Danish Meteorological Institute

DMI Report 18-09

Weather observations from Tórshavn, The Faroe Islands

1953-2017

- Observation data with description

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Colophon

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06011 Tórshavn weather station seen from southeast. Photo: DMI Technicians.

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Content

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Abstract

The purpose of this report is to present DMI weather observations 1958-2017 from Tórshavn, The Faroe Islands, accessible to the public. The data series is attached.

Resumé

Formålet med denne rapport er at præsentere DMI vejrobservationer 1958-2017 fra Tórshavn, Færøerne, som er tilgængelige for offentligheden. Dataserien er vedhæftet.

1. Introduction

Before 2014 the Danish Meteorological Institute has not previously published weather observations from Tórshavn, but large parts of this dataset have primarily been used for research and educational purposes and as background for data analysis as in The Faroe Islands climatological standard normal (DMI Technical Report 98-14 [1]) and the DMI historical climate data collection – the Faroe Islands (latest report DMI Report 18-05 [4]).

By publishing the DMI Technical Report 14-09 [2] weather observation from Tórshavn in the period 1953-2013 for the first time became accessible to the public.

A comprehensive quality control has been applied to the whole dataset and erroneous data were removed. It must be stressed that the data series in question not at all have been tested for homogeneity nor homogenized.

Because of a new data structure, that DMI recently introduced, the data from 2014 was processed in a new format and DMI Technical Reports 14-09 with data up to 2013 then finished the “old” data format.

The “new” data format was for the first time introduced in DMI Technical Reports 15-09 [3]. The purpose of this report is to update the Faroe weather observation datasets with quality controlled 2017 data in the new data format, but also include the old data format from 1953-2013. A description of both data formats is included. It is up to the users of the data to compile the two data sets.

One station, Tórshavn, with 10 parameters is included in the “old” dataset. One station, Tórshavn, with 17 parameters is included in the “new” dataset.

A similar report with weather observations from Greenland 1958-2017 can be found in DMI Report 18-08 [5].

2. Description of the data

2.1 Synoptic stations

Synoptic stations at the Faroe Islands such as Tórshavn 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.

Time stamps
The station Tórshavn included in the dataset is a synoptic station. Synoptic stations (or SYNOP-station) all over the world follow at least a 3-hour interval (00, 03, 06, 09, 12, 15, 18 and 21 hours UTC).

Since 1 December 1992 an introduction of 1-hour interval began (00, 03, 06, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 22, 23 hours UTC. Since 16 March 1995 observations 04 and 05 hours UTC were added. Since 1 November 1998 observations every whole hour UTC the clock around can be found.

Synoptic stations always follow the same guidelines[1]. In Appendix 2 it is indicated which observations from Tórshavn are 3-hourly or 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 Tórshavn dataset are given in table 1 and 2.

Station identification
The official WMO station identifiers describing synoptic stations at The Faroe Islands consist of 5 digits, always starting with 06. However, in the old data series the in front “0” is omitted, giving 4 digits i.e. 6011 for Tórshavn.

In the new data format “00” is added to all station identifiers, so they consist of 6 digits i.e. 601100 for Tórshavn.

2.2 Stations and data series

The position of the weather station Tórshavn can be seen in figure 1. The station details and its coordinates are furthermore listed in appendix 1.

A complete visual overview of the “old” data series can be seen in Appendix 2, where all parameters 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 the station 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 “old” data series Tórshavn 1953-2013 are identical to the one in DMI Technical Report 14-09 [2] data. Please notice, that compared to earlier published similar datasets, minor changes may be

[1] See more at http://www.wmo.int (WMO - World Meteorological Organization)

found. This can be related to the ongoing quality control of data.

The “new” data series Tórshavn (V98) from 2014 has no similar visual overview. The station has ideally all data connected to the specific type of station (see table 2 and Appendix 1):

- **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 continuously.

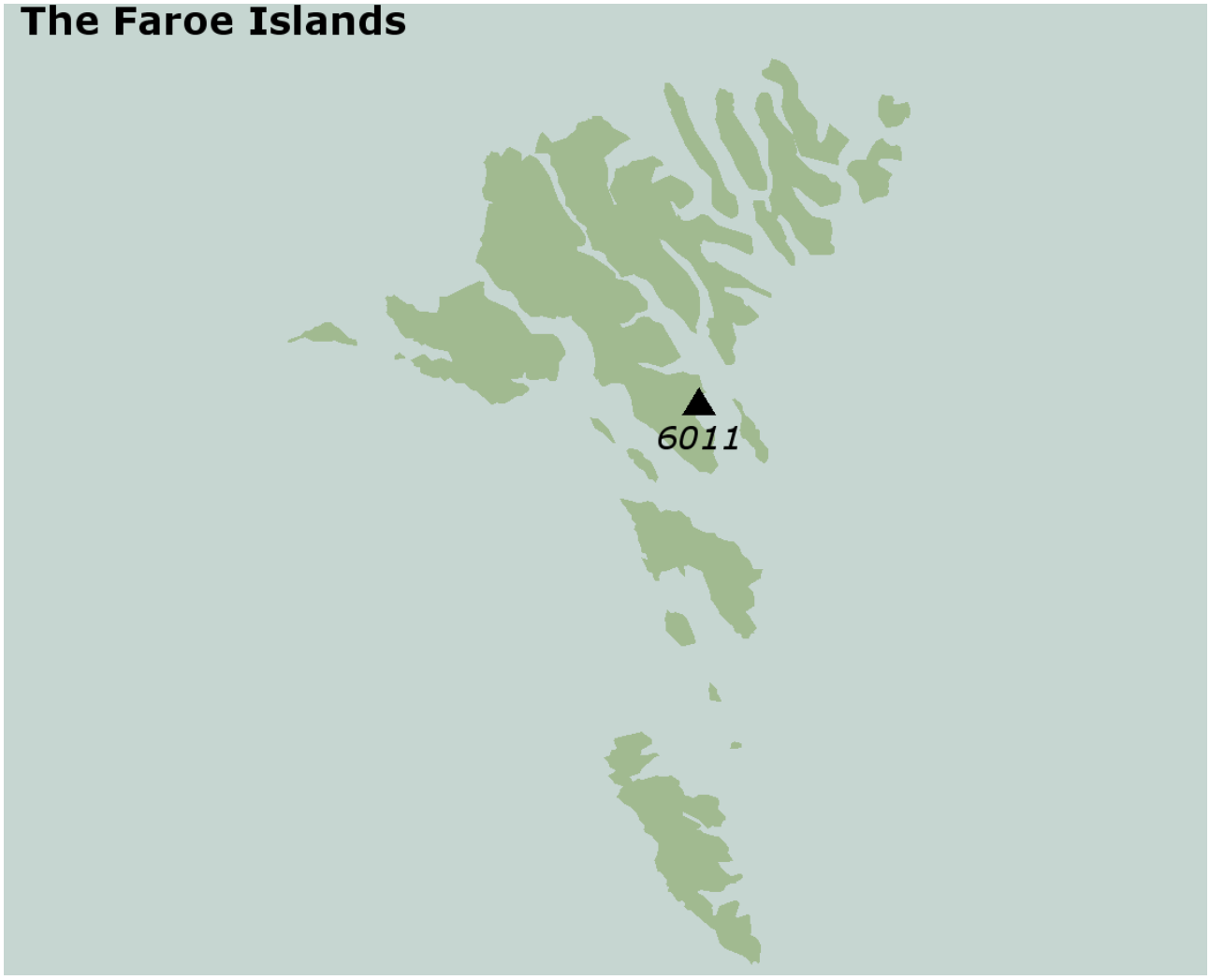

Figure 1. *Station position, 06011 Tórshavn, The Faroe Islands. The official WMO station number for Tórshavn consist of 5 digits “06011”. On the map the station identifier “6011” is used for Tórshavn. This identifier is used in the “old” data sets before 2014. In the “new” data sets “00” is added to all station identifiers, so they consist of 6 digits i.e. 601100 for Tórshavn.*

3. Data format 1953-2013

Data can be found in one ZIP-compressed file attached to this report. The ZIP-file contains 2 files representing all data from one station Tórshavn. The "old" data series is available as one tabulator separated txt-file: *DMIRep18-09_old_dataformat_1953_2013.txt*. All time stamps are given in UTC. Each column in the txt-files has a header, which is described in table 1.

Headers in synoptic data series-files

Parameter	Description
stat_no	4 digit station number in the format '6011'
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. 990 applies to variable wind directions
ff	Mean wind speed (0.1 m/s) over the 10-minute period preceding the observation
n	Cloud cover (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 (0.1 hPa) at mean sea level
ttt	Dry bulb temperature (0.1°C)
txtxtx	Absolute maximum temperature (0.1°C). Observation period depends on the interval of SYNOP time intervals, normally 12 hours at 6 and 18 hours UTC
tntntn	Absolute minimum temperature (0.1°C). Observation period depends on the interval of SYNOP time intervals, normally 12 hours at 6 and 18 hours UTC
rh*	Relative humidity (%)
rrr6	6, 12 or 24 hours accumulated precipitation (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 (cm). 997 applies to less than 0.5 cm. 998 applies to snow cover not continuous

Table 1. *Description of parameters in the synoptic data series (old data format). Resolution 1 to 24 hours. Parameters given in 0.1-values (ff, pppp, ttt, txtxtx, tntntn, 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.***

Note * Relative humidity:

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

Note ** Snow depth:

1) 6011 Tórshavn has observed snow depth in the period 18 January 1955 12UTC – 9 April 2006 06UTC. The observations are however sparse and some observations have been changed (not excluded) in this report, when it was evident, that it should have been divided by 10. For a more continuous series of snow depth very near to Tórshavn, please check the climate station 33060 Hoyvik in different yearbooks [5] or in the DMI climate database.

4. Data format 2014-

The “new” data series is available as a csv-file (; separated) and are found in the file: *DMIRep18-09_new_dataformat_2014_2017.csv* in the ZIP-compressed file attached to this report. All time stamps are given in UTC. Each parameter in the csv-file has a header, which is described in table 2.

Headers in synoptic data series-files

Parameter	Description
Station	6 digit station number in the format ‘601100’
År	Year of observation
Måned	Month of observation
Dag	Day of observation
Time (utc)	Hour of observation (UTC)
101	Mean air temperature (°C; 2 metres above ground). Mean of drybulb temperatures last hour. If not available, drybulb temperature (°C); minute = 0. Time resolution 1 hour. V98.
112	Absolute maximum temperature (°C; 2 metres above ground). Absolute maximum temperature last hour. V98.
113	Absolute maximum temperature (°C; 2 metres above ground). Absolute maximum temperature last 12 hours. V98.
122	Absolute minimum temperature (°C; 2 metres above ground). Absolute minimum temperature last hour. V98.
123	Absolute minimum temperature (°C; 2 metres above ground). Absolute minimum temperature last 12 hours. V98.
201	Mean relative humidity (%). Mean of relative humidity last hour. If not available, relative humidity; minute = 0. Time resolution 1 hour. V98.
301	Mean wind speed (m/s; 10 metres above ground) observed last 10 min; minute = 0. Time resolution 1 hour. V98.
305	Highest 3 sec. wind speed (m/s; 10 metres above ground) last hour. If not available, highest 3 sec. wind speed (m/s) observed last 10 min. V98.
365	Mean wind direction (degrees; 10 metres above ground) observed last 10 min; minute = 0. 0 applies to calms. Time resolution 1 hour. V98.
371	Mean wind direction (degrees; 10 metres 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.
401	Air pressure (hPa) at mean sea level; minute = 0. V98.
504	Accumulated sunshine duration (hours) last hour. V98.
550	Mean incoming (global) radiation (W/m^2) last hour. V98.
601	Accumulated precipitation (mm; about 3 metres above ground) last hour. V98.
603	Accumulated precipitation (mm; about 3 metres above ground) last 12 hours. V98.
609	Accumulated precipitation (mm; about 3 metres above ground) last 24 hours. V98.
801	Cloud cover (%); minute = 0. Observations of obscured sky are converted to overcast if possible using additional weather information, otherwise cloud cover is missing. V98.

Table 2. *Description of parameters in the synoptic data series (new data format). Resolution from 1 to 24 hours. All parameters given with one decimal except 201, 365, 371, 550 and 801.*

5. Differences between “old” and “new” data format

In the table below differences between parameters in the “old“ and “new” data format can be seen. See also table 1 and 2.

Parameter	Data description 1953-2013	Data description 2014 -
ttt/101	Drybulb temperature (0.1°C) 2 metres above ground. Observed minute = 0. Time resolution 1, 3 or more hours.	Mean air temperature (°C; 2 metres above ground). Mean of drybulb temperatures last hour. If not available, drybulb temperature (°C) observed minute = 0. Time resolution 1 hour. V98.
/112	NA	Absolute maximum temperature (°C; 2 metres above ground). Absolute maximum temperature last hour. V98.
txtxtx/113	Absolute maximum temperature (0.1°C) 2 metres above ground. Observation period depends on the interval of SYNOP time intervals, normally 12 hours at 6 and 18 hours UTC.	Absolute maximum temperature (°C; 2 metres above ground). Absolute maximum temperature last 12 hours. V98.
/122	NA	Absolute minimum temperature (°C; 2 metres above ground). Absolute minimum temperature last hour. V98.
tntntn/123	Absolute minimum temperature (0.1°C) 2 metres above ground. Observation period depends on the interval of SYNOP time intervals, normally 12 hours at 6 and 18 hours UTC.	Absolute minimum temperature (°C; 2 metres above ground). Absolute minimum temperature last 12 hours. V98.
rh/201	Relative humidity (%). Observed minute = 0. Time resolution 1, 3 or more hours.	Mean relative humidity (%). Mean of relative humidity last hour. If not available, relative humidity observed minute = 0. Time resolution 1 hour. V98.
ff/301	Mean wind speed (0.1 m/s) over the 10-minute period preceding the observation.	Mean wind speed (m/s; 10 metres above ground) observed last 10 min.; minute = 0. Time resolution 1 hour. V98.
/305	NA	Highest 3 sec. wind speed (m/s; 10 metres above ground) last hour. If not available, highest 3 sec. wind speed (m/s) observed last 10 min. V98).
dd/365	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.	Mean wind direction (degrees; 10 metres above ground) observed last 10 min.; minute = 0. 0 applies to calms. Time resolution 1 hour. V98.
/371	NA	Mean wind direction (degrees; 10 metres 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.
pppp/401	Air pressure (0.1 hPa) at mean sea level. Time resolution 1, 3 or more hours.	Air pressure (hPa) at mean sea level; minute = 0. V98.
/504	NA	Accumulated sunshine duration (hours) last hour. V98.
/550	NA	Mean incoming (global) radiation (W/m^2) last hour. V98.

/601	NA	Accumulated precipitation (mm; about 3 metres above ground) last hour. V98.
rrr6*/603	6, 12, 18 or 24* hours accumulated precipitation (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.	Accumulated precipitation (mm; about 3 metres above ground) last 12 hours. V98.
rrr6*/609	6, 12, 18 or 24* hours accumulated precipitation (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.	Accumulated precipitation (mm; about 3 metres above ground) last 24 hours. V98.
tr	Period covered in rrr24 (hours). Could be more than 24 hours i.e. 48, 76 hours etc.	NA (not necessary)
n/801	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.	Cloud cover (%); minute = 0. Observations of obscured sky are converted to overcast if possible using additional weather information, otherwise cloud cover is missing. V98.
sss*	Snow depth (cm). 997 applies to less than 0.5 cm. 998 applies to snow cover not continuous.**	NA**

Table 3. *Differences between the "old" and "new" data format.*

***when stations were manually operated back in time both 6 hours, 12, 18 and 24 hours acc. precipitation could occur in parameter rrr6. At automatic DMI stations normally accumulated precipitation at 6 and 18 hours UTC cover 12 hours in parameter rrr6; 0 and 12 hours UTC cover 6 hours in parameter rrr6.*
*** snow observations not a part of the observation plan in Tórshavn the last at least 10 years. Parameter not defined in the "new" data format.*

References

[1] Cappelen, J. & Laursen, E.V. (1998): The Climate of the Faroe Islands – with Climatological Standard Normals, 1961-1990. DMI Technical Report 98-14. Copenhagen.

[2] Cappelen, J. (ed) (2014): Weather observations from Tórshavn 1953-2013 – Observation data with description. DMI Technical Report 14-09. Danish Meteorological Institute. Copenhagen.

[3] Cappelen, J. (ed) (2015): Weather observations from Tórshavn 1953-2014 – Observation data with description. DMI Technical Report 15-09. Danish Meteorological Institute. Copenhagen.

[4] Cappelen, J. (ed) (2018): The Faroe Islands – DMI Historical Climate Data Collection 1873-2017. DMI Report 18-05. Danish Meteorological Institute. Copenhagen.

[5] Cappelen, J. (ed) (2018): Weather observations from Greenland 1958-2017 – Observation data with description. DMI Report 18-08. Danish Meteorological Institute. Copenhagen.

[6] 1873-1983 “Meteorologisk Årbog”
From the start of the institute year books have been published with varying content and size. A principal rule is that these publications contain descriptions, surveys and observations. The Faroe Islands is included in the following parts of “Meteorologisk Årbog”:

1873	Joint volume: Denmark, Greenland and the Faroe Islands, supplement 1868-1872
1874-1919	Part 2 (The Faroe Islands, Greenland and other colonies)
1920-1960	Part l (Denmark and The Faroe Islands) + Part 2 (Greenland)
1961-1970	Part 1 (Denmark and The Faroe Islands)
1971-1975	Not published
1976	Part 1 (Denmark and The Faroe Islands)
1977-1978	Not published
1979-1983	Part 1 (Denmark and The Faroe Islands)

1872-1895 *”Meteorologiske Middeltal og Ekstremer for Færøerne, Island og Grønland. Appendix til det danske meteorologiske Instituts Aarbog 1895, II.del”, published 1899*
Additionally a joint volume for the years 1872-1895 was published in 1899.

1940-1945 *Meteorologisk Årbog - Tillæg - Færøerne 1940-45*
Additionally a joint volume for the years 1872-1895 was published in 1899.

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 - FI: The Faroe Islands.

	Owner	Time of operation		Latitude N		Longitude W		Elevation
		start	stop	degrees	minute	degrees	minute	m.a.s.
06011 Tórshavn	FI/V98	01-01-1953 01-07-1962 01-01-1993	30-06-1962 31-12-1992	62 62 62	01 01 01	06 06 06	46 46 46	35 43 54

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Appendix 2 – Overview of data series 06011 Tórshavn 1953-2013