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The Commercial Shrimp Fishery in the Denmark Strait in 1985 and 1986

by

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INTRODUCTION

At its meeting in January 1986 STACFIS was not able to advice on a total allowable catch for the shrimp fishery in the Denmark Strait area (including fishing grounds on the Icelandic side of the mid-line) in 1986. For the Greenland part of the area Greenland authorities set a regulatory TAC of 7,525 tons for the traditionally exploited area, while experimental fishery without quota restrictions was carried on outside this area. The total reported catches from the Greenland side reached 9,805 tons, the highest catch ever reported.

Similar to 1985, about 25% of the reported catches were taken in the second half of the year - in contrast to earlier years, where only a minor proportion was caught in this period.

In 1986 logbook data from nine trawlers fishing at East Greenland from January to May and from November to December have been available to the Greenland Fisheries and Environment Research Institute.

The present paper updates the information given by Carlsson (1983; 1984; 1985; 1986) on catches and analysis of commercial fishery data.

MATERIALS AND METHODS

Total catches and numbers of vessels in the shrimp fishery were compiled by nation and month based on the obligatory weekly reporting to Greenland authorities by all vessels above 80 GRT. Logbook data from nine trawlers fishing from January to May and November to December 1986 were analysed to show the overall distribution of effort and monthly distribution of effort and mean catch rates. Monthly mean catch rates together with rates of by-catches from 1980 to December 1986 were calculated from available logbook data.

In 1986 commercial shrimp samples were available from January and from April. The samples have been analysed for size and sexual stage composition.

RESULTS AND DISCUSSION

Reported catches in 1985 and 1986.

Table 1 shows reported catches of shrimp by nation and month in 1985

and 1986, and Table 2 the corresponding numbers of reporting vessels. Vessels smaller than 80 GRT are assumed not to join the fishery (Carlsson, 1985), and the tables should therefore represent the total shrimp fishery on the Greenland side of the mid-line.

In 1985 and 1986 the fishery was more evenly distributed over the year compared to earlier years, with about 25% of the catches taken in the second half of the year compared to 0, 14.9 and 1.6% in 1982, 1983 and 1984 respectively. Similar to 1985 the highest catches in 1986 were taken in March and April. In 1986, however, the December catch almost reached the level of the catch in April. In general the fishery was more evenly distributed over the year in 1986 compared to earlier years. A total of 59 vessels joined the fishery in 1986 compared to 47 in 1985. The highest numbers of vessels on the fishing grounds were found in February, March and April.

Geographical distribution of the fishery.

Figure 1 and Figure 2 show the distribution of hauls by statistical unit in 1985 and 1986 respectively, based on logbook data from January to April and October to December in 1985, and from January to May and November to December in 1986. Figure 3 shows the distribution of hauls by month. While the fishery as given in the logbook data from 1985 took place in the central parts of the main fishing area, with far the highest activity in one single statistical unit (KD113), the fishery in 1986 was much more widespread from 65°30´N to 67°N. In 1986 ice may not have been as big a problem to the fishery as in the years before, as the distribution of the fishery over the exploited grounds in 1986 is much more even. Only in May the fishery was significantly concentrated in a single statistical unit (JZ113). However, the data for 1986 cover a greater part of the actual fishery and therefore include more hauls than in earlier years, which may influence comparisons with earlier years.

Catch and effort.

Table 4 shows the mean catch rates of shrimp by month in a south to north grid (7.5 minute latitude scale) based on logbook data from 1980 to 1986, Table 5 the corresponding numbers of hours trawled. Catch rates may be influenced by variation in vessel sizes represented in the log-book data from year to year and from month to month. Also the introduction of more efficient gears (high-opening trawls, new net material with lesser water resistance) and trawl-positioning systems in 1985 and 1986 (Carlsson and Kanneworff, 1987) may bias catch rates upwards.

Figure 5 shows the monthly mean catch rates based on logbook data in the main fishing area (Carlsson, 1985), updated with data from 1986. Table 3 shows the corresponding numbers of hours trawled. Similar to earlier years a peak catch rate is found in spring 1986 (March), followed by a decline. November and December catch rates in 1986 are high, the December figure (based on 113 hours of trawling) being the highest ever reported in the available logbook material. The catch rate figures may - however - not be directly comparable from month to month and from year to year due to the above mentioned reasons.

By-catches.

By-catches reported in the available logbook data are shown in Table 6 and compared to logbook-catches of shrimp. In 1986 reported by-catches remain at a very low level as in 1985, redfish still being the most frequently reported species.

Shrimp samples.

Composition by stages of sexual development in commercial shrimp samples from January and April is shown in Table 7 and Table 8 respectively. Figures 5 and 6 show the corresponding length-frequency distributions.

Relatively high frequencies of males (in general more than 50% in numbers) and transitionals (up to about 13%) are found in January samples from south of 66°N, while more northern samples from the same month (statistical units JZ112, KB113 and KD113) show dominance of berried females. This is in agreement with findings in earlier years of concentrations of berried females around statistical units KA112-KA113 (Carlsson, 1985). April samples from north of 66°30´N show relatively high frequencies of males as in the January samples from south of 66°N. More than 50% of the berried females in April samples are developing new head roe, indicating that they will be spawning again at the following spawning season.

Males are in general ranging from about 20 to about 30 mm caparace length (CPL), with a distinct mode around 26 mm CPL and two possible modes at 23 and 28.5 mm CPL. Females are ranging from 25 up to 35 mm CPL, with modes at about 28 and 32 mm and a possible mode in between around 30 mm. Samples show that the female component of up to 35 mm CPL is still present.

CONCLUSIONS

Reported catches of shrimp in 1986 from the Greenland part of the Denmark Strait totalled 9,805 tons, which is the highest catch figure since the fishery started in 1980. In 1986 59 vessels joined the shrimp fishery, i.e. with a (reported) mean catch of 166 tons per vessel compared to 134 tons in 1985. The fishery took place throughout the year, with a proportion similar to that in 1985 (about 25%) being taken in the second half of the year.

Logbook data from 1986 indicate a more evenly distribution of the fishery over the fishing grounds compared to earlier years, indicating lesser problems with ice in this year. Data for 1986 do however include a larger proportion of the fishery.

Logbook data show spring peak catch rates in March 1986, followed by a decline as in earlier years. November and December catch rates are very high in 1986, the December catch rate being the highest recorded in the available data.

As in 1985 reported by-catches in the East Greenland shrimp fishery were at a very low level in 1986.

Commercial shrimp samples from January and April 1986 show dominance of berried females in January between 66°N and 66°30´N in agreement with earlier observations. April samples indicate that more than 50% of the berried females will spawn again in the next spawning season. Large females up to 35 mm carapace length still occur in the samples.

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Table 1. Catches of shrimp (tons) at East Greenland by nation and month as reported to Greenland authorities in 1985 (a) and 1986 (b).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
					a. 1985								
Greenland	584	581	349	192	14	-	-	-	24	171	261	420	2596
Denmark	-	-	44	96	10	-	-	-	-	-	4	199	353
Faroe Islands	-	46	136	209	13	-	-	-	-	78	101	91	674
Norway	-	-	720	989	302	40	-	-	-	-	-	-	2051
France	-	-	-	171	278	42	-	20	50	64	-	-	625
Total	584	627	1249	1657	617	82	-	20	74	313	366	710	6299
					b. 1986								
Greenland	888	1042	1423	674	87	-	-	-	-	7	398	1262	5781
Denmark	260	28	54	51	50	-	-	-	-	-	27	30	500
Faroe Islands	185	158	87	41	35	-	-	-	2	3	94	122	727
Norway	36	233	652	624	321	-	2	74	55	-	-	-	1997
France	-	-	6	265	274	41	-	2	87	125	-	-	800
Total	1369	1461	2222	1655	767	41	2	76	144	135	519	1414	9805

Table 2. No. of vessels in the shrimp fishery at East Greenland by nation and month as reported to Greenland authorities in 1985 (a) and 1986 (b).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
					a. 1985								
Greenland	6	8	6	3	1	-	-	-	1	2	3	5	12
Denmark	-	-	1	1	1	-	-	-	-	-	1	2	3
Faroe Islands	-	2	5	3	1	-	-	-	-	1	3	1	9
Norway	-	-	16	19	11	1	-	-	-	-	-	-	20
France	-	-	-	2	2	2	-	1	1	1	-	-	3
Total	6	10	28	28	16	3	-	1	2	4	7	8	47
					b. 1986								
Greenland	10	17	16	10	3	-	-	-	-	1	5	14	23
Denmark	2	1	1	1	1	-	-	-	-	-	1	1	2
Faroe Islands	4	5	3	2	1	-	-	-	1	1	2	3	9
Norway	2	8	15	17	13	-	1	2	3	-	-	-	22
France	-	-	1	3	3	2	-	1	2	1	-	-	3
Total	18	31	36	33	21	2	1	3	6	3	8	18	59

Table 3. No. of hours trawled by year and month from April 1980 to December 1986 in the main fishing area at East Greenland as reported in logbooks of 8 trawlers in 1980, 5 trawlers in 1981 and 1982, 2 trawlers in 1983, 1 trawler in 1984, 2 trawlers in 1985, and 9 trawlers in 1986.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1980	-	-	-	35	1297	315	59	31	482	1166	464	-	3849
1981	-	-	-	1343	914	7	-	-	-	-	-	-	2264
1982	-	-	763	1570	1394	-	-	-	-	-	-	-	3727
1983	-	-	488	469	-	-	-	-	-	-	-	-	957
1984	105	312	281	-	-	-	-	-	-	-	-	-	698
1985	647	579	570	625	-	-	-	-	-	51	360	300	3132
1986	759	1314	1801	725	505	-	-	-	-	-	271	113	5488

Table 4. Mean catch of shrimp (kg/hour) by month at East Greenland in a south to north grid (7.5 minute latitude scale) based on logbooks of 8 trawlers in 1980, 5 trawlers in 1981 and 1982, 2 trawlers in 1983, 1 trawler in 1984, 2 trawlers in 1985, and 9 trawlers in 1986.

	8104	8105	8106	8203	8204	8205	8303	8304	8401	8402	8403	8501	8502	8503	8504	8510	8511	8512	8601	8602	8603	8604	8605	8611	8612
PA	-	-	-	-	-	-	-	-	-	-	-														
LZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	89	-	-	-	-
LV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	-	-	-	-
KN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	159	-	-	-	-
KM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-
KH	189	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	986	-	-	-	-
KG	355	0	-	-	50	-	243	37	-	-	-														
KF	332	0	-	114	129	-	286	159	-	-	-	-	-	-	-	-	129	-	-	-	928	706	40	622	898
KE	318	124	215	111	0	-	-	-	-	-	-	419	-	-	-	-	-	-	160	63	454	522	40	510	1000
KD	588	332	-	153	150	86	-	-	-	-	-	385	109	-	-	-	-	-	89	68	344	185	141	811	673
KB	513	278	31	166	182	176	-	-	672	-	-	279	269	227	248	-	-	420	139	128	272	130	63	-	1646
KA	447	249	-	196	183	157	0	-	728	356	249	325	396	231	222	164	216	304	120	150	186	140	74	293	244
JZ	418	254	-	172	182	148	0	-	223	-	204														
JX	120	279	-	131	213	253	-	102	390	-	-	338	340	147	149	70	255	288	175	224	120	194	85	274	-
JV	-	267	-	143	201	265	380	152	-	-	-	380	384	179	211	-	236	207	193	214	191	192	131	352	480
JT	-	162	-	115	202	291	402	171	-	-	241	403	353	-	222	-	-	124	240	283	528	214	150	-	-
JS	-	225	-	86	129	278	57	245	-	-	-	-	524	-	-	-	-	-	182	674	351	321	90	-	-
JR	-	-	-	-	-	-	-	-	-	-	-	-	123	-	-	-	-	-	373	292	293	157	250	-	-
JP	-	-	-	-	-	-	-	-	-	-	-	-	160	-	-	-	-	0	348	337	283	-	46	-	-
JN	-	-	-	-	-	-	-	-	-	-	-														
JM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	254	353	155	-	0	-	-
JL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88	-	-	-
JK	-	-	-	-	-	-	-	-	-	-	-	-	-	489	-	-	-	-	-	-	-	-	-	-	-
JJ	-	-	-	-	-	-	-	-	-	-	-	-	-	594	-	-	-	-	-	-	-	-	-	-	-
JH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5. No. of hours trawled by month in a north to south grid at East Greenland based on logbook information (see Table 4).

	8104	8105	8106	8203	8204	8205	8303	8304	8401	8402	8403	8501	8502	8503	8504	8510	8511	8512	8601	8602	8603	8604	8605	8611	8612
PA	-	-	-	-	-	-	-	-	-	-	-														
LZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
LV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
KN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
KM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
KH	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60	-	-	-	-
KG	7	4	-	-	2	-	97	9	-	-	-	-	-	-	-	-	2	-	-	-	233	76	10	90	33
KF	47	2	-	4	2	-	95	223	-	-	-	-	-	-	-	-	-	-	13	40	155	79	8	33	4
KE	82	5	3	10	1	-	-	-	-	-		29	-	-	-	-	-	-	86	155	278	58	4	15	34
KD	309	115	-	48	59	4	-	-	-	-	-	52	6	-	-	-	-	-	75	70	119	46	10	-	9
KB	448	114	3	175	132	7	-	-	54	-	-	333	321	424	327	-	-	7	68	78	224	70	24	74	5
KA	362	166	-	179	298	7	6	-	30	312	67	86	68	78	83	41	201	204	104	137	63	62	56	19	-
JZ	81	118	-	124	180	12	5	-	18	-	152	77	105	61	54	10	101	19	289	369	258	333	317	41	27
JX	2	89	-	78	277	80	-	4	3	-	-	57	57	7	86	-	57	53	3	213	130	65	25	-	-
JV	-	236	-	87	300	348	72	43	-	-	-	12	21	-	75	-	-	20	23	74	220	71	34	-	-
JT	-	62	-	55	275	663	257	183	-	-	63	-	15	-	-	-	-	-	144	271	328	163	96	-	-
JS	-	3	-	4	44	274	9	9	-	-	-	-	16	-	-	-	-	-	41	56	86	-	15	-	-
JR	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	21	36	34	3	-	4	-	-
JP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
JN	-	-	-	-	-	-	-	-	-	-	-	-	-	67	-	-	-	-	-	-	-	-	-	-	-
JM	-	-	-	-	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	-	-
JL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 6. By-catches by species and month reported in logbooks from the Denmark Strait shrimp fishery, compared to the corresponding shrimp catches.

SPECIES	8104	8105	8106	8203	8204	8205	8303	8304	8401	8402	8403	8501	8502	8503	8504	8601	8602	8603	8604	8605	8611	8612
Redfishes	-	10.5	-	-	-	-	-	1.0	-	20.1	1.5	0.3	0	0.5	0.2	0.3	0.9	5.0	0.9	0.4	-	-
Mixed	-	-	-	-	-	-	3.7	0.8	-	-	-	-	-	-	-	0.3	0.6	-	-	-	-	
Total bycatch	-	10.5	-	-	-	-	3.7	1.8	-	20.1	1.5	0.3	0	0.5	0.2	0.6	1.5	5.0	0.9	0.4	-	-
Corresponding shrimp catch	653	240	1	124	301	386	182	76	63	111	63	201	184	189	139	146	279	684	314	60	126	86
Bycatch in % of shrimp catch	-	4.4	-	-	-	-	2.0	2.4	-	18.1	2.4	0.1	0	0.3	0.1	0.4	0.5	0.7	0.3	0.7	-	-

Table 7. Composition by stages of sexual development (in number of specimens) of samples of P. borealis from the commercial fishery in the Denmark Strait in January 1986.

Station no.	Area kode	Number of specimens in groups, %								Totals, %			Nos.
		1	2	3	4	5	6	7	8	Mal	Tran	Fem	
115TR01	JZ112	9.0	0.8	0.0	0.0	8.2	0.0	82.0	0.0	9.0	0.8	90.2	122
116TR01	JZ112	15.3	1.6	1.6	0.0	9.7	0.8	70.2	0.8	15.3	3.2	81.5	124
116TR02	JZ112	1.3	0.0	1.3	0.0	5.9	2.6	88.8	0.0	1.3	1.3	97.4	152
116TR03	KB113	6.6	0.0	1.8	0.0	5.4	2.4	83.8	0.0	6.6	1.8	91.6	167
116TR04	KB113	9.2	0.0	1.6	0.0	5.4	2.2	81.5	0.0	9.2	1.6	89.1	184
117TR01	KD113	21.6	1.4	3.3	0.5	3.3	1.4	68.5	0.0	21.6	4.7	73.7	213
117TR02	KB113	6.1	0.5	0.0	0.0	4.5	1.0	87.9	0.0	6.1	0.5	93.4	198
117TR03	KA112	12.4	0.0	2.0	0.0	5.0	1.0	79.1	0.5	12.4	2.0	85.6	201
117TR04	JT109	65.8	2.8	9.6	0.0	10.3	0.0	11.0	0.4	65.8	12.5	21.7	281
117TR05	JT108	60.5	3.4	5.3	0.0	13.2	0.0	17.7	0.0	60.5	8.6	30.8	266
118TR02	JT109	57.8	1.2	6.1	0.0	15.2	0.0	19.3	0.4	57.8	7.4	34.8	244
118TR03	JT109	53.6	3.3	5.9	0.0	17.2	0.4	19.7	0.0	53.6	9.2	37.2	239
118TR04	JT109	57.5	4.5	8.6	0.0	9.0	0.4	18.8	1.1	57.5	13.2	29.3	266
118TR05	JS109	54.5	3.4	5.5	0.4	15.3	0.4	20.4	0.0	54.5	8.9	36.6	235
119TR01	JT109	62.5	3.4	5.3	0.4	8.7	0.0	19.3	0.4	62.5	8.7	28.8	264
119TR02	JT108	64.7	0.4	7.8	0.4	8.2	0.0	18.6	0.0	64.7	8.2	27.1	269
119TR03	JT108	61.9	1.3	2.9	0.0	8.4	0.4	24.7	0.4	61.9	4.2	33.9	239
119TR04	JT109	60.5	2.3	7.4	0.4	7.8	0.4	20.7	0.4	60.5	9.8	29.7	256
119TR05	JT108	69.3	4.0	6.6	0.0	5.8	0.0	14.2	0.0	69.3	10.6	20.1	274
127TR02	JX111	38.5	2.2	4.4	0.0	14.2	2.7	38.1	0.0	38.5	6.6	54.9	226
128TR03	JX110	51.1	1.3	6.3	0.0	15.2	2.7	23.3	0.0	51.1	7.6	41.3	223

Group 1. Juveniles and males.
- 2. Transitionals without roe.
- 3. Transitionals with head roe.
- 4. Females without roe.
- 5. Females with head roe.
- 6. Females, berried, with head roe.
- 7. Females, berried.
- 8. Females with egg hairs.

Table 8. Composition by stages of sexual development (in number of specimens) of samples of P. borealis from the commercial fishery in the Denmark Strait in April 1986.

Station no.	Area kode	Number of specimens in groups, %								Totals, %			Nos.
		1	2	3	4	5	6	7	8	Mal	Tran	Fem	
418TR01	KF110	45.8	1.9	0.0	0.0	6.8	23.1	21.2	1.1	45.8	1.9	52.3	264
418TR02	KF111	45.1	7.4	0.0	0.0	7.4	26.6	13.5	0.0	45.1	7.4	47.5	244
418TR03	KF111	53.5	0.8	0.0	0.0	1.7	26.1	16.2	1.7	53.5	0.8	45.6	241
418TR05	KF111	44.7	2.2	0.0	0.0	14.0	20.7	18.4	0.0	44.7	2.2	53.1	179
418TR06	KF111	55.1	0.4	0.0	0.0	6.8	23.7	13.6	0.4	55.1	0.4	44.5	236
419TR02	KF111	62.1	1.1	0.0	0.0	12.6	15.4	7.1	1.6	62.1	1.1	36.8	182
419TR03	KF111	68.1	0.0	1.4	0.0	10.6	10.6	8.7	0.5	68.1	1.4	30.4	207
419TR04	KF110	40.3	0.0	0.0	0.4	11.9	29.2	18.1	0.0	40.3	0.0	59.7	243
419TR05	KF110	52.8	0.9	0.0	0.0	10.8	28.1	7.4	0.0	52.8	0.9	46.3	231
419TR06	KF110	49.1	0.0	0.5	0.0	6.4	28.0	15.1	0.9	49.1	0.5	50.5	218
420TR01	KG110	68.2	2.0	0.0	0.0	13.9	6.0	5.5	4.5	68.2	2.0	29.9	201
420TR03	KF110	48.1	0.5	0.0	0.0	7.6	27.1	14.8	1.9	48.1	0.5	51.4	210
420TR04	KF110	33.5	0.0	0.0	0.0	10.1	31.6	22.2	2.5	33.5	0.0	66.5	158

Group 1. Juveniles and males.
- 2. Transitionals without roe.
- 3. Transitionals with head roe.
- 4. Females without roe.
- 5. Females with head roe.
- 6. Females, berried, with head roe.
- 7. Females, berried.
- 8. Females with egg hairs.

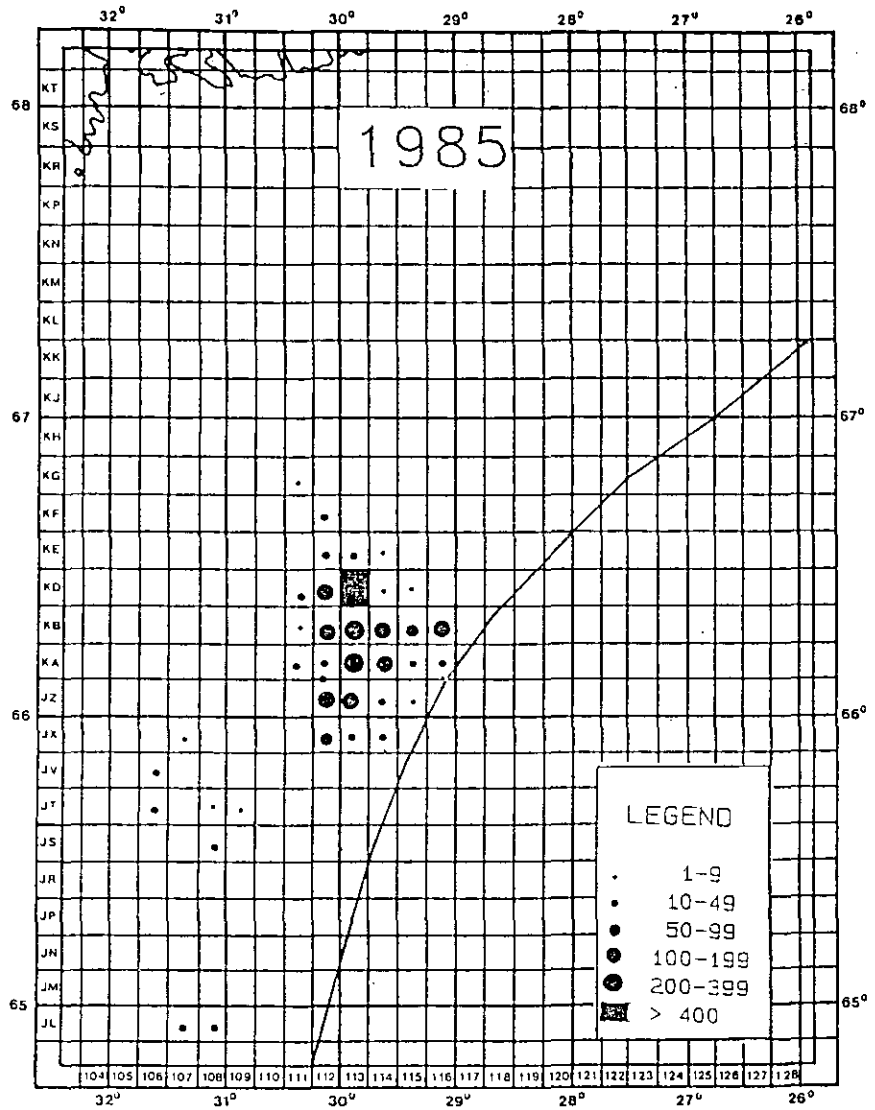


Figure 1. Distribution of hauls by 2 trawlers in the shrimp fishery at East Greenland in January to December 1985, based on logbook information.

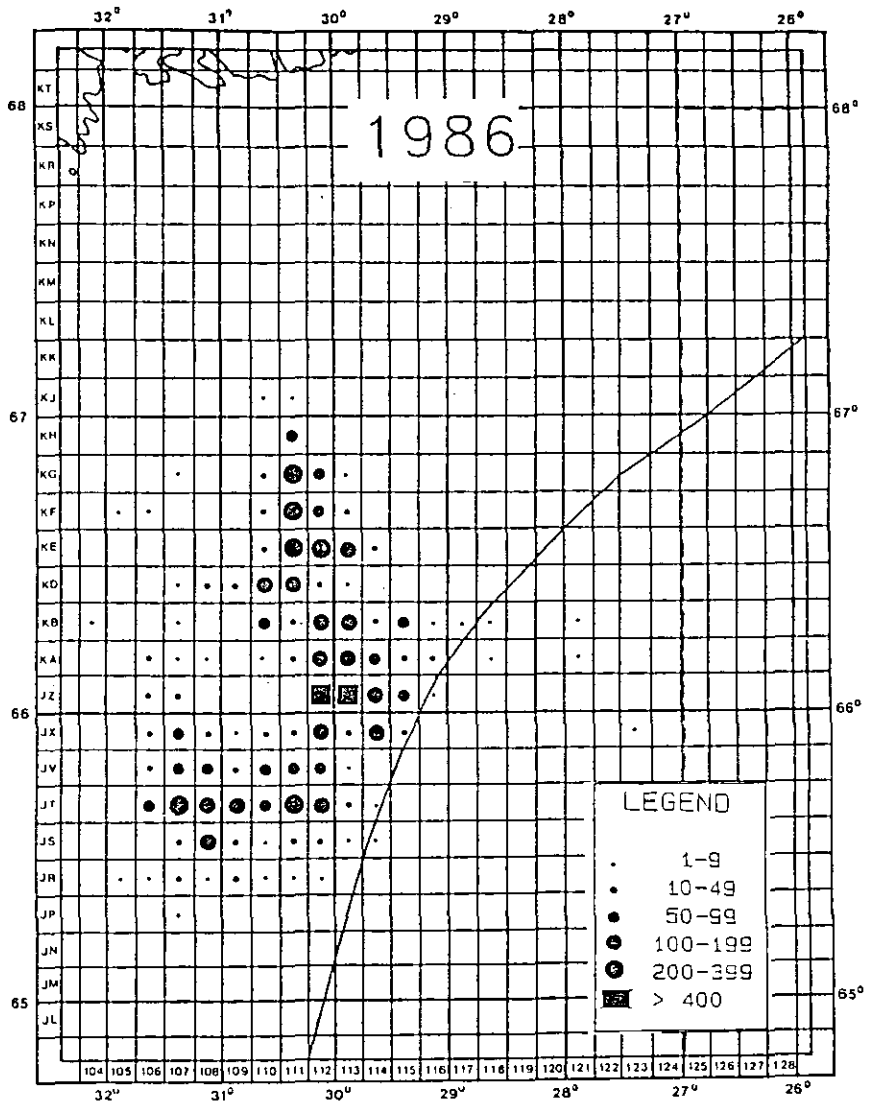


Figure 2. Distribution of hauls by 9 trawlers in the shrimp fishery at East Greenland in January to December 1986, based on logbook information.

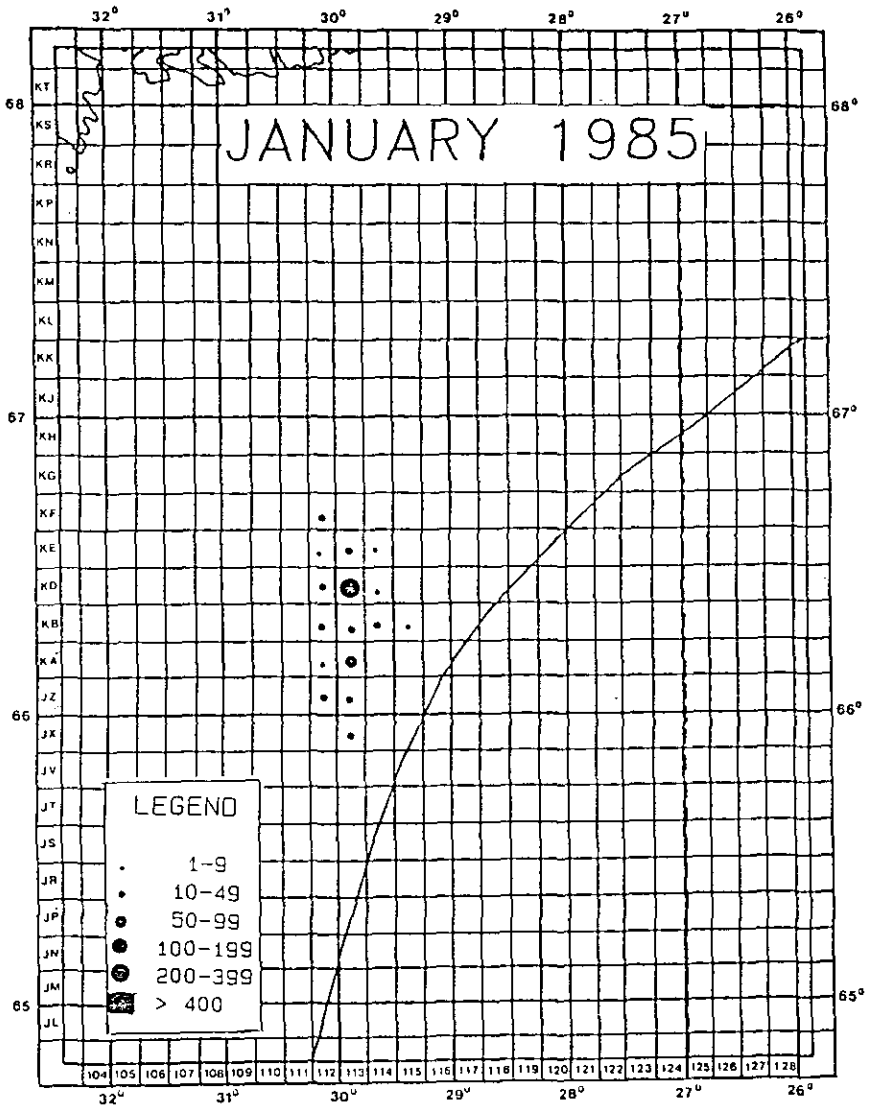
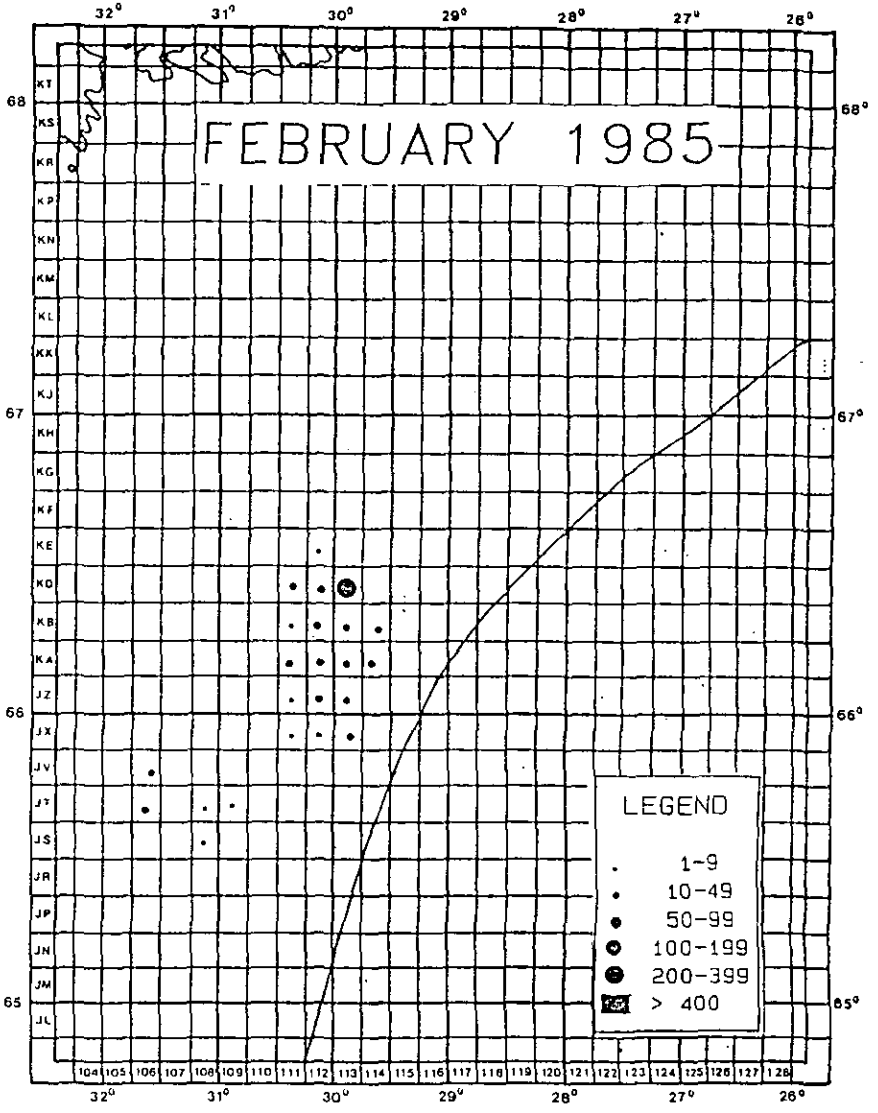


Figure 3. Distribution of effort (hours trawled) per month in the shrimp fishery in 1985 and 1986 based on logbook information from 2 trawlers.



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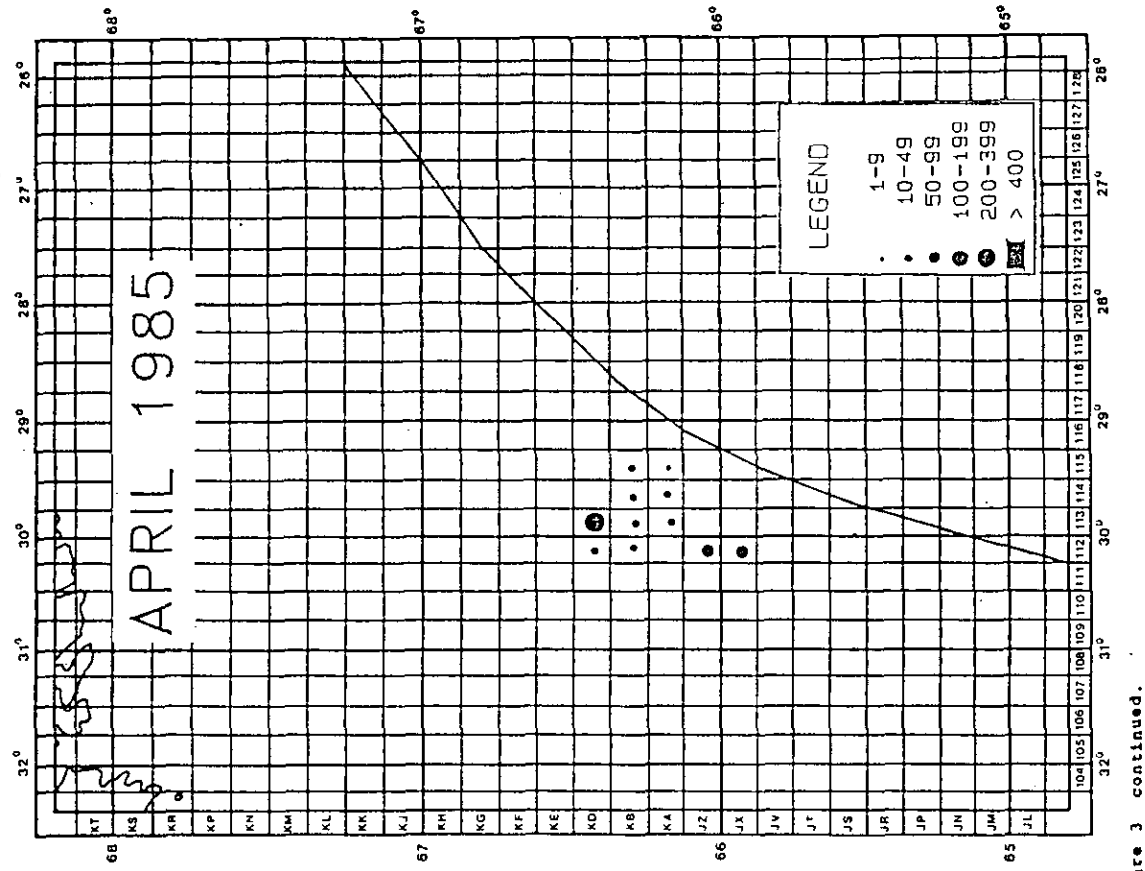

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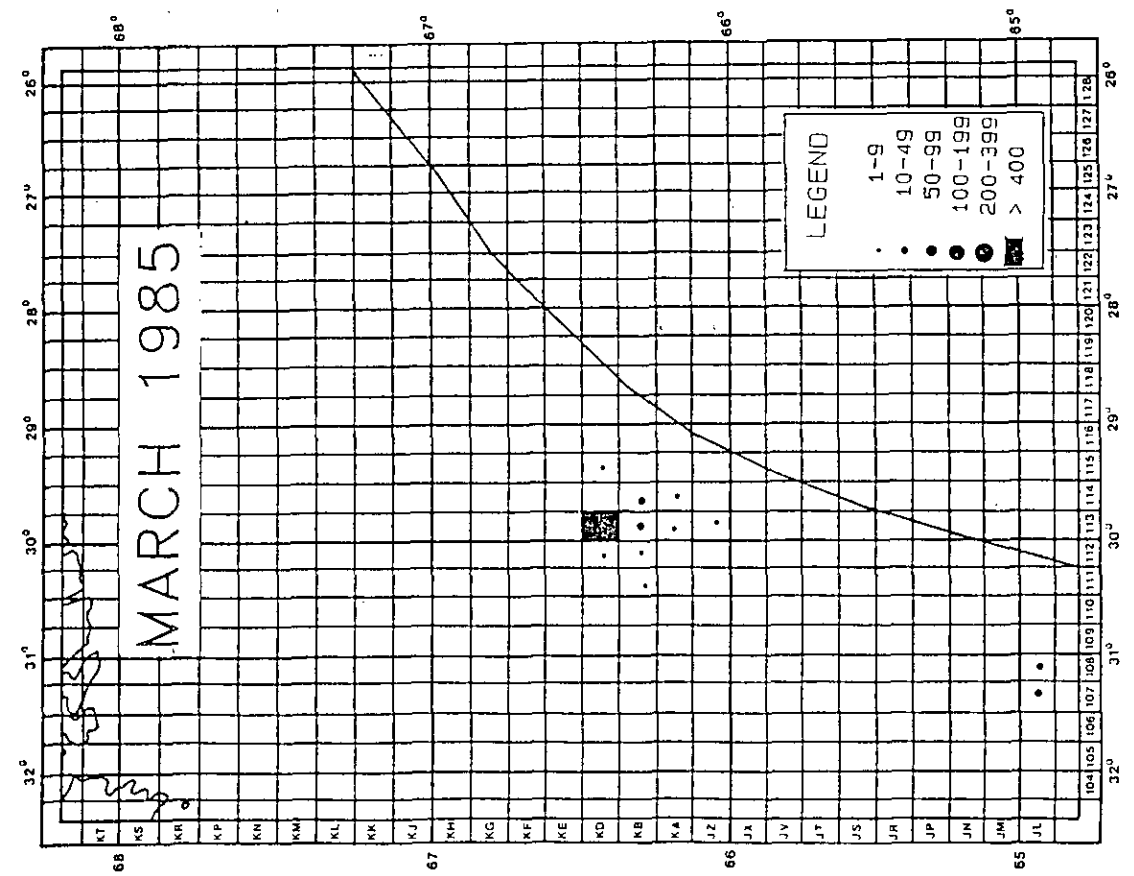

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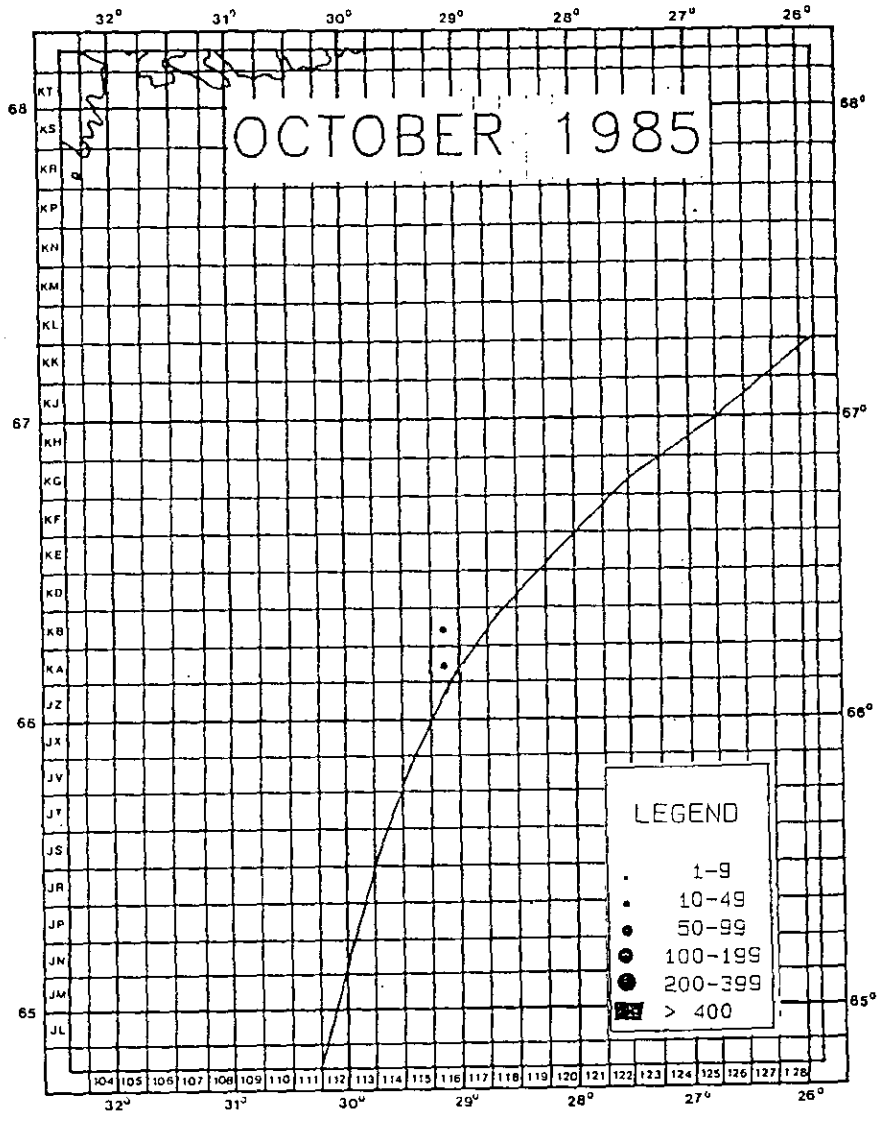

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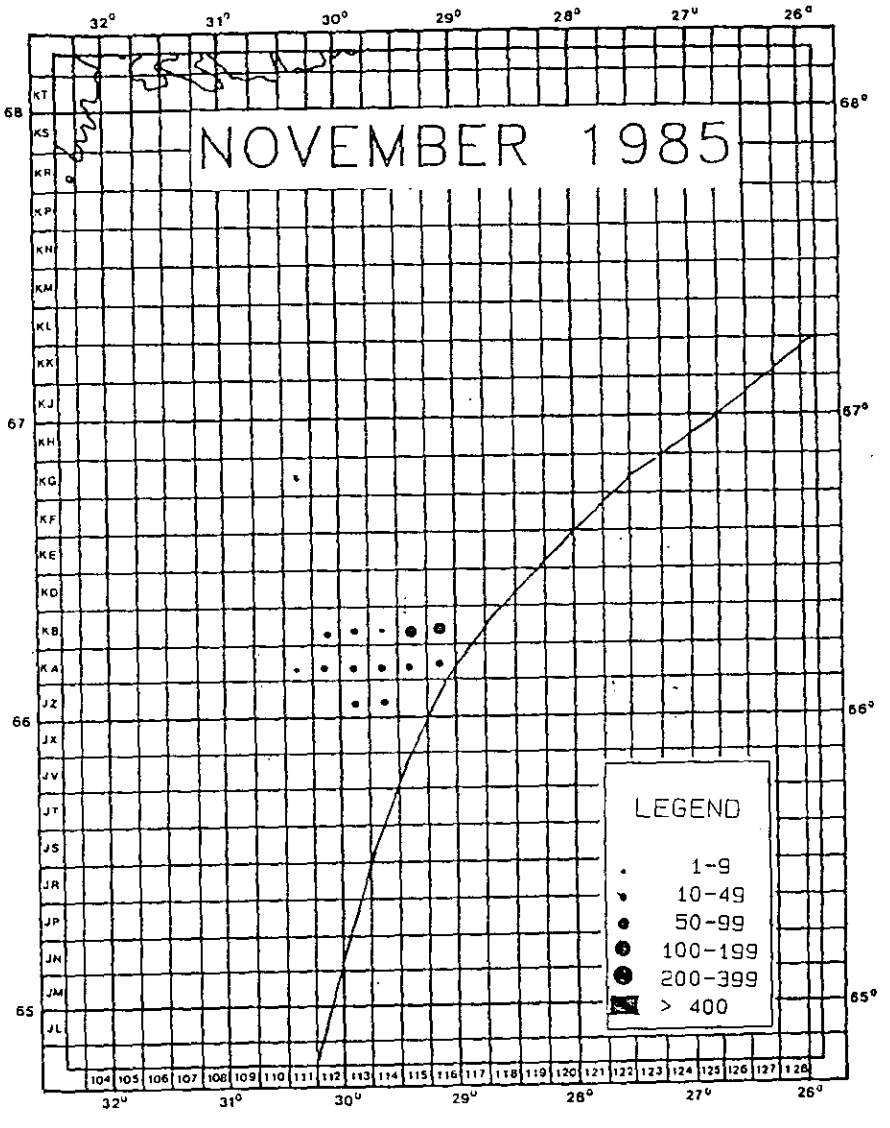

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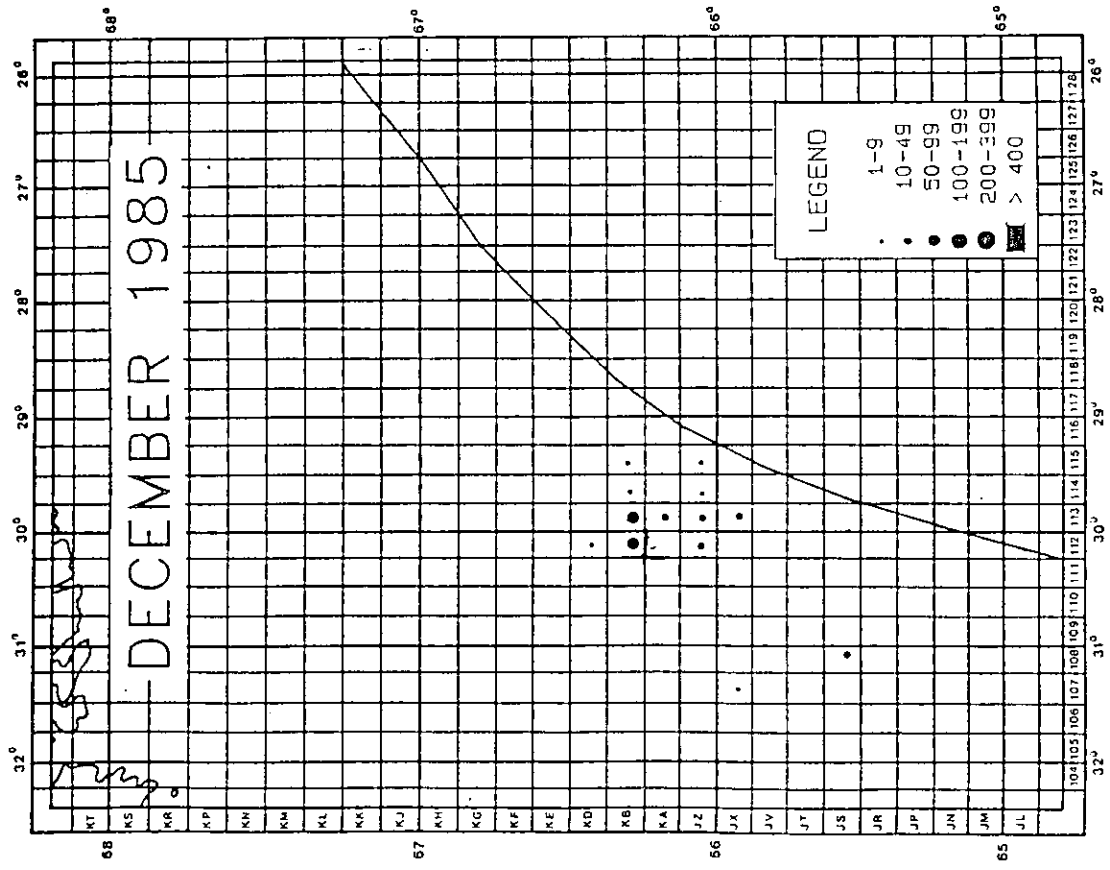

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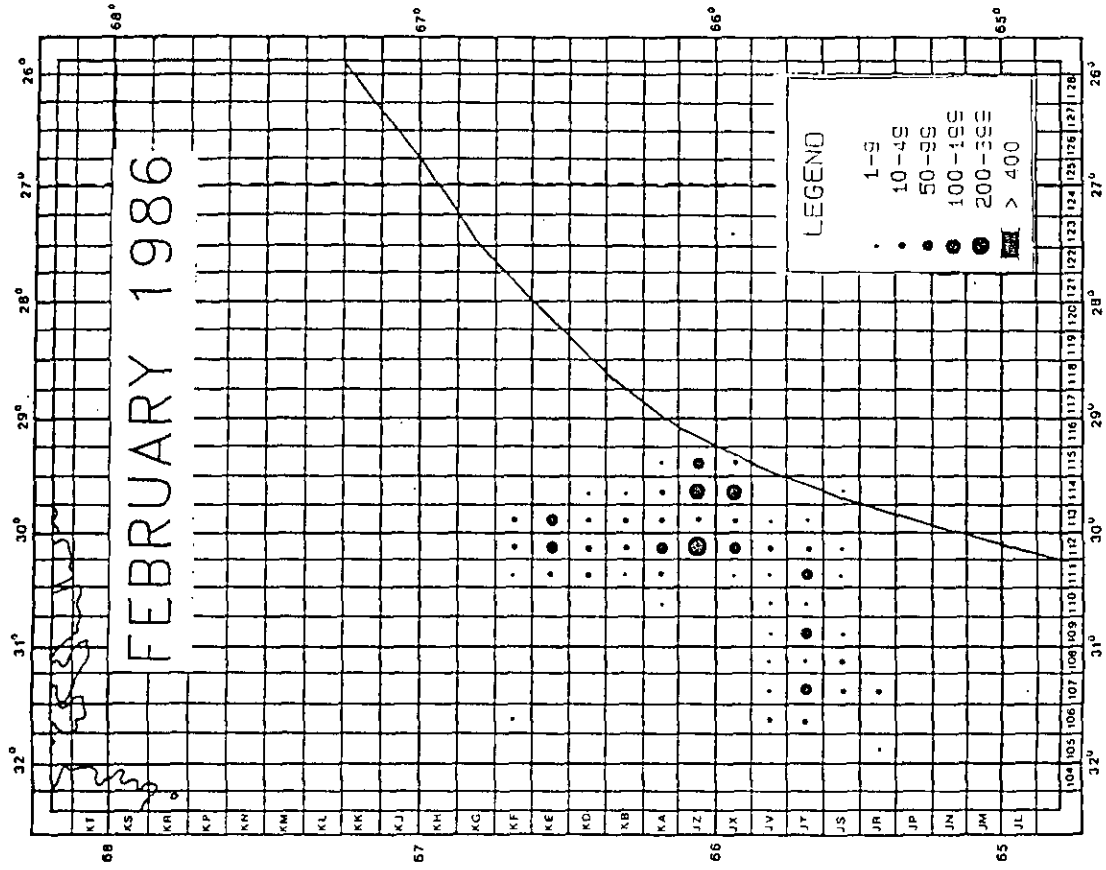

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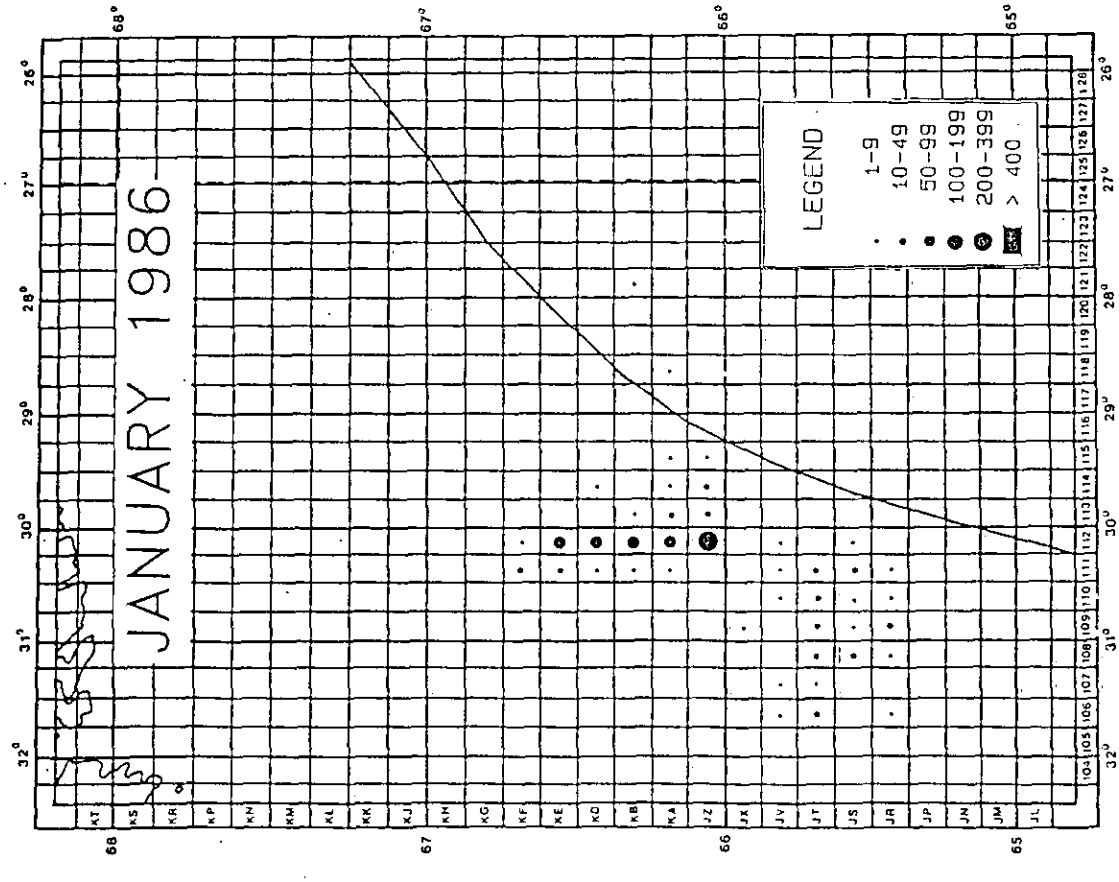

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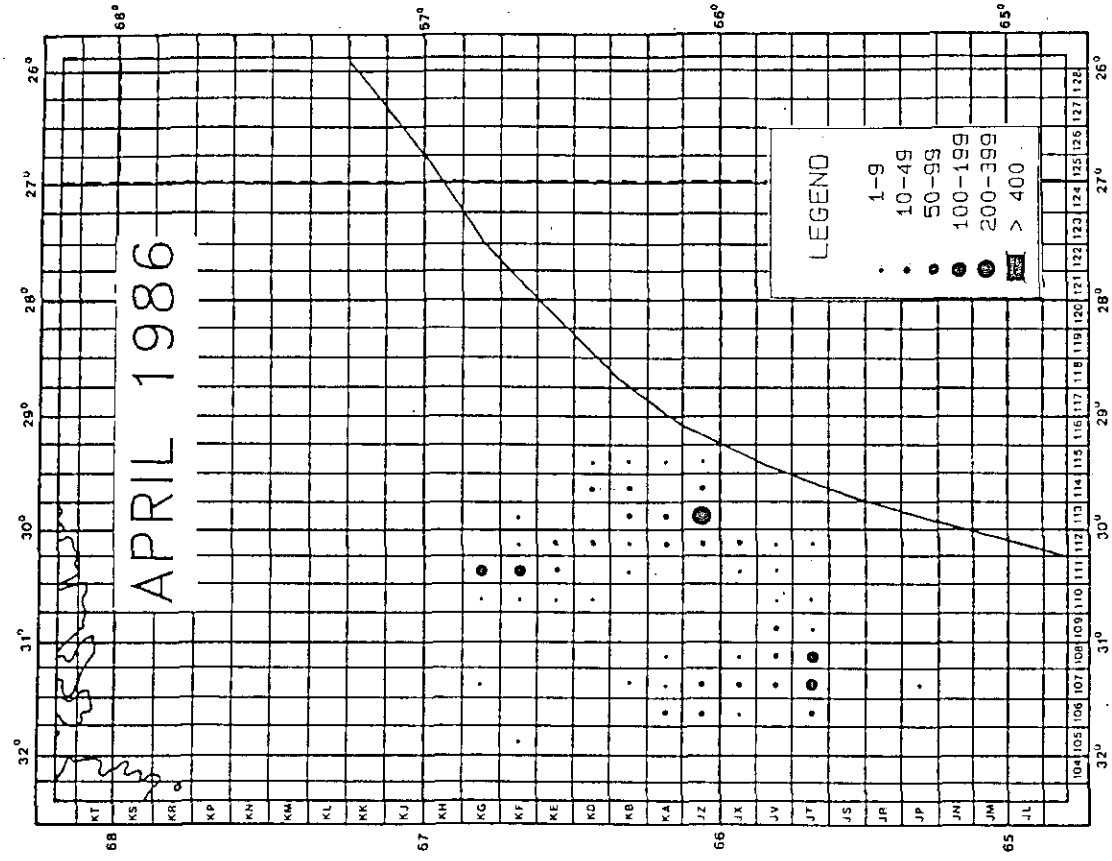

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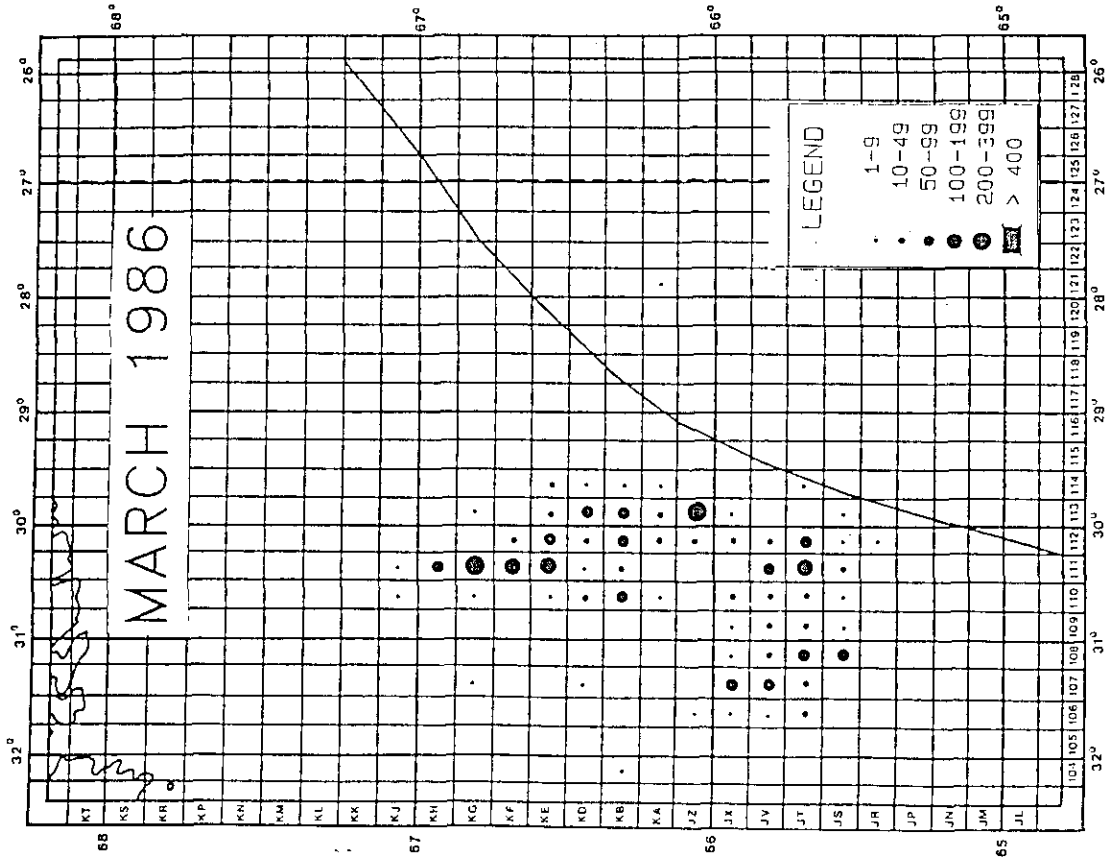

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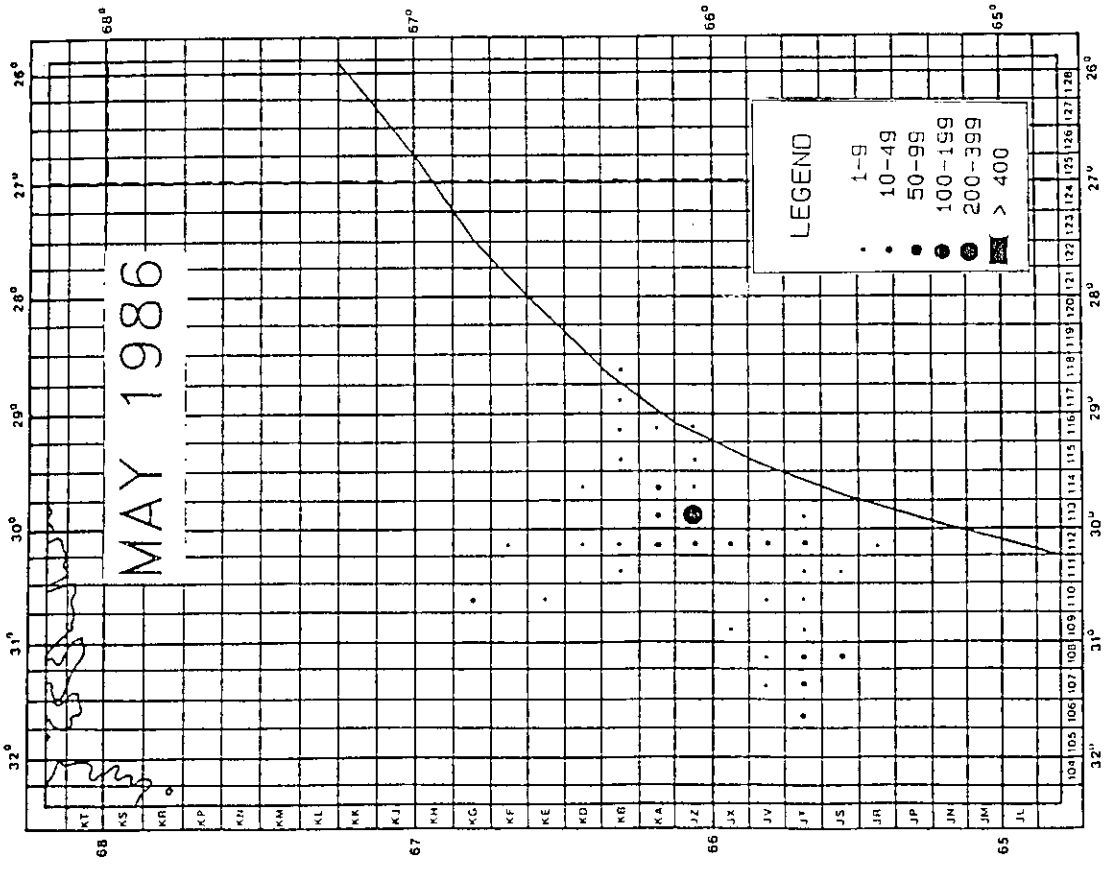

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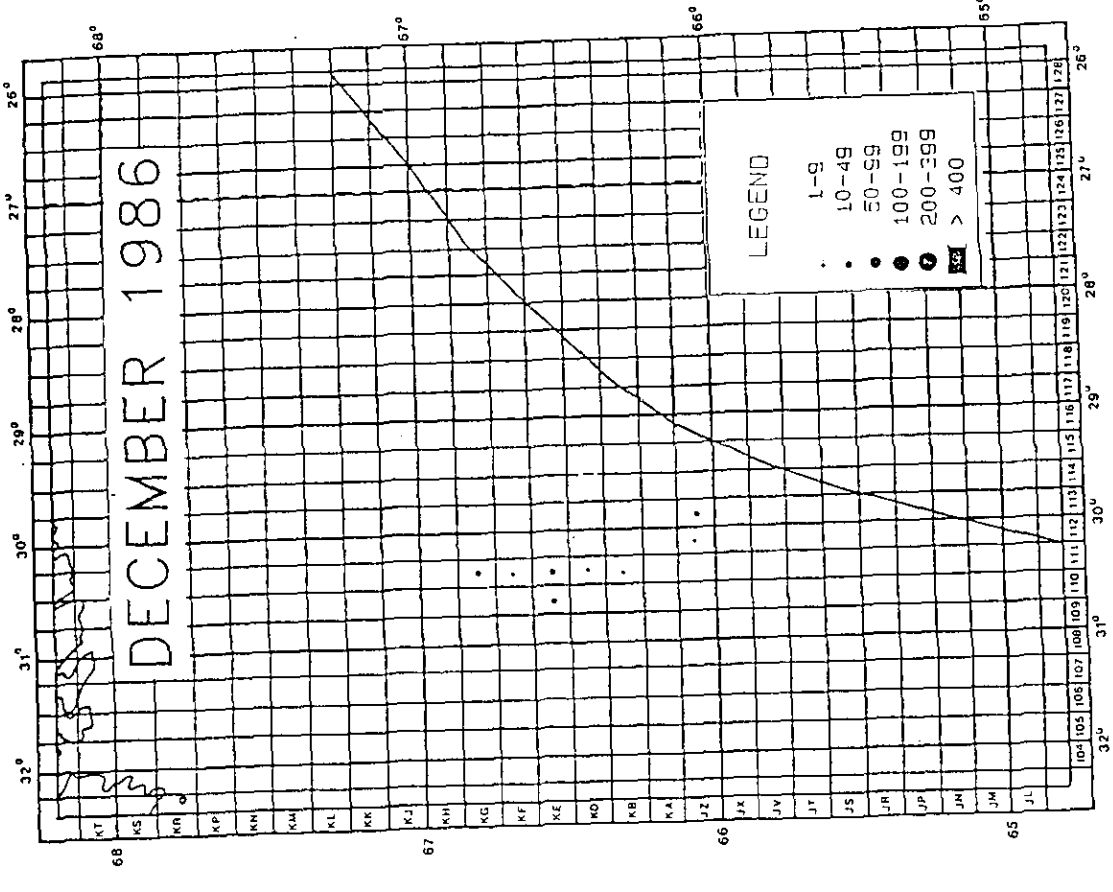

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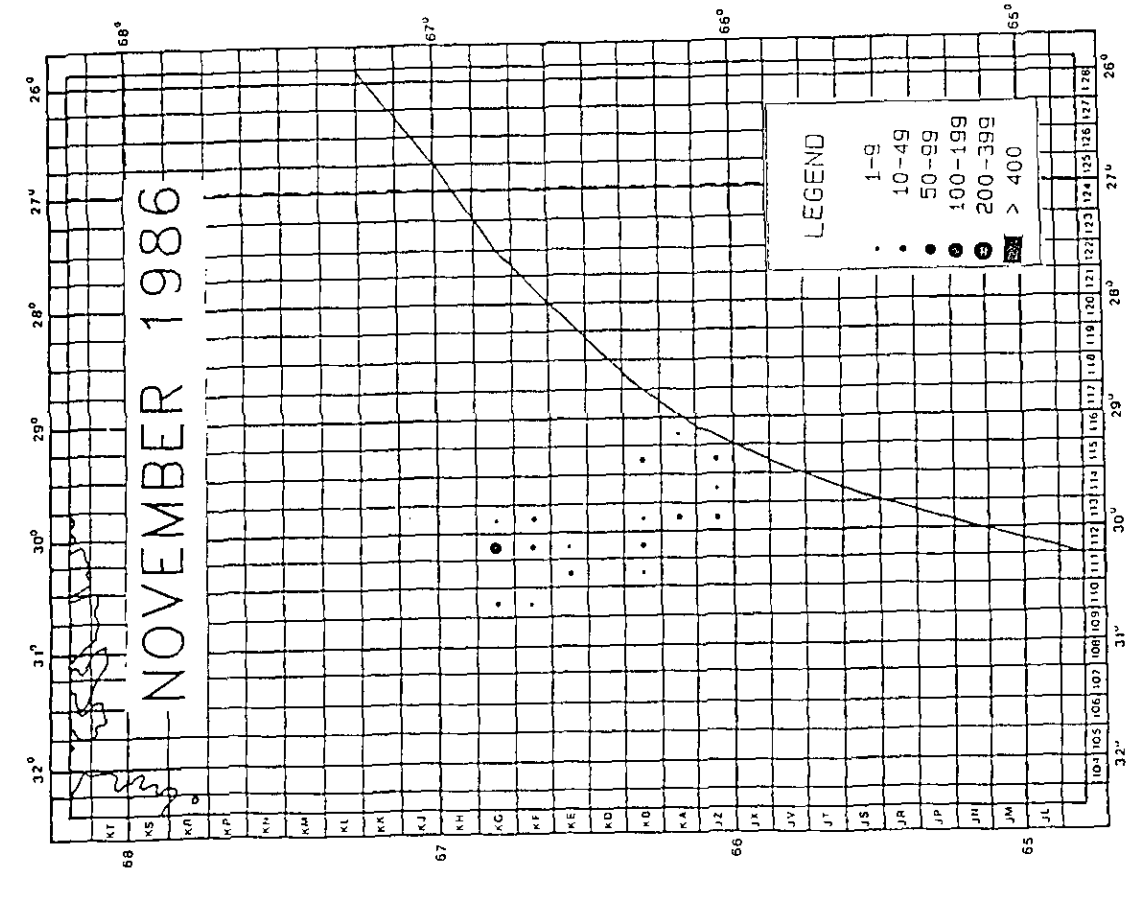

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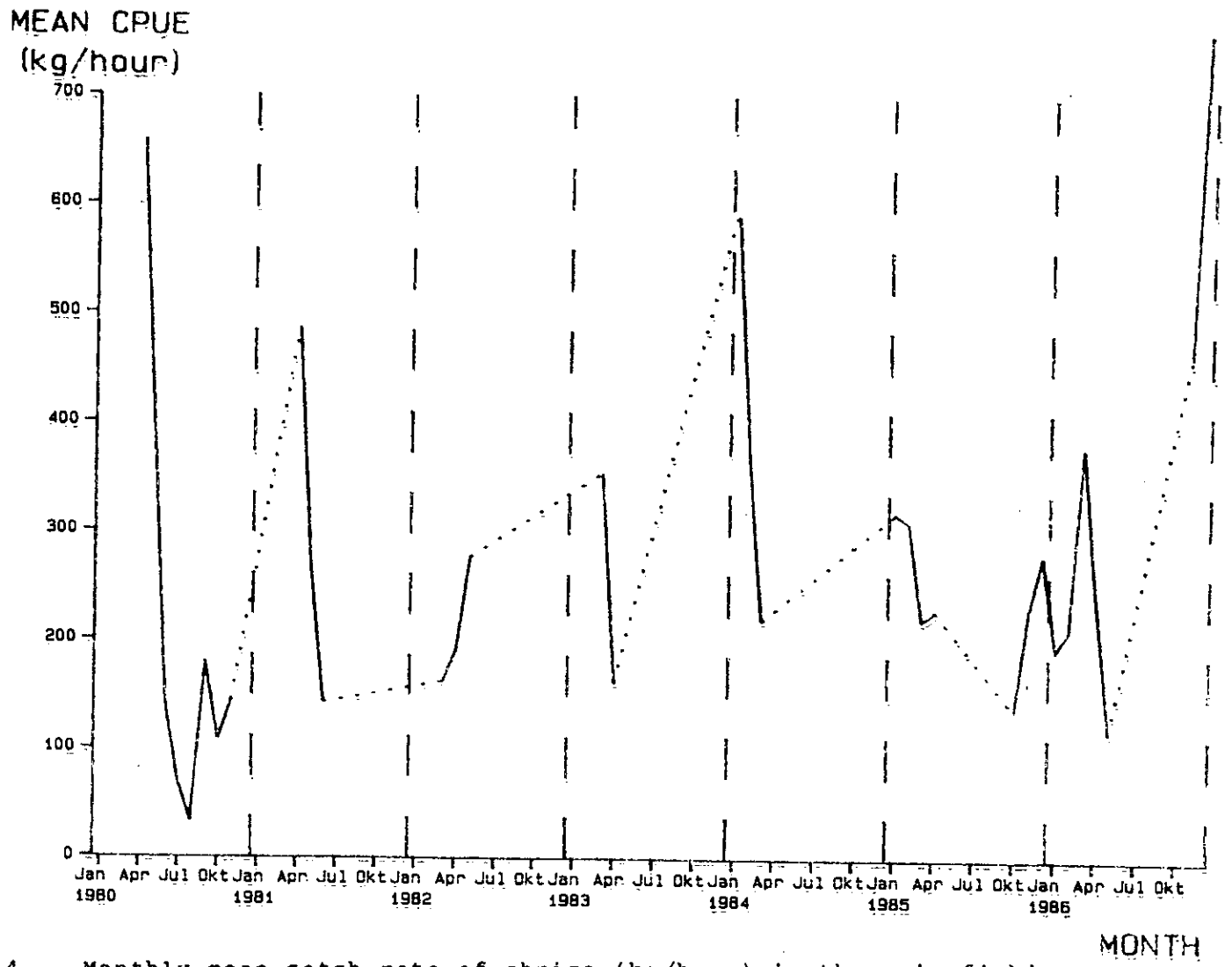


Figure 4. Monthly mean catch rate of shrimp (kg/hour) in the main fishing area at East Greenland from April 1980 to December 1986 based on logbook information (Table 3 shows the corresponding no. of hours trawled).

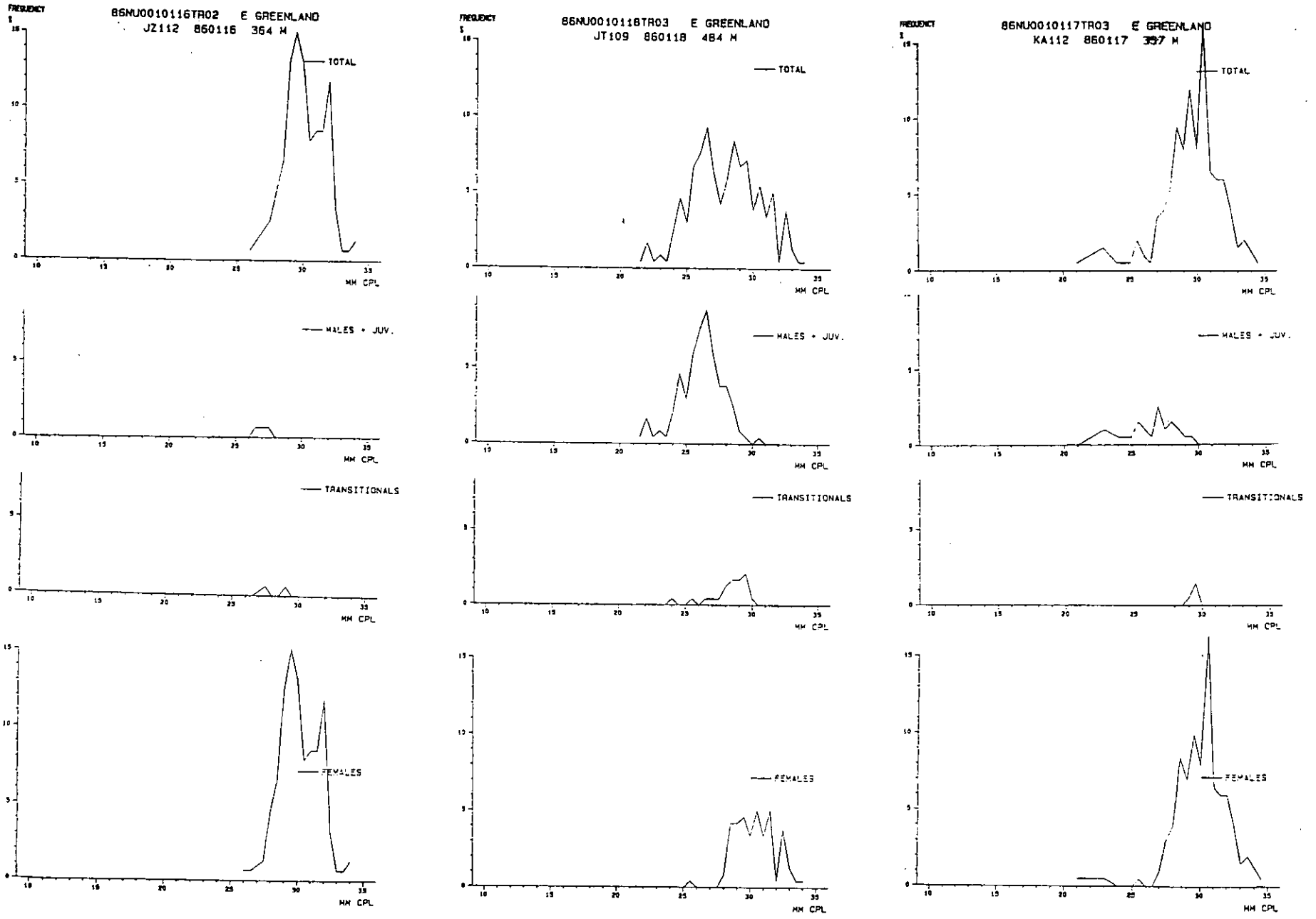


Figure 5. Length-frequency distribution of samples of P. borealis from Denmark Strait in January 1986.

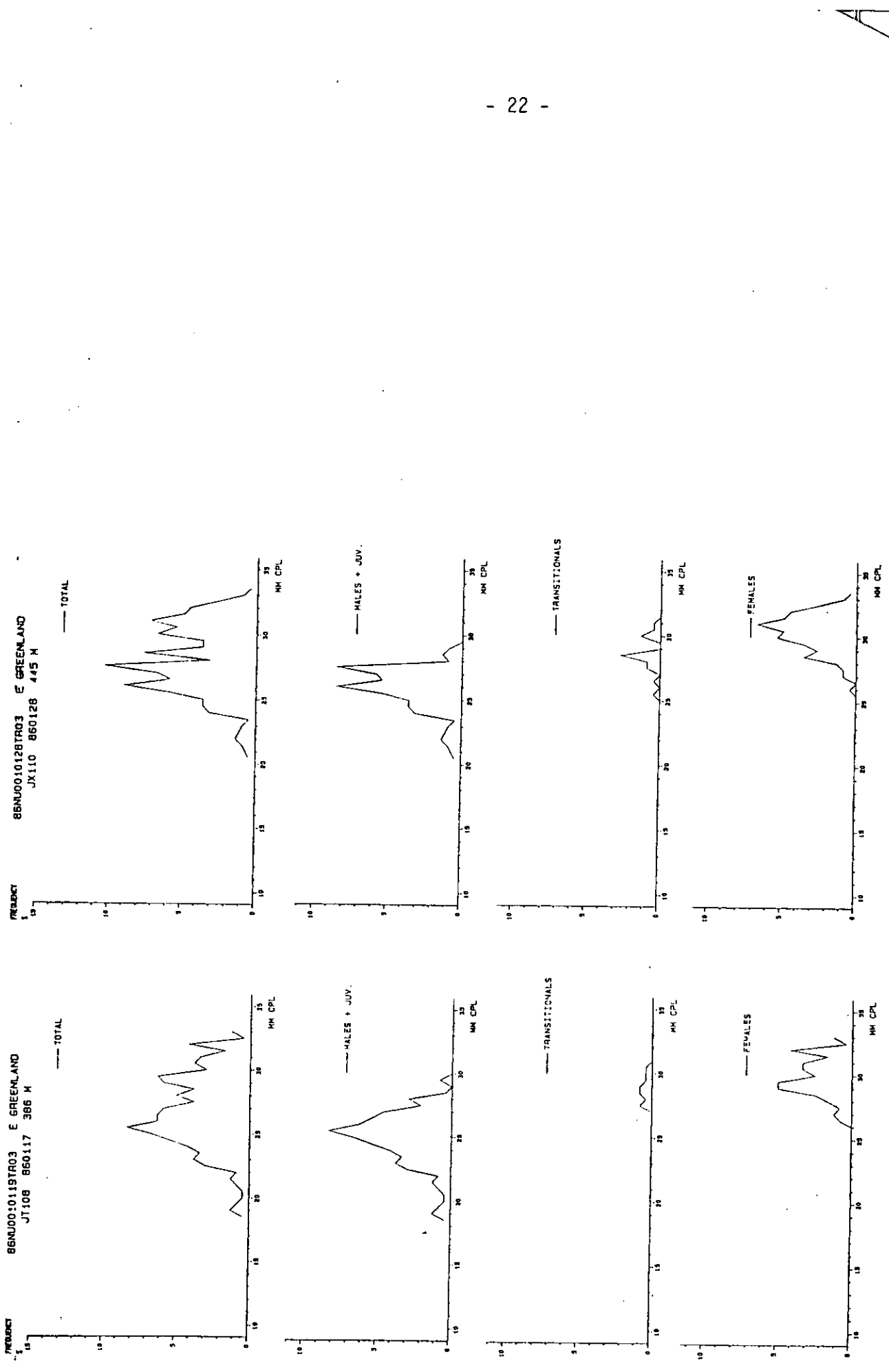


Fig. 5 continued.

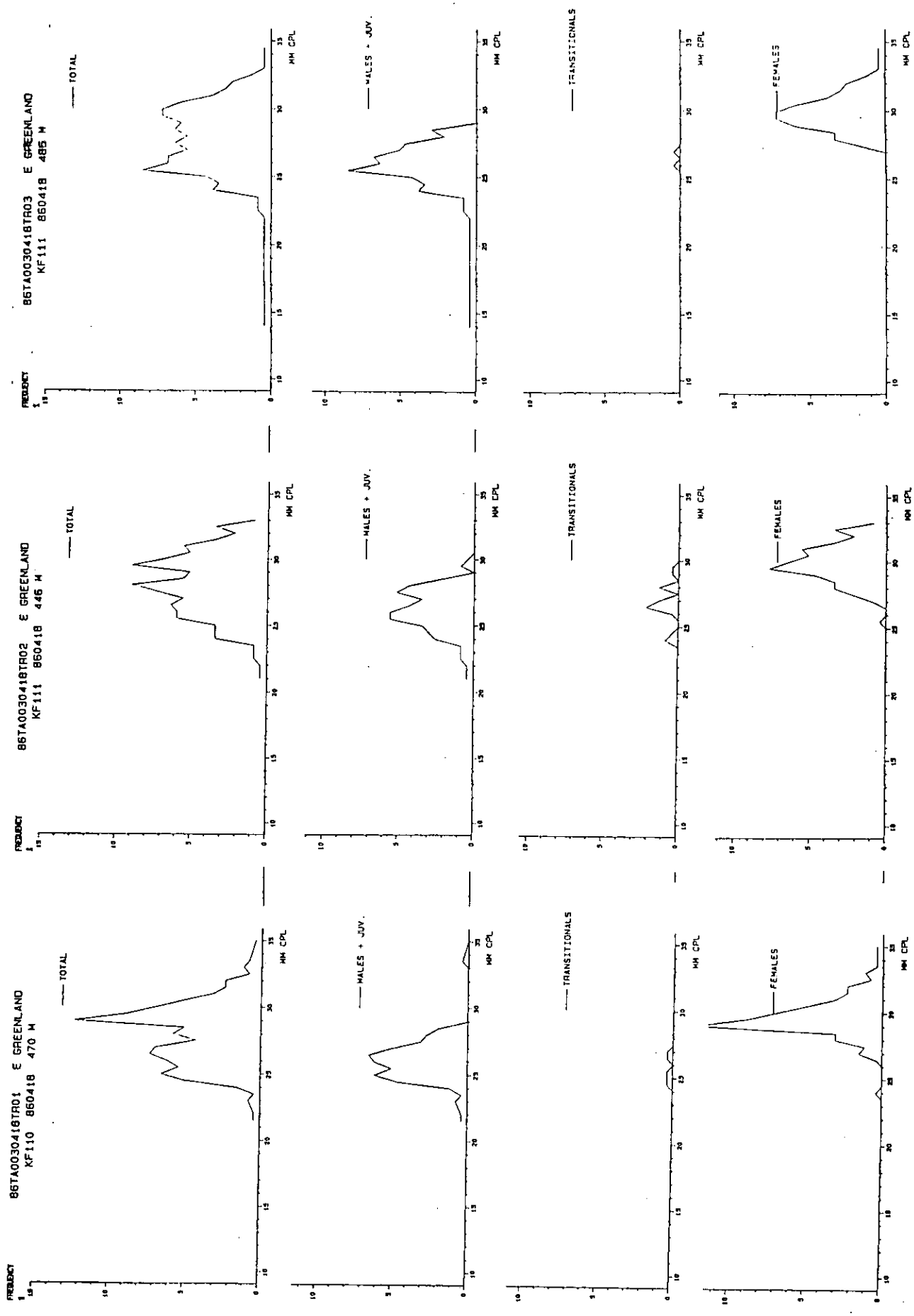


Figure 6. Length-frequency distribution of samples of P. borealis from Denmark Strait in April 1986.

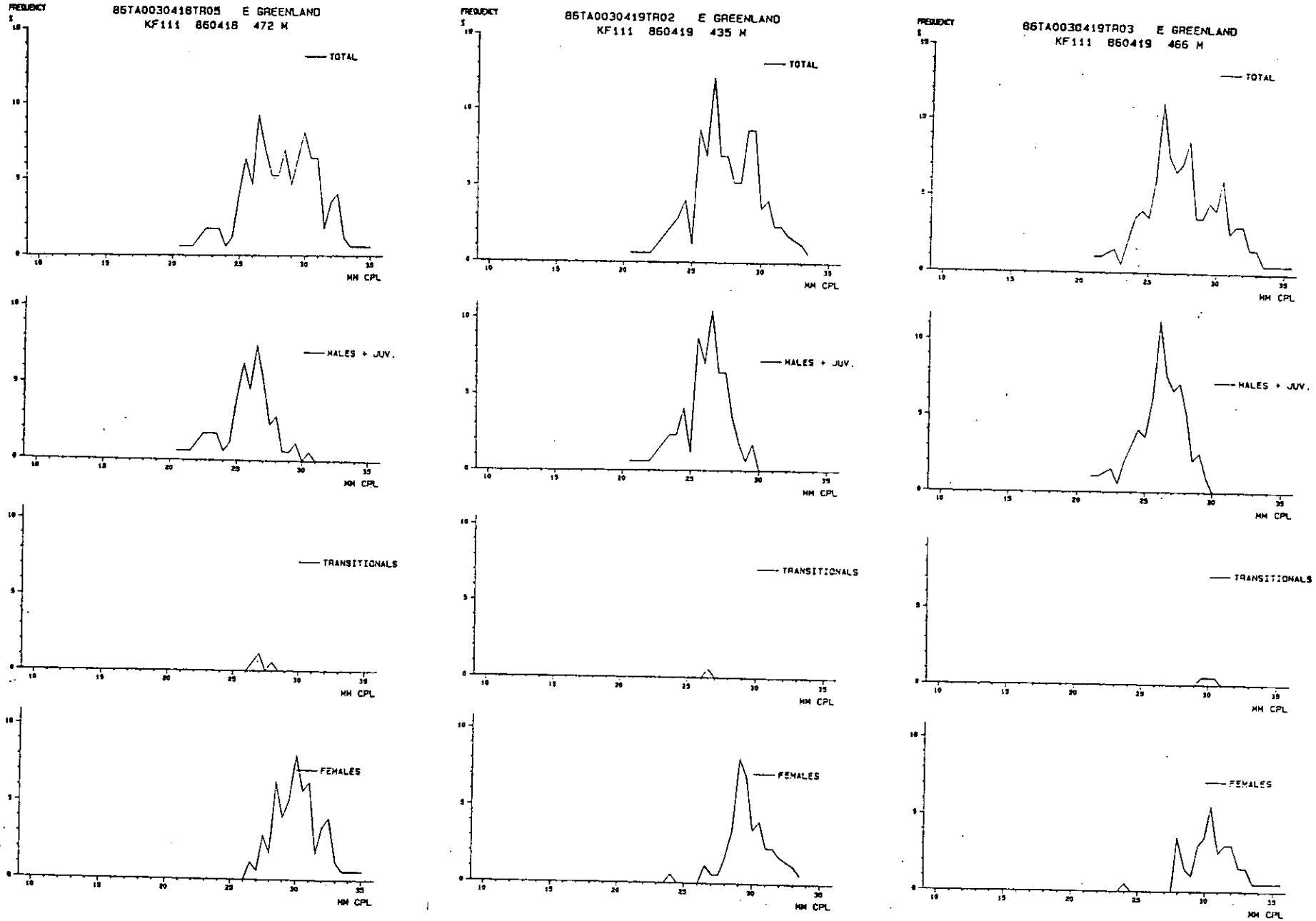
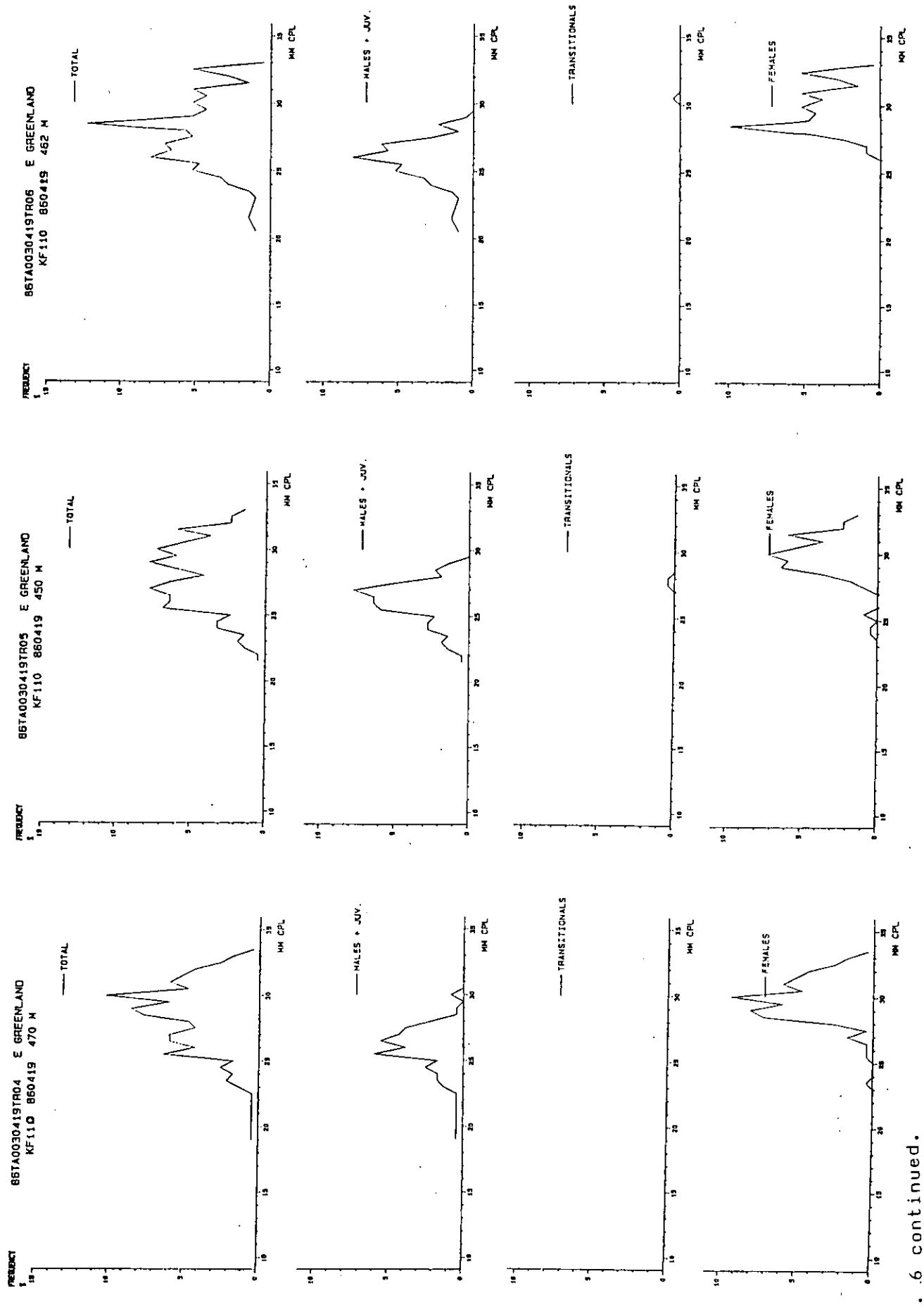


Fig. 6 continued.



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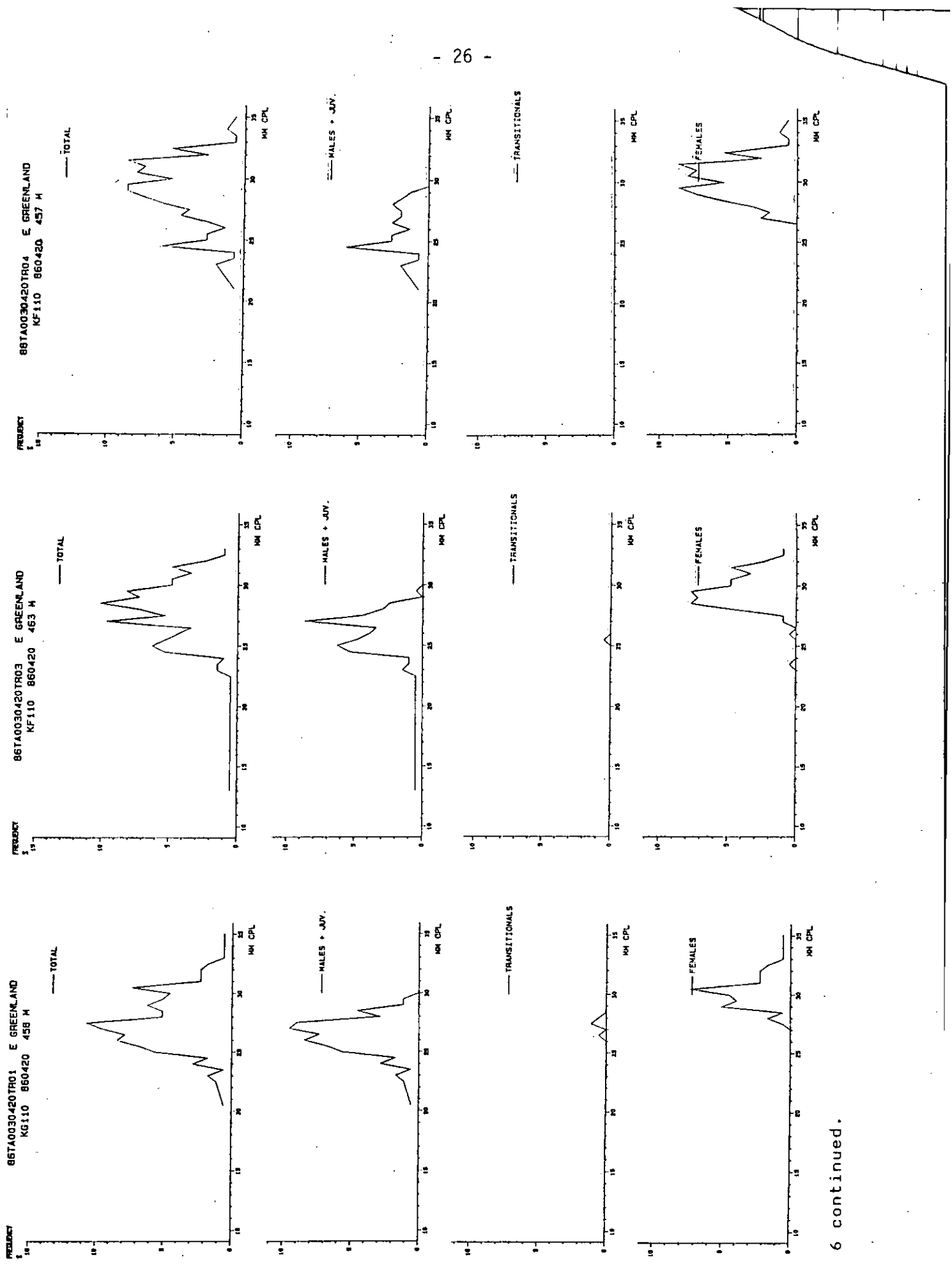

Fig. 6 continued.