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The State Climatologist

NCDC IN THE 1990's

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... Major action was necessary in order to ensure this nation's climate archive remains stable and responsive.

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Introduction

For over three decades the National Climatic Data Center (NCDC) has been the leader in National Climatic Services. Its activities have been wide ranging, touching many decision makers in most economic sectors. However, in a time of scarce resources and at a time of great national and global concern for the environment and man's influence on its change, NCDC has had to rethink its programs and roles. It has become apparent that major action was necessary in order to ensure this nation's climate archive remains stable and responsive.

As a positive management action, NCDC will change emphasis in several areas. The main thrust of NCDC for the 1990's will be in Reference Data Sets, Data from Automated Systems, Support for the Research Community and Definition of Standards. Funding for these new activities will be achieved by de-emphasizing some functions, through increased User fees, and through the elimination of low priority activities. Such functions include use of contract

personnel; reduction in manually intensive Quality Control, especially as we move toward digital data ingest; and a de-emphasis on printed publications.
(continued on page 2)

A NEW LOOK.....

This issue makes a dramatic change in appearance for The State Climatologist. It will be issued quarterly again and hopefully will have articles that interest you, the climate community. Comments welcome!

Steve Doty

Note from Editor

Dr. William H. Hooke, Executive Director for NOAA's Chief Scientist, recently visited NCDC. He kindly agreed to answer questions from several State Climatologists.

Interview With Bill Hooke

I am very happy to have this opportunity for dialog with the American Association of State Climatologists. We are at a truly historic moment in our science. Five hundred years from now, people will look
(continued on page 3)

U.S. DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE

NATIONAL CLIMATIC DATA CENTER IN COOPERATION WITH AMERICAN
ASSOCIATION OF STATE CLIMATOLOGISTS

NCDC IN THE 1990's
(continued from page 1)

Proposed Changes

Some of the changes will be implemented rather quickly, others will take several years before the impact can be fully appreciated. The road ahead may be rocky and full of potholes, but it's a road that must be taken.

Reference Data Sets. NCDC will give renewed attention (actually we've been doing this for years) to the creation, maintenance, and promotion of Reference Data Sets (RDSs). The idea is to build high quality, definitive, certified baseline data sets complete with data and station histories. These RDSs will be both national and global in scope and both long-term yet near real-time. Available in several different sorts and on different media (microfiche, tape, disk, CD-ROM, etc.), these RDSs will be the standard data sets used by the research community to evaluate their theories and models.

Data from Automated Systems. NCDC will begin to play a larger role in the definition of requirements for the climatological community as new observing systems are designed and implemented. Consistency of record in terms of instrumentation, location, and data quality are of special concern. Decisions must be made on data flow and, most importantly, on data retention. These high density, high volume observing platforms will force the climate community to make hard choices on which data to keep, which to integrate, and which to throw away.

Research Community Support. NCDC will place more emphasis

on servicing the research community. The creation of Reference Data Sets is perhaps the largest example of this new commitment. However, other activities such as a more proactive role in data management for large scale research experiments and projects will be emphasized. Data catalogs, a user services unit to cater to the research community, and wholesale prices will all aid the entire community.

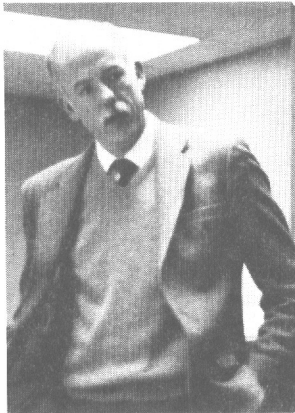
Definition of Standards. NCDC will move aggressively in the establishment of standards on three major fronts - data, descriptive techniques, and perspectives. Standards for data include such items as formats, media, and requirements. Work needs to be accomplished to find the best methods to calculate normals, define indices, and standardize weighting functions. The historical perspective of current climate conditions must be made available and relevant.

Self-Sufficiency in User Services. NCDC will move as quickly as the law allows to achieve full cost recovery for user services. New legislation authorizes two-tier pricing, retail and wholesale, a major change from charging only the cost of reproduction. Prices will rise; however, service will become more responsive as contract staffing adds new flexibility in meeting customer demands.

Automated Quality Control. NCDC will move from manually intense quality control to a greater emphasis on quality control at the source. Automated observing systems will remove the need for checking for keying errors or human transposition errors. Quality assurance of the 1990's will mean checking on instrumentation changes, drifts, and biases; telecommunication errors; and, for the first time, consistency on a spatial as well

The idea is to build high quality, definitive, certified baseline sets...

NCDC will move as quickly as the law allows to achieve full cost recovery for users services.



Dr. Bill Hooke

*The Golden Age of
the environmental
sciences...*

as on a temporal scale.

Digital Data Ingest. NCDC will see climate data begin arriving in digital form (this is already true). This means a de-emphasis on paper or photographic archives. Keying of observations can be eliminated. Data will become available real-time, giving, for the very first time, a climatic data base that is dynamic and in tune with today's events.

Publication Changes. NCDC will begin the de-emphasis of printed publications. The Hourly Precipitation Data bulletin may no longer be printed; instead, it will be available on microfiche. Shelf stock used to fill ad-hoc orders will be dropped from a three-year supply to a one-year supply. Prices will increase. Additionally, low-demand Local Climatological Data bulletins will be available only on microfiche.

In Conclusion

To recap, NCDC is committed to maintaining a dynamic, consistent, high quality accessible climate data base. How this data base grows and is serviced will undergo some rather major changes in the next 3-5 years. New demands are being placed on the climate service systems, and NCDC will be there to meet them head-on. The National Climatic Data Center will remain a "National Resource for Climate Information," now and into the 1990's.

Kenneth D. Hadeen
Director, NCDC

*Interview with Hooke
(continued)*

back on this time (the year 2000 A.D.) and say "that was

the Golden Age of the environmental sciences in general, and climatology in particular." They'll say, "For the first time, we had instruments of high diagnostic power able to take the pulse of the planet. We had communications and the computer, to digest the data and convert them into information. There was a flowering of understanding, and it occurred in the nick of time, because ten billion people were turning Earth into an ash can." They'll go on to add, with little sensitivity to the tensions and doubts you and I experience daily, "What an exciting time! You could stumble blindfolded through that period and make important contributions and discoveries." Finally, they'll lament, "It's not like today (the year 2500 A.D.). Today all we have are organizational turf fights, personality squabbles, declining budgets, and red tape."

As the nation awakens to the importance of climate and global change and looks to federal agencies for a response, our community is engaged in a great dialog attempting to define the tasks ahead and sort out roles. Given the time scales involved and the high stakes for all the players, it's probably too early to see how all this will settle out, but certain themes are beginning to emerge. One is a national need for observations and predictions of climate changes; predictions on all time scales from seasons to a century or more, and predictions which are uncolored by a policy bias, whether that bias deals with food and fiber production, water resources, energy consumption, or environmental quality. Along with this comes a need for access to retrospective climate data, dealing with a similarly broad range of time scales. Under any scenario you can imagine, NOAA can and should have major responsibilities for this task.

(continued next page)

From Bob Muller, Louisiana: The First Order Station Network is not a climate network. The present Cooperative Network is in turmoil and some of these data are questionable. What are NOAA's plans for establishing a TRUE climate network for the 1990's?

Your question touches on one of the great challenges facing NOAA. We are only beginning to comprehend fully the broad interplay of physical, chemical, and biological processes responsible for climate. A "TRUE" climate network, to use your phrase, requires oceanic as well as atmospheric observations. It demands measurement of chemical and biological as well as physical parameters. It must comprehend satellite as well as surface data. It must define global changes, but must also resolve regional and local variability as well. Also, as the work of Tom Karl of NCDC and his colleagues has recently demonstrated, designing a network robust for decades or a century or so in the face of the societal change now underway worldwide is not easy. The AASC, NOAA, and other players have our work cut out for us in specifying what is needed. Even if we succeed, however, for the rest of our careers we are likely to remain profoundly dissatisfied with the gap we see between the climate data we have available and the data sets and data quality we believe to be necessary.

From Dick Reinhardt, Western Regional Climate Center: There is a significant difference between operational requirements of a weather service program and a climate services program. Maintenance of long-term stations and the continuity of

the measurements taken are but two of the most obvious differences. The basic question is: Is NOAA committed to climate services?

Absolutely committed. As you remind us, NOAA is engaged in an extensive modernization of the National Weather Service, replacing virtually all the observing systems, communications, and ADP available to its forecasters. In the midst of this effort, however, we have not lost sight of the need to re-examine our climate information system and related products and services. These are the key to NOAA's future. To meet the national needs will require a complete revamping and expansion, along lines to be defined by working with users; e.g., the AASC.

From Nolan Doesken, Colorado: The flow of data in NOAA is somewhat cumbersome, with most basic meteorological/climatological data collected by the NWS but with QC, archiving and dissemination done elsewhere. Is it likely that this will change in the future, or is the current system working well as viewed from inside NOAA?

You're kind to say that the flow of data in NOAA's only somewhat cumbersome. We've made some big improvements over the past decade, but the plain truth is, we're struggling to stay even with a data stream that is only one percent of the data flow that we can reasonably expect by 1995, based on simple extrapolations of past trends and the prospect of a true Earth Observing Systems. This means that increments of 10% to the current strategy, or even a doubling or two, fall far short of the goal. We require qualitatively different approaches, totally new ease of access to our real time and retrospective data. NOAA's scientific and technical staff are working with NOAA management to identify a strategy

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...during this spring and summer, observers will continue to exchange pencils, pens, and manuscript forms for keyboards, monitors, and printers.

for meeting this challenge and developing the additional services that will be needed, beginning as early as FY 1991. Fortunately, we have an excellent staff at our Centers, committed to those goals, and armed with lots of ideas for coping. The task of NOAA management is to put the needed resources at their disposal. We'll probably be coming to the AASC looking for help as we marshal the case.

I'm excited by the prospect before us. We face daunting scientific and technical obstacles, but the corporate will and determination are there. Working together, we will succeed.

Dr. William H. Hooke
NOAA

MAPSO: DAWNING OF A NEW ERA IN THE OBSERVATION AND ARCHIVAL OF METEOROLOGICAL DATA

The primary objective of the surface observing function of the National Weather Service (NWS) is to provide timely and accurate surface data. In support of this, an automated data quality assurance program was developed to run on microcomputers at each of the 250 NWS observing sites throughout its surface acquisition network. This is called the Microcomputer-Aided Paperless Surface Observations (MAPSO) program. Early versions have been in use since 1985 in the NWS Alaska and Pacific Regions. A new version suitable for use across the entire country is now being field tested at 17 NWS sites. As the program is implemented nationwide during this spring and summer, observers will continue to exchange pencils, pens, and manuscript forms for

keyboards, monitors, and printers. MAPSO substantially changes the way most NWS personnel record and disseminate surface observations.

The MAPSO program runs on an IBM PC/XT compatible microcomputer and requires only that the observed data be entered into a preformat. There is no need for the observer to format the basic parts of the observation. Derived parameters are automatically generated from the data entered by the observer. The observer still has the ability to enter appropriate remarks manually. MAPSO performs various quality assurance checks as the data are entered, ensuring that the various parameters are consistent with each other and within normal ranges. After MAPSO generates the appropriate message format (record, special, local, or synoptic), the observer validates the observation and transmits it throughout the NWS communications system for world-wide distribution.

The effects of MAPSO are far-reaching. The most immediate impact is to encourage greater observer proficiency as it prompts the observer for accurate, logical data. Some computations normally performed manually by the observer under the old system will be done automatically with MAPSO. The quality of the transmitted and recorded observation data will be further improved, providing better data to the climatological community. Since the observer is relieved of a few tedious record checking chores, he is available to devote more time to other public services. Finally, since monthly archive diskettes are mailed to NCDC (instead of the old paper forms), MAPSO allows NCDC to put its resources to more efficient use.

One of MAPSO's greatest potential advantages is the ability to quality control an observation as it is being made...

MAPSO-Induced Changes at NCDC

The National Weather Service implementation of MAPSO has a significant effect on the way the NCDC performs its data management function on surface weather observations. The NWS and NCDC have been working closely for the past few years collaborating on portions of the MAPSO system design to try to maximize the chance of having a successful implementation that would be of great benefit to all parties.

MAPSO will streamline the data entry and quality control processing of NWS, first order station, hourly observations for the NCDC. Digital data will be received on computer floppy diskette from each station as the use of the forms 10-A and B is phased out. The benefit here is that the data entry (i.e. keypunching) of the form "B" data will be eliminated (the form "A" data are already being processed digitally from the AFOS data stream received at the NCDC).

As noted before, the NWS has a number of quality control checks built into MAPSO. Much of the data quality control, then, will be performed on site rather than at the NCDC. The NCDC Surface Data Processing System quality control, which contains approximately 400 algorithms, will still be run against the MAPSO data to ensure that the highest level of quality data is archived in the historical data base.

Robert Quayle, Chief of NCDC's Data Operations Division, which is responsible for the processing and quality control of surface observations, sees the benefits of MAPSO quality control: "One of MAPSO's greatest potential advantages is

the ability to quality control an observation as it is being made prior to transmittal from a station. This will improve the quality of data input to real-time now-casting and forecasting systems, as well as improving the efficiency and quality of NCDC operations."

Manuscript Reproduction

MAPSO cannot and will not entirely eliminate the proliferation of paper copies of hourly observations. There is a firm archival and user community requirement, for example, for litigation purposes, to have a hard copy of the observations available.

NCDC's Robert Money, Chief of the User Services Branch, underscores the importance of producing hardcopies of the observations: "We handle about 20,000 requests a year for surface weather observation manuscripts. It is essential that we retain the ability to produce such manuscripts from the MAPSO digital data in an efficient and timely manner."

To accomplish this, NCDC has written software which computer-generates the forms 10-A and B from the MAPSO data stream and can create either paper or microfiche copies of the manuscripts.

Summary

These changes to the observing program are only the beginning of the efforts to modernize NWS activities. The Automated Surface Observing System (ASOS) being developed by the NWS, Federal Aviation Administration, and U.S. Air Force is planned for implementation in the 1990s. When ASOS is fully operational, the spatial resolution of detailed observations across the country will be significantly increased, and it will be capable of reporting

observations more frequently to other new NWS systems supporting more complex meteorological analysis.

MAPSO is a link between two eras: the old one of manuscripts and archival by mail, the new one of automated observations and archival by telecommunications in real or near-real-time. MAPSO has made great improvements in the logging, quality-controlling and digitizing of surface weather observations, but with negligible gains in terms of data delivery for archival purposes. One of the challenges of the 1990's will be the improvements in data delivery to and from our national data archive centers.

Michael Crowe, NCDC
Richard Thomas, NWS

AASC Annual Meeting - July 8-9, 1989 - Bar Harbor, Maine

Words on the 1989 Annual AASC Meeting

Preliminary information for the 1989 annual meeting of AASC: As you remember, at last year's meeting we decided to meet at Bar Harbor, ME in 1989. Bernie Dethier has done the leg work for this meeting, and given yeoman's service. Bar Harbor is a popular summer vacation spot, on the coast, and near the mountains. The popularity of the location and the limited availability of motels within our price range caused the meeting to be earlier than usual: July 8-9, 1989, a Saturday and Sunday. (For once, we can take advantage of weekend airfares.)

We have blocked out 34 rooms at the Atlantic Oakes Motel (1-800-336-2463), located about 1-1/2 miles out of Bar Harbor, ME. The meetings will be held in their conference room. Guest rooms contain 2 double

beds, and room rates are:

- 1 person: \$ 89.88
- 2 persons: 89.88
- 3 persons: 96.30
- 4 persons: 102.72

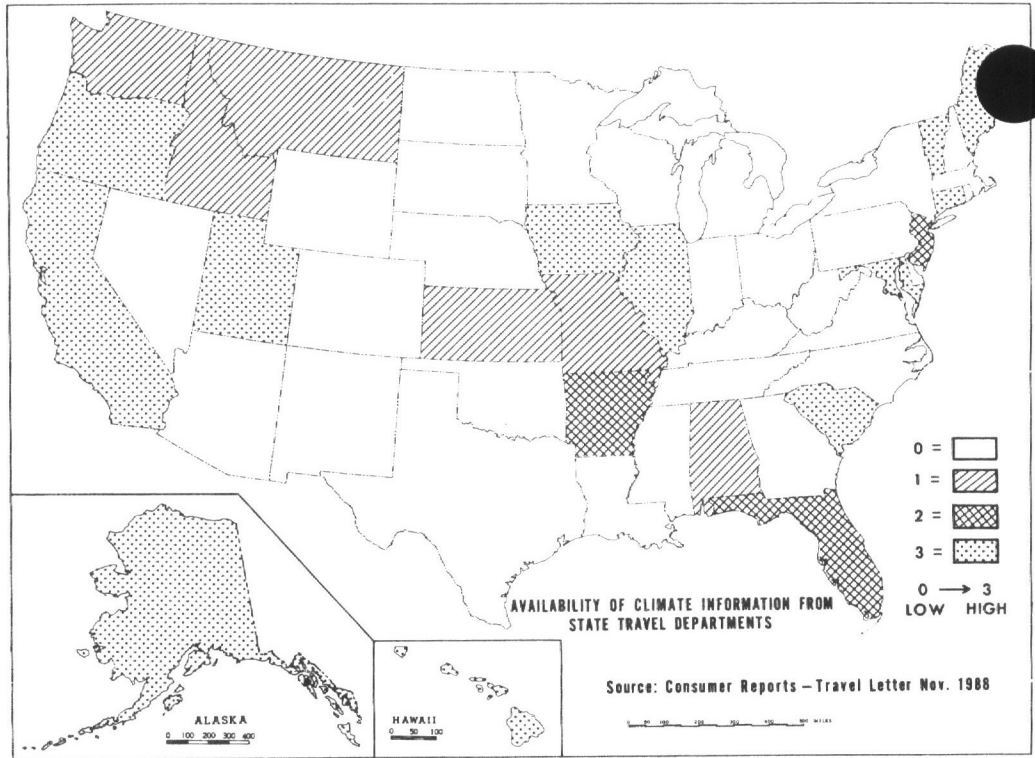
Cots are an additional \$4.28 per night. Each of us should make our own reservations directly with the motel, deciding roommates ahead of the call. Bar Harbor is a popular spot, so make your reservations as early as possible. They will refund room deposits if written notice is received by the motel at least 7 days prior to the reservation date. We plan an icebreaker on a yacht the evening of July 7, and an outdoor lobster-clambake on the 8th. The meeting will consume 2 full days.

One additional item re the meeting. If you fly in, the closest airport is Bangor, ME; however you may also fly to Portland. Since you will have to rent a car if you fly in, after you have made flight arrangements, call me and I will match you with others who arrive about the same time so that you can group together for the car rental.

I look forward to a good meeting. I will be inviting federal and state people to address, discuss, and respond to the pressing issues at hand. The RCCs are expanding in services and will be in attendance to discuss future plans with the SCs.

Wayne Wendland, President
American Association of
State Climatologists

How well does your state do
in providing climate data
to the interested traveler?



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