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SEASONAL AND YEAR-TO-YEAR VARIATIONS OF TEMPERATURE AND
SALINITY ALONG THE KOLA MERIDIAN TRANSECT

by

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ABSTRACT

Systematized monthly and year values of temperature and salinity of the Murman Current in the layers 0-50, 0-200, 50-200 and 150-200 m along the Kola Meridian transect (the Kola section) for 1951-1995 are presented in the paper.

Seasonal and interannual variations of temperature and salinity of the Murman Current are discussed on the basis of these data. Results of classification of thermohaline status of this current are presented.

INTRODUCTION

To study the regularity of seasonal and interannual variations of oceanographic characteristics and to reveal main features of development of oceanographic processes, historical series of observations along standard sections are required. Just the long-term observations along sections give the possibility to monitor climatic environment parameters and to use these data as predictors in developing of long-term temperature, ice and fishery predictions.

In the Barents Sea, it is the Kola section for which we have the unique long-term data on water temperature and salinity. It is located along 33°30'E in the central sea and intersects the Murman Current from 70°30' to 72°30'N (Fig. 1).

Oceanographic works in the Kola section were initiated in 1900 (Knipovich, 1906), and upto present time the section has been done more than 900 times. However, till the 1950's, the section was being done irregularly, and in some years (1907-1920, 1942-1944) the observations were not being carried out. In the beginning of the 1960's the Kola section was determined as a historical one, and oceanographic works were being conducted there nearly every month.

Previously, data on the Kola section were summarized in publications. Mean monthly and mean annual data on the Murman Current temperature in the layer 0-200 m for 1963-1973 were published in Mukhin and Sarynina (1974) and for 1953-1973 - in Mukhin (1975). The most completed series on water temperature in the 0-200 m layer for 1900-1982 is in Bochkov (1982) which includes the restored data for 1900-1920 and 1941-1944 (Bochkov, 1982). Besides, mean values of temperature and salinity in the layers 0-50, 0-200, and 50-200 m obtained along the Kola section during both surveys for eggs and larvae in May and July of 1959-1980 (Mukhin and Dvinina, 1982) and 0-group fish in August-September of 1965-1991 (Tereshchenko, 1992) were published as well.

Authors of works mentioned above have revealed a dense correlation link ($r = 0.60-0.90$) between variations of water temperature along the Kola section and temperature changes along sections located in different parts of the Barents Sea. It was a reason to consider the Kola section as a registration point, by a temperature of which one can justify on the level of the heating condition of Atlantic waters in the Barents Sea (Izhevsky, 1961). Besides, the prolonged series of observations in the Kola section allows to use the data in the long-term prognostication of water temperature (Bochkov, 1979; Ottersen et al., 1994).

The aim of the paper is to continue investigations of seasonal and interannual variations of the Murman Current temperature on the basis of data for 1951-1995 not only in the 0-200 m layer, but in the upper 50-m layer and deep (50-200 and 150-200 m) layers as well. Next task is to systematize data on water salinity in different layers along the section and to discuss seasonal and interannual changes of this important oceanographic parameter. Besides, we raise a problem to classify thermohaline water status by a long-term series of observations on the basis of a quantitative index.

MATERIALS AND METHODS

Data on temperature and salinity of the Murman Current in the Kola section for 1951-1995 are analysed in the paper. Data in Table 1 prove that a sufficient number of observations was done during that period (721 events). Two years (1994 and 1995) were exclusions, since because of the absence of financing the frequency of carrying the section out decreased. In such cases, the graphical interpolation was used, and in some months the data were restored with the use of inertial and physical and statistical models.

Zverev, Sedykh, Khanaichenko, Sarynina, Borovaya and, recent years, the author of the paper systematized the average water temperatures and interpolated them to the middle of the month by curves of the annual variations.

Data on the water salinity for 1951-1995 were systematized for

the first time. Using the graphic interpolation, values of the Murman Current salinity were obtained to the middle of the month by different layers. It should be mentioned that to analyse the salinity it was necessary to check thoroughly the initial data. As a result, many data on salinity were rejected and were not used in analysis. The reason was that for many years the salinity was being determined by different methods, often - under unfavourable conditions and sometimes - by inexperienced operators.

Thus, after systematizing and control, the continuous massives of monthly and annual temperatures and salinities of the Murman Current in the Kola section in 0-50, 0-200, 50-200, 150-200 m layers for 1951-1995 were formed (Tables 2-9).

To average temperatures and salinities in the Kola section, the 40-years period (1951-1995) was taken as a long-term period, by which the main statistical parameters (long-term mean or norm, anomalies and mean quadratic deviation) were calculated. The period of 40 years was considered as the most suitable for objective conclusions on variability of meteorological and oceanographic parameters (Drozdov and Rubinshtein, 1966; Bochkov, 1980).

To estimate thermohaline status of the Murman Current in different layers in the Kola section, the classification by 5 gradations for the temperature and by 3 gradations for the salinity was used (Bochkov et al., 1987; Tereshchenko, 1992). Results of the analysis are presented as characteristics of the level of the thermohaline status of the Murman Current in the Kola section for 1951-1995 (Tables 10 and 11).

RESULTS AND DISCUSSION

Long-term seasonal variation of the Murman Current temperature in all layers has one minimum and one maximum (Fig. 2). Minimum of water temperature in the Kola section in the upper 200-m layer is in April (Table 12). Maximum temperature in the 0-50 m layer is usually observed in August. The deeper layer, the later maximum of an annual wave. For instance, maximum temperature in the 50-200-m layer is three months later than that in the 0-50-m layer; and in the 150-200-m layer - four months later. A range of seasonal temperature fluctuations are quite big, especially in the upper 50-m layer (Table 12). Each year, the point of beginning of heat irradiation, warming up and, correspondingly, extremes can shift to compare with the long-term mean periods. Very often during the investigated period the beginning of temperature maximum was observed 1-2 months earlier than usually, and maximum of the seasonal variation was found 1-2 months later than usually. Thus for example, spring/summer period in the 0-200-m layer lasted 6-9 months in some years (1963, 1964, 1967, 1982, 1989 and 1990) to compare with the standard of 5 months.

More prolonged than usually the period of spring/summer warming up of waters influences favourably the life activity of a biota

and, first of all, the survival of hydrobionts and increase of their growth and weight. This factor is more positive in the years with the heightened water temperature.

Analysis of the Murman Current temperature for 1951-1995 has revealed sufficient interannual variations. This is proved by the extreme temperatures in different layers for the investigated years (Table 13). The absolute minimum of the mean annual temperature in the 0-200-m layer (2.8°C) was registered in 1966 and maximum (4.8°C) - in 1954. Thus, the range of temperature variations constituted 2.0°C and corresponded to the seasonal one. It should be mentioned that the range of interannual changes in the 0-50-m layer (1.7°C) was sufficiently less than the seasonal ones (4.4°C), whereas in the deep 150-200-m layer the range of long-term variations by 1.0°C exceeded the seasonal ones. The comparison of seasonal and interannual variability (mean quadratic deviation) of temperature also justifies on a great role of long-term variations in the formation of a temperature regime, which constitutes 30 % of the seasonal variations value in the 0-50-m layer and 64, 86 and 126 % in the 0-200, 50-200 and 150-200 m layers, correspondingly (Bochkov et al., 1987).

Results of classification of the Murman Current temperature by 5 gradations (Table 10) allowed to single out periods of cooling (1956-1958, 1965-1969, 1977-1981, 1986-1987) and warming (1951-1955, 1959-1962, 1972-1976, 1983-1984, 1989-1995). Specific features of hydrometeorological conditions in each year and in the mentioned periods are discussed in detail in Sarynina (1973-1981), Mukhina and Dvinina (1982), Bochkov et al. (1987), Bochkov and Tereshchenko (1992), Sarynina and Tereshchenko (1984) and Tereshchenko (1982-1984) and, therefore, are not discussed in this paper.

Besides, the classification has shown a good coincidence of water temperatures in the surface and deep layers (Table 10). But there were some cases when a year was estimated as a cold one by temperatures in the 0-50 m layer, but as a normal one - in the 50-200 and 150-200-m layer. For example, such situation was observed in 1965, 1968, 1980 and 1982. Quite different picture was observed in 1957, 1961, 1964, 1972 and 1974 when the upper 50-m layer was warmed up more than usually, and temperature of deep layers corresponded to standard years. One of the reasons of such discrepancies is different intensities of processes of interaction of the ocean and atmosphere in each year.

Dense link between mean annual temperature of the Murman Current in the 0-200 m layer and a value of the autumn/winter cooling ($r=-0.59$, $n=45$) and its absence with the warming up parameter ($r=-0.15$, $n=45$) proves again that temperature is determined in a great measure by processes of heat irradiation in the preceding autumn/winter period, but not by the warming up values (Mukhin, 1975).

In its turn the thermal status of waters influences sufficiently the ice index of the sea. The annual fluctuations of total ice

index* of the Barents Sea are in the back dependence ($r = -0.64$, $n = 45$) on temperature changes of the Murman Current in the 0-200 m layer along the Kola section (Fig. 3).

One of the main parameters of water masses is salinity participating in the formation of water dynamics, horizontal and vertical movements of water masses, as well as influencing the processes of ice formation.

Salinity regime of the marine water is formed under the influence of some factors, such as: evaporation, precipitations, advection of salts by flows, ice formation and ice melting and land run off. The first three factors have the strongest effect on changes of salinity of the open part of the Barents Sea and of the Murman Current, in particular, since the local land run off influences the salinity in the narrow band along the coast (Sedykh, 1960; Shirokolobov, 1980), as for the processes of ice formation and melting, they are limited by the northern and eastern areas of the sea. It is known that in high latitudes precipitations predominate over the evaporation, but this value is very small for the Barents Sea to compare with the water exchange between adjacent seas (Zubov, 1938). Thus, the main factor determining the regime of salinity of the Murman Current is the advection of salts by flows from the Norwegian Sea.

Kislyakov (1964) has shown that in June water masses in the 0-200 m layer in the Kola section consist of the Atlantic waters (65 %) and coastal waters of the North Cape Current (35 %). Due to Sedykh (1960), there is a dense link between changes of salinity of the Murman Current and Coastal Branch of the North Cape Current. Thermohaline conditions of coastal waters of the North Cape Current are determined by the regime of the coastal

Norwegian Current and run off of the Norwegian rivers. It is proved by a dense link between changes of the salinity of the Murman Current in the Kola section in winter and salinity variations of the coastal Norwegian Current, as well as by a value of the Norwegian rivers run off, and the biggest correlation coefficients were registered with the shift of 3-4 months (Sedykh, 1960; Antonov, 1958).

Analysis of a mean annual salinity of water in different layers has shown that only in the 0-50 m layer, the seasonal changes are expressed distinctly with maximum in February-April and minimum in September (Fig. 2, B). The range of seasonal fluctuations in this layer constituted 0.13 p.s.u., whereas in layers 0-200, 50-200 and 150-200 it did not exceed 0.03 p.s.u.

*

Data on total ice index (the square of sea covered with ice in per cent of total square of the Barents Sea) are kindly presented by Borovaya (Murmanskhydrometcentre).

As for changes of salinity for 1951-1995, the sufficient interannual variations of this parameter were observed for all layers and exceeded the seasonal ones many times. For example, the range of long-term variations of mean annual values of salinity in the 0-50 m layer constituted 0.37 p.s.u., and in the 150-200 m layer - 0.21 p.s.u. Extremely low salinity in the 0-200 m layer (34.65 p.s.u.) was registered in 1989, and the highest one - in 1970 (Table 13).

Classification by 3 gradations of the haline status of waters has allowed to mark a period from 1951 to 1975, when water salinity of the Murman Current was close to a standard or exceeded it, and in further 1976-1995 years it corresponded to the long-term mean level or was lower (Table 11). It should be mentioned that "a transfer" from the heightened values of salinity to the lower ones was observed in the second half of the 1970's. In this period, the lowest values of salinity along all layers were registered in 1979-1980 (Table 7). The low salinity in those years was attended by the abnormal lowering of thermal status of the Murman Current caused by the strong weakening of the advective factor. The obtained materials coincides with the results of works (Dickson and Blindheim, 1984; Dickson et al., 1988), in which it was pointed out to the lag of waters "born" north of Iceland in the second half of the 1960's and with low salinity and which riched the areas of Spitsbergen and the Barents Sea in 1978-1980.

As for the 1980-90's, the lowest salinity was registered in 1982-1984, 1989 and 1995, and these years were considered as warm years by water temperature. For example, in 1989 and 1995, the Murman Current in the 0-200 m layer under abnormally high temperature (positive anomalies of mean annual temperature - 0.5-0.6°C) had very low salinity - 34.65 p.s.u. (the absolute minimum for all years observed) and 34.70 p.s.u., correspondingly. Thus, one can assume that in the mentioned years more than ususally warm and less salted coastal waters of the Norwegian Current penetrated into the Barents Sea. Therefore, the salinity increases not always in the years of warming up of the Murman Current and vice versa. The low correlation coefficients ($r=0.14$, $n=45$) between temperature and salinity of the Murman Current also prove it.

CONCLUSIONS

Seasonal and interannual changes of thermohaline parameters for 1951-1995 are discussed on the basis of the continuous monthly and annual values of temperature and salinity of the Murman Current in the Kola section in the 0-50, 0-200, 50-200 and 150-200 m layers.

Due to long-term data, minimum of temperature is observed in April. Maximum warming up of the upper 50-m layer is usually observed in August, and that of the deep layers - 3-4 months later, in November/December. The largest range of seasonal temperature variations is observed in the 0-50-m layer. To compare with long-term data, the points of extremes shift in some

years. Sometimes, spring/summer period in the layer of 0-200 m (the period of water temperature increase) lasts 6-9 months at the standard of 5. This factor influences favourably the life activity of a biota, especially in the years with the increased water temperature.

Sufficient interannual variations of water temperatures are registered, that is proved by their extreme values in various layers for the years observed. The range of long-term variations of temperature increases with the depth, and in the 150-200 m layer it exceeds the range of seasonal variations 1.0°C. Classification of temperatures of the Murman Current by 5 gradations is carried out, and periods of cooling (1956-1958, 1965-1969, 1977-1981 and 1986-1987) and warming up (1951-1955, 1959-1962, 1972-1976, 1983-1984 and 1989-1995) are revealed.

It is stated that a level of water temperature in a current year is depended on processes of heat irradiation in the preceding autumn/winter period more than on indices of warming up.

Variations of a total ice index of the Barents Sea are in the back dependence on changes of temperature of the Murman Current ($r=-0.64$).

Due to long-term data, the seasonal changes of salinity are distinctly observed in the 0-50 m layer with maximum of salinity in February-April and minimum - in September. Interannual fluctuations of this parameter exceeds the seasonal ones many times. In 1951-1975, water salinity of the Murman Current was close to the standard or exceeded it, and in 1976-1995 - corresponded or was lower than long-term mean value.

Sufficient lowering of salinity in 1979-1980 coincided with the abnormal decrease of temperature caused by the weakening of advection. In 1982-1984, 1989 and 1995, the extreme lowering of salinity and increased temperature of the Murman Current were observed. It is assumed that in those years warm and less salted coastal waters of the Norwegian Current inflowed into the Barents Sea more than usually. Low correlation coefficients between temperature and salinity of the Murman Current were observed.

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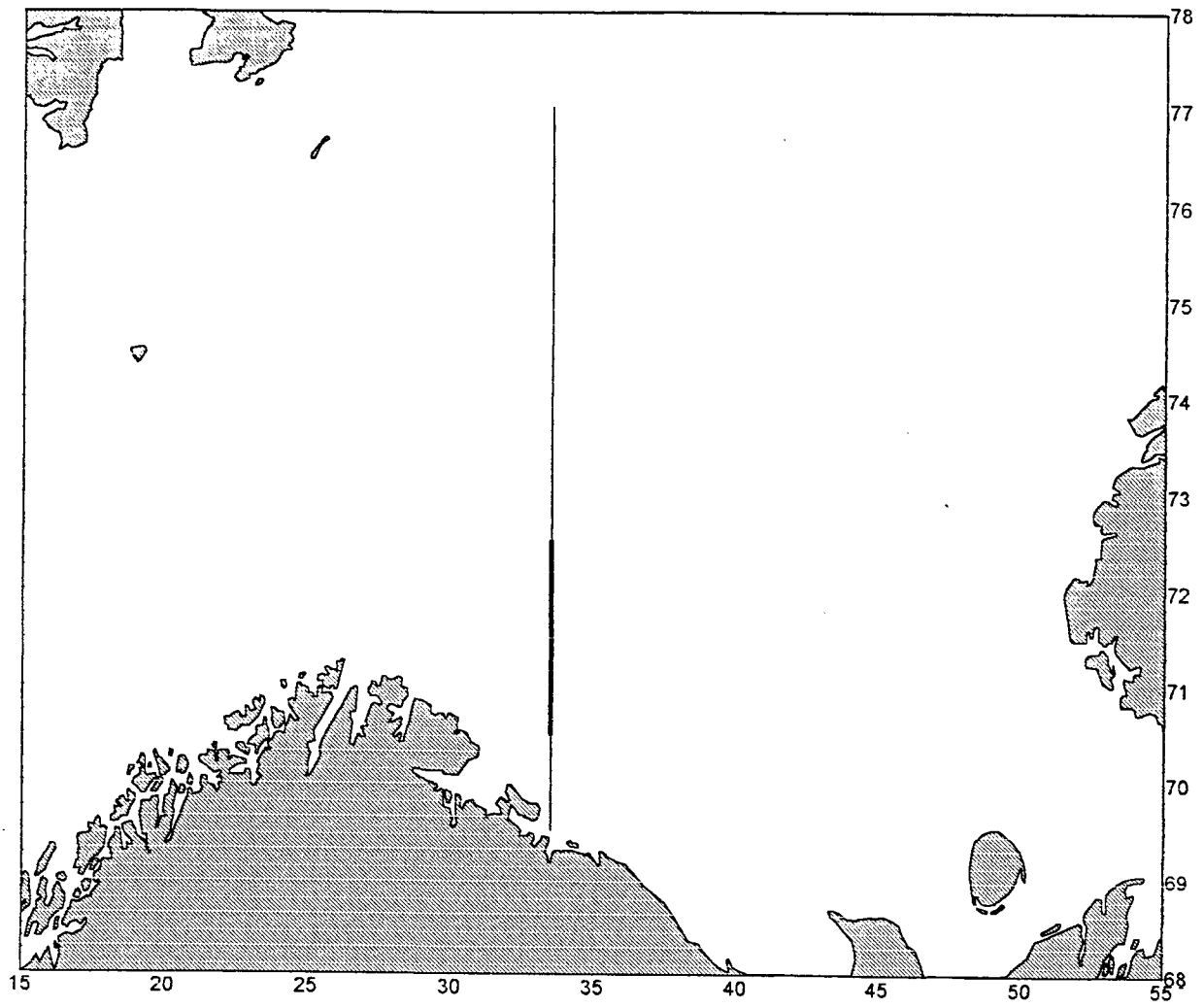


Fig. 1. Location of the Kola section in the Barents Sea.

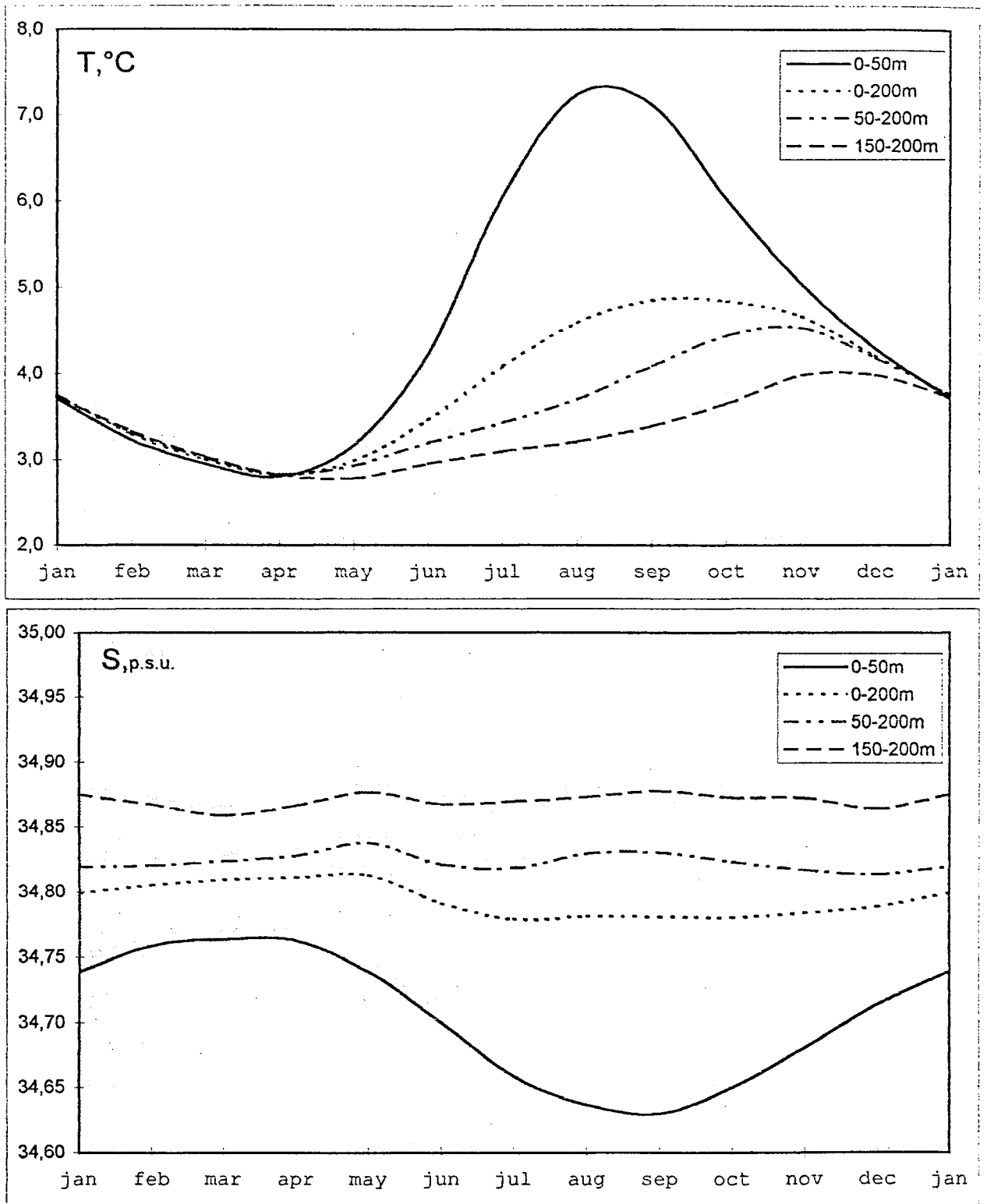


Fig. 2. Long-term mean seasonal temperature (A) and salinity (B) of the Murman Current along the Kola section in layers 0-50, 0-200, 50-200 and 150-200 m.

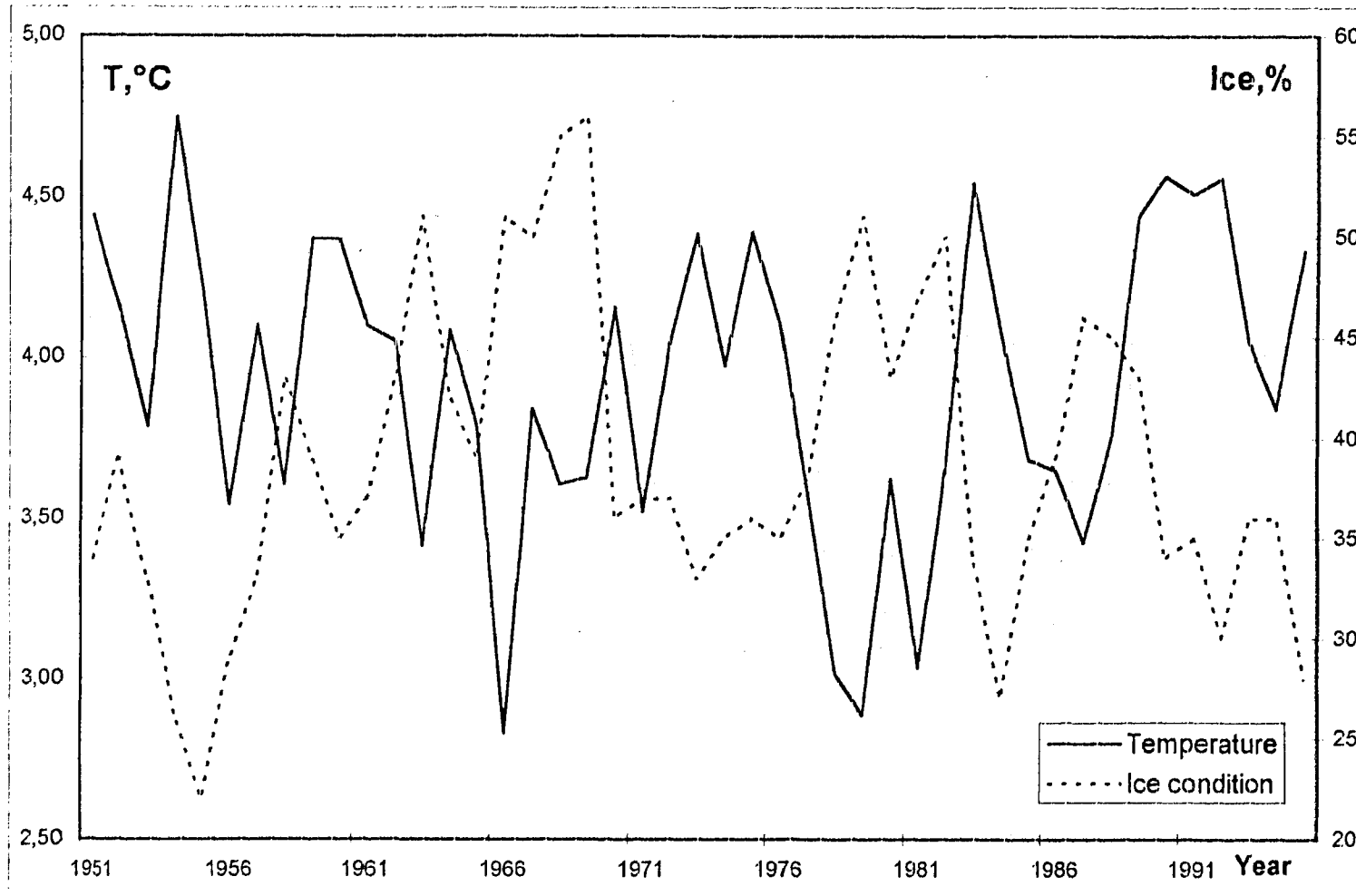


Fig. 3 Changes of temperature of the Murman Current in the 0-200 m layer in the Kola section and of ice coverage in general in the Barents Sea from 1951 to 1995.

Table 1. Frequency of observations in the Kola section
in 1951 - 1995 rr.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Per year
1951	1	1	-	1	1	1	1	2	1	1	-	1	11
1952	1	2	1	-	1	1	1	1	-	-	-	1	9
1953	1	-	1	1	-	1	-	-	1	1	1	-	7
1954	1	1	1	1	-	1	1	-	1	1	1	-	9
1955	-	1	1	1	-	-	1	2	-	1	1	1	9
1956	2	1	-	2	1	2	2	1	-	1	2	1	15
1957	3	2	1	2	1	-	2	1	1	1	1	2	17
1958	3	1	1	3	3	2	3	1	3	1	-	1	22
1959	1	-	2	2	3	1	2	1	1	2	2	1	18
1960	1	2	1	3	2	2	1	1	1	1	1	1	17
1961	1	1	2	1	1	1	2	1	-	1	2	1	14
1962	1	1	1	1	2	1	1	1	1	1	1	2	14
1963	1	1	1	1	2	1	2	1	1	1	1	1	14
1964	2	1	3	1	2	1	2	1	1	1	-	2	17
1965	1	1	1	1	2	1	2	1	2	1	1	1	15
1966	1	1	2	-	1	1	1	3	-	1	2	1	14
1967	1	2	1	1	3	-	2	2	1	-	1	2	16
1968	2	1	1	1	2	1	2	2	1	1	1	1	16
1969	1	1	-	1	2	1	2	2	-	1	2	2	15
1970	2	1	1	2	2	2	2	3	1	1	1	2	20
1971	3	2	1	3	2	1	2	2	1	1	1	1	20
1972	1	1	1	-	4	1	2	3	1	1	2	1	18
1973	-	2	2	3	3	6	2	3	1	2	3	1	28
1974	1	-	3	1	2	1	2	3	-	1	1	1	16
1975	1	1	2	3	3	2	2	3	1	1	2	2	23
1976	1	1	2	2	2	1	2	2	1	1	1	2	18
1977	1	1	1	1	3	1	2	1	3	1	1	2	18
1978	1	2	2	1	3	1	1	3	1	2	1	1	19
1979	2	2	2	1	1	1	1	1	3	2	1	2	19
1980	-	1	-	2	3	1	1	2	2	-	2	1	15
1981	1	1	1	1	2	2	3	1	2	-	2	1	17
1982	-	2	2	2	2	2	2	2	2	2	2	1	21
1983	1	2	4	2	2	-	2	4	2	1	1	2	23
1984	1	1	1	4	1	1	3	3	2	1	1	2	21
1985	1	2	1	2	3	1	2	1	3	1	1	1	19
1986	1	2	1	2	1	2	2	1	2	1	2	2	19
1987	1	2	1	1	2	1	2	2	1	1	2	2	18
1988	1	1	1	2	1	1	2	2	1	1	1	2	16
1989	1	2	1	1	2	2	1	1	2	1	2	1	17
1990	1	2	1	-	2	1	1	1	1	2	1	1	14
1991	1	1	1	-	2	1	1	1	1	1	-	1	11
1992	1	1	-	1	1	-	1	-	1	2	3	2	13
1993	1	2	-	3	1	1	2	1	-	1	1	1	14
1994	1	1	-	-	-	1	-	-	2	1	-	1	7
1995	1	-	1	1	1	1	1	-	1	-	-	1	8

Total: 721

Year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	mean year
1951	4.47	3.96	3.51	3.33	3.77	4.88	6.03	7.16	6.94	6.12	5.09	4.12	4.95
1952	3.87	3.38	3.12	2.84	3.23	4.86	7.14	7.54	7.05	6.14	5.32	4.30	4.90
1953	3.54	3.15	2.80	2.50	3.03	4.40	6.33	7.68	7.30	5.63	5.30	5.23	4.74
1954	5.00	4.30	3.78	3.60	4.04	5.05	7.20	8.07	7.13	6.39	5.22	4.54	5.36
1955	4.23	3.93	3.42	3.24	3.66	4.42	5.50	6.60	7.30	6.62	5.44	3.85	4.85
1956	3.49	3.00	2.70	2.60	2.97	4.60	6.23	7.30	6.00	5.09	4.72	4.20	4.41
1957	3.69	3.91	3.40	3.02	3.37	4.63	5.96	7.83	7.84	6.70	5.13	4.24	4.98
1958	3.75	3.03	2.70	2.63	2.73	3.71	5.67	6.48	6.73	5.40	4.84	4.38	4.34
1959	3.64	3.33	3.44	3.30	3.78	5.16	6.85	7.80	7.75	6.40	5.65	4.76	5.16
1960	4.22	3.70	3.30	3.62	3.89	4.87	6.75	7.31	7.95	5.80	4.80	4.30	5.04
1961	4.03	3.37	3.37	2.94	3.25	4.60	6.65	8.35	8.10	7.10	6.00	5.10	5.24
1962	4.08	3.70	3.35	3.15	3.12	3.69	5.95	6.85	6.65	5.65	5.25	4.60	4.67
1963	3.60	2.78	2.05	2.17	2.71	3.95	5.25	6.41	6.85	6.66	5.15	4.30	4.32
1964	3.57	3.02	3.00	3.06	3.60	4.05	6.47	7.80	7.55	6.75	5.60	4.74	4.93
1965	4.40	3.70	3.22	3.07	3.07	3.57	4.95	6.20	6.50	5.56	4.22	3.83	4.36
1966	3.20	2.48	1.77	1.45	1.95	3.15	5.50	6.65	6.20	4.70	4.00	3.62	3.72
1967	2.85	2.47	2.50	2.70	3.22	4.13	6.35	7.35	7.65	6.42	5.36	4.50	4.63
1968	3.35	3.00	2.82	2.70	2.52	3.37	5.03	5.97	5.77	4.70	3.83	3.64	3.89
1969	3.50	3.17	2.70	2.35	2.65	3.60	5.08	6.48	6.75	6.66	6.21	5.21	4.53
1970	4.25	3.70	3.48	3.32	3.43	4.48	6.18	7.48	7.75	6.29	5.05	4.30	4.98
1971	3.70	3.10	2.66	2.36	2.63	3.56	5.57	6.75	6.17	5.10	4.29	4.17	4.17
1972	3.80	3.48	3.17	3.05	3.40	4.63	7.10	8.35	8.20	6.65	5.36	4.73	5.16
1973	4.18	3.57	3.55	3.53	4.00	4.95	7.10	8.10	7.68	6.35	5.10	4.02	5.18
1974	3.67	3.33	3.05	3.02	3.20	4.56	6.45	8.09	7.98	7.30	5.42	4.28	5.03
1975	3.95	3.75	3.60	3.45	3.90	4.60	6.05	7.15	7.02	5.88	5.22	4.54	4.93
1976	3.68	3.10	3.00	2.95	3.45	4.50	6.30	7.90	7.46	5.85	4.83	4.30	4.78
1977	3.73	3.31	3.00	2.72	2.85	3.82	5.22	7.00	6.48	4.75	4.87	4.46	4.35
1978	3.56	2.90	2.46	2.10	2.45	3.45	5.16	6.45	6.10	4.53	3.70	3.45	3.86
1979	2.70	1.92	1.60	1.56	2.20	3.10	5.76	6.58	6.68	5.46	4.61	3.74	3.83
1980	3.12	2.70	2.43	2.38	2.72	4.00	5.60	7.30	7.30	6.08	4.72	3.58	4.33
1981	3.25	2.80	2.28	1.96	2.13	3.37	5.27	6.30	6.65	5.66	4.70	3.67	4.00
1982	2.87	2.45	2.41	2.44	2.95	3.75	5.45	7.05	6.64	5.56	5.05	4.67	4.27
1983	4.54	3.85	3.44	3.30	3.60	4.60	6.30	8.07	8.00	7.06	5.25	3.93	5.16
1984	3.53	3.12	3.22	2.67	3.32	5.00	6.30	7.70	7.27	6.50	5.20	4.49	4.86
1985	3.76	3.13	2.96	2.78	3.20	3.90	5.70	6.84	7.20	6.15	4.85	4.02	4.54
1986	3.40	2.78	2.56	2.41	2.70	3.90	6.09	7.33	7.20	5.72	5.24	4.51	4.49
1987	3.58	2.70	2.60	2.28	2.79	3.58	4.94	5.70	6.16	5.84	5.00	3.92	4.09
1988	3.69	3.40	2.95	2.62	3.06	4.21	6.24	7.16	6.78	5.70	4.44	3.78	4.50
1989	3.06	2.88	3.16	3.26	4.22	5.68	7.57	8.48	7.98	7.10	6.25	5.20	5.40
1990	4.12	3.82	3.36	3.56	4.10	4.86	7.10	8.12	8.12	6.60	5.55	4.76	5.34
1991	4.22	3.92	3.65	3.57	3.92	5.05	7.10	7.68	7.54	6.45	5.45	4.78	5.28
1992	4.50	4.17	4.10	3.74	4.09	4.90	6.22	7.35	7.40	6.50	5.08	4.31	5.20
1993	4.11	3.80	3.54	3.40	3.64	4.35	5.55	7.35	7.19	5.40	4.02	3.90	4.69
1994	3.64	3.24	2.98	2.81	3.16	4.41	6.20	7.50	7.40	5.88	4.85	4.03	4.68
1995	3.94	3.70	3.44	3.42	3.83	5.11	6.45	7.40	7.40	5.88	4.94	4.27	4.98
for the 1951 - 1990													
standard	3.72	3.23	2.95	2.80	3.17	4.23	6.06	7.24	7.12	6.02	5.05	4.30	4.66
sigma	0.48	0.50	0.50	0.53	0.56	0.62	0.70	0.71	0.67	0.71	0.56	0.47	0.46

Table 2. Mean water temperature of the Murman Current along the Kola section in the 0-50 m layer, °C.

Year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	mean year
1951	4,65	4,07	3,82	3,60	3,68	4,02	4,57	5,19	5,32	5,30	4,90	4,20	4,44
1952	4,00	3,65	3,40	3,04	3,26	3,94	4,68	4,77	4,97	5,10	4,92	4,28	4,17
1953	3,57	3,15	2,75	2,44	2,65	3,29	3,88	4,43	4,78	4,68	4,83	5,00	3,79
1954	4,90	4,43	4,03	3,83	3,98	4,52	5,22	5,45	5,54	5,42	5,06	4,60	4,75
1955	4,26	4,00	3,54	3,22	3,36	3,73	4,20	4,60	5,30	5,43	5,20	3,85	4,22
1956	3,52	2,90	2,67	2,52	2,67	3,23	3,90	4,32	4,32	4,12	4,25	4,08	3,54
1957	3,67	3,81	3,36	2,94	3,17	3,73	4,31	4,97	5,20	5,10	4,76	4,20	4,10
1958	3,74	3,03	2,69	2,52	2,58	3,25	3,78	4,10	4,62	4,42	4,37	4,20	3,61
1959	3,89	3,48	3,38	3,30	3,56	4,15	4,73	5,32	5,47	5,34	5,21	4,63	4,37
1960	4,32	3,73	3,25	3,38	3,66	4,33	4,81	5,27	5,48	5,24	4,65	4,30	4,37
1961	3,90	3,35	3,35	2,95	2,98	3,62	4,23	4,82	5,00	5,20	5,02	4,80	4,10
1962	4,20	3,80	3,57	3,10	3,10	3,45	3,95	4,50	4,76	4,80	4,74	4,65	4,05
1963	3,60	2,84	2,07	2,20	2,33	2,87	3,42	3,90	4,35	4,80	4,60	3,98	3,41
1964	3,45	3,02	2,95	3,00	3,14	3,50	4,45	5,10	5,05	5,35	5,30	4,70	4,08
1965	4,44	3,75	3,45	3,05	2,97	3,23	3,66	4,24	4,50	4,30	4,10	3,80	3,79
1966	3,00	2,50	1,95	1,67	1,70	2,43	3,00	3,55	3,73	3,40	3,52	3,50	2,83
1967	2,83	2,43	2,40	2,57	2,96	3,40	4,25	4,85	5,27	5,50	5,25	4,38	3,84
1968	3,72	3,16	3,04	2,93	2,95	3,15	3,80	4,20	4,60	4,45	3,70	3,60	3,61
1969	3,50	3,16	2,70	2,30	2,33	2,88	3,40	3,85	4,32	4,80	5,50	4,80	3,63
1970	4,26	3,90	3,50	3,33	3,24	3,65	4,26	4,74	5,11	4,84	4,85	4,20	4,16
1971	3,80	3,37	2,96	2,57	2,63	3,02	3,67	4,20	4,15	4,06	3,96	3,86	3,52
1972	3,70	3,46	3,08	2,95	3,02	3,65	4,22	4,77	5,25	5,07	4,81	4,58	4,05
1973	4,18	3,60	3,55	3,52	3,75	4,24	4,90	5,28	5,31	5,33	4,85	4,10	4,38
1974	3,67	3,29	2,96	2,90	3,10	3,60	4,26	4,95	5,08	5,20	4,55	4,16	3,98
1975	3,96	3,86	3,54	3,40	3,80	4,10	4,66	5,18	5,30	5,28	4,95	4,64	4,39
1976	3,88	3,44	3,10	3,00	3,42	3,78	4,37	5,00	5,45	5,05	4,60	4,20	4,11
1977	3,75	3,33	3,00	2,65	2,66	3,04	3,54	4,15	4,45	4,02	4,33	4,00	3,58
1978	3,46	2,88	2,35	2,00	2,00	2,50	3,26	3,47	3,80	3,50	3,50	3,48	3,02
1979	2,65	1,85	1,60	1,50	1,85	2,34	3,14	3,56	4,02	4,25	4,11	3,76	2,89
1980	3,40	3,18	2,72	2,55	2,76	3,30	3,92	4,30	4,70	4,71	4,36	3,60	3,63
1981	3,28	2,78	2,26	1,86	1,91	2,33	3,10	3,55	3,86	3,98	4,03	3,46	3,03
1982	2,90	2,52	2,48	2,56	2,75	3,20	3,97	4,65	4,93	4,92	4,50	4,52	3,66
1983	4,66	3,90	3,60	3,58	3,72	3,90	4,60	5,58	5,86	5,78	5,25	4,08	4,54
1984	3,68	3,37	3,10	2,87	3,20	3,77	4,27	5,00	5,10	5,36	4,86	4,38	4,08
1985	3,73	3,10	2,93	2,70	2,98	3,16	3,82	4,25	4,55	4,55	4,39	4,03	3,68
1986	3,48	2,92	2,64	2,43	2,46	3,10	3,88	4,32	4,56	4,60	4,92	4,48	3,65
1987	3,62	2,70	2,60	2,27	2,65	2,90	3,40	3,90	4,16	4,48	4,56	3,88	3,43
1988	3,64	3,30	3,14	2,86	2,98	3,48	3,94	4,48	4,58	4,67	4,14	3,80	3,75
1989	3,06	2,85	2,95	3,14	3,70	4,38	5,07	5,54	5,76	5,82	5,83	5,20	4,44
1990	4,20	3,96	3,60	3,66	3,94	4,15	4,95	5,36	5,50	5,40	5,35	4,72	4,57
1991	4,24	3,90	3,64	3,54	3,74	4,17	4,98	5,28	5,42	5,40	5,13	4,66	4,51
1992	4,40	4,20	4,17	3,72	3,90	4,35	4,78	5,12	5,40	5,60	4,80	4,24	4,56
1993	4,27	3,92	3,52	3,33	3,40	3,80	4,28	4,80	4,91	4,50	3,98	3,90	4,05
1994	3,55	3,16	2,92	2,83	3,12	3,64	4,18	4,64	4,96	4,73	4,40	3,96	3,84
1995	4,02	3,78	3,45	3,40	3,68	4,14	4,60	5,10	5,55	5,22	4,76	4,27	4,33
for the 1951 - 1990													
standa	3,75	3,30	3,00	2,82	2,99	3,46	4,09	4,59	4,85	4,84	4,66	4,22	3,88
sigma	0,50	0,53	0,53	0,54	0,58	0,56	0,56	0,59	0,55	0,58	0,53	0,43	0,47

Table 3. Mean water temperature of the Murman Current along the Kola section in the 0-200 m layer, °C.

Year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	mean year
1951	4,71	4,11	3,92	3,69	3,65	3,73	4,08	4,53	4,78	5,03	4,84	4,23	4,28
1952	4,04	3,74	3,49	3,11	3,27	3,63	3,86	3,85	4,28	4,75	4,79	4,27	3,92
1953	3,58	3,15	2,73	2,42	2,52	2,92	3,06	3,35	3,94	4,36	4,67	4,92	3,47
1954	4,87	4,47	4,11	3,91	3,96	4,34	4,56	4,58	5,01	5,10	5,01	4,62	4,54
1955	4,27	4,02	3,58	3,21	3,26	3,50	3,77	3,93	4,63	5,03	5,12	3,85	4,02
1956	3,53	2,87	2,66	2,49	2,57	2,77	3,12	3,33	3,76	3,80	4,09	4,04	3,25
1957	3,66	3,78	3,35	2,91	3,10	3,43	3,76	4,02	4,32	4,57	4,64	4,19	3,81
1958	3,74	3,03	2,69	2,48	2,53	3,10	3,15	3,31	3,92	4,09	4,21	4,14	3,37
1959	3,97	3,53	3,36	3,30	3,49	3,81	4,02	4,49	4,71	4,99	5,06	4,59	4,11
1960	4,35	3,74	3,23	3,30	3,58	4,15	4,16	4,59	4,66	5,05	4,60	4,30	4,14
1961	3,86	3,34	3,34	2,95	2,89	3,29	3,42	3,64	3,97	4,57	4,69	4,70	3,72
1962	4,24	3,83	3,64	3,08	3,09	3,37	3,28	3,72	4,13	4,52	4,57	4,67	3,85
1963	3,60	2,86	2,08	2,21	2,20	2,51	2,81	3,06	3,52	4,18	4,42	3,87	3,11
1964	3,41	3,02	2,93	2,98	2,99	3,32	3,78	4,20	4,22	4,88	5,20	4,69	3,80
1965	4,45	3,77	3,53	3,04	2,94	3,12	3,23	3,59	3,83	3,88	4,06	3,79	3,60
1966	2,93	2,51	2,01	1,74	1,62	2,19	2,17	2,52	2,91	2,97	3,36	3,46	2,53
1967	2,82	2,42	2,37	2,53	2,87	3,16	3,55	4,02	4,48	5,19	5,21	4,34	3,58
1968	3,84	3,21	3,11	3,01	3,09	3,08	3,39	3,61	4,21	4,37	3,66	3,59	3,51
1969	3,50	3,16	2,70	2,28	2,22	2,64	2,84	2,97	3,51	4,18	5,26	4,66	3,33
1970	4,26	3,97	3,51	3,33	3,18	3,37	3,62	3,83	4,23	4,36	4,78	4,17	3,88
1971	3,83	3,46	3,06	2,64	2,63	2,84	3,04	3,35	3,48	3,71	3,85	3,76	3,30
1972	3,67	3,45	3,05	2,92	2,89	3,32	3,26	3,58	4,27	4,54	4,63	4,53	3,68
1973	4,18	3,61	3,55	3,52	3,67	4,00	4,17	4,34	4,52	4,99	4,77	4,13	4,12
1974	3,67	3,28	2,93	2,86	3,07	3,28	3,53	3,90	4,11	4,50	4,26	4,12	3,63
1975	3,96	3,90	3,52	3,38	3,77	3,93	4,20	4,52	4,73	5,08	4,86	4,67	4,21
1976	3,95	3,55	3,13	3,02	3,41	3,54	3,73	4,03	4,78	4,78	4,52	4,17	3,88
1977	3,76	3,34	3,00	2,63	2,60	2,78	2,98	3,20	3,77	3,78	4,15	3,85	3,32
1978	3,43	2,87	2,31	1,97	1,85	2,18	2,63	2,48	3,03	3,16	3,43	3,49	2,74
1979	2,63	1,83	1,60	1,48	1,73	2,09	2,27	2,55	3,13	3,85	3,94	3,77	2,57
1980	3,49	3,34	2,82	2,61	2,77	3,07	3,36	3,30	3,83	4,25	4,24	3,61	3,39
1981	3,29	2,77	2,25	1,83	1,84	1,98	2,38	2,63	2,93	3,42	3,81	3,39	2,71
1982	2,91	2,54	2,50	2,60	2,68	3,02	3,48	3,85	4,36	4,71	4,32	4,47	3,45
1983	4,70	3,92	3,65	3,67	3,76	3,67	4,03	4,75	5,15	5,35	5,25	4,13	4,34
1984	3,73	3,45	3,06	2,94	3,16	3,36	3,59	4,10	4,38	4,98	4,75	4,34	3,82
1985	3,72	3,09	2,92	2,67	2,91	2,91	3,19	3,39	3,67	4,02	4,24	4,03	3,40
1986	3,51	2,97	2,67	2,44	2,38	2,83	3,14	3,32	3,68	4,23	4,81	4,47	3,37
1987	3,63	2,70	2,60	2,27	2,60	2,67	2,89	3,30	3,49	4,03	4,41	3,87	3,21
1988	3,62	3,27	3,20	2,94	2,95	3,24	3,17	3,59	3,85	4,33	4,04	3,81	3,50
1989	3,06	2,84	2,88	3,10	3,53	3,95	4,24	4,56	5,02	5,39	5,69	5,20	4,12
1990	4,23	4,01	3,68	3,69	3,89	3,91	4,23	4,44	4,63	5,00	5,28	4,71	4,31
1991	4,25	3,89	3,64	3,53	3,68	3,88	4,27	4,48	4,71	5,05	5,02	4,62	4,25
1992	4,37	4,21	4,19	3,71	3,84	4,17	4,30	4,38	4,73	5,30	4,71	4,22	4,34
1993	4,32	3,96	3,51	3,31	3,32	3,62	3,86	3,95	4,15	4,20	3,97	3,90	3,84
1994	3,52	3,13	2,90	2,84	3,11	3,38	3,51	3,69	4,15	4,35	4,25	3,94	3,56
1995	4,05	3,81	3,45	3,39	3,63	3,82	3,98	4,33	4,93	5,00	4,70	4,27	4,11
for the 1951 - 1990													
standard	3,77	3,32	3,02	2,83	2,93	3,20	3,43	3,71	4,10	4,45	4,54	4,19	3,62
sigma	0,51	0,54	0,55	0,55	0,60	0,57	0,57	0,62	0,58	0,59	0,54	0,43	0,49

Table 4. Mean water temperature of the Murman Current along the Kola section in the 50-200 m layer, °C.

Year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	mean year
1951	4,70	4,06	3,75	3,66	3,62	3,70	3,90	3,99	4,19	4,46	4,45	4,28	4,06
1952	4,16	4,22	3,95	3,47	3,34	3,50	3,58	3,50	3,65	4,11	4,40	4,20	3,84
1953	3,63	3,24	2,87	2,36	2,41	2,62	2,70	2,73	2,90	3,60	3,95	4,35	3,11
1954	4,68	4,55	4,40	4,05	3,90	4,13	4,29	4,34	4,38	4,46	4,82	4,95	4,41
1955	4,51	4,06	3,78	3,12	3,00	3,14	3,55	3,55	3,91	4,16	4,70	3,80	3,77
1956	3,62	2,91	2,64	2,44	2,46	2,60	2,84	2,85	2,78	3,00	3,64	4,00	2,98
1957	3,65	3,74	3,30	2,86	2,88	3,07	3,34	3,32	3,64	3,71	4,17	4,08	3,48
1958	3,68	2,95	2,71	2,33	2,12	2,23	2,72	2,97	3,24	3,42	3,80	3,72	2,99
1959	3,86	3,60	3,32	3,30	3,26	3,54	3,46	3,80	4,05	4,22	4,54	4,32	3,77
1960	4,30	3,70	3,10	3,33	3,33	3,75	3,74	3,90	4,00	4,30	4,33	4,15	3,83
1961	3,88	3,27	3,36	2,73	2,60	3,10	3,15	3,15	3,25	4,00	3,95	4,15	3,38
1962	3,90	3,85	3,70	2,97	3,00	3,40	3,22	3,50	3,45	3,82	4,00	4,55	3,61
1963	3,65	2,73	1,87	2,25	2,00	2,22	2,50	2,30	2,53	2,83	3,63	3,40	2,66
1964	3,15	2,67	2,80	2,95	2,85	3,35	3,45	3,75	3,50	4,10	4,20	4,40	3,43
1965	4,50	3,92	3,55	3,22	2,95	2,92	3,06	3,35	3,30	3,33	3,75	3,60	3,45
1966	2,90	2,50	2,20	1,87	1,45	1,95	1,96	2,05	2,18	2,40	2,90	3,32	2,31
1967	2,84	2,38	2,38	2,42	2,67	3,00	3,10	3,34	3,45	3,74	3,93	4,00	3,10
1968	3,92	3,26	3,16	3,20	3,00	2,75	3,12	3,34	3,36	3,55	3,60	3,54	3,32
1969	3,54	3,17	2,70	2,25	1,90	2,33	2,50	2,36	2,67	3,04	4,07	4,07	2,88
1970	4,25	3,95	3,47	3,25	3,00	3,08	3,25	3,27	3,50	3,59	4,20	3,85	3,56
1971	3,98	3,52	3,08	2,75	2,63	2,59	2,85	2,82	2,93	3,15	3,52	3,61	3,12
1972	3,46	3,38	3,00	2,75	2,76	3,10	3,13	3,30	3,67	3,75	3,65	4,20	3,35
1973	3,97	3,53	3,45	3,25	3,60	3,85	3,75	3,87	4,04	4,33	4,30	4,00	3,83
1974	3,66	3,28	2,80	2,84	2,90	3,01	3,25	3,47	3,40	3,55	3,58	4,06	3,32
1975	3,90	3,95	3,43	3,35	3,50	3,75	3,92	4,00	3,97	4,32	4,46	4,60	3,93
1976	3,95	3,55	3,25	3,15	3,40	3,28	3,42	3,52	3,95	4,29	4,06	3,99	3,65
1977	3,72	3,47	3,02	2,56	2,36	2,32	2,53	2,74	3,05	3,00	3,50	3,36	2,97
1978	3,25	2,77	2,27	1,86	1,62	2,02	2,20	2,00	2,46	2,30	3,00	3,28	2,42
1979	2,55	1,76	1,56	1,36	1,45	1,65	1,87	2,03	2,40	2,82	3,24	3,45	2,18
1980	3,46	3,64	3,02	2,80	2,60	2,88	2,92	2,68	3,35	3,70	3,88	3,60	3,21
1981	3,35	2,70	2,20	1,70	1,69	1,76	1,87	2,10	2,28	2,56	2,97	3,07	2,35
1982	2,76	2,60	2,54	2,58	2,53	2,80	3,15	3,28	3,52	3,85	3,90	4,37	3,16
1983	4,48	3,95	3,65	3,82	3,85	3,72	3,96	4,20	4,21	4,40	4,63	4,27	4,10
1984	4,06	3,70	3,10	3,10	3,25	3,10	3,30	3,75	3,80	4,20	4,42	4,19	3,66
1985	3,78	2,98	2,86	2,60	2,73	2,72	2,82	3,10	3,25	3,30	3,58	3,86	3,13
1986	3,53	3,11	2,69	2,38	1,98	2,55	2,75	2,76	2,92	3,20	4,04	4,04	3,00
1987	3,58	2,64	2,58	2,26	2,55	2,50	2,54	2,89	2,94	3,27	3,78	3,61	2,93
1988	3,61	3,15	3,14	2,95	2,82	3,06	2,76	3,08	3,22	3,68	3,71	3,60	3,23
1989	2,95	2,84	2,93	2,90	3,30	3,40	3,64	3,68	4,16	4,37	5,00	4,97	3,68
1990	4,15	4,10	3,80	3,76	3,80	3,67	3,94	4,08	4,20	4,38	4,90	4,63	4,12
1991	4,20	3,78	3,57	3,45	3,48	3,63	3,95	3,96	3,98	4,26	4,44	4,32	3,92
1992	4,20	4,12	4,20	3,70	3,68	3,78	3,89	3,94	4,12	4,56	4,45	4,04	4,06
1993	4,37	4,10	3,74	3,35	3,12	3,26	3,52	3,50	3,63	3,76	3,86	3,87	3,67
1994	3,46	3,06	2,80	2,80	2,90	3,18	3,22	3,24	3,46	3,64	3,90	3,88	3,30
1995	3,98	3,85	3,42	3,30	3,56	3,60	3,66	3,90	4,06	4,17	4,24	4,14	3,82
for the 1951 - 1990													
standard	3,74	3,33	3,03	2,82	2,78	2,95	3,10	3,22	3,39	3,66	3,98	3,99	3,33
sigma	0,52	0,60	0,59	0,59	0,65	0,61	0,59	0,62	0,59	0,60	0,51	0,45	0,52

Table 5. Mean water temperature of the Murman Current along the Kola section in the 150-200 m layer, °C.

Year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	mean year
1951	34,68	34,75	34,79	34,83	34,80	34,70	34,57	34,78	34,70	34,73	34,75	34,76	34,74
1952	34,85	34,80	34,80	34,80	34,75	34,72	34,63	34,59	34,57	34,60	34,67	34,69	34,71
1953	34,79	34,90	34,96	34,91	34,86	34,81	34,80	34,80	34,80	34,81	34,82	34,79	34,84
1954	34,67	34,57	34,60	34,64	34,65	34,57	34,49	34,44	34,50	34,60	34,70	34,72	34,60
1955	34,73	34,74	34,88	34,89	34,84	34,79	34,73	34,77	34,70	34,63	34,69	34,82	34,77
1956	34,79	34,83	34,88	34,84	34,75	34,80	34,79	34,73	34,74	34,78	34,86	34,94	34,81
1957	34,94	34,87	34,92	34,90	34,92	34,88	34,79	34,77	34,75	34,72	34,70	34,76	34,83
1958	34,83	34,84	34,81	34,89	34,84	34,73	34,65	34,62	34,57	34,62	34,63	34,58	34,72
1959	34,67	34,68	34,60	34,55	34,65	34,62	34,61	34,58	34,64	34,72	34,74	34,69	34,65
1960	34,71	34,87	34,91	34,98	34,84	34,87	34,83	34,87	34,86	34,86	34,94	34,91	34,87
1961	34,97	35,03	34,97	34,98	34,94	34,86	34,80	34,69	34,61	34,60	34,63	34,69	34,81
1962	34,73	34,78	34,77	34,82	34,73	34,84	34,69	34,56	34,60	34,70	34,79	34,86	34,74
1963	34,79	34,86	34,69	34,72	34,71	34,67	34,65	34,69	34,65	34,66	34,78	34,79	34,72
1964	34,85	34,76	34,78	34,82	34,74	34,67	34,65	34,66	34,69	34,74	34,66	34,67	34,72
1965	34,73	34,77	34,78	34,79	34,81	34,77	34,82	34,74	34,72	34,77	34,78	34,82	34,78
1966	34,83	34,80	34,79	34,79	34,79	34,62	34,61	34,61	34,61	34,66	34,72	34,78	34,72
1967	34,75	34,82	34,77	34,69	34,60	34,58	34,53	34,52	34,48	34,49	34,54	34,52	34,61
1968	34,51	34,67	34,75	34,72	34,70	34,72	34,65	34,66	34,70	34,70	34,75	34,86	34,70
1969	34,94	34,97	34,94	34,86	34,76	34,76	34,67	34,65	34,65	34,67	34,73	34,85	34,79
1970	34,85	34,95	34,96	34,97	34,97	34,86	34,88	34,85	34,96	34,89	34,77	34,75	34,89
1971	34,77	34,73	34,78	34,79	34,69	34,66	34,68	34,68	34,69	34,72	34,75	34,79	34,73
1972	34,82	34,88	34,88	34,88	34,88	34,82	34,75	34,73	34,71	34,70	34,68	34,68	34,78
1973	34,73	34,80	34,80	34,83	34,86	34,84	34,78	34,73	34,68	34,66	34,74	34,78	34,77
1974	34,84	34,83	34,81	34,82	34,83	34,77	34,72	34,65	34,59	34,58	34,68	34,79	34,74
1975	34,75	34,79	34,76	34,76	34,72	34,68	34,68	34,64	34,68	34,77	34,64	34,62	34,71
1976	34,62	34,54	34,55	34,60	34,55	34,56	34,59	34,62	34,70	34,75	34,74	34,70	34,63
1977	34,75	34,78	34,83	34,83	34,87	34,79	34,77	34,72	34,75	34,77	34,69	34,71	34,77
1978	34,74	34,78	34,79	34,79	34,78	34,68	34,61	34,63	34,53	34,60	34,66	34,70	34,69
1979	34,74	34,76	34,74	34,69	34,68	34,65	34,59	34,56	34,45	34,51	34,46	34,49	34,61
1980	34,50	34,53	34,56	34,55	34,57	34,50	34,50	34,50	34,47	34,49	34,57	34,65	34,53
1981	34,74	34,73	34,77	34,79	34,76	34,69	34,64	34,56	34,55	34,53	34,52	34,65	34,66
1982	34,68	34,69	34,65	34,58	34,54	34,52	34,51	34,51	34,53	34,56	34,59	34,53	34,57
1983	34,54	34,57	34,57	34,57	34,56	34,56	34,54	34,43	34,59	34,48	34,53	34,64	34,55
1984	34,50	34,53	34,69	34,60	34,60	34,59	34,56	34,50	34,50	34,54	34,65	34,73	34,58
1985	34,78	34,80	34,80	34,81	34,80	34,71	34,56	34,57	34,60	34,55	34,63	34,67	34,69
1986	34,73	34,67	34,73	34,71	34,70	34,68	34,60	34,59	34,55	34,60	34,58	34,61	34,65
1987	34,69	34,72	34,68	34,75	34,69	34,68	34,66	34,63	34,60	34,70	34,80	34,82	34,70
1988	34,82	34,75	34,65	34,65	34,69	34,58	34,57	34,47	34,44	34,45	34,50	34,55	34,59
1989	34,60	34,54	34,49	34,46	34,47	34,50	34,50	34,51	34,49	34,53	34,54	34,55	34,52
1990	34,61	34,68	34,67	34,66	34,66	34,70	34,69	34,65	34,59	34,57	34,64	34,66	34,65
1991	34,75	34,68	34,66	34,66	34,67	34,65	34,62	34,63	34,62	34,64	34,66	34,68	34,66
1992	34,78	34,76	34,79	34,82	34,79	34,73	34,68	34,63	34,58	34,56	34,65	34,75	34,71
1993	34,70	34,70	34,74	34,78	34,80	34,80	34,75	34,57	34,57	34,68	34,73	34,82	34,72
1994	34,88	34,91	34,86	34,86	34,84	34,80	34,76	34,74	34,74	34,74	34,74	34,71	34,80
1995	34,56	34,55	34,63	34,65	34,67	34,62	34,55	34,50	34,49	34,52	34,56	34,61	34,58
for the 1951 - 1990													
standa	34,74	34,76	34,76	34,76	34,74	34,70	34,66	34,64	34,63	34,65	34,68	34,71	34,70
sigma	0,11	0,12	0,12	0,13	0,12	0,11	0,10	0,11	0,11	0,11	0,10	0,11	0,09

Table 6. Mean water salinity of the Murman Current along the Kola section in the 0-50 m layer, p.s.u.

Year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	mean year
1951	34,79	34,79	34,84	34,90	34,98	34,78	34,73	34,93	34,83	34,79	34,79	34,82	34,83
1952	34,91	34,93	34,90	34,85	34,82	34,85	34,89	34,83	34,79	34,79	34,80	34,79	34,85
1953	34,79	34,92	34,97	34,92	34,90	34,89	34,89	34,88	34,89	34,89	34,90	34,88	34,89
1954	34,78	34,67	34,70	34,74	34,75	34,73	34,69	34,64	34,64	34,67	34,73	34,77	34,71
1955	34,79	34,81	34,92	34,89	34,85	34,83	34,81	34,87	34,84	34,75	34,83	34,86	34,84
1956	34,80	34,85	34,91	34,85	34,80	34,86	34,85	34,80	34,80	34,84	34,88	34,98	34,85
1957	34,96	34,89	34,94	34,90	34,95	34,92	34,85	34,88	34,85	34,88	34,81	34,82	34,89
1958	34,87	34,85	34,83	34,90	34,89	34,81	34,80	34,79	34,70	34,73	34,74	34,72	34,80
1959	34,78	34,75	34,66	34,65	34,73	34,72	34,73	34,74	34,77	34,82	34,84	34,77	34,75
1960	34,79	34,91	34,93	35,00	34,88	34,92	34,91	34,92	34,92	34,92	34,97	34,92	34,92
1961	34,97	35,04	34,98	35,00	34,96	34,92	34,90	34,89	34,85	34,80	34,83	34,79	34,91
1962	34,83	34,86	34,87	34,87	34,85	34,87	34,82	34,73	34,76	34,85	34,86	34,88	34,84
1963	34,80	34,82	34,72	34,74	34,78	34,75	34,74	34,77	34,75	34,78	34,82	34,81	34,77
1964	34,87	34,80	34,82	34,84	34,81	34,77	34,77	34,83	34,91	34,90	34,83	34,80	34,83
1965	34,82	34,84	34,85	34,85	34,86	34,84	34,88	34,85	34,85	34,85	34,82	34,85	34,85
1966	34,87	34,84	34,86	34,85	34,82	34,75	34,73	34,74	34,73	34,74	34,76	34,80	34,79
1967	34,79	34,84	34,80	34,76	34,74	34,73	34,70	34,72	34,70	34,68	34,69	34,72	34,74
1968	34,70	34,72	34,82	34,84	34,81	34,83	34,79	34,80	34,82	34,80	34,83	34,92	34,81
1969	34,94	34,97	34,94	34,89	34,86	34,86	34,81	34,82	34,82	34,81	34,84	34,89	34,87
1970	34,90	34,97	34,98	34,99	34,99	34,91	34,94	34,91	35,02	34,96	34,85	34,83	34,94
1971	34,86	34,80	34,82	34,83	34,81	34,79	34,81	34,82	34,83	34,84	34,85	34,85	34,83
1972	34,86	34,88	34,90	34,91	34,90	34,88	34,85	34,86	34,87	34,86	34,84	34,80	34,87
1973	34,81	34,83	34,83	34,88	34,90	34,90	34,87	34,85	34,83	34,80	34,84	34,84	34,85
1974	34,87	34,88	34,85	34,85	34,87	34,83	34,82	34,81	34,80	34,78	34,81	34,85	34,84
1975	34,82	34,83	34,80	34,79	34,83	34,76	34,77	34,76	34,80	34,85	34,77	34,72	34,79
1976	34,73	34,65	34,64	34,66	34,67	34,69	34,71	34,72	34,75	34,78	34,78	34,75	34,71
1977	34,78	34,81	34,84	34,85	34,88	34,84	34,84	34,82	34,83	34,84	34,79	34,75	34,82
1978	34,76	34,78	34,80	34,82	34,82	34,75	34,71	34,72	34,73	34,72	34,69	34,74	34,75
1979	34,76	34,76	34,76	34,71	34,73	34,71	34,69	34,69	34,67	34,65	34,64	34,60	34,70
1980	34,62	34,66	34,64	34,66	34,67	34,65	34,70	34,67	34,64	34,64	34,67	34,71	34,66
1981	34,77	34,74	34,77	34,80	34,79	34,77	34,73	34,71	34,73	34,71	34,71	34,75	34,75
1982	34,73	34,71	34,70	34,67	34,67	34,68	34,69	34,68	34,68	34,71	34,70	34,70	34,69
1983	34,75	34,75	34,68	34,70	34,70	34,71	34,69	34,64	34,75	34,73	34,69	34,71	34,71
1984	34,61	34,64	34,71	34,65	34,69	34,72	34,71	34,70	34,69	34,68	34,74	34,78	34,69
1985	34,80	34,81	34,80	34,82	34,86	34,77	34,66	34,74	34,77	34,75	34,76	34,77	34,78
1986	34,78	34,74	34,79	34,79	34,78	34,77	34,74	34,75	34,75	34,76	34,72	34,73	34,76
1987	34,71	34,74	34,72	34,78	34,80	34,77	34,78	34,78	34,76	34,82	34,85	34,84	34,78
1988	34,85	34,78	34,74	34,74	34,77	34,72	34,73	34,73	34,68	34,64	34,65	34,63	34,72
1989	34,68	34,63	34,61	34,61	34,63	34,65	34,64	34,67	34,68	34,69	34,69	34,66	34,65
1990	34,67	34,73	34,74	34,71	34,72	34,75	34,78	34,78	34,75	34,72	34,74	34,75	34,74
1991	34,78	34,72	34,70	34,72	34,78	34,78	34,75	34,73	34,76	34,76	34,76	34,77	34,75
1992	34,84	34,80	34,80	34,83	34,85	34,81	34,75	34,70	34,71	34,79	34,77	34,81	34,79
1993	34,80	34,75	34,79	34,82	34,84	34,86	34,81	34,76	34,77	34,80	34,78	34,86	34,80
1994	34,89	34,91	34,90	34,90	34,90	34,88	34,86	34,84	34,82	34,82	34,80	34,75	34,86
1995	34,67	34,66	34,69	34,73	34,76	34,77	34,73	34,67	34,65	34,66	34,68	34,71	34,70
for the 1951 - 1990													
standa	34,80	34,81	34,81	34,81	34,81	34,79	34,78	34,78	34,78	34,78	34,78	34,79	34,79
sigma	0,08	0,09	0,10	0,10	0,09	0,08	0,08	0,08	0,08	0,08	0,07	0,08	0,07

Table 7. Mean water salinity of the Murman Current along the Kola section
in the 0-200 m layer, p.s.u.

Year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	mean year
1951	34,83	34,80	34,86	34,92	35,04	34,81	34,78	34,98	34,87	34,81	34,80	34,84	34,86
1952	34,93	34,97	34,93	34,87	34,84	34,89	34,98	34,91	34,86	34,85	34,84	34,82	34,89
1953	34,79	34,93	34,97	34,92	34,91	34,92	34,92	34,91	34,92	34,92	34,93	34,91	34,91
1954	34,82	34,70	34,73	34,77	34,78	34,78	34,76	34,71	34,69	34,69	34,74	34,79	34,75
1955	34,81	34,83	34,93	34,89	34,85	34,84	34,84	34,90	34,89	34,79	34,88	34,87	34,86
1956	34,80	34,86	34,92	34,85	34,82	34,88	34,87	34,82	34,82	34,86	34,89	34,99	34,87
1957	34,97	34,90	34,95	34,90	34,96	34,93	34,87	34,92	34,88	34,93	34,85	34,84	34,91
1958	34,88	34,85	34,84	34,90	34,91	34,84	34,85	34,85	34,74	34,77	34,78	34,77	34,83
1959	34,82	34,77	34,68	34,68	34,76	34,75	34,77	34,79	34,81	34,85	34,87	34,80	34,78
1960	34,82	34,92	34,94	35,01	34,89	34,94	34,94	34,94	34,94	34,94	34,98	34,92	34,93
1961	34,97	35,04	34,98	35,01	34,97	34,94	34,93	34,96	34,93	34,87	34,90	34,82	34,94
1962	34,86	34,89	34,90	34,89	34,89	34,88	34,86	34,79	34,81	34,90	34,88	34,89	34,87
1963	34,80	34,81	34,73	34,75	34,80	34,78	34,77	34,80	34,78	34,82	34,83	34,82	34,79
1964	34,88	34,81	34,83	34,85	34,83	34,80	34,81	34,89	34,98	34,95	34,89	34,84	34,86
1965	34,85	34,86	34,87	34,87	34,88	34,86	34,90	34,89	34,89	34,88	34,83	34,86	34,87
1966	34,88	34,85	34,88	34,87	34,83	34,79	34,77	34,78	34,77	34,77	34,77	34,81	34,81
1967	34,80	34,85	34,81	34,78	34,79	34,78	34,76	34,79	34,77	34,74	34,74	34,79	34,78
1968	34,76	34,74	34,84	34,88	34,85	34,87	34,84	34,85	34,86	34,83	34,86	34,94	34,84
1969	34,94	34,97	34,94	34,90	34,89	34,89	34,86	34,88	34,88	34,86	34,88	34,90	34,90
1970	34,92	34,98	34,99	35,00	35,00	34,93	34,96	34,93	35,04	34,98	34,88	34,86	34,96
1971	34,89	34,82	34,83	34,84	34,85	34,83	34,85	34,87	34,88	34,88	34,88	34,87	34,86
1972	34,87	34,88	34,91	34,92	34,91	34,90	34,88	34,90	34,92	34,91	34,89	34,84	34,89
1973	34,84	34,84	34,84	34,90	34,91	34,92	34,90	34,89	34,88	34,85	34,87	34,86	34,88
1974	34,88	34,90	34,86	34,86	34,88	34,85	34,85	34,86	34,87	34,85	34,85	34,87	34,87
1975	34,84	34,84	34,81	34,80	34,87	34,79	34,80	34,80	34,84	34,88	34,81	34,75	34,82
1976	34,77	34,69	34,67	34,68	34,71	34,73	34,75	34,75	34,77	34,79	34,79	34,77	34,74
1977	34,79	34,82	34,84	34,86	34,88	34,86	34,86	34,85	34,86	34,86	34,82	34,76	34,84
1978	34,77	34,78	34,80	34,83	34,83	34,77	34,74	34,75	34,80	34,76	34,70	34,75	34,77
1979	34,77	34,76	34,77	34,72	34,75	34,73	34,72	34,73	34,74	34,70	34,70	34,64	34,73
1980	34,66	34,70	34,67	34,70	34,70	34,70	34,77	34,73	34,70	34,69	34,70	34,73	34,70
1981	34,78	34,74	34,77	34,80	34,80	34,80	34,76	34,76	34,79	34,77	34,77	34,78	34,78
1982	34,75	34,72	34,72	34,70	34,71	34,73	34,75	34,74	34,73	34,76	34,74	34,76	34,73
1983	34,82	34,81	34,72	34,74	34,75	34,76	34,74	34,71	34,80	34,81	34,74	34,73	34,76
1984	34,65	34,68	34,72	34,67	34,72	34,76	34,76	34,77	34,75	34,73	34,77	34,80	34,73
1985	34,81	34,81	34,80	34,82	34,88	34,79	34,69	34,80	34,83	34,82	34,80	34,80	34,80
1986	34,80	34,76	34,81	34,82	34,81	34,80	34,79	34,80	34,82	34,81	34,77	34,77	34,80
1987	34,72	34,75	34,73	34,79	34,84	34,80	34,82	34,83	34,81	34,86	34,87	34,85	34,81
1988	34,86	34,79	34,77	34,77	34,80	34,77	34,78	34,82	34,76	34,70	34,70	34,66	34,77
1989	34,71	34,66	34,65	34,66	34,68	34,70	34,69	34,72	34,74	34,74	34,74	34,70	34,70
1990	34,69	34,75	34,76	34,73	34,74	34,77	34,81	34,82	34,80	34,77	34,77	34,78	34,77
1991	34,79	34,73	34,71	34,74	34,82	34,82	34,79	34,76	34,81	34,80	34,79	34,80	34,78
1992	34,86	34,81	34,80	34,83	34,87	34,84	34,77	34,72	34,75	34,87	34,00	81,00	38,59
1993	34,83	34,77	34,81	34,83	34,85	34,88	34,83	34,82	34,84	34,84	34,80	34,87	34,83
1994	34,89	34,91	34,91	34,91	34,92	34,91	34,89	34,87	34,85	34,85	34,82	34,76	34,87
1995	34,71	34,70	34,71	34,76	34,79	34,82	34,79	34,73	34,70	34,71	34,72	34,74	34,74
for the 1951 - 1990													
standa	34,82	34,82	34,82	34,83	34,84	34,82	34,82	34,83	34,83	34,82	34,82	34,81	34,82
sigma	0,08	0,09	0,09	0,09	0,08	0,07	0,07	0,07	0,08	0,07	0,07	0,07	0,07

Table 8. Mean water salinity of the Murman Current along the Kola section in the 50-200 m layer, p.s.u.

Year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	mean year
1951	34,94	34,84	34,91	35,00	35,06	34,93	35,00	35,04	34,96	34,87	34,84	34,89	34,94
1952	35,02	35,08	35,02	34,94	34,92	34,95	35,00	34,95	34,92	34,92	34,92	34,89	34,96
1953	34,88	34,95	34,98	34,95	34,95	34,95	34,96	34,97	34,98	34,99	34,99	34,96	34,96
1954	34,88	34,80	34,81	34,83	34,85	34,84	34,84	34,80	34,80	34,83	34,81	34,84	34,83
1955	34,86	34,89	34,96	34,90	34,91	34,92	34,90	34,93	34,93	34,90	34,95	34,89	34,91
1956	34,82	34,90	34,94	34,84	34,83	34,91	34,90	34,86	34,85	34,87	34,91	35,00	34,89
1957	34,98	34,91	34,95	34,90	34,98	34,95	34,90	34,92	34,96	34,98	34,86	34,87	34,93
1958	34,90	34,87	34,84	34,92	34,91	34,87	34,89	34,87	34,81	34,84	34,84	34,83	34,87
1959	34,91	34,85	34,70	34,76	34,83	34,79	34,85	34,81	34,78	34,76	34,88	34,83	34,81
1960	34,90	34,95	34,93	35,00	34,90	34,93	34,96	34,94	34,94	34,96	34,99	34,93	34,94
1961	34,98	35,04	35,00	35,01	34,96	34,97	34,96	34,99	34,97	34,93	34,95	34,91	34,97
1962	34,95	34,96	34,94	34,94	34,93	34,96	34,93	34,83	34,87	34,97	34,92	34,85	34,92
1963	34,84	34,86	34,75	34,82	34,86	34,81	34,80	34,86	34,85	34,86	34,86	34,82	34,83
1964	34,92	34,80	34,85	34,87	34,84	34,85	34,87	34,96	35,08	35,04	34,97	34,93	34,92
1965	34,94	34,91	34,90	34,92	34,92	34,88	34,95	34,90	34,94	34,92	34,86	34,91	34,91
1966	34,88	34,87	34,89	34,90	34,88	34,83	34,84	34,84	34,82	34,82	34,82	34,83	34,85
1967	34,83	34,87	34,82	34,81	34,83	34,86	34,82	34,83	34,81	34,80	34,82	34,83	34,83
1968	34,88	34,86	34,93	34,95	34,95	34,92	34,91	34,90	34,91	34,90	34,90	34,95	34,91
1969	34,98	34,98	34,94	34,91	34,90	34,93	34,89	34,90	34,92	34,90	34,93	34,95	34,93
1970	34,91	34,98	34,99	34,99	35,00	34,93	34,96	34,93	35,05	34,97	34,88	34,85	34,95
1971	34,95	34,91	34,89	34,88	34,88	34,90	34,92	34,94	34,94	34,95	34,96	34,97	34,92
1972	34,90	34,90	34,91	34,93	34,93	34,94	34,91	34,92	34,94	34,94	34,94	34,93	34,92
1973	34,91	34,90	34,86	34,89	34,93	34,92	34,93	34,95	34,93	34,86	34,95	34,91	34,91
1974	34,91	34,91	34,90	34,89	34,91	34,88	34,89	34,90	34,90	34,89	34,88	34,89	34,90
1975	34,89	34,88	34,84	34,85	34,90	34,85	34,84	34,86	34,90	34,90	34,89	34,83	34,87
1976	34,83	34,76	34,76	34,80	34,80	34,80	34,83	34,82	34,82	34,87	34,82	34,84	34,81
1977	34,84	34,85	34,87	34,86	34,90	34,88	34,89	34,87	34,89	34,87	34,89	34,83	34,87
1978	34,79	34,83	34,80	34,83	34,83	34,79	34,80	34,80	34,78	34,80	34,76	34,79	34,80
1979	34,78	34,78	34,80	34,72	34,76	34,76	34,76	34,76	34,75	34,73	34,78	34,71	34,76
1980	34,76	34,80	34,76	34,78	34,76	34,73	34,79	34,78	34,76	34,76	34,77	34,78	34,77
1981	34,83	34,76	34,79	34,80	34,82	34,82	34,80	34,80	34,82	34,82	34,83	34,85	34,81
1982	34,80	34,75	34,76	34,77	34,78	34,83	34,82	34,80	34,80	34,84	34,84	34,89	34,81
1983	34,94	34,92	34,83	34,85	34,87	34,83	34,80	34,82	34,87	34,88	34,80	34,82	34,85
1984	34,78	34,77	34,77	34,74	34,80	34,81	34,81	34,84	34,80	34,81	34,88	34,86	34,81
1985	34,84	34,83	34,81	34,86	34,89	34,84	34,75	34,82	34,89	34,86	34,86	34,87	34,84
1986	34,87	34,86	34,84	34,86	34,86	34,90	34,84	34,85	34,85	34,84	34,83	34,85	34,85
1987	34,76	34,76	34,74	34,83	34,85	34,84	34,85	34,85	34,85	34,90	34,88	34,86	34,83
1988	34,90	34,82	34,81	34,83	34,85	34,84	34,84	34,89	34,85	34,77	34,79	34,79	34,83
1989	34,78	34,71	34,74	34,74	34,76	34,78	34,75	34,78	34,77	34,78	34,83	34,77	34,77
1990	34,75	34,83	34,84	34,80	34,79	34,80	34,85	34,85	34,84	34,82	34,82	34,77	34,81
1991	34,80	34,88	34,82	34,80	34,88	34,90	34,85	34,80	34,83	34,85	34,85	34,86	34,84
1992	34,89	34,84	34,83	34,86	34,90	34,89	34,84	34,82	34,84	34,92	34,88	34,91	34,87
1993	34,91	34,84	34,87	34,89	34,89	34,91	34,94	34,90	34,89	34,87	34,84	34,89	34,89
1994	34,92	34,91	34,90	34,90	34,90	34,90	34,90	34,90	34,89	34,88	34,86	34,84	34,89
1995	34,82	34,80	34,74	34,81	34,87	34,88	34,87	34,81	34,74	34,76	34,78	34,81	34,81
for the 1951 - 1990													
standa	34,88	34,87	34,86	34,87	34,88	34,87	34,87	34,87	34,88	34,87	34,87	34,86	34,87
sigma	0,07	0,08	0,08	0,08	0,07	0,06	0,07	0,07	0,08	0,07	0,06	0,06	0,06

Table 9. Mean water salinity of the Murman Current along the Kola section in the 150-200 m layer, p.s.u.

Table 10. Heating status of the Murman Current in 1951-1995.

Layer Year	0-50	0-200	50-200	150-200
1951	4	4	4	4
1952	4	4	4	4
1953	3	3	3	3
1954	5	5	5	5
1955	3	4	4	4
1956	2	2	2	2
1957	4	3	3	3
1958	2	2	2	2
1959	4	4	4	4
1960	4	4	4	4
1961	4	3	3	3
1962	3	3	3	4
1963	2	2	2	2
1964	4	3	3	3
1965	2	3	3	3
1966	1	1	1	1
1967	3	3	3	3
1968	1	2	3	3
1969	3	2	2	2
1970	4	4	3	3
1971	2	2	2	3
1972	4	3	3	3
1973	4	4	4	4
1974	4	3	3	3
1975	4	4	4	4
1976	3	3	4	4
1977	2	2	2	2
1978	1	1	1	1
1979	1	1	1	1
1980	2	2	3	3
1981	2	1	1	1
1982	2	3	3	3
1983	4	4	4	4
1984	3	3	3	4
1985	3	3	3	3
1986	3	3	3	2
1987	2	2	2	2
1988	3	3	3	3
1989	5	4	4	4
1990	4	5	4	5
1991	4	4	4	4
1992	4	4	4	4
1993	3	3	3	4
1994	3	3	3	3
1995	4	4	4	4

1 - an anomaly cold year, 2 - a cold year,
 3 - a normal or middle year, 4 - a warm year,
 5 - an anomaly warm year.

Table 11. Haline status of the Murman Current
in 1951-1995.

Layer Year	0-50	0-200	50-200	150-200
1951	2	2	2	3
1952	2	3	3	3
1953	3	3	3	3
1954	1	1	1	1
1955	3	3	3	3
1956	3	3	2	2
1957	3	3	3	3
1958	2	2	2	2
1959	2	2	2	1
1960	3	3	3	3
1961	3	3	3	3
1962	2	3	3	3
1963	2	2	2	1
1964	2	2	3	3
1965	3	3	3	3
1966	2	2	2	2
1967	1	1	1	1
1968	2	2	2	3
1969	3	3	3	3
1970	3	3	3	3
1971	2	2	2	3
1972	3	3	3	3
1973	3	3	3	3
1974	2	3	3	2
1975	2	2	2	2
1976	1	1	1	1
1977	3	2	2	2
1978	2	2	1	1
1979	1	1	1	1
1980	1	1	1	1
1981	2	2	2	1
1982	1	1	1	1
1983	1	1	1	2
1984	1	1	1	1
1985	2	2	2	2
1986	2	2	2	2
1987	2	2	2	1
1988	1	1	1	1
1989	1	1	1	1
1990	2	1	1	1
1991	2	2	2	2
1992	2	2	2	2
1993	2	2	2	2
1994	3	3	3	2
1995	1	1	1	1

1 - low salinity, 2 - normal salinity,
3 - high salinity.

Table 12. Time period and values of extreme seasonal long term (1951-1990rr.) temperature of the Murman Current along the Kola section.

Layer, m	Beginning of maximum	T max °C	Beginning of minimum	T min °C	Range
0-50	august	7.24	april	2.80	4.44
0-200	september	4.85	april	2.82	2.03
50-200	november	4.54	april	2.83	1.71
150-200	december	3.99	april	2.82	1.17

Table 13. Extreme interannual fluctuations of mean annual temperature (T °C) and salinity (S p.s.u.) of the Murman Current in 1951-1995.

Layer	Maximum, year of beginning		Minimum, year of beginning		Range	
	T °C	S p.s.u.	T °C	S p.s.u.	T °C	S p.s.u.
0-50	5.40 1989	34.89 1970	3.72 1966	34.52 1989	1.68	0.37
0-200	4.75 1954	34.94 1970	2.83 1966	34.65 1989	1.92	0.29
50-200	4.54 1954	34.96 1970	2.53 1966	34.76 1989	2.01	0.27
150-200	4.41 1954	34.97 1961	2.18 1979	34.76 1979	2.23	0.21