

**Abundance and length composition for
Sebastes marinus L., deep sea *S. mentella* and juvenile redfish (*Sebastes spp.*)
off Greenland and Iceland based on groundfish surveys 1985-2001**

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Abstract

The joint presentation of the German and Icelandic research survey results off Greenland and Iceland is considered a comprehensive review of available information regarding demersal redfish occurrences in the shelf areas and on the continental slopes down to 400 m depth. The main difference between the surveys is the season of operations. Apart from catchability or migration related problems there have been yet no attempts undertaken to account for the seasonal difference in the survey series (recruitment, mortality, growth). Such effects need to be evaluated in future to improve the joint German-Icelandic survey evaluation.

After a severe depletion of the *S. marinus* stock on the traditional fishing grounds around East Greenland in the early 1990's, the survey estimates off Iceland increased until 1999 to the level observed during the mid 1980s when the surveys commenced. However, the most recent survey results indicate a decreasing trend in stock size since 2000 and a concentration of the stock off southwest Iceland. Marked shifts of size-spectra peaks might indicate annual growth increments of single cohorts between 2-5 cm/year.

The combined German-Icelandic survey results indicate that they do cover only the immature part of the deep-sea *S. mentella* stock and should therefore be used only as a recruitment indicator. However, the poor status of the deep-sea *S. mentella* stock on the East Greenland shelves in the 80's was subject to a steady improvement since the early 1990s. This positive trend was due to successful recruitment of one individual year classes until 1997. During the following two years, the year class has obviously left the survey area and is believed to have also recruited into the oceanic stock of *S. mentella*. Most recently, there are indications of further recruiting year classes, which seem, however, to be significantly less abundant. The observed growth rate of about 2cm/year coincides quite closely with results from other studies.

Juvenile unspecified redfish *S. spp.* (<17cm) were found almost exclusively off East Greenland more abundant during the latter half of the survey period during 1993-1998. They were recorded to be bigger off East Greenland as compared to West Greenland and exhibited growth rates of about 5 cm/year in age-groups 0, 1 and 2. Especially for the juvenile redfish the estimated combined abundance, biomass and length frequencies must be corrected for the seasonal difference between the survey series.

Introduction

The shelf areas and continental slopes around Greenland and Iceland traditionally were important fishery grounds for redfish. Two species constitute to the commercial fishery, namely the golden redfish *Sebastes marinus* and the deep sea redfish *S. mentella*. Catches of *S. marinus* around Iceland have declined until mid 1990s by 50 % but remained stable since then on the low level at around 35 000 t. Catches taken on the Greenland shelf have been declining over the last three decades, and since 1991, there is no targeted fishery on this stock (Anon., 2001). Deep sea *S. mentella* catches on the Greenland shelf have varied considerably during the past 2 decades but they were recently restricted to by-catches in the Greenland halibut fishery only (Anon., 1998). In Icelandic waters, the catches of deep sea *S. mentella* peaked in 1994 and decreased thereafter to less than 30 000 t. Mean lengths in commercial redfish catches off Greenland have decreased since the mid-1970's (Rätz, 1996).

Extensive redfish nursery grounds on the East Greenland shelf are known since the mid 1950's (Magnússon, 1956; Magnússon and Magnússon, 1975) and possible effects of recruitment success for *S. marinus* and the Irminger Sea stocks of *S. mentella* were described frequently (e.g. Magnússon *et al.*, 1988 and 1990, Magnússon and Magnússon, 1995; Magnússon and Jóhannesson, 1997; Anon., 1998). The occurrence of large amounts of young redfish on the East Greenland shelf, observed by Magnússon *et al.* (1988), was found to be present over the past five years (Anon., 2001).

The mean growth rate for young redfish (< 17cm), reported by Friðriksson (1961) from Icelandic surveys in the 1930's and by Magnússon *et al.* (1988), was found to be around 2cm/year. Similar observations were made for redfish off Nova Scotia (Perlmutter and Clarke, 1949) and Newfoundland (Sandemann, 1957 and 1961). Age-validation studies by Mayo *et al.* (1981), Nedreaas (1990) and Anon., (2001) indicated slightly higher growth rates, referring to strong year classes.

This paper presents survey results for *S. marinus* (≥ 17 cm), deep sea *S. mentella* (≥ 17 cm), and juvenile redfish *S. spp.* (<17 cm) off West and East Greenland and Iceland down to 400 m depth. The combination of both survey series is performed to allow a comprehensive review of their results. Estimates of stock abundance and biomass indices as well as length compositions are given for the period 1985-2001.

Material and Methods

Abundance, biomass estimates and length structures have been derived using annual German groundfish surveys covering shelf areas and the continental slopes off West and East Greenland and Icelandic groundfish surveys covering the shelves around Iceland, respectively. Both survey series were primarily designed for the assessment of cod and are considered similar in survey design and evaluation.

The German survey off Greenland is designed as a stratified random survey. The hauls are allocated to the strata off West and East Greenland both according to the area and the mean historical cod abundance at equal weights. Stations are randomly selected from successfully trawled grounds. Because of favourable weather and ice conditions and to avoid spawning concentrations, autumn was chosen for the time of the surveys. These were carried out by the research vessel (RV) WALTHER HERWIG (II) throughout most of the time period. In 1984 and since 1994, she was replaced by RV ANTON DOHRN and the new RV WALTHER HERWIG III, respectively. The fishing gear used was a standardized 140-foot bottom trawl, its net frame rigged with heavy ground gear because of the rough nature of the fishing grounds. A small mesh liner (10 mm) was used inside the cod end. The horizontal distance between wing-ends was 25 m at 300 m depth, the vertical net opening being 4 m. Hauls which received net damage or became hang up after less than 15 minutes were rejected. Some hauls of the 1987 and 1988 surveys were also included although their towing time had been intentionally reduced to 10 minutes because of the expected large cod catches as observed from echo sounder traces.

The Icelandic groundfish surveys have been carried out annually in March since 1985, covering the continental shelf waters around Iceland with 540-600 "semi-randomly" distributed tows (Pálsson *et al.*, 1989). Each year 4-5 commercial trawlers, of the same type have been hired to cover the stations with a standard fishing gear. The fishing gear is a standardised 105-foot bottom trawl, also rigged with heavy ground gears. The net opening was estimated to be 17 m and the trawling covered a standard distance of 4 nautical miles. The Icelandic survey design has been called a semi-random design, which also allocated the numbers of trawl stations due to the cod abundance and stratum area. The Icelandic survey area has been re-stratified according the Greenland scheme of 200 m depth intervals.

Fish were identified to species or lowest taxonomic level and the catch in number and weight was recorded. Redfish inhabiting the survey area close to the bottom are believed to belong to the traditional stocks off Greenland, Iceland and Faroes (Anon., 1995). In the German surveys off Greenland, fish (≥ 17 cm) were separated to *Sebastes marinus* L. or deep sea *Sebastes mentella* Travin, whereas juvenile redfish (<17 cm) were classified as *Sebastes spp.* due to time-consuming and difficult species identification. However, in the Icelandic surveys the redfish <17 cm were identified to the species level. These data were transformed to meet the category of small and unspecified redfish *S. spp.* (<17 cm) as used in the German survey records. Total fish lengths were measured to cm below.

Calculations of abundance and biomass indices were based on the 'swept area' method using the trawl parameters as specified in Table 1. The redfish survey catches off Iceland were converted to 30 min. trawling duration irrespective of the distance covered during that time. In order to reduce the error of abundance estimates, the subdivision of shelf areas and the continental slope into different geographic and depth strata was required due to a pronounced heterogeneity of redfish distribution. The survey area was thus split into eleven geographic strata. Each stratum was itself subdivided into two depth strata covering the 0-200 m and 201-400 m zones. Figure 1 and Table 2 indicate the names of the 22 strata, their geographic boundaries, depth ranges and areas in nautical square miles (nm^2). The inner limit of all strata was the 3 mile offshore line. Figure 1 also shows the positions of hauls conducted during the surveys.

Stratified abundance estimates were calculated from catch-per-tow data using the stratum areas as weighting factor (Cochran, 1977; Saville, 1977). Strata with less than five valid sets were rejected from the calculation. The coefficient of catchability was set arbitrarily at 1.0, implying that estimates are merely indices of abundance and biomass. Respective confidence intervals (CI) were set at the 5% significance level of the stratified mean. The length measurements were compiled by stratum and year and raised to the respective abundance estimation.

The main difference between the German surveys off Greenland and the Icelandic groundfish surveys is the season. The German survey is conducted during fall (October-November) due to favourable weather and ice conditions while the Icelandic survey is conducted in spring (March). Apart from catchability related problems there have been yet no attempts undertaken to account for the seasonal difference in the survey series (recruitment, mortality, growth). Such effects need to be evaluated in future to improve the joint German-Icelandic survey evaluation.

Results

S. marinus (≥ 17 cm)

For the period 1985-2001, survey abundance and biomass indices for *S. marinus* (≥ 17 cm) are listed in Tables 3 and 4 by stratum, West and East Greenland and Iceland, aggregated to total and accompanied confidence intervals. The trends of the combined survey indices are illustrated in Figures 2 and 3. Total estimates showed a variation between two levels, the estimates since 1991 are reduced by 50 % as compared to earlier periods. This is mainly due to the significant decrease in abundance and biomass of *S. marinus* (≥ 17 cm) in East Greenland waters to very low values in the recent past. West Greenland shares are negligible while the Icelandic values decreased during the early 1990s but increased again since the mid 1990s until 1999 to the level observed at the start of the time series in 1985. Since 2000, both abundance and biomass indices decreased significantly. Figure 4 displays the abundance distribution as observed in 2001. Highest concentrations were only found off southwest Iceland.

Length frequencies of *S. marinus* (≥ 17 cm) are listed for West, East Greenland, Iceland and aggregated to total in Tables 5-8, and illustrated in Figures 5 and 6 for the periods 1985-1994 and 1995-2001, respectively. They reveal pronounced year and area effects. Usually, the few individuals off West Greenland are hard to discover. The fish off East Greenland were generally smaller than those observed in Icelandic waters and there are indications of several good individual year classes growing up off East Greenland and recruiting to Icelandic grounds. There are marked peaks at lengths of 20, 24, 27, 29 and 30 cm between the successive years 1985-89 and at lengths of 22 and 25 cm between the successive years 1990-91 off East Greenland. Icelandic age readings in recent years indicate similar growth rates by year as derived from the length distributions (Anon., 2001). The abrupt decrease in size of the indices of such year classes indicated major recruitment migrations in 1987-1988

and 1990-1991. Such recruitment events explain the increased abundance and biomass estimates of *S. marinus* (≥ 17 cm) during the late 1990s.

Deep sea S. mentella (≥ 17 cm)

Survey abundance and biomass estimates and accompanied confidence intervals for deep sea *S. mentella* (≥ 17 cm) are presented in Tables 9 and 10, broken down by stratum, West and East Greenland, Iceland and aggregated to total. The trends in stock size in numbers and weight are illustrated in Figures 7 and 8 while Figure 9 shows the geographic abundance distribution in 2001. The abundance and biomass figures are clearly dominated by the occurrences off East Greenland, while there were only negligible parts distributed off West Greenland and Iceland at depths of 0-400 m. It can be derived from those figures that the surveys do cover only the immature part of the stock (recruits) since the figures also are dominated by a single strong year class recorded in 1989 for the first time at a mean length of 20 cm (Fig. 10). This cohort grew about 2 cm a year and recruited to the survey gear until 1997 (Fig. 11) when it reached its maximum abundance and biomass at a length of about 27 cm (total abundance 7 billion and biomass 1.5 million tons). During the following two years, this year class declined drastically. Most recently, there are indications of further recruiting year classes, which seem, however, to be significantly less abundant. The size compositions for the period 1985-2001 by area and total are given in Tables 11-14.

Juvenile S. spp. (< 17 cm)

Trends in survey abundance and biomass for juvenile redfish (< 17 cm) are listed in Tables 15 and 16, again broken down by stratum, West and East Greenland, Iceland and total and accompanied with confidence intervals. Respective values are shown in Figures 12 and 13. Figure 14 shows the geographic abundance distribution recorded in 2001. In 1985 and from 1993 to 1998, small and unspecified redfish (< 17 cm) were very abundant and distributed almost exclusively off East Greenland. The abundance and biomass values estimated since 1999 are very low. Weighted mean lengths and length distributions are listed in Tables 17, 18, 19 and 20 for West, East Greenland, Iceland and total. These data are illustrated in Figures 15 and 16. Juveniles off East Greenland were found to be bigger than those off West Greenland. Reappearing peaks at 6-7, 10-12 and 15-16 cm might indicate annual growth increments and represent the age groups 0, 1 and 2 years of unspecified juvenile redfish.

Discussion

The joint presentation of the German and Icelandic research survey results off Greenland and Iceland is considered a comprehensive review of available information regarding demersal redfish occurrences in the shelf areas and on the continental slopes down to 400 m depth. Both survey designs are rather similar and required only minor adaptations of the data structure and evaluation. The main difference is the season of operations. The German survey is conducted during fall (October-November) due to favourable weather and ice conditions while the Icelandic survey is conducted in spring (March). Apart from catchability or migration related problems there have been yet no attempts undertaken to account for the seasonal difference in the survey series (recruitment, mortality, growth). Such effects need to be evaluated in future to improve the joint German-Icelandic survey evaluation.

After a severe depletion of the *S. marinus* stock on the traditional fishing grounds around East Greenland in the early 1990's, the survey estimates off Iceland increased until 1999 to the level observed during the mid 1980s when the surveys commenced. However, the most recent survey results indicate a decreasing trend in stock size since 2000 and a concentration of the stock off southwest Iceland. Marked shifts of size-spectra peaks might indicate annual growth increments of single cohorts between 2-5 cm/year.

The combined German-Icelandic survey results indicate that they do cover only the immature part of the deep-sea *S. mentella* stock and should therefore be used only as a recruitment indicator. However, the poor status of the deep-sea *S. mentella* stock on the East Greenland shelves in the 80's was subject to a steady improvement since the early 1990s. This positive trend was due to successful recruitment of one individual year classes until 1997. During the following two years, the year class has obviously left the survey area and is believed to have not only recruited to the East Greenland-Iceland-Faeroe Island stock but also recruited into the oceanic stock of *S.*

mentella (Stransky, 2000). Most recently, there are indications of further recruiting year classes, which seem, however, to be significantly less abundant. The observed growth rate of about 2cm/year coincides quite closely with results from studies by Perlmutter and Clarke (1949), Sandemann (1957 and 1961), Friðriksson (1961), Mayo *et al.* (1981), Magnússon *et al.* (1988) and Nedreaas (1990).

Juvenile unspecified redfish *S. spp.* (<17cm) were found almost exclusively off East Greenland more abundant during the latter half of the survey period during 1993-1998. They were recorded to be bigger off East Greenland as compared to West Greenland and exhibited growth rates of about 5 cm/year in age-groups 0, 1 and 2. Especially for the juvenile redfish the estimated combined abundance, biomass and length frequencies must be corrected for the seasonal difference between the survey series.

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Table 1 Trawl parameters of the joint German-Icelandic groundfish surveys.

	German survey	Icelandic survey
Gear	140-feet bottom trawl	105-feet bottom trawl
Horizontal net opening	22 m	17 m
Standard trawling speed	4.5 kn	3.8 kn
Towing time	30 minutes	Corrected to 30 minutes
Variable to standard distance		
Coefficient of catchability	1.0	1.0

Tab. 2 Survey area and effort (hauls) of the joint German-Icelandic groundfish survey database including West Greenland, East Greenland and Iceland, 1985-2001.

STRATUM	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	WEST	EAST	ICELAND	TOTAL
DEPTH (m)	0- 200	200- 400	0- 200	200- 400	0- 200	200- 400	0- 200	200- 400	0- 200	200- 400	0- 200	200- 400	0- 200	200- 400	0- 200	200- 400	0- 200	200- 400	0- 200	200- 400	0- 200	200- 400				
AREA (nm)	6805	1881	2350	1018	1938	742	2568	971	2468	3126	1120	7795	92	4589	7973	5771	7824	6405	10940	11231	6391	2363	18273	19190	58898	96361
YEAR																										
1985	10	8	26	10	17	5	21	4	5	21	14	50	0	28	53	35	116	94	127	93	45	22	101	118	585	804
1986	27	9	21	9	16	7	18	3	3	15	14	37	1	34	45	34	108	85	119	93	45	21	110	104	550	764
1987	25	11	21	4	18	3	21	3	19	16	13	40	0	18	48	35	112	93	116	93	40	22	106	106	559	771
1988	34	21	28	5	18	5	18	2	21	8	13	39	0	26	46	34	113	79	114	92	38	21	131	107	537	775
1989	26	14	30	9	8	3	25	3	17	18	12	29	0	11	37	35	113	92	111	86	40	23	118	87	537	742
1990	19	7	23	8	16	3	21	6	18	19	6	15	0	13	44	30	113	90	100	90	42	23	103	71	532	706
1991	19	11	23	7	12	6	14	5	8	11	10	28	0	16	40	31	110	89	108	89	36	22	97	73	525	695
1992	6	6	6	5	6	6	7	5	0	0	0	0	0	6	33	34	110	80	115	89	35	21	47	6	517	570
1993	9	6	9	6	10	8	7	0	9	6	6	18	0	14	41	28	117	84	111	84	50	21	55	53	536	644
1994	16	13	13	8	10	6	7	5	0	0	0	0	0	6	39	30	117	84	116	87	43	19	78	6	535	619
1995	0	0	3	0	10	7	10	5	8	6	6	17	0	12	54	33	107	86	116	86	42	15	35	49	539	623
1996	5	5	8	5	12	5	10	5	7	9	5	13	0	9	51	34	108	90	106	70	48	23	55	43	530	628
1997	5	6	5	5	6	5	8	5	5	5	4	8	0	8	38	35	108	86	104	55	47	22	45	30	495	570
1998	9	5	10	7	11	6	10	5	5	8	6	12	0	9	45	34	99	62	99	58	47	22	63	40	466	569
1999	8	6	14	8	13	6	9	3	5	6	6	13	0	5	52	32	92	70	110	61	49	20	67	35	486	588
2000	13	6	14	7	14	5	9	5	6	5	8	16	0	11	49	33	104	85	113	69	48	22	73	46	523	642
2001	0	0	15	7	15	5	12	5	6	5	11	15	0	16	50	31	172	45	89	63	49	23	59	53	522	634

Table 3 *S. marinus* (≥ 17 cm). Abundance indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2001. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	4661	10451	6157	1569	3221	14442	4974		78117	32398	1786	141503		25946	112276	177729	82724	86210	31214	19054	41439	38725	45475	279750	589372	914597	21
1986	6329	4324	2077	3483	21504	2883	2717			124615	470	298704		22234	135764	186392	101959	106802	36469	27225	33118	52182	43317	446023	679911	1169252	26
1987	905	653	1328		9611		660		50962	9422	245	507384		27919	105650	187806	140757	85377	27903	40173	39081	27104	13156	595933	653851	1262940	23
1988	830	2238	343	2255	5938	1954	732		3011	5014	148	132460		34353	138180	109418	91725	109657	28277	32938	34185	17871	14291	174987	562252	751530	21
1989	422	421	776	690	6490		362		4003	33320	625	110666		76935	207497	226316	80731	31165	27751	14756	18170	35268	9161	225548	641652	876362	29
1990	122	433	280	710	1037		146	2270	14973	72317	391	653011		37483	128628	351916	27743	20872	20467	23108	19742	24081	4998	778175	616557	1399729	54
1991	225	256	96	691	236	528	21	1671	1385	13239	171	64691		28199	151646	83558	71031	66150	40518	34790	34754	12335	3724	107685	494782	606190	19
1992	129	105	73	190	194	476	193	836						32623	114676	73713	53646	25868	46503	31566	14597	16350	2197	32623	376918	411737	21
1993	170	482	59	267	79	132	0		175	6043	77	54425		4171	54137	118848	58228	90289	31868	26385	20183	15492	1189	64891	415429	481509	28
1994	109	325	155	167	66	46	152	247						3350	81149	96964	40884	84580	46808	29449	30875	28011	1266	3350	438721	443337	29
1995					50	68	39	146	346	1519	153	38889		2060	111439	99942	17745	26029	28795	28800	15179	29897	302	42968	357824	401094	25
1996	150	267	21	243	380	383	28	298	647	3145	494	21109		2363	95875	173678	44357	33691	36885	40971	26638	34880	1770	27757	486975	516503	30
1997	252	609	16	175	120	311	36	552	721	913		21257		1611	118750	206232	25174	40457	26655	25342	49633	36359	2072	24501	528602	555176	44
1998	116	141	45	142	19	106	126	254	590	1388	328	166868		5837	94448	236519	46258	37294	29406	35364	31207	24485	949	175011	534981	710941	49
1999	225	293	132	219	72	213	10		128	644	412	30603		2405	145547	377435	32798	86924	29652	16501	32364	25858	1163	34192	747079	782435	37
2000	197	621	63	571	83	200	10	836	247	2151	241	57106		2685	120895	285993	33178	19683	20374	26427	28529	27739	2582	62429	562818	627829	35
2001			106	304	72	456	8	1867	291	2151	16952	30019		6792	89058	196191	39631	9201	19032	18682	22362	36253	2812	56204	430411	489428	24

Table 4 *S. marinus* (≥ 17 cm). Biomass indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2001. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	1021	1819	2968	472	1426	9210	2720		8613	22454	1317	65299		23762	52622	86305	27445	30836	11443	7032	27200	27434	19636	121445	270317	411398	16
1986	1279	1215	752	1230	10122	1705	1762			43120	382	213271		24368	58458	90847	31236	41877	13438	7777	21787	35296	18065	281141	300716	599922	22
1987	252	246	660		4954		439		9539	5345	105	230841		19329	48715	94425	62205	32130	9779	15863	28184	18389	6551	265160	309690	581401	24
1988	143	404	118	942	2570	1342	383		1091	4930	68	98131		48263	60547	56412	31113	37560	10713	14629	24823	13800	5900	152483	249595	407978	27
1989	184	137	273	249	2620		208		970	14920	442	54588		34358	90111	94021	33342	10342	9049	5117	13721	25662	3671	105279	281366	390316	24
1990	41	149	75	275	479		80	1343	6760	27246	155	130527		14722	60284	128278	7470	6248	6010	9447	13268	16619	2441	179409	247624	429474	41
1991	41	83	24	226	120	272	3	1007	726	10632	120	34267		62979	68974	39831	17385	17772	11961	14012	21205	8249	1775	108723	199391	309889	37
1992	20	36	21	61	52	241	69	447						12074	56369	35117	11261	6633	13769	7766	9785	10652	948	12074	151353	164374	23
1993	48	111	19	114	39	55	0		74	1379	30	20181		2900	22556	47051	12104	21474	8608	7692	12641	8975	385	24564	141100	166050	25
1994	34	147	47	64	27	36	41	80						1542	28304	39133	7686	19976	14406	9256	18035	15341	475	1542	152137	154154	26
1995					19	19	21	43	114	713	50	8894		1143	40726	39664	2990	5849	8947	10745	9523	17992	102	10913	136437	147452	25
1996	61	102	2	60	128	118	8	132	138	1713	196	10851		1409	35185	73828	9443	9271	10518	14586	15498	21525	611	14307	189854	204771	32
1997	41	261	5	61	35	188	10	246	163	447		15411		1225	42145	81388	5477	13028	9525	8384	28012	20168	847	17246	208127	226219	40
1998	20	43	12	42	14	54	56	117	193	597	112	34680		2005	39291	72530	12659	10887	10832	14469	17678	14726	359	37587	193072	231018	29
1999	54	71	35	68	17	82	8		47	294	119	16221		1537	54208	146243	7049	21418	12046	6766	18208	15707	337	18218	281645	300200	32
2000	68	173	31	215	21	76	3	388	72	1200	56	45897		2317	44234	98684	7028	5255	7377	11586	16617	17113	974	49542	207893	258410	33
2001			24	113	54	228	3	931	141	1019	3428	20820		5429	32490	73286	9063	4107	6885	6777	12641	19455	1352	30837	164703	196893	22

Table 5 *S. marinus* (≥ 17 cm). Length disaggregated abundance indices (n*1000) for West Greenland, 1985-2001.

West	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
15,5	0	0	0	0	9	39	50	14	0	0	0	0	0	0	12	0	0
16,5	2381	1438	30	686	8	24	21	29	0	0	0	0	0	0	0	0	0
17,5	1918	1347	64	321	46	137	87	15	0	0	0	19	12	0	0	30	19
18,5	1372	1733	51	131	37	58	94	51	35	69	0	28	0	0	22	65	2
19,5	1258	1241	76	351	90	45	53	5	95	88	33	8	30	6	31	95	47
20,5	1434	1047	95	253	131	74	122	44	147	70	29	431	113	34	41	127	24
21,5	1192	940	132	243	109	79	87	147	71	27	30	32	93	5	100	78	37
22,5	1320	1155	187	303	140	143	135	80	22	41	15	51	81	68	51	113	103
23,5	1285	1140	264	298	214	176	102	87	23	10	11	89	75	33	103	84	53
24,5	1119	1787	449	464	320	187	131	148	45	52	11	8	158	76	51	150	62
25,5	1374	1611	381	640	343	251	160	106	110	33	4	62	143	71	64	179	126
26,5	1556	1717	631	765	561	218	186	140	41	70	7	176	124	121	109	199	208
27,5	2049	1879	647	798	679	255	171	94	86	57	29	21	155	103	86	115	165
28,5	1781	2213	768	769	732	272	192	81	35	20	18	59	144	36	66	184	238
29,5	2358	2549	937	914	871	221	273	140	16	18	14	40	83	66	75	142	157
30,5	3193	3285	1024	1081	1071	410	141	144	75	17	15	23	120	53	91	138	172
31,5	2321	3090	1155	947	709	327	192	107	41	29	8	27	113	19	109	124	136
32,5	2873	3224	1028	826	715	268	193	132	49	45	25	0	150	16	10	86	180
33,5	2080	2926	1235	720	625	204	236	150	35	21	0	134	33	10	21	115	150
34,5	2144	2505	946	645	430	260	134	129	40	33	0	73	57	82	19	84	106
35,5	1765	2199	901	721	397	259	185	106	27	27	11	34	78	14	26	95	146
36,5	1446	1321	650	562	329	214	134	61	43	15	31	53	40	5	25	84	124
37,5	1211	945	485	467	219	169	156	57	44	0	0	127	17	43	5	76	82
38,5	1289	631	251	364	115	130	81	21	20	10	0	0	22	11	5	60	117
39,5	1091	413	252	252	120	82	114	9	37	23	0	0	38	27	21	24	58
40,5	1107	415	201	234	51	127	102	62	4	0	0	127	60	7	0	37	55
41,5	537	222	128	127	27	118	25	5	4	0	0	0	45	6	0	32	81
42,5	572	84	56	64	11	82	65	17	24	24	15	0	40	0	5	29	62
43,5	430	94	39	65	22	54	28	14	0	5	0	0	30	5	0	27	38
44,5	243	40	42	53	15	0	27	0	10	7	0	0	6	5	0	0	38
45,5	221	22	22	45	0	42	19	0	12	14	0	127	6	15	0	0	10
46,5	185	25	13	53	0	24	5	0	0	0	0	0	6	5	0	0	5
47,5	94	17	5	16	0	18	14	0	0	0	0	0	0	0	5	0	2
48,5	94	0	0	4	0	12	6	0	0	0	0	0	0	0	0	0	13
49,5	68	0	0	6	4	0	0	0	0	0	0	0	0	0	0	7	2
50,5	22	9	0	0	4	12	0	0	0	0	0	0	0	0	0	0	0
51,5	6	0	4	0	4	0	0	0	0	0	0	0	6	0	0	0	0
52,5	11	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
53,5	6	4	0	8	4	0	0	0	0	0	0	0	0	0	0	0	0
54,5	22	8	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0
55,5	17	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56,5	4	0	0	6	0	0	0	0	0	5	0	0	0	0	0	0	0
57,5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58,5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59,5	6	5	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0
60,5	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6 *S. marinus* (≥ 17 cm). Length disaggregated abundance indices (n*1000) for East Greenland, 1985-2001.

East	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
15,5	187	0	0	0	0	39	0	0	0	0	7	11	0	2001	0	0	0
16,5	12373	24	7	0	413	13	31	0	0	0	17	0	0	0	0	0	0
17,5	12112	875	43	119	1210	305	286	0	16	0	0	0	0	12049	0	335	702
18,5	17364	2696	3943	88	9897	33894	678	172	997	0	2357	84	0	18047	132	475	1309
19,5	23545	6560	6846	286	16446	75037	997	200	692	29	2503	145	54	16162	64	418	1731
20,5	21553	13489	9955	322	18186	129668	1848	772	874	88	5876	421	110	14261	120	391	1969
21,5	15097	18902	15099	413	15321	136359	2440	743	2473	88	5125	153	128	20295	228	601	2414
22,5	13596	18877	18697	817	5958	113752	3167	1229	471	88	5432	563	201	16411	463	604	2538
23,5	7292	32300	20955	1174	5616	75314	5427	1544	504	59	3412	592	652	16778	370	895	2943
24,5	8030	34850	36708	2494	5517	32945	5660	2630	981	206	2495	1126	587	11643	720	923	3850
25,5	10005	28103	46562	4370	7426	24280	7865	3774	7676	118	1195	1174	798	10370	1422	2058	3236
26,5	9016	24499	63065	7625	12136	24797	7312	5661	7441	441	1018	1766	629	5545	2443	2703	2738
27,5	11082	23963	67566	12543	13871	23832	4924	6690	15611	118	1231	1841	738	3730	2907	3805	2432
28,5	11925	25507	58098	14890	18560	20193	3213	3974	6356	470	1253	1685	985	3996	3331	4109	2523
29,5	10119	28797	40954	14160	17615	18376	2797	2459	4579	529	1327	1537	1175	3509	3995	3427	2808
30,5	11604	23392	31243	9313	16793	12865	3304	629	3232	88	1388	2309	2188	1371	2931	4351	3263
31,5	4988	16142	19699	5744	10512	7707	2404	229	2411	29	1050	1992	979	2994	2445	2902	3894
32,5	4262	11808	18287	4215	7796	5866	2621	286	1426	176	1087	1440	1144	1065	1987	2186	2156
33,5	4932	8255	16669	2173	3071	4288	2052	57	420	118	862	1386	983	921	1195	2971	1654
34,5	4945	5731	14076	4077	2288	3186	2261	86	858	59	939	2199	969	1234	979	974	1390
35,5	6507	7555	10726	3099	1878	3030	2161	257	703	88	719	1675	971	797	1069	1479	1071
36,5	5300	6606	7792	3516	2305	2619	1806	57	357	59	760	1638	1088	754	798	1401	1091
37,5	4141	6643	6090	3089	1663	1906	1841	114	165	0	560	900	1080	966	747	638	1420
38,5	5617	6376	7457	5459	1675	2509	1461	57	952	0	390	704	851	1024	472	1551	863
39,5	4433	6029	5899	3958	1801	2300	2134	57	154	29	399	697	1064	1114	753	2084	956
40,5	5245	7172	5452	5474	2025	2686	2321	0	1146	59	234	683	1348	1380	468	3015	979
41,5	3385	7407	5917	4471	2357	1484	2878	0	446	0	164	246	955	1268	695	1709	777
42,5	5480	6182	6301	6429	2260	2173	2457	114	473	29	154	199	926	971	625	1911	951
43,5	3515	8500	4999	7116	2425	2080	2780	0	691	88	189	263	720	1200	528	2187	1945
44,5	3856	8717	4841	8198	2801	1458	2408	86	32	29	100	27	823	857	582	1336	638
45,5	3860	9387	7268	8498	2425	1835	4035	143	591	59	207	79	825	509	371	1385	413
46,5	2637	7970	7234	5867	2407	1997	3279	57	133	29	168	34	240	554	663	1729	459
47,5	2520	7163	7353	5632	2083	1269	2429	29	89	29	83	95	182	403	259	2806	268
48,5	1770	5723	5491	5582	1662	1423	2634	114	598	59	112	0	313	396	132	1073	261
49,5	1975	5348	3949	2688	1746	1249	1935	114	92	59	34	45	240	146	90	1177	273
50,5	1556	4224	3909	3760	1614	1589	2385	143	836	29	17	45	130	97	124	869	117
51,5	900	2301	1838	1945	895	772	1572	29	288	0	17	0	189	49	45	505	99
52,5	501	1510	1565	1622	727	961	1553	29	32	0	17	0	96	49	45	663	28
53,5	649	1475	1272	1318	391	774	1407	57	0	0	17	0	36	24	0	146	33
54,5	400	1248	959	775	450	407	1170	29	24	0	17	0	57	24	0	146	14
55,5	488	747	372	395	272	362	1245	0	0	0	14	0	0	24	0	156	0
56,5	177	551	151	407	269	69	116	0	16	0	0	0	0	0	0	0	0
57,5	156	470	130	234	112	145	897	0	16	0	0	0	36	0	0	16	4
58,5	84	335	41	143	138	39	288	0	16	0	0	0	0	0	0	146	0
59,5	67	310	63	36	112	19	128	0	0	0	0	0	0	0	0	16	0
60,5	37	164	19	157	80	19	278	0	12	0	0	0	0	24	0	0	0

Table 7 *S. marinus* (≥ 17 cm). Length disaggregated abundance indices (n*1000) for Iceland, 1985-2001.

Ice	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
15,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17,5	4840	5469	1972	1622	3566	4888	5988	5800	4267	6877	3570	3545	2073	1894	1589	2577	2224
18,5	4886	6144	2996	1356	2331	4874	7387	6871	4142	6949	4553	4604	1992	1753	1669	3107	2510
19,5	4788	6727	4107	1874	1795	4233	7742	6850	4199	6473	4379	5156	2725	1656	1669	2806	2572
20,5	4483	6459	4977	2299	1545	3942	8679	6512	5128	7493	5167	6133	3753	1951	1982	3719	2810
21,5	4292	6607	5386	3032	1495	4704	10508	7107	5660	7456	5094	7011	4445	2251	2306	3907	3292
22,5	4000	6701	6613	4145	2179	2917	11180	7263	7010	8037	5497	8681	7063	4283	2300	4292	3947
23,5	3876	7122	6636	5228	2456	2472	11746	8945	7580	8682	5528	8274	7004	6446	4216	5752	3556
24,5	3411	7158	6272	6628	4249	2485	10569	10238	9841	10026	5931	9107	7767	12668	5790	5452	4599
25,5	5708	6997	7921	8259	6391	3004	10624	10444	13221	11629	7178	9028	10754	21093	7820	9002	5370
26,5	9838	9139	9798	11406	7167	5042	8843	11875	16952	16149	8447	11035	9053	26182	15182	8533	7841
27,5	12049	10636	12247	11880	12753	11686	9748	10826	22709	21320	8953	12709	14045	32938	22152	13448	10569
28,5	16296	14314	13529	18978	17424	14576	11668	10188	32339	27116	12672	15644	18794	39566	40213	16681	15476
29,5	20889	19116	14377	20837	28299	34668	13489	10035	32837	26485	14146	16854	23820	31402	55404	28308	18863
30,5	21117	25297	16934	23864	32070	44597	16072	9614	31147	25004	16321	22471	24213	23209	51841	41432	28926
31,5	23700	30923	21957	25506	42481	58337	18735	11597	23476	26810	27762	22184	22187	23681	53841	45309	42284
32,5	23995	36834	24050	26947	43272	59065	22028	13091	17954	23774	20609	29586	28238	31476	52396	47493	43423
33,5	28275	38700	32140	28217	42131	51438	25315	13643	16849	22643	27004	33379	39820	27114	64707	51377	44082
34,5	27176	37460	33152	35520	39866	40440	27460	16376	16520	20655	23040	35915	37568	27237	51146	50534	35790
35,5	33879	41450	41340	34210	41147	40953	29832	17870	16383	19911	22271	36039	47329	31475	40567	37931	32635
36,5	35414	45565	46629	40330	37804	24138	30937	21043	17676	17851	21663	30969	39105	29636	46328	35168	26309
37,5	42911	46232	46203	39955	41771	27282	31007	23252	16240	19240	20511	27741	35583	31482	45893	29986	24921
38,5	48436	48312	50609	38683	45522	25872	29991	26079	15924	17903	15137	25104	31218	26771	43024	27592	18717
39,5	40600	47705	46631	33592	36822	25968	24020	23512	15917	13809	13829	22025	27448	22410	36949	19673	15174
40,5	38723	41506	43011	29760	32776	23754	23999	21304	14939	13995	13776	17136	19668	18601	27990	16486	11233
41,5	32356	33315	38354	26407	27638	23144	24160	17015	12844	11728	11523	16128	18028	15929	21126	13886	8096
42,5	24339	24615	30139	19698	22425	20304	18513	15942	9063	10620	8425	13068	13198	11148	18052	11598	5090
43,5	21781	20244	24652	16186	18815	14152	14698	10403	6921	7597	6647	10665	11089	9625	10220	7735	3459
44,5	12054	12624	18050	12326	13955	12229	9563	7599	4968	6231	5286	6583	7205	5678	8325	5993	2110
45,5	10906	11516	12321	9332	9129	8054	6817	5404	3787	4354	3540	7024	5010	4888	5055	4773	1475
46,5	8317	7618	10669	6601	6963	4967	5056	3459	2476	2963	2443	4311	3172	4092	2036	2506	1008
47,5	4897	4275	6845	4724	4277	4610	2524	1993	1623	2744	2132	3230	1563	1971	2298	2001	757
48,5	3268	3513	5055	4028	2652	2821	1869	1267	1142	1564	1266	1537	1127	1210	636	1053	421
49,5	2463	3298	2169	2553	2047	1445	1230	1055	1453	1222	827	1162	572	1173	1085	697	203
50,5	1808	1850	2310	1776	1769	877	613	596	807	1087	595	490	648	674	527	1173	105
51,5	959	1460	1082	1372	1193	920	466	658	572	686	397	462	511	385	206	185	118
52,5	555	894	843	655	1004	434	413	382	450	492	217	568	187	222	134	170	56
53,5	681	570	595	660	1084	473	257	406	73	375	146	258	144	357	148	76	97
54,5	452	534	205	418	576	273	206	106	74	124	24	208	150	182	42	150	36
55,5	293	317	591	324	325	114	149	31	62	307	27	127	126	35	35	36	31
56,5	149	147	118	246	134	132	187	17	73	112	35	121	29	46	37	31	58
57,5	127	202	24	175	132	106	116	37	21	13	20	56	22	88	37	20	48
58,5	18	48	172	188	120	27	189	44	56	47	82	38	52	12	44	40	6
59,5	114	78	41	107	33	66	11	21	7	53	5	24	30	25	13	21	16
60,5	123	103	30	22	14	28	22	0	14	19	5	84	44	20	11	25	44

Table 8 *S. marinus* (≥ 17 cm). Length disaggregated abundance indices (n*1000) for Greenland and Iceland combined, 1985-2001.

Total	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
15,5	187	0	0	0	9	78	50	14	0	0	7	11	0	2001	12	0	0
16,5	14754	1462	37	686	421	37	52	29	0	0	17	0	0	0	0	0	0
17,5	18870	7691	2079	2062	4822	5330	6361	5815	4283	6877	3570	3564	2085	13943	1589	2942	2945
18,5	23622	10573	6990	1575	12265	38826	8159	7094	5174	7018	6910	4716	1992	19800	1823	3647	3821
19,5	29591	14528	11029	2511	18331	79315	8792	7055	4986	6590	6915	5309	2809	17824	1764	3319	4350
20,5	27470	20995	15027	2874	19862	133684	10649	7328	6149	7651	11072	6985	3976	16246	2143	4237	4803
21,5	20581	26449	20617	3688	16925	141142	13035	7997	8204	7571	10249	7196	4666	22551	2634	4586	5743
22,5	18916	26733	25497	5265	8277	116812	14482	8572	7503	8166	10944	9295	7345	20762	2814	5009	6588
23,5	12453	40562	27855	6700	8286	77962	17275	10576	8107	8751	8951	8955	7731	23257	4689	6731	6552
24,5	12560	43795	43429	9586	10086	35617	16360	13016	10867	10284	8437	10241	8512	24387	6561	6525	8511
25,5	17087	36711	54864	13269	14160	27535	18649	14324	21007	11780	8377	10264	11695	31534	9306	11239	8732
26,5	20410	35355	73494	19796	19864	30057	16341	17676	24434	16660	9472	12977	9806	31848	17734	11435	10787
27,5	25180	36478	80460	25221	27303	35773	14843	17610	38406	21495	10213	14571	14938	36771	25145	17368	13166
28,5	30002	42034	72395	34637	36716	35041	15073	14243	38730	27606	13943	17388	19923	43598	43610	20974	18237
29,5	33366	50462	56268	35911	46785	53265	16559	12634	37432	27032	15487	18431	25078	34977	59474	31877	21828
30,5	35914	51974	49201	34258	49934	57872	19517	10387	34454	25109	17724	24803	26521	24633	54863	45921	32361
31,5	31009	50155	42811	32197	53702	66371	21331	11933	25928	26868	28820	24203	23279	26694	56395	48335	46314
32,5	31130	51866	43365	31988	51783	65199	24842	13509	19429	23995	21721	31026	29532	32557	54393	49765	45759
33,5	35287	49881	50044	31110	45827	55930	27603	13850	17304	22782	27866	34899	40836	28045	65923	54463	45886
34,5	34265	45696	48174	40242	42584	43886	29855	16591	17418	20747	23979	38187	38594	28553	52144	51592	37286
35,5	42151	51204	52967	38030	43422	44242	32178	18233	17113	20026	23001	37748	48378	32286	41662	39505	33852
36,5	42160	53492	55071	44408	40438	26971	32877	21161	18076	17925	22454	32660	40233	30395	47151	36653	27524
37,5	48263	53820	52778	43511	43653	29357	33004	23423	16449	19240	21071	28768	36680	32491	46645	30700	26423
38,5	55342	55319	58317	44506	47312	28511	31533	26157	16896	17913	15527	25808	32091	27806	43501	29203	19697
39,5	46124	54147	52782	37802	38743	28350	26268	23578	16108	13861	14228	22722	28550	23551	37723	21781	16188
40,5	45075	49093	48664	35468	34852	26567	26422	21366	16089	14054	14010	17946	21076	19988	28458	19538	12267
41,5	36278	40944	44399	31005	30022	24746	27063	17020	13294	11728	11687	16374	19028	17203	21821	15627	8954
42,5	30391	30881	36496	26191	24696	22559	21035	16073	9560	10673	8594	13267	14164	12119	18682	13538	6103
43,5	25726	28838	29690	23367	21262	16286	17506	10417	7612	7690	6836	10928	11839	10830	10748	9949	5442
44,5	16153	21381	22933	20577	16771	13687	11998	7685	5010	6267	5386	6610	8034	6540	8907	7329	2786
45,5	14987	20925	19611	17875	11554	9931	10871	5547	4390	4427	3747	7230	5841	5412	5426	6158	1898
46,5	11139	15613	17916	12521	9370	6988	8340	3516	2609	2992	2611	4345	3418	4651	2699	4235	1472
47,5	7511	11455	14203	10372	6360	5897	4967	2022	1712	2773	2215	3325	1745	2374	2562	4807	1027
48,5	5132	9236	10546	9614	4314	4256	4509	1381	1740	1623	1378	1537	1440	1606	768	2126	695
49,5	4506	8646	6118	5247	3797	2694	3165	1169	1545	1281	861	1207	812	1319	1175	1881	478
50,5	3386	6083	6219	5536	3387	2478	2998	739	1643	1116	612	535	778	771	651	2042	222
51,5	1865	3761	2924	3317	2092	1692	2038	687	860	686	414	462	706	434	251	690	217
52,5	1067	2404	2408	2277	1734	1395	1966	411	482	492	234	568	283	271	179	833	84
53,5	1336	2049	1867	1986	1479	1247	1664	463	73	375	163	258	180	381	148	222	130
54,5	874	1790	1168	1199	1026	680	1376	135	98	124	41	208	207	206	42	296	50
55,5	798	1076	963	719	597	476	1394	31	62	307	41	127	126	59	35	192	31
56,5	330	698	269	659	403	201	303	17	89	117	35	121	29	46	37	31	58
57,5	288	672	154	409	244	251	1013	37	37	13	20	56	58	88	37	36	52
58,5	108	383	213	331	258	66	477	44	72	47	82	38	52	12	44	186	6
59,5	187	393	104	149	145	85	139	21	7	53	5	24	30	25	13	37	16
60,5	160	276	49	179	94	47	300	0	26	19	5	84	44	44	11	25	44

Table 9 *S. mentella* (≥ 17 cm). Abundance indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2001. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	0	369	31	26	56	327	0		34905	16909	105	38687	81487	0	7745	0	1162	8	21874	0	9041	809	172092	39829	212731	41	
1986	2144	414	38	292	4	444	0			6930	27	76656	67174	0	300	0	140	144	9277	6	652	3335	150787	10520	164643	34	
1987	987	13679	42		56		0		0	18340	65	7179	62456	0	560	62	3750	0	4085	0	1040	14764	88041	9497	112301	42	
1988	150	3186	26	777	60	4620	0		22024	28156	74	176635	25345	80	5159	0	56	0	5979	77	858	8818	252234	12209	273261	56	
1989	0	186	9	102	0		8		847	3067	0	72049	222282	0	1552	0	7	0	2958	0	3122	305	298244	7639	306188	59	
1990	0	9	5	704	50		0	3881	328	12454	2353	13517	16048	0	410	0	0	0	2362	722	154	4650	44700	3647	52997	41	
1991	0	0	0	0	0	652	0	1773	0	10707	46	724506	234746	0	162	0	0	0	1234	0	683	2425	970004	2079	974508	80	
1992	0	36	0	15	0	106	0	0					60065	0	312	10	7	0	883	45	4683	157	60065	5940	66163	148	
1993	0	23	0	159	8	0	0		62	3529	140	1258378	121925	0	12	0	7	8	1202	0	239	189	1384034	1468	1385691	86	
1994	0	271	21	96	95	162	0	36					77894	853	617	0	0	0	702	6	562	680	77894	2742	81316	160	
1995					29	234	95	1468	267	24464	1174	2394063	83313	8	121	0	7	0	2415	0	480	1826	2503280	3031	2508137	54	
1996	1524	619	0	236	0	1921	28	7135	395	176447	1215	4246100	75012	0	1021	0	0	0	32	0	87	11464	4499169	1141	4511773	64	
1997	252	1759	0	381	37	3204	144	30742	165	22270		6257093	628353	0	8639	10	406	0	1255	0	1434	36518	6907882	11745	6956144	61	
1998	0	324	0	212	151	828	10	2543	627	50219	0	2803222	39167	0	3174	0	385	8	74	0	210	4068	2893235	3852	2901155	66	
1999	34	235	7	281	39	1735	95		276	16277	35	552260	15144	0	681	0	77	0	1096	0	704	2426	583992	2558	588976	43	
2000	0	94	7	768	31	1422	0	21187	0	54245	90	656674	10752	0	791	31	105	17	575	0	1602	23509	721761	3120	748390	64	
2001			24	636	116	5419	1240	15600	8418	61682	17375	642487	178627	0	1333	0	0	51	9511	6	5	23035	908589	10906	942531	71	

Table 10 *S. mentella* (≥ 17 cm). Biomass indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2001. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	0	96	14	11	27	110	0		2959	7168	40	17009	38534	0	3843	0	420	0	11937	0	4851	258	65710	21052	87020	34	
1986	225	38	19	110	4	180	0			3945	15	29278	31334	0	150	0	63	25	5054	6	366	574	64571	5665	70810	34	
1987	82	1183	9		31		0		0	4892	17	2331	23266	0	323	10	1840	0	2075	0	659	1305	30506	4908	36719	41	
1988	20	425	21	159	45	1878	0		3542	10166	9	55836	11606	32	3393	0	21	0	3149	38	470	2548	81157	7104	90809	52	
1989	0	23	7	15	0		0		89	656	0	21148	45454	0	941	0	0	0	1841	0	1860	45	67347	4641	72033	59	
1990	0	6	2	87	8		0	542	62	2742	329	1964	3277	0	225	0	0	0	1532	735	64	644	8373	2556	11573	38	
1991	0	0	0	0	0	153	0	445	0	2960	30	211471	69455	0	115	0	0	0	840	0	480	598	283916	1436	285949	80	
1992	0	2	0	1	0	28	0	0					19857	0	190	0	0	0	500	32	2209	31	19857	2932	22820	138	
1993	0	4	0	22	2	0	0		35	494	19	194672	34101	0	12	0	0	0	479	0	64	28	229321	554	229903	61	
1994	0	32	2	10	12	24	0	3					7122	175	162	0	0	0	319	6	97	84	7122	759	7965	115	
1995					6	24	10	159	30	2860	207	355943	16507	0	40	0	0	0	1064	0	201	200	375547	1305	377052	52	
1996	7	55	0	19	0	235	3	689	12	24445	123	837222	14501	0	387	0	0	0	21	0	50	1008	876304	458	877770	58	
1997	20	141	0	38	2	320	18	2973	20	3445		1323965	162744	0	2349	0	77	0	202	0	766	3512	1490174	3394	1497080	59	
1998	0	26	0	17	17	88	3	326	153	6458	0	728848	8719	0	1091	0	56	0	11	0	78	478	744179	1235	745892	73	
1999	7	21	5	36	6	188	21		39	1932	8	178194	3878	0	202	0	14	0	564	0	189	283	184051	969	185302	52	
2000	0	9	0	65	2	122	0	1915	0	6796	21	135196	1923	0	265	0	21	0	298	0	768	2114	143936	1352	147403	56	
2001			2	66	10	469	108	1664	1093	6658	5696	174896	37001	0	744	0	0	25	4256	6	5	2319	225346	5037	232701	81	

Table 11 Deep sea *S. mentella* (≥ 17 cm). Length disaggregated abundance indices (n*1000) for West Greenland, 1985-2001.

West	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
15,5	0	0	6	0	5	5	5	0	0	0	0	0	0	0	0	0	0
16,5	29	0	5220	230	0	0	5	0	0	0	0	0	0	0	0	0	0
17,5	6	1303	2178	217	14	72	0	0	0	0	0	0	6345	0	0	10530	5798
18,5	9	442	2794	99	19	83	9	17	6	267	701	3188	9988	1341	987	4518	6195
19,5	41	199	1721	965	64	240	31	25	6	163	366	2675	11375	752	479	3353	4394
20,5	26	117	1922	748	92	636	9	0	12	76	251	1853	4345	543	380	1903	2177
21,5	26	54	272	532	30	1077	71	20	6	30	349	935	1446	408	114	635	767
22,5	13	98	131	722	25	1544	300	5	19	62	44	721	1034	364	95	733	1116
23,5	35	88	84	409	9	640	389	18	6	25	15	328	658	264	49	579	743
24,5	85	106	137	346	0	191	649	28	13	22	39	168	721	120	85	413	544
25,5	76	35	36	355	19	76	607	9	19	0	29	42	262	80	58	264	298
26,5	52	49	18	320	0	58	165	18	14	5	29	29	111	102	57	214	403
27,5	37	43	47	319	0	18	93	5	25	0	0	0	151	34	45	130	167
28,5	46	81	43	265	5	0	38	0	25	12	0	0	28	29	28	85	78
29,5	38	71	0	296	0	5	19	0	0	5	0	0	6	15	11	59	126
30,5	55	81	52	454	0	0	29	0	12	0	7	0	6	20	9	29	114
31,5	44	61	36	324	0	0	0	0	0	0	0	0	0	0	11	15	24
32,5	48	106	24	397	0	0	0	0	6	0	0	0	22	0	0	29	42
33,5	40	58	6	397	0	0	0	0	0	0	0	0	0	0	5	7	20
34,5	32	117	6	421	0	0	0	0	0	0	0	0	0	0	0	7	8
35,5	26	71	0	482	5	0	5	5	13	0	0	0	22	0	0	0	4
36,5	15	46	6	228	0	0	0	0	0	0	0	0	0	0	12	0	0
37,5	4	27	0	130	6	0	0	0	0	5	0	0	0	0	0	6	0
38,5	0	36	4	38	0	0	0	5	0	0	0	0	0	0	5	0	0
39,5	9	13	0	50	5	0	0	5	0	0	0	0	0	0	0	0	0
40,5	7	0	7	18	0	0	0	0	6	5	0	0	0	0	0	0	0
41,5	9	14	11	11	0	0	0	0	0	0	0	0	0	0	0	0	8
42,5	0	0	4	17	8	0	0	0	0	5	0	0	0	0	0	0	0
43,5	0	9	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0
44,5	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
45,5	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
46,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47,5	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49,5	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0
50,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 12 Deep sea *S. mentella* (≥ 17 cm). Length disaggregated abundance indices (n*1000) for East Greenland, 1985-2001.

East	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
15,5	187	0	9	0	0	0	0	0	307	0	0	742	0	0	0	0	0
16,5	12373	0	0	620	2061	0	966	0	319	0	0	4707	472	19	0	0	0
17,5	12112	102	0	1381	3125	238	235	0	74	0	0	2627	152323	10078	258	20366	21149
18,5	17364	347	798	3076	7749	3742	814	0	333995	22779	200067	74794	311504	76658	25871	28778	22213
19,5	23545	455	1913	3697	18831	4178	1812	429	207529	23237	241881	127533	213710	91452	22051	55140	27956
20,5	21553	1050	3588	5505	54201	6713	5105	801	132958	10645	373074	274530	491989	104205	27944	86330	41327
21,5	15097	1526	4444	7258	72956	6110	8838	1259	95583	3978	515997	376323	303044	99922	28081	71388	51425
22,5	13596	2702	5368	8367	44631	7596	34773	2203	67838	4006	521701	481578	351810	88151	39793	53626	59796
23,5	7292	4739	6965	9589	12277	3182	70531	1860	55216	1660	330707	610032	495466	112435	42946	44397	86156
24,5	8030	8155	6142	12993	3087	2935	156528	3663	70069	2633	175357	827123	904459	147194	52379	66171	104148
25,5	10005	10831	5254	17279	5282	1490	232104	7183	82962	2833	76326	876234	1141871	289798	57657	74034	105960
26,5	9016	12548	7437	22992	10243	940	229277	11818	81127	2032	27451	439568	925720	401287	62502	60623	86155
27,5	11082	11990	7186	32960	12409	1005	154058	11418	83942	944	17232	233226	764082	468784	50940	52768	79777
28,5	11925	9907	7373	35625	10505	1405	46165	10445	64237	572	5969	91689	440296	404285	53222	35949	65876
29,5	10119	11937	4852	33744	9087	1356	10596	4063	53497	2118	7094	42717	236198	326253	47125	25369	52266
30,5	11604	16547	4476	24607	10599	1639	6914	2661	33668	229	6021	18203	109619	196460	31288	20108	46845
31,5	4988	13576	5230	15089	7665	798	3319	658	11080	143	2700	10976	47591	56154	18133	14625	27654
32,5	4262	11839	3573	6874	6339	606	4096	601	6227	29	1381	1513	7597	15865	7402	7600	15953
33,5	4932	9471	4035	3908	2579	253	2223	658	1146	0	29	2474	5612	3361	5809	2909	7267
34,5	4945	7733	3338	2453	1491	159	663	315	732	0	0	673	3300	38	3970	1052	3895
35,5	6507	6045	2017	1233	1066	122	323	29	354	0	292	743	1078	19	1537	219	2151
36,5	5300	3227	1867	1252	1042	49	287	0	663	0	0	347	21	112	1570	36	278
37,5	4141	2677	859	575	495	25	106	0	44	0	0	714	0	0	1368	18	107
38,5	5617	1450	470	504	156	44	25	0	53	0	0	0	0	225	909	128	114
39,5	4433	1013	452	169	256	49	207	0	0	0	0	0	0	225	1234	0	52
40,5	5245	436	168	208	50	45	0	0	0	0	0	57	0	19	0	0	66
41,5	3385	219	57	27	20	6	0	0	196	0	0	0	0	0	0	0	0
42,5	5480	75	74	71	10	6	21	0	10	0	0	0	0	0	0	0	0
43,5	3515	9	16	57	20	0	0	0	22	0	0	0	0	206	0	128	0
44,5	3856	47	31	50	0	6	4	0	0	29	0	0	0	0	0	0	0
45,5	3860	38	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0
46,5	2637	15	0	0	0	0	0	0	0	29	0	0	0	27	0	0	0
47,5	2520	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48,5	1770	22	22	13	16	0	15	0	0	0	0	0	0	0	0	0	0
49,5	1975	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50,5	1556	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51,5	900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52,5	501	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53,5	649	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54,5	400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55,5	488	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56,5	177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57,5	156	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0
58,5	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59,5	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60,5	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 13 Deep sea *S. mentella* (≥ 17 cm). Length disaggregated abundance indices (n*1000) for Iceland, 1985-2001.

Ice	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
15,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17,5	116	177	22	29	34	42	13	21	40	82	23	0	31	11	0	7	0
18,5	71	268	79	15	7	50	20	14	67	93	78	0	142	29	0	14	0
19,5	46	249	58	51	7	50	13	7	83	36	147	0	199	35	0	13	222
20,5	14	223	173	88	28	33	20	21	89	50	225	0	368	33	0	13	444
21,5	28	93	245	146	21	0	7	21	72	70	107	0	196	35	0	10	0
22,5	32	82	229	212	28	0	13	14	51	43	114	0	325	54	0	20	222
23,5	14	71	230	258	48	0	6	28	74	185	99	0	32	45	0	10	0
24,5	62	20	194	220	48	17	7	28	51	185	61	0	84	82	0	17	0
25,5	48	26	111	310	62	0	7	58	98	219	47	0	663	70	0	13	0
26,5	76	51	75	240	83	58	13	28	88	150	38	0	175	66	0	47	0
27,5	59	28	57	192	104	50	19	27	41	214	34	39	1079	79	0	50	12
28,5	67	43	53	112	81	107	30	49	35	303	24	39	921	233	0	57	0
29,5	133	39	122	82	76	88	55	33	32	286	18	29	908	349	0	132	3
30,5	482	84	110	102	78	79	61	73	28	222	62	97	1098	205	0	301	2
31,5	796	64	98	80	83	117	81	259	22	96	100	128	1253	655	0	423	533
32,5	1053	45	277	91	89	88	81	295	40	62	91	156	1410	262	0	446	1404
33,5	1204	121	209	137	121	95	58	799	33	18	77	180	417	539	0	228	1587
34,5	3623	295	352	341	253	57	49	460	22	11	212	146	606	301	0	241	1411
35,5	6030	473	536	465	540	73	44	424	22	11	122	112	653	281	0	103	534
36,5	4856	1011	668	601	431	46	67	636	17	7	118	20	145	201	0	80	1236
37,5	5370	1425	699	881	552	84	62	510	33	18	168	39	225	76	0	102	937
38,5	4072	1412	838	1024	661	63	49	310	17	18	171	20	199	104	0	119	522
39,5	3716	1181	1125	1028	604	109	37	625	33	14	127	34	250	46	0	97	524
40,5	1711	966	929	1066	870	182	121	231	34	0	88	5	163	15	0	135	523
41,5	1646	455	628	662	650	196	144	331	28	32	61	34	92	10	0	42	4
42,5	1177	452	332	841	580	255	167	148	28	28	114	5	0	10	0	138	189
43,5	602	243	140	919	369	225	101	87	24	35	114	5	49	10	0	30	177
44,5	510	159	247	671	348	278	122	72	22	56	154	10	49	10	0	48	176
45,5	668	125	88	316	195	184	146	54	22	28	62	10	4	0	0	42	2
46,5	357	103	131	419	175	275	104	59	29	46	34	10	9	0	0	10	4
47,5	371	115	102	204	116	208	106	79	34	32	53	5	0	0	0	12	12
48,5	236	145	128	143	124	225	97	63	47	35	23	0	0	0	0	64	4
49,5	165	137	122	150	78	152	87	37	46	21	38	16	0	0	0	0	0
50,5	183	72	43	83	64	67	39	21	29	20	15	0	0	0	0	54	223
51,5	132	58	22	15	30	77	20	17	12	7	0	0	0	0	0	0	0
52,5	7	7	7	15	0	17	19	0	17	7	8	0	0	0	0	0	0
53,5	85	0	14	0	0	0	0	7	0	0	0	0	0	0	0	0	0
54,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58,5	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 14 Deep sea *S. mentella* (≥ 17 cm). Length disaggregated abundance indices (n*1000) for Greenland and Iceland combined, 1985-2001.

Total	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
15,5	0	0	15	0	5	5	5	0	307	0	0	742	0	0	0	0	0
16,5	102	0	5220	850	2061	0	971	0	319	0	0	4707	472	19	0	0	0
17,5	12182	1582	2200	1627	3173	352	248	21	114	82	23	2627	158699	10089	258	30903	26947
18,5	9136	1057	3671	3190	7775	3875	843	31	334068	23139	200846	77982	321634	78028	26858	33310	28408
19,5	7631	903	3692	4713	18902	4468	1856	461	207618	23436	242394	130208	225284	92239	22530	58506	32572
20,5	9657	1390	5683	6341	54321	7382	5134	822	133059	10771	373550	276383	496702	104781	28324	88246	43948
21,5	5080	1673	4961	7936	73007	7187	8916	1300	95661	4078	516453	377258	304686	100365	28195	72033	52192
22,5	2974	2882	5728	9301	44684	9140	35086	2222	67908	4111	521859	482299	353169	88569	39888	54379	61134
23,5	2770	4898	7279	10256	12334	3822	70926	1906	55296	1870	330821	610360	496156	112744	42995	44986	86899
24,5	3012	8281	6473	13559	3135	3143	157184	3719	70133	2840	175457	827291	905264	147396	52464	66601	104692
25,5	4744	10892	5401	17944	5363	1566	232718	7250	83079	3052	76402	876276	1142796	289948	57715	74311	106258
26,5	5014	12648	7530	23552	10326	1056	229455	11864	81229	2187	27518	439597	926006	401455	62559	60884	86558
27,5	6894	12061	7290	33471	12513	1073	154170	11450	84008	1158	17266	233265	765312	468897	50985	52948	79956
28,5	8183	10031	7469	36002	10591	1512	46233	10494	64297	887	5993	91728	441245	404547	53250	36091	65954
29,5	10080	12047	4974	34122	9163	1449	10670	4096	53529	2409	7112	42746	237112	326617	47136	25560	52395
30,5	15038	16712	4638	25163	10677	1718	7004	2734	33708	451	6090	18300	110723	196685	31297	20438	46961
31,5	10231	13701	5364	15493	7748	915	3400	917	11102	239	2800	11104	48844	56809	18144	15063	28211
32,5	11933	11990	3874	7362	6428	694	4177	896	6273	91	1472	1669	9029	16127	7402	8075	17399
33,5	12739	9650	4250	4442	2700	348	2281	1457	1179	18	106	2654	6029	3900	5814	3144	8874
34,5	16181	8145	3696	3215	1744	216	712	775	754	11	212	819	3906	339	3970	1300	5314
35,5	17454	6589	2553	2180	1611	195	372	458	389	11	414	855	1753	300	1537	322	2689
36,5	11136	4284	2541	2081	1473	95	354	636	680	7	118	367	166	313	1582	116	1514
37,5	9735	4129	1558	1586	1053	109	168	510	77	23	168	753	225	76	1368	126	1044
38,5	6039	2898	1312	1566	817	107	74	315	70	18	171	20	199	329	914	247	636
39,5	4936	2207	1577	1247	865	158	244	630	33	14	127	34	250	271	1234	97	576
40,5	2492	1402	1104	1292	920	227	121	231	40	5	88	62	163	34	0	135	589
41,5	1883	688	696	700	670	202	144	331	224	32	61	34	92	10	0	42	12
42,5	1316	527	410	929	598	261	188	148	38	33	114	5	0	10	0	138	189
43,5	733	261	156	990	389	225	101	87	46	35	114	5	49	216	0	158	177
44,5	635	210	278	721	348	284	126	72	22	85	154	10	49	10	0	48	184
45,5	807	163	88	347	195	184	146	54	22	28	62	10	4	0	0	42	2
46,5	436	118	131	419	175	275	104	59	29	75	34	10	9	27	0	10	4
47,5	422	142	102	204	116	208	106	79	34	32	53	5	0	0	0	12	12
48,5	282	167	150	156	140	225	112	63	47	35	23	0	0	0	0	64	4
49,5	188	175	122	160	78	152	87	37	46	21	38	16	0	0	0	0	0
50,5	194	72	43	83	64	67	39	21	29	20	15	0	0	0	0	54	223
51,5	155	58	22	15	30	77	20	17	12	7	0	0	0	0	0	0	0
52,5	13	7	7	15	0	17	19	0	17	7	8	0	0	0	0	0	0
53,5	96	0	14	0	0	0	0	7	0	0	0	0	0	0	0	0	0
54,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57,5	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0
58,5	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 15 *Sebastes spp.* (<17 cm). Abundance indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2001. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	4886	9616	54	2712	47	67	54		817414	149898	209	5067		96	2049	548	7439	3512	6969	10224	6	0	17435	972684	30749	1020868	159
1986	10738	237636	113	1811	54	218	39			2651	68	12308		5755	3149	542	5364	3582	3846	10809	0	0	250609	20782	27293	298684	153
1987	12453	113990	5		19		18		2342	2579	132	8964		123715	2918	1449	4264	8228	10985	18299	0	12	126486	137732	46155	310373	74
1988	19680	42481	0	107	19	139	0		1580	2982	896	13064		18457	6737	2031	9309	6780	6672	9501	0	0	62426	36979	41031	140435	30
1989	7717	13159	3071	5370	17		69		1330	3170	150	4272		2152	3101	877	7151	7291	7258	8894	0	0	29405	11074	34573	75052	21
1990	11255	35933	15416	1538	72		6199	848	2268	3182	482	13704		4360	3747	629	6042	6605	5357	8001	0	0	71261	23995	30380	125636	39
1991	51936	59846	34872	22668	13692	2508	891	1540	45453	3051	209	1707		624	4608	1027	11107	20403	6138	11703	0	0	187952	51045	54987	293984	31
1992	25716	19083	12690	17276	17463	13973	41	13718						1372	5828	2499	13018	13091	2997	14544	115	33	119961	1372	52125	173459	38
1993	5458	39035	665	11331	355	2773	13		3401242	2403635	244	810641		6007	9544	877	8230	10272	3149	12650	13	19	59629	6621769	44754	6726151	110
1994	3403	12003	9828	4014	1190	1730	10842	9867						57890	11601	560	9648	8291	1927	5724	332	14	52877	57890	38097	148864	70
1995					399	10236	855	34695	274128	2671933	4071	188896		3061	6881	1506	3750	3596	866	2532	89	0	46185	3142089	19221	3207496	104
1996	456	14356	5210	9377	26961	11571	2488	107236	405273	223350	1373188	2424		3070	3269	2158	4192	2533	1180	1447	198	24	177655	2007305	15001	2199961	97
1997	6519	47117	0	15852	43421	20194	444	68931	225859	89354		374542		1372	6737	2862	2692	1182	484	2085	141	12	202479	691127	16196	909801	61
1998	1558	25350	50177	30834	55983	13090	37049	13318	474804	1219068	13	1911622		4961	1770	1783	3617	1322	314	989	6	0	227359	3610468	9802	3847630	99
1999	3886	54143	1067	8617	1105	7643	758		16195	169704	1313	53458		5700	1387	929	5569	2372	212	809	0	0	77218	246370	11278	334866	46
2000	1293	9958	63	3052	393	8195	0	33103	14344	35205	131	10243		1625	3038	2447	11847	4982	1426	2245	0	0	56059	61547	25985	143590	50
2001			1318	3559	110	2432	241	1569	4847	13636	792	2876		1716	3819	1131	11775	1994	1316	2383	13	0	9230	23867	22431	55528	15

Table 16 *Sebastes spp.* (<17 cm). Biomass indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2001. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	82	367	2	58	2	3	0		15336	7130	7	203		5	56	6	226	84	187	266	0	0	514	22681	824	24019	137
1986	456	6646	2	77	2	6	0			122	2	218		73	72	12	164	70	102	202	0	0	7189	416	622	8227	156
1987	265	5020	0		0		0		148	138	4	288		6503	40	23	82	98	119	192	0	0	5286	7081	553	12920	89
1988	218	1492	0	3	0	5	0		67	144	41	616		1413	128	35	175	119	127	170	0	0	1718	2281	753	4752	47
1989	109	271	21	49	0		0		81	166	7	320		133	80	29	185	154	170	181	0	0	450	707	798	1954	26
1990	102	369	63	20	0		10	2	67	119	19	834		266	96	17	154	112	144	192	0	0	567	1305	715	2586	42
1991	197	798	73	242	29	24	3	15	563	94	3	62		32	112	17	277	294	153	192	0	0	1380	754	1045	3179	32
1992	150	386	49	111	74	220	0	64						18	128	46	319	203	68	245	0	0	1054	18	1008	2080	30
1993	75	512	16	265	6	76	0		51858	75674	11	48524		262	215	23	206	224	76	319	0	0	950	176328	1063	178342	89
1994	27	216	54	57	29	64	141	277						2703	303	12	267	217	59	170	13	0	865	2703	1041	4609	101
1995					6	330	10	348	3833	40791	46	9752		193	175	35	103	98	25	85	0	0	694	54614	521	55829	95
1996	7	284	14	117	91	297	18	3300	5839	10853	26881	133		170	80	46	113	63	34	43	0	0	4128	43876	378	48383	95
1997	61	344	0	214	163	544	15	2437	5017	2141		16112		73	144	58	72	28	8	43	6	0	3779	23344	359	27482	79
1998	20	433	165	322	221	351	141	531	7310	29572	1	93376		280	40	40	82	28	8	32	0	0	2184	130540	231	132954	119
1999	54	941	14	190	17	272	18		427	3401	20	2541		317	40	17	134	42	8	21	0	0	1506	6706	263	8475	45
2000	27	252	2	106	14	284	0	1414	47	1028	3	546		73	64	46	247	77	25	32	0	0	2099	1698	491	4288	54
2001			7	65	6	90	10	77	67	506	31	117		87	72	29	247	49	34	53	0	0	255	809	483	1547	19

Table 17 *Sebastes spp.* (<17 cm). Length disaggregated abundance indices (n*1000) for West Greenland, 1985-2001.

West	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
0,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4,5	0	6	0	7	0	14	59	0	0	0	0	0	0	0	0	0	7
5,5	25	36	121	97	39	3468	15519	2396	0	2392	26	236	622	182	1235	186	283
6,5	111	97	850	486	1814	5708	59602	30723	117	9939	193	7127	32049	44724	3401	639	2440
7,5	185	460	1393	1940	2111	2758	11107	27896	200	1053	142	28816	54642	124965	232	411	1591
8,5	326	1913	902	9815	2176	8484	15958	5799	1935	4092	540	7089	2405	4670	126	87	20
9,5	2161	4221	658	7404	4284	11835	23919	11346	9480	9035	616	7908	4589	3927	3177	1114	223
10,5	4165	8595	941	3378	5703	6994	36922	8922	8916	5238	935	28169	13241	10533	27661	1800	338
11,5	1470	19713	2445	1453	4835	7050	16197	5788	5980	2909	5090	17615	11127	4294	23335	566	313
12,5	508	106866	7017	1560	3156	7575	2388	7518	9527	6043	9656	12200	6785	2104	3134	4074	113
13,5	1599	76491	8666	3244	2148	6284	1648	11461	5614	4357	4247	17440	20084	6322	4979	13437	532
14,5	2716	14063	18412	8866	1020	4611	1196	6078	6021	2686	7343	11415	26222	10205	4558	14810	464
15,5	4173	4189	47210	13645	709	3556	1549	1220	5822	2401	8718	11658	16131	5645	1482	9324	868
16,5	0	5121	31716	4826	572	944	1005	391	3914	1329	5090	16748	14577	5203	1764	9607	2036
17,5	0	6513	6136	2998	505	654	591	379	2105	1241	3545	11162	0	4585	2139	0	0
18,5	0	1400	0	2514	307	824	218	46	0	68	44	58	0	0	0	0	0
19,5	0	930	0	194	24	133	32	0	0	47	0	15	0	0	0	0	0
20,5	0	0	0	0	0	133	13	0	0	16	0	0	0	0	0	0	0
21,5	0	0	0	0	0	67	0	0	0	32	0	0	0	0	0	0	0
22,5	0	0	0	0	0	67	19	0	0	0	0	0	0	0	0	0	0
23,5	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0
24,5	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
25,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 18 *Sebastes spp.* (<17 cm). Length disaggregated abundance indices (n*1000) for East Greenland, 1985-2001.

East	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
0,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3,5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4,5	59	173	20	0	0	0	0	0	0	0	23	0	0	0	0	0	0
5,5	169	417	85	9	20	0	11	0	7407	0	208	17	0	105	1092	853	206
6,5	193	0	54	0	20	252	292	0	184	0	302	989	803	11703	7843	11217	2423
7,5	214	460	158	126	46	281	373	0	8205	0	87545	2831	1212	67654	1493	1910	2211
8,5	3719	2007	475	356	110	1234	746	0	77003	0	757306	13655	905	31523	1795	126	378
9,5	80721	7288	754	284	133	1212	6038	0	693957	0	498874	165504	23970	45502	21325	1755	745
10,5	350907	5779	1896	756	127	1211	21767	0	413320	0	109292	418879	114109	317417	63608	2808	640
11,5	246177	1054	2690	1471	298	732	17348	28	562208	29	428703	402736	44359	612504	45762	1412	553
12,5	35246	365	3764	2818	611	1314	2488	168	1753530	543	618072	78735	46097	148411	13549	9074	337
13,5	41307	658	11437	3287	1028	511	598	56	736969	1745	361458	204342	83578	305157	17876	12433	580
14,5	66498	704	36338	3090	1776	1381	355	168	396138	8237	49198	399689	134051	371674	13445	6342	1792
15,5	70011	249	53226	3426	2517	2533	379	168	652488	11469	52623	163138	117029	457390	9082	5534	3824
16,5	56545	777	23023	4698	2759	6819	501	448	510139	9582	61631	84279	124540	878446	21025	8082	10179
17,5	20913	851	3568	7172	1572	6492	109	112	391937	26285	116856	71455	431	361575	28477	0	0
18,5	0	0	248	6849	34	20	33	224	257	0	0	466	43	1382	0	0	0
19,5	0	0	0	2313	20	0	0	0	418027	0	0	366	0	19	0	0	0
20,5	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0	0	0
21,5	0	0	0	0	0	0	0	0	0	0	0	224	0	0	0	0	0
22,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 19 *Sebastes spp.* (<17 cm). Length disaggregated abundance indices (n*1000) for Iceland, 1985-2001.

Ice	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
0,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5,5	0	5	0	0	0	0	0	0	0	41	165	373	10	5	10	0	3
6,5	0	128	18	0	4	4	9	5	0	10	5	70	87	9	0	23	105
7,5	25	1324	430	46	365	107	322	52	50	18	61	94	682	83	90	112	233
8,5	19	5248	2978	207	2284	603	2864	639	75	141	234	224	543	98	423	425	715
9,5	83	2012	5048	1326	984	1223	10791	1581	194	150	169	554	180	251	713	1480	1251
10,5	662	576	13941	3077	694	2647	4012	5259	1767	687	483	1088	678	1052	732	3190	2183
11,5	1234	504	11774	5033	1854	3613	3815	11428	3293	2165	888	1740	1763	1586	1094	4953	2773
12,5	2791	834	5583	8904	3751	2949	4893	9508	5005	3598	1487	1320	2113	1038	1014	3942	3229
13,5	4928	1688	1714	8634	5624	3183	6212	5592	8111	5479	2568	1381	1868	939	1489	2782	3608
14,5	6162	2960	1144	6671	6641	4159	7130	5529	10370	7129	3187	1606	2700	935	1823	3163	3040
15,5	7381	4895	1410	4351	6066	5509	7915	6211	8707	9339	4646	2579	3278	2280	1947	2743	2820
16,5	7456	7115	2114	2783	6300	6383	7022	6325	7180	9344	5329	3976	2298	1523	1946	3169	2455
17,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 20 *Sebastes spp.* (<17 cm). Length disaggregated abundance indices (n*1000) for Greenland and Iceland combined, 1985-2001.

Total	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Length																	
0,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3,5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4,5	59	179	20	7	0	14	59	0	0	0	23	0	0	0	0	0	7
5,5	194	458	206	106	59	3468	15530	2396	7407	2433	399	626	632	292	2337	1039	492
6,5	304	225	922	486	1838	5964	59903	30728	301	9949	500	8186	32939	56436	11244	11879	4968
7,5	424	2244	1981	2112	2522	3146	11802	27948	8455	1071	87748	31741	56536	192702	1815	2433	4035
8,5	4064	9168	4355	10378	4570	10321	19568	6438	79013	4233	758080	20968	3853	36291	2344	638	1113
9,5	82965	13521	6460	9014	5401	14270	40748	12927	703631	9185	499659	173966	28739	49680	25215	4349	2219
10,5	355734	14950	16778	7211	6524	10852	62701	14181	424003	5925	110710	448136	128028	329002	92001	7798	3161
11,5	248881	21271	16909	7957	6987	11395	37360	17244	571481	5103	434681	422091	57249	618384	70191	6931	3639
12,5	38545	108065	16364	13282	7518	11838	9769	17194	1768062	10184	629215	92255	54995	151553	17697	17090	3679
13,5	47834	78837	21817	15165	8800	9978	8458	17109	750694	11581	368273	223163	105530	312418	24344	28652	4720
14,5	75376	17727	55894	18627	9437	10151	8681	11775	412529	18052	59728	412710	162973	382814	19826	24315	5296
15,5	81565	9333	101846	21422	9292	11598	9843	7599	667017	23209	65987	177375	136438	465315	12511	17601	7512
16,5	64001	13013	56853	12307	9631	14146	8528	7164	521233	20255	72050	105003	141415	885172	24735	20858	14670
17,5	20913	7364	9704	10170	2077	7146	700	491	394042	27526	120401	82617	431	366160	30616	0	0
18,5	0	1400	248	9363	341	844	251	270	257	68	44	524	43	1382	0	0	0
19,5	0	930	0	2507	44	133	32	0	418027	47	0	381	0	19	0	0	0
20,5	0	0	0	324	0	133	13	0	0	16	0	0	0	0	0	0	0
21,5	0	0	0	0	0	67	0	0	0	32	0	224	0	0	0	0	0
22,5	0	0	0	0	0	67	19	0	0	0	0	0	0	0	0	0	0
23,5	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0
24,5	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
25,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

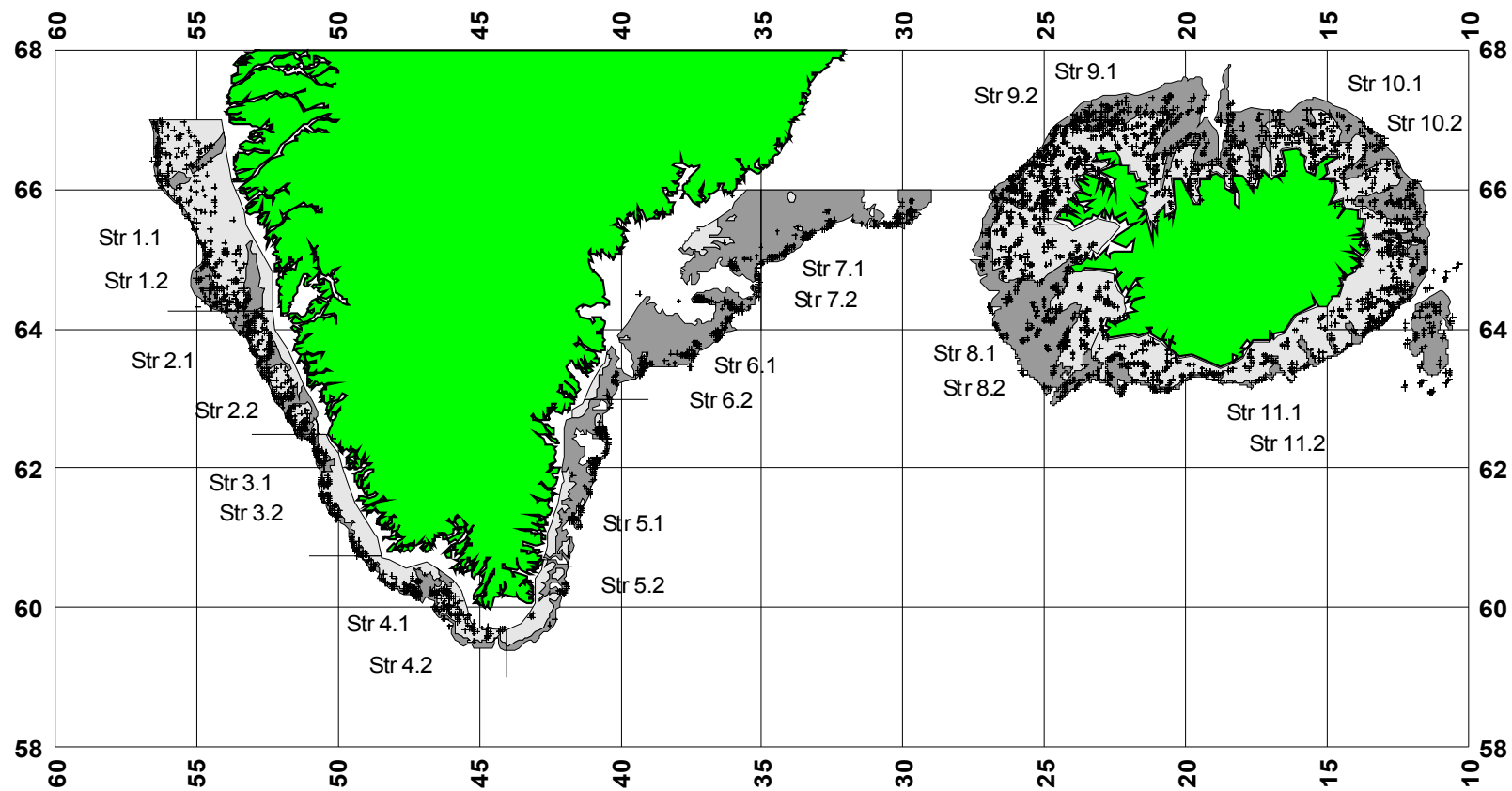


Fig. 1 Stratification scheme of the joint German-Iceland groundfish surveys (Tab. 2) and haul distribution, 1985-2001

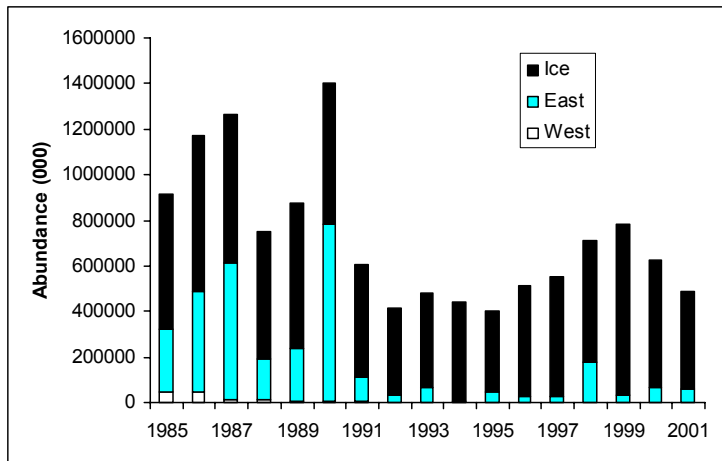


Fig. 2 *S. marinus* (≥ 17 cm). Survey abundance indices for East and West Greenland and Iceland, 1985-2001.

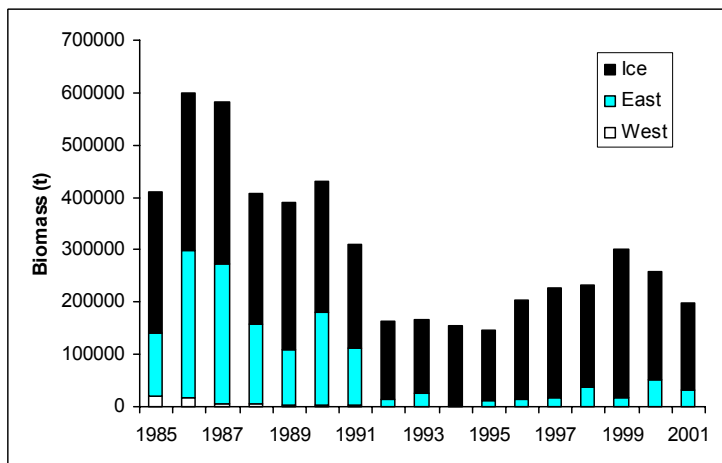


Fig. 3 *S. marinus* (≥ 17 cm). Survey biomass indices for East and West Greenland and Iceland, 1985-2001.

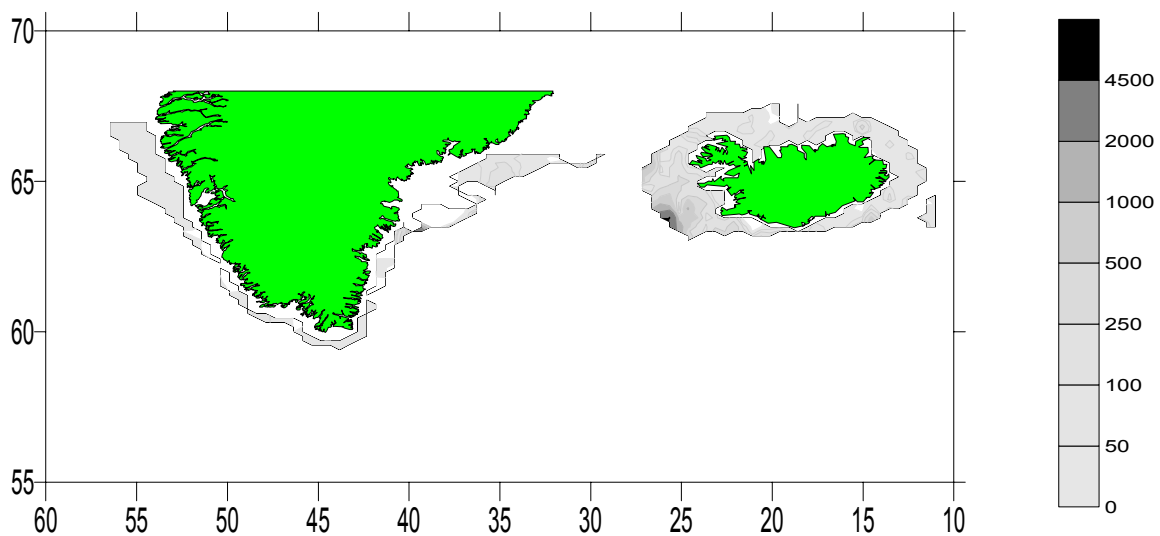


Fig. 4 *S. marinus* (≥ 17 cm). Survey abundance distribution (n/0.5h trawling) off East and West Greenland and Iceland, 2001.

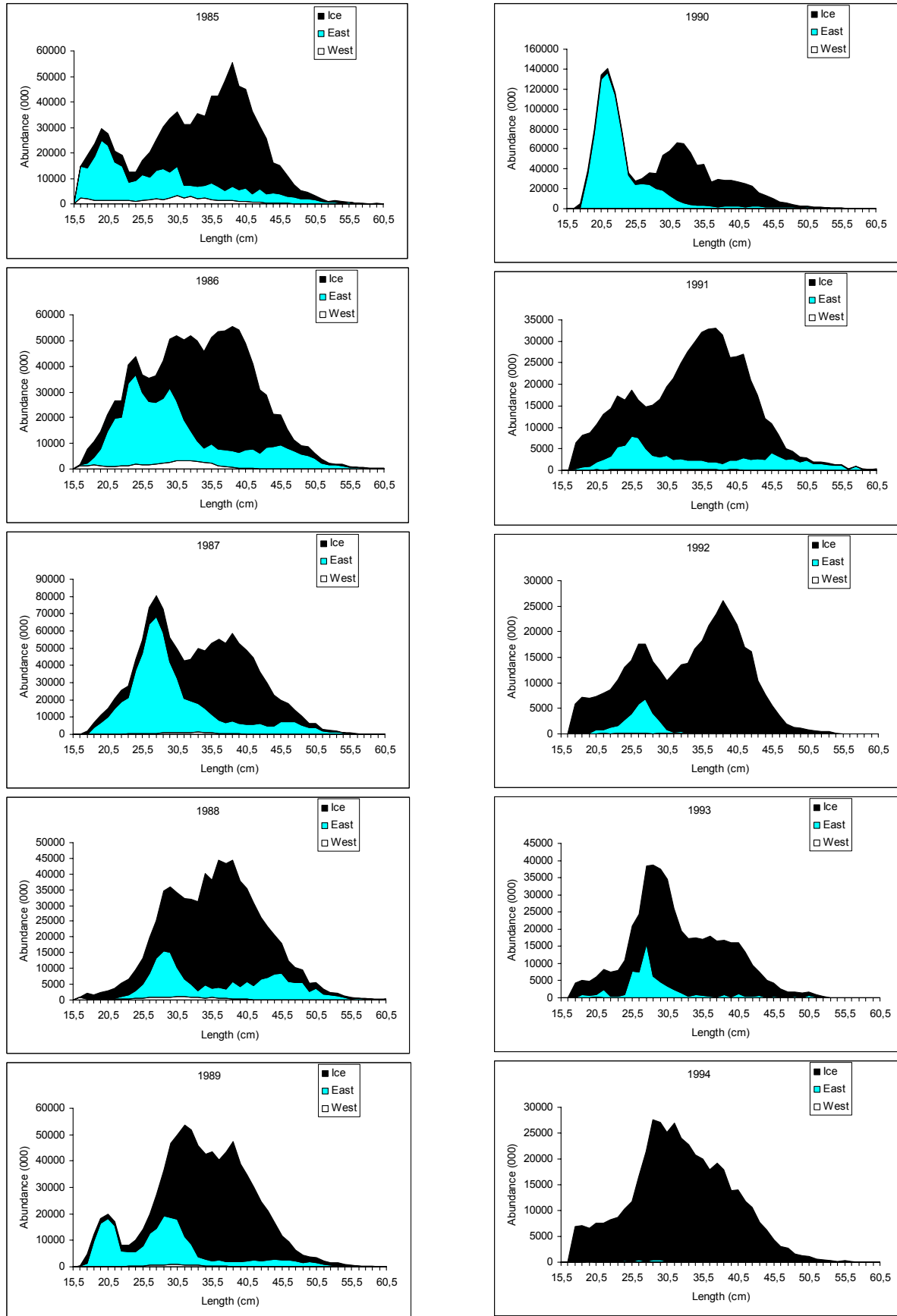


Fig. 5 *S. marinus* (≥17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1985-94.

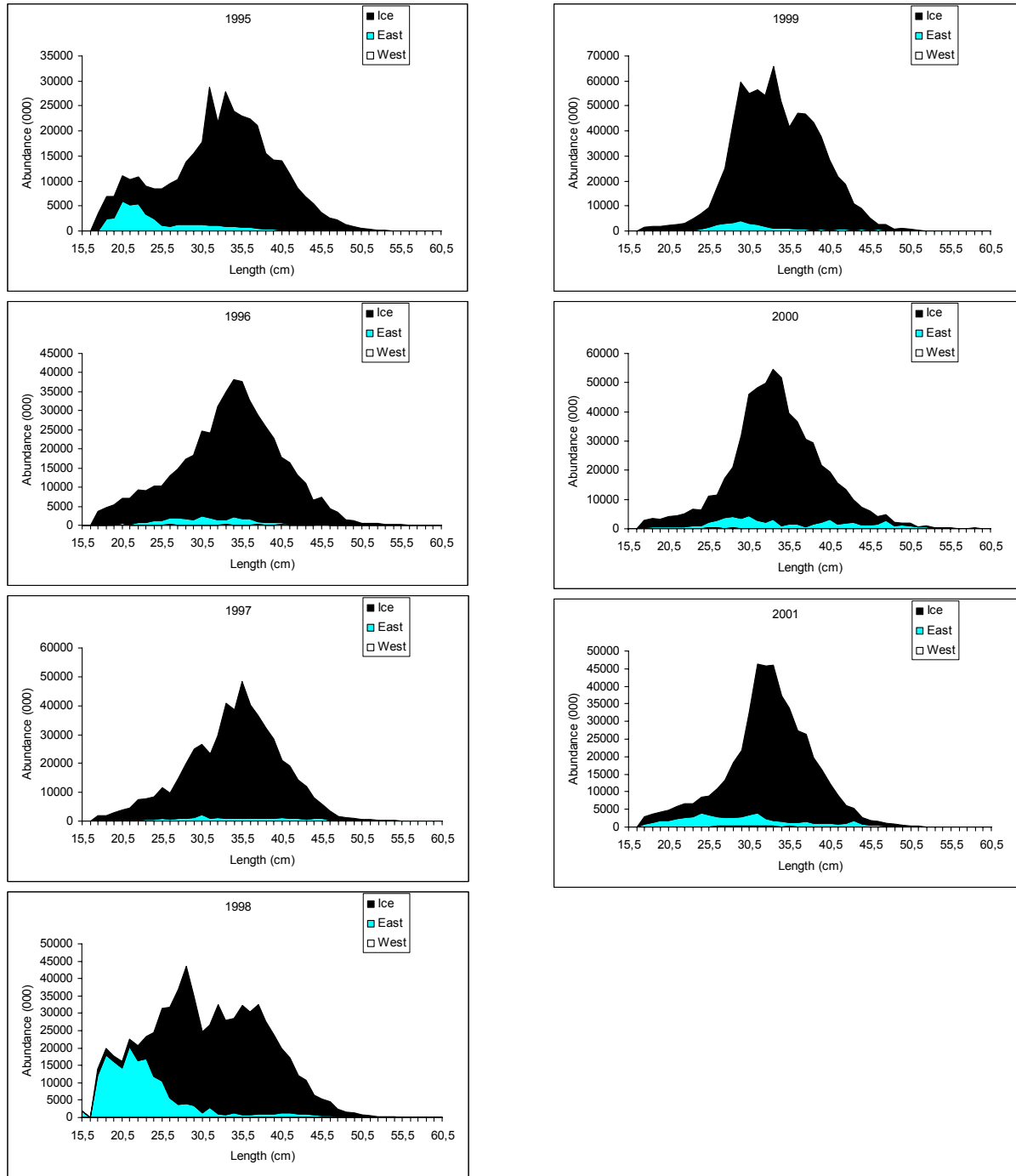


Fig. 6 *S. marinus* (≥ 17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1995-2001.

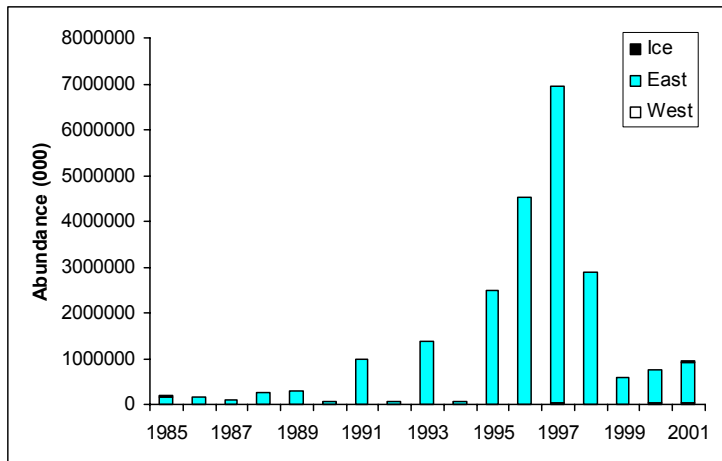


Fig. 7 *S. mentella* (≥ 17 cm). Survey abundance indices for East and West Greenland and Iceland, 1985-2001.

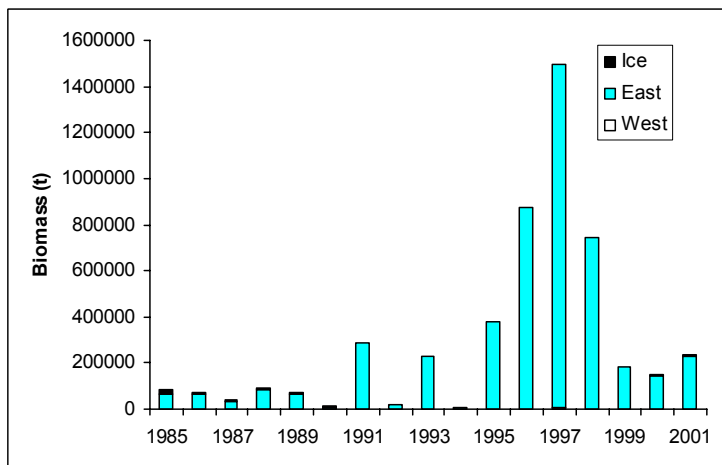


Fig. 8 *S. mentella* (≥ 17 cm). Survey biomass indices for East and West Greenland and Iceland, 1985-2001.

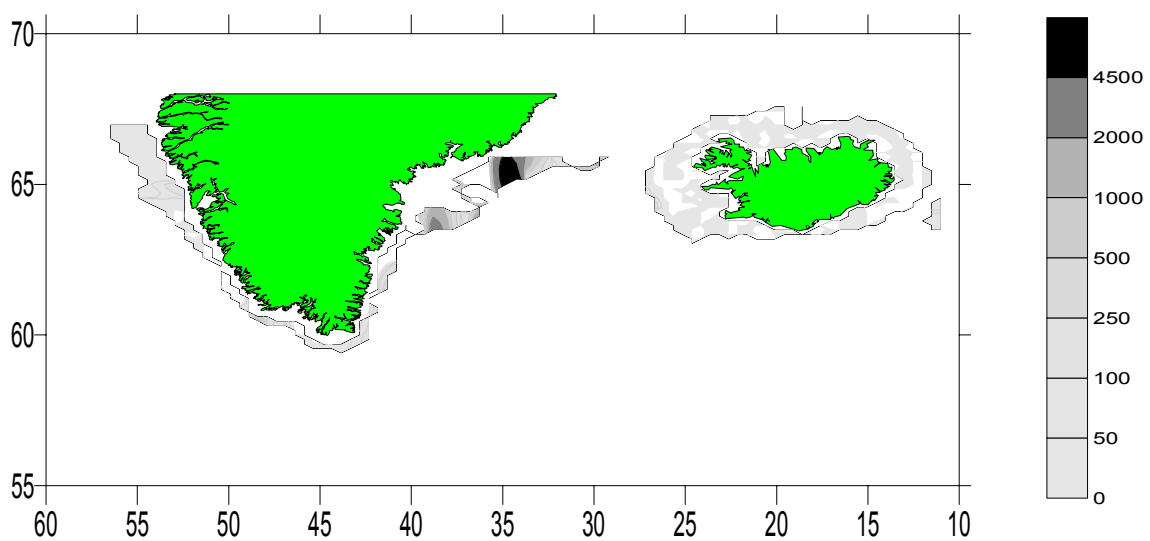


Fig. 9 *S. mentella* (≥ 17 cm). Survey abundance distribution (n/0.5h trawling) off East and West Greenland and Iceland, 2001.

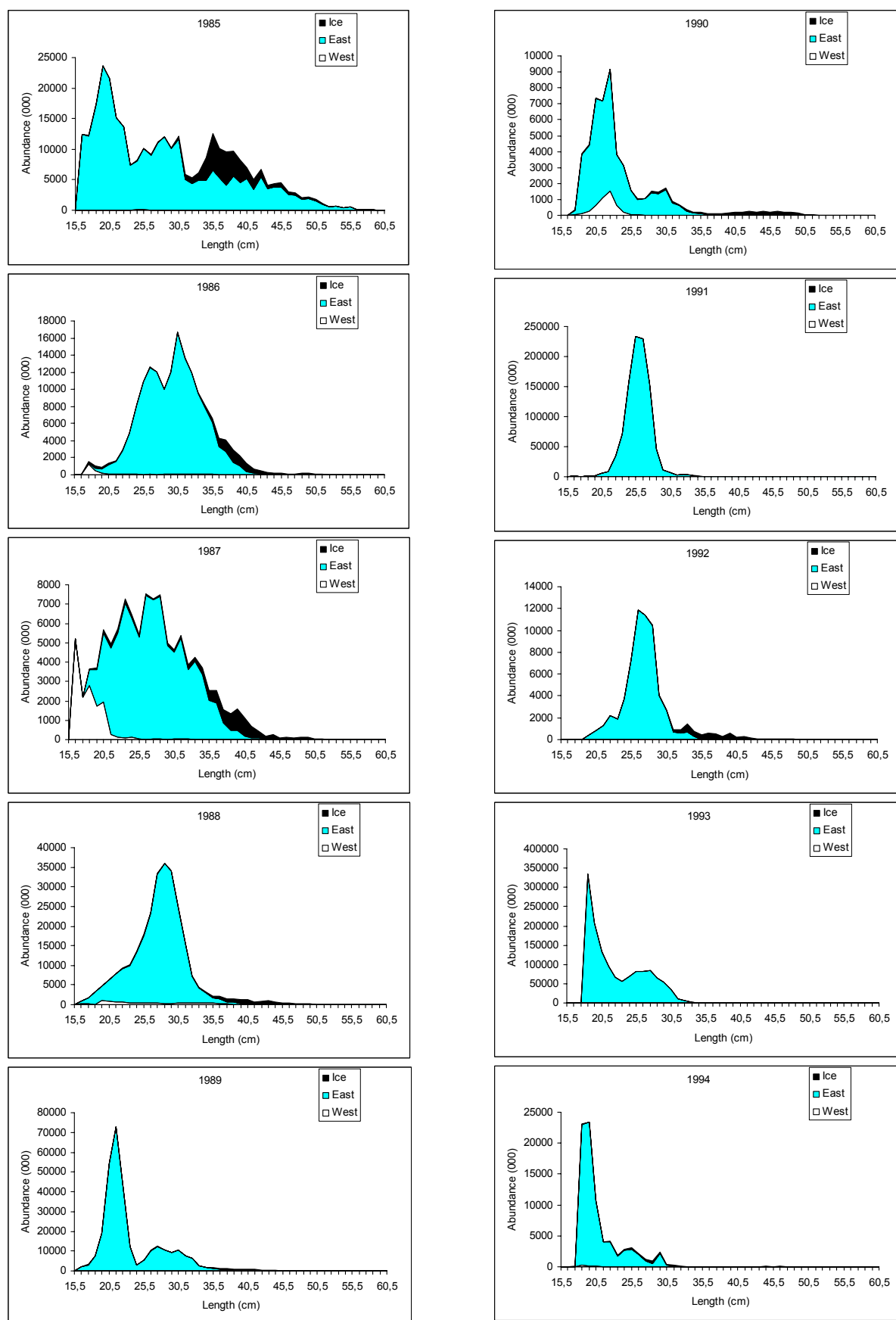


Fig. 10 *S. mentella* (≥17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1985-94.

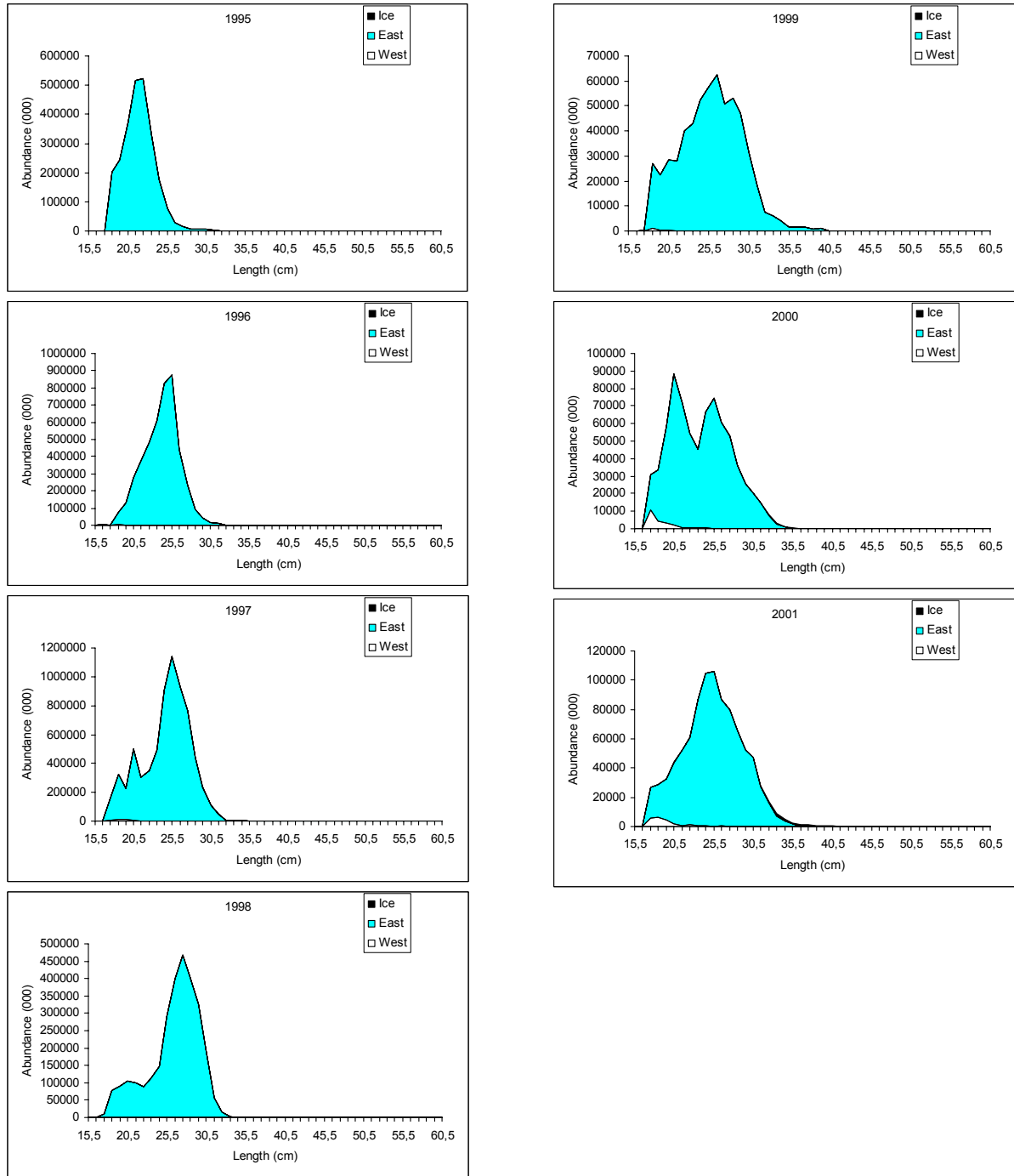


Fig. 11 *S. mentella* (≥ 17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1995-2001.

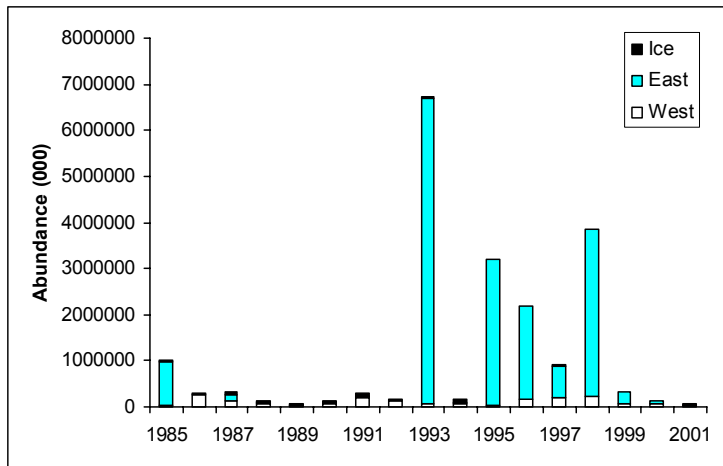


Fig. 12 *S. spp.* (<17 cm). Survey abundance indices for East and West Greenland and Iceland, 1985-2001.

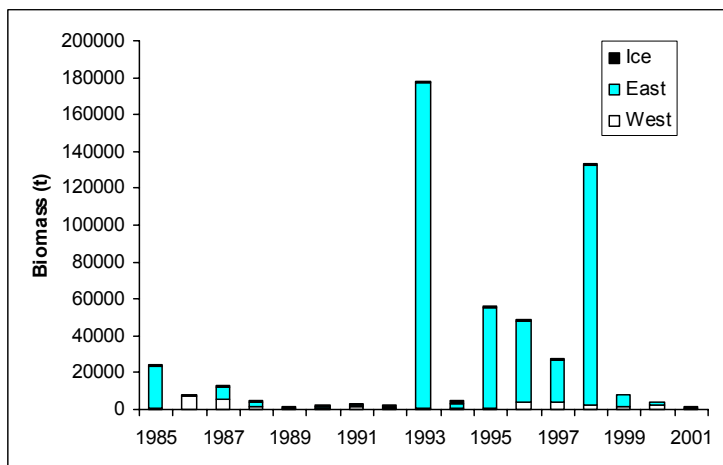


Fig. 13 *S. spp.* (<17 cm). Survey biomass indices for East and West Greenland and Iceland, 1985-2001.

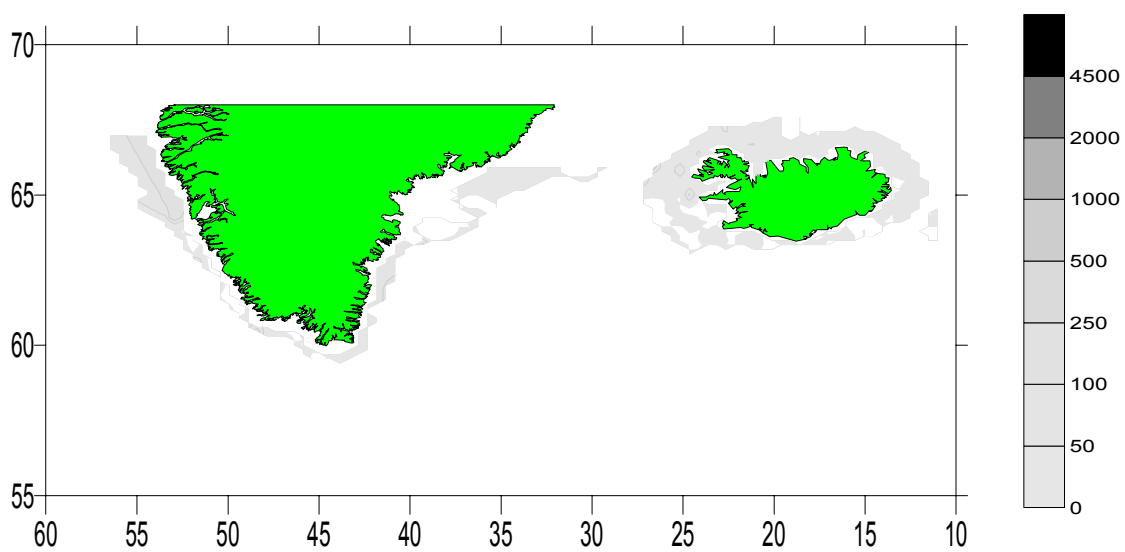


Fig. 14 *S. spp.* (≥ 17 cm). Survey abundance distribution (n/0.5h trawling) off East and West Greenland and Iceland, 2001.

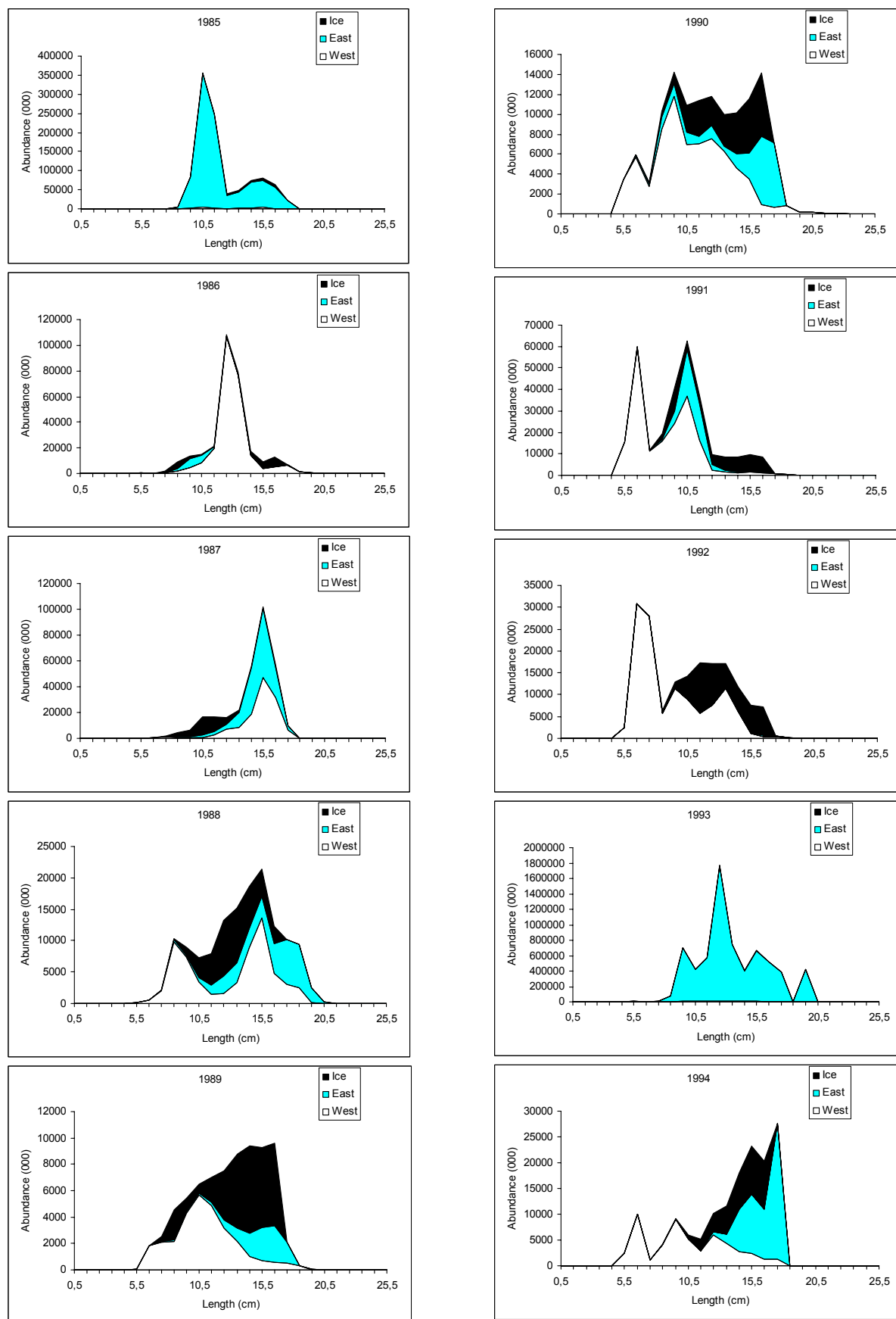


Fig. 15 *S. spp.* (<17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1985-94.

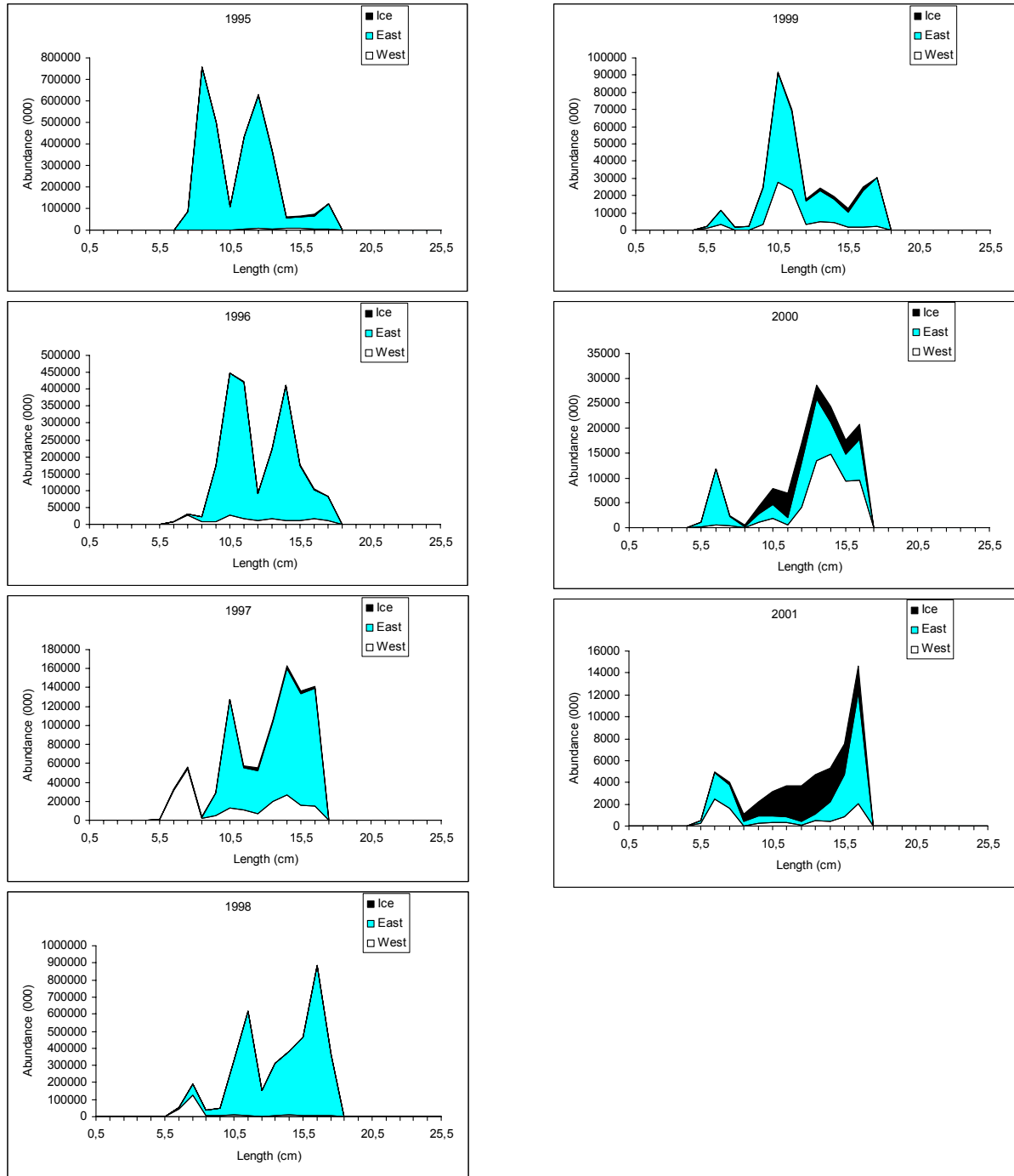


Fig. 16 *S. spp.* (<17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1995-2001.