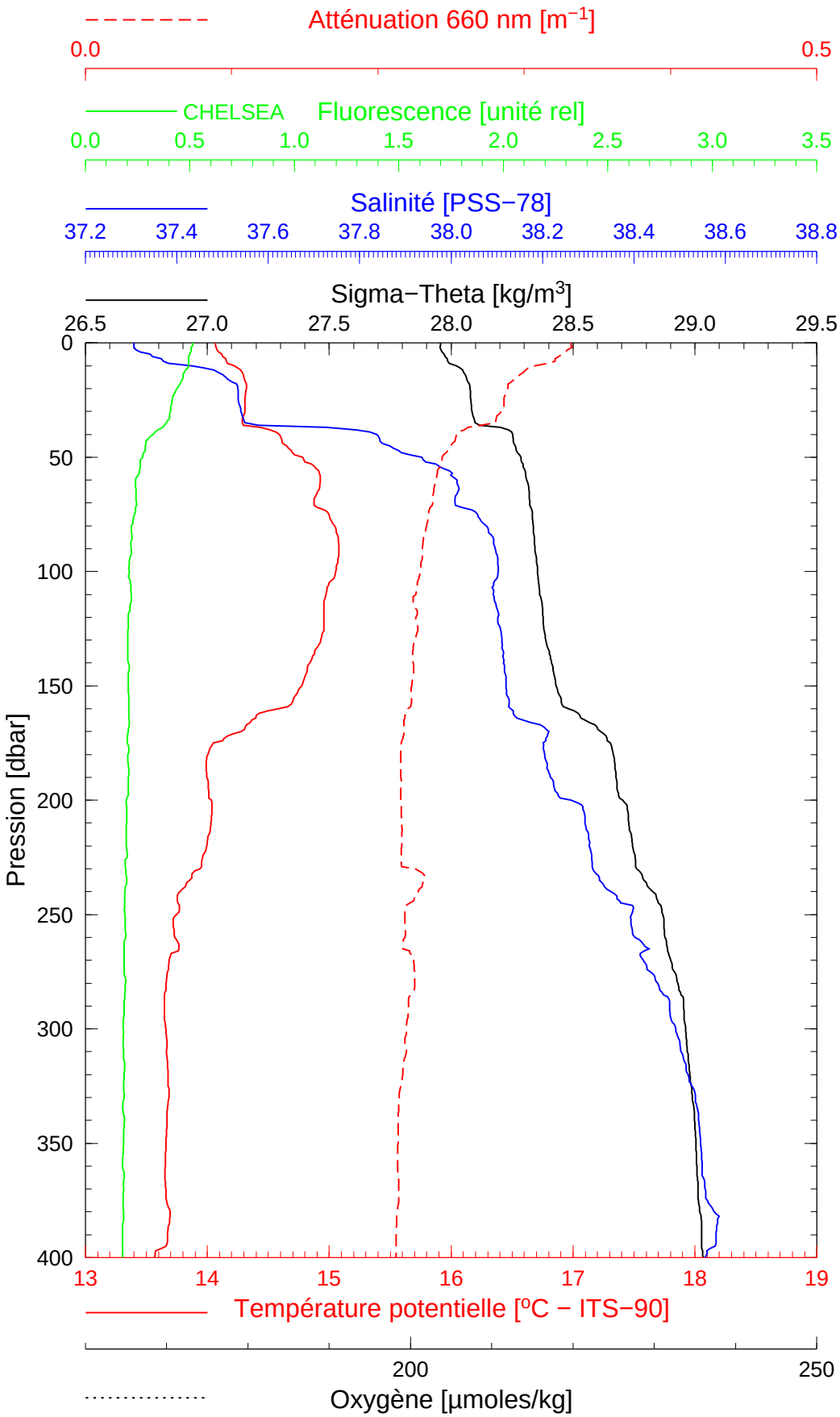


Date *23/01/2014* *Latitude* *43°36.920 N*

Heure déb *15h 57min [TU]* *Longitude* *07°25.001 E*

BOUSSOLE 143 **23/01/2014** **BOUS140123_07**

BOUS007



Date *23/01/2014* *Latitude* *43°38.999 N*

Heure déb *16h 34min [TU]* *Longitude* *07°20.957 E*