Meteorological Data from the Russian Arctic, 1961-2000, Version 1

USER GUIDE

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As a condition of using these data, you must include a citation:

National Snow and Ice Data Center. Edited by V. F. Radionov and F. Fetterer. 2003. *Meteorological Data from the Russian Arctic, 1961-2000, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. https://doi.org/10.7265/N56H4FB3. [Date Accessed].

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1 DETAILED DATA DESCRIPTION

1.1 Station List

For complete station information, see Table 2. Station Information and Table 3. Discrepancies Between WMO and AARI Station Information.

1.2 Format

The station data from AARI have been reformatted to "uniformat." Uniformat files are ASCII files with columns for parameters described in the Table 1. Uniformat was developed to combine the synoptic and monthly meteorological data from the several sources on the Arctic Meteorology and Climate Atlas (Arctic Climatology Project, 2000) into a single format. The single format makes it easier to read and manipulate data from different sources.

Table 1. Uniformat File Description. (Note that only parameters 1,2,3,7,8,9,10,13,14,15, and 19 have data, other fields are filled with a value indicating missing. These fields apply to data on the Arctic Meteorology and Climate Atlas).

Parameter Number	Parameter Name	Columns	Value for Missing	Comments
1	WMO station number	0-4	99999	
2	Year	5-9	Not Applicable	
3	Month	10-12	Not Applicable	
4	Day	13-15	-1	(-1 means monthly, not synoptic data)
5	Time	16-20	-1	(-1 means monthly, not synoptic data)

Parameter Number	Parameter Name	Columns	Value for Missing	Comments
6	Position interpolation flag	21-22	9	Code to indicate position characteristic: 9: Missing. Used if either lat. or lon. is missing 1: Default. Means observed, fixed position 2: Linearly interpolated. Used only for North Pole drifting stations. 3: Rounded to nearest degree. Used for some western drifting station and Ice Patrol ship data. 4: Monthly mean position. Used only for monthly mean data from NP stations.
7	Latitude, decimal degrees North	23-28	99.99	This position is the position provided by AARI, not that provided for the station by WMO. Differences may occur.
8	Longitude, decimal degrees East	29-36	999.99	(0 - 360); This position is the position provided by AARI, not that provided for the station by WMO. Differences may occur.
9	Air temperature (°C)	37-43	999.99	
10	Sea level pressure (mbar)	44-50	9999.9	
11	Wind direction (deg.)	51-56	999.9	
12	Wind speed (m/s)	57-62	999.9	
13	Total cloud amount (tenths)	63-67	99.9	Visual estimates. Note that Russian drifting stations may have "11," meaning "10, with gaps."
14	Low cloud amount (tenths)	68-72	99.9	Visual estimates. Note that Russian drifting stations may have "11", meaning "10, with gaps."
15	Relative humidity (percent)	73-78	999.9	

Parameter Number	Parameter Name	Columns	Value for Missing	Comments
16	Dew point (°C)	79-85	999.99	
17	Wet bulb temperature (°C)	86-92	999.99	
18	Vapor pressure (mbar)	93-99	9999.9	
19	Precipitation (millimeters)	100-106	-1.00	"Trace" precipitation is coded in uniformat files as 0.1 mm.
20	Soil or ice surface temperature (°C)	107-113	999.99	
21	Sea surface temperature (°C)	114-120	999.99	
22	Station name	121-		Text field of varying length.

1.3 File Naming Convention

The naming convention for the uniformat data files is `uni.[station_name].[station_id].dat`.

1.4 File Size

The data files range between 60 KB and 65 KB. All data files combined total 3.3 MB.

1.5 Spatial Coverage

Figure 1 and Table 2 and 3 describe the locations of the stations.

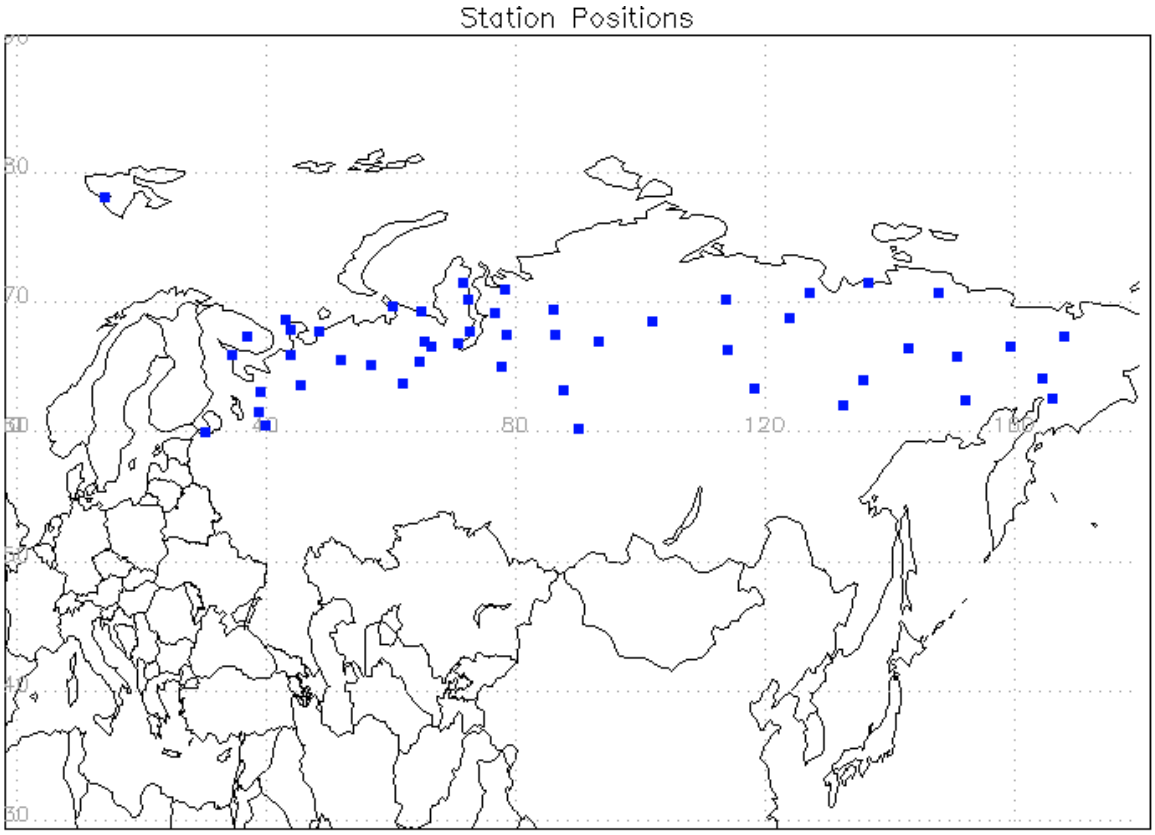

Figure 1. Station Locations

Table 2. Station Location and Date Information

Name	WMO station number	Period for which data are available	Latitude degrees and minutes North	Longitude degrees and minutes East (0-360)	Elevation above sea level (m)	Elevation barometers level (m)
1. Barentsburg	20107	1961-1994	78 04	14 15	70	64.9
2. Tambey	20864	1961-2000	71 30	71 50	8	10.0
3. Gyda	20963	1961-1998	70 53	78 28	8	8.0
4. Seyakha	20967	1961-2000	70 13	72 36	16	16.0
5. Nijneynsk	21835	1961-1998	71 29	136 42	2	3.2
6. Dzalinda	21908	1961-2000	70 08	113 58	61	62.8
7. Kjusjur	21921	1961-2000	70 41	127 24	39	38.1

Name	WMO station number	Period for which data are available	Latitude degrees and minutes North	Longitude degrees and minutes East (0-360)	Elevation above sea level (m)	Elevation barometers level (m)
8. Cokurdah	21946	1961-2000	70 37	147 53	44	61.0
9. Kanin Nos	22165	1961-2000	68 39	43 18	48	48.8
10. Krasnoscel'e	22235	1961-2000	67 22	37 02	155	157.2
11. Sojna	22271	1961-2000	67 53	44 08	16	19.0
12. Indiga	22292	1961-2000	70 37	147 53	44	61.0
13. Gridino	22422	1961-2000	65 54	34 46	9	9.0
14. Mezen'	22471	1961-2000	65 52	44 13	14	15.9
15. Turcasovo	22648	1961-2000	63 06	39 15	36	33.3
16. Sura	22676	1961-2000	63 35	45 38	65	65.0
17. Kargopol'	22845	1961-2000	61 30	38 56	121	122.8
18. Vozega	22954	1961-2000	60 28	40 12	178	179.9
19. Belyy Nos	23024	1961-2000	69 39	60 25	6	5.9
20. Ust'-Kara	23029	1961-2000	69 15	64 56	5	3.8
21. Antipayuta	23058	1961-2000	69 05	76 51	2	3.4
22. Dudinka	23074	1961-2000	69 24	86 10	16	19.4
23. Novyy Port	23242	1961-2000	67 42	72 54	11	12.2
24. Tazovskoe	23256	1961-2000	67 28	78 44	8	8.1
25. Igarka	23274	1961-2000	67 28	86 34	20	26.7

Name	WMO station number	Period for which data are available	Latitude degrees and minutes North	Longitude degrees and minutes East (0-360)	Elevation above sea level (m)	Elevation barometers level (m)
26. Salekhard	23330	1961-2000	66 32	66 32	14	15.7
27. Ra-Iz	23331	1961-1997	66 57	65 28	895	889.8
28. Yar-Sale	23341	1961-1990	66 50	70 49	8	10.0
29. Agata	23383	1961-2000	66 53	93 28	277	278.3
30. Ust'-Cil'Ma	23405	1961-2000	65 27	52 16	70	68.2
31. Pechora	23418	1961-2000	65 07	57 06	56	61.5
32. Muzi	23426	1961-2000	65 23	64 43	18	18.1
33. Tarko-Sale	23552	1961-2000	64 55	77 49	26	30.2
34. Sosva	23625	1961-2000	63 39	61 59	27	28.7
35. Verhne-Imbatskoe	23678	1961-2000	63 09	87 57	40	40.0
36. Jarcevo	23987	1961-2000	60 15	90 14	57	57.8
37. Essej	24105	1961-1993	68 28	102 10	271	270.9
38. Dzardzan	24143	1961-2000	68 44	124 00	45	45.5
39. Selagoncy	24329	1961-2000	66 15	114 17	235	237.6
40. Ust'-Moma	24382	1961-2000	66 27	143 14	195	196.8
41. Njurba	24639	1961-2000	63 17	118 20	129	131.2
42. Tompo	24671	1961-2000	63 57	135 52	400	402.8
43. Curapca	24768	1961-2000	62 02	132 36	179	183.7

Name	WMO station number	Period for which data are available	Latitude degrees and minutes North	Longitude degrees and minutes East (0-360)	Elevation above sea level (m)	Elevation barometers level (m)
44. Ilirnej	25248	1961-1997	67 20	168 14	426	427.4
45. Ust-Oloj	25325	1961-2000	66 33	159 25	125	125.0
46. Egvekinot	25378	1961-2000	66 21	180 53	15	19.8
47. Zyryanka	25400	1961-2000	65 44	150 54	43	44.9
48. Verhnee Penzino	25538	1961-2000	64 08	164 35	326	326.0
49. Srednekan	25705	1961-2000	62 27	152 19	264	266.1
50. Kamenskoe	25744	1961-2000	62 29	166 13	34	34.0
51. Leningrad	26063	1961-2000	59 58	30 18	2	4.0

Note that the station names, positions, and elevations provided by AARI may differ from those provided by the World Meteorological Organization (WMO). Table 3 shows where differences occur.

Table 3 contains station information contained on the WMO web site. The information was obtained from Meteorological Station Location Information on July 14, 2003. Some of the station names, geographical coordinates, and elevations differ from those obtained from AARI (displayed in Table 2).

Table 3. Discrepancies between WMO and AARI station information

AARI Station Number	WMO Station Number	AARI NAME	WMO NAME	AARI LATITUDE (DM)	WMO LATITUDE (DM)	AARI LONGITUDE (DM)	WMO LONGITUDE (DM)	AARI ELEVATION	WMO ELEVATION
20107	20107	BARENTSBURG	BARENCSBURG	78 04	78-04	14 15	014-15	15	49
20864	20864	TAMBEY	TAMBEY	71 30	71-29	71 50	075-24	8	21
20963	20963	GYDA	GYDA	70 53	70-53	78 28	078-30	8	8
20967	20967	SEYAKHA	SEJAHA	70 13	70-10	72 36	072-31	16	16
21835	-----	NIJNEYNSK		71 29		136 42		2	
21908	21908	DZHALINDA	DZALINDA	70 08	70-08	113 58	113-58	62	62
21921	21921	KJUSJUR	KJUSJUR	70 41	70-41	127 24	127-24	39	39
21946	21946	CHOKURDAH	CHOKURDAH	70 37	70-37	147 53	147-53	48	61
22165	22165	KANIN NOS	KANIN NOS	68 39	68-39	43 18	043-18	48	49
22235	22235	KRASNOSCELE	KRASNOSCEL'E	67 22	67-21	37 02	037-03		155
22271	22271	SOJNA	SOJNA	67 53	67-53	44 08	044-08	18	16
22292	22292	INDIGA	INDIGA	67 42	67-41	48 46	048-41	4	3
22422	22422	GRIDINO	GRIDINO	65 54	65-54	34 26	034-46		10
22471	22471	MEZEN	MEZEN	65 52	65-52	44 13	044-13	14	14
22648	22648	TURCASOVO	TURCASOVO	63 06	63-07	39 15	039-14		35
22676	22676	SURA	SURA	63 35	63-35	45 38	045-38	62	66
22845	22845	KARGOPOL	KARGOPOL	61 30	61-30	38 56	038-56	121	121
22954	22954	VOZEGA	VOZEGA	60 28	60-28	40 12	040-12	178	178

AARI Station Number	WMO Station Number	AARI NAME	WMO NAME	AARI LATITUDE (DM)	WMO LATITUDE (DM)	AARI LONGITUDE (DM)	WMO LONGITUDE (DM)	AARI ELEVATION	WMO ELEVATION
23024	23024	BELYY NOS	CAPE BELY	69 39	69-29	60 25	060-20	19	6
23029	23029	UST KARA	UST-KARA	69 15	69-15	64 56	064-59	4	4
23058	23058	ANTIPAYUTA	ANTIPAJETA	69 05	69-09	76 51	077-00	15	4
23074	23074	DUDINKA	DUDINKA	69 24	69-24	86 10	086-10	28	19
23242	23242	NOVYY PORT	NOVY PORT	67 42	67-41	72 54	072-52	12	12
23256	23256	TAZOVSKOE	TAZOVSKOE	67 28	67-28	78 44	078-44	8	8
23274	23274	IGARKA	IGARKA	67 28	67-28	86 34	086-34	30	30
23330	23330	SALEKHARD	SALEHARD	66 32	66-32	66 32	066-40	35	16
23331	23331	RA-IZ	RA-IZ	66 57	66-54	65 28	065-40	890	890
23341	23341	YAR-SALE	JAR-SALE	66 50	66-50	70 49	070-50	8	8
23383	23383	AGATA	AGATA	66 53	66-53	93 28	093-28	263	280
23405	23405	UST-CILMA	UST'- CIL'MA	65 27	65-26	52 16	052-16	70	70
23418	23418	PECHORA	PECHORA	65 07	65-07	57 06	057-06	56	56
23426	23426	MUZHY	MUZI	65 23	65-23	64 43	064-43	18	18
23552	23552	TARKO-SALE	TARKO-SALE	64 55	64-55	77 49	077-49	27	27
23625	23625	SOSVA	SOSVA	63 39	63-39	61 59	062-06	27	27
23678	23678	VERHNE-IMBATSKOE	VERHNEIMBATSK	63 09	63-09	87 57	087-57	40	40
23987	23987	JARCEVO	JARCEVO	60 15	60-15	90 14	090-14	58	58
24105	24105	ESSEJ	ESSEJ	68 28	68-28	102 10	102-22	271	271
24143	24143	DZHARDZHAN	DZARDZAN	68 44	68-44	124 00	124-00	45	45

AARI Station Number	WMO Station Number	AARI NAME	WMO NAME	AARI LATITUDE (DM)	WMO LATITUDE (DM)	AARI LONGITUDE (DM)	WMO LONGITUDE (DM)	AARI ELEVATION	WMO ELEVATION
24329	24329	SELAGONCY	SELAGONCY	66 15	66-15	114 17	114-17		235
24382	24382	UST-MOMA	UST'- MOMA	66 27	66-27	143 14	143-14	196	196
24639	24639	NIURBA	NJURBA	63 17	63-17	118 20	118-20	129	129
24671	24671	TOMPO	TOMPO	63 57	63-57	135 52	135-52	400	400
24768	24768	CUPRAPCA	CURAPCA	62 02	62-02	132 36	132-36	179	179
25248	25248	ILIRNEYJ	ILIRNEJ	67 20	67-15	168 14	167-58	426	356
25325	25325	UST-OLOY	UST'- OLOJ	66 33	66-33	159 25	159-25	213	125
25378	25378	EGVEKINOT	EGVEKINOT	66 21	66-21	180 53	179-07	15	26
25400	25400	ZYRYANKA	ZYRJANKA	65 44	65-44	150 54	150-54		43
25538	25538	VERHNEE PENZINO	VERHNEE PENZINO	64 08	64-13	164 35	164-14	326	326
25705	-----	SREDNEKAN		62 27		152 19		264	
25744	25744	KAMENSKOE	KAMENSKO	62 29	62-26	166 13	166-05	34	8
26063	26063	LENINGRAD	ST. PETERBURG	59 58	59-58	30 18	030-18	2	4

1.6 Temporal Coverage

The data range from 1 January 1961 through 31 December 2000.

Meteorological observation hours were changed several times within the period of record. From 1961 through 1965, observations were at 0100, 0700, 1300 and 1900 local solar time; since 1966, observations were at 0000, 0300, 0600, 0900, 1200, 1500, 1800 and 2100 hours Moscow Local Time.

1.7 Sample Data Record

The following data sample is from file `uni.agata.23383.dat`:

```
23383 1961 1 -1 -1 1 66.88 93.47 -40.3 1024.1 999.9 999.9 8.4 0.0 76 999.99 999.99 9999.9 32.0
999.99 999.99 agata
23383 1961 2 -1 -1 1 66.88 93.47 -31.9 1018.2 999.9 999.9 9.2 0.0 77 999.99 999.99 9999.9 28.0
999.99 999.99 agata
23383 1961 3 -1 -1 1 66.88 93.47 -15.2 1018.2 999.9 999.9 7.8 1.8 77 999.99 999.99 9999.9 25.0
999.99 999.99 agata
23383 1961 4 -1 -1 1 66.88 93.47 -8.6 1008.7 999.9 999.9 8.1 2.3 69 999.99 999.99 9999.9 34.0
999.99 999.99 agata
```

2 DATA ACQUISITION AND PROCESSING

These data were originally published in the Meteorological Monthly issues of the All-Russia Research Institute of Hydrometeorological Information, (RIHMI), Obninsk. Data were digitized at the Arctic and Antarctic Research Institute, St. Petersburg. The stations and time period covered by this data set were chosen to make data available that were not already available (as of 2000) in the NOAA National Climatic Data Center's Global Historical Climate Network or at the International Arctic Research Center (IARC), Fairbanks, AK.

Average daily (from four observations per day for the period 1961-1965 and from eight observations per day since 1966) and monthly values of meteorological parameters were calculated from individual observations by the observer (a meteorologist) at each of the stations. The meteorologist calculated monthly mean from daily data as (d1 + d2 + ... + dn)/n, where n= 28,29,30 or 31 days. A monthly mean was not calculated if there were more than seven missing observations at the same observation time during the month (for example, 0000 or 0300).

Table 4 gives a description of the surface parameters and the accuracy of observations measured at the stations. When reviewing

table 4, please refer to Section 2.2 Note on Precipitation. Meteorological observations were performed according to the Manual for Hydrometeorological Stations, Gidrometeoizdat, 1985 (translated from the Russian "Nastavlenie dlay gidrometeorologicheskih stantsy"). A standard meteorological site was 26 m by 26 m, and was located on relief typical of the area. It was more than 100 m distant from any bodies of water, and at a distance 20 times the height of any obstruction (such as trees or a building). Station and barometer elevations are presented in Table 6.

In the original data tables, some gaps occurred in the period of record and other gaps were introduced due to quality control. Quality control was performed at AARI using the methods outlined in Section 2.1 Quality Control Methods.

Table 4. Meteorological parameters measured at the meteorological stations

Parameter	Observation	Observation method and accuracy
Air temperature	Temperature, maximum, minimum (Temperature only in this data set)	Measured by mercury thermometer placed in psychrometric box at a meteorological site. Measurement accuracy is equal to 0.1 °C.
Air pressure	Pressure, pressure tendency (Pressure only in this data set)	Measured by mercury barometer placed in stationary room at 50 to 60 cm height from floor (barometric cistern). Corrected record is written in hPa with accuracy up to 0.1 hPa. (1 mbar = 1hPa)
Air humidity	Partial pressure of water vapor, relative humidity, moisture deficit (Relative humidity only in this data set)	Calculated using records from dry-bulb and wet-bulb thermometers (in summer) and from dry thermometer and hair hygrometer (when temperature is below -10 °C). Calculation accuracy is 1 percent.
Precipitation	Measurement of amount, duration period (within 24 hours), and type of precipitation two or four times within 24 hours (Measurement of amount only in this data set)	Tretyakov precipitation gauge twice daily (0000 and 0600 hours local time) to an accuracy of 0.1 mm. [check this against Groisman paper]
Cloud cover	Amount of total and low cloud, its form and type (Amount only in this data set).	Cloud amount is given in tenths; cloud forms are defined by the international atlas of clouds; base height of low cloud border is defined visually or by IVO device with accuracy up to 50 m.

2.1 Quality Control Methods

No filtering or editing of the data took place at NSIDC. Plots showing the distribution of the data by month for each parameter at each station are available as pdf files in a single tarred file accessible via FTP.

The following documentation, provided by V. Radionov, describes general methods of quality control used at AARI.

2.1.1 Time series testing

Stage I: Data that were not already in digital form were digitized from logbooks, bulletins, or charts. Quality control for monthly means was performed as follows:

1. Each monthly mean (monthly means were calculated at each station by an observer) was evaluated based on the likelihood and consistency of individual parameter values. This excluded most large errors.
2. For individual meteorological parameters, where the distribution is close to normal, statistical estimates of the mean and extremes can be used for testing. These parameters generally include pressure, air temperature, relative humidity, and surface temperature.
    - Grubbs' criterion (Grubbs, 1950) was used to detect individual extrema. If a point exceeded a threshold based on the mean, one may assume the hypothesis of over estimation. Points that exceeded plus or minus 2.5 standard deviations from the monthly mean were marked.
    - The modified criteria of Tietjen and Moore (1972) were sometimes used for testing outliers.

Values exceeding the thresholds were noted as questionable. As an additional quality control, a parameter may have been temporarily changed by interpolation of the tested parameter with observational data of this parameter across two adjacent intervals. Discrepancies between tested and interpolated parameter values were estimated as extreme deviations (Kolmogoroff deviation) and each evaluated by an expert, who made the ultimate decision. Additionally, all questionable observations were tested by an expert specialist from AARI who made the ultimate decision about the rejection of questionable values.

Stage II: Testing during Stage I excluded crude errors. In Stage II, systematic errors connected with instrument function, improper operation, or with incorrect data processing were considered. These are errors that would not necessarily be routinely noticed.

2.1.2 Horizontal control between stations

Within a 40-year period, changes may appear in the climatic homogeneity of time series. These may result from changes in the meteorological station location, or in the station surroundings, and

from natural climatic changes. The most common analysis methods of climatic homogeneity, the difference and ratio methods (Drozdov, 1989) are used in this test. This procedure makes it possible to identify shifts in parameter value. Other cases of climatic heterogeneity of temporal sets will not be identified during these threshold tests because it is impossible to distinguish the causes of heterogeneity without carrying out a sophisticated analysis. The data record of the 51 stations in this data set was tested by this method.

As in all preceding steps, an expert made the final decisions regarding quality control, including the advisability of testing observations at adjacent stations. Observations that passed all stages of the testing are included in this data set.

2.2 Note on Precipitation

Precipitation measurements in this data set were acquired using Tretyakov's precipitation gauges. Tretyakov's precipitation gauges replaced rain gauges with Nipher shields at most Russian stations before 1954. Rain gauges with Nipher shields were replaced in order to reduce errors caused by the blowing of solid precipitation out of the gauges during snowstorms. Nipher gauges record considerably less solid precipitation than do Tretyakov gauges. For this reason data acquired using Nipher shield gauges cannot be used with data acquired using Tretyakov gauges without adjustments to the data record (Groisman and Rankova, 2001).

Prior to 1966, data used to create monthly totals of precipitation values were uncorrected for wind, gauge type, or wetting. Beginning in 1966, data were corrected for wetting directly by observers at the stations. The wetting correction is 0.2 mm for liquid and mixed precipitation, and 0.1 mm for solid precipitation, for each individual measurement. It is theoretically possible to correct monthly totals of precipitation prior to 1966 for wetting if daily precipitation totals and air temperatures are known, but doing so is beyond the scope of this data set.

Measuring arctic precipitation accurately is difficult and these data records are known to have errors. Users of these data should first become familiar with error sources. We strongly suggest consulting Groisman and Rankova (2001) and references contained therein, and the documentation on gridded precipitation fields in Arctic Climatology Project (2000) for an introduction to precipitation measurement issues. Groisman and Rankova (2001) have information on adjusting the raw precipitation measurements in this data set so that pre- and post-1966 values are homogeneous.

3 REFERENCES AND RELATED PUBLICATIONS

Arctic Climatology Project. 2000. *Environmental Working Group arctic meteorology and climate atlas*. Edited by F. Fetterer and V. Radionov. Boulder, CO: National Snow and Ice Data Center. CD-ROM.

Gidrometeoizdat. Nastavlenie dlay gidrometeorologicheskih stantsy (Manual for hydrometeorological stations and posts). 1985. Gidrometeoizdat, Leningrad. 300 pp.

Groisman, P.Y and E.Y. Rankova. 2001. *Precipitation trends over the Russian permafrost-free zone: removing the artifacts of pre-processing*. International Journal of Climate 21: 657-678.

Grubbs, F.E. 1950. *Sample criteria for testing outlying observations*. Annals Of Mathematical Statistics 21 (1): 27-58.

Tietjen, G., and H. Moore. 1972. *Some Grubb's type statistics for the detection of several outliers*. Technometrics 14 (3): 583-597.

In addition, the following related document is available on NSIDC's Web site:

Document	Description	URL
NOAA at NSIDC's Precipitation Data Set Station Lists and Overlap Analysis Web page	Provides an analysis of the overlap in station coverage for various precipitation data sets.	http://nsidc.org/noaa/search/precipitation_station_analysis/

3.1 Related Data Collections

Arctic Climatology Project. 2000. *Environmental Working Group Arctic Meteorology and Climate Atlas.* Edited by F. Fetterer and V. Radionov. Boulder, CO: National Snow and Ice Data Center. CD-ROM.

V.F. Radionov, Ye. I. Aleksandrov, P.N. Svyashchennikov, and F. Fetterer. 2004. *Daily precipitation sums at coastal and island Russian Arctic stations, 1940-1990*. Boulder, CO: National Snow and Ice Data Center. Digital media.

National Snow and Ice Data Center, compiler. 2006. *Monthly mean precipitation sums at Russian Arctic stations, 1966-1990.* Boulder, Colorado USA: National Snow and Ice Data Center. Digital media

USSR Monthly Precipitation For 622 Stations 1891-1999, NCDC DSI-3720. Available from the NOAA National Climatic Data Center.

Global Historical Climate Network. Available from the NOAA National Climatic Data Center.

Global Daily Climatology Network, V1.0. Available from the NOAA National Climatic Data Center.

Air temperature and daily precipitation data from 223 former USSR stations. Available from the All-Russian Research Institute of Hydrometeorological Information World Data Center (RIHMI-WDC).

Global precipitation analyses for monitoring and research from the Global Precipitation Climatology Centre (GPCC).

4 CONTACTS AND ACKNOWLEDGMENTS

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5 DOCUMENT INFORMATION

5.1 Document Authors

This document was prepared by K. Webster and F. Fetterer based on the documentation of the related product, Arctic Climatology Project (2000), and on information supplied by V. Radionov, AARI. A. Machado reviewed the data and provided the graphic.

5.2 Publication Date

August 2003

5.3 Date Last Updated

October 2006; F. Fetterer made minor edits, updated the documentation formatting, and provided a link to graphs of data.