CRUISE REPORT

North Sea Ecosystem Cruise

RV "G.O.Sars" 11 April – 9 May 2016

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1. Summary

The North Sea Ecosystem spring cruise is a multi-purpose survey, covering hydrography, chemistry, phytoplankton and zooplankton as well as fish eggs and fish larvae (IMR project 14385 and 14387). The survey area of the North Sea Ecosystem cruise 2016 included the northern North Sea and the Skagerrak. Pre-selected stations along standard transects were sampled for hydrography (CTD), chemistry (nutrients and chlorophyll) and plankton (including fish larvae and eggs). Two 24-hour process stations were undertaken east of Shetland (60ºN; 0.5ºW) and northeast of Aberdeen (Fladen ground, 58°N-0.6°W), to investigate the vertical and diel distribution of fish eggs and larvae and their potential predators and prey. In addition, water for analyses of radioactive contamination were sampled in Skagerrak (IMR project 14379-01). This cruise also included sampling for two projects within the Norwegian Taxonomy Initiative, on copepods (COPCLAD) and hydrozoa (HYPNO). Sampling for Hydrozoa was conducted by a guest from University of Bergen (Bergen Museum).

Cruise dates:	11.04.2016 – 11.05.2016
Cruise name:	GOS 2016106, North Sea Ecosystem Cruise
Vessel:	RV "G.O. Sars"
Master:	John Hugo Johnsen (11.-28.04)/ Preben Vindenes (28.04-11.05)
Area:	North Sea/Skagerrak (57-60.8ºN, 2.2ºW- 8.6ºE)
Ports of Call:	Hanstholm, Denmark 16.04.15 Kristiansand, Norway, 19.-20.04.15 Bergen, Norway, 28.04-29.04 (crew change)

Projects:

- Climate and plankton in the North Sea and Skagerrak (IMR 14385),
- Early life history dynamics of North Sea fishes (IMR 14387).
- Monitoring of radioactivity in Norwegian waters (IMR 14379-01)
- Inventory of marine Copepoda and Cladocera (Crustacea) in Norway (COPCLAD; IMR 14534)
- Hydrozoan pelagic diversity in Norway (HYPNO, UiB)
- Viking Bank Sandeel study

2. Introduction

The North Sea Ecosystem spring cruise has been run since 2010 by the Institute of Marine Research (IMR) as a multi-purpose survey. The cruise covered hydrography, chemistry, phytoplankton and zooplankton as well as fish eggs and fish larvae for the IMR projects "Monitoring of climate and plankton in the North Sea Skagerrak", and "Early life history dynamics of North Sea Fishes". The cruise also included monitoring of radioactive contamination, and sampling for two projects within the Norwegian Taxonomy Initiative, on hydrozoa (HYPNO) and copepods (COPCLAD). The survey area of the North Sea Ecosystem cruise 2016 included both northern North Sea and the Skagerrak

The objectives of the North Sea Ecosystem Cruise 2016 were:

1) To sample pre-selected stations along standard transects for physical, chemical and biological parameters in the Northern North Sea and Skagerrak.

2) To map the abundance, distribution and species composition of phytoplankton, zooplankton, and early life stages of fish (eggs and larvae).

3) To undertake two process studies (northwestern North Sea and Skagerrak) to investigate the spatial, vertical and diel distribution of fish eggs and larvae and their potential predators and prey.

4) To determine the horizontal and vertical distribution of sandeel larvae (*Ammodytes* spp) in the vicinity of Viking Bank (sandeel habitat).

5) To monitor radioactive contamination in Skagerrak

6) To collect species of pelagic Hydrozoa

2.1 Monitoring of plankton, biogeochemistry and hydrography in the North Sea and Skagerrak (IMR 14385)

The aim of the IMR monitoring project «Climate and plankton in the North Sea and Skagerrak« is, 1) to collect and analyze biological, chemical, and physical data to characterize and understand the causes of variability in the North Sea and Skagerrak at the seasonal, and interannual scales, and 2) to provide multidisciplinary data sets that can be used to establish relationships among the biological, chemical, and physical variability. The monitoring activity includes one regional coverage per year (the spring survey in April/May) in addition to sampling along three standard transects 4-12 times a year (Utsira-StartPoint, Hanstholm-Aberdeen and Torungen-Hirtshals).

The spring survey on plankton and hydrography in the North Sea - Skagerrak has been carried out by the Institute of Marine Research since 2006. From 2006 to 2014, the survey was undertaken as a combination of two cruises running in parallel: "The Environmental cruise" (Miljøtoktet on RV / GM Dannevig) in the Skagerrak, and the North Sea plankton survey (usually on RV/ Johan Hjort) in the northern North Sea. In 2010, sampling of fish eggs and fish larvae was included in the sampling program, and the survey was renamed to "The North Sea Ecosystem Cruise". Since 2015, the former two spring surveys has been combined into one single cruise, covering both the northern North Sea and the Skagerrak.

2.2 Early life history dynamics of North Sea fishes (IMR 14387)

The IMR project "Early life history dynamics of North Sea fishes" aims to determine the distribution and abundance of fish eggs and larvae in the northeastern North Sea, and to link studies on the early life history of fish with zooplankton. The survey provides depth integrated distribution of fish eggs and larvae that can be related to the zooplankton and physical oceanographic data from the standard sections in the northern North Sea. In addition, studies are undertaken to investigate the vertical and diel distribution of fish eggs and larvae and their potential predators and prey.

2.3. Viking Bank sandeel study

The last two days of the cruise were dedicated to studies on the Viking Bank. The objective was to determine the horizontal and vertical distribution of sandeel larvae (*Ammodytes* spp) in the vicinity of Viking Bank (sandeel habitat).

2.4 Inventory of marine Copepoda and Cladocera (Crustacea) in Norway (COPCLAD, IMR 14534)

Collection of zooplankton samples were made as part of the project COPCLAD (Inventory of marine Copepoda and Cladocera in Norway, 2015-2017). The project is funded by the Norwegian Taxonomy Initiative (NTI) and aims to perform an inventory of marine planktonic copepods and water fleas in the Norwegian EEC and the Arctic Ocean.

2.5 Monitoring of radioactivity in Norwegian waters (IMR 14379-01)

Water samples are collected by IMR once a year from Skagerrak, for analyses of radioactive contamination (cesium-137). This project contributes to the national monitoring program "Radioactivity in the Marine Environment (RAME)" which is coordinated by the Norwegian Radiation Protection Authority.

2.6 Hydrozoan pelagic diversity in Norway (HYPNO)

Samples of gelatinous zooplankton were collected as part of the NTI project "HYPNO" (Hydrozoan pelagic diversity in Norway). The project studies the species composition of pelagic Hydrozoa in several environments along the Norwegian coast, with photographic documentation and DNA barcoding of 16S and COI sequences of the encountered species.

3. Materials and Methods

3.1 Participation

Personnel participating in the cruise are listed (along with dates and their primary responsibilities) in Table 1. A scientific crew change was undertaken on the 19th April in Kristiansand, and a crew change on 28th April in Bergen.

Table 1: *Cruise participants*

Name	Role	Research group	Dates	
Tone Falkenhaug	Cruise leader (1st part)	Plankton 434	11.04	- 19.04
Kjell Gundersen	Biogeochemistry	Plankton 434	11.04	- 19.04
Lena Omli	Plankton	Plankton 434	11.04	- 28.04
Magnus Johannessen	Plankton	Plankton 434	11.04	- 28.04
Alina Rey	Fish larvae	Plankton 434	11.04	- 28.04
Richard Nash	Cruise leader (2nd part)	Pelagisk fisk 433	19.04	- 11.05
Eli Gustad	Plankton	Plankton 434	19.04	- 28.04
Julio Erices	Plankton	Plankton 434	28.04	- 11.05
Jon Rønning	Plankton	Plankton 434	28.04	- 11.05
Mona Ring Kleiven	Plankton	Plankton 434	28.04	- 11.05
Jan Henrik Simonsen	Fish larvae	Plankton 434	28.04	- 11.05
Asgeir Steinsland	Instrument	Elektr. instrument. 620	11.04	- 28.04
Jarle Kristiansen	Instrument	Elektr. Instrument. 620	11.04	- 11.05
Ingve Fjeldstad	Instrument	Elektr. Instrument. 620	28.04	- 11.05
Aino Hosia	Gelatinous zoopl.	Guest (UiB)	11.04	- 19.04

Table 2. *Sampling equipment*

Equipment	Samples
CTD with water bottle rosette	Hydrography, Chemistry, Phytoplankton
Algae net (10µm)	Phytoplankton
WP2 (25 m^2, 180 µm)	Zooplankton
WP3 (1m^2, 1000 µm)	Gelatinous zooplankton
MOCNESS (1m^2, 180 µm)	Zooplankton
Gulf VII (40 cm diameter, 280 µm)	Fish larvae
PUP (5 cm, 65 µm) fitted on Gulf	Prey items for fish larvae
Multinet MAXI (0.5 m^2, 390 µm)	Fish larvae
MIK with MIKeyM	Fish larvae

3.2 Narrative

The cruise program was undertaken according to Table 3. Maps of the cruise track and stations are presented in Figure 1a-c. Sampling was undertaken over a 24h basis.

The vessel left Bergen at 20:00 UTC on 11th April 2016, and headed north to the first station on the transect Utsira-StartPoint (59.28ºN; 5.03ºE) which was undertaken on 12th April at 11:40 UTC.

16th April: A short call was made in Hanstholm (Denmark) at 8:20-11:00 UTC.

On 16-18th April, sampling was made along transects in the eastern Skagerrak. Allowance was not given by the Swedish Ministry of Defence to sample the innermost stations on the transect "Gøteborg-Fredrikshavn" (Stn 1; 57.55ºN;11.53ºE) and "Måseskjær" (Stn 2; 58.98ºN;11.22ºE). Due to strong wind and heavy sea conditions, the MOCNESS was not launched on the last station on the transect "Väderö" (Stn 309/310). This station was completed on 18th April at 11:20 UTC, and no further sampling was possible due to adverse weather conditions. The ship headed southwards towards Denmark, and anchored in the lee of Skagen during the night, waiting for the storm to calm.

On 19th April at 06:30 UTC sampling was resumed along the transect "Torungen-Hirtshals". Due to time constraints, only three stations were sampled on Torungen-Hirtshals. The last station (Station 313; 58.13°N; 9.18°E) was completed on 19th April at 15:00 UTC whereupon the vessel headed for Kristiansand.

On the 19th-20th April a call was made in Kristiansand for a scientific crew change (Table 1)
20th-22nd April: Sampling of Oksøy-Hanstholm and three short transects along western Denmark. Allowance was not given to sample the innermost stations on the Danish transects (within 12 Nm; Danish Ministry of Foreign affairs): Huseby Klit- stn 1; Knude Dyb-stn 1; Harboør-stn 1.

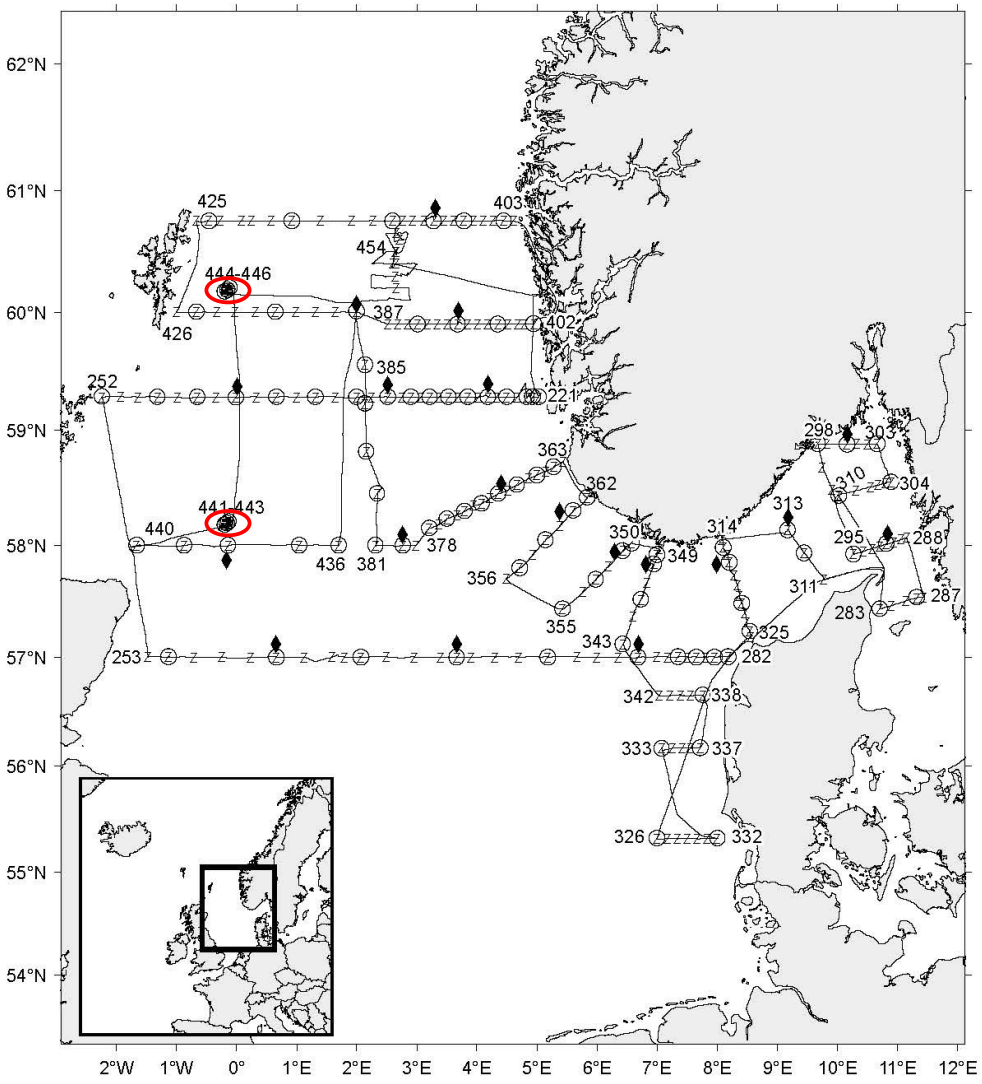
On the 27-28th April a call was made in Bergen for crew change (Table 1).

2nd May: South central Process Station (58.2°N-0.1°W).
5th May: The Shetland process station (60.2°N-0.1°W).
7th May: Viking bank studies.

The last station was completed on 8th May at 21.27 UTC whereupon the vessel headed for Bergen where it arrived on the 9th May at 06:50 UTC.

Table 3: *Cruise program with CTD station numbers*

Date	Time (UTC)	Activity	Station number
11.04.2016	20:00	**Departure Bergen**	
12.04.2016	01:14	Transect "Utsira-StartPoint"	221-252
14.04.2016	12:34	Transect " Aberdeen-Hanstholm" (west-east direction)	253-282
16.04.2016	08:20	**Call in Hanstholm, Denmark**	
16.04.2016	21:11	Transect "Göteborg-Fredrikshavn"	283-287
17.04.2016	00:51	Transect "Måseskär»	288-295
17.04.2016	16:06	Transect "Jomfruland-Skagen»	296-297
17.04.2016	19:30	Transect "Jomfruland-Koster"	298-303
18.04.2016	04:20	Transect "Väderö"	304-309/310
19.04.2016	06:36	Transect "Hirtshals-Torungen" (south-north direction)	311-313
19.04.2016	19:00	**Call in Kristiansand 20-21th April.** Scientific crew change.	
21.04.2016		**Vessel depart Kristiansand**	
20.04.2016	11:30	Transect "Oksøy-Hanstholm" (north-south direction).	314-325
21.04.2016	11:33	Transect "Knude Dyb"	326-332
21.04.2016	23:44	Transect "Huseby Klit"	333-337
22.04.2016	07:09	Transect "Harboør"	338-342
22.04.2016	16:09	Transect "Lindesnes SSW" (south-north direction)	343-349
23.04.2016	06:58	Transect "Lista mot SSW" (north-south direction)	350-355
23.04.2016	22:03	Transect "Egerøya mot SSW" (south-north direction)	356-362
24.04.2016	13:02	Transect " Jærens Rev mot SW og W" (eastern part)	363-381
25.04.2016	16:04	Stations between transects	382-385
26.04.2016	05:51	Transect "Slotterøy mot SV" (eastern part)	386-402
		Call in Bergen 27th- 28th April. Crew change.	
28.04.2016	19:42	Transect "Feie-Shetland" (east-west direction)	403-425
30.04.2016	09:14	Transect "Slotterøy mot SV" (western part)	426-435
01.05.2016	14:24	Transect " Jærens Rev mot SW og W" (western part)	436-440
02.05.2016	01:33	South central Process station	441-443
05.05.2016	01:22	Shetland Process Station	444-446
07.05.2016	01:00	Viking Bank studies	447-454
09.05.2016		Last station completed.	
09.05.2016		**Arrival Bergen. End of cruise**	



Cruise no 2016106 "G.O.Sars"
11 April–9 May 2016

z CTD st.no 221–454
O Plankton st. (WP-II-net)
♦ Plankton st. (Mocness)

Standard sections:
Utsira W st.no 221-252
Hanstholmen–Aberdeen st.no 253-282
Gøteborg–Fr.havn st.no 283-287
Måseskjær st.no 288-295
Jomfruland–Koster st.no 298-303
Vaderø st.no 304-310
Oksøy st.no 314-325
Lindesnes st.no 343-349
Lista st.no st.no 350-355
Egerøy SW st.no 356-362
Jærens Rev SW/Wst.no 363-381, 436-440
Slotterøy W st.no 387-402, 426-435
Fedje-Shetland st.no 403-425

Figure 1a: *RV "G.O. Sars" 11.04-09.05.2016. Cruise track with stations for CTD casts and plankton sampling. Process stations are indicated with red circles.*

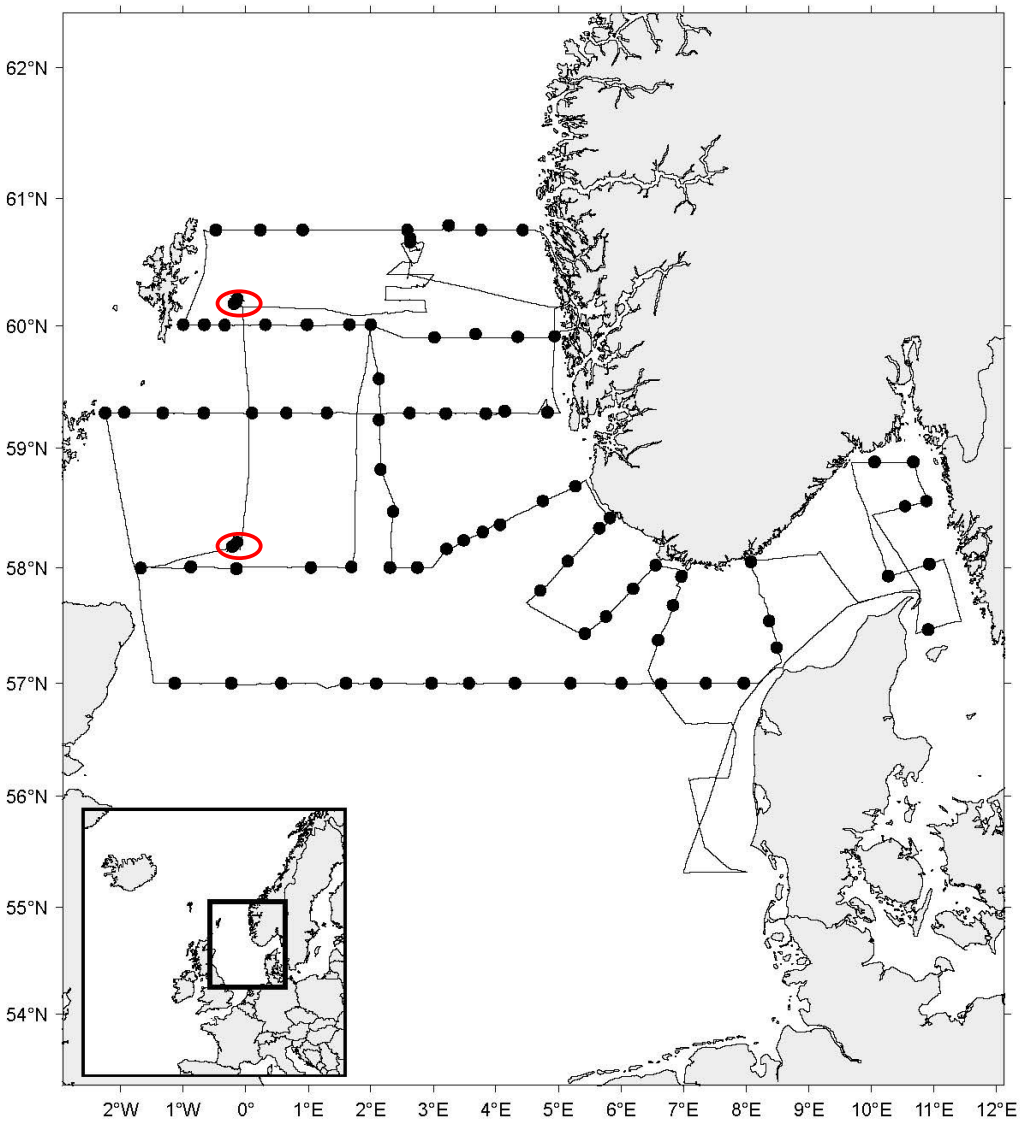


Figure 1b: *RV "G.O. Sars" 11.04-09.05.2016. Cruise track with stations for Gulf VII (with PUP sampler). Process stations are indicated with red circles.*

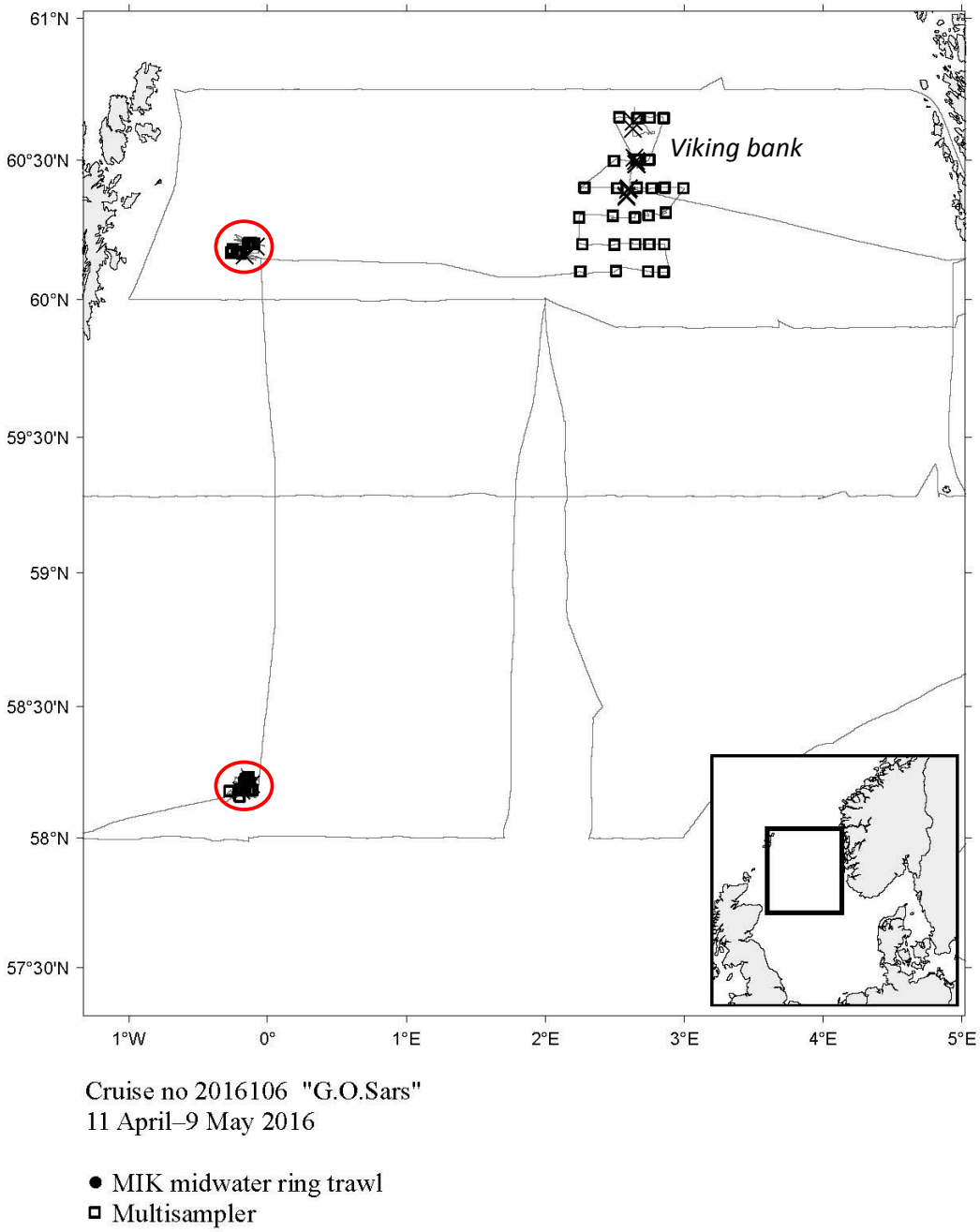


Figure 1c: *RV "G.O. Sars" 11.04-09.05.2016. Cruise track with stations for MIK and Multinet (MAXI). Process stations are indicated with red circles.*

3.3 Hydrography

Seawater temperature and salinity were measured at all stations with a SeaBird Electronics SBE911 CTD profiler fitted with a water bottle rosette. The Secchi disk was not used. However, as a measure of the clarity of the water, the depth when the CTD rosette sampler was no longer visible was recorded during day time, and used as a proxy for Secchi-depth.

3.4 Biogeochemistry

Water samples for nutrient analysis (nitrate, nitrite, phosphate, silicate) were collected from all CTD stations at all depths. From each depth 20 mL aliquots of sample water were collected in clean polyethylene bottles to which was added 0.2 mL chloroform, before storage at +4 ^{0}C until further analysis at the Chemistry Laboratory at Institute of Marine Research (IMR) in Bergen. Chlorophyll pigment samples (268 mL) were taken from eight depths between the surface and 100 m and collected on GF/F glassfiber filters. The filters were stored at -20 ^{0}C to be analyzed for Chlorophyll-a and Phaeopigments (Chl-a, Phaeo) at the Chemistry Laboratory at IMR, Bergen. Details of analytical methods can be found at: http://www.imr.no/om_havforskningsinstituttet/fasiliteter/kjemilaboratoriet_1/kjemilaboratoriet/uorganisk_kjemi/analytiske_tjenester/nb-no .

Extra samples were taken from surface waters along the Utsira-V transect (1 L) and phytoplankton cells were collected on 25 mm Whatman GFF glassfiber filters. The filter samples were flash frozen and stored at -80 ^{0}C until analysis at the Helmholtz Center for Ocean Research Kiel at GEOMAR in Kiel, Germany. Each sample was extracted in acetone and analyzed using a high-pressure liquid chromatography (HPLC), and the phytoplankton community composition was determined from 14 different pigments using a factor analysis algorithm (Mackey et al. 1996).

Samples for Total Nitrogen and Phosphorous (Tot NP) were collected at selected stations in the Skagerrak and along the Danish west coast (Appendix 1). Samples were obtained from the CTD water bottles at 5, 10, 20, 30 and 100 m (or deepest possible if bottom depth < 100 m). Sampling and handling of samples was carried out in accordance with the existing manuals (Hassel et al., 2013). Analyses of Tot NP was performed by the laboratory at IMR, Flødevigen.

3.5 Phytoplankton

Samples for phytoplankton species composition and abundance were obtained from predefined stations along the transects (Appendix 1). Samples for algal cell counts were obtained from the CTD water bottles by mixing equal amounts of water (25 mL) from 5, 10, 20 and 30 m depth and fixed in Lugol. A further sample of 100 ml was also taken from 50 m depth. Qualitative phytoplankton samples at some of the stations were obtained from vertical net tows with the "Algae-net" (10 µm mesh; 0.1 m^2 opening; 30-0 m), and fixed with formalin.

3.6 Zooplankton

Zooplankton were sampled by vertical tows with WP-2 plankton nets (0.25 m^2 opening; 180 µm mesh size) from the bottom to the surface, and from 200-0 m, bottom depth permitting. Additional stratified sampling of zooplankton was carried out by MOCNESS. Oblique tows were made from 5 m above bottom while releasing nets at standard depths (Table 4)

Table 4. *MOCNESS standard depth of the IMR zooplankton monitoring in the North Sea – Skagerrak*

Depth strata	MOCNESS net number
0-bottom	0
bottom-400	1
400-300	2
300-200	3
200-150	4
150-100	5
100-50	6
50-25	7
25-0	8

Large medusae and ctenophores were removed from whole samples, and the displacement volume of each species was recorded. The remaining zooplankton sample was split in two parts by a Motoda plankton splitter: one part was fixed in 4 % borax buffered formaldehyde for species identification and enumeration. The other half was used for estimation of biomass (dry weight): samples were fractionated into three fractions (180-1000µm, 1000-2000µm and >2000µm) and placed on pre-weighted aluminum trays, dried at 60°C for 24 hours and kept in a freezer until return to Bergen. From the >2000 µm size fraction euphausiids, shrimps, amphipods, fish and fish larvae were counted and their lengths measured separately before drying. In addition, Chaetognaths, *Pareuchaeta* sp. and *Calanus hyperboreus* from the >2000 µm size fraction were counted and dried separately (but sizes not measured).

Samples were not split on the transect Hanstholm-Aberdeen, due to shallow depths and small sampling volumes. Instead, two WP2-tows were made: 1/1 sample was fixed in 4% formaldehyde, and 1/1 sample was fractionated and dried for later biomass measurements.
All dry weights were determined at the IMR plankton laboratory in Bergen after the cruise.
Details on the sampling procedures are found in the IMR Plankton Manual (Hassel et al., 2013-updated version).

3.7 Zooplankton samples for genetic studies

MOCNESS net number 0 was kept open during lowering of the MOCNESS. This sample is to be considered as a non-quantitative integrated sample from the entire water column and was fixed on 96% un-denatured (i.e., drinkable) ethyl alcohol for later genetic analyses as part of the COPCLAD project. After 24 hours, the ethanol was replaced with fresh ethanol, and the sample kept in the freezer (-18°C).

3.8 Fish eggs and larvae

Sampling for fish eggs and larvae was undertaken at selected stations along each of the standard North Sea transects (see Figure 2 and Appendix 1) using a Gulf VII high-speed sampler (Nash *et al.* 1998) (76 cm frame). The sampler was fitted with a 40 cm diameter nose cone, a General Oceanics flow meter was fitted slightly off centre in the nose cone (for quantities of water filtered) and a 280 or 425 µm mesh net. The sampler was towed at 5 knots in a double oblique haul to 100m depth or to within 10m of the bottom. All fish eggs and larvae were sorted from the samples at sea, sub-sampling being undertaken where necessary, and preserved in 4% seawater and Borax buffered formalin.

In addition a PUP sampler (5cm diameter nosecone with a General Oceanics flow meter for water volume sampled and a 65 µm mesh net) was fitted to the Gulf VII to provide samples of prey items for fish larvae. These samples were also preserved in 4% seawater and Borax buffered formalin.

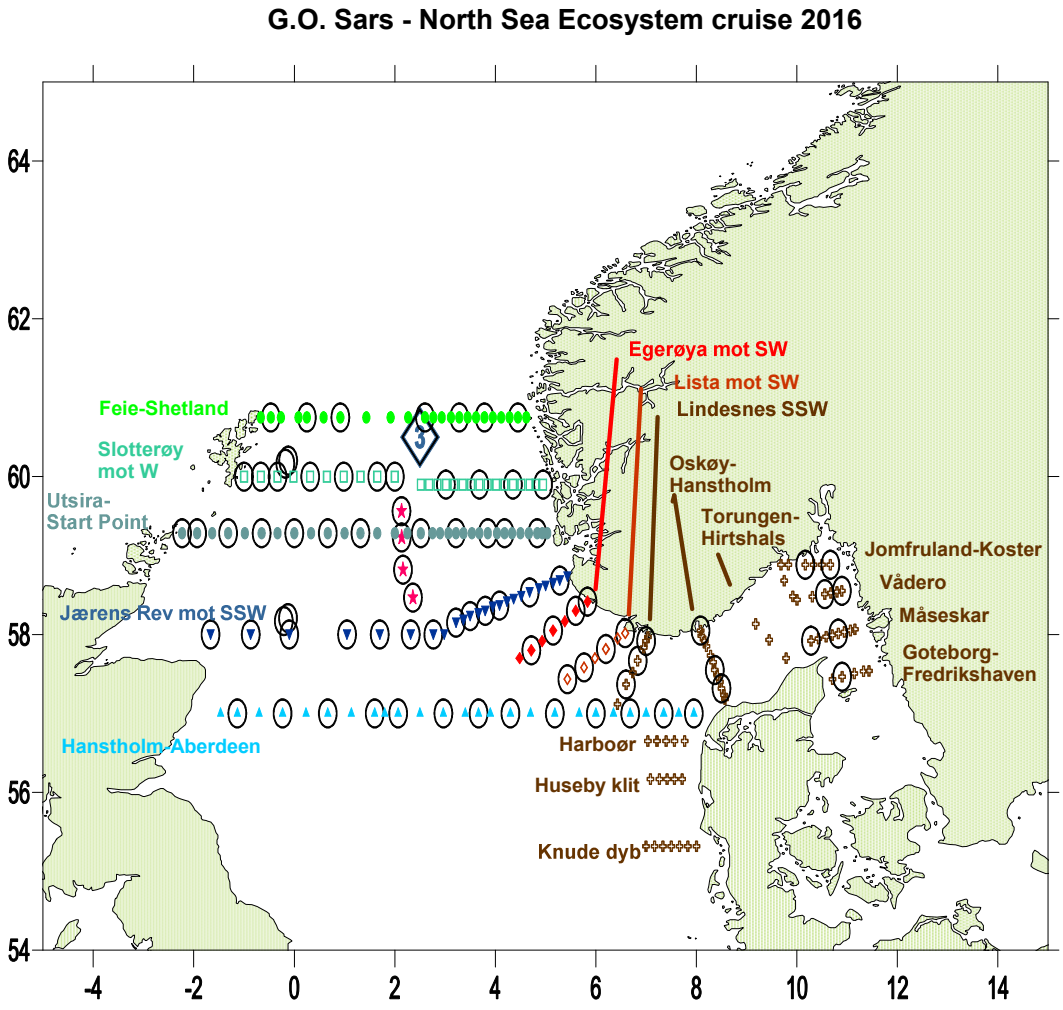


Figure 2. *Location of Gulf VII stations (open circles). CTD and Viking Bank study location also shown.*

3.9 Process station

The southern (South Central) and northern process stations (off Shetland, see Figure 2) were sampled using a combination of acoustics (5 x 5NM grid with transects spaced at 1NM), 3 Gulf VII and PUP net samples, 2 MIK and a series of Multinet tows. The layout for each process station is shown in Figure 3. The MIK was a standard 2m ring trawl with a 1.6mm mesh net and 500 µm final 1m and cod-end mesh and towed at 3 knots in a double oblique tow. The Multinet was a standard Hydrobios 'MAXI' (0.5 m^2) with 390µm mesh net, soft cod-ends and towed horizontally in a single oblique tow from depth to the surface at 3 knots. The target depths for the Multinet are given in Table 5. The sequence of sampling at each of the process stations is given in Table 6.

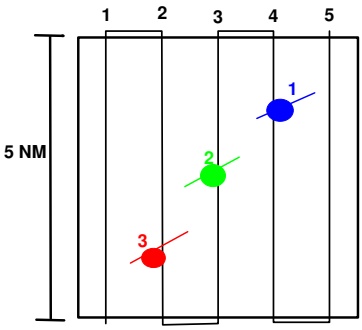


Figure 3. *Survey area layout for process studies. Lines 1-5 are acoustic transects, circles (1-3) with lines denote CTD stations plus Gulf VII high-speed plankton sampling (stations 1-3) and Multinet stations (1 and 3 only).*

Table 5. *Target sampling depths for Multinet (MAXI).*

Net number	Depth strata
1	100 – 75m
2	75 – 50m
3	50 – 30m
4	30 – 15m
5	15 – 0m

Table 6. Process station sampling sequences.

Sequence	Station number	Acoustic transects	CTD	WP II	Gulf VII+PUP	MIK	Multinet
1.		✓					
2.	1		✓	✓	✓		
3.	2		✓	✓			
4.	3		✓	✓	✓		
5.	3					✓	✓
6.	1					✓	✓
7.	1						✓
8.	3						✓
9.		✓					
10.	1						✓
11.	3						✓
Repeat 7-11							

NB: Sequencing of acoustic transects may change depending on processing time and the time of day/night.

3.10 Viking Bank sandeel study

Objectives: To determine the horizontal and vertical distribution of sandeel larvae (*Ammodytes* spp) in the vicinity of Viking Bank (sandeel habitat).

Sampling: Regular grid of stations sampled with a MAXI Multinet (5 depths) and a series of CTD casts across the sandeel habitat to characterise the water column (Figure 4). Sampling to progress both day and night to give an indication of diel variability in vertical distribution of sandeel larvae.

Sample processing: Samples to be examined for sandeel larvae only. All sandeels to be removed from the sample and counted. If time permits all sand eel to be measured. All sandeel to be preserved in Borax and seawater buffered 4% formalin. The remainder of the sample to be discarded. Note anything unusual in the comments column. Initially the samples were not retained. After the southern row was partially completed, all larvae were sorted, counted and preserved, from each net, at selected stations.

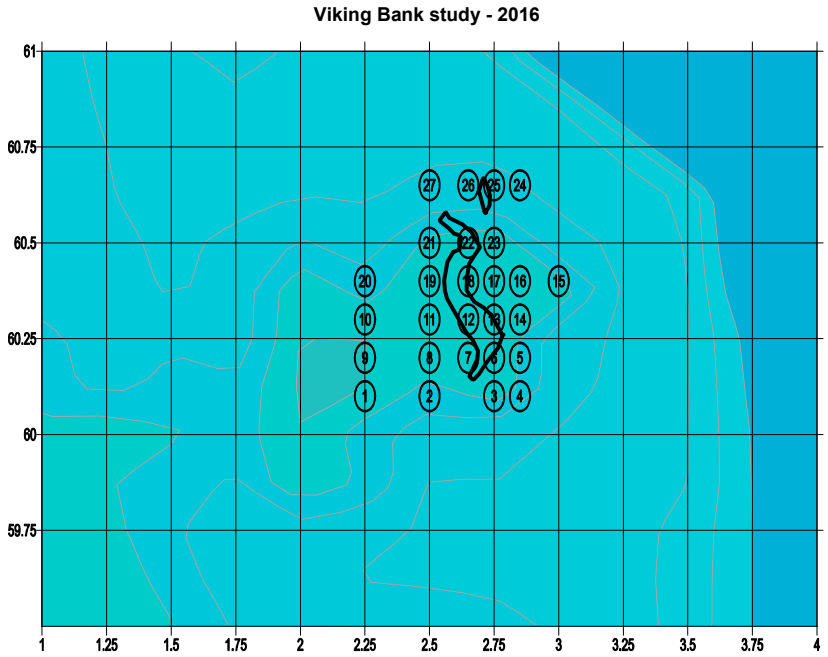


Figure 4. *Multinet station locations for the Viking Bank sandeel study. CTD casts (no water bottles) to be undertaken at stations 7, 12, 18, 22 and 26.*

To determine if larger larvae were present on Viking Bank two sets of vertically stratified MIK samplings were to be undertaken.

MIK

Towing speed: 3/3.5 knots
Initial haul: V-haul (5-7m off bottom)
Towing depth (separate hauls): 10m, 30m and 60m (lowered to depth reasonably quickly, retrieval reasonably quickly). Adjust wire length to keep net in approximately +/- 2.5m.
Tow duration: Approximately 20 min at prescribed depth
Viking Bank Stations: 22 and west side of 18

Sequence:

Station location	Type of haul	Station location	Type of haul
22	CTD	18W	CTD
	V-haul		V-haul
	10m		10m
	30m		30m
	50m		50m

Notes: *A. Rapid speed to depth and retrieval is to minimise fishing time at non-target depths.*
B. Flow meter readings at the end of each haul.

3.11 Radioactivity

Water samples for analyzes of radioactive contamination (project number 14379-01) are normally collected from 10 preselected stations in Skagerrak (Figure 5). In 2016, samples were collected from 9 of these stations (Table 7). One of these sample was collected from RV G.M. Dannevig, as the station was not covered from RV G.O.Sars (see Table 8). On each station 50 liters of water from the seawater inlet (surface) were filled into 2 x 25 L plastic cans for later analyses for Cs-137 at the Chemistry Laboratory at IMR, Bergen.

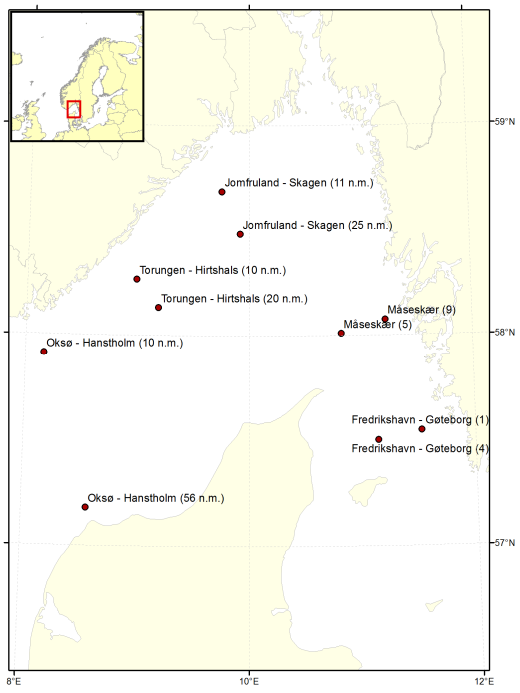


Figure 5. *Stations where seawater has been collected yearly since 2008 for analyses of Cs-137*

Table 7. *Stations where samples of seawater were collected in April 2016 for monitoring of cesium-137*

Date	Station	Latitude	Longitude	
20.04.2016	316	57,92	8,17	Oksø-Hanstholm 10 n.m
21.04.2016	325	57,18	8,56	Oksø-Hanstholm 56 n.m
09.05.2016*	137*	58,26*	8,98*	Torungen-Hirtshals 10 n.m.
19.04.2016	313	58,13	9,18	Torungen-Hirtshals 20 n.m.
17.04.2016	298	58,88	9,68	Jomfruland-Skagen 11 n.m.
17.04.2016	297	58,68	9,76	Jomfruland-Skagen 25 n.m.
17.04.2016	290	58,03	10,94	Måseskär (9)
17.04.2016	294	57,95	10,43	Måseskär (5)
16.04.2016	285	57,51	11,14	Fredrikshavn- Göteborg (4)

*Sampled from RV G.M. Dannevig

3.12 Sampling of pelagic Hydrozoa (HYPNO)

Opportunistic sampling of gelatinous zooplankton for DNA barcoding was undertaken 12-19 April. Plankton samples were screened alive and selected specimens (n= 63) were individually picked and noted as removed from the sample before fixation (Table 9). Morphology of interesting live specimens was then documented photographically prior to individual fixation in ethanol for later sequencing of 16S and COI.

Table 8. *Summary of sampling (number of stations) on transects and process stations*

	Station	CTD	**Nutrients (N, P)**	**Tot NP**	**Chl*a***	**Mixed algal sample**	**Phytopl. net 10µm**	**Water (radio-activity)**	**WP-2 180µm**	**MOCNESS 180 µm**	**WP3 1000 µm**	**Gulf VII (+PUP)**	**MIK**	**Multinet MAXI**
Utsira-W	221-252	32	32	0	32	9	0	0	16	3	3	12	0	0
Aberdeen-Hanstholm	253-282	30	30	8	30	14	0	0	7	3	4	13	0	0
Gøteborg-Fredrikshavn	283-287	5	5	5	5	3	0	1	2	0	0	1	0	0
Måseskjær	288-295	8	8	8	8	4	0	2	2	1	0	2	0	0
Jomfruland -Skagen	296-297	2	0	0	0	0	0	2	0	0	0	0	0	0
Jomfruland-Koster	298-303	6	6	6	6	4	0	0	3	1	0	2	0	0
Väderô	304-309/310	6	6	6	6	4	0	0	2	0	0	2	0	0
Torungen-Hirtshals	311-313	3	3	0	3	1	0	1	2	1	0	0	0	0
Oksøy-Hanstholm	314-325	12	12	12	12	6	1	2	3	1	0	3	0	0
Knude Dyp	326-332	7	7	7	7	6	2	0	2	0	0	0	0	0
Huseby	333-337	5	5	5	5	4	2	0	2	0	0	0	0	0
Harboør	338-342	5	5	5	5	4	2	0	2	0	0	0	0	0
Lindesnes SSV	343-349	8	7	0	7	1	1	0	4	1	3	3	0	0
Lista mot SV	350-355	6	6	0	6	1	1	0	4	1	3	3	0	0
Egerøya mot SV	356-362	7	7	0	7	1	1	0	4	1	0	4	0	0
Jærens Rev mot SSV	363-381	19	19	0	19	5	2	0	10	2	0	8	0	0
Stations between transects	382-385	4	4	0	4	0	0	0	4	0	0	4	0	0
Slotterøy mot SV	386-402	17	17	0	17	5	5	0	5	1	0	5	0	0
Feie Shetland	403-425	23	23	0	23	6	6	0	6	1	0	7	0	0
Slotterøy mot SV-rest	426-435	10	10	0	10	3	2	0	3	1	0	7	0	0
Jærens Rev mot SSV -rest	436-440	5	5	0	5	3	3	0	5	1	0	5	0	0
South central Process St	441-443	3	0	0	3	0	0	0	3	0	0	2	2	10
Shetland Process St	444-446	3	0	0	3	0	0	0	3	0	0	2	2	10
Vikingbank studies	447-454	8	0	0	8	0	0	0	0	0	0	0	8	27
SUM stations		**234**	**217**	**62**	**231**	**84**		**8**	**94**	**19**	**13**	**85**	**12**	**47**

4. Results and Discussion

4.1 Hydrography

The hydrographic coverage of the survey area provides information on the main characteristics of the water masses in the northern North Sea and in the Skagerrak. The lowest surface salinities are typically found in the Skagerrak due to the Baltic outflow of low-saline waters through the Kattegat and the supplement of fresh water from local rivers along the Skagerrak coast. The resulting low-saline surface waters then follow the Norwegian coast westward out of the Skagerrak and northward along the coast, as the Norwegian Coastal Current (NCC).

Based on the hydrographic measurements from the Ecosystem Cruise from April 11 to May 9, the NCC can easily be identified in the resulting surface salinity map in the areas with the minimum values (Figure 6, upper panel). The NCC is normally located closer to the Norwegian southwest coast, but during April 2016 the main core was displaced slightly offshore, probably due to local winds from the north/northeast. The salinities in the North Sea and Skagerrak area were close to normal during this cruise.

The surface temperatures varied from about 6-6.5^{o}C along the Norwegian southwest coast to 7.5-8^{o}C in the northwestern North Sea. These are typical spring conditions when the local waters of the NCC are slightly colder than the Atlantic waters dominating the northern North Sea. In relation to the long-term average, both the surface temperatures and the deep-water temperatures were close to normal or slightly warmer than normal.

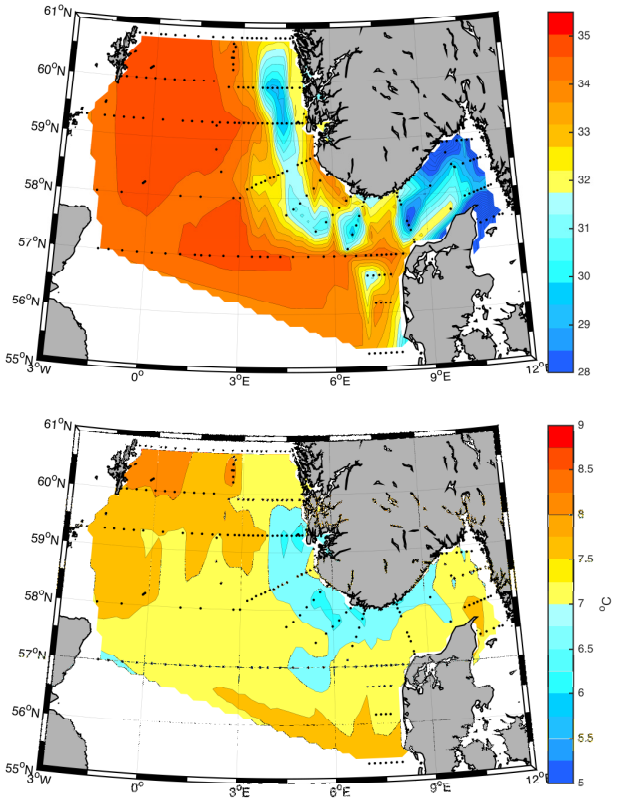


Figure 6: *Salinity (upper panel) and temperature (lower panel, in °C) at 5m depth based on the hydrographic stations (marked with black dots) taken between 9/4 and 29/4 2015.*

4.2 Satellite imagery

Figures 7a and 7b show the evolution of the mean surface chlorophyll-a concentrations from MODIS satellite imagery. The southern North Sea (circa 55-57°N) had persistent phytoplankton bloom activity throughout much of the cruise and it appeared that the sea currents transported some of this north-eastward toward Norway. The increase in chlorophyll concentration in the north-west part of the North Sea (60-62°N) over the period of the cruise represents the development of the spring bloom in that region.

Figure 7c shows the MODIS derived chlorophyll concentration anomaly relative to the decade 2003-2012. In contrast to last year, when there was higher than normal chlorophyll around the western coast of southern Norway, this year had slightly below normal chlorophyll concentrations in the same area. Higher than normal chlorophyll concentration was observed in the central North Sea around 56°N, suggesting this region may have been the more productive in 2016.

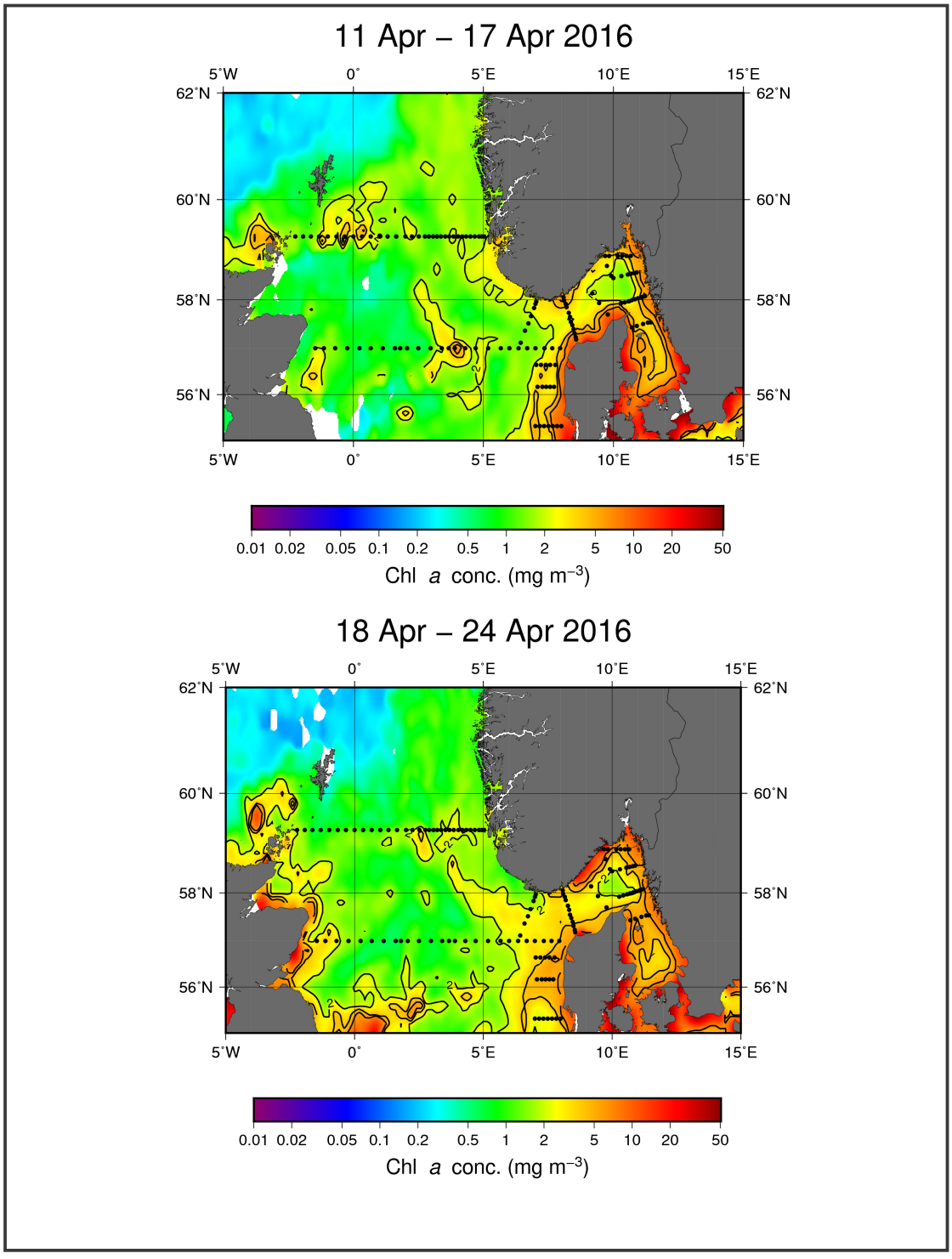


Figure 7a: *Surface mean chlorophyll-a (Chl-a) concentrations as detected by MODIS during the Ecosystem cruises in the North Sea and Skagerrak region, for the period April 11 – April 24, 2016.*

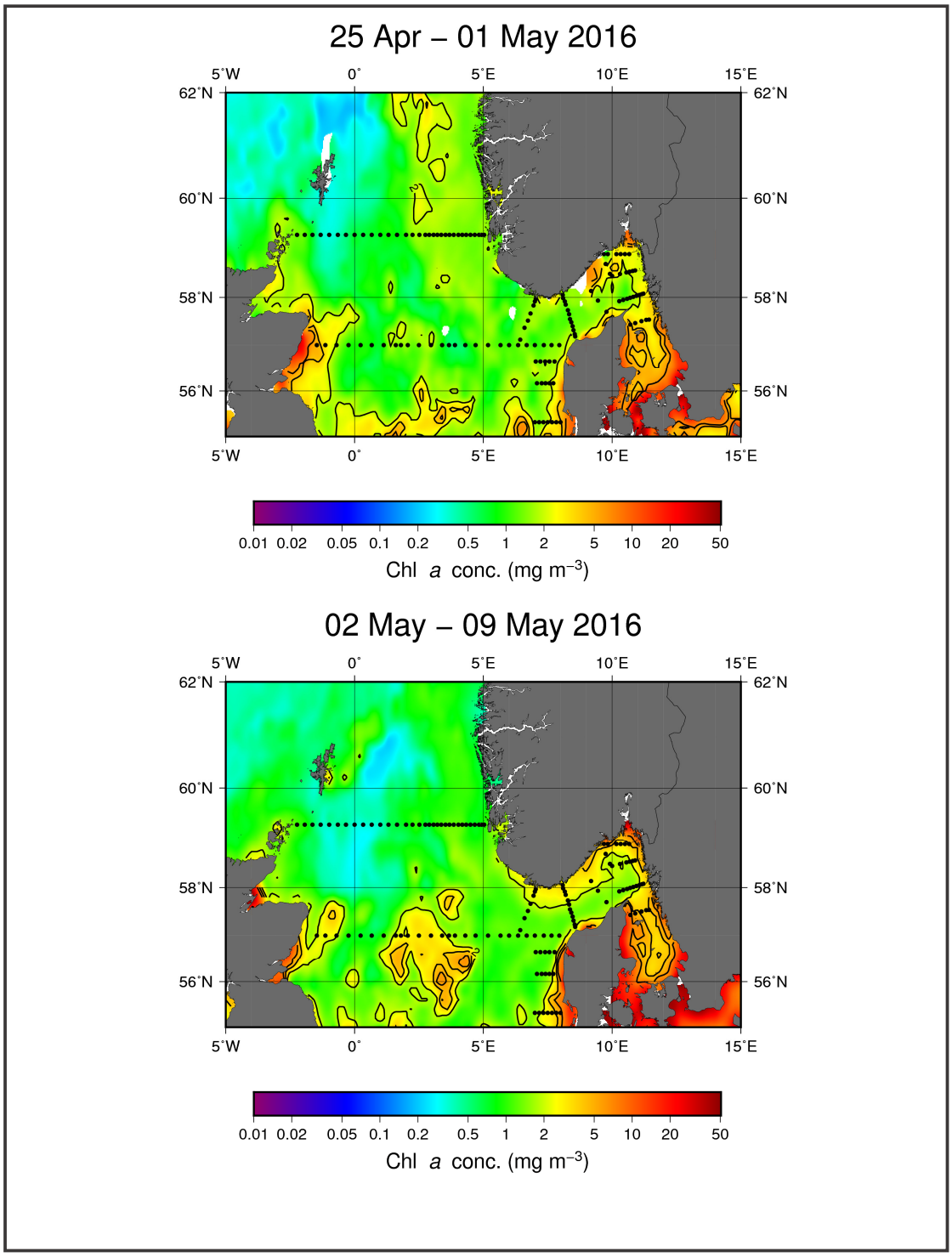


Figure 7b: *Surface mean chlorophyll-a (Chl-a) concentrations as detected by MODIS during the Ecosystem cruises in the North Sea and Skagerrak region, for the period April 25 – May 9, 2016.*

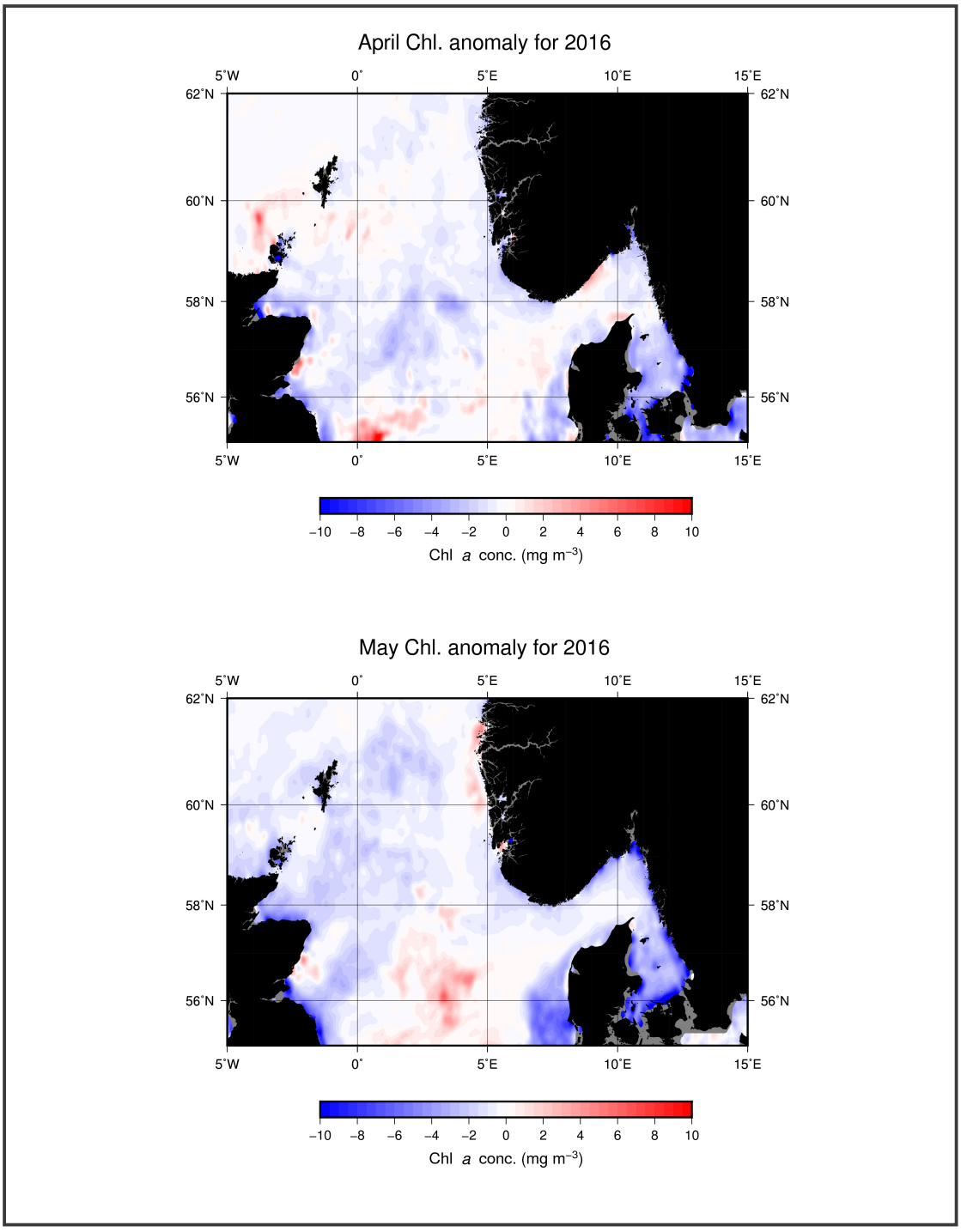


Figure 7c: *Surface mean chlorophyll-a (Chl-a) MODIS concentration anomalies as detected by MODIS in April and May 2016. Anomalies are calculated relative to the decade 2003-2012.*

4.3 Biogeochemistry

Two phytoplankton biomass maxima (measured as Chl-a) were found in surface waters in this survey (Figure 8). One Chl-maximum was found in the north-western part of the North Sea, immediately south of major dissolved nutrient concentrations (DIN, SiO4) and due east of the Orkneys. The other Chl-maximum was detected off the west coast of Denmark, immediately north of a major plume of DIN that showed low concentrations of PO4 and SiO4. Surface concentrations of SiO4 were high in the Norwegian Trench and northwards in the Norwegian Coastal Current (Figure 8), but remained low relative to DIN and PO4 in the entire region investigated (Figure 8). Outside the nutrient plume extending for the English Channel, surface PO4 concentrations remained higher than DIN. In fact, the N:P-ratio remained higher than the Redfield relationship of 16 in the entire region investigated (Figure 9) only with one exception; the surface nutrient plume off the west coast of Denmark contained unusually low concentrations PO4 and SiO4 levels relative to DIN (Figure 8).

The factor analysis algorithm of phytoplankton cell pigment compositions along the Utsira-V transect (Figure 10A) showed a relatively low presence of diatoms and an overall predominance of cryptophytes. Haptophytes and chlorophytes were abundant in surface waters of the Coastal Current (sample stations closest to Norway), while the remaining groups (dinoflagellates and chrysophytes) appeared low along the entire transect. The calculated dissolved inorganic nutrient ratios showed N:Si ratios ranging from 1-6 and N:P ranged from 2-10 (Figure 10B). The higher N:Si-ratios may suggest that some of the phytoplankton communities along the Utsira-V transect were deficient in SiO4, but all stations visited appeared to have an abundance of PO4.

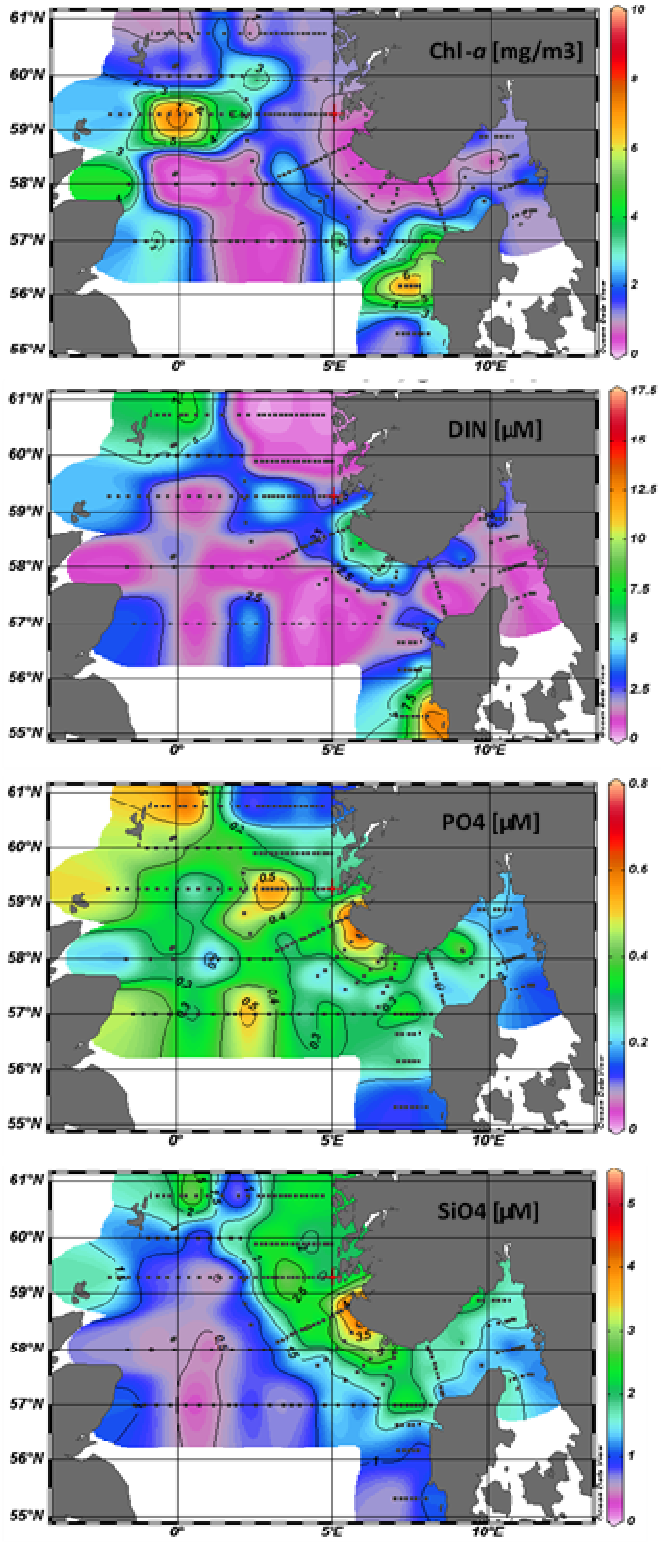


Figure 8: *Surface concentrations of Chlorophyll-a (Chl-a), combined nitrate + nitrite (Dissolved Inorganic Nitrogen; DIN), Phosphate (PO4) and Silicate (SiO4) from samples collected at 0-10 m depth) during the Ecosystem cruise in the North Sea and Skagerrak region, April 12 – May 5, 2016.*

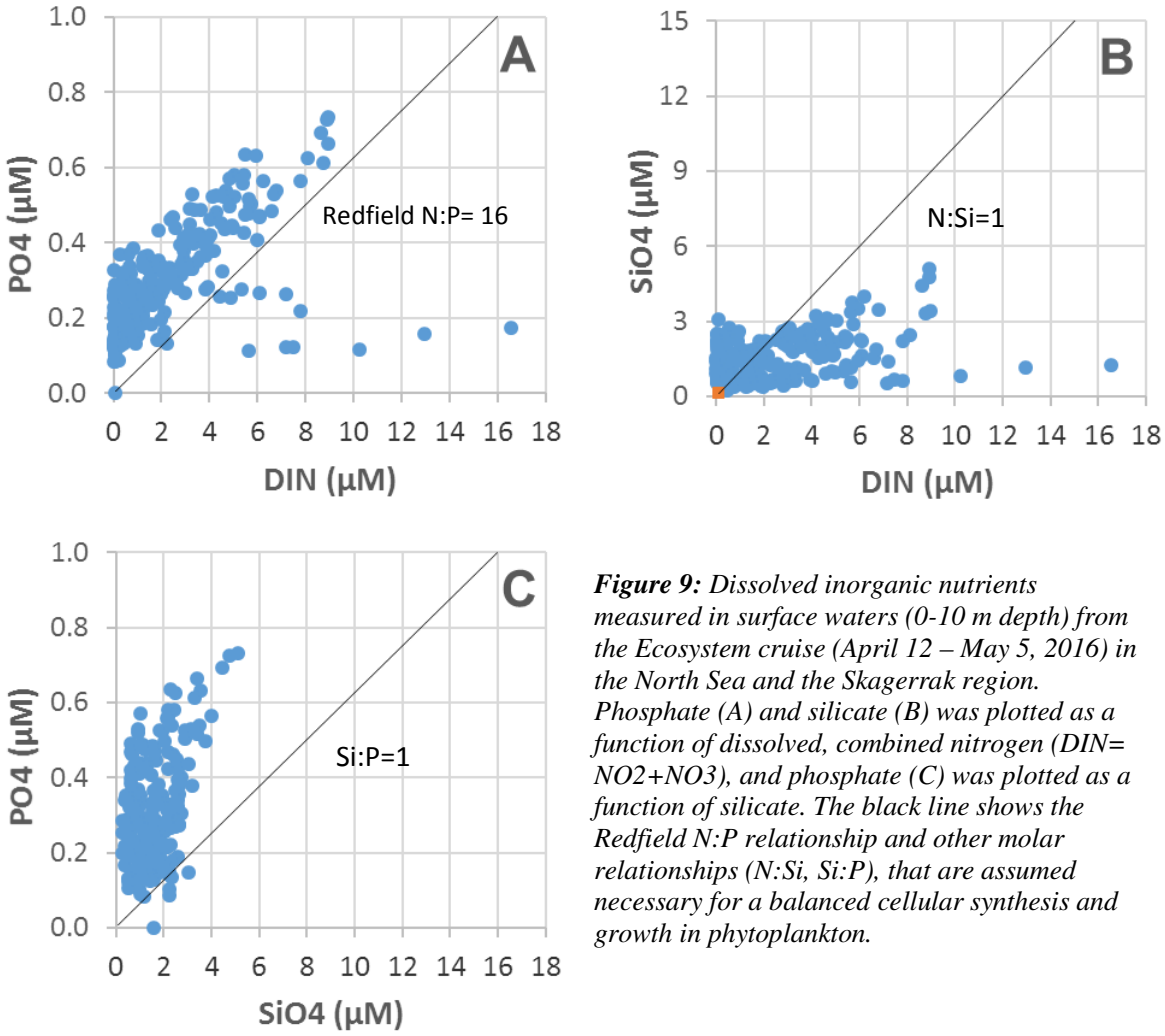


Figure 9: *Dissolved inorganic nutrients measured in surface waters (0-10 m depth) from the Ecosystem cruise (April 12 – May 5, 2016) in the North Sea and the Skagerrak region. Phosphate (A) and silicate (B) was plotted as a function of dissolved, combined nitrogen (DIN= NO2+NO3), and phosphate (C) was plotted as a function of silicate. The black line shows the Redfield N:P relationship and other molar relationships (N:Si, Si:P), that are assumed necessary for a balanced cellular synthesis and growth in phytoplankton.*

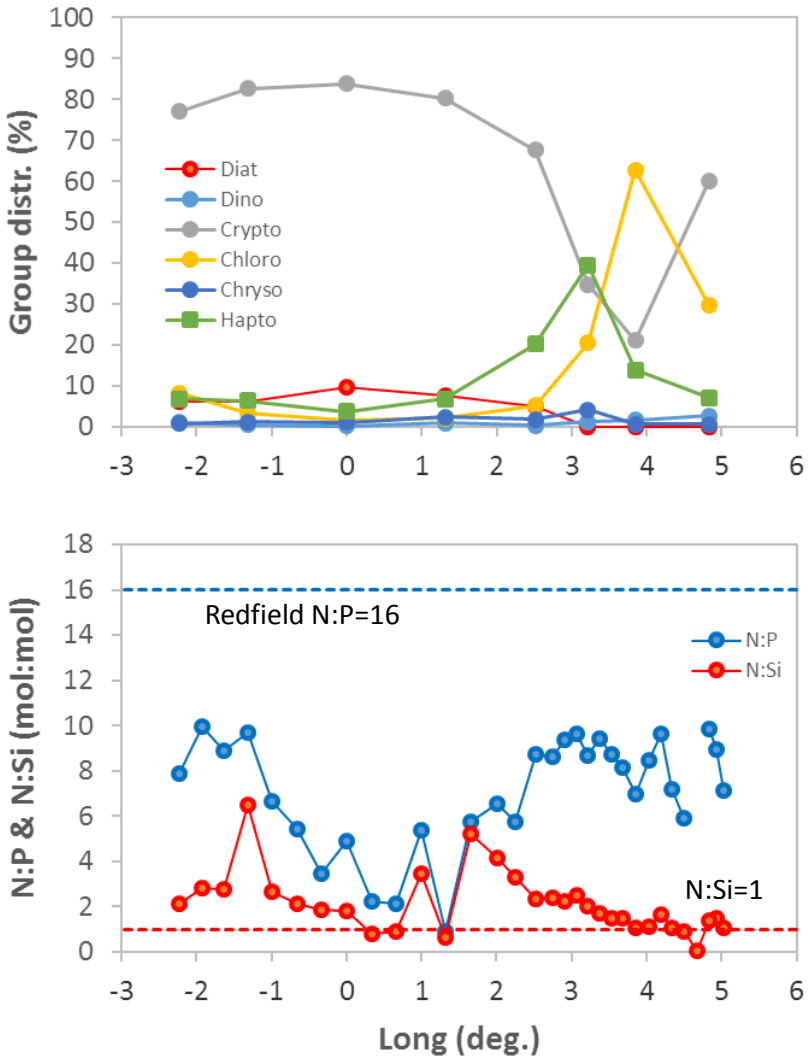


Figure 10: *Phytoplankton groups (upper panel) and dissolved inorganic nutrient-ratios (lower panel) in surface waters along the Utsira-transect (59.3 °N) during the Ecosystem cruise (April 12 – May 5, 2016) in the North Sea and the Skagerrak region. The phytoplankton groups identified by their pigment composition (upper panel) are diatoms (Diat), dinoflagellates (Dino), cryptophytes (Crypto), chlorophytes (Chloro), chryspphytes (Chryso) and haptophytes (Hapto). The blue horizontal dotted line (lower panel) shows the Redfield N:P relationship and the red dotted line shows the N:Si molar relationship assumed necessary for a balanced cellular synthesis and growth in phytoplankton.*

4.4 Phytoplankton taxa

Two changes in sampling method were made on this year's cruise. As described in Section 3.5 above, phytoplankton samples from the CTD water bottles were taken from 0-30 m and also from 50 m representing the upper and lower photic zones respectively. Greater sample

volumes (now 100 mL) were taken for microscopy analysis, now using the Utermohl method, with the larger sample volume enabling better resolution of individual species abundance.

The most frequent phytoplankon identifications made by microscopy were small unidentified flagellate and monader, which dominated at most of the stations sampled. Dinoflagellates (*Gymnodinium sp* and *Gyrodinium sp*) were found at some of the stations in the northern (Fedje-Shetland) and central North Sea (Hanstholmen-Aberdeen and Utsira transects). Cryptophyceae were also an important species at many stations throughout the region and also in the transects around Denmark. Diatoms (*Thalassiosira* and *Chaetoceros sp*) were also significant on the Fedje-Shetland, and Utsira transects and the coccolithophore *Emiliania huxleyi* was identified at some of the stations on the Utsira and Hanstholmen-Aberdeen transects.

Some *Pseudchattonella sp* was observed on the Koster-Jomfruland transect, and other localised occurrences of it were seen in the coastal waters around Denmark and Norway in April, with some limited fish mortalities.

Net tows in the southern North Sea indicated the presence of a mucilaginous species, most likely *Phaeocystis sp*. These correspond with the region of increased chlorophyll concentration evident in the MODIS satellite imagery (Figure 7a,b). Toward the end of the cruise period the satellite data show that a coccolithophore bloom began to develop in this region (around 56°N) with other subsequent coccolithophore blooms developing during the remainder of May and into June, in this region and to the north.

4.5 Zooplankton

Depth integrated zooplankton biomass (g dry weight/m^2) in April 2016 is presented as total biomass (>180µm, Figures 11 and 12) and as three different size fractions (Figure 13 a-c). The highest biomass values were registered in the eastern area, above the Norwegian Trench (15.2 g/m^2, Figure 11). An area of relatively low values along the SW Norwegian coast was related to the offshore displacement of the coastal current (NCC), due to local winds from the north/northeast (See chapter 4.1). The average zooplankton biomass for the whole survey area was 5.6 g m^{-2} which is below the long term average 2005-2015 (Figure 12).

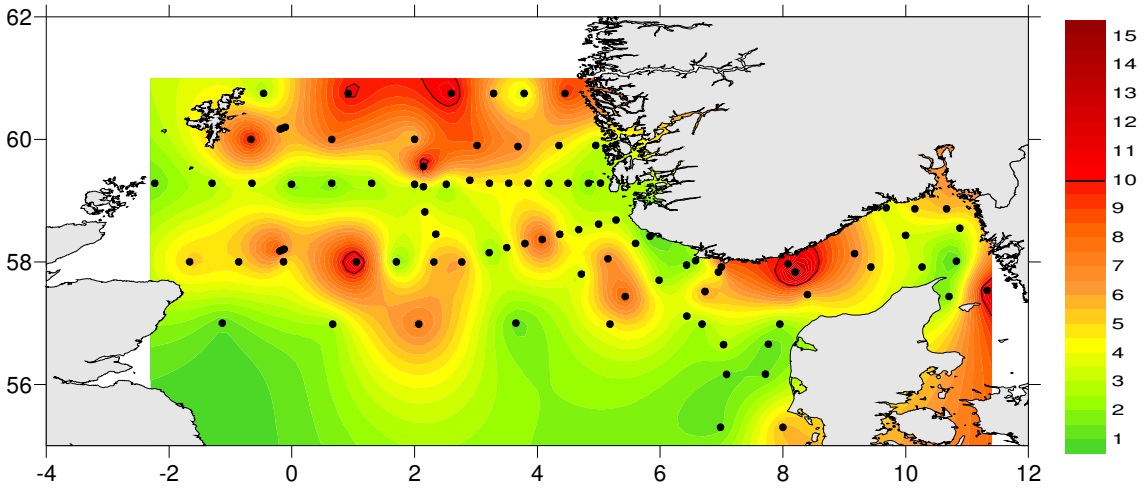


Figure 11. *Zooplankton biomass (g dry weight m^{-2}) in depth integrated net tows (bottom – surface, WP2, 180 µm).*

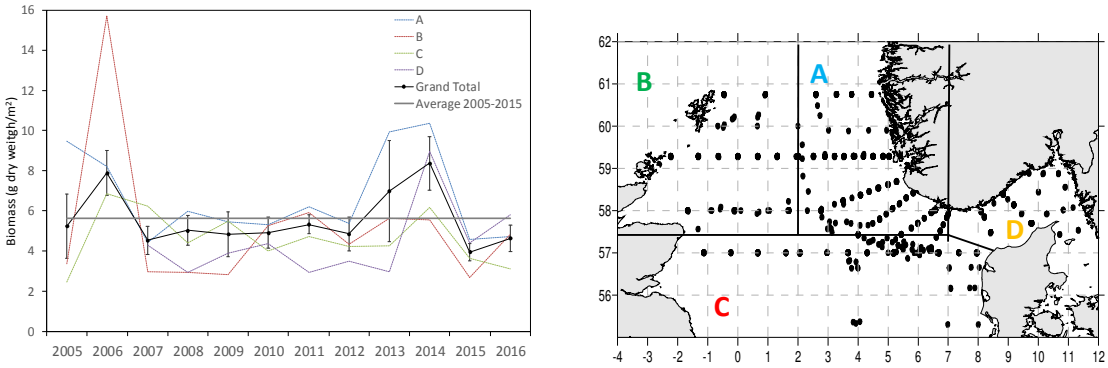


Figure 12. *Average zooplankton biomass in April/May 2005-2016. Average for the entire survey area (black line) and for three different sub-areas (A-D, see Figure b). Grey line indicates the long term average 2005-2015. Vertical lines are confidence interval.*

The 180-1000 µm size fraction (Figure 13 a) contains small sized copepods (*Oithona* sp, *Pseudocalanus* spp), juvenile stages of large copepods (*Calanus*) and benthic larvae. However, this fraction may also contain phytoplankton. The highest biomass of this smallest fraction was observed in the northwest (Shetland) and in the southeast. In contrast, the 1000-2000 µm size fraction, which is dominated by *Calanus* spp, was mainly distributed along the Norwegian Trench (Figure 13b). Similarly, the largest size fraction > 2000 µm was found in the deeper areas over the Norwegian trench. (Figure 13c). This fraction contains large sized copepods (*Calanus hyperboreus, Paraeuchaeta norvegica)*, amphipods, decapod shrimps, chaetognaths and gelatinous zooplankton (Figure 14).

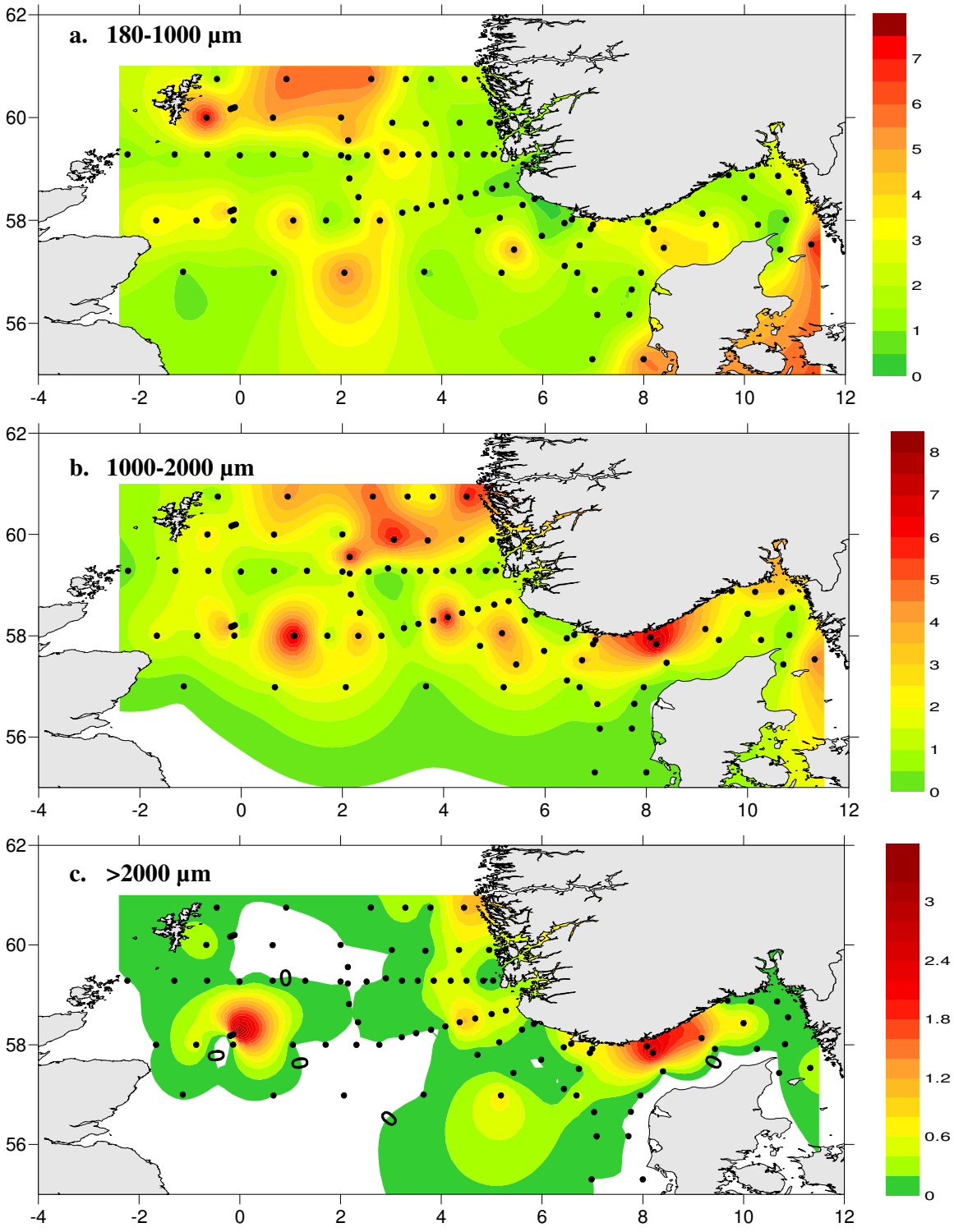


Figure 13. *Zooplankton biomass (g dryweight m-2) in depth integrated net tows (bottom – surface, WP2, 180 µm). Biomass in a) Size fraction 180-1000 µm, b) Size fraction 1000-2000 µm, c) Size fraction >2000 µm.*

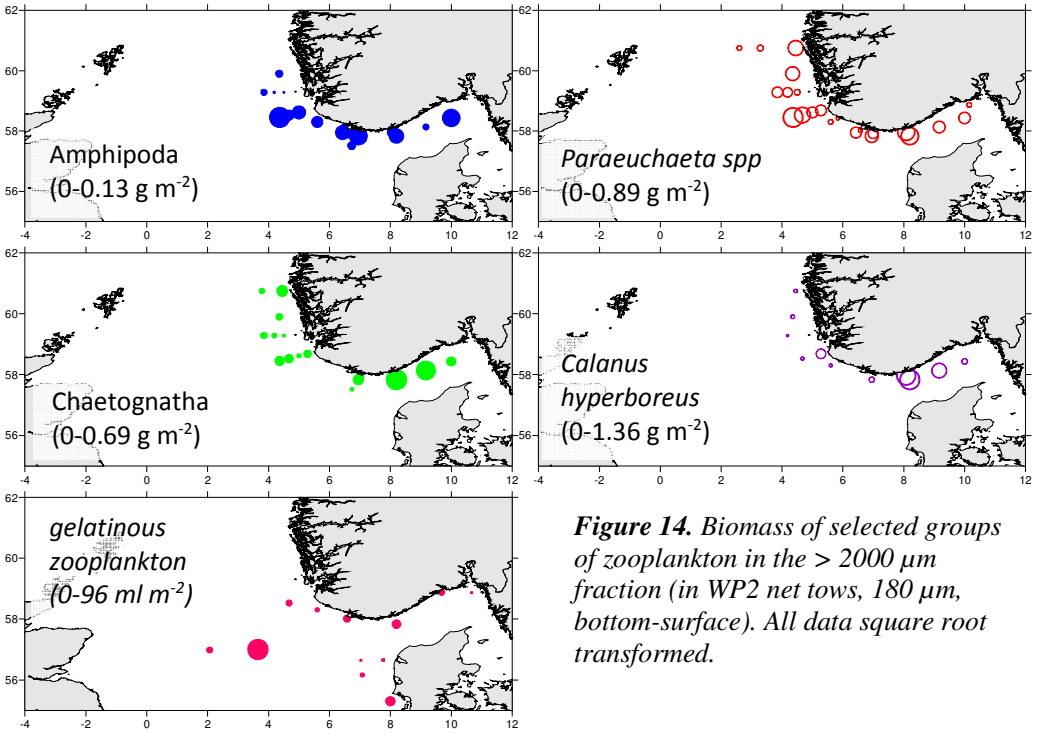


Figure 14. *Biomass of selected groups of zooplankton in the > 2000 µm fraction (in WP2 net tows, 180 µm, bottom-surface). All data square root transformed.*

4.6 Fish eggs- and larvae

Fish eggs and larvae occurred all over the northern North Sea, however, the highest densities tended to be in the north and west toward Shetland (Figure 15).

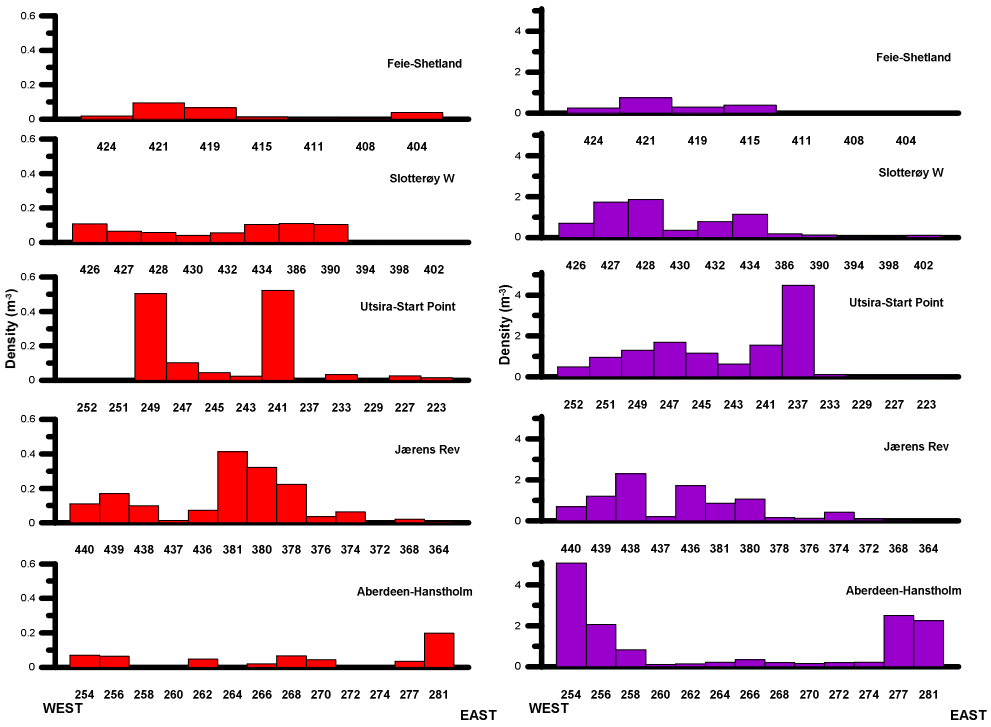


Figure 15. *Densities of fish eggs (left, red) and larvae (right, purple) caught on the standard transects across the northern North Sea using a Gulf VII high speed plankton sampler. Stations are arranged from west to east as left to right. See Figure 16 for spatial locations.*

In 2016, larvae were not identified and counted as gadoids, flatfish or others for all stations so it is not possible to provide a detailed spatial breakdown by major taxonomic groups as in previous years. However, in general gadoid larvae predominated in the northwestern part and flatfish larvae tended to dominate the shallower southeastern part of the survey area (Figure 16). Very few larvae occurred over the deep water of the Norwegian trench.

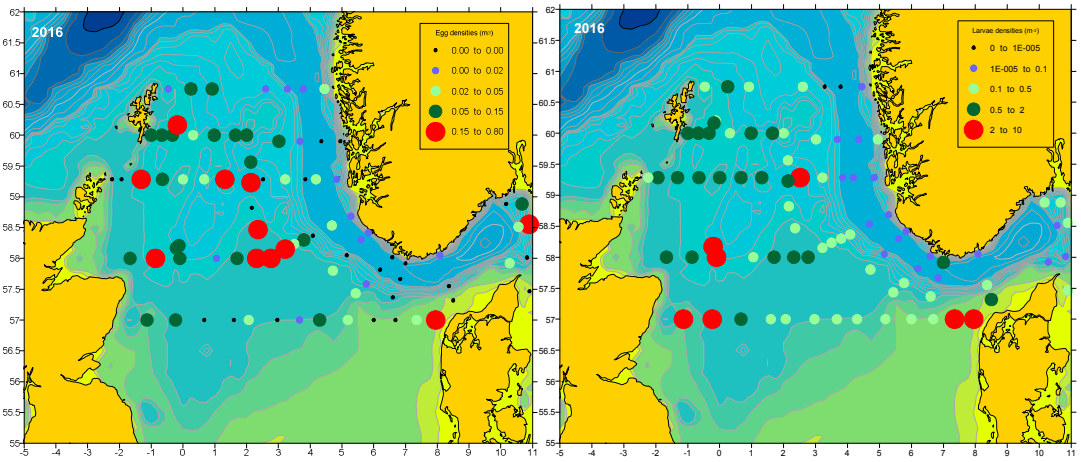


Figure 16. *Distribution of larvae caught with the Gulf VII high speed plankton sampler.*

4.7 Process studies

The acoustics data are not immediately available. The Gulf VII samples indicate similar composition and densities of larvae as seen on the transects to the north and south (see Figure 15). In this area the larvae consisted mainly of gadoids and non-flatfishes.

There were higher densities of eggs in the northern station with both stations indicating variation through the water column (Figure 17). There were similar densities of larvae at both the northern and southern station. In general the densities of larvae tended to be higher in the water column later in the day (Figure 18). The larvae data will be identified to species.

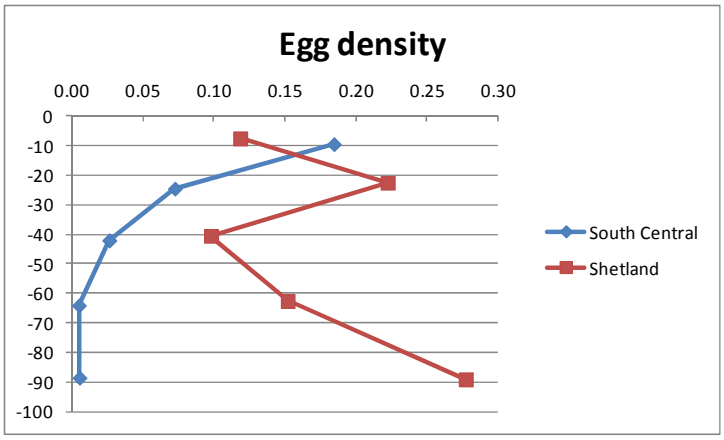


Figure 17. *Vertical distribution of eggs and larvae at the Shetland (1200 and 1500h UTC) and South Central (1600 and 1900h UTC) process stations. Densities are given in numbers* m^{-3}.

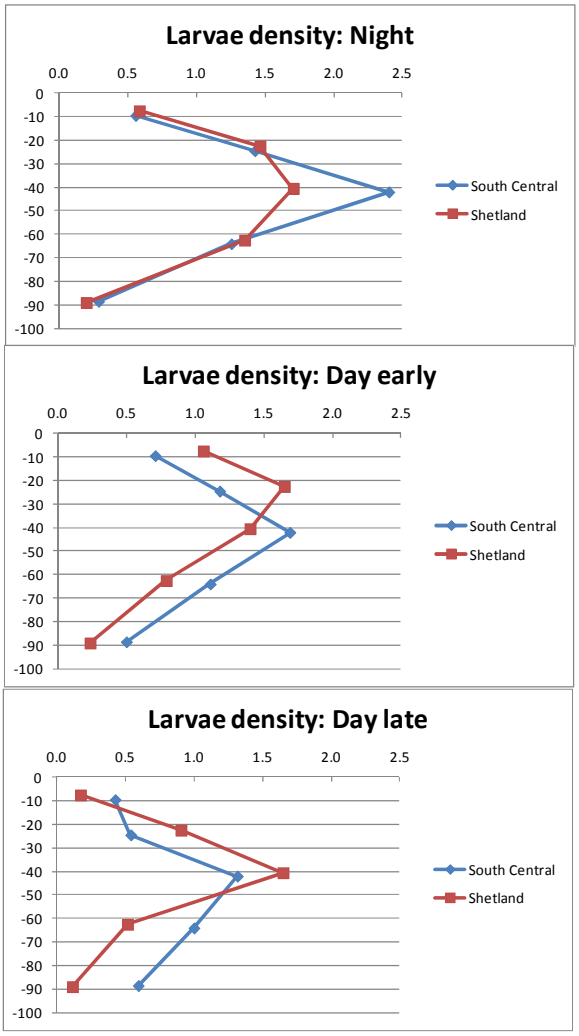


Figure 18. *Average vertical distribution of fish larvae at the Shetland and South Central process stations. Night = 2200-0400 UTC, Early day = 0400-1400 UTC, Late day = 1400-2200 UTC. Densities are given in numbers* m^{-3}.

4.8 Viking Bank Study

4.8.1 Sandeel larvae

No sandeel larvae were found in any of the Multinet (MAXI) samples nor the MIK vertically stratified samples at stations 18 and 22 (see Figure 18). Sandeel larvae were found in Gulf VII samples to the south of Viking Bank (see Figure 19). Either there were no larvae in the area, the larvae too large to be caught i.e. a gear selectivity problem, or spawning and hatching is much later in the northern area and thus the survey was too early. Which is the correct interpretation is unknown.

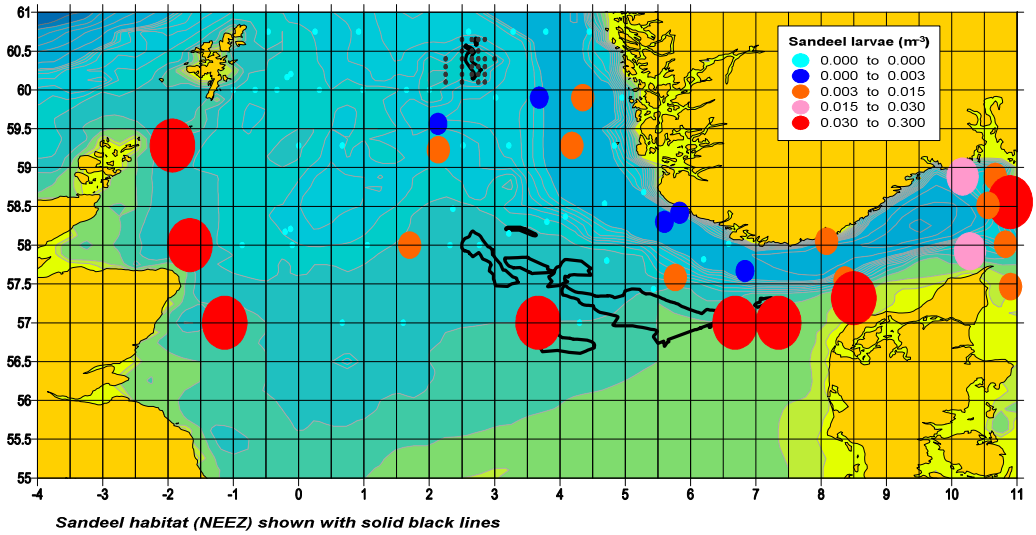


Figure 19. *Densities of sandeel larvae caught in the Gulf VII sampling over the northern North Sea in April/May 2016. The location of the Viking Bank Multinet and MIK sampling stations are given as dark grey dots.*

4.8.2 Other larvae

There were spatial differences in the abundance of larvae in the Viking Bank area with the western side generally having a greater abundance. These differences were compounded by diel differences in abundance with two of the western stations (20 and 21) also being sampled at night. In general, the highest abundances occurred in the mid water column (Figure 20).

The densities of larvae in the MIK samples were relatively low. In general, the lowest densities occurred in the centre of the water column with elevated densities in the deepest depth (Figure 21).

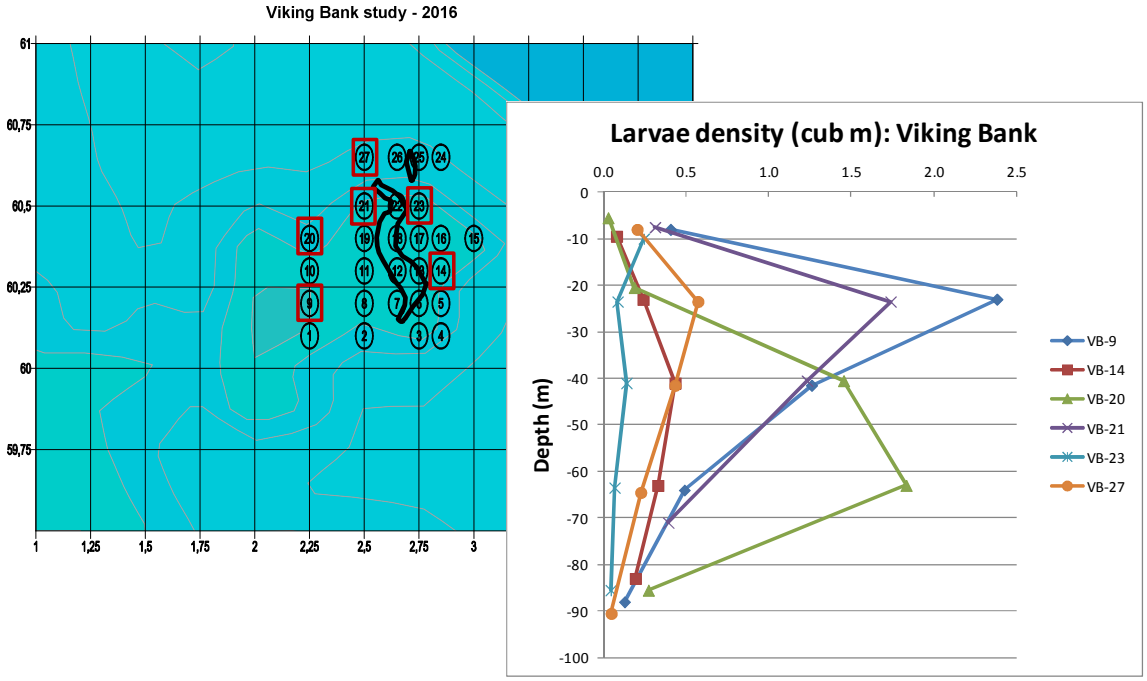


Figure 20. *Vertical distribution of larvae (m^{-3}) on Viking Bank. Stations where larvae were enumerated are shown with a red rectangle on the map. Stations 20 and 21 were sampled at night, all the remainder were sampled during daylight.*

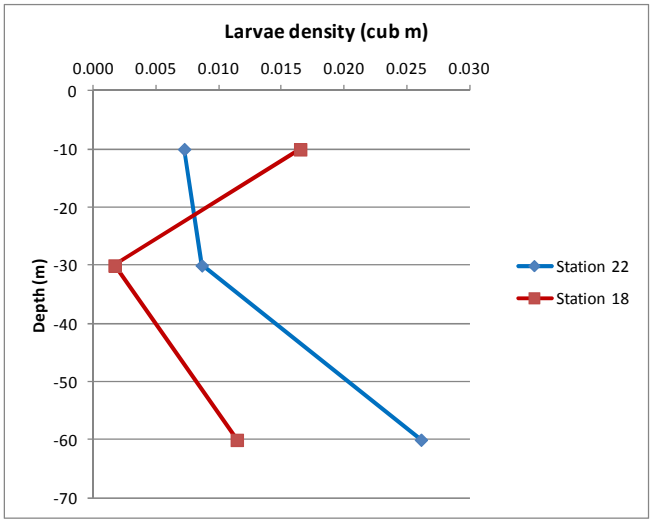


Figure 21. *Vertical distribution of fish larvae in MIK samples on Viking Bank. Both sets of samples were during day time.*

4.9 Radioactivity

The Baltic Sea is the largest source of radioactive contamination to Norwegian waters today. The reason for this is that land areas around the Baltic Sea received significant amounts of fallout from the Chernobyl accident. Run-off from these contaminated areas is transported with ocean currents from the Baltic Sea to Norwegian waters. In order to monitor the supply of cesium-137 (Cs-137) from the Baltic Sea to Norwegian waters, samples of seawater have been collected yearly since 2008 from the 10 stations shown in Figure 5.

The samples collected in 2015 have not yet been analysed. Results from 2008 to 2014 are shown in Figure 22. The highest activity concentrations of Cs-137 are, as expected, found at the stations nearest the outlet of the Baltic Sea. The data indicate a general decreasing time trend, but this is not evident at all stations. Yearly variations are due to variations in precipitation and run-off from land and oceanographic processes, among other things. The lowest levels are found at the station at the Oksø-Hanstholm section, near Hanstholm. This is as expected as seawater at this station has characteristics more like the North Sea.

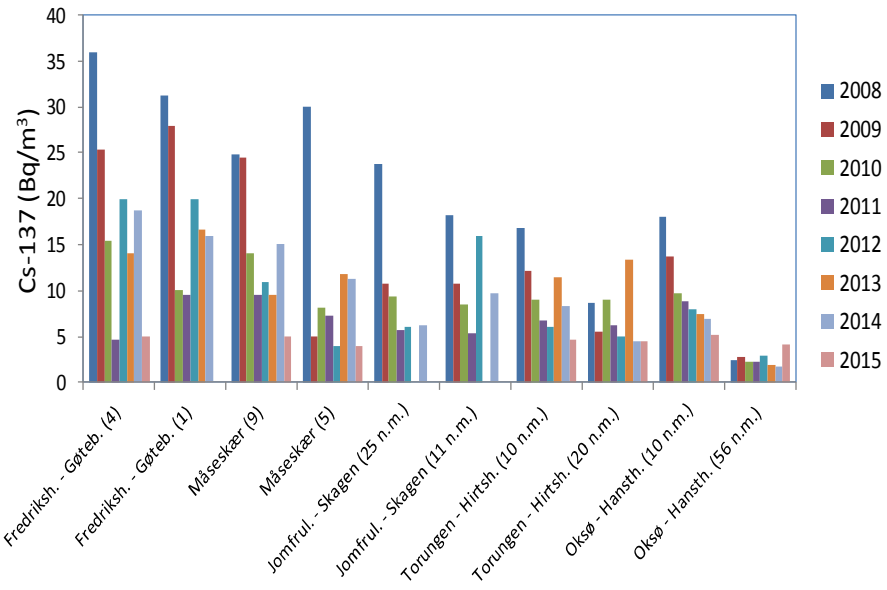


***Figure 22**. Activity concentrations of cesium-137 (Cs-137) (Bq/m^3) in samples of seawater collected yearly in the period 2008 – 2014 at the stations shown in Figure 5.*

4.10 Pelagic Hydrozoa (HYPNO)

Opportunistic sampling of pelagic Hydrozoa for DNA barcoding yielded material representing ~17 species, collected from 13 stations (Table 9). The WP3 samples were dedicated to gelatinous zooplankton. When samples were picked from samples collected with other gear (Table 9), the specimens were removed from the half of the sample later fixed in formalin. Note that this is NOT a complete list of gelatinous species or numbers in the sample. Both the

diversity and abundance of hydrozoans observed during the cruise appeared to be relatively low.

Table 9. *Specimens of gelatinous zooplankton sorted out from zooplankton samples by the HYPNO project*

Station	Gear	Taxon	numbers	notes
222	WP3	*Obelia* sp.	1	
222	WP3	*Nanomia* sp.	1	nectophore
222	WP3	cf *Euplokamis* sp.	1	
227	MOC1	*Dimophyes arctica*	2	anterior nectophore
227	MOC2	*Nanomia* sp.	1	nectophore
227	MOC3	*Agalma elegans*	2	athorybia larvae
227	MOC6	*Euphysa aurata*	1	
227	MOC2	*Nanomia* sp.	2	nectophores
241	Gulf	Unknown cnidaria	1	
243	WP2	*Plotocnida borealis*	1	ethanol
245	gulf	*Agalma elegans*	5	nectophores
245	gulf	*Nanomia* sp.	1	nectophore
245	gulf	*Agalma elegans*	3	Stems with pneumatophore
247	WP2	*Plotocnida borealis*	1	
309	WP2	*Nanomia cara*	5	nectophores
309	WP2	*Bythotiara murrayi*	1	
291	WP2	*Nanomia* sp.	3	nectophores
291	WP2	*Nanomia* sp.	1	stem with pneumatophore
291	MOC2	*Agalma elegans*	1	stem with pneumatophore
291	MOC2	*Agalma elegans*	4	nectophores
295	WP2	*Hydractinia borealis*	1	
295	WP2	*Aglantha digitale*	2	
298	WP2 gen	*Hydractinia areolata*	1	
298	WP2 gen	*Rathkea octopunctata*	3	
298	WP2	*Eutonina indicans*	1	juvenile
298	WP2	*Obelia* sp.	1	
298	WP2	cydippid larva	1	
300	MOC2	*Euphysa tentaculata*	1	
300	MOC3	*Mitrocomella polydiademata*	1	
312	WP2	cf *Hybocodon prolifer*	1	
312	WP2	*Cyanea* sp.	1	juvenile
312	WP2	*Mitrocomella polydiademata*	3	
313	WP2	*Dimophyes arctica*	5	anterior nectophore
313	MOC0	*Pasiphaea* sp.	1	with hydroid epibiont?
313	MOC2	*Bythotiara murrayi*	1	
313	MOC4	*Euphysa aurata*	1	

5 Acknowledgements

We greatly appreciate and thank the masters and crew onboard RV "G.O. Sars" for outstanding collaboration and practical assistance at the North Sea Ecosystem cruise 11 April – 9 May 2016. We are indebted to all the participants of the North Sea Ecosystem Cruise 2016 for their valuable work during collection and processing of samples.

6 References

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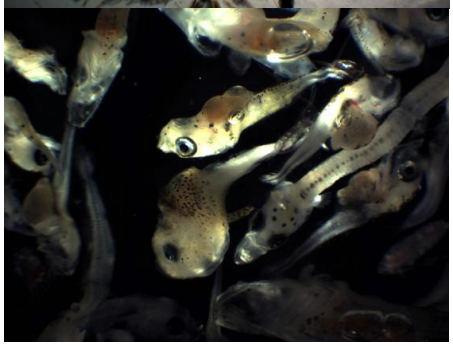
MOCNESS for vertically stratified samples of zooplankton.

Gulf VII high-speed plankton sampler with PUP net for sampling fish eggs and larvae.

Plankton community in the northern North Sea



Fish larvae community from the Utsira transect

NORDSJØEN OG SKAGERRAK										**FEIE - SHETLAND**						**April/May 2016**							
Tid:		23.3																						
Kommentar	155 nm, 23 CTD stasjoner, 6 planktonstasjoner m håv, 1 stasjon MOC,																							
	POSISJON									**Skriv**	**PRØVETAKING**													
Nr.	**Grad**	**Min**		**Grad**	**Min**		**Desimalgrader**		**Distanse**	**Antatt**	**inn**	**VANNPRØVER**					**DYREPLANKTONPRØVER**							
	N			**E/W**			**N**	**E/W**	**n.m.**	**dyp**	**CTD stasjon**	**CTD**	**N.salt**	**Oksygen**	**Klorofyll**	**Pl.plankt.**	**WP2-Håv**	**MOC**	**Algehåv**	**Secci-dyp**	**WP3**	**Gulf VII**		
1	60	45	E	4	37	60.750	4.617		175		x	x		x						x				
2	60	45	E	4	27	60.750	4.450	4.88	375		x	x		x	50-0*	bunn-0/200-0		30-0***	x	x		X		
3	60	45	E	4	17	60.750	4.283	4.88	315		x	x		x					x	x				
4	60	45	E	4	7	60.750	4.117	4.88	315		x	x		x						x				
5	60	45	E	3	57	60.750	3.950	4.88	315		x	x		x						x				
6	60	45	E	3	47	60.750	3.783	4.88	325		x	x		x	50-0*	bunn-0/200-0		30-0***	x			X		
7	60	45	E	3	37	60.750	3.617	4.88	315		x	x		x						x				
8	60	45	E	3	27	60.750	3.450	4.88	325		x	x		x						x				
9	60	45	E	3	17	60.750	3.283	4.88	330		x	x		x	50-0*	bunn-0/200-0	x	30-0***	x			X		
10	60	45	E	3	7	60.750	3.117	4.88	240		x	x		x						x				
11	60	45	E	2	56	60.750	2.933	5.37	170		x	x		x						x				
12	60	45	E	2	46	60.750	2.767	4.88	125		x	x		x						x				
13	60	45	E	2	36	60.750	2.600	4.88	125		x	x		x	50-0*	bunn-0		30-0***	x			X		
14	60	45	E	2	16	60.750	2.267	9.77	125		x	x		x						x				
15	60	45	E	1	55	60.750	1.917	10.25	125		x	x		x						x				
16	60	45	E	1	26	60.750	1.433	14.16	150		x	x		x						x				
17	60	45	E	0	55	60.750	0.917	15.14	155		x	x		x	50-0*	bunn-0		30-0***	x			X		
18	60	45	E	0	35	60.750	0.583	9.77	145		x	x		x						x				
19	60	45	E	0	15	60.750	0.250	9.77	135		x	x		x						x			X	
20	60	45	E	0	5	60.750	0.083	4.88	120		x	x		x						x				
21	60	45	W	0	16	60.750	-0.267	10.25	115		x	x		x						x				
22	60	45	W	0	28	60.750	-0.467	5.86	140		x	x		x	50-0*	bunn-0		30-0***	x			X		
23	60	45	W	0	40	60.750	-0.667	5.86	100		x	x		x						x				
								154.78			23	23	0	23	6	6	1	6	23	3	7			

NORDSJØEN OG SKAGERRAK **SLOTTERØY MOT W**

Tid:

Kommentar:

Nr.	POSISJON							Distanse	Antatt	Skriv inn	PRØVETAKING											
	Grad N	Min		Grad E/W	Min	Desimalgrader N	E/W	n.m.	dyp	CTD stasjon	VANNPRØVER CTD	N.salt	Oksygen	Klorofyll	Pl.plankt.	DYREPLANKTONPRØVER WP2-Håv	MOC	Algehåv	Secci-dyp	WP3	Gulf VII
1	59	54	E	4	57	59.900	4.950				x	x		x	50-0*	bunn-0		0-30 m	x	x	
2	59	54	E	4	48	59.900	4.800	4.51			x	x		x					x	x	
3	59	54	E	4	41	59.900	4.683	3.51			x	x		x					x	x	
4	59	54	E	4	31	59.900	4.517	5.01			x	x		x					x		
5	59	54	E	4	21	59.900	4.350	5.01			x	x		x	50-0*	bunn-0/200-0		0-30 m	x		
6	59	54	E	4	11	59.900	4.183	5.01			x	x		x					x		
7	59	54	E	4	1	59.900	4.017	5.01			x	x		x					x		
8	59	54	E	3	51	59.900	3.850	5.01			x	x		x					x		
9	59	54	E	3	41	59.900	3.683	5.01			x	x		x	50-0*	bunn-0/200-0	x	0-30 m	x		
10	59	54	E	3	31	59.900	3.517	5.01			x	x		x					x		
11	59	54	E	3	21	59.900	3.350	5.01			x	x		x					x		
12	59	54	E	3	11	59.900	3.183	5.01			x	x		x					x		
13	59	54	E	3	1	59.900	3.017	5.01			x	x		x	50-0*	bunn-0		0-30 m	x		
14	59	54	E	2	51	59.900	2.850	5.01			x	x		x					x		
15	59	54	E	2	41	59.900	2.683	5.01			x	x		x					x		
16	59	54	E	2	31	59.900	2.517	5.01			x	x		x					x		
17	60	0	E	2	0	60.000	2.000	16.63			x	x		x	50-0*	bunn-0		0-30 m	x		
18	60	0	E	1	39	60.000	1.650	10.49			x	x		x					x		
19	60	0	E	1	19	60.000	1.317	9.99			x	x		x					x		
20	60	0	E	0	59	60.000	0.983	9.99			x	x		x					x		
21	60	0	E	0	39	60.000	0.650	9.99			x	x		x	50-0*	bunn-0		0-30 m	x		
22	60	0	E	0	19	60.000	0.317	9.99			x	x		x					x		
23	60	0	W	0	1	60.000	-0.017	9.99			x	x		x					x		
24	60	0	W	0	20	60.000	-0.333	9.49			x	x		x					x		
25	60	0	W	0	40	60.000	-0.667	9.99			x	x		x	50-0*	bunn-0		0-30 m	x		
26	60	0	W	1	0	60.000	-1.000	9.99			x	x		x					x		
											26	26	0	26	7	7	1	7	26	3	0

NORDSJØEN OG SKAGERRAK									**UTSIRA MOT W**							**April/May 2016**								
Fartøy:																artsopparbeiding på zooplankton								
Tid:		####														Planktonstasjon med håvtrekk er markert med gult								
Kommenta	223 nm, 32 CTD stasjoner, 16 planktonstasjoner med håv, 3 MOC																							
	POSISJON									**Skriv**	**PRØVETAKING**													
Nr.	**Grad**	**Min**		**Grad**	**Min**	**Desimalgrader**		**Distanse**	**Antatt**	**inn**	**VANNPRØVER**					**PLANKTONPRØVER**								
	N			**E/W**		**N**	**E/W**	**n.m.**	**dyp**	**CTD stasjon**	**CTD**	**N.salt**	**Oksygen**	**Klorofyll**	**Pl.plankt.***	**WP2-Håv**	**MOC**	**Algehåv**	**Secci-dyp**	**WP3**	**Gulf VII**			
1	59	17	E	5	2	59.283	5.033		80		x	x		x	50-0*	2 stk 0-bunn			x	x				
2	59	17	E	4	56	59.283	4.933	3.06	140		x	x		x					x	x				
3	59	17	E	4	50	59.283	4.833	3.06	150		x	x		x		bunn-0			x	x	X			
4	59	17	E	4	40	59.283	4.667	5.10	270		x	x		x					x					
5	59	17	E	4	30	59.283	4.500	5.10	255		x	x		x	50-0*	bunn-0/200-0			x					
6	59	17	E	4	20	59.283	4.333	5.10	260		x	x		x					x					
7	59	17	E	4	11	59.283	4.183	4.59	280		x	x		x		bunn-0/200-0	x		x		X			
8	59	17	E	4	2	59.283	4.033	4.59	280		x	x		x					x					
9	59	17	E	3	51	59.283	3.850	5.62	270		x	x		x	50-0*	bunn-0/200-0			x		X			
10	59	17	E	3	41	59.283	3.683	5.10	250		x	x		x					x					
11	59	17	E	3	32	59.283	3.533	4.59	220		x	x		x		bunn-0			x					
12	59	17	E	3	22	59.283	3.367	5.10	160		x	x		x					x					
13	59	17	E	3	13	59.283	3.217	4.59	140		x	x		x	50-0*	bunn-0			x		X			
14	59	17	E	3	4	59.283	3.067	4.59	130		x	x		x					x					
15	59	17	E	2	54	59.283	2.900	5.10	105		x	x		x		bunn-0			x					
16	59	17	E	2	45	59.283	2.750	4.59	115		x	x		x					x					
17	59	17	E	2	31	59.283	2.517	7.15	130		x	x		x	50-0*	bunn-0	x		x		X			
18	59	17	E	2	15	59.283	2.250	8.17	125		x	x		x					x					
19	59	17	E	2	0	59.283	2.000	7.66	120		x	x		x		bunn-0			x					
20	59	17	E	1	39	59.283	1.650	10.72	115		x	x		x					x					
21	59	17	E	1	19	59.283	1.317	10.21	110		x	x		x	50-0*	bunn-0			x		X			
22	59	17	E	1	0	59.283	1.000	9.70	110		x	x		x					x					
23	59	17	E	0	40	59.283	0.667	10.21	135		x	x		x		bunn-0			x		X			
24	59	17	E	0	20	59.283	0.333	10.21	135		x	x		x					x					
25	59	17	E	0	0	59.283	0.000	10.21	130		x	x		x	50-0*	bunn-0	x		x		X			
26	59	17	W	0	20	59.283	-0.333	10.21	135		x	x		x					x					
27	59	17	W	0	39	59.283	-0.650	9.70	125		x	x		x		bunn-0			x		X			
28	59	17	W	0	59	59.283	-0.983	10.21	125		x	x		x					x					
29	59	17	W	1	19	59.283	-1.317	10.21	110		x	x		x	50-0*	bunn-0			x		X			
30	59	17	W	1	38	59.283	-1.633	9.70	90		x	x		x					x					
31	59	17	W	1	56	59.283	-1.933	9.19	95		x	x		x					x		X			
32	59	17	W	2	14	59.283	-2.233	9.19	70		x	x		x	50-0*	bunn-0			x		X			
								222.56			32	32	0	32	9	16	3	0	32	3	12			
														* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol								
														***Planteplankton "kvalitative prøver": 10 um håv, 30-0 m								

NORDSJØEN OG SKAGERRAK — HANSTHOLMEN - ABERDEEN — April/May 2014

Dyp:
Tid: 46.20
Kommentar 308 nm, 26 CTD stasjoner, 13 planktonstasjoner med håv, 3 MOC

artsopparbeiding på zooplankton

Nr.	POSISJON							Distanse	Antatt	Skriv inn	PRØVETAKING												
	Grad N	Min N		Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	n.m.	dyp	CTD stasjon	VANNPRØVER					PLANKTONPRØVER						Gulf VII
											CTD	N.salt	Oksygen	Klorofyll	Tot NP	Pl.plankt.	WP2-Håv	MOC	Algehåv	Secci-dyp	WP3	
1a	57	0	E	8	11	57.000					x	x		x	x	50-0*				x	x	
1b	57	0	E	7	57	57.000	7.950		25		x	x		x	x	50-0*	2 st bunn-0**			x	x	X
2a	57	0	E	7	48	57.000					x	x		x	x	50-0*				x		
2b	57	0	E	7	39	57.000	7.650	9.80	20		x	x		x	x	50-0*				x	x	
3a	57	0	E	7	30	57.000					x	x		x	x	50-0*				x		
3b	57	0	E	7	21	57.000	7.350	9.80	37		x	x		x	x	50-0*				x	x	X
4a	57	0	E	7	10	57.000					x	x		x	x	50-0*				x		
4b	57	0	E	7	0	57.000	7.000	11.43	32		x	x		x	x	50-0*				x		
5	57	0	E	6	41	57.000	6.683	10.34	55		x	x		x		50-0*	2 st bunn-0	x		x		X
6	57	0	E	6	21	57.000	6.350	10.89	55		x	x		x						x		
7	57	0	E	6	0	57.000	6.000	11.43	50		x	x		x						x		X
8	57	0	E	5	40	57.000	5.667	10.89	50		x	x		x						x		
9	57	0	E	5	11	57.000	5.183	15.79	55		x	x		x		50-0*	2 st bunn-0			x		X
10	57	0	E	4	42	57.000	4.700	15.79	60		x	x		x						x		
11	57	0	E	4	18	57.000	4.300	13.06	60		x	x		x						x		X
12	57	0	E	3	54	57.000	3.900	13.06	60		x	x		x						x		
13	57	0	E	3	40	57.000	3.667	7.62	65		x	x		x		50-0*	2 st bunn-0	x		x		X
14	57	0	E	3	24	57.000	3.400	8.71	65		x	x		x						x		
15	57	0	E	2	58	57.000	2.967	14.15	65		x	x		x						x		X
16	57	0	E	2	30	57.000	2.500	15.24	70		x	x		x						x		
17	57	0	E	2	4	57.000	2.067	14.15	90		x	x		x		50-0*	2 st bunn-0			x		X
18	57	0	E	1	48	57.000	1.800	8.71	90		x	x		x						x		
19	57	0	E	1	36	57.000	1.600	6.53	95		x	x		x						x		X
20	57	0	E	1	8	57.000	1.133	15.24	85		x	x		x						x		
21	57	0	E	0	40	57.000	0.667	15.24	90		x	x		x		50-0*	2 st bunn-0	x		x		X
22	57	0	E	0	14	57.000	0.233	14.15	80		x	x		x						x		
23	57	0	W	0	14	57.000	-0.233	15.24	75		x	x		x						x		X
24	57	0	W	0	42	57.000	-0.700	15.24	65		x	x		x						x		
25	57	0	W	1	8	57.000	-1.133	14.15	65		x	x		x		50-0*	2 st bunn-0			x		X
26	57	0	W	1	28	57.000	-1.467	10.89	65		x	x		x						x		
								308			30	30	0	30	8	14	7	3	0	30	4	13

Tot NP Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m

* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol

** Dyreplankton: To replikate WP2-håver bunn-0m: en til biomasse og en til fiksering

***Planteplankton "kvalitative prøver": 10 um håv, 30-0 m

JÆRENS REV MOT SW OG W

April/May 2016

Dyp:

Tid: 35.7

Kommentar: 238 nm, 10 CTD stasjoner, 10 planktonstasjoner med håv, 3 MOC

Nr.	POSISJON							Distanse	Antatt	Skriv inn	PRØVETAKING											
	Grad N	Min		Grad E/W	Min	Desimalgrader N	Desimalgrader E/W	n.m.	dyp	CTD stasjon	VANNPRØVER CTD	N.salt	Oksygen	Klorofyll	Pl.plankt.	PLANKTONPRØVER WP2-Håv	MOC	Algehåv	Secci-dyp	WP3	Gulf VII
1	58	44	E	5	26	58.733	5.433				x	x		x					x	x	
2	58	41	E	5	17	58.683	5.283	5.55	234		x	x		x	50-0*	0-bunn		0-30 m	x	x	X
	58	39	E	5	9	58.650	5.150	4.61			x	x		x							
4	58	37	E	5	0	58.617	5.000	5.09	248		x	x		x		0-bunn			x	x	
	58	35	E	4	52	58.583	4.867	4.62			x	x		x							
6	58	32	E	4	41	58.533	4.683	6.47	270		x	x		x	50-0*	0-bunn	x	0-30 m	x		x
	58	29	E	4	31	58.483	4.517	6.02			x	x		x							
8	58	27	E	4	22	58.450	4.367	5.11	286		x	x		x		0-bunn			x		
	58	25	E	4	14	58.417	4.233	4.64			x	x		x							
10	58	22	E	4	5	58.367	4.083	5.59	162		x	x		x	50-0*	0-bunn		0-30 m	x		X
	58	21	E	3	57	58.350	3.950	4.31			x	x		x							
12	58	18	E	3	48	58.300	3.800	5.59			x	x		x		0-bunn			x		x
	58	16	E	3	40	58.267	3.667	4.65			x	x		x							
14	58	14	E	3	30	58.233	3.500	5.63	101		x	x		x	50-0*	0-bunn		0-30 m	x		x
	58	11	E	3	22	58.183	3.367	5.17			x	x		x							
16	58	9	E	3	13	58.150	3.217	5.15			x	x		x		0-bunn			x		x
	58	0	E	2	59	58.000	2.983	11.65			x	x		x							
18	58	0	E	2	46	58.000	2.767	6.88	63		x	x		x	50-0*	0-bunn	x	0-30 m	x		X
	58	0	E	2	32	58.000	2.533	7.41													
20	58	0	E	2	19	58.000	2.317	6.88			x	x		x		0-bunn			x		x
	58	0	E	2	0	58.000	2.000	10.06													
22	58	0	E	1	42	58.000	1.700	9.53	91		x	x		x	50-0*	0-bunn		0-30 m	x		X
	58	0	E	1	22	58.000	1.367	10.59													
24	58	0	E	1	3	58.000	1.050	10.06			x	x		x		0-bunn			x		x
	58	0	E	0	35	58.000	0.583	14.83													
26	58	0	W	0	6	58.000	-0.100	21.71	124		x	x		x	50-0*	0-bunn	x	0-30 m	x		X
	58	0	W	0	24	58.000	-0.400	9.53													
28	58	0	W	0	52	58.000	-0.867	14.83			x	x		x		0-bunn			x		x
	58	0	W	1	16	58.000	-1.267	12.71													
30	58	0	W	1	40	58.000	-1.667	12.71	105		x	x		x	50-0*	0-bunn		0-30 m	x		x
								237.61			24	24	0	24	8	15	3	8	16	3	13

EGERØYA MOT SW

April/May 2016

Dyp:
Tid: ca 12 timer
Kommentar 83 nm, 8 CTD, 8 håv, 1 MOC

Nr.	POSISJON Grad N	Min N	Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksygen	Klorofyll	Pl.plankt.	PLANKTONPRØVER WP2-Håv	MOC	Algehåv	Secci-dyp	WP3	Gulf VII
1	58	25	E 5	50	58.417	5.833		70		x	x		x		2 stk 0-bunn			x	x	X
							5.42													
3	58	18	E 5	36	58.300	5.600	4.74	332		x	x		x	50-0*	0-200/0-bunn	x	0-30 m	x	x	X
							5.09													
5	58	10	E 5	23	58.167	5.383	5.44	296		x	x		x					x	x	
							5.44													
7	58	3	E 5	9	58.050	5.150	4.76	191		x	x		x		0-bunn			x		X
							5.11													
9	57	55	E 4	56	57.917	4.933	5.46	100		x	x		x					x		
							4.78													
11	57	48	E 4	43	57.800	4.717	5.12	95		x	x		x		0-bunn			x		X
							5.21													
13	57	42	E 4	29	57.700	4.483	4.39	73		x	x		x					x		
							9.49													
15	57	26	E 4	0	57.433	4.000	12.81	69		x	x		x		0-bunn			x		X
							83			8	8	0	8	1	5	1	1	8	3	5

LISTA MOT SW

April/May 2016

Dyp:
Tid: ca 8 timer
Kommentar 51 nm, 5 CTD, 6 håvstasjoner, 1 MOC

Nr.	POSISJON Grad N	Min N	Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksygen	Klorofyll	Pl.plankt.	PLANKTONPRØVER WP2-Håv	MOC	Algehåv	Secci-dyp	WP3	Gulf VII	
1	58	1	E 6	35	58.017	6.583		340		x	x		x		0-200/0-bunn			x	x	X	0-bunn: tell
2	57	57	E 6	26	57.950	6.433	6.22	330		x	x		x	50-0*	0-200/0-bunn	x	0-30 m	x	x		
							5.46	300													
4	57	49	E 6	12	57.817	6.200	5.46	280		x	x		x					x	x	X	
							4.38	250													
6	57	42	E 5	59	57.700	5.983	5.47	150		x	x		x		0-bunn			x			
							4.79	136													
8	57	35	E 5	46	57.583	5.767	5.13	100		x	x		x					x		X	
							4.80	90													
10	57	26	E 5	26	57.433	5.433	9.21	79		x	x		x		0-bunn			x		X	
							51			6	6	0	6	1	4	1	1	6	3	4	

LINDESNES MOT SSW

April/May 2016

Dyp:
Tid: ca 9,5 timer
Kommentar 55 nm, 6 CTD, 6 håvstasjoner, 1 MOC

Nr.	POSISJON Grad N	Min N		Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksygen	Klorofyll	Pl.plankt.	PLANKTONPRØVER WP2-Håv	MOC	Algehåv	Secci-dyp	WP3	Gulf VII
1	57	58	E	7	2	57.967	7.033		25		x					2 stk 0-bunn			x	x	
2	57	55	E	7	0	57.917	7.000	3.18	376		x	x		x		0-200/0-bunn			x	~~x~~	~~X~~
3	57	50	E	6	57	57.833	6.950	5.25	390		x	x		x	50-0*	0-200/0-bunn	x	0-30 m	x	x	
								5.25	340												
5	57	40	E	6	50	57.667	6.833	5.43	200		x	x		x					x		~~X~~
								4.31	300												
7	57	31	E	6	44	57.517	6.733	5.25	160		x	x		x		0-bunn			x		
								4.54	110												
9	57	22	E	6	36	57.367	6.600	5.44	100		x	x		x					x		X
								6.21	75												
11	57	7	E	6	26	57.117	6.433	9.76	50		x	x		x		0-bunn			x		X
								9.57	50												
								15.78	50												
								80			7	6	0	6	1	5	1	1	7	3	4

Planktonstasjon med håvtrekk er markert med gult

NORDSJØEN OG SKAGERRAK — TORUNGEN - HIRTSHALS

April/May 2016

Snittet kjøres på GM Dannevig i samme periode. Derfor tas kun et utvalg stasjoner.

Dyp:
Tid: Februar, april, juni-juli, november-desember
Kommentar: Primært ovennevnte måneder, men ellers så ofte som mulig.

Nr.	POSISJON Grad N	Min N		Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksygen	Klorofyll	Tot NP	Pl.plankt.	PLANKTONPRØVER MOC	WP2-Håv	Algehåv	Secci-dyp	Radioaktivitet		Gulf
1	58	24	E	8	46	58.400	8.767		110													Æredypet	
2	58	23	E	8	49	58.383	8.817	1.86	90		x			x				bunn-0				1 n.m	X
3	58	20	E	8	53	58.333	8.883	3.66	250													5 n.m	
4	58	16	E	8	59	58.267	8.983	5.09	400		x			x				bunn-0			x	10 n.m	
5	58	12	E	9	5	58.200	9.083	5.09	410													15 n.m	
6	58	8	E	9	11	58.133	9.183	5.10	640		x			x			x	bunn-0, 200-0**			x	20 n.m	
7	58	0	E	9	21	58.000	9.350	4.79	440													30 n.m	
8	57	56	E	9	27	57.933	9.450	5.11	175		x			x				bunn-0				35 n.m	X
9	57	51	E	9	34	57.850	9.567	6.23	80													41 n.m	
10	57	48	E	9	40	57.800	9.667	4.38	35													47 n.m	
11	57	42	E	9	47	57.700	9.783	7.06	65		x			x				bunn-0				52 n.m	X
12	57	38	E	9	52	57.633	9.867	4.81	25													57 n.m	
											5	0	0	5	0	0	1	5	0	0	2	12	3

Tot NP Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m

* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol

Dyreplankton: To WP2-håver: a) **bunn-0 (har første prioritet!) og b) 200-0m

***Planteplankton "kvalitative prøver": 10 um håv, 30-0 m

NORDSJØEN OG SKAGERRAK — OKSØ - HANSTHOLMEN — April/May 2016

Dyp:

Tid: Februar, april, juni-juli, november-desember

Kommentar: Primært ovennevnte måneder, men ellers så ofte som mulig.

Nr.	POSISJON Grad N	Min N	Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksyger	Klorofyll	Tot NP	PLANKTONPRØVER Pl.plankt.*	MOC	WP2-Håv	Algehåv	Secci-dyp	Radioaktiv	Gulf
1	58	3	E 8	5	58.050	8.083		100		x	x	x	x	x	0-50				x		X
2	57	59	E 8	6	57.983	8.100	4.03	450		x	x	x	x	x	0-50		2 stk 0-bunn		x		
3	57	55	E 8	10	57.917	8.167	4.53	480		x	x	x	x	x					x	x	
4	57	51	E 8	12	57.850	8.200	4.14	520		x	x	x	x	x	0-50	x	bunn-0, 200-0**		x		
5	57	44	E 8	17	57.733	8.283	7.49	400		x	x	x	x	x					x		
6	57	39	E 8	20	57.650	8.333	5.25	210		x	x	x	x	x	0-50				x		
7	57	33	E 8	22	57.550	8.367	6.09	120		x	x	x	x	x					x		X
8	57	29	E 8	25	57.483	8.417	4.31	75		x	x	x	x	x	0-50		bunn-0		x		
9	57	24	E 8	28	57.400	8.467	5.25	40		x	x	x	x	x					x		
10	57	19	E 8	30	57.317	8.500	5.11	25		x	x	x	x	x					x		X
11	57	14	E 8	33	57.233	8.550	5.25	25		x	x	x	x	x	0-50			0-30 m	x		
12	57	11	E 8	34	57.183	8.567				x	x	x	x	x					x	x	
										12	12	12	12	12	6	1	3	1	12	2	

Tot NP Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m

* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol

**Dyreplankton: To WP2-håver (bunn-0 og 200-0m)

SKAGERAK								JOMFRULAND - SKAGEN			Kun radioaktivitet+CTD på to stasjoner							April/May 2016				
Dyp:																						
Tid:				En gang hver måned.																		
Kommentar:																						

	Nr.	POSISJON Grad N	Min N	Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksyger	Klorofyll	Tot NP	Pl.plankt.	PLANKTONPRØVER MOC	WP2-Håv	Algehåv	Secci-dyp	Radioaktivitet
	3	58	41	E 9	45	58.683	9.750		400		x										x
	5	58	29	E 9	55	58.483	9.917		500		x										x
											3	0	0	0	0	0	0	0	0	0	2
															Tot NP	Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m					

SKAGERAK — JOMFRULAND - KOSTER — April/May 2016

Dyp:
Tid:
Kommentar:

Nr.	POSISJON Grad N	Min N	Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksyger	Klorofyll	Tot NP	Pl.plankt.	PLANKTONPRØVER MOC	WP2-Håv	Algehåv	Secci-dyp	Gulf	
3	58	41	E 9	45	58.683	9.750		400		x										x	Jomfruland
1	58	53	E 9	41	58.883	9.683				x	x		x	x	0-50		2 stk 0-bunn		x		
2	58	53	E 9	50	58.883	9.833	4.65			x	x		x	x					x		
3	58	53	E 10	10	58.883	10.167	10.33			x	x		x	x	0-50	x	bunn-0		x	X	
4	58	53	E 10	20	58.883	10.333	5.16			x	x		x	x					x		
5	58	53	E 10	30	58.883	10.500	5.16			x	x		x	x	0-50				x		
6	58	53	E 10	40	58.883	10.667	5.16			x	x		x	x	0-50		bunn-0		x	X	
										6	6	0	6	6	4	1	3	0	6	2	

Tot NP: Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m

* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol

SKAGERAK — VÄDERØ — April/May 2016

Dyp:
Tid:
Kommentar:

Nr.	POSISJON Grad N	Min N	Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksyger	Klorofyll	Tot NP	Pl.plankt.	PLANKTONPRØVER MOC	WP2-Håv	Algehåv	Secci-dyp	Gulf	
3	58	33.2	E 10	53.7	58.553	10.895	1.99	80		x	x		x	x	50-0		2 stk 0-bunn		x	X	
4	58	32.5	E 10	48.0	58.542	10.800	3.05	105		x	x		x	x					x		
5	58	31.6	E 10	40.7	58.527	10.678	3.91	135		x	x		x	x	50-0				x		
6	58	30.7	E 10	33.3	58.512	10.555	3.97	185		x	x		x	x					x	X	
7	58	28.8	E 10	18.4	58.480	10.307	8.01	360		x	x		x	x	50-0				x		
8	58	26.4	E 10	0.0	58.440	10.000	9.91	560		x	x		x	x	50-0	x	bunn-0		x		
5	58	29	E 9	55	58.483	9.917		500		x										x	Jomfruland
										7	6	0	6	6	4	1	2	0	6	3	

Tot NP: Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m

* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol

SKAGERAK — MÅSESKJÆR

posisjoner stemmer ikke m Miljøtokt? **April/May 2016**

Dyp:
Tid:
Kommentar:

Nr.	POSISJON Grad N	Min N	Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksyger	Klorofyll	Tot NP	Pl.plankt.	PLANKTONPRØVER MOC	WP2-Håv	Algehåv	Secci-dyp	Radioaktiv	Gulf
~~2~~	~~58~~	~~4.6~~	~~E~~	~~11~~	~~58.077~~	~~11.220~~	~~1.92~~	~~55~~													
3	58	4.0	E	11	58.067	11.155	2.15	110		x	x		x	x					x		
4	58	3.1	E	11	58.052	11.063	3.04	125		x	x		x	x	0-50				x		
5	58	1.9	E	10	56.6	58.032	10.943	3.99	100		x	x		x	x					x	x	
6	58	0.7	E	10	49.4	58.012	10.823	4.00	210		x	x		x	x	0-50	x	bunn-0		x		X
7	57	59.5	E	10	42.2	57.992	10.703	4.00	190		x	x		x	x					x		
8	57	58.3	E	10	35.0	57.972	10.583	4.00	145		x	x		x	x	0-50				x		
9	57	56.8	E	10	25.9	57.947	10.432	5.05	110		x	x		x	x					x	x	
10	57	55.3	E	10	16.8	57.922	10.280	5.06	90		x	x		x	x	0-50		bunn-0		x		X
										8	8	0	8	8	4	1	2	0	8	2	2

Tot NP Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m

* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol

KATTEGAT — GØTEBORG - FREDRIKSHAVN

April/May 2016

Dyp:
Tid:
Kommentar:

Nr.	POSISJON Grad N	Min N	Grad E/W	Min E/W	Desimalgrader N	Desimalgrader E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksyger	Klorofyll	Tot NP	Pl.plankt.	PLANKTONPRØVER MOC	WP2-Håv	Algehåv	Secci-dyp	Radioaktiv	Gulf
~~1~~	~~57~~	~~33.0~~	~~E~~	~~11~~	~~31.5~~	~~57.550~~	~~11.525~~		~~80~~		~~x~~	~~x~~		~~x~~	~~x~~	~~0-50~~		~~bunn-0~~		~~x~~	~~x~~	~~X~~
2	57	32.3	E	11	26.0	57.538	11.433	3.03	55		x	x		x	x					x		
3	57	32.0	E	11	19.5	57.533	11.325	3.50	45		x	x		x	x	0-50		bunn-0		x		
4	57	30.3	E	11	8.5	57.505	11.142	6.14	45		x	x		x	x					x	x	
5	57	27.9	E	10	54.0	57.465	10.900	8.15	45		x	x		x	x	0-50				x		X
6	57	26.0	E	10	42.5	57.433	10.708	6.47	30		x	x		x	x	0-50		bunn-0		x		
										6	6	0	6	6	4	0	3	0	6	2	2

Tot NP Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m

* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol

NORDSJØEN **HARBOØR** **April/May 2016**

Dyp:
Tid:
Kommentar:

	Nr.	POSISJON Grad N	Min		Grad E/W	Min	Desimalgrader N	E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksyger	Klorofyll	Tot NP	Pl.plankt.	PLANKTONPRØVER MOC	WP2-Håv	Algehåv	Secci-dyp	
	1	56	39	E	8	2				30		x	x		x	x	0-50		bunn-0**	0-30	x	
	2	56	39	E	7	46				35		x	x		x	x					x	
	3	56	39	E	7	34				35		x	x		x	x	0-50				x	
	4	56	39	E	7	24				35		x	x		x	x					x	
	5	56	39	E	7	13				40		x	x		x	x	0-50				x	
	6	56	39	E	7	2				40		x	x		x	x	0-50		bunn-0**	0-30	x	
												6	6	0	6	6	4	0	2	2	6	0

Tot NP Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m

* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol

** Dyreplankton: To replikate WP2-håver bunn-0m: en til biomasse og en til fiksering

NORDSJØEN — **HUSEBY KLIT** — **April/May 2016**

Dyp:
Tid:
Kommentar:

Nr.	POSISJON Grad N	Min	Grad E/W	Min	Desimalgrader N	E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksyger	Klorofyll	Tot NP	Pl.plankt.	PLANKTONPRØVER MOC	WP2-Håv	Algehåv	Secci-dyp
1	56	10	E 7	54				30		x	x		x	x	0-50		bunn-0**	0-30	x
2	56	10	E 7	43				35		x	x		x	x					x
3	56	10	E 7	34				35		x	x		x	x	0-50				x
4	56	10	E 7	25				30		x	x		x	x					x
5	56	10	E 7	16				35		x	x		x	x	0-50				x
6	56	10	E 7	5				35		x	x		x	x	0-50		bunn-0**	0-30	x
										6	6	0	6	6	4	0	2	2	6

0

Tot NP Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m

* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol

** Dyreplankton: To replikate WP2-håver bunn-0m: en til biomasse og en til fiksering

NORDSJØEN — **KNUDE DYB** — **April/May 2016**

Dyp:
Tid:
Kommentar:

Nr.	POSISJON Grad N	Min	Grad E/W	Min	Desimalgrader N	E/W	Distanse n.m.	Antatt dyp	Skriv inn CTD stasjon	PRØVETAKING VANNPRØVER CTD	N.salt	Oksyger	Klorofyll	Tot NP	Pl.plankt.	PLANKTONPRØVER MOC	WP2-Håv	Algehåv	Secci-dyp
1	55	19	E 8	14				35		x	x		x	x	0-50		bunn-0**	0-30	x
2	55	19	E 8	0				35		x	x		x	x					x
3	55	19	E 7	50				30		x	x		x	x	0-50				x
4	55	19	E 7	40				30		x	x		x	x	0-50				x
5	55	19	E 7	30				25		x	x		x	x	0-50				x
6	55	19	E 7	20				25		x	x		x	x					x
7	55	19	E 7	10				25		x	x		x	x	0-50				x
8	55	19	E 7	0				20		x	x		x	x	0-50		bunn-0**	0-30	x
										8	8	0	8	8	6	0	2	2	8

0

Tot NP Fra alle dyp 5-30 m + største dyp hvis bunndyp< 100m/ eller 100 m hvis bunndyp>100m

* Planteplankton: "kvantitative prøver": blandingsprøve fra 0-50 m. Fikseres på brun flaske m Lugol

** Dyreplankton: To replikate WP2-håver bunn-0m: en til biomasse og en til fiksering

Næringssalt og klorofyllprøver Norskehavet

Skip:	G.O. SARS					Antall prøver					
						Næring-	Klorofyll	Håvtrekk	Algepr. gj.sn.	Algepr.	Siktedyp
St. nr.	ast str	År	Måned	Dag	Snitt/retn.	salt	filtrert	30-0m	5-10-20-30	50m	m
221	1	2016	4	12	**Utsira V**	7	8				m
222	2	2016	4	12	Utsira V	9	8				m
223	3	2016	4	12	Utsira V	8	8		1	1	m
224	4	2016	4	12	Utsira V	11	6				9
225	5	2016	4	12	Utsira V	11	6		1	1	9
226	6	2016	4	12	Utsira V	11	6				10
227	7	2016	4	12	Utsira V	11	7				9
228	8	2016	4	12	Utsira V	12	8				9
229	9	2016	4	12	Utsira V	12	8		1	1	7
230	10	2016	4	12	Utsira V	11	8				7
231	11	2016	4	12	Utsira V	10	8				8
232	12	2016	4	12	Utsira V	9	8				11
233	13	2016	4	12	Utsira V	9	8		1	1	8
234	14	2016	4	12	Utsira V	8	8				m
235	15	2016	4	12	Utsira V	7	8				m
236	16	2016	4	13	Utsira V	7	8				m
237	17	2016	4	13	Utsira V	7	8		1	1	m
238	18	2016	4	13	Utsira V	8	8				m
239	19	2016	4	13	Utsira V	8	8				m
240	20	2016	4	13	Utsira V	8	8				m
241	21	2016	4	13	Utsira V	7	8		1	1	m
242	22	2016	4	13	Utsira V	7	8				8
243	23	2016	4	13	Utsira V	8	8				7
244	24	2016	4	13	Utsira V	7	7				mye sjø
245	25	2016	4	13	Utsira V	8	8		1	1	9
246	26	2016	4	13	Utsira V	9	8				9
247	27	2016	4	13	Utsira V	8	8				8
248	28	2016	4	13	Utsira V	8	8				8
249	29	2016	4	13	Utsira V	8	8		1	1	11
250	30	2016	4	13	Utsira V	6	7				m
251	31	2016	4	13	Utsira V	7	8				m
252	32	2016	4	13	Utsira V	6	7		1	1	m
253	26	2016	4	14	**Aberd-Hansth**	6	7				11
254	25	2016	4	14	Aberd-Hansth	6	7		1		10
255	24	2016	4	14	Aberd-Hansth	6	7				9
256	23	2016	4	14	Aberd-Hansth	6	7				10
257	22	2016	4	14	Aberd-Hansth	6	7				m
258	21	2016	4	15	Aberd-Hansth	7	8		1		m
259	20	2016	4	15	Aberd-Hansth	6	7				m
260	19	2016	4	15	Aberd-Hansth	7	8				m
261	18	2016	4	15	Aberd-Hansth	7	8				m

Næringssalt og klorofyllprøver Norskehavet

Skip:	G.O. SARS					Antall prøver					
						Næring-	Klorofyll	Håvtrekk	Algepr. gj.sn.	Algepr.	Siktedyp
St. nr.	ast str	År	Måned	Dag	Snitt/retn.	salt	filtrert	30-0m	5-10-20-30	50m	m
262	17	2016	4	15	Aberd-Hansth	7	8		1	1	m
263	16	2016	4	15	Aberd-Hansth	6	7				13
264	15	2016	4	15	Aberd-Hansth	6	7				14
265	14	2016	4	15	Aberd-Hansth	6	7				na
266	13	2016	4	15	Aberd-Hansth	5	6		1		13
267	12	2016	4	15	Aberd-Hansth	6	7				10
268	11	2016	4	15	Aberd-Hansth	6	7				9
269	10	2016	4	15	Aberd-Hansth	6	7				na
270	9	2016	4	15	Aberd-Hansth	5	6		1	1	7
271	8	2016	4	15	Aberd-Hansth	5	6				m
272	7	2016	4	15	Aberd-Hansth	5	6				m
273	6	2016	4	16	Aberd-Hansth	5	6				m
274	5	2016	4	16	Aberd-Hansth	5	6		1		m
275	4b	2016	4	16	Aberd-Hansth	4	5		1		m
276	4a	2016	4	16	Aberd-Hansth	4	5		1		m
277	3b	2016	4	16	Aberd-Hansth	5	6		1		m
278	3a	2016	4	16	Aberd-Hansth	4	5		1		m
279	2b	2016	4	16	Aberd-Hansth	3	4		1		m
280	2a	2016	4	16	Aberd-Hansth	5	6		1		m
281	1b	2016	4	16	Aberd-Hansth	4	5		1		m
282	1a	2016	4	16	Aberd-Hansth	4	5		1		6
283	6	2016	4	16	**Fredr-Gøteb**	4	5		1		m
284	5	2016	4	17	Fredr-Gøteb	5	6		1		m
285	4	2016	4	17	Fredr-Gøteb	5	6		1		m
286	3	2016	4	17	Fredr-Gøteb	5	6		1		m
287	2	2016	4	17	Fredr-Gøteb	5	6		1		m
288	3	2016	4	17	**Måseskjær**	7	8		1	1	4
289	4	2016	4	17	Måseskjær	8	8		1	1	7
290	5	2016	4	17	Måseskjær	9	8				9
291	6	2016	4	17	Måseskjær	10	8		1	1	9
292	7	2016	4	17	Måseskjær	10	8				10
293	8	2016	4	17	Måseskjær	9	8		1	1	11
294	9	2016	4	17	Måseskjær	7	8				9
295	10	2016	4	17	Måseskjær	7	8		1	1	9
296		2016	4	17	**Radioakt.vann**						
297		2016	4	17	Radioakt.vann						
298	1	2016	4	17	**Jomfr-Koster**	4	5		1	1	m
299	2	2016	4	17	Jomfr-Koster	11	8				m
300	3	2016	4	17	Jomfr-Koster	10	8		1	1	m
301	4	2016	4	17	Jomfr-Koster	10	8				m
302	5	2016	4	17	Jomfr-Koster	9	8		1	1	m

Næringssalt og klorofyllprøver Norskehavet

Skip:	G.O. SARS					Antall prøver					
						Næring-	Klorofyll	Håvtrekk	Algepr. gj.sn.	Algepr.	Siktedyp
St. nr.	ast str	År	Måned	Dag	Snitt/retn.	salt	filtrert	30-0m	5-10-20-30	50m	m
303	6	2016	4	18	Jomfr-Koster	7	8				m
304	3	2016	4	18	**Væderø**	6	7		1	1	6
305	4	2016	4	18	Væderø	7	8				mye sjø
306	5	2016	4	18	Væderø	8	8		1	1	mye sjø
307	6	2016	4	18	Væderø	10	8				mye sjø
308	7	2016	4	18	Væderø	12	8		1	1	mye sjø
309	8	2016	4	18	Væderø	12	7				8
310	8	2016	4	18	Væderø	0	0		1	1	na
311	11	2016	4	19	**Torung-Hirtsh**	6	7				mye sjø
312	8	2016	4	19	Torung-Hirtsh	10	8				9
313	6	2016	4	19	Torung-Hirtsh	12	6		1	1	8
314	1	2016	4	20	**Oksø-Hanst**	7	8		1	1	13
315	2	2016	4	20	Oksø-Hanst	12	8		1	1	11
316	3	2016	4	20	Oksø-Hanst	12	8		1	1	8
317	4	2016	4	20	Oksø-Hanst	12	7		1	1	8
318	5	2016	4	20	Oksø-Hanst	12	8		1	1	9
319	6	2016	4	20	Oksø-Hanst	10	8		1	1	m
320	7	2016	4	20	Oksø-Hanst	8	8				m
321	8	2016	4	20	Oksø-Hanst	6	7		1	1	m
322	9	2016	4	20	Oksø-Hanst	5	5				m
323	10	2016	4	20	Oksø-Hanst	4	4				m
324	11	2016	4	20	Oksø-Hanst	3	4	1	1		m
325	**12**	2016	4	20	Oksø-Hanst	4	5				m
326	8	2016	4	21	**Knudedyb**	4	5	1	1		9
327	7	2016	4	21	Knudedyb	4	5		1		9
328	6	2016	4	21	Knudedyb	3	4				10
329	5	2016	4	21	Knudedyb	3	4		1		8
330	4	2016	4	21	Knudedyb	3	4				8
331	3	2016	4	21	Knudedyb	3	4				7
332	2	2016	4	21	Knudedyb	3	4	1	1		4
333	6	2016	4	21	**Huseby Klit**	4	5	1	1		m
334	5	2016	4	22	Huseby Klit	4	5		1		m
335	4	2016	4	22	Huseby Klit	4	5				m
336	3	2016	4	22	Huseby Klit	4	5				m
337	2	2016	4	22	Huseby Klit	4	5	1	1		m
338	2	2016	4	22	**Harboør**	4	5	1	1		6
339	3	2016	4	22	Harboør	4	5		1		4
340	4	2016	4	22	Harboør	4	5				mye sjø
341	5	2016	4	22	Harboør	4	5		1		8
342	6	2016	4	22	Harboør	4	5	1			7
343	11	2016	4	22	**Lindesnes SSW**	5	6				mye sjø

Næringssalt og klorofyllprøver Norskehavet

Skip:	G.O. SARS					Antall prøver					
						Næring-	Klorofyll	Håvtrekk	Algepr. gj.sn.	Algepr.	Siktedyp
St. nr.	ast str	År	Måned	Dag	Snitt/retn.	salt	filtrert	30-0m	5-10-20-30	50m	m
344	9	2016	4	22	Lindesnes SSW	7	8				m
345	7	2016	4	22	Lindesnes SSW	9	8				m
346	5	2016	4	22	Lindesnes SSW	12	8				m
347	3	2016	4	22	Lindesnes SSW	12	8	1	1		m
348	2	2016	4	23	Lindesnes SSW	12	8				m
349		2016	4	23	**Kun CTD**						
350	1	2016	4	23	**Lista SW**	12	8				10
351	2	2016	4	23	Lista SW	12	8	1	1	1	13
352	4	2016	4	23	Lista SW	12	8				11
353	6	2016	4	23	Lista SW	9	8				9
354	8	2016	4	23	Lista SW	7	8				7
355	10	2016	4	23	Lista SW	6	7				6
356	13	2016	4	23	**Egerøya SW**	6	7				m
357	11	2016	4	23	Egerøya SW	7	8				m
358	9	2016	4	23	Egerøya SW	7	8				m
359	7	2016	4	24	Egerøya SW	10	8				m
360	5	2016	4	24	Egerøya SW	12	8				12
361	3	2016	4	24	Egerøya SW	12	8	1	1	1	9
362	2	2016	4	24	Egerøya SW	6	7				16
363	1	2016	4	24	**Jærens Rev**	5	6				14
364	2	2016	4	24	Jærens Rev	11	8	1	1	1	13
365	3	2016	4	24	Jærens Rev	11	8				9
366	4	2016	4	24	Jærens Rev	11	8				11
367	5	2016	4	24	Jærens Rev	11	8				9
368	6	2016	4	24	Jærens Rev	12	8	1	1	1	m
369	7	2016	4	24	Jærens Rev	12	8				m
370	8	2016	4	24	Jærens Rev	12	8				m
371	9	2016	4	24	Jærens Rev	12	8				m
372	10	2016	4	24	Jærens Rev	10	8	1	1	1	na
373	11	2016	4	25	Jærens Rev	9	8				m
374	12	2016	4	25	Jærens Rev	8	8				m
375	13	2016	4	25	Jærens Rev	8	8				m
376	14	2016	4	25	Jærens Rev	7	8	1	1	1	m
377	15	2016	4	25	Jærens Rev	6	7				m
378	16	2016	4	25	Jærens Rev	6	7				7
379	17	2016	4	25	Jærens Rev	6	7				10
380	18	2016	4	25	Jærens Rev	5	6	1	1	1	9
381	20	2016	4	25	Jærens Rev	6	7				15
382		2016	4	25	**Gulf stasjoner**	6	7				11
383		2016	4	25	Gulf stasjoner	7	8				m
384		2016	4	25	Gulf stasjoner	8	8				m

Næringssalt og klorofyllprøver Norskehavet

Skip: G.O. SARS

Antall prøver

St. nr.	ast str	År	Måned	Dag	Snitt/retn.	Næring-salt	Klorofyll filtrert	Håvtrekk 30-0m	Algepr. gj.sn. 5-10-20-30	Algepr. 50m	Siktedyp m
385		2016	4	25	Gulf stasjoner	8	8				m
386	17	2016	4	26	**Slotterøy**	7	8	1	1	1	na
387	16	2016	4	26	Slotterøy	8	8				5
388	15	2016	4	26	Slotterøy	8	8				7
389	14	2016	4	26	Slotterøy	8	8				8
390	13	2016	4	26	Slotterøy	8	8	1	1	1	8
391	12	2016	4	26	Slotterøy	9	8				6
392	11	2016	4	26	Slotterøy	11	8				7
393	10	2016	4	26	Slotterøy	12	8				6
394	9	2016	4	26	Slotterøy	11	7	1	1	1	7
395	8	2016	4	26	Slotterøy	12	8				m
396	7	2016	4	26	Slotterøy	12	8				m
397	6	2016	4	26	Slotterøy	12	8				m
398	5	2016	4	26	Slotterøy	12	8	1	1	1	m
399	4	2016	4	27	Slotterøy	12	8				m
400	3	2016	4	27	Slotterøy	11	8				m
401	2	2016	4	27	Slotterøy	11	8				m
402	1	2016	4	27	Slotterøy	10	8	1	1	1	8
403	1	2016	4	28	**Shetland-Feie**	10	8				Ikke tatt
404	2	2016	4	28	Shetland-Feie	12	8	1	1	1	Ikke tatt