MUMM

MANAGEMENT UNIT OF THE NORHT SEA MATHEMATICAL MODELS

CAMPAIGN REPORT BMM-Measuring service Ostend 2004/19

13.09.2004 till 17.09.2004

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Program identification	ENDIS RISK – SISCO

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MUMM is the "Management of the marine ecosystem" department of the Royal Institute for Natural Sciences, Federal office for scientific, technical and cultural affairs.

CAMPAIGN REPORT BMM-Measuring service Ostend 2004/19

13.09.2004 till 17.09.2004

1. Scienctist team

ENDIS-RISKS team:

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2. Visitors

P. Roose
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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.

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3. Operations

Monday 6 September

11h30 : Zeebrugge – departure

Station S01 Vlissingen

12h47 : Start centrifuge
13h30 : CTD scan
13h30 : Water sampling (Nisking / Go Flo)
13h46 : Sediment sampling (Van Veen)
13h59 : Sediment sampling (Boxcorer)
14h33 : Fish tracks (Hyperbentic sledge)
15h35 : Fish tracks (Beam trawl)
16h00 : CTD scan
16h06 : Stop centrifuge

18h52 : Station 710 (SISCO: Niskin + VanVeen)
19h46 : Station 780 (SISCO: Niskin + VanVeen)
21h10 : Station 130 (SISCO: Niskin + VanVeen)
22h10 : Station 230 (SISCO: Niskin + Boxcorer)

20h30 : Antwerp – Touch & Go

Tuesday 9 September

Station S15 Doel

06h46 : Start centrifuge
06h55 : CTD scan
06h55 : Water sampling (Nisking / Go Flo)
07h22 : Sediment sampling (Van Veen)
07h30 : Sediment sampling (Boxcorer)
08h02 : Fish tracks (Beam trawl)
08h55 : Fish tracks (Hyperbentic sledge)
09h27 : CTD scan
09h27 : Stop centrifuge

Station S07 Hansweert

11h02 : Start centrifuge
11h15 : CTD scan
11h15 : Water sampling (Nisking / Go Flo)
11h40 : Sediment sampling (Van Veen)
11h00 : Sediment sampling (Reineck)
12h13 : Fish tracks (Hyperbentic sledge)
12h55 : CTD scan

Station Temse

18h40 : Start centrifuge
18h40 : CTD scan
18h40 : Water sampling (Nisking / Go Flo)
18h53 Sediment sampling (Van Veen)
19h30 : Sediment sampling (Boxcorer)
19h33 : CTD scan
19h36 : Fish tracks (Hyperbentic sledge)
20h02 : Stop centrifuge

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Wednesday 10 September

Station S22 Antwerpen

08h14 : Fish tracks (Hyperbentic sledge)
08h24 : Start centrifuge
09h37 : CTD scan
09h37 : Water sampling (Nisking / Go Flo)
09h50 : Sediment sampling (Van Veen)
10h11 : Sediment sampling (Boxcorer)
10h28 : Stop centrifuge

Station S09 Saeftinghe

12h10 : Start centrifuge
12h22 : CTD scan
12h22 : Water sampling (Nisking / Go Flo)
12h38 : Sediment sampling (Van Veen)
12h43 : Sediment sampling (Reineck)
13h13 : Fish tracks (Hyperbentic sledge)
14h00 : Stop centrifuge
14h10 : CTD scan

Thursday 11 September

Station S12 Bath

08h09 : Start centrifuge
08h00 : CTD scan
08h00 : Water sampling (Nisking / Go Flo)
08h15 : Sediment sampling (Reineck)
08h19 : Sediment sampling (Van Veen)
08h31 : Fish tracks (Hyperbentic sledge)
09h26 : CTD scan
10h43 : Stop centrifuge

Station Saliniteit 17

11h00 : CTD scan + Niskin
11h15 : Sediment (2xReineck)

Station Saliniteit 21

12h00 : CTD scan + Niskin
12h15 : Sediment (2xReineck)

Station S04 Terneuzen

13h28 : Start centrifuge
13h45 : CTD scan
13h45 : Water sampling (Nisking / Go Flo)
13h55 : Sediment sampling (Reineck)
14h07 : Sediment sampling (Van Veen)
14h25 : Fish tracks (Hyperbentic sledge)
15h28 : CTD scan
16h52 : Stop centrifuge

Friday 11 September

Station 330

05h30 : Water (Niskin) + Sediment (Reineck)

Station 230

07h00 : Water sampling (3 x Niskin BMM + Niskin SISCO)

09h30 : Arrival Zeebrugge

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4. Remarks regarding measurement instruments and the campaign in general

In general the campaign went very smoothly. However following remarks could be made:

Regarding fishing:

1. On Tuesday 9 September an accident occurred during fishing with the beam trawl. The cable snapped suddenly because the beam got stuck resulting in severe traction on the cable that overstrained the chains connecting the beam to the cables. Although the cable swept over the deck, no personal injuries occurred.
2. The incident happened at S15 by Doel. As this was not the first time that incidents (e.g. fish net damage) occurred at this station, it had been decided in accordance with the Commander of the Belgica, that no fishing will be done on S15 anymore. It has been suggested to scan the bottom with the multi-beam scanner before fishing again on S15 in the future.
3. Although no personal injuries occurred because of this incident, it clearly illustrates the danger of working on the rear deck during fishing. Any sort of activity, such as cleaning of equipment, should be postponed until after the fishing to ensure the safety of the scientists and the crew. It is imperative that conflicting orders concerning this safety measure are also avoided.

Regarding CTD-data

1. Due to a failure of the sea-cat a part of the CTD-results are to be considered indicative. Measures have been taken to prevent future problems with the measuring devices of the seacat.
2. This would only be the case for the dept profiles of stations S01 en S15. The results that are mentioned in the table of paragraph 8 are considered to be liable.

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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 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	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 = 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 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									
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

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	Date	Time (gmt)	Wind sp. (m/s)	Wind dir. (dg)	Air temp. (°C)	Water depth (m)	Water temp. (°C)	Salinity (PSU)
S01								
Centrifuge start	06.09.04	10h48	7.5	26.9	25.8	-14.75	19.5	31.6
CTD start	06.09.04	11h30	8.4	26.2	27.3	-15.70	19.6	29.9
Water sampling	06.09.04	11h31	8.3	42.9	27.9	-18.85	19.7	29.7
Sediment	06.09.04	11h46	8.1	36.3	27.8	-18.46	19.7	29.7
Sledge start	06.09.04	12h33	7.4	28.6	28.8	-20.37	19.8	29.4
Sledge stop	06.09.04	12h44	7.8	46.8	29.4	-18.91	19.8	29.3
Sledge start 2	06.09.04	13h04	6.5	42.6	28.9	-22.11	19.9	29.4
Sledge stop 2	06.09.04	13h14	5.7	31.2	29.4	-19.71	19.9	29.5
Beam trawl start	06.09.04	13h34	7.0	2.7	27.6	-20.00	19.9	29.5
Centrifuge stop	06.09.04	14h07	7.3	14.7	27.9	-18.18	19.9	29.9
S15								
Centrifuge start	07.09.04	4h43	6.4	52.3	20.8	-10.43	21.2	11.2
CTD start	07.09.04	4h55	8.6	22.4	20.8	-10.68	21.2	11.2
Water sampling	07.09.04	5h03	6.8	45.7	20.7	-11.09	21.2	11.2
Sledge start	07.09.04	6h02	5.4	44.8	20.7	-17.62	22.0	11.5
Sledge start 2	07.09.04	6h38	9.0	51.7	20.4	-11.9	21.0	12.0
Sledge stop 2	07.09.04	6h51	3.1	83.2	20.6	-12.36	21.0	12.1
Sledge start 3	07.09.04	6h54	7.6	67.8	20.7	-11.45	21.0	12.1
Sledge stop 3	07.09.04	7h21	7.0	54.2	21.0	-12.33	21.5	12.0
CTD stop	07.09.04	7h27	6.3	36.6	20.9	-12.83	20.9	12.8
Centrifuge stop	07.09.04	7h28	6.5	54.0	21.1	-13.21	20.9	13.0
S07								
Centrifuge start	07.09.04	9h01	8.8	21.2	22.8	-15.55	19.9	22.9
CTD start	07.09.04	9h16	6.7	45.6	23.0	-13.79	19.9	19.6
Water sampling	07.09.04	9h22	7.3	144.4	23.1	-13.09	19.9	23.7
Sediment	07.09.04	9h40	6.4	48.5	23.8	-10.7	19.9	23.3
Sledge start	07.09.04	10h04	7.7	29.9	24.6	-8.83	19.9	22.9
Sledge stop	07.09.04	10h19	7.3	52.9	24.6	-9.05	19.9	23.7
Sledge start 2	07.09.04	10h32	6.1	43.4	25.2	-8.23	20.0	22.6
Sledge stop 2	07.09.04	10h43	6.2	43.0	25.6	-6.98	19.9	23.4
CTD stop	07.09.04	10h53	8.1	39.0	24.9	-7.49	19.9	22.9

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Tabel (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	07.09.04	16h40	6.4	40.9	28.8	-10.24	20.6	0.724
CTD start	07.09.04	16h38	6.4	40.9	28.8	-10.24	20.6	0.724
Water sampling	07.09.04	16h44	7.8	28.4	28.7	-09.61	20.6	0.730
Sediment	07.09.04	16h53	7.9	55.7	28.9	-12.11	20.5	0.737
CTD start 2	07.09.04	17h32	7.5	29.4	27.4	-14.82	20.4	0.904
Bentic sledge stop	07.09.04	17h46	8.9G	10.7G	26.9	-14.89	20.4	0.936
S22								
Bentic sledge start	08.09.04	6h14	3.1S	38.3S	17.6	-8.4	22.4S	5.0S
Centrifuge start	08.09.04	6h25	2.5	20.3	17.6	-10.16	20.4	3.4
Sledge stop	08.09.04	6h31	2.5	58.3	17.7	-7.53	20.4	3.5
Sledge start 2	08.09.04	6h41	2.5	35	17.9	-10.32	20.4	3.6
Sledge stop 2	08.09.04	6h55	3.1	58.2	18.2	-10.98	20.4	3.9
CTD	08.09.04	7h34	6.4	46.1	19.6	-15.6	20.4	3.8
Water sampling	08.09.04	7h40	3.1	111.7	19.8	-14.82	20.4	4.0
Sediment	08.09.04	8h06	7.5	46.6	20.2	-13.14	20.5	5.4
Centrifuge stop	08.09.04	8h28	2.8	77.5	20.9	-17.38	20.8	6.9
S09								
CTD start	08.09.04	10h24	8.9	68.7	23.0	-17.62	20.0	18.9
Water sampling	08.09.04	10h30	6	65.6	23.0	-17.36	20.0	18.6
Sediment	08.09.04	10h36	5.6	39.7	23.3	-17.71	20.0	18.6
Sledge start	08.09.04	11h13	5.2	41	24.5	-19.41	20.2	18.6
Sledge stop	08.09.04	11h21	5.2	49.3	24.7	-21.64	20.1	18.5
Sledge start 2	08.09.04	11h42	6.1	53.6	25.1	-19.49	20.1	18.5
Sledge stop 2	08.09.04	11h52	6.3	38.2	25.3	-21.31	20.2	18.3
Centrifuge stop	08.09.04	11h57	7.8	46.2	24.9	-23.92	20.1	18.5
CTD stop	08.09.04	12h11	8.9	29	24.9	-18.50	20.3	17.3

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Tabel (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)
S12								
CTD start	09.09.04	6h02	7.5	83.6	18.5	-9.53	20.5	12.2
Water sampling	09.09.04	6h04	8.4	94.4	18.7	-8.93	20.6	12.3
Centrifuge start	09.09.04	6h07	8.8	77.8	18.6	-9.75	20.6	12.3
Van Veen	09.09.04	6h19	7.2	69.6	18.9	-9.05	20.4	13.0
Sledge start	09.09.04	6h31	8.9	76.5	18.9	-11.61	20.4	12.7
Sledge stop	09.09.04	6h45	8.0	77.5	18.9	-15.78	20.9	11.8
Sledge start 2	09.09.04	6h59	7.0	88.8	19.4	-11.03	20.4	13.2
Sledge stop 2	09.09.04	7h14	4.3	100.5	19.3	-15.53	20.6	12.3
CTD stop	09.09.04	13h17	0.9	B	23.3	-10.85	16	11.0
Centrifuge stop	09.09.04	13h35	3.4	137	23.5	-19.4	15.7	13.0
S04								
Centrifuge start	09.09.04	11h27	7.9	83.9	25.8	-31.03	19.7	26.8
CTD start	09.09.04	11h43	9.3	73.3	26.1	-19.37	19.8	26.1
Water sampling	09.09.04	11h51	8.6	96.5	26.1	-18.78	19.8	26.2
Van Veen	09.09.04	12h07	8.2	93.6	26.5	-18.87	19.8	26.4
Sledge start	09.09.04	12h25	6.6	96.4	26.8	-20.59	19.8	25.9
Sledge stop	09.09.04	12h36	9.5	93.0	27.6	-11.53	19.8	26.1
Sledge 2 start	09.09.04	13h01	7.5	104.3	27.1	-19.91	19.8	26.0
Sledge 2 stop	09.09.04	13h11	7.4	106.9	27.4	-19.23	19.8	26.1
CTD stop	09.09.04	13h26	7.8	111.3	27.3	-19.13	19.7	26.1
Centrifuge stop	09.09.04	16h07	5.0	323.6	23.0	-19.46	15.0	19.9

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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)

Sample depth

Station	Depth (m)	Temperature (°C)	Salinity (ppt)	Oxygen (ml/L)	Oxygen Sat (ml/L)	Turbidity (FTU)
S01 Start	6.28	19.5	30.5	4.6	5.3	9.8
S01 Stop	5.61	19.7	30.8	5.2	5.3	6.2
S04 Start	4.99	19.7	26.8	5.5	5.4	4.8
S04 Stop	5.50	19.7	27.1	5.8	5.4	7.5
S07 Start	4.46	19.8	24.3	5.3	5.5	7.1
S07 Stop	3.88	20.1	23.4	5.3	5.5	16.4
S09 Start	3.17	19.9	20.4	5.9	5.6	6.2
S09 Stop	3.14	20.3	18.1	5.9	5.7	10.7
S12 Start	5.45	20.5	12.8	5.2	5.8	17.0
S12 Stop	4.55	20.2	13.5	5.4	5.8	11.6
S15 Start	4.20	20.7	12.1	4.4	5.8	14.4
S15 Stop	4.32	20.8	13.2	4.8	5.8	25.0
S22 Stop	3.14	20.4	4.1	3.2	6.2	19.5
Temse start	3.22	20.9	0.77	1.08	6.20	56.9
Temse voor visserij	11.62	21.8	0.87	1.72	6.09	38.85

Bottom

Station	Depth (m)	Temperature (°C)	Salinity (ppt)	Oxygen (ml/L)	Oxygen Sat (ml/L)	Turbidity (FTU)
S01 Start	8.50	19.6	30.4	4.7	5.6	11.55
S01 Stop	13.73	19.8	30.9	5.2	5.3	10.11
S04 Start	16.64	19.6	27.2	5.5	5.4	12.55
S04 Stop	15.89	19.8	27.0	5.6	5.4	16.28
S07 Start	11.17	19.8	23.7	5.2	5.5	8.48
S07 Stop	7.18	20.1	23.2	5.4	5.5	18.9
S09 Start	14.77	19.9	20.2	6.0	5.6	12.4
S09 Stop	15.02	20.3	18.3	5.8	5.7	13.97
S12 Start	9.91	20.2	12.5	5.4	5.9	19.3
S12 Stop	11.56	20.2	13.5	5.6	5.8	11.1
S15 Start	8.33	20.5	13.1	4.6	5.8	35.11
S15 Stop	10.26	20.7	13.1	4.8	5.8	48.40
S22 Stop	12.09	30.3	4.01	3.4	6.2	23.61
Temse start	7.00	20.9	0.78	1.3	6.20	52.88
Temse voor visserij	4.06	20.7	0.94	1.8	6.23	38.85

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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	

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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.

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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.

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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.

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ANNEX B: Detailed time-schedule 6 – 10 September 2004

Campaign 2004-19

Date	Sampling	Remarks
6/9/04		
Vlissingen		
12h47	Centrifuge start	
13h30	CTD + Niskin	
13h31	5 L Niskin	
13h34	10L Niskin	
13h37	Go Flo 1	
13h40	Go Flo 2	
13h43	Go Flo 3	
13h46	VanVeen	
13h59	Boxcorer	
14h33	Bentic sledge Start	
14h44	Bentic sledge Stop	
15h04	Bentic sledge Start 2	
15h14	Bentic sledge Stop 2	
15h35	Beam thrawl Start	
15h44	Beam thrawl Stop	
16h00	CTD	
16h06	Centrifuge stop	10638l
BCP		
18h52	station 710	SISCO: Niskin + VanVeen
19h46	station 780	SISCO: Niskin + VanVeen
21h10	station 130	SISCO: Niskin + VanVeen
22h10	station 230	SISCO: Niskin + Boxcorer
7/9/04		
Doel		
6h46	Centrifuge start	
6h55	CTD + 5L niskin	
6h57	10L Niskin	
7h00	10L Niskin	
7h03	Go Flo 1	
7h05	Go Flo 2	
7h08	Go Flo 3	
7h25	Go Glo 4	3 keer mislukt: druk niet groot genoeg?
7h22	VanVeen	
7h30	Boxcorer	
8h02	Beam trawl Start	3 knopen
8h12	Beam trawl Stop	kabel is afgebroken, boomkor weg
8h38	Bentic sledge Start	Passief bemonsteren
8h50	Bentic sledge Stop	gn goeie vangst
8h55	Bentic sledge Start 2	Passief bemonsteren
9h20	Bentic sledge Stop 2	oke
9h27	CTD	
9hh27	Centrifuge stop	16675L
	ODAS uitgevallen, opnieuw opgestart, OKE	

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Hasnweert

11h02	Centrifuge start	
11h15	CTD + Niskin 5L	Niskin 5L Slagpin afgebroken
11h18	Niskin 10L	
11h20	Niskin 10L	
11h23	Go Flo 1	
11h26	Go Flo 2	
11h28	Go Flo 3	
11h40	Van Veen	
11h46	Van Veen 2	
12h00	Reineck	
12h04	Bentic sledge Start	
12h19	Bentic sledge Stop	
12h32	Bentic sledge Start 2	
12h43	Bentic sledge Stop 2	
12h55	CTD stop	
12h55	Centrifuge stop	

Temse

18h40	Centrifuge start	
18h40	CTD + Niskin 10L	
18h42	Niskin 10L	
18h44	Go Flo 1	
18h46	Go Flo 2	
18h47	Go Flo 3	
18h53	Van Veen	Allemaal gruis en steen
18h57	Van Veen 2	Allemaal gruis en steen -> verplaatsing voor boxcorer
19h30	Boxcorer	Boxcorer leeg
19h33	CTD	scan op nieuwe plaats
19h36	Bentic sledge Start	Passief met oude slede
19h46	Bentic sledge Stop	Geen vangst --> geen 2e
20h02	Centrifuge stop	3540L

8/9/04

Antwerpen

8h14	Bentic sledge start	aan de kaai
8h24	Centrifuge start	aan de kaai
8h31	Bentic sledge stop	aan de kaai
8h41	Bentic sledge start 2	aan de kaai
8h54	Bentic sledge stop 2	aan de kaai
9h37	CTD + 10L Niskin	op S22
9h38	Niskin 10L	op S22
9h39	Niskin 10L	op S22
9h40	Go Flo 1	Fles opent zich niet
9h43	Go Flo 2	op S22
9h45	Go Flo 3	op S22
9h50	VanVeen 1	op S22, allemaal gruis en stenen
10h03	Go Flo 4	aan pontonneke
10h05	VanVeen 2	aan pontonneke (coordinaten noteren)
10h11	Boxcorer	
10h28	Centrifuge stop	

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Saeftinge

	Centrifuge start	
12h22	CTD + Niskin 10 L	
12h24	Niskin 10 L	
12h26	Niskin 10 L	
12h28	Niskin 10 L	
12h30	Go Flo 1	
12h32	Go Flo 2	
12h34	Go Flo 3	
12h38	Van Veen	
12h43	Reineck	
13h13	Bentic sledge start	
13h23	Bentic sledge stop	
13h42	Bentic sledge 2 start	
13h52	Bentic sledge 2 stop	
14h10	CTD stop	
14h00	Centrifuge stop	11676L

9/9/04

Bath

8h09	Centrifuge start	
8h00	CTD + Niskin 10 L	
8h03	Go Flo 1	saliniteit 11
8h06	Go Flo 2	
8h09	Go Flo 3	
8h12	Niskin 10 L (SISCO)	
8h15	Reineck (SISCO)	
8h19	Van Veen	
8h31	Bentic sledge start	
8h45	Bentic sledge stop	
8h59	Bentic sledge 2 start	
9h14	Bentic sledge 2 stop	
9h26	CTD stop	
10h43	Centrifuge stop	19000L

Saliniteit 17

11h00 tot	CTD + Niskin	SISCO
11h30	2 Reinecks	SISCO

Saliniteit 21

12h00 tot	CTD + Niskin	SISCO
12h30	2 Reinecks	SISCO

Terneuzen-S04

13h28	Centrifuge start
13h45	CTD + Niskin 10L
13h48	Niskin 10L
13h49	Go Flo 1
13h50	Go Flo 2
13h52	Go Flo 3
13h55	Reineck 1
13h59	Reineck 2
14h07	VanVeen

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14h25	Bentic sledge start	
14h36	Bentic sledge stop	
15h01	Bentic sledge 2 start	
15h13	Bentic sledge 2 stop	
15h28	CTD stop	
16h52	Centrifuge stop	27000L

10/9/04

station 330

5h30	Niskin + Reineck	SISCO

station 230

7h00	Niskin	BMM 25L
	Niskin	SISCO

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