CAMPAIGN REPORT BMM-Measuring service Ostend 2004/28

29.11.2004 till 02.12.2004

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Program identification	ENDIS RISKS – SISCO

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29.11.2004 till 02.12.2004

1. Scienctist team

ENDIS-RISKS team:

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A. Ghekiere
H. Noppe
B. Kreegerman
B. Beuselinck
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G. Desmet
D. Peelaers
I. De Mesel

SISCO team:

L. Chou
J. Petit
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L. Rebreanu
C. De Bodt

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.

3. Operations

Monday 29 November

11h00 : Zeebrugge – departure

Station S01 Vlissingen

12h47 : Start centrifuge
13h00 : CTD scan
13h02 : Water sampling (Nisking / Go Flo)
13h24 : Sediment sampling (Van Veen)
13h41 : Sediment sampling (Boxcorer)
14h07 : Fish tracks (Beam trawl) start
14h38 : Fish tracks (Hyperbentic sledge) start
15h05 : Fish tracks (Hyperbentic sledge) 2 start
15h30 : CTD scan
15h40 : Stop centrifuge

Station S04 Terneuzen

16h10 : Start centrifuge
16h30 : CTD scan
16h36 : Fish tracks (Hyperbentic sledge) 1 start
16h58 : Fish tracks (Hyperbentic sledge) 2 start
17h29 : Fish tracks (Beam trawl) start
18h15 : CTD scan
18h17 : Water sampling (Nisking / Go Flo)
18h30 : Sediment sampling (Van Veen)
18h55 : Sediment sampling (Reineck)
19h29 : Stop centrifuge

Station 710

22h00 : Niskin
22h04 : Reineck
22h09 : Reineck

Station 780

22h42 : Niskin
22h47 : Reineck
22h54 : Reineck

Tuesday 30 november

Station 130

00h25 : Niskin
00h29 : Reineck
00h34 : Reineck

Station 330

04h49 : Niskin
04h52 : Niskin
04h58 : Reineck
06h00 : Centrifuge stopped

Station 230

07h00 : Niskin
07h20 : Boxcore

Station S07 Hansweert

12h05 : Start centrifuge
12h39 : CTD scan
12h39 : Water sampling (Nisking / Go Flo)
13h00 : Sediment sampling (Reineck)
13h07 : Sediment sampling (Van Veen)
13h29 : Fish tracks (Beam trawl)
14h19 : Fish tracks (Hyperbentic sledge)
14h38 : CTD scan
17h57 : Stop centrifuge

Station S15 Doel

16h00 : Start centrifuge
16h23 : Fish track passive (Hyperbentic sledge)
16h33 : CTD scan
16h33 : Water sampling (Nisking / Go Flo)
16h48 : Sediment sampling (Van Veen)
16h52 : Fish track passive (Hyperbentic sledge)
17h25 : Sediment sampling (Boxcorer)
17h32 : CTD scan
17h46 : Stop centrifuge

Wednesday 01 December

Station S22 Antwerpen

‘s nachts: Start centrifuge
‘s morgens: Stop centrifuge
08h26 : Fish track passive (Hyperbentic sledge)
08h30 : CTD scan
08h30 : Water sampling (Nisking / Go Flo)
08h50 : Sediment sampling (Van Veen)
08h58 : Fish track passive (Hyperbentic sledge)
09h26 : Sediment sampling (Boxcorer)
09h49 : CTD scan

Staton S18

10h21 : Sediment (Van Veen)

Station T1 SISCO

10h45 : Niskin
10h50 : Reineck
10h54 : Reineck

Station S12 Bath

11h15 : Start centrifuge
11h37 : CTD scan
11h37 : Water sampling (Nisking / Go Flo)
11h50 : Sediment sampling (Reineck)
11h57 : Sediment sampling (Van Veen)
12h34 : Fish tracks (Beam trawl)
13h00 : Fish tracks (Hyperbentic sledge)
13h37 : CTD scan
13h44 : Stop centrifuge

Thursday 02 December

Station S09 Saefthinge

07h20 : Centrifuge start
08h00 : CTD scan
08h03 : Water sampling (Nisking / Go Flo)
08h15 : Sediment sampling (Reineck)
08h24 : Sediment sampling (Van Veen)
08h38 : Fish tracks (Beam trawl)
09h00 : Fish track passive (Hyperbentic sledge)
09h00 : Fish track passive (Hyperbentic sledge) 2
09h34 : CTD
09h42 : Centrifuge stop

4. Remarks regarding measurement instruments and the campaign in general

In general the campaign went very smoothly. The co-operation between scientists and the crew was very good. Regarding fishing it was decided on the former campaign (campaign 2004-19) that we do not take the risk to fish on S15 by Doel again. The passive fishing with the hyperbentic sledge on S15 during this campaign, however, gave good results.

On S12 Bath we decided on the last campaign (campaign 2004-19) to scan the bottom with a multi-beam. Due to the low resolution, we could not take any conclusive decisions based on these results. It has then been decided, in accordance with the Commander, that we would fish for 5 minutes and stop the fishing as soon as any problem arose. We have had no problems while fishing.

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
Temse	51 07.50	4 18.50	X	X	X	X	X	X

ODAS = automatic registration of :
navigation parameters and bathymetry
meteo parameters (inclusive solar radiation)
salinity and temperature (thermosalinographe Seabird SBE21)
fluorescence (Turner Design fluorimeter model 10AU)
temperature (Seabird SBE 38 temperaturesensor)

CTD = Conductivity (Salinity), Temperature, Depth coupled with Density, Turbidity with 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	X		
780	51 28.27	3 03.48	X	X	X	X		
130	51 16.25	2 54.30	X	X	X	X		
230	51 18.50	2 51.00	X	X	X	X		
330	51 26.00	2 48.50	X	X	X	X		

ODAS = automatic registration of :
navigation parameters and bathymetry
meteo parameters (inclusive solar radiation)
salinity and temperature (thermosalinographe Seabird SBE21)
fluorescence (Turner Design fluorimeter model 10AU)
temperature (Seabird SBE 38 temperaturesensor)

CTD = Conductivity (Salinity), Temperature, Depth coupled with Density, Turbidity with OBS-sensor, LiCor Quantameter (PAR).

6. Detailed overview sampling programme ENDIS-RISKS and SISCO

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 / 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	X
Temse	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 / 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

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

Station	Date	Time (gmt)	Wind sp. (m/s)	Wind dir. (dg)	Air temp. (°C)	Water depth (m)	Water temp. (°C)	Salinity (PSU)
S01								
Centrifuge start	29.11.04	11h48	0.5	3.7	12.0	B	8.6	30.2
CTD start	29.11.04	11h59	0.1	53.4	12.4	B	8.7	30.5
Water sampling	29.11.04	12h07	0.2	164.0	11.9	B	8.7	30.5
Sediment	29.11.04	13h23	0.6	11.9	11.9	B	8.7	30.5
Beam trawl start	29.11.04	13h06	0.7	206.7	12.1	B	8.7	30.8
Beam trawl stop	29.11.04	13h14	0.8	193.0	12.2	B	8.7	31.0
Sledge start	29.11.04	13h37	1.1	225.7	12.2	-24.53	8.7	31.1
Sledge stop	29.11.04	13h47	0.7	272.2	12.1	-25.44	8.7	31.1
Sledge start 2	29.11.04	14h09	1.0	279.7	12.3	-25.8	8.7	31.4
Sledge stop 2	29.11.04	14h14	1.2	294.0	12.3	-26.17	8.7	31.3
Centrifuge stop	29.11.04	14h27	0.9	302	12.4	-24.61	8.7	31.3
S04								
Centrifuge start	29.11.04	15h10	3.6	353.2	12.3	-23.41	8.6	28.3
CTD start	29.11.04	15h28	2.6	258.0	12.3	-22.21	8.5	27.1
Sledge start	29.11.04	15h35	3.1	347.0	12.4	-21.92	8.5	27.1
Sledge stop	29.11.04	15h45	3.3	346.6	12.4	-27.01	8.5	27.0
Sledge start 2	29.11.04	15h57	2.3	338.2	12.4	-25.69	8.5	26.9
Sledge stop 2	29.11.04	16h11	1.6	7.5	12.4	-29.47	8.5	26.9
Beam trawl start	29.11.04	16h28	2.4	78.5	12.5	-22.73	8.5	27.1
Beam trawl stop	29.11.04	16h39	1.6	124.4	12.0	-28.39	8.5	26.9
CTD	29.11.04	17h12	1.0	133.1	12.0	-21.61	8.5	27.0
Water sampling	29.11.04	17h21	0.9	113.4	12.1	-20.51	8.5	27.1
Sediment	29.11.04	17h29	1.0	108.3	11.9	-20.43	8.5	27.1
S07								
Centrifuge start	30.11.04	11h05	5.8	37.5	9.9	-23.61	8.4	21.5
CTD start	30.11.04	11h38	4.7	56.1	9.7	-8.88	8.5	20.0
Water sampling	30.11.04	11h51	4.1	58.0	9.4	-9.20	8.4	20.0
Sediment	30.11.04	12h06	4.3	73.2	9.3	-9.40	8.5	20.1
Beam trawl start	30.11.04	12h28	3.5	69.0	9.4	-7.40	8.4	21.0
Beam trawl stop	30.11.04	12h38	5.3	63.1	9.3	-10.50	8.4	20.6
Sledge start	30.11.04	13h18	4.4	45.4	9.5	-8.19	8.4	22.1
Sledge stop	30.11.04	13h26	4.4	71.9	9.6	-9.62	8.4	21.9
CTD stop	30.11.04	13h36	5.5	82.1	9.5	-10.7	8.4	21.4
Centrifuge stop	30.11.04	13h56	5.6	58.8	9.2	-17.32	8.4	21.2

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

Station	Date	Time (gmt)	Wind sp. (m/s)	Wind dir. (dg)	Air temp. (°C)	Water depth (m)	Water temp. (°C)	Salinity (PSU)
S15 Doel								
Centrifuge start	30.11.04	15h00	5.1	75.5	9.3	-22.31	9.3	11.1
CTD start	30.11.04	15h32	5.8	48.1	9.5	-12.2	9.3	11.4
Water sampling	30.11.04	15h38	3.3	52.4	9.5	-13.4	9.3	11.5
Sediment	30.11.04	15h47	4.7	32.0	9.4	-13.29	9.3	11.7
CTD stop	30.11.04	16h31	5.0	54.4	8.9	-14.4	9.2	12.3
Cenrifuge stop	30.11.04	16h46	8.0	62.4	8.7	-17.2	9.4	11.48
S22								
Bentic sledge start	01.12.04	07h26	3.8	18.2	8.8	-10.99	8.57	4.6
Water sampling	01.12.04	07h29	3.8	13.0	8.2	-15.78	8.6	4.5
Sledge stop	01.12.04	07h44	2.5	32.6	7.5	-14.2	8.5	4.3
Sediment	01.12.04	07h52	2.2	21.4	7.5	-14.61	8.4	3.7
Sledge start 2	01.12.04	07h57	3.0	72.8	7.2	-13.51	8.3	3.3
CTD	01.12.04	08h49	3.9	45.5	7.0	-11.02	8.1	2.6
S18								
Sediment	01.12.04	09h21	4.0	29.4	8.3	-11.00	8.9	6.4
S12								
Centrifuge on	0112.04	10h14	1.0	77.6	7.7	-16.91	9.3	9.2
CTD start	01.12.04	10h37	3.5	116.4	7.7	-12.91	9.3	10.5
Water sampling	01.12.04	10h42	2.4	99.9	7.7	-13.21	9.3	10.4
Sediment	01.12.04	10h57	3.4	54.0	8.1	-11.4	9.3	10.2
Beam trawl start	01.12.04	11h33	2.9	27.4	8.1	-9.31	9.3	9.8
Beam trawl stop	01.12.04	11h39	3.6	30.0	7.9	-11.00	9.3	9.6
Sledge start	01.12.04	12h00	2.7	340.4	8.1	-14.56	9.3	9.4
Sledge stop	01.12.04	12h06	2.1	26.6	8.0	-13.09	9.3	9.6
Sledge stop 2	01.12.04	12h29	2.5	13.9	8.4	-13.51	9.3	9.6
Centrifuge stop	01-12.04	12h43	2.3	254.5	8.3	-15.31	9.3	9.4

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

Station	Date	Time (gmt)	Wind sp. (m/s)	Wind dir. (dg)	Air temp. (°C)	Water depth (m)	Water temp. (°C)	Salinity (PSU)
Temse								
Centrifuge start	01.12.04	14h35	1.7	322.5	8.5	-11.11	7.8	0.5
CTD start	01.12.04	14h42	0.7	322.7	8.4	-11.20	7.8	0.5
Sledge start	01.12.04	14h49	1.5	297.2	8.4	-9.2	7.8	0.5
Water sampling	01.12.04	14h50	1.1	314.9	8.5	-10.30	7.8	0.5
Van Veen	01.12.04	15h00	0.7	344.1	8.5	-11.32	7.8	0.5
Sledge stop	01.12.04	15h11	1.4	319.7	8.5	-12.00	7.7	0.5
CTD stop	01.12.04	15h27	1.0	317.7	8.6	-11.2	7.7	0.5
Centrifuge stop	01.12.04	15h45	1.9	307.7	8.5	-17.29	7.6	0.6
S09 Saefthinge								
Centrifuge start	02.12.04	06h59	2.4	184.3	7.2	-15.90	8.1	20.31
CTD start	02.12.04	07h03	2.7	219.2	6.9	-16.51	8.1	19.50
Water sampling	02.12.04	07h06	2.6	205.1	7.2	-16.70	8.1	19.2
Van Veen	02.12.04	07h24	3.0	201.7	6.8	-15.99	8.2	19.1
Beam trawl start	02.12.04	07h38	3.1	201.5	6.9	-15.78	8.2	19.0
Beam trawl stop	02.12.04	07h46	2.9	211.2	7.0	-15.70	8.2	19.5
Sledge start	02.12.04	07h59	3.0	214.1	7.2	-13.26	8.2	19.1
Sledge stop	02.12.04	08h05	3.6	203.1	7.1	-16.61	8.2	19.3
Sledge start2	02.12.04	08h18	2.6	204.9	7.2	-15.99	8.2	18.3
Sledge stop2	02.12.04	08h25	2.9	218.3	7.4	-16.40	8.2	18.7
Centrifuge stop	02.12.04	8h41	3.8	238.9	7.4	-18.60	8.2	19.2

8. SCTD-PARAMETERS SEABIRD SBE 19 (Seacat)

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

Sample depth

Station	Depth (m)	Temperature (°C)	Salinity (ppt)	Oxygen (ml/L)	Oxygen Sat (ml/L)	Turbidity (FTU)
S01 Start	3.88	8.74	30.61	7.84	6.69	31.43
S01 Stop	4.33	8.71	31.39	7.73	6.65	14.27
S04 Start	4.31	8.53	27.23	7.87	6.86	12.56
S04 Stop	4.79	8.52	27.11	7.87	6.87	9.67
S07 Start	6.00	8.41	20.64	8.04	7.17	11.34
S07 Stop	5.40	8.38	21.98	8.04	7.12	12.40
S09 Start	3.07	8.10	20.41	8.14	7.24	7.86
S09 Stop	3.53	7.28	19.2	8.05	7.28	12.34
S12 Start	4.33	9.28	10.93	6.48	7.49	25.8
S12 Stop	4.25	9.30	9.96	6.05	7.53	10.25
S15 Start	2.38	9.29	11.38	6.52	7.46	21.88
S15 Stop	4.31	9.18	12.54	6.83	7.42	28.71
S22 Start	3.37	8.57	4.56	2.89	7.93	33.21
S22 Stop	2.79	8.06	2.61	2.35	8.13	39.84
Temse start	3.25	7.67	0.61	2.07	8.31	39.87
Temse stop	2.80	7.69	0.54	1.13	8.31	43.35

Bottom

Station	Depth (m)	Temperature (°C)	Salinity (ppt)	Oxygen (ml/L)	Oxygen Sat (ml/L)	Turbidity (FTU)
S01 Start	17.38	8.7	30.63	7.80	6.69	37.89
S01 Stop	17.95	8.74	31.39	7.73	6.65	15.59
S04 Start	17.32	8.56	27.84	7.65	6.83	18.88
S04 Stop	18.20	8.54	27.52	7.82	6.85	28.36
S07 Start	8.75	8.41	20.77	8.02	7.17	19.82
S07 Stop	8.48	8.38	22.07	8.02	7.12	22.18
S09 Start	10.80	8.15	20.66	8.16	7.22	16.99
S09 Stop	18.86	8.19	19.93	8.02	7.25	18.86
S12 Start	11.50	9.16	12.17	6.60	7.44	53.08
S12 Stop	13.02	9.29	10.54	6.06	7.50	12.30
S15 Start	6.15	9.27	11.73	6.58	7.45	37.75
S15 Stop	11.03	7.42	12.59	6.84	7.42	46.24
S22 Start	10.31	8.58	4.58	3.01	7.93	26.70
S22 Stop	7.53	7.89	2.63	2.96	8.16	76.31
Temse start	7.18	7.55	0.87	2.20	8.32	42.66
Temse stop	7.63	7.70	0.54	2.05	8.31	50.17

9. ROSCOP-DATA

ENDIS-RISKS

No.	Data Type	Description
8 stations	H09 H10 P01 P02 P03 P04 P05 P90	
8 stations	G04 P02 P03 P04 P05 P90	
8 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

Table 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 table 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	

Table 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

Table 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 29 nov – 2 dec 2004

Campaign 2004-28

Date/Time	Sampling	Remarks
29/11/04		
Vlissingen S01		
12h47	Centrifuge start	Probleem met ODAS: geen dieptemeting
13h00	CTD + Niskin	
13h02	10 L Niskin	
13h05	5L Niskin	
13h08	Go Flo 1	
13h11	Go Flo 2	Fles niet geopend, 2e poging oke
13h16	Go Flo 3	
13h24	VanVeen	BMM slibrijk
13h25	VanVeen	Foppe slibrijk
13h41	Boxcorer	
14h07	Beam trawl Start	
14h15	Beam trawl Stop	
14h38	Bentic sledge Start	
14h47	Bentic sledge Stop	Vuiligheid onderaan
15h05	Bentic sledge Start 2	Print wat te laat genomen
15h15	Bentic sledge Stop 2	
15h30	CTD	
15h40	Centrifuge stop	5480l
Terneuzen S04		
16h10	Centrifuge start	
16h30	Seacat	
16h36	Bentic sledge Start	
16h46	Bentic sledge Stop	
16h58	Bentic sledge Start 2	halfdonker
17h12	Bentic sledge Stop 2	
17h29	Beam trawl Start	donker
17h40	Beam trawl Stop	
18h15	CTD + Niskin	
18h17	10 L Niskin	
18h19	5L Niskin	
18h21	Go Flo 1	
18j23	Go Flo 2	
18h26	Go Flo 3	
18h30	VanVeen	BMM
18h35	VanVeen	Foppe
18h55	Reineck	
19h01	Reineck	
19h29	Centrifuge stop	6122L

BCP SISCO

710

22h00	Niskin	
22h04	Reineck	
22h09	Reineck	
		Niskin + Reineck
		Niskin + Reineck

780

22h42	Niskin	
22h47	Reineck	
22h54	Reineck	

30/11/04

130

00h25	Niskin	
00h29	Reineck	
00h34	Reineck	

330

04h49	Niskin	
04h52	Niskin	
04h58	Reineck	
06h00	Centrifuge stopped	

230

07h00	Niskin	
07h20	Boxcore	

Opm. 1 30L Niskin heeft een afsluiting te kort

Hansweert S07

12h05	Centrifuge start	
12h39	CTD + 10L niskin	marker 3 niet genomen
12h41	10L Niskin	
12h40	5L Niskin	
12h49	Go Flo 1	
12h52	Go Flo 2	
12h54	Go Flo 3	
13h00	Reineck	
13h07	VanVeen	BMM
13h11	VanVeen2	Foppe
13h29	Beam trawl Start	
13h39	Beam trawl Stop	
14h19	Bentic sledge Start	Problemen met hydroliek voor opstart
14h27	Bentic sledge Stop	Geen 2e keer, wegens erg kleine vangst…
14h38	CTD	Zijn liever voor donker op S15
14h57	Centrifuge stop	4968L

Doel S15

16h00	Centrifuge start	
16h23	Oude Slede start	Passief
16h28	Oude Slede start 2	Naar andere zijde wegens stroming, gn print
16h33	CTD + Niskin 10L	
16h37	Niskin 5L	
16h39	Go Flo1	
16h42	Go Flo2	
16h44	Go Flo3	
16h45	Oude Slede stop 2	
16h48	VanVeen	BMM + Foppe --> Slib
16h52	Oude Slede start 3	Passief
17h11	Oude Slede stop 3	
17h25	Boxcorer	
17h32	CTD stop	
17h46	Centrifuge stop	3326 l

1/12/04

Antwerpen S22

	Centrifuge	Centrifuge heeft gans de nacht aangestaan Opgelet in het vervolg--> centrifuge TE vol!!! 3 à 4 potten gevuld
08h26	Oude Slede start 1	
08h30	CTD + Niskin 10L	
08h32	Go Flo1	
08h36	Niskin 10L	
08h39	Niskin 5L	
08h41	Go Flo2	
08h43	Go Flo3	
08h44	Oude Slede stop 1	
08h50	VanVeen 1	Enkel schelp en steen, wat verder voorbij gele
08h55	VanVeen 2	BMM Boomse klei
08h57	VanVeen 3	Enkel schelp en steen, boxcorer proberen
08h58	Oude Slede start 2	
09h09	Oude Slede stop 2	
		Eerst verplaatst voor goeie coordinaten boxcorer
09h26	Boxcorer	Sediment voor Foppe
09h41	Boxcorer 2	
09h49	CTD stop	

S18

10h21	VanVeen

T1	**SISCO**
10h45	Niskin
10h50	Reineck
10h54	Reineck

Bath S12

11h15	Centrifuge start	
11h37	CTD + Niskin	
11h40	10 L Niskin	
11h41	5L Niskin	
11h43	Go Flo 1	
11h45	Go Flo 2	
11h47	Go Flo 3	
11h50	Reineck 1	
11h53	Reineck 2	
11h57	VanVeen 1	BMM
11h59	VanVeen 2	Foppe
12h34	Beam trawl Start	tegenstroom 500 m
12h40	Beam trawl Stop	
13h00	Bentic sledge Start	actief
13h06	Bentic sledge Stop	
13h20	Bentic sledge Start 2	
13h30	Bentic sledge Stop 2	
13h37	CTD	
13h44	Centrifuge stop	4392 l

Temse

16h36	Centrifuge start	
16h43	CTD + Niskin 10L	
16h45	Niskin 10L	
16h48	Bentic sledge Start	passief
16h50	Niskin 5L	
16h52	Go Flo 1	
16h56	Go Flo 2	
16h58	Go Flo 3	
17h00	Van Veen	
17h03	Van Veen 2	
17h12	Bentic sledge Stop	Geen goede vangst
17h16	Reineck	
17h21	Reineck 2	
17h28	CTD	
17h45	Centrifuge stop	2214 l

T2	**SISCO**	
17h24	Niskin	
17h28	Reineck	empty
17h33	Reineck	too much current, abandon

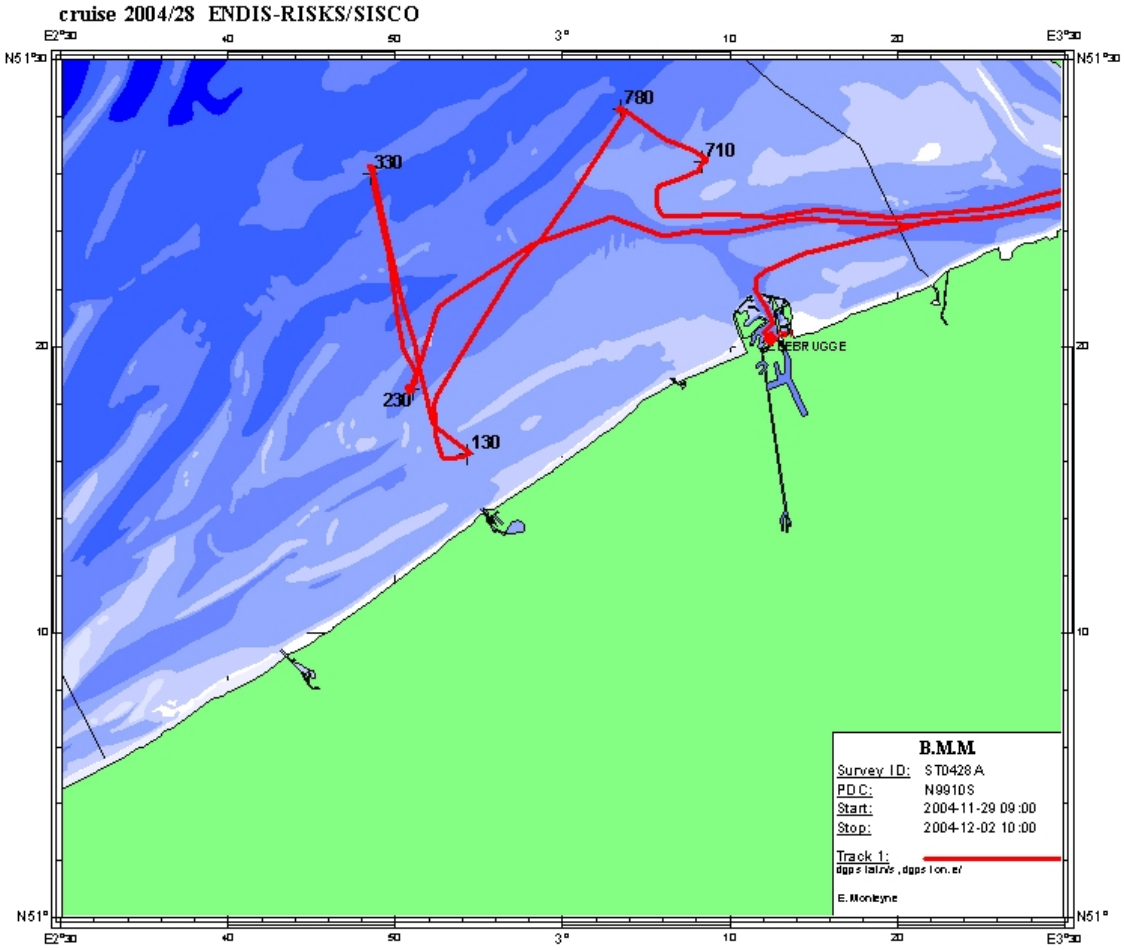
T3	**SISCO**	
19h29	Niskin	
19h31	Reineck	
19h37	Reineck	

2/12/04

Saefthinge S09

07h20	Centrifuge start	
08h00	CTD + 10L niskin	
08h03	10L Niskin	
08h04	5L Niskin	
08h07	Go Flo 1	
08h09	Go Flo 2	
08h11	Go Flo 3	
08h15	Reineck	
08h17	Reineck 2	
08h24	VanVeen	
08h38	Beam trawl Start	
08h48	Beam trawl Stop	
09h00	Bentic sledge Start	
09h06	Bentic sledge Stop	
09h19	Bentic sledge Start 2	
09h26	Bentic sledge Stop 2	
09h34	CTD	Geen ODAS outprint
09h42	Centrifuge stop	7092 L

ANNEX C: Trackplot BCP traject



ANNEX D: Trackplot Scheldt Traject