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A First Report on a Special Study on Variations in Catch of Shrimp (*Pandalus borealis*) by Depth in West Greenland (NAFO Subarea 1) in 1997.

by

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INTRODUCTION

Biomass estimates of shrimp are generally confounded with high variance. In the evaluation of the results of the stratified-random surveys for shrimp in West Greenland waters it is relevant to investigate the origin of the variation in the biomass estimates. Based on the assumption that shrimp are distributed by depth, the survey area is stratified after this parameter in the areas, where information on depth structure is available (Carlsson and Kanneworff, 1997).

To investigate the variation in catches of shrimp between hauls inside depth strata a project with consecutive trawl hauls along depth curves was designed. Theoretically the aim was to investigate the variation on a scale of distance corresponding to the size of a depth stratum. The mean size of depth strata in the offshore West Greenland area is about 2600 sq.km, i.e. 51 * 51 sq.km. Realistically a transect of about 40 km could be trawled in a day, as trawling was limited to day time (0900-1900 UTC) to avoid the influence of diel migrations on catches.

To further obtain information on measurement precision the design included repetition of transects the following day when time allowed.

Data on catches of shrimp, Greenland halibut and redfish should be recorded to be included in the analysis of variation. Not only variation in total catch size, but also in catch by length or size group should be analyzed.

The study was planned in cooperation with Hans Lassen and Holger Hovgård from the Danish Institute for Fisheries Research.

The present paper presents a first report on the study with only preliminary results, as data have not yet been analyzed.

MATERIAL AND METHODS

Study area

The study was performed on the southwestern and northwestern slopes of Store Hellefiske Bank in area W3 of the West Greenland offshore survey (Carlsson and Kanneworff, 1997) in August 1997 (Figure 1).

Vessel and gear

Vessel and gear was the same as used in the offshore trawl survey in 1997, as described by Carlsson and Kanneworff (1997). Trawling time was one hour with the trawl on the bottom as recorded by the use of a Furono trawleye. Bottom temperature during hauls was measured by a SEAMON recorder mounted on one of the trawl doors.

Handling of catch

From the catch a sample of shrimp of about 4 kg was taken from the cod-end, before the catch was sorted. Catch of shrimp, Greenland halibut and redfish was weighted, and samples of the two fish species taken for length measurement.

Shrimp samples were sorted by sexual development and carapace length measured by sliding caliper to .1 mm. Samples of Greenland halibut and redfish were sorted by sex (specimens above 20 and 17 cm, respectively) and measured to nearest cm below.

RESULTS AND DISCUSSION

Ten days were available for the study, and the following transects were taken (Figure 1):

On the southwestern slopes of Store Hellefiske Bank:

- S250. 2 days à 7 hauls following the 250-meter depth contour (duplicated hauls)
- S500. 1 day à 6 hauls along the 500 meter contour.
- S375. 1 day à 6 hauls along the 375 meter contour.
- STR. 2 days à 7 hauls in a transect from 250 to 500 meters depth (duplicated hauls).

On the northwestern slopes of Store Hellefiske Bank:

- N250. 1 day à 3 hauls along the 250 meter depth contour.
- N350. 2 days à 7 hauls along the 350 meter contour (duplicated hauls).
- NTR. 1 day à 6 haul in a transect from 250 to 500 meters depth.

A total of 63 hauls were performed. Table 1 gives details on catches of shrimp, Greenland halibut and redfish. Data are not yet analyzed, but some details may be noted.

Means and standard deviations by transect and species:

	Pandalus borealis		Greenland halibut		Redfish	
Transect	Mean	S.D	Mean	S.D	Mean	S.D
S250/1	1715.14	2191.13	0.12	0.10	2.25	1.48
S250/2	1095.29	1455.78	0.12	0.07	1.63	1.26
S500	3.29	1.80	13.80	6.21	137.33	38.57
S375	1135.63	482.07	2.72	1.39	1313.40	905.69
STR/1	293.24	491.06	11.54	17.84	456.39	698.27
STR/2	301.90	458.02	11.12	16.52	466.33	529.61
N250	0.02	0.03	0.04	0.05	0.80	0.49
N350/1	718.73	224.48	5.68	3.30	143.46	94.64
N350/2	850.77	158.03	5.50	3.38	205.53	135.39
NTR	171.50	170.32	14.23	21.86	25.57	37.26

Catches of shrimp were relatively large in the southern area in 250 and 375 meters depth, but showed high variability (from 50 to 6 000 kg of shrimp and from 774 to almost 2 000 kg of shrimp, respectively). Very small catches were found in 500 meters depth. Accordingly the transect across the depth contours showed high variation, with small catches in shallow and deep water and largest catches about 375 meters depth.

In the northern area shrimp were almost absent in 250 meter depth. Due to this and to bad weather this transect was not continued. Catches in 350 meters depth were not as high as at the almost same depth in the southern area, and showed less variability. Catches along the transect across depth curves were also smaller than in the southern area and varied from 0 kg in 220 meter depth to almost 300 kg in 430 meters depth.

Catches of Greenland halibut were relatively small in both areas, but increased with depth. Catches of redfish were consistently small at 250 meter depth in both areas and were most abundant between 300 and 400 meters depth, however with high variability.

REFERENCES

Carlsson, D.M. and P. Kanneworff, 1997. Offshore stratified-random trawl survey for shrimp (*Pandalus borealis*) in NAFO Subarea 0+1, in 1997. *NAFO SCR Doc.*, No. 101. Serial No. N2958.

Station				Duration	Depth			Catch, kg		
PA002	Date	Transect	Id.	of haul (min)	Depth1	Depth2	Mean depth	P.borealis	Grl. Halibut	Redfish
34	970731	S250	1	60	246	254	250.0	51.10	0.10	3.67
35	970731	S250	2	60	249	253	251.0	781.60	0.17	3.74
36	970731	S250	3	60	248	251	249.5	1605.10	0.28	2.60
37	970731	S250	4	60	248	250	249.0	241.70	0.06	0.70
38	970731	S250	5	60	248	250	249.0	69.20	0.23	0.30
39	970731	S250	6	60	249	256	252.5	3344.80	0.03	0.82
40	970731	S250	7	60	249	258	253.5	5912.50	0.00	3.90
41	970801	S250	1	60	247	255	251.0	60.20	0.00	3.72
42	970801	S250	2	60	250	254	252.0	296.40	0.17	2.13
43	970801	S250	3	59	249	254	251.5	910.20	0.06	1.19
44	970801	S250	4	60	248	254	251.0	84.90	0.22	0.46
45	970801	S250	5	60	249	259	254.0	81.40	0.09	0.30
46	970801	S250	6	60	244	253	248.5	2505.10	0.13	0.95
47	970801	S250	7	60	249	258	253.5	3728.80	0.15	2.69
48	970802	S500	1	60	498	502	500.0	4.33	15.20	102.90
49	970802	S500	2	60	497	500	498.5	5.44	24.20	149.30
50	970802	S500	3	60	495	501	498.0	2.02	15.10	183.50
51	970802	S500	4	60	498	502	500.0	1.81	11.25	94.50
52	970802	S500	5	60	500	503	501.5	1.24	5.45	178.20
53	970802	S500	6	60	499	502	500.5	4.89	11.60	115.60
54	970803	S375	1	60	373	378	375.5	774.40	1.53	619.90
55	970803	S375	2	60	373	376	374.5	648.30	3.59	1097.10
56	970803	S375	3	60	370	379	374.5	1939.30	1.24	2781.60
57	970803	S375	4	60	370	376	373.0	1464.10	4.90	2055.30
58	970803	S375	5	60	373	379	376.0	996.50	3.04	768.70
59	970803	S375	6	60	375	377	376.0	991.20	2.02	557.80
60	970804	STR	1	60	207	241	224.0	0.04	0.04	0.63
61	970804	STR	2	60	259	306	282.5	28.30	0.35	2.07
62	970804	STR	3	60	306	352	329.0	329.20	0.78	19.60
63	970804	STR	4	60	363	399	381.0	1360.30	2.82	1869.10
64	970804	STR	5	60	417	444	430.5	296.90	8.51	898.10
65	970804	STR	6	60	465	503	484.0	30.50	19.50	180.90
66	970804	STR	7	60	510	551	530.5	7.41	48.80	224.30
67	970805	STR	1	60	200	266	233.0	0.02	0.00	0.80
68	970805	STR	2	60	255	298	276.5	10.35	0.37	2.41
69	970805	STR	3	60	315	354	334.5	560.70	1.27	23.50
70	970805	STR	4	60	373	401	387.0	1238.70	1.06	967.50
71	970805	STR	5	60	419	441	430.0	207.20	7.45	1307.80
72	970805	STR	6	60	460	502	481.0	59.00	25.10	699.30
73	970805	STR	7	60	510	558	534.0	37.30	42.60	263.00
74	970806	N250	1	60	246	252	249.0	0.05	0.00	0.81
75	970806	N250	2	60	242	258	250.0	0.01	0.10	0.31
76	970806	N250	3	60	248	258	253.0	0.00	0.03	1.28
82	970808	N350	1	60	349	355	352.0	464.00	2.93	155.50
83	970808	N350	2	60	349	353	351.0	687.90	1.65	185.30
84	970808	N350	3	60	350	351	350.5	904.50	8.80	324.90
85	970808	N350	4	60	346	359	352.5	460.60	7.70	133.40
86	970808	N350	5	60	350	356	353.0	618.90	2.06	43.00
87	970808	N350	6	60	348	356	352.0	1049.20	7.59	59.40
88	970808	N350	7	60	349	355	352.0	846.00	9.00	102.70
89	970809	N350	1	60	350	361	355.5	827.00	3.38	445.10
90	970809	N350	2	60	347	352	349.5	960.70	1.80	194.80
91	970809	N350	3	60	348	352	350.0	848.40	8.53	234.20
92	970809	N350	4	60	354	364	359.0	661.90	10.50	300.00
93	970809	N350	5	60	351	363	357.0	630.80	5.10	110.10
94	970809	N350	6	60	348	355	351.5	1001.00	1.92	54.60
95	970809	N350	7	60	350	364	357.0	1025.60	7.30	99.90
96	970810	NTR	1	60	211	223	217.0	0.00	0.18	0.08
97	970810	NTR	2	60	271	291	281.0	0.05	0.00	0.26
98	970810	NTR	3	36	312	358	335.0	100.60	0.13	4.95
99	970810	NTR (?)	4	9	373	388	380.5	65.50	0.19	15.10
100	970810	NTR	6	60	452	458	455.0	133.00	42.30	36.80
101	970810	NTR	5	60	420	433	426.5	291.60	42.60	96.20

Table 1. List of transects and hauls with details on haul duration, depth interval, and catch of shrimp, Greenland halibut and redfish.

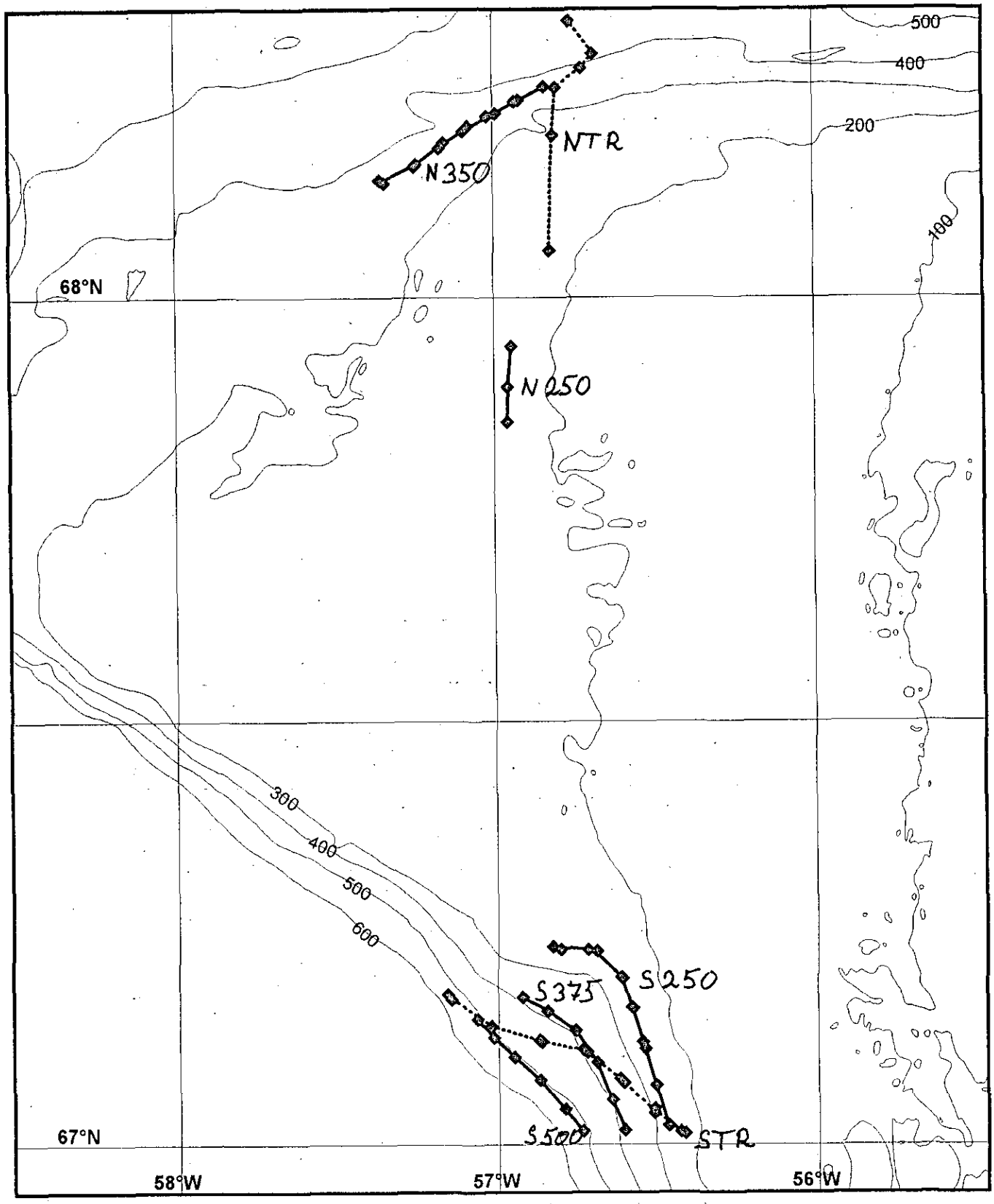

Figure 1. Map showing position of transects and hauls on the southwestern (transects S250, S375, S500 and STR) and northwestern slopes of Store Hellefiske Bank (transect N250, N350 and NTR).