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Northwest Atlantic Fisheries Organization

Serial No. N1025

NAFO SCS Doc. 85/17

SCIENTIFIC COUNCIL MEETING - JUNE 1985

Denmark (Greenland) Research Report for 1984

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This report contains information on the fisheries by Greenland vessels and on research carried out by Greenland Fisheries and Environment Research Institute (Grønlands Fiskeri- og Miljøundersøgelser) in the NAFO Area and at East Greenland (ICES Subarea XIV) in 1984. Such work which is of minor interest to NAFO such as land-based environmental work is only just mentioned, although this kind of work is a major and increasing part of the institute's work. Various scientists in the institute have contributed to the report. Some information on fisheries by Danish and Faroese vessels is also given.

SUBAREA 0

Apart from a catch of 477 tonnes of shrimp no catch by Greenland vessels was reported from Subarea 0 for 1984. Faroese vessels caught 555 tonnes of shrimp, and Danish vessels 223 tonnes (all figures are provisional and taken from NAFO SCS Doc. 85/I/2).

Two of the thirtysix stations operated in the photographic shrimp survey by the R/V ADOLF JENSEN in July-August were on the shrimp grounds adjacent to the major offshore ground in Div. 1B. Results of this survey, including the detailed observations on each station, were presented to the Special Meeting of the Scientific Council in January 1985 by P. Kanneworff (NAFO SCR Doc. 85/I/8).

SUBAREA 1

A. STATUS OF THE FISHERIES

1. General trends

Preliminary statistics for the fisheries in 1984 are given in Table 1. Preliminary figures supplied for the year prior to the NAFO June Meeting are usually very close to the final figures. However, the preliminary figures here supplied for 1984 may differ relatively much from the final figures to be supplied later in the year. This is due mainly to the more and more complex fleet composition and the decentralized production and trade, and to temporary complications by the administrative change in statistical recordings and reporting, which by January 1985 was taken over by the Greenland Home Rule administration.

Table 1. Nominal catches (tonnes) by Greenland vessels[1] in Subarea 1, 1984 (provisional figures), and the relative changes from 1983 to 1984.

Species	Nom. catch 1984 (provisional)	Percentage change from 1983[2]
Cod	20,676	-60
Greenland cod	2,774	-21
Redfish	110	-
Wolffishes	1,282	-45
Grenadiers	19	-
Greenland halibut	6,030	+46
Halibut	106	-
Capelin	850	+180
Atlantic salmon	297	-4
Arctic char	34	-
Lumpsucker	600	-
Herring	4	-
Industrial fish and fish not specified	50	-
Shrimp	41,000	+7
Scallops	50	New fishery
Total	73,882	-30

1) including non-Greenland vessels in joint-venture arrangements.

2 Given only for major species due to the preliminary nature of 1984 statistics.

The general trends in the Greenland fishery are, however, very obvious. Total catch of cod was more than halved as compared to 1983, while catches of shrimp remained at the high level round 40.000 tons. Increased landings of redfish and Greenland halibut were not sufficient to counterbalance the drastic decline in cod catches. Therefore also total landings by Greenland vessels decreased relatively much (by about 30,000 t) from 1983 to 1984.

Salmon catches were at the same low level as in 1983 when the catch level decreased dramatically from a level of 1100-1200 tons to a level of about 300 tons.

Experimental fishing for scallops (Chlamys islandica) has lead to a minor commercial fishery for this species.

2. Cod

a) The fisheries

Total landings of cod by Greenland vessels decreased dramatically from about 50,000 tonnes to about 20.700 tonnes, of which about one half was taken inshore, the other offshore. Offshore catches were taken mainly by trawlers (about 8,500 tonnes), the remainder by long liners (1247 tonnes) and by gill nets (580 tonnes). Virtually no offshore catch of cod was reported for Div. 1A-1C, the major part of the offshore catch being taken in Div. 1E, followed by Div. 1D.

Based upon figures for trawlers of the Royal Greenland Trade Department overall catch-per-unit-effort decreased by about 28% from 1983 to a level of only about 1/3 of the level for 1981.

Inshore catches were about halved, the catch being about 10.300 tonnes of which about 60% is estimated to have been taken by pound nets. The major part of the inshore catch was from Div. 1D (about 4900 tonnes), but in contrast to the offshore fishery, Div. 1B and 1C both showed better catches than did Div. 1E-1F. Also for Div. 1A a small inshore catch (140 tonnes) was reported.

b) Forecast for 1985-86

The cod landings in 1984 were heavily predominated by the two year classes 1979 and 1977, the former being the more abundant, especially in Div. 1A-1D.

The 1982 year class was initially expected to be a relatively good one (200 million individuals by age 3). Already last year the estimate was lowered to 150 million due to possible adverse influence by the extremely cold winters 1982/83 and 1983/84. If the year class had been of that size it ought to have shown up as undersized fish in the pound-net fisheries in 1984, and to have been observed much more frequently in the inshore research surveys. It has, however, been necessary to revise the initial optimism round this year class, since it was not observed in anything like the expected abundance. In the assessment carried out jointly by biologists in Denmark and the Federal Republic of Germany (Res. Doc. 85/VI/65) it is now regarded a poor year class of about 20 million fish by age 3.

Thus, for the years 1985-86 no improvement in the stock situation is expected. The TAC for 1985 has been set at a record-low level of 25.000 tonnes, but it seems doubtful that even such a low catch will be achieved. Catches by Greenland fishermen by the end of April 1985 are well below those by the same time in 1984.

3. Shrimp

a) The fisheries

The total nominal catch of shrimp in Subarea 1 in 1984 by Greenland vessels was 41,000 tons, of which ab. 33,500 tons were taken in the offshore area. The catch figures are thus slightly higher than in 1983 (total 39,600 tons).

As in the two previous years severe ice conditions did early in 1984 hinder the access to the main shrimp fishing areas in the Davis Strait from January to May. In general, the distribution of the offshore shrimp fishery was similar to the 1983 situation, however, with more fishing taking place in Division 1C than in the previous years (NAFO SCR Doc. 85/I/3).

b) Forecast for 1985

The status of the offshore shrimp stock in Subarea 1 was assessed by the Shrimp Working Group of STACFIS in January 1985. Because of apparent stability in the shrimp stock and higher-than-advised yields in the period from 1979 to 1984, it was advised that the overall 1985 TAC for the offshore grounds in Subarea 1 and adjacent parts of Subarea 0 should not exceed 36,000 tons, which corresponds to the average catch by year in the stable period (where the advised overall TAC was 29,500 tons).

4. Salmon

The reported nominal catches of salmon at West Greenland in 1984 are 297 tonnes, which is near the level of last year (310 tonnes). The catch in 1984 accounts for only 34% of the TAC set for 1984.

The ICES Working Group of North Atlantic Salmon concluded that at least three major factors have caused the low catches of salmon in 1983 and 1984.

1) Adverse environmental factors.

2) Lower than normal sea survival rate of relevant smolts and low stock abundance.

3) Reduced fishing effort at Greenland for both years during the fishing season.

5. Other fish

Landings of Greenland halibut increased by about 46%, mainly as a result of increasing interest in the inshore fisheries by longlines and gillnets.

Landings of wolffishes, redfish and halibut seem to have decreased, probably due to decreased trawl effort for cod since these species are caught primarily as by-catch in the cod fishery.

B. SPECIAL RESEARCH STUDIES

I. ENVIRONMENTAL STUDIES

1. Hydrography.

In 1984 two hydrographic cruises were performed with R/V "ADOLF JENSEN". In April measurements were carried out at the standard sections between Fylla Bank and Kap Farvel. In July the sections between Fylla Bank and Disko Bugt were worked out. In addition to these two cruises hydrographic observations were made:

- at the Fylla Bank section regularly throughout the year
- in connection with biological observations at various stations along the west coast of Greenland.

In October the GFM hydrographer participated in a cruise with the R/V "Walther Herwig" of the Federal Republic of Germany, where hydrographic observations from Dohrn Bank at East Greenland to Disko Bugt were made. Preliminary results from this cruise are given in the papers: NAFO SCR Doc. 85/30 and 31.

a. Temperature.

The winter 1983-84 was one of coldest experienced in Greenland during the last 100 years, see NAFO SCR Doc. no. 85/61. The effect of these abnormal meteorological conditions were formation of great amounts of winter ice as well as negative temperature anomalies in the surface layer along the entire west coast of Greenland throughout the year, Fig. 1-6.

In the deep layers, which are highly influenced by the inflow of Irminger water, the temperature was markedly below normal during the first nine months of 1984 as was also the case at the end of 1983, indicating either a reduced inflow rate of Irminger water or negative temperature anomalies in the water of this current.

b. Salinity.

The surface salinities from July are shown in Fig. 7, and the salinity distribution across the Fylla Bank also from July are given in Fig. 8.

The surface salinities were below normal while the conditions in the deeper layer were about normal.

c. Other hydrographic observations.

In addition to the temperature and salinity observations also oxygen, phosphate, nitrate and nitrit have been observed.

2. Plankton

The standard zooplankton sampling programme was continued in Davis Strait and Disko Bugt in July at the same sections and stations as the hydrographic programme. Half-hour oblique hauls were made from about 50 m depth using stramin net (2 m ring diameter, mesh aperture 1 mm, 225-0 m wire, speed 2 n. miles/hour), and bongo net (60 cm diameter rings, mesh aperture 0.5 and 1 mm, 225-0 m wire, speed 4 1/2 n. miles/hour).

The material has not yet been worked up finally. At the sections in Davis Strait only few or single cod larvae were observed. However, at one station on Lille Hellefiskebanke (off Sukkertoppen) a concentration of 102 cod larvae was taken by 30 min. stramin net haul.

3. Other environmental studies

The environment research section of the institute in 1985 undertook the following work related to the marine environment. Besides these, studies on land and in freshwater were carried out.

a) The monitoring studies of the impact by heavy metals on the environment by the lead-zinc mine (the Black Angel mine) in Maarmorilik (North West Greenland) continued. Studies were undertaken in April and September.

b) The impact by heavy metals of the cryolite mine in Ivittuut (South Greenland) was studied in June.

c) Samples of seawater, seaweed and mussels were collected in a fiord south of Paamiut as baseline information in connection with possible future gold mining.

d) Baseline studies of heavy metals in seawater, sediments and marine organisms were conducted in Thule district in areas not exposed to mining, towns and other local human activity.

e) Samples of sediments and marine organisms were collected at Thule Air Base to evaluate possible heavy metal and PCB pollution.

II. BIOLOGICAL STUDIES

1. Cod

a) Eggs and larvae

The routine sampling of cod eggs and larvae by means of stramin net hauls on the West Greenland standard hydrographic sections and stations was continued in 1984. However, due to technical complications in an attempt to transfer the plankton sorting and analyses from Copenhagen to the laboratory in Greenland the samples were not yet worked up at the time when this report was made. However, from the initial sorting and subsampling on board the vessel and from final sorting of some of the more interesting subsamples it occurs that the occurrence of cod larvae in plankton sampled was quite extraordinary. The total number may well turn out to be one of the highest on record. However, the high number is due to the extremely high catch (more than 100 larvae) in a single haul. This haul (off Sukkertoppen) is in the region where the highest concentrations of cod larvae are usually found. It will be extremely interesting to follow the further development of this year class, the only one presently giving some hope for the future of the West Greenland cod stock. Bearing in mind the fate of the 1982 year class (see section on forecast for 1985-86) the 1984 year class will be followed closely in the 1985-86 research programs.

b) Occurrence of pre-recruit cod

In the Sisimiut/Holsteinsborg area a pilot study of estimating abundance of pre-recruit cod was undertaken, the method being of fixed gill nets of thin monofilament material with various mesh sizes. Since this method has not yet had a chance to be compared to methods previously applied in studying pre-recruit cod, it is not possible to make firm conclusions on the abundance of pre-recruit cod in the region. However, although both 2 and 3 year old cod were caught their abundance does not seem noteworthily high.

Visual observations on shallow waters at a number of inshore localities known as young-cod localities in Div. 1F did not result in an estimate of any cod year classes as being modest or good. Few, scattered observations at Nuuk/Godthaab do not change that picture.

c) Cod in commercial landings

The age composition of the total catch in 1984 was heavily dominated by the year classes 1977 and 1979, the former predominantly caught offshore and in the southern divisions (Div. 1E-1F). The 1979 year class was predominant offshore as well as inshore. In the inshore fishery its main occurrence was in Div. 1B-1D. The 1980 year class, which was almost lacking in the offshore fishery, accounted for about 22% by numbers in the inshore fishery, like the 1979 year class especially abundant in Div. 1B-1D. For further details see NAFO SCR Doc. 85/63.

d) Tagging experiments

A total of 688 cod were tagged in Subarea 1 in 1984, mainly in Div. 1D and 1F.

2. Salmon

Samples were taken from commercial catches at fish plants in Sisimiut/Holsteinsborg (Div. 1B), Maniitsoq/Sukkertoppen (Div. 1C), Nuuk/Godthaab (Div. 1D) and Paamiut/Frederikshaab(Div. 1E), in cooperation with Canadian scientists. Altogether 2720 scale samples and 7280 length samples were taken.

3. Other finfish

Samples of Greenland halibut from commercial gill-net catches in the Godthaab Fiord (Div. 1D) were taken at the fish plant in Nuuk/Godthaab.

Scale samples of redfish by species (S. marinus and S. mentella) were taken from research catches, and age determination of these scales has been started.

4. Shrimp (Pandalus borealis)

As in previous years offshore shrimp surveys were mainly carried out around Store Hellefiske Banke and west of Disko, while inshore investigations were limited.

Information on the distribution of the shrimp fishery and catch rates were obtained from logbooks of Greenland trawlers. Size composition of the stock was evaluated based on analysis of shrimp samples from research surveys and commercial trawlers (NAFO SCR Doc. 85/I/3).

Shrimp biomass was estimated by bottom photography in the depth range 100 - 600 meters in the offshore area from 66°00´N to 69°30´N (NAFO SCR Doc. 85/I/8).

5. Scallops (Chlamys islandica)

In Div. 1D, 1E and 1F scallops were investigated with respect to distribution, abundance, growth and mortality. With an estimated fishable stock of 13,000 tons in Div. 1D, a TAC of 1,300 tons was recommended. The stocks found in Div. 1E and 1F are too small to support any substantial commercial fishery.

6. Marine mammals

Staff members of GFM participated in a Canadian study of the hooded seal whelping patch in the Davis Strait in March.

An aerial survey of ringed seals was conducted in Scoresby Sund, East Greenland, in June in order to assess the distribution and numbers of seals hauled out on the ice.

Sampling of material for age determination of harp and hooded seals was continued in West Greenland.

The distribution and abundance of large cetaceans off West Greenland was investigated in June-July using aerial survey methodology.

A shore-based census of narwhals summering in the Inglefield Bredning (Thule district) was conducted in August-September. A minimum of around 4000 narwhals was estimated to be present in the area during the observation period. During the same period collection of samples for age determination and heavy metal analysis was undertaken from part of the catch of narwhals in the area.

An aerial survey was carried out in Scoresby Sund in September with the aim to investigate the distribution and abundance of narwhals summering in the area.

EAST GREENLAND

A. STATUS OF THE FISHERIES

Provisional figures for the Greenland fisheries in this area (ICES Subarea XIV) show a total of 3,373 tons landed, an increase of 77% from 1983. The increase is mainly due to increasing catches of cod (from 438 tons in 1983 to 1041 tons in 1984, taken nearly exclusively by trawlers), and of shrimp (from 1467 tons to 2250 tons). Other species are caught in negligible quantities.

A Danish fishery on capelin, totally 7980 tons, was also carried out in ICES Subarea XIV. Faroese vessels fished 6190 tons of capelin in this area.

B. SPECIAL RESEARCH STUDIES

Shrimp samples for analysis of size composition of the shrimp stock were obtained from a commercial trawler in February and March.

Research on marine mammuals is reported under marine mammual research at West Greenland.

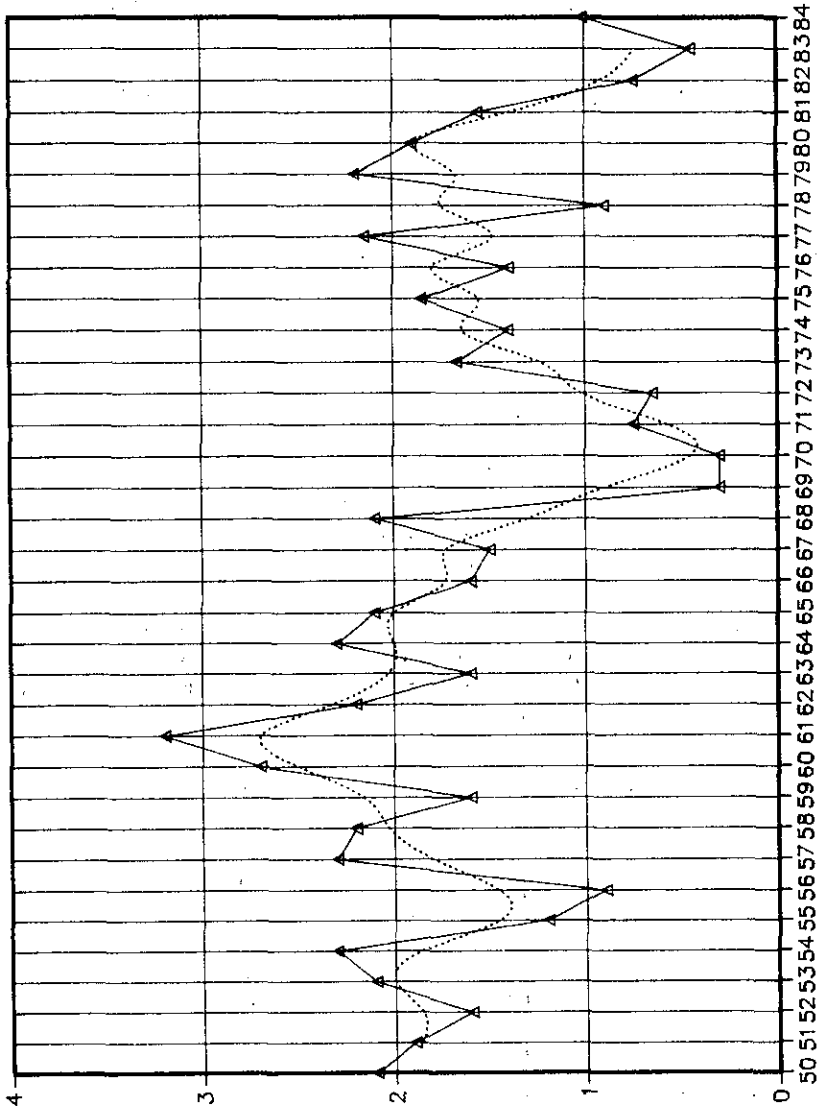

Fig. 1. Mean temperature of the upper 40 m on Fylla Bank by the middle of June.

_____ actual observations

.....). running 3 years mean

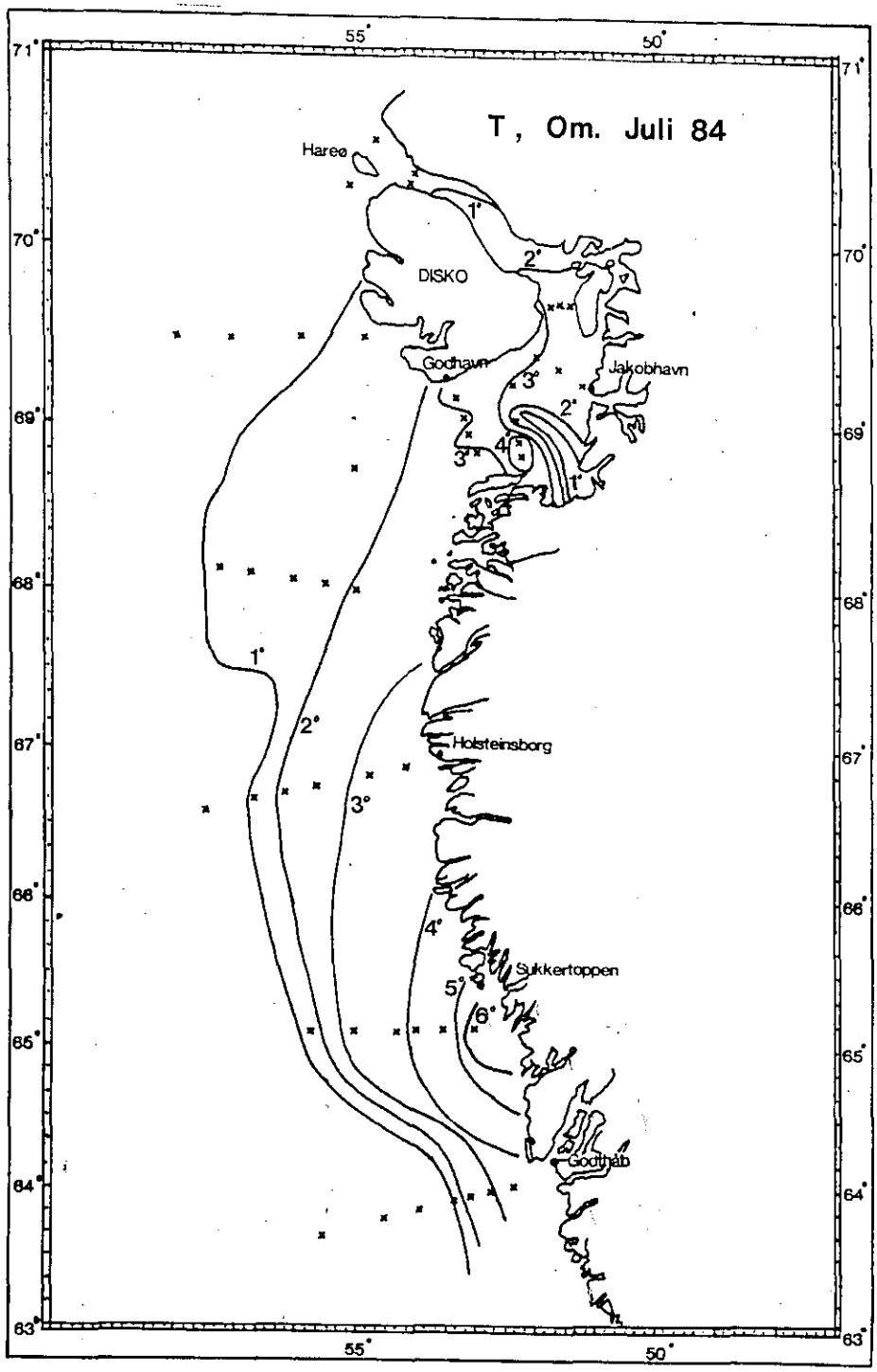

Fig. 2. Surface temperatures, July 1984.

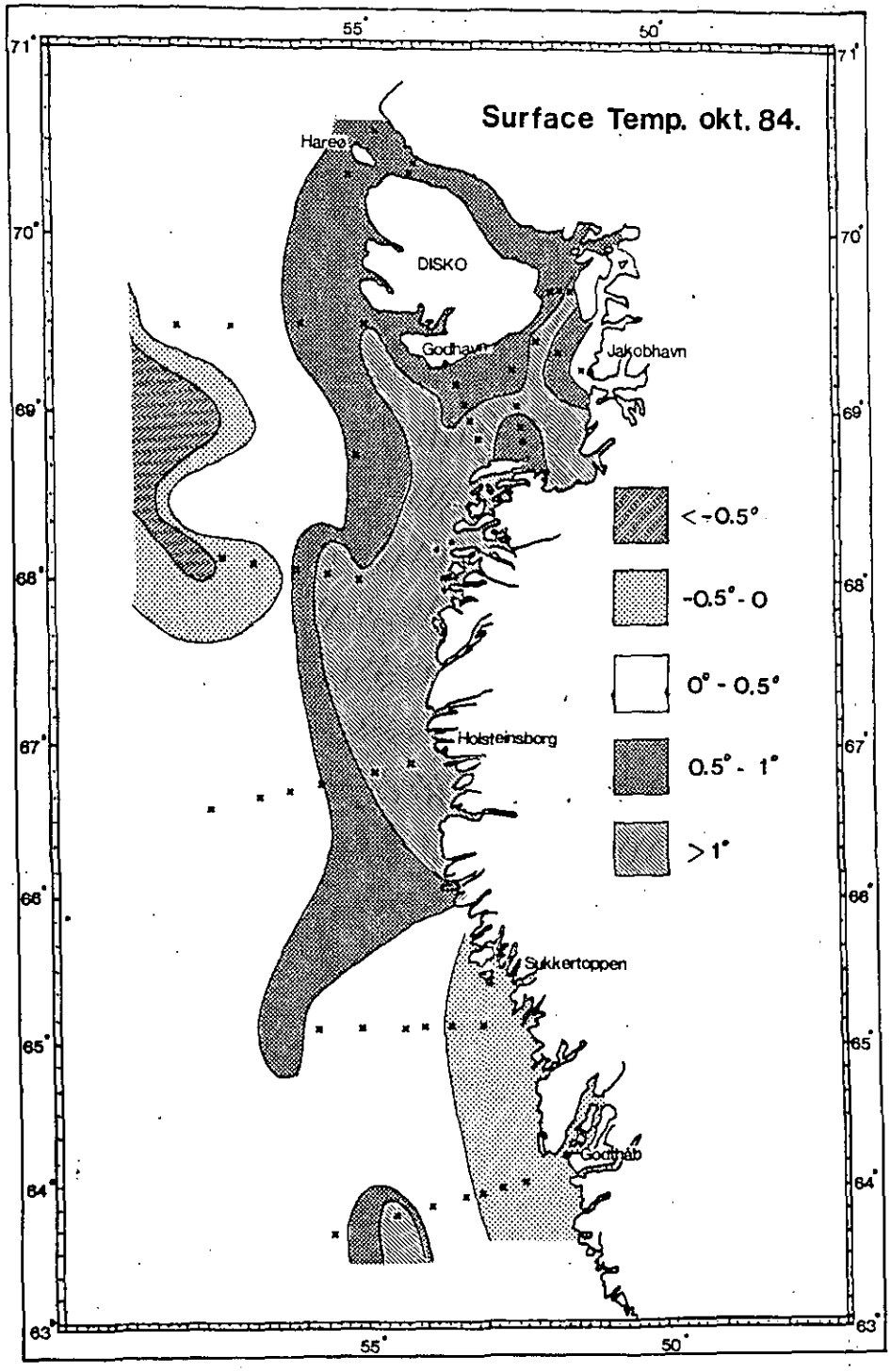

Fig. 3. Surface temperatures, October 1984.

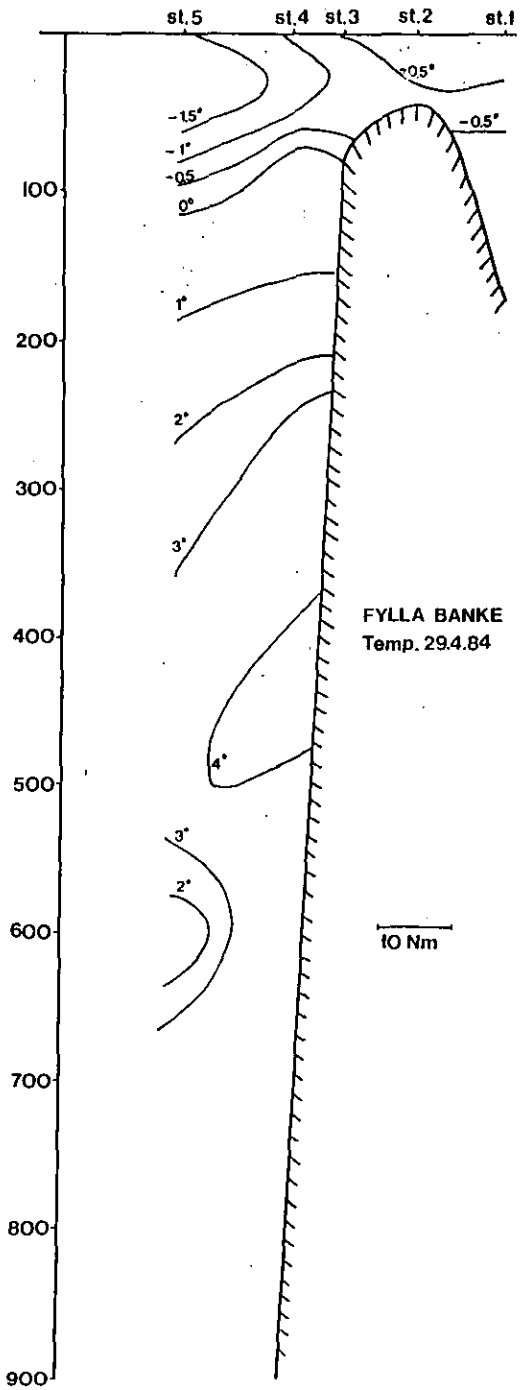

Fig. 4. Vertical temperature distribution across Fylla Bank, April 1984.

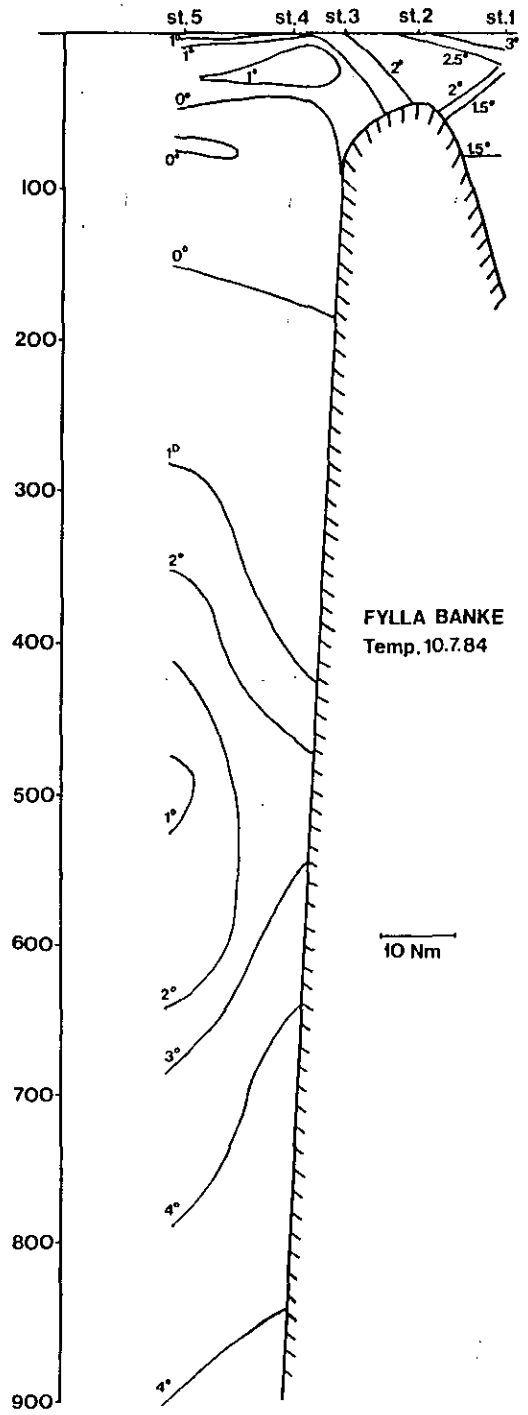

Fig. 5. Vertical temperature distribution across Fylla Bank, July 1984

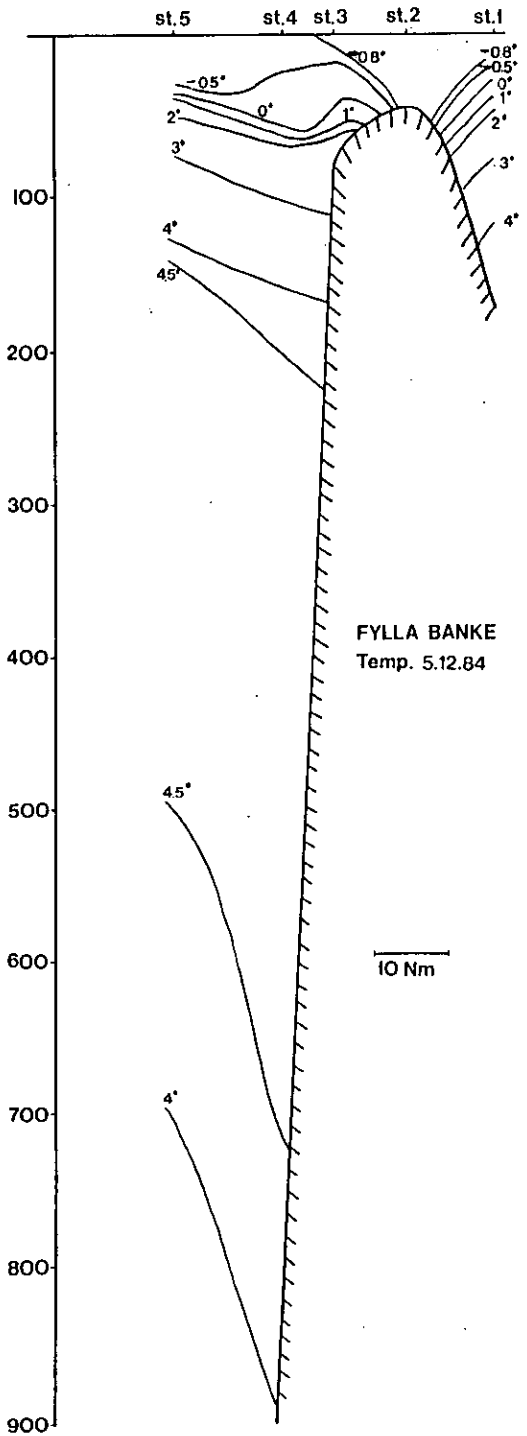

Fig. 6. Vertical temperature distribution across Fylla Bank, December 1984.

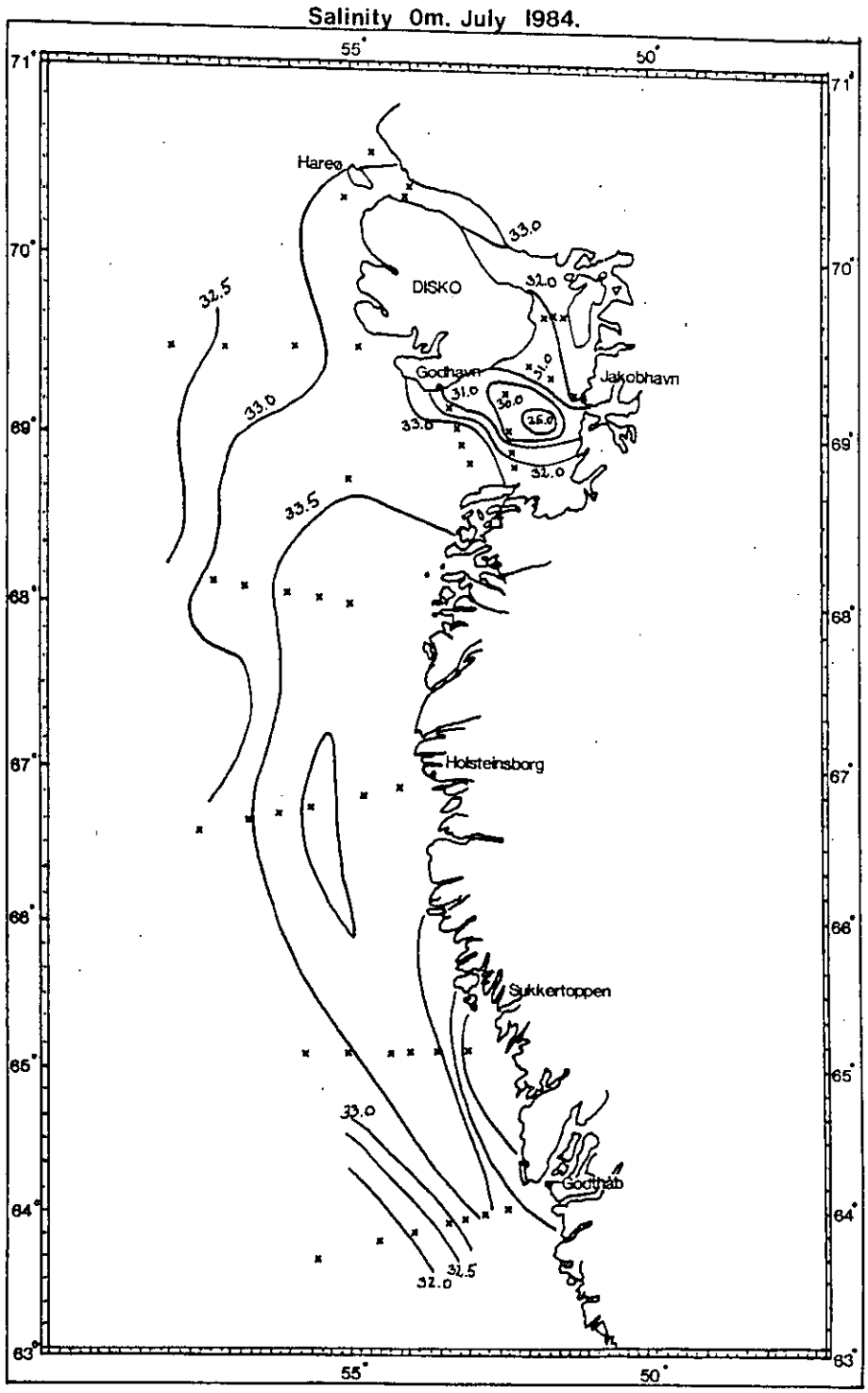

Fig. 7. Surface salinity, July 1984.

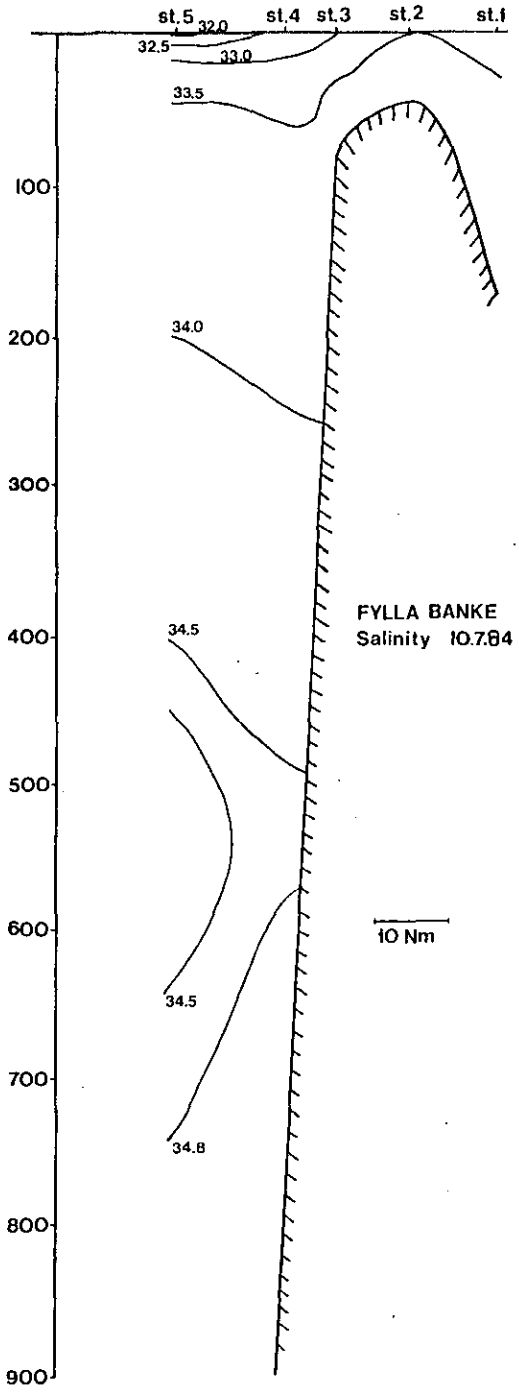

Fig. 8. Vertical salinity distribution across Fylla Bank, July 1984.