

# WMO OMM

WEATHER CLIMATE WATER  
TEMPS CLIMAT EAU



World Meteorological Organization  
Organisation météorologique mondiale  
Organización Meteorológica Mundial  
Всемирная метеорологическая организация  
المنظمة العالمية للأرصاد الجوية  
世界气象组织

Secrétariat

7 bis, avenue de la Paix – Case postale 2300  
CH 1211 Genève 2 – Suisse  
Tél.: +41 (0) 22 730 81 11  
Fax: +41 (0) 22 730 81 81  
wmo@wmo.int – public.wmo.int

Our ref.: 08791/2019/CLW/CLPA/DMA/CLINO8110

1 April 2019

Annex: 1

Subject: Reminder: Collection of the WMO Climatological Standard Normals for 1981-2010

Action required: Submission of data at the earliest convenience **but not later than 31 May 2019**

Dear Sir/Madam,

I wish to refer to our letter, reference No. 20077/2018/CLW/DMA/CLINO8110 dated 1 August 2018 (Annex), requesting the submission of WMO Climatological Standard Normals for 1981-2010 by 28 February 2019. As of 1 March, 34 submissions have been registered, from less than 20 per cent of all WMO Members:

- 1 submission from RA I
- 10 submissions from RA II
- 5 submissions from RA III
- 1 submission from RA IV
- 2 submissions from RA V
- 15 submissions from RA VI.

I wish to reiterate that the collected Climatological Standard Normals are a mandatory WMO publication. If you have not already done so, I kindly invite your active participation in this WMO standard procedure by submitting your Climatological Standard Normals as per attached letter with annexes, at your earliest convenience but not later than **31 May 2019**.

Yours faithfully,

(E. Manaenkova)  
for the Secretary-General

To: Permanent Representatives (or Directors of Meteorological or Hydrometeorological Services) of Members of WMO

cc: Presidents of Regional Associations  
President and vice-president of CCI  
President and vice-president of CBS  
Chair GCOS-SC  
Director of the National Centers for Environmental Information (NCEI), Asheville

Ref.: 08791/2019-17 CLW/DMA

## WMO OMM

WEATHER CLIMATE WATER  
TEMPS CLIMAT EAU

World Meteorological Organization  
 Organisation météorologique mondiale  
 Organización Meteorológica Mundial  
 Всемирная метеорологическая организация  
 المنظمة العالمية للأرصاد الجوية  
 世界气象组织

## Secrétariat

7 bis, avenue de la Paix – Case postale 2300  
 CH 1211 Genève 2 – Suisse  
 Tél.: +41 (0) 22 730 81 11  
 Fax: +41 (0) 22 730 81 81  
 wmo@wmo.int – public.wmo.int

Our ref.: 20077/2018/CLW/CLPA/DMA/CLINO8110

1 August 2018

Annexes: 5 (Annexes 3, 4 and 5 available in English only)

Subject: Collection of the WMO Climatological Standard Normals for 1981–2010

Action required: Submission of data at the earliest convenience **but not later than 28 February 2019**

Dear Sir/Madam,

I wish to draw your attention to the arrangements made for the collection of the WMO Climatological Standard Normals. As you may recall, the Seventeenth World Meteorological Congress (Cg-17) in 2015, through Resolution 16 (Cg-17) – Report of the sixteenth session of the Commission for Climatology, decided to improve the definition of a Climatological Standard Normal based on guidance from the WMO Commission for Climatology. The Climatological Standard Normal is now taken to refer to the most recent 30-year period finishing in a year ending with 0 (1981–2010, 1991–2020 etc.), replacing the previous definition which used non-overlapping 30-year periods (1931–1960, 1961–1990 etc.). Under the new definition, the most recent 30-year period (1981–2010) will be used to establish the new current standard. Annex 1 provides relevant background information and discusses reasons for, and implications of, the modified definition of Climatological Standard Normals.

The WMO Secretariat, in collaboration with Members, should therefore facilitate the necessary update of Global Climate Normals (CLINO) (WMO-No. 847), which is a mandatory publication, on the basis of the new definition.

For this endeavour, the World Data Center for Meteorology, which is hosted by the United States of America National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI), generously agreed to continue, as in the past, the centralized collection and publication of the global Climatological Standard Normals on behalf of WMO. The publication of the new Climatological Standard Normals will provide an updated global long-term dataset of comparable and accessible standards.

I hereby invite you to submit the 1981–2010 Climatological Standard Normals for as many stations as possible from your country, including stations registered in the Observing Systems Capability Analysis and Review tool for surface-based observations (OSCAR/Surface), and in particular for stations that (i) constitute the Regional Basic Climatological Networks (RBCNs), (ii) report monthly CLIMAT messages, and (iii) contribute to the World Weather Records collection. (Note: OSCAR/Surface replaces Weather Reporting (WMO-No. 9), Volume A, Observing Stations, which is available at <http://www.wmo.int/pages/prog/www/ois/volume-a/vola-home.htm>).

To: Permanent Representatives (or Directors of Meteorological or Hydrometeorological Services) of Members of WMO

cc: Presidents of Regional Associations  
 President and vice-president of CCI  
 President and vice-president of CBS  
 Chair GCOS-SC  
 Director of the National Centers for Environmental Information (NCEI), Asheville

It is requested that data be calculated and provided in either Microsoft Excel or text format, following the WMO Guidelines on the Calculation of Climate Normals ([Annex 2](#)). Additional information, including the Excel and text templates (Annex 4 and 5), is available at [http://www.wmo.int/pages/prog/wcp/wcdmp/GCDS\\_1.php](http://www.wmo.int/pages/prog/wcp/wcdmp/GCDS_1.php).

To facilitate the publication of WMO Climatological Standard Normals for the period 1981–2010, I would appreciate if you could send your submission at your earliest convenience, preferably by **28 February 2019**, to the respective Commission for Basic Systems (CBS) lead centre for the Global Climate Observing System (GCOS) as per the attached guidelines (Annex 3). Alternatively, the data can be sent to the WMO Secretariat ([wcdmp@wmo.int](mailto:wcdmp@wmo.int)).

I take this opportunity to highlight the importance of Members' collaboration, through lessons learnt and procedural adjustments, in achieving a fine-tuned computational and collection mechanism for the next WMO Climatological Standard Normals (1991–2020), tentatively scheduled for the second half of 2021.

Should you require further clarification, please do not hesitate to contact the WMO Data Management Applications Division (Mr Omar Baddour and Mr Peer Hechler, [wcdmp@wmo.int](mailto:wcdmp@wmo.int)).

I also take this opportunity to thank Members' National Meteorological and Hydrological Services for their continuous and enthusiastic engagement in the provision of standard and trustworthy climate data that underpin WMO role as the authoritative source of information on the state of the climate globally.

Yours faithfully,

(P. Taalas)  
Secretary-General

## Background information

*Note: We are grateful to MétéoSuisse, the National Meteorological Service of Switzerland, for sharing its documentation published nationally on the occasion of the introduction of the 1981–2010 Climatological Standard Normals in Switzerland at the beginning of 2013.*

### Purposes of climatological normals

Climatological normals are used for two principle purposes. They are widely used, implicitly or explicitly, as a characterisation – including for the near future – of the average conditions most likely to be experienced in a given location. They are also used as a benchmark with which recent or current weather or climate conditions can be compared; moreover, they provide a basis for many anomaly-based climate datasets such as global mean temperatures (for example, year xy was z degrees warmer/colder...).

### New definition of Climatological Standard Normal and introduction of WMO reference period

In the past, Climatological Standard Normals referred to non-overlapping 30-year periods (1901–1930, 1931–1960 and 1961–1990). The Seventeenth World Meteorological Congress in 2015, through Resolution 16 (Cg-17) – Report of the sixteenth session of the Commission for Climatology, endorsed the following update of the definition of Climatological Standard Normals: *“Averages of climatological data computed for the following consecutive periods of 30 years: 1 January 1981 – 31 December 2010, 1 January 1991 – 31 December 2020, and so forth.”*

Congress also agreed to introduce a WMO reference period for long-term climate change assessment: *“The consecutive period of 30 years from 1 January 1961 to 31 December 1990.”*

### Main reason for updating the definition of Climatological Standard Normals

It is widely acknowledged that the historical method of calculating Climatological Standard Normals (30-year normal updated every 30 years) leads to a reference standard that in a changing climate is unlikely to provide good guidance for most climate applications. For example, using the 1961–1990 Climatological Standard Normal as reference in 2018 for a climate application to energy demands in the years 2019–2022 is likely to lead to an inaccurate conclusion. The same application is likely to provide much more accurate results with the 1981–2010 Climatological Standard Normal as reference.

There are, however, certain areas in climatology where a relatively stable reference period is required, notably in long-term climate variability assessment and climate change monitoring. Therefore, the consecutive period of 30 years from 1 January 1961 to 31 December 1990 is retained as a reference period for long-term climate change assessment.

### Implications of modifying the definition of Climatological Standard Normals

Updating Climatological Standard Normals requires dedicated explanations to users; related items of communication may include the following aspects and examples:

- The need for the update – To ensure a better representation of the average conditions at a given location, particularly for many sectoral operational climate applications and services.
- The implications of the update – Example: A region experienced a distinct warming over the last one to two decades. Operational climate monitoring using the 1961–1990 Climatological Standard Normal has identified most of the past years as ‘warmer than normal’. By switching to the 1981–2010 Climatological Standard Normal, which is likely higher than the 1961–1990 Climatological Standard Normal, the number of years characterised as ‘warmer than normal’ may be less, and more ‘normal’ or ‘cooler than normal’ years may appear.

- Obviously, the example above does not indicate necessarily that the warming trend in this region has slowed down, stopped or reversed. The example illustrates, however, that warmer average conditions are expected, that they are better reflected by using the 1981–2010 Climatological Standard Normal compared to 1961–1990.
- A stable reference for climate change assessments – For long-term climate variability and change assessment (time scale of decades), it is recommended to use the newly defined WMO reference period 1961–1990 (to be used internationally in perpetuity, unless compelling scientific reasons suggest its modification).
- It is recommended to publish the list of National Meteorological and Hydrological Services' (standard) products that use updated Climatological Standard Normals, including the date of the switchover from the previous (e.g. 1961–1990) to the updated (e.g. 1981–2010) Normal. Moreover, it is strongly recommended to explicitly mention the Climatological Standard Normal in use on all products affected.

20087/2018/CLW/CLPA/DMA/CLINO8110, ANNEX 3

## **Guidelines for the Submission of WMO Climatological Standard Normals:**

**Collection for 1981-2010**

## CONTENTS

### 1. BACKGROUND

- 1.1. World Meteorological Organization climate normals
- 1.2. Submission channels

### 2. METHODOLOGY FOR REPRESENTING THE CLIMATOLOGICAL STANDARD NORMALS FOR 1981-2010

- 2.1. Station header information
- 2.2. Statistical descriptors
- 2.3. Principal climatological surface parameters and units
- 2.4. Secondary and other climatological surface parameters and units

### 3. EXCEL SUBMISSION FOR EACH STATION RECORD

### 4. OPTIONAL ASCII SUBMISSION IN COMMA SEPARATED VALUES FORMAT (\*.CSV)

### 5. PLANNING FOR 1991-2020 NORMALS

## REFERENCES

**ATTACHMENT I: RECOMMENDED COLLECTION MECHANISMS BY REGION**

**ATTACHMENT II: EXAMPLE EXCEL FILE (SINGLE STATION PER TAB)**

**ATTACHMENT III: EXAMPLE ASCII FILE IN \*.CSV FORMAT (SINGLE STATION PER FILE)**

## 1. BACKGROUND

This document provides technical instructions for submitting Climatological Standard Normals for the most recent 30-year period ending in "0", 1981-2010. Brief background material for this activity is provided below, followed by uniform collection instructions.

### 1.1 World Meteorological Organization Climate Normals

In 2015, the Seventeenth World Meteorological Congress (WMO, 2015) approved a change in formal practice to calculate Climatological Standard Normals every ten years, rather than in non-overlapping 30-year periods (Resolution 16 [Cg-17]). In 2017, WMO published *WMO Guidelines on the Calculation of Climate Normals* (WMO-No. 1203) that provides updated methodological instructions for these calculations (WMO, 2017). The combination of these progressive steps provides an opportunity to collect globally Climatological Standard Normals for the period 1981-2010. These normals will be gathered and housed for global access at the U.S. National Oceanic and Atmospheric Administration as done during the mid-1990s, when 1961-1990 Climatological Standard Normals were collected for the WMO and are still available at the World Data Center for Meteorology Asheville Web Site:

<https://www.ncdc.noaa.gov/wdcmnet/data-access-search-viewer-tools/global-climate-normals-1961-1990>

The current normals collection will not follow the format of the previous collection, but will be based on the WMO-No. 1203 *Guidelines and Definitions*. For the definitions of climate elements and parameters and methods for their calculations, readers should refer to WMO-No. 1203 and its underlying source documents. This document will merely describe the submission process and format.

### 1.2 Submission channels

WMO Members should make submissions to the responsible Commission for Basic Systems (CBS) lead center for the Global Climate Observing System (GCOS), or to the WMO Secretariat as appropriate (see Attachment I with regional collection methods). The submissions can also be made directly to the NOAA NCEI host of the collection at [gcos.ncdc@noaa.gov](mailto:gcos.ncdc@noaa.gov). Each WMO Member choosing to participate in the 1981-2010 Climatological Standard Normals collection has an option to submit station files in Excel format or Comma Separated Values (\*.csv ASCII text) format as attachments to electronic mail to the chosen electronic destination. Example files of each type can be seen in Attachment II and Attachment III.

## 2. METHODOLOGY FOR REPRESENTING THE CLIMATOLOGICAL STANDARD NORMALS FOR 1981-2010

### 2.1 Station header information

Each file submitted can contain Climatological Standard Normals for many different variables but should be limited to only one station per tab (Excel) or file (ASCII \*.csv). The Excel file format is simple and compatible to most versions of Excel. Each tab or file header should contain the following information:

Station Header Record

Row 6: Country Name – Column B



Row 7: Station Name – Column B

Row 10: WMO Number – Column A formatted as 5 digit number  
 Latitude – Column B formatted as deg|min|sec|N or S  
 Longitude – Column C formatted as deg|min|sec|E or W  
 Station\_Height – Column D formatted in whole meters (using “-” below sea level)

Row 13: WIGOS Station ID (if available) – Column A formatted as 12 digits

The Excel file template provides sufficiently wide columns for all input types with standard Excel Calibri 12 point font. Labels are provided for each field and row spaces separate fields (Attachment II). The same approach can be used in constructing a \*.csv file (Attachment III).

## 2.2 Statistical Descriptors

A parameter is a statistical descriptor of a climate element. Most observed elements are formed into means, sums, or counts for understanding the state of the element for a representative calendar month. WMO-No. 1203 describes the most fundamental parameter calculation methods, which are listed in Table 1a.

Table 1a. Calculation method names (abbreviated), codes, and parameter calculation method descriptions from WMO-No. 1203, *WMO Guidelines on the Calculation of Climate Normals*.

Calculation _Name	Calculation _Code	Parameter calculation method descriptions from WMO-No. 1203
Mean	1	Mean Parameter - mean of daily values during the month
Max	2	Extreme Parameter Maximum - highest value during month
Min	3	Extreme Parameter Minimum - lowest value during month
Sum	4	Sum Parameter - sum of daily values during month
Count	5	Count Parameter - Number of days (cf. section 2.3 below)
Q0	6	Quintile Parameter 0 - Lower bound of quintile 1 (Extreme Minimum)
Q1	7	Quintile Parameter 1 - Upper bound of quintile 1
Q2	8	Quintile Parameter 2 - Upper bound of quintile 2
Q3	9	Quintile Parameter 3 - Upper bound of quintile 3
Q4	10	Quintile Parameter 4 - Upper bound of quintile 4
Q5	11	Quintile Parameter 5 - Upper bound of quintile 5 (Extreme Maximum)

There are also some additional parameter calculation methods provided in Table 1b that are derived from the 1961-1990 Climatological Standard Normals collection effort. Some Members may still wish to use these statistics, especially the “Number of Years Used to Calculate Normal” statistic, NOY.

Table 1b. Additional parameter calculation methods from the 1961-1990 Climatological Standard Normals collection effort.

Calculation _Name	Calculation _Code	Parameter calculation method descriptions from 1961-1990 normals
Median	12	Median Monthly Value
SDMean	13	Standard Deviation of Mean Monthly Value
SDMeanD	14	Standard Deviation of Mean Daily Value
MaxDate	15	Date (Year/Day) of Occurrence of Extreme Maximum Daily Value
MinDate	16	Date (Year/Day) of Occurrence of Extreme Minimum Daily Value
MinMon	17	Minimum Monthly Value
DMinMon	18	Year of Occurrence of Minimum Monthly Value
MaxMon	19	Maximum Monthly Value
DMaxMon	20	Year of Occurrence of Maximum Monthly Value
NOY	98	Number of Years Used to Calculate Normal
Custom	99	Custom Parameter or Statistic Specified by Contributor

Ref.: 0879J/2019-17 CLW/DMA

### 2.3 Principal climatological surface parameters and units

Climate parameters are defined as an aspect of climate that can be statistically described, such as mean air temperature, precipitation total, or mean sea level pressure. Subject to limitations on available data, there are eight principal climatological surface parameters (Table 2) that should always be reported in station climate normals submissions if possible. Due to their importance, the Excel submission template contains these fields. The suggested submission format includes the use of the parameter name in a header above a data table. In order to assure compatibility between Excel and ASCII \*.csv submissions, parameter name words are linked by underscores with no spaces, and units of temperature are spelled out in basic ASCII characters (Deg\_C). Finally, it should be noted that additional climatological surface parameters derived from the same element but a different calculation method (e.g., median precipitation total, extreme maximum daily maximum temperature, etc.), can be reported on additional spreadsheet rows in conjunction with each principal climatological surface parameter.

Table 2. Principal climatological surface parameters from WMO-No. 1203, *WMO Guidelines on the Calculation of Climate Normals*.

Parameter_Code	Parameter_Name	Units
1	Precipitation_Total	mm
2	Number_of_Days_with_Precipitation_≥_1 mm	count
3	Daily_Maximum_Temperature	Deg_C
4	Daily_Minimum_Temperature	Deg_C
5	Daily_Mean_Temperature	Deg_C
6	Mean_Sea_Level_Pressure	hPa
7	Mean_Vapor_Pressure	hPa
8	Total_Number_of_Hours_of_Sunshine	hours

While it is very important for Members submitting normals data to review all recommended calculation instructions in WMO-No. 1203, the treatment of “count” variables is especially noteworthy and so will be reviewed here. Normals for counts should be calculated as follows (cf. section 4.3 of WMO-No. 1203):

- (a) The count of values for each individual month should be calculated, and converted to a percentage of days with available observations. (For example, if there were 25 days with observations in February 1981 and there were 22 days with temperatures  $\geq 30$  °C, the value for February 1981 is calculated as 88%).
- (b) The average percentage count for each month with sufficient available data within the 1981-2010 period is calculated.
- (c) This average is then reconverted to an average number of days for the month by multiplying the average percentage by the number of days in the month. February percentages should be multiplied by 28.25.
- (d) The sum of the monthly normals as per above instructions constitute the annual normal.

The purpose for this procedure is to prevent the underestimation of count variables as a result of missing data within a month.

#### 2.4 Secondary and other climatological surface parameters and units

Secondary climatological surface parameters (Table 3) are generally well recognized from standard CLIMAT messages and other common sources. Many are counts exceeding a threshold of temperature, precipitation, or wind. When parameter names with the term “threshold” are used, that word should be replaced with the numerical value representing the threshold being tested.

Table 3. Secondary climatological surface parameters from WMO-No. 1203, *WMO Guidelines on the Calculation of Climate Normals*.

Parameter_Code	Parameter_Name	Units
10	Mean_Station-Level_Pressure	hPa
11	Boundaries_of_quintiles_of_monthly_precipitation	mm
12	Number_of_Days_with_Maximum_Temperature_≥_threshold*_Deg_C	count
13	Number_of_Days_with_Minimum_Temperature_≤_threshold*_Deg_C	count
14	Number_of_Days_with_Maximum_Temperature_<_0_Deg_C	count
15	Number_of_Days_with_Minimum_Temperature_<_0_Deg_C	count
16	Number_of_Days_with_Daily_Precipitation_≥_threshold*_mm	count
17	Number_of_Days_with_Snow_Depth_>_threshold*_cm	count
18	Number_of_Days_with_Wind_Speed_≥_threshold*_m/s	count
19	Number_of_Days_with_Visibility_<_threshold*_m	count
20	Highest_Value_of_Mean_Daily_Temperature	Deg_C
21	Lowest_Value_of_Mean_Daily_Temperature	Deg_C
22	Highest_Value_of_Daily_Maximum_Temperature	Deg_C
23	Lowest_Value_of_Daily_Minimum_Temperature	Deg_C
24	Highest_Value_of_Daily_Precipitation	mm
25	Highest_Wind_Gust	m/s
26	Mean_Number_of_Days_with_Thunder	count
27	Mean_Number_of_Days_with_Hail	count

\* For parameters with the word "threshold" specify a numerical value or qualifier, repeat as needed.

In the "other" category, climatological surface parameters mentioned in the WMO-No. 1203 outside the principal and secondary lists are included in Table 4a. Element-statistics combinations used to define parameters in some 1961-1990 normals submissions but not directly referenced in WMO-No. 1203 are listed in Table 4b, often with the option of adopting user-selected thresholds for count statistics. Note that in Table 4b, the option for parameter code 99 is available if a Member wishes to submit a climatological surface parameter that is not described in the lists available.

Table 4a. Other climatological surface parameters from WMO-No. 1203, *WMO Guidelines on the Calculation of Climate Normals*.

Parameter_Code	Parameter_Name	Units
30	Cloud_Amount	okta
31	Global_Solar_Radiation	MJ/m2
32	Direct_Solar_Radiation	MJ/m2
33	Diffuse_Solar_Radiation	MJ/m2
34	Wind_Speed	m/sec
35	Wind_Direction	degrees
36	Soil_Temperature	Deg_C
37	Snowfall	cm
38	Relative_Humidity	%
39	Dewpoint_Temperature	Deg_C

Table 4b. Other climatological surface parameters utilized in the 1961-1990 normals collection effort. Some provide variations on a theme, others are somewhat unique to a given country.

Parameter_Code	Parameter_Name	Units
40	Rainfall	mm
41	Bright_Sunshine	hours
42	Calm_Winds	hours
43	Number_of_Days_with_Sandstorm/Thick Dust/Haze	count
44	Number_of_Days_with_Measurable_Bright_Sunshine	count
45	Number_of_Days_with_Lightning	count
46	Number_of_Days_with_Rain_Showers	count
47	Number_of_Days_with_Snowfall	count
48	Number_of_Days_with_Fog/Ice_Fog	count
49	Number_of_Days_with_Fog_Sky_Obscured	count
50	Number_of_Days_with_Fog_Sky_Unobscured	count
51	Number_of_Days_with_Haze/Smoke	count
52	Number_of_Days_with_Dust	count
53	Number_of_Days_with_Blowing_Dust/Sand	count
54	Number_of_Days_with_Visibility_≤_Threshold*_km	count
55	Number_of_Days_with_No_Sunshine	count
56	Number_of_Days_with_Dew	count

Parameter_Code	Parameter_Name	Units
57	Number_of_Days_with_Rime/Glaze_Ice	count
58	Number_of_Days_with_Air_Frost	count
59	Number_of_Days_with_Grass_Frost	count
60	Number_of_Days_with_Gale_Force_Winds	count
61	Number_of_Days_Maximum_Temperature_≤_threshold*_Deg_C	count
62	Number_of_Days_Minimum_Temperature_≥_threshold*_Deg_C	count
63	Number_of_Days_with_Dust/Haze/Mist	count
64	Number_of_Days_Maximum_Temperature_>_threshold*_Deg_C	count
65	Number_of_Days_Maximum_Temperature_<_threshold*_Deg_C	count
66	Number_of_Days_Minimum_Temperature_>_threshold*_Deg_C	count
67	Number_of_Days_Minimum_Temperature_<_threshold*_Deg_C	count
68	Number_of_Days_with_Snowfall_≥_threshold*_cm	count
69	Number_of_Days_with_Freezing_Rain/Drizzle	count
70	Number_of_Days_with_Blowing_Snow	count
71	Number_of_Days_with_Rain/Drizzle	count
72	Number_of_Days_with_Snow/Hail	count
73	Number_of_Days_with_Fog/Mist	count
74	Number_of_Days_with_Ice_Storm	count
75	Number_of_Days_with_Thick_Haze	count
76	Number_of_Days_with_Rising_Sand	count
77	Number_of_Days_with_Mist	count
78	Number_of_Days_with_Squalls	count
79	Number_of_Days_with_Duststorm/Sandstorm	count
80	Number_of_Days_with_Sleet/Snow	count
81	Number_of_Days_with_Fog	count
82	Number_of_Days_with_Daily_Max_Wind_Speed_≥_threshold*_m/s	count
99	Custom_Element_Specified_by_Contributor	custom

\* For parameters with the word "threshold" specify a numerical value or qualifier, repeat as needed.

### 3. EXCEL SUBMISSION FOR EACH STATION RECORD

The Excel approach for the collection of Climatological Standard Normals is designed to be very simple to use and is compatible to most versions of Excel (Attachment II). Excel is the preferred solution for submitting Climatological Standard Normals at this time. Each climatological surface parameter is available in the Parameter tab of the Template workbook. The Template has the headers pre-defined for the principal climatological surface parameters, but for secondary and other parameters, the three fields in the Parameter tab (Parameter\_Code, Parameter\_Name, and Units) can be copied and pasted into blank header sections to be included in the submission. When including data in the section below the header, the station's WMO\_Number and the Parameter\_Code are the first two items in a data row, followed by the Calculation\_Name and Calculation\_Code for the parameter that can be copied and pasted from the Calculation Method tab. The monthly and annual (if available) data values then populate the remainder of the row. An Example tab shows a station submission with multiple parameters already entered.

As shown in Attachment II, each parameter included in a submission has an individual header and data table.

Header:

Column A: Parameter\_Code

Column B: Parameter\_Name

Column C: Units

Data:

Column A: WMO\_Number

Column B: Parameter\_Code

Column C: Calculation\_Name

Column D: Calculation\_Code

Columns E-P: January-December Normals Data

Column Q: Annual Normals Data

### 4. OPTIONAL ASCII SUBMISSION IN COMMA SEPARATED VALUES FORMAT (\*.CSV)

In the previous normals collection in the 1990s, ASCII submissions were allowed in a variety of formats using a number of delimiter (blanks, multiple blanks, tabs, etc.). The current collection will reduce these possibilities to one, the use of Comma Separated Values format (\*.csv). One of the key attributes of this approach is that vertical alignment of data columns will not be required (as is needed in space and tab delimited files) as long as commas are separating both existing and missing values. Files constructed like the Attachment III example will easily import into Excel, so that the final formatted version made available for all Climatological Standard Normals will all be uniform. The same relative positional formatting will be followed as in the Excel case, except the values will be in an ASCII text file with comma separate values.

## 5. PLANNING FOR 1991-2020 NORMALS

The collection of the 1981-2010 Climatological Standard Normals from WMO Members will serve as a lasting reference for climate information consumers globally. It will also serve as a test case for collecting the next 30-year Climatological Standard Normals for 1991-2020 in 2021. Lessons learned in the 1981-2010 collection will be applied to the upcoming case to improve the completeness and ease with which the data are collected.

This document, the Excel template with example, the ASCII \*.cvs with example, and a copy of WMO-No. 1203 are located at: <ftp://ftp.ncdc.noaa.gov/pub/data/normals/WMO2010/>.

### REFERENCES

World Meteorological Organization, 1996: Climatological Normals (CLINO) for the Period 1961-1990 (WMO-No. 847). Geneva

World Meteorological Organization, 2015: *Seventeenth World Meteorological Congress* (WMO-No. 1157). Geneva.

World Meteorological Organization, 2017: *WMO Guidelines on the Calculation of Climate Normals* (WMO-No. 1203). Geneva.



**ATTACHMENT I: RECOMMENDED COLLECTION MECHANISMS BY REGION**

Note: Members may choose to submit their 1981-2010 Climatological Standard Normals through any of the below mentioned CBS lead centers for GCOS. Members can also send their submissions directly to the U.S. NOAA National Centers for Environmental Information (NCEI) at [gcos.ncdc@noaa.gov](mailto:gcos.ncdc@noaa.gov) .

Region	Member States/ Territories	Collection mechanism	Alternative
RA I	All Members of RA I	CBS Lead Centre for GCOS Africa, Morocco (DMN*); <a href="mailto:cbs.lead.centre.4gcos@gmail.com">cbs.lead.centre.4gcos@gmail.com</a>	WMO, Geneva; <a href="mailto:wcdmp@wmo.int">wcdmp@wmo.int</a>
RA II	All Members of RA II	CBS Lead Centre for GCOS Asia, Japan (JMA*); <a href="mailto:climatemonitor@met.kishou.go.jp">climatemonitor@met.kishou.go.jp</a>	WMO, Geneva; <a href="mailto:wcdmp@wmo.int">wcdmp@wmo.int</a>
RA III	All Members of RA III	CBS Lead Centre for GCOS South America, Chile (DMC*); <a href="mailto:gtorres@meteochile.cl">gtorres@meteochile.cl</a>	WMO, Geneva; <a href="mailto:wcdmp@wmo.int">wcdmp@wmo.int</a>
RA IV	All countries of RA IV	CBS Lead Centre for GCOS North and Central America and the Caribbean, United States (NCEI*); <a href="mailto:gcos.ncdc@noaa.gov">gcos.ncdc@noaa.gov</a>	WMO, Geneva; <a href="mailto:wcdmp@wmo.int">wcdmp@wmo.int</a>
RA V	All Members of RA V	CBS Lead Centre for GCOS South West Pacific, Australia, (BOM*); <a href="mailto:GCOS_Lead_Centre_RAV@bom.gov.au">GCOS_Lead_Centre_RAV@bom.gov.au</a>	WMO, Geneva; <a href="mailto:wcdmp@wmo.int">wcdmp@wmo.int</a>
RA VI	All Members of RA VI	CBS Lead Centre for GCOS Europe, Germany (DWD*); <a href="mailto:christiana.lefebvre@dwd.de">christiana.lefebvre@dwd.de</a>	WMO, Geneva; <a href="mailto:wcdmp@wmo.int">wcdmp@wmo.int</a>

\* BOM: Bureau of Meteorology; DMC: [Dirección Meteorológica de Chile](#); DMN: [Direction de la météorologie nationale du Maroc](#); DWD: Deutscher Wetterdienst; JMA: Japan Meteorological Agency; NCEI: National Centers for Environmental Information.

**ATTACHMENT II: EXAMPLE EXCEL FILE (SINGLE STATION PER TAB)**

This example table shows a subset of the Excel Climatological Standard Normals spreadsheet for a station. The complete header is included, followed by headers and data fields for four of the eight principal element parameter combinations. The table subset ends on the right to the column for March, but in the template there are columns not shown to the right completing the twelve months and also providing a column for an annual value. Note the use of vertical bar characters to separate the latitude and longitude degrees, minutes, seconds, and direction so they will stay together if exported from the Excel file.

Ref.: 08791/2019-17 CLW/DMA

World Meteorological Organization Climate Normals for 1981-2010						
Single Station Data Sheet For All Climatological Surface Parameters						
Station Header Record						
Country_Name	UNITED_STATES_OF_AMERICA					
Station_Name	FAIRBANKS_INTL					
WMO_Number	Latitude	Longitude	Station_Height			
70261	64 49 00 N	147 52 00 W	133			
WMO Integrated Global Observing System (WIGOS) Station Identifier (if available)						
0-20000-0-70261						
Principal Climatological Surface Parameters						
Parameter_Code	Parameter_Name	Units				
1	Precipitation_Total	mm				
WMO_Number	Parameter_Code	Calculation_Name	Calculation_Code	January	February	March
70261	1	Sum	4	11.9	10.2	9.4
70261	1	NOY	98	30.0	30.0	30.0
Parameter_Code	Parameter_Name	Units				
2	Number_of_Days_with_Precipitation_>=1_mm	count				
WMO_Number	Parameter_Code	Calculation_Name	Calculation_Code	January	February	March
70261	2	Count	5	3.8	2.8	3.0
70261	2	NOY	98	30.0	30.0	30.0
Parameter_Code	Parameter_Name	Units				
3	Daily_Maximum_Temperature	Deg_C				
WMO_Number	Parameter_Code	Calculation_Name	Calculation_Code	January	February	March
70261	3	Mean	1	-18.7	-13.8	-4.6
70261	3	NOY	98	30.0	30.0	30.0
Parameter_Code	Parameter_Name	Units				
4	Daily_Minimum_Temperature	Deg_C				
WMO_Number	Parameter_Code	Calculation_Name	Calculation_Code	January	February	March
70261	4	Mean	1	-28.1	-25.8	-18.7
70261	4	NOY	98	30.0	30.0	30.0

