

BELGICA CRUISE 2005/15 - REPORT

MOMO/GILSON/MAREBASSE-MESH

Period: 20-24/06/2005



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1. CRUISE DETAILS

1.	Cruise number	2005-15
2.	Date / hour (local time)	Zeebrugge TD: 20/06, 16h00 Zeebrugge TA: 22/06, 10h45 Zeebrugge TD: 22/06, 12h00 Zeebrugge TA: 24/06, 11h10
3.	Responsible scientist	Dr. Michael FETTWEIS
	Participating institutions	MUMM, RBINS-Invert dep., UG-RCMG
4.	Area of interest	Belgian continental shelf

2. PARTICIPANTS

Name	Institution-Team	On board 20-22/06	On board 22-24/06
FETTWEIS Michael	MUMM-MOMO	X	X
VAN DEN EYNDE Dries	MUMM-MOMO	X	
FRANCKEN Fritz	MUMM-MOMO	X	X
BACKERS Joan	MUMM-MOMO	X	
DE BLAUWE Jean-Pierre	MUMM-MOMO	X	
HOUZIAUX Jean-Sébastien	RBIN	X	X
LOUFA Mohamed Yassine	RBINS	X	
DE BLAUWE HANS	collaborator RBINS	X	X
DELEU Samuel	UG-RCMG		X
VERFAILLIE Els	UG-RCMG		X
STAELENS Peter	UG-RCMG		X
NAUDTS Lieven	UG-RCMG		X
TOTAL aboard		8	8

3. SCIENTIFIC OBJECTIVES

MOMO project (MUMM):

MOMO stands for the monitoring and modelling of cohesive sediment transport and the evaluation of the effects on the marine ecosystem due to dredging and dumping operations. The primary objective of the project is the study of the cohesive sediments on the Belgian Continental Shelf (BCS) using numerical models and field measurements. The combination of monitoring and modelling will provide information on the transport processes of this fine fraction and is therefore fundamental to answer questions on composition, origin and residence of it on the BCS, the change in characteristics of this sediment due to dredging and dumping operations, the effects of the natural variability, the impact on the marine ecosystem especially due to alterations of habitats, the estimation of the net input of hazardous substances in the marine environment and the possibilities to reduce these last two items.

GILSON project (RBINS):

This project focuses on the long-term changes in epibenthos around the Westhinder bank by comparing century-old data (the "Gilson collection" of the RBINS) and new samples (small beamtrawl and video recordings). Re-sampling will be done mostly in spring 2005 at most "remarkable" sites (according to the old collection) for what regards epibenthic content, diversity and habitats. The goal will be to identify the nature of observed changes in epibenthic communities of gravel grounds and former oyster banks to draw hypotheses on their causes as well as on the ecological importance of this area.

MAREBASSE project (RCMG/MUMM):

The -Marebasse- research project is essentially meant to set-up an integrated assessment framework for marine aggregates. This framework is regarded important to answer management/policy questions on how a sustainable exploitation of marine resources should be viewed and what approaches should be envisaged. This implies that essentially an

increase of knowledge is necessary on the level of the sediments themselves and their distribution, but also on the dynamical environment. The project is structured around a three-tiered approach encompassing three spatial scales: broad-based, regional and site-specific. Fieldwork programmes are the focal point of the regional and site-specific research, however with a coupling towards the broad-based approach.

MESH (Development of a framework for Mapping European Seabed Habitats) (RCMG)

MESH is an EU Interreg IIIb-funded international marine habitat mapping programme aiming at the development of international standards and protocols for seabed mapping. Partnership: Joint Nature Conservation Committee (JNCC, coordination) (UK); Ghent University (B); IFREMER (FR); Marine Institute (IRL); Alterra-Texel (NL); TNO Environment, Energy and Process Innovation (NL); Centre for Environment, Fisheries and Aquaculture Science (CEFAS) (UK); Department for Agriculture and Rural Development, Northern Ireland (DARD) (UK); English Nature (UK); Envision Mapping Ltd (UK); National Museums and Galleries of Wales (NMGW) (UK); Natural Environment Research Council (British Geological Survey) (BGS) (UK)

4. OPERATIONAL COURSE

All times are given in local time.

Monday, June 20th

16h00	Departure from Zeebrugge.
16h00-18h30	Transit to Hinderbanken
19h30-20h30	Beam trawl sampling tracks JSH_30 and _31
20h30-21h45	Transit to Kwinte Bank; Anchoring at location C2: 51°N 18.128', 2°E 40.1294'
21h59-	Start of through tide cycle
22h20, 22h40, 23h00	Niskin samples 1, 2, 3
23h20, 23h40, 00h00	Niskin samples 4, 5, 6

Tuesday, June 21st

00h20, 00h40, 01h00	Niskin sample 7, 8, 9
01h20, 01h40, 02h00	Niskin sample 10, 11, 12
02h20, 02h40, 03h00	Niskin sample 13, 14, 15
03h20, 03h40, 04h00	Niskin sample 16, 17, 18
04h20, 04h40, 05h00	Niskin sample 19, 20, 21
05h20, 05h40, 06h00	Niskin sample 22, 23, 24
06h20, 06h40, 07h00	Niskin sample 25, 26, 27
07h20, 07h40, 08h00	Niskin sample 28, 29, 30
08h20, 08h40, 09h00	Niskin sample 31, 32, 33
09h20, 09h40, 10h00	Niskin sample 34, 35, 36
10h20, 10h40, 11h00	Niskin sample 37, 38, 39
11h00	End of through tide cycle.

11h09	Van Veen grab sample (C2) 51°N 18.151', 2° 40.2189'
11h10-12h15	Transit to Hinderbanken
12h30-16h00	Beam trawl sampling tracks JSH_32 to _39
16h00-18h30	Transit to MOW 1;
18h45	Deployment of bottom mounted ADCP at 51°N 21.760', 3°E 7.3466'
19h10	Anchoring at 51°N 21.808, 3°E 7.4319
19h15-	Start of through tidal measurement, Rosette in water
19h20	Van Veen grab sample (MOW1) at 51°N 21.806', 3° 7.4305'
19h31	Seacat in water
19h20, 19h40, 20h00	Niskin samples 1, 2, 3
20h20, 20h40, 21h00	Niskin samples 4, 5, 6
21h20, 21h40, 22h00	Niskin samples 7, 8, 9
22h20, 22h40, 23h00	Niskin samples 10, 11, 12
23h20, 23h40, 00h00	Niskin samples 13, 14, 15

Wednesday, June 22nd

00h20, 00h40, 01h00	Niskin sample 16, 17, 18
01h20, 01h40, 02h00	Niskin sample 19, 20, 21
02h20, 02h40, 03h00	Niskin sample 22, 23, 24
03h20, 03h40, 04h00	Niskin sample 25, 26, 27
04h20, 04h40, 05h00	Niskin sample 28, 29, 30
05h20, 05h40, 06h00	Niskin sample 31, 32, 32
06h20, 06h40, 07h00	Niskin sample 34, 35, 36
07h20, 07h40, 08h00	Niskin sample 37, 38, 39
08h10	End of through tide cycle. (51°N 21.741', 3°E 7.4887')
08h10-10h15	Downloading data from the Lisst, reprogramming the Lisst for long measuring period. Deployment of tripod at 51°N 21.690', 3°E 7.3299' (TSS depth -10m)
10h20-10h45	Transit to Zeebrugge
10h45-12h00	Touch & Go at Zeebrugge. Disembarkation of MOMO (except MF & FF) team. Embarkation of UG team (MAREBASSE/MESH).
12h00-14h45	Transit to Hinderbanken
15h00-18h30	Beam trawl sampling tracks JSH_40 to _46
19h00-	Multibeam

Thursday, June 23rd

08h00	End of multibeam
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08h00-09h20	Beam trawl sampling tracks JSH_47 to _50
09h20-13h30	Multibeam
14h40-18h00	Beam trawl sampling tracks JSH_51 to _58
18h00-	Multibeam

Friday, June 24th

04h00	End of multibeam
04h00-05h15	Transit
05h15-10h40	Van Veen sampling
10h40-11h10	Transit to Zeebrugge
11h10-14h00	Arrival at Zeebrugge. Disembarkation. End of campaign 2005/15

5. REMARKS

The departure from Zeebrugge on Monday 20/06 was delayed until 16h00, because the ballast tanks had to be refilled. Therefore the trawling (Gilson-project) was limited to 2h and the through tidal cycle was delayed by 2.5h.

The scientific objective of the Momo programme was only partly fulfilled, because of failure of the SonTek/YSI 3MHz ADP instrument. The instrument could not be brought out of sleeping mode and was therefore not mounted on the tripod.

Downloading the data from the Lisst is very slow (9600 baud rates) and furthermore a problem rose with the transfer cable during downloading (bad connection). Therefore about 1 hour was lost on Wednesday morning before the Lisst could be mounted on the frame.

This campaign was very successful for the RBINS-Gilson project since almost all samples planned have been collected and provide excellent material for analysis of long-term changes.

The beam trawl is robust and allowed us to collect more than 50 samples in total (together with campaign 14) on gravelly grounds. Some repairs had to be done on the inside (10 mm mesh) net on some occasions. The external net started to call for repair on the very last samples. We also want to thank the Department for sea fisheries (H. Polet) and H. Goutsmit for advices and support regarding the gear, which has fulfilled his duty. The fishing distance had to be reduced when operating the gear on gravelly bottoms, since very large cobbles or high gravel content are sometimes encountered, which put the net at risk.

Gravel sample processing takes time and this should not be underestimated. In general, sampling itself was faster than foreseen, but this time is necessary in case of problem or voluminous sample. On the other hand, three persons are well needed in addition to the Belgica crew.

Nevertheless the delays (see above), the whole programme could have been carried out. This was partly due to the excellent weather during the campaign which allowed for very efficient beam trawl and multibeam operations. The skills of the Belgica crew however largely explained the success of the campaign and we want to thank everybody again for help and good will.

6. TRACK PLOT

Figure 1: Track plot of the whole campaign.

7. MEASUREMENTS

7.1. MOMO-project

1) Moorings

In order to measure suspended sediment transport during a longer period, the tripod, the bottom mounted ADCP and a buoy have been moored near the 'Meetpaal MOW1', on the same locations as during campaign 2005/02-03 and 2005/07-08, see table below.

On the tripod the instruments (SonTek/YSI ADV Ocean/Hydra, OBS; LISST 100) were mounted for a long period (19 days). The SonTek/YSI 3MHz ADP was not mounted due to failure of the instrument (see above).

The instruments will be recuperated on Monday 11 July during campaign 2005/18.

Table 1: Position of the moorings and through tide measurements.

<i>Station</i>	<i>Instrument</i>	<i>Lat/lon WGS 84</i>	<i>Start (GMT)</i>	<i>End (GMT)</i>
Kwinte Bank C2	Through tide	51°N 18.128' 2°E 40.1294'	21/06/2005 20h00	22/06/2005 9h00
MOW1	Through tide	51°N 21.808' 3°E 7.4319'	21/06/2005 17h15	22/06/2005 6h??
"	Tripod	51°N 21.???' 3°E 7.????'	22/06/2005 ??h??	to be recovered on 11/07
"	ADCP	51°N 21.760' 3°E 7.3466'	21/06/2005 16h46	to be recovered on 11/07

2) *Through tide measurements and water sampling*

Two through tide cycles were carried out: one during the night of Monday/Tuesday on the Kwinte Bank on position C2 (same position as during campaign 2003/??) and the second during the night of Tuesday/Wednesday near Meetpaal MOW1 (see table 1).

Instruments used are: SBE19 CTD SeaCat, SBE09 CTD Rosette, Lisst 100, Valeport Model 106 current meter, hull mounted ADCP

Water samples were taken every 20'. Rosette was taken out of water every hour for emptying Niskin bottles. Filtration to determine SPM concentration is carried on every 20' samples and to determine POC concentration on every 1 hour samples. Water samples for salinity were taken every hour.

During the measurements, suspended matter was sampled with the centrifuge, see table 2.

Table 2: Centrifuge samples

Station	Start (GMT)	End (GMT)	Litres
C2 Kwinte Bank	20/06/2005 19h56	21/06/2005 07h00	21254
MOW1	21/06/2005 18h44	21/06/2005 21h36	4068

3) Bottom sample with Van Veen grab

Bottom samples were taken with the Van Veen grab on the through tide locations and on the positions 1-22 (see figure 2 and photo's).

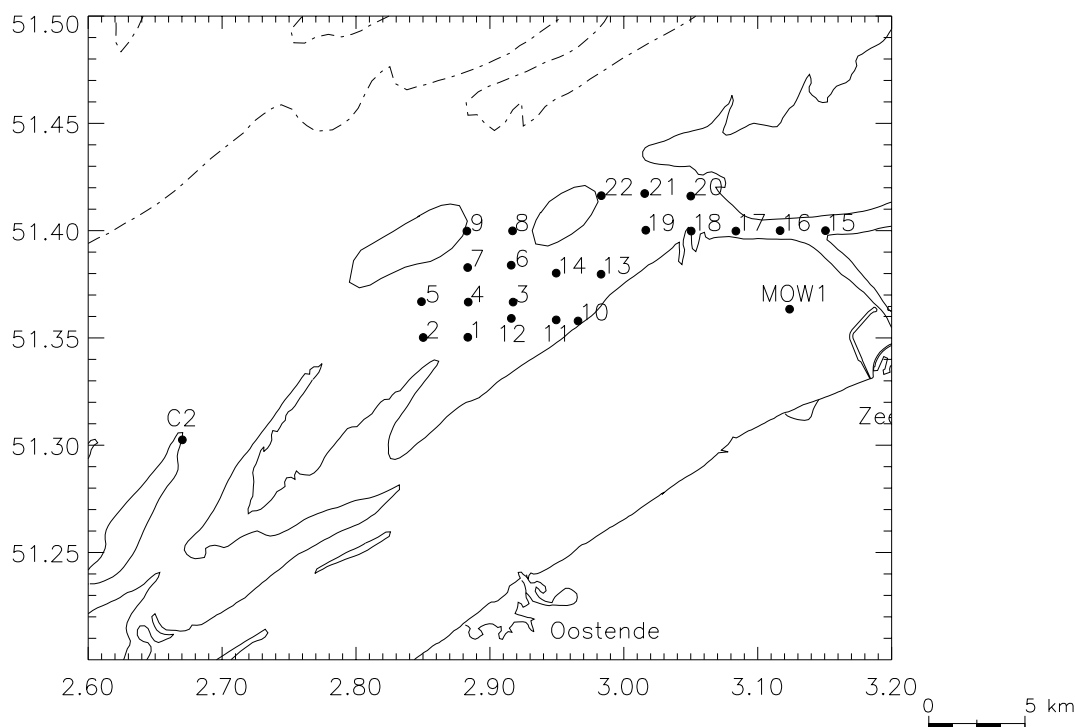


Figure 2: Position of Van Veen grab samples (latitude N, longitude E; WGS84).

Table 3: Coordinates, time and description of Van Veen grab samples (WGS84).

Station	Lat(°N)	Lon (°E)	Date Time (GMT)	Description
VV0515-C2	51° 18.151'	2° 40.2189'	21/06/05 9h11	Fine brown sand with lot of fine shell fragments. Inside a black muddy sand lens
VV0515-MOW1	51° 21.806'	3° 7.4305'	22/06/05 17h20	4 cm liquid mud. Underneath grey fine sand with lot of shell fragments and lenses of consolidated mud (Holocene)
VV0515-1	51° 21.020'	2° 53.0089'	24/06/05 3h46	Fine sand with little amounts of shell grit;; Ophiotrix (brokkelster), Echinus (zeeappel); below: muddy sand (small lens with sandy mud)
VV0515-2	51° 21.013'	2° 51.0148'	24/06/05 3h33	Top: thin layer of brown fine sand with Ophiotrix (brokkelster), Echinus (zeeappel), shells (reduced Ensys); below: Soft grey-blue mud to sandy mud,
VV0515-3	51° 22.002'	2° 55.0363'	24/06/05 5h17	Top: thin layer of fine sand (1 cm); below: soft consolidated grey-blue mud; black muddy sand. Little amounts of shell fragments and shell grit; Nereis; black oyster.

VV0515-4	51° 22.002'	2° 53.0273'	24/06/05 4h02	Top: fine sand with shells & Ophiotrix (smaller than in VV0515-2), Lanice et al.; below: soft grey-blue mud to sandy mud with more consolidated mud zones/pebbles
VV0515-5	51° 22.011'	2° 50.9228'	24/06/05 3h16	Fine sand with shell fragments, shell grit and intact shells (Ensys, Cerastoderma, Spicula); big (4-5cm) clay particles/pebbles
VV0515-6	51° 23.021'	2° 54.9554'	24/06/05 5h06	Fine sand, shell fragments and grit, gravel and clay pebbles (<10cm)
VV0515-7	51° 22.967'	2° 53.0037'	24/06/05 4h18	Fine sand with lot of shell grit
VV0515-8	51° 23.993'	2° 55.0120'	24/06/05 4h50	Top: fine brown sand; below: little muddy grey sand with Lanice, some shells & shell grit; soft and hard mud lenses (flocs)
VV0515-9	51° 23.985'	2° 52.9666'	24/06/05 4h35	Fine sand
VV0515-10	51° 21.475'	2° 57.9494'	24/06/05 5h51	Top: thin layer of 'liquid' brown mud; below: muddy sand with little amount of shells, Ensys, small crab (0.5cm) and Lanice
VV0515-11	51° 21.506'	2° 56.9677'	24/06/05 5h40	Top: sand with Lanice, Tunicata, little amount of shell fragments; below: soft to soft consolidated mud and below again sand
VV0515-12	51° 21.543'	2° 54.9592'	24/06/05 5h26	Top: recent soft mud; below: sand
VV0515-13	51° 22.779'	2° 58.9789'	24/06/05 6h25	Top: brown muddy sand with Lanice, shells, shell fragments; below: consolidated black sandy mud
VV0515-14	51° 22.812'	2° 56.9684'	24/06/05 6h09	Fine sand with on top mud flocs (mm size). Some small shells and shell fragments mainly on top
VV0515-15	51° 23.998'	3° 9.0374'	24/06/05 8h32	Recent very soft mud, grab completely full
VV0515-16	51° 24.003'	3° 7.0024'	24/06/05 8h19	Top: thin layer of liquid mud; below: alternating layers soft consolidated mud and muddy sand
VV0515-17	51° 23.989'	3° 5.0239'	24/06/05 8h04	Top: muddy sand; below: alternating layers of mud and muddy sand
VV0515-18	51° 23.985'	3° 3.0162'	24/06/05 7h32	Fine sand with shell fragments, one layer of nearly 100% shell fragments. 1 mud floc (!)
VV0515-19	51° 24.011'	3° 0.9823'	24/06/05 7h14	Top: Thin layer of fine sand; below: soft mud and reduced muddy sand to sandy mud
VV0515-20	51° 24.965'	3° 3.0008'	24/06/05 7h45	Top: thin layer of 'liquid' mud, muddy sand and shell fragments; shells and Nasarius (fuikhoorn)
VV0515-21	51° 25.039'	3° 0.9377'	24/06/05 7h01	Top: fine sand with Ophiotrix (brokkelster) and Lanice; below: reduced muddy sand with locally 'liquid' mud
VV0515-22	51° 24.979'	2° 58.9898'	24/06/05 6h46	Fine sand with mud lenses, shells, Tunicata, Echinus (zeeappel), Lanice; below: reduced muddy sand

7.2. GILSON Project

Table 4: 2m beam trawl data

ZONE	Sample NR	Date	UTC Heure start	lat start WGS84	lon start WGS84	UTC heure end	lat end WGS84	Lon End WGS84
R	JSH-30	20/06/2005	18:00	51°24.685	2°29.0116	18:11	51°24.889	2°29.3405
R	JSH-31	20/06/2005	18:24	51°24.445	2°28.1904	18:34	51°24.641	2°28.5099
K	JSH-32	21/06/2005	11:19	51°24.332	2°32.1012	11:26	51°24.251	2°31.8169
K	JSH-33	21/06/2005	11:40	51°24.179	2°31.364	11:49	51°24.093	2°31.1311

K	JSH-34	21/06/2005	11:59	51°24.137	2°31.7709	12:11	51°24.094	2°31.3045
K	JSH-35	21/06/2005	12:20	51°24.03	2°31.5237	12:28	51°23.92	2°30.9447
L	JSH-36	21/06/2005	12:52	51°25.035	2°31.6873	13:01	51°24.849	2°31.5726
L	JSH-37	21/06/2005	13:12	51°24.956	2°31.7483	13:19	51°24.71	2°31.6425
L	JSH-38	21/06/2005	13:30	51°24.932	2°31.7307	13:36	51°24.721	2°31.7401
L	JSH-39	21/06/2005	13:52	51°24.646	2°32.0914	14:01	51°24.428	2°31.965
O	JSH-40	22/06/2005	12:51	-	-	12:58	-	-
O	JSH-41	22/06/2005	13:15	51°23.19	2°30.0755	13:21	51°23.074	2°29.9973
O	JSH-42	22/06/2005	13:35	51°23.208	2°30.0222	13:41	51°23.011	2°30.1303
N	JSH-43	22/06/2005	14:25	51°27.304	2°31.7353	14:31	51°27.243	2°31.6228
N	JSH-44	22/06/2005	14:45	51°27.333	2°31.8747	14:56	51°27.149	2°31.5093
N	JSH-45	22/06/2005	15:09	51°27.119	2°32.0015	15:19	51°26.993	2°31.6962
N	JSH-46	22/06/2005	15:34	51°26.755	2°32.1058	15:44	51°26.476	2°32.1748
J	JSH-47	23/06/2005	6:14	51°23.853	2°28.4308	6:21	51°24.192	2°28.0806
R	JSH-48	23/06/2005	6:31	51°24.542	2°28.5665	6:39	51°24.755	2°28.7276
F	JSH-49	23/06/2005	6:51	51°24.876	2°30.3723	6:53	51°24.994	2°30.4889
F	JSH-50	23/06/2005	7:06	51°25.698	2°30.0221	7:12	51°25.546	2°30.3298
M	JSH-51	23/06/2005	12:36	51°25.995	2°33.263	12:44	51°25.818	2°33.0676
M	JSH-52	23/06/2005	12:54	51°26.015	2°33.0149	13:05	51°25.726	2°32.6994
M	JSH-53	23/06/2005	13:15	51°25.824	2°32.5907	13:23	51°25.602	2°32.4244
M	JSH-54	23/06/2005	13:34	51°25.662	2°32.1526	13:43	51°25.458	2°32.0335
Q	JSH-55	23/06/2005	14:13	51°26.901	2°32.986	14:36	51°26.667	2°32.8447
Q	JSH-56	23/06/2005	14:46	51°26.726	2°33.0976	14:53	51°26.507	2°32.8684
Q	JSH-57	23/06/2005	15:06	51°26.468	2°33.2375	15:13	51°26.243	2°33.1414
Q	JSH-58	23/06/2005	15:29	51°26.272	2°33.4421	15:37	51°26.149	2°33.1807

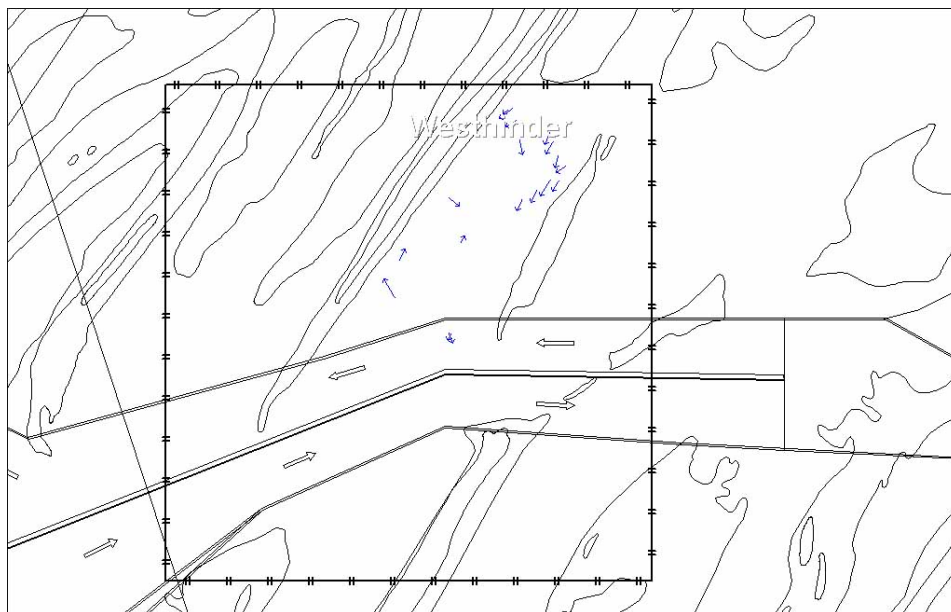


Figure : Beamtrawl tracks in the Westhinder area.

7.3. MAREBASSE/MESH project

Multibeam registrations (Kongsberg/simrad EM1002), south of the Hinder Banken area.