

**WMO OMM**

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

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Our ref.: 16953/2021/S/CS/CMP/CLINO9120

4 August 2021

Annexes: 2 (available in English only)

Subject: WMO collection of the Climatological Standard Normals for 1991–2020

Action required: Submission of data at your earliest convenience from 1 October 2021,
but not later than 31 March 2022

Dear Sir/Madam,

I wish to inform you that arrangements have been made for the World Meteorological Organization (WMO) collection of the Climatological Standard Normals 1991–2020. 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. A Climatological Standard Normal now refers to the most recent 30-year period finishing in a year ending with zero (1981–2010, 1991–2020 etc.) rather than to non-overlapping 30-year-periods (1931–1960, 1961–1990 etc.). [Annex 1](#) provides relevant background information and addresses lessons learnt from the most recent collection of 1981–2010 Climatological Standard Normals.

While Members are strongly encouraged to comply with the new standard as quickly as possible, WMO continues to serve as a collector of Climatological Standard Normals in order to establish a global holding of comparable and accessible standards. The United States of America National Oceanic and Atmospheric Administration (NOAA), through their National Centres for Environmental Information (NCEI), generously agreed to continue collecting and publishing Climatological Standard Normals globally on behalf of WMO.

I therefore invite you to submit 1991–2020 Climatological Standard Normals for as many stations as possible from your country, including stations registered in [OSCAR/Surface](#), the Observing Systems Capability Analysis and Review tool for the surface-based observations, 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.

It is requested that data be calculated, digitized and provided in either EXCEL or text format, following the guidance provided in the [WMO Guidelines on the Calculation of Climate Normals](#) (WMO-No. 1203) as well as in the attached Guidelines for the Submission of WMO Climatological Standard Normals ([Annex 2](#)). Additional information including the EXCEL and text file templates are available [online](#).

To: Permanent Representatives of Members with WMO

cc: Presidents of Regional Associations
President and vice-presidents of SERCOM
President and vice-presidents of INFCOM
National Centres for Environmental Information (NCEI), Asheville

To facilitate the publication of WMO Climatological Standard Normals for the period 1991–2020, I should be grateful if you could send your contribution at your earliest convenience from 1 October 2021 **but not later than 31 March 2022**, to the WMO Secretariat (wcdmp@wmo.int). Please use the following subject for your submission: "CLINO [name of country/territory]" (example: CLINO Germany).

Should you require further clarification, please do not hesitate to contact the WMO Secretariat (Mr Peer Hechler, Scientific Officer, S/CS/CMP) at wcdmp@wmo.int.

Yours faithfully,

A handwritten signature in blue ink, appearing to read 'E. Manaenkova', with a stylized flourish at the end.

Dr Elena Manaenkova
for the Secretary-General

Background information

Purposes of Climate Normals

Climate normals are used for two principle purposes. They are widely used, implicitly or explicitly, as a characterization – 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 against which recent or current weather or climate conditions can be compared, including providing a basis for many anomaly-based climate datasets such as global mean temperature anomalies (... year xy was z degrees too warm/too cold ...).

New definition of Climatological Standard Normal and introduction of WMO Reference Period for long-term climate change assessment

In the past, Climatological Standard Normals had referred to non-overlapping 30-year periods (1901-30, 1931-60 and 1961-90). 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 a Climatological Standard Normal:

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 has been recognized widely that the historic 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 1961-90 Climatological Standard Normal as reference in 2022 for a climate application on energy demands in the years 2023 to 2025 is likely to lead to an inaccurate conclusion. The same application is likely to provide much more accurate results with 1991–2020 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 explanation 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 1961–1990 Climatological Standard Normals has identified most of the past years as 'warmer than normal'. By switching to the 1991–2020 Climatological Standard Normal, which is likely higher than the 1961-1990 Climatological Standard Normal, the number of years

characterized as 'warmer than normal' may be less and a greater number of 'normal' or 'cooler than normal' years may appear.

- Obviously, the above example does not indicate necessarily that the warming trend in this region has been slowed down, stopped or reversed. The example illustrates, however, that warmer average conditions are expected, and conditions today are better reflected by using the 1991–2020 Climatological Standard Normal compared to 1961–1990.
- 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 or unless compelling scientific reasons suggest its modification).

It is recommended to publish the list of NMHS (standard) products that use updated Climatological Standard Normals including the date of the switch-over from the previous (e.g. 1961-1990 or 1981-2010) to the updated (e.g. 1991-2020) Normal. Moreover, it is strongly recommended to explicitly mention the Climatological Standard Normal in use on all products affected.

**GUIDELINES FOR THE SUBMISSION OF WMO CLIMATOLOGICAL STANDARD
NORMALS: COLLECTION FOR 1991-2020**

This document, the EXCEL template with example, the ASCII *.csv with example, and a copy of WMO-No. 1203 are located at:

<https://www.ncei.noaa.gov/pub/data/normals/WMO/>

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1. BACKGROUND

This document provides technical instructions for submitting Climatological Standard Normals for the most recent 30-year period ending in "0", 1991–2020. 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 1991–2020. 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 website: <https://www.ncei.noaa.gov/products/wmo-climate-normals>.

The current normals collection will be based on the WMO-No. 1203 guidance 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 WMO Secretariat email account at wcdmp@wmo.int. Each WMO Member has an option to submit station files in EXCEL format or Comma Separated Values (*.csv ASCII text) format as attachments to electronic mail. Example files of each type can be seen in [Attachment I](#) and [Attachment II](#).

2. METHODOLOGY FOR REPRESENTING THE CLIMATOLOGICAL STANDARD NORMALS FOR 1991–2020

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 when providing data in EXCEL format or one station per file when providing data in ASCII *.csv format. 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 five 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 I](#)). The same approach can be used in constructing a *.csv file ([Attachment II](#)).

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 1(a).

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

| 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 1(b) that are derived from the 1961–1990 Climatological Standard Normals collection effort. Some Members may also wish to use these statistics, especially the “Number of Years Used to Calculate Normal” statistic, NOY.

Table 1(b) 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 |

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. The EXCEL submission template contains these fields (as well as the secondary parameters). 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 for the same element but using 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 Guidelines on the Calculation of Climate Normals* (WMO-No. 1203)

| 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 1991 and there were 22 days with temperatures ≥ 30 °C, the value for February 1991 is calculated as 88%).
- (b) The average percentage count for each month with sufficient available data within the 1991–2020 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 constitutes the annual normal.

The purpose of 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 Guidelines on the Calculation of Climate Normals* (WMO-No. 1203)

| 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 4(a). 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 4(b), often with the option of adopting user-selected thresholds for count statistics. Note that in Table 4(b), 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 4(a) Other climatological surface parameters from, *WMO Guidelines on the Calculation of Climate Normals* (WMO-No. 1203)

| 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 4(b). 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 |
| 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 |

| Parameter Code | Parameter Name | Units |
|----------------|---|--------|
| 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 I](#)). 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 and secondary parameters, but for 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 I](#), 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

Further important notes including lessons learnt from 1981–2010 CLINO collection:

- If a value is missing, then leave the field blank.
- All values should be right-justified.
- Decimal points are represented as dots "." (11.1, 1014.0, -14.2).
- If the temperature is negative, the first value of the field should be "-" (e.g. -13.0).
- If precipitation is zero, the field should be "0.0". Trace should be coded as "0.0".
- Using the EXCEL format, a country can submit files individually for each station, or using a single EXCEL file for all stations, placing each station in a separate spreadsheet tab.
- For single station files, construct file names as: StationName_Number.xls with no spaces or special characters (example: Asheville_72315.xlsx). The last five digits of WIGOS numbers or the WMO numbers are acceptable; if there is no station WMO or WIGOS number, inclusion of a local country station number is optional (maximum five digits). Leading with the station name will be best for listing files on access systems.
- For files with multiple stations, do not put multiple stations in a single table. Each station should have its own tab, with the name of each tab constructed as: StationName_Number with no spaces or special characters (example: Asheville_72315.xlsx). WIGOS numbers (last five digits) or the WMO numbers are acceptable; if there is no station WMO or WIGOS number, local station numbers can be used (maximum five digits). The file should not be compressed if less than 10 MB. The file name should be CountryName_WMO_Normals_9120.xls with no spaces (example: UnitedStates_WMO_Normals_9120.xlsx).
- If a folder of files is transmitted in a compressed fashion, it should be compressed and zipped in a standard manner compatible with Windows. The file name should be CountryName_WMO_Normals_9120.zip with no spaces (example: UnitedStates_WMO_Normals_9120.zip).

4. 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 delimiters (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 II](#) 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.

Further important notes including lessons learnt from 1981–2010 CLINO collection:

- Missing values are represented with blanks only, no numerical or alphabetical codes.
- Decimal points are represented as dots "." (11.1, 1014.0, -14.2).
- If the temperature is negative, the first value of the field should be "-" (e.g. -13.0).
- If precipitation is zero, the field should be "0.0". Trace should be coded as "0.0".
- Each *.csv station file should be for only one station.
- If a folder of files is transmitted in a compressed fashion, it should be compressed and zipped in a standard manner compatible with Windows. The file name should be CountryName_WMO_Normals_9120.zip with no spaces (example: UnitedStates_WMO_Normals_9120.zip).
- File names should be constructed as: StationName_Number.csv with no spaces or special characters (example: Asheville_72315.csv). WIGOS numbers (last five digits) or the WMO numbers are acceptable; if there is no station WMO or WIGOS number, inclusion of a local country station number is optional (maximum five digits). Leading with the place name will be best for listing files on access systems.

5. SUBMISSION OF EXPLANATORY NOTES

Explanatory notes are strongly encouraged to be provided with the data submission in open text format (WORD document or TEXT file; file name: CountryName_WMO_Normals_9120_Additional.doc), ideally using one of the WMO languages. Explanatory notes document information necessary to correctly interpret Climatological Standard Normals submitted. Examples for Explanatory notes include information on homogeneity of underlying time series, use of data estimation methods to fill data gaps in underlying time series, observing time constraints, implications of station automation, less than 30 years of observations, formula used for vapour pressure calculation etc.

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: 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 three 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. The EXCEL template is available at <https://www.ncei.noaa.gov/pub/data/normals/WMO/>.

Ref.: 16953/2021-115 S/CMP

| World Meteorological Organization Climate Normals for 1991-2020 | | | | | | | |
|--|---|------------------|------------------|---------|----------|-------|--|
| 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 | |

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

This example table shows a subset of an ASCII *.csv format Climatological Standard Normals file for a station. The complete header is included, followed by headers and data fields for three of the eight principal climatological surface parameters. The table subset shows entire parameter records for all months and the annual value, but the month labels end on the right at March due to space limitations here; in the example file there are month labels 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 imported into an EXCEL spreadsheet. The csv template is available at <https://www.ncei.noaa.gov/pub/data/normals/WMO/>.

World Meteorological Organization Climate Normals for 1991-2020
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