



# Daily Precipitation Sums at Coastal and Island Russian Arctic Stations, 1940-1990, Version 1

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## USER GUIDE

### How to Cite These Data

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

Radionov, V. F., Y. I. Aleksandrov, P. N. Svyashchennikov, and F. Fetterer. 2004. *Daily Precipitation Sums at Coastal and Island Russian Arctic Stations, 1940-1990, Version 1*. [Indicate subset used].

Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center.

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FOR QUESTIONS ABOUT THESE DATA, CONTACT [NSIDC@NSIDC.ORG](mailto:NSIDC@NSIDC.ORG)

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/G02164>



National Snow and Ice Data Center

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# 1 DETAILED DATA DESCRIPTION

## 1.1 Overview

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This data set contains precipitation data originally recorded in log books at 65 Russian coastal and island meteorological stations, and later digitized at the Arctic and Antarctic Research Institute (AARI), St. Petersburg, Russia, under the direction of Vladimir Radionov. Records from most stations begin in 1940. Instrumentation was generally a rain gauge with Nipher shield until the early 1950s (for most stations), when the Tretyakov precipitation gauge replaced earlier instrumentation. Data have not been adjusted for gauge type or wind bias. Observers corrected the data from 1967-1990 for wetting loss as they recorded the station data.

These data are provided as part of an ongoing effort to fill gaps in the precipitation record available to the arctic research community. While data from some of these 65 stations are available from other sources (see section 1.9 Overlap and Comparison with Other Collections), most are unique. The location of these stations along the Arctic coastline makes them a particularly valuable record of meteorology at the land/sea boundary.

## 1.2 Station List

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Appendix A – Station Information contains station information including the year of the beginning of record and the date on which the Tretyakov gauge was installed. Also included is information on the station from a listing of World Meteorological Organization (WMO) stations. WMO official station names and positions may vary slightly from the names of stations and positions provided by AARI. They are included here for the convenience of users who might wish to cross reference these stations with WMO station lists.

## 1.3 Format

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The data files are in ASCII text format.

## 1.4 File Naming Convention

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The data are available as ASCII text files with the following naming format and as described in Table 1:

`DXXXXX_formatted.dat`

Table 1. File Naming Convention

Variable	Description
D	Identifies this as a data file
XXXXX	five-digit station identification number. See Appendix A – Station Information for a list.
_formatted	Indicates this was formatted at NSIDC (see section 2.2.1 Processing Steps)
.dat	Extension identifying this as an ASCII file

Example file names: D21931\_formatted.dat and D25594\_formatted.dat.

## 1.5 File Size

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The data files range in size from 92-304 KB.

## 1.6 Sample Data Record

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The following sample data shows a segment of the D21931\_formatted.dat file.

```
# Name: JUBILEJNAJA (KAZACHIE)
# Precipitation daily sum (mm)
# WMO (synoptic) station number: 21931
# Latitude degrees and minutes north: 70 45
# Longitude degrees and minutes (0-360): 136 13
# Missing observations are coded as: 999.9
#
1965-01-01 0.0
1965-01-02 0.0
1965-01-03 0.6
1965-01-04 0.3
1965-01-05 0.0
1965-01-06 0.0
1965-01-07 0.0
1965-01-08 0.0
1965-01-09 0.0
1965-01-10 0.0
1965-01-11 0.4
1965-01-12 888.8
1965-01-13 0.2
1965-01-14 0.0
1965-01-15 0.0
1965-01-16 0.0
1965-01-17 0.1
1965-01-18 0.0
1965-01-19 0.0
1965-01-20 0.8
1965-01-21 1.7
1965-01-22 2.0
1965-01-23 0.9
1965-01-24 0.0
```

1965-01-25 888.8  
1965-01-26 0.8  
1965-01-27 0.3  
1965-01-28 0.2  
1965-01-29 888.8  
1965-01-30 0.0  
1965-01-31 888.8  
1965-02-01 888.8  
1965-02-02 0.3  
1965-02-03 888.8  
1965-02-04 0.1  
1965-02-05 0.4  
1965-02-06 0.2  
1965-02-07 888.8  
1965-02-08 0.0  
1965-02-09 0.0  
1965-02-10 0.0  
1965-02-11 0.0  
1965-02-12 0.0  
1965-02-13 0.7  
1965-02-14 888.8  
1965-02-15 0.0

## 1.7 Spatial Coverage and Resolution

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Data were collected at stations between 64° 25' N and 84° 48' N, and 36° 46' E and 170° W. See Appendix B – Station Map for a station map.

## 1.8 Temporal Information

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Data records in this data set begin in 1940 and end in 1990.

## 1.9 Overlap and Comparison with Other Collections

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Note: This section is current as of date of publication in 2005.

### 1.9.1 Global Daily Climatology Network (GDCN) V1.0

The GDCN data set, available from the [NOAA National Climatic Data Center \(NCDC\)](#), contains daily precipitation and temperature records from over 32,000 stations. Of these, 31 are the same as stations in this data set. However, the records presented here are transcriptions of hand written station logbooks, while most of the data in the GDCN for corresponding stations probably came via electronic transmission over the Global Telecommunication System (GTS) or Global Climate Observing System (GCOS) networks. The data from the GTS network are not quality controlled retrospectively. In theory, data from the station logbooks given here are more accurate. They are, however, subject to transcription errors. Appendix C - A Comparison with GDCN Data documents

those instances where differences appear; the logbooks transcribed for this data set are believed to be more accurate.

In addition to different values, the record length may be different for those stations that are present in both GDCN V1.0 and this data set. Another difference concerns the precision of the record: GTS precipitation is coded in full millimeters unless the amount is less than 1 millimeter, in which case tenths of millimeters are used. This will result in differences when a daily value is arrived at by summing the reports for that day.

### **USSR Monthly Precipitation for 622 Stations 1891-1999 Meteorological Data from the Russian Arctic, 1961-2000**

The first of these monthly precipitation data sources is NCDC data set *USSR Monthly Precipitation for 622 Stations 1891-1999* (DSI-3720). It includes all data in the NCDC Global Historical Climate Network and more, and has corrections for wind, wetting, and gauge type. The second is NSIDC data set *Meteorological Data from the Russian Arctic, 1961-2000* (G02141). It includes monthly precipitation totals without corrections, with the exception of the post-1966 wetting correction. *Daily Precipitation Sums at Coastal and Island Russian Arctic Stations, 1940-1990*, (G02164, the data set you are viewing) has 21 stations in common with *USSR Monthly Precipitation for 622 Stations, 1891-1999* and five stations in common with *Meteorological Data from the Russian Arctic, 1961-2000*. Note that the period of record may not be the same for differing data sources. Appendix D - A Comparison of G02164 Station Coverage with NCDC Dataset DSI-3720 and NSIDC Dataset G02141 has details on station names, numbers, and the period of record for duplicated stations.

## 1.9.2 Other Data Collections

Overlap with other collections has not been assessed. These include a collection (223 stations) of daily precipitation data from the [All-Russian Research Institute of Meteorological Information - World Data Center \(RIHMI-WDC\)](#). This collection has some data records that begin in 1881 (though most begin in 1936) and end in 1995. The [Carbon Dioxide Information Analysis Center \(CDIAC\)](#) holds a data set of "Six- And Three-Hourly Meteorological Observations from 223 U.S.S.R. Stations."

# 2 DATA ACQUISITION AND PROCESSING

## 2.1 Data Acquisition Methods

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Meteorological observations including precipitation were performed according to the Manual for Hydrometeorological Stations and Posts, Gidrometeoizdat, 1985 (translated from the Russian "Nastavlenie gidrometeorologicheskim stantsiyam 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 one, two or four times every 24 hours (see the last paragraph in this section). Duration and type of precipitation were observed continuously. Amount of precipitation was measured to a precision of 0.1 mm.

Daily totals of precipitation have not been corrected for change of instrument type (Nipher shielded gauge to Tretyakov gauge), or for the effect of wind reducing or increasing the measurement (in the case of blowing snow that may enter the precipitation gauge bucket due to strong winds).

Tretyakov's precipitation gauges replaced rain gauges with Nipher shields at stations on the date given in Appendix A – Station Information. Rain gauges with Nipher shields were replaced to reduce errors caused by undercatch in windy conditions and 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. This correction, "K1," is typically applied to monthly totals using coefficients derived for individual stations. However, for arctic sites with strong winds in winter, the variance in the ratio of old and new gauge measurements was high and the coefficients were not published (Groisman and Rankova 2001).

Beginning in 1966, precipitation observations were corrected for wetting by adding 0.2 mm to each non-zero precipitation measurement before entering into the log book, even though the correction actually is equal to 0.2 mm for liquid and mixed precipitation and 0.1 mm for solid precipitation for each individual measurement. In 1967, the correction was changed to differentiate between solid and liquid/mixed precipitation, by reducing the correction for solid precipitation to 0.1 mm. These corrected values were summed to obtain the daily precipitation given in this data set. This wetting correction accounted for systematic moisture losses due to moisture remaining on the sides and bottom of the precipitation gauge bucket when precipitation was decanted to the precipitation measurement glass.

Note that the amount of precipitation added to the total by the wetting correction depends on the number of observations per day. Table 2 clarifies how the wetting correction was applied.

Table 2. Observations per day and application of wetting correction (Groisman and Rankova 2001)

	<b>Before 1936</b>	<b>1936-1966</b>	<b>1966-1986</b>	<b>1986-1990</b>
Observations per day	1	2	4	2
Time zone exceptions			7th, 8th, 9th	3rd

## 2.2 Derivation Techniques and Algorithms

### 2.2.1 Processing Steps

Data were digitized at the Arctic and Antarctic Research Institute, St. Petersburg from the original station log books ("TM-1" books) and quality controlled by Ye.I. Aleksandrov and P.N. Svyashchennikov.

At NSIDC, the following steps were performed:

- Data were reformatted
- The value 888.8 was substituted for 0 or "trace" values (zeros in the data as delivered by V. Radionov indicated trace precipitation. Trace is recorded when the observer notes that precipitation has occurred in the time interval between measurements, but no precipitation is detectable when the gauge is emptied into the measuring glass.)
- The value 0.0 was substituted for blanks (blanks in the data as delivered by V. Radionov mean "zero" precipitation)

The example below shows data as they were received from AARI:

```
Name:      VIKTORIJA IS.
Precipitation daily sum (mm)
WMO (synoptic) station number: 20026
Latitude degrees and minutes north:      80 09
Longitude degrees and minutes (0-360): 36 46
Missing observations are coded as: 999.9
```

```
1960
day jan  feb  mar  apr  may  jun  jul  aug  sep  oct  nov  dec
1  .0      1.2
2  .2  2.1      .2  .0  1.9
3  .0  .5  5.3      1.0  .6  .0
4  .8      .2      .3  .0  3.6  .0  .0  .4  .2
5  .1      .6  .0      2.0  .3  .8  .0
6      1.3      .2      .2  .1  .6      .0
7      2.4      .0      .0  .2
8      .3  .6  1.0  .4      .2      .2  .1
9      .3  .0  1.2      .0      .6  1.3  2.5
10     1.3  1.0  .0      .9      .0  1.0
11  3.1      4.5  .0  .0      1.8  .0  .3  1.5  3.5
12     .0  .0      .2  1.1  1.1  .4  .9
13  9.1      .0      .2  6.4  .1  .4  2.6
```



A portion of the same data file reformatted and with substitutions for “trace” and “zero” precipitation by NSIDC:

```
# Name:      VIKTORIJA IS.
# Precipitation daily sum (mm)
# WMO (synoptic) station number: 20026
# Latitude degrees and minutes north:    80 09
# Longitude degrees and minutes (0-360): 36 46
# Missing observations are coded as: 999.9
#
1960-01-01 888.8
1960-01-02 0.2
1960-01-03 888.8
1960-01-04 0.8
1960-01-05 0.1
1960-01-06 0.0
1960-01-07 0.0
1960-01-08 0.0
1960-01-09 0.0
1960-01-10 0.0
1960-01-11 3.1
1960-01-12 0.0
1960-01-13 9.1
1960-01-14 0.4
1960-01-15 0.3
1960-01-16 0.3
1960-01-17 0.2
1960-01-18 0.4
1960-01-19 0.5
1960-01-20 0.4
1960-01-21 0.4
1960-01-22 0.3
1960-01-23 0.0
1960-01-24 0.0
1960-01-25 0.0
1960-01-26 0.0
1960-01-27 0.0
1960-01-28 0.0
1960-01-29 0.0
1960-01-30 0.0
1960-01-31 0.0
1960-02-01 0.0
1960-02-02 2.1
1960-02-03 0.5
1960-02-04 0.0
```

## 2.2.2 Quality Assessment

Data digitized from logbooks are subject to transcription errors. These data have been assessed by comparing with data from the GDCN (see section 1.9 Overlap and Comparison with Other Collections), yet some errors may have gone undetected.

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 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.

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.

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

### 3.1 Related Data Collections

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- 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.
- 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.
- 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.

### 3.2 Related NSIDC Documents

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The [Precipitation Data Set Station Lists and Overlap Analysis](#) section on NOAA@NSIDC's IPY/SEARCH Activities web page provides an analysis of the overlap in station coverage for various precipitation data sets.

### 3.3 Related Websites

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- [USSR Monthly Precipitation For 622 Stations 1891-1999, NCDC DSI-3720](#)
- [Global Historical Climate Network - Daily](#)

- 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

V.F. Radionov, Ye.I. Aleksandrov, and P.N. Svyashchennikov  
Arctic and Antarctic Research Institute  
St. Petersburg, Russia

Florence Fetterer  
National Snow and Ice Data Center  
University of Colorado  
Boulder, Colorado USA

### 4.1 Acknowledgments

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We are grateful to Dr. Hermann Mächel of the Global Precipitation Climatology Centre, Offenbach am Main, Germany, who assisted in quality control of this data set by checking values against those in the GDCN. His generous contribution of time and expertise has resulted in an improved data product.

The NOAA team (F. Fetterer, L. Ballagh, K. Webster, and J. Kovarik) prepared this data product for publication at NSIDC. This work was supported by funding from NOAA's National Environmental Satellite, Data, and Information Service and the National Geophysical Data Center.

## 5 DOCUMENT INFORMATION

### 5.1 Document Authors

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F. Fetterer and K. Webster prepared this document based on information provided by V. Radionov and on documentation of related NSIDC precipitation products.

## 5.2 Publication Date

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February 2005

## 5.3 Date Last Updated

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November 2020

## APPENDIX A – STATION INFORMATION

Table A - 1. Station Information. The last four columns include the WMO station information.

Line Number	Station Number	Station Name	Latitude Deg N	Min N	Longitude Deg E	Min E	HSL (station elevation in meters)	Beginning of record	Date, installation of Tretyakov's gauge (DD.MM.YYYY)	WMO Station Name	WMO Latitude (Deg-Min)	WMO Longitude (Deg-Min)	WMO Elevation (meters)
1	20026	VIKTORIJA IS.	80	9	36	46	8	1959	10.01.1960	Viktoriya Island	80-10N	036-45E	9
2	20034	NAGURSKAYA	80	49	47	38	15	1952	30.06.1952	No WMO information found			
3	20046	KRENKELJA	80	37	58	3	20	1958	01.01.1958	Polargmo Im. E. T. Krenkelja	80-37N	058-03E	20
4	20049	RUDOLFA IS.	84	48	57	58	51	1940	21.09.1951	Tikhaya Bay	80-22N	052-55E	46
5	20069	VIZE IS.	79	30	76	59	10	1945	20.04.1953	Ostrov Vize	79-30N	076-59E	10
6	20087	GOLOMJANNYY IS.	79	33	90	37	7	1954	14.06.1954	Ostrov Golomjannyj	79-33N	090-37E	8
7	20199	MALYY TAYMIR IS.	78	8	106	40	12	1941	01.08.1953	Malyy Taymir Island	78-08N	107-12E	12
8	20274	UEDINENIYA IS.	77	30	82	14	22	1940	20.09.1951	Ostrov Uedinenija	77-30N	082-12E	23
9	20289	RUSSKIY IS.	77	10	96	26	9	1940	08.09.1954	Russkiy Island	77-11N	096-35E	9

10	20291	SOLNECHNAJA BUKHTA	78	12	103	16	30	1951	23.06.1953	Solnechnaya Bay	78-14N	103-07E	30
11	20292	CAPE CHELUSKIN	77	43	104	17	13	1940	01.10.1952	Gmo Im. E. K. Fedorova	77-43N	104-18E	13
12	20294	GEYBERGA IS.	77	36	101	31	6	1952	01.03.1953	No WMO information found			
13	20353	CAPE JELANIJA	76	57	63	34	8	1940	20.06.1951	Mys Zelanija	76-57N	068-33E	8
14	20357	RUSSKAJA HAVAN	76	11	63	34	18	1940	01.01.1951	Russkaya Gavan	76-11N	063-34E	9
15	20388	PRAVDY IS.	76	16	94	17	10	1940	01.08.1953	Pravdy Island	76-17N	094-44E	10
16	20476	CAPE STERLEGOVA	75	25	88	54	10	1940	31.08.1951	Cape Sterlegova	75-24N	088-47E	10
17	20667	POPOVA	73	20	70	2	4	1940	01.03.1954	Im. M. V. Popova	73-20N	070-03E	6
18	20674	DIKSON IS.	73	30	80	14	42	1940	01.11.1952	Ostrov Dikson	73-30N	080-24E	47
19	20696	KOSISTYY	73	40	109	44	20	1940	26.10.1954	No WMO information found			
20	20744	MALYE KARMAKULY	72	23	52	44	20	1940	31.07.1953	Malye Karmakuly	72-22N	052-42E	16
21	20766	LESKINA	72	21	79	33	10	1940	18.10.1954	Leskino	72-20N	079-30E	10
22	20856	CAPE HARASAVEY	71	8	66	49	10	1953	01.10.1953	Cape Kharasovoy	71-24N	067-38E	18
23	20864	TAMBHEY	71	30	71	50	8	1940	01.09.1953	Tambey	71-29N	071-49E	8
24	20871	SOPOCHNAJA KARGA	71	52	82	42	4	1940	09.09.1954	Sopochnaya Karga	71-54N	082-43E	2

25	20891	HATANGA	71	59	102	28	30	1940	01.07.1953	Hatanga	71-59N	102-28E	33
26	20946	BOLVANSKIY NOS	70	27	59	4	13	1947	27.03.1952	Cape Bolvanskij	70-27N	059-04E	13
27	20963	GYDOJAMA	70	53	78	28	8	1940	01.01.1953	Gyda	70-53N	078-30E	8
28	20964	TADIBEJAHA	70	22	74	3	4	1950	01.11.1952	No WMO information found			
29	20967	SEJAHA	70	13	72	36	16	1940	01.09.1954	Sejaha	70-10N	072-31E	16
30	21301	ANDREJA IS.	76	49	110	45	6	1942	03.10.1952	Andreya Island	76-48N	110-50E	6
31	21358	JOHOVA IS.	76	9	152	50	14	1956	01.06.1956	No WMO information found			
32	21405	PRONCHICHEVOY BUKHTA	75	32	113	31	15	1940	23.04.1954	No WMO information found			
33	21432	KOTELNYY IS.	68	41	158	43	10	1940	01.12.1952	Ostrov Kotel'Nyj	76-00N	137-52E	10
34	21504	PREOBRAJENIYA IS.	74	0.4	112	0.56	24	1940	01.03.1953	Ostrov Preobrazenija	74-40N	112-56E	57
35	21535	SANNIKOVA STRAIT	74	30	139	0	16	1940	28.02.1953	No WMO information found			
36	21541	ZEMLJA BUNGE	74	53	142	7	10	1954	01.10.1953	No WMO information found			

37	21611	TERPJAY-TUMSA	73	32	118	40	12	1961	01.01.1961	No WMO information found			
38	21636	CAPE KIGILYAKH	73	0.2	139	0.55	26	1940	06.05.1951	No WMO information found			
39	21647	CAPE SHALAUROVA	73	11	143	56	14	1940	10.10.1953	Mys Shalaurova	73-11N	143-14E	22
40	21729	CAPE BUORKHAYA	71	57	132	43	24	1942	01.09.1953	No WMO information found			
41	21824	TIKSI BUKHTA	71	35	128	55	6	1940	01.07.1953	Tiksi	71-35N	128-55E	8
42	21825	MUOSTAH IS.	71	33	130	1	3	1940	04.10.1953	Mostakh Island	71-32N	129-55E	3
43	21931	JUBILEJNAJA (KAZACHIE)	70	45	136	13	25	1940	17.05.1955	Jubilejnaja	70-46N	136-13E	22
44	21946	CHOKURDAH	70	37	147	53	48	1945	17.09.1954	Chokurdah	70-37N	147-53E	61
45	21955	ALAZEJA	70	40	153	44	2	1947	15.09.1952	No WMO information found			
46	21965	CHETYREHSTOLBOVOY	70	38	162	24	32	1940	13.08.1953	Ostrov Chetyreh-Stolbovoy	70-38N	162-29E	
47	21978	VALKARKAY	70	5	170	56	4	1941	05.11.1952	No WMO information found			
48	21982	VRANGELJA IS.	70	58	181	31	2	1940	20.09.1953	Ostrov Vrangelja	70-59N	178-29W	3



49	23022	AMDERMA	69	46	61	41	52	1940	01.03.1953	Amderma	69-45N	061-42E	53
50	23024	BELYY NOS	69	29	60	20	19	1943	15.08.1953	Cape Bely	69-29N	060-20E	6
51	23032	MARRESALE	69	43	66	49	24	1940	01.11.1952	Maresale	69-43N	066-48E	25
52	23146	CAPE KAMENNY	68	28	73	36	5	1950	01.09.1953	No WMO information found			
53	23242	NOVYY PORT	67	42	72	54	12	1975	01.06.1975	Novy Port	67-41N	072-52E	12
54	25034	BUHTA AMBARCHIK	69	34	162	18	26	1940	25.11.1955	Buhta Ambarcik	69-37N	162-18E	
55	25042	AYON	69	56	167	58	16	1940	11.08.1954	Ajon Island	69-50N	168-40E	16
56	25044	RAUCHUA	69	29	166	33	6	1944	01.09.1953	No WMO information found			
57	25051	PEVEK	69	42	170	20	5	1940	01.09.1953	No WMO information found			
58	25062	CAPE BILLINGSA	69	53	176	5	4	1940	01.10.1954	No WMO information found			
59	25173	CAPE SHMIDTA	68	55	180	31	3	1940	01.11.1952	Mys Shmidta	68-54N	179-22W	7
60	25282	CAPE VANKAREM	67	51	184	22	5	1940	23.08.1954	No WMO information found			
61	25392	CAPE NETTEN	66	56	188	10	20	1943	01.09.1949	No WMO information found			
62	25399	CAPE UELEN	66	10	190	10	6	1940	01.03.1953	Mys Uelen	66-10N	169-50W	7

63	25594	BUKHTA PROVIDENIA	64	26	186	46	9	1940	01.03.1953	Buhta Providenja	64-25N	173-14W	3
64	25595	CHAPLINO	64	25	187	45	5	1940	15.08.1954	No WMO information found			
65	99999	CAPE STOLBOVOY	73	18	53	46	6	1940	01.09.1953	No WMO information found			

## APPENDIX B – STATION MAP

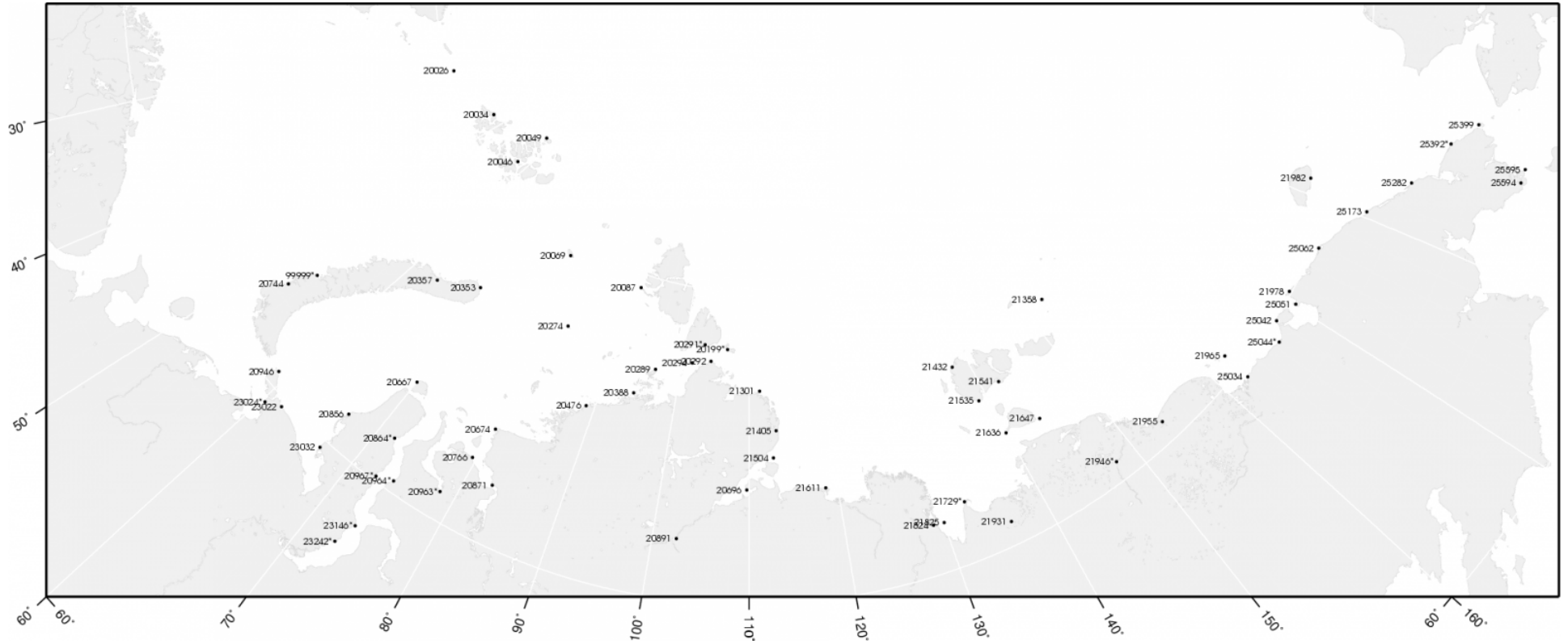


Figure B - 1. Map of Station Locations.

## APPENDIX C - A COMPARISON WITH GDCN DATA

Dr. Hermann Mächel of the Global Precipitation Climatology Centre, Offenbach am Main, Germany, kindly compared values in this data set with those from the GDCN (Global Daily Climatology Network, V1.0 from the NOAA National Climatic Data Center). In some cases, this resulted in corrections being made to the digitized version of the log book values. In other cases, the log book values were deemed to be more correct than the GDCN values. These cases in which the log book values are unchanged after re-examination are documented below. The text marked by "+" notes a difference with GDCN values. The text below it is the response of AARI investigators. "TM-1" refers to the station logbook. "The new version" refers to the data set provided here (G02164).

+ Many stations from 1985 day nr. 29-31 (mar-dec) on have no precipitation in contrast to GDCN (eg. station 20046 no missing values 1986 July+Aug 29.-31) about 25 stations have missing values in 1986 July+Aug in contrast to GDCN since 1985 no traces listed, days 29-31

The data for the dates 29-31 since March by December for the period 1985-1990 had been lost during coding-decoding procedures at the following stations:

```
20026 20292 20766 21358 21931 23242 25595
20034 20294 20856 21405 21946 25034
20046 20353 20864 21432 21955 25042
20049 20357 20871 21504 21965 25051
20069 20388 20891 21535 21978 25062
20087 20476 20946 21541 21982 25173
20199 20667 20963 21611 23022 25282
20274 20674 20964 21647 23024 25392
20289 20696 20967 21824 23032 25399
20291 20744 21301 21825 23146 25594
```

+20049 1961 Mar very high value (more than 5 standard deviations)

The values are correct (TM-1).

1961

```
day Mar    07h    19h
 3  29.0    5.5mm+23.5mm =29.0mm
```

+20049 1981 Oct. first 2 days to high (maybe snow)

day Oct

01 11.0 The values are correct (TM-1).

The old version. The new version.

```
day Oct          day Oct
02  29.0          02   2.9
```

+20289 1961 Mar monthly and some daily values to high (more than 5 standard deviations)

The values are correct (TM-1).

Note in TM-1 log book: the values were rejected, possibly false precipitation due to blowing the snow

1961

day Mar

17 18.4

22 59.7

23 29.5

+20289 1967 Apr day 15. to high (more than 5 standard deviations)

The values are correct (TM-1).

Note in TM-1 log book: the values were rejected, possibly false precipitation due to blowing the snow

day Apr

15 32.5

+20353 1959 Jan 27. 0.7 mm in GDCN 7.0 mm

The values are correct (TM-1).

day Jan

27 0.7

+20353 1963 Apr 20+21+24 seems to high in comparison with GDCN

The values are correct (TM-1).

Note in TM-1 log book: partly false precipitation due to blowing the snow

day Apr

19 27.1

20 23.9

21 1.0

22 .6

23 16.9

24 3.4

+20353 1963 Oct some days are in GDCN higher by a factor of TEN

The values are correct (TM-1).

+20353 1966 Dec 28+29. are zero but have values in GDCN

The data had been written in TM-1 log book but these are rejected

day Dec

28 17.4

29 22.9

+20353 1967 Jan 17+21. are zero but have values in GDCN

The data had been written in TM-1 log book but these are rejected

day Jan

17 24.6

21 45.1

+20353 Maximum daily value decreases after 1982 from more than 10mm/day to

under 10mm/day; the number of days with precipitation also decreases

The values are correct (TM-1).

Since 1985 trace precipitation (0.0) are not update

+20388 1964 Feb to high (more than 5 standard deviations)

The values are correct (TM-1).

day Feb

01 10.7

02 30.5

03 31.9

08 15.1

13 11.3

+20388 1967 Apr to high (more than 5 standard deviations)

The values are correct (TM-1).

day Apr

08 6.4

15 23.7

20 10.7

21 12.2

+20667 1975 Aug no day with precipitation although in GDCN there are 13.7 mm

The data for August 1975 at this station are absent

\*20667 1982 June no day with precipitation although in GDCN

+20674 1943 Aug 03 and 04 are equal 13.5 mm

The values are correct (TM-1).

Day Aug 07h 19h

03 13.5 0.4mm+13.1mm=13.5mm

04 13.5 12.8mm+ 0.7mm=13.5mm

+20674 1952 Jan-June are different in comparison with GDCN  
In January - June 1952 rain gauge with Nipher shield was used. The precipitation gauge

of Tretyakov (O-1) was used starting from July 1952.

+20674 1954 Apr.24. 1.0 mm in GDCN 10.0 mm

The data had been written in TM-1 log book but these are rejected

The old version. The new version.

day Apr day Apr

24 1.0 24 10.0

+20696 1964 Feb to high (more than 5 standard deviations)

The values are correct (TM-1).

day feb

03 14.2  
04 6.7  
09 4.5  
10 11.0  
13 8.8

+20744 1958 Jun 12 2.6 mm in GDCN 26.2 mm

1958 Jun the values are correct (TM-1).

+20864 1959 Mar to high (more than 5 standard deviations)

The values are correct (TM-1).

day Mar  
03 13.6  
04 28.3  
06 38.6

+20891 1958 Oct 18. 0.0 mm in GDCN 9.0 mm

The values are correct (TM-1).

day Oct  
18 0.0

+21301 1961 Mar to high (more than 5 standard deviations)

The values are correct (TM-1).

day Mar  
17 13.5  
18 20.4  
23 12.0

+21432 1956 Feb to high (more than 5 standard deviations)

The values are correct (TM-1).

day Feb  
20 26.7

+21432 1964 Mar to high (more than 5 standard deviations)

The values are correct (TM-1).

day Mar  
20 23.3

+21504 1967 Apr 21. too high

The values are correct (TM-1).

day Apr  
21 21.1

+21535 1952 Aug too high (more than 4 standard deviations)

The values are correct (TM-1).

day Aug 07h 19h  
02 21.6 11.8+ 9.8=21.6  
04 16.2 11.2+ 5.2=16.2  
15 28.3 17.5+10.8=28.3

+21535 1956 Oct too high (more than 5 standard deviations)

The values are correct (TM-1).

Note in TM-1 log book: false precipitation due to blowing the snow  
day Oct  
30 18.3  
31 28.8

+21535 1958 Aug 9. too high

The values are correct (TM-1).

Note in TM-1 log book: false precipitation due to blowing the snow  
day Aug  
09 46.0

+21535 1969 Jan too high (more than 5 standard deviations)

The values are correct (TM-1).

day Jan  
15 7.4  
17 10.4

+21636 1955 Mar 21. too high by ten

Note in TM-1 log book: partly false precipitation due to blowing the snow

day Mar 07h 19h  
21 46.4 30.2+16.2=46.4

+21647 1969 Jan too high (more than 5 standard deviations)

The values are correct (TM-1).

day Jan  
07 8.8  
14 7.4  
15 13.6  
16 15.5  
17 8.0

+21824 1965 Nov some days with no precipitation but have values in GDCN (dif. =127mm)

The values are correct (TM-1).

+21824 1976 May 1.+2. are zero but have 32.3 mm in GDCN

Note in TM-1 log book: partly false precipitation due to blowing the snow

The old version. The new version.

day	May	day	May
01		01	17.6
02		02	14.7

+21824 1976 Dec 22.+23. are zero but have 23.8 mm in GDCN

Note in TM-1 log book: the values were rejected, possibly false precipitation due to blowing the snow



The old version. The new version.

day	Dec	day	Dec
22		22	13.1
23		23	10.7

+21824 1983 Dec 27. is zero but have 40.2 mm in GDCN

Note in TM-1 log book: the values were rejected, possibly false precipitation due to blowing the snow.

The old version. The new version.

day	Dec	day	Dec
27		27	40.2

+21825 1955 Dec 25-29 too high

The values are correct (TM-1).

The old version.

day	Dec	07h	19h
25	29.2	14.0	+15.2
26	31.7	16.0	+15.7
27	28.6	14.8	+13.8
28	44.5	19.5	+25.0
29	10.4	9.9	+ 0.5

+21946 1970 Jan+Feb are different in comparison with GDCN

The values are correct (TM-1).

+21946 1977 July 12. 8.2 mm, in GDCN 15.4 mm

The values are correct (TM-1).

day	Jul
12	8.2

+21946 1981 Sep 29. 14.6 mm, in GDCN 11.9 mm

The values are correct (TM-1).

day	Sep
29	14.6

+21955 1955 Mar+Dec too high (more than 5 standard deviations)

The values are correct (TM-1).

Note in TM-1 log book: the values were rejected, possibly false precipitation due to blowing the snow

day	Mar	07h	19h	day	Dec	07h	19h
20	29.7	1.4	+28.3	25	18.1	3.9	+14.2
21	20.7			28	29.1	12.6	+16.5

+21965 1946 July 19. 0.0 mm, in GDCN 3.3 mm

The values are correct (TM-1).

day	Jul
19	( )

+21978 1971 Mar too high (more than 5 standard deviations)

The values are correct (TM-1).

day Mar  
 01 18.2  
 02 25.4

+23022 1948 Aug 12 11.6 mm, in GDCN 1.6 mm

The values are correct (TM-1).

day Aug 07h 19h  
 12 11.6 0.6+11.0

+23022 1949 Oct 22 3.4 mm, in GDCN 34.0 mm ?

The values are correct (TM-1).

day Oct 07h 19h  
 20 4.9 1.4+3.5  
 21 3.4 3.3+0.1  
 22 0.1 0.0+0.1  
 23 2.7 1.1+1.6

+23022 1958 Apr 12 4.7 mm, in GDCN 0.0 mm

The values are correct (TM-1).

day Apr 07h 19h  
 12 4.7 4.5+ 0.2

+23022 1958 Aug 06 13.2 mm, in GDCN 0.0 mm

The values are correct (TM-1).

day Aug 07h 19h  
 12 13.2 2.0+11.2

+23022 1958 Sep 29+30 6.0 4.0 mm, in GDCN 0.0 mm

The values are correct (TM-1).

day Sep 07h 19h  
 29 6.2 4.2+ 2.0  
 30 4.0 3.2+ 0.8

+23022 1959 Feb 07 20.0 mm, in GDCN 0.0 mm

The values are correct (TM-1).

day Feb 07h 19h  
 07 20.0 14.5+ 5.5

+23022 1966 Aug 09 1.8 mm, in GDCN 4.8 mm

The values are correct (TM-1).

day Aug 07h 19h  
 09 1.8 0.2+ 1.6

+23022 1967 Jun 09 4.9 mm, in GDCN 49.7 mm

The values are correct (TM-1).

day Jun 03h 06h 15h 18h  
 09 4.9 1.4+ 2.9+ 0.5+ 0.1

+23022 1967 Jun 19 1.9 mm, in GDCN 11.9 mm

The values are correct (TM-1).

day	Jun	03h	06h	15h	18h
19	1.9	1.0+		0.6+	0.3

+23022 1981 Jun all daily values are zero

1981 Jun The values are correct (TM-1).

+23022 1981 Aug 17 4.5 mm, in GDCN 14.5 mm

The values are correct (TM-1).

+23146 1961 Jan too high (more than 5 standard deviations)

The values are correct (TM-1).

day	Jan
07	21.6
08	11.2
19	19.7
20	12.6
21	57.5
31	15.3

+23146 1962 Feb 24-27 too high

The values are correct (TM-1).

The data had been written in TM-1 log book but these are rejected

day	Feb
24	23.5
25	17.2
26	26.8
27	12.0

+23146 1970 Jan+Feb are different in comparison with GDCN

The values are correct (TM-1).

## APPENDIX D - A COMPARISON OF G02164 STATION COVERAGE WITH NCDC DATASET DSI-3720 AND NSIDC DATASET G02141

A check for duplicate stations across datasets R2, R6, R7 was made by Bruce Raup, NSIDC, February 2004. Results in which stations from R7 (G02164, "Daily Precipitation Sums at Coastal Russian Arctic Stations 1940-1990") appear in one of the mentioned data sets are detailed below.

R2: "USSR Monthly Precipitation for 622 Stations 1891-1999," NCDC data set DSI-3720. This data set includes all data in the Global Historical Climate Network and more, and has corrections for wind, wetting, and gauge type.

R6: "Meteorological Data from the Russian Arctic, 1961-2000," NSIDC data set [G02141](#). This data set includes monthly precipitation totals without corrections, with the exception of the post 1966 wetting correction.

Number of duplicates in each dataset combination:

```
R2R6R7: 1 (23242)
R2R7: 21 (20049 20087 20274 20292 20667 20674 20744 20891 21432 21636
21647 21824 21931 21965 21982 23022 23032 25173 25392 25399 25594)
R6R7: 5 (20864 20963 20967 21946 23024)
```

Details of record length, station position (longitude E, latitude N), and station name for duplicated stations:

```
20049:
  R2: [57.97, 81.80, 1891-1999, "Rudolf island"]
  R7: [57.97, 81.80, 1941-1990, "OSTROV RUDOLFA"]
20087:
  R2: [91.13, 79.50, 1891-1999, "Domaschniy island (Golomyannyi)"]
  R7: [90.62, 79.55, 1954-1990, "MYS GOLOMYANNYY"]
20274:
  R2: [82.23, 77.50, 1891-1999, "Uyedineniya island"]
  R7: [82.23, 77.50, 1940-1990, "OSTROV UEDINENIYA"]
20292:
  R2: [104.28, 77.72, 1891-1999, "Cheluskin,AMSG (im. E.K.Fedorova)"]
  R7: [104.30, 77.72, 1940-1990, "MYS CHELUSKIN"]
20667:
  R2: [70.03, 73.33, 1891-1999, "Bely island"]
  R7: [70.05, 73.33, 1940-1990, "OSTROV BELYY"]
20674:
  R2: [80.23, 73.50, 1891-1999, "Dixon island"]
  R7: [80.23, 73.50, 1940-1990, "OSTROV DIKSON"]
20744:
  R2: [52.73, 72.38, 1891-1999, "Maliye Karmakuly"]
  R7: [52.73, 72.38, 1940-1990, "MALYE KARMAKULY"]
20864:
  R6: [71.83, 71.50, 1961-2000, " tambey"]
  R7: [71.82, 71.48, 1940-1990, "TAMBEY"]
20891:
```

R2: [102.47, 71.98, 1891-1999, "Khatanga"]  
R7: [102.47, 71.97, 1940-1990, "KHATANGA"]  
20963:  
R6: [78.47, 70.88, 1961-2000, " gyda"]  
R7: [78.45, 70.88, 1940-1990, "GYDA"]  
20967:  
R6: [ 72.60, 70.22, 1961-2000, " seyakha"]  
R7: [72.52, 70.15, 1936-1990, "SEYAKHA"]  
21432:  
R2: [137.90, 76.00, 1891-1999, "Kotelny island"]  
R7: [137.90, 76.00, 1940-1990, "OSTROV KOTELNYY"]  
21636:  
R2: [139.88, 73.35, 1891-1999, "Kigilyakh cape"]  
R7: [139.88, 73.35, 1940-1983, "KIGILYAKH"]  
21647:  
R2: [143.23, 73.18, 1891-1999, "Shalaurova island"]  
R7: [143.93, 73.18, 1940-1990, "MYS SHALAUROVA"]  
21824:  
R2: [128.92, 71.58, 1891-1999, "Tiksi"]  
R7: [128.92, 71.58, 1940-1990, "BUKHTA TIKSI"]  
21931:  
R2: [136.22, 70.75, 1891-1999, "Kazach'ye (Yubileinaya)"]  
R7: [136.22, 70.75, 1965-1990, "KAZACHIE"]  
21946:  
R6: [147.88, 70.62, 1961-2000, " chokurdah"]  
R7: [147.88, 70.62, 1945-1990, "CHOKURDAH"]  
21965:  
R2: [162.40, 70.63, 1891-1999, "Chetyrekhstolbovoy isl."]  
R7: [162.40, 70.63, 1940-1990, "O.CHETYREKHSTOLBOV"]  
21982:  
R2: [178.53, 70.97, 1891-1999, "Vrangelya island"]  
R7: [181.52, 70.97, 1940-1990, "OSTROV VRANGELYA"]  
23022:  
R2: [60.75, 69.82, 1891-1999, "Yugorskiy Shar (post)"]  
R7: [61.68, 69.77, 1940-1990, "AMDERMA"]  
23024:  
R6: [60.42, 69.65, 1961-2000, " belyy\_nos"]  
R7: [60.33, 69.48, 1943-1990, "BELYY NOS"]  
23032:  
R2: [66.82, 69.72, 1891-1999, "Marre-sale"]  
R7: [66.80, 69.72, 1940-1990, "MARRE-SALE"]  
23242:  
R2: [72.95, 67.70, 1891-1999, "Novy-Port"]  
R6: [72.90, 67.70, 1961-2000, " novyy\_port"]  
R7: [72.92, 67.68, 1975-1990, "NOVYY PORT"]  
25173:  
R2: [180.52, 68.92, 1891-1999, "Schmidta, cape"]  
R7: [180.53, 68.92, 1940-1986, "MYS SCHMIDTA"]  
25392:  
R2: [188.07, 66.97, 1891-1999, "Serdtse-Kamen'"]  
R7: [188.17, 66.93, 1943-1990, "CAPE NETTEN"]  
25399:  
R2: [190.17, 66.17, 1891-1999, "Uelen"]  
R7: [190.17, 66.17, 1940-1990, "MYS UELEN"]  
25594:  
R2: [186.77, 64.43, 1891-1999, "Provideniya Bay"]  
R7: [186.77, 64.42, 1940-1987, "BUKHTA PROVIDENIYA"]