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FRV *Scotia*

Cruise 1508S

## **REPORT**

3-16 December 2008

**Loading:** Aberdeen, 1 December 2008

**Unloading:** Aberdeen, 16 December 2008

### **Personnel**

J Dunn (SIC)

J Hunter

N Collie

K Cook

J Rasmussen

D Lichtman

B Berx

M Rose

S Robinson

**Project:** AE11r - 14 days

**Sampling gear:** Hydrographic CTD; Plankton nets (ARIES)

**Fishing gear:** None

**Area:** North Sea-Faroe Shetland Channel.

### **Objective**

1. To conduct routine hydrographic sampling at stations along the standard JONSIS, Fair Isle-Munken and Nolso-Flugga survey lines.
2. To conduct plankton and hydrographic sampling with ARIES in the Faroe Shetland Channel.

### **Narative**

Staff joined the Scotia at 06.00hrs and the vessel sailed by 07.00h on 3 December. Fire and boat drill were completed by 08.00h while the vessel proceeded to deep water for test deployments of the CTD system, the plankton winch and associated crane. Following these, a test deployment of the ARIES system fitted with a Seabird 911 system was completed. Several faults with both systems were identified and worked on while the vessel made a passage to the end of the extended Jonsis line. Staff were unable to repair the faults with the Seabird CTD system, which meant that the Seabird sealogger system had to be modified to be fitted to the ARIES frame.

Work started on the eastern most end of the Jonsis line at 23.55h on 3 December and continued steadily until 08.00h when the wind had reached 50knts, coupled with a heavy swell, meant that Scotia was forced to dodge for 12 hours. When the weather allowed Scotia worked steadily westwards along the Jonsis line stations completing the line by 03.45h on 5 December.

Scotia set away in poor weather conditions to the southern most end of the Fair Isle –Munken line and commenced work at 10.29h on 5 December. Scotia completed ten stations along the Fim line and occupied Fim8 by midnight on 6 December in freshening winds. By 07.00h on Sunday the master decided that given the conditions and the forecast that Scotia would make for shelter at Sydero in the Faeroe Islands.

The weather had moderated sufficiently by 05.30h on 8 December to allow Scotia to complete Fim11 and an ARIES tow at Fim 10 before making a passage north to the western end of the Nol line and starting the first station at 16.36h. Steady progress was made along the line and Nol 18 was reached by midnight in intermittent snow showers. However, by 06.30h on 9 December after completing Nol 7 Scotia was forced to dodge in strong winds and a heavy swell. Conditions had improved by 07.30h on 10 December to allow Nol 6 to be completed safely.

Good weather meant that steady progress was made along the Nol line and it was completed on 11 December at 18.45h. On completion of the last Nol station Scotia was forced to seek shelter in the lee of Unst in deteriorating weather and sea conditions. Scotia dodged in the lee of the North end of Unst for seventy two hours during which time the wind increased dramatically at times up to storm force 12. On 14 December Scotia tried to go round Flugga to start a series of stations to the east of Shetland, however, a very large swell and strong winds forced the vessel to turn back. Scotia then made a passage down the west side of Shetland in an attempt to get to a line of stations on the west side of Shetland. The first of these was reached at 19.00h and a CTD was deployed in very poor conditions. However, as Scotia was making for the next station on the line, in deteriorating weather with increasing winds, and poor forecast, the decision was taken by the master and senior fishing mate to abandon the line of stations and for Scotia to make for Aberdeen at 20.30h on 16 December.

J Dunn  
23 December 2008

## **Results**

The first part of the survey was conducted with only minor breaks for poor weather, however, the second part was disrupted by some extreme weather and sea conditions.

1. The JONSIS standard section in the northern North Sea was surveyed completely, including an extra station at the eastern end and four ARIES tows.
2. Plankton and water samples were collected using CTD, ARIES and a Dual Methot net in the Faeroe Shetland Channel.

Throughout the cruise surface temperature, salinity and fluorescence recordings were made using a Sea-bird SBE21 Thermosalinograph and a Sea Point Fluorometer. The water sampling room was thoroughly cleaned, and the thermosalinograph thoroughly flushed out with fresh water at the end of the cruise. Detailed results of the hydrographic data collected during the cruise will be made available as the data is worked up and interpreted by the laboratory.

The Bran and Luebbe auto analyser performed efficiently, after a faulty USB lead was replaced, and kept pace with number of samples being produced. A total of 726 samples were processed

for total oxidised nitrogen, silicate and phosphate. Results will be available when data is fully worked up by the laboratory.

### **OPC data**

Preliminary OPC analysis, Scotia Cruise 1508S

Data from the optical plankton counter (OPC) obtained during ARIES deployments were investigated during the cruise. Abundances of equivalent spherical diameters corresponding to the copepodite stages 4 and 5 of *Calanus finmarchicus* were plotted with depth to obtain vertical profiles across the JONSIS, Fair Isle-Munken (FIM) and Nolso-Flugga (NOL) (Figures 1-3) transects.

The preliminary analysis provide counts of a particular size category, but makes no distinction between species, so it is necessary to verify OPC results with a more detailed analysis of the collected plankton samples at a later stage.

In addition to vertical profiles of OPC counts, integrated abundances of Calanus C4-C5 sized particles were also calculated and plotted for the FIM and NOL lines (Figure 4). The annual integrated abundances from 2005 to 2008 are plotted on the same scale to illustrate differences in spatial distributions.

The deployments of ARIES on the JONSIS line revealed low concentrations on these shallow stations, similar to those of 2007. Typically, *Calanus finmarchicus* overwinters at depths between 600 and 1000m, so it is not surprising that these stations showed little or no overwintering *Calanus* copepodites as the bottom depth is around 150m.

Concentrations of *Calanus* C5 sized particles were high in the centre of the FIM and NOL lines this year, when compared to data from 2005-2007. In particular the central priority station, FIM-6 on the Fair-Isle Munken line and the western-most priority station on the NOL line, NOL-6 showed high concentrations in comparison to the previous years (Figure 5).

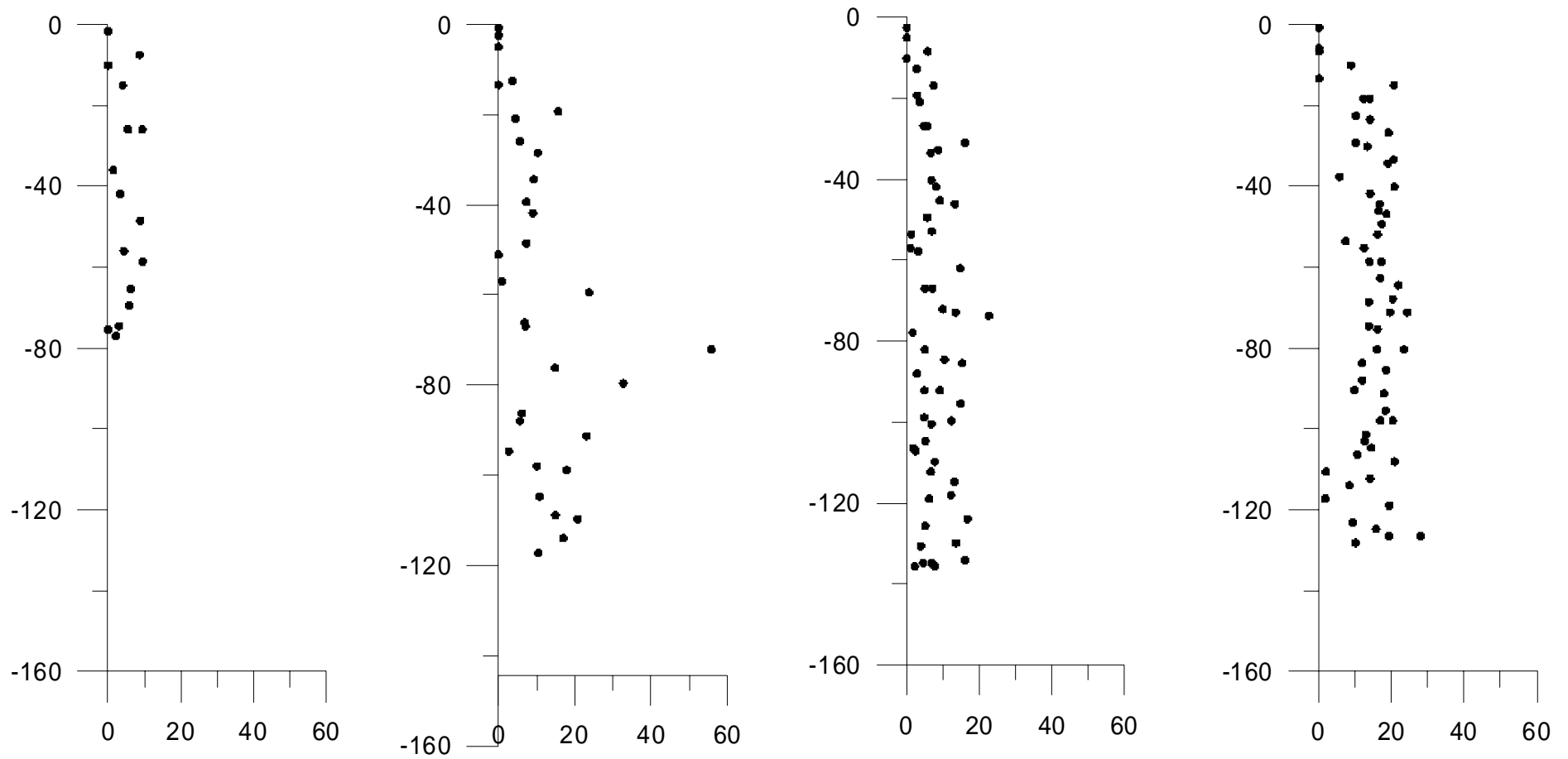


Figure 1. JONSIS line OPC data for particles of equal size to *Calanus finmarchius* C5. Stations are displayed west (left) to east (right) in order of JO4, JO7, JO9, and JO11

# 1508S - FIM-Line OPC

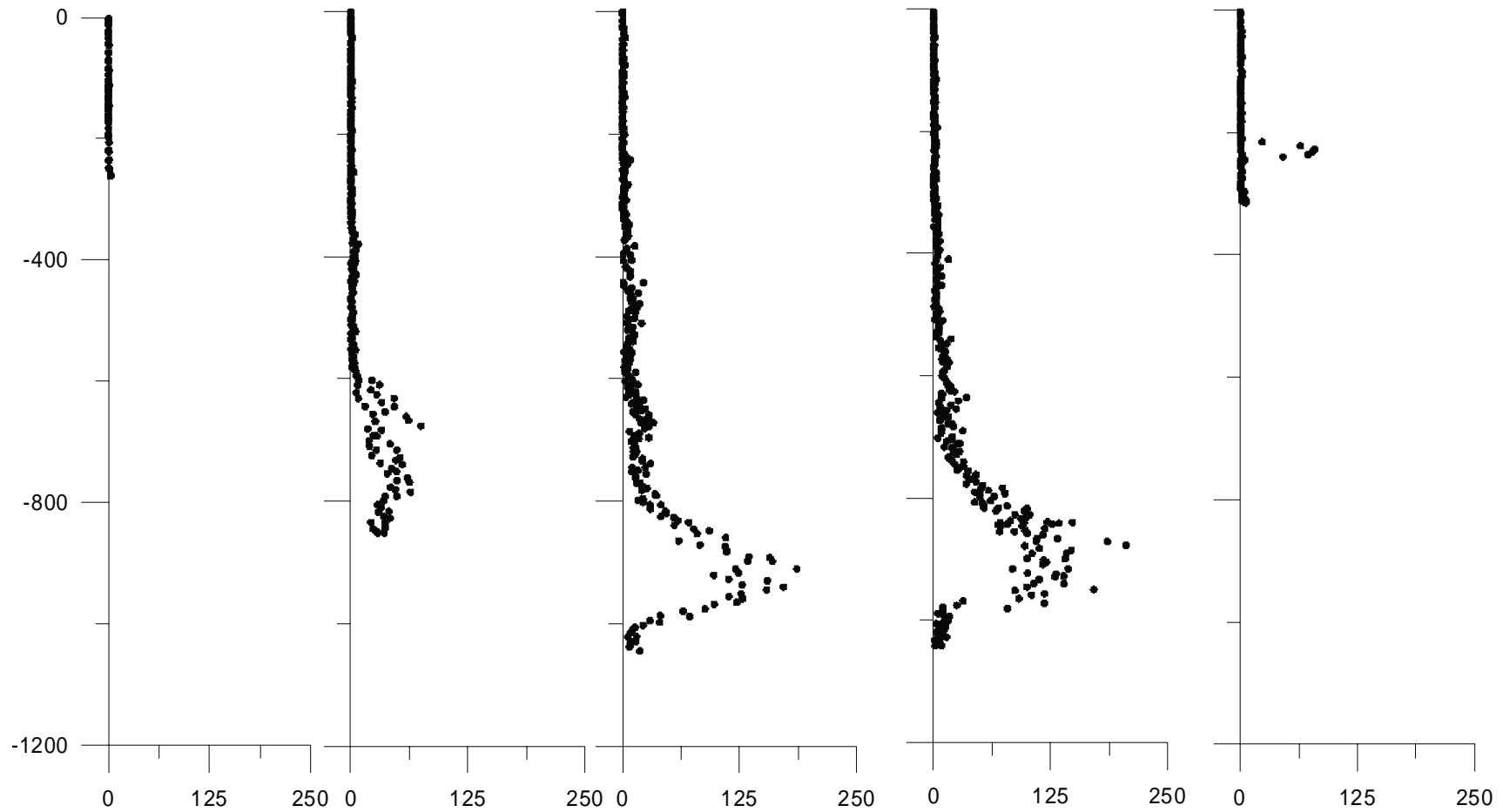


Figure 2. OPC data for the Fair-Isle Munken line stations FIM9, FIM7, FIM6, FIM5, and SEFOS-2

1508S - NOL-Line OPC

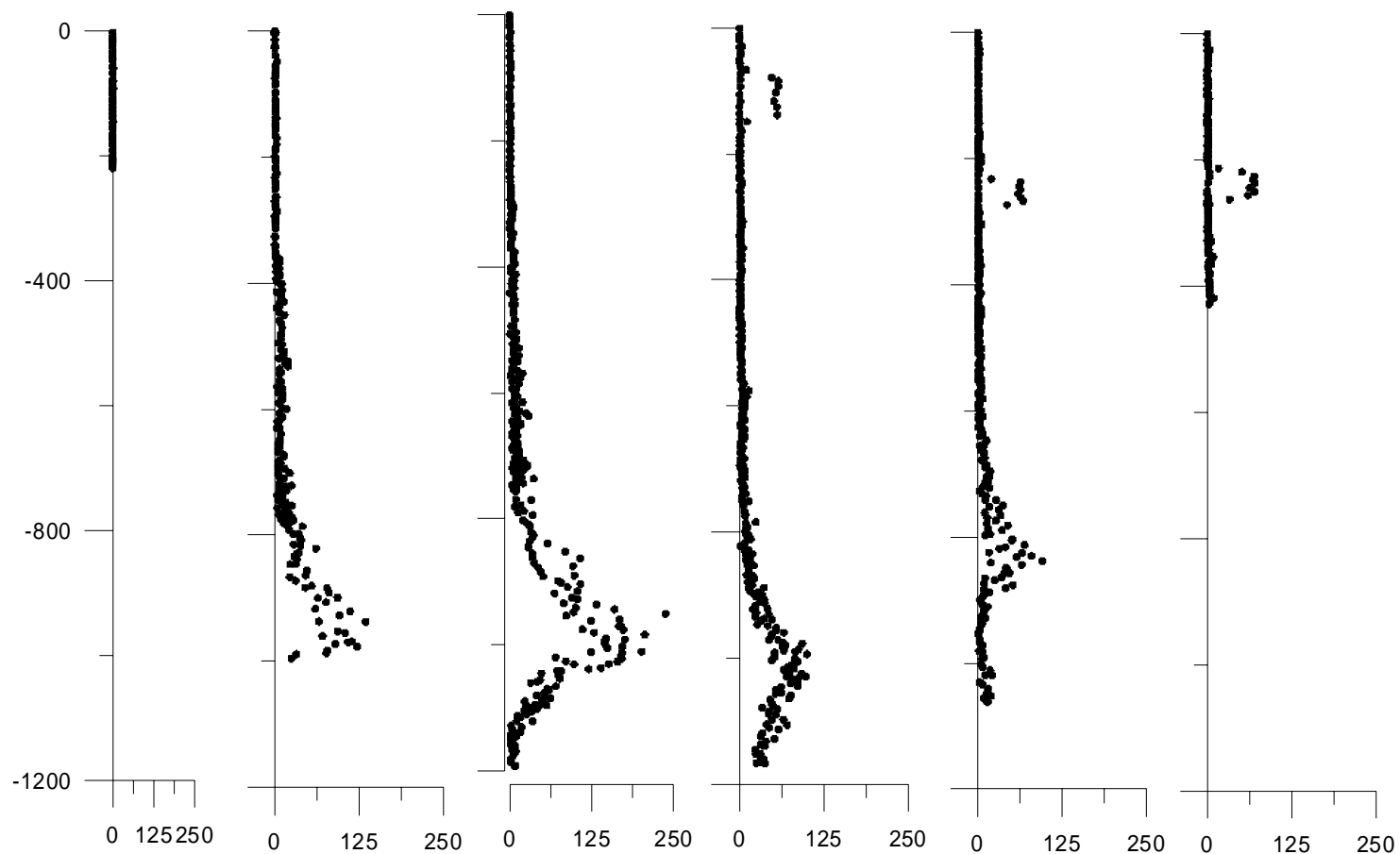


Figure3. OPC data for NOL line stations NOL8, NOL7, NOL6, NOL5, NOL4, and SEFOS-5

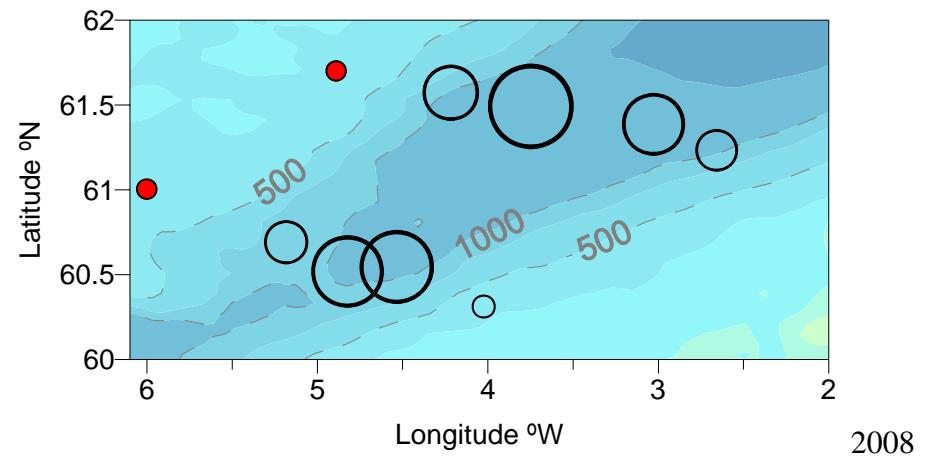
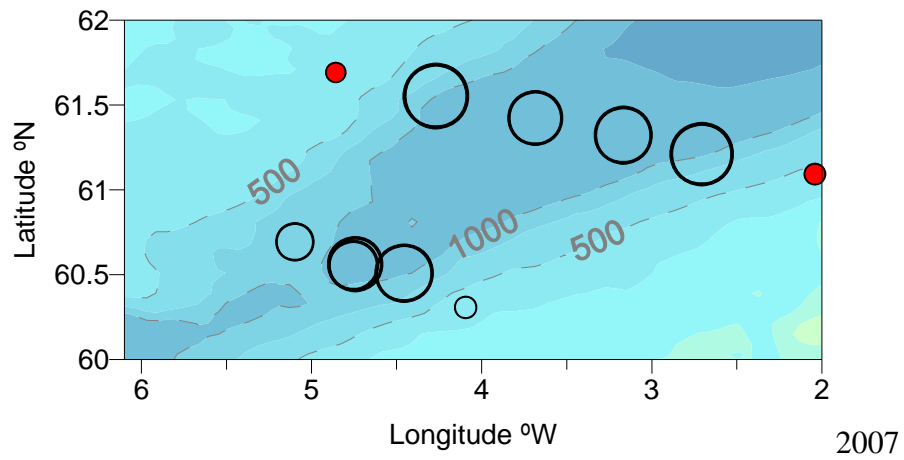
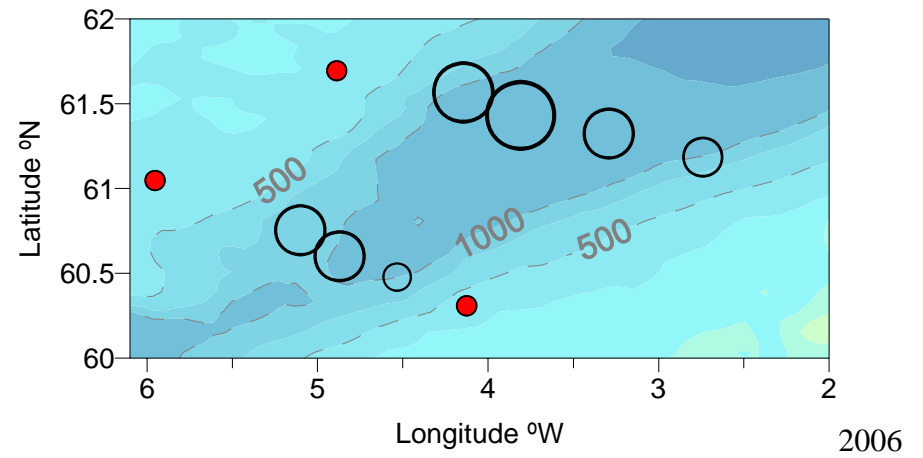
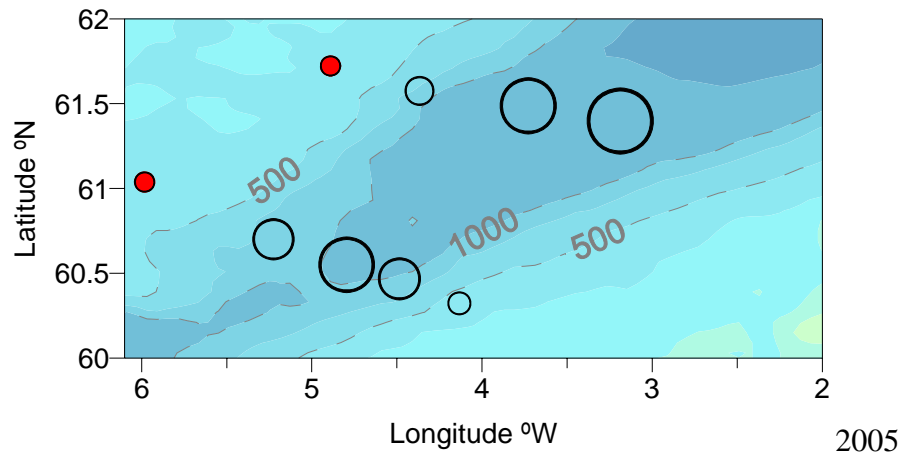


Figure 4. Integrated OPC counts for FIM and NOL Lines.

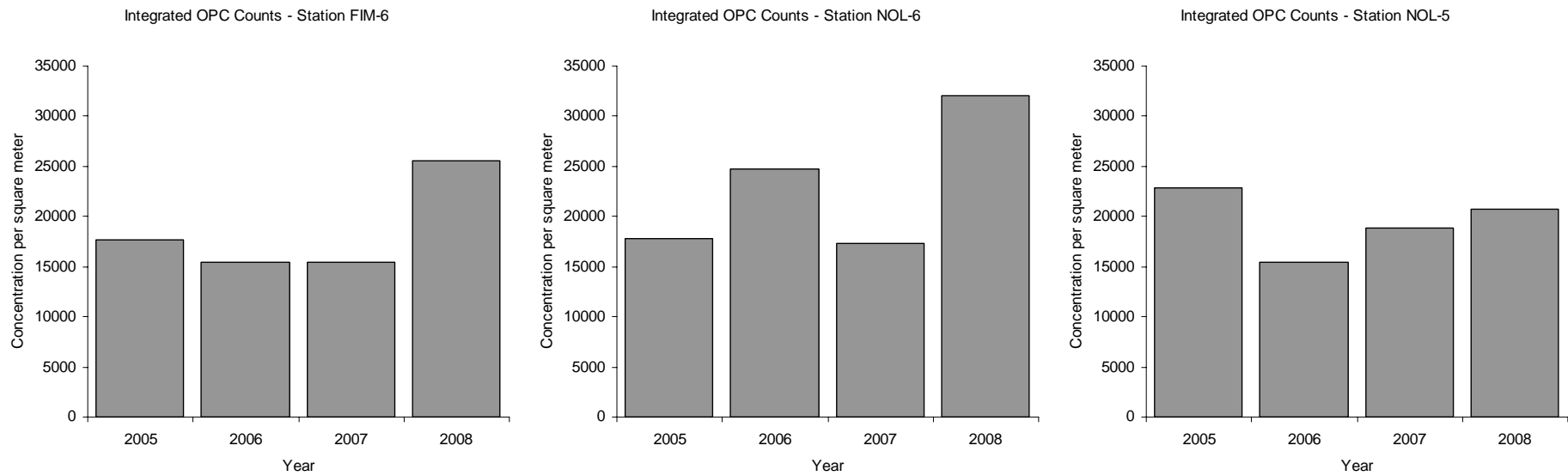


Figure 5. Integrated abundances on priority stations between 2005 and 2008.



**TABLE 1**

JONSIS line stations

Name	Latitude	Longitude	Depth	Spacing
JO 1	59°17.00'N	02°14.00'W	75 m	
JO 1A	59°17.00'N	02°5.00'W	90 m	8.5 km
JO 2	59°7.00'N	01°56.00'W	100 m	8.5 km
JO 3	59°17.00'N	01°48.00'W	80 m	7.6 km
JO 4	59°17.00'N	01°40.00'W	90 m	7.6 km
JO 5	59°17.00'N	01°30.00'W	95 m	9.5 km
JO 6	59°17.00'N	01°20.00'W	110 m	9.5 km
JO 6A	59°17.00'N	01°10.00'W	120 m	9.5 km
JO 7	59°17.00'N	01°0.00'W	125 m	9.5 km
JO 8	59°17.00'N	00°40.00'W	120 m	18.9 km
JO 9	59°17.00'N	00°20.00'W	140 m	18.9 km
JO10	59°17.00'N	00°0.00'W	135 m	18.9 km

**TABLE 2**

## Fair Isle - Munken line stations

Name	Latitude	Longitude	Depth	Spacing	
FIM-01	60° 10.00' N	03° 44.00' W	150 m		CTD
SEFOS-1	60° 13.00' N	03° 51.50' W	170 m	8.9 km	CTD
FIM-02	60° 16.00' N	03° 59.00' W	200 m	8.9 km	CTD
SEFOS-2	60° 18.00' N	04° 04.50' W	330 m	6.3 km	CTD, ARIES
FIM-03	60° 20.25' N	04° 09.00' W	390 m	6.3 km	CTD
FIM-04	60° 25.00' N	04° 19.00' W	655 m	12.4 km	CTD
FIM-05	60° 29.00' N	04° 26.00' W	995 m	9.8 km	CTD, ARIES
FIM-06	60° 35.00' N	04° 45.00' W	1090 m	20.6 km	CTD, ARIES, MIKT Priority station for ARIES
FIM-6a	60° 38.00' N	04° 54.00' W	1030 m	9.9 km	CTD
FIM-07	60° 43.00' N	05° 06.00' W	915 m	14.3 km	CTD, ARIES
FIM-08	60° 47.00' N	05° 16.00' W	830 m	11.7 km	CTD
FIM-09	60° 51.00' N	05° 29.00' W	600 m	13.9 km	CTD
FIM-10	61° 02.00' N	05° 57.00' W	280 m	32.4 km	CTD, ARIES
FIM-11	61° 12.00' N	06° 22.00' W	240 m	29.1 km	CTD

**TABLE 3**

## Nolso - Flugga line stations

Name	Latitude	Longitude	Depth	Spacing	
NOL-11	62° 00.00' N	06° 12.00' W	125 m		CTD
NOL-10	61° 54.00' N	05° 45.00' W	290 m	26.0 km	CTD
NOL-09	61° 49.00' N	05° 21.00' W	180 m	22.9 km	CTD
NOL-08	61° 42.00' N	04° 51.00' W	235 m	29.3 km	CTD, ARIES
NOL-07	61° 35.00' N	04° 15.00' W	990 m	34.2 km	CTD, ARIES
NOL-06	61° 28.00' N	03° 42.00' W	1235 m	31.9 km	CTD, MIKT, ARIES Priority station for ARIES
NOL-05	61° 21.00' N	03° 10.00' W	1370 m	31.2 km	CTD, ARIES Priority station for ARIES
NOL-04	61° 14.00' N	02° 40.00' W	1080 m	29.6 km	CTD, ARIES
NOL-3a	61° 11.00' N	02° 25.00' W	730 m	14.5 km	CTD
SEFOS-6	61° 09.30' N	02° 17.50' W	630 m	7.4 km	CTD
NOL-03	61° 08.00' N	02° 10.00' W	550 m	7.1 km	CTD
SEFOS-5	61° 06.00' N	02° 01.50' W	440 m	8.5 km	CTD, ARIES
NOL-02	61° 04.00' N	01° 53.00' W	270 m	8.5 km	CTD
SEFOS-4	61° 01.40' N	01° 35.40' W	155 m	16.7 km	CTD
SEFOS-3	60° 58.70' N	01° 17.70' W	125 m	16.7 km	CTD, ARIES
NOL-01	60° 56.00' N	01° 00.00' W	110 m	16.7 km	CTD

