

Historical Sea Surface Salinity Data in WDC-B

Historical data are considered in the framework of the USSSDA Pilot Project as a part of comprehensive surface salinity data archive since they are very important for detecting long-term climate variability.

In order to identify historical Sea Surface Salinity Data in RIHMI-WDC holding the digitized data archive has been processed to reveal the cruises which match the following criteria. If all observations in cruise were made at one level (0 meters) and there were salinity measurements the cruise was included in the List of Historical Sea Surface Salinity Data (see cruise list in Appendix I). Thus results presented below show not all of the surface salinity data which can be retrieved from RIHMI-WDC archives (from ocean station archive for example) but refer to the underway bucket measurements only.

There are 221 cruises on the list. Most of them have been submitted in manuscript form to the RIHMI-WDC by foreign countries (Fig. 1) in frames of international data exchange. The data of 23 cruises were collected by national (the former Soviet Union) vessels.

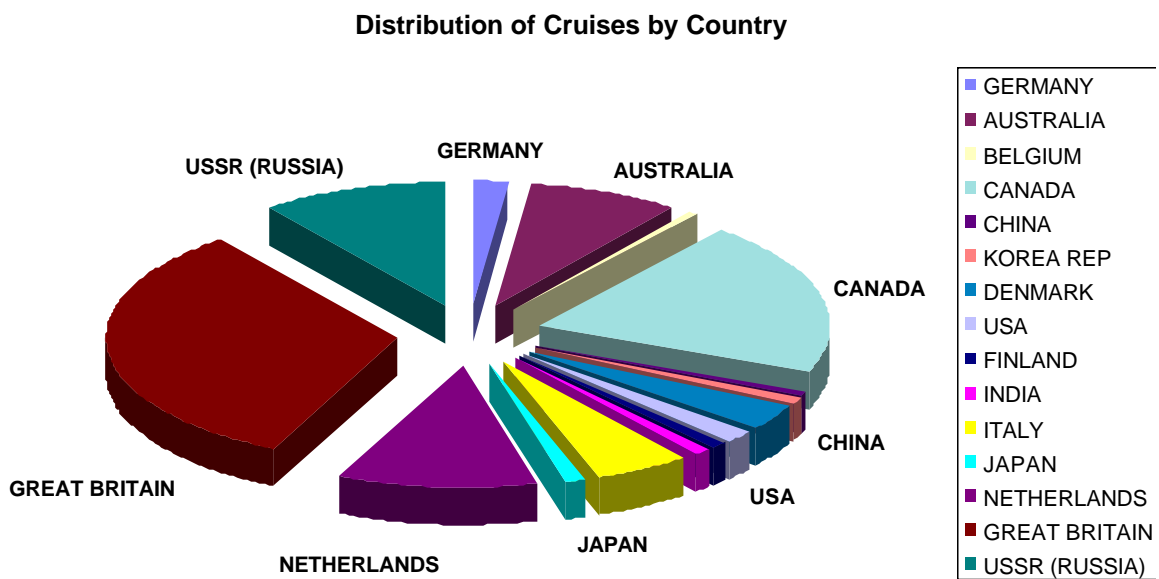


Figure 1

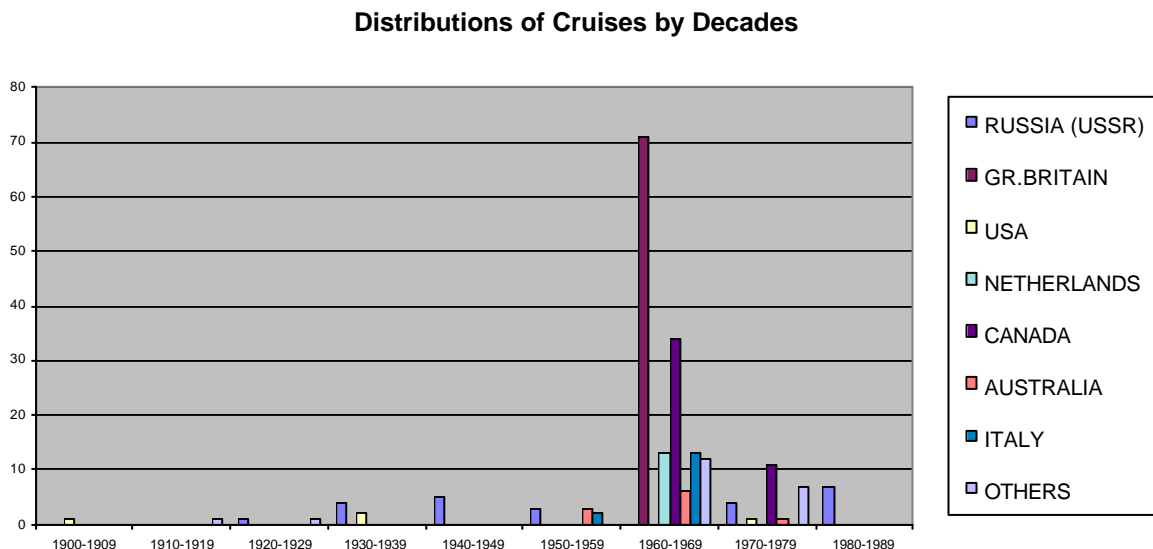


Figure 2

The total amount of Sea Surface Salinity measurements is 54282 samples. The observation were made from 1908 to 1988. Most of them were made in the 1960-s (Fig.2).

The spatial distribution of stations is presented in Fig. 3 (the Ocean Data View software of R.Schlitzer have been used to obtain the picture). Most of the observational points are concentrated in the North Sea, in the Northeastern Atlantic, around the Nova Scotia, to the east of Australia. The points of national observations are mainly situated in the Barentz, Black, Azov and Caspian Seas.

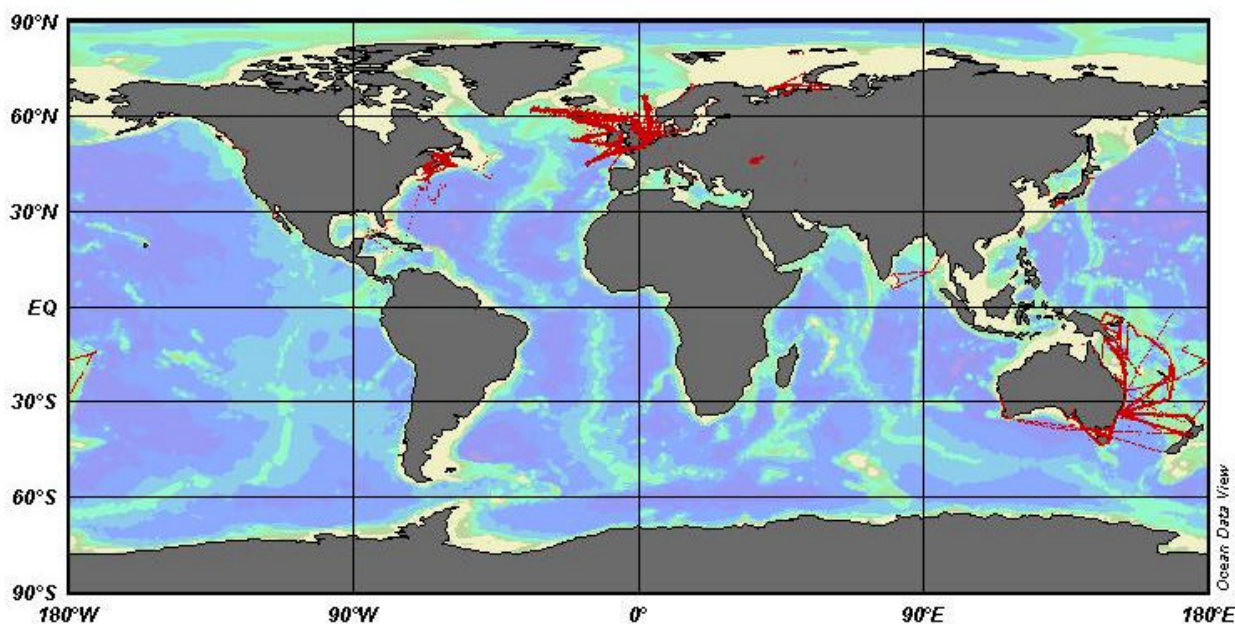


Figure 3

To build a comprehensive high quality global archive of SSSAL data the duplicates check of data submitted by different contributors is needed. For historical data the comparison of cruise descriptions (country, ship ID, start and finish dates of cruise) could be considered as the first level of duplicates check. If a ship is unknown we have to compare dates and coordinates of observational points. It could be considered as the second level of duplicates check. Probably the third level of check – comparing the observed data also would be useful since the errors in coordinates and dates can affect the results of the check.

It will not be a difficult work to perform the first level duplicates check by using any DBMS if contributors submit cruise descriptions in the spreadsheet format. This kind of metadata will be also useful to manage global SSSAL data as a distributed archive. For implementation of the second and third level of duplicates identification special procedure should be developed.

It seems to be useful to review the other RIHMI-WDC archives of historical data (ocean station, STD and so on) as a source for the comprehensive SSSAL data set.

List of cruises with bucket Sea Surface Salinity measurements

Ship ID	Ship Name	Country ID	Country	Start Date	End Date	Number of Samples
2	AGASSIZ, A.	31	USA	01.09.1908	04.09.1908	72
10	INVESTIGATOR	41	INDIA	16.04.1914	21.04.1914	31
0	UNKNOWN SHIP	74	GREAT BRITAIN	28.08.1920	21.09.1920	5
10	INVESTIGATOR	41	INDIA	13.04.1925	24.04.1925	33
345	MOJAVE	31	USA	29.03.1930	09.04.1930	4
345	MOJAVE	31	USA	01.05.1930	31.05.1930	13
67	SADKO	90	USSR (RUSSIA)	25.07.1936	27.07.1936	42
446	STEPAN MALYGIN	90	USSR (RUSSIA)	29.07.1936	30.07.1936	35
67	SADKO	90	USSR (RUSSIA)	23.09.1936	23.09.1936	9
109	ERMAK	90	USSR (RUSSIA)	11.02.1938	07.03.1938	116
551	MURMANETZ	90	USSR (RUSSIA)	04.10.1946	07.10.1946	34
1019	KULAZ	90	USSR (RUSSIA)	06.04.1949	07.04.1949	4
601	ISSLEDOVATEL	90	USSR (RUSSIA)	30.05.1949	01.07.1949	11
725	BYSTRYI	90	USSR (RUSSIA)	02.08.1949	10.08.1949	70
1019	KULAZ	90	USSR (RUSSIA)	08.12.1949	23.12.1949	11
551	MURMANETZ	90	USSR (RUSSIA)	15.10.1950	19.10.1950	56
774	MOKSHA	90	USSR (RUSSIA)	23.05.1952	02.11.1952	313
695	VEST	90	USSR (RUSSIA)	08.08.1952	21.12.1952	314
33	LIVORNO	48	ITALY	01.07.1957	25.03.1959	633
34	PORTOFINO	48	ITALY	01.08.1957	25.03.1959	391
31	USTICA	48	ITALY	01.08.1957	30.06.1959	683
32	CASAMICCIOLA	48	ITALY	01.08.1957	30.06.1959	698
40	IMPERIA	48	ITALY	01.08.1957	23.03.1959	590
35	S.MARINELLA	48	ITALY	12.09.1957	26.03.1959	559
36	PORTATARRES	48	ITALY	01.10.1957	30.06.1959	637
37	CARLOFORTE	48	ITALY	01.11.1957	30.06.1959	602
41	TULAGI	9	AUSTRALIA	22.12.1957	19.12.1958	672
27	TRIESTE	48	ITALY	01.01.1958	30.06.1960	113
43	WANGANELLA	9	AUSTRALIA	03.01.1958	31.12.1958	1316
18	JILLIAN CROUCH	9	AUSTRALIA	22.01.1958	14.12.1958	419
38	TALUNE	9	AUSTRALIA	26.01.1958	29.12.1958	247
39	OTRANTO	48	ITALY	07.02.1958	29.02.1960	746
38	VIESTE	48	ITALY	09.02.1958	29.02.1960	737
24	MALAITA	9	AUSTRALIA	04.01.1959	19.12.1959	770
39	TAROONA	9	AUSTRALIA	07.01.1959	18.09.1959	220
38	TALUNE	9	AUSTRALIA	17.01.1959	03.04.1959	80
41	TULAGI	9	AUSTRALIA	23.01.1959	23.12.1959	629
43	WANGANELLA	9	AUSTRALIA	13.02.1959	07.12.1959	495
28	PATEENA	9	AUSTRALIA	06.05.1959	29.11.1959	183
33	RISDON	9	AUSTRALIA	31.08.1959	29.12.1959	263
29	POOLTA	9	AUSTRALIA	19.11.1959	17.12.1959	51
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	30.12.1960	315
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	29.12.1960	91
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	29.12.1960	95
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	29.12.1960	95
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	29.12.1960	95
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	28.12.1960	136

RIHMI-WDC/Russian NODC, September 2002

0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	23.08.1960	269
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	12.10.1960	397
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	29.12.1960	264
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	30.11.1960	144
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1960	30.12.1960	138
20	KOKAR F/S	34	FINLAND	01.01.1960	31.12.1960	1437
29	POOLTA	9	AUSTRALIA	01.01.1960	31.12.1960	431
0	UNKNOWN SHIP	74	GREAT BRITAIN	02.01.1960	31.12.1960	339
30	PRINCESS TASMANIA	9	AUSTRALIA	02.01.1960	31.12.1960	261
0	UNKNOWN SHIP	74	GREAT BRITAIN	02.01.1960	31.12.1960	434
18	SIR LANCELOT	74	GREAT BRITAIN	04.01.1960	31.10.1960	435
24	MALAITA	9	AUSTRALIA	05.01.1960	20.11.1960	226
33	RISDON	9	AUSTRALIA	05.01.1960	12.12.1960	564
0	UNKNOWN SHIP	74	GREAT BRITAIN	07.01.1960	09.12.1960	303
9	PLATESSA	74	GREAT BRITAIN	07.01.1960	28.06.1960	463
0	UNKNOWN SHIP	74	GREAT BRITAIN	08.01.1960	28.12.1960	120
43	WANGANELLA	9	AUSTRALIA	08.01.1960	06.12.1960	463
0	UNKNOWN SHIP	74	GREAT BRITAIN	09.01.1960	30.12.1960	231
0	UNKNOWN SHIP	74	GREAT BRITAIN	09.01.1960	12.12.1960	302
41	TULAGI	9	AUSTRALIA	09.01.1960	09.11.1960	347
0	UNKNOWN SHIP	74	GREAT BRITAIN	18.01.1960	30.12.1960	125
0	UNKNOWN SHIP	74	GREAT BRITAIN	27.01.1960	20.12.1960	425
8	HOLT, E.	74	GREAT BRITAIN	12.02.1960	15.12.1960	687
0	UNKNOWN SHIP	74	GREAT BRITAIN	06.04.1960	26.10.1960	179
33	HARENGUS	18	CANADA	09.08.1960	15.08.1960	36
10	TELLINA	74	GREAT BRITAIN	15.11.1960	17.12.1960	67
42	MALLOTUS	18	CANADA	28.11.1960	03.12.1960	15
0	UNKNOWN SHIP	64	NETHERLANDS	01.01.1961	31.12.1961	506
20	KOKAR F/S	34	FINLAND	01.01.1961	31.12.1961	1486
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1961	28.12.1961	217
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1961	30.12.1961	142
0	UNKNOWN SHIP	64	NETHERLANDS	01.01.1961	31.12.1961	456
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1961	17.12.1961	396
100	SEVEN STONES	74	GREAT BRITAIN	01.01.1961	29.12.1961	95
106	VARNE	74	GREAT BRITAIN	01.01.1961	29.12.1961	94
56	GALLOPER	74	GREAT BRITAIN	01.01.1961	29.12.1961	93
2	WESTHINDER L/S	11	BELGIUM	01.01.1961	31.12.1961	353
122	SMITH'S KNOLL	74	GREAT BRITAIN	01.01.1961	29.12.1961	84
0	UNKNOWN SHIP	64	NETHERLANDS	01.01.1961	31.12.1961	364
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1961	24.12.1961	383
0	UNKNOWN SHIP	64	NETHERLANDS	01.01.1961	31.12.1961	429
0	UNKNOWN SHIP	74	GREAT BRITAIN	02.01.1961	31.12.1961	327
0	UNKNOWN SHIP	64	NETHERLANDS	02.01.1961	31.12.1961	187
0	UNKNOWN SHIP	74	GREAT BRITAIN	02.01.1961	29.12.1961	464
0	UNKNOWN SHIP	64	NETHERLANDS	02.01.1961	07.09.1961	352
74	LIVERPOOL BAR	74	GREAT BRITAIN	02.01.1961	29.12.1961	155
135	BARDSEY, L. H.	74	GREAT BRITAIN	02.01.1961	29.12.1961	152
84	MORECOMBE BAY	74	GREAT BRITAIN	02.01.1961	29.12.1961	152
0	UNKNOWN SHIP	74	GREAT BRITAIN	03.01.1961	06.12.1961	129
0	UNKNOWN SHIP	64	NETHERLANDS	04.01.1961	24.12.1961	533
0	UNKNOWN SHIP	64	NETHERLANDS	05.01.1961	28.12.1961	370
0	UNKNOWN SHIP	74	GREAT BRITAIN	05.01.1961	28.12.1961	98
0	UNKNOWN SHIP	64	NETHERLANDS	07.01.1961	24.12.1961	176

RIHMI-WDC/Russian NODC, September 2002

0	UNKNOWN SHIP	6	GERMANY FED	07.01.1961	31.12.1961	439
0	UNKNOWN SHIP	74	GREAT BRITAIN	08.01.1961	31.10.1961	215
2	DOHRN, A.	6	GERMANY FED	12.01.1961	30.11.1961	133
9	PLATESSA	74	GREAT BRITAIN	13.01.1961	14.12.1961	416
0	UNKNOWN SHIP	74	GREAT BRITAIN	13.01.1961	20.09.1961	261
0	UNKNOWN SHIP	74	GREAT BRITAIN	17.01.1961	02.12.1961	223
0	UNKNOWN SHIP	74	GREAT BRITAIN	25.01.1961	14.12.1961	408
0	UNKNOWN SHIP	74	GREAT BRITAIN	03.02.1961	31.12.1961	304
0	UNKNOWN SHIP	64	NETHERLANDS	17.02.1961	24.10.1961	365
0	UNKNOWN SHIP	74	GREAT BRITAIN	21.02.1961	24.10.1961	114
10	TELLINA	74	GREAT BRITAIN	21.02.1961	06.10.1961	56
8	HOLT, E.	74	GREAT BRITAIN	24.02.1961	18.11.1961	419
15	SCOTIA	74	GREAT BRITAIN	03.03.1961	18.04.1961	91
0	UNKNOWN SHIP	74	GREAT BRITAIN	22.03.1961	25.10.1961	191
0	UNKNOWN SHIP	64	NETHERLANDS	03.04.1961	07.12.1961	359
0	UNKNOWN SHIP	64	NETHERLANDS	15.05.1961	31.12.1961	415
11	CLIONE	74	GREAT BRITAIN	12.07.1961	24.10.1961	43
56	GALLOPER	74	GREAT BRITAIN	01.01.1962	29.12.1962	87
106	VARNE	74	GREAT BRITAIN	01.01.1962	29.12.1962	95
100	SEVEN STONES	74	GREAT BRITAIN	01.01.1962	29.12.1962	89
15	TERSCHELLINGERBA	64	NETHERLANDS	01.01.1962	31.12.1962	364
0	UNKNOWN SHIP	74	GREAT BRITAIN	01.01.1962	31.12.1962	468
112	WEATHER	74	GREAT BRITAIN	01.01.1962	29.12.1962	95
0	UNKNOWN SHIP	64	NETHERLANDS	01.01.1962	06.11.1962	555
0	UNKNOWN SHIP	64	NETHERLANDS	01.01.1962	23.12.1962	330
10	TELLINA	74	GREAT BRITAIN	03.01.1962	18.12.1962	126
0	UNKNOWN SHIP	64	NETHERLANDS	03.01.1962	01.12.1962	454
0	UNKNOWN SHIP	64	NETHERLANDS	03.01.1962	26.12.1962	385
0	UNKNOWN SHIP	74	GREAT BRITAIN	04.01.1962	21.12.1962	125
0	UNKNOWN SHIP	64	NETHERLANDS	04.01.1962	20.12.1962	196
0	UNKNOWN SHIP	74	GREAT BRITAIN	05.01.1962	31.12.1962	366
0	UNKNOWN SHIP	74	GREAT BRITAIN	06.01.1962	17.12.1962	394
0	UNKNOWN SHIP	74	GREAT BRITAIN	06.01.1962	30.12.1962	393
0	UNKNOWN SHIP	6	GERMANY FED	08.01.1962	30.12.1962	608
8	HOLT, E.	74	GREAT BRITAIN	15.01.1962	01.12.1962	200
0	UNKNOWN SHIP	64	NETHERLANDS	18.01.1962	29.11.1962	418
0	UNKNOWN SHIP	74	GREAT BRITAIN	20.01.1962	24.12.1962	304
0	UNKNOWN SHIP	74	GREAT BRITAIN	20.01.1962	25.12.1962	244
0	UNKNOWN SHIP	64	NETHERLANDS	22.01.1962	19.03.1962	176
0	UNKNOWN SHIP	74	GREAT BRITAIN	24.01.1962	13.12.1962	405
0	UNKNOWN SHIP	74	GREAT BRITAIN	05.02.1962	23.08.1962	121
0	UNKNOWN SHIP	74	GREAT BRITAIN	17.02.1962	30.12.1962	268
0	UNKNOWN SHIP	64	NETHERLANDS	07.03.1962	23.09.1962	359
11	CLIONE	74	GREAT BRITAIN	25.03.1962	06.11.1962	261
0	UNKNOWN SHIP	74	GREAT BRITAIN	28.03.1962	21.12.1962	161
0	UNKNOWN SHIP	74	GREAT BRITAIN	04.04.1962	31.10.1962	179
0	UNKNOWN SHIP	64	NETHERLANDS	21.04.1962	16.06.1962	179
4	BEUKELSZ, W.	64	NETHERLANDS	01.05.1962	07.06.1962	167
3	GAUSS	6	GERMANY FED	14.05.1962	07.06.1962	99
0	UNKNOWN SHIP	74	GREAT BRITAIN	06.06.1962	26.09.1962	137
33	HARENGUS	18	CANADA	05.07.1962	31.07.1962	44
33	HARENGUS	18	CANADA	03.08.1962	09.08.1962	42
15	CAMERON, A. T.	18	CANADA	09.09.1962	14.09.1962	22

RIHMI-WDC/Russian NODC, September 2002

0	UNKNOWN SHIP	64	NETHERLANDS	29.10.1962	31.12.1962	197
33	HARENGUS	18	CANADA	24.10.1963	26.10.1963	19
26	TARANTO	48	ITALY	08.06.1964	30.11.1964	98
78	ALDER POINT	18	CANADA	05.10.1964	15.10.1964	36
14	DROGDEN L/V	26	DENMARK	01.01.1965	31.12.1965	361
0	UNKNOWN SHIP	26	DENMARK	01.01.1965	31.12.1965	1486
15	CAMERON, A. T.	18	CANADA	26.09.1965	06.10.1965	40
0	UNKNOWN SHIP	26	DENMARK	01.01.1966	31.12.1966	1486
2	CUMULUS	64	NETHERLANDS	01.01.1966	31.12.1966	1112
14	DROGDEN L/V	26	DENMARK	01.01.1966	31.12.1966	364
0	UNKNOWN SHIP	24	KOREA REP	22.05.1967	18.07.1967	14
84	JUDITH, R.	18	CANADA	06.06.1968	16.06.1968	37
15	CAMERON, A. T.	18	CANADA	05.07.1968	11.07.1968	25
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	362
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	357
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	360
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	361
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	361
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	354
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	358
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	362
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	364
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	361
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	253
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	358
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	364
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	359
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	364
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	309
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	361
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	325
0	UNKNOWN SHIP	18	CANADA	01.01.1969	31.12.1969	361
9	SACKVILLE	18	CANADA	28.04.1969	20.05.1969	71
72	E.E.PRINCE	18	CANADA	30.05.1969	04.06.1969	46
72	E.E.PRINCE	18	CANADA	07.10.1969	10.10.1969	49
72	E.E.PRINCE	18	CANADA	28.10.1969	30.10.1969	45
72	E.E.PRINCE	18	CANADA	14.11.1969	17.11.1969	28
0	UNKNOWN SHIP	31	USA	01.01.1970	31.12.1970	1235
9	SACKVILLE	18	CANADA	14.02.1970	13.03.1970	60
72	E.E.PRINCE	18	CANADA	17.04.1970	23.04.1970	84
72	E.E.PRINCE	18	CANADA	20.05.1970	30.05.1970	99
3	XIANG YANG HONG	21	CHINA	01.07.1970	30.11.1970	915
0	UNKNOWN SHIP	24	KOREA REP	26.10.1970	06.12.1970	117
50	PANDALUS	18	CANADA	03.08.1971	08.09.1971	22
94	CHEBUCTO	18	CANADA	30.08.1971	01.09.1971	51
287	WAKATAKA MARU	49	JAPAN	11.11.1971	14.11.1971	17
151	SHUNYO MARU	49	JAPAN	01.12.1971	15.12.1971	76
72	E.E.PRINCE	18	CANADA	11.04.1972	15.04.1972	73
72	E.E.PRINCE	18	CANADA	16.11.1972	28.11.1972	134
0	UNKNOWN SHIP	9	AUSTRALIA	01.01.1973	31.12.1973	1506
72	E.E.PRINCE	18	CANADA	28.02.1973	13.03.1973	127
72	E.E.PRINCE	18	CANADA	19.06.1973	28.06.1973	119
122	MOORE, W. A.	18	CANADA	24.08.1973	14.09.1973	93

RIHMI-WDC/Russian NODC, September 2002

9	SACKVILLE	18	CANADA	18.10.1974	27.10.1974	80
0	UNKNOWN SHIP	26	DENMARK	01.01.1975	31.12.1975	1506
0	UNKNOWN SHIP	26	DENMARK	01.01.1976	31.12.1976	1437
14	DROGDEN L/V	26	DENMARK	01.01.1976	31.12.1976	365
572	ALKEI	90	USSR (RUSSIA)	10.07.1976	18.07.1976	27
573	ZVENIGOROD	90	USSR (RUSSIA)	13.08.1976	23.08.1976	27
595	ZADORNYI	90	USSR (RUSSIA)	20.08.1976	23.08.1976	40
110	GEORGY	90	USSR (RUSSIA)	09.04.1978	10.04.1978	10
316	GRADIENT	90	USSR (RUSSIA)	19.06.1980	26.06.1980	28
802	GIDROFIZIK	90	USSR (RUSSIA)	14.10.1981	19.10.1981	36
315	GORIZONT	90	USSR (RUSSIA)	28.08.1982	01.09.1982	18
315	GORIZONT	90	USSR (RUSSIA)	11.09.1982	26.09.1982	75
316	GRADIENT	90	USSR (RUSSIA)	21.05.1984	05.06.1984	57
802	GIDROFIZIK	90	USSR (RUSSIA)	17.06.1986	22.06.1986	47
132	OKEANOGRAF	90	USSR (RUSSIA)	22.06.1988	08.08.1988	356