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Characteristics of water temperature and salinity at Admiralty Bay (King George Island, South Shetland Islands Antarctic) during the austral summer 1978/1979 *

ABSTRACT: Measurements of water temperature and salinity were carried out at 38 oceanographic stations at Admiralty Bay in the period between December 1978 and February 1979. The temperature at the water surface ranged from 0.18°C to 2.81°C and salinity from 16.40 to 34.16‰. Deeper water temperature decreased and salinity increased ranging at the bottom, at the depth of 480 m, from -0.23°C to 26°C and from 34.51‰ to 34.57‰, respectively. The investigations at the shore and offshore stations showed a marked effect of the run-offs from glaciers causing a considerable decrease in salinity of the thin surface layer of the waters. The main area of the Bay is characterized by high uniformity of water temperature and salinity, which proves that these waters are well mixed.

KEY WORDS: Admiralty Bay, temperature, salinity, relative density

1. Introduction

The South Shetlands Archipelago, to which King George Island belongs, divides the waters of the West Winds Drift flowing from the Bellingshausen Sea into two currents (Charitonov 1976) — one of them flow through Drake Passage the other, much smaller, flows into Bransfield Strait, where it mixes with a whirlpool from the Weddell Sea flowing against the main current along Antarctic Peninsula. Admiralty Bay is the largest inlet in King George Island — covering an area of 131.3 km² and containing 18.02 km³ of water. The waters of the Bay

*) This study was carried out within the scope of the Programme MR. II. 16. during the Third Antarctic Expedition to the Arctowski Station, 1978/1980.

are connected with Bransfield Strait by a wide inlet over 500 m deep (Rakusa-Suszczewski 1980 a).

Oceanographic studies in the region of Bransfield straits were began by Wüst (1926), then Cloves (1934) and Deacon (1937). More recently, this region was investigated within the scope of broad scientific programmes, e.g. The Thirteenth Soviet Antarctic Expedition (Toporkov 1973), F. Drake 75 (Gordon and Nowlin 1978), Polex-South 75 and 76. In all the above-mentioned investigations measurements were carried out at the oceanographic stations situated in the open sea. The investigations of the Admiralty Bay waters were started during the Second Antarctic Expedition of the Polish Academy of Sciences (Dera 1978; Lauer 1978, unpubl. data — Internal Report, Institute of Meteorology and Water Management, Maritime Department). At that time, water samples were collected only from the board of an anchored vessel (near the Station No. 13 — Fig. 1). During the Third Expedition a network of oceanographic stations ranged over the whole area of the Bay. The studies carried out had in view a thorough exploration of Admiralty Bay treated as a region for comprehensive oceanologic and hydrobiological research (Rakusa-Suszczewski 1980 a, 1980 b), including the determination of: oxygen and biogenic salts content (Samp 1980); pH and chlorophyll (Lipski, in prep.); organic carbon (DOC and POC) suspended matter and some microelements content in water (Pęcherzewski 1980, Pęcherzewski, in prep.). The present study gives a picture of the structure and variability of water temperature and salinity during the austral summer season 1978/1979.

2. Methods

The investigations were conducted at 38 oceanographic stations (Fig. 1, Table I) from 21 December 1978 until February 15 1979. Some of the stations, i.e. Nos. 1, 2, 3, and 1B were situated ashore and all the measurements and samplings were made the shore. Stations Nos. 18, 13, 8, 5, 19 and 20 were placed along the line of section across Admiralty Bay running from Ezcurra Inlet all the way down to Bransfield Strait. The measurements were made from the board of a fishing motorboat "DZIUNIA", especially adapted to hydrological investigations. Water samples were collected at the depth of 0, 25, 50, 100, 200, 400 m and at the depth of about 10 m above the bottom using reversing bathometers BM-48 with attached thermometers. In December and February parallel measurements were carried out by means of a mechanical bathythermograph. Termistorthermometers were used for surface measurements. In the stations ashore standard certified water-thermometers were used. Salinity was determined with a laboratory salinometer (Model Plessey 6230 N). Numerical elaboration of the results was made according to the "BAŁT" Programme worked out at the Institute of Meteorology and Water Management, Maritime Department at Gdynia.

Table I

Geographical coordinates of oceanographic stations in Admiralty Bay
(December 1978—February 1979)

Station No	Depth (m)	Longitude	Latitude
1*)	—	62°09.7'S	58°28.4'W
1B*)	—	62 09.9	58 28.3
2*)	—	62 10.2	58 30.8
3*)	—	62 10.1	58 27.9
4	102	62 09.5	58 27.8
5	410	62 08.8	58 26.0
6	103	62 08.1	58 24.3
7	80—90	62 09.3	58 29.5
8	240	62 09.0	58 29.8
9	270	62 08.7	58 30.0
10	270	62 07.4	58 26.4
10A**)	—	62 07.5	58 24.4
10B**)	—	62 07.4	58 28.2
11	32	62 05.8	58 26.7
11A**)	—	62 05.8	58 28.3
11B**)	—	62 04.5	58 26.5
11C**)	—	62 05.3	58 29.6
12	220	62 05.8	58 22.7
12A**)	—	62 05.1	58 22.8
12B**)	—	62 05.6	58 19.0
12C**)	61	62 04.3	58 22.0
12D**)	—	62 04.8	58 19.8
13	82—134	62 10.1	58 32.0
14	70—82	62 10.2	58 32.0
15	102—113	62 09.7	58 33.0
16	55	62 10.7	58 34.6
16A**)	—	62 10.4	58 35.4
17	81	62 09.9	58 35.1
18	62—78	62 10.9	58 36.7
18A	14	62 11.2	58 37.5
19	480	62 09.8	58 24.2
19A**)	—	62 10.5	58 26.2
19B**)	—	62 09.5	58 20.4
20	500	62 11.7	58 22.0
20A**)	—	62 11.7	58 26.6
20B**)	—	62 10.6	58 18.2

*) shore station

**) only surface measurements

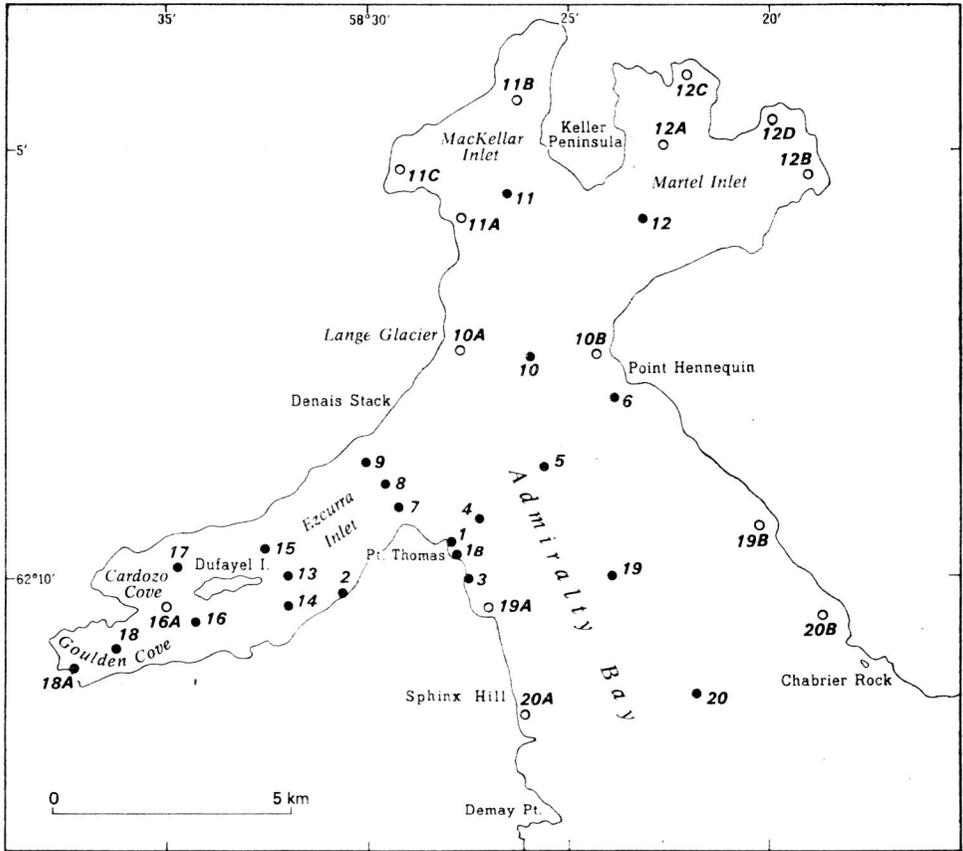


Fig. 1. Positions of oceanographic stations in Admiralty Bay (December 1978 — February 1979)

3. Results

3.1. Water temperature

The first measurements taken on December 21, 1978 at Ezcurre Inlet showed that the vertical thermic structure of the waters was not much differentiated. At the water surface the temperature ranged from 0.18 to 0.77°C. In the water-layer between the surface and depth of about 30 m, a very weakly marked thermocline with a gradient of 0.02°C/m was observed (Fig. 2). Below that layer, down to the bottom, water temperature was cooler ranging from -0.15 to 0.08°C. Between December 28—30 measurements were conducted in the deep-water regions of the Bay. The obtained results show that there were no significant differences in the surface water temperatures, as compared with the Ezcurre Inlet.

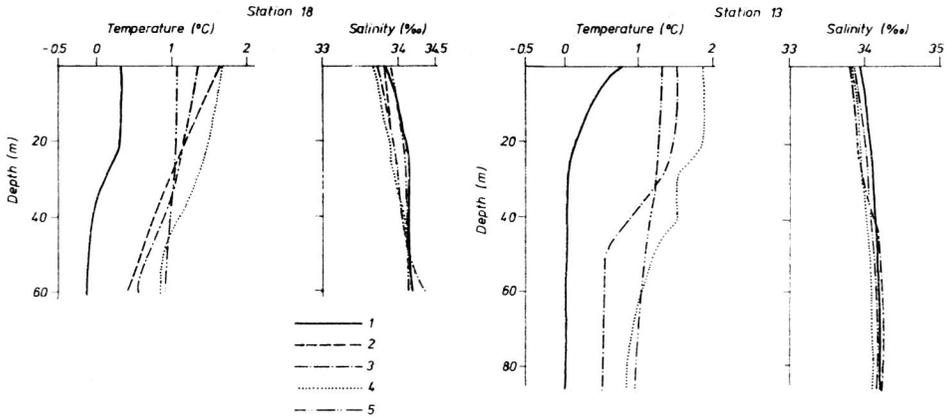


Fig. 2. Vertical structure of temperature and salinity (December 1978 — February 1979)

1 — December 21, 1978, 2 — January 9, 1979, 3 — January 25, 1979, 4 — February 7, 1979, 5 — February 15, 1979.

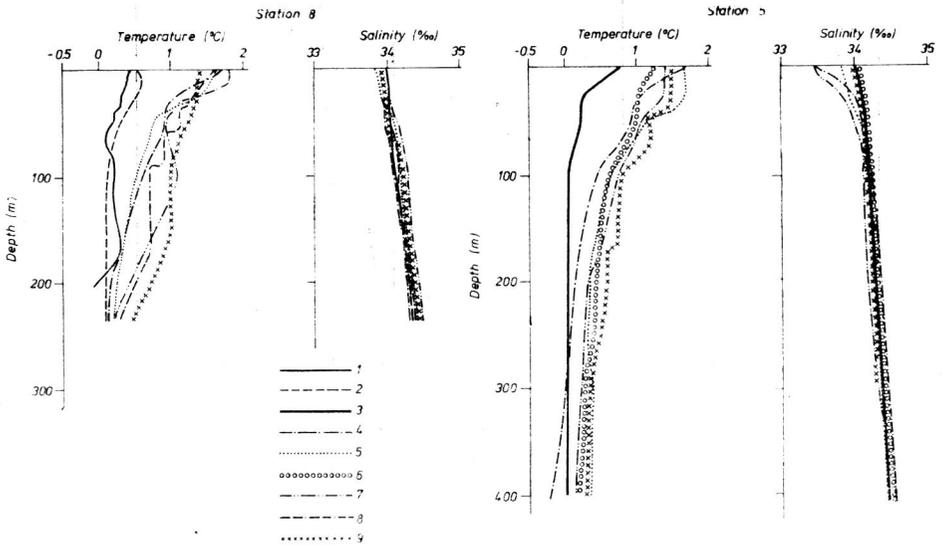


Fig. 3. Vertical structure of temperature and salinity (December 1978 — February 1979)

1 — December 21, 1978, 2 — December 29, 1978, 3 — December 30, 1978, 4 — January 10, 1979, 5 — January 25, 1979, 6 — January 29, 1979, 7 — February 4, 1979, 8 — February 7, 1979, 9 — February 15, 1979.

At the water surface the temperature ranged from 0.49 to 0.81°C (Figs. 3 and 4). Some symptoms of the formation of thermocline were observed but it reached deeper down to the depth of 40 – 80 m, showing, likewise, minimal gradients in the range of 0.01 – $0.05^{\circ}\text{C}\cdot\text{m}^{-1}$. Below that layer water temperature was equable ranging at the bottom from -0.04 to 0.02°C . Measurements carried out between January 9–11, 1979 showed at Ezcurra Inlet, a slight rise of temperature of the water masses from the surface (1.52 – 2.81°C) down to the bottom (0.11 – 0.75°C) and throughout Admiralty Bay from the surface (1.36 – 1.76°C) down to the depth of 200 m (0.00 – 0.14°C). In the deep-water zone a slight fall of the temperature was observed (Fig. 5). Surface water temperatures

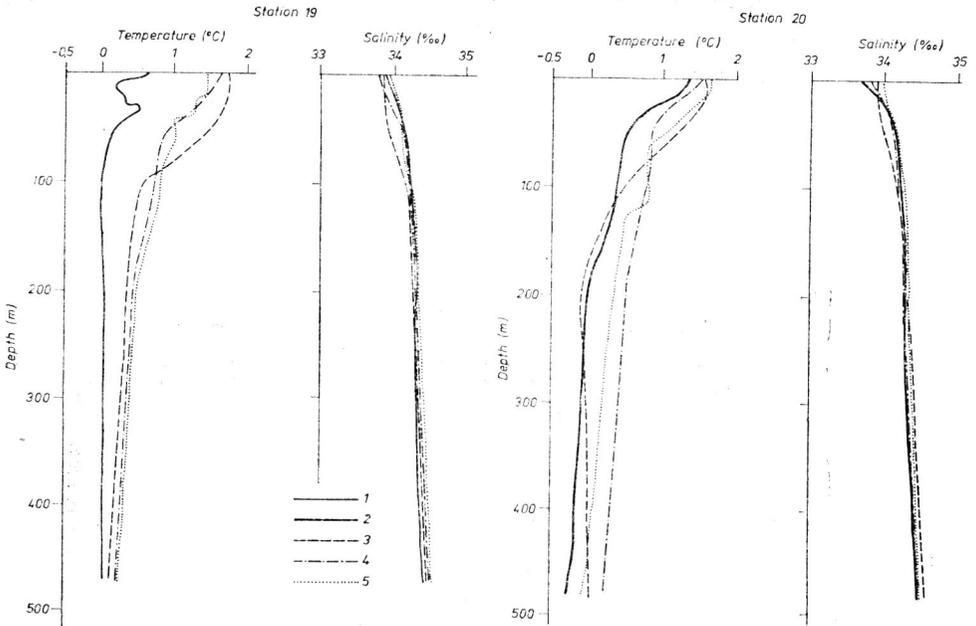


Fig. 4. Vertical structure of temperature and salinity (December 1978 — February 1979)

1 — December 30, 1978, 2 — January 11, 1979, 3 — January 25, 1979, 4 — January 29, 1979, 5 — February 15, 1979.

showed considerable (0.6°C) daily fluctuations (measurements on January 9th and 10th at the stations Nos. 8 and 13). The measurements made on January 15th showed that the waters of the main part of Admiralty Bay have surface temperature little differentiated (1.2 – 1.4°C). A belt of water stretching over from the Hennequin Point northward through a

part of MacKellar Inlet to the west shores of Keller Peninsula had higher water temperatures (1.5—2.0°C). Warmer water was also noted at Ezcurra Inlet, whereas the regions neighbouring glaciers were, in general, characterized by lower temperatures, ranging from 0.6 to 1.0°C (Fig. 6).

A series of measurements carried out on January 25th and 29th showed, likewise, little thermic differentiation throughout the Bay (Fig. 7). Water temperature ranged from 1.0°C in the middle area of the Bay up to 2.05°C at the shallow-water station No. 11, situated in the southern part

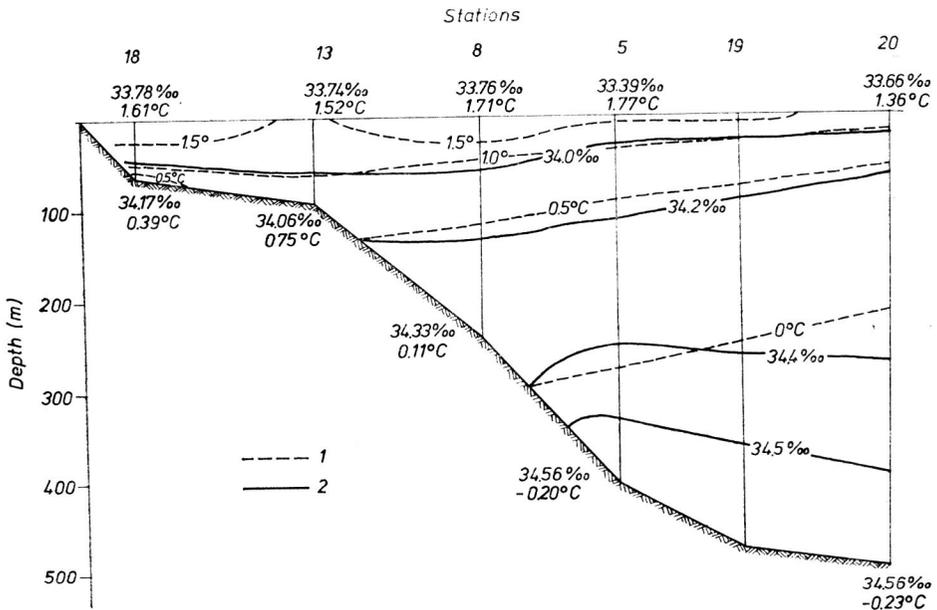


Fig. 5. Vertical structure of temperature and salinity in Admiralty Bay on January 9—11, 1979 (cross-section Goulden Cove — Bransfield Strait)

1 — temperature, 2 — salinity.

of MacKellar Inlet. With the increasing depth to about 100 m a slight fall of temperature was observed (Figs. 2, 3 and 4). Still downwards water temperature was nearly uniform, ranging in the deep-water part of the Bay from 0.03 to 0.26°C. Water temperature at the bottom of the shallow regions, not more than 100 m deep, ranged from 0.49 to 0.81°C.

In February (measurements on the 4th, 7th and 15th) further rise of water temperature was noted. The rise of temperature regards, above all, the minimum values (Table II). Similarly as in precedent months,

Table II

Extremal values of temperature ($^{\circ}\text{C}$), salinity (‰) and relative density (ρ_t) in waters of Admiralty Bay during austral summer 1978/1979

Depth (m)	December 1978	January 1979		February 1979
		Temperature		
0	0.18—0.80	0.60—2.81		0.60—2.01
25	—0.13—0.68	0.86—1.73		1.02—1.77
50	—0.12—0.61	0.52—1.51		0.85—1.36
100	—0.06—0.52	0.41—0.81		0.59—1.03
200	—0.06—0.06	0.00—0.45		0.30—0.61
400	—0.02*)	—0.20—0.27		0.12—0.28
470—480	0.04*)	—0.23—0.26		—0.02—0.23
		Salinity		
0	33.69—34.16	16.40—34.09		26.43—34.00
25	33.99—34.20	33.85—34.18		33.76—34.08
50	34.08—34.24	33.90—34.20		33.89—34.15
100	34.10—34.27	34.13—34.27		34.07—34.26
200	34.18—34.32	34.27—34.38		34.18—34.36
400	34.54*)	34.53—34.56		34.50—34.53
470—480	34.53*)	34.51—34.57		34.53—34.56
		Relative density		
0	27.07—27.42	13.17—27.33		21.21—27.22
25	27.29—27.47	27.10—27.41		27.05—27.33
50	27.36—27.51	27.15—27.43		27.16—27.39
100	27.39—27.54	27.40—27.51		27.32—27.50
200	27.46—27.58	27.51—27.62		27.45—27.59
400	27.76*)	27.74—27.79		27.72—27.73
470—480	27.74*)	27.72—27.79		27.73—27.77

*) only one measurement available

small fluctuations of temperature at different depths, were observed, sometimes occurring repeatedly (Figs. 3 and 4). In these slightly marked thermoclines, temperature gradients were small, averaging $0.01\text{--}0.10^{\circ}\text{C}\cdot\text{m}^{-1}$. Between February 4—7, 1979 surface water temperature ranged from 1.38 to 2.01°C and on the 15th from 0.89 to 1.64°C . At the bottom of the deep-water part of the Bay the temperature ranged from -0.02 to 0.37°C . (Fig. 8). Only in the shallow zone (to the depth of 100 m) higher temperatures were noted ($0.060\text{--}0.89^{\circ}\text{C}$). The highest temperatures were noted in the whallow areas of the southern part of MacKellar Inlet (1.59°C) and the western edge of Gulden Cove (1.60°C). Both-thermograph recordings also confirm small thermic differentiation in the waters of Admiralty Bay. In addition this recordings show small fluctuations of temperature ($0.1\text{--}0.2^{\circ}\text{C}$), occurring mainly at the depths from 0 to 20 m. This is associated probably with daily fluctuations of temperature. Two series of measurements of surface water temperature

(December 4—11, 1978 and February 21—27, 1979) carried out from the board of the anchored vessel m/s "Antoni Garnuszewski" (position corresponding to station No. 13) give some pictures of daily fluctuations of temperature (Table III). During windless and sunny weather differen-

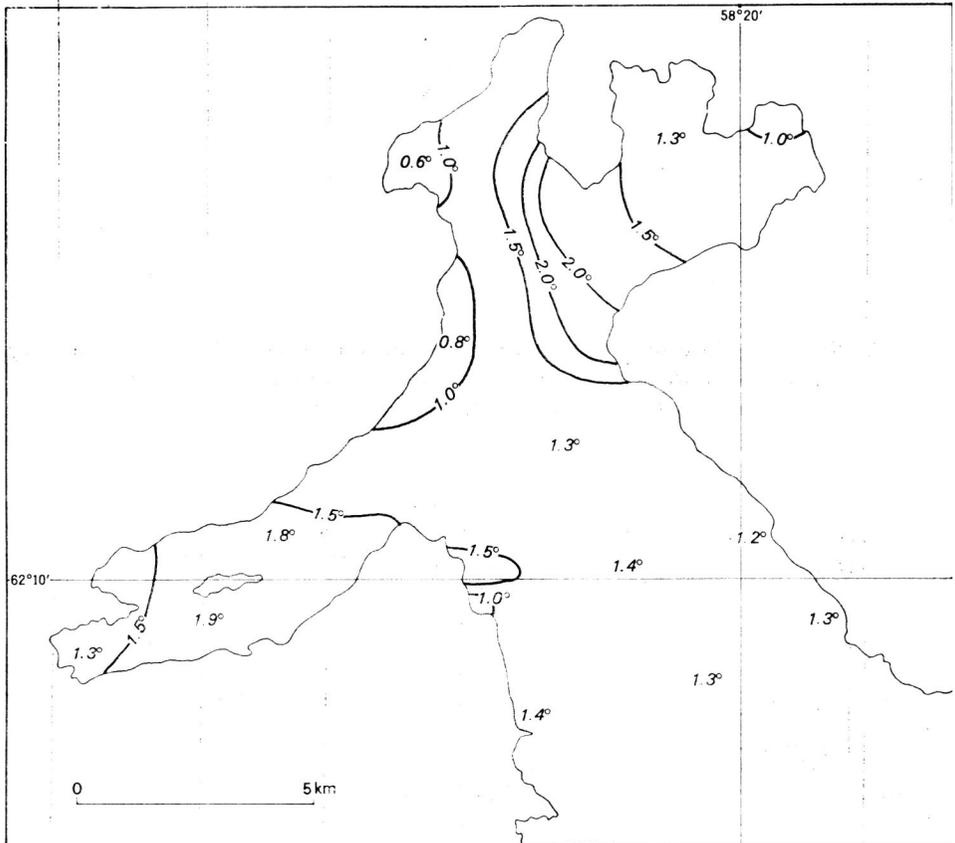


Fig. 6. Surface water temperature in Admiralty Bay on January 15, 1979.

ces of about 1°C may be observed in the course of a few hours. The widest range of fluctuation of water temperature was noted at the shore stations, e.g. from -1.6°C at the station No. 3 close to the Glacier of Ecology to 5.3°C at the station No. 2 (Ezcurra Inlet) (Table IV). The course of water temperature at station No. 1, throughout the period of investigations, is given in Fig. 9.

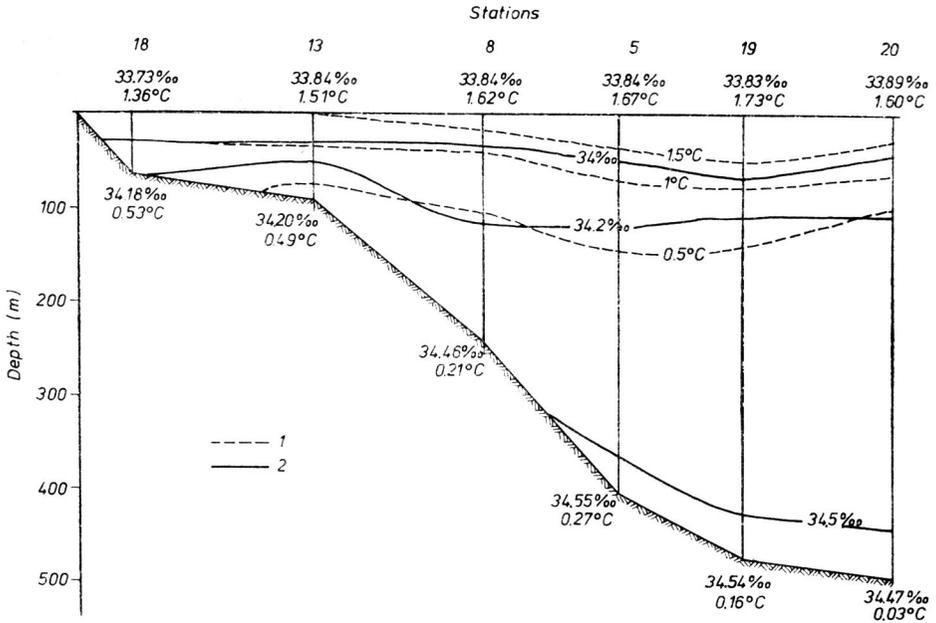


Fig. 7. Vertical structure of temperature and salinity in Admiralty Bay on January 25, 1979 (cross-section Goulden Cove — Bransfield Strait)
1 — temperature, 2 — salinity.

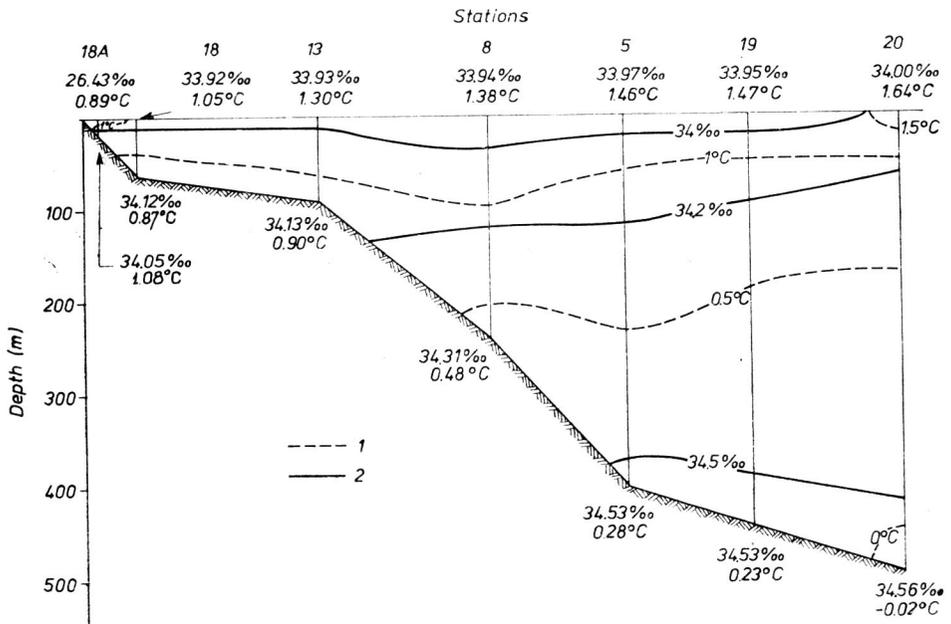


Fig. 8. Vertical structure of temperature and salinity in Admiralty Bay on February 15, 1979 (cross-section Goulden Cove — Bransfield Strait)
1 — temperature, 2 — salinity.

Table III

Surface water temperature (°C) and salinity (‰) in Ezcurra Inlet (station No. 13) during periods 4—11 December 1978 and 21—27 February 1979

Date	GMT 0		3		6		9		12		15		18		21	
	T*)	S**)	T	S	T	S	T	S	T	S	T	S	T	S	T	S
4 Dec. 1978	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.5	34.18
5 Dec. 1978	0.3	—	0.0	—	-0.1	—	-0.2	—	-0.1	—	-0.1	34.16	0.0	—	0.0	—
6 Dec. 1978	0.0	—	0.0	—	0.0	—	-0.2	—	-0.2	—	-0.2	34.17	-0.1	—	-0.2	—
7 Dec. 1978	-0.2	—	-0.2	—	-0.2	—	-0.3	—	-0.1	—	-0.1	34.09	0.0	—	-0.1	—
8 Dec. 1978	-0.1	—	-0.1	—	0.0	—	0.0	—	0.0	—	0.2	34.08	0.6	—	0.4	—
9 Dec. 1978	0.4	—	0.4	—	-0.2	—	-0.2	—	-0.1	—	0.0	34.04	0.1	—	1.1	—
10 Dec. 1978	0.1	—	-0.2	—	0.0	—	0.1	—	0.0	—	0.1	34.11	0.1	—	0.0	—
11 Dec. 1978	-0.2	—	-0.2	—	-0.1	—	-0.1	—	-0.2	—	-0.1	34.11	0.0	—	—	—
21 Feb. 1979	—	—	—	—	—	—	—	—	—	—	—	33.52	—	—	—	—
22 Feb. 1979	3.1	31.78	2.3	33.26	—	—	2.1	33.43	—	—	2.0	33.17	—	—	1.8	33.31
23 Feb. 1979	—	—	1.8	33.01	—	—	1.7	33.55	—	—	1.7	33.77	—	—	1.8	33.73
24 Feb. 1979	—	—	1.7	33.53	—	—	1.6	33.84	—	—	1.6	33.72	—	—	1.6	33.69
25 Feb. 1979	—	—	1.5	33.22	—	—	1.5	33.69	—	—	1.5	33.59	—	—	1.6	33.60
26 Feb. 1979	—	—	1.4	33.61	—	—	1.4	33.69	—	—	1.4	33.83	—	—	—	—
27 Feb. 1979	—	—	1.2	33.68	—	—	—	—	—	—	—	—	—	—	—	—

*) T—temperatura
 **) S—salinity

Table IV

Water temperature ($^{\circ}\text{C}$) and salinity (‰) on shore stations in Admiralty Bay during austral summer 1978/1979

Station No.	17 Dec.	19 Dec.	22 Dec.	24 Dec.	27 Dec.	31 Dec.	3 Jan.	6 Jan.	12 Jan.	15 Jan.	19 Jan.	22 Jan.	31 Jan.	5 Feb.	13 Feb.
1	1.4	-0.9	-0.1	0.7	1.7	1.4	1.9	2.9	2.1	1.3	2.4	1.2	1.5	1.9	1.7
1B	1.9	-0.3	-0.2	0.9	1.1	1.7	1.9	3.0	1.3	1.7	2.6	2.1	1.6	2.9	-0.7
2	1.7	-0.1	-1.1	0.1	1.3	0.6	1.1	2.9	2.1	5.3	3.1	-0.9	1.6	0.1	1.9
3	1.7	-1.6	-0.9	1.0	1.1	1.7	1.4	2.1	1.7	1.7	2.4	2.1	1.5	3.0	1.1
	Temperature														
1	33.97	33.75	33.98	34.02	33.95	33.93	33.95	33.82	33.22	33.98	33.97	33.06	34.16	33.87	33.76
1B	33.92	33.67	33.75	34.05	34.03	33.83	34.12	34.03	32.40	33.97	33.93	33.73	33.96	33.91	32.37
2	32.13	33.30	32.85	33.18	33.31	33.24	33.38	33.18	33.66	33.64	33.66	29.39	33.79	32.25	33.26
3	33.56	31.09	33.58	33.69	33.92	33.83	34.11	33.98	32.64	33.75	34.00	33.81	33.14	33.89	33.50
	Salinity														

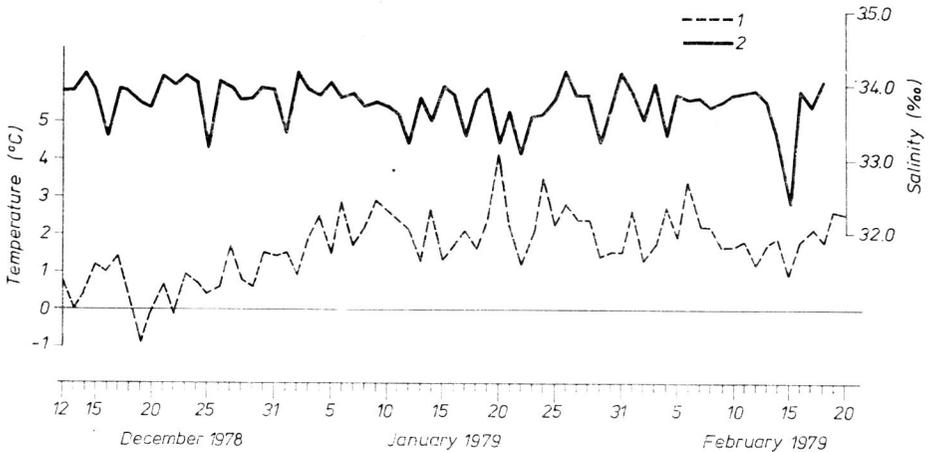


Fig. 9. Water temperature (1) and salinity (2) on station No. 1 during the period December 12, 1978 — February 20, 1979

3. 2. Salinity

High equability of salinity is a characteristic feature of the water masses throughout Admiralty Bay, except in the narrow zones close to the run-offs from the glaciers. Throughout the period of investigations, salinity of the surface water layer in the main part of the Bay ranged from 33.30‰ to 34.04‰. Great fluctuations of salinity (16.40‰—34.16‰) were observed in the narrow zone of offshore waters, but only in the areas directly adjacent to the run-offs from the glaciers. Salinity of the bottom water-layer showed little regional differentiation. At Ezcurra Inlet and in the shallow-water zones, to the depth of 100 m deep, throughout Admiralty Bay, salinity ranged from 34.05‰ to 34.28‰. In the northern part of the Bay, in the waters adjacent to Ezcurra Inlet, salinity at the depth of 200—250 m averaged 34.25‰—34.46‰. In the bottom water-layers of the deep-water zone of the Bay (400—500 m) salinity was in the range of 34.50‰—34.57‰. In the shallow-water regions, e.g. in the western part of Goulden Cove and southern part of the MacKellar Inlet, salinity was in the range of 33.67‰—34.07‰. In vertical profiles salinity of the open waters of the Bay showed small changes. Differences between the surface and the bottom values seldom exceeded 1‰ (Figs. 3 and 4). For example, the values of the gradient at the stations Nos. 18 and 20, representing two different parts of the Bay, were respectively in the range of Bay: 0.001—0.010‰ and 0.001—0.015‰ per metre. The situation differed in areas close to the run-offs from the glaciers, water with very low salinity was sometimes observed in those places, though its thickness did not exceed 1 metre. Farther downwards, salinity did not differ greatly from that of the waters of the main area of the Bay. A good illustration of such a situation occurred at station No. 18A, where an increase in salinity was noted of as much as 13‰ per metre.

Determination of the effect of the run-offs on the decrease in salinity of the waters over the area under investigations is very difficult without the knowledge of the volume of the run-offs and the dynamics of the exchange of waters between Admiralty Bay and Bransfield Strait. During the period of investigations between December 1978 and February 1979 slight but significant decrease in surface and bottom water-layer salinity was observed only at Ezcurra Inlet. The investigations of the surface waters carried out from the board of the vessel m/s "Antoni Granuszewski" (Station No. 13) showed a decrease in salinity in the range of 34.04-34.18‰ in the first period of the studies down to 29.92-33.84‰ in the second period (Table III). At that time, in the area of the open waters of the Bay no definite changes in salinity were found, neither at the surface nor at the bottom.

The longest series of measurements of salinity were carried out at the shore stations (Nos. 1, 1B, 2 and 3). The extreme values of salinity at these stations ranged from 29.39‰ to 34.16‰ (Table IV). At station No. 1. a series of daily measurements of salinity was carried out. The obtained results are given in Fig. 9.

3.3 Relative density

Just as in the earlier mentioned parameters density of the waters of Admiralty Bay are little differentiated. The greatest fluctuations occur at the water surface, which is connected with the run-offs from the glaciers e.g. in February, the value of 21, 21 was noted in the region of a large run-off at Goulden Cove and 26,95 in larger area of McKellar Inlet. Deeper downwards relative density increases up to the value of 27,7 in the bottom layers of the deep-water parts of the Bay. A very great difference between the density of fresh-water run-offs and sea waters, averaging 27.5 units of relative density, causes slow mixing of these waters in the periods of weak winds. Run-offs from the glaciers, often carrying along large quantities of suspended matter (P e c h e r z e w s k i 1980), spread across in a thin layer, less than 0.5 m, over large areas of the Bay, which can be easily registered by means of air photography (Furmańczyk et al., in prep.)

4. Discussion

Waters of Bransfield Strait adjoining Admiralty Bay have a complex structure. Studies conducted on board the r/v "Profesor Siedlecki" parallel to our investigations (C h r o m i c z, G r e l o w s k i and P a s t u s z a k, 1979) show that in the region, quite often, the typical structure of circum-antarctic waters does not occur (G o r d o n s 1967). Within the column of the Antarctic Surface Water in the regions of Bransfield Strait, there was often a lack of T_{min} core layer and sometimes several fluctuations of temperature in different directions were observed. This is caused by mixing of water masses from the Bellingshausen Sea and Weddell Sea, which in addition, occurs over a strongly rugged bottom. These processes are particularly intensive in the shallow shelf waters in the bays and straits. Tidal phenomena connected with them water currents (Pru-

s z a k 1980) and strong katabatic winds are additional agents having an effect upon the waters of Admiralty Bay. The waters of the Bay are more thoroughly mixed than those of the Bransfield Strait. Thermocline occurs rarely and in a very weak form. Also, there are no great local differences in temperatures between various regions of the Bay. During the period of investigations slight gradual rise of temperature was observed. This change of a seasonal character pertains to the water layer down to the depth of 100 m. Deeper downwards changes in temperature of different directions are dependent on the origin of water flowing into the Bay.

Apart from zones of direct run-offs from the glaciers, the values of salinity show little differentiation. The gradient of the increase in salinity with the increasing depth is fairly constant and much alike in the greater part of the oceanographic stations. A rapid exchange of waters between Admiralty Bay and Bransfield Strait, estimated by P r u s z a k (1980) as lasting from one to two weeks in the water layer down to the depth of 100 m (depending on the region of the Bay), precludes the occurrence of greater differences in physical and chemical parameters of these waters. The phenomenon of a decrease of salinity of the antarctic surface waters during the summer, distinctly visible in seasonal investigations (Lipski, in prep.), occurs within the range of the whole shelf of Antarctica.

Very similar results of the measurements of temperature and salinity were obtained during the Second Antarctic Expedition of the Polish Academy of Sciences (Lauer, 1978 — Internal Report). Institute of Meteorology and Water Management, which proves the stability of hydrological regimes observed in these regions (Table V). The results from hydrochemical measurements (S a m p 1980) parallel to our investigations corroborate in full the earlier presented inferences.

Table V

Comparison of extremal values of water temperature (°C) and salinity (‰) in Admiralty Bay (Station No. 13) during summer periods 1977/1978 and 1978/1979

Depth (m)	Temperature		Salinity	
	1977/1978	1978/1979	1977/1978	1978/1979
0	-0.2 —3.4	-0.24—3.10	32.90—34.00	33.01—34.18
25	-0.2 —1.1	0.09—1.67	33.75—34.11	33.90—34.10
50	-0.6 —0.9	0.03—1.12	33.79—34.18	33.99—34.20
bottom	-0.4 —0.8	-0.01—0.90	33.80—34.31	34.06—34.21

In general, it may be stated that the local, geographical, meteorological and hydrological conditions have an effect upon the structure of the waters at Admiralty Bay through a much more intensive mixing than in the open sea. However, directly the effect upon the general balance of temperature and salinity is of no great importance. Greater variations of narrow offshore shallows (considerable rise of temperature on windless and sunny days) and in the regions of the run-offs from the glaciers strong decrease in salinity, but not reaching far in depth, and large quantities of suspended matter.

Our warm thanks are due to Andrzej Cieślak, the Skipper of fishing boat "DZIUNIA", for guiding the vessel with masterly skill during the collection of samples at the oceanographic stations.

5. Summary

Measurements of temperature and salinity were conducted at 38 oceanographic stations, covering the whole area of Admiralty Bay, during the period between December 1978 — February 1979 (Fig. 1, Table I). These investigations were made to show either vertical variabilities from the water surface to the bottom across the longitudinal section from Bransfield Strait, far into Ezcurrea Inlet, or to give a picture of the values of surface water temperature and salinity over the greatest part of the Bay.

The values of temperature at the water surface ranged from 0.18°C up to 2.81°C and salinity from 16.40‰ to 34.16‰. In deeper parts of the Bay variability of the examined parameters was much smaller and at the bottom at a depth of 480 m the temperature ranged from -0.23°C to 0.26°C and salinity from 34.51 to 34.57‰ (Table II). Local, geographical, meteorological and hydrological conditions and a rapid exchange of waters from Bransfield Strait causes a thorough mixing of the waters of Admiralty Bay, so that in greater part the thermocline does not occur. The increase of salinity with increasing depth is uniform and there are no great differences in temperature (T) and salinity (S) between various regions of the Bay.

A considerable decrease of salinity occurs in a very thin surface water layer only in the regions close to the run-offs of fresh water from the glaciers. In the narrow zones of offshore shallows 2—3°C rise of water temperature may be noted on sunny and windless days.

6. Резюме

В период декабрь 1978 — февраль 1979 проводились измерения температуры и солености воды на 38 океанографических станциях, охватывающих весь Залив Адмиралты (рис. 1, таблица I). Отбор проб в очередные дни должен был представить вертикальные изменения во всей толще воды от поверхности до дна в разрезах от Пролива Брансфилда вглубь Бухты Эскурра, или же дать картину распределения показателей поверхностных слоев воды на как можно большей части залива.

На поверхности были установлены температуры от 0,18 до 2,81°C и соленость от 16,40 до 34,16‰. В глубших частях залива диапазон исследуемых величин был значительно меньше и составлял над дном на глубине 480 м для температуры от -0,23°C до 0,26°C и для солености от 34,51 до 34,57‰ (таблица II). Географические, метеорологические и гидрологические условия, а также быстрый обмен вод с Проливом Бранс филда способствуют хорошему перемешиванию вод залива так, что и большинстве случаев не выступает здесь термоклин; рост солености с глубиной равномерен; не наблюдались большие разницы T и S в разных частях залива.

Значительные массы пресной воды наблюдаются в очень тонком поверхностном слое только в районе стока вод из тающих льдов и снегов, в свою же очередь в узком поясе прибрежного мелководья в солнечные и безветренные дни можно установить прост температуры на 2—3°C.

7. Streszczenie

W okresie grudzień 1978 — luty 1979 prowadzono pomiary temperatury i zasolenia na 38 stacjach oceanograficznych pokrywających cały obszar Zatoki Admiralicji (rys. 1, tabela I). Pobory w poszczególnych dniach miały uchwycić zmienności pionowe od powierzchni dna, na przekrojach od Cieśniny Bransfielda, aż w głąb Zatoki Ezcurra lub dać obraz wartości powierzchniowych na jak największej części zatoki.

Stwierdzono na powierzchni wartości temperatury od 0.18°C do 2.81°C oraz zasolenie od 16,40‰ do 34,16‰. W głębszych partiach zatoki zmienność badanych parametrów była znacznie mniejsza i wynosiła nad dnem na głębokości 480 m od -0.23°C do 0.26°C oraz dla zasolenia od 34.51 do 34.57‰ (tabela II). Lokalne warunki geograficzne, meteorologiczne i hydrologiczne oraz szybka wymiana wód z Cieśniną Bransfielda powoduje dobre mieszanie się wód zatoki, tak że w większości przypadków nie występuje tu termoklina. Wzrost zasolenia z głębokością jest jednostajny i nie stwierdza się dużych różnic T i S w różnych regionach zatoki.

Znaczne wysłodzenia występują w bardzo cienkiej warstwie powierzchniowej tylko w okolicach spływu słodkich wód roztopowych, natomiast w wąskim pasie płyczn przybrzeżnych w słoneczne i bezwietrzne dni można zanotować wzrosty tempertaury o 2 do 3°C.

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Paper received 1 June 1980

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