Veðurstofa Íslands
Report

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Atmospheric circulation and ocean surface data in the Iceland Sea

A comparison between February 1997, February 1993 and February 1994

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Abstract

Atmospheric circulation, sea ice and sea surface conditions strongly influence the sensible and latent heat fluxes (or energy fluxes) at the air/sea interface.
Meteorological data (surface pressure, temperature, dew point, and upper level potential heights), sea ice charts, 50 meters depth ocean data (temperature and salinity) and energy fluxes for the Iceland Sea in February 1997 are presented in tables and compared with the correspondent data for February 1993 and 1994.
Average energy fluxes, salinity and temperature are calculated and presented. Major differences in the averages appear every year between different types of ocean water (Irminger Current water and Icelandic Current water), but minor differences for the same type of water in different years are partly related to a different atmospheric circulation and sea ice presence.
The data provide material for further studies of atmosphere/sea ice/ocean interaction.

Contents

Acknowledgements

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Introduction

Observations and data listed in this data report present results of a cooperation between the Icelandic Meteorological Office and the Marine Research Institute, Reykjavík, in the European project ESOP-2 (the European Subpolar Ocean Programme, phase 2).

The ocean salinity and temperature measurements, as well as the the marine atmosphere measurements used by Einarsson & Jakobsson (1994) and Wallevik & Jakobsson (1997) (see [2] and [4]) to calculate the energy fluxes presented in this report, were undertaken during oceanographic cruises on the oceanographic vessels Bjarni Sæmundsson and Árni Friðriksson of the Marine Research Institute. Scientific project leader of the expeditions was Dr. Svend Aage Malmberg of the same Institute.

The ocean area investigated is the Iceland Sea, characterized by a complicated pattern of oceanic currents.
To the west of Iceland, the Denmark Strait is characterized by a very steep temperature and salinity gradient, because the relatively warm and salty branch of the North Atlantic Gulf Stream, named Irminger Current and approaching Iceland from south and surrounding it clockwise, meets the polar originated East Greenland Current, characterized by very cold, low salinity water, and bringing sea ice. To the east of Iceland, a branch of the cold and low salinity East Greenland Current, named Icelandic Current, flows southward around Iceland.

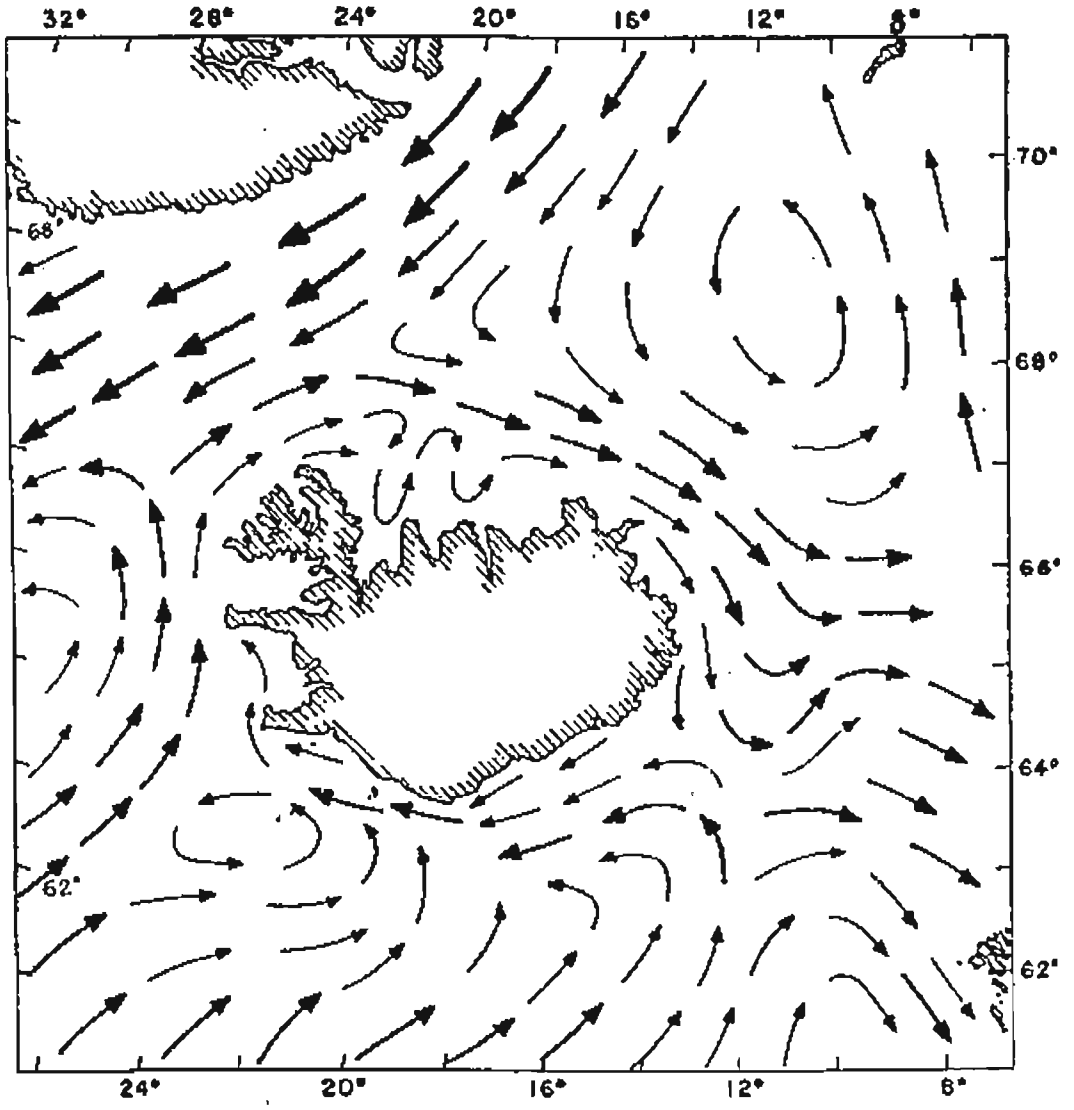


Fig.1:*Surface ocean currents around Iceland* (from Stefánsson, U. 1961, see [8])

The Iceland Sea

The present report can be seen as a continuation of similar data reports accounting for a) observations during joint Danish Icelandic cruises in the Iceland and Greenland Seas in 1987 - 1991 (see [1]), b) the first half of ESOP (see [2]), c) the second half of ESOP (see [3]) and d) the first half of ESOP-2 (see [4]).
The reader is referred to these reports, with a particular attention to the first one, for further information concerning the measurements and calculation of the energy fluxes.

The Iceland Sea is defined as the oceanic area between Iceland, Greenland and Jan Mayen, overlapping the southern part of the Greenland Sea which extends from Scoresby Sund to Jan Mayen, and northward to Spitsbergen. Sea ice amount in the Iceland Sea is quite variable from year to year, depending on three fluctuating parameters:

1) variable sea ice advection in the Arctic East Greenland Current;
2) variable stability conditions in the local ocean surface layer due to changing temperature and salinity;

3) the dominating pressure configuration prevailing in the atmospheric general circulation across the North Atlantic.

Favourable conditions for ocean bottom production in the Iceland Sea are considered substantial, though far from comparable to conditions in the Odden sea ice area between Jan Mayen and Spitsbergen, the central research area of interest to ESOP-2.

Observations and data

The present report mainly aims at a comparison of the sensible and latent heat fluxes, calculated in the previous report by Wallevik & Jakobsson (1997) (see [4]) for the month of February 1997, with the same energy fluxes calculated by Einarsson & Jakobsson (1994) (see [2]) for the months of February 1993 and February 1994. All the measurements necessary for the calculation and comparison of the energy fluxes were obtained during oceanographic cruises on the vessel "Bjarni Sæmundsson".

In comparing these different energy fluxes we must take into account:

a) the weather conditions at the time of measuring;
b) the sea ice extent, concentration and type present at the time of measuring in the Iceland Sea;
c) the type of water we are looking at; we decided to describe the type of water by its salinity and temperature measured at 50 meters depth.

In Appendix B tables displaying the salinity and temperature of the ocean at a depth of 50 meters are listed. These data were retrieved from the Marine Research Institute's archive, from the expeditions reports taken in cruises on Bjarni Sæmundsson and Árni Friðriksson for the ESOP and ESOP-2 energy fluxes projects. Each table refers to a different cruise.

The same set of data is available on floppy disk at the Icelandic Meteorological Office, c/o Dr. Thor Jakobsson.

It is hoped that this report will provide further material for the study of the atmosphere/ocean interactin in the Iceland Sea. This is an important area for studying the climate of the North Atlantic Ocean and the surrounding area. Sampling of sea surface variables and air-sea fluxes comparisons are of increasing interest in the study of dynamics of climate (Weller & Taylor (1993) , see [7]).

1. Year 1997

1.1 Description of the atmospheric general circulation

1.1.1 Tables of meteorological parameters

These tables show all the meteorological data achieved from the German charts (Europäischer Wetterbericht), for the time period January-February-March ***1997***, and for the 3 stations Ísafjörður (Iceland), Scoresby Sund (Greenland) and Jan Mayen (Norway). The data contain the surface pressure (***pres***), temperature (***temp***) and dew point temperature (***dew***), and the potential height at the 500 hPa (***500***) and 100hPa (***100***) upper levels.

N.B.: day 1 is 1/1/1997, then days are counted progressively, so that day 32 is 1/2/1997, day 60 is 1/3/1997 and day 90 is 31/3/1997.

Ísafjörður

day	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)		*day*	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)
1	1029.0	4	2	562	1586		46	997,4	0	0	518	1528
2	1030.5	5	3	562	1586		47	1000.1	-6	-9	518	1536
3	1029.4	6	4	562	1584		48	964.3	1	1	496	1532
4	1025.9	4	0	556	1574		49	948.1	2	1	484	1514
5	1025.1	0	-1	556	1570		50	958.3	-1	-6	489	1500
6	1023.6	2	0	552	1572		51	975.6	-4	-7	496	1494
7				546	1575		52	971.8	-2	-3	498	1500
8				542	1570		53	977.5	-2	-16	500	1502
9	1019.2	-3	-5	538	1563		54	985.7	-5	-6	503	1496
10	1020.3	-2	-5	536	1560		55	985.6	-3	-6	500	1494
11	1016.3	-1	-4	528	1554		56	983.6	-3	-5	499	1496
12	999.2	-4	-6	519	1544		57	989.3	-3	-5	508	1506
13	991.9	-4	-7	512	1536		58	995.8	-1	-5	512	1517
14	984.9	-3	-4	504	1538		59	970.0	5		496	1516
15	993.4	-7	-10	518	1544		60	986.2	-7	-9	506	1512
16				525	1544		61	986.2	-5	-9	504	1507
17	995.0	-2	-2	524	1538		62	986.8	-5	-8	512	1518
18	1010.3	-7	-11	536	1552		63				506	1534
19	1008.0	-3		540	1560		64	975.1	-3	-7	490	1512
20	999.9	-1	-8	528	1548		65	972.7	-3	-5	496	1520
21	976.1	5	-4	504	1548		66	964.8	-4	-5	490	1512
22	989.1	1	-6	516	1540		67	991.9	-1	-9	506	1544
23	996.2	4	-4	528	1544		68	968.5	3	-4	504	1544
24	962.0	6	1	496	1548		69				504	1564
25	977.4	-4	-11	500	1544		70	997.4	-5	-8	520	1576
26	990.2	1	-10	496	1550		71				518	1578
27				544	1576		72	1027.3	-8	-13	531	1576
28	1018.3	5	0	548	1580		73	1023.6	-5	-8	530	1572
29				524	1568		74	1023.9	-8	-13	539	1564
30	1017.5	-1	-6	552	1576		75	1024.6	-4	-10	545	1576
31	1025.6	4	-5	552	1580		76	1018.7	1	-3	538	1582
32	1007.3	7	2	524	1552		77	1021.7	-4	-5	536	1588
33	992.1	-3	-10	504	1536		78				539	1587
34	996.3	-13	-16	504	1532		79	1025.8	-2	-4	536	1576
35	998.3	-12	-17		1520		80	1018.7	-1	-3	535	1568
36	996.6	-8	-13	499	1516		81	1006.7	0	0	528	1562
37	980.2	-5	-10	494	1520		82	1015.9	-1	-3	535	1563
38				509	1524		83	1003.7	-4	-9	524	1556
39	1004.1	-7	-12	517	1530		84	975.8	2	-3	502	1548
40	985.6	0	-3	507	1518		85	971.2	-2	-3	504	1540
41	976.9	-2	-3	496	1510		86	992.4	-2	-3	523	1532
42	966.8	1	0	504	1520		87				530	1548
43	985.9	-1	-5	504	1514		88	996.5	2	1	523	1552
44	992.6	-4	-9	516	1524		89				514	1551
45	994.7	2	-5	520	1520		90	992.9	-2	-7	504	1544

Scoresby Sund

day	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)		*day*	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)
1	1025.3	-10	-15	552	1576		46	1010.9	-10	-11	518	1504

2	1024.4	-5	-12	556	1574		47				514	1520
3	1022.0	-5	-11	558	1574		48	991.9	-11	-12	506	1524
4	1014.7	-1	-10	552	1566		49	970.7	-5	-5	493	1516
5	1020.6	-12	-13	544	1560		50	967.5	0	0	498	1500
6	1015.8	-3	-11	544	1562		51	981.3	-6	-7	504	1494
7	1015.0	-5	-10	536	1562		52	980.7	-1	-3	504	1494
8	1008.6	-9	-11	527	1558		53	983.3	-5	-5	504	1498
9	1032.7	-18	-22	526	1544		54	996.2	-6	-13	505	1490
10	1029.9	-18	-24	528	1539		55	993.8	-6	-10	502	1488
11	1024.7	-20	-23	524	1538		56	990.8	-11	-13	496	1487
12	1013.6	-18	-23	510	1527		57	996.3	-20	-22	498	1493
13	1006.5	-23	-26	504	1522		58	1001.3	-22	-24	507	1505
14	1005.5	-24	-29	504	1528		59	993.2	-16	-20	497	1498
15	1009.3	-24	-31	510	1528		60	989.5	-16	-23	497	1496
16	1028.2	-28	-32	519	1535		61	996.6	-19	-26	508	1496
17	1018.9	-28	-32	522	1528		62	1002.3	-18	-26	507	1496
18	1013.7	-22	-26	526	1536		63	1006.8	-24	-28	512	1520
19				528	1544		64	977.8	-11	-12	488	1502
20	970.3	-8	-13	504	1528		65	975.2	-12	-15	484	1496
21	986.7	-11	-19	496	1524		66	978.8	-15	-17	490	1495
22	989.0	-19	-20	504	1523		67	987.9	-13	-17	503	1520
23	999.0	-21	-22	520	1528		68	974.4	-8	-9	496	1512
24	980.7	-2	-2	483	1532		69	994.4	-12	-14	496	1536
25	964.4	-9	-10	472	1524		70	995.1	-16	-19	498	1540
26	976.0	-19	-25	477	1520		71	1018.3	-19	-25	511	1544
27	999.6	-18	-20	512	1544		72				519	1544
28	1006.6	-16	-24	528	1560		73	1025.8	-10	-25	520	1536
29	1000.2	-5	-12	508	1544		74	1027.3	-14	-24	523	1536
30	1017.5	-14	-17	536	1552		75	1030.1	-16	-24	535	1544
31	1030.4	-12	-15	544	1560		76				535	1567
32	1007.2	-20	-22	520	1541		77				536	1573
33	996.4	-15		501	1520		78	1035.6	-20	-22	537	1565
34	996.5	-12	-14	500	1512		79	1036.2	-19	-21	535	1564
35	999.9	-11	-12	504	1503		80	1035.9	-20	-24	530	1558
36	1008.3	-14	-22		1502		81	1033.6	-14	-18	532	1544
37	1002.1	-15	-16	507	1503		82	1026.9	-14	-17	530	1544
38	1005.9	-17	-19	508	1504		83	1017.3	-15	-17	528	1543
39	1008.4	-20	-22	511	1512		84	1005.4	-5	-7	514	1533
40	1006.3	-20	-22	508	1506		85	983.5	-2	-4	508	1527
41	1005.1	-20	-22	512	1502		86	992.9	-3	-4		1522
42				512	1504		87	1007.5	-3	-4	523	1528
43	1005.7	-10	-13	512	1504		88	1007.7	-5	-6	518	1528
44	1006.6	-14	-15	518	1508		89	985.3	-5	-5	504	1524
45	1010.2	-11	-12	520	1504		90	996.2	-9	-13	505	1520

Jan Mayen

day	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)		*day*	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)
1	1026.9	-4	-9	546	1576		46	1013.0	-3	-6	522	1512
2	1021.4	-6	-7	554	1569		47	1009.7	-2	-2	522	1522
3	1020.0	-5	-6	551	1569		48	994.3	0	0	518	1539
4	1013.1	-2		548	1565		49	976.4	1	1	504	1536
5	1022.3	-7	-8	544	1557		50	976.7	1	0	505	1520
6	1010.0	-4	-9	536	1555		51	984.9	-1	-3	508	1506
7	1014.9	-6	-7	527	1557		52	968.8	0	-1	500	1499
8	1015.1	-5	-6	526	1550		53	977.7	1	-1	501	1500

9	1020.9	-17	-19	518	1536		54	978.8	-1	-1	504	1496
10	1029.3	-17	-19	520	1532		55	984.8	-3	-5	499	1488
11	1027.9	-15	-17	524	1532		56	980.2	-6	-12	493	1487
12	1006.6	-2	-4	510	1528		57	980.9	-7	-8	496	1494
13	991.1	-16	-18	500	1524		58	999.9	-13	-16	509	1512
14	1002.5	-17	-21	509	1528		59	992.4	-3	-6	496	1510
15	993.1	-17	-20	512	1534		60	959.2	-4	-4	495	1503
16	1022.7	-23	-27	522	1536		61	980.2	-6	-7	500	1506
17	1013.7	-19	-21	524	1535		62	990.2	-10	-12	503	1501
18	1004.3	-9	-12	520	1525		63	1003.7	-11	-14	524	1533
19	1005.0	-8	-11	532	1541		64	978.4	0	0	497	1528
20	982.6	1	-4	491	1524		65	980.3	-1	-3	496	1509
21	991.8	-16	-19	500	1531		66	980.3	-1	-2	488	1512
22	978.5	-4	-4	507	1534		67	974.5	-7	-8	513	1528
23	1003.0	-9	-14	529	1536		68	978.4	2	1	502	1526
24	1003.5	-1	-1	516	1548		69	1000.2	-1	-5	515	1540
25	983.4	0	-3	504	1544		70	988.4	-1	-5	494	1544
26	980.5	-7	-9	486	1530		71	1006.2	-13	-17	508	1544
27	991.9	-16	-20	492	1540		72	1007.1	-5	-5	517	1535
28	1010.7	-13	-19	528	1564		73	1021.2	-13	-19	509	1528
29	1003.0	1	-1	527	1556		74	1017.8	-11	-15	517	1527
30	1004.4	-12	-15	522	1553		75	1023.6	-8	-11	527	1541
31	1035.1	-13	-17	548	1504		76	1031.8	-9	-12	529	1550
32	1011.1	6	1	536	1552		77		-10	-13	528	1562
33	990.9	0	0	512	1530		78	1029.2	-7	-9	530	1557
34	971.1	-8	-8	504	1517		79	1030.1	-7	-11	525	1554
35	982.7	-3	-5	506	1512		80	1026.7	-8	-10	527	1554
36	1000.5	-7	-14	510	1508		81	1028.0	-5	-8	534	1551
37	1003.3	-4	-8	512	1510		82	1023.6	-3	-5	533	1541
38	990.2	-5	-8	504	1508		83	1020.5	-3	-4	532	1543
39	1001.7	-7	-10	511	1512		84	1008.9	-2	-4	517	1538
40	1001.7	-5	-6	516	1515		85	973.3	0	0	506	1532
41	995.6	-1	-4	515	1509		86	980.2	2	1	515	1527
42	991.5	-1	-4	516	1506		87	997.4	-2	-4	518	1526
43	1002.0	-7	-9	518	1509		88	1007.7	-3	-4	522	1531
44	1007.9	-4	-9	521	1510		89	991.0	-2	-3		1526
45	1011.4	-4	-8	523	1511		90	986.7	-4	-5	506	1524

The following table contains the pressure differences between different pairs of stations, calculated from the previous table. The first 3 columns display the surface pressure difference, while the 4th column (***Ísa-Sco 500***) displays the 500 hPa potential height difference between Ísafjörður and Scoresby Sund.

N.B.: day 1 is 1/1/1997, then days are counted progressively, so that day 32 is 1/2/1997, day 60 is 1/3/1997 and day 90 is 31/3/1997.

day	*Ísa-Sco* (mb)	*Sco-Jan* (mb)	*Jan-Ísa* (mb)	*Ísa-Sco 500* (*10 m)		*day*	*Ísa-Sco* (mb)	*Sco-Jan* (mb)	*Jan-Ísa* (mb)	*Ísa-Sco 500* (*10 m)
1	3.7	-1.6	-2.1	10		46	-13.5	-2.1	15.6	0
2	6.1	3.0	-9.1	6		47			9.6	4
3	7.4	2.0	-9.4	4		48	-27.6	-2.4	30.0	-10
4	11.2	1.6	-12.8	4		49	-22.6	-5.7	28.3	-9
5	4.5	-1.7	-2.8	12		50	-9.2	-9.2	18.4	-9
6	7.8	5.8	-13.6	8		51	-5.7	-3.6	9.3	-8
7		0.1		10		52	-8.9	11.9	-3.0	-6
8		-6.5		15		53	-5.8	5.6	0.2	-4

9	-13.5	11.8	1.7	12		54	-10.5	17.4	-6.9	-2
10	-9.6	0.6	9.0	8		55	-8.2	9.0	-0.8	-2
11	-8.4	-3.2	11.6	4		56	-7.2	10.6	-3.4	3
12	-14.4	7.0	7.4	9		57	-7.0	15.4	-8.4	10
13	-14.6	15.4	-0.8	8		58	-5.5	1.4	4.1	5
14	-20.6	3.0	17.6	0		59	-23.2	0.8	22.4	-1
15	-15.9	16.2	-0.3	8		60	-3.3	30.3	-27.0	9
16		5.5		6		61	-10.4	16.4	-6.0	-4
17	-23.9	5.2	18.7	2		62	-15.5	12.1	3.4	5
18	-3.4	9.4	-6.0	10		63		3.1		-6
19			-3.0	12		64	-2.7	-0.6	3.3	2
20	29.6	-12.3	-17.3	24		65	-2.5	-5.1	7.6	12
21	-10.6	-5.1	15.7	8		66	-14.0	-1.5	15.5	0
22	0.1	10.5	-10.6	12		67	4.0	13.4	-17.4	3
23	-2.8	-4.0	6.8	8		68	-5.9	-4.0	9.9	8
24	-18.7	-22.8	41.5	13		69		-5.8		8
25	13.0	-19.0	6.0	28		70	2.3	6.7	-9.0	22
26	14.2	-4.5	-9.7	19		71		12.1		7
27		7.7		32		72			-20.2	12
28	11.7	-4.1	-7.6	20		73	-2.2	4.6	-2.4	10
29		-2.8		16		74	-3.4	9.5	-6.1	16
30	0.0	13.1	-13.1	16		75	-5.5	6.5	-1.0	10
31	-4.8	-4.7	9.5	8		76			13.1	3
32	0.1	-3.9	3.8	4		77		0.0		0
33	-4.3	5.5	-1.2	3		78		6.4		2
34	-0.2	25.4	-25.2	4		79	-10.4	6.1	4.3	1
35	-1.6	17.2	-15.6			80	-17.2	9.2	8.0	5
36	-11.7	7.8	3.9			81	-26.9	5.6	21.3	-4
37	-21.9	-1.2	23.1	-13		82	-11.0	3.3	7.7	5
38		15.7		1		83	-13.6	-3.2	16.8	-4
39	-4.3	6.7	-2.4	6		84	-29.6	-3.5	33.1	-12
40	-20.7	4.6	16.1	-1		85	-12.3	10.2	2.1	-4
41	-28.2	9.5	18.7	-16		86	-0.5	12.7	-12.2	
42			24.7	-8		87		10.1		7
43	-19.8	3.7	16.1	-8		88	-11.2	0.0	11.2	5
44	-14.0	-1.3	15.3	-2		89		-5.7		10
45	-15.5	-1.2	16.7	0		90	-3.3	9.5	-6.2	-1

The following table contains additional meterological data about the pressure at surface measured at Keflavík Airport (Iceland) during the period January-February-March 1997.

N.B.: day 1 is 1/1/1997, then days are counted progressively, so that day 32 is 1/2/1997, day 60 is 1/3/1997 and day 90 is 31/3/1997.

day	*pressure* (mb)		*day*	*pressure* (mb)
1	1032.50		46	998.00
2	1033.70		47	995.50
3	1032.90		48	961.80
4	1027.90		49	946.20
5	1025.00		50	962.50
6	1025.40		51	973.90
7	1022.50		52	972.00
8	1018.40		53	977.10
9	1015.00		54	982.00
10	1017.20		55	979.70

11	1012.40		56	980.30
12	991.30		57	987.80
13	986.70		58	997.80
14	975.30		59	959.10
15	987.60		60	981.50
16	1000.40		61	980.60
17	985.20		62	988.30
18	1002.20		63	977.90
19	1018.30		64	979.20
20	1009.60		65	983.80
21	984.80		66	966.30
22	996.20		67	997.70
23	1003.00		68	982.80
24	969.80		69	1002.30
25	983.70		70	1006.10
26	1003.10		71	1011.60
27	1019.30		72	1024.20
28	1026.70		73	1020.50
29	1012.30		74	1019.30
30	1024.60		75	1019.70
31	1029.00		76	1018.50
32	1012.30		77	1012.30
33	997.50		78	1020.00
34	992.90		79	1022.00
35	993.50		80	1012.40
36	985.60		81	1008.90
37	985.90		82	1013.80
38	985.60		83	999.70
39	997.30		84	968.60
40	988.30		85	966.50
41	962.70		86	991.30
42	960.60		87	1008.80
43	985.40		88	1001.90
44	986.70		89	993.50
45	989.90		90	992.90

1.1.2 Plot of the surface pressure difference between Ísafjörður and Scoresby Sund

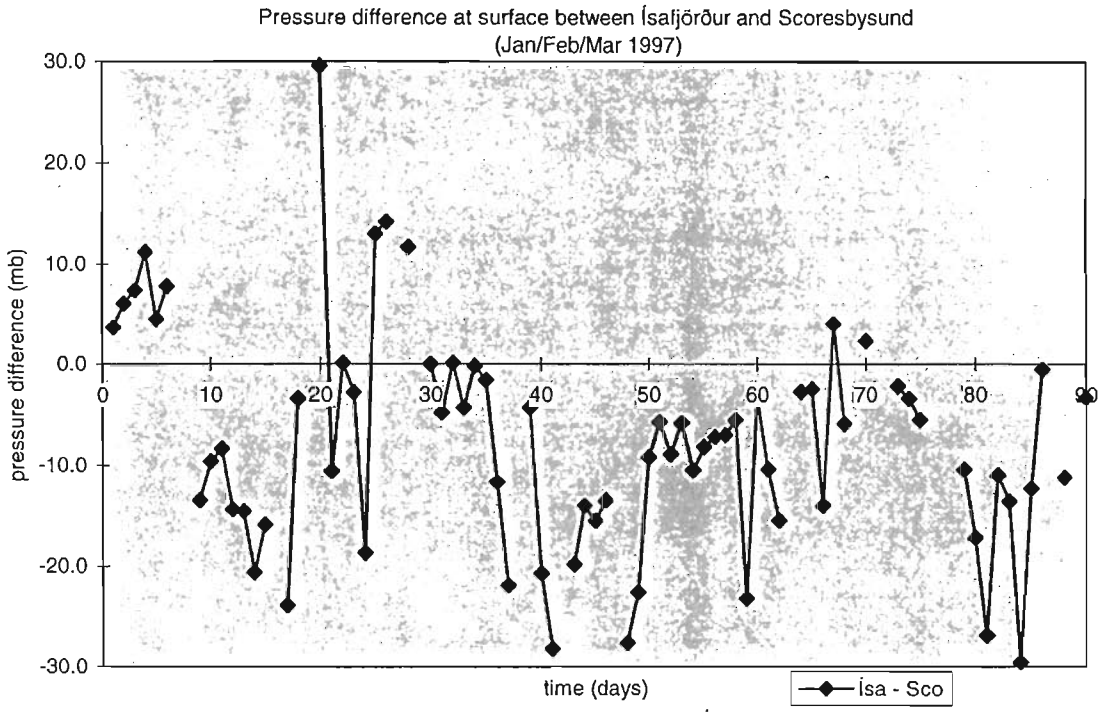


Fig.2:*Surface pressure difference between the stations Ísafjörður and Scoresby Sund during January-February-March 1997 (values are in mb)*

1.1.3 Description of the synoptic scale general circulation over the Iceland Sea and surroundings during the period January-February-March 1997

The following is a description of the synoptic scale general circulation deduced from the Europäischer Wetterbericht (European Meteorological Bullettin) daily maps. The phrase "pressure difference", which will often be used, refers to the surface pressure difference between the stations Ísafjörður and Scoresby Sund (i.e. surface pressure in Ísafjörður - surface pressure in Scoresby Sund). Usually this difference was evaluated from the pressure values measured at these two stations and reported on the maps. Whenever the measurement report was missing, the pressure difference was evaluated from the isobars on the map.

The description also refers to ***sea ice charts*** *which are shown in* Appendix A. *These charts are copies of the report charts made by the Icelandic Coast Guard (Landhelgisgæslan).*

- Due to a high pressure field persisting over Iceland, the first 8 days of January are dominated by anticyclonic circulation, with winds blowing from West. The centre of the high, coming from South East, approaches Iceland on the 3rd of January and persists over land until day 8/1. The pressure difference between Ísafjörður and Scoresby Sund reaches +8 mb. This situation, causing westerlies to blow over the Denmark Strait, is particularly unfortunate for Iceland, because the wind field pushes the sea ice from the East coast of Greenland to the North and North West coast of Iceland. Indeed, as we can see from the sea ice charts, the ice edge is very close to Icelandic coasts already on day 5/1, and has reached the North West coast on day 10/1.

- From day 9/1 to day 19/1 the circulation pattern is variable, giving changing winds. The pressure difference is negative, and winds are mainly from North because of the persistent high over Greenland. Occasionally a fast moving cyclone approaches Iceland from the Atlantic Ocean, causing the winds to turn South-Easterly (i.e. on day 17/1, when the pressure difference reaches -23 mb). To sum up, during these 10 days the winds contributes to push the ice back towards Greenland, as we can see from the ice charts taken on days 13/1 and 18/1, where the ice edge has backed up from Icelandic coasts.

- From day 20/1 to day 22/1 the normal situation is somehow reversed, with a low standing over Greenland and centred over Scoresby Sund and a high over Iceland. Again the winds blow from West
and are strong (weaker on day 22/1), since the pressure difference is large and positive (+30 m). We do not have sea ice charts depicting the ice edge position during these few days, so we do not know if the winds managed to push ice again to Icelandic coasts. It is though unlikely, since the Westerlies lasted only one or two days on this occasion. In fact, on day 23/1 a deep low reaches the South-East coast of Greenland, the winds turn to Southerlies and the pressure difference becomes negative (on day 24/1 it is -20 mb).

- The low, which is very deep and is widening, moves unusually North. From day 25/1 to the end of the month, Westerly wind develops again. In fact, the low moving to North persists over Scoresby Sund, then moves polewards and finally to Spitsbergen. The pressure differences are positive and up to +16 mb on day 27/1. Winds stay Westerly for about 4 days, pushing the ice edge to the North-West coast of Iceland as we can see from the ice charts taken on days 28/1, 30/1, 31/1 and 3/2. On day 29/1 the circulation is no more governed by the deep low, and a new low centred over East Greenland and moving quickly to Norway causes the winds to turn first South-Westerly and then Northerly.

- On day 31/1 a high appears over Faroe Islands and moves South, while a low is centred between North Greenland and Spitsbergen. The combination makes the winds to blow from South-West , and the pressure difference is about 0 mb. The pressure pattern quickly evolves and on day 4/2 the normal circulation pattern of North-Easterly winds due to the persistent high over Greenland is restored.

- From day 5/2 until the end of March, the general circulation pattern is affected by a number of cyclones that approach Iceland from South-West and leave towards the Norwegian Sea, as we can see from the pressure difference plot, where they appear as series of "pressure difference drops" which can range from a negative value of few millibars up to 30 mb. The general wind pattern given by the persistent high over Greenland, which causes the winds to blow from North-East, is periodically shifted to South-Westerly every time a cyclone approaches Iceland from the Atlantic Ocean. When the cyclone moves East or North-East, winds gradually change until they are North-Easterly again, and the cycle can start again with a new low. This type of circulation generally keeps the ice edge far from the Icelandic coasts, and, as we can see from the ice charts taken after the beginning of February and in March, sea ice is indeed far from Iceland.

♣ The measurements taken on the vessel Bjarni Sæmundsson during the cruise in February 1997, from the 13th to the 22nd, were taken under such synoptic conditions, with a series of lows passing over Iceland and shifting the winds from North-Easterly to South-Easterly and then North-Easterly again. The pressure difference remained negative throughout the whole cruise.

1.2 Description of the uppermost layer (50 m) at the ocean surface

The oceanic uppermost layer is described by :

a) salinity at the depth of 50 m;
b) temperature at the depth of 50 m;
c) energy fluxes (i.e. sensible and latent heat fluxes) through the air/sea interface; in this case we take as positive an upward flux, that is a flux is taken positive if the sea is losing energy.

The salinity and temperature data were measured by the Marine Research Institute (Hafrannsóknastofnun) during a cruise taken in February 1997 on the oceanographic vessel "Bjarni Sæmundsson". The cruise started on the 13th of February, 1997 and ended on the 22nd of February, 1997, and covered several profiles in the Iceland Sea, i.e. West, North and East of Iceland. Each profile contains some oceanographic stations. The energy fluxes were then calculated by Wallevik & Jakobsson (1997) (see [4]) of the Icelandic Meteorological Office (Veðurstofa Íslands) using additional marine meteorological data measured during the same cruise.
The reader is referred to the above mentioned report by Wallevik & Jakobsson (1997) for further information about the energy fluxes.

1.2.1 Heat fluxes, salinity and temperature tables.

Sensible (***Qh***) and latent (***Ql***) heat fluxes, calculated at the ocean surface in some selected oceanographic stations, are given in the table below, together with the ***50 meters depth*** salinity (***salt 50***) and temperature (***temp 50***) of the ocean water. Each station is described by a station number (that was given during the cruise) and by its spatial coordinates (given in the degree decimal notation, for example a latitude of 65.500 means 65 degrees and 30 minutes North [65°30'N], or a longitude of -18.833 means 18 degrees and 50 minutes West [18°50'W]).

Station	*Date*	*Latitude*	*Longitude*	*Qh* (W/m^2)	*Ql* (W/m^2)	*salt 50* ‰	*temp 50* (°C)
45	13.2.1997	65.500	-24.567	-1.6	15.2	34.53	0.33
46	13.2.1997	65.583	-24.917	10.1	49.4	34.88	2.77
47	13.2.1997	65.667	-25.250	47.3	59.1	34.95	4.14
48	13.2.1997	65.750	-25.633	51.0	49.6	34.91	4.07
49	13.2.1997	65.833	-26.000	54.2	45.8	34.88	4.03
50	13.2.1997	65.933	-26.483	43.3	39.4	34.92	5.12
51	13.2.1997	66.350	-26.783	51.0	45.4	34.95	5.63
52	13.2.1997	66.083	-27.050	21.8	24.0	34.79	4.52
53	13.2.1997	66.217	-27.467	14.7	14.3	34.81	4.53
54	13.2.1997	66.150	-27.267	17.0	15.8	34.87	5.00
55	13.2.1997	66.083	-27.067	25.1	20.2	35.00	5.92
56	14.2.1997	66.500	-23.000	-7.2	1.5	34.39	0.87

57	14.2.1997	66.683	-23.133	5.7	6.1	34.58	2.01
58	14.2.1997	66.883	-23.300	29.6	17.4	34.42	2.31
59	14.2.1997	67.083	-23.450	18.5	9.2	34.33	1.87
60	15.2.1997	67.000	-20.783	1.4	2.9	34.37	1.80
61	15.2.1997	66.750	-20.783	2.3	7.1	34.54	1.87
62	15.2.1997	66.500	-20.783	13.5	8.2	34.56	1.86
63	15.2.1997	66.633	-20.700	2.8	2.7	34.48	1.58
64	15.2.1997	66.267	-18.833	15.7	9.7	34.66	1.92
65	15.2.1997	66.400	-18.833	12.4	10.0	34.58	1.76
66	16.2.1997	66.533	-18.833	9.0	5.1	34.56	1.61
67	16.2.1997	66.733	-18.850	8.2	5.6	34.55	1.63
68	16.2.1997	67.000	-18.833	6.6	4.4	34.64	1.60
69	16.2.1997	67.333	-18.833	2.1	2.4	34.63	1.84
70	16.2.1997	67.667	-18.833	11.6	7.8	34.44	0.92
71	16.2.1997	68.000	-18.833	-3.3	-4.0	34.32	-1.67
72	17.2.1997	67.500	-16.267	-22.3	-20.6	34.66	0.81
73	17.2.1997	67.167	-16.267	-18.8	-16.5	34.66	2.03
74	17.2.1997	66.833	-16.250	-19.6	-16.9	34.63	1.96
75	17.2.1997	68.000	-12.667	-25.9	-16.1	34.64	-0.89
76	18.2.1997	67.750	-12.967	-16.3	-14.6	34.62	-0.95
77	18.2.1997	67.500	-13.267	-9.4	-6.9	34.69	-0.75
78	18.2.1997	67.250	-13.567	-13.2	-3.2	34.71	-0.53
79	18.2.1997	67.000	-13.833	-20.6	-3.6	34.68	1.11
80	18.2.1997	66.617	-14.267	5.6	24.8	34.61	1.87
81	18.2.1997	66.367	-14.400	4.7	9.5	34.60	1.71
83	19.2.1997	66.367	-13.583	1.0	10.5	34.57	1.70
84	19.2.1997	66.367	-13.000	3.0	5.2	34.59	1.78
85	19.2.1997	66.367	-12.100	6.6	11.2	34.79	1.88
86	19.2.1997	66.367	-11.017	2.7	3.7	34.63	0.04
87	19.2.1997	66.367	-10.000	-5.4	-3.1	34.62	0.54
88	21.2.1997	65.000	-13.500	-5.2	0.8	34.42	1.53
89	21.2.1997	65.000	-12.817	-2.4	-2.2	34.56	1.99
90	22.2.1997	65.000	-11.667	-2.0	-1.9	34.61	1.98
91	22.2.1997	65.000	-11.283	-0.9	-1.1	34.24	1.70
92	22.2.1997	65.000	-10.117	10.5	10.3	34.76	3.47
93	22.2.1997	65.000	-9.000	-20.0	-13.0	34.55	0.80

1.2.2 Contour maps

These contour maps display the 'fields' of sensible and latent heat fluxes, salinity and temperature (the last two at 50 meters depth) for the Iceland Sea. They were drawn from the data contained in the table above. They also display a division of the sea into different subsections (heavy lines) which will be explained later in chapter 3.
Although the measurements taken at the different oceanographic stations are not taken simultaneously, it was nonetheless decided to draw contour maps for the salinity and temperature data, accounting for the fact that the cruising time was short compared to the time that water masses take to change their salinity and temperature at 50 m depth. We have though to keep in mind that this may not be true at all times. Concerning the energy fluxes, we decided not to draw countour maps, because they depend on many parameters (like the air temperature or the solar income radiation or the cloud coverage) which can vary dramatically in a short time (hours), so that data that were not recorded at the same time are not comparable.

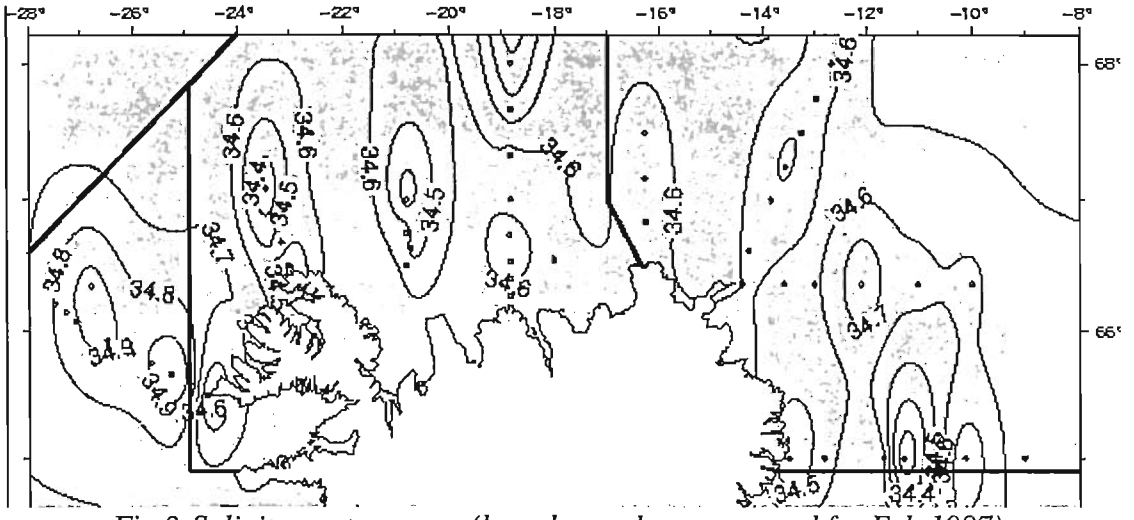


Fig.3:*Salinity contour map (based on values measured for Feb.1997). Values are in ‰, contour levels are drawn every 0.1‰.*

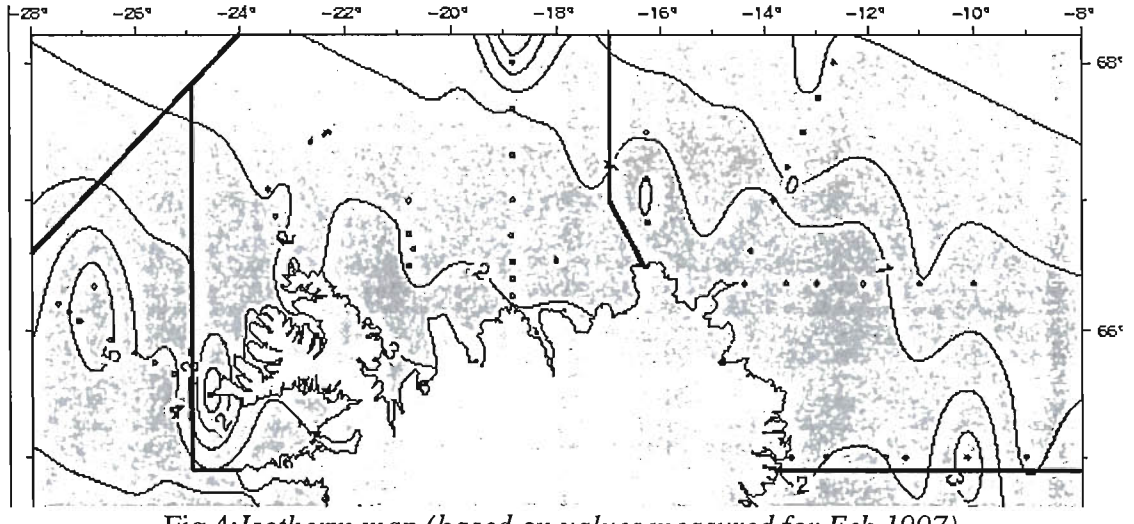


Fig.4:*Isotherm map (based on values measured for Feb.1997). Values are in °C, isotherms are drawn every 1°C.*

2. Years 1993 and 1994

2.1 Description of the atmospheric general circulation

Part A - Year 1993

A 2.1.1 Tables of meteorological parameters

These tables show all the meteorological data achieved from the German charts (Europäischer Wetterbericht), for the time period January-February-March ***1993***, and for the 3 stations Ísafjörður (Iceland), Scoresby Sund (Greenland) and Jan Mayen (Norway). The data contain the surface pressure (***pres***), temperature (***temp***) and dew point temperature (***dew***), and the potential height at the 500 hPa (***500***) and 100hPa (***100***) upper levels.

N.B.: day 1 is 1/1/1993, then days are counted progressively, so that day 32 is 1/2/1993, day 60 is 1/3/1993 and day 90 is 31/3/1993.

Ísafjörður

day	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)		*day*	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)
1	990.1	-2	-11	504	1504		46	1001.0	-3	-4	536	1558
2	989.8	-1	-7	508	1512		47	1002.7	1	-3	539	1562
3	996.0	0	-3	508	1528		48	1017.6	0	-2	542	1550
4	972.7	-5	-6	504	1528		49	983.3	4	0	522	1530
5	991.1	-3	-12	506	1544		50	1023.1	-5	-8	536	1544
6	990.0	-3	-10	505	1544		51	1003.3	0	-5	530	1536
7	980.3	-1	-5	496	1532		52	1022.1	-1	-4	555	1566
8	976.1	-4	-6	490	1517		53	1015.2	5	2	544	1560
9	980.6	-6	-12	488	1492		54	1005.5	1	0	506	1539
10	976.0	-5	-6	484	1474		55	985.2	-6	-8	500	1544
11	960.3	-4	-5	488	1472		56	991.8	-5	-9	508	1568
12	981.0	-6	-8	500	1478		57	1015.5	-5	-6	528	1586
13	991.9	-6	-8	500	1477		58	1029.5	-4	-5	552	1596
14	990.3	-7	-13	503	1480		59	1023.6	6	3	554	1602
15	979.5	-1	-5	498	1492		60	1006.1	8	1	544	1592
16	981.7	-1	-4	502	1498		61	1002.6	1	-3	536	1576
17	981.0	-1	-6	499	1512		62	1024.1	-4	-10	540	1568
18	985.6	-4		504	1508		63	1011.9	-1	-4	538	1568
19	991.0	-5	-10	504	1520		64	1007.1	0	-1	528	1552
20	983.5	-5	-10	503	1524		65	996.9	3	2	520	1554
21	986.7	-7	-11	502	1520		66	982.5	0	-1	494	1558
22	994.3	-5	-13	506	1540		67	981.2	-3	-9	502	1572
23	995.8	-3	-9	502	1544		68	1005.1	-3	-7	536	1588
24	979.8	-6	-8	504	1540		69	1018.5	4	-4	544	1594
25	1001.2	-5	-7	524	1548		70	1005.6	6	-2	535	1590
26	1004.5	-4	-8	538	1555		71	992.0	7	2	525	1586
27	1015.1	-8	-15	536	1564		72	979.7	5	2	514	1582
28	994.8	3	-6	512	1554		73	985.4	2	-1	514	1580
29	986.9	-1	-4	508	1560		74	982.3	2	0	514	1588
30	948.4	2	-3	490	1552		75	983.6	0	-4	500	1584
31	981.7	-3	-6	520	1552		76	974.3	-4	-5	496	1578
32	970.4	-2	-5	512	1560		77	981.7	-7	-8		1572
33	968.1	-1	-8	492	1532		78	996.1	-8	-12	496	1564
34	982.6	-5	-6	494	1536		79	980.0	-3	-7	494	1556
35	991.4	-6	-15	510	1540		80	980.2	-6	-8	486	1548
36	1022.7	-6	-12	538	1566		81	976.7	-6	-12	492	1536
37	1010.7	3	-4	546	1568		82	996.2	-5	-9	512	1544
38	1001.3	7	3	538	1544		83	1015.6	-4	-10	538	1554
39	1008.8	-1	-4	536	1532		84	1014.1	6	-1	538	1568
40	1012.4	4	2	542	1544		85	1003.6	2	-4	520	1548
41	1007.2	3	1	546	1548		86	996.7	0	-7	518	1552
42	1005.8	8	1	528	1552		87	1006.6	3	-2	528	1552
43	994.6	2	-5	520	1544		88	1001.4	4	-6	524	1548
44	978.8	0	-11	504	1528		89	992.1	3	0	515	1550
45	990.3	-1	-7	506	1528		90	987.5	5	0	524	1546

Scoresby Sund

day	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)		*day*	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)
1	993.4	-8	-10	503	1496		46	1003.1	-13	-14	519	1528

2	992.5	-16	-17	504	1496		47	1017.8	-16	-19	522	1536
3	1006.4	-12	-13	512	1512		48	1025.4	-18	-18	528	1528
4	983.8	-10	-11	498	1512		49	1019.9	-20	-21	520	1516
5	993.8	-11	-16	501	1525		50	1018.5	-14	-15	516	1522
6	992.1	-13	-15	504	1528		51	1004.9	-21	-21	518	1514
7	999.1	-15	-18	500	1518		52	1024.1		-22	535	1544
8	990.4	-16	-22	496	1504		53	1008.6	-19	-20	533	1544
9	987.7	-10	-11	488	1480		54	981.1	-3	-4	500	1520
10	987.7	-15	-22	488	1471		55	986.0	-12	-13	490	1516
11	989.4	-18	-22	492	1471		56	1001.7	-15	-16		1533
12	991.7	-16	-17	501	1472		57	1020.0	-20	-21	514	1560
13	999.4	-14	-17	498	1472		58	1029.6	-22	-25	534	1570
14	993.1	-14	-21	497	1468		59	1023.4	-13	-14	542	1580
15	996.0	-19	-23	496	1480		60	999.6	-10	-10	535	1574
16	993.6	-20	-24	502	1480		61	995.3	-15	-15	504	1552
17	998.0	-19	-24	502	1492		62	1017.0	-17	-18	520	1535
18	997.4	-14	-15	499	1486		63	1032.9	-20	-24	522	1535
19	989.3	-15	-15	496	1492		64	1016.6	-19	-20	511	1529
20				494	1500		65	1014.2	-19	-20	518	1542
21	996.9	-17	-19	496	1500		66				500	1554
22	994.3	-15	-21	500	1516		67	982.9	-8	-11	496	1566
23	984.9	-15	-17	495	1512		68	1008.1	-19	-21	517	1578
24	1003.4	-25	-28	488	1508		69	1022.1	-14	-15	529	1582
25	1004.2	-25	-29	506	1515		70	1018.1	-18	-19	528	1576
26	1008.8	-25	-26	516	1528		71	1009.3	-17	-18	519	1574
27	1017.3	-17	-19	533	1544		72		-22	-24	514	1568
28	1002.0	-17	-18	524	1542		73	1000.4	-22	-24	512	1572
29	990.3	-12	-12	496	1536		74	1002.6	-21	-25	510	1568
30	962.9	-14	-14	486	1534		75	998.2	-21	-26	502	1568
31	972.9	-7	-7	490	1520		76	986.7	-17	-22		1562
32	965.5	-11	-11	495	1536		77	996.3	-17	-23	506	1556
33	969.0	-13	-13		1508		78				504	1544
34	980.8	-15	-17		1504		79	999.7	-15	-23	500	1540
35	996.5	-17	-19	504	1512		80	992.2	-15	-23	494	1528
36	1027.2	-16	-19	529	1536		81	976.8	-9	-12	494	1520
37	1030.0	-18	-22	526	1540		82	995.7	-9	-9	510	1522
38	1012.0	-13	-14	526	1520		83	1012.8	-8	-12	525	1526
39	1000.7	-16	-16	508	1503		84	1018.6	-7	-12	538	
40	1027.2	-21	-23	533	1525		85	998.3	-12	-12	513	1536
41	1024.8	-15	-16	531	1528		86	995.2	-8	-12	514	1536
42	1016.8	-16	-18	538	1544		87	1021.1	-13	-14	529	1540
43	998.3	-6	-6	510	1533		88	1025.9	-14	-14	532	1542
44	989.6	-11	-11	502	1518		89	1014.4	-3	-3	528	1546
45	987.3	-17	-17	502	1512		90	1014.4	-9	-9	530	1545

Jan Mayen

day	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)		*day*	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)
1	995.7	-2	-8	512	1512		46	991.0	-1	-2	508	1521
2	983.8	0	-1	509	1508		47	1011.7	-10	-14	520	1531
3	1005.0	0	-4	524	1525		48	1019.4	-9	-15	524	1523
4	972.4	1	1	500	1520		49	1016.6	-12	-18	520	1508
5				504	1533		50	1014.6	-10	-16	515	1514
6	992.3	-7	-13	507	1535		51	993.3	-6	-10	505	1503
7	996.6	-5	-8	506	1532		52	1012.4	-12	-14	520	1525
8	967.7	-3	-4	484	1520		53	1012.7	-8	-12	536	1543

9	961.6	3	-5	490	1499	54	992.9	1	-5	520	1534
10	970.1	-5	-7	491	1480	55	963.3	-3	-5	493	1522
11	970.8	-5	-6	487	1478	56	990.0	-10	-16	503	1528
12	967.0	-4	-6	496	1475	57	1003.2	-10	-16	508	1544
13	981.7	-3	-7	503	1480	58	1021.3	-12	-15	520	1567
14	979.6	-1	-5	500	1473	59				542	1582
15	990.6	-10	-15	501	1481	60	1005.5	3	2	552	1584
16	985.3	-10	-14	497	1490	61	1003.5	4	-1	528	1569
17	997.1	-10	-15	506	1501	62	1011.1	-14	-18	513	1539
18	994.0	-7	-12	508	1491	63	1026.3	-14	-18	524	1535
19	987.4		-4	498	1491	64	1014.0	-9	-15	518	1525
20	983.5	-6	-10	496	1502	65	1007.9	-3	-6	526	1533
21	978.7	-6	-10	496	1505	66	994.8	0	0	520	1543
22	985.7	-12	-15	495	1501	67	984.4	-1	-4	498	1557
23	985.4	-5	-12	504	1509	68	990.0	-5	-7	511	1566
24	986.8	-10	-11	491	1497	69	1020.9	-9	-15	526	1571
25	989.7	-16	-18	495	1504	70	1009.7	-7	-10	528	1568
26	998.1	-13	-15		1511	71	1005.1	-7	-9	528	1564
27	1012.9	-6	-8	528	1533	72	988.9	0	0	522	1568
28	1007.9	-4	-8	532	1544	73	972.0	0	0	520	1572
29	994.3	1	1	508	1540	74	992.4	-4	-6	507	1571
30	966.2	0	0	488	1544	75	993.0	-7	-12	506	1573
31	964.8	-7	-9	506	1535	76	980.3	-4	-7	504	1576
32	962.9	0	0	496	1542	77	978.1	-3	-6	500	1562
33	969.0	1	1	485	1528	78	991.5	-4	-7	508	1560
34	974.4	-10	-13	486	1506	79	991.2	-7	-12	504	1560
35	982.5	-11	-14	497	1508	80	977.8	-1	-3	496	1556
36	1004.9			524	1530	81	977.5	-2	-4	498	1546
37	1027.1	-8	-14	535	1539	82	978.6	-1	-3	499	1536
38	1008.3	-3	-5	529	1530	83	989.4	-1	-2	522	1539
39	994.7	0	-1	510	1508	84	1017.3	-4	-8	538	1560
40	1018.3	-8	-11	536	1529	85	1010.1	1	0	536	1551
41	1024.0	-3	-4	544	1543	86	994.4	0	0	521	1549
42	1016.7	-5	-8	546	1550	87	1017.4	-7	-11	530	1555
43	1006.8	1	0	526	1547	88	1027.9	-5	-8	539	1560
44	1003.3	0	0	516	1538	89	1019.3	1	0	539	1560
45	995.0	0	-5	512	1526	90	1014.2	1	-2	538	1566

The following table contains the pressure differences between different pairs of stations, calculated from the previous table. The first 3 columns display the surface pressure difference, while the 4th column (***Ísa-Sco 500***) displays the 500 hPa potential height difference between Ísafjörður and Scoresby Sund.

N.B.: day 1 is 1/1/1993, then days are counted progressively, so that day 32 is 1/2/1993, day 60 is 1/3/1993 and day 90 is 31/3/1993.

day	*Ísa-Sco* (mb)	*Sco-Jan* (mb)	*Jan-Ísa* (mb)	*Ísa-Sco 500* (*10 m)		*day*	*Ísa-Sco* (mb)	*Sco-Jan* (mb)	*Jan-Ísa* (mb)	*Ísa-Sco 500* (*10 m)
1	-3.3	-2.3	5.6	1		46	-2.1	12.1	-10.0	17
2	-2.7	8.7	-6.0	4		47	-15.1	6.1	9.0	17
3	-10.4	1.4	9.0	-4		48	-7.8	6.0	1.8	14
4	-11.1	11.4	-0.3	6		49	-36.6	3.3	33.3	2
5	-2.7			5		50	4.6	3.9	-8.5	20
6	-2.1	-0.2	2.3	1		51	-1.6	11.6	-10.0	12
7	-18.8	2.5	16.3	-4		52	-2.0	11.7	-9.7	20
8	-14.3	22.7	-8.4	-6		53	6.6	-4.1	-2.5	11
9	-7.1	26.1	-19.0	0		54	24.4	-11.8	-12.6	6

10	-11.7	17.6	-5.9	-4		55	-0.8	22.7	-21.9	10
11	-29.1	18.6	10.5	-4		56	-9.9	11.7	-1.8	
12	-10.7	24.7	-14.0	-1		57	-4.5	16.8	-12.3	14
13	-7.5	17.7	-10.2	2		58	-0.1	8.3	-8.2	18
14	-2.8	13.5	-10.7	6		59	0.2			12
15	-16.5	5.4	11.1	2		60	6.5	-5.9	-0.6	9
16	-11.9	8.3	3.6	0		61	7.3	-8.2	0.9	32
17	-17.0	0.9	16.1	-3		62	7.1	5.9	-13.0	20
18	-11.8	3.4	8.4	5		63	-21.0	6.6	14.4	16
19	1.7	1.9	-3.6	8		64	-9.5	2.6	6.9	17
20			0.0	9		65	-17.3	6.3	11.0	2
21	-10.2	18.2	-8.0	6		66			12.3	-6
22	0.0	8.6	-8.6	6		67	-1.7	-1.5	3.2	6
23	10.9	-0.5	-10.4	7		68	-3.0	18.1	-15.1	19
24	-23.6	16.6	7.0	16		69	-3.6	1.2	2.4	15
25	-3.0	14.5	-11.5	18		70	-12.5	8.4	4.1	7
26	-4.3	10.7	-6.4	22		71	-17.3	4.2	13.1	6
27	-2.2	4.4	-2.2	3		72			9.2	0
28	-7.2	-5.9	13.1	-12		73	-15.0	28.4	-13.4	2
29	-3.4	-4.0	7.4	12		74	-20.3	10.2	10.1	4
30	-14.5	-3.3	17.8	4		75	-14.6	5.2	9.4	-2
31	8.8	8.1	-16.9	30		76	-12.4	6.4	6.0	
32	4.9	2.6	-7.5	17		77	-14.6	18.2	-3.6	
33	-0.9	0.0	0.9			78			-4.6	-8
34	1.8	6.4	-8.2			79	-19.7	8.5	11.2	-6
35	-5.1	14.0	-8.9	6		80	-12.0	14.4	-2.4	-8
36	-4.5	22.3	-17.8	9		81	-0.1	-0.7	0.8	-2
37	-19.3	2.9	16.4	20		82	0.5	17.1	-17.6	2
38	-10.7	3.7	7.0	12		83	2.8	23.4	-26.2	13
39	8.1	6.0	-14.1	28		84	-4.5	1.3	3.2	0
40	-14.8	8.9	5.9	9		85	5.3	-11.8	6.5	7
41	-17.6	0.8	16.8	15		86	1.5	0.8	-2.3	4
42	-11.0	0.1	10.9	-10		87	-14.5	3.7	10.8	-1
43	-3.7	-8.5	12.2	10		88	-24.5	-2.0	26.5	-8
44	-10.8	-13.7	24.5	2		89	-22.3	-4.9	27.2	-13
45	3.0	-7.7	4.7	4		90	-26.9	0.2	26.7	-6

A 2.1.2 Plot of the surface pressure difference between Ísafjörður and Scoresby Sund

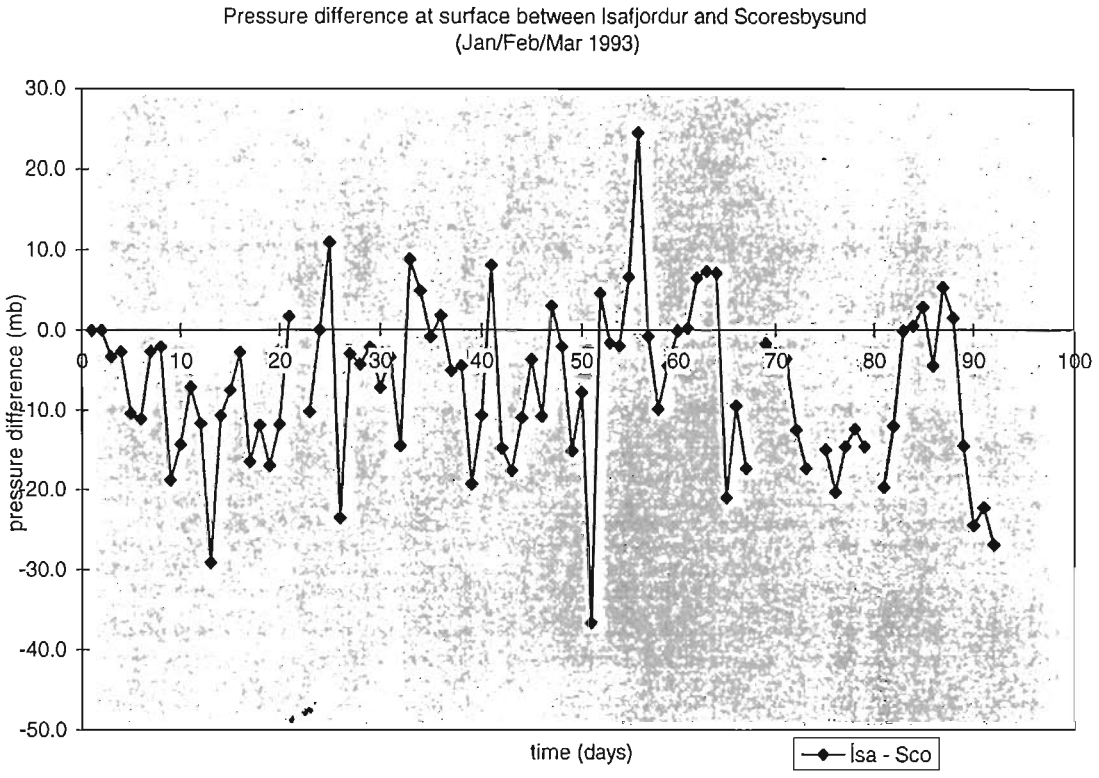


Fig.5:*Surface pressure difference between the stations Ísafjörður and Scoresby Sund during January-February-March 1993 (values are in mb)*

A 2.1.3 Description of the synoptic scale general circulation over the Iceland Sea and surroundings during the period January-February-March 1993

The following is a description of the synoptic scale general circulation deduced from the Europäischer Wetterbericht (European Meteorological Bullettin) daily maps. The phrase "pressure difference", which will often be used, refers to the surface pressure difference between the stations Ísafjörður and Scoresby Sund (i.e. surface pressure in Ísafjörður - surface pressure in Scoresby Sund). Usually this difference was evaluated from the pressure values measured at these two stations and reported on the maps. Whenever the measurement report was missing, the pressure difference was evaluated from the isobars on the map.
The description also refers to ***sea ice charts*** *which are shown in* Appendix A. *These charts are copies of the report charts made by the Icelandic Coast Guard (Landhelgisgæslan).*
- Like we can see from the surface pressure difference plot, during the first 20 days of January the difference is always negative, meaning a lower pressure in Ísafjörður compared to Scoresby Sund. The reason for this has to be found in a sequence of low pressure centres approaching Iceland.
Indeed, during the first 10 days of the month, the circulation pattern is very complicated, because more cyclones are governing the circulation over Iceland at the same time. On day 3/1 a big and deep cyclone centred South-West of Iceland causes winds to blow from South-East. Again, from day 4/1 to day 9/1, more lows influence the zone at the same time, and the circulation pattern is not clear.

On day 10/1 a low, which has been persisting over South-East of Greenland, pushes the winds to blow from North-West. This cyclone quickly moves to South-East of Iceland, winds are still North-Easterly but quite strong, the pressure difference being about -30 mb on day 11/1. From day 12/1 to day 14/1 this cyclone slowly moves over the Norwegian Sea to Norway, the pressure difference gets smaller (in modulus) but the winds do not change direction. From day 15/1 to day 22/1 three fast moving cyclones approach Iceland one after the other; each of them shifts the winds from North-Easterly to South-Easterly and drops the pressure difference while approaching, and then shifts the winds back to North-Easterly while leaving towards Scandinavia. Between the second and the third cyclone (which is quite small giving a pressure difference of only about -10 mb) there is a small low pressure centre over the Denmark Strait on day 19/1 which causes the pressure difference to be small but positive. Throughout the whole period above described, the ice edge keeps far from Iceland and no Westerlies blow during this period of time (check the ice charts taken on days 5/1 and 19/1).

- Like we can see from the sudden positive rise in the pressure difference plot on day 23/1, a low is present over Greenland. This causes winds to be from West. Fortunately this situation lasts for only few hours and is not enough to push the ice close to the Icelandic coast. In fact, from day 24/1 to day 26/1, the persistent high over Greenland shows up again, and the usual North-Easterly are restored.

- From day 27/1 a new period of cyclonic circulation starts. What makes it different from the previous cyclonic patterns is that this time the cyclones center over or around Scoresby Sund, giving a positive pressure difference and sometimes westerly.
The period starts with a cyclone developing over the South-East coast of Greenland. As the low deepens, winds blows from South-East over the Iceland Sea (days 27-28-29/1). This time, though, the cyclones travels along the Greenland coast: on day 30/1 it is centered over the Iceland sea and the circulation is complicated, while on day 31/1 a new small low has developed over Scoresby Sund. The pressure difference is positive (+9 mb) and winds are Westerlies. The situation does not change significantly until day 4/2 when the low has reached Spitsbergen and winds are again from North-East. To sum up, we have about 4 days during which the winds blow mainly from West, due to a cyclone first centered over Scoresby Sund and then travelling slowly along the Greenland coast. We do not have detailed sea ice charts or reports from this period: the only available chart, taken on day 4/2, only depicts a small fraction of the ice edge West of Iceland, and no information is given about the ice edge North-West of Iceland. From the chart, we cannot say if the Westerly wind was strong or sustained long time enough to push the ice to Icelandic coasts.

- From day 6/2 to day 21/2 a family of 5 cyclones influences the weather in Iceland. The first cyclone is small and forming on day 6/2 South of Iceland, but there is also a high over Greenland so that the pressure difference is about -20 mb. Winds are South-Easterly, but when the cyclone moves to Jan Mayen on day 8/2, they may have turned to Westerly (also the pressure difference becomes positive). But this Westerly regime lasts very short, because on day 10/2 a big and deep new cyclone forms over the East coast of Greenland. This low persists over East Greenland for 3 days, giving South-Easterlies and a drop in the pressure difference plot, as the previous cyclone did. On day 13/2 the low starts moving along the Greenland coast towards Scoresby Sund.

Winds are variable over Iceland Sea, but they may have been from West on 13/2 and 14/2 (when the pressure difference is small but positive). On day 15/2 this low is already over Spitsbergen and the third low of the family, small but fast moving, approaches Iceland and centers over the Western Fjords giving South-Easterly wind (see the small drop in the pressure difference). When this low leaves, winds turn to North-Easterly because of the persistent high over Greenland, but on day 18/2 the fourth cyclone has approached the Western Fjords and the pressure difference drops to -36 mb, giving South-Easterly wind.
The fourth low fastly moves to Europe, restoring North-Easterlies on day 19/2, but a new low has formed South of Greenland. This fifth cyclone is fastly moving to North-East of Iceland, where it gets on day 20/2. Winds are variable in the Iceland Sea, but they could be from West. On day 21/2 the fifth low moves towards Europe and winds return to North-Easterly due to the persistent high over Greenland.

- Like we can see from the sudden rise in the pressure difference plot, on day 22/2 and 23/2 a different circulation pattern developes. A huge anticyclone, centered over West of Ireland, and a small low over Northern Greenland, cause the pressure difference to be large and positive (up to +24 mb). Winds are Westerly and quite strong, especially on day 23/2 when the low has deepened. On day 24/2 the high moves towards Europe while the low moves South of Jan Mayen: winds are still strong and westerly. However, from the ice chart taken on day 26/2, we can see that the ice edge is kept far from Icelandic coasts, despite the westerly wind.

- From day 25/2 the circulation turns back to cyclonic, because the low has moved and is centred North of Iceland. Soon it moves away and the normal pattern is restored (North-Easterly).

- From the 1st of March to the 9th, a system of lows and cyclonic circulation develops. All of the lows, but the first, shift the usual North-Easterly winds to South-Easterly, and then again North-Easterly when they exit the area. The first low instead, after having formed over the East coast of Greenland, travels along the Greenland coast, therefore giving Westerly wind (pressure difference is positive and up to +7 mb) for a couple of days. We do not have sea ice charts for these days, so we do not know how effective the wind was in driving the ice to Iceland.

- A short period of anticyclonic circulation begins on day 10/3. A high over Faroe Islands affects Iceland, and winds over the sea are south-westerly, although probably changing to Southerlies on day 11/3 and to South-Easterlies on day 12/3.

- From day 13/3 to the end of the month, a sequence of lows approaches Iceland, causing alternate shifts of the wind from North-East to South-East and back. The pressure difference keeps negative, dropping when a low is closest. The only exception occurs on days 26/3 and 27/3, when the low is centred over Scoresby Sund so that the pressure difference is positive (about +5 mb). Despite of that, winds are Southerlies or South-Easterlies.

♣ The cruise on vessel Bjarni Sæmundsson started on the 11th of February, 1993 and ended on the 24th. During the cruise, the general circulation was cyclonic until the 21st,

due to a sequence of lows approaching Iceland and shifting the wind to blow from South-East. The pressure difference between Ísafjörður and Scoresby Sund dropped down to -36 mb on the 18th. From the 22nd of February, the Iceland Sea experienced a period of anticyclonic circulation due to a wide high over the North-West Atlantic ocean, with Westerly wind and a large positive pressure difference between Ísafjörður and Scoresby Sund.

Part B - Year 1994

B 2.1.1 Tables of meteorological parameters

These tables show all the meteorological data achieved from the German charts (Europäischer Wetterbericht), for the time period January-February-March ***1994***, and for the 3 stations Ísafjörður (Iceland), Scoresby Sund (Greenland) and Jan Mayen (Norway). The data contain the surface pressure (***pres***), temperature (***temp***) and dew point temperature (***dew***), and the potential height at the 500 hPa (***500***) and 100hPa (***100***) upper levels.
N.B.: day 1 is 1/1/1994, then days are counted progressively, so that day 32 is 1/2/1994, day 60 is 1/3/1994 and day 90 is 31/3/1994.

Ísafjörður

day	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)	*day*	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)
1	1005.0	0	-2	524	1570	46	1018.9	-1	-6	531	1574
2	1004.4	-1	-4	520	1562	47	1008.2	0	-2	524	1568
3	1007.1	-3	-6	522	1550	48	1001.3	2	0	530	1570
4	1006.6	-3	-8	514	1532	49	993.8	2	0	526	1573
5	1007.5	-2	-8	523	1530	50	998.2	5	-2	535	1568
6	1019.0	-6	-11	524	1531	51	991.6	7	0	529	1560
7	1019.9	-4	-11	522	1532	52	1014.8	4	1	544	1556
8	1006.1	-3	-9	516	1522	53	1018.6	0	-1	543	1552
9	1008.2	-4	-6		1521	54	1021.1	1	-4	546	1550
10	1006.5	1	-5	528	1529	55	1029.0	-4	-7	546	1550
11	988.2	2	0	520	1529	56	1027.9	-5	-11	544	
12	985.5	3	0	516	1523	57	1025.9	-2	-5	544	1539
13	988.2	1	-2	519	1519	58	1020.5	0	-6	539	1544
14	1006.6	0	-2	527	1523	59	1020.2	1	-2	539	1546
15	1014.5	-2	-7	531	1534	60	1012.2	3	-5	529	1544
16	1030.2	-8	-13	538	1552	61	983.6	4	-5	506	1536
17	1002.8	4	1	529	1552	62	979.4	2	-5	501	1529
18	974.1	3	0	493	1536	63	978.4	-1	-9	493	1532
19	965.3	-2	-4	496	1532	64	977.1	-6	-9	496	1542
20	983.6	0	-8	500	1544	65	993.9	-5	-12	512	1560
21	961.1	-2	-8	484	1518	66	978.4	2	-1	503	1560
22	976.3	-4	-8	487	1515	67	971.9	-2	-12	485	1540
23	985.3	-6	-13	508	1528	68	971.1	-3	-8	504	1540
24	1010.0	-7	-12	508	1529	69	1006.9	-7	-11	509	1530
25	1002.1	-6	-12		1517	70	981.5	-2	-7	500	1510
26	1003.3	-5	-9	503	1504	71	993.5	-3	-6		1510
27	1000.4	-8	-11	504	1504	72	983.2	-5	-10	504	1512
28	1019.2	-11	-17	518	1514	73	985.4	-3	-5		1508
29	1007.2	-2	-6	505	1512	74	993.4	-5	-7	506	1500

30	995.6	-2	-3	517	1530		75	1002.0	-5	-11	514	1504
31	983.0	1	-2	509	1540		76	1017.0	-6	-9	516	1520
32	966.1	4	-1	492	1545		77	1012.3	-5	-8	512	1528
33	971.7	-4	-6	496	1552		78	1009.2	-7	-10	512	1527
34	990.3	-1	-8	512	1560		79	1022.4	-9	-15	526	1536
35	1005.4	0	-4	534	1568		80	1004.9	-4	-12	517	1544
36	1006.8	2	-3	528	1572		81	951.5	4	1	492	1536
37	997.5	2	-1	527	1570		82	955.1	0	-1	500	1538
38	995.6	3	0	521	1568		83	987.8	-1	-1		1558
39	996.2	2	-2	517	1560		84	1005.4	-1	-4	528	1566
40	998.7	2	-2	532	1561		85	1005.4	1	-1	528	1562
41	1007.2	5	-1	520	1552		86	995.2	3	0	523	1572
42	1000.4	1	-5	520	1548		87	975.0	3	1	506	1573
43	981.1	-1	-2	504	1544		88	968.3	-1	-3	496	1560
44	991.7	-1	-5	520	1555		89	976.3	-3	-6	505	1552
45	1009.7	1	-4	529	1566		90	981.3	-2	-7	504	1560

Scoresby Sund

day	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)		*day*	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)
1	1020.6	-14	-16		1560		46	1020.6	-12	-17	524	1552
2	1022.8	-20	-22	524	1552		47				518	1544
3	1022.3	-25	-26	522	1541		48	1017.5	-15	-20	522	1552
4	1021.5	-24	-26	520	1526		49	1027.2	-21	-25	533	1556
5	1024.0	-20	-24	523			50	1015.6	-10	-11	536	1556
6	1027.0	-18	-21	523			51	1014.8	-9	-10	535	1556
7	1032.5	-22	-23	520	1526		52	1020.5	-16	-18	533	1546
8	1025.2	-19	-22	517	1520		53	1019.5	-18	-19	540	1540
9	1022.4	-15	-16	520	1521		54	1032.5	-24	-26	542	1540
10	1032.3	-16	-17	529	1528		55	1044.5	-28	-30	539	1538
11	1033.7	-16	-20	531	1528		56	1029.6	-31	-33	540	
12	1020.0			524	1525		57	1027.8	-18	-20	536	1530
13	1013.3	-14	-21	521	1512		58	1018.0	-20	-21	536	1533
14	1018.1	-17	-20	520	1515		59				539	1536
15	1027.1	-21	-23	520	1520		60	1010.1	-18	-19	532	1532
16	1028.8	-23	-24	528	1536		61	1000.4	-17	-18	515	1526
17	1016.9	-21	-22	518	1536		62	982.3	-8	-8	502	1516
18	1002.4	-20	-21	505	1534		63	991.7	-16	-17	504	1512
19	961.8	-7	-8	491	1530		64	990.7	-14	-14	501	1520
20	986.6	-11	-12	495	1528		65	990.4	-20	-20	504	1536
21	966.7	-12	-13	481	1506		66	987.5	-14	-17	504	1530
22	970.2	-6	-7	491	1501		67	971.6	-7	-7	492	1516
23	988.7	-7	-8	506	1512		68	986.4	-11	-11	507	1518
24	1012.3	-14	-19	510	1512		69	1007.9	-21	-22	511	1512
25	1014.1	-16	-21	503	1504		70	997.1	-23	-23	504	1494
26	1018.9	-21	-25	497			71	1001.1	-20	-22	508	1498
27	1013.0	-19					72	995.8	-14	-15		1494
28	1021.0	-18	-24	508	1504		73	1000.0	-16	-19		1492
29	1019.4	-16	-23	509	1506		74	1003.7	-17	-22	502	1488
30	1006.2	-17	-23	510	1512		75	1011.1	-12	-14	514	1498
31	998.5	-17	-20	510	1520		76	1021.0	-18	-20	512	1512
32	984.8	-11	-11	507	1536		77	1024.1	-18	-23		1512
33	965.5	-1	-2	500	1544		78	1023.3	-21	-24	512	1512
34	997.8	-4	-5	517	1553		79	1026.5	-16	-19	517	1518
35	1017.1	-3	-4	538	1560		80	1019.3	-19	-20	513	1520
36	1024.9	-3	-6	536	1570		81	990.4	-11	-11	503	1521

37	1020.4	-4	-5	532	1568		82	973.4	-6	-6	507	1524
38	1015.5	-4	-4	531	1563		83	990.4	-2	-2	516	1536
39	1013.8	-9	-10	523	1552		84	1005.9	-8	-8	516	1544
40	1011.7	-12	-14	524	1552		85	1006.8	-13	-15	515	1541
41	1013.8	-20	-21	528	1544		86	1010.1	-14	-15	516	1560
42	1001.1	-6	-7	523	1536		87	1005.6	-17	-19	513	1552
43	975.5	-2	-2	499	1532		88	983.2	-11	-13	506	1544
44	982.6	-3	-4	504	1540		89	979.8	-9	-9	504	1536
45	1009.2	-13	-15	522	1546		90	988.6	-7	-7	508	1551

Jan Mayen

day	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)		*day*	*pres* (mb)	*temp* (°C)	*dew* (°C)	*500* (*10 m)	*100* (*10 m)
1	1010.5	-5	-9	523	1555		46	1016.6	-2	-5	536	1567
2	1013.2	-10	-15	515	1547		47	1015.7	-3	-5	521	1555
3	1008.7	-8	-11	515	1535		48	1009.8	-1	-3	527	1559
4	1010.1	-5	-12	514	1525		49	1019.4	-12	-16	536	1562
5	1011.6	-5	-9	516	1521		50	1014.0	0	0	542	1566
6	1011.6	-3	-5		1523		51	1016.3	0	0	544	1564
7	1014.8	-3	-9	515	1524		52	1016.1	0	0	537	1555
8				516	1523		53	1015.4	-4	-6	531	1542
9	1014.0	-5	-9	520	1523		54	1022.2	-7	-10	532	1534
10	1025.6	-6	-9	533	1530		55	1029.6	-10	-15	524	1531
11	1024.9	-6	-10	532	1534		56	1026.3	-8	-13	526	
12	1017.0	-4	-8	526	1527		57	1022.7	-7	-11	533	1529
13	1002.9	-3	-8	518	1517		58	1022.0	-4	-11	530	1528
14	1008.4	-4	-13	512	1515		59	1020.4	-3	-6	536	1531
15	1016.1	-10	-14	512	1514		60	1017.5	-2	-6	536	1534
16	1019.9	-12	-16	515	1524		61	1007.8	0	-5	525	1532
17	1016.6	-11	-16	519	1526		62	986.6	1	0	510	1523
18	1006.9	-8	-13	523	1548		63	985.7	1	1	506	1520
19	971.2	0	0	497	1528		64	979.1	-2	-7	496	1520
20	976.2	0		500	1530		65	971.1	-9	-10	499	1528
21	960.9	-2	-3	481	1518		66	986.8	-8	-13	508	1536
22	952.6	-2	-4	473	1510		67	980.7	-1	-6	496	1532
23	962.0	-1	-2	495	1513		68	974.4	-3	-5	496	1528
24	987.6	-3	-4	508	1512		69	985.0	-2	-2		1522
25	997.8	-4	-7	505	1505		70	993.8	-5	-10	506	1500
26	1003.7	-10	-14	501	1501		71	991.8	-2	-8	506	1508
27	993.5	-7	-12	502	1500		72	982.1	-4	-6	503	1494
28	1000.5	-9	-13	510	1506		73	979.8	-2	-2	502	1496
29	1007.9	-8	-11	508	1509		74	979.1	-1	-1	504	1492
30	998.1	-8	-11	508	1508		75	989.4	-2	-2	513	1494
31	1001.5	-6	-10	513	1520		76	1006.8	-9	-12	509	1498
32	988.0	1	0	520	1540		77	1008.7	-10	-13	505	1501
33	982.4	2	2	523	1552		78	1002.7	-10	-11	512	1501
34	1001.8	0	0	528	1560		79	1007.2	-6	-6	517	1506
35	1020.0	-1	-1	540	1566		80	1014.9	-8	-13	523	1514
36	1026.6	-2	-2	542	1572		81	999.7	-1	-5	512	1521
37	1022.9	1	-2	539	1575		82	973.0	0		508	1522
38	1014.6	1	-1		1571		83	983.0	1	0	510	1527
39	1009.3	1	1	528	1561		84	992.7	-1	-4	512	1538
40	1002.4	1	1	526	1562		85	995.2	-3	-4		1537
41	1014.0	-3	-4	540	1563		86	1003.5	-4	-8	520	1543
42	1008.9	1	0	537	1554		87	998.4	-5	-7	522	1556
43	999.5	2	1	528	1560		88	975.5	1	1	505	1557

44	997.3	0	-4	520	1556		89	970.0	0	0	503	1552
45	1012.0	0	-5	538	1565		90	985.2	-1	-3	517	1563

The following table contains the pressure differences between different pairs of stations, calculated from the previous table. The first 3 columns display the surface pressure difference, while the 4th column (***Ísa-Sco 500***) displays the 500 hPa potential height difference between Ísafjörður and Scoresby Sund.

N.B.: day 1 is 1/1/1994, then days are counted progressively, so that day 32 is 1/2/1994, day 60 is 1/3/1994 and day 90 is 31/3/1994.

day	*Ísa-Sco* (mb)	*Sco-Jan* (mb)	*Jan-Ísa* (mb)	*Ísa-Sco 500* (*10 m)		*day*	*Ísa-Sco* (mb)	*Sco-Jan* (mb)	*Jan-Ísa* (mb)	*Ísa-Sco 500* (*10 m)
1	-15.6	10.1	5.5			46	-1.7	4.0	-2.3	7
2	-18.4	9.6	8.8	-4		47			7.5	6
3	-15.2	13.6	1.6	0		48	-16.2	7.7	8.5	8
4	-14.9	11.4	3.5	-6		49	-33.4	7.8	25.6	-7
5	-16.5	12.4	4.1	0		50	-17.4	1.6	15.8	-1
6	-8.0	15.4	-7.4	1		51	-23.2	-1.5	24.7	-6
7	-12.6	17.7	-5.1	2		52	-5.7	4.4	1.3	11
8	-19.1			-1		53	-0.9	4.1	-3.2	3
9	-14.2	8.4	5.8			54	-11.4	10.3	1.1	4
10	-25.8	6.7	19.1	-1		55	-15.5	14.9	0.6	7
11	-45.5	8.8	36.7	-11		56	-1.7	3.3	-1.6	4
12	-34.5	3.0	31.5	-8		57	-1.9	5.1	-3.2	8
13	-25.1	10.4	14.7	-2		58	2.5	-4.0	1.5	3
14	-11.5	9.7	1.8	7		59			0.2	0
15	-12.6	11.0	1.6	11		60	2.1	-7.4	5.3	-3
16	1.4	8.9	-10.3	10		61	-16.8	-7.4	24.2	-9
17	-14.1	0.3	13.8	11		62	-2.9	-4.3	7.2	-1
18	-28.3	-4.5	32.8	-12		63	-13.3	6.0	7.3	-11
19	3.5	-9.4	5.9	5		64	-13.6	11.6	2.0	-5
20	-3.0	10.4	-7.4	5		65	3.5	19.3	-22.8	8
21	-5.6	5.8	-0.2	3		66	-9.1	0.7	8.4	-1
22	6.1	17.6	-23.7	-4		67	0.3	-9.1	8.8	-7
23	-3.4	26.7	-23.3	2		68	-15.3	12.0	3.3	-3
24	-2.3	24.7	-22.4	-2		69	-1.0	22.9	-21.9	-2
25	-12.0	16.3	-4.3			70	-15.6	3.3	12.3	-4
26	-15.6	15.2	0.4	6		71	-7.6	9.3	-1.7	
27	-12.6	19.5	-6.9			72	-12.6	13.7	-1.1	
28	-1.8	20.5	-18.7	10		73	-14.6	20.2	-5.6	0
29	-12.2	11.5	0.7	-4		74	-10.3	24.6	-14.3	4
30	-10.6	8.1	2.5	7		75	-9.1	21.7	-12.6	0
31	-15.5	-3.0	18.5	-1		76	-4.0	14.2	-10.2	4
32	-18.7	-3.2	21.9	-15		77	-11.8	15.4	-3.6	
33	6.2	-16.9	10.7	-4		78	-14.1	20.6	-6.5	0
34	-7.5	-4.0	11.5	-5		79	-4.1	19.3	-15.2	9
35	-11.7	-2.9	14.6	-4		80	-14.4	4.4	10.0	4
36	-18.1	-1.7	19.8	-8		81	-38.9	-9.3	48.2	-11
37	-22.9	-2.5	25.4	-5		82	-18.3	0.4	17.9	-7
38	-19.9	0.9	19.0	-10		83	-2.6	7.4	-4.8	
39	-17.6	4.5	13.1	-6		84	-0.5	13.2	-12.7	12
40	-13.0	9.3	3.7	8		85	-1.4	11.6	-10.2	13
41	-6.6	-0.2	6.8	-8		86	-14.9	6.6	8.3	7
42	-0.7	-7.8	8.5	-3		87	-30.6	7.2	23.4	-7
43	5.6	-24.0	18.4	5		88	-14.9	7.7	7.2	-10
44	9.1	-14.7	5.6	16		89	-3.5	9.8	-6.3	1

45	0.5	-2.8	2.3	7		90	-7.3	3.4	3.9	-4

B 2.1.2 Plot of the surface pressure difference between Ísafjörður and Scoresby Sund

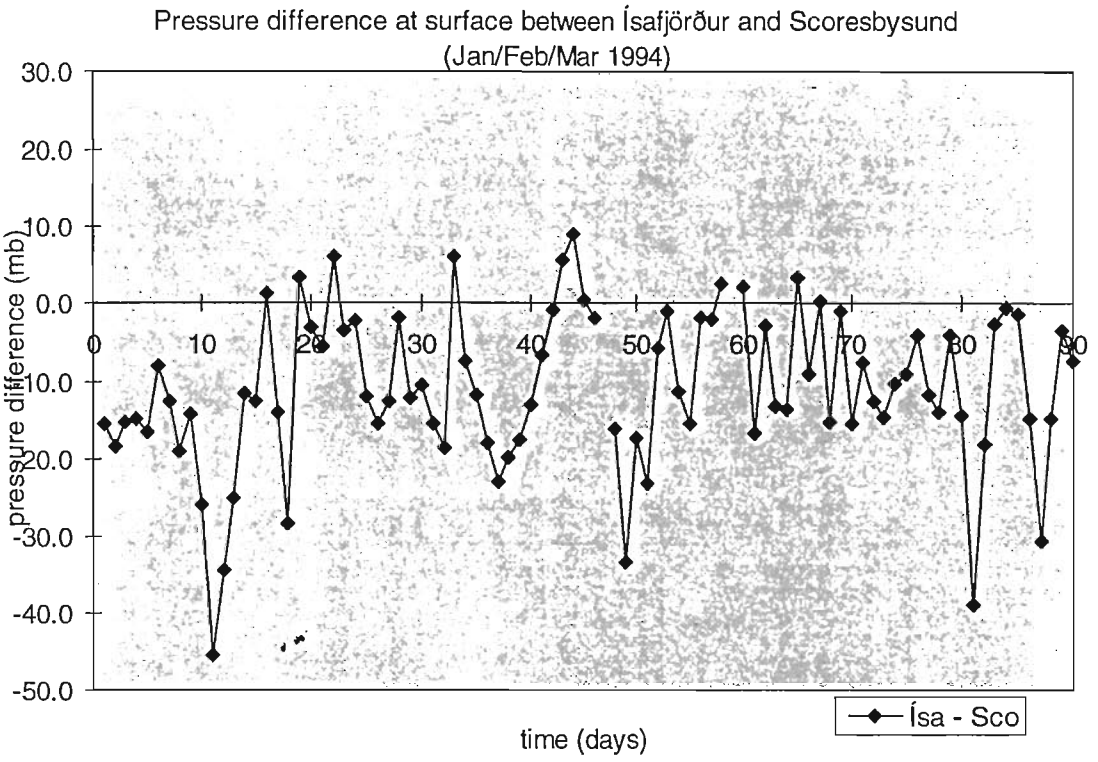


Fig.6:*surface pressure difference between the stations Ísafjörður and Scoresby Sund during January-February-March 1994 (values are in mb)*

B 2.1.3 Description of the synoptic scale general circulation over the Iceland Sea and surroundings during the period January-February-March 1994

The following is a description of the synoptic scale general circulation deduced from the Europäischer Wetterbericht (European Meteorological Bullettin) daily maps. The phrase "pressure difference", which will often be used, refers to the surface pressure difference between the stations Ísafjörður and Scoresby Sund (i.e. surface pressure in Ísafjörður - surface pressure in Scoresby Sund). Usually this difference was evaluated from the pressure values measured at these two stations and reported on the maps. Whenever the measurement report was missing, the pressure difference was evaluated from the isobars on the map.
The monitoringof ***sea ice*** *in the Iceland Sea during January-February-March 1994 by the Icelandic Coast Guard (Landhelgisgæslan) provides us only 4* ***sea ice charts*** *(which are shown in* Appendix A*) and they do not cover the whole ice edge.*

- From the 1st of January to the 8th, the persistent high over Greenland is not disturbed by any other synoptic scale feature, so that winds are North-Easterly and the circulation is anticyclonic. The pressure difference keeps negative and about -15 mb.

- From day 9/1 to day 14/1 a huge and deep cyclone, located West of Scotland, changes the circulation into cyclonic. Being an extensive and stationary low, winds are mainly Easterly until day 11/1, when they shift to South-Easterly and the pressure difference reaches the highest value in modulus (- 44 mb). Because of such high pressure difference, the winds are very strong. Winds continue to be from South-East until day 14/1, when the cyclone has reached Norway and the usual anticyclonic circulation with winds from North-East has been restored, due also to the persistent high over Greenland. This pattern persists until day 16/1.
On day 17/1 a low appears North-West of Iceland. The pressure difference begins to drop (down to - 28 mb on day 18/1), and winds shift to South-Easterly again. This cyclonic circulation continues until day 19/1, when the cyclone has moved and is placed over Scoresby Sund. Winds appear now Southerly.

- From day 20/1 to day 25/1 the circulation pattern is without doubt cyclonic, characterized by a succession of lows which travel close one to the other. The wind field is instead very complicated, because the low are so close and they influence the winds at the same time.

- From day 26/1 to day 28/1 the persistent high over Greenland gives North-Easterly winds, and the circulation is anticyclonic. The pressure difference is about -10 mb. On day 28/1 a small low appears on the South-East coast of Greenland.

- From day 29/1 to day 9/2 a long period of cyclonic circulation begins, due to many lows approaching Iceland in sequence. Winds blow from South-East and the pressure difference keeps negative. The only exception occurs on day 2/2, when a low centred over the South-Eastern coast of Greenland with a SW-NE elongation causes the wind to blow from South-West and the pressure difference to be +12 mb because the low stretches over Scoresby Sund. On day 9/2 no low is in the area any more, and the wind field shifts back to North-Easterly.

- From day 10/2 a new period of cyclonic circulation begins. At first, a sequence of three lows affects the area. The result is that we have Southerly and South-Easterly wind, but weak as the isobars are aligned almost in the Ísafjörður - Scoresby Sund direction. In fact, the pressure differences are negative but small. On day 12/2 a low is centred over Scoresby Sund, the pressure difference becomes positive and winds shift Westerly. We do not have available ice charts for these days, but presumably the ice edge was not driven too close to Iceland because the Westerly wind was quite weak and lasted a short time (until day 13/2, when the pressure difference was +9 mb). In fact, on day 14 and 15/2 this series of lows has weakened and moved , and winds are very weak. The pressure difference is about 0 mb. This means that if there is any wind, it is blowing in the direction Ísafjörður - Scoresby Sund.
From day 16/2 a second sequence of lows affects the area. The first cyclone is small, persisting for 5 days over West of Iceland, but its effect (South-Easterly wind) is magnified by a high over Scoresby Sund. On day 17/2 this cyclone becomes deeper and winds increase in strength (although not everywhere), and on day 18/2 a small high standing over Scoresby Sund gives the deepest drop in pressure difference, down to -33 mb. Winds continue to blow from South-East until day 21/2.
Then a sequence of cyclones centred over the North Atlantic ocean approaches. At first the winds keep blowing from South-East, like on day 22/2, but are weak. But,

from day 23/2, the persistent high over Greenland becomes stronger, so that winds shift to North-Easterlies. This continues until day 26/2. The pressure differences, as we can see from the plot, keep negative and reach their minimum on day 24/2, when both the low over the North Atlantic Ocean and the high over Greenland are strongest. After that they start to weaken.

- During days 27 and 28/2 a small low over Greenland and Spitsbergen shifts the wind to South-Westerlies and the pressure difference is small but positive.

- From day 2/3 to day 11/3 the area is affected by two cyclones. The first one behaves in a "classical" way, shifting the winds to blow from South-East for a few days, during which the pressure difference is negative. On day 6/3 the low is over Jan Mayen and the wind is switched back to North-Easterly.
The second cyclone instead gives a very complicated pattern, but we can simply say that winds are South-Easterlies on day 7/3 and turn North-Easterlies on day 9/3, and keep like that for the rest of the time.

- From day 12/3 to day 20/3 we can identify a period of anticyclonic circulation due to a high pressure field over Greenland and no cyclone coming. Winds are North-Easterly throughout the whole period, and the pressure difference keeps negative and scattering around a value of - 10 mb.

- From day 21/3 to day 31/3 a sequence of three cyclones enters the area. We can see them very well from the pressure difference plot, where they are displayed as three narrow and sudden drop to about -35 mb (the third one has been cut because the month ended!). They all shift the winds to South-Easterly as they enter the area, cause a pressure drop and, when they leave the area, the winds turn and blow again from North-East.

♣ The measurements taken on the Bjarni Sæmundsson vessel during the cruise from the 8th of February, 1994 to the 18th of February, 1994, were taken under very variable synoptic scale conditions. During the first two days of the cruise, the pattern was anticyclonic and winds were North-Easterly. After that the circulation pattern was always cyclonic, but a sequence of different lows in the Iceland Sea are of interest: the first type was centred over Scoresby Sund, causing a large and positive pressure difference and the winds to blow from South and West; the second type was a weak low centred over Western Iceland, but a high over Scoresby Sund dropped the pressure difference down to -35 mb, and even if the synoptic pattern looked very complicated, we can basically say that, during this second half of the cruise, winds were blowing from South-East.
Like we said in the beginning of the description, ice monitoring does not give us a detailed picture for these 3 months. As known from the Icelandic Coast Guard sea ice reconnaissance and ship reports, supported by the atmospheric circulation discussed here, no sea ice reached the Icelandic coast in the first three months of the year 1994. This, reversely, is a reason for the low number of reconaissance flights taken by the Coast Guard.

2.2 Description of the uppermost layer (50 m) at the ocean surface

Part A - Year 1993

The oceanic uppermost layer is described by :

a) salinity at the depth of 50 m;
b) temperature at the depth of 50 m;
c) energy fluxes (i.e. sensible and latent heat fluxes) through the air/sea interface; in this case we take as positive an upward flux, that is a flux is taken positive if the sea is losing energy.

The salinity and temperature data were measured by the Marine Research Institute (Hafrannsóknastofnun) during a cruise taken in February 1993 on the oceanographic vessel "Bjarni Sæmundsson". The cruise started on the 11th of February, 1993 and ended on the 24th of February, 1993, and covered several profiles around Iceland, some of which lay in the Iceland Sea. Each profile contains some oceanographic stations. The energy fluxes were then calculated by Einarsson & Jakobsson (1994) (see [2]) of the Icelandic Meteorological Office (Veðurstofa Íslands) using additional marine meteorological data measured during the same cruise.
The reader is referred to the above mentioned report by Einarsson & Jakobsson (1994) for further information about the energy fluxes.

A 2.2.1 Heat fluxes, salinity and temperature tables.

Sensible (***Qh***) and latent (***Ql***) heat fluxes, calculated at the ocean surface in some selected oceanographic stations, are given in the table below, together with the ***50 meters depth*** salinity (***salt 50***) and temperature (***temp 50***) of the ocean water. Each station is described by a station number (that was given during the cruise) and by its spatial coordinates (given in the degree decimal notation, for example a latitude of 65.500 means 65 degrees and 30 minutes North [65°30'N], or a longitude of -18.833 means 18 degrees and 50 minutes West [18°50'W]).

N.B.:FEBRUARY 1993: concerning the fluxes, in one case they had to be averaged because they had been calculated twice at the same station (station number 135 located at [21° 30' W ; 62° 59' N] or [-21.483 ; 62.983] in degree decimal notation).

Station	*Date*	*Latitude*	*Longitude*	*Qh* (W/m^2)	*Ql* (W/m^2)	*salt 50* ‰	*temp 50* (°C)
82	11.2.1993	65.500	-24.567	-6.3	-5.1	34.61	0.64
83	11.2.1993	65.583	-24.917	4.8	11.7	34.94	3.14
84	11.2.1993	65.667	-25.267	5.9	17.1	35.00	3.57
85	11.2.1993	65.750	-25.650	22.9	29.8	35.00	5.08
86	11.2.1993	65.833	-26.000	25.8	31.9	35.00	5.09
87	11.2.1993	65.933	-26.483	52.0	40.8	34.97	5.09
88	11.2.1993	66.017	-26.800	50.4	44.7	34.97	5.08
89	12.2.1993	66.083	-27.050	31.8	29.2	34.84	3.93
90	12.2.1993	66.133	-27.250	4.3	12.1	34.88	4.40
91	12.2.1993	66.500	-23.000	-1.8	5.6	34.66	0.94
92	12.2.1993	66.683	-23.150	24.7	34.0	34.90	2.86

93	12.2.1993	66.883	-23.300	55.3	56.1	34.91	4.43
95	13.2.1993	67.150	-22.867			34.66	1.51
97	13.2.1993	67.083	-23.467	27.4	15.4	34.59	0.62
98	14.2.1993	67.000	-20.783	30.3	34.7	34.85	2.78
99	14.2.1993	66.750	-20.783	47.4	43.1	34.85	2.39
100	14.2.1993	66.500	-20.783	37.6	32.7	34.89	2.97
101	14.2.1993	66.267	-18.833	12.6	33.2	34.68	0.99
102	14.2.1993	66.400	-18.833	23.3	43.7	34.74	1.50
103	14.2.1993	66.533	-18.833	17.0	24.6	34.75	1.50
104	14.2.1993	66.733	-18.833	31.0	18.9	34.73	1.38
105	14.2.1993	67.000	-18.833	26.5	16.0	34.73	1.37
106	15.2.1993	67.333	-18.833	22.9	17.3	34.72	1.24
107	15.2.1993	67.667	-18.833	46.8	26.9	34.71	0.98
108	15.2.1993	68.000	-18.833	68.3	35.6	34.78	-0.15
109	16.2.1993	68.000	-12.667	26.9	14.5	34.78	-0.40
110	16.2.1993	67.750	-12.967	19.4	10.5	34.77	-0.47
111	16.2.1993	67.500	-13.267	29.4	16.0	34.79	-0.31
112	16.2.1993	67.250	-13.567	13.0	6.1	34.80	-0.21
113	16.2.1993	67.000	-13.817	15.2	8.3	34.69	0.85
114	16.2.1993	66.617	-14.267	11.1	6.5	34.65	1.57
115	16.2.1993	66.367	-14.367	4.8	2.5	34.45	1.01
116	16.2.1993	66.367	-14.033	11.7	7.9	34.66	1.43
117	16.2.1993	66.367	-13.583	7.7	4.2	34.70	0.81
118	16.2.1993	66.367	-13.000	2.6	1.4	34.66	1.32
119	17.2.1993	66.367	-12.083	0.8	1.4	34.73	0.36
120	17.2.1993	66.367	-11.000	6.8	3.8	34.72	0.49
121	17.2.1993	66.367	-10.000	10.1	7.4	34.75	0.19
122	17.2.1993	65.000	-10.117	-10.5	-8.2	34.68	0.86
123	18.2.1993	65.000	-11.283	-16.8	-12.1	34.67	1.20
124	18.2.1993	65.000	-11.667	-17.2	-15.7	34.65	1.31
125	18.2.1993	65.000	-12.817	9.6	13.7	34.58	1.65
126	18.2.1993	65.000	-13.500	1.5	10.8	34.51	1.24
127	19.2.1993	63.650	-13.667	29.6	56.4	35.15	7.37
128	19.2.1993	63.783	-13.933	67.3	85.4	35.14	7.31
129	19.2.1993	63.867	-14.150	68.8	132.1	35.12	6.72
130	19.2.1993	64.033	-14.467	31.2	38.1	35.05	5.74
131	19.2.1993	64.200	-14.833	23.0	34.1	34.90	5.30
132	20.2.1993	63.567	-16.300	80.0	98.9	35.02	6.06
133	20.2.1993	63.700	-16.500	137.5	134.3	35.08	6.42
134	20.2.1993	63.767	-16.600	86.1	90.0	35.04	6.02
135	21.2.1993	62.983	-21.483	6.4	6.9	35.11	6.66
136	21.2.1993	63.133	-21.300	0.0	-1.3	35.10	6.33
137	21.2.1993	63.317	-21.117	-28.5	-27.4	34.93	5.09
138	21.2.1993	63.483	-20.900	-7.1	-8.0	34.78	4.66
139	21.2.1993	63.683	-20.683	-3.9	-5.1	34.89	4.65
140	23.2.1993	63.833	-31.200	65.0	70.8	34.95	4.42
141	23.2.1993	63.967	-30.400	123.7	89.8	34.95	4.45
142	23.2.1993	64.067	-29.583	188.2	137.3	35.01	5.36
143	23.2.1993	64.217	-28.783	212.9	154.9	35.02	5.56
144	23.2.1993	64.333	-28.017	236.3	174.0		
145	24.2.1993	64.333	-26.000	204.3	149.3	35.03	5.07
146	24.2.1993	64.333	-25.000	129.1	92.9	35.02	4.82
147	24.2.1993	64.333	-24.350	109.1	81.3	35.03	4.88

148	24.2.1993	64.333	-23.750	61.2	0.0	35.05	5.20
149	24.2.1993	64.333	-23.250	74.7	54.5	34.92	4.56
150	24.2.1993	64.333	-22.750	74.5	53.4	35.03	4.65
151	24.2.1993	64.333	-22.417	67.7	47.8	34.99	4.30

A 2.2.2 Contour maps

These contour maps display the 'fields' of sensible and latent heat fluxes, salinity and temperature (the last two at 50 meters depth) for the Iceland Sea. They were drawn from the data contained in the table above. They also display a division of the sea into different subsections (heavy lines) which will be explained later in chapter 3.
Although the measurements taken at the different oceanographic stations are not taken simultaneously, it was nonetheless decided to draw contour maps for the salinity and temperature data, accounting for the fact that the cruising time was short compared to the time that water masses take to change their salinity and temperature at 50 m depth. We have though to keep in mind that this may not be true at all times. Concerning the energy fluxes, we decided not to draw countour maps, because they depend on many parameters (like the air temperature or the solar income radiation or the cloud coverage) which can vary dramatically in a short time (hours), so that not simutaneous data are not comparable.

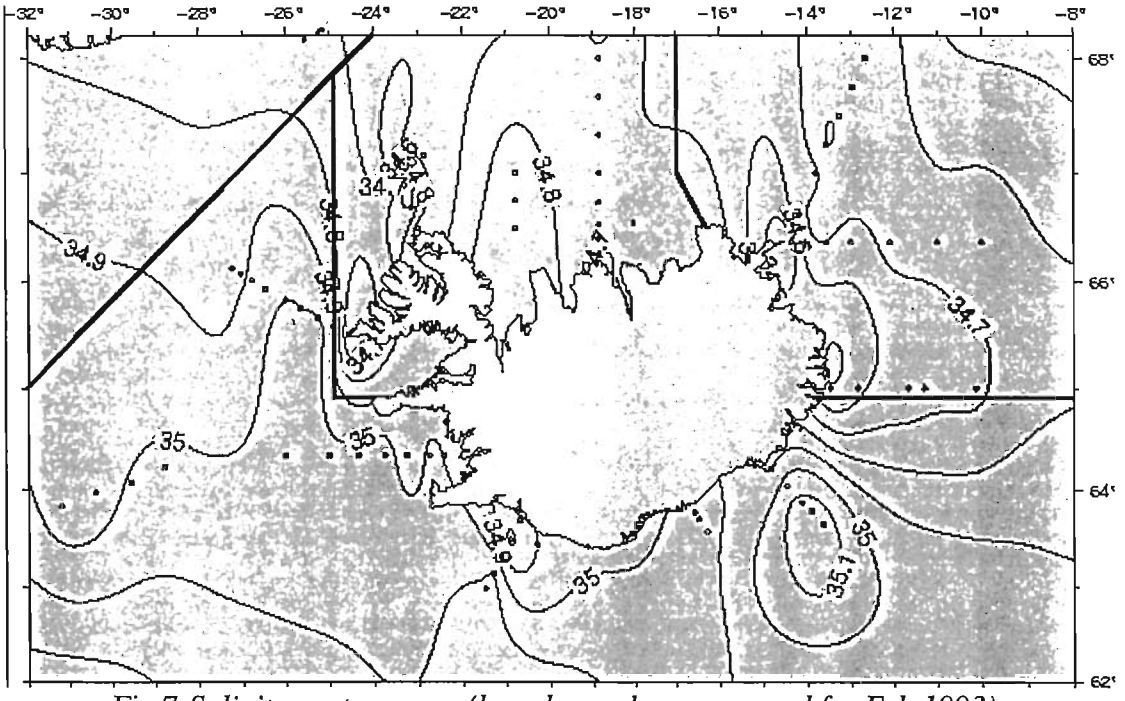


Fig.7:*Salinity contour map (based on values measured for Feb.1993). Values are in ‰, contour levels are drawn every 0.1‰.*

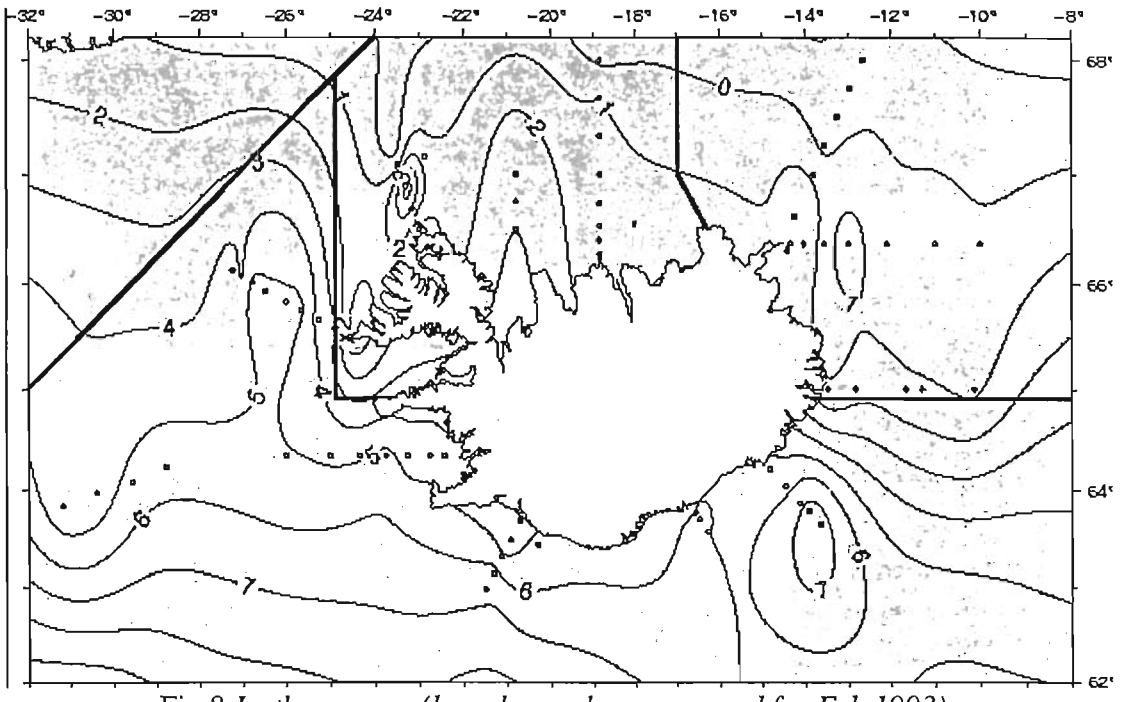


Fig.8:*Isotherm map (based on values measured for Feb.1993). Values are in °C, isotherms are drawn every 1°C.*

Part B - Year 1994

The oceanic uppermost layer is described by :

a) salinity at the depth of 50 m;

b) temperature at the depth of 50 m.

c) energy fluxes (i.e. sensible and latent heat fluxes) through the air/sea interface; in this case we take as positive an upward flux, that is a flux is taken positive if the sea is losing energy.

The salinity and temperature data were measured by the Marine Research Institute (Hafrannsóknastofnun) during a cruise taken in February 1994 on the oceanographic vessel "Bjarni Sæmundsson". The cruise started on the 8th of February, 1994 and ended on the 18th of February, 1994, and covered several profiles around Iceland, some of which lay in the Iceland Sea. Each profile contains some oceanographic stations. The energy fluxes were then calculated by Einarsson & Jakobsson (1994) (see [2]) of the Icelandic Meteorological Office (Veðurstofa Íslands) using additional marine meteorological data measured during the same cruise.

The reader is referred to the above mentioned report by Einarsson & Jakobsson (1994) for further information about the energy fluxes.

B 2.2.1 Heat fluxes, salinity and temperature tables.

Sensible (***Qh***) and latent (***Ql***) heat fluxes, calculated at the ocean surface in some selected oceanographic stations, are given in the table below, together with the ***50 meters depth*** salinity (***salt 50***) and temperature (***temp 50***) of the ocean water. Each station is described by a station number (that was given during the cruise) and by its spatial coordinates (given in the degree decimal notation, for example a latitude of

65.500 means 65 degrees and 30 minutes North [65°30'N], or a longitude of -18.833 means 18 degrees and 50 minutes West [18°50'W]).

N.B.: FEBRUARY 1994: concerning the fluxes, in one case they had to be averaged because they had been calculated twice at the same station (station number 83 located at [18° 50' W; 66° 24' N] or [-18.833 ; 66.40] in degree decimal notation).

Station	*Date*	*Latitude*	*Longitude*	*Qh* (W/m^2)	*Ql* (W/m^2)	*salt 50* ‰	*temp 50* (°C)
64	8.2.1994	65.500	-24.567	-1.6	-1.2	34.46	-0.11
65	8.2.1994	65.583	-24.917	-0.5	4.1	34.79	2.93
66	8.2.1994	65.667	-25.267	19.5	26.7	35.00	4.32
67	8.2.1994	65.750	-25.650	29.5	33.6	34.99	4.93
68	8.2.1994	65.833	-26.000	32.0	44.2	35.02	5.17
69	8.2.1994	65.933	-26.483	34.3	48.2	35.01	5.54
70	8.2.1994	66.017	-26.800	50.8	56.7	35.00	5.70
71	8.2.1994	66.083	-27.033	48.5	52.0	34.99	5.74
72	8.2.1994	66.150	-27.250	63.0	64.2	34.95	5.22
73	8.2.1994	66.217	-27.467	47.8	53.4	34.66	0.63
74	9.2.1994	66.500	-23.000	0.0	0.9	34.40	0.81
75	9.2.1994	66.683	-23.150	10.7	9.3	34.67	2.01
76	9.2.1994	66.883	-23.300	2.1	2.7	34.91	3.93
77	9.2.1994	67.083	-23.467	1.6	2.1	34.93	4.63
78	9.2.1994	67.333	-23.667	2.0	2.8	34.92	4.14
79	9.2.1994	67.583	-23.933	8.0	7.9	34.88	2.99
80	10.2.1994	66.750	-20.783	1.0	12.7	34.82	2.83
81	10.2.1994	66.500	-20.783	-8.3	11.4	34.80	2.69
82	10.2.1994	66.267	-18.833	-18.7	10.2	34.77	2.52
83	10.2.1994	66.400	-18.833	-23.4	25.1	34.77	2.58
84	11.2.1994	66.533	-18.833	8.3	16.4	34.78	2.59
85	11.2.1994	66.733	-18.850	19.8	47.4	34.79	2.43
86	11.2.1994	67.000	-18.833	-50.2	-24.5	34.78	2.55
87	11.2.1994	67.333	-18.833	-35.6	-8.8	34.78	2.45
88	11.2.1994	67.667	-18.833	-32.6	-17.0	34.79	1.98
89	12.2.1994	67.850	-17.500	-9.1	0.0	34.73	1.67
90	12.2.1994	68.167	-16.167	-4.1	-0.6	34.75	0.34
91	12.2.1994	68.417	-14.833	-0.8	-0.3	34.72	-0.08
92	12.2.1994	68.000	-12.667	-4.1	0.8	34.72	-0.25
93	12.2.1994	67.750	-12.967	-15.1	2.6	34.76	-0.26
94	12.2.1994	67.500	-13.267	-36.6	13.4	34.73	-0.29
95	13.2.1994	67.250	-13.567	-30.6	-2.1	34.70	0.21
96	13.2.1994	67.000	-13.817	-8.8	1.2	34.67	2.18
98	13.2.1994	66.617	-14.267	-8.1	13.6	34.64	2.14
99	13.2.1994	66.367	-14.367	-4.7	-2.4	34.65	2.00
100	13.2.1994	66.367	-14.000	-1.4	1.2	34.66	1.97
101	13.2.1994	66.367	-13.583	-0.8	1.3	34.66	1.89
102	13.2.1994	66.367	-13.000	-2.8	0.9	34.66	1.81
103	13.2.1994	66.367	-12.083	-2.7	-1.6	34.64	1.73
104	14.2.1994	66.367	-11.000	-0.5	-0.2	34.66	1.19
105	14.2.1994	66.367	-10.000	-38.2	-27.8	34.63	0.86
106	14.2.1994	65.000	-10.000	-40.0	-26.8	34.64	2.73
107	14.2.1994	65.000	-11.283	-36.2	-20.2	34.61	1.83

108	14.2.1994	65.000	-11.667	-37.0	-17.9	34.61	1.77
109	15.2.1994	65.000	-12.817	-21.7	-9.4	34.43	1.95
110	15.2.1994	65.000	-13.500	-12.6	-5.5	34.32	1.81
111	15.2.1994	63.633	-13.667	31.8	48.1	35.13	7.30
112	15.2.1994	63.783	-13.933	15.7	19.8	35.12	7.03
113	15.2.1994	63.867	-14.133	16.1	27.3	35.03	6.21
114	16.2.1994	64.033	-14.467	3.8	17.1	35.00	6.00
115	16.2.1994	64.200	-14.833	-0.6	-1.0	34.58	3.69
116	16.2.1994	63.567	-16.300	1.9	3.7	35.00	6.06
117	16.2.1994	63.700	-16.500	4.6	5.6	34.98	5.90
118	16.2.1994	63.767	-16.583	6.3	7.4	35.01	5.78
119	16.2.1994	62.983	-21.483	-5.5	9.2	35.09	7.01
120	16.2.1994	63.150	-21.300	-6.3	4.9	35.09	6.74
121	17.2.1994	63.317	-21.133	-12.9	0.8	35.06	6.20
122	17.2.1994	63.483	-20.900	-17.5	-7.0	34.99	5.33
123	17.2.1994	63.683	-20.683	-18.5	2.9	34.93	5.74
124	18.2.1994	64.333	-25.000	-4.5	3.5	35.02	5.58
125	18.2.1994	64.333	-24.333	-28.1	-0.7	35.04	5.56
126	18.2.1994	64.333	-23.750	-4.2	-2.4	35.04	5.83
127	18.2.1994	64.333	-23.250	-2.5	4.2	34.83	4.70
128	18.2.1994	64.333	-22.750	-2.5	0.1	34.76	4.56
129	18.2.1994	64.333	-22.417	-1.8	1.4	34.76	3.71

B 2.2.2 Contour maps

These contour maps display the 'fields' of sensible and latent heat fluxes, salinity and temperature (the last two at 50 meters depth) for the Iceland Sea. They were drawn from the data contained in the table above. They also display a division of the sea into different subsections (heavy lines) which will be explained later in chapter 3.
Although the measurements taken at the different oceanographic stations are not taken simultaneously, it was nonetheless decided to draw contour maps for the salinity and temperature data, accounting for the fact that the cruising time was short compared to the time that water masses take to change their salinity and temperature at 50 m depth. We have though to keep in mind that this may not be true at all times. Concerning the energy fluxes, we decided not to draw countour maps, because they depend on many parameters (like the air temperature or the solar income radiation or the cloud coverage) which can vary dramatically in a short time (hours), so that not simutaneous data are not comparable.

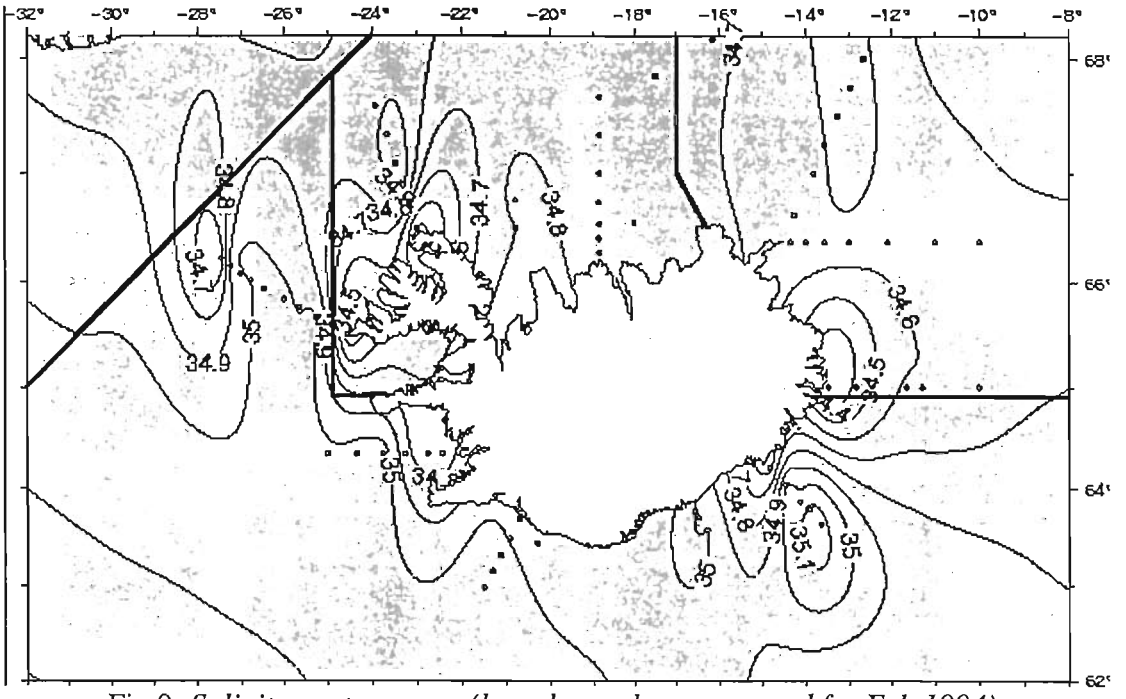


Fig.9: *Salinity contour map (based on values measured for Feb.1994). Values are in ‰, contour levels are drawn every 0.1‰.*

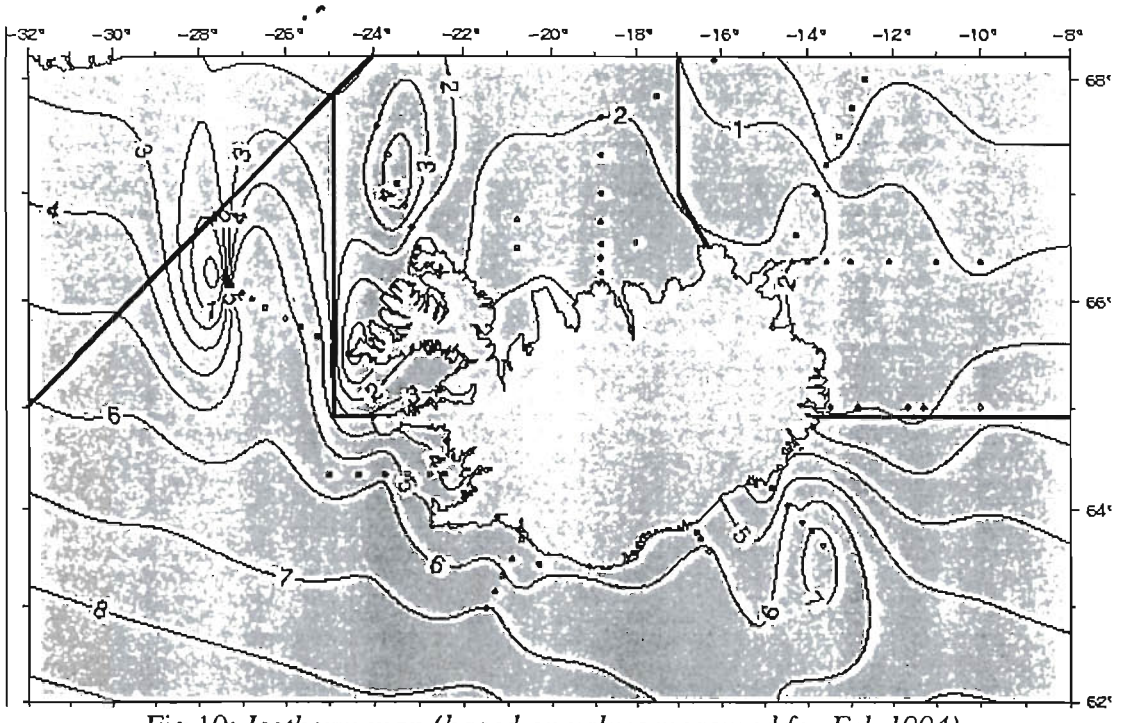


Fig.10: *Isotherm map (based on values measured for Feb.1994). Values are in °C, isotherms are drawn every 1°C.*

3. Comparison of the three years

We decided to try a comparison of the *average* values of energy fluxes, temperature (50 m depth) and salinity (50 m depth), and see how and if they relate to the general synoptic scale circulation of the atmosphere and to the sea ice presence and extent. As

said before, the temperature and salinity were *measured* on cruises, while the energy fluxes were *calculated* (see [1], [2], [3], [4]).
As said above about the contour maps, averaging can be misleading for the energy fluxes, because the measurements were not taken simultaneously and because the fluxes depend strongly on the weather conditions (which of course can change very quickly) and on the solar income (which changes dramatically from day to night, or with different cloud cover). Nonetheless average energy fluxes were calculated, because in February the solar income radiation at high latitudes is little, and because these averages provide us a *rough* idea of the fluxes magnitude in space over the different subsections. High standard deviations are though expected in averaging these fluxes.

In order to average the fluxes, salinity and temperature of the uppermost layer, it was necessary to split the area into more homogeneous subsections. It was not possible to classify the waters according to their salinity at 50 m depth, as Jakobsson & Björnsson (1991) did for *late summer* waters (see [1]). In fact, in their report, they decided to categorize the Polar water as the water whose 50 m depth salinity was less than 34‰, and the Atlantic water as the water whose 50 m depth salinity was more than 34‰; in our case all of the samples had salinity greater than 34‰, probably because during the winter time the salinity difference between Irminger type water and East Greenland type water is lower than in the summer.
An attempt was made to divide the waters accounting for the oceanic currents' pattern. The following splitting into 3 subsections was then decided:
- subsection **G**: water belonging to the Irminger (**G**ulf) Current, i.e. relatively warm and with a higher salinity;
- subsection **I**: water belonging to the **I**celandic Current, i.e. quite cold and low salinity;
- subsection **M**: water of **M**ixed, intermediate type between G and I; in fact to the North of Iceland, Irminger and Icelandic water mix together.
No measurement was taken where the East Greenland Current flows, so we do not have data that cover that area and consequently it was pointless to add it as a further subsection.

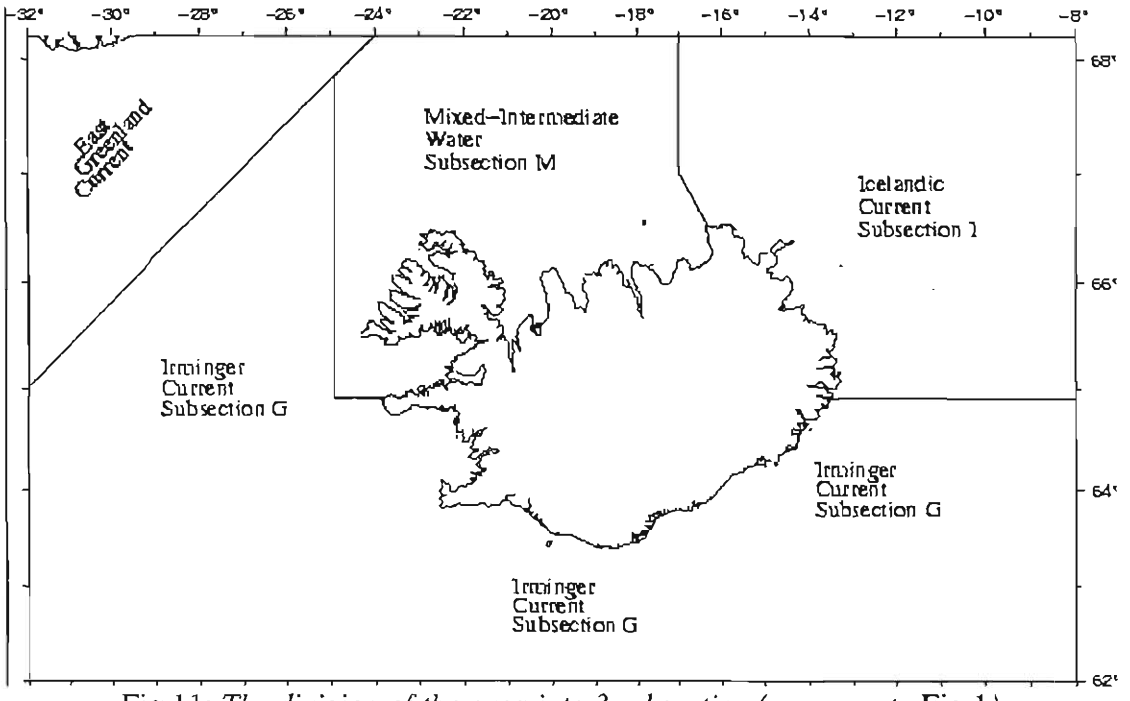


Fig.11: *The division of the area into 3 subsection (compare to* Fig.1*)*

In the following table, the values of sensible and latent flux, salinity (50 m depth) and temperature (50 m depth) are displayed (averaged over each subsection) together with their error, estimated as the standard deviation.

Year	*Water type*	*Sensible heat flux* (W/m^2)	*Latent heat flux* (W/m^2)	*Salinity (50m depth)* (‰)	*Temperature (50m depth)* (°C)
1993	*subsec.G*	68 +/- 68	59 +/- 53	35.00 +/- 0.09	5.2 +/- 1.0
	subsec.M	29 +/- 19	27 +/- 15	34.75 +/- 0.10	1.6 +/- 1.1
	subsec.I	7 +/- 13	4 +/- 9	34.68 +/- 0.09	0.7 +/- 0.7
1994	*subsec.G*	11 +/- 23	19 +/- 22	34.96 +/- 0.14	5.3 +/- 1.4
	subsec.M	-7 +/- 19	6 +/- 16	34.76 +/- 0.14	2.5 +/- 1.1
	subsec.I	-15 +/- 15	-4 +/- 11	34.64 +/- 0.10	1.3 +/- 1.0
1997	*subsec.G*	34 +/- 17	36 +/- 16	34.90 +/- 0.06	4.6 +/- 0.9
	subsec.M	7 +/- 9	7 +/- 5	34.50 +/- 0.11	1.4 +/- 0.9
	subsec.I	-7 +/- 11	-2 +/- 12	34.61 +/- 0.11	1.1 +/- 1.2

N.B.: during the cruise in February 1997 no measurements were taken along the profiles South of Iceland, so the average fluxes in the subsection G are obtained from a much smaller number of measurements.

The quite high standard deviations (especially in energy fluxes averages) warrent caution in interpreting differences between different subsections and years: in fact the differences are often equal to or smaller than the errors. For the energy fluxes, the very high standard deviation is partly expected, as mentioned above.

We notice the following features:

1) Much higher heat fluxes in 1993. No explanation for this can be found in the synoptic scale circulation: in fact the measurements in 1993 were taken under "intermediate" synoptic scale conditions between the ones in 1994 and the ones in 1997, and according to this the fluxes should be "intermediate", too.

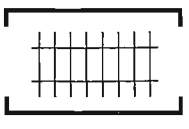
2) For every year, the water in subsection G is warmer than the one in subsection M, which is warmer than the one in subsection I; the energy fluxes and the salinity are always much higher where the water temperature is higher, as expected. There is though an exception to this: in the year 1997 the salinity appears higher in I than in M, and the temperatures are about equal.
It is subsection M which is anomalous, because the values for subsection I are about the same as the previous years. *The unusually low salinity in section M in 1997 could be explained by the fact that in the year 1997 the measurements in subsection M were taken 10 days after a sea ice edge had approached the Icelandic coasts.* We can think that the melting of part of that ice has diluted the waters. Gill (1982) (see [11], pages 31-33) discusses how a "salt flux" develops after the melting or freezing of sea ice (or after water evaporating or precipitating over the ocean) and causes the salinity of the ocean to change not because salt is added or removed, but because fresher water is added (melting or precipitating) or removed (freezing or evaporating).
3) Concerning the energy fluxes, they are affected by much higher errors, as said above, so even more caution is required in interpreting these data. The fluxes were positive (i.e. the air gained energy) in all the subsections in the year 1993, while in 1994 and 1997 they were always negative in the Icelandic Current section.
In 1994 even the sensible heat flux in subsection M appears negative. This means that air had to be warmer than water. We checked what the *air temperature* was during the days when the expedition in 1994 sampled waters of type M so that we could see how it compares to the *sea temperature* of that area for that expedition (i.e. it would be possible to see if the sensible heat was in reality flowing upwards or downwards, but we have to keep in mind that the sea temperature available to us is the 50 meters depth temperature). The expedition in February 1994 sampled waters of type M during the days 12/13/14 - 2 - 1994; at these days the air temperature was -1/-1/0 °C, respectively, in Ísafjörður and 2/0/0°C, respectively, in Jan Mayen (see tables of meteorological parameters for the year 1994) while the 50 m depth sea temperature, average for M, is 2.5 +/- 1.1 °C. According to this, the sensible heat flow should be positive and not negative, because the water appears generally warmer than the sea. Our guesses to explain this mismatch are:

a) the sensible heat flux is affected by a high relative error, and it could as well be a positive flux, or
b) it could have happened that a thin branch (a surface layer thinner than 50 meters) of East Greenland Current cold water, pushed by Westerly winds actually blowing during those days (see **B 2.1.3**), had entered the subsection M, so that the 50 meters depth water temperature was (as usual) warmer than the air, but the surface water was sensibly colder because of this advection of cold water, and hence the sensible heat flux at the air-sea interface was negative.

Appendix A

Sea ice charts by the Icelandic Coast Guards are here displayed, concerning the months of February, 1997 - 1993 - 1994.

Concentration Code:



10/10 CONSOLIDATED PACK ICE

7-9/10 CLOSE PACK ICE

4-6/10 OPEN PACK ICE

1-3/10 VERY OPEN PACK ICE

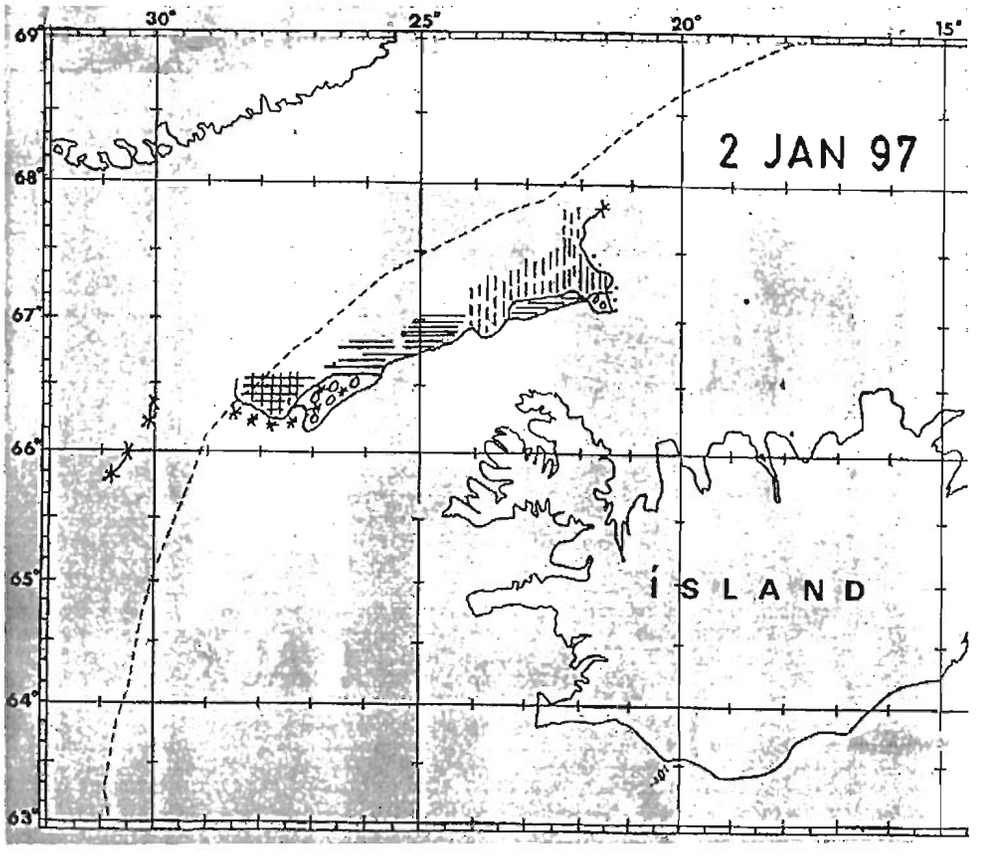
< 1/10 OPEN WATER

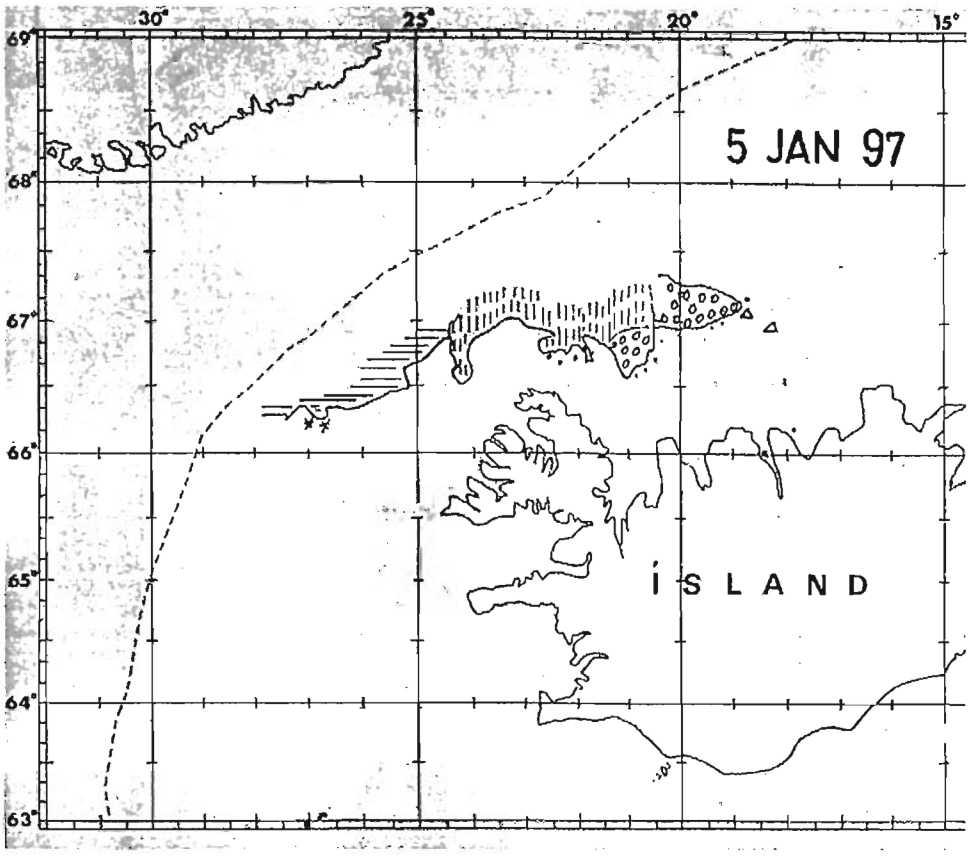
NEW ICE

GLACIER BERG

200 NAUTICAL MILES
economic zone

1997

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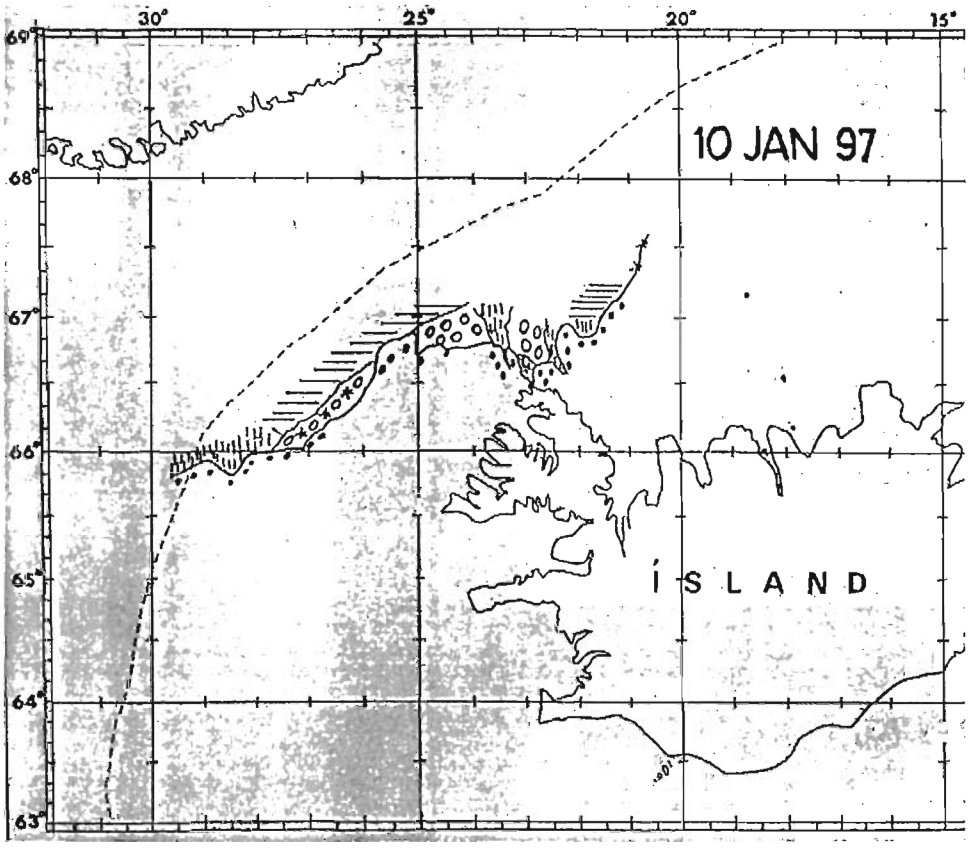
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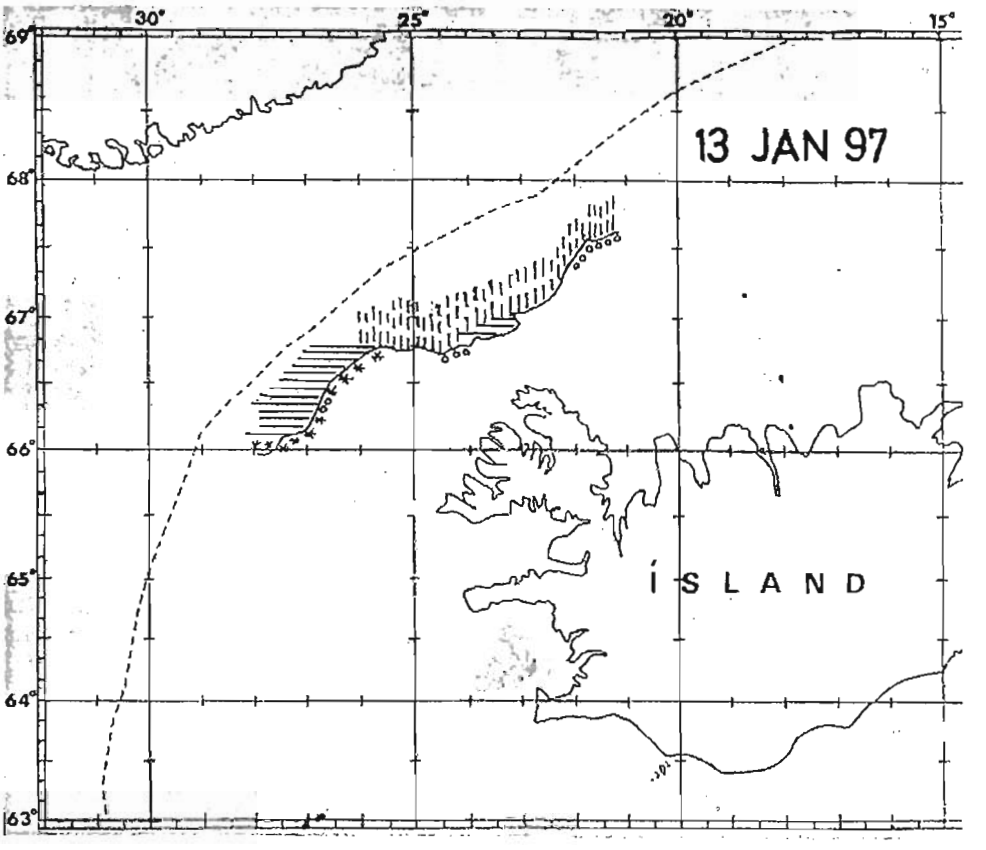
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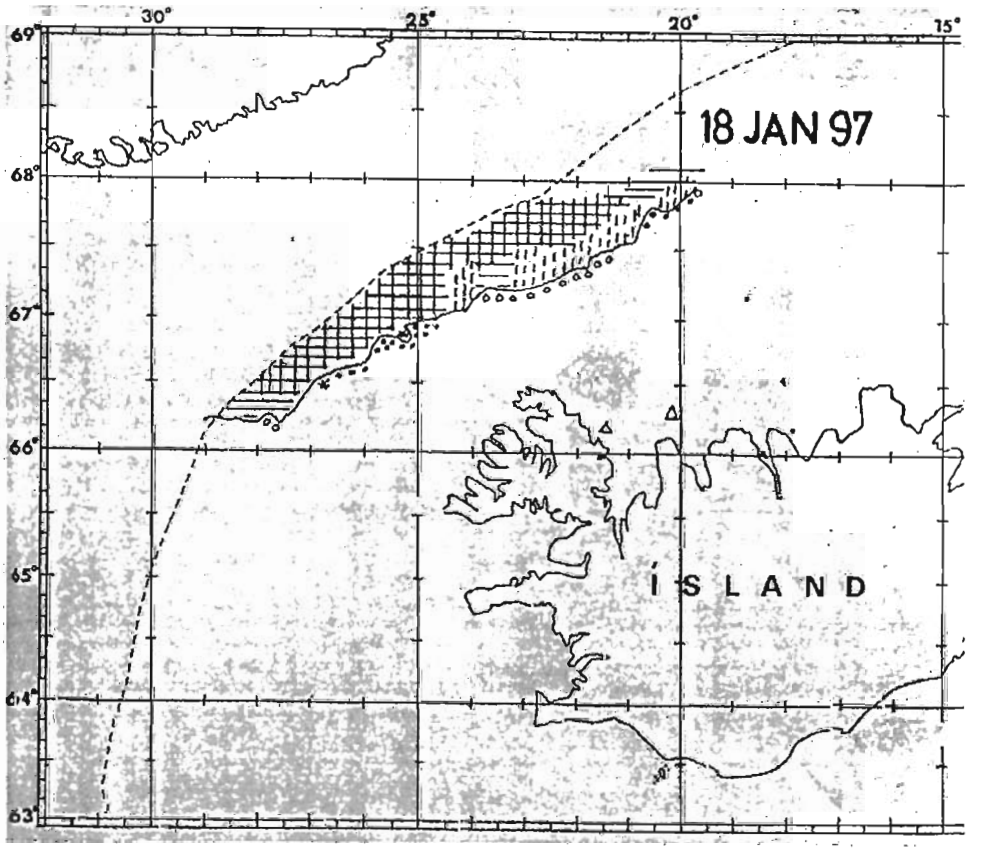
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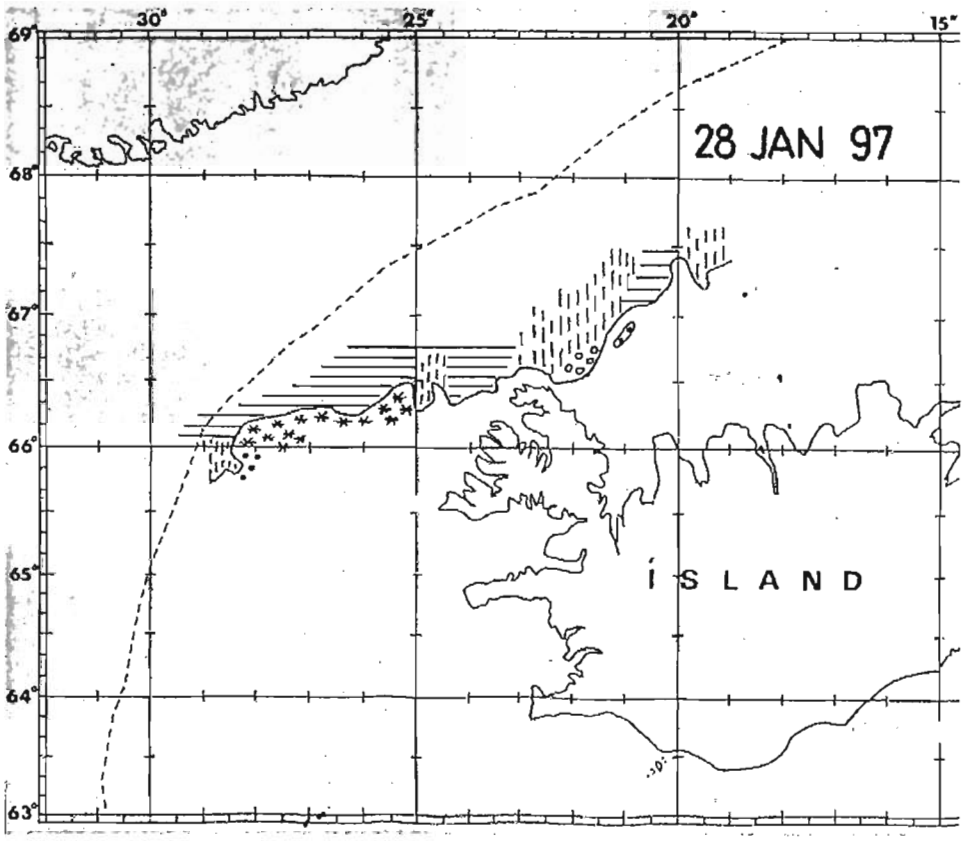
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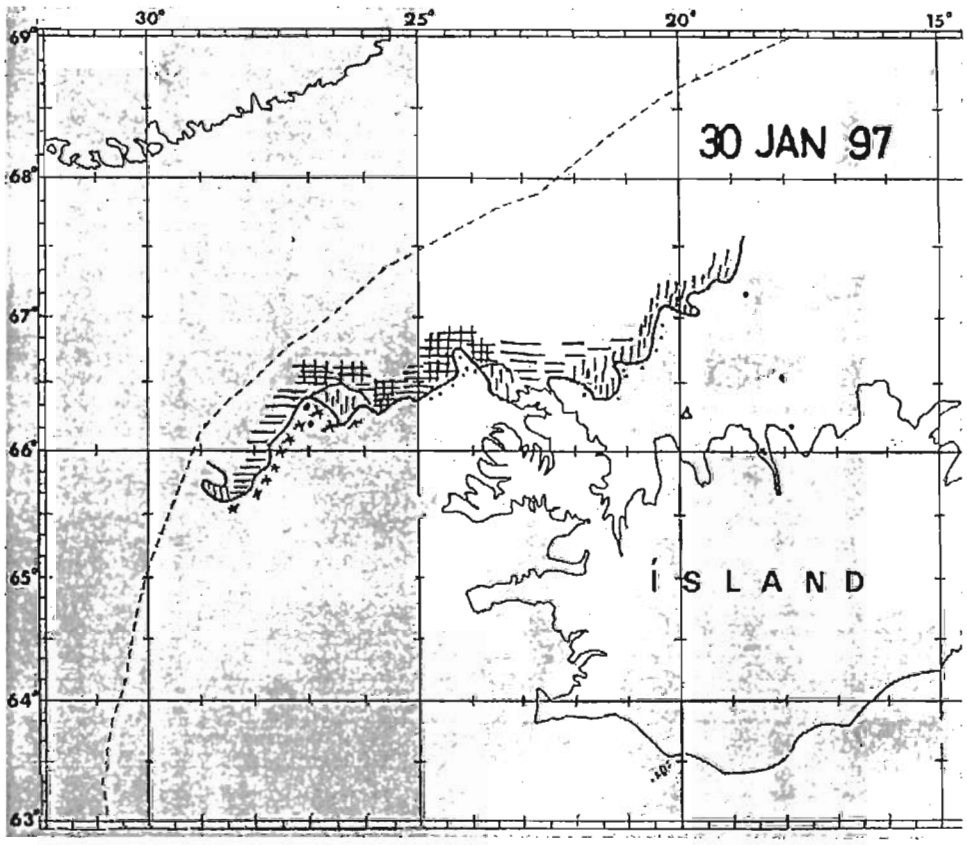
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30 JAN 97
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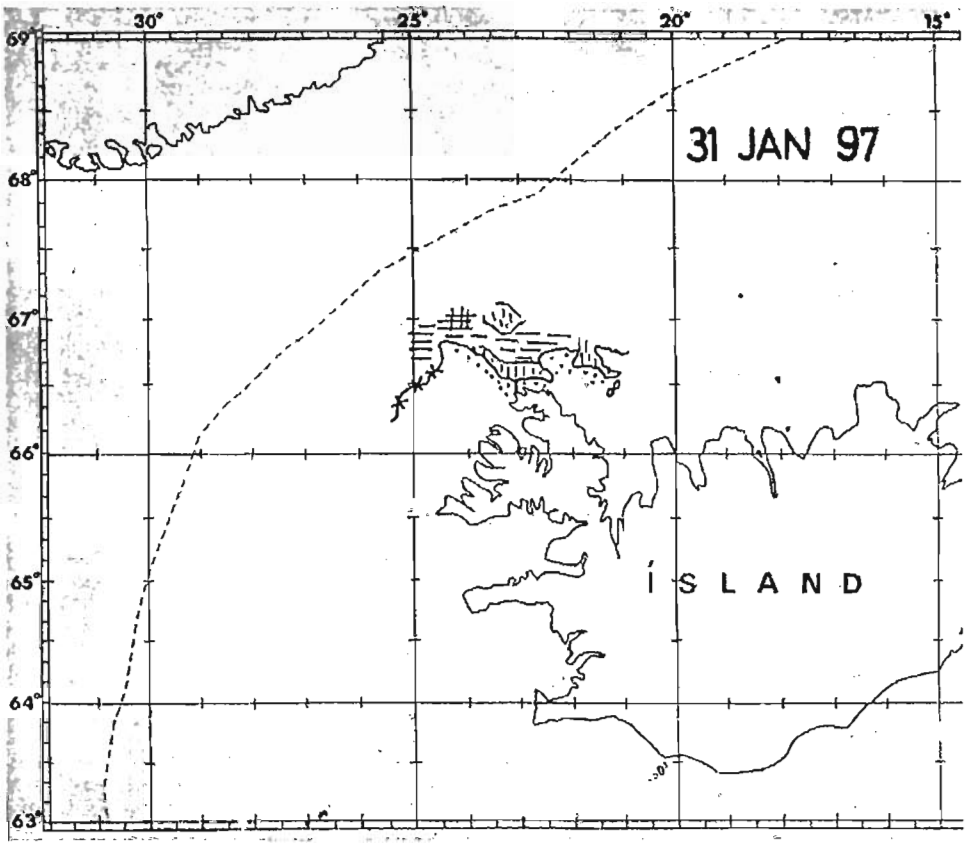
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31 JAN 97
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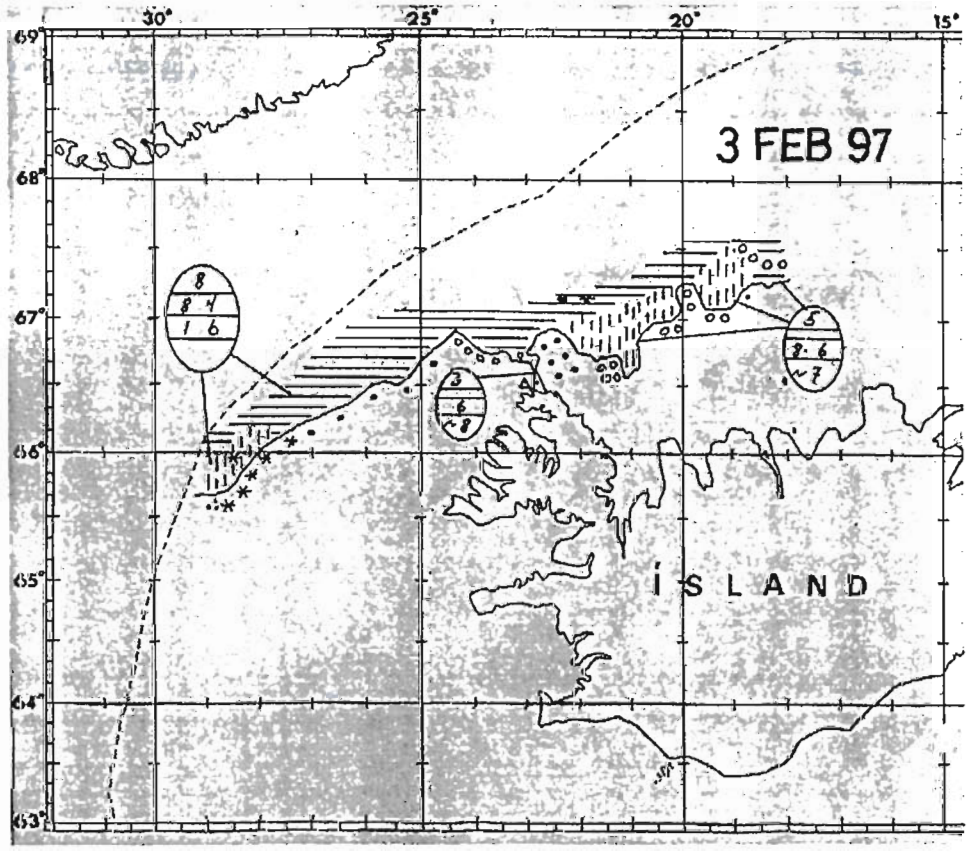
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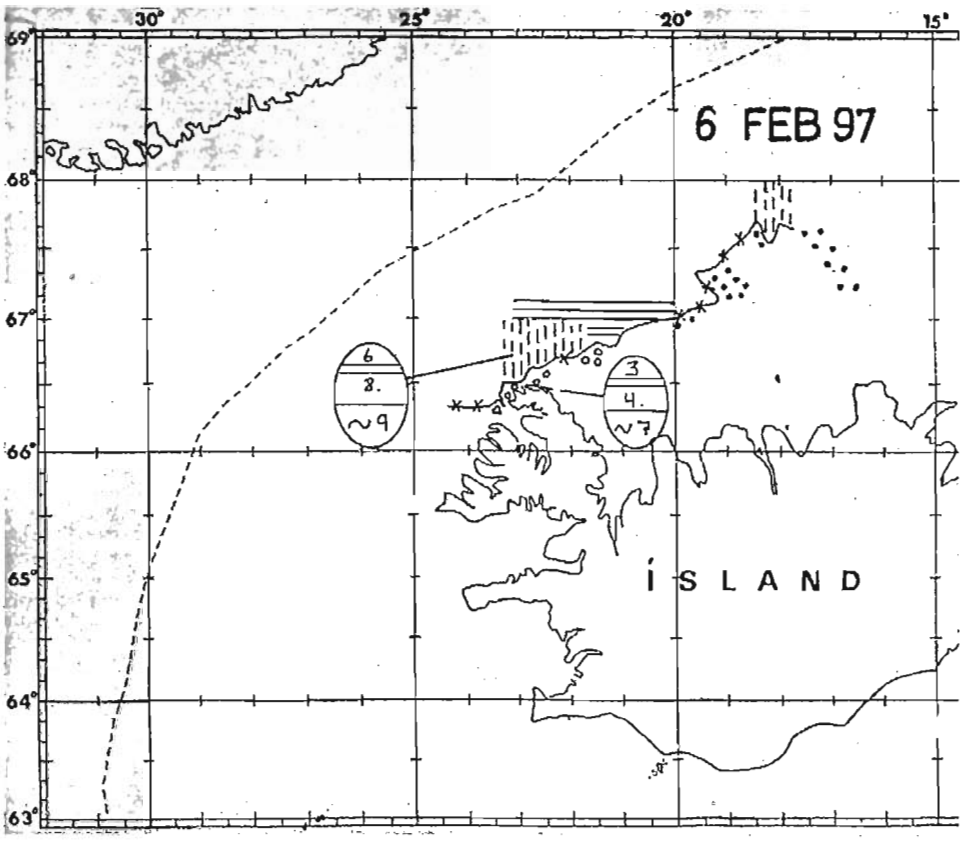
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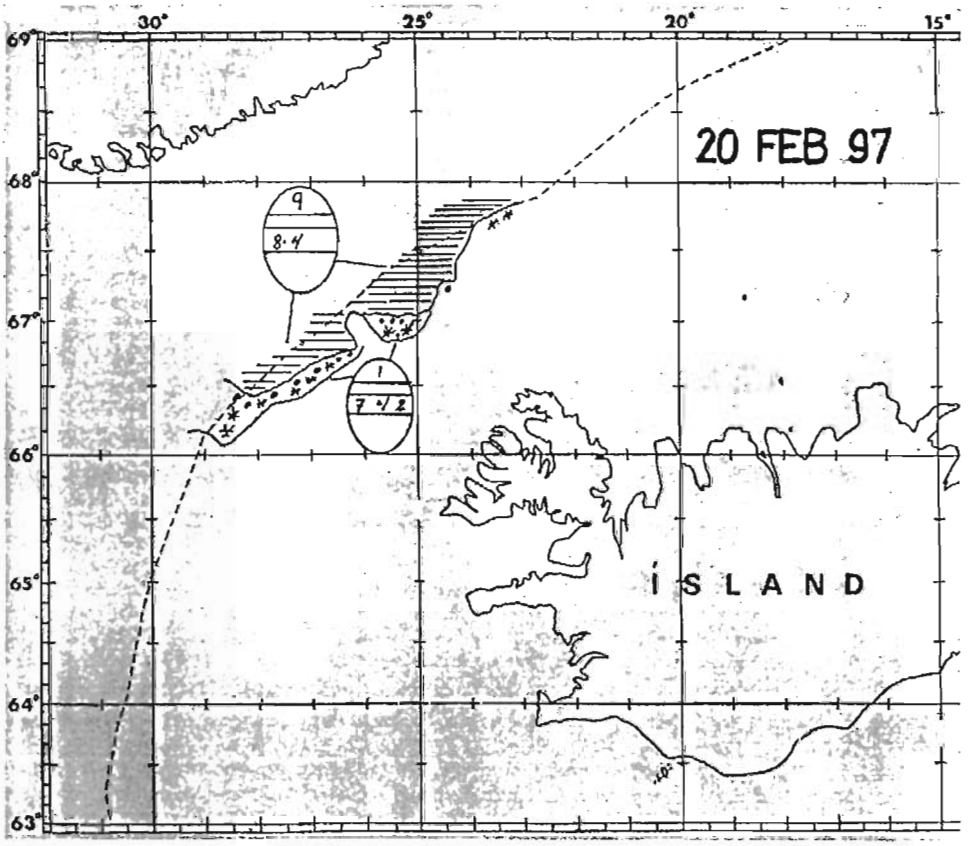
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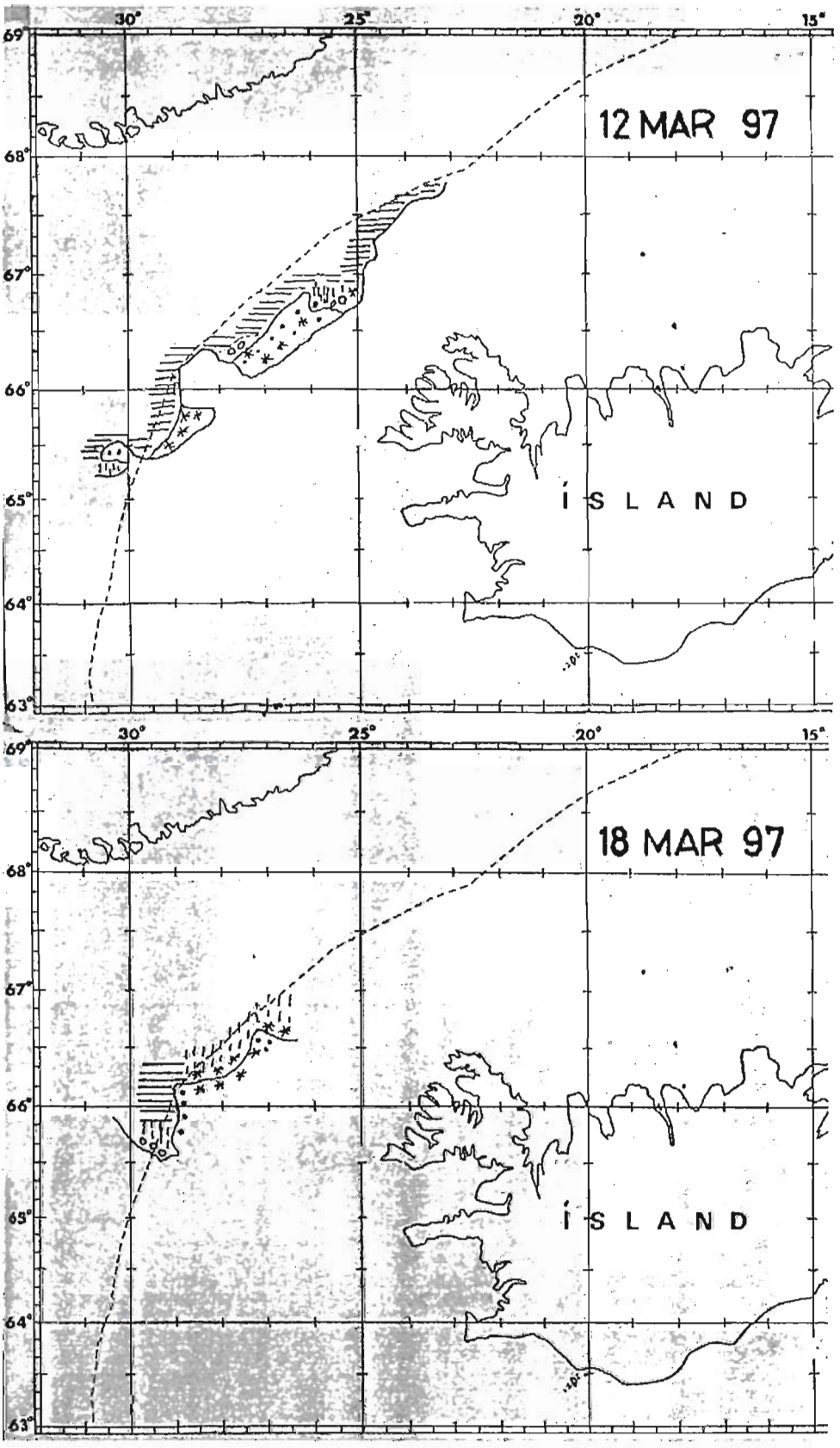
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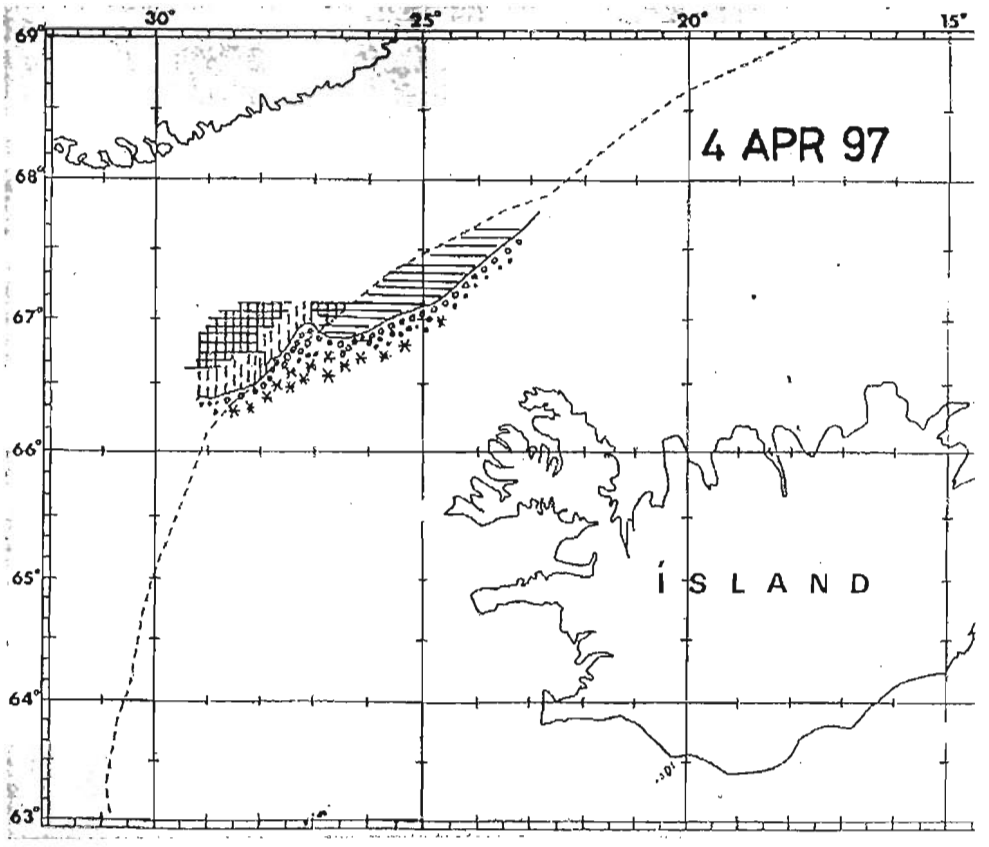
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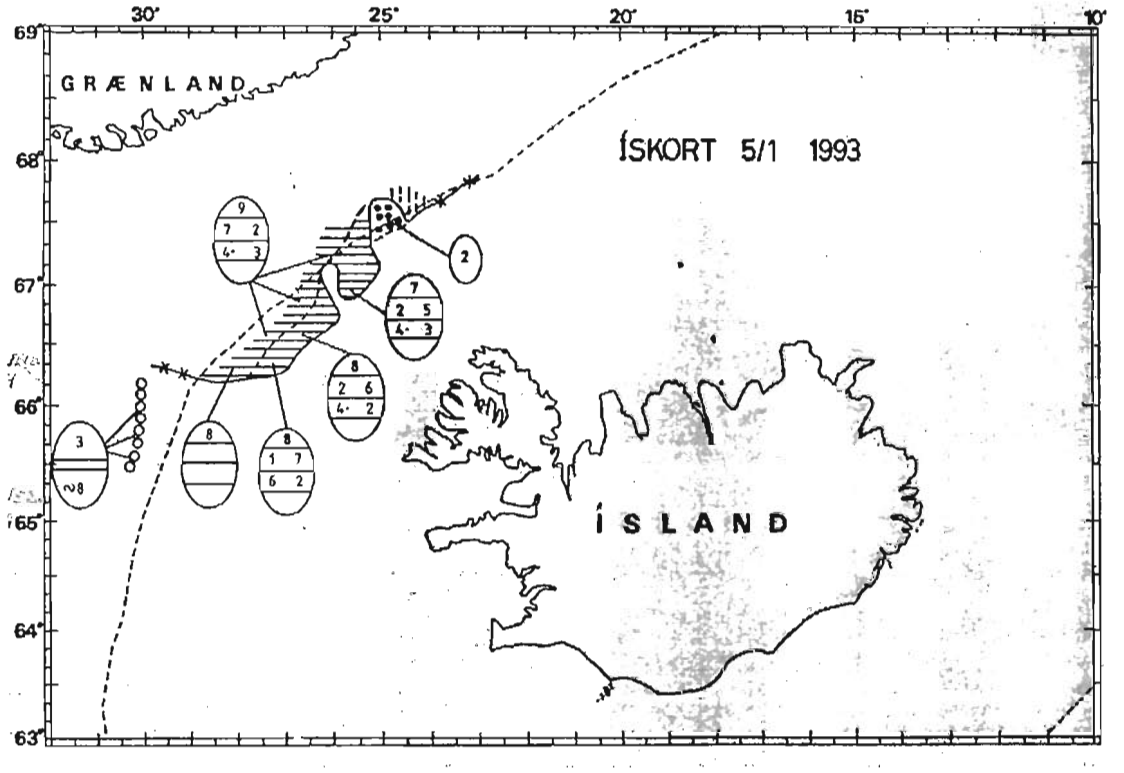
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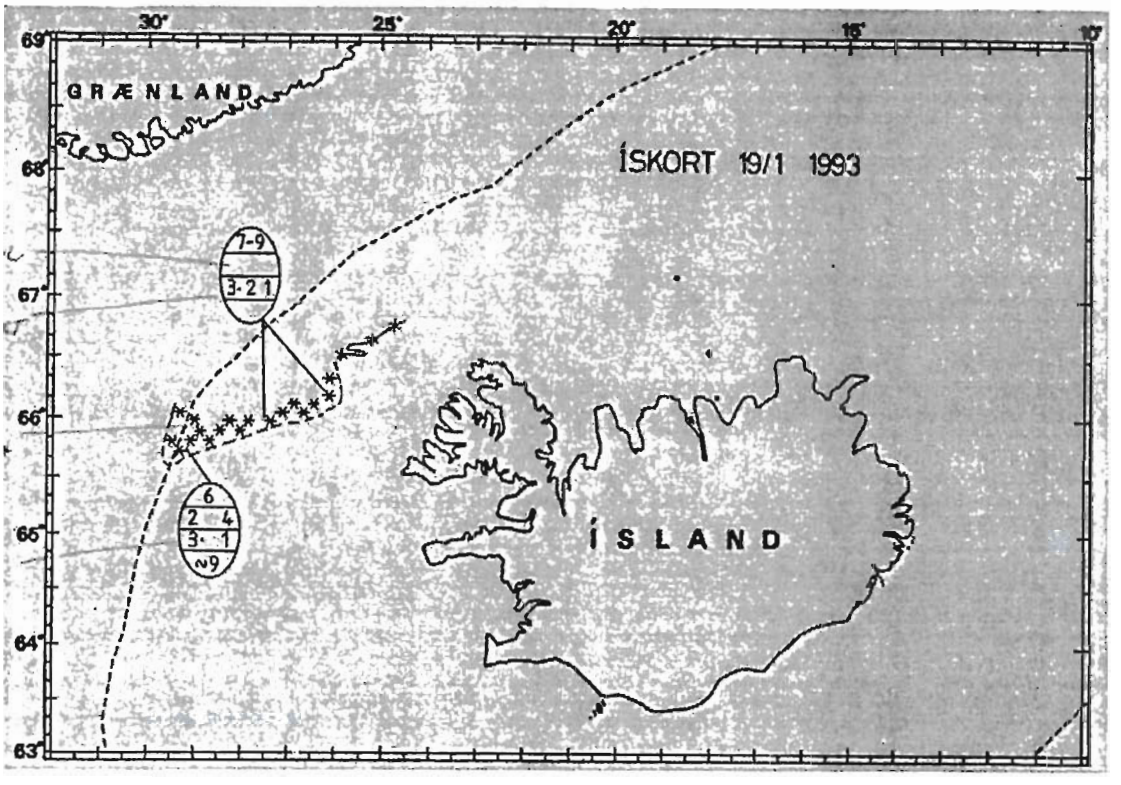
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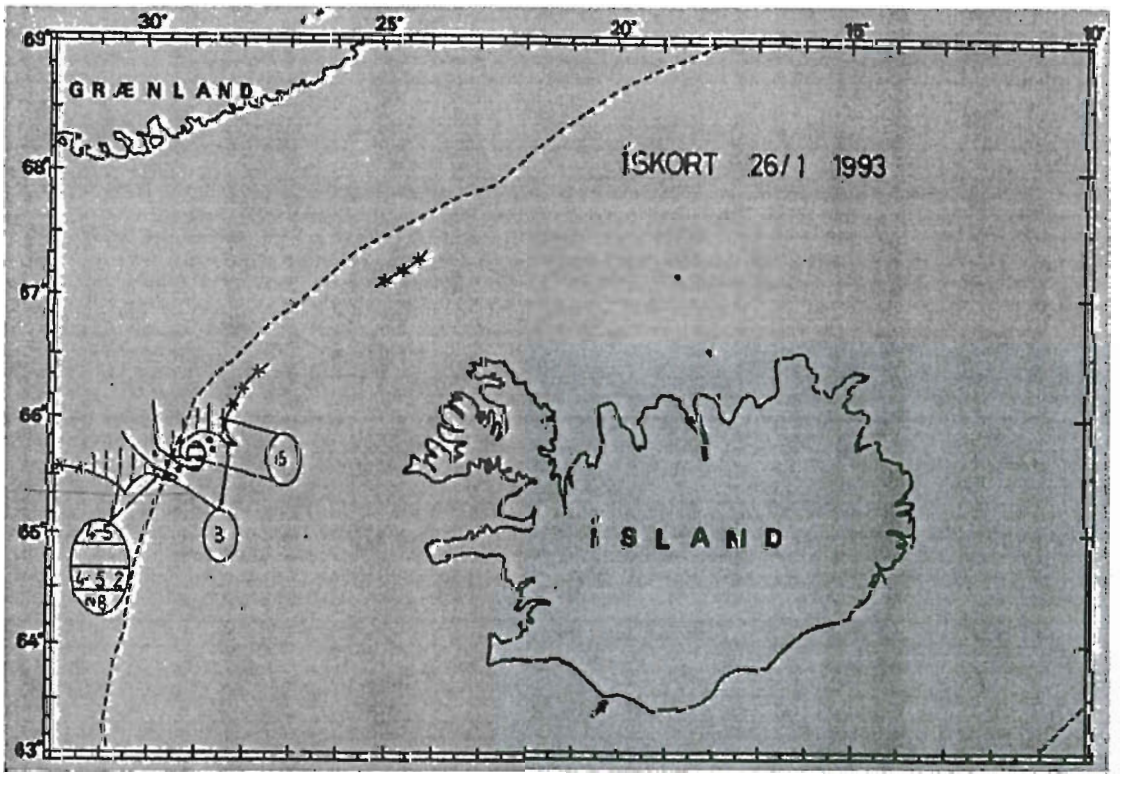
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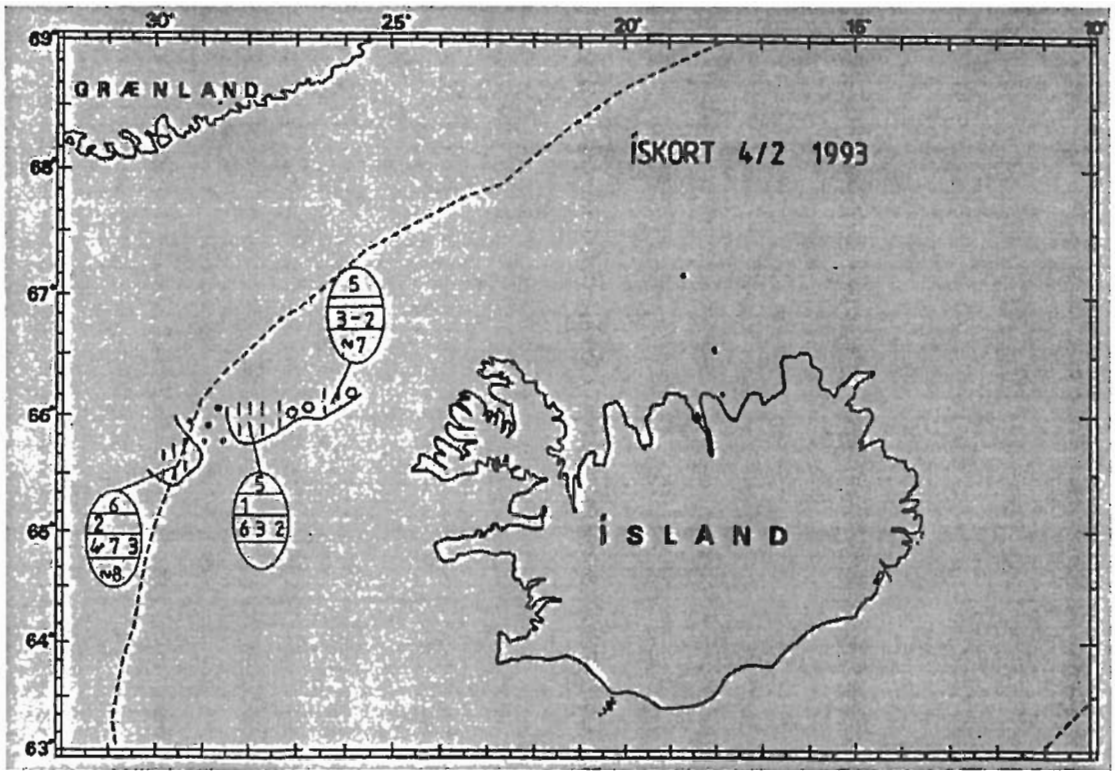
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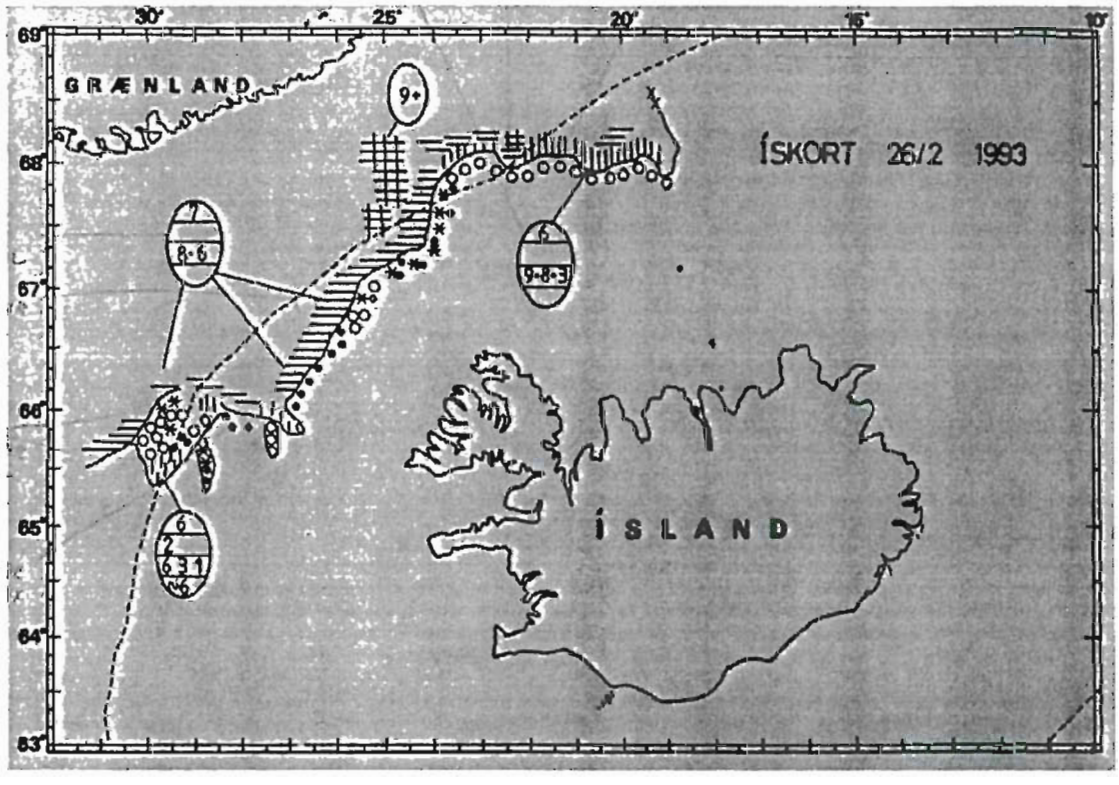
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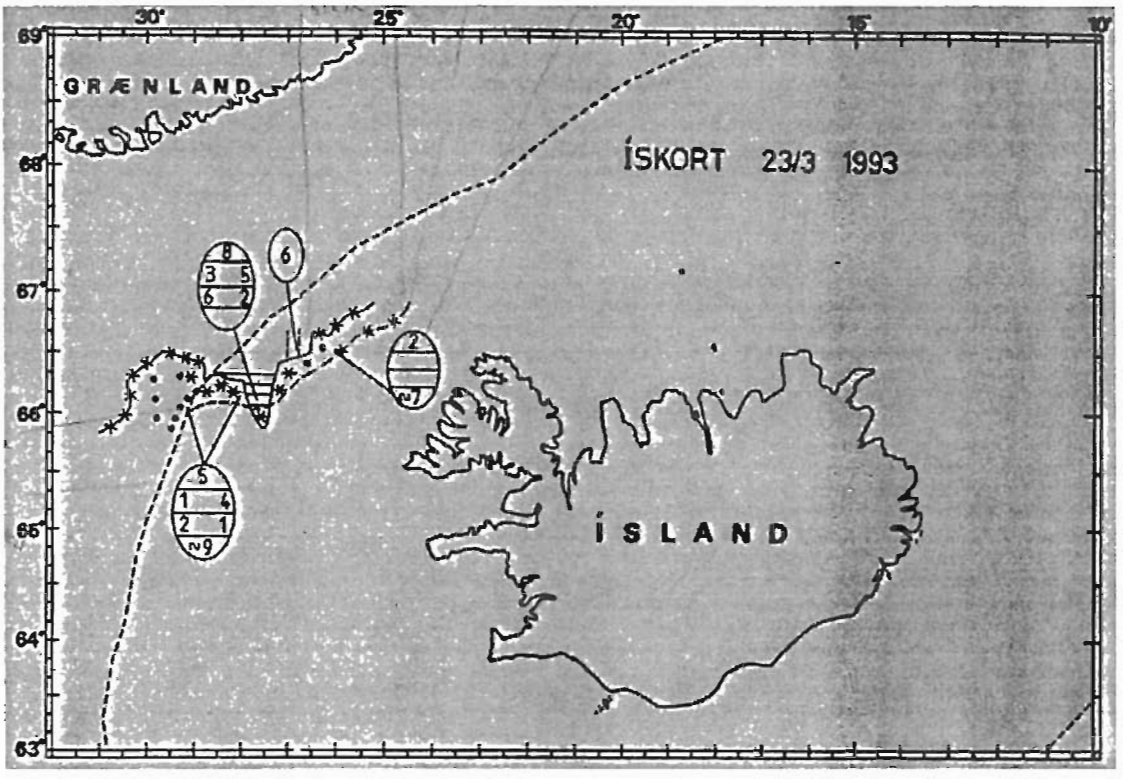
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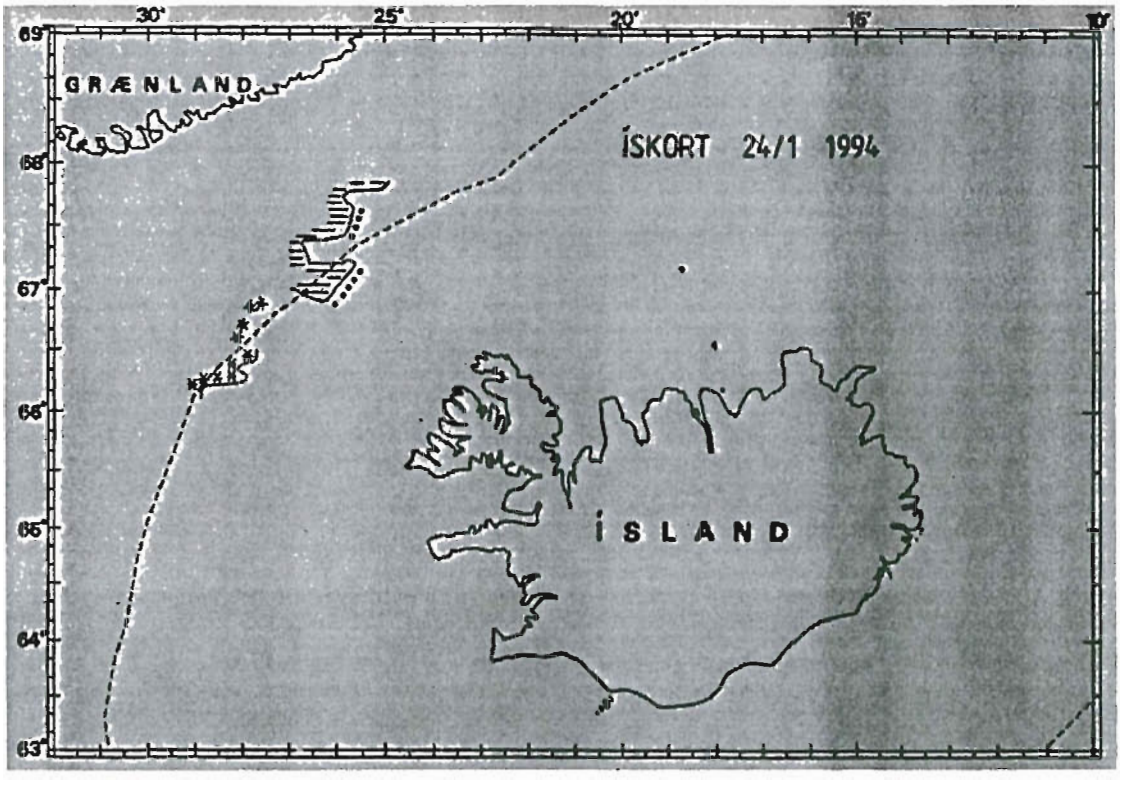
1994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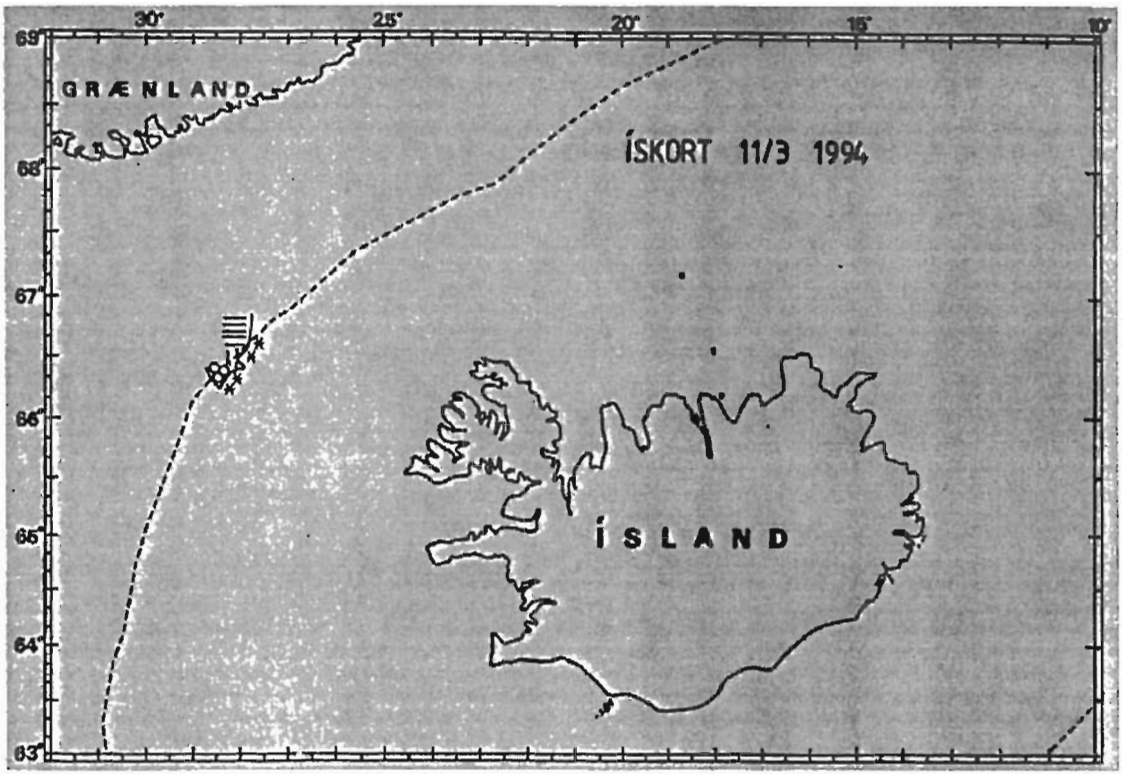

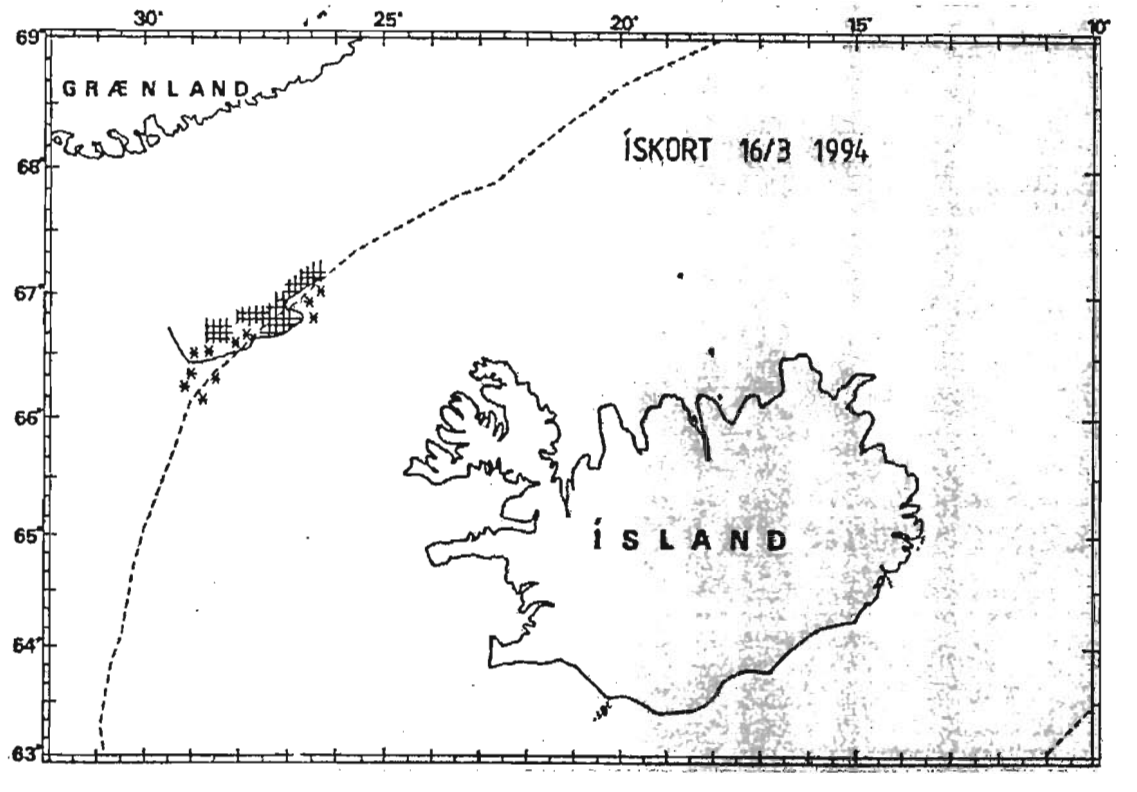

Appendix B

The Appendix B displays a series of tables reporting the temperature and salinity at 50 m depth as measured during oceanographic cruises on the Marine Research Institute's vessels.

Each table contains the data collected during a cruise. In each table line the following parameters are listed:

- Station Number,
- Latitude (in decimal degree notation -a positive value means North of the equator- ; for example
65.500 means 65 degrees and 30 minutes North [65°30'N]),
- Longitude (in decimal degree notation -a negative value means West of the Greenwich meridian- ; for example -18.833 means 18 degrees and 50 minutes West [18°50'W]),
- Temperature (in °C) at 50 m depth and
- Salinity (in ‰) at 50 m depth.

The same set of data is available on floppy disk (***ESOP II*** - *Salinity and temperature of the sea water at a depth of 50 meters, Reykjavík, 1998*) at the Icelandic Meteorological Office, c/o Dr. Thor Jakobsson.

For further information about the measurements (i.e. the sampling date or time at each station, or any meteorological parameter recorded at the time of measurement), the reader is referred to the tables listed in the previous reports ([2], [3] and [4]). Also this further information is available on floppy disk (***ESOP II*** - *Sea Surface Energy Fluxes in the Iceland and Greenland Seas, Reykjavík, 1997*), c/o Dr. Thor Jakobsson.

SEPTEMBER 1992

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
1007	66.5	-23	5.85	34.63		1045	66.8333	-30.45	3.37	34
1008	66.6833	-23.15	5.71	34.73		1046	66.75	-30.05	3.12	34.02
1009	66.8833	-23.3	5.04	34.49		1047	66.6667	-29.65	1.09	33.6
1010	67.15	-22.8667	3.75	34.19		1048	66.5833	-29.2667	0.08	33.1
1011	67.3333	-23.3333	3.75	34.37		1049	66.5	-28.9	0.35	33.18
1012	67.5167	-23.7833	3.22	34.29		1050	66.4167	-28.5167	0.9	33.49
1013	67.7	-24.2167	0.13	32.9		1051	66.3333	-28.1333	4.48	34.48
1014	67.9	-24.6333	-0.16	33.13		1052	66.25	-27.75	-2.89	32.56
1015	68.0167	-24.95	-1.52	33.1		1053	66.2333	-27.7667	-0.97	32.66
1018	68.35	-25.9333	-0.59	31.86		1054	66.2333	-27.7833	-0.5	32.8
1019	66.3333	-25.5	6.86	34.92		1055	66.2	-27.8	-0.33	32.86
1020	66.4167	-25.8667	1.44	33.79		1056	66.1833	-27.8167	2.12	33.34
1021	66.5167	-26.25	0.96	33.69		1057	66.1667	-27.8333	3.65	33.93
1022	66.6	-26.6167	-0.46	32.58		1058	66.15	-27.85	4.2	34.03
1023	66.7	-27	-0.89	32.17		1059	66.1333	-27.8833	4.16	34.07
1024	66.7833	-27.3667	-0.02	32.72		1060	66.1167	-27.8833	4.38	34.11
1025	66.8833	-27.75	0.8	33.64		1061	66.1	-27.9	4.7	34.26
1026	66.9667	-28.2833	-0.2	33.09		1062	66.0833	-27.9167	5.23	34.34
1027	68.1167	-25.2667	-0.48	33.04		1063	66.0667	-27.9333	5.64	34.49
1028	68.2333	-25.5333	-0.73	32.14		1064	66.05	-27.95	5.55	34.62
1029	67.9333	-24.65	-0.36	33.17		1065	66.0333	-27.9667	6	34.49
1030	67.0667	-28.6667	0.35	33.24		1066	66.0167	-27.9833	6.72	34.73
1031	67.15	-29.0333	0.35	33.44		1067	66	-28	6.34	34.6
1032	67.25	-29.4167	1.16	33.83		1068	66.15	-27.25	1.83	33.88
1033	67.3333	-29.7833	0.5	33.07		1069	66.0833	-27.05	-0.33	33.31
1034	67.4333	-30	-0.97	32.81		1070	66.0167	-26.8	6.07	34.61
1035	67.6	-30	1.08	32.81		1071	65.9333	-26.4833	7.45	34.99
1036	67.7667	-30	0.35	32.2		1072	65.8333	-26	7.51	35.01

1037	67.9333	-30	0.19	31.8		1073	65.75	-25.65	7.42	34.91
1038	67.6	-31.55	-0.33	32.55		1074	65.6667	-25.2833	7.3	34.98
1039	67.3333	-32.75	-0.35	32.1		1076	66.25	-25.1667	6.97	34.9
1040	67.25	-32.3667	-0.17	32.35		1077	66.1333	-24.75	6.37	34.89
1041	67.1667	-31.9833	2.37	33.89		1078	66.05	-24.3333	6.58	34.87
1042	67.0833	-31.6	1.16	33.7		1079	65.9667	-24	6.66	34.65
1043	67	-31.2167	1.6	33.63		1080	65.5	-24.5667	7.98	34.68
1044	66.9167	-30.8333	2.2	33.46						

MAY AND JUNE 1993

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
247	64.3333	-22.4167	5.87	35.03		310	66.3667	-12.0833	1.7	34.77
248	64.3333	-22.75	5.47	34.65		311	66.3333	-13	1.55	34.63
249	64.3333	-23.25	5.6	34.69		312	66.3667	-13.5667	2.16	34.76
250	64.3333	-23.75	5.9	34.81		313	66.3667	-14.0167	2.14	34.68
251	65.5	-24.5667	4.2	34.44		314	66.3667	-14.3667	1.86	34.69
252	65.5833	-24.9167	4.29	34.58		317	65	-13.5	2.02	34.44
253	65.6667	-25.2667	4.7	34.89		318	65	-12.8167	1.68	34.6
254	65.75	-25.65	4.7	34.97		319	65	-11.6667	1.81	34.72
255	65.8333	-26	5.17	35.03		320	65	-11.2833	1.79	34.74
256	65.9333	-26.4833	5.2	35.03		321	65	-10.1167	3.83	34.84
257	66.0167	-26.8	5.45	35.03		322	65	-9	2.78	34.79
258	66.0833	-27.05	5.42	35.03		325	64.5	-6	3.99	34.92
259	66.15	-27.25	4.88	34.97		332	63.6333	-13.6667	7.91	35.19
260	66.2167	-27.4667	1.72	34.59		333	63.7833	-13.9333	7.42	35.14
264	66.5	-23	3.31	34.43		334	63.8667	-14.1333	7.24	35.13
265	66.6833	-23.15	3.75	34.74		335	64.0333	-14.4667	6.95	35.08
266	66.8833	-23.3	3.83	34.81		336	64.2	-14.8333	6.46	34.92
267	67.0833	-23.4667	4.85	34.99		340	63.5667	-16.3	7.14	35.1
268	67.3333	-23.6667	3.63	34.92		341	63.7	-16.5	7.11	35.08
269	67.5833	-23.9333	-1.27	34.27		342	63.7667	-16.6	7.05	34.99
270	67.8	-24.2	-1.71	33.49		345	63.2167	-19.9	7.41	35.11
271	67.6333	-24.7333	-1.68	33.78		347	62.9833	-21.4833	7.46	35.12
275	67	-20.7833	4.34	34.96		348	63.15	-21.3	7.28	35.11
276	66.75	-20.7833	4.29	34.95		349	63.3167	-21.1167	7.08	35.06
277	66.5	-20.7833	4.08	34.88		350	63.4833	-20.9	6.95	35.03
278	66.2833	-20.7833	3.84	34.84		351	63.6833	-20.6833	7.03	34.95
281	66.2667	-18.8333	3.53	34.87		356	64.4	-23.2667	6.51	34.75
282	66.4	-18.8333	3.7	34.89		357	63.8333	-31.2	5.12	34.97
283	66.5333	-18.8333	4.12	34.93		358	63.9667	-30.4	5.69	34.99
284	66.7333	-18.85	3.9	34.94		359	64.0833	-29.5833	5.92	35.02
285	67	-18.8333	3.6	34.93		360	64.2167	-28.7667	6.18	35.04
286	67.3333	-18.8333	4.16	34.95		361	64.3333	-27.9667	6.11	35.04
287	67.6667	-18.8333	2.98	34.89		362	64.3333	-27	6.29	35.07
298	66.5833	-16.25	2.25	34.74		363	64.3333	-26	6.05	35.06
299	66.6167	-14.2667	1.74	34.63		364	64.3333	-25	6.24	35.07
300	67	-13.8333	2.22	34.82		365	64.3333	-24.3333	6.62	35.08
301	67.25	-13.5667	0.7	34.75		367	64.3333	-23.75	6.57	35.05
302	67.5	-13.2667	0.2	34.78		368	64.3333	-23.25	6.39	35.01
303	67.75	-12.9667	0.1	34.78		369	64.3333	-22.75	5.95	34.69

304	68	-12.6667	0.08	34.78		370	64.3333	-22.4167	6.17	34.84
308	66.3667	-10	1.41	34.69		371	64.2	-21.9667	5.79	34.79
309	66.3667	-11	1.34	34.74						

AUGUST 1993

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
302	63.6833	-20.6833	8.41	34.88		397	67.75	-12.9667	0.55	34.8
303	63.4833	-20.9	8.41	34.93		399	68	12.6667	0.48	34.8
304	63.3167	-21.1167	8.15	35.06		412	66.8333	-16.25	5.25	34.89
305	63.15	-21.3	8.6	35.05		415	67.1667	-16.25	5.03	34.82
306	63	-21.4667	9.59	35.1		418	67.5	-16.25	4.39	34.66
307	63.5667	-16.3	7.51	35.08		447	68	-18.8333	-0.39	34.46
308	63.7	-16.5	7.45	35.09		449	67.6667	-18.8333	4.51	34.55
310	64.2	-14.8333	7.18	34.82		453	67.3333	-18.8333	5.22	34.72
311	64.0333	-14.4667	8.55	34.92		456	67	-18.8167	3.9	34.58
312	63.8667	-14.1333	9.25	35.02		460	66.7333	-18.8333	2.44	34.2
314	63.7833	-13.95	9.43	35.12		461	66.5333	-18.8333	5.18	34.73
315	63.6667	-13.6833	9.35	35.16		464	66.4	-18.8333	4.8	34.59
320	65	-10	5.3	34.94		466	66.2667	-18.8333	5.24	34.68
322	65	-11.2833	4.23	34.8		489	67	-20.7833	-0.93	33.95
325	65	-11.6667	3.06	34.78		491	66.75	-20.7833	1.54	33.92
328	65	-12.8167	4.51	34.6		493	66.5	-20.7833	4.54	34.14
329	65	-13.5	5.21	34.3		521	66.5	-22.9833	7.13	34.55
361	66.3667	-14.3667	5.59	34.69		523	66.6833	-23.1667	6.17	34.77
362	66.3667	-14.0167	5.61	34.72		534	66.8833	-23.3	-0.11	33.71
364	66.3667	-13.5833	5.79	34.76		567	66.15	-27.2333	8.45	34.97
366	66.3667	-13	3.37	34.84		568	66.0833	-27.0667	4.74	34.37
369	66.3667	-12.0833	4.61	34.93		570	66.0167	-26.8	5.76	34.53
373	66.3667	-10.9667	1.64	34.76		572	65.9	-26.4833	8.13	34.89
375	66.3667	-10.0167	1.95	34.77		574	65.8333	-26	7.32	34.97
386	66.6167	-14.25	5.21	34.81		576	65.75	-25.65	7.29	34.94
390	67.0167	-13.85	4.16	34.65		577	65.6667	-25.2667	6.68	35.05
392	67.25	-13.55	0.63	34.81		579	65.5833	-24.9333	8.08	34.92
394	67.5	-13.2667	0.15	34.74		581	65.5	-24.5667	9.22	34.56

SEPTEMBER 1993

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
839	66.5	-23	7.53	34.5		860	66.2167	-27.4167	-1.07	32.7
840	66.6833	-23.15	0.34	33.68		861	66.25	-27.8	-1.06	32.85
841	66.8833	-23.3	1.97	34.2		862	66.3333	-28.1333	5.04	34.26

842	66.6667	-21.5833	0.43	33.43		863	66.4167	-28.5167	4.58	34.12
843	66.8333	-21.5833	0.66	33.64		864	66.5	-28.9	1.28	33.45
844	67	-21.5833	-0.34	33.66		865	66.5833	-29.2667	1.41	33.57
845	67.1667	-21.5833	2.47	34.11		866	66.6667	-29.65	0.69	33.64
846	67.3333	-21.5833	2.17	34.44		868	66.8	-27.3833	3.49	34.06
847	67.5	-21.5833	3.69	34.6		869	66.75	-27	-1.6	32.68
849	67.15	-22.8333	0.93	34.21		871	65.9333	-26.4833	8.04	34.89
850	67	-21.5667	1.2	34.19		872	65.8333	-26	7.48	34.95
856	65.9333	-26.4833	7.48	34.91		873	65.75	-25.65	7.8	34.88
857	66.0167	-26.8	3.72	33.96		874	65.6667	-25.2667	9.09	34.92
858	66.0833	-27.05	7.44	34.69		875	65.5833	-24.9167	8.42	34.94
859	66.15	-27.25	-1.41	32.89		876	65.5	-24.5667	9.2	34.48

NOVEMBER 1993

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
1069	67	-13.8167	2.87	34.43		1120	67.5	-17.9333	2.21	34.36
1070	67.25	-13.55	2.54	34.7		1121	67	-19.75	2.75	34.02
1071	67.5	-13.2667	2.79	34.73		1123	67.5	-19.75	5.15	34.72
1076	67.75	-13	2.88	34.69		1125	67.25	-19.1667	4.17	34.35
1077	68	-12.6667	2.8	34.67		1126	67	-19	0.81	33.99
1081	68	-15	1.19	34.61		1127	67.25	-20.75	4.14	34.18
1092	66.3667	-10	2.81	34.72		1129	67.5833	-20.75	2.74	34.02
1093	66.3667	-11	3.28	34.61		1130	67.75	-21.5	2.46	34.18
1094	66.3667	-12.1	2.7	34.46		1133	67.3333	-21.5	1.85	33.96
1097	66.3667	-13	2.98	34.31		1134	67	-21.5	3.52	34.23
1099	66.3667	-13.5833	2.88	34.09		1135	67	-22.5	4.97	34.35
1102	66.3667	-14.0167	3.7	34.28		1137	67.5	-23.5	4.61	31.67
1103	66.3667	-14.35	2.58	33.51		1140	64.3333	-27	7.02	34.99
1110	65	-10.1333	4.26	34.67		1141	64.3333	-26	7.02	35
1111	65	-11.3	3.91	34.47		1142	64.3333	-25	6.78	35.03
1112	65	-11.6667	3.66	34.48		1143	64.3333	-24.35	7.11	35.03
1113	65	-12.8167	4.59	34.6		1144	64.3333	-23.75	7.38	34.95
1114	65	-13.35	3.74	33.59		1145	64.3333	-23.25	7.26	34.82
1119	67	-17.9333	4.09	34.35						

MAY AND JUNE 1994

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
194	64.35	-22.4667	4.05	34.66		260	66.5833	-16.25	2.1	34.63
195	64.3333	-22.75	5.31	34.65		261	66.6167	-14.2667	1.93	34.72
196	64.3333	-23.25	6.03	34.86		262	66.3667	-14.3667	2.34	34.66

197	64.3333	-23.75	6.16	35.06
198	64.3333	-24.3333	5.95	35.06
199	64.3333	-25	5.78	35.03
200	64.3333	-26	6.07	35.04
201	64.3333	-27	6.27	35.04
202	64.3333	-27.9833	6.3	35.06
203	64.6667	-25.8333	5.01	34.97
204	64.8667	-24.3	5.59	35.03
205	64.9167	-24.1333	4.85	34.77
206	65.5	-24.5667	4.37	34.76
207	65.5833	-24.9167	4.54	34.87
208	65.6667	-25.2667	4.66	34.97
209	65.75	-25.65	5.28	35.01
210	65.8333	-26	5.72	35.02
211	65.9333	-26.4833	5.81	35.03
212	66	-26.7833	5.68	35.02
213	66.0667	-26.7	5.65	35.02
214	66.1167	-26.45	5.74	35.02
215	66.95	-24.9333	3.68	34.85
216	66.9	-24.8	2.89	34.84
217	66.8167	-24.5833	5.47	35.01
218	66.7	-24.2667	5.52	35.01
219	66.6167	-24	4.35	34.91
220	66.5	-23.6667	4.65	34.94
221	66.5	-23	3.16	34.52
222	66.6833	-23.15	3.04	34.75
223	66.8833	-23.3	5.31	35
224	67.0833	-23.4667	5.44	35.01
225	67.3333	-23.4833	4.05	34.91
226	67.5333	-23.3167	2.05	34.82
227	67.6667	-20.7833	2.9	34.86
228	67.3333	-20.7833	4.45	34.92
229	67	-20.7833	4.94	34.98
230	66.75	-20.7833	4.8	34.94
231	66.5	-20.7833	4.53	34.92
232	66.2833	-20.7833	4.74	34.94
233	66.7333	-18.85	2.9	34.84
234	66.4	-18.8333	4.55	34.92
235	66.5333	-18.8333	4.35	34.92
236	66.7333	-18.8333	4.18	34.89
237	67	-18.8333	3.75	34.9
238	67.3333	-18.8333	3.85	34.88
239	67.6667	-18.8333	3.08	34.87
240	68	-18.8333	-0.24	34.72
241	67.85	-17.5	1.83	34.86
242	68.1667	-16.1667	-0.26	34.8
243	68.4167	-14.8333	0.99	34.8
244	67.75	-16.25	1.84	34.86
245	67.5	-16.25	2.28	34.85
246	67.1667	-16.25	3.02	34.91
247	66.8333	-16.25	2.61	34.86
248	66.5833	-17	2.42	34.79
249	66.5833	-16.6	1.95	34.71
250	66.5	-16.6	1.97	34.62
251	66.3667	-16.5667	2.59	34.51
252	66.2833	-16.5	2.69	34.58
253	66.1833	-16.75	2.4	34.7
254	66.25	-17	2.35	34.73
255	66.4167	-17	2.56	34.79

263	66.3667	-14.0167	1.78	34.74
264	66.3667	-13.5833	2.34	34.73
265	66.3667	-13	2.16	34.76
266	66.3667	-12.0833	1.52	34.79
267	67	-13.8167	2.61	34.87
268	67.25	-13.5667	0.75	34.79
269	67.5	-13.2667	2.26	34.76
270	67.75	-12.9667	-0.25	34.75
271	68	-12.6667	-0.02	34.74
272	68	-11	0.14	34.71
273	68	-10	0.99	34.74
274	68	-9	0.28	34.69
275	68	-8	0.47	24.71
276	68	-7	3.45	34.99
277	68	-8	3.62	35
279	67.75	-7	2.65	34.88
282	67.5	-7.98333	0.79	34.68
283	67.5	-6	3.67	35
284	67.25	-7	3.42	34.99
285	67	-8	1.08	34.72
286	67	-6	2.62	34.9
287	66.7	-6.5	3.12	34.93
288	66.3667	-7	2.43	34.88
290	66.3667	-8	2.31	34.89
291	66.3667	-9	1.59	34.76
292	66.3667	-10	1.23	34.73
293	66.3667	-11	0.58	34.77
294	65.6667	-11	1.91	34.75
295	65.6667	-10	1.54	34.7
296	65.6667	-9	1.2	34.63
297	65.6667	-8	1.55	34.7
298	65.6667	-7	2.61	34.87
299	65.6667	-6	2.33	34.88
300	65	-6	3.22	34.88
301	64.5	-6	3.68	34.86
303	64.6667	-7	2.34	34.79
305	64.8333	-8	2.44	34.8
307	65	-9	2.97	34.64
308	65	-10.1	3.46	34.84
309	65	-11.2833	1.74	34.78
310	65	-11.6667	1.97	34.77
311	65	-12.8167	2.16	34.65
312	65	-13.5	2.8	34.42
313	64.6167	-13.4167	2.66	34.58
314	64.2833	-13.5	5.08	34.73
315	63.95	-13.6	7.88	35.16
316	63.6333	-13.6667	7.87	35.18
317	63.7833	-13.9333	8.02	35.17
318	63.8667	-14.1333	7.4	35.08
319	64.0333	-14.4667	7.34	35.03
320	64.2	-14.8333	6.88	34.98
321	63.7667	-16.6	6.86	35.05
322	63.7	-16.5	6.88	35.06
323	63.5667	-16.3	6.94	35.04
324	61.2	-21.65	8.39	35.13
325	61.7	-21.5833	7.94	35.13
326	62.2	-21.55	7.6	35.13
327	62.7	-21.5167	7.84	35.12
328	62.9833	-21.4833	7.45	35.14

256	66.2333	-17.1833	2.75	34.75		329	63.15	-21.3	7.98	35.08
257	66.2333	-17.75	3.19	34.87		330	63.3167	-21.1167	7.66	35.07
258	66.1667	-17.4	2.92	34.81		331	63.4833	-20.9	7	35.05
259	66.0667	-17.5167	3.66	34.74		332	63.6833	-20.6833	7.36	34.84

SEPTEMBER 1994

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
741	65.5	-24.5667	9.94	34.56		784	66.8833	-27.75	0.03	33.24
742	65.4167	-24.9167	8.85	34.93		785	66.9667	-28.2667	1.77	33.7
743	65.6667	-25.2667	6.58	35.05		786	67.0667	-28.6667	1.17	33.82
744	66.5	-23	8.72	34.59		787	67.1667	-29.05	0.21	33.71
745	66.6833	-23.15	7.09	34.89		788	67.25	-29.4333	0.07	33.5
746	66.8833	-23.3	6.78	34.75		789	67.4833	-29.8	0.6	33.08
747	67.15	-22.8667	7.06	34.85		790	67.4167	-30.0833	1.79	32.52
748	67.3333	-23.3333	0.76	33.99		791	67.5	-30.4	1.96	33.56
749	67.5167	-23.8	0.03	34.39		792	67.6	-30.7833	1.5	33.77
750	67.7	-24.2167	-1.33	33.97		793	67.6833	-31.1667	0.5	33.36
751	67.9	-24.6333	1.43	33.35		794	67.7667	-31.5333	2.01	32.43
752	68.0167	-24.95	-0.8	33.86		795	67.8	-31.5333	0.39	32.34
753	68.1333	-25.25	-1.24	33.03		796	67.5	-31.6	1.7	33.6
754	68.2333	-25.5167	-0.04	31.84		797	67.25	-32.3333	0.66	32.73
755	68.2833	-25.6667	-0.06	32.09		798	67.1667	-31.9833	1.34	33.31
761	67.6667	-18.8167	5.17	34.41		799	67.0833	-31.6	1.1	33.65
762	67.85	-17.5	2.76	34.58		800	66.9833	-31.2	1.18	33.87
763	68.1667	-16.1667	1.79	34.69		801	66.9167	-30.85	3.45	34.18
764	68.4167	-14.8333	2.12	34.7		802	66.8333	-30.45	3.08	34.17
768	67.0167	-18.8333	4.07	34.48		803	66.75	-30.05	3.09	34.07
769	66.5333	-18.8333	4.39	34.43		804	66.6667	-29.6667	3.74	33.89
770	66.65	-19.4167	4.52	34.58		806	66.6	-29.2667	5.67	34.33
771	66.7833	-20.2	5.95	34.34		807	66.5	-28.9	0.93	32.7
772	66.8667	-20.75	6	34.41		808	66.4167	-28.5167	0.09	32.92
773	67.0167	-21.55	6.04	34.61		809	66.3333	-28.15	0.4	32.75
774	67	-21.5667	7.15	34.8		810	66.25	-27.7667	-1.24	33.04
775	66.3167	-23.5	8.17	34.87		811	66.15	-27.25	4.53	34.4
776	66.3333	-24.2333	8.03	34.87		812	66.0833	-27.0667	7.56	35.01
777	66.3333	-24.7333	6.48	35.02		813	66.0167	-26.8167	5.67	34.74
778	66.3333	-25.4833	7.68	34.97		814	66.9333	-26.5	7.78	34.91
779	66.4333	-25.8667	4.35	34.28		815	65.8333	-26	7.59	34.99
780	66.5167	-26.25	3.08	34.21		816	65.75	-25.65	7.86	35
781	66.6167	-26.6333	-1.41	33.28		817	65.6667	-25.2667	8.7	34.98
782	66.7	-27	0.98	32.38		818	65.5833	-24.9167	9.3	34.71
783	66.8	-27.3667	0.86	32.21		819	65.5	-24.5833	9.37	34.66

OCTOBER 1994

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)

(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
923	64.3333	-22.4167	7.75	34.74		937	65.9333	-26.4833	6.17	34.91
924	64.3333	-22.75	7.75	34.86		938	66.0167	-26.8	6.33	35
925	64.3333	-23.25	7.7	34.93		939	66.0833	-27.05	2.92	34.13
926	64.3333	-23.75	7.49	34.89		940	66.15	-27.25	5.2	34.72
927	64.3333	-24.3333	7.57	35.03		941	67.45	-26.2167	-0.44	33.54
928	64.3333	-25	7.41	35.01		942	67	-25.3833	-0.29	33.58
929	64.3333	-26	7.26	35.02		943	66.2667	-18.8333	5.61	34.75
930	64.3333	-27	7.4	35.01		945	66.4	-18.8333	5.65	34.54
931	64.3333	-27.9667	7.64	34.94		946	66.5333	-18.8333	5.73	34.73
932	65.5	-24.5667	6.93	34.69		947	66.7333	-18.85	4.34	34.31
933	65.5833	-24.9167	7.36	34.85		949	67	-18.8333	5.21	34.63
934	65.6667	-25.25	7.17	34.89		951	67.3333	-18.8333	2.82	34.07
935	65.75	-25.6667	6.6	34.95		954	67.6667	-18.8333	2.39	34.03
936	65.8333	-26	6.43	34.96		955	68	-18.8333	0.11	34.45

NOVEMBER 1994

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
956	67.75	-20.25	2.47	34.04		1015	67.75	-12.9667	2.52	34.68
960	67.25	-20.25	3.77	34.4		1016	67.5	-13.2667	2.6	34.66
962	67	-20.75	3.5	34.34		1017	67.25	-13.5667	1.92	34.66
965	67.5	-20.75	3.84	34.46		1019	67	-13.8333	5.4	34.83
967	68	-20.75	0.84	33.92		1022	67.6167	-14.2667	4.32	34.23
968	66.5	-23	4.54	34.54		1023	66.6667	-13.2667	4.03	34.26
969	66.6833	-23.15	5.17	34.71		1025	66.7167	-12.25	2.86	34.22
970	66.8833	-23.3	5.3	34.9		1026	66.8833	-11	3.45	34.55
971	67.0833	-23.4667	4.68	34.84		1027	66.3667	-10	3.72	34.54
976	67.3333	-23.6667	3.69	34.79		1028	66.3667	-11	3.28	34.35
978	67.6667	-24.0333	2.56	34.39		1029	66.3667	-12.0833	3.89	34.27
979	67.9167	-24.6333	1.7	34.21		1031	66.3667	-13	4.2	34.37
980	67.4	-26	-0.28	33.63		1032	66.3667	-13.5833	4.44	34.34
981	68	-23.5833	0.48	34.01		1033	66.3667	-14.0167	4.13	34.28
982	67.75	-23.4167	1.96	34.24		1034	66.3667	-14.3667	4.89	34.68
985	67.25	-23.1	5.09	34.88		1035	66.1167	-13.5	4.22	34.43
986	66.2833	-20.7833	5.2	34.6		1036	65.9	-12.75	4.1	34.38
988	66.5	-20.7833	4.95	34.58		1037	65.7167	-12.15	4.36	43.39
989	66.75	-21.0667	4.22	34.53		1038	65	-13.5	4.56	34.36
990	67.25	-21.25	4.24	34.64		1039	65	-12.8167	4.47	34.54
993	67.75	-21.25	3.38	34.45		1040	65	-11.6667	4.25	34.52
994	67.5	-21.75	3.53	34.59		1041	65	-11.2833	4.22	34.56
997	67.6667	-18.8333	2.54	34.2		1042	65	-10.1167	4.6	34.63
999	67.85	-17.5	2.38	34.21		1043	65	-9	3.92	34.67
1000	68.1667	-16.1667	1.6	34.72		1044	64.5	-10	4.71	34.61
1001	68.4167	-14.8333	1.96	34.46		1045	64.4833	-10.7667	6.3	34.77
1003	68.4167	-16.25	1.48	34.16		1046	64.4667	-11.5	8.15	35.16
1004	68.4167	-17.3333	1.31	34.08		1048	64.15	-12.5333	7.86	35.1
1005	68.4167	-18.5	0.49	34.09		1049	63.6333	-13.6667	8.65	35.19
1006	69	-18.5	0.46	34.35		1050	63.7833	-13.9333	8.56	35.18

1007	69	-17.3333	0.63	34.4		1051	63.8667	-14.1333	7.33	34.96
1008	69	-16.25	1.25	34.59		1053	64.2	-14.8333	7.04	34.86
1009	69	-15	1.75	34.65		1054	66.5667	-16.3	7.46	35.01
1011	68.85	-13.4167	2.15	34.71		1055	63.7	-16.5	7.48	35.02
1012	68.5	-12.05	2.44	34.68		1056	63.7667	-16.6	7.22	34.97
1013	68.25	-12.4167	2.4	34.66		1057	62.9833	-21.4833	7.74	35.1
1014	68	-12.6667	2.41	34.67						

MARCH 1995

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
89	64.3333	-22.4	2.06	34.72		130	66.6167	-14.2667	0.9	34.73
90	64.3333	-22.75	2.47	34.77		131	67	-13.8333	0.42	34.74
91	64.3333	-23.25	3.92	34.89		132	67.25	-13.5667	0.8	34.76
92	64.3333	-23.75	5.44	35.09		133	67.5	-13.2667	-0.71	34.73
93	64.3333	-24.3333	4.97	35.07		134	67.75	-12.9667	-0.59	34.72
94	64.3333	-24.9333	5.26	35.08		135	68	-12.6667	-0.61	34.74
95	64.3333	-26	5.89	35.07		136	68.4167	-14.8333	-0.69	34.82
96	64.3333	-27	5.84	35.06		137	68.1667	-16.1667	-0.48	34.83
97	64.3333	-27.9667	5.88	35.05		138	67.85	-17.5	-0.35	34.81
98	63.2833	-35.8667	4.03	34.91		139	67	-18.8333	0.86	34.78
100	63.4833	-36.3	4.27	34.92		140	66.7333	-18.8333	1.01	34.81
101	63.7	-16.5	6.13	35.1		141	66.5333	-18.8333	1.05	34.71
106	63.65	-15.9	5.78	35.07		142	66.4	-18.8333	1.11	34.71
109	63.3833	-15.5833	7.31	35.16		143	67.2667	-18.8333	1.14	34.82
110	63.5	-15.6333	6.65	35.13		144	66.5	-20.7833	0.9	34.83
111	63.6333	-13.6667	7.26	35.17		145	67	-20.7833	0.7	34.85
112	63.7833	-13.9333	7.04	35.16		146	66.75	-20.7833	0.77	34.84
113	63.8667	-14.1333	6.47	35.11		147	66.5	-23	-0.08	34.83
114	64.0333	-14.4667	5.66	35.1		148	66.6833	-23.15	0.29	34.85
115	64.2	-14.8333	5.3	35.04		149	66.8833	-23.3	1.19	34.87
116	65	-13.5	1.07	34.59		150	67.0833	-23.4667	1.16	34.87
117	65	-12.8167	1.7	34.61		151	67.3333	-23.6667	-0.03	34.72
118	65	-11.6667	3.76	34.89		152	66.7	-24.2667	0.9	34.85
119	65	-11.3	5.66	35.09		153	66.5167	-25.3167	-1.24	34.26
120	65	-10.1167	0.67	34.67		154	66.2167	-22.45	2.53	34.83
121	65	-9	0.48	34.73		155	66.15	-27.25	3.49	34.89
122	66.3667	-9	0.02	34.72		156	66.0833	-27.05	2.9	34.94
123	66.3667	-10	0.69	34.71		157	66.0167	-26.8	5.07	35.04
124	66.3667	-11	0.01	34.71		158	65.9333	-26.4833	4.82	35.04
125	66.3667	-12.0833	0.44	34.75		159	65.8333	-26	5.09	35.05
126	66.3667	-13	0.66	34.72		160	65.75	-25.65	3.63	35.01
127	66.3667	-13.5833	0.62	34.73		161	65.6667	-25.2667	3.98	35.03
128	66.3667	-14	0.95	34.71		162	65.5833	-24.9167	0.81	34.78
129	66.3667	-14.3667	0.79	34.72						

MAY 1995

(1) station
(2) latitude (decimal)

(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
290	65.5	-24.5667	3.82	34.7		329	66.3667	-13	0.71	34.75
291	65.5833	-24.9167	3.11	34.86		330	66.3667	-12.0667	0.63	34.79
292	65.6667	-25.2667	3.71	35		331	67	-13.8333	0.77	34.76
293	65.75	-25.65	5.15	35.04		332	67.25	-13.5667	0.35	34.78
294	65.8333	-26	5.49	35.04		333	67.5	-13.2667	0.09	34.78
295	65.9333	-26.4833	5.26	35.04		334	67.75	-12.9667	0.2	34.74
296	66.0167	-26.8	2.06	34.58		335	67.9833	-12.6333	0.13	34.76
297	66.0333	-26.8333	5.25	34.99		336	67.6667	-11	0.22	34.74
298	66.7	-24.2667	3.24	34.78		337	67.45	-10	0.19	34.74
299	66.6167	-24	3.32	34.85		338	67.2333	-9	0.21	34.74
300	66.5	-23.6667	3.28	34.87		339	67	-8	1.68	34.87
301	66.5	-23	2.45	34.64		340	67	-7	3.23	35
302	66.6833	-23.15	2.36	34.75		341	67	-6	3.6	35.02
303	66.8833	-23.3	4.11	34.85		342	67	-5	3.48	34.99
304	67.0833	-23.4667	-0.67	34.32		343	67	-4	3.26	34.96
305	67.3333	-23.6667	-0.52	34.68		344	66.3667	-4	3.09	34.88
307	67.3333	-20.7833	2.35	34.75		345	66.3667	-5	3.3	34.98
308	67	-20.7833	2.32	34.68		346	66.3667	-6	3.18	34.95
309	66.75	-20.7833	0.43	34.51		347	66.3667	-7	3.31	34.99
310	66.5	-20.7833	-1.18	34.32		348	66.3667	-8	2.28	34.9
311	66.2833	-20.7833	-0.92	34.3		349	66.3667	-9	0.11	34.74
312	66.2667	-18.8333	0.48	34.69		350	66.3667	-10	-0.26	34.78
313	66.4	-18.8333	0.36	34.5		351	66.3667	-11	0.45	34.76
314	66.5333	-18.8333	0.25	34.56		352	66.1	-9	0.82	34.75
315	66.7333	-18.8333	0.01	34.45		353	65.95	-8.03333	0.5	34.75
316	67	-18.8333	0.71	34.67		354	65.8167	-7.05	2.39	34.9
317	67.3333	-18.8333	0.67	34.74		355	65.6667	-6	3.37	35
318	67.6667	-18.8333	0.81	34.82		356	65.6667	-5	3.38	35
319	68	-18.8333	-0.43	34.68		357	65.6667	-4	3.06	34.93
320	67.75	-17.5	0.5	34.81		358	65	-4	3.51	34.86
321	66.5	-16.25	0.1	34.8		359	65.75	-5	3.49	34.87
322	67.1667	-16.25	0.75	34.8		360	64.5	-6	3.26	34.94
323	66.8333	-16.25	0.53	34.78		361	64.6667	-7	3.4	34.98
324	66.5833	-16.25	0.96	34.7		362	64.8333	-8	2.34	34.84
325	66.6167	-14.2667	1.33	34.74		363	65	-9	2.33	34.86
326	66.3667	-14.3667	1.17	34.71		364	65	-10.1167	4.09	34.98
327	66.3667	-14.0167	0.99	34.75		365	65	-11.2833	1.67	34.83
328	66.3667	-13.9167	1.05	34.76		366	65	-11.6667	0.8	34.77

JUNE 1995

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
367	65	-13.5	1.51	34.5		388	63.6833	-20.6833	7.41	34.97
368	65	-12.8167	0.95	34.71		389	63.4833	-20.9	7.25	35.1
370	64.4	-13.3833	5.58	34.98		390	63.3167	-21.1167	7.22	35.1

371	64.1	-13.65	6.97	35.14		391	63.15	-21.3	7.62	35.12
372	63.7833	-13.95	7.15	35.16		392	63	-21.4667	7.04	35.12
373	63.8667	-14.1333	6.93	35.13		405	64.3333	-27.9667	6.57	35.08
374	64.0333	-14.4667	7.07	35.12		406	64.3333	-27	6.21	35.06
375	64.2	-14.8333	6.84	35		407	64.3333	-26	6.04	35.06
376	63.9167	-15.9833	7.11	35.11		408	64.3333	-25	6.21	35.07
377	63.7667	-16.6	6.63	35.08		409	64.3333	-24.3333	6.63	35.08
378	63.7	-16.5167	6.87	35.09		410	64.3333	-23.75	6.43	35.08
379	63.5667	-16.3	7.17	35.1		411	64.3333	-23.25	6.07	34.99
380	63.4667	-16.1167	7.17	35.13		412	64.3333	-22.75	5.89	34.81
381	63.3833	-16	7.69	35.15		413	64.3333	-22.4167	5.28	34.92

AUGUST 1995

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
420	65	-13.5167	3.9	34.26		534	64.75	-20.7833	5.05	34.76
436	66.3667	-14.3667	3.63	34.37		535	66.5	-20.7833	4.76	34.76
437	66.3667	-14.0167	2.72	34.63		554	66.5	-23	9.34	34.66
438	66.3667	-13.5833	3.3	34.65		556	66.6833	-23.15	7.89	34.89
440	66.3667	-13.0167	1.85	34.69		558	66.8833	-23.3167	2.86	34.46
442	66.3667	-12.0833	2.15	34.76		560	67.0833	-23.4667	1.55	34.2
444	66.3667	-10.9667	1.65	34.79		562	67.3167	-23.6667	1.98	34.4
446	66.3667	-10.0167	1.04	34.77		563	67.5833	-23.9333	-0.92	34.06
454	66.6	-14.2667	3.39	34.53		593	66.15	-27.25	3.47	34.56
456	67.0167	-13.8667	4.3	34.82		594	66.0833	-27.05	2.63	33.86
458	67.25	-13.55	2.17	34.78		595	66.0167	-26.8	6.59	34.88
460	67.5	-13.25	1.38	34.81		597	65.9	-26.4833	7.93	34.97
461	67.75	-12.9667	0.83	34.79		598	65.8333	-26.0167	6.8	35.03
463	68	-12.6667	0.57	34.78		600	65.75	-25.65	6.77	35.03
474	67.8333	-16.25	4.38	34.52		602	65.6667	-25.2667	8.41	34.88
477	67.15	-16.2333	4.57	34.73		604	65.5833	-24.9167	9.29	34.69
479	67.5	-16.25	1.69	34.79		606	65.5	-24.5667	9.97	34.16
500	68	-18.8333	-0.7	34.22		646	64.3333	-27.95	6.89	34.93
502	67.6667	-18.8333	4.03	34.73		648	64.3333	-27	6.82	35.05
505	67.3333	-18.8333	4.13	34.63		651	64.3333	-26.1333	7.22	35.07
508	67	-18.8333	5.32	34.91		653	64.3333	-25	7.44	35.07
510	66.7333	-18.8333	4.19	34.42		655	64.3333	-24.3333	7.7	35.08
513	66.5333	-18.8333	5.27	34.76		656	64.3333	-23.75	7.66	35.05
515	66.4	-18.8333	4.93	34.61		658	64.3333	-23.25	8.36	34.98
517	66.2667	-18.8333	7.18	34.57		660	64.3333	-22.75	10	34.66
532	67	-20.7833	6.52	34.96		662	64.3333	-22.4167	9.44	34.8

SEPTEMBER 1995

(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
739	65.5	-24.5667	9.87	34.28		776	66.4667	-25.8833	-1.62	33.85
740	65.5833	-24.9167	9.3	34.57		777	66.3333	-25.5	6.41	35.05
741	65.6667	-25.2667	6.59	35.05		778	66.25	-25.1667	7.68	34.97
742	65.75	-25.65	7.78	34.99		779	66.1333	-24.75	7.86	34.94
743	65.8333	-25.9833	8.34	34.98		780	66.05	-24.3333	8.94	34.76
744	65.9333	-26.4833	7.32	34.91		781	65.9667	-24	9.56	34.35
745	66.0167	-26.8	-1.49	33.59		782	66.5	-22.9833	8.99	34.48
746	66.0833	-27.05	-0.4	33.48		783	66.6833	-23.15	7.85	34.83
747	66.15	-27.25	-1.23	33.51		784	66.8833	-23.3	6.77	34.66
748	66.25	-27.0667	-1.57	33.36		785	67.0833	-23.4667	4.27	34.24
749	66.3333	-28.1333	-0.13	33.79		786	67.3333	-23.65	4.04	34.7
750	66.4167	-28.5167	1.51	33.84		787	67.5833	-23.9333	-1.07	33.87
751	66.5	-28.9	0.99	33.59		788	67.75	-24.25	-1.66	33.82
752	66.5833	-29.2667	-0.18	33.45		789	67.9167	-24.65	-1.66	33.84
753	66.6667	-29.65	2.49	34.02		790	68	-24.9333	-1.25	33.82
754	66.75	-30.05	2.77	34.09		791	68.1333	-25.25	-1.68	33.67
755	66.8333	-30.45	1.44	33.98		792	68.2333	-25.55	-1.25	32.68
756	66.9167	-30.8333	1.67	34.03		793	68.2667	-25.65	1.01	31.15
757	67	-31.2167	-0.46	33.86		794	68.15	-28.7667	-0.04	32.27
758	67.0833	-31.6	-0.77	33.38		795	68.0833	-28.55	1.59	31.69
759	67.1667	-31.9833	-0.83	32.57		796	67.9667	-28.2	0.44	32.02
760	67.25	-32.3667	-0.16	32.05		797	67.8667	-27.8667	1.14	31.81
761	67.7667	-31.6667	-0.67	32.55		798	67.75	-27.5167	-0.7	32.49
762	67.6833	-31.1667	-0.48	33.42		799	67.65	-27.1833	-1	32.78
763	67.5833	-30.7833	0.78	33.76		800	67.55	-26.85	-0.67	32.47
764	67.5	-30.4	-0.37	33.36		801	67.4333	-26.5167	-1.16	32.96
765	67.4167	-30.0833	-0.67	33.81		802	67.4	-26.0167	-0.79	32.69
766	67.35	-29.8	-1.58	33.62		803	67.3333	-26.2	-1.3	33.07
767	67.25	-29.4167	-1.55	33.71		804	67.2333	-25.85	-1.52	33.3
768	67.1667	-29.0333	0.95	33.88		805	67.1333	-25.5167	-1.57	33.59
769	67.0667	-28.6667	1.98	33.99		806	67.0167	-25.1833	-1.56	33.78
770	66.9833	-28.3	1.49	33.21		807	66.9	-24.8	1.33	34.12
771	66.8833	-27.75	-1.37	32.95		808	66.8167	-24.5833	6.22	35.01
772	66.8	-27.4	2.1	33.47		809	66.7	-24.2667	7.89	34.84
773	66.7	-27	0.52	33.15		810	66.6167	-24	7.2	34.89
774	66.6	-26.6333	-1.47	33.13		811	66.5	-23.6667	8.13	34.84
775	66.5167	-26.2667	-1.64	33.47		812	66.25	-23.2833	9.17	34.59

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(1) station
(2) latitude (decimal)
(3) longitude (decimal)
(4) ocean temperature in °C (50 meters depth)
(5) ocean salinity in parts per thousand (50 meters depth)

(1)	(2)	(3)	(4)	(5)		(1)	(2)	(3)	(4)	(5)
982	64.3333	-25.9833	6.55	35.04		1050	67.5	-13.2667	2.46	34.5
983	64.3333	-27	6.93	35.03		1051	67.75	-12.9667	2.26	34.62
984	64.3333	-27.9667	6.68	34.93		1052	68	-12.6667	2.36	34.66
989	66.2833	-28.2	-0.56	33.29		1053	67.3333	-12	2.96	34.38
991	66.15	-27.6667	-0.27	34.02		1054	67	-12.8333	2.33	34.41
992	67	-27.2667	5.34	34.82		1058	66.6833	-13.4167	3.88	34.5
994	65.8333	-27.05	6.19	35.01		1062	66.6167	-12.75	3.38	34.47
995	65.8333	-26.8	6.2	35.02		1064	66.3667	-14	4.03	34.52
996	65.9333	-26.4833	6.15	34.98		1066	66.3667	-13.5833	3.78	34.49

997	65.8333	-26	6.18	34.98		1067	66.3667	-13	3.75	34.48
998	65.75	-25.65	6.52	34.91		1070	66.3667	-12.0833	3.57	34.59
999	65.5	-24.5667	6.17	34.69		1074	65.75	-11.0833	3.42	34.58
1000	65.5833	-24.9167	5.33	34.51		1076	65.4333	-11	3.68	34.57
1001	65.6667	-25.25	5.83	34.71		1077	66	-11	3.33	34.56
1016	66.9833	-21.55	4.37	34.68		1078	66.35	-11	3.28	34.59
1017	66.7333	-18.85	4.31	34.66		1079	66.2333	-10	3.06	34.58
1018	67	-18.8333	4.68	34.7		1080	65	-9	3.58	34.56
1021	67.3333	-18.8333	4.01	34.64		1081	65	-10.1167	6.89	34.96
1023	67.6667	-18.8333	4.1	34.64		1082	65	-11.2833	4.39	34.58
1024	68	-18.8333	0.76	34.45		1083	65	-11.65	3.55	34.57
1026	68	-17.25	1.14	34.45		1084	65	-12.8167	3.63	34.46
1032	67.75	-16.25	4.12	34.6		1085	65	-13.5	3.85	34.31
1033	67.5	-16.25	4	34.54		1099	63.65	-13.6667	8.08	35.16
1034	67.1667	-16.25	4.58	34.57		1101	63.7833	-13.9333	7.95	35.16
1037	66.8333	-16.25	4.53	34.58		1102	63.8667	-14.1167	7.33	35.07
1038	66.5833	-16.25	4.04	34.62		1103	64.0333	-14.4667	7.36	35.09
1039	66.8	-15.5833	4.54	34.56		1104	64.2	-14.8167	5.33	34.56
1040	67.1667	-15.4	4.34	34.53		1113	63.6833	-20.6833	6.96	34.83
1043	67.55	-15.2167	3.72	34.5		1114	63.4833	-20.9	7.09	34.9
1044	66.3667	-14.3667	4.04	34.32		1115	63.3167	-21.1167	7.38	34.94
1045	66.6167	-14.2667	4.24	34.53		1116	63.15	-21.3	7.62	35.04
1048	67	-13.8333	2.78	34.43		1117	62.9833	-21.4833	7.69	35.05
1049	67.25	-13.5667	2.23	34.51						

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