# BOUSSOLE Monthly Cruise Report

## Cruise 32
## April 09 – 12, 2004

Duty Chief: Alec Scott (alec.scott@obs-vlfr.fr)
Vessel: R/V Téthys II
(Captain: Rémy Lafond)

Science Personnel: Alec Scott, Dominique Tailliez, David Antoine, Aurelie Laudea, Davy Merien and Marc Tedetti

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

Fig 1. Hoisting materials up to the Boussole buoy head to attempt a direct communication link with a laptop PC.

**BOUSSOLE project**

**ESA/ESRIN contract N° 17286/03/I-OL**

**Deliverable from WP#400/200**

*December 2, 2005*

# 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 of the USA

Centre National de la Recherche Scientifique, France

Institut National des Sciences de l'Univers, France

Université Pierre & Marie Curie, France

Observatoire Océanologique de Villefranche sur mer, France

# Contents

# Cruise Objectives

Multiple SPMR profiles are to occur within 1 hour of satellite overhead passes of SeaWiFS and MERIS and around solar noon. 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), SIMBADA measurements are to be performed consecutively where possible with SPMR profiles. If sea conditions are poor but sky is good, SIMBADA sun photometer measurements can be made at intervals throughout the day to measure atmospheric optical thickness. A floating platform is to be used to support the SPMR Eu sensor approximately 20cm below the surface for up to 3 minutes of stable light field before a release mechanism triggers the release of the profiler to start a descent as normal. Multiple descents ideally will be started in this way and the data will be used to assess near-surface Eu extrapolation model calculations. CTD deployments are required at the start and end of the SPMR profiling day and around noon in the longer summer days or when there is a high possibility of a satellite matchup. In addition to the depth profile from the CTD, CDOM fluorometer, Chl fluorometer and AC9, seawater samples are to be collected,filtered and stored in LN2 for HPLC pigment and particule absorption spectrophotometric filter analysis in the lab. A gimbled PAR sensor positioned on the foredeck and operated from the CTD computer serves as a light field stability indicator during SPMR profiling.

For each cruise, at the end of the optics measurements on site, there will be one ctd transect between the Boussole site and the Port of Nice. This transect consists of four fixed locations on-route from Boussole and a final two station positions to be decided during the transect in order to sample on both sides of the main frontal structure between the coastal waters and Ligurian Sea. The time of day of this transect should be similar for each cruise, if possible to minimise influence of diurnal variability. On other uninterrupted transits between Nice and Boussole, Simbada measurements of optical thickness should be taken every 30 minutes to characterise variability between the Cap Ferrat sun photometer site and the Boussole site.

Davey Merien will be assisting Dominique Tailliez with CTD operations in order to establish an efficient protocol for processing the data from the AC9.

DEA student Aurelie Laudea will be participating in the cruise as an observer.

Mark Tedetti, from the Centre d'Océanologie de Marseille will be testing a new Satlantic UV/Vis MicroPro Free Fall Profiler and observing our procedures to develop his own. Profiles will be performed synchronously with our profiler to establish complementary data sets.

Three private commercial divers will be aboard to check on the physical state of the buoy below the surface, providing underwater photographs, cleaning the sensors and exchanging the radiometers. A new 3m80 Quiksilver semi-rigid inflatable boat will be used for the first time for these activities.

Other activities will also be performed on the buoy to try to establish communication. Various configurations will be tried with the laptop PC, each time using the direct cable link to bypass the cisco systems.

# Cruise Summary

Friday 9th April

Departure was delayed half an hour whilst waiting for some ship supplies to arrive. This was not of any loss to the schedule because the weather forecast and current conditions were overcast with rain. Despite the gloomy conditions the seas were quite calm in the morning. The first activity was to climb on the buoy to make a general check of the above water instruments and hardware. The antenna tube of the Cisco bridge was loose was retightened. The cisco for the new system was connected temporarily and left for 3 hours to try communicating with the ship and dozwnloading some data with 3 attempts. However, no connection was made. With the poor optics conditions, the time was used to complete the quadrilateral grid and transect.

Sea conditions wer fairly rough throughout the afternoon but during the transect and around 1700 hours there was some sunshine and the seas progressively calmed. However, due to the weather conditions, no SPMR work was performed.

Saturday 10th April

A test cable that arrived in Villefranche yesterday was used to attempt a direct link from the pc to the DACNet, thus directly bypassing the Cisco ethernet bridge. However, communication failed even with this. Sea conditions

were calm and the sky was very clear but with the diving activities on the buoy, there was not a lot of time left for optics work with the SPMR but some profiles were done in time with the afternoon SeaWiFS pass.

Sunday 11th April
Sea and sky conditions were excellent today and the time was used with SPMR profiles for the SeaWiFS and Modis passes and for comparison casts with the UV/Vis Micropro profiler from Marseille. The Micropro casts did not produce good data due to configuration problems but the main objective was to experiment with the configuration to find the best setting. From this perspective, the sessions were very useful.

Monday 12th April
Soon after departure and with some distance offshore, it became clear that conditions were too rough to be able to do any work at the Boussole site. After the decision to turn around and head back towards land, the Tethys stopped in the deep water at the opening of the Bay of Villefranche. A CTD profile was made to collect samples for the Marseille group and several comparison profiles were made with both the SPMR and UV/Vis MicroPro in the water simultaneously.

# Cruise Report

## 9th April, 2004 (Times UTC)

0500 Depart port of Nice
0815 Arrival at Boussole Site (43°22'N 7°54'E).
0845 Alec on buoy to attempt communication
0950 Alec on buoy to attempt communication
1050 Alec on buoy to attempt communication
1250 Quadrilateral completed
1307 CTD Boussole 1. Max 400m. Bottle depths (m): 200,100,70,60,50,40,30,20,10, 5.
1416 CTD Boussole 2. Max 400m. Transect Station 1 (43°25'N 7°28'E).
1522 CTD Boussole 3. Max 400m. Transect Station 2 (43°28'N 7°42'E).
1621 CTD Boussole 4. Max 400m. Transect Station 3 (43°31'N 7°37'E).
1720 CTD Boussole 5. Max 400m. Transect Station 4 (43°34'N 7°31'E).
1827 CTD Boussole 6. Max 400m. Transect Station 5 (43°37'N 7°25'E).
1930 Arrival in port of Nice

## 10th April, 2004

0430 Depart port of Nice
0745 Arrival at Boussole Site (43°22'N 7°54'E).
0800 Divers on buoy for cleaning sensors and photography
0855 Divers on board
0945 Alec on buoy to attempt communication
0954 CTD Boussole 7. Max 400m. Bottle depths (m): 200,100,70,60,50,40,30,20,10, 5.
1025 CTD on deck
1105 Divers in water to exchange radiometers
1140 Divers on board
1400 SPMR in water
1450 SPMR on deck (3 profiles + SeaWiFS 1325)
1455 Alec on buoy to attempt communication
1510 Depart for port of Nice
1820 Arrival in port of Nice

## 11th April, 2004

0430 Depart port of Nice
0745 Arrival at Boussole Site (43°22'N 7°54'E).
0750 Alec on buoy to attempt communication
0817 CTD Boussole 8. Max 400m. Bottle depths (m): 200,100,70,60,50,40,30,20,10,5.
0850 CTD on deck
0855 SPMR in water
0930 SPMR on deck (2 profiles + Meris 0944)
0935 UV profiler in water

1000 UV profiler on deck
1122 SPMR and UV profiler in water (1 profile simultaneously +SeaWiFS 1228)
1145 SPMR and UV profiler on deck
1150 Alec on buoy to attempt communication
1220 SPMR and UV profiler in water
1240 SPMR and UV profiler on deck (2 profiles simultaneously +SeaWiFS 1228)
1245 Alec on buoy to attempt communication
1430 CTD Boussole 9. Max 400m. Bottle depths (m): 10,5
1457 CTD on deck
1500 Depart for port of Nice
1820 Arrival in port of Nice

## 12th April, 2004

0430 Depart port of Nice
0515 Ship turned around due to conditions deteriorating
0648 CTD Boussole 10. Max 100m. Bottle depths (m): 100,60,50,30,10,5.
0701 CTD on deck
0755 SPMR and UV profiler in water
0830 SPMR and UV profiler on deck (3 profiles simultaneously)
0845 Depart for port of Nice
0930 Arrival in Port of Nice

# Boussole Site Satellite Overhead Pass Schedule

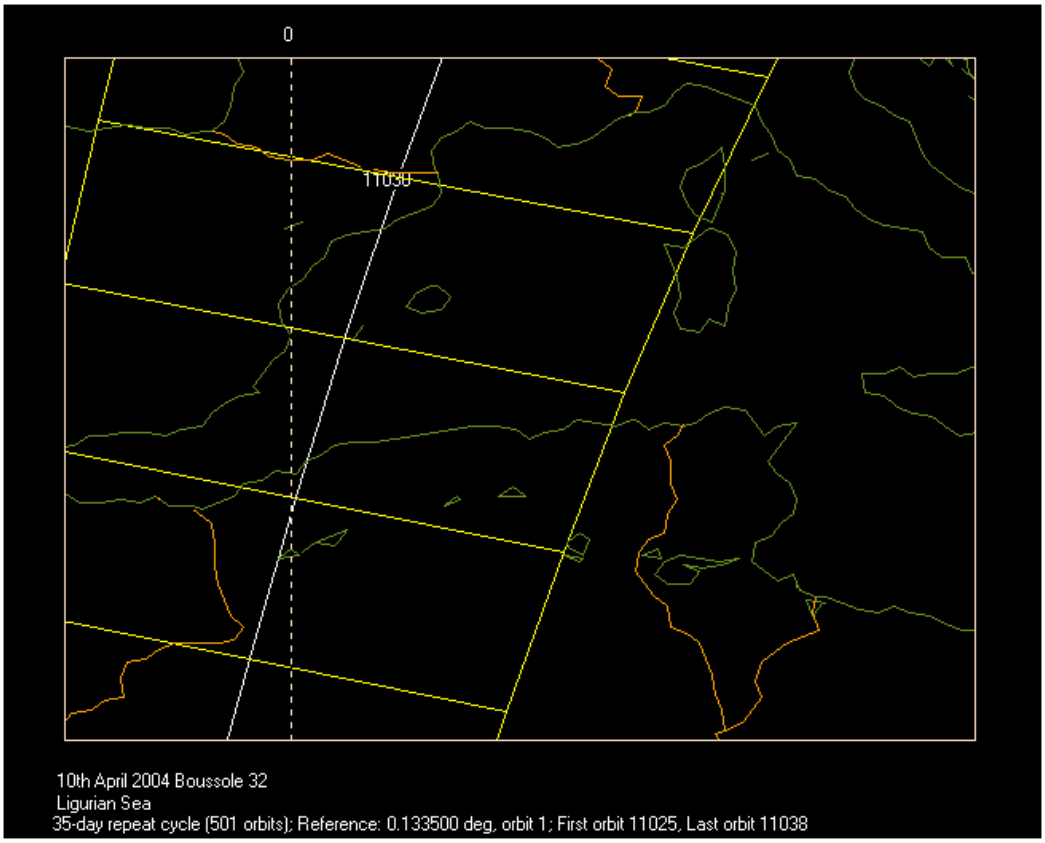
SeaWiFS: Viewing Times
Date Time Lat Lon Sat. Sat. Range Sun Sun Tilt Flags*
(UTC) (DEG) (DEG) Azi. Elev. (km) Azi. Elev.
---
09 Apr 2004 11:07:58 43.220 7.540 104.81 17.26 1715 170.07 54.22 AFT 2 3
09 Apr 2004 12:45:39 43.220 7.540 261.58 46.55 926 210.13 51.04 AFT 2
10 Apr 2004 11:48:25 43.220 7.540 121.88 41.08 1005 187.46 54.76 AFT 2
10 Apr 2004 13:25:48 43.220 7.540 282.31 20.86 1551 224.08 46.94 AFT 2 3
11 Apr 2004 12:28:46 43.220 7.540 230.88 63.55 774 204.34 53.10 AFT 2
12 Apr 2004 11:31:27 43.220 7.540 112.40 28.57 1278 180.40 55.69 AFT 2 3
12 Apr 2004 13:08:58 43.220 7.540 276.33 29.05 1266 219.34 49.55 AFT 2 3

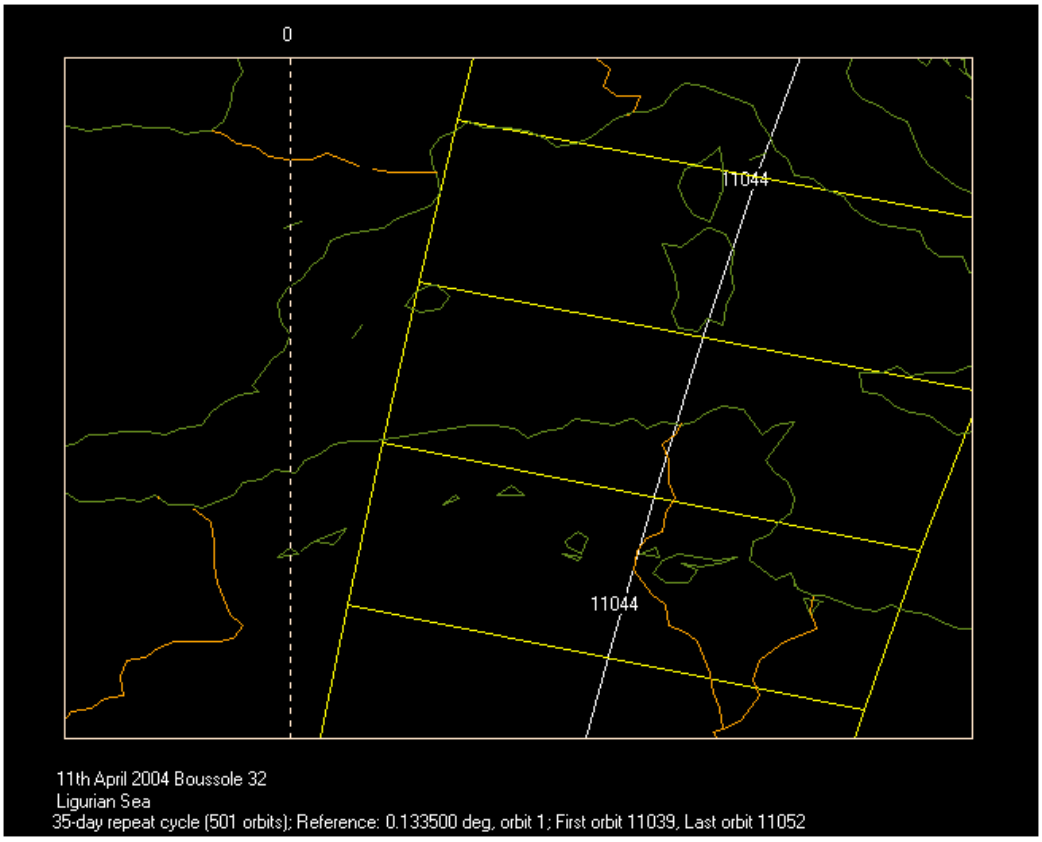
MERIS: Viewing Times
Date Time Lat Lon Sat. Sat. Range Sun Sun Tilt Flags*
(UTC) (DEG) (DEG) Azi. Elev. (km) Azi. Elev.
---
10 Apr 2004 10:15:54 43.220 7.540 287.70 68.78 841 149.36 51.27 NADIR 4
11 Apr 2004 09:44:40 43.220 7.540 100.93 63.13 873 138.42 48.27 NADIR

# Ligurian Sea Boussole Site Satellite Images

Images not available at time of last edit

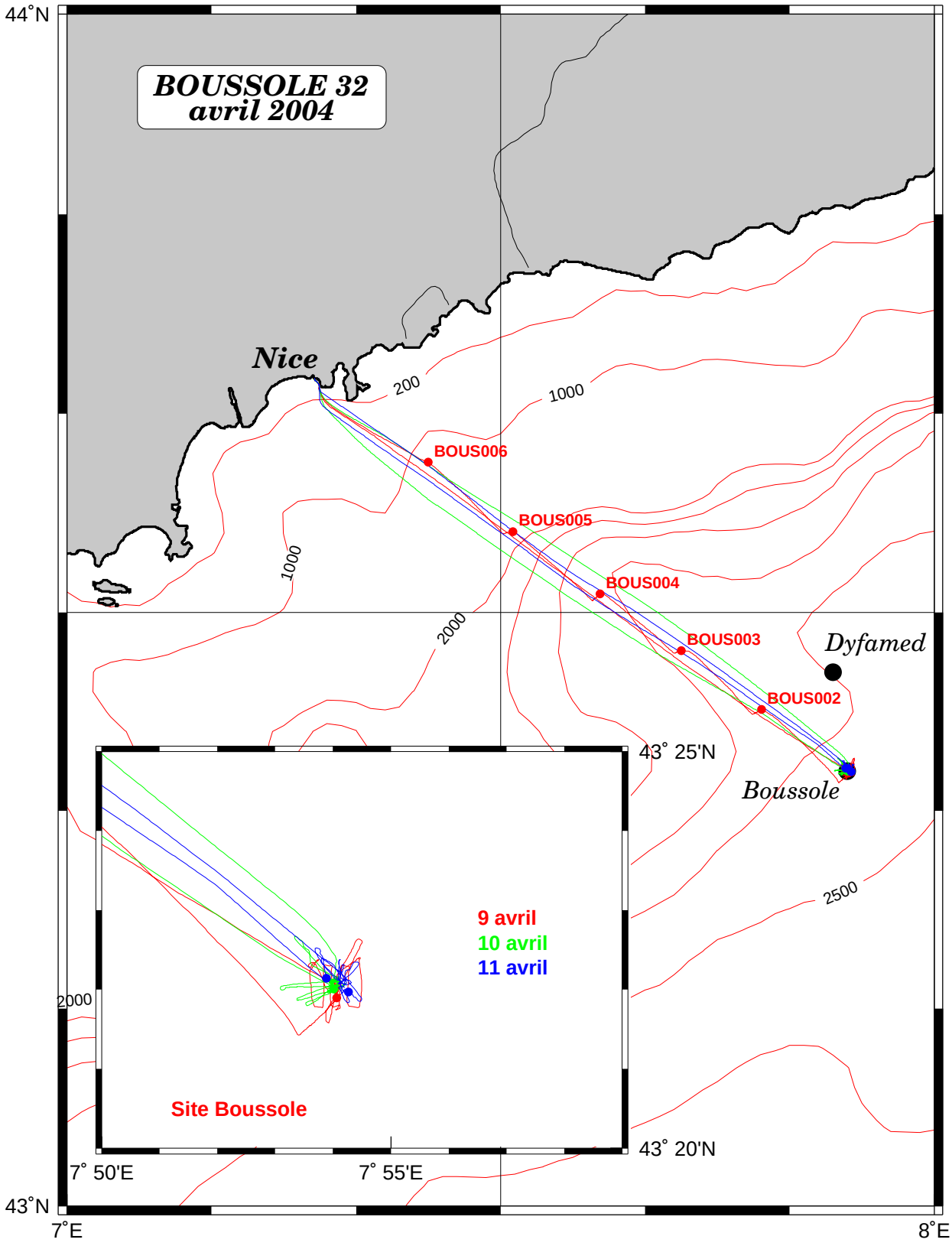
# Calculated Swath paths for Modis Sensor (ESOV Software)



Boussole 32 Cruise Summary Table

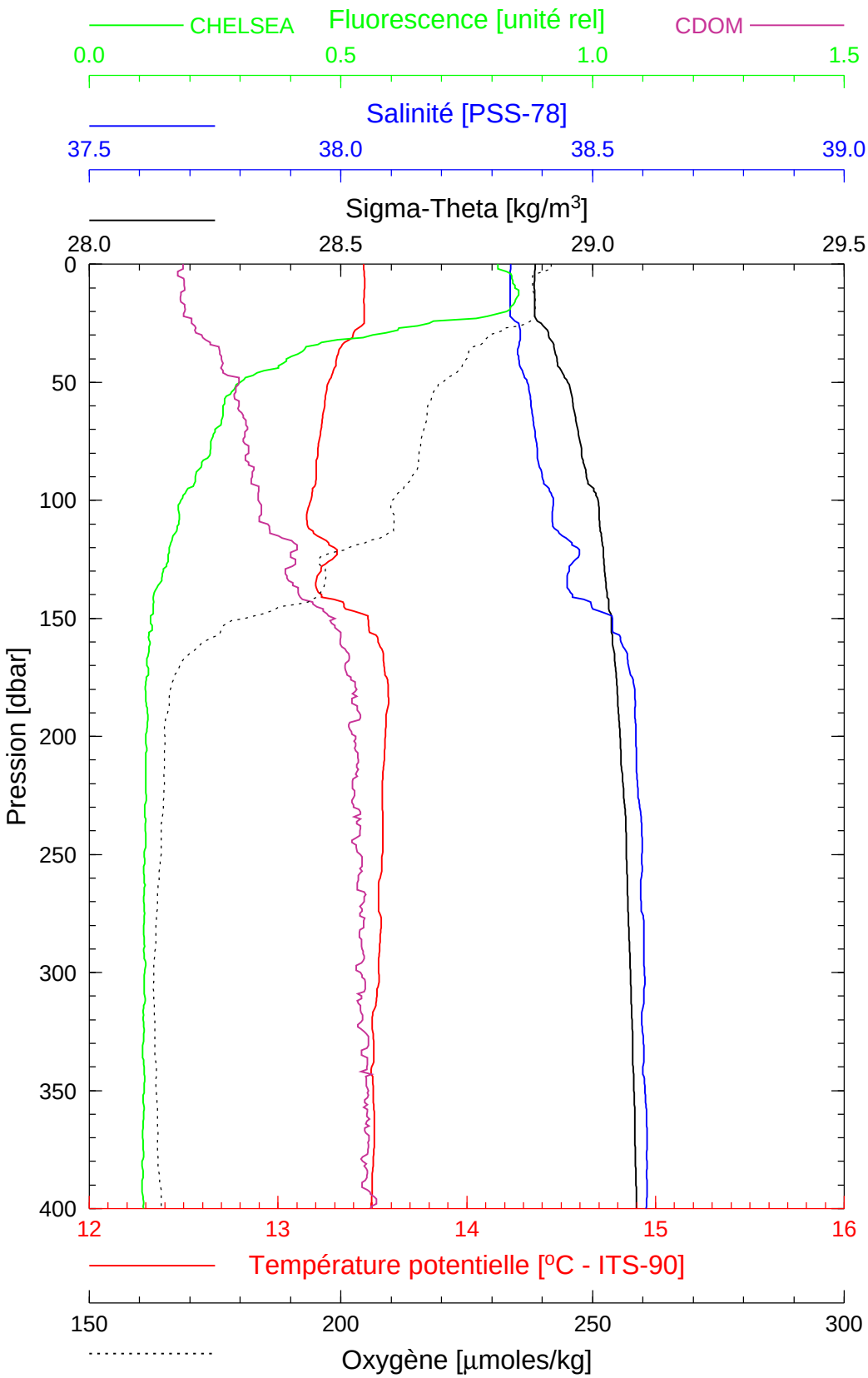
| Date | Black names | Profile names | CTD notées / | Start Time | Duration | Depth max | Latitude (N) | | 50 | | Other sensors | Their cast | PAR | Start/Finish | | | | Weather | | | | | | | Sea | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (file extension: ".raw") | (file extension: ".raw") | satellite overpass | GMT (hour.min) | (min.sec) | (meter) | (Degree) | (Minute) | (Degree) | (Minute) | | | | S# F# | Sky | Clouds | Qty(/8) | Wind spd | Wind dir. | Atm. Pres | humidity | Visibility | T air | T water | Sea | Swell ht | Swell dir. | White horses |
| 09/04/04 | | | Quadrilatere001 | 11:52 | | | 43 | 22.371 | 7 | 53.721 | | | | | | | | | | | | | | | | | | |
| | | | Quadrilatere002 | 12:17 | | | 43 | 21.786 | 7 | 54.094 | | | | | | | | | | | | | | | | | | |
| | | | Quadrilatere003 | 12:43 | | | 43 | 22.401 | 7 | 54.471 | | | | | | | | | | | | | | | | | | |
| | | | CTDBOUS001 | 13:07 | 29:00 | 400 | 43 | 21.897 | 7 | 54.062 | | | | | rain | rain | 8 | 16kts | 34 | 1006 | 83 | | 9.5 | 13.46 | slightly rough | | | |
| | | | CTDBOUS002 | 14:16 | 32:00 | 400 | 43 | 25.112 | 7 | 48.073 | | | | | rain | rain | 8 | 15kts | 50 | 1005.5 | 80 | | 8.9 | 13.57 | rough | | | |
| | | | CTDBOUS003 | 15:22 | 26:00 | 400 | 43 | 25.112 | 7 | 42.491 | | | | | rain | rain | 8 | 11kts | 49 | 1005.3 | 78 | | 9.3 | 13.56 | slightly rough | | | |
| | | | CTDBOUS004 | 16:21 | 24:00 | 400 | 43 | 30.944 | 7 | 36.886 | | | | | | | 8 | 8kts | 36 | 1005.5 | 74 | | 10.2 | 13.67 | slightly rough | | | |
| | | | CTDBOUS005 | 17:20 | 28:00 | 400 | 43 | 34.064 | 7 | 30.865 | | | | | | | 6 | 3kts | 92 | 1005.9 | 79 | | 9.4 | 13.51 | calm | | | |
| | | | CTDBOUS006 | 18:27 | 26:00 | 400 | 43 | 37.552 | 7 | 24.981 | | | | | | | 7 | 4kts | 141 | 1006.2 | 77 | | 9.3 | 13.49 | calm | | | |
| 10/04/04 | | | CTDBOUS007 | 09:54 | 29:00 | 400 | 43 | 22.007 | 7 | 54.01 | | | | | | | 7 | 9kts | 40 | 1008.1 | 76 | | 10.9 | 13.4 | slightly rough | | | |
| | bou100404black1 | | | 13:55 | 03:00 | | | | | | | | | | | | | | | | | | | | | | | |
| | | bou100404a | SeaWiFs 1325 | 14.04 | 04:23 | 192 | 43 | 22.443 | 7 | 53.595 | | | | | blue | cumulus | 3 | 2kts | 83 | 1008.6 | 70 | v.good | 12.2 | | calm | 0.3-0.4 | - | no |
| | | bou100404b | | 14.16 | 04:00 | 200 | 43 | 22.563 | 7 | 53.484 | | | | | blue | cumulus | 3 | 2kts | 83 | 1008.6 | 70 | v.good | 12.2 | | calm | 0.3-0.4 | - | no |
| | | bou100404c | | 14.39 | 04:37 | 200 | 43 | 22.261 | 7 | 54.044 | | | | | blue | cumulus | 3 | 2kts | 83 | 1008.6 | 70 | v.good | 12.2 | | calm | 0.3-0.4 | - | no |
| | bou100404black2 | | | 14.55 | 03:00 | | | | | | | | | | | | | | | | | | | | | | | |
| 11/04/04 | | | CTDBOUS008 | 8.17 | 30:00 | 400 | 43 | 22.146 | 7 | 53.889 | | | | | | | 1 | 3kts | 46 | 1012.6 | 62 | | 12.5 | 13.44 | calm | | | |
| | bou110404black1 | | | 8.55 | 03:00 | | | | | | | | | | | | | | | | | | | | | | | |
| | | bou110404a | Meris 0944 | 9.05 | 04:12 | 190 | 43 | 22.157 | 7 | 54.197 | | | | | | | - | 3kts | 341 | 1013.2 | 58 | v.good | 13 | | very calm | 0 | - | no |
| | | bou110404b | | 9.19 | 04:19 | 200 | 43 | 22.219 | 7 | 54.092 | | | | | | | - | 3kts | 341 | 1013.2 | 58 | v.good | 13 | | very calm | 0 | - | no |
| | | bou110404c | | 11.22 | 04:26 | 185 | 43 | 22.283 | 7 | 54.116 | | | | | | | - | 3kts | 341 | 1013.2 | 58 | v.good | 13 | | very calm | 0 | - | no |
| | bou110404black2 | | | 11.46 | 03:00 | | | | | | | | | | | | | | | | | | | | | | | |
| | | bou110404d | SeaWiFs 1228 | 12.25 | 05:33 | 200 | 43 | 22.194 | 7 | 54.207 | | | | | milky blue | cumulus | 3 | 3kts | 10 | 1012.4 | 60 | v.good | 12.9 | | very calm | 0 | - | no |
| | | bou110404e | | 12.38 | 03:15 | 130 | 43 | 22.278 | 7 | 54.317 | | | | | milky blue | cumulus | 3 | 3kts | 10 | 1012.4 | 60 | v.good | 12.9 | | very calm | 0 | - | no |
| | | | CTDBOUS009 | 14.30 | 27:00 | 400 | 43 | 21.974 | 7 | 54.268 | | | | | | | 4 | 2kts | 308 | 1011.5 | 56 | | 13.6 | 13.98 | glassy | | | |
| 12/04/04 | | | CTDBOUS010 | 6.48 | 13:00 | 100 | 43 | 40.658 | 7 | 18.85 | | | | | | | 8 | 8kts | 305 | 1012 | 43 | | 12.6 | 14.02 | calm | | | |
| | rad120404black1 | | | 7.55 | 03:00 | | | | | | | | | | | | | | | | | | | | | | | |
| | | rad120404a | | 8.01 | - | - | 43 | 40.63333333 | 7 | 18.517 | | | | | cloudy | cirrocumulus | 8 | 10kts | 210 | 1012.5 | 27 | fair | 14 | | moderate | 0.2 | - | no |
| | | rad120404b | | 8.04 | - | - | 43 | 40.78333333 | 7 | 18.45 | | | | | cloudy | cirrocumulus | 8 | 10kts | 210 | 1012.5 | 27 | fair | 14 | | moderate | 0.2 | - | no |
| | | rad120404c | | 8.16 | - | - | 43 | 40.55 | 7 | 18.45 | | | | | cloudy | cirrocumulus | 8 | 10kts | 210 | 1012.5 | 27 | fair | 14 | | moderate | 0.2 | - | no |




GMT 2004 Apr 11 20:57:53

**Boussole 32** **09/04/2004** **BOUS040409_01**

*BOUS001*

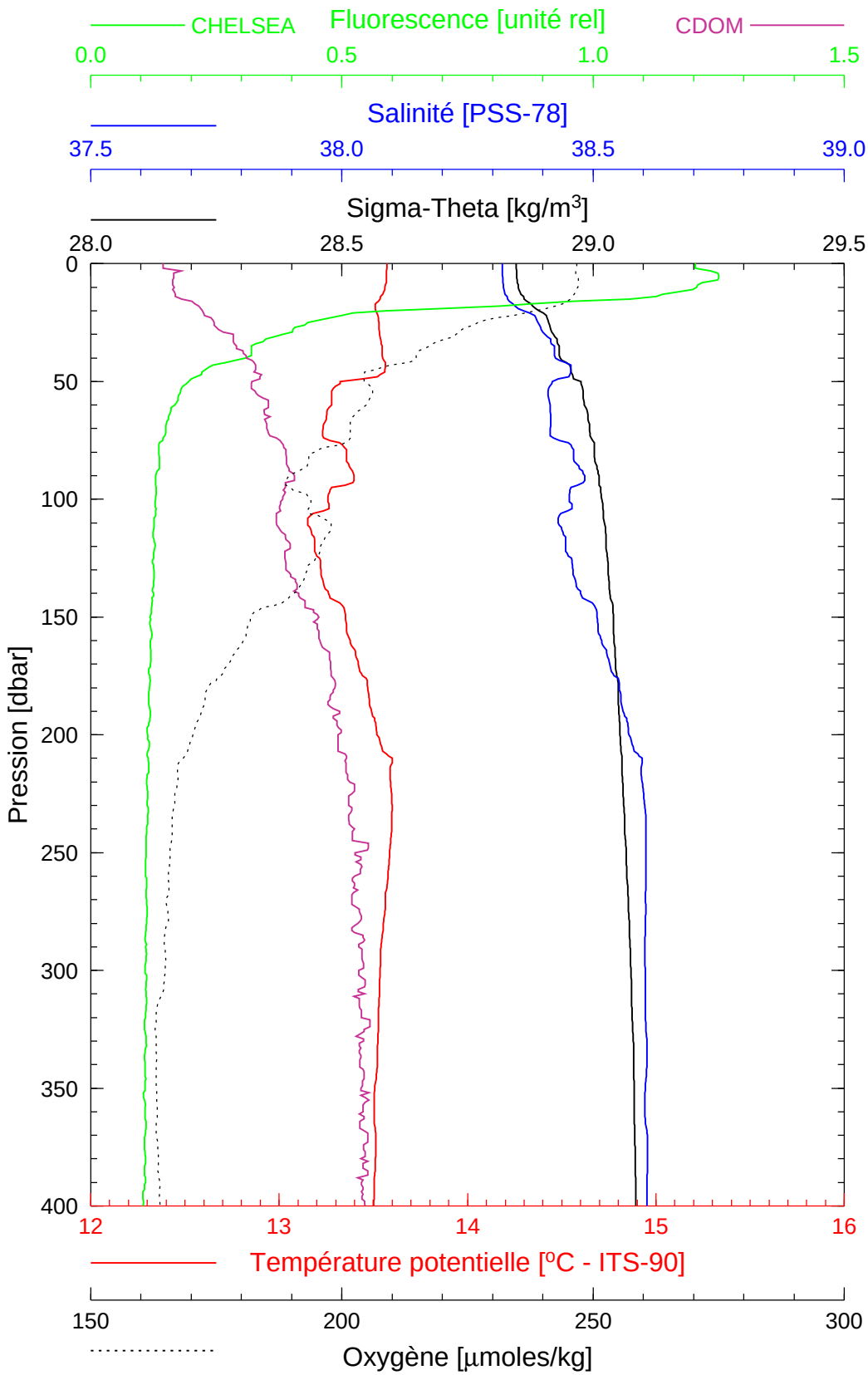



*Date* *09/04/2004* *Latitude* *43º21.897 N*

*Heure déb* *13h 07min [TU]* *Longitude* *07º54.062 E*

**Boussole 32** **09/04/2004** **BOUS040409_02**

*BOUS002*

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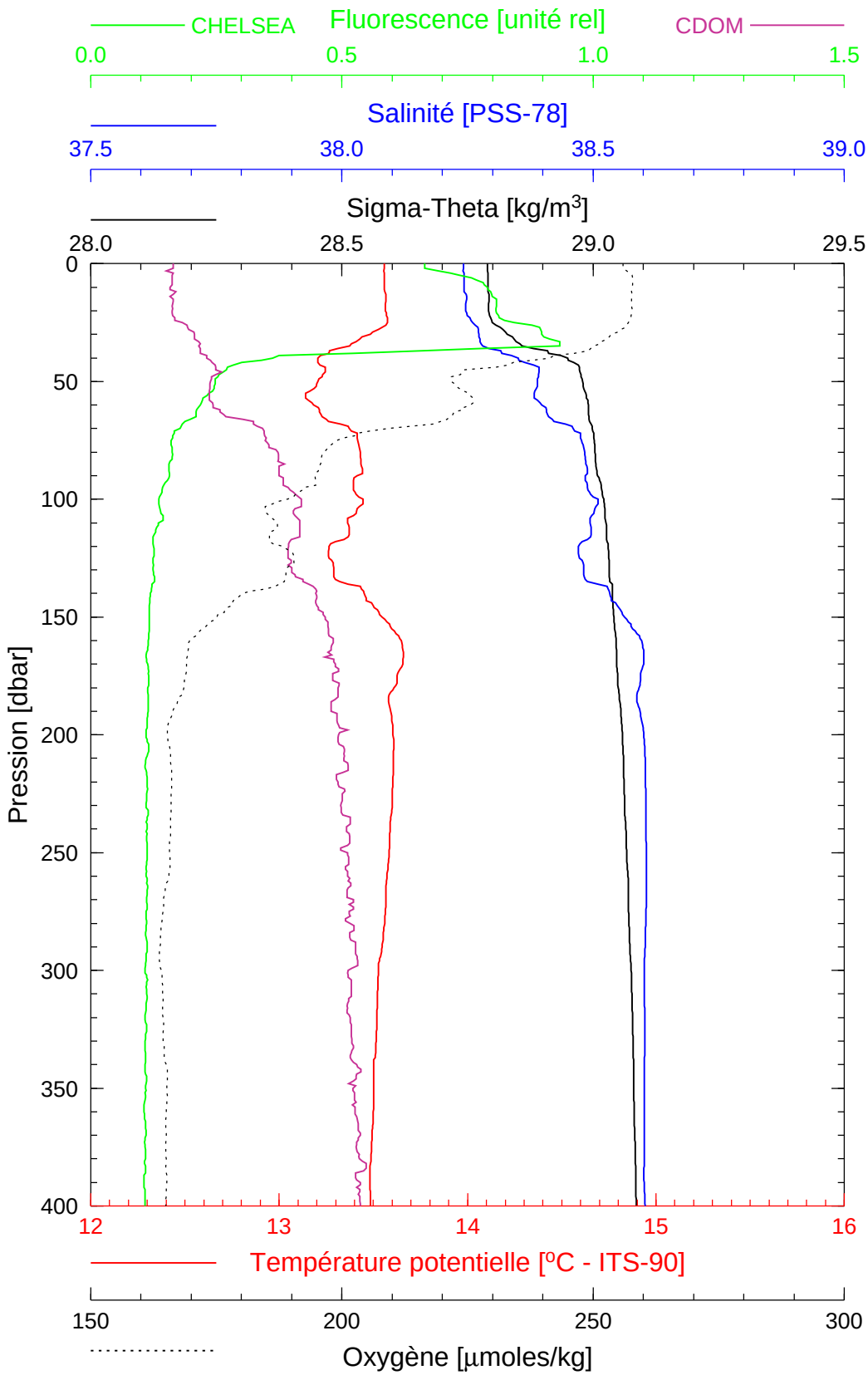
*Heure déb* *14h 16min [TU]* *Longitude* *07º48.073 E*

**Boussole 32** **09/04/2004** **BOUS040409_03**

*BOUS003*

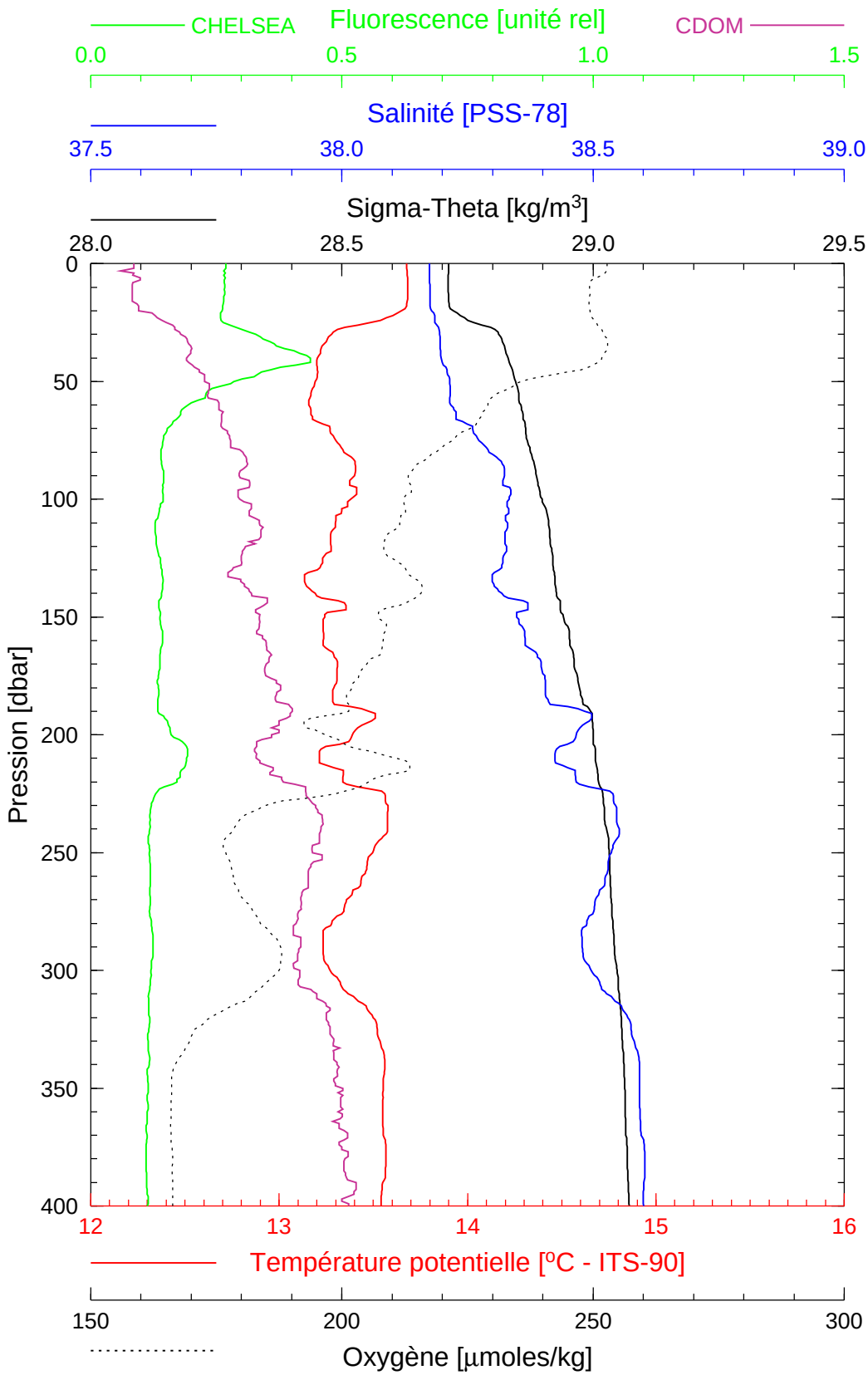



*Date* *09/04/2004* *Latitude* *43º28.088 N*

*Heure déb* *15h 22min [TU]* *Longitude* *07º42.491 E*

**Boussole 32** **09/04/2004** **BOUS040409_04**

*BOUS004*

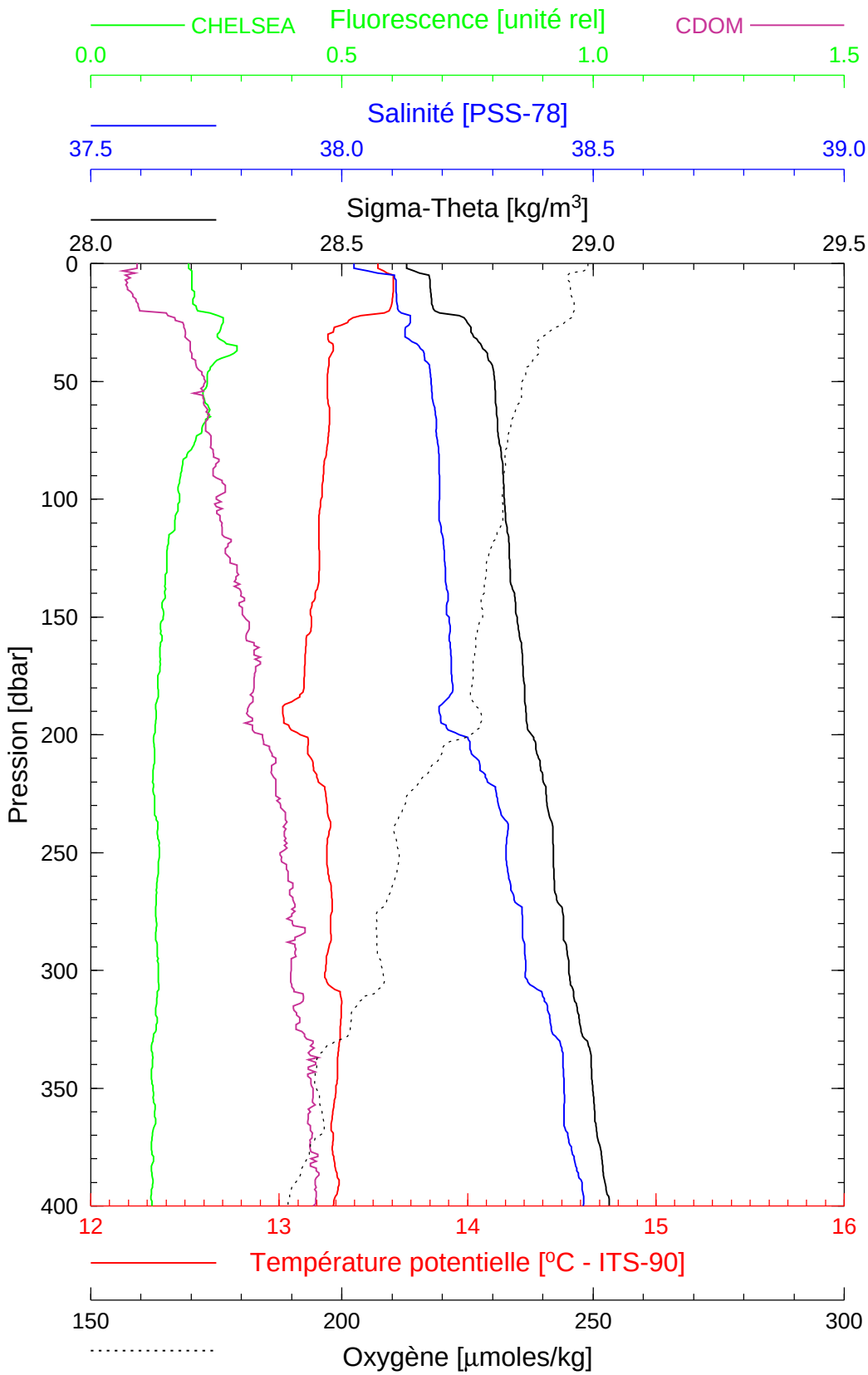



*Date* *09/04/2004* *Latitude* *43º30.944 N*

*Heure déb* *16h 21min [TU]* *Longitude* *07º36.886 E*

**Boussole 32** **09/04/2004** **BOUS040409_05**

*BOUS005*

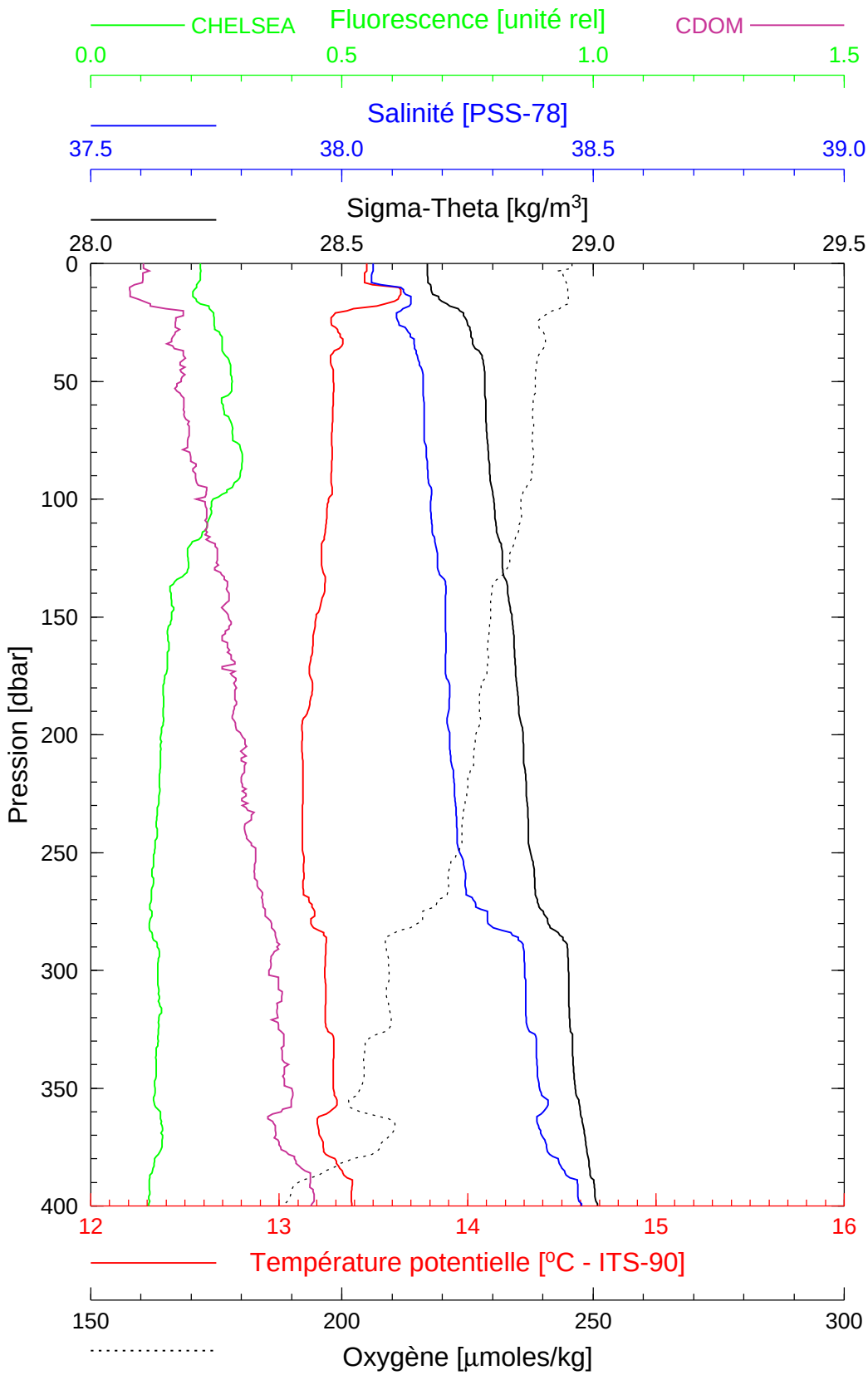



*Date* *09/04/2004* *Latitude* *43º34.064 N*

*Heure déb* *17h 20min [TU]* *Longitude* *07º30.865 E*

**Boussole 32** **09/04/2004** **BOUS040409_06**

*BOUS006*

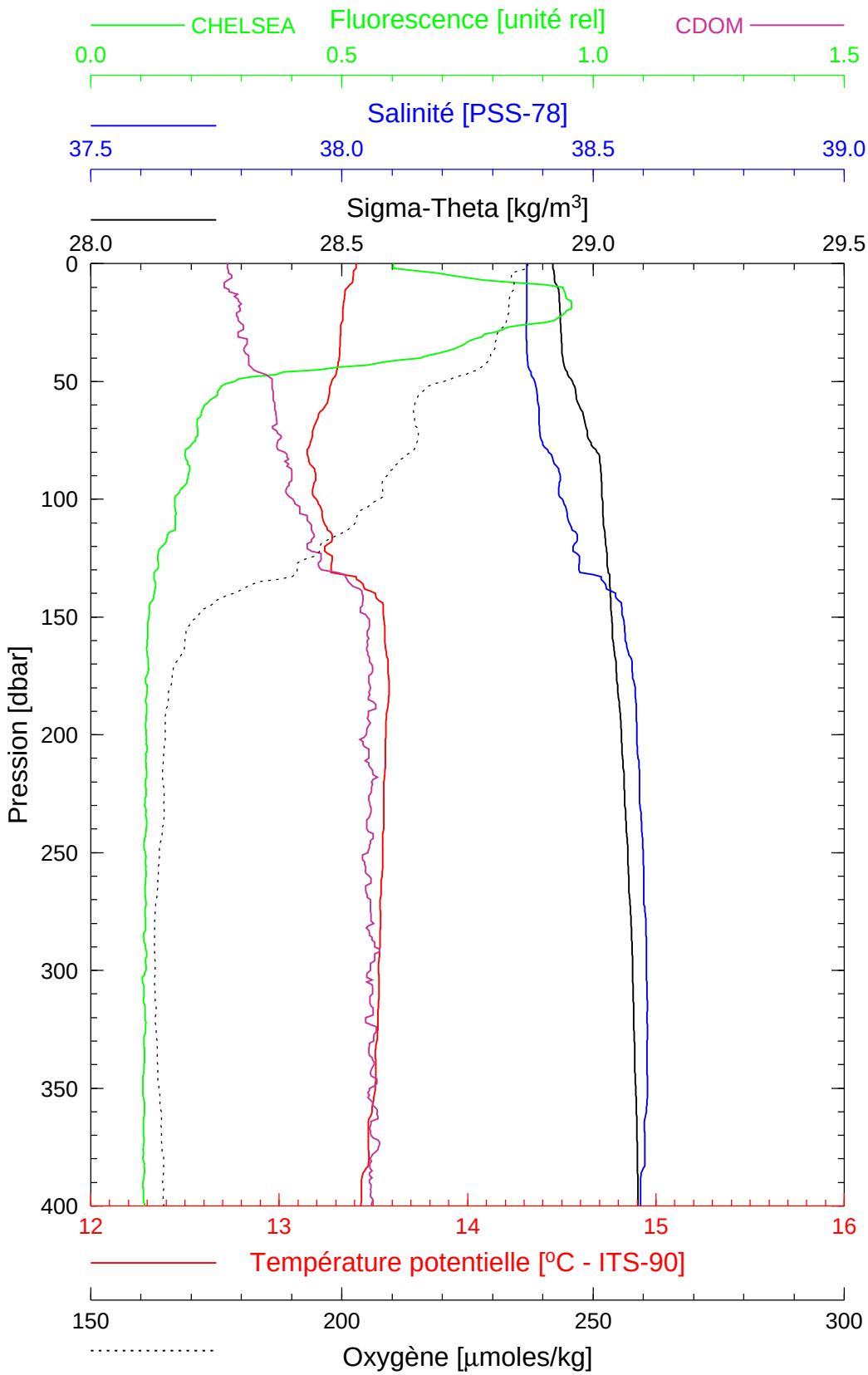



*Date* *09/04/2004* *Latitude* *43º37.552 N*

*Heure déb* *18h 27min [TU]* *Longitude* *07º24.981 E*

**Boussole 32** **10/04/2004** **BOUS040410_01**

*BOUS007*

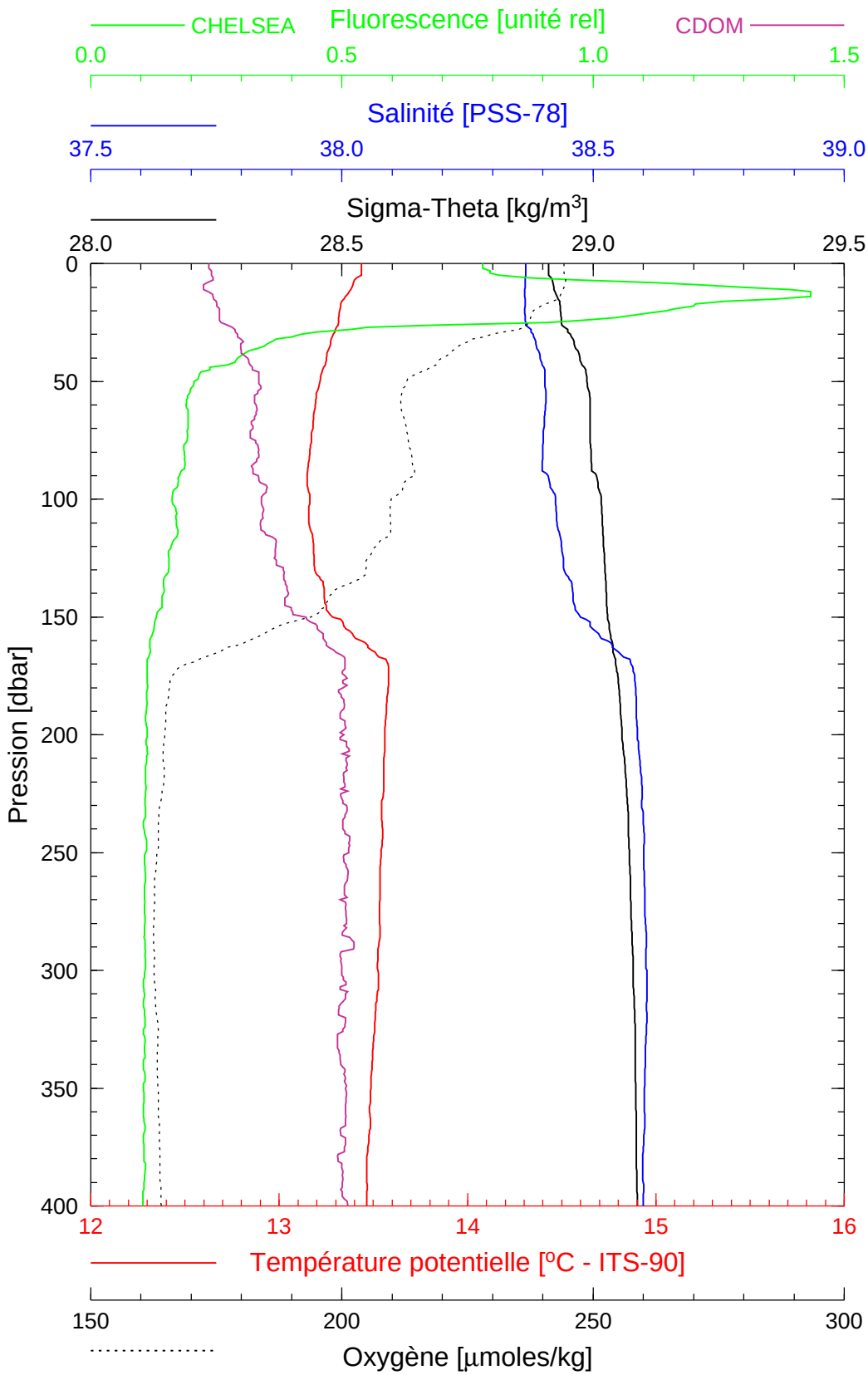



*Date* *10/04/2004* *Latitude* *43º22.007 N*

*Heure déb* *09h 54min [TU]* *Longitude* *07º54.010 E*

**Boussole 32** **11/04/2004** **BOUS040411_01**

*BOUS008*

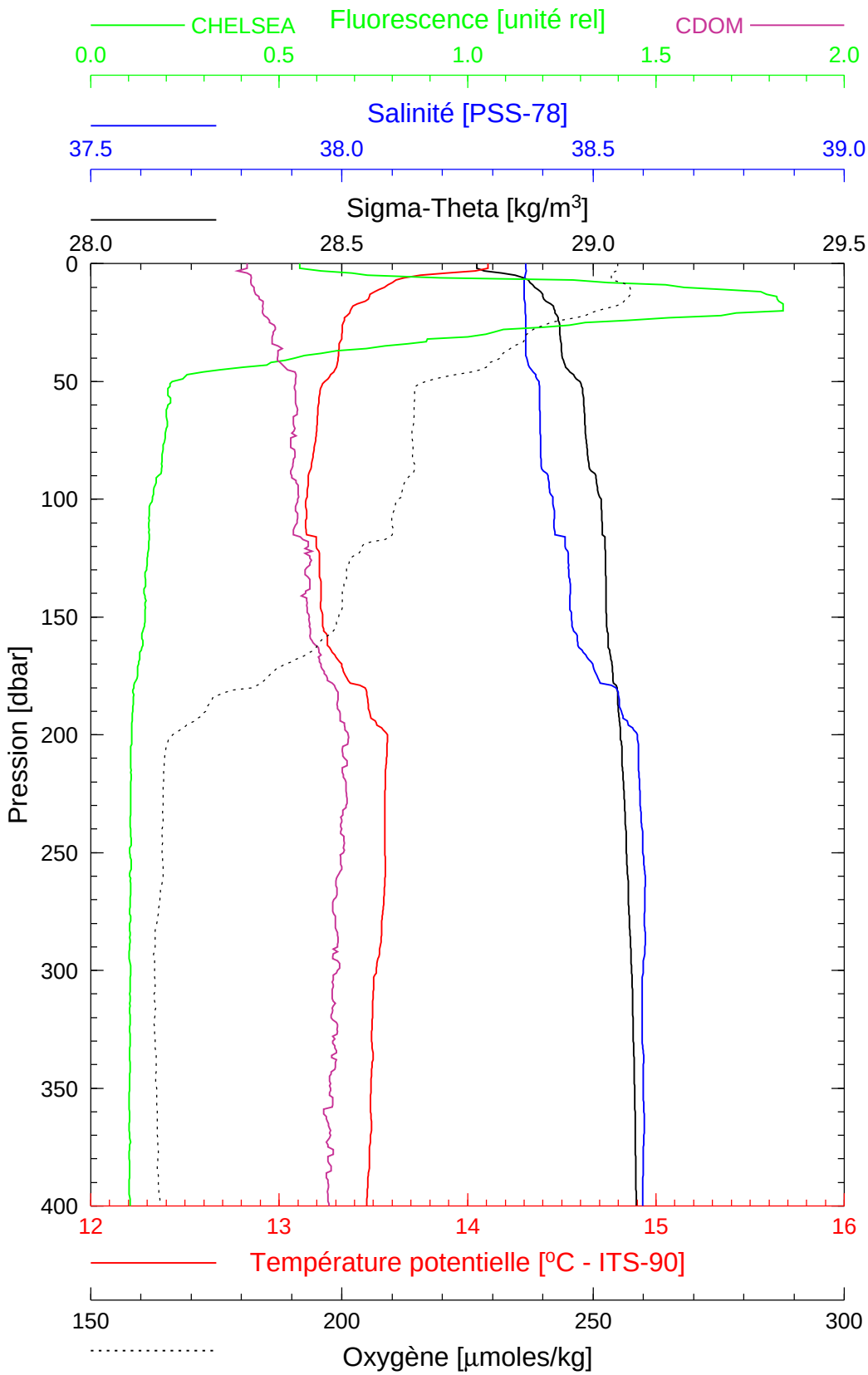



*Date* *11/04/2004* *Latitude* *43º22.146 N*

*Heure déb* *08h 17min [TU]* *Longitude* *07º53.889 E*

**Boussole 32** **11/04/2004** **BOUS040411_02**

*BOUS009*

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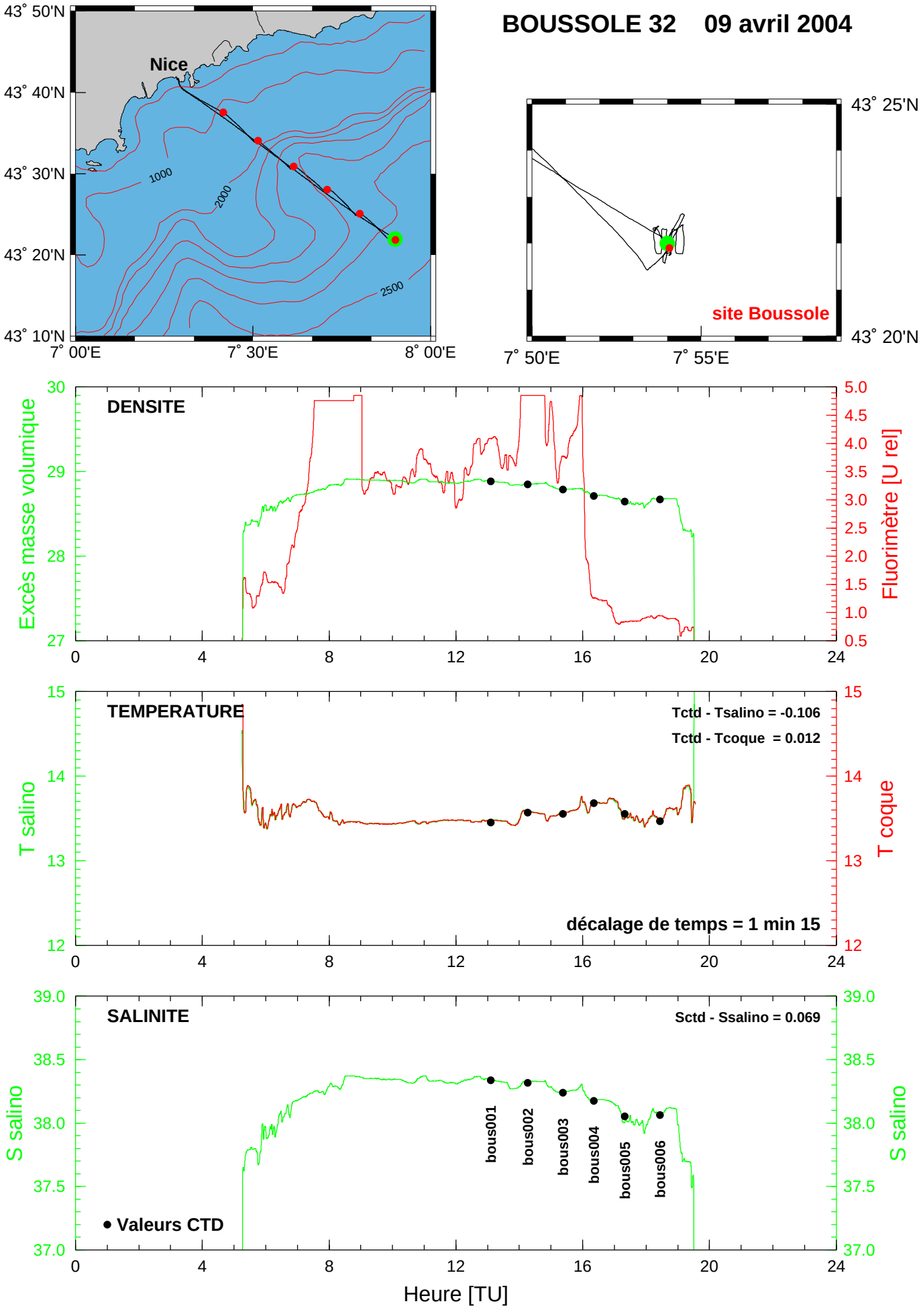
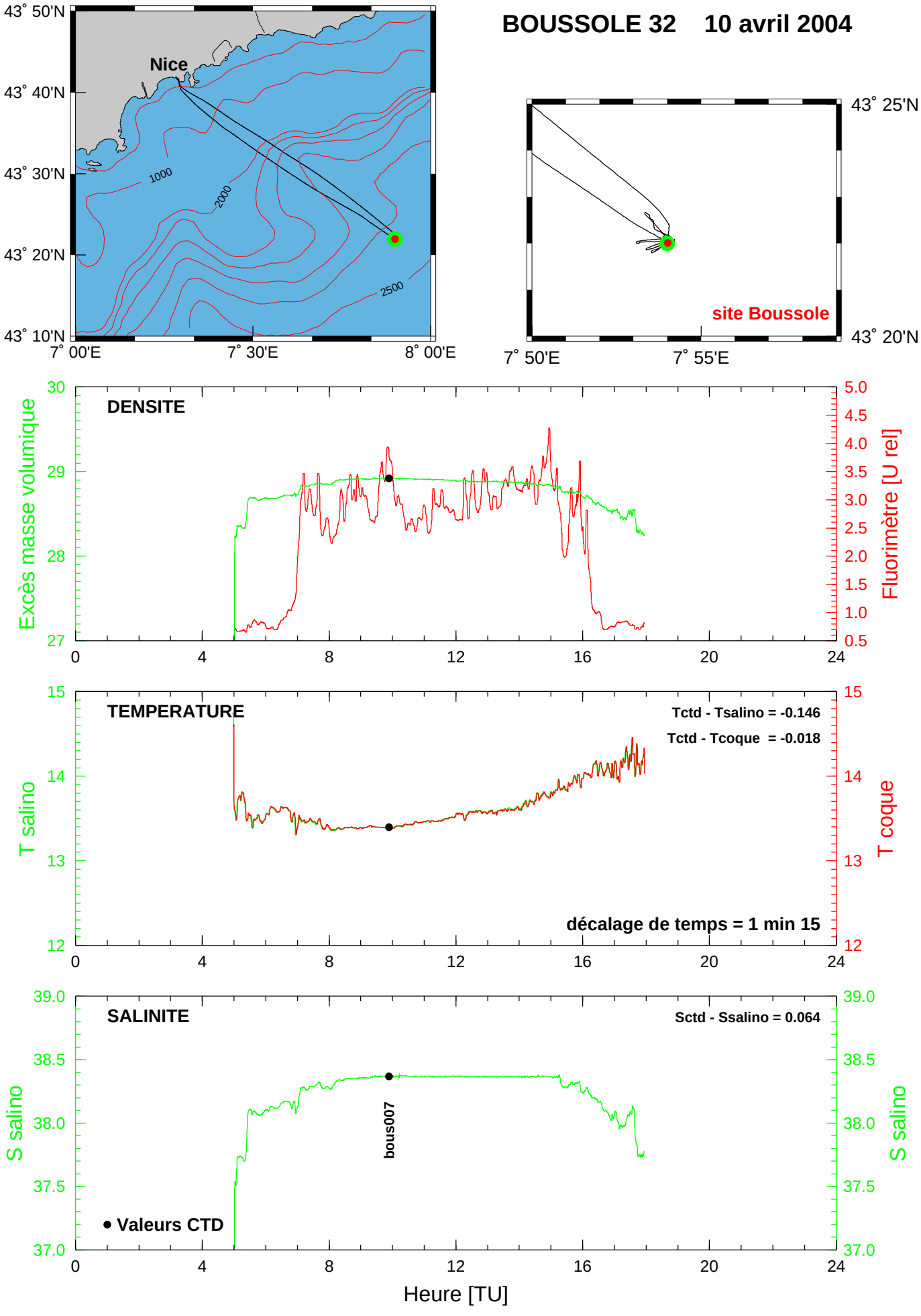
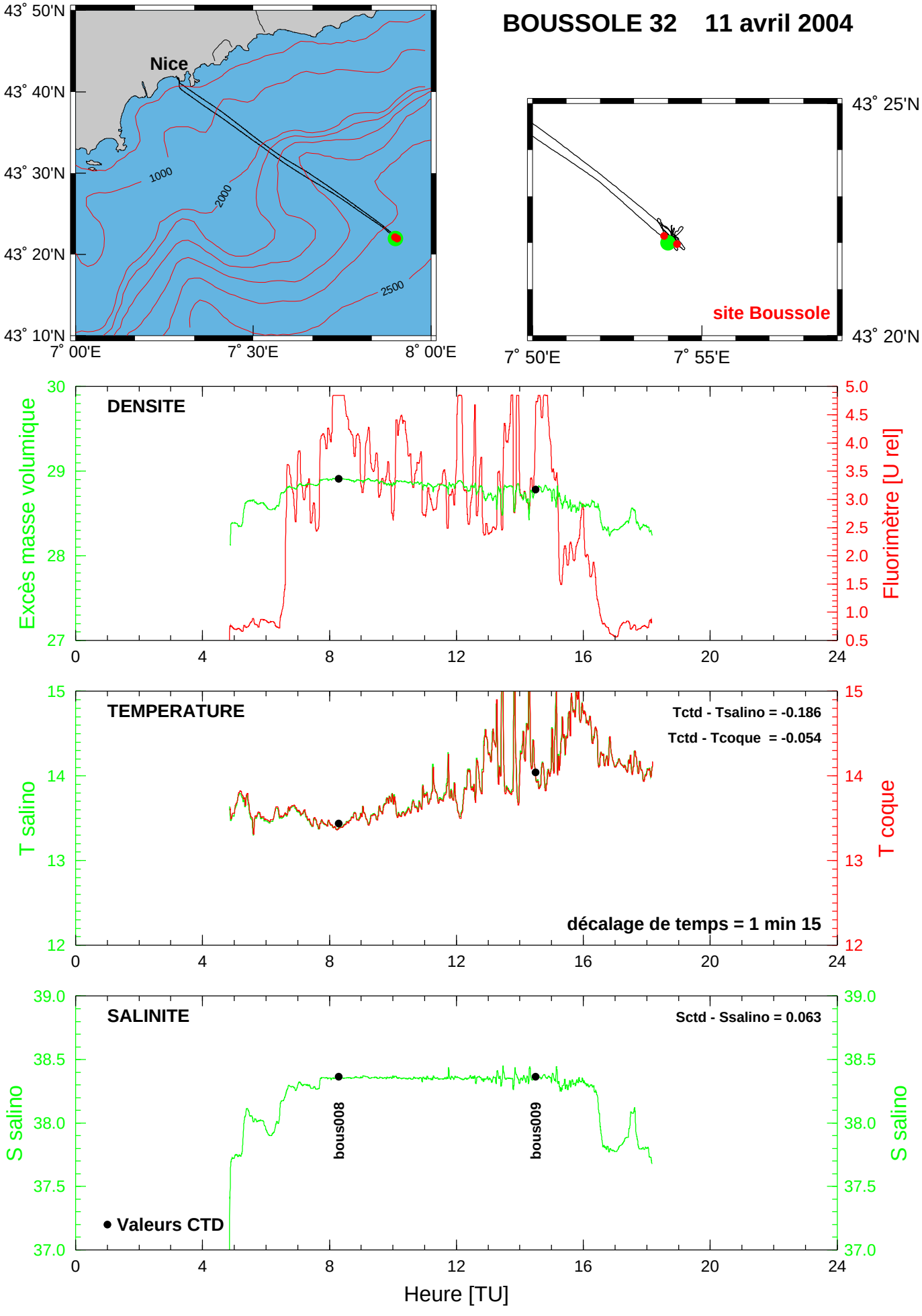
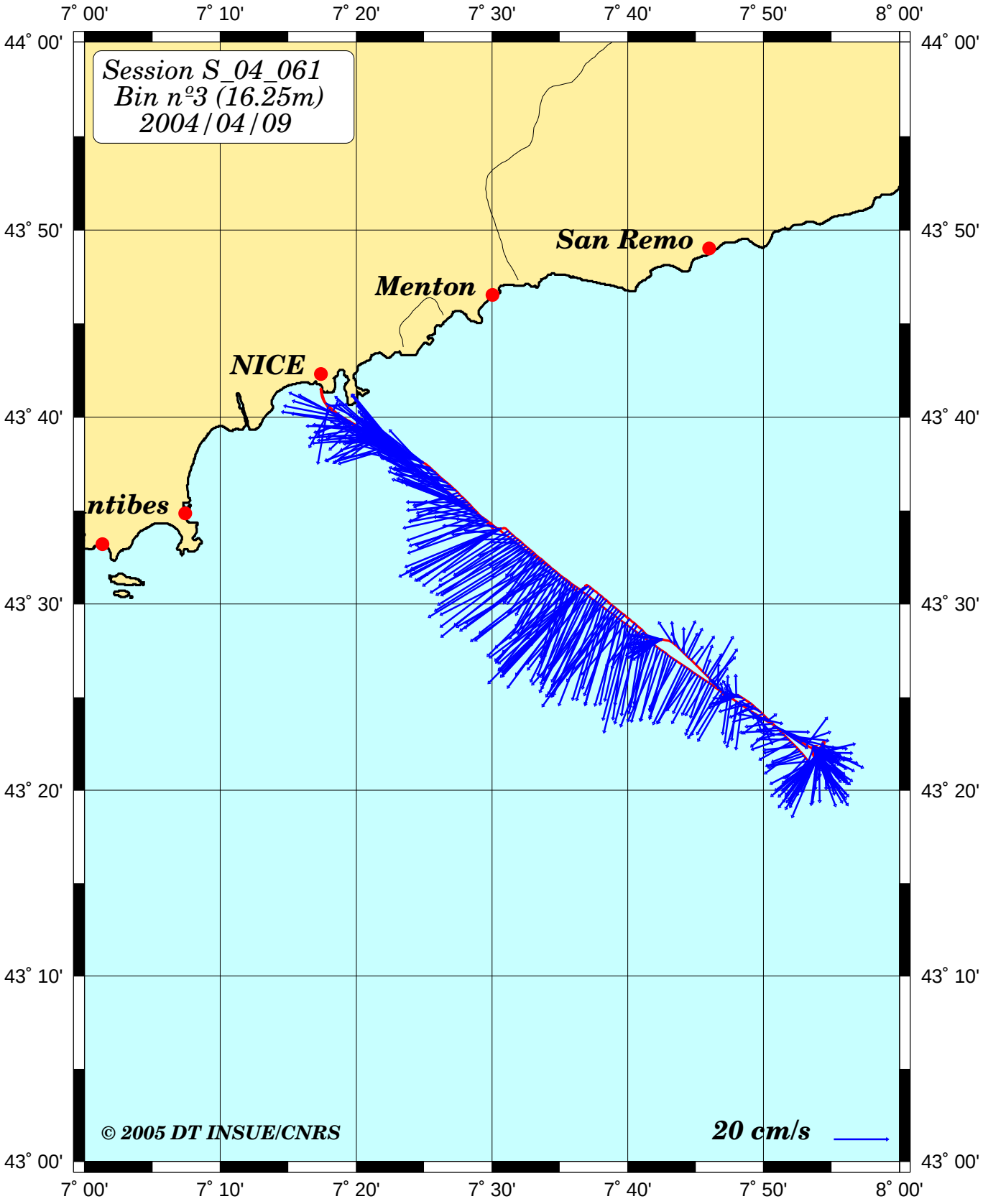
*Heure déb* *14h 30min [TU]* *Longitude* *07º54.268 E*


BOUSSOLE 32 09 avril 2004
Nice
43° 50'N
43° 40'N
43° 30'N
43° 20'N
43° 10'N
7° 00'E
7° 30'E
8° 00'E
1000
2000
2500
43° 25'N
43° 20'N
7° 50'E
7° 55'E
site Boussole
DENSITE
Excès masse volumique
Fluorimètre [U rel]
TEMPERATURE
Tctd - Tsalino = -0.106
Tctd - Tcoque = 0.012
T salino
T coque
décalage de temps = 1 min 15
SALINITE
Sctd - Ssalino = 0.069
S salino
bous001
bous002
bous003
bous004
bous005
bous006
• Valeurs CTD
Heure [TU]


BOUSSOLE 32 10 avril 2004
Nice
43° 50'N
43° 40'N
43° 30'N
43° 20'N
43° 10'N
7° 00'E
7° 30'E
8° 00'E
1000
2000
2500
43° 25'N
43° 20'N
7° 50'E
7° 55'E
site Boussole
DENSITE
Excès masse volumique
Fluorimètre [U rel]
TEMPERATURE
Tctd - Tsalino = -0.146
Tctd - Tcoque = -0.018
T salino
T coque
décalage de temps = 1 min 15
SALINITE
Sctd - Ssalino = 0.064
S salino
bous007
• Valeurs CTD
Heure [TU]


BOUSSOLE 32 11 avril 2004
Nice
43° 50'N
43° 40'N
43° 30'N
43° 20'N
43° 10'N
7° 00'E
7° 30'E
8° 00'E
1000
2000
2500
43° 25'N
43° 20'N
7° 50'E
7° 55'E
site Boussole
DENSITE
Excès masse volumique
Fluorimètre [U rel]
TEMPERATURE
Tctd - Tsalino = -0.186
Tctd - Tcoque = -0.054
T salino
T coque
décalage de temps = 1 min 15
SALINITE
Sctd - Ssalino = 0.063
S salino
bous008
bous009
• Valeurs CTD
Heure [TU]

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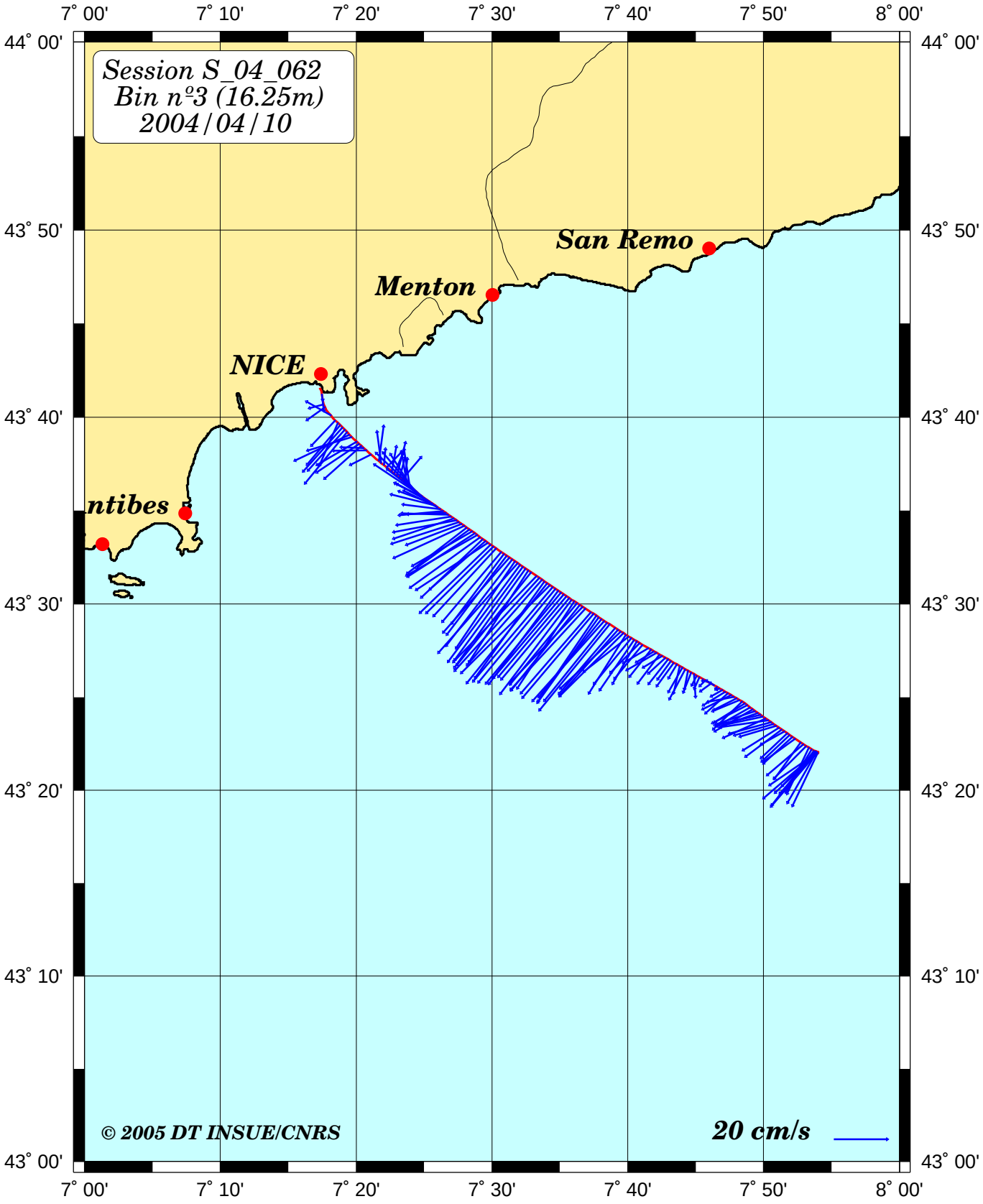
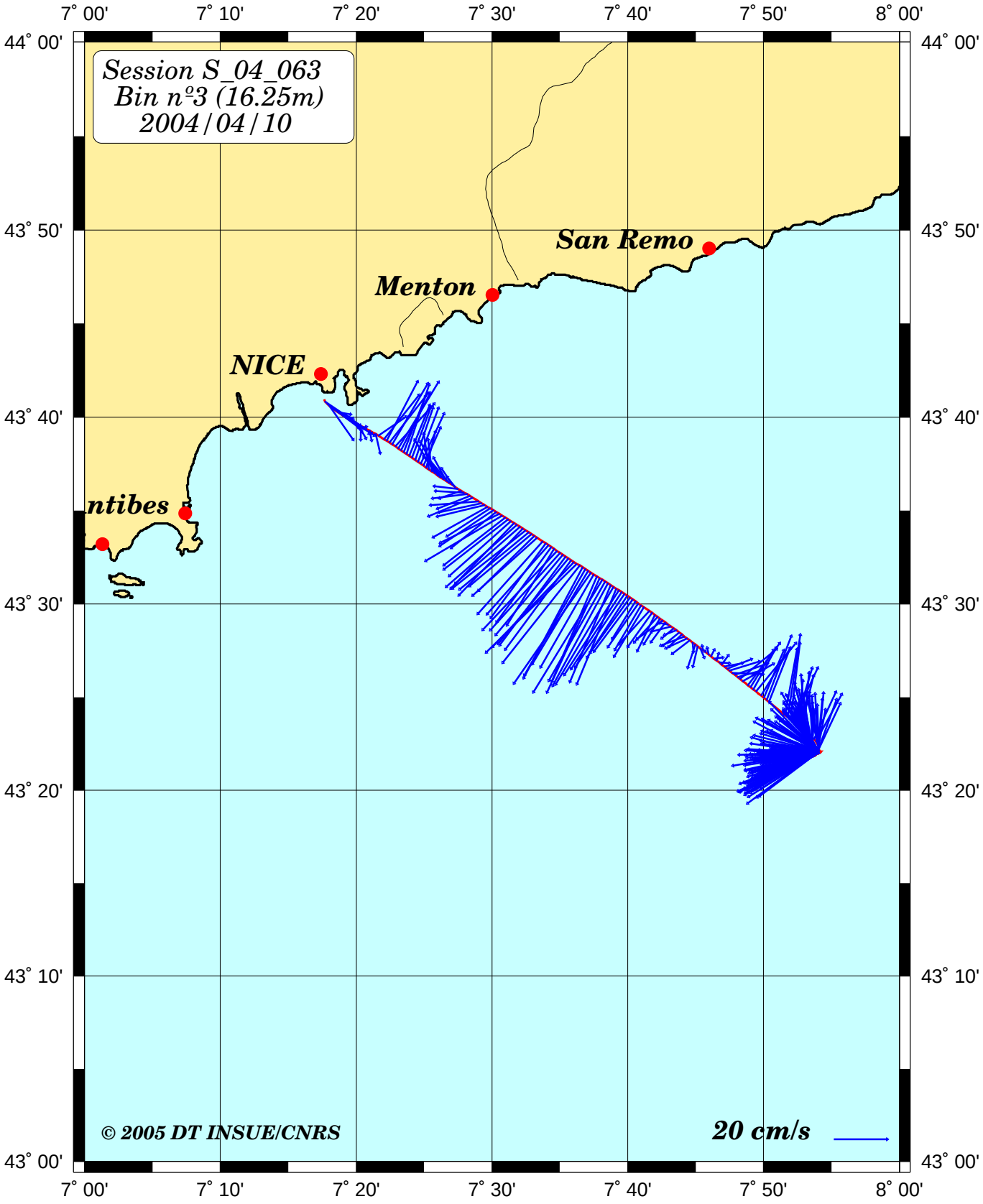



GMT 2005 Jun 8 13:29:02




GMT 2005 Jun 8 13:29:16