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# THE CLIMATE OF IOWA

## *Introduction*



by *Gerald L. Barger*

**Agronomy Department, Iowa State College**

and

**Weather Bureau, United States Department of Commerce**

**cooperating**

***Special Report No. 7***

**Agricultural Experiment Station—Iowa State College**

**Ames, Iowa—August, 1954**

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## THE CLIMATE OF IOWA

Introduction  
by Gerald L. Barger

Climate is day to day, year to year, weather. Climatology is the study of the variations (and consistencies) in our weather.

The Climate of Iowa is being published in a continuing series of parts, each of which treats a specific weather element or problem in some detail. The weather condition affecting a given activity is defined briefly and the probability of occurrence of this condition (the risk involved) is estimated for several localities in Iowa and for different seasons. When practical, suggestions are offered for improving or utilizing unfavorable weather conditions. Specific applications of climatological techniques at Iowa State are concerned primarily with agricultural problems but, in many cases, application to industrial, engineering or human endeavor is direct and such application is encouraged wherever possible.

When "normal," Iowa's climate is practically ideal for growing corn and many other crops adapted to temperate climates. Under the influence of its characteristically warm, moist summers and cold, dry winters, a prairie soil of unusual fertility has been built up in the state during past centuries.

The Weather Bureau, the Iowa Department of Agriculture and many citizens throughout the state have cooperated in observing and recording weather conditions. One observation has been made daily at most stations, but a few have taken hourly records. The late Charles D. Reed, Iowa Section Director of the U. S. Weather Bureau and head of the Iowa Weather and Crop Reporting Service concurrently for some 28 years, is in large measure responsible for the excellence of Iowa weather records. A brief review of his life's work can be found in the Iowa Yearbook of Agriculture, 1944. Through this same publication, which always contains the annual report of the Iowa Weather and Crop Bureau, a short history of Iowa weather service is available in the 1945 issue. In fig. 1, present stations and their facilities are shown.

The general features of the climate of Iowa have been discussed in Climate and Man, the 1941 Yearbook of the U. S. Department of Agriculture, and in The Midwest Farm Handbook

published by the Iowa State College Press.

Despite the favorable nature of Iowa's climate it is not perfect. Infrequent drouths and floods occur, late and early freezes are distinct possibilities, and other conditions of rainfall, temperatures, wind, humidity, sunshine and cloudiness may affect agriculture adversely. Because of these hazards, a detailed study of climatic data has been undertaken.

Through the Departments of Agronomy and Statistics, Iowa State College began cooperating with the U. S. Weather Bureau in 1944 by transferring weather records from their original handwritten form to punched cards. Once the data are on these cards they can be analyzed rather simply by electrical machines. There are too many observations in the files to allow effective hand tabulation. Many stations have been recording at least temperature, rainfall and general sky and wind conditions since the establishment of the Weather Bureau in 1890, and some observers started long before that when settlement in this state first began. It is largely through the utilization of these machine methods that this Climate of Iowa can be produced. Many parts which will be published under this general title are a direct product of the cooperation in climatological research outlined above.

Information available through U. S. Weather Bureau

The following services are available from the Weather Bureau, most of them through the Iowa Section Center in Des Moines:

Current--

24-36 hour forecast, including 3 day agricultural outlook, daily.

5 day forecast, every Tuesday and Friday morning.

30 day outlook, about the 1st and 15th of each month. An experimental attempt to predict general temperature and precipitation departures from normal over areas as large as one or more states. Not a specific local forecast.



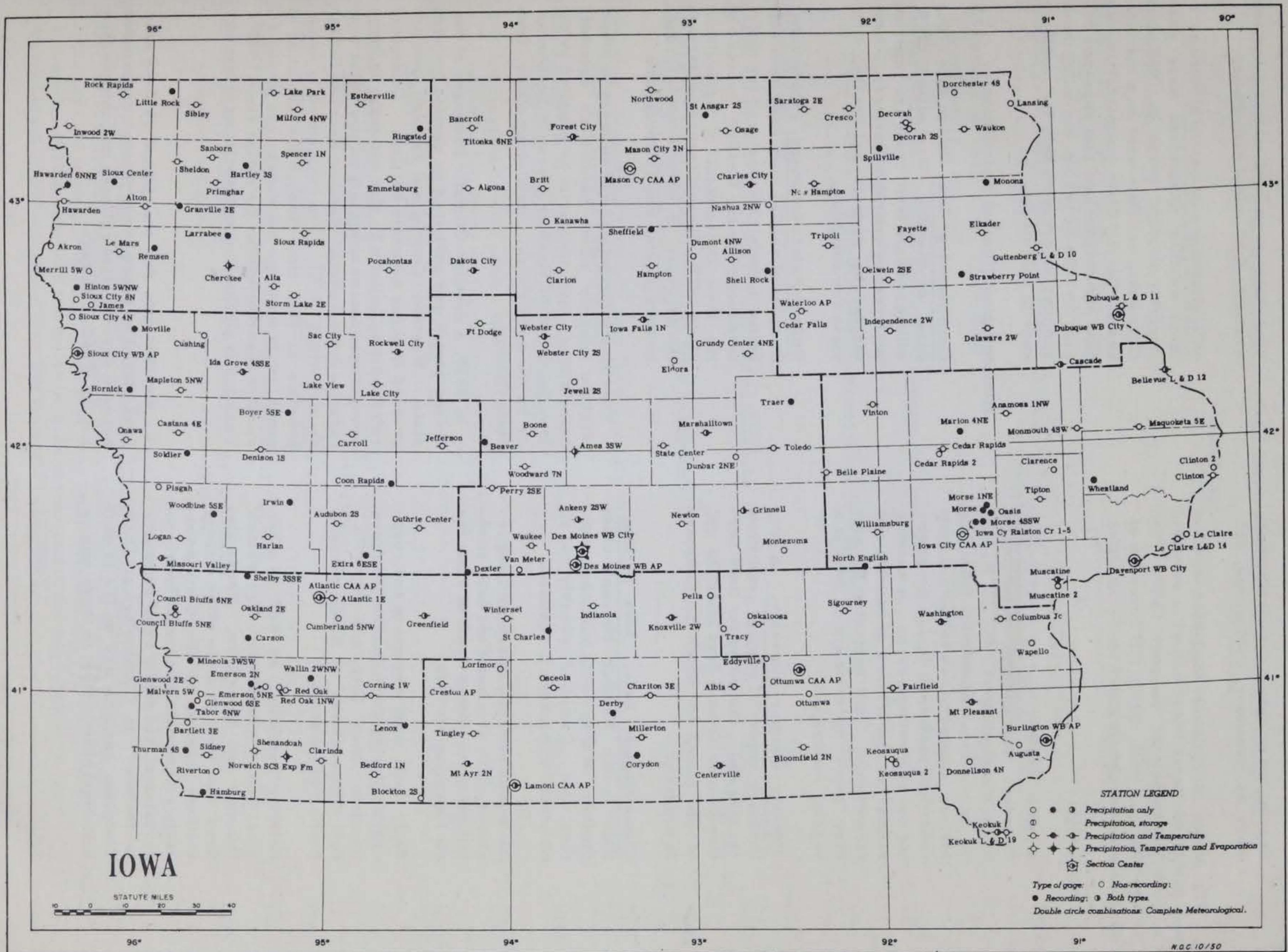


Fig. 1. Iowa weather stations.



Special warnings of severe weather, such as tornadoes, cold waves, etc.

The above information (and also the first two published items listed below) is available in your newspaper or on your radio. The college station, WOI, gives full coverage on weather news through its AM-FM-TV facilities.

Published--

Weekly weather and crop bulletin, Tuesday. This bulletin, issued jointly by the Weather Bureau and the Bureau of Agricultural Economics from Des Moines, summarizes weather and crop conditions each week during the growing and harvesting season. A running record of departures of rainfall and temperature from normal in the nine crop reporting districts in Iowa is a regular feature.

Monthly weather summary. A preliminary report of weather conditions over the state, issued by the Iowa Section Center about 5 days after the end of the month for which the summary is prepared.

Climatological Data, Iowa Section. This is the Weather Bureau's chief medium of dispensing published weather data. Compiled monthly and as an annual summary, it contains:

Daily maximum and minimum temperatures, daily precipitation, daily snowfall and accumulated depth of snow for all reporting stations.

Daily total wind movement and evaporation (during warm months) for Ames, Castana, Iowa City and Norwich. Soil temperatures at Ames, Council Bluffs and Saratoga.

Relative humidity, as well as other usual data, for Burlington, Des Moines, Dubuque and Sioux City. These stations (as well as a few other airport stations manned by the Civil Aeronautics Administration) make hourly observations, but only a brief summary is included in Climatological Data. Complete records are on file in each individual office. Most of these offices

also have a printed station summary available for limited distribution.

Miscellaneous summaries of more pertinent weather phenomena were particularly plentiful prior to 1948 when Climatological Data went on a machine basis. Table 1 lists the miscellaneous data and discussions that appeared during the 1928-48 period, excluding those summaries covering only the month or year of publication.

Mimeographed (limited distribution)--

Corn phenology data, 1921 to date. The dates of planting, first silked, 75% silked and safe from frost are reported each year by individual farmers. Summaries by district and for the entire state are compiled.

Corn moisture summary, 1928 to date. Samples of shelled corn have been collected in the fall and analyzed for moisture content by the Weather Bureau and the Iowa Department of Agriculture since 1928. These measurements trace the decrease in water content through to corn picking and cribbing time.

The above information, and answers to other weather question which involve no detailed calculations, can ordinarily be supplied by the Iowa Section of the Weather Bureau in Des Moines or by the Agricultural Climatology office, Iowa State College.

In 1930, a detailed Climatic Summary of the United States was published by section for each state. Western, Central and Eastern Iowa are covered in three separate sections. Commonly referred to as Bulletin W, this summary is being brought up to date as a supplement now under preparation in the National Weather Records Center at Asheville, N.C.. The supplement is made possible at this time through the tabulation of punch cards on which the Bureau has placed all weather observations for the nation since 1948<sup>1</sup>. Practically all checking and tabulating of weather

1. Weather data for the period 1930-48 have been placed on punch cards through cooperation between several state colleges and universities and the Weather Bureau.



TABLE I WEATHER SUMMARIES PUBLISHED IN IOWA CLIMATOLOGICAL DATA

1928-1948<sup>1</sup>

Title of summary: <sup>2</sup>	Date published	
Hail damage (dollars) 1947, by counties (assessor's figures)	July	1948
Greatest yearly hail damage (dollars) of record, by counties (assessor's figures) 1923-47	July	1948
Hail damage (dollars) 1946, by counties (assessor's figures)	July	1947
Greatest yearly hail damage (dollars) of record, by counties 1924-46	July	1947
Comparison of some of highest floods of record along Des Moines and Raccoon Rivers	July	1947
Floods of June, 1947	July	1947
Normal annual precipitation (inches) shaded Iowa map	Annual	1947 (also 1946-45-44)
Normal crop season rainfall (inches) April to September, inclusive, shaded Iowa map	Annual	1947 (also 1946-45-44)
Usual length of growing season in days (based on long-time average) isopleths on Iowa map	Annual	1947
Usual spring freeze date with probabilities on other dates. (Based on long-time average) isopleths on Iowa map	Annual	1947
Usual fall freeze date with probabilities on other dates. (Based on long-time average) isopleths on Iowa map	Annual	1947
Hail damage (dollars) 1945, by counties (assessor's figures)	August	1946
Greatest yearly hail damage (dollars) of record, by counties (assessor's figures) 1923-45	August	1946
Preparation of normals, by C. D. Reed, a 2-page article	January	1945
Hail damage (dollars) 1944, by counties (assessor's figures)	July	1945
Greatest yearly hail damage (dollars) of record, by counties, (assessor's figures) 1923-44	July	1945

1. U. S. Weather Bureau and Weather Division, Iowa Department of Agriculture, Des Moines, Iowa, cooperating. Some issues not available for general distribution.
2. Including only those published in a month or year other than that of their occurrence. Summaries dealing only with the month or year of publication are not listed here, but may be found in Climatological Data for the period concerned.



Title of summary :	Date published:	
Rank of principal floods of record on the Des Moines River gage readings corrected to gages in use in May, 1944	May	1944
Rank of principal floods of record on the Raccoon and Boone Rivers	June	1944
Hail damage (dollars) 1943	June	1944
Average hail damage, 20 years, 1923-42 (dollars)	June	1944
Plymouth County, average hail damage, 20 years, 1923-42 (dollars)	June	1944
Sioux County, average hail damage, 20 years, 1923-42 (dollars)	June	1944
Sioux County, total hail damage, 1929 had greatest damage in any county in Iowa in a single year during 21-year period	June	1944
Boone County, total hail damage, 1943 Colfax township had greatest township damage in Iowa in 21 years	June	1944
Temperature normals-prepared under direction of C. D. Reed (1899-1943) and precipitation normals Included isopleth Iowa maps on normal annual temperature; normal crop season temperature, April to September inclusive; normal annual precipitation; normal crop season rainfall, April to September inclusive; January normal temperature; July normal temperature; January normal precipitation; June normal precipitation.	Annual	1944
Twenty years of hail damage in Iowa, 1923-42 for state, counties, and townships 6 1/2-page table	July	1943
Summary of air and soil temperatures at Ames, Iowa, 6 years, 1938-43	Annual	1943
Lake Park, Iowa tornado in pictures and some notes on causes of destructive local storms in Iowa - by S. E. Decker	June	1942
Iowa map showing lowest temperatures of record for September	Sept.	1942
Two Iowa maps showing areas, durations and time of occurrence of drouths of three magnitudes in 1942	Annual (also 1939-40-41)	1942
Iowa map showing greatest October total rainfall of record at all active stations. Rainfall for October 1941 broke many records	Oct.	1941
Iowa map showing combined rainfall of September and October 1941, at all stations	Oct.	1941
Iowa map showing total rainfall of April to September 1941, inclusive	Oct.	1941
Description of storm of November 11, 1940	Nov.	1940
Discussion and maps on Iowa frost; maps and charts include: Ave. date of last killing frost in spring, 1899-1938 Ave. date of first killing frost in autumn, 1899-1938 Ave. length of growing season, 1899-1938 June temperatures indicate corn maturity, 1890-1940 Percent of corn matured without frost damage, Ave. 18 years 1923-40	Annual	1940



Title of summary	Date published	
Iowa average rainfall in seasonal and monthly combinations listed separately for years 1873-1940 and also an overall average.	Annual	1940
Hail damage in Iowa (by years 1923-38; also average)	June	1939
Hail damage (dollars) 1938- average hail damage (dollars) 16 years, 1923-38	June	1939
Normal temperature and precipitation--charts and tables showing long time average. Similar to summary published in 1944 annual	Nov.	1939
Iowa frosts (similar in type of content to that given in 1940 annual	Annual	1937
Coldest periods of record in Iowa, 4 pages of discussion, tables and charts.	Feb.	1936
Iowa winter precipitation by drainage basins for Dec.-Feb. in 1880-81, 1928-29, 1935-36	March March	1936 1936
Hottest periods of record in Iowa; 4 pages of discussion, tables and charts	July	1936
The summer of 1936 - hottest of 64 summers of record	Aug.	1936
Drouths of 1936 and 1934 compared.	Sept. and Oct.	1936
Drouths at Des Moines compared	Annual	1936
Maximum precipitation in short periods of time (all years through 1935)	Annual	1936
Normal temperature and precipitation, based on records ending with 1930	Jan.	1932
Average date of last killing frost in spring, based on records to the close of 1931	April	1932
Average date of first killing frost in autumn, based on records to the close of 1930	Oct.	1932
Winters at Keokuk	Dec.	1928

information is now done by machines in three Weather Records Processing Centers.

But the Weather Bureau has few punch card data for the years prior to 1948. Through cooperative agreements with various state agencies, such as Iowa State College entered into in the very beginning of the program, this backlog of information has been "mechanized" in several states, particularly in the Midwest. Each state is supplying the Bureau with duplicates of all cards punched and these duplicates are now going into the Bulletin W supplement, which

will eventually be available for Iowa through the Des Moines office of the Weather Bureau.

The Bureau also plans to prepare a National Climatic Atlas, similar in some respects to the Climate of Iowa, when funds become available

The parts which follow treat some of the climatic problems affecting large numbers of people in Iowa. Questions of more specific interest to smaller groups of people will be included as they are completed.



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