



The State Climatologist

CLIMATE ANALYSIS CENTER - A REVIEW

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The Climate Analysis Center (CAC) of the National Weather Service was formed in 1979 to maintain a continuous watch on short-term climate fluctuations and to diagnose and predict them. These efforts help the government and private industry cope with problems of food supply, energy allocation, and water resources. The CAC consists of three branches: Analysis and Information Branch, Diagnostics Branch, and Prediction Branch.

The Analysis and Information Branch develops and maintains a quality-controlled Climate Assessment Data Base and provides products through a continuously operated Climate Dial-Up Service and through bulletins and summaries. They also develop and execute meteorological analyses of the stratosphere (levels at and above 70 millibars) and provide information on stratospheric ozone. The Agricultural Weather Section, located at the Joint Agricultural Weather Facility in the United States Department of Agriculture (USDA) provides the USDA with up-to-date information on global

farming areas and assists them in producing impact statements and crop yield forecasts.

The Diagnostics Branch operationally monitors large-scale global climate systems, particularly the status of the El Nino-Southern Oscillation (ENSO) phenomenon. This research-oriented branch is developing new or improved methods of monitoring the climate and defining, describing, and understanding coherent phenomena in the coupled ocean-atmosphere climate system.

The Prediction Branch produces 6- to 10-day, 30-day, and 90-day outlooks of temperature and precipitation, primarily for the United States. The outlooks are expressed as probabilities of above median, near median, and below average temperature and total precipitation.

The CAC has maintained a vibrant program of development. The Climate Dial-Up System was transferred to a VAX computer, thus improving product quality while

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reducing staff requirements for maintaining the product. The acquisition of Apollo workstations has enabled the CAC to produce several products more conveniently and has allowed the introduction of automated analysis schemes into the task of monitoring the state of domestic and global climate conditions.

The Climate Diagnostics Bulletin is a highly technical publication that provides detailed information describing why certain climate conditions exist. Heavy emphasis is placed on the tropics and on ENSO. After an intense examination of the tropical Pacific, more generalized information about the world at large is presented. The Climate Diagnostics Bulletin can be obtained at no cost by writing to:

Climate Analysis Center,
NOAA, National Weather Service,
World Weather Building,
Washington, DC 20233, Phone:
301-763-8227

The Climate Dial-Up System (CDUS) is a unique component of the National Weather Service's Family of Services. It provides customers with access to climatological data bases which are updated on a near real-time basis. This VAX-based system allows users world-wide to receive climatological information via their own computers and long-distance telephone lines. The system is heavily oriented to the United States, and a variety of products ranging from the most recent Palmer Drought Index to the latest seasonal outlooks can be directly downloaded by the customer. This enables each user to ingest and process data by utilizing familiar software on a familiar system. The

customer pays two fees: one for the telephone call into the system (including long-distance charges, if applicable), and one for accessing the CDUS. Each customer must submit a signed agreement and obtain a password. For detailed information, please write to: CAC, Attention: "Climate Dial-Up Service" or phone 301-763-4670.

The Daily Weather Maps are a compilation of daily weather conditions across the United States at 7 AM, Eastern Standard Time. Each day's set of maps includes surface weather conditions, 500 millibar height contours, maximum and minimum temperature, and 24-hour precipitation totals. Charts for each day are arranged on a single page and are based on National Meteorological Center analyses. For subscription information, please write to CAC, Attention: "Daily Weather Maps," or phone 301-763-4670.

The Monthly and Seasonal Outlook, generated twice a month, describes the outlook for total precipitation and average temperature in terms of probability of above median or below median conditions occurring. An explanation of the outlook is given, which includes details on how the forecast is derived and how the product can best be used. Recent climate conditions are also published, allowing the user to compare the last forecast to actual observations. Subscriptions are available by writing to CAC, Attention: "Monthly and Seasonal Outlook," or phone 301-763-8155.

The Weekly Climate Bulletin describes in a brief, concise format current climatic conditions in the United States and around the world. Monthly and seasonal summaries are also included in this general

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interest publication. Graphical and tabular data, primarily from the United States, allow users from government agencies, private industry, and educational institutions to obtain up-to-date information on long and short-term climate phenomena. The Weekly Climate Bulletin can be obtained at no cost by writing to CAC, Attention: "Weekly Climate Bulletin," or phone 301-763-8071.

The Weekly Weather and Crop Bulletin contains crop summaries and detailed information about weather conditions affecting agricultural production. Extensive coverage of the United States include the graphic tabular display of temperature, precipitation, Palmer Drought Index, Crop Moisture Index, pan evaporation, soil temperatures, and growing degree days. All major agricultural regions of the world are also examined. In addition, monthly and seasonal updates are included in this weekly publication, which is jointly produced by the U.S. Department of Agriculture and the U.S. Department of Commerce. For subscription information and costs please write to:

Weekly Weather and Crop Bulletin
NOAA/USDA Joint Agricultural
Weather Facility
USDA South Building, Room 5844
Washington, DC 20250
Phone: 202-447-7917

The Climate Analysis Center is fulfilling a role, mandated by public law, to monitor the state of the climate and to regularly advise government agencies, private industry, and educational institutions on existing climate conditions. The CAC stands ready to provide detailed information on

a regular basis to support policy makers and executives as they make their important decisions during critical situations, such as the Drought of 1988, or regarding long-term concerns, such as global warming.

The CAC is also currently involved in the upgrading and automating of its various climate products and publications through its recently acquired Apollo computer system, along with its new role as national administrator of the six Regional Climate Centers. These roles and tasks, however, are another story and will be discussed in detail at a later date.

Climate Analysis Center

The State Climatic Divisional Boundary Question

Several state climatologists, Frank Quinlan, and I have studied the divisional boundary question for some time. There are some significant problems with the present divisions. Several of the 344 divisions, particularly those that are drainage basins, are not very homogeneous (climatically), and sometimes host opposite departures at the same time. This can be a serious handicap for some applications. For large scale applications however, particularly those involving significant anomalies (such as building episodic regional and national time series), it is not such a problem.

While all of us agree that it would be desirable to alter some divisions, we also recognize that it would be a major effort. Much of the data from 1895 to 1948 is not keyed and not quality controlled (QC). Performing the data entry and QC,

This tabulated information provides a quick reference for dealing with time of observation changes in historical climate data.

writing and altering literally dozens (perhaps hundreds) of programs, changing maps, changing the entire data base, etc., would take several months. Until resources become available to expend on a project of that magnitude, we will have to continue to use the current divisions. Meanwhile, it seems entirely appropriate that some states develop and utilize their own divisions for special applications. It may even be useful to develop multiple divisional boundaries for a given state or region for various applications such as agriculture, water resources, and energy usage. If the time finally arrives when it will be practical to alter the divisional boundaries, we will certainly do so unless some improved methodology is developed by that time to replace divisional data (e.g., a fine mesh grid).

Robert G. Quayle
NCDC

Time changes in the U.S.

A book on historical time changes in the United States has been discovered. This book, called Time Changes in the U.S.A., was published in 1966 (with a supplement in 1969) by Professional Astrologers Incorporated, P.O. Box 2616, Hollywood, CA 90028, authored by Doris Chase Doane.

The book is of interest to SC's because it documents time changes in all 50 states from their dates of settlement through 1969. This includes dates of change from standard to daylight saving time or war time. In addition, all local exceptions to the statewide rules are noted along with the years of occurrence. This tabulated information provides a quick

reference for dealing with time of observation changes in historical climate data.

Because this is an older, nonstandard reference source, it may not be very accessible to most SC's. The Wisconsin copy was found by chance in a used book store. Upon request, I would be happy to provide photocopies of the appropriate pages to each state. I'm also interested in finding more recent tabulations of time change information.

Pam Naber
Wisconsin State Climatologist

Minnesota Honors Centennial Observers - October 12, 1990

On the beautiful fall afternoon of October 12th, Minnesotans gathered to honor 15 National Weather Service Cooperative Observers and their communities for 100 or more years of service as climate data gatherers. The event was held at historic Fort Snelling in Minneapolis, the first site in Minnesota to record climate data. The celebration featured a barbecue lunch, a series of short speeches, and concluded with an awards ceremony. The awards were presented by Dr. Norton Strommen, Chief Meteorologist for the USDA, and Dr. Elbert (Joe) Friday, Assistant Administrator for Weather Services, NOAA.

Among the approximately 150 people in attendance were representatives from industry, the media, the University of Minnesota, state and federal agencies, and interested citizens. Cooperative observers from non-Centennial locations were well represented. The awards ceremony began with

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dignity as the honorees were led to their seats by costumed employees of Fort Snelling carrying the state and national flags. The audience relaxed in the comfort of the patriotically adorned enclosure and listened as the invited speakers praised the Cooperative Weather Observer Program. Each honoree, and the community that they represent, received a plaque commemorating their contributions. In addition, certificates of commendation from United States Senator Boschwitz were presented and a proclamation from Minnesota's Governor Perpich was on hand. Special awards were conferred upon two observers whose families have gathered climate data for the entire period of record. The ceremony was organized through the combined efforts of the National Weather Service, the University of Minnesota Agricultural Experiment Station, and the Department of Natural Resources State Climatology Office. Logistical responsibilities were divided among the organizations making for a manageable work load. The entire effort was funded by private contributions solicited from local utilities, agribusinesses, and others.

The primary objective of the celebration was to assure these honorees (and all weather observers) that they are appreciated and that there are many who rely on their fine efforts. From the feedback that was received it appears that the objective was accomplished.

State Climatology Office
Minnesota Department of Natural Resources, St. Paul

The Saga of "Surface Weather Observations" Status Report November, 1990

Don't panic! While it is true that all hourly meteorological observations from the National Weather Service (NWS), U.S. Navy, and Federal Aviation Administration (FAA) stations will no longer be recorded on paper copy, the National Climatic Data Center (NCDC) is coming to your rescue. (At least, if you need it!) Rapid changes in weather observation techniques during the 1990's are continuing to require extensive revisions in both hardware and software within NOAA organizations. Long gone are the days when NWS observers recorded their observations on Forms MF1-10 A & B and mailed those to NCDC. (See Figure 1 for a sample).

In the 1980's, the primary communications network for the NWS was the Automation of Field Operations and Services (AFOS) network. The NCDC received these data on magnetic tape a week after the observations were made, and digitized data were used to avoid the laborious keying-in of hourly observations. The Service Records Retention System (SRRS) was developed at NCDC to store these observations, along with other meteorological and hydrological data, analyses, forecasts, and warnings on one magnetic tape daily. Even with this advance, paper copies of the forms were still being mailed to NCDC from NWS, FAA, and Navy stations.

By mid-1990, most of the NWS stations had been upgraded and began recording observations using the Microcomputer Aided Paperless Surface Observations (MAPSO) System. This system spelled doom

for NWS original paper copy records, and the observations are mailed monthly to the NCDC on floppy disks. Software work at NCDC succeeded in using the digitized data to produce a hard-copy replica of the original MF1-10 A & B sheets. In order to provide these data to the public as soon as possible, two versions are made. The first produces a computer listing (See Figure 2), and the second produces a microfiche

from which hard copy can be made (See Figure 3). NCDC has found that both of these work very well in that: 1) the computer listing is available shortly after NCDC receives the diskette, 2) the microfiche hard copy is formatted so that it appears to be simply a printed version of the original MF1 - 10 A & B, and 3) both the computer listings and microfiche versions can be Department of Commerce certified for courtroom

Figure 1 shows a microfiche record (MF1-10A) for Charleston, SC, dated September 21, 1989. The data is organized in a grid with columns for time (0000, 0100, 0200, 0300, 0400, 0500, 0600, 0700, 0800, 0900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2100, 2200, 2300, 2400) and rows for various weather parameters including temperature, pressure, wind, and cloud cover. The data is handwritten in black ink on a white background.

Fig. 1 MF1-10A (original record)

Figure 2 is a computer listing derived from MAPSO data for Charleston, SC, dated September 21, 1989. The data is presented in a structured table format with columns for time (TIME), location (STATION), and various meteorological variables (TEMP, WIND, PRES, etc.). The data is printed in a monospaced font, typical of early computer output.

Fig. 2 MAPSO-Derived computer listing

Figure 3 shows a microfiche record (MF1-10A) for Charleston, SC, dated September 21, 1989. The data is organized in a grid with columns for time (0000, 0100, 0200, 0300, 0400, 0500, 0600, 0700, 0800, 0900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2100, 2200, 2300, 2400) and rows for various weather parameters including temperature, pressure, wind, and cloud cover. The data is printed in a monospaced font, similar to the original record.

Fig. 3 MF1-10A (from microfiche)

Figure 4 is a computer listing derived from AWOS data for Charleston, SC, dated September 21, 1989. The data is presented in a structured table format with columns for time (TIME), location (STATION), and various meteorological variables (TEMP, WIND, PRES, etc.). The data is printed in a monospaced font, similar to the MAPSO-derived listing.

Fig. 4 AWOS output

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use. Even though virtually all of the NWS sites have been converted to MAPSO, the NCDC still receives paper copies of the less complete MF1 - 10C forms from FAA stations. The evolution of surface weather observations in the 1990's is still continuing. New, fully automated observing systems are now undergoing quality control checks and test, and the Automated Surface Observing System (ASOS) looms on the horizon. ASOS, a triagency program involving the NWS, FAA, and U.S. Navy will more than double the number of full time observing sites and will standardize weather observations provided by the three agencies. Automated Weather Observing Systems (AWOS), the preliminary FAA version, are now functional at several FAA sites, and data from 22 of these sites are being received at NCDC through the SRRS. In preparing for ASOS, NCDC is developing an interim system using AWOS data that are now available. Thus far, AWOS data have been extracted from the SRRS tapes; hardcopy products have been produced; and a common AWOS/ASOS output product has been finalized (See Figure 4). The common output product will soon be available as hardcopy or on microfiche and will replace the MF1 - 10 A & B and MF1 - 10C forms. Once a station is converted to AWOS, paper copy originals will no longer be mailed to NCDC. Implementation of ASOS at primary NWS stations is scheduled for 1993-1995.

Even though a common format will be used, thus eliminating the differences between NWS and FAA forms, there will continue to be differences between the AWOS and ASOS observing products, at least for a while. One of the main

differences is that AWOS data are measured every twenty minutes with no special observations; ASOS observations will be measured hourly with the special observations being taken. Other details have yet to be finalized.

Now that NCDC has successfully extracted AWOS data from the SRRS and reformatted it into an easy-to-use replica of the standard MF1 - 10C form, the possibility of doing the same for other types of automated observing stations has been raised. So far, AMOS, RAMOS, and AUTOB data have been isolated from the remainder of the SRRS data; however, no decision has been made to proceed with this development.

Initially, all AWOS/ASOS data will be transmitted longline over the AFOS communications network. In the future, ASOS data from the NWS will be transmitted over the Advanced Weather Interactive Processing System for the 1990's (AWIPS-90), and AWOS data from the FAA is planned to be obtained through an AWIPS-90 interface with the FAA's AWOS Data Acquisition System (ADAS). The AWIPS-90 network will replace AFOS, and this will once again require hardware and software changes within NCDC. However, the end result will be that NCDC will be able to produce an expanding array of digital products. At the same time, NCDC will still be able to produce hard-copy and microfiche copies of the surface weather observations, even though the era of recording those observations on paper will have long since passed!

Sam McCown
NCDC

Minnesota Honors Centennial Stations

On October 12, 1990, Minnesota held a state-wide ceremony to honor its centennial cooperative weather stations (see article on Page 4).

Participants included (standing L to R): Norton Strommen, USDA; Luther Opjorden, Milan, MN observer; Joe Friday, NOAA; Jerome Stoffel, Farmington, MN observer.



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