

Cruise Report
Cruise no. 0732

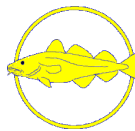
**Joint investigations on Norwegian spring-spawning herring and
blue whiting north of the Faroes**

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R/V Magnus Heinason OW2252



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INTRODUCTION

The main aim of this survey was to investigate the distribution and abundance of Norwegian spring-spawning herring and immature blue whiting in the areas north of the Faroes and in the Norwegian Sea. Hydrographic data and plankton net samples were collected along the cruise tracks.

The cruise was part of a joint international survey (Faroes, Norway, Russia, Denmark, and Iceland) coordinated by the ICES Planning Group on Northeast Atlantic Pelagic Ecosystem Surveys (PGNAPES). Six vessels participated in the cooperative investigations, R/V *Magnus Heinason* (FO), R/V *G.O.Sars*, R/V *Håkon Mosby* (NO), R/V *Árni Friðriksson* (IC), and R/V *Dana* (DK). Combined abundance estimates of Norwegian spring spawning herring and blue whiting will be calculated during the meeting of the PGNAPES in August 2007, and reported to the ICES Northern Pelagic and Blue Whiting Fisheries Working Group (WGNPBW) in late August 2007 (ICES CM 2007).

MATERIAL AND METHODS

Cruise tracks with hydrographic stations (CTD), WP2 plankton stations, and pelagic trawl stations in the surveyed area are shown in Fig. 1. Acoustic data were recorded with a Simrad EK-500 echo sounder. Data from the hull mounted 38 kHz transducer were logged at sea and used in the fish abundance estimation. The area backscattering recordings (s_A) per nautical mile were averaged by each 5 nautical mile and the recordings were scrutinised on a daily basis with the EchoView 4.1 software and allocated to herring, blue whiting, plankton or other fish (e.g. lantern fish) based on regular pelagic trawling aimed at the various acoustic recordings and to a limited extent on the characteristics of the echo recordings. Details of the trawls used are given in Appendix 1.

The hull mounted 38 kHz Echo sounder (Simrad EK 500) was operating with settings obtained from a copper sphere calibration at 29/3 2007 (see **Appendix 1**). Biological samples of the acoustic recordings were obtained with a pelagic trawl from Vónin (see details **Appendix 2**).

Hydrographic data (temperature and conductivity/salinity) were collected along the cruise tracks at every 35-45 nm with a CTD cast down to 1000 m depth or to the bottom (**Fig. 1**). Water samples were taken from each station, with water bottles mounted on the CTD for analysis of nutrients. Samples for chlorophyll analysis were collected from the upper 100m.

Zooplankton samples were taken at each hydrographic station from vertical hauls 0-200m depth with a standard WP-2 net with 180 μ m meshes.

RESULTS

The cruise tracks and the surveyed area is shown in **Fig. 1**. During the third to fifth day bad weather hampered the survey progress, otherwise the weather was excellent and the survey coverage was according to the survey plans.

Norwegian spring spawning herring

A relatively large biomass of Norwegian spring spawning herring was found in the surveyed area. A preliminary estimate of the abundance of herring in the area north of the Faroes was about 3.4 million tonnes (**Fig. 2 and 3**). This was approximately the same amount as was found in the area in 2006 and about twice the amount found in 2005. The total abundance of herring from all the participating vessels will be available in August in a joint report to ICES (ICES 2007).

Herring was widely distributed in the surveyed area (**Fig. 2**). The herring formed schools at 200-400 m depths during the day and ascended just before midnight to the surface where the schools broke

up. Due to the shallow distribution of herring an unknown proportion was distributed above the depth of the hull mounted acoustic transducer (5 m) and thus unavailable to the recordings from the vessel during the night hours (24-02).

The length distribution of Norwegian spring spawning herring in the area north of the Faroes is shown in **Fig. 4**. Most of the herring was 5 and 8-9 years old (the 2002 and 1999-1998 year-classes, respectively), but also some old herring of the 1991 year-class was present in the western part of the area (**Fig. 5**).

Blue whiting

The amount of blue whiting was low in the surveyed area and the open waters was void of blue whiting (**Fig. 6**). The highest concentrations of blue whiting were recorded just north of the Faroeplateau and north of the Iceland-Faroe Ridge. In the open ocean practically no blue whiting were found. Less blue whiting were observed in the Faroese area than last year. The mean length of blue whiting in the Faroese area was 24 cm (86 g), which is rather small fish. The length distribution of blue whiting is shown in **Fig. 7**. Most of the blue whiting was age 1 and age 3-4 with some age 5 (the 2006, 2004, and 2003 year classes, respectively, **Fig. 8**).

It should be noted that the 2 year olds (the 2005 year-class) are almost missing from the catches. This confirms the findings in 2006, when no age 1 blue whiting was found.

Mackerel

Small mackerel 28 cm long (most likely the 2005 year-class) was found in the southeastern area in the investigated area, i.e. east towards the EU fishery limit on 63°10'N and 24°W (**Fig. 9**).

Zooplankton

Krill (*Meganyctiphanes norvegica*) was found at depths in the whole area. in the area north of the Faroes compared to 2006. The herring fed on the copepod *Calanus* spp.

Environment

The sea-surface temperature in the surveyed area is shown in **Fig. 10**. The influence of the East-Icelandic current seems to be strong in 2007, leading to relatively cold water north of the Faroes.

REFERENCES

ICES 2007. Report of the Planning Group on Northeast Atlantic Pelagic Ecosystem Surveys (PGNAPES). ICES CM 2007/RMC:07.

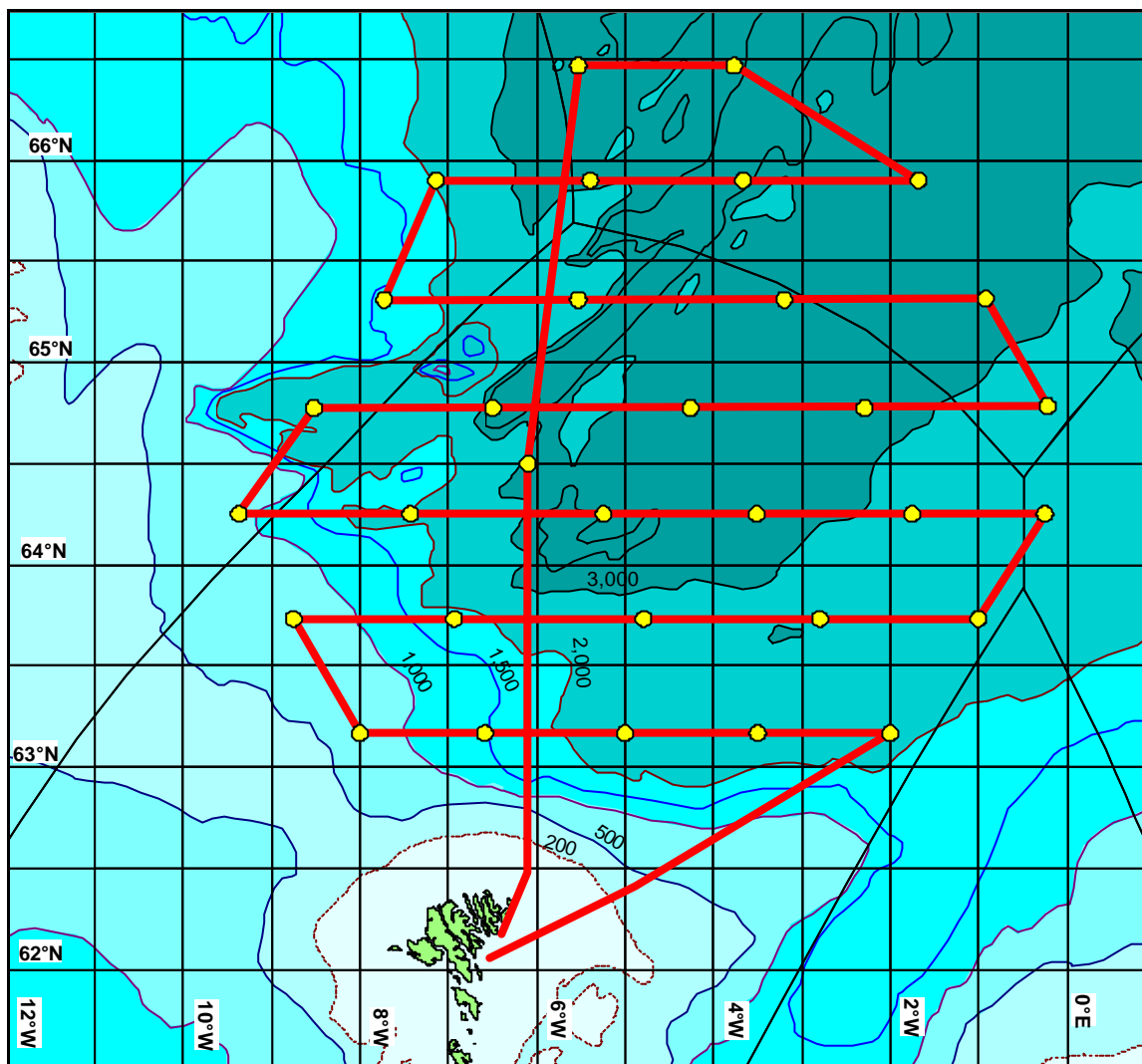


Figure 1. Cruise tracks (blue lines) with hydrographic stations (light yellow circles) and trawl stations (dark green circles) north of the Faroes, *Magnus Heinason* cruise 0732, 4-16/5 2007.

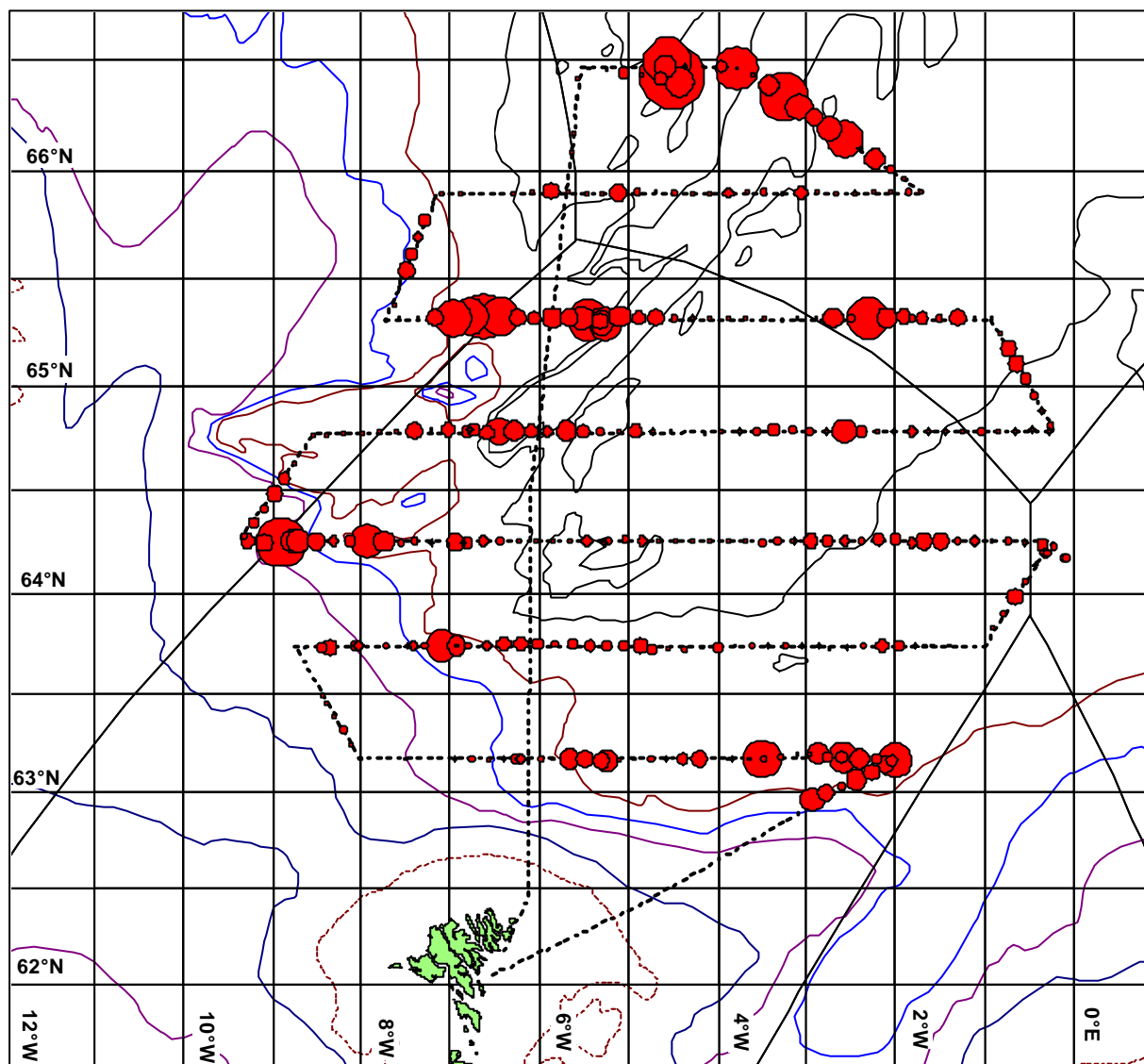


Figure 2. Integration values (s_A , m^2/nm^2) of Norwegian spring spawning herring per 5 nm along the cruise tracks, *Magnus Heinason* cruise 0732, 4/16/5 2007.

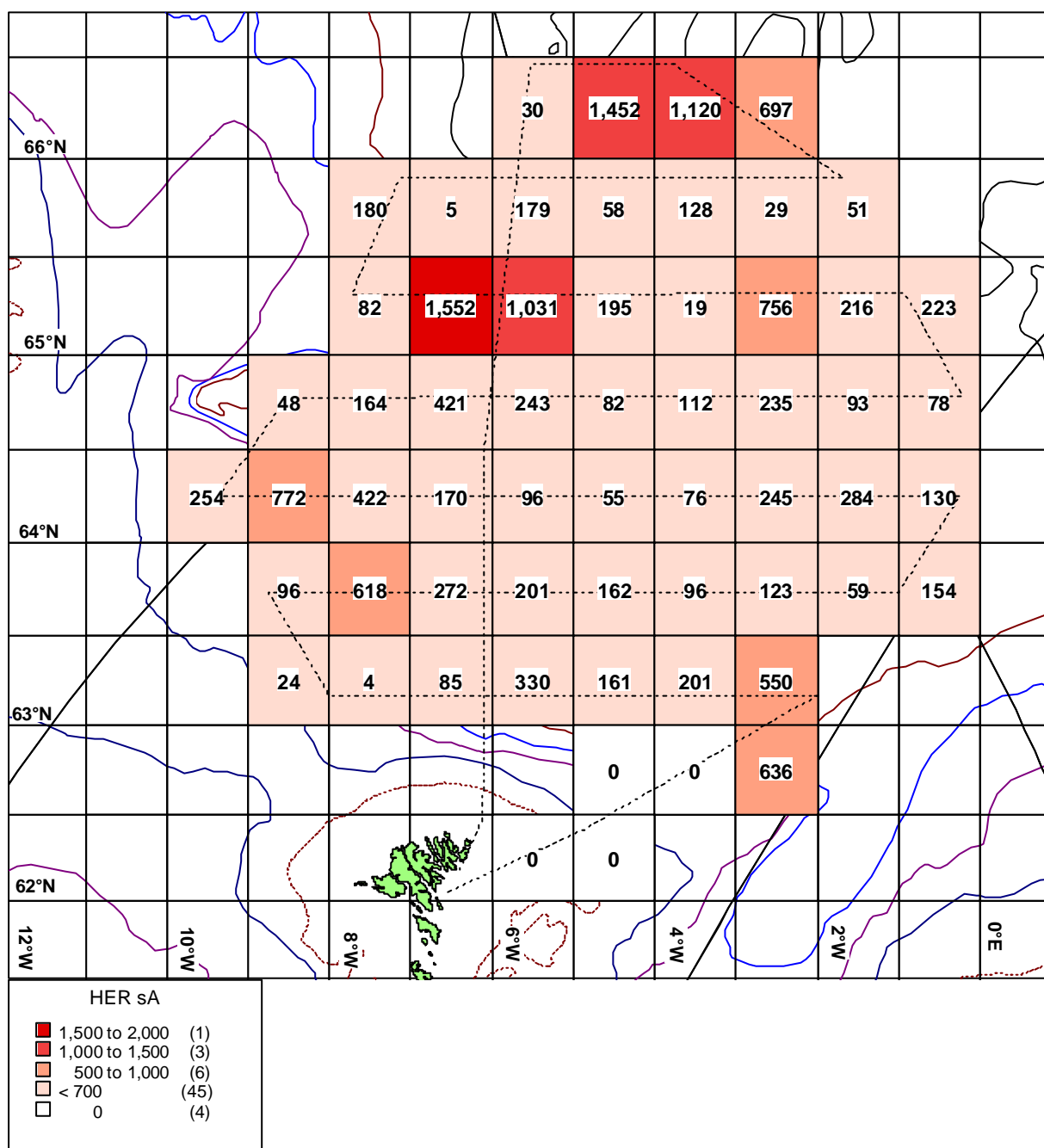


Figure 3. Mean integration values (s_A , m^2/nm^2) of Norwegian spring spawning herring per statistical square (1x2 degrees), *Magnus Heinason* cruise 0732, 4-16/5 2007.

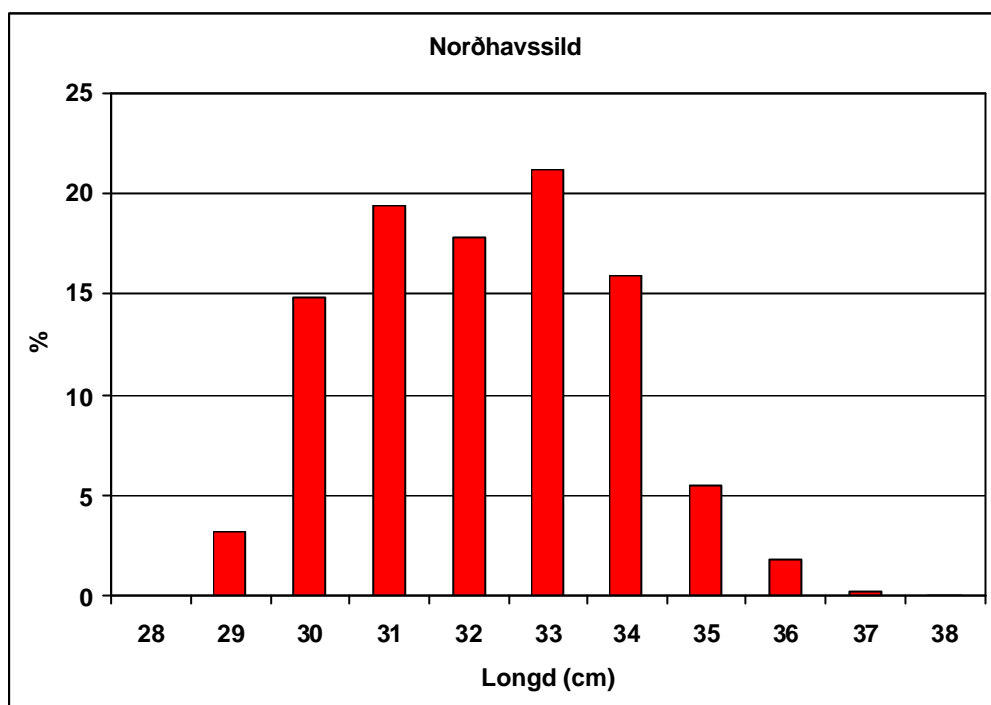


Figure 4. Length distribution of Norwegian spring spawning herring north of the Faroes, *Magnus Heinason* cruise 0732, 4-16/5 2007.

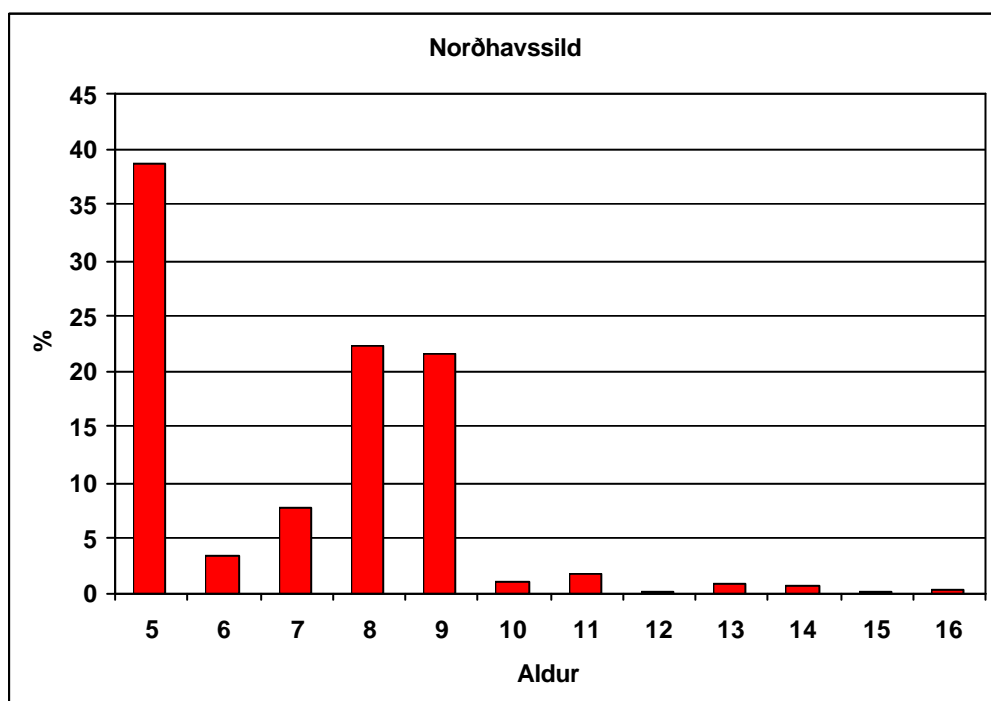


Figure 5. Age distribution of Norwegian spring spawning herring north of the Faroes, *Magnus Heinason* cruise 0732, 4-16/5 2007.

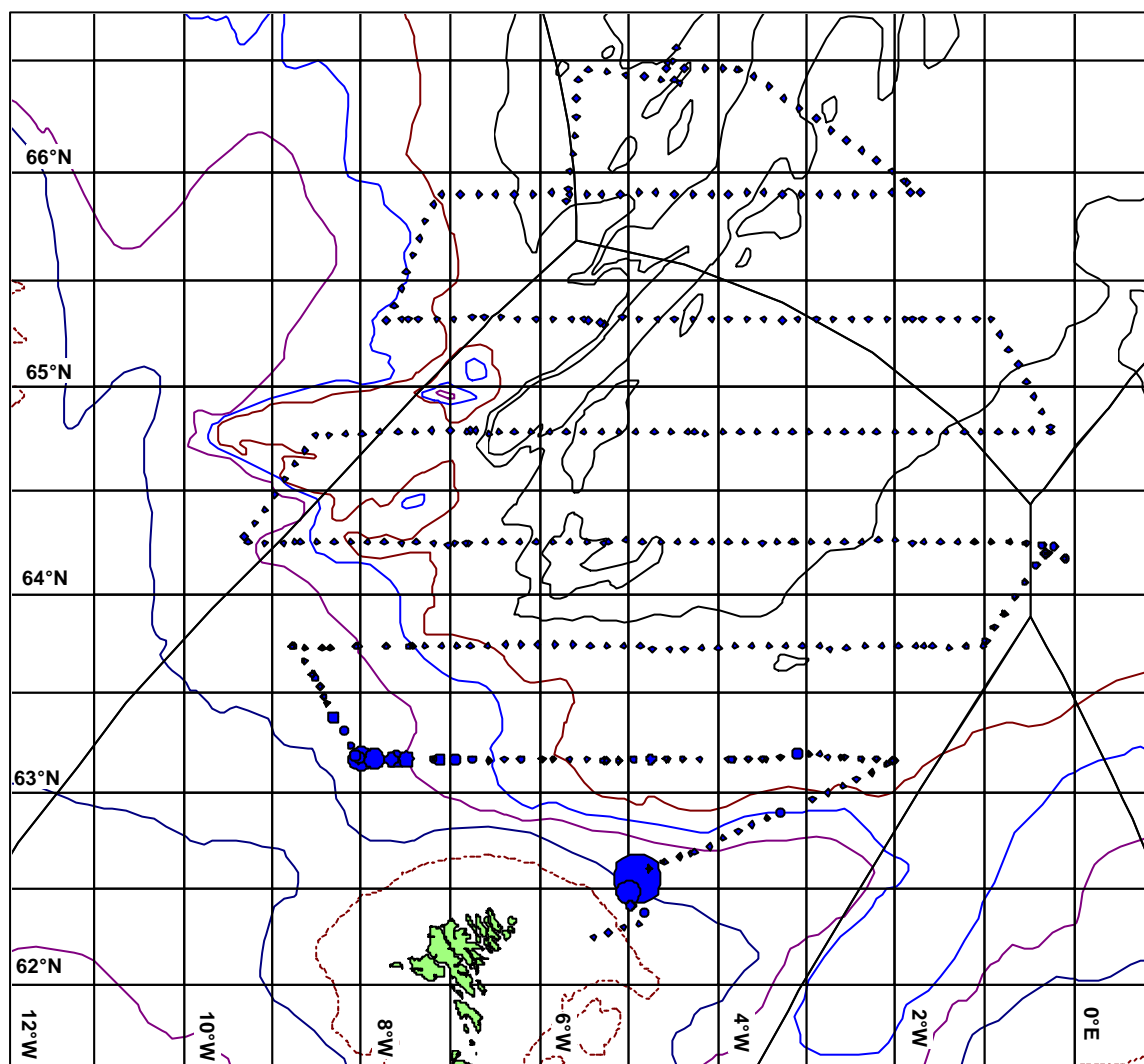


Figure 6. Integration values (s_A , m^2/nm^2) of blue whiting per 5 nm along the cruise tracks, *Magnus Heinason* cruise 0732, 4-16/5 2007.

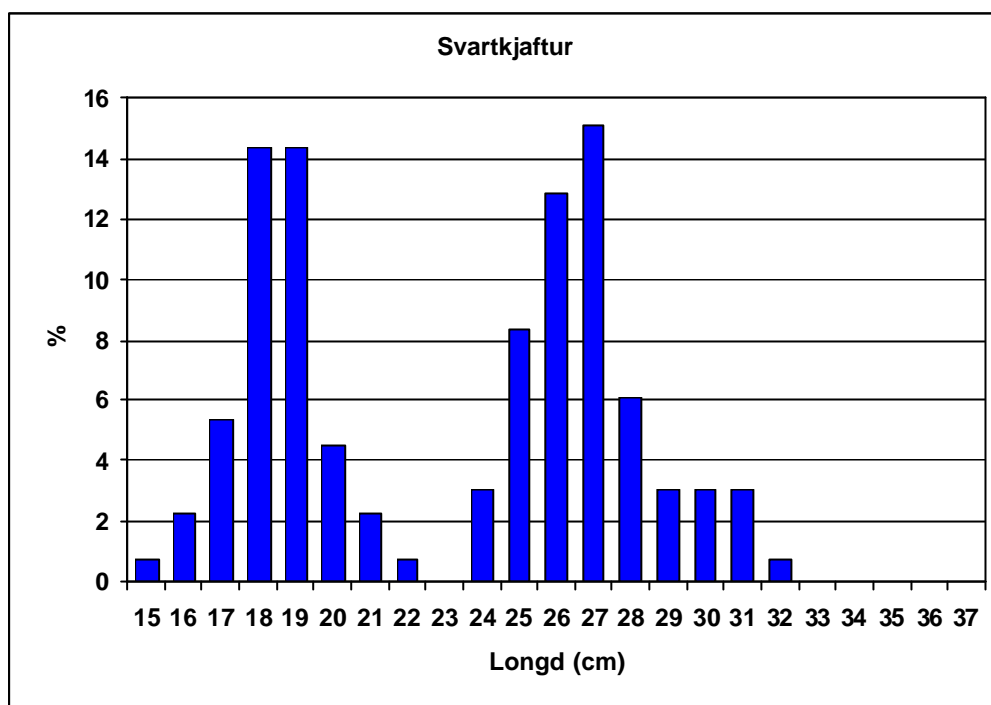


Figure 7. Length distribution of blue whiting north of the Faroes, *Magnus Heinason* cruise 0732, 4-16/5 2007.

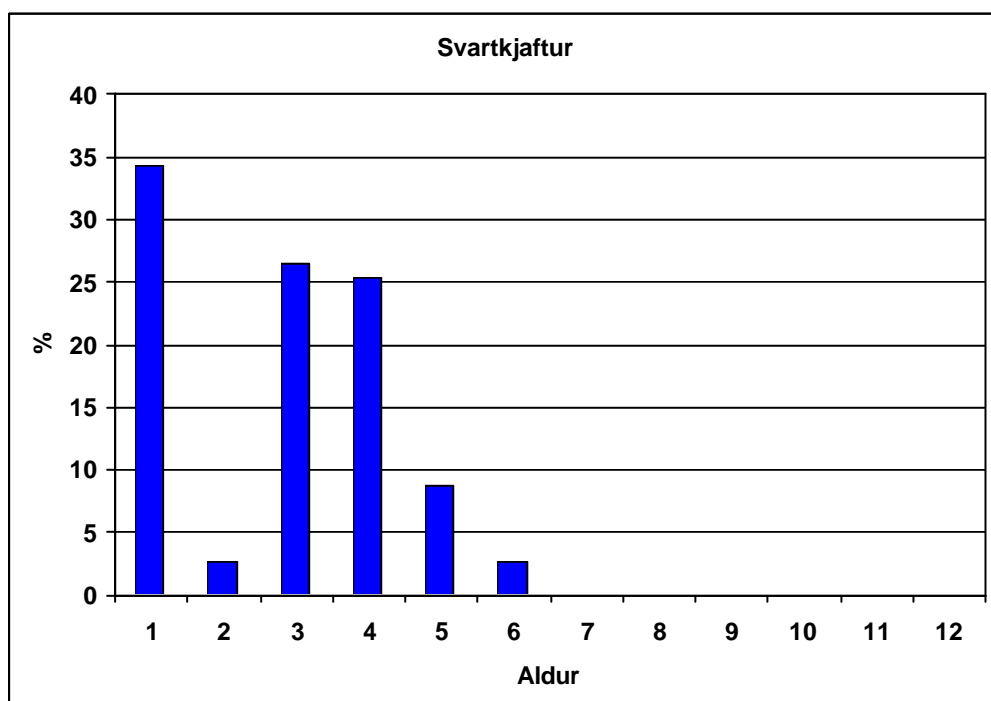


Figure 8. Age distribution of blue whiting north of the Faroes, *Magnus Heinason* cruise 0732, 4-16/5 2007.

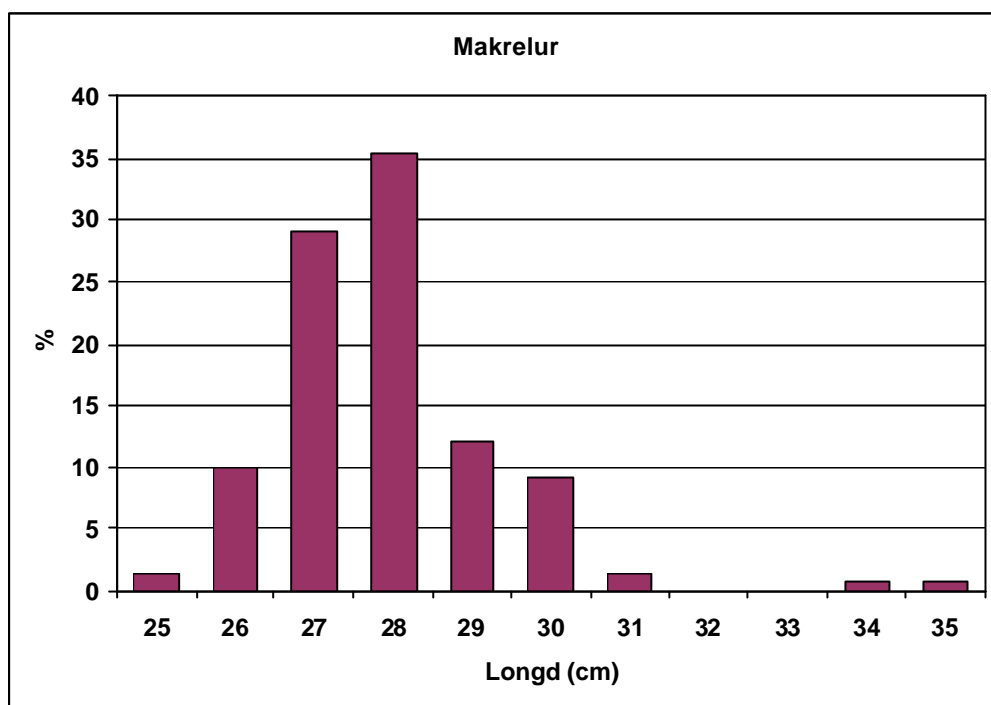


Figure 9. Length distribution of mackerel (mean length 28 cm, most likely the 2005 year-class) north of the Faroes, *Magnus Heinason* cruise 0732, 4/16/5 2007.

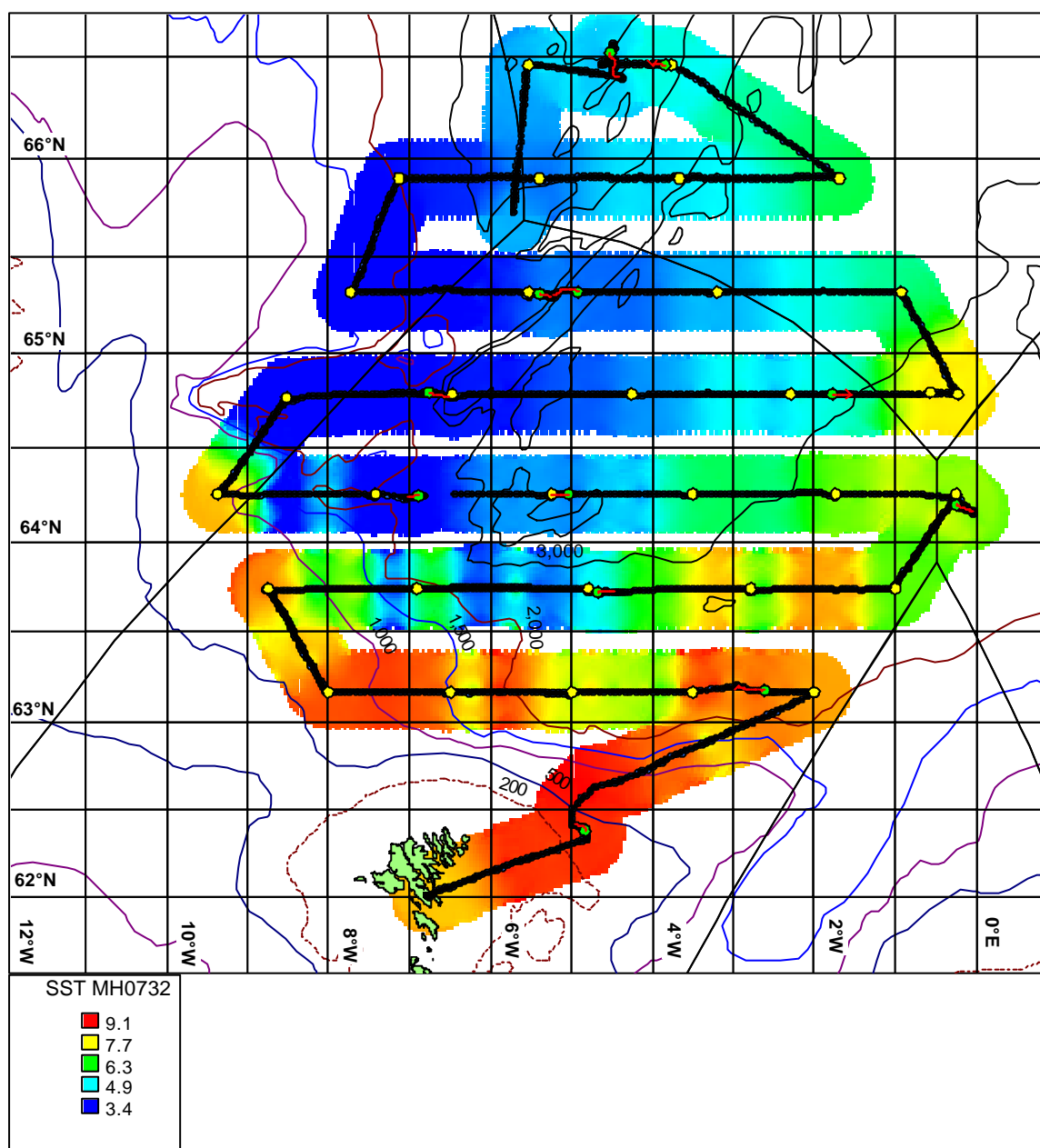


Figure 10. Sea-surface temperature north of the Faroes, *Magnus Heinason* cruise 0732, 4-16/5 2007.

APPENDIX 1. Acoustic instruments and settings

Acoustic instruments and settings for the primary frequency (38 kHz) on the R/V *Magnus Heinason*, during the surveys in April-May 2006. The 38 kHz Echo sounder was calibrated prior to the survey (2/4 2006) following standard procedures.

Echo sounder	Simrad EK 500
Frequency (kHz)	38
Primary transducer	ES38B
Transducer installation	Hull
Transducer depth (m)	3
Upper integration limit (m)	7
Absorption coeff. (dB/km)	10
Pulse length (ms)	Medium
Band width (kHz)	Wide
Transmitter power (W)	2000
Angle sensitivity (dB)	21.9
2-way beam angle (dB)	-20.9
Sv Transducer gain (dB)	27.22
Ts Transducer gain (dB)	27.40
s_A correction (dB)	None
3 dB beam width (dg)/offset (dg)	
Alongship:	7.05/0.31
athw. ship:	6.83/-0.12
Maximum range (m)	750
Post processing software	Sonardata Echoview 4.1

APPENDIX 2. Configuration of the pelagic trawls

Details of the pelagic trawl used to collect the biological samples during the survey are listed below:

Type: Vónin

Circumference 640 m

Vertical opening 45-55 m (average 47 m)

Horizontal opening 58-62 (average 60 m)

Mesh size in the mouth is 16 m, gradually decreasing to 40 mm in the cod-end

Towing speed 3.0 - 4.0 knots (average 3.5 knots)

Weights on each side on lower bridles 800 kg.