

# Cruise report

RV Aurora Cruise 2/4 – 11/4 2016

Mrk: "12. februar 2016, 01.-12.04.2016, Jnr. 16/2132".

"Ref no 621/2016"

Cruiseleader Asc. Prof. Peter Grønkjær, Aarhus University



Funded by Dansk Center for Havforskning & Aarhus University

## Participants

Participants	Leg 1 (3-6/4)	Leg 2 (6-10/4)
Asc. Prof. Peter Grønkjær, AU (cruiseleader)	X	X
Lab-leader Jens T. Christensen, AU	X	X
Asc. Prof. Kurt Thomas Jensen, AU	X	X
PhD Morten Holtegård Nielsen, MSC		X
Student Jens Dujardin, AU.	X	X
Student Erik Haar Nielsen, AU.	X	X
Asc. Prof. Peter R. Møller, KU	X	
Marcus Anders Krag, KU		X
Student Signe Lembke, AU	X	X
Student Emil Hoffgaard, AU	X	

AU: Aarhus University, Dept. of Bioscience; KU: Copenhagen University.

## Cruise Narrative

RV Aurora left Hvide Sande harbour April 2<sup>nd</sup> at 13.00 and arrived in Hirtshals April 3<sup>rd</sup> 06.00 for final cruise mobilisation. The cruise started April 4<sup>th</sup> at 10, and Aurora was back in Hirtshals due to weather and for a change of the scientific personnel April 6<sup>th</sup> at 16.00. Second leg of the cruise started 7 April at 9.00 and lasted until April 10<sup>th</sup> at 14.00 interrupted by a 10 hr weather break in Hirtshals. RV Aurora returned to Aarhus for demobilization on the 11 April.

Sampling was performed on 5 stations along a transect from 58<sup>o</sup>05.4N, 9<sup>o</sup>08.9E (DFE 5, 600 m) to 57<sup>o</sup>56N, 9<sup>o</sup>24E (DFE 1, 200 m). Stations were placed at depth intervals of 100 m. Base sampling at each station consisted of 2 CTD's with water sampling, 3 Rumohr lots, 4 Box cores, 1 IKMT and one Agassiz trawl sample. At DFE 5 (600 m) a multinet vertical profile of zooplankton was sampled at midday and midnight, and 4 \* 4 sediment traps were deployed for 25 hrs. At DFE 1 (200 m) 3 \* 4 sediment traps were deployed for 16 hrs. A full transect of undulating (0-100 m) Scanfisk II CTD measurements were performed across the Skagerrak from ca 4 nm from Hirtshals harbor to the 12 miles off the Norwegian coast.

All research equipment functioned and all planned samples were obtained. One set of 4 sediment traps were lost.

2 M.Sc. students and two B.Sc. students took part in the cruise. A third B.Sc. student had to cancel due to sickness. The data collected will form the basis for at least two M.Sc. theses and a B.Sc. thesis.

## Sampling details and purpose

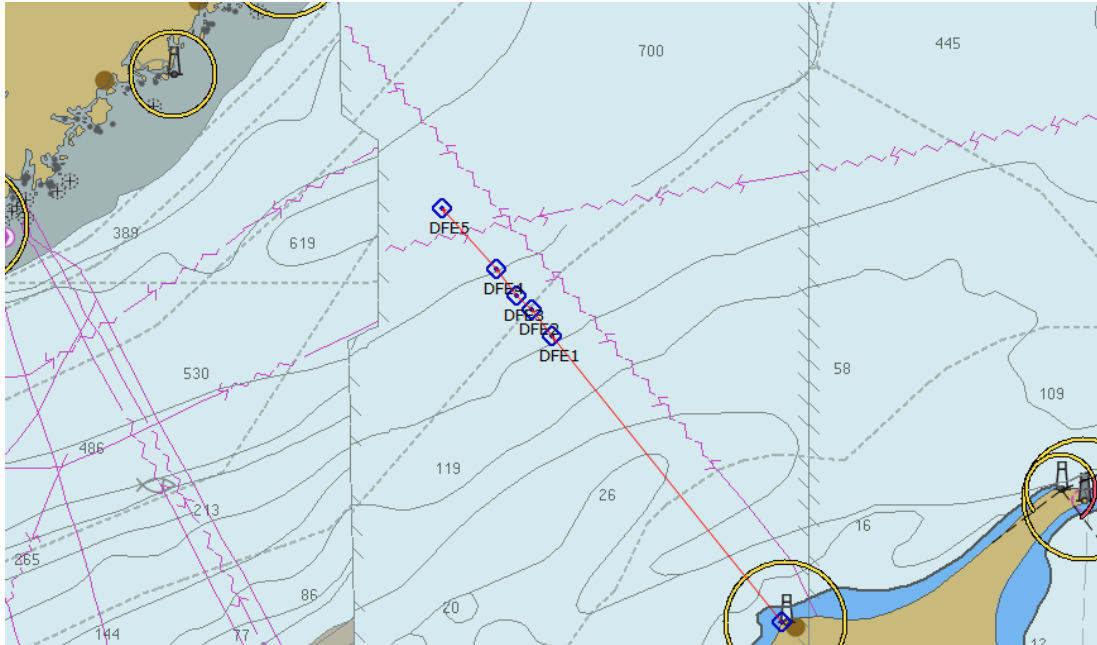


Fig 1. Transect with sampling station DFE1-5.

**CTD/ScanFishII:** These data will be used to describe the watermasses occurring in the area. A preliminary onboard examination of the data revealed a large 10-20 m deep low saline surface water mass, and 2-3 distinct deep-watermasses. Chlorophyll samples were obtained from the water bottles at 3-5 depths on each station and these will be used to calibrate the CTD's fluorometer. The hydrography will be related to the amount and quality (C/N ratio, isotopic signatures) of the sinking detritus from the sediment traps at station DFE5 and 1 in order to explain hydrographic influences on the amount and quality of detritus reaching the seafloor.

**Sediment traps:** Three units each consisting of four tubular traps were deployed twice for about 24 hours. Material from sediment traps will be dried, weighed, and analysed with regard to C/N-ratios and stable C & N isotopes to describe the sedimenting material.

**Plankton samples:** Two vertical hauls were performed with a Multinet (HydroBios, Kiel) each resulting in 9 stratified samples of zooplankton. Samples were split in two and one half will be used for identification and density estimation (fixed in formalin) while the other will be dried and used for stable isotope analysis.

**IKMT:** An Isaacs-Kidd Midwater Trawl was deployed 4 times and hauled in a v-shaped pattern down to about 500 m. The collected fish and shrimps will be used for stable isotope analysis and preserved for

identification. Several specimens were preserved by Peter R Møller, SNM, and will be included in their museum collections and in the new Marine Fish Atlas.

**Agassiz trawl:** Benthic animals were collected from these trawl samples to provide a sufficient number of organisms for stable isotope and age/size composition analyses of target animals. In particular deposit feeding benthic bivalves will be used as indicators for organic matter available to benthos. Age/size composition data will furthermore reflect both recruitment and growth patterns in relation to the examined depth gradient.

**Box corer:** The samples were sieved through a 1 mm mesh and retained organisms were preserved in formalin. These quantitative samples will be used to describe the benthic communities along the examined depth gradient. In particular we will focus on various diversity indices and examine functional diversity patterns as a reflection of resource exploitation.

**Rumohr Lot:** Collected sediment cores were extruded on board and sliced in 1 cm intervals. One long core (maximum ca 70 cm) from each depth position was sliced along the whole core. For the other the upper 10 cm was sliced in 1 cm intervals. All samples are frozen until further analyses. The material will be analysed with respect to grain size composition, chlorophyll and pheophytin, organic matter (loss on ignition) and the samples will also be analysed for stable C & N isotopes (SIA). These data will enable us to clarify if the organic matter in the surface sediment is enriched with  $\delta^{15}\text{N}$ . If this is confirmed it will support the Norwegian trench as a depositional area for river discharges

Detailed sampling list is provided below.

Aarhus 20 May 2016



Asc. Prof. Peter Grønkjær, Cruiseleader.  
Dept. of Bioscience  
Aarhus University  
Ole Worms Allé 1  
8000 Aarhus C  
[Peter.Groenkjaer@bios.au.dk](mailto:Peter.Groenkjaer@bios.au.dk)  
Phone: 2338 2177

## Detailed sampling list

Event	Date	Station	Start time	Start Lat (N)	Start Lon (E)	Depth	Instrument	Status
1	04-04-2016	DFE5	15:15	58°05.4	9°08.9	618	CTD1	Success
2	04-04-2016	DFE5	16:00	58°05.4	9°08.8	618	CTD2	Success
3	04-04-2016	DFE5	17:10	58°05.449	9°08.987	618	4 sediment traps deployed	Success
4	04-04-2016	DFE5	19:10	58°05.48	9°08.87	622	Rumohr Lot 1	Success
5	04-04-2016	DFE5	19:50	58°05.559	9°08.654	625	Rumohr Lot 2	Success
6	04-04-2016	DFE5	20:24	58°05.76	9°08.40	625	Rumohr Lot 3	Failed
7	04-04-2016	DFE5	21:05	58°05.92	9°08.44	625	Rumohr Lot 4	Failed
8	04-04-2016	DFE5	22:55	58°06.31	9°07.50	636	Agassiz 1	Success
9	04-05-2016	DFE5	01:05	58°06.558	9°08.084	632	Multinet	Success
10	04-05-2016	DFE5	10:48	58°05.020	9°09.83	617	Boxcorer 1	Success
11	04-05-2016	DFE5	09:31	58°05.649	9°09.185	625	Boxcorer 2	Success
12	04-05-2016	DFE5	10:18	58°05.407	9°08.591	625	Boxcorer 3	Failed
13	04-05-2016	DFE5	10:45	58°05.294	9°08.180	622	Boxcorer 4	Success
14	04-05-2016	DFE5	11:25	58°05.617	9°09.112	627	Boxcorer 5	Success
15	04-05-2016	DFE5	13:05	58°05.666	9°08.901	625	Multinet	Success
16	04-05-2016	DFE5	15:55	58°05.702	9°09.899	624	IKMT1	Success
17	04-05-2016	DFE5	18:55	58°04.782	9°10.050	624	Sedimentfælder	Success
18	04-05-2016	DFE5	19:45	58°03.680	9°11.945	602-424	IKMT2	Success
19	04-06-2016	DFE2	08:20	57°58.092	9°21.380	303	CTD3	Success
20	04-06-2016	DFE2	09:15	57°58.134	9°21.490	303	CTD4	Success
21	04-06-2016	DFE2	10:20	57°58.203	9°21.118	311	Boxcorer 6	Success
22	04-06-2016	DFE2	10:50	57°58.017	9°21.634	297	Boxcorer 7	Success
23	04-06-2016	DFE2	11:12	57°57.908	9°21.364	297	Boxcorer 8	Success
24	04-06-2016	DFE2	11:57	57°57.962	9°21.675	298	Boxcorer 9	Success
25	04-06-2016	DFE2	13:00	57°57.994	9°21.509	297	Rumohr Lot 5	Failed
26	04-06-2016	DFE2	13:22	57°57.978	9°21.381	297	Rumohr Lot 6	Failed
27	04-06-2016	DFE2	13:50	57°58.036	9°21.676	297	Rumohr Lot 7	Success
28	04-06-2016		17:30				Arrival Hirtshals	
29	04-07-2016		10:45				Departure Hirtshals	
30	04-07-2016		11:10	57°37.745	9°55.098	21	Scanfisk	Cancelled
31	04-07-2016	DFE3	16:00	57°59.073	9°19.543	391	CTD5	Success
32	04-07-2016	DFE3	16:50	57°59.073	9°19.543	391	CTD6	Success
33	04-07-2016	DFE3	17:35	57°59.033	9°19.573	382	Rumohr Lot 8	Failed
34	04-07-2016	DFE3	17:55	57°58.993	9°19.414	384	Rumohr Lot 9	Success
35	04-07-2016	DFE3	18:50	57°59.003	9°19.537	388	Rumohr Lot 10	Failed
36	04-07-2016	DFE3	19:10	57°59.062	9°19.383	391	Rumohr Lot 11	Success
37	04-07-2016	DFE3	19:41	57°59.086	9°19.338	395	Box-corer 10	Success
38	04-07-2016	DFE3	20:06	57°59.099	9°19.371	393	Box-corer 11	Success
39	04-07-2016	DFE3	20:40	57°58.956	9°19.531	378	Box-corer 12	Success
40	04-07-2016	DFE3	21:04	57°58.956	9°19.531	380	Box-corer 13	Success

41	04-07-2016	DFE3	21:52	57°59.184	9°20.166	387	Agassiz 2	Success
42	04-07-2016	DFE3	23:54	57°59.239	9°20.421	386	IKMT 3	Success
43	04-08-2016		02:50	57°55.428	9°23.204		Scanfish2	Success
44	04-08-2016		04:15	57°57.480	9°21.426		Scanfish3	Success
45	04-08-2016	DFE4	08:50	58°00.998	9°16.553	502	CTD7	Success
46	04-08-2016	DFE4	09:54	58°00.801	9°16.409	502	CTD8	Success
47	04-08-2016	DFE4	10:41	58°01.273	9°16.822	507	IKMT 4	Success
48	04-08-2016	DFE4	15:35	58°01.003	9°16.500	505	Rumohr Lot 12	Success
49	04-08-2016	DFE4	16:00	58°00.981	9°16.481	505	Rumohr Lot 13	Failed
50	04-08-2016	DFE4	16:24	58°01.004	9°16.484	506	Rumohr Lot 13	Failed
51	04-08-2016	DFE4	16:48	58°01.042	9°16.575	504	Rumohr Lot 14	Success
52	04-08-2016	DFE4	17:25	58°01.035	9°16.630	505	Box-corer 15	Success
53	04-08-2016	DFE4	18:45	58°01.035	9°16.630	506	Box-corer 16	Failed
54	04-08-2016	DFE4	19:10	58°00.933	9°16.710	506	Box-corer 17	Failed
55	04-08-2016	DFE4	20:00				Towards Hirtshals	
56	04-09-2016		03:00				Arrival Hirtshals	
57	04-09-2016		11:00				Departure Hirtshals	
58	04-09-2016		11:17	57°38.275	9°54.761		Scanfish	Success
59	04-09-2016	DFE4	15:25	58°00.977	9°16.476	504	Boxcorer 18	Success
60	04-09-2016	DFE4	16:15	58°00.977	9°16.476	504	Boxcorer 19	Success
61	04-09-2016	DFE4	16:52	58°00.984	9°16.491	505	Boxcorer 20	Failed
62	04-09-2016	DFE4	17:54	58°00.477	9°14.799	510	Agassiz 3	Success
63	04-09-2016	DFE1	20:55	57°55.840	9°24.626		Sedimentfælder	
64	04-09-2016	DFE1	21:10	57°56.019	9°24.664	194	CTD9	Success
65	04-09-2016	DFE1	21:49	57°56.200	9°24.260	205	CTD10	Success
66	04-09-2016	DFE1	22:34	57°56.149	9°24.225	211	Rumohr Lot 15	Success
67	04-09-2016	DFE1	22:56	57°56.141	9°24.126	215	Rumohr Lot 16	Success
68	04-09-2016	DFE1	23:16	57°56.146	9°24.103	215	Boxcorer 21	Success
69	04-10-2016	DFE1	00:03	57°56.101	9°23.684	211	Agassiz 4	Success
70	04-10-2016	DFE2	07:54	57°58.049	9°21.569	303	Agassiz 5	Success
71	04-10-2016	DFE1	11:01	57°57.508	9°23.278		Bøje 1	
72	04-10-2016	DFE1	11:07	57°57.448	9°23.312		Bøje 2	
73	04-10-2016	DFE1	11:17	57°57.509	9°23.976		Bøje 3	
74	04-10-2016		11:25				Afgang mod Hirtshals	
75	04-10-2016		15:30				Ankomst Hirtshals	