



Technical Report 14-08

Weather observations from Greenland 1958-2013

- Observation data with description

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Front page:

The new GIWS Greenland Independent Weather Station 4301 Kap Morris Jesup, photographed in 2009. It is the northernmost land based weather station in the world. The flat coastal landscape permits landing with fixed winged aircraft. The station to the right with the Stevenson screen is the old weather station. Photo: DMI Technical Team.



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Abstract

The purpose of this report is to present DMI Greenlandic weather observations 1958-2013 that are accessible to the public. Data series from 88 stations are attached as separated files.

Resumé

Formålet med denne rapport er at præsentere DMI grønlandske vejrobservationer 1958-2013 som er tilgængelige for offentligheden. Dataserier fra 88 stationer er vedhæftede som individuelle filer.



1. Introduction

The Danish Meteorological Institute has previously published a series of similar DMI Technical Reports, the latest Technical Report 11-10 [2], containing a description of Greenlandic weather observations from 1958 to 2010. Large parts of this dataset have primarily been used for research and educational purposes and as background for data analysis as in Greenland climatological standard normal (DMI Technical Report 00-18 [1]).

By publishing DMI Technical Report 11-15 [3] the Greenlandic weather observation datasets in the period 1958-2010 for the first time became accessible to the public.

At the same time a comprehensive quality control was applied to the whole dataset and erroneous data were removed. This quality control was described in DMI Technical Report 11-16 [4]. It must be stressed that the data series in question not at all have been tested for homogeneity nor homogenized.

This new procedure introduced in DMI Technical Reports 11-15 and 11-16 has been followed by updates every year since. The purpose of this report is to update the Greenlandic weather observation datasets with quality controlled 2013 data.

The data series have variable length and characteristics depending on type of station, parameter and many other factors. 88 Greenlandic stations with up to 10 parameters are included in this dataset.

2. Description of the data

2.1 Synoptic stations

Synoptic stations in Greenland have been operated with different degrees of automation over time which has had consequences for the way parameters are observed and for the quality of data series. Furthermore, some stations in remote areas are unmanned, meaning that maintenance and calibration often are done with long intervals (at least a year).

Time stamps

All stations included in the dataset are synoptic stations except five manual precipitation stations, see chapter 2.2. Synoptic stations (or SYNOP-station) all over the world follow a 3-hour interval (00, 03, 06, 09, 12, 15, 18 and 21 hours UTC). Since 1996, Greenland stations (not all from 1996) started with 1-hour observations (every whole hour UTC). Recently some stations also started with observations every 10 minutes, but this report only includes hourly observations. Synoptic stations always follow the same guidelines¹. In Appendix 2 it is indicated, which DMI Greenlandic observations are 3-hourly or 1-hourly.

Parameters

A synoptic station should observe as standard *weather, cloud cover, visibility, snow cover, air temperature, relative humidity, wind, air pressure and precipitation*. The selected parameters in the current DMI Greenlandic dataset are given in table 1.

Station identification

The official station numbers describing synoptic stations in Greenland consist of 5 digits, always starting with 04. However, in the data series the “0” is omitted.

¹ See more at <http://www.wmo.int>



2.2 Manual precipitation stations

There are four manual precipitation stations in Greenland still operating.

Time stamps

The four remaining manual precipitation stations observe 12 hours UTC, covering the previous 24 hours. 34250 Nuuk observed 21 hours UTC. It was closed 1 September 2012.

Parameters

A manual precipitation station only measures *daily accumulated precipitation*. The parameters in the current dataset are given in table 2.

Station identification

The national station numbers describing manual precipitation stations in Greenland consist of 5 digits, always starting with 34.

2.3 Stations and data series

As seen in figure 1 and 2 the stations are scattered across Greenland, although most stations are located in the more populated southern Greenland. Furthermore, most stations are coastal or near-coastal stations and only a few stations are located on the ice cap. The 88 stations and their coordinates are furthermore listed in appendix 1.

The length of the data series varies significantly within and between stations depending on location and type of station. A complete visual overview of all data series can be seen in appendix 2, where all 88 stations are shown with data series length. One cell equals one data year. A data year is one year in one data series for one parameter, so the total number of data years is the length of all data series aggregated. The number of data years for each station is shown below the station name. The overall total number of data years for the whole dataset is shown in the left upper corner of the overview.

Please notice that each cell represents one year of data regardless of the amount of data in this year. Hence data years do not necessarily correspond to a calendar year of data.

The data series are ideally identical to the ones in DMI Technical Report 13-11 [5] plus 2013 data, but when compared to earlier published datasets, minor changes may be found. This can be related to an ongoing quality control of data.

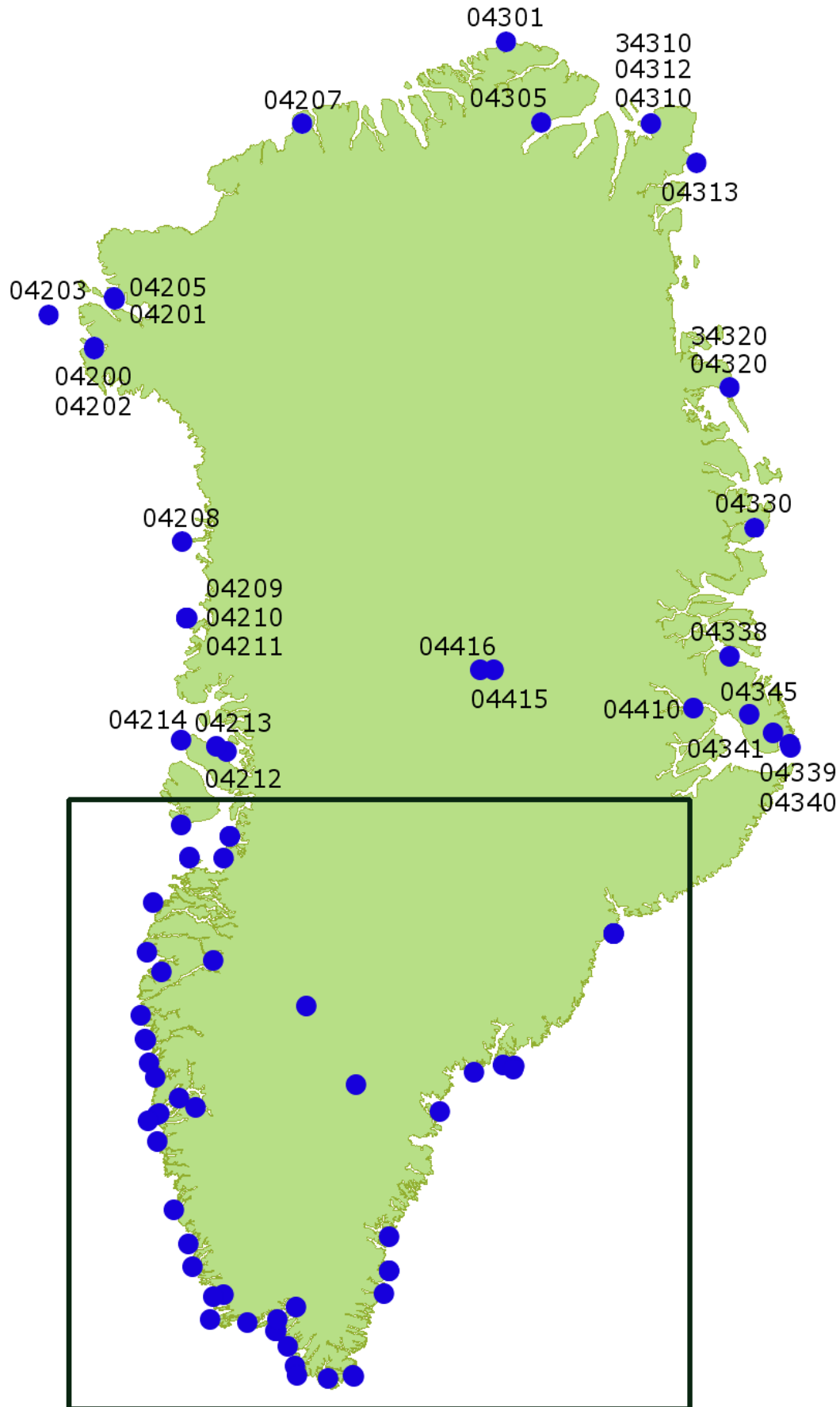


Figure 1: Station positions, Greenland. The section marked is enlarged in figure 2 (graphics M. Scharling).

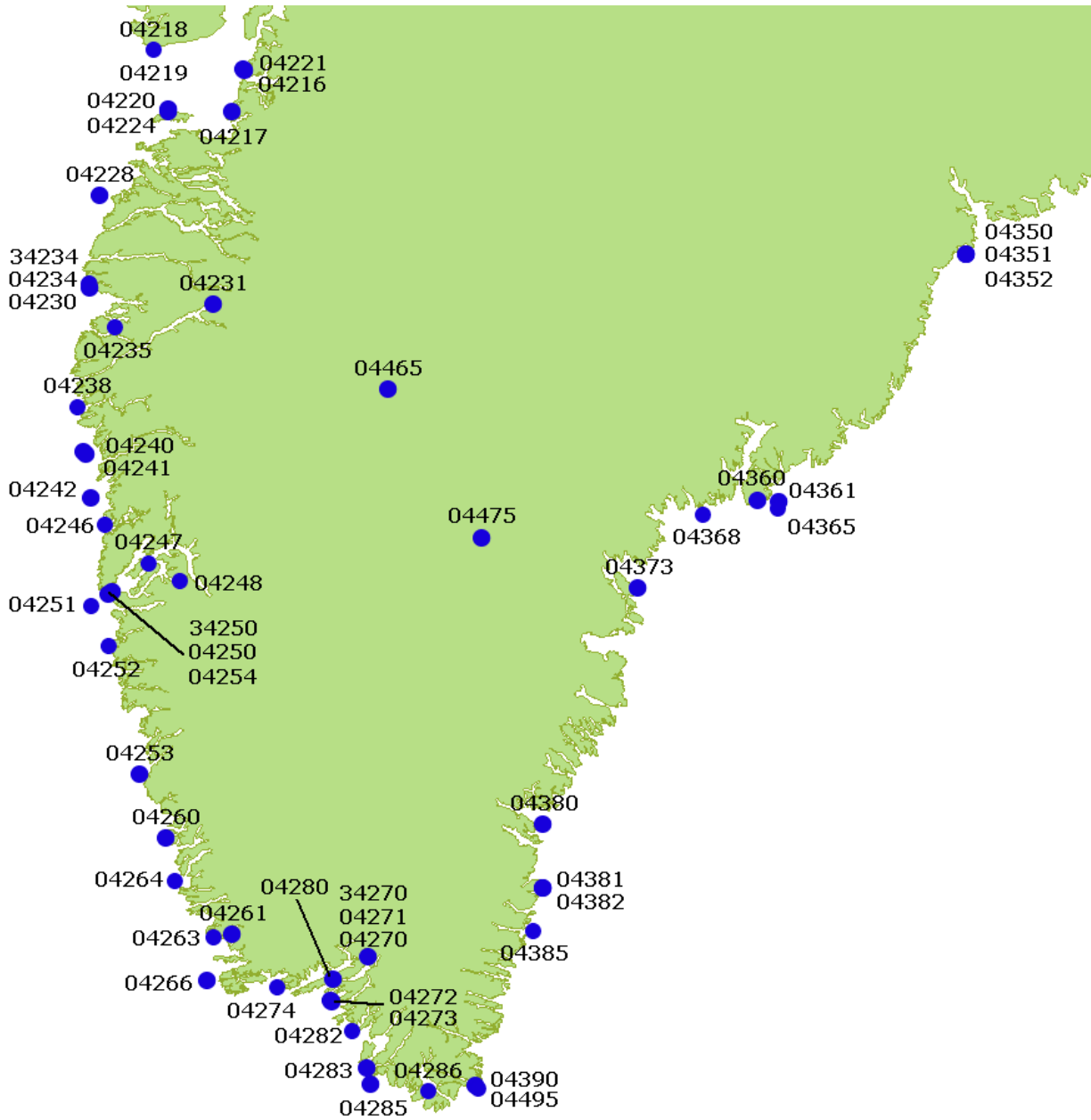


Figure 2: Station positions, Southern Greenland. See fig. 1 for a map of Greenland as a whole (graphics M. Scharling).

3. Data format

The data series are available as tabulator separated txt-files and are found in one ZIP-compressed file *tr14-08.zip* attached to this report. The ZIP-file contains 88 txt-files each representing all data from one station. All time stamps are given in UTC time. Each column in the txt-files has a header, which is described in table 1 and 2.

Headers in synoptic data series-files

Column title	Description
stat_no	4 digit station number, all in the format '4xxx'
Year	Year of observation
Month	Month of observation
Day	Day of observation
hour	Hour of observation (UTC)
dd	Mean wind direction over the 10-minute period preceding the observation. In 1 or 10-degree intervals. 0 applies to calms. 999 applies to variable wind directions
ff	Mean wind speed over the 10-minute period preceding the observation. Observations given in 0.1 m/s
n	Cloud cover in octas (0/8 clear sky, 8/8 overcast). 9 apply to obscured sky, due to fog or heavy snow, and therefore no available observation
pppp	Air pressure at mean sea level in 0.1 hPa
ttt	Dry bulb temperature in 0.1 degrees centigrade
txtxtx	Absolute maximum temperature in 0.1 degrees centigrade. Observation period depends on the interval of SYNOP time intervals, normally 12 hours at 6 and 18 hours UTC
tnntn	Absolute minimum temperature in 0.1 degrees centigrade. Observation period depends on the interval of SYNOP time intervals, normally 12 hours at 6 and 18 hours UTC
rh	Relative humidity in percent
rrr6	6, 12 or 24 hours accumulated precipitation in 0.1 mm. -1 applies to more than 0 mm, but less than 0.1 mm. Normally 6 and 18 hours UTC cover 12 hours; 0 and 12 hours UTC cover 6 hours. If there is only one observation every day it is expected to cover 24 hours
sss	Snow depth in cm. 997 applies to less than 0.5 cm. 998 applies to snow cover not continuous

Table 1. Description of columns in the synoptic data series. Parameters given in 0.1-values (*ff*, *pppp*, *ttt*, *txtxtx*, *tnntn* and *rrr6*) are to be divided with 10 to obtain the actual value. **Remember that in order to obtain i.e. daily acc. precipitation, you cannot just add precipitation using the observations at 0, 6, 12 and 18 hours UTC. The precipitation at 0 and 12 hours UTC cover 6 hours; precipitation at 6 and 18 hours UTC cover 12 hours and therefore the precipitation at 0 and 12 hours UTC are imbedded in the precipitation at 6 and 18 hours UTC.**

Headers in manual precipitation data series-files

Column title	Description
stat_no	5 digit station number, all in the format '34xxx'
Year	Year of observation
Month	Month of observation
Day	Day of observation
hour	Hour of observation (UTC)
rrr24	24 hours accumulated precipitation in 0.1 mm. -1 applies to more than 0 mm, but less than 0.1 mm
tr	Period covered in rrr24 in hours. Could be more than 24 hours i.e. 48, 76 hours etc.

Table 2. Description of columns in the manual precipitation data series. Parameters given in 0.1-values (*rrr24*) are to be divided with 10 to obtain the actual value.



References

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- [4] Boas, L. and Wang, P.R. (2011): Quality control of Greenlandic weather and climate data series 1958-2010 – supplement to TR11-15. DMI Technical Report 11-16. Danish Meteorological Institute. Copenhagen.
- [5] Cappelen, J. (ed) (2013): Weather observations from Greenland 1958-2012 - Observation data with description. DMI Technical Report 13-11. Danish Meteorological Institute. Copenhagen.

Previous reports

Previous reports from the Danish Meteorological Institute can be found on:
<http://www.dmi.dk/laer-om/generelt/dmi-publikationer/>



Appendix 1 – Station details

Abbreviations - DMI: Danmarks Meteorologisk Institut (Danish Meteorological Institute). MIT: Mittarfeqarfiit / Grønlands lufthavne (Greenland Airports) Tidl. GLV: Grønlands Lufthavnsvæsen (Greenland Airport Authority). USAF: US Air Force. GTO: Greenland's Technical Organization

	Owner	Time of operation		Latitude N		Longitude W		Elevation m.a.s.
		start	stop	degrees	minute	degrees	minute	
04200 Dundas	DUNDAS RADIO	01-01-1961	31-08-1983	76	34	68	48	21
04201 Qaanaaq	DMI	10-08-1995	13-10-2004	77	28	69	13	16
04202 Pituffik	USAF	01-01-1974	27-11-2006	76	32	68	45	77
04203 Kitsissut	DMI	02-06-1980		76	38	73	00	11
04205 Qaanaaq	DMI	02-01-1964	30-06-1980	77	29	69	12	14
04205 Mitt. Qaanaaq	MIT	30-08-2001		77	29	69	23	16
04207 Hall Land	DMI	30-08-1982	06-09-2007	81	41	59	57	105
04208 Kitsissorsuit	DMI	10-09-1981		74	02	57	49	40
04209 Upernavik AWS	DMI	30-08-1984	26-09-1995	72	47	56	10	63
04210 Upernavik	DMI	01-01-1958	28-01-1987	72	47	56	10	63
04210 Upernavik		08-09-1995	16-08-2004	72	47	56	10	120
04211 Mitt. Upernavik	MIT	25-10-2000		72	47	56	08	126
04212 Ummannaq	DMI	01-01-1961	21-08-1989	70	40	52	07	39
04212 Ummannaq Heli.	MIT	23-01-2004	30-06-2006	70	41	52	07	2
04213 Mitt. Qaarsut	DMI	23-11-2000	23-10-2005	70	44	52	42	88
	MIT	01-02-2006		70	44	52	42	88
04214 Qullitsat	DMI	01-01-1961	31-08-1972	70	03	52	51	2
04214 Nuussuaq		18-09-1982		70	41	54	37	27
04216 Ilulissat	DMI	01-01-1961	31-08-1992	69	13	51	03	39
04217 Qasigiannguit	DMI	01-01-1962	30-06-1980	68	49	51	05	77
04217 Qasigiannguit Heli.	MIT	04-04-2004		68	49	51	10	24
04218 Qeqertarsuaq	DMI	01-01-1962	30-06-1980	69	14	53	31	24
04219 Qeqertarsuaq Heli.	MIT	01-07-2010		69	15	53	32	11
04220 Aasiaat	DMI	01-01-1958		68	42	52	45	43
04221 Mitt. Ilulissat	MIT	15-08-1991		69	14	51	04	29
04224 Mitt. Aasiaat	MIT	02-11-2000		68	43	52	47	23
04228 Kitsissut/Attu	DMI	18-08-1983		67	47	53	58	12
04230 Sisimiut	DMI	01-01-1961	22-06-2001	66	55	53	40	12
04231 Kangerlussuaq	DMI	01-05-1973	31-12-1989	67	00	50	48	50
		01-01-1990		67	01	50	42	50
04234 Mitt. Sisimiut	MIT	28-11-2000		66	57	53	43	10
04235 Dye 1	USAF	13-03-1974	18-09-1989	66	38	52	52	1439
04238 Kangaamiut	DMI	14-09-1966	30-12-1969	65	49	53	19	—
04240 Maniitsoq	DMI	01-01-1961	30-01-1987	65	24	52	52	25
04241 Mitt. Maniitsoq	MIT	06-12-2000		65	25	52	56	28



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	Owner	Time of operation		Latitude N		Longitude W		Elevation m.a.s.
		start	stop	degrees	minute	degrees	minute	
04242 Sioralik	DMI	16-06-1983		65	01	52	33	14
04246 Atammik	DMI	14-02-1966	30-12-1969	64	48	52	09	—
04247 Qoornoq	DMI	03-01-1966	31-12-1969	64	32	51	03	—
04248 Kapisillit	DMI	26-01-1966	30-12-1969	64	25	50	18	—
04250 Nuuk	DMI	01-01-1958	31-08-1991	64	10	51	45	54
		01-09-1991		64	10	51	45	80
04251 Kitsissut	DMI	01-01-1961	31-12-1973	64	02	52	05	19
04252 Kangerluarsorseq	DMI	02-01-1961	31-08-1973	63	42	51	33	10
04253 Ukiivik	DMI	20-06-1982		62	34	50	25	22
04254 Qeqertarsuatsiaat	DMI	17-01-1967	30-12-1969	63	05	50	41	—
04254 Mitt. Nuuk	MIT	01-11-2000		64	12	51	41	86
04260 Paamiut	DMI	01-01-1958	21-09-1992	62	00	49	43	15
04260 Paamiut Heliport	DMI	22-09-1992	06-12-2007	62	00	49	40	13
04260 Mitt. Paamiut	MIT	07-12-2007		62	01	49	40	36
04261 Kangilinnguit	DMI	01-01-1961	01-09-1974	61	13	48	07	27
		01-01-1981	19-09-1997	61	14	48	06	35
04263 Arsuk	DMI	01-08-1964	30-12-1969	61	11	48	27	—
04264 Narsalik	DMI	23-11-1966	30-12-1969	61	39	49	22	—
04266 Nunarsuit	DMI	22-07-1981		60	46	48	27	33
04270 Mitt. Narsarsuaq	MIT	01-01-1961		61	10	45	25	27
04271 Narsarsuaq Radisonde	DMI	25-09-2012		61	09	45	26	4
04272 Qaqortoq	DMI	01-01-1961		60	43	46	03	32
04273 Qaqortoq Heliport	MIT	17-03-2004		60	43	46	02	18
04274 Qassimiut	DMI	08-04-1964	30-12-1969	60	48	47	06	—
04280 Narsaq	DMI	01-01-1958	31-12-1969	60	54	45	58	30
04280 Narsaq Heliport	MIT	10-03-2005		60	55	46	03	25
04282 Alluitsup PAA Helip.	MIT	07-08-2006	31-01-2011	60	28	45	35	23
04283 Nanortalik	DMI	02-01-1961	31-10-1985	60	08	45	13	21
04283 Nanortalik Heliport	MIT	10-03-2005		60	08	45	14	5
04285 Angisoq	DMI	01-01-1964	28-12-1973	59	59	45	08	20
		22-07-1981		59	59	45	08	20
04286 Narsaq Kujalleq	DMI	01-01-1971	31-12-1973	59	58	44	03	—
		01-03-1982	31-12-1983	59	58	44	03	—
04301 Kap Morris Jesup	DMI	16-07-1980		83	39	33	22	4
04305 Kap Harald Moltke	DMI	24-08-1983	17-07-1991	82	09	29	55	4
04310 Station Nord	DMI	01-01-1961	09-07-2007	81	36	16	39	36
04312 Station Nord AWS	DMI	26-07-1985		81	36	16	40	34
04313 Henrik Krøyer Holme	DMI	01-07-1985		80	39	13	43	10



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	Owner	Time of operation		Latitude N		Longitude W		Elevation m.a.s.
		start	stop	degrees	minute	degrees	minute	
04320 Danmarkshavn	DMI	01-01-1958		76	46	18	40	11
04330 Daneborg	DMI	01-01-1958	31-07-1975	74	18	20	13	12
		04-01-1979		74	18	20	13	44
04338 Mestersvig	SLV	01-01-1961	25-10-1985	72	15	23	54	16
04339 Ittoqqortoormiit	DMI	01-11-1980	16-08-2005	70	29	21	57	65
		17-08-2005		70	29	21	57	70
04340 Uunarteq	DMI	01-01-1958	31-10-1980	70	25	21	58	42
		05-09-1985	10-06-1990	70	25	21	58	41
04341 Mitt. Nerlerit Inaat	MIT	26-05-2002		70	45	22	39	13
04345 Jameson Land	DMI	11-02-1985	18-09-1989	71	11	23	37	261
04350 Aputiteeq	DMI	01-01-1958	09-02-1987	67	47	32	18	20
04351 Aputiteeq	DMI	31-01-1987		67	47	32	18	13
04352 Aputiteeq	DMI	18-06-1980	08-04-1982	67	47	32	18	13
04360 Tasiilaq	DMI	01-01-1958	31-03-1982	65	36	37	38	36
		01-04-1982	14-08-2005	65	36	37	37	50
		15-08-2005		65	36	37	37	53
04361 Mitt. Kulusuk	MIT	28-11-2000		65	35	37	09	35
04365 DYE 4	USAF	24-01-1974	20-05-1991	65	31	37	10	329
04368 Orsuiagsuaq	LORAN STATION	13-09-1971	31-12-1973	65	29	38	53	71
04373 Ikermit	DMI	01-11-1986		64	47	40	18	85
04380 Timmiarmiut	DMI/GTO (TELE)	01-01-1958	30-06-1979	62	32	42	08	10
04381 Ikermiuarsuk	DMI	06-12-1979	29-11-1989	61	56	42	04	39
04382 Ikermiuarsuk	DMI	18-06-1980		61	56	42	04	39
04385 Qulleq	LORAN STATION	01-05-1962	31-12-1973	61	32	42	14	157
04390 Ikerasassuaq	DMI	01-01-1958	09-10-1980	60	02	43	07	75
		14-05-1981	30-06-1992	60	03	43	10	26
		01-07-1992		60	03	43	10	88
04410 Renland	DMI	23-09-1987	15-07-1988	71	30	26	32	2320
04415 Summit	DMI	02-01-1991	15-06-1994	72	35	37	38	3250
04416 Summit	DMI	04-11-1997		72	35	38	27	3202
04465 DYE 2	USAF	25-01-1974	18-08-1988	66	29	46	17	2332
04475 DYE 3	USAF	24-01-1974	18-09-1989	65	11	43	50	2652
04495 Ikerasassuaq	DMI	01-10-1980	22-05-1981	60	02	43	07	26
34234 Mitt. Sisimiut	DMI	01-12-2004		66	57	53	43	10
34250 Nuuk	DMI	02-02-1999	01-09-2012	64	11	51	44	54
34270 Narsarsuaq	DMI	22-01-2009		61	10	45	25	26
34310 Station Nord	DMI	01-02-2008		81	36	16	40	36
34320 Danmarkshavn	DMI	01-01-2009		76	46	18	40	11



