

UNITED STATES DEPARTMENT OF COMMERCE  
WEATHER BUREAU  
WASHINGTON

July 31, 1957

IN REPLY, PLEASE ADDRESS  
CHIEF, U. S. WEATHER BUREAU  
WASHINGTON 25, D. C.  
AND REFER TO

C-3.1

MEMORANDUM

TO : Area and State Climatologists, Substation Inspectors, Field Aides, WRPCs, River District Offices and Area Engineers (With copies to Regional Offices for information)

FROM : Office of Climatology

SUBJECT: Climatological Services Memorandum No. 61

GENERAL

1. INFORMAL MINUTES OF THE 5TH MEETING OF THE ADVISORY COMMITTEE ON CLIMATOLOGY: The meeting was held on June 20 and 21, 1957 at the Travelers Weather Research Center, Hartford, Connecticut.

A. The following attended the meeting of the Committee:

Members

Dr. T. F. Malone (Chairman)  
Dr. W. A. Baum  
Dr. Phil E. Church  
Dr. A. O. Kuhn

By invitation of NRC

Dr. W. E. Reifsnyder  
Dr. E. W. Hewson

From the U. S. Weather Bureau

Dr. H. E. Landsberg, Washington D. C.  
Mr. James W. Osmun, Regional Administrative Officer, New York  
Mr. James K. McGuire, Area Climatologist, New York  
Mr. Lawrence R. Mahar, MIC, Hartford, Connecticut  
Dr. A. Boyd Pack, State Climatologist, Connecticut-Rhode Island  
Mr. Robert Lautzenheiser, State Climatologist, Northern New England

From the Travelers Weather Research Center

Dr. Don Friedman  
Dr. George Howe  
Mr. Russell Hamon  
Mr. Barlowe

From the University of Connecticut

Dr. Byron Janes

B. During the first session of the Committee Dr. Landsberg briefed the

FILE: 922

MEMO

(Climatological Services Memorandum No. 61)

WASHINGTON, D. C.  
7-31-57

Committee on the recent developments in the Office of Climatology and asked the Committee to view the progress and prospects in the light of the increasingly tight budgetary situation of the Weather Bureau. He mentioned the appointment of Mr. Ken Vestal as Area Climatologist for the South and the current status of the State Climatological Program. He then referred to the increased cooperation with the universities through the card punching program of long record cooperative stations. (This has been summarized in CSM-59. It is an outgrowth of an earlier recommendation of the Committee. It is intended to revise and supplement it from time to time including bibliographical information on technical results based on the punched cards.)

Further reporting concerned the current status of the climatological studies of the fall-out, air pollution, bioclimatology and drought studies. In particular the recent cooperation with the Disaster Committee of the Department of Agriculture and the briefing and background material prepared for this Committee by Mr. Palmer and progress of the studies of Mr. Blanc on soil moisture at the University of Maryland Experimental Tobacco Farm at Upper Marlboro, Maryland was mentioned. Finally, a status report on the development of FOSDIC and MIMIC was given. The Committee again expressed considerable interest in these developments and Dr. Malone expressed a hope that the detailed information on FOSDIC could be made available soon because other groups are experiencing the problem of punch card storage and re-call, if to a lesser degree than NWRC.

In a discussion of some of the items, the Committee suggested that soil temperatures should be measured at all bench-mark stations at a depth of one meter for comparability's sake. This should be done in a standardized soil and also under the natural conditions prevalent at the station. On the soil moisture problem, some of the discussion referred to the use of tritium as a tracer. The possibility of carrying on such a study at the University of Maryland Tobacco Farm was mentioned.

C. Professor Janes briefed the Committee on the agro-climatic station of the University of Connecticut. This is located on the vegetable research farm near Storrs, Connecticut. It is completely equipped for multi-level microclimatic measurements and will serve as a central station. Professor Janes hopes to get equipment for some satellite stations and, in particular, would like to establish one on high grounds in the same area. The punch card project at the University of Connecticut has made good progress and has been helpful in the analysis of irrigation of vegetable crops. In this connection, Dr. Friedman has made estimates of rain-fall for 7-day periods during the growing season, setting up the problem on the IBM 650 computer. He used as an approximation of the rain-fall distribution the incomplete gamma function for an estimate of the scale and shape parameters following the lead of H. C. S. Thom. This has been computed for 6 stations for weekly periods. A Connecticut Agricultural Experimental Station report on this is now in preparation. Dr. Howe used a program developed by Dr. Barger for the IBM 650, reducing the initial stack of 70,000 cards to 140 cards to obtain probabilities and confidence limits. (The ultimate machine time for data covering 30 weeks for 6 stations turned out to be about 25 minutes.) The quality of cards was quite high and showed only a small percent of error. One of the difficulties encountered, however, was missing data. These had to be

estimated. The total preparation time for the final machine run required 6 months. All corrections were sent to NWRC.

In connection with the discussions of the Punch Card Program, the problem of preparing a users manual for the NWRC Punch Card Library was brought up again.

D. The second session of the Committee was devoted to a general discussion of the Marine Climatological Program. Dr. Landsberg briefed the Committee on the status of the Navy Atlas, charts for mariners, hurricane climatology, the study of bench-mark squares for climatological trends over the ocean and the Mariners Weather Log. There was considerable discussion regarding the Mariners Weather Log and in particular, about the make-up and the relative merits of popularization of technical contents. Dr. Church made a number of suggestions for topics which might advantageously be discussed and be of interest to skippers and mates. He made a special plea that more information be gathered and disseminated on the Great Lakes. In particular, he pointed out the amount of information that might be gathered from the regular ferries. He hoped that some analyses of the ice records in the Great Lakes would be published. Some further discussion ensued regarding the advisability of slanting some of the information toward the small craft operators but no firm conclusion was reached.

E. The Committee then discussed the usefulness of the Monthly Weather Stories in the State CD's. There was some opinion that these could be improved if the effects of weather are stressed more than to constitute a recital of the synoptic sequences and descriptions of climatological means and extremes for the month. The general reaction was that the narrative summaries are useful for general orientation and historical research.

In this connection Professor Baum raised the question of an evaluation of publications of the Office of Climatology in general to establish whether they serve maximum utility. He felt that, if possible, a study of the users of the publications by someone outside the Weather Bureau might turn up some useful suggestions.

F. On June 21 the Committee paid a visit to the Weather Bureau micro-meteorological installation at Middletown, Connecticut. This is set up in connection with the new AEC reactor site and collects micrometeorological and climatological data which will be useful in the operation of the plant. Mr. Bowne, MIC, and his staff explained the tower and ground equipment, the records obtained and the analyses prepared so far.

G. After returning to Hartford, the remainder of the Committee's meeting was devoted to a briefing by the staff member of the Travelers Weather Research Center on their activities which were of general interest. Mr. Barlowe described the cooperation with the State Highway Department which operates 8 meteorological stations. All stations maintain wind and temperature records and have a tipping bucket 8" raingage with heating element. Four of the stations are equipped with microbarographs and three with aneroid barometers. The primary purpose of these stations is to help in the forecasting of severe local storms, snow and ice storms and heavy

rainfall conditions. The data are made available operationally by Travelers Research Center to the Weather Bureau Airport Station at Windsor Locks. It was briefly discussed whether it would be possible to get forms 1009s from these stations and have the records ultimately deposited at the National Weather Records Center.

H. Mr. Hamon presented the latest information on his drought studies. His bookkeeping procedure in following the evapotranspiration and rainfall to estimate available soil moisture is based on the Penman equation and using Halstead-Brunt's relations for radiation conditions and a multiple recession for the depletion rate of the water from the soil. He indicated that upon the basis of his study of the past history, drought conditions in Connecticut were particularly pronounced in 1932, 1935, 1915 and 1955 and the current year 1957, at least for the period through the middle of June. A procedure has been developed so that the data for a large number of stations can be quickly calculated.

I. Dr. Miller presented information on the hurricane predictions based on a synoptic climatic approach, selecting from 95 variables the most important, using the sea level pressure data from 1928-1953. Testing on an independent sample indicates that the procedure gives an average error of 150 miles in 24 hours for the position forecasting. In the southern area of the hurricane belt the prediction error has been only 90 miles for 24 hours. In subjective analyses 68% of the positions fell in an area of 57,000 square miles whereas the objective system gave them 68% of the positions in 34,000 square mile area. The prediction equations can be solved in 15 minutes with a desk calculator. All information has been extracted from the climatological data and the objective methods are now down to the "noise level". The method is amenable to yield probability of errors.

J. Dr. Howe presented a review of the synoptic-climatic model using statistical prognosis for data in January 1957. For the surface data it takes approximately two hours to produce a forecast. Judging from the small sample available, both the 500 millibar height and surface pressure forecasts compare favorably with the thermotropic and barotropic prognoses of JNWP, respectively. The method is now being extended by Travelers for long range predictions using, as Dr. Malone calls it, a 4-dimensional climatic statistical model.

A brief discussion ensued about the general acceptance by the public of the forecast couched in probability terms. Dr. Malone indicated that the public response in Connecticut had been overwhelmingly in favor (surveys of this company indicate this to be in the ratio of 35:1). He also indicated that there is need for considerable educational campaign prior to the time such a system is introduced to the public. It requires full cooperation by the communications media, in particular newspapers and radio. He also mentioned in passing, that probability forecasting is now being taught at MIT.

The Committee briefly discussed the advisability of commenting on the funds situation for climatological research, and considered suitable places and dates for a meeting (possibly in November).

## 2. COOPERATION IN THE NATIONAL INVENTORY OF SOIL AND WATER CONSERVATION

NEEDS: Reference: CSM #55, Item 3. From time to time we are asked what our part in the above program should be. The following is taken from a recent letter to a State Climatologist on this subject:

"At this point we have no way of knowing just what climatological information will be required. Your plan to make available to Mr. Woodman information concerning the "a" and "b" networks and the extent of climatological records on punched cards will probably serve as a basis upon which the inventory can be built.

"Other information concerning the length and quality of record for each particular station as well as its representativeness undoubtedly will be necessary.

"Information concerning the preparation of substation summaries might be important and there might be a need for information concerning more specialized summarizations such as the freeze data, etc.

"In general, inquiries concerning the cost of special summaries should be directed to this office. The Standard Substation Summaries are normally prepared through the cooperative efforts of the state climatologists and some other interested agency and the cost is negligible."

3. USE OF W. B. FORMS 1056: These forms were in more or less general use during that period in which the Climatological Data bulletins were printed at the former Section Centers. They are titled "State Maximum and Minimum Temperatures for a Month". At those Section Centers where the printing of the CDs was done in another office the Form 1056 was manually prepared as printer's copy for setting up type for printing the temperature table. The form is 13" x 13" in size, with the days of the month numbered across the top, and with lines for entry of station names along the left side.

Since there has been but little demand for this form we are considering its discontinuance. In the event any State Climatologist has a need for the form please advise the Office of Climatology not later than September 30, 1957, stating approximate annual requirements. If insufficient demand is indicated by the above date the form will be discontinued. Your replies will not be considered as requests for these forms; they will be used for information only.

4. LEGEND ON CROP BULLETIN: To expedite delivery of the local Weekly Weather and Crop Bulletin, the legend, "Immediate - U. S. Weather Report, This report will be treated in all respects as letter mail (See Section 34.17 P. L. & R)", should be carried in the address. This may be done even though mailing is under U. S. Department of Agriculture or other frank than Weather Bureau.

5. STORM LOGS FROM SELS: The Kansas City WRPC receives logs of severe local storms from the SELS unit each week. These are forwarded by the WRPC directly to the appropriate State Climatologist. These reports should be considered in the preparation of Form 614-3 monthly Report of Storm Data

and Unusual Weather Phenomena. Any differences in the SELS log and the State Climatologist's summary should be investigated and the data on form 614-3 should include authenticated reports.

6. COLLECTION OF UNOFFICIAL WEATHER RECORDS: We have been asked if we have developed plans, procedures, standards of quality, etc. that could be used as a guide in collecting unofficial weather records. The following basic principles should be kept in mind in this connection:

A. Any record, if it is to be used intelligently, must be such that it can be documented unquestionably; that is, the data must refer to a precise location, or locations, at a definite time.

B. Although instrumental observations are preferred, other definite information pertaining to important weather events are also quite worthwhile. Records consisting of vague adjectival comments such as warm, cold, comfortable, clear, fair, rainy, etc. are of very little value and in most cases are not worth collecting.

C. As the identity and location of valuable records become known, this information should be catalogued with the aim of eventually collecting them and microfilming them.

At the present time funds are not available for an extensive program of this sort. However, we have done a small amount of this work during the past two years.

7. TORNADOES: The following, taken from a letter to a field station, is carried here for information:

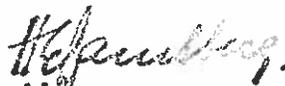
"We are quite sure that you are correct in the assumption that during earlier years many tornadoes were not reported, especially funnels which did not cause damage, because of the lack of interest, poorer communications, etc., not to mention recent subscription to newspaper clipping service.

"The Weather Glossary 1945 in describing a tornado gives as the chief characteristic, 'There hangs a funnel-shaped cloud which marks the vortex and, as the storm moves along, may or may not touch the earth'. In the climatological listing of tornadoes, evidence of the existence of a characteristic funnel has been taken, as far as is known, as positive indications of a tornado. Whether it remained completely aloft, clipped off the tops of trees or high buildings, or touched the ground, causing no damage or heavy damage and loss of life, have been considered as information on that particular tornado. Because of the numerous factors involved, the climatic listings of severe storms include as much of the supporting pertinent information as it is possible to secure, so that research interests and others may process the material in accordance with their needs. Climatic summaries of tornadoes usually give a breakdown of the number of tornado days, the number of tornadoes which remained aloft, and the number which touched the ground separated into those causing no damage and those causing damage and/or loss of life.

"However, beginning with the April 1957, Climatological Data - National Summary storms are being listed in the tabulation of 'Storm Data and Unusual Weather Phenomena' as 'funnel clouds' when the characteristic tornadic funnels do not reach the surface or surface objects, as 'tornadoes' when they reach the land surface or objects on the ground, and as 'waterspouts' when they touch a water surface or objects on the water. This is being done to make the climatic listings agree with the synoptic description which became effective September 1, 1956, as given in the Manual of Surface Observations (WBAN) Circular N, September 1956, Chapter 3 - Atmospheric Phenomena, Paragraph 3100 - Tornadoes, Waterspouts and Funnel Clouds.

"Your reasons for assuming that it is highly improbable that there has been much of an increase in the actual number of tornadoes are quite similar to those used by other offices. For instance, the 1956 summary of tornadoes published in the 1956 Annual Climatological Data, National Summary contains the following statements: 'In dealing with tornado statistics we must realize that it is impractical to make accurate comparisons with previous years, due to improved technique in observations, greater public interest and news dissemination, increased air traffic, and an expanding population. Furthermore, since losses are based on values at the time of occurrence, corresponding adjustments for the change in price index would necessarily have to be made in comparing damages of the present time with those of previous years.'

"As you have explained, our greatest problem is in determining whether the storm or a portion of it was of the tornado type. Much remains to be done in establishing criteria for the classification of storm types."



H. E. Landsberg

Director, Office of Climatology

GUIDE TO CLIMATOLOGICAL SERVICES MEMORANDUM NO. 61

Item No.

Page No.

GENERAL

1. INFORMAL MINUTES OF THE 5TH MEETING OF THE ADVISORY COMMITTEE ON CLIMATOLOGY . . . . .	1
2. COOPERATION IN THE NATIONAL INVENTORY OF SOIL AND WATER CONSERVATION NEEDS . . . . .	5
3. USE OF W. B. FORMS 1056 . . . . .	5
4. LEGEND ON CROP BULLETIN . . . . .	5
5. STORM LOGS FROM SELS . . . . .	5
6. COLLECTION OF UNOFFICIAL WEATHER RECORDS . . . . .	6
7. TORNADOES . . . . .	6