

Guidelines for the Submission of the World Weather Records 2011+

2021 edition

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WORLD
METEOROLOGICAL
ORGANIZATION

WMO-No. 1186

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EDITORIAL NOTE

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WMO-No. 1186

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ISBN 978-92-63-11186-9

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1. **BACKGROUND**

1.1 **History**

The World Weather Records (WWR) database contains historical monthly climatic data from land surface stations worldwide. First released in 1927, the WWR database has been widely employed in operational climate monitoring, international climate assessments, and numerous other applications. To date, there have been 10 editions of the WWR database, the first containing the available data up to and including 1920, with each successive release containing data for another decade (that is, 1921–1930, 1931–1940, 1941–1950, 1951–1960, 1961–1970, 1971–1980, 1981–1990, 1991–2000, 2001–2010). Since its inception, WWR has been produced by three different institutions: the Smithsonian Institution (1927, 1934, 1947); the United States of America Weather Bureau (1959, 1967); and the United States National Oceanic and Atmospheric Administration (NOAA; 1983, 1991, 2005). The current edition will also be produced by NOAA. It addresses the 2011+ period, consistent with WMO Secretariat guidance. However, the previous edition lacked data for many countries/territories because of the decline in station coverage that started in 1991, posing an impediment to climate monitoring and assessment activities. The Sixteenth World Meteorological Congress, Geneva 2011, emphasized the importance of updating the WWR database continuously. It requested Members to complete the data sets for WWR 1991–2000, submit WWR for 2001–2010, and – starting from 2011 – move towards annual updates of the WWR database. This approach has been formalized through Resolution 14 (EC-64) – Submission of World Weather Records on an annual basis.

1.2 **Submission channels of the World Weather Records**

Each WMO Member should submit two types of files to one of the responsible Commission for Basic Systems (CBS) lead centres for the Global Climate Observing System (GCOS) (see recommended collection mechanisms by region in Annex I).¹ The first file type should contain station data for the country/territory (single Excel file containing all stations OR single text file per station, see Annexes II and III, respectively), and the second should contain a history metadata file (Annex IV). These files can be submitted via electronic mail following guidance provided by the WMO Secretariat or by a regional coordinating centre. Annex I specifies responsible institutions for each region including an email address. In case of any questions, Members are encouraged to contact WMO: wcdmp@wmo.int.

1.3 **Quality assurance and accessibility of World Weather Records**

World Weather Records can be accessed through the World Data Centre for Meteorology, National Centers for Environmental Information (NCEI), Asheville, United States at <https://www.ncdc.noaa.gov/wdcmnet/data-access-search-viewer-tools/world-weather-records-wwr-clearinghouse>. It is planned to provide access to quality-controlled WWR within six months of the WMO submission deadline annually. Routine quality assurance reviews of NCEI focus on gross data problems and include format consistency checks, determination of duplication and reasonableness of submitted values and metadata.

2. **METHODOLOGY FOR REPRESENTING THE WORLD WEATHER RECORDS**

2.1 **Data elements**

This document provides guidance on how to format data for submission to the current edition of WWR. As in the previous edition, the database will contain six climatic elements:

- (Code 2) Monthly mean station pressure;
- (Code 3) Monthly mean sea-level pressure;

¹ WMO centre designations are expected to be reviewed under the new commission structure.

(Code 4) Monthly mean temperature;

- (Code 5) Total precipitation in tenths of a mm;
 (Code 6) Mean daily maximum air temperature in tenths of a °C;
 (Code 7) Mean daily minimum air temperature in tenths of a °C.

As practiced in recent years, monthly means of daily relative humidity can also be submitted:

- (Code 8) Monthly mean relative humidity.

The primary goal is to capture year-by-year, month-by-month data for each element at each station (for example, total monthly precipitation for Geneva in January 2011, February 2011,..., December 2015+). However, station metadata are also of particular importance. At a minimum these metadata should include station name, coordinates and elevation. Preferably, observation times, averaging formulas, instrumentation types, and station changes will also be documented. WMO Members should submit data for all their surface stations that have an official WMO station index number/WIGOS Station Identifier (WSI).

2.2 Data format

Each WMO Member should submit the WWR data in either Excel or text file format. This section describes the format of these files, which are similar to previous editions of WWR. There are generally two record types in these formats:

- (a) Station header records documenting basic station characteristics;
 (b) Yearly data records with monthly and annual data for a particular year.

Note that decadal average (MEAN) and climate normal (CLINO) records are no longer necessary with this data submission.

Option 1: Excel

An example of a properly formatted Excel submission is given in Annex II, and an electronic template is provided to Members. A single Excel file should contain all stations for a given country/territory, with a single station on each tab, and each tab containing a single station's elements.

The first line for each station must be a station header record, which should contain the most recent information for the station. A second header record line has been added to accommodate the new WSI.

The next yearly data record section contains data for each climatic element for that station. Leave the element section blank if the station does not report that element.

- (a) Station header records

Station header records contain 15 fields documenting basic station characteristics. These characteristics should represent the most recent location of the station. Stated in tabular form, the contents include the following:

Field	Columns	Contents	Notes
	1–2		Leave these columns blank
A	3–7	WMO number	5 digits with leading 0 if applicable, right-justified. Leave null if new station with only WSI.
B	8	Record type	1 = station header record
C	9–10	Degrees of latitude (0–90)	Right-justified
C	11–12	Minutes of latitude (0–59)	Right-justified

Field	Columns	Contents	Notes
C	13–14	Seconds of latitude (if available, 0–59)	Right-justified
C	15	Hemisphere of latitude	N (northern) or S (southern)
D	16–18	Degrees of longitude (0–180)	Right-justified
D	19–20	Minutes of longitude (0–59)	Right-justified
D	21–22	Seconds of longitude (if available, 0–59)	Right-justified
D	23	Hemisphere of longitude	E (eastern) or W (western)
E	24–47	Name of country/territory in English	Left-justified
F	48–71	Name of station in English	Left-justified
G	72–76	Height of station above sea level (whole metres)	Right-justified
H	77–83	Height of barometer above sea level (tenths of metres)	Right-justified
L	3–33	WSI	Maximum 31 character identifier from the WMO OSCAR system, left-justified

(b) Yearly data records

Each yearly data record contains monthly and annual data for a particular year. These records contain 17 fields documenting the WMO number, element type, year, monthly data values, and the annual value. Stated in tabular form, the contents include the following:

Field	Columns	Contents	Notes
	1–2		Leave these columns blank
A	3–7	WMO number	5 digits with leading 0 if applicable, right-justified. Leave null if new station with only WSI.
B	8	Element type	2 = mean station pressure in tenths of hPa 3 = mean sea-level pressure in tenths of hPa 4 = mean daily air temperature in tenths of a °C 5 = total precipitation in tenths of a mm 6 = mean daily maximum air temperature in tenths of a °C 7 = mean daily minimum air temperature in tenths of a °C 8 = mean of the daily relative humidity in whole per cent
I	9–12	Year	4 digits
J	13	Record type	Blank = yearly data record
K	14–18	January	If a value is missing, then leave the field blank All values should be right-justified
K	19–23	February	
K	24–28	March	
K	29–33	April	
K	34–38	May	
K	39–43	June	
K	44–48	July	
K	49–53	August	
K	54–58	September	
K	59–63	October	
K	64–68	November	
K	69–73	December	
K	74–78	Annual	If precipitation is zero, the field should be "0". If there was trace precipitation, the field should be "T"

If data are missing for an entire year, then only complete fields A, B, I and J.

Yearly data can be provided for only the data-year in question but also for other data years where data were not previously submitted or need to be corrected.

Option 2: Text

An example of a properly formatted text file submission is given in Annex III, and a template is provided. A single text file should contain one station containing that single station's elements.

The first line for each station must be a station header record, which should contain the most recent information for the station. A second header record line has been added to accommodate the new WSI.

The next yearly data record section contains data for each climatic element for that station. Leave the element section blank by using spaces if the station does not report that element. Do not use figure "9" or "-9" or tabs to represent missing data.

(a) Station header records

Station header records contain eight rows documenting basic station characteristics. These characteristics should represent the most recent location of the station.

<i>Line</i>	<i>Position</i>	<i>Contents</i>	<i>Notes</i>
1	40–44	WMO number	5 digits with leading 0 if applicable, left-justified. Leave null if new station with only WSI.
2	40–63	Name of station in English	Left-justified
3	40–63	Name of country/territory in English	Left-justified
4	40–49	Latitude degrees (0–90) minutes (0–59) seconds (0–59) direction (N or S)	Left-justified, example 09 04 00N
5	40–50	Longitude degrees (0–180) minutes (0–59) seconds (0–59) direction (E or W)	Left-justified, example 000 45 59E
6	40–49	Height of station above sea level	Left-justified, whole metres
7	40–49	Height of barometer above sea level	Left-justified, tenths of metres, explicit decimal
8	40–49	WSI	Maximum 31 character identifier from WMO OSCAR system, left-justified

(b) Yearly data records

Each yearly data record contains monthly and annual data for a particular year. These records contain 14 fields documenting the year, element type, monthly data values, and the annual value. Stated in tabular form, the contents include the following:

Field	Columns	Contents	Notes
1	1–4	Year	4-digits
2	6–11	January	If a value is missing, then leave the field blank All values should be right justified Decimal points should be explicitly noted except for relative humidity (which is rounded to whole per cent) If there is no value after the decimal, the last character should be "0" (e.g., 1014 hpa should be "1014.0") If the temperature is negative, the 1st value of the field should be "-" (e.g., -13) If precipitation is zero, the field should be "0". If there was trace precipitation, the field should be "T"
3	13–18	February	
4	20–25	March	
5	27–32	April	
6	34–39	May	
7	41–46	June	
8	48–53	July	
9	55–60	August	
10	62–67	September	
11	69–74	October	
12	76–81	November	
13	83–88	December	
14	90–95	Annual	

If data are missing for an entire year, then only complete field 1. *If data are missing for any months, use spaces to fill (not the tab key).*

Yearly data can be provided for only the data year in question but also for other data-years where data were not previously submitted or need to be corrected.

2.3 History metadata (station notes)

Each WMO Member should submit one file containing all the metadata (station notes) for all the stations in their country/territory. There is no required format for this information, but there is some preferred content to make the greatest possible use of the submitted climatic data. Critical content includes the times of observation, the formulas used in computing means, and the types of instrumentation. To the extent possible, this information should be specific to each climatic element. Furthermore, it is extremely helpful if historical changes are explicitly documented for all types of metadata, including observation times, averaging formulas, instrumentation types, and basic parameters such as location and elevation. An example of station notes is given in Annex IV.

ANNEX I. RECOMMENDED COLLECTION MECHANISM BY REGION

Note: The CBS Lead Centres for GCOS listed below constitute the principle regional nodes of the WWR collection mechanism. The WMO Secretariat does not act as a node in the WWR collection mechanism. Members are requested to contact the WMO Secretariat (wcdmp@wmo.int) for coordination should submission problems arise.

<i>Region</i>	<i>Member States/ Territories</i>	<i>Collection mechanism</i>
RA I	All Members of RA I	CBS Lead Centre for GCOS Africa, Morocco (DMN*); cbs.lead.centre.4gcos@gmail.com
RA II	All Members of RA II	CBS Lead Centre for GCOS Asia, Japan (JMA*); climatemonitor@met.kishou.go.jp
RA III	All Members of RA III	CBS Lead Centre for GCOS South America, Chile (DMC*); gtorres@meteo Chile.cl
RA IV	All countries of RA IV	CBS Lead Centre for GCOS North and Central America and the Caribbean, United States (NCEI*); gcos.ncdc@noaa.gov
RA V	All Members of RA V	CBS Lead Centre for GCOS South West Pacific, Australia, (BOM*); GCOS_Lead_Centre_RAV@bom.gov.au
RA VI	All Members of RA VI	CBS Lead Centre for GCOS Europe, Germany (DWD*); CBS-LC-GCOS.RAVI@dwd.de

* BOM: Bureau of Meteorology; DMC: Dirección Meteorológica de Chile; DMN: National Meteorological Office of Morocco; DWD: Deutscher Wetterdienst; JMA: Japan Meteorological Agency; NCEI: National Centers for Environmental Information.

ANNEX II. EXAMPLE EXCEL FILE (SINGLE STATION PER TAB)

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web/2021-03-25 10.48.08/links/1186_Annex-II-p1.pdf.

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web/2021-03-25 10.48.08/links/1186_Annex-II-p2.pdf.

ANNEX III. EXAMPLE TEXT FILE (SINGLE STATION PER FILE)

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web/2021-03-25 10.48.08/links/1186_Annex-III-p1.pdf.

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ANNEX IV. STATION NOTES EXAMPLE

TRINIDAD AND TOBAGO (2 stations)

General:

All observation hours were in local time. A total of 24 hourly observations per day were used in computing the means of temperature and pressure except at Crown Point. At this station, part-time operation existed during June to December 1980; January 1976; 1977, and 1978; February, March, April 1976; and for February, March, and April 1978. Observation hours during these periods were 0700 to 2300 hours or 0800 to 2200 hours.

At Piarco, the period of record of CLINO values for sea-level pressure and temperature was 1946–1975. For precipitation it was 1946–1980. No CLINO exists for Crown Point since past records begin only in 1970.

Pressure:

Pressure was measured by a Kew Pattern barometer until 1974 after which a precision Aneroid type was used. Heights of the barometers were 13.4 metres at Piarco and 6.7 metres at Crown Point.

Temperature:

Thermometers, housed in a standard Stevenson screen, were 1.2 metres above ground at both stations.

Precipitation:

Rainfall was measured by a pot gauge. A tilting–siphon rain recorder adjusted the pot gauge. Rainfall was measured four times daily at 0200, 0800, 1400, and 2000 hours local time at both stations except during part-time operations at Crown Point. Heights of the rain gauges were 3 metres at Piarco, and 3 metres at Crown Point.

URUGUAY (13 stations)

General:

CLINO values correspond to the period 1951–1980 for precipitation and 1946–1980 for other elements. Rain gauges and thermometers were located 1.5 metres above the ground.

Pressure and temperature:

The monthly pressure and temperature values were both computed from the equation:

$$1/10(00+03+06+09+12+15+18+21 \text{ hours GMT} + \text{Mean max} + \text{Mean min})$$

Precipitation:

The daily values were measured at 0900 hours GMT.

For more information, please contact:

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