

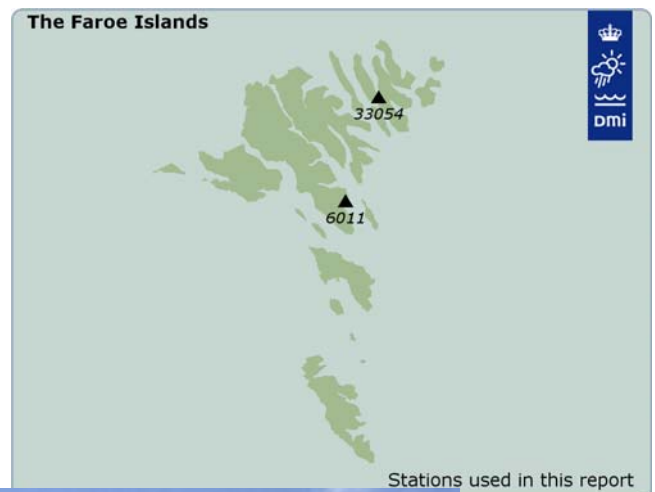


## Technical Report 12-05

# The Faroe Islands - DMI Historical Climate Data Collection 1873-2011

-with Danish Abstracts

John Cappelen (ed)





# Colophon

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**Important note:**

This report is an annual update (2011 data) of the “DMI observational, monthly and annual Faroe Islands climate data collection” published for the first time in that form in 1) DMI Technical Report 08-05: DMI Daily Climate Data Collection 1873-2007, Denmark, The Faroe Islands and Greenland - including Air Pressure Observations 1874-2007 (WASA Data Sets). Copenhagen 2008 [8], 2) Technical Report No. 03-26: DMI Monthly Climate Data Collection 1860-2002, Denmark, The Faroe Island and Greenland. An update of: NACD, REWARD, NORDKLIM and NARP datasets, Version 1. DMI Copenhagen 2003 [20] and 3) DMI Technical Report 05-06: DMI annual climate data collection 1873-2004, Denmark, The Faroe Islands and Greenland - with Graphics and Danish Abstracts. Copenhagen 2005 [7].

**Front Page:**

Photo: Jens Juncher Jensen.



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## **Abstract**

This report contains the available DMI historical data collection 1873-2011 from the Faroe Islands, including observations (atmospheric pressure) and long monthly and annual series of station based data.

## **Resumé**

Denne rapport indeholder tilgængelige historiske DMI datasamlinger 1873-2011 fra Færøerne. Det drejer sig om observationer af lufttryk samt lange månedlige og årlige stationsdataserier.



## Preface

This report contains a DMI historical data collection 1873-2011 for The Faroe Islands, including long series of station based data comprising observations of atmospheric pressure plus monthly and annual values of selected parameters. A general description of the weather and climate at the Faroes is included [6].

This information has been published earlier in different DMI reports [9], [10], [11] and despite it is now published in one report it will be divided in sections covering the different data types. These sections can for that reason vary slightly in design.

Below is a survey of all the information from the Faroes you can find in this report and a map showing weather stations (present name and location) from where the data presented in this report comes from.

Data Collection	Products in the report	Page
Observation	<b>Section 1.3. Atmospheric pressure observations</b> , 1 station 6011 Tórshavn (1874-2011)	13
Monthly	<b>Section 2.3.1. Mean air temperature, mean of daily minimum and maximum temperatures and highest/lowest temperature, mean atmospheric pressure, accumulated precipitation, highest 24-hour precipitation, no. of days with snow cover and mean cloud cover</b> , 1 station: 6011 Tórshavn (1873-2011) <b>Section 2.3.2. Accumulated precipitation and highest 24-hour precipitation</b> , 1 station: 33054 Strond Kraftstation (1932-2011)	19
Annual	<b>Section 3.3. Mean air temperature, mean of daily minimum and maximum temperatures and highest/lowest temperature, mean atmospheric pressure, accumulated precipitation, highest 24-hour precipitation, no. of days with snow cover and mean cloud cover</b> , 1 station: 6011 Tórshavn (1873-2011)	28
	<b>Section 3.3. Accumulated precipitation and highest 24-hour precipitation</b> , 1 station: 33054 Strond Kraftstation (1932-2011)	28
	<b>Section 3.4. Mean air temperature; graph and values with gauss filtered values</b> , 1 station: 6011 Tórshavn (1873-2011)	28





Denne rapport indeholder en DMI historisk dataindsamling 1873-2011 for Færøerne. Det drejer sig om tilgængelige lange serier af stationsbaserede data, herunder observationer af lufttryk samt månedlige og årlige værdier af udvalgte parametre. En generel beskrivelse af vejr og klima på Færøerne er medtaget [6].

Datasamlingen er blevet offentliggjort tidligere i forskellige DMI rapporter [9], [10], [11], og på trods af det er nu offentliggjort i én rapport, vil den være opdelt i sektioner, der dækker de forskellige datatyper. Disse afsnit kan af denne grund variere lidt i design.

Nedenfor er en oversigt over tilgængelig klimainformation fra Færøerne, du kan finde i denne rapport samt et kort (ovenfor) over stationer (nuværende navn og placering), hvorfra denne rapports datamateriale kommer fra.

<b>Datasamling</b>	<b>Produkter i rapporten</b>	<b>Sidetotal</b>
<b>Observation</b>	<b>Sektion 1.3. Lufttryksobservationer, 1 station 6011 Tórshavn (1874-2011)</b>	<b>13</b>
<b>Måned</b>	<b>Sektion 2.3.1. Middel luft-, max- og min- temperatur samt højeste og laveste temperatur, middellufttryk, nedbørsum, max 24 t nedbørsum, antal snedækkedage og middelskydække, 1 station: 6011 Tórshavn (1873-2011)</b>  <b>Sektion 2.3.2. Nedbørsum og max 24 t nedbørsum, 1 station: 33054 Strond Kraftstation (1932-2011)</b>	<b>19</b>
<b>År</b>	<b>Sektion 3.3. Middel luft-, max- og min- temperatur samt højeste og laveste temperatur, middellufttryk, nedbørsum, max 24 t nedbørsum, antal snedækkedage og middelskydække, 1 station: 6011 Tórshavn (1873-2011)</b>	<b>28</b>
	<b>Sektion 3.3. Nedbørsum og max 24 t nedbørsum, 1 station: 33054 Strond Kraftstation (1932-2011)</b>	<b>28</b>
	<b>Sektion 3.4. Middeltemperatur som data og grafik med gauss-filtrede værdier: 1 station: 6011 Tórshavn (1873-2011)</b>	<b>28</b>



## History of stations used in the report

By convention a time series is named after the most recent primary station delivering the data. Here is presented an overview back in time of the positions and relocations and starting and (if any) closing dates of the stations used in this report. Also presented are any positions or relocations and starting and closing dates of other stations forming part of the series and therefore referred to in the description of the different data series in the report. More metadata on the series/station may be found in [21]. The information can also be found in a text file attached to this report, see page 8.

### 6011 Tórshavn

No.	Name	Start	End	Type	UTM	Northings	Eastings	Longitude	Latitude	Elev.
33071	Tórshavn skole	01-JAN-1871	31-DEC-1871	clima_man	29V	6877520	616750	-64600	620100	9
33071	Tórshavn skole	01-OCT-1872	31-JUL-1907	clima_man	29V	6877520	616750	-64600	620100	9
33071	Tórshavn skole	01-AUG-1907	31-MAR-1925	clima_man	29V	6877560	616920	-64600	620100	24
33060	Hoyvik	01-JUN-1921	31-DEC-1981	clima_man	29V	6879770	617460	-64500	620200	20
33060	Hoyvik	01-FEB-1983	31-MAR-1983	clima_man	29V	6879770	617460	-64500	620200	20
33100	Vagur	01-NOV-1903	30-NOV-1922	precip_man	29V	6817750	616350	-64900	612800	15
33100	Vagur	02-JUN-1999	01-OCT-2011	precip_man	29V	6817549	619270	-64500	612800	43
6011	Tórshavn	01-JAN-1953	30-JUN-1962	synop_dk	29V	6878110	616530	-64600	620100	35
6011	Tórshavn	01-JUL-1962	31-DEC-1992	synop_dk	29V	6878170	616530	-64600	620100	43
6011	Tórshavn	01-JAN-1993		synop_dk	29V	6879010	617080	-64600	620100	54

### 33054 Strond Kraftstation

This station was selected as a supplement to the precipitation series of Tórshavn. The Tórshavn precipitation series is not characteristic for the more extreme amounts of precipitation received at the Faroe Islands whereas Strond Kraftstation held the 24 hours record for the period 1961-1990.

No.	Name	Start	End	Type	UTM	Northings	Eastings	Longitude	Latitude	Elev.
33054	Strond Kraftstation	01-MAR-1931	30-JUN-1981	precip_man	29V	6906290	625480	-63500	621600	10
33054	Strond Kraftstation	01-JUL-1981	30-JUN-1983	precip_man	29V	6906250	625440	-63500	621600	4
33054	Strond Kraftstation	01-JUL-1983	27-MAY-1987	precip_man	29V	6906315	625435	-63500	621600	8
33054	Strond Kraftstation	28-MAY-1987	01-JAN-2006	precip_man	29V	6906335	625430	-63500	621600	6
33020	Fossaverkid	01-FEB-1960	01-JAN-2006	precip_man	29V	6892955	596540	-70900	620900	2
33037	Hvalvik	01-JUN-1921	28-FEB-1930	clima_man	29V	6896770	602305	-70200	621100	14
33037	Hvalvik	01-JAN-1987	01-APR-2009	precip_man	29V	6896770	602305	-70200	621100	14
33045	Hellur	01-JUN-1987	01-JAN-2006	precip_man	29V	6905115	611100	-65200	621600	11
33051	Kirkja	01-MAY-1873	31-AUG-1874	clima_man	29V	6912765	639150	-61900	621900	44
33051	Kirkja	01-MAR-1879	30-JUN-1880	clima_man	29V	6912815	639110	-61900	621900	49
33051	Kirkja	01-JUL-1987	01-MAY-1999	clima_man	29V	6912895	638960	-61900	621900	53
33051	Kirkja	02-MAY-1999	01-JAN-2006	precip_man	29V	6912895	638960	-61900	621900	53
33060	Hoyvik	01-JUN-1921	31-DEC-1981	clima_man	29V	6879770	617460	-64500	620200	20
33060	Hoyvik	01-FEB-1983	31-MAR-1983	clima_man	29V	6879770	617460	-64500	620200	20
33070	Tórshavn	21-SEP-1906	09-JUL-1907	clima_man	29V	6877720	616570	-64600	620100	20
33070	Tórshavn	23-APR-1908	30-JUN-1916	clima_man	29V	6877720	616570	-64600	620100	20
33070	Tórshavn	01-JUL-1916	30-JUN-1922	clima_man	29V	6878110	616530	-64600	620100	35
33070	Tórshavn	01-JUL-1930	31-JAN-1942	clima_man	29V	6878110	616530	-64600	620100	35
33070	Tórshavn	01-FEB-1943	31-DEC-1948	precip_man	29V	6878110	616530	-64600	620100	35
33080	Nolsoy Fyr	01-APR-1955	30-NOV-1995	precip_man	29V	6872000	625100	-63600	615700	80
33090	Sandur	01-APR-1873	31-JAN-1877	clima_man	29V	6858140	614800	-64900	615000	34
33090	Sandur	01-SEP-1877	31-MAY-1879	clima_man	29V	6858140	614800	-64900	615000	34
33090	Sandur	01-JAN-1881	31-MAY-1885	clima_man	29V	6858650	614730	-64900	615000	9
33090	Sandur	01-MAR-1904	29-FEB-1908	clima_man	29V	6860810	614390	-65000	615200	16
33090	Sandur	01-NOV-1912	31-DEC-1916	clima_man	29V	6858140	614800	-64900	615000	34
33090	Sandur	01-JUN-1921	31-AUG-1940	clima_man	29V	6860810	614390	-65000	615200	16
33090	Sandur	01-JUN-1956	31-DEC-1970	clima_man	29V	6858897	615363	-64900	615100	10
33090	Sandur	01-JAN-1973	01-JAN-1997	clima_man	29V	6858897	615363	-64900	615100	10
33090	Sandur	01-JAN-1971	31-OCT-1971	precip_man	29V	6858897	615363	-64900	615100	10
33090	Sandur	01-FEB-1972	31-DEC-1972	precip_man	29V	6858897	615363	-64900	615100	10
33090	Sandur	02-JAN-1997	07-SEP-2002	precip_man	29V	6858895	615362	-64900	615100	10
33090	Sandur	08-SEP-2002	01-OCT-2007	precip_man	29V	6858893	615361	-64900	615100	9



## File formats; Station position file

A station file included in this report contains the digitised information on the station positions and thereby on any removals of the stations during the operation period.

The file name is:

### **fr\_station\_position.dat**

Format of the station position fixed format text file:

<b>Position</b>	<b>Format</b>	<b>Description</b>
1-5	F5.0	Station number
6-35	A30	Station name
36-45	A10	Station type (synop_dk = part of WMO synoptic net, clima_man = manual climate station, precip_man = manual precipitation station)
46-56	Date11	Start date (dd-mmm-yyyy)
57-67	Date11	End date (dd-mmm-yyyy)
68-70	A3	UTM zone
71-81	F11.0	Eastings
82-92	F11.0	Northings
93-98	F6.0	Elevation (metres above mean sea level)
99-109	F11.0	Latitude, degrees N (dddmmss)
110-120	F11.0	Longitude, degrees E (dddmmss)

Data are only to be used with proper reference to the accompanying report: Cappelen, J. (ed), 2012: The Faroe Islands - DMI Historical Climate Data Collection 1768-2011 – with Danish Abstracts. DMI Technical Report 12-05. Copenhagen.





## Weather and climate in general; The Faroe Islands

The Faroe Islands (Føroyar) are situated at approximately latitude 62° N, longitude 7° W and consist of 18 small, hilly islands. The islands have a total area of 1399 km<sup>2</sup>, and extend 113 km from north to south and 75 km from east to west. The highest elevations, reaching nearly 890 m above sea level are found in the northern islands.

The climate in the Faroe Islands is greatly influenced by the warm Gulf Stream and by the passage of frequent cyclones, which arrive from the south and west depending on the position of the polar frontal zone. Consequently the climate is humid, unsettled and windy, with mild winters and cool summers.

The Azores High is sometimes displaced towards the islands, in which case settled summer weather with fairly high temperatures may prevail for several weeks. During the winter time the course of the lows may be more southerly than normal, in which case cold air from the north dominates the weather. This situation may cause sunny weather with an unusually high frequency of days with frost and also snowfall. The latter occurs in conjunction with the build up of showers in the cold air above the relatively warm sea water. The northern part of the islands particularly almost always experiences wintry weather with snow or frost for a prolonged period during the winter time - occasionally some of the fiords freeze over with a thin layer of ice.

The maritime climate is also influenced by the bifurcation of the East Iceland current (polar current), a branch of which is directed from eastern Iceland towards the Faroes. This sea current flows round the Faroe Islands in a clockwise direction. The mixing of the water masses causes a relatively large difference in the sea temperatures to the north and to the south or south west of the Faroe Islands as well as local variations in sea surface temperatures.

The cooling of humid air masses by the cold sea water is a contributory cause of frequent fog in June, July and August.

The precipitation pattern reflects the topography of the islands, the precipitation being smallest near the coastal areas and rising to a peak at the centre of the hilliest islands. Nearly all coastal areas receive around 1000 mm per year, rising to above 3000 mm in the central parts. Investigations [16] have shown that some places receive more than 4000 mm. This precipitation distribution is attributable to both topographical and meteorological conditions. The topographical orographic precipitation occurs in conjunction with lows moving east and north east. The land lifts the air masses, leading to a discharge of precipitation. The amount and intensity of the precipitation are of course also determined by the wind speed and the instability of the air.

Being close to the common cyclone tracks in the North Atlantic region the islands have a windy climate. The air in the lower atmosphere is affected by the hilly islands, causing considerable local winds, as a result from stowing, channelling and turbulence. This and the fact that the sea currents between the islands are very strong, sometimes causes navigational problems for ships. The turbulence in the mountain regions also causes problems for air traffic.

Intensive cyclone developments frequently give unstable weather, especially in autumn and winter. Drops in atmospheric pressure of about 20 hPa in 24 hours occur in nearly all months but sometimes the pressure falls more rapidly - occasionally more than 80 hPa in 24 hours - and such situations cause very high wind speeds and considerable damages all over the islands.



# 1. Observational Section: Historical DMI Data Collec- tion

Data Collection	Products in the report	Page
Observation	Section 1.3. Atmospheric pressure observations, 1 station 6011 Tórshavn (1874-2011)	13



Datasamling	Produkter i rapporten	Sidetæl
Observation	Sektion 1.3. Luftryksobservationer, 1 station 6011 Tórshavn (1874-2011)	13



Latest earlier report:

[11] Cappelen, J. (ed), 2011: DMI Daily Climate Data Collection 1873-2010, Denmark, The Faroe Islands and Greenland - including Air Pressure Observations 1874-2010 (WASA Data Sets). DMI Technical Report No. 11-06.

## 1.1. Introduction

The purpose of this section is to publish one mean sea level atmospheric pressure data series from Tórshavn, The Faroe Islands (*observations*) covering the period 1874-2011 as can be seen in table 1.2.1.

According to the intentions to update regularly, preferably every year, this section contains an update (2011 data) of one Faroe Islands mean sea level atmospheric pressure series from Tórshavn originally published in DMI Technical Report 97-3: North Atlantic-European pressure observations 1868-1995 - WASA dataset version 1.0 [25].

As part of a former project called WASA, selected DMI series of atmospheric pressure observations from Denmark, Greenland and the Faroe Islands 1874-1970 on paper were digitised. The pressure observations were digitised from the meteorological yearbooks, which means that the observations were station level data corrected for index error, temperature and, since 1893, gravity. From 1971 the pressure data were taken from the DMI Climate Database. The WASA project was originally titled: “The impact of storms on waves and surges: Changing climate in the past 100 years and perspectives for the future” [26].

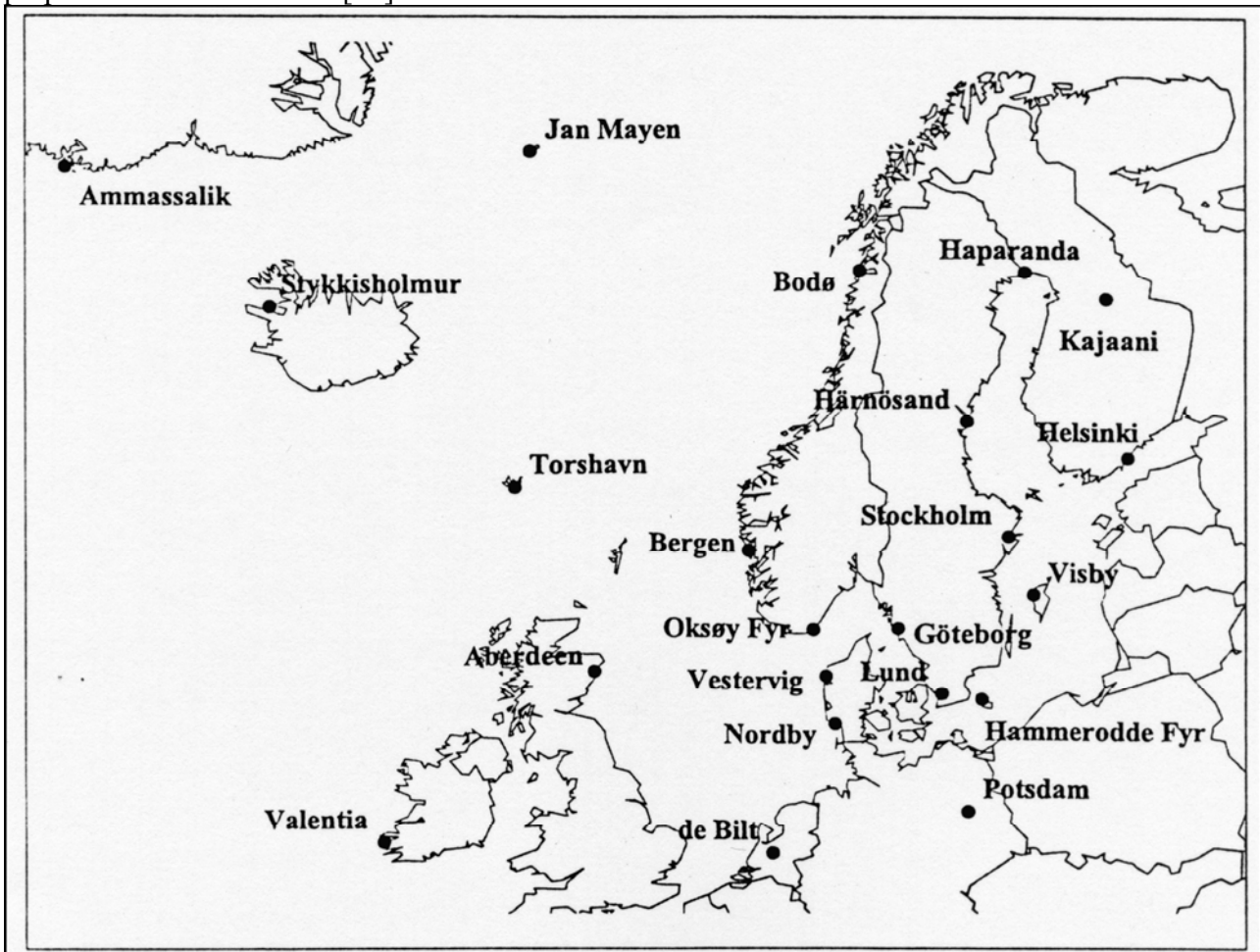


Figure 1.1.1. Location of the stations that originally provided atmospheric pressure observations to the WASA pressure data set [25]. In this chapter the updated Faroe series Tórshavn is presented. The station representing this site is listed in the table 1.2.1. For station co-ordinates confer with the station position file in the data files included in this report. Pressure data sets from Denmark (three sites) and Ammassalik/Tasiilaq, Greenland are presented in the representative historical Climate Data Collection; DMI Technical Report 12-02 [13]) and DMI Technical Report 12-04 [14]).



Climate change studies and the related analysis of observed climatic data call for long time series of climate data on all scales, but please note that the digitisation of the observations of atmospheric pressure only can be considered as the first step towards sensible utilisation of the observations for climate change studies. Next follows testing for homogeneity of the series, ensuring that any discovered trend are natural.

During the WASA project the data have been homogenised. The updated series presented in this chapter has been tested and corrected carefully, mainly based on visual tests. Thus it must be stressed that the updated atmospheric pressure data after the WASA project consist of the values *as observed*, and that no final testing for homogeneity has been performed on these observations for the whole period up to now. They are therefore not necessarily homogenized as such and this should be considered before applying the data series for climate research purposes.

For the benefit of scientists that may wish to conduct such testing various results and remarks concerning observational pressure data have been included in the report. For supplementary meta-data, see also [21].

The mean sea level atmospheric pressure data set from Tórshavn, The Faroe Islands can be downloaded from the publication part of DMI web pages.



*Formålet med denne sektion er at publicere en tilgængelig dataserie af observationer af lufttryk (msl) fra Tórshavn, Færøerne 1874-2011. Dataseriens detaljer kan ses i tabel 1.3.1 i afsnit 1.3 og filformat af den medfølgende fil kan ses i afsnit 1.4.*

## 1.2. Stations and parametres

### 1.2.1. Station Overview

	Country	Station	Station number	First year
1	FR	Tórshavn	6011 <sup>1)</sup>	1874

Table 1.2.1 Primary stations used in this report.

<sup>1)</sup> Before 1958 the observations were taken from 33060 Hoyvik and before 1925 from 33071 Tórshavn Skole, see table 1.3.1.

The stations have been relocated several times since the start, new station numbers and names have been attached, new instruments and new observers have been introduced. The latter have obviously been replaced many times. See the station history in the chapter “History of stations used in the report”.

### 1.2.2. Data Dictionary

Abbr.	Element	Method	Unit
pppp	Atmospheric pressure (MSL)	obs	0,1 hPa

Table 1.2.2. Elements used in this section. ‘Method’ specifies that the element is an observation. The units of the observation values in the data files are specified in ‘Unit’.

## 1.3. Atmospheric pressure observations; Tórshavn – 6011; 1874-2011

The atmospheric pressure measurements started 1874 at a national climate station Tórshavn Skole, continued from 1925 in Hoyvík. Measurements of atmospheric pressure were stopped at this manually operated climate station in 1983. In the 1950s atmospheric pressure measurements were also started at a synoptic station in Tórshavn. In the WASA project the data were merged into a long homogeneous series and the table 1.3.1 indicates how the stations were merged and how many observations the series contains in the different parts.

Site and period	Station	Start	End	Obs. Hours (utc)
<b>Tórshavn 1874-2011</b>	33071 Tórshavn Skole	01 January 1874	31 March 1925	8,14,21
	33060 Hoyvík	01 November 1925	31 December 1957	8,14,21
	6011 Tórshavn	01 January 1958	01 January 1993	0,3,6,9,12,15,18,21
	6011 Tórshavn	01 January 1993	31 December 2011	0 – 23 every hour

Table 1.3.1. The Tórshavn series of atmospheric pressure observations (at MSL, mean sea level).



## 1.4. File Formats; Observation data files

An observation file included in this report contains mean sea level (MSL) atmospheric pressure observations from 6011 Tórshavn, The Faroe Islands.

The file name is determined as follows:

**fr\_obs\_<station number>\_pppp\_<period>.dat**

More specifically in this report:

**fr\_obs\_pppp\_6011\_1874\_2011.dat**

There **can** be missing dates/records/values between the start and the end date.

### **Format and units of the atmospheric pressure observation fixed format text file:**

<b>Position</b>	<b>Format</b>	<b>Description</b>
1-5	F5.0	Station number
6-9	F4.0	Year
10-11	F2.0	Month
12-13	F2.0	Day
14-15	F2.0	Hour (UTC)
16-20	F5.0	Atmospheric pressure reduced to MSL (0.1 hPa)

Data are only to be used with proper reference to the accompanying report: Cappelen, J. (ed), 2012: The Faroe Islands - DMI Historical Climate Data Collection 1873-2011 – with Danish Abstracts. DMI Technical Report 12-05. Copenhagen.

## 2. Monthly Section: Historical DMI Data Collection

Data Collection	Products in the report	Page
Monthly	<p><b>Section 2.3.1. Mean air temperature, mean of daily minimum and maximum temperatures and highest/lowest temperature, mean atmospheric pressure, accumulated precipitation, highest 24-hour precipitation, no. of days with snow cover and mean cloud cover, 1 station: 6011 Tórshavn (1873-2011)</b></p> <p><b>Section 2.3.2. Monthly accumulated precipitation and highest 24-hour precipitation, 1 station: 33054 Strond Kraftstation (1932-2011)</b></p>	19



Datasamling	Produkter i rapporten	Sidetæl
Måned	<p><i>Sektion 2.3.1. Middel luft-, max- og min- temperatur samt højeste og laveste temperatur, middelluftryk, nedbørsum, max 24 t nedbørsum, antal snedækkedage og middelskydække, 1 station: 6011 Tórshavn (1873-2011)</i></p> <p><i>Sektion 2.3.2. Nedbørsum og max 24 t nedbørsum, 1 station: 33054 Strond Kraftstation (1932-2011)</i></p>	19



Latest earlier report:

[10] Cappelen, J. (ed), 2011: DMI monthly Climate Data Collection 1768-2010, Denmark, The Faroe Islands and Greenland. DMI Technical Report No. 11-05.



## 2.1. Introduction

The purpose of this section is to publish available long *monthly* DMI data series 1873-2011 from the Faroe Islands. The data parameters include mean temperature, minimum temperature, maximum temperature, atmospheric pressure, accumulated precipitation, highest 24-hour precipitation, number of days with snow and cloud cover.

According to the intentions to update regularly, preferably every year, this section contains an update (2011 data) of the “DMI Monthly Climate Data Collection” published for the first time in that form in DMI Technical Report 03-26: DMI Monthly Climate Data Collection 1860-2002, Denmark, The Faroe Island and Greenland. An update of: NACD, REWARD, NORDKLIM and NARP datasets, Version 1, Copenhagen 2003 [20]. A similar collection of long DMI *annual* climate data series from the Faroe Islands can be found in section 3 in this report.

Some of the monthly data have over the years been published in connection with different Nordic climate projects like NACD (North Atlantic Climatological Dataset [18]), REWARD (Relating Extreme Weather to Atmospheric circulation using a Regionalised Dataset [17]), NORDKLIM (Nordic Co-operation within Climate activities, see NORDKLIM project homepage: [http://www.smhi.se/hfa\\_coord/nordklim/](http://www.smhi.se/hfa_coord/nordklim/)) and NARP (Nordic Arctic Research Programme, see NARP project homepage: <http://thule.oulu.fi/narp/pages/projects.htm>).

The original DMI Monthly Climate Data Collection published in DMI Technical Report 03-26 [20] was for that reason, besides a publication of a collection of recommended DMI long monthly data series 1860-2002, also an revision/update of the NACD, REWARD, NORDKLIM and NARP datasets with a clarification on what has been done with the data previously. The method used in this clarification was based on 3 different datasets:

- 1) **Recommended** - a collection of DMI recommended well-documented data series.
- 2) **Observed** - based strictly on raw observations, which have to fulfil certain criteria in terms of frequency etc., in order for arithmetic means, maximums, minimums etc. to be calculated depending on the parameter. These dataset acts as a baseline, since many of the time-series previously published represent adjusted data, which are not very well documented.
- 3) **Previous** - represents the time-series generated earlier primarily in connection with NACD and REWARD. These time-series are quite complete for the period 1890 – 1995 and many holes have been filled compared to the observed dataset.

The revision/update of those datasets is considered done with the DMI Technical Report 03-26 [20].

**Therefore only already published recommended DMI monthly data series with relevant updates/corrections will be included in this and the coming reports comprising DMI Monthly Data Collections from the Faroe Islands.**

The monthly data sets can be downloaded from the publication part of DMI web pages.





## Special remarks:

In the following chapters the reference “NARP1” refers to the “NARP dataset version 1”, see [20].

The time series referred to in this section have been constructed by specific persons. Their names and initials/abbreviations are: John Cappelen (JC) and Ellen Vaarby Laursen (EVL).

Time series are referred to by their creator (abbreviations seen above) and the number they have in the internal DMI time series classification.

Therefore, time series “, JC-TS1154” means a time series created by John Cappelen with number 1154 in the time series classification.

“Monthly\_db” refers to an internal DMI monthly database with monthly values of various weather parameters.

The reference “TR” refers to DMI Technical Reports. Therefore, “TR98-14” means DMI Technical Report 98-14 [6] available from:

<http://www.dmi.dk/dmi/index/viden/dmi-publikationer/tekniskerapporter.htm>

In this report months are referred to by year/month number (ex. 2000/03 = March 2000) and the minimum criteria used here for calculating a valid monthly value is that measurements from more than 21 days are present in that month, so the number of daily values are ranging 22-31.

During some of the former data projects (i.e. NACD) the data have been homogenised based on tests against neighbouring stations.

The updated series presented in this report have been tested and corrected carefully, mainly based on visual tests. Otherwise it is indicated if care should be taken when using the series.

Special care should be taken concerning most of the series with mean cloud cover. There are still problems to be solved in the data sets mainly due to the difficult character of the observation (visual) and the shift to automatic detection with a ceilometer starting approximately in the beginning of the new millennium. Care should also be taken in the case of series with number of days with snow cover, another visual parameter.



*Formålet med denne sektion er at publicere tilgængelige lange anbefalede månedlige DMI dataserier 1873-2011 fra Færøerne. Det omfatter middeltemperatur, minimumtemperatur, maksimumtemperatur, atmosfærisk tryk, nedbørsum, maksimal 24t nedbørsum, antallet af dage med sne og skydække. I afsnit 2.2 kan ses hvilke stationer og parametre, det drejer sig. Stationshistorien kan ses i afsnittet “History of stations used in the report”. I afsnit 2.3 er de enkelte seriers sammensætning beskrevet og endelig er filformatet af de medfølgende filer beskrevet i afsnit 2.4.*

## 2.2. Stations and parameters

### 2.2.1. Station Overview

	Country	Station	Station number	First year
1	FR	Tórshavn	6011 <sup>1)</sup>	1873
2	FR	Strond Kraftstation	33054	1932

Table 2.2.1 Primary stations used in this report.

<sup>1)</sup>The series are a combination of 6011 Tórshavn, 33060 Hoyvik and before that 33071 Tórshavn Skole, see chapter 2.3.1.

The stations have been relocated several times since the start, new station number and names have been attached, new instruments and new observers have been introduced. The latter have obviously been replaced many times. See the station history in the chapter “History of stations used in the report”.

### 2.2.2. Data Dictionary

Number	Abbr.	Element	Method	Unit
101	T	Mean temperature	Mean	0,1°C
111	Tx	Mean of daily maximum temperature	Mean	0,1°C
112	Th	Highest temperature	Max	0,1°C
121	Tn	Mean of daily minimum temperature	Mean	0,1°C
122	Tl	Lowest temperature	Min	0,1°C
401	P	Mean atmospheric pressure	Mean	0,1 hPa
601	R	Accumulated precipitation	Sum	0,1 mm
602	Rx	Highest 24-hour precipitation	Max	0,1 mm
701	DSC	No. of days with snow cover (> 50 % covered)	Sum	days
801	N	Mean cloud cover	Mean	%

Table 2.2.2. Elements used in this report. ‘Method’ specifies whether the element is a sum, a mean or an extreme. The units of the monthly values in the data files are specified in ‘Unit’. The DMI system of element numbers contains more than the shown elements. At the moment (2012) there are about 250 entries.



## 2.3. Description of monthly data series

### 2.3.1. Tórshavn (TORS) – 6011; 1873-2011

<b>Element No. 101 (Mean Temperature)</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1890 – 2011	NARP1 + EVL-TS353 + Monthly-db TORS 6011	1464	0
Details: Created using NARP1: 1890-1921, EVL-TS353: 1922-1997, monthly-db TORS 6011: 1998-2011. The original NACD series had many holes and corrections were done by comparison with 33060 Hoyvik. These holes were filled in TR98-14 (EVL-TS353).				

<b>Element No. 111 (Mean of Daily Maximum Temperature)</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1873 – 2011	NARP1 + EVL-TS361 + Monthly-db TORS 6011	1668	0
Details: Created using NARP1: 1873-1960, EVL-TS361: 1961-1990, monthly-db TORS 6011: 1991-2011. The months 1957/9+10+11+12 and 1973/11 months were filled using values from 33060.				

<b>Element No. 112 (Highest Temperature)</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1873 – 2011	NARP1 + EVL-TS368 + Monthly-db TORS 6011	1668	0
Details: Created using NARP1: 1873-1960, EVL-TS368: 1961-1990, monthly-db TORS 6011: 1991-2011. The months 1957/9+10+11+12 and 1973/11 months were filled using values from 33060.				

<b>Element No. 121 (Mean of Daily Minimum Temperature)</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1873 – 2011	NARP1 + EVL-TS375 + Monthly-db TORS 6011	1668	0
Details: Created using NARP1: 1873-1960, EVL-TS375: 1961-1990, monthly-db TORS 6011: 1991-2011. The months 1957/9+10+11+12 and 1973/11 months were filled using values from 33060.				

<b>Element No. 122 (Lowest Temperature)</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1873 – 2011	NARP1 + EVL-TS496 + Monthly-db TORS 6011	1668	0
Details: Created using NARP1: 1873-1960, EVL-TS496: 1961-1990, monthly-db TORS 6011: 1991-2011. The months 1957/9+10+11+12 and 1973/11 months were filled using values from 33060.				



## Tórshavn (TORS) – 6011 (continued)

<b>Element No. 401 (Mean Atmospheric Pressure)</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1890 – 2011	NARP1 + JC-TS1220 + Monthly-db TORS 6011	1464	7
Details: Created using NARP1: 1890-1960 (33060) reduced to mean sea level (see appendix 2.2), JC-TS1220: 1961-1990, monthly-db TORS 6011: 1991-2011. Missing: 1925/4-10.				

<b>Element No. 601 (Accumulated Precipitation) Not necessarily homogenous</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1890 – 2011	NARP1 + JC-TS1154 + Monthly-db TORS 6011	1464	2
Details: Created using NARP1: 1890-1921, JC-TS1154: 1922-1997, monthly-db TORS 6011: 1998-2011. Missing months 1957/9+10+11+12, 1971/8+9+10, 1972/11 & 1973/11 were filled using values from 33060. Missing months (2008/10 and 2008/11). 2009/11 has been corrected. In the period 14 – 24 November 2009 a total of 66,7 mm precipitation have been added. Data were taken from 33100 Vagur. 2 September 2006 an automatic raingauge was installed at 6011 Tórshavn. Not necessarily homogenous, because of new ways of detection.				

<b>Element No. 602 (Highest 24-hour Precipitation) Not necessarily homogenous</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1890 – 2011	NARP1 + JC-TS1166 + Monthly-db TORS 6011	1464	2
Details: Created using NARP1: 1890-1960, JC-TS1166: 1961-1990, monthly-db TORS 6011: 1991-2011. Missing months 1957/9+10+11+12, 1971/8+9+10, 1972/11 & 1973/11 were filled using values from 33060. Missing months (2008/10 and 2008/11). In the period 15 – 24 November 2009 a total of 66,7 mm precipitation have been added. Data are taken from 33100 Vagur. That had no effect on the highest 24 hour precipitation sum in 2009/11, because it was not found in that period. 2 September 2006 an automatic raingauge was installed at 6011 Tórshavn. Not necessarily homogenous, because of new ways of detection.				

<b>Element No. 701 (Number of days with Snow Cover)</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1939 – 2006	NARP1 + JC-TS1224 + Monthly-db TORS 6011	812	0
Details: Created using NARP1: 1939-1960, JC-TS1224: 1961-1990, monthly-db TORS 6011: 1991-2006/8. Missing months; 22 months (not listed here) were filled using values from 33060. Observations of snow cover were stopped 1 September 2006, when 6011 Tórshavn was changed to a full automatic station.				

<b>Element No. 801 (Cloud Cover) Not necessarily homogenous</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1890 – 2011	NARP1 + JC-TS532 + Monthly-db TORS 6011	1464	3
Details: Created using NARP1: 1890-1960, JC-TS532: 1961-1990, monthly-db TORS 6011: 1991-2011. Missing months 1957/9+10+11+12, 1973/11 were filled using values from 33060. 2009/6-8 could not be filled. 2 September 2006 a ceilometer for automatic detection of cloud cover was installed at 6011 Tórshavn. Not necessarily homogenous, because of the different ways of detection.				



### 2.3.2. Strond Kraftstation (STRO) – 33054; 1932-2011

<b>Element No. 601 (Accumulated Precipitation)</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1932 – 2005	JC-TS1161 + Monthly-db STRO 33054	888	0
<p>Details:            Created using monthly-db STRO 1932-1960, JC-TS1161: 1961-1999, monthly-db STRO 33054: 1991-2005. 1933/7 was filled using the average of 33060, 33070 &amp; 33090. 1977/3, 1982/8+9+10 were filled in JC-TS1161, see TR98-14 [6] for further details. Month 1991/5+6+11 were filled using a 5-year period regression against the average of stations 33020 and 33045 (<math>r^2=0.810</math>): <math>St.33054 = 0.9451 * (St.33020 + St.33045)/2</math>. This was an improvement compared to single station correlations (with 33020, 33037, 33045, 33051, 33080 and 33090). The station was closed 1 January 2006.</p>				

<b>Element No. 602 (Highest 24-hour Precipitation)</b>				
<i>Dataset</i>	<i>Period</i>	<i>Content</i>	<i>Total months</i>	<i>Missing months</i>
Recommended	1932 – 2005	JC-TS1172 + Monthly-db STRO 33054	888	4
<p>Details:            Created using monthly-db STRO 1932-1960, JC-TS1172: 1961-1999, monthly-db STRO 33054: 1991-2005. Missing: 1933/7, 2000/12, 2001/9-10. Months 1977/3 &amp; 1982/8+9+10 were filled in JC-TS1172, see TR98-14 [6] for further details. Months 1991/5+6+11, 2001/11+12 were filled using the same regression as for element 601. The station was closed 1 January 2006.</p>				



## 2.4. File formats; Monthly data files

The monthly files included in this report contain monthly DMI data series 1873-2011 comprising different parameters from 2 stations at the Faroe Islands.

The files are provided for each station, for each element, named by the 4-letter station abbreviation plus station number, element number and period.

The file names are determined as follows:

**fr\_monthly\_<station abbreviation>\_<station number>\_<element number>\_<period>.dat**

ex. *fr\_monthly\_tors\_6011\_101\_1873\_2011.dat* (all files are not listed here)

The fixed format text files consist of 3 columns: YEAR, MONTH, “VALUE”.

The units of “VALUE” can be seen in the data dictionary, table 2.2.2, in chapter 2.2.

### Special Remarks:

- 1) Months are referred to by year/month number (ex. 1981/03 = March 1981).
- 2) The minimum criteria used here for calculating a valid monthly value is that **measurements from more than 21 days** are present in that month, so the number of daily values are ranging 22-31.

**In addition a dataset containing all monthly data series is also available as both a fixed format text file, a Excel file and a csv file (; seperated) named: fr\_monthly\_all**

In the fixed format text file **fr\_monthly\_all.dat** each record contains:

Variable	Start	End	Format	Description
STAT_NO	1	5	F5.0	Station number (see section 2.2.1)
ELEM_NO	6	8	F3.0	Element number (see section 2.2.2)
YEAR	9	12	F4.0	Year
JAN	13	17	F5.0	Jan. value (units described in section 2.2.2)
FEB	18	22	F5.0	Feb. value (units described in section 2.2.2)
MAR	23	27	F5.0	March value (units described in section 2.2.2)
APR	28	32	F5.0	April value (units described in section 2.2.2)
MAY	33	37	F5.0	May value (units described in section 2.2.2)
JUN	38	42	F5.0	June value (units described in section 2.2.2)
JUL	43	47	F5.0	July value (units described in section 2.2.2)
AUG	48	52	F5.0	Aug. value (units described in section 2.2.2)
SEP	53	57	F5.0	Sep. value (units described in section 2.2.2)
OCT	58	62	F5.0	Oct. value (units described in section 2.2.2)
NOV	63	67	F5.0	Nov. value (units described in section 2.2.2)
DEC	68	72	F5.0	Dec. value (units described in section 2.2.2)
ANNUAL	73	77	F5.0	Ann. value (units described in section 2.2.2)
CO_CODE	78	80	A3	Country code (FR= The Faroe Islands).

In the files **fr\_monthly\_all** data are sorted according to element and station number. Furthermore all missing values have been replaced with the dummy value -9999 and a calculated annual value and a country code have been included.

Data are only to be used with proper reference to the accompanying report: Cappelen, J. (ed), 2012: The Faroe Islands - DMI Historical Climate Data Collection 1873-2011 – with Danish Abstracts. DMI Technical Report 12-05. Copenhagen.



## Appendix 2.1. Additional notes on monthly values; Tórshavn and Strond Kraftstation

For Tórshavn and Strond Kraftstation the original NACD series, the NORDKLIM, NARP and REWARD series, the present series in the time-series database and observed values in the Dmi internal monthly database has been studied in further details. These details are found in the tables below:

TÓRSHAVN - TORS
<p><b>Element No.101</b> Further details: The NACD Element 101 data had extensive holes: 1925/4-10 and 1964/01 – 1965/12 and 1969/09 - 1975/12. These were filled in DMI Technical Report 98-14 [6] and introduced in NORDKLIM and NARP datasets. In NACD, several corrections were made by comparisons with Hoyvik 33060. Data in NARP (series 353) and monthly are the same from 1958 - 1999, except in two cases (1973/11 &amp; 1980/2).</p>
<p><b>Element No. 111</b> Further details: Data in REWARD and “monthly” are the same from 1958 - 1995, except in very few cases (1969/10, 1979/06, 1981/01 &amp; 1995/07). “Monthly” was used to update REWARD to include the period 1995-2000 in NORDKLIM/NARP. Data in EVL-TS361 are the same as in “monthly” except for 1973/11 where a value from Hoyvik was inserted.</p>
<p><b>Element No. 112</b> Further details: Data values in REWARD and “monthly” are the same from 1964 except in two cases (1969/10 &amp; 1979/06). The values in EVL-TS368 are the same as in monthly.</p>
<p><b>Element No. 121</b> Further details: Data values in REWARD and monthly are the same from 1964 except in the following cases (1967/07, 1969/08, 1972/07 &amp; 1995/10). The values in EVL-TS375 are the same as in monthly, except 1973/11.</p>
<p><b>Element No. 122</b> Further details: Data values in REWARD and monthly are the same from 1964 except in the following cases (1968/07, 1969/08 &amp; 1972/07). The values in EVL-TS496 are the same as in monthly, except 1973/11.</p>
<p><b>Element No. 401</b> Further details: Data values in NACD and monthly are the same from 1958 except in the following cases (1980/01 &amp; 1981/01). The values in EVL-TS1220 are the same as in monthly, except 1973/11 and 1980/01. There are no observations on the Faroe Islands during the missing period in 1925.</p>
<p><b>Element No. 601</b> Further details: Data values in NACD and monthly are the same from 1958 except in the following cases (1971/07, 1980/03, 1981/01 &amp; 1985/03). The values in JC-TS1154 are completely different from both NACD and monthly until 1993/01. From then onwards, they are the same.</p>
<p><b>Element No. 602</b> Further details: Data values in NACD and NARP are the same. NACD and monthly are the same from 1958/01 except in the following cases (1971/09 &amp; 1985/03). The values in JC-TS1166 are the same except the cases (1971/8+9+10, 1972/11, &amp; 1973/11).</p>
<p><b>Element No. 701</b> Further details: Data values in NACD had holes for entire years 1964, 1965 and 1970. Values from DMI Technical Report 98-14 [6] are different from NACD and monthly in most months in the period 1961-1990. The values in EVL-TS1224 are the same as monthly except the cases (1962/02, 1966/12, 1967/01, 1967/03, 1967/12, 1973/11 &amp; 1982/01).</p>
<p><b>Element No. 801</b> Further details: Comparison between the NACD and monthly was not made.</p>
STROND KRAFTSTATION – (STRO)
<p><b>Element No. 601</b> Further details: The series JC-TS1161 from DMI Technical Report 98-14 [6], originally had holes that were filled through correlation with 6009, 6011, 33020, 33080, 33090 [6].</p>
<p><b>Element No. 602</b> Details: The Element 602 (JC-TS172) from DMI Technical Report 98-14 [6], originally had holes that were filled through correlation with 6009, 6011, 33020, 33080, 33090 [6]. In the NARP/monthly-clima dataset 3 holes in 1991 as in element 601 was found. The same correlation was used to calculate the missing daily values and there from the missing monthly values. (Inserted values: 1991/05=172, 1991/06=302, 1991/11 = 591).</p>



## Appendix 2.2. Regarding monthly data of atmospheric pressure

The reading of a mercury barometer is proportional to the length of a mercury column in the barometer, which is balanced against the weight of the entire atmospheric column of air above the open surface of the mercury. The mercury barometer was therefore calibrated to “standard conditions” (0°C and a certain standard gravity). At other conditions corrections must be used.

The formula used to correct old barometer readings for the stations presented in this publication is given below. The formula simply corrects for gravity (part 1) and reduces the pressure to mean sea level (part 2):

$$P * (1 - 0,00259 * \cos (2 * \varphi * \pi / 180)) * (1 + 9.82 / 287.04 * h / (T / 10 + 273.15))$$

P is atmospheric pressure (0.1 hPa) at station level,  $\varphi$  is the latitude in degrees, h is the height of the barometer in metres above sea level and T is the air temperature at station level (0.1 °C)

For the calculation are used monthly means of P and T. This introduces an error compared to a reduction performed on the actual observations. The error is proportional to the difference between ‘the average P to T ratio’ and ‘the ratio of average P to average T’ (T in Kelvin). This means the error is zero if T is constant within the period. Within a month the maximum T-range would normally be within 30 degrees. And a numerical variation of 30 is small when compared to the temperature in Kelvin and the atmospheric pressure in 0.1 hPa. Therefore the error introduced by using monthly values may be considered small.

The different station specific corrections, which have been used in the construction of the pressure series in this report, can be seen in the following DMI publication:

DMI Technical Report 03-24: Metadata, selected climatological and synoptic stations, 1750-1996, Copenhagen 2003 [21].

This publication can be downloaded from the publication part of DMI’s web site:

<http://www.dmi.dk/dmi/dmi-publikationer.htm>



# 3. Annual Section: Historical DMI Data Collection

Data Collection	Products in the report	Page
Annual	<b>Section 3.3. Mean air temperature, mean of daily minimum and maximum temperatures and highest/lowest temperature, mean atmospheric pressure, accumulated precipitation, highest 24-hour precipitation, no. of days with snow cover and mean cloud cover, 1 station: 6011 Tórshavn (1873-2011)</b>	28
	<b>Section 3.3. Accumulated precipitation and highest 24-hour precipitation, 1 station: 33054 Strond Kraftstation (1932-2011)</b>	28
	<b>Section 3.4. Mean air temperature; graph and values with gauss filtered values, 1 station: 6011 Tórshavn (1873-2011).</b>	28



Datasamling	Produkter i rapporten	Sidetotal
År	<i>Sektion 3.3. Middel luft-, max- og min- temperatur samt højeste og laveste temperatur, middellufttryk, nedbørsum, max 24 t nedbørsum, antal snedækkedage og middelskydække, 1 station: 6011 Tórshavn (1873-2011)</i>	28
	<i>Sektion 3.3. Nedbørsum og max 24 t nedbørsum, 1 station: 33054 Strond Kraftstation (1932-2011)</i>	28
	<i>Sektion 3.4. Middeltemperatur som data og grafik med gauss-filtrede værdier: 1 station: 6011 Tórshavn (1873-2011)</i>	28



Latest earlier report:  
 [9] Cappelen, J., 2011: DMI Annual Climate Data Collection 1873-2010, Denmark, The Faroe Islands and Greenland - with graphics and Danish summary. DMI Technical Report No. 11-04.



### 3.1. Introduction

The purpose of this section is to publish different *annual* climate data from The Faroe Islands together with relevant graphics. That is:

- Annual values within the period 1873-2011 from The Faroe Islands. The data parameters include mean temperature, minimum temperature, maximum temperature, atmospheric pressure, accumulated precipitation, highest 24-hour precipitation, number of days with snow and cloud cover.
- Annual mean temperatures and filtered values for one meteorological stations at the Faroe Islands (Tórshavn); 1873-2011, both as data and graphics.

Annual values of mean temperatures also regularly forms part (graphical) of the yearly publication “Danmarks Klima” (newest one to have been published in 2012 is DMI Teknisk Rapport 12-01: Danmarks klima 2011 med Nuuk, Grønland og Tórshavn, Færøerne – with English translations. København 2012 [12]), as well as other publications.

The annual data from the Faroe Islands are partly an annual update (with 2011 data) of the “DMI Annual Climate Data Collection” published for the first time in that form in DMI Technical Report 05-06: DMI Annual Climate Data Collection 1873-2004, Denmark, The Faroe Islands and Greenland - with Graphics and Danish Abstracts. Copenhagen 2005 [7].

The annual data sets can be downloaded from the publication part of DMI web pages.



*Formålet med denne sektion er at publicere forskellige årlige klimaværdier indenfor perioden 1873-2011 samt tilhørende grafik. Det drejer sig om henholdsvis:*

- *Årsmiddelværdier for udvalgte meteorologiske stationer på Færøerne. Det omfatter middeltemperatur, minimumtemperatur, maksimumtemperatur, atmosfærisk tryk, nedbørsum, maksimal 24t nedbørsum, antallet af dage med sne og skydække.*
- *Årsmiddeltemperaturer og gauss filtrerede værdier for én meteorologisk station på Færøerne (Torshavn), både som data og grafik.*

*I afsnit 3.2 kan ses hvilke stationer og parametre, det drejer sig om. Årsmiddelværdierne af de forskellige parametre kan findes sammen med de månedlige data, se sektion 2. I afsnit 3.4 er Tórshavn's årsmiddeltemperatur grafisk vist sammen med København, Danmark og forskellige stationer i Vest- og Østgrønland. Endelig er filformatet af de medfølgende filer og grafik beskrevet i afsnit 3.5 og 3.6.*

## 3.2. Stations and parameters

### 3.2.1. Station Overview

One meteorological station with a long record has been operated at the Faroe Islands since the 19th century; Tórshavn. This station has digitised records back to the start of 1870's (the Danish Meteorological Institute (DMI) was established 1872. Another meteorological station with a long precipitation record has been operated at the Faroe Islands since 1932; Strond Kraftstation. In table 3.2.1 stations used in this section are listed together with a start year.

The stations have been relocated several times since the start, new station numbers and names have been attached, new instruments and new observers have been introduced. The latter have obviously been replaced many times. See the station history in the chapter "History of stations used in the report".

It is also obvious that the quality and homogeneity of the series have been affected in various degrees. The series have been corrected in the best possible way i.e. in connection with the development of the North Atlantic Climatological Dataset: DMI Scientific Report 96-1: North Atlantic Climatological Dataset (NACD Version 1) - Final report. Copenhagen 1996 [18] and the regularly publication of the DMI historical monthly data collection in section 2.

The station numbers and names in the table 3.2.1 refer to the present situation.

	Country	Station number	Name	First year
1	FR	6011 <sup>1)</sup>	Tórshavn	1873
2	FR	33054	Strond Kraftstation	1932

Table 3.2.1. The meteorological stations and year of first appearance.

<sup>1)</sup> The series are a combination of 6011 Tórshavn, 33060 Hoyvik and before that 33071 Tórshavn Skole.

### 3.2.2 Data Dictionary

Number	Abbr.	Element	Method	Unit
101	T	Mean temperature	Mean	0,1°C
111	Tx	Mean of daily maximum temperature	Mean	0,1°C
112	Th	Highest temperature	Max	0,1°C
121	Tn	Mean of daily minimum temperature	Mean	0,1°C
122	Tl	Lowest temperature	Min	0,1°C
401	P	Mean atmospheric pressure	Mean	0,1 hPa
601	R	Accumulated precipitation	Sum	0,1 mm
602	Rx	Highest 24-hour precipitation	Max	0,1 mm
701	DSC	No. of days with snow cover (> 50 % covered)	Sum	Days
801	N	Mean cloud cover	Mean	%

Table 3.2.2. Parameters used in this section. 'Method' specifies whether the element is a sum, a mean or an extreme. The units of the monthly values in the data files are specified in 'Unit'. The DMI system of element numbers contains more than the shown elements. At the moment (2011) there are about 250 entries.

### 3.3. Annual values 1873-2011; The Faroe Islands

Calculated annual values for the different stations in table 3.2.1, 6011 Tórshavn and 33054 Strond Kraftstation and the different parameters in table 3.2.2 can be found together with the monthly data (see section 2).

### 3.4. Annual mean temperatures and filtered values for Tórshavn – 6011; 1873-2011

Annual mean temperatures 1873-2011 and filtered values for one station 6011 Tórshavn at The Faroe Islands are available as a data series and a graph. The graphs in this section show the annual mean temperatures for Tórshavn at The Faroe Islands together with København, Danmark and selected stations from West and East Greenland. See [13] for details concerning the Danish annual temperature series and [14] for the Greenlandic series.

The annual mean temperature data from 1890-2011 are the same as the annual values for parameter 101 Mean Temperature mentioned in section 3.3. There are no monthly mean temperatures processed for 1873-1889. From 1873-1889 the annual mean temperatures are values processed in connection with the NACD project [24], but only published for the first time in [7].

A Gauss filter with filter width (standard deviation) 9 years has been used to create the “bold” smooth curves – the filtered values. A Gauss filter with standard deviation 9 years is comparable to a 30-years running mean. However, the filter gives a smoother curve than a running mean, as temperatures from central years are given larger weight than temperatures from peripheral years. Filter values are also calculated for the years at either end of the series. It should be noted that these values are computed from one-sided Gauss filters, and that values from later years will change, when the series is updated.

**Important note:** 2010 in West Greenland was extremely record breaking warm many places and the usual graphics are not tuned to deal with such extreme values. A better graphic presentation can be seen in a poster showing “Annual mean temperatures 1873-2011, Greenland” (Tr12-04\_gr\_temperatur\_1873\_2011\_plakat.pdf) [14]. The following record breaking annual 2010 average temperatures (normal 1961-90) can also help in the interpretation: Pituffik -7.9°C, Upernavik -3.1°C, Ilulissat -0.1°C, Nuuk 2.6°C, Narsarsuaq 5.4°C. Tasiilaq 1.1°C was the second warmest in 2010 and Danmarkshavn with -11.3°C in northeast Greenland, ended in the warm end of the scale, but not near the record.

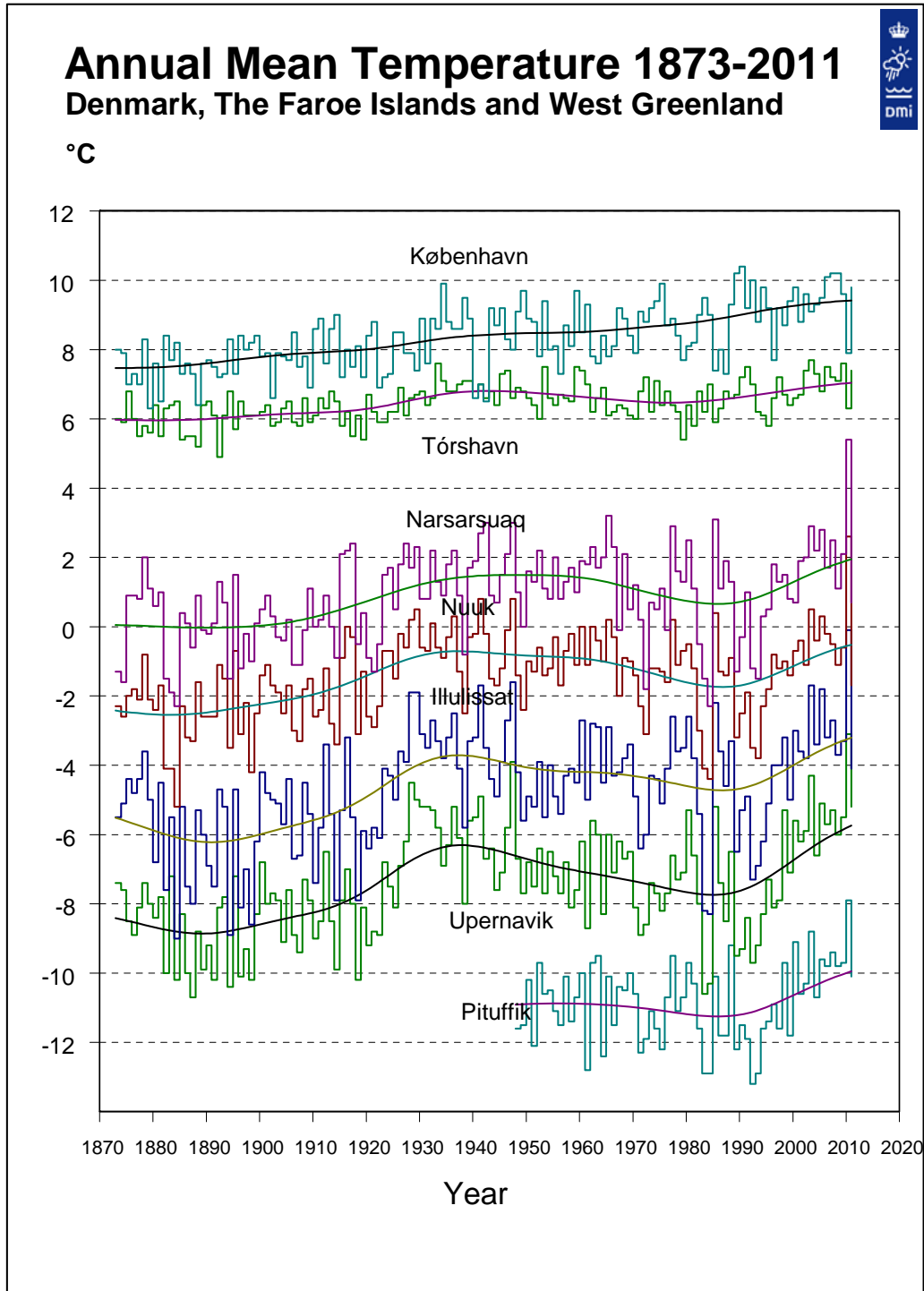


Figure 3.4.1. Annual mean temperatures 1873-2011, Denmark, The Faroes and West Greenland.

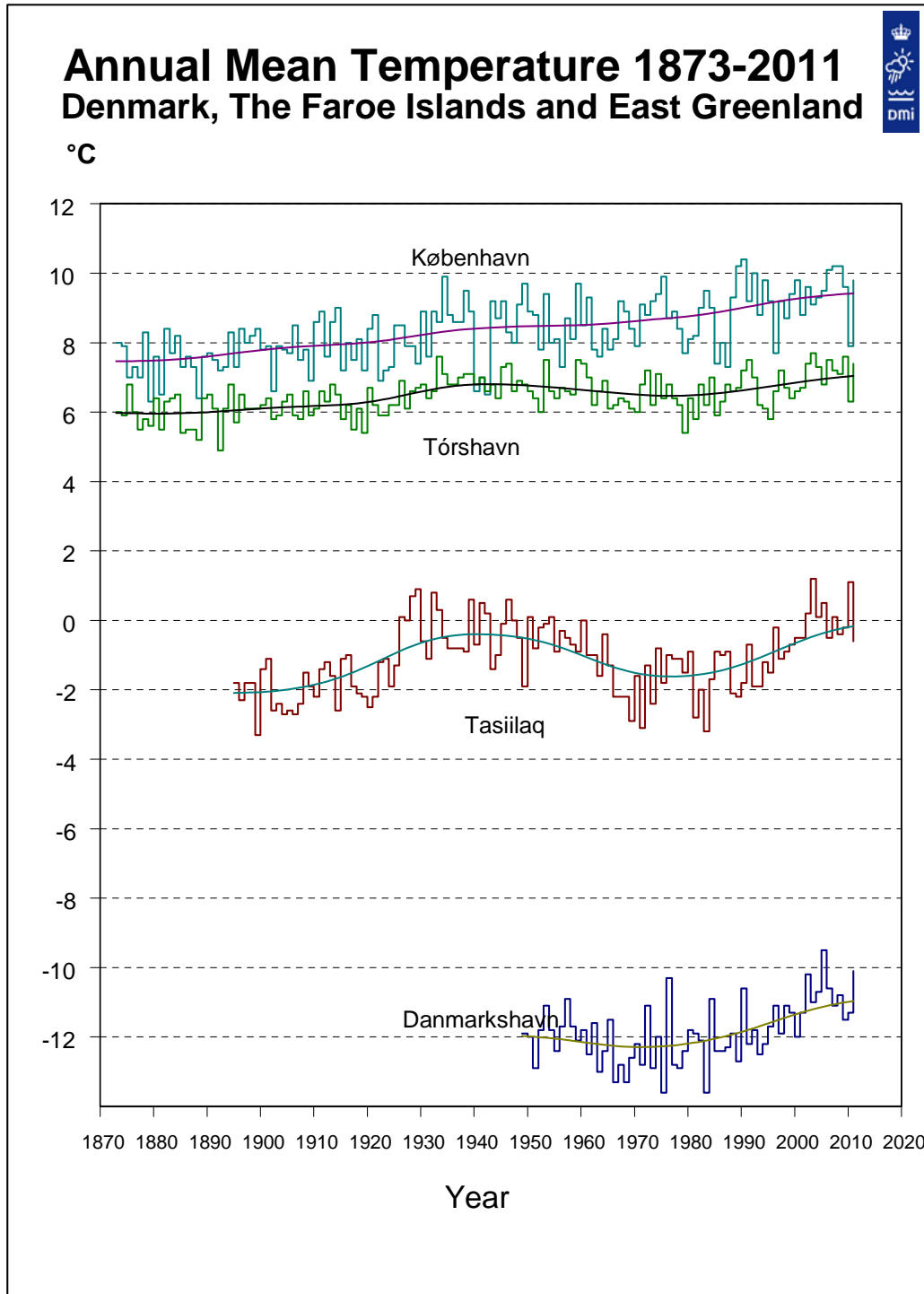


Figure 3.4.2. Annual mean temperatures 1873-2011, Denmark, The Faroes and East Greenland.

### 3.5. File formats; Annual data files

The annual files included in this report contain annual mean temperature 1873 - 2011 for selected meteorological stations in Denmark, The Faroe Islands and Greenland.

The file names are determined as follows:

**fr\_annual\_temperature\_dkfrgr\_<period>**

More specifically a fixed format text file and an Excel file in this report:

fr\_annual\_temperature\_dkfrgr\_1873\_2011.dat

fr\_annual\_temperature\_dkfrgr\_1873\_2011.xls

Besides years the files contains the annual mean temperatures in degrees Celsius to one decimal place (the variable is specified with a “T” followed by a station number) and a Gaussian filtered value to 2 decimal places (the variable is specified with a “F” followed by a station number).

Description of the data format for the fixed format text file:

Variable	Type	Start	End	Format
YEAR	YEAR	1	4	F4.0
T04202	TEMP	5	12	F8.1
F04202	FILTER	13	20	F8.2
T04211	TEMP	21	28	F8.1
F04211	FILTER	29	36	F8.2
T04221	TEMP	37	44	F8.1
F04221	FILTER	45	52	F8.2
T04250	TEMP	53	60	F8.1
F04250	FILTER	61	68	F8.2
T04270	TEMP	69	76	F8.1
F04270	FILTER	77	84	F8.2
T04320	TEMP	85	92	F8.1
F04320	FILTER	93	100	F8.2
T04360	TEMP	101	108	F8.1
F04360	FILTER	109	116	F8.2
T06011	TEMP	117	124	F8.1
F06011	FILTER	125	132	F8.2
T06186	TEMP	133	140	F8.1
F06186	FILTER	141	148	F8.2

**Note** that the annual values of the different stations in table 3.2.1 and parameters in table 3.2.2 can be found together with the monthly data (see file formats; monthly data files chapter 2.4).

Data are only to be used with proper reference to the accompanying report: Cappelen, J. (ed), 2012: The Faroe Islands - DMI Historical Climate Data Collection 1873-2011 – with Danish Abstracts. DMI Technical Report 12-05. Copenhagen.



### 3.6. File formats; Annual graphics

Annual graphics included in this report contain graphs showing annual mean temperatures 1873-2011 for one station 6011 Tórshavn at The Faroe Islands together with København, Danmark and selected stations from West and East Greenland. The graphs are available in a Danish and English version and also in a larger version as a poster (only Danish version).

The file names are determined as follows:

**fr\_annual\_temperatur\_side\_<sidetal>\_<periode>\_<sprog>.pdf**  
**fr\_annual\_temperature\_page\_<page number>\_<period>\_<language>.pdf**

More specifically a number of pdf files (Danish and English versions) in this report:

**fr\_annual\_temperatur\_side1\_1873\_2011\_dk.pdf:**

Annual mean temperatures 1873-2011 Denmark, The Faroe Islands and West Greenland (Danish version)

**fr\_annual\_temperatur\_side2\_1873\_2011\_dk.pdf:**

Annual mean temperatures 1873-2011 Denmark, The Faroe Islands and East Greenland (Danish version)

**fr\_annual\_temperature\_page1\_1873\_2011\_eng.pdf:**

Annual mean temperatures 1873-2011 Denmark, The Faroe Islands and West Greenland (English version)

**fr\_annual\_temperature\_page2\_1873\_2011\_eng.pdf:**

Annual mean temperatures 1873-2011 Denmark, The Faroe Islands and East Greenland (English version)

**fr\_annual\_temperatur\_side1\_1873\_2011\_plakat.pdf:**

Annual mean temperatures 1873-2011 Denmark, The Faroe Islands and West Greenland (Danish poster)

**fr\_annual\_temperatur\_side2\_1873\_2011\_plakat.pdf:**

Annual mean temperatures 1873-2011 Denmark, The Faroe Islands and East Greenland (Danish poster)

Data are only to be used with proper reference to the accompanying report: Cappelen, J. (ed), 2012: The Faroe Islands - DMI Historical Climate Data Collection 1873-2011 – with Danish Abstracts. DMI Technical Report 12-05. Copenhagen.



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