Monthly Mean Precipitation Sums at Russian Arctic Stations, 1966-1990, Version 1

USER GUIDE

How to Cite These Data

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

National Snow and Ice Data Center (comp.). 2006. *Monthly Mean Precipitation Sums at Russian Arctic Stations, 1966-1990, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. https://doi.org/10.7265/N55H7D6Q. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT NSIDC@NSIDC.ORG

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/G02170

National Snow and Ice Data Center

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1 OVERVIEW

These data are provided as part of an ongoing effort to fill gaps in the precipitation record available to the arctic research community.

2 DETAILED DATA DESCRIPTION

2.1 Station List

A tab-delimited ASCII text file, precip_station_list.txt, is available via HTTPS: https://noaadata.apps.nsidc.org/NOAA/G02170/. This file lists the station name, latitude (deg N) and longitude (deg E) of the station position, the temporal range, the river basin name (if known) and the station number (if known). This station list was created by NSIDC based on a station list with station positions provided by V. Vuglinsky. Users should note that station name spellings and positions can vary depending on the original data source and on the interpretive translation between languages.

2.2 Parameters

Precipitation is the only parameter in this data set. It is provided in monthly mean precipitation sums in mm.

2.3 Spatial and Temporal Coverage and Resolution

Data were collected at stations between 50.17 N and 69.77 N, and 38.25 E and 164.17 E. Monthly data records in this data set begin in 1966 and end in 1990. The map in Figure 1 displays the location of meteorological stations where these precipitation measurements were taken.

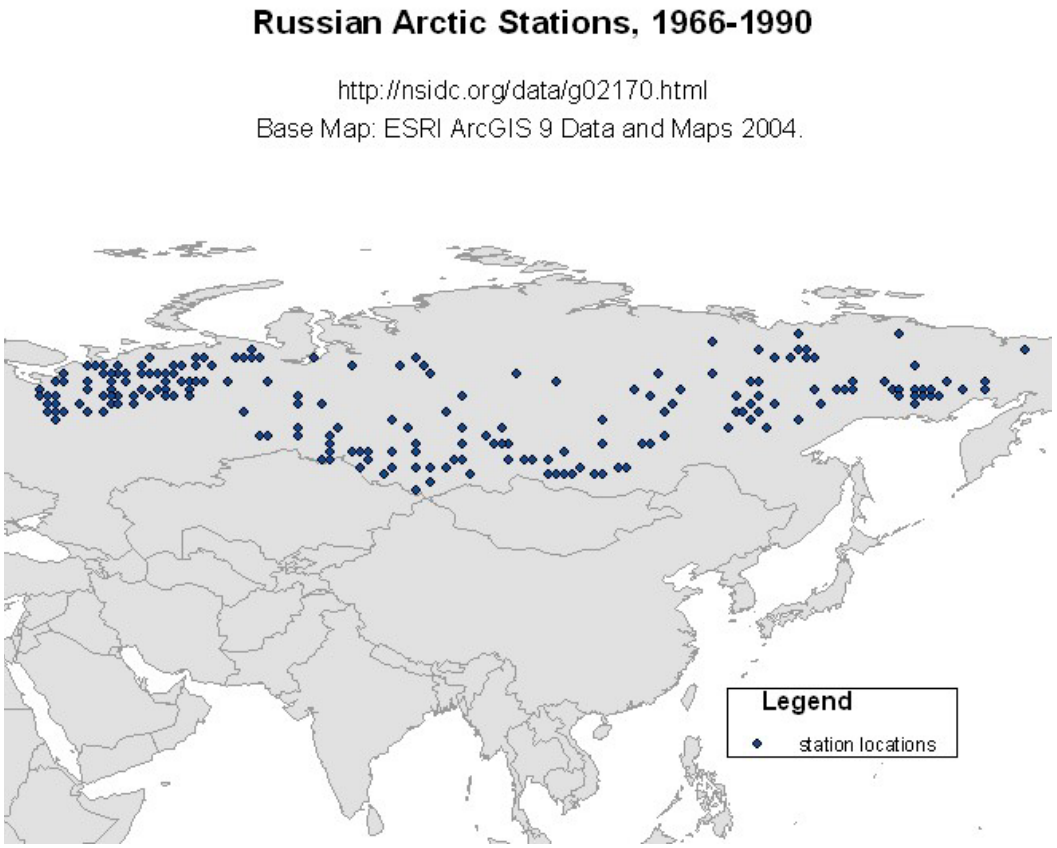

Figure 1. Station Locations

2.4 Format

The following text shows the first segment of the `northern_dvina_precip.txt` file.

```
Northen Dvina
Biryakovo
Year    1       2       3       4       5       6       7       8       9       10      11      12      sum
1966    54.6    50.7    71.9    70.2    75.1    64.4    74.8    77      111.8   59.6    26.8    37.3    774.2
1967    20.1    16.5    39      64.2    43.9    54.9    50.2    120     45.7    95.8    62.2    55.7    668.2
1968    53.6    27.8    21.6    61.3    59.2    28.6    138.8   70.4    40.6    90.6    34.1    57.5    684.1
1969    28.6    8.2     17.3    41.9    100.5   32.4    48      98.4    97.1    106.4   123.6   28      730.4
1970    41.9    39.5    18.3    30.8    50.7    51.7    71.6    45.7    49.4    70.7    33.9    39.8    544
1971    47.1    16.3    37      26.7    30.5    40.8    97.3    36.9    65.3    74.5    37.6    63.1    573.1
1972    13.3    11.5    22.9    75.8    52.4    24.1    48.5    14      66.3    58.8    74.4    30.2    492.2
1973    24      45      26.2    58.7    39.9    84.5    38.5    100.8   71.6    88.4    53.6    43.9    675.1
1974    22.2    39.1    14.7    40.3    102.5   25.5    96      42.8    42.3    67.3    56.8    48.5    598
1975    36.8    24.8    25.2    42.2    38.6    91.7    43.7    116.1   15.2    57.5    40.8    68.2    600.7
1976    31.9    16.3    35      49.9    46.6    166.4   30.4    51.1    49.4    21.2    41      38      573.2
1977    40.8    51.9    28.4    60      85.9    61.4    93.5    81.3    71.2    97.8    97.3    27.1    796.6
1978    42.9    28.7    56.9    18.7    44.3    160.9   91.9    147.7   66.8    103.4   68.1    25.9    856.2
1979    24.2    28.3    21.9    33.9    31.7    67.5    125.9   61      70.5    57.3    62.2    35.2    638.8
1980    38.3    28.3    9.6     33.1    98.2    53.4    171.2   74      52.1    69.1    56.8    88      772.1
1981    65.9    31      38      35.9    50      42.2    43.4    124.8   79.6    73.7    65.6    68.3    718.4
1982    48.5    11.2    36.7    40.2    44.6    65.7    64.6    100     61.4    44.8    50.5    70.5    638.7
1983    42.4    42.8    58.3    56.9    44.1    68      95.3    50.5    71.2    95.1    95      79.9    799.5
1984    43.5    1.7     24      9.6     20.9    79.2    170.3   68.6    73      102.9   29.2    27.5    650.4
1985    48.7    17.3    15.7    49.8    12.7    82.9    99.1    75.9    64.4    43.6    71.8    88.8    670.7
1986    51.7    17.6    21.3    44.2    23.6    139.3   76.4    123.9   100.1   47.4    52.8    57.9    756.2
1987    15.8    47.9    21.2    21.9    66.1    134.7   70.8    112.5   62      0.7     37.6    59.5    650.7
1988    18.8    62.1    24.2    54.3    22.9    35.1    58.3    48.9    53.7    57      66      52.4    553.7
1989    68.4    33.6    32.6    13.5    37.1    103.7   68.5    75.6    70.2    65.4    58.3    52.1    679
1990    52.6    51.9    55.5    19.6    58.3    95.4    93.9    80.3    64.2    52.9    70.6    65.4    760.6
```

In this example, Northern Dvina is the river basin, Biryakovo refers to the station name, Year gives the year the precipitation measurement was taken (ranges from 1966 to 1990), values 1-12 denote months (1 = January and 12 = December), and the sum is the sum of the monthly mean precipitation measurements from a specific station (Biryakovo) for a particular year.

Precipitation is recorded in mm.

2.5 File Naming Convention

The data are available as tab-delimited ASCII text files with the following naming format:

`<river_basin_name>_precip.txt`

Where

- `river_basin_name` = name of the river basin (i.e. Northern Dvina)
- `precip` = monthly mean precipitation sums from Russian stations
- `txt` = ASCII text format

Example file name: `northern_dvina_precip.txt`

If the river basin name was unknown for a station at the time of the data set publication, the station data were put in the `output_precip.txt` file.

2.6 File Size

The data files range from 13 KB to 64 KB.

2.7 Quality Assessment

The precipitation data were transferred to NSIDC from the State Hydrological Institute in St. Petersburg, Russian Federation by V. Vuglinsky. The original precipitation data were written records, prepared by regional hydrometeorological authorities. Editors at the regional hydrometeorological authorities quality control data before publishing the data in monthly precipitation bulletins. Because the data were transcribed (keyed) at the State Hydrological Institute, the data are subject to transcription errors. NSIDC did not perform a quality assessment on the precipitation data.

Users should note that precipitation sums for certain months are missing from some stations. Reasons for the missing sums include that certain stations had closed, there were gaps in the observations, the quality of the data was poor or a data value was lost during transmission. A file

containing the missing values is available. Note that not every precipitation file was exhaustively checked. Therefore, there may be missing precipitation values that are not listed in the missing values file.

Measuring arctic precipitation accurately is difficult. Users of these data should first become familiar with error sources inherent in all arctic precipitation measurements. We strongly suggest consulting Groisman and Rankova (2001) and Groisman et al. (1991) and references contained therein, and the documentation on gridded precipitation fields in Arctic Climatology Project (2000) for an introduction to precipitation measurement issues.

3 DATA ACQUISITION AND PROCESSING

The original monthly precipitation sums were acquired from the official monthly precipitation bulletins prepared by regional hydrometeorological authorities in paper form and transcribed (keyed) to digital form at the State Hydrological Institute.

Meteorological observations including precipitation were performed according to the Manual for Hydrometeorological Stations and Posts, Gidrometeoizdat, 1985 (from "Nastavlenie gidrometeorologicheskim stantsyyam i postam." Vypusk 3, chast' 1). 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). A meteorologist measured the amount of precipitation two or four times every 24 hours (see Groisman et al.,1991 for detailed instructions). Duration and type of precipitation were observed continuously. Amount of precipitation was measured to a precision of 0.1 mm.

The data were received at NSIDC in two deliveries, on 3 December 2004 and also on 30 January 2006. These data, in Excel spreadsheets, were combined with data from V. Vuglinsky already in use by NSIDC researchers to create this data set. The data were reformatted from Excel spreadsheets to tab-delimited ASCII file.

4 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.

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.

Groisman, P. Y., V. V. Koknaeva, T. A. Belokrylova, and T. R. Karl. 1991. Overcoming biases of precipitation measurement: A history of the USSR experience. Bulletin of American Meteorological Society pp. 1725-1733.

Legates, D. R., and C. J. Willmott, Mean seasonal and spatial variability in gauge-corrected, global precipitation. 1990. International Journal of Climatology, 10 (1), pp. 111-1270.

Nastavlenie gidrometeorologicheskim stantsyyam i postam. Vypusk 3, chast' 1. (Manual for hydrometeorological stations and posts. Iss.3, part 1). 1985. Gidrometeoizdat, Leningrad. 300 pp.

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

Table 1. Related Documents

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/

4.1 Relation to Other Precipitation Data Sets

Planning for this data set began in 2003, as part of a Study of Environmental Arctic Change (SEARCH) project to acquire data sets that may be needed for an arctic reanalysis effort. Precipitation data was seen as important, but identifying what stations or temporal coverage was missing from the many precipitation data sets already available was a necessary first step. A table of precipitation data sets potentially valuable for arctic reanalysis was constructed, and a match was sought between the stations that could be acquired for this data set and stations in most of the data sets in the table, based on proximity of station location (to within 0.25 degrees, or 27.75 km). In March of 2004, it was determined that the stations provided in this data set were not available elsewhere, with the exceptions noted below. For completeness, the precipitation data set table is included here as a document file (Precipitation_Dataset_Inventory.pdf) for downloading. This data set, G02170, is an extension of the "R4" data set in the table. The "R4" data have an associated station number in the station list. Station numbers are not available for other stations in the data set.

4.2 Stations Known to be Present in Other Data Sets

The document, G02170_Overlap_Stations.doc on the HTTPS site: https://noaadata.apps.nsidc.org/NOAA/G02170/, contains a list of stations that appear in this data set and also in other readily available data sets (though the date range may be different) is available.

There is also overlap with several stations in the archives of the Global Precipitation Climatology Centre (GPCC), Germany. Most of the GPCC station records start in 1986 and end in 1995 with some gaps. The GPCC received these data from the NOAA Climate Prediction Center (H. Mächel, personal communication, e-mail to F. Fetterer on 25 October 2004.)

Stations from this data set that overlap with stations in the GPCC:

Northern Dvina River Basin

Table 2. Northern Dvina River Basin

Station (number)	Latitude (deg. N)	Longitude (deg. E)	Station Name	Data Range
22974	60.40	44.25	Njuksenitsa	1966-1990
23904	60.33	51.55	Kazhym	-
22781	62.97	46.58	Okulovskaya	1966-1990
23709	62.18	54.20	Pomozdino	1966-1990
22869	61.13	43.35	Shangaly	1966-1990
23608	63.17	52.60	Mesju	1966-1990

Pechora River Basin

Table 3. Pechora River Basin

Station (number)	Latitude (deg. E)	Longitude (deg. N)	Station Name	Data Range
23812	61.83	56.87	Yaksha	1966-1990
23215	67.43	58.02	Khorey-Ver	1966-1990
23411	65.95	55.17	Mutny Materik	1966-1990
23316	66.60	59.28	Adzva-Vom	1966-1987
23519	64.05	59.43	Verkhniy Schugor	1966-1990
23509	64.22	53.57	Kedva-Vom	1966-1990
23514	64.52	55.40	Ira-Yol	1966-1990
23322	66.68	62.60	Sivaya Maska	1966-1987

Onega River Basin

Table 4. Onega River Basin

Station (number)	Latitude (deg. E)	Longitude (deg. N)	Station Name	Data Range
22749	62.13	39.33	Konevo	1966-1990
22944	60.47	38.62	Charozero	1966-1990

Mezen River Basin

Table 5. Mezen River Basin

Station (number)	Latitude (deg. E)	Longitude (deg. N)	Station Name	Data Range
23501	64.77	51.08	Levkinskaya	1966-1990

4.3 Related NSIDC 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. Gridded monthly mean precipitation, climatological means for period 1950-1990. See http://nsidc.org/data/g01938.html. Fields (250 km equal area EASE-Grid) were created from station data using iterated Cressman interpolation and a first guess (Legates and Willmott, 1990) field. Precipitation over land uses the Former Soviet Union Monthly Precipitation Archive, 1891-1993 and Canadian Monthly Precipitation (see below). Monthly precipitation totals for the Arctic Ocean are Russian North Pole (NP) drifting station data corrected for biases by Daqing Yang. There are no plans to remake these 12 average precipitation fields with additional data, but they are mentioned here because they were prepared with bias-corrected data and are a convenient representation of climatology.
- National Snow and Ice Data Center. 2003. *Meteorological Data from the Russian Arctic, 1961-2000.* V. Radionov, compiler. Boulder, CO: National Snow and Ice Data Center. Digital media.
- 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.

4.4 Other Related Data Collections

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).

Canadian Monthly Precipitation (NOAA National Climatic Data Center data set TD-9816.)

USSR Monthly Precipitation for 622 Stations 1891-1999 (NCDC DSI-3720). Available from the NOAA National Climatic Data Center. NSIDC previously distributed the following two data sets. These data sets were withdrawn because they duplicated data in the above two data sets distributed by NCDC.

Former Soviet Union Monthly Precipitation Archive, 1891-1993 Monthly precipitation totals from 622 stations. Work on this archive began at the State Hydrological Institute in St. Petersburg in 1977. The data are available along with a file containing the correction factors so that it is possible to reconstruct the uncorrected data.

Federal Climate Complex Global Surface Summary Of Day Data Version 6 NCDC's Climate Services Branch produces global summary of day data for 18 surface meteorological elements including precipitation. These are derived from the synoptic/hourly observations contained in TD9956 (USAF DATSAV3 Surface data). Historical data are generally available for 1973 to the present, with some stations having data back to before 1930. Data from 1994 on are available online. Synoptic data undergo extensive automated QC. These data are quality controlled further as the summary of day data are derived. Data are ongoing, and are normally available a few days after the end of the data week . A visualization tool (CLIMVIS) can be used to plot data from individual stations.

Global Historical Climate Network Daily that is available from the NOAA National Climatic Data Center.

Global Historical Climate Network. Available from the NOAA National Climatic Data Center. The GHCN contains monthly average temperature and precipitation data. The GHCN incorporates data from NCAR ds570.0, and from many additional sources. A subset of all GHCN stations is updated monthly (primarily those for which data from the Global Telecommunications System or GTS, are available). For any given station, the GHCN may have more than one time series and each time series taken singly may not cover the entire history of that station.

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

Adjusted and Homogenized Canadian Climate Data (AHCCD) - Adjusted Precipitation Data
Provides monthly, seasonal and annual rain, snow and total precipitation from the second generation Adjusted Precipitation for Canada (APC2) dataset for over 450 locations. Series extend back to 1895.

NCAR ds570.0, World Monthly Surface Station Climatology, 1738-cont Data from National Climatic Data Center (NCDC) Monthly Climate Data of the World, plus other data sources including World

Weather Records from the Smithsonian Institution, the U.S. Weather Bureau, and the Department of Commerce. Standard parameters are sea level pressure, station pressure, temperature, and precipitation. Data from more than 4700 stations were quality controlled at NCAR by looking for deviations of greater than four or five standard deviations from the long period monthly mean. These extreme values were then manually inspected and either accepted, or set to missing. Updated yearly.

5 CONTACTS AND ACKNOWLEDGMENTS

Acknowledgements:

The NOAA team (F. Fetterer, L. Ballagh, and J. Kovarik) prepared this data product for publication at NSIDC. B. Raup, NSIDC, was responsible for the analysis that assured that these data are a new contribution (see Relation to Other Precipitation Data Sets). J. Beitler, NSIDC, performed a final edit on the documentation before publication. We thank Dr. Hermann Mächel, Global Precipitation Climatology Centre (GPCC) Offenbach am Main, Germany, for evaluating overlap with stations in GPCC archives.

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6 DOCUMENT INFORMATION

6.1 Document Authors

L. Ballagh prepared this document based on discussion and email exchange with F. Fetterer, on correspondence with V. Vuglinsky at the State Hydrological Institute in St. Petersburg, Russian Federation, and on documentation of related NSIDC precipitation products. F. Fetterer provided most of the content for the "Related NSIDC Data Collections" and "Other Related Data Collections" sections.

6.2 Publication Date

August 2006

6.3 Date Last Updated

November 2020