REPORT BMM-Measuring service Ostend CAMPAIGN 2003/18

30.06.2003 till 04.07.2003

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REPORT BMM-Measuring service Ostend CAMPAIGN 2003/08

30.06.2003 till 04.07.2003

1. Scienctist team

Part1:

ENDIS-RISKS team:
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Part2:

SPISULA-team:
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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 Inventory of shellfish stocks in the estuary of the Western Scheldt
DVZ – DE CLERCK (Spisula)

Since 1993 the Dutch Institute for fishery research does inventorisation of shellfish stock in the Foredelta. Banks of ecologically important species, e.g. of the bivalve beach shell Spisula subtruncata, exceed the land borders. In order to become a good interpretation of the estimate (e.g. estimation of the amount of available food for higher trophic levels, it is important to inventorise the complete estuary of the Western Scheldt. The Dutch part of this area is excecuted with the RV ISIS. This programme concerns the Belgian part of this area.

3. Operations

The first part of the campaign members of ENDIS RISKS and SISCO-PROJECT took samples. Scheldt points are sampled together for the ENDIS-RISKS and the SISCO project. The points on the Belgian Continental Shelf are sampled only for the SISCO project. The second part of the campaign was reserved for the SPISULA project.

1st PART: ENDIS RISKS and SISCO

Monday 30 June 2003

12h34 : Station 230 : Boxcorer
13h33 : Station 130 : Boxcorer
14h55 : Recovery ADCP
15h12 : ADCP on board
15h42 : Buoy on board
16h35 : Tripode on board
17h40 : Station 330 : Boxcorer and Niskin (10 L)
20h00 : Station 710 : Boxcorer
20h30 : Station 780 : Boxcorer

Tuesday 1 July 2003

Station S22 Antwerp
07h42 : Boxcorer
07h56 : Centrifuge start
08h04 : Passive sampling (Hyperbentic sledge) (11 min)
08h07 : Water sampling (Go Flow / Niskin)
08h12 : Sediment sampling (Van Veen)
08h22 : Passive sampling (Hyperbentic sledge) (11 min)
09h49 : Stop centrifuge

Station S09 Saeftinghe
11h09 : Start centrifuge
11h28 : Boxcorer
11h51 : Water sampling (Go Flow / Niskin)
12h11 : Sediment sampling (Van Veen)
13h35 : Fish tracks (Beam thrawl)
14h12 : Fish tracks (Hyperbentic sledge)
15h17 : Stop centrifuge

Station S04 Terneuzen
16h26 : Start centrifuge
16h55 : Fish tracks (Hyperbentic sledge)
17h46 : Fish tracks (Beam thrawl)
18h10 : Boxcorer
18h20 : Water sampling (Go Flow / Niskin)
18h33 : Sediment sampling (Van Veen)
19h00 : Stop centrifuge

Wednesday 2 July 2003

Station S15 Doel
07h20 : Start centrifuge
07h39 : Boxcorer
08h00 : Water sampling (Niskin)
08h10 : Sediment sampling (Van Veen)
08h16 : Winchester bottle
08h32 : Fish tracks (Beam thrawl)
09h00 : Fish tracks (Hyperbentic sledge)
09h52 : Stop centrifuge

Station S07 Hansweert
10h50 : Start centrifuge
11h05 : Water sampling (Go Flow / Niskin)
11h16 : Sediment sampling (Van Veen)
11h33 : Fish tracks (Beam thrawl)
13h12 : Fish tracks (Hyperbentic sledge)
14h20 : Stop centrifuge
14h21 : Boxcorer

Station S12 Bath
15h50 : Start centrifuge
15h54 : Boxcorer
16h44 : Water sampling (Go Flow / Niskin)
16h51 : Sediment sampling (Van Veen)
17h16 : Fish tracks (Beam thrawl)
10h08 : Fish tracks (Hyperbentic sledge)
10h40 : Stop centrifuge

Thursday 3 July 2003

Station S01 Vlissingen
07h18 : Start centrifuge
07h47 : Water sampling (Niskin)
07h56 : Sediment sampling (Van Veen)
08h14 : Fish tracks (Hyperbentic sledge)
09h08 : Fish tracks (Beam thrawl)
09h36 : Boxcorer
10h00 : Stop centrifuge

2nd PART : SPISULA

13h45 : Station 17
14h05 : Station 18
14h21 : Staiton 19
14h36 : Station 10
14h54 : Station 9
15h12 : Station 8
15h32 : Station 7
15h48 : Station 6
16h02 : Station 28
16h21 : Station 13
16h38 : Station 12
16h51 : Station 11
17h38 : Station 1
18h05 : Station 20
19h04 : Station 22
19h17 : Station 21
19h32 : Station 4
19h51 : Station 23
20h08 : Station 5
20h32 : Station 10
20h45 : Station 3
22h00 : Station 25
22h19 : Station 26
22h49 : Station 16
23h06 : Station 15
23h31 : Station 14

4. Remarks regarding measurment instruments and the campaign in general

Monday 30 June 2003
In the former campaign the recovery of the ADCP, tripode and buoy failed due to bad currents and the snapping of the cable. As a result the recovery of the equipment had to be done on Monday 30 June, as was decided by the Commander. The sampling schedule as was foreseen has been adapted accordingly.

Further remarks are to be found in Annex B.

5. Executed sampling programme

ENDIS-RISKS and SISCO

Scheldt River

STATION	POSITIE		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	POSITIE		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).**

B. SPISULA

Belgian Continental Shelf

STATION	POSITIE		ODAS	TRACK	STATION	POSITIE		ODAS	TRACK
	N.B.	O.L.				N.B.	O.L.		
1	51°25'00.00"	3°19'00.00"	X	X	15	51°30'00.00"	3°07'30.00"	X	X
2	51°24'00.00"	3°19'00.00"	X	X	16	51°30'00.00"	3°05'00.00"	X	X
3	51°24'00.00"	3°17'00.00"	X	X	17	51°26'00.00"	3°00'00.00"	X	X
4	51°24'00.00"	3°15'00.00"	X	X	18	51°26'00.00"	3°02'30.00"	X	X
5	51°25'00.00"	3°15'00.00"	X	X	19	51°26'00.00"	3°05'00.00"	X	X
6	51°26'00.00"	3°17'00.00"	X	X	20	51°22'00.00"	3°19'00.00"	X	X
7	51°26'00.00"	3°15'00.00"	X	X	21	51°23'00.00"	3°17'00.00"	X	X
8	51°26'00.00"	3°12'30.00"	X	X	22	51°23'00.00"	3°19'00.00"	X	X
9	51°26'00.00"	3°10'00.00"	X	X	23	51°25'00.00"	3°17'00.00"	X	X
10	51°26'00.00"	3°07'30.00"	X	X	24	51°26'00.00"	3°17'00.00"	X	X
11	51°28'00.00"	3°10'00.00"	X	X	25	51°28'00.00"	3°05'00.00"	X	X
12	51°28'00.00"	3°12'30.00"	X	X	26	51°28'00.00"	3°07'30.00"	X	X
13	51°28'00.00"	3°15'00.00"	X	X	27	51°28'00.00"	3°07'30.00"	X	X
14	51°30'00.00"	3°10'00.00"	X	X	28	51°27'00.00"	3°17'00.00"	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)

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	Boxcorer	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	Boxcorer	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	03.07.03	07h18	11.1	288.2	20.0	-22.16	19.1	31.0
Water sampling	03.07.03	07h47	13.0	288.2	19.4	-22.50	19.2	30.8
Sediment	03.07.03	07h56	10.4	287.2	20.0	-19.63	19.2	30.7
Sledge start	03.07.03	08h14	11.4	278.7	19.8	-21.82	19.2	30.7
Sledge stop	03.07.03	08h25	10.9	279.2	19.9	-17.73	19.2	30.7
Sledge start 2	03.07.03	08h41	11.8	282.3	20.1	-17.79	19.1	30.5
Sledge stop 2	03.07.03	08h52	13.5	279.3	20.0	-16.41	19.1	30.6
Beam trawl start	03.07.03	09h08	13.6	296.3	20.0	-17.64	19.2	30.5
Beam trawl stop	03.07.03	09h18	12.0	291.4	20.2	-18.51	19.3	30.1
S04								
Centrifuge start	01.07.03	16h27	4.8	265.5	20.5	-20.48	20.3	25.4
Sledge start	01.07.03	16h56	4.4	353.5	21.9	-22.60	21.9	26.1
Sledge stop	01.07.03	17h04	5.6	301.6	21.3	-28.20	20.3	26.0
Sledge start 2	01.07.03	17h14	5.4	299.2	21.0	-32.23	21.0	26.0
Sledge stop 2	01.07.03	17h29	4.1	295.0	21.3	-33.78	21.3	25.8
Beam trawl start	01.07.03	17h46	4.6	275.6	20.5	-24.83	20.3	26.2
Beam trawl stop	01.07.03	17h56	4.1	235.3	20.6	-20.13	20.3	26.3
Boxcorer	01.07.03	18h12	1.4	263.7	21.3	-20.77	20.3	26.3
Water sampling	01.07.03	18h22	2.8	295.2	21.7	-19.82	20.3	25.9
Sediment	01.07.03	18h33	3.1	292.4	21.4	-17.70	20.3	26.4
Centrifuge stop	01.07.03	19h17	5.9	280.5	21.9	-27.34	20.4	23.0

Station	Datum	Uur (gmt)	Wind sp. (m/s)	Wind dir. (dg)	Air temp. (°C)	Water depth (m)	Water temp. (°C)	Salinity (PSU)
S07								
Centrifuge start	02.07.03	10h55	12.9	275.4	21.3	-19.95	20.1	19.2
Water sampling	02.07.03	11h05	11.3	276.9	21.3	-16.20	20.1	19.3
Sediment	02.07.03	11h16	10.5	300.8	20.6	-16.78	20.1	19.3
Beam trawl start	02.07.03	11h33	7.8	278.1	20.4	-9.71	20.1	19.6
Beam trawl stop	02.07.03	11h48	6.9	282.0	23.7	-23.63	20.1	19.1
Sledge start	02.07.03	13h12	10.1	193.4	19.0	-9.52	20.2	20.0
Sledge stop	02.07.03	13h26	7.5	318.9	18.7	-12.53	20.2	19.5
Sledge start 2	02.07.03	13h42	8.2	308.0	19.8	-9.74	20.2	20.3
Sledge stop 2	02.07.03	13h52	7.3	309.6	20.0	-12.73	20.2	20.0
Stop centrifuge	02.07.03	14h26	9.0	302.9	23.0	-19.26	20.2	20.0
S09								
Centrifuge start	01.07.03	11h09	10.6	193.8	22.0	-16.78	21.2	13.3
Boxcorer	01.07.03	11h27	6.6	182.6	20.3	-12.23	21.1	14.1
Water sampling	01.07.03	11h52	8.0	197.5	20.6	-12.37	21.1	13.8
Sediment	01.07.03	12h14	4.8	189.7	21.3	-14.22	21.2	13.6
Beam trawl start	01.07.03	13h35	8.9	174.6	18.6	-14.61	21.1	14.5
Beam trawl stop	01.07.03	13h45	2.4	165.2	18.8	-14.4	20.9	15.3
Sledge start	01.07.03	14h12	5.3	206.3	19.7	-12.58	20.9	15.9
Sledge stop	01.07.03	14h19	3.5	202.2	20.2	-14.11	20.9	15.8
Sledge start 2	01.07.03	14h41	6.8	223.2	17.9	-14.65	20.8	16.6
Sledge stop 2	01.07.03	14h51	4.2	228.5	18.2	-16.62	20.8	16.4
Centrifuge stop	01.07.03	15h17	4.7	250.5	21.0	-16.86	20.6	18.8
S12								
Boxcorer	02.07.03	13h54	7.7	320.5	21.8	-16.12	21.1	11.9
Water sampling	02.07.03	16h43	8.4	282.5	21.8	-15.76	21.1	12.1
Sediment	02.07.03	16h51	9.1	283.4	22.0	-15.03	21.2	12.3
Beam trawl start	02.07.03	17h16	8.1	289.4	21.9	-20.40	21.0	13.3
Beam trawl stop	02.07.03	17h26	9.3	297.2	21.9	-24.81	20.9	13.6
Sledge start	02.07.03	17h48	6.4	291.9	21.7	-28.12	20.9	13.9
Sledge stop	02.07.03	17h55	7.9	315.5	23.5	-22.38	20.9	14.0
Sledge start 2	02.07.03	18h06	7.9	311.5	22.6	-20.64	20.9	14.0
Sledge stop 2	02.07.03	18h13	8.9	315.6	23.2	-16.39	20.9	13.7
Centrifuge stop	02.07.03	18h25	7.8	294.5	21.8	-20.77	20.8	14.2

Station	Datum	Uur (gmt)	Wind sp. (m/s)	Wind dir. (dg)	Air temp. (°C)	Water depth (m)	Water temp. (°C)	Salinity (PSU)
S15								
Centrifuge start	02.07.03	07h26	6.8	209.2	19.6	-20.23	21.4	12.4
Boxcorer	02.07.03	07h39		117.5		-16.86	21.3	12.0
Water sampling	02.07.03	08h00	8.2	229.2	19.4	-16.41	21.2	11.3
Sediment	02.07.03	08h10	8.1	225.3	19.6	-16.08	21.2	11.5
Winchester Bottle	02.07.03	08h16	6.4	234.5	19.4	-16.18	21.2	11.5
Start beam trawl	02.07.03	08h32	6.4	206.2	19.3	-15.79	21.2	11.5
Stop beam trawl	02.07.03	08h42	9.4	223.5	19.2	-17.08	21.2	11.6
Start sledge	02.07.03	09h00	4.5	222.6	19.3	-16.00	21.4	10.3
Stop sledge	02.07.03	09h10	3.9	254.6	19.2	-15.21	21.4	10.8
Start sledge 2	02.07.03	09h23	5.7	241.4	19.4	-16.39	21.4	10.5
Stop sledge 2	02.07.03	09h30	6.8	236.5	19.7	-12.32	21.4	10.6
Stop centrifuge	02.07.03	09h52	13.0	224.2	20.1	-18.72	21.2	11.8
S22								
Sediment	01.07.03	08h38	6.3	179.0	21.8	-14.24	20.7	5.2
Start sledge 2	01.07.03							
Stop sledge 2	01.07.03	08h47	7.2	215.7	21.8	-14.37	20.7	4.6
Stop centrifuge	01.07.03	09h50	8.5	216.2	21.9	-11.26	21.4	4.6

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)

Op staalnamediepte

Station	Depth (m)	Temperature (°C)	Salinity (ppt)	Oxygen (ml/L)	PAR	Turbidity (FTU)
S01	3.75	19.161	30.988	5.55	1.097	5.57
S04	3.44	20.804	16.383	5.08	0.130	33.55
S07	4.27	20.080	19.429	5.43	0.099	22.47
S09 B	3.94	21.084	14.250	4.70	0.179	23.83
S09 E	2.88	20.255	26.501	5.75	25.824	4.35
S12	4.01	21.119	12.324	4.48	0.146	38.19
S15	3.93	21.236	11.794	9.85	7.215	37.90
S22	2.69	21.785	5.823	1.51	0.103	125.03

B : No Data

M : Staalname op het station werd uitgevoerd, verkregen data is foutief en niet bruikbaar

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

Op de bodem

Station	Depth (m)	Temperature (°C)	Salinity (ppt)	Oxygen (ml/L)	PAR	Turbidity (FTU)
S01	19.05	19.12	31.304	5.46	0.125	58.51
S04	12.46	20.70	17.512	5.13	0.083	54.85
S07	14.01	20.16	20.111	5.52	0.078	31.75
S09 B	10.17	20.99	15.122	4.82	0.157	33.21
S09 E	17.45	20.15	27.064	5.90	0.091	12.31
S12	14.93	21.01	12.905	4.69	0.136	51.23
S15	14.18	21.12	12.849	4.51	0.076	66.28
S22	10.45	21.794	5.794	1.64	0.078	175.87

B : No Data

M : Staalname op het station werd uitgevoerd, verkregen data is foutief en niet bruikbaar

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 2003-18

Time	Action	Remarks
01/07/03		
S22 – Antwerpen		
7h42	Boxcorer	
7h56	Centrifuge start	
8h04	Bentic Sledge	Little Sledge for Passive sampling
	SCTD	
	Niskin 10 L	
	Niskin 5L	
	Go Flow	
	2 Go Flow	
8h15	Stop Passive Sampling	
8h22	2nd Bentic Sledge	Little Sledge for Passive sampling
8h35	Van Veen	
8h43	2nd Sledge stop	
9h49	Centrifuge stop	3179 L
S09 – Saeftinghe		
11h09	Centrifuge start	
11h28	Boxcorer	
11h51	Niskin 10 L	
11h54	Niskin 5 L	
11h57	Niskin 10 L ULB	failed : air in bottle
12h03	Niskin ULB	
12h06	Go flow	
12h09	Go flow 2	
12h11	Van Veen	
12h14	Van Veen 2	
13h35	Boomkor	
13h45	Boomkor einde	
14h12	Hyperbenthic sledge	
14h19	Hyperbenthic sledge end	
14h41	Hyperbenthic sledge 2	
14h51	Hyperbenthic sledge 2 end	
	SCTD2	File Name SO4
15h17	Centrifuge stop	6922 L

S04 – Terneuzen

16h26	Centrifuge start	
16h55	Hyperbenthic sledge 1 start	
17h04	Hyperbenthic sledge 1 end	
17h14	Hyperbenthic sledge 2 start	
17h29	Hyperbenthic sledge 2 end	
17h46	Boomkor start	
17h56	Boomkor end	
18h10	Boxcorer	
18h20	Niskin 5 L	
18h 23	Niskin 10 L ULB	
18h25	Go Flo 10 L UG	
18h27	Go Flo 10 L UG	
18h33	Van Veen	
19h00	Stop centrifuge 4789	

02/07/03

S15 - Doel

7h20	Centrifuge start	
7h39	Boxcore	
8h00	Niskin 5 L	
8h02	Niskin 10 L	
8h04	Go flow	
8h07	Go flow 2	
8h10	Van Veen	veel schelpen
8h13	Van Veen 2	slib
8h16	Fles	
8h32	Boomkor start	
8h42	Boomkort end	net gescheurd bovenaan; veel grote stenen
9h00	Hyperbenthic sledge 1 start	passief
9h10	Hyperbenthic sledge 1 end	
9h23	Hyperbenthic sledge 2 start	actief
9h30	Hyperbenthic sledge 2 end	slee dwars gebogen
9h52	Centrifuge stop	4214 L

S07 – Hansweert

10h50	Centrifuge start	
11h05	Niskin 5 L	
11h06	Niskin 10 L	
11h08	Go flow 1	failed
11h11	Go flow 2	
11h14	Go flow 3	
11h16	Van Veen	
11h19	Van Veen 2	
11h33	Boomkor	
11h48	Boomkor end	
13h12	Hyperbenthic sledge 1 start	
13h26	Hyperbenthic sledge 1 end	
13h42	Hyperbenthic sledge 2 start	
13h52	Hyperbenthic sledge 2 end	
14h20	Stop centrifuge 5429l	
14h21	Boxcore	

S12 - Bath

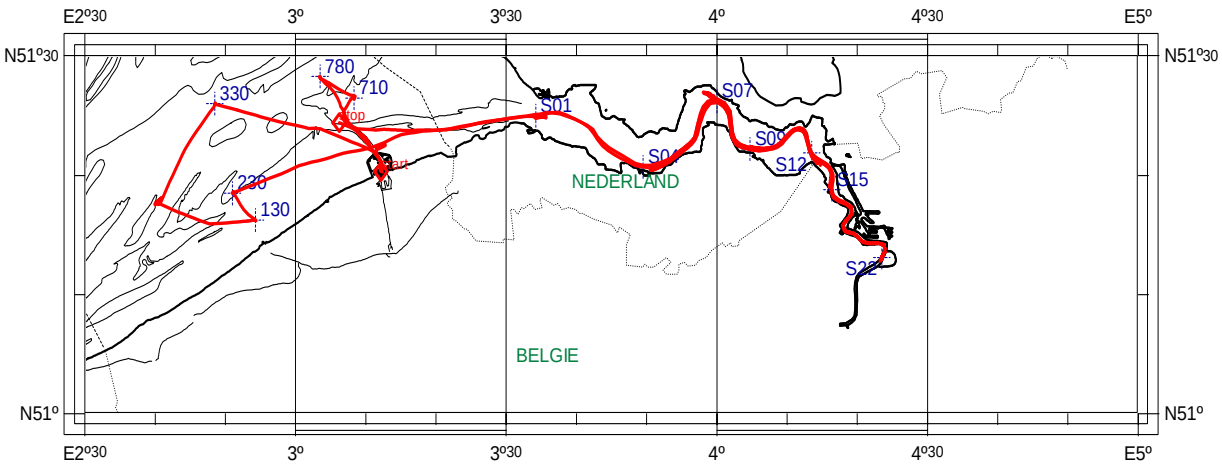
15h50	Centrifuge start	
15h54	Boxcorer	failed
16h04	Boxcorer 2	failed
16h20	Boxcorer 3	
16h44	Niskin 5 L	
16h45	Niskin 10 L	
16h47	Go flow	
16h50	Go flow 2	
16h51	Van Veen	failed
16h54	Van Veen 2	failed
16h56	Van Veen 3	failed
16h58	Van Veen 4	failed
17h06	Van Veen 5	
17h16	Boxcorer start	
17h26	Boxcorer end	
17h48	Hyperbenthic sledge 1 start	
17h55	Hyperbenthic sledge 1 end	
18h06	Hyperbenthic sledge 2 start	
18h13	Hyperbenthic sledge 2 end	
18h24	Centrifuge stop	4222 L

03/07/03

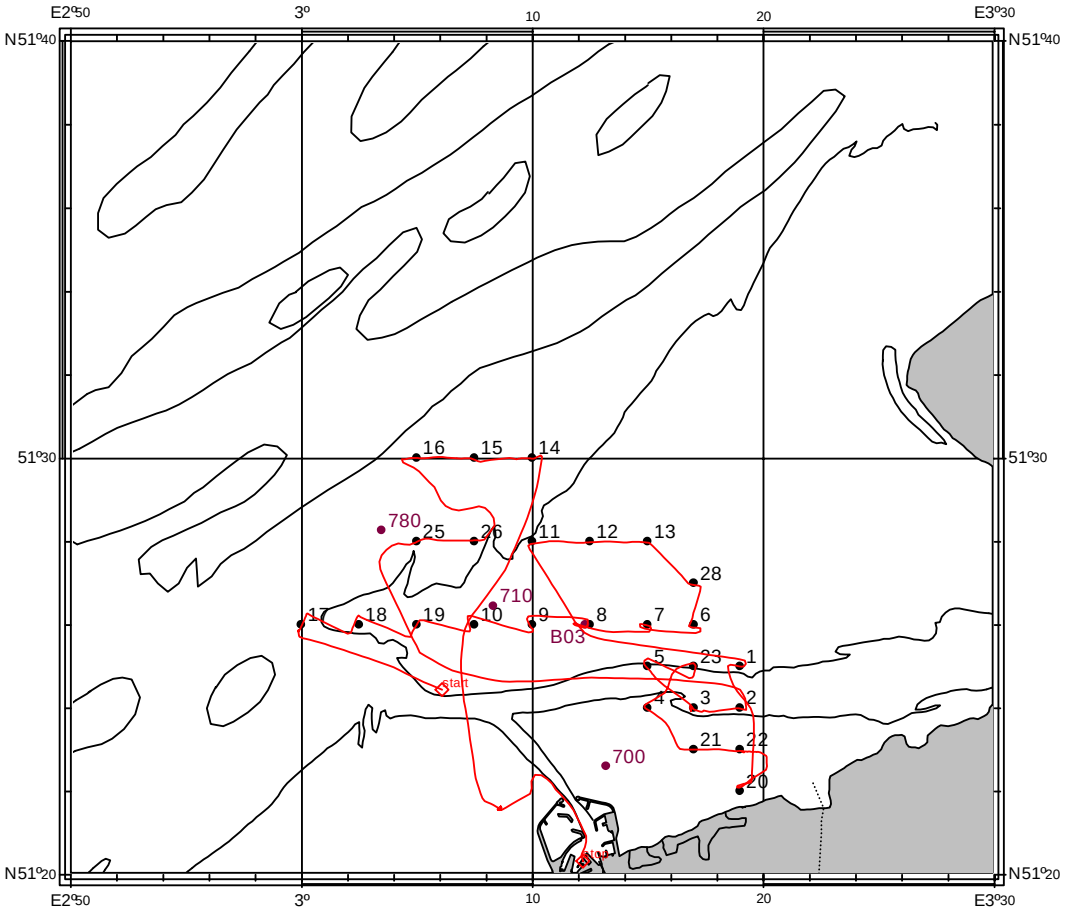
S01 – Vlissingen

7h18	Centrifuge start
7h47	Niskin 5 L
7h49	Niskin 10 L
7h51	Go flow 1
7h53	Go flow 2
7h56	Van Veen 1
8h00	Van Veen 2
8h14	Hyperbenthic sledge 1 start
8h24	Hyperbenthic sledge 1 end
8h41	Hyperbenthic sledge 2 start
8h52	Hyperbenthic sledge 2 end
9h08	Boomkor start
9h18	Boomkor end
9h36	Boxcorer
10h00	Stop centrifuge 3964l

ANNEX C: Track-plot Campaign: part 1



ANNEX D: Track-plot Campaign: part 2 (SPISULA)

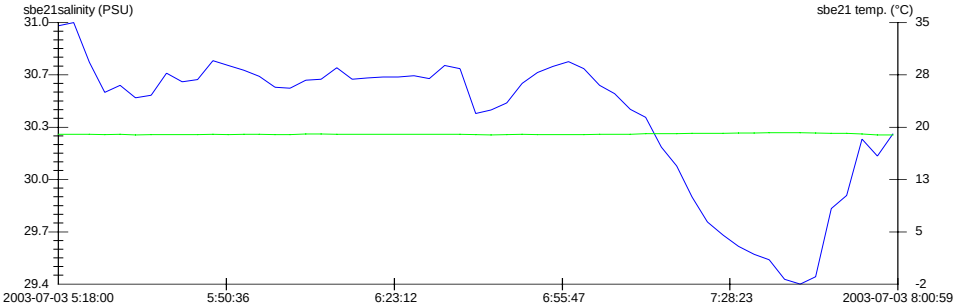


ANNEX E: Sea-Bird SBE21 thermosalinograph timeprofiles

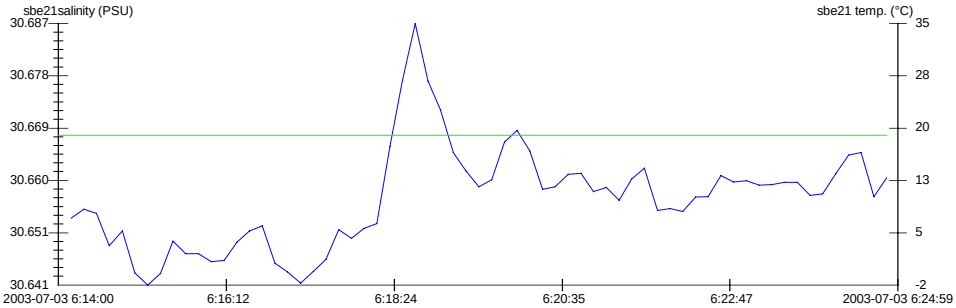
Graph legend
sbe21 salin (PSU) :
sbe21 temp (°C) :

S01 – Vlissingen

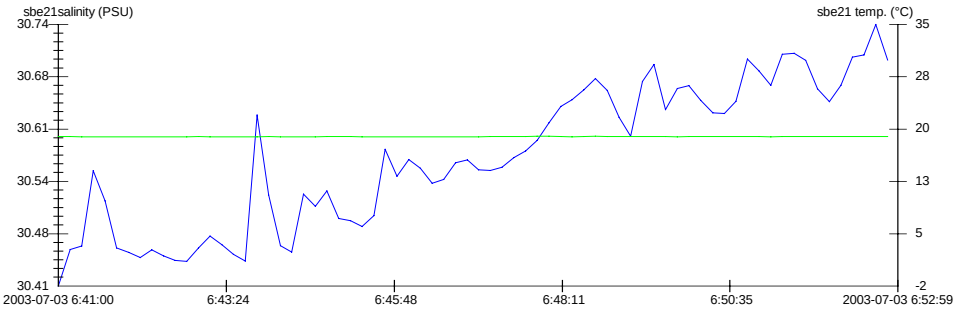
SPM-sampling



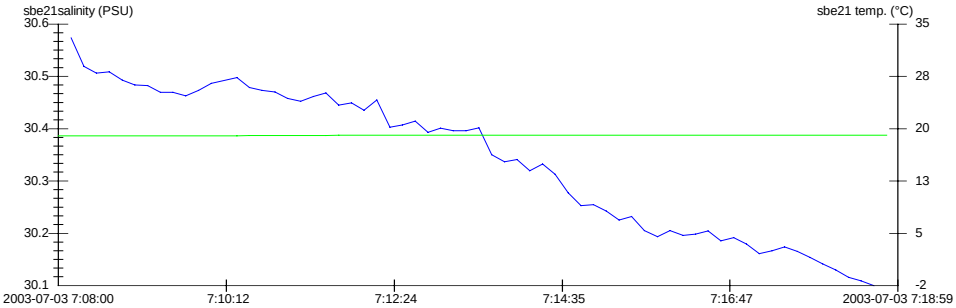
Fish track 1



Fish track 2

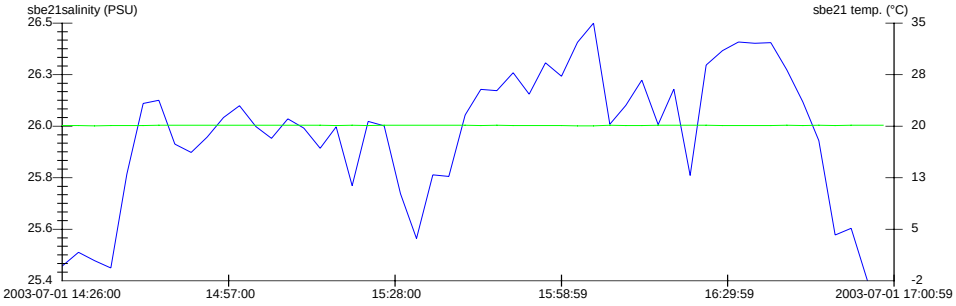


Fish track 3

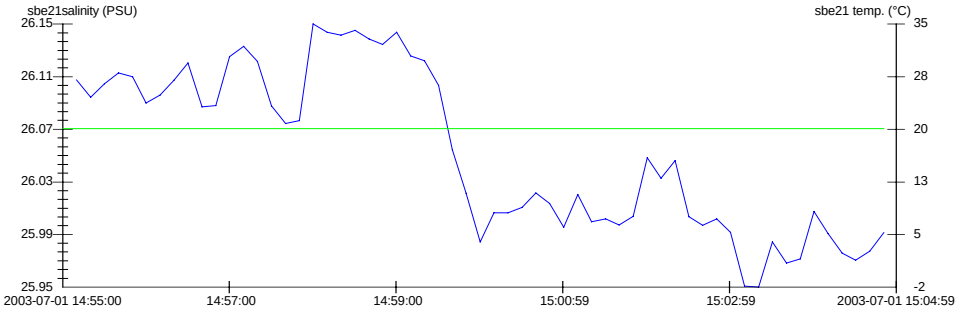


S04 - Terneuzen

SPM-sampling

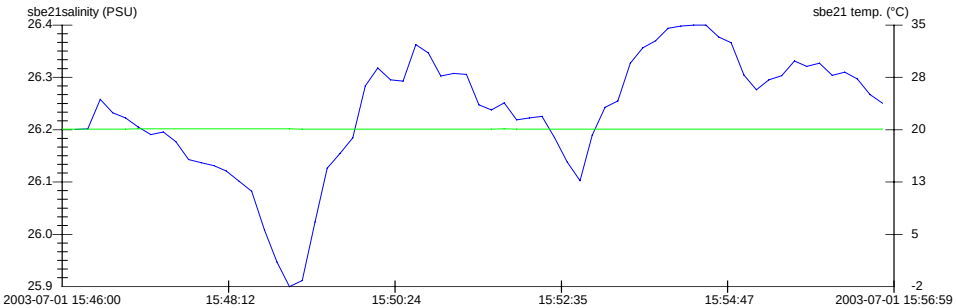


Fish track 1



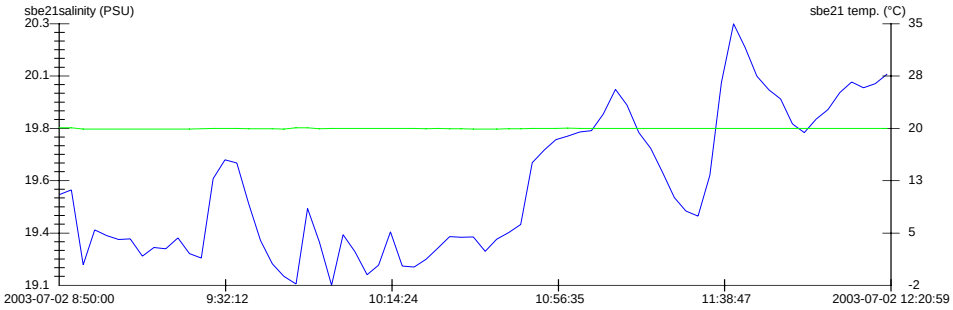
Fish track 2

Fish track 3

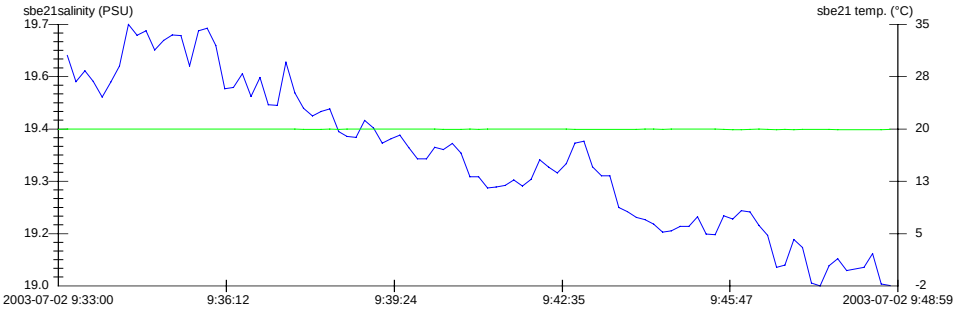


S07 - Hansweert

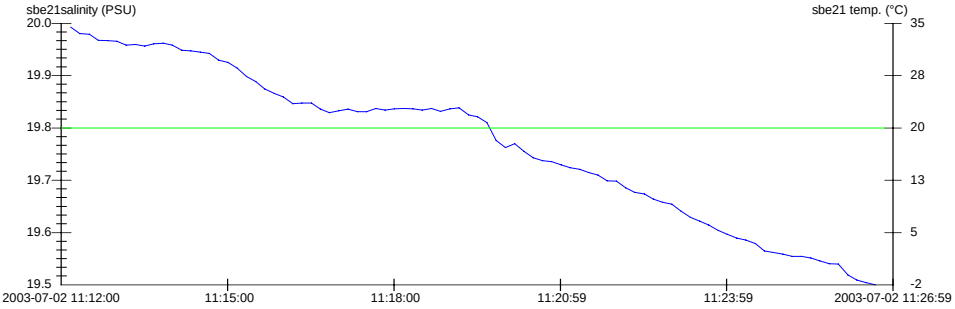
SPM sampling



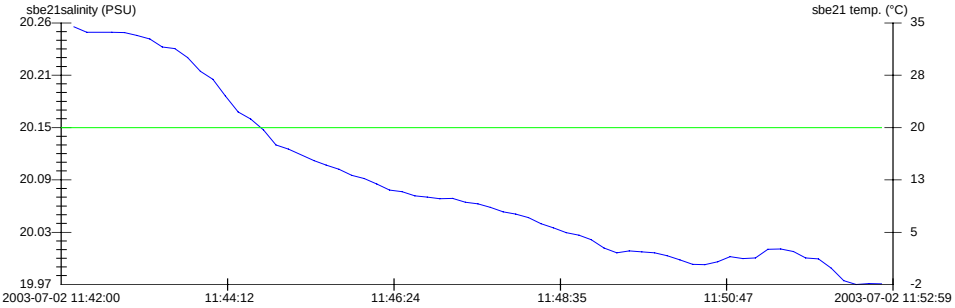
Fish track 1



Fish track 2

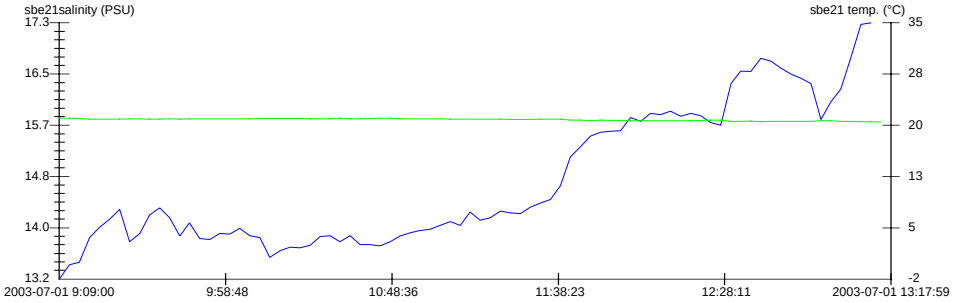


Fish track 3

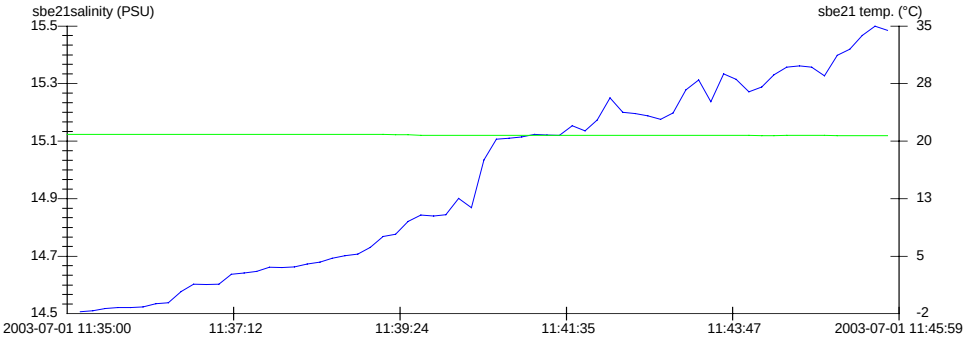


S09 - Saeftinghe

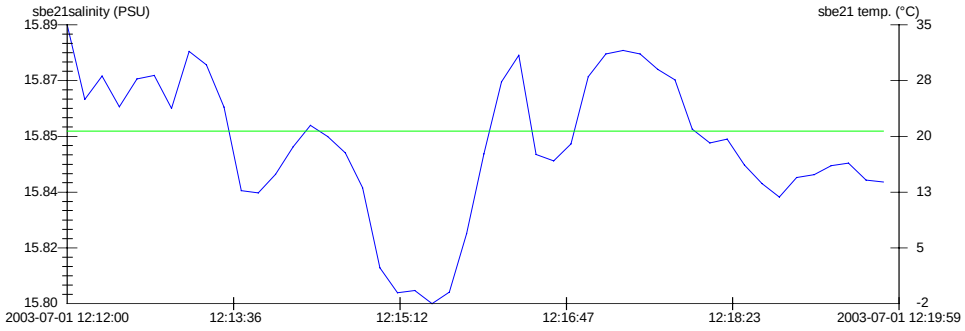
SPM-sampling



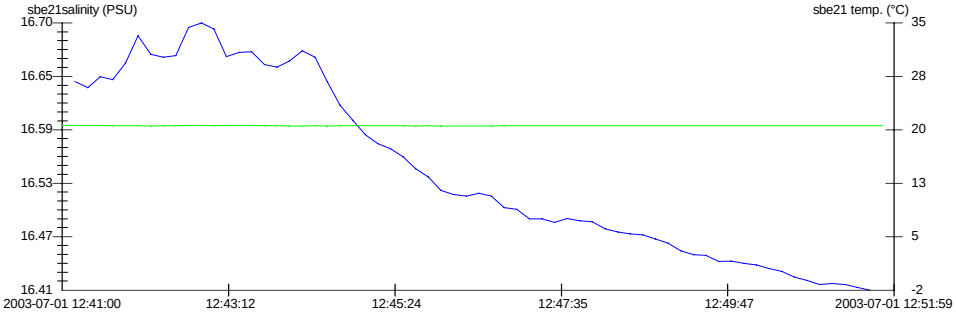
Fish track 1



Fish track 2

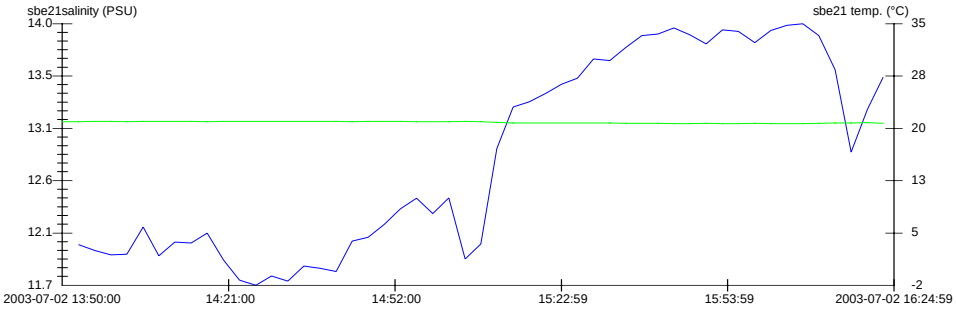


Fish track 3

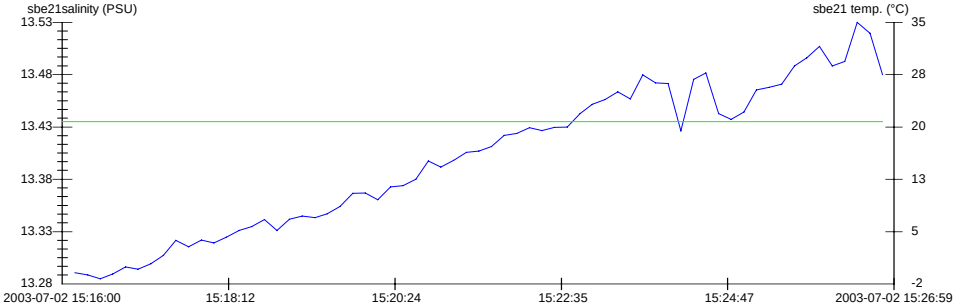


S12 – Bath

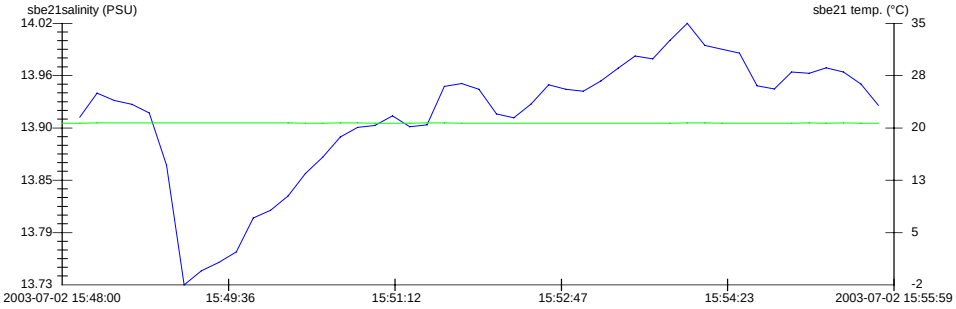
SPM-sampling



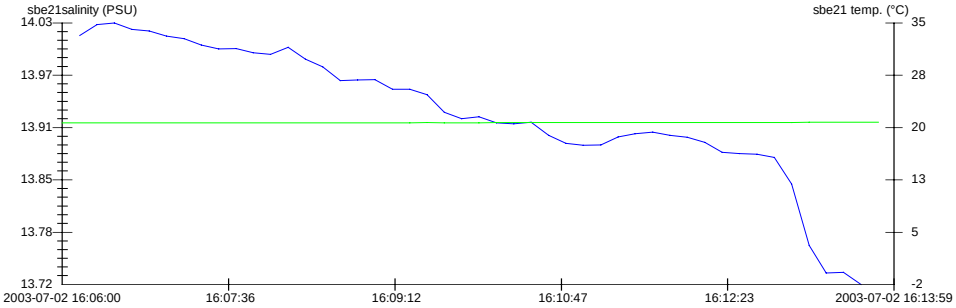
Fish track 1



Fish track 2

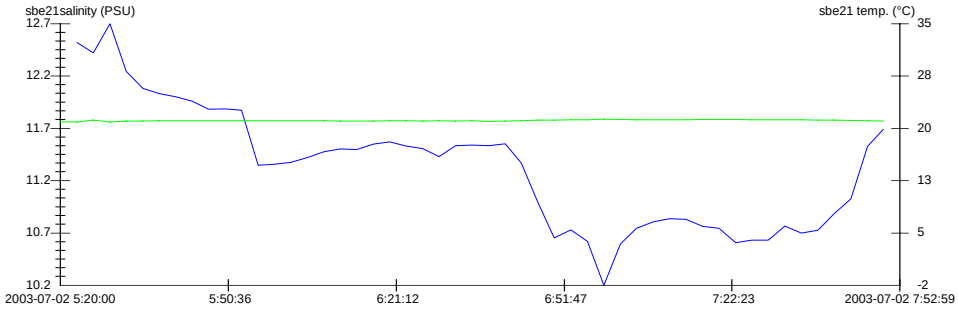


Fish track 3

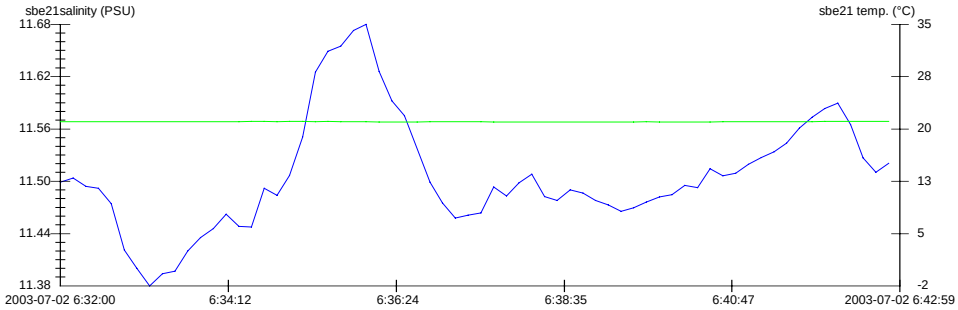


S15 – Doel

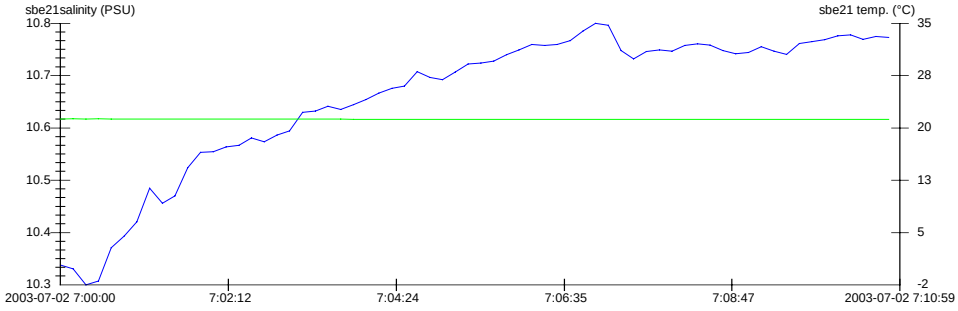
SPM-sampling



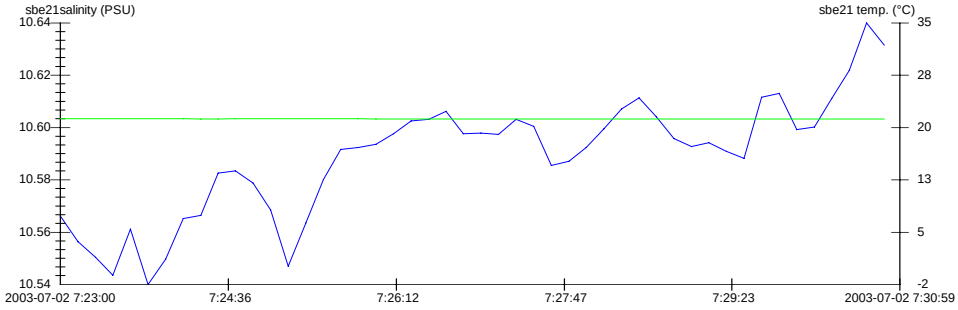
Fish track 1



Fish track 2

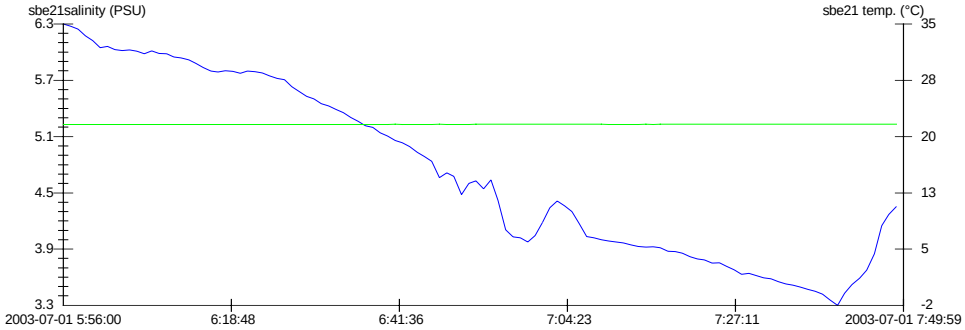


Fish track 3

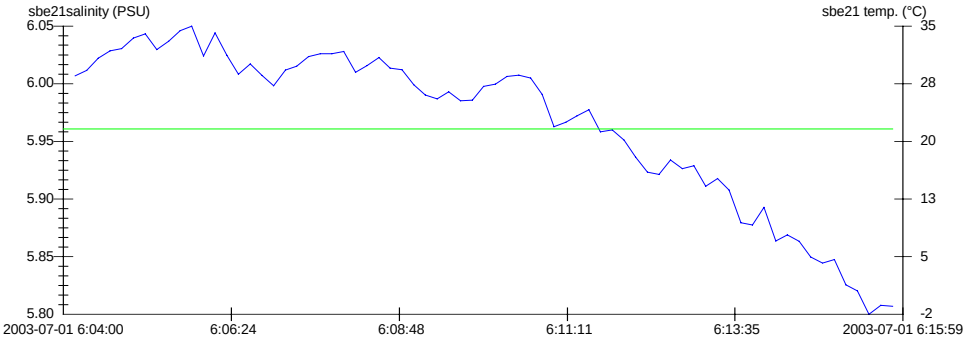


S22 – Antwerpen

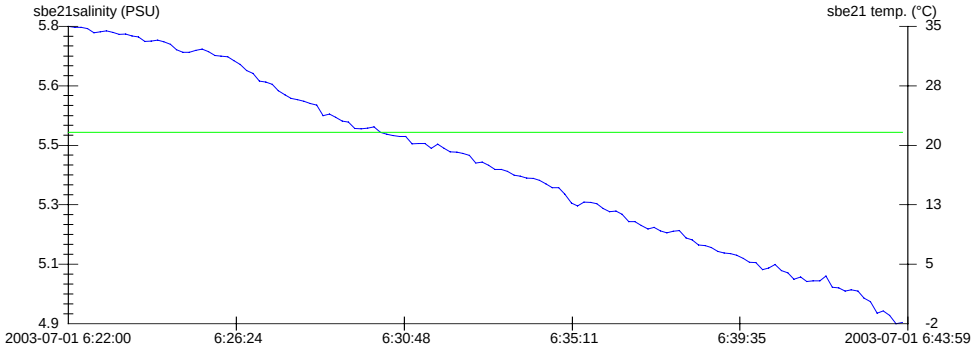
SPM-sampling



Fish track 1

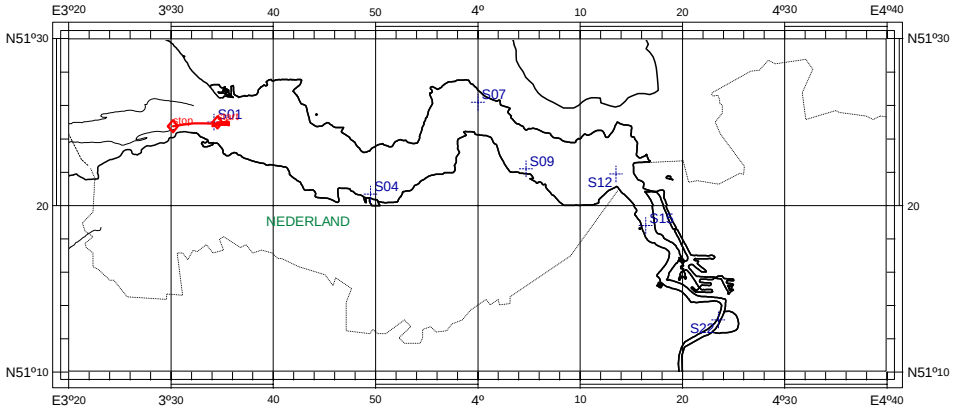


Fish track 2

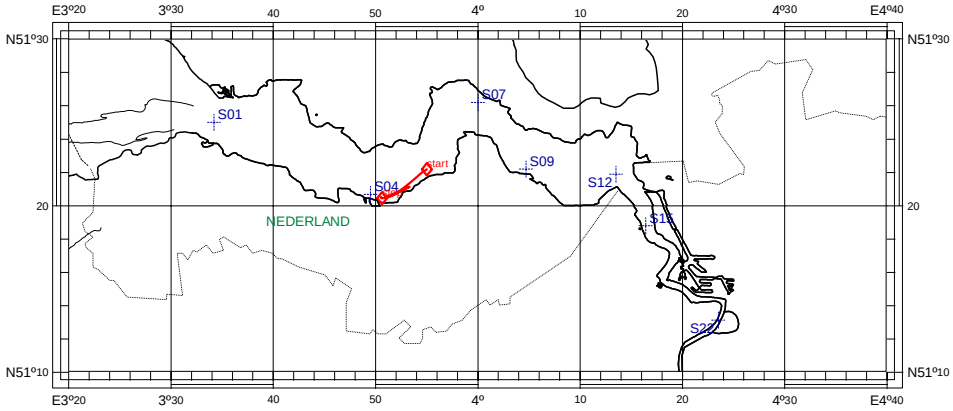


ANNEX F: Track-plots SPM-Sampling

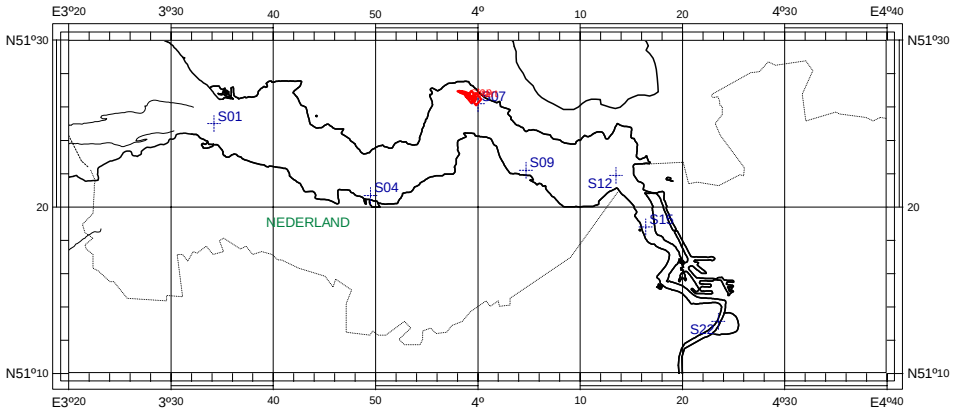
S01 – Vlissingen



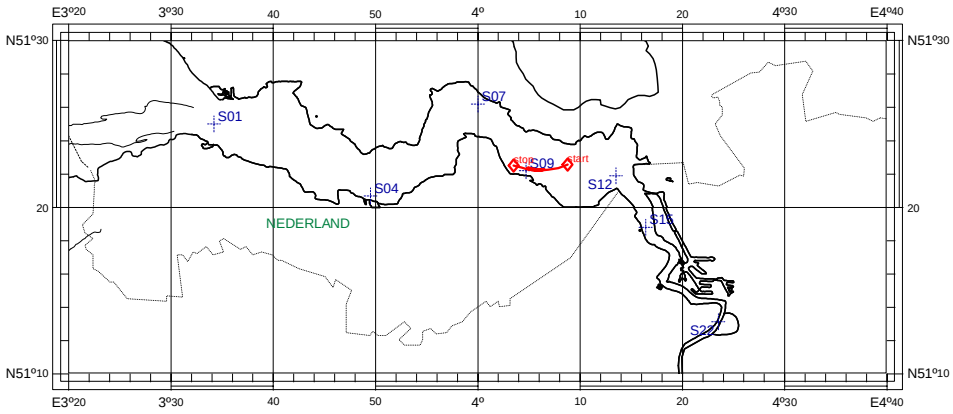
S04 – Terneuzen



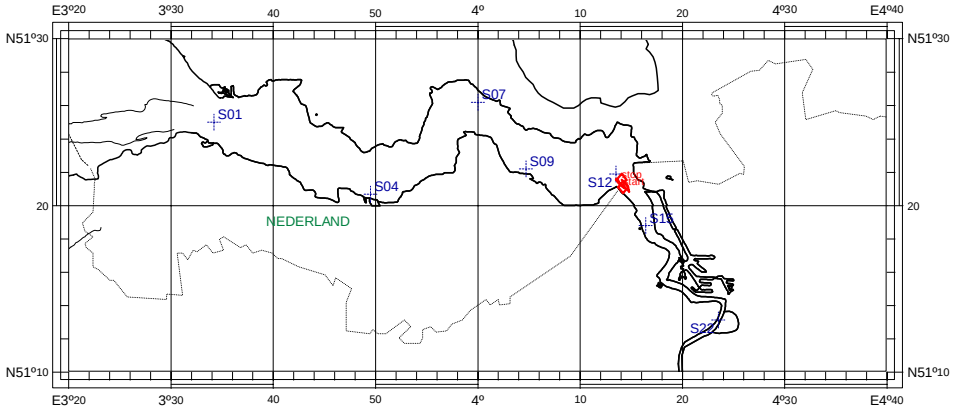
S07 – Hansweert



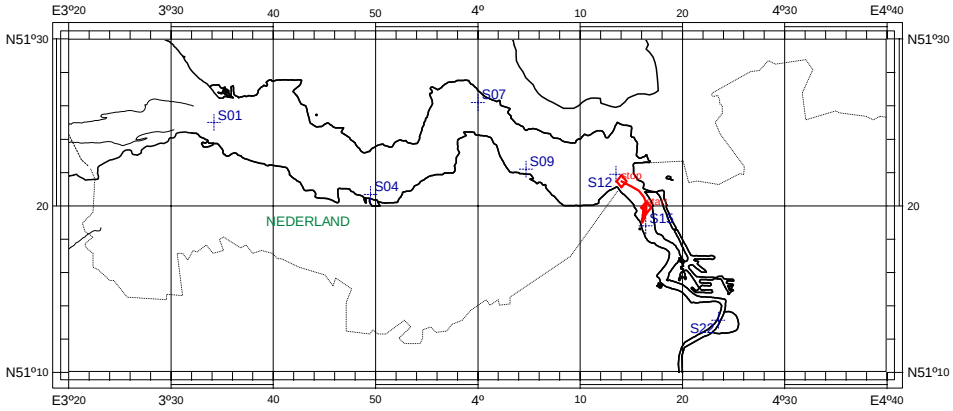
S09 – Saeftinghe



S12 – Bath



S15 – Doel



S22 – Antwerp