ORNL/CDIAC-118
NDP-070

UNITED STATES HISTORICAL CLIMATOLOGY NETWORK DAILY TEMPERATURE, PRECIPITATION, AND SNOW DATA FOR 1871–1997

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National Climatic Data Center

Dale P. Kaiser and Linda J. Allison, editors
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Contributed by

D. R. Easterling, T. R. Karl, J. H. Lawrimore, and S. A. Del Greco

National Oceanic and Atmospheric Administration
National Climatic Data Center
Asheville, North Carolina

Prepared by

Dale P. Kaiser and Linda J. Allison

Carbon Dioxide Information Analysis Center

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Carbon Dioxide Information Analysis Center
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831-6335
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ABSTRACT

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This document describes a database containing daily observations of maximum and minimum temperature, precipitation amount, snowfall amount, and snow depth from 1062 observing stations across the contiguous United States. This database is an expansion and update of the original 138-station database previously released by the Carbon Dioxide Information Analysis Center (CDIAC) as CDIAC numeric data package NDP-042. These 1062 stations are a subset of the 1221-station U.S. Historical Climatology Network (HCN), a monthly database compiled by the National Climatic Data Center (Asheville, North Carolina) that has been widely used in analyzing U.S. climate. Data from 1050 of these daily records extend into the 1990s, while 990 of these extend through 1997. Most station records are essentially complete for at least 40 years; the latest beginning year of record is 1948. Records from 158 stations begin prior to 1900, with that of Charleston, South Carolina beginning the earliest (1871).

The daily resolution of these data makes them extremely valuable for studies attempting to detect and monitor long-term climatic changes on a regional scale. Studies using daily data may be able to detect changes in regional climate that would not be apparent from analysis of monthly temperature and precipitation data. Such studies may include analyses of trends in maximum and minimum temperatures, temperature extremes, daily temperature range, precipitation "event size" frequency, and the magnitude and duration of wet and dry periods. The data are also valuable in areas such as regional climate model validation and climate change impact assessment.

This database is available free of charge from CDIAC as a numeric data package (NDP). The NDP consists of this document and 57 files: 48 daily data files (containing records from stations in each of the 48 contiguous states), the HCN/D station inventory and station history files, a text file describing all data files, and 6 files containing computer software routines for reading the data. This document describes the HCN/D station network, gives details of the format and content of all files, and provides a reprint from the literature detailing analysis of U.S. daily precipitation data.

Keywords: United States; HCN; historical; climate; climatology; daily data; temperature; maximum temperature; minimum temperature; precipitation; snowfall; snow depth

1. BACKGROUND INFORMATION

Over the past few decades, numerous global, hemispheric, and regional meteorological databases have been assembled for use in studying the nature and variability of the earth's climate. This work has been largely inspired by growing international concern over the potential climatic impacts of increasing atmospheric concentrations of greenhouse gases. While the parameters important in the study of climate change are myriad, those that seem to have received the most attention are near-surface air temperature (herein referred to as temperature) and precipitation. There are many reasons for this, including (1) the spatial and temporal variability of these parameters affects ecosystems, agriculture, water resources, human health, and energy needs and consumption; (2) instrumental records of these variables are relatively long, beginning in the 1800s in many regions of the northern hemisphere; and (3) analyses of temperature data from around the globe show an increase in global mean surface temperature of between 0.3°C and 0.6°C since the late 19th century (IPCC 1996).

The suitability of modern historical temperature and precipitation data for climate change studies depends on their reliability and accuracy. Most records of significant length, regardless of source, are likely to contain biases or inhomogeneities resulting from changes in the environment or operation of individual observing sites (e.g., urbanization, station moves, and instrument and time of observation changes). The process of identifying and removing these nonclimatic effects is complex and tedious, and has been undertaken on large scales in such studies as Jones (1994), Jones et al. (1986; 1997), Vinnikov et al. (1990), Peterson and Vose (1997), and Quinlan et al. (1987). The work of Quinlan et al. (1987) involved the compilation of a database containing monthly temperature and precipitation data from a network of 1219 U.S. stations known as the Historical Climatology Network (HCN). The compilation was performed at the National Climatic Data Center (NCDC) of the National Oceanic and Atmospheric Administration (NOAA) in Asheville, North Carolina, and sponsored by the Carbon Dioxide Research Program of the U.S. Department of Energy. The project arose from the need for an accurate, unbiased, and modern historical climate record suitable for detecting and monitoring secular changes in regional climate in the contiguous United States. The quality of the HCN data was enhanced with the use of outlier and areal edits, and the data were corrected for time of observation differences, instrument changes, instrument moves, station relocations, and urbanization effects (Karl et al. 1986; Karl and Williams 1987). The HCN has been updated several times since its inception, most recently by Easterling et al. (1996). Some of the stations in the HCN are first-order weather stations, but the majority were selected from approximately 5000 U.S. cooperative weather stations.

The first database released by NCDC to contain daily data from HCN stations, the HCN/Daily (HCN/D; Hughes et al. 1992; hereafter H92) contained daily maximum and minimum temperatures and precipitation totals from 138 select U.S. stations. The temperature and precipitation records from these stations were considered to be the most reliable, internally consistent, and unbiased records from the HCN. These records were compiled from digital and nondigital data sets archived at NCDC that come from a variety of sources, including climatological publications, universities, federal agencies, individuals, and data archives. Records were subjected to extensive manual and automated quality assurance (QA) checks. The selection of stations for inclusion in H92 was performed with the following data quality issues in mind.

1. The degree to which each station maintained a constant observation time for maximum and minimum temperatures, excursions from a station's predominant observing time of no more than four years being desired.

2. At least 95% of a station's pre-1951 data should be contained in NCDC digital daily archives.

3. A station's potential for heat island bias over time should be low.

4. Quality assessments based upon the decile ranking assigned by Karl et al. (1990) to the stations' *monthly* maximum/minimum temperature data for certain quality characteristics.

Since the release of H92, much more work has been conducted at NCDC involving compilation and digitizing of daily data. However, to enable the compilation of a database providing better spatial coverage of the contiguous United States, the four station selection criteria listed above were not strictly adhered to in the current version of the HCN/D presented here.

2. DESCRIPTION OF THE DATABASE

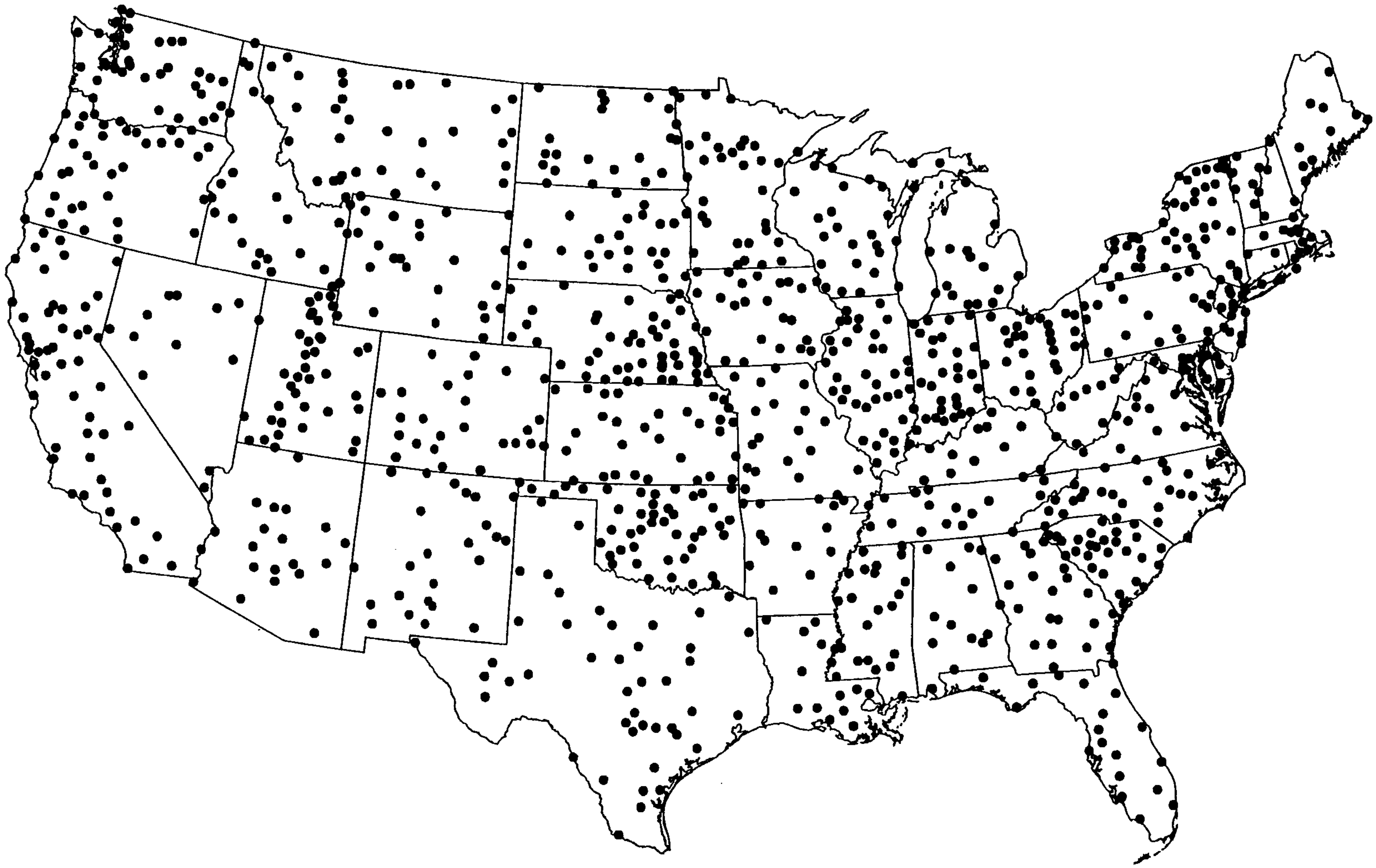
The data presented in this package are daily observations of maximum and minimum temperature, precipitation amount (liquid equivalent), snowfall amount, and snow depth from 1062 of the now 1221 stations currently comprising the HCN. This daily database represents a vast expansion of the number of station records originally available (138) in H92. In addition, snowfall amount and snow depth observations were not available in H92. Data from 1050 of these daily records extend into the 1990s, while 990 of these extend through 1997. Most station records are essentially complete for at least 40 years; the latest beginning year of record is 1948. Records from 158 stations begin prior to 1900, with that of Charleston, South Carolina beginning the earliest (1871).

While the stations selected in H92 were determined to be superior with regard to the above station selection criteria, the resulting network's spatial coverage of the United States was lacking in several regions. By including many more stations (mainly from the U.S. cooperative station network), and performing the needed QA checks, coverage has now been vastly improved. Figure 1 shows the distribution of the 1062 HCN/D stations. All of the contiguous 48 states are now represented by stations in the database, whereas H92 contained no stations for several states. Appendix A contains an inventory of the present HCN/D stations; the names and numbers of the original 138 stations from H92 are bolded and italicized for the user's reference.

3. DATA INHOMOGENEITIES AND NONCLIMATIC INFLUENCES IN THE DATA

For users to correctly interpret records from this latest version of the HCN/D in their analyses, it is important to describe a few caveats inherent in the recording of daily meteorological data in the United States. These relate primarily to observations of maximum and minimum temperature at U.S. cooperative network stations.

Figure 1. Spatial distribution of the 1062 stations in the U.S. Historical Climatology Network / Daily (HCN/D) database.



As pointed out in Sect. 2, the criterion deemed most important in the H92 station selection process was the degree to which a station maintained a constant observing time, i.e., a fixed observing "day," for maximum and minimum temperatures. The importance of maintaining a consistent schedule for observing daily maximum and minimum temperature has been illustrated by several studies, such as Mitchell (1958), Baker (1975), and Schaal and Dale (1977). These studies examined the effects of changing observation time on the daily mean temperature, customarily determined for U.S. stations by adding the maximum and minimum temperature observed over a prescribed 24-hour observing day and dividing by 2. At first-order National Weather Service (NWS) stations (some of which are included in the HCN/D), the 24-hour observing day ends at or near local midnight. Monthly and annual mean temperatures derived using the mean of the daily maximum and minimum temperatures from such stations have been shown by Baker (1975) and Mitchell (1958) to correspond closely with those computed using the stations' hourly observations. While this evidence lends clear support to the practice of ending the observing day at midnight, cooperative observers (comprising most of the HCN/D stations) generally do not take readings at this hour. Most end their observing day in the late afternoon or early evening, with a smaller number choosing a time between 0700 and 0800 local standard time (LST). The systematic biases introduced to the daily means by varying observing times can have far-reaching effects, as the daily mean temperatures form the basis of monthly and annual mean temperatures, and also monthly, seasonal, and annual heating degree days, cooling degree days, and growing degree days. Information on the LST of maximum/minimum temperature observations at each station is contained in the station history file for the HCN/D which is described in Sect. 5. **Users are strongly urged to make use of this time of observation information in analyses where homogeneity of observing practices across a network of selected stations would be considered important.**

While combining daily temperature (or precipitation) data from stations which use different observing days complicates data compilation and quality control and also distorts areal patterns, of perhaps more fundamental importance is the degree of homogeneity over time of observing practices at individual stations and the associated implications for studies of climatic trends. Many stations in the HCN/D depart to varying degrees from a single, fixed observation time for maximum and minimum temperatures over their period of record (see the station history file). This often results from observing responsibilities being transferred between individuals and may even result in a station moving to a new location in the area (relocation information is also contained in the station history file). The user is referred to the work of Mitchell (1958), Baker (1975), and Schaal and Dale (1977) for detailed illustrations of how such changes in observing time are likely to bias calculations involving maximum and minimum temperature data. Two main conclusions common to all three studies are (1) mean temperature calculations using 24-hour maximum/minimum temperatures from PM observations are biased high with respect to midnight observations, while those from AM observations are biased low, and (2) the magnitude of these biases is dependent upon time of year and a station's climatic regime.

Another factor users should be aware of pertains to thermometers used at the HCN/D stations. In 1984, the NWS introduced a new Maximum/Minimum Temperature System (MMTS) at cooperative network observing stations. Through 1994, 645 out of 1062 (~60%) of the HCN/D stations had installed an MMTS (the station history file identifies these stations). Concerns have arisen about the calibration of this system as compared to that of the earlier thermometric system. The new system is thermistor-based with a "beehive like" instrument shelter, whereas the older systems consisted of liquid-in-glass thermometers, mounted inside a Cotton Region Shelter (Stevenson Screen). Quayle et al. (1991) looked into performance differences of the two systems and found that the new system produces maximum temperatures ~0.3°C lower and minimum temperatures ~0.4°C higher than the old system. Unfortunately, because large samples of side-by-side overlapping measurements are not available, site-specific corrections cannot yet be derived and only large-scale temperature changes can be corrected. Furthermore, daily biases, which are likely to be dependent on synoptic conditions, are unlikely to be the same from day to day. Thus, to date there has been no attempt to adjust the daily temperature data from the HCN/D for these instrument-induced biases.

In summary, while the HCN/D stations represent the best long-term climate records available for the contiguous U.S., no station is completely free of changes that could possibly affect its instrumental record; therefore, it is recommended that users make full use of the information contained in the station histories when performing analyses with these data. The data have not been adjusted for station relocations, heat island effects, instrument changes, or time of observation biases. The nature of inhomogeneities arising from such factors depends on a station's climatic regime.

4. QUALITY ASSURANCE OF THE HCN/D DATABASE

An important part of the numeric data packaging process at CDIAC is the quality assurance (QA) of data before distribution. Data received at CDIAC are rarely in perfect condition for immediate distribution, regardless of their source. To guarantee data of the highest possible quality, CDIAC conducts extensive QA reviews. Reviews involve examining the data for completeness, reasonableness, and accuracy. Although they have common objectives, these reviews are tailored to each data set, often requiring extensive programming efforts. Although time-consuming, the QA process is an important component in the value-added concept of ensuring accurate, usable data for researchers.

Through the years, NCDC has conducted extensive manual and automated QA assessments of the HCN/D data. Although the data sent by NCDC were in excellent condition, CDIAC still conducted QA checks on the data and found some minor discrepancies. The following summarizes the major aspects of QA work performed by NCDC and CDIAC, respectively. Users may also find additional details of QA work performed at NCDC in NCDC's *Summary of the Day*[1] (SOD, TD-3200) documentation, available over the internet via NCDC's web site (http://www.ncdc.noaa.gov). (From the NCDC homepage, use the search feature to search for "Summary of the Day" or "TD-3200".)

NCDC QA Checks and Adjustments

A general overview of the history of HCN/D QA efforts conducted at NCDC, paraphrased from NCDC's SOD documentation, is as follows. In 1982, historical data were converted from various digital files to an "element" (observation type; e.g., maximum temperature, precipitation amount, etc.) type of file structure. At the time, data were only

[1]The primary digital source of HCN values is the NCDC *Summary of the Month* (SOM, TD-3220), whereas the primary digital source of HCN/D data is the NCDC *Summary of the Day* (SOD, TD-3200). Differences between the data contained in these major archives arise from differences in the key entry procedures and validation techniques of these databases.

processed through a gross value check. Shortly thereafter, NCDC instituted a greatly enhanced computer algorithm for operational, automated validation of digital archives. The revised edit system performed internal consistency checks and evaluated against surrounding stations in addition to climatological limits and serial checks. Quality control flags were appended to each element to show how they fared during the edit procedures and to indicate what, if any, action was taken. Prior to 1982, the files consisted only of raw, observed data values; both observed and edited values (as necessary) have been supplied from 1982 onward.

Since 1982, the operational edit system at NCDC has evolved into a Geographical Edit and Analysis (GEA) expert system which affords interactive graphics presentations for the human editors. As of 1991, additional capabilities to detect systematic errors in the daily data have been incorporated using the Validation of Historical Daily Data (ValHiDD) system. Furthermore, in November 1993, the entire historical period of record was independently processed (no human editing) through the ValHIDD system for five data elements (the five variables included in NDP-070). Hence, the entire period of record for these elements now comprises observed (raw) and edited values.

The following is a list of items from H92 that constitute some of the main human and automated QA checks performed on the data by NCDC.

1. Monthly mean values of maximum and minimum temperature, computed from the HCN/D data, were compared to their respective unadjusted monthly means from the HCN. All conflicts were investigated and resolved, with verification based on manuscript or published sources.

2. Checks were performed to ensure that no monthly mean values of maximum and minimum temperature calculated from a station's daily data were above (below) the monthly state extremes of maximum (minimum) temperature.

3. Any daily precipitation total exceeding 5 in. was verified against manuscript or published sources.

4. Checks were implemented to ensure that maximum temperatures were never less than minimum temperatures on the day of occurrence, the preceding day, and the following day. Conversely, checks were performed to ensure that minimum temperatures were never greater than maximum temperatures on the day of occurrence, the preceding day, and the following day.

5. Temperature data from stations that took readings during the morning over some period have been checked for any date shifting resulting from observers assigning readings to the calendar day of occurrence (the previous day in the case of maximum temperature) rather than the observation day. Such readings were switched back to the day of observance as part of the manual QA checks on the HCN/D data.

CDIAC QA Checks and Modifications

1. Because each record in an HCN/D file contains 31 daily data elements (to allow for 31 days in a month), elements pertaining to nonexistent dates were checked to ensure that they contained missing data indicators with blank flag spaces (the prescribed conventions).

2. A few data measurement and data quality flags were found in the data that are not detailed in NCDC's SOD documentation. Records containing these were submitted to NCDC. In some cases, consultation with NCDC determined that these flags were due to corrupted data elements, which have since been corrected. The meanings of a few unknown data measurement flags were not able to be resolved by NCDC. NCDC acknowledges these flag caveats in the following passage from the SOD documentation: *"Other values occasionally appear in Data Measurement Flag 1 for which documentation is not currently available, e.g., "C" and "s"."*

3. The logical record length of the HCN/D files was shortened from 402 to 270 characters. This was accomplished by compressing the width of each daily data field from 12 characters to 8 characters, and slightly modifying some header information in each record.

4. All data records were checked to ensure that the number of days in the month (specified in each record) was correct for the year and month of each record.

5. FILE DESCRIPTIONS

This section describes the 57 files contained in this database. In addition to the 48 actual daily data files (one per state), there are station inventory and history files, a text documentation file, and FORTRAN and SAS codes for reading the the various files.

DOCUMENTATION FILE FOR NDP-070 (ndp070.txt)

This file is an ASCII version of the HTML documentation that may be found for this database on CDIAC's web site. It exists for the benefit of those downloading the database directly from CDIAC's file transfer protocol (FTP) area without the use of a web browser.

FORTRAN AND SAS®[2] DATA RETRIEVAL PROGRAMS (.for and .sas files)

These files are provided for the benefit of users with FORTRAN or SAS® on their systems, enabling them to read any of the data files in this database using these software packages. The program files are:

invent.for - a FORTRAN program for reading the station inventory file (invent.txt)

history.for - a FORTRAN program for reading the station history file (history.txt)

data.for - a FORTRAN program for reading any of the 48 daily data files

invent.sas - a SAS® program for reading the station inventory file (invent.txt)

history.sas - a SAS® program for reading the station history file (history.txt)

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[2]SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

data.sas - a SAS® program for reading any of the 48 daily data files

STATION INVENTORY FILE FOR NDP-070 (invent.txt)

The station inventory file for the HCN/D data set is sorted by two-digit state code (see Appendix B for a list of these codes) and four-digit Cooperative Network Index (CNI), with one record per station containing two-letter state abbreviation, two-digit state code, four-digit CNI, station name, latitude and longitude (both in decimal degrees), elevation (ft), and five columns containing the beginning month and year of daily observations of maximum temperature, minimum temperature, precipitation amount, snowfall amount, and snow depth.

The file may be read using the following FORTRAN format:

```
      INTEGER STCODE,CNI,ELEV,MOTMAX,YRTMAX,MOTMIN,YRTMIN,
     +MOPRCP,YRPRCP,MOSNOW,YRSNOW,MOSNWD,YRSNWD
      REAL LAT,LON
      CHARACTER*2 STATE
      CHARACTER*30 STNAME
      READ(5,100,END=99)STATE,STCODE,CNI,STNAME,LAT,LON,
     +ELEV,MOTMAX,YRTMAX,MOTMIN,YRTMIN,MOPRCP,YRPRCP,
     +MOSNOW,YRSNOW,MOSNWD,YRSNWD
  100 FORMAT(A2,1X,I2,I4,1X,A30,1X,F5.2,1X,F7.2,2X,
     +       I4,5(1X,I2,1X,I4)
```

or by using the SAS® format:

```
DATA INVENT;
LENGTH STNAME $ 30;
INFILE 'INVENT.TXT';
INPUT STATE $ 1-2 STCODE 4-5 CNI 6-9 STNAME $ 11-40
      LAT 42-46 LON 48-54 ELEV 57-60 MOTMAX 62-63
      YRTMAX 65-68 MOTMIN 70-71 YRTMIN 73-76
      MOPRCP 78-79 YRPRCP 81-84 MOSNOW 86-87
      YRSNOW 89-92 MOSNWD 94-95 YRSNWD 97-100;
```

Stated in tabular form, the contents of the station inventory file include the following.

Variable	Variable type	Variable width	Starting column	Ending column
STATE	Character	2	1	2
STCODE	Numeric	2	4	5
CNI	Numeric	4	6	9
STNAME	Character	30	11	40
LAT	Numeric	5	42	46
LON	Numeric	7	48	54
ELEV	Numeric	4	57	60

Variable	Variable type	Variable width	Starting column	Ending column
MOTMAX	Numeric	2	62	63
YRTMAX	Numeric	4	65	68
MOTMIN	Numeric	2	70	71
YRTMIN	Numeric	4	73	76
MOPRCP	Numeric	2	78	79
YRPRCP	Numeric	4	81	84
MOSNOW	Numeric	2	86	87
YRSNOW	Numeric	4	89	92
MOSNWD	Numeric	2	94	95
YRSNWD	Numeric	4	97	100

where

STATE is the two-letter state abbreviation;

STCODE is the two-digit state code (01–48);

CNI is the four-digit Cooperative Network Index;

STNAME is the station name;

LAT is the latitude of the station in decimal degrees north;

LON is the latitude of the station in degrees west;

ELEV is the elevation of the station in feet;

MOTMAX is the beginning month of the daily maximum temperature record for a station;

YRTMAX is the beginning year of the daily maximum temperature record for a station;

MOTMIN is the beginning month of the daily minimum temperature record for a station;

YRTMIN is the beginning year of the daily minimum temperature record for a station;

MOPRCP is the beginning month of the daily precipitation amount record for a station;

YRPRCP is the beginning year of the daily precipitation amount record for a station;

MOSNOW is the beginning month of the daily snowfall record for a station;

YRSNOW is the beginning year of the daily snowfall record for a station;

MOSNWD is the beginning month of the daily snow depth record for a station; and

YRSNWD is the beginning year of the daily snow depth record for a station.

Please note that for station 238444 (Trenton, MO) beginning month and year variables for snowfall amount and snow depth contain "-9" and "-999", respectively, as snowfall amount and snow depth data are not available for Trenton.

STATION HISTORY FILE (history.txt)

The station history file provides valuable information concerning each station in the HCN/D. This file documents station moves and instrument changes, lists station observers and observation times, and identifies suspect fields. For each station in the file there is an identification record followed by multiple data records describing station observing details over its period of record.

The file may be read using the following FORTRAN format:

```
      DIMENSION DATA(54)
      READ(5,100,END=99) (DATA(I),I=1,54)
100   FORMAT(54A4)
```

or using the SAS® format:

```
DATA HISTORY (DROP=X);
RETAIN STANUM STATE DIVISION CURRNAME COUNTY XREF;
INFILE 'HISTORY.TXT' MISSOVER LS=216;
INPUT @45 X $1. @;
IF X NE ' ' THEN DO;
 INPUT STANUM 1-6 STATE $ 8-9 DIVISION 11-12 CURRNAME $ 14-43
       COUNTY $ 45-60 XREF $ 62-86 ;
END;
ELSE
INPUT STANUM2 1-6 MOBEG 8-9 DAYBEG 11-12 YRBEG 14-17 MOEND 19-20
 DAYEND 22-23 YREND 25-28 SUSPLAT 30 SUSPLONG 31 SUSPLOC 32
 SUSPELEV 33 SUSPPO 34 SUSPNAME 35 SUSPQUAL 36 SUSPINST 37
 SUSPTIME 38 SUSPHTS 39 SUSPPUBS 40 SUSPBEG 41 SUSPEND 42
 SUSPOBS 43 SUSPOTHR 44 LATNORTH $ 46-51 LONGWEST $ 53-59
 DISTANCE 61-63 DIRECT $ 65-67 ELEV 69-73 DISTPO 75-77
 DIRECTPO $ 79-81 NAME $ 83-110 QUALIF $ 112-121 ADDINST 123
 COTTON 124 DBULB 125 EVAPSTA 126 FISHPORT 127 HYGRO 128
 MINTHERM 129 MAXTHERM 130 NORIVGAG 131 RAINGAGE 132
 SHELTER 133 RECRIVER 134 RECRAIN 135 SNOW 136 STORAGE 137
 STDRAIN 138 STDSHELT 139 THERMOGR 140 DIGTHERM 141
 TIPBUCK 142 OTHEVAP 143 MAXMIN 144 TIMEOBS $ 146-149 PCPHT $
 151-152 PCTHT $ 154-155 BULLETW 157 COMBBUL 158 CLIMDATA 159
 RIVSTAGE 160 HYDROBUL 161 PRECDATA 162 SNOWBULL 163
 NOTPUB 164 CWB 165 MONTHREV 166 STATEPUB 167 LCD 168 BQ 169
 SGPD 170 WWR 171 MYB 172 OBSNAME $ 174-213 NUMOBS 215-216;
```

Stated in tabular form, the contents of the station history file include the following.

Variable	Variable type	Variable width	Starting column	Ending column
		Identification record:		
X	Alphanumeric	1	45	45
STANUM	Numeric	6	1	6
STATE	Character	2	8	9
DIVISION	Numeric	2	11	12
CURRNAME	Alphanumeric	30	14	43
COUNTY	Alphanumeric	16	45	60
XREF	Alphanumeric	25	62	86
		Data record:		
STANUM2	Numeric	6	1	6
MOBEG	Numeric	2	8	9
DAYBEG	Numeric	2	11	12
YRBEG	Numeric	4	14	17
MOEND	Numeric	2	19	20
DAYEND	Numeric	2	22	23
YREND	Numeric	4	25	28
SUSPLAT	Numeric	1	30	30
SUSPLONG	Numeric	1	31	31
SUSPLOC	Numeric	1	32	32
SUSPELEV	Numeric	1	33	33
SUSPPO	Numeric	1	34	34
SUSPNAME	Numeric	1	35	35
SUSPQUAL	Numeric	1	36	36
SUSPINST	Numeric	1	37	37
SUSPTIME	Numeric	1	38	38
SUSPHTS	Numeric	1	39	39
SUSPPUBS	Numeric	1	40	40
SUSPBEG	Numeric	1	41	41
SUSPEND	Numeric	1	42	42
SUSPOBS	Numeric	1	43	43
SUSPOTHR	Numeric	1	44	44
LATNORTH	Alphanumeric	6	46	51
LONGWEST	Alphanumeric	7	53	59
DISTANCE	Numeric	3	61	63
DIRECT	Alphanumeric	3	65	67
ELEV	Numeric	5	69	73
DISTPO	Numeric	3	75	77

Variable	Variable type	Variable width	Starting column	Ending column
DIRECTPO	Alphanumeric	3	79	81
NAME	Character	28	83	110
QUALIF	Alphanumeric	10	112	121
ADDINST	Numeric	1	123	123
COTTON	Numeric	1	124	124
DBULB	Numeric	1	125	125
EVAPSTA	Numeric	1	126	126
FISHPORT	Numeric	1	127	127
HYGRO	Numeric	1	128	128
MINTHERM	Numeric	1	129	129
MAXTHERM	Numeric	1	130	130
NORIVGAG	Numeric	1	131	131
RAINGAGE	Numeric	1	132	132
SHELTER	Numeric	1	133	133
RECRIVER	Numeric	1	134	134
RECRAIN	Numeric	1	135	135
SNOW	Numeric	1	136	136
STORAGE	Numeric	1	137	137
STDRAIN	Numeric	1	138	138
STDSHELT	Numeric	1	139	139
THERMOGR	Numeric	1	140	140
DIGTHERM	Numeric	1	141	141
TIPBUCK	Numeric	1	142	142
OTHEVAP	Numeric	1	143	143
MAXMIN	Numeric	1	144	144
TIMEOBS	Alphanumeric	4	146	149
PCPHT	Alphanumeric	2	151	152
PCTHT	Alphanumeric	2	154	155
BULLETW	Numeric	1	157	157
COMBBUL	Numeric	1	158	158
CLIMDATA	Numeric	1	159	159
RIVSTAGE	Numeric	1	160	160
HYDROBUL	Numeric	1	161	161
PRECDATA	Numeric	1	162	162
SNOWBULL	Numeric	1	163	163
NOTPUB	Numeric	1	164	164
CWB	Numeric	1	165	165
MONTHREV	Numeric	1	166	166
STATEPUB	Numeric	1	167	167
LCD	Numeric	1	168	168

Variable	Variable type	Variable width	Starting column	Ending column
BQ	Numeric	1	169	169
SGPD	Numeric	1	170	170
WWR	Numeric	1	171	171
MYB	Numeric	1	172	172
OBSNAME	Alphanumeric	40	174	213
NUMOBS	Numeric	2	215	216

where

X — is a dummy variable used in the above SAS® program to differentiate header records from data records;

STANUM — is the station identification number, composed of the two-digit state code followed by the four-digit Cooperative Network Index;

STATE — is the two-letter state abbreviation;

DIVISION — is the station division number;

CURRNAME — is the most current station name;

COUNTY — is the county in which the station is currently located;

XREF — is a station cross-reference, representing the cooperative network index of the station or the county name that the current station moved to or from;

STANUM2 — is the station identification number, composed of the two-digit state code followed by the four-digit Cooperative Network Index;

MOBEG — is the month the data record started (missing values are represented by 99);

DAYBEG — is the day the data record started (missing values are represented by 99);

YRBEG — is the year the data record started;

MOEND — is the month the data record ended (missing values are represented by 99);

DAYEND — is the day the data record ended (missing values are represented by 99); and

YREND — is the year the data record ended (missing values are represented by 9999).

The next 15 variables represent suspect fields in the station history file. The values for these variables will be either 0 or 1. Values of 1 represent fields flagged as suspect by the pre-key editor.

1.	SUSPLAT	Latitude
2.	SUSPLONG	Longitude
3.	SUSPLOC	Previous location
4.	SUSPELEV	Elevation
5.	SUSPPO	Post office location
6.	SUSPNAME	Station name
7.	SUSPQUAL	Qualifier
8.	SUSPINST	Instruments
9.	SUSPTIME	Observation time
10.	SUSPHTS	Instrument heights
11.	SUSPPUBS	Publications
12.	SUSPBEG	Beginning date
13.	SUSPEND	Ending date
14.	SUSPOBS	Observer
15.	SUSPOTHR	Other observers

LATNORTH is the current station latitude expressed in degrees and minutes north;

LONGWEST is the current station longitude expressed in degrees and minutes west;

DISTANCE is the distance, in tenths of miles, from the previous station location (e.g., 015 = 1.5 miles), with unknown distances represented by "999";

DIRECT is the direction (16 point) of a station move from the previous location. The location of the temperature instrument defines the official station location. Values may be blank, character, or numeric. Unknown direction is represented by "999". Some examples of DISTANCE and DIRECT combinations are:

999 999	=	first record of new station or distance and direction unknown;
015 NW	=	station moved 1.5 miles NW from previous location;
000 000	=	no change in station (or instrument) location;
000 ESE	=	moved <0.1 mile east-southeast (ESE) from previous location;
000 999	=	moved <0.1 mile, direction unknown;
902 ESE	=	temperature instrument moved 0.2 miles ESE and precipitation instrument either did not move or was moved to a location different than that of the temperature instrument;
800 000	=	precipitation instrument moved <0.1 mile, but the temperature instrument did not move; and
999 NW	=	distance unknown, direction NW;

ELEV is the ground elevation at the station, expressed in whole feet above or below mean sea level;

DISTPO	is the distance, in tenths of miles, from the nearest post office (e.g., 015 = 1.5 miles), with unknown distances represented by "999";
DIRECTPO	is the direction on a 16-point compass from the nearest post office. Values may be either blank, character, or numeric. Unknown directions are represented by "999". Some examples of DISTPO and DIRECTPO combinations are:

999 999	=	distance and direction unknown;
015 NW	=	1.5 miles NW of post office;
000 NW	=	<0.1 mile NW from post office;
000 999	=	<0.1 mile from post office, direction unknown; and
000 000	=	at the post office.

NAME	is the full station name; and
QUALIF	is a qualifier or description that is added to the proper name of the station (e.g., Charleston 2WNW).

The next 22 variables represent the following instruments and classifications. If an instrument was used at a particular station or if a particular classification is appropriate for that station, the variable will have a value of 1; if it was not used, the variable will have a value of 0.

1. ADDINST	Additional instrument (wind, pressure, etc.)
2. COTTON	Cotton region shelter (official, CRS)
3. DBULB	Dry bulb thermometer
4. EVAPSTA	Class "A" evaporation station
5. FISHPORT	Fisher-Porter gage
6. HYGRO	Hygrothermograph
7. MINTHERM	Minimum thermometer
8. MAXTHERM	Maximum thermometer
9. NORIVGAG	Nonrecording river gage
10. RAINGAGE	Nonstandard rain gage
11. SHELTER	Nonstandard shelter
12. RECRIVER	Recording river gage
13. RECRAIN	Recording rain gage
14. SNOW	Snow density gage
15. STORAGE	Storage gage
16. STDRAIN	Standard rain gage (SRG)
17. STDSHELT	Standard shelter (official)
18. THERMOGR	Thermograph
19. DIGTHERM	Digital thermometer
20. TIPBUCK	Tipping bucket gage
21. OTHEVAP	Other than class "A" evaporation station
22. MAXMIN	Max/min temperature system

TIMEOBS — are the observation times (2 characters each) for precipitation and temperature, respectively, if both times are known. Values may be either numeric (rounded to the nearest whole hour), character, or alphanumeric. Codes which relate to one or both of the times may also be present. Possible values and their meanings include the following:

0719	=	precipitation amount read at 0700 LST (local standard time), temperatures read at 1900 LST;
SRSS	=	precipitation amount read at sunrise, temperatures read at sunset;
SS99	=	precipitation amount read at sunset, time of temperature observations either unknown or no temperature data was available for that period of the record;
06HR	=	station observed 6 hours per day (not to be confused with a 6-hourly synoptic observing schedule). How these observations were used to produce daily precipitation amount and maximum/minimum temperatures is unclear;
9079	=	ambiguous form; station records only gave one observation time (0700 LST), but it is unknown if this time applies to both precipitation and temperature;
TRID	=	Tri-daily temperature observations (TAVG = [7AM + 2PM + (2 x 9PM)]/4), but time of observation for precipitation amount is unknown; and
RSSS	=	Precipitation amounts read on a rotating schedule (SR during crop season, i.e., April/May–October/November, but SS otherwise), temperatures read at sunset;

PCPHT — is the height of the precipitation instrument above ground level. Values may be numeric or character, with numeric values expressed to the nearest whole foot; and

PCTHT — is the height of the temperature instrument above ground level. Values may be numeric or character, with numeric values expressed to the nearest whole foot. Potential values for both PCPHT and PCTHT include the following:

01–97	=	actual height;
98	=	≥98 feet;
99	=	missing; and
RF	=	roof, actual height above ground level unknown.

The next 16 variables represent the following forms of publications. If the data from a particular station appeared in a publication, the variable will have a value of 1; if not, the variable will have a value of 0. The variables and their corresponding forms of publications are as follows:

1. BULLETW	Bulletin W
2. COMBBUL	*Combined Bulletin*
3. CLIMDATA	*Climatological Data*
4. RIVSTAGE	*Daily River Stages*

5. HYDROBUL — *Hydrologic Bulletin*
6. PRECDATA — published as hourly precipitation data
7. SNOWBULL — *Snow Bulletin*
8. NOTPUB — not published
9. CWB — Report to the chief of the U.S. Weather Bureau
10. MONTHREV — *Monthly Weather Review*
11. STATEPUB — published in state publications
12. LCD — *Local Climatological Data*
13. BQ — Bulletin Q, 1870–1903.
14. SGPD — *Storage Gage Precipitation Data, Western United States*
15. WWR — *Weekly Weather Review*
16. MYB — *U.S. Meteorological Yearbook*

OBSNAME is the observer's name (may include more than one name per record);

NUMOBS is the number of observers participating during the time of record for an agency.

HCN/D DATA FILES

The 48 HCN/D data files (one for each state of the contiguous United States) contain daily maximum and minimum temperatures (°F), precipitation amounts (hundredths of inches), snowfall amounts (tenths of inches), snow depths (whole inches), and data flags from the 1062 HCN/D stations. The files are sorted by six-digit station number (the two-digit state code followed by the four-digit Cooperative Network Index), year, and month, with one record per month containing station number, data type, data units, year, month, number of days in the month, and 31 daily data values with their respective flags.

The files may be read using the following FORTRAN format:

```
      INTEGER YEAR,MON,DAYS,VALUE(31)
      CHARACTER*1 SF(31),DMF(31),DQF(31)
      CHARACTER*4 DATTYP
      CHARACTER*6 STAID
      CHARACTER*2 UNITS
    1 CONTINUE
      READ(5,100,END=99) STAID,DATTYP,UNITS,YEAR,MON,
     + DAYS,(SF(I),VALUE(I),DMF(I),DQF(I),I=1,31)
100  FORMAT(A6,1X,A4,A2,I4,I2,1X,I2,31(1X,A1,I4,2A1))
```

or by using the SAS® format:

```
DATA HCND;
ARRAY DAY  {31} $ DAY1-DAY31;
INFILE IN LRECL=270;
INPUT STAID $ 1-6 DATTYP $ 8-11 UNITS $ 12-13 YEAR 14-17
      MON 18-19 DAYS 21-22 @23 (DAY1-DAY31) ($CHAR8.);
```

(The respective flag and data values contained in each of the 31 elements of the array DAY in the SAS® format may be extracted using the program data.sas.)

Stated in tabular form (using variable names from the FORTRAN format), the contents of a record in an HCN/D data file include the following.

Variable	Variable type	Variable width	Starting column	Ending column
STAID	Character	6	1	6
DATTYP	Character	4	8	11
UNITS	Character	2	12	13
YEAR	Numeric	4	14	17
MON	Numeric	2	18	19
DAYS	Numeric	2	21	22
SF(1)	Alphanumeric	1	24	24
VALUE(1)	Numeric	4	25	28
DMF(1)	Alphanumeric	1	29	29
DQF(1)	Alphanumeric	1	30	30
SF(2–31)	Alphanumeric	1	*	*
VALUE(2–31)	Numeric	4	*	*
DMF(2–31)	Alphanumeric	1	*	*
DQF(2–31)	Alphanumeric	1	*	*

*May be obtained using: COL(N) = COL(1) + (N * 8) – 8, where COL(N) is the starting/ending column for SF(N), VALUE(N), DMF(N), or DQF(N); COL(1) is the starting/ending column for SF(1), VALUE(1), DMF(1), or DQF(1); and N is the day of the month (2–31).

where

STAID is the station identification number, composed of the two-digit state code followed by the four-digit Cooperative Network Index (defined as character to preserve leading zeros upon output);

DATTYP is the data type (TMAX = maximum temperature, TMIN = minimum temperature, PRCP = precipitation amount, SNOW = snowfall amount, and SNWD = snow depth). Some stations do not always have records for all five data types in a given month;

YEAR is the year of the data;

MON is the month of the data;

DAYS is the number of days in the month;

SF(1–31)	are the source flags for the daily data values;
VALUE(1–31)	are daily data values, with temperature in whole degrees Fahrenheit, precipitation amount in hundredths of inches, snowfall amount in tenths of inches, and snow depth in whole inches;
DMF(1–31)	are the data measurement flags for the daily data values; and
DQF(1–31)	are the data quality flags for the daily data values.

Flag codes for the HCN/D data

SF is a code indicating the source of the daily data value. The codes and their meanings are as follows:

- 0 = NCDC Tape Deck 3200, *Summary of the Day* Element Digital File;
- 3 = Manuscript–Original Records, NCDC;
- 4 = *Climatological Data (CD)* (monthly NCDC publication);
- 5 = *Climate Record Book*; as described within: *History of Climatological Records Books*, U.S. Department of Commerce, Weather Bureau, U.S. Government Printing Office (1960);
- Blank = manually estimated (see DQF flag) or missing data value.

DMF is the data measurement flag, which describes how the daily value was measured. The codes and their meanings are as follows:

- A = accumulated amount since last measurement;
- B = accumulated amount includes estimated values (since last measurement);
- E = estimated value (see DQF flag for the particular estimation method);
- J = value has been manually validated;
- S = data value is included in a subsequent value, with the current data value being set to "0" or "-999";
- T = Trace of precipitation, snowfall, or snow depth (data value set to "0" for a trace);
- (= Expert System edited value; not validated;
-) = Expert System approved edited value; and
- Blank = valid original data (no flag needed) or missing data value.

Please note: other values occasionally appear as data measurement flags for which documentation is not currently available, e.g., "C" and "s".

DQF is the data quality flag. In January 1982, NCDC instituted a greatly enhanced computer algorithm for automated validation of digital data archives. The system checks the internal consistency of a station's data and compares each station's observations to prescribed climatological limits and observations from surrounding stations. Numeric DQF codes apply only to

NCDC's digital data, i.e., where the source flag (SF) is equal to "0" for a particular value. Alphabetic codes describe the particular manual or automated NCDC procedure employed to correct or estimate a data value. The codes and their meanings are as follows:

- 0 = valid data element;
- 1 = valid data element (from an "unknown" source, in the case of pre-1982 data);
- 3 = invalid data—no edited data value available;
- 4 = validity unknown—automated quality control procedures have not been applied;
- 5 = original non-numeric data value has been replaced by its deciphered numeric value;
- A = substituted temperature from time of observation for TMAX or TMIN;
- B = time-shifted value;
- C = precipitation estimated from snowfall;
- D = transposed digits;
- E = changed units;
- F = adjusted TMAX or TMIN by a multiple of ± 10°;
- G = changed algebraic sign;
- H = moved decimal point;
- I = rescaling other than that of flags "F", "G", or "H";
- J = subjectively derived value;
- K = extracted from an accumulated value;
- L = switched TMAX and TMIN;
- M = switched temperature from time of observation with TMAX or TMIN;
- N = substituted the mean of values taken from the three nearest cooperative weather stations;
- O = snow and precipitation columns were switched in station's report;
- P = added snowfall to snow depth;
- Q = switched snowfall and snow depth;
- R = precipitation amount was not reported, "0" has been inserted;
- S = manually edited value (derived using one of the procedures described by data quality flags A–R);
- T = data value failed internal consistency check;
- U = failed areal consistency check (beginning October, 1992); and
- Blank = valid data value (with source flag other then "0") or missing data value.

6. HOW TO OBTAIN THE DATABASE AND DOCUMENTATION

The HCN/D database is available free of charge from CDIAC. The data and a plain text version of the documentation are available from CDIAC's anonymous FTP (file transfer protocol) area via the Internet. Please note: your computer needs to have FTP software loaded on it (this is built in to most modern day operating systems). Commands used to obtain the database are shown below. For additional information, contact CDIAC.

ftp cdiac.esd.ornl.gov *or* ftp 128.219.24.36
(When the system asks you to login, enter "anonymous")
(When the system asks for your password, enter your e-mail address.)
Change the directory to pub/ndp070 (i.e., "cd pub/ndp070")
Retrieve the file you want (e.g., "get invent.txt")

The data and an HTML version of the documentation may also be obtained from CDIAC's web site at http://cdiac.esd.ornl.gov/.

For non-internet data acquisitions (e.g., 8mm tape, CD-ROM, etc.), users should contact CDIAC directly.

Address: Carbon Dioxide Information Analysis Center
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, Tennessee 37831-6335, U.S.A.

Telephone: (423) 574-3645 (Voice)
(423) 574-2232 (Fax)

Electronic mail: cdiac@ornl.gov

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APPENDICES

APPENDIX A

INVENTORY OF STATIONS IN THE 1062-STATION HCN/D DATABASE

Inventory of stations in the 1062-station HCN/D database. The original 138 stations included in Hughes et al. (1992) are italicized. Columns labeled "TMAX", "TMIN", "PRCP", "SNOW", and "SNWD" contain the beginning month and year of record for the variables maximum temperature, minimum temperature, precipitation amount, snow fall amount, and snow depth, respectively.

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
AL	011084	BREWTON 3SSE	31.07	−87.05	85	01/1928	01/1928	01/1928	01/1928	01/1928
AL	012813	FAIRHOPE 2NE	30.55	−87.89	23	06/1948	06/1948	06/1948	06/1948	06/1948
AL	013511	GREENSBORO	32.71	−87.59	220	02/1890	02/1890	02/1890	02/1890	02/1890
AL	013816	HIGHLAND HOME	31.95	−86.32	594	06/1948	06/1948	06/1948	06/1948	06/1948
AL	*015749*[b]	*MUSCLE SHOALS FAA AP*	34.76	−87.62	536	12/1940	12/1940	12/1940	12/1940	12/1940
AL	017157	ST BERNARD	34.17	−86.82	800	01/1930	01/1930	01/1930	01/1930	01/1930
AL	017304	SCOTTSBORO	34.69	−86.05	615	01/1927	01/1927	01/1927	01/1927	01/1927
AL	017366	SELMA	32.42	−87.00	147	01/1930	01/1930	01/1930	01/1930	01/1930
AL	*018024*	*TALLADEGA*	33.44	−86.10	555	09/1893	09/1893	07/1891	06/1948	06/1948
AL	018178	THOMASVILLE	31.92	−87.74	405	01/1930	01/1930	01/1930	01/1930	01/1930
AL	018323	TROY	31.79	−85.95	498	01/1930	01/1930	01/1930	01/1930	01/1930
AL	018438	UNION SPRINGS 9S	32.02	−85.75	440	06/1948	06/1948	06/1948	06/1948	06/1948
AL	018469	VALLEY HEAD	34.57	−85.62	1062	06/1948	06/1948	06/1948	06/1948	06/1948
AZ	*020080*	*AJO*	32.37	−112.87	1800	01/1915	01/1915	05/1914	05/1914	05/1914
AZ	021026[b]	BUCKEYE	33.39	−112.59	890	03/1893	03/1893	03/1893	03/1893	03/1893
AZ	021614	CHILDS	34.36	−111.70	2650	09/1915	09/1915	09/1915	09/1915	09/1915
AZ	*023160*	*FORT VALLEY*	35.27	−111.74	7347	01/1909	01/1909	01/1909	01/1909	01/1909
AZ	024089	HOLBROOK	34.91	−110.17	5070	01/1893	01/1893	01/1893	01/1893	01/1893
AZ	024849	LEES FERRY	36.87	−111.60	3210	09/1921	09/1921	04/1916	04/1916	04/1916
AZ	*025467*	*MESA*	33.42	−111.80	1235	03/1896	03/1896	03/1896	03/1896	03/1896
AZ	025512	MIAMI	33.41	−110.89	3560	02/1914	02/1914	02/1914	02/1914	02/1914
AZ	026250	PARKER 6NE	34.22	−114.22	410	10/1893	10/1893	10/1893	10/1893	10/1893
AZ	026796	PRESCOTT	34.57	−112.44	5205	05/1898	07/1898	05/1898	05/1898	05/1898
AZ	027281	ROOSEVELT 1WNW	33.67	−111.16	2205	07/1905	07/1905	07/1905	07/1905	07/1905
AZ	027370[b]	SACATON	33.07	−111.75	1285	04/1908	04/1908	04/1908	04/1908	04/1908
AZ	027435	SAINT JOHNS	34.52	−109.39	5790	08/1901	08/1901	08/1901	08/1901	08/1901
AZ	027716	SELIGMAN	35.32	−112.89	5250	12/1904	12/1904	12/1904	12/1904	12/1904
AZ	028619	TOMBSTONE	31.70	−110.05	4610	07/1893	07/1893	07/1893	07/1893	02/1897
AZ	029271	WHITERIVER 1SW	33.84	−109.97	5120	02/1900	02/1900	02/1900	02/1900	02/1900
AZ	029287	WICKENBURG	33.99	−112.74	2095	03/1908	03/1908	03/1908	03/1908	03/1908
AZ	029359	WILLIAMS	35.26	−112.19	6750	03/1897	03/1897	03/1897	03/1897	03/1897
AZ	*029652*	*YUMA CITRUS*	32.62	−114.66	191	09/1920	09/1920	09/1920	09/1920	09/1920

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
AR	030936	BRINKLEY	34.89	−91.19	200	01/1948	01/1948	01/1948	01/1948	01/1948
AR	***031596***	***CONWAY***	35.09	−92.47	310	01/1897	01/1897	08/1890	08/1890	02/1897
AR	031632	CORNING	36.41	−90.59	300	01/1930	01/1930	01/1930	02/1930	02/1930
AR	032356	EUREKA SPRINGS 3WNW	36.42	−93.79	1420	01/1948	01/1948	01/1948	01/1948	01/1948
AR	032930	GRAVETTE	36.44	−94.45	1260	01/1948	01/1948	01/1948	01/1948	01/1948
AR	034572	MAMMOTH SPRING	36.49	−91.54	650	01/1948	01/1948	01/1948	01/1948	01/1948
AR	034756	MENA	34.57	−94.27	1130	01/1942	01/1942	01/1942	01/1948	01/1948
AR	035186	NEWPORT	35.61	−91.29	228	01/1930	01/1930	01/1930	01/1930	01/1930
AR	035508[b]	OZARK	35.49	−93.82	390	01/1930	01/1930	01/1930	01/1930	01/1930
AR	035754	PINE BLUFF	34.22	−92.02	215	06/1887	06/1887	06/1887	01/1892	03/1895
AR	***035820***	***POCAHONTAS 1***	36.27	−90.97	315	04/1894	04/1894	04/1894	01/1948	01/1948
AR	035908	PRESCOTT	33.80	−93.39	308	01/1930	01/1930	01/1930	01/1930	01/1930
AR	036928	SUBIACO	35.30	−93.66	500	01/1948	01/1948	01/1948	01/1948	01/1948
CA	040693	BERKELEY	37.87	−122.27	299	01/1919	01/1919	01/1919	01/1919	01/1919
CA	040924	BLYTHE	33.62	−114.60	268	01/1931	01/1931	01/1931	07/1948	07/1948
CA	041048	BRAWLEY 2SW	32.96	−115.55	-100	12/1927	12/1927	12/1927	12/1927	12/1927
CA	041614	CEDARVILLE	41.54	−120.17	4670	07/1948	07/1948	07/1948	07/1948	07/1948
CA	041715	CHICO UNIV FARM	39.71	−121.82	185	01/1906	01/1906	01/1906	03/1936	07/1948
CA	041758	CHULA VISTA	32.61	−117.10	56	07/1948	07/1948	07/1948	07/1948	07/1948
CA	041912	COLFAX	39.11	−120.95	2410	07/1948	07/1948	07/1948	07/1948	07/1948
CA	042239	CUYAMACA	32.99	−116.59	4640	07/1948	07/1948	07/1948	07/1948	07/1948
CA	042294	DAVIS EXP FARM 2WSW	38.54	−121.77	60	01/1917	01/1917	01/1917	07/1948	07/1948
CA	042728	ELECTRA PH	38.34	−120.67	715	07/1948	07/1948	07/1948	07/1948	07/1948
CA	042910	EUREKA WSO	40.80	−124.17	43	07/1948	07/1948	07/1948	07/1948	07/1948
CA	042941	FAIRMONT	34.71	−118.44	3060	07/1948	07/1948	07/1948	07/1948	07/1948
CA	043161	FORT BRAGG 5N	39.51	−123.79	120	07/1948	07/1948	07/1948	07/1948	07/1948
CA	043257	FRESNO WSO AP	36.79	−119.72	336	07/1948	07/1948	07/1948	07/1948	07/1948
CA	043747	HANFORD 1S	36.30	−119.66	245	12/1927	12/1927	12/1927	02/1928	02/1928
CA	043761	HAPPY CAMP RS	41.80	−123.37	1120	01/1931	01/1931	01/1931	01/1931	01/1931
CA	043875	HEALDSBURG	38.62	−122.87	108	01/1931	01/1931	01/1931	07/1948	07/1948
CA	044232	INDEPENDENCE	36.80	−118.20	3950	01/1927	01/1927	01/1927	01/1927	01/1927
CA	044259	INDIO FIRE STATION	33.74	−116.27	-21	12/1927	12/1927	12/1927	03/1928	03/1928
CA	044713	LAKE SPAULDING	39.32	−120.64	5156	07/1948	07/1948	07/1948	07/1948	07/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
CA	044890	LEMON COVE	36.39	−119.04	513	07/1948	07/1948	07/1948	07/1948	07/1948
CA	044997	LIVERMORE	37.67	−121.77	480	04/1930	04/1930	04/1930	07/1948	07/1948
CA	045032	LODI	38.12	−121.29	40	07/1948	07/1948	07/1948	07/1948	07/1948
CA	045385	MARYSVILLE	39.16	−121.60	57	07/1948	07/1948	07/1948	07/1948	07/1948
CA	045532	MERCED MUNICIPAL AP	37.29	−120.52	153	07/1948	07/1948	07/1948	07/1948	07/1948
CA	045983	MOUNT SHASTA	41.32	−122.32	3590	07/1948	07/1948	07/1948	07/1948	07/1948
CA	***046074***	***NAPA STATE HOSPITAL***	38.29	−122.27	35	01/1893	01/1893	01/1893	03/1943	07/1948
CA	***046399***	***OJAI***	34.46	−119.24	750	01/1906	01/1906	05/1905	07/1948	07/1948
CA	046506	ORLAND	39.76	−122.20	254	07/1948	07/1948	07/1948	07/1948	07/1948
CA	046508	ORLEANS	41.30	−123.54	410	07/1948	07/1948	07/1948	07/1948	07/1948
CA	046719	PASADENA	34.16	−118.16	864	12/1927	12/1927	12/1927	01/1928	01/1928
CA	046730	PASO ROBLES	35.64	−120.69	700	10/1901	10/1901	10/1901	07/1948	07/1948
CA	046826	PETALUMA FIRE STN #2	38.27	−122.66	31	07/1948	07/1948	07/1948	07/1948	07/1948
CA	047195	QUINCY	39.97	−120.95	3408	07/1948	07/1948	07/1948	07/1948	07/1948
CA	047306	REDLANDS	34.05	−117.19	1318	12/1927	12/1927	12/1927	06/1928	06/1928
CA	047851	SAN LUIS OBISPO POLY	35.30	−120.67	315	07/1948	07/1948	07/1948	07/1948	07/1948
CA	047902	SANTA BARBARA	34.42	−119.69	5	12/1927	12/1927	12/1927	12/1927	12/1927
CA	047916	SANTA CRUZ	36.99	−122.02	130	07/1948	07/1948	07/1948	07/1948	07/1948
CA	047965	SANTA ROSA	38.46	−122.70	167	01/1931	01/1931	01/1931	07/1948	07/1948
CA	048702	SUSANVILLE AP	40.39	−120.57	4146	01/1931	01/1931	01/1931	01/1931	02/1931
CA	048758	TAHOE CITY	39.17	−120.14	6230	01/1931	01/1931	01/1931	01/1931	01/1931
CA	048839	TEJON RANCHO	35.04	−118.75	1425	07/1948	07/1948	07/1948	07/1948	07/1948
CA	049087	TUSTIN IRVINE RANCH	33.74	−117.79	118	12/1927	12/1927	12/1927	12/1927	12/1927
CA	***049122***	***UKIAH***	39.16	−123.20	633	01/1893	01/1893	01/1893	03/1910	07/1948
CA	049200	VACAVILLE	38.41	−121.95	110	07/1948	07/1948	07/1948	07/1948	07/1948
CA	049452	WASCO	35.61	−119.34	345	07/1948	07/1948	07/1948	07/1948	07/1948
CA	049490	WEAVERVILLE RS	40.74	−122.94	2050	07/1948	07/1948	07/1948	07/1948	07/1948
CA	049699	WILLOWS 6W	39.52	−122.30	233	07/1948	07/1948	07/1948	07/1948	07/1948
CA	049855	YOSEMITE PARK HEADQUARTERS	37.76	−119.59	3966	07/1948	07/1948	07/1948	07/1948	07/1948
CA	049866	YREKA	41.72	−122.64	2625	07/1948	07/1948	07/1948	07/1948	07/1948
CO	050848	BOULDER	40.01	−105.27	5484	08/1948	08/1948	08/1948	08/1948	08/1948
CO	051294	CANON CITY	38.42	−105.24	5330	08/1948	08/1948	08/1948	08/1948	08/1948
CO	051528	CHEESMAN	39.22	−105.29	6880	08/1948	08/1948	08/1948	08/1948	08/1948
CO	051564	CHEYENNE WELLS	38.82	−102.35	4250	01/1918	01/1918	01/1918	01/1918	12/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
CO	051741	COLLBRAN	39.26	−107.97	5980	11/1900	11/1900	03/1900	03/1900	08/1948
CO	052184	DEL NORTE	37.67	−106.35	7880	08/1948	08/1948	08/1948	08/1948	08/1948
CO	052281	DILLON 1E	39.64	−106.04	9065	05/1910	05/1910	05/1909	05/1909	11/1909
CO	052432[b]	DURANGO	37.29	−107.89	6600	01/1900	01/1900	01/1900	01/1900	02/1913
CO	052446	EADS 2S	38.49	−102.79	4211	01/1918	01/1918	01/1918	01/1918	01/1918
CO	053005	FORT COLLINS	40.59	−105.09	5004	01/1900	01/1900	01/1900	01/1900	01/1949
CO	053038	FORT MORGAN 2S	40.22	−103.80	4331	08/1948	08/1948	08/1948	08/1948	08/1948
CO	053146	FRUITA 1W	39.17	−108.75	4480	01/1948	01/1948	01/1948	01/1948	01/1948
CO	***053662***	***GUNNISON 3SW***	38.54	−106.97	7640	07/1893	07/1893	07/1893	01/1900	11/1928
CO	053951	HERMIT 7ESE	37.77	−107.14	9000	08/1948	08/1948	08/1948	08/1948	08/1948
CO	054076	HOLLY	38.05	−102.12	3390	01/1918	01/1918	01/1918	01/1918	08/1948
CO	054770	LAMAR	38.09	−102.62	3627	01/1918	01/1918	01/1918	01/1918	01/1918
CO	054834	LAS ANIMAS	38.07	−103.22	3890	01/1930	01/1930	01/1930	01/1930	11/1931
CO	055322	MANASSA	37.17	−105.95	7690	09/1948	09/1948	09/1948	09/1948	09/1948
CO	055722	MONTROSE #2	38.49	−107.89	5785	01/1903	01/1903	01/1900	01/1900	08/1948
CO	057167	ROCKY FORD 2SE	38.04	−103.70	4170	01/1918	01/1918	01/1918	01/1918	03/1920
CO	057337	SAGUACHE	38.09	−106.14	7692	08/1948	08/1948	08/1948	08/1948	08/1948
CO	057936	STEAMBOAT SPRINGS	40.51	−106.84	6840	09/1908	09/1908	09/1908	09/1908	11/1915
CO	058204	TELLURIDE	37.96	−107.87	8672	12/1900	12/1900	12/1900	12/1900	10/1911
CO	058429	TRINIDAD	37.17	−104.49	6030	01/1948	01/1948	01/1948	01/1948	01/1948
CO	059243	WRAY	40.07	−102.24	3535	01/1918	01/1918	01/1918	01/1918	01/1918
CT	062658	FALLS VILLAGE	41.96	−73.37	550	06/1948	06/1948	06/1948	06/1948	06/1948
CT	068138	STORRS	41.80	−72.25	650	06/1888	06/1888	06/1888	06/1888	06/1888
DE	072730	DOVER	39.16	−75.52	30	08/1948	08/1948	08/1948	08/1948	08/1948
DE	075915[b]	MILFORD 4SE	38.91	−75.47	30	08/1948	08/1948	08/1948	08/1948	08/1948
DE	076410	NEWARK UNIV FARM	39.67	−75.74	90	08/1948	08/1948	08/1948	08/1948	08/1948
FL	***080211***	***APALACHICOLA WSO AP***	29.74	−85.04	19	10/1903	10/1903	10/1903	03/1931	03/1931
FL	080228	ARCADIA	27.24	−81.85	63	01/1931	01/1931	01/1931	07/1948	07/1948
FL	080478	BARTOW	27.90	−81.85	125	01/1931	01/1931	01/1931	08/1948	08/194
FL	***080611***	***BELLE GLADE EXP STN***	26.65	−80.64	15	05/1924	05/1924	05/1924	07/1948	07/1948
FL	082220	DE FUNIAK SPRINGS	30.74	−86.07	230	01/1931	01/1931	01/1931	08/1948	11/1937
FL	082850	EVERGLADES	25.86	−81.39	5	01/1931	01/1931	01/1931	07/1948	07/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
FL	082915	FEDERAL POINT	29.75	−81.54	5	01/1931	01/1931	01/1931	07/1948	07/1948
FL	082944	FERNANDINA BEACH	30.65	−81.47	13	07/1948	07/1948	07/1948	07/1948	07/1948
FL	083163	FORT LAUDERDALE	26.11	−80.20	16	07/1948	07/1948	07/1948	07/1948	07/1948
FL	083186[b]	FORT MYERS FAA AP	26.61	−81.87	15	01/1931	01/1931	01/1931	07/1948	07/1948
FL	083207	FORT PIERCE	27.47	−80.35	25	01/1931	01/1931	01/1931	09/1943	07/1948
FL	084289	INVERNESS 3SE	28.74	−82.32	40	07/1948	07/1948	07/1948	07/1948	07/1948
FL	084731	LAKE CITY 2E	30.19	−82.60	195	01/1931	01/1931	01/1931	08/1948	08/1948
FL	085275	MADISON 4N	30.54	−83.44	180	01/1931	01/1931	01/1931	07/1948	07/1948
FL	086414	OCALA	29.20	−82.09	75	07/1948	07/1948	07/1948	07/1948	07/1948
FL	***087851***	***SAINT LEO***	28.34	−82.27	190	03/1895	03/1895	04/1895	08/1948	08/1948
FL	088758	TALLAHASSEE WSO AP	30.39	−84.37	55	01/1948	01/1948	01/1948	01/1948	01/1948
FL	088824	TARPON SPRINGS SEWAGE PLANT	28.15	−82.75	8	07/1948	07/1948	07/1948	07/1948	07/1948
FL	088942	TITUSVILLE	28.62	−80.82	5	01/1931	01/1931	01/1931	07/1948	07/1948
GA	090140	ALBANY 3SE	31.54	−84.14	180	07/1892	07/1892	07/1892	07/1892	09/1908
GA	091340	BRUNSWICK	31.17	−81.50	13	01/1930	01/1930	01/1930	01/1930	01/1930
GA	092318	COVINGTON	33.61	−83.87	770	07/1948	07/1948	07/1948	07/1948	07/1948
GA	092475	DAHLONEGA 2NW	34.55	−84.02	1360	01/1930	01/1930	01/1930	01/1930	01/1930
GA	092966	EASTMAN 1W	32.21	−83.20	400	07/1948	07/1948	07/1948	07/1948	07/1948
GA	093621	GAINESVILLE	34.30	−83.85	1170	01/1930	01/1930	01/1930	01/1930	01/1930
GA	093754	GLENNVILLE	31.94	−81.92	170	01/1930	01/1930	01/1930	01/1930	01/1930
GA	094170	HAWKINSVILLE	32.27	−83.47	272	01/1930	01/1930	01/1930	01/1930	01/1930
GA	095874	MILLEDGEVILLE	33.09	−83.25	400	07/1948	07/1948	07/1948	07/1948	07/1948
GA	095882	MILLEN 4N	32.87	−81.97	195	01/1930	01/1930	01/1930	01/1930	01/1930
GA	096335	NEWNAN 4NE	33.44	−84.79	920	07/1948	07/1948	07/1948	07/1948	07/1948
GA	097276	QUITMAN 2NW	30.80	−83.59	185	11/1896	11/1896	03/1894	03/1894	11/1917
GA	097600	ROME	34.26	−85.16	620	01/1930	01/1930	01/1930	01/1930	01/1930
GA	***097847***	***SAVANNAH WSO AP***	32.14	−81.20	46	01/1874	01/1874	01/1871	07/1948	07/1948
GA	098535	TALBOTTON	32.69	−84.55	730	01/1930	01/1930	01/1930	01/1930	01/1930
GA	098703	TIFTON EXP STN	31.50	−83.54	380	04/1922	04/1922	04/1922	04/1922	12/1922
GA	098740	TOCCOA	34.59	−83.32	1019	01/1930	01/1930	01/1930	01/1930	01/1930
GA	099141	WARRENTON	33.42	−82.66	510	01/1930	01/1930	01/1930	01/1930	01/1930
GA	099157	WASHINGTON 2ESE	33.72	−82.72	620	07/1948	07/1948	07/1948	07/1948	07/1948
GA	099186	WAYCROSS 4NE	31.25	−82.32	145	01/1930	01/1930	01/1930	01/1930	01/1930
GA	099291	WEST POINT	32.87	−85.19	575	01/1930	01/1930	01/1930	01/1930	01/1930

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
ID	100010	ABERDEEN EXPERIMENT STATION	42.96	−112.84	4405	04/1914	04/1914	04/1914	04/1914	04/1914
ID	100448	ARROWROCK DAM	43.61	−115.92	3275	06/1916	06/1916	06/1916	06/1916	06/1916
ID	100470	ASHTON	44.07	−111.45	5260	08/1948	08/1948	08/1948	08/1948	08/1948
ID	***101380***	***CALDWELL***	43.67	−116.69	2370	10/1904	10/1904	10/1904	10/1904	10/1904
ID	101408	CAMBRIDGE	44.57	−116.69	2650	01/1931	01/1931	01/1931	01/1931	01/1931
ID	101663[b]	CHALLIS	44.51	−114.24	5175	01/1931	01/1931	01/1931	01/1931	01/1931
ID	103631	GLENNS FERRY	42.94	−115.32	2510	08/1948	08/1948	08/1948	08/1948	08/1948
ID	103732	GRACE	42.59	−111.74	5550	01/1931	01/1931	01/1931	01/1931	01/1931
ID	104140	HAZELTON	42.61	−114.14	4060	08/1948	08/1948	08/1948	08/1948	08/1948
ID	104295	HOLLISTER	42.36	−114.57	4525	08/1948	08/1948	08/1948	08/1948	08/1948
ID	104670	JEROME	42.74	−114.52	3740	04/1919	04/1919	04/1919	04/1919	04/1919
ID	104831	KELLOGG	47.54	−116.12	2320	02/1905	02/1905	02/1905	02/1905	02/1905
ID	105275	LIFTON PUMPING STATION	42.12	−111.30	5926	05/1935	05/1935	05/1935	05/1935	05/1935
ID	105462	MACKAY RS	43.92	−113.62	5897	01/1931	01/1931	01/1931	01/1931	11/1931
ID	106152	MOSCOW U OF ID	46.74	−116.97	2660	11/1893	11/1893	11/1893	11/1893	03/1894
ID	106388	NEW MEADOWS RS	44.97	−116.29	3870	08/1948	08/1948	08/1948	08/1948	08/1948
ID	106542	OAKLEY	42.24	−113.89	4560	01/1931	01/1931	01/1931	01/1931	02/1931
ID	106891	PAYETTE	44.09	−116.94	2150	08/1948	08/1948	08/1948	08/1948	08/1948
ID	107264	PORTHILL	49.01	−116.50	1775	08/1948	08/1948	08/1948	08/1948	08/1948
ID	***107386***	***PRIEST RIVER EXPERIMENT STN***	48.36	−116.84	2380	02/1898	02/1898	02/1898	12/1911	12/1911
ID	108137	SANDPOINT EXP STN	48.29	−116.57	2100	10/1910	10/1910	10/1910	10/1910	10/1910
IL	***110072***	***ALEDO***	41.24	−90.74	720	01/1901	01/1901	01/1901	01/1901	01/1901
IL	110187	ANNA 1E	37.47	−89.24	640	01/1901	01/1901	01/1901	01/1901	01/1901
IL	110338	AURORA	41.76	−88.35	640	01/1901	01/1901	01/1901	01/1901	01/1901
IL	***111280***	***CARLINVILLE***	39.29	−89.87	630	01/1893	01/1893	01/1893	01/1901	01/1901
IL	***111436***	***CHARLESTON***	39.49	−88.17	680	02/1896	02/1896	01/1896	01/1901	01/1901
IL	112140	DANVILLE	40.14	−87.66	558	01/1901	01/1901	01/1901	01/1901	01/1901
IL	112193	DECATUR	39.84	−89.02	620	01/1901	01/1901	01/1901	01/1901	01/1901
IL	112348	DIXON 1NW	41.84	−89.52	700	01/1901	01/1901	01/1901	01/1901	01/1901
IL	***112483***	***DUQUOIN 4SE***	37.99	−89.20	420	05/1898	05/1898	01/1893	01/1901	01/1901
IL	113335	GALVA	41.17	−90.05	860	01/1901	01/1901	01/1901	01/1901	01/1901
IL	***113717***[b]	***GRIGGSVILLE***	39.72	−90.74	700	01/1893	01/1893	01/1893	01/1901	01/1901
IL	***113879***	***HARRISBURG***	37.74	−88.52	365	03/1898	03/1898	03/1898	01/1901	01/1901
IL	114108	HILLSBORO	39.16	−89.49	630	01/1901	01/1901	01/1901	01/1901	01/1901

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
IL	***114198***	***HOOPESTON 1NE***	40.47	−87.67	710	06/1902	06/1902	06/1902	06/1902	06/1902
IL	114442	JACKSONVILLE 2E	39.74	−90.20	610	01/1901	01/1901	01/1901	01/1901	01/1901
IL	114823	LA HARPE	40.59	−90.97	700	01/1901	01/1901	01/1901	01/1901	01/1901
IL	115079	LINCOLN	40.16	−89.41	590	02/1906	02/1906	02/1906	02/1906	02/1906
IL	115326	MARENGO	42.26	−88.60	820	01/1901	01/1901	01/1901	01/1901	01/1901
IL	115515	MCLEANSBORO 2ENE	38.11	−88.50	480	01/1901	01/1901	01/1901	01/1901	01/1901
IL	115712	MINONK	40.91	−89.05	750	01/1901	01/1901	01/1901	01/1901	01/1901
IL	***115768***	***MONMOUTH***	40.92	−90.64	770	02/1893	02/1893	02/1893	01/1901	01/1901
IL	115833	MORRISON	41.82	−89.97	603	07/1901	07/1901	07/1901	07/1901	07/1901
IL	115901	MOUNT CARROLL	42.11	−89.99	640	01/1901	01/1901	01/1901	01/1901	01/1901
IL	115943	MT VERNON 3NE	38.36	−88.87	490	01/1901	01/1901	01/1901	01/1901	01/1901
IL	116446	OLNEY 2S	38.71	−88.07	480	01/1901	01/1901	01/1901	01/1901	01/1901
IL	116526	OTTAWA 4SW	41.34	−88.92	525	01/1901	01/1901	01/1901	01/1901	01/1901
IL	***116558***	***PALESTINE***	39.01	−87.62	520	01/1893	01/1893	01/1893	01/1901	01/1901
IL	116579	PANA	39.39	−89.09	700	01/1901	01/1901	01/1901	01/1901	01/1901
IL	***116610***	***PARIS WATERWORKS***	39.62	−87.70	720	04/1893	04/1893	04/1893	01/1901	01/1901
IL	116910	PONTIAC	40.89	−88.64	650	01/1903	01/1903	01/1903	01/1903	01/1903
IL	***117551***	***RUSHVILLE***	40.12	−90.55	660	01/1893	01/1893	01/1893	01/1901	01/1901
IL	***118147***	***SPARTA 3N***	38.17	−89.70	520	01/1893	01/1893	01/1893	01/1901	01/1901
IL	118740	URBANA	40.11	−88.24	743	01/1903	01/1903	01/1903	01/1903	01/1903
IL	118916	WALNUT	41.55	−89.60	690	01/1901	01/1901	01/1901	01/1901	01/1901
IL	119241	WHITE HALL 1E	39.44	−90.39	580	04/1902	04/1902	04/1902	04/1902	04/1902
IL	***119354***	***WINDSOR***	39.44	−88.60	685	01/1904	01/1904	01/1904	01/1904	01/1904
IN	120177	ANDERSON SEWAGE PLANT	40.11	−85.72	845	04/1948	04/1948	04/1948	04/1948	04/1948
IN	120200	ANGOLA	41.64	−84.99	1010	01/1901	01/1901	01/1901	01/1901	01/1901
IN	***120676***	***BERNE***	40.67	−84.95	860	02/1910	02/1910	01/1910	01/1910	01/1910
IN	120784	BLOOMINGTON IN UNIV	39.17	−86.52	825	03/1901	03/1901	03/1901	03/1901	03/1901
IN	121030	BROOKVILLE	39.42	−85.02	760	04/1948	04/1948	04/1948	04/1948	04/1948
IN	121229	CAMBRIDGE CITY	39.87	−85.19	999	04/1948	04/1948	04/1948	04/1948	04/1948
IN	121747	COLUMBUS	39.21	−85.92	621	01/1901	01/1901	01/1901	01/1901	01/1901
IN	122149	DELPHI 3NNE	40.62	−86.67	560	04/1948	04/1948	04/1948	04/1948	04/1948
IN	123418	GOSHEN COLLEGE	41.57	−85.84	805	04/1948	04/1948	04/1948	04/1948	04/1948
IN	123513	GREENCASTLE 1SE	39.64	−86.85	860	04/1948	04/1948	04/1948	04/1948	04/1948
IN	123527	GREENFIELD	39.79	−85.75	865	04/1948	04/1948	04/1948	04/1948	04/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
IN	124008	HOBART 2WNW	41.55	-87.29	640	04/1948	04/1948	04/1948	04/1948	04/1948
IN	124837	LAPORTE	41.61	-86.72	810	03/1901	03/1901	03/1901	05/1901	04/1948
IN	125237	MADISON SEWAGE PLANT	38.74	-85.41	455	04/1948	04/1948	04/1948	04/1948	04/1948
IN	125337	MARION 2N	40.57	-85.67	790	01/1901	01/1901	01/1901	01/1901	01/1901
IN	126001	MOUNT VERNON	37.96	-87.89	415	03/1901	03/1901	03/1901	03/1901	03/1901
IN	126580	OOLITIC PURDUE EXP FM	38.89	-86.55	650	01/1902	01/1902	01/1902	01/1902	01/1902
IN	126705	PAOLI	38.55	-86.49	560	03/1901	03/1901	03/1901	03/1901	03/1901
IN	***127125***	***PRINCETON 1W***	38.36	-87.59	480	01/1899	01/1899	08/1896	01/1901	01/1911
IN	127482	ROCHESTER	41.07	-86.22	770	04/1948	04/1948	04/1948	04/1948	04/1948
IN	127522	ROCKVILLE	39.77	-87.24	690	03/1901	03/1901	03/1901	03/1901	03/1901
IN	127755	SALEM	38.62	-86.09	800	04/1948	04/1948	04/1948	04/1948	04/1948
IN	127875	SCOTTSBURG	38.71	-85.77	550	01/1901	01/1901	01/1901	01/1901	01/1901
IN	127935	SEYMOUR 2N	38.99	-85.91	573	04/1948	04/1948	04/1948	04/1948	04/1948
IN	128036	SHOALS HIGHWAY 50 BRIDGE	38.67	-86.80	550	04/1948	04/1948	04/1948	04/1948	04/1948
IN	***129253***	***WASHINGTON***	38.67	-87.19	485	08/1896	08/1896	08/1896	01/1992	01/1992
IN	129511	WHEATFIELD 4NNW	41.26	-87.09	655	09/1916	09/1916	09/1916	09/1916	09/1916
IN	129557	WHITESTOWN	40.01	-86.35	935	01/1901	01/1901	01/1901	01/1901	01/1901
IN	129670	WINAMAC 2SSE	41.02	-86.59	690	04/1948	04/1948	04/1948	04/1948	04/1948
IA	130112	ALBIA 3NNE	41.07	-92.79	880	04/1948	04/1948	04/1948	04/1948	04/1948
IA	130133	ALGONA 3W	43.07	-94.30	1230	01/1893	01/1893	01/1893	01/1893	01/1893
IA	130600	BELLE PLAINE	41.91	-92.27	840	04/1948	04/1948	04/1948	04/1948	04/1948
IA	131402	CHARLES CITY	43.05	-92.67	1013	05/1948	05/1948	05/1948	05/1948	05/1948
IA	131533	CLARINDA	40.74	-95.04	1050	01/1893	01/1893	01/1893	01/1893	01/1893
IA	131635	CLINTON #1	41.80	-90.27	585	04/1948	04/1948	04/1948	04/1948	04/1948
IA	132724	ESTHERVILLE 2N	43.42	-94.84	1302	04/1948	04/1948	04/1948	04/1948	04/1948
IA	***132789***	***FAIRFIELD***	41.04	-91.95	740	01/1893	01/1893	01/1893	01/1896	01/1896
IA	132864	FAYETTE	42.86	-91.80	1050	01/1900	01/1900	01/1900	01/1900	01/1900
IA	132977	FOREST CITY 2NNE	43.29	-93.64	1300	04/1948	04/1948	04/1948	04/1948	04/1948
IA	132999	FORT DODGE	42.51	-94.20	1115	04/1948	04/1948	04/1948	04/1948	04/1948
IA	134063	INDIANOLA	41.37	-93.55	940	01/1893	01/1893	01/1893	01/1893	01/1893
IA	134142	IOWA FALLS	42.52	-93.25	1130	04/1948	04/1948	04/1948	04/1948	04/1948
IA	***134735***	***LE MARS***	42.79	-96.17	1195	03/1896	03/1896	03/1896	03/1896	03/1896
IA	***134894***	***LOGAN***	41.64	-95.79	990	01/1893	01/1893	01/1893	01/1893	01/1893
IA	135769	MOUNT AYR 4SW	40.69	-94.30	1240	01/1893	01/1893	01/1893	01/1893	01/1893

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
IA	135796	MOUNT PLEASANT 1SSW	40.96	−91.55	730	05/1948	05/1948	05/1948	05/1948	05/1948
IA	***135952***	***NEW HAMPTON***	43.07	−92.32	1160	03/1897	03/1897	04/1897	04/1897	04/1897
IA	137147	ROCK RAPIDS	43.44	−96.17	1350	04/1893	04/1893	04/1893	04/1893	04/1893
IA	***137161***	***ROCKWELL CITY***	42.41	−94.62	1210	09/1894	09/1894	10/1893	01/1894	02/1894
IA	137979	STORM LAKE 2E	42.64	−95.19	1425	01/1893	01/1893	01/1893	01/1893	01/1893
IA	138296	TOLEDO	41.99	−92.59	890	04/1948	04/1948	04/1948	04/1948	04/1948
IA	138688	WASHINGTON	41.29	−91.69	756	01/1893	01/1893	01/1893	01/1893	01/1893
KS	140264	ANTHONY	37.16	−98.09	1340	01/1939	01/1939	01/1939	01/1939	01/1939
KS	140365	ASHLAND	37.21	−99.77	1970	01/1900	01/1900	01/1900	01/1900	01/1900
KS	140405	ATCHISON	39.57	−95.12	945	01/1939	01/1939	01/1939	01/1939	01/1939
KS	141704	COLDWATER	37.27	−99.34	2083	08/1948	08/1948	08/1948	08/1948	08/1948
KS	141740	COLUMBUS 1SW	37.17	−94.85	900	01/1900	01/1900	01/1900	01/1900	01/1900
KS	***142401***	***EL DORADO***	37.82	−96.84	1340	01/1893	01/1893	01/1893	01/1904	01/1904
KS	142459[b]	ELLSWORTH	38.72	−98.24	1530	04/1904	04/1904	04/1904	04/1904	04/1904
KS	142602[b]	ESKRIDGE 1SE	38.86	−96.10	1420	08/1948	08/1948	08/1948	08/1948	08/1948
KS	142835	FORT SCOTT	37.86	−94.70	845	01/1939	01/1939	01/1939	01/1939	01/1939
KS	143527	HAYS 1S	38.87	−99.34	2010	01/1900	01/1900	01/1900	01/1900	01/1900
KS	143810	HORTON	39.67	−95.52	1030	01/1900	01/1900	01/1900	01/1900	01/1900
KS	***143954***	***INDEPENDENCE***	37.26	−95.70	780	01/1893	01/1893	01/1893	01/1900	01/1900
KS	144464	LAKIN	37.94	−101.25	2998	01/1939	01/1939	01/1939	01/1939	01/1939
KS	144530	LARNED	38.19	−99.10	1995	04/1904	04/1904	06/1903	04/1904	04/1904
KS	144559	LAWRENCE	38.97	−95.27	980	01/1939	01/1939	01/1939	01/1939	01/1939
KS	144588	LEAVENWORTH	39.32	−94.94	910	08/1948	08/1948	08/1948	08/1948	08/1948
KS	144695	LIBERAL	37.05	−100.92	2834	01/1939	01/1939	01/1939	01/1939	01/1939
KS	144972	MANHATTAN	39.21	−96.59	1065	01/1900	01/1900	01/1900	01/1900	01/1900
KS	145152	MCPHERSON	38.39	−97.67	1495	01/1900	01/1900	01/1900	01/1900	01/1900
KS	***145173***	***MEDICINE LODGE***	37.29	−98.59	1500	05/1895	05/1895	01/1893	01/1900	01/1900
KS	***145363***	***MINNEAPOLIS***	39.14	−97.70	1310	01/1892	01/1892	01/1892	01/1900	01/1900
KS	145856	NORTON 9SSE	39.71	−99.84	2360	01/1939	01/1939	01/1939	01/1939	01/1939
KS	145906	OBERLIN 1E	39.84	−100.52	2540	01/1939	01/1939	01/1939	01/1939	01/1939
KS	145972	OLATHE 3E	38.89	−94.77	1055	01/1939	01/1939	01/1939	01/1939	01/1939
KS	***146128***	***OTTAWA***	38.62	−95.29	900	05/1895	05/1895	05/1895	01/1900	01/1900
KS	146374[b]	PHILLIPSBURG 1SSE	39.74	−99.32	1907	01/1900	01/1900	01/1900	01/1900	01/1900
KS	147093	SAINT FRANCIS	39.77	−101.80	3362	05/1908	05/1908	05/1908	05/1908	05/1908

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
KS	147271	SCOTT CITY	38.49	−100.91	2970	08/1948	08/1948	08/1948	08/1948	08/1948
KS	147305	SEDAN	37.14	−96.19	880	08/1948	08/1948	08/1948	08/1948	08/1948
KS	148495	WAKEENEY	39.02	−99.89	2450	08/1948	08/1948	08/1948	08/1948	08/1948
KY	150619	BEREA COLLEGE	37.57	−84.30	1070	06/1948	06/1948	06/1948	06/1948	06/1948
KY	150909[b]	BOWLING GREEN FAA AP	36.97	−86.44	528	01/1932	01/1932	01/1932	01/1932	01/1932
KY	152791	FARMERS 2S	38.12	−83.55	680	01/1932	01/1932	01/1932	01/1932	01/1932
KY	153028	FRANKFORT LOCK 4	38.24	−84.87	500	06/1948	06/1948	06/1948	06/1948	06/1948
KY	153430	GREENSBURG	37.26	−85.50	590	01/1932	01/1932	01/1932	01/1932	01/1932
KY	153994	HOPKINSVILLE	36.84	−87.50	590	01/1932	01/1932	01/1932	01/1932	01/1932
KY	154703	LEITCHFIELD 2N	37.52	−86.30	620	06/1948	06/1948	06/1948	06/1948	06/1948
KY	155389[b]	MIDDLESBORO	36.61	−83.74	1175	01/1928	01/1928	01/1928	01/1928	01/1928
KY	156091	OWENSBORO 3W	37.77	−87.16	405	01/1932	01/1932	01/1932	01/1932	01/1932
KY	157324	SHELBYVILLE 1E	38.21	−85.20	730	01/1932	01/1932	01/1932	01/1932	01/1932
KY	158714	WILLIAMSTOWN 3NW	38.66	−84.62	940	06/1948	06/1948	06/1948	06/1948	06/1948
LA	160098	ALEXANDRIA	31.32	−92.47	87	01/1930	01/1930	01/1930	01/1930	01/1930
LA	160205	AMITE	30.70	−90.54	170	01/1948	01/1948	01/1948	01/1948	01/1948
LA	160537	BASTROP	32.79	−91.91	150	01/1948	01/1948	01/1948	01/1948	01/1948
LA	160549	BATON ROUGE WSO AP	30.54	−91.14	64	01/1930	01/1930	01/1930	01/1930	01/1930
LA	161411	CALHOUN RESEARCH STN	32.52	−92.34	180	01/1948	01/1948	01/1948	01/1948	01/1948
LA	***162151***	***COVINGTON 4NNW***	30.54	−90.12	40	05/1893	05/1893	05/1893	01/1930	01/1930
LA	162534	DONALDSONVILLE 4SW	30.07	−91.04	30	01/1930	01/1930	01/1930	01/1930	01/1930
LA	163313	FRANKLIN 3NW	29.82	−91.55	12	01/1948	01/1948	01/1948	01/1948	01/1948
LA	164407	HOUMA	29.59	−90.74	15	01/1930	01/1930	01/1930	01/1930	01/1930
LA	164700	JENNINGS	30.20	−92.67	25	01/1948	01/1948	01/1948	01/1948	01/1948
LA	165026	LAFAYETTE FCWOS	30.20	−91.99	38	01/1948	01/1948	01/1948	01/1948	01/1948
LA	167344	PLAIN DEALING	32.91	−93.69	290	01/1930	01/1930	01/1930	01/1930	01/1930
LA	168163	SAINT JOSEPH 3N	31.95	−91.24	78	03/1930	03/1930	03/1930	03/1930	03/1930
LA	169806	WINNSBORO 5SSE	32.11	−91.72	80	01/1930	01/1930	01/1930	01/1930	01/1930
ME	***172426***	***EASTPORT***	44.92	−67.00	85	04/1873	04/1873	04/1873	01/1926	04/1926
ME	172765	FARMINGTON	44.69	−70.16	420	01/1926	01/1926	01/1926	01/1926	01/1930
ME	173046	GARDINER	44.22	−69.79	140	06/1948	06/1948	06/1948	06/1948	06/1948
ME	174566	LEWISTON	44.11	−70.22	180	01/1926	01/1926	01/1926	01/1926	04/1926

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
ME	175304	MILLINOCKET	45.66	−68.70	360	06/1948	06/1948	06/1948	06/1948	06/1948
ME	176430	ORONO	44.91	−68.67	115	06/1948	06/1948	06/1948	06/1948	06/1948
ME	***176905***	***PORTLAND WSFO AP***	43.66	−70.30	45	04/1874	04/1874	01/1872	01/1920	01/1920
ME	176937	PRESQUE ISLE	46.66	−68.00	599	01/1926	01/1926	01/1926	01/1926	04/1926
ME	177174[b]	RIPOGENUS DAM	45.89	−69.19	965	06/1948	06/1948	06/1948	06/1948	06/1948
ME	179891	WOODLAND	45.16	−67.41	140	06/1948	06/1948	06/1948	06/1948	06/1948
MD	180470	BALTIMORE WSO CITY	39.29	−76.62	14	01/1893	01/1893	01/1893	06/1893	11/1894
MD	181385[b]	CAMBRIDGE WATER TRMT PLANT	38.57	−76.07	5	08/1948	08/1948	08/1948	08/1948	08/1948
MD	181750	CHESTERTOWN	39.22	−76.07	40	08/1948	08/1948	08/1948	08/1948	08/1948
MD	181995[b]	COLLEGE PARK	38.99	−76.95	90	08/1948	08/1948	08/1948	08/1948	08/1948
MD	183675	GLENN DALE BELL STN	38.97	−76.80	150	08/1948	08/1948	08/1948	08/1948	08/1948
MD	185111	LAUREL 3W	39.11	−76.91	400	07/1949	07/1949	07/1949	07/1949	07/1949
MD	185985	MILLINGTON 1SE	39.27	−75.87	30	08/1948	08/1948	08/1948	08/1948	08/1948
MD	186620	OAKLAND 1SE	39.41	−79.41	2420	08/1948	08/1948	08/1948	08/1948	08/1948
MD	186770	OWINGS FERRY LANDING	38.69	−76.67	160	08/1948	08/1948	08/1948	08/1948	08/1948
MD	187330	PRINCESS ANNE	38.22	−75.69	20	12/1948	12/1948	12/1948	12/1948	12/1948
MD	188000	SALISBURY	38.37	−75.59	10	09/1948	09/1948	08/1948	08/1948	08/1948
MD	***189750***	***WOODSTOCK***	39.34	−76.87	460	03/1893	01/1893	01/1893	02/1956	02/1956
MA	190120	AMHERST	42.39	−72.54	150	01/1926	01/1926	01/1926	01/1926	05/1926
MA	***190736***	***BLUE HILL***	42.22	−71.12	630	04/1896	04/1896	04/1896	01/1926	01/1926
MA	191447[b]	CHESTNUT HILL	42.34	−71.16	120	06/1948	06/1948	06/1948	06/1948	06/1948
MA	191561[b]	CLINTON	42.41	−71.69	398	06/1948	06/1948	06/1948	06/1948	06/1948
MA	192975[b]	FRAMINGHAM	42.29	−71.42	170	06/1948	06/1948	06/1948	06/1948	06/1948
MA	194105	LAWRENCE	42.71	−71.17	60	01/1926	01/1926	01/1926	01/1926	03/1926
MA	195246	NEW BEDFORD	41.64	−70.94	70	06/1948	06/1948	06/1948	06/1948	06/1948
MA	196486	PLYMOUTH-KINGSTON	41.99	−70.70	45	06/1948	06/1948	06/1948	06/1948	06/1948
MA	198367	TAUNTON	41.91	−71.07	20	06/1948	06/1948	06/1948	06/1948	06/1948
MI	200032	ADRIAN 2NNE	41.92	−84.02	760	05/1948	05/1948	05/1948	05/1948	05/1948
MI	200128	ALLEGAN 5NE	42.59	−85.79	750	05/1948	05/1948	05/1948	05/1948	05/1948
MI	200146	ALMA	43.39	−84.67	760	06/1948	06/1948	05/1948	05/1948	05/1948
MI	***200230***	***ANN ARBOR UNIV OF MI***	42.30	−83.72	900	10/1891	10/1891	10/1891	01/1897	01/1897
MI	***200779***	***BIG RAPIDS WATERWORKS***	43.71	−85.49	930	04/1896	04/1896	05/1896	01/1899	01/1899

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
MI	201492	CHEBOYGAN	45.66	−84.47	590	05/1948	05/1948	05/1948	05/1948	05/1948
MI	***201675***	***COLDWATER STATE SCHOOL***	41.96	−85.00	984	01/1898	01/1898	01/1898	01/1898	01/1898
MI	202423	EAST TAWAS	44.29	−83.50	586	05/1948	05/1948	05/1948	05/1948	05/1948
MI	202737	FAYETTE 4SW	45.67	−86.72	745	03/1931	03/1931	03/1931	03/1931	03/1931
MI	203632	HART	43.69	−86.35	700	07/1921	07/1921	07/1921	07/1921	07/1921
MI	203823	HILLSDALE	41.94	−84.64	1080	05/1948	05/1948	05/1948	05/1948	05/1948
MI	204090	IRON MT. KINGSFORD WWTP	45.79	−88.09	1060	03/1931	03/1931	03/1931	03/1931	03/1931
MI	204104	IRONWOOD	46.47	−90.19	1430	07/1901	07/1901	07/1901	07/1901	07/1901
MI	204244[b]	KALAMAZOO STATE HOSPITAL	42.29	−85.60	950	05/1948	05/1948	05/1948	05/1948	05/1948
MI	205650	MOUNT CLEMENS ANG BASE	42.62	−82.84	580	05/1948	05/1948	05/1948	05/1948	05/1948
MI	205662[b]	MOUNT PLEASANT UNIVERSITY	43.59	−84.77	796	05/1948	05/1948	05/1948	05/1948	05/1948
MI	205690	MUNISING	46.42	−86.67	680	05/1948	05/1948	05/1948	05/1948	05/1948
MI	205816	NEWBERRY STATE HOSPITAL	46.34	−85.50	875	01/1911	11/1910	11/1910	11/1910	01/1911
MI	206300	OWOSSO 3NNW	43.04	−84.19	740	05/1948	05/1948	05/1948	05/1948	05/1948
MI	207690	SOUTH HAVEN	42.41	−86.29	620	01/1926	01/1926	01/1926	01/1926	01/1926
MI	207812	STAMBAUGH 2SSE	46.05	−88.62	1560	05/1948	05/1948	05/1948	05/1948	05/1948
MN	210018	ADA	47.30	−96.52	910	07/1948	07/1948	07/1948	07/1948	07/1948
MN	210075	ALBERT LEA 3SE	43.62	−93.42	1230	07/1948	07/1948	07/1948	07/1948	07/1948
MN	210515	BAUDETTE	48.72	−94.62	1075	01/1932	01/1932	01/1932	01/1932	01/1932
MN	***211630***	***CLOQUET***	46.71	−92.52	1265	04/1911	04/1911	04/1911	01/1949	03/1921
MN	212142	DETROIT LAKES 1NNE	46.84	−95.85	1375	01/1932	01/1932	01/1932	01/1932	01/1932
MN	212698	FAIRMONT	43.64	−94.47	1187	07/1948	07/1948	07/1948	07/1948	07/1948
MN	212737	FARMINGTON 3NW	44.67	−93.19	980	07/1948	07/1948	07/1948	07/1948	07/1948
MN	212916	FOSSTON	47.57	−95.74	1310	08/1948	08/1948	08/1948	08/1948	08/1948
MN	213290	GRAND MEADOW	43.71	−92.57	1350	01/1932	01/1932	01/1932	01/1932	04/1932
MN	213455[b]	HALLOCK	48.77	−96.95	810	01/1932	01/1932	01/1932	01/1932	01/1932
MN	214106	ITASCA U OF MN	47.22	−95.20	1490	01/1912	01/1912	01/1912	06/1931	02/1939
MN	214652	LEECH LAKE DAM	47.26	−94.22	1302	07/1948	07/1948	07/1948	07/1948	07/1948
MN	215400	MILAN 1NW	45.14	−95.94	1020	07/1948	07/1948	07/1948	07/1948	07/1948
MN	***215435***	***MINNEAPOLIS WSFO AP***	44.89	−93.22	834	01/1891	01/1891	01/1891	07/1948	07/1948
MN	215563	MONTEVIDEO 1SW	44.94	−95.75	985	07/1948	07/1948	07/1948	07/1948	07/1948
MN	215615	MORA	45.89	−93.30	1005	01/1932	01/1932	01/1932	01/1932	01/1932
MN	215638	MORRIS WC EXP. STATION	45.59	−95.89	1140	01/1886	01/1886	01/1886	12/1907	07/1948
MN	215887	NEW ULM	44.30	−94.45	860	07/1948	07/1948	07/1948	07/1948	07/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
MN	216360	PARK RAPIDS 2S	46.91	−95.07	1443	07/1948	07/1948	07/1948	07/1948	07/1948
MN	216547	PINE RIVER DAM	46.67	−94.12	1250	01/1901	01/1901	01/1901	01/1901	02/1904
MN	216565	PIPESTONE	44.02	−96.32	1705	08/1877	08/1877	08/1877	08/1877	08/1877
MN	216612	POKEGAMA DAM	47.26	−93.59	1280	07/1948	07/1948	07/1948	07/1948	07/1948
MN	217087	ROSEAU 1E	48.86	−95.74	1047	07/1948	07/1948	07/1948	07/1948	07/1948
MN	217405	SAINT PETER 2SW	44.30	−93.97	850	07/1948	07/1948	07/1948	07/1948	07/1948
MN	217460	SANDY LAKE DAM LIBBY	46.80	−93.32	1234	07/1948	07/1948	07/1948	07/1948	07/1948
MN	218419	TWO HARBORS	47.02	−91.67	625	07/1948	07/1948	07/1948	07/1948	07/1948
MN	218618	WALKER AH-GWAH-CHING	47.07	−94.59	1410	07/1948	07/1948	07/1948	07/1948	07/1948
MN	219046	WINNEBAGO	43.77	−94.17	1110	01/1932	01/1932	01/1932	01/1932	01/1932
MN	219059	WINNIBIGOSHISH DAM	47.44	−94.05	1315	07/1948	07/1948	07/1948	07/1948	07/1948
MN	219249	ZUMBROTA	44.30	−92.67	985	01/1932	01/1932	01/1932	01/1932	03/1932
MS	220021	ABERDEEN	33.84	−88.52	198	01/1948	01/1948	01/1948	01/1948	01/1948
MS	220488	BATESVILLE 2SW	34.30	−89.99	220	01/1948	01/1948	01/1948	01/1948	01/1948
MS	***220792***[b]	***BILOXI HILLER PARK***	30.40	−88.95	15	06/1893	06/1893	05/1893	01/1995	01/1995
MS	220955	BOONEVILLE	34.67	−88.57	490	01/1948	01/1948	01/1948	01/1948	01/1948
MS	221094	BROOKHAVEN CITY	31.55	−90.45	435	01/1930	01/1930	01/1930	01/1930	01/1930
MS	221389	CANTON	32.61	−90.04	228	01/1948	01/1948	01/1948	01/1948	01/1948
MS	221707	CLARKSDALE	34.21	−90.57	173	01/1930	01/1930	01/1930	01/1930	01/1930
MS	221865	COLUMBIA	31.25	−89.84	155	01/1930	01/1930	01/1930	01/1930	01/1930
MS	221962	CORINTH CITY	34.92	−88.52	385	01/1930	01/1930	01/1930	01/1930	01/1930
MS	223605	GREENVILLE	33.39	−91.02	132	01/1920	01/1920	01/1920	01/1920	01/1920
MS	223887	HATTIESBURG	31.32	−89.30	161	01/1948	01/1948	01/1948	01/1948	01/1948
MS	223975	HERNANDO	34.84	−90.00	363	01/1930	01/1930	01/1930	01/1930	01/1930
MS	224776	KOSCIUSKO	33.05	−89.60	410	01/1948	01/1948	01/1948	01/1948	01/1948
MS	224939	LAUREL	31.69	−89.12	225	03/1891	03/1891	03/1891	03/1891	03/1891
MS	225247	LOUISVILLE	33.14	−89.07	581	01/1930	01/1930	01/1930	01/1930	01/1930
MS	225987	MONTICELLO	31.55	−90.10	220	01/1948	01/1948	01/1948	01/1948	01/1948
MS	226009	MOORHEAD	33.46	−90.52	117	07/1940	07/1940	07/1940	07/1940	07/1940
MS	226177	NATCHEZ	31.55	−91.39	195	01/1930	01/1930	01/1930	01/1930	01/1930
MS	227132	PORT GIBSON 1NW	31.97	−91.00	120	01/1930	01/1930	01/1930	01/1930	01/1930
MS	228374	STATE UNIVERSITY	33.47	−88.79	185	01/1930	01/1930	01/1930	01/1930	01/1930
MS	229079	UNIVERSITY	34.39	−89.54	380	01/1930	01/1930	01/1930	01/1930	01/1930

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
MS	229400	WATER VALLEY 1NNE	34.17	−89.64	376	01/1948	01/1948	01/1948	01/1948	01/1948
MS	229793	WOODVILLE 4ESE	31.11	−91.24	400	01/1948	01/1948	01/1948	01/1948	01/1948
MO	230204	APPLETON CITY	38.21	−94.04	800	07/1948	07/1948	07/1948	07/1948	07/1948
MO	231037	BRUNSWICK	39.42	−93.12	645	01/1918	01/1918	01/1918	01/1918	01/1918
MO	231364	CARUTHERSVILLE	36.21	−89.67	280	01/1918	01/1918	01/1918	01/1918	01/1918
MO	231711	CLINTON	38.41	−93.77	770	01/1918	01/1918	01/1918	01/1918	01/1918
MO	231822	CONCEPTION	40.26	−94.69	1108	07/1948	07/1948	07/1948	07/1948	07/1948
MO	232289	DONIPHAN	36.59	−90.82	330	07/1948	07/1948	07/1948	07/1948	07/1948
MO	234271	JEFFERSON CITY WATER PLANT	38.59	−92.19	670	02/1918	02/1918	02/1918	02/1918	02/1918
MO	234705	LAMAR	37.51	−94.27	980	07/1948	07/1948	07/1948	07/1948	07/1948
MO	234825	LEBANON 2W	37.67	−92.66	1279	01/1918	01/1918	01/1918	01/1918	01/1918
MO	234904	LEXINGTON 3NE	39.21	−93.87	825	01/1918	01/1918	01/1918	01/1918	01/1918
MO	235027	LOCKWOOD	37.39	−93.95	1080	01/1918	01/1918	01/1918	01/1918	01/1918
MO	235253	MARBLE HILL	37.30	−89.97	390	07/1948	07/1948	07/1948	07/1948	07/1948
MO	235541[b]	MEXICO	39.17	−91.91	770	07/1948	07/1948	07/1948	07/1948	07/1948
MO	235834	MOUNTAIN GROVE 2N	37.16	−92.27	1450	01/1918	01/1918	01/1918	01/1918	01/1918
MO	***235976***	***NEOSHO***	36.87	−94.37	1011	01/1893	01/1893	01/1893	01/1918	01/1918
MO	237263	ROLLA UNIV OF MO	37.96	−91.77	1180	01/1918	01/1918	01/1918	01/1918	01/1918
MO	238051	STEFFENVILLE	39.97	−91.89	690	01/1918	01/1918	01/1918	01/1918	01/1918
MO	***238444***	***TRENTON***	40.08	−93.63	837	09/1895	09/1895	01/1895	-9/-999[c]	-9/-999[c]
MO	238523	UNIONVILLE	40.49	−93.00	1062	01/1918	01/1918	01/1918	01/1918	01/1918
MO	238725	WARRENTON 1N	38.82	−91.14	845	01/1918	01/1918	01/1918	01/1918	01/1918
MT	***240364***	***AUGUSTA***	47.49	−112.39	4070	06/1896	06/1896	06/1896	06/1896	10/1906
MT	***240780***	***BIG TIMBER***	45.84	−109.95	4100	04/1894	04/1894	04/1894	04/1894	03/1922
MT	241044	BOZEMAN MONTANA ST. UNIV	45.67	−111.05	4856	04/1892	04/1892	04/1892	05/1892	05/1892
MT	***241552***	***CASCADE 5S***	47.22	−111.72	3360	04/1904	04/1904	04/1904	04/1904	04/1904
MT	241722	CHINOOK	48.59	−109.24	2340	07/1948	07/1948	07/1948	07/1948	07/1948
MT	241737	CHOTEAU AP	47.82	−112.17	3945	01/1893	01/1893	01/1893	01/1893	02/1905
MT	242112[b]	CROW AGENCY	45.61	−107.45	3030	04/1898	04/1898	04/1898	04/1898	04/1898
MT	***242173***	***CUT BANK FAA AP***	48.61	−112.37	3838	12/1903	12/1903	12/1903	12/1903	12/1903
MT	***242409***	***DILLON WMCE***	45.21	−112.64	5228	01/1895	01/1895	01/1895	01/1895	01/1895
MT	***242689***	***EKALAKA***	45.89	−104.54	3425	01/1897	01/1897	01/1897	11/1896	01/1897
MT	242793	ENNIS	45.36	−111.72	4953	07/1948	07/1948	07/1948	07/1948	07/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
MT	243013	FLATWILLOW 4ENE	46.86	−108.32	3138	07/1913	07/1913	06/1913	06/1913	10/1913
MT	***243089***[b]	***FORKS 4NNE***	48.79	−107.47	2600	01/1915	01/1915	01/1915	01/1915	04/1915
MT	243110	FORT ASSINNIBOINE	48.51	−109.80	2613	01/1917	01/1917	01/1917	04/1949	04/1949
MT	***243139***	***FORTINE 1N***	48.79	−114.91	3000	03/1906	03/1906	03/1906	03/1906	03/1906
MT	243581	GLENDIVE	47.11	−104.72	2076	01/1893	01/1893	01/1893	01/1893	10/1933
MT	243885	HAMILTON	46.26	−114.16	3529	06/1895	06/1895	06/1895	12/1898	02/1899
MT	***243984***[b]	***HAUGAN (DEBORGIA) 3E***	47.39	−115.35	3100	02/1912	02/1912	02/1912	02/1912	02/1912
MT	244038	HEBGEN DAM	44.87	−111.34	6489	07/1948	07/1948	07/1948	07/1948	07/1948
MT	***244055***	***HELENA WSO***	46.61	−112.00	3828	01/1893	01/1893	01/1893	01/1893	01/1893
MT	244345	HUNTLEY EXPERIMENT STATION	45.92	−108.25	2990	01/1911	01/1911	01/1911	03/1935	02/1952
MT	244522	JORDAN	47.32	−106.91	2590	01/1905	01/1905	01/1905	02/1905	01/1905
MT	***244558***	***KALISPELL WSO AP***	48.30	−114.27	2965	06/1896	06/1896	06/1896	05/1899	05/1899
MT	245015	LIBBY 1NE RS	48.41	−115.54	2096	06/1895	06/1895	06/1895	11/1895	11/1895
MT	245572	MEDICINE LAKE 3SE	48.49	−104.45	1952	01/1911	01/1911	01/1911	01/1911	01/1911
MT	***245761***	***MOCCASIN EXPERIMENT STATION***	47.05	−109.95	4300	04/1909	04/1909	01/1909	05/1919	02/1932
MT	***246157***	***NORRIS MADISON POWER HOUSE***	45.49	−111.64	4745	01/1907	01/1907	01/1907	01/1907	01/1907
MT	246601	PLEVNA	46.42	−104.50	2765	11/1910	11/1910	11/1910	11/1910	11/1910
MT	246660[b]	POPLAR	48.14	−105.16	2000	02/1893	02/1893	02/1893	02/1893	02/1898
MT	***246918***	***RED LODGE 1NW***	45.19	−109.25	5850	04/1894	04/1894	03/1894	03/1894	12/1902
MT	***247286***	***SAINT IGNATIUS***	47.32	−114.10	2900	02/1896	02/1896	02/1896	02/1896	02/1896
MT	***247382***	***SAVAGE***	47.46	−104.35	1985	09/1905	09/1905	09/1905	10/1905	10/1905
MT	***248501***	***VALIER***	48.32	−112.25	3805	08/1911	08/1911	08/1911	08/1911	03/1918
MT	248597	VIRGINIA CITY	45.30	−111.95	5773	07/1948	07/1948	07/1948	07/1948	07/1948
MT	248857[b]	WEST YELLOWSTONE	44.66	−111.10	6659	01/1924	01/1924	01/1924	01/1924	01/1924
NE	250070	ALBION	41.67	−97.99	1745	01/1893	01/1893	01/1893	01/1893	01/1893
NE	250130	ALLIANCE 1WNW	42.11	−102.91	3994	09/1896	09/1896	11/1894	11/1894	11/1894
NE	250375	ASHLAND 2	41.05	−96.35	1070	06/1948	06/1948	06/1948	06/1948	06/1948
NE	250420	ATKINSON	42.54	−98.99	2110	06/1906	06/1906	06/1906	06/1906	06/1906
NE	250435	AUBURN 5ESE	40.37	−95.75	930	06/1948	06/1948	06/1948	06/1948	06/1948
NE	250640	BEAVER CITY	40.14	−99.84	2160	06/1948	06/1948	06/1948	06/1948	06/1948
NE	***251145***	***BRIDGEPORT***	41.67	−103.10	3666	05/1897	05/1897	05/1897	05/1897	05/1897
NE	251200	BROKEN BOW 2W	41.42	−99.69	2500	11/1894	11/1894	11/1894	11/1894	11/1894
NE	252020	CRETE	40.62	−96.95	1435	06/1948	06/1948	06/1948	06/1948	06/1948
NE	252100	CURTIS 3NNE	40.67	−100.50	2721	06/1948	06/1948	06/1948	06/1948	06/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
NE	252205	DAVID CITY	41.27	−97.12	1610	12/1897	12/1897	01/1889	01/1889	01/1889
NE	***252820***	***FAIRBURY***	40.16	−97.17	1430	08/1895	08/1895	01/1893	01/1893	01/1893
NE	252840	FAIRMONT	40.64	−97.59	1640	06/1948	06/1948	06/1948	06/1948	06/1948
NE	253035[b]	FRANKLIN	40.11	−98.97	1855	01/1888	01/1888	01/1888	01/1888	01/1888
NE	253175	GENEVA	40.54	−97.60	1630	06/1948	06/1948	06/1948	06/1948	06/1948
NE	253185	GENOA 2W	41.46	−97.77	1590	06/1948	06/1948	06/1948	06/1948	06/1948
NE	***253365***	***GOTHENBURG***	40.94	−100.17	2585	09/1894	09/1894	09/1894	09/1894	09/1894
NE	253540[b]	HALSEY 2W	41.91	−100.32	2705	04/1903	04/1903	02/1903	02/1903	02/1903
NE	253615	HARRISON	42.69	−103.89	4850	05/1914	05/1914	03/1893	03/1893	03/1893
NE	253630	HARTINGTON	42.61	−97.27	1370	01/1893	01/1893	01/1893	01/1893	01/1893
NE	253660	HASTINGS 4N	40.66	−98.39	1940	06/1948	06/1948	06/1948	06/1948	06/1948
NE	253735	HEBRON	40.17	−97.59	1480	06/1948	06/1948	06/1948	06/1948	06/1948
NE	253910	HOLDREGE	40.44	−99.37	2320	06/1948	06/1948	06/1948	06/1948	06/1948
NE	254110	IMPERIAL	40.52	−101.64	3278	06/1948	06/1948	06/1948	06/1948	06/1948
NE	254440	KIMBALL	41.26	−103.67	4760	01/1893	01/1893	01/1893	01/1893	01/1893
NE	254900	LODGEPOLE	41.16	−102.64	3832	06/1948	06/1948	06/1948	06/1948	06/1948
NE	254985	LOUP CITY	41.29	−98.97	2065	06/1948	06/1948	06/1948	06/1948	06/1948
NE	255080	MADISON	41.84	−97.45	1580	06/1948	06/1948	06/1948	06/1948	06/1948
NE	255310	MCCOOK	40.21	−100.60	2530	06/1948	06/1948	06/1948	06/1948	06/1948
NE	255470	MERRIMAN	42.92	−101.69	3250	11/1948	11/1948	11/1948	11/1948	11/1948
NE	255565	MINDEN	40.52	−98.95	2160	06/1948	06/1948	06/1948	06/1948	06/1948
NE	256040	NORTH LOUP	41.51	−98.77	1960	06/1948	06/1948	06/1948	06/1948	06/1948
NE	256135	OAKDALE	42.07	−97.97	1710	06/1948	06/1948	06/1948	06/1948	06/1948
NE	***256570***	***PAWNEE CITY***	40.11	−96.16	1185	11/1903	11/1903	09/1902	09/1902	09/1902
NE	256970	PURDUM	42.07	−100.25	2690	06/1948	06/1948	06/1948	06/1948	06/1948
NE	257070	RED CLOUD	40.11	−98.52	1720	06/1948	06/1948	06/1948	06/1948	06/1948
NE	257515	SAINT PAUL	41.27	−98.47	1775	06/1948	06/1948	06/1948	06/1948	06/1948
NE	257715	SEWARD	40.91	−97.10	1480	06/1948	06/1948	06/1948	06/1948	06/1948
NE	258395	SYRACUSE	40.67	−96.19	1100	06/1948	06/1948	06/1948	06/1948	06/1948
NE	258465	TECUMSEH	40.37	−96.22	1150	06/1948	06/1948	06/1948	06/1948	06/1948
NE	258480	TEKAMAH	41.77	−96.22	1040	06/1948	06/1948	06/1948	06/1948	06/1948
NE	258915	WAKEFIELD	42.27	−96.87	1390	06/1948	06/1948	06/1948	06/1948	06/1948
NE	259090	WEEPING WATER	40.87	−96.16	1100	06/1948	06/1948	06/1948	06/1948	06/1948
NE	259510	YORK	40.87	−97.60	1610	06/1948	06/1948	06/1948	06/1948	06/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
NV	260507	AUSTIN	39.51	−117.09	6605	01/1921	01/1921	01/1921	01/1921	01/1921
NV	261071	BOULDER CITY	35.99	−114.85	2525	09/1931	09/1931	09/1931	09/1931	09/1931
NV	262573	ELKO FAA AP	40.84	−115.79	5050	01/1928	01/1928	01/1928	01/1928	01/1928
NV	262780	FALLON EXPERIMENT STATION	39.46	−118.79	3965	01/1928	01/1928	01/1928	01/1928	01/1928
NV	263245	GOLCONDA	40.96	−117.49	4392	07/1948	07/1948	07/1948	07/1948	07/1948
NV	264698	LOVELOCK	40.19	−118.47	3975	01/1928	01/1928	01/1928	01/1928	01/1928
NV	264950	MCGILL	39.41	−114.77	6300	01/1928	01/1928	01/1928	01/1928	01/1928
NV	265168	MINA	38.39	−118.10	4550	01/1928	01/1928	01/1928	01/1928	01/1928
NV	266779	REN WSFO AP	39.51	−119.79	4404	03/1937	03/1937	03/1937	03/1937	03/1937
NV	267369	SEARCHLIGHT	35.47	−114.92	3540	07/1948	07/1948	07/1948	07/1948	07/1948
NV	268988	WELLS	41.12	−114.97	5650	07/1948	07/1948	07/1948	07/1948	07/1948
NV	***269171***	***WINNEMUCCA WSO AP***	40.91	−117.80	4298	07/1877	07/1877	07/1877	02/1929	01/1928
NH	270703[b]	BETHLEHEM	44.29	−71.69	1380	06/1948	06/1948	06/1948	06/1948	06/1948
NH	272174	DURHAM	43.16	−70.95	80	01/1926	01/1926	01/1926	01/1926	01/1926
NH	272999	FIRST CONNECTICUT LAKE	45.09	−71.29	1660	06/1948	06/1948	06/1948	06/1948	06/1948
NH	273850	HANOVER	43.71	−72.29	603	01/1926	01/1926	01/1926	01/1926	01/1926
NH	274399	KEENE	42.96	−72.32	510	01/1926	01/1926	01/1926	01/1926	02/1931
NJ	***280325***	***ATLANTIC CITY STATE MARINA***	39.39	−74.44	10	01/1874	01/1874	01/1874	08/1948	08/1948
NJ	280907	BOONTON 1SE	40.91	−74.41	280	01/1926	01/1926	01/1926	05/1926	05/1926
NJ	281582	CHARLOTTEBURG RESERVOIR	41.04	−74.44	760	01/1926	01/1926	01/1926	01/1926	01/1926
NJ	283029	FLEMINGTON 5NNW	40.57	−74.89	260	01/1926	01/1926	01/1926	01/1926	01/1926
NJ	283951	HIGHTSTOWN 2W	40.27	−74.57	100	01/1931	01/1931	01/1931	01/1931	01/1931
NJ	284229	INDIAN MILLS 2W	39.80	−74.79	100	01/1926	01/1926	01/1926	01/1926	01/1926
NJ	284987	LONG BRANCH OAKHURST	40.27	−74.00	30	01/1928	01/1928	01/1928	01/1928	01/1928
NJ	285728	MOORESTOWN	39.97	−74.97	45	01/1926	01/1926	01/1926	01/1926	01/1926
NJ	***286055***	***NEW BRUNSWICK 3SE***	40.47	−74.44	86	01/1893	01/1893	01/1893	01/1991	01/1991
NJ	287079	PLAINFIELD	40.61	−74.41	90	01/1931	01/1931	01/1931	01/1931	01/1931
NJ	288899[b]	TUCKERTON	39.61	−74.35	20	09/1948	09/1948	09/1948	09/1948	09/1948
NM	290692	AZTEC RUINS NATL MONUMENT	36.84	−108.00	5644	01/1948	01/1948	01/1948	01/1948	01/1948
NM	290858	BELL RANCH	35.54	−104.10	4500	01/1948	01/1948	01/1948	01/1948	01/1948
NM	291469	CARLSBAD	32.42	−104.24	3120	01/1948	01/1948	01/1948	01/1948	01/1948
NM	291515	CARRIZOZO 1SW	33.64	−105.89	5405	01/1948	01/1948	01/1948	01/1948	01/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
NM	291664	CHAMA	36.92	−106.59	7850	01/1948	01/1948	01/1948	01/1948	01/1948
NM	291813	CIMARRON 4SW	36.47	−104.95	6540	05/1904	05/1904	05/1904	05/1904	05/1904
NM	291887[b]	CLAYTON WSO AP	36.46	−103.16	4970	02/1896	02/1896	02/1896	02/1896	02/1896
NM	292848	ELEPHANT BUTTE DAM	33.16	−107.19	4576	01/1948	01/1948	01/1948	01/1948	01/1948
NM	293265	FORT BAYARD	32.80	−108.16	6142	02/1897	02/1897	02/1897	02/1897	02/1897
NM	293294	FORT SUMNER	34.47	−104.25	4025	01/1948	01/1948	01/1948	01/1948	01/1948
NM	293368	GAGE 4ESE	32.22	−108.02	4410	01/1948	01/1948	01/1948	01/1948	01/1948
NM	***294369***	***JEMEZ SPRINGS***	35.77	−106.69	6262	10/1910	10/1910	05/1910	01/1948	01/1948
NM	294426	JORNADA EXPERIMENTAL RANGE	32.62	−106.74	4266	01/1953	01/1953	01/1953	01/1953	01/1953
NM	295273	LUNA RS	33.84	−108.94	7050	01/1948	01/1948	01/1948	01/1948	01/1948
NM	295960	MOUNTAIN PARK	32.96	−105.85	6780	01/1948	01/1948	01/1948	01/1948	01/1948
NM	295965	MOUNTAINAIR	34.52	−106.25	6520	01/1948	01/1948	01/1948	01/1948	01/1948
NM	296435	OROGRANDE	32.39	−106.10	4182	01/1948	01/1948	01/1948	01/1948	01/1948
NM	297323	RED RIVER	36.71	−105.41	8676	01/1948	01/1948	01/1948	01/1948	01/1948
NM	***297867***	***SAN JON***	35.12	−103.34	4230	06/1907	06/1907	06/1907	01/1948	01/1948
NM	298107	SANTA ROSA	34.96	−104.69	4620	01/1948	01/1948	01/1948	01/1948	01/1948
NM	298387	SOCORRO	34.09	−106.89	4585	01/1931	01/1931	01/1931	01/1931	01/1931
NM	298501	SPRINGER	36.37	−104.59	5922	01/1948	01/1948	01/1948	01/1948	01/1948
NM	299156	TUCUMCARI 4NE	35.21	−103.69	4086	12/1904	12/1904	12/1904	12/1904	12/1904
NM	299165	TULAROSA	33.09	−106.05	4430	01/1948	01/1948	01/1948	01/1948	01/1948
NY	***300042***	***ALBANY WSFO AP***	42.76	−73.80	275	01/1874	01/1874	01/1874	01/1991	01/1991
NY	300085	ALFRED	42.26	−77.79	1770	01/1926	01/1926	01/1926	01/1926	01/1926
NY	300093	ALLEGANY STATE PARK	42.11	−78.75	1500	05/1948	05/1948	05/1948	05/1948	05/1948
NY	300183	ANGELICA	42.30	−78.02	1425	01/1926	01/1926	01/1926	01/1926	01/1926
NY	300321[b]	AUBURN	42.92	−76.54	770	01/1926	01/1926	01/1926	01/1926	01/1926
NY	300360[b]	BAINBRIDGE 2E	42.29	−75.45	994	05/1948	05/1948	05/1948	05/1948	05/1948
NY	***300443***	***BATAVIA***	42.99	−78.19	890	01/1932	01/1932	01/1931	05/1948	05/1948
NY	***300889***	***BRIDGEHAMPTON***	40.96	−72.30	60	08/1930	08/1930	08/1930	08/1930	08/1930
NY	300937[b]	BROCKPORT	43.21	−77.94	535	02/1950	02/1950	02/1950	02/1950	02/1950
NY	301012	BUFFALO WSCMO AP	42.94	−78.74	705	01/1922	01/1922	01/1922	01/1922	01/1922
NY	301185	CANTON 4SE	44.57	−75.12	440	01/1922	01/1922	01/1922	01/1922	01/1922
NY	301387[b]	CHASM FALLS	44.76	−74.22	1060	05/1948	05/1948	05/1948	05/1948	05/1948
NY	301401	CHAZY	44.89	−73.44	170	01/1926	01/1926	01/1926	01/1926	01/1926
NY	301752	COOPERSTOWN	42.71	−74.92	1200	04/1926	04/1926	04/1926	04/1926	04/1926

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
NY	301799	CORTLAND	42.61	−76.19	1129	05/1948	05/1948	05/1948	05/1948	05/1948
NY	301966	DANNEMORA	44.72	−73.72	1340	01/1926	01/1926	01/1926	01/1926	01/1926
NY	301974	DANSVILLE	42.57	−77.72	660	10/1941	10/1941	10/1941	10/1941	10/1941
NY	302610	ELMIRA	42.11	−76.80	844	01/1926	01/1926	01/1926	01/1926	01/1926
NY	***303033***	***FREDONIA***	42.46	−79.30	760	01/1914	01/1914	01/1914	01/1926	01/1926
NY	303259[b]	GLENHAM	41.52	−73.94	275	05/1948	05/1948	05/1948	05/1948	05/1948
NY	303319	GLOVERSVILLE	43.05	−74.35	812	06/1948	06/1948	05/1948	06/1948	06/1948
NY	303773	HEMLOCK	42.79	−77.62	902	01/1926	01/1926	01/1926	01/1926	01/1926
NY	304102	INDIAN LAKE 2SW	43.76	−74.29	1660	05/1948	05/1948	05/1948	05/1948	05/1948
NY	304555	LAKE PLACID 2S	44.26	−73.99	1940	05/1948	05/1948	05/1948	05/1948	05/1948
NY	304647	LAWRENCEVILLE	44.76	−74.66	500	05/1948	05/1948	05/1948	05/1948	05/1948
NY	304791	LITTLE FALLS CITY RESER	43.07	−74.87	900	02/1926	02/1926	02/1926	02/1926	02/1926
NY	304796[b]	LITTLE FALLS MILL ST	43.04	−74.87	360	09/1942	09/1942	01/1926	01/1926	01/1926
NY	304844	LOCKPORT 2NE	43.19	−78.66	520	01/1926	01/1926	01/1926	01/1926	01/1926
NY	304912	LOWVILLE	43.80	−75.49	860	01/1926	01/1926	01/1926	01/1926	05/1926
NY	305426	MOHONK LAKE	41.77	−74.16	1245	05/1948	05/1948	05/1948	05/1948	05/1948
NY	305512	MORRISVILLE 3S	42.86	−75.66	1340	05/1926	05/1926	01/1926	01/1926	05/1926
NY	***305801***	***NEW YORK CENTRAL PARK***	40.79	−73.97	130	01/1876	01/1876	01/1876	02/1890	01/1912
NY	306085	NORWICH	42.54	−75.54	1020	01/1926	01/1926	01/1926	01/1926	01/1926
NY	306164	OGDENSBURG 4NE	44.74	−75.44	280	01/1926	01/1926	01/1926	01/1926	01/1926
NY	306314	OSWEGO EAST	43.47	−76.50	350	01/1926	01/1926	01/1926	01/1926	01/1926
NY	306659[b]	PLATTSBURGH AFB	44.66	−73.47	165	05/1948	05/1948	05/1948	05/1948	05/1948
NY	306774	PORT JERVIS	41.39	−74.69	470	01/1926	01/1926	01/1926	01/1926	01/1926
NY	307167	ROCHESTER AIRPORT	43.14	−77.67	600	01/1926	01/1926	01/1926	01/1926	01/1926
NY	307497[b]	SCARSDALE	40.99	−73.80	199	05/1948	05/1948	05/1948	05/1948	05/1948
NY	307633	SETAUKET STRONG	40.97	−73.10	40	01/1926	01/1926	01/1926	01/1926	01/1926
NY	308248	STILLWATER RESERVOIR	43.89	−75.04	1690	05/1948	05/1948	05/1948	05/1948	05/1948
NY	308383	SYRACUSE WSO AP	43.12	−76.12	420	01/1922	01/1922	01/1922	01/1922	01/1922
NY	308631	TUPPER LAKE SUNMOUNT	44.24	−74.44	1680	05/1948	05/1948	05/1948	05/1948	05/1948
NY	***308944***	***WANAKENA RANGER SCHOOL***	44.16	−74.91	1510	06/1910	06/1910	06/1910	01/1926	01/1926
NY	309000	WATERTOW	43.97	−75.87	497	01/1926	01/1926	01/1926	01/1926	01/1926
NY	309292	WEST POINT	41.39	−73.97	320	05/1948	05/1948	05/1948	05/1948	05/1948
NC	310090	ALBEMARLE	35.37	−80.19	610	01/1933	01/1933	01/1933	01/1933	01/1933
NC	310506	BANNER ELK	36.17	−81.87	3750	08/1948	08/1948	08/1948	08/1948	08/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
NC	311677	CHAPEL HILL 2W	35.92	−79.10	500	08/1948	08/1948	08/1948	08/1948	08/1948
NC	***312635***	***EDENTON***	36.05	−76.62	20	02/1896	02/1896	02/1896	01/1933	01/1933
NC	312719	ELIZABETH CITY	36.32	−76.20	8	01/1934	01/1934	01/1934	01/1934	01/1934
NC	313017	FAYETTEVILLE	35.07	−78.87	96	01/1933	01/1933	01/1933	01/1933	01/1933
NC	313510	GOLDSBORO 4SE	35.34	−77.97	109	02/1900	02/1900	07/1902	07/1902	07/1902
NC	313969	HENDERSON 2NNW	36.37	−78.42	480	01/1933	01/1933	01/1933	01/1933	01/1933
NC	313976	HENDERSONVILLE 1NE	35.34	−82.45	2160	08/1948	08/1948	08/1948	08/1948	08/1948
NC	314055	HIGHLANDS	35.05	−83.19	3840	08/1948	08/1948	08/1948	08/1948	08/1948
NC	314684	KINSTON 5SE	35.22	−77.54	55	08/1948	10/1948	08/1948	08/1948	08/1948
NC	314938	LENOIR	35.92	−81.54	1200	08/1948	08/1948	08/1948	08/1948	08/1948
NC	315123	LOUISBURG	36.11	−78.32	260	08/1948	08/1948	08/1948	08/1948	08/1948
NC	315177	LUMBERTON 3SE	34.62	−78.99	112	01/1903	01/1903	01/1903	01/1903	01/1903
NC	315340	MARION	35.69	−82.00	1425	03/1949	03/1949	03/1949	03/1949	03/1949
NC	315356	MARSHALL	35.80	−82.67	2000	08/1948	08/1948	08/1948	08/1948	08/1948
NC	***315771***	***MONROE 4SE***	34.97	−80.50	580	02/1896	02/1896	01/1896	01/1933	01/1933
NC	315838	MORGANTON	35.76	−81.69	1160	01/1933	01/1933	01/1933	01/1933	01/1933
NC	***315890***	***MOUNT AIRY***	36.52	−80.62	1030	01/1893	01/1893	01/1893	01/1893	01/1893
NC	317615	SALISBURY	35.69	−80.49	700	01/1893	01/1893	01/1893	01/1893	01/1893
NC	317994	SMITHFIELD	35.52	−78.35	150	08/1948	08/1948	08/1948	08/1948	08/1948
NC	318113	SOUTHPORT 5N	34.01	−78.02	20	08/1948	08/1948	08/1948	08/1948	08/1948
NC	318292	STATESVILLE 2NNE	35.82	−80.89	950	01/1901	01/1901	01/1901	01/1901	01/1901
NC	318500	TARBORO 1S	35.89	−77.54	35	08/1948	08/1948	08/1948	08/1948	08/1948
NC	319147	WAYNESVILLE 1E	35.49	−82.97	2658	08/1894	08/1894	08/1894	08/1894	08/1894
ND	320941	BOTTINEAU	48.84	−100.45	1640	03/1898	03/1898	03/1898	03/1898	07/1905
ND	321871	CROSBY	48.91	−103.30	1952	01/1909	01/1909	01/1909	01/1909	05/1909
ND	***322188***	***DICKINSON EXP STN***	46.89	−102.80	2460	01/1893	01/1893	01/1893	03/1903	03/1903
ND	322365	DUNN CENTER 2SW	47.36	−102.66	2232	07/1948	07/1948	07/1948	07/1948	07/1948
ND	323207	FORT YATES 4SW	46.05	−100.67	1675	07/1948	07/1948	07/1948	07/1948	07/1948
ND	323287	FULLERTON 1ESE	46.16	−98.41	1435	07/1948	07/1948	07/1948	07/1948	07/1948
ND	323594	GRAFTON	48.42	−97.4	2827	07/1948	07/1948	07/1948	07/1948	07/1948
ND	323621	GRAND FORKS UNIVERSITY	47.94	−97.09	830	01/1932	01/1932	01/1932	01/1932	01/1932
ND	324178	HETTINGER	45.99	−102.66	2680	01/1916	01/1916	01/1916	01/1916	03/1916
ND	324203	HILLSBORO 3N	47.46	−97.07	910	08/1948	08/1948	08/1948	08/1948	08/1948
ND	324418	JAMESTOWN STATE HOSPITAL	46.89	−98.69	1467	06/1881	06/1881	06/1881	06/1881	06/1881

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
ND	324958	LANGDON EXPERIMENT STN	48.76	−98.34	1615	04/1907	04/1907	04/1907	04/1907	04/1907
ND	325220	LISBON	46.44	−97.69	1110	01/1932	01/1932	01/1932	01/1932	01/1932
ND	325479	MANDAN EXPERIMENT STN	46.80	−100.91	1750	07/1913	07/1913	07/1913	07/1913	07/1913
ND	***325660***[b]	***MAYVILLE***	47.51	−97.32	935	03/1896	03/1896	01/1896	01/1911	04/1911
ND	326155	MOTT	46.39	−102.34	2515	07/1948	07/1948	07/1948	07/1948	07/1948
ND	326255	NAPOLEON	46.51	−99.77	1980	01/1901	01/1901	01/1901	01/1901	01/1901
ND	326315	NEW ENGLAND	46.55	−102.87	2639	07/1948	07/1948	07/1948	07/1948	07/1948
ND	326947	PEMBINA	48.97	−97.24	790	07/1948	07/1948	07/1948	07/1948	07/1948
ND	327530	RICHARDTON ABBEY	46.89	−102.32	2470	07/1948	07/1948	07/1948	07/1948	07/1948
ND	328792	TOWNER 2NE	48.36	−100.41	1480	07/1948	07/1948	07/1948	07/1948	07/1948
ND	329100	WAHPETON 3N	46.32	−96.60	956	03/1897	03/1897	03/1897	03/1897	07/1898
ND	329445	WILLOW CITY	48.62	−100.30	1460	07/1948	07/1948	07/1948	07/1948	07/1948
OH	331072	BUCYRUS	40.82	−82.97	955	01/1936	01/1936	01/1936	01/1936	01/1936
OH	***331152***	***CADIZ***	40.27	−81.00	1260	09/1903	09/1903	09/1903	09/1903	09/1903
OH	331541	CHIPPEWA LAKE	41.05	−81.94	1180	01/1936	01/1936	01/1936	01/1936	01/1936
OH	331592	CIRCLEVILLE	39.62	−82.95	673	01/1942	01/1942	01/1942	01/1942	01/1942
OH	331890	COSHOCTON WPC PLANT	40.26	−81.87	760	01/1936	01/1936	01/1936	01/1936	01/1936
OH	332119	DELAWARE	40.29	−83.07	868	01/1936	01/1936	01/1936	01/1936	01/1936
OH	332791	FINDLAY WPCC	41.05	−83.67	768	01/1936	01/1936	01/1936	01/1936	01/1936
OH	333375	GREENVILLE WATER PLANT	40.11	−84.66	1024	01/1900	01/1900	01/1900	01/1900	01/1900
OH	333758	HILLSBORO	39.21	−83.62	1100	01/1900	01/1900	01/1900	01/1900	01/1901
OH	333780	HIRAM	41.30	−81.16	1230	01/1900	01/1900	01/1900	01/1900	01/1900
OH	334189	KENTON	40.66	−83.60	995	01/1900	01/1900	01/1900	01/1900	01/1900
OH	335041	MCCONNELLSVILLE LOCK 7	39.66	−81.85	660	01/1900	01/1900	01/1900	01/1900	04/1900
OH	335297	MILLERSBURG	40.55	−81.92	819	01/1936	01/1936	01/1936	01/1936	01/1936
OH	335315	MILLPORT 2N	40.72	−80.91	1145	01/1936	01/1936	01/1936	01/1936	01/1936
OH	336118	NORWALK WWTP	41.27	−82.62	670	01/1900	01/1900	01/1900	01/1900	01/1900
OH	336196	OBERLIN	41.27	−82.22	816	07/1936	07/1936	07/1936	07/1936	07/1936
OH	336600	PHILO 3SW	39.84	−81.92	1020	05/1948	05/1948	05/1948	05/1948	05/1948
OH	336781	PORTSMOUTH-SCIOTOVILLE	38.76	−82.89	540	01/1936	01/1936	01/1936	01/1936	01/1936
OH	338313	TIFFIN	41.12	−83.17	740	01/1936	01/1936	01/1936	01/1936	01/1936
OH	338534	UPPER SANDUSKY	40.84	−83.29	854	01/1936	01/1936	01/1936	01/1936	01/1936
OH	338552	URBANA WWTP	40.11	−83.79	1000	01/1936	01/1936	01/1936	01/1936	01/1936
OH	338769	WARREN 3S	41.21	−80.82	900	01/1936	01/1936	01/1936	01/1936	01/1936

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
OH	338822	WAUSEON WATER PLANT	41.52	−84.16	750	01/1936	01/1936	01/1936	01/1936	01/1936
OH	338830	WAVERLY	39.12	−82.99	560	01/1936	01/1936	01/1936	01/1936	01/1936
OH	***339312***	***WOOSTER EXP STN***	40.79	−81.92	1020	06/1893	06/1893	06/1893	01/1900	01/1901
OK	340017	ADA	34.79	−96.69	1015	01/1907	01/1907	01/1907	01/1907	01/1907
OK	340179	ALTUS IRRIGATION RES STN	34.59	−99.34	1380	01/1948	01/1948	01/1948	01/1948	01/1948
OK	340256	ANTLERS	34.26	−95.64	520	01/1948	01/1948	01/1948	01/1948	01/1948
OK	340292	ARDMORE	34.21	−97.16	840	08/1901	08/1901	08/1901	08/1901	08/1901
OK	340548	BARTLESVILLE 2W	36.76	−96.00	715	01/1948	01/1948	01/1948	01/1948	01/1948
OK	340593	BEAVER	36.82	−100.54	2465	01/1948	01/1948	01/1948	01/1948	01/1948
OK	340908	BOISE CITY 2E	36.74	−102.49	4145	01/1948	01/1948	01/1948	01/1948	01/1948
OK	341243	BUFFALO	36.84	−99.62	1795	01/1948	01/1948	01/1948	01/1948	01/1948
OK	341504	CARNEGIE 2ENE	35.12	−98.57	1290	01/1948	01/1948	01/1948	01/1948	01/1948
OK	341724	CHEROKEE	36.77	−98.35	1180	01/1948	01/1948	01/1948	01/1948	01/1948
OK	341828	CLAREMORE 2ENE	36.32	−95.59	588	01/1948	01/1948	01/1948	01/1948	01/1948
OK	342678	DURANT-USDA	34.02	−96.39	660	08/1901	08/1901	08/1901	08/1901	08/1901
OK	342912	ENID	36.42	−97.87	1245	02/1894	02/1894	02/1894	02/1894	02/1894
OK	342944	ERICK 4E	35.21	−99.80	1985	01/1948	01/1948	01/1948	01/1948	01/1948
OK	343497	GEARY	35.64	−98.32	1595	01/1948	01/1948	01/1948	01/1948	01/1948
OK	343628	GOODWELL RESEARCH STATION	36.61	−101.62	3310	01/1948	01/1948	01/1948	01/1948	01/1948
OK	343821	GUTHRIE	35.89	−97.45	1030	01/1948	01/1948	01/1948	01/1948	01/1948
OK	343871	HAMMON 3SSW	35.61	−99.41	1820	01/1948	01/1948	01/1948	01/1948	01/1948
OK	344055	HENNESSEY 4ESE	36.11	−97.84	1150	01/1948	01/1948	01/1948	01/1948	01/1948
OK	344204[b]	HOBART FAA AP	35.01	−99.05	1552	01/1948	01/1948	01/1948	01/1948	01/1948
OK	***344235***	***HOLDENVILLE***	35.09	−96.41	860	01/1901	01/1901	01/1901	01/1901	01/1901
OK	344298	HOOKER	36.87	−101.22	2995	01/1948	01/1948	01/1948	01/1948	01/1948
OK	344384	HUGO	34.01	−95.52	570	01/1948	01/1948	01/1948	01/1948	01/1948
OK	344573	JEFFERSON	36.72	−97.80	1045	07/1897	07/1897	07/1897	07/1897	07/1897
OK	344766	KENTON	36.91	−102.97	4350	01/1948	01/1948	01/1948	01/1948	01/1948
OK	344861	KINGFISHER 2SE	35.86	−97.91	1100	04/1897	04/1897	04/1897	04/1897	04/1897
OK	345063	LAWTON	34.62	−98.45	1150	01/1948	01/1948	01/1948	01/1948	01/1948
OK	345509	MANGUM RESEARCH STATION	34.84	−99.44	1520	01/1948	01/1948	01/1948	01/1948	01/1948
OK	345779	MEEKER 4W	35.51	−96.99	925	01/1948	01/1948	01/1948	01/1948	01/1948
OK	345855	MIAMI	36.89	−94.89	805	01/1948	01/1948	01/1948	01/1948	01/1948
OK	346130	MUSKOGEE	35.77	−95.34	583	01/1948	01/1948	01/1948	01/1948	01/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
OK	346139	MUTUAL	36.24	−99.17	1865	01/1948	01/1948	01/1948	01/1948	01/1948
OK	346278	NEWKIRK	36.89	−97.05	1140	01/1898	01/1898	01/1898	01/1898	01/1898
OK	346629	OKEENE	36.12	−98.32	1210	01/1948	01/1948	01/1948	01/1948	01/1948
OK	***346638***	***OKEMAH***	35.44	−96.30	935	04/1912	04/1912	04/1912	04/1912	04/1912
OK	346670	OKMULGEE WATER WORKS	35.62	−96.02	647	01/1948	01/1948	01/1948	01/1948	01/1948
OK	346926	PAULS VALLEY 4WSW	34.74	−97.29	940	03/1900	03/1900	03/1900	03/1900	03/1900
OK	346935	PAWHUSKA	36.67	−96.35	835	01/1898	01/1898	01/1898	01/1898	01/1898
OK	347012	PERRY	36.29	−97.30	1025	01/1948	01/1948	01/1948	01/1948	01/1948
OK	348501	STILLWATER 2W	36.12	−97.10	895	01/1893	01/1893	01/1893	01/1893	01/1893
OK	348677	TAHLEQUAH	35.94	−94.97	850	01/1948	01/1948	01/1948	01/1948	01/1948
OK	349395	WAURIKA	34.17	−98.00	875	01/1910	01/1910	01/1910	01/1910	01/1910
OK	349422	WEATHERFORD	35.52	−98.70	1635	01/1948	01/1948	01/1948	01/1948	01/1948
OK	349445	WEBBERS FALLS 5WSW	35.49	−95.20	550	01/1948	01/1948	01/1948	01/1948	01/1948
OR	350304	ASHLAND	42.22	−122.72	1750	07/1948	07/1948	07/1948	07/1948	07/1948
OR	350694	BEND	44.07	−121.29	3660	01/1928	01/1928	01/1928	01/1928	01/1928
OR	351055	BROOKINGS 2SE	42.04	−124.25	46	01/1931	01/1931	01/1931	01/1931	01/1931
OR	351433	CASCADIA	44.41	−122.49	860	02/1931	02/1931	02/1931	02/1931	02/1931
OR	351765	CONDON	45.24	−120.19	2861	01/1928	01/1928	01/1928	01/1928	01/1928
OR	351862	CORVALLIS STATE UNIV	44.64	−123.20	225	07/1948	07/1948	07/1948	07/1948	07/1948
OR	351897[b]	COTTAGE GROVE 1S	43.79	−123.07	650	07/1948	07/1948	07/1948	07/1948	07/1948
OR	351946	CRATER LAKE NPS HQ	42.91	−122.14	6475	01/1931	01/1931	01/1931	01/1931	01/1931
OR	352135	DANNER	42.94	−117.34	4225	01/1931	01/1931	01/1931	01/1931	01/1931
OR	352406	DRAIN	43.67	−123.32	292	12/1910	12/1910	12/1910	12/1910	07/1948
OR	***352440***	***DUFUR***	45.46	−121.14	1330	06/1910	06/1910	09/1909	07/1904	07/1904
OR	352997	FOREST GROVE	45.54	−123.10	180	01/1928	01/1928	01/1928	01/1928	01/1928
OR	353095[b]	FREMONT 5NW	43.39	−121.20	4609	08/1948	08/1948	08/1948	08/1948	08/1948
OR	***353445***	***GRANTS PASS***	42.44	−123.35	925	01/1893	01/1893	01/1893	01/1928	01/1928
OR	353770	HEADWORKS PORTLAND WTRB	45.46	−122.16	748	05/1904	05/1904	05/1904	05/1904	05/1904
OR	353827	HEPPNER	45.37	−119.55	1885	01/1928	01/1928	01/1928	01/1928	01/1928
OR	353847	HERMISTON 1SE	45.82	−119.27	640	01/1928	01/1928	01/1928	01/1928	01/1928
OR	354003	HOOD RIVER EXPERIMENT STN	45.69	−121.52	500	01/1928	01/1928	01/1928	01/1928	01/1928
OR	354506	KLAMATH FALLS 2SSW	42.21	−121.79	4098	01/1928	01/1928	01/1928	01/1928	01/1928
OR	354670	LAKEVIEW 2NNW	42.22	−120.37	4778	01/1928	01/1928	01/1928	01/1928	01/1928
OR	355362	MCKENZIE BRIDGE RS	44.19	−122.12	1478	07/1948	07/1948	07/1948	07/1948	07/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
OR	355384	MCMINNVILLE	45.22	−123.17	155	01/1928	01/1928	01/1928	01/1928	02/1928
OR	355593	MILTON-FREEWATER	45.96	−118.42	970	01/1928	01/1928	01/1928	01/1928	01/1928
OR	355734	MORO	45.49	−120.72	1870	01/1928	01/1928	01/1928	01/1928	01/1928
OR	356032	NEWPORT	44.64	−124.05	122	01/1931	01/1931	01/1931	01/1931	01/1931
OR	356073	NORTH BEND FAA AP	43.42	−124.25	6	01/1931	01/1931	01/1931	01/1931	01/1931
OR	356426	PAISLEY	42.71	−120.54	4360	07/1948	07/1948	07/1948	07/1948	07/1948
OR	356634	PILOT ROCK 1SE	45.49	−118.82	1720	07/1948	07/1948	07/1948	07/1948	07/1948
OR	356883	PRINEVILLE 4NW	44.36	−120.91	2840	01/1928	01/1928	01/1928	01/1928	01/1928
OR	356907	PROSPECT 2SW	42.74	−122.52	2482	01/1931	01/1931	01/1931	01/1931	01/1931
OR	357169	RIDDLE	42.96	−123.35	680	07/1948	07/1948	07/1948	07/1948	07/1948
OR	358466	THREE LYNX	45.12	−122.07	1120	01/1931	01/1931	01/1931	01/1931	01/1931
OR	358494	TILLAMOOK 1W	45.46	−123.87	10	07/1948	07/1948	07/1948	07/1948	07/1948
OR	358746	UNION EXP STN	45.22	−117.89	2765	01/1928	01/1928	01/1928	01/1928	01/1928
OR	358797	VALE	43.99	−117.25	2240	01/1928	01/1928	01/1928	01/1928	01/1928
OR	358997	WALLOWA	45.57	−117.54	2923	07/1948	07/1948	07/1948	07/1948	07/1948
PA	360106	ALLENTOWN WSO AP	40.66	−75.44	387	06/1948	06/1948	05/1948	06/1948	06/1948
PA	361354	CHAMBERSBURG 1ESE	39.94	−77.64	640	05/1948	05/1948	05/1948	05/1948	05/1948
PA	363028	FRANKLIN	41.39	−79.82	990	01/1926	01/1926	01/1926	01/1926	01/1926
PA	363056[b]	FREELAND	41.02	−75.91	1900	01/1926	01/1926	01/1926	01/1926	01/1926
PA	363526	GREENVILLE 2NE	41.42	−80.37	1130	01/1926	01/1926	01/1926	01/1926	01/1926
PA	363699[b]	HARRISBURG CAPITAL CITY	40.22	−76.85	340	01/1926	01/1926	01/1926	01/1926	01/1926
PA	364385[b]	JOHNSTOWN	40.34	−78.92	1214	01/1926	01/1926	01/1926	01/1926	01/1926
PA	365915	MONTROSE	41.84	−75.87	1560	01/1926	01/1926	01/1926	01/1926	01/1926
PA	366233	NEW CASTLE 1N	41.02	−80.37	825	01/1926	01/1926	01/1926	01/1926	01/1926
PA	***366689***	***PALMERTON***	40.80	−75.62	410	05/1917	05/1917	04/1917	01/1926	01/1926
PA	367477	RIDGWAY	41.42	−78.75	1360	01/1926	01/1926	01/1926	01/1926	01/1926
PA	368449	STATE COLLEGE	40.80	−77.87	1170	01/1926	01/1926	01/1926	01/1926	01/1926
PA	368596	STROUDSBURG	41.01	−75.19	480	12/1926	12/1926	12/1926	01/1927	01/1927
PA	368905	TOWANDA 1ESE	41.76	−76.42	750	01/1926	01/1926	01/1926	01/1926	01/1926
PA	369050	UNIONTOWN 1NE	39.92	−79.72	956	01/1926	01/1926	01/1926	01/1926	01/1926
PA	369298	WARREN	41.86	−79.16	1210	01/1926	01/1926	01/1926	01/1926	01/1926
PA	369464[b]	WEST CHESTER 1W	39.97	−75.64	450	05/1948	05/1948	05/1948	05/1948	05/1948
PA	369933	YORK PUMP STATION 3SSW	39.92	−76.75	390	01/1926	01/1926	01/1926	01/1926	01/1926

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
RI	370896[b]	BLOCK ISLAND STATE AP	41.17	−71.59	110	06/1948	06/1948	06/1948	06/1948	06/1948
RI	374266	KINGSTON	41.49	−71.54	100	01/1926	01/1926	01/1926	01/1926	01/1926
SC	380074	AIKEN 4NE	33.61	−81.69	400	07/1948	07/1948	07/1948	07/1948	07/1948
SC	***380165***	***ANDERSON***	34.54	−82.67	800	06/1901	06/1901	01/1892	07/1948	07/1948
SC	380559	BEAUFORT 7SW	32.39	−80.77	20	01/1930	01/1930	01/1930	01/1930	01/1930
SC	380764	BLACKVILLE 3W	33.37	−81.32	324	01/1930	01/1930	01/1930	01/1930	01/1930
SC	381277	CALHOUN FALLS	34.09	−82.59	530	01/1930	01/1930	01/1930	01/1930	01/1930
SC	381310	CAMDEN 3W	34.26	−80.66	140	07/1948	07/1948	07/1948	07/1948	07/1948
SC	***381549***	***CHARLESTON CITY***	32.79	−79.94	10	01/1871	01/1871	01/1871	07/1948	07/1948
SC	381588	CHERAW	34.71	−79.89	140	01/1930	01/1930	01/1930	01/1930	01/1930
SC	381770	CLEMSON UNIVERSITY	34.69	−82.82	819	01/1930	01/1930	01/1930	01/1930	01/1930
SC	381944	COLUMBIA U OF SC	33.99	−81.02	242	01/1930	01/1930	01/1930	01/1930	01/1930
SC	381997	CONWAY	33.84	−79.05	20	01/1930	01/1930	01/1930	01/1930	01/1930
SC	382260	DARLINGTON	34.30	−79.89	150	07/1948	07/1948	07/1948	07/1948	07/1948
SC	383468	GEORGETOWN 2E	33.36	−79.25	10	01/1930	01/1930	01/1930	01/1930	01/1930
SC	383754	GREENWOOD 3SW	34.17	−82.20	615	07/1948	07/1948	07/1948	07/1948	07/1948
SC	384690	KERSHAW	34.55	−80.59	500	07/1948	07/1948	07/1948	07/1948	07/1948
SC	384753	KINGSTREE 1SE	33.66	−79.82	60	01/1930	01/1930	01/1930	01/1930	01/1930
SC	385017	LAURENS	34.51	−82.04	589	01/1930	01/1930	01/1930	01/1930	01/1930
SC	385200	LITTLE MOUNTAIN	34.21	−81.42	711	01/1930	01/1930	01/1930	01/1930	01/1930
SC	386209	NEWBERRY	34.29	−81.62	476	07/1948	07/1948	07/1948	07/1948	07/1948
SC	387631	SALUDA	33.99	−81.77	480	07/1948	08/1948	07/1948	07/1948	07/1948
SC	387722	SANTUCK	34.64	−81.52	520	01/1930	01/1930	01/1930	01/1930	01/1930
SC	388426	SUMMERVILLE	32.99	−80.19	35	01/1930	01/1930	01/1930	01/1930	01/1930
SC	388440	SUMTER	33.94	−80.35	177	07/1948	07/1948	07/1948	07/1948	07/1948
SC	388887	WALHALLA	34.76	−83.09	980	07/1948	07/1948	07/1948	07/1948	07/1948
SC	389327	WINNSBORO	34.37	−81.09	560	01/1930	01/1930	01/1930	01/1930	01/1930
SC	389350	WINTHROP COLLEGE	34.94	−81.04	690	07/1948	07/1948	07/1948	07/1948	07/1948
SC	389469	YEMASSEE	32.69	−80.85	25	01/1930	01/1930	01/1930	01/1930	01/1930
SD	390020	ABERDEEN WSO AP	45.46	−98.44	1296	01/1932	01/1932	01/1932	01/1932	05/1932
SD	***390043***	***ACADEMY 2NE***	43.51	−99.07	1680	09/1898	09/1898	07/1898	07/1898	07/1898
SD	390128	ALEXANDRIA	43.66	−97.79	1350	01/1932	01/1932	01/1932	01/1932	02/1932
SD	391392	CANTON 4WNW	43.30	−96.67	1345	01/1948	01/1948	01/1948	01/1948	01/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
SD	***391739***	***CLARK***	44.89	−97.74	1780	01/1893	04/1893	04/1893	01/1896	01/1896
SD	391972	COTTONWOOD 2E	43.97	−101.87	2414	06/1909	06/1909	06/1909	06/1909	06/1909
SD	***392429***	***DUPREE***	45.05	−101.60	2370	03/1922	03/1922	01/1922	01/1922	01/1922
SD	392797	EUREKA	45.79	−99.64	1870	03/1877	03/1877	03/1877	03/1877	03/1877
SD	***392927***	***FAULKTON 1NW***	45.04	−99.14	1570	01/1893	01/1893	01/1893	01/1896	01/1896
SD	393029	FORESTBURG 3NE	44.04	−98.07	1231	01/1896	01/1896	01/1896	01/1896	06/1896
SD	***393217***	***GANN VALLEY 4NW***	44.07	−99.07	1720	01/1893	01/1893	01/1893	01/1920	01/1920
SD	***393832***	***HIGHMORE 1W***	44.52	−99.47	1890	01/1893	01/1893	01/1893	01/1896	01/1896
SD	394007	HOT SPRINGS	43.44	−103.47	3560	01/1908	01/1908	01/1908	01/1908	01/1908
SD	394037	HOWARD	44.02	−97.52	1560	01/1948	01/1948	01/1948	01/1948	01/1948
SD	394516	KENNEBEC	43.92	−99.87	1700	01/1948	01/1948	01/1948	01/1948	01/1948
SD	395456	MELLETTE	45.16	−98.50	1290	05/1896	05/1896	05/1896	05/1896	06/1896
SD	395481	MENNO	43.24	−97.59	1324	01/1948	01/1948	01/1948	01/1948	01/1948
SD	395536[b]	MILBANK 2SSW	45.21	−96.64	1160	01/1948	01/1948	01/1948	01/1948	01/1948
SD	395891	MURDO	43.89	−100.70	2320	01/1948	01/1948	01/1948	01/1948	01/1948
SD	396597	PIERRE FAA AP	44.39	−100.29	1726	01/1948	01/1948	01/1948	01/1948	01/1948
SD	396947	RAPID CITY	44.12	−103.29	3450	06/1949	06/1949	06/1949	06/1949	06/1949
SD	398622	VERMILLION 2SE	42.76	−96.92	1190	01/1948	01/1948	01/1948	01/1948	01/1948
SD	398932[b]	WATERTOWN FAA AP	44.92	−97.16	1746	01/1948	01/1948	01/1948	01/1948	01/1948
SD	399442	WOOD	43.51	−100.49	2180	01/1948	01/1948	01/1948	01/1948	01/1948
TN	401790	CLARKSVILLE SEWAGE PLANT	36.55	−87.37	382	08/1948	08/1948	08/1948	08/1948	08/1948
TN	402024	COPPERHILL	35.01	−84.39	1535	08/1948	08/1948	08/1948	08/1948	08/1948
TN	402108	COVINGTON 1W	35.57	−89.67	310	01/1928	01/1928	01/1928	01/1928	01/1928
TN	402202	CROSSVILLE EXPERIMENT STN	36.02	−85.14	1810	03/1912	03/1912	03/1912	03/1912	03/1912
TN	402489	DICKSON	36.07	−87.39	780	08/1948	08/1948	08/1948	08/1948	08/1948
TN	402589	DOVER 1W	36.49	−87.85	475	01/1928	01/1928	01/1928	01/1928	01/1928
TN	404561	JACKSON EXPERIMENT STN	35.62	−88.84	400	01/1900	01/1900	01/1900	01/1900	01/1900
TN	405187	LEWISBURG EXPERIMENT STN	35.46	−86.80	787	01/1928	01/1928	01/1928	01/1928	01/1928
TN	405882	MCMINNVILLE	35.69	−85.80	940	01/1927	01/1927	01/1927	01/1927	01/1927
TN	406371	MURFREESBORO 5N	35.92	−86.37	550	08/1948	08/1948	08/1948	08/1948	08/1948
TN	406534	NEWPORT 1NW	35.99	−83.20	1036	01/1927	01/1927	01/1927	01/1927	01/1927
TN	***407884***	***ROGERSVILLE 1NE***	36.42	−82.99	1355	02/1896	02/1896	09/1887	01/1927	01/1927
TN	***409155***	***TULLAHOMA***	35.36	−86.20	1048	01/1896	01/1896	03/1893	01/1928	01/1928

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
TN	409219	UNION CITY	36.41	−89.05	350	01/1930	01/1930	01/1930	01/1930	01/1930
TN	409502	WAYNESBORO	35.30	−87.77	750	01/1927	01/1927	01/1927	01/1927	01/1927
TX	***410120***	***ALBANY***	32.74	−99.29	1420	11/1901	11/1901	11/1901	11/1901	11/1901
TX	410144	ALICE	27.74	−98.07	201	07/1911	07/1911	04/1911	04/1911	04/1911
TX	410174	ALPINE	30.37	−103.67	4480	03/1900	03/1900	03/1900	03/1900	03/1900
TX	410493	BALLINGER 2NW	31.74	−99.99	1755	01/1897	01/1897	01/1897	01/1897	01/1897
TX	410498	BALMORHEA	30.99	−103.75	3220	09/1923	09/1923	09/1923	09/1923	09/1923
TX	410639	BEEVILLE 5NE	28.45	−97.70	255	11/1901	11/1901	11/1901	11/1901	11/1901
TX	410832	BLANCO	30.11	−98.42	1370	01/1897	01/1897	01/1897	01/1897	01/1897
TX	410902	BOERNE	29.80	−98.72	1422	03/1904	03/1904	07/1897	07/1897	07/1897
TX	***411048***	***BRENHAM***	30.17	−96.41	313	01/1897	01/1897	01/1897	01/1902	01/1902
TX	411138	BROWNWOOD	31.72	−99.00	1385	01/1947	01/1947	01/1947	01/1947	01/1947
TX	411772	CLARKSVILLE 2NE	33.64	−95.04	435	03/1903	03/1903	03/1903	03/1903	03/1903
TX	412015	CORPUS CHRISTI WSO AP	27.77	−97.50	41	01/1948	01/1948	01/1948	01/1948	01/1948
TX	***412019***	***CORSICANA***	32.09	−96.47	425	01/1893	01/1893	01/1893	01/1897	01/1897
TX	412121	CROSBYTON	33.66	−101.25	3010	01/1897	01/1897	01/1897	01/1897	01/1897
TX	412266	DANEVANG 1W	29.05	−96.24	70	01/1897	01/1897	01/1897	01/1897	01/1897
TX	412598	DUBLIN	32.11	−98.34	1502	01/1897	01/1897	11/1898	11/1898	11/1898
TX	412679	EAGLE PASS	28.70	−100.49	805	01/1897	01/1897	02/1900	02/1900	02/1900
TX	412797	EL PASO WSO AP	31.80	−106.41	3918	01/1948	01/1948	01/1948	01/1948	01/1948
TX	412906	ENCINAL	28.04	−99.42	590	02/1908	02/1908	11/1907	11/1907	11/1907
TX	413063	FALFURRIAS	27.24	−98.14	120	04/1907	04/1907	03/1907	03/1907	03/1907
TX	413183	FLATONIA	29.67	−97.12	520	01/1908	01/1908	01/1908	01/1908	01/1908
TX	413280	FORT STOCKTON	30.89	−102.87	2980	05/1940	05/1940	05/1940	05/1940	05/1940
TX	413734	GREENVILLE	33.16	−96.12	535	03/1900	03/1900	03/1900	03/1900	03/1900
TX	***413873***	***HALLETTSVILLE 2N***	29.47	−96.95	275	01/1893	01/1893	01/1893	01/1897	01/1897
TX	413992	HASKELL	33.17	−99.75	1600	01/1898	08/1897	08/1897	08/1897	08/1897
TX	***415018***	***LAMPASAS***	31.05	−98.19	1024	01/1897	01/1897	01/1897	01/1897	01/1897
TX	415196	LIBERTY	30.05	−94.80	35	05/1904	05/1904	05/1904	05/1904	05/1904
TX	415272	LLANO	30.75	−98.69	1040	02/1903	02/1903	12/1896	12/1896	12/1896
TX	***415429***	***LULING***	29.67	−97.66	398	01/1897	01/1897	12/1901	12/1901	12/1901
TX	415618	MARSHALL	32.54	−94.35	352	07/1908	07/1908	07/1908	07/1908	07/1908
TX	415707	MCCAMEY	31.14	−102.20	2450	02/1932	02/1932	02/1932	02/1932	02/1932
TX	***415869***	***MEXIA***	31.69	−96.49	535	09/1904	09/1904	09/1904	09/1904	09/1904

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
TX	415875	MIAMI	35.71	−100.64	2755	07/1905	07/1905	07/1905	07/1905	07/1905
TX	416135	MULESHOE 1	34.24	−102.74	3825	07/1927	07/1927	08/1921	08/1921	08/1921
TX	416276	NEW BRAUNFELS	29.74	−98.12	710	01/1897	01/1897	01/1897	01/1897	01/1897
TX	416892	PECOS	31.42	−103.50	2610	01/1904	01/1904	01/1904	01/1904	01/1904
TX	417079	PLAINVIEW	34.19	−101.70	3370	09/1908	09/1908	09/1908	09/1908	09/1908
TX	417622	RIO GRANDE CITY 3W	26.39	−98.87	176	01/1897	01/1897	01/1897	01/1897	01/1897
TX	417945	SAN ANTONIO WSFO	29.54	−98.47	788	09/1946	09/1946	09/1946	09/1946	09/1946
TX	418201	SEMINOLE	32.72	−102.67	3340	08/1922	08/1922	08/1922	08/1922	08/1922
TX	418433	SNYDER	32.72	−100.92	2335	05/1911	05/1911	05/1911	05/1911	05/1911
TX	418692	STRATFORD	36.36	−102.09	3693	07/1911	07/1911	07/1911	07/1911	07/1911
TX	418910	TEMPLE	31.09	−97.32	635	01/1897	01/1897	01/1897	01/1897	01/1897
TX	***419532***	***WEATHERFORD***	32.77	−97.82	1065	10/1896	10/1896	10/1896	01/1902	01/1902
UT	420086	ALTON	37.44	−112.49	7040	01/1928	01/1928	01/1928	01/1928	01/1928
UT	420519[b]	BEAVER	38.30	−112.66	5940	01/1928	01/1928	01/1928	01/1928	01/1928
UT	420738	BLANDING	37.62	−109.49	6040	12/1904	12/1904	12/1904	12/1904	01/1929
UT	***420788***	***BLUFF***	37.29	−109.55	4315	06/1911	06/1911	06/1911	01/1928	01/1928
UT	421731	CORINNE	41.55	−112.12	4220	01/1928	01/1928	01/1928	01/1928	01/1928
UT	422101	DESERET	39.29	−112.66	4590	01/1928	01/1928	01/1928	01/1928	01/1928
UT	422418[b]	ELBERTA	39.96	−111.95	4690	01/1928	01/1928	01/1928	01/1928	01/1928
UT	422592	ESCALANTE	37.77	−111.60	5810	05/1901	05/1901	05/1901	05/1901	11/1928
UT	422828	FILLMORE	38.96	−112.32	5120	01/1928	01/1928	01/1928	01/1928	01/1928
UT	422996	FORT DUCHESNE	40.29	−109.87	5050	01/1928	01/1928	01/1928	01/1928	01/1928
UT	423611	HANKSVILLE	38.37	−110.72	4308	07/1948	07/1948	07/1948	07/1948	07/1948
UT	423809	HEBER	40.51	−111.42	5630	01/1928	01/1928	01/1928	01/1928	01/1928
UT	423896[b]	HIAWATHA	39.49	−111.02	7280	09/1921	09/1921	09/1921	09/1921	09/1921
UT	424508	KANAB	37.05	−112.54	4950	07/1948	07/1948	07/1948	07/1948	07/1948
UT	424856	LAKETOWN	41.82	−111.32	5980	07/1948	07/1948	07/1948	07/1948	07/1948
UT	425065	LEVAN	39.57	−111.87	5300	01/1928	01/1928	01/1928	01/1928	01/1928
UT	425148[b]	LOA	38.41	−111.66	7070	07/1948	07/1948	07/1948	07/1948	07/1948
UT	425186	LOGAN USU	41.76	−111.80	4790	01/1928	01/1928	01/1928	01/1928	01/1928
UT	425402	MANTI	39.26	−111.64	5740	01/1928	01/1928	01/1928	01/1928	01/1928
UT	425733	MOAB	38.59	−109.55	4021	01/1928	01/1928	01/1928	01/1928	01/1928
UT	425752	MODENA	37.80	−113.92	5460	07/1948	07/1948	07/1948	07/1948	07/1948
UT	425826	MORGAN COMO SPRINGS	41.04	−111.66	5080	07/1948	07/1948	07/1948	07/1948	07/1948

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
UT	426404	OGDEN PIONEER PH	41.26	−111.95	4350	07/1948	07/1948	07/1948	07/1948	07/1948
UT	426601	PANGUITCH	37.82	−112.44	6610	07/1948	07/1948	07/1948	07/1948	07/1948
UT	426686	PAROWAN POWER PLANT	37.84	−112.84	6000	07/1948	07/1948	07/1948	07/1948	07/1948
UT	427260	RICHFIELD RADIO KSVC	38.77	−112.09	5300	01/1928	01/1928	01/1928	01/1928	01/1928
UT	427318[b]	RIVERDALE	41.16	−112.00	4400	01/1928	01/1928	01/1928	01/1928	01/1928
UT	427516	SAINT GEORGE	37.12	−113.57	2770	01/1928	01/1928	01/1928	01/1928	01/1928
UT	427714	SCIPIO	39.26	−112.10	5300	01/1928	01/1928	01/1928	01/1928	01/1928
UT	***427909***	***SNAKE CREEK PH***	40.55	−111.50	6010	12/1913	12/1913	12/1913	01/1928	01/1928
UT	***428119***	***SPANISH FORK PH***	40.09	−111.60	4720	07/1909	07/1909	07/1909	01/1928	01/1928
UT	428705[b]	THOMPSON	38.97	−109.72	5100	07/1948	07/1948	07/1948	07/1948	07/1948
UT	428771	TOOELE	40.54	−112.30	5070	01/1919	01/1919	01/1919	01/1919	01/1919
UT	428973	UTAH LAKE LEHI	40.37	−111.91	4497	01/1928	01/1928	01/1928	01/1928	01/1928
UT	429111	VERNAL AP	40.46	−109.52	5260	01/1928	01/1928	01/1928	01/1928	01/1928
UT	429382	WENDOVER AWOS	40.74	−114.04	4237	08/1924	08/1924	08/1924	08/1924	08/1924
UT	429595	WOODRUFF	41.54	−111.16	6315	07/1948	07/1948	07/1948	07/1948	07/1948
UT	***429717***	***ZION NATIONAL PARK***	37.22	−112.99	4050	01/1904	01/1904	01/1904	01/1928	01/1928
VT	***431081***	***BURLINGTON AP***	44.47	−73.16	332	01/1884	07/1875	01/1884	05/1920	05/1920
VT	431243	CAVENDISH	43.39	−72.60	800	06/1948	06/1948	06/1948	06/1948	06/1948
VT	431360	CHELSEA	43.99	−72.45	800	06/1948	06/1948	06/1948	06/1948	06/1948
VT	431580[b]	CORNWALL	43.96	−73.22	490	01/1926	01/1926	01/1926	01/1926	01/1926
VT	432769	ENOSBURG FALLS	44.92	−72.82	420	06/1948	06/1948	06/1948	06/1948	06/1948
VT	437054	SAINT JOHNSBURY	44.42	−72.02	699	01/1926	01/1926	01/1926	01/1926	01/1926
VA	441209	BURKES GARDEN	37.09	−81.34	3300	08/1948	08/1948	08/1948	08/1948	08/1948
VA	441593	CHARLOTTESVILLE 2W	38.04	−78.52	870	08/1948	08/1948	08/1948	08/1948	08/1948
VA	442208	DALE ENTERPRISE	38.46	−78.94	1400	08/1948	08/1948	08/1948	08/1948	08/1948
VA	442245	DANVILLE	36.59	−79.39	410	08/1948	08/1948	08/1948	08/1948	08/1948
VA	442941	FARMVILLE 2N	37.34	−78.39	450	01/1914	01/1914	01/1914	01/1914	01/1914
VA	443192	FREDERICKSBURG NATIL PARK	38.32	−77.45	90	01/1930	01/1930	01/1930	01/1930	01/1930
VA	***444101***	***HOPEWELL***	37.30	−77.30	40	10/1916	10/1916	10/1916	01/1930	01/1930
VA	444128	HOT SPRINGS	38.01	−79.84	2236	08/1948	08/1948	08/1948	08/1948	08/1948
VA	444876	LEXINGTON	37.79	−79.44	1060	08/1948	08/1948	08/1948	08/1948	08/1948
VA	444909	LINCOLN	39.12	−77.72	500	01/1930	01/1930	01/1930	01/1930	01/1930
VA	446626[b]	PENNINGTON GAP	36.76	−83.05	1510	07/1931	07/1931	07/1931	07/1931	07/1931

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
VA	447338	ROCKY MOUNT	37.01	−79.91	1232	08/1948	08/1948	08/1948	08/1948	08/1948
VA	448062	STAUNTON SEWAGE PLANT	38.16	−79.04	1390	08/1948	08/1948	08/1948	08/1948	08/1948
VA	449263	WOODSTOCK 2NE	38.91	−78.47	660	01/1930	01/1930	01/1930	01/1930	01/1930
WA	450008	ABERDEEN	46.97	−123.82	10	01/1931	01/1931	01/1931	01/1931	01/1931
WA	450729	BLAINE	49.01	−122.75	60	06/1948	06/1948	06/1948	06/1948	06/1948
WA	***450945***	***BUCKLEY 1NE***	47.17	−122.00	685	01/1913	01/1913	01/1913	01/1931	01/1931
WA	451233	CEDAR LAKE	47.42	−121.74	1560	01/1931	01/1931	01/1931	01/1931	01/1931
WA	451276	CENTRALIA	46.72	−122.95	185	01/1931	01/1931	01/1931	01/1931	01/1931
WA	451484	CLEARBROOK	48.97	−122.34	64	01/1931	01/1931	01/1931	01/1931	01/1931
WA	451504	CLE ELUM	47.19	−120.95	1920	01/1931	01/1931	01/1931	01/1931	01/1931
WA	451586[b]	COLFAX 1NW	46.89	−117.39	1965	05/1893	05/1893	05/1893	05/1893	05/1893
WA	451666	CONCONULLY	48.55	−119.75	2320	06/1948	06/1948	06/1948	06/1948	06/1948
WA	452007	DAVENPORT	47.66	−118.14	2440	06/1948	06/1948	06/1948	06/1948	06/1948
WA	452030	DAYTON 1WSW	46.32	−118.00	1557	01/1931	01/1931	01/1931	01/1931	01/1931
WA	452675	EVERETT	47.99	−122.19	60	06/1948	06/1948	06/1948	06/1948	06/1948
WA	452914	FORKS 1E	47.96	−124.37	350	01/1931	01/1931	01/1931	01/1931	01/1931
WA	453284[b]	GRAPEVIEW 3SW	47.30	−122.87	51	06/1948	06/1948	06/1948	06/1948	06/1948
WA	454154	KENNEWICK	46.22	−119.10	390	06/1948	06/1948	06/1948	06/1948	06/1948
WA	454769	LONGVIEW	46.16	−122.92	12	01/1931	01/1931	01/1931	01/1931	01/1931
WA	456039	ODESSA	47.32	−118.70	1530	06/1948	06/1948	06/1948	06/1948	06/1948
WA	***456096***	***OLGA 2SE***	48.62	−122.80	80	07/1891	07/1891	07/1891	07/1891	05/1893
WA	456610	POMEROY	46.49	−117.59	1900	06/1948	06/1948	06/1948	06/1948	06/1948
WA	456624	PORT ANGELES	48.12	−123.44	90	07/1948	07/1948	07/1948	07/1948	07/1948
WA	456678	PORT TOWNSEND	48.12	−122.75	100	06/1948	06/1948	06/1948	06/1948	06/1948
WA	***456803***[b]	***PUYALLUP EXPERIMENT STN 2W***	47.21	−122.34	50	01/1914	01/1914	01/1914	01/1931	01/1931
WA	457059	RITZVILLE 1SSE	47.12	−118.37	1830	06/1948	06/1948	06/1948	06/1948	06/1948
WA	457507	SEDRO WOOLLEY	48.51	−122.24	60	01/1931	01/1931	01/1931	01/1931	01/1931
WA	457773	SNOQUALMIE FALLS	47.55	−121.85	440	01/1931	01/1931	01/1931	01/1931	01/1931
WA	***457938***	***SPOKANE WSO AP***	47.64	−117.54	2356	02/1881	02/1881	02/1881	01/1893	02/1892
WA	458059	STEHEKIN 4NW	48.36	−120.72	1270	01/1931	01/1931	01/1931	01/1931	01/1931
WA	458207	SUNNYSIDE	46.32	−120.00	747	06/1948	06/1948	06/1948	06/1948	06/1948
WA	458773	VANCOUVER 4NNE	45.69	−122.66	210	05/1898	05/1898	05/1898	05/1898	05/1898
WA	459012	WATERVILLE	47.66	−120.07	2620	01/1931	01/1931	01/1931	01/1931	01/1931
WA	459074	WENATCHEE	47.42	−120.32	640	02/1877	02/1877	02/1877	02/1877	01/1931

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
WA	459238	WILBUR	47.76	−118.67	2230	02/1900	02/1900	02/1900	02/1900	05/1925
WA	459376	WINTHROP 1WSW	48.47	−120.19	1755	01/1931	01/1931	01/1931	01/1931	01/1931
WV	***461220***	***BUCKHANNON***	38.99	−80.22	1455	10/1891	10/1891	01/1888	08/1948	08/1948
WV	***463353***[b]	***GARY***	37.37	−81.55	1430	02/1920	02/1920	07/1917	01/1926	03/1926
WV	463544	GLENVILLE 1ENE	38.94	−80.82	720	01/1926	01/1926	01/1926	01/1926	01/1926
WV	465224	LEWISBURG 3N	37.86	−80.41	2303	08/1948	08/1948	08/1948	08/1948	08/1948
WV	465707	MARTINSBURG FAA AIRPORT	39.41	−77.99	537	01/1926	01/1926	01/1926	01/1926	01/1926
WV	466867	PARSONS 1NE	39.11	−79.67	1770	08/1948	08/1948	08/1948	08/1948	08/1948
WV	468384	SPENCER 1SE	38.80	−81.35	740	01/1926	01/1926	01/1926	01/1926	01/1926
WV	469368[b]	WELLSBURG WATER TRMT PLANT	40.29	−80.62	660	08/1948	08/1948	08/1948	08/1948	08/1948
WV	469605[b]	WILLIAMSON	37.67	−82.29	670	02/1926	02/1926	02/1926	03/1926	03/1926
WV	469683	WINFIELD LOCKS	38.54	−81.92	571	08/1948	08/1948	08/1948	08/1948	08/1948
WI	470349	ASHLAND EXPERIMENT FARM	46.57	−90.97	650	06/1948	06/1948	06/1948	06/1948	06/1948
WI	471078	BRODHEAD	42.62	−89.39	790	06/1948	06/1948	06/1948	06/1948	06/1948
WI	472001	DARLINGTON	42.69	−90.12	930	03/1901	03/1901	03/1901	04/1901	04/1901
WI	472839	FOND DU LAC	43.80	−88.45	760	06/1948	06/1948	06/1948	06/1948	06/1948
WI	***473405***	***HANCOCK EXPERIMENT FARM***	44.12	−89.54	1076	11/1902	11/1902	11/1902	01/1903	05/1903
WI	473471[b]	HATFIELD HYDRO PLANT	44.41	−90.74	953	06/1948	06/1948	06/1948	06/1948	06/1948
WI	474546	LANCASTER 4WSW	42.84	−90.79	1040	06/1948	06/1948	06/1948	06/1948	06/1948
WI	475017	MANITOWOC	44.11	−87.69	660	06/1948	06/1948	06/1948	06/1948	06/1948
WI	***475120***	***MARSHFIELD EXPERIMENT FARM***	44.66	−90.14	1250	01/1913	01/1913	01/1913	03/1913	03/1924
WI	475255	MEDFORD	45.14	−90.35	1470	01/1948	01/1948	01/1948	01/1948	01/1948
WI	475516	MINOCQUA DAM	45.89	−89.74	1580	03/1905	03/1905	03/1905	03/1905	03/1905
WI	475932	NEW LONDON	44.37	−88.72	805	06/1948	06/1948	06/1948	06/1948	06/1948
WI	476208	OCONTO 4W	44.91	−87.95	660	06/1948	06/1948	06/1948	06/1948	06/1948
WI	476330	OSHKOSH	44.04	−88.55	750	06/1948	06/1948	06/1948	06/1948	06/1948
WI	476718	PORTAGE	43.52	−89.44	800	01/1948	01/1948	01/1948	01/1948	01/1948
WI	476827	PRAIRIE DU CHIEN	43.04	−91.16	658	06/1948	06/1948	06/1948	06/1948	06/1948
WI	476922	RACINE	42.71	−87.77	595	06/1948	06/1948	06/1948	06/1948	06/1948
WI	***478027***	***SPOONER EXPERIMENT FARM***	45.82	−91.89	1100	08/1894	08/1894	04/1894	01/1911	01/1911
WI	478110	STANLEY	44.97	−90.94	1080	06/1948	06/1948	06/1948	06/1948	06/1948
WI	478827	VIROQUA 2NW	43.57	−90.92	1185	01/1901	01/1901	01/1901	01/1901	04/1903
WI	478919	WATERTOWN	43.19	−88.74	820	01/1924	01/1924	01/1924	01/1924	12/1930

HCN/D station inventory (continued)

State	Station number	Station name[a]	Lat.	Long.	Elev. (ft)	TMAX	TMIN	PRCP	SNOW	SNWD
WY	480140	ALTA 1NNW	43.79	−111.04	6430	08/1948	08/1948	08/1948	08/1948	08/1948
WY	480540	BASIN	44.39	−108.05	3837	08/1948	08/1948	08/1948	08/1948	08/1948
WY	***480915***[b]	***BORDER 3N***	42.26	−111.04	6110	01/1902	01/1902	01/1902	01/1902	01/1949
WY	481175	BUFFALO BILL DAM	44.51	−109.19	5156	08/1948	08/1948	08/1948	08/1948	08/1948
WY	***481675***	***CHEYENNE WSFO***	41.16	−104.82	6130	11/1872	11/1872	01/1871	01/1915	08/1939
WY	***481730***	***CHUGWATER***	41.76	−104.82	5304	11/1900	11/1900	11/1900	01/1915	08/1948
WY	***481905***	***COLONY***	44.94	−104.20	3570	01/1915	01/1915	01/1915	01/1915	08/1948
WY	482595	DIVERSION DAM	43.24	−108.94	5575	08/1948	08/1948	08/1948	08/1948	08/1948
WY	482715	DUBOIS	43.57	−109.64	6960	08/1948	08/1948	08/1948	08/1948	08/1948
WY	483100	EVANSTON 1E	41.27	−110.95	6825	12/1890	12/1890	12/1890	04/1898	08/1948
WY	484065[b]	GREEN RIVER	41.54	−109.47	6089	01/1915	01/1915	01/1915	01/1915	12/1947
WY	485345	LAKE YELLOWSTONE	44.55	−110.41	7770	08/1948	08/1948	08/1948	08/1948	08/1948
WY	485830	LUSK 2SW	42.76	−104.49	5090	01/1915	01/1915	01/1915	01/1915	08/1948
WY	486195	MIDWEST	43.41	−106.29	4815	08/1948	08/1948	08/1948	08/1948	08/1948
WY	486440	MORAN 5WNW	43.86	−110.59	6798	01/1915	01/1915	01/1915	01/1915	08/1948
WY	486660	NEWCASTLE	43.86	−104.22	4315	01/1918	01/1918	01/1918	01/1918	03/1940
WY	487105[b]	PATHFINDER DAM	42.47	−106.85	5930	08/1948	08/1948	08/1948	08/1948	08/1948
WY	487115	PAVILLION	43.26	−108.69	5440	08/1948	08/1948	08/1948	08/1948	08/1948
WY	487260	PINEDALE	42.87	−109.87	7175	08/1948	08/1948	08/1948	08/1948	08/1948
WY	487760	RIVERTON	43.02	−108.39	4950	08/1918	08/1918	08/1918	08/1918	08/1948
WY	487990	SARATOGA	41.46	−106.82	6790	08/1948	08/1948	08/1948	08/1948	08/1948
WY	488160	SHERIDAN FIELD STATION	44.84	−106.84	3750	01/1920	01/1920	01/1920	06/1920	08/1948
WY	488995	TORRINGTON EXP FARM	42.09	−104.22	4098	01/1922	01/1922	01/1922	01/1922	08/1948
WY	489615	WHEATLAND 4N	42.12	−104.95	4638	01/1915	01/1915	01/1915	01/1915	08/1948
WY	489770	WORLAND	44.02	−107.97	4060	01/1915	01/1915	01/1915	01/1915	08/1948
WY	489905	YELLOWSTONE PARK MAMMOTH	44.97	−110.70	6230	08/1948	08/1948	08/1948	08/1948	08/1948

[a]Definitions for abbreviations included in some station names may be found in the station history file.
[b]Station's record ends before 1997.
[c]No record for this variable at this station.

APPENDIX B

STATE NUMBERS AND ABBREVIATIONS USED FOR THE 48 STATES IN THE HCN/D DATABASE

State Code	State Abbreviation	State Name
01	AL	Alabama
02	AZ	Arizona
03	AR	Arkansas
04	CA	California
05	CO	Colorado
06	CT	Connecticut
07	DE	Delaware
08	FL	Florida
09	GA	Georgia
10	ID	Idaho
11	IL	Illinois
12	IN	Indiana
13	IA	Iowa
14	KS	Kansas
15	KY	Kentucky
16	LA	Louisiana
17	ME	Maine
18	MD	Maryland
19	MA	Massachusetts
20	MI	Michigan
21	MN	Minnesota
22	MS	Mississippi
23	MO	Missouri
24	MT	Montana
25	NE	Nebraska
26	NV	Nevada
27	NH	New Hampshire
28	NJ	New Jersey
29	NM	New Mexico
30	NY	New York
31	NC	North Carolina
32	ND	North Dakota
33	OH	Ohio
34	OK	Oklahoma
35	OR	Oregon
36	PA	Pennsylvania
37	RI	Rhode Island
38	SC	South Carolina
39	SD	South Dakota
40	TN	Tennessee
41	TX	Texas
42	UT	Utah
43	VT	Vermont
44	VA	Virginia
45	WA	Washington
46	WV	West Virginia
47	WI	Wisconsin
48	WY	Wyoming

APPENDIX C

REPRINT OF PERTINENT LITERATURE

Secular Trends of Precipitation Amount, Frequency, and Intensity in the United States

Thomas R. Karl and Richard W. Knight
NOAA/NESDIS/National Climatic Data Center, Asheville, North Carolina

ABSTRACT

Twentieth century trends of precipitation are examined by a variety of methods to more fully describe how precipitation has changed or varied. Since 1910, precipitation has increased by about 10% across the contiguous United States. The increase in precipitation is reflected primarily in the heavy and extreme daily precipitation events. For example, over half (53%) of the total increase of precipitation is due to positive trends in the upper 10 percentiles of the precipitation distribution. These trends are highly significant, both practically and statistically. The increase has arisen for two reasons. First, an increase in the frequency of days with precipitation [6 days (100 yr)$^{-1}$] has occurred for all categories of precipitation amount. Second, for the extremely heavy precipitation events, an increase in the intensity of the events is also significantly contributing (about half) to the precipitation increase. As a result, there is a significant trend in much of the United States of the highest daily year–month precipitation amount, but with no systematic national trend of the median precipitation amount.

These data suggest that the precipitation regimes in the United States are changing disproportionately across the precipitation distribution. The proportion of total precipitation derived from extreme and heavy events is increasing relative to more moderate events. These changes have an impact on the area of the United States affected by a much above-normal (upper 10 percentile) proportion of precipitation derived from very heavy precipitation events, for example, daily precipitation events exceeding 50.8 mm (2 in.).

1. Introduction

In many areas of the United States during recent years, there has been a notable number of catastrophic flooding episodes. A few examples include the 1993 flooding event along the Mississippi, the New England floods during the autumn of 1996, the winter floods of 1997 in the Pacific Northwest and California, and the 1997 spring floods along the Ohio River and the Red River Valley. Previous work (Karl et al. 1996) has documented an increase in the proportion of the area of the United States affected by a much above-normal frequency of extreme precipitation events, for example, > 50.4 mm day^{-1} (or 2 in.). A thorough analysis of how precipitation is changing in the United States, however, has not been provided.

Changes in precipitation have most often been quantified in terms of changes in the total precipitation over long averaging periods, for example, annually, seasonally, and occasionally monthly. Such statistics (Karl et al. 1993; Groisman and Easterling 1994; IPCC 1990, 1996), although quite useful for many applications, do not reveal important aspects of how precipitation changes within such a long averaging period. After all, most precipitation events in the midlatitudes last a few days at most.

It would be remiss not to mention some notable work that has emphasized changes in precipitation intensity (Englehart and Douglas 1985; Diaz 1991; Yu and Neil 1991; Nicholls and Kariko 1992; Karl et al. 1995; R. Suppiah and K. Hennessy 1998, manuscript submitted to *Int. J. Climatol.*; Mearns et al. 1995). In these analyses, however, there has been no standard technique of investigating precipitation intensity. For example, R. Suppiah and K. Hennessy (1998, manuscript

Corresponding author address: Thomas Karl, NOAA/NESDIS/National Climatic Data Center, 151 Patton Ave., Asheville, NC 28801-5001.
E-mail: tkarl@ncdc.noaa.gov
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submitted to *Int. J. Climatol.*) calculate trends equivalent to the number of days with precipitation to understand how the frequency of precipitation contributes to changes of precipitation, but only the trends of the 90th and 95th percentiles of daily precipitation amount are used to calculate how the intensity of precipitation may be affecting the trend. Nicholls and Kariko (1992) define precipitation intensity as the mean rainfall per day, but define a rainfall event as any period of days with consecutive rainfall. Mearns and Giorgi (1995) analyze on a monthly basis the number of precipitation days, the average rainfall per rain day (what they define as intensity), and the average rainfall per day.

Although there is no single method of analysis that can comprehensively cover all the important aspects of how precipitation changes over the course of time, it is fairly apparent that more consideration needs to be given to the type of questions various analyses can address. For example, a rather fundamental question might be related to how much of any precipitation increase or decrease is attributable to changes in the frequency of precipitation versus intensity of precipitation. For example, increased precipitation could be derived from simply more days during the year with precipitation, and they may be equally distributed for all quantiles[1] of daily precipitation amount. Alternatively, one could also envision a situation where the number of days with precipitation does not change, but the amount of precipitation changes for all, or a limited number of quantiles.

2. Data

There are several datasets that are used in this analysis. The primary dataset is the daily precipitation dataset used by Karl et al. (1996). This dataset consists of 182 stations across the contiguous United States. Of these 182 stations, 134 are part of the U.S. Historical Climate Network (HCN, Hughes et al. 1993). An additional 48 stations were added to improve data coverage in the western United States. Detailed station histories for all of these stations indicate that standard 8 in. precipitation gauges have been used throughout the twentieth century at all locations. This dataset is referred to as the HCN special network (HCNs). The data from these stations span the period 1910–96, but there is some missing data, and some stations do not have data back through 1910. To prevent missing data from introducing any bias, Karl et al. (1995) describe a procedure that was used to estimate missing data. Basically, a gamma function is fit to each station's daily data for each month of the year. To determine if precipitation occurs on any missing day, a random number generator is used such that the probability of precipitation is set equal to the empirical probability of precipitation during that month. If precipitation occurs, then the gamma distribution is used to determine the amount that falls for that day, again using a random number generator.

The other two datasets that are included in this study are used primarily to serve as a cross check against the 182 daily dataset. This includes the climatological state divisional precipitation data (Guttman and Quayle 1996), which are monthly averages based on all reporting stations in the United States. In some years and months, this network reaches over 7500 stations. Most of these stations are cooperative weather stations that have not changed in instrumentation during the twentieth century, unlike the first-order stations, which have been affected by new automated instruments and the introduction of wind shields (Karl et al. 1993). These data span the period of the HCNs data, but there is an uneven number of stations that enter and leave the network during the course of the twentieth century, possibly contributing to some bias in trends. The other dataset (TD3200) consists of 3091 stations in the United States that reported daily precipitation and passed our completeness criterion. The period of record is shorter for these data, spanning the years 1948–95, and each station had to have at least 80% of all data present. The TD3200 data were subjected to the standard National Climatic Data Center (NCDC) data checks as given in TD3200 documentation.

3. Methods

a. Spatial averages

The HCNs daily precipitation data as well as the TD3200 data were arithmetically averaged into 1° × 1° grid cells. These grid cells were then area weighted to calculate changes of precipitation for nine regions across the United States. A national average was derived from these nine regions by area weighting the values within each region on a monthly basis. All sea-

[1]The value of any quantile (Q) in a sample is given by the ordered data values themselves. The order of the quantile is given by $P_i = (i - 0.5)\, n^{-1}$, where $i = 1$ to n, and n is the sample size. So $Q(0.5)$ is the median, $Q(0.25)$ is the first quartile, etc.

sonal averages are derived from the totals of each month where the standard seasons apply, for example, winter (December–February), spring (March–May), etc. The CD data were area weighted into regional and subsequently into national averages from 344 divisional averages.

b. Precipitation assessment

Changes in precipitation amount can occur from a change in the frequency of precipitation events, the intensity of precipitation per event, or any combination thereof. Precipitation intensity is defined here simply by the amount of precipitation associated with specific quantiles of the precipitation distribution. Percentiles near 100 represent very intense precipitation and those near zero very light precipitation events. Daily precipitation totals are treated as precipitation events.

It is possible to estimate the proportion of any trend in total precipitation that is attributable to changes in frequency versus changes in precipitation intensity. This is calculated for the frequency component by determining the average precipitation amount per event ($\overline{P}_e$) and the trend in the frequency of events (b_f). Then the change in precipitation due to the trend in the frequency of precipitation events (b_f) is simply defined by

$$b_e = \overline{P}_e(b_f). \quad (1)$$

In this analysis, b_e is expressed as (mm yr^{-1}) or (mm season^{-1}) or as (a % of the mean seasonal or annual total precipitation), for example, (mm day^{-1}) (day yr^{-1}) = mm yr^{-1}. For the intensity component, the trend is directly calculated as a residual using the expression

$$b_i = b - b_e, \quad (2)$$

where b is the trend in total precipitation for the frequency band or intensity component.

For comparative purposes, trends of total precipitation are expressed as a percent of mean precipitation for months, seasons, annually, etc. The full period of record is used in this analysis to calculate the expected mean total precipitation.

Expressions (1) and (2) are insufficient, however, to adequately describe the nature of precipitation variations and change. For example, it would not be possible to know whether the change in precipitation frequency was due to a change in the number of days with very heavy precipitation or light precipitation amounts. Similarly, it would be uncertain as to whether the precipitation intensity had increased across all quantiles of the distribution or just a few, such as the very heavy precipitation intensities or some of the more moderate intensities, for example, around the median.

Information about these kinds of changes can be obtained by simply applying (1) and (2), not to the full dataset, but to specific class intervals defined by the quantiles of the precipitation distribution. In this analysis the precipitation distribution is categorized into 20 class intervals, where each class interval has a width of five percentiles. The percentile defined intervals range from the lowest percentile to the 5th percentile, the 5th to the 10th percentile, . . . and the 95th to the highest percentile. These percentiles were defined for each station on a monthly, seasonal, and annual basis. So, for each season of interest, (1) and (2) is directly applied 20 times to the ensemble of all values falling within each of these class intervals for the time period of interest, that is, 1910–96.

Trends of precipitation can also be calculated for specific quantiles. One particular statistic of interest is the trend of the highest daily precipitation amount. In this analysis, we find the highest and median precipitation amount each month for all years of record and then calculate the trend of these values. The amount of precipitation associated with the trend is expressed as a percentage of the mean of these year-month total precipitation amounts, for example, either the highest monthly daily total or the median of the daily totals.

Another way to analyze how precipitation is changing is to evaluate the trends of the proportion of precipitation falling in a specific class interval compared with the total mean precipitation. This statistic also provides information about relative changes within the distribution unrelated to changes in the mean.

Another aspect of precipitation change that is important in some applications relates to trends in the area affected by heavy or extreme precipitation amounts. In this analysis, the upper 10 percentile is defined as a very heavy precipitation event. Similar to the analysis of Karl et al. (1996), the area of the United States affected by a much greater than normal (upper 10 percentiles) frequency of the proportion of total annual precipitation derived from very heavy precipitation was calculated for each station. The trend in the area affected by these events is calculated on a national and regional basis. In this analysis, the upper 10 percentile has been chosen as the class limit, but obviously other class limits could have been selected.

4. Results

Precipitation has increased across the United States over much of the twentieth century (Table 1). The increase is most pronounced during the spring and autumn but is also apparent during summer. Wintertime precipitation amount has increased only slightly. The sensitivity of the trend to the dataset used is reflected in Table 1. It is apparent that the annual increase in precipitation is fairly stable from one dataset to the next, but for seasonal trends, even when the trends are statistically significant, differences among the datasets can be up to 4% per century. Given the variability of trends between the datasets from TD3200 and CD (Table 1), the use of the higher quality, lower density HCNs is not grossly affected by its relatively low coverage.

TABLE 1. United States national precipitation trends expressed in terms of percent of the mean per century and (top line) millimeters per century (bottom line) in each row. Statistical significance ($\alpha = 0.05$) is reflected by bold numbers based on a nonparametric Kendall τ-test. Datasets are HCNs, Climate Division (CD) data (the U.S. climatological division dataset), and TD3200.

Dataset	Time period	Annual	Winter	Spring	Summer	Autumn
HCNs	1910–96	**10.1**	2.8	**11.2**	**11.6**	**14.3**
		81	5	**23**	**24**	**29**
CD	1910–96	**10.0**	−0.3	**14.3**	6.6	**19.5**
		76	−1	**29**	14	**34**
CD	1901–96	**7.7**	1.1	**9.3**	2.1	**19.2**
		65	2	**19**	4	**40**
TD 3200	1948–95	**16.9**	−7.2	23.6	11.8	**37.7**
		128	−12	**48**	25	**66**
HCNs	1948–95	**14.7**	−7.0	20.0	5.5	**40.1**
		110	−12	**41**	11	**71**
CD	1948–95	**19.5**	−2.6	23.9	10.3	**48.8**
		151	−5	**49**	21	**86**

Figure 1 depicts how the change in precipitation has occurred. In such an analysis, it is possible to understand the contribution of light, medium, and heavy precipitation amounts to the total trend. The sum of the trend across all class intervals is identically equal to the trend of the total precipitation. Nationally, on an annual basis, over half of the precipitation increase is due to the increase of precipitation within the upper 10% of all the daily precipitation amounts, for example, class intervals 90 and 95 in Fig. 1a. The trends in these two categories are highly significant based on Kendall's nonparametric τ statistic[2], and Fig. 2 depicts the time series from which the trends were derived. Over half (53%) of the total trend is due to the upper 10% of daily precipitation events, despite the fact that they only constitute about 35% or 40% of the total annual precipitation across the United States. Given this, the trends in these percentiles are larger than might be expected. The contribution to the increase in precipitation due to the heaviest precipitation events is even more pronounced during the summer (Fig. 1), as about half of the increase in summer precipitation is from the highest class interval (> the 95th percentile). During both spring and autumn (Fig. 1 and Table 1), the same tendency is observed, a significantly large contribution to the total trend from the higher percentile class intervals.

Based on Table 1, it might be tempting to conclude that during winter there has been little change in precipitation frequency or intensity, but Fig. 1 indicates that precipitation from the heaviest categories has increased, although not in a statistically significant manner, but this accounts for all of the increase. The lighter precipitation categories have tended to have slight decreasing trends, partially offsetting the increase from the heaviest categories.

The trends in the frequency of events (Fig. 3) within each of the percentile-defined class intervals indicates that at least a portion of the increase in precipitation is due to an increase in the frequency of events. On an annual basis, virtually every region has a statisti-

[2]Kendall's τ statistic for trends tests the nonrandomness of the ranks of the time-dependent data. It is nearly as powerful as Pearson's correlation coefficient in rejecting the hypothesis of no trend in the data, but is insensitive to the distribution of the data.

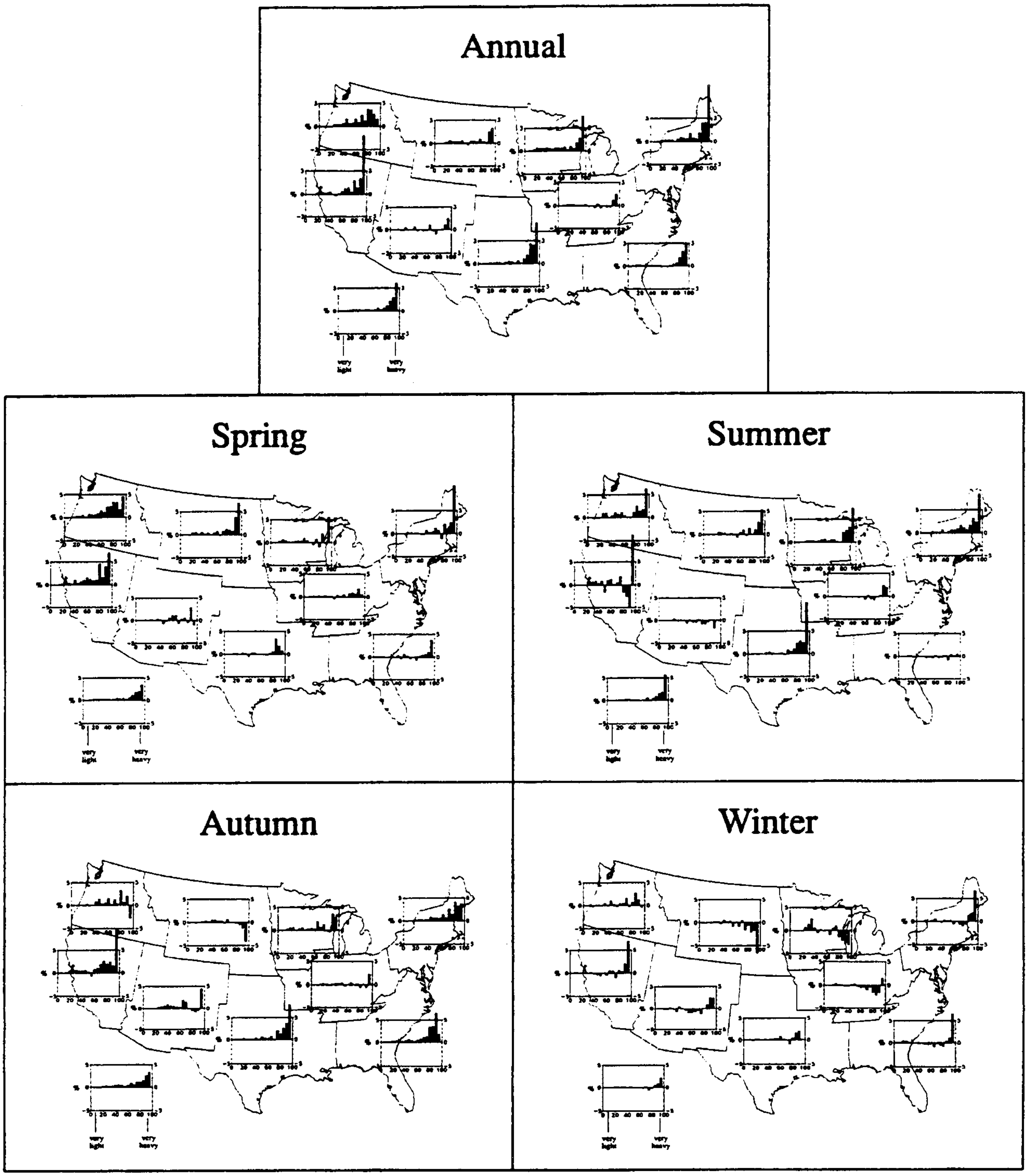

FIG. 1. Trends (1910–96) expressed as percent of mean precipitation per century for various categories of precipitation defined by five percentile class intervals. Value plotted at the 95th percentile represents the trend for the 95th to the highest percentiles, value plotted for the 90th percentile represents the trend for the 90th to the 95th percentile. Value plotted at 5th percentile represents the trend from the lowest percentile to the 5th percentile. The bar chart in the lower left reflects the national average.

cally significant increase in the number of precipitation events. There is a slight tendency, however, for this to be most pronounced for the light precipitation categories. On a seasonal basis, the summer and winter (Fig. 3) have the smallest increases in frequency, with winter having just a slight increase in precipita-

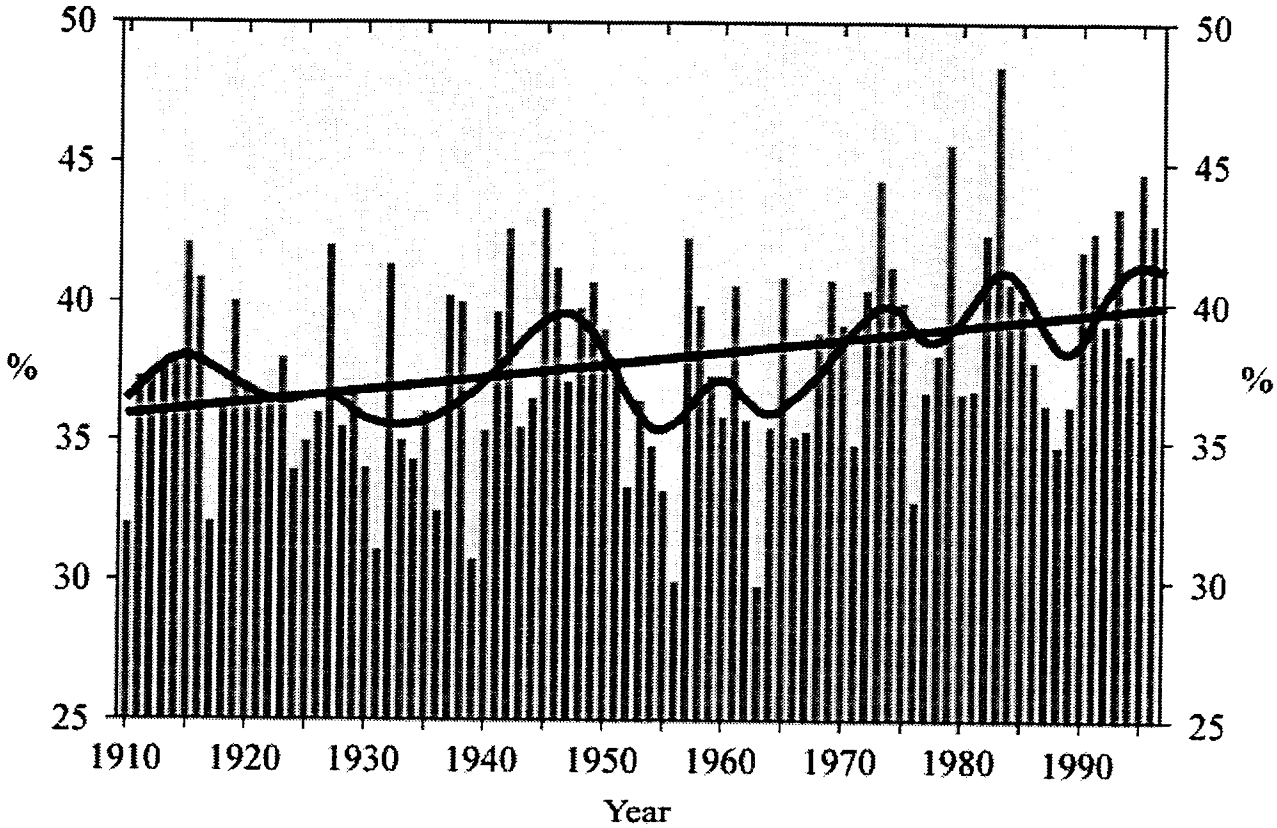

FIG. 2. Time series of the percent contribution of the upper 10 percentile of daily precipitation events to the total annual precipitation area-averaged across the United States. Smooth curve is a nine-point binomial filter, and the trend is also depicted.

tion frequency (< 0.5 days per century) followed by summer (1.3 days per century). Increases in the days with precipitation were significantly higher for the spring and autumn with 2.2 and 2.3 more precipitation days per century, respectively. These latter increases are fairly evenly spread throughout the precipitation distribution (Fig. 3). Clearly, the total annual increase in precipitation frequency of 6.3 days per century significantly contributes to the increase in precipitation.

Over the entire precipitation distribution, on a national basis, the increase in the number of days with precipitation contributed an amount equal to 87% of the total increase of precipitation. The contribution is strongest for the heavy and extreme precipitation categories (> 90th percentile) as depicted in Fig. 4. These two categories contributed about one-third of the total increase of precipitation given in Table 1 (10.1% per century). During the spring, summer, and autumn (Fig. 4), many of the large increases in frequency within each of the class intervals are statistically significant.

On an annual basis, trends of precipitation intensity (Fig. 5) reflect increases for the heavy and extreme precipitation categories, but only slight decreases throughout the rest of the distribution. This is apparent in most seasons (Fig. 5), but is particularly noteworthy for the highest precipitation class interval during summer. Here, like the annual increase, the increase in precipitation intensity is statistically significant at the $\alpha = 0.10$ significance level. For the upper 10 percentiles in the precipitation distribution, representing heavy and extreme precipitation amounts, the contributions to the total precipitation increase related to increased intensity versus frequency are about equal, 47% versus 53%, respectively. This is in contrast to the overall 13% contribution from intensity versus an 87% contribution from frequency to the total precipitation increase.

The trends in the extreme highest precipitation amount for each year-month also reflect the increase in intensity at the highest quantiles (Fig. 6). All areas reflect an increase in precipitation intensity for the highest quantile. Also depicted in Fig. 6 is the tendency for a decrease in precipitation intensity for the more

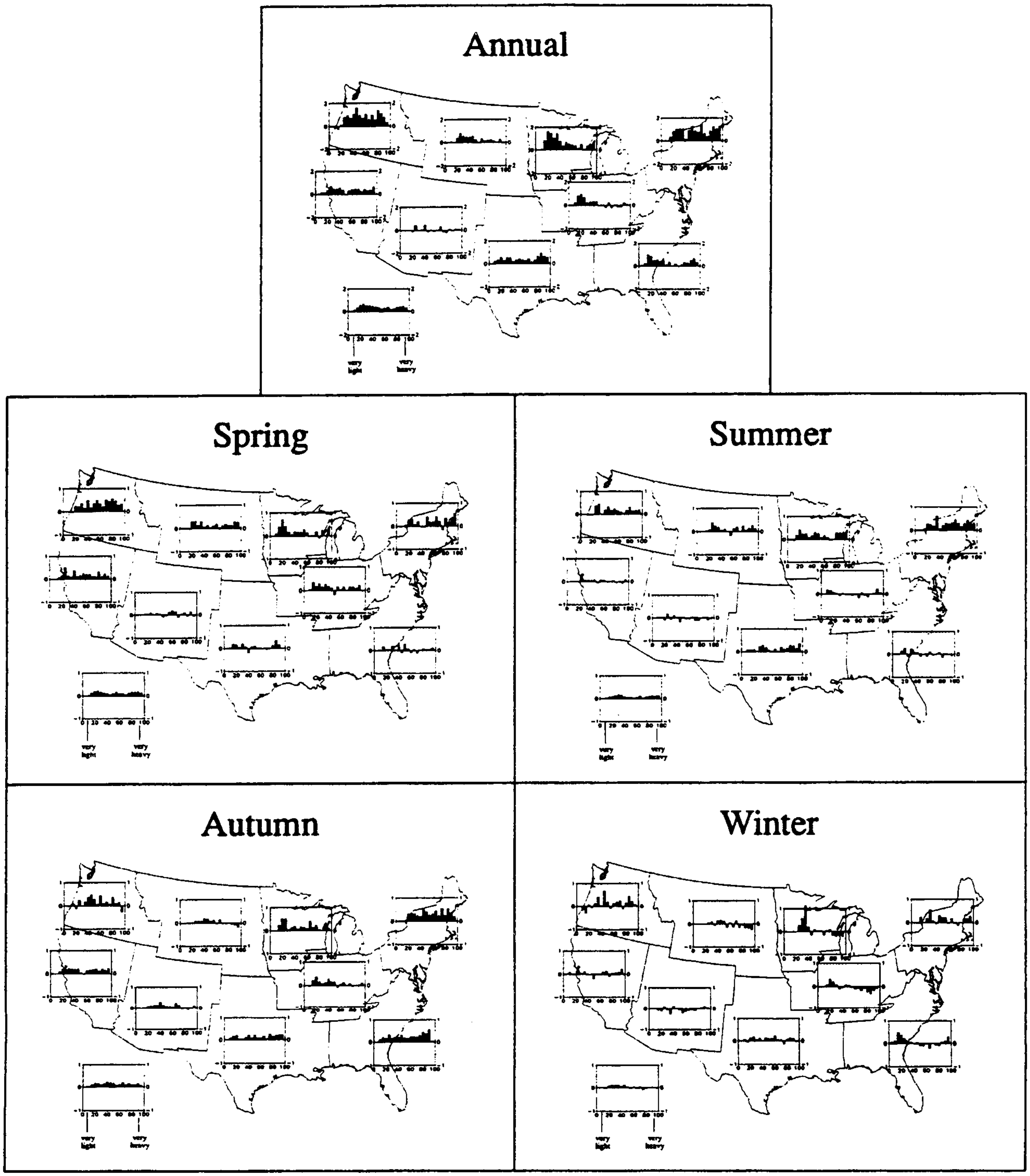

FIG. 3. The trend of the number of precipitation events expressed as events per century for the same percentiles as in Fig. 1.

moderate precipitation amounts, for example, the 50th percentile from each year-month as suggested in Fig. 5.

Given the increase in precipitation intensity at high precipitation amounts and the decrease at lower amounts (Fig. 5), the results of Karl et al. (1995) are easier to understand. They found an increase in the proportion of the total annual precipitation contributed by precipitation exceeding 50.8 mm (2 in.) day^{-1} across the United States. This is in contrast to the proportion of total annual precipitation contributed by precipitation events in more moderate categories (Fig. 7) between 2.54 and 25.4 mm (0.1 to 1 in.). These changes reflect

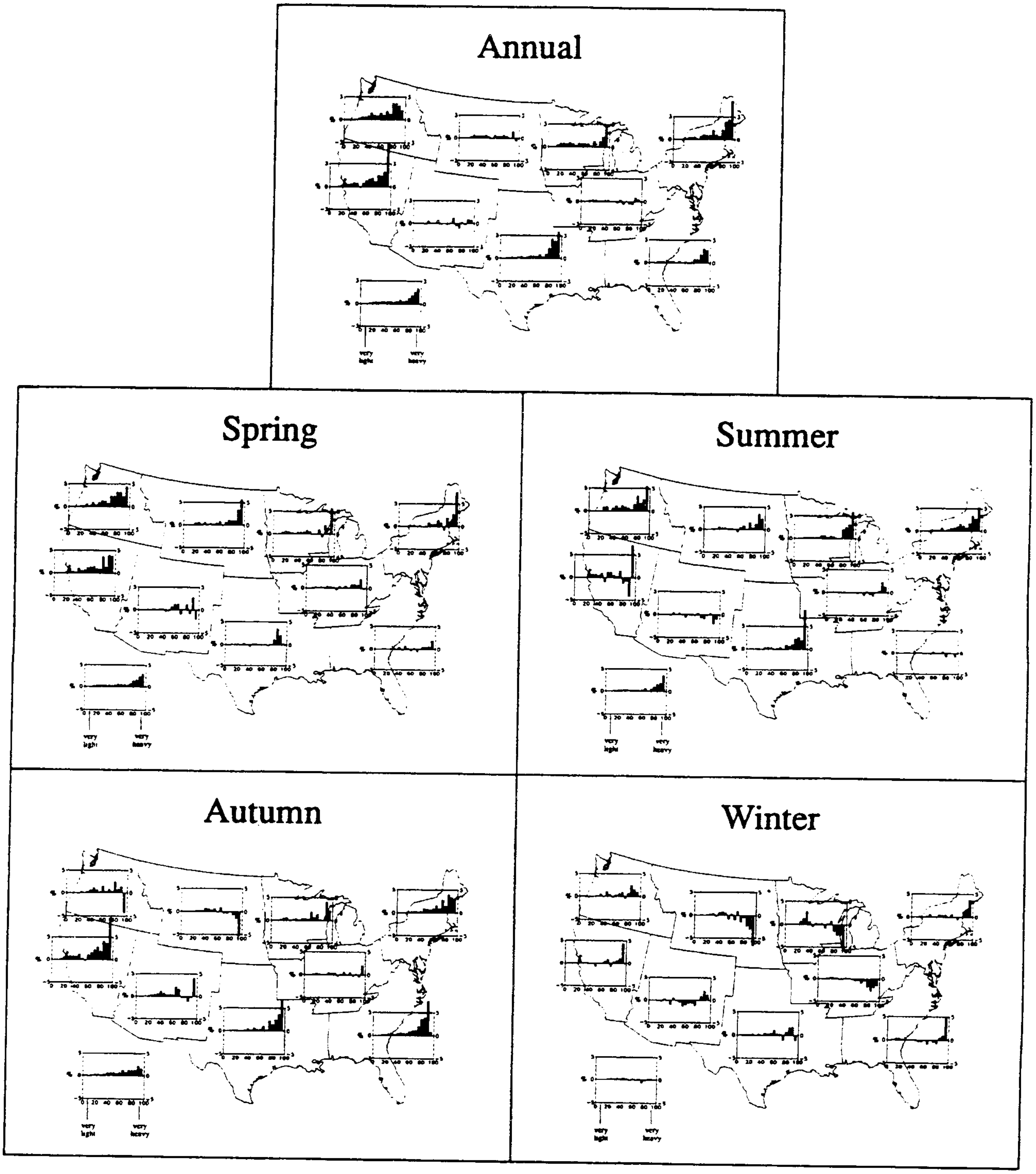

FIG. 4. The contribution to the trends in Fig. 1 attributed to trends in precipitation frequency. Trends are expressed as in Fig. 1.

a change in the precipitation distribution; for example, a change in the shape and/or scale parameters for a gamma distribution fit to daily precipitation amounts. The time series for the national average (Fig. 8) of the proportion of precipitation derived from events exceeding 50.8 mm day^{-1} reveals a statistically significant increase (2%) in area affected by a much above-normal frequency of these heavy and extreme events (Fig. 8).[3]

[3]Karl et al. (1996) published a similar time series, but the data presented here is based on an improved 1° × 1° grid-cell scheme. Trends are unchanged, but annual values differ from earlier work, sometimes substantially.

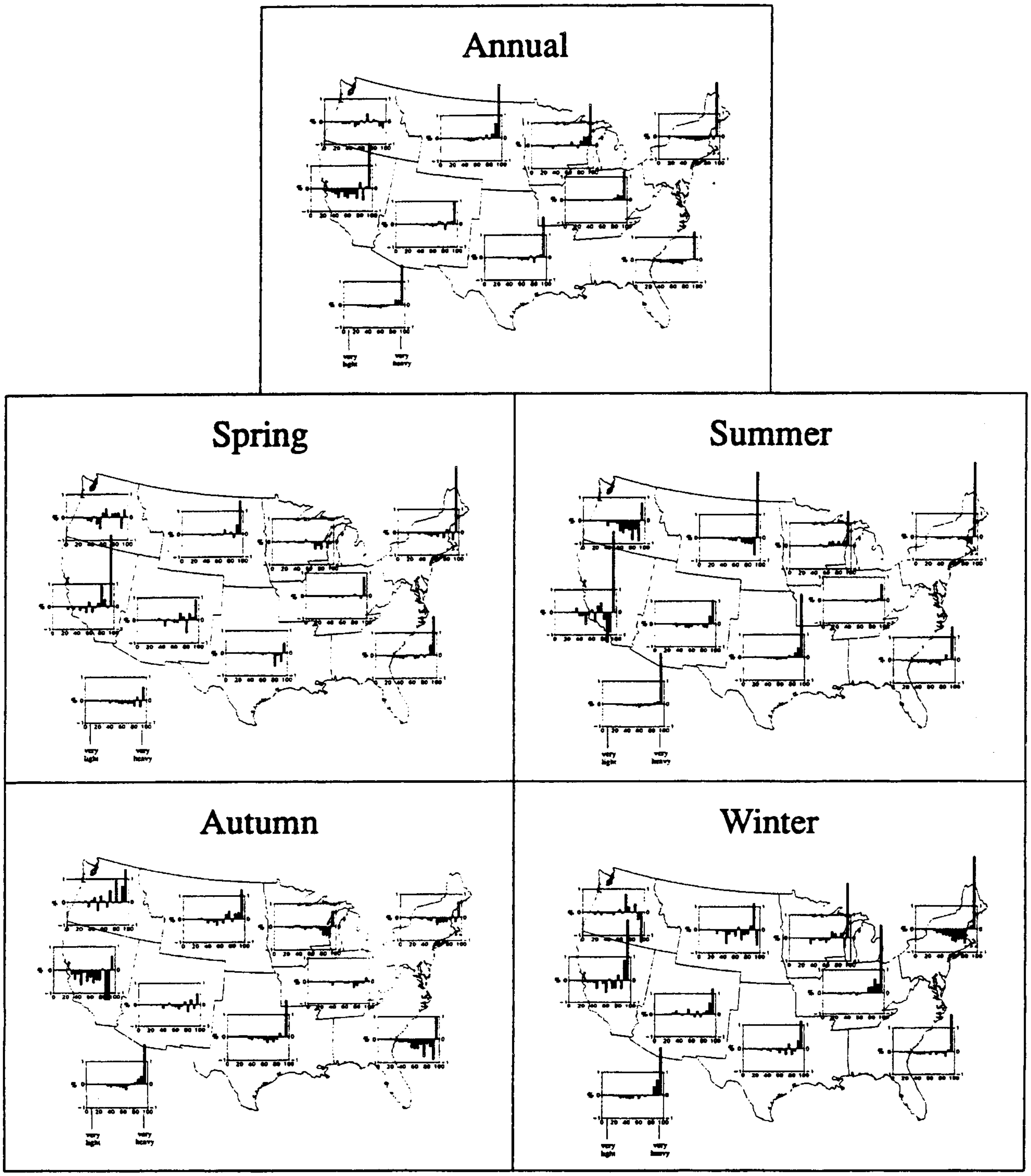

FIG. 5. The contribution to the trends in Fig. 1 attributed to trends in precipitation intensity. Trends are expressed as in Fig. 1.

5. Conclusions

Evaluating changes in precipitation extremes can be viewed using a variety of measures. In this analysis, simple methods to decompose the effect of changes in the frequency or probability of precipitation, and changes in precipitation intensity have been shown to uncover significant changes in U. S. precipitation extremes. Although it has been documented in several studies that precipitation is increasing in the United States, there are a variety of ways in which such an increase could have occurred. For example, precipita-

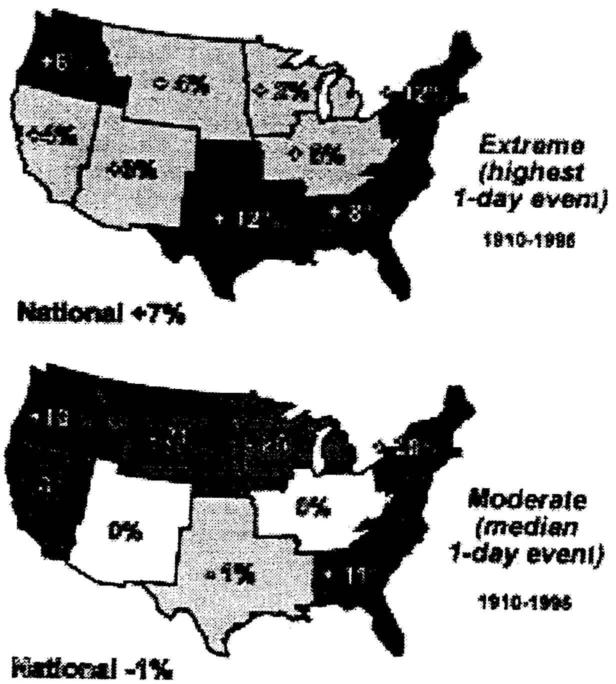

FIG. 6. Trends (1910–95) related to the highest daily year-month precipitation amount averaged throughout the year, and likewise for the medium precipitation amount. Trends are expressed as a percentage of the overall mean of the highest (median) daily year-month precipitation amount. Statistically significant trends are highlighted. The national trend is statistically significant at the $\alpha = 0.05$ level for the highest daily year-month values.

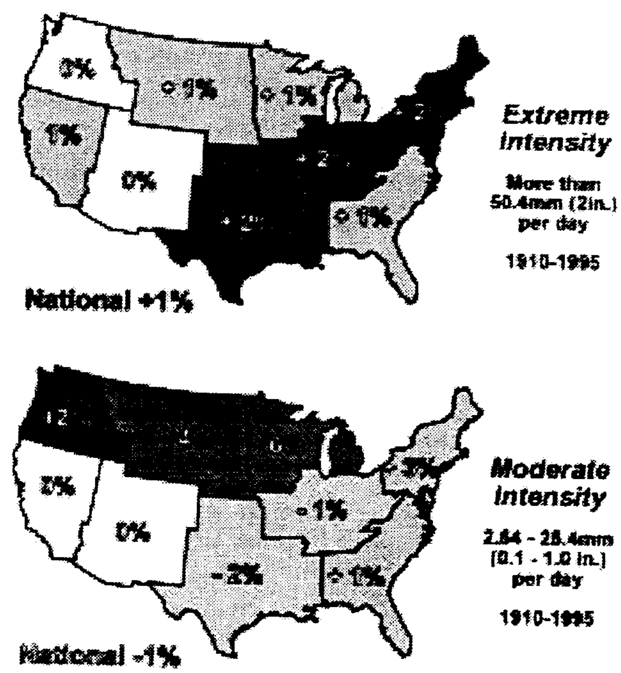

FIG. 7. Trends (1910–95) related to the proportion of total annual precipitation within various categories of precipitation. Trends are expressed as a percent change. Statistically significant trends are highlighted.

tion could have increased because a greater number of precipitation days in selective categories of precipitation, or it could have increased without any increase in precipitation frequency, but with an increase in precipitation intensity. What this analysis revealed is that in the United States over the past century, precipitation has increased in a fairly complex manner. For example,

- Increases of total precipitation are strongly affected by increases in both frequency and intensity of heavy and extreme precipitation events.
- The probability of precipitation on any given day has increased for all categories of daily precipitation amount.
- The intensity of precipitation has increased for very heavy and extreme precipitation days only.
- The proportion of total annual precipitation derived from heavy and extreme precipitation events has increased relative to more moderate precipitation.

As more daily data becomes available through data archeology efforts, similar analyses for other areas of the world will provide considerable information to better understand how the source term of the hydrologic cycle has varied and changed.

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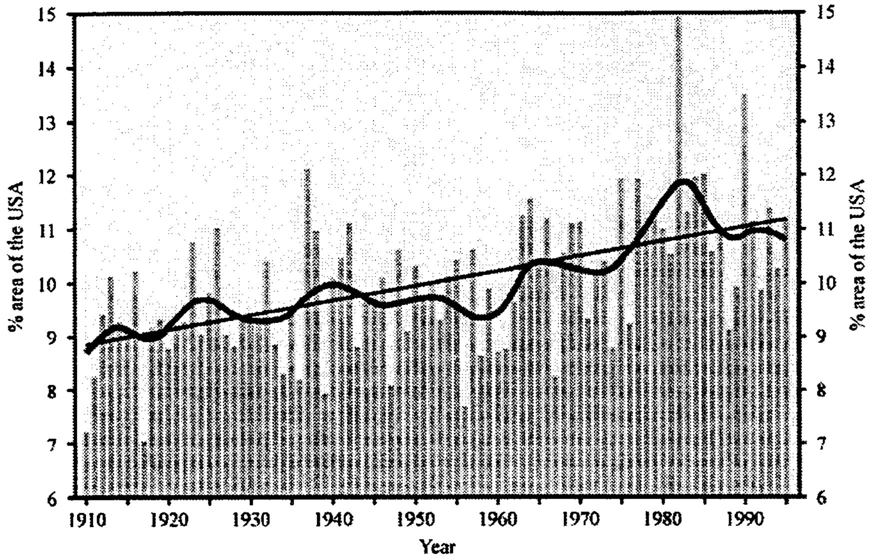

FIG. 8. Time series of the change in the area of the United States affected by a much above normal proportion of extreme precipitation events (daily precipitation exceeded 50.8

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68. W. E. Asher, University of Washington, Joint Institute for the Study of the Atmosphere and the Ocean, Box 354235, Seattle, WA 98195

69. D. C. Bader, Pacific Northwest National Laboratory, 901 D Street, SW, Suite 900 Washington, DC 20024

70. R. C. Balling, Jr., Arizona State University, Office of Climatology, Box 871508, Tempe, AZ 85287

71. R. G. Barry, University of Colorado, WDC-A Glaciology, CIRES, Campus Box 449, Boulder, CO 80309

72. M. F. Baumgardner, Purdue University, Department of Agronomy, 1220 Potter Drive, W. Lafayette, IN 47907

73. R. Bidigare, University of Hawaii, Department of Oceanography, 1000 Pope Road, Honolulu, HI 96822

74. C. Boelcke, P.S.S., UNEP, P. O. Box 30552, Nairobi, Kenya

75. D. P. Bowman, National Oceanic and Atmospheric Administration, National Climatic Data Center, 151 Patton Avenue, Suite 120, Asheville, NC 28801

76. F. P. Bretherton, University of Wisconsin, Space Science and Engineering Center, 1225 West Dayton Street, Madison, WI 53706

77. P. G. Brewer, Monterey Bay Aquarium Research Institute, P. O. Box 628, 7700 Sandholt Road, Moss Landing, CA 95039

78. D. A. Burns, Wilkes University, Department of Earth and Environmental Sciences, Wilkes-Barre, PA 18766

79. R. H. Byrne, University of South Florida, Department of Marine Sciences, 140 Seventh Avenue, St. Petersburg, FL 33701

80. D. Changnon, Northern Illinois University, Department of Geography, DeKalb, IL 60115-2854

81. P. A. Crowley, Department of Energy, Office of Biological and Environmental Research, Environmental Sciences Division, SC-74, 19901 Germantown Road, Germantown, MD 20874

82. H. Croze, P.S.S., UNEP, P. O. Box 30552, Nairobi, Kenya

83. E. G. Cumesty, ORNL Site Manager, Department of Energy, Oak Ridge National Laboratory, P. O. Box 2008, Oak Ridge, TN 37831-6269

84. R. C. Dahlman, Department of Energy, Office of Biological and Environmental Research, Environmental Sciences Division, SC-74, 19901 Germantown Road, Germantown, MD 20874

85. Database Section, National Institute for Environmental Studies, Center for Global Environmental Research, 16-2 Onogawa, Tsukuba, Ibaraki 305, Japan

86. K. D. Davidson, National Climatic Data Center, 151 Patton Avenue, Suite 120, Asheville, NC 28801

87. A. T. DeGaetano, Northeast Regional Climate Center, 1123 Bradfield Hall, Cornell University, Ithaca, NY 14853-1901

88. S. A. Del Greco, National Oceanic and Atmospheric Administration, National Climatic Data Center, 151 Patton Avenue, Suite 120, Asheville, NC 28801

89. W. C. Draeger, WDC-A for Remotely Sensed Land Data, U.S. Geological Survey, EROS Data Center, Sioux Falls, SD 57198

90. H. W. Ducklow, College of William and Mary, Virginia Institute of Marine Sciences, P.O. Box 1346, Gloucester Point, VA 23062

91-95. D. R. Easterling, National Oceanic and Atmospheric Administration, National Climatic Data Center, 151 Patton Avenue, Suite 120, Asheville, NC 28801

96. J. W. Elwood, Department of Energy, Office of Biological and Environmental Research, SC-74, 19901 Germantown Road, Germantown, MD 20874

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100. G. Esser, Justus-Liebig-University, Institute for Plant Ecology, Heinrich-Buff-Ring 38, D-35392, Giessen, Germany

101. J. S. Fein, National Science Foundation, Atmospheric Sciences Division, 4201 Wilson Boulevard, Room 775, Arlington, VA 22230

102. W. Ferrell, Department of Energy, Office of Biological and Environmental Research, Environmental Sciences Division, SC-74, 19901 Germantown Road, Germantown, MD 20874

103. R. H. Gammon, University of Washington, Chemistry Department, Box 351700, Seattle, WA 98195

104. W. Gardner, Texas A & M University, Department of Oceanography, College Station, TX 77843

105. J.-P. Gattuso, Observatoire Oceanologicque Europe, Avenue Saint-Martin, MC 98000, Monaco

106. J. P. Giesy, Michigan State University, College of Natural Science, Department of Zoology, 203 Natural Sciences Building, East Lansing, MI 48824-1115

107. P. Ya. Groisman, National Oceanic and Atmospheric Administration, National Climatic Data Center 151 Patton Avenue, Suite 120, Asheville, NC 28801

108. D. O. Hall, University of London, Division of Biosphere Sciences, King's College, London W8 7AH, United Kingdom

109. M. Hein, Freshwater Biological Laboratory, Helsingoersgade 51, DK-3400 Hilleroed, Denmark

110. A. Hittelman, WDC-A for Solid Earth Geophysics, National Oceanic and Atmospheric Administration, Code E/GC1, 325 Broadway, Boulder, CO 80303

111. H. Hodgson, British Library, Boston Spa, DSC, Special Acquisitions, Wetherby, West Yorkshire, LS23 7BQ, United Kingdom

112. W. Hogg, Chief, Climate Monitoring and Data Interpretation Division, (CCRM) Climate Research Branch, AES, 4905 Dufferin Street, Downsview, ON M3H 5T7, Canada

113. H. Hong, Xiamen University, Environmental Science Research Center, Post Code 361005, Mail Box 1085, Xiamen, Fujian, Peoples Republic of China

114. C. A. Hood, GCRIO, 2250 Pierce Road, Bay City, MI 48710

115. J. C. Houghton, Department of Energy, Office of Biological and Environmental Research, Environmental Sciences Division, SC-74, 19901 Germantown Road, Germantown, MD 20874

116. M. K. Hughes, University of Arizona, Laboratory of Tree-Ring Research, Building 58, 1105 V. Stadium, Tucson, AZ 85721

117. P. Y. Hughes, National Ocean and Atmospheric Administration, National Climatic Data Center, 151 Patton Avenue, Suite 120, Asheville, NC 28801

118. M. Hulme, Climatic Research Unit, School of Environmental Sciences, University of East Anglia, Norwich NR47TJ, United Kingdom

119. M. Janis, Department of Geography and Geology, Florida Atlantic University, P.O. Box 3091, Boca Raton, Florida 33431-0991

120. R. Jenne, National Center for Atmospheric Research, P. O. Box 3000, 1850 Table Mesa Drive, Boulder, CO 80307-3000

121. P. D. Jones, Climatic Research Unit, School of Environmental Sciences, University of East Anglia, Norwich NR47TJ, United Kingdom

122. T. R. Karl, National Climatic Data Center, 151 Patton Avenue, Federal Building, Room 516E, Asheville, NC 28801

123. C. D. Keeling, Scripps Institute of Oceanography, University of California, San Diego, Mail Code 0220, 9500 Gilman Drive, 2314 Ritter Hall, La Jolla, CA 92093

124. S. Kempe, Schnittspahnstr. 9, D-64287 Darmstadt, Germany

125. R. M. Key, Princeton University, Geology Department, Princeton, NJ 08544

126. K.-R. Kim, Seoul National University, Department of Oceanology, Seoul 151-7442, Korea

127. T. Kimoto, Research Institute of Oceano-Chemistry, Osaka Office, 3-1 Fumahashi-cho, Tennoji-ku, Osaka 543, Japan

128. B. Klein, University Laval, GIROQ, Pav. Vachon, Quebec, PQ, G1K 7P4, Canada

129. J. C. Klink, Miami University, Department of Geography, 217 Shideler Hall, Oxford, OH 45056

130. R. W. Knight, National Oceanic and Atmospheric Administration, National Climate Data Center, 151 Patton Avenue, Suite 120, Asheville, NC 28801

131. W. A. Kurz, Environmental and Social Systems Analysts Limited, 3rd Floor, 1765 W 8th Avenue, Vancouver, B.C. V6J 5C6, Canada

132. D. T. Lauer, EROS Data Center, U.S. Geological Survey, Sioux Falls, SD 57198

133. J. D. Laver, Climate Prediction Center, National Oceanic and Atmospheric Administration, National Weather Service, 5200 Auth Road, Room 800, Camp Springs, MD 20746

134. J. H. Lawrimore, National Oceanic and Atmospheric Administration, National Climatic Data Center, 151 Patton Avenue, Suite 120, Asheville, NC 28801

135. S. Levitus, National Oceanic and Atmospheric Administration, National Oceanographic Data Center, E/OC5, 1315 East-West Highway, Room 4362, Silver Spring, MD 20910

136. J. J. Lloyd, Australian National University, Research School of Biological Sciences, GPO Box 475, Canberra, ACT 2601, Australia

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139. T. H. Mace, U.S. Environmental Protection Agency, National Data Processing Division, MD-34, 79 TW Alexander Drive, Building 4201, Durham, NC 27711

140. E. H. Mason, National Oceanic and Atmospheric Administration, National Climatic Data Center, 151 Patton Avenue, Suite 120, Asheville, NC 28801

141. E. Matthews, National Aeronautics and Space Administration, Goddard Institute for Space Studies, 2880 Broadway, New York, NY 10025

142. J. J. McCarthy, Harvard University, Museum of Comparative Zoology, 26 Oxford Street, Cambridge, MA 02138

143. M. C. McCracken, National Assessment Coordination Office, Suite 750, 400 Virginia Avenue, Washington, DC 20024

144. L. Mearns, National Center for Atmospheric Research, P.O. Box 3000, Boulder, CO 80307

145. F. J. Millero, University of Miami, RSMAS, 4600 Rickenbacker Causeway, Miami, FL 33149

146. D. Miskus, Joint Agricultural Weather Facility, USDA, South Agricultural Building, Room 5844, 14th Street & Independence Avenue, Washington, DC 20250

147. R. E. Munn, University of Toronto, Institute for Environmental Studies, Haultain Building 170 Street, Toronto, Ontario M5S 1A4, Canada

148. S. Murayama, National Institute for Resources and Environment, Environmental Assessment Department, 16-3 Onogawa, Tsukuba, Ibaraki 305, Japan

149. S. Nishioka, National Institute for Environmental Studies, Global Environment Research Division, 16-2 Onogawa, Tsukuba, Ibaraki 305, Japan

150. J. R. Oh, Korea Ocean Research and Development Institute, Chemical Oceanography Division, An San P. O. Box 29, Seoul 4325-600, Korea

151-152. Office of Scientific and Technical Information, P. O. Box 62, Oak Ridge, TN 37831

153. C. Oudot, Centre ORSTOM de Cayenne, B.P. 165-97323, Cayene Cedex, Guyana

154. B. Parra, Department of Energy, Office of Biological and Environmental Research, Environmental Sciences Division, SC-74, 19901 Germantown Road, Germantown, MD 20874

155. W. Parton, Colorado State University, Natural Resource Ecology Laboratory, Fort Collins, CO 80523

156. T.-H. Peng, National Oceanographic and Atmospheric Administration, Atlantic Oceanographic Marine Laboratory, Ocean Chemistry Division, 4301 Rickenbacker Causeway, Miami, FL 33149

157. F. F. Perez, Instituto Investigacions Marinas, Eduardo Cabello 6, 36206 Vigo, Spain

158. T. C. Peterson, National Climatic Data Center, Global Climate Laboratory, 151 Patton Avenue, Suite 120, Asheville, NC 28801

159. B. Preselin, University of California, Department of Biological Sciences, Santa Barbara, CA 93106

160. P. D. Quay, University of Washington, School of Oceanography, Box 357940, Seattle, WA 98195

161. R. Y. Rand, USDA, Global Change Data and Information Management, 10301 Baltimore Boulevard, Beltsville, MD 20705

162. S. Ichtiaque Rasool, 52, Boulevard de Sebastopol, 5th Floor, 75003 Paris, France

163. J. Ribbe, University of Washington, Joint Institute for the Study of the Atmosphere and Oceans, Box #35425, Seattle, WA 98195

164. M. R. Riches, Department of Energy, Office of Biological and Environmental Research, Environmental Sciences Division, SC-74, 19901 Germantown Road, Germantown, MD 20874

165. A. F. Rios, Institute de Investigaciones Marinas, Consejo Superior de Invest. Cientificas, c/Eduardo Cabello, 6, 36208 Vigo, Spain

166. D. Robinson, Department of Geography, Lucy Stone Hall, Kilmer Campus, New Brunswick, NJ 08903

167. L. Robinson, Director, Environmental Sciences Institute, Florida A&M University, Science Research Facility, 1520 S. Bronough Street, Tallahassee, FL 32307

168. A. Robock, Department of Environmental Sciences, Rutgers – The State University of New Jersey, 14 College Farm Road, New Brunswick, NJ 08901-8551

169. A. Samel, Bowling Green State University, Geography/Environmental Programs, 300 Hanna Hall/143 College Park, Bowling Green, OH 43403

170. J. L. Sarmiento, Princeton University, Atmospheric and Oceanic Sciences Program, P. O. Box CN710, Sayre Hall, Princeton, NJ 08544

171. C. L. Schelske, University of Florida, Department of Fisheries and Aquaculture, 7922 W. 71st Street, Gainesville, FL 32606

172. M. D. Schwartz, Department of Geography, Bolton 410, P.O. Box 413, University of Wisconsin-Milwaukee, Milwaukee, WI 53201

173. S. Sorooshian, University of Arizona, Department of Hydrology and Water Resources, Tucson, AZ 85721

174. M. H. C. Stoll, Netherlands Institute for Sea Research, Department MCG, P. O. Box 59, 1790 Ab den Burg-Texel, Netherlands

175. E. T. Sundquist, U.S. Geological Survey, Quissett Campus, Branch of Atlantic Marine Geology, Woods Hole, MA 02543

176. T. Takahashi, Columbia University, Lamont-Doherty Earth Observatory, Climate/Environment/Ocean Division, Rt. 9W, Palisades, NY, 10964

177. L. D. Talley, Scripps Institute of Oceanography, UCSD 0230, 9500 Gilman Drive, Solana Beach, CA 92075

178. J. A. Taylor, Australian National University, CRES, GPO Box 4, Canberra, ACT 0200, Australia

179. J. M. Tiedje, University Distinguished Professor and Director, 540 Plant and Soil Sciences Building, Michigan State University, East Lansing, MI 48824

180. J. R. G. Townshend, University of Maryland, Dept. of Geography, 1113 Lefrak Hall, College Park, MD, 20742

181. K. Vinnikov, University of Maryland, Department of Meteorology, College Park, MD 20742

182. R. Vose, Arizona State University, Office of Climatology, Box 871508, Curry Road & Mill Avenue, Tempe, AZ 85287

183. D. W. R. Wallace, Abteilung Meereschemie, Institut für Meereskunde, Düsternbrooker Weg 20/, 24105 Kiel, Germany

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186. F. Webster, University of Delaware, College of Marine Studies, Lewes, DE 19958

187. A. Winter, University of Puerto Rico, Department of Marine Sciences, Puerto Rico State Climate Office, P. O. Box 5000, Mayaguez, PR 00681

188. C.-S. Wong, Government of Canada, Institute of Ocean Sciences, P.O. Box 6000, 9860 West Saanich Road, Sidney, BC V8L 4B2, Canada

189. Y. Yosuoka, National Institute for Environmental Studies, Center Global Environment Research, 16-2 Onogawa, Tsukuba, Ibaraki 305, Japan