BOARD REPORT BMM-Measuring service Ostend CAMPAIGN 2003/08

17.03.2003 till 23.03.2003

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BOARD REPORT BMM-Measuring service Ostend CAMPAIGN 2003/08

17.03.2003 till 23.03.2003

1. Scienctist team

ENDIS-RISKS team:
M. Neyts
E. Monteyne
T. Verslycke
A. Ghekiere
K. Verheyen
S. Poelmans
H. Noppe
N. Fockedey
G. Desmet
L. Granda
B. Beuselinck

SISCO team:
L. Chou
V. Carbonnel
L. Rebreanu
M. Tsagiris
C. Van der Zee

2. Objectives of the campaign

2.1 ENDIS-RISKS – Roose

The goal of the project is to get better insight into the distribution and the possible effects of hormone disrupting substances in the Scheldt Estuary. The components to be analysed are mentioned on the OSPAR list of priority substances or are mentioned as hormone disrupting components on the OSPAR list of candidate substances. Also the short and long term effects of these components will be evaluated in the laboratory and in the field. For the priority substances the fysico-chemical distribution (speciation between the different compartments: sediment, water, suspended particulate matter), their concentrations in biota (mysids and gobies) and geographical spreading will be measured. Possible toxicological effects will also be investigated on an ecological important group of endemic organisms (mysids). For this purpose acute as well as chronical effects are studied on individual and population level and compared to historical data.

2.2 SISCO – Chou

The general goal of the project "SISCO" is to get better insights into the bio-chemical cycle of Si and its antropogenic disturbance in the Scheldt Estuary. The bio-chemical cycle of dissolved Si in aquatic ecosystems is important to structure biological societies. The excess of N and P relative to Si, carried from rivers to the coastal zone, has a dramatic effect on the food webs in the coastal seas.

The origin and sinks of Si in the Scheldt estuary will be defined. Important processes controlling the bio-chemical behaviour of Si in the water column will be measured. The early diagenesis of Si will be evaluated in order to determine the flux of Si (retained) in the sediment as well as the internal recycling of Si in the sediments. At last the Si flux of the Scheldt to the southern bay of the North Sea will be quantified by using a coupled hydro-dynamic bio-geochemical model in which the input of the most important supplying rivers, the fraction retained in the estuary, as well as the fraction reaching the coastal zone are determined. This will permit the evaluation of the impact of Si on eutrophication of the coastal zone via the alteration in the composition of the species of phyto-plankton.

2.3 Oceanographic study day – Chou

The goal of this project is a 1-day session of practical training a board of the Belgica for students following Chemical Oceanographics (ULB).

3. Operations

The Scheldt points are sampled together for the ENDIS-RISKS and the SISCO project. The points on the Belgian Continental Shelf are sampled for the SISCO project. For a more detailed schedule of the performed samples refer to annex A.

Monday 17 February 2003

Station S01 Vlissingen
12h00 : Start centrifuge
12h12 : Water sampling (Go Flow / Niskin)
13h00 : Fish tracks (Hyperbentic sledge)
14h00 : Sediment sampling (Reineck / Van Veen)
14h43 : Fish tracks (Beam thrawl)
15h05 : Stop centrifuge

Station S04 Terneuzen
15h57 : Start centrifuge
16h27 : Water sampling (Go Flow / Niskin)
17h08 : Fish tracks (Beam thrawl)
17h34 : Sediment sampling (Reineck / Van Veen)
18h13 : Fish tracks (Hyperbentic sledge)
19h25 : Stop centrifuge

Tuesday 18 February 2003

Station S22 Antwerp
07h43 : Start centrifuge
07h44 : Water sampling (Go Flow / Niskin)
08h12 : Sediment sampling (Reineck / Van Veen)
09h02 : Fish tracks (Beam thrawl)
09h39 : Stop centrifuge

Station S09 Saeftinghe
11h55 : Start centrifuge
12h41 : Water sampling (Go Flow / Niskin)
13h15 : Fish tracks (Beam thrawl)
13h48 : Sediment sampling (Reineck / Van Veen)
14h13 : Fish tracks (Hyperbentic sledge)
15h03 : Stop centrifuge

Station S22 Antwerp
16h41 : Start centrifuge
17h17 : Fish tracks (Hyperbentic sledge)
20h45 : Stop centrifuge

Wednesday 19 February 2003

Station S15 Doel
08h30 : Start centrifuge
08h47 : Water sampling (Go Flow / Niskin)
09h05 : Fish tracks (Hyperbentic sledge)
10h25 : Sediment sampling (Reineck / Van Veen)
10h50 : Fish tracks (Beam thrawl)
11h16 : Stop centrifuge

Station S07 Hansweert
12h52 : Start centrifuge
12h46 : Water sampling (Go Flow / Niskin)
13h09 : Fish tracks (Beam thrawl)
13h32 : Sediment sampling (Reineck / Van Veen)
14h09 : Fish tracks (Hyperbentic sledge)
16h19 : Stop centrifuge

Thursday 20 February 2003

Station S12 Bath
07h50 : Start centrifuge
08h15 : Water sampling (Go Flow / Niskin)
08h38 : Fish tracks (Hyperbentic sledge)
09h45 : Sediment sampling (Reineck / Van Veen)
10h08 : Fish tracks (Beam thrawl)
10h40 : Stop centrifuge

Station S04 Terneuzen
12h54 : Fish tracks (Beam thrawl)

4. Remarks regarding measurment instruments and the campaign in general

In general the campaign went very smoothly. The atmosphere between the different scientists teams and the coordination between the scientist personnel and the Commandant /crew was excellent during the campaign.

REMARKS:
The single drum hydrographic winch at the starboard deck was removed for major repairs, consequently the Reineck and Van Veen samples had to be taken from the rear deck using one of the fishery winches.

Further remarks are to be found in Annex B.

5. Executed sampling programme

Scheldt River

STATION	POSITION		ODAS	SCTD	Water sampling	Sediment	Suspended particulate matter (SPM)	Fish tracks
	N.B.	O.L.						
S01	51 25.00	3 34.20	X	X	X	X	X	X
S04	51 20.70	3 49.50	X	X	X	X	X	X
S07	51 26.20	4 00.00	X	X	X	X	X	X
S09	51 22.20	4 04.70	X	X	X	X	X	X
S12	51 21.90	4 13.50	X	X	X	X	X	X
S15	51 18.80	4 16.40	X	X	X	X	X	X
S22	51 13.13	4 23.50	X	X	X	X	X	X

ODAS = automatic registration of :
navigation parameters en bathymetry
meteo parameters (inclusive solar radiation)
salinity en temperature (thermosalinographe Seabird SBE21)
fluorescence (Turner Design fluorimeter model 10AU)
temperature (Rosemount temperatuurssensor)

CTD = Conductiviteit (Saliniteit), Temperatuur, Diepte gekoppeld met Densiteit, Turbiditeit met OBS-sensor, LiCor Quantameter (PAR).

Belgian Continental Shelf

STATION	POSITION		ODAS	CTD	Water sampling	Sediment	Suspended particulate matter (SPM)	Fish tracks
	N.B.	O.L.						
710	51 26.45	3 08.32	X	X		X		
780	51 28.27	3 03.48	X	X		X		
130	51 16.25	2 54.30	X	X		X		
230	51 18.50	2 51.00	X	X		X		
330	51 26.00	2 48.50	X	X	X	X		

ODAS = **automatische registratie van :**
navigatie parameters en bathymetrie
meteoparameters (inclusief solarradiation)
saliniteit en temperatuur (thermosalinograaf Seabird SBE21)
fluorescentie (Turner Design fluorimeter model 10AU)
temperatuur (Rosemount temperatuurssensor)

CTD = **Conductiviteit (Saliniteit), Temperatuur, Diepte gekoppeld met Densiteit, Turbiditeit met OBS-sensor, LiCor Quantameter (PAR).**

6. Detailed overview sampling programme

Scheldt River

STATION	WATER SAMPLING				SEDIMENT		SPM	FISH TRACKS	
	WATER NISKIN (5 l)		WATER GO FLO (10 l)	WATER NISKIN (10 l)	Van Veen	Reineck	Centrifuge	Beam trawl	Hyperbentic sledge
	SPM	DOC POC	Endocrine Disruptors	Radiotracer Incubation					
S01	X	X	X	X	X	X	X	X	X
S04	X	X	X	X	X	X	X	X	X
S07	X	X	X	X	X	X	X	X	X
S09	X	X	X	X	X	X	X	X	X
S12	X	X	X	X	X	X	X	X	X
S15	X	X	X	X	X	X	X	X	X
S22	X	X	X	X	X	X	X	X	

Belgian Continental Shelf

STATION	WATER SAMPLING				SEDIMENT		SPM	FISH TRACKS	
	WATER NISKIN (5 l)		WATER GO FLO (10 l)	WATER NISKIN (10 l)	Van Veen	Reineck	Centrifuge	Beam trawl	Hyperbentic sledge
	SPM	DOC POC	Endocrine Disruptors	Radiotracer Incubation					
710				X		X			
780				X		X			
130				X		X			
230				X		X			
330				X		X			

7. METEO PARAMETERS - ODAS

Tabel : Wind Speed, Wind direction, Air temperature, Water depth, Barometric Pressure and salinity at the different sampling stations.
(B : No data, S : Suspected data)

Station	Datum	Uur (gmt)	Wind sp. (m/s)	Wind dir. (dg)	Air temp. (°C)	Water depth (m)	Water temp. (°C)	Salinity (PSU)
S01								
Centrifuge start	17.03.03	10h59	4.6	38.6	13.2	-23.32	5.9	27.1
Water sampling	17.03.03	11h13	2.3	270.6	14.0	-22.65	5.9	27.3
Sledge start	17.03.03	12h01	5.4	354.7	13.4	-24.20	5.8	27.7
Sledge stop	17.03.03	12h12	2.6	317.3	13.4	-23.90	6.0	27.7
Sledge start 2	17.03.03	12h32	2.6	347.3	13.0	-22.30	5.9	27.8
Sledge stop 2	17.03.03	12h43	1.9	309.9	13.4	-23.79	5.9	27.7
Beam trawl start	17.03.03	13h44	2.9	322.1	12.5	-23.51	5.9	28.0
Beam trawl stop	17.03.03	13h54	3.4	326.1	12.5	-22.02	6.0	27.9
Centrifuge stop	17.03.03	15h05	5.4	347.4	13.1	-22.30	5.9	27.9
S04								
Centrifuge start	17.03.03	14h58	7.5	345.6	12.4	-18.19	6.5	23.4
Water sampling	17.03.03	15h28	1.8	347.4	12.8	-19.00	6.3	21.5
Beam trawl start	17.03.03	16h10	7.0	348.1	12.6	-18.40	6.3	21.4
Beam trawl stop	17.03.03	16h17	8.0	347.0	12.6	-27.06	6.4	20.5
Sediment	17.03.03	16h36	7.7	356.4	11.8	-17.19	6.4	20.7
Sledge start	17.03.03	17h14	5.9	0.5	11.7	-15.91	6.5	19.3
Sledge stop	17.03.03	17h23	6.5	3.8	11.1	-28.21	6.4	19.4
Sledge start 2	17.03.03	17h46	6.5	11.5	11.4	-19.49	6.5	18.8
Sledge stop 2	17.03.03	17h57	5.1	9.8	10.8	-17.69	6.4	19.2
Beam trawl start	20.03.03	11h55	2.1	35.1	9.7	-17.99	6.7	18.6
Beam trawl stop	20.03.03	12h06	1.3	23.0	9.6	-25.18	6.8	18.7

Station	Datum	Uur (gmt)	Wind sp. (m/s)	Wind dir. (dg)	Air temp. (°C)	Water depth (m)	Water temp. (°C)	Salinity (PSU)
S07								
Water sampling	19.03.03	11h47	3.1	28.4	14.8	-14.29	7.0	12.8
Centrifuge start	19.03.03	11h53	1.8	24.7	15.0	-16.40	7.0	12.9
Beam trawl start	19.03.03	12h10	1.8	295.5	15.3	-15.79	7.0	13.0
Beam trawl stop	19.03.03	12h21	1.4	309.7	15.6	-13.58	7.0	12.9
Sediment	19.03.03	12h33	1.4	310.2	14.8	-14.89	7.0	13.3
Sledge start	19.03.03	13h10	2.5	348.2	15.9	-17.51	6.9	14.6
Sledge stop	19.03.03	13h20	2.8	345.9	16.6	-15.69	6.9	14.4
Sledge start 2	19.03.03	13h36	2.0	335.9	15.9	-16.58	6.8	15.2
Sledge stop 2	19.03.03	13h45	3.6	348.4	16.7	-14.30	6.9	15.1
Sledge start 3	19.03.03	14h04	4.1	351.2	16.1	-18.00	6.8	15.8
Sledge stop 3	19.03.03	14.08	4.6	340.8	15.5	-17.81	6.8	16.2
Sledge start 4	19.03.03	15h06	5.7	347.5	14.6	-18.11	6.7	17.3
Sledge stop 4	19.03.03	15.16	6.7	351.0	17.9	-18.00	6.7	17.6
S09								
Centrifuge start	18.03.03	11h00	2.0	53.3	10.5	-23.30	8.3	5.35
Water sampling	18.03.03	11h42	2.6	81.0	11.6	-14.21	7.4	9.24
Beam trawl start	18.03.03	12h16	2.7	71.7	12.4	-10.79	7.5	8.69
Beam trawl stop	18.03.03	12h26	3.6	58.9	13.2	-11.90	7.4	9.32
Sediment	18.03.03	12h57	4.4	54.5	15.8	-12.28	7.4	9.89
Sledge start	18.03.03	13h14	4.8	86.3	14.3	-13.80	7.4	10.25
Sledge stop	18.03.03	13h24	5.8	81.8	14.6	-14.59	7.2	10.51
Sledge start 2	18.03.03	13h42	5.1	67.6	14.4	-14.72	7.1	11.73
Sledge stop 2	18.03.03	13h52	5.9	58.5	15.1	-15.21	7.4	10.41
Centrifuge stop	18.03.03	14h04	4.3	71.8	14.3	-14.09	7.2	11.77
S12								
Centrifuge start	20.03.03	06h48	2.5	16.7	7.6	-12.51	8.2	6.44
Water sampling	20.03.03	07h16	2.4	345.4	7.9	-16.20	8.6	5.72
Sledge start	20.03.03	07h38	2.3	293.5	7.9	-13.81	8.6	5.37
Sledge stop	20.03.03	07h52	0.8	282.4	7.7	-14.81	8.5	5.51
Sledge start 2	20.03.03	08h23	2.4	354.8	7.8	-7.00	8.7	4.70
Sledge stop 2	20.03.03	08h36	0.9	269.8	7.9	-10.79	8.7	4.97
Sediment	20.03.03	08h47	1.3	353.8	8.0	-13.71	8.8	4.70
Beam trawl start	20.03.03	09h09	2.0	336.0	8.3	-9.60	8.8	4.40
Beam trawl stop	20.03.03	09h24	1.1	256.3	7.9	-19.91	8.9	4.40
Centrifuge stop	20.03.03	09h42	4.2	303.2	8.2	-15.01	8.8	4.47

Station	Datum	Uur (gmt)	Wind sp. (m/s)	Wind dir. (dg)	Air temp. (°C)	Water depth (m)	Water temp. (°C)	Salinity (PSU)
S15								
Water sampling	19.03.03	07h49	1.3	88.5	8.2	-13.65	8.9	3.57
Start sledge	19.03.03	08h06	1.0	42.8	9.8	-13.00	8.9	3.51
Stop sledge	19.03.03	08h17	1.8	65.5	10.2	-14.18	8.9	3.55
Start sledge 2	19.03.03	08h41	0.6	110.9	11.2	-12.31	8.8	3.07
Stop sledge 2	19.03.03	08h51	0.4	201.6	10.9	-12.39	8.8	3.19
Start sledge 3	19.03.03	09h03	1.3	199.9	11.0	-12.19	8.8	2.90
Stop sledge 3	19.03.03	09h13	0.4	207.0	11.5	-12.10	8.8	2.98
Sediment	19.03.03	09h36	0.1	170.6	13.1	-11.90	8.8	2.49
Start beam trawl	19.03.03	09h51	0.7	269.5	12.5	-11.21	8.8	2.46
Stop beam trawl	19.03.03	10h03	0.6	143.2	13.0	-11.60	8.9	2.54
Stop centrifuge	19.03.03	10h18	3.2	288.5	13.3	-16.00	8.8	2.62
S22								
Start centrifuge	18.03.03	06h42	3.1	44.5	5.5	-11.45	8.4	0.77
Water sampling	18.03.03	06h45	3.3	20.7	5.4	-11.79	8.7	0.74
Sediment	18.03.03	07h13	3.3	25.2	6.3	-11.19	8.7	0.62
Start sledge	18.03.03	08h03	3.6	35.6	6.0	-9.69	8.7	0.50
Stop sledge	18.03.03	08h14	3.2	20.8	6.4	-9.50	8.7	0.48
Stop centrifuge	18.03.03	08h41	3.2	7.0	6.5	-14.27	8.7	0.46
Start centrifuge	18.03.03	15h43	3.7	31.1	16.3	-18.02	8.9	2.01
Start sledge	18.03.03	16h59	2.6	61.8	16.4	-12.01	8.8	1.75
Stop sledge	18.03.03	17h31	2.1	36.8	15.8	-11.31	8.9	1.52

8. SCTD-PARAMETERS SEABIRD SBE 19 (Seacat)

Tabel : Sampling Depth, Sea Temperature, Salinity, Turbidity, Oxygen and Density are measured In situ with the Seabird SCTD-model SBE19 (Seacat) (B: no data)

Sampling depth

Station	Temperature (°C)	Salinity (PSU)	Oxygen (ml/l)	Turbidity (FTU)	Irradiance (μEinstein s^{-1} m^{-2})
S01 Start	5.8894	27.4256	7.173	27.40	0.445
S01 End	5.8381	27.9388	7.567	24.96	1.702
S04 Start	6.2357	21.6569	7.813	19.93	0.808
S04 End	6.4322	19.2844	7.964	29.55	0.040
S04 Start2	6.6406	18.7118	7.949	30.33	0.069
S07 Start	6.9384	12.9290	8.066	44.74	0.049
S07 End	6.7049	16.8677	7.953	38.39	0.106
S07 End 2	6.7432	17.2453	7.995	29.60	0.065
S09 Start	7.3891	9.2774	7.441	31.55	0.142
S09 End	7.2768	10.8919	7.655	43.08	0.075
S12 Start	8.3774	5.9546	5.834	50.55	0.040
S12 End	8.7878	4.6158	5.041	97.14	0.037
S15 Start	8.8656	3.5719	4.897	116.04	0.039
S15 End	8.8317	2.5448	4.425	63.64	0.099
S22 Start	8.7080	0.7318	3.191	49.87	0.061
S22 End	8.6751	0.4770	2.980	32.58	4.001

B : No Data

M : Sampling executed, data not valid

Tabel : Sampling Depth, Sea Temperature, Salinity, Turbidity and Density are measured in situ with the Seabird SCTD-model SBE19 (Seacat) (b: no data)

At the bottom

Station	Temperature (°C)	Salinity (PSU)	Oxygen (ml/l)	Turbidity (FTU)	Irradiance (µEinstein s^{-1} m^{-2})
S01 Start	5.7660	28.0407	7.688	65.05	0.063
S01 End	5.9231	28.0120	7.570	73.55	0.046
S04 Start	6.2205	21.9837	8.022	66.28	0.052
S04 End	6.4282	19.4326	8.055	34.04	0.038
S04 Start2	6.5871	19.0966	8.066	70.13	0.034
S07 Start	6.9153	13.0167	9.101	59.05	0.041
S07 End	6.7049	16.8677	7.953	38.39	0.106
S07 End 2	6.6110	18.5312	7.995	44.84	0.054
S09 Start	7.1071	10.5795	7.613	87.77	0.040
S09 End	7.0105	12.4454	7.744	62.52	0.048
S12 Start	8.1935	6.9639	6.032	200.00	0.038
S12 End	8.7995	4.5388	5.245	200.00	0.040
S15 Start	8.8646	3.5798	5.016	134.36	0.037
S15 End	8.8118	2.7781	4.586	132.01	0.099
S22 Start	8.715	0.7454	3.474	90.11	0.028
S22 End	8.6820	0.4647	3.523	96.70	0.037

B : No Data

M : Sampling executed, data not valid

9. ROSCOP-DATA

A. P. ROOSE
B. L. CHOU

Principal Investigator	No.	Data Type	Description
A.	7 stations	H09 H10 P01 P02 P03 P04 P05 P90	
A.	7 stations	G04 P02 P03 P04 P05 P13	
A.	7 stations	B18 B14 P13	

ANNEX A: Instrumentation and Data-acquisition

A.1. Used instrumentation.

A.1.1. Navigational instrumentation.

During this cruise, the data from the following navigational instruments connected to the ship born computer system were logged by the Oceanographic Data Acquisition System "ODASII":

- THALES NAVIGATION AQUARIUS-02 LRK DGPS positioning system with an accuracy of 2 to 10 cm using IALA beacons for the differential correction.
- MAGNAVOX 200MX DGPS positioning system with an accuracy of ca. 5 m using IALA beacons for the differential correction.
- ANSHUTZ STD20 Gyro Compass.
- RAYTHEON DSN450 Doppler speed log and bathymetric depth.
- ATLAS DESO 22 Scientific Echosounder.
  The Atlas Deso 22 is equipped with 2 transducers (33 kHz and 210 kHz).
- TSS 320B Heave Compensator.
  The data of the Atlas Deso 22 echosounder are corrected for the heave by the TSS 320B.
- FURUNO Echosounder FCV381.
  The Furuno is also equipped with 2 transducers (28 kHz and 88 kHz).

A.1.2. Oceanografical instrumentation.

The sea surface temperature was measured continuously with the remote temperature sensor of the Sea-Bird SBE21 thermosalinograph as well as with a Sea-Bird SBE38 temperature sensor, both installed at the inlet of the non-toxic seawater circuit situated at the bow of the vessel.

The Sea-Bird SBE21 thermosalinograph, installed in the wet lab, is also connected to the non-toxic seawater circuit. The salinity was measured continuously using a personal computer with a dedicated software package from Sea-Bird. The processed data were continuously (every 6 sec.) transmitted to the HP1000/A400 data acquisition computer. The specifications of this thermosalinograph are found in table 1.

Parameter	Units	Range	Accuracy
Temperature	°C	-5 - +35	0.01 °C /6 months
Conductivity	S/m	0 – 7	0.001 S/m/month

Tabel 1. Sea-Bird SBE21 thermosalinograph specifications.

Salinity and density are calculated from conductivity, temperature and depth, in accordance to the 1978 Practical Salinity Scale from the IEEE Journal of Oceanic Engineering, January 1980.

A Turner Designs 10-AU-005 fluorimeter, also connected to the non toxic seawater circuit, was used to measure chlorophyll concentrations during the full campaign. The data were also transmitted to the HP1000/A400 data acquisition computer.

A Sea-Bird SBE19 'SeaCat' CTD profiler measures different parameters where under depth, temperature, conductivity, turbidity, oxygen content and lightintensity. The CTD-system is connected to the hydrologic winch and hydrologic CTD-measurements coincide with the water sampling. The specifications of the sensors of the SeaCat are found in tabel 2.

Parameter	Units	Range	Accuracy
Depth	m	0 - 600	
Temperature	°C	-5 - +35	0,02 °C/ 6 maand
Conductivity	S/m	0 – 7	0,001 S/m/maand
Backscatterance (OBS)	FTU	0 – 2000	
Dissolved Oxygen	ml/L	0 – 15	0,02 ml/L
Irradiance	µEinstein s^{-1} m^{-2}	0,02 - 2000	

Tabel 2. Sea-Bird SBE19 'SeaCat' specifications.

A.1.3. Meteorological instrumentation.

Following parameters were measured by the Friedrichs meteorological station:

- wind speed
- wind direction
- air temperature
- air pressure
- solar radiation

Table 3 gives a summary of the specifications of the meteo sensors.

Parameter	Units	Range	Accuracy
Wind speed	m/s	0 – 41	0.2
Wind direction	degrees	0 – 360	2
Air pressure	mbar	950 – 1050	0.3
Air temperature	°C	-35 - +45	0.2
Solar radiation	watt/m^2	0 – 1000	10

Tabel 3. Specifications of the meteo sensors.

The meteo sensors are calibrated at least once a year.

A.2. Data Acquisition System.

A.2.1. ODASII data acquisition and processing system.

A Hewlett Packard HP1000 Model A400 real-time minicomputer system with 26 RS-232 interfaces and a Hewlett Packard HP3852A data acquisition system (for analogous signals) were used to acquire meteorological, hydrological and navigational data at a 10 seconds interval.

The HP1000/A400 minicomputer is implemented as a black box. All input devices are connected through RS232 type interfaces to this real-time computer. The data acquisition software collects the sensor data and delivers this raw data to the data processing software implemented on a HP9000/748i-100 UNIX workstation. This on-line data processing software converts the raw data from the different input devices into physical units and stores the data in an Informix relational database.

The data presentation software is based on a Client Server model. The oceanographic data in the Informix database on the UNIX workstation are obtained on personal computer through a local area network (thin Ethernet LAN). These personal computer presentation units are installed in the labs, in the computer room and on the bridge and are accessible by all scientists on board for the production of real-time listings, graphs and track plots.

A.5.2. Sea-Bird CTD system.

The acquisition of the data from the Sea-Bird CTD systems (SBE09, SBE19 en SBE21) is allowed by using PCs using the Sea-Bird software. The software allows the necessary configuration and data acquisition. The sea-bird CTD software allows you to make real-time data-plots and to make markings when water bottle samples are taken so that the CTD and related parameters are known at the exact sampling depth.

ANNEX B: Detailed time-schedule

ENDIS-RISKS CAMPAIGN MARCH 2003

Action	Time	Remarks
17/03/03		
S01	Vlissingen	
Start centrifuge	12:00	
SCTD	12:12	
go-flow	12:12	
go-flow 2	12:20	12:31: tweede poging
Niskin 10L	12:35	
Niskin 5L	12:38	
Reineck		The single drum hydrographic winch at the starboard deck was removed for major repairs, consequently the Reineck and Van Veen samples had to be taken from the rear deck using one of the fishery winches.
Hyperbenthic sledge start	13:00	water bevat een olielaag !!
Hyperbenthic sledge stop	13:11	
Hyperbenthic sledge start2	13:31	
Hyperbenthic sledge stop2	13:42	
Reineck (twee maal SISCO)	14:10	genomen van op achterdek met grote winch (te weinig sediment voor ENDIS)
Van Veen (ENDIS)	14:20	
Boomkor start	14:43	gesleept aan 3.5 knopen, waarschijnlijk te snel (slede weinig de bodem geraakt, volgende keer 2.5 knopen)
Boomkor stop	14:53	
SCTD 2	15:05	
Stop centrifuge	15:05	5302 liters
S04	Terneuzen	
Start centrifuge	15:57	
SCTD	16:27	
go-flow	16:27	
go-flow 2	16:32	
Niskin 10L	16:36	
Niskin 5L	16:38	
Boomkor start	17:08	
Boomkor stop	17:15	
Van Veen (ENDIS)	17:34	
Reineck	17:45	
Reineck (twee maal SISCO)	17:50	
Hyperbenthic sledge start	18:13	bij zonsondergang
Hyperbenthic sledge stop	18:22	
Hyperbenthic sledge start2	18:46	
Hyperbenthic sledge stop2	18:56	
SCTD2	19:08	
Stop centrifuge	19:25	4931liters

18/3/03

S22	Antwerpen	
Start centrifuge	07:43	
SCTD	07:44	
go-flow	07:44	
go-flow 2	07:50	
Niskin 10L	07:53	
Niskin 5L	07:55	
Van Veen (ENDIS)	08:12	
Reineck	08:22	
Reineck (twee maal SISCO)		
hyperb. slede (klein) start	09:02	passief bemonsteren tegen stroom. Zuurstofgehalte was rond 4 mg/L.
hyperb. slede (klein) stop	09:13	Beperkte vangst mogelijk.
SCTD2	09:25	
Stop centrifuge	09:39	545 liters, volume water gecentrifugeerd zeer laag
S09	Saeftinghe	
Start centrifuge	11:55	
SCTD	12:41	
go-flow	12:41	
go-flow 2	12:51	
Niskin 10L	12:53	
Niskin 5L	12:56	
Boomkor start	13:15	
Boomkor stop	13:25	
Reineck	13:48	
Reineck (twee maal SISCO)	13:53	
Van Veen (ENDIS)	13:55	
Hyperbenthic sledge start	14:13	
Hyperbenthic sledge stop	14:23	
Hyperbenthic sledge start2	14:41	
Hyperbenthic sledge stop2	14:51	
SCTD 2	14:59	
Stop centrifuge	15:03	5252 liters
S22	Antwerpen	
Start centrifuge	16:41	17:30:00
Start kleine slede	17:17	kleine slede via loskraan overboord. Passief bemonsteren
Stop kleine slede	17:47	
Start kleine slede2	17:57	
Stop kleine slede2	18:30	
Stop centrifuge	20:45	4947 litres

19/3/03

S15	Doel	
Start centrifuge	08:30	
SCTD	08:47	
go-flow	08:47	
go-flow 2	08:52	
Niskin 10L	08:55	
Niskin 5L	08:57	
Hyperbenthic sledge start	09:05	
Hyperbenthic sledge stop	09:16	
Hyperbenthic sledge start2	09:40	
Hyperbenthic sledge stop2	09:50	veel organismen (voor zekerheid derde sleep)
Hyperbenthic sledge start3	10:02	veel biomassa; vrij eenvoudig te triëren
Hyperbenthic sledge stop3	10:12	
Reineck	10:25	
Reineck (twee maal SISCO)	10:30	
Van Veen	10:34	
Van Veen2	10:37	
Boomkor start	10:50	
Boomkor stop	11:02	
SCTD2	11:08	
Stop centrifuge	11:16	4298 litres

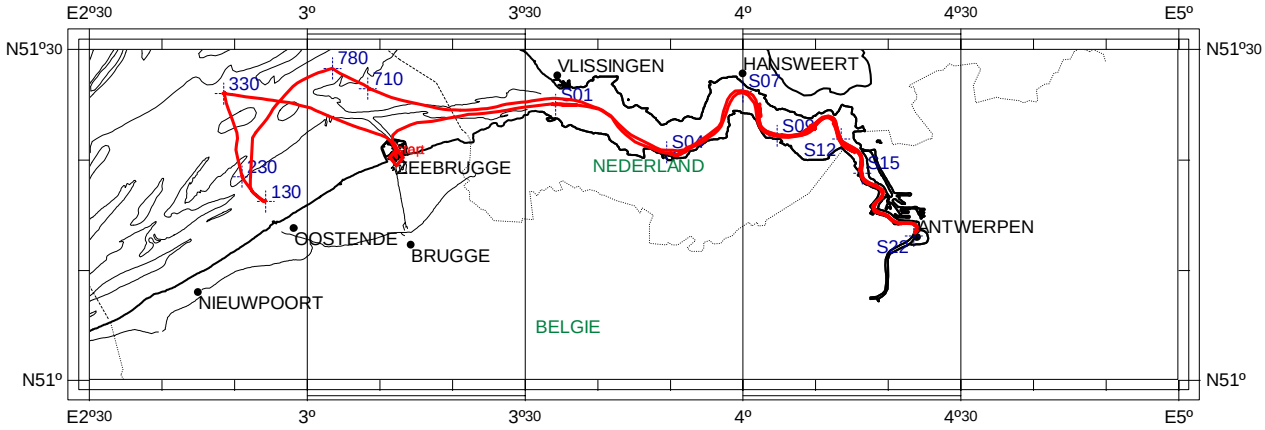
S07	Hansweert	zeer veel stroming!!
Start centrifuge	12:52	
SCTD	12:46	
go-flow	12:46	
go-flow 2	12:50	
Niskin 10L	12:53	
Niskin 5L	12:56	
Boomkor start	13:09	niet zoveel gobies
Boomkor stop	13:20	
Van Veen (ENDIS)	13:32	
Van Veen 2	13:34	
Reineck	13:42	
Reineck (twee maal SISCO)	13:52	
Hyperbenthic sledge start	14:09	hyperbenthische stalen vrij veel detritus
Hyperbenthic sledge stop	14:19	net linksboven losgekomen (geen mysids in linksboven)
Hyperbenthic sledge start2	14:35	
Hyperbenthic sledge stop2	14:44	
Hyperbenthic sledge start3	15:03	
Hyperbenthic sledge stop3	15:07	teveel stroom zijwaarts
SCTD 2	15:20	
Hyperbenthic sledge start4	16:05	
Hyperbenthic sledge stop4	16:15	
Stop centrifuge	16:19	5358 liters
SCTD3	16:23	

20/3/03

S12	Bath	
Start centrifuge	07:50	
SCTD	08:15	
go-flow	08:15	
go-flow 2	08:19	
Niskin 10L	08:22	
Niskin 5L	08:26	
Hyperbenthic sledge start	08:38	
Hyperbenthic sledge stop	08:50	veel vuil geschept, net linksonder los, veel mysids
Hyperbenthic sledge start2	09:22	iets dichet bij de vaargeul, een beetje dieper gesleept (minder debris)
Hyperbenthic sledge stop2	09:35	zeer veel mysids
Van Veen	09:45	
Van Veen2	09:48	
Van Veen3	09:58	large stones, decided not to take the Reineck
Boomkor start	10:08	stuk ijzer van 50 kg bovengehaald, fijnmazig net van kor volledig stuk
Boomkor stop	10:21	
SCTD2	10:30	
Stop centrifuge	10:40	4455 liters

S04	Terneuzen
Boomkor start	12:54
Boomkor stop	13:05
SCTD	

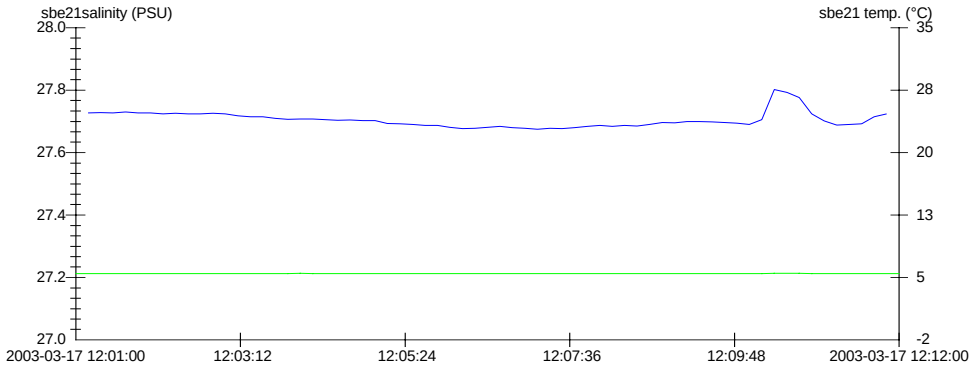
ANNEX C: Track-plot campaign

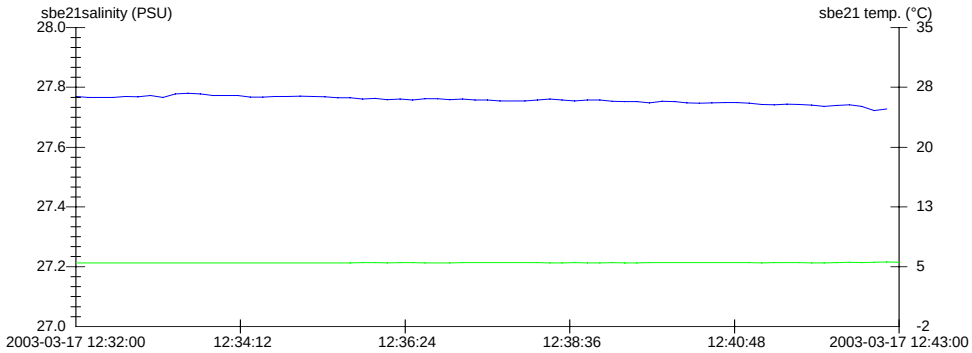


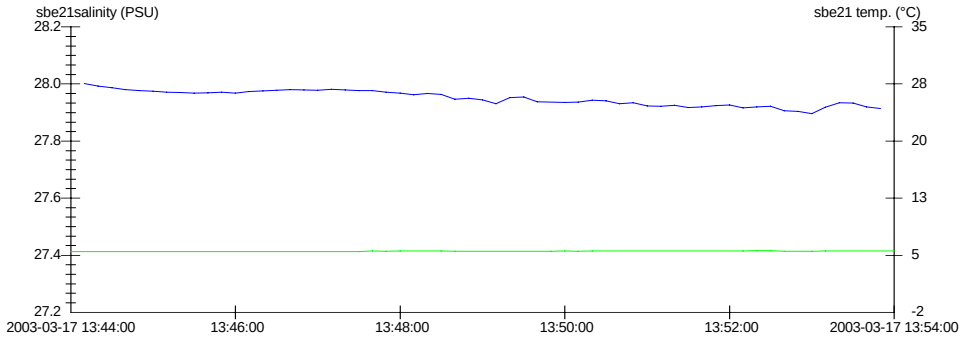
ANNEX D: Sea-Bird SBE21 thermosalinograph timeprofiles

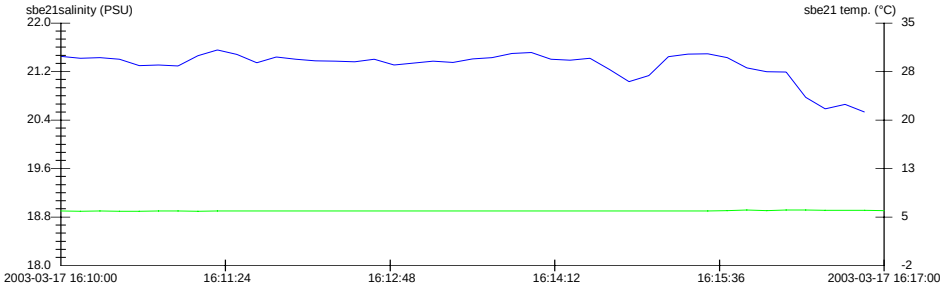
Graph legend
sbe21 salin (PSU) :
sbe21 temp (°C) :

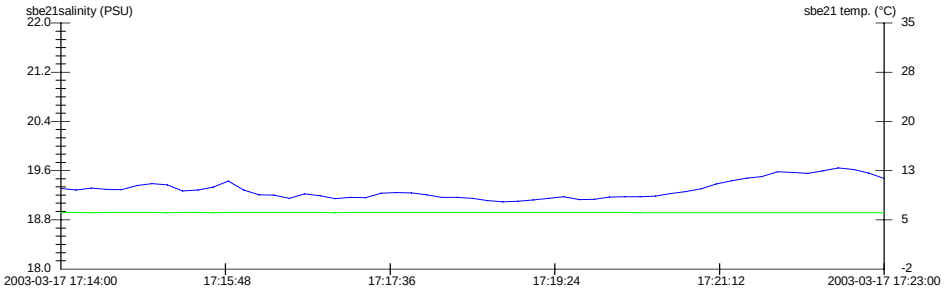
S01 - Vlissingen

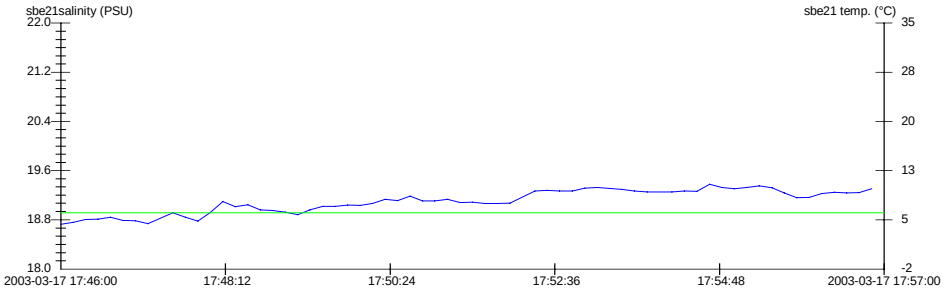


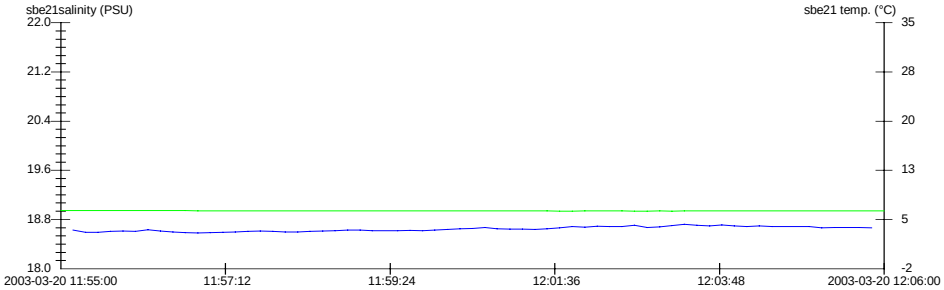


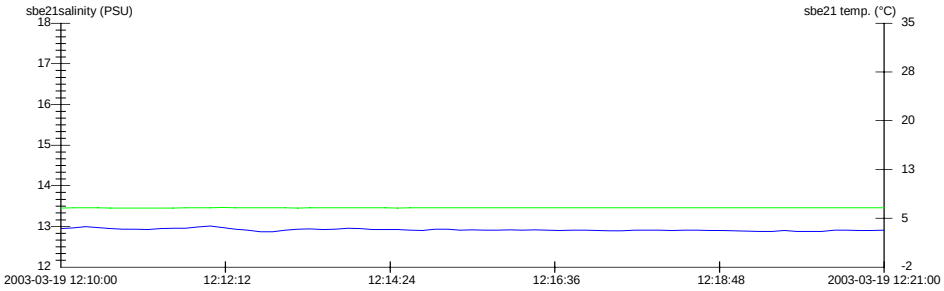


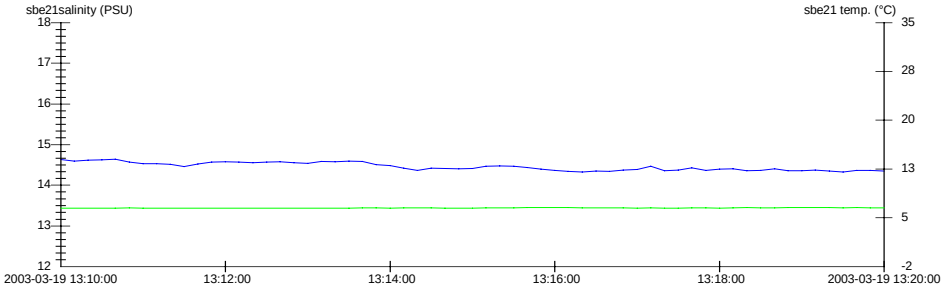


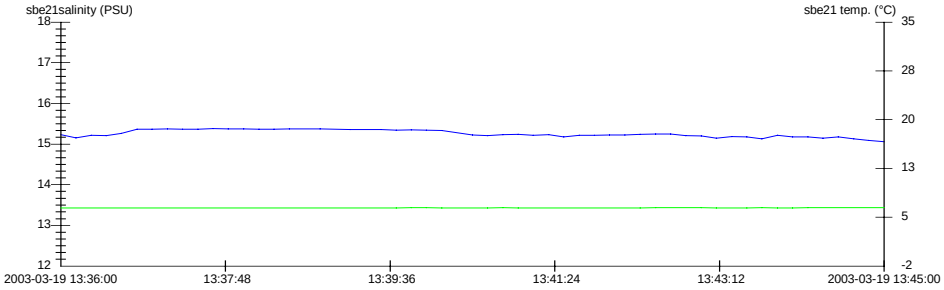


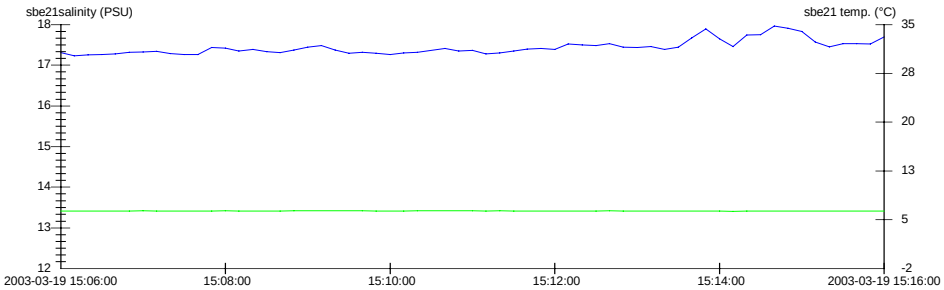


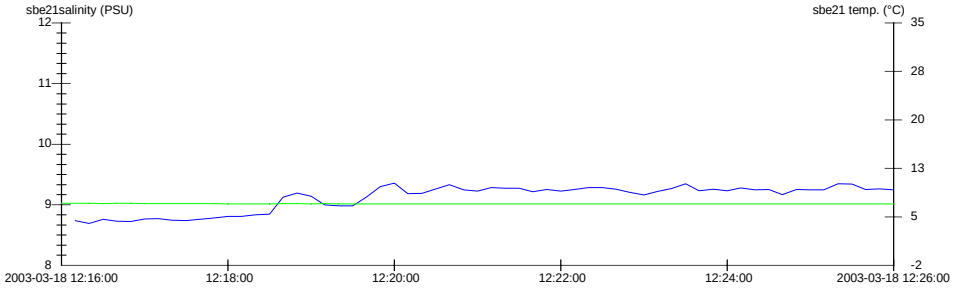


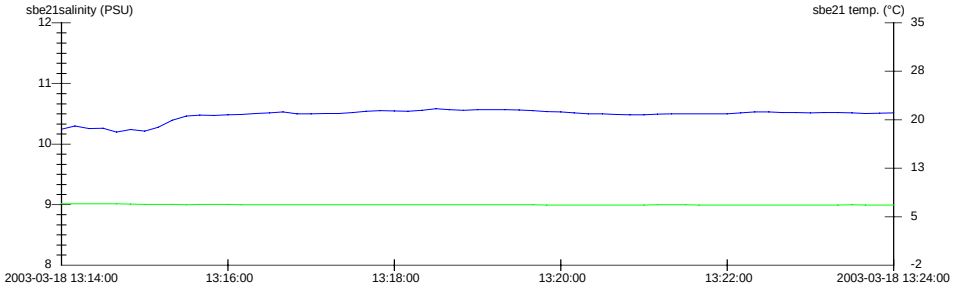


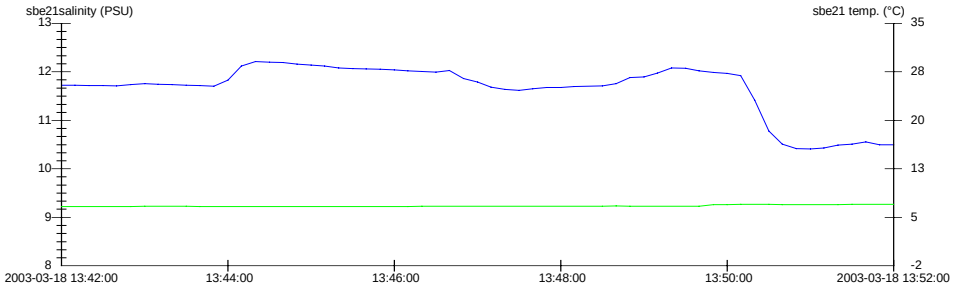


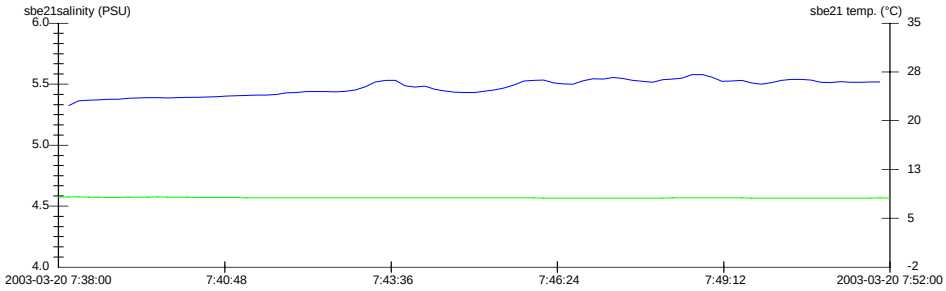


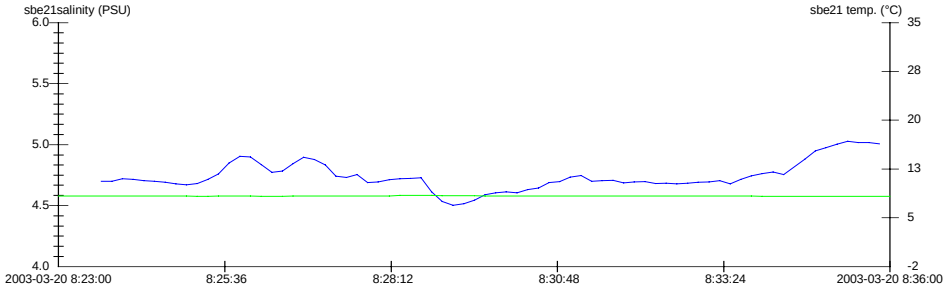


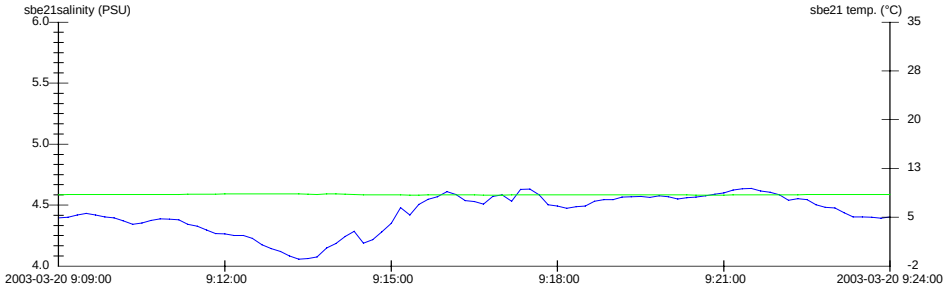


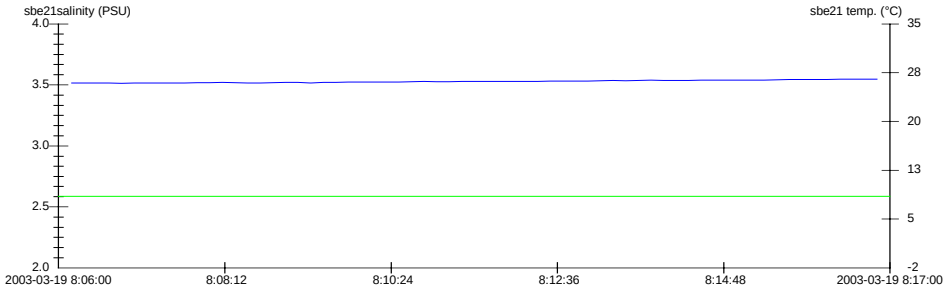


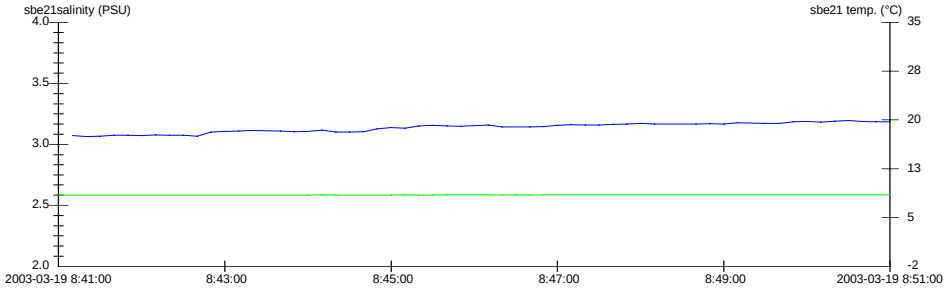


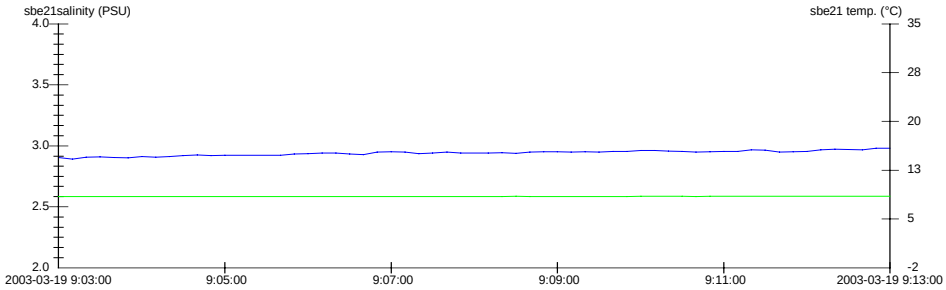


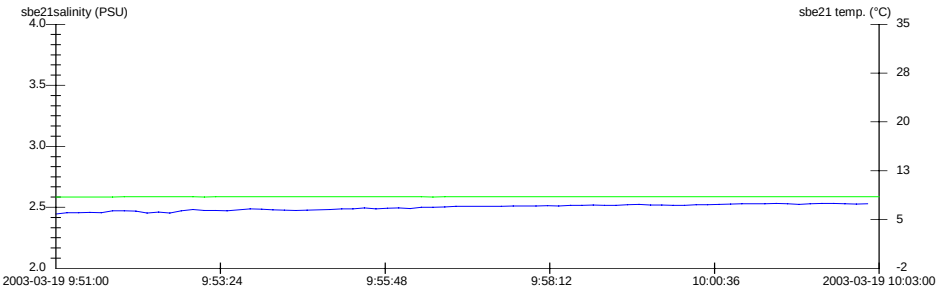


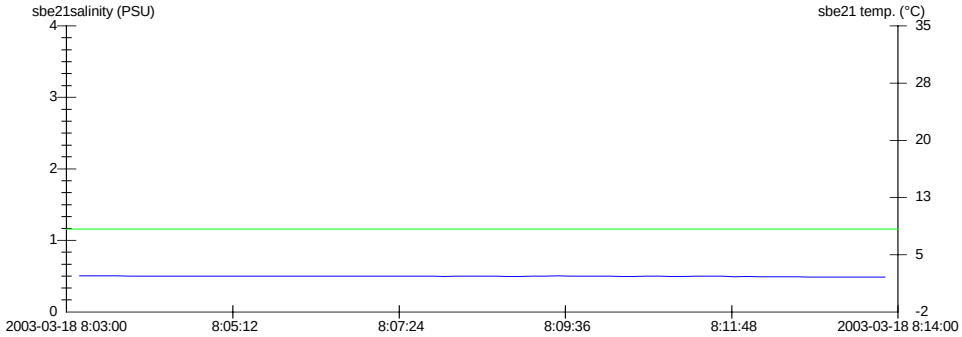


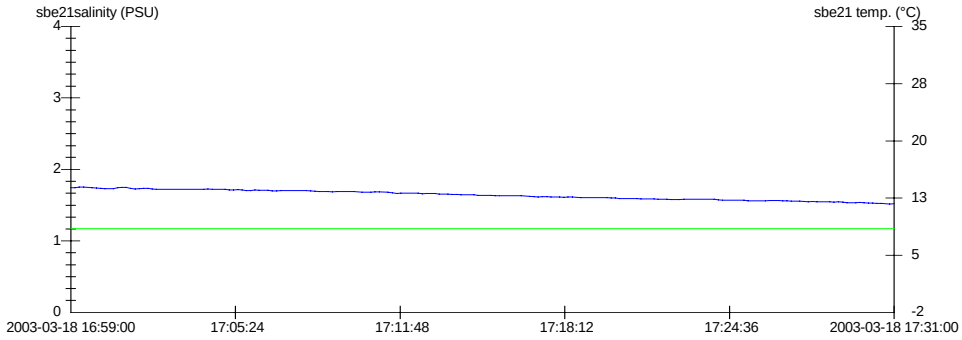






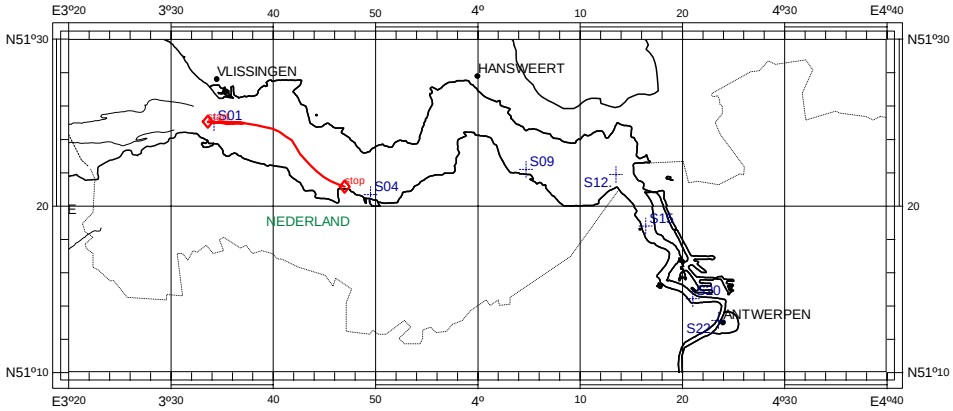




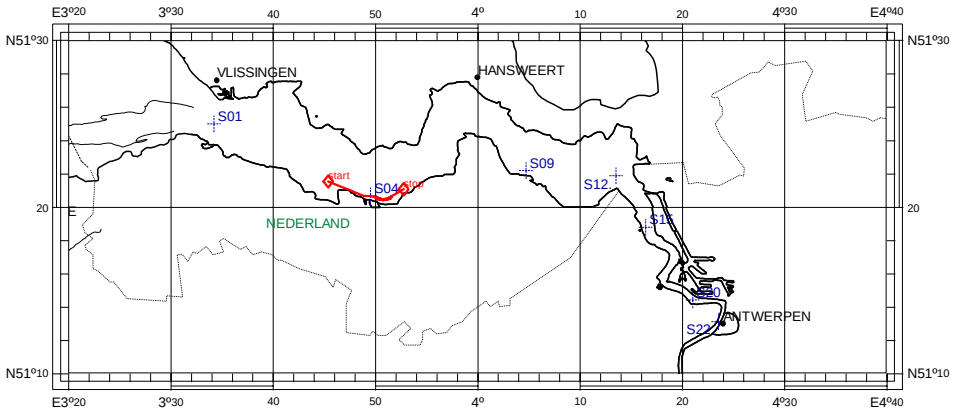


ANNEX E: Track-plots SPM-Sampling

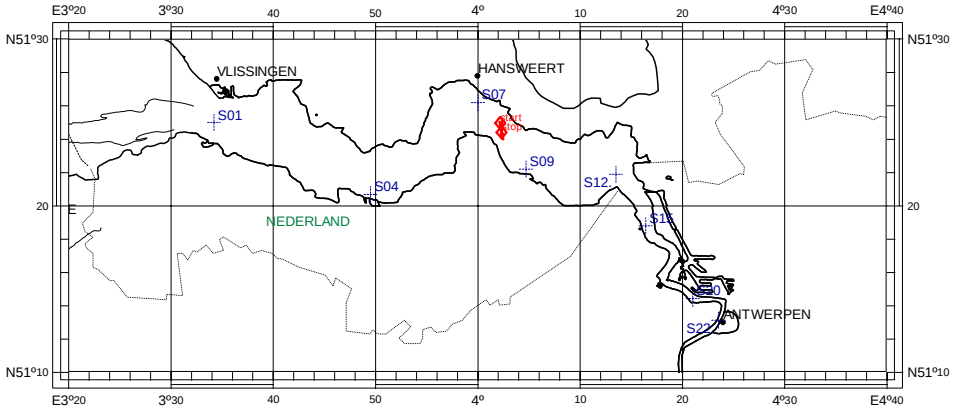
S01 – Vlissingen



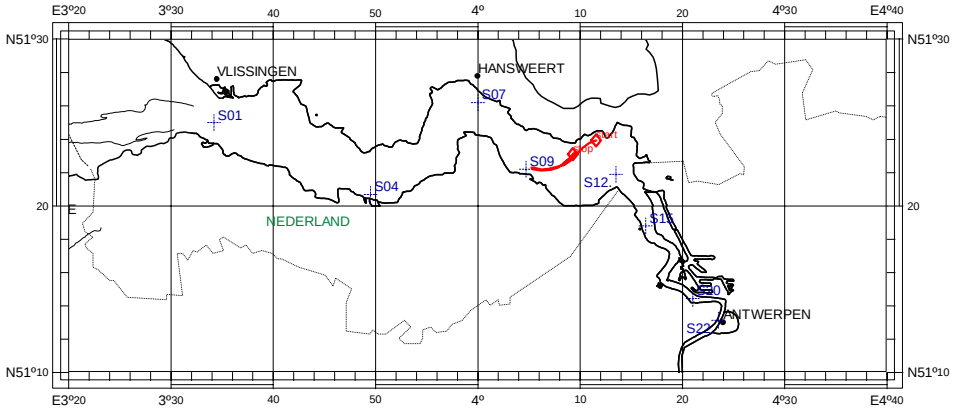
S04 – Terneuzen



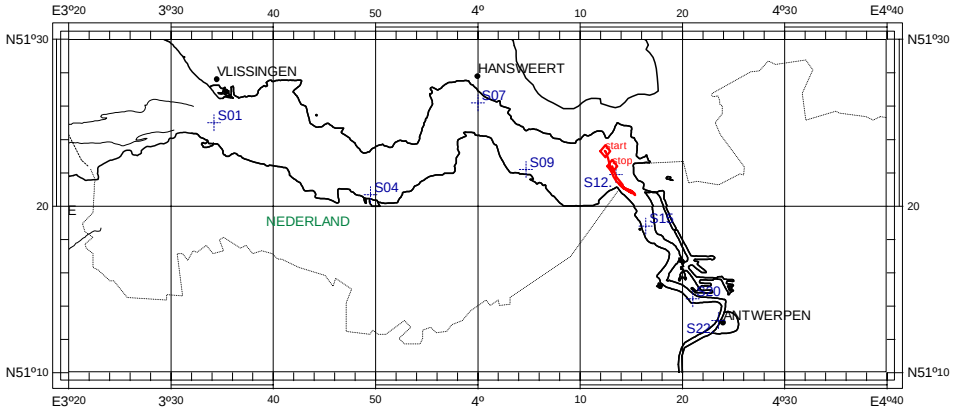
S07 – Hansweert



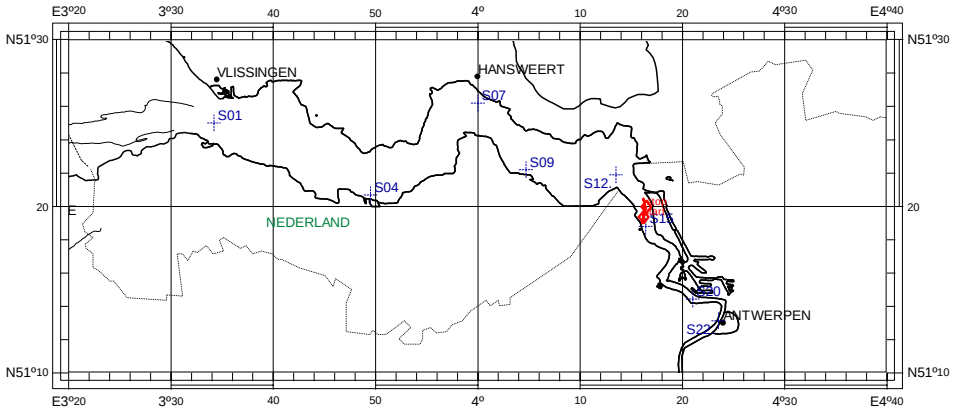
S09 – Saeftinghe



S12 – Bath



S15 – Doel



S22 – Antwerp