FEDERAL SERVICE OF RUSSIA FOR HYDROMETEOROLOGY AND ENVIRONMENTAL MONITORING

Russian Federation State Research Center

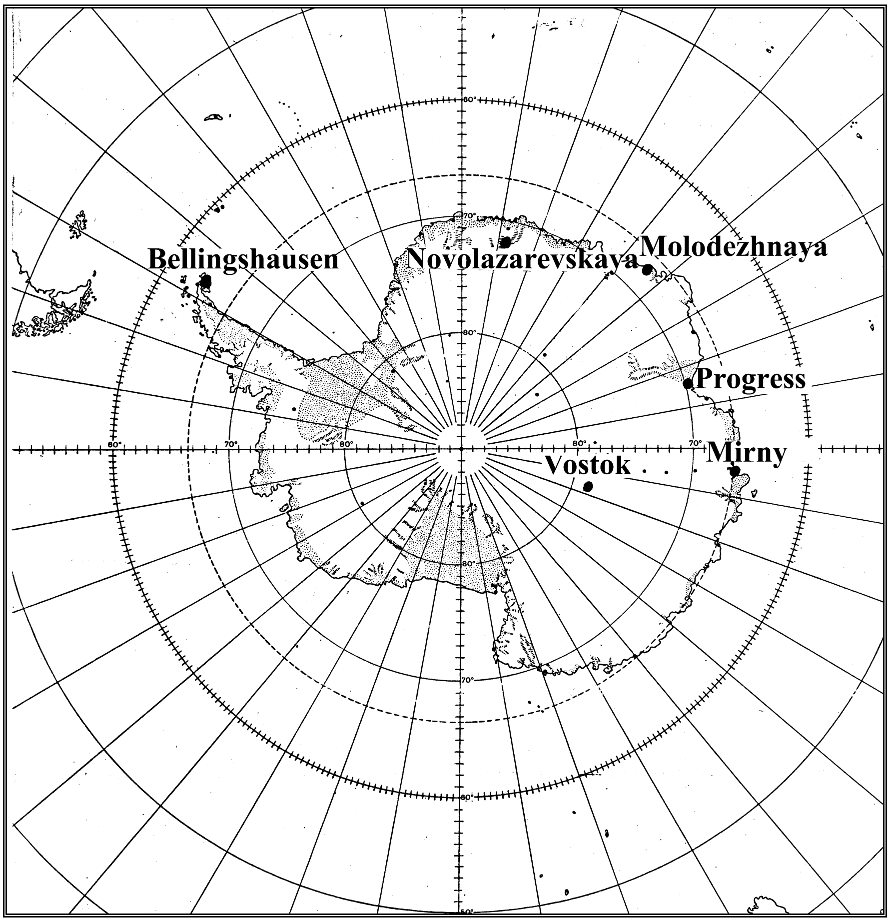
Arctic and Antarctic Research Institute

Russian Antarctic Expedition

STATE OF ANTARCTIC ENVIRONMENT

Operational data of Russian Antarctic stations

July - September 2001



St. Petersburg

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Operational data of Russian Antarctic stations

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CONTENTS

PREFACE

The Bulletin is prepared on the basis of data reported from the Russian Antarctic stations in real time via the communication channels.

In this issue, Section I presents monthly averages of standard meteorological and actinometric observations and upper-air sounding at the Russian Antarctic stations for July-September 2001.

At the present time, standard meteorological observations are carried out at Mirny, Novolazarevskaya, Bellingshausen and Vostok stations. The upper-air sounding is undertaken once a day at 00.00 UT at two stations, namely, at Mirny Observatory and at Novolazarevskaya station. More frequent sounding is conducted at both stations during the International Geophysical Intervals (IGI) in accordance with the International Geophysical Calendar.

The atmospheric pressure values in the meteorological tables are referenced to sea level for coastal stations and to the station level for the inland Vostok station located at a height of almost 3500 m.

Along with the monthly averages of meteorological parameters, the tables also contain their deviations from multiyear averages (absolute anomalies), normalized anomalies (deviations in σ_f fractions - $(f-f_{avg})/\sigma_f$) and relative anomalies (f/f_{avg}) of the monthly sums of precipitation and total radiation. The statistical characteristics necessary for calculation of anomalies were derived at the AARI Department of Meteorology for the period 1961-1990 as recommended by the World Meteorological Organization.

Data of geophysical observations published in the Bulletin (section 6) present the results of measurements in Mirny Observatory and at Vostok station under the geomagnetic and ionospheric programs (magnetic and riometer observations). Data of riometer observations are presented as plots of the maximum daily values of space radio-emission absorption at the 32 MHz frequency.

Geophysical information also includes the magnetic activity index (PC-index), which is calculated on the basis of geomagnetic observations at Vostok station.

The Bulletin also contains brief overviews with an assessment of the anomalous state of the Antarctic environment based on actual data. Sections 2 and 3 are devoted to the meteorological and synoptic conditions. The analysis of ice conditions in the Southern Ocean (Section 4) is performed using satellite data received at the Bellingshausen, Novolazarevskaya and Mirny stations and observations conducted at the coastal Bellingshausen, Progress and Mirny stations. The anomalous character of ice conditions is evaluated against the multiyear averages of the drifting ice edge location and the multiyear averages of the onset of different ice phases in the coastal areas of the Southern Ocean adjoining the Antarctic stations. The multiyear averages were obtained at the AARI Ice Regime and Forecasting Department over the period 1971-1995.

Section 5 presents as usual, an overview of total ozone (TO) based on measurements at the Russian stations. This issue contains the results of measurements in Mirny Observatory and measurements resumed at Novolazarevskaya station. No observations were undertaken at Vostok station during this period due to low Sun's heights.

Sections 7 presents information on seismic observations conducted in 2000 in Mirny Observatory and at Novolazarevskaya station that are permanent stations of the Geophysical Service of the Russian Academy of Science (RAS GS).

Sections 8 and 9 publish information about the XXIV Antarctic Treaty Consultative Meeting held in July 2001 in St. Petersburg and the XIII Meeting of the Council of Managers of National Antarctic Programs held in August 2001 in Amsterdam (Netherlands).

The last Section (10) is traditionally devoted to the main directions and events of the logistics activity of RAE during the period under consideration.

Russian Antarctic stations in operation in July - September 2001

MIRNY OBSERVATORY

STATION SYNOPTIC INDEX	**89592**
METEOROLOGICAL SITE HEIGHT ABOVE SEA LEVEL	**39.9 m**
GEOGRAPHICAL COORDINATES	**φ = 66°33′ S; λ = 93°01′ E**
GEOMAGNETIC COORDINATES	**Φ = -76.8°; Δ = 151.1°**
BEGINNING AND END OF POLAR DAY	**7 December – 5 January**
BEGINNING AND END OF POLAR NIGHT	**No**

NOVOLAZAREVSKAYA STATION

STATION SYNOPTIC INDEX	**89512**
METEOROLOGICAL SITE HEIGHT ABOVE SEA LEVEL	**119 m**
GEOGRAPHICAL COORDINATES	**φ = 70°46′ S; λ = 11°50′ E**
BEGINNING AND END OF POLAR DAY	**15 November - 28 January**
BEGINNING AND END OF POLAR NIGHT	**21 May - 23 July**

BELLINGSHAUSEN STATION

STATION SYNOPTIC INDEX	**89050**
METEOROLOGICAL SITE HEIGHT ABOVE SEA LEVEL	**14.3 m**
GEOGRAPHICAL COORDINATES	**φ = 62°12′ S; λ = 58°56′ W**
BEGINNING AND END OF POLAR DAY	**No**
BEGINNING AND END OF POLAR NIGHT	**No**

VOSTOK STATION

STATION SYNOPTIC INDEX	**89606**
METEOROLOGICAL SITE HEIGHT ABOVE SEA LEVEL	**3488 m**
GEOGRAPHICAL COORDINATES	**φ = 78°27′ S; λ = 106°52′ E**
GEOMAGNETIC COORDINATES	**Φ = -89.3°; Δ = 139.5°**
BEGINNING AND END OF POLAR DAY	**21 October - 21 February**
BEGINNING AND END OF POLAR NIGHT	**23 April - 21 August**

PROGRESS STATION

METEOROLOGICAL SITE HEIGHT ABOVE SEA LEVEL	**64 m**
GEOGRAPHICAL COORDINATES	**φ = 69°23′ S; λ = 76°23′ E**
BEGINNING AND END OF POLAR DAY	**21 November – 21 January**
BEGINNING AND END OF POLAR NIGHT	**28 May - 16 July**

1. DATA OF AEROMETEOROLOGICAL OBSERVATIONS AT THE RUSSIAN ANTARCTIC STATIONS

JULY 2001

MIRNY OBSERVATORY

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

July 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Sea level pressure, hPa	983,4	1000,9	963,2	-2,6	-0,4	
Air temperature, °C	-14	-3,7	-29,2	2,7	1,0	
Relative humidity, %	84			9,8	1,9	
Total cloudiness (sky coverage), tenths	8			1,3	1,2	
Lower cloudiness(sky coverage),tenths	4,4			1,4	0,9	
Precipitation, mm	26,6			-43,5	-0,9	0,4
Mean wind speed, m/s	12,5	28		-0,2	-0,1	
Prevailing wind direction, deg	112					
Total radiation, MJ/m^2	11			1,5	0,7	1,2
Total ozone content, DU	No observations were done					

Results of aerological atmospheric sounding (from CLIMAT-TEMP messages)

July 2001

Isobaric surface, P, hPa	Isobaric surface height, H m	Temperature, T °C	Dew point deficit, D °C	Resulting wind direction, deg	Resulting wind speed, m/s	Wind stability parameter	Number of days without temperature data	Number of days without wind data
974	978	53	-13,4	2,9				
925	925	480	-13,8	3,6	92	14	99	3
850	850	1118	-16,9	2,9	86	13	96	3
700	700	2561	-22,3	4,4	78	9	85	3
500	500	4960	-36,5	5,3	76	6	60	3
400	400	6475	-46,8	5	69	5	44	3
300	300	8327	-59,2	4,3	54	3	22	3
200	200	10797	-68,9	3,9	305	5	40	3
150	150	12511	-70,7	3,9	290	8	65	4
100	100	14895	-75,2	3,7	288	14	86	13

Anomalies of standard isobaric surface heights and temperature

July 2001

P, hPa	$H-H_{avg}$, m	$(H-H_{avg})/\sigma_H$	$T-T_{avg}$, °C	$(T-T_{avg})/\sigma_T$
850	7	0,2	2,3	1,1
700	12	0,2	0,8	0,5
500	20	0,3	1,2	0,7
400	28	0,4	1,1	0,7
300	33	0,4	0,7	0,6
200	34	0,4	-0,6	-0,4
150	29	0,3	-1,1	-0,7
100	16	0,2	-2,1	-1,2

NOVOLAZAREVSKAYA STATION

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

July 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Sea level pressure, hPa	987,6	1010,5	967	0	0,0	
Air temperature, °C	-16,2	-6,8	-34,2	1,1	0,4	
Relative humidity, %	54			3,6	0,5	
Total cloudiness (sky coverage), tenths	5,7			0,2	0,1	
Lower cloudiness(sky coverage),tenths	1,4			0,3	0,3	
Precipitation, mm	93,9			55,6	1,2	2,5
Mean wind speed, m/s	12,3	36		1,7	0,7	
Prevailing wind direction, deg	135					
Total radiation, MJ/m^2	1			-1,2	-0,5	0,4

Results of aerological atmospheric sounding (from CLIMAT-TEMP messages)

July 2001

Isobaric surface, P, hPa	Isobaric surface height, H m	Temperature, T °C	Dew point deficit, D °C	Resulting wind direction, deg	Resulting wind speed, m/s	Wind stability parameter	Number of days without temperature data	Number of days without wind data
965	122	-16,4	8,1					
925	502	-16,3	7	104	14	98	2	2
850	1133	-20,6	7,3	95	14	94	2	2
700	2552	-26	5,5	77	4	43	2	2
500	4927	-38,9	5,3	326	2	16	2	2
400	6425	-49	4,7	306	4	27	2	2
300	8263	-60,6	4,2	297	8	42	2	2
200	10719	-70,2	4	291	11	64	2	2
150	12417	-72,7	3,7	291	12	75	3	3
100	14769	-77,5	3,7	281	15	86	3	3
70	16798	-80,5	3,5	280	18	93	3	3
50	18691	-81,9	3,5	279	22	96	4	4
30	21505	-82,5	3,7	275	27	97	8	8
20	23753	-80,8	3,5	273	31	97	12	9

Anomalies of standard isobaric surface heights and temperature

July 2001

P, hPa	$H-H_{avg}$, m	$(H-H_{avg})/\sigma_H$	$T-T_{avg}$, °C	$(T-T_{avg})/\sigma_T$
850	4	0,1	0,4	0,2
700	5	0,1	1,3	0,7
500	17	0,3	1,3	0,8
400	27	0,4	1,4	0,9
300	38	0,5	1,6	1,4
200	56	0,7	1,3	0,8
150	64	0,8	0,8	0,6
100	69	0,9	0,3	0,2
70	82	1,0	1,0	0,7
50	73	1,0	2,0	1,1
30	72	0,6	2,9	1,7
20	140	1,1	4,6	2,2

BELLINGSHAUSEN STATION

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

July 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$…	Relative anomaly f/f_{avg}
Sea level pressure, hPa	996	1015	997,6	2,1	0,4	
Air temperature, °C	-7	-0,6	-18,6	-0,4	-0,1	
Relative humidity, %	85			-3,4	-1,3	
Total cloudiness (sky coverage), tenths	9,1			0,7	1,2	
Lower cloudiness(sky coverage),tenths	8,4			1,3	1,2	
Precipitation, mm	29,5			-23,5	-0,8	0,6
Mean wind speed, m/s	6,6	16		-0,8	-0,6	
Prevailing wind direction, deg	112					
Total radiation, MJ/m^2	18			-5,7	-1,7	0,8

VOSTOK STATION

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

July 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Station surface level pressure, hPa	625,8	643,3	610,9	4,7	0,8	
Air temperature, °C	-66,8	-41,4	-80,5	0,3	0,1	
Relative humidity, %	52*			-16,6	-3,9*	
Total cloudiness (sky coverage), tenths	1,7			-1,1	-1,1	
Lower cloudiness(sky coverage),tenths	0			0	0,0	
Precipitation, mm	0,7			-2,5	-1,0	0,2
Mean wind speed, m/s	3,7	8		-2	-2,2	
Prevailing wind direction, deg	247,5					
Total radiation, MJ/m^2						
Total ozone content, DU	No observations were done					

* Measurements of relative humidity at Vostok station in the wintertime are incorrect. The sensors applied are not to be used at such low temperatures.

July 2001

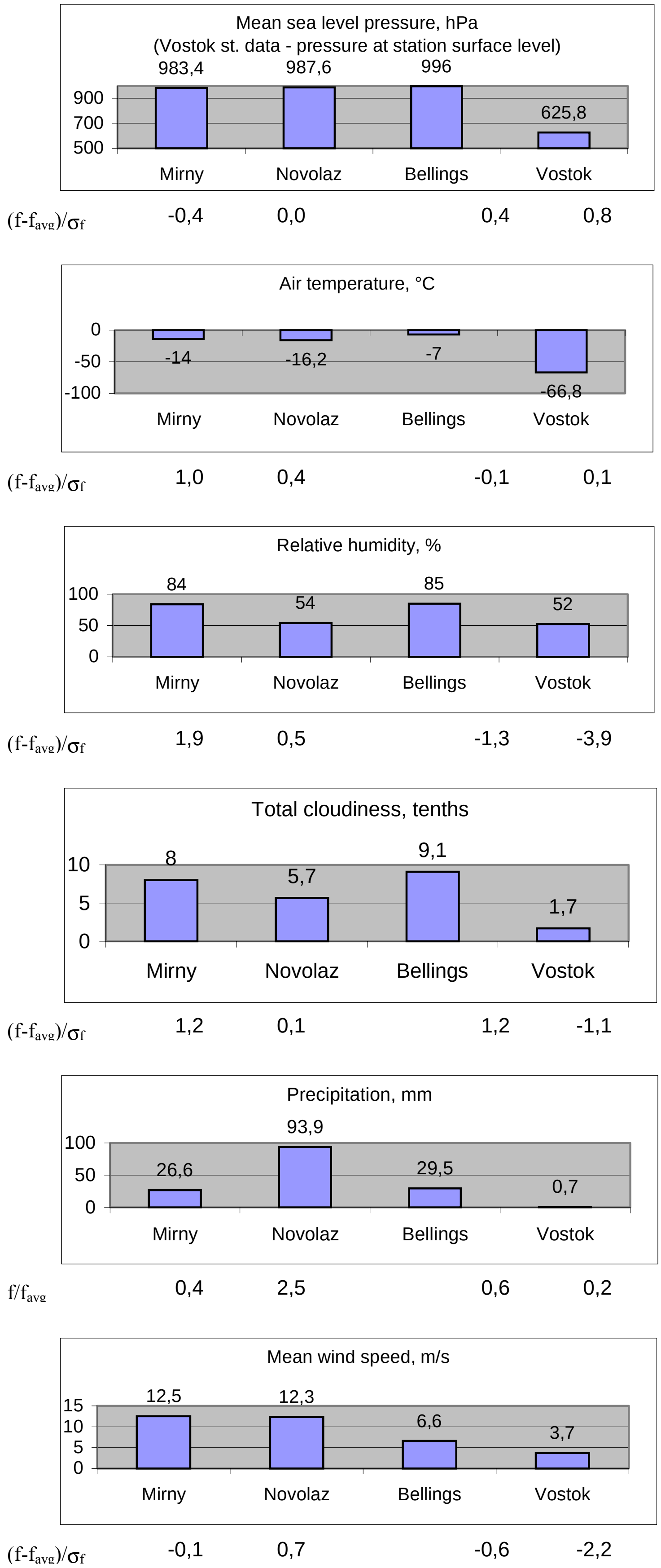

Fig. 1.1. Comparison of monthly averages of meteorological parameters at the stations, July 2001.

AUGUST 2001

MIRNY OBSERVATORY

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

August 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Sea level pressure, hPa	980,8	1005,4	937,3	-3,6	-0,6	
Air temperature, ^{0}C	-18,4	-8,3	-31	-1,2	-0,4	
Relative humidity, %	74			1	0,2	
Total cloudiness (sky coverage), tenths	7,2			0,5	0,6	
Lower cloudiness(sky coverage),tenths	4,2			1,4	1,1	
Precipitation, mm	41,1			-26,3	-0,5	0,6
Mean wind speed, m/s	12,5	32		-0,4	-0,3	
Prevailing wind direction, deg	135					
Total radiation, MJ/m^2	66			0,3	0,0	1,0
Total ozone content, DU	240	269	219			

Results of aerological atmospheric sounding (from CLIMAT-TEMP messages)

August 2001

Isobaric surface, P, hPa	Isobaric surface height, H m	Temperature, T ^{0}C	Dew point deficit, D ^{0}C	Resulting wind direction, deg	Resulting wind speed, m/s	Wind stability parameter	Number of days without temperature data	Number of days without wind data
982	53	-19,5	4,2					
925	467	-19,1	5	92	11	98	1	1
850	1092	-21,8	4,6	89	10	92	1	1
700	2514	-24,7	5,7	83	3	36	1	1
500	4897	-38,6	5,8	258	3	31	1	1
400	6397	-48,6	5,2	259	6	51	1	1
300	8235	-60,8	4,7	263	10	70	1	1
200	10679	-71,3	4,1	265	13	81	1	1
150	12365	-73,7	4	268	16	92	1	1
100	14733	-76,9	3,8	269	22	94	5	6
70	16787	-78,3	3,7	271	29	96	9	9
50	18722	-78,7	3,4	275	35	98	14	9
30	21666	-77,9	3,5	277	45	99	19	9

Anomalies of standard isobaric surface heights and temperature

August 2001

P, hPa	$H-H_{avg}$, m	$(H-H_{avg})/\sigma_H$	$T-T_{avg}$, °C	$(T-T_{avg})/\sigma_T$
850	-3	-0,1	-2,0	-0,8
700	-20	-0,3	-1,1	-0,6
500	-27	-0,4	-0,6	-0,3
400	-36	-0,4	-0,4	-0,2
300	-35	-0,3	-0,3	-0,2
200	-54	-0,5	-0,9	-0,4
150	-63	-0,6	-1,2	-0,5
100	-55	-0,5	-1,8	-0,6
70	-56	-0,4	-1,5	-0,4
50	-84	-0,5	-1,6	-0,3
30	-91	-0,4	-1,8	-0,3

NOVOLAZAREVSKAYA STATION

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

August 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Sea level pressure, hPa	983,1	1003,9	948,6	-3,4	-0,6	
Air temperature, ^0C	-19,6	-9,1	-33,4	-1,3	-0,5	
Relative humidity, %	41			-9,7	-1,3	
Total cloudiness (sky coverage), tenths	4,7			-0,7	-0,5	
Lower cloudiness(sky coverage),tenths	0,2			-0,7	-0,9	
Precipitation, mm	19,3			-23,1	-0,5	0,5
Mean wind speed, m/s	10,5	32		-0,1	0,0	
Prevailing wind direction, deg	135					
Total radiation, MJ/m^2	38			4,3	0,9	1,1

Results of aerological atmospheric sounding (from CLIMAT-TEMP messages)

August 2001

Isobaric surface, P, hPa	Isobaric surface height, H m	Temperature, T ^0C	Dew point deficit, D ^0C	Resulting wind direction, deg	Resulting wind speed, m/s	Wind stability parameter	Number of days without temperature data	Number of days without wind data
973	122	-19,1	10,7					
925	482	-18,9	8,1	112	12	95	0	0
850	1106	-23	7,4	103	13	96	0	0
700	2530	-28,6	5,9	111	7	68	0	0
500	4858	-41,8	6,4	168	4	35	0	0
400	6337	-51,8	5,7	191	6	47	0	0
300	8154	-62,6	5	210	8	60	0	0
200	10588	-72,2	4,4	222	9	70	0	0
150	12261	-76,2	4,2	236	10	79	0	0
100	14577	-80,2	4	246	13	86	1	1
70	16573	-82,6	3,8	251	14	90	3	3
50	18444	-83,7	3,8	256	17	93	3	3
30	21276	-82,7	3,8	258	21	95	4	4
20	23567	-78,4	4,2	261	22	96	6	7

Anomalies of standard isobaric surface heights and temperature

August 2001

P, hPa	$H-H_{avg}$, m	$(H-H_{avg})/\sigma_H$	$T-T_{avg}$, °C	$(T-T_{avg})/\sigma_T$
850	-7	-0,1	-1,1	-0,6
700	5	0,1	-0,8	-0,4
500	-24	-0,3	-0,9	-0,6
400	-30	-0,4	-0,8	-0,6
300	-34	-0,4	0,0	0,0
200	-33	-0,4	0,3	0,2
150	-39	-0,4	-0,7	-0,5
100	-51	-0,5	-1,0	-0,7
70	-88	-0,8	-0,9	-0,5
50	-125	-0,9	-0,7	-0,3
30	-159	-0,8	0,1	0,0
20	-140	-0,7	2,2	0,6

BELLINGSHAUSEN STATION

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

August 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Sea level pressure, hPa	982,2	1002,2	952,3	-9,8	-1,6	
Air temperature, ^{0}C	-3,1	0,4	-11,2	3,6	1,5	
Relative humidity, %	91			3,1	1,1	
Total cloudiness (sky coverage), tenths	9,2			0,7	1,4	
Lower cloudiness(sky coverage),tenths	8,9			1,7	1,7	
Precipitation, mm	56,2			-12	-0,3	0,8
Mean wind speed, m/s	9,9	20		2,1	2,3	
Prevailing wind direction, deg	270					
Total radiation, MJ/m^2	58			-28,1	-3,5	0,7

VOSTOK STATION

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

August 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Station surface level pressure, hPa	615	627,7	601,6	-4,6	-0,6	
Air temperature, ^{0}C	-68,6	-37,5	-80,7	-0,6	-0,2	
Relative humidity, %	66*			-2,6	-0,6	
Total cloudiness (sky coverage), tenths	3,5			0,1	0,1	
Lower cloudiness(sky coverage),tenths	0			0	0,0	
Precipitation, mm	3,1			0	0,0	1,0
Mean wind speed, m/s	5,2	15		-0,4	-0,5	
Prevailing wind direction, deg	225					
Total radiation, MJ/m^2	3			0,7	0,4	1,4
Total ozone content, DU	No observations were done					

* Measurements of relative humidity at Vostok station in the wintertime are incorrect. The sensors applied are not to be used at such low temperatures.

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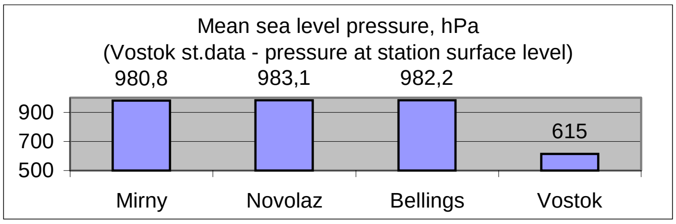
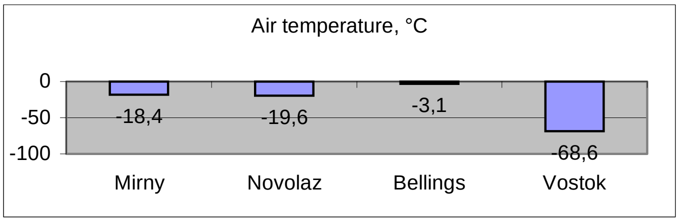


$(f-f_{avg})/\sigma_f$ -0,6 -0,6 -1,6 -0,6



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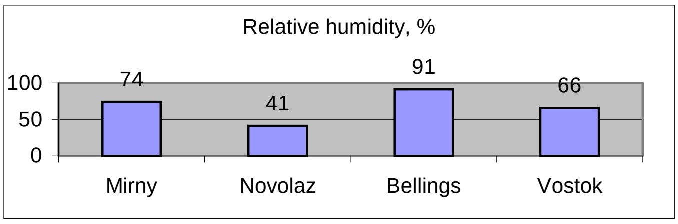
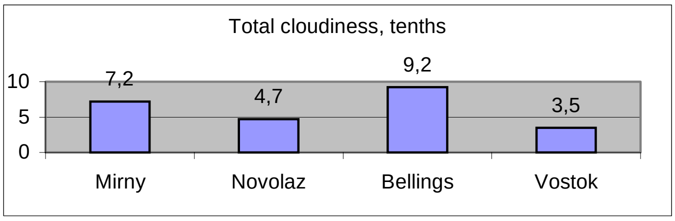
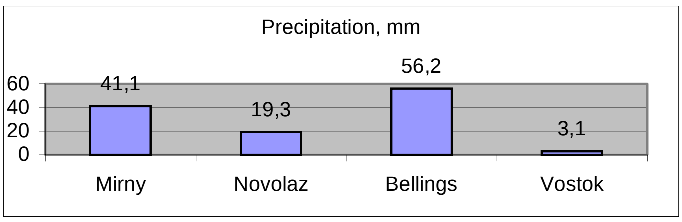


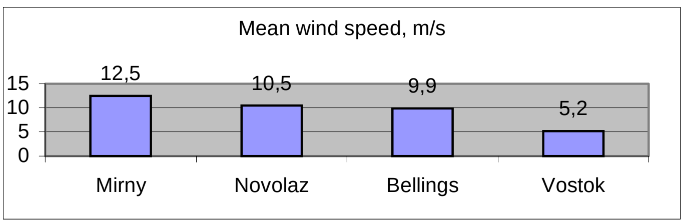
$(f-f_{avg})/\sigma_f$ 0,2 -1,3 1,1 -0,6



$(f-f_{avg})/\sigma_f$ 0,6 -0,5 1,4 0,1



f/f_{avg} 0,6 0,5 0,8 1,0



$(f-f_{avg})/\sigma_f$ -0,3 0,0 2,3 -0,5

Fig. 1.2. Comparison of monthly averages of meteorological parameters at the stations, August 2001.

SEPTEMBER 2001

MIRNY OBSERVATORY

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

September 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Sea level pressure, hPa	976,8	993,3	948,2	-5,3	-1,1	
Air temperature, ^{0}C	-16,3	-5,8	-30,7	0,4	0,2	
Relative humidity, %	66			-5,4	-1,2	
Total cloudiness (sky coverage), tenths	6,2			-0,3	-0,3	
Lower cloudiness(sky coverage),tenths	2,8			0	0,0	
Precipitation, mm	13,6			-47,3	-0,9	0,2
Mean wind speed, m/s	11,1	31		-1	-0,7	
Prevailing wind direction, deg	135					
Total radiation, MJ/m^2	228			4,5	0,3	1,0
Total ozone content, DU	197	257	143			

Results of aerological atmospheric sounding (from CLIMAT-TEMP messages)

September 2001

Isobaric surface, P, hPa	Isobaric surface height, H m	Temperature, T ^{0}C	Dew point deficit, D ^{0}C	Resulting wind direction, deg	Resulting wind speed, m/s	Wind stability parameter	Number of days without temperature data	Number of days without wind data
973	53	-18	5,2					
925	430	-15,1	6,1	92	9	91	3	3
850	1065	-18,1	4,8	91	7	87	3	3
700	2501	-23,6	5,9	99	3	34	3	3
500	4892	-38,1	5,8	277	1	12	3	4
400	6394	-48,1	5,6	269	3	30	3	3
300	8238	-59,8	4,4	281	5	51	3	3
200	10703	-69,2	4,1	276	11	84	3	4
150	12410	-71,5	4,1	273	15	93	3	6
100	14790	-73,2	4,3	271	22	97	8	8
70	16872	-74	4	271	29	97	8	9
50	18863	-72,7	4,5	274	37	98	12	9
30	21854	-69,3	5,1	276	48	99	19	9
20	24310	-62,6	5,9	278	55	99	19	9
10	28744	-49,1						

Anomalies of standard isobaric surface heights and temperature

September 2001

P, hPa	$H-H_{avg}$, m	$(H-H_{avg})/\sigma_H$	$T-T_{avg}$, °C	$(T-T_{avg})/\sigma_T$
850	-24	-0,6	1,0	0,5
700	-26	-0,6	-0,4	-0,2
500	-30	-0,5	-0,4	-0,2
400	-32	-0,5	0,0	0,0
300	-36	-0,5	0,2	0,2
200	-32	-0,4	0,0	0,0
150	-37	-0,4	-1,0	-0,4

100	-55	-0,6	-2,8	-0,8
70	-87	-0,9	-5,3	-1,0
50	-141	-1,0	-6,3	-1,0
30	-289	-1,3	-8,5	-1,2
20	-409	-1,2	-7,6	-1,0
10	-561	-1,1	-7,1	-0,9

NOVOLAZAREVSKAYA STATION

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

September 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Sea level pressure, hPa	983,8	1004	942,1	-0,4	-0,1	
Air temperature, ^{0}C	-18,2	-5,7	-30,5	-1	-0,5	
Relative humidity, %	39			-12,1	-1,7	
Total cloudiness (sky coverage), tenths	4,6			-0,8	-0,8	
Lower cloudiness(sky coverage),tenths	0,5			-0,3	-0,3	
Precipitation, mm	1,1			-44	-0,8	0,0
Mean wind speed, m/s	9	31		-0,9	-0,5	
Prevailing wind direction, deg	135					
Total radiation, MJ/m^2	200			25,9	1,6	1,1

Results of aerological atmospheric sounding (from CLIMAT-TEMP messages)

September 2001

Isobaric surface, P, hPa	Isobaric surface height, H m	Temperature, T ^{0}C	Dew point deficit, D ^{0}C	Resulting wind direction, deg	Resulting wind speed, m/s	Wind stability parameter	Number of days without temperature data	Number of days without wind data
969	122	-18,4	10,9					
925	475	-17,7	8,9	112	12	93	0	0
850	1101	-22,3	8,2	106	12	93	0	0
700	2508	-28,3	5,7	101	7	74	0	0
500	4869	-40	6	180	4	39	0	0
400	6359	-50,2	5,4	212	6	46	0	0
300	8186	-62	4,8	222	7	54	0	0
200	10620	-72,4	4,2	227	11	76	0	0
150	12298	-75,3	4,1	234	11	83	0	0
100	14621	-79,1	4	244	13	86	1	1
70	16629	-81	4	249	15	92	2	2
50	18504	-81,1	4	256	19	94	4	4
30	21396	-77,1	4,4	261	24	97	8	8
20	23767	-70	4,9	264	28	97	11	9

Anomalies of standard isobaric surface heights and temperature

September 2001

P, hPa	$H-H_{avg}$, m	$(H-H_{avg})/\sigma_H$	$T-T_{avg}$, °C	$(T-T_{avg})/\sigma_T$
850	0	0,0	-1,2	-0,9
700	-8	-0,2	-0,9	-0,7
500	-12	-0,2	0,1	0,1
400	-11	-0,2	0,1	0,1
300	-12	-0,2	0,0	0,0
200	-15	-0,2	-0,1	-0,1
150	-17	-0,2	-0,4	-0,2
100	-35	-0,5	-1,8	-0,9
70	-66	-0,7	-2,8	-1,2
50	-129	-1,1	-2,9	-0,9
30	-210	-1,2	-2,1	-0,5
20	-295	-1,0	-1,2	-0,2

BELLINGSHAUSEN STATION

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

September 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Sea level pressure, hPa	991	1013,8	969,5	-0,1	0,0	
Air temperature, ^{0}C	-3	0,2	-11,6	1,4	0,8	
Relative humidity, %	91			2,3	0,9	
Total cloudiness (sky coverage), tenths	8,9			0,1	0,2	
Lower cloudiness(sky coverage),tenths	7,6			-0,3	-0,4	
Precipitation, mm	105,4			42,6	2,1	1,7
Mean wind speed, m/s	8,3	20		0,3	0,3	
Prevailing wind direction, deg	315					
Total radiation, MJ/m^2	185			-28,6	-1,6	0,9

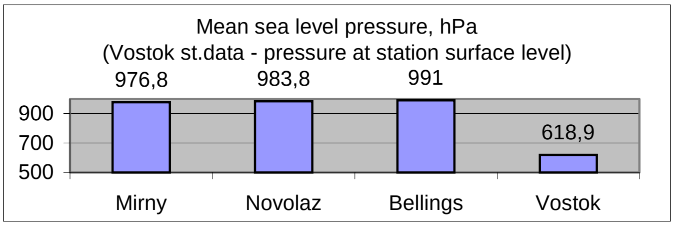
VOSTOK STATION

Monthly averages of meteorological parameters (f) and their deviations from multiyear averages (f_{avg})

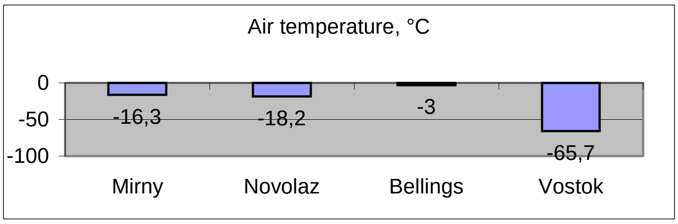
September 2001

Parameter	$f_{mon.avg}$	f_{max}	f_{min}	Anomaly $f-f_{avg}$	Normalized anomaly $(f-f_{avg})/\sigma_f$	Relative anomaly f/f_{avg}
Station surface level pressure, hPa	618,9	635,7	606	0,9	0,2	
Air temperature, ^{0}C	-65,7	-44,2	-77,2	0	0,0	
Relative humidity, %	69			0	0,0	
Total cloudiness (sky coverage), tenths	3,8			-0,1	-0,1	
Lower cloudiness(sky coverage),tenths	0			-0,1	-0,5	
Precipitation, mm	1,1			-1,9	-0,7	0,4
Mean wind speed, m/s	4,3	8		-1,2	-1,3	
Prevailing wind direction, deg	225					
Total radiation, MJ/m^2	111			11,8	1,0	1,1
Total ozone content, DU	No observations were done					

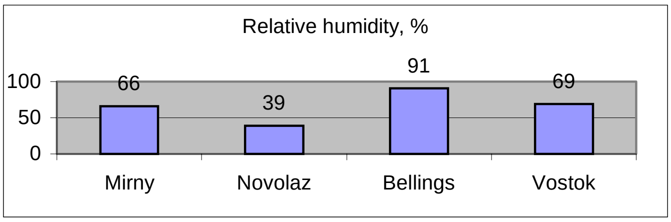
September 2001



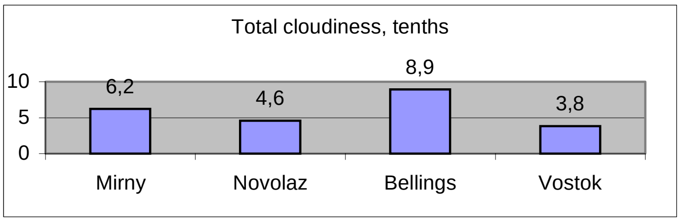
$(f-f_{avg})/\sigma_f$ -1,1 -0,1 0,0 0,2



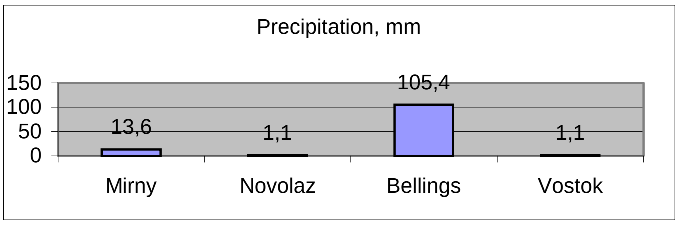
$(f-f_{avg})/\sigma_f$ 0,2 -0,5 0,8 0,0



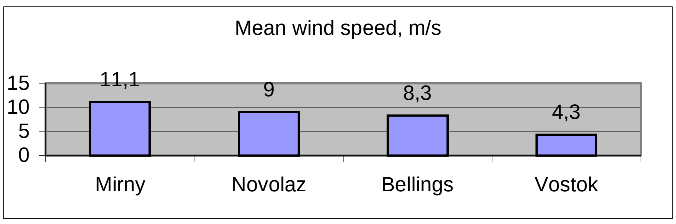
$(f-f_{avg})/\sigma_f$ -1,2 -1,7 0,9 0,0



$(f-f_{avg})/\sigma_f$ -0,3 -0,8 0,2 -0,1



f/f_{avg} 0,2 0,0 1,7 0,4



$(f-f_{avg})/\sigma_f$ -0,7 -0,5 0,3 -1,3

Fig. 1.3. Comparison of monthly averages of meteorological parameters at the stations, September 2001.

2. ANOMALOUS METEOROLOGICAL CONDITIONS AT THE RUSSIAN ANTARCTIC STATIONS IN JULY-SEPTEMBER 2001

In July-September, small above and below zero anomalies of monthly air temperature averages at Novolazarevskaya, Mirny and Vostok stations were preserved. The normalized anomalies at these stations were less than 1σ. Only at Bellingshausen station the normalized anomaly in August comprised 1.5 σ. In the interannual temperature variations, August 2001 at Bellingshausen was the fourth in the rank of warm years.

Fig. 2.1 characterizes the temperature conditions in July-September in general in Antarctica. It presents the absolute and normalized surface temperature anomalies at the Russian and non-Russian meteorological stations. The anomalies at the non-Russian stations were obtained from the actual data contained in /1/ and multiyear averages /2/.

In July and September, the air temperature over much of Antarctica was characterized by the above zero anomalies. The core of the heat center was located in East Antarctica in the area of the Adelie Land. Here, at Dumont d'Urville station, the temperature anomaly comprised 4.2^o C (1.3σ) in July and 3.4^o C (1.3σ) in September. Insignificant below zero anomalies were recorded in these months in the Atlantic coastal zone.

In August, two pronounced centers of anomalies of an opposite sign were observed. The core of the heat center was located in the area of the Antarctic Peninsula and the South Orkney Islands. At Orcadas station, the temperature anomaly comprised 5.5^o C (1.8σ). Such a large heat anomaly at Orcadas station is noted for the first time over the period from 1957. The core of the cold center was located in the area of the Polar Plateau and the Ross Sea. The cold anomaly was equal to - 5.0^o C (-1.7σ) at Amundsen-Scott station and to -5.7^o C (-1.4σ) at McMurdo station.

An assessment of long-period changes of monthly air temperature averages at the Russian stations in these months reveals the statistically significant trends only at Novolazarevskaya (July) and Bellingshausen (August) stations (Table 2.1, Figs. 2.2-2.4). The air temperature increase was about 2.9^o C/41 years at Novolazarevskaya for July from 1961 and about 2.6^o C/34 years at Bellingshausen for August (from 1968).

During the last decade, no statistically significant linear temperature trends were observed at the Russian stations.

Table 2.1

Linear trend parameters of the monthly surface air temperature averages

Stations	Parameter	VII	VIII	IX	VII	VIII	IX
		Entire observation period			1992-2001 period		
Novolazarevskaya, 1961-2001	^{o}C/1 year	0.071	-0.002	0.044	-0.062	-0.106	-0.001
	%	32	1	25	8	21	0
	P	95	–	–	–	–	–
Mirny, 1957-2001	^{o}C/1 year	0.016	0.018	0.044	0.369	0.100	0.222
	%	8	8	22	44	13	27
	P	–	–	–	–		–
Vostok, 1957-2001	^{o}C/1 year	0.016	0.015	-0.019	0.146	-0.138	0.015
	%	7	6	8	21	18	2
	P	–	–	–	–	–	95
Bellingshausen, 1968-2001	^{o}C/1 year	0.043	0.078	-0.013	0.279	0.051	-0.242
	%	14	33	8	34	7	37
	P	–	95	–	–	–	–

Note: First line is the linear trend coefficient;
Second line - dispersion explained by the linear trend;
Third line - significance level (given if it exceeds 90%, 95% or 99 % confidence intervals).

The atmospheric pressure at the Russian stations in July-September was characterized predominantly by negative anomalies. Small (less than 1σ) positive anomalies occurred only in July at Bellingshausen and in July and September at Vostok stations. The largest negative anomaly was noted in August at Bellingshausen station (-9.8 hPa (-1.6σ). Such a significant negative pressure anomaly is recorded at this station for the third time over the entire observation period. In the interannual variations of atmospheric pressure the statistically significant trends are observed for August at Mirny station (negative trend) and for September at Vostok station (positive trend). For example, the atmospheric pressure increase for September at Vostok for the period 1958-2001 comprised 4.7 hPa/44 years.

The amount of precipitation in July-September at the Russian stations was predominantly less than a multiyear average. Only in July at Novolazarevskaya and in September at Bellingshausen, the increased precipitation was recorded 2.5- and 1.7-fold greater than a multiyear monthly average. For Bellingshausen station, this is the first case of abundant precipitation in the indicated month, while for Novolazarevskaya station, this is the third case (the former two occurring in 1973 and 1981).

References:

1. http://www.ncdc.noaa.gov/ol/climatedata.html
2. Atlas of the Oceans. Southern Ocean. RF Ministry of Defense (in press).

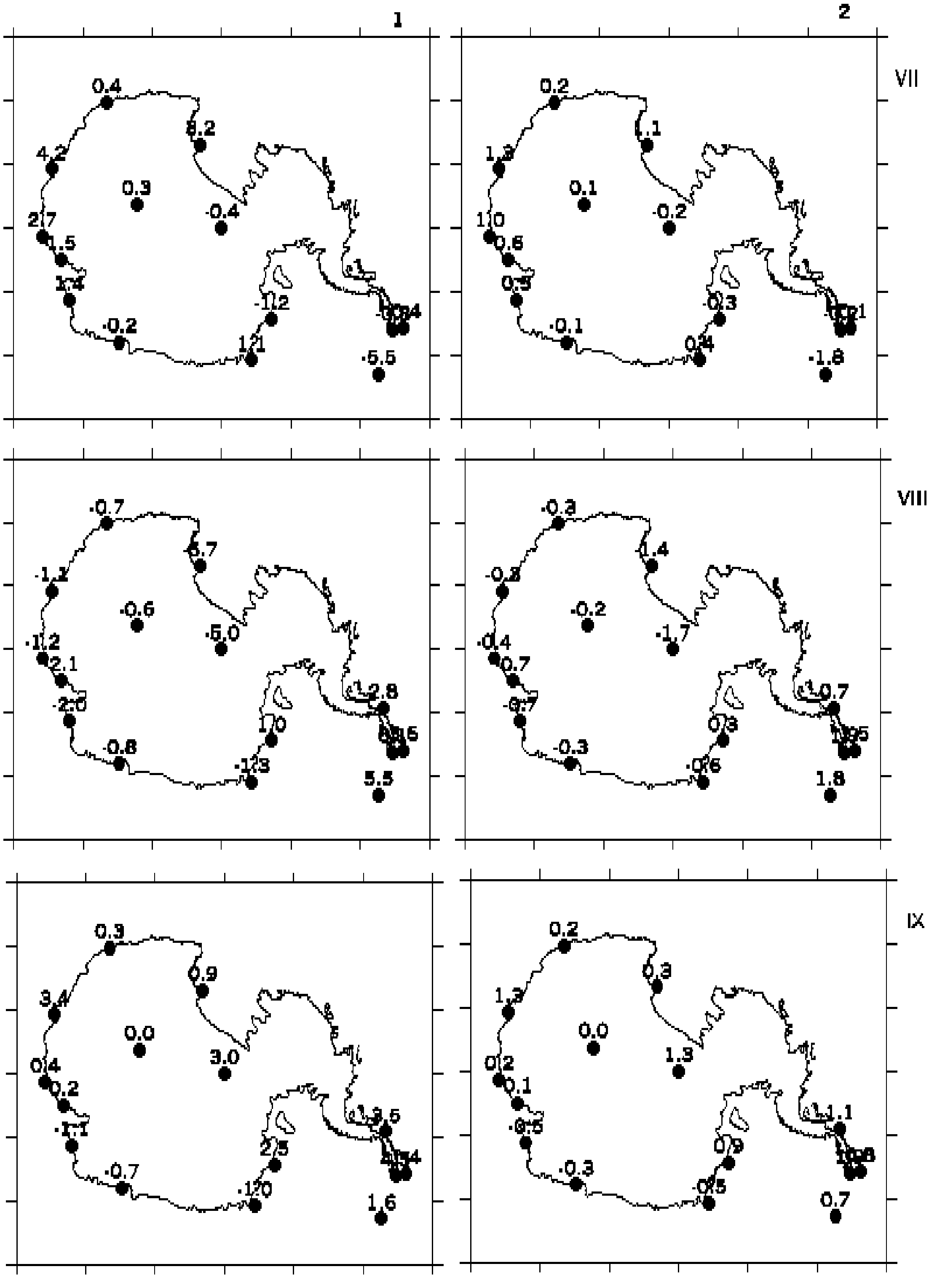


Fig. 2.1. Absolute anomalies (1) and normalized anomalies (2) of surface air temperature in July (VII), August (VIII), and September (IX) 2001 from data of stationary meteorological stations in the South Pole area.

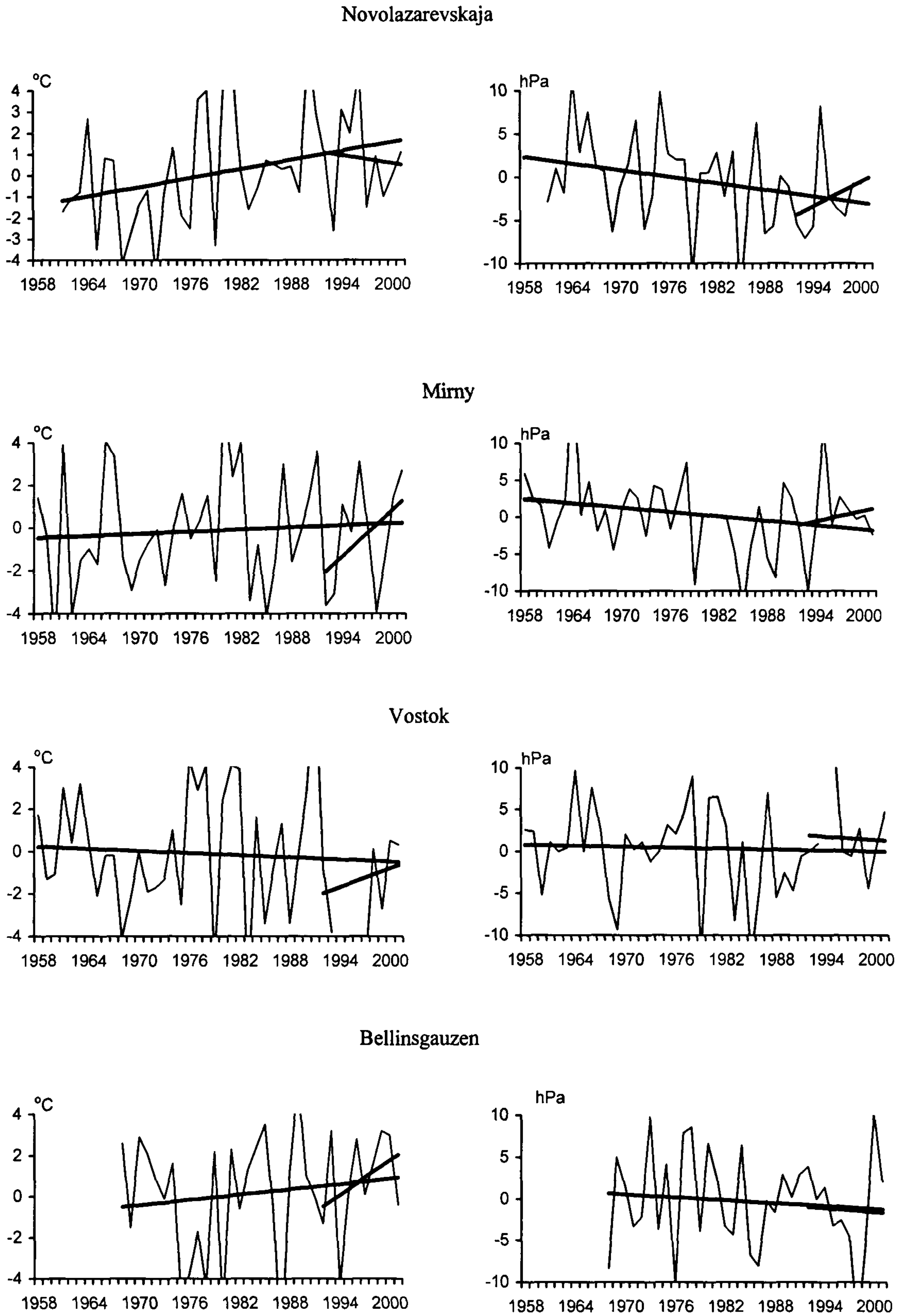


Fig. 2.2. Interannual variations of air temperature and atmospheric pressure anomalies at the Russian Antarctic stations. July.

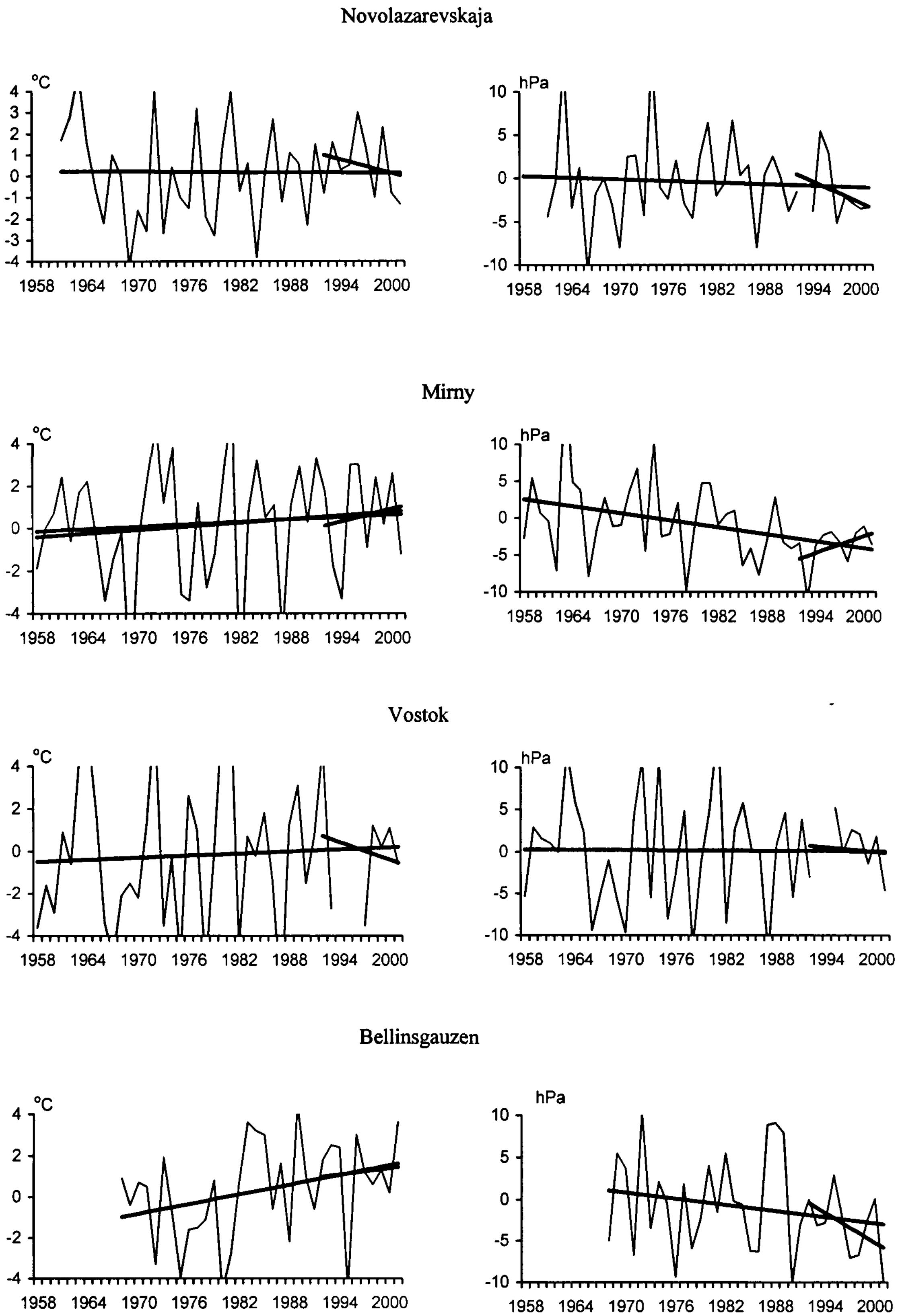


Fig. 2.3. Interannual variations of air temperature and atmospheric pressure anomalies at the Russian Antarctic stations. August.

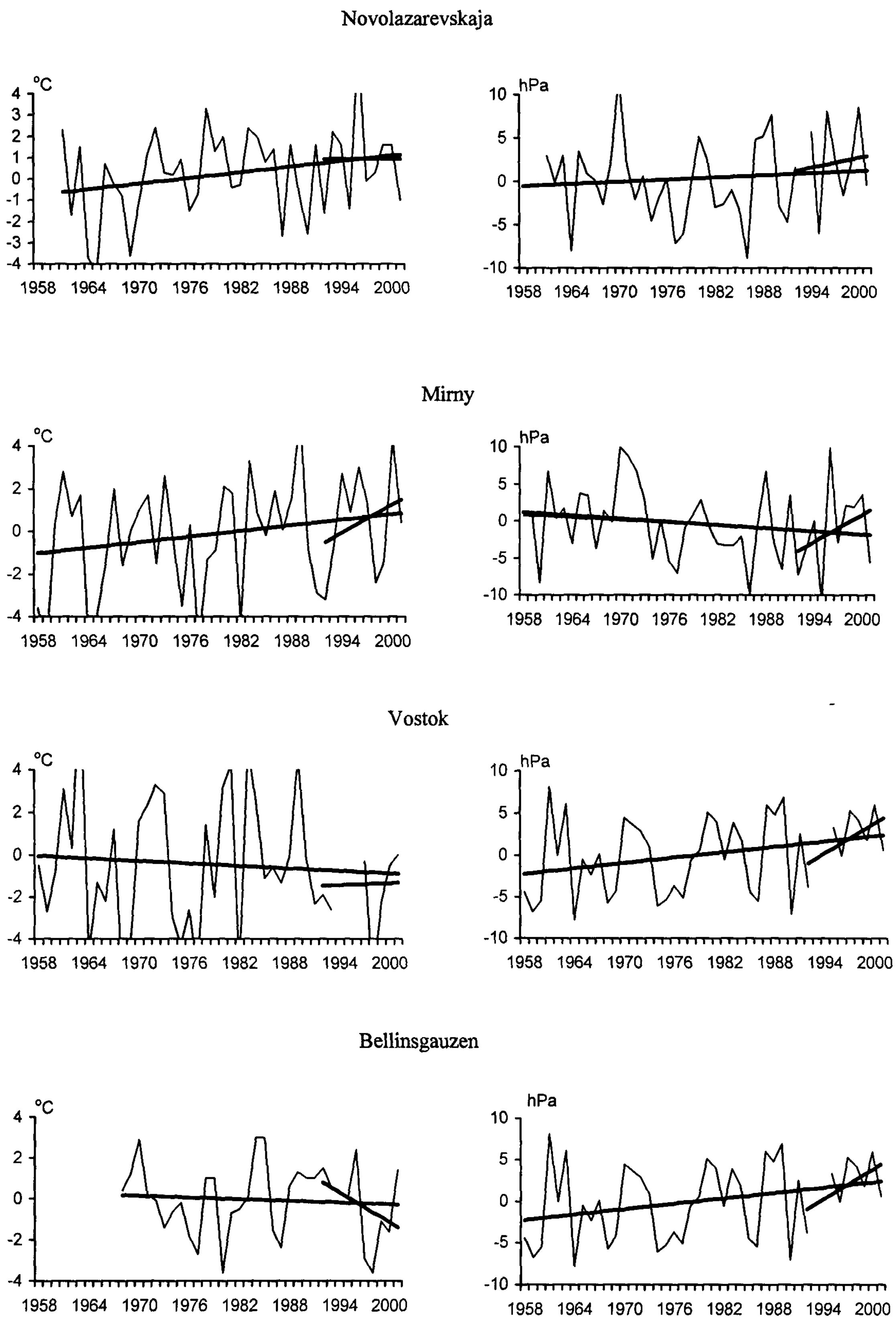


Fig. 2.4. Interannual variations of air temperature and atmospheric pressure anomalies at the Russian Antarctic stations. September.

3. REVIEW OF ATMOSPHERIC PROCESSES ABOVE THE ANTARCTIC IN JULY-SEPTEMBER 2001

During the winter months (July-September), the atmospheric circulation above the Antarctic was characterized by the dominating processes of zonal and meridional M_b forms (see Table 3.1). The meridional circulation of the M_a form /1, 2 and 3/ was less frequent, especially in July and September. In the eastern Antarctic, as is typical of this time of the year, deep cyclones moved predominantly along zonal trajectories in a belt of 44-55° S, while in the coastal areas, extensive depressions of low mobility were observed at the Antarctic front.

In July, the Falkland branch of the trajectory of cyclones was active in the Atlantic sector of the Antarctic. The cyclones of average depth passed above the areas of the Lazarev and Riiser-Larsen Seas. The wind increase to 25-36 m/s with gusts up to 42 m/s was recorded at this at Novolazarevskaya station.

Table 3.1

Frequency of occurrence of the atmospheric circulation forms in the Southern Hemisphere and their anomalies in July-September 2001

Month	Frequency of occurrence (days)			Anomalies (days)		
	Z	M_a	M_b	Z	M_a	M_b
July	13	7	11	3	-6	3
August	13	8	10	1	-3	2
September	14	4	12	3	-8	5

In the Indian and Australian sectors, the New Zealand branch of the trajectory of cyclones along which deep cyclones exited to the coast of Antarctica, was the most developed.

In August, similar to July, the total intensity of meridional processes was weaker. However, two cases of very deep cyclones exiting by meridional trajectories were observed – along the Kerguelen branch to the Pravda shore area and along the East Pacific trajectory across the Drake Passage to the high latitudes of the Weddell Sea.

In September, the processes of a zonal transfer continued to dominate with a noticeable increase of the frequency of occurrence of M_b form. Similar to July and August, the intensity of zonal processes was low and more weak compared to the preceding two months.

According to the upper-air sounding data in Mirny Observatory, the lowest temperature of the tropopause up to -84.9° C were recorded in August with the largest tropopause heights up to 15.7 km observed in July. In August and September, the tropopause height oscillations were much smaller in amplitude.

The largest flow velocities in the winter stratospheric vortex were recorded in September at a height of 10 hPa comprising 81 m/s.

References:

1. Dydina L.A., Rabtsevich S.V., Ryzhakov L.Yu., Savitsky G.B. Atmospheric circulation forms in the Southern Hemisphere. – AARI Proceedings, 1976, V. 330, p. 5-16.
2. Ryzhakov L.Yu. Some characteristics of the anomalous development of atmospheric circulation forms in the Southern Hemisphere at the cold time of the year. – AARI Proceedings, 1976, V. 330, p. 17-29.
3. Ryzhakov L.Yu., Savitsky G.B. and Ryabkov G.Ye. Seasonal motion features of pressure formations in the Southern Hemisphere at typical atmospheric macroprocesses. – SAE Proceedings, 1990, Vol. 87, p. 70-74.
4. Ryzhakov L.Yu. Macrosynoptic and climatological studies of the Southern Hemisphere. “Meteorlogy and Climatology”, V. 9. Itogi nauki i tekhniki VINITI AN SSSR. M., 1983, 136 p.

4. BRIEF REVIEW OF ICE PROCESSES IN THE SOUTHERN OCEAN IN JULY-SEPTEMBER 2001

During the Antarctic winter of 2001, similar to the two preceding years, a smaller ice cover extent was observed in the Atlantic and especially in the Indian sector of the Southern Ocean. Thus, in September, the ice edge was located more to the south than usually at 2^{o} of latitude, on average (Table 4.1, Fig. 4.1).

The main cause of the decreased ice cover extent is probably a low intensity of the atmospheric processes that was observed during the entire period July to September (see Section 3). This has governed a significant attenuation in the aforementioned sectors of the main export branches of ice advection that provide its distribution over the ocean area north of 65^{o} S.

For example, the export of thick second-year ice northward to the Scotia Sea from the core of the Atlantic ice massif defined in June, has probably stopped completely as early as mid-July (see previous Bulletin for April-June, Section 4). That is why, the exceptionally easy ice conditions formed here by the type of “warm winters” beginning from 1996. In particular, the duration of the ice period in the vicinity of the Bellingshausen field base (South Shetland Islands) comprised not more than 2.5 months similar to the last year (Table 4.2).

The winter synoptic conditions of low activity influenced in quite a peculiar way the regional weather and ice conditions. The Mirny Observatory area can serve as a good example where fog was observed in July for many hours and the intensity of landfast ice growth with a relatively small snow cover was anomalously decreased throughout the winter (Table 4.3).

In conclusion, it is noted that in winter, the ice cover extent of the Southern Ocean was in general still within the multiyear averages due to a compensating increased expansion of the ice belt in the Pacific Ocean sector.

Table 4.1

Latitudinal location of the external northern drifting ice edge in the Southern Ocean based on satellite data of Novolazarevskaya and Mirny stations in September 2001

Meridians	Actual	Multiyear average
40° W	59.0° S	58.1° S
30° W	57.5° S	57.0° S
20° W	56.9° S	56.9° S
10° W	-	56.6° S
0°	55.8° S	55.9° S
10° E	57.7° S	55.3° S
20° E	59.2° S	56.6° S
30° E	59.4° S	58.7° S
40° E	61.0° S	59.1° S
50° E	62.1° S	59.1° S
60° E	61.6° S	59.3° S
70° E	61.3°S	59.1° S
80° E	61.9°S	58.3° S
90° E	61.3°S	59.5° S
100° E	61.1°S	59.9° S
110° E	63.2°S	60.6° S
120° E	64.2°S	61.3° S
130° E	63.9°S	61.9° S
140° E	64.3°S	62.3° S

Table 4.2

Dates of the onset of main ice phases in the Bellingshausen field base area (Ardley Bay) in winter of 2001

	Ice formation		Landfast ice formation		Freezeup		Landfast ice break-up		Ice clearance	
	first	stable	first	stable	first	final	start	end	first	Final
Actual	22.06	22.06	23.06	No	24.06	No	23.07	08.08	08.08	10.09
Multi-year avg	09.05	08.06	11.06	13.06	03.07	07.07	10.09	09.10	12.10	05.11

Note: No- no phenomenon.

Table 4.3

Average landfast ice thickness (cm) and snow depth on landfast ice (cm) in the area of Mirny Observatory from data of profile measurements in July-September 2001

	Ice			Snow		
Months	VII	VIII	IX	VII	VIII	IX
Actual	82	102	113	13	12	13
Multiyear avg	101	119	137			

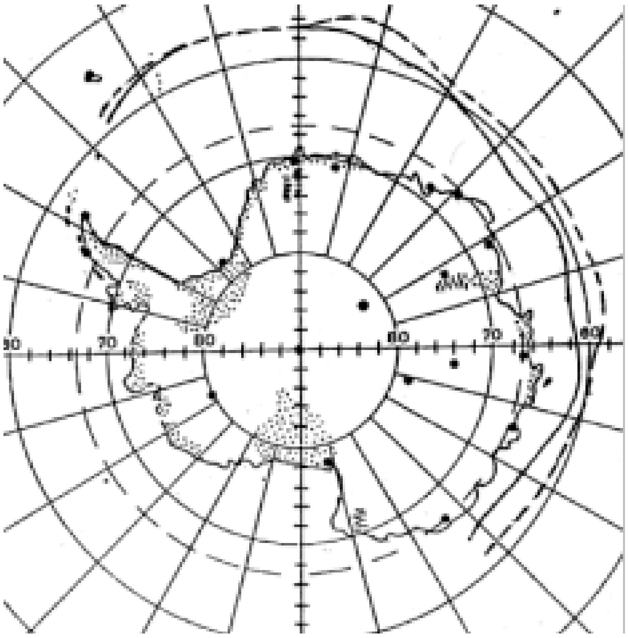


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Fig. 4.1. Actual and mean multiyear location of the external, northern drifting ice edge in the Southern Ocean in September 2001.

Conventional designations:

——— Actual
- - - - - Multiyear average

5. TOTAL OZONE MEASUREMENTS AT MIRNY AND NOVOLAZAREVSKAYA STATIONS IN JULY-SEPTEMBER 2001

Measurements of total ozone (TO) after the end of polar night began on July 30 in Mirny Observatory and on September 1, 2001 at Novolazarevskaya station.

During the polar night, the total ozone in Mirny decreased from 270 Dobson units in May to 240 Dobson units in August. As can be seen from Fig. 5.1, the daily averages were not less than 219 Dobson units. In total, the TO was stable, which can be probably attributed to a weak intensity of the atmospheric processes above Antarctica in August.

In September, the monthly total ozone average in Mirny comprised 197 Dobson units, i.e. being the second in the rank of minimum values for this month (the first in the rank of minimum values of 185 Dobson units was observed in 1994). The lowest in September daily TO average in Mirny of 143 Dobson units was recorded on September 23, 2001. The sufficiently sharp ozone fluctuations occurred throughout the month as is often the case in September.

At Novolazarevskaya station during September, a steady ozone decline was observed with the maximum value of 233 Dobson units recorded on September 1 and the minimum value of 127 Dobson units – on September 28 (see Fig. 5.1). The monthly average comprised 174 Dobson units, which is higher than in 1990 (173 Dobson units), in 1993 (132 Dobson units) and in 1995 (163 Dobson units). It should be taken into account that observations here were not continuous being conducted only in some seasons. Data of observations organized at Novolazarevskaya station in 2001 require an additional analysis and are presented as preliminary in order to show a tendency of TO change in this region in September.

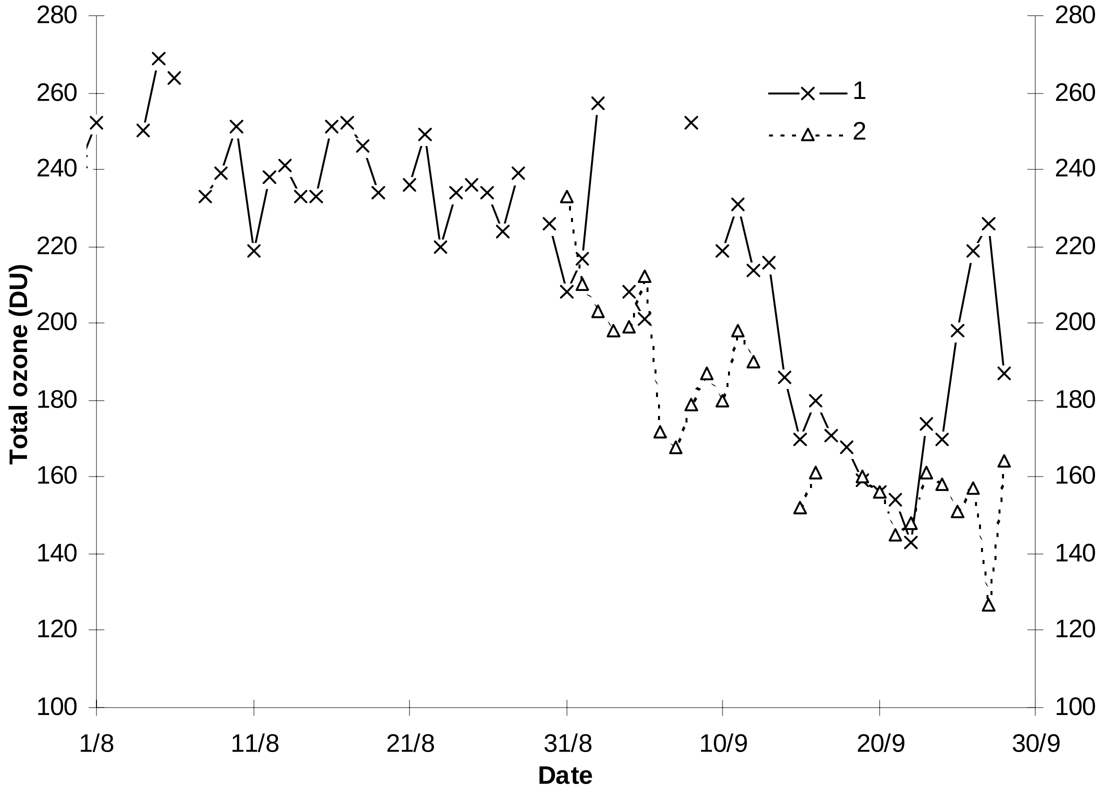


Fig. 5.1. Daily total ozone averages at Mirny station (1) and Novolazarevskaya station (2) in July-September 2001.

6. GEOPHYSICAL OBSERVATIONS AT RUSSIAN ANTARCTIC STATIONS IN JULY-SEPTEMBER 2001

MIRNY OBSERVATORY

Mean monthly absolute geomagnetic field values

	July	*August*	*September*
Declination	*86°52.9'W*	*86°53.3'W*	*86°36.4'W*
Horizontal component	*13935 nT*	*13941 nT*	*13957 nT*
Vertical component	*-57500 nT*	*-57515 nT*	*-57520 nT*

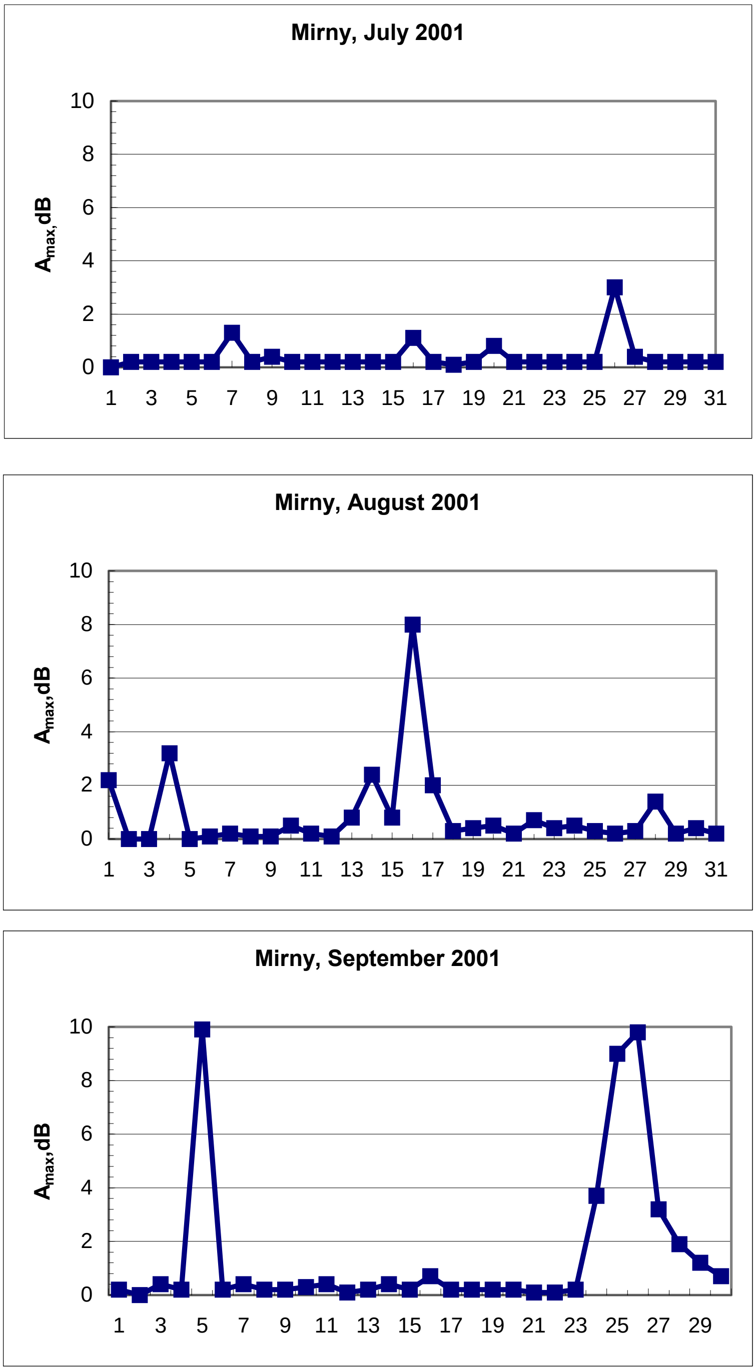
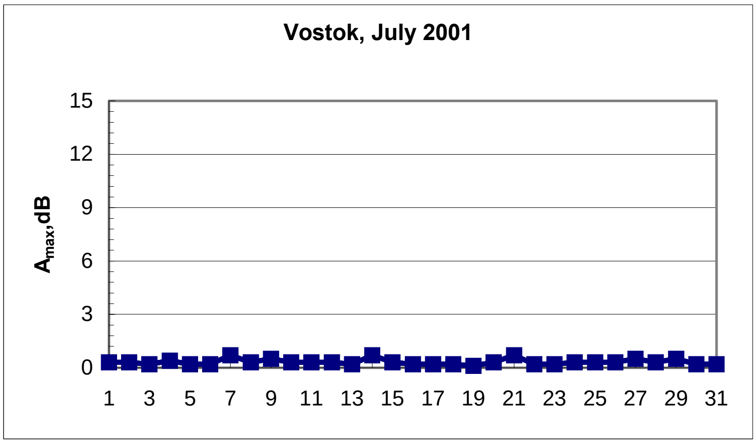


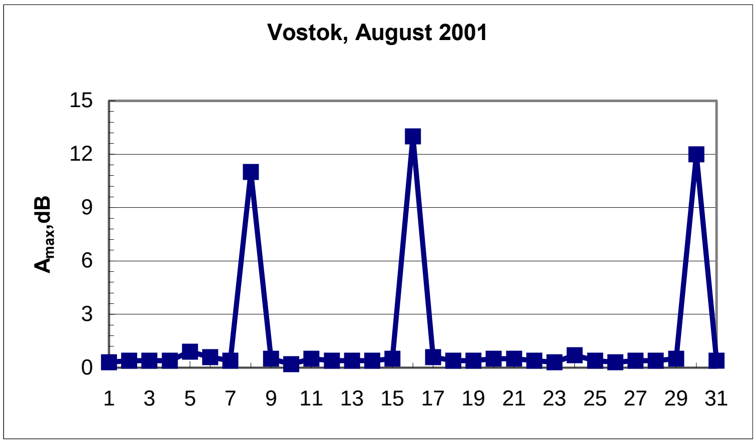
Fig. 6.1. Maximum daily space radio-emission absorption at the 32 MHz frequency from riometer observations in Mirny Observatory.

VOSTOK STATION

Mean monthly absolute geomagnetic field values

	April	*May*	*June*
Declination	*120°53.67'W*	*120°54.9'W*	*120°53.02'W*
Horizontal component	*13476 nT*	*13487 nT*	*13478 nT*
Vertical component	*-58152 nT*	*-58151 nT*	*-58141 nT*





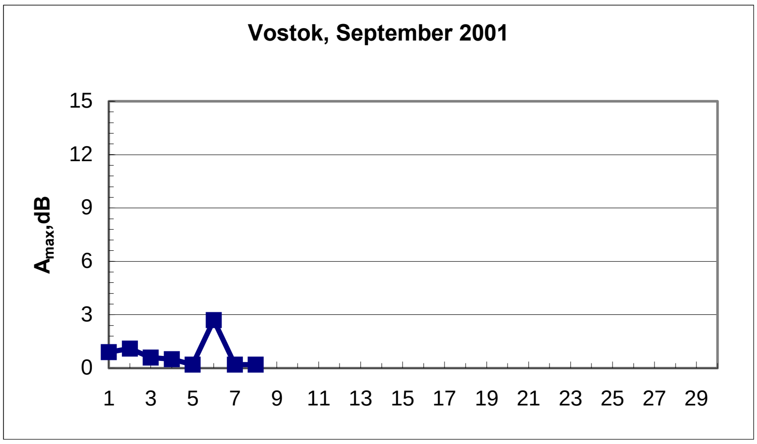
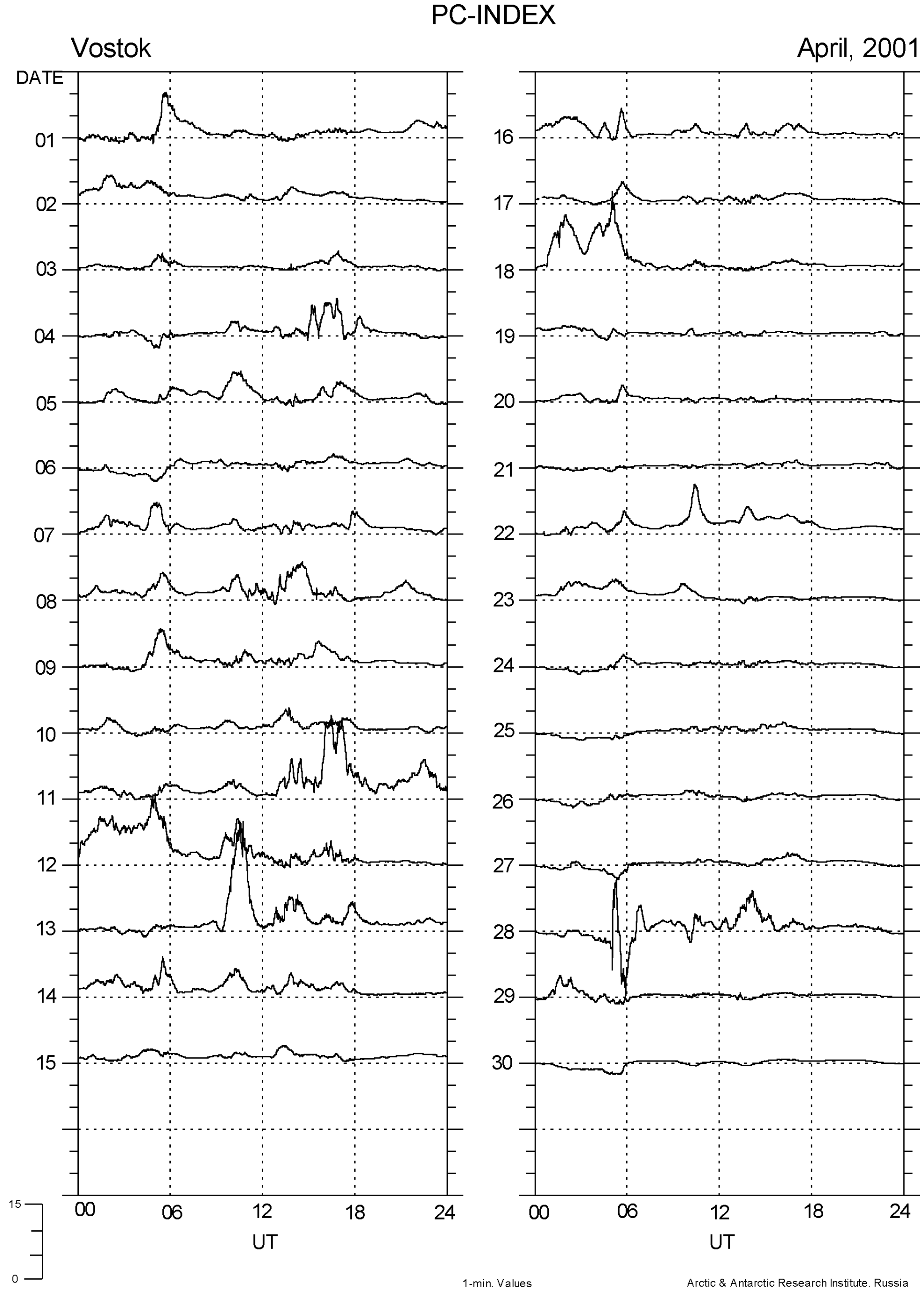


Fig. 6.2. Maximum daily space radio-emission absorption at the 32 MHz frequency from riometer observations at Vostok station.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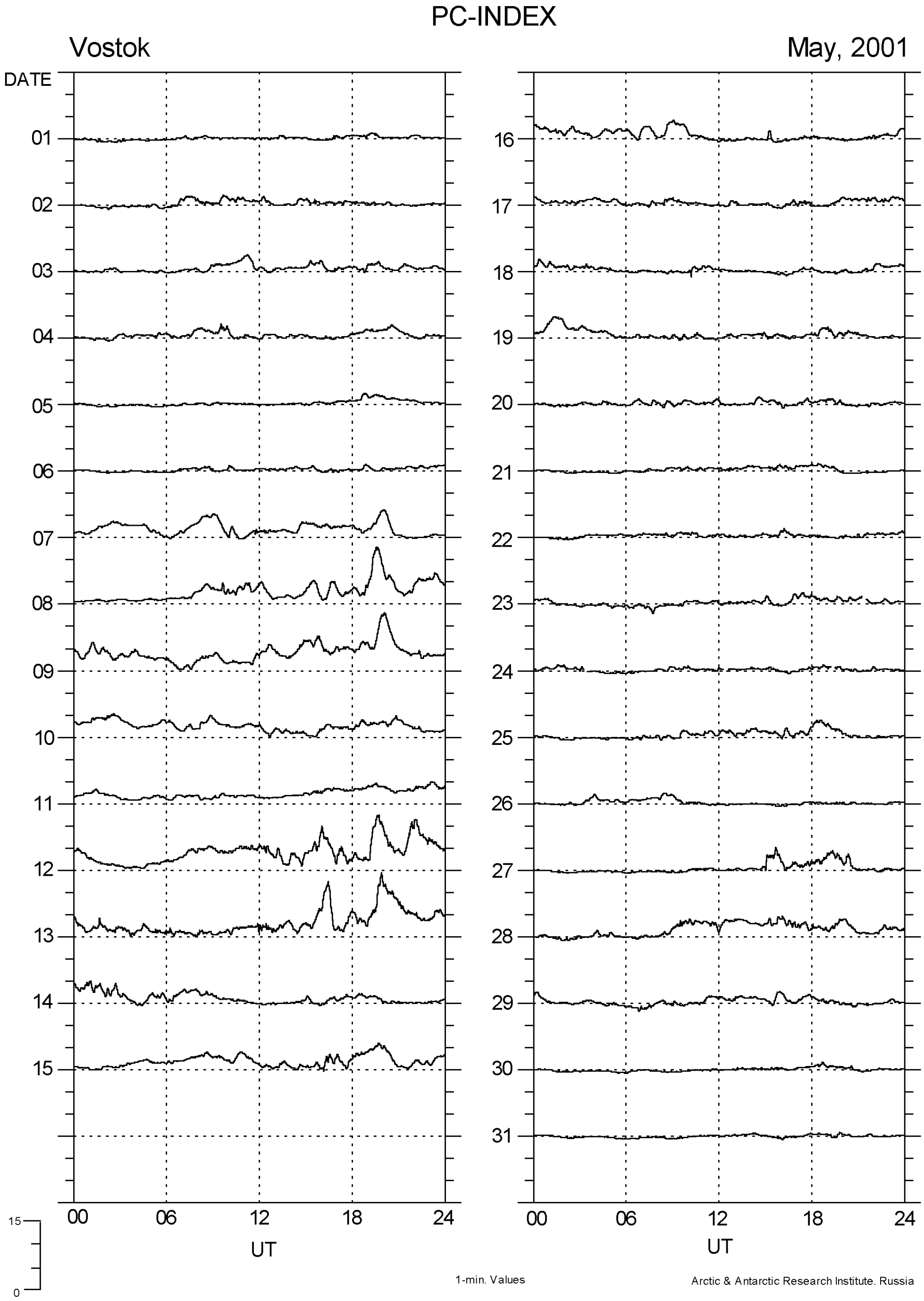
Arctic & Antarctic Research Institute. Russia

Fig. 6.2.



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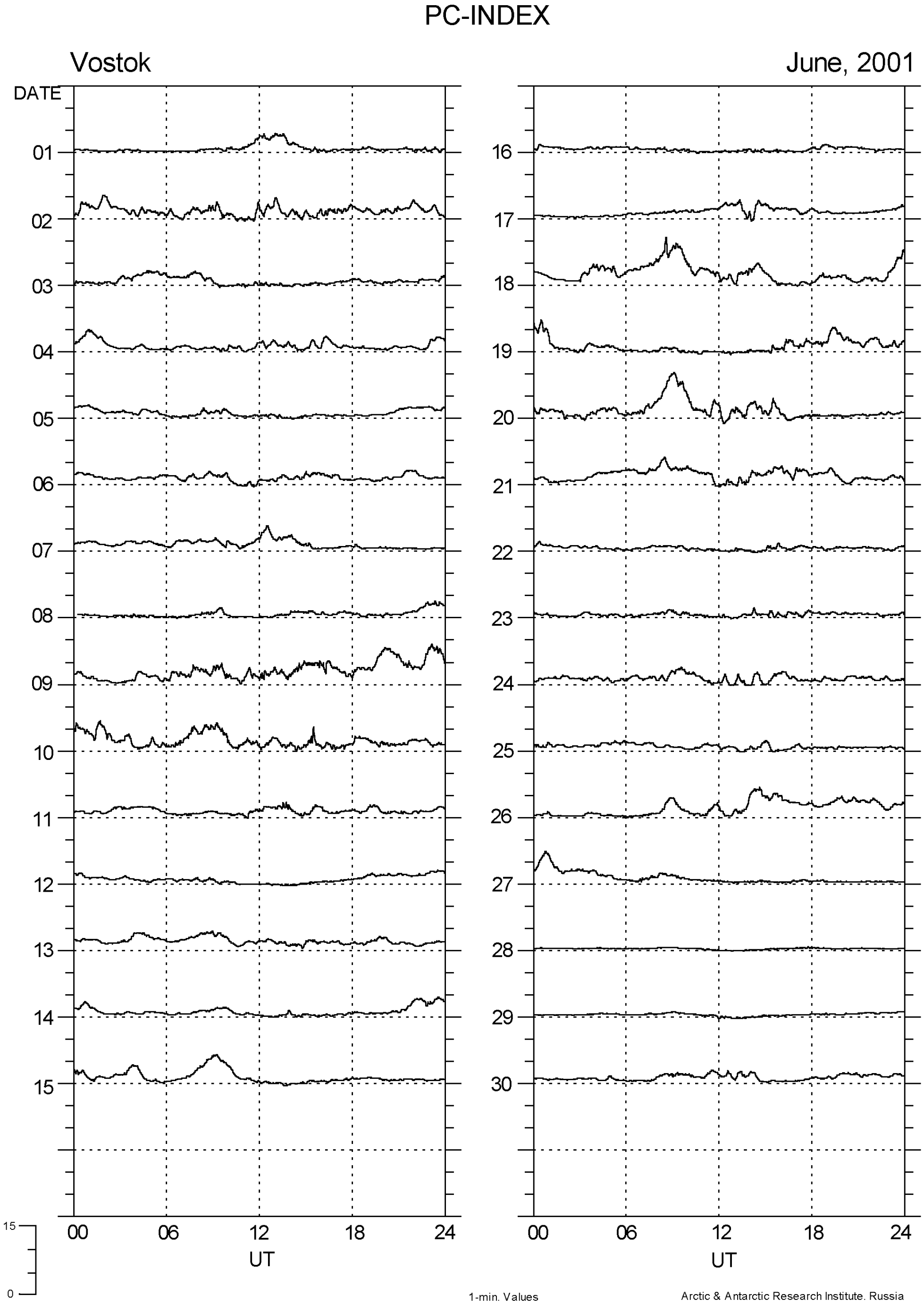
Arctic & Antarctic Research Institute. Russia

Fig. 6.3.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Arctic & Antarctic Research Institute. Russia

Fig. 6.4.

Review of the state of geomagnetic field and ionosphere above the Antarctic in July-September 2001

Observations of magnetic activity at Vostok, Mirny and Novolazarevskaya stations (PC- and K-indices registration) indicate that magnetic perturbations occurred on July 25-26, July 31- August 6, August 14-17, August 22, August 25-31 and September 23-30. The magnetic storms on August 14-17 and September 23-30 can be referred to a rank of extremely intense polar magnetic perturbations (the PC-index values were greater than 20).
These perturbations were accompanied by the intrusion of high-energy solar protons to the upper atmosphere of the Antarctic. The effects of these intrusions, the so-called absorption events in the polar cap (PCA) were recorded by riometers at Mirny and Vostok stations. The maximum absorption at Vostok station at the 32 MHz frequency on August 16 comprised 13 dB (8 dB in Mirny). On September 23-30, the absorption both in Mirny and at Vostok was greater than 10 dB. During these periods, there was a complete absence of radio-communication at the SW range.

7. SEISMIC OBSERVATIONS IN ANTARCTICA IN 2000

In 2000, seismic observations in Antarctica were continued at two permanent stations of the Geophysical Service of the Russian Academy of Science (RAS GS) – at Mirny and Novolazarevskaya stations.

At Mirny station (MIR), seismic observations have been carried out since 1956. In 1962, observations began at Novolazarevskaya station (NVL) in 3060 km to the east of Mirny station. These stations are part of the tele-seismic network of the Geophysical Service of RAS whose main objective is to ensure continuous monitoring in the Earth's seismic active zones including Russia.

At present, the Antarctic seismic stations fulfil the following functions:

- monitoring of strong earthquakes with a M>6 magnitude;
- registration of earthquakes in the seismic active zone around Antarctica;
- registration of local phenomena in Antarctica, including local earthquakes and fractures in the ice sheet.

A unique array of seismometers on the monolithic bedrock outcrops of a practically a-seismic continent remote from civilization that creates a high noise level allows registration of seismic waves from the earthquakes occurring at significant distances from these stations. Earthquakes with a magnitude greater than M=6 are recorded at a distance of 165 degrees (18000 km). Highly sensitive equipment also allows tracing less intense earthquakes in the oceanic belt surrounding the continent at a 15-25 degree distance from the coast.

The equipment at Mirny station includes a set of analogue instrumentation – seismometers with a highly sensitive short-period SKM-3 channel and a medium-period SKD seismograph with a decreased sensitivity channel. From July 1999, observations at the seismic Novolazarevskaya station are carried out by a wide band SKD seismometer in a set with a 16bit digital seismic station SDAS developed and produced by the Central Test-Methodological Expedition (CTME) of the RAS GS (Obninsk) jointly with the Scientific-Production Association "Geotekh". This equipment with a bandwidth of 0.04-5 Hz, quantization frequency of 20 readouts a second and a dynamic range of about 90 dB has allowed a transfer to a modern digital level of acquisition, storage and processing of seismic records.

Processing of records of analogue seismological data at Mirny station consisted of the following stages. The seismograms obtained as a result of continuous observations were subjected to preliminary processing that included keeping the registration log of the change of seismograms, isolation of precise time signals and determination of time corrections and official registration of seismograms. Then, the interpretation of the earthquake records was performed consisting in separation of arrivals of seismic waves, determination of the time and precision of arrivals, identification of seismic waves and determination of the main earthquake parameters. Upon the return of the expedition, the seismograms were passed to the archive of the RAS GS Central Test-Methodological Expedition.

At Novolazarevskaya station digital records of earthquakes were computer-processed and archived on CD that were passed after the return to the archive of the RAS GS Central Test-Methodological Expedition.

Processing of the records of earthquakes at Mirny and Novolazarevskaya stations was performed in accordance with the methodology commonly accepted at the RAS GS /1/. The results of interpretation were recorded at the station logs on whose basis daily operational reports were prepared and sent by telegraph to the RAS GS Information Processing Center (IPC). These data were used in a composite processing of earthquakes for preparation of operational catalogues and the Seismological Bulletin /2/. In addition, tracing of the level of microseisms and separation in the records of short-period oscillations connected with fractures in the ice sheet of Antarctica were performed on a daily basis.

In 2000 at Mirny, 689 earthquakes and separate arrivals were recorded and the main parameters (time at the source and the magnitude) were determined for 113 earthquakes. Data of Mirny station were used for a composite processing of 52 earthquakes, with 70 events among them with a MPSP magnitude[1]≥6.0, including 20 events with MPSP≥6.5 (see Table 7.1). On SKM-3 seismograms, records of short-period oscillations related to the Antarctic ice sheet fractures were identified. The distribution of these events by months is shown in Table 7.2.

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[1] MPSP magnitude – a characteristic of the earthquake force, which is calculated from measurements of amplitudes and periods in the maximum phase of longitudinal wave P in the records of short-period instruments (SP). It corresponds to the international magnitude mb.

At Novolazarevskaya station, using digital SDAS equipment, 1089 earthquakes and individual arrivals were recorded and main parameters for 209 earthquakes were determined during the period January 1 to December 31, 2000. Data from Novolazarevskaya were used in 2000 for a composite processing at the RAS GS IPC of 297 earthquakes with 67 events with MPSM ≥ 6.0 including 20 events with MPSM ≥ 56.5 (see Table 7.1). Fig. 7.1 shows an example of a digital record at Novolazarevskaya station of the strongest earthquake in Eurasia in 2000 with MPSM=6.7 that occurred in West Turkmenistan on December 6. The records of the ice sheet fractures were also processed and the distribution of these events by months is shown in Table 7.2. Table 7.1 presents the main parameters of strong earthquakes from the Seismological Bulletin data /2/.

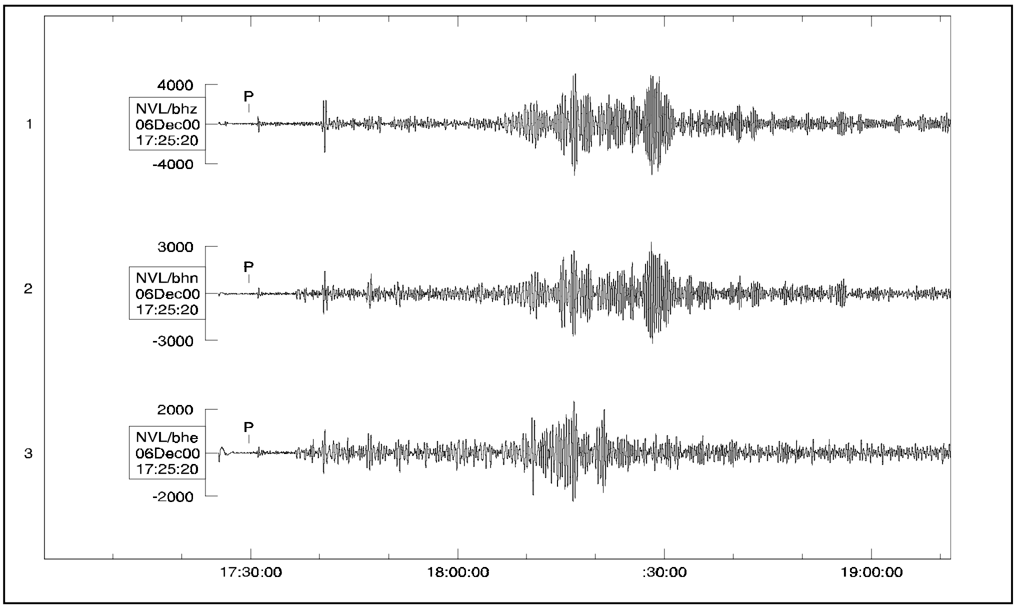


Fig. 7.1. Record of the earthquake on December 6, 2000 with MPSP=6.7 in West Turkmenistan by the digital seismic station at Novolazarevskaya (epicenter distance of 114 degrees and the record filtering in the frequency band 0.01-0.08 Hz).

Table 7.1

Earthquakes with MPSP≥6.0, recorded by the Antarctic Mirny and Novolazarevskaya stations in 2000

No.	Date	Time at the source (Greenwich)	Epicenter coordinates		Depth, h, km	MPSP magnitude	Epicenter distance to the station Δ, degrees	
			φ°	λ°			NVL	MIR
1	20000108	011946.7	-9.76	159.95	33	6.0	-[2]	72.0
2	20000108	115921.7	-23.08	-70.14	33	6.0	65.8	89.8
3	20000108	164714.6	-16.63	-173.97	116	6.7	-	76.1
4	20000115	124836.7	-22.65	-179.45	33	6.2	-	68.5
5	20000126	132651.0	-17.08	-173.93	33	6.2	92.3	75.7
6	20000128	142103.7	42.96	146.81	33	6.9	144.4	-
7	20000206	113353.3	-5.56	150.96	33	6.6	99.1	72.6
8	20000225	014359.5	-19.52	173.9	33	6.3	89.1	68.7
9	20000303	220916.8	-7.11	128.45	160	6.6	91.8	64.1
10	20000303	222246.5	-6.29	143.96	33	6.7	96.8	69.5
11	20000305	235708.1	-63.3	146.19	33	6.3	42.5	22.2

[2] "-" the results of processing this earthquake are absent in the station log

No.	Date	Time at the source (Greenwich)	Epicenter coordinates		Depth, h, km	MPSP magnitude	Epicenter distance to the station Δ, degrees	
			φ°	λ°			NVL	MIR
12	20000321	052559.9	3.25	127.97	33	6.4	-	74.0
13	20000328	110023.9	22.47	143.75	132	6.9	124.3	96.6
14	20000411	064120.5	-27.85	-178.35	149	6.0	81.4	Strong microseisms
15	20000421	043518.2	51.51	-178.13	33	6.1	160.1	135.3
16	20000423	092722.4	-28.25	-63.04	595	6.5	58.6	83.8
17	20000502	150335.0	17.58	147.58	33	6.1	Strong wind perturbations	93.1
18	20000504	042116.7	-0.99	123.45	33	6.7	Strong wind perturbations	68.9
19	20000504	203537.7	-18.55	-178.71	33	6.2	Strong wind perturbations	72.5
20	20000506	134418.2	-11.01	165.55	33	6.2	96.5	73.0
21	20000512	184308.1	-23.65	-66.87	129	6.5	64.2	88.8
22	20000514	200834.8	-4.16	123.06	33	6.1	92.9	65.7
23	20000519	203426.0	59.24	-153.25	79	6.0	166.9	150.3
24	20000602	111348.5	44.44	-130.23	10	6.0	147.7	148.0
25	20000604	162826.4	-4.61	102.17	33	7.0	85.8	62.2
26	20000606	024153.1	40.82	32.98	33	6.0	112.3	116.4
27	20000606	095807.8	-4.83	102.73	33	6.4	85.8	62.0
28	20000606	145703.1	29.58	131.49	33	6.1	127.3	100.2
29	20000606	211646.5	37	135.54	33	6.0	135.5	-
30	20000607	214656.3	26.86	97.28	33	6.6	113.6	93.2
31	20000607	234526.3	-4.57	102.02	33	6.6	85.8	62.2
32	20000609	080022.9	-5.7	102.94	33	6.0	85.0	61.1
33	20000609	233146.6	30.54	137.71	495	6.0	130.1	-
34	20000610	182329.4	23.88	121.19	33	6.5	118.7	92.6
35	20000615	111050.8	29.58	132.08	33	6.2	127.5	100.3
36	20000616	075536.0	-33.82	-70.12	120	6.1	55.9	79.1
37	20000618	144412.5	-13.82	97.37	10	7.1	75.6	52.8
38	20000701	070201.3	34.6	139.08	39	6.1	134.3	106.8
39	20000707	154647.6	51.56	179.97	54	6.6	160.0	-
40	20000708	185749.7	34.64	139.26	33	6.1	134.4	-
41	20000710	095818.8	46.83	145.52	364	6.1	147.5	-
42	20000710	103935.1	-4.41	103.75	69	6.4	86.5	62.5
43	20000711	013226.5	57.57	-154.47	41	6.8	165.5	148.7
44	20000716	032145.6	20.36	122.01	33	6.2	115.7	89.4
45	20000716	035749.7	-7.66	150.86	33	6.1	97.1	70.6
46	20000717	225346.6	36.38	71.02	131	6.3	114.9	-
47	20000720	183920.7	36.94	140.96	49	6.6	137.1	-
48	20000721	015336.6	9.64	-85.17	33	6.0	101.4	123.2
49	20000722	205608.4	-3.97	102.15	33	6.3	86.4	62.8
50	20000730	122551.6	34.53	139.36	33	6.3	134.4	106.8
51	20000804	211304.4	48.76	142.27	21	6.4	148.2	121.0
52	20000806	072714.8	28.85	139.59	413	6.5	129.1	101.5
53	20000807	143356.4	-6.84	123.37	648	6.4	90.5	63.2
54	20000809	114146.4	18.16	-102.49	33	6.3	-	130.6
55	20000815	043009.8	-31.44	179.77	362	6.1	77.7	60.3
56	20000815	202045.7	43.42	146.67	33	6.3	144.7	-
57	20000819	172632.3	44.37	147.16	81	6.1	145.7	-

No.	Date	Time at the source (Greenwich)	Epicenter coordinates		Depth, h, km	MPSP magnitude	Epicenter distance to the station Δ, degrees	
			φ°	λ°			NVL	MIR
58	20000828	150551.0	-3.95	127.38	36	6.5	94.5	66.9
59	20000828	192926.7	-4.08	127.12	46	6.6	94.3	66.7
60	20000910	190616.1	-0.97	129.23	33	6.0	97.9	70.2
61	20000911	171748.5	-15.65	-173.63	66	6.2	93.7	77.1
62	20000925	040040.8	-46.56	37.57	10	6.0	27.3	34.9
63	20000926	061750.1	-17.07	-173.82	33	6.3	92.3	75.8
64	20001002	022527.9	-7.91	30.58	10	6.4	63.9	72.0
65	20001004	143735.5	11.11	-62.64	33	6.1	95.4	122.2
66	20001004	165845.8	-15.32	166.94	33	6.3	92.4	69.7
67	20001006	043023.8	35.67	133.06	33	6.0	133.4	106.4
68	20001007	115742.7	-9.57	119.09	33	6.0	86.6	59.6
69	20001025	093223.2	-6.57	105.66	33	6.8	85.1	60.5
70	20001027	042153.1	26.3	140.52	398	6.4	127.0	99.3
71	20001101	042742.1	-7.91	-74.43	117	6.0	81.4	-
72	20001107	001809.2	-55.8	-29.73	33	6.0	23.3	50.6
73	20001108	070001.9	7.19	-77.96	33	6.0	96.7	120.4
74	20001116	074218.0	-5.27	153.15	33	6.5	99.9	73.6
75	20001118	020549.0	-5	153.25	33	6.0	100.2	73.9
76	20001118	033036.4	-4.13	152.67	33	6.1	-	74.5
77	20001118	065459.3	-5.08	151.61	33	6.2	99.7	73.3
78	20001125	180908.3	40.01	50.02	33	6.1	113.8	111.2
79	20001125	181048.5	40.36	50.03	33	6.2	114.2	-
80	20001129	102511.8	-24.9	-70.75	33	6.1	64.3	88.0
81	20001206	171107.5	39.68	54.71	33	6.7	114.4	109.9
82	20001206	225741.2	-4.05	152.77	33	6.3	101.0	74.6
83	20001207	093120.2	-4.17	152.76	33	6.0	100.9	74.5
84	20001218	011922.6	-20.96	-179.15	629	6.5	88.2	70.1
85	20001219	131147.7	12.03	144.93	33	6.3	-	87.0
86	20001220	112358.0	-38.97	-74.91	33	6.2	52.7	74.4
87	20001221	010128.9	-5.57	151.09	33	6.4	99.2	72.6
Total number of the recorded earthquakes with MPSP≥6.0 for 2000							77	74

Table 7.2

Data on ice shears in 2000

Month	Number of the recorded shears	
	Mirny	Novolazarevskaya
January	10	14
February	12	10
March	11	10
April	20	7
May	17	11
June	11	3
July	8	17
August	13	5
September	4	6
October	11	12
November	6	7
December	7	2

Most of the epicenters of earthquakes recorded by Mirny and Novolazarevskaya stations are located in the Southern Hemisphere in the regions within the Pacific Ocean seismic belt. There is a significant number in the area of South America, South Sandwich Islands and the Balleny Islands (see Fig. 7.2). In 2000, no earthquakes were recorded in the territory of Antarctica.

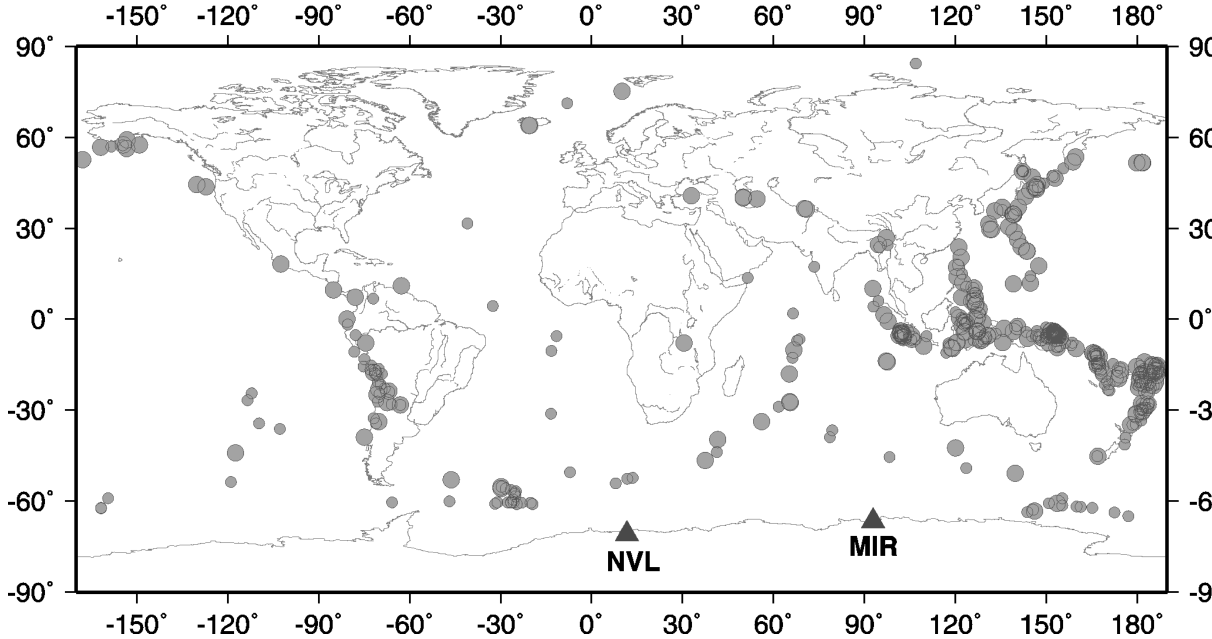
All observation data (compact-disks and seismograms) and the results of data processing (station logs and reports) obtained at Mirny and Novolazarevskaya stations are stored at the archive of the RAS GS Central Test-Methodological Expedition and are made available on request to a wide range of users.

References

1. Kondorskaya N.V. (responsible executor) et al., 1981. Instruction on the conduct and processing of observations at the seismic stations of the USSR united system of seismic observations. M., Nauka.

2. Seismological Bulletin (every 10 days), 2000, RAS GS CTME.

a)



Conventional designations:

-- epicenters of earthquakes, - seismic stations

MPSP magnitude

3.6-4.5 4.6-5.5 5.6-6.5 6.6-7.5

b)

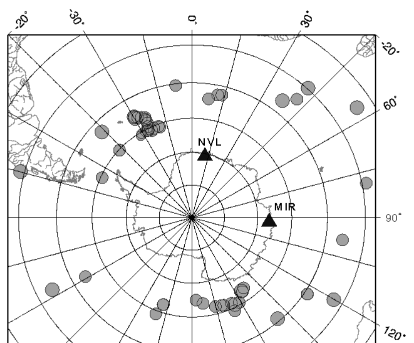


Fig. 7.2 (a, b). Charts of the epicenters of earthquakes recorded by Mirny and Novolazarevskaya stations in 2000

a) at Earth,

b) in the area of the seismic belt of Antarctica.

8. XXIV ANTARCTIC TREATY CONSULTATIVE MEETING

In accordance with the order of the Russian Federation Government of April 11, 2001 No. 512, the XXIV Antarctic Treaty Consultative Meeting was held in St. Petersburg during the period July 9 to 20, 2001. This Meeting pursuant to Article IX of the Antarctic Treaty is the highest body of this International Law Act, which discusses current interaction issues of the international community in the Treaty Area. The decision of holding the XXIV ATCM in Russia was made on the basis of recommendations of VIII ATCM (Oslo, Norway, 1975) that determined the order of holding the next meetings of Consultative Parties in the Latin alphabet order.

As of June 2001, 45 States joined the Antarctic Treaty with 27 of them having the status of Consultative Parties. The last country becoming the Antarctic Treaty participant was Estonia.

Twenty-six delegations from 27 countries representing the Consultative Parties except for Ecuador attended the Meeting. These were Australia, Argentina, Belgium, Bulgaria, Brazil, Germany, India, Italy, Spain, China, the Netherlands, New Zealand, Norway, Peru, Poland, the Republic of Korea, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland, the USA, Uruguay, Finland, France, Chile, Sweden, Republic of South Africa and Japan. The Contracting Parties to the Antarctic Treaty, which are not Consultative Parties, were represented by the delegations of Greece, Denmark, Canada, the Popular Democratic Republic of Korea, Romania, Slovakia, the Ukraine, the Czech Republic, Switzerland and Estonia. In accordance with the existing Rules of Procedure, Observers and Experts from the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Scientific Committee on Antarctic Research (SCAR), Council of Managers of National Antarctic Programs (COMNAP), Antarctic Southern Ocean Coalition (ASOC), International Association of Antarctic Tourist Operators (IAATO), United Nations Environment Program (UNEP) and World Meteorological Organization (WMO) having a scientific or practical interest in Antarctica were present at the Meeting. A total of 254 people participated in the work of the XXIV ATCM.

The Russian Delegation was headed by L.A. Skotnikov, Director, Legal Department, and Ministry of Foreign Affairs of the Russian Federation. P.G. Dzyubenko, Deputy Director of the Legal Department and Yu.S. Tsaturov, First Deputy of the Head of Roshydromet, were his Deputies. The members of the Delegation included V.A. Martyshchenko, Head of the Roshydromet Administration, V.V. Lukin, Head of RAE, M.Yu. Moskalevsky, Responsible Secretary of the RAS Scientific Council on Arctic and Antarctic Research and Yu.V. Sorokin, Head of Department of the Ministry of Natural Resources of Russia. The experts in the Russian Delegation were V.N. Pomelov, lead ecologist of RAE, A.A. Bystromovich, lead specialist of Roshydromet, V.N. Masolov, Head of Polar Marine Geological Exploration Expedition (PMGRE Party), A.P. Makorta, Deputy Head of Main Administration of Navigation and Oceanography of the Ministry of Defense (MO GUNiO)and V.A. Brukhis, Head of Administration of State Fishery Committee (Goskomrybolovstvo).

Ambassador of the Russian Federation Leonid Skotnikov, Director of the Legal Department of the Ministry of Foreign Affairs of Russia was elected Chairman of the XXIV ATCM, V.S. Knyazev, Head of the Legal Department Division as Head of the Secretariat and V.Yu. Titushkin, First Secretary of the Legal Department of the Ministry of Foreign Affairs of Russia Executive Secretary.

The participants to the XXIV ATCM were welcomed by special messages from the President of the Russian Federation V.V. Putin, the Governor of St. Petersburg V.A. Yakovlev and a Deputy Chairman of State Duma of the Federal Assembly of the Russian Federation A.N. Chilingarov.

In compliance with the adopted Agenda, the following was considered at the XXIV ATCM:

1) Operation of the Antarctic Treaty System (Item 4):
   a. General Matters;
   b. Consequences of the entry into force of the Protocol on Environmental Protection and related issues.
2) Operation of the Antarctic Treaty System: Reports by Observers and Experts (Item 5):
   a. Reports under Recommendation XIII 2 (the USA Government as the Depositary Government of the Antarctic Treaty and Protocol to it, CCAMLR, the Australia Government as the Depositary Government for the Convention on the Conservation of Antarctic Marine Living Resources, the United Kingdom Government as the Depositary Government for the Convention on the Conservation of Antarctic Seals, SCAR and COMNAP;
   b. Reports in relation to Article III (2) of the Antarctic Treaty (ASOC, IAATO, International Hydrographic Organization and WMO);
3) Report of the Committee for Environmental Protection (Item 6);
4) Compliance with the Protocol on Environmental Protection (Item 7);
5) Co-operation among Parties with respect to Article 6 of the Protocol (Item 8);
6) Emergency Response and Contingency Planning (Item 9);
7) The Question of Liability as Referred to in Article 16 of the Protocol (Item 10);

8) Safety of Operations in Antarctica (Item 11);

9) Relevance of developments in the Arctic and the Antarctic (Item 12);

10) Tourism and Non-Governmental Activities in the Antarctic Treaty Area (Item 13);

11) Inspections under the Antarctic Treaty (Item 14);

12) Science Issues, particularly Scientific Cooperation and Facilitation (Item 15);

13) Operational issues (Item 16);

14) Educational Issues (Item 17);

15) Exchange of Information (Item 18);

16) Preparation of the XXV Meeting of ATCM(Item 19);

17) Other Business (Item 20).

In accordance with the adopted schedule, the XXIV ATCM held its sessions as follows:

First week (July 9 to 13) – sessions of the Committee on Environmental Protection (CEP) and informal consultations of experts on the question of liability (XXIV ATCM Agenda Item 10); the CEP considered XXIV ATCM Agenda Items 7 and 8. The CEP carried out its work under the chairmanship of the Director of the Norwegian Polar Institute Olaf Orheim and the informal consultations were held under the chairmanship of Ambassador Don MacCay (New Zealand);

Second week (July 16 to 20) – sessions of the Working Group I (XXIV ATCM Agenda Items 4, 8, 10, 12 and 18) and Working Group II (Agenda Items 9, 11, 13, 14, 15, 16 and 17). The WG I was chaired by Ambassador Don MacCay (New Zealand) and the WG II – by Dr. Roberto Puseiro (Uruguay). The Agenda Items 5, 6, 19 and 20 were discussed at the plenary sessions.

In the framework of the XXIV ATCM, the IV session of CEP was held, which considered 24 working and 47 information papers.

The Meeting noted a large activity of the Intersessional Contact Working Groups that discussed important Antarctic environmental protection issues using electronic conferences and operational exchange of information. Significant attention was paid to the discussion on the Czech Republic’s proposals to construct a new research facility on King George Island (South Shetland Islands). The Meeting recommended that the Czech Republic should take due account of the provisions of Recommendation XV-17 concerning the location of new stations including the need for a Comprehensive Environmental Evaluation (CEE) before proceeding further with this proposal.

A great deal of discussion was devoted to the Working Paper submitted by the Russian Federation on the expert conclusion on the Project of the “ecologically clean” method of penetration to subglacial Lake Vostok from deep borehole 5-G. These materials were prepared on the basis of the Act of the State Ecological Expert Examination of Russia that had considered this technology in March 2001. It was noted that Russia should submit to the next CEP meeting the CEE materials in relation to this technology.

In discussing the List of Initial Environmental Evaluations (IEEs) circulated by the host country in accordance with resolution 6 (1995), many delegations noted that Environmental Impact Assessments for all activities undertaken in the Antarctic Treaty Area require advance notification including associated logistic support activities. However, some delegations noted that the types of activities undertaken under CCAMLR do not envisage such procedures.

The XXIV ATCM adopted the following measures and resolutions:

- Measure 1 (2001) on Historic Sites and Monuments regarding A Hut of Scott Base at Pram Point, Ross Island.
- Measure 2 (2001) on Historic Sites and Monuments regarding the base Pedro Aguirre Cerda, Pendulum Cove, and Deception Island.
- Measure 3 (2001) – on extension of expiry dates for certain Sites of Special Scientific Interest (SSSI):
- SSSI Number 4 Cape Crozier, Ross Island
- SSSI Number 5 Fildes Peninsula, King George Island, South Shetland Islands
- SSSI Number 6 Byers Peninsula, Livingston Island, South Shetland Islands
- SSSI Number 7 Haswell Island
- SSSI Number 18 North-West White Island, McMrdo Sound
- SSSI No. 33 Ardley Island, Maxwell Bay, King George Island

- SSSI No. 35 Western Bransfield Strait, off Low Island, South Shetland Islands
- SSSI Number 36 East Dallman Bay, off Brabant Island.

Very important issues discussed at the session of WG I included a problem of establishment of a permanent Secretariat to the Antarctic Treaty, a possibility of adopting the main provisions of Annex 6 of the Protocol on Environmental Protection to the Antarctic Treaty "Liability" and dissimilarities of the geopolitical status and natural features of the Arctic and the Antarctic.

The problem of establishment of a permanent Secretariat to the Antarctic Treaty has been discussed at the Antarctic Treaty Consultative Meetings for the last 7 years. The delegation of Argentina insistently proposes Buenos Aires as a location site of the Secretariat. This proposal was however constantly opposed by the delegation of Great Britain. The work undertaken during the intersessional period allowed the United Kingdom to reach a consensus with Argentina on this issue. At the XXIV ATCM, the delegation of Great Britain circulated the Statement of the Foreign Secretary to Argentine Defense Minister's Statement, where the Great Britain announced that it was ready to join a consensus on the location of the Secretariat to the Antarctic Treaty in Buenos Aires.

In the course of discussing the issue of adopting the Annex to the Protocol on Environmental Protection to the Antarctic Treaty in relation to liability by ATCM participants, a compromise settlement was found. As a first step, it was proposed to apply the liability approach for breaching the main provisions of the Protocol on Environmental Protection exclusively for current breaching and only on condition that the responsible persons do not undertake the necessary actions preventing the dangerous environmental impact. This decision will allow reaching further a consensus on the text of this Annex acceptable for all Consultative Parties.

The only working paper on the issue of interrelation of operations in the Arctic and the Antarctic was the materials submitted by the RF that contained an objective evidence on the difference between natural conditions and phenomena in both polar regions. It was clearly illustrated that these regions had significantly more differences than similarities and that a comparison of the Arctic and the Antarctic is permissible only in the issues of scientific character. This approach was strongly criticized by the delegations of the Scandinavian countries and participants to the Antarctic Treaty who have territorial claims in the Antarctic region. However, the arguments presented by the opponents of the Russian paper were sufficiently disputable providing a necessary basis to develop further documents aimed to support the standpoint of the Russian Party.

At the sessions of Working Group II, the most interesting were the issues of Antarctic tourism and scientific activity. The submitted papers and discussions held on them have demonstrated that tourism is an important aspect of the Treaty System. The development of this process has an irreversible character leading simultaneously to serious problems related to environmental protection. The Meeting agreed that the issue of tourism should be the subject of detailed discussion at XXV ATCM.

There was an animated discussion of the Working and Information Papers submitted by the RF in relation to Antarctic research under the Federal Research Program "World Ocean". Some delegations have expressed their concern with the practical direction of Russian geological studies of Antarctic mineral resources. The Meeting welcomed the clarification from the Russian delegation that these studies have an exclusively scientific character and they are carried out in strict compliance with the requirements of the Protocol on Environmental Protection.

Significant interest was shown in the Russian Information Paper on results of studies of the subglacial Lake Vostok. Russia confirmed its plan to drill an additional 50 meters of new ice in deep borehole at Lake Vostok and advised the Meeting that the work would continue to be based on the precautionary approach and would stop at a safe distance from the lake surface.

The next XXV ATCM as proposed by the delegation of Poland will be held in Warsaw in September 2002.

9. XIII MEETING OF THE COUNCIL OF MANAGERS OF NATIONAL ANTARCTIC PROGRAMS

During the period August 20-24, 2001, the XIII Meeting of the Council of Managers of National Antarctic Programs (COMNAP) took place in Amsterdam (Netherlands). The Meeting was held in the premises of the Royal Academy of Science of Netherlands. The following issues were considered:

- COMNAP Chairperson's Report;
- Executive Secretary's Report;
- Working Groups Reports;
- Current issues in the main COMNAP activities;
- ATCM XXIV Outcomes and Tasking;
- SCALOP Chairman's Report;
- Sub-glacial Lakes Exploration;
- Consideration of Requests for Funds;
- Confirmation of 2002 Budget;
- Presentation of the Romania Antarctic Program to join COMNAP;
- International Geophysical Year 50th Anniversary;
- Election of Officers;
- Venues of Future COMNAP Meetings.

The Russian Delegation was represented by the RAE Head V.V. Lukin, RAE Deputy Head V.D. Klokov and RAE lead ecologist V.N. Pomelov.

For discussion, 33 papers were presented that included not only the usual Reports on the activity of the National Antarctic Programs in the past summer season, but also the proposals for the current issues of COMNAP activity.

At present, the COMNAP has the following structure:

Committees

- Executive Committee (EXCOM) (Chair – Karl Erb, the USA);
- Standing Committee on Antarctic Logistics and Operations (SCALOP) (Chair – Kim Pitt, Australia);
- Steering Committee for the Antarctic Master Directory (STADM) (Chair – Dean Petersen, New Zealand;

Working Groups

- Working Group on Air Operations (AIROPS) (Chair – John Pye, Great Britain):
- Coordinating Group on Education and Training (CEDAT) (Chair – Magnus Augner, Sweden);
- Environmental Coordinating Group (ECG) (Chair Heinz Miller, FRG);
- Working Group on Emergency Response and Contingency Planning (EMRAC) (Chair – Kim Pitt, Australia);
- Working Group on Alternative Energy (ENMAN) (Chair – Julian Tangaere, New Zealand);
- Working Group to Monitor the Liability Annex (MOLIBA) (Chair – Gerard Jugie, France);
- Working Group on Ship Operations (SHIPOPS) (Chair – Hartwig Gernandt, FRG);
- Symposium Working Group (SYMP) (Chair – Yilin Wu, China);
- Working Group on Tourism and NGOs (TANGO) (Chair – Snders Karlqvist, Sweden).

Networks

- Antarctic Environment Officers Network (AEON) (Chair – Birgit Njaastad, Norway);
- Energy Management Network (ENMANET) (Chair Davis Blake, Great Britain);

- Antarctic Information Officers Network (INFONET) (Chair – Guy Gutheridge, the USA);
- Training Network (TRAINET) (Chair - Rodolfo Sanchez, Argentina).

The working groups discussed the present-day issues of activity of the national Antarctic programs in the indicated areas and exchanged experience. Of greatest interest was the organization of aviation and ship operations in the Antarctic. The proposal of Russia to resume transcontinental flights between Africa and the Antarctic stations of East Antarctica was listened to with great attention. With this aim, Russia presented the project of reconstruction of the snow-ice runway in the area of Novolazarevskaya station to receive heavy transport wheel aircraft of IL-76 type.

Preparation of the Guide for Shipping in the Antarctic based on Russian experience of ice navigation in waters of the Southern Ocean has also caused a significant interest.

The methods of electronic conferences and electronic exchange of information are increasingly widely used in the organization of activity of the COMNAP Working Groups.

During the discussion of studies of sub-glacial lakes in the Antarctic, the results of work at Lake Vostok carried out by the national Antarctic expeditions of Italy, the USA and Russia and the results of the International meeting held in China were presented. Participants to the Meeting confirmed a large scientific importance of these studies and defined the directions of future studies.

At the XIII Meeting of COMNAP, the Antarctic Program of Romania has become its member.

The Delegation of FRG proposed to conduct a large International Expedition to investigate the structure of the ice sheet in East Antarctica to commemorate the 50^{th} anniversary of the International Geophysical Year in 2007-2009. With this aim, it is proposed using the sledge-caterpillar traverses to connect with one route the main ice sheet deep drilling points where the studies are performed by the remote sounding method (seismic and radio-echo sounding) and the glaciological study of the snow-firn strata. These are the Kohnen station (Queen Maud Land, FRG), Dome F (Japan), Dome A (China), Dome B (Russia), Vostok station (Russia) and Dome C (France, Italy).

10. MAIN RAE EVENTS IN JULY-SEPTEMBER 2001

June 25, 2001	Extraction of the main airfield mechanisms from ice and snow at Novolazarevskaya station.
June 30, 2001	Arrival of the R/V “Akademik Fedorov” to Bremerhaven (Germany) for a preventive repair of the power plant and ship machinery.
July 5, 2001	Arrival of the R/V “Akademik Fedorov” with the 46th RAE participants to St. Petersburg.
July 8, 2001	Establishment of Mirny-Vostok radio-communication using a back-up channel in accordance with safety requirements.
July 9, 2001	Opening of the XXIV Antarctic Treaty Consultative Meeting in St. Petersburg.
July 15, 2001	Making functional all diesel-generators of Vostok station.
July 20, 2001	Final session of the XXIV Antarctic Treaty Consultative Meeting.
July 29, 2001	Russian polar explorers from Bellingshausen station render assistance to personnel of the Uruguay station Artigas in the delivery of cargo.
August 15, 2001	Visit of personnel of Novolazarevskaya station to Maitri station by invitation of the Indian side on the occasion of celebration of the Independence Day of India.
August 26, 2001	Completion of measurements and marking by stakes of the Cone of Winds – Bergy Bit route to deliver heavy transportation vehicles to Mirny station. Next traverse to the barrier of Novolazarevskaya station for its resupply with fuel.
September 6, 2001	Session of the Russian Federation Government, consideration of the issue “On execution the decisions of the RF Government to provide for the interests of Russia in the Antarctic and measures to organize the activity of the Russian Antarctic Expedition for perspective up to 2005”.
September 3-9, 2001	Traverse to the 80th km from Novolazarevskaya station to deliver defective vehicles (MTT-14) to the station.
September 14, 2001	Mounting radio and navigation equipment to the vehicles of the planned traverse along the Mirny-Vostok-Mirny route.
September 16, 2001	Burial of the remains of the honorary polar explorer P.K. Sen’ko on Buromsky Island near Mirny station.
September 21, 2001	Driving of heavy transportation vehicles unloaded from the R/V “Akademik Fedorov” from the bergy bit to Mirny station.
September 23, 2001	Unsuccessful traverse from Novolazarevskaya station to the barrier (the traverse had to return due to technical failures).
September 24, 2001	Publication of the decision of the Russian Federation Government “On measures to ensure the interests of the Russian federation in the Antarctic and activity of the Russian Antarctic Expedition in 2002-2005”.
September 25, 2001	Start of traverse of four transport vehicles to the barrier from Novolazarevskaya station.
September 30, 2001	Return of the traverse to Novolazarevskaya station after fulfilling the work at the barrier.