

International Commission for



the Northwest Atlantic Fisheries

Serial No. 5215

ICNAF Summ.Doc. 78/VI/12
Addendum

ANNUAL MEETING - JUNE 1978

Denmark (Greenland), Research Report for 1977

edited
by

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This report contains information on the fisheries by Greenland vessels and of research carried out by the Greenland Fisheries Investigations (Grønlands Fiskeriundersøgelser) in the ICNAF Area and at East Greenland in 1977. Various colleagues in the institute have made contribution to the report.

Information on fisheries and research carried out by Faroese vessels and the Faroese Fisheries Laboratory is reported by K.Hoydal in Summ.Doc. 78/VI/12

STATISTICAL AREA 0

No catches and no research activity reported for 1977.

SUBAREA 1

A. STATUS OF THE FISHERIES

1. General trends.

The nominal catches by Denmark (G) in 1977 are given in Table 1. Figures are provisional but are not likely to be changed to any noteworthy extent.

The total nominal catch increased by 33% from 1976 to 1977, primarily due to improved catch rate for cod, especially in the inshore pound-net fishery, and due to increased effort in the offshore shrimp fishery resulting in a 53% increase in landings of shrimp. A considerable increase was recorded in landing of Greenland halibut, and catches of Greenland cod continued to increase to

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a level of 5 800 tons, the highest so far for this species.

Table 1. Nominal catches by Denmark(G) in Subarea 1, 1977 (provisional figures)

Species	Nominal catch 1977 (metric tons)	Increase or decrease from 1976(%)
Cod	25 353	+ 56
Greenland cod	5 828	+ 23
Redfish	1 077	- 60
Wolffish	3 004	- 89
Roundnose grenadier	8	+700
Greenland halibut	6 039	+ 70
Halibut	105	- 31
American plaice	0	-100
Capelin	323	- 32
Atlantic salmon	1 379	+ 17
Arctic char	307	+129
Lumpsucker (roe only, not converted to round, fresh fish)	131	+ 13
Herring	3	- 50
Industrial fish and fish not specified	154	+ 44
Shrimp	14 936	+ 53
TOTAL (excl.lumpsucker roe)	58 516	+ 33

Further details of the major fisheries are given below.

2. Cod

a) The fisheries. Nominal catch by Greenland vessels was 56% above that of 1976 (the 1976 catch was the lowest in the last 30 years). The increase was most pronounced in the inshore fishery which increased from about 5 100 tons in 1976 to about 14 000 tons in 1977. In the peak season of the pound net fishery the capacity of some factories was a limiting factor locally, especially due to rather small average size of the fish.

Offshore catch by the trawlers remained stable at about 11 000 tons. However, this catch was achieved already in the first half of the year, and the trawlers were stopped in their cod fishing at West Greenland in the mid of the year in order to leave the remainder of the quota to inshore fisheries. The trawlers then switched to shrimp fishery or to fishery off East Greenland.

It is thus likely that cod catches would have been even higher, if the

Cod made up about 58% of the total landings by trawlers, about the same as in 1976 (55%) but less than in 1975 (65%).

The major part (76%) of the offshore catches was taken in Div. 1D and 1E, the remainder in Div. 1C and 1F. For the inshore catches 29% from Div. 1D, the remainder mainly from Div. 1C, 1E and 1F. No offshore catch of cod was made in Div. 1A and 1B, and only 7% of the inshore catch was from these two divisions.

b) Forecast for 1978-79. Catches in the first quarter of 1978 have been very good in the offshore trawl fishery. By the end of April the catch by trawlers was about 13 800 tons, whereas inshore fisheries had hardly started yet.

The improvement in 1977 and in the first part of 1978 is due to the 1973 year class, which made up about 75% of the catch (by number as well as by weight). The 1973 year class is expected to contribute heavily also to the 1979 fishery, especially offshore, whereas the inshore fishery by 1979, especially the dominating pound-net fishery, is expected to get a significant contribution from the 1975 year class. This latter year class seems to be distributed also in Div. 1B. It is thus likely that the inshore catches will be more evenly distributed between divisions in 1979 than in 1976-77.

Whether the offshore fishery will extend further north than in 1976-77 will depend upon migration of cod, but possibly the strong inflow of warm water recorded in 1977-78 at the western slope of the banks will result in some northwards extension of cod. However, the major offshore fishery is still likely to occur in Div. 1C, 1D and 1E in 1978-79, especially if TAC remains low in 1979 so that trawlers are fishing only in the first half of the year.

Further details concerning the cod stock and the fisheries are found in Res.Doc. 78/VI/44, and in the Report of the Assessment Subcommittee (Summ.Doc. 78/VI/16).

3. Shrimp (*Pandalus borealis*)

a) The fisheries. Nominal catch by Greenland vessels increased by about 53% from 1976 to 1977. The 1977 catch of close to 15 000 tons is their highest catch so far. The increase is due mainly to an increase in effort in the offshore fishery (trawlers switched from cod fishery to shrimp fishery, see Section 2a above), from where at least 5 500 tons were landed.

The fishery on the important inshore grounds in the Diskø Bay (Div. 1A), which decreased from about 7 000 tons in 1975 to about 6 000 tons in 1976, increased again in 1977 to about 6 800 tons, and total inshore catches made up about 9 000 tons.

b) Forecast for 1978-79. Forecast for the shrimp fishery is very difficult to give. The quota regulation now in force will limit offshore fisheries.

It will be extremely interesting to see what effects the heavy inflow of warm water will have upon the density and distribution of shrimp. Inshore catches in the Disko Bay will as usually be very much dependant upon winter ice. By the end of April 1978 the inshore catch was round about the same as by the end of April 1977.

4. Other fish

The catch of Greenland cod increased further to a level of 5 800 tons. This fish is caught mainly inshore, and half the catch is taken in Div. 1A-1B.

Landings of Greenland halibut increased sharply to about 6 000 tons, the highest catch so far. So to say the total catch has been by small boats or from ice (dog sledges) inshore, and about 2/3 of the catch has been taken in Div. 1A.

After a period with high catches (about 5 000 tons) in the years 1974-76 the catch of wolffishes is now back to the same level as in the 1960ies (about 3 000 tons) of which about 60% are from the small-boat fishery by lines, the remainder from offshore trawlers.

Catches of redfish decreased by 60% to about 1 100 tons of which nearly all were taken by offshore trawlers. The decrease is likely due to less directed effort on redfish.

B. SPECIAL RESEARCH STUDIES

1. Environmental studies

a) Hydrography. Work has been carried out on some of the ICNAF Standard Oceanographic Sections off West Greenland, especially the Fylla Bank Section (Fig.1). Fig. 1-4 illustrate the situation in 1977.

The water temperatures on the Fylla Bank Section were generally higher in 1977 than in the previous cold years and were even above average for the years 1950-66.

The lowermost temperatures were found over the shallow part of Fylla Bank in February-March but were not lower than -0.5°C as compared to -1.8°C in the same months of 1976.

In June the mean temperature over the shallow part of Fylla Bank was (for the 0-40 m water mass) 2.11°C . This temperature should be rather favourable for survival of cod larvae.

In July the temperature west of the Fylla Bank (0-500 m average) was 0.61°C higher than the mean for the relatively warm period 1950-66. Also on the northern banks (Lille Hellefiskebank, Fig.2 and Store Hellefiskebank, Fig.3) were temperatures in July relatively high, $2-5^{\circ}\text{C}$ and $2-3^{\circ}\text{C}$, respectively

Temperatures at the western slope of Fylla Bank remained at a relatively high level through the last part of 1977 and also in the beginning of 1978

(Fig.4). The strong inflow of Irminger water usually observed in November - December occurred already in September.

b) Plankton. Oblique hauls with 2 m stramin net (each haul 30 min., 225-0 m wire) were taken in July on the same standard stations where hydrographic observations were made, and on two stations between the two northernmost sections (Fig.5). Furthermore, at the standard station close to Godthåb, plankton hauls were made throughout the year. Plankton hauls were also made in the Disko Bay in order to observe shrimp larvae.

Several plankton hauls were also made in the Melville Bay in connection with environmental studies of a small oil spill.

The plankton on the oceanographic standard stations in the Davis Strait showed an extraordinarily high content of voluminous ctenophores (Beroe) and medusae whereas crustaceans, even copepods, were sparsely observed. It is very likely that the great inflow of especially Beroe has obstructed the fine meshes in the stramin net so that the catchability of fish larvae and crustaceans was not comparable to more normal years. However, it could probably not be disregarded that the medusae have had an important role as predators on other animals.

c) Benthic studies. In the Umanak Fjord studies of the marine environment at the lead and zinc mine at Marmorilik continued with samples taken in March (from the ice) and in September.

d) Observations on ice. Regular aerial observations on the ice round Greenland is carried out by the Danish Meteorological Institute. Besides this both governmental and offshore industry environmental programs have had observations on movements of ice bergs as one of their main items.

e) Bacteriological studies. As part of the environmental program in connection with the offshore search for oil at Greenland samples of sediments and water were taken at various localities in the coastal region of Div.1D. The purpose was to study occurrence (if any) of bacterias able to degrade oil. The studies showed that such organisms do occur although they are relatively sparse.

f) Oil-spill studies. In August a small oil spill (390 tons) occurred from a vessel in Melville Bay. Studies of this spill were made. Studies of the oil itself as well as hydrographic, plankton and benthic studies were made jointly with scientists from USA.

g) Other environmental studies. A number of organisms (invertebrates and fish) were collected for studies of content of (natural) hydrocarbons and metals in various tissues. Hydrocarbons found all seem to be biogene and not due to any pollution.

2. Biological studies

a) Cod

Eggs and larvae. The number of cod larvae found in the plankton samples is shown in Fig.5. The number was very small. However, the efficiency of the plankton net may have been influenced by ctenophores (see Section 1b above). Temperatures were rather favourable (Section 1a above). Thus there is at present a great uncertainty as to the likely strength of the 1977 cod year class.

Occurrence of pre-recruit cod. Cod of age group 1 (the 1976 year class) have not been observed in any noteworthy degree in research hauls whereas two-year old cod (the 1975 year class) have occurred both in research hauls and as discards in commercial pound-net catches, especially in Div.1B. The year class seems to be relatively good with a northern distribution. Three year old cod (the 1974 year class) were found in most research hauls as well as in commercial pound-net catches. The year class does not seem good as the 1975 year class but may have a more even distribution between divisions.

Further details on the pre-recruits are found in Res.Doc. 78/VI/44 (pages 5-7).

Cod in commercial landings. The most important material has been sampled from the trawlers' landings and from some inshore pound-net catches and landings. Details of samples are given in Table 7 of Res.Doc. 78/VI/44.

As was expected the major part (about 75%) of the fishery in 1977 was based on the 1973 year class. Fig. 6 and 7 show examples of the length and age distribution of commercial catches and landings.

Tagging experiments. 268 cod were tagged in the coastal region of Div. 1D.

b) Atlantic salmon. Scales of about 200 salmon were samples from research vessels in October and November in the coastal area of Godthåb (Div. 1D) after the commercial fishery was stopped.

c) Capelin. Research hauls by midwater trawl were made in the Godthåb area (Div. 1D) in January, February, March, April and December, and in Div. 1C in December. Samples were taken from these catches and from capelin by-catch when such by-catch occurred in research hauls for shrimp.

d) Lumpsucker. In the lumpsucker-roe season (March-May) in Godthåb records were made of the number and weight of female lumpsucker and roe landed (and recorded in the official statistics) and of the number of male lumpsucker used for local consumption.

e) Other fish. Age and/or length samples of commercial species other than those already mentioned above have been taken from research vessels' catches. The following species were sampled regularly: Greenland cod, redfish, wolffish, American plaice, Greenland halibut.

f) Shrimp (Pandalus borealis). Research on shrimp had a high priority in the 1977 research program. The major part of the research and the results were presented in research documents to the November 1977 Meeting of STACRES, and only a list of the activities is given here with a reference to the proper research documents

- i) Bottom photography on the offshore grounds in Div. 1A-1B to assess the density of shrimp. About 2000 exposures were made (Res.Doc. 77/XI/65).
- ii) Hauls by research vessel on a number of offshore standard stations of which some have been operated since 1968 (Res.Doc. 77/XI/67).
- iii) Observations and sampling onboard commercial trawlers fishing offshore (Res.Doc. 77/XI/67).
- iv) Continuation of a sampling program where samples are supplied from the major shrimp factories. This material is not yet fully worked up.

g) Queen crab (Chionoecetes opilio). Experimental fishing with various traps was carried out in the vicinity of Godthåb (Div. 1D). At a request of the Municipal Council of Frederikshåb a special survey with trawl and traps was conducted in October in a part of the coastal area of Div. 1E, where local fishermen observe by-catch of crabs. Concentrations of immediate commercial interest were, however, not found.

Experimental fishing was also carried out in the Disko Bay, where good catches (up to 31 crabs per trap/day) were recorded in some localities.

h) Marine mammals. The sampling program of harp and hooded seals was continued, and material from previous years was worked up. Analyses of the age composition of harp seal catches were presented at the November 1977 Meeting of STACRES as Res.Doc. 77/XI/66. A first attempt to sample minke whale (earplugs) was made in 1977.

3. Gear and selectivity studies. Nothing special to report.

4. Practical fishing experiments.

A survey was made in October for queen crab in Div. 1E (see Section 2g).

EAST GREENLAND

A. STATUS OF THE FISHERIES

Besides the local fishing at Angmagssalik, which resulted in increased landings of close to 1000 tons of cod (263 tons in 1976) also one of the larger trawlers conducted fishing off East Greenland in the last half of the year after having been stopped in fishing for cod in Subarea 1. Its landings from East Greenland include 868 tons of cod, 5 tons of wolffish, 1 tons of redfish and 2 tons of halibut.

B. SPECIAL RESEARCH STUDIES

No special research was carried out by the Greenland Fisheries Laboratory. The Faroese Laboratory initiated two surveys for cod by chartered vessels. This is reported by K. Hoydal in Summ.Doc. 78/VI/12.

SUBAREAS 2-5 and STAT AREA 6

No fishing and no research by Denmark(G) in 1977.

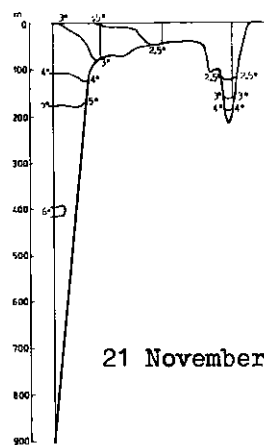
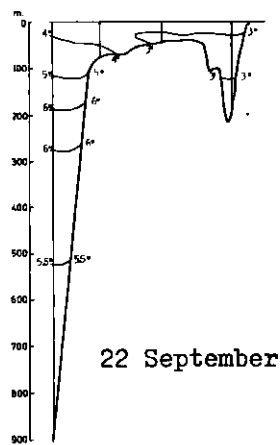
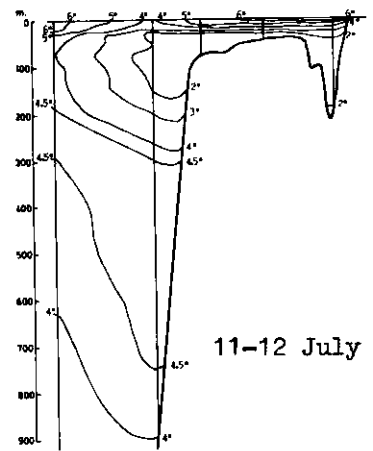
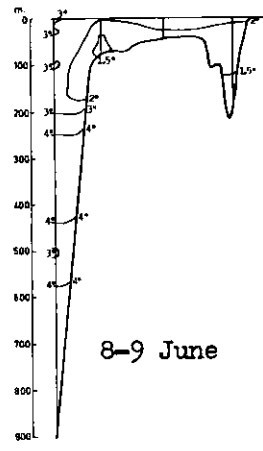
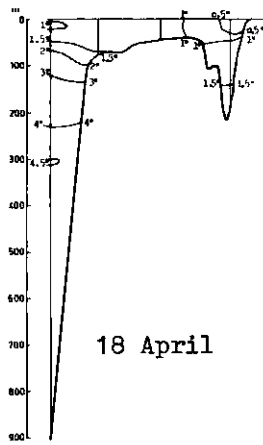
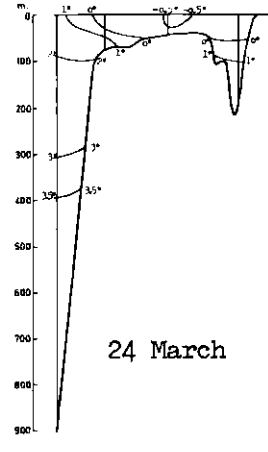
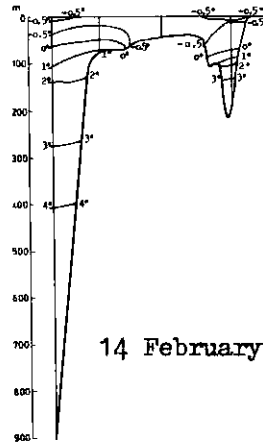
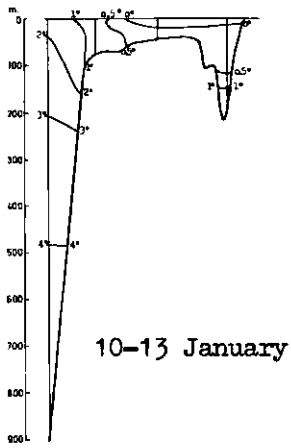


Fig. 1. Temperature sections across Fylla Bank (Div. 1D) 1977

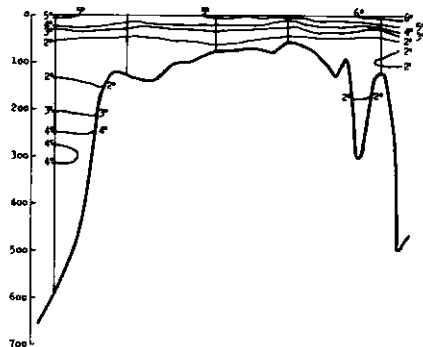


Fig. 2. Temperature section across Lille Hellefiskebanke off Sukkertoppen (Div. 1C), 10 July 1977.

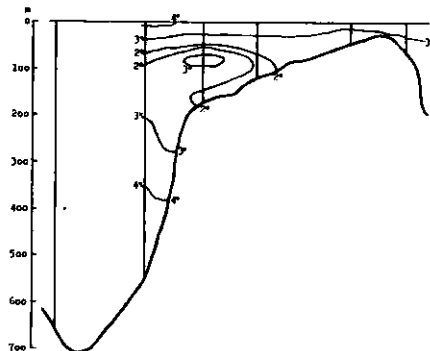


Fig. 3. Temperature section off Holsteinsborg (Div. 1B), 7 - 8 July 1977.

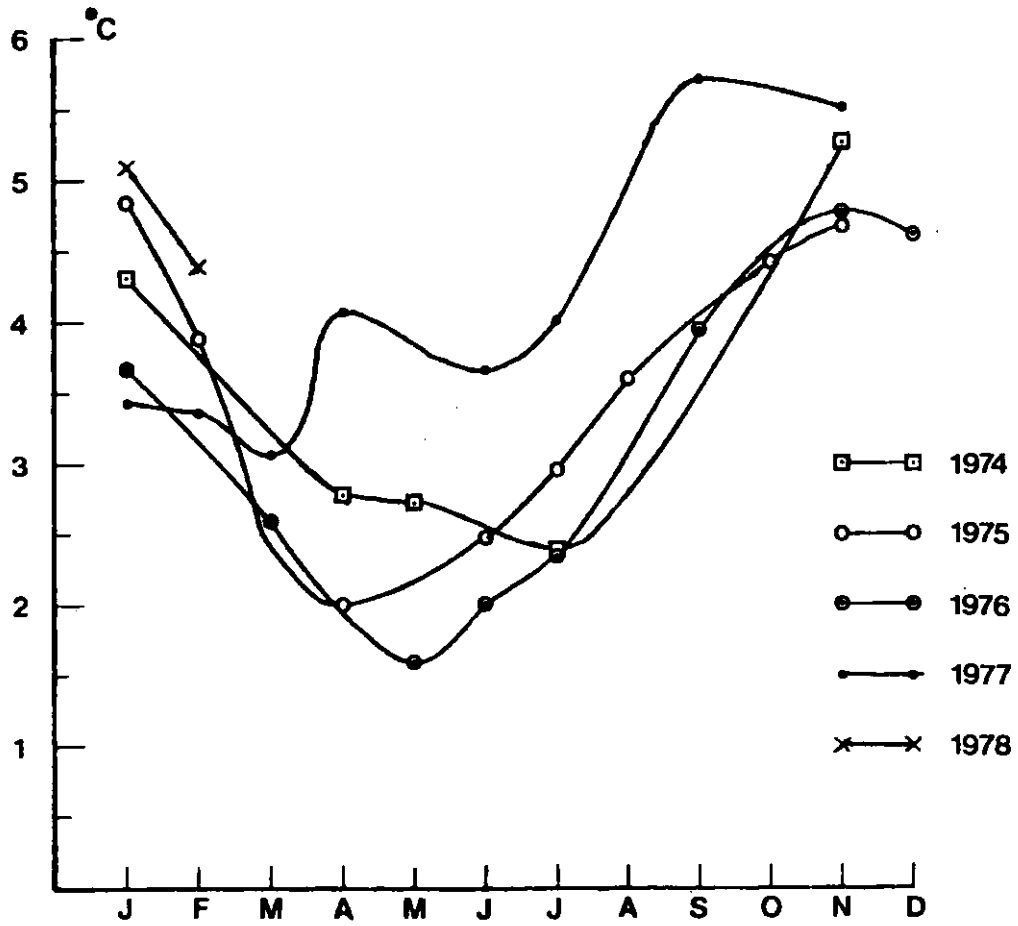


Fig. 4. Mean temperatures for the 100 - 600 m water column west of Fylla Bank 1974 - 78.

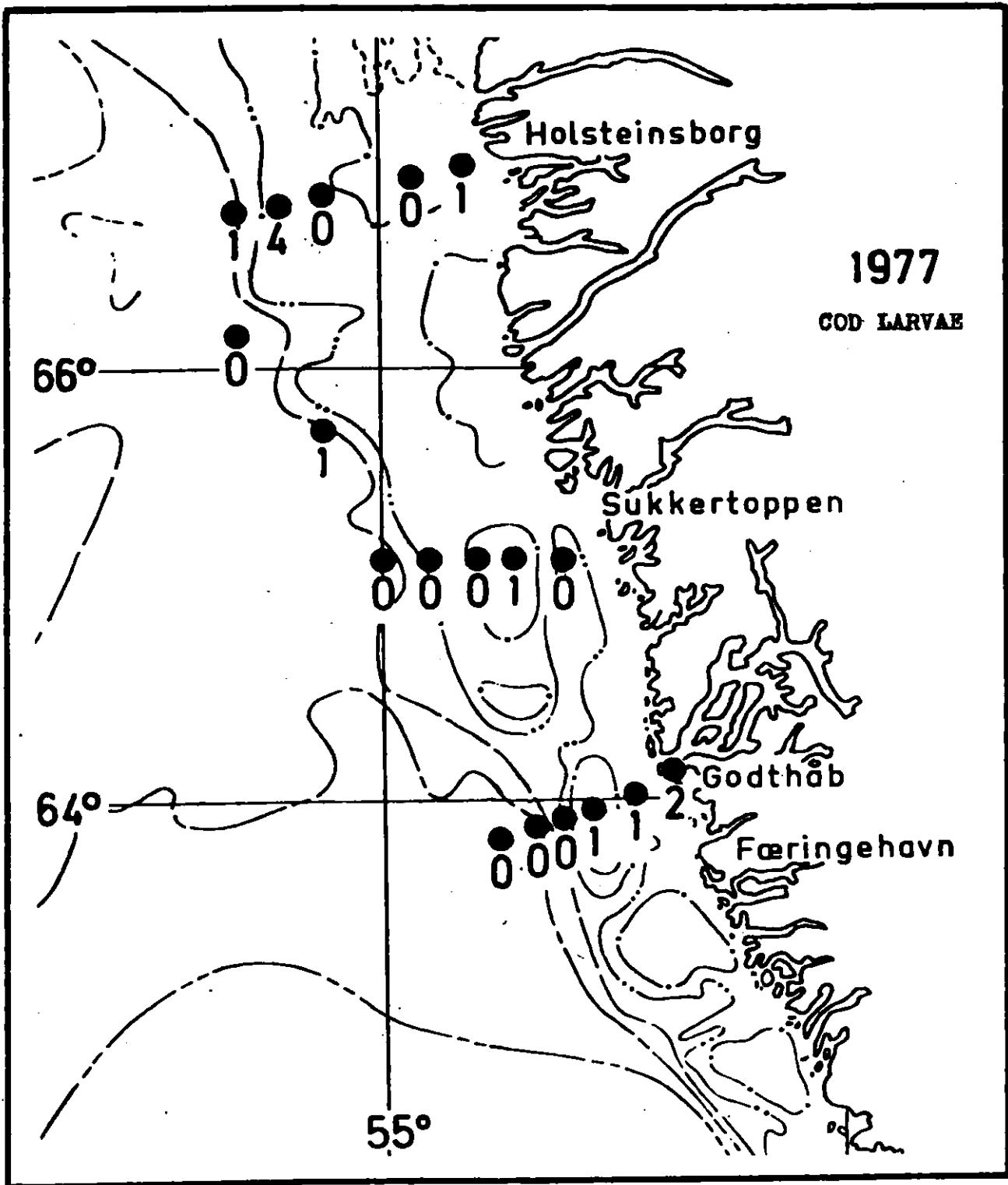


Fig. 5. Cod larvae (number per 30 min.)
taken by 2 m stramin net in the upper
water layers (max.depth 50 m) in July 1977

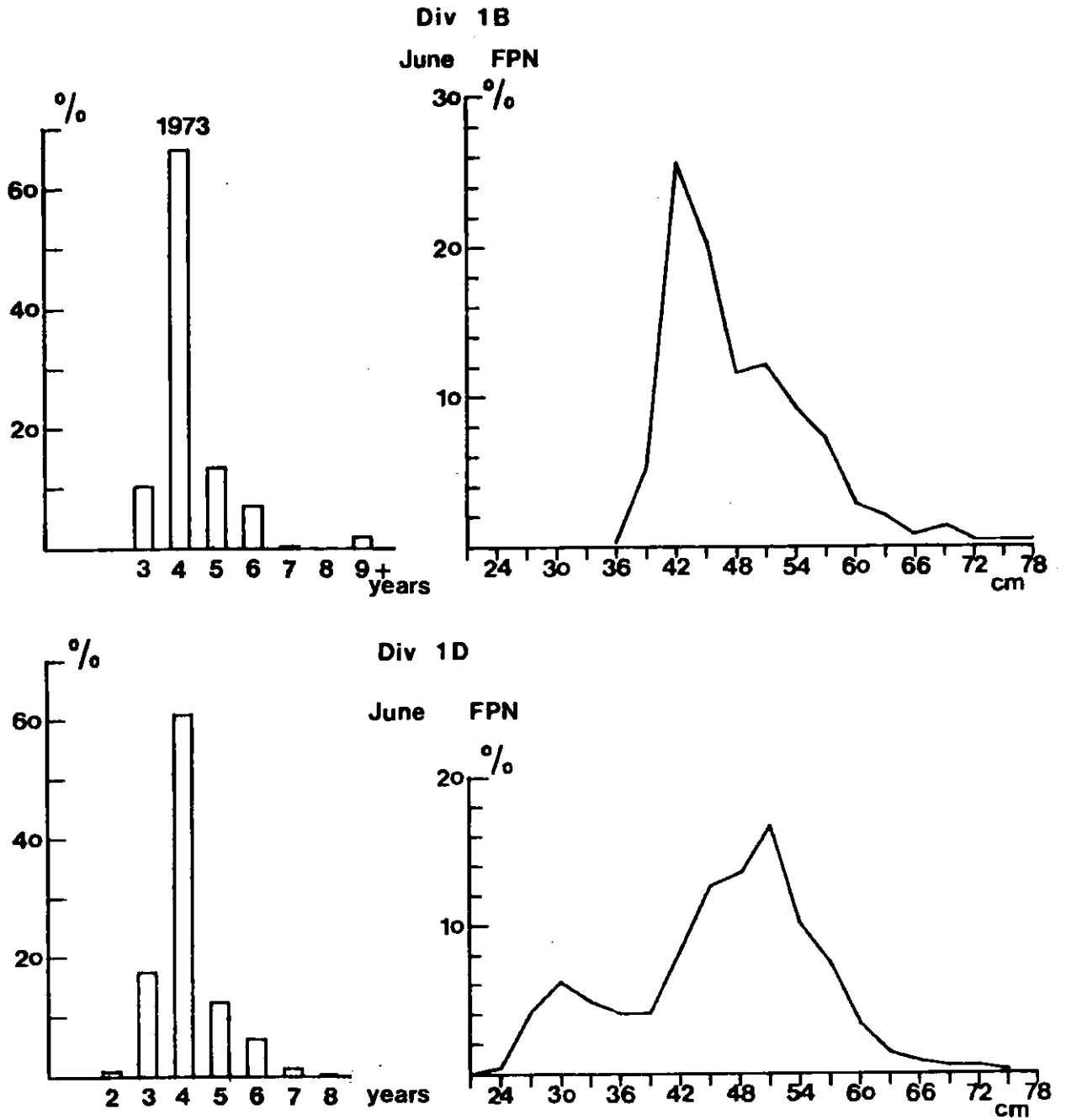
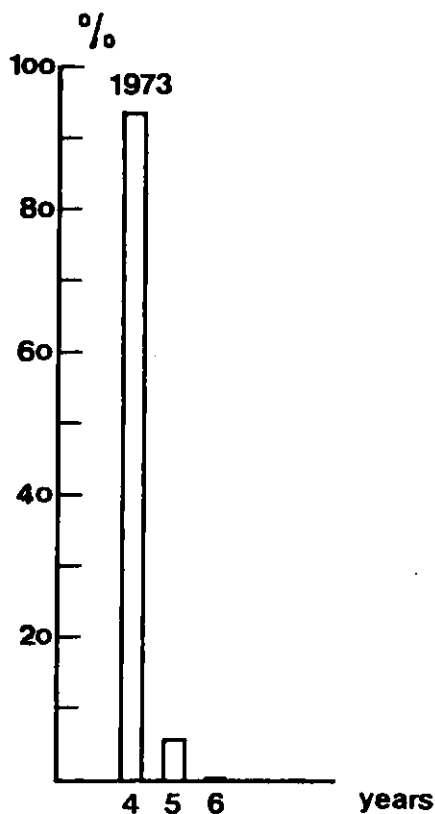
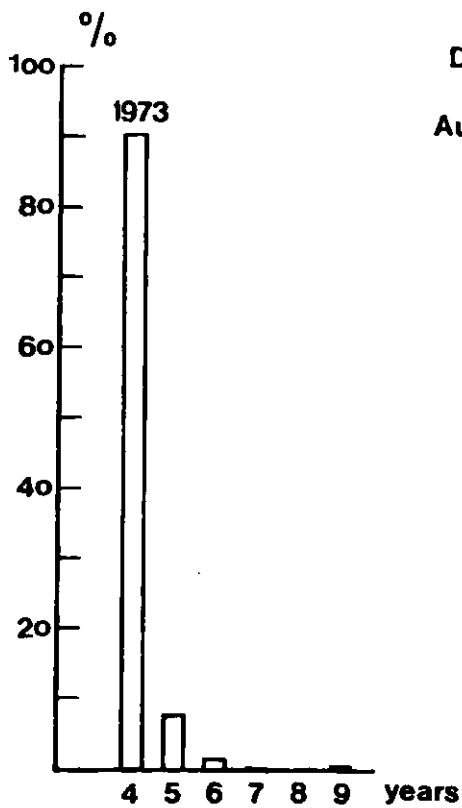
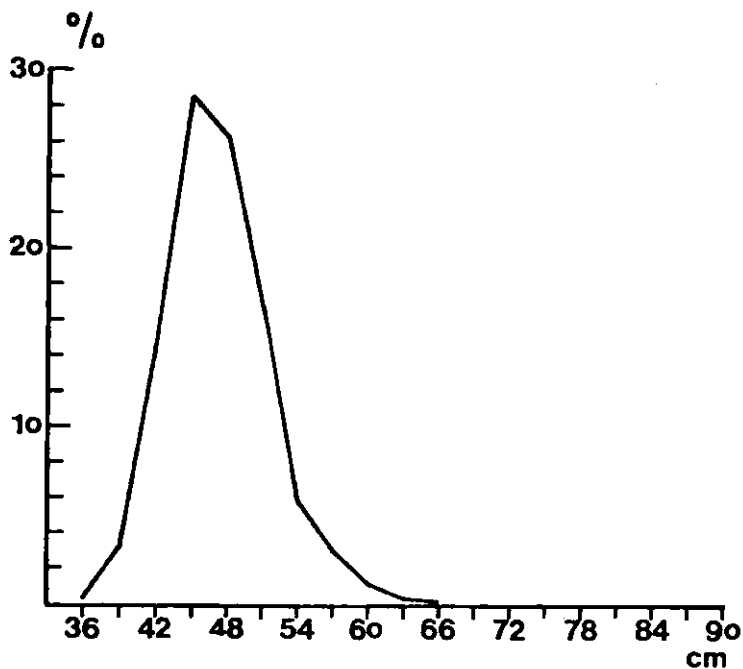


Fig. 6. Age and length distribution of samples from landings (Div. 1B) and catch (Div. 1D) of cod in commercial inshore pound nets.



Div 1D+1E

June OTB



Div 1F

Aug OTB

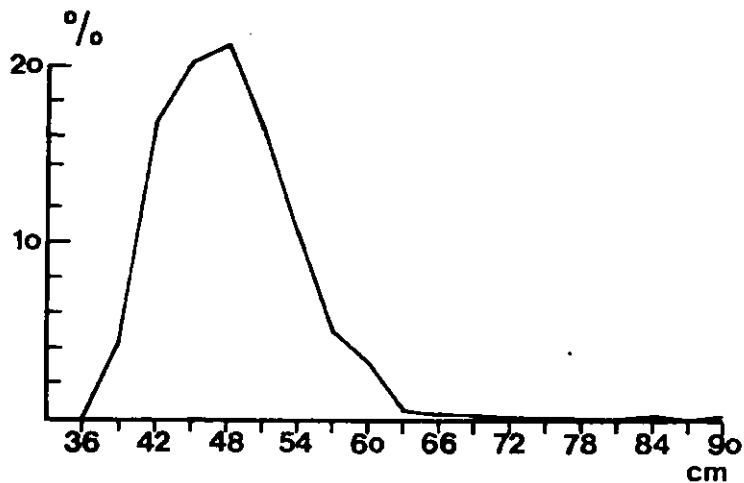


Fig. 7. Age and length distribution of some samples from landings by commercial otter trawlers (offshore).

International Commission for



the Northwest Atlantic Fisheries

Serial No. 5215
(D.a.77)

ICNAF Sum. Doc. 78/VI/12

ANNUAL MEETING - JUNE 1978

Denmark (Faroes) Research Report, 1977

by

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I. Statistical Area 0 (and north of)

A. Status of the Fisheries

Greenland halibut

An increase in the landings from longliners fishing Greenland halibut off Baffinland was observed in 1977, 1 507 tons compared to 916 tons in 1976. The increase was due to increased effort.

Prawns

For the first time, landings of 126 tons of northern deepwater prawn was recorded from the area north of Statistical Area 0.

B. Special Research Studies

No special research to report for this area.

II. Subarea 1

A. Status of the Fisheries

Cod

There was a change in fishing activity by Faroese vessels in the West Greenland area in 1977. For the first time in several years, there was a fishery in the first part of the year by larger trawlers producing wet salted cod. The catches in Subarea 1 were about 6,417 tons during the first six months of the year when the fishery was stopped. These large catches stopped the traditional gillnet fishery by gillnetters class in the latter half of the year which in 1976 caught 3,460 tons, the total cod landings from Subarea 1 in 1976.

Prawns

The catches of prawn remained on a high level and landings of 12,724 tons were recorded. Comparing this figure with that of 1976, 11,179 tons, it has to be borne in mind that area closures restricted the fishery activities in the last part of the year. The monitoring of Faroese catches by continuous inspection of catch effort data recorded on a haul-to-haul basis by the prawn trawlers was carried out in 1977.

Other fish

Small by-catches of Greenland halibut were recorded in the 1977 landings.

B. Special Research Studies

A statistical analysis of the catch-per-unit-effort data from Faroese prawn trawlers in the years 1975, 1976, and preliminary results for the first nine months of 1977 has been made, including 15,000

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hauls in the area off the West Greenland shore. The statistical method applied was analysis of variance with catch per unit effort as a dependent variable, and ship, date, time of day and statistical rectangle (1 degree longitude by one-half degree latitude) as independent variables. A multiplicative model used describes the data, but significant parts of the variance are left unexplained. For the purpose of stock assessments, the CPUE values of the model showed fair agreement with the indices of CPUE calculated directly from the observed data. These latter more crude data have been used in the swept area assessment of the prawn stock.

III. Subarea 3

A. Status of the Fisheries

Cod

The traditional fishery in waters off the Canadian Coast was mostly restricted to longlining on Flemish Cap. Catches on Flemish Cap increased to 5,820 tons from 2,139 tons in 1976, and the longliners reported good catch rates. 645 tons of cod were taken in the Div. 3L area in November-December 1977 when the Faroese fishery on Flemish Cap had been stopped.

IV. Subareas 4 and 5

284 tons of porbeagle were taken by Faroese longliners in 1977.

B. Special Research Studies

No special research to report for this area.

V. East Greenland

A. Status of the Fisheries

Cod

The Faroese trawlers fishing in West Greenland waters crossed to East Greenland waters in May-June 1977. Faroese longliners had good catches in March and April. Ice conditions were favourable for most of the year. Total catches increased from 462 tons to 1,200 tons in 1977 due to increased effort and favourable ice conditions. The catches were not sampled but age and length samples are in hand from an exploratory fishing experiment in the autumn as described below.

B. Special Research Studies

Cod

During August-October, the Fisheries Laboratory conducted two fishing experiments in East Greenland waters by a chartered longliner and a chartered gillnetter. The gillnets only had minimal catches of 16 tons of large cod. However, from 29 August to 13 October, the longliner had good catch rates and landed 92 tons of large cod, 19 tons of tusk, and 5 tons of halibut. The fishing positions are shown in Fig. 1. The conclusion of the experiment was that a profitable fishery was possible in the autumn, if ice conditions allowed it.

A large number of age and length samples were taken by observers. Fig. 2 shows four age samples of cod for the longliner, and shows predominance of 5- and 6-year-olds. A more detailed study of the material will be presented to the Annual Meeting.

Capelin

A chartered purse seiner conducted two fishing experiments in East Greenland waters in September 1977. The fishery was carried out north of Dohrn Bank, about 67° N, but was hampered by bad ice conditions and the catch was 300 tons. It is considered that it is a part of the Icelandic capelin stock which crosses the borderline between East Greenland and Icelandic waters at this time of year.

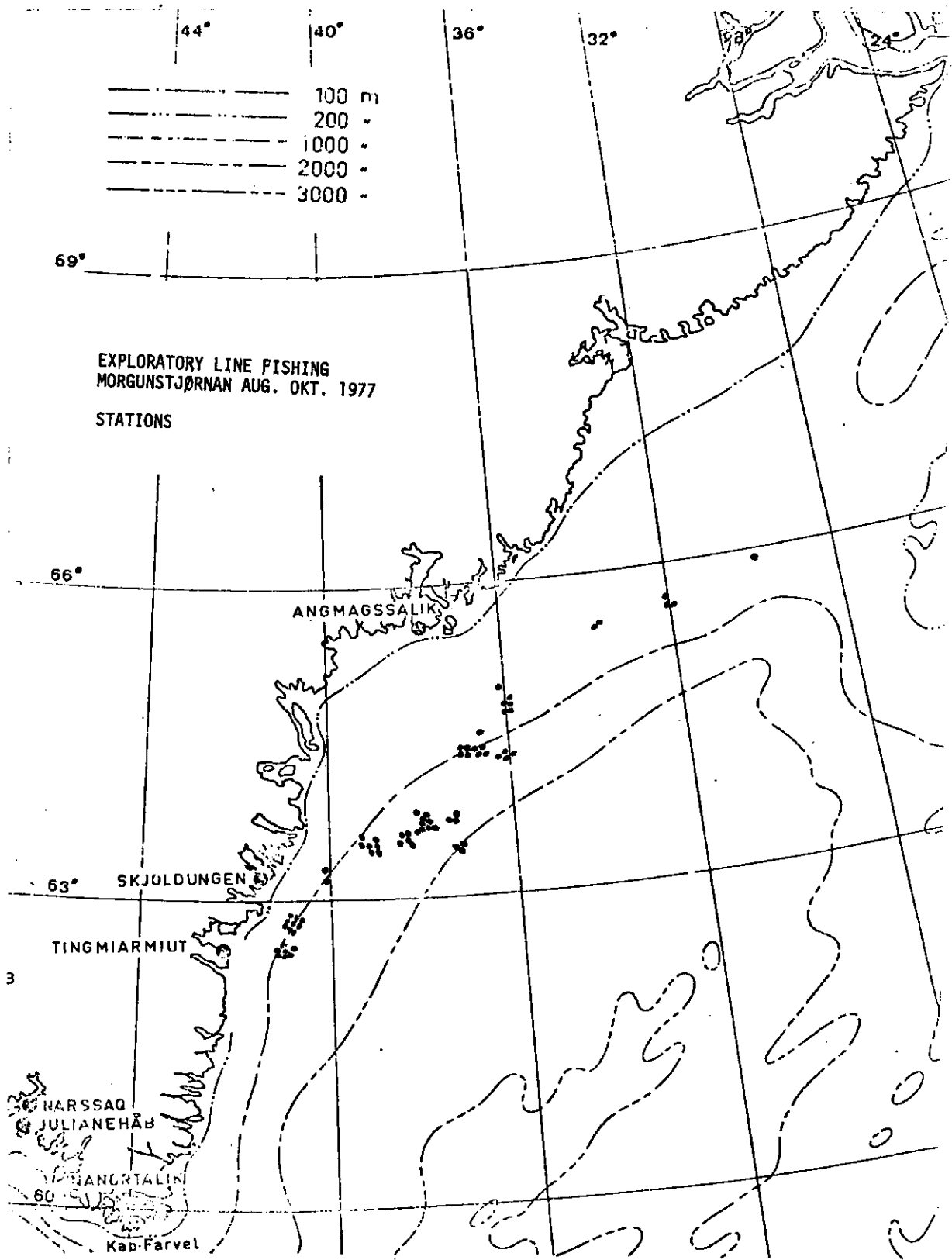


Fig. 1.

