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Weather Observations from Tórshavn, the Faroe Islands 1953-2023

- Observational Data with Description

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Colophon

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Content

1	Abstract	1
2	Resume	1
3	Introduction	1
4	Data Description	3
5	Data Format and Description of Meteorological Parameters	4
	5.1 Measuring Techniques and Homogeneity	6
	5.2 General Information about Accumulated Precipitation	6
	5.3 Calculation of Accumulated Precipitation from Tórshavn	7
6	References	8
7	Previous Reports	8
8	Appendix 1 – Station Details	9

1 Abstract

The purpose of this report is to present DMI weather observations from Tórshavn on the Faroe Islands in the period 1953-2023, which are accessible to the public. The data series from the station is attached as separate files.

2 Resume

Formålet med denne rapport er at præsentere DMI vejrobservationer fra Tórshavn på Færøerne i perioden 1958-2023, som er tilgængelige for offentligheden. Dataserien fra stationen er vedhæftet i separate filer.

3 Introduction

Before 2014, the Danish Meteorological Institute did not publish weather observations from Tórshavn. However, the dataset presented in this report was used for research and educational purposes. Furthermore, the dataset was used e.g. in the Faroe Islands climatological standard normals (DMI Technical Report 98-14 [1]) and the DMI historical climate data collection – the Faroe Islands (latest report DMI Report 21-05 [2]).

In publishing the DMI Technical Report 14-09 [3], weather observations from Tórshavn in 1953-2013 became accessible to the public for the first time.

Comprehensive quality-control was applied to the entire dataset and erroneous data were removed. It must be stressed that the data series in question not has been tested for homogeneity nor homogenized.

In 2014, DMI introduced a new data structure, which meant that data from 2014 and onwards were processed in a new format. DMI Technical Report 14-09 [3], with data up to 2013, thus only contains data in an “old” data format.

The “new” data format was introduced in DMI Technical Report 15-09 [4]. The purpose of this report was to update the dataset from the Faroe Islands with quality-controlled data in the new data format from 2014. The report also included the old dataset with the old data format from 1953-2013. A description of both data formats was included. It was up to the data users to compile the two datasets.

In 2021, extra quality control of data from 1953-2013 was carried out as part of the preparation of the climatological standard normals 1991-2020 [5]. Therefore, data from 1953-2013 now have the same format as data from 2014-2023. This means that the previous distinction between an “old” and “new” data format presented in DMI Report 21-09 [6] is the last report containing this distinction. Furthermore, depth of snow is not included in the present report. Therefore, go to DMI Report 21-09 [6] for snow data.

This DMI report presents data in the same data format from 1958-2023. From 1953-2013 data from Tórshavn contains 10 different meteorological parameters. From 2014-2023 data from Tórshavn contains 17 different meteorological parameters.

The weather station in Tórshavn owned by DMI was closed 31 May 2021. Therefore, data from 2021 is limited to the months January to and including May. The station in Tórshavn has been replaced and is now run by the Faroese Meteorological Office (FMO). Currently, DMI and FMO are working together to exchange data from the station owned by FMO and the data DMI received from FMO in 2023 is included here (January 2023-August 2023).

A similar report with weather observations from Greenland 1958-2023 can be found under the name DMI Report 24-08 [7].

4 Data Description

Synoptic stations on the Faroe Islands such as Tórshavn have been operated with different degrees of automation over time, which has influenced the way parameters are observed and the quality of the data series.

The station Tórshavn is a synoptic station. Synoptic stations (or SYNOP stations) always follow the same guidelines. All over the world, synoptic stations observe the weather in at least a 3-hour interval (00, 03, 06, 09, 12, 15, 18, and 21 hours UTC). Since 1 December 1992, a 1-hour observation interval was introduced (00, 03, 06, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 22, and 23 hours UTC). Since 16 March 1995, observations at 04:00 and 05:00 UTC were added. Since 1 November 1998, observations are carried out once every hour (UTC).

As a standard, synoptic stations should observe weather, cloud cover, visibility, snow cover, air temperature, relative humidity, wind, air pressure, and precipitation. The selected parameters in the current DMI dataset from Tórshavn are provided in Table 1.

Ideally, the data series from Tórshavn have data for every time interval that the specific type of station observes (see Table 1 and Appendix 1 – Station Details).

The station identifier consists of 6 digits in the format 601100 for Tórshavn.

The position of the weather station Tórshavn can be seen below in Figure 1. Information about the station such as coordinates can be found in Appendix 1 – Station Details.



Figure 1: Map of the Faroe Islands including the location of the weather station 6011 Tórshavn. The 4-digit station identifier is an old version of the current 6-digit station identifier 601100.

The weather station type in Tórshavn is called a V98:

- V98 (Weather station 1998) is an automatic station with hourly data for all temperature parameters (101, 112, 113, 122, 123), relative humidity (201), all wind parameters (301, 305, 365, 371), atmospheric air pressure (401), sunshine duration (504), radiation (550), precipitation (601, 603, 609) and cloud cover (801). Sampling is carried out continuously.

Please notice that compared to earlier published datasets, minor changes may be found. This is related to the ongoing quality control of data.

5 Data Format and Description of Meteorological Parameters

The data series is available as a CSV file (semicolon separated) in a ZIP compressed folder named *DMIRep22-09_1953_2022*. All timestamps are provided in UTC. Each parameter in the CSV file has a header, which is described in Table 1.

The time resolution of the data ranges from 1 to 24 hours. For more information, please see Table 1 below. All meteorological parameters are provided with one decimal except 201, 365, 371, 550, and 801.

Table 1: Description of meteorological parameters in the synoptic data series from Tórshavn 1953-2022.

Parameter	Description
Station	6-digit station identifier in the format '601100'
Year	Year of observation
Month	Month of observation
Day	Day of observation
Hour (UTC)	Hour of observation (UTC)
101	Mean air temperature (°C; 2 meters above ground). 1953-2013: Dry-bulb temperature observed minute = 0. Time resolution: 1, 3, or more hours. From 2014: Mean air temperature. If not available, dry-bulb temperature (°C); minute = 0. Time resolution: 1 hour. V98.
112	Absolute maximum temperature (°C; 2 meters above ground). Absolute maximum temperature last hour. V98. Parameter exists from 2014 and onwards.
113	Absolute maximum temperature (°C; 2 meters above ground). 1953-2013: Observation period depends on the interval of SYNOP time intervals, normally every 12 hours at 06:00 and 18:00 UTC. From 2014: Absolute maximum temperature last 12 hours. V98.
122	Absolute minimum temperature (°C; 2 meters above ground). Absolute minimum temperature last hour. V98. Parameter exists from 2014 and onwards.
123	Absolute minimum temperature (°C; 2 meters above ground). 1953-2013: Observation period depends on the interval of SYNOP time intervals, normally every 12 hours at 06:00 and 18:00 UTC. From 2014: Absolute minimum temperature last 12 hours. V98.
201*	Mean relative humidity (%). 1953-2013: Observed minute = 0. Time resolution 1, 3, or more hours. From 2014: Mean of relative humidity last hour. Time resolution 1 hour. If not available, relative humidity; minute = 0. V98.
301	Mean wind speed (m/s; 10 meters above ground). 1953-2013: Mean wind speed over the 10-minute period preceding the observation. From 2014: Observed last 10 minutes; minute = 0. Time resolution 1 hour. V98.

Parameter	Description
305	Highest 3 sec. wind speed (m/s; 10 meters above ground) last hour. If not available, highest 3 sec. wind speed (m/s) observed last 10 min. V98. Parameter exists from 2014 and onwards.
365	Mean wind direction (degrees) 1953-2013: Mean wind direction (degrees) over the 10-minute period preceding the observation. In 1 or 10-degree intervals. 0 applies to calms. 990 applies to variable wind directions. From 2014: Mean wind direction (degrees; 10 meters above ground) observed last 10 min.; minute = 0. 0 applies to calms. Time resolution 1 hour. V98.
371	Mean wind direction (degrees; 10 meters above ground). Mean of wind direction last hour. If not available, mean wind direction (degrees) observed last 10 min. 0 applies to calms. Time resolution 1 hour. V98. Parameter exists from 2014 and onwards.
401	Air pressure (hPa) at mean sea level. 1953-2013: Time resolution 1, 3, or more hours. From 2014: Time resolution 1 hours; minute = 0. V98.
504	Accumulated sunshine duration (hours) last hour. V98. Parameter exists from 2014 and onwards.
550	Mean incoming (global) radiation (W/m ²) last hour. V98. Parameter exists from 2014 and onwards.
601	Accumulated precipitation (mm; about 3 meters above ground) last hour. V98. Parameter exists from 2014 and onwards.
603**	Accumulated precipitation (mm, about 3 meters above ground). 1953-2013: 6 and 12 hours accumulated precipitation. -1 indicates more than 0 mm, but less than 0.1 mm. Normally, observations at 06:00 and 18:00 UTC cover 12 hours and observations at 00:00 and 12:00 UTC cover 6 hours. On rare occasions, rrr6 could also cover more than 12 hours. From 2014: Accumulated precipitation (mm; about 3 meters above ground) last 12 hours. V98. -0.1 indicates more than 0 mm, but less than 0.1 mm.
609	Accumulated precipitation (mm, about 3 meters above ground). 1953-2013: 6 and 12 hours accumulated precipitation. -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. On rare occasions, rrr6 could also cover more than 12 hours From 2014: Accumulated precipitation (mm; about 3 meters above ground) last 24 hours. V98.
801	Cloud cover (% or octas) 1953-2013: Cloud cover in octas (0/8 clear sky, 8/8 overcast). 9 indicates obscured sky, due to fog or heavy snow, and therefore no available observation. From 2014: Cloud cover (%); minute = 0. Observations of obscured sky are converted to overcast if possible using additional weather information, otherwise cloud cover is missing. V98.

* Relative humidity: In periods, it is evident that different instruments and calibrations characterize the relative humidity at 6011 Tórshavn. These periods are not excluded in the data series, but care should be taken when using the data in these periods. Some relative humidity values above 100% are changed (not excluded) to 100%, when it was evident, that this was OK.

** Accumulated precipitation: At manually operated stations back in time, both 6 and 12 hours accumulated precipitation occur in parameter rrr6 (18 and 24 hours in rare occasions).

5.1 Measuring Techniques and Homogeneity

The time series included in this report goes back to 1953. During this time, measuring techniques may have changed, which may affect the meteorological parameters. Examples include changes in the number of observations during the day or changes in the computing of the observations themselves (e.g. observation from minute = 0 or mean value during several observations from the last hour). This information is important to keep in mind when assessing the homogeneity of the data series. It must be stressed that the data series in question has not been tested for homogeneity nor homogenized.

5.2 General Information about Accumulated Precipitation

The daily frequency of precipitation measurements from 1953 to 2022 has changed. Recent data consist of hourly precipitation measurements from some automatic synoptic stations, while older data consist of fewer precipitation measurements during the day. When calculating daily accumulated precipitation, it is important to keep these differences in mind.

DMI have calculated all derived values as accurately as possible, but in cases where the observations are odd (could happen back in time), we have tried to do it as best as possible to involve as much precipitation as possible in the derived values.

To obtain i.e. daily acc. precipitation, one cannot just add precipitation using the observations at 0,6,12 and 18 hours UTC. The precipitation at 00:00 and 12:00 UTC covers 6 hours; precipitation at 06:00 and 18:00 UTC covers 12 hours. Therefore, the precipitation at 00:00 and 12:00 UTC is imbedded in the precipitation at 06:00 and 18:00 UTC.

First, the accumulated precipitation from 06:00-18:00 UTC on the day in question is determined. If accumulated precipitation at 18:00 UTC exists (covering 12 hours), this value is used, or else the accumulated precipitation at 12:00 UTC (covering 6 hours) is used. Then the accumulated precipitation from 18:00 UTC on the day in question to 06:00 UTC the next day is determined. If accumulated precipitation at 06:00 UTC the next day exists (covering 12 hours), this value is used, or else the accumulated precipitation at 00:00 UTC (covering 6 hours) is used. The daily accumulated precipitation is thus the sum of the accumulated precipitation from 06:00-18:00 UTC and the accumulated precipitation from 18:00 to 06:00 UTC and normally is listed on the date where the period starts.

The daily accumulated precipitation in most cases is calculated using accumulated precipitation at 06:00 and 18:00 UTC covering 12 hours. When this is not possible one can try to get as much precipitation as possible within 06:01-06:00 UTC. However, in rare cases that can be questioned.

For example, daily accumulated precipitation (14 April at 06:01 UTC – 15 April at 06:00 UTC = 3,2 mm) from a station, which is calculated using 14 April at 12:00 UTC = 2,0 mm (covering 12 hours because at that time the station only measured at 0,12,15,18 UTC) + 15 April at 18:00 UTC = 1,2 mm (covering 6 hours). 15 April at 00:00 UTC: missing accumulated precipitation and 15 April at 06:00 UTC: no observation. Even though the calculation of this derived daily accumulated precipitation could have been omitted, it has been calculated this way at DMI.

5.3 Calculation of Accumulated Precipitation from Tórshavn

In the recent period, the precipitation gauge in Tórshavn has been automatic. It means that observations have been carried out regularly. Therefore, observations at 06:00 and 18:00 UTC covering 12 hours have always been present.

Back in times, when stations were manually operated with a Hellman rain gauge, the observations could have been irregular and covered odd periods.

Calculation of daily accumulated precipitation before 2014: At DMI the daily accumulated precipitation before 2014, in general, has been calculated from 06:01 UTC on the day in question to 06:00 UTC the next day using a routine: Only the observations at 00 (normally covering 6 hours), 06 (normally covering 12 hours), 12 (normally covering 6 hours) and 18:00 UTC (normally covering 12 hours) are used in the calculation.

Calculation of daily accumulated precipitation after 2014: At DMI the daily accumulated precipitation from Tórshavn from 2014, in general, is calculated from 00:01 UTC the day in question to 00:00 UTC the next day adding the hourly values (parameter 601).

6 References

- [1] J. Cappelen and L. V. Ellen, "The Climate of the Faroe Islands - with Climatological Standard Normals, 1961-1990. DMI Technical Report 98-14.," Danish Meteorological Institute, Copenhagen, 1998.
- [2] J. Cappelen (ed.), "The Faroe Islands - DMI Historical Climate Data Collection 1873-2020. DMI Technical Report 21-05.," Danish Meteorological Institute, Copenhagen, 2021.
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- [6] J. Cappelen (ed), "Weather Observations from Tórshavn, The Faroe Islands 1953-2020. DMI Report 21-09.," Danish Meteorological Institute, Copenhagen, 2021.
- [7] C. D. Jensen (ed), "Weather Observations From Greenland 1958-2023 - Observation data with description. DMI Technical Report 24-08.," Danish Meteorological Institute, Copenhagen, 2024.

7 Previous Reports

Previous reports from the Danish Meteorological Institute can be found on:

<https://www.dmi.dk/publikationer/>

8 Appendix 1 – Station Details

Table 2: Station details: Tórshavn, the Faroe Islands (FI).

No.	Name	Owner	Time of operation		Latitude	Longitude	Elevation
			start	stop			
06011	Tórshavn	FI/V98	01-01-1953	30-06-1962	62.0152	-6.7758	35
			01-07-1962	31-12-1992	62.0157	-6.7758	43
			01-01-1993	31-05-2021	62.0231	-6.7647	54
06011	Tórshavn	FMO	01-08-2022		62.0230	-6.7644	54