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Diurnal variations in shrimp catches on the offshore  
grounds of ICNAF Div. 18

by

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Introduction.

The Greenland trawler SISIMIUT has been fishing for shrimps on the offshore West Greenland grounds for several months in different seasons in 1975 and 1976. Information on positions, duration of hauls, and catches per haul (in 100 kg unit) is recorded in the fishing logbook, from which catches per hour trawled have been calculated. Most of the trawl hauls had a duration of about 2 hours, but also hauls of from about one to about three hours were made. Catch per hour in two-hours intervals were calculated on a total of 923 hauls covering the periods end of December 1975 - January 1976, and June - October 1976. Further, material from October, November, December 1975 has been computerized to show catch per hour in three -hours intervals.

Results

The results are shown in Figs. 1 and 2 and in Tables 1 and 2, and the basic material from ultimo 1975 and from 1976 is presented in table 3.

In spite of a big variation between the catch sizes the curves in Figs. 1 and 2 have not been smoothed. The detailed material and a smoothed curve from July 1976 is, however, presented by Horsted (Res. Doc. 76/XII/150), but still they clearly show diurnal variations by months with the smallest catches taken by night. Further, the biggest diurnal variation is seen in the autumn, when the variation in light intensity is maximal, while the smallest diurnal catch variation is seen in December-January and in June, when the variation in light intensity is minimal. It is, therefore, reasonable to believe that the diurnal variation in light intensity causes vertical migrations by the shrimps some of which move up in the water by night.

These observed day and night variations in shrimp catches are in good accordance with information from interviews with Greenland shrimp fishermen in the Disko Bay (see Smidt, Res. Doc. 76/XII/151).

**TABLE 1.** Diurnal variation in shrimp catches in different months from ultimo December 1975 to October 1976. Average kg per hour in two hours intervals.

Month	Effort and catch per unit effort	Two hours intervals											
		0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24
Dec 28-	No of hauls	15	12	15	17	9	17	10	17	15	16	7	12
Jan 25	kg per hour	580	460	620	600	700	630	770	780	560	390	530	290
June	No of hauls	10	13	11	14	13	12	14	14	14	14	14	15
	kg per hour	790	860	970	950	790	1230	1080	960	1060	800	1110	700
July	No of hauls	8	12	12	14	11	7	12	14	10	11	15	14
	kg per hour	640	640	820	860	790	1010	910	1160	1040	880	730	540
August	No of hauls	9	11	14	13	7	15	13	12	15	17	12	10
	kg per hour	370	640	940	980	830	840	960	1290	1090	930	830	570
September	No of hauls	13	12	15	19	13	13	14	20	18	13	13	13
	kg per hour	210	330	550	800	830	830	930	930	970	690	510	230
October	No of hauls	7	11	14	8	15	11	12	14	12	14	9	12
	kg per hour	300	200	310	410	570	540	630	470	610	230	160	200

**TABLE 2.** Diurnal variation in shrimp catches in October, November, December 1975. Average kg per hour in three hours intervals.

Month	Three hours intervals							
	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24
October	78	66	275	466	500	875	420	300
November	244	498	370	832	1050	781	537	460
December	187	445	383	508	582	600	473	427

**TABLE 3.** Commercial shrimp catches taken by M/T SISIMIUT in the period ultimo December-January 1975-76, and in different months from June to October 1976. Average numbers of kg trawled per hour in two hours intervals during 24 hours. Positions given as rectangular codes (see Ref. Doc. 76/VI/16 by Carlsson and Smidt).

Month	Date	Code	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	
Dec 1975	27	KF 7												320	
	28	KG 6	200	130											
		KF 7				200	170								100
	29	KA 9	500			620					750		410		
		KB 9			670				0			710			340
	30	KA 9				340			290		350	790			
KB 9				400								190		340	
31	KA 9		330					500			350		0		
	KB 9				400					930					
Jan 1976	1	KA 9	640		750	400		340			240			80	
		KB 9		960			1090			160		430			
	3	JZ 9												220	
	4	JZ 9				880		70			150				
		KA 9	80		790					860					
	5	JV 7	50												
		JZ 9			230	0		260	750	330		330			
	6	JZ 9								500	1000	600	110	750	
		KB 12		30											
		KD 14			100										
	7	JZ 9	400	500	570	550	1910		1000		690	130	50	220	
	8	JZ 9		790	3000	1500		2000	1000	720	530	270		0	
	11	JE 18													200
		JF 14							350						
		JG 14				170	670								
		JG 15											150		
		JH 15								290					
	12	JF 16	180	170		280		170		220		160	250		
	13	JF 15													230
		JF 16			150	560									
		JF 17								930	1270		360		
		JF 18							330						
	14	JE 17							570			270			
		JF 17	460		280	600									
	15	JZ 9					860			1200					
16	JZ 9						1600	250	1670	670	1140	860			
17	JZ 9	2220	110		640		330	860		710	430		1140		
18	JZ 9	400		600	2130		860		950		1390	1330			
19	JZ 9	2670													
21	JZ 9		670	550		670	1420	750	130		290				
	JZ 10	140													
22	JZ 9	70		800	500	670	1000		550	950	90		330		
23	JZ 9	400	670	160	480	0			960	900	400	500			
24	JZ 9	260							1330	1270	800				
	JZ 11		500	290		250	670								
25	JZ 9		710												
June 1976	1	KF 7		900	1000	1000	480		570	750	250		240		
		KG 7												440	
	2	KG 7	1000		750	890									
		KH 7					1040								
		KJ 6							960	960		1200			
	5	KH 7	500	720		440									
KJ 6						500									
KK 6							670	670	1000		1290	1140	1000		

Table 3 Continued

Month	Date	Code	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	
June 1976 (cont.)	6	KK 6		960	1000	1160		2000	1920		2000	1500	1500	1000	
	7	KL 6			960	1780		2500							
		KM 5		1500											
	9	KE 14												130	
	10	KE 14		360		750		440		490	1290		530		
	11	KE 14	430		490		490			430		400			300
		KE 15											340		
	12	KE 14			420										
		KK 5								470	1800	1000	860		
		KL 5												630	1200
	13	KL 5	1800	950	720	1000	2000								
		KM 4						1270	1000	1270	1880				
	15	KL 5													270
		KK 6											130		
	16	KL 5	1070	630	950		1330								
		KM 4				670			740	950	1800	1710		2110	
		KM 5													1500
	17	KK 4												1140	
		KL 5			600	800	900			2000		1000	1000		
		KM 5		400				1670			670				
	19	KK 5											530		
		KL 5												400	200
	20	KJ 5									510	530			
		KK 5								200				570	
		KL 5	630	1800	1250	1000	670						670		600
	21	KB 8							130						670
		KD 8						170		500	0	0	350	800	
	22	KB 8	500	1050		1250	500								290
		KD 8							500	1500		1580	1250	1140	
	25	KJ 5													950
KK 5											300	690	560		
KL 4							380	240		130					
26	KJ 5	670		720	630	320	3300	2000	2000	1270	1390	1500			
27	KJ 5						1500						1000		
	KK 5	1260	950	1270	1380				2000	1000	1250			500	
28	KJ 5		500	1000				1250							
	KK 5				600										
30	KJ 5								1100		1250	2290	1500		
July 1976	1	KJ 5		750	400	710	480		1000	1500	1500		1000		
	3	KJ 5									530		250	190	
	4	K 5		450	330	630		1110	860	750		250	350	630	
	5	KJ 5		750	850	1000		1250	760	1550	1000	1050		750	
	6	KJ 5	300	930		830	1250	1680		1500	1250		500	260	
	8	KH 5												500	460
		KK 5									1000		1000		
	9	KH 5		500	500		500		800			750		250	
	10	KH 5	300	570	570	400		500	690	800		690	930		
	11	KH 5	300	720		860	690		960	1330		750	500		
	18	KK 5-6		1200	900		480		450	500	900	800			
	21	KJ 5											690	500	790
	22	KJ 5		850	1000	900		700	750		600		600	460	
	23	KJ 5	550		600	570	750	960		700	1000		790	750	
24	KJ 5	650	750		550	550	900		1000	1000	1250	630	650		
25	KK 4	500		750	1000	750		1200	1120		1250	1000	780		
26	KK 4	910		1110	1750										

Table 3 - continued

Month	Date	Code	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	
July 1976 (cont.)	29	KK 4 KL 4		200		250	240		290	940	1010		1100	630	
	30	KL 4	1600		1750	1600	1950		1710	1500	1600		1440	930	
	31	KL 4		400	1130	960	1000		1440	1500		1250	900	150	
August 1976	1	KL 4		500	1250	1390		650		1250	1750	1670	1250		
	5	KL 4 KM 4	200	1000		750		1000		1250	2000	2500	1500	2000	
	6	KM 3 KM 4			1780	1000		1000		1390		1000		1500	
	7	KM 3			1000	1000	280		500	890	1500	1250		690	
	8	KM 3		1130	1500	1440		1850		2000	2000	1500			
	11	KM 3					1810		1500	2000	1580		1580	400	
	12	KM 2 KM 3			800		1500		1290		1500	1500	1140	1110	
	15	KM 2 KM 3		350	450	670		440	430		1100	400		500	
	16	KM 2 KM 3			150	290	440		570	500		560	460		
	17	KM 2 KM 3	160		1000	1390		1000		1200	1000	1070	690		
	18	KM 3	250		800	1200		1020	860		600	440			
	20	KH 7 KJ 6 KJ 7											1000		
	21	KM 3			800	930		460	580	750		500	390		
	22	KM 3 KM 4	550	1000	750			560	1370	1250		1150	1000	750	
	23	KM 4	200	250	750	650		800	1000	1000			1030		
	25	KH 6 KJ 6 KK 5										450	500		
	26	KM 2 KM 3 KM 4			650	1110		1070	460		930	1470	950	480	
	27	KM 3	400	630	1200	830		890	600		600	240		270	
	28	KL 2 KL 3 KL 4 KM 3 KM 4					210				1000		690	180	
	29	KL 3 KL 4						650	580				290		
	September 1976	1	KJ 5 KL 3	130			400	270	1000		1250	1670	830		
		2	KL 3	70		450	750	1130		1000	1550	1250		1000	
		3	KL 3		200	750	1450		950	1200	850	1150		630	
		4	KL 3 KM 2		240	530	100			1000	1100	1050		900	
		5	KM 2	230		350	800	900	550		700	950	1090		
		8	KL 4 KM 3				830		1050	740	1500	1300		900	
		9	KL 4		250	670	850		1000	880	580		440	1450	
		11	KK 5												110
		12	KL 3 KM 3		500	400		1230		550		320	800	450	80
13		KM 3	40		560	1250	1670			1140	1600	1550	960	280	

Table 3 - continued

Month	Date	Code	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	
Sept. 1976 (cont.)	14	KM 3	160		400	1150	1500	1350		1200	550	400			
	15	KM 4	130	400		1300	1500		1650	2150	2150	1400	130		
	17	KM 4												130	
	18	KM 4	460	500		500	1000	300		200	550	640	90		
	19	KM 4	50	150	340	1300									
		KM 5							1250	670	400		520	200	580
		KN 4												70	
	20	KN 2							800	1050	650	420			
		KN 4		200	300	720									
	21	KN 3	580	1000	950						1150	750			
		KN 4				450			250	670					260
		KN 5													
	23	KN 5												120	
	24	KN 5	450	400	350	470		850	950	350	560			300	
	25	KN 4				200	460			550	200	500	340		
		KN 5													200
	26	KN 5	840	80		850									
		KP 5					100			960	880	740	690		250
27	KP 5	1400		700	1150	600	900			1250	820	720	400		
	KN 5								550				330		
28	KP 5			360	650	400				700	750	500			
	KN 5														
October 1976	1	KN 5				400									
		KN 4					670					350	150		
		KN 5			370										530
		KP 5													
	2	KP 5		90	500	400		650			200		160	300	130
		KR 4													
		KR 5								400					
	3	KN 5		360	350		500	300	400	150			130		
	4	KN 5	230		230										
		KP 5				550	550								
	6	KR 4											490	40	
		KP 2											300		
	7	KN 2													
		KP 3	120											40	
		KP 5			120										
		KR 5				350						650			
		KS 3					650								
	8	KS 4								250					
		KS 5									400				
		KM 3		120											
	9	KL 4												40	
10	KJ 5					400									
	KJ 6						600	450							
	KK 3		65												
	KK 4			50											
	KK 6									200					
	KL 5											200			
11	KN 2	367													
12	KP 4			300											
	KP 5				250										
	KR 4							1150	950	1000	800	260		200	
	KS 4														
12	KP 3													330	
	KR 4			400				555			900	200			
	KS 4		400							1000					
	KS 5					600									

Table 3 - continued

Month	Date	Code	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24
October 1976 (cont.)	13	KP 3								850	1050		100	
		KP 4		30				200						
		KR 4			500		550							
	15	KK 3										100		
KL 3													90	
	16	KM 3		200			600							
KN 2								500						
KN 3					220									
KP 1									1250					
KP 2										870		300	120	
		KP 3	235											
	17	KP 2			290	690	670		700	300	400		120	
KR 3		470												
	18	KP 2	230											
KR 4				340						980	230			
KS 4						300	650			200				
KS 5									500					
	19	KP 2		240	250									
KP 3						820								
KN 2								530	750					
KN 3										650	360			
	21	KL 3												65
	22	KN 2						670			600	290		300
KN 3			240											
KP 2									850					
KP 3					200		630							
	23	KM 3	440				600			200				
KN 2								400		300				
KN 3					100									
KP 2												200		
KP 3													400	
	24	KN 2												160
KN 3														
KP 3											350			
KR 3			100											
KR 4										300				
KS 3					170									
KS 4							240							
KS 5									350					
	25	KM 3											360	
KN 2			340											
KN 3						330	360		650	700	200			

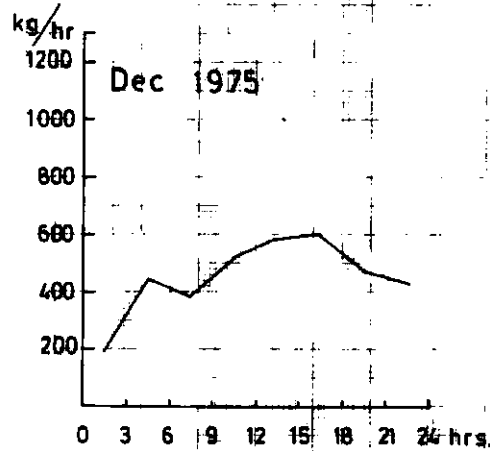
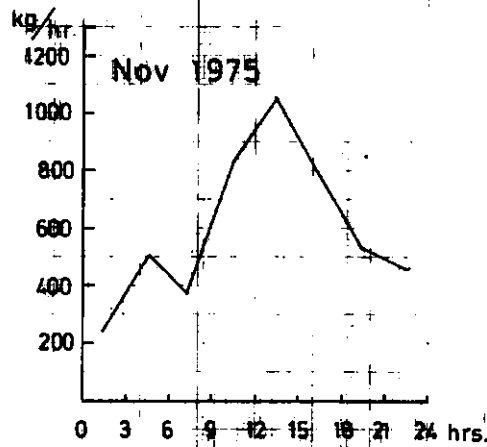
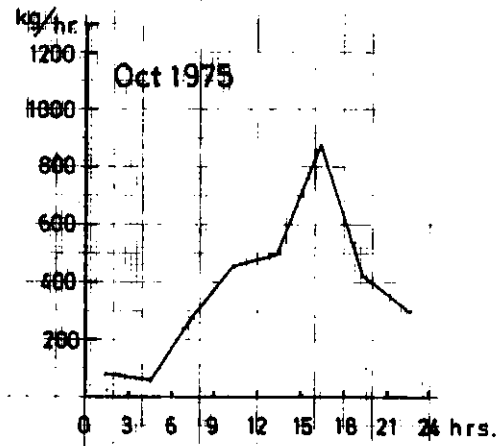


Fig.1 Diurnal variation in catch per hour trawled in three hours intervals for October, November and December 1975.



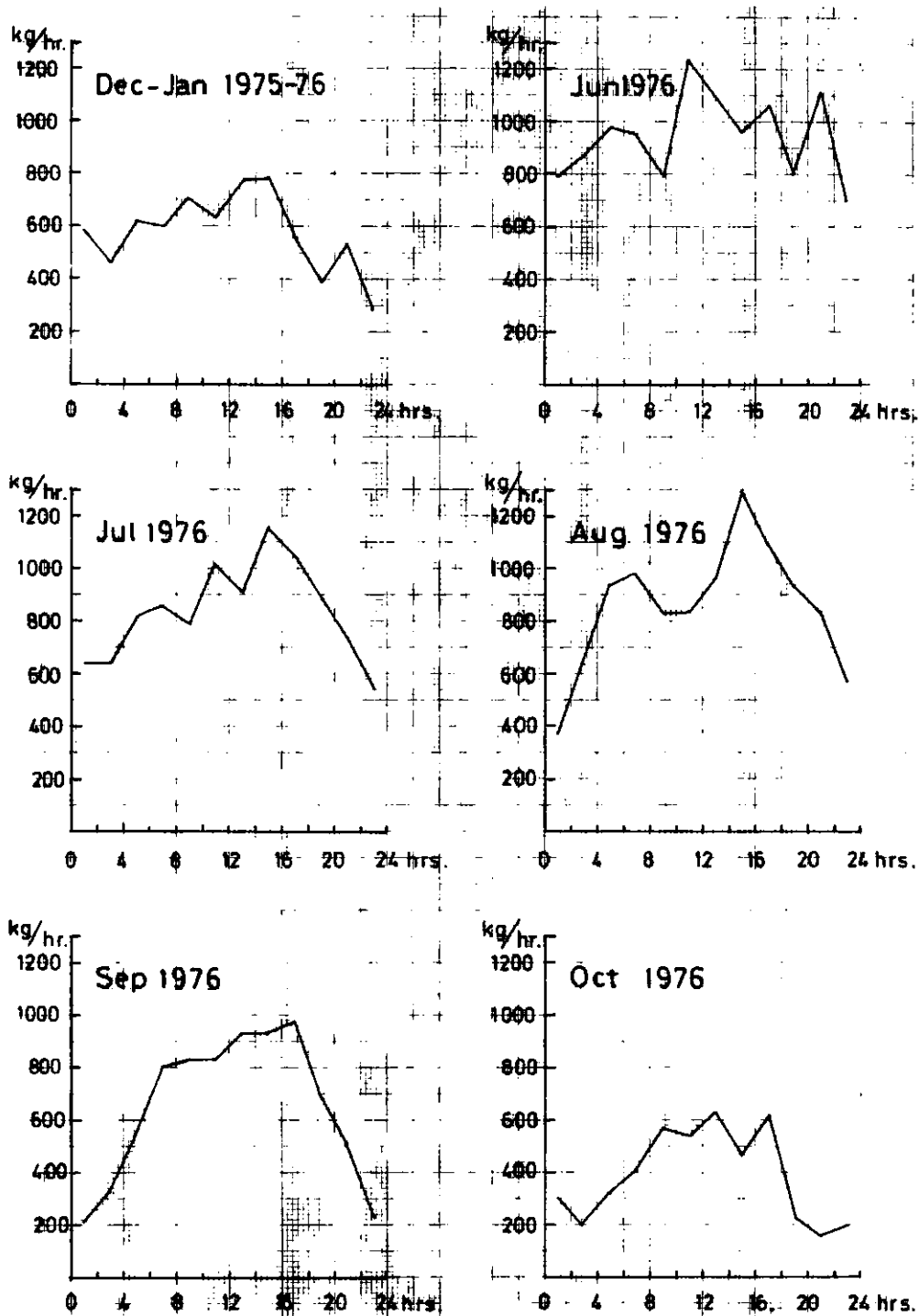


Fig.2 Diurnal variation in catch per hour trawled in two hours intervals in ultimo December - January 1975-76, and in the months June to October 1976.

