

Northwest Atlantic



Fisheries Organization

Serial No. N778

NAFO SCR Doc. 84/I/9

SPECIAL SCIENTIFIC COUNCIL MEETING, JANUARY 1984

Data on the Shrimp Fishery in NAFO Subarea 1 in 1982 and 1983

by

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Introduction

Since 1979 the scientific advice for the total offshore catch of shrimp in NAFO Subareas 0 and 1 has been 29,500 tons per year. While the nominal catch was below this figure in 1979, it has been higher than 37,000 tons in each of the following years. Effective offshore TACs in 1982 and 1983 have been 5,000 tons set by Canada for Subarea 0 and 34,800 and 34,625 tons respectively, set by the EEC for Subarea 1. Totals of 27,250 and 27,850 tons have been allocated to Greenland in offshore Subarea 1 in those two years.

Eight (from 1983 nine) trawlers of the Royal Greenland Trade Department are fishing a considerable part of the Greenland quota, in 1982 and 1983 between 25 and 30%. Haul-by-haul logbook information and reports on landings covering all fishing activity of these trawlers since 1975 is available in ADP-files at the Greenland Fisheries Investigations. Information on the distribution of the offshore shrimp fishery, on catch rates and by-catches in 1982 and 1983 drawn from these logbooks is presented in this paper, together with reported catches by all nations fishing shrimp in Subarea 1 in these two years. Also some biological information, based on the analysis of research shrimp samples from July and August 1983, is included.

The Offshore Shrimp Fishery in Subarea 1 in 1982 and 1983

As in earlier years, the management of the offshore shrimp fishery in Subarea 1 was based on obligatory reporting once a week by all vessels above 80 GRT of their catches. Table 1 shows the reported catches of shrimp by month and nation in 1982 and 1983 and Table 2 shows the numbers of reporting vessels. Total catch figures in the offshore area from smaller non-reporting Greenland vessels are assumed to be about 3,500 tons in 1983, the Greenland offshore shrimp catch in Subarea 1 thus totalling about 32,500 tons.

Geographical Distribution of the Offshore Shrimp Fishery

Figures 1 and 2 show the distribution of hauls by seven trawlers of the Royal Greenland Trade Department in 1982 and eight trawlers in 1983 (through October). In both years, virtually no fishing took place north of 69°N, where a considerable amount of effort was spent in 1980 and 1981 (Carlsson, 1981). The fishery was concentrated along the northern and western slopes of the Store Hellefiske Banke, in the Holsteinsborg Deep and especially in the area off the main entrance to the Disko Bay. The latter area may not be fished by foreign vessels, as only Greenland trawlers are allowed to fish north of 68°N.

Figures 3 shows the monthly distribution of number of hauls and mean catch of shrimp per hour from January 1982 through October 1983. In both years severe ice conditions in February to April hampered the shrimp fishery in the main fishing area, in 1983 there was not full access to this area until June. Otherwise, the distribution of the fishery was very similar between 1982 and 1983.

Trends in Catch Rates

Figure 4 shows the variation by month in mean catch rates from October 1975 to October 1983 in NAFO Division 1B based on logbook information and landings of six trawlers (722 GRT), in 1983 seven trawlers (630-722 GRT) of the Royal Greenland Trade Department (Table 3 shows the numbers of hours trawled, on which the mean catch rates are based). In 1983 spring peak catch rates were found in April, being somewhat lower than peak catch rates in May 1982, but similar to 1981 values. As ice conditions in spring 1982 and 1983 hindered the access to fishing grounds where concentrations of berried female shrimp are normally found, peak catch rates may not be directly comparable to those of previous years. In 1983 there was a steady decline in catch rates through the year until September.

Table 4 shows the mean catch rates by division and month in a south to north 7.5' latitude grid in 1982 and 1983 (through October), and Table 5 shows the corresponding numbers of hours trawled. The northward shift in the fishery throughout the year, found in previous years (Carlsson, 1981), was not as evident in 1982 and 1983.

Mean catch rates for the period July to September have been used to calculate CPUE indices to allow a comparison of catch rates from year to year. CPUE for six (722 GRT) and (for 1983) seven (630-722 GRT) trawlers of the Royal Greenland Trade Department from 1976 to 1983 are given below and also shown in Fig. 5:

	1976	1977	1978	1979	1980	1981	1982	1983
Hours trawled	1,005	2,966	3,446	3,588	1,872	5,285	3,543	3,967
kg/hour	743	549	501	379	468	438	550	490
Index	1.00	0.74	0.67	0.51	0.63	0.59	0.74	0.66

CPUE indices for 1981-83 may not be directly comparable to those of previous years due to introduction of more efficient gears from 1980 (Carlsson, 1983). Also the highly reduced monthly catches in spring 1982 and 1983 due to ice conditions may have caused relatively higher abundance of shrimp in the July-September period of those years. Catch rates in that period may therefore have been higher than they would have been, if spring catches had been at the same level as in previous years.

Figure 7 shows the variation in mean catch rates in the July-September period in 30' latitude strips (see Fig. 6) from 1976 to 1983 in the main fishing area in Subarea 1. Mean catch rates were lower in 1983 compared to 1982 in the area north of Store Hellefiske Banke (Block-strip No. 3), while there was a slight increase west of Store Hellefiske Banke (Block-strips No. 4 and 5). The same reservations as given above regarding the development in CPUE indices should, however, be valid for the variations in block-strip CPUE values.

By-catches in the Shrimp Fishery

Table 6 shows the reported by-catches from logbooks of seven (eight in 1983) trawlers of the Royal Greenland Trade Department from 1976 to 1983 by division and species. Table 7 shows a breakdown by month for 1982 and 1983. The 1983 by-catches were at the same level as in 1982, and very low compared to data for earlier years.

In 1982, a by-catch of cod was reported in May from Division 1B, being the first reported occurrence of cod as by-catch in this area since 1979. Cod was not reported as by-catch in 1983.

Discards in the Shrimp Fishery

Only one of the trawlers of the Royal Greenland Trade Department processes sea-cooked shrimp. An observer reported discards of shrimp from this trawler in May of up to 30% of the total shrimp catch. As the other RGTD trawlers land all of their shrimp catch for processing at land, there is virtually no discarding of shrimp.

Biological Samples

During the photographic survey in July and August 1983 in Subarea 1 (Kanneworff, 1984), shrimp samples were collected at all photographic stations, where trawling was performed. Not all shrimp samples have yet been analyzed, but preliminary information may be retrieved from some samples.

Six samples have been selected for this purpose (Tables 8-13, Fig. 8-13). Although carapace length was measured with 0.1 mm accuracy, measurements have here been combined in 1 mm groups.

Male shrimp are present in all samples, with a modal length group around 19-21 mm carapace length. Only in the sample from the northermost station (Table 13, Fig. 13) is a modal length group at 12 mm carapace length evident. This group is almost absent in samples from the commercially most exploited

areas (KX-007, KP-440, see Table 9-10, Fig. 9-10). Almost all transitionals and females were ovigerous at the sampling time (July-August) except for the two northermost stations (LZ-011, LS-014: Tables 12-13, Fig. 12-13). A varying number of female shrimp have spawned. The northermost station is unusual, as some female shrimp still carries eggs from the spawning in the previous year and also in the relative high number of female shrimp not showing development of new head roe, indicating that a high proportion of female shrimp will not spawn this year.

References

- CARLSSON, D. M. 1981. Data on the shrimp fishery in NAFO Subareas 0+1 in 1980 and 1981. NAFO SCR Doc., No. 81/XI/151, Ser. No. N458.
- CARLSSON, D. M. 1983. Data on the shrimp fishery in NAFO Subareas 0 and 1 in 1981 and 1982. NAFO SCR Doc., No. 83/I/8, Ser. No. N646.
- KANNEWORFF, P. 1984. Biomass of shrimp (*Pandalus borealis*) in NAFO Subarea 1 in 1978-1983 estimated by means of bottom photography. NAFO SCR Doc., No. 84/I/6, Ser. No. N775.

Table 1. Offshore catches of shrimp (tons) in NAFO Subarea 1 by trawlers above 80 GRT by month and nation as reported to Greenland authorities in 1982 (a) and 1983 (b).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
a. 1982													
Greenland	2134	557	53	606	3297	3530	3542	2411	3355	3384	3652	1301	27822
Denmark	-	-	-	-	-	357	223	-	-	8	105	163	856
Faroe Islands	-	-	-	-	31	370	128	-	-	-	-	-	529
Norway	-	-	-	-	52	191	576	-	-	-	-	-	819
France	-	-	-	-	-	276	351	66	-	-	-	-	693
Total	2134	557	53	606	3380	4448	4745	2755	3421	3392	3757	1464	30719
b. 1983													
Greenland	20	173	137	665	3165	3388	4065	4497	2998	3123	3257	3498	28986
Denmark	-	-	-	-	-	42	67	-	-	-	33	259	401
Faroe Islands	-	-	-	-	42	84	29	-	-	166	154	-	475
Norway	-	-	-	-	-	35	402	80	-	-	-	-	517
France	-	-	-	-	-	-	100	318	-	-	-	-	418
Total	20	173	137	665	3207	3549	4663	4895	2998	3289	3444	3757	30797

Table 2. No. of vessels above 80 GRT in the shrimp fishery in NAFO Subarea 1 by month and nation as reported to Greenland authorities in 1982 (a) and 1983 (b).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
a. 1982													
Greenland	17	13	3	9	21	28	25	24	22	26	29	21	34
Denmark	-	-	-	-	-	2	3	2	-	1	2	-	3
Faroe Islands	-	-	-	-	1	6	4	-	-	-	-	-	6
Norway	-	-	-	-	3	8	6	4	-	-	-	-	11
France	-	-	-	-	-	-	2	2	1	-	-	-	2
Total	17	13	3	9	25	44	40	29	23	27	31	21	56
b. 1983													
Greenland	2	4	2	10	24	26	27	27	26	28	31	30	35
Denmark	-	-	-	-	-	1	2	-	-	-	2	-	2
Faroe Islands	-	-	-	-	2	2	1	1	-	-	3	-	5
Norway	-	-	-	-	-	1	4	3	-	-	-	-	4
France	-	-	-	-	-	-	2	2	-	-	-	-	2
Total	2	4	2	10	26	30	36	32	26	31	36	32	48

Table 3. No. of hours trawled per month and year from October 1975 through October 1983 in NAFO Divisions 1A and 1B in the shrimp fishery of seven trawlers (630-722 GRT) of the Royal Greenland Trade Department.

Div.	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1A	1975	-	-	-	-	-	-	-	-	-	-	-	-	-
	1976	-	-	-	-	-	-	-	-	-	-	-	-	2
	1977	-	-	-	-	-	-	-	-	-	-	-	-	62
	1978	-	-	-	-	-	-	-	10	-	-	-	-	110
	1979	77	-	-	91	65	143	-	-	-	-	-	-	376
	1980	39	118	93	46	70	979	171	199	255	319	-	-	2289
	1981	187	-	13	71	369	178	66	209	82	72	-	19	1266
	1982	6	-	-	-	6	-	35	14	-	20	25	-	106
	1983	-	-	-	-	5	-	13	20	5	24	-	-	67
1B	1975	-	-	-	-	-	-	-	-	-	50	331	183	564
	1976	12	-	-	-	7	252	326	309	370	329	-	-	1605
	1977	104	84	245	391	643	839	874	1053	1039	1297	1293	957	8819
	1978	233	-	-	13	948	1209	1226	1326	894	1282	1199	626	8956
	1979	27	18	823	752	991	972	1191	1521	876	911	922	891	9895
	1980	771	627	685	670	1330	131	469	822	581	254	-	-	6340
	1981	857	172	366	729	1059	1167	1915	1816	1834	1436	1254	692	13017
	1982	169	-	-	220	711	1001	1301	1302	940	1258	684	13	7599
	1983	-	-	-	15	1032	1184	1244	1307	1416	1313	-	-	7511

Table 4. Mean catch of shrimp (kg/hour) per month in NAFD Subarea 8-1 in the shrimp fishery of eight trawlers (43°-72° GR) of the Royal Brunei and Brunei Department in 1982 and 1983 in a south to north grid 7.5 minutes latitude scale. See Fig. 1.

Table 6. Reported by-catches in shrimp fishery in NAFO Subarea 0 and 1 by trawlers (473-722 GRT) of the Royal Greenland Trade Department from 1976 to 1983 and a comparison with the corresponding total shrimp catches (tons).

Species		1977	1978	1979	1980	1981	1982	1983
Div	OA	Redfishes	4.2	9.2	132.7	106.9	0.1	0.3
	Others	-	-	-	-	-	-	-
-	1A	Redfishes	0.1	4.1	5.8	18.3	0.6	-
-	Others	-	-	-	-	-	-	-
-	1B	Redfishes	102.3	1035.5	903.8	360.1	63.4	36.0
-	Others	1.2	19.9	8.4	1.6	-	21.0	-
-	1C	Redfishes	2.8	15.6	39.3	40.4	6.9	5.6
-	Others	4.2	-	1.4	20.5	-	-	-
SA	0+1	Redfishes	109.4	1064.4	1081.6	525.7	71.0	33.5
-	Others	5.4	19.9	9.8	22.1	-	21.0	-
-	Total bycatch	114.8	1084.3	1091.4	547.8	71.0	54.5	41.4
-	Shrimp catch	5503	4703	6465	8484	9239	6946	5120
-	Bycatch in 2 of total	2.1	23.1	16.9	6.5	0.8	0.8	0.8
-	Shrimp catch							

Table 7. Reported by-catches in shrimp fishery in NAFO Subareas 0 and 1 by eight trawlers (473-722 GRT) of the Royal Greenland Trade Department by month and species in 1982 and 1983 and a comparison with the corresponding shrimp catches (tons).

		8201	8202	8203	8204	8205	8206	8207	8208	8209	8210	8211	8212	8301	8302	8303	8304	8305	8306	8307	8308	8309	8310		
0A Redfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1A Redfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1B Redfish	0.7	-	0.5	0.6	5.5	2.1	3.6	-	9.7	3.9	0.8	-	-	-	-	-	-	-	7.3	5.5	5.3	5.5	6.4	6.0	
Cod	-	-	0.4	21.0	-	-	-	-	-	-	0.8	2.9	-	-	-	-	-	-	0.6	1.9	0.1	0.1	1.0	1.2	
1C Redfish	0.4	0.3	-	0.4	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Bycatch	1.1	0.3	-	0.9	22.6	5.5	2.1	3.6	-	10.0	4.7	3.7	-	-	-	-	-	-	0.6	9.2	5.6	5.4	6.0	7.4	7.2
Shrimp catch	41.0	72	-	366	1162	993	895	911	534	880	584	149	5	-	-	128	978	954	943	787	685	640	-	-	
Bycatch in % of shrimp catch	0.3	0.4	-	0.2	1.9	0.6	0.2	0.4	0	1.1	0.8	2.5	0	-	-	0.5	0.9	0.6	0.6	0.8	1.1	1.1	-	-	

Table 8. Research shrimp sample from statistical unit LD-012, 31 July 1983, south of Disko Banke, depth 248-264 m., 1543-1643 GMT. Total shrimp catch 576 kg, weight of sample 5.3 kg.

mm	M+juv.	M+F (UR)	M+F (HR)	F (UR)	F (HR)	F (BR)	F (UR, EH)	F (HR, EH)	LH+ UR	Total
11	1	-	-	-	-	-	-	-	-	1
12	4	-	-	-	-	-	-	-	-	4
13	11	-	-	-	-	-	-	-	-	11
14	25	-	-	-	-	-	-	-	-	25
15	37	-	-	-	-	-	-	-	-	37
16	53	-	-	-	-	-	-	-	-	53
17	98	-	-	-	-	-	-	-	-	98
18	155	-	-	-	-	-	-	-	-	155
19	143	-	-	-	-	-	-	1	2	146
20	123	-	-	-	-	1	-	-	-	124
21	85	-	2	-	-	1	-	1	-	89
22	44	-	9	1	-	2	-	2	-	58
23	12	1	12	-	-	5	-	3	-	33
24	3	-	21	1	4	6	1	-	-	36
25	2	-	10	1	7	1	1	1	-	23
26	-	-	1	2	4	1	-	1	-	9
27	-	-	1	2	2	1	-	-	-	6
28	-	-	-	1	3	1	2	-	-	7
29	-	-	-	1	-	1	-	-	-	2
30	-	-	-	-	1	-	-	-	-	1
31	-	-	-	-	1	-	-	-	-	1
Total	796	1	56	9	22	20	4	9	2	919

M+juv. - Males and juveniles
M+F(UR) - Transitionals, no roe
M+F(HR) - Transitionals, ovigerous
F(UR) - Females, no roe
F(HR) - Females, ovigerous
F(BR) - Females, berried
F(UR,EH) - Females, no roe, egg setae present
F(HR,EH) - Females, ovigerous, egg setae present
(LH+UR) - Loose heads, no roe
F(BR,ER) - Females, berried, eyed eggs

Table 9. Research shrimp sample from statistical unit KX-007, 22 August 1983. NW of Store Hellefiske Banke, Depth 443-452 m., 1115-1215 GMT. Total shrimp catch 65 kg, weight of sample 5.1 kg. Explanation of codes: see Table 8.

mm	M+juv.	M+F (HR)	F (UR)	F (HR)	F (BR)	F (UR, EH)	F (HR, EH)	LH+ UR	Total
16	1	-	-	-	-	-	-	-	1
17	-	-	-	-	-	-	-	-	-
18	4	-	-	-	-	-	-	-	4
19	11	-	-	-	-	-	-	-	11
20	21	-	-	-	-	-	-	1	22
21	38	-	-	-	-	-	-	-	38
22	33	-	-	-	-	-	-	-	33
23	43	-	-	-	-	-	-	-	43
24	20	1	1	1	2	-	1	-	26
25	6	30	4	11	4	1	-	-	56
26	1	31	1	13	12	3	-	-	61
27	-	11	1	24	22	1	-	-	59
28	-	3	2	35	25	7	-	-	72
29	-	-	1	33	12	3	-	-	49
30	-	1	-	7	1	1	1	-	11
31	-	-	-	3	-	-	-	-	3
Total	178	77	10	127	78	16	2	1	489

Table 10. Research shrimp sample from statistical unit KP-440, 30 July 1983. West of Store Hellefiske Banke, depth 286 m, 1250-1351 GMT. Total shrimp catch 49 kg, weight of sample 2.9 kg. Explanation of codes: see Table 8.

mm	M+juv.	M+F (UR)	M+F (HR)	F (UR)	F (HR)	F (BR)	Total
15	3	-	-	-	-	-	3
16	1	-	-	-	-	-	1
17	1	-	-	-	-	-	1
18	8	-	-	-	-	-	8
19	16	-	-	-	-	-	16
20	36	-	-	-	-	-	36
21	53	-	-	-	-	-	53
22	57	-	2	-	-	-	59
23	35	-	5	-	-	-	40
24	10	1	16	1	3	-	31
25	1	-	31	-	8	-	40
26	-	-	33	-	18	-	51
27	-	-	12	-	26	-	38
28	-	-	7	-	16	1	24
29	-	-	-	-	5	-	5
30	-	-	-	-	3	-	3
Total	221	1	106	1	79	1	409

Table 11. Research shrimp sample from statistical unit KA-011, 7 August 1983. Holsteinsborg Deep, depth 229-220 m, 1250-1350 GMT. Total shrimp catch 163 kg, weight of sample 3.9 kg. Explanation of codes: see Table 8.

mm	M+juv.	M+F (HR)	F (UR)	F (HR)	LH+ UR	Total
10	1	-	-	-	-	1
11	-	-	-	-	-	-
12	3	-	-	-	-	3
13	4	-	-	-	1	5
14	9	-	-	-	-	9
15	5	-	-	-	-	5
16	29	-	-	-	-	29
17	52	-	-	-	1	53
18	67	-	-	-	-	67
19	115	-	-	-	1	116
20	167	1	-	-	-	168
21	121	1	-	-	-	122
22	32	1	-	-	-	33
23	17	14	-	1	-	32
24	1	20	-	2	-	23
25	-	14	1	3	-	18
26	-	6	-	4	-	10
27	-	-	-	1	-	1
28	-	-	-	4	-	4
29	-	-	-	3	-	3
Total	623	57	1	18	3	702

Table 12. Research shrimp sample from statistical unit LF-011, 17 August 1983. Godhavn Rende, depth 255-256 m, 1025-1125 GMT. Total shrimp catch 350 kg, weight of sample 6.1 kg. Explanation of codes: see Table 8.

mm	F+ juv.	M+F (UR)	M+F (HR)	M (UR)	M (HR)	M (BR)	M (UR,EH)	M (HR,EH)	M (BR,EH)	LH+ UR	Total
8	1	-	-	-	-	-	-	-	-	1	2
9	1	-	-	-	-	-	-	-	-	-	1
10	3	-	-	-	-	-	-	-	-	-	3
11	14	-	-	-	-	-	-	-	-	-	14
12	36	-	-	-	-	-	-	-	-	-	36
13	47	-	-	-	-	-	-	-	-	1	48
14	60	-	-	-	-	-	-	-	-	1	61
15	73	-	-	-	-	-	-	-	-	2	75
16	110	-	-	-	-	-	-	-	-	-	110
17	128	-	-	-	-	-	-	-	-	-	128
18	213	1	-	-	-	-	-	-	-	1	215
19	202	2	1	-	1	-	-	-	1	2	209
20	128	2	-	1	-	2	-	-	2	1	136
21	122	7	1	1	-	4	-	-	2	1	138
22	93	6	1	8	2	22	2	-	-	-	134
23	29	1	5	11	-	37	3	1	-	-	87
24	5	-	-	11	4	18	1	-	-	-	39
25	-	-	-	3	1	4	-	-	-	-	8
26	-	-	-	1	-	2	5	-	-	-	8
27	-	-	-	1	-	1	-	-	-	-	2
28	-	-	-	-	1	2	-	-	-	-	3
Total	1265	19	9	36	11	95	6	6	10	1457	

Table 13. Research shrimp sample from statistical unit LS-014, 2 August 1983, Southeast of Hareø, depth 254-264 m, 2200-2300 GMT. Total shrimp catch 75 kg, weight of sample 4.7 kg. Explanation of codes: see Table 8.

mm	F+ juv.	M+F (UR)	M+F (HR)	M (UR)	M (HR)	M (BR)	M (UR,EH)	M (HR,EH)	M (BR,EH)	LH+ UR	Total
10	2	-	-	-	-	-	-	-	-	-	2
11	13	-	-	-	-	-	-	-	-	-	13
12	27	-	-	-	-	-	-	-	-	-	27
13	10	-	-	-	-	-	-	-	-	-	10
14	8	-	-	-	-	-	-	-	-	-	8
15	23	-	-	-	-	-	-	-	-	2	25
16	48	-	-	-	-	-	-	-	-	-	48
17	80	-	-	-	-	-	-	-	-	-	80
18	94	-	-	-	-	-	1	-	-	-	95
19	71	-	-	-	-	-	2	-	-	2	75
20	31	1	1	-	-	-	-	-	-	-	33
21	27	2	7	1	1	-	2	-	-	-	40
22	7	3	17	6	8	-	1	-	-	-	42
23	-	1	26	13	11	1	8	3	-	-	63
24	-	-	21	10	19	1	21	-	1	-	73
25	-	-	6	8	18	-	8	1	1	-	42
26	-	-	-	8	21	-	8	1	2	-	40
27	-	-	-	6	11	1	1	1	-	-	20
28	-	-	-	-	4	-	5	-	-	-	9
29	-	-	-	-	2	1	2	-	-	-	5
Total	441	7	78	52	95	4	59	6	4	4	750

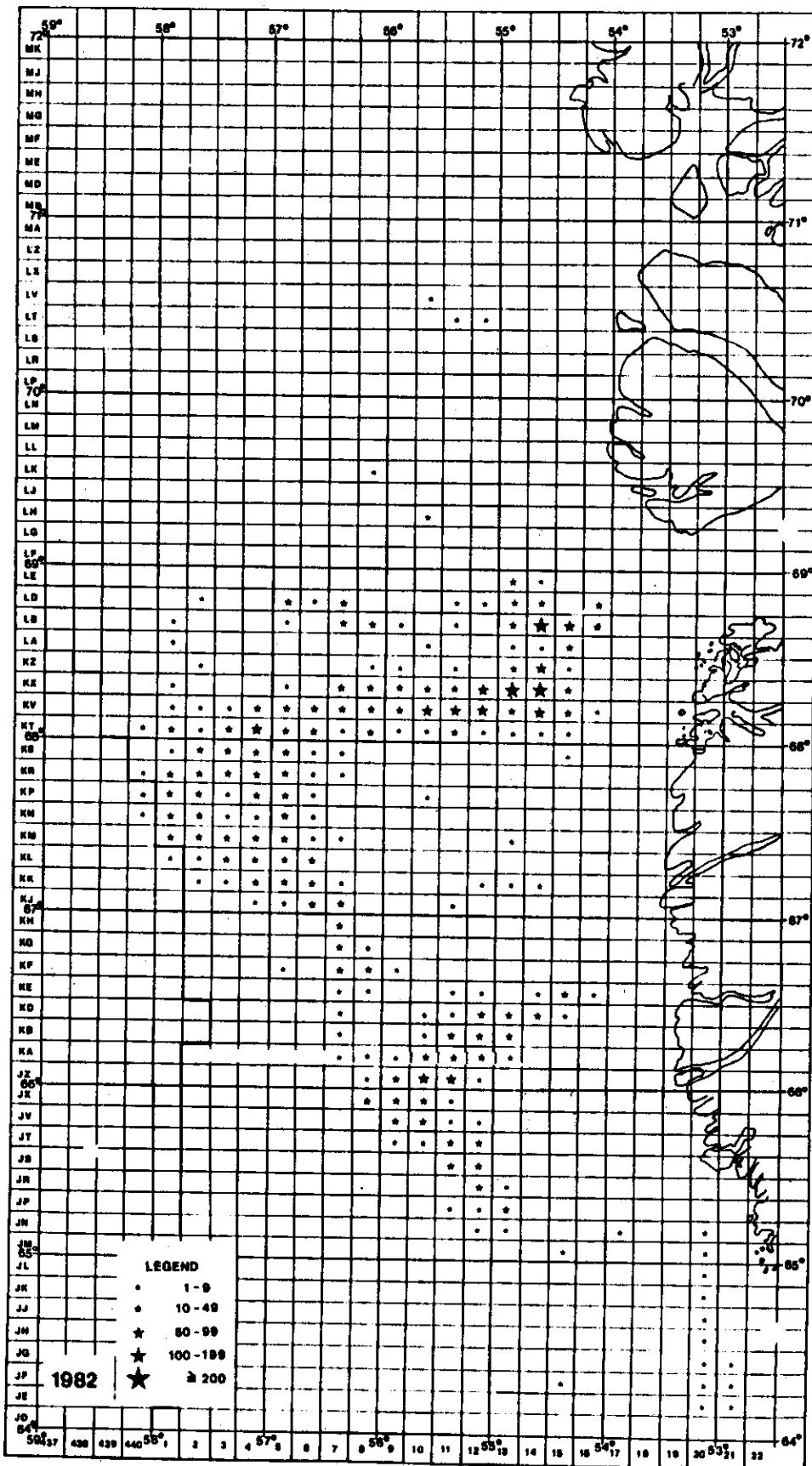


Figure 1. Distribution of hauls in the shrimp fishery of seven trawlers (473-722 GRT) of the Royal Greenland Trade Department in NAFO Subareas 0 and 1 between 64 N and 72 N in 1982.

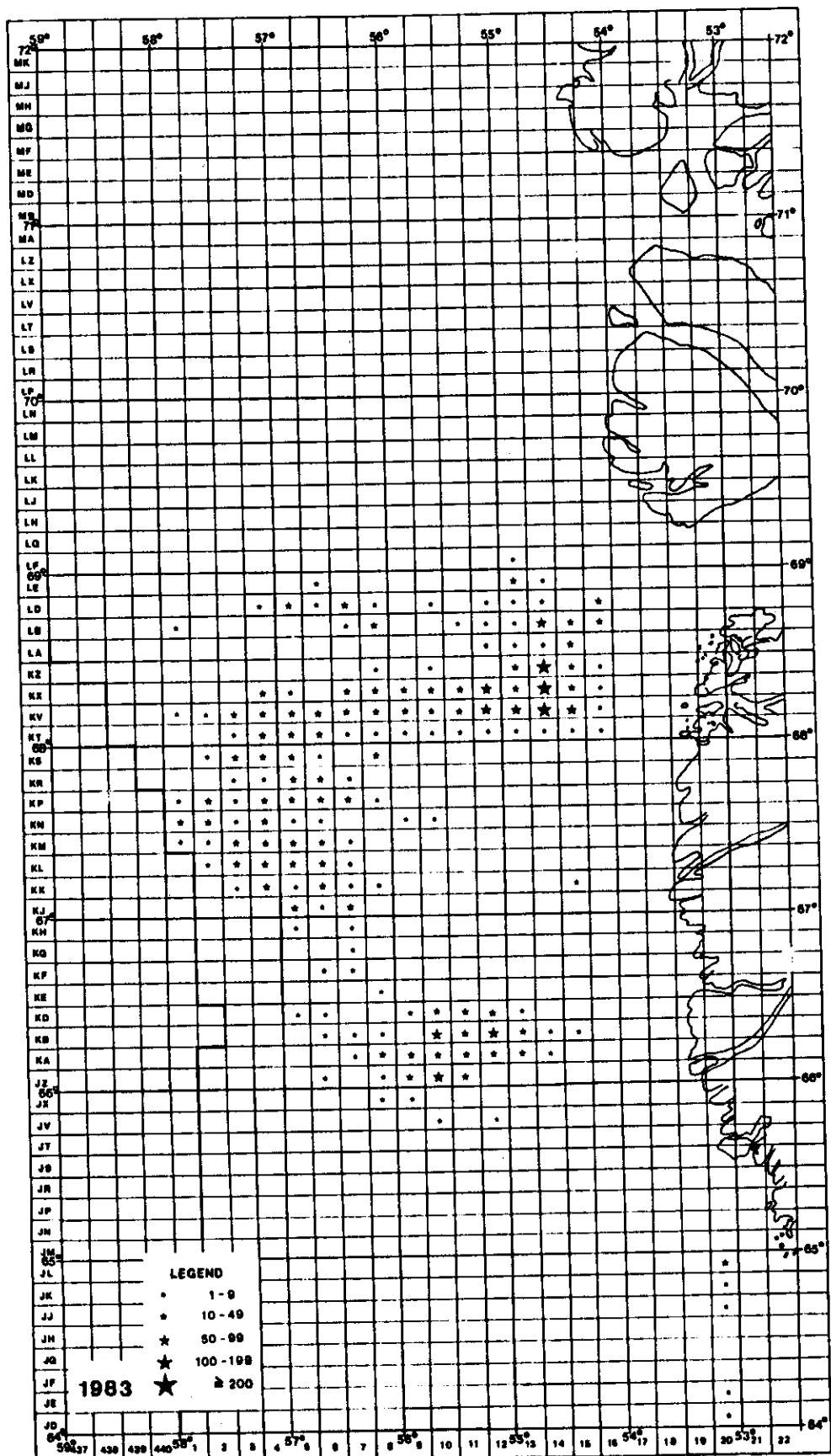


Figure 2. Distribution of hauls in the shrimp fishery of eight trawlers (473-722 GRT) of the Royal Greenland Trade Department in NAFO Subareas 0 and 1 between 64 N and 72 N in 1983.

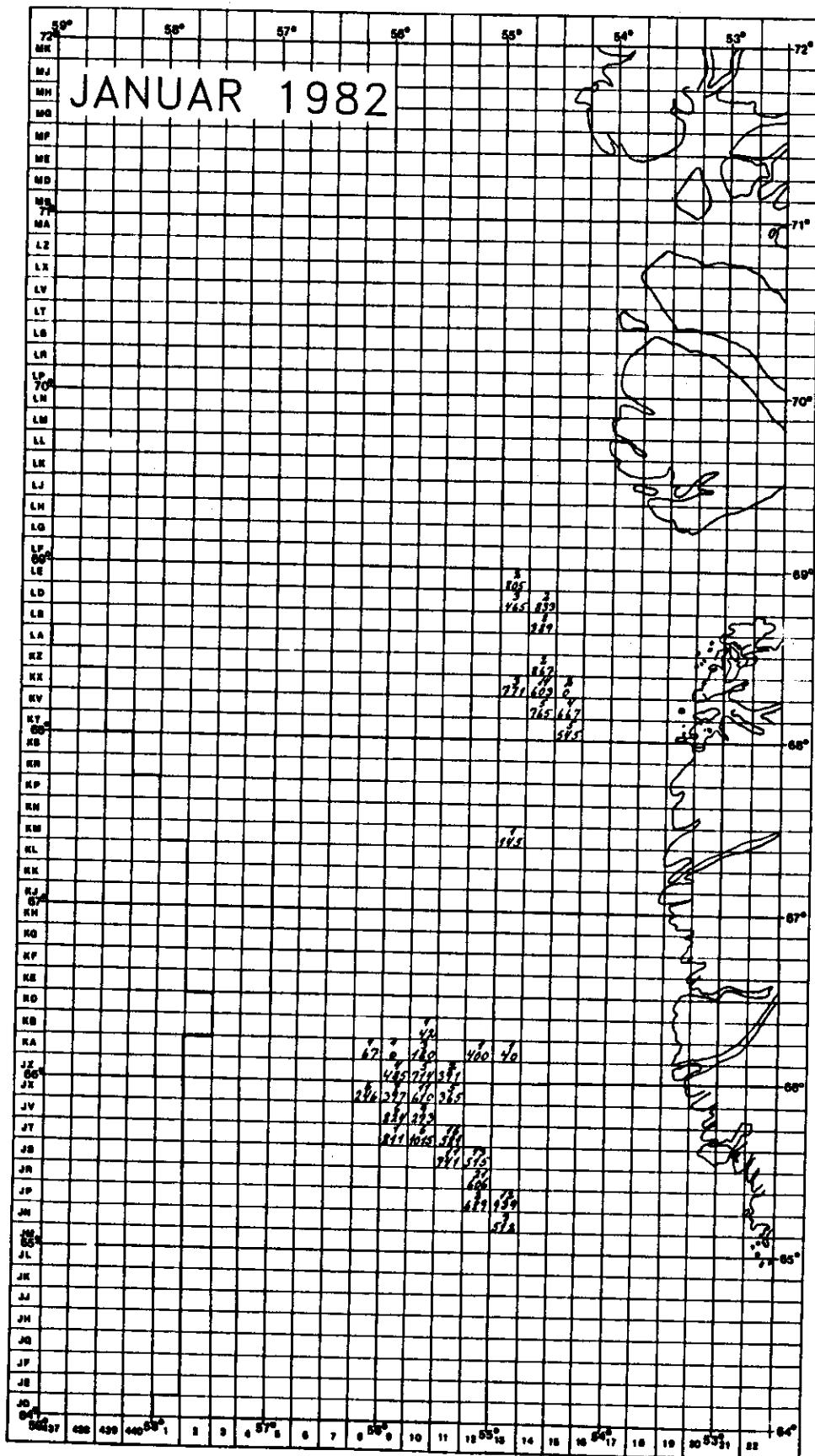


Figure 3. Distribution of effort and mean catch of shrimp per hour in January 1982 in NAFO Subareas 1 in the shrimp fishery of seven trawlers (473-722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical is no. of hauls, lower figure the mean catch rate (kg/hour).

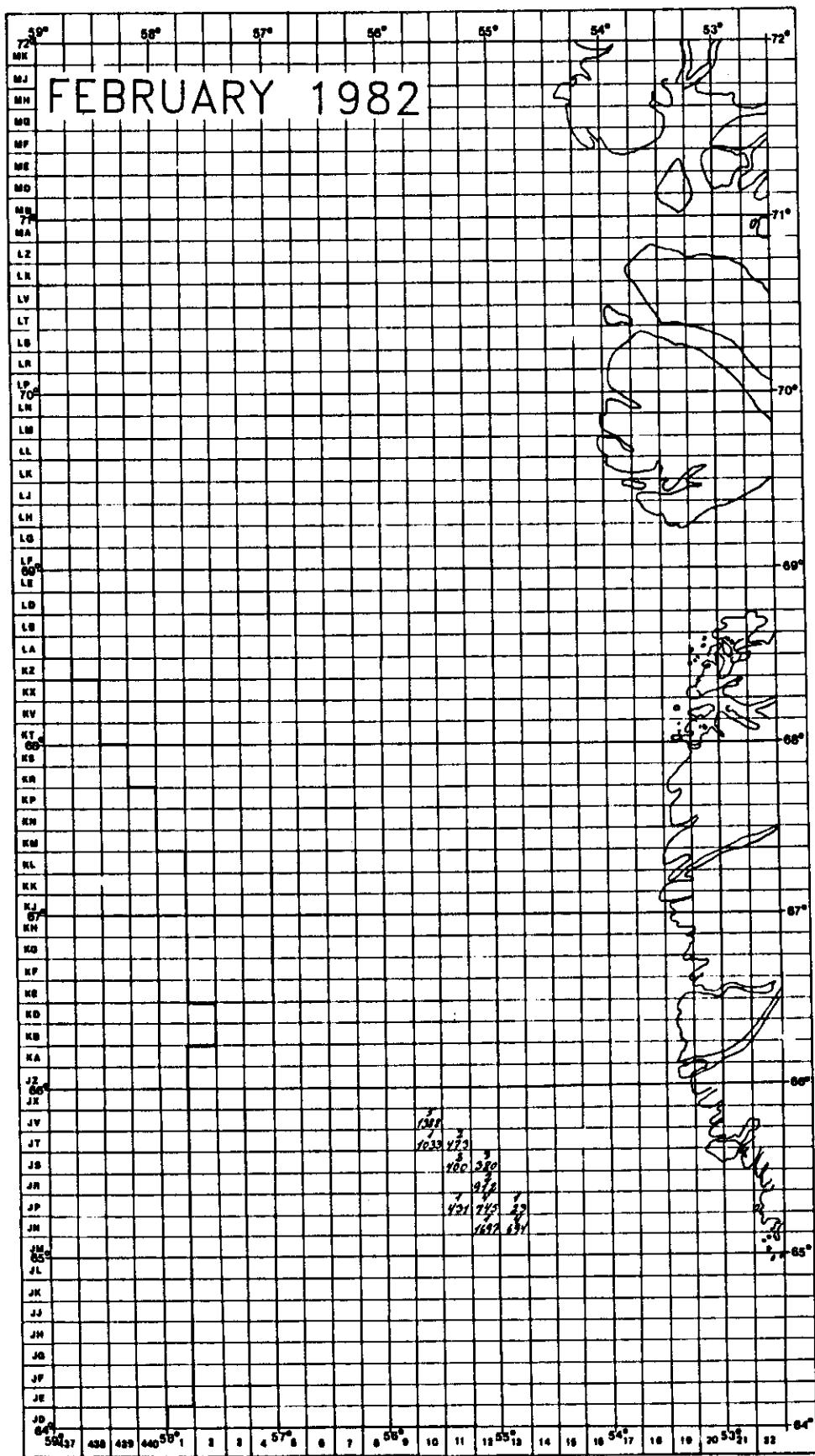


Figure 3. Continued. February 1982.

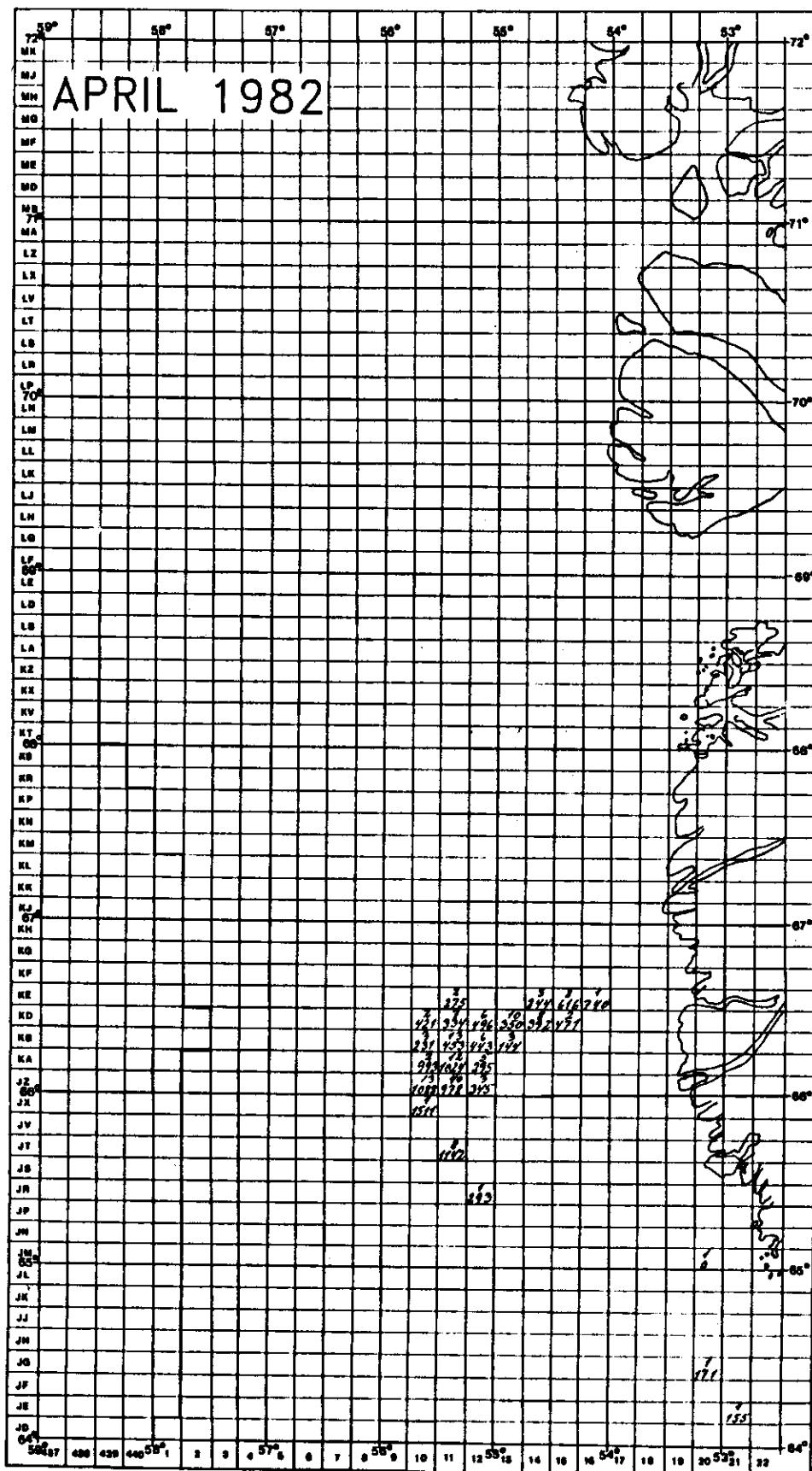


Figure 3. Continued. April 1982.

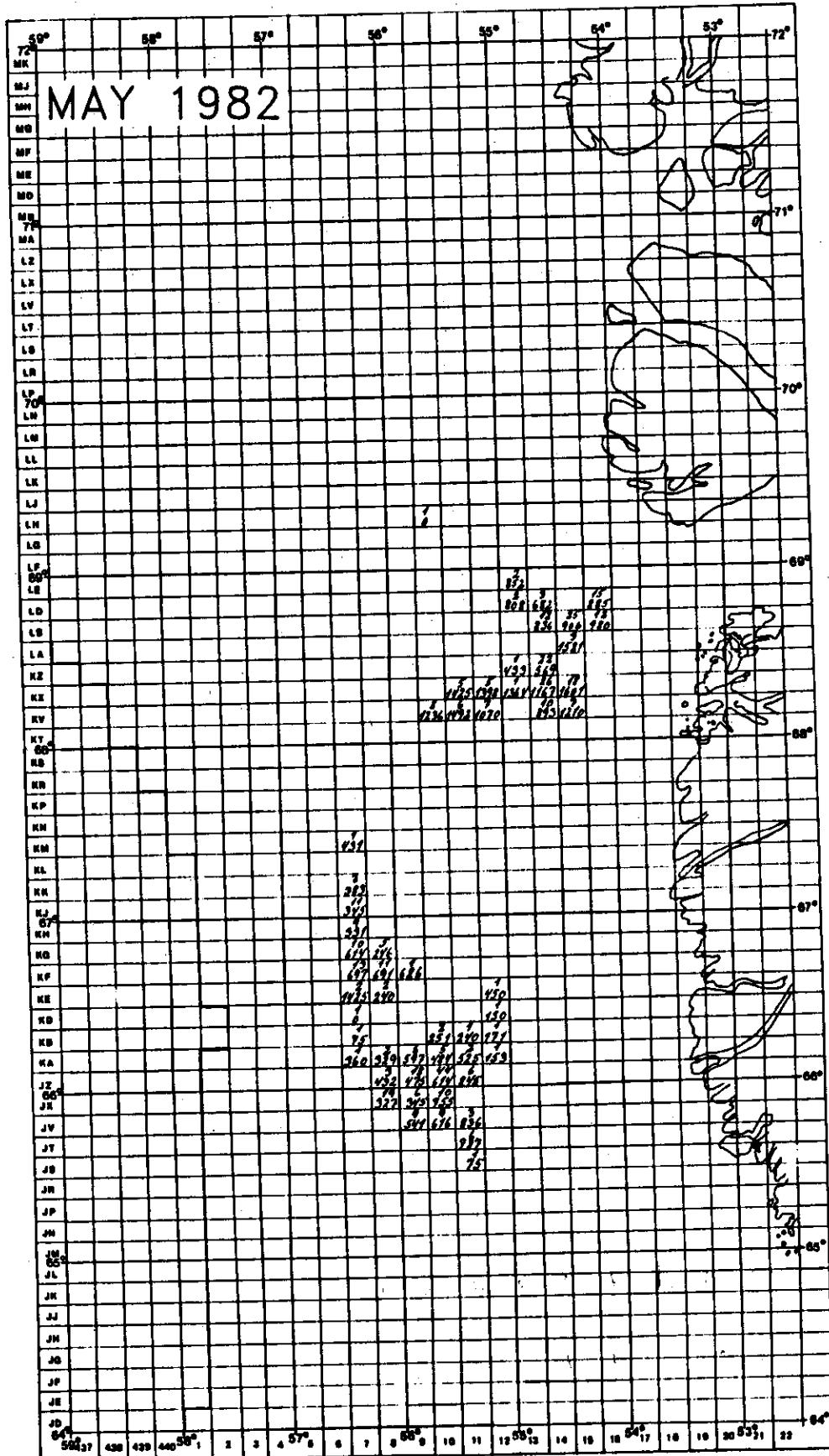


Figure 3. Continued. May 1982.

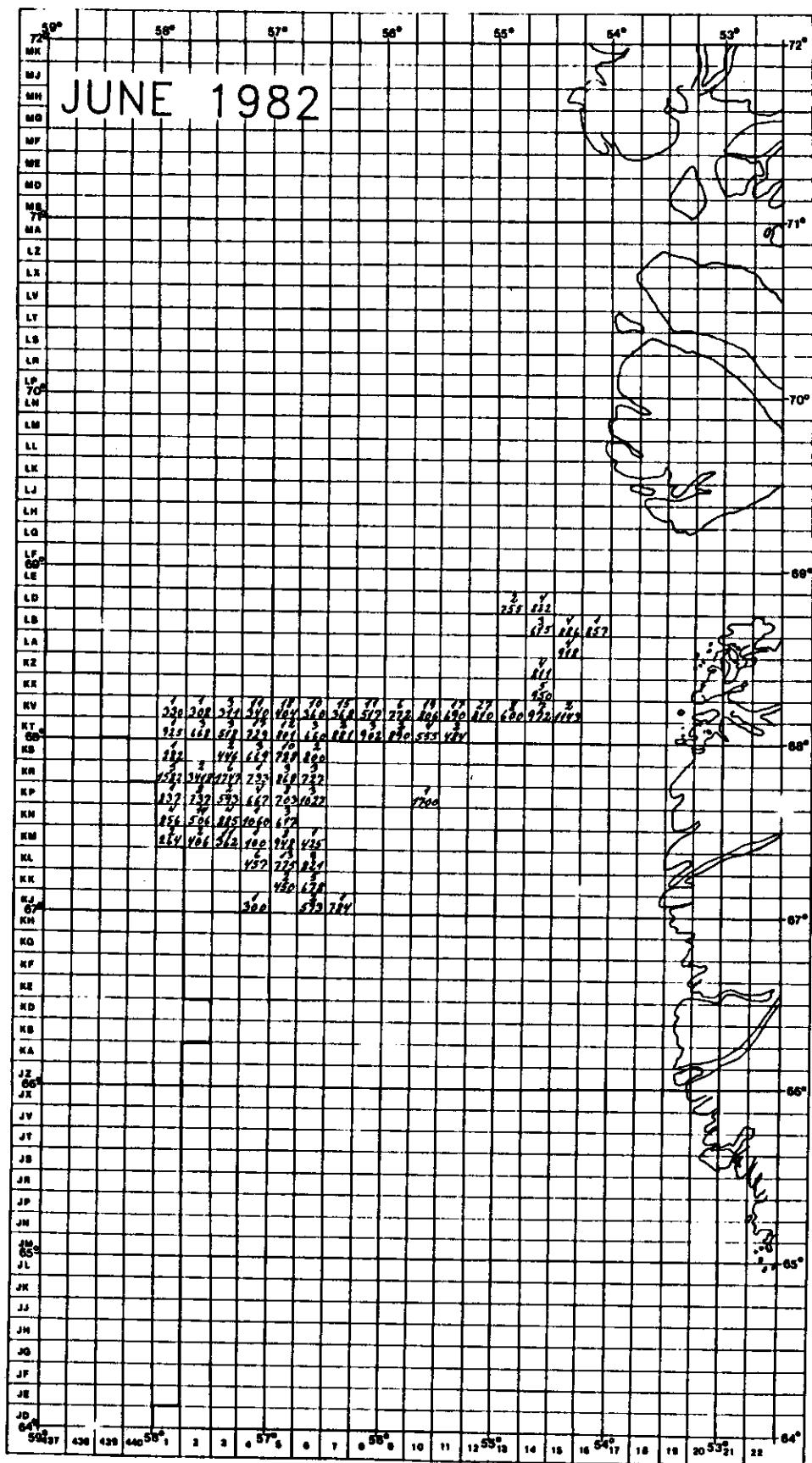


Figure 3. Continued. June 1982.

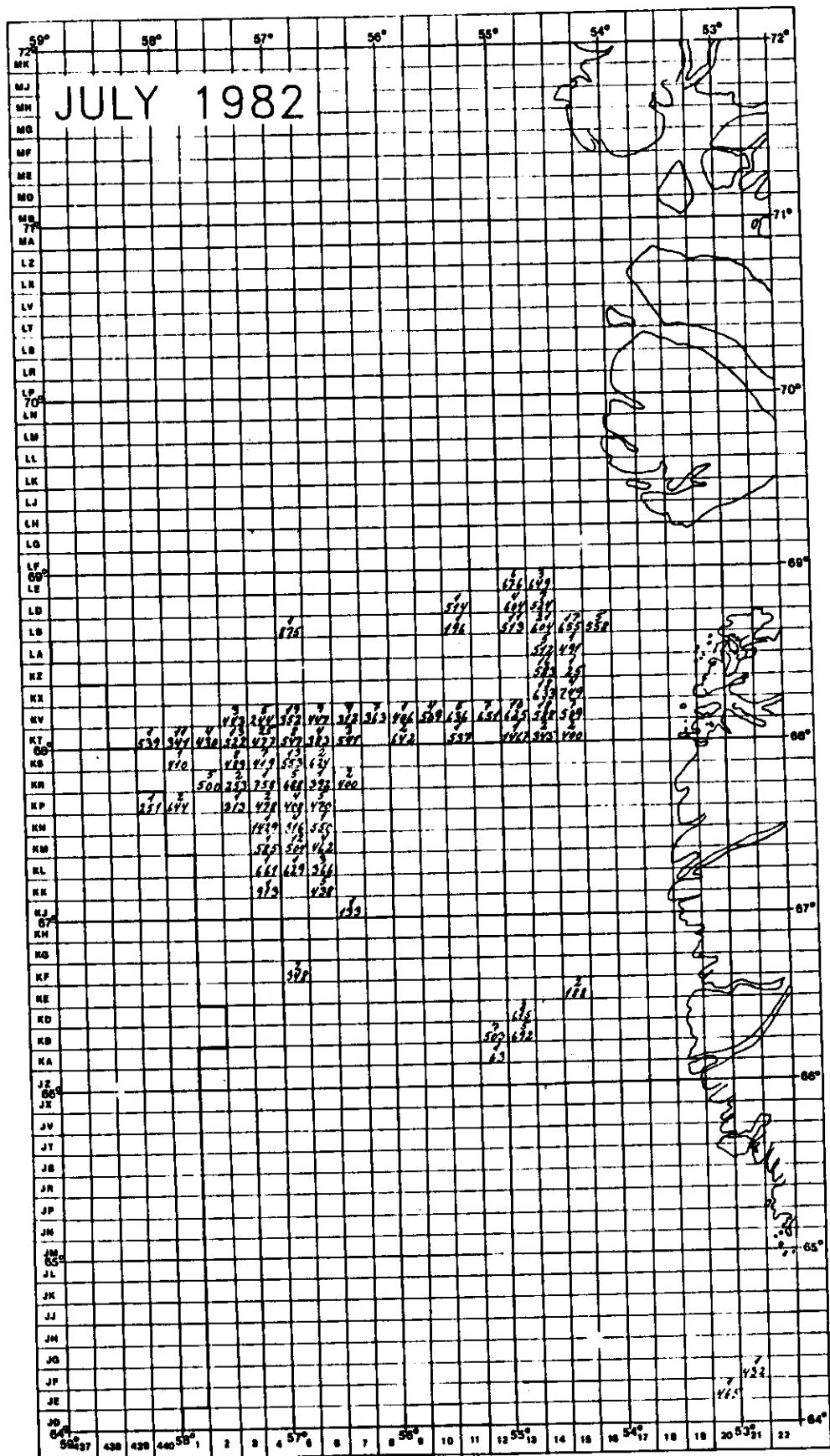


Figure 3. Continued. July 1982.

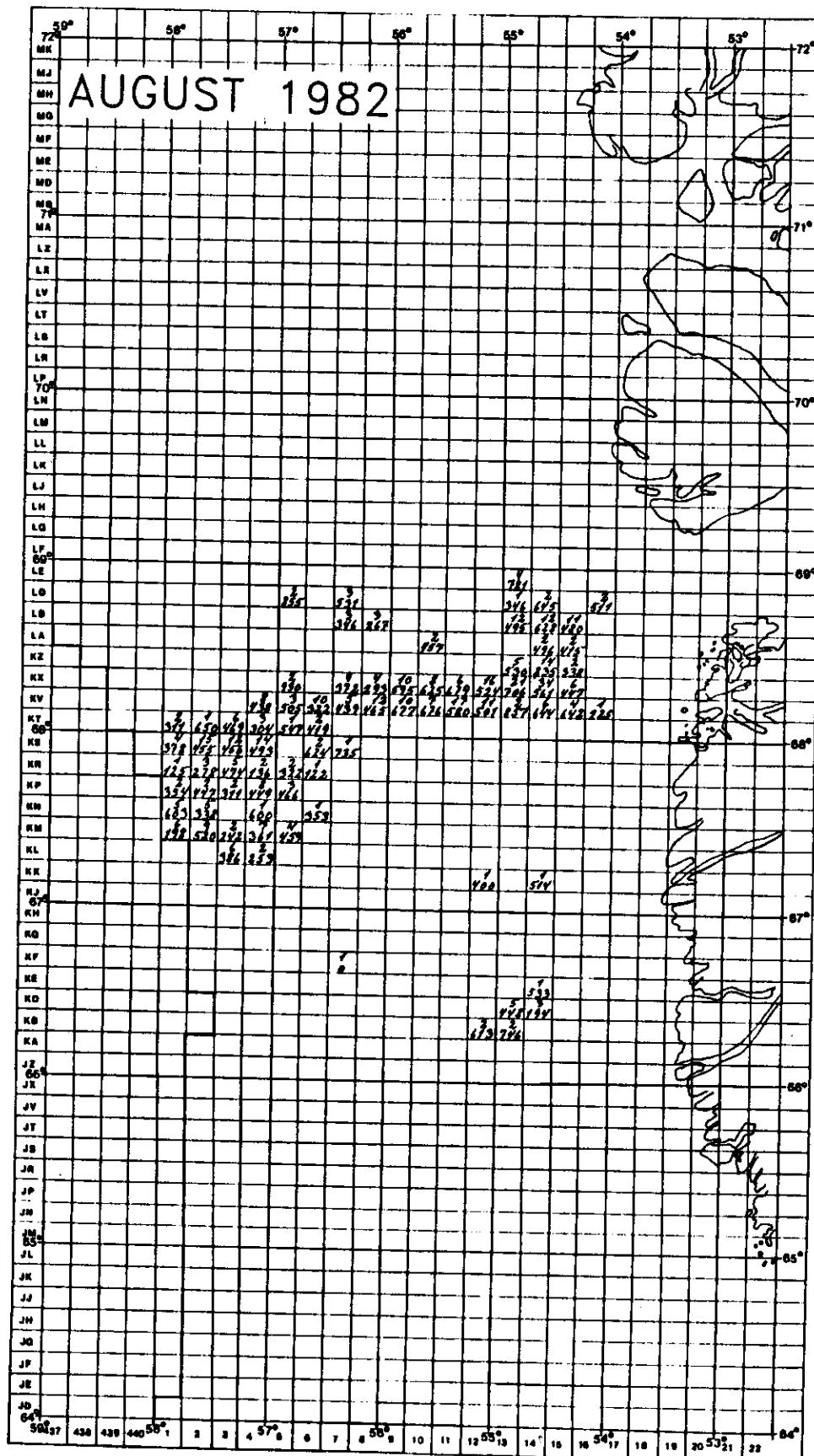


Figure 3. Continued. August 1982.

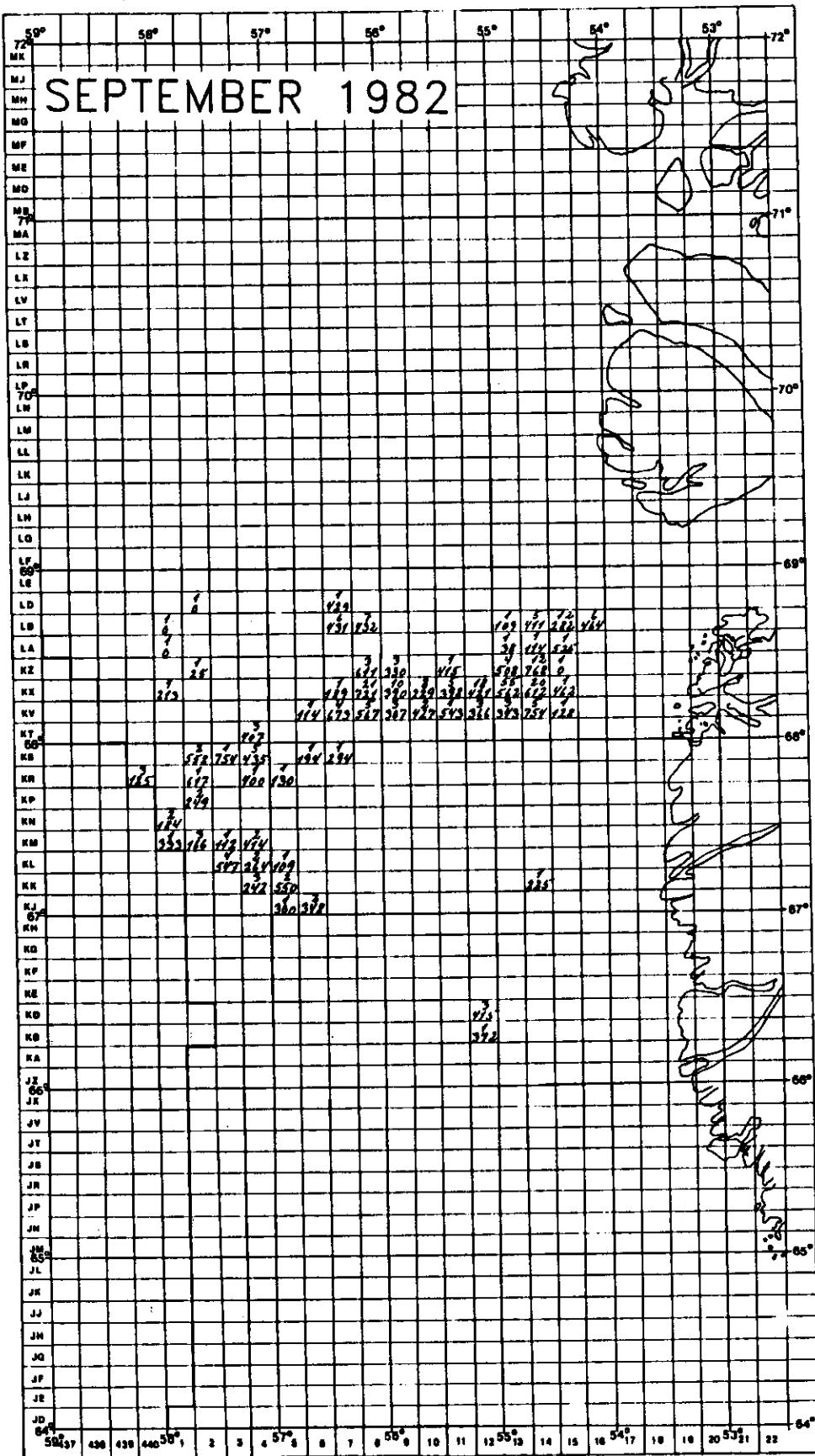
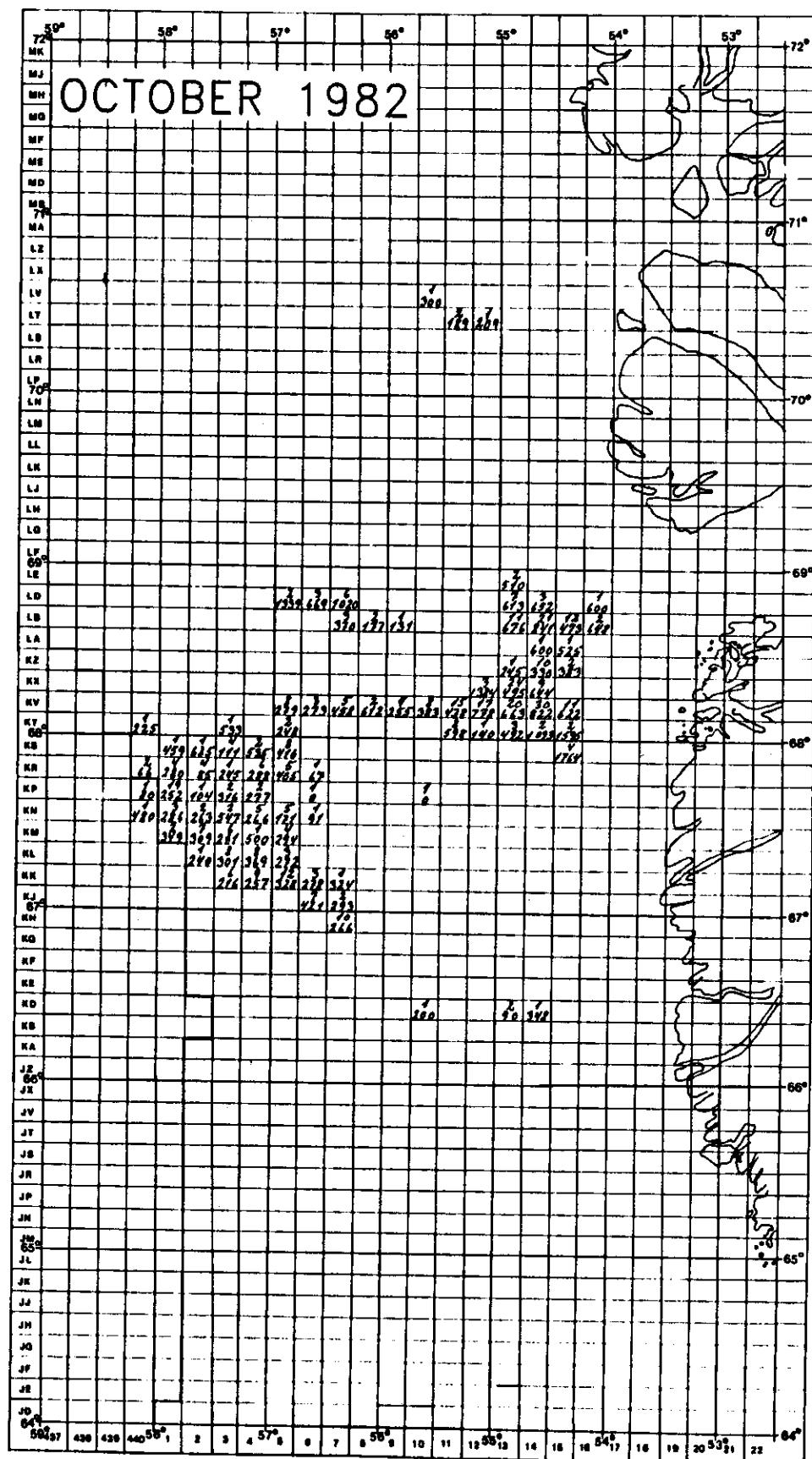


Figure 3. Continued. September 1982.



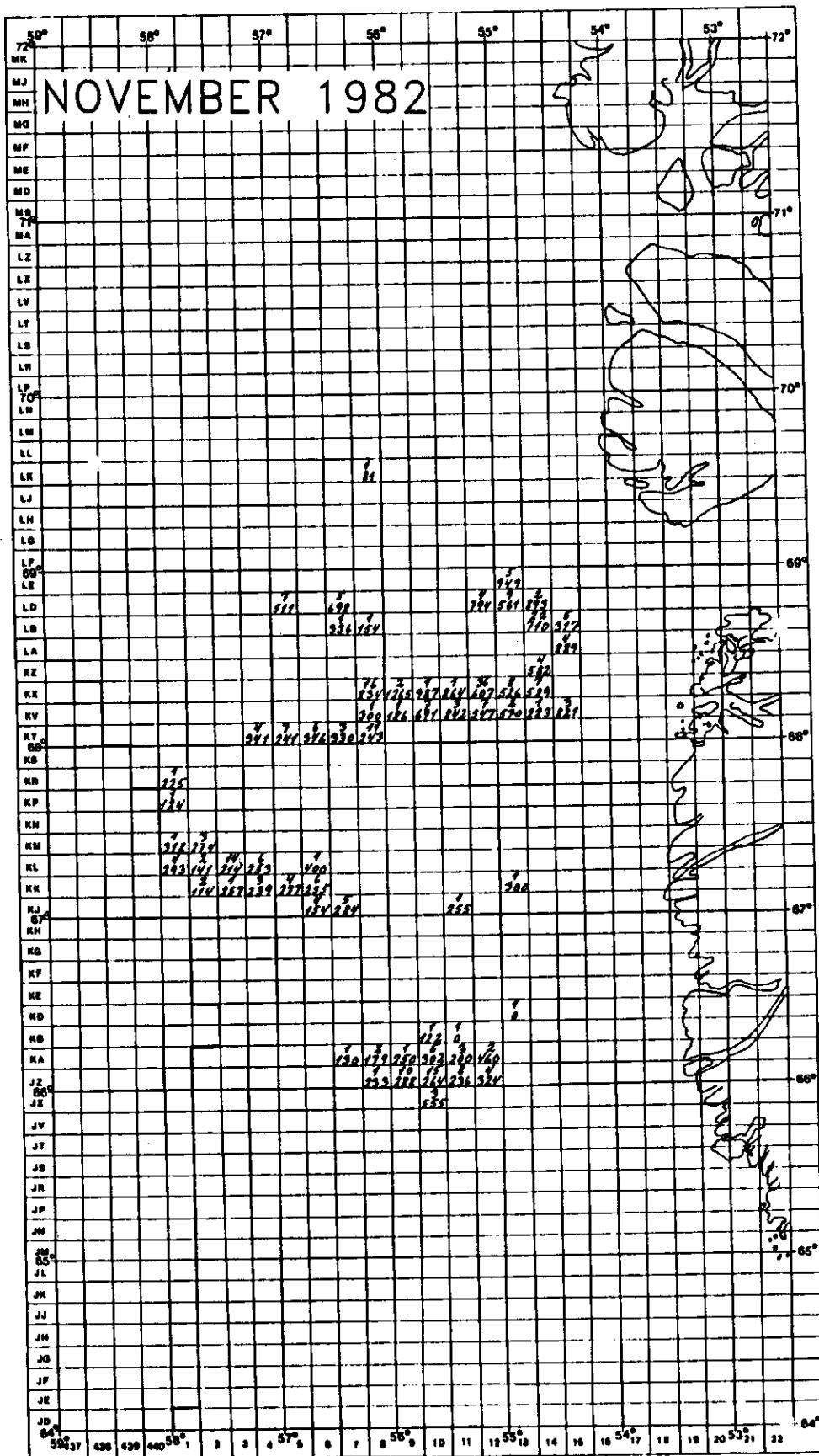


Figure 3. Continued. November 1982.

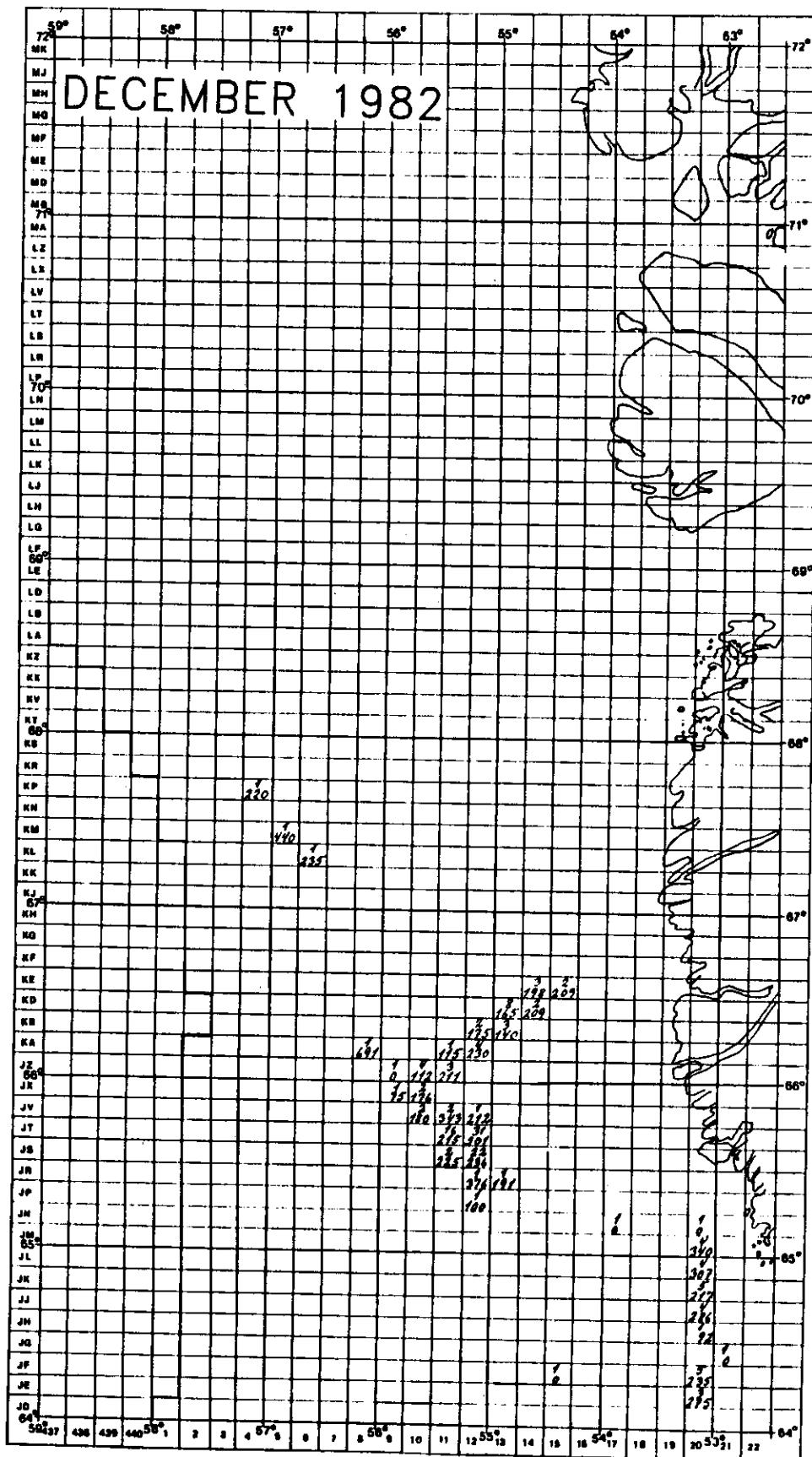


Figure 3. Continued. December 1982.

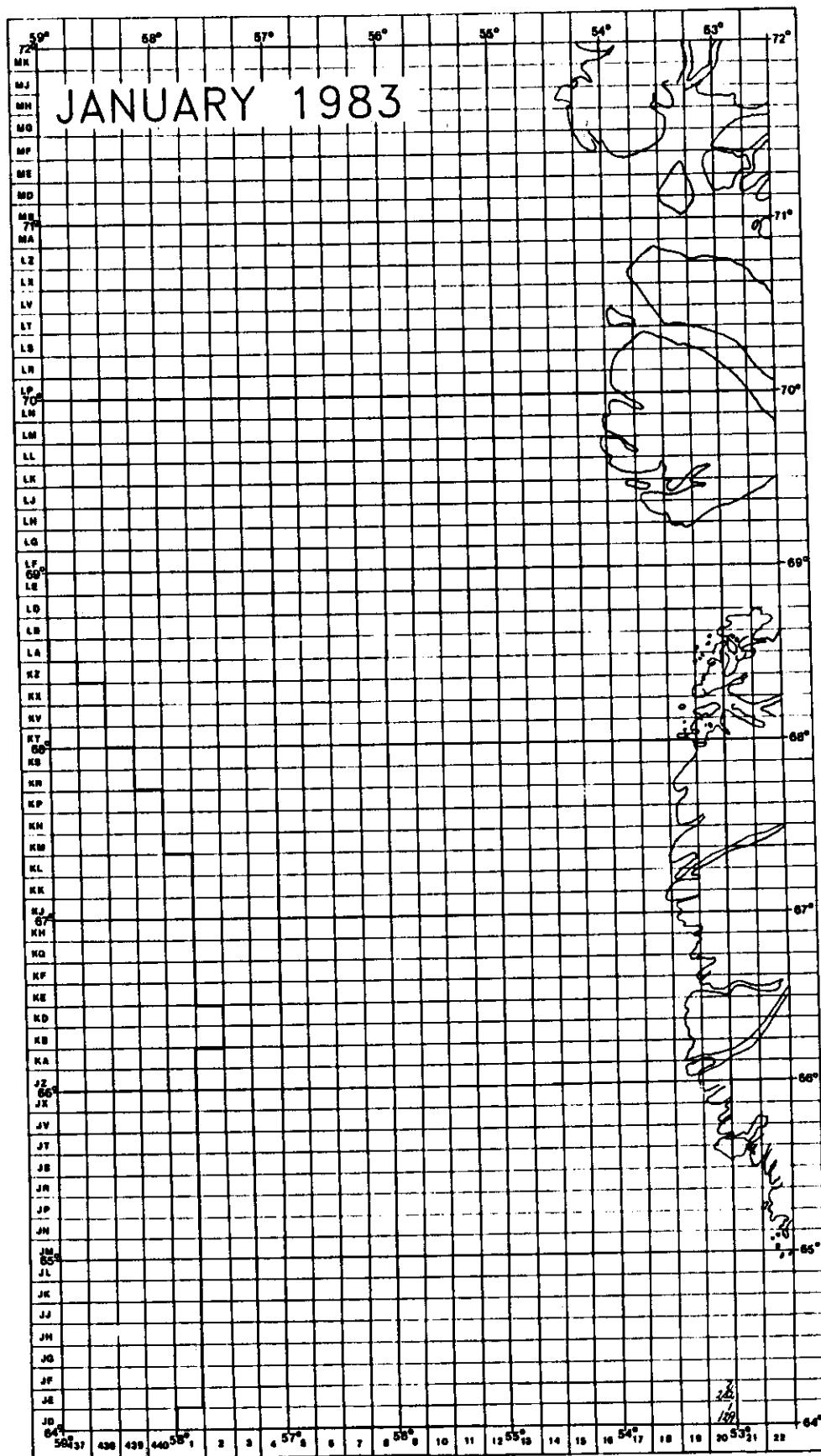


Figure 3. Continued. January 1983.

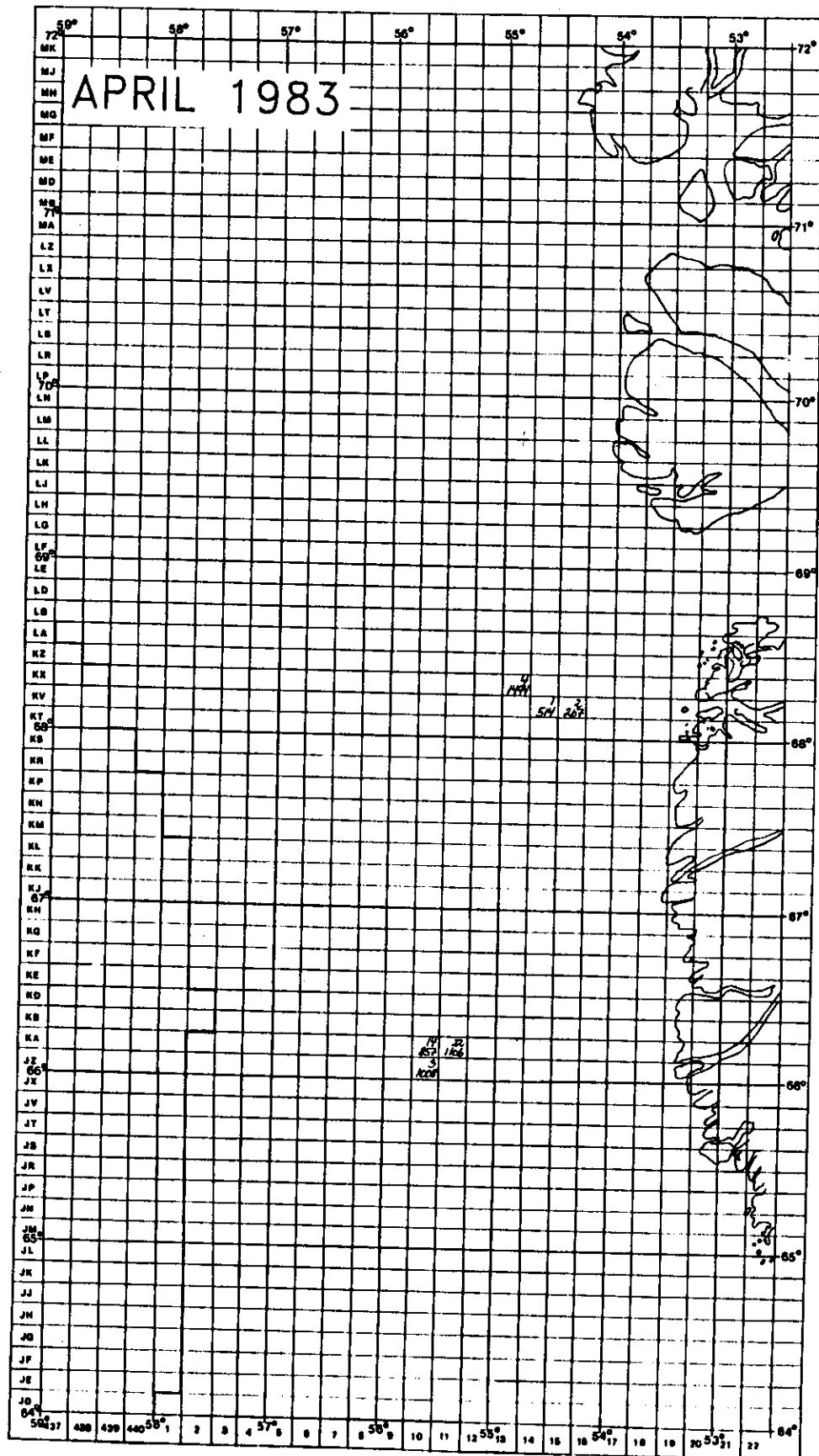


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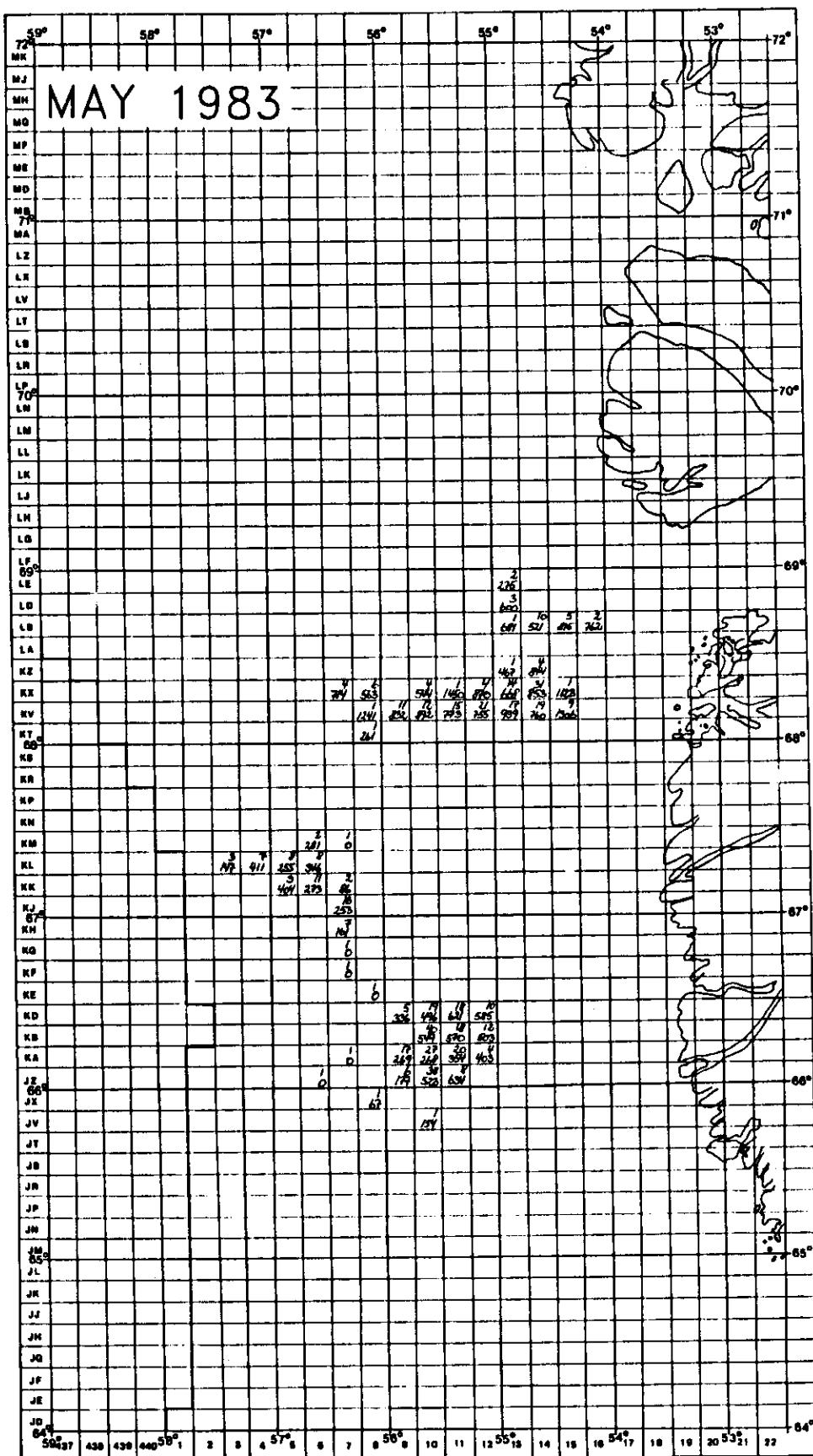


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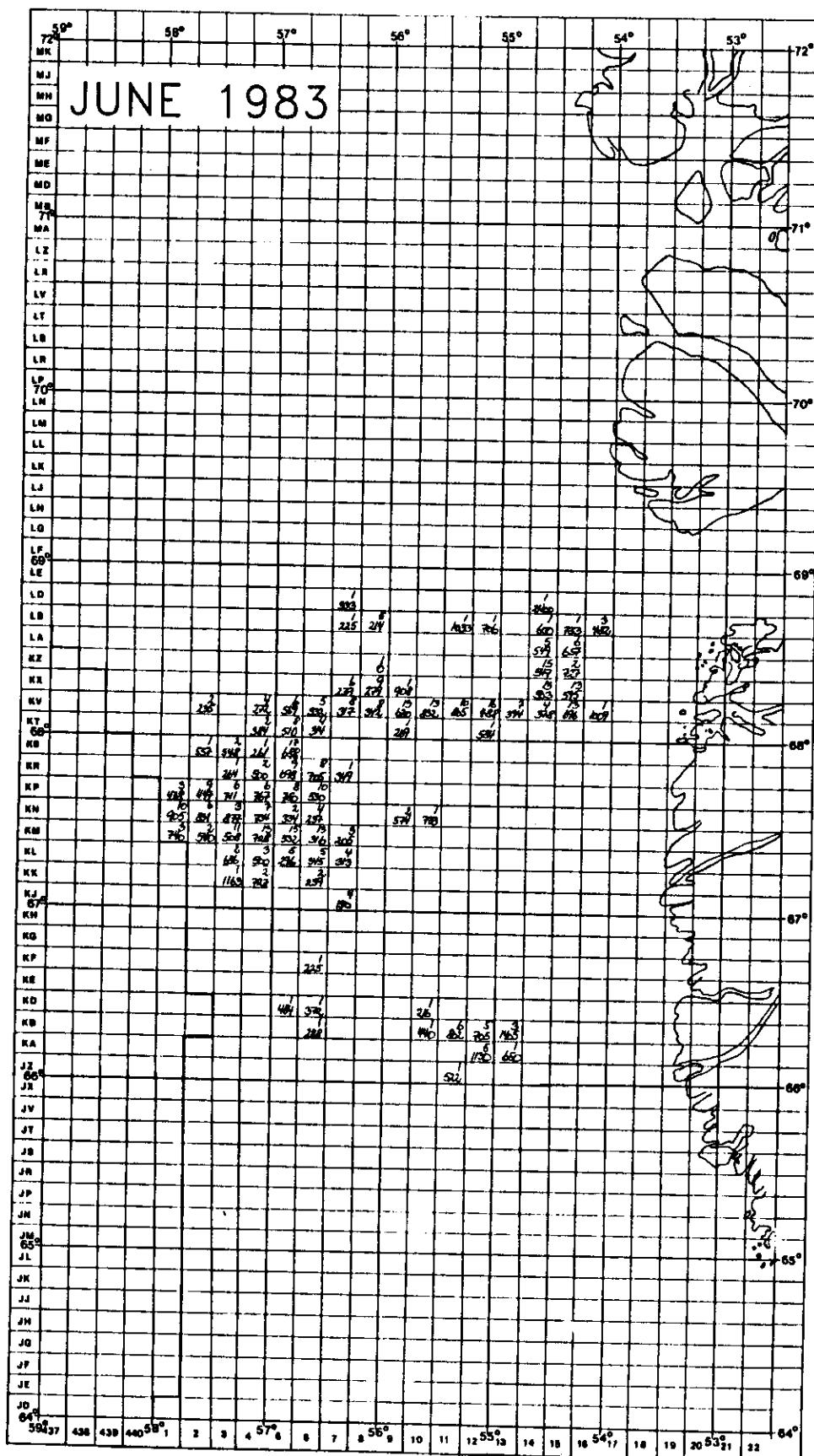


Figure 3. Continued. June 1983.

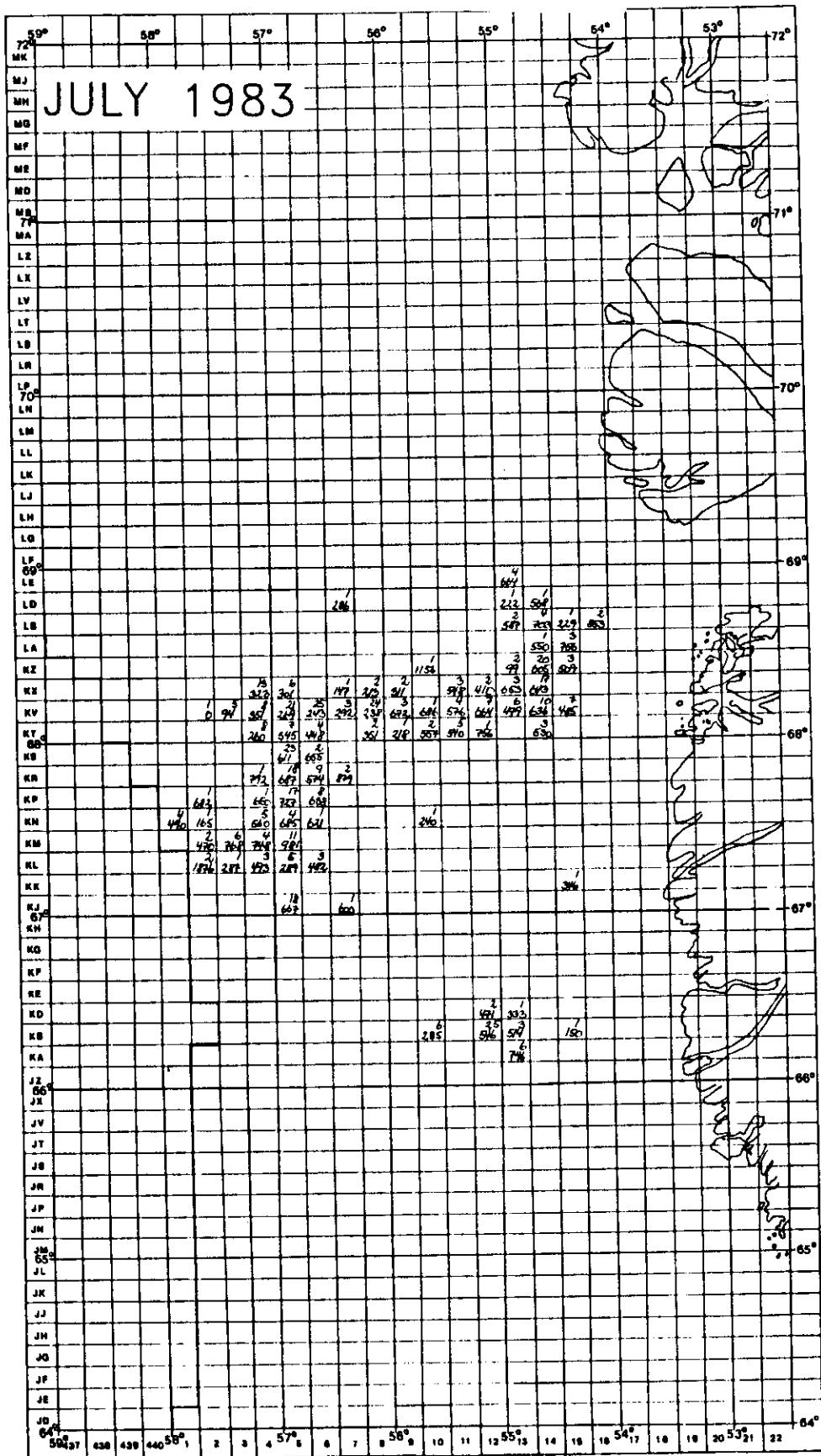


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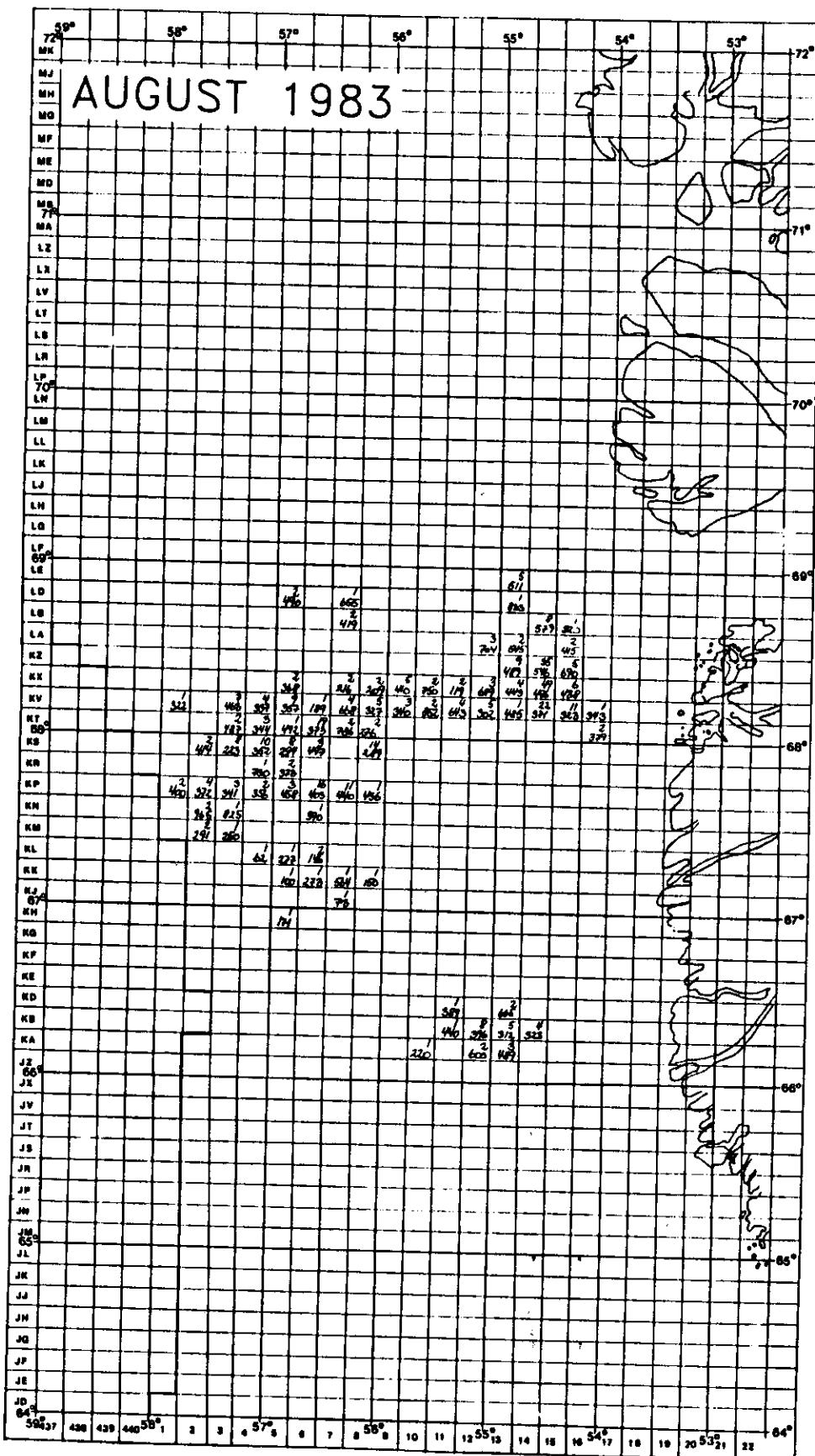


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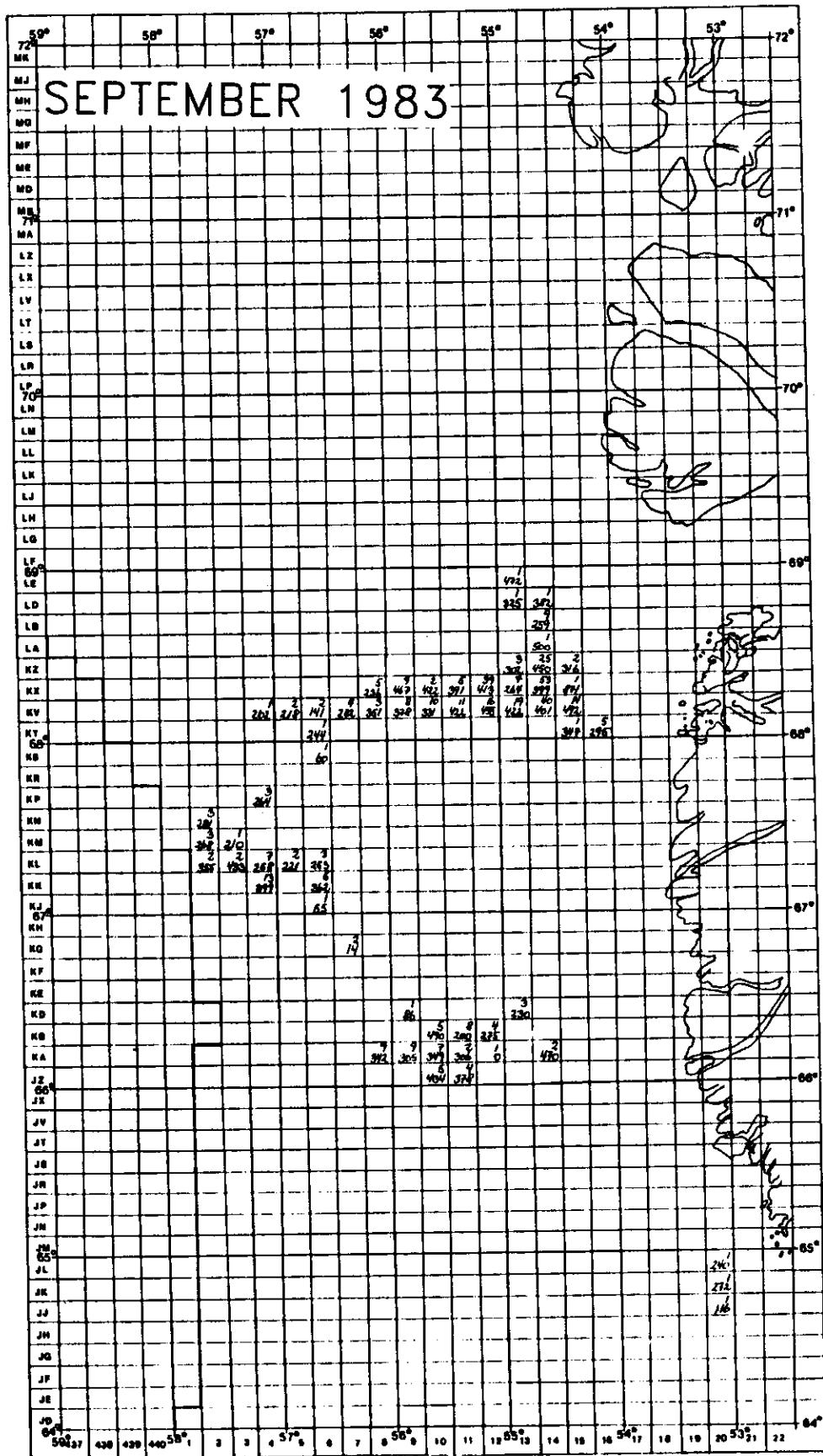


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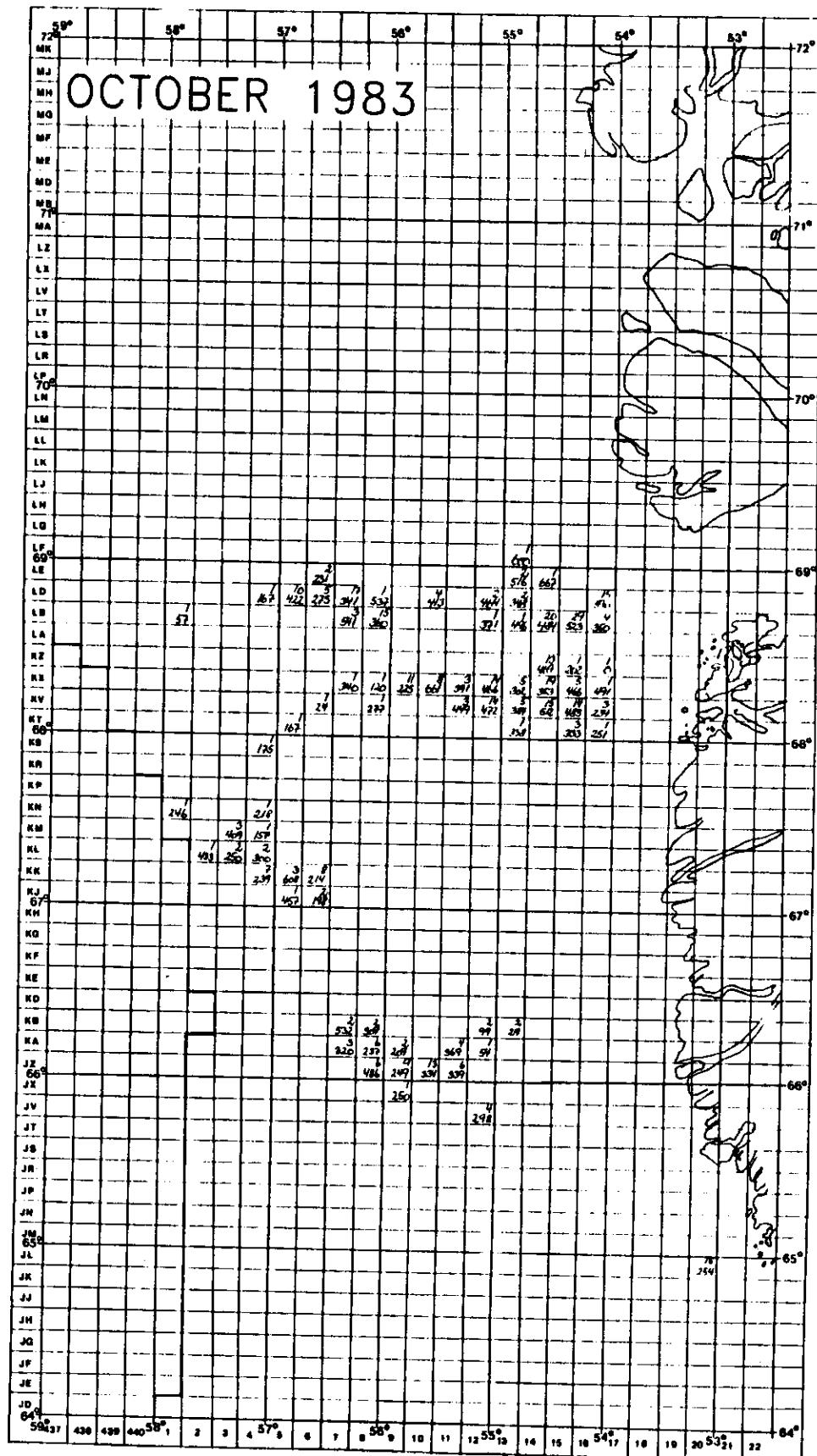


Figure 3. Continued. October 1983.

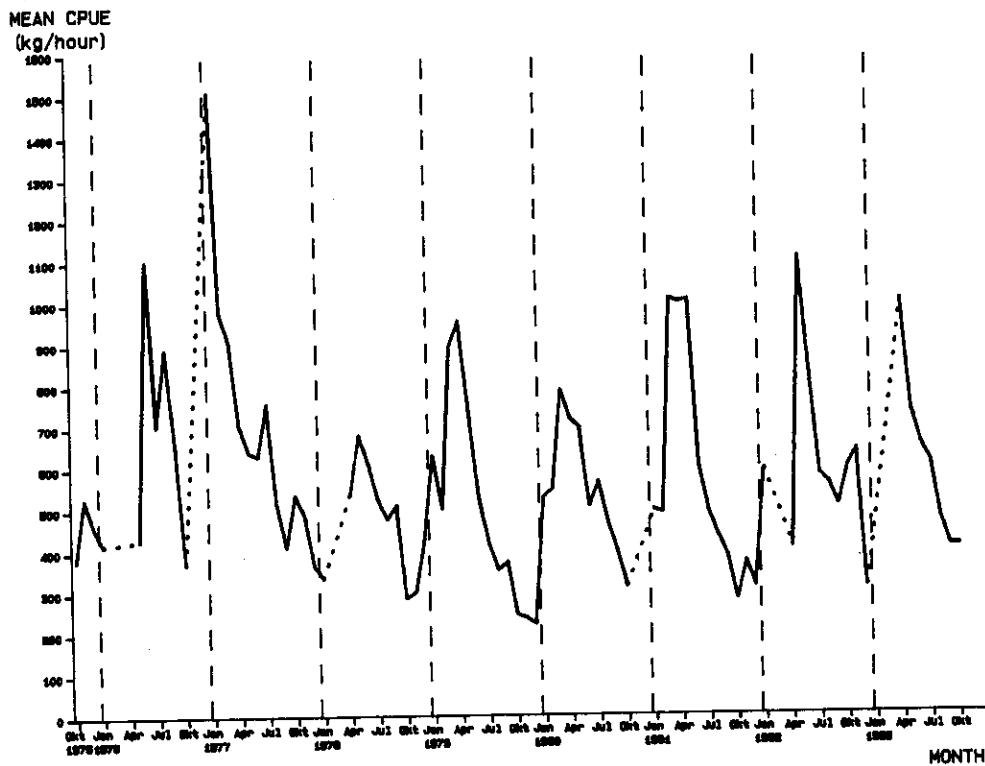


Figure 4. Monthly mean catch rate of shrimp (kg/hour) in NAFO Division 1B from October 1975 to October 1983 based on logbook information and landings from seven trawlers (630-722 GRT) of the Royal Greenland Trade Department (corresponding no. of hours trawled are given in Table 3).

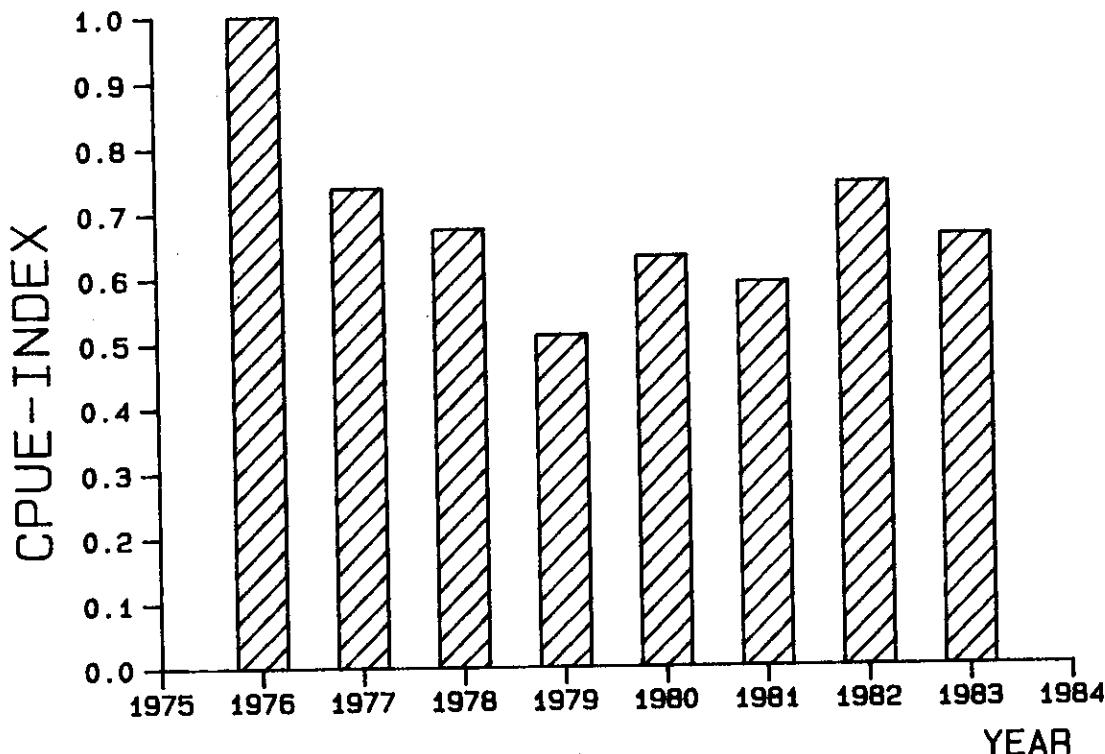


Figure 5. Indices of mean catch rates for the period July-September by year in NAFO Division 1B from 1976 to 1983, based on logbook information and landings of seven trawlers (630-722 GRT) of the Royal Greenland Trade Department. Indices are calculated relative to the mean catch rate for the period in 1976.

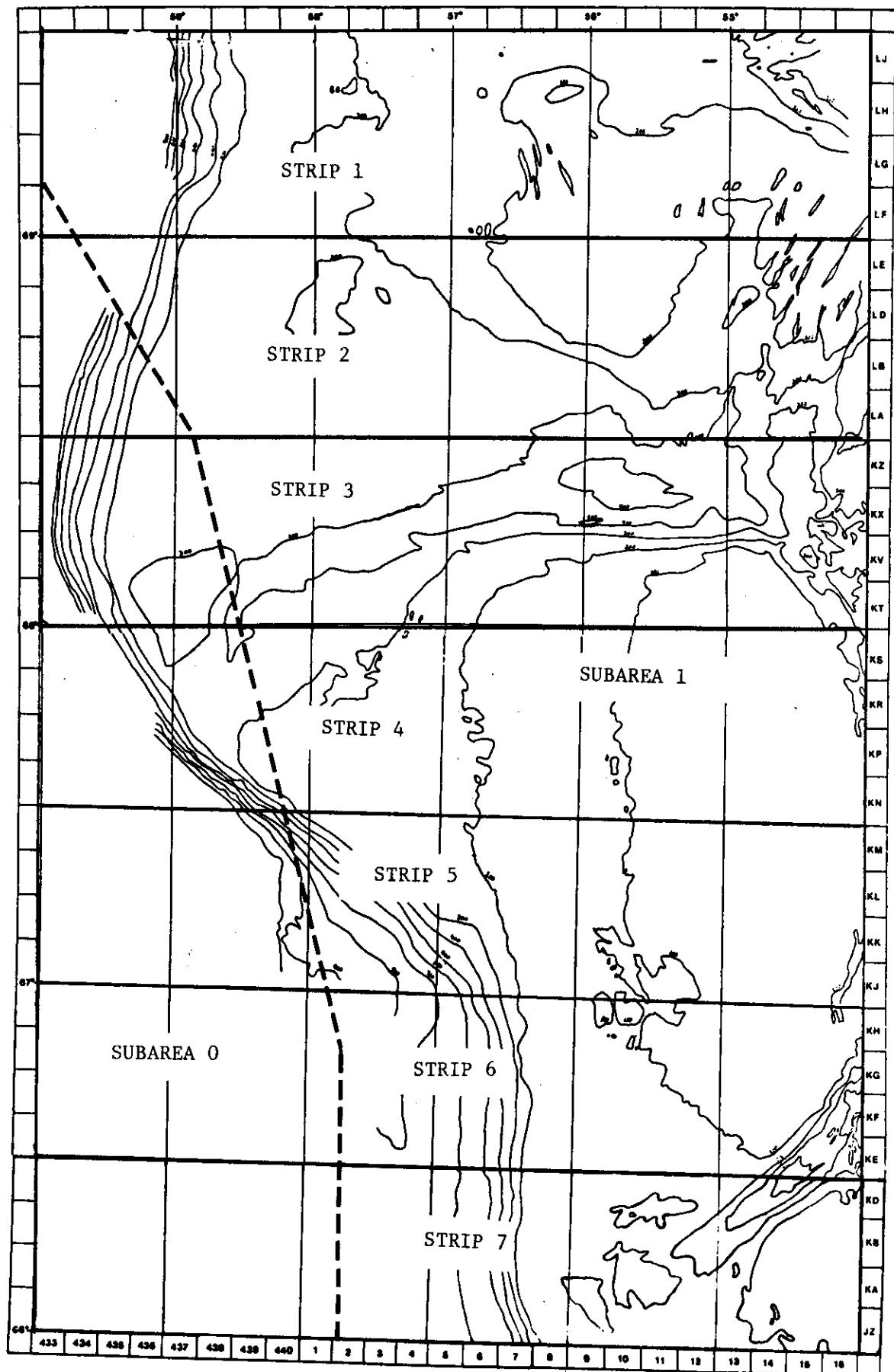


Figure 6. Map showing block-strips used in Figure 7.

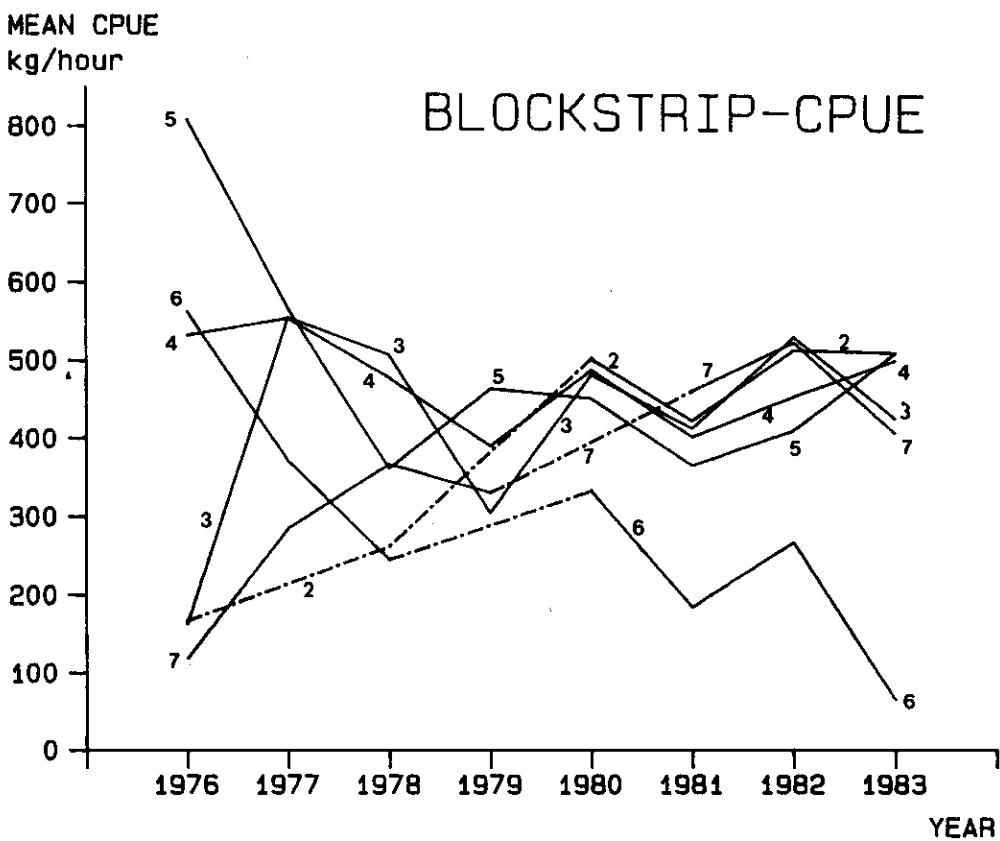


Fig. 7. Mean catch rates (kg/hour) of shrimp for the period July-September in block-strips in NAFO Subareas 0+1 from 1976 to 1983, based on log-book information from eight trawlers (473-722 GRT) of the Royal Greenland Trade Department. Curve numbers refer to blockstrips shown in Fig. 6.

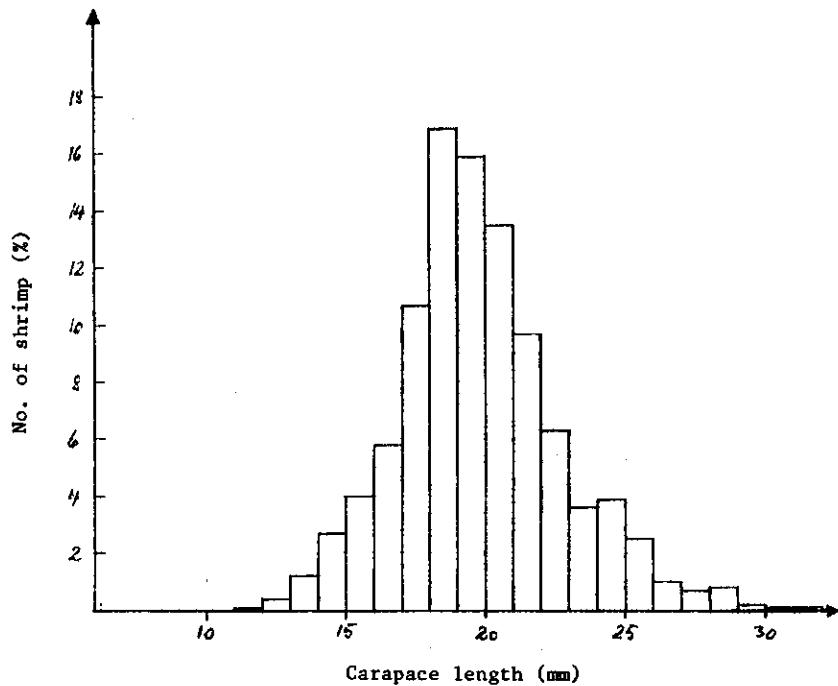


Fig. 8. Shrimp sample from statistical unit LD-012 (see Table 8). Total length-frequency diagram.

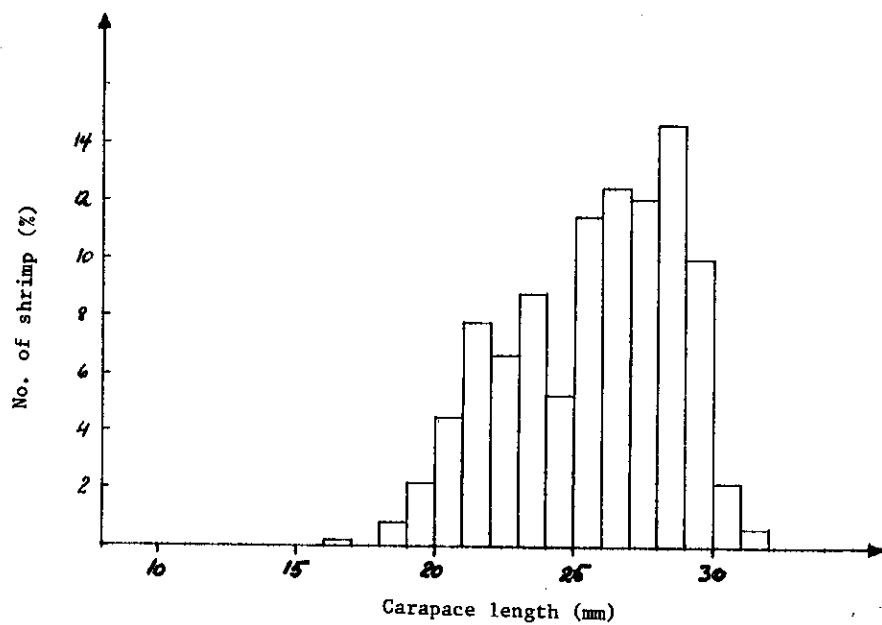


Fig. 9. Shrimp sample from statistical unit KX-007 (see Table 9).
Total length-frequency diagram.

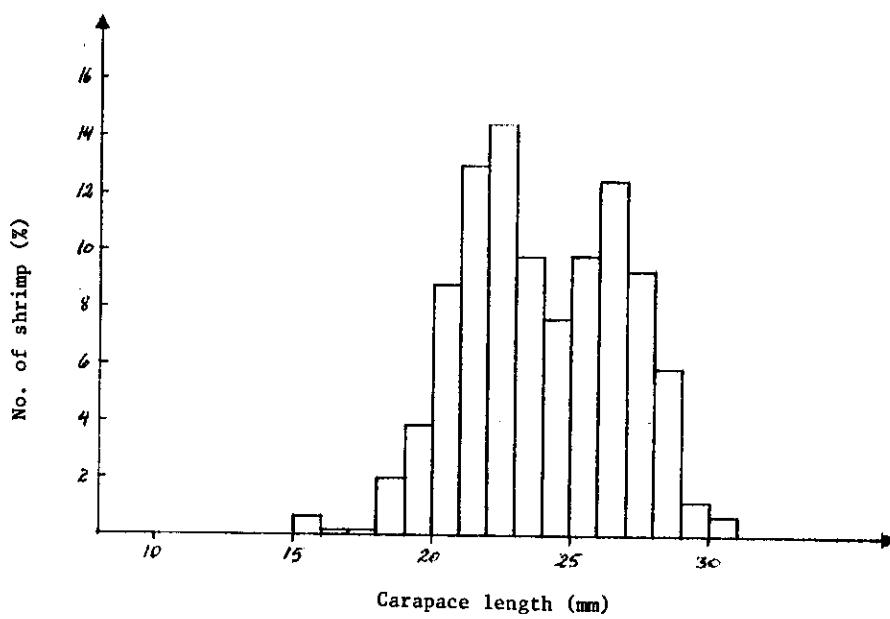


Fig. 10. Shrimp sample from statistical unit KP-440 (see Table 10).
Total length-frequency diagram.

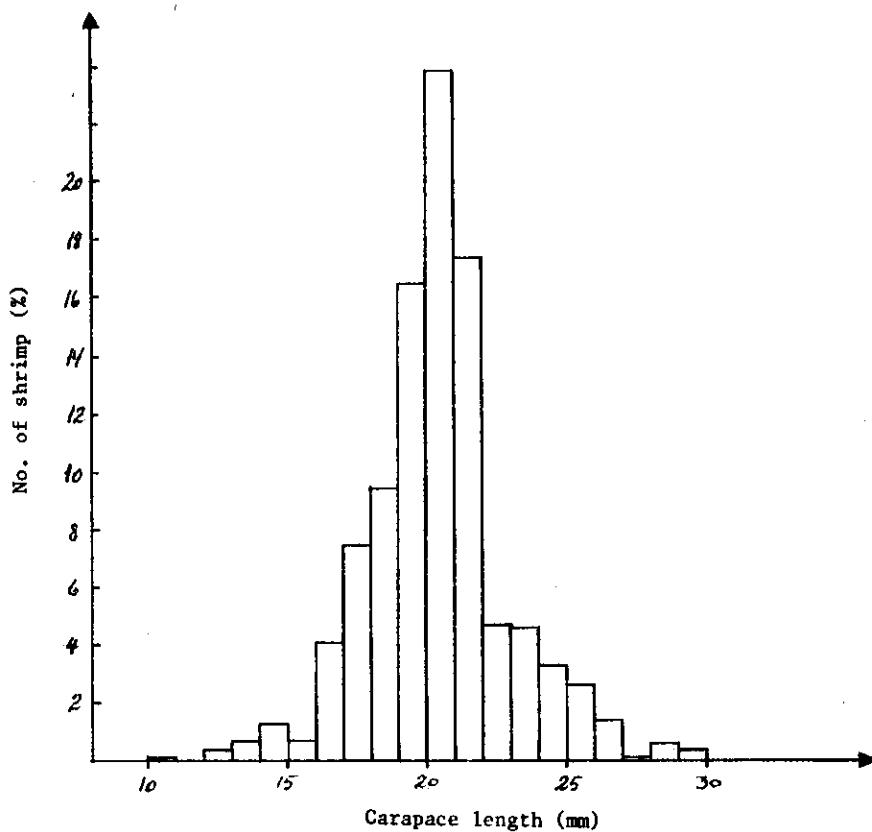


Fig. 11. Shrimp sample from statistical unit KA-011 (see Table 11).
Total length-frequency diagram.

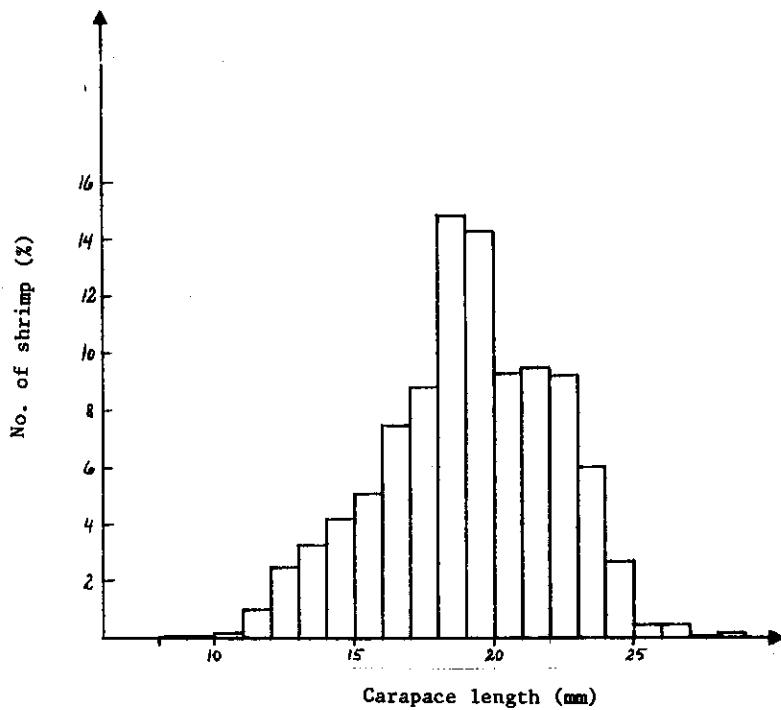


Fig. 12. Shrimp sample from statistical unit LF-011 (see Table 12).
Total length-frequency diagram.

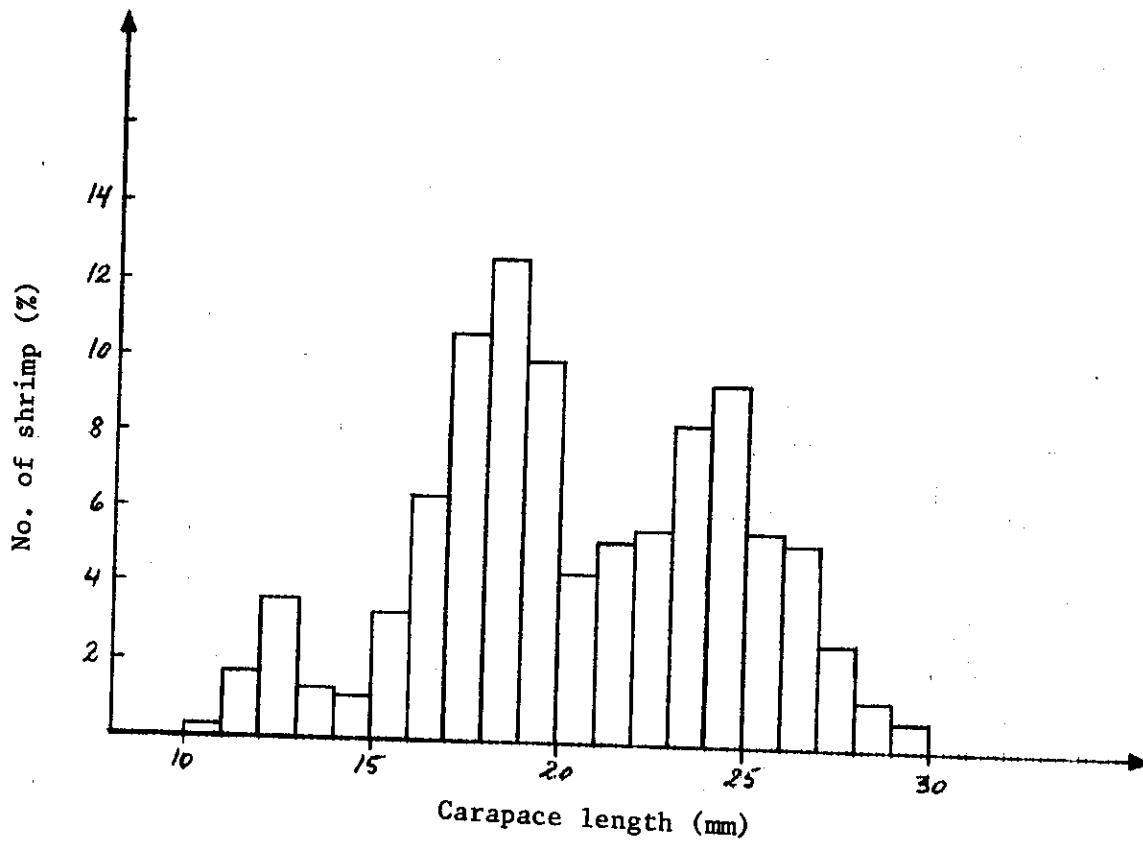


Fig. 13. Shrimp sample from statistical unit LS-014 (see Table 13).
Total length-frequency diagram.

