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LUTHER H. HODGES, Secretary
WEATHER BUREAU
F. W. REICHELDERFER, Chief

CLIMATOGRAPHY OF THE UNITED STATES NO. 81-11

DECENNIAL CENSUS OF UNITED STATES CLIMATE—

MONTHLY NORMALS OF TEMPERATURE, PRECIPITATION, AND HEATING DEGREE DAYS

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PREFACE

The climatological standard normals presented in this publication are based on records for the 30-year period 1931-1960 inclusive. For the first time, normals have been computed for substations and divisions using a base period identical to that used for first-order stations.

Previous normals were published in Weather Bureau Technical Paper No. 31, "Monthly Normal Temperatures, Precipitation, and Degree Days," and were based on records for the period 1921-1950. Earlier sets of normals are described in [1].

This is the first series of publications resulting from the project "The Decennial Census of United States Climate, 1960." The project is a continuation of earlier censuses of the climate of the United States that date back to the early 19th Century and are described in [2]. Future publications of this project will be listings of daily normals of temperature, and degree days; summaries of hourly observations; and listings of monthly divisional averages of temperature and precipitation.

Units used in this publication are degrees F. for temperatures, and inches for precipitation. The heating degree day normals are derived from the monthly normal temperatures, and are computed on the standard base of 65°F. Monthly normals of less than 5 degree days are shown as zero.

Standard Normals for Weather Bureau First Order Stations

A normal of a climatological element is an arithmetic mean for a specific period of record which estimates the true mean of the element at the current exposure of the meteorological instrument measuring the element. The true mean is the mean of all possible observations (population) at the current exposure. It is from this population that future observations will come, not from values in the past record. This is what makes it important to obtain an estimate of this mean. The true mean can never be known exactly but must be estimated from a sample of the past record ([3] p. 53 section 4. 3). The normals presented here are estimates of the true mean obtained from the 30-year sample record 1931-1960. They are called standard normals because they conform to the World Meteorological Organization standard for climatological normals.

If no exposure changes have occurred at a station the normal is estimated by simply averaging the 30 values from the 1931-1960 record. Since it is next to impossible to maintain a multiple purpose network of meteorological stations without having exposure changes, it is first necessary to find and evaluate these changes and then make adjustments for them if necessary.

Heterogeneities in record due to exposure changes are found in two ways: by determining them from the station histories and by use of statistical tests. The statistical test when standardized for the purpose is easy to apply and will often find heterogeneities which are not defined by the station histories as well as those which have been so determined. Two statistical tests were employed: one for temperature and the other for precipitation. These are described in [4].

After the periods of heterogeneity have been determined, adjustments are applied to remove the heterogeneities introduced into the mean. This is done by comparing the record at the base station, for which the normal is desired, to the record at a supplementary station with a homogeneous period which covers the heterogeneous period at the base station. The difference method is applied to the monthly average maximum and minimum temperatures and the ratio method to the monthly total precipitation. A weighted average of the various partial means of the adjusted and unadjusted record is then prepared to give the normal. Brief discussions of the methods of adjustment are found in [3] (p. 49, section 4. 24).

Normal heating degree days are derived by the method described in [5].

Normals for Substations and Divisions

Normals for substations were computed somewhat differently than those for first-order stations. Monthly substation normals are the simple arithmetic averages of the monthly values of temperature and precipitation for the period 1931-1960. These were computed for only those substations that were active during the entire period and no attempt was made to adjust for minor changes in location of the observing site, or for changes in the time of observation. Normals were not computed for substations that were moved a significant distance during the 1931-1960 period. Missing values in the data series were estimated by methods described in [6]. Substations whose locations were essentially unchanged during the 1931-1960 period are identified in the tables.

Monthly divisional normals are the means of the monthly divisional averages of temperature and precipitation for the period 1931-1960. In calculating the monthly divisional averages, all of the stations in the division that furnished both temperature and precipitation data during the particular month were used. The averages therefore were obtained from a variable station sample. As a result, the divisional normals often differ from the averages of the normals for stations in the division.

Annual substation and divisional normals are the averages of the 12 monthly temperature normals and the sums of the 12 monthly precipitation normals.

References

1. U. S. Weather Bureau, "History of Climatological Publications," Key to Meteorological Records Documentation No. 4. 1, Washington, D. C., 1958.

2. H. E. Landsberg, "The Decennial United States Census of Climate 1960 and Its Antecedents," Key to Meteorological Records Documentation No. 6. 2, U. S. Weather Bureau, Washington, D. C., 1960.

3. U. S. Weather Bureau, Climatology at Work, Gerald L. Barger, ed., Washington, D. C., 1960.

4. H. C. S. Thom, "Tests of Significance for Temperature and Precipitation Normals," U. S. Weather Bureau Manuscript, 1961.

5. H. C. S. Thom, "The Rational Relationship Between Heating Degree Days and Temperature," Monthly Weather Review, Vol. 82, No. 1, January 1954.

6. U. S. Weather Bureau, Administrative Manual, Vol. III, Chap. C-05, paras. C-0509 and C-0510.

NOTES

1. Station Names

In Table I, "AP" after the city name indicates "airport station" "CO" indicates "city office station." Figures and letters following the station name indicate a rural location, and refer to the distance and direction of the station from the nearest post office.

\# indicates a station whose location has been essentially unchanged during the period 1931-1960.

H indicates the ground elevation of the station in feet above sea level, as of December 31, 1960.

G indicates the elevation at hygrothermometer site (where different from "H").

T indicates the height of the thermometer in feet above the ground as of December 31, 1960.

/NO TEST/ indicates that significant difference tests were not made.

2. Table Content

* indicates that the departure of the 1951-60 record from the 1921-50 normal is statistically significant, but through the adjustments for changes in location and exposure the absolute difference between old and new normals may even in these cases be very small.

T in the data tables indicates a monthly precipitation amount of only a trace.

February monthly normals are for a 28-day month.

TABLE I - NORMALS FOR FIRST ORDER STATIONS

STATION		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	ANNUAL
BURLINGTON AP H 694 T 5														
	MAX TEMP	32.7	36.5	46.9	61.4	72.5	82.7	87.6*	85.2	77.3	66.6	48.8	36.5	61.2
	MIN TEMP	16.1	19.1	27.6	40.2	51.1	61.5	65.6	63.9	54.6*	44.1	29.9	20.3	41.2
	AVG TEMP	24.4	27.8	37.3	50.8	61.8	72.1	76.6*	74.6	66.0*	55.4	39.4	28.4	51.2
	DEG DAYS	1259	1042	859	426	177	33	0	0	93*	322	768	1135	6114
	PRECIP	1.64	1.39	2.71	3.44	4.03	5.01	3.40	3.61	3.19*	2.70	1.88*	1.60	34.60
DES MOINES AP H 948 T 4														
	MAX TEMP	30.1	33.9	44.1*	60.6	72.8	82.6*	88.3	85.4	77.6	66.4	47.5	34.9	60.4
	MIN TEMP	12.5	15.9	25.8	39.1	50.7	61.2	65.6	63.6	54.1*	43.0	28.3*	18.1	39.8
	AVG TEMP	21.3	24.9	35.0*	49.9	61.8	71.9*	77.0	74.5	65.9*	54.7	37.9*	26.5	50.1
	DEG DAYS	1355	1123	930*	453	189	36*	0	6	96*	347	813*	1194	6542
	PRECIP	1.30	1.10	2.09	2.53	4.07	4.71	3.06	3.67	2.88*	2.06	1.76	1.14	30.37
DUBUQUE AP H1065 T 5														
	MAX TEMP	27.3	30.2	40.6	57.1	68.7	78.3	83.7	81.3	72.7	61.4	43.2	31.0	56.3
	MIN TEMP	11.1	13.8	23.2*	36.4	47.4	57.4	61.5*	59.6	50.7*	40.0	26.3*	16.0	37.0
	AVG TEMP	19.2	22.0	31.9*	46.8	58.1	67.9	72.6*	70.5	61.7*	50.7	34.8*	23.5	46.6
	DEG DAYS	1420	1204	1026*	546	260	78	12*	31	156*	450	906*	1287	7376
	PRECIP	1.83	1.40	2.76	3.08*	4.22*	4.21*	3.51	3.73	3.74*	2.74*	2.59	1.90*	35.71
SIOUX CITY AP H1094 T 5														
	MAX TEMP	28.9	32.7	43.5*	60.9	72.9	82.5	88.5	85.9	77.2	65.9	46.7	34.5	60.0
	MIN TEMP	8.5	12.6	23.7	36.8	48.8	59.3	64.2	62.2	51.8	40.1	24.5	14.4	37.2
	AVG TEMP	18.7	22.7	33.6*	48.9	60.9	70.9	76.4	74.1	64.5	53.0	35.6	24.5	48.7
	DEG DAYS	1435	1184	973*	483	220	48	0	12	123	394	882	1256	7010
	PRECIP	.78	.89*	1.46*	2.25	3.23	4.33	3.11	2.66	2.74*	1.42	1.16	.74	24.77
WATERLOO AP H 867 T 5														
	MAX TEMP	27.8	31.4	42.0*	59.4	72.2	81.6	86.7	84.5	76.3	64.8	45.3	31.9	58.7
	MIN TEMP	8.9	12.3	22.9	36.2	47.5	57.6	61.8	59.9	50.4	39.5	25.1*	14.4	36.4
	AVG TEMP	18.4	21.9	32.5*	47.8	59.9	69.6	74.3	72.2	63.4	52.2	35.2*	23.2	47.6
	DEG DAYS	1445	1207	1008*	516	229	57	12	19	129	412	894*	1296	7224
	PRECIP	1.15*	.92	2.05	2.70*	3.74	4.83	3.79	3.42	3.80*	2.12	1.83	1.13	31.48

TABLE II - NORMALS BY CLIMATOLOGICAL DIVISIONS

STATIONS (By Divisions)	TEMPERATURE (°F) JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	ANNUAL	PRECIPITATION (In.) JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	ANNUAL
NORTHWEST DIVISION																										
AKRON	•	•	•	•	•	•	•	•	•	•	•	•	•	.60	.81	1.32	2.28	3.56	4.75	3.19	3.41	2.79	1.29	1.06	.67	25.73
ALTON	•	•	•	•	•	•	•	•	•	•	•	•	•	.71	.90	1.45	2.26	3.38	4.60	3.22	3.91	2.62	1.50	1.06	.78	26.39
CHEROKEE 3 N	17.9	21.6	32.4	47.7	59.6	69.1	74.3	72.5	63.5	52.4	35.1	23.7	47.5	.63	.89	1.47	2.31	4.20	4.76	3.88	3.61	2.81	1.72	1.15	.75	28.18
ESTHERVILLE	16.3	20.1	30.7	46.7	59.2	69.0	74.1	71.9	62.8	51.3	33.7	21.9	46.5	.81	.91	1.64	2.31	3.91	5.11	3.22	3.90	2.97	1.53	1.49	.89	28.69
HAWARDEN	•	•	•	•	•	•	•	•	•	•	•	•	•	.55	.89	1.38	2.34	3.28	4.44	3.15	3.33	2.73	1.25	1.10	.75	25.19
INWOOD 2 W	16.3	20.0	31.1	47.0	59.3	68.8	74.5	72.5	63.2	51.4	33.7	22.2	46.7	.52	.90	1.47	2.29	3.22	4.27	2.85	3.52	2.65	1.30	1.02	.73	24.74
LAKE PARK	15.7	19.3	29.9	45.8	58.4	67.9	73.2	71.2	62.2	51.0	33.3	21.4	45.8	.58	.79	1.50	1.93	3.55	4.79	3.68	3.50	2.91	1.54	1.14	.67	26.58
LE MARS 2 N	18.8	22.9	33.6	48.9	60.7	70.4	75.7	73.7	64.5	52.9	35.6	24.7	48.5	.73	.94	1.58	2.41	3.88	4.39	3.25	3.31	2.99	1.52	1.11	.81	26.92
POCAHONTAS	17.9	21.9	32.6	48.0	60.1	69.6	74.5	72.3	63.6	52.4	34.9	23.4	47.6	.80	.94	1.67	2.58	4.13	5.03	3.55	3.46	2.78	1.64	1.45	.87	28.90
ROCK RAPIDS	16.3	20.2	31.3	46.9	59.4	68.8	74.3	72.4	62.7	50.9	33.5	22.0	46.6	.52	.86	1.45	2.28	3.91	4.67	3.19	3.69	2.98	1.31	1.04	.69	26.59
#SANBORN	16.0	19.9	30.5	46.6	58.8	68.3	73.5	71.3	62.0	50.7	33.3	21.7	46.1	.77	1.01	1.77	2.37	3.84	4.73	3.67	3.81	2.98	1.66	1.20	.99	28.80
#SHELDON	16.2	20.1	31.0	46.7	58.9	68.4	73.5	71.6	62.5	51.0	33.5	21.9	46.3	.65	.88	1.53	2.14	3.81	4.80	3.28	3.62	2.81	1.47	1.13	.82	26.94
SPENCER 1 N	16.1	19.8	30.9	46.6	58.8	68.7	73.7	71.7	62.4	51.0	33.3	21.5	46.2	.75	.88	1.55	2.21	3.89	5.01	3.30	3.67	2.91	1.63	1.32	.82	27.94
STORM LAKE 2 E	17.5	21.2	31.6	47.3	59.4	69.1	74.3	72.2	63.6	52.3	34.8	23.2	47.2	.74	1.03	1.63	2.26	3.99	4.47	3.73	3.40	2.84	1.68	1.33	.79	27.89
DIVISION	16.9	20.7	31.5	47.3	59.2	68.9	74.1	72.3	63.1	51.8	34.2	22.6	46.9	.66	.93	1.56	2.30	3.81	4.78	3.42	3.58	2.84	1.55	1.19	.79	27.41
NORTH CENTRAL DIVISION																										
ALGONA 3 W	17.4	21.1	31.9	47.6	59.8	69.3	74.1	71.9	63.4	52.4	34.9	22.8	47.2	.87	.93	1.74	2.25	3.83	4.84	3.31	4.01	2.93	1.59	1.52	1.00	28.82
ALLISON	18.2	21.8	32.4	47.8	59.9	69.8	74.6	72.4	63.8	52.7	35.4	23.2	47.7	1.12	1.05	2.21	2.51	4.01	5.17	3.89	4.04	3.59	1.99	1.91	1.23	32.72
BRITT	16.8	20.5	31.3	47.3	59.6	69.5	74.2	72.1	63.2	51.9	34.3	22.1	46.9	1.05	1.00	2.05	2.23	4.11	5.06	3.42	3.86	3.21	1.78	1.62	1.09	30.48
CHARLES CITY	17.3	20.8	31.6	47.3	59.3	69.0	73.7	71.6	62.6	51.6	34.7	22.5	46.8	1.19	1.06	2.21	2.70	4.00	4.51	3.49	3.94	3.37	1.93	1.88	1.19	31.47
FOREST CITY	16.2	20.0	30.6	46.7	59.0	68.5	73.4	71.3	62.6	51.4	33.7	21.7	46.3	•	•	•	•	•	•	•	•	•	•	•	•	•
HAMPTON 3 NE	17.7	21.3	31.9	47.4	59.6	69.2	73.9	71.8	63.1	52.0	35.0	22.8	47.1	1.10	1.01	1.98	2.69	4.29	4.81	3.52	3.85	3.46	2.13	1.80	.98	31.62
HUMBOLDT NO 2	18.0	21.8	32.4	47.9	59.9	69.6	74.4	72.3	63.7	52.4	35.2	23.5	47.6	.85	.90	1.79	2.44	4.19	5.03	3.47	3.44	2.93	1.59	1.60	.88	29.11
#MASON CITY 3 N	16.3	19.8	30.4	46.2	58.4	68.3	73.0	71.0	62.0	50.9	33.8	21.7	46.0	.88	.86	1.70	2.40	3.81	5.17	3.55	4.08	3.20	1.89	1.56	.89	29.99
NORTHWOOD	15.8	19.2	30.0	45.9	58.3	67.8	72.6	70.6	61.8	50.9	33.5	21.1	45.6	1.09	.94	2.13	2.47	4.18	5.24	3.52	4.26	3.35	1.85	1.72	1.14	31.89
OSAGE	16.7	20.1	30.7	46.5	58.6	68.1	72.9	70.9	62.1	51.2	34.1	21.8	46.1	1.06	.90	1.92	2.29	4.00	4.76	3.52	3.96	3.19	2.01	1.77	1.02	30.40
DIVISION	16.9	20.6	31.2	47.0	59.1	68.7	73.5	71.5	62.6	51.7	34.3	22.2	46.6	1.00	.96	1.94	2.46	4.00	5.01	3.50	3.87	3.16	1.84	1.63	1.00	30.37
NORTHEAST DIVISION																										
#CEDAR FALLS	•	•	•	•	•	•	•	•	•	•	•	•	•	1.26	1.00	2.20	2.92	3.93	4.96	4.00	3.56	3.88	2.39	1.98	1.26	33.34
DELAWARE 3 WSW	18.5	21.8	32.1	47.3	58.9	68.7	73.1	71.3	63.0	51.9	35.2	23.3	47.1	1.20	.90	2.20	2.94	4.10	5.26	3.69	3.55	3.77	2.15	1.98	1.30	33.04
DUBUQUE AP	19.2	22.0	31.9	46.8	58.1	67.9	72.6	70.5	61.7	50.7	34.8	23.5	46.6	1.83	1.40	2.76	3.08	4.22	4.21	3.51	3.73	3.74	2.74	2.59	1.90	35.71
FAYETTE	18.2	21.3	31.7	47.0	58.8	68.4	72.9	70.8	62.0	50.9	34.6	22.5	46.6	1.18	1.05	2.38	2.67	3.84	4.93	3.59	3.74	3.36	2.26	1.97	1.22	32.19
INDEPENDENCE 2 SW	19.3	22.6	32.9	48.0	59.4	69.1	73.7	71.7	63.4	52.3	35.9	24.1	47.7	1.15	.99	1.95	2.58	3.92	5.26	3.43	3.67	4.16	2.17	1.89	1.28	32.45
#LANSING	•	•	•	•	•	•	•	•	•	•	•	•	•	1.26	1.11	2.40	2.85	3.90	4.71	4.06	4.12	3.40	1.93	2.15	1.24	33.13
NEW HAMPTON 1 E	16.8	20.0	30.5	46.2	58.3	67.9	72.7	70.7	61.9	50.9	33.9	21.4	45.9	1.06	.92	2.01	2.43	4.14	4.61	3.66	3.86	3.64	2.09	1.85	.99	31.26
OELWEIN 2 SE	18.7	21.7	32.2	47.4	59.2	69.1	73.8	71.9	63.3	52.1	35.4	23.4	47.4	•	•	•	•	•	•	•	•	•	•	•	•	•
WATERLOO AP	18.4	21.9	32.5	47.8	59.9	69.6	74.3	72.2	63.4	52.2	35.2	23.2	47.6	1.15	.92	2.05	2.70	3.74	4.83	3.79	3.42	3.80	2.12	1.83	1.13	31.48
DIVISION	18.2	21.8	31.9	47.2	58.9	68.5	73.2	71.4	62.6	51.9	35.2	23.1	47.0	1.15	1.01	2.14	2.87	3.92	4.93	3.80	3.80	3.25	2.15	1.79	1.17	31.98
WEST CENTRAL DIVISION																										
AUDUBON	20.1	23.9	34.1	49.1	60.5	70.3	75.6	73.5	64.7	53.7	36.4	25.6	49.0	1.13	1.07	1.90	2.59	3.77	4.82	3.96	4.72	3.06	1.85	1.59	.89	31.35
CARROLL 2 SSW	19.9	23.4	33.8	49.0	60.6	70.2	75.4	73.1	64.5	53.4	36.2	25.5	48.8	.98	1.08	1.79	2.43	3.68	5.08	3.34	3.62	2.80	1.59	1.53	.89	28.81
DENISON 1 S	19.8	23.5	33.9	48.7	60.3	70.0	75.2	73.1	64.4	53.4	36.2	25.5	48.7	.82	.86	1.43	2.33	3.83	5.12	3.53	3.50	2.85	1.81	1.28	.62	27.98
GUTHRIE CENTER	21.6	25.3	35.3	50.2	61.5	71.2	76.2	74.0	65.4	54.4	37.8	26.9	50.0	1.04	.98	1.90	2.28	3.82	4.68	3.60	4.35	3.09	2.02	1.70	.95	30.41
HARLAN	21.2	25.3	35.7	50.3	61.6	71.2	76.2	74.2	65.6	54.3	37.4	26.8	50.0	.93	.95	1.67	2.63	3.68	4.64	3.40	4.08	3.07	1.72	1.43	.75	28.95
JEFFERSON	20.5	24.3	34.6	49.5	60.9	70.4	75.0	72.8	64.4	53.5	37.0	26.0	49.1	1.17	1.03	1.97	2.56	4.08	4.81	3.90	4.00	3.01	1.80	1.58	.96	30.87
LOGAN	21.2	25.5	36.1	50.8	62.0	71.5	76.5	74.6	66.0	54.8	37.5	27.0	50.3	.92	.88	1.67	2.62	3.71	4.68	3.59	3.78	2.65	1.82	1.35	.79	28.46
ONAWA	20.7	24.6	35.4	50.5	62.0	71.6	76.5	74.4	65.6	54.6	37.3	26.6	50.0	.88	1.05	1.68	2.61	3.79	4.80	3.47	3.34	2.59	1.68	1.23	.73	27.85
ROCKWELL CITY	18.8	22.8	33.3	48.5	60.6	70.2	75.0	72.9	64.3	53.0	35.7	24.4	48.3	1.05	1.04	1.93	2.49	3.81	5.10	3.40	3.76	2.83	1.66	1.62	.97	29.66
SAC CITY	19.2	23.2	33.8	48.9	61.0	70.7	75.8	73.7	65.2	53.7	36.1	24.9	48.9	•	•	•	•	•	•	•	•	•	•	•	•	•
SIOUX CITY AP	18.7	22.7	33.6	48.9	60.9	70.9	76.4	74.1	64.5	53.0	35.6	24.5	48.7	.78	.89	1.46	2.25	3.23	4.33	3.11	2.66	2.74	1.42	1.16	.74	24.77
DIVISION	20.1	24.3	34.3	49.5	60.9	70.6	75.6	73.6	65.0	53.9	36.7	25.8	49.2	.93	1.02	1.77	2.57	3.84	4.87	3.56	3.80	2.72	1.74	1.38	.80	29.00

TABLE II - NORMALS BY CLIMATOLOGICAL DIVISIONS

STATIONS (By Divisions)	TEMPERATURE (°F) JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	ANNUAL	PRECIPITATION (In.) JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	ANNUAL
CENTRAL DIVISION																										
AMES 3 SW	20.0	23.9	34.2	49.1	60.5	70.2	74.8	72.7	64.3	53.3	36.7	25.1	48.7	1.08	.98	1.88	2.59	4.28	5.21	3.31	3.85	3.30	2.00	1.62	1.02	31.12
BOONE	20.7	24.5	34.7	49.7	61.3	71.0	76.0	73.7	65.2	54.1	37.1	25.8	49.5	1.23	1.02	2.06	2.64	4.31	5.28	3.88	3.91	3.26	2.05	1.69	1.11	32.44
DES MOINES AP	21.3	24.9	35.0	49.9	61.8	71.9	77.0	74.5	65.9	54.7	37.9	26.5	50.1	1.30	1.10	2.09	2.53	4.07	4.71	3.06	3.67	2.88	2.06	1.76	1.14	30.37
DES MOINES WB CITY	22.6	26.2	36.2	50.8	62.7	72.4	77.4	75.1	66.5	55.2	38.8	27.6	51.0	1.25	1.11	2.23	2.48	4.03	4.87	3.05	3.88	3.05	2.27	1.72	1.12	31.06
FORT DODGE	18.7	22.5	33.0	48.3	60.1	69.9	74.7	72.5	63.9	52.8	35.7	24.1	48.0	1.08	1.03	1.88	2.52	3.82	5.07	3.52	3.69	3.20	1.68	1.75	.99	30.23
GRINNELL	21.2	24.8	35.0	49.6	61.1	70.8	75.8	73.7	65.2	54.0	37.2	25.9	49.5	1.35	1.05	2.15	2.71	4.40	4.98	3.56	3.53	3.62	2.26	2.17	1.35	33.13
GRUNDY CENTER 4 NE	19.0	22.4	33.0	48.0	59.6	69.2	73.9	71.8	63.5	52.6	35.6	23.7	47.7	1.25	.95	2.10	2.62	4.00	5.10	3.65	3.45	3.59	2.15	1.90	1.09	31.85
IOWA FALLS	18.3	22.0	32.7	48.0	59.6	69.1	73.7	71.7	63.2	52.3	35.3	23.3	47.4	1.14	1.04	2.20	2.44	4.07	4.78	3.56	3.81	3.71	1.90	1.95	1.10	31.70
MARSHALLTOWN	20.3	23.9	34.4	49.1	60.7	70.6	75.2	73.0	64.3	53.2	36.6	25.1	48.9	1.27	1.08	2.22	2.83	4.62	4.89	3.42	3.42	3.39	2.19	1.93	1.18	32.44
NEWTON	21.8	25.6	35.7	50.2	61.7	71.5	76.4	74.2	66.0	54.8	38.2	26.8	50.2	1.42	1.12	2.28	2.76	4.07	4.94	3.81	3.69	3.27	2.21	2.07	1.31	32.95
PERRY 1 SE	20.8	24.7	35.0	49.7	61.2	70.7	75.2	73.0	64.8	53.9	37.2	26.0	49.4	1.15	1.01	1.90	2.29	3.79	4.59	3.75	4.16	2.78	1.75	1.73	1.09	29.99
TOLEDO	21.0	24.7	34.7	49.2	60.5	69.9	74.6	72.8	64.6	54.0	37.6	25.9	49.1	1.30	1.07	2.20	2.80	4.36	4.89	3.61	3.65	3.75	2.26	2.14	1.32	33.35
VAN METER	*	*	*	*	*	*	*	*	*	*	*	*	*	1.21	.98	1.92	2.63	3.95	5.19	3.35	4.50	3.11	1.89	1.76	.99	31.28
WEBSTER CITY	18.6	22.3	33.3	48.4	60.2	69.9	74.4	72.5	64.0	52.5	35.4	23.8	47.9	.87	.91	1.66	2.41	3.87	4.90	3.47	3.40	2.88	1.83	1.51	.90	28.61
DIVISION	20.2	24.1	34.1	49.2	60.7	70.3	75.1	72.9	64.6	53.6	36.8	25.2	48.9	1.17	1.06	2.08	2.62	4.16	4.94	3.55	3.71	3.18	1.99	1.80	1.10	31.36
EAST CENTRAL DIVISION																										
BELLE PLAINE	21.1	24.8	35.0	49.6	61.0	70.6	75.1	73.0	64.7	53.6	37.2	25.8	49.3	1.40	1.06	2.41	3.12	4.13	4.79	3.31	3.41	3.73	2.35	2.24	1.50	33.45
CEDAR RAPIDS NO 1	21.5	25.1	35.1	49.5	60.7	70.3	74.9	72.8	64.6	53.5	37.6	26.2	49.3	1.44	1.10	2.34	3.17	3.90	4.85	3.70	3.16	3.71	2.46	2.13	1.37	33.33
CEDAR RAPIDS NO 2	*	*	*	*	*	*	*	*	*	*	*	*	*	1.54	1.16	2.35	3.19	3.95	4.91	3.46	3.31	3.91	2.43	2.20	1.41	33.82
CLINTON NO 1	23.5	26.4	36.1	50.3	61.4	71.2	75.6	73.6	65.5	54.5	38.9	27.6	50.4	1.76	1.31	2.35	3.10	3.92	4.71	3.39	4.20	3.44	2.53	2.39	1.75	34.85
CLINTON NO 2	*	*	*	*	*	*	*	*	*	*	*	*	*	1.65	1.26	2.30	3.09	3.75	4.81	3.43	4.14	3.42	2.47	2.44	1.68	34.44
DAVENPORT L AND D NO 15	23.8	27.3	37.4	50.7	62.1	71.9	76.9	74.7	66.9	55.5	39.7	28.2	51.3	1.56	1.32	2.53	3.34	3.59	4.53	3.49	3.58	3.80	2.32	2.11	1.71	33.88
IOWA CITY	*	*	*	*	*	*	*	*	*	*	*	*	*	1.38	1.15	2.14	2.98	3.83	4.81	3.47	3.39	3.22	2.40	2.07	1.44	32.68
MUSCATINE	*	*	*	*	*	*	*	*	*	*	*	*	*	1.41	1.16	2.33	3.09	3.71	4.25	3.41	3.42	3.00	2.23	2.19	1.68	31.88
WILLIAMSBURG	21.8	25.4	35.4	49.8	61.2	70.8	75.4	73.2	65.0	54.1	38.0	26.5	49.7	1.25	.95	1.94	2.63	3.76	4.75	3.56	3.16	3.10	2.30	2.07	1.25	30.72
DIVISION	22.1	25.5	35.4	49.7	60.7	70.4	75.0	73.2	64.8	53.9	38.0	26.6	49.6	1.46	1.19	2.27	3.10	3.94	4.80	3.41	3.49	3.32	2.44	2.04	1.51	32.97
SOUTHWEST DIVISION																										
ATLANTIC 1 NE	21.4	25.4	35.4	49.9	61.0	70.8	75.9	74.0	65.3	54.1	37.5	26.8	49.8	1.05	.96	1.85	2.63	4.00	4.85	3.44	4.62	3.31	1.99	1.64	.84	31.18
BEDFORD	*	*	*	*	*	*	*	*	*	*	*	*	*	1.15	1.05	2.21	2.99	4.29	5.76	3.31	5.10	3.63	2.43	1.84	1.06	34.82
CLARINDA	23.6	27.8	37.8	51.7	62.1	71.9	76.8	74.8	66.3	55.4	39.3	28.7	51.4	.96	.98	2.05	2.44	3.84	5.53	3.24	4.60	3.36	2.11	1.66	.90	31.67
CORNING 1 W	23.0	26.7	36.4	50.5	61.4	71.0	76.3	74.2	66.1	55.1	38.7	28.1	50.6	.84	.81	1.65	2.50	3.88	4.46	2.89	4.07	3.37	1.80	1.40	.71	28.38
#CUMBERLAND 3 NW	*	*	*	*	*	*	*	*	*	*	*	*	*	1.11	.95	1.81	2.37	3.86	4.95	3.39	4.35	3.21	1.87	1.51	.91	30.29
GLENWOOD 2 N	23.6	27.5	37.6	51.9	62.6	72.7	77.8	75.8	67.3	56.0	39.5	28.9	51.8	.86	1.01	1.85	2.59	4.25	5.12	3.90	4.68	3.36	1.90	1.51	.88	31.91
GREENFIELD 1 WNW	*	*	*	*	*	*	*	*	*	*	*	*	*	1.02	1.08	2.01	2.62	4.12	5.05	3.48	4.31	3.39	2.20	1.52	.99	31.79
DIVISION	22.9	27.3	36.8	51.2	61.9	71.5	76.5	74.6	66.2	55.5	38.9	28.2	51.0	.95	1.04	1.97	2.69	4.03	5.28	3.41	4.61	3.30	2.14	1.50	.86	31.78
SOUTH CENTRAL DIVISION																										
ALBIA	24.4	27.8	37.4	51.3	62.3	72.0	77.1	75.1	66.9	56.2	39.8	29.0	51.6	1.39	1.11	2.33	3.09	3.82	4.96	3.64	3.99	3.26	2.08	1.89	1.39	32.95
CENTERVILLE	25.0	28.6	37.9	51.5	62.3	72.0	76.8	74.9	66.8	56.1	40.3	29.5	51.8	1.42	1.08	2.37	3.28	3.80	5.34	3.22	4.17	3.44	2.36	1.67	1.31	33.46
CHARITON	23.5	27.1	37.0	50.7	61.4	71.1	75.9	74.1	65.9	55.2	39.3	28.3	50.8	1.21	.97	2.06	2.88	4.03	5.10	3.17	3.94	3.40	2.06	1.88	1.19	31.89
CRESTON 2 SW	22.5	26.1	36.0	50.1	61.0	70.8	76.0	73.7	65.3	54.2	38.0	27.5	50.1	.95	.83	1.91	2.72	3.88	4.84	2.62	4.53	3.38	1.95	1.83	.97	30.41
INDIANOLA	23.1	26.8	36.7	51.1	62.4	72.1	77.1	75.0	66.8	55.9	39.1	28.1	51.2	1.38	1.12	2.13	2.64	4.36	5.00	3.29	3.94	3.14	2.26	1.88	1.24	32.38
KNOXVILLE	23.7	27.2	37.1	51.5	62.4	72.0	76.9	74.6	66.7	56.0	39.6	28.6	51.4	1.40	1.14	2.15	2.71	3.98	4.73	3.09	4.07	3.05	2.15	2.09	1.32	31.88
LAMONI FAA AIRPORT	23.6	27.4	37.9	50.5	61.2	71.1	76.1	74.1	65.8	55.0	38.8	25.2	50.6	1.18	1.01	1.96	3.07	3.96	5.30	3.26	3.74	3.83	2.29	1.77	1.24	32.61
MOUNT AYR 2 N	23.9	27.6	37.3	50.9	61.6	71.3	76.3	74.4	66.1	55.5	39.2	28.6	51.1	1.14	1.02	1.96	2.88	3.87	5.29	2.93	4.66	3.66	2.25	1.89	1.15	32.70
DIVISION	23.5	27.3	37.0	51.0	61.8	71.5	76.5	74.5	66.3	55.5	39.2	28.1	51.0	1.27	1.06	2.15	2.89	3.99	5.11	3.15	4.16	3.35	2.18	1.84	1.21	32.36
SOUTHEAST DIVISION																										
BURLINGTON AP	24.4	27.8	37.3	50.8	61.8	72.1	76.6	74.6	66.0	55.4	39.4	28.4	51.2	1.64	1.39	2.71	3.44	4.03	5.01	3.40	3.61	3.19	2.70	1.88	1.60	34.60
COLUMBUS JUNCTION	23.6	27.0	36.7	50.8	61.6	71.0	75.3	73.3	65.5	54.8	39.2	28.0	50.6	1.40	1.15	2.22	3.14	4.01	4.88	3.73	3.58	2.97	2.52	2.12	1.57	33.29
FAIRFIELD	24.1	27.5	37.2	51.2	62.1	72.0	76.6	74.7	66.4	55.5	39.5	28.5	51.3	1.50	1.23	2.36	3.26	4.06	5.07	3.37	4.14	3.56	2.44	2.12	1.64	34.75
KEOKUK LOCK AND DAM 19	*	*	*	*	*	*	*	*	*	*	*	*	*	1.61	1.43	2.48	3.20	3.76	4.61	3.16	3.32	3.17	2.62	1.80	1.68	32.84
KEOSAUQUA	25.8	29.2	38.7	52.1	62.7	72.2	76.6	75.2	67.3	56.5	40.8	30.1	52.3	1.55	1.23	2.57	3.38	4.00	5.39	3.55	4.02	3.56	2.74	1.98	1.63	35.60
MOUNT PLEASANT	24.9	28.3	37.9	51.6	62.5	72.2	76.7	74.7	66.8	55.9	40.2	29.0	51.7	1.49	1.25	2.52	3.39	3.86	5.19	3.21	4.18	3.42	2.51	1.97	1.67	34.66
OSKALOOSA 2 WSW	23.3	26.8	36.7	50.7	61.8	71.4	76.1	74.0	65.9	55.2	39.1	28.0	50.8	1.56	1.17	2.41	3.07	4.22	5.06	3.45	3.73	3.09	2.25	2.28	1.50	33.79
OTTUMWA FAA AIRPORT	24.3	27.9	37.6	51.7	62.8	72.5	77.2	75.3	66.9	56.0	39.8	28.8	51.7	1.42	1.08	2.31	3.09	4.03	5.28	3.41	3.87	3.41	2.26	1.87	1.43	33.46
OTTUMWA	*	*	*	*	*	*	*	*	*	*	*	*	*	1.54	1.21	2.47	3.20	3.85	5.45	3.40	4.11	3.56	2.17	1.91	1.51	34.38
SIGOURNEY	23.2	26.6	36.8	51.0	62.1	72.0	76.7	74.5	66.5	55.5	39.2	27.9	51.0	1.29	.97	1.92	2.78	4.25	4.92	3.33	4.00	2.93	2.20	1.98	1.30	31.87
WASHINGTON	23.8	27.2	37.2	51.2	62.3	72.0	76.4	74.5	66.5	55.4	39.3	28.1	51.2	1.49	1.29	2.56	3.15	3.75	4.89	3.81	3.51	2.92	2.25	2.23	1.62	33.47
DIVISION	24.4	27.9	37.6	51.4	62.6	72.1	76.7	74.7	66.7	55.8	39.9	28.9	51.6	1.50	1.23	2.40	3.21	3.93	5.06	3.42	3.77	3.15	2.44	1.95	1.55	33.61

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1963 REVISIONS AND ADDITIONS TO CLIMATOGRAPHY OF THE UNITED STATES NO. 81-11

IOWA

TABLE I — NORMALS FOR FIRST ORDER STATIONS

STATION	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
DES MOINES AP													
G 948 T 5													
MAX TEMP	29.1	32.9	44.1	60.6	72.8	82.6	88.3	85.4	77.6	65.4	46.5	33.9	59.9
MIN TEMP	12.5	15.9	26.8	40.1	51.7	62.2	66.6	64.6	55.1	43.0	28.3	17.1	40.3
AVG TEMP	20.8	24.4	35.5	50.4	62.3	72.4	77.5	75.0	66.4	54.2	37.4	25.5	50.2
DEG DAYS	1370	1137	915	438	180	30	0	6	96	363	828	1225	6588
SIOUX CITY AP													
G1095 T 5													
MAX TEMP	27.9	31.7	42.5	59.9	72.9	82.5	89.5	86.9	78.2	66.9	46.7	34.5	60.0
MIN TEMP	9.5	12.6	23.7	37.8	49.8	60.3	65.2	63.2	52.8	41.1	25.5	15.4	38.1
AVG TEMP	18.7	22.2	33.1	48.9	61.4	71.4	77.4	75.1	65.5	54.0	36.1	25.0	49.1
DEG DAYS	1435	1198	989	483	214	39	0	9	108	369	867	1240	6951
WATERLOO AP													
G 868 T 5													
MAX TEMP	26.8	30.4	41.0	58.4	71.2	81.6	85.7	83.5	75.3	63.8	44.3	31.9	57.8
MIN TEMP	8.9	12.3	22.9	36.2	48.5	58.6	61.8	59.9	50.4	39.5	25.1	14.4	36.5
AVG TEMP	17.9	21.4	32.0	47.3	59.9	70.1	73.8	71.7	62.9	51.7	34.7	23.2	47.2
DEG DAYS	1460	1221	1023	531	229	54	12	19	138	428	909	1296	7320

TABLE II — NORMALS BY CLIMATOLOGICAL DIVISIONS

TEMPERATURE (°F.)

NORTHWEST DIVISION		20.8	31.6		59.4	69.0	74.2	72.2	63.2	51.7			
NORTH CENTRAL DIVISION					59.2	68.9	73.7		62.8		34.4		46.7
NORTHEAST DIVISION	18.5	21.7	32.1	47.3	59.1	68.7	73.4		62.8	51.7	35.3	23.2	47.1
WEST CENTRAL DIVISION		24.0	34.4	49.4	61.0	70.7	75.7	73.7		53.8		25.7	
CENTRAL DIVISION	20.5	24.3	34.6	49.4	60.9	70.6	75.3	73.2	64.8	53.8	37.0	25.5	49.2
EAST CENTRAL DIVISION		25.3	35.2	49.5	60.8	70.5		73.1	64.9	53.8			
SOUTHWEST DIVISION	23.2	27.1	37.1	51.3	62.1	71.8	76.9	74.9	66.4	55.3	39.0	28.4	51.1
SOUTH CENTRAL DIVISION	23.6	27.2	36.9	50.9		71.4		74.4				28.4	
SOUTHEAST DIVISION	24.7	28.1	37.7		62.4	72.2	76.8	74.8		55.9	40.0	29.0	

PRECIPITATION (In.)

NORTHWEST DIVISION	.68	.91	1.57	2.28	3.79	4.72	3.41	3.60	2.89	1.54	1.21	.80	27.40
NORTH CENTRAL DIVISION		.95	1.92	2.40	3.97	5.00	3.48	3.94	3.24	1.83	1.67	1.01	30.41
NORTHEAST DIVISION	1.17	.98	2.10	2.70		4.82	3.76	3.85	3.54		1.92	1.18	32.09
WEST CENTRAL DIVISION	.94	.98	1.72	2.48	3.79	4.78	3.55	3.76	2.82	1.73	1.41	.82	28.78
CENTRAL DIVISION	1.18	1.03	2.04	2.61	4.20	4.95	3.57	3.77	3.28	2.03	1.85	1.12	31.63
EAST CENTRAL DIVISION		1.13	2.21	2.99	3.91	4.67	3.39	3.48	3.40	2.45	2.15	1.50	32.74
SOUTHWEST DIVISION		.98	1.93	2.59	3.98	5.14	3.37		3.43	2.13	1.56	.88	31.55
SOUTH CENTRAL DIVISION	1.26	1.04		2.90	4.01	5.05	3.18	4.27	3.41	2.19	1.87		32.54
SOUTHEAST DIVISION	1.49	1.21	2.38	3.19	3.92	5.05	3.41	3.76	3.22	2.46	2.00	1.57	33.66

REVISIONS TO FIRST ORDER STATIONS IN TABLE I AFFECT THE SAME STATIONS IN TABLE II.

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1964 REVISIONS AND ADDITIONS TO CLIMATOGRAPHY OF THE UNITED STATES NO. 81-11
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TABLE I — NORMALS FOR FIRST ORDER STATIONS

STATION	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
DES MOINES AP													
G 938 T 3													
MAX TEMP	28.5	32.2	42.9	59.4	71.4	81.3	87.3	84.7	76.9	65.7	46.5	33.5	59.2
MIN TEMP	11.3	14.6	24.6	38.0	49.8	60.7	65.2	63.4	53.8	42.6	27.6	17.0	39.1
AVG TEMP	19.9	23.4	33.8	48.7	60.6	71.0	76.3	74.1	65.4	54.2	37.1	25.3	49.2
DEG DAYS	1398	1165	967	489	211	39	0	9	99	363	837	1231	6808

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