

BOUSSOLE Monthly Cruise Report

Cruise 142

December 11 – 14, 2013

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

Vessel: R/V Téthys II

(Captain: Rémy Lafond)

Science Personnel: Melek Golbol, Léo Lacour, David Luquet, Paul Mahacek, Grigor Obolensky and Vincenzo Vellucci.

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



V. Vellucci with a sailor in the dinghy, replacing a solar panel of the BOUSSOLE buoy.

BOUSSOLE project

ESA/ESRIN contract N° 13226/10/I-NB

January 09, 2014



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'Études Spatiales, France

CENTRE NATIONAL D'ÉTUDES SPATIALES



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 Hydrosat-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) and particulate organic carbon (from October 2011) analyses in the lab. Small quantities of seawater are to be fixed with glutaraldehyde for cytometric analysis (from December 2011).
- 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

The buoy DACNet (Data Acquisition and Control Network) stopped working during the first cruise day. The decision was taken to replace the faulty microdrive (where the data storage takes place and the buoy operating system is also stored). So, the divers went at sea the second day to recover the DACNet. The microdrive was replaced on board, before the DACNet be reinstalled on the buoy during a second dive.

One of the buoy solar panels was found broken on arrival. This is probably due to bad weather the days before the cruise. A new solar panel was installed in replacement.

Cruise Summary

The first day was used for optical profiles, 1 CTD cast with water sampling at the BOUSSOLE site, 1 Secchi disk, CIMEL measurements and the CTD transect.

The second day was used for diving operations: cleaning of the sensors and recovering of the DACNet during a first dive. The microdrive was exchanged on board, then the DACNet was reinstalled during a second dive. During this day, 1 CTD cast with water sampling at the BOUSSOLE site and 1 Secchi disk were also performed. The third day was used for 2 CTD casts with water sampling at the BOUSSOLE site, optical profiles and 1 Secchi disk.

The last day was used to replace a broken solar panel and to perform 1 CTD cast with water sampling at the BOUSSOLE site, 1 Secchi disk and optical profiles.

Wednesday 11 December 2013

The first day, the sea state was smooth with a light breeze. The sky was blue and the visibility was excellent. When arrived at the BOUSSOLE site, only 1 C-OPS profile was performed because the software “µprofile” used for the acquisition of the C-OPS profile stopped during the ascent of the C-OPS at surface. So, this operation was stopped after the first profile. Then, 1 CTD cast with water sampling was performed at the BOUSSOLE site, 3 C-OPS profiles, 3 CIMEL measurements and the CTD transect were performed.

Thursday 12 December 2013

The second day, the sea state was smooth with a light breeze. The sky was overcast. When arrived at the BOUSSOLE site, divers went at sea to clean the sensors and to recover the DACNet. The microdrive was exchanged on board. Then, 1 CTD cast with water sampling was performed at the BOUSSOLE site and 1 Secchi disk was performed. After, the DACNet was reinstalled during a second dive.

Friday 13 December 2013

The third day, the sea state was calm with a light breeze. The sky was cloudy and the visibility was good. 2 CTD cast with water sampling, 3 C-OPS profiles and 1 Secchi disk were performed at the BOUSSOLE site.

Saturday 14 December 2013

The last day, the sea state was smooth with a light breeze. The sky was blue and the visibility was good. The buoy was tilted and below its nominal water line. The broken solar panel was replaced and sensors on the top of the buoy were cleaned. Then, 1 CTD cast with water sampling, 1 Secchi disk and 4 C-OPS profiles were performed at the BOUSSOLE site.

Cruise Report

Thursday 11 December 2013 (UTC)

People on board: Melek Golbol and Grigor Obolensky.

0615 Departure from the Nice harbour.
0920 Arrival at the BOUSSOLE site.
0930 C-OPS 01.
0955 CTD 01, 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.
1035 C-OPS 02, 03, 04.
1100 Secchi disk 01 (21m).
1115 CIMEL 01, 02, 03.
1215 CTD 02, 400m, station 01 (43°25'N 07°48'E).
1315 CTD 03, 400m, station 02 (43°28'N 07°42'E).
1410 CTD 04, 400 m, station 03 (43°31'N 07°37'E).
1505 CTD 05, 400 m, station 04 (43°34'N 07°31'E).
1605 CTD 06, 400 m, station 05 (43°37'N 07°25'E).
1700 CTD 07, 400 m, station 06 (43°39'N 07°21'E).
1725 Departure to the Nice harbour.
1750 Arrival at the Nice harbour.

Thursday 12 December 2013 (UTC)

People on board: Melek Golbol, David Luquet, Paul Mahacek, Grigor Obolensky and Vincenzo Vellucci.

0700 Departure from the Nice harbour.
1005 Arrival at the BOUSSOLE site.
1020 Diving on the buoy for cleaning sensors and dismounting the DACNet.
1100 Lunch.
1200 Changing of the DACNet microdrive.

1210 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.
1330 Diving on the buoy for reinstalling the DACNet.
1345 Secchi disk 02 (14 m).
1440 Departure to the Nice harbour.
1740 Arrival at the Nice harbour.

Friday 13 December 2013 (UTC)

People on board: Melek Golbol and Léo Lacour.

0640 Departure from the Nice harbour.
0950 Arrival at the BOUSSOLE site.
0955 CTD 09, 400 m with water sampling at 400, 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, a_p , CDOM, POC and Cytometry.
1200 Lunch.
1305 C-OPS 05, 06, 07.
1335 CTD 10, 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.
1350 Secchi disk 03 (12 m).
1410 Departure to the Nice harbour.
1715 Arrival at the Nice harbour.

Saturday 14 December 2013 (UTC)

People on board: Melek Golbol and Vincenzo Vellucci.

0700 Departure from the Nice harbour.
1015 Arrival at the BOUSSOLE site.
1020 Changing of 1 solar panel of the buoy and cleaning of sensors at the head of the buoy.
1155 CTD 11, 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.
1255 Secchi disk 03 (15 m).
1310 C-OPS 08, 09, 10, 11.
1345 Departure to the Nice harbour.
1700 Arrival at the Nice harbour.

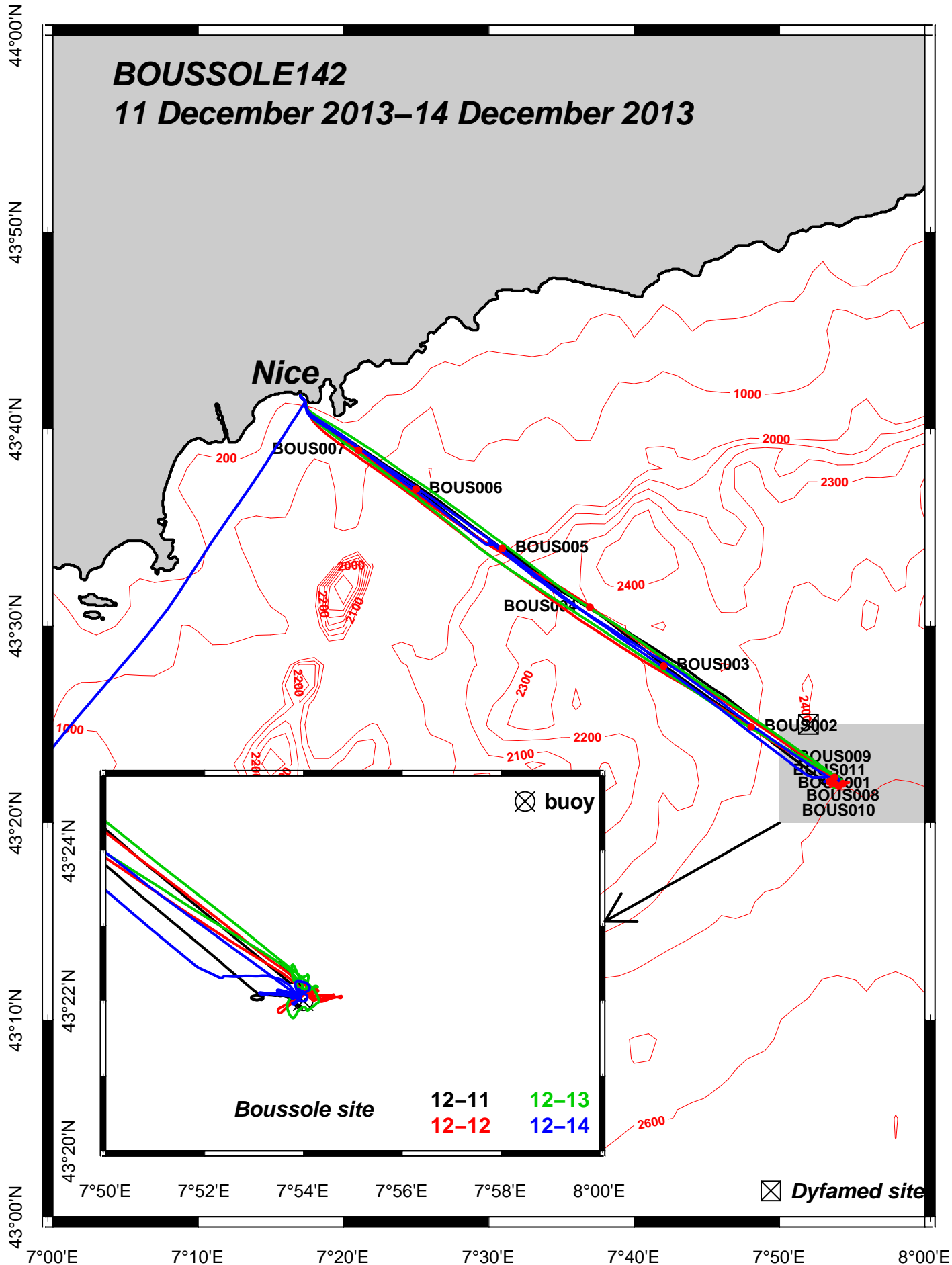
Problems identified during the cruise

- The first day, the “ μ profile” software stopped during the ascent of the C-OPS. The C-OPS was brought on board and the software was relaunched. Then it worked correctly.
- During this cruise, the buoy DACNet stopped working. The microdrive was replaced but the system did not restart, however. The microdrive was actually in good shape, and the problem was instead due to low battery voltage because of one missing (broken) solar panel. After the solar panel was replaced, the system restarted correctly.
- Replacement of the solar panel was difficult because the buoy was tilted and below its nominal water line. The operation was carried out directly from the dinghy.

Appendices

BOUSSOLE142

11 December 2013–14 December 2013

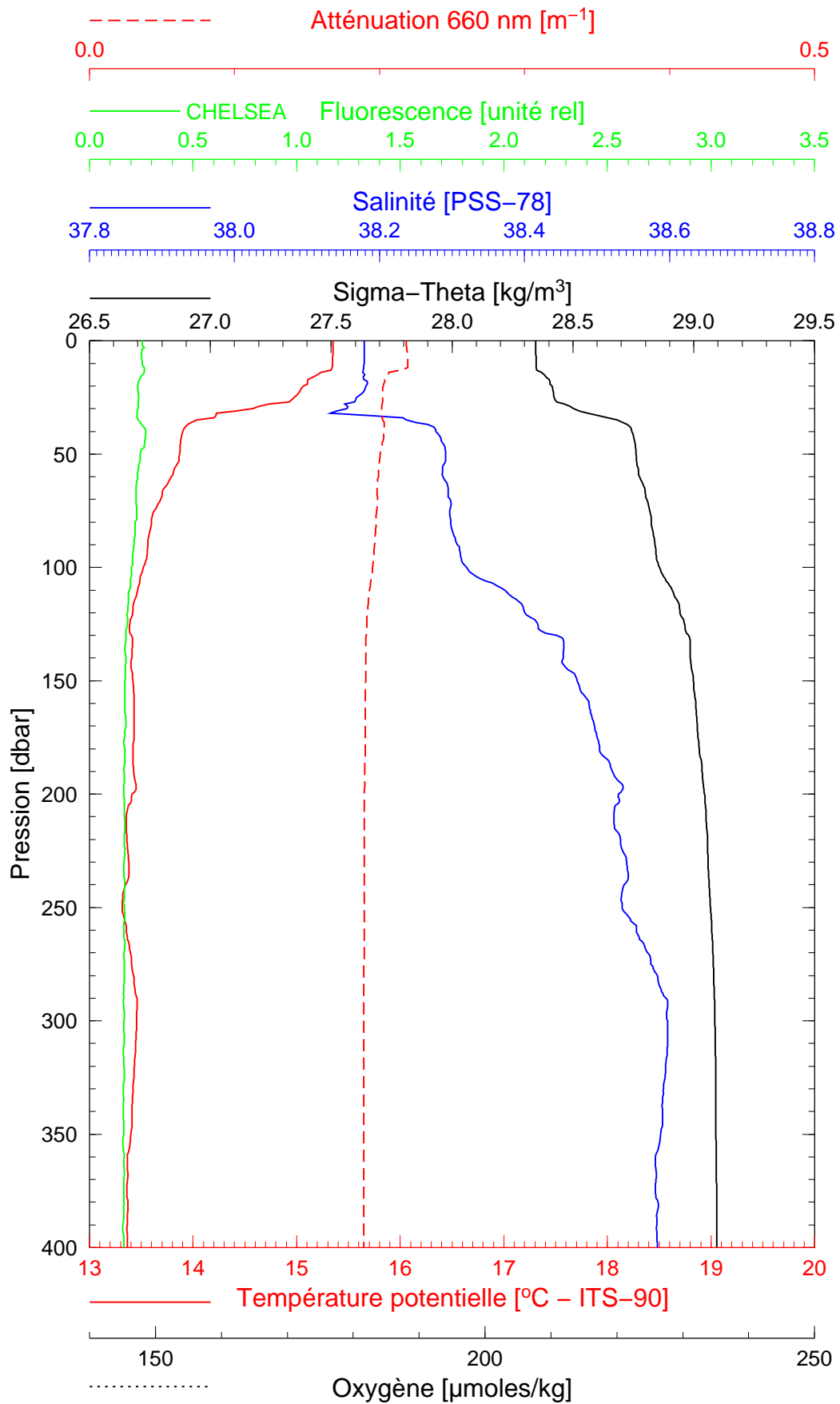


BOUSSOLE 142

11/12/2013

BOUS131211_01

BOUS001



Date 11/12/2013
Heure déb 09h 52min [TU]

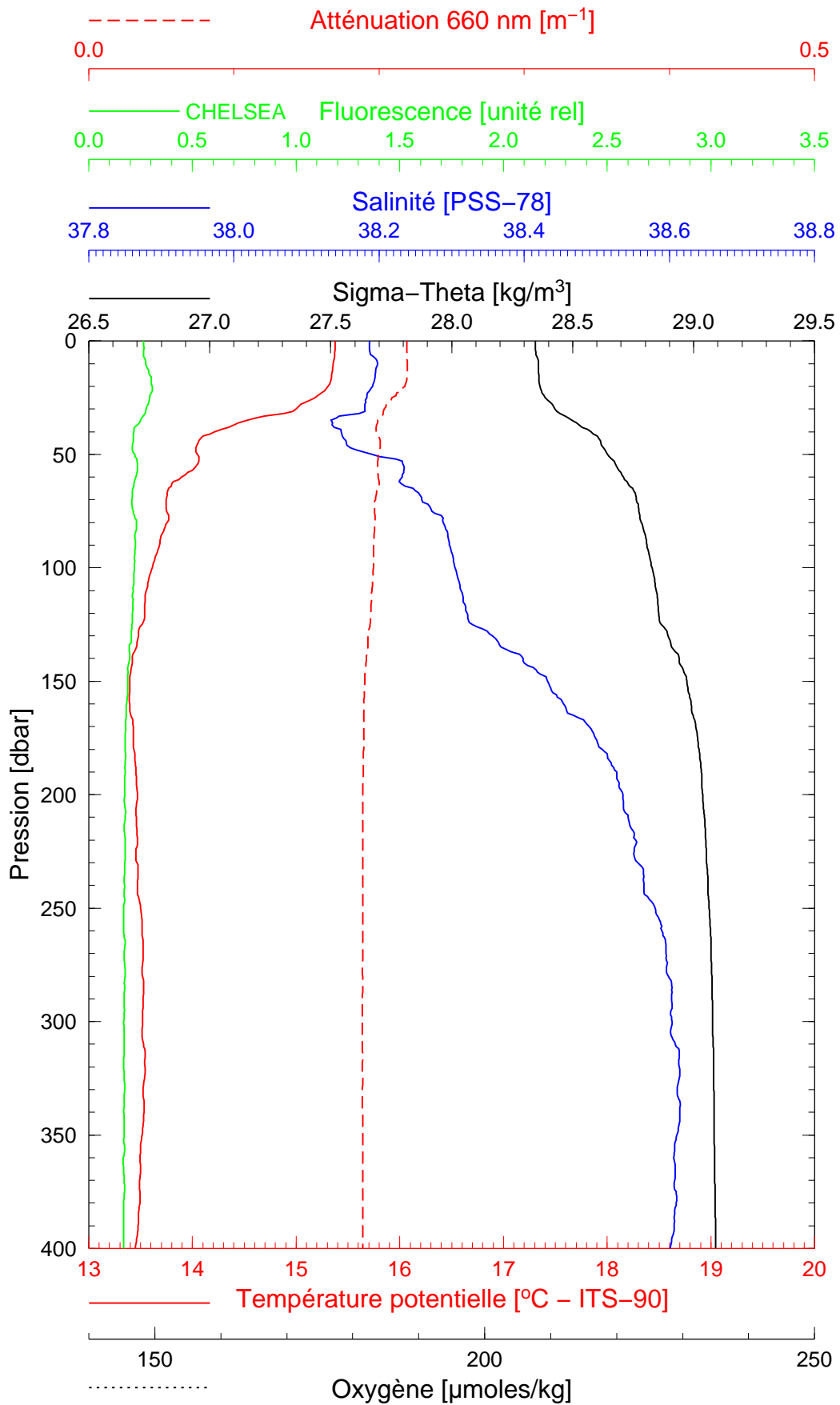
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Longitude 07°53.798 E

BOUSSOLE 142

11/12/2013

BOUS131211_02

BOUS002



Date 11/12/2013

Latitude 43°24.880 N

Heure déb 12h 18min [TU]

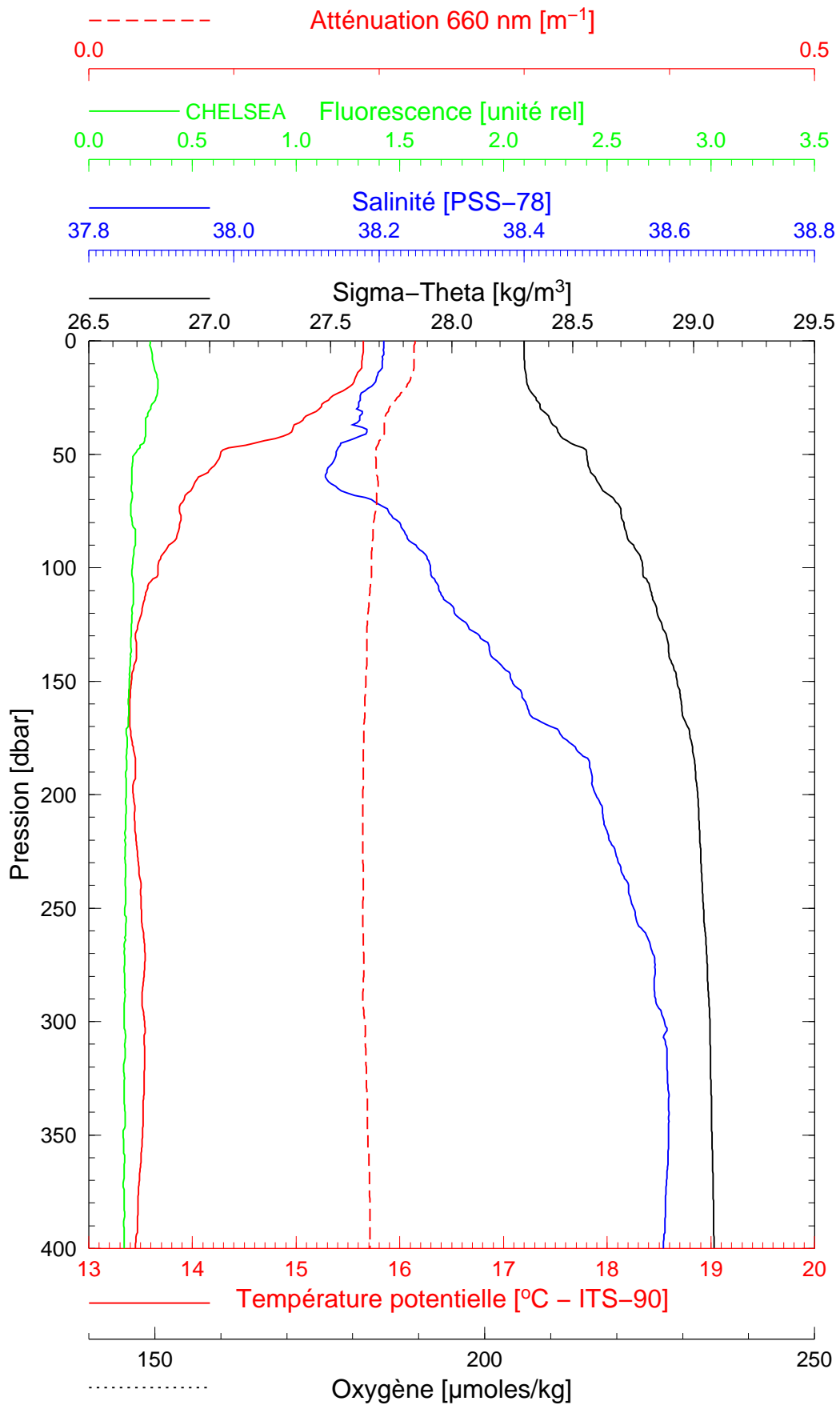
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BOUSSOLE 142

11/12/2013

BOUS131211_03

BOUS003



Date 11/12/2013
Heure déb 13h 16min [TU]

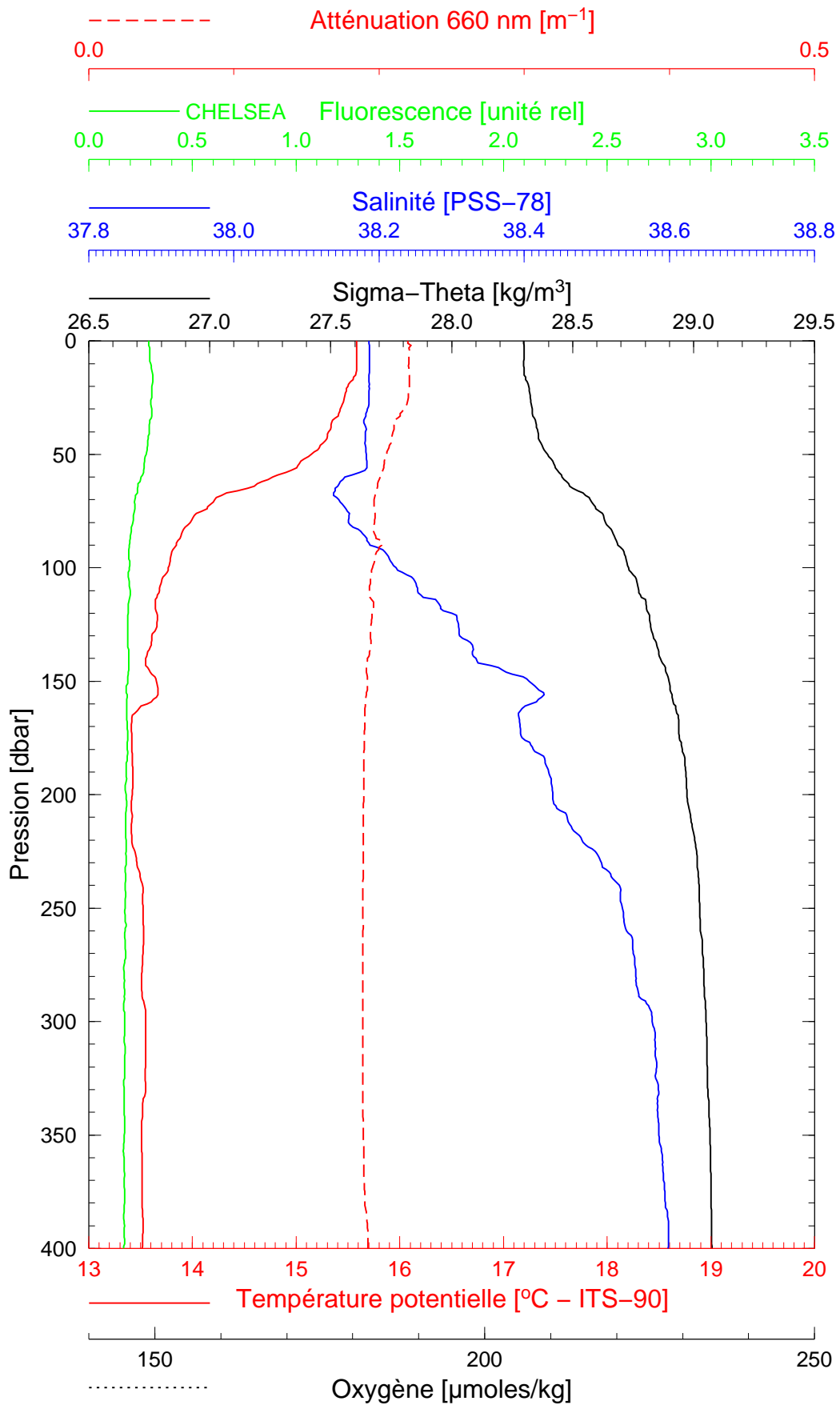
Latitude 43°27.955 N
Longitude 07°42.031 E

BOUSSOLE 142

11/12/2013

BOUS131211_04

BOUS004



Date 11/12/2013

Latitude 43°30.950 N

Heure déb 14h 10min [TU]

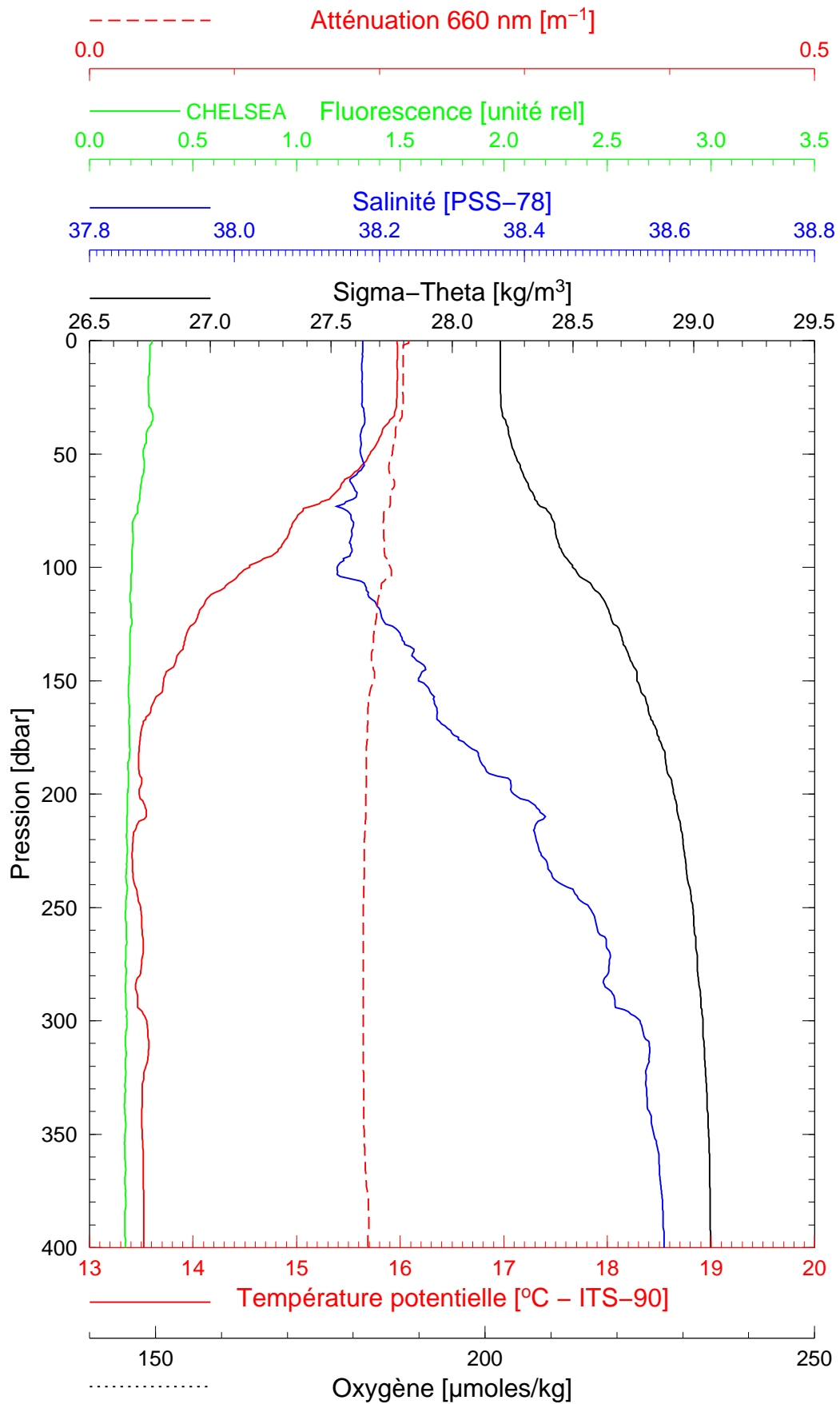
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BOUSSOLE 142

11/12/2013

BOUS131211_05

BOUS005



Date 11/12/2013
Heure déb 15h 05min [TU]

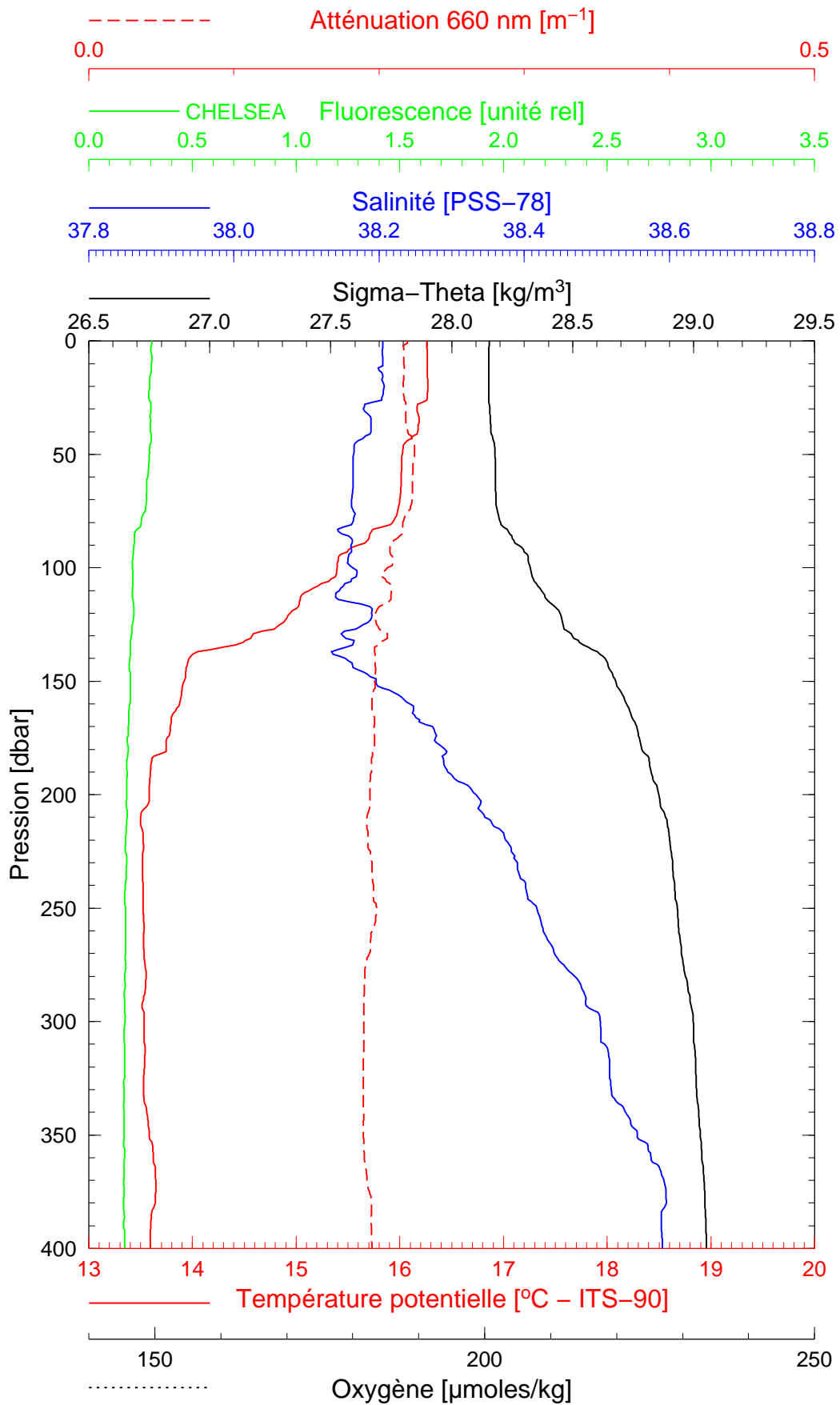
Latitude 43°33.946 N
Longitude 07°30.928 E

BOUSSOLE 142

11/12/2013

BOUS131211_06

BOUS006



Date 11/12/2013
Heure déb 16h 03min [TU]

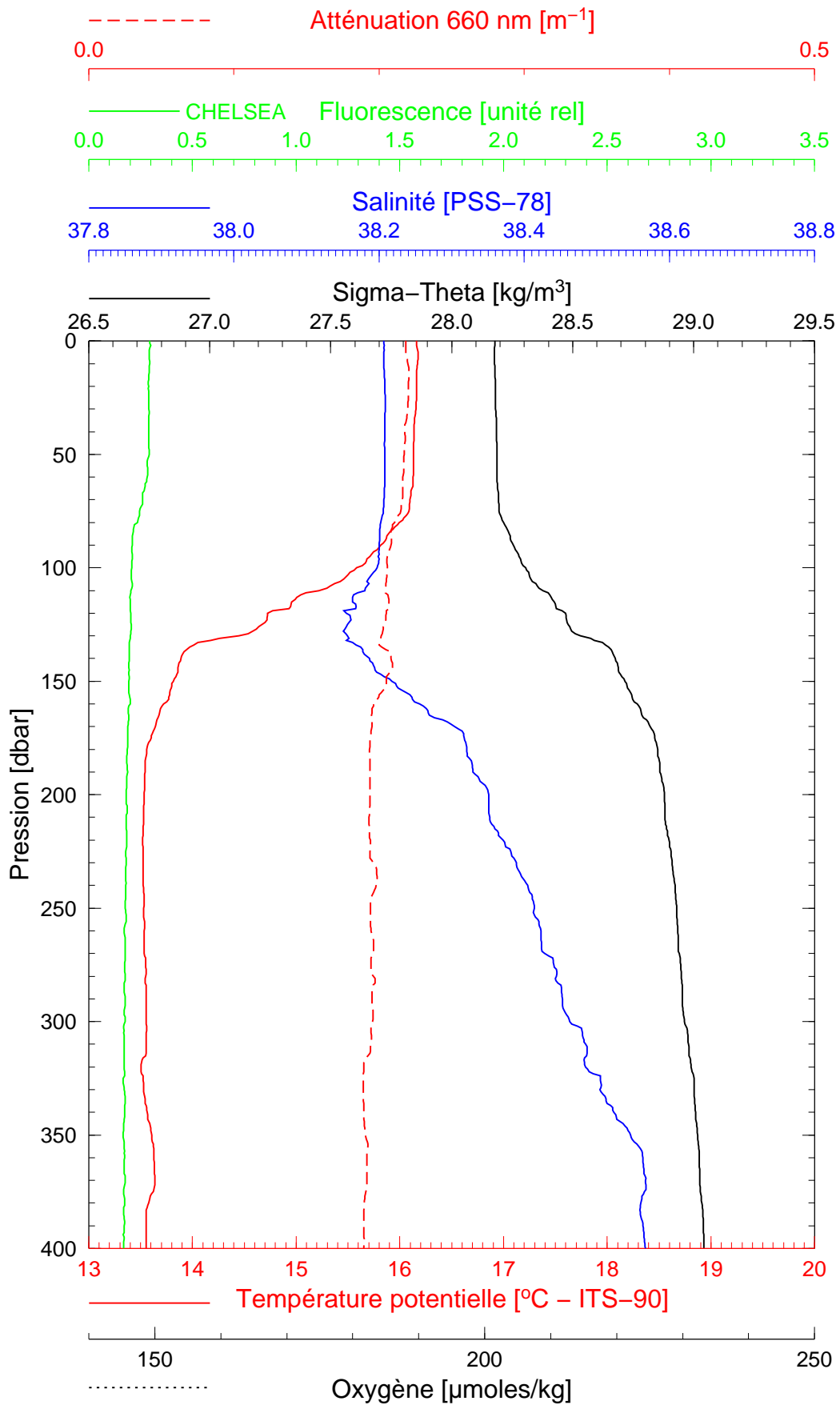
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BOUSSOLE 142

11/12/2013

BOUS131211_07

BOUS007



Date 11/12/2013

Latitude 43°38.914 N

Heure déb 17h 00min [TU]

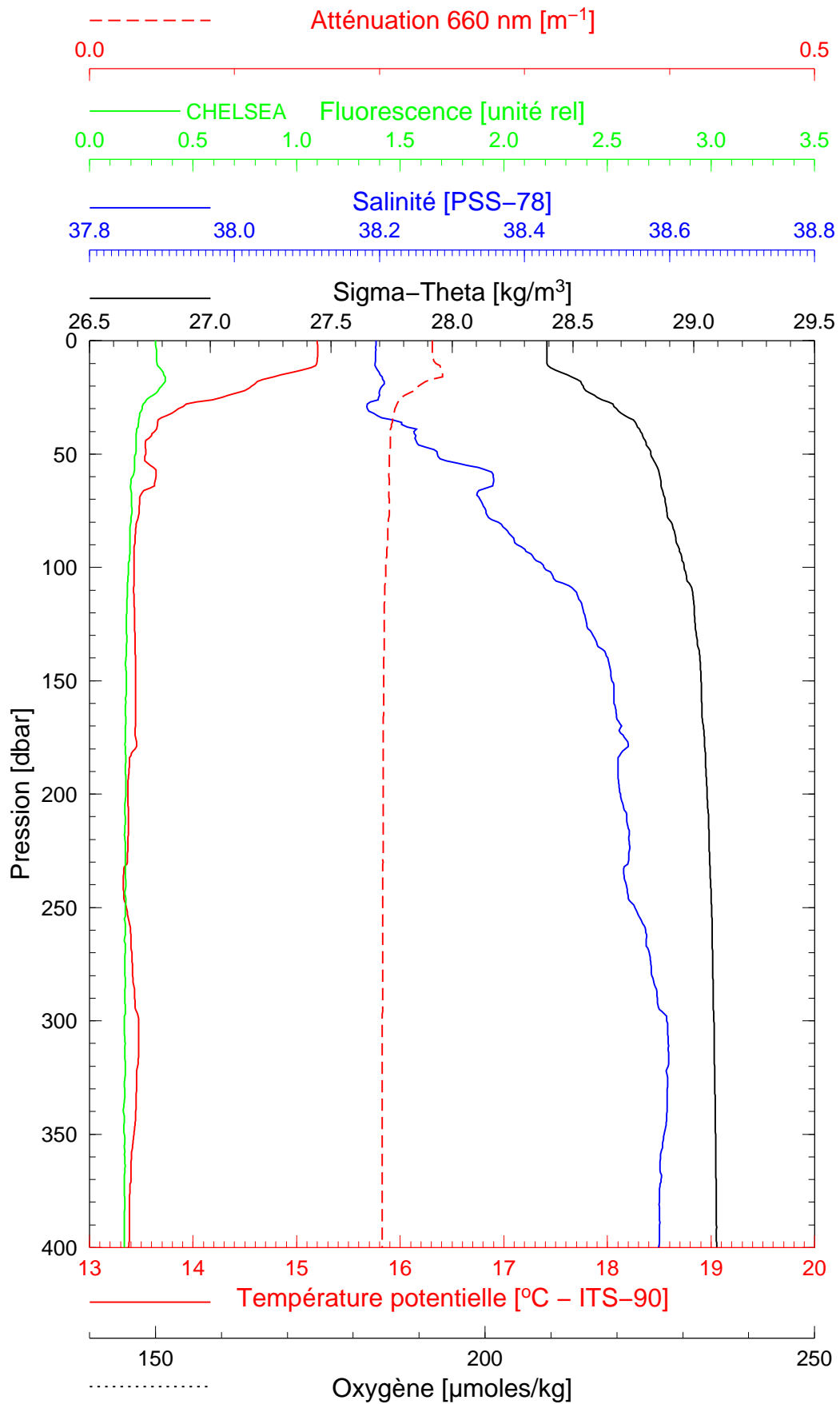
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BOUSSOLE 142

12/12/2013

BOUS131212_01

BOUS008



Date 12/12/2013
Heure déb 12h 11min [TU]

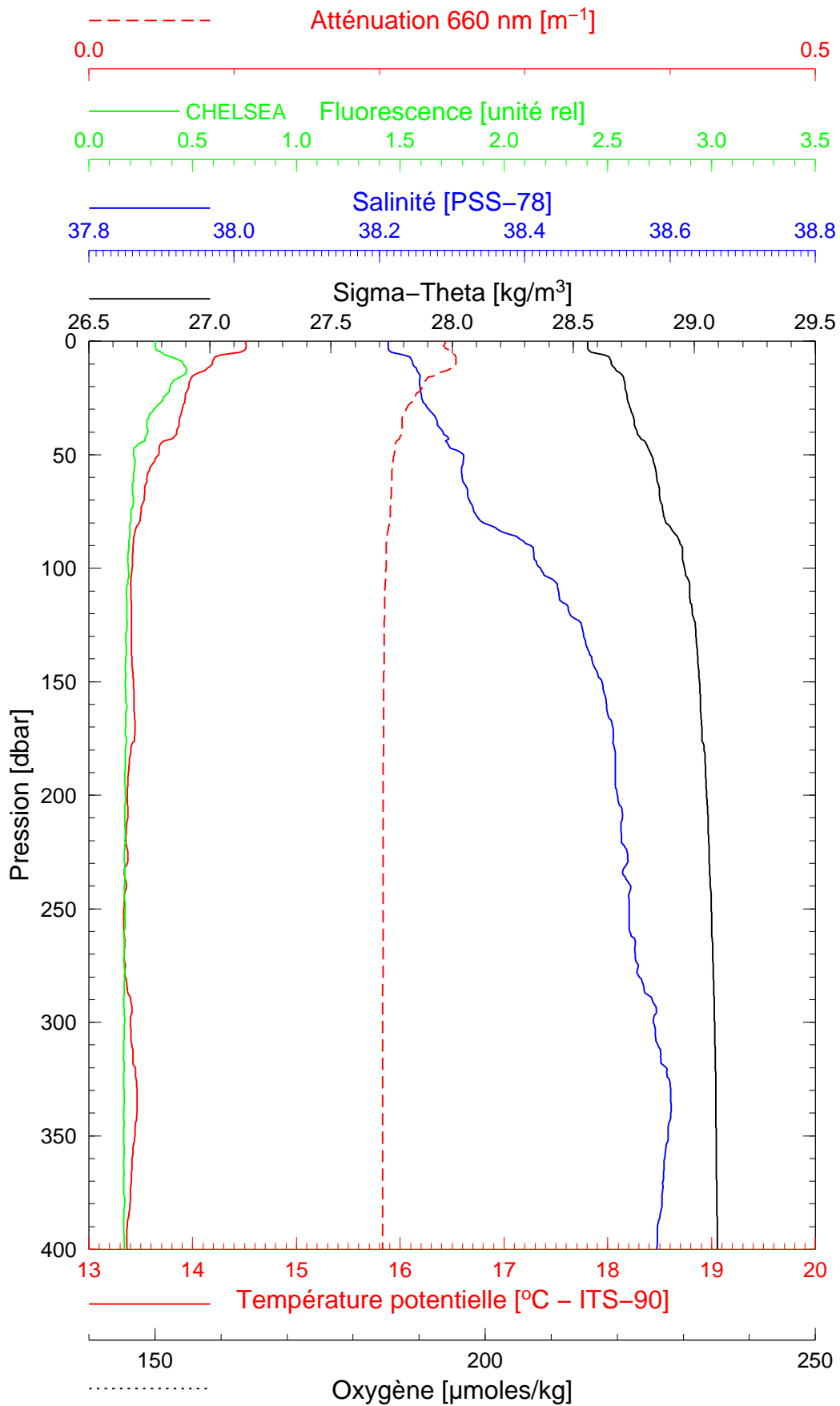
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BOUSSOLE 142

13/12/2013

BOUS131213_01

BOUS009



Date 13/12/2013
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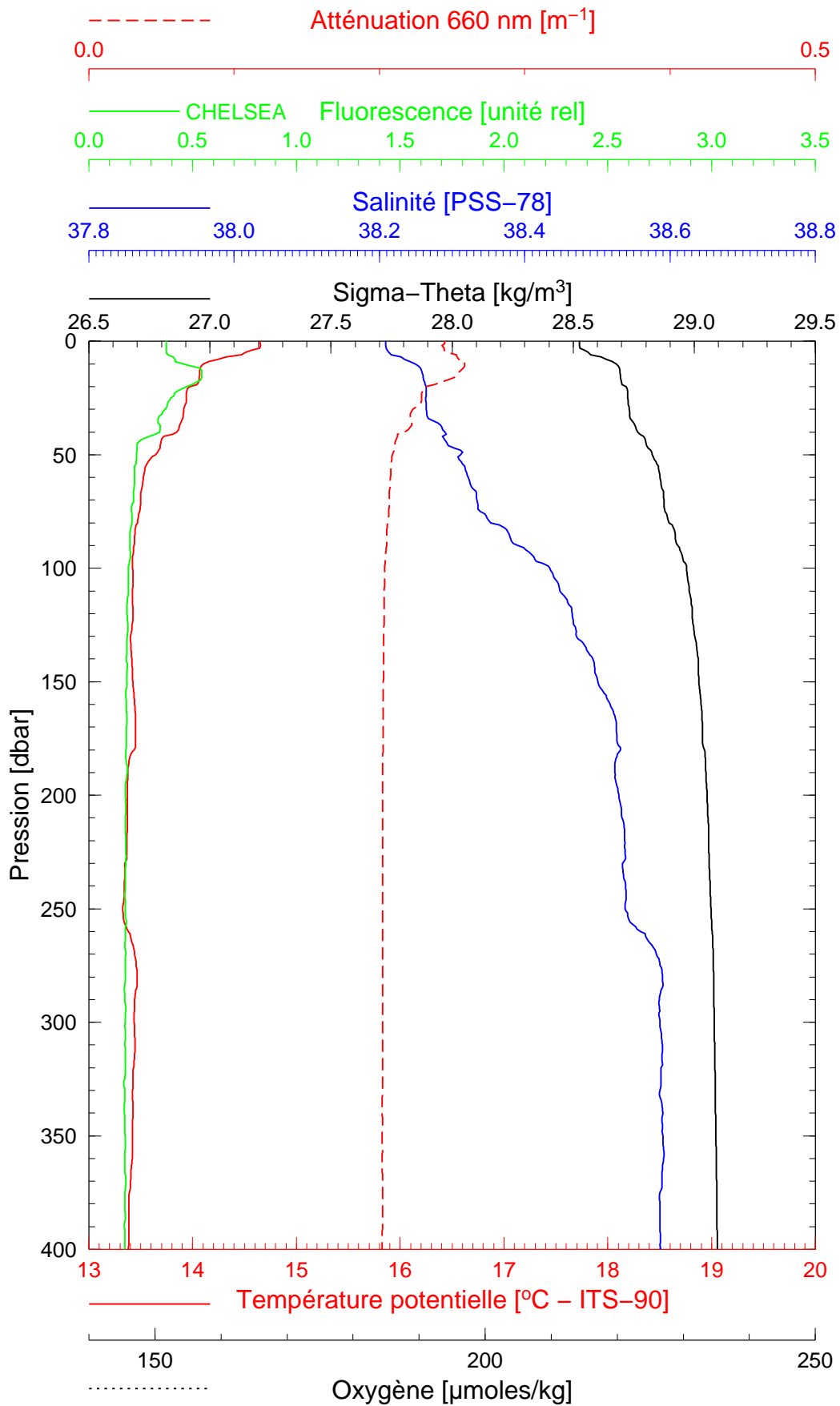
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BOUSSOLE 142

13/12/2013

BOUS131213_02

BOUS010



Date 13/12/2013
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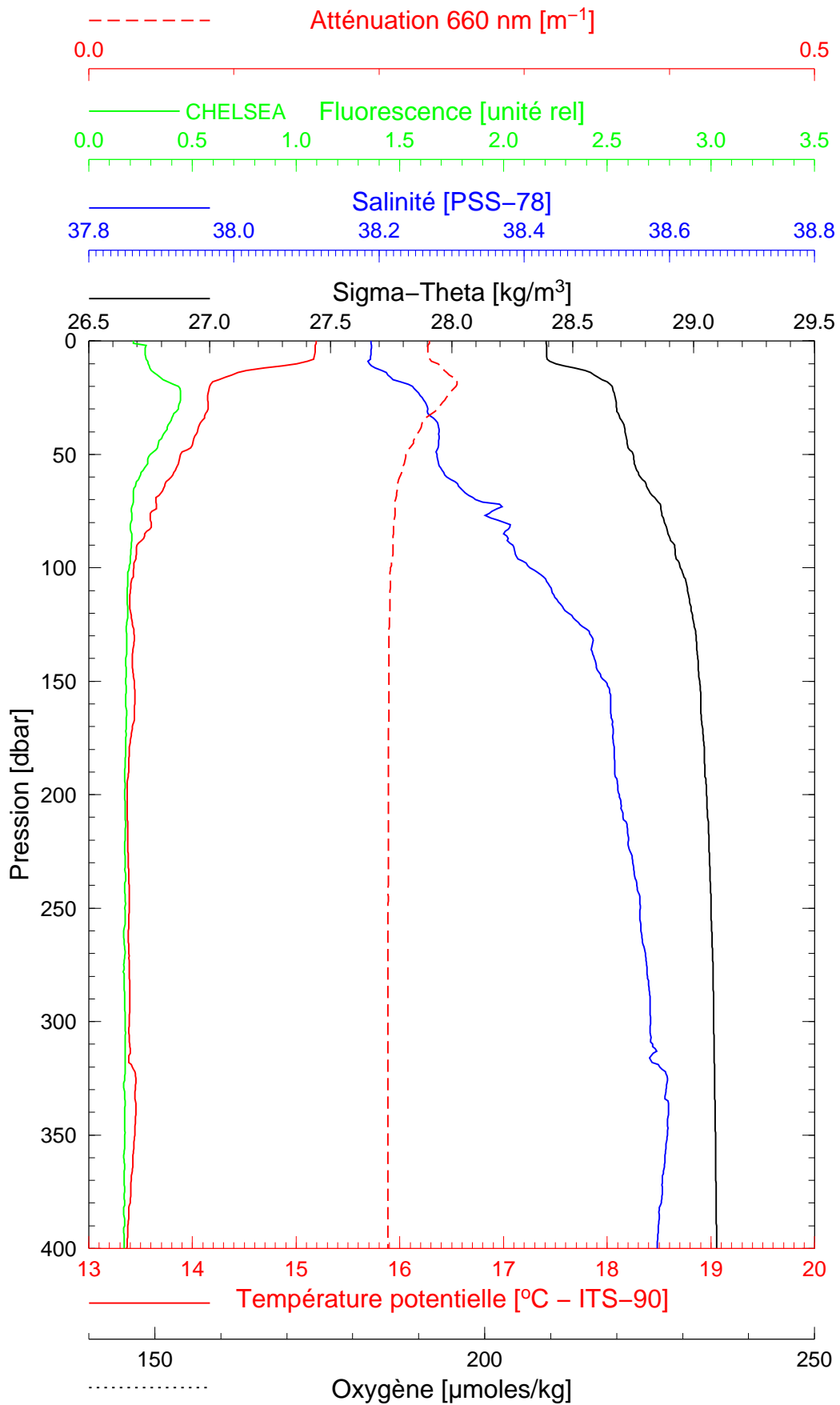
Latitude 43°21.874 N
Longitude 07°54.079 E

BOUSSOLE 142

14/12/2013

BOUS131214_01

BOUS011



Date 14/12/2013

Latitude 43°22.103 N

Heure déb 11h 54min [TU]

Longitude 07°53.454 E