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The Commercial Shrimp Fishery in Denmark Strait in 1988

by

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INTRODUCTION

STACFIS was not able to advise a total allowable catch for the shrimp fishery in Denmark Strait (including fishing grounds on the Icelandic side of the mid-line) for the year 1988. The reported catches from the Greenland zone in East Greenland waters totalled about 11,000 tons of shrimp, of which Greenland vessels accounted for about 67%.

About 66% of the total catches of shrimp were taken in the first four month of 1988.

Logbooks from 27 Greenland trawlers fishing at East Greenland from January to December 1988 have been available to the Greenland Fisheries Research Institute, covering about 93% of the Greenland catches and about 62% of the total catches in the area.

The present paper updates information given by Carlsson and Kanneworff (1988) on catches and analysis of commercial fishery data. Also information on size composition of commercial shrimp samples from 1989 is included.

MATERIALS AND METHODS

Total catches and number of vessels fishing in the Greenland zone were compiled by nation and month based on the compulsory weekly reporting to Greenland authorities by all vessels above 80 GRT (smaller vessels are not joining the fishery). Logbook data were analysed to show the overall distribution of effort and catches, and of effort and catch-rates on a monthly basis. Monthly mean catch-rates from 1980 to December 1988 were calculated from available logbook data, as were by-catch rates in 1987 and 1988.

Three commercial shrimp samples from April 1989 were analysed for composition of sexual stages and sizes.

RESULTS AND DISCUSSION

Reported catches in 1988.

Table 1 shows reported catches by division, nation and month in 1988, and Table 2 the corresponding numbers of reporting vessels.

The fishery in 1988 was more evenly distributed over the year with about 28.2% of the total catches being taken in the last half of the year compared to 0, 14.9, 1.6, 25, 25, and 20% in 1982 to 1987.

In 1988 highest catches were taken in January, February and March, but also in December a substantial catch was taken (more than 1,000 tons). Highest number of vessels on the fishing grounds were found in January to March.

Geographical distribution of the fishery.

Figure 1 shows the distribution of effort (in numbers of hours trawled) in 1988, and Figure 2 the distribution of total catches. Figure 3 shows the distribution of CPUE and effort by month.

Similar to 1987, highest total catches were obtained around statistical units JS109-JT110 and KE112-KG110. The distribution of effort was also similar to 1987.

The distribution of the fishing activity in Denmark Strait is highly dependant on environmental conditions, i.e. ice cover, and early in the year also on the distribution of concentrations of berried female shrimp. Data are not available to evaluate the actual causes for the distribution of the fishery in 1988.

In January and February the fishery was evenly distributed over the western part of the fishing ground, while in March and April it was more concentrated in the southern part. After a period with very low or no activity the fishery was expanded in the northeastern part of the area. In September through November the fishery moved towards the west and northwest. In the last two months of the year the fishery moved towards the southern parts.

Catch and effort.

Similar to 1987 the highest mean catch-rates were found in January and February, but peak catch-rates early in the year did not reach the same high levels as found in earlier years (except for 1982 - Figure 4, corresponding effort shown in Table 3). Mean catch-rates remained at a level of about 120 kg per hour in April and May and from August through October, while during the November-December period they increased to more than 200 kg per hour. In spite of large fluctuations a general stability over the years of the fishery is indicated, although a decrease in 1988 compared to earlier years is indicated. The annual mean catch rate decreased from 274 kg per hour in 1987 to 200 kg per hour in 1988.
The mean catch rate for the period January to May decreased from 321 kg per hour in 1987 to 221 kg per hour in 1988. For the period August to December there was an increase from 145 to 160 kg per hour for the same two years.

Table 4 and 5 show the mean catch-rate and the number of hours trawled by month in a north to south grid (7.5 minute latitude scale) based on logbook data from 1987 and 1988. The data show the same trends as mentioned above.

By-catches in the shrimp fishery.

Table 6 shows by-catches by month as reported in logbook data in 1987 and 1988. Reported by-catch levels are similar between the two years, with redfish being the most dominant species especially in February and March. As noted before (Carlsson and Kanneworff, 1988) these levels can not be considered accurate.

Biological samples.

Length-frequencies of commercial shrimp samples from the southern part of the main fishing area (statistical units JX109, JZ110 and JV110) in April 1989 are shown in Figures 5-7. All samples are from depths between 400 and 500 meters and were taken from hauls performed around 10 hours GMT. Males are occurring in sizes from 14.5 to 32.5 mm carapace length, but sample sizes are to small to point out evident modes except for a mode around 28-29 mm carapace length. Primiparous females show a mode around 30 mm carapace length. Also multiparous females show a significant mode at 30 mm carapace length, as found in earlier years (Carlsson and Kanneworff, 1987), and one or two modes are indicated for larger shrimp. Females up to 35 mm carapace length are still found in the samples.

CONCLUSIONS

Reported catches of shrimp in 1988 from the Greenland part of Denmark Strait totalled 11,125 tons, which is the highest catch figure since the fishery begun in 1980. As in 1987 a total of 60 vessels joined the fishery. The mean catch per vessel in 1988 was 185 tons. The fishery took place throughout the year except for June and July, with about 28% of the total catches being taken in the second half of the year.

In the last three years logbook data show a more even distribution of the fishery over the fishing grounds compared to earlier years.

Again in 1988 logbook data show mean peak catch-rates in the beginning of the year, however not as pronounced as in most earlier years. In April to October mean catch-rates remained at a low level around 120 kg per hour, followed by an increase at the end of the year. The yearly mean catch-rate is lower than in 1987, bur may be influenced by possible changes between the two years in the access to shrimp concentrations due to environmental conditions.

Reported by-catches remain at a low level as in preceeding years, redfish being the dominant species.

Biological samples from the commercial shrimp fishery in April show the occurrence of both male and female shrimp. Large females up to 35 mm carapace length are still present, and an influence of the fishery on the mean size of the larger female shrimp is not evident.

REFERENCES

Carlsson, D.M., Kanneworff, P., 1987. The commercial shrimp fishery in the Denmark Strait in 1985 and 1986. NAFO SCR Doc. 87/09, Ser.No. N1277.

Carlsson, D.M., Kanneworff, P., 1988. The commercial shrimp fishery in the Denmark Strait in 1987. NAFO SCR Doc. 88/57, Ser.No. N1497.

Table 1. Catches of shrimp (tons) at East Greenland in 1988 by division, nation and month as reported to Greenland authorities.

ICES DIVISION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
XIVB	DENMARK	156	147	23	3	-	-	-	-	23	19	36	37	444
	FAROE ISL.	228	301	69	36	35	-	-	10	-	-	-	-	679
	FRANCE	-	-	45	239	160	-	-	2	48	-	-	-	494
	GREENLAND	2062	1919	1105	139	60	5	1	194	199	263	516	993	7456
	NORWAY	4	262	354	303	327	6	-	316	282	194	24	-	2052
	TOTAL	2450	2629	1596	720	582	11	1	522	532	476	576	1030	11125

Table 2. No. of vessels in the shrimp fishery at East Greenland in 1988 by division, nation and month as reported to Greenland authorities.

ICES DIVISION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
XIV	DENMARK	1	2	1	1	-	-	-	-	1	1	1	1	2
	FAROE ISL.	5	6	2	1	1	-	-	2	-	-	-	-	7
	FRANCE	-	-	1	3	3	-	-	1	1	-	-	-	3
	GREENLAND	20	20	20	5	3	1	1	4	7	8	10	14	27
	NORWAY	1	10	15	14	11	1	-	16	12	8	4	-	21
	TOTAL	27	38	39	24	18	2	1	23	21	17	15	15	60

Table 3. No. of hours trawled by year and month from April 1980 to December 1988 in the main fishing area at East Greenland as reported in available logbooks.

Year	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
1987	3256	4306	2816	861	355	-	13	59	386	698	1885	3473	17908
1988	6828	7883	6355	1074	427	-	-	984	1388	2494	3102	4122	34657

4. Mean catch of shrimp (kg/hour) by month at East Greenland in 1988 in a north to south grid (7.5 minute latitude scale) based on available logbooks.

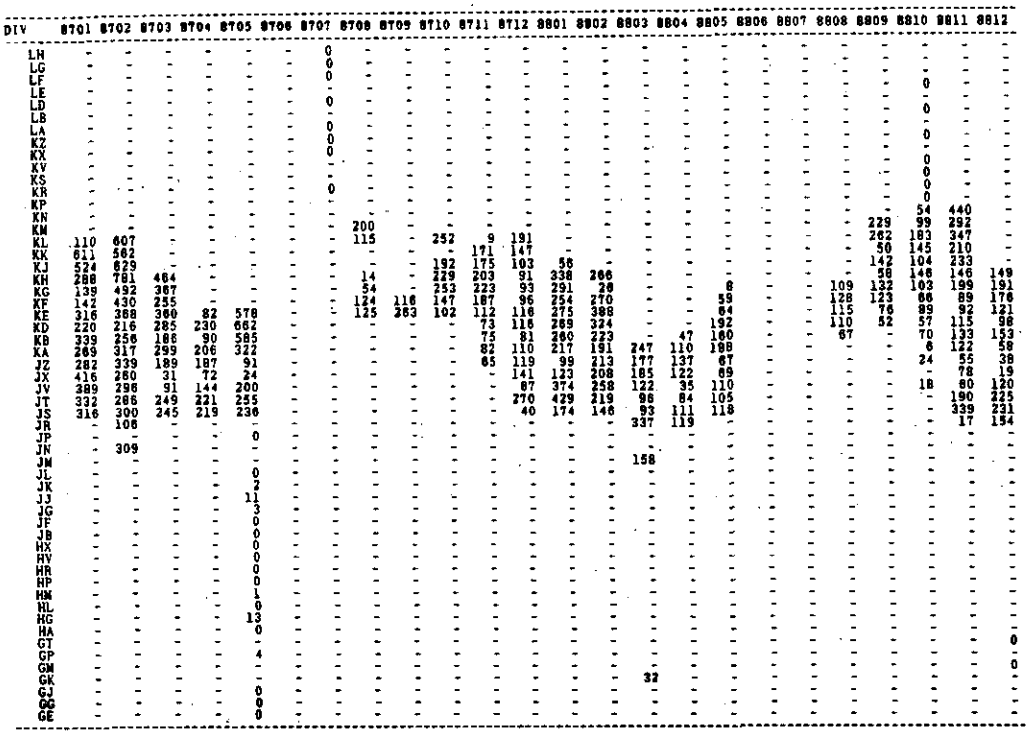


Table 5. No. of hours trawled by month in a north to south grid at East Greenland in 1988 based on logbook information (see Table 4).

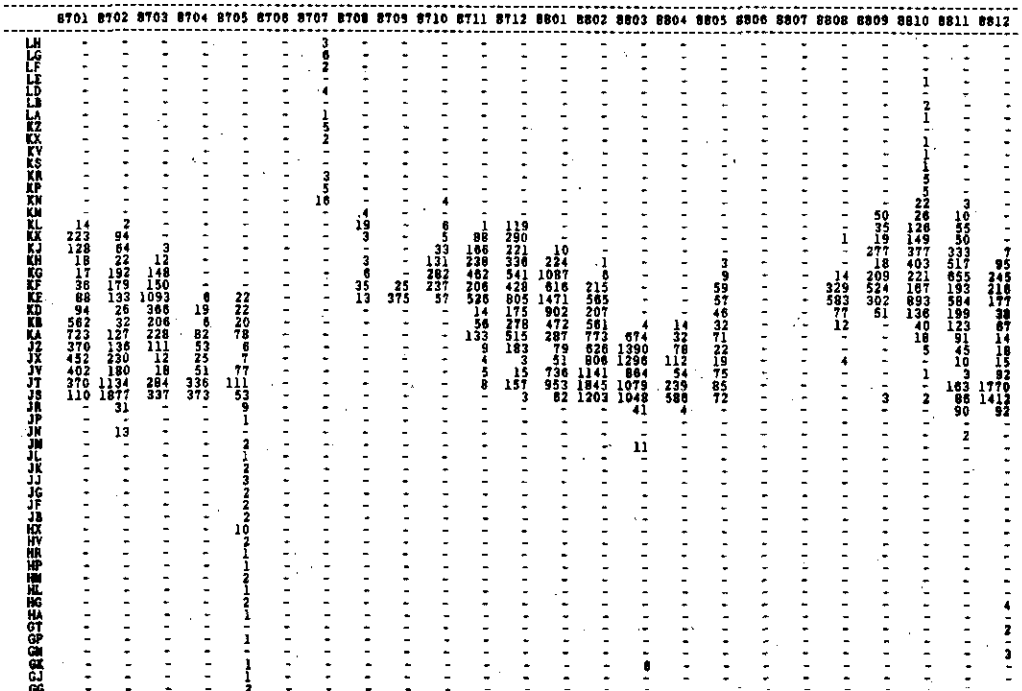


Table 6. By-catches by species and month in 1987 and 1988 reported in logbooks from the Denmark Strait shrimp fishery, compared to the corresponding shrimp catches.

SPECIES	8701	8702	8703	8704	8705	8708	8709	8710	8711	8712	8801	8802	8803	8804	8805	8808	8809	8810	8811	8812
Redfishes	2.8	20.2	7.9	3.1	2.1	-	-	0.1	8.2	5.9	13.7	30.7	16.0	8.7	2.0	0.3	0.4	2.2	4.6	18.3
Mixed	0.2	0.7	1.3	-	-	0.2	1.4	2.4	0.8	1.3	9.4	10.4	7.5	2.1	0.1	0.8	3.1	6.0	7.9	9.5
Total bycatch	3.0	20.9	9.2	3.1	2.1	0.2	1.4	2.5	9.0	7.2	23.1	41.1	23.5	10.8	2.1	1.1	3.5	8.3	12.6	27.8
Corresponding shrimp catch	1161	1403	849	187	108	7	100	144	258	400	2072	1786	965	117	53	116	173	269	497	878
Bycatch in % of shrimp catch	0.3	1.5	1.1	1.7	2.0	3.0	1.4	1.7	3.5	1.8	1.1	2.3	2.4	9.2	4.0	0.9	2.0	3.1	2.5	3.2

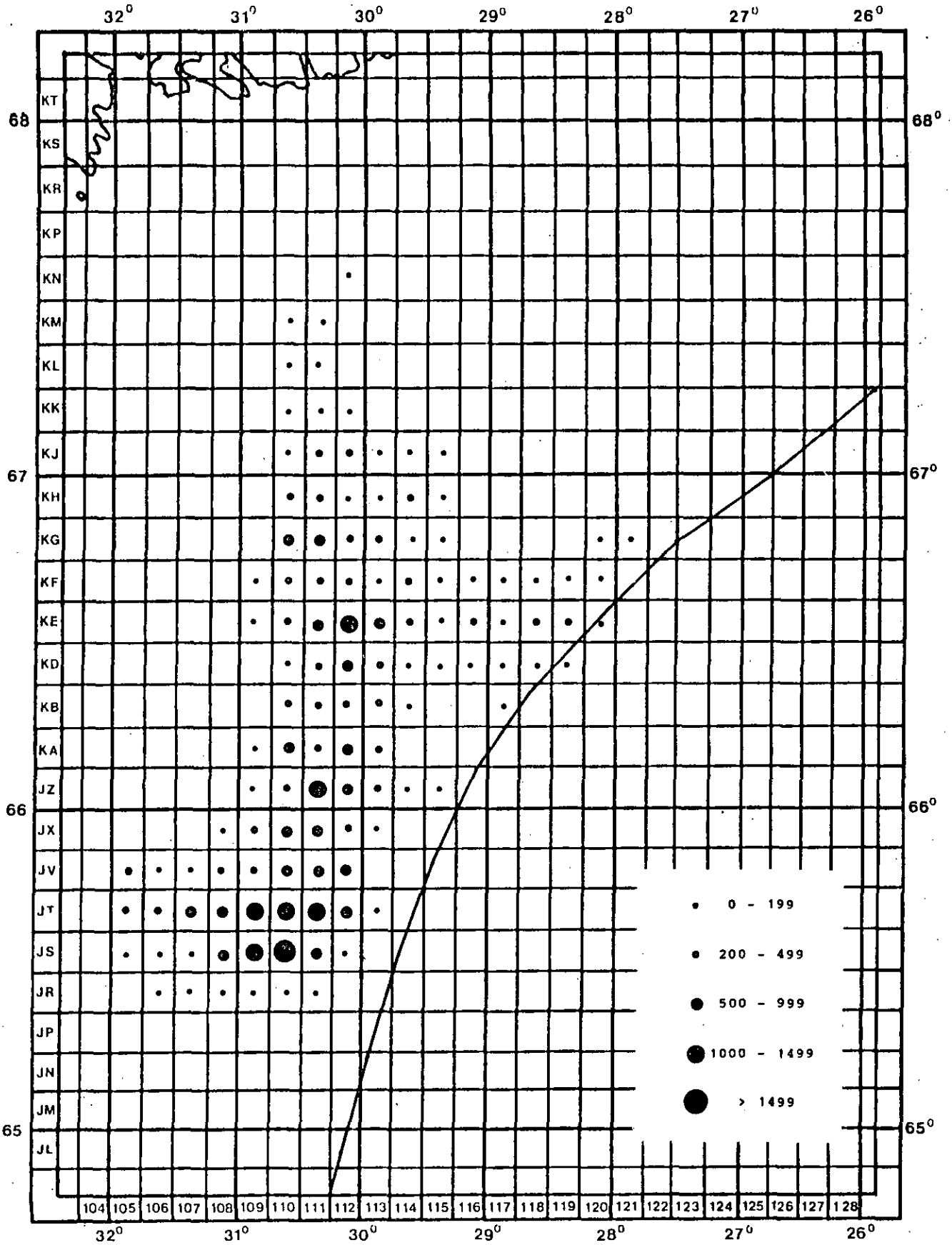


Figure 1. Distribution of effort (in no.s of hours trawled) in the shrimp fishery at West Greenland in 1988, based on available logbook information.

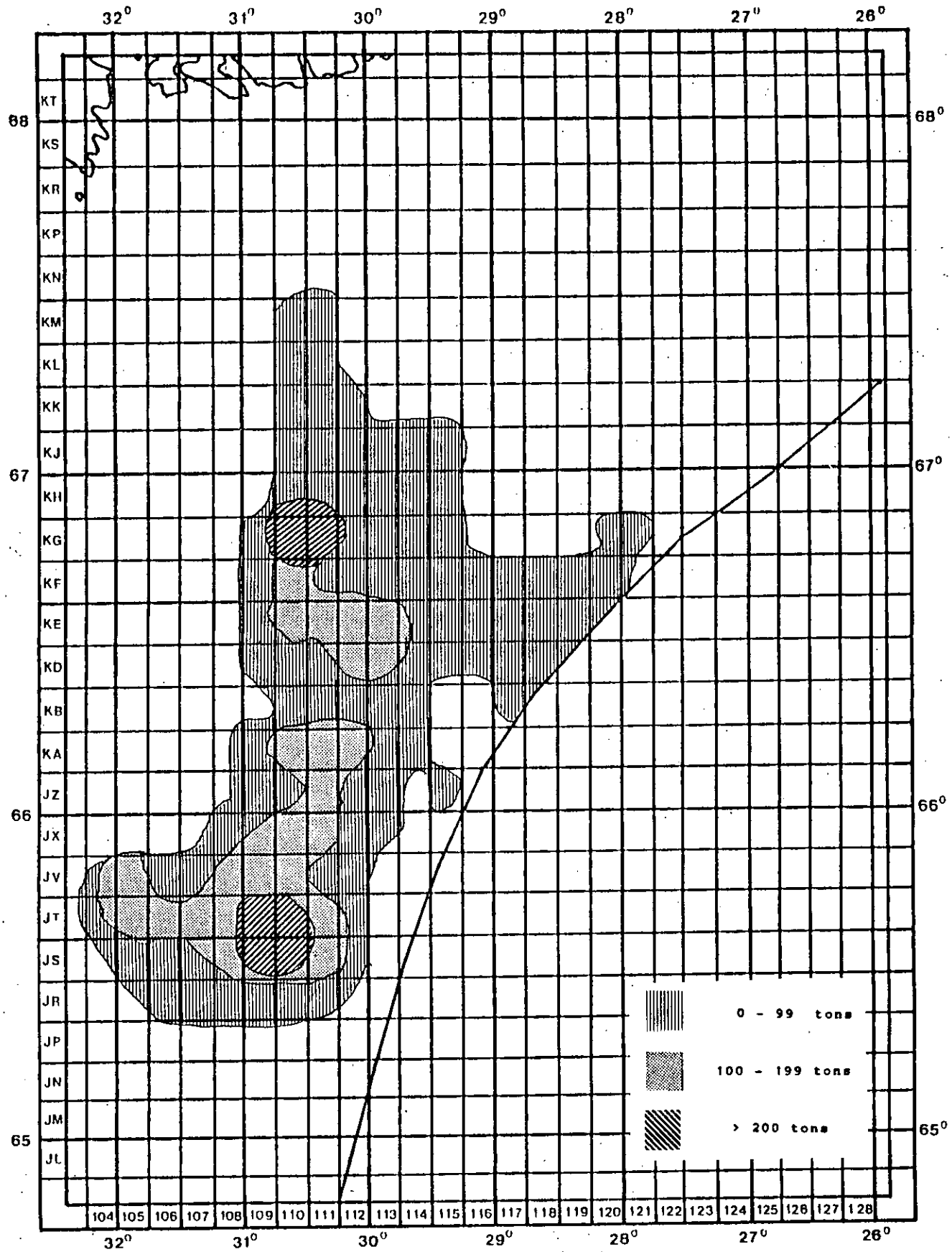


Figure 2. Distribution of catches of shrimp (tons) in the shrimp fishery at East Greenland in 1988, based on available logbook information.

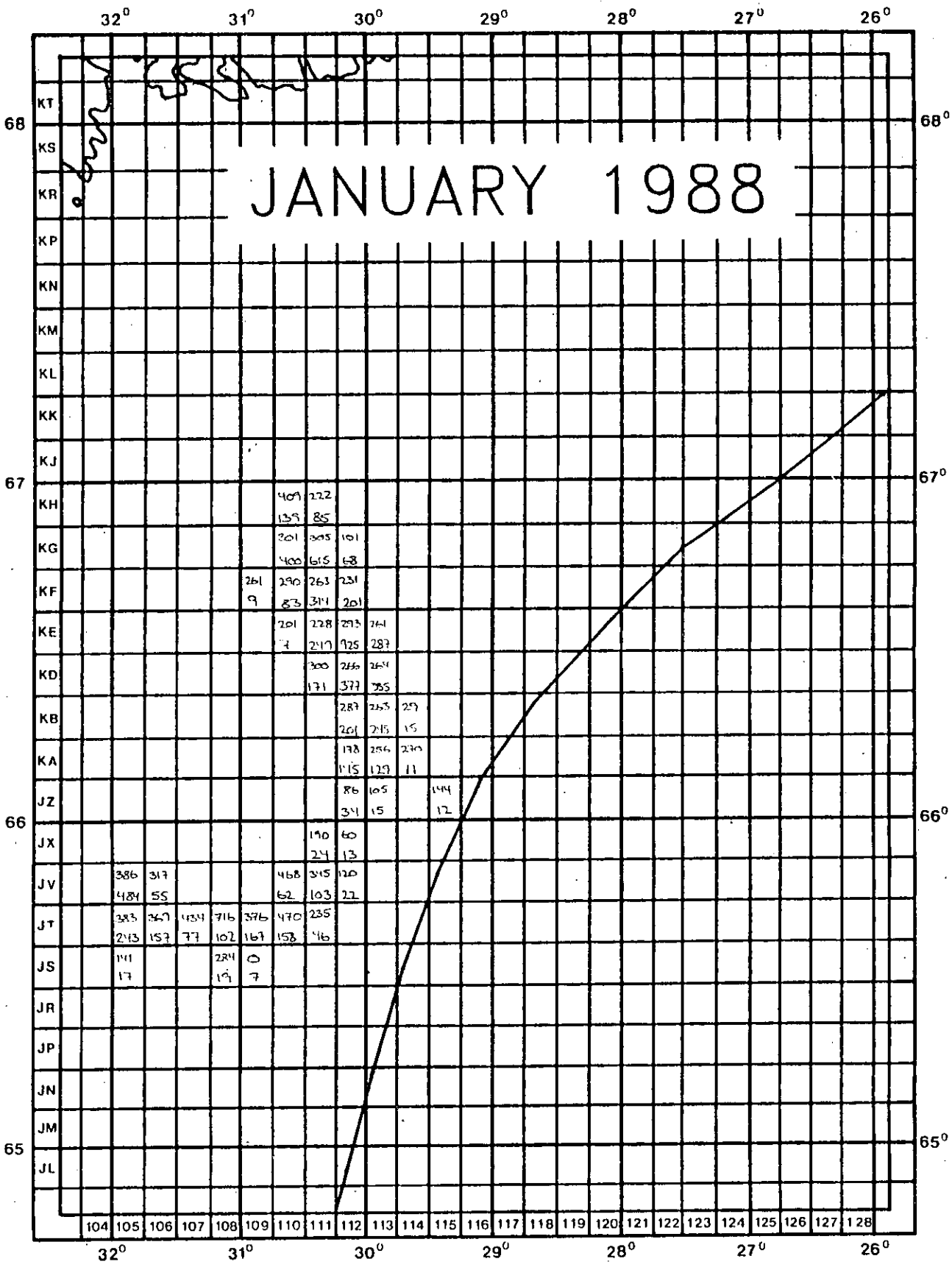


Figure 3. Distribution of mean catch of shrimp (kg/hour) and effort (hours) in the shrimp fishery at East Greenland in January 1988 based on available logbook information.

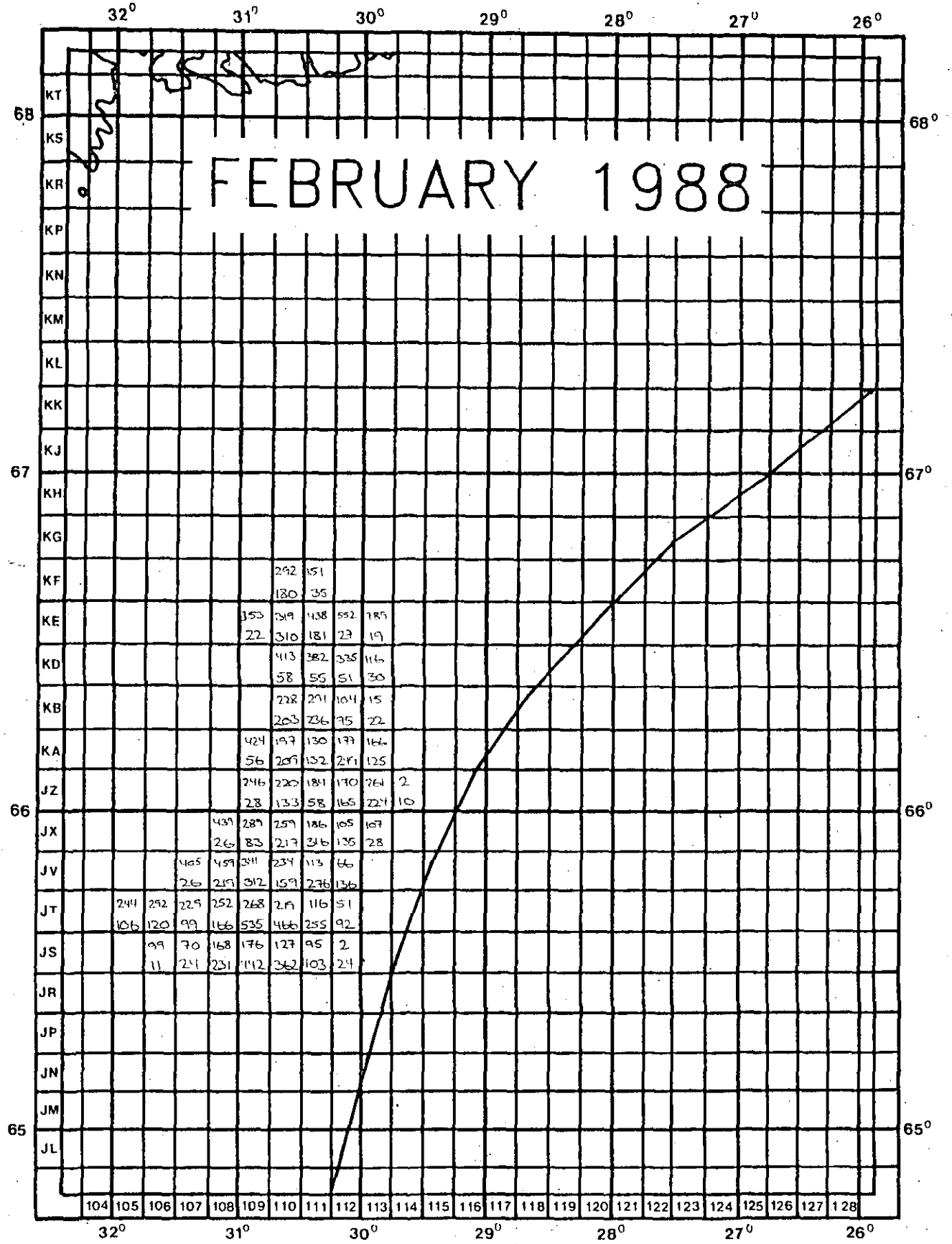


Figure 3 continued. February 1988.

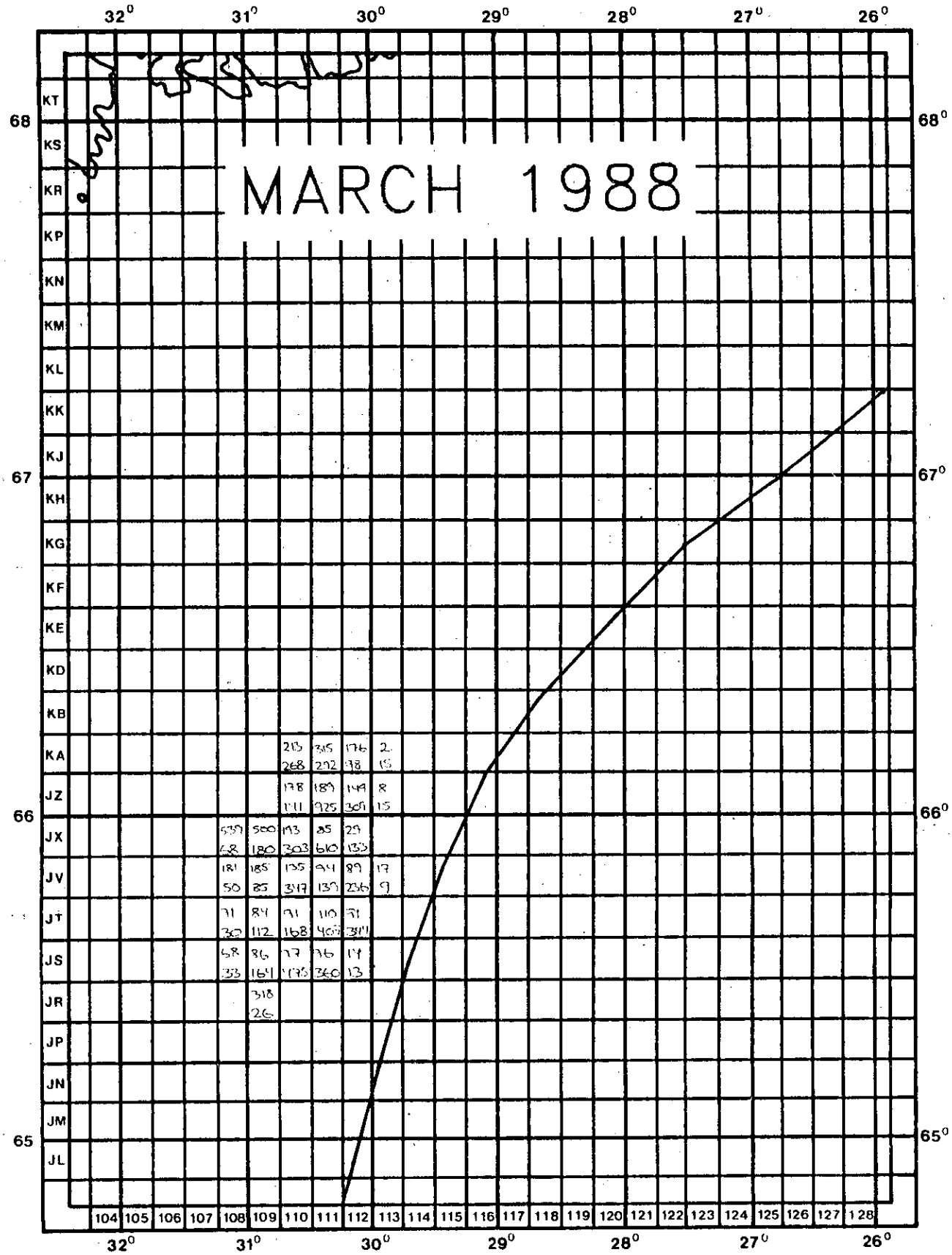
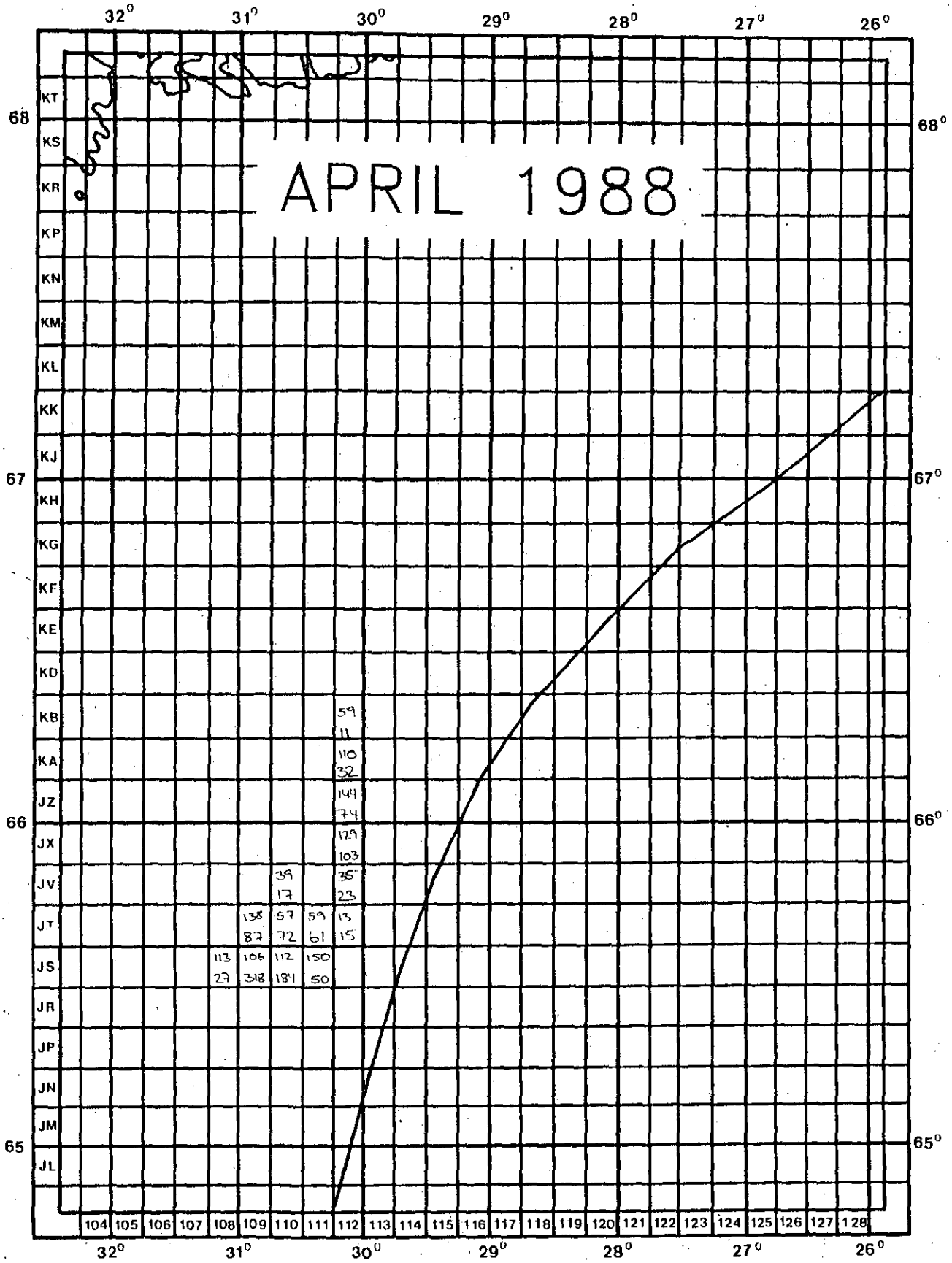


Figure 3 continued. March 1988.



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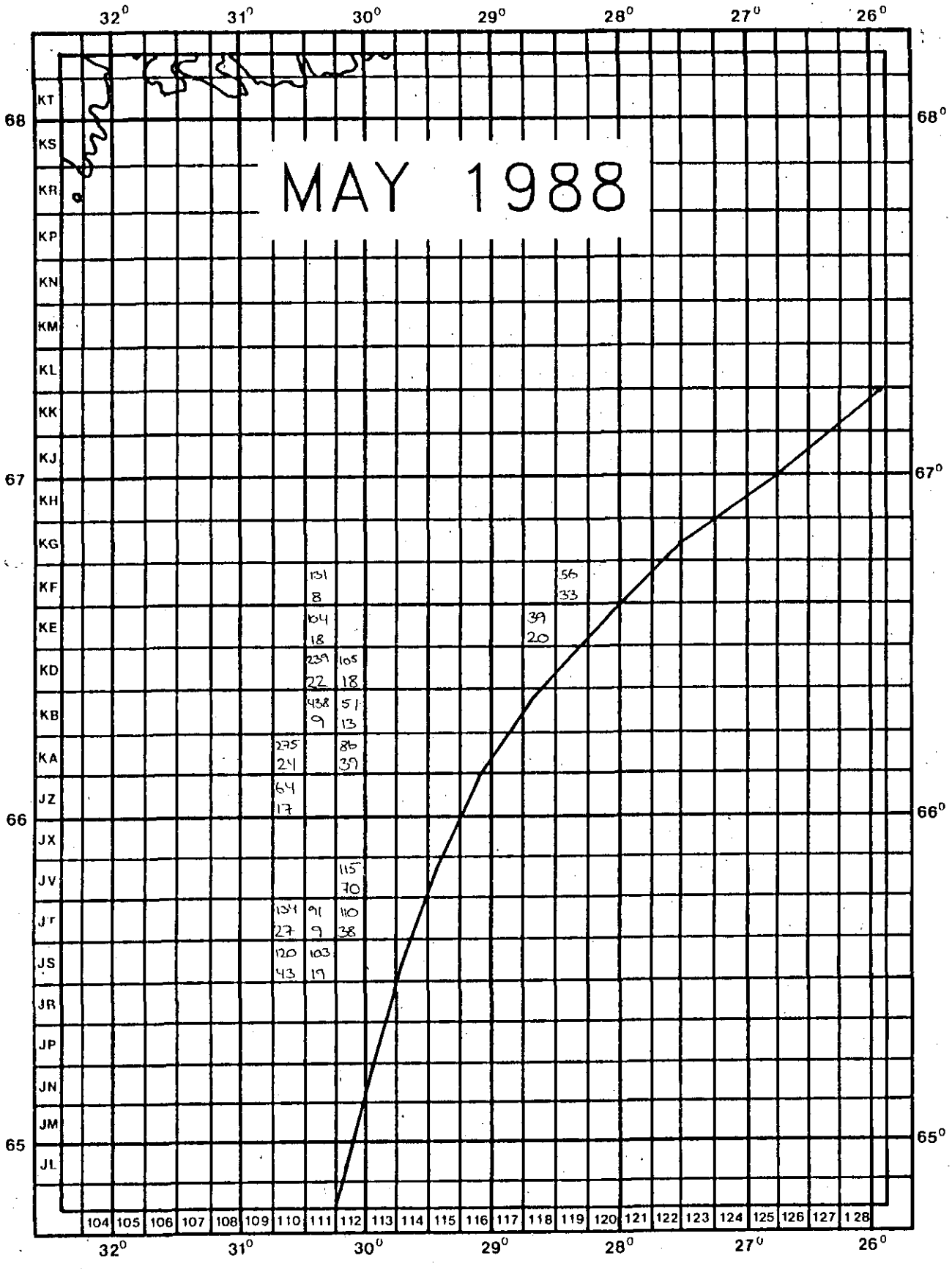

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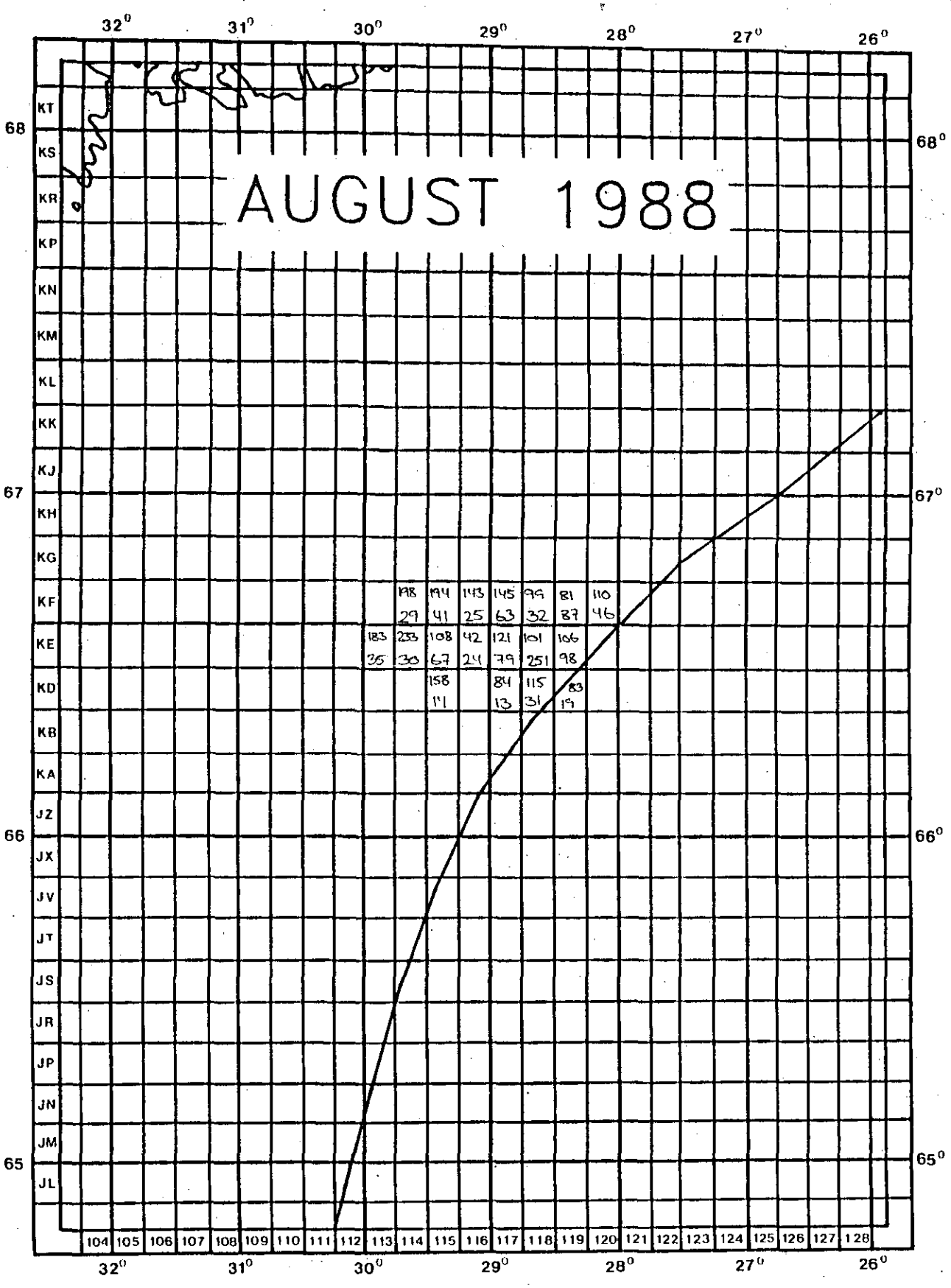


Figure 3 continued. August 1988.

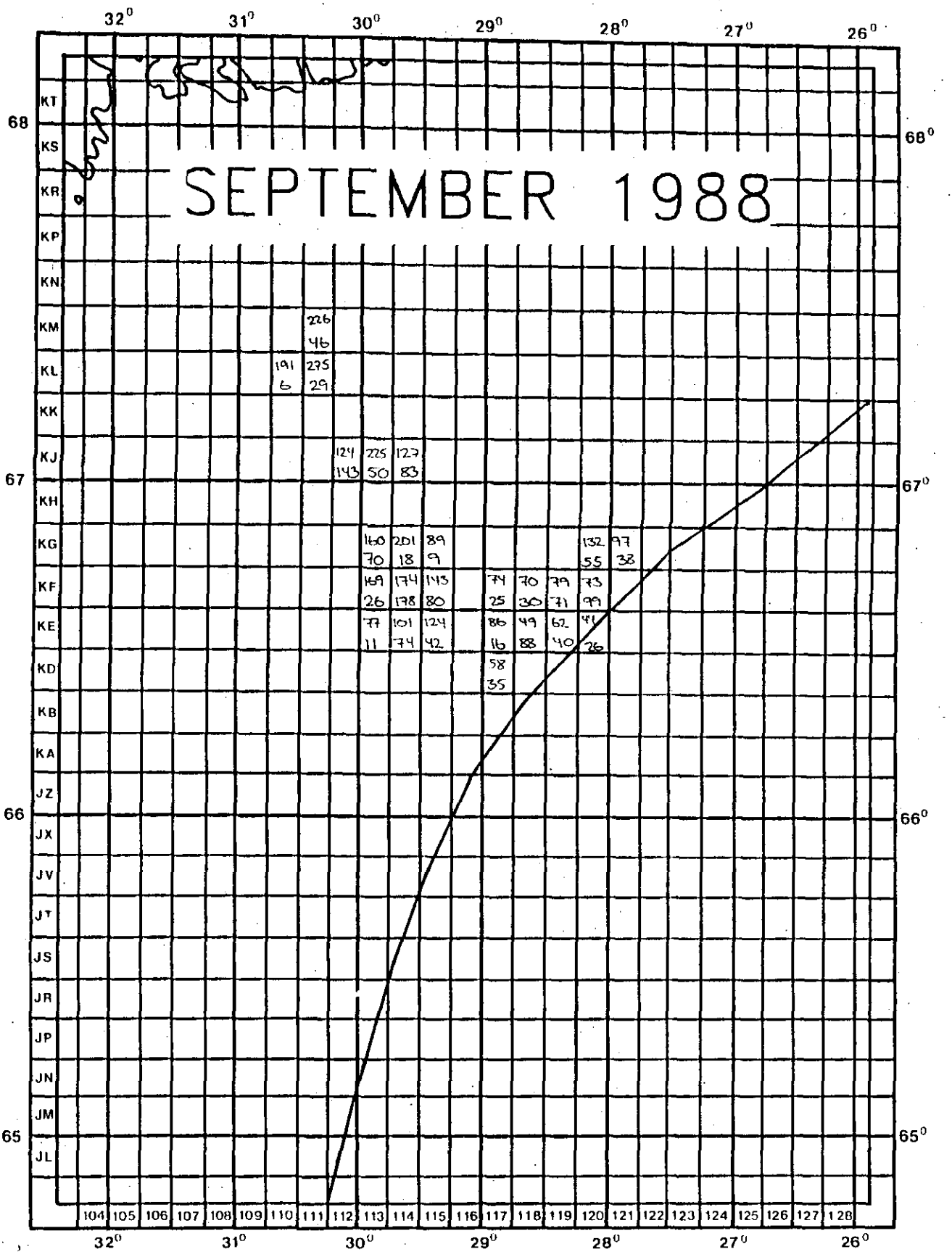


Figure 3 continued. September 1988.

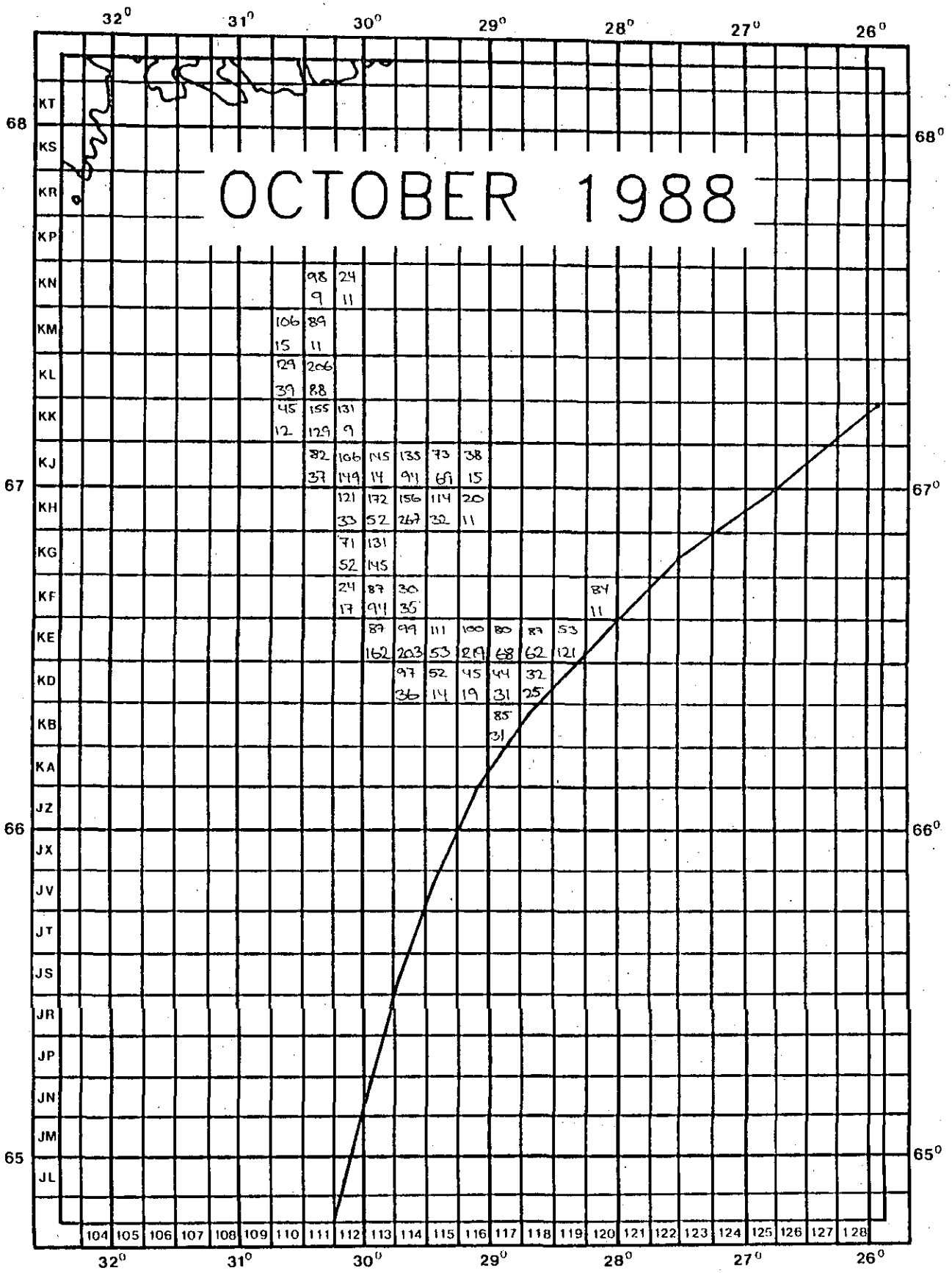


Figure 3 continued. October 1988.

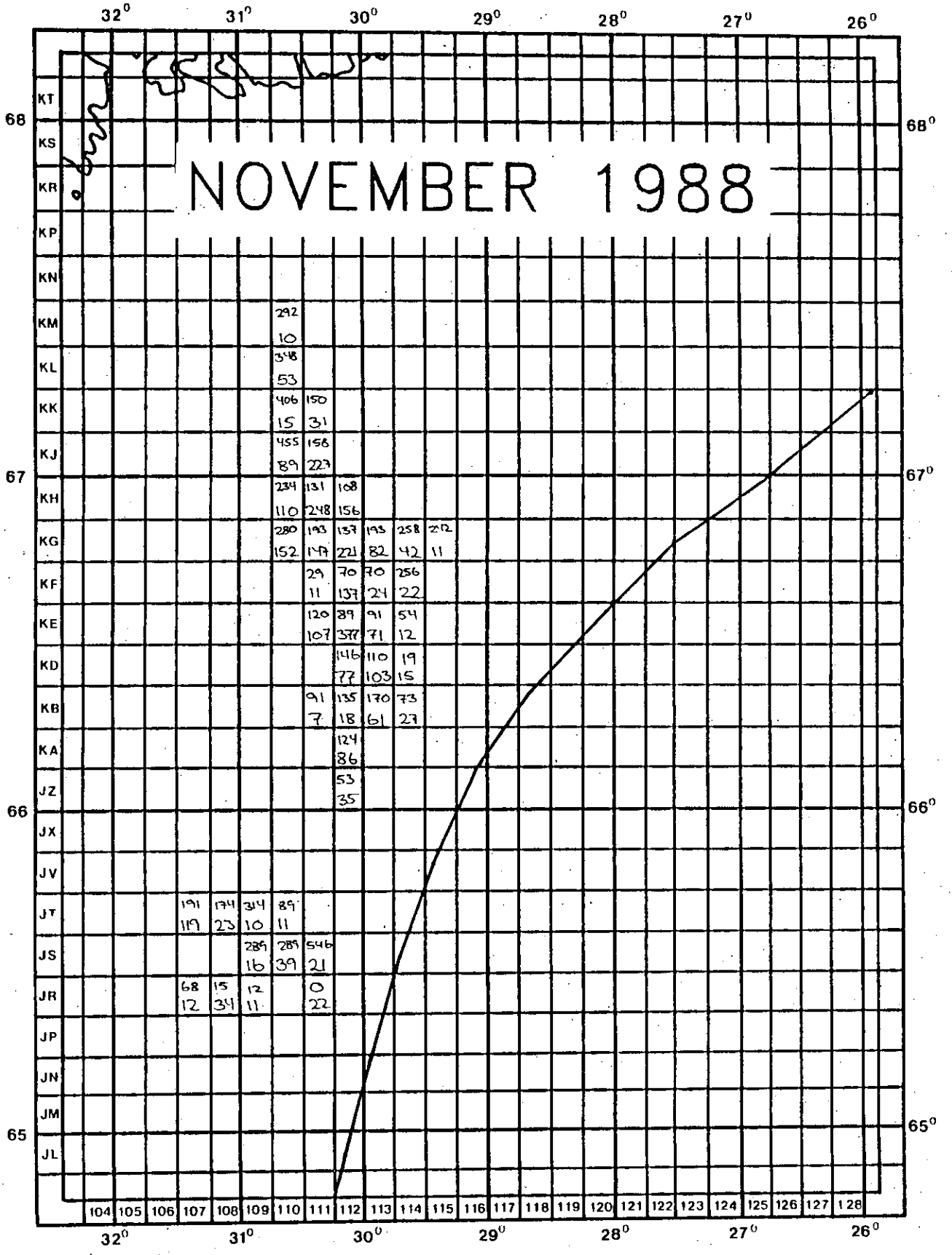


Figure 3 continued. November 1988.

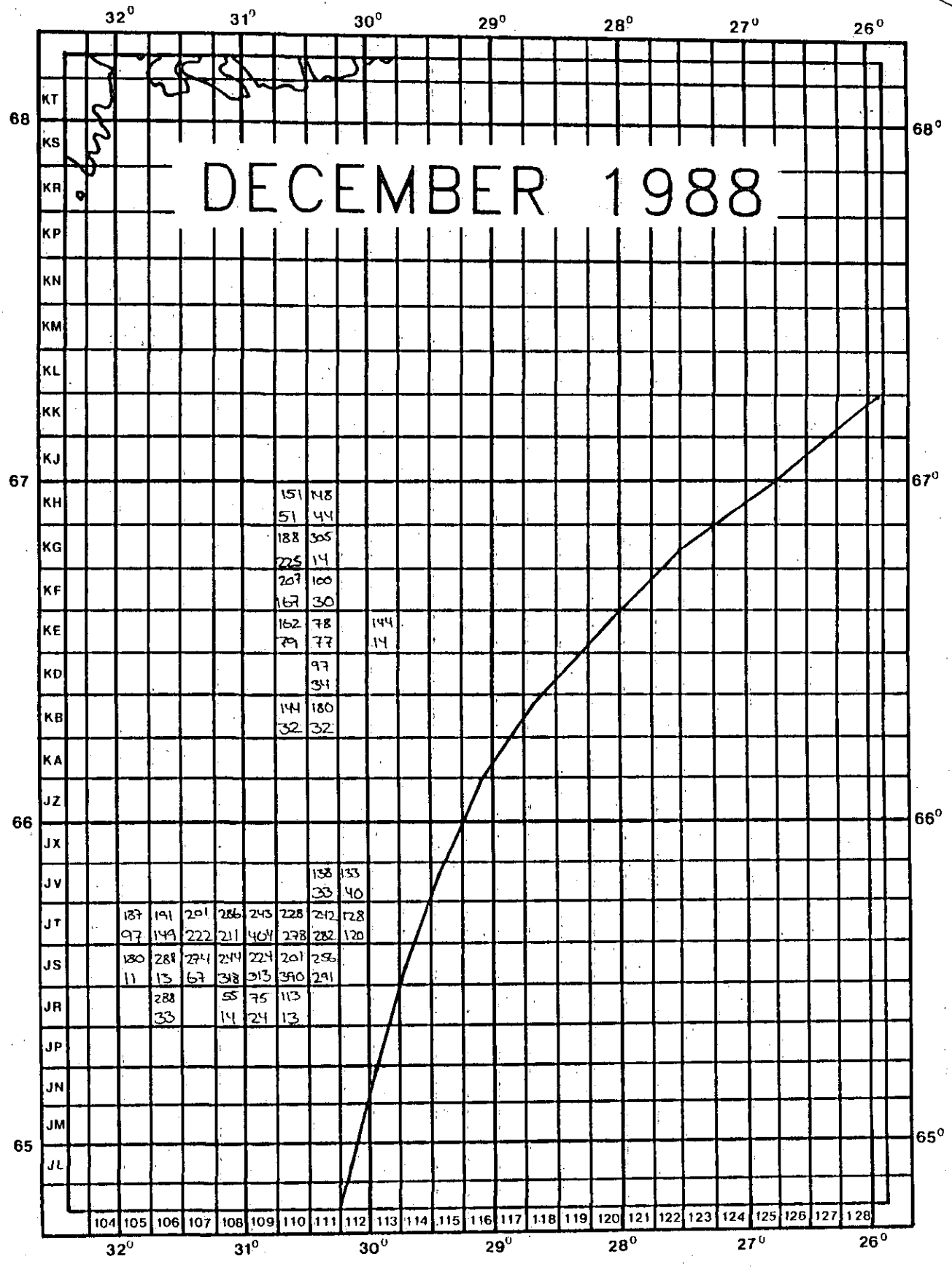


Figure 3 continued. December 1988.

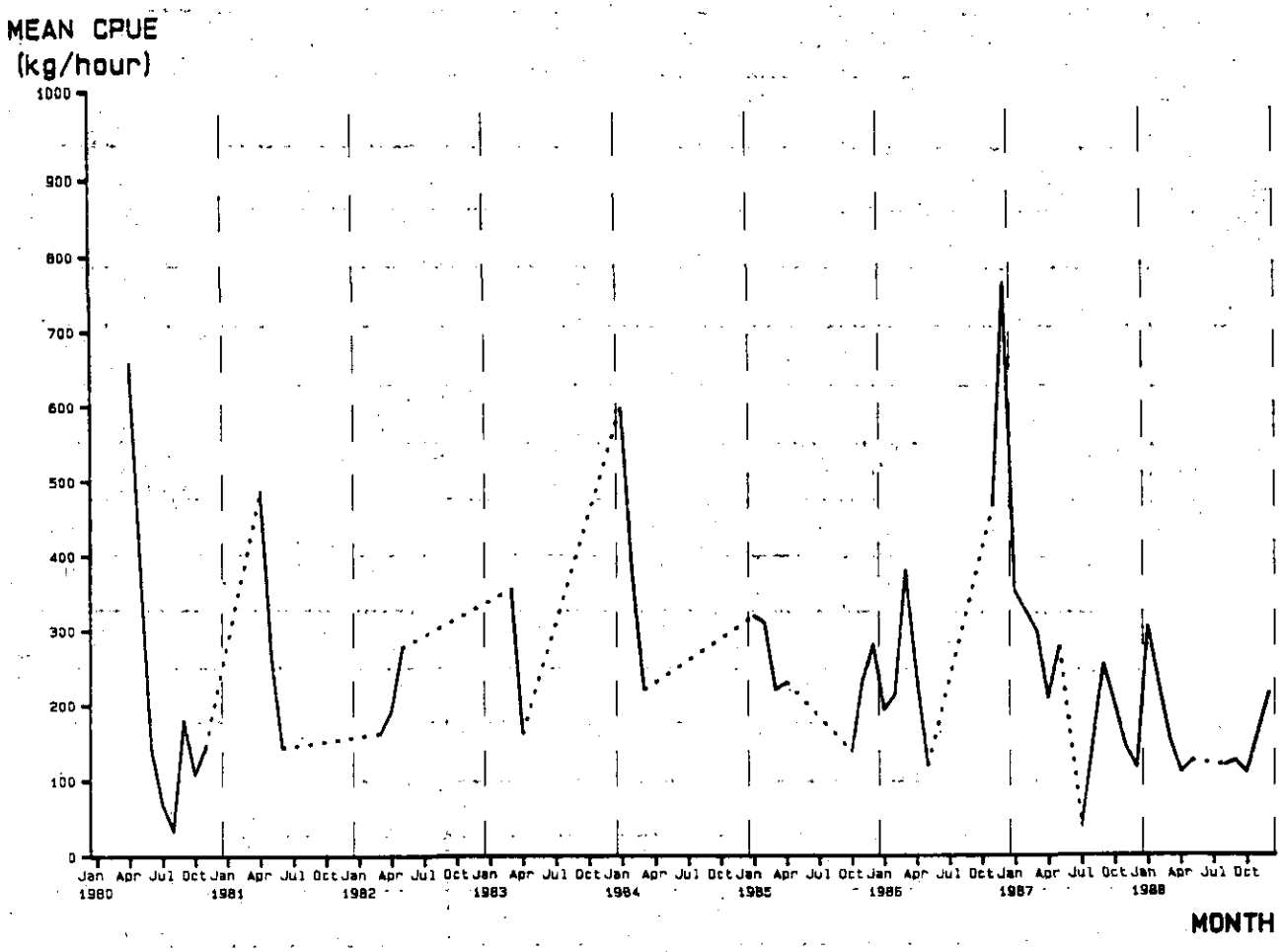


Figure 4. Monthly mean catch rate of shrimp (kg/hour) in the main fishing area at East Greenland from April 1980 to December 1988 based on available logbook information (Table 3 shows the corresponding no. of hours trawled).

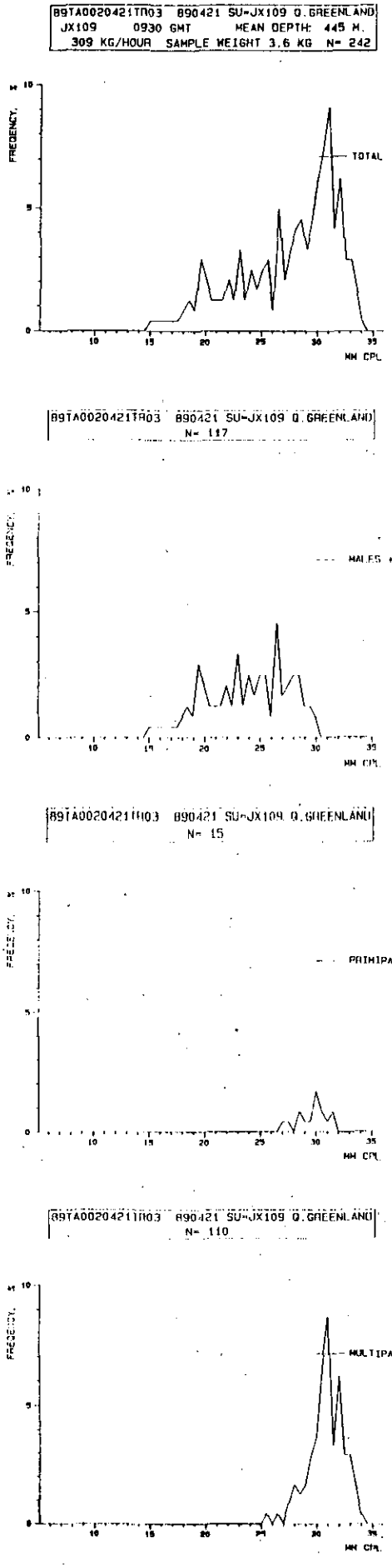
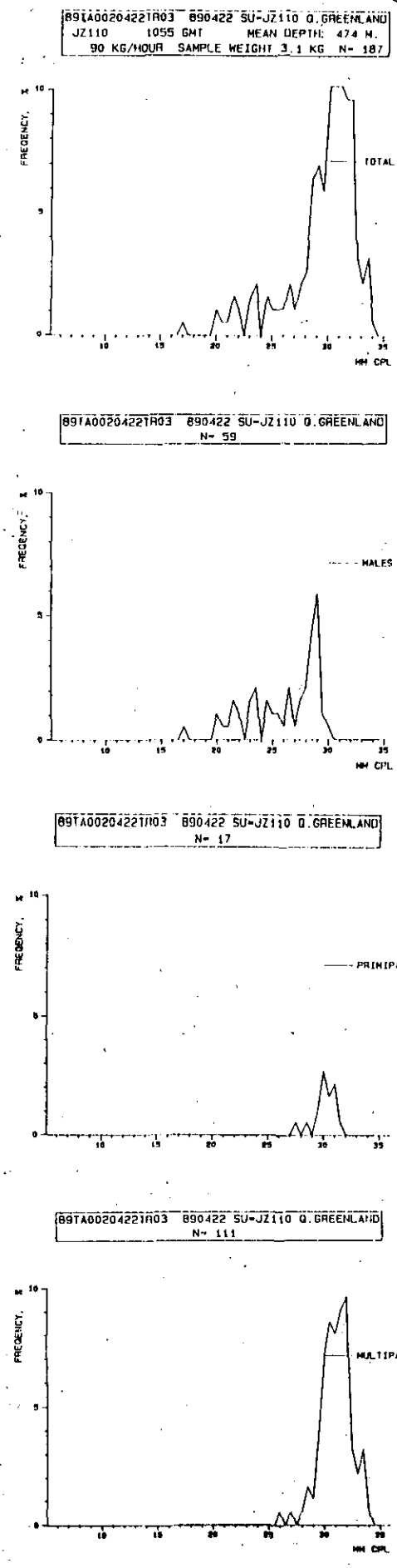


Figure 5. Length-frequency distribution of samples of P. borealis from Denmark Strait in April 1989.



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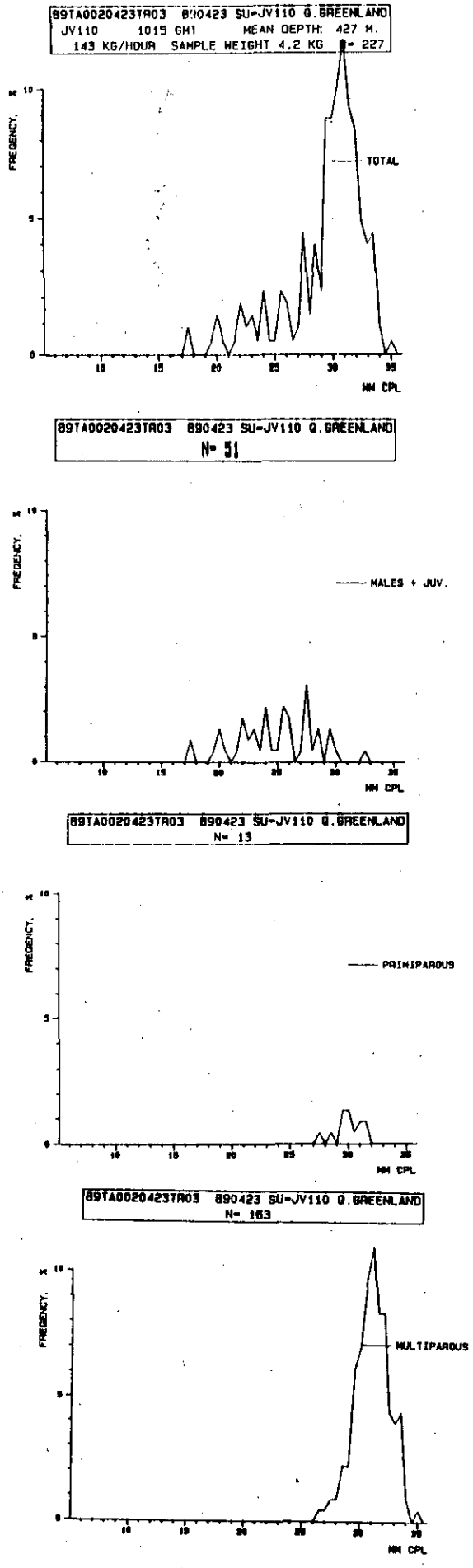

Figure 7. Length-frequency distribution of samples of P. borealis from