BOUSSOLE Monthly Cruise Report

Cruise 30
January 28 – February 01, 2004

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

Science Personnel: Alec Scott, Dominique Tailliez, Jean-Benoît Charrassin

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

Fig 1. Rough conditions during Muséum National d'Histoire Naturelle miniature ctd testing with 30 knots of wind. Menton and the French/Italian border are in the background.

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.

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Université Pierre & Marie Curie, France

Observatoire Océanologique de Villefranche sur mer, France

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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 collecte, filtered and the filters stored in LN2 for HPLC pigment and particulate 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.

The Boussole buoy is scheduled to be reinstalled the morning of the 4th March. After installation, profiles with the SPMR synchronous with the buoy sampling should be attempted as a means of cross calibration and validation.

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

PhD student Sophie Bonnet is participating on the cruise with the intention of sampling seawater to a depth of 40m for dissolved and particulate iron and pigments. This is a monthly activity but there is particular urgency for these samples since a major rainfall deposition of Saharan dust occurred two weeks prior.

Cruise Summary

A suitable summary for the first Boussole cruise of 2004 would be ‘just swell’. Unfortunately, this only refers to the sea conditions rather than the productivity during the cruise as a large low pressure over France and England generated strong winds to the west of the site which crossed us throughout the week. The weather forecasts available from Meteo France proved to be unreliable reference and the web site for the Dyfamed weather buoy often was very late to update in time to be of use to us to gauge the conditions on site prior to leaving port.

The first day’s weather forecast was for windy and rough sea conditions. However, this proved to be a slightly pessimistic forecast as there turned out to be clear skies and winds of 8 to 12 knots. Unfortunately, large westerly swells from the west made sea conditions close to the upper limit of CTD operations. However, the swell was fairly smooth in the absence of strong wind so conditions were fair for optics work. Consequently, two CTD profiles marked the start and end of the SPMR profiling session with water samples being collected during the morning session. The sea conditions were not suitable for using the SPMR surface float and the transect was completed as far as Station 4 before increasing confused seas became too much to allow CTD operations.

Day two started similarly to the previous day in terms of weather conditions. However, it became apparent about 10 miles into the transit that the swell was bigger than the previous day and would prevent any CTD work. An increasingly cloudy sky in the direction of the Boussole site also made conditions seem rather ominous. It was decided to turn back to Station 5 to see if it would be possible to complete the transect behind the shelter of Cap d'Antibes. This was not possible. The final option was to run some 1000m CTD calibration work for University of Paris. A location near to Station 5 with over 1200m depth was chosen.

Day three provided much better conditions than forecast and the Dyfamed buoy data was not available in the morning. Consequently, the ship departed with Dominique and Jean Benois Charmassin expecting to be limited to coastal waters and further calibration work for University of Paris. After one profile in calm and sunny conditions, the ship returned to port, picked up Alec Scott and steamed out to the Boussole Site in time to benefit from the good conditions and catch the SeaWiFS pass. There was still a significant swell rolling in from the west. This late transit to the site did allow good conditions for Simbad A sky measurements to be made.

The fourth day was overcast and still with a swell from the west. Upon arriving at the Boussole Site, Captain Lafonde stated the swell was too large to operate the CTD rosette safely. However, the solo Seabird unit loaded with miniature CTD/transmitters was deployed at the site as a profile for Boussole and as a calibration cast for University of Paris. Two SPMR profiles were performed with some difficulty. On the journey back to Nice, dolphins were observed swimming off the bow.

The final day started similarly to the previous day with overcast skies but also some light rain. On arrival at site, 12 to 15 knot winds made the residual swell just too large for CTD rosette work. Instead, a survey using the sonar equipment was carried out to find the lower portion of the buoy and verify it was still in position. By the time this was achieved the winds had decreased and conditions were suitable for the CTD. Lunch followed from the CTD profile and by dessert, the sun was showing through the cirrus clouds. Four profiles with the SPMR and surface float were performed before the sky clouded over completely again. There was not time to perform a second CTD profile as priority had been given to achieving the optics profiles.

Cruise Report

28th January, 2004 (Times UTC)

0700 Depart port of Nice
1020 Arrival at Boussole Site (43°22'N 7°54'E).
1055 SPMR in water
1125 SPMR on deck (2 profiles + Meris 1010 SeaWiFS 1120)
1320 SPMR in water
1410 SPMR on deck (5 profiles + SeaWiFS 1307)
1436 CTD Boussole 2. Max 400m. Boussole Site.
1544 CTD Boussole 3. Max 400m. Transect Station 1 (43°25'N 7°28'E).
1639 CTD Boussole 4. Max 400m. Transect Station 2 (43°28'N 7°42'E).
1738 CTD Boussole 5. Max 400m. Transect Station 3 (43°31'N 7°37'E).
1851 CTD Boussole 6. Max 400m. Transect Station 4 (43°34'N 7°31'E).
1920 Depart Station 4 for port of Nice
2015 Arrival in port of Nice

29th January, 2004

0530 Depart port of Nice
0655 Turn around to find more sheltered water
0728 CTD unit test 1 in >1000m water (43°36'N 7°26'E)
0845 Depart for port of Nice
1000 Arrival in port of Nice

30th January, 2004

0530 Depart port of Nice
0634 CTD unit test 2 in >1000m water (43°36'N 7°26'E)

0835 Pick-up in port of Nice, immediate depart.
1200 Arrival at Boussole Site
1210 SPMR in water
1320 SPMR on deck (5 profiles + SeaWiFS 1113 and 1251)
1340 Start of quadrilateral.
1440 End of quadrilateral
1438 SPMR in water
1500 SPMR on deck (2 profiles)
1516 CTD Boussole 7. Max 400m. Bottle depths (m): 200,150,100,70,60,50,40,30,20,10,5.
1546 CTD on deck. Depart Boussole site for transect Station 5.
1827 CTD Boussole 8. Max 400m. Transect Station 5 (43°37'N 7°25'E).
1850 CTD on deck.
1908 CTD unit test 3 in >1000m water (43°36'N 7°26'E)
2004 CTD on deck. Depart for port of Nice
2300 Arrival in port of Nice

31st January, 2004

0530 Depart port of Nice
0850 Arrival at Boussole Site
0859 SPMR in water
0920 SPMR on deck (2 profiles + Meris 1015)
0937 CTD unit test 4 at Boussole Site
1037 CTD on deck. Depart for sheltered coastal waters.
1308 CTD unit test 5 in >1000m water (43°36'N 7°26'E)
1407 CTD on deck. Depart for port of Nice
1500 Arrival in port of Nice

1st February, 2004

0530 Depart port of Nice
0845 Arrival at Boussole Site (conditions rough)
1022 CTD Boussole 9. Max 400m. Bottle depths (m): 160,120,100,70,60,50,40,30,20,10,5.
1051 CTD on deck.
1245 SPMR surface float deployed
1325 SPMR on deck (4 profiles + SeaWiFS 1234). Depart site for Port of Nice
1900 Arrival in port of Nice (delays due to ship crew working on cable winch on route)

Boussole Site Satellite Overhead Pass Schedule

SeaWiFS: Viewing Times

Date (UTC)	Time (DEG)	Lat (DEG)	Lon	Sat. Azi.	Sat. Elev.	Range (km)	Sun Azi.	Sun Elev.	Tilt	Flags*
28 Jan 2004	11:30:20	43.220	7.540	112.58	28.85	1268	176.67	28.45	AFT	2 3
28 Jan 2004	13:07:51	43.220	7.540	276.54	28.70	1274	202.45	25.50	AFT	2 3
29 Jan 2004	12:10:46	43.220	7.540	162.77	64.84	765	187.54	28.45	AFT	2
30 Jan 2004	11:13:26	43.220	7.540	106.69	20.10	1579	171.97	28.66	AFT	2 3
30 Jan 2004	12:51:05	43.220	7.540	267.50	40.30	1017	198.23	27.09	AFT	2
31 Jan 2004	11:53:55	43.220	7.540	128.25	47.71	910	182.93	29.27	AFT	2
31 Jan 2004	13:31:14	43.220	7.540	284.35	18.15	1671	208.41	24.48	AFT	2 3
01 Feb 2004	12:34:17	43.220	7.540	248.14	56.55	822	193.86	28.49	AFT	2

MERIS: Viewing Times

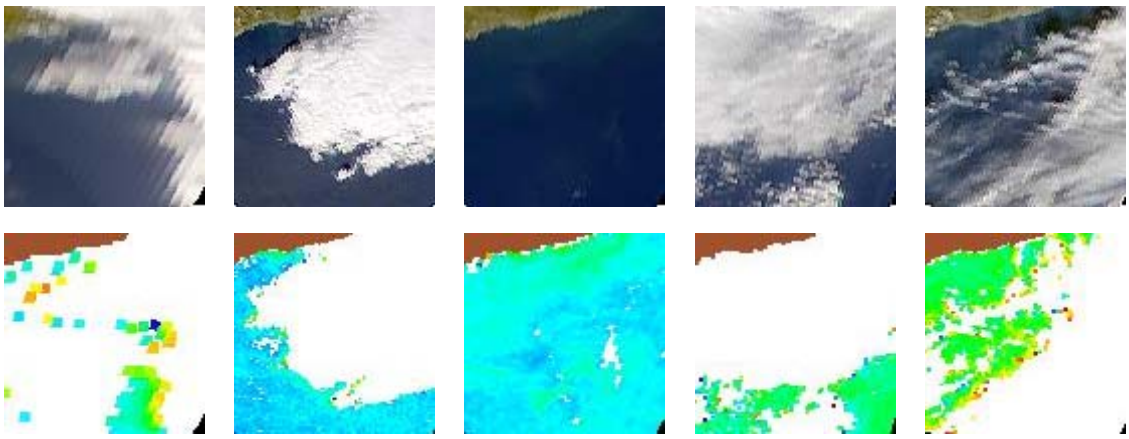
Date (UTC)	Time (DEG)	Lat (DEG)	Lon	Sat. Azi.	Sat. Elev.	Range (km)	Sun Azi.	Sun Elev.	Tilt	Flags*
28 Jan 2004	10:10:11	43.220	7.540	287.34	77.31	808	155.73	24.94	NADIR	
29 Jan 2004	09:38:56	43.220	7.540	100.11	55.79	932	148.03	22.48	NADIR	

31 Jan 2004 10:15:50 43.220 7.540 287.71 68.86 841 156.74 26.08 NADIR
01 Feb 2004 09:44:36 43.220 7.540 100.90 63.07 874 148.90 23.73 NADIR

Ligurian Sea Boussole Site Images

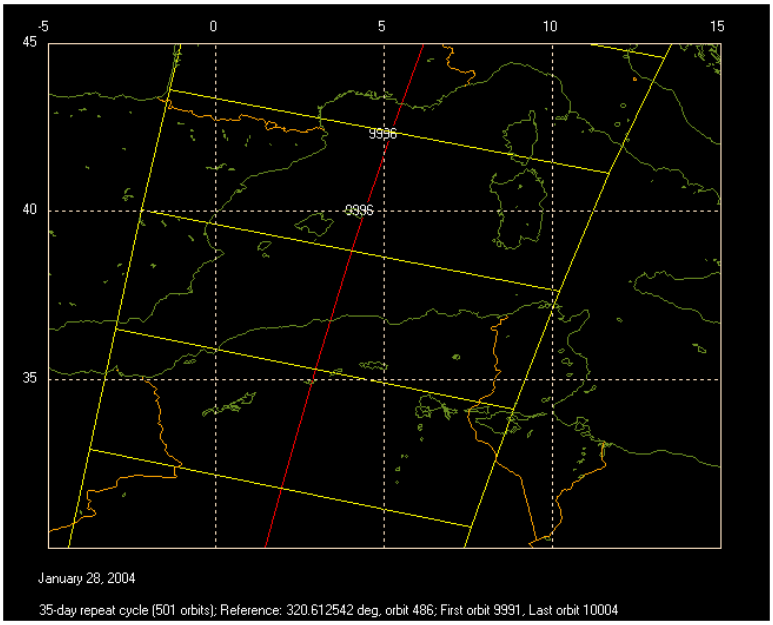
http://seawifs.gsfc.nasa.gov/cgi/seawifs_region_extracts.pl

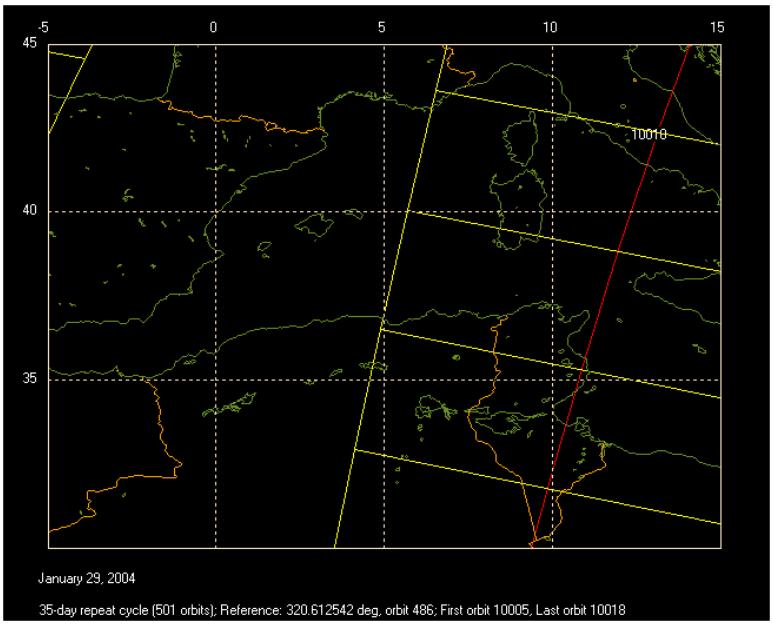
SeaWiFS

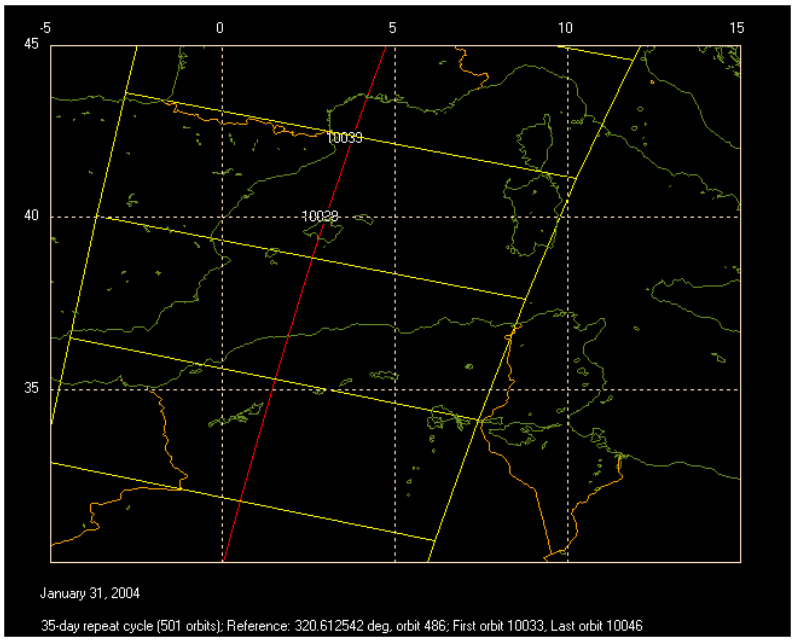


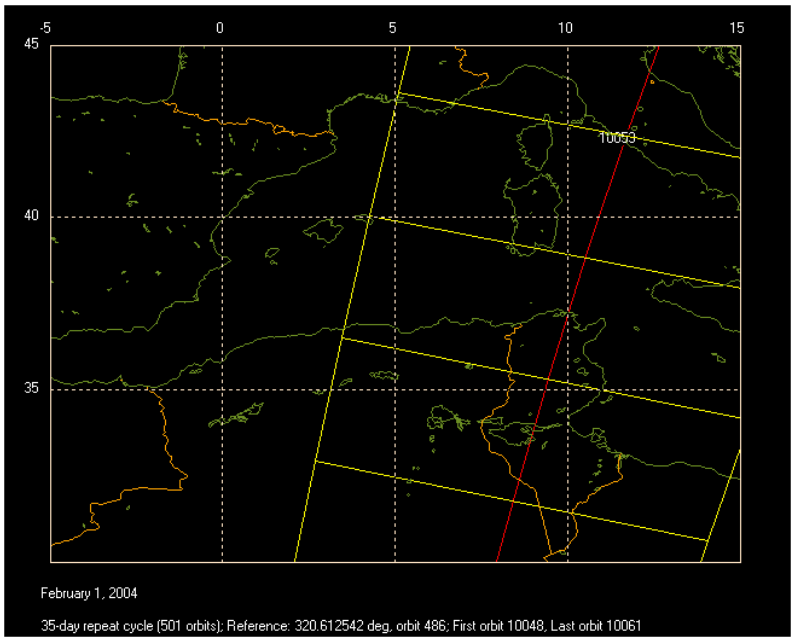
28th January 2004 **29th January 2004** **30th January 2004** **31st January 2004** **1st February 2004**

Calculated Swath paths for Modis Sensor (ESOV Software)



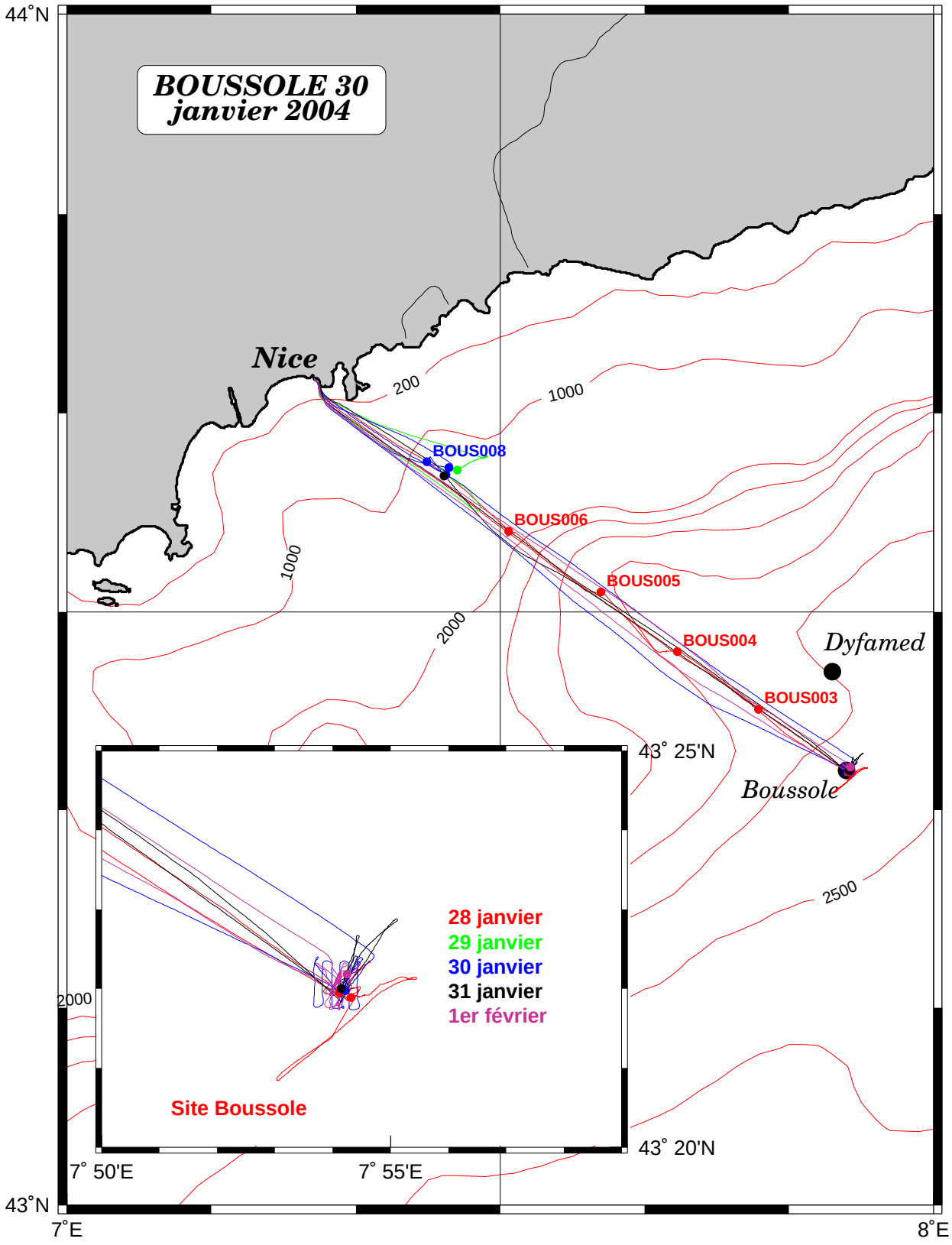



-5
0
5
10
15
45
40
35
10039
10033
January 31, 2004
35-day repeat cycle (501 orbits); Reference: 320.612542 deg, orbit 486; First orbit 10033, Last orbit 10046


-5
0
5
10
15
45
40
35
10053
February 1, 2004
35-day repeat cycle (501 orbits); Reference: 320.612542 deg, orbit 486; First orbit 10048, Last orbit 10061

Boussole 30 Cruise Summary Table

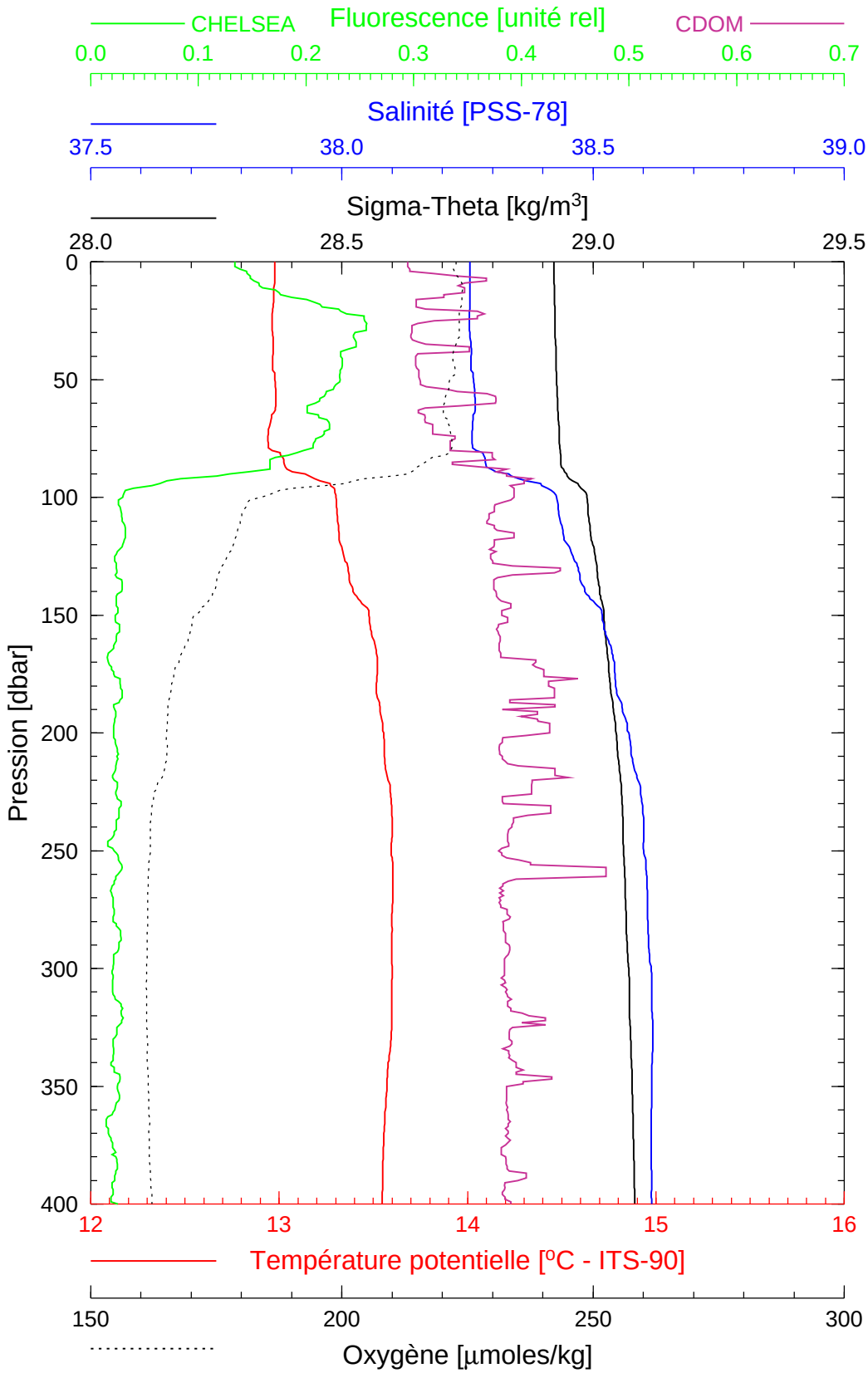
Date	Sensors:	Black names	Profile names	CTD notées /	Start Time	Duration	Depth max	Latitude (N)		50		Other sensors	cast	PAR	Start/Finish			Weather							Sea		
	spmr&smsr	(file extension: *.raw*)	(file extension: *.raw*)	satellite overpass	GMT (hour.min)	(min.sec)	(meter)	(Degree)	(Minute)	(Degree)	(Minute)				S/F mark#	Sky	Clouds	Qty (#/8)	Wind speed	Wind dir.	Atm. Press	humidity	Visibility	T air	T water	Sea	Swell height	Swell dir.	White horses
28/01/04				CTDBOUS001	10:20	32:00	400	43	21.892	7	54.318							3	6	201	1000.3	56		9.6	12.9	agitee			
	spmr&smsr	bou280104black1			10.55	03:00																							
	spmr&smsr		bou280104a	Meris 1010	11.00	04:19	200	43	22.056	7	54.856					clear milky	large cumulus to east but clear overhead	1	7kts	351	999.5	50	good	9.5		large swell	1-1.8	270	no
	spmr&smsr		bou280104b	SeaWiFS 1130	11.17	04:27	200	43	22.147	7	55.218					clear milky	large cumulus to east but clear overhead	1	7kts	351	999.5	50	good	9.5		large swell	1-1.8	270	no
	spmr&smsr	bou280104black2			11.41	03:00						Simbada	11:50																
	spmr&smsr	bou280104black3			13.13	03:00																							
	spmr&smsr		bou280104c	SeaWiFS 1307	13.23	04:17	200	43	22.005	7	54.309					blue	cumulus in distance	1	5kts	224	999	42	good	10.3		large swell	1-1.2	240	no
	spmr&smsr		bou280104d		13.32	05:01	200	43	22.028	7	54.3					blue	cumulus in distance	1	5kts	224	999	42	good	10.3		large swell	1-1.2	240	no
	spmr&smsr		bou280104e		13.45	04:06	200	43	22.186	7	54.39					blue	cumulus in distance	1	5kts	224	999	42	good	10.3		large swell	1-1.2	240	no
	spmr&smsr		bou280104f		13.53	04:22	200	43	22.235	7	54.45					blue	cumulus in distance	1	5kts	224	999	42	good	10.3		large swell	1-1.2	240	no
	spmr&smsr		bou280104g		14.04	04:19	200	43	22.298	7	54.53					blue	cumulus in distance	1	5kts	224	999	42	good	10.3		large swell	1-1.2	240	no
	spmr&smsr	bou280104black4			14.20	03:00																							
				CTDBOUS002	14.36	26:00	400	43	21.951	7	54.115							5	3kts	120	999.2	44		9.9	13.1	peu agitee			
				CTDBOUS003	15.44	27:00	400	43	25.085	7	47.899							5	17kts	122	999.6	67		8.9	13.1	agitee			
				CTDBOUS004	16.39	29:00	400	43	28	7	42.255							5	13	128	1000.4	60		8.8	13.2	agitee			
				CTDBOUS005	17.38	27:00	400	43	31.006	7	36.995							9	20	120	1000.8	63		8.2	13.7	agitee			
				CTDBOUS006	18.51	27:00	400	43	34.062	7	30.568							9	3	211	1002.2	45		10.7	13.7	agitee			
29/01/04				CTD TEST001	7.28	01:03:00	1000	43	37.157	7	27.016																		
30/01/04				CTD TEST002	6.34	59:00	1000	43	37.261	7	26.461																		
												Simbada	09:10																
												Simbada	10:20																
												Simbada	10:55																
												Simbada	12:05																
	spmr&smsr	bou290104black1			12.08	03:00																							
	spmr&smsr		bou290104a	SeaWiFS 1113	12.16	04:32	200	43	22.168	7	54.236					blue	cirrus	1	13kts	263	1022.4	53	v.good	9.9		fair	0.4	120	a few
	spmr&smsr		bou290104b		12.28	04:24	197	43	22.212	7	54.303					blue	cirrus	1	13kts	263	1022.4	53	v.good	9.9		fair	0.4	120	a few
	spmr&smsr		bou290104c		12.38	04:00	200	43	22.261	7	54.409					blue	cirrus	1	13kts	263	1022.4	53	v.good	9.9		fair	0.4	120	a few
	spmr&smsr		bou290104d	SeaWiFS 1251	13.01	04:20	200	43	22.011	7	54.035					blue	cirrus	1	13kts	263	1022.4	53	v.good	9.9		fair	0.4	120	a few
	spmr&smsr		bou290104e		13.11	04:17	200	43	22.127	7	54.19					blue	cirrus	1	13kts	263	1022.4	53	v.good	9.9		fair	0.4	120	a few
				Q1	13.42		5	43	22.338	7	53.709																		
				Q2	14.07		5	43	21.768	7	54.153																		
				Q3	14.30		5	43	22.38	7	54.418																		
	spmr&smsr		bou290104f		14.40	04:15	200	43	22.033	7	54.134					blue	cirrus	1	16kts	236	1022.3	48	v.good	10.2		fair	0.3-0.5	-	a few
	spmr&smsr		bou290104g		14.50	04:41	200	43	22.149	7	54.259					blue	cirrus	1	16kts	236	1022.3	48	v.good	10.2		fair	0.3-0.5	-	a few
	spmr&smsr	bou290104black2			15.08	03:00																							
				CTDBOUS007	15.16	30:00	400	43	21.978	7	54.215							2	15kts	240	1022.4	45		10.3	13.05	peu agitee			
				CTDBOUS008	18.27	23:00	400	43	37.56	7	24.922							9	13kts	246	1023.4	61		10.1	13.7	peu agitee			
				CTD TEST003	19.08	56:00	1000	43	36.905	7	26.255																		
31/01/04	spmr&smsr	bou310104black1			08:50	03:00																							
	spmr&smsr		bou310104a		08:59	04:00	200	43	22.114	7	54.205					cloudy		8	15kts	223	1027.3	62	fair	11.5		rough	0.4-0.6	-	yes
	spmr&smsr		bou310104b	Meris 1015	9.10	04:00	200	43	22.273	7	54.291					cloudy		8	15kts	223	1027.3	62	fair	11.5		rough	0.4-0.6	-	yes
				CTD TEST004	9.37	01:00:00	1000	43	21.999	7	54.145							7	15kts	224	1027.4	63		11.5	13.2	agitee			
	spmr&smsr	bou310104black2			9.45	03:00																							
				CTD TEST005	13.08	59:00	1000	43	36.852	7	26.122							8	9kts	292	1026.5	73		10.9		peu agitee			
01/02/04				CTDBOUS009	10.22	29:00	400	43	22.185	7	54.254					rain	rain	8	6kts	327	1029.1	89		11.8	13.1	peu agitee			
	spmr&smsr	bou010204black1			12.32	03:00																							
	spmr&smsr		bou010204spmratsurface1	SeaWiFS 1234	12.51	07:00	200	43	22.022	7	54.036					milky	cirrus and cumulus	6	6kts	263	1028.2	78	good	12.7		calm	0.2-0.5	180	no
	spmr&smsr		bou010204spmratsurface2		13.13	07:21	200	43	22.203	7	53.885					milky	cirrus and cumulus	6	6kts	263	1028.2	78	good	12.7		calm	0.2-0.5	180	no
	spmr&smsr		bou010204spmratsurface3		13.34	07:09	200	43	22.139	7	54.141					milky	cirrus and cumulus	6	6kts	263	1028.2	78	good	12.7		calm	0.2-0.5	180	no
	spmr&smsr		bou010204spmratsurface4		13.15	07:00	200	43	22.284	7	53.986					milky	cirrus and cumulus	6	6kts	263	1028.2	78	good	12.7		calm	0.2-0.5	180	no
	spmr&smsr	bou010204black2			14.00	03:00																							



GMT 2005 Apr 12 15:26:51

Boussole 30 **28/01/2004** **BOUS040128_01**

BOUS001

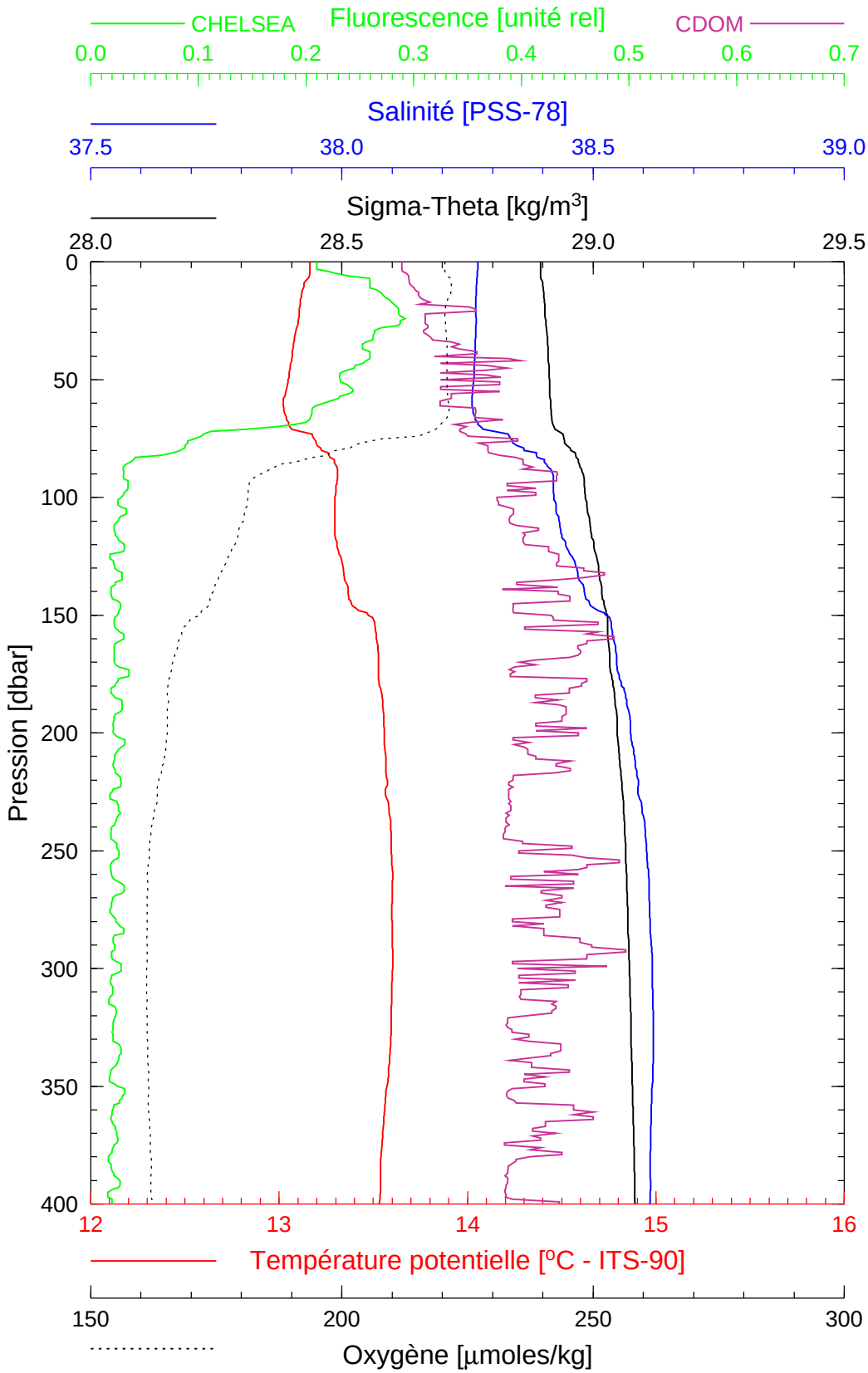


Date *28/01/2004* *Latitude* *43º21.892 N*

Heure déb *10h 20min [TU]* *Longitude* *07º54.378 E*

Boussole 30 **28/01/2004** **BOUS040128_02**

BOUS002

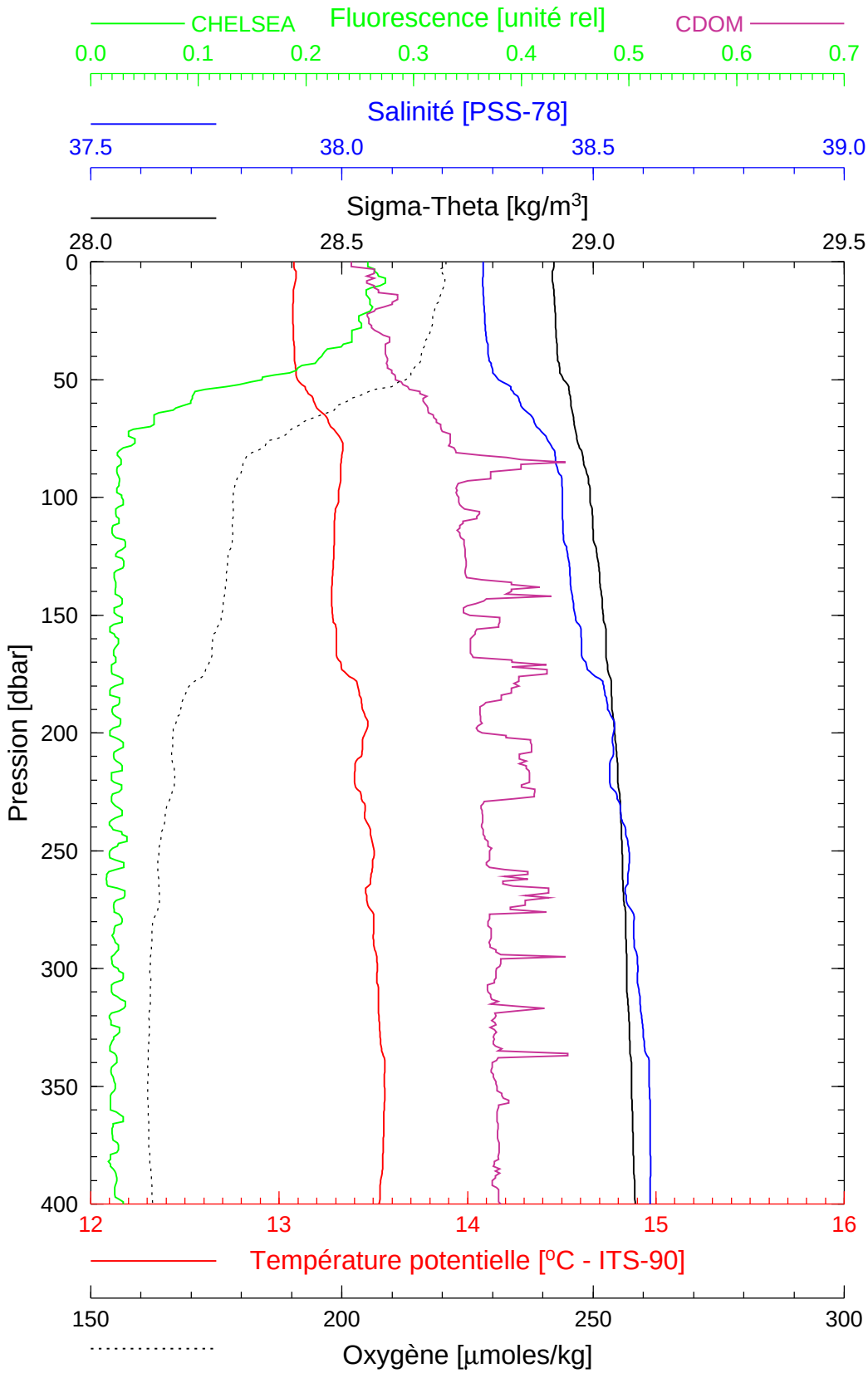


Date *28/01/2004* *Latitude* *43º21.951 N*

Heure déb *14h 36min [TU]* *Longitude* *07º54.115 E*

Boussole 30 **28/01/2004** **BOUS040128_03**

BOUS003

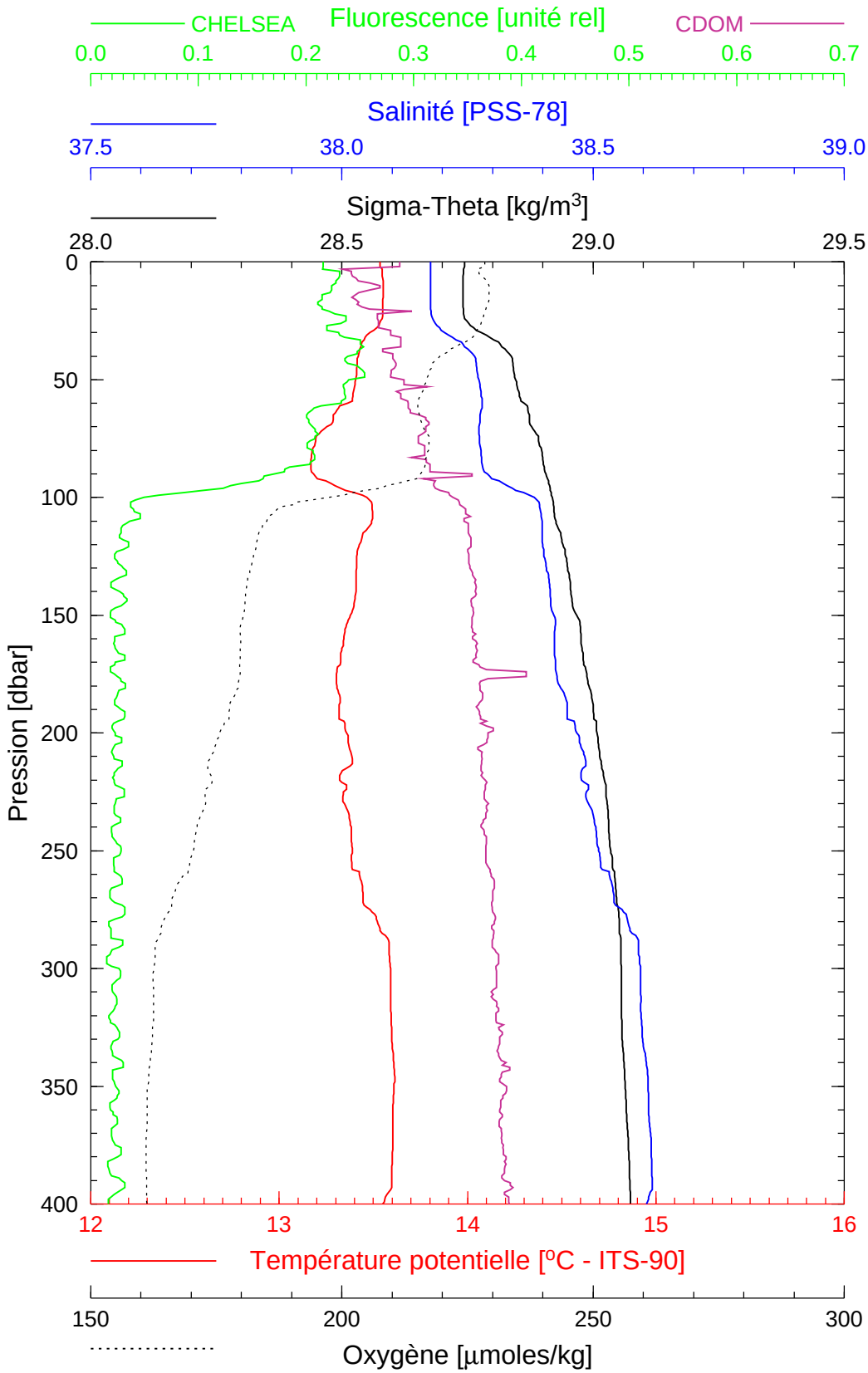


Date *28/01/2004* *Latitude* *43º25.085 N*

Heure déb *15h 44min [TU]* *Longitude* *07º47.893 E*

Boussole 30 **28/01/2004** **BOUS040128_04**

BOUS004

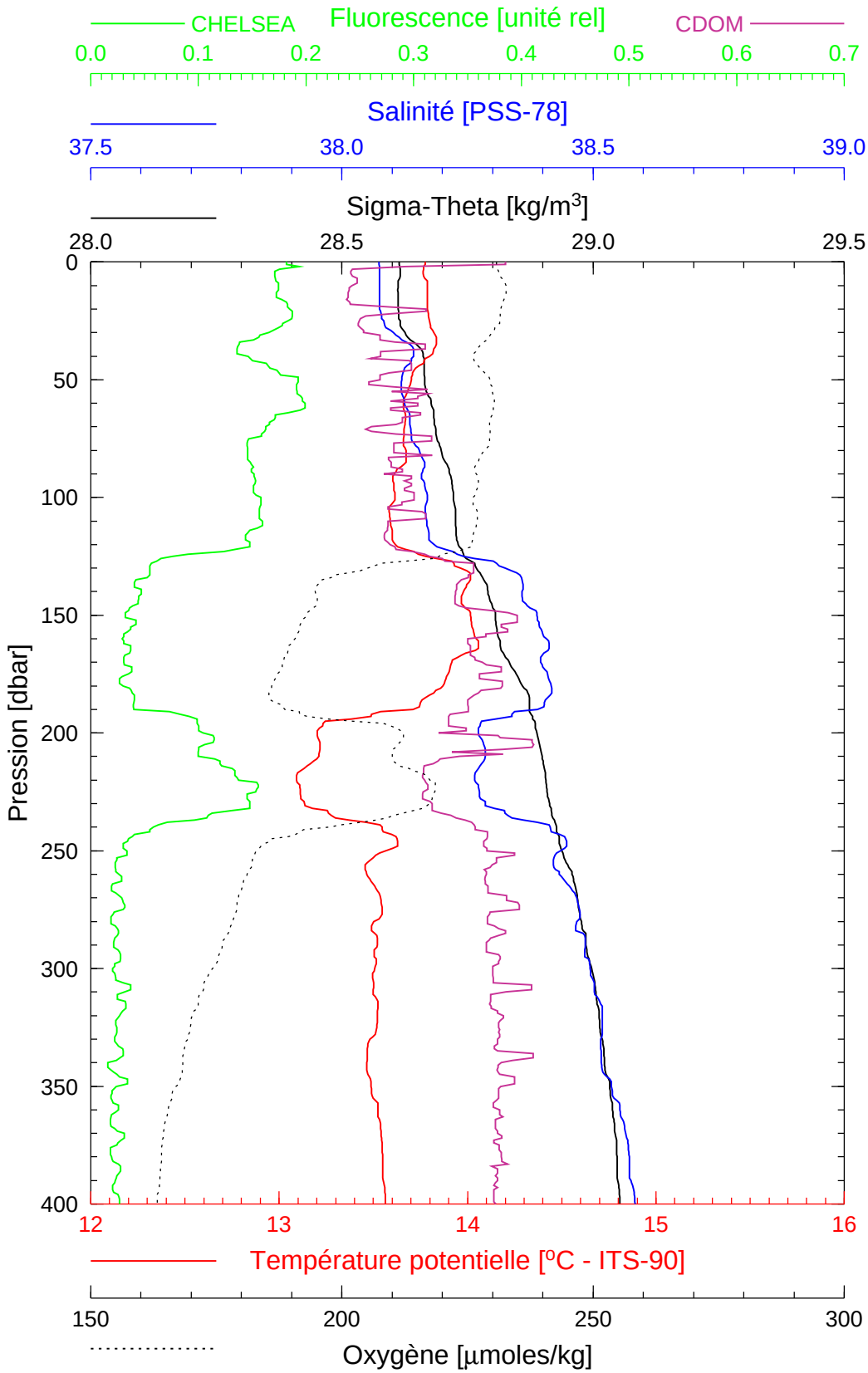


Date *28/01/2004* *Latitude* *43º28.000 N*

Heure déb *16h 39min [TU]* *Longitude* *07º42.255 E*

Boussole 30 **28/01/2004** **BOUS040128_05**

BOUS005

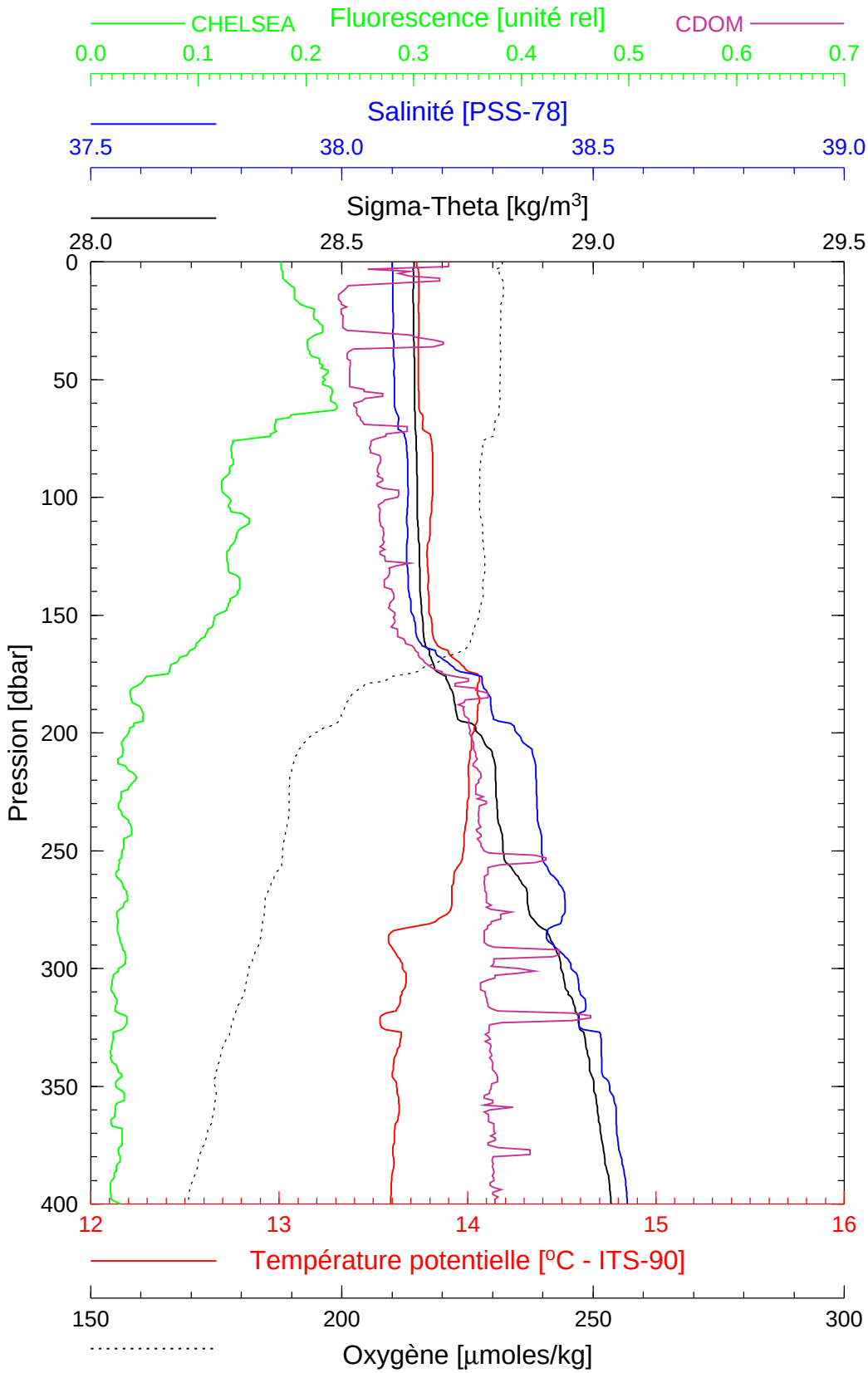


Date *28/01/2004* *Latitude* *43º31.006 N*

Heure déb *17h 38min [TU]* *Longitude* *07º36.995 E*

Boussole 30 **28/01/2004** **BOUS040128_06**

BOUS006

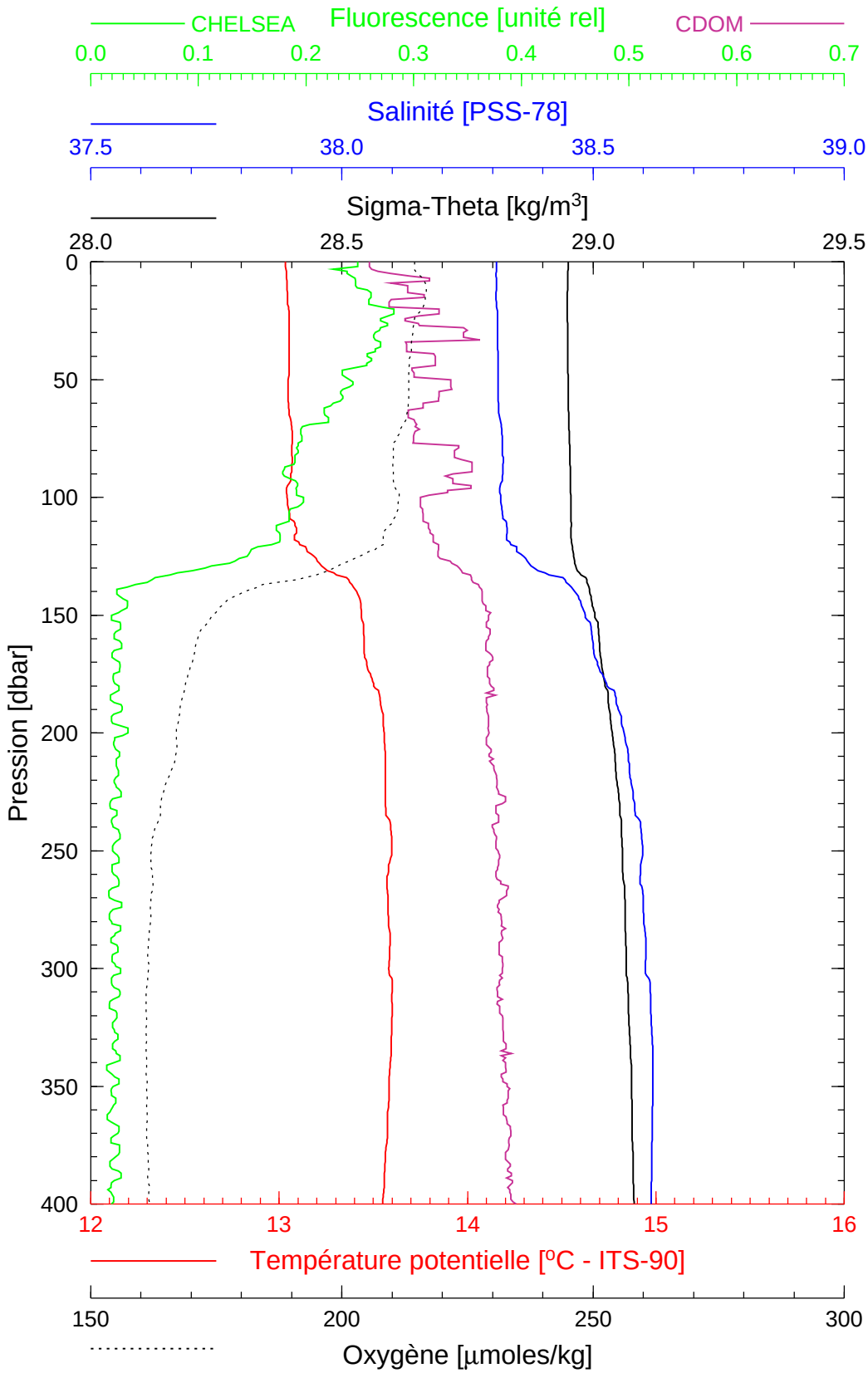


Date *28/01/2004* *Latitude* *43º34.062 N*

Heure déb *18h 51min [TU]* *Longitude* *07º30.568 E*

Boussole 30 **30/01/2004** **BOUS040130_02**

BOUS007

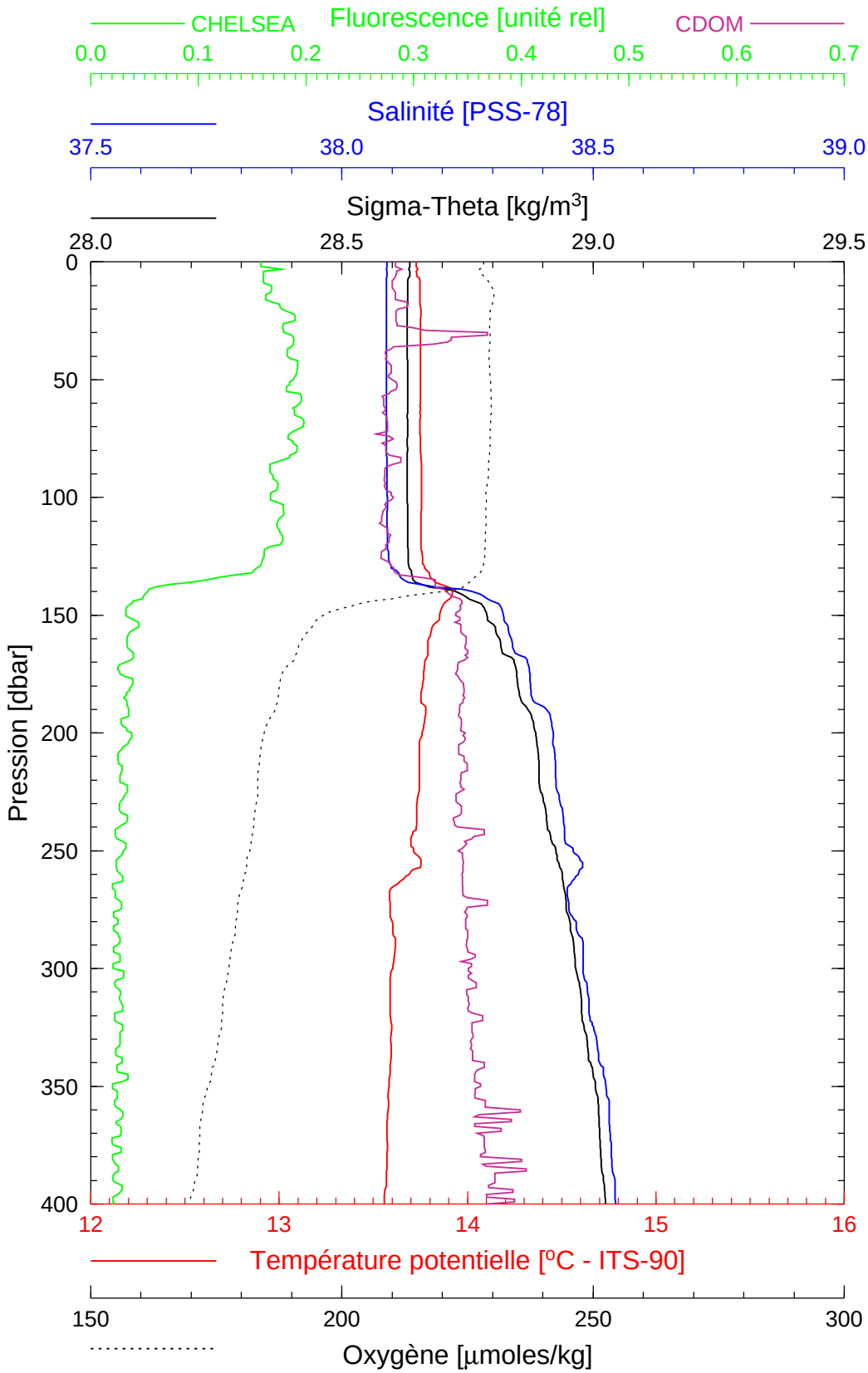


Date *30/01/2004* *Latitude* *43º21.978 N*

Heure déb *15h 16min [TU]* *Longitude* *07º54.215 E*

Boussole 30 **30/01/2004** **BOUS040130_03**

BOUS008

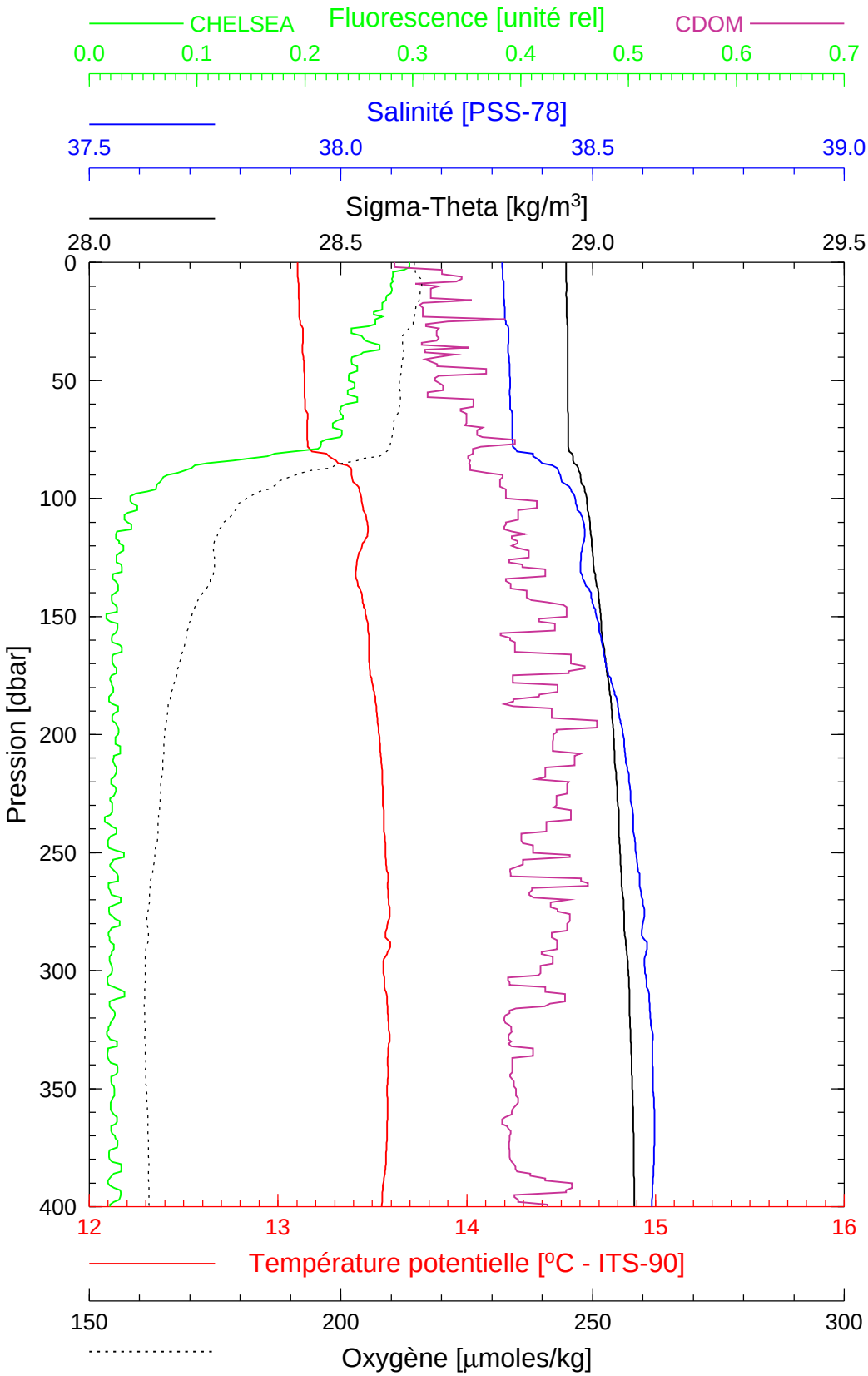


Date *30/01/2004* *Latitude* *43º37.560 N*

Heure déb *18h 27min [TU]* *Longitude* *07º24.922 E*

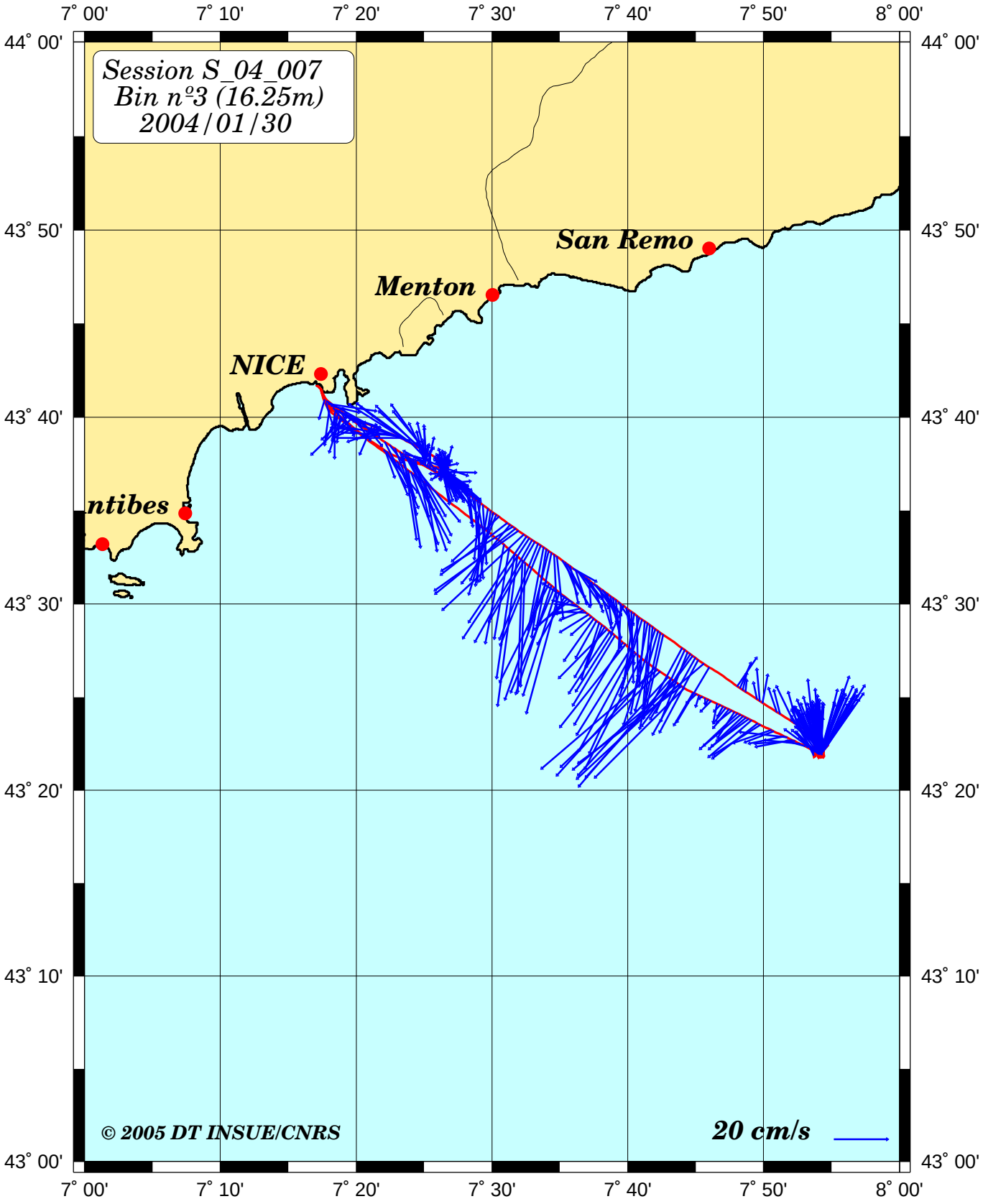
Boussole 30 **01/02/2004** **BOUS040201_01**

BOUS009

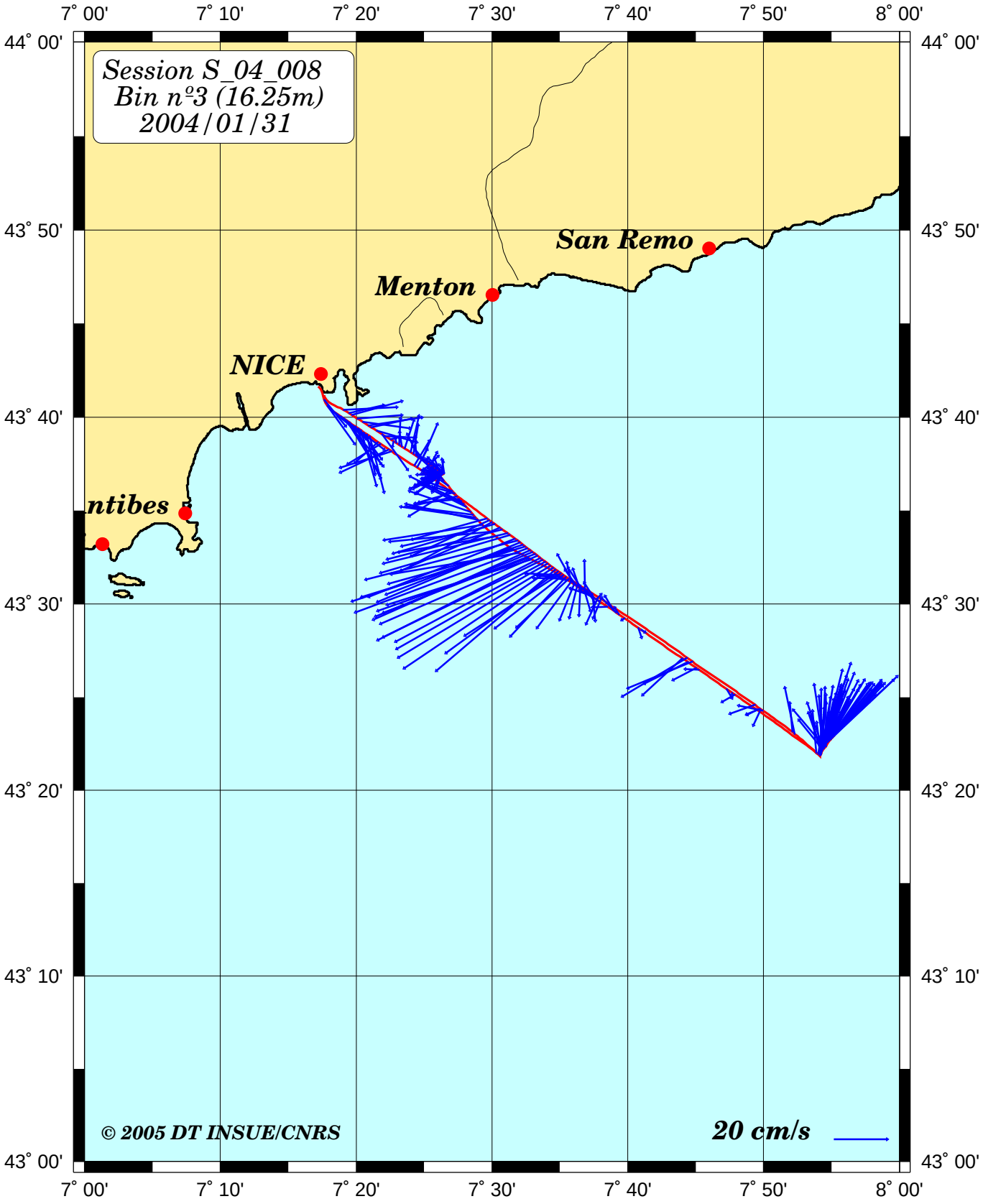


Date *01/02/2004* *Latitude* *43º22.185 N*

Heure déb *10h 22min [TU]* *Longitude* *07º54.254 E*



GMT 2005 Jun 8 13:27:24



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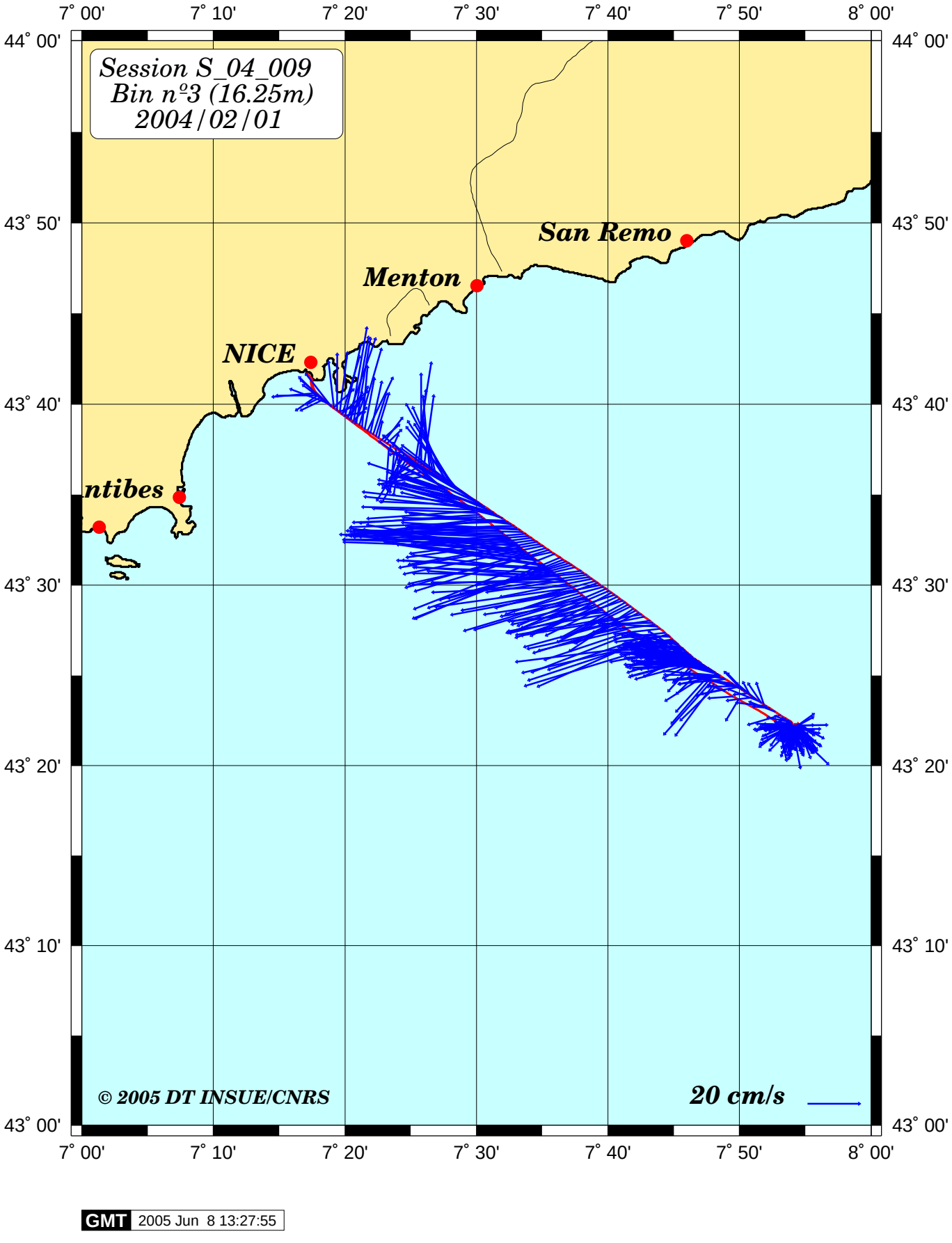

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