Annual Climatological Summaries

NOTE: English units are displayed on all output formats.

I. Description

Annual Climatological Summaries provide historical monthly temperature, precipitation, and snow records over thousands of reporting sites in the United States. The Annual Climatological Summaries database includes 29 meteorological elements (see Table A below for complete list) including temperature (monthly means and extremes), precipitation (monthly totals, extremes and number of days various amount thresholds are met), snowfall, maximum snow depth, degree days and soil temperatures.

II. Format/Observation Definitions

(Note: the term 'element' is used throughout this documentation and refers to an individual meteorological/climatological measurement or statistical value such as temperature, precipitation (amount), etc.)

Users are given the choice between the following three delivery formats:

1) Annual Summary -Annual Climatological Summary-Portable Document Format (PDF) output gives monthly values for all elements (see Table A).

2) Annual Summary -Annual Climatological Summary ASCII Spreadsheet- Output is ASCII text file and user is given the choice whether to include flags (attributes), station name or geographic location in data records. The user can define which of the observations (values) listed in Table A (below) to include in data records.

3) Annual Summary -Annual Climatological Summary ASCII Form- Options are same as #2 above but output is given as CSV file for use in spreadsheet applications.

A. Identification information (location, date, etc.)

Each record represents all selected observations (i.e. elements) available for a given station-year. The initial section of each record is ordered as follows with the following definitions:

STATION (17 characters) is the station identification code. Please see

http://www1.ncdc.noaa.gov/pub/data/ghcn/daily/ghcnd-stations.txt

for a complete list of stations and their metadata.

STATION_NAME (max 50 characters) is the name of the station (usually city/airport name). This is an optional output field (appears automatically on PDF output).

GEOGRAPHIC_LOCATION (31 characters) is the latitude (decimated degrees w/northern hemisphere

values > 0, southern hemisphere values < 0), longitude (decimated degrees w/western hemisphere values < 0, eastern hemisphere values > 0) and elevation above mean sea level (tenths of meters on text/CSV output and feet on PDF output). This is an optional output field on text/CSV output.

DATE is the year of the record (4 digits) followed by month (2 digits).

Following the date the text/CSV output gives the available individual observational elements as listed and defined in Table A below. The PDF output has headings labeling the observational elements at the top of the form and organizes temperature data on the left of the form and precipitation/snowfall data on the right.

Flags: Each observational element on the text/CSV output is followed by the following flag values:

1) Measurement Flag (defined in Table B below),

2) Quality Flag (defined in Table C below),

3) Number of Days flag - Number of days is given as 00 when all days in the month are considered in computing data value or otherwise the maximum number of consecutive days in the month considered in computing the data value.

4) Units flag (defined in Table D below)

Note: Users have the option of not including the above flag values in text/CSV output formats. Units are defined on form for PDF output option.

Table A (observations/values)

All 29 observation/element values are defined below. Each of these may be included (or excluded) on the Custom Annual Climatological Summary ASCII text/CSV output and all are also included on the Annual Climatological Summary-Portable Document Format (PDF). The PDF form includes a summed row at the bottom of the form to represent the complete year. Any elements with values of 9999 or -9999 mean that data are missing.

Computed

CLDD - Cooling degree days. These are using a 65 degree Fahrenheit base (whole degrees Fahrenheit)

DP01 - Number of days in month with greater than or equal to 0.1 inch of precipitation

DP05 - Number of days in month with greater than or equal to 0.5 inch of precipitation

DP10 - Number of days in month with greater than or equal to 1.0 inch of precipitation

DT00 - Number days in month with minimum temperature less than or equal to 0.0 F

DT32 - Number days in month with minimum temperature less than or equal to 32.0 F

DT90 - Number days in month with maximum temperature greater than or equal 90.0 F

DX32 - Number days in month with maximum temperature less than or equal to 32.0 F

HTDD - Heating degree days. These are using a 65 degree Fahrenheit base (whole degrees Fahrenheit)

Precipitation

EMXP - Extreme maximum daily precipitation total within month (inches to hundredths), day of occurrence given on PDF output

TPCP - Total precipitation amount for the month (inches to hundredths)

TSNW - Total snow fall amount for the month (inches to tenths)

MXSD - Maximum snow depth reported during month (inches), day of occurrence given on PDF output

DPNP – Departure from normal monthly precipitation (1981 – 2010 normal)

Air Temperature (all units in Fahrenheit)

EMNT - Extreme minimum temperature reported in month, day of occurrence given on PDF output

EMXT - Extreme maximum temperature reported in month, day of occurrence given on PDF output

MMNT - Monthly mean minimum temperature (tenths of degrees)

MMXT - Monthly mean maximum temperature (tenths of degrees)

MNTM – Monthly mean temperature (tenths of degrees)

DPNT – Departure from normal monthly mean temperature (1981 – 2010 normal)

Pan Evaporation

MMNP – Mean minimum temperature for month of water within evaporation pan (Fahrenheit to tenths)

MMXP - Mean maximum temperature for month of water within evaporation pan (Fahrenheit to tenths)

TEVP – Total water to evaporated from evaporation pan for month (inches to hundredths)

Soil Temperature

Note: Soil temperature records are from 1982 to present. Each data observational element has an appended 4 character code which represents soil cover, soil depth, subplot, and the time of observation. There is no distinction whether or not the depth is in inches or centimeters.

Soil temperature data were added in January 1982 with approximately 250 stations reporting soil data. Soil data before 1982 are available in DS9639 (please inquire at ncdcorders@noaa.gov). In January 1987, the 1982 and 1983 soil data were removed due to poor data quality.

Selection of the following data types (elements) will be available on the Custom Output user interface:

MNyzop – monthly mean minimum soil temperature
HNyzop – highest minimum soil temperature for the month
LNyzop – lowest minimum soil temperature for the month
MOyzop – monthly mean soil temperatureat observation time
HOyzop – highest soil temperature at observation time
LOyzop – lowest soil temperature at observation time
MXyzop – monthly mean maximum soil temperature
HXyzop – highest maximum soil temperature for the month
LXyzop – lowest maximum soil temperature for the month

For the soil temperature observational elements above:
y is the soil cover code (see table E)
z is the soil depth code (see table F)
o is the subplot code (see table G)
p is the time of observation code (see table H)

Custom output (text and csv) will provide all data in each of the soil temperature classifications.

Table B (Measurement Flag)

A - Accumulated amount. This value is a total that may include data from a previous month or months (TPCP).

B - Adjusted Total. Monthly value totals based on proportional available data across the entire month. (CLDD, HTDD)

E - An estimated monthly or annual total.

I - Monthly means or totals based on incomplete time series. 1 to 9 days are missing. (MMNT,MMXP, MMXT, MNTM, TPCP, TSNW)

M - used to indicate data element missing.

S - Precipitation for the amount is continuing to be accumulated. Total will be included in a subsequent value (TPCP).

Example: Days 1-20 had 1.35 inches of precipitation, then a period of accumulation began. The element TPCP would then be 00135S and the total accumulated amount value appears in a subsequent monthly value.

If TPCP = 0 there was no precipitation measured during the month. Flag 1 is set to "S" and the total accumulated amount appears in a subsequent monthly value.

T - Trace of precipitation, snowfall, or snow depth. The precipitation data value will = "00000". (EMXP, MXSD, TPCP, TSNW)

+ - The phenomena in question occurred on several days. The date in the DAY field is the last day of occurrence.

(blank) No report

Table C (Quality Flag)

A – Accumulated amount
E – Estimated value
+ - Value occurred on more than one day – last date of occurrence is used

Table D (Units)

C -Whole degree Celsius
D - Whole Fahrenheit Degree Day
F - Whole degree Fahrenheit
HI - Hundredths of inches
I - Whole inches
M - Whole miles
MH – Miles per hour
MM – Millimeters
NA – No units applicable (dimensionless)
TC – Tenths of degrees Celsius
TF – Tenths of degrees Fahrenheit
TI – Tenths of inches
TM – Tenths of millimeters
1 - Soils – degrees Fahrenheit, soil depths in inches and hundredths
2 - Soils – degrees Celsius, soil depth in whole centimeters
3 – Soils – degrees Celsius, soil, soil depth in inches and hundredths
4 – Soils – degrees Fahrenheit, soil depth in whole centimeters
5 – Soils – If the soil station closed during the current month, “5” indicates the station has closed.

Table E (soil cover code, y)
1 – grass
2 – fallow
3 – bare ground
4 – brome grass
5 – sod
6 – straw mulch
7 – grass muck
8 – bare muck
0 – unknown

Table F (soil depth code, z)
1 – 2 inches or 5 centimeters
2 – 4 inches or 10 centimeters
3 – 8 inches or 20 centimeters
4 – 20 inches or 50 centimeters
5 – 40 inches or 100 centimeters
0 – unknown

Table G (subplot code, o)
0 – station plot only
1 – 1st subplot
2 – 2nd subplot
3- 3rd subplot
4 – 4th subplot
8 – 8th subplot
9 – not applicable

Table H (time of observation code, p)
A – Temperature reading at AM time
P – Temperature reading at PM time
9 – not applicable