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VOLUME III

SOLAR THERMAL CONVERSION MISSION ANALYSIS

Southwestern United States Insolation Climatology

THE AEROSPACE CORPORATION

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SOLAR THERMAL CONVERSION MISSION ANALYSIS

VOLUME III

SOUTHWESTERN UNITED STATES INSOLATION CLIMATOLOGY

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FOREWORD

This report describes results of the insolation analysis applied to the Southwestern United States conducted as part of the Solar Thermal Conversion Mission Analysis performed by The Aerospace Corporation under contract to the National Science Foundation/Research Applied to National Needs. The time period of the contract was from December 1, 1973, to August 15, 1974. This report on the insolation analysis is the third of five volumes. The remaining four volumes are: Summary Report, Demand Analysis; Comparative Systems/Economics Analyses; and Area Definition and Siting Analysis.

This study was conducted under NSF Contract C-797 by the Energy Programs Group of the Energy and Resources Division. Mr. D. F. Spencer and subsequently Mr. G. Kaplan, was the NSF Program Manager for this contract and Dr. A. B. Greenberg, General Manager of the Energy and Resources Division, was the Principal Investigator. Dr. M. B. Watson is Associate Group Director of the Energy Programs Group. Mr. P. B. Bos, Associate Director, Solar Thermal Projects, provided the Program Management.

This report was prepared by Dr. R. T. Hall, Dr. S. L. Leonard, Dr. C. M. Randall, and Mr. N. A. Fiamengo of the Chemistry and Physics Laboratory, Laboratory Operations.

The authors of this report appreciate the support of this project by personnel of the Analytic Support Group of The Aerospace Corporation Laboratory Operations. These include Dr. Henry Hilton, who provided a number of computer routines for computing solar position, Ms. Gwen Boyd who processed the hourly data bases, Mr. Guy Kuncir of the Information Processing Division who was responsible for the conversion of the data to metric units and for providing informative header records for the data tapes, as well as combining the insolation data into the mission analysis computer methodology and making the insolation data available to other users.

The timely acquisition of the meteorological records used in this study was possible only through the cheerful and efficient cooperation of Mr. Vincent Haggarty and other personnel at the National Climatic Center in Asheville, North Carolina.

The authors also express their sincere appreciation for the assistance of the following people: Mr. M. S. Ensign for his diligent efforts in preparing the tables and figures, Mr. F. Eggers for technical editing, and Ms. Mari Bythway and Ms. Bobbie Devaney for so ably typing and preparing this document.

ABSTRACT

An insolation data base consisting of hourly values of normal incidence or direct insolation and total insolation for a two-year period has been prepared in computer compatible format for 20 stations characterizing the climatology of the Southwestern United States. The data base includes, in addition to the insolation data, solar position and weather information. When measured insolation values were unavailable, estimated values obtained by statistical procedures discussed in this report were developed in order to complete the insolation data base. In addition, a worst-case data base has been prepared for two locations: Albuquerque, New Mexico, and Inyokern, California. These data were also used in several statistical studies to include a comparison of insolation values at various stations, a percentile frequency analysis of insolation data, a temperature-insolation correlation, and a wind-insolation frequency analysis. The procedures used in these various studies and the results obtained are discussed in detail in this report.

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1. INTRODUCTION AND OBJECTIVES

The preparation and analysis of a standard insolation data base representative of the climatology of the Southwestern United States was one of the objectives of the follow-on Solar Thermal Conversion Mission Analysis conducted by The Aerospace Corporation. An earlier report (Reference 1) describes a similar study conducted for Southern California. This report describes an extension of the earlier study to encompass the entire Southwestern United States.

Any assessment of the relative merits of different solar conversion concepts, no matter what methodology is used for the comparison, must in some way take into account the characteristics of the incident solar radiation or insolation. Some insolation model or characteristic data base must be used to represent the solar energy input to the system. In order to permit comparisons between solar power plants using concentrating collectors and those using flat-plate collectors, this insolation input model must separately account for the unscattered solar radiation and the total insolation (including both the unscattered radiation and the scattered, or diffuse, component). The model must also contain, in some form, the "random" daily and hourly, seasonal and diurnal variations characteristic of the geographical region represented by the model. Furthermore, the model must reflect the spatial differences resulting from local climatological variations among the different regions within the area under study (e.g., the climatic subregions of the Southwest).

One of the principal objectives of the insolation climatology study reported here has been to develop a representative insolation data base for the Southwestern United States, satisfying the above general requirements. This data base is intended for use as an input for the comparative studies of solar power systems being conducted at The Aerospace Corporation. It is intended that this data base will also be useful as a reference data base to be used by other investigators in assessing the merits of specific solar energy conversion concepts. Use of the same insolation data base will permit such assessments to be made on a consistent basis, thus facilitating comparisons. This data base is summarized in Figure 1.1 and is available on magnetic tape to NSF contractors.

A second major objective of this portion of the program was to perform a statistical study of the characteristics of the climatology (with emphasis on insolation) for the Southwestern United States. The hourly data base developed was used as the basis for these studies. These statistical studies include, for example, summaries of insolation data useful for rapid assessments of system performance as well as investigations of the relative simultaneous wind and insolation frequency distributions.

The desired content of the reference data base and the reservoir of actual measurements available for the Southwestern United States area are discussed in Chapter 2. In Chapter 3 a description is given of the data base development and of the procedures employed to validate the data base. This chapter also describes the methodology employed for the preparation of worst-case insolation data bases for two locations: Albuquerque, New Mexico, and Inyokern, California. Chapter 4 describes the insolation related statistical studies performed for the Southwestern United States. Chapter 5 summarizes the content of the report, with some recommendations for future work.

- REPRESENTATIVE CLIMATIC REGIONS IN SOUTHWESTERN UNITED STATES
- TIME PERIOD 1962 - 1963 (2 year data base)
- HOURLY DATA ON MAGNETIC TAPE
  (optionally available on 7-track BCD or 9-track EBCDIC tapes)
- TAPE 1
  - ALBUQUERQUE, N.M.
  - INYOKERN, CA
  - YUMA, AZ
  - EDWARDS A.F.B., CA
  - RIVERSIDE, CA
- TAPE 2
  - LOS ANGELES CIVIC CENTER, CA
  - LOS ANGELES AIRPORT, CA
  - SAN DIEGO, CA
  - SANTA MARIA, CA
  - FRESNO, CA
- TAPE 3
  - TUCSON, AZ
  - SALT LAKE CITY, UT
  - PHOENIX, AZ
  - ELY, NV
  - GRAND JUNCTION, CO
- TAPE 4
  - OMAHA, NE
  - FORT WORTH, TX
  - DODGE CITY, KS
  - MIDLAND, TX
  - EL PASO, TX
- CONTENTS:
  - IDENTIFYING INFORMATION
    - DATE, TIME, SOLAR POSITION
  - INSOLATION
    - EXTRATERRESTRIAL, NORMAL INCIDENCE, TOTAL
      PERCENT OF POSSIBLE TOTAL INSOLATION
  - WEATHER DATA
    - TEMPERATURE, HUMIDITY, SKY COVER, CLOUDS
    - WINDS

FIGURE 1.1 Insolation Climatology Data Base

2. SOUTHWESTERN UNITED STATES CLIMATOLOGY

2.1 SELECTION OF REPRESENTATIVE DATA

In order to be truly representative of the Southwestern United States, the data base developed in this study should include data from at least one site in each of the major climatological regions into which the area can be divided. The first task, therefore, was to define and establish the boundaries of these weather regions on the basis of climatological and physiographic information. For the purposes of this study, the most important factor to be considered, of course, was solar radiation, as reflected in insolation and sunshine measurements. It was also appropriate, however, to take into account topography and such surface weather variables as precipitation and humidity.

The variations of available solar energy over the Southwestern United States are illustrated in Figures 2.1 through 2.5. The first two figures show isocontours of winter and summer sunshine, respectively, expressed as a percentage of the number of possible sunshine hours. In Figures 2.3 and 2.4, the contours represent constant values of the average number of hours of daily sunshine for winter and summer respectively, while those in Figure 2.5 indicate constant values of daily total insolation, expressed in terms of annual averages. These graphs illustrate the well-known fact that the Southwest is the most promising region in the continental United States for solar energy conversion, but they provide relatively little guidance for the task of defining weather regions within the Southwest.

Somewhat more assistance in defining the boundaries of weather regions is provided by the data shown in Figures 2.6 and 2.7. In Figure 2.6 are shown the boundaries of the physiographic provinces into which the Southwest can be divided on the basis of land surface forms. Figure 2.7

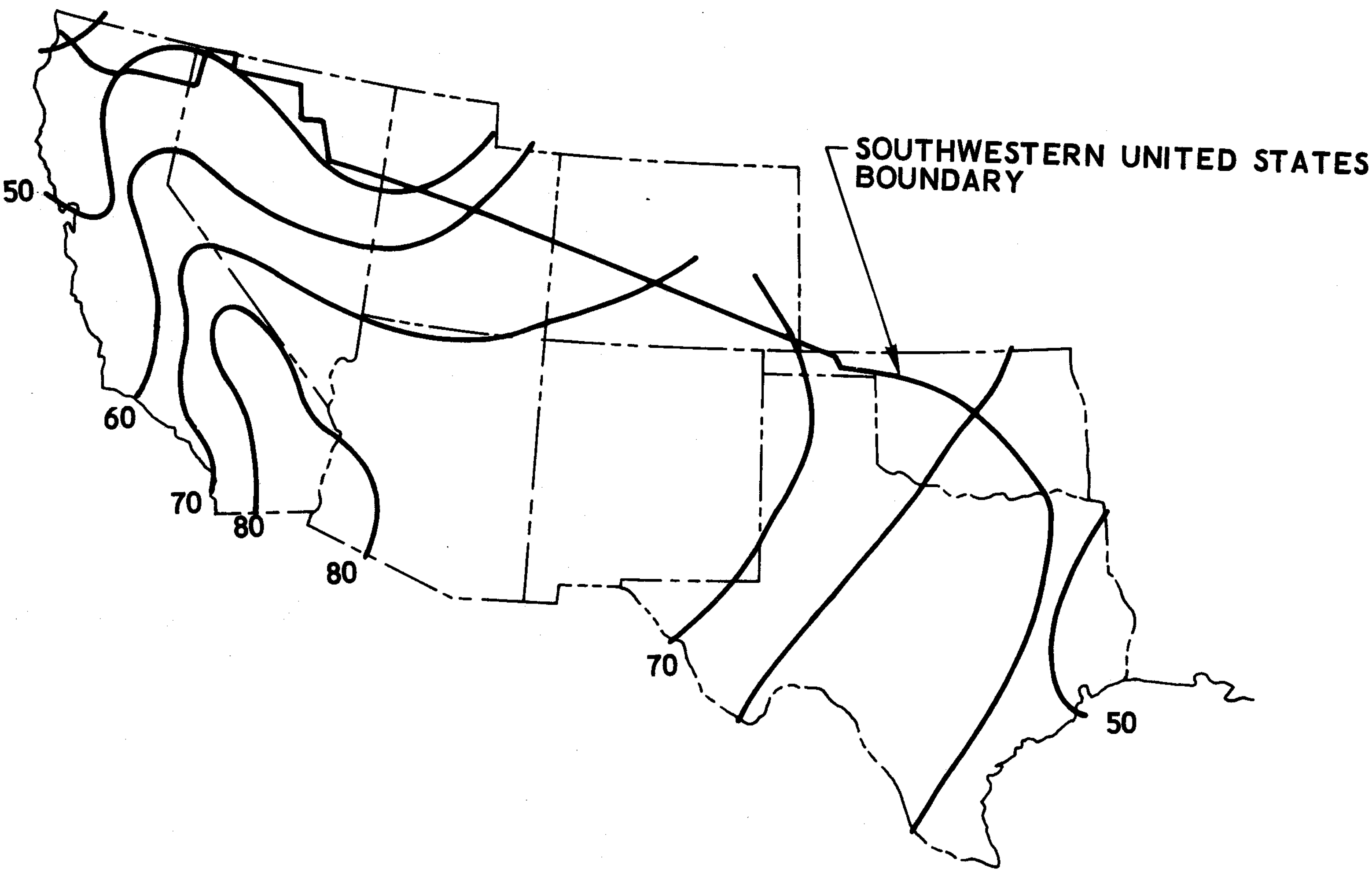


FIGURE 2.1 Percent of Possible Winter Sunshine

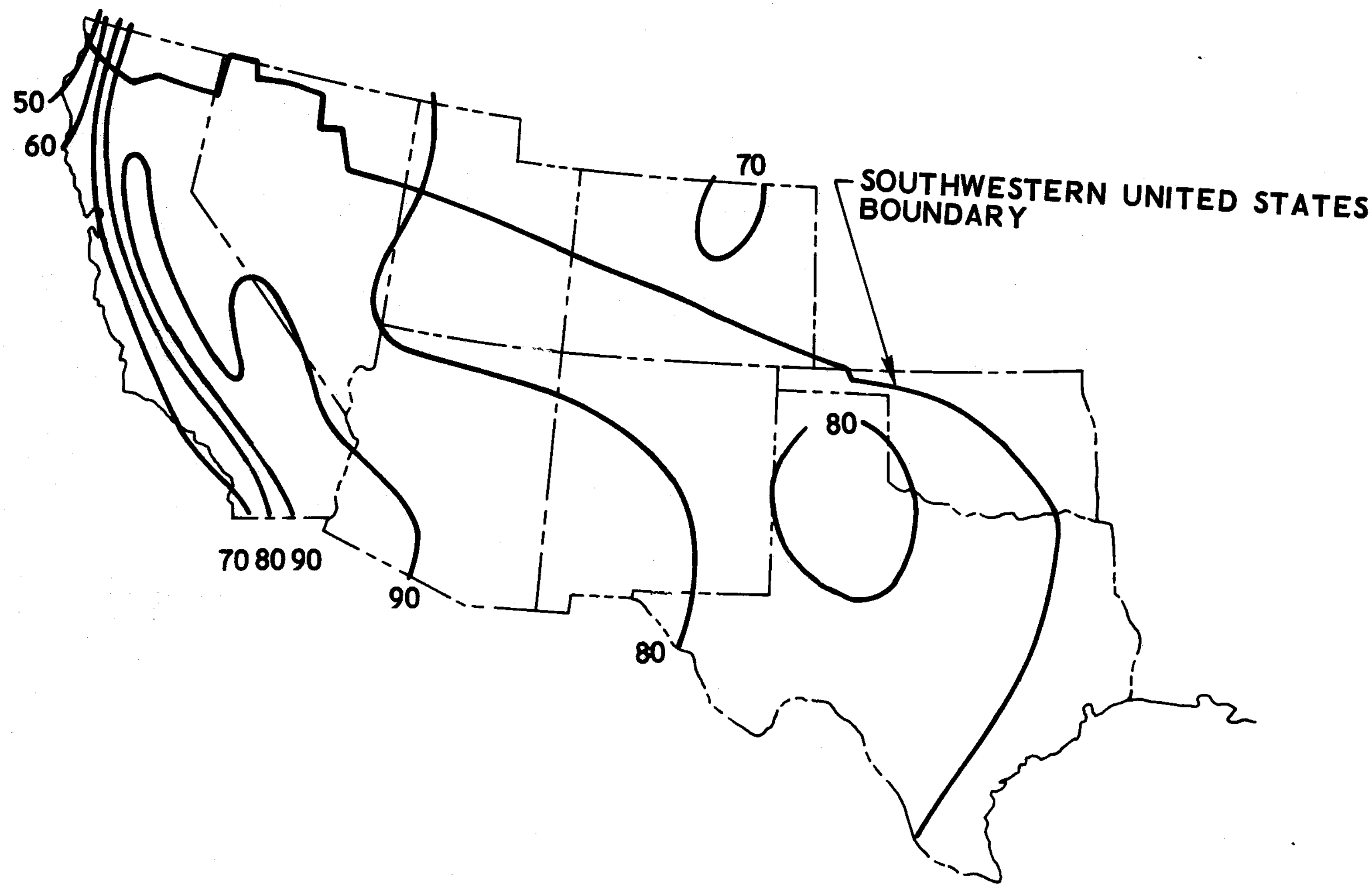


FIGURE 2.2 Percent of Possible Summer Sunshine

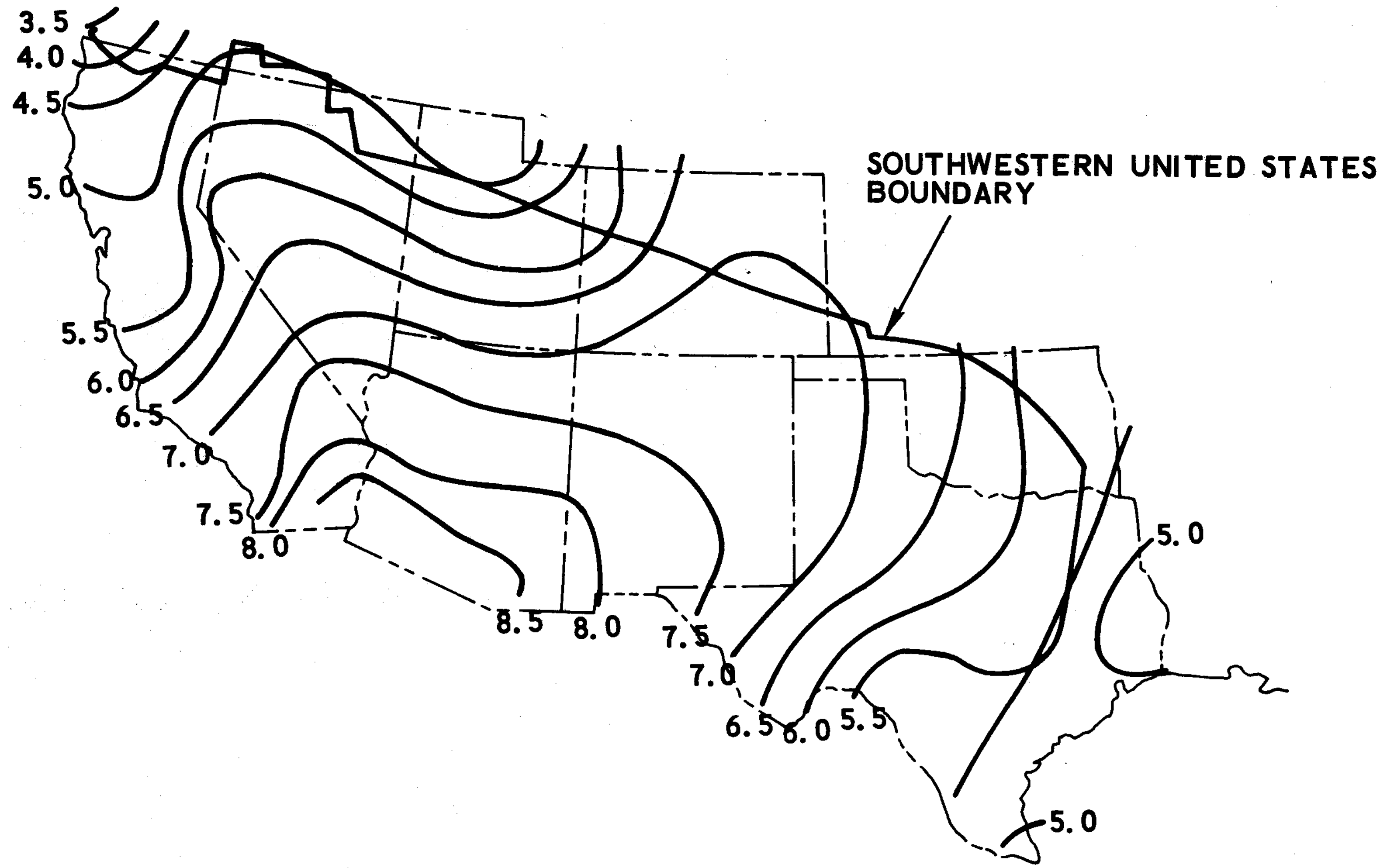


FIGURE 2.3 Average Number of Hours of Daily Sunshine - Winter

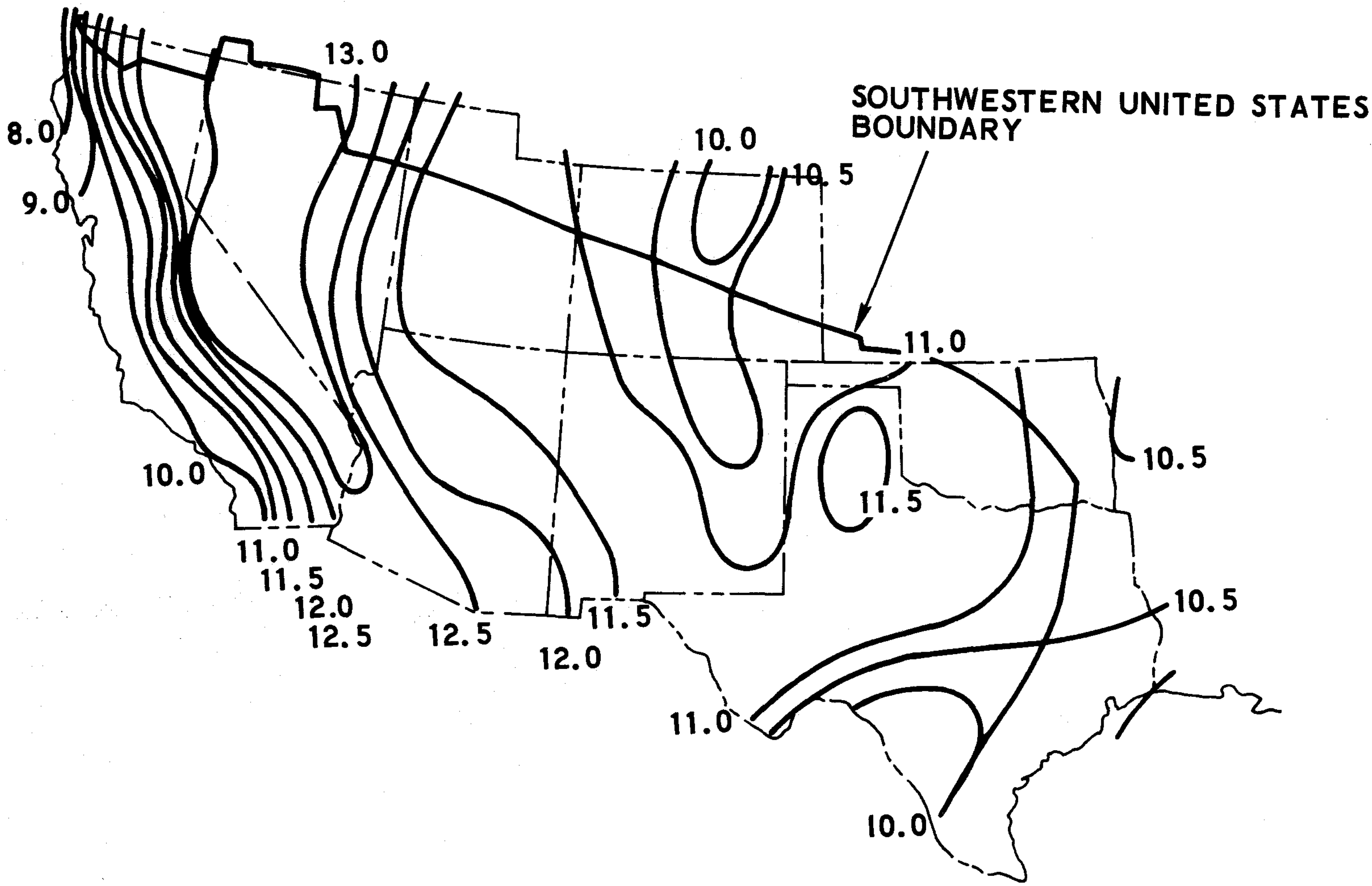


FIGURE 2.4 Average Number of Hours of Daily Sunshine - Summer

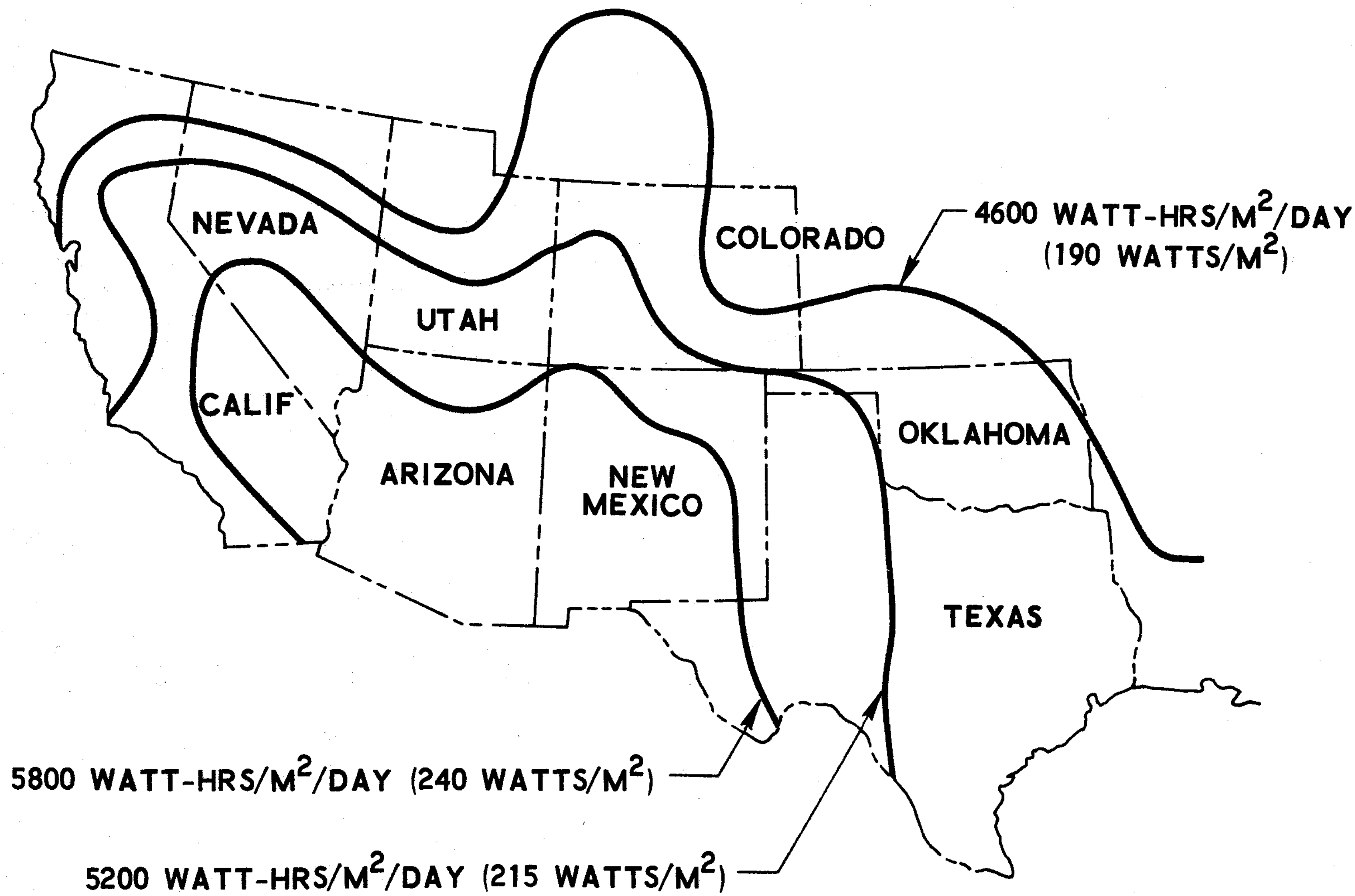


FIGURE 2.5 Daily Total Insolation - Annual Average

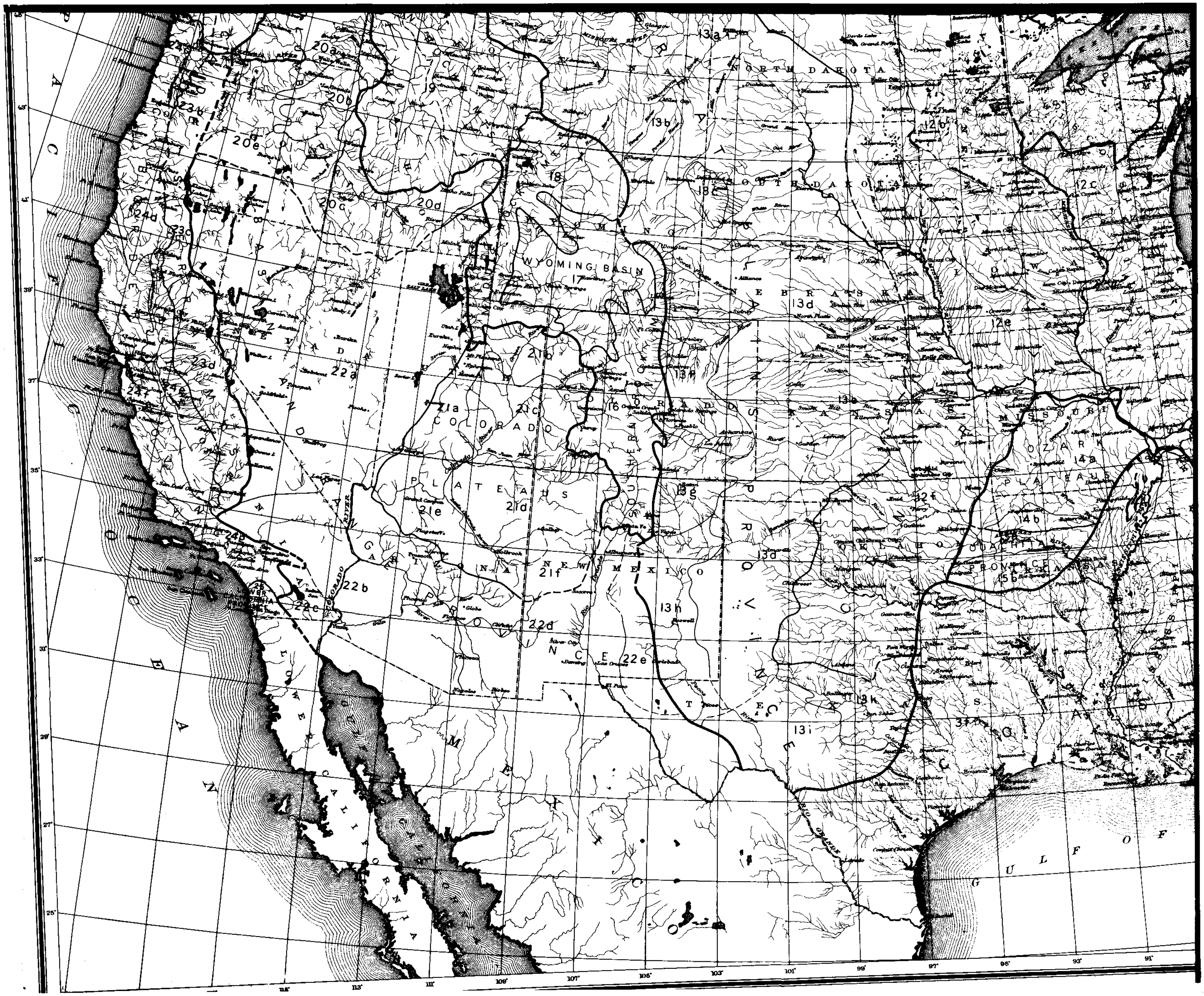
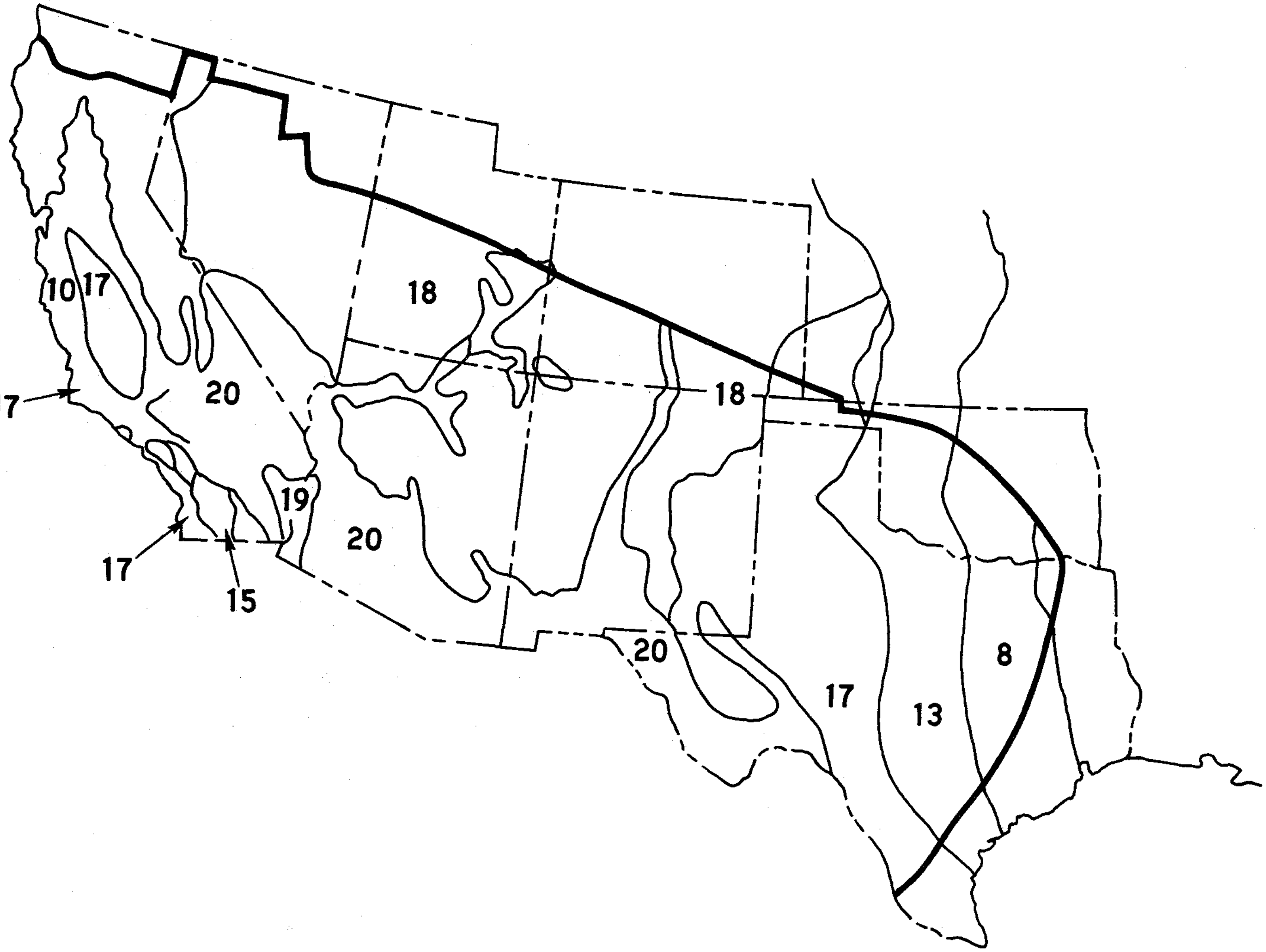


FIGURE 2.6 Physiographic Provinces of the Southwestern United States



*From Climatic Provinces Map,
U.S. Dept. of Agriculture, 1937

FIGURE 2.7 Climate Zones, Southwestern United States shows the climate zones of the Southwestern United States as defined in terms of characteristics important to agriculture. The key to the numbering systems used to label the different climate zones and physiographic provinces in these two figures is given in Table 2.1. Omitted from the table, for the sake of brevity, are the numbers corresponding to mountainous physiographic provinces, since such regions are unsuitable for siting solar power plants.

In selecting the sources of the data to be included in the representative insolation data base for the Southwestern United States, an attempt was made to provide representation for as many as possible of the climate zones and physiographic provinces listed in Table 2.1. Every Southwestern weather station for which hourly total (hemispheric) insolation data are available for the 1962-63 time period is included, as well as three stations not strictly within the boundaries of the Southwest as prescribed in Volume 5 of this set of reports. In addition, in order to extend the coverage to climate zones and physiographic provinces for which no insolation measurement data were available, surface weather data were used to estimate hourly insolation values at five stations. As finally constituted, the present data base includes data from 19 separate sites in the Southwest and from Omaha, Nebraska, as shown in Figure 2.8. This data base includes 8 sites representing Southern California which was the area of study under the preceding contract (Reference 1.) The classifications of the 19 Southwestern United States sites in terms of their respective climate zones and physiographic provinces are given in Table 2.2 The data base includes Omaha, Nebraska, even though this station is well outside the region, because it is one of only 4 weather stations in the continental U. S. where measurements of direct (normal-incidence) insolation were made in 1962-63. A comparison of Figure 2.8 with Figures 2.1 to 2.5 demonstrates that the data base provides adequate coverage of the Southwest with respect to variations in sunshine and insolation.

TABLE 2.1

Key to Numbering Systems for Climate Zones
and Physiographic Provinces

Climate Zones	Humidity	Temperature	Precipitation
8	Sub-humid	Mesothermal	Adequate at all seasons
10	Sub-humid	Mesothermal	Summer deficiency
13	Sub-humid	Mesothermal	Deficiency at all seasons
14	Sub-humid	Microthermal	Deficiency at all seasons
15	Semi-arid	Mesothermal	Summer deficiency
17	Semi-arid	Mesothermal	Deficiency at all seasons
18	Semi-arid	Microthermal	Deficiency at all seasons
19	Arid	Tropical	Deficiency at all seasons
20	Arid	Mesothermal	Deficiency at all seasons
21	Arid	Microthermal	Deficiency at all seasons

Physiographic Provinces

12f	Central Lowland, Osage Plains Section
13d	Great Plains, High Plains Section
13g	Great Plains, Raton Section
13h	Great Plains, Pecos Valley Section
13i	Great Plains, Edwards Plateau Section
13k	Great Plains, Central Texas Section
21a	Colorado Plateaus, High Plains of Utah Section
21c	Colorado Plateaus, Canyon Lands Section
21d	Colorado Plateaus, Navajo Section
21f	Colorado Plateaus, Datil Section
22a	Basin and Range, Great Basin Section
22b	Basin and Range, Sonoran Desert Section
22c	Basin and Range, Salton Trough Section
22d	Basin and Range, Mexican Highland Section
22e	Basin and Range, Sacramento Section
24e	Pacific Border, California Trough Section
24g	Pacific Border, Los Angeles Range
25	Lower Region

TABLE 2.2

Classification of Insolation Data Sources by Climate Zone and Physiographic Province

Station	Climate* Zone	Physiographic** Province
Albuquerque, N. M.	20	22d
Dodge City, Kan.	13	13d
Edwards AFB, Calif.	20	22b
El Paso, Tex.	20	22d
Ely, Nev.	18	22a
Fresno, Calif.	17	24e
Ft. Worth, Tex.	8	12f
Grand Junction, Colo.	18	21c
Inyokern, Calif.	20	22a
Los Angeles Airport, Calif.	17	24g
Los Angeles Civic Center, Calif.	17	24g
Midland, Tex.	17	13g
Phoenix, Ariz.	20	22b
Riverside, Calif.	15	24g
Salt Lake City, Utah	18	22a
San Diego, Calif.	17	25
Santa Maria, Calif.	17	24g
Tuscon, Ariz.	20	22b
Yuma, Ariz.	19	22c

*Unrepresented Climate Zones: 10, 14, 21

**Unrepresented Physiographic Provinces: 13h, i, k; 21a, d, f; 22e

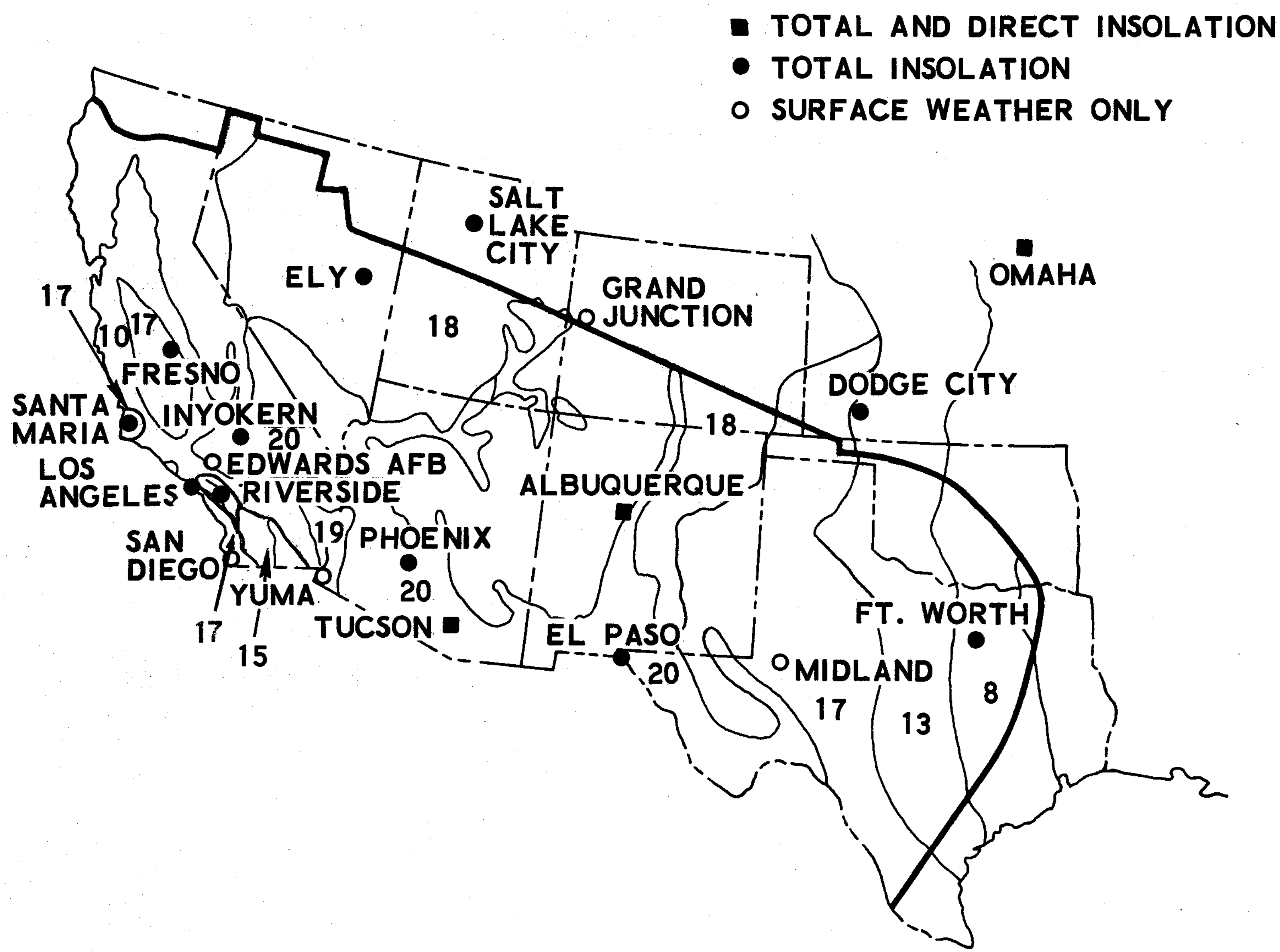


FIGURE 2.8 Insolation and Weather Data Stations Represented in Insolation Data Base

2.2 WEATHER-RELATED SITING INFORMATION

Although the dominant criterion for the selection of sites for solar power plants must, of necessity, be the availability of insolation, other factors must also be considered. In addition to topography, land availability, demography, etc., there are a number of weather-related criteria that must be included in the evaluation of candidate sites. These include, for example, wind velocity distributions, temperature ranges, humidity, snowfall, and the frequency of thunderstorms. Because of the importance of these weather variables in site selection, summaries of local climatological data for sixteen of the nineteen Southwestern United States sites represented in the insolation data base are included in this report. (Appendix A) These data summaries were obtained from the Environmental Data Service National Oceanic and Atmospheric Administration. Summaries for three of the sites (Edwards AFB, Inyokern/China Lake, and Riverside) were not available from that source.

No attempt has been made in the course of the present study to develop a unified set of siting criteria that incorporates these weather-related factors. It is anticipated, however, that future studies will include the development of a site-evaluation procedure that includes these variables.

3. INSOLATION DATA BASE DESCRIPTION AND PREPARATION

The complete insolation data base prepared in this study consists of hourly insolation data for the years 1962 and 1963 for the 20 locations listed in Table 3.1. These locations were selected to characterize the various climatic regions representative of the Southwestern United States. In addition, worst-case data bases have been prepared for two locations: Inyokern, California, and Albuquerque, New Mexico, by degrading the insolation data to account for uncertainties in the measurements.

In this section the data base is described in general terms, deferring to Appendix B the detailed format specifications.

The procedures employed to generate the data base are similar to those used in preparing the Southern California data base reported earlier (Reference 1), and the Southern California data are included. However, some improvements have been made in the data for the Southern California stations.

3.1 HOURLY DATA BASE DESCRIPTION

The hourly insolation climatology data base format is based on the Card Deck 280 format used by the National Climatic Center to archive hourly insolation data. The hourly record format has been expanded from 80 to 130 characters in order to include additional information and to provide space for future expansion. Space has been provided in the format to permit inclusion of data for every hour of the day. Consequently, weather data can be included for the 24-hour period, if available. Furthermore, all units have been converted to the International metric system. The format is described in detail in Appendix B. Sample listings of the data base contents for three days at two stations are provided in Appendix D.

TABLE 3.1

Insolation Data Base Stations and Data Sources

Station	Number	Weather Data Source[1]	Total Insolation Source[1,2]	Time Zone	Latitude (deg)	Longitude (deg)	Parameter Set[3]
Albuquerque, N. M.	23050	280	280	Mountain	35.05	106.62	1
Edwards AFB, Ca.	23114	144	Est.	Pacific	34.90	117.90	1
Riverside, Ca.	23119	144	Mans.	Pacific	33.95	117.45	1
Los Angeles Airport, Ca.	23174	280	280	Pacific	33.93	118.38	1
San Diego, Ca.	23188	144	Est.	Pacific	32.73	117.18	1
Yuma, Ariz.	23195	144	Est.	Mountain	32.65	114.62	1
Santa Maria, Ca.	23273	280	280	Pacific	34.90	120.45	1
Inyokern/China Lake, Ca.	93104	144	Mans.	Pacific	35.68	117.68	1
L. A. Civic Center, Ca.	93134	APCD	APCD	Pacific	34.05	118.23	1
Fort Worth, Tx.	03927	280	280	Central	32.83	97.05	2
Dodge City, Kansas	13985	280	280	Central	37.77	97.97	2
Tucson, Ariz.	23160	144	Mans.	Mountain	32.23	110.95	2
Phoenix, Ariz.	23183	280	280	Mountain	33.43	112.02	2
Omaha, Nebraska	94918	280	280	Central	41.37	96.02	1
Ely, Nevada	23154	280	280	Pacific	39.28	114.85	1
El Paso, Tx.	23044	280	280	Mountain	31.80	106.40	1
Fresno, Ca.	93193	280	280	Pacific	36.77	119.72	3
Midland, Tx	23023	144	Est.	Central	31.93	102.20	1
Salt Lake City, Utah	24127	144	Mans.	Mountain	40.78	111.92	1
Grand Junction Co.	23066	144	Est.	Mountain	39.12	108.53	1

NOTES TO TABLE 3.1

1. "280" signifies the Deck 280 format archived by the National Climatic Center for daylight hours only. "144" signifies the surface weather data Deck 144 archived by the National Climatic Center covering 24 hours per day (although not all data are recorded every hour). APCD indicates that the data were obtained from Los Angeles Air Pollution Control District records.

2. "Mans." indicates the hourly total insolation data were obtained in manuscript form from the National Weather Records Center. "Est." indicates total insolation values were estimated from weather data as described in the report.

3. Parameter set numbers refer to the set of total insolation estimating parameters employed to fill in data values when measured total insolation values were unavailable. See Table 4.1 for definition.

In general, the contents of the insolation climatology data base may be conveniently separated into three categories: identifying information, insolation data, and weather data. The specific data included in each category are listed in Table 3.2. Not all of the information listed in this table is available at any one station at all times.

3.1.1 Identifying Information

The identifying information category includes all quantities that can be calculated from known parameters without reference to individual observations, with the exception of the extraterrestrial insolation.

3.1.2 Insolation Data

Several different measures of the insolation are provided at hourly intervals in the data base so that the data will be useful for the analysis of both concentrating and non-concentrating types of collector systems. Values of normal-incidence (direct) insolation, total (hemispherical) insolation, and extraterrestrial insolation are included in the data base for all daylight hours. The extraterrestrial insolation can be computed from the sun-earth geometry. Measured values of the other insolation quantities have been used if measurements were available; otherwise, they were estimated by the means described later in this section. Included in the data base are all of the Southwestern United States locations for which measured insolation values for 1962 and 1963 were available from the National Climatic Center. As discussed in Chapter 2, some additional locations for which only weather data were available were included in order to complete the characterization of the Southwest.

The total extraterrestrial radiation (E) received on a horizontal flat plate during an hour was calculated from the following formula (Reference 2).

$$E = rI_s \left[0.9972 \cos(L) \cos(\delta) \cos(H) + \sin(L) \sin(\delta)\right] \qquad (3\text{-}1)$$

TABLE 3.2

Contents of the Insolation Climatology Data Base

1. Identifying Information

Station Number
Date as Year, Month, Day
Hour of Local Standard Time
Date as Modified Julian Day Number
Hour of Solar Time
Solar Elevation Angle
Solar Azimuth Angle
Solar Declination
Solar Week

2. Insolation Data

Extraterrestrial Solar Radiation on horizontal flat plate
Observed Total Solar Radiation on a horizontal flat plate for one hour
Flags to indicate when Total and Normal-Incidence Insolation have been estimated
Normal-Incidence Solar Radiation
Percent of Possible Total Insolation on a flat horizontal plate

3. Weather Data

Snow Cover
Opaque Sky Cover
Visibility
Weather and Obstructions to Vision (Precipitation, Haze, etc.)
Dry Bulb Temperature
Dew Point Temperature
Clouds and Obscuring Phenomena (See Appendix B for details)
Total Sky Cover
Wind Direction
Wind Speed
Station Pressure

where: r is the square of the ratio of the average earth-sun distance to the actual earth-sun distance, L is the latitude of the station, δ is the declination of the sun, and H is the hour angle at the midpoint of the hour for which the insolation is desired. The value used for the solar constant $I_s = 135.1\ mW/cm^2$ ($1.936\ cal\ cm^{-2}\ min^{-1}$), is based on recent high altitude aircraft measurements (Reference 3).

Measured values for normal-incidence (direct) insolation were available for only three sites: Albuquerque, New Mexico; Omaha, Nebraska; and Tucson, Arizona. Even for these sites, measurements of normal-incidence insolation were not made at hourly intervals but rather at times corresponding to certain standard air-mass ratios. Furthermore, only a very limited number of measurements were available for Omaha and Tucson. Where measured values of normal-incidence insolation were available, hourly values were obtained by interpolation and inserted into the data base; otherwise, values were estimated by means of the relation:

$$N = \begin{cases} b_1 + b_2 P & P \geq 25\% \\ 0 & P < 25\% \end{cases} \qquad (3\text{-}2)$$

where: $b_1 = -117.1\ W/m^2$; $b_2 = 12.28\ W/m^2$; and P is the percent of possible total insolation (the ratio of the total insolation value for the hour in question to the corresponding extraterrestrial insolation). This equation and the numerical values of the parameters were derived by means of a statistical analysis which is described in detail in Reference 1.

No measured values of total insolation were available for five locations in the data base: Edwards AFB, California; San Diego, California; Yuma, Arizona; Midland, Texas; and Grand Junction, Colorado. For these stations, values for opaque sky cover (S) were used to estimate values for the percent of possible total insolation (P) from which the total insolation was subsequently computed. The following estimating relation was used:

$$P = a_1 + a_2 A + a_3 S + a_4 S^2 + a_5 S^3 \qquad (3\text{-}3)$$

where A is the airmass ratio, computed from the solar zenith angle by means of a computer subroutine, based on the work of Kasten (Reference 4), which is described in Reference 1. A discussion of this equation, the values of the coefficients, and the statistical analysis used to determine these coefficients is presented in Chapter 4 of this report. At Edwards AFB, the opaque sky cover was measured only every third hour; for the intervening hours the total sky cover (R) was used to estimate the opaque sky cover, on the basis of the relation:

$$S = \begin{cases} R - 1 & R \geq 1 \\ 0 & R = 0 \end{cases} \qquad (3\text{-}4)$$

It was also necessary to establish specific procedures for dealing with the many gaps (missing data) in the records obtained from the National Climatic Center. These gaps ranged in length from a single hour to, in one case, several months. The procedure adopted for filling these gaps employed a hierarchical sequence of steps: when a measured value for total insolation was not available for a particular hour, a value was obtained from the calculated extraterrestrial insolation (Equation 3-1) and an estimated percent of possible total insolation (P) based, if possible, on a value for opaque sky cover observed at the same hour. If an opaque sky cover value was not available, then total sky cover for that hour was used, together with equation 3-4. If no sky cover data were available for the hour in question, then a value for P for one of the two adjacent hours was used. If this was not available, opaque sky cover was used in preference to total sky cover. If none of these data were available for the adjacent hours, a mean value of P from Table 4.1 was employed.

It was not necessary to use this latter arbitrary value for more than 2% of the possible observations at any location. The numerical relations used to estimate P from the opaque and total sky cover were those listed in the preceding paragraph.

As is indicated in the above discussion, the normal-incidence values are in many cases the result of two estimates. As such, these values should be regarded more as typical than as the values which would actually have been measured. Because of the limitations of the estimation procedures, the normal-incidence insolation data should not be used for at least two kinds of studies:

a. The comparison of regions to find areas of enhanced normal-incidence insolation in comparison to total insolation is impossible because all the normal incidence insolation values have been estimated from total insolation in the same way. This does not imply that, in fact, a location with such an enhancement might not exist. There is clearly a need for normal-incidence measurements at more locations.

b. Because the variations in normal-incidence insolation are smoothed out in the estimating procedure, the data base cannot, in general, be used in a conclusive comparison of a solar energy conversion system employing concentrating collectors. For those studies, the Albuquerque data, which include measured normal incidence insolation values, should be used.

3.1.3 Weather Data

The weather data available are much less complete than the insolation data. No attempt has been made to fill in missing weather data. For some stations weather data were obtained for daylight hours only, while for others the weather data cover 24 hour periods. Some of the weather parameters that are allotted a location in the data base are not available for some stations. Caution should, therefore, be used in depending on the availability of weather data in the data base.

3.2 DATA BASE PREPARATION AND VALIDATION PROCEDURES

3.2.1 Data Base Preparation

With the exception of the total insolation data for Los Angeles Civic Center (obtained from the Los Angeles Air Pollution Control District), all the data were supplied by the National Climatic Center at Asheville, North Carolina. These data were recorded in three different formats: Card Deck 280, in which hourly insolation values were combined with selected surface-weather data; Card Deck 144, containing hourly values for a somewhat larger set of weather variables; and manuscript records of hourly insolation data. The CD 280 and CD 144 data were sorted into ascending order by time and put in the format described in Appendix B, leaving blanks where data were not available in the input tape records. The insolation data obtained in manuscript form and those provided in a different tape-recorded format by the Los Angeles Air Pollution Control District were then inserted in the appropriate locations in the data base.

The tape records compiled in this manner were then ready for statistical analysis to determine the optimum parameters for estimating missing insolation values. The results of this analysis are discussed in Chapter 4 of this report. A final data-base preparation program was developed that provided estimated values to fill in all gaps in the insolation data. This program also printed out the data for every tenth day, as well as accumulating statistics on the number of estimations required to generate the data base.

The data base preparation program also prevented unrealistically large estimated values for normal incidence insolation for the early morning and late afternoon hours when the sun is near the horizon. Large estimated insolation values were possible for these time periods because the normal incidence insolation estimation procedure is based upon values for the percent of possible total insolation (P). A greater uncertainty in P exists in the early and late hours of the day than during the middle of the day because of the small total insolation values. For these hours the percent of possible insolation (P) is the ratio of two small numbers, with the associated higher fractional uncertainty. This could result in normal incidence insolation estimates at those times when the sun was nearest to the horizon that are consistently and unrealistically greater than those for the times when the sun was higher. Accordingly, in such cases the normal-incidence insolation was estimated at the same value as the normal-incidence insolation for the adjacent hour that reflected a greater solar elevation angle.

3.2.2 Data Base Verification

The data base was verified by examining the print-out from the final program and, in particular, the print-out of all the data for every tenth day. Correctness of solar position values in the print-out was checked by comparison with hand calculations. Time shifts in the total insolation (see discussion below) were checked by noting the symmetry about noon of the values for percent of possible total insolation (P), particularly for clear days.

Reproductions of the original continuous strip chart records for Albuquerque, New Mexico, were obtained for the months of June 1963, and June, 1964. The corresponding strip chart records of normal incidence insolation at Albuquerque were not available for periods prior to 1964; however, these charts were obtained for June, 1964. Examples of these strip charts are provided in Figures 3.1 through 3.3. Typical days were selected from this set of charts, and the 1963 total insolation charts were compared with the total insolation values in the data base to verify that the values received from the National Climatic Center in Card Deck 280 format were indeed integrated hourly values for the days in question. The normal incidence chart records were used to verify the interpolation procedures employed to obtain hourly normal incidence insolation from the values published for standard air-mass ratios in the Climatological Data National Summary. It was found, in fact, that the interpolation

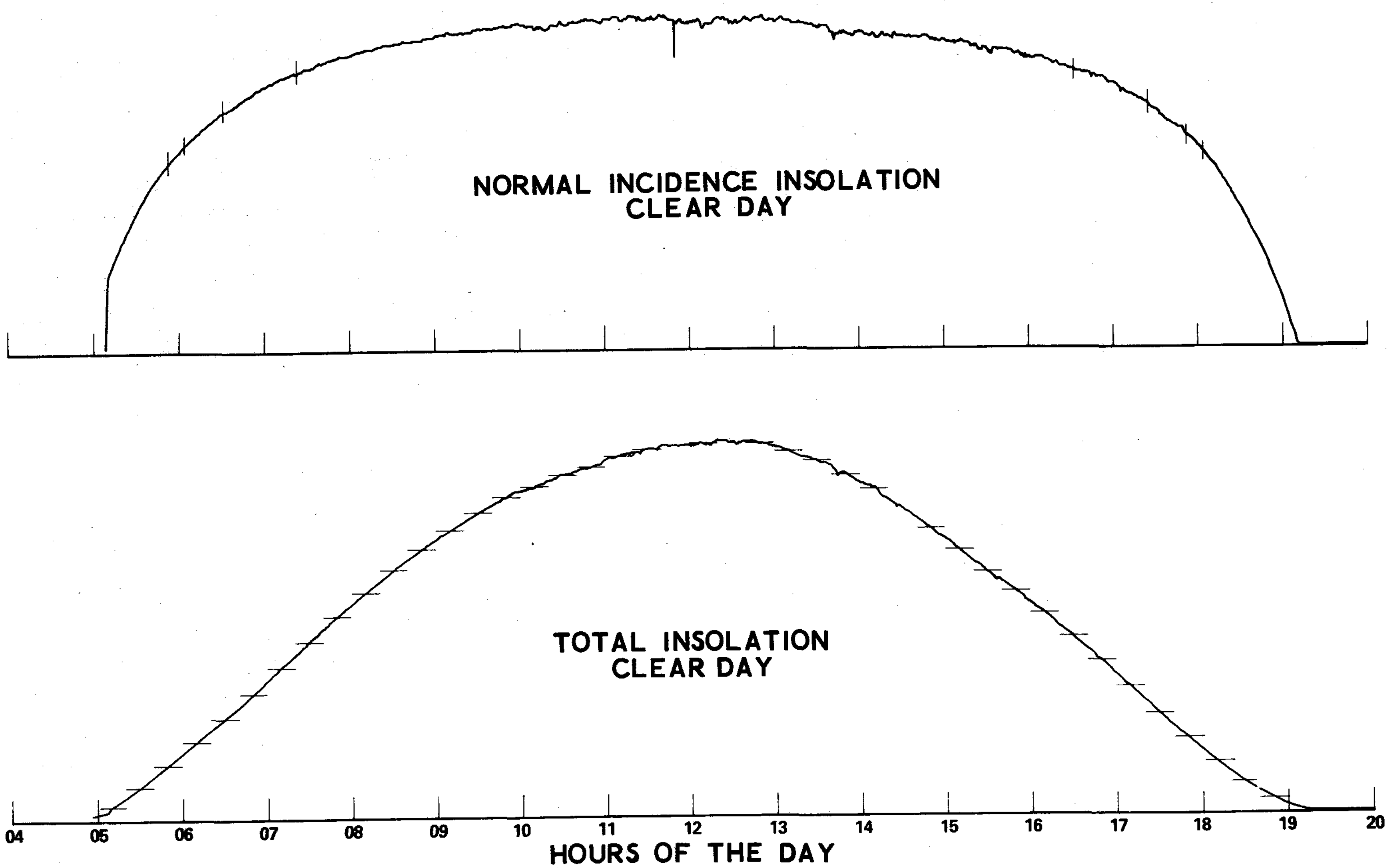


FIGURE 3.1 Raw Insolation Data, Albuquerque, New Mexico, 14 June 1964, Clear Day

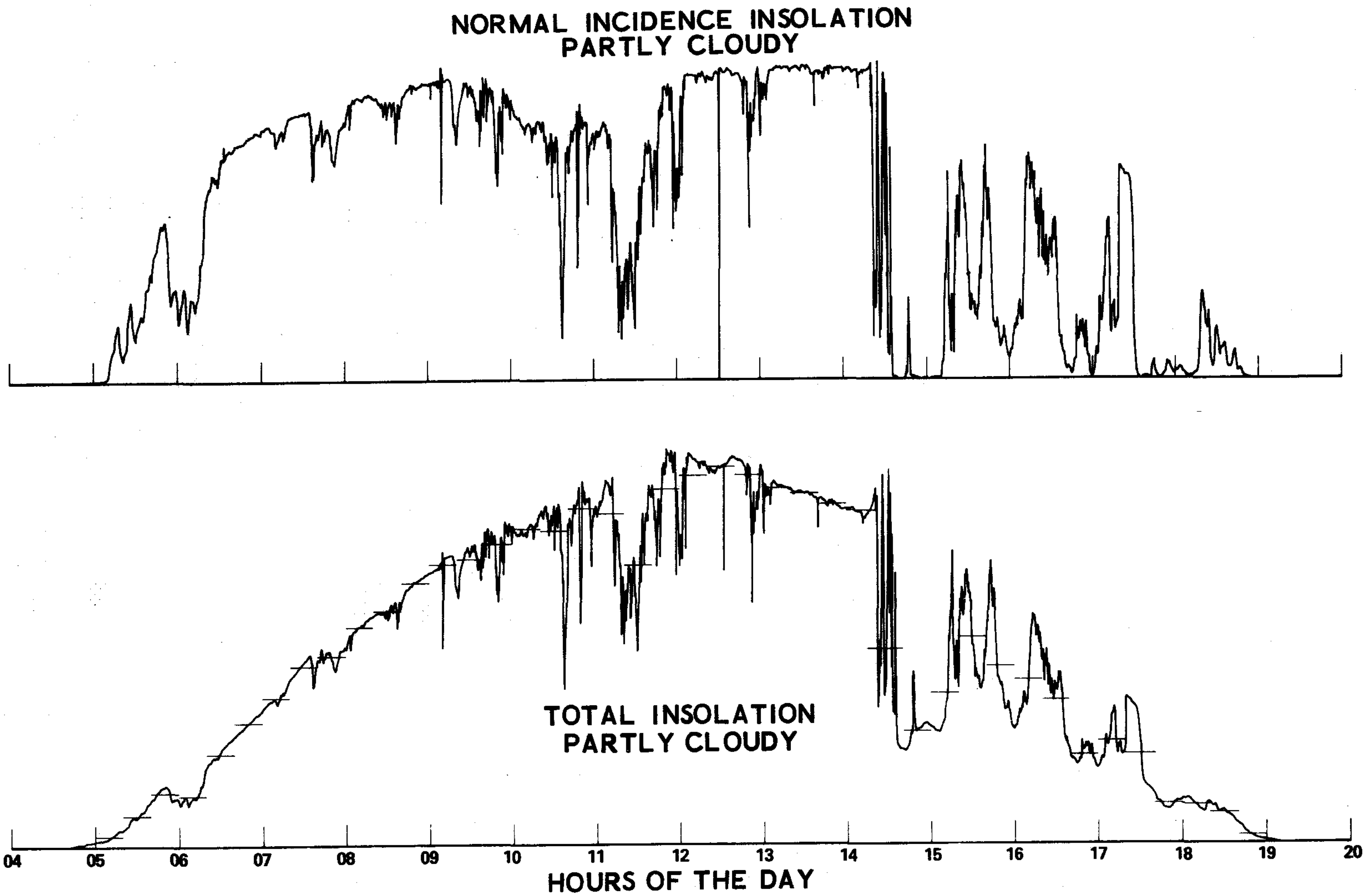


FIGURE 3.2 Raw Insolation Data, Albuquerque, New Mexico, 5 June 1964, Partly Cloudy

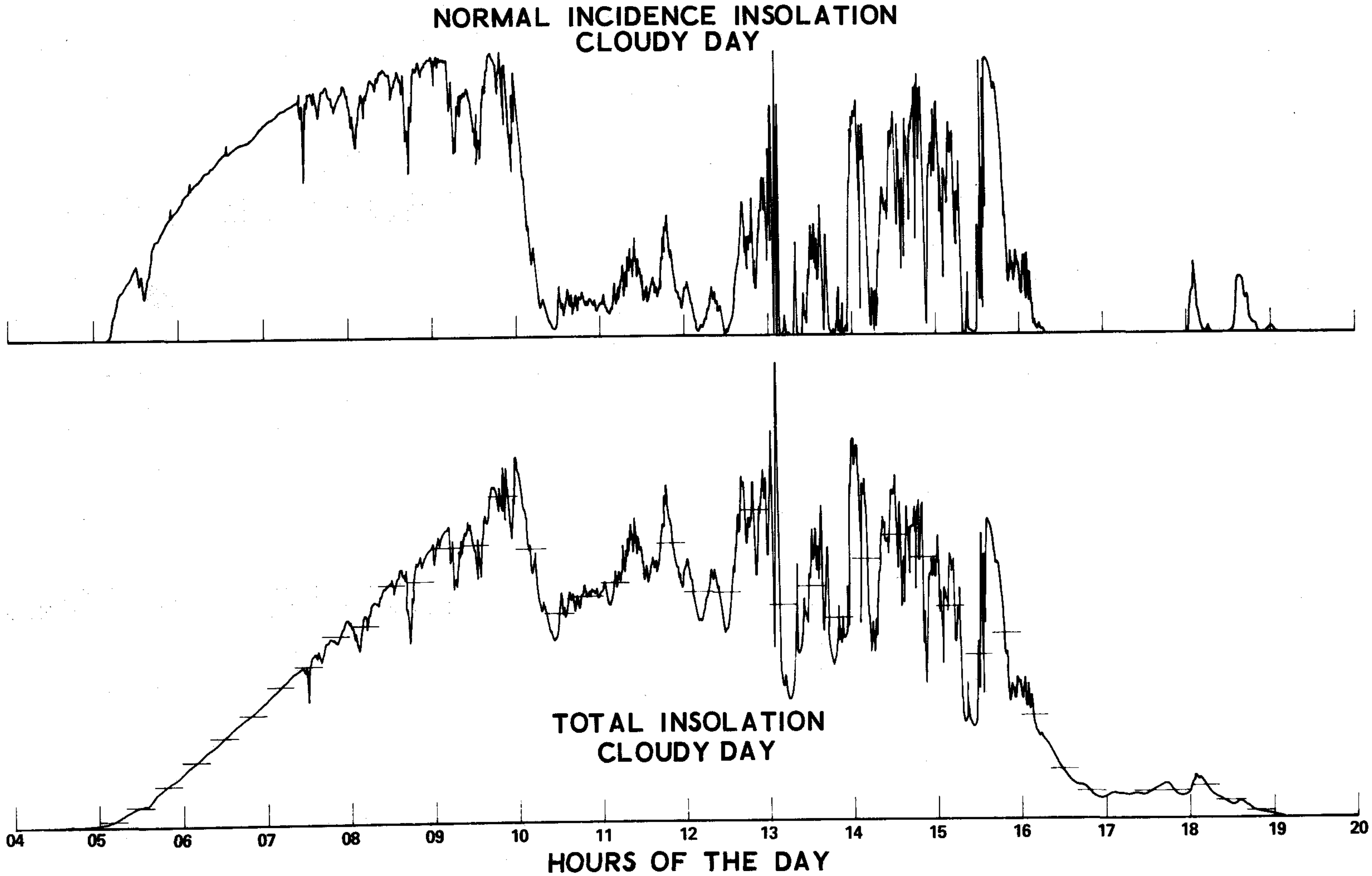


FIGURE 3.3 Raw Insolation Data, Albuquerque, New Mexico, 3 June 1964, Cloudy

procedures tend to underestimate the normal incidence insolation by 1-3%, so that the normal incidence values in the data base are slightly conservative.

3.2.3 Time Shift in Total Insolation Data for Inyokern and Salt Lake City

A difference between the time base used in measuring total insolation and that used to compute extraterrestrial radiation leads to unrealistic estimated values of normal incidence insolation because of the error introduced in the computed values for the percent of possible total insolation (P). This arises because the measured total insolation depends on the cosine of the zenith angle of the sun. If a time bias exists, the effect is to compare the measured insolation with computed extraterrestrial insolation for a different zenith angle. If there is a constant difference between the two time scales, the results are values of percent of possible total insolation that are too high in the morning, nearly correct at noon, and too low in the afternoon, or vice versa, depending on the direction of the time shift. In either case, the expected symmetry for clear days about noon is destroyed. The same error is carried forward into estimated normal incidence data.

A time bias error of this type, amounting to about 18 minutes, was discovered in the manuscript records of total insolation measurement data for Inyokern, California, as a result of the incorrect application of the correction for longitude to obtain local mean solar time from local standard time. It was possible to verify the existence of this time bias through the cooperation of personnel at the Naval Weapons Center at China Lake, who were responsible for the basic measurements. The Inyokern data tape was accordingly revised to correct for this time shift. Applying an 18-minute correction made most of the values for the percent of possible total insolation acceptable; however, for a few time periods the effect was to make the distortion worse. For these time periods other corrections, never exceeding 18 minutes, were applied. It is believed that these procedures have removed virtually all of the problems introduced into the Inyokern data base by time shifts.

The Salt Lake City manuscript insolation data records also appeared to contain time biases. Unfortunately, the pattern of the error was not as clear as for the Inyokern data. Furthermore, it was impossible to contact anyone familiar with the data-taking procedure followed in 1962 and 1963. As noted above, the effect of such a time bias is to artificially cause the values of the percent of possible total insolation to either increase or decrease monotonically over a large fraction of the day. Figures 3.4 and 3.5 show for clear days at Salt Lake City the time shift required to minimize the slope of the percent of possible total insolation versus time. It was felt to be unreasonable to correct the record for each day by minimizing the slope because this would arbitrarily remove any real fluctuations. It is believed that the source of the time errors is most likely an error in data reduction procedure and thus likely to persist for at least several days at a time. It was, therefore, decided to apply the same correction for significant periods of time. On the basis of the results illustrated in Figures 3.4 and 3.5, the corrections shown in Figure 3.6 were applied to the data records for 1962, while a constant correction of 12 minutes was applied to the 1963 data.

The Salt Lake City data should, therefore, be used with caution; first, because the time correction procedure employed did not remove all the unusual days and, second, because there is no independent justification for the correction applied. This is in contrast to the Inyokern situation where the basis for the correction was independently verified by a review of the data reduction procedures.

3.3 DATA BASE VALIDATION

The insolation data base developed in this program can be considered truly representative only if the years 1962 and 1963 were reasonably

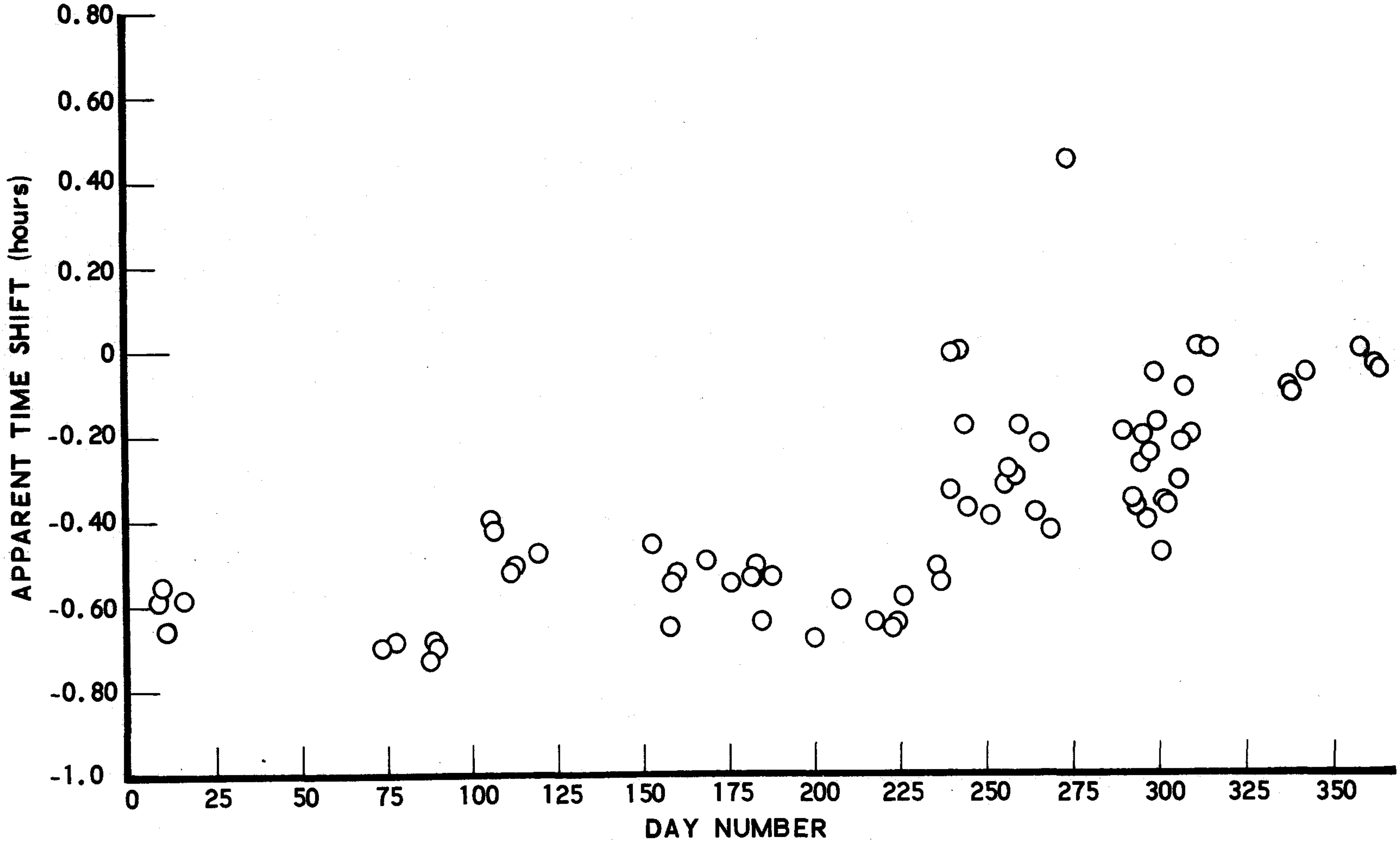


FIGURE 3.4 Apparent Time Shift in 1962 Salt Lake City Total Insolation Data

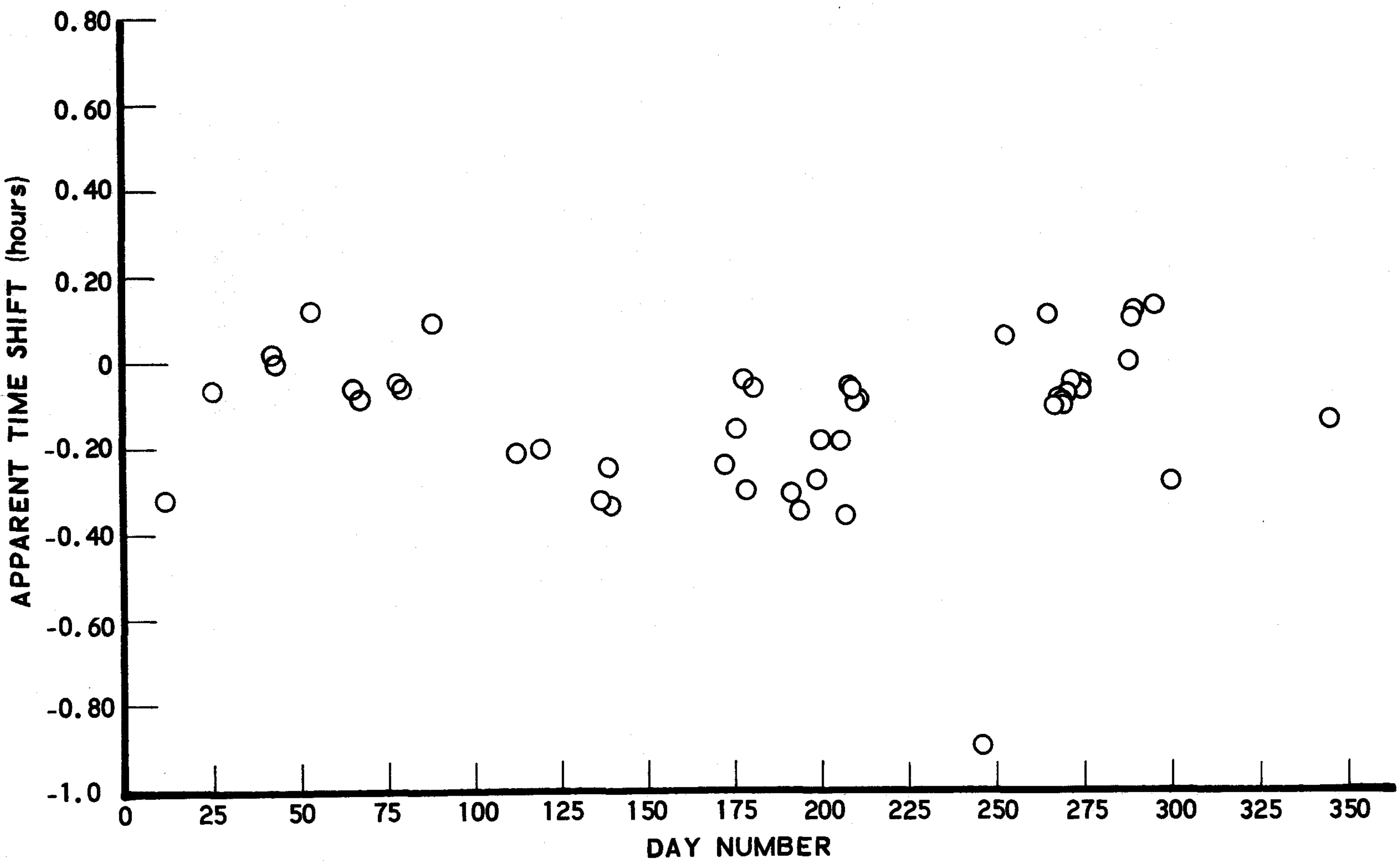


FIGURE 3.5 Apparent Time Shift in 1963 Salt Lake City Total Insolation Data

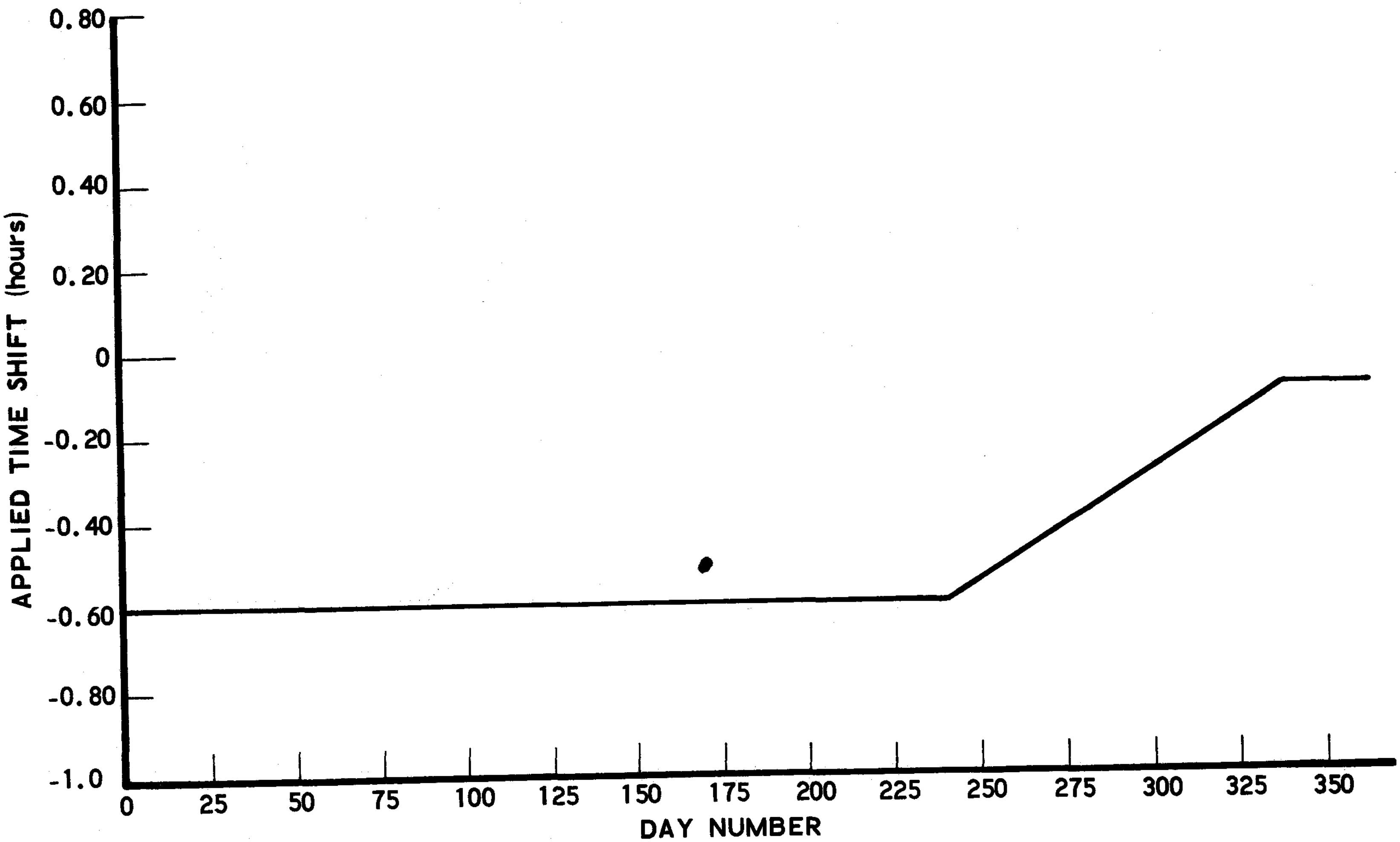


FIGURE 3.6 Time Shift Applied to 1962 Salt Lake City Total Insolation Data

typical from the point of view of solar radiation. In order to determine how representative these years were, long-term records of total daily insolation (Weather Service Card Deck 480) were obtained on magnetic tape from the National Climatic Center.

The long-term Deck 480 records include daily values of total insolation for all stations in the United States where total insolation is routinely measured, for time periods extending from as early as 1952 to early 1973. During certain periods of time data are missing from these records, and no attempt was made to fill these gaps. Because of these gaps the most unbiased quantities which can be obtained from the long-term records are values for the percent of possible total insolation (P).

From these records for the entire United States, the data for the Southwestern United States stations represented in the record have been extracted. For each of these stations, average values of the percent of possible total insolation were computed on an annual basis and for the extreme months of June and December. These data were plotted as a function of year. The results for Ely, Nevada, which are typical of most of the stations, are shown in Figure 3.7.

The years selected for the detailed hourly data base, 1962 and 1963, seem to be quite typical of the insolation climate of the Southwest. This conclusion is qualitatively supported by data like that shown in Figure 3.7 but for the other locations; these also show that 1962 and 1963 were not unusual years.

A more quantitative demonstration is available in Table 3.3. This table shows the difference between the mean value of percent of possible total insolation for the year in question and the average value of percent of possible total insolation over all the years for which data exist in the long-term data collection. In the first column the magnitude of this difference is given; in the second, the difference is expressed as a fraction of the standard deviation (σ) calculated for that station from the long-term data.

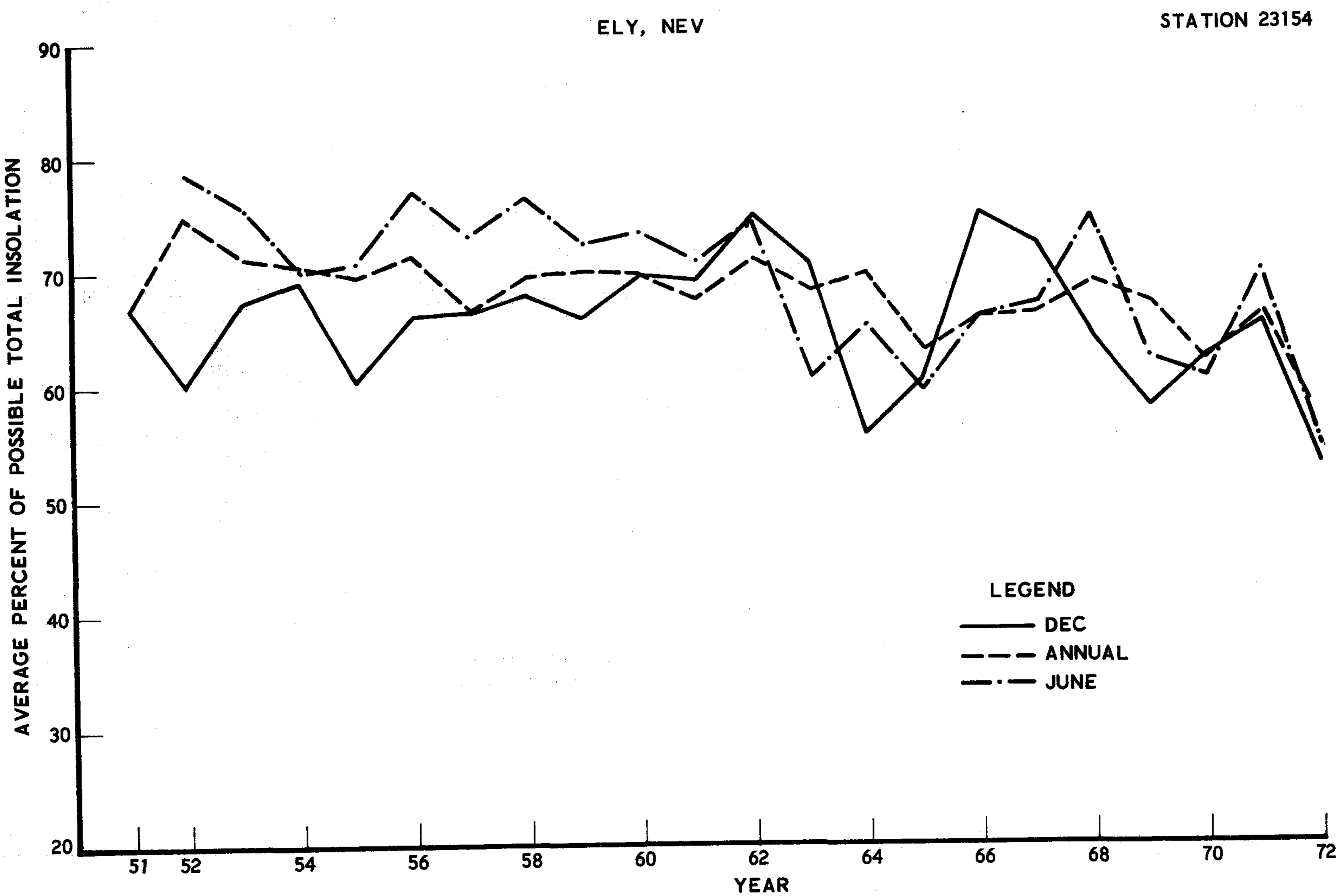


FIGURE 3.7 Average Percent of Possible Total Insolation, Ely, Nevada

TABLE 3.3

Comparison of Average Percent Possible Total Insolation For 1962 and 1963 With Long Term Averages

Station/Year	(Annual Average) - (Long-term Average)	
	Magnitude	Magnitude/σ
Fort Worth		
1962	1.35	.29
1963	1.45	.31
Tucson		
1962	2.55	.54
1963	3.75	.79
Dodge City		
1962	-.84	-.17
1963	1.36	.28
El Paso		
1962	.69	.22
1963	2.39	.78
Albuquerque		
1962	2.47	.57
1963	.12	.03
Ely		
1962	3.11	.79
1963	.31	.08
Fresno		
1962	1.88	.39
1963	.58	.12
Omaha		
1962	1.31	.36
1963	2.11	.58

It is seen that the 1962 and 1963 data are within one standard deviation of the mean for all the stations. (A similar analysis for Southern California stations is available in Table 2, Reference 1.)

3.4 WORST-CASE ANALYSIS

In order to assess the impact of insolation data uncertainties on solar power plant performance, alternative "worst-case" insolation data bases have been prepared for the two weather stations, Inyokern and Albuquerque. The generation of these worst-case data bases from the nominal data bases required a number of assumptions about the magnitudes of the various sources of uncertainties in the data. These uncertainties were then combined pessimistically to generate the "worst-case" data bases. These worst-case data bases are labeled with fictitious station numbers to avoid confusion with the standard data base. Albuquerque (worst-case) is labeled 99050, and Inyokern (worst-case) is 99104.

There are at least four general categories of uncertainty affecting the standard insolation data bases. These are: (1) uncertainties associated with the yearly climatic variability of insolation; (2) uncertainties introduced by the statistical estimating procedures used to fill in either missing total insolation values or to estimate the direct insolation values at Inyokern; (3) drifts in sensitivity between calibrations of the pyranometers and pyrheliometer; and (4) uncertainties in the calibration of the instruments involved in the measurements.

Sufficient data to permit quantitative estimates of probable errors, in the sense of standard deviations, exist only for the second category. In the following paragraphs these data are presented, along with arguments supporting the quantitative choices made with respect to the other categories of uncertainty. These estimates are summarized in Table 3.4, along with the combined overall reduction factors. These reduction factors were applied to the relevant quantities in the original standard data bases for

TABLE 3.4

Worst-Case Analysis Reduction Factor Summary

Factor	Inyokern				Albuquerque			
	Total Insolation		Normal Inc. Insolation		Total Insolation		Normal Inc. Insolation	
	1962	1963	1962	1963	1962	1963	1962	1963
Climatic Variability	.874	.922	NA	NA	.907	.937	.907	.937
Estimation Error	NA	NA	$b_1 = -83.55\ w/m^2$ $b_2 = 11.63\ w/m^2$		NA	NA	NA	NA
Calibration Factor	.970	.970	note 3		.96	.96	.985	.985
Drift Factor	.965	.965	note 3		.99	.97	1.0	1.0
Combined Reduction Factor (note 1)	.834	.879	note 2		.869	.890	.893	.923

Note 1 see text for detailed discussion

Note 2 see text for detailed discussion

Note 3 ignored - see text for discussion these two stations to develop the reduced magnitudes of insolation that are present in the worst-case data bases.

3.4.1 Insolation Variability

Two distinct issues may be identified here. One is associated with the short-term variability of the data: does the insolation for the sample years of 1962 and 1963 differ significantly from the mean values for these same locations? The second is associated with the long-term trend: is the average insolation going up or down, either because of long-term climatic effects or because of fundamental changes in the energy output by the sun itself? Data of sufficient accuracy simply do not exist for long enough time periods to unequivocally demonstrate the existence or non-existence of long-term insolation variations from either of these sources. Long-term changes in climate are of great importance for many reasons in addition to its importance in the field of solar power (for example, agriculture) and, consequently, these questions are beginning to receive more attention. This is an area of research of continuing interest to analysts of the mission of solar-thermal power. However, in the present worst-case analysis, long-term trends have been assumed to be negligible, in view of the lack of clearly demonstrated trends.

With respect to short-term variations, the years chosen for the basic data base appear to be quite typical of the sites chosen, as is demonstrated in Table 3.5. From the total insolation data covering a span of 20 years the mean and standard deviations in percent of possible total insolation have been calculated. The means for 1962 and 1963 are then compared with these 20 year means. With the exception of the 1962 Inyokern data, all are within one standard deviation of the mean.

In preparing the worst-case data bases the effect of short-term variability has been taken into account by multiplying the data by a correction factor which has the effect of reducing the annual mean value of total insolation

TABLE 3.5

Yearly Climatic Variability
Percent of Possible Total Insolation

Station	Albuquerque	Inyokern
Mean (20 year)	70.72	72.00
Standard Deviation (1σ)	4.33	4.40
1962 Deviation	2.47 ($\pm 0.57\sigma$)	5.34 ($\pm 1.21\sigma$)
1963 Deviation	0.12 ($\pm 0.03\sigma$)	1.32 ($\pm 0.30\sigma$)
1962 Worst Case Factor	.9070	.8741
1963 Worst Case Factor	.9372	.9220

to a value which is one standard deviation (1σ) below the 20-year mean. Consequently, a different correction factor has been used for each year and station; these factors are listed in Table 3.5. These same factors are assumed to apply to the direct insolation since no independent long-term analysis exists for the normal incidence data.

3.4.2 Statistical Uncertainties of Estimates

The normal incidence insolation values for Inyokern were generated entirely by estimation. The estimated normal incidence insolation (N) is related linearly (Equation 3-2) to the percent of possible total insolation (P) by means of coefficients obtained from the measured Albuquerque, New Mexico, and Blue Hill, Massachusetts, data (Reference 1). The Albuquerque data are shown in Figure 3.8. Superimposed is the linear regression line derived from these data. The coefficients and associated standard deviations are $b_1 = -83.7 \pm 0.153$ W/m^2 and $b_2 = 11.65 \pm 0.014$ W/m^2. In preparing the worst-case data base for Inyokern, the effect of uncertainty in the estimation procedure was incorporated by re-estimating the normal incidence data with modified estimation coefficients:

$$b_1 \text{ (worst)} = -83.55 \text{ W/m}^2, \quad b_2 \text{ (worst)} = 11.636 \text{ W/m}^2.$$

These coefficients are smaller than the average coefficients by one standard deviation (1σ). For reference, this -1σ estimation line is drawn in Figure 3.8 together with lines corresponding to coefficients that are smaller than the average by 2σ and 3σ.

Other estimation procedures were used to fill in occasional gaps in the total insolation data for both Albuquerque and Inyokern and the direct insolation data for Albuquerque. Since these estimates affect only a small fraction of the data, no modification of the statistical estimation procedures were used in preparing the worst-case data bases.

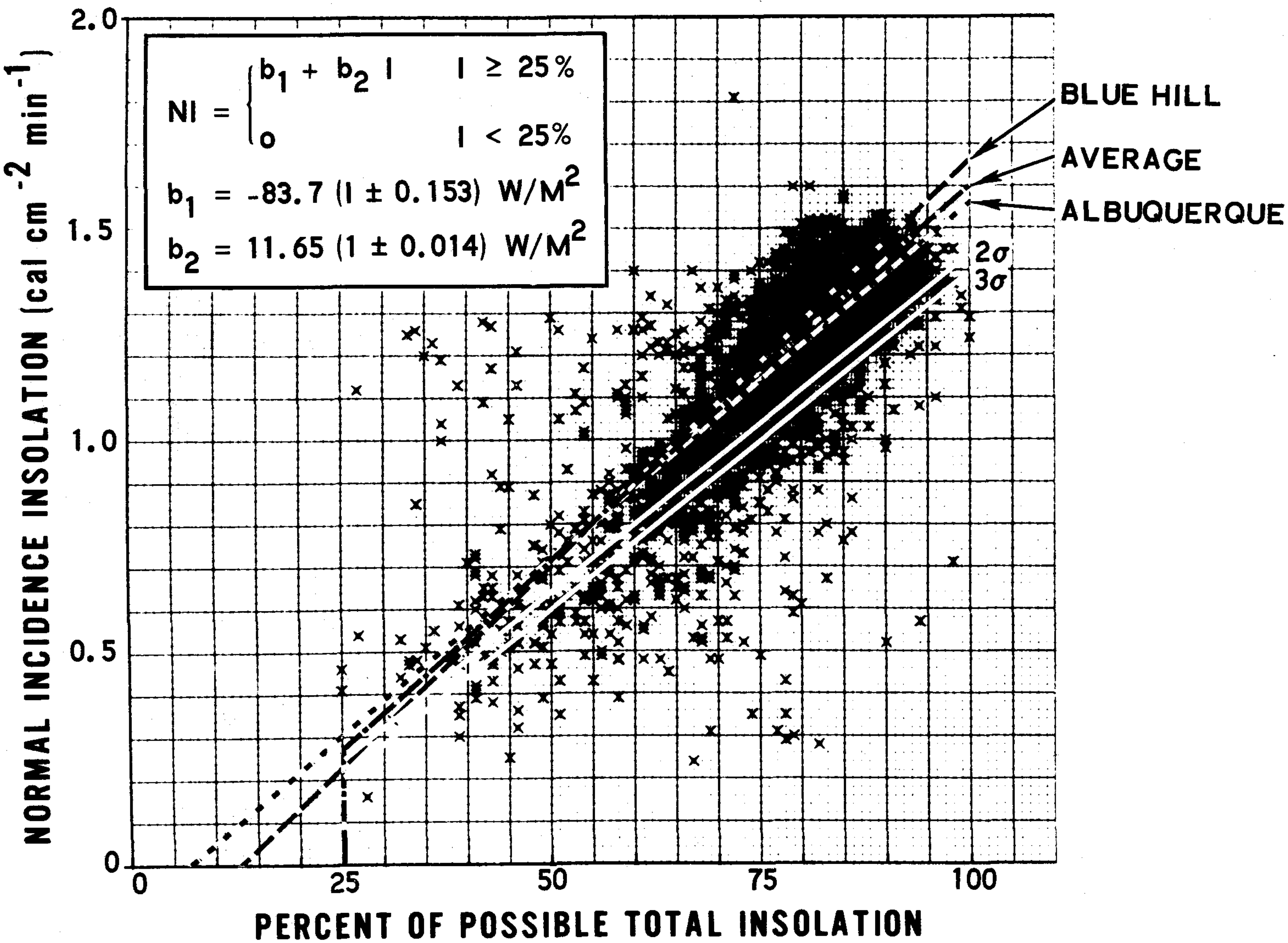


FIGURE 3.8 Normal-Incidence Insolation as Function of Percent of Possible Total Insolation, Albuquerque, 1962-63

3.4.3 Sensor Drift

The Albuquerque pyrheliometer was calibrated in 1960, 1968, and 1970. The sensitivity values obtained in these calibrations were 1.95, 1.92, and 1.94 mV/(Langley min^{-1}), respectively. Since the differences in these values are within the stated reproducibility of the calibration procedure, it is believed that no drift took place in the calibration of the Albuquerque pyrheliometer. In the worst-case data base for Albuquerque, therefore, no adjustment has been made for the effect of pyrheliometer drift in the normal incidence values.

The Inyokern pyranometer was calibrated in 1950 when installed. No information about the details of this calibration have been located. Subsequently, it was calibrated 16 years later in 1966, first by comparison with a traveling standard device at Inyokern, California, and shortly thereafter by direct comparison with a primary standard in Silver Spring, Maryland. Both comparisons indicated that a drift of about 16% had taken place. This drift has been assumed linear and has been applied as a correction to the standard data base for Inyokern. Since only two calibration points are available, which were already used to correct the standard data base, it is difficult to assign an additional drift factor for the worst-case analysis. It is unlikely, however, that the drift during the 16-year period was ever greater than at the end. Accordingly, for the worst-case data base, it was simply assumed that the entire 16% change occurred prior to 1962. This assumption leads to reduction factors for drift, in addition to those already applied to obtain the standard data base, of 4% and 3% for the years 1962 and 1963, respectively. For simplicity, a single value of 3.5% was used for both years (correction factor .965).

The Albuquerque pyranometer was calibrated in 1962 and 1967, with respective sensitivities of 2.75 and 2.52 mV/(Langley min^{-1}), corresponding to a change of about 1.8% per year. Accordingly, for the worst-case data base for Albuquerque, drift adjustments of -0.9% for 1962 and -2.7% for 1963 were applied.

3.4.4 Calibration Uncertainties

A study has been made by Dr. K. Hanson of NOAA of the procedures employed by the National Weather Service (NWS) for calibrating pyranometers used to measure total insolation. In general, he finds the procedures lead to indicated insolation values higher than the true insolation by 3 to 5% as a result, for example, of the use of incorrect sensitivity values for the calibration standards. Calibration errors of at least this size were found for most of the instruments. Hanson believes, however, that an additional 7.5% error exists for some sensors, as a result of the spectral characteristics of the different types of blacks used in the sensors. Several of the calibration standards maintained by the Weather Service (e.g., unit 2620) have lamp-black coatings. Comparisons with these standards may be made either in sunlight or in an integrating sphere with artificial illumination. Many other pyranometers use a coating called Parson's black. It has been found that comparisons between a Parson's black instrument and a lamp-black instrument in the integrating sphere do not agree with comparisons between the same two instruments in sunlight. The 7.5% spectral factor may be attributed to this difference.

There is, however, conflicting evidence with respect to these calibration errors, particularly in the case of the pyranometer used at Inyokern between 1950 and 1966. In 1966 this lamp-black instrument was calibrated in the field (sunlight) against a Parson's black traveling standard. The traveling standard, in turn, had been calibrated against a lamp-black primary standard using an integrating sphere. This sequence should have led to a total calibration error of more than 11%. Yet a direct comparison between the Inyokern instrument and a lamp-black primary standard, carried out in Silver Spring several weeks later, essentially reproduced the quantities obtained in the field. There is clearly some contradiction, which can only be resolved through further study of the history of the NWS calibrations in question. For the purposes of the present study, the 7.5% contribution to the error that is associated with the spectral properties of the Parson's black/lamp black comparison has not been included. The adjustment factors used to generate the worst-case data base are .97 for Inyokern (the error ascribed by Hanson to the 1966 Silver Spring calibration of the Inyokern instrument) and .96 for Albuquerque (the Hanson correction factor after the 7.5% contribution is removed).

There appears to have been no systematic study of the calibration procedures used with normal-incidence pyrheliometers. The 1960, 1968, and 1970 calibrations of the Albuquerque instrument, as noted above, led to values which differed by at most 1.5%. Accordingly, in constructing the worst-case data base for Albuquerque, an adjustment factor of .985 was used for the normal-incidence insolation data in order to take into account the effect of uncertainties in pyrheliometer calibrations.

3.4.5 Combination

In the foregoing sections an account has been given of the basic information available for determining the reduction required to obtain worst-case data bases from the standard data bases. In this section the rationale for the combination of these quantities in the present study is included. The corrections applied are summarized in Table 3.4.

3.4.5.1 Albuquerque Normal Incidence Data

For this study, only two of the four effects are applicable: (1) the sensor calibration factor (.985) and (2) the yearly variability factor (.9070 for 1962 and .9372 for 1963). Since only the sensor calibration error is a statistical error, the factors were simply multiplied to derive the overall reduction factors of .893 for 1962 and .923 for 1963.

3.4.5.2 Inyokern Normal Incidence Data

All of the effects discussed above for Albuquerque must be taken into account in adjusting these data for the worst-case data base at Inyokern. In addition to the effects of insolation variability and of the statistical uncertainty in the estimation procedure, the drift and calibration uncertainties associated with the Inyokern pyranometer must be considered, because these normal-incidence data are estimated on the basis of the total insolation data obtained with this instrument.

Furthermore, since the estimation procedure itself is based on correlations between the Albuquerque pyrheliometer and pyranometer data, the drifts and calibration errors associated with these instruments also enter. Incorporation of these latter drifts and calibration errors, however, would revise the estimation parameters in such a way as to produce increases in estimated normal-incidence insolation data. Since this result would be contrary to the worst-case philosophy, the effects of the drift and calibration errors in the Albuquerque instruments on the estimation parameters (b_1 and b_2) were not included in the calculation of the worst-case adjustment factors for the Inyokern normal incidence values.

Consequently, the preparation of the Inyokern worst-case normal-incidence data was simply accomplished by using the worst-case values of the estimation parameters (b_1 and b_2) and the worst-case values of percent of possible total insolation (obtained from worst-case values of total insolation at Inyokern) in the correlation equation (Equation 3-2) for estimating these normal-incidence data.

3.4.5.3 Inyokern Total Insolation Data

The three significant effects are a 3% calibration uncertainty, a 3.5% uncertainty in the drift, and the insolation variability shown in Table 3.5. The calibration and drift were assumed to be statistically independent, leading to a combined value of 4.6% or an adjustment factor of .954. This value, combined with the insolation variability factors, results in reduction factors of .834 for 1962 and .879 for 1963, respectively.

3.4.5.4 Albuquerque Total Insolation Data

The three significant effects are a 4% calibration uncertainty, drift values of 0.9% for 1962 and 2.7% for 1963, and the insolation variability factors. The results of combining these factors, in the manner outlined above for Inyokern, are reduction factors of .869 for 1962 and .890 for 1963. Redundant calibrations are not available for the Albuquerque instruments, and because of the ambiguities in the Inyokern calibration, the 7.5% spectral reduction has not been applied to the data.

4. STATISTICAL STUDIES RELATED TO INSOLATION

One objective of the insolation analysis was to compile the hourly insolation data as well as other related data into summaries which can be used in preliminary analyses. These summaries are described in this chapter. One important issue has been the statistical analyses of the hourly insolation measurements required to provide estimating parameters for filling in missing data in the data base. The derivation of these estimating parameters is the topic of the first section. Subsequent sections deal with long-term trends, frequency distributions of insolation and wind velocity at selected sites, summaries of the insolation data, and the correlation of temperature with insolation. In addition, monthly and annual averages of direct and total insolation for all the study sites and percentile distributions of insolation were compiled, as well as insolation values on typical days at the Inyokern and Albuquerque stations.

4.1 DERIVATION OF INSOLATION ESTIMATING PARAMETERS

In the previous report (Reference 1) a detailed discussion was included of the correlation between opaque sky cover, S, and the percent of possible total insolation, P, and of procedures to exploit this correlation in order to provide estimators for missing insolation data. This same procedure was employed for each of the additional Southwestern U.S. Stations for which incomplete insolation data were available. As was determined previously, a third-order polynomial fit was adequate to represent the relationship between S and P. Graphs similar to Figure 4.1 were plotted for each of the eight stations. Plots for three of the stations - Omaha, Nevada; Ely, Nevada; and El Paso, Texas - fell within the envelope of the curves obtained in the previous study and have been designated Group I. For these three stations the estimating coefficients previously derived were used to fill in the missing insolation data.

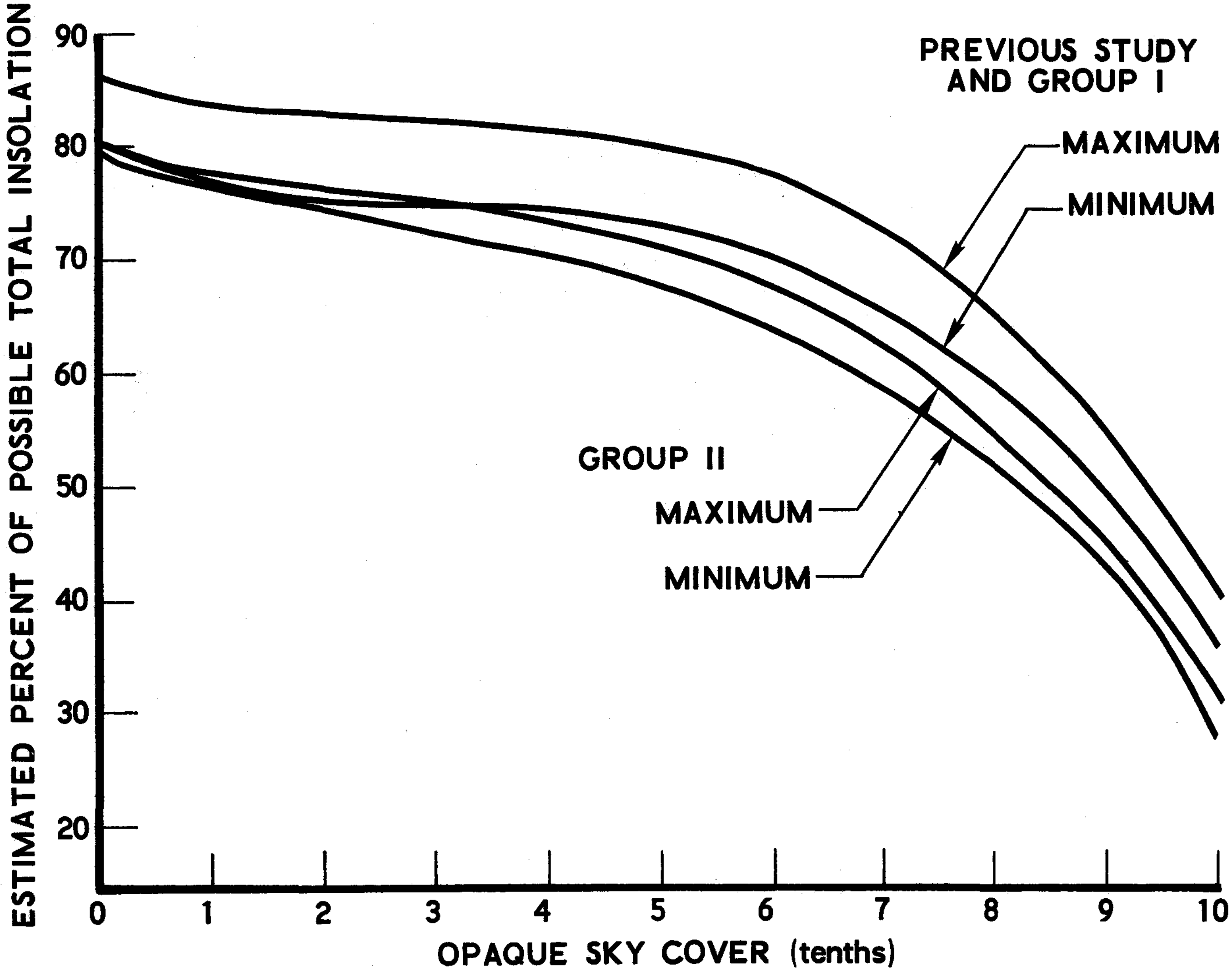


FIGURE 4.1 Third-order Polynomial Estimates of Percent of Possible Total Insolation

Five of the remaining eight stations had plots which fell outside the envelope of the previous data. Four of these stations - Fort Worth, Texas; Dodge City, Kansas; Tucson and Phoenix, Arizona - were found to have similar characteristic curves. The envelope of these curves, labeled "Group II" is shown in Figure 4.1. Group III consisted of the remaining station, Fresno, California, which required estimating parameters outside the envelopes of both groups I and II. The polynomial-fitting procedure described in the previous report was used to derive separately the estimator coefficients for groups II and III. The results of these calculations are given in Table 4.1 along with the previously derived values employed for group I.

Of the remaining three stations, two locations - Midland, Texas, and Grand Junction, Colorado - had no insolation data available whatsoever. Therefore, the insolation data for these two locations had to be entirely estimated. The Group I estimator parameters were used to estimate the insolation for these two locations. The choice of Group I over the Group II parameters was somewhat arbitrary but was based on the climatological similarity of Midland and Grand Junction to the stations of Group I.

The remaining station, Salt Lake City, Utah, had insolation data available but suffered from the variable time shift problem described in Chapter 3. Since this time shift affects the percent of possible total insolation values, it was felt that little faith could be placed in a separate estimator parameter analysis. For this reason, no statistical analysis of the Salt Lake City insolation data was carried out. Instead, the parameters of Group I were selected to estimate the missing insolation data.

The normal incidence data for Omaha and Tucson were too limited to justify modification of the normal incidence insolation estimating procedures that were derived earlier on the basis of the Albuquerque, New Mexico, and Blue Hill, Massachusetts, data. The available Omaha and Tucson

TABLE 4.1

Total Insolation Estimator Coefficients

Parameter	Group I[a]	Group II[b]	Group III[c]
a_1	+83.018	+78.953	+78.335
a_2	- 3.847	- 2.233	- 2.817
a_3	- 4.4074	- 2.9536	- 6.2334
a_4	+ 1.10129	+ 0.64274	+ 1.41585
a_5	- 0.110903	- 0.084663	- 0.128537
Mean Values	59.5105	62.8547	60.8421

a. Group I includes Los Angeles Airport, Riverside, Santa Maria, California; Omaha, Nebraska; Ely, Nevada; and El Paso, Texas.

b. Group II includes Fort Worth, Texas; Dodge City, Kansas; and Tucson and Phoenix, Arizona.

c. Group III is characteristic of Fresno, California.

data were compared with the Albuquerque data. No significant deviations were found that would require a change in the Albuquerque-based estimators.

4.2 LONG TERM INSOLATION TRENDS

Daily insolation summaries (National Climatic Center Card Deck 480 format), covering a time period up to 20 years, were obtained for 15 insolation measuring stations in the Southwestern U.S. For each day, this data summary provides values of the total insolation, the total time of sunshine, and the average cloud cover. Each of these three quantities, expressed as a percent of the possible value, was averaged by months and years, and these averaged values were examined.

The annual averages were plotted as a function of year to indicate long-term trends. Typical data for Albuquerque, El Paso, and Fresno are shown in Figures 4.2 through 4.4, respectively. In addition to the annual average values, linear regression lines computed from these data are shown in these figures. From these figures and similar data for the other stations, it was found that the trends for total insolation and sunshine appear to be slightly downward while the trend in cloudiness appears to be upward.

A more quantitative summary of these long-term data is provided in Tables 4.2 through 4.4. One table is devoted to each of the three variables: total insolation, sunshine, and average cloudiness, obtained from the Card Deck 480 summaries. The general format of each of the tables is the same. The first two columns provide the station number and name as they appear in Card Deck 480; the third column indicates the time period for which data were included in the statistical summaries provided in the remainder of the table. Column 4 provides the average value for the entire time period. Columns 5 and 6 describe the linear regression lines by providing their slopes and their ordinates in 1952, the earliest year for which long-term data were available for analysis. The last three columns indicate in which month(s) the maximum, minimum, or typical average values of

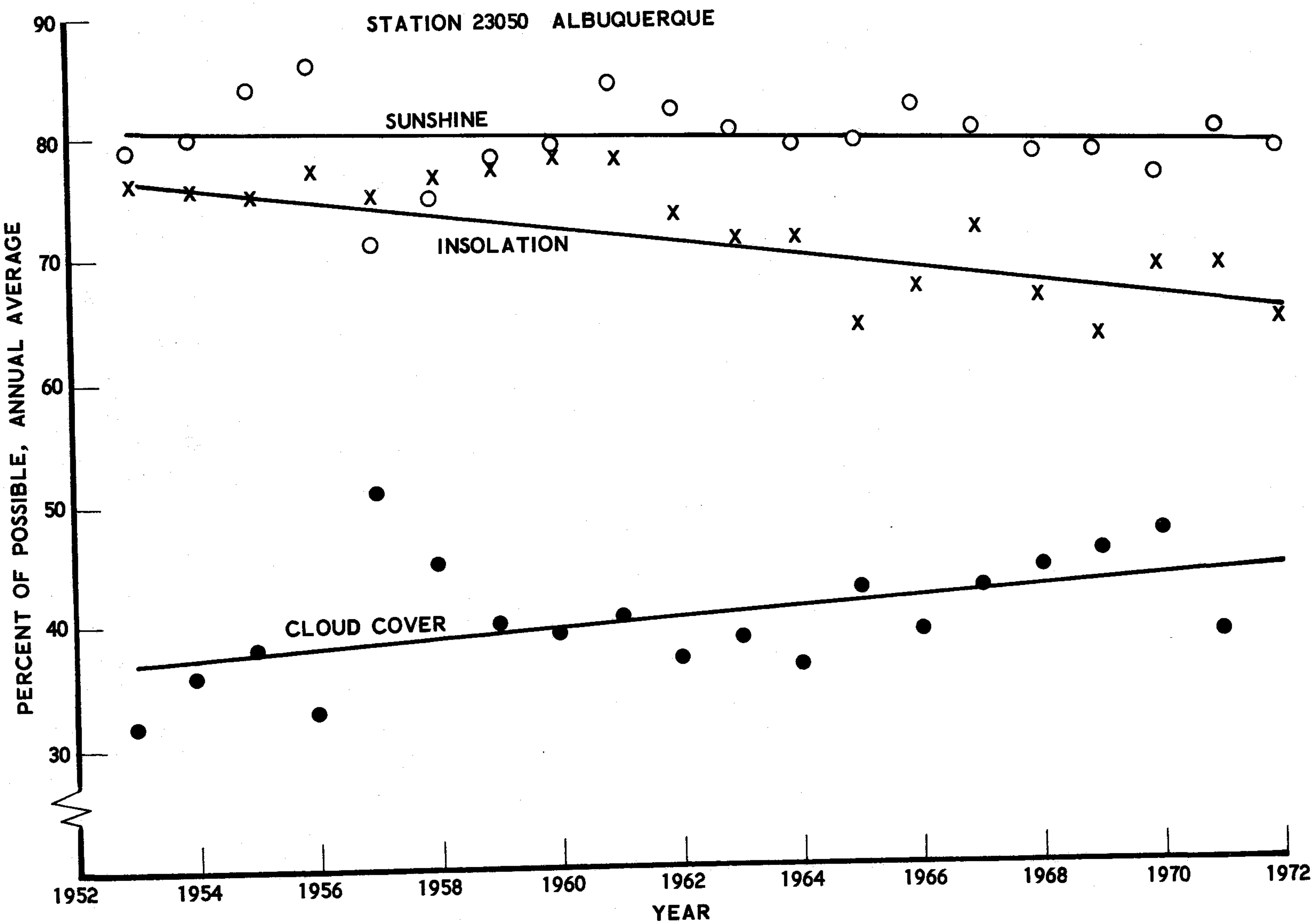


FIGURE 4.2 Percent of Possible Sunshine, Total Insolation, and Cloud Cover – Annual Averages for Albuquerque

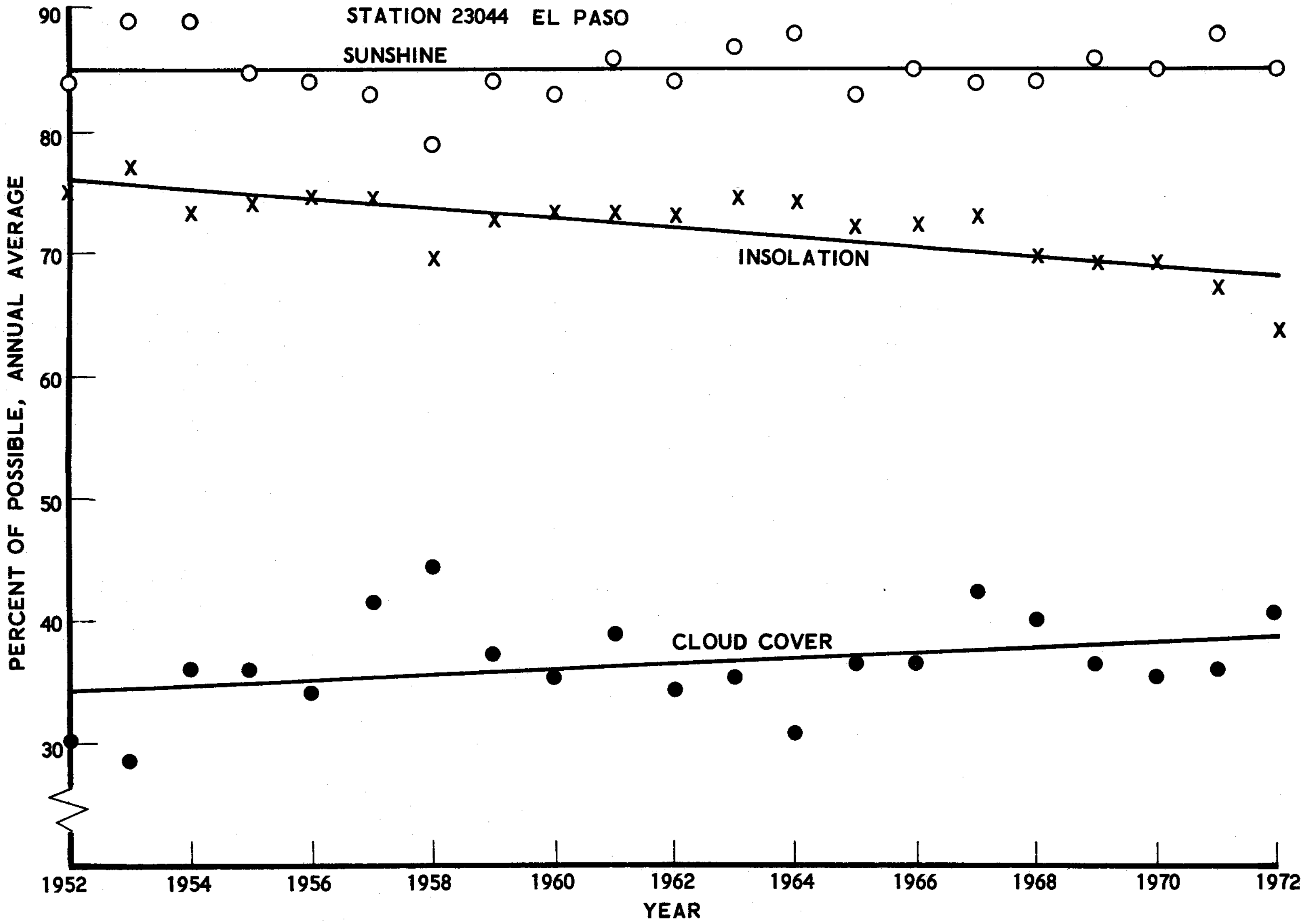


FIGURE 4.3 Percent of Possible Sunshine, Total Insolation, and Cloud Cover - Annual Averages for El Paso

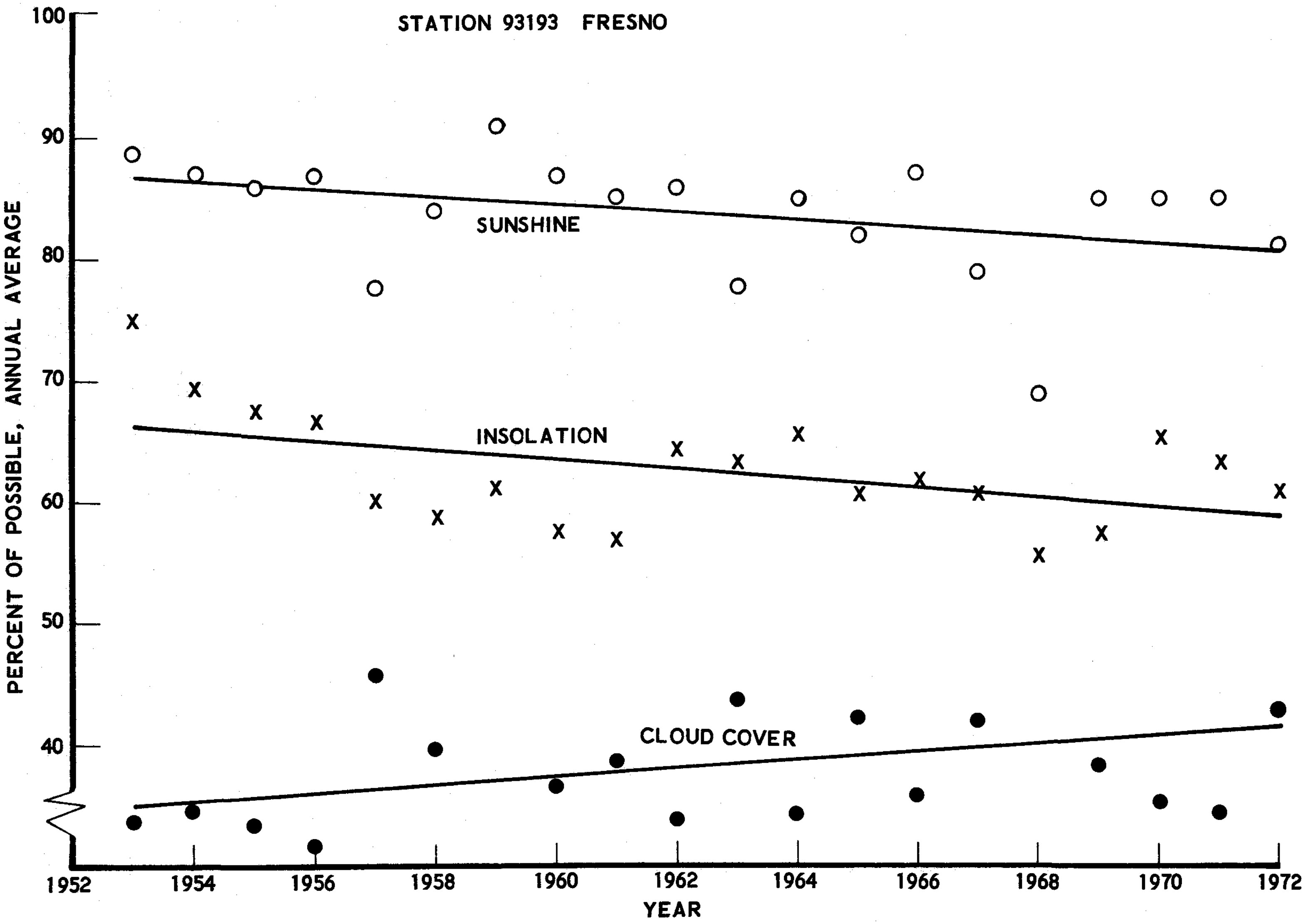


FIGURE 4.4 Percent of Possible Sunshine, Total Insolation, and Cloud Cover – Annual Averages for Fresno

TABLE 4.2

Percent of Possible Insolation

Station	Station No.	Data Period	Average Value	Slope	Intercept (1952)	FREQUENCY		
						Maximum Month	Minimum Month	Typical Month
El Centro	2718	1963-1973	60.96	.380	54.06	4	12	2,8
Fort Worth	3927	1953-1971	58.85	-.573	65.20	7,8	12	2, 5, 10
Inyokern	4279	1952-1971	76.80	-.911	85.03	6,10	11	3
Riverside	7473	1952-1972	64.06	-.473	69.70	8	1	4, 10
Tucson	8815	1958-1972	66.55	-.891	78.97	4, 5	12	2
Dodge City	13985	1952-1972	62.54	-.555	69.24	1, 10	5, 11	6
Blue Hill	14753	1952-1973	48.15	-.273	51.80	7	11	8, 9
El Paso	23044	1952-1972	72.11	-.387	75.98	4	12	9
Albuquerque	23050	1953-1972	70.70	-.592	77.13	9	12, 1	7
Ely	23154	1952-1972	67.79	-.477	72.30	9	11, 1	1, 6, 8
LAX	23174	1951-1973	60.20	-.409	64.63	4, 7	1	10
Santa Maria	23273	1954-1972	63.39	-.473	68.50	4, 6	2	6, 8, 9
Los Angeles	93134	1952-1972	59.95	-.320	63.36	7	12, 1	11
Fresno	93193	1953-1972	62.72	-.379	67.47	7	12	3
Omaha	94918	1957-1972	56.09	-.350	60.50	1, 2, 10	11	6, 11

TABLE 4.3

Percent of Possible Sunshine

Station	Station No.	Data Period	Average Value	Slope	Intercept (1952)	FREQUENCY		
						Maximum Month	Minimum Month	Typical Month
El Centro	2718	Not Available						
Fort Worth	3927	Not Available						
Inyokern	4279	Not Available						
Riverside	7473	Not Available						
Tucson	8815	1958-1962	86.00	.400	82.8			
Dodge City	13985	1953-1972	75.25	-.207	77.4	9	11	6, 12
Blue Hill	14753	1952-1973	63.91	.050	63.4	1	11	6, 9
El Paso	23044	1952-1972	85.00	.017	84.8	3, 9	12	4
Albuquerque	23050	1953-1972	79.30	-.074	80.1	9	1	7
Ely	23154	1952-1972	76.19	.052	75.7	10	1	5, 7
LAX	23174	Not Available						
Santa Maria	23273	Not Available						
Los Angeles	93134	1952-1965	76.85	-.818	82.1	2	1	7
Fresno	93193	1953-1972	83.80	-.325	87.2	7	11	4, 10
Omaha	94918	Not Available						

TABLE 4.4

Percent of Possible Cloud Cover

Station	Station No.	Data Period	Average Value	Slope	Intercept (1952)	FREQUENCY Maximum Month	FREQUENCY Minimum Month	FREQUENCY Typical Month
El Centro	2718	Not Available						
Fort Worth	3927	1953-1973	51.42	.732	44.1	1	7, 8	12
Inyokern	4279	Not Available						
Riverside	7473	Not Available						
Tucson	8815	1957-1962	34.70	-.887	41.3	-	-	-
Dodge City	13985	1952-1972	51.45	.845	43.0	12	10	8
Blue Hill	14753	1952-1958	59.65	1.33	55.7	5, 12	9	3
El Paso	23044	1952-1972	36.62	.213	34.5	7	9	7
Albuquerque	23050	1953-1972	40.40	.367	36.5	1	9	5
Ely	23154	1952-1972	51.32	.367	47.8	1, 2	9	5, 11
LAX	23174	1951-1973	46.81	.154	44.8	2	8	5, 12, 1, 2
Santa Maria	23273	1954-1972	41.79	.084	42.8	3	8	11
Los Angeles	93134	1952-1965	38.38	.100	37.7	12		
Fresno	93193	1953-1972	38.29	.350	34.6	1	7	4, 5
Omaha	94918	Not Available						

these parameters most frequently occurred. For example, the data in the columns of line 2 of Table 4.2 indicate that for Fort Worth, Texas, July and August were the months which most frequently experienced the maximum monthly average percent of possible total insolation. December was the month which most frequently experienced the minimum monthly average percent of possible total insolation, and the months of February, May, and October were the months which most frequently experienced average values of percent of possible total insolation. The correlation coefficients relating the three variables in the long-term data are provided in Table 4.5 for all stations where two or more variables were measured over a sufficient length of time to make a correlation analysis meaningful.

4.3 WIND FREQUENCY

Wind may affect a solar energy plant in many ways, for example, by altering cooling-tower efficiency or causing a mechanical wind-loading on structures. Because of the importance of these effects, data are needed on the frequency of occurrence of winds with various forces at the potential sites of solar power plants. Some effects, such as the stability of collector elements under wind loads, are important only if the wind occurs when insolation is being collected. It is, therefore, useful to analyze wind data separately for periods when insolation was present and for periods of no insolation. Although data are desired for the actual solar power plant sites (since the intensity of winds may change dramatically within a few miles as a result of differences in topographic features), the required data are available only for the sites where insolation has been measured or estimated. The hourly data for Inyokern and Edwards AFB, California, have been selected for wind frequency analysis. Because of the importance of solar collector mechanical stability for concentrating normal-incidence insolation, it was the presence or absence of normal-incidence insolation that was considered in the analysis.

TABLE 4.5

Long-Term Insolation Correlation Coefficients

	Sunshine Insolation	Sunshine Cloud Cover	Insolation Cloud Cover
Dodge City	.569	-.725	-.835
Blue Hill	.413	-.632	-.171
El Paso	.152	-.591	-.500
Albuquerque	.406	-.722	-.642
Ely	.025	-.233	-.539
LAX	n.a.	n.a.	-.592
Santa Maria	n.a.	n.a.	-.543
Los Angeles	.806	-.393	-.590
Fresno	.470	-.953	-.565
Fort Worth	n.a.	n.a.	-.889

Figures 4.5 and 4.6 show, for Inyokern and Edwards, the fraction of the hours in three categories in which there were wind velocities greater than the values listed on the abscissa. The curves labeled "Direct Insolation" show the fraction of the hours when direct insolation was present in which the wind exceeded the given values. Similarly, the curves labeled "Daylight - No Insolation" are obtained when the analysis considers only the hours when the sun was above the horizon but the direct insolation in the data base was zero. Finally, the curve labeled "Night" is based on wind data for hours when the sun was below the horizon. These plots indicate, for example, that only 20% of the non-zero hourly normal-incidence values at Edwards occurred when the wind velocity was greater than 6 m sec^{-1}.

The wind velocity can vary significantly with changes in the specific location of the measuring instrument because of the effects of mountains and other geographic features. Great care should, therefore, be exercised in using the information in Figures 4.5 and 4.6 for even nearby locations. In particular, the Inyokern station is located at an elevation of about 2,000 ft., near the edge of a valley about 20 miles in diameter. This valley is bordered on the west by the Sierra Nevada mountain range with elevations up to 9,000 ft. and on the other sides by mountains 4,000 ft. high or higher. Discussions with Naval Weapons Center personnel indicate that winds of 15 miles per hour can be observed at the China Lake-Inyokern weather station, while 10 miles to the east, over a mountain ridge, it may be calm. This type of locally-influenced variation may, in fact, explain most of the differences displayed in Figures 4.5 and 4.6 between Inyokern and Edwards, since, although the two stations are within 60 miles of each other and at about the same elevation, the Edwards station is in the middle of a much larger open area.

4.4 COMPARISON OF INSOLATION AT VARIOUS LOCATIONS

Monthly and yearly averages of the total and direct insolation for 1962 and 1963 for each of the 20 stations in the data base have been calculated

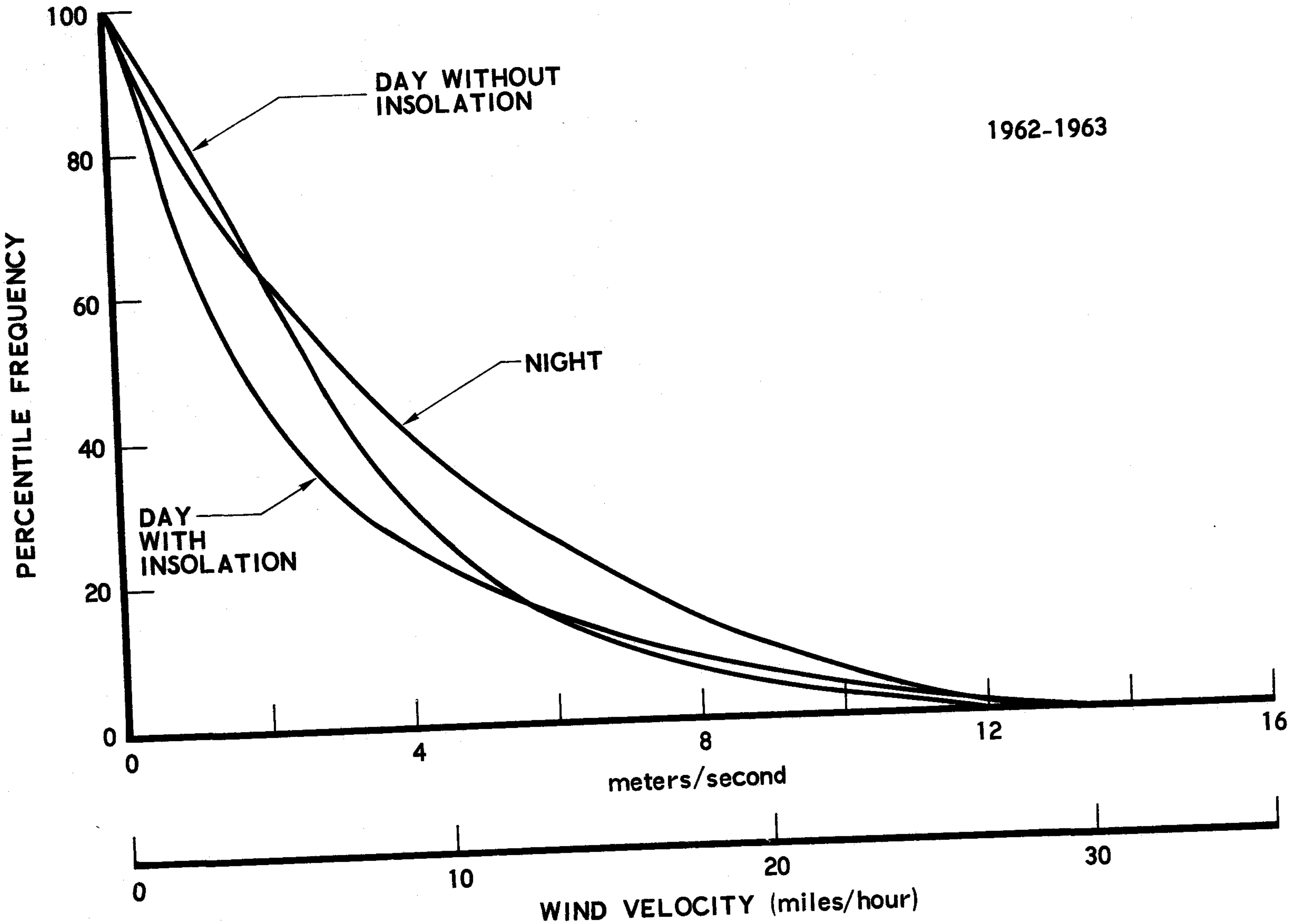


FIGURE 4.5 Percentile Frequency of Wind Occurrence with Direct Insolation, Inyokern, California

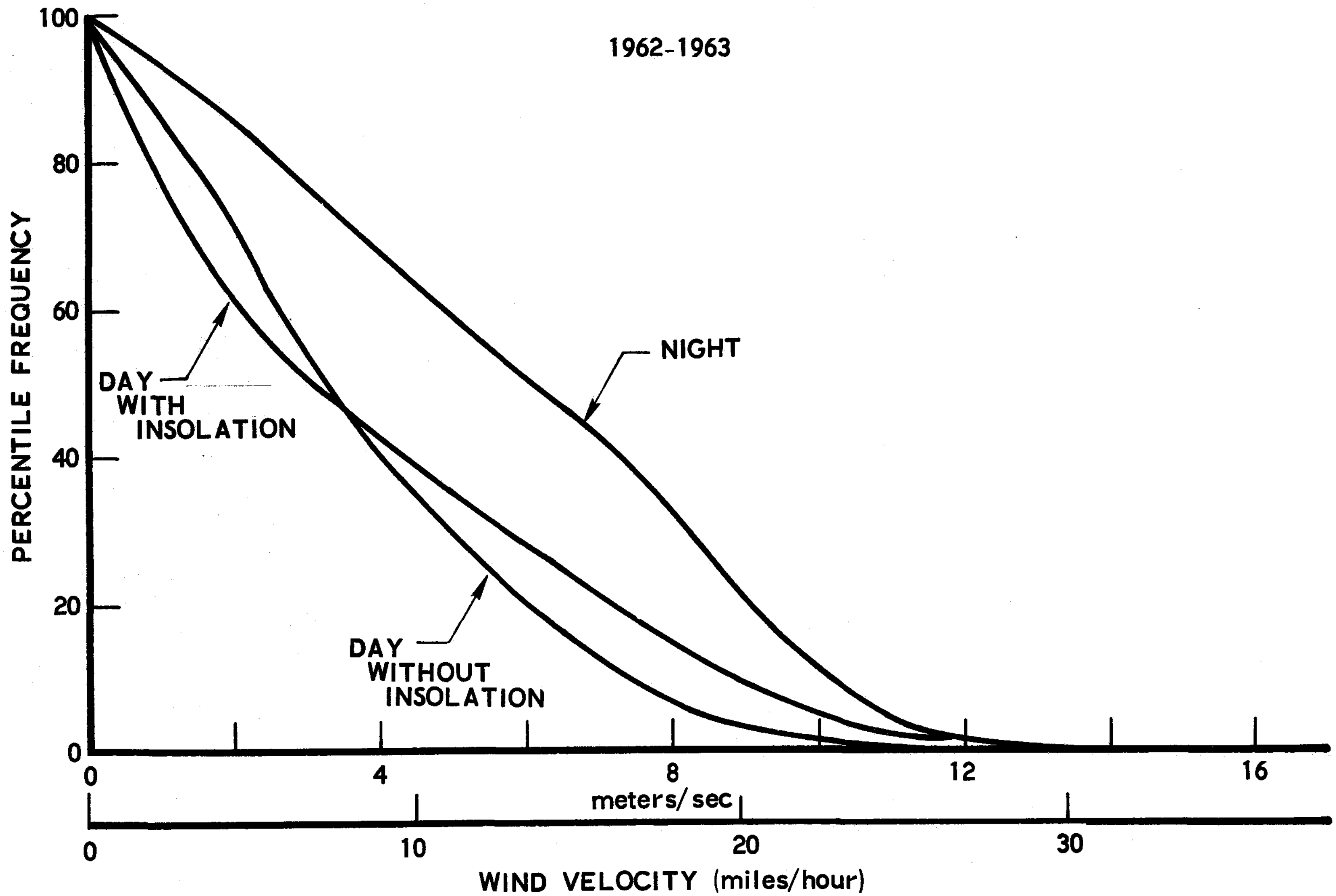


FIGURE 4.6 Percentile Frequency of Wind Occurrence with Direct Insolation, Edwards AFB, California

in order to provide a convenient means for comparing locations on the basis of insolation. The results are presented in Tables 4.6 through 4.9. For graphic comparison purposes, the annual, June, and December averages from these tables are plotted in bar graph form in Figures 4.7 through 4.10. In general, the annual average values in the figures are between the high June average values and the lower December average values. However, the influence of prevailing local weather patterns can significantly affect this pattern. For example, the June normal incidence insolation averages for the California coastal sites (San Diego and Los Angeles Airport) are severely reduced, probably as a result of the prevalence of heavy morning coastal fog during the month of June.

Significant variations in available insolation at the various locations are apparent from the figures and tables. However, if the locations are ordered by descending average annual insolation, the ranking of the stations is similar whether the year is 1962 or 1963 or whether normal incidence or total insolation is used for the ranking. For example, four of the top six stations are always Inyokern, Albuquerque, El Paso, and Yuma. At the other end of the insolation scale, Omaha is always the last station on the list.

Ranking of locations on the basis of annual averages will not necessarily be reflected in a comparison of monthly averages. For example, Fresno ranks high in June total insolation but near the bottom with respect to total insolation in December, and it has an annual average near the median.

4.5 FREQUENCY OF OCCURRENCE OF INSOLATION INTENSITY

The viability of a solar power plant depends critically on the fraction of the day for which the insolation is high enough to permit economic operation. To estimate this information, the average percent of time the insolation exceeds a given value has been extracted from the hourly insolation data

TABLE 4.6

Average Daily Total Insolation, 1962

(kWh/m^2)

Weather Station	CALIFORNIA								ARIZONA		
	Inyokern	Edwards AFB	Riverside	Fresno	San Diego	Santa Maria	LAX	LA Civic Center	Yuma	Phoenix	Tuscon
Jan	3.59	3.27	3.20	1.87	3.46	3.47	3.22	3.16	3.74	3.57	3.88
Feb	4.20	3.72	3.35	2.25	3.61	3.46	3.37	2.95	4.35	4.33	4.61
Mar	6.17	5.44	5.19	4.61	4.99	5.28	5.37	4.94	5.86	5.81	6.32
Apr	7.85	6.74	6.94	6.05	5.89	7.34	6.39	6.35	7.32	7.24	7.97
May	8.52	7.82	7.51	6.65	6.46	8.21	7.28	6.94	8.24	8.09	8.40
June	9.26	8.63	7.68	8.41	6.14	7.75	6.12	6.42	8.44	7.72	8.43
July	8.94	8.42	8.43	8.79	7.19	7.94	7.20	7.89	8.35	7.87	7.03
Aug	8.33	7.68	7.91	7.99	6.95	7.53	7.08	7.47	7.53	7.24	7.11
Sep	7.01	6.55	6.53	6.55	5.73	5.84	5.60	5.92	6.22	5.67	5.72
Oct	4.90	4.86	4.94	4.58	4.53	4.74	4.12	4.12	5.29	5.23	5.26
Nov	3.76	3.53	3.64	3.02	3.28	3.46	3.03	3.15	3.87	3.73	3.92
Dec	3.24	3.05	3.27	1.93	2.93	2.96	2.72	2.87	3.22	3.12	3.26
Annual	6.32	5.82	5.73	5.24	5.11	5.68	5.14	5.20	6.04	5.81	6.00

TABLE 4.6 (con'd)

Average Daily Total Insolation, 1962
(kWh/m^2)

	UTAH	NEVADA	N. M.	COLO.	TEXAS			KA.	NEB.
Weather Station	Salt Lake City	Ely	Albuquerque	Grand Junction	El Paso	Midland	Fort Worth	Dodge City	Omaha
Jan	2.16	3.10	3.59	2.65	4.01	3.22	3.13	2.87	2.59
Feb	2.53	3.16	4.59	3.06	5.24	4.47	4.13	3.60	2.67
Mar	5.42	5.53	5.87	4.90	6.22	5.24	4.99	5.21	4.25
Apr	6.90	6.92	7.35	6.51	7.74	6.45	5.08	5.89	5.70
May	7.55	6.46	8.82	6.82	8.93	7.41	7.25	6.60	6.09
June	8.40	8.49	8.86	7.90	8.70	7.61	6.81	7.01	6.61
July	8.01	8.00	7.44	7.65	7.46	7.01	7.10	7.34	6.88
Aug	7.60	7.80	7.73	7.00	7.75	7.38	7.09	7.11	6.20
Sep	6.12	6.50	5.64	5.63	5.71	5.70	5.27	4.48	4.87
Oct	4.62	4.81	5.43	4.38	5.52	4.64	4.24	4.07	3.43
Nov	2.65	3.34	3.74	3.01	3.96	3.44	2.82	2.78	2.09
Dec	2.07	2.79	3.29	2.44	3.45	2.98	2.67	2.63	1.96
Annual	5.35	5.59	6.04	5.17	6.23	5.47	5.06	4.97	4.45

TABLE 4.7

Average Daily Total Insolation, 1963
(kWh/m^2)

Weather Station	CALIFORNIA								ARIZONA		
	Inyokern	Edwards AFB	Riverside	Fresno	San Diego	Santa Maria	LAX	LA Civic Center	Yuma	Phoenix	Tuscon
Jan	3.53	3.28	3.13	2.56	3.05	2.97	2.81	2.74	3.58	3.65	3.71
Feb	4.59	3.96	4.21	2.85	3.93	3.78	3.66	3.70	4.69	4.68	4.82
Mar	5.98	5.40	5.80	5.05	5.48	5.59	5.58	5.53	5.92	6.16	6.09
Apr	7.40	6.69	6.83	6.01	6.70	6.67	6.72	6.78	6.99	7.26	7.29
May	8.10	7.63	6.78	7.43	6.15	5.72	5.82	5.65	8.00	7.91	8.03
June	8.56	8.39	7.47	8.29	6.12	7.17	6.14	6.12	8.65	8.51	8.81
July	8.85	8.37	8.69	8.58	7.17	7.71	7.72	8.40	8.13	7.63	7.38
Aug	7.55	7.38	7.52	7.46	6.83	7.09	6.82	7.36	7.28	6.52	6.10
Sep	5.95	6.05	6.20	5.50	5.65	5.62	5.44	5.83	6.41	6.22	6.16
Oct	4.64	4.56	4.73	4.10	4.41	4.16	4.17	4.33	5.04	5.06	4.92
Nov	3.72	3.37	3.76	2.22	3.57	3.22	3.28	3.37	3.95	4.03	3.71
Dec	3.35	3.08	3.90	1.10	3.42	3.28	3.25	3.22	3.61	3.71	3.56
Annual	6.03	5.69	5.76	5.11	5.21	5.26	5.13	5.26	6.03	5.95	5.88

TABLE 4.7 (Con'd)

Average Daily Total Insolation, 1963
(kWh/m^2)

	UTAH	NEVADA	N. M.	COLO.	TEXAS			KA.	NEB.
Weather Station	Salt Lake City	Ely	Albuquerque	Grand Junction	El Paso	Midland	Fort Worth	Dodge City	Omaha
Jan	2.30	2.96	3.55	2.43	4.19	3.55	3.03	2.93	2.36
Feb	3.39	3.86	4.48	3.60	5.38	6.23	3.62	4.13	3.11
Mar	5.25	5.33	6.10	4.74	6.60	5.75	5.44	5.22	4.14
Apr	5.17	5.74	7.30	5.83	7.73	6.34	5.36	6.77	4.97
May	7.98	5.27	7.79	7.36	8.24	6.82	6.39	5.91	5.62
June	7.74	7.13	8.42	7.67	8.87	7.37	7.24	7.20	7.23
July	8.03	8.82	7.36	7.62	7.83	7.50	7.76	7.56	6.81
Aug	6.82	7.02	6.72	6.02	7.11	6.75	7.12	6.31	5.71
Sep	5.17	5.79	6.11	5.71	5.68	5.87	5.27	5.38	4.48
Oct	4.26	4.51	5.06	4.23	8.55	4.97	4.71	4.33	4.26
Nov	2.55	3.15	3.86	2.99	4.25	3.81	3.30	3.16	2.69
Dec	1.61	2.76	3.68	2.36	3.90	2.66	2.59	2.50	2.27
Annual	5.03	5.37	5.87	5.05	6.29	5.48	5.16	5.12	4.48

TABLE 4.8

Average Daily Normal Incidence Insolation, 1962
(kWh/m^2)

Weather Station	CALIFORNIA								ARIZONA		
	Inyokern	Edwards AFB	Riverside	Fresno	San Diego	Santa Maria	LAX	LA Civic Center	Yuma	Phoenix	Tuscon
Jan	7.28	6.11	5.26	3.03	6.15	6.60	5.95	5.80	6.76	6.29	6.91
Feb	6.75	5.78	4.87	2.93	5.22	5.30	5.08	4.27	6.67	6.41	6.90
Mar	9.26	7.47	7.09	6.35	6.53	7.50	7.58	6.92	8.03	7.78	8.61
Apr	10.36	8.48	8.72	7.81	6.85	9.33	7.66	7.66	9.17	8.93	9.93
May	10.87	9.60	9.26	7.84	7.15	9.89	8.63	7.92	10.03	9.79	10.42
June	11.56	10.74	8.86	10.19	6.56	8.58	6.32	7.09	10.49	9.13	10.17
July	11.26	10.58	10.27	10.97	8.10	8.70	8.00	8.99	10.37	9.45	8.03
Aug	11.11	9.64	10.37	10.61	7.94	9.10	8.63	8.91	9.21	8.94	8.49
Sep	9.92	9.04	8.69	9.15	7.09	7.26	6.89	7.46	8.30	7.20	7.03
Oct	7.58	7.39	7.71	7.04	6.20	7.29	6.00	5.86	7.81	8.06	8.00
Nov	7.05	6.38	6.40	5.28	5.31	6.20	4.96	5.42	6.73	6.36	6.50
Dec	7.11	5.94	6.44	3.49	5.16	6.03	4.94	5.65	6.29	5.95	5.83
Annual	9.19	8.11	7.85	7.08	6.54	7.67	6.74	6.84	8.33	7.87	8.07

TABLE 4.8 (Con'd)

Average Daily Normal Incidence Insolation, 1962

(kWh/m^2)

	UTAH	NEVADA	N. M.	COLO.	TEXAS			KA.	NEB.
Weather Station	Salt Lake City	Ely	Albuquerque	Grand Junction	El Paso	Midland	Fort Worth	Dodge City	Omaha
Jan	4.73	6.64	6.90	5.21	7.07	5.45	5.20	6.00	5.92
Feb	3.72	5.07	7.60	4.90	8.14	6.62	6.00	5.90	4.25
Mar	8.10	7.99	8.70	6.93	8.41	6.71	6.41	7.37	6.07
Apr	8.58	8.96	9.49	8.20	9.58	7.75	5.54	7.33	7.36
May	8.57	7.69	10.98	8.35	11.05	8.63	8.24	7.90	7.06
June	10.00	10.37	10.79	9.78	10.24	9.03	7.51	7.96	7.60
July	9.77	9.72	8.78	9.59	8.13	8.30	8.27	8.64	8.01
Aug	10.55	10.35	10.22	8.95	9.53	8.93	8.66	9.08	7.80
Sep	9.07	9.21	6.94	7.88	7.27	7.36	6.56	5.60	6.59
Oct	8.16	8.08	8.77	7.06	8.28	6.47	6.00	6.47	5.62
Nov	5.54	6.76	7.25	5.78	6.37	5.53	4.34	5.15	4.17
Dec	4.94	6.82	6.82	5.17	6.25	5.24	4.66	6.57	4.33
Annual	7.67	8.16	8.61	7.33	8.36	7.17	6.46	7.01	6.25

TABLE 4.9

Average Daily Normal Incidence Insolation, 1963
(kWh/m^2)

Weather Station	CALIFORNIA								ARIZONA		
	Inyokern	Edwards AFB	Riverside	Fresno	San Diego	Santa Maria	LAX	LA Civic Center	Yuma	Phoenix	Tuscon
Jan	7.18	6.20	5.53	4.57	5.17	5.41	4.97	4.93	6.41	6.64	6.39
Feb	7.57	6.25	6.42	3.78	5.80	5.85	5.50	5.49	7.28	7.40	7.42
Mar	9.21	7.48	8.35	6.71	7.26	8.19	8.13	7.85	8.05	8.63	8.31
Apr	9.76	8.39	8.61	7.60	8.13	8.42	8.48	8.43	8.73	9.12	9.01
May	10.39	9.37	7.85	8.71	6.77	6.26	6.51	6.23	9.60	9.60	9.65
June	10.51	10.38	8.57	9.83	6.68	7.98	6.61	6.52	10.72	10.33	10.73
July	11.24	10.54	10.79	10.49	8.13	8.99	8.84	9.77	10.07	9.04	8.45
Aug	9.90	9.18	9.86	9.49	7.74	8.36	8.25	8.92	8.88	7.70	7.06
Sep	8.11	8.21	8.38	7.19	7.25	7.39	6.93	7.64	8.60	8.12	8.20
Oct	7.31	6.83	7.38	6.11	6.20	6.19	6.29	6.68	7.36	7.68	7.21
Nov	6.79	6.09	6.72	3.50	6.05	5.69	5.70	5.91	6.84	6.93	6.32
Dec	7.30	6.06	8.22	1.39	6.55	7.00	6.50	6.48	6.97	7.42	7.00
Annual	8.78	7.93	8.07	6.63	6.82	7.15	6.90	7.08	8.30	8.22	7.98

TABLE 4.9 (Con'd)

Average Daily Normal Incidence Insolation, 1963
(kWh/m^2)

	UTAH	NEVADA	N. M.	COLO.	TEXAS			KA.	NEB.
Weather Station	Salt Lake City	Ely	Albuquerque	Grand Junction	El Paso	Midland	Fort Worth	Dodge City	Omaha
Jan	5.23	6.30	6.91	4.56	7.35	6.16	5.06	6.05	5.33
Feb	5.78	6.44	7.01	6.09	8.24	6.23	5.30	6.76	5.21
Mar	8.04	7.79	8.92	6.62	9.18	7.57	7.08	7.75	5.84
Apr	6.47	7.06	9.20	7.25	9.47	7.49	5.85	8.65	5.96
May	9.36	8.95	9.27	9.28	10.07	7.68	6.99	6.85	6.15
June	8.84	8.37	10.08	9.43	10.65	8.78	8.25	9.18	8.16
July	9.86	11.38	8.21	9.45	9.09	9.04	9.15	8.95	7.88
Aug	9.23	9.16	7.82	7.34	8.23	8.03	8.92	8.11	6.99
Sep	7.46	8.09	7.94	8.04	7.72	7.56	6.44	7.19	6.05
Oct	7.24	7.34	8.12	6.66	8.55	7.01	6.92	6.93	7.06
Nov	5.20	6.28	7.19	5.68	7.03	6.39	5.24	6.23	5.78
Dec	3.37	6.48	7.75	4.90	7.35	4.48	4.50	5.65	5.34
Annual	7.19	7.82	8.21	7.11	8.58	7.21	6.66	7.36	6.32

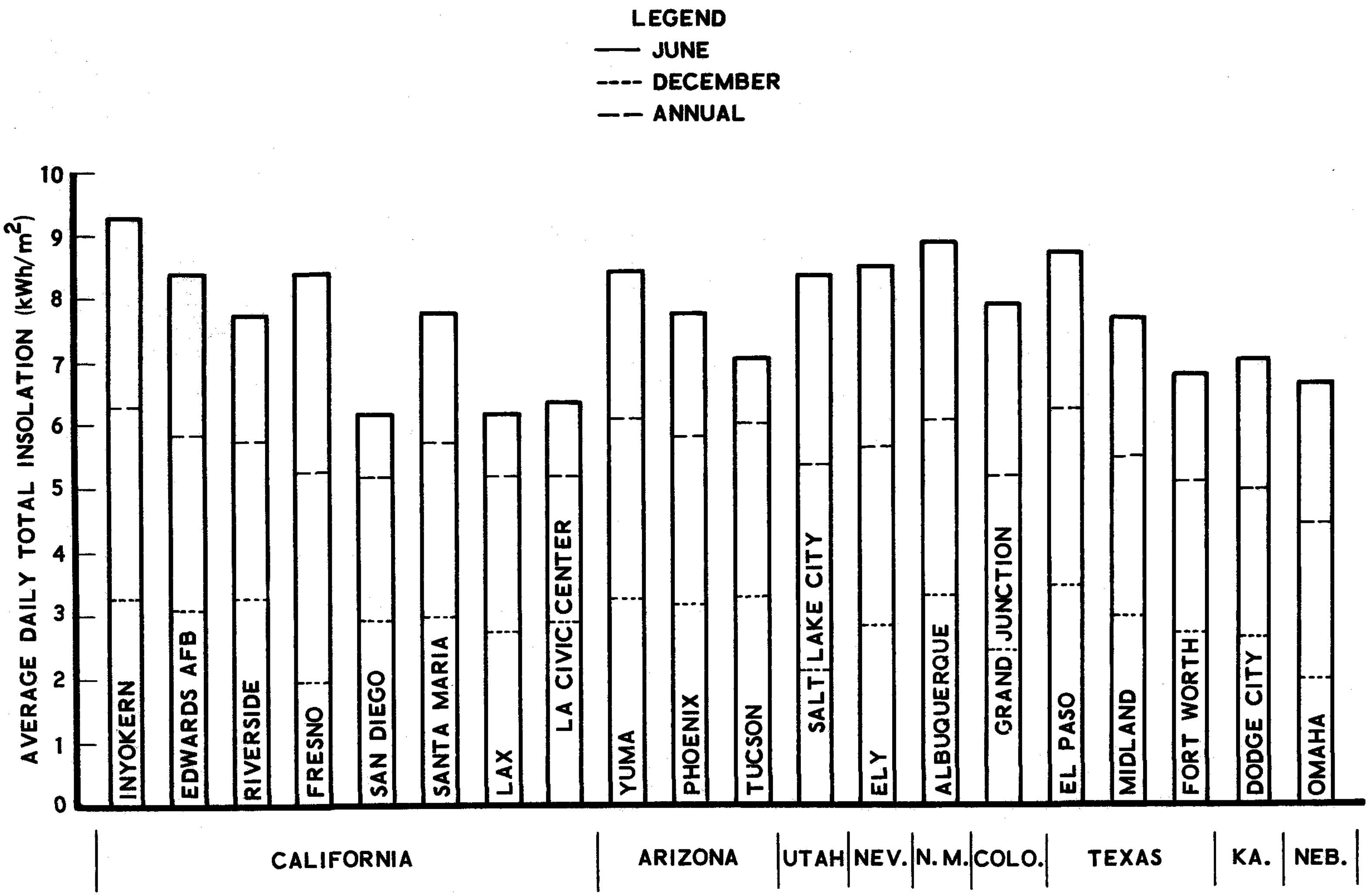


FIGURE 4.7 Average Daily Total Insolation, 1962

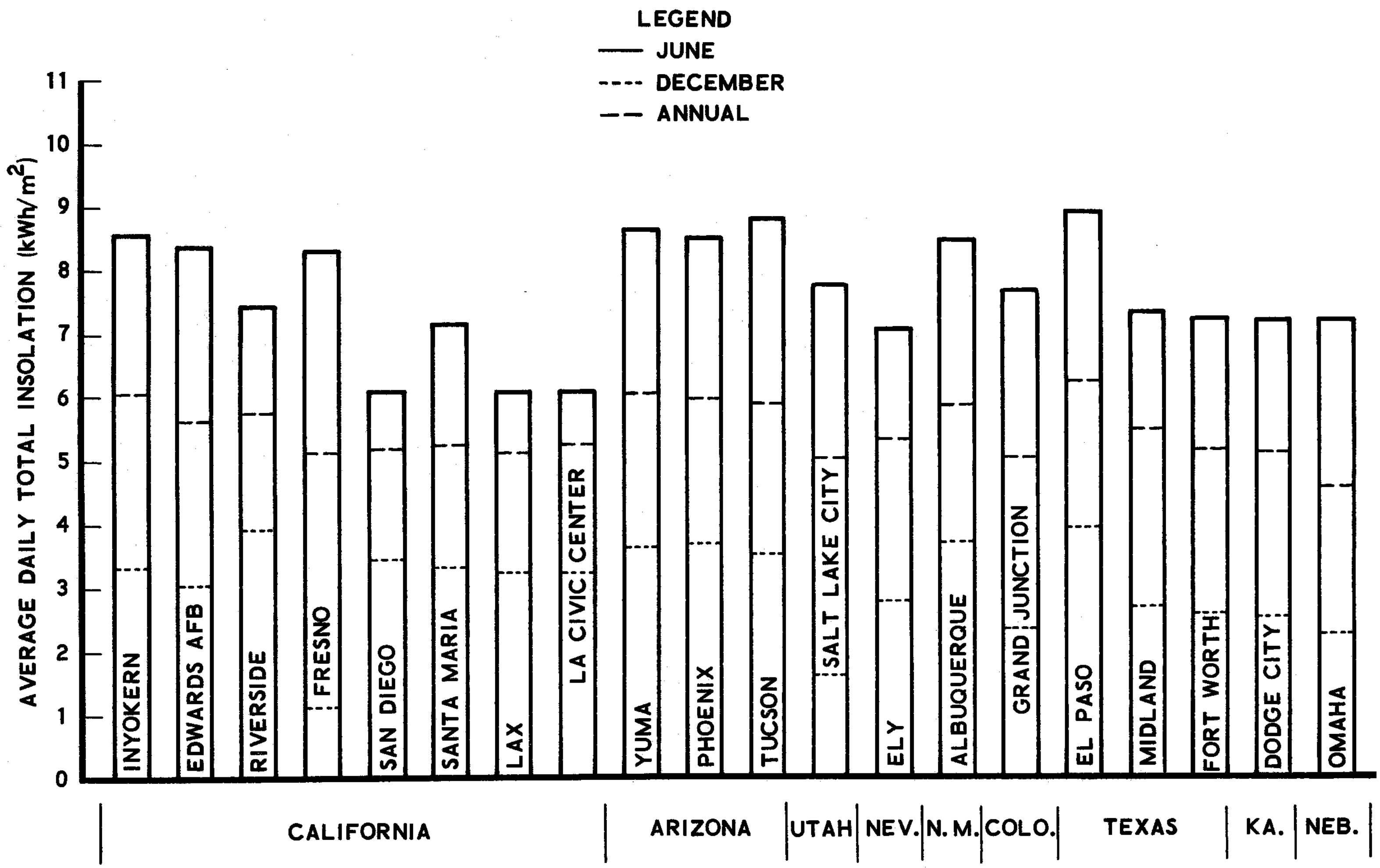


FIGURE 4.8 Average Daily Total Insolation, 1963

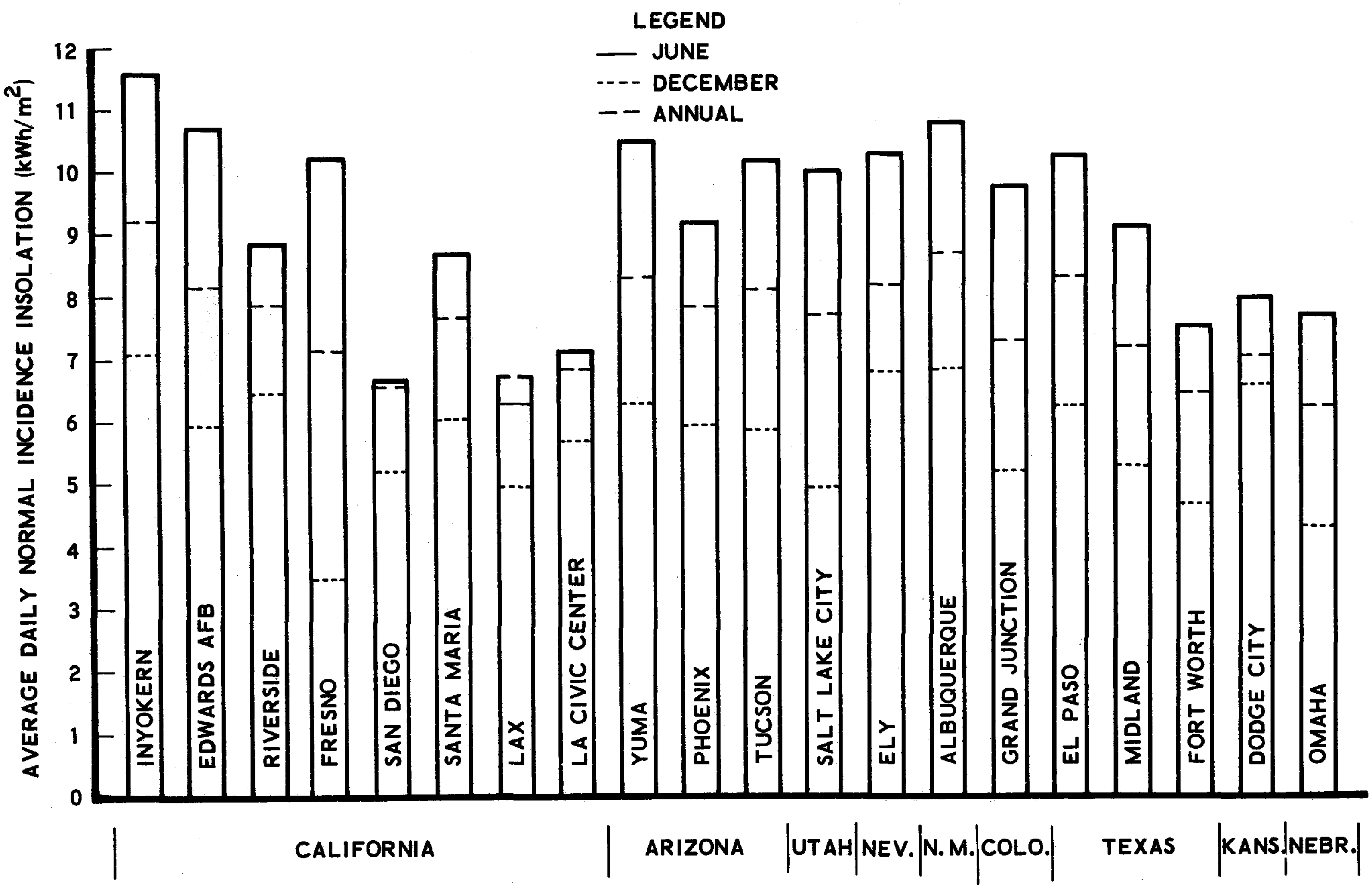


FIGURE 4.9 Average Daily Normal Incidence Insolation, 1962

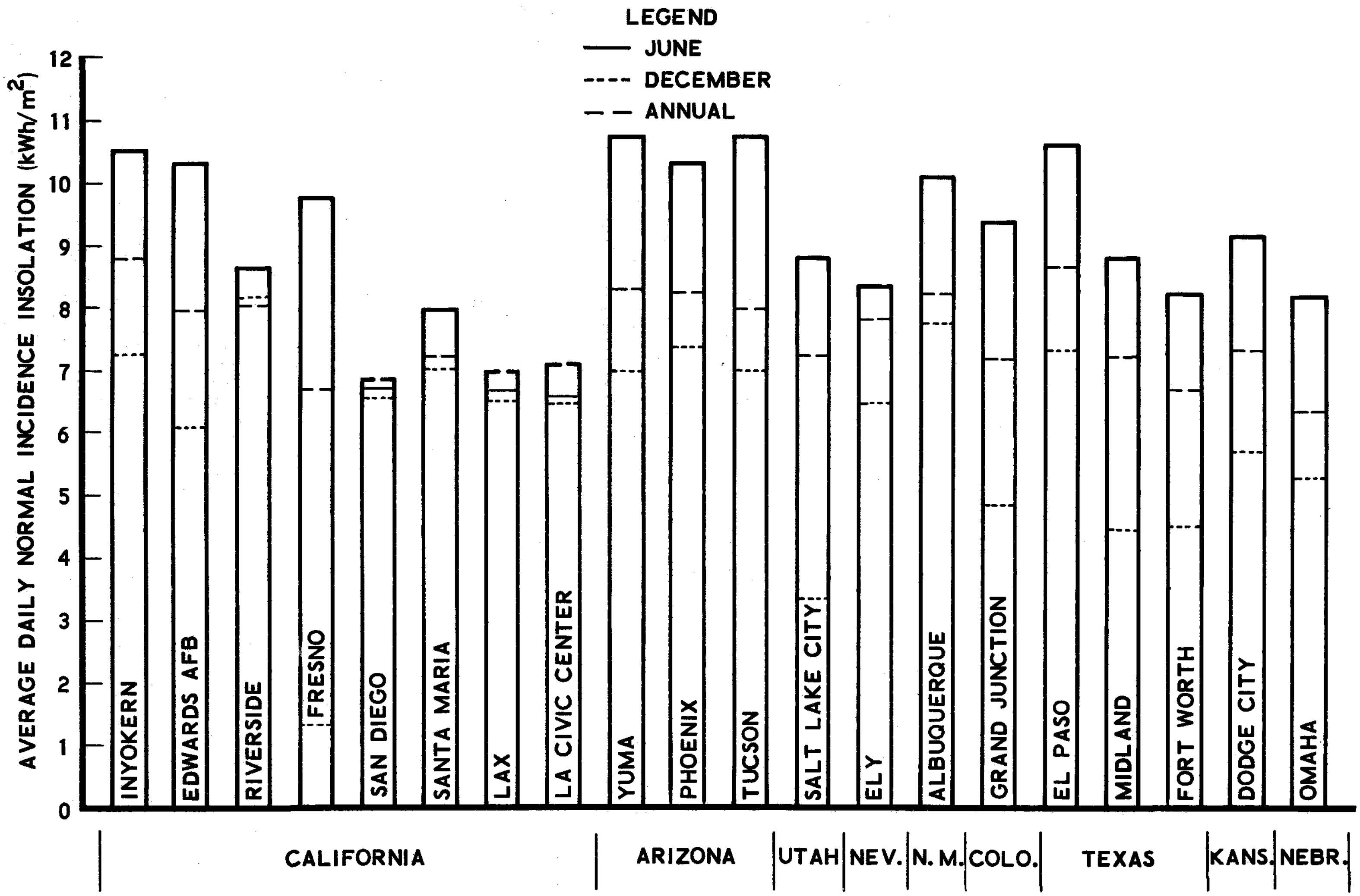


FIGURE 4.10 Average Daily Normal Incidence Insolation, 1963

bases for 1962 and 1963. Figure 4.11 shows for Albuquerque, New Mexico, the fraction of a 24-hour day for which the normal-incidence insolation exceeds given values during the extreme months of January and June. Similar plots of total insolation percentile frequency are provided for 11 Southwestern locations in Appendix C for the months of December and June. For all the locations represented in Appendix C, the normal incidence insolation is estimated from the total insolation; therefore, separate plots of normal-incidence percentile frequency at these locations have not been provided.

The principal difference between winter and summer that affects the normal incidence curves is the reduced number of daylight hours in the winter. The winter total insolation is reduced by this factor and also by a factor resulting from the smaller maximum solar zenith angle in the winter. Thus, there is a reduction in the peak values of total insolation in the winter as well as in the total hours during which the sun is above the horizon.

4.6 SAMPLE INSOLATION DATA FOR ALBUQUERQUE AND INYOKERN

The major thrust of the data base preparation effort has been to prepare the computer-orientated two-year hourly data base for use in comprehensive mission analysis studies reported in the other volumes of this report. However, because of this computer orientation, it is awkward to obtain data for hand calculations for such purposes as concept demonstration or computer code checkout. In order to provide some representative data for such purposes, Figures 4.12 through 4.17 were prepared. They provide insolation data for three clear days at each of the sites which have been agreed on as comparison sites: Inyokern and Albuquerque. The days were selected from the early parts of the months of April, August, and December of 1962 to coincide with the time period for which the Federal Power Commission Summaries of electrical demand are available. For

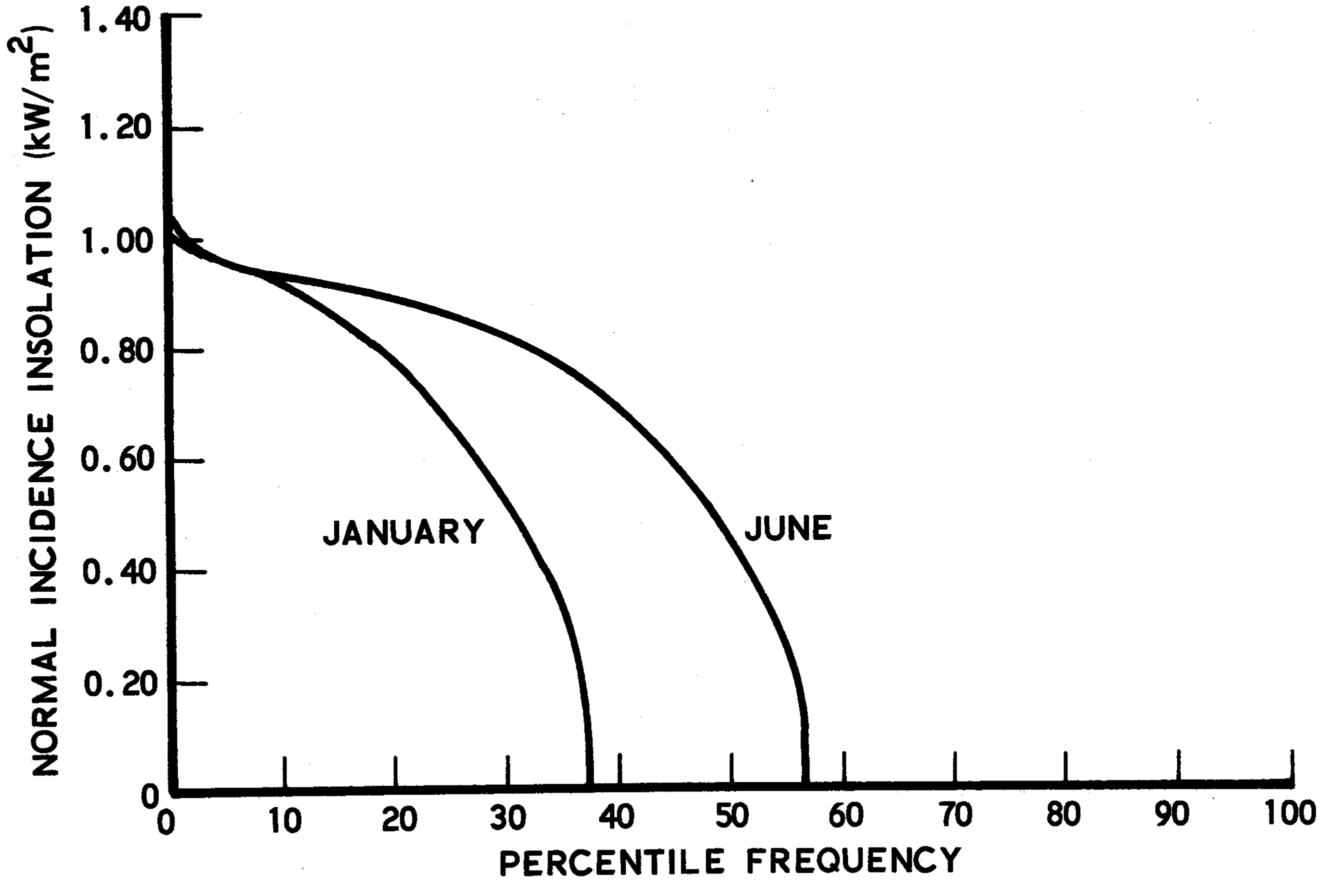


FIGURE 4.11 Percentile Frequency of Normal Incidence Insolation, Albuquerque, New Mexico

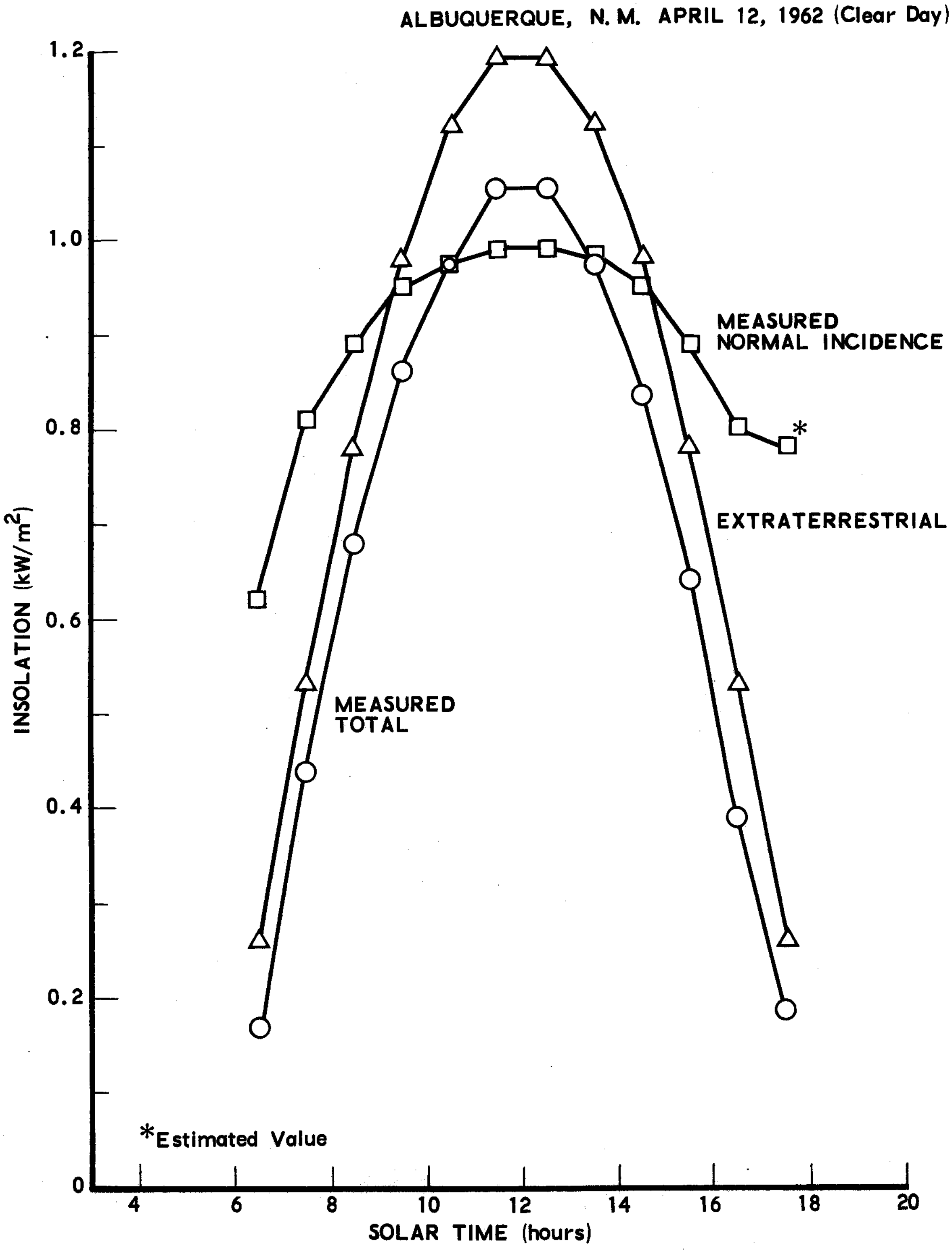


FIGURE 4.12 Sample Insolation Data, Albuquerque, April 12, 1962

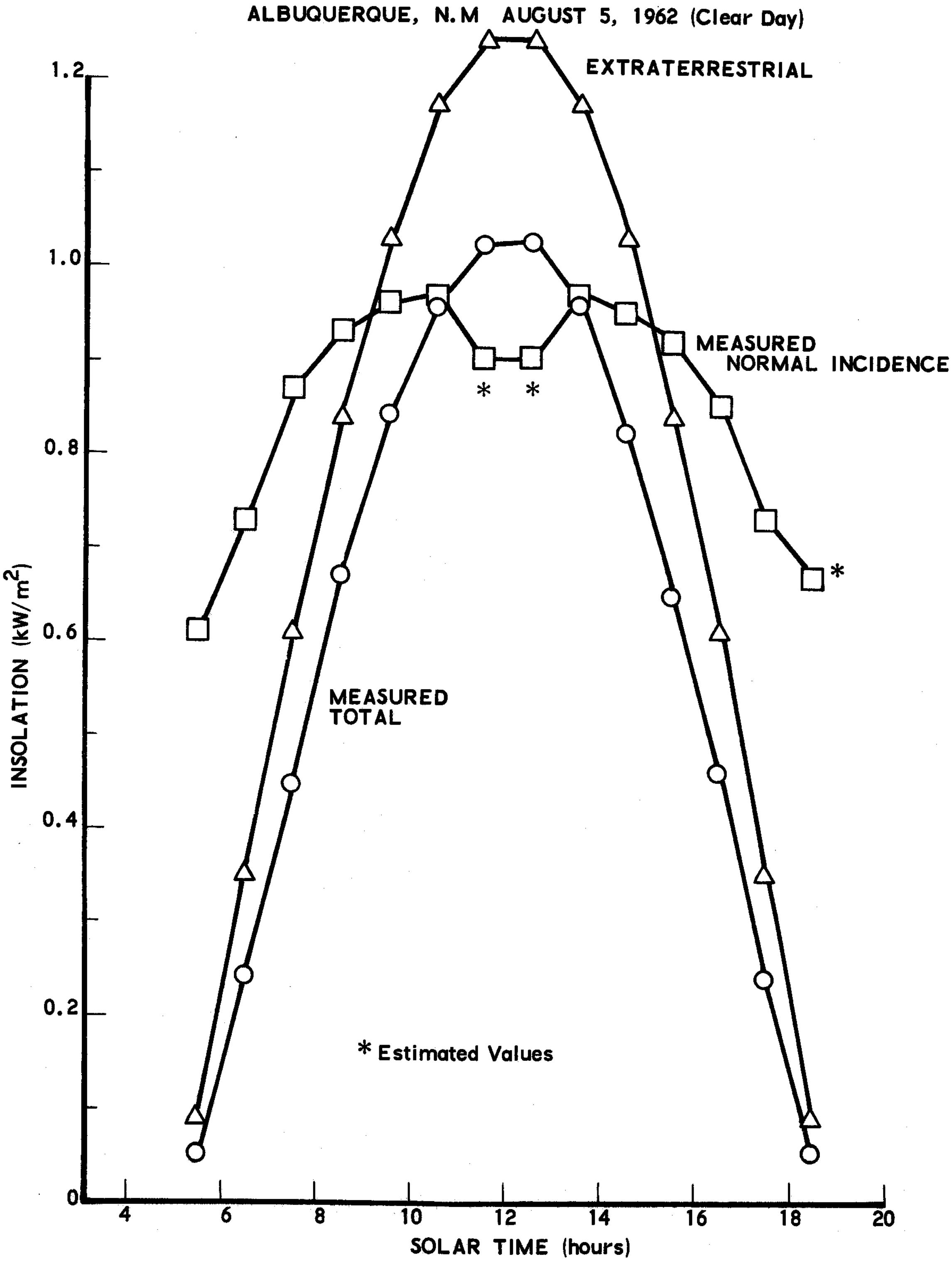


FIGURE 4.13 Sample Insolation Data, Albuquerque, August 5, 1962

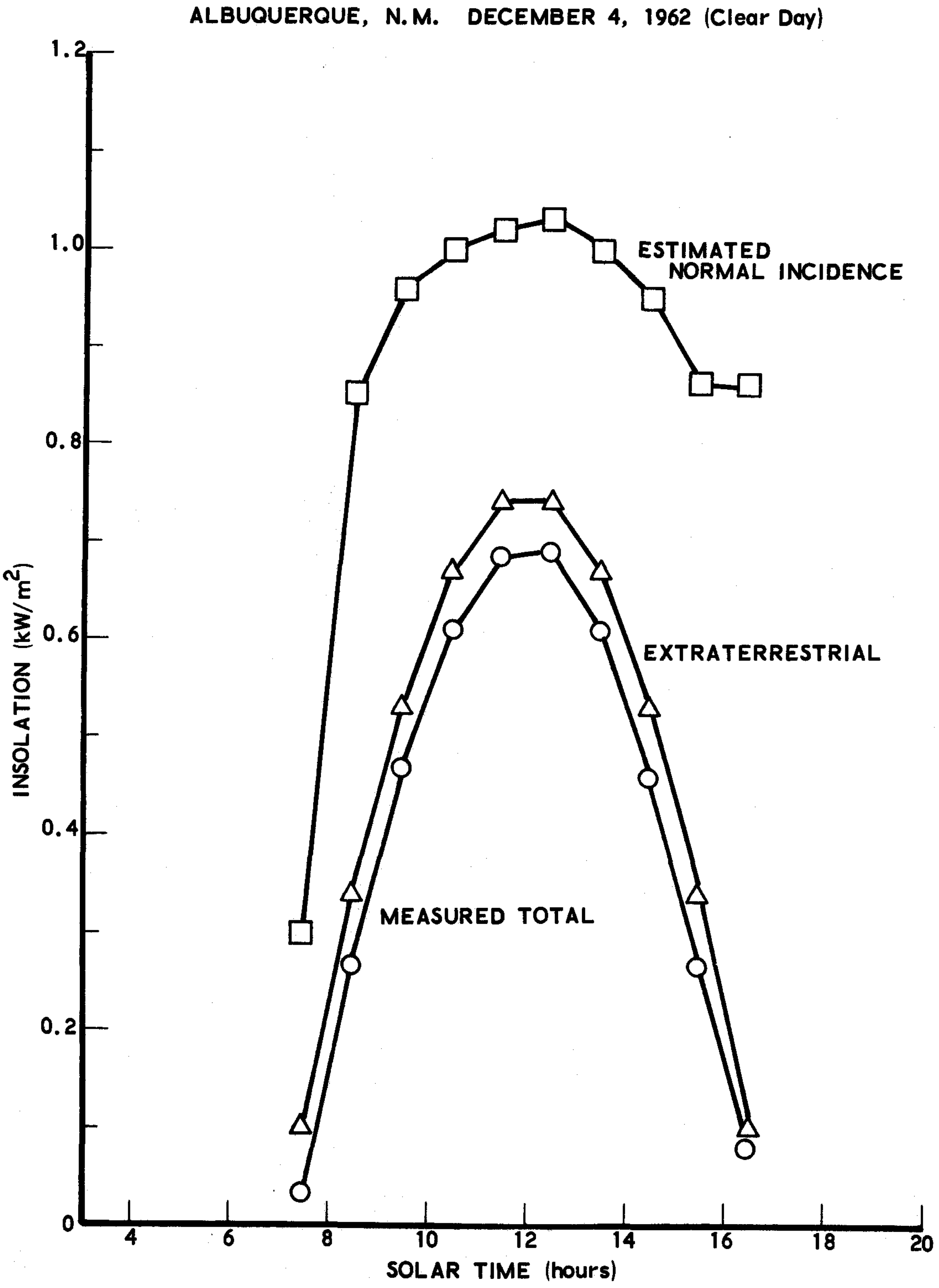


FIGURE 4.14 Sample Insolation Data, Albuquerque, December 4, 1962

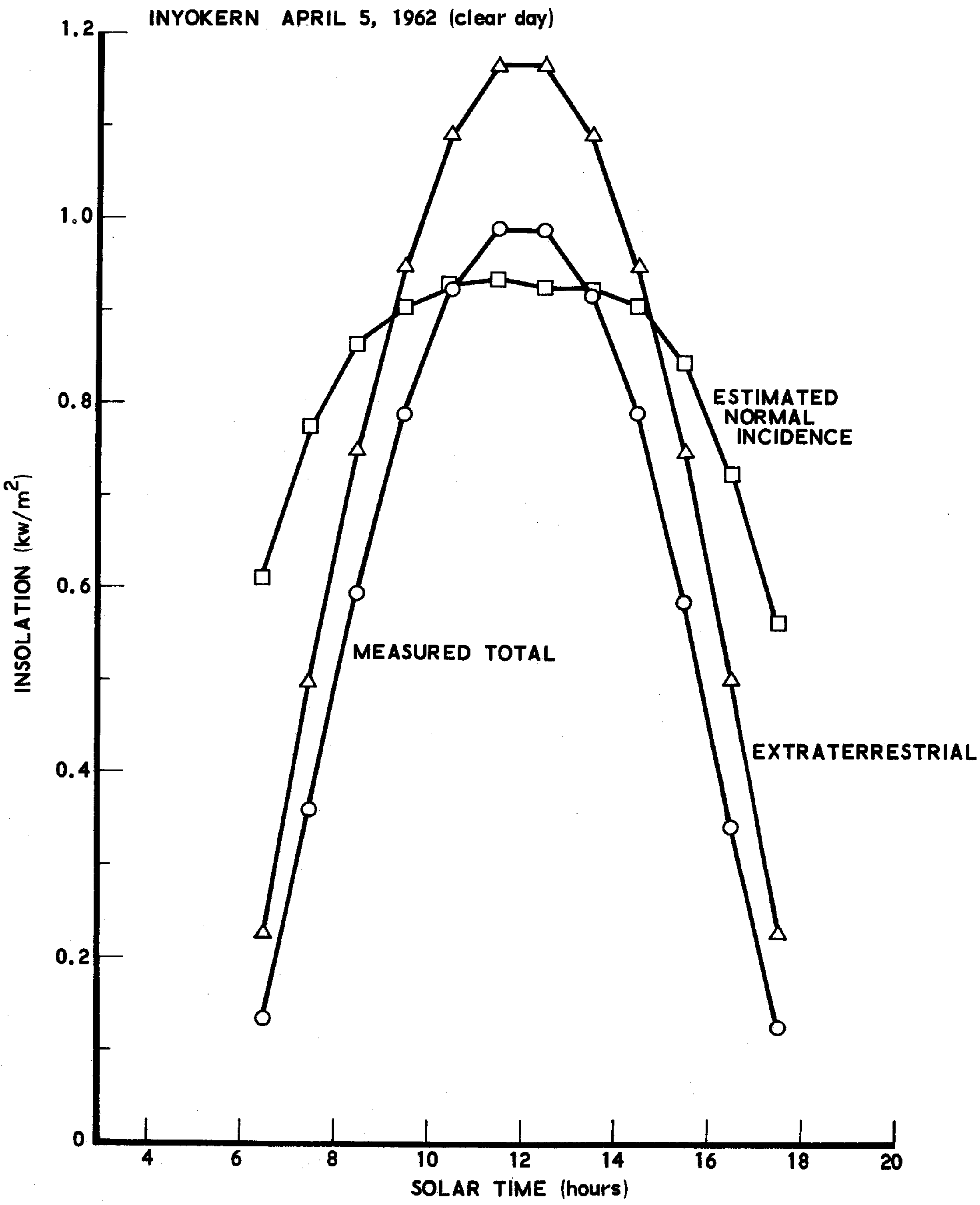


FIGURE 4.15 Sample Insolation Data, Inyokern, California, April 5, 1962

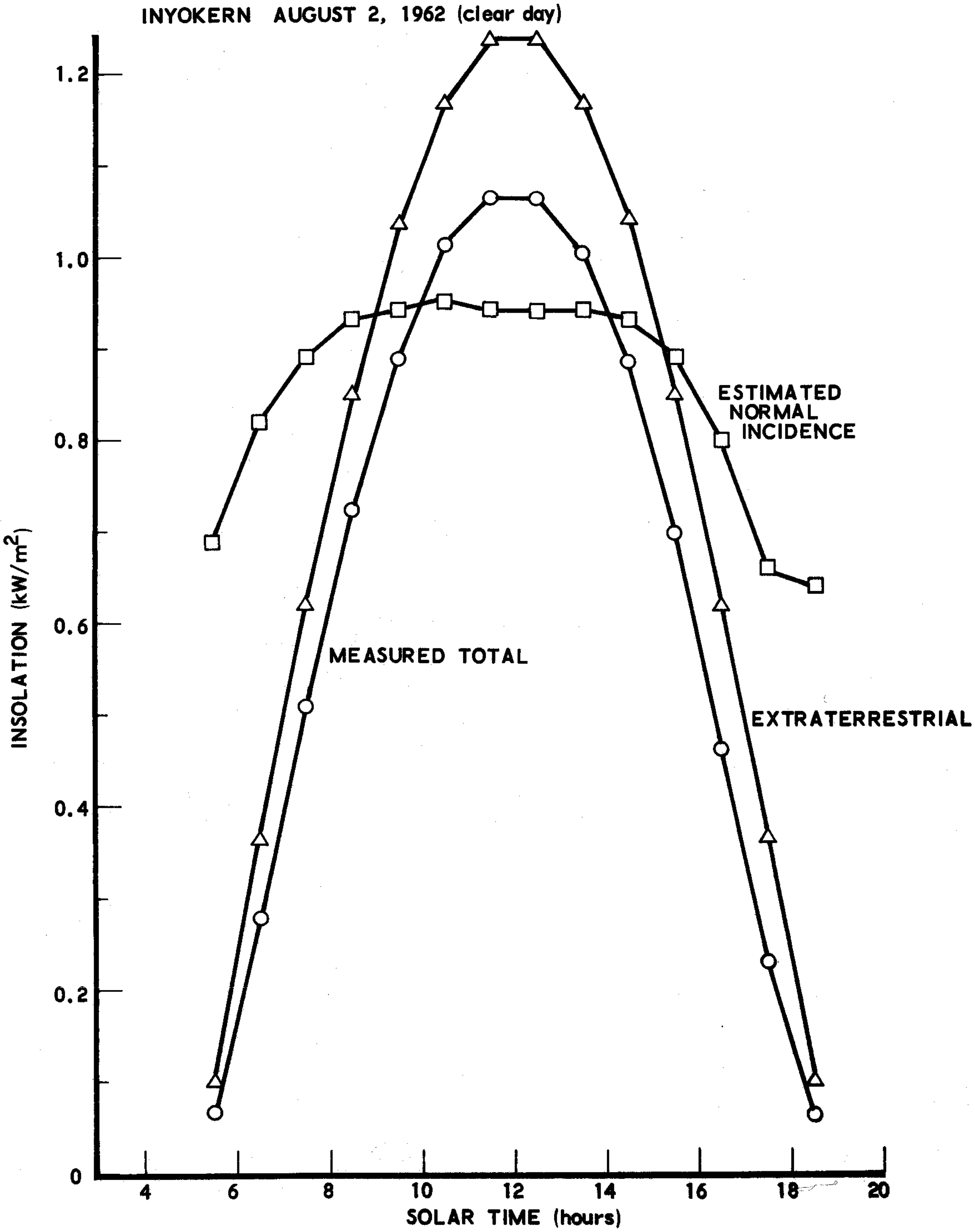


FIGURE 4.16 Sample Insolation Data, Inyokern, California, August 2, 1962

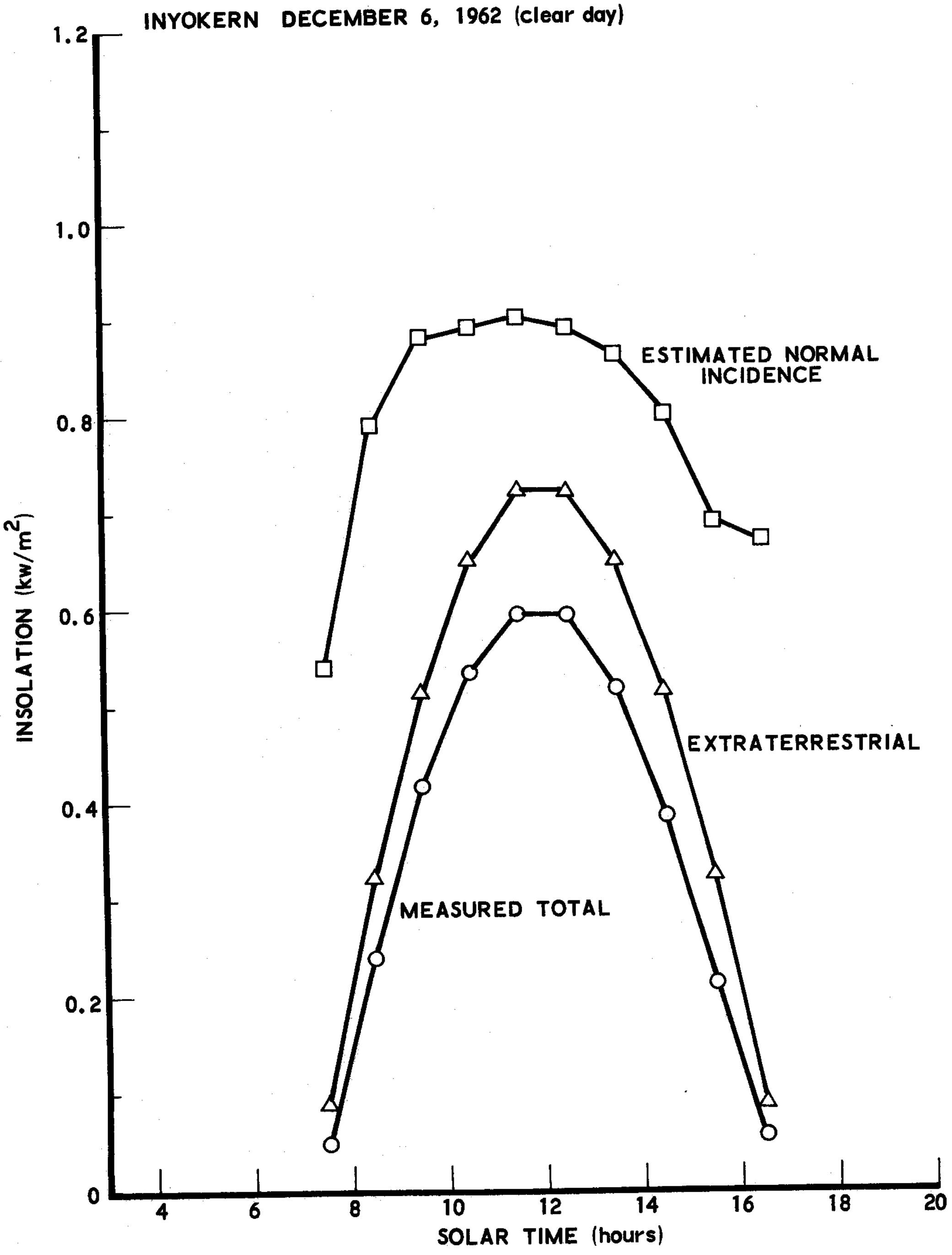


FIGURE 4.17 Sample Insolation Data, Inyokern, California, December 6, 1962

additional reference purposes, the entire contents of the data base for these six days is provided in Appendix D.

4.7 TEMPERATURE-INSOLATION CORRELATION STUDY

Possible correlations between insolation and temperature are of considerable interest in studies of solar energy conversion because of the effect such correlations might have in reducing energy storage requirements. For this reason, a preliminary investigation of this correlation for two Southern California stations was carried out in the previous study (Reference 1). On an annual basis, only a very weak correlation was found. Since the investigation utilized hourly data for an entire year, however, it is possible that a stronger correlation might have existed on a seasonal basis without having been detected by the earlier methods employed.

The earlier investigation has been extended in the course of the current study on the basis of hourly 1962 and 1963 data for two sites, Riverside and Inyokern, California. Correlations between total insolation and temperature, in the form of degree-hours of heating and cooling per day, were sought on a monthly basis. The number of degree-hours of cooling per day was calculated by adding up the hourly amounts by which the temperature exceeded the reference temperature of 18°C (65°F) for those hours in which the temperature was above this temperature. Degree-hours of heating were similarly calculated by adding up the hourly amounts by which the reference temperature of 18°C (65°F) exceeded the measured temperature for those hours in which the temperature was below the reference temperature. Insolation was represented by total insolation during each day.

Strong consistent correlations between degree-hours of heating and cooling and total insolation were not found. Previous results (Reference 1) for Riverside gave a temperature-insolation correlation coefficient of 0.51 in 1962 and of 0.40 in 1963. The present analysis determined that less than half the correlations are as good as or better than those previously cited.

The months with good correlations from Riverside and Inyokern were selected; and their scatter diagrams, with regression lines, are presented in Figures 4.18 through 4.21. Two regression lines are plotted on each figure. The solid line represents the results obtained when total insolation was the independent parameter, while the broken line represents the results when total insolation was a dependent parameter. These lines would be coincident if there were perfect (unity) correlation and orthogonal if there were no (zero) correlation.

Figure 4.18 represents degree-hours of cooling per day versus total insolation for Riverside in October, 1963. The correlation coefficient for these data is 0.530. Although the degree-hours of cooling per day are low, these are nonetheless correlated with total insolation to the extent that as insolation increases, so, too, do the cooling requirements.

Figure 4.19 represents degree-hours of heating per day versus total insolation for Riverside during the same period as above; there is a substantially lower correlation coefficient, -0.383, which again has the expected sign. The expected result, that heating requirements declined with increasing insolation, is more readily seen from the regression coefficient.

One may question the large number of degree-hours of both cooling and heating in October at Riverside. Recalling the cooling/heating criteria and noting the low daily totals in both Figures 4.18 and 4.19, one can conclude that October at Riverside is probably a moderate month with cool mornings and late afternoons and warm mid-days.

Figures 4.20 and 4.21 give the same cooling and heating information as above but for Inyokern in September, 1962. The cooling correlation

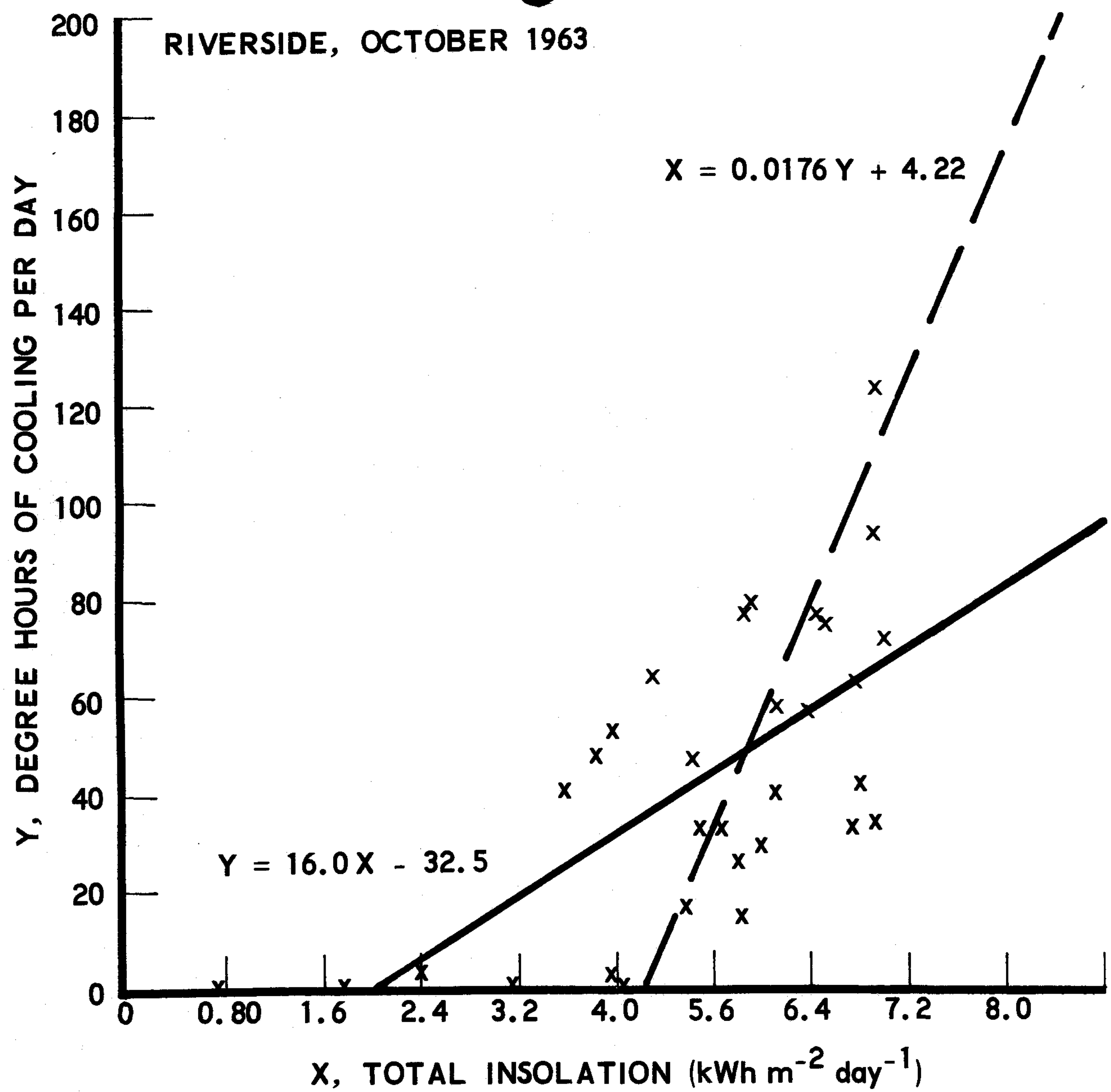


FIGURE 4.18 Correlation Between Total Insolation and Degree-Hours of Cooling, Riverside, October 1963

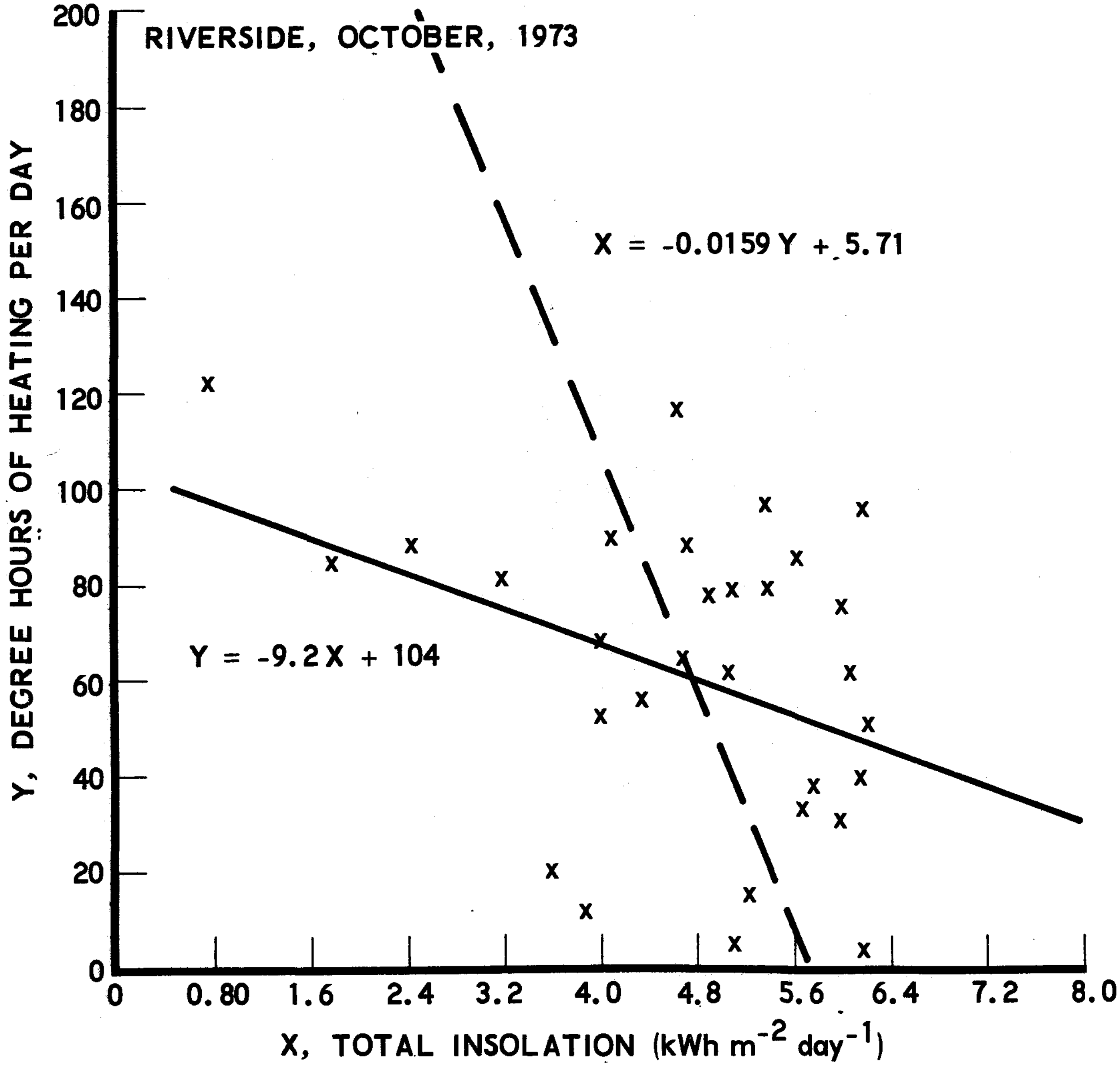


FIGURE 4.19 Correlation Between Total Insolation and Degree-Hours of Heating, Riverside, October 1963

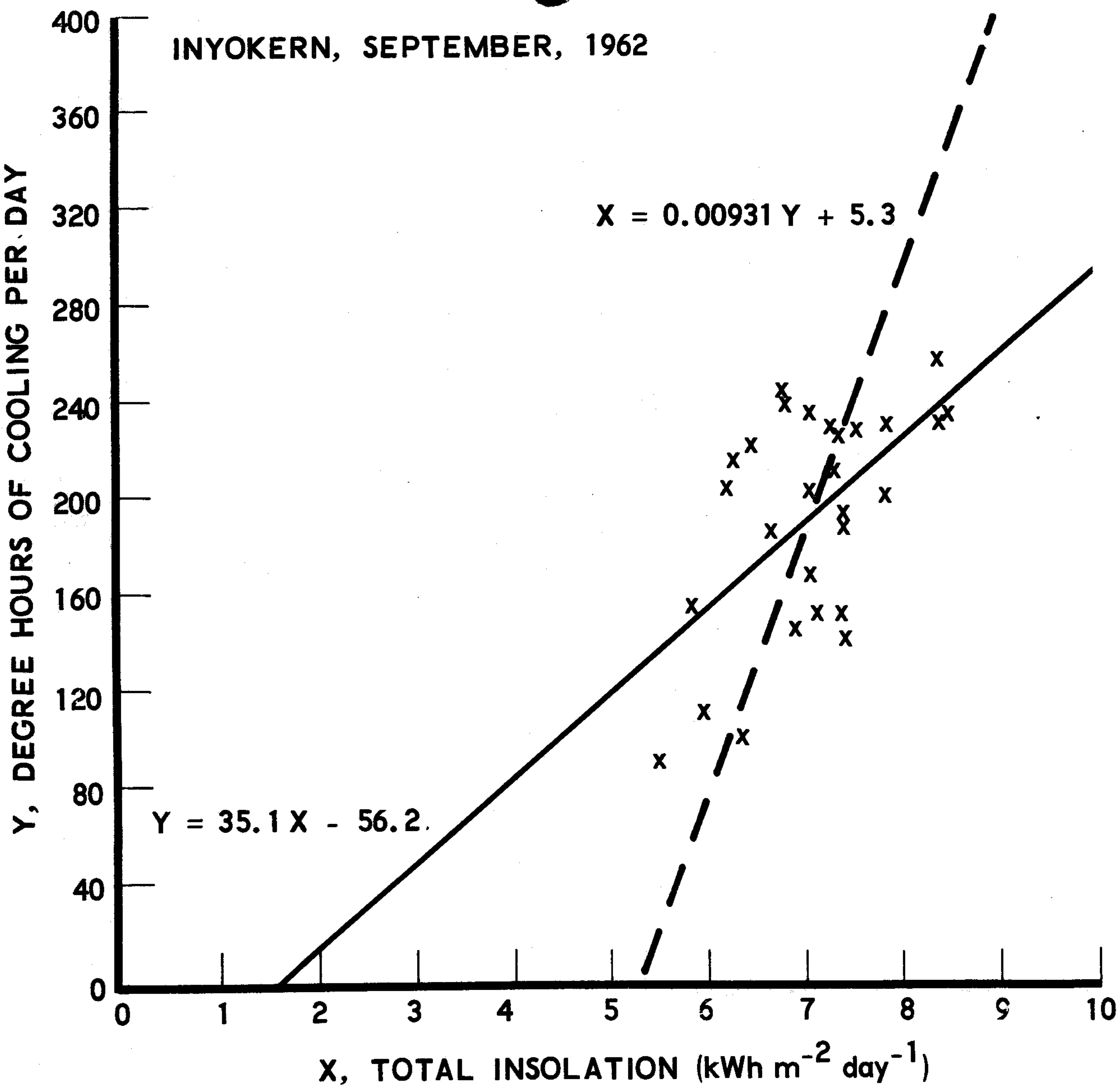


FIGURE 4.20 Correlation Between Total Insolation and Degree-Hours of Cooling, Inyokern, September 1962

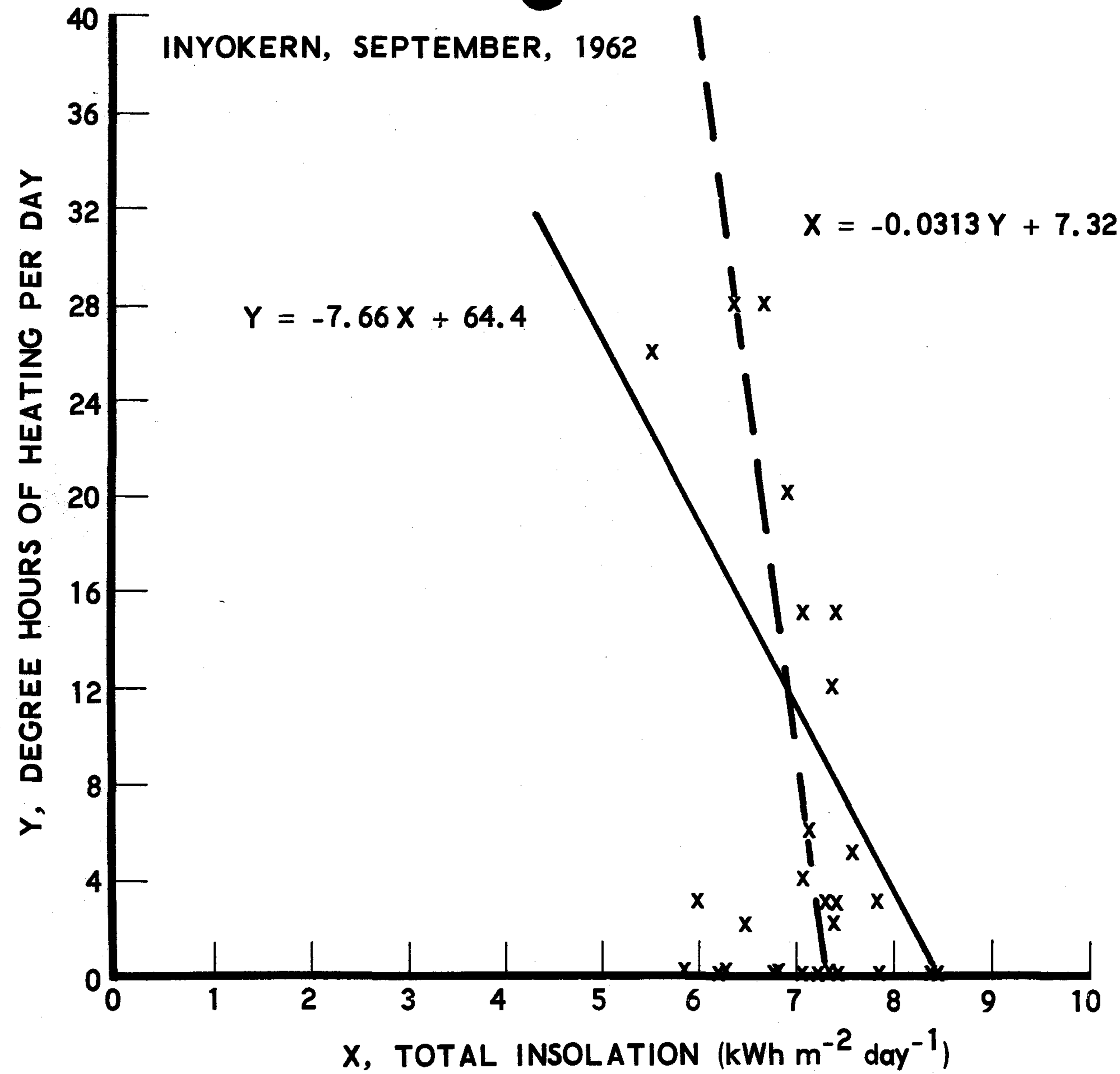


FIGURE 4.21 Correlation Between Total Insolation and Degree-Hours of Heating, Inyokern, September 1962

coefficient is 0.571 and the heating coefficient is -0.490. Except for a higher mean temperature, a discussion similar to that for Riverside is applicable.

These coefficients represent the best correlations (cooling/heating) obtained from analyzing 48 months of data. In all cases one would be hard pressed to recognize trends and estimate correlations by visual inspection of the data. Hence, it must be concluded that the correlation between temperature and insolation is low.

5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

An hourly insolation data base characterizing the Southwestern United States for the years 1962 and 1963 has been prepared. The characterization has been provided by selecting 20 representative locations on the basis of climatological and physiographic features and then for these locations obtaining measured insolation values or estimating insolation values on the basis of cloud cover. The data base is computer-compatible and designed for comprehensive mission analysis applications and, therefore, contains auxiliary solar and weather information in addition to the insolation data.

A supplemental set of two additional hourly data sets was prepared on the basis of pessimistic assumptions about the annual weather variations and instrumental calibrations in order to provide an insolation basis for evaluating worst case system performance.

Insolation information for six sample clear days has been obtained from the computer-oriented data base for reference purposes.

Several statistical studies were carried out on the insolation data for the 20 locations characterizing the Southwestern United States. These studies lead to the following conclusions.

- The single polynomial found in the previous study (Reference 1) to satisfactorily relate cloud cover to insolation for three quite different locations was found to be inadequate for the expanded number of locations in the present study. Three sets of polynomial coefficients were required.

- Long-term insolation data indicate a possible general long-term trend of increased cloudiness and, consequently, decreased insolation.

- The hourly data base indicates that for 90% of the hours when normal incidence insolation is available at Edwards AFB and

Inyokern, California, the wind has a velocity of 9 m/sec (20 mi per hour) or less. Extending this conclusion to even nearby locations may be highly questionable because of the dependency of these results on the specific location of the wind measuring instruments.

o On the basis of all comparisons of the annual average insolation from the hourly data bases, it is found that Inyokern, California; Albuquerque, New Mexico; El Paso, Texas; and Yuma, Arizona, are always among the six locations with the greatest insolation.

o A more detailed insolation-temperature correlation study than that performed previously (Reference 1) still indicates that the correlation between temperature and insolation is weak.

On the basis of the experience acquired in undertaking the studies reported here, several recommendations are possible:

o Routine insolation measurements should be made with carefully and accurately calibrated instruments at the actual potential sites of solar power plants. In particular, these measurements should include normal incidence measurements since virtually all of the normal incidence data in the present Southwestern United States data base is scaled from measurements at the single location of Albuquerque, New Mexico. These insolation measurements should be supported by adequate additional meteorological measurements of quantities of interest, such as temperature and wind velocity. These measurements are needed at the actual plant sites because of the probability of local variations from the values obtained at existing measuring locations and because of limited confidence in the calibration of some existing instruments.

o The National Weather Service should undertake a painstaking and careful review of all past calibration procedures to rehabilitate as much of the existing insolation data as possible.

- Hidden insolation data should be sought. Some data may exist from locations which are not part of the National Weather Service net.

- The estimating procedures employed to provide missing insolation data in the present data base should be reexamined in the light of the data added to the hourly data base in the course of the present study. It is quite possible that more accurate estimating procedures could be found.

6. REFERENCES

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2. Liu, B. Y. H. and R. C. Jordan, "Availability of Solar Energy for Flat-Plate Solar Heat Collectors," Low Temperature Engineering Application of Solar Energy, edited by R. C. Jordan, American Society of Heating, Refrigeration, and Air Conditioning Engineers Inc., N. Y.

3. Thekaekara, M. P., R. Kruger, and C. H. Duncan, "Solar Irradiance Measurements from a Research Aircraft," Applied Optics 8, 1713 (1969).

4. Kasten, F., "Effect of Variation of the Vertical Air Density Profile on the Relative Optical Air Mass," Arch. Met. Geoph. Biok. B, Bd 15, 62-66 (1967).

APPENDIX A

LOCAL CLIMATOLOGICAL DATA SUMMARIES

APPENDIX A
LOCAL CLIMATOLOGICAL DATA SUMMARIES

While the dominant factor to be considered in selecting a location for a solar plant is the availability of solar energy, many other characteristics of the site must also be taken into account. In addition to such factors as topography, land availability and cost, seismic activity, etc., there are certain surface-weather variables which are important in site selection. Included in this appendix are copies of the 1972 issues of Local Climatological Data Summary, published by the Environmental Data Service, for sixteen of the twenty weather stations represented in the insolation data base for the Southwestern United States. (The Environmental Data Service has not published summaries for three of the stations -- Edwards, Inyokern, and Riverside -- and the summary for Omaha is omitted because this station is outside the boundaries of the Southwestern U. S.). These summaries provide a great deal of information about the surface-weather variables at the sites in question and can be used in preliminary assessments of the various weather-related siting criteria, other than insolation, that may be considered important for particular types of solar power plants.

A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

ALBUQUERQUE, NEW MEXICO

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

'Arid Continental' characterizes the climate of Albuquerque and vicinity in a minimum number of words. With an average annual rainfall of just over eight inches there is generally insufficient natural moisture to maintain the growth of any but the most hardy desert vegetation. However, successful farming is carried on in the valley by irrigation and considerable fruit and produce are raised. In the mountains east of the City precipitation is considerably heavier. At Tijeras Ranger Station, about 15 miles east of Albuquerque, the average annual rainfall is more than 15 inches. Some dryland farming is carried on in this mountain area and native vegetation shows the effect of the heavier rainfall with good native grass cover and timbered mountains. The average monthly precipitation at Albuquerque varies from less than one-half inch during the winter months, November through March, to over an inch and a quarter during the months of July and August. With normally less than two inches of moisture, the winters are generally very dry. A considerable portion of this meager winter precipitation falls in the form of snow, but the monthly fall exceeds 3 inches infrequently and there are normally only four days a year when as much as one inch of snow occurs. Snow rarely remains on the ground in the valley for more than 24 hours but in the nearby mountains, snow cover is normal from the middle of December until early spring and a modern ski resort operates during the winter months just 25 miles from the City. The July-September period furnishes almost half of the annual moisture with most of the rain falling in the form of brief but at times rather heavy thundershowers. Prolonged rainy spells are practically unknown. These summer showers do not materially interfere with outdoor activities but do have a considerable moderating effect on summer daytime temperatures.

Temperatures in Albuquerque are those characteristic of high altitude, dry, continental climates. The average daily range of temperature is relatively high but extreme temperatures are rare as testified by the fact that there is normally less than one day a year when the temperature reaches 100° or drops to zero. Daytime temperatures during the winter average near 50° with only a few days on which the temperature does not rise above the freezing mark. In the summer, daytime maxima average less than 90° except in July and with the large daily range, the nights normally are comfortably cool. The air is normally dry with an average annual relative humidity of approximately 43%. "Muggy" days are unknown and the usual humidity during the warmer part of the day is about 30%, dropping down to less than 20% in June, the least humid month of the year.

Another feature of the climate is the large number of clear days and the high percentage of sunshine. Sunshine is recorded during more than three-fourths of the hours from sunrise to sunset and this high percentage carries throu i the winter months when clear, sunny weather predominates. Wind movement throughout the year averages around nine miles per hour, but during the late winter and spring months the average is somewhat higher and occasional windy and dusty days occur. These occasional dust storms are the most discomforting part of Albuquerque's climate. However there are on an average only 46 days during the year when the maximum wind speed reaches 32 miles per hour. Tornadoes rarely occur in the vicinity of Albuquerque.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: ALBUQUERQUE, NEW MEXICO   INTL AIRPORT-KIRTLAND AFB   Standard time used: MOUNTAIN   Latitude: 35° 03' N   Longitude: 106° 37' W   Elevation (ground): 5311 feet   Year: 1972

Month	Temperature – Averages – Daily maximum	Daily minimum	Monthly	Extremes – Highest	Date	Lowest	Date	Degree days (Base 65°) – Heating	Cooling	Precipitation – Total	Greatest in 24 hrs.	Date	Snow, Ice pellets – Total	Greatest in 24 hrs.	Date	Relative humidity – Hour 05	Hour 11	Hour 17	Hour 23 (Local time)	Wind & – Resultant – Direction	Speed	Average speed	Fastest mile – Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Maximum – 90° and above ‡	32° and below	Minimum – 32° and below	0° and below	Average daily solar radiation - langleys **
JAN	51.2	21.0	36.1	68	26+	3	5	889	0	0.12	0.12	3	1.2	1.2	3	58	38	29	51	34	1.6	8.4	45	E	3	90	3.6	15	10	6	1	1	0	0	0	2	31	0	
FEB	58.7	26.2	42.5	75	29	11	11	648	0	0.12	0.12	10	1.1	1.1	10	49	33	20	36	32	1.2	9.8	42	E	22	85	5.0	11	8	10	1	1	0	2	0	0	24	0	
MAR	71.1	36.1	53.6	80	19	21	31+	346	0	0.08	0.08	23	0.0	0.0		39	21	12	24	32	3.5	10.2	61	E	18	89	2.9	20	7	4	1	0	0	0	0	0	6	0	
APR	75.2	38.5	56.9	88	10	27	1	244	5	T	T	14	T	T	14	33	16	9	21	27	3.9	10.9	54	NW	12	83	4.0	14	9	7	0	0	0	0	0	0	5	0	
MAY	81.2	46.7	64.0	91	20	34	1	76	52	0.18	0.11	6-7	0.0	0.0		42	19	13	31	17	3.4	11.1	47	E	29	81	4.1	16	6	9	3	0	1	0	1	0	0	0	
JUN	90.3	57.1	73.7	102	29	50	9	0	267	0.55	0.32	22-23	0.0	0.0		56	27	21	44	19	1.9	9.7	47	E	29+	78	3.6	15	12	3	4	0	5	0	18	0	0	0	
JUL	93.1	64.1	78.6	103	31	56	6	0	428	1.00	0.45	4-5	0.0	0.0		62	36	26	45	15	2.9	10.1	48	E	4	71	4.9	11	12	8	6	0	7	0	24	0	0	0	
AUG	86.4	61.8	74.1	99	1	58	26+	3	294	2.93	0.95	18	0.0	0.0		67	42	35	59	12	2.8	9.4	42	E	16	73	4.7	14	11	6	12	0	9	0	10	0	0	0	
SEP	80.6	55.5	68.1	88	16	45	30	14	113	1.00	0.74	8-9	0.0	0.0		70	42	34	57	18	2.4	8.9	34	E	1	78	5.3	9	10	11	7	0	8	0	0	0	0	0	
OCT	68.3	46.9	57.6	87	2	29	31	244	23	3.08	0.94	25	T	T	31	74	55	50	69	12	3.3	9.8	45	E	14	54	6.5	6	9	16	17	0	9	2	0	0	1	0	
NOV	50.9	29.3	40.1	65	8	22	28+	740	0	0.69	0.28	17-18	2.9	2.0	12	74	51	41	65	36	3.4	8.8	40	NW	27	66	4.9	10	12	8	9	1	0	0	0	0	24	0	
DEC	47.3	22.6	35.0	64	4	15	6	925	0	0.36	0.28	28	1.2	1.0	11	66	48	40	59	35	3.0	9.7	54	NW	5	74	3.9	15	9	7	3	1	0	2	0	0	31	0	
YEAR	71.2	42.2	56.7	103	JUL. 31	3	JAN. 5	4129	1182	10.11	0.95	AUG. 18	6.4	2.0	NOV. 12	58	36	28	47	21	0.2	9.7	61	E	MAR. 18	77	4.5	156	115	95	64	4	39	6	53	2	122	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature – Normal – Daily maximum	Daily minimum	Monthly	Extremes – Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation – Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets – Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity – Hour 05	Hour 11	Hour 17	Hour 23 (Local time)	Wind & – Mean speed	Prevailing direction #	Fastest mile – Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Max. – 90° and above ‡	32° and below	Min. – 32° and below	0° and below	Average daily solar radiation - langleys **
(a)	(b)	(b)	(b)	13		13		(b)	(b)	33		33		33		33	33		33		12	12	12	12	33	15	33	33		33	33	33	33	33	33	33	33	33	12	12	12	12	
J	46.4	23.5	35.0	69	1971	-17	1971	930	0.41	1.17	1941	T	1970+	0.87	1962	1.8	6.0	1951	4.6	1966	66	47	35	56	7.8	N	61	E	1949	74	4.8	13	8	10	3	1	*	1	0	3	29	1	
F	52.2	27.5	39.9	75	1972	1	1964	703	0.38	1.42	1948	0.04	1959	0.48	1957	1.8	8.2	1964	4.2	1946	61	42	31	50	8.8	N	68	NW	1944	74	4.8	12	7	9	4	1	*	1	0	1	23	0	
M	58.8	32.7	45.8	85	1971	9	1966	595	0.48	1.71	1958	T	1966+	0.77	1968	1.7	7.3	1958	6.8	1942	52	31	23	40	10.0	SE	80	NW	1943	74	4.9	12	10	9	4	1	1	*	0	*	18	0	
A	69.1	42.2	55.7	89	1965	23	1970	288	0.47	1.97	1942	T	1972+	1.66	1969	0.3	4.6	1949	3.0	1944	44	24	17	32	10.9	S	72	S	1946	77	4.5	13	9	8	3	*	2	*	0	0	4	0	
M	78.3	51.9	65.1	94	1969+	28	1967	81	0.75	3.07	1941	T	1945+	1.14	1969	T	T	1951	T	1951	42	22	15	30	10.4	S	72	W	1950	80	4.1	15	10	6	4	0	4	0	3	0	*	0	
J	88.6	61.1	74.9	102	1972+	42	1971	0	0.57	1.71	1967	T	1964+	1.64	1952	0.0	0.0		0.0		45	24	18	32	9.9	S	82	SE	1946	83	3.3	18	9	3	4	0	5	*	16	0	0	0	
J	91.2	65.8	78.5	104	1971	54	1964	0	1.20	3.33	1968	0.14	1958	1.77	1961	0.0	0.0		0.0		61	36	28	48	9.1	SE	68	E	1945	76	4.5	12	14	5	9	0	11	*	24	0	0	0	
A	88.0	64.3	76.2	99	1972+	52	1968	0	1.33	3.30	1967	T	1962	1.22	1967	0.0	0.0		0.0		66	40	31	53	8.1	SE	61	SE	1951	76	4.2	14	13	4	9	0	12	*	15	0	0	0	
S	82.3	57.6	70.0	94	1971	37	1971+	12	0.95	1.99	1940	T	1957	1.92	1955	T	T	1971+	T	1971+	58	41	31	52	8.5	SE	62	SE	1945+	81	3.4	17	8	5	6	0	5	*	3	0	0	0	
O	70.7	45.3	58.0	87	1972+	25	1971+	229	0.75	3.08	1972	0.00	1952	1.80	1969	T	0.5	1970	0.5	1970	58	37	30	48	8.3	SE	66	N	1959	79	3.5	18	7	6	5	0	3	*	0	0	2	0	
N	56.1	31.1	43.6	72	1971+	13	1968	642	0.38	1.45	1940	0.00	1949	0.76	1940	1.3	9.3	1940	5.5	1946	64	44	36	54	7.7	N	57	NW	1948+	77	3.9	16	7	7	3	1	1	1	0	*	15	0	
D	48.3	25.6	37.0	68	1966	4	1968	868	0.46	1.85	1959	0.00	1956+	1.35	1958	2.8	14.7	1959	14.2	1958	69	52	43	60	7.5	N	90	SE	1943	71	4.5	14	8	9	4	1	*	1	0	2	29	0	
YR	69.2	44.1	56.6	104	JUL. 1971	-17	JAN. 1971	4348	8.13	3.33	JUL. 1968	0.00	DEC. 1956+	1.92	SEP. 1955	9.7	14.7	DEC. 1959	14.2	DEC. 1958	57	37	28	46	8.9	SE	90	SE	DEC. 1943	77	4.2	174	110	81	58	4	43	5	61	6	120	1	

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Maximum monthly precipitation 8.15 in June 1852 (measured by Medical Officers of Army at Army Post near plaza).

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

\# To 8 compass points only.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	32.4	31.9	47.2	48.6	59.8	72.2	77.8	73.4	70.8	58.2	44.1	38.8	54.6
1934	35.4	43.9	49.3	56.7	67.1	72.0	79.5	77.2	67.2	58.7	44.4	36.0	57.3
1935	37.4	38.6	46.2	54.1	58.0	72.0	77.2	74.6	66.2	56.6	41.9	34.7	54.8
1936	32.6	39.9	47.1	55.4	65.0	74.3	77.0	76.4	66.2	55.2	42.0	35.2	55.5
1937	26.4	37.3	48.4	54.0	64.5	70.8	76.8	77.8	69.9	58.0	45.6	37.8	55.2
1938	36.0	40.4	46.2	54.4	62.8	73.2	75.9	76.7	67.4	57.6	38.0	37.7	55.5
#1939	34.4	30.0	46.2	56.0	65.5	74.3	76.2	75.7	70.6	56.0	44.2	40.0	55.8
1940	35.2	39.2	48.0	54.4	65.5	73.4	78.2	74.2	68.4	58.8	41.4	39.2	56.4
1941	36.0	42.8	45.0	50.6	63.8	70.2	76.0	75.1	67.3	56.6	45.5	37.7	55.6
1942	37.0	36.2	43.3	54.8	64.4	74.8	78.8	75.8	68.6	57.8	48.1	40.8	56.7
1943	38.6	43.6	48.2	60.9	65.8	74.0	79.0	78.4	70.2	56.8	44.3	32.1	57.7
1944	29.2	40.0	44.4	52.2	63.9	73.3	76.4	76.3	68.6	58.7	43.0	36.2	55.2
1945	36.8	43.0	45.0	52.3	66.2	72.6	78.4	78.2	70.6	58.6	45.2	33.4	56.7
1946	33.5	40.2	47.9	61.3	64.0	77.5	78.3	75.9	71.3	56.3	41.6	40.4	57.4
1947	33.0	42.2	47.4	54.5	67.0	72.8	80.2	76.0	72.6	60.4	40.4	34.6	56.8
1948	33.7	37.6	40.9	59.3	66.7	73.8	79.6	77.6	71.4	57.2	40.6	38.2	56.4
1949	30.3	37.2	47.9	55.5	64.8	73.7	77.7	76.3	71.8	56.2	50.7	34.1	56.4
1950	37.5	44.8	47.9	58.5	65.7	76.1	76.8	76.3	67.9	65.8	48.3	42.3	59.0
1951	36.6	39.8	46.3	54.8	66.5	74.7	82.6	76.6	71.9	58.8	42.2	36.2	57.2
1952	39.0	39.4	42.3	55.9	66.4	78.1	78.2	79.9	70.7	61.0	40.1	33.7	57.0
1953	42.2	38.7	48.8	55.1	61.5	78.1	80.0	77.7	73.0	59.2	46.3	32.8	57.8
1954	38.4	46.8	46.0	62.8	67.0	76.4	81.3	76.6	72.8	61.4	48.7	36.1	59.5
1955	33.8	34.8	47.4	55.1	63.9	73.9	77.0	76.9	72.5	61.1	45.1	40.0	56.8
1956	41.1	36.0	49.2	55.3	69.6	78.9	78.4	76.3	74.1	60.3	41.0	36.3	58.1
1957	39.9	48.1	47.3	54.2	61.9	74.8	79.1	76.0	70.3	56.6	40.3	38.5	57.3
#1958	35.3	43.5	42.8	53.0	68.6	78.5	79.6	78.9	69.2	56.9	46.0	41.5	57.8
1959	34.3	39.5	45.9	57.0	65.1	77.0	78.6	76.2	70.6	56.8	43.9	38.2	56.9
#1960	33.0	36.5	49.9	57.9	64.7	76.6	78.7	78.4	71.8	56.5	46.5	33.9	57.1
1961	33.9	40.6	47.0	54.5	65.9	75.8	76.7	75.2	65.6	56.8	40.3	34.1	55.5
1962	31.6	42.3	41.2	58.1	64.1	72.7	76.3	77.6	69.4	58.1	46.9	36.9	56.3
1963	29.4	40.5	45.2	57.7	68.0	74.6	81.4	75.9	72.5	61.5	45.7	34.8	57.3
1964	30.0	29.1	41.5	51.7	65.8	73.6	78.2	76.8	69.3	59.4	43.7	35.5	54.5
1965	38.8	39.4	44.6	54.8	61.7	69.4	77.9	75.4	66.6	58.0	48.4	35.8	55.9
1966	30.1	33.2	48.6	54.6	67.2	72.8	79.8	75.7	68.4	56.8	46.7	34.3	55.4
1967	33.2	40.5	52.0	57.8	63.8	71.5	79.2	74.5	68.4	58.2	46.1	32.4	56.5
1968	36.8	43.3	46.7	53.4	62.7	75.2	76.1	72.4	68.0	58.3	42.8	30.0	55.5
1969	38.0	38.5	41.1	57.4	66.2	73.6	80.2	79.0	70.0	53.8	41.4	39.1	56.6
1970	34.5	42.8	44.1	52.5	66.2	72.7	79.6	77.8	67.5	52.6	44.5	36.4	56.0
1971	33.6	38.9	47.7	53.3	61.7	73.8	78.1	73.9	66.4	53.8	45.2	31.9	54.8
1972	36.1	42.5	53.6	56.9	64.0	73.7	78.6	74.1	68.1	57.6	40.1	35.0	56.7
RECORD													
MEAN	34.6	39.6	46.3	54.9	63.8	73.2	77.1	75.1	68.4	56.8	43.9	35.1	55.8
MAX	47.2	52.8	60.7	69.9	79.0	88.7	90.9	88.6	82.2	71.1	57.4	47.3	69.7
MIN	22.0	26.3	31.9	39.9	48.6	57.7	63.3	61.6	54.5	42.4	30.3	22.9	41.8

TOTAL DEGREE DAYS

ALBUQUERQUE, NEW MEXICO

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0	0	0	212	625	810	917	590	488	254	44	1	3941
1934-35	0	3	28	198	618	898	856	740	580	327	236	3	4487
1935-36	0	0	64	267	691	937	1003	724	556	289	67	6	4604
1936-37	0	0	87	301	692	925	1196	778	672	345	67	10	5073
1937-38	0	0	11	221	583	844	904	688	582	335	123	2	4293
1938-39	0	0	5	240	810	843	946	976	583	267	36	0	4706
#1939-40	0	0	14	280	626	775	925	748	497	318	61	0	4244
1940-41	0	0	13	195	712	798	898	622	619	420	102	15	4394
1941-42	0	0	51	263	584	846	862	805	672	307	89	0	4479
1942-43	0	0	16	228	504	749	819	599	519	163	60	0	3657
1943-44	0	0	14	250	624	1019	1115	727	639	386	85	3	4862
1944-45	0	0	21	200	660	888	875	621	618	379	41	11	4314
1945-46	0	0	53	206	593	982	979	697	532	125	76	0	4243
1946-47	0	0	12	273	704	763	991	637	543	318	48	9	4298
1947-48	0	0	0	172	735	942	970	791	746	185	61	3	4605
1948-49	0	0	13	245	733	836	1074	777	530	299	63	3	4573
1949-50	0	0	6	290	426	958	845	560	522	195	50	0	3852
1950-51	0	0	27	20	495	697	874	699	572	301	81	5	3771
1951-52	0	0	3	200	680	888	800	738	693	264	58	6	4330
1952-53	0	0	13	134	740	965	700	732	500	298	200	0	4282
1953-54	0	0	0	185	554	989	818	503	581	96	59	2	3787
1954-55	0	0	3	151	483	889	961	840	538	292	90	2	4249
1955-56	0	0	1	139	590	764	736	836	483	288	20	0	3857
1956-57	0	0	0	195	715	880	771	468	543	317	123	3	4015
#1957-58	0	0	3	269	739	817	914	596	679	354	24	0	4395
1958-59	0	0	35	249	562	722	948	706	587	249	60	0	4118
#1959-60	0	0	20	250	628	823	987	819	462	211	82	0	4282
1960-61	0	0	3	256	548	956	956	678	551	308	65	0	4321
1961-62	0	0	43	248	731	951	1030	629	730	214	78	2	4656
1962-63	0	0	22	208	534	863	1098	680	605	219	7	2	4238
1963-64	0	0	0	124	573	931	1076	1036	722	391	85	3	4941
1964-65	2	0	20	173	632	909	805	709	624	300	128	24	4326
1965-66	0	0	56	217	492	895	1074	882	595	305	53	0	4569
1966-67	0	0	15	247	541	942	980	682	396	211	109	0	4123
1967-68	0	0	13	220	557	1003	870	623	559	343	107	8	4303
1968-69	2	0	12	208	660	1080	831	735	735	228	84	0	4575
1969-70	0	0	1	348	701	795	938	612	644	367	63	11	4480
1970-71	0	0	58	380	605	878	968	725	533	343	122	5	4617
1971-72	0	0	101	341	587	1022	889	648	346	244	76	0	4254
1972-73	0	3	14	244	740	925							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	0.08	0.01	0.09	0.39	0.23	3.81	2.04	2.42	1.12	0.24	0.91	0.05	11.39
1934	0.06	0.04	0.01	0.13	0.72	0.37	0.61	2.10	1.08	0.24	0.84	0.78	6.98
1935	0.91	0.20	0.03	0.48	0.91	1.40	0.19	3.74	1.19	0.26	1.37	0.36	11.04
1936	0.55	0.12	0.11	0.09	0.27	0.43	0.67	0.62	2.05	0.17	T	0.13	5.21
1937	0.21	0.11	0.63	0.42	2.78	1.91	1.02	0.22	0.87	0.79	0.01	0.48	9.45
1938	0.12	0.49	0.22	0.20	0.02	1.51	1.45	0.17	2.36	0.63	0.02	0.36	7.55
#1939	0.70	0.32	0.67	0.86	0.14	T	2.33	0.54	1.19	0.83	0.78	0.10	8.46
1940	0.52	0.58	0.48	0.21	1.71	1.32	0.62	3.25	1.99	0.36	1.45	0.87	13.36
1941	1.17	0.20	1.00	1.20	3.07	0.90	2.15	1.07	1.85	2.67	0.37	0.23	15.88
1942	0.13	0.54	0.39	1.97	T	0.22	0.20	1.42	1.55	0.73	T	1.10	8.25
1943	0.25	0.26	0.23	0.06	1.41	1.20	1.19	1.33	0.39	0.22	0.14	0.94	7.62
1944	0.46	0.42	0.49	0.91	0.57	0.85	1.58	1.44	0.65	0.86	0.56	0.76	9.55
1945	0.34	0.32	0.50	0.77	T	T	1.09	2.27	0.26	0.43	T	0.35	6.33
1946	0.25	0.33	1.03	0.26	0.31	0.07	2.28	1.49	0.57	1.02	0.54	0.12	8.27
1947	0.02	0.14	0.03	0.03	0.48	0.23	0.38	1.45	0.67	0.31	0.45	1.05	5.24
1948	0.18	1.42	0.41	0.33	0.94	0.57	0.46	0.51	0.80	0.60	0.11	0.11	6.44
1949	0.61	0.29	0.65	0.67	1.35	0.32	2.21	0.72	0.87	0.14	0.00	0.59	8.42
1950	0.02	0.38	0.04	0.27	0.06	0.23	2.00	0.08	1.01	0.01	T	0.00	4.10
1951	0.41	0.27	0.29	0.38	0.10	0.02	0.85	2.22	0.05	0.37	0.14	0.28	5.38
1952	0.20	0.17	0.59	0.76	0.65	1.64	1.91	1.10	0.34	0.00	0.53	0.20	8.09
1953	T	0.43	0.74	0.69	0.03	0.35	0.52	0.59	0.06	0.46	0.91	0.29	5.08
1954	0.20	0.07	0.24	T	0.51	0.01	1.45	0.65	0.77	0.25	0.22	0.14	4.51
1955	0.29	0.18	T	0.04	0.53	0.32	1.60	1.32	1.94	0.06	T	0.22	6.51
1956	0.46	0.49	T	T	0.18	0.43	1.49	0.62	0.02	0.34	0.03	0.00	4.06
1957	0.78	0.59	0.52	0.38	0.35	0.04	2.48	1.32	T	2.59	1.24	0.32	10.61
#1958	0.21	0.27	1.71	0.62	0.43	0.22	0.14	1.74	1.34	1.72	0.37	1.35	10.12
1959	0.17	0.04	0.42	0.43	0.80	0.78	0.73	2.79	0.36	1.70	0.07	1.85	10.14
1960	0.34	0.38	0.44	0.19	0.71	0.91	0.47	0.78	0.56	2.88	0.07	0.39	8.12
1961	0.23	0.10	0.61	0.73	0.01	0.11	2.70	1.69	1.09	0.47	0.48	0.65	8.87
1962	1.01	0.11	0.18	0.07	0.01	0.19	1.24	T	0.71	0.75	0.61	0.51	5.39
1963	0.29	0.24	0.55	0.14	0.03	0.11	1.43	3.00	0.63	0.76	0.29	T	7.47
1964	0.07	1.12	0.13	0.61	0.35	T	1.87	0.98	1.57	0.04	0.21	0.49	7.44
1965	0.47	0.60	0.49	0.49	0.19	0.99	1.65	0.61	1.18	0.89	0.33	1.42	9.31
1966	0.42	0.30	T	0.04	0.02	1.66	1.63	1.06	1.04	0.54	0.09	0.01	6.81
1967	0.01	0.44	0.25	T	0.04	1.71	0.61	3.30	0.79	0.18	0.15	0.56	8.04
1968	0.01	0.98	1.48	0.51	0.99	0.05	3.33	1.49	0.30	0.12	0.59	0.82	10.67
1969	0.08	0.34	0.41	1.76	1.31	0.59	0.94	0.95	1.08	2.37	0.01	0.72	10.56
1970	T	0.27	0.42	0.05	0.33	0.40	1.22	2.24	0.79	0.25	0.08	0.23	6.28
1971	0.27	0.21	0.03	0.78	0.16	0.02	1.05	0.87	1.44	1.15	0.67	1.40	8.05
1972	0.12	0.12	0.08	T	0.18	0.55	1.00	2.93	1.00	3.08	0.69	0.36	10.11
RECORD MEAN	0.36	0.35	0.41	0.55	0.62	0.59	1.43	1.34	0.91	0.83	0.42	0.46	8.27

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0.0	0.0	0.0	0.0	0.2	0.2	0.1	T	T	0.0	0.0	0.0	0.5
1934-35	0.0	0.0	0.0	0.0	3.0	0.0	T	1.8	T	0.0	2.0	0.0	6.8
1935-36	0.0	0.0	0.0	T	T	1.2	6.8	0.3	0.1	0.7	T	0.0	9.1
1936-37	0.0	0.0	T	0.0	0.0	1.5	4.0	T	4.4	1.5	0.0	0.0	11.4
1937-38	0.0	0.0	0.0	0.0	0.0	1.0	T	2.5	T	0.1	T	0.0	3.6
1938-39	0.0	0.0	0.0	T	0.1	0.1	1.0	3.0	0.5	0.2	0.0	0.0	4.9
#1939-40	0.0	0.0	0.0	0.0	T	0.3	T	3.7	T	T	0.0	0.0	4.0
1940-41	0.0	0.0	0.0	0.0	9.3	0.5	0.9	0.5	2.0	T	0.0	0.0	13.2
1941-42	0.0	0.0	0.0	0.0	0.4	2.0	2.1	3.0	7.1	T	0.0	0.0	14.6
1942-43	0.0	0.0	0.0	0.0	T	T	1.0	T	T	0.0	0.0	0.0	1.0
1943-44	0.0	0.0	0.0	0.0	T	4.0	4.9	T	1.0	3.0	0.0	0.0	12.9
1944-45	0.0	0.0	0.0	0.0	T	1.0	1.0	2.0	T	2.0	0.0	0.0	6.0
1945-46	0.0	0.0	T	0.0	0.0	2.6	3.8	4.2	6.0	0.0	0.0	0.0	16.6
1946-47	0.0	0.0	0.0	0.0	6.5	T	0.3	T	T	T	0.0	0.0	6.5
1947-48	0.0	0.0	0.0	0.0	5.7	5.1	3.1	6.1	1.0	0.0	0.0	0.0	21.0
1948-49	0.0	0.0	0.0	0.0	T	0.2	2.8	2.4	3.0	4.6	0.0	0.0	13.0
1949-50	0.0	0.0	0.0	T	0.0	5.0	T	T	T	T	0.0	0.0	5.0
1950-51	0.0	0.0	0.0	0.0	T	0.0	6.0	1.0	T	T	T	0.0	7.0
1951-52	0.0	0.0	0.0	0.0	T	3.0	T	T	2.0	T	0.0	0.0	5.0
1952-53	0.0	0.0	0.0	0.0	2.7	0.9	T	3.8	T	0.0	0.0	0.0	7.4
1953-54	0.0	0.0	0.0	0.0	7.5	3.7	2.9	T	T	0.0	0.0	0.0	14.1
1954-55	0.0	0.0	0.0	0.0	0.0	1.4	3.0	1.2	T	0.0	0.0	0.0	5.6
1955-56	0.0	0.0	0.0	0.0	T	1.0	2.9	4.5	0.0	T	0.0	0.0	8.4
1956-57	0.0	0.0	0.0	0.0	T	0.0	1.5	T	T	T	0.0	0.0	1.5
1957-58	0.0	0.0	0.0	T	T	2.9	2.3	0.5	7.3	T	0.0	0.0	13.0
1958-59	0.0	0.0	0.0	T	2.2	14.2	1.7	0.6	4.8	T	0.0	0.0	23.5
1959-60	0.0	0.0	0.0	T	0.0	14.7	1.8	0.8	2.8	0.0	0.0	0.0	20.1
1960-61	0.0	0.0	0.0	0.0	0.0	2.5	0.6	0.4	3.0	T	0.0	0.0	6.5
1961-62	0.0	0.0	0.0	T	3.4	2.4	4.0	T	0.2	0.0	0.0	0.0	10.0
1962-63	0.0	0.0	0.0	0.0	T	1.0	2.5	0.8	2.5	0.0	0.0	0.0	6.8
1963-64	0.0	0.0	0.0	0.0	T	T	0.5	8.2	1.3	T	0.0	0.0	10.0
1964-65	0.0	0.0	0.0	0.0	T	0.3	1.4	3.6	T	T	0.0	0.0	5.3
1965-66	0.0	0.0	0.0	0.0	T	3.0	5.4	1.0	0.0	T	0.0	0.0	9.4
1966-67	0.0	0.0	0.0	0.0	T	T	T	1.0	1.1	T	0.0	0.0	2.1
1967-68	0.0	0.0	0.0	0.2	1.0	2.8	T	2.0	1.4	T	0.0	0.0	7.4
1968-69	0.0	0.0	0.0	0.0	T	7.4	T	1.8	5.5	T	0.0	0.0	14.7
1969-70	0.0	0.0	0.0	0.0	T	1.1	T	2.7	3.3	0.0	0.0	0.0	7.1
1970-71	0.0	0.0	0.0	0.5	T	0.5	3.0	2.3	0.5	T	0.0	0.0	6.8
1971-72	0.0	0.0	T	T	T	6.8	1.2	1.1	0.0	T	0.0	0.0	9.1
1972-73	0.0	0.0	0.0	T	2.9	1.2							

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1893.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table. Precipitation Data are from Univ. of New Mexico location for 1/93-12/05, 7/06-9/06, 5/07-2/08, 4/08-8/08, 11/08, 1/09-2/09, 4/09-4/10, 9/18-3/31; 1216 W Central Ave. location for 1/06-6/06, 10/06-4/07, 8/07,3/08, 9/08-10/08, 12/08, 3/09, 5/10-4/15, 7/15-9/15, 1/16; and Rio Grande Ind. School location for 5/15-6/15, 10/15-12/15 and 2/16-7/16. Temperature data are from Univ. of New Mexico location for 1/93-5/10; Rio Grande Ind. School location for 5/15-12/18; and Univ. of New Mexico location for 1/19-3/31.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above: Sea level	Ground								Sea level	Remarks
						Ground at temperature site	Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	
COOPERATIVE																
4th and W. Gold Avenue	1-1892	12-1892		35° 05'	106° 39'								3			
University of New Mex.	1-1893	5-1910	1.5 mi. E	35° 05'	106° 37'	5150		?					39			
1216 W. Central Avenue	1-1906	1-1916	2 mi. W	35° 05'	106° 40'	4960							3			Precipitation only. Record intermittent.
Rio Grande Industrial School	5-1915	12/31/18	5 mi. S	35° 01'	106° 40'	4950		4					3			Temperature only after July 1916.
5th and W. Central Ave.	8-1916	8-1918	5 mi. N	35° 05'	106° 39'	4960							3			
University of New Mex.	9-1918	3-1931	1.5 mi. E	35° 05'	106° 37'	5150	59	48	48				39			
CITY																
Kimo Theatre Building 419 W. Central Avenue	4/01/31	1/23/33	1.5 mi. W	35° 05'	106° 39'	4960	66	52	51		45		45			Office moved 1000 feet SW to Federal Building 6/29/32, but instruments not moved.
AIRPORT																
TWA Airport West of City	1/23/33	7/31/39	3.8 mi. W	35° 05'	106° 43'	5100	39	6	5		15		15			
Administration Building Municipal Airport	7/31/39	6/23/58	6 mi.ESE	35° 03'	106° 37'	5310	48	6	5		3	5	3		5348	
Administration Building Municipal Airport	6/23/58	2/04/60	A			5310	48	16	15		13	15	13		5348	A - Instrument relocation to roof 33 feet SSE of ground site.
Administration Building Municipal Airport	2/04/60	3/16/65	B	35° 03'	106° 37'	5311	a23	17	17		13	15	13	5	5348	B - Instrument relocations and commissioning of hygrothermometer. a - Direct reading equipment 48 feet to 3/1/60; other wind equipment continued at 48 feet.
FAA/Weather Bureau Building, Albuquerque Sunport-Kirtland AFB †	3/16/65	Present	350 ft. SW	35° 03'	106° 37'	5311	b23	16	16		17	17	d17	b5	c5337	b - Not moved 3/16/65. c - 5327 to 1/22/66. d - 13 feet to 4/16/66.

† Albuquerque International Airport—Kirtland AFB effective in 1971.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

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LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

DODGE CITY, KANSAS

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

The climate of Dodge City and southwestern Kansas is classified as semiarid. Dodge City is nearly 300 miles east of the Rocky Mountains, but the weather reflects the influence of the mountains. The mountains form a barricade against all except high level moisture from the southwest, west, and northwest. Chinook winds occur occasionally but with less frequency and effect than at stations farther to the west. Relatively dry air predominating with an abundance of sunshine contribute to broad diurnal temperature ranges.

The average annual precipitation accumulates to near 20 inches. Thunderstorms during the growing season contribute most of the moisture. In general, the thunderstorms are widely scattered, occurring during the late afternoons and evenings. They are occasionally accompanied by hail and strong winds, but due to the local nature of the storms, damage to crops and buildings is extremely spotted and variable. Winter is the dry season; however, the moisture accumulated during the winter months is important for the hard winter wheat. Accumulated snowfall averages near 20 inches for the winter, but duration of snow cover is generally brief due to mild temperatures and an abundance of sunshine. The exception results from the occasional blizzard that spreads across the flat treeless prairies of the high plains.

The extreme temperatures recorded for Dodge City range from 109° to -26°. Afternoon temperatures in the nineties prevail during the summer months; temperatures above 100° are the exception. Due to low humidity and a continual breeze, these temperatures are effectively moderated. Temperatures drop sharply after sunset, allowing cool comfortable nights. During the winter months, large temperature changes are frequent, but duration of extreme cold spells are brief. Temperatures below zero are infrequent and of only a few hours duration each winter.

The visibility at Dodge City is generally unrestricted as the terrain is favorable for unrestricted movement of air and airmasses. Periods of calm winds are rare as are extremely strong winds.

Western Kansas is noted for clear skies and abundance of sunshine with seldom a day the sun fails to shine.

The climate is conducive to the growing of hard winter wheat and maize. The winter wheat is pastured by cattle and sheep during the fall and winter. The semiarid climate favors production of wheat high in protein.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: DODGE CITY, KANSAS MUNICIPAL AIRPORT Standard time used: CENTRAL Latitude: 37° 46' N Longitude: 99° 58' W Elevation (ground): 2582 feet Year: 1972

Month	Temperature – Averages – Daily maximum	Daily minimum	Monthly	Extremes – Highest	Date	Lowest	Date	Degree days (Base 65°) – Heating	Cooling	Precipitation – Total	Greatest in 24 hrs.	Date	Snow, Ice pellets – Total	Greatest in 24 hrs.	Date	Relative humidity – Hour 00 (Local time)	Hour 06	Hour 12	Hour 18	Wind & – Resultant – Direction	Speed	Average speed	Fastest mile – Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Maximum – 90° and above ‡	32° and below	Minimum – 32° and below	0° and below	Average daily solar radiation - langleys **
JAN	42.5	15.5	29.0	65	12	-8	15	1111	0	0.17	0.11	3-4	2.2	1.2	3-4	73	74	52	55	27	1.4	13.0	38	N	12+	77	5.3	13	5	13	7	0	0	4	0	7	30	4	
FEB	52.4	21.2	36.8	85	29	3	3+	812	0	0.07	0.04	11	0.7	0.4	11	57	63	40	38	27	1.0	13.2	43	N	21	65	6.1	7	8	14	2	0	0	2	0	2	26	0	
MAR	65.9	32.5	49.2	87	19+	12	2	485	4	0.27	0.10	28 +	1.0	1.0	28	50	59	32	27	28	1.5	14.7	51	N	1	75	5.8	9	10	12	4	1	1	0	0	0	14	0	
APR	69.3	40.9	55.1	90	12	21	1	301	11	2.06	1.29	26	T	T	15	50	59	37	33	19	0.7	14.5	49	N	3	65	6.3	9	5	16	6	0	3	2	1	0	3	0	
MAY	74.6	51.3	63.0	91	16	37	3	129	72	5.44	1.46	10-11	0.0	0.0		71	75	51	47	16	2.3	12.5	47	NW	10	70	5.4	13	7	11	13	0	12	0	1	0	0	0	
JUN	86.0	61.6	73.8	93	3	52	21	3	275	5.94	3.01	13	0.0	0.0		66	75	48	44	17	6.5	11.1	49	NW	18	85	5.4	9	12	9	8	0	10	0	10	0	0	0	
JUL	87.3	64.7	76.0	102	14	53	5	6	356	7.26	3.52	15-16	0.0	0.0		66	76	49	45	17	6.0	11.6	33	S	8+	73	6.1	5	16	10	15	0	15	1	15	0	0	0	
AUG	86.8	64.2	75.5	96	20	55	25	0	334	3.97	2.76	24	0.0	0.0		63	72	46	43	18	5.4	10.3	42	SW	21	71	5.3	12	9	10	10	0	7	1	17	0	0	0	
SEP	78.9	56.3	67.6	94	18	40	30	70	156	2.48	1.41	8	0.0	0.0		70	78	52	49	17	3.6	10.5	31	W	20	65	5.6	10	8	12	4	0	5	1	7	0	0	0	
OCT	65.5	43.3	54.4	92	10	25	19	345	26	0.71	0.24	30	T	T	30	63	70	53	54	15	2.4	11.4	34	N	5	40	8.6	1	7	23	8	0	1	4	1	1	5	0	
NOV	45.2	28.8	37.0	68	5	17	22+	831	0	2.28	0.97	9	6.3	4.4	17-18	78	80	64	67	25	2.6	10.9	37	N	25	48	7.0	7	5	18	9	3	0	4	0	6	21	0	
DEC	37.3	17.2	27.3	68	2	-6	6	1164	0	0.35	0.20	11-12	3.2	1.8	11-12	73	75	60	68	29	2.4	12.7	42	N	23	60	5.6	11	6	14	7	1	0	2	0	15	30	3	
YEAR	66.0	41.5	53.8	102	JUL. 14	-8	JAN. 15	5257	1234	31.00	3.52	JUL. 15-16	13.4	4.4	NOV. 17-18	65	71	49	48	19	2.2	12.2	51	N	MAR. 1	67	6.0	106	98	162	93	5	54	21	52	31	129	7	

NORMALS, MEANS, AND EXTREMES

Month	Temperature – Normal – Daily maximum	Daily minimum	Monthly	Extremes Ø – Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation – Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets – Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity – Hour 00 (Local time)	Hour 06	Hour 12	Hour 18	Wind & – Mean speed	Prevailing direction	Fastest mile – Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Max. – 90° and above ‡	32° and below	Min. – 32° and below	0° and below	Average daily solar radiation - langleys **
(a)	(b)	(b)	(b)	9		9		(b)	(b)	30		30		30		30	30		30		9	9	9	9	30	14	29	29		30	30	30	30	30	30	30	30	30	9	9	9	9	
J	42.4	19.7	31.1	78	1967	-10	1966	1051	0.57	1.96	1949	T	1961	1.12	1945	3.9	10.3	1949	8.8	1971	72	77	57	58	13.8	S	56	NW	1950+	68	5.6	11	7	13	4	1	*	3	0	8	29	2	
F	46.6	23.3	35.0	85	1972+	-1	1965	840	0.70	2.04	1971	0.01	1970+	1.18	1948	3.3	14.1	1971	10.3	1971	70	75	55	52	14.3	N	72	NW	1953	64	5.8	9	7	12	5	1	1	3	0	5	25	*	
M	54.3	29.3	41.8	91	1971	-1	1967	719	1.16	4.71	1957	0.02	1966	1.49	1970	5.2	24.0	1970	12.8	1970	63	72	46	41	16.0	N	74	NW	1952	67	5.9	9	9	13	6	2	1	3	*	3	20	*	
A	66.1	41.1	53.6	92	1967	19	1970+	354	1.84	5.18	1952	0.07	1963	2.01	1952	0.6	5.6	1956	5.9	1970	63	71	43	39	15.8	SSE	70	N	1955	69	5.8	9	9	12	7	*	4	2	1	*	4	0	
M	75.5	51.9	63.7	102	1967	26	1967	124	3.22	8.69	1951	0.68	1953	2.72	1965	T	T	1954+	T	1954+	67	77	47	43	14.9	S	71	W	1959	69	5.7	9	10	12	10	0	9	2	4	0	*	0	
J	86.8	61.9	74.4	104	1968	42	1969	9	3.03	7.95	1951	0.12	1952	3.28	1944	0.0	0.0		0.0		69	80	48	43	14.7	S	73	S	1947	75	4.9	11	11	8	9	0	11	1	13	0	0	0	
J	92.8	67.5	80.2	106	1971+	51	1970	0	2.31	9.13	1962	0.17	1946	4.17	1944	0.0	0.0		0.0		65	77	46	41	13.1	S	78	SW	1951	77	4.9	11	13	7	9	0	12	1	20	0	0	0	
A	91.7	66.6	79.2	107	1964	50	1967	0	2.36	6.31	1968	0.68	1970	3.08	1968	0.0	0.0		0.0		68	79	48	43	12.8	S	72	NW	1944	77	4.6	13	11	7	9	0	10	1	16	0	0	0	
S	82.9	57.6	70.3	102	1971	36	1970	33	1.53	4.24	1962	0.01	1947	3.27	1959	T	T	1945	T	1945	73	82	52	48	14.0	S	73	NE	1962	75	4.3	15	7	8	6	0	5	2	7	0	0	0	
O	71.1	45.5	58.3	96	1968	25	1972	251	1.42	4.88	1968	T	1952	4.55	1968	0.1	1.5	1951	1.5	1951	66	74	46	48	13.7	S	63	SW	1949	73	4.4	15	7	9	5	*	2	2	1	*	3	0	
N	55.1	30.4	42.8	81	1964	12	1964	666	0.64	3.75	1971	T	1966+	2.42	1971	2.1	13.2	1948	6.7	1948	73	79	55	59	13.8	S	59	NW	1948	68	5.0	12	8	10	4	1	1	2	0	1	16	0	
D	45.8	23.6	34.7	74	1965	-7	1968	939	0.47	2.01	1965	T	1957+	0.95	1944	3.4	10.8	1942	6.6	1958	74	78	60	64	13.5	N	57	NW	1957	64	5.5	11	7	13	4	1	*	3	0	8	28	1	
YR	67.6	43.2	55.4	107	AUG. 1964	-10	JAN. 1966	4986	19.25	9.13	JUL. 1962	T	NOV. 1966+	4.55	OCT. 1968	18.6	24.0	MAR. 1970	12.8	MAR. 1970	69	77	50	48	14.2	S	78	SW	JUL. 1951	71	5.2	135	106	124	77	6	54	23	62	25	126	4	

Ø For period August 1963 through the current year.
Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 109 in August 1936 and earlier; lowest temperature -26 in February 1899; maximum monthly precipitation 12.82 in May 1881; minimum monthly precipitation 0.00 in December 1889; maximum precipitation in 24 hours 6.03 in June 1899; maximum monthly snowfall 27.7 in February 1903; maximum snowfall in 24 hours 17.5 in March 1922.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

\# To 8 compass points only.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	38.8	31.5	46.3	53.6	64.2	79.9	81.9	76.8	74.2	58.6	47.0	40.4	57.8
1934	36.7	35.8	43.9	56.2	69.5	80.0	87.3	82.8	65.6	62.4	47.4	35.4	58.6
1935	36.0	39.8	50.4	51.8	57.4	71.4	83.6	80.2	68.7	56.8	40.4	35.4	56.0
1936	28.4	23.6	48.0	54.2	67.4	76.6	83.8	83.6	70.5	53.8	43.4	37.9	55.9
1937	21.4	33.6	40.2	54.6	67.0	73.4	82.0	83.8	71.4	57.0	41.4	31.9	54.8
1938	35.8	37.8	49.6	53.1	63.1	73.3	80.8	83.6	73.0	63.6	41.5	36.6	57.6
1939	38.4	29.1	45.2	55.0	67.8	76.0	83.2	79.0	73.2	59.6	45.0	39.4	57.6
1940	16.6	35.2	45.6	53.3	63.8	73.0	82.0	75.8	70.2	63.4	40.8	37.8	54.8
1941	33.6	34.4	40.2	53.8	66.8	70.6	78.2	78.2	70.8	57.1	45.5	37.2	55.5
#1942	31.5	31.7	44.8	55.6	63.1	72.8	81.0	76.5	67.0	57.2	44.6	32.1	54.8
1943	33.3	41.1	38.6	57.8	59.8	75.6	82.0	82.8	67.2	55.3	42.6	28.2	55.4
1944	30.6	36.0	38.2	48.0	63.8	74.8	77.0	77.8	67.7	57.7	44.4	31.4	54.0
1945	32.4	34.1	49.0	50.2	61.8	66.6	77.4	78.4	68.0	57.2	46.2	28.9	54.2
1946	34.4	41.7	50.0	60.1	60.0	75.4	82.8	77.3	68.2	56.0	41.8	38.6	57.2
1947	32.0	31.8	38.6	50.3	59.8	71.0	77.8	81.8	74.0	64.9	37.4	32.2	54.3
1948	28.7	29.5	33.8	60.3	64.2	73.6	77.4	75.4	71.8	57.4	39.5	33.2	53.7
1949	21.6	32.2	41.8	53.6	64.0	73.8	78.8	75.6	65.6	57.0	50.1	34.2	54.0
1950	29.6	39.3	40.8	51.7	62.3	75.3	73.3	71.6	66.2	62.5	40.4	34.9	54.0
1951	28.8	37.7	38.7	49.9	63.2	67.3	77.6	78.4	65.1	54.3	38.6	32.2	52.7
1952	36.2	38.7	38.3	50.9	63.6	81.7	79.5	80.6	71.1	55.3	40.6	30.5	55.6
1953	39.1	38.9	47.8	50.7	63.2	80.9	77.9	76.3	72.0	60.7	43.5	34.5	57.1
1954	31.3	45.7	40.2	58.1	59.0	77.5	84.8	81.1	74.7	57.3	48.2	37.2	57.9
1955	33.3	29.8	42.2	59.0	65.7	69.9	81.5	79.5	70.7	60.0	39.3	32.6	55.3
1956	31.5	31.0	45.2	50.6	68.5	79.3	79.3	80.0	73.5	62.6	41.8	36.8	56.7
1957	25.0	39.8	40.7	50.7	68.0	70.7	81.5	79.0	65.7	54.9	39.5	40.6	54.1
1958	34.2	31.4	31.7	50.2	66.5	73.4	76.1	77.7	70.3	58.7	43.9	32.5	53.9
1959	26.4	33.7	43.4	52.6	65.1	76.2	76.1	81.3	68.9	53.1	38.5	37.3	54.4
1960	28.8	25.1	34.1	57.2	62.7	73.3	77.1	78.7	70.8	58.7	44.1	32.8	53.6
1961	33.2	37.7	43.5	51.4	62.3	72.6	77.5	75.6	64.1	57.2	38.8	30.4	53.7
1962	26.5	37.1	40.9	54.0	71.1	70.9	77.3	78.9	65.9	59.3	44.4	36.3	55.2
#1963	22.2	39.0	47.7	58.2	67.8	75.6	82.3	79.3	72.9	66.5	46.5	26.5	57.0
1964	35.5	31.8	40.8	56.8	69.0	73.9	83.1	77.4	68.2	57.2	43.8	30.9	55.7
1965	34.4	32.4	33.8	57.9	66.4	72.3	79.2	76.2	65.3	60.0	49.1	36.9	55.3
1966	25.3	30.9	48.0	51.2	64.7	75.9	84.2	74.2	67.0	56.9	43.1	28.9	54.2
1967	34.5	36.6	46.9	57.1	61.5	72.8	74.9	73.6	67.3	58.3	42.4	33.2	54.9
1968	32.1	33.4	48.1	54.9	59.3	74.5	77.8	78.3	69.0	59.6	40.8	28.4	54.7
1969	31.7	35.3	31.8	56.9	65.5	70.9	82.5	78.9	70.3	52.6	45.4	35.9	54.8
1970	30.0	40.8	36.5	52.7	68.2	73.7	80.8	81.6	68.2	51.3	41.7	36.4	55.2
1971	27.2	31.9	42.3	53.6	62.0	77.1	77.7	76.6	68.2	57.9	43.5	34.9	54.4
1972	29.0	36.8	49.2	55.1	63.0	73.8	76.0	75.5	67.6	54.4	37.0	27.3	53.8
RECORD													
MEAN	30.0	34.1	42.5	54.0	63.5	73.5	78.8	77.6	69.2	57.0	42.8	33.2	54.7
MAX	41.9	46.4	55.7	67.0	75.6	85.7	91.1	89.9	81.8	70.0	55.5	44.7	67.1
MIN	18.1	21.8	29.2	41.0	51.4	61.2	66.5	65.2	56.5	44.0	30.0	21.6	42.2

TOTAL DEGREE DAYS

DODGE CITY, KANSAS

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0	0	8	208	540	764	876	816	654	280	48	0	4194
1934-35	0	8	100	123	529	916	898	707	451	398	268	24	4422
1935-36	0	12	66	281	738	918	1136	1201	527	358	60	10	5307
1936-37	0	0	94	362	647	842	1352	881	770	332	72	29	5381
1937-38	0	0	25	274	709	1026	908	761	479	370	136	1	4689
1938-39	0	0	18	148	708	879	825	1004	613	332	52	2	4581
1939-40	0	0	47	200	605	792	1497	858	604	364	86	9	5062
1940-41	3	0	55	104	725	844	973	853	769	338	53	17	4734
#1941-42	0	0	60	267	585	858	1035	932	629	298	168	20	4852
1942-43	0	0	99	268	610	1016	985	667	831	235	228	89	5028
1943-44	0	0	44	308	675	1143	1065	842	828	508	128	10	5551
1944-45	0	0	57	231	621	1042	1013	865	494	459	191	62	5035
1945-46	1	5	118	254	564	1120	953	654	476	171	189	40	4545
1946-47	0	13	64	299	694	821	1022	932	819	445	177	32	5318
1947-48	6	0	19	122	826	1018	1126	1031	965	173	125	7	5418
1948-49	0	4	34	253	761	988	1342	921	722	351	91	6	5473
1949-50	0	0	69	279	442	956	1089	714	744	423	137	12	4865
1950-51	0	16	53	131	731	925	1117	756	808	459	102	50	5148
1951-52	0	4	96	350	785	1013	893	758	819	420	105	0	5243
1952-53	1	0	25	307	729	1060	797	725	529	441	201	5	4820
1953-54	2	0	16	182	635	937	1036	535	761	226	221	16	4567
1954-55	0	0	15	299	498	853	974	976	703	214	54	29	4615
1955-56	0	0	63	190	765	999	1033	976	614	439	87	0	5166
1956-57	0	10	16	128	688	869	1229	696	749	429	148	19	4981
1957-58	0	0	55	336	757	748	948	937	1027	439	67	15	5329
1958-59	2	0	48	240	623	1003	1189	871	662	370	108	3	5119
1959-60	0	0	56	364	788	849	1112	1150	953	247	123	13	5655
1960-61	0	0	34	219	620	992	977	758	658	420	154	9	4841
1961-62	0	1	126	247	777	1065	1188	777	739	344	13	34	5311
1962-63	0	0	72	212	615	881	1321	722	539	219	77	5	4663
#1963-64	0	0	9	73	549	1186	911	956	742	272	75	14	4787
1964-65	0	3	81	254	632	1051	943	905	960	226	65	4	5124
1965-66	0	3	127	175	473	862	1221	948	521	405	116	5	4856
1966-67	0	5	54	273	651	1110	938	789	561	259	205	23	4868
1967-68	0	6	45	265	669	974	1015	908	526	306	215	4	4933
1968-69	0	1	17	225	718	1127	1028	826	1021	241	70	36	5310
1969-70	0	0	8	415	578	894	1079	672	878	382	58	33	4997
1970-71	4	0	85	441	696	880	1163	919	701	337	142	0	5368
1971-72	2	0	110	238	639	929	1111	812	485	301	129	3	4759
1972-73	6	0	70	345	831	1164							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	T	0.17	0.09	4.06	3.16	1.23	1.75	4.79	1.01	1.27	0.38	0.75	18.66
1934	0.29	1.60	0.52	0.42	1.00	2.34	0.43	0.24	2.05	1.50	0.98	0.13	11.50
1935	0.65	0.55	0.84	0.03	4.40	1.95	1.09	1.62	1.77	1.09	0.98	0.12	15.09
1936	0.59	0.06	0.10	0.56	5.81	1.31	1.10	0.98	1.81	1.00	T	0.85	14.17
1937	0.76	0.56	1.11	0.52	1.64	3.15	1.99	0.60	0.84	0.87	0.34	0.25	12.63
1938	0.01	1.08	1.63	3.20	4.30	1.50	1.71	2.96	2.73	0.18	0.07	0.06	19.43
1939	0.68	1.30	1.06	0.46	2.29	2.48	0.93	2.09	0.10	0.28	0.42	0.89	12.98
1940	0.50	0.59	1.31	3.54	4.41	3.53	1.52	5.09	2.09	0.12	2.39	0.79	25.84
1941	0.97	1.37	0.82	2.32	3.76	7.34	4.65	2.19	1.58	3.89	0.87	0.37	30.13
#1942	0.10	1.24	1.19	5.27	1.22	6.06	1.70	1.89	1.33	3.60	0.06	0.88	24.54
1943	0.13	0.24	0.34	1.30	1.13	4.34	0.25	2.62	0.83	2.51	0.04	0.85	14.58
1944	0.96	0.77	1.41	4.13	6.95	4.53	5.40	5.11	1.36	1.58	0.93	1.16	34.29
1945	1.48	0.97	0.13	3.84	1.56	3.19	3.04	3.42	2.58	1.17	0.01	0.54	21.93
1946	0.77	0.89	0.76	0.36	1.56	1.27	0.17	4.41	2.16	4.56	2.10	0.03	19.04
1947	0.74	0.06	1.54	3.59	4.01	3.53	2.17	1.15	0.01	0.56	1.37	1.61	20.34
1948	0.46	1.72	2.00	0.50	2.62	4.40	5.25	3.61	0.62	0.32	1.98	0.19	23.67
1949	1.96	1.01	1.55	2.95	4.85	3.30	1.31	2.57	0.55	4.48	0.01	0.41	25.44
1950	0.03	0.24	0.13	0.32	1.82	1.12	4.71	4.87	0.49	0.66	0.07	0.09	14.55
1951	0.55	0.88	0.90	1.56	8.69	7.95	5.42	2.17	2.66	1.33	0.63	0.02	32.76
1952	0.09	0.35	1.32	5.18	1.74	0.12	1.37	2.29	0.18	T	0.85	0.75	14.24
1953	0.15	0.15	1.14	1.04	0.68	1.99	1.18	1.62	0.65	0.89	1.22	0.75	11.46
1954	0.20	0.60	0.24	0.60	2.29	0.79	2.19	2.18	1.37	1.51	T	0.04	12.01
1955	0.50	0.58	0.19	0.79	7.99	2.18	1.79	0.78	2.47	0.07	0.07	0.01	17.42
1956	0.76	0.34	0.25	0.99	1.44	1.20	2.13	1.08	0.02	1.73	0.03	T	9.97
1957	0.25	0.17	4.71	1.60	3.74	4.38	3.29	1.87	3.76	0.71	0.98	T	25.46
1958	0.51	0.42	2.40	0.74	3.60	4.64	5.62	1.85	1.17	0.06	0.44	0.78	22.23
1959	0.50	0.48	1.58	0.37	4.36	2.03	1.78	0.91	3.86	3.30	0.15	0.77	20.09
1960	1.16	1.80	1.91	1.82	2.32	3.21	0.47	1.80	2.91	2.04	0.28	0.42	20.14
1961	T	0.31	1.32	0.99	2.82	4.06	3.41	4.37	0.43	1.78	1.42	0.23	21.34
1962	0.56	0.32	1.34	1.75	1.84	5.68	9.13	1.64	4.24	0.41	0.58	0.48	27.97
1963	0.56	0.10	0.46	0.07	2.88	2.18	2.27	1.22	1.86	0.65	0.08	0.64	12.97
1964	0.04	0.57	0.77	0.69	3.67	2.17	5.30	2.99	1.75	0.83	1.89	0.58	21.25
1965	0.49	0.60	0.15	0.63	5.65	4.76	3.37	1.62	2.63	3.04	T	2.01	24.95
1966	0.45	0.43	0.02	2.18	0.77	1.61	1.48	4.36	1.89	0.32	T	0.63	14.14
1967	0.32	0.01	0.14	1.54	2.24	5.49	5.06	3.16	2.38	0.31	0.14	0.51	21.30
1968	0.14	0.41	0.26	0.93	3.93	4.78	4.08	6.31	0.23	4.88	1.41	0.43	27.79
1969	0.03	1.77	2.31	1.39	2.83	0.75	2.17	4.21	1.40	1.66	0.08	0.19	18.79
1970	0.07	0.01	2.62	1.91	0.81	1.18	1.72	0.68	2.64	0.52	0.06	0.04	12.26
1971	1.10	2.04	0.09	1.09	2.81	3.93	4.49	0.99	1.46	2.87	3.75	0.66	25.28
1972	0.17	0.07	0.27	2.06	5.44	5.94	7.26	3.97	2.48	0.71	2.28	0.35	31.00
RECORD MEAN	0.44	0.71	0.98	1.82	3.01	3.21	2.99	2.57	1.78	1.41	0.77	0.57	20.26

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0.0	0.0	0.0	0.0	0.3	0.0	2.6	10.9	2.7	0.0	0.0	0.0	16.5
1934-35	0.0	0.0	0.0	0.0	3.4	0.2	0.4	1.4	0.5	0.0	0.0	0.0	5.9
1935-36	0.0	0.0	0.0	0.0	0.2	1.5	6.9	0.7	0.1	1.2	0.0	0.0	10.6
1936-37	0.0	0.0	0.0	0.9	T	3.9	2.9	6.4	4.4	0.0	0.0	0.0	18.5
1937-38	0.0	0.0	0.0	0.0	1.6	2.0	0.1	4.1	0.1	14.3	0.0	0.0	22.2
1938-39	0.0	0.0	0.0	0.0	0.2	1.2	0.8	14.3	2.8	T	0.0	0.0	19.3
1939-40	0.0	0.0	0.0	0.0	1.0	4.6	6.7	5.9	0.8	1.5	0.0	0.0	20.5
1940-41	0.0	0.0	0.0	0.0	2.5	5.5	1.3	7.5	8.8	0.9	0.0	0.0	26.5
#1941-42	0.0	0.0	0.0	4.0	5.3	3.3	1.9	12.2	2.4	T	0.0	0.0	29.1
1942-43	0.0	0.0	0.0	T	0.1	10.8	3.5	0.5	7.4	0.0	0.0	0.0	22.3
1943-44	0.0	0.0	0.0	0.0	T	10.5	3.6	7.0	5.4	T	0.0	0.0	26.5
1944-45	0.0	0.0	0.0	0.0	0.1	6.5	10.1	8.2	T	5.0	0.0	0.0	29.9
1945-46	0.0	0.0	T	T	T	3.8	2.1	T	1.0	0.0	0.0	0.0	6.9
1946-47	0.0	0.0	0.0	0.0	1.5	0.3	8.9	0.8	6.2	1.1	0.0	0.0	18.8
1947-48	0.0	0.0	0.0	0.0	5.3	4.7	8.3	4.4	17.9	0.0	0.0	0.0	40.6
1948-49	0.0	0.0	0.0	0.0	13.2	0.9	10.3	3.9	0.4	0.9	0.0	0.0	29.6
1949-50	0.0	0.0	0.0	0.0	0.0	4.3	T	T	1.0	0.1	0.0	0.0	5.4
1950-51	0.0	0.0	0.0	0.0	T	0.1	6.2	1.0	4.5	1.8	0.0	0.0	13.6
1951-52	0.0	0.0	0.0	1.5	6.1	0.5	1.8	2.5	11.7	T	0.0	0.0	24.1
1952-53	0.0	0.0	0.0	0.0	5.3	6.7	1.2	1.4	0.7	0.2	T	0.0	15.5
1953-54	0.0	0.0	0.0	0.0	4.2	0.4	2.3	2.4	T	0.0	T	0.0	9.3
1954-55	0.0	0.0	0.0	0.0	T	0.6	0.8	4.1	0.9	0.0	0.0	0.0	6.4
1955-56	0.0	0.0	0.0	0.0	0.6	0.2	8.6	3.5	2.5	5.6	0.0	0.0	21.0
1956-57	0.0	0.0	0.0	0.0	T	T	3.1	2.2	22.1	0.8	0.0	0.0	28.2
1957-58	0.0	0.0	0.0	T	3.8	T	3.4	2.8	10.3	0.0	0.0	0.0	20.3
1958-59	0.0	0.0	0.0	0.0	2.8	9.6	7.1	1.0	1.7	0.4	0.0	0.0	22.6
1959-60	0.0	0.0	0.0	0.0	1.0	3.6	5.8	11.9	10.8	0.0	0.0	0.0	33.1
1960-61	0.0	0.0	0.0	0.3	0.7	3.0	T	2.9	2.0	0.2	0.0	0.0	9.1
1961-62	0.0	0.0	0.0	0.0	3.2	1.4	3.4	T	0.4	0.0	0.0	0.0	8.4
1962-63	0.0	0.0	0.0	0.0	4.3	0.7	0.4	0.3	T	0.0	0.0	0.0	5.7
1963-64	0.0	0.0	0.0	0.0	7.0	0.4	3.3	2.6	0.0	0.0	0.0	0.0	13.3
1964-65	0.0	0.0	0.0	0.0	2.5	5.4	4.9	5.5	0.3	0.0	0.0	0.0	18.6
1965-66	0.0	0.0	0.0	0.0	0.0	9.1	4.7	1.1	0.2	T	0.0	0.0	15.1
1966-67	0.0	0.0	0.0	0.0	T	8.2	4.1	0.1	0.6	0.0	0.0	0.0	13.0
1967-68	0.0	0.0	0.0	T	1.0	2.9	0.2	3.7	0.3	T	0.0	0.0	8.1
1968-69	0.0	0.0	0.0	0.0	T	2.6	T	8.9	19.4	0.0	0.0	0.0	30.9
1969-70	0.0	0.0	0.0	0.0	0.1	0.3	0.5	T	24.0	1.8	0.0	0.0	26.7
1970-71	0.0	0.0	0.0	1.1	T	T	9.9	14.1	0.1	T	0.0	0.0	25.2
1971-72	0.0	0.0	0.0	T	1.6	5.2	2.2	0.7	1.0	T	0.0	0.0	10.7
1972-73	0.0	0.0	0.0	T	6.3	3.2							

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1875.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above: Sea level									Sea level	Remarks
						Ground at temperature site	Ground: Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	
COOPERATIVE																
Fort Dodge	6/?/66	10/?/77		37° 44'	99° 54'	2430										Temperature, wind, clouds, precipitation. Closing date doubtful.
Fort Dodge	11/?/67	2/?/71		37° 44'	99° 54'	2430										Temperature and precipitation.
Fort Dodge	11/?/76	10/?/77		37° 44'	99° 54'	2430										Temperature and precipitation.
Dodge City	8/?/88	12/?/88	7 mi. WNW	37° 45'	100° 01'	2485										
CITY																
Old Dodge House Chestnut & Railroad Ave.	9/15/74	6/4/76		37° 45'	100° 01'	2485	30	16	16				on roof			Temperature and precipitation.
Lake Building, Walnut St. & Second Ave., 2nd Floor	6/5/76	12/31/82	600 ft. WNW	37° 45'	100° 01'	2491	36	15	15				30			
Hoover Block, 108 Front Street	1/1/83	8/31/86	500 ft. SE	37° 45'	100° 01'	2485	47	16	16				41			Forced to move by fire.
Beeson Block, Front St.	9/1/86	11/21/09	300 ft. W	37° 45'	100° 01'	2485	a54	44	44		37		36			Wind speeds diminished from fall of 1907 due to new buildings. a - 55 feet to 1894 and 52 feet to 10/7/02.
Weather Bureau Building Central and Spruce	11/22/09	4/6/31	900 ft. NE	37° 45'	100° 01'	2522	51	11	11		3		3			Wind speed from north reduced by buildings and trees, 1927-1931.
First National Bank Building, Second & Spruce Streets	4/7/31	5/30/32	750 ft. W	37° 45'	100° 01'	2504	100	88	88		81		81			Temporary quarters while Federal Building under construction.
Federal Building 2nd Floor Central Street & Spruce Avenue	5/21/32	6/30/42	750 ft. E	37° 45'	100° 01'	2522	86	10	10		3	3	3			
AIRPORT																
2nd Floor †† Administration Building Municipal Airport †† Office moved to 1st Floor 4/10/61.	7/1/42	Present	2.9 mi. E	37° 46'	99° 58'	d2582	a20	b4	b4			5	4	c5	2625	a - 58 feet to 4/12/61. b - 5 feet to 8/1/63. c - Commissioned 8/1/63 on site 1295 feet NE of thermometer shelter. d - 2594 feet to 8/1/63.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

Sale Price: 15 cents per copy. Checks and money orders should be made payable to Department of Commerce, NOAA. Remittances and correspondence regarding this publication should be sent to: National Climatic Center, Federal Building, Asheville, N. C. 28801. Attn: Publications.

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A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

EL PASO, TEXAS

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

The city of El Paso is located in the extreme west point of Texas at an elevation of about 3,700 feet in the business district, with the National Weather Service station located on a mesa at about 200 feet higher elevation. The climate of the region is characterized by the abundance of sunshine throughout the year, high but no extreme daytime summer temperatures, with very low humidity, scanty rainfall, and a relatively cool winter season typical of arid areas.

Rainfall throughout the year is light, insufficient for any growth except desert vegetation, and irrigation is necessary for crops, gardens, and lawns. Dry periods of several months' duration without appreciable rainfall are not unusual. More than half of the precipitation occurs in the summer season from brief, but at times heavy, thunderstorms. Small amounts of snow fall nearly every winter, but snow cover rarely amounts to more than an inch and seldom remains on the ground for more than a few hours.

Daytime summer temperatures are high, frequently above 90° and occasionally above 100°, but summer nights are usually comfortable, with minimum temperatures usually in the sixties. The average number of days with temperatures 90° or higher is 102 per year, and with 100° or higher 10 per year. The highest temperature on record is 109° on June 21, 1960, and July 3, 1960. It should be noted that when temperatures are high the relative humidity is generally quite low. A 20-year tabulation of observations with temperatures above 90° shows that in April, May, and June the humidity averaged from 10 to 14 percent, while in July, August, and September it averaged 22 to 24 percent. This low humidity aids the efficiency of evaporative air coolers, which are widely used in homes and public buildings and are quite effective in cooling the air to comfortable temperatures.

Winter daytime temperatures are mild, rising to 55° to 60° on the average. At night they drop below freezing about half the time in December and January, and the average number of days with temperatures 32° or lower is 51 per year. Temperatures below 10° are rare, having occurred on only 28 days in over 80 years of record, although an extreme of 8° below zero has been recorded. The flat, irrigated land of the Rio Grande Valley in the vicinity of El Paso is noticeably cooler, particularly at night, than the airport or the City proper, both in summer and winter. This results in more comfortable temperatures in summer, but increases the severity of frosts in winter. The cooler air in the Valley also causes marked short-period fluctuations of temperature and dewpoint at the airport with changes in wind direction, especially during the early morning hours.

The Franklin Mountains begin within the City limits and extend northward for about 16 miles; peaks of these mountains range from 4,687 to 7,152 feet above sea level. They add noticeably to the gustiness of the winds during high velocities, and cause changes in direction during periods of light winds.

Dust and sandstorms are the most unpleasant features of the weather in El Paso. While wind velocities are not excessively high, the soil surface is dry and loose and natural vegetation is sparse, so moderately strong winds raise considerable dust and sand. A tabulation of duststorms, for a period of 20 years, shows definitely that they are most frequent in March and April, and comparatively rare in the fall months, although they do occur at all times of the year. The highest monthly average is in March, nearly 40 hours a month with visibility reduced to 6 miles or less by dust.

Prevailing winds are from the north in winter and south in summer, with the prevailing direction for the year north by a small margin.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: EL PASO, TEXAS INTERNATIONAL AIRPORT Standard time used: MOUNTAIN Latitude: 31° 48' N Longitude: 106° 24' W Elevation (ground): 3918 feet Year: 1972

Month	Temperature – Averages – Daily maximum	Daily minimum	Monthly	Extremes – Highest	Date	Lowest	Date	Degree days (Base 65°) – Heating	Cooling	Precipitation – Total	Greatest in 24 hrs.	Date	Snow, Ice pellets – Total	Greatest in 24 hrs.	Date
JAN	59.8	30.6	45.2	75	26	10	5	607	0	0.44	0.22	31	2.5	2.0	31
FEB	69.4	35.2	52.3	83	21+	18	3	364	4	T	T	5	0.0	0.0	
MAR	77.4	44.9	61.2	85	12	31	29	126	15	T	T	26 +	0.0	0.0	
APR	82.8	47.5	65.2	92	10+	30	1	56	70	0.00	0.00		0.0	0.0	
MAY	85.1	54.5	69.8	93	21	46	2+	3	159	0.04	0.03	30	0.0	0.0	
JUN	91.3	65.2	78.3	101	29	52	1	0	404	1.62	0.53	11-12	0.0	0.0	
JUL	94.5	69.9	82.2	104	31	64	13	0	543	0.71	0.33	18-19	0.0	0.0	
AUG	88.5	66.8	77.7	101	1	62	26+	0	401	2.59	1.77	25-26	0.0	0.0	
SEP	83.6	62.1	72.9	89	19+	48	22	3	247	1.60	0.87	2-3	0.0	0.0	
OCT	78.7	52.7	65.7	92	11	40	31	87	120	1.25	0.48	20-21	0.0	0.0	
NOV	62.9	34.6	48.8	75	8	24	30	480	0	0.33	0.25	23-24	0.0	0.0	
DEC	60.6	32.6	46.6	72	4	20	16	563	0	0.42	0.26	29	T	T	29 +
YEAR	77.9	49.7	63.8	104	JUL. 31	10	JAN. 5	2289	1963	9.00	1.77	AUG. 25-26	2.5	2.0	JAN. 31

Month	Relative humidity – Hour 05 (Local time)	Hour 11	Hour 17	Hour 23	Wind & – Resultant – Direction	Speed	Average speed	Fastest mile – Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Maximum – 90° and above ‡	Maximum – 32° and below	Minimum – 32° and below	Minimum – 0° and below	Average daily solar radiation - langleys **
JAN	56	38	30	47	26	2.2	7.9	36	W	27	88	4.1	15	9	7	4	1	1	2	0	0	16	0	
FEB	43	23	17	30	30	2.7	7.7	34	W	2	87	4.5	14	6	9	0	0	0	1	0	0	11	0	
MAR	35	21	14	25	27	4.1	9.5	42	W	3	96	2.4	23	4	4	0	0	0	0	0	0	2	0	
APR	24	14	15	17	26	5.4	9.7	48	SW	13	92	3.3	16	12	2	0	0	0	0	4	0	1	0	
MAY	39	22	18	26	21	2.4	8.9	30	SW	21+	79	5.0	11	9	11	2	0	2	0	7	0	0	0	
JUN	55	33	25	42	24	0.9	8.6	44	W	8	88	3.8	16	10	4	8	0	8	0	22	0	0	0	
JUL	59	36	26	45	15	4.6	8.9	57	N	12	84	5.3	8	14	9	3	0	11	0	27	0	0	0	
AUG	76	50	41	65	12	2.5	7.7	37	W	14	76	5.0	11	15	5	14	0	15	0	14	0	0	0	
SEP	79	55	44	69	13	0.9	6.7	34	NE	1	82	5.1	11	10	9	11	0	6	0	0	0	0	0	
OCT	74	48	37	64	15	0.8	7.0	32	SW	21	77	4.2	17	4	10	8	0	4	0	4	0	0	0	
NOV	73	42	36	63	31	2.8	7.4	38	SW	1	86	2.6	20	7	3	4	0	0	0	0	0	11	0	
DEC	61	40	32	50	29	2.5	8.8	49	W	29+	87	4.0	16	9	6	4	0	0	0	0	0	16	0	
YEAR	56	35	28	45	25	1.4	8.2	57	N	JUL. 12	85	4.1	178	109	79	58	1	47	3	78	0	57	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature – Normal – Daily maximum	Daily minimum	Monthly	Extremes Ø – Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation – Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year
(a)	(b)	(b)	(b)	13		13		(b)	(b)	33		33		33	
J	56.3	29.5	42.9	80	1970	-8	1962	685	0.46	1.84	1949	0.00	1967+	0.61	1960
F	62.4	35.7	49.1	83	1972	11	1963	445	0.41	1.42	1944	0.00	1943	0.87	1956
M	69.4	40.3	54.9	88	1971+	14	1971	319	0.35	2.26	1958	T	1972+	1.72	1941
A	78.2	48.5	63.4	98	1965	30	1972	105	0.29	1.23	1942	0.00	1972+	1.08	1966
M	86.9	56.9	71.9	101	1969	31	1967	0	0.40	1.92	1941	0.00	1962	1.23	1941
J	95.4	66.5	81.0	106	1968	51	1968+	0	0.69	2.67	1966	T	1969+	1.45	1966
J	94.9	68.9	81.9	106	1963	62	1971+	0	1.29	5.53	1968	0.17	1965	2.63	1968
A	93.0	67.7	80.4	105	1969	58	1970+	0	1.19	4.11	1957	T	1962	2.00	1957
S	87.5	61.4	74.5	98	1970+	44	1971	0	1.14	6.29	1958	T	1959+	2.89	1941
O	78.8	50.0	64.4	92	1972+	25	1970	84	0.85	4.31	1945	0.00	1952	1.77	1945
N	66.3	36.1	51.2	81	1966	18	1970	414	0.33	1.63	1961	0.00	1964+	1.19	1943
D	57.5	30.7	44.1	75	1970	11	1964	648	0.49	1.73	1960	0.00	1955+	1.05	1946
YR	77.2	49.4	63.3	106	JUN. 1968+	-8	JAN. 1962	2700	7.89	6.29	SEP. 1958	0.00	APR. 1972+	2.89	SEP. 1941

Month	Snow, Ice pellets – Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity – Hour 05 (Local time)	Hour 11	Hour 17	Hour 23	Wind & – Mean speed	Prevailing direction	Fastest mile – Speed	Direction #	Year
(a)	33	33		33		12	12	12	12	30	15	33	33	
J	1.3	8.3	1949	4.2	1949	59	41	31	49	9.2	N	61	SW	1943
F	0.7	8.9	1956	7.2	1956	49	34	25	39	10.2	N	69	W	1960
M	0.4	7.3	1958	7.3	1958	43	29	20	33	12.0	WSW	70	SW	1950+
A	T	T	1971+	T	1971+	33	21	14	23	12.1	WSW	66	W	1958+
M	0.0	0.0		0.0		36	20	14	24	11.2	WSW	70	NW	1950+
J	0.0	0.0		0.0		42	25	18	31	10.2	S	68	N	1947
J	0.0	0.0		0.0		58	39	29	43	9.1	SSE	68	NE	1966
A	0.0	0.0		0.0		61	41	33	48	8.6	S	63	N	1948
S	0.0	0.0		0.0		65	46	35	52	8.5	S	52	SW	1970
O	0.0	0.0		0.0		57	35	27	47	8.3	N	49	W	1956
N	0.9	7.8	1961	7.8	1961	59	38	32	50	8.7	N	57	W	1944
D	1.0	10.1	1960	7.1	1951	63	45	37	55	8.8	N	66	W	1970+
YR	4.3	10.1	DEC. 1960	7.8	NOV. 1961	52	35	26	41	9.7	N	70	NW	MAY 1950+

Month	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Max. – 90° and above ‡	Max. – 32° and below	Min. – 32° and below	Min. – 0° and below	Average daily solar radiation - langleys **
(a)	30	30	30	30	30	33	33	33	33	12	12	12	12	
J	78	4.6	14	8	9	3	1	*	1	0	1	19	*	
F	82	4.1	14	7	7	3	*	*	*	0	*	12	0	
M	84	4.3	15	8	8	2	0	*	*	0	0	5	0	
A	87	3.6	16	9	5	2	0	1	*	2	0	*	0	
M	88	3.3	18	9	4	2	0	2	*	14	0	*	0	
J	89	2.9	20	7	3	4	0	5	0	25	0	0	0	
J	80	4.6	12	13	6	8	0	10	0	28	0	0	0	
A	80	4.2	14	12	5	7	0	10	0	22	0	0	0	
S	82	3.2	19	6	5	5	0	4	*	9	0	0	0	
O	84	3.1	19	7	5	4	0	2	*	1	0	*	0	
N	83	3.5	18	6	6	2	*	*	*	0	0	6	0	
D	78	4.2	16	7	8	4	*	*	*	0	*	17	0	
YR	83	3.8	195	99	71	45	1	36	2	101	1	61	*	

Ø Beginning Sept. 1, 1960.
Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows:
Highest temperature 109 in June and July 1960; maximum monthly precipitation 8.18 in July 1881; maximum precipitation in 24 hours 6.50 in July 1881; maximum snowfall in 24 hours 8.4 in November 1906.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

To 8 compass points only.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	43.7	46.6	58.9	60.5	70.6	80.0	84.0	82.0	79.8	68.6	55.4	50.1	65.0
1934	45.4	53.8	58.0	68.0	76.8	83.1	84.8	83.8	77.8	69.4	55.4	48.5	67.1
1935	48.8	48.6	58.6	65.3	68.4	81.2	84.0	81.6	73.4	67.1	53.4	46.5	64.7
#1936	45.5	51.2	58.0	65.8	74.2	82.4	82.6	80.8	73.7	63.4	50.6	46.8	64.6
1937	42.4	49.3	52.8	64.4	74.4	82.4	84.4	84.3	76.9	66.8	55.2	47.4	65.1
1938	47.2	53.8	57.4	63.8	73.1	81.2	80.6	81.0	73.8	68.6	49.8	48.4	64.9
1939	45.8	43.6	58.2	65.6	75.0	83.6	83.1	80.7	77.2	64.4	51.5	49.4	64.8
1940	42.6	50.4	58.4	63.6	73.8	79.2	83.4	79.6	77.2	66.0	50.8	50.4	64.6
1941	46.7	53.0	53.8	60.2	73.7	78.6	80.9	79.8	74.4	65.2	53.3	48.2	64.0
#1942	47.7	48.2	54.1	63.6	73.5	83.6	83.6	79.4	73.5	64.8	58.1	47.7	64.8
1943	44.4	51.2	55.8	67.2	72.6	79.6	80.7	84.0	73.8	63.8	51.2	43.6	64.0
1944	40.8	49.4	54.0	61.6	71.7	79.4	82.3	80.0	72.6	65.6	51.4	44.7	62.8
1945	45.8	51.5	54.2	61.8	73.2	79.0	81.7	81.5	75.8	63.8	54.9	45.4	64.0
1946	41.0	48.5	58.8	67.8	71.6	82.6	82.0	81.8	76.8	66.2	49.8	47.0	64.2
1947	40.0	49.7	55.4	61.4	73.5	79.4	83.6	80.0	76.4	68.0	49.4	43.0	63.3
1948	40.6	48.8	50.8	67.4	74.6	82.2	83.2	82.2	76.0	64.4	47.9	47.8	63.8
1949	36.1	48.2	57.0	62.1	72.5	80.6	81.6	80.1	74.7	62.7	55.7	44.0	62.9
1950	49.2	53.4	58.0	65.9	72.1	82.5	79.6	80.6	74.4	70.7	54.0	49.5	65.8
1951	44.2	47.6	54.5	61.3	73.1	80.8	85.6	82.5	77.9	67.8	51.0	46.4	64.4
1952	49.2	47.5	50.7	63.0	72.0	82.7	81.3	83.6	76.2	65.4	49.5	44.1	63.8
1953	50.3	48.1	58.7	64.4	68.8	84.1	83.5	82.1	76.3	64.2	53.8	39.5	64.5
1954	47.0	52.6	54.9	68.6	73.2	81.2	83.2	79.3	78.5	67.9	54.5	46.0	65.6
1955	42.3	45.4	55.8	64.8	71.6	79.8	79.7	80.1	76.8	66.3	54.4	49.4	63.9
1956	49.7	44.9	57.5	61.8	75.7	83.9	82.0	79.9	77.4	67.5	48.4	44.6	64.4
1957	49.3	57.6	57.0	62.4	69.5	81.9	83.9	80.5	74.5	62.4	49.0	46.4	64.5
1958	42.9	51.6	51.2	63.3	74.2	83.5	84.5	82.6	74.0	62.5	53.3	47.0	64.2
1959	47.9	49.3	54.0	65.0	73.9	83.0	82.9	81.0	77.9	66.1	50.3	46.3	64.8
#1960	42.4	46.3	59.7	66.3	73.7	85.0	81.9	82.5	75.6	63.5	52.9	38.8	64.0
1961	41.0	47.9	56.3	64.1	74.1	80.8	82.8	80.5	74.5	63.5	47.8	46.3	63.3
1962	40.5	53.5	50.9	67.3	74.1	80.0	81.3	84.0	73.9	64.9	53.7	45.2	64.1
1963	40.5	49.2	56.4	66.5	74.9	81.1	84.9	80.3	76.2	66.4	53.5	42.7	64.4
1964	39.3	40.8	53.6	63.2	73.9	81.5	84.5	82.6	75.2	63.4	51.8	44.0	62.8
1965	48.0	46.7	52.1	65.3	71.8	78.2	84.2	81.1	74.0	63.0	56.8	45.7	63.9
1966	40.1	42.9	56.4	65.1	74.5	79.5	83.6	78.7	73.4	62.1	54.5	42.4	62.8
1967	41.6	48.0	59.6	65.1	70.9	79.1	83.0	78.6	73.3	63.7	53.1	41.5	63.1
1968	42.4	50.4	53.0	61.4	73.0	81.0	79.1	76.5	72.4	65.0	51.0	41.3	62.2
1969	48.6	48.4	49.4	65.8	72.1	81.5	84.9	85.7	77.1	67.7	52.5	48.6	65.2
1970	46.9	52.3	58.6	63.5	72.2	79.7	82.8	81.4	74.2	59.5	51.9	48.0	64.0
1971	44.6	48.4	58.1	62.6	72.1	81.1	82.3	77.0	73.5	62.5	52.1	44.7	63.2
1972	45.2	52.3	61.2	65.2	69.8	78.3	82.2	77.7	72.9	65.7	48.8	46.6	63.8
RECORD MEAN	44.8	49.4	55.6	63.8	72.2	80.8	82.0	80.3	74.9	64.7	52.6	45.2	63.8
MAX	57.3	62.4	69.0	77.5	85.9	94.2	93.8	91.8	86.8	77.7	65.7	57.3	76.6
MIN	32.2	36.3	42.2	50.1	58.5	67.3	70.1	68.7	63.0	51.6	39.4	33.1	51.0

TOTAL DEGREE DAYS

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0	0	0	3	286	465	608	315	231	31	1	0	1940
1934-35	0	0	0	17	290	512	503	462	213	53	69	0	2119
#1935-36	0	0	16	86	353	570	604	397	221	88	3	0	2338
1936-37	0	0	36	111	434	563	705	441	378	80	8	0	2756
1937-38	0	0	0	41	297	548	557	314	239	134	10	0	2140
1938-39	0	0	0	36	452	513	598	600	218	82	5	0	2504
1939-40	0	0	0	72	404	484	696	420	218	93	5	0	2392
1940-41	0	0	0	58	422	452	567	333	349	152	15	0	2348
1941-42	0	0	0	73	349	524	537	473	337	97	1	0	2391
#1942-43	0	0	7	69	216	537	639	389	289	52	5	0	2203
1943-44	0	0	14	61	412	664	748	451	339	112	10	0	2811
1944-45	0	0	1	49	412	629	594	379	334	148	1	0	2547
1945-46	0	0	28	84	310	607	742	462	287	13	5	0	2538
1946-47	0	0	4	38	453	555	773	428	308	148	1	0	2708
1947-48	0	0	0	32	473	684	758	472	444	47	0	0	2910
1948-49	0	0	2	102	512	533	899	473	257	152	0	0	2930
1949-50	0	0	0	139	277	653	484	320	221	42	7	0	2143
1950-51	0	0	0	0	323	456	634	480	322	131	27	0	2373
1951-52	0	0	0	21	414	569	482	499	437	94	14	0	2530
1952-53	0	0	0	47	459	642	450	468	211	69	64	0	2410
1953-54	0	0	0	86	329	784	551	338	316	17	13	0	2434
1954-55	0	0	0	46	308	580	696	543	284	64	2	0	2523
1955-56	0	0	0	34	317	477	468	578	238	132	0	0	2244
1956-57	0	0	0	65	494	624	478	205	242	102	19	0	2229
1957-58	0	0	4	127	476	570	677	370	422	116	3	0	2765
1958-59	0	0	16	120	343	549	523	434	335	86	3	0	2409
1959-60	0	0	0	33	439	573	691	534	176	58	10	0	2514
#1960-61	0	0	0	86	357	806	735	473	266	97	1	0	2821
1961-62	0	0	0	82	513	575	754	318	433	36	3	0	2714
1962-63	0	0	0	65	333	608	753	438	279	41	0	0	2517
1963-64	0	0	0	17	341	683	789	695	354	99	3	0	2981
1964-65	0	0	0	76	391	643	521	504	397	54	7	2	2595
1965-66	0	0	4	107	240	592	769	612	264	59	4	0	2651
1966-67	0	0	2	126	307	695	718	469	173	56	25	0	2571
1967-68	0	0	2	106	352	720	691	415	377	128	0	0	2791
1968-69	0	0	0	61	414	728	503	464	477	43	24	0	2714
1969-70	0	0	0	62	371	504	556	348	286	94	33	0	2254
1970-71	0	0	39	180	388	519	625	457	254	110	6	0	2578
1971-72	0	0	31	112	381	624	607	364	126	56	3	0	2304
1972-73	0	0	3	87	480	563							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	0.19	0.23	T	0.09	0.04	2.14	1.34	0.27	0.99	0.60	0.04	0.00	5.93
1934	0.01	0.12	0.24	0.05	0.37	0.01	0.19	0.60	0.17	0.44	0.21	0.32	2.73
1935	0.24	0.47	0.14	0.02	0.17	0.09	0.16	1.72	1.24	0.14	0.92	0.34	5.65
#1936	0.57	0.06	T	0.11	0.56	0.34	0.68	1.94	3.52	0.32	1.32	0.51	9.93
1937	0.12	0.32	0.48	T	0.19	1.05	0.39	0.36	0.48	1.71	0.22	0.91	6.23
1938	1.22	0.17	0.49	T	0.02	2.82	0.60	0.20	2.31	0.19	T	0.28	8.30
#1939	0.65	0.08	0.44	0.45	0.01	T	0.60	0.91	0.90	0.93	0.75	0.19	5.91
1940	0.47	0.53	0.01	0.01	1.21	0.84	0.67	0.35	0.26	0.69	1.17	0.32	6.53
1941	0.59	0.55	1.97	1.18	1.92	0.18	0.77	1.42	5.19	1.55	0.49	0.48	16.29
1942	0.06	0.65	0.01	1.23	T	0.05	1.08	1.86	0.64	1.61	T	1.26	8.45
1943	0.25	0.00	0.07	T	T	1.63	0.92	0.44	1.36	T	1.53	0.82	7.02
1944	0.45	1.42	0.15	T	0.39	1.67	1.52	1.04	0.25	1.30	0.41	0.48	9.08
1945	0.11	0.17	0.64	T	T	0.03	0.47	0.84	0.12	4.31	0.00	0.05	6.74
1946	1.23	T	0.04	0.36	1.23	0.20	0.71	1.19	1.51	0.41	0.03	1.31	8.22
1947	0.87	T	0.66	0.06	0.68	0.53	0.97	1.63	0.02	0.35	0.53	0.82	7.12
1948	0.25	0.63	0.04	0.11	T	0.96	0.82	1.82	0.03	0.18	T	0.86	5.70
1949	1.84	0.22	0.04	0.05	0.39	0.51	1.18	0.43	1.74	1.50	T	0.86	8.76
1950	0.29	0.26	T	T	0.10	0.11	3.57	0.16	1.32	0.94	0.00	0.00	6.75
1951	0.33	0.63	0.59	0.45	T	T	2.48	0.72	0.04	0.43	0.12	0.68	6.47
1952	0.02	0.96	0.92	1.08	0.46	1.14	1.88	1.06	0.07	0.00	0.23	0.15	7.97
1953	0.00	0.34	0.12	0.71	0.27	0.53	0.99	0.42	T	0.65	T	0.39	4.42
1954	0.10	T	0.09	0.19	1.26	0.23	0.88	2.37	0.95	0.30	0.00	0.02	6.39
1955	0.59	0.05	0.18	0.00	0.26	0.18	3.70	0.70	0.16	0.73	0.15	0.00	6.70
1956	0.35	1.06	T	0.05	T	1.19	1.10	0.61	0.43	0.01	T	0.64	5.44
1957	0.24	0.46	0.33	0.09	0.10	0.02	2.64	4.11	0.11	2.34	0.74	0.02	11.20
1958	0.74	1.11	2.26	0.05	0.40	1.66	1.36	1.14	6.29	1.98	0.20	T	17.19
1959	0.21	T	0.07	0.15	0.30	0.46	0.40	2.39	T	0.58	0.14	0.29	4.99
1960	0.72	0.37	0.21	0.02	0.04	0.76	3.61	0.77	0.01	0.77	0.11	1.73	9.12
1961	0.41	T	0.29	0.01	T	0.27	2.18	1.40	0.69	0.18	1.63	0.63	7.69
1962	0.94	0.58	0.24	0.10	0.00	T	1.82	T	3.54	0.55	0.21	0.30	8.28
1963	0.13	0.53	T	T	0.71	0.05	0.52	1.03	0.64	0.55	0.76	T	4.92
1964	T	T	0.99	0.08	0.02	T	0.18	0.76	2.40	0.40	0.00	0.52	5.35
1965	0.19	0.59	0.03	0.01	0.11	0.66	0.17	0.49	2.12	0.18	0.12	0.74	5.41
1966	0.38	0.20	T	1.08	0.04	2.67	1.17	1.85	1.79	0.01	0.01	0.04	9.24
1967	0.00	0.04	0.17	0.03	0.05	1.41	0.84	0.54	1.54	0.09	0.23	0.78	5.72
1968	0.47	1.11	0.85	0.10	T	0.03	5.53	1.71	0.53	0.11	1.35	0.23	12.02
1969	0.05	0.08	0.17	T	0.28	T	1.14	0.28	0.43	0.59	0.63	0.69	4.34
1970	0.03	0.55	0.47	T	0.71	0.73	1.41	0.41	1.01	0.68	T	0.06	6.06
1971	0.17	0.04	0.00	0.42	T	0.01	2.34	1.59	0.96	1.07	0.14	0.50	7.24
1972	0.44	T	T	0.00	0.04	1.62	0.71	2.59	1.60	1.25	0.33	0.42	9.00
RECORD MEAN	0.42	0.40	0.34	0.25	0.34	0.61	1.69	1.45	1.20	0.79	0.44	0.50	8.43

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0.0	0.0	0.0	0.0	0.0	0.0	T	T	T	0.0	0.0	0.0	T
1934-35	0.0	0.0	0.0	0.0	0.0	T	0.0	1.3	1.2	0.0	T	0.0	2.5
#1935-36	0.0	0.0	0.0	0.0	0.0	T	T	0.0	0.0	0.0	0.0	0.0	T
1936-37	0.0	0.0	0.0	0.0	T	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.6
1937-38	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	1.2
1938-39	0.0	0.0	0.0	0.0	0.0	0.0	T	0.5	T	T	0.0	0.0	0.5
1939-40	0.0	0.0	0.0	0.0	0.0	T	3.6	T	0.0	0.0	0.0	0.0	3.6
1940-41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	T	0.0	0.0	0.0	T
1941-42	0.0	0.0	0.0	0.0	0.0	T	0.0	T	0.1	0.0	0.0	0.0	0.1
#1942-43	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	1.5
1943-44	0.0	0.0	0.0	0.0	4.2	T	T	T	T	0.0	0.0	0.0	4.2
1944-45	0.0	0.0	0.0	0.0	T	0.0	T	T	T	T	0.0	0.0	T
1945-46	0.0	0.0	0.0	0.0	0.0	T	6.0	T	T	0.0	0.0	0.0	6.0
1946-47	0.0	0.0	0.0	0.0	T	0.8	5.3	0.0	3.8	0.0	0.0	0.0	9.9
1947-48	0.0	0.0	0.0	0.0	0.0	0.6	2.4	0.6	T	0.0	0.0	0.0	3.6
1948-49	0.0	0.0	0.0	0.0	0.0	T	8.3	T	T	T	0.0	0.0	8.3
1949-50	0.0	0.0	0.0	0.0	0.0	T	T	T	T	0.0	0.0	0.0	T
1950-51	0.0	0.0	0.0	0.0	0.0	0.0	3.8	1.8	T	T	0.0	0.0	5.6
1951-52	0.0	0.0	0.0	0.0	0.0	7.1	T	1.0	T	T	0.0	0.0	8.1
1952-53	0.0	0.0	0.0	0.0	T	T	0.0	T	0.0	0.0	0.0	0.0	T
1953-54	0.0	0.0	0.0	0.0	T	2.2	T	0.0	0.0	0.0	0.0	0.0	2.2
1954-55	0.0	0.0	0.0	0.0	0.0	0.6	T	T	0.8	0.0	0.0	0.0	1.4
1955-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	0.0	T	0.0	0.0	8.9
1956-57	0.0	0.0	0.0	0.0	0.0	2.3	T	0.0	T	0.0	0.0	0.0	2.3
1957-58	0.0	0.0	0.0	0.0	4.1	0.0	2.0	0.0	7.3	T	0.0	0.0	13.4
1958-59	0.0	0.0	0.0	0.0	0.8	0.0	0.0	T	T	0.0	0.0	0.0	0.8
1959-60	0.0	0.0	0.0	0.0	0.0	T	T	2.1	T	T	0.0	0.0	2.1
1960-61	0.0	0.0	0.0	0.0	0.0	10.1	T	0.0	T	0.0	0.0	0.0	10.1
1961-62	0.0	0.0	0.0	0.0	7.8	T	1.6	0.0	T	0.0	0.0	0.0	9.4
1962-63	0.0	0.0	0.0	0.0	0.0	0.0	0.8	5.3	0.0	0.0	0.0	0.0	6.1
1963-64	0.0	0.0	0.0	0.0	0.0	T	0.0	T	T	0.0	0.0	0.0	T
1964-65	0.0	0.0	0.0	0.0	0.0	T	0.0	0.3	T	0.0	0.0	0.0	0.3
1965-66	0.0	0.0	0.0	0.0	0.0	T	0.4	T	T	0.0	0.0	0.0	0.4
1966-67	0.0	0.0	0.0	0.0	0.0	T	0.0	T	0.0	T	0.0	0.0	T
1967-68	0.0	0.0	0.0	0.0	0.0	5.6	2.1	2.3	0.8	0.0	0.0	0.0	10.8
1968-69	0.0	0.0	0.0	0.0	7.0	T	0.0	0.0	T	0.0	0.0	0.0	7.0
1969-70	0.0	0.0	0.0	0.0	6.0	1.9	0.3	1.7	T	0.0	0.0	0.0	9.9
1970-71	0.0	0.0	0.0	0.0	0.0	0.0	3.8	T	0.0	T	0.0	0.0	3.8
1971-72	0.0	0.0	0.0	0.0	0.0	1.0	2.5	0.0	0.0	0.0	0.0	0.0	3.5
1972-73	0.0	0.0	0.0	0.0	0.0	T							

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1887 for temperature and 1879 for precipitation.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table. Temperature, degree day, and snowfall data are from City Office locations through November 1942, precipitation through 1939.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above										Remarks
						Sea level	Ground								Sea level	
						Ground at temperature site	Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	
CITY																
San Francisco Street between Santa Fe and El Paso Streets	11/06/77	8/12/80		31° 47'	106° 30'	3720	22	17	17				11			
One door east of above office	8/12/80	11/01/81	1 door E	31° 47'	106° 30'	3720	27									
Corner San Francisco and Santa Fe Streets	11/01/81	11/01/82	1/2 block W	31° 47'	106° 30'	3720	21	5	5				2			
State National Bank Building, 1 door W of SW corner San Antonio and Oregon Streets	11/01/82	4/01/88	700 ft. E	31° 47'	106° 30'	3720	37	21	21				34			Maximum temperature too high in early years, due to exposure of thermometers on northwest wall of building.
Sheldon Hotel, SW corner St. Louis (later Mills) and Oregon Streets	4/01/88	8/08/94	400 ft. NW	31° 47'	106° 30'	3720	80	68	68		62		62			
Government Building SE corner St. Louis and Oregon Streets	8/08/94	12/29/07	100 ft. NE	31° 47'	106° 30'	3720	110	10	10		2		2			Thermometer shelter and rain gages in San Jacinto Plaza.
El Paso & Southwestern Building, SE corner Stanton & Franklin Sts.	12/29/07	6/30/25	1100 ft.NNE	31° 47'	106° 30'	3731	133	111	110		102		102			
Mills Building, NW corner Oregon and Mills Streets	7/01/25	4/28/36	1100 ft.SSW	31° 47'	106° 30'	3720	175	153	152		145		145			
U. S. Court House, NE corner San Antonio and Kansas Streets	4/28/36	12/19/42	1500 ft. E	31° 47'	106° 30'	3711	101	82	82		75		75			
AIRPORT																
American Airlines Adm. Building, Municipal AP	11/20/31	12/14/42		31° 48'	106° 24'	3913	54	6	6			3	3			
Administration Building International Airport (formerly Municipal AP)	12/14/42	4/01/64	2000 ft. E	31° 48'	106° 24'	a3918	b20	c32	c31		29	30	29	d5	e3950	Ground exposure for temperature and precipitation instruments to 5/17/44. a - 3920 feet to 9/1/60. b - 85 feet to 5/1/61. c - 37 feet 5/17/44 to 4/23/59. d - Commissioned 4000 feet N of thermometer site 9/1/60. e - Added 5/30/49.
FAA-WB Building International Airport	4/01/64	Present	.3 mi. SE	31° 48'	106° 24'	3918	f20				25	26	25	f5	3954	f - Not moved.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

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A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

ELY, NEVADA

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

Ely, Nevada, is located within but near the southern rim of the Great Basin. The neighboring terrain consists of alternate mountain ranges and sagebrush covered valleys. Principal cover on the mountains is juniper, pinion, and, at higher elevations, white fir and white pine.

Valley floors in this region are near 6,000 feet above sea-level. This high elevation is conducive to sharp night-time radiation, which produces pleasant summer nights but also reduces the season that is free from freezing temperatures to, on the average, about 74 days.

Owing to the normally low (yearly average less than 10 inches) precipitation, farming is limited to areas that can be irrigated from mountain streams or wells. The livestock industry is predominant in agriculture. Cultivated crops consist almost entirely of grains and forage.

The mountain ranges provide fairly good summer pastures for cattle which find enough food also for a good portion of the winter in dry or snow-softened desert plants. All stock, however, has to be finished for market in the feed-yards.

Sheep share the mountain pastures with cattle in the summer, and as winter approaches move out on the wide flat valleys. These browsers eat snow for water and consume a wide variety of desert plants, including the lowly sagebrush. It is not uncommon for bands of sheep to spend an entire winter without supplemental feed.

The Ely weather station is near the center of Steptoe Valley, which is five miles wide at this point. The mountains of the Egan Range to the west and the Schell Creek Range to the east range up to 4,000 feet above the station elevation and prevent strong surface winds from these directions. A very pronounced drainage wind sweeps down the valley during the morning hours. More precipitation is noted near the mountains than is measured in the center of the valley.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: ELY, NEVADA YELLAND FIELD Standard time used: PACIFIC Latitude: 39° 17' N Longitude: 114° 51' W Elevation (ground): 6253 feet Year: 1972

Month	Temperature Averages: Daily maximum	Daily minimum	Monthly	Extremes: Highest	Date	Lowest	Date	Degree days (Base 65°): Heating	Cooling	Precipitation: Total	Greatest in 24 hrs.	Date	Snow, Ice pellets: Total	Greatest in 24 hrs.	Date	Relative humidity: Hour 04	Hour 10	Hour 16	Hour 22 (Local time)	Wind &: Resultant: Direction	Speed	Average speed	Fastest mile: Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures: Maximum: 90° and above ‡	32° and below	Minimum: 32° and below	0° and below	** Average daily solar radiation - langleys
JAN	39.7	8.5	24.1	51	22+	-19	4	1257	0	0.17	0.13	26-27	3.3	2.0	26-27	75	59	52	71	21	5.2	10.1	30	S	25+	84	4.8	13	8	10	5	3	0	0	0	6	31	9	
FEB	47.3	17.7	32.5	63	27	-11	2	936	0	0.01	0.01	5	0.1	0.1	5	73	51	35	65	22	4.6	9.3	27	W	29	83	6.0	7	11	11	1	0	0	0	0	2	29	3	
MAR	59.1	23.3	41.2	70	9	6	28	732	0	0.07	0.06	13	T	T	29 +	65	35	23	52	24	3.5	10.1	36	SW	25	92	5.4	9	13	9	2	0	0	0	0	0	26	0	
APR	57.5	25.7	41.6	71	28	10	19	693	0	0.88	0.55	17-18	4.3	3.7	17-18	63	36	27	53	23	3.3	11.5	38	S	5	70	5.8	10	6	14	8	2	0	0	0	1	24	0	
MAY	69.7	32.4	51.1	84	30+	20	1	425	0	0.32	0.18	20	1.3	1.3	20	57	28	25	43	20	4.4	10.0	36	SE	16	74	5.7	8	13	10	4	1	2	0	0	0	15	0	
JUN	79.2	44.6	61.9	94	30	36	26	102	16	0.83	0.34	3	0.0	0.0		67	33	31	47	20	5.2	9.8	40	W	18	73	5.4	7	16	7	7	0	7	0	2	0	0	0	
JUL	89.4	46.8	68.1	96	13	37	22+	16	117	0.17	0.15	30-31	0.0	0.0		41	18	15	28	22	3.6	9.6	32	SW	20	83	3.5	20	5	6	3	0	4	0	15	0	0	0	
AUG†	83.5	44.1	63.8	96	9	33	24	86	58	0.47	0.19	13-14	† 0.0	† 0.0		54	27	23	41	19	5.3	10.2	41	SE	18	81	3.9	15	9	7	7	0	7	0	8	0	0	0	
SEP	71.8	36.3	54.1	80	15	17	25	320	0	1.82	0.90	1-2	0.0	0.0		67	35	29	52	21	6.1	9.9	40	S	18+	80	4.8	9	15	6	7	0	5	0	0	0	10	0	
OCT	58.1	32.7	45.4	76	2	12	31	599	0	1.02	0.45	18-19	T	T	29 +	81	55	48	74	20	2.5	9.6	33	S	14	60	5.9	9	9	13	10	0	4	0	0	1	13	0	
NOV	43.9	17.8	30.9	59	3	3	23+	1019	0	0.14	0.04	16-17	0.7	0.4	19	84	67	57	78	22	3.5	9.3	30	SE	7	45	6.9	7	7	16	6	0	0	0	0	0	28	0	
DEC	35.0	5.2	20.1	57	2	-28	10	1384	0	0.69	0.25	8	10.5	5.4	6-7	76	65	62	73	20	4.3	9.6	33	SE	6	72	6.1	8	10	13	6	4	0	0	0	14	31	9	
YEAR	61.2	27.9	44.6	96	AUG. 9+	-28	DEC. 10	7569	191	6.59	0.90	SEP. 1-2	20.2	5.4	DEC. 6-7	67	42	36	56	21	4.2	9.9	41	SE	AUG. 18	76	5.4	122	122	122	66	10	29	0	25	24	207	21	

† DATA CORRECTED AFTER PUBLICATION OF THE MONTHLY ISSUE.

NORMALS, MEANS, AND EXTREMES

Month	Temperature Normal: Daily maximum	Daily minimum	Monthly	Extremes: Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation: Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets: Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity: Hour 04	Hour 10	Hour 16	Hour 22 (Local time)	Wind &: Mean speed	Prevailing direction #	Fastest mile: Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Max.: 90° and above ‡	32° and below	Min.: 32° and below	0° and below	** Average daily solar radiation - langleys
(a)	(b)	(b)	(b)	34		34		(b)	(b)	34		34		34		34	34		34		20	20	20	20	34	11	29	29		34	29	34	34	34	34	34	34	34	34	34	34	34	
J	36.8	8.7	22.8	68	1951	-27	1949	1308	0.78	1.92	1952	T	1948	0.95	1952	8.5	24.8	1967	13.1	1943	71	59	55	69	10.7	S	66	SE	1952	65	6.2	9	7	15	6	2	*	*	0	8	31	7	
F	39.8	13.3	26.6	66	1963	-25	1949	107[illegible]	0.70	2.19	1969	0.01	1972	1.54	1969	6.7	19.9	1959	10.4	1956	75	58	51	72	10.7	S	56	S	1954	66	6.3	7	7	14	7	2	*	*	0	5	28	4	
M	47.2	19.7	33.5	73	1966	-13	1952	977	0.85	2.40	1952	0.07	1972+	0.86	1954	8.6	24.8	1958	10.6	1954	71	47	40	65	10.9	S	59	SE	1951	72	6.1	8	9	14	8	3	*	*	0	3	30	1	
A	57.6	27.5	42.6	78	1962+	-5	1963	672	0.95	2.77	1964	0.16	1966+	1.04	1947	6.4	24.5	1963	10.7	1970	68	40	34	57	11.1	S	59	S	1951	67	6.1	8	8	14	8	2	1	*	0	*	24	*	
M	66.7	33.8	50.3	87	1954+	7	1950	456	0.85	3.05	1967	T	1948	1.42	1955	1.8	10.8	1964	7.2	1964	65	33	30	52	11.0	S	74	S	1948	71	6.0	7	12	12	7	1	4	*	0	*	17	0	
J	77.2	40.0	58.6	99	1954	19	1950	225	0.50	3.53	1963	T	1946+	1.50	1963	0.3	5.6	1939	5.6	1939	60	29	25	44	10.7	S	63	SW	1952	78	4.4	13	10	7	5	*	5	*	2	0	3	0	
J	86.8	48.1	67.5	97	1960	30	1968+	28	0.65	1.81	1970	T	1948+	1.22	1952	0.0	0.0		0.0		51	23	21	38	10.4	S	50	S	1957	80	3.9	15	11	5	5	0	8	0	9	0	*	0	
A	85.1	47.1	66.1	96	1972	24	1960	43	0.49	1.58	1945	T	1962+	0.69	1957	0.0	0.0		0.0		57	27	23	42	10.7	S	57	E	1954	81	3.8	14	13	4	5	0	8	0	5	0	1	0	
S	76.9	38.1	57.5	93	1950	15	1968	234	0.56	2.23	1967	T	1953+	1.25	1963	0.1	2.2	1971	2.2	1971	56	29	22	43	10.6	S	57	S	1953	83	3.2	18	7	5	4	*	3	*	1	0	8	0	
O	63.1	28.7	45.9	84	1967	-3	1971	592	0.73	1.76	1941	0.00	1952	1.09	1968	1.8	9.7	1971	7.3	1954	64	37	30	54	10.5	S	65	S	1950	75	4.2	15	8	8	5	1	1	*	0	*	22	*	
N	49.1	18.2	33.7	71	1956+	-15	1964	939	0.59	1.82	1960	T	1959	1.29	1960	4.6	15.3	1946	10.4	1967	72	52	46	68	10.2	S	51	S	1954	66	5.8	10	8	12	5	1	*	*	0	3	28	1	
D	40.8	12.7	26.8	67	1958	-28	1972	1184	0.68	2.11	1966	T	1962	1.12	1966	7.9	22.3	1968	12.7	1970	72	59	55	71	10.3	S	61	SE	1952	64	6.1	9	8	14	6	3	*	*	0	7	30	5	
YR	60.6	28.0	44.3	99	JUN. 1954	-28	DEC. 1972	7733	8.33	3.53	JUN. 1963	0.00	OCT. 1952	1.54	FEB. 1969	46.7	24.8	JAN. 1967+	13.1	JAN. 1943	65	41	36	56	10.6	S	74	S	MAY 1948	73	5.2	133	108	124	72	15	32	2	16	27	218	19	

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

\# To 8 compass points only.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1938										44.8	28.6	27.3	
1939	21.1	14.7	34.5	45.8	51.8	57.4	67.4	66.3	57.1	44.4	37.7	34.0	44.4
1940	26.4	31.2	38.3	43.4	55.4	62.6	68.1	68.1	56.3	47.1	31.9	30.4	46.6
1941	27.2	34.7	36.2	36.2	51.4	55.8	65.1	63.0	51.1	41.8	34.6	28.6	43.8
1942	23.4	23.8	30.6	41.6	46.0	57.4	70.1	65.6	55.7	45.6	35.0	31.2	43.8
1943	25.3	28.8	36.8	48.1	49.8	54.6	66.6	65.8	59.3	46.8	36.2	27.1	45.4
1944	18.7	23.0	29.5	38.0	51.0	53.4	65.2	63.8	57.0	47.4	30.4	25.5	41.9
1945	25.6	29.0	27.6	37.4	49.0	53.4	67.2	65.3	55.0	48.0	32.6	24.6	42.9
1946	21.2	25.8	35.4	45.2	48.3	59.8	67.6	66.5	56.2	39.8	29.8	30.0	43.8
1947	20.0	34.8	37.6	41.2	53.5	55.8	67.3	65.5	58.4	48.3	29.0	24.8	44.7
1948	28.8	24.0	26.4	42.8	48.8	57.4	66.2	64.5	57.1	44.9	30.4	18.9	42.5
1949	5.8	15.0	31.8	46.0	50.0	57.6	66.3	64.5	59.0	43.0	41.4	23.4	42.0
1950	20.2	33.0	33.7	42.4	47.3	56.7	65.9	63.8	54.8	51.1	39.0	34.8	45.2
1951	25.3	29.3	32.3	43.5	50.3	56.8	67.3	64.8	57.6	43.0	31.8	18.4	43.4
1952	17.6	19.9	22.4	43.0	52.1	57.3	66.5	67.5	59.3	50.6	26.9	24.6	42.3
1953	33.5	30.7	35.1	39.8	42.7	57.5	69.1	65.2	59.7	45.9	37.9	24.1	45.1
1954	27.2	34.3	31.8	46.1	54.0	57.7	69.6	64.0	56.5	46.0	38.8	25.8	46.0
1955	14.6	17.9	31.4	39.3	47.8	57.6	65.2	67.7	56.8	47.3	31.6	28.6	42.2
1956	31.9	19.5	35.8	41.3	50.5	60.5	65.6	62.9	59.8	44.2	30.6	26.8	44.1
1957	18.7	34.3	35.9	41.0	47.5	60.0	67.0	66.5	56.4	43.5	29.1	30.6	44.2
1958	27.5	33.9	30.2	38.2	54.1	59.5	65.7	68.6	57.8	47.5	34.6	33.9	46.0
1959	28.8	26.0	35.6	44.8	47.4	63.3	69.4	65.5	53.5	46.1	34.4	25.9	45.0
1960	19.0	23.3	39.3	43.2	50.3	62.6	68.0	65.4	60.6	46.3	35.3	26.6	45.0
1961	27.0	31.7	34.0	41.4	50.2	62.4	68.4	66.1	52.6	43.4	30.5	25.1	44.4
1962	20.4	29.4	29.3	47.4	49.0	59.6	65.5	65.8	58.9	48.7	38.0	29.7	45.2
1963	22.9	36.8	32.3	36.1	54.3	53.7	66.5	65.3	59.8	50.7	34.3	27.6	45.0
1964	19.3	22.3	27.9	39.6	48.6	56.6	68.4	64.7	54.4	49.6	29.3	26.0	42.2
1965	29.4	27.8	32.4	41.9	45.9	55.2	65.5	63.6	50.5	49.2	37.6	24.5	43.6
1966	20.1	22.5	36.7	42.6	55.5	60.6	68.6	66.3	59.1	45.7	38.1	27.0	45.2
1967	26.2	28.4	38.4	34.7	49.2	54.6	68.1	68.1	57.9	47.7	37.6	17.6	44.1
1968	23.1	35.8	36.7	38.0	49.3	59.4	68.4	61.1	54.5	46.7	34.8	23.8	44.3
1969	31.2	25.9	26.2	43.2	56.9	57.4	68.5	69.6	60.7	40.4	35.1	29.8	45.4
1970	29.3	35.0	32.9	34.8	50.7	58.1	67.3	68.1	52.2	41.1	36.0	21.7	43.9
1971	24.2	29.9	34.7	41.3	47.0	59.1	68.2	68.4	52.5	40.3	32.0	18.9	43.1
1972	24.1	32.5	41.2	41.6	51.1	61.9	68.1	63.8	54.1	45.4	30.9	20.1	44.6
RECORD													
MEAN	23.7	27.8	33.3	41.5	50.2	58.0	67.3	65.7	56.6	45.8	33.9	26.2	44.2
MAX	38.1	41.3	47.3	56.5	66.6	76.1	86.5	84.4	75.7	63.1	49.0	40.4	60.4
MIN	9.3	14.3	19.2	26.5	33.8	39.9	48.0	46.9	37.4	28.5	18.8	12.0	27.9

TOTAL DEGREE DAYS

ELY, NEVADA

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1938-39					1093	1169	1361	1406	945	577	410	237	
1939-40	18	22	237	639	819	960	1192	981	826	648	293	132	6767
1940-41	19	19	260	554	997	1073	1172	848	897	864	422	276	7401
1941-42	55	81	418	717	906	1130	1289	1158	1066	706	587	228	8341
1942-43	1	59	282	605	894	1043	1230	1010	873	508	469	311	7285
1943-44	40	52	170	566	866	1173	1437	1216	1105	806	436	352	8219
1944-45	36	59	246	544	1039	1226	1222	1011	1155	832	496	349	8215
1945-46	23	43	311	531	973	1254	1363	1097	917	598	519	163	7792
1946-47	5	18	268	782	1055	1084	1397	846	851	714	357	275	7652
1947-48	22	60	221	518	1081	1247	1125	1187	1198	667	504	227	8057
1948-49	35	63	247	628	1036	1430	1836	1400	1030	569	464	224	8962
1949-50	16	73	183	679	705	1291	1382	889	960	672	542	255	7647
1950-51	35	54	319	423	776	929	1221	992	1008	641	449	241	7088
1951-52	4	48	214	672	991	1439	1463	1300	1312	654	394	224	8715
1952-53	20	9	176	439	1138	1248	973	954	920	749	687	225	7538
1953-54	6	43	160	585	809	1262	1166	854	1024	560	331	248	7048
1954-55	8	82	253	580	781	1208	1557	1313	1034	765	525	219	8325
1955-56	66	2	263	542	994	1121	1019	1312	901	704	444	146	7514
1956-57	36	82	159	637	1025	1176	1432	855	893	712	535	176	7718
1957-58	12	33	252	659	1074	1058	1154	864	1068	796	332	173	7475
1958-59	34	3	227	534	903	958	1115	1085	901	598	537	98	6993
1959-60	11	51	342	580	909	1205	1418	1200	792	649	447	86	7690
1960-61	10	75	137	574	883	1183	1170	925	953	702	454	128	7194
1961-62	6	19	368	661	1029	1230	1381	987	1098	522	490	176	7967
1962-63	29	49	177	500	802	1091	1299	786	1007	861	322	335	7258
1963-64	20	35	152	435	913	1152	1411	1230	1143	755	500	251	7997
1964-65	17	74	314	470	1064	1203	1097	1037	1006	684	586	285	7837
1965-66	27	76	429	485	814	1248	1387	1188	869	664	291	154	7632
1966-67	9	35	177	592	801	1169	1193	1019	817	904	485	313	7514
1967-68	3	10	210	530	814	1462	1293	840	870	802	483	182	7499
1968-69	10	151	316	559	900	1268	1039	1087	1198	649	244	229	7650
1969-70	26	7	127	757	892	1084	1100	834	990	900	435	234	7386
1970-71	12	7	376	734	863	1334	1259	979	933	705	549	183	7934
1971-72	18	4	369	760	983	1422	1257	936	732	693	425	102	7701
1972-73	16	86	320	599	1019	1384							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1938											0.42	0.43	
1939	0.83	0.56	0.87	1.57	0.60	0.94	1.42	0.83	1.47	1.69	0.07	0.07	10.62
1940	0.95	1.12	0.51	1.76	0.07	0.70	0.03	0.05	2.07	1.06	0.19	0.15	8.66
1941	0.35	0.60	0.93	2.63	1.84	1.45	1.55	0.75	0.19	1.76	0.67	0.80	13.52
1942	0.63	0.27	1.03	0.59	0.69	T	0.15	0.17	T	0.40	0.61	0.06	4.60
1943	1.00	0.50	0.44	1.58	0.11	1.10	0.17	0.27	0.35	1.55	0.29	0.91	8.27
1944	0.53	0.56	0.99	1.16	0.52	1.15	T	T	0.11	0.43	1.60	0.44	7.49
1945	0.23	0.63	2.01	1.31	1.04	2.39	0.43	1.58	1.03	1.48	0.87	0.23	13.23
1946	0.62	0.08	1.22	0.97	1.21	T	1.18	0.84	0.01	1.46	1.60	0.67	9.56
1947	0.14	0.28	0.21	1.79	1.17	0.49	T	0.48	1.04	0.81	0.20	0.30	6.91
1948	T	0.89	0.87	0.62	T	0.92	T	0.26	0.26	0.47	0.10	0.92	5.31
1949	0.78	0.48	0.53	0.36	1.53	0.57	0.63	0.18	0.36	0.61	0.42	0.43	6.88
1950	0.45	0.13	0.88	0.16	0.87	0.04	0.87	0.06	0.98	0.63	0.54	0.42	6.03
1951	0.13	0.08	0.20	0.94	0.48	0.36	1.33	1.05	0.10	0.32	0.76	1.54	7.29
1952	1.92	0.87	2.40	1.77	0.36	0.51	1.51	0.19	0.03	0.00	0.43	0.99	10.98
1953	0.51	0.14	0.52	0.45	0.49	0.33	1.13	0.74	T	0.57	0.10	0.24	5.22
1954	0.94	0.54	1.37	0.54	0.28	0.19	0.32	0.05	1.48	0.47	1.12	0.59	7.89
1955	1.00	0.76	0.07	0.21	1.74	0.76	0.47	1.21	0.16	0.04	0.66	1.68	8.76
1956	0.99	0.94	0.34	0.63	1.61	0.38	0.18	T	0.65	0.54	0.04	0.06	6.36
1957	1.01	0.17	1.14	0.53	2.68	0.41	0.66	0.71	0.02	0.77	0.54	0.50	9.14
1958	0.53	1.08	2.25	0.69	0.58	0.35	0.12	0.49	0.79	T	0.53	0.17	7.58
1959	0.17	1.43	0.31	0.46	1.07	0.17	0.16	0.44	0.99	0.15	T	0.62	5.97
1960	0.80	0.70	0.77	0.67	0.79	0.21	0.26	0.19	0.98	0.37	1.82	0.33	7.89
1961	0.15	0.36	1.21	0.80	0.64	0.56	0.64	1.14	0.41	0.52	0.36	0.48	7.27
1962	0.81	1.51	1.09	0.18	1.26	0.45	0.62	T	0.10	1.06	0.28	T	7.36
1963	0.11	0.49	0.84	2.12	0.40	3.53	0.01	0.29	2.18	0.37	0.60	0.20	11.14
1964	1.41	0.07	1.24	2.77	1.17	2.44	0.02	0.58	0.09	0.19	0.93	1.79	12.70
1965	0.46	0.64	0.46	0.74	0.54	1.25	1.12	1.52	1.56	0.27	0.93	1.28	10.77
1966	0.23	0.31	0.16	0.16	0.46	0.14	0.16	0.61	1.34	0.10	0.30	2.11	6.08
1967	1.86	0.10	0.37	1.38	3.05	2.83	0.84	0.61	2.23	0.13	0.84	0.69	14.73
1968	0.15	0.92	0.67	1.26	1.00	1.12	1.32	1.04	0.10	1.44	0.22	0.79	10.03
1969	1.24	2.19	0.41	0.98	0.28	2.80	0.55	0.34	0.37	0.91	0.79	0.59	11.45
1970	0.11	0.14	0.59	1.55	0.01	1.09	1.81	1.45	0.45	0.23	1.69	1.57	10.69
1971	0.63	0.57	0.20	1.31	2.89	0.09	0.17	0.25	0.39	1.08	0.59	1.25	9.42
1972	0.17	0.01	0.07	0.88	0.32	0.83	0.17	0.47	1.82	1.02	0.14	0.69	6.59
RECORD													
MEAN	0.64	0.59	0.80	1.04	0.93	0.90	0.59	0.53	0.71	0.67	0.61	0.69	8.70

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1938-39					5.8	6.5	13.8	8.6	5.8	4.8	1.5	5.6	
1939-40	0.0	0.0	0.0	3.1	T	0.1	6.4	7.1	1.7	6.5	0.0	0.0	24.9
1940-41	0.0	0.0	T	T	2.8	1.0	3.9	1.7	4.6	12.2	2.0	0.2	28.4
1941-42	0.0	0.0	T	5.6	6.1	11.8	5.5	3.2	11.7	2.0	1.2	0.0	47.1
1942-43	0.0	0.0	0.0	1.0	8.3	1.4	15.7	7.2	1.2	3.0	T	T	37.8
1943-44	0.0	0.0	0.0	T	0.4	7.6	11.2	9.9	20.3	5.8	0.0	T	55.2
1944-45	0.0	0.0	T	0.6	T	8.3	3.8	7.4	20.4	8.5	2.1	0.0	51.1
1945-46	0.0	0.0	T	T	10.5	4.7	11.0	1.5	11.6	T	T	0.0	39.3
1946-47	0.0	0.0	T	5.6	15.3	4.4	2.6	3.3	1.2	1.3	T	T	33.7
1947-48	0.0	0.0	T	T	1.0	4.0	T	9.0	16.1	2.8	T	0.0	32.9
1948-49	0.0	0.0	0.0	0.0	1.3	18.9	16.7	11.1	5.5	0.0	T	T	53.5
1949-50	0.0	0.0	0.0	6.1	1.1	10.1	6.4	1.2	7.8	2.1	7.5	0.2	42.5
1950-51	0.0	0.0	0.0	T	1.3	2.1	1.7	1.3	1.4	4.3	T	T	12.1
1951-52	0.0	0.0	0.0	T	11.5	14.4	17.8	9.8	23.5	1.0	T	T	78.0
1952-53	0.0	0.0	0.0	0.0	5.3	7.3	5.1	1.8	2.8	1.2	0.5	T	24.0
1953-54	0.0	0.0	0.0	2.2	T	6.8	10.9	4.8	16.6	1.0	T	0.2	42.5
1954-55	0.0	0.0	0.0	7.8	3.8	6.3	16.3	13.3	T	4.3	0.7	1.7	54.2
1955-56	0.0	0.0	T	0.0	5.8	13.4	7.5	18.8	3.2	4.7	6.2	0.0	59.6
1956-57	0.0	0.0	0.0	1.1	1.6	0.4	18.5	T	12.2	5.9	3.8	0.0	43.5
1957-58	0.0	0.0	0.0	0.6	10.0	4.0	9.1	12.6	24.8	7.5	0.0	0.0	68.6
1958-59	0.0	0.0	0.8	T	5.3	1.8	2.0	19.9	3.3	0.3	3.9	0.0	37.3
1959-60	0.0	0.0	0.1	1.2	T	10.6	9.9	8.3	5.1	4.5	2.6	0.0	42.3
1960-61	0.0	0.0	0.0	3.9	2.4	4.9	0.5	5.0	18.5	7.3	4.1	0.0	46.6
1961-62	0.0	0.0	T	6.6	4.6	5.5	13.9	5.9	15.0	0.3	T	0.0	51.8
1962-63	0.0	0.0	0.0	T	1.1	T	T	2.1	7.7	24.5	0.7	T	36.1
1963-64	0.0	0.0	0.0	0.0	5.0	3.5	19.3	1.2	17.4	21.8	10.8	T	79.0
1964-65	0.0	0.0	T	T	12.9	17.9	6.6	9.0	4.6	6.8	1.0	0.0	58.8
1965-66	0.0	0.0	T	2.0	5.5	12.7	3.5	4.2	1.6	1.4	T	0.0	30.9
1966-67	0.0	0.0	0.0	T	1.0	7.1	24.8	2.1	4.4	12.8	3.6	0.8	56.6
1967-68	0.0	0.0	0.0	0.0	12.7	11.8	2.4	8.6	9.5	16.7	0.7	0.0	62.4
1968-69	0.0	0.0	T	3.5	1.9	22.3	8.3	19.1	6.3	3.9	0.0	0.0	65.3
1969-70	0.0	0.0	0.0	2.2	2.9	2.6	1.0	0.9	4.2	19.9	0.0	T	33.7
1970-71	0.0	0.0	0.0	T	8.0	17.5	8.8	7.7	4.1	13.1	6.3	0.0	65.5
1971-72	0.0	0.0	2.2	9.7	6.0	13.6	3.3	0.1	T	4.3	1.3	0.0	40.5
1972-73	0.0	0.0	0.0	T	0.7	10.5							

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1939.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above: Sea level — Ground at temperature site	Ground: Wind instruments	Ground: Extreme thermometers	Ground: Psychrometer	Ground: Telepsychrometer	Ground: Tipping bucket rain gage	Ground: Weighing rain gage	Ground: 8" rain gage	Ground: Hygrothermometer	Sea level: Pyranometer	Remarks
Yelland Field	10/12/38	9/08/61		30° 17'	114° 51'	6257	46	6	6		3	3	3		6262	
Yelland Field FAA-WB Building	9/08/61	Present	400 ft. NNW	39° 17'	114° 51'	6253	20	4	4		3	3	3		6279	Wind equipment moved 3000 feet north to center of field.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

USCOMM-NOAA-ASHEVILLE - 850

U.S. DEPARTMENT OF COMMERCE
NATIONAL CLIMATIC CENTER
FEDERAL BUILDING
ASHEVILLE, N.C. 28801

A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

FORT WORTH, TEXAS

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

Fort Worth is located in North Central Texas approximately 250 miles north of the Gulf of Mexico. Headwaters of the Trinity River lie just northwest of the city on the Fort Worth Prairie. Rolling hills in the area range from about 600 to 800 feet in elevation.

The climate of Fort Worth is humid subtropical with hot summers. It is also continental, characterized by a wide range in annual temperature extremes. Precipitation averages near 32 inches annually but varies considerably from year to year ranging from less than 20 to more than 50 inches.

Winters are mild, but "northers" occur about three times each month, and often are accompanied by sudden drops in temperature. Cold spells rarely last longer than two or three days. In an average year, temperature minima of 20° or below occur on only six days.

The highest temperatures of summer are associated with fair skies, westerly winds and low humidities. Characteristically, hot spells in summer are broken into three-to-five day periods by thunderstorm activity. There are only a few nights each summer when the minimum temperature exceeds 80°. Refrigerated-type air conditioners are recommended for maximum comfort indoors, and for traveling via automobile.

Throughout the year, rainfall occurs more frequently during the night. Usually, periods of rainy weather last for only a day or two, and are followed by several days with fair skies. Greatest amounts of rain occur during the months of April, May, June, September and October. July and August are relatively dry months. Thunderstorms occur throughout the year, but are most frequent in the spring. Hail falls on about two or three days a year, ordinarily with only slight and scattered damage. Windstorms occurring during thunderstorm activity are sometimes destructive. Snowfall is rare, with a measurable fall occurring only once in an average year.

The average length of the warm season (freeze free period) at Fort Worth is 249 days. Since 1940 the longest was 290 days in both 1946 and 1953; the shortest was 196 days in 1957. The average date of the last occurrence of 32° or below is March 16. During the period 1940 - 1970, the earliest occurrence was February 14, 1946; the latest was April 13, 1957. The average date of the first occurrence of 32° or below in the fall is November 21. The earliest occurrence, during the period 1940 - 1970, was October 27, 1957; the latest was December 25, 1965.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: FORT WORTH, TEXAS   GREATER SW INTL AIRPORT   Standard time used: CENTRAL   Latitude: 32° 50' N   Longitude: 97° 03' W   Elevation (ground): 537 feet   Year: 1972

Month	Temperature – Averages – Daily maximum	Daily minimum	Monthly	Extremes – Highest	Date	Lowest	Date	Degree days (Base 65°) – Heating	Cooling	Precipitation – Total	Greatest in 24 hrs.	Date	Snow, Ice pellets – Total	Greatest in 24 hrs.	Date	Relative humidity – Hour 00	Hour 06	Hour 12	Hour 18 (Local time)
JAN	56.6	33.3	45.0	82	20	15	5	615	2	1.09	0.50	31-1	T	T	15 +	78	85	60	61
FEB	64.8	38.1	51.5	84	28	20	3	398	14	0.26	0.25	10-11	T	T	1	73	84	52	48
MAR	75.9	48.3	62.1	89	23	32	2	143	57	0.10	0.09	26	0.0	0.0		62	76	44	40
APR	82.1	58.0	70.1	95	12	40	1	26	185	3.25	2.37	27	0.0	0.0		66	78	52	44
MAY	83.6	61.7	72.7	92	27	52	3	1	249	2.35	1.15	7	0.0	0.0		73	86	53	50
JUN	92.6	70.1	81.4	105	25	55	1	0	498	1.50	0.80	13-14	0.0	0.0		70	84	53	51
JUL	94.0	72.2	83.1	102	29	59	6	0	569	0.59	0.27	18	0.0	0.0		72	89	51	44
AUG	95.8	73.5	84.7	104	6	68	24	0	618	0.81	0.41	12-13	0.0	0.0		69	84	49	47
SEP	90.4	71.1	80.8	100	8	50	30	3	480	2.42	0.88	21	0.0	0.0		79	93	63	57
OCT	77.7	57.3	67.5	95	17	45	25	96	183	6.89	2.42	21-22	0.0	0.0		78	87	62	62
NOV	58.9	41.2	50.1	79	9	31	22	446	4	2.36	0.78	31-1	T	T	29 +	80	86	63	64
DEC	54.5	33.5	44.0	75	29	18	16	644	0	0.61	0.31	10-11	1.4	1.4	10	77	80	63	63
YEAR	77.2	54.9	66.1	105	JUN. 25	15	JAN. 5	2372	2859	22.23	2.42	OCT. 21-22	1.4	1.4	DEC. 10	73	84	55	53

Month	Wind & – Resultant – Direction	Speed	Average speed	Fastest mile – Speed	Direction	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Maximum – ‡ 90° and above	Maximum – 32° and below	Minimum – 32° and below	Minimum – 0° and below	** Average daily solar radiation - langleys
JAN	25	0.8	10.1	25	34	4		5.6	11	7	13	6	0	0	1	0	0	12	0	
FEB	21	2.2	10.7	28	01	26+		5.3	11	7	11	3	0	0	1	0	0	9	0	
MAR	19	2.3	13.1	31	19	26		4.0	17	7	7	2	0	4	1	0	0	1	0	
APR	17	7.0	13.5	25	18	20+		5.6	9	10	11	6	0	6	0	6	0	0	0	
MAY	13	2.4	8.3	23	20	16		5.1	12	9	10	5	0	4	0	4	0	0	0	
JUN	16	6.3	9.0	28	02	21		4.5	13	10	7	4	0	9	0	22	0	0	0	
JUL	17	6.6	10.2	26	21	2		5.1	10	14	7	4	0	4	0	27	0	0	0	
AUG	16	5.3	8.8	28	17	3		6.3	8	10	13	6	0	8	0	30	0	0	0	
SEP	16	4.0	8.8	37	22	23		7.0	6	8	16	11	0	7	1	17	0	0	0	
OCT	14	2.5	8.8	28	06	26		6.2	9	8	14	8	0	4	3	8	0	0	0	
NOV	34	2.1	9.4	36	32	12		5.1	15	3	12	8	0	5	0	0	0	1	0	
DEC	30	1.7	11.1	35	35	5		5.6	12	5	14	5	1	2	5	0	0	15	0	
YEAR	17	2.8	10.2	37	22	SEP. 23		5.5	133	98	135	68	1	53	12	114	0	38	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature Ø – Normal – Daily maximum	Daily minimum	Monthly	Extremes – Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation – Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets – Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year
(a)	(b)	(b)	(b)	9		9		(b)	(b)	19		19		19		19	19		19	
J	56.0	34.9	45.5	88	1969	4	1964	614	2.04	3.60	1968	0.19	1971	2.36	1961	1.5	12.1	1964	12.1	1964
F	59.8	38.6	49.2	87	1969	12	1971	448	2.24	6.20	1965	0.15	1963	4.06	1965	0.7	7.9	1966+	2.9	1966+
M	67.3	44.4	55.9	91	1971	19	1965	319	2.51	6.39	1968	0.10	1972	2.99	1958	0.4	2.5	1962	2.5	1962
A	75.6	53.9	64.8	95	1972	31	1971	99	3.60	12.19	1957	0.92	1959	4.55	1957	0.0	0.0		0.0	
M	82.8	62.6	72.7	96	1967	42	1971	0	4.59	12.64	1957	1.06	1961	4.86	1965	0.0	0.0		0.0	
J	91.6	71.3	81.5	105	1972	51	1964	0	2.98	6.94	1962	0.40	1964	3.11	1966	0.0	0.0		0.0	
J	95.9	74.9	85.4	105	1964+	59	1972+	0	1.75	6.36	1962	0.09	1965	3.22	1958	0.0	0.0		0.0	
A	96.2	74.6	85.4	108	1964	56	1967	0	1.68	6.83	1970	0.02	1961	3.30	1970	0.0	0.0		0.0	
S	89.3	67.5	78.4	102	1963	46	1971+	0	2.54	9.52	1964	0.23	1956	4.76	1965	0.0	0.0		0.0	
O	79.4	56.4	67.9	96	1963	37	1966+	65	2.59	9.22	1959	0.20	1955	5.91	1959	0.0	0.0		0.0	
N	66.1	43.5	54.8	88	1965+	24	1970	324	2.46	6.23	1964	0.20	1970	2.83	1964	T	T	1972+	T	1972+
D	58.2	37.2	47.7	84	1966	10	1963	536	2.35	6.99	1971	0.21	1955	3.10	1971	0.2	2.6	1963	2.5	1963
YR	76.5	55.0	65.8	108	AUG. 1964	4	JAN. 1964	2405	31.33	12.64	MAY 1957	0.02	AUG. 1961	5.91	OCT. 1959	2.8	12.1	JAN. 1964	12.1	JAN. 1964

Month	Relative humidity – Hour 00	Hour 06	Hour 12	Hour 18 (Local time)	Wind & – Mean speed	Prevailing direction	Fastest mile – Speed	Direction	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Max. – ‡ 90° and above	Max. – 32° and below	Min. – 32° and below	Min. – 0° and below	** Average daily solar radiation - langleys
(a)	9	9	9	9	19	10	19	19			19	19	19	19	19	19	19	19	9	9	9	9	
J	75	81	59	58	11.6	S	46	36	1957		6.1	10	5	16	7	1	1	2	0	1	15	0	
F	72	79	56	52	12.3	S	51	36	1962+		5.7	10	5	13	7	*	2	2	0	*	11	0	
M	71	80	56	50	13.5	S	55	29	1954		5.8	10	8	13	7	*	4	1	*	0	5	0	
A	75	85	59	54	13.3	S	55	32	1970		6.1	9	7	14	8	0	7	1	1	0	*	0	
M	80	88	62	59	11.8	S	55	14	1955		5.9	8	11	12	8	0	7	*	2	0	0	0	
J	73	86	56	51	11.3	S	52	32	1955		4.8	12	11	7	6	0	6	*	19	0	0	0	
J	66	80	50	44	10.1	S	65	36	1961		4.3	14	10	7	5	0	5	0	27	0	0	0	
A	69	82	52	47	9.5	S	73	36	1959		4.3	15	10	6	5	0	5	*	25	0	0	0	
S	79	88	60	58	9.9	S	53	11	1961+		4.6	13	9	8	7	0	4	*	12	0	0	0	
O	76	85	55	58	10.1	S	44	27	1957		4.5	14	7	10	5	0	3	1	2	0	0	0	
N	75	82	55	58	10.9	S	50	34	1957		5.0	13	5	12	6	0	1	1	0	0	3	0	
D	77	82	61	62	11.4	S	53	32	1968		5.6	11	6	14	7	*	1	3	0	*	9	0	
YR	74	83	57	54	11.3	S	73	36	AUG. 1959		5.2	139	94	132	78	1	45	11	89	2	42	0	

Ø For period July 1963 through the current year.
Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 112 in August 1936; lowest temperature -8 in February 1899; maximum monthly precipitation 17.64 in April 1922; minimum monthly precipitation 0.00 in November 1903; maximum precipitation in 24 hours 9.57 in September 1932.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	54.6	46.8	59.2	66.0	75.5	81.6	85.4	83.3	82.8	70.2	59.0	54.0	68.2
#1934	48.9	49.2	54.8	67.2	74.4	86.0	88.2	88.3	76.8	73.2	60.2	49.7	68.1
1935	49.7	49.6	63.4	64.6	69.5	78.6	85.1	85.7	73.8	69.0	51.8	45.5	65.5
1936	44.0	42.2	62.7	64.8	74.0	84.0	84.4	87.6	79.8	62.6	52.4	50.4	65.7
1937	41.0	48.8	51.6	66.2	75.0	81.8	85.0	86.6	79.8	67.4	52.4	46.1	65.1
1938	49.2	54.3	64.2	63.2	72.9	81.3	83.6	85.9	80.3	73.0	54.5	48.9	67.6
#1939	50.8	45.4	60.1	65.0	75.8	81.6	86.6	85.4	83.7	71.4	54.4	52.6	67.7
1940	34.9	47.8	60.0	64.2	71.6	76.8	81.6	81.7	76.6	70.4	53.1	48.9	64.0
1941	48.2	46.7	51.9	65.4	75.6	78.1	84.4	84.9	79.8	71.2	55.2	50.0	66.0
1942	43.1	48.3	56.2	65.6	72.6	81.4	84.8	84.4	74.3	65.4	60.0	47.5	65.3
1943	45.0	53.2	51.4	69.2	73.4	82.4	86.1	89.3	76.2	66.3	55.4	44.5	66.0
1944	46.5	51.8	54.9	64.6	72.2	83.1	85.5	85.5	77.2	68.9	58.0	44.2	66.0
1945	45.8	49.6	61.6	63.0	71.8	79.6	81.7	83.2	78.2	65.4	59.8	43.4	65.2
1946	45.0	52.4	60.8	68.4	69.7	78.4	85.4	85.0	75.2	68.8	56.4	52.2	66.5
1947	45.2	43.9	49.8	65.0	71.2	81.0	84.2	86.2	79.2	73.2	51.6	48.0	64.9
1948	38.4	46.3	52.8	71.0	73.2	82.8	84.8	85.8	77.6	66.8	55.6	51.4	65.5
1949	39.1	48.6	57.0	63.6	75.7	82.2	86.0	83.0	75.4	65.5	58.8	49.8	65.4
1950	47.9	53.0	56.0	63.6	73.7	80.2	81.3	82.2	75.2	71.8	54.6	46.5	65.5
1951	46.0	49.5	56.8	64.7	72.6	80.6	87.1	90.3	79.4	69.8	52.3	50.1	66.6
1952	54.0	54.4	55.5	62.5	72.6	85.3	86.3	91.1	79.8	65.1	55.1	46.6	67.4
#1953	51.9	50.7	61.6	62.4	72.8	87.5	85.1	84.0	79.1	68.8	53.7	44.9	66.9
1954	45.6	56.3	55.9	70.7	68.8	83.9	90.5	88.8	81.9	69.9	55.6	49.7	68.1
1955	46.3	48.6	57.9	69.6	76.5	78.0	85.4	84.2	80.8	68.3	55.4	47.1	66.5
1956	44.9	50.1	58.4	64.8	77.7	83.3	89.0	88.0	80.9	71.0	52.7	50.0	67.6
1957	43.7	54.1	52.6	61.6	71.5	80.2	87.4	85.1	75.1	62.3	51.6	51.7	64.8
1958	44.9	43.6	48.7	61.5	73.1	82.3	85.7	85.0	78.4	65.8	57.4	43.6	64.2
1959	42.5	48.9	56.6	63.4	75.1	80.7	83.1	84.5	79.7	66.1	49.5	50.2	65.0
1960	44.1	43.0	49.1	67.3	72.0	82.9	84.6	84.0	79.6	70.0	57.5	43.7	64.8
1961	40.9	50.3	59.3	64.0	73.1	77.9	82.3	82.7	76.9	67.3	52.7	45.8	64.5
1962	39.6	53.3	54.0	64.3	77.6	79.9	85.5	85.6	77.1	70.4	55.5	47.2	65.8
#1963	37.8	46.4	61.2	70.4	75.0	83.1	87.4	87.3	79.2	73.5	58.4	40.3	66.7
1964	43.8	43.8	55.6	66.8	73.2	81.0	87.1	85.3	76.9	63.6	57.6	47.1	65.2
1965	47.1	45.8	47.0	68.4	72.9	79.9	86.3	84.1	79.4	66.6	62.9	52.8	66.1
1966	40.3	45.4	56.3	63.8	70.8	79.6	86.3	82.7	75.8	65.0	60.7	45.3	64.4
1967	48.3	46.8	63.3	71.1	71.4	81.4	82.9	83.1	74.1	65.4	55.6	47.0	65.9
1968	44.4	44.2	54.6	63.4	72.4	79.5	81.0	83.5	74.6	67.8	53.9	47.4	63.9
1969	49.0	50.0	49.8	65.4	71.9	79.8	87.9	84.2	77.1	65.3	55.1	49.9	65.5
1970	40.6	48.6	52.1	66.2	71.7	79.1	84.0	85.8	78.2	65.1	54.7	53.6	65.0
1971	46.7	49.2	58.6	64.0	70.5	82.9	84.4	79.5	77.1	70.1	57.0	52.2	65.8
1972	45.0	51.5	62.1	70.1	72.7	81.4	83.1	84.7	80.8	67.5	50.1	44.0	66.1
RECORD													
MEAN	45.7	48.8	56.8	65.3	72.7	80.9	84.5	84.7	77.9	67.8	56.1	47.7	65.7
MAX	56.0	59.5	67.9	75.9	82.6	91.0	94.7	95.2	88.3	78.6	66.6	57.7	76.2
MIN	35.3	38.1	45.6	54.6	62.7	70.8	74.2	74.1	67.5	56.9	45.5	37.6	55.2

TOTAL DEGREE DAYS

FORT WORTH, TEXAS

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0	0	0	8	210	349	500	441	340	40	0	0	1888
#1934-35	0	0	1	5	192	473	484	430	143	80	49	0	1857
1935-36	0	0	11	54	405	606	654	667	115	124	0	0	2636
1936-37	0	0	25	153	389	451	743	454	421	92	1	0	2729
1937-38	0	0	1	78	394	585	495	312	114	144	17	0	2140
1938-39	0	0	0	35	351	502	444	552	186	98	0	0	2168
#1939-40	0	0	2	34	330	385	935	506	197	135	4	0	2528
1940-41	0	0	7	19	357	499	523	515	409	72	1	0	2402
1941-42	0	0	0	80	308	464	683	476	287	77	11	0	2386
1942-43	0	0	21	82	209	545	625	339	446	44	11	0	2322
1943-44	0	0	3	73	297	636	574	390	320	79	16	0	2389
1944-45	0	0	0	24	260	647	595	438	146	115	32	0	2257
1945-46	0	0	22	66	204	672	621	349	165	28	28	3	2158
1946-47	0	0	0	42	271	412	614	592	478	104	19	0	2532
1947-48	0	0	0	9	400	525	826	549	403	34	4	0	2750
1948-49	0	0	1	59	301	435	806	457	255	124	0	0	2438
1949-50	0	0	6	115	213	472	540	335	305	123	4	0	2113
1950-51	0	0	0	3	338	576	583	435	276	112	5	0	2328
1951-52	0	0	0	52	399	476	360	311	317	110	10	0	2035
#1952-53	0	0	0	107	341	563	404	394	133	127	42	0	2111
1953-54	0	0	0	55	334	615	592	247	324	28	57	0	2252
1954-55	0	0	0	77	276	464	580	455	284	57	0	0	2193
1955-56	0	0	0	55	356	553	625	445	260	97	0	0	2391
1956-57	0	0	0	21	374	468	656	311	381	142	21	0	2374
1957-58	0	0	0	144	402	410	615	592	496	138	9	0	2806
1958-59	0	0	0	82	247	659	690	452	276	143	4	0	2553
1959-60	0	0	0	68	470	450	643	639	499	54	32	0	2855
1960-61	0	0	0	45	253	658	740	409	209	132	9	2	2457
1961-62	0	0	0	50	381	590	781	328	345	107	2	0	2584
#1962-63	0	0	0	46	280	545	839	517	185	34	13	0	2459
1963-64	0	0	0	4	227	760	651	608	285	65	1	0	2601
1964-65	0	0	6	81	260	550	550	530	551	36	0	0	2564
1965-66	0	0	2	60	103	376	760	542	274	84	26	0	2227
1966-67	0	0	0	79	182	627	514	503	146	15	21	0	2067
1967-68	0	0	13	80	282	548	631	598	330	100	2	0	2584
1968-69	0	0	0	47	348	540	492	416	468	49	6	4	2370
1969-70	0	0	0	116	306	463	756	455	404	63	21	1	2585
1970-71	0	0	7	105	316	369	564	440	307	97	19	0	2224
1971-72	0	0	12	7	270	389	615	398	143	26	1	0	1861
1972-73	0	0	3	96	446	644							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	1.96	2.47	2.18	1.57	4.67	0.03	5.70	2.25	4.94	1.24	0.66	2.13	29.80
#1934	1.86	1.67	4.26	2.39	0.82	T	0.08	0.13	4.90	0.12	2.30	0.56	19.09
1935	3.70	3.29	1.40	3.06	9.15	7.22	0.89	0.70	3.61	4.01	1.65	2.26	40.94
1936	0.67	0.45	0.63	0.99	9.48	0.03	2.35	0.23	7.30	3.72	0.46	1.84	28.15
1937	1.71	0.30	3.88	0.58	1.00	5.74	1.93	1.02	0.32	3.55	4.39	5.31	29.73
1938	2.74	4.57	3.89	3.03	2.80	1.61	2.16	0.11	0.78	0.11	1.17	1.26	24.23
#1939	2.66	2.42	1.64	1.48	2.54	4.04	2.02	1.44	0.12	0.55	2.72	0.68	22.31
1940	0.59	2.00	0.40	5.97	7.15	7.30	2.86	2.16	0.68	1.47	6.35	4.72	41.65
1941	1.45	3.42	1.52	3.52	2.02	7.12	1.49	2.71	1.28	3.68	1.08	1.88	31.17
1942	0.39	0.64	1.37	16.97	2.85	3.23	0.62	4.69	3.82	6.18	0.92	1.59	43.27
1943	0.20	0.51	4.05	1.63	7.83	3.93	0.73	T	7.31	0.73	0.51	3.32	30.75
1944	2.58	4.81	1.30	2.70	6.42	0.76	2.52	2.65	0.80	2.53	3.82	3.60	34.49
1945	1.92	6.96	6.19	2.87	1.81	4.12	3.07	0.62	2.17	2.31	1.13	0.55	33.72
1946	2.79	2.93	2.80	2.49	12.09	0.65	0.90	6.84	2.69	1.31	6.50	3.40	45.39
1947	1.21	0.55	2.92	2.98	2.50	4.08	0.10	4.18	2.81	2.14	2.23	4.50	30.20
1948	0.96	4.12	1.07	1.11	4.34	2.46	1.93	0.90	0.19	2.09	0.50	0.44	20.11
1949	5.45	4.75	3.69	2.47	10.64	3.52	0.10	2.27	3.13	6.50	0.09	1.04	43.65
1950	5.01	2.47	1.58	4.73	6.16	3.16	4.53	3.05	3.21	0.30	0.02	T	34.22
1951	1.39	2.42	1.33	2.27	4.60	4.12	2.22	0.47	1.84	1.62	1.00	0.09	23.37
1952	0.58	1.12	1.39	6.51	3.21	T	0.56	0.44	0.54	0.01	5.84	2.49	22.69
#1953	0.54	1.34	2.52	4.82	3.55	0.55	0.97	1.09	1.68	4.27	2.09	1.32	24.74
1954	2.08	0.73	0.66	3.62	4.38	1.20	0.24	0.81	1.46	2.35	1.24	0.78	19.55
1955	1.17	2.01	2.15	1.94	6.58	4.99	0.64	1.00	3.68	0.20	0.59	0.21	25.16
1956	1.34	2.54	0.11	3.12	3.83	0.88	0.38	0.23	0.23	1.20	2.61	2.08	18.55
1957	1.72	1.77	4.18	12.19	12.64	3.96	0.65	0.12	3.23	3.53	4.72	1.78	50.49
1958	1.70	0.84	5.49	8.63	1.50	0.67	3.69	3.64	5.10	1.07	2.26	1.09	35.68
1959	0.36	1.61	2.31	0.92	3.27	5.27	3.27	0.93	2.40	9.22	1.74	2.84	34.14
1960	2.29	2.16	0.74	1.67	1.89	1.72	3.96	2.76	1.25	1.82	0.49	4.22	24.97
1961	3.29	2.20	2.95	2.23	1.06	5.93	2.32	0.02	2.92	2.82	2.72	2.12	30.58
1962	1.00	2.01	1.80	5.66	1.58	6.94	6.36	3.22	3.79	4.15	3.93	0.99	41.43
1963	0.86	0.15	0.48	6.20	2.52	0.57	2.28	2.73	1.70	0.23	1.29	1.45	20.46
1964	3.53	1.17	3.35	2.71	2.85	0.40	0.25	2.43	9.52	0.62	6.23	1.25	34.31
1965	2.77	6.20	1.45	2.15	8.97	1.50	0.09	2.26	5.04	1.97	2.43	1.73	36.56
1966	1.68	2.84	1.38	10.74	3.13	5.47	3.26	3.38	4.23	1.48	0.53	1.17	39.29
1967	0.28	0.32	2.09	3.84	4.02	0.72	2.20	0.48	5.94	4.19	0.92	2.30	27.30
1968	3.60	1.48	6.39	2.41	6.02	3.50	1.88	2.71	2.53	2.18	4.58	1.20	38.48
1969	1.26	1.99	3.62	3.40	7.12	0.63	0.77	2.56	4.55	5.82	1.22	2.75	35.69
1970	0.72	4.78	3.49	4.68	3.62	0.61	0.94	6.85	6.25	2.95	0.20	1.01	36.10
1971	0.19	1.32	0.34	2.76	1.88	0.83	3.60	5.70	3.24	7.64	1.77	6.99	36.26
1972	1.09	0.26	0.10	3.25	2.35	1.50	0.59	0.81	2.42	6.89	2.36	0.61	22.23
RECORD MEAN	1.77	2.00	2.27	3.94	4.56	2.90	2.12	2.26	2.87	2.84	2.28	2.00	31.81

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.5
#1934-35	0.0	0.0	0.0	0.0	0.0	0.0	T	0.2	0.0	0.0	0.0	0.0	0.2
1935-36	0.0	0.0	0.0	0.0	0.0	0.0	4.5	T	0.0	0.0	0.0	0.0	4.5
1936-37	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.1	2.0	0.0	0.0	0.0	6.3
1937-38	0.0	0.0	0.0	0.0	5.0	0.0	0.0	3.1	0.0	T	0.0	0.0	8.1
1938-39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	T
#1939-40	0.0	0.0	0.0	0.0	0.0	0.0	4.0	T	0.0	0.0	0.0	0.0	4.0
1940-41	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	T	0.0	0.0	0.0	T
1941-42	0.0	0.0	0.0	0.0	0.0	0.0	1.3	T	6.0	0.0	0.0	0.0	7.3
1942-43	0.0	0.0	0.0	0.0	0.0	T	T	0.0	T	0.0	0.0	0.0	T
1943-44	0.0	0.0	0.0	0.0	0.0	T	T	0.0	0.0	0.0	0.0	0.0	T
1944-45	0.0	0.0	0.0	0.0	0.0	T	0.0	T	0.0	0.0	0.0	0.0	T
1945-46	0.0	0.0	0.0	0.0	0.0	T	0.1	T	0.0	0.0	0.0	0.0	0.1
1946-47	0.0	0.0	0.0	0.0	0.0	2.6	T	T	3.9	0.0	0.0	0.0	6.5
1947-48	0.0	0.0	0.0	0.0	0.0	T	7.9	0.9	T	0.0	0.0	0.0	8.8
1948-49	0.0	0.0	0.0	0.0	T	T	3.5	T	T	0.0	0.0	0.0	3.5
1949-50	0.0	0.0	0.0	0.0	0.0	T	1.0	T	T	0.0	0.0	0.0	1.0
1950-51	0.0	0.0	0.0	0.0	0.0	T	1.8	4.2	T	0.0	0.0	0.0	6.0
1951-52	0.0	0.0	0.0	0.0	0.6	0.0	0.0	T	0.0	0.0	0.0	0.0	0.6
#1952-53	0.0	0.0	0.0	0.0	T	0.0	1.0	T	T	0.0	0.0	0.0	1.0
1953-54	0.0	0.0	0.0	0.0	T	0.0	1.3	0.0	1.7	0.0	0.0	0.0	3.0
1954-55	0.0	0.0	0.0	0.0	0.0	T	T	T	T	0.0	0.0	0.0	T
1955-56	0.0	0.0	0.0	0.0	T	0.0	3.8	0.7	T	0.0	0.0	0.0	4.5
1956-57	0.0	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	T
1957-58	0.0	0.0	0.0	0.0	T	0.0	T	0.9	T	0.0	0.0	0.0	0.9
1958-59	0.0	0.0	0.0	0.0	0.0	0.3	0.2	2.0	0.0	0.0	0.0	0.0	2.5
1959-60	0.0	0.0	0.0	0.0	0.0	T	0.9	1.0	T	0.0	0.0	0.0	1.9
1960-61	0.0	0.0	0.0	0.0	0.0	T	3.5	2.9	0.0	0.0	0.0	0.0	6.4
1961-62	0.0	0.0	0.0	0.0	0.0	0.0	2.6	T	2.5	0.0	0.0	0.0	5.1
1962-63	0.0	0.0	0.0	0.0	0.0	T	T	T	0.1	0.0	0.0	0.0	0.1
1963-64	0.0	0.0	0.0	0.0	0.0	2.6	12.1	0.2	0.4	0.0	0.0	0.0	15.3
1964-65	0.0	0.0	0.0	0.0	0.0	T	0.0	T	T	0.0	0.0	0.0	T
1965-66	0.0	0.0	0.0	0.0	0.0	0.0	4.4	2.9	0.0	0.0	0.0	0.0	7.3
1966-67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	T	0.0	0.0	0.0	T
1967-68	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.6	T	0.0	0.0	0.0	3.0
1968-69	0.0	0.0	0.0	0.0	T	0.0	0.0	T	0.0	0.0	0.0	0.0	T
1969-70	0.0	0.0	0.0	0.0	0.0	T	T	0.0	0.8	0.0	0.0	0.0	0.8
1970-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	1.6	0.0	0.0	0.0	1.6
1971-72	0.0	0.0	0.0	0.0	T	0.0	T	T	0.0	0.0	0.0	0.0	T
1972-73	0.0	0.0	0.0	0.0	T	1.4							

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1899.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table. Data are from City Office locations through 1939.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude NORTH	Longitude WEST	Elevation above: Sea level	Ground								Sea level	Remarks
						Ground at temperature site	Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	
CITY OFFICE																
Federal Building Jennings Avenue, between 11th and Texas Streets	9- 1-98	10-31-34		32° 45'	97° 20'	615	114	107	106		99					
											3					4-1-00 To improve exposure.
											23					6-23-08 To improve exposure.
											51					1-15-09 To improve exposure.
U. S. Courthouse 10th St. between Lamar and Burnett	11- 1-34	12-16-39	900 ft. W	32° 45'	97° 20'	616	110	93	92		85					Observations continued to 1-5-40 except psychrometer to 6-30-39 and extreme thermometers to 12-31-39. City Office consolidated with Airport Station at Meacham Field.
AIRPORT STATION																
Meacham Field, 5.5 mi. NNW of Post Office No. 1 Hangar	7-22-30	9-11-34		32°48.9'	97°21.0'	688	47		4							Established for aviation weather.
Meacham Field CAA Watchhouse	9-11-34	3- 6-37	300 ft. NW	32°48.9'	97°21.0'	688	47		4							
Meacham Field Administration Building	3- 6-37	4-25-53	120 ft. N	32°48.9'	97°21.0'	688	37		34							
																EFFECTIVE DATES OF CHANGES:
								36	35			34				9-1-37.
							78									1-22-38 (Used for Climat records after 10-11-48.)
							56				34					1-5-40 to 10-11-48 Extra instruments for Climat records only.
								6	5							10-21-40 Ground exposure.
								36	35							9-14-43 Roof exposure.
								41	40							2-24-45 (After 11-12-48 used only when temperature is below 20°.)
										4						11-12-48
															A740	A - Added 2-17-49; approximate elevation.
Terminal Building Greater Southwest International Airport *	4-26-53		17.5 mi. E	32° 50'	97° 03'	a537	b22	34	33	4		32	31	c5	574	* Name changed from Amon Carter Field, 5-24-63.
																a - 544 ft. to 6-14-63.
																b - 85 ft. to 5-23-63.
																c - Commissioned 3100 ft. E of telepsychrometer site 6-14-63.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

Sale Price: 15 cents per copy. Checks and money orders should be made payable to Department of Commerce, NOAA. Remittances and correspondence regarding this publication should be sent to: National Climatic Center, Federal Building, Asheville, N. C. 28801. Attn: Publications.

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A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

LOCAL CLIMATOLOGICAL DATA
ANNUAL SUMMARY WITH COMPARATIVE DATA

FRESNO, CALIFORNIA

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

Fresno is located about midway and toward the eastern edge of the San Joaquin Valley, which is oriented northwest to southeast and has a length of about 225 miles and an average width of about 50 miles. The terrain around Fresno itself is generally level with an abrupt upward slope about 15 miles eastward to the foothills of the Sierra Nevadas. The main Sierra Nevada Range is located about 50 miles to the east and extends from 12,000 to more than 14,000 feet in elevation. About 45 miles west of Fresno lie the foothills of the Coastal Range.

The climate of Fresno is dry - mild in winter and hot in summer, and nearly nine-tenths of the year's precipitation falls in the six months from November to April.

Thanks to clear skies during the summer and the comparative isolation of the San Joaquin Valley from marine effects, the normal daily maximum temperature advances to a high of 101° during the latter part of July. The daily maximum temperature during this warmest month has ranged from 76° to 115°. Low relative humidities and some wind movement substantially lower the sensible temperature during periods of high readings. Even on the warmest days, the high rate of evaporation of perspiration from the body and the constant movement of air combine to keep the skin temperature much below the air temperature. Sunstroke is practically unknown. Humidity readings of 15 percent are common on summer afternoons, and readings as low as 8 percent have been recorded. In contrast to this, humidity readings average 90 percent during the morning hours of December and January.

Winds flow with the major axis of the San Joaquin Valley; as the Valley is oriented from the northwest to southeast, the winds are generally from one of these directions with northwest prevailing most of the time. This feature is especially beneficial since, during the warmest months, the northwest winds increase during the evenings as a result of heating or thermal effects that have occurred during the day. These refreshing breezes and the normally large temperature variation of about 35° between the highest and lowest readings of the day result in comfortable evening and night temperatures generally.

Winter temperatures are usually mild but during infrequent cold spells minimum readings occasionally drop below freezing. Heavy frost occurs almost every year, and the first heavy frost in the autumn usually occurs during the last week of November. The last frost in the spring is early in March; however, one year in five will have the last heavy frost after the first of April. The average growing season in this area is 291 days.

The mean annual precipitation is less than 12 inches, with 68 percent falling from December through March, and 93 percent falling from October through April. Although the heaviest rain recorded at Fresno for short periods occurred in June, usually any rainfall during the summer is very light. On an average, over 40 rainy days are experienced each year. Although light amounts have fallen, snow is a rare occurrence in Fresno.

Fresno enjoys a very high percentage of sunshine, receiving more than 70 percent of the possible amount during all but the three months of December, January, and February. Reduction of sunshine during these months is caused by fog and short periods of stormy weather. During foggy periods, sometimes of nearly two weeks duration, winter fog reduces sunshine to a minimum. This fog frequently lifts to a few hundred feet above the surface of the Valley and presents the appearance of a heavy, solid cloud layer.

Spring and autumn are very enjoyable seasons in Fresno, with clear skies, light rainfall and winds, and mild temperatures.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: FRESNO, CALIFORNIA — FRESNO AIR TERMINAL — Standard time used: PACIFIC — Latitude: 36° 46' N — Longitude: 119° 43' W — Elevation (ground): 328 feet — Year: 1972

Month	Temperature Averages: Daily maximum	Daily minimum	Monthly	Extremes: Highest	Date	Lowest	Date	Degree days (Base 65°): Heating	Cooling	Precipitation: Total	Greatest in 24 hrs.	Date	Snow, Ice pellets: Total	Greatest in 24 hrs.	Date
JAN	46.9	34.3	40.6	57	25+	24	5	750	0	0.37	0.18	27	T	T	26
FEB	64.7	40.2	52.5	75	27	26	3	357	0	0.67	0.61	4-5	0.0	0.0	
MAR	76.2	45.2	60.7	90	17	31	27	142	17	0.00	0.00		0.0	0.0	
APR	75.9	46.2	61.1	93	27	36	14	128	18	0.27	0.24	11	0.0	0.0	
MAY	86.0	53.8	69.9	102	14	46	7	37	195	0.15	0.15	20	0.0	0.0	
JUN	93.6	61.4	77.5	109	30	52	11	0	383	0.60	0.60	7	0.0	0.0	
JUL	98.7	64.2	81.5	111	15	57	20	0	518	T	T	30 +	0.0	0.0	
AUG	95.7	63.7	79.7	105	5	54	16	0	464	0.00	0.00		0.0	0.0	
SEP	86.5	57.0	71.8	102	1	45	25	2	213	0.29	0.29	4-5	0.0	0.0	
OCT	74.9	50.3	62.6	90	7	27	30	108	42	0.22	0.18	16	0.0	0.0	
NOV	56.9	43.4	50.2	75	3	35	24	437	0	3.50	0.99	10-11	0.0	0.0	
DEC	47.5	34.2	40.9	64	19	23	9	740	0	1.40	0.42	7	T	T	7 +
YEAR	75.3	49.5	62.4	111	JUL. 15	23	DEC. 9	2701	1850	7.47	0.99	NOV. 10-11	T	T	DEC. 7 +

Month	Relative humidity: Hour 04 (Local time)	Hour 10	Hour 16	Hour 22	Wind &: Resultant Direction	Resultant Speed	Average speed	Fastest mile: Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days, Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Maximum: 90° and above ‡	Maximum: 32° and below	Minimum: 32° and below	Minimum: 0° and below	Average daily solar radiation - langleys **
JAN	96	92	77	93	10	1.3	5.4	23	SE	27	26	8.0	4	5	22	5	0	0	15	0	0	9	0	
FEB	95	79	53	88	32	1.2	5.6	26	NW	29	68	6.2	7	9	13	3	0	0	10	0	0	3	0	
MAR	86	57	35	67	32	3.3	6.5	25	NW	22	95	3.2	18	10	3	0	0	0	2	1	0	1	0	
APR	74	44	26	53	30	4.6	8.0	28	NW	13	88	3.7	18	6	6	2	0	0	0	1	0	0	0	
MAY	68	41	23	44	30	4.6	7.7	27	NW	7	95	2.3	20	8	3	1	0	0	0	13	0	0	0	
JUN	63	38	22	43	29	4.9	7.5	32	NW	9	91	2.9	20	6	4	1	0	1	0	23	0	0	0	
JUL	67	40	23	44	29	5.7	7.9	20	NW	31	94	1.6	26	3	2	0	0	0	0	29	0	0	0	
AUG	64	40	25	46	29	4.9	7.4	22	NW	14	95	1.1	26	5	0	0	0	0	0	26	0	0	0	
SEP	75	48	30	56	29	3.5	6.0	20	NW	19	82	2.8	21	6	3	2	0	0	0	9	0	0	0	
OCT	87	61	43	74	20	0.4	6.1	24	NW	28	64	4.6	12	11	8	4	0	0	4	1	0	2	0	
NOV	92	83	73	91	09	0.8	5.7	26	SE	11	30	7.9	3	6	21	9	0	0	8	0	0	0	0	
DEC	98	94	79	96	12	0.1	6.2	27	NW	28	33	7.3	6	6	19	9	0	1	16	0	2	15	0	
YEAR	80	60	42	66	30	2.5	6.7	32	NW	JUN. 9	75	4.3	181	81	104	36	0	2	55	103	2	30	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature Normal: Daily maximum	Daily minimum	Monthly	Extremes: Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation: Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets: Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year
(a)	(b)	(b)	(b)	9		9		(b)	(b)	23		23		23		23	23		23	
J	55.4	36.7	46.1	70	1970	22	1971	586	2.03	8.56	1969	0.37	1972	2.59	1969	0.1	2.2	1962	1.5	1962
F	61.3	39.6	50.5	76	1967	25	1971	406	2.19	5.97	1962	T	1964	1.99	1969	0.0	0.0		0.0	
M	67.9	42.0	55.0	90	1972	26	1966	319	1.96	5.79	1958	0.00	1972	1.63	1958	T	T	1952	T	1952
A	76.1	46.4	61.3	95	1965	33	1968+	150	1.13	4.41	1967	0.02	1962	1.23	1969	0.0	0.0		0.0	
M	84.5	51.8	68.2	104	1967	36	1965	56	0.30	1.56	1957	T	1965+	0.96	1957	0.0	0.0		0.0	
J	92.1	57.2	74.7	110	1964	45	1971	0	0.07	0.60	1972	0.00	1971+	0.60	1972	0.0	0.0		0.0	
J	100.0	62.6	81.3	111	1972	53	1965+	0	T	0.04	1969	0.00	1963+	0.04	1969	0.0	0.0		0.0	
A	97.6	60.1	78.9	108	1971+	49	1966	0	0.01	0.25	1964	0.00	1972+	0.25	1964	0.0	0.0		0.0	
S	92.1	56.3	74.2	105	1971	41	1968	0	0.10	0.92	1959	0.00	1970+	0.91	1959	0.0	0.0		0.0	
O	80.7	48.5	64.6	96	1971+	27	1972	78	0.43	1.54	1968	0.00	1966+	1.13	1964	0.0	0.0		0.0	
N	67.5	40.0	53.8	88	1966	28	1969	339	0.95	3.50	1972	0.00	1959+	1.35	1953	0.0	0.0		0.0	
D	56.5	37.5	47.0	71	1969	21	1967	558	1.97	6.73	1955	0.07	1960	1.76	1955	0.1	1.2	1968	1.2	1968
YR	77.6	48.2	63.0	111	JUL. 1972	21	DEC. 1967	2492	11.14	8.56	JAN. 1969	0.00	AUG. 1972+	2.59	JAN. 1969	0.2	2.2	JAN. 1962	1.5	JAN. 1962

Month	Relative humidity: Hour 04 (Local time)	Hour 10	Hour 16	Hour 22	Wind &: Mean speed	Prevailing direction	Fastest mile: Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days, Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Max.: 90° and above ‡	Max.: 32° and below	Min.: 32° and below	Min.: 0° and below	Average daily solar radiation - langleys **
(a)	9	9	9	9	23	14	23	23		23	23	23	23	23	23	23	23	23	9	9	9	9	
J	91	85	67	88	5.4	SE	32	SE	1952	50	7.2	5	8	18	8	*	*	12	0	0	9	0	
F	91	78	55	84	5.7	NW	38	W	1951	66	5.9	8	8	12	7	0	*	7	0	0	5	0	
M	86	62	43	74	6.7	NW	41	NW	1964	81	4.9	13	8	10	5	0	1	2	*	0	2	0	
A	81	52	35	63	7.2	NW	36	NW	1955	85	4.2	15	7	8	5	0	1	*	2	0	0	0	
M	74	43	26	51	8.0	NW	38	N	1952	88	3.2	19	7	5	2	0	1	*	11	0	0	0	
J	68	41	25	47	8.2	NW	34	W	1950	94	1.8	24	4	2	1	0	1	0	18	0	0	0	
J	63	38	22	41	7.1	NW	25	NE	1958	96	1.1	27	3	1	*	0	*	0	30	0	0	0	
A	68	41	25	46	6.6	NW	31	S	1961	96	1.2	27	3	1	*	0	*	0	28	0	0	0	
S	74	44	27	54	5.9	NW	29	SW	1958	95	1.5	25	3	2	1	0	1	*	17	0	0	0	
O	78	51	33	65	5.3	NW	40	NE	1959	89	2.7	20	7	4	2	0	*	1	5	0	*	0	
N	87	74	58	83	4.8	NW	29	NW	1968	68	5.1	12	7	11	5	0	*	6	0	0	3	0	
D	94	87	73	92	5.1	SE	43	NW	1949	46	7.0	7	6	18	7	*	*	12	0	*	11	0	
YR	80	58	41	66	6.3	NW	43	NW	DEC. 1949	83	3.8	202	71	92	43	*	5	41	110	*	30	0	

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 115 in July 1905; lowest temperature 17 in January 1913; maximum precipitation in 24 hours 2.86 in November 1900; maximum monthly snowfall 2.5 in January 1930; maximum snowfall in 24 hours 2.5 in January 1930; fastest mile of wind 54 from Northwest in March 1916.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

\# To 8 compass points only.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	43.0	49.0	56.2	61.0	62.8	73.5	85.6	82.2	72.4	71.4	57.5	46.4	63.4
1934	46.0	54.4	63.8	67.6	71.3	73.2	81.8	81.0	76.6	66.0	55.5	47.5	65.4
1935	46.8	50.8	51.2	60.6	67.5	78.2	80.2	82.2	76.4	63.2	51.8	49.5	63.2
1936	50.5	51.6	58.1	63.6	70.7	76.5	84.8	83.1	76.4	67.6	56.4	45.8	65.4
1937	40.7	51.0	56.3	60.2	70.6	75.6	83.4	82.3	75.2	67.9	57.0	50.8	64.2
1938	46.6	52.4	52.4	60.8	69.4	77.6	82.4	80.0	76.8	64.6	53.6	49.4	63.8
#1939	47.0	47.7	56.2	66.4	69.4	76.5	81.8	81.0	75.9	63.3	55.7	49.9	64.2
1940	48.8	52.8	57.6	63.1	72.2	80.4	80.4	80.2	71.3	65.1	51.8	51.0	64.6
1941	49.8	53.6	57.2	58.8	69.8	73.8	82.4	76.8	70.5	61.0	55.0	49.0	63.1
1942	47.3	49.0	54.4	59.8	65.4	75.8	83.4	80.4	72.4	65.4	52.6	45.9	62.6
1943	45.6	51.6	56.4	62.1	70.4	71.6	81.0	77.2	75.8	64.4	54.0	47.8	63.2
1944	46.8	48.6	54.8	58.2	69.6	72.0	80.0	78.8	75.2	66.4	51.4	47.4	62.4
1945	43.6	50.8	50.5	61.0	66.8	76.0	84.2	79.4	75.5	66.7	53.4	47.6	63.0
1946	44.4	49.3	54.8	64.4	68.5	74.6	82.0	81.1	74.7	61.6	50.6	45.6	62.6
1947	41.0	52.4	59.0	64.7	73.0	76.4	79.0	77.6	77.0	65.2	50.6	45.2	63.4
1948	51.2	49.0	53.2	59.8	65.2	75.8	80.2	78.8	73.8	65.0	52.9	44.4	62.4
#1949	39.6	47.2	54.4	65.6	68.6	78.5	81.2	76.8	75.2	62.6	57.4	44.1	62.6
1950	42.7	51.5	53.4	62.9	68.4	72.8	82.4	79.3	72.2	65.9	58.2	51.0	63.4
1951	45.6	49.9	53.6	61.0	68.3	74.2	79.2	77.9	75.0	63.1	55.5	44.8	62.4
1952	45.2	49.9	50.1	60.9	69.6	69.1	81.7	79.1	75.5	68.2	52.6	46.9	62.4
1953	50.5	48.4	53.3	59.4	61.7	69.3	82.5	75.5	75.5	63.3	54.3	45.7	61.7
1954	46.7	49.6	51.8	63.9	69.7	71.7	81.4	74.5	71.2	63.7	52.4	43.8	61.7
1955	41.6	47.1	53.9	54.8	65.6	72.3	76.2	80.2	74.6	65.0	50.6	50.1	61.0
1956	48.2	45.5	53.8	59.6	66.9	74.3	79.7	76.0	74.4	61.5	53.2	44.5	61.4
1957	42.5	53.3	54.9	60.5	65.1	77.1	80.2	76.4	74.2	62.5	51.9	45.3	62.0
1958	46.4	53.8	51.8	59.1	69.9	72.7	79.5	83.3	75.0	69.2	54.4	49.6	63.7
1959	49.0	49.7	57.7	65.6	64.9	76.4	83.2	77.8	71.9	66.5	55.0	46.4	63.7
1960	46.9	49.5	56.8	60.1	66.1	80.0	82.9	78.5	75.2	63.1	51.6	43.7	62.9
#1961	42.4	51.5	53.4	61.4	63.9	78.8	82.5	81.1	72.4	64.3	51.9	43.8	62.3
1962	41.4	48.3	52.1	64.8	65.0	75.9	80.9	78.8	74.7	64.0	55.2	47.4	62.4
#1963	42.2	56.4	53.3	55.9	67.6	73.2	78.5	78.2	76.6	65.4	52.1	40.0	61.6
1964	43.8	47.4	51.3	58.8	64.9	73.3	81.0	78.9	71.0	68.3	51.2	49.0	61.6
1965	46.3	49.6	55.5	60.8	67.5	71.4	78.9	78.8	68.6	65.8	54.7	42.0	61.6
1966	43.4	47.2	56.3	65.5	70.9	76.3	78.2	81.0	72.8	64.8	56.9	45.2	63.2
1967	46.1	48.9	54.4	52.6	68.8	74.3	83.8	83.6	77.4	66.0	56.8	42.6	62.9
1968	44.8	55.8	55.8	61.5	68.1	78.0	82.4	77.2	73.7	63.3	51.9	43.3	63.0
1969	44.8	47.5	53.1	59.7	70.4	72.9	80.9	79.7	75.7	59.7	53.1	46.2	62.0
1970	49.1	52.7	55.3	57.0	70.8	76.5	83.3	79.9	73.0	63.4	55.4	46.3	63.5
1971	45.7	47.6	54.4	59.1	64.2	74.4	81.9	81.1	73.4	60.9	50.7	42.9	61.4
1972	40.6	52.5	60.7	61.1	69.9	77.5	81.5	79.7	71.8	62.6	50.2	40.9	62.4
RECORD MEAN	45.8	51.0	55.1	60.9	67.6	75.2	81.7	79.9	73.8	64.7	54.3	46.3	63.0
MAX	54.3	61.2	66.6	74.2	82.1	91.0	98.8	96.9	89.7	78.9	66.2	54.8	76.2
MIN	37.3	40.8	43.6	47.6	53.0	59.3	64.6	62.9	57.8	50.4	42.4	37.8	49.8

TOTAL DEGREE DAYS

FRESNO, CALIFORNIA

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0	0	0	16	224	579	593	298	57	31	9	7	1814
1934-35	0	0	17	70	286	541	560	395	432	161	40	0	2502
1935-36	0	0	0	117	395	481	450	384	213	98	18	5	2161
1936-37	0	0	0	40	254	592	753	396	273	160	14	0	2482
1937-38	0	0	0	20	241	439	573	352	394	154	44	0	2217
#1938-39	0	0	0	67	337	485	557	484	273	56	27	6	2292
1939-40	0	0	1	104	276	469	500	355	227	101	10	0	2043
1940-41	0	0	4	81	397	431	469	318	242	195	9	1	2147
1941-42	0	0	5	150	301	495	550	450	326	163	76	0	2516
1942-43	0	0	0	74	374	594	606	376	267	107	21	6	2425
1943-44	0	0	0	106	329	536	562	475	314	216	26	9	2573
1944-45	0	0	1	19	407	543	666	396	447	187	24	0	2690
1945-46	0	0	4	38	345	538	640	440	312	100	16	0	2433
1946-47	0	0	0	141	430	602	745	353	192	82	4	0	2549
1947-48	0	0	2	64	435	612	428	463	370	173	67	0	2614
1948-49	0	0	18	64	364	637	785	499	327	39	22	0	2755
#1949-50	0	0	1	142	236	645	686	370	354	104	72	9	2619
1950-51	0	0	10	41	211	428	598	416	348	146	56	2	2256
1951-52	0	0	0	89	278	620	606	432	454	139	24	9	2651
1952-53	0	0	16	18	366	554	441	459	355	185	127	22	2543
1953-54	0	0	0	107	312	587	560	422	401	98	15	21	2523
1954-55	0	0	0	82	372	650	716	495	337	300	87	5	3044
1955-56	0	0	1	53	426	455	517	558	340	183	49	4	2586
1956-57	0	0	0	135	347	627	692	321	308	156	64	0	2650
1957-58	0	0	0	79	386	604	568	309	402	183	18	1	2550
1958-59	0	0	2	21	313	470	488	422	218	38	59	0	2031
1959-60	0	0	6	54	292	571	556	443	255	161	54	0	2392
1960-61	0	0	0	96	394	656	694	369	352	138	57	1	2757
#1961-62	0	0	0	126	382	654	724	461	392	66	65	6	2876
1962-63	0	0	0	69	291	538	698	234	356	266	30	0	2482
#1963-64	0	0	2	56	382	767	651	502	417	201	92	12	3082
1964-65	0	3	3	41	410	492	572	423	287	191	58	8	2488
1965-66	0	0	12	41	302	707	664	492	271	60	7	1	2557
1966-67	0	0	1	65	238	606	579	444	322	366	59	11	2691
1967-68	0	0	0	29	239	686	619	258	278	139	37	2	2287
1968-69	0	0	12	73	387	665	619	480	366	168	30	0	2800
1969-70	0	0	0	166	349	574	485	340	291	232	25	0	2462
1970-71	0	0	0	108	282	573	593	480	322	181	81	8	2628
1971-72	0	0	20	209	423	678	750	357	142	128	37	0	2744
1972-73	0	0	2	108	437	740							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	2.18	0.45	1.38	0.12	0.34	0.07	T	T	0.00	0.53	0.00	1.59	6.66
1934	0.43	1.80	T	T	0.03	0.05	0.00	0.00	0.01	1.74	2.22	1.89	8.17
1935	3.64	2.07	2.36	2.77	T	0.00	T	T	0.02	1.17	0.80	1.16	13.99
1936	0.68	4.70	1.36	0.54	0.04	0.01	T	T	0.00	2.55	T	3.11	12.99
1937	1.97	2.46	2.32	0.33	0.00	T	T	0.00	T	0.11	0.05	3.00	10.24
1938	2.14	3.98	5.19	1.32	0.01	0.05	T	0.00	0.13	0.69	0.10	1.47	15.08
#1939	1.99	0.77	1.88	0.37	0.02	1.66	0.00	T	0.17	0.99	0.04	0.11	8.00
1940	5.89	3.22	0.92	0.16	T	T	0.00	0.00	0.00	0.55	0.05	5.24	16.03
1941	1.56	5.04	1.86	2.61	T	0.12	0.00	0.07	0.00	0.76	0.56	4.16	16.74
1942	1.34	0.67	1.09	1.32	0.27	0.00	T	T	0.00	T	0.84	1.44	6.97
1943	1.48	0.85	3.21	0.90	0.00	T	0.00	0.00	0.00	0.06	0.23	1.48	8.21
1944	0.95	2.60	0.17	1.13	0.29	0.02	0.00	0.00	0.01	0.89	1.37	1.45	8.88
1945	0.92	2.31	2.25	0.12	0.04	0.24	T	T	T	1.04	1.45	1.11	9.48
1946	0.28	1.40	2.01	0.03	1.02	0.00	0.02	0.00	0.14	0.73	1.94	1.95	9.52
1947	0.20	0.60	0.46	0.41	0.20	0.02	T	T	T	0.81	0.43	0.42	3.55
1948	T	0.77	2.28	2.28	0.96	0.01	0.00	0.00	0.00	0.08	0.02	1.23	7.63
#1949	0.60	0.73	3.60	0.01	0.39	T	T	T	0.00	T	0.46	0.78	6.57
1950	3.01	1.84	1.84	0.82	0.05	0.00	0.02	T	0.13	1.19	1.85	1.60	12.35
1951	1.94	1.60	0.31	1.58	0.02	0.06	0.00	0.00	0.00	0.33	1.03	2.82	9.69
1952	3.59	0.53	3.57	2.07	T	0.01	T	0.00	0.09	0.02	1.61	4.05	15.54
1953	1.49	0.09	0.59	0.96	0.48	0.32	T	T	0.00	0.18	1.51	0.51	6.13
1954	1.80	1.13	2.90	0.48	0.09	0.29	T	0.00	0.00	0.00	1.32	1.82	9.83
1955	3.51	1.46	0.07	1.47	0.63	0.00	T	T	0.00	T	1.34	6.73	15.21
1956	2.41	0.65	0.08	1.38	0.81	0.00	T	0.00	T	1.00	0.00	0.31	6.64
1957	1.75	1.51	0.53	1.38	1.56	0.16	T	0.00	0.19	0.43	1.02	1.90	10.43
1958	2.03	4.11	5.79	2.71	0.79	0.02	0.02	0.01	0.46	T	0.21	0.32	16.47
1959	1.47	3.66	0.09	0.54	0.09	0.00	0.00	0.01	0.92	0.00	0.00	0.43	7.21
1960	2.08	2.37	0.67	1.50	0.02	0.00	T	0.00	0.02	0.09	2.75	0.07	9.57
#1961	1.52	0.40	1.04	0.57	0.40	0.01	T	0.10	T	T	1.60	1.32	6.96
1962	1.12	5.97	1.04	0.02	0.20	T	T	0.00	T	0.73	0.03	0.48	9.59
1963	2.16	2.01	2.10	3.66	0.39	0.03	0.00	0.01	0.15	0.95	2.54	0.27	14.27
1964	0.66	T	1.27	0.50	0.35	0.06	T	0.25	0.00	1.23	1.49	2.63	8.44
1965	1.05	0.43	2.38	1.74	T	T	T	0.02	0.00	0.30	2.69	1.73	10.34
1966	0.53	0.54	0.01	0.15	0.10	0.07	0.03	0.00	0.03	0.00	1.57	3.04	6.07
1967	2.21	0.22	3.15	4.41	0.19	0.14	T	T	T	0.07	1.55	1.04	12.98
1968	1.05	1.10	1.49	0.70	0.24	0.00	T	T	0.00	1.54	1.94	2.44	10.50
1969	8.56	5.60	1.16	1.64	0.06	0.04	0.04	0.00	0.04	0.06	0.80	1.14	19.14
1970	3.83	1.27	1.65	0.21	0.00	0.08	T	0.00	0.00	0.01	2.30	2.51	11.86
1971	0.40	0.29	0.58	1.04	1.40	0.00	T	T	0.04	0.03	0.65	2.56	6.99
1972	0.37	0.67	0.00	0.27	0.15	0.60	T	0.00	0.29	0.22	3.50	1.40	7.47
RECORD MEAN	1.78	1.56	1.57	0.99	0.37	0.10	0.01	0.01	0.14	0.52	1.00	1.60	9.65

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1888 for temperature and 1878 for precipitation.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table. Data are from City Office locations through June 1939.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above: Sea level	Elevation above: Ground								Elevation above: Sea level	Remarks
						Ground at temperature site	Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	
COOPERATIVE																
#	1-1878	8/16/87		36° 44'	119° 47'	287							?			# - Precipitation record only by Southern Pacific RR Co.
CITY																
Taylor Blk., 1042 J St. (Later Fulton Street)	8/16/87	10/14/87		36° 44'	119° 47'	287	46	36	36				36			
Taylor Blk., 1042 J St. (Later Fulton Street)	10/15/87	1/30/89	No change	36° 44'	119° 47'	287	46	47	46				35			New instruments received.
Hughes Bldg., 1011 I St. (Later Broadway)	1/31/89	9/30/90	420 ft. SW	36° 44'	119° 47'	287	*64	68	67				55			* Exposure of wind instruments poor due to taller buildings nearby 8/16/87 to 9/30/90.
Fresno Loan & Savings Bank Building, 1052 J Street (Later Fulton)	10/01/90	1/25/95	435 ft. NE	36° 44'	119° 47'	287	77	79	78				65			
Farmer's National Bank Building, 1056 I Street (Later Broadway)	1/26/95	4/26/07	380 ft. SW	36° 44'	119° 47'	287	70	68	67		a54		54			a - Added 8/28/97.
Farmer's National Bank Building, 1056 I Street (Later Broadway)	4/27/07	4/30/13	No change	36° 44'	119° 47'	287	65	63	62		54		54			
Rowell Bldg., SE corner Tulare & Van Ness Ave.	5/01/13	8/31/33	700 ft.ENE	36° 44'	119° 47'	287	#98	89	89		82		82		x369	# - High buildings NW and SW reduced wind movement beginning in 1924. x - Added 10/6/28.
Brix Building 1221 Fulton Street	9/01/33	7/01/39	700 ft.WNW	36° 44'	119° 48'	287	105	97	97		89		89		377	
AIRPORT																
Maddux Field, Highway 99 and Barstow Avenue	7/01/29	3/14/30		36° 49'	119° 53'	302	37	?	3				?			
WBO Building Chandler Field Kearney Blvd. and Fruit Avenue	3/14/30	3/31/35	7 mi. SE	36° 44'	119° 49'	277	33	?	18				?			Airport Station closed.
Administration Annex Chandler Field Kearney Blvd. and Fruit Avenue	3/01/39	6/30/39	1.5 mi.WSW	36° 44'	119° 49'	277	35	6	5				3			Airport Station reopened.
Administration Annex Chandler Field Kearney Blvd. and Fruit Avenue	7/01/39	8/20/49	No change	36° 44'	119° 49'	277	34	6	5		5		5		296	Offices consolidated at Airport. Changed wind instruments.
Fresno Air Terminal SW corner Shields and Clovis Avenue	8/20/49	9/1/61	7 mi. ENE	36° 47'	119° 42'	331	42	6	6		3		3		362	
Fresno Air Terminal	9/01/61	Present	0.9 mi. W	36° 46'	119° 43'	d328	20	5	5		5		b5	c4	336	b - 3 feet to 9/14/62. c - Commissioned 4800 feet ESE of thermometer site 11/13/63 and moved 750 feet WNW 5/24/64. d - 326 feet to 11/13/63.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

Sale Price: 15 cents per copy. Checks and money orders should be made payable to Department of Commerce, NOAA. Remittances and correspondence regarding this publication should be sent to: National Climatic Center, Federal Building, Asheville, N. C. 28801. Attn: Publications.

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LOCAL CLIMATOLOGICAL DATA
ANNUAL SUMMARY WITH COMPARATIVE DATA

GRAND JUNCTION, COLORADO

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

Located in a large mountain valley, the junction of the Colorado and Gunnison rivers, on the west slope of the Rockies, Grand Junction has a climate marked by the wide seasonal range usual to interior localities at this latitude. Thanks, however, to the protective topography of the vicinity, sudden and severe weather changes are very infrequent. Elevation of the valley floor ranges from 4,400 to 4,800 feet above sea level, with mountains on all sides at distances of from 10 to 60 miles, reaching heights of 9,000 to over 12,000 feet.

This mountain valley location, with attendant "valley breezes" provides protection from spring and fall frosts, resulting in a growing season averaging 191 days in the city of Grand Junction. This value varies considerably in the outlying districts, is about the same in the upper valley around Palisade, and 3 to 4 weeks shorter near the river west of Grand Junction, where the "valley breeze" is less effective. Farming areas located on mesas also enjoy longer frost-free seasons than adjacent lower lying ground where cool air tends to collect at night; this effect is more noticeable in the west, or lower portion of the valley. The growing season is sufficiently long to permit growth commercially of almost all fruits except citrus varieties. Peaches are the leading fruit, with apricots, pears, cherries and apples important. A wide variety of vegetables, grain, feed crops and an important acreage of sugar beets are grown. Tomatoes are usually the leading vegetable. Summer grazing of cattle and sheep on nearby mountain ranges is extensive, foundation herds are wintered in the valley and there is some winter feeding of fat cattle and sheep.

The interior, continental location, ringed by mountains on all sides, results in quite low precipitation in all seasons. Consequently, agriculture is dependent on irrigation, for which an adequate supply of water has been available from mountain snows and rains. Summer rains occur chiefly as scattered light showers from thunderstorms which develop over nearby mountains. Winter snows are fairly frequent, but mostly light and quickly melt off. Even the infrequent snows of from 4 to 8 inches, which are heavy for this locality, seldom remain on the ground for prolonged periods. Blizzard conditions in the valley are extremely rare.

Temperatures at Grand Junction have ranged from 105° to -23°, but readings of 100° or higher are infrequent, and about one third of the winters have no readings below zero. Summer days with maximum temperatures in the middle and low 90's and minima in the low 60's are common. Relative humidity is very low during the summer, with values close to such other dry localities as the southern parts of New Mexico and Arizona. Spells of cold winter weather are sometimes prolonged due to cold air becoming trapped in the valley. Winds are usually very light during the coldest weather. Changes in winter are generally gradual, and abrupt changes are much less frequent than in eastern Colorado. "Cold Waves" are rare. Sunny days predominate in all seasons.

Flying weather conditions are generally favorable for operation of light airplanes, with visibilities of 20 miles or more and ceilings of 5,000 feet or higher prevailing approximately 95 percent of the time. Gusty surface winds are rather frequent in the spring and early summer. The prevailing wind is from the east-southeast due to the "valley breeze" effects, but the strongest winds are usually from the south and southwest, and are associated with thunderstorms or with pre-frontal weather.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: GRAND JUNCTION, COLORADO MUNICIPAL AIRPORT Standard time used: MOUNTAIN Latitude: 39° 07' N Longitude: 108° 32' W Elevation (ground): 4843 feet Year: 1972

Month	Temperature Averages Daily maximum	Daily minimum	Monthly	Extremes Highest	Date	Lowest	Date	Degree days (Base 65°) Heating	Cooling	Precipitation Total	Greatest in 24 hrs.	Date	Snow, Ice pellets Total	Greatest in 24 hrs.	Date
JAN	41.8	18.2	30.0	58	26+	-8	4	1076	0	0.20	0.17	2-3	4.0	3.7	2-3
FEB†	51.1	22.1	36.6	64	28+	8	4+	813	0	T	† T	† 29 +	T	T	25 +
MAR	62.1	31.0	46.6	75	10	17	30	563	0	0.02	0.01	23 +	0.0	0.0	
APR	68.3	38.2	53.3	82	24	28	27+	346	0	0.11	0.03	13 +	T	T	14
MAY	78.7	47.4	63.1	90	31+	27	1	139	86	0.44	0.20	11-12	0.0	0.0	
JUN	89.5	59.1	74.3	98	30	55	24+	0	288	0.64	0.29	7-8	0.0	0.0	
JUL	96.1	64.3	80.2	104	30	59	23	0	479	0.03	0.02	9	0.0	0.0	
AUG	91.6	62.5	77.1	102	11	51	24	0	381	0.29	0.24	19	0.0	0.0	
SEP	81.7	54.4	68.1	94	5	43	30	31	130	0.72	0.60	18-19	0.0	0.0	
OCT	63.1	44.8	54.0	84	3	19	30	335	3	3.45	0.63	14-15	5.7	5.7	29-30
NOV	44.7	29.4	37.1	57	4	15	29	832	0	0.69	0.23	11-12	1.3	0.9	12
DEC	32.6	12.8	22.7	50	4+	-6	31	1303	0	0.74	0.34	4-5	9.7	3.8	4-5
YEAR	66.8	40.4	53.6	104	JUL. 30	-8	JAN. 4	5438	1367	7.33	0.63	OCT. 14-15	20.7	5.7	OCT. 29-30

Month	Relative humidity Hour 05 (Local time)	Hour 11	Hour 17	Hour 23	Wind & Resultant Direction	Resultant Speed	Average speed	Fastest mile Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Maximum ‡ 90° and above	Maximum 32° and below	Minimum 32° and below	Minimum 0° and below	** Average daily solar radiation - langleys
JAN	66	54	43	62	09	1.3	8.2	37	W	27	68	5.3	12	6	13	4	2	0	0	0	4	30	2	
FEB†	54	38	25	44	10	1.3	9.0	35	W	24	74	5.7	9	10	10	0	0	0	0	0	1	28	0	
MAR	45	28	19	31	01	0.2	10.3	38	W	23	81	5.5	8	13	10	2	0	1	0	0	0	17	0	
APR	42	24	19	34	22	2.4	12.4	36	SW	18	63	5.9	9	9	12	6	0	0	0	0	0	5	0	
MAY	39	23	17	30	14	2.7	9.6	42	SW	20	74	4.7	12	9	10	5	0	3	0	2	0	1	0	
JUN	49	26	22	36	14	1.8	9.0	41	NW	19	71	4.9	11	11	8	5	0	7	0	19	0	0	0	
JUL	35	20	15	25	15	1.9	10.0	40	NW	31+	77	4.2	14	13	4	2	0	4	0	30	0	0	0	
AUG	46	28	20	35	12	2.1	8.9	45	SW	8	71	4.4	13	12	6	4	0	5	0	19	0	0	0	
SEP	57	38	28	44	13	4.1	10.8	43	NW	19	69	4.8	10	14	6	6	0	4	0	3	0	0	0	
OCT	81	64	62	78	11	3.3	9.3	30	NE	22	40	7.5	4	8	19	20	2	6	0	0	0	3	0	
NOV	81	67	61	83	09	3.0	8.1	26	NW	27	44	7.5	5	5	20	9	0	0	3	0	0	18	0	
DEC	84	74	71	84	09	1.4	7.8	34	S	28	64	6.1	6	14	11	10	3	0	3	0	17	31	2	
YEAR	57	40	34	49	12	1.8	9.5	45	SW	AUG. 8	67	5.5	113	124	129	73	7	30	6	73	22	133	4	

† DATA CORRECTED AFTER PUBLICATION OF THE MONTHLY ISSUE.

NORMALS, MEANS, AND EXTREMES

Month	Temperature Normal Daily maximum	Normal Daily minimum	Normal Monthly	Extremes Ø Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year
(a)	(b)	(b)	(b)	9		9		(b)	(b)	26		26		26		26	26		26	
J	34.8	17.1	26.0	60	1971	-15	1971	[illegible]09	0.64	2.46	1957	T	1961	0.64	1956	7.2	33.7	1957	9.1	1957
F	41.8	23.4	32.6	64	1972+	4	1971+	907	0.69	1.56	1948	T	1972	0.53	1960	4.4	18.4	1948	8.6	1948
M	52.8	30.2	41.5	81	1971	6	1971	729	0.75	1.75	1970+	0.02	1972+	0.78	1949	4.4	14.9	1948	6.1	1948
A	64.9	39.6	52.3	85	1969	16	1971	387	0.75	1.95	1965	0.06	1958	1.33	1965	0.7	5.5	1955	5.5	1955
M	75.4	49.0	62.2	94	1969+	26	1970	146	0.60	1.79	1957	T	1970	0.64	1961	T	T	1971+	T	1971+
J	85.9	56.7	71.3	103	1971+	38	1968	21	0.42	2.07	1969	T	1961	1.57	1969	0.0	0.0		0.0	
J	92.5	63.8	78.2	105	1971	48	1968	0	0.57	1.03	1967	0.03	1972+	0.73	1963	0.0	0.0		0.0	
A	89.0	62.0	75.5	103	1969	43	1968	0	1.07	3.48	1957	0.04	1956	1.21	1953	0.0	0.0		0.0	
S	81.1	54.4	67.8	95	1967	30	1971	30	0.91	2.52	1965	T	1953	1.35	1965	0.1	3.1	1965	3.1	1965
O	67.4	42.6	55.0	88	1963	19	1972	313	0.74	3.45	1972	0.00	1952	1.24	1957	0.5	5.7	1972	5.7	1972
N	49.5	28.0	38.8	71	1965	14	1968+	786	0.58	1.69	1954	0.15	1949	0.78	1954+	3.0	12.1	1964	8.4	1954
D	38.1	20.0	29.1	61	1965	-9	1968	1113	0.57	1.89	1951	0.11	1958	1.16	1951	5.7	16.7	1967	6.0	1967
YR	64.4	40.6	52.5	105	JUL. 1971	-15	JAN. 1971	5641	8.29	3.48	AUG. 1957	0.00	OCT. 1952	1.57	JUN. 1969	26.0	33.7	JAN. 1957	9.1	JAN. 1957

Month	Relative humidity Hour 05 (Local time)	Hour 11	Hour 17	Hour 23	Wind & Mean speed	Prevailing direction	Fastest mile Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Max. ‡ 90° and above	Max. 32° and below	Min. 32° and below	Min. 0° and below	** Average daily solar radiation - langleys
(a)	9	9	9	9	26	15	26	26		26	26	26	26	26	26	26	26	26	9	9	9	9	
J	75	62	59	73	5.7	ESE	54	S	1950	59	6.1	9	8	14	7	3	*	2	0	10	30	3	
F	67	49	41	61	6.9	ESE	56	W	1967+	64	6.2	8	6	14	6	1	*	2	0	1	26	0	
M	56	37	29	46	8.4	ESE	65	S	1954	65	5.9	9	9	13	7	1	1	1	0	*	21	0	
A	52	32	25	43	9.8	ESE	59	W	1955	67	5.8	8	10	12	6	*	2	*	0	0	8	0	
M	47	27	21	36	9.8	ESE	65	NW	1966	71	5.4	10	11	10	6	0	4	*	2	0	1	0	
J	47	26	21	35	10.0	ESE	66	S	1951	78	4.0	15	9	6	4	0	5	0	11	0	0	0	
J	47	28	21	35	9.4	ESE	56	SE	1955	77	4.2	14	12	5	5	0	8	0	27	0	0	0	
A	52	32	23	40	9.0	ESE	56	W	1957+	74	4.4	14	11	6	7	0	8	0	20	0	0	0	
S	53	34	26	42	9.3	ESE	61	S	1947	79	3.5	17	8	5	6	*	5	0	3	0	*	0	
O	59	41	35	53	8.2	ESE	61	NW	1954	73	4.2	15	8	8	6	*	2	*	0	0	4	0	
N	69	51	47	65	6.8	ESE	54	NW	1954	63	5.3	12	7	11	5	1	*	1	0	*	20	0	
D	77	64	63	76	6.0	ESE	48	NW	1951	59	5.8	10	7	14	7	2	*	2	0	9	29	2	
YR	58	40	34	50	8.3	ESE	66	S	JUN. 1951	70	5.1	141	106	118	71	9	36	8	63	21	139	5	

Ø For period October 1963 through the current year.
Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Lowest temperature -23 in January 1963; maximum monthly precipitation 3.78 in September 1896; maximum precipitation in 24 hours 2.50 in October 1908; maximum snowfall in 24 hours 17.0 in November 1919.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

\# To 8 compass points only.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	20.2	16.5	43.4	48.0	57.4	77.2	80.9	76.4	71.2	58.7	41.4	32.6	52.0
1934	34.6	42.7	50.2	59.0	68.9	72.0	82.6	78.3	65.9	57.9	43.2	33.2	57.4
1935	34.0	37.8	42.2	51.9	59.2	74.2	80.1	76.6	68.6	54.8	38.8	30.6	54.1
1936	27.4	36.6	44.9	55.2	65.9	75.8	79.8	77.4	66.6	55.0	39.0	30.8	54.5
1937	15.0	30.1	44.0	50.8	66.2	71.0	78.6	78.0	69.4	56.4	44.0	33.4	53.1
1938	32.4	38.2	43.0	53.2	60.1	73.2	77.7	77.0	68.2	56.4	33.4	29.2	53.5
1939	27.4	22.7	42.7	55.6	65.8	72.2	80.1	77.2	67.9	53.9	44.2	35.0	53.7
1940	28.6	37.9	47.3	54.4	67.4	76.6	80.8	77.6	67.9	56.0	38.0	31.0	55.3
1941	32.0	38.5	44.2	49.2	63.5	69.2	77.4	75.4	63.4	52.6	41.0	34.9	53.4
1942	28.4	28.6	39.2	54.3	60.4	72.0	79.4	76.9	67.1	55.1	42.4	34.7	53.2
1943	32.2	38.8	42.8	60.3	61.3	70.6	79.9	75.0	69.4	56.6	41.3	33.8	55.2
1944	25.8	34.8	40.4	48.0	62.2	69.5	77.6	76.6	69.3	58.6	41.5	32.2	53.0
1945	32.0	38.8	42.1	47.8	63.6	66.6	78.5	76.2	66.0	56.2	38.6	25.5	52.7
#1946	26.1	33.6	45.6	57.6	59.9	74.4	79.9	75.8	67.7	49.6	37.9	32.7	53.4
1947	22.0	36.0	44.2	51.0	64.3	66.6	78.4	74.0	70.0	56.5	34.5	28.6	52.2
1948	25.4	30.2	35.4	52.8	63.8	69.8	77.1	74.4	69.6	54.4	32.5	28.4	51.2
1949	18.9	20.3	42.8	54.1	61.0	69.0	77.2	75.5	67.6	51.1	44.4	29.4	50.9
1950	23.1	34.3	41.3	52.6	59.1	70.8	74.9	73.7	66.2	60.7	41.6	35.4	52.8
1951	25.3	30.7	41.0	51.7	62.1	68.0	79.4	73.9	66.3	52.4	36.2	23.0	50.8
1952	26.9	31.4	36.4	53.1	62.6	73.3	77.3	74.6	68.6	57.4	35.8	28.0	52.1
1953	33.5	33.1	48.1	49.3	56.5	74.0	79.5	72.6	69.2	54.9	42.6	27.1	52.9
1954	32.7	40.7	40.0	56.6	64.4	71.1	79.9	74.5	67.1	55.0	42.6	26.1	54.3
1955	23.9	21.5	38.5	48.9	60.4	69.6	79.4	76.0	69.9	55.9	35.1	35.8	51.2
1956	36.7	30.9	42.3	52.4	64.5	75.4	77.1	73.5	70.6	56.3	34.3	24.9	53.3
1957	25.0	31.0	48.2	48.9	56.8	69.9	76.1	72.9	65.2	54.3	36.3	31.5	50.9
1958	29.8	39.9	40.2	49.2	65.6	75.5	78.0	78.6	67.2	55.8	40.6	35.6	54.7
1959	29.4	35.7	41.3	52.6	62.9	75.7	79.5	75.3	64.6	52.4	38.1	32.2	53.3
1960	26.6	29.4	42.4	53.1	61.4	74.6	79.5	76.6	69.2	54.0	41.5	30.0	53.2
1961	29.4	37.1	42.4	50.3	63.0	76.2	78.4	76.2	58.9	52.9	37.9	23.1	52.2
1962	22.9	37.9	38.4	55.5	61.7	71.3	76.9	75.9	67.4	56.6	44.1	29.3	53.2
#1963	12.1	38.6	41.9	51.1	66.3	71.4	79.8	73.6	69.8	61.3	44.0	27.1	53.1
1964	25.5	29.5	37.0	50.3	62.3	70.2	81.3	74.1	66.6	58.0	38.1	30.4	51.9
1965	32.3	32.9	40.4	53.9	62.4	70.3	78.9	76.6	63.4	58.1	48.3	33.8	54.3
1966	24.5	30.6	46.1	53.6	65.4	72.0	80.9	77.0	69.1	56.5	43.9	29.5	54.1
1967	23.9	36.4	48.5	51.6	59.5	68.6	77.7	76.2	67.5	55.3	41.0	18.3	52.0
1968	15.4	37.0	43.8	46.3	59.1	72.8	78.0	70.3	64.2	53.8	38.0	22.7	50.1
1969	28.5	33.6	38.1	53.8	66.4	67.7	80.3	79.5	69.3	47.4	39.2	32.7	53.1
1970	29.3	40.9	39.8	45.9	63.3	71.4	79.1	78.7	64.1	48.8	41.0	31.9	52.9
1971	27.7	34.1	41.1	52.2	60.1	74.1	80.2	78.5	63.2	52.3	38.4	25.9	52.3
1972	30.0	36.6	46.6	53.3	63.1	74.3	80.2	77.1	68.1	54.0	37.1	22.7	53.6
RECORD MEAN	26.0	33.5	42.7	52.3	61.9	71.8	78.3	75.6	66.8	54.2	39.9	28.5	52.7
MAX	36.5	44.1	54.4	65.1	75.3	86.3	92.3	89.0	80.4	67.1	51.4	38.7	65.1
MIN	15.5	22.9	30.9	39.5	48.4	57.3	64.3	62.1	53.2	41.2	28.4	18.3	40.2

TOTAL DEGREE DAYS

GRAND JUNCTION, COLORADO

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0	0	0	202	706	1003	944	624	458	208	49	13	4207
1934-35	0	0	80	230	655	986	961	761	704	394	202	7	4980
1935-36	0	0	52	328	785	1064	1166	822	624	296	76	36	5249
1936-37	4	0	71	312	779	1062	1548	976	648	428	48	42	5918
1937-38	0	0	43	271	630	980	1010	749	682	361	198	2	4926
1938-39	0	0	12	281	950	1109	1166	1184	691	285	51	18	5747
1939-40	0	0	26	345	624	932	1130	786	548	323	26	3	4743
1940-41	0	0	39	277	812	1054	1022	742	647	476	102	50	5221
1941-42	0	0	123	388	725	935	1134	1021	801	322	187	5	5641
1942-43	0	0	39	38	679	940	1014	734	690	165	170	50	4519
1943-44	0	5	2	268	710	967	1215	871	768	509	128	31	5474
1944-45	0	0	6	207	707	1016	1024	734	708	513	86	61	5062
#1945-46	0	0	91	279	791	1226	1204	881	599	230	179	7	5487
1946-47	0	0	62	477	810	1003	1327	815	646	425	79	73	5717
1947-48	0	0	27	287	915	1129	1227	1011	911	364	118	30	6019
1948-49	0	0	18	337	973	1135	1428	1252	687	331	140	41	6342
1949-50	0	0	31	433	620	1101	1291	854	728	365	196	32	5651
1950-51	0	0	69	129	695	913	1220	954	739	391	151	49	5310
1951-52	0	0	36	383	860	1293	1171	968	878	349	109	4	6051
1952-53	0	0	14	231	867	1142	970	887	674	466	276	7	5534
1953-54	0	0	2	316	667	1166	994	674	766	248	97	40	4970
1954-55	0	0	35	314	669	1195	1265	1213	816	475	163	42	6187
1955-56	0	0	33	279	888	900	870	982	695	372	71	0	5090
1956-57	0	0	8	281	914	1235	1236	948	670	478	252	45	6067
1957-58	0	11	55	340	854	1032	1084	693	761	468	84	0	5382
1958-59	0	0	62	278	726	904	1096	814	728	369	104	0	5081
1959-60	0	0	138	386	801	1007	1183	1026	697	359	156	0	5753
1960-61	0	4	17	338	696	1077	1099	774	696	434	127	2	5264
1961-62	0	0	196	367	809	1290	1295	752	819	286	148	18	5980
1962-63	0	0	39	255	620	1099	1633	733	708	411	32	3	5533
#1963-64	0	2	4	145	624	1166	1220	1022	861	437	168	18	5667
1964-65	0	2	39	219	800	1067	1004	893	758	334	158	8	5282
1965-66	0	0	138	209	496	960	1246	959	582	337	59	4	4990
1966-67	0	2	16	256	628	1092	1268	795	508	396	213	21	5195
1967-68	0	0	28	320	714	1442	1532	805	648	552	218	24	6283
1968-69	0	12	86	346	804	1302	1125	874	826	332	52	34	5793
1969-70	0	0	20	545	764	995	1100	671	772	564	115	39	5585
1970-71	0	0	93	495	714	1019	1152	858	734	378	182	4	5629
1971-72	0	0	134	389	792	1204	1076	813	563	346	139	0	5456
1972-73	0	0	31	335	832	1303							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	0.54	0.27	0.31	0.32	0.54	0.25	1.50	0.43	1.04	0.32	0.66	0.34	6.52
1934	0.41	1.36	0.09	0.55	1.48	0.09	0.30	1.45	0.72	0.02	1.04	0.58	8.10
1935	0.77	0.46	0.60	1.25	0.77	0.09	0.10	1.15	0.82	0.13	0.44	0.82	7.40
1936	0.22	1.02	0.57	0.45	0.24	0.74	1.60	1.13	0.72	0.52	0.21	0.57	7.99
1937	0.78	0.66	0.67	0.22	0.30	0.14	0.94	1.00	0.93	0.94	0.42	1.63	8.63
1938	0.58	0.31	1.10	0.74	0.81	0.98	0.14	0.69	2.41	0.30	0.07	1.12	9.25
1939	0.95	0.83	1.04	0.05	0.34	0.11	0.34	0.68	2.37	0.44	0.30	0.13	7.58
1940	1.43	1.04	0.88	0.98	T	0.07	0.64	0.28	2.35	1.41	0.83	1.07	10.98
1941	0.77	0.93	1.70	1.31	1.03	0.78	0.35	1.51	2.90	2.73	0.26	0.49	14.76
1942	0.19	1.17	0.56	1.26	0.15	0.01	1.15	0.84	0.41	0.32	0.13	0.08	6.48
1943	0.15	0.42	1.52	0.20	1.04	0.77	0.09	1.98	0.31	0.46	0.29	0.26	7.50
1944	0.27	0.61	0.88	1.67	0.59	0.59	0.75	0.10	T	0.50	0.98	0.24	7.18
1945	0.26	0.53	0.64	1.25	0.45	1.32	0.40	1.63	3.10	0.71	0.24	0.53	8.06
#1946	0.23	0.33	0.29	0.81	1.25	0.07	0.35	1.68	0.12	0.82	1.46	0.80	8.21
1947	0.40	0.11	0.60	0.59	0.41	1.38	0.09	1.27	0.26	1.98	0.69	0.49	8.27
1948	0.50	1.56	1.54	0.48	0.22	0.64	0.86	1.78	0.46	0.57	0.70	0.70	10.01
1949	1.33	0.40	1.75	0.74	0.74	0.52	0.91	0.32	1.72	0.72	0.15	0.31	9.62
1950	1.40	0.47	0.42	0.54	0.46	0.01	1.00	0.21	1.05	T	0.32	0.30	6.18
1951	0.78	0.83	0.25	0.56	0.64	0.28	0.19	1.16	0.32	1.27	0.25	1.89	8.42
1952	0.48	0.38	0.70	0.57	0.44	0.26	0.26	1.25	0.39	0.00	0.52	0.56	5.81
1953	0.53	0.16	1.20	0.71	0.42	0.17	0.19	2.81	T	1.48	1.22	0.34	9.23
1954	0.35	0.27	0.87	0.52	0.54	0.39	0.40	0.39	2.51	0.83	1.69	0.36	9.32
1955	0.61	1.05	0.17	1.13	1.30	0.24	0.48	0.85	0.38	0.02	0.34	0.18	6.75
1956	1.07	0.70	0.07	0.24	0.26	0.30	0.53	0.04	0.01	0.54	0.18	0.47	4.41
1957	2.46	0.63	0.73	1.51	1.79	0.61	0.57	3.48	0.09	2.24	1.15	0.43	15.69
1958	0.55	0.70	0.84	0.06	0.34	0.76	0.06	0.70	1.34	0.33	0.52	0.11	6.31
1959	0.36	0.90	0.10	0.45	0.39	0.09	0.08	0.98	0.82	0.66	0.50	0.88	6.21
1960	0.33	1.26	1.06	0.74	0.35	0.17	0.13	0.47	0.65	0.49	0.39	0.20	6.24
1961	T	0.18	1.47	0.85	1.11	T	0.03	1.63	2.22	0.70	0.66	0.63	9.48
1962	0.39	1.09	0.28	0.97	0.17	0.30	0.08	0.15	1.41	0.46	0.36	0.36	6.02
1963	0.99	0.47	0.55	0.12	0.01	0.61	0.93	1.75	0.48	0.60	0.36	0.45	7.32
1964	0.47	0.02	0.70	1.37	0.41	0.16	0.65	1.16	0.36	T	1.05	0.53	6.88
1965	0.66	0.94	0.87	1.95	1.35	1.33	0.89	0.67	2.52	1.40	0.82	0.76	14.16
1966	0.65	0.44	0.04	0.83	0.71	0.13	0.31	0.52	0.26	1.23	0.62	1.78	7.52
1967	0.25	0.22	0.18	0.08	1.52	1.34	1.03	0.59	0.37	0.63	0.33	1.14	7.68
1968	0.26	1.13	0.44	0.67	1.14	0.05	0.49	1.37	0.48	0.94	0.42	0.47	7.45
1969	1.03	0.40	0.67	0.33	0.45	2.07	0.21	0.88	1.45	2.01	0.45	0.36	10.31
1970	0.52	0.05	1.75	0.76	T	0.91	0.60	0.44	0.78	1.56	0.54	0.39	8.30
1971	0.19	0.13	0.02	0.42	1.10	0.03	0.15	1.02	0.58	1.13	0.56	0.67	6.00
1972	0.20	T	0.02	0.11	0.44	0.64	0.03	0.29	0.72	3.45	0.69	0.74	7.33
RECORD MEAN	0.59	0.59	0.75	0.74	0.72	0.44	0.59	1.07	0.92	0.92	0.59	0.59	8.51

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0.0	0.0	0.0	0.0	1.8	1.6	2.5	0.3	0.0	2.5	0.0	0.0	8.7
1934-35	0.0	0.0	0.0	0.0	3.0	0.4	1.3	3.2	3.4	T	0.0	0.0	11.3
1935-36	0.0	0.0	0.0	0.8	4.2	5.2	2.2	3.0	3.9	T	0.0	0.0	19.3
1936-37	0.0	0.0	0.0	0.0	0.8	2.8	8.4	3.7	2.5	T	0.0	0.0	18.2
1937-38	0.0	0.0	0.0	0.0	T	5.9	4.0	0.1	1.4	0.6	0.0	0.0	12.0
1938-39	0.0	0.0	0.0	0.0	T	9.2	6.6	9.3	3.2	0.0	0.0	0.0	28.3
1939-40	0.0	0.0	0.0	0.0	0.0	1.4	7.7	3.5	2.1	0.0	0.0	0.0	14.7
1940-41	0.0	0.0	0.0	0.0	3.8	8.4	7.2	T	0.9	0.9	0.0	0.0	21.2
1941-42	0.0	0.0	0.0	0.0	2.2	3.2	2.0	8.4	3.7	0.0	T	0.0	19.5
1942-43	0.0	0.0	0.0	0.0	T	0.2	0.8	1.4	6.6	T	T	0.0	9.0
1943-44	0.0	0.0	0.0	T	T	3.3	3.0	4.3	6.9	T	T	0.0	17.5
1944-45	0.0	0.0	0.0	0.0	T	0.9	2.6	0.2	0.8	6.6	T	0.0	11.1
#1945-46	0.0	0.0	0.0	0.0	1.4	3.5	3.9	3.5	T	0.0	0.2	0.0	12.5
1946-47	0.0	0.0	0.0	0.0	2.5	4.1	5.2	1.0	1.3	T	0.0	0.0	14.1
1947-48	0.0	0.0	0.0	0.0	7.1	4.1	5.6	18.4	14.9	T	0.0	0.0	50.1
1948-49	0.0	0.0	0.0	T	7.2	9.6	18.2	5.0	11.0	T	0.0	0.0	51.0
1949-50	0.0	0.0	0.0	T	T	3.0	19.5	T	2.2	T	T	0.0	24.7
1950-51	0.0	0.0	0.0	0.0	T	2.6	10.1	10.0	1.8	0.2	T	0.0	24.7
1951-52	0.0	0.0	0.0	T	1.7	8.3	1.9	4.5	6.9	0.0	0.0	0.0	23.3
1952-53	0.0	0.0	0.0	0.0	3.8	7.2	4.2	1.4	8.7	2.6	T	0.0	27.9
1953-54	0.0	0.0	0.0	T	3.3	3.9	3.0	1.0	3.1	0.0	0.0	0.0	14.3
1954-55	0.0	0.0	0.0	0.0	8.7	1.5	4.3	14.9	2.0	5.5	T	0.0	36.9
1955-56	0.0	0.0	0.0	T	4.7	1.5	3.2	9.3	2.5	T	0.0	0.0	21.2
1956-57	0.0	0.0	0.0	1.8	2.3	6.4	33.7	0.3	2.7	1.8	0.0	0.0	49.0
1957-58	0.0	0.0	0.0	0.0	3.9	4.6	6.2	2.2	1.8	T	0.0	0.0	18.7
1958-59	0.0	0.0	0.0	0.0	3.2	1.8	4.5	5.9	0.1	T	0.0	0.0	15.5
1959-60	0.0	0.0	0.0	0.0	0.3	6.6	2.3	13.8	5.9	T	T	0.0	28.9
1960-61	0.0	0.0	0.0	0.0	2.2	1.1	T	1.2	7.8	0.6	0.0	0.0	12.9
1961-62	0.0	0.0	0.0	T	1.1	8.1	4.6	6.1	3.0	1.7	0.0	0.0	24.6
1962-63	0.0	0.0	0.0	0.0	3.3	4.9	17.7	0.2	4.3	0.2	0.0	0.0	30.6
1963-64	0.0	0.0	0.0	0.0	T	7.0	4.8	0.4	8.0	0.8	T	0.0	21.0
1964-65	0.0	0.0	0.0	0.0	12.1	3.0	5.9	7.5	3.8	0.2	T	0.0	32.5
1965-66	0.0	0.0	3.1	0.0	2.8	3.5	11.0	5.9	0.3	0.8	T	0.0	27.4
1966-67	0.0	0.0	0.0	1.9	4.2	6.3	2.8	T	0.2	0.4	T	0.0	15.8
1967-68	0.0	0.0	0.0	T	0.5	16.7	3.7	0.9	0.3	0.6	T	0.0	22.7
1968-69	0.0	0.0	0.0	0.0	0.2	7.8	3.4	3.8	9.5	T	T	0.0	24.7
1969-70	0.0	0.0	0.0	0.6	0.5	4.8	5.2	T	12.4	1.2	0.0	0.0	24.7
1970-71	0.0	0.0	0.0	3.1	T	4.1	3.2	1.5	0.2	1.1	T	0.0	13.2
1971-72	0.0	0.0	0.0	0.5	3.9	10.4	4.0	T	0.0	T	0.0	0.0	18.8
1972-73	0.0	0.0	0.0	5.7	1.3	9.7							

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1892.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table. Data are from Cooperative and City Office locations through March 16, 1946 and from Airport locations thereafter.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above Sea level: Ground at temperature site	Ground: Wind instruments	Ground: Extreme thermometers	Ground: Psychrometer	Ground: Telepsychrometer	Ground: Tipping bucket rain gage	Ground: Weighing rain gage	Ground: 8" rain gage	Ground: Hygrothermometer	Sea level: Pyranometer	Remarks
COOPERATIVE																
Home or Offices of Frank McClintock and L. F. Ingersoll	4/?/84	4/?/88		39° 04'	108° 34'	4587		?					?			Broken record during period, exact addresses and dates of service unknown.
Upstairs Office of Dr. S. M. Bradbury 520 Main Street	3/01/92	12/31/98	1 block SW	39° 04'	108° 34'	4587		?					?			Window shelter used.
CITY																
4th and Main Streets	1/01/99	1/31/14	1.5 blks.W	39° 04'	108° 34'	4587	51	43	43		37		37			
5th and Main Streets	1/31/14	3/15/18	1 block E	39° 04'	108° 34'	4587	96	82	82		74		74			
4th Street and Rood Ave Post Office	3/15/18	3/16/46	2 blks. NW	39° 04'	108° 34'	4587	68	60	60		52		52			Office closed and activities transferred to Airport Station, 5.5 miles NE, 3/16/46.
AIRPORT																
Municipal Airport (Walker Field)	11/28/45	2/28/50		39° 07'	108° 32'	4849	b24	5	5		a4	a4	3		# 4840	a - Added 3/16/46. b - 32 ft. to 12/17/46. # - Added 5/1/49.
Terminal Building Municipal Airport	2/28/50	11/03/60	325 ft. SE	39° 07'	108° 32'	4849	59	11	11			4			4848	
Terminal Building Municipal Airport	11/30/60	Present	No change	39° 07'	108° 32'	f4843	d22	c6	c6			c5		e6	g 4832	c - Moved about 500 feet SE. d - 59 feet until moved 2400 feet SE 9/30/61. e - Commissioned 9/22/63 on site 2050 feet ESE of thermometer site. f - 4825 feet to 9/22/63 and 4855 feet to 12/12/68. g - 4848 feet to 7/7/61.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

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U.S. DEPARTMENT OF COMMERCE
NATIONAL CLIMATIC CENTER
FEDERAL BUILDING
ASHEVILLE, N.C. 28801

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LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

LOS ANGELES, CALIFORNIA

CIVIC CENTER

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

The climate of Los Angeles is normally pleasant and mild through the year. The Pacific Ocean is the primary moderating influence, but coastal mountain ranges lying along the north and east sides of the Los Angeles coastal basin act as a buffer against extremes of summer heat and winter cold occurring in desert and plateau regions in the interior. A variable balance between mild sea breezes, and either hot or cold winds from the interior, results in some variety in weather conditions, but temperature and humidity are usually well within the limits of human comfort. An important, and somewhat unusual, aspect of the climate of the Los Angeles metropolitan area, is the pronounced difference in temperature, humidity, cloudiness, fog, rain, and sunshine over fairly short distances.

These differences are closely related to the distance from, and elevation above, the Pacific Ocean. Both high and low temperatures become more extreme and the average relative humidity becomes lower as one goes inland and up foothill slopes. On the coast and in the lower coastal plain, average daily temperature ranges are about 15° in summer and 20° in winter, but in foothill and inland valley communities these ranges increase to about 30° in summer and 25° in winter. Relative humidity is frequently high near the coast, but may be quite low along the foothills. During periods of high temperatures, the relative humidity is usually below normal so that discomfort is rare, except for infrequent periods when high temperatures and high humidities occur together.

Like other Pacific Coast areas, most rainfall comes during the winter with nearly 85 percent of the annual total occurring from November through March, while summers are practically rainless. As in many semiarid regions, there is a marked variability in monthly and seasonal totals. Annual precipitation may range from less than a third of the normal value to nearly three times normal, while some customarily rainy months may be either completely rainless, or receive from three to four times the average for the month. Precipitation generally increases with distance from the ocean from a yearly total of around 12 inches in coastal sections to the south of the City up to over 20 inches in foothill areas. Destructive flash floods occasionally develop in and below some mountain canyons. Snow is often visible on nearby mountains in the winter, but is extremely rare in the coastal basin. Thunderstorms are infrequent.

Prevailing winds are from the west during the spring, summer, and early autumn, with northeasterly wind predominating the remainder of the year. Average wind speeds are rather low. At times, the lack of air movement, combined with a frequent and persistent temperature inversion, is associated with concentrations of air pollution in the Los Angeles coastal basin and some adjacent areas. In fall, winter, and early spring months, occasional foehn-like descending (Santa Ana) winds come from the northeast over ridges and through passes in the coastal mountains. These Santa Ana winds may pick up considerable amounts of dust and reach speeds of 35 to 50 m.p.h. in north and east sections of the City, with higher speeds in outlying areas to the north and east, but rarely reach coastal portions of the City.

Sunshine, fog, and clouds depend a great deal on topography and distance from the ocean. Low clouds are common at night and in the morning along the coast during spring and summer, but form later and clear earlier near the foothills so that average annual cloudiness and fog frequencies are greatest near the ocean, and sunshine totals are highest on the inland side of the City. The sun shines about 75 percent of daytime hours at the Civic Center. Light fog may accompany the usual night and morning low clouds, but dense fog is more likely to occur during the night and early morning hours of the winter months.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: LOS ANGELES, CALIFORNIA CIVIC CENTER Standard time used: PACIFIC Latitude: 34° 03' N Longitude: 118° 14' W Elevation (ground) 270 feet Year: 1972

Month	Temperature Averages Daily maximum	Daily minimum	Monthly	Extremes Highest	Date	Lowest	Date	Degree days (Base 65°) Heating	Cooling	Precipitation Total	Greatest in 24 hrs.	Date	Snow, Ice pellets Total	Greatest in 24 hrs.	Date
JAN	66.3	44.6	55.5	81	15	39	9+	288	0	0.00	0.00		0.0	0.0	
FEB	70.3	50.3	60.3	81	27	44	1	132	4	0.13	0.13	5	0.0	0.0	
MAR	73.1	54.3	63.7	94	4	48	29	61	27	T	T	7	0.0	0.0	
APR	74.0	53.7	63.9	91	26	46	20	61	34	0.03	0.03	18	0.0	0.0	
MAY	76.5	58.6	67.6	97	29	51	21	35	122	0.03	0.03	19	0.0	0.0	
JUN	81.0	63.3	72.2	96	5	58	27	0	223	0.07	0.04	22	0.0	0.0	
JUL	88.7	67.2	78.0	102	27	62	3	0	409	0.00	0.00		0.0	0.0	
AUG	87.2	67.6	77.4	102	22	64	20+	0	391	0.35	0.32	12	0.0	0.0	
SEP	81.4	63.1	72.3	96	21	56	14+	0	225	0.02	0.01	5 +	0.0	0.0	
OCT	75.9	58.4	67.2	96	6+	48	31	14	89	0.29	0.27	18	0.0	0.0	
NOV	72.7	51.7	62.2	86	26	44	24	97	21	3.26	1.21	16	0.0	0.0	
DEC	68.6	47.6	58.1	85	1	35	11	230	25	2.36	1.41	4	0.0	0.0	
YEAR	76.3	56.7	66.5	102	AUG. 22+	35	DEC. 11	918	1570	6.54	1.41	DEC. 4	0.0	0.0	

Month	Relative humidity Hour 04	Hour 10	Hour 16	Hour 22 (Local time)	Wind & Resultant Direction	Resultant Speed	Average speed	Fastest mile Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Maximum 90° and above ‡	Maximum 32° and below	Minimum 32° and below	Minimum 0° and below	** Average daily solar radiation - langleys
JAN								19	SW	26		3.2	16	11	4	0	0			0	0	0	0	
FEB								15	SW	6	70	4.8	10	13	6	1	0			0	0	0	0	
MAR								17	W	28+	77	4.3	12	14	5	0	0			1	0	0	0	
APR								22	NW	13	87	3.6	18	5	7	1	0			1	0	0	0	
MAY								16	SW	28+	85	4.3	14	10	7	1	0			4	0	0	0	
JUN								15	NW	20+	80	4.6	12	11	7	3	0			1	0	0	0	
JUL								13	SW	21+	83	2.9	18	10	3	0	0			13	0	0	0	
AUG								18	SW	26	81	3.3	19	8	4	3	0			9	0	0	0	
SEP								18	SW	19	72	4.8	11	14	5	2	0			5	0	0	0	
OCT								33	N	30	57	5.4	12	8	11	2	0			2	0	0	0	
NOV								25	SW	16	68	3.4	19	3	8	5	0			0	0	0	0	
DEC								27	NW	28	77	2.8	20	5	6	4	0			0	0	0	0	
YEAR								33	N	OCT. 30		4.0	181	112	73	22	0			36	0	0	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature Normal Daily maximum	Daily minimum	Monthly	Extremes Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year
(a)	(b)	(b)	(b)	32		32		(b)	(b)	32		32		32		32	32		32	
J	65.0	46.6	55.8	95	1971	28	1949	310	3.07	14.94	1969	T	1948	6.11	1956	T	0.3	1949	0.3	1949
F	66.0	48.2	57.1	91	1971	34	1949	230	3.33	12.42	1941	T	1964	4.02	1944	T	T	1951+	T	1951+
M	68.6	50.2	59.4	94	1972	38	1971+	202	2.26	8.14	1941	0.00	1959	3.41	1943	0.0	0.0		0.0	
A	70.6	53.0	61.8	99	1966	41	1965	123	1.17	6.02	1965	0.00	1970+	2.05	1956	0.0	0.0		0.0	
M	73.5	56.0	64.8	102	1967	46	1964	68	0.16	1.43	1955	0.00	1970+	1.07	1955	0.0	0.0		0.0	
J	77.1	58.9	68.0	104	1957	50	1953+	18	0.06	0.32	1964	0.00	1971+	0.32	1964	0.0	0.0		0.0	
J	83.3	62.6	73.0	103	1959	54	1952	0	T	0.03	1969	0.00	1972+	0.03	1969	0.0	0.0		0.0	
A	83.3	62.9	73.1	103	1967	53	1943	0	0.04	0.39	1958	0.00	1971+	0.38	1958	0.0	0.0		0.0	
S	82.4	61.4	71.9	110	1955	51	1948	6	0.23	1.80	1965	0.00	1970+	1.45	1965	0.0	0.0		0.0	
O	77.3	57.4	67.4	104	1958+	41	1971	31	0.41	1.53	1941	0.00	1970+	0.62	1941	0.0	0.0		0.0	
N	73.3	52.1	62.7	100	1966	39	1964	132	1.08	9.68	1965	0.00	1956	4.07	1970	0.0	0.0		0.0	
D	67.5	48.8	58.2	89	1958	32	1951	229	2.87	6.57	1971	T	1963+	3.92	1965	T	T	1947	T	1947
YR	74.0	54.8	64.4	110	SEP. 1955	28	JAN. 1949	1349	14.68	14.94	JAN. 1969	0.00	JUL. 1972+	6.11	JAN. 1956	T	0.3	JAN. 1949	0.3	JAN. 1949

Month	Relative humidity $ Hour 04	Hour 10	Hour 16	Hour 22 (Local time)	Wind & Mean speed	Prevailing direction #	Fastest mile Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms %	Heavy fog %	Temperatures Max. 90° and above ‡	Max. 32° and below	Min. 32° and below	Min. 0° and below	** Average daily solar radiation - langleys
(a)	17	10	23	11	24	23	32	32		31	32	32	32	32	32	32	23	23	32	32	32	32	
J	63	51	50	67	6.8	NE	49	N	1946	71	4.5	14	8	9	6	0	1	2	*	0	*	0	
F	71	54	52	70	6.9	W	40	NW	1961+	72	4.7	13	6	9	5	0	1	2	*	0	0	0	
M	74	52	52	72	7.0	W	47	NW	1964	73	4.7	13	9	9	6	0	1	1	0	0	0	0	
A	78	53	54	74	6.6	W	40	NW	1955	70	4.7	12	10	8	4	0	1	1	1	0	0	0	
M	81	56	55	75	6.3	W	39	NW	1945	66	4.8	12	11	8	1	0	*	1	1	0	0	0	
J	85	59	56	78	5.7	W	32	N	1949	65	4.3	14	10	6	1	0	*	1	1	0	0	0	
J	84	54	53	79	5.4	W	21	W	1947	82	2.7	21	9	1	*	0	*	1	4	0	0	0	
A	84	56	55	79	5.3	W	24	E	1945	83	2.6	22	8	1	1	0	*	1	5	0	0	0	
S	78	52	54	76	5.3	W	27	NW	1941	79	2.9	19	8	3	1	0	*	1	8	0	0	0	
O	76	55	56	74	5.7	W	48	N	1959	73	3.8	16	9	6	2	0	*	3	3	0	0	0	
N	61	45	49	62	6.4	W	42	N	1946	74	3.8	16	8	6	4	0	1	2	1	0	0	0	
D	62	45	50	62	6.6	NE	44	SE	1943	71	4.3	15	8	8	5	0	1	2	0	0	*	0	
YR	75	53	53	72	6.2	W	49	N	JAN. 1946	73	4.0	187	104	74	34	0	6	17	20	0	*	0	

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Maximum monthly precipitation 15.80 in December 1889; maximum precipitation in 24 hours 7.36 in December 1933; maximum monthly snowfall 2.0 in January 1932; maximum snowfall in 24 hours 2.0 in January 1932.

\# To 8 compass points only.
$ Through 1963.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ [symbol] 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

% Through 1964. The station did not operate 24 hours daily. Fog and thunderstorm data may be incomplete.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	54.4	56.0	59.7	59.1	60.4	65.0	69.4	70.2	64.6	66.7	66.9	57.4	62.4
1934	60.4	59.5	65.5	64.6	67.5	65.2	72.3	71.1	72.7	67.5	62.8	60.8	65.8
1935	57.0	60.0	55.3	60.7	62.0	66.4	70.8	74.0	69.8	67.0	60.8	59.4	63.6
1936	59.4	56.5	59.0	60.6	65.6	69.0	74.1	73.4	70.5	67.4	67.8	58.6	65.2
1937	47.8	55.3	58.5	62.2	64.0	67.8	71.4	71.6	72.4	67.6	61.7	61.9	63.5
1938	61.2	56.8	57.8	61.6	63.3	65.4	69.6	73.9	74.0	66.7	62.7	62.3	64.6
1939	57.0	54.0	56.8	63.0	63.6	66.9	70.6	73.0	76.6	71.6	67.1	64.2	65.4
#1940	59.8	59.4	61.2	62.8	66.0	66.0	70.6	70.6	69.6	68.3	63.4	61.2	64.9
1941	57.6	58.8	60.6	59.1	67.9	66.0	70.7	71.2	68.0	66.0	65.4	57.0	64.0
1942	58.6	55.7	58.8	59.4	62.8	65.9	71.8	71.0	67.8	67.6	63.5	58.8	63.5
1943	57.6	60.1	58.8	61.4	65.5	66.4	70.7	71.3	70.6	66.6	65.0	56.8	64.2
1944	57.2	53.7	59.6	58.8	62.4	63.4	66.6	71.3	69.2	64.8	59.0	60.0	62.2
1945	56.6	56.6	54.6	59.4	61.9	64.6	71.0	73.3	73.2	67.2	61.6	57.2	63.1
1946	58.0	54.8	57.4	62.0	61.1	68.7	71.8	72.3	73.0	64.5	58.8	56.4	63.2
1947	55.9	59.8	60.4	62.6	64.0	66.9	73.0	71.4	72.2	66.3	59.0	57.2	64.0
#1948	58.6	54.6	55.2	60.4	63.9	67.0	71.0	71.2	71.6	66.3	62.1	53.4	63.0
1949	46.8	52.6	56.0	63.3	64.3	69.7	71.8	73.7	72.9	66.2	67.2	55.6	63.3
1950	50.4	56.7	58.8	62.7	62.2	66.6	73.3	70.9	68.9	69.5	63.7	62.1	63.8
1951	55.7	56.4	60.2	60.4	63.1	66.7	72.8	71.3	71.0	68.8	61.9	54.3	63.6
1952	52.8	58.8	55.3	61.1	66.7	65.7	72.3	74.1	74.3	67.0	59.1	56.1	63.6
1953	60.6	58.9	58.9	58.7	63.9	66.8	74.9	70.7	70.2	69.1	63.6	59.1	64.6
1954	55.6	64.1	57.0	60.9	63.8	67.6	76.7	73.1	72.5	65.7	64.3	58.1	64.9
1955	53.7	57.0	61.3	61.3	63.0	66.7	70.5	75.2	74.5	64.2	61.1	55.9	63.7
1956	56.0	53.1	60.5	58.7	64.4	69.8	71.8	71.9	76.5	66.5	67.2	60.5	64.8
1957	54.2	60.7	61.6	61.7	64.2	72.5	76.0	76.2	72.2	67.1	60.7	61.7	65.7
1958	59.6	60.3	56.9	65.4	68.0	71.0	72.8	75.2	75.9	74.0	63.3	62.0	67.1
1959	60.1	56.3	64.7	66.2	65.0	71.5	77.8	75.5	73.5	70.2	66.6	60.7	67.3
1960	54.6	57.0	62.0	65.3	67.7	70.1	75.5	73.2	75.6	68.0	60.3	58.7	65.7
1961	62.0	61.0	60.1	64.0	63.4	68.8	74.2	74.3	71.0	67.9	60.2	56.9	65.3
1962	57.5	53.8	55.2	64.3	62.9	66.3	70.1	74.1	70.9	65.7	60.6	57.4	63.2
1963	55.6	62.7	58.3	59.6	64.1	66.4	72.1	73.7	77.3	69.1	62.3	60.6	65.1
1964	56.7	59.0	58.6	60.5	61.7	64.8	71.8	73.4	70.2	70.5	59.8	56.5	63.6
1965	58.3	58.0	59.0	61.7	63.4	64.1	70.1	75.6	69.6	73.1	62.0	56.9	64.3
1966	55.7	56.2	61.3	64.4	64.5	70.2	74.4	76.6	73.4	71.2	63.6	60.7	66.0
1967	59.2	62.9	61.0	56.1	67.3	66.3	75.7	79.2	75.2	72.5	66.6	55.6	66.5
1968	58.5	63.8	62.9	64.0	65.5	69.2	74.7	74.1	73.4	69.2	63.3	56.2	66.2
1969	58.3	54.9	59.7	63.8	66.6	67.2	73.8	77.0	71.7	67.3	65.2	59.2	65.4
1970	57.6	61.4	61.2	60.9	67.4	70.0	75.3	76.2	74.4	68.3	63.3	57.2	66.1
1971	58.8	59.2	60.3	62.0	64.0	68.8	74.2	78.9	74.6	67.4	60.2	52.8	65.1
1972	55.5	60.3	63.7	63.9	67.6	72.2	78.0	77.4	72.3	67.2	62.2	58.1	66.5
RECORD MEAN	55.9	56.9	58.5	60.7	63.3	67.0	71.4	72.2	70.6	66.5	62.2	57.5	63.6
MAX	65.1	66.1	67.7	70.0	72.2	76.4	81.9	82.6	81.2	76.7	72.6	66.9	73.3
MIN	46.6	47.7	49.2	51.4	54.3	57.5	60.9	61.8	60.0	56.2	51.7	48.1	53.8

TOTAL DEGREE DAYS

LOS ANGELES, CALIFORNIA
CIVIC CENTER

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	3	1	35	55	84	249	147	158	50	41	15	28	866
1934-35	0	0	4	38	99	147	268	168	308	139	112	5	1288
1935-36	5	0	0	30	139	173	176	251	203	140	28	10	1155
1936-37	0	0	0	25	37	203	535	266	216	108	77	8	1475
1937-38	0	0	0	19	106	115	128	233	231	134	80	25	1071
1938-39	0	1	0	27	97	138	253	305	260	104	79	7	1271
#1939-40	0	0	0	17	21	80	166	167	133	115	29	11	739
1940-41	0	0	0	32	91	156	226	175	151	177	27	14	1049
1941-42	0	0	4	71	74	254	208	259	192	168	98	13	1341
1942-43	0	0	3	36	106	209	229	174	194	130	44	42	1167
1943-44	0	0	0	49	52	255	261	329	179	184	98	66	1473
1944-45	5	0	5	34	182	164	259	244	336	178	110	40	1557
1945-46	0	0	2	27	138	246	224	288	248	118	126	0	1417
1946-47	0	0	0	75	190	266	285	155	169	128	67	6	1341
#1947-48	0	0	1	14	182	260	219	308	302	170	75	17	1548
1948-49	0	0	4	38	101	367	562	348	279	85	76	0	1860
1949-50	0	0	0	54	66	294	443	228	198	89	98	17	1487
1950-51	0	0	0	2	104	114	298	235	168	133	69	7	1130
1951-52	0	1	0	14	113	324	371	182	310	129	10	17	1471
1952-53	0	0	0	13	201	281	157	180	194	180	82	26	1314
1953-54	0	0	2	16	97	188	292	98	242	120	47	9	1111
1954-55	0	0	0	30	81	213	345	223	142	125	88	14	1261
1955-56	0	0	6	58	144	279	271	338	150	191	74	0	1511
1956-57	0	0	0	34	42	136	328	146	123	111	44	0	964
1957-58	0	0	0	16	131	112	164	130	246	82	13	0	894
1958-59	0	0	0	2	80	132	155	237	49	29	24	0	708
1959-60	0	0	0	2	23	145	319	224	111	65	24	0	913
1960-61	0	0	0	22	135	194	116	111	146	74	61	11	870
1961-62	0	0	2	32	161	243	240	309	298	66	97	38	1486
1962-63	0	0	0	33	138	228	286	101	202	161	37	24	1210
1963-64	0	0	0	1	103	145	250	169	211	169	113	36	1197
1964-65	0	0	0	5	186	256	224	196	183	168	70	38	1326
1965-66	0	0	0	1	98	264	281	244	126	58	34	0	1106
1966-67	0	0	0	0	88	145	179	81	133	260	43	25	954
1967-68	0	0	0	0	32	287	207	70	99	70	50	7	822
1968-69	0	0	0	4	76	267	219	277	186	68	25	1	1123
1969-70	0	0	0	22	52	182	222	106	128	134	27	1	874
1970-71	0	0	0	8	72	243	255	184	154	127	77	11	1131
1971-72	0	0	0	94	153	369	288	132	61	61	35	0	1193
1972-73	0	0	0	14	97	230							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	8.46	0.00	0.19	0.54	0.21	0.47	T	0.01	0.00	0.34	0.04	8.48	18.76
1934	3.22	2.04	0.01	T	0.00	0.41	T	0.01	0.13	2.31	2.79	3.75	14.67
1935	2.91	2.23	4.31	3.19	0.03	T	T	0.11	T	0.05	1.24	0.42	14.49
1936	0.51	7.25	1.34	0.95	0.00	0.20	0.01	0.02	0.03	1.25	0.05	6.63	18.24
1937	1.99	7.87	4.04	0.24	0.28	0.00	0.00	0.00	0.00	0.01	0.00	3.54	17.97
1938	1.63	9.81	7.94	0.48	0.02	T	0.00	T	0.01	0.01	T	7.26	27.16
1939	2.96	1.13	1.44	0.24	0.02	T	T	0.01	5.67	0.13	0.08	0.38	12.06
#1940	4.33	5.43	1.55	1.61	0.02	T	T	0.00	0.01	1.47	0.34	5.50	20.26
1941	2.21	12.42	8.14	2.67	T	T	T	0.04	0.00	1.53	0.05	4.22	31.28
1942	0.59	1.05	1.26	2.44	T	T	0.00	0.23	T	0.58	0.24	1.01	7.40
1943	7.98	3.07	4.55	0.50	T	0.01	T	0.00	T	0.18	0.05	6.23	22.57
1944	0.97	8.65	2.47	0.60	0.02	0.05	T	T	0.01	0.06	3.72	0.90	17.45
1945	0.04	3.34	3.43	0.08		0.01	T	0.04	T	0.56	0.23	5.05	12.78
1946	0.11	1.52	3.66	0.44	0.04	T	T	0.00	0.02	0.92	6.04	3.47	16.22
1947	0.38	0.86	0.79	0.04	0.12	0.02	0.00	0.01	0.09	0.14	0.06	1.62	4.13
1948	T	1.29	3.07	0.78	T	0.16	T	T	T	0.09	T	2.20	7.59
1949	2.43	1.41	1.40	T	0.46	T	T	0.01	0.01	0.01	2.18	2.72	10.63
1950	2.57	1.67	0.87	0.56	T	T	0.01	0.00	0.38	0.24	1.05	0.03	7.38
1951	2.80	1.48	0.44	1.54	0.24	T	T	0.15	0.00	0.59	1.29	5.80	14.33
1952	10.03	0.63	6.14	1.58	T	T	T	T	0.13	0.00	3.13	3.31	24.95
1953	1.08	0.33	0.48	0.91	0.03	0.00	0.00	0.00	T	T	1.11	0.08	4.08
1954	4.60	2.98	2.99	0.13	0.02	0.08	T	T	T	T	2.03	0.86	13.69
1955	4.30	0.68	0.56	2.07	1.43	0.01	T	0.05	T	T	1.68	1.11	11.89
1956	8.39	0.59	T	3.72	0.46	T	0.00	T	0.00	0.12	0.00	0.34	13.62
1957	4.41	1.47	1.02	1.47	0.63	0.08	T	T	0.00	1.51	0.51	2.14	13.24
1958	2.08	6.46	5.30	3.09	0.04	0.00	T	0.39	0.07	0.06	T	T	17.49
1959	1.24	3.32	0.00	0.50	T	T	T	T	0.01	T	0.07	1.09	6.23
1960	2.94	2.26	0.31	1.45	0.05	T	0.00	0.00	T	0.01	2.40	0.15	9.57
1961	1.28	0.15	0.57	0.29	T	T	T	0.03	0.05	T	2.02	1.44	5.83
1962	2.56	11.57	1.10	T	0.02	T	0.00	0.00	0.00	0.12	T	T	15.37
1963	0.52	2.88	2.78	1.94	T	0.14	0.00	0.02	1.31	0.57	2.15	T	12.31
1964	1.43	T	1.79	0.33	0.01	0.32	T	0.00	0.00	0.33	1.72	2.05	7.98
1965	0.84	0.23	2.49	6.02	0.00	0.01	T	0.01	1.80	0.00	9.68	5.73	26.81
1966	0.96	1.51	0.53	0.00	0.22	0.00	T	T	0.30	0.06	4.07	5.26	12.91
1967	5.93	0.11	2.50	3.76	0.01	0.00	0.00	T	1.02	0.00	8.67	1.66	23.66
1968	0.90	0.49	3.24	0.49	0.00	0.01	0.01	0.11	0.03	0.55	0.37	1.28	7.58
1969	14.94	8.03	1.49	0.63	0.03	T	0.03	0.00	T	0.00	1.11	0.06	26.32
1970	1.59	2.58	2.36	0.00	0.00	0.04	0.00	0.00	0.00	0.00	5.05	4.92	16.54
1971	0.43	0.67	0.53	0.50	0.22	0.00	T	0.00	T	0.04	0.30	6.57	9.26
1972	0.00	0.13	T	0.03	0.03	0.07	0.00	0.35	0.02	0.29	3.26	2.36	6.54
RECORD MEAN	3.00	3.01	2.47	1.09	0.31	0.07	0.01	0.03	0.21	0.51	1.40	2.66	14.77

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1878.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above: Sea level									Sea level	Remarks
							Ground									
						Ground at temperature site	Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	
CITY																
Ducommun Building, NE Corner Main & Commercial Streets	7/01/77	1/27/81		34° 03'	118° 14'	292	67	37	37				50			
Baker Block 342 North Main Street	1/28/81	10/31/88	300 ft. NE	34° 03'	118° 14'	291	114	57	57				107			Rain gage on cupola.
Wilson Building 102-1/2 S Spring Street	11/01/88	10/14/02	900 ft. WSW	34° 03'	118° 15'	287	82	74	74		a67		67			a - Added 2/18/97.
Los Angeles Trust Bldg. 129 W 2nd Street	10/15/02	7/31/08	300 ft. SW	34° 03'	118° 15'	283	123	116	116		108		108			
Central Building SW corner Main & 6th St.	8/01/08	2/29/40	0.5 mi. SW	34° 03'	118° 15'	261	191	159	159		151	b151	151			b - Installed when office moved and operated 3/1/40 through 6/30/53.
U. S. Post Office and Courthouse Building 312 N Spring Street	3/01/40	6/30/64 (A)	0.75 mi. NE	34° 03'	118° 14'	312	250	c223		d4	235		235		540	c - 5.5 feet from 5/1/48 to 6/15/49. d - Added 6/15/49 and used as source of temperature data. (A) - Instruments maintained as source of data until Civic Center installations were activated July 13 & 29, 1964.
COOPERATIVE																
Civic Center:																
(1) 434 S San Pedro St.	7/13/64	Present		34° 02'	118° 14'	257	104								352	L. A. County Air Pollution Control District.
(2) 410 N Ducommun St.	7/29/64	Present		34° 03'	118° 14'	270					36	36	36	38		L. A. City Dept. of Water & Power.

In general, the exposures at the various locations were quite similar. Wind exposure at sites 1 and 2 were in the lee of a hill that would decrease wind velocities from SW through NNW quadrants. During the period from 3/1/40 until 5/1/48 thermometers were about eighteen stories above the ground. At other times the exposures are considered representative of ambient temperature conditions in mid-city. Precipitation exposures have been good except during time of high wind when the roof catch is light; this is especially true of the location from March 1940 through June 1964.

Requests for additional information should be directed to the National Weather Service Forecast Office, 11102 Federal Building, 11000 Wilshire Blvd., Los Angeles, California 90024.

Sale Price: 15 cents per copy. Checks and money orders should be made payable to Department of Commerce, NOAA. Remittances and correspondence regarding this publication should be sent to: National Climatic Center, Federal Building, Asheville, N. C. 28801. Attn: Publications.

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LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

LOS ANGELES, CALIFORNIA

INTERNATIONAL AIRPORT

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

Predominating influences on the climate of the Los Angeles International Airport are the Pacific Ocean, 3 miles to the west; the southern California coastal mountain ranges which line the inland side of the coastal plain surrounding the airport, and the large scale weather patterns which allow Pacific storm paths to extend as far south as the Los Angeles area only during late fall, winter, and early spring. Marine air covers the coastal plain most of the year but air from the interior reaches the coast at times, especially during the fall and winter months. The coast ranges act as a buffer to the more extreme conditions of the interior. Pronounced differences in temperature, humidity, cloudiness, fog, sunshine, and rain occur over fairly short distances on the coastal plains and the adjoining foothills due to the local topography and the decreased marine effect further inland. In general, temperature ranges are least and humidity highest close to the coast, while precipitation increases with elevation on the foothills.

The most characteristic feature of the climate of the coastal plain around the station is the night and morning low cloudiness and sunny afternoons which prevail during the spring and summer months and occur often during the remainder of the year. Combined with the westerly sea breeze at Los Angeles International Airport, the coastal low cloudiness is associated with mild temperatures throughout the year. Daily temperature range is usually less than 15° in spring and summer but increases to around 20° in fall and winter. Hot weather is not frequent at any season along the coast, although readings have exceeded 85° at the airport occasionally in every month of the year when air from the interior reached the coast. When high temperatures do occur the humidity is almost always low so that discomfort is unusual. Nighttime temperatures are generally cool but minimum temperatures below 40° are rare and periods of over 10 years have passed with no readings below freezing at the airport. Prevailing daytime winds are from the west, but night and early morning breezes are usually light and from the east and northeast. Strongest winds observed at the station have been from the west and north following winter storms. At times during the fall, winter, and spring, gusty dry northeasterly "Santa Ana" winds blow over southern California mountains and through passes to the coast, but very rarely reach Los Angeles International Airport. The extremely dry air and the dust clouds associated with them can be expected at the station several times each year, however.

Precipitation occurs mainly in the winter. Measurable rain may fall on an average of about one day in four from late October into early April, but in three years out of four traces or less are reported for the entire months of July and August. Thunderstorms do not occur often near the coast, but showers and thunderstorms are observed over the coastal ranges at times during the summer when moist air from the south and southeast invades southern California. Annual rainfall at Los Angeles International Airport is somewhat less than that recorded on the Palos Verdes Hills rising to an elevation of near 1,500 feet on a peninsula 12 miles to the south, and on the Hollywood Hills and Santa Monica Mountains which extend east-west 12 miles north of the station with peaks reaching to near 2,000 feet. Traces of snow have fallen at Los Angeles International Airport only a few times, melting as they fell. Snow is visible on mountains from 30 to 100 miles to the east and northeast, however, at times every winter.

Visibility at Los Angeles International Airport is frequently restricted by haze, fog, or smoke. Low visibilities are favored by a layer of moist marine air with warm dry air above. Lowest visibilities usually occur with weak winds, but at times a moderate afternoon sea breeze will bring a fog bank ashore and over the airport. Light fog occurs at sometime nearly every month, but heavy fog is observed least during the summer and can be expected on about one night or early morning in four during the winter.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: LOS ANGELES, CALIFORNIA INTERNATIONAL AIRPORT Standard time used: PACIFIC Latitude: 33° 56' N Longitude: 118° 24' W Elevation (ground): 97 feet Year: 1972

Month	Temperature: Averages: Daily maximum	Daily minimum	Monthly	Extremes: Highest	Date	Lowest	Date	Degree days (Base 65°): Heating	Cooling	Precipitation: Total	Greatest in 24 hrs.	Date	Snow, Ice pellets: Total	Greatest in 24 hrs.	Date	Relative humidity: Hour 04 (Local time)	Hour 10	Hour 16	Hour 22	Wind &: Resultant: Direction	Speed	Average speed	Peak gust: Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures: Maximum: 90° and above ‡	32° and below	Minimum: 32° and below	0° and below	** Average daily solar radiation - langleys
JAN	63.0	44.8	53.9	80	15	37	5	339	0	0.00	0.00		0.0	0.0		74	59	58	72	26	0.9	6.0	25	W	26		4.4	14	9	8	0	0	0	6	0	0	0	0	
FEB	64.5	49.2	56.9	75	11	46	13+	229	0	0.16	0.16	5	0.0	0.0		81	63	69	80	25	1.8	6.5	21	NW	29+		6.3	7	12	10	1	0	0	9	0	0	0	0	
MAR	66.1	53.5	59.8	86	4	46	29	161	8	T	T	26 +	0.0	0.0		88	71	70	81	25	3.9	7.8	44	NW	3		6.0	8	13	10	0	0	0	3	0	0	0	0	
APR	69.2	53.7	61.5	80	26	47	20	103	3	T	T	19 +	0.0	0.0		87	57	62	82	25	5.2	8.4	38	W	13		3.8	18	4	8	0	0	1	1	0	0	0	0	
MAY	70.9	57.3	64.1	84	30	52	21	53	34	0.01	0.01	7	0.0	0.0		85	66	66	80	25	6.5	8.4	29	SW	21		4.9	12	11	8	1	0	0	2	0	0	0	0	
JUN	72.6	61.5	67.1	77	30+	58	11	0	68	0.06	0.06	7	0.0	0.0		86	70	69	84	25	7.1	8.7	28	SW	27		5.9	8	11	11	1	0	1	0	0	0	0	0	
JUL	76.8	63.8	70.3	87	29	60	5	0	173	T	T	20 +	0.0	0.0		86	67	64	78	25	6.9	8.6	26	W	1		3.7	13	15	3	0	0	0	0	0	0	0	0	
AUG	78.8	66.7	72.8	90	30	62	16+	0	251	0.06	0.06	12	0.0	0.0		83	67	68	79	24	5.6	8.3	28	SW	26		3.8	15	12	4	1	0	0	0	1	0	0	0	
SEP	75.7	63.9	69.8	89	5	58	14	0	151	0.03	0.03	5	0.0	0.0		86	69	69	82	25	6.1	8.4	28	SW	19		5.3	10	8	12	1	0	1	1	0	0	0	0	
OCT	73.0	59.7	66.4	95	6	48	31	15	65	1.79	1.77	18-19	0.0	0.0		81	60	63	75	26	3.4	7.8	33	N	29		5.8	8	10	13	3	0	3	2	1	0	0	0	
NOV	69.1	51.3	60.2	79	29	44	24	138	1	3.13	1.27	14	0.0	0.0		73	55	61	71	25	0.8	7.1	45	W	11		3.7	19	1	10	7	0	0	2	0	0	0	0	
DEC	65.7	47.9	56.8	80	20	37	11+	248	4	1.88	0.78	6-7	0.0	0.0		59	48	47	57	33	2.4	7.8	45	W	4		3.5	19	5	7	4	0	0	3	0	0	0	0	
YEAR	70.5	56.1	63.3	95	OCT. 6	37	DEC. 11+	1286	758	7.12	1.77	OCT. 18-19	0.0	0.0		81	63	64	77	25	4.1	7.8	45	W	DEC. 4+		4.8	151	111	104	19	0	6	29	2	0	0	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature: Normal: Daily maximum	Daily minimum	Monthly	Extremes: Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation: Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets: Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity: Hour 04 (Local time)	Hour 10	Hour 16	Hour 22	Wind &: Mean speed	Prevailing direction	Peak gust: Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures: Max.: 90° and above ‡	32° and below	Min.: 32° and below	0° and below	** Average daily solar radiation - langleys
(a)	(b)	(b)	(b)	14		14		(b)	(b)	37		37		37		37	37		37		13	13	13	13	24	28	23	23			24	37	37	37	37	37	30	40	13	13	13	13	
J	63.8	45.0	54.4	86	1971+	30	1963	347	2.66	9.60	1969	0.00	1972	6.19	1956	T	T	1962+	T	1962+	67	53	58	68	6.7	W	48	SW	1951		5.2	12	8	11	6	0	*	5	0	0	*	0	
F	63.7	46.7	55.2	92	1963	37	1965+	277	2.88	11.07	1962	T	1964+	4.16	1962	T	T	1951+	T	1951+	72	57	61	70	7.3	W	57	N	1953		5.0	12	6	10	6	0	*	4	*	0	0	0	
M	65.0	48.9	57.0	88	1964	39	1971+	264	1.79	5.98	1938	0.00	1959	3.54	1968	0.0	0.0		0.0		77	59	64	74	7.9	W	62	W	1952		5.1	12	8	11	5	0	*	4	0	0	0	0	
A	66.9	51.9	59.4	95	1966	43	1965	177	1.05	4.52	1965	0.00	1962	1.88	1960	0.0	0.0		0.0		79	60	63	75	8.4	WSW	59	N	1957		4.9	11	9	10	4	0	*	3	*	0	0	0	
M	68.7	55.2	62.0	96	1967	45	1964	121	0.13	0.56	1956	0.00	1943+	0.56	1956	0.0	0.0		0.0		81	64	65	78	8.2	WSW	45	N	1953		5.1	10	11	10	1	0	0	2	*	0	0	0	
J	71.1	58.5	64.8	88	1970	50	1971+	54	0.05	0.29	1964	0.00	1971+	0.29	1964	0.0	0.0		0.0		85	70	68	82	7.9	WSW	32	W	1954		5.2	9	11	10	1	0	*	2	0	0	0	0	
J	75.9	62.3	69.1	92	1960	55	1964	19	0.01	0.15	1969	0.00	1963+	0.15	1969	0.0	0.0		0.0		86	68	68	82	7.6	WSW	29	W	1954		4.0	12	13	6	1	0	*	2	*	0	0	0	
A	75.4	62.8	69.1	91	1967	59	1970+	16	0.02	0.30	1961	0.00	1971+	0.21	1961	0.0	0.0		0.0		85	68	69	82	7.5	WSW	33	SE	1955		3.9	13	12	6	*	0	*	3	*	0	0	0	
S	75.8	61.1	68.5	110	1963	55	1971+	36	0.17	4.39	1939	0.00	1968+	4.20	1939	0.0	0.0		0.0		82	65	66	80	7.1	WSW	28	SW	1972		4.1	13	11	6	1	0	*	4	1	0	0	0	
O	73.0	56.8	64.9	106	1961	43	1971	62	0.39	2.34	1936	0.00	1969+	1.77	1972	0.0	0.0		0.0		77	58	63	76	6.8	W	46	N	1956		4.4	13	10	8	2	0	*	5	2	0	0	0	
N	71.1	51.0	61.1	101	1966	38	1964	159	1.09	7.92	1946	0.00	1956+	5.60	1967	0.0	0.0		0.0		75	59	64	74	6.6	W	55	N	1953		4.7	14	8	8	4	0	*	6	*	0	0	0	
D	66.5	47.3	56.9	88	1959	32	1968	267	2.39	6.57	1936	T	1963	3.01	1951	T	T	1971	T	1971	69	55	61	69	6.7	W	49	S	1952		4.7	13	8	10	6	0	*	6	0	0	*	0	
YR	69.7	54.0	61.9	110	SEP. 1963	30	JAN. 1963	1799	12.63	11.07	FEB. 1962	0.00	JAN. 1972+	6.19	JAN. 1956	T	T	DEC. 1971+	T	DEC. 1971+	78	61	64	76	7.4	W	62	W	MAR. 1952		4.7	144	115	106	35	0	3	46	5	0	*	0	

Data for October - December 1959 considered in extracting temperature extremes above.
Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows:
Lowest temperature 23 in January 1937.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

\# To 8 compass points only.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1936	54.2	53.2	58.3	56.3	62.0	65.8	70.1	68.4	66.1	62.8		55.4	
1937	45.0	51.0	54.1	57.1	61.0	63.4	67.4	66.8	67.2	62.7	57.0	57.6	59.2
1938	55.6	53.4	54.6	57.6	58.6	62.6	65.2	69.0	68.4	61.4	56.5	56.4	59.9
1939	51.8	49.4	51.8	57.8	59.2	63.6	66.6	67.0	70.6	64.8	59.4	55.2	59.8
1940	55.0	55.2	57.4	60.2	63.1	63.5	65.6	66.8	64.8	64.0	57.4	58.4	61.0
1941	56.2	58.6	60.1	58.8	65.8	65.0	67.5	69.2	65.6	63.9	62.2	56.8	62.5
1942	56.8	53.7	56.1	58.4	60.6	63.8	67.4	67.8	65.7	65.9	59.1	55.0	60.9
1943	54.4	58.3	58.1	59.6	63.4	64.1	67.8	68.3	66.7	64.4	60.5	56.6	61.8
1944	54.8	53.0	58.2	56.9	61.2	62.0	64.0	67.0	66.1	61.9	57.4	56.4	59.9
1945	53.5	54.8	53.2	57.0	60.0	62.8	67.2	69.3	69.2	64.4	57.6	54.7	60.3
1946	54.3	51.4	55.1	58.6	60.0	65.0	67.7	68.1	68.4	61.6	56.7	54.4	60.1
#1947	51.4	56.9	58.6	60.2	61.9	65.2	67.5	68.4	67.6	63.7	56.6	55.3	61.1
1948	54.9	52.6	53.8	59.0	60.3	63.2	65.7	65.8	65.6	62.7	59.4	52.8	59.6
1949	47.0	51.4	54.2	60.3	62.2	67.0	67.3	68.4	67.6	62.6	63.2	53.2	60.4
1950	48.5	53.6	55.8	59.8	59.8	62.8	68.8	65.9	66.1	65.0	61.3	59.1	60.5
1951	54.1	53.4	56.9	58.3	60.4	64.5	68.6	67.4	67.4	65.8	60.8	54.0	61.0
1952	52.3	56.9	54.1	58.3	62.4	63.0	65.7	68.3	67.9	63.3	58.2	55.3	60.5
1953	58.8	57.5	56.4	57.2	62.0	64.1	70.4	66.8	65.3	65.2	61.4	56.7	61.8
1954	53.5	60.8	55.7	59.0	61.6	65.0	71.9	70.9	67.8	62.6	62.6	57.6	62.4
1955	52.0	55.2	59.2	58.9	61.0	63.9	67.2	70.5	70.4	62.2	59.5	55.6	61.3
1956	54.6	52.7	58.8	58.7	63.0	66.3	68.4	69.2	70.1	64.8	65.9	58.8	62.6
1957	53.9	59.1	59.9	60.1	63.2	69.5	72.3	72.7	69.0	66.2	60.1	60.8	63.9
1958	59.3	60.2	57.9	64.6	66.4	68.9	70.0	73.4	72.7	72.5	63.9	62.4	66.0
#1959	59.9	57.3	64.0	65.4	65.6	69.7	75.1	73.9	72.8	68.2	65.1	59.6	66.4
1960	53.3	55.3	57.5	61.2	63.9	65.8	69.3	68.4	70.0	64.4	58.2	54.9	61.9
1961	58.9	57.9	56.9	59.6	60.9	65.0	71.2	70.1	68.1	65.7	59.1	54.1	62.3
1962	56.1	53.8	53.6	60.5	61.5	63.2	66.0	69.6	67.7	64.6	59.7	56.6	61.1
1963	55.2	61.1	56.6	57.3	62.9	65.6	68.7	71.0	74.6	67.9	61.8	57.9	63.4
1964	55.3	56.0	55.9	58.2	58.5	62.2	66.8	69.4	66.7	67.0	58.9	55.2	60.9
1965	55.7	55.3	57.5	58.6	60.6	62.9	65.7	71.5	68.0	69.5	60.5	55.1	61.7
1966	53.6	53.0	57.5	61.7	63.5	66.6	68.2	71.9	69.6	69.5	62.5	57.5	63.0
1967	56.6	59.6	59.3	56.0	64.3	62.9	69.3	72.8	72.0	68.5	64.2	54.1	63.3
1968	57.3	60.8	60.5	61.6	63.9	66.2	68.3	68.5	68.6	65.3	61.7	54.3	63.1
1969	56.9	53.9	56.4	60.3	63.1	65.5	69.1	71.0	67.1	66.1	64.3	58.8	62.7
1970	56.9	60.7	59.4	59.3	63.3	65.7	68.7	69.4	69.2	66.1	61.2	56.1	63.0
1971	55.5	56.7	56.8	58.8	61.4	64.7	69.5	74.3	70.9	65.0	59.2	52.7	62.1
1972	53.9	56.9	59.8	61.5	64.1	67.1	70.3	72.8	69.8	66.4	60.2	56.8	63.3
RECORD MEAN	54.5	55.8	57.0	59.3	62.1	64.8	68.2	69.5	68.5	65.2	60.4	56.3	61.8
MAX	63.9	64.6	65.4	67.0	69.2	71.2	74.8	76.2	75.9	73.4	70.1	65.9	69.8
MIN	45.1	46.9	48.6	51.6	55.0	58.3	61.6	62.8	61.1	56.9	50.6	46.7	53.8

TOTAL DEGREE DAYS

LOS ANGELES, CALIFORNIA
INTERNATIONAL AIRPORT

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1935-36							339	346	295	264	97	41	
1936-37	1	5	11	81			623	398	335	240	124	61	
1937-38	12	15	10	74	236	228	288	325	323	225	199	78	2013
1938-39	26	5	4	130	255	274	404	433	420	219	182	64	2416
1939-40	6	8	18	68	162	300	310	283	236	171	65	48	1675
1940-41	23	3	26	88	235	204	274	182	161	192	48	23	1459
1941-42	1	1	26	88	105	255	255	320	275	200	150	46	1719
1942-43	2	0	17	40	182	311	330	200	214	162	69	40	1567
1943-44	3	4	16	39	133	254	313	344	213	245	132	98	1794
1944-45	39	8	15	97	230	270	355	289	374	244	158	64	2143
1945-46	11	1	9	58	233	316	330	379	305	194	151	22	2009
#1946-47	0	2	4	113	253	329	427	228	198	165	102	16	1837
1947-48	10	4	4	52	253	308	313	359	347	193	152	55	2050
1948-49	10	10	31	83	167	375	557	381	334	140	98	3	2189
1949-50	1	2	6	101	122	364	503	312	283	150	155	64	2063
1950-51	0	8	8	42	153	184	340	322	251	193	137	22	1660
1951-52	3	1	0	26	134	334	385	232	338	195	78	58	1784
1952-53	30	0	14	55	216	299	199	211	262	227	122	36	1671
1953-54	1	0	29	62	125	257	349	144	279	170	100	19	1535
1954-55	0	0	3	79	106	228	397	268	178	184	124	36	1603
1955-56	3	0	12	92	167	283	316	351	189	182	95	9	1699
1956-57	0	0	0	42	63	188	337	172	158	144	53	0	1157
1957-58	0	0	0	16	143	133	174	131	211	70	4	0	882
1958-59	0	0	0	0	64	118	148	209	55	15	15	0	624
#1959-60	0	0	0	3	41	173	357	272	227	132	55	3	1263
1960-61	4	0	0	57	197	306	188	193	248	156	122	21	1492
1961-62	0	0	1	53	182	331	275	308	344	139	110	61	1804
1962-63	2	0	0	35	154	253	296	123	255	225	63	15	1421
1963-64	0	0	0	1	107	220	297	254	285	214	196	75	1649
1964-65	9	0	8	21	197	301	291	271	226	198	130	60	1712
1965-66	12	0	1	9	127	304	350	328	225	113	45	8	1522
1966-67	0	0	0	1	102	224	254	150	171	263	64	61	1290
1967-68	1	0	0	3	49	331	236	118	135	115	61	5	1054
1968-69	3	0	1	26	104	328	250	306	266	143	64	7	1498
1969-70	0	0	3	28	59	199	244	121	168	167	71	10	1070
1970-71	0	1	5	20	118	274	311	234	248	191	130	34	1566
1971-72	0	0	3	92	180	371	339	229	161	103	53	0	1531
1972-73	0	0	0	15	138	248							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	6.02	0.00	0.13	0.55	0.23	0.64	0.00	0.01	T	0.32	0.05	4.11	12.06
1934	4.35	1.54	0.01	T	0.00	0.52	0.00	0.02	0.13	1.29	3.57	2.69	14.12
#1935	2.25	1.95	4.55	2.18	0.01	0.00	0.04	0.36	0.01	0.14	1.75	0.40	13.64
1936	0.54	6.54	1.21	0.19	0.00	0.04	0.05	0.00	0.00	2.34	0.30	6.57	17.78
1937	1.70	8.14	3.12	0.42	0.09	0.00	0.00	0.00	0.00	0.00	0.07	3.14	16.68
1938	1.02	6.69	5.98	0.20	0.02	0.02	0.00	0.00	0.02	T	0.00	5.16	19.11
1939	2.17	1.72	0.84	0.20	0.08	0.00	0.00	0.00	4.39	0.10	0.09	0.46	10.05
1940	3.66	5.06	0.77	1.41	0.01	T	T	0.00	T	1.74	0.17	5.70	18.52
1941	3.44	7.31	5.96	3.14	0.43	0.00	T	0.02	0.00	0.97	0.03	2.61	23.91
1942	0.50	0.84	1.14	2.44	T	T	0.00		0.00	0.66	0.26	1.10	6.94
1943	0.12	2.58	2.14	0.75	0.00	T	0.00	0.00		0.26	0.12	6.41	18.38
1944	0.60	6.40	1.74	0.43	T	T	T	T	T	0.06	3.77	0.54	13.54
1945	0.15	2.74	3.21	T	T	0.03	T	T	T	0.46	0.18	4.45	11.22
1946	0.25	0.53	3.29	0.65	T	T	T	0.00	0.01	0.80	7.92	2.91	16.36
#1947	0.09	0.44	1.02	0.23	0.04	T	0.00	0.01	0.03	0.25	0.03	0.98	3.12
1948	0.15	1.00	2.24	0.63	T	0.04	T	T	T	0.03	T	2.22	6.31
1949	2.30	1.55	1.44	0.01	0.42	T	T	T	0.01	T	1.46	2.21	9.40
1950	2.53	2.04	0.47	0.41	T	0.02	0.03	T	0.11	0.12	0.94	0.01	6.68
1951	2.82	0.84	0.38	1.37	0.02	T	0.00	0.06	T	0.23	0.71	4.63	11.06
1952	7.23	0.72	4.33	1.21	T	T	T	T	0.06	T	2.76	2.28	18.59
1953	1.13	0.10	0.44	1.78	T	T	0.02	T	T	T	1.23	0.06	4.76
1954	4.78	3.36	2.60	0.11	0.02	0.01	0.01	0.04	T	T	1.24	0.74	12.91
1955	4.12	0.88	0.15	2.20	0.42	0.07	0.01	T	T	T	1.35	0.94	10.14
1956	8.07	0.51	T	2.07	0.56	T	T	T	0.00	0.01	0.00	0.49	11.71
1957	3.88	1.94	0.95	1.33	0.27	0.06	0.03	T	0.00	1.27	0.46	2.10	12.29
1958	1.49	6.26	5.25	2.04	0.01	T	T	0.02	0.03	0.32	T	0.01	15.43
1959	1.11	3.72	0.00	0.39	T	T	T	T	0.04	0.01	0.06	1.11	6.44
1960	2.83	2.90	0.21	2.00	T	T	T	0.00	T		2.67	0.06	10.67
1961	1.27	T	0.46	0.02	T	T	0.01	0.30	0.04	T	1.88	1.07	5.05
1962	2.68	11.07	1.11	0.00	0.06	T	T	0.00	T	0.07	0.02	0.01	15.02
1963	0.62	4.48	2.42	1.41	0.02	0.24	0.00	0.01	1.13	0.42	2.76	T	13.51
1964	1.49	T	1.20	0.20	0.01	0.29	T	T	T	0.30	1.07	1.95	6.51
1965	0.43	0.34	1.63	4.52	T	0.03	T	0.12	0.11	T	6.38	3.25	16.81
1966	0.84	1.40	0.49	0.01	0.02	T	0.01	T	0.19	0.04	2.69	3.67	9.36
1967	2.71	0.05	1.47	2.68	0.03	T	T	0.00	0.44	T	7.47	1.05	15.90
1968	0.84	0.44	3.77	0.49	T	T	0.04	T	0.00	0.32	0.24	1.42	7.56
1969	9.60	3.76	0.42	0.38	T	T	0.15	0.00	0.01	0.00	1.37	0.01	15.70
1970	1.44	1.39	1.29	T	T	0.01	T	0.00	T	0.02	3.68	4.12	11.95
1971	0.66	0.36	0.23	0.68	0.17	0.00	T	0.00	T	0.28	0.22	5.70	8.30
1972	0.00	0.16	T	T	0.01	0.06	T	0.06	0.03	1.79	3.13	1.88	7.12
RECORD MEAN	2.30	2.66	1.71	0.97	0.07	0.02	0.01	0.02	0.18	0.35	1.53	2.19	12.01

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1937 for temperature and 1936 for precipitation.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table. Data are from Inglewood locations through 1935.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above: Sea level	Ground								Sea level	Remarks
						Ground at temperature site	Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	
COOPERATIVE																
Inglewood High School	1/01/19	?/?/28		33° 58'	118° 22'	125		a18					a18			For Los Angeles County Flood Control District.
Inglewood Fire Dept.	?/?/28	4/30/39	1/8 mile NW	33° 58'	118° 22'	125		a30					a30			a - Estimated.
AIRPORT																
Los Angeles Airport (Mines Field) Hangar #1	12/13/31	1/21/43		33° 56'	118° 23'	97	77	%9	%9				7			Rain gage installed 1/1/36. % - Correct for major portion of period.
Los Angeles Municipal Airport, Hangar #1	1/21/43	3/27/44	No Change	33° 56'	118° 23'	97	60	%5	%5				7			% - Correct for major portion of period.
Los Angeles Municipal Airport	3/27/44	4/07/47	350 feet E	33° 56'	118° 23'	97	58	4	4				5			
Los Angeles International Airport	4/07/47	9/22/59	3/4 mile N	33° 56'	118° 23'	99	59	30	30	4	27				126	Telepsychrometer installed 2/18/49.
Los Angeles International Airport	9/22/59	6/21/68	No Change	33° 56'	118° 23'	97	20	30	30		27			5	126	Hygrothermometer and wind equipment commissioned 1/2 mile SW of observatory.
International Airport 10445 S Sepulveda Blvd.	6/21/68	4/11/72	3/4 mile W	33° 56'	118° 24'	97	a20	s19	s19		16			a5	125	a - Same site as prior to 6/21/68.
Weather Service Building International Airport 10445 S Sepulveda Blvd.	4/11/72	Present	90 feet N	33° 56'	118° 24'	97	b20	s5	s5		3			b5	119	b - Same site as prior to 4/11/72. s - Standby status.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

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LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

MIDLAND, TEXAS

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

Midland is located on the southern extension of the South Plains of Texas. The terrain is level with only slight occasional undulations. There is a marked downslope of about 900 feet per 100 miles to the east and southeast and upslope of about 600 feet per 100 miles to the north and west.

The climate of Midland is typical of a semiarid region. The vegetation of the area consists mostly of native grasses, and there are very few trees in the area, mostly mesquite. There is very little farming in the immediate vicinity. The economy is based on ranching and the extensive oil fields in the area.

Droughts occur with monotonous frequency. Several years which show an excess in precipitation might be misleading, since extremely heavy downpours would show as large accumulations but the runoff would be so great and rapid that little benefit would be derived from the rainfall. If good rains occur in the spring and summer months cattle ranges are good, even though the remainder of the year may be well below normal.

Most of the annual precipitation in the Midland area comes as a result of very violent spring and early summer thunderstorms. These are usually accompanied by winds in excess of 40 m.p.h., excessive rainfall over limited areas, and sometimes hail. Due to the flat nature of the countryside, local flooding occurs, but this is of short duration. Tornadoes are occasionally sighted, mostly aloft, but the sparsity of population in the area, with most people concentrated in cities or towns, causes very infrequent damage or injury.

There is very little precipitation in the winter and infrequent snow. Fog and drizzle due to the upslope from the southeast occur frequently during night hours, but generally clear by noon.

During the late winter and early spring months, duststorms occur very frequently. The flat plains of the area with only grass as vegetation offer little resistance to the strong winds that occur. Dust in many of these storms remains suspended in the air for several days after the storm has passed. The sky is occasionally obscured by dust but in most storms visibilities range from 1 to 3 miles.

Daytime temperatures are quite hot in the summer, but there is a large diurnal range and most nights are comfortable. The normal daily maximums in the summer months range in the low to mid-nineties, while the normal minimums range in the upper sixties. In winter the temperature range is from the upper fifties to the low and middle thirties.

The temperature usually first drops below 32° in the fall about the middle of November and the last temperature below 32° in spring comes early in April. However, below 32° temperatures have been recorded as early as October 31 and as late as April 20.

Winters are characterized by frequent cold periods followed by rapid warming. Springs have very violent thunderstorm activity, while summers are hot and dry, with numerous small convective showers. Extremely variable weather occurs during the fall. Frequent cold frontal passages are followed by chilly weather for 2 or 3 days, then rapid warming. Cloudiness is at a minimum.

The prevailing wind direction in this area is from the southeast. This, together with the upslope of the terrain from the same direction, causes frequent low cloudiness and drizzle during winter and spring months. Glaze occurs when the temperature is below freezing, but usually lasts for only a few hours. Maximum temperatures during the summer months frequently are from 2° to 6° cooler than those at places 100 miles southeast, due to the cooling effect of the upslope winds.

Very low humidities are conducive to personal comfort, because even though summer afternoon temperatures are frequently above 90°, the low humidity with resultant rapid evaporation, has a cooling effect. The climate of the area is generally quite pleasant with the most disagreeable weather concentrated in the late winter and spring months.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: MIDLAND, TEXAS MIDLAND-ODESSA REG. AIR TERM. Standard time used: CENTRAL Latitude: 31° 57' N Longitude: 102° 11' W Elevation (ground): 2851 feet Year: 1972

Month	Temperature – Averages – Daily maximum	Temperature – Averages – Daily minimum	Temperature – Averages – Monthly	Temperature – Extremes – Highest	Date	Lowest	Date	Degree days (Base 65°) – Heating	Degree days – Cooling	Precipitation – Total	Greatest in 24 hrs.	Date	Snow, Ice pellets – Total	Greatest in 24 hrs.	Date	Relative humidity – Hour 00 (Local time)	Hour 06	Hour 12	Hour 18	Wind & – Resultant – Direction	Resultant – Speed	Average speed	Fastest mile – Speed	Fastest mile – Direction	Fastest mile – Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Maximum – 90° and above ‡	Maximum – 32° and below	Minimum – 32° and below	Minimum – 0° and below	** Average daily solar radiation - langleys
JAN	60.4	27.9	44.2	80	23	3	5	639	0	0.37	0.25	31	2.4	1.7	31	56	66	42	34	22	3.3	11.7	30	24	12		4.0	18	2	11	3	1	0	3	0	1	18	0	
FEB	66.7	31.9	49.3	85	21	10	3	446	0	0.04	0.04	10	T	T	10 +	58	74	36	26	23	3.4	11.2	29	04	26		4.0	15	6	8	1	0	0	1	0	0	14	0	
MAR	76.3	43.7	60.0	89	7	25	31	176	31	T	T	30 +	T	T	30	51	63	32	25	18	3.0	13.0	30	30	28		2.4	20	9	2	0	0	0	2	0	0	3	0	
APR	85.9	53.5	69.7	99	12+	31	1	37	187	0.29	0.24	19	0.0	0.0		50	67	25	19	19	6.0	14.0	31	16	25		3.6	16	10	4	2	0	3	0	9	0	1	0	
MAY	82.5	58.2	70.4	92	24+	47	8	12	183	1.20	0.66	13-14	0.0	0.0		73	92	51	45	14	8.5	13.5	35	06	13		6.1	10	6	15	7	0	9	1	5	0	0	0	
JUN	91.8	66.0	78.9	104	28	53	1	0	423	1.70	0.78	12	0.0	0.0		65	86	43	34	15	5.8	11.1	35	36	15+		4.3	14	11	5	5	0	7	0	16	0	0	0	
JUL	90.7	67.6	79.2	101	31	60	5+	0	446	0.58	0.52	4	0.0	0.0		58	76	46	35	15	10.2	12.9	40	33	4		5.5	9	13	9	2	0	2	0	24	0	0	0	
AUG	86.2	65.1	75.7	97	1	60	17	0	338	3.80	1.43	26-27	0.0	0.0		76	88	55	48	14	7.9	10.8	30	01	6		6.3	6	11	14	11	0	12	0	8	0	0	0	
SEP	84.0	61.0	72.5	91	29+	44	30	19	249	1.05	0.64	20-21	0.0	0.0		82	94	56	49	15	5.4	10.0	31	07	14		5.6	10	10	10	7	0	7	1	3	0	0	0	
OCT	74.4	50.6	62.5	92	17+	36	31	158	88	2.26	1.18	19-20	0.0	0.0		82	89	59	58	13	3.8	9.9	29	03	14		5.9	10	9	12	7	0	5	3	3	0	0	0	
NOV	58.7	34.1	46.4	75	5	27	19	551	0	0.22	0.11	29	0.6	0.6	29	80	87	54	53	16	0.8	10.4	41	30	12		3.8	16	6	8	4	0	0	1	0	0	13	0	
DEC	58.2	28.8	43.5	75	5	15	16+	660	0	0.15	0.15	11	T	T	14 +	68	74	44	42	22	1.7	11.3	33	32	23		4.7	14	7	10	1	0	1	3	0	1	20	0	
YEAR	76.3	49.0	62.7	104	JUN. 28	3	JAN. 5	2698	1945	11.66	1.43	AUG. 26-27	3.0	1.7	JAN. 31	67	80	45	39	16	4.4	11.7	41	30	NOV. 12		4.7	158	100	108	50	1	46	15	68	2	69	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature – Normal – Daily maximum	Normal – Daily minimum	Normal – Monthly	Extremes ø – Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation – Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets – Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity – Hour 00 (Local time)	Hour 06	Hour 12	Hour 18	Wind & – Mean speed	Prevailing direction	Fastest mile – Speed	Fastest mile – Direction	Fastest mile – Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Max. – 90° and above ‡	Max. – 32° and below	Min. – 32° and below	Min. – 0° and below	** Average daily solar radiation - langleys
(a)	(b)	(b)	(b)	9		9		(b)	(b)	25		25		19		24	25		19		9	9	9	9	19	10	19	19			24	24	24	24	25	25	24	24	9	9	9	9	
J	57.1	30.9	44.0	81	1969	2	1971+	[illegible]	0.80	3.66	1949	0.00	1967	1.15	1958	1.2	7.7	1949	5.9	1955	59	68	43	37	9.8	S	41	27	1965+		5.1	13	6	12	3	1	*	3	0	1	20	0	
F	61.2	35.4	48.3	85	1972	10	1972	[illegible]	0.60	1.79	1969	0.01	1971	1.22	1965	0.8	3.5	1965	2.5	1965+	62	73	43	35	11.0	SW	67	25	1960		5.1	11	7	10	4	*	1	3	0	*	16	0	
M	68.9	41.5	55.2	95	1971	14	1965	322	0.36	2.86	1970	T	1972+	2.20	1970	0.5	5.9	1970	5.0	1970	55	67	37	29	12.1	S	48	25	1960		4.9	13	8	10	2	*	1	1	*	*	8	0	
A	78.5	51.2	64.9	99	1972	28	1970	90	0.83	2.85	1949	0.00	1964	1.25	1966	T	T	1949	T	1949	52	66	33	26	12.2	SSE	44	29	1961		4.8	13	8	9	3	0	3	*	3	0	1	0	
M	86.2	60.6	73.4	102	1969+	34	1970	0	2.08	4.99	1959	0.08	1953	4.75	1968	0.0	0.0		0.0		61	76	40	32	12.0	SSE	52	20	1958		4.7	13	9	9	5	0	6	1	10	0	0	0	
J	93.1	69.3	81.2	106	1964	48	1970	0	1.63	3.93	1949	0.05	1951	2.54	1969	0.0	0.0		0.0		59	77	42	32	11.7	SSE	58	24	1966+		4.0	15	9	6	5	0	6	*	20	0	0	0	
J	94.5	71.2	82.9	106	1964	59	1971	0	1.88	6.73	1961	T	1954	5.99	1961	0.0	0.0		0.0		52	68	39	30	10.2	SSE	40	33	1972		4.6	12	12	7	5	0	6	*	27	0	0	0	
A	94.1	70.2	82.2	107	1964	56	1967+	0	1.48	3.84	1958	0.17	1967+	2.41	1965	0.0	0.0		0.0		60	73	44	37	9.4	SE	37	31	1966		4.4	14	11	6	5	0	6	*	19	0	0	0	
S	87.7	63.1	75.4	100	1965+	42	1971	0	1.79	4.06	1962	0.14	1960	2.16	1962	0.0	0.0		0.0		73	83	53	46	9.6	SSE	40	36	1959		4.1	15	8	7	5	0	3	1	9	0	0	0	
O	78.6	53.1	65.9	95	1964	34	1969	87	1.66	4.09	1953	0.00	1952	1.79	1959	T	T	1958	T	1958	69	79	44	41	9.6	S	36	31	1970		3.8	17	6	8	5	0	2	1	2	0	0	0	
N	66.3	38.7	52.5	88	1963	20	1970	381	0.47	2.32	1968	0.00	1950+	1.21	1968	0.3	4.5	1968	2.0	1968	69	77	46	44	9.7	S	41	30	1972		4.2	15	6	9	3	*	1	2	0	0	7	0	
D	59.6	32.2	45.9	81	1970+	12	1966	592	0.66	1.88	1960	T	1958+	0.93	1960	0.3	4.8	1960	2.7	1960	66	74	45	43	9.7	SW	39	28	1970+		4.7	14	7	10	3	*	*	3	0	1	17	0	
YR	77.2	51.5	64.3	107	AUG. 1964	2	JAN. 1971+	2591	14.24	6.73	JUL. 1961	0.00	JAN. 1967+	5.99	JUL. 1961	3.1	7.7	JAN. 1949	5.9	JAN. 1955	61	73	42	36	10.6	SSE	67	25	FEB. 1960		4.5	165	97	103	50	2	35	15	91	2	68	0	

ø For period July 1963 through the current year.
Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows:
Lowest temperature -11 in February 1933; maximum monthly precipitation 8.18 in September 1932.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	47.1	44.0	56.8	60.3	70.8	79.8	82.6	80.9	78.5	68.7	54.9	50.1	64.5
1934	45.4	48.7	53.9	65.4	73.5	82.8	83.4	82.0	74.7	69.4	55.7	46.9	65.2
#1935	48.1	46.9	59.6	65.4	68.2	77.4	79.1	81.0	68.3	64.6	52.1	44.4	62.9
#1936	41.5	43.6	57.8	62.4	71.5	79.8	78.4	80.6	72.9	60.5	48.9	46.9	62.1
1937	40.2	46.9	49.3	63.9	73.2	80.0	81.9	83.0	76.7	65.6	50.7	44.4	63.0
1938	45.2	51.7	59.1	62.2	73.8	79.8	79.3	79.0	74.7	65.8	48.8	43.6	63.6
1939	45.2	42.4	57.3	63.7	73.0	81.2	82.0	79.0	76.5	66.3	50.0	47.1	63.6
1940	36.7	48.7	57.6	63.5	72.4	76.3	81.2	78.9	74.8	65.9	50.5	47.8	62.9
1941	46.4	47.4	49.6	60.5	70.3	75.0	79.2	79.3	73.7	65.3	53.7	47.0	62.3
#1942	41.8	46.9	53.2	63.8	71.5	80.0	80.9	78.7	69.9	63.2	57.3	47.6	62.9
1943	44.2	51.1	54.4	68.6	70.6	79.6	81.8	85.2	73.4	63.3	51.8	42.3	63.9
1944	42.8	50.0	58.6	62.6	72.3	78.2	83.5	81.6	72.9	64.7	53.4	42.0	63.1
1945	46.4	49.8	59.4	61.9	75.1	80.3	78.1	81.0	76.0	62.4	56.3	44.6	64.3
#1946	41.5	49.8	58.4	71.0	73.6	79.0	83.6	84.3	76.4	69.3	55.5	49.6	66.0
1947	42.3	44.8	53.9	65.2	72.2	80.6	82.6	80.0	76.2	70.4	50.8	45.6	63.7
#1948	41.4	46.8	52.3	70.1	74.7	83.2	81.6	83.0	74.1	64.1	50.8	50.3	64.4
1949	35.5	49.8	56.6	60.5	73.7	79.3	82.0	79.9	74.2	62.4	57.1	46.8	63.2
1950	50.4	53.3	56.2	64.2	72.7	80.2	80.5	80.5	74.5	69.8	54.2	46.3	65.2
1951	42.9	49.4	54.1	62.1	74.3	81.8	84.7	83.4	76.1	64.8	51.2	48.4	64.4
1952	51.3	50.9	53.4	62.6	72.1	82.1	80.9	85.6	74.1	64.1	50.5	45.3	64.4
1953	52.1	47.4	60.6	63.8	72.7	85.5	84.4	82.0	76.9	65.4	53.5	41.5	65.5
1954	47.0	53.8	58.1	68.6	69.0	79.7	83.3	82.4	78.2	65.9	54.2	48.2	65.5
1955	42.9	46.8	56.6	68.0	73.4	79.2	80.7	80.6	76.3	65.7	52.1	48.3	64.2
1956	45.2	46.4	57.0	63.0	76.4	83.0	82.5	81.2	76.6	67.6	50.2	47.5	64.7
1957	44.9	54.2	55.4	61.0	69.5	77.9	83.3	82.4	73.4	61.9	47.2	48.5	63.3
1958	42.0	44.5	48.0	60.2	71.8	81.5	84.2	82.0	74.7	61.5	53.6	43.4	62.3
#1959	42.7	46.8	53.9	62.1	73.3	78.8	78.1	81.2	76.3	63.0	47.1	46.8	62.5
1960	43.3	42.6	51.3	65.3	72.3	82.4	80.6	80.8	75.5	66.9	54.7	40.4	63.0
1961	40.2	47.9	55.4	64.4	73.7	77.5	78.0	78.3	73.3	65.6	48.7	44.6	62.3
1962	39.1	54.1	52.4	65.0	77.4	78.9	82.2	83.0	74.5	67.6	54.9	45.6	64.5
#1963	39.8	47.4	58.7	69.5	74.4	79.2	83.5	82.2	76.2	71.1	56.0	40.2	64.8
1964	43.6	42.7	58.6	67.1	75.7	83.5	86.9	87.2	76.5	66.4	56.6	49.0	65.9
1965	47.6	43.2	47.7	67.4	71.7	79.0	82.8	79.6	74.9	63.9	57.4	49.7	63.7
1966	38.0	42.7	57.2	61.9	70.4	78.0	84.1	78.9	72.8	61.2	56.8	43.4	62.1
1967	43.6	46.4	60.5	68.7	72.3	79.9	80.7	77.7	71.1	64.0	54.0	41.9	63.4
1968	44.3	44.7	53.5	60.8	70.8	77.5	78.5	79.2	72.6	67.0	49.6	43.3	61.8
1969	47.6	48.1	47.5	65.2	69.3	78.2	84.1	82.7	74.2	61.0	51.4	47.6	63.1
1970	42.0	47.6	49.8	61.5	69.9	77.5	82.2	79.9	73.4	61.9	53.1	50.7	62.4
1971	47.4	47.2	55.8	62.8	72.2	78.4	80.7	74.4	71.6	64.0	53.3	47.8	63.0
1972	44.2	49.3	60.0	69.7	70.4	78.9	79.2	75.7	72.5	62.5	46.4	43.5	62.7
RECORD MEAN	43.8	47.8	54.6	64.2	72.1	79.7	81.6	80.9	74.6	65.1	52.5	45.6	63.5
MAX	57.4	61.8	69.4	78.7	85.8	92.7	94.2	93.3	86.8	78.2	65.9	58.9	76.9
MIN	30.2	33.8	39.8	49.6	58.4	66.7	68.9	68.4	62.3	52.0	39.0	32.3	50.1

TOTAL DEGREE DAYS

MIDLAND, TEXAS

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0	0	0	9	306	462	611	454	356	83	14	0	2295
1934-35	0	1	0	17	284	556	525	504	208	69	75	0	2239
#1935-36	0	0	30	109	393	634	714	642	225	173	1	0	2921
#1936-37	0	0	49	188	489	561	771	508	489	113	7	0	3175
1937-38	0	0	3	73	436	638	617	375	199	162	22	0	2525
1938-39	0	0	0	73	492	671	615	634	233	123	18	0	2859
1939-40	0	0	3	79	433	560	882	484	243	138	4	0	2826
1940-41	0	0	3	64	436	532	586	493	479	154	23	1	2771
#1941-42	0	0	3	93	350	557	719	507	368	104	17	0	2718
1942-43	0	0	35	97	258	535	642	394	342	36	52	0	2391
1943-44	0	0	18	95	390	705	689	436	357	113	17	0	2820
1944-45	0	0	1	80	359	713	578	427	182	130	20	1	2491
#1945-46	0	0	36	124	272	633	729	425	221	23	13	0	2476
1946-47	0	0	2	21	290	470	702	567	353	109	16	0	2530
#1947-48	0	0	0	9	415	594	660	527	406	34	11	0	2656
1948-49	0	0	12	97	426	456	915	430	267	182	0	0	2785
1949-50	0	0	3	157	240	573	454	330	284	121	17	0	2179
1950-51	0	0	0	4	338	581	688	430	333	148	15	5	2542
1951-52	0	0	4	46	412	513	421	402	356	78	29	0	2261
1952-53	0	0	17	98	430	605	398	488	160	85	58	0	2339
1953-54	0	0	0	86	338	722	550	309	339	48	50	0	2442
1954-55	0	0	0	105	319	517	678	504	277	69	3	3	2475
1955-56	0	0	0	74	383	512	604	542	263	146	0	0	2524
1956-57	0	0	0	54	439	536	617	301	293	175	25	10	2450
1957-58	0	0	2	155	530	504	709	566	522	176	16	0	3180
1958-59	0	0	10	161	338	664	686	501	341	179	6	0	2886
#1959-60	0	0	9	110	534	556	666	643	426	84	28	0	3056
1960-61	0	0	2	64	307	758	761	474	293	124	5	4	2792
1961-62	0	0	12	66	481	625	796	309	394	96	7	0	2786
#1962-63	0	0	2	74	299	595	773	487	233	45	19	0	2527
1963-64	0	0	1	3	274	761	656	643	287	63	5	0	2693
1964-65	0	0	6	34	283	493	535	604	529	52	5	0	2541
1965-66	0	0	11	96	232	468	831	621	258	124	46	0	2687
1966-67	0	3	4	159	242	663	654	516	176	23	22	0	2462
1967-68	0	0	9	95	324	708	634	582	360	143	14	0	2869
1968-69	0	0	0	60	456	665	535	467	534	52	30	0	2799
1969-70	0	0	0	216	405	532	706	482	463	137	48	5	2994
1970-71	0	0	41	150	348	441	540	493	297	119	15	0	2444
1971-72	0	0	51	71	350	528	639	446	176	37	12	0	2310
1972-73	0	0	19	158	551	660							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	T	0.87	0.02	0.02	0.14	0.26	1.12	1.56	2.36	0.09	0.14	0.18	6.76
1934	0.46	0.02	0.63	1.30	1.06	0.63	0.77	5.34	1.97	0.13	0.33	0.05	12.69
#1935	0.09	1.32	0.15	0.22	3.18	3.02	1.88	0.08	3.21	1.79	0.94	0.26	16.14
#1936	0.10	T	0.40	0.90	3.21	1.00	6.18	0.00	5.90	1.01	0.37	0.30	19.37
1937	0.23	0.07	0.89	0.42	1.79	0.31	1.65	1.21	1.09	0.84	0.34	1.13	9.97
1938	1.63	1.29	0.09	0.10	0.82	4.30	5.63	0.28	0.45	0.79	0.30	0.48	16.16
1939	4.99	T	0.02	0.08	1.26	0.67	1.81	1.26	0.01	0.46	0.96	0.90	12.42
1940	0.31	0.23	0.21	0.47	1.18	5.10	0.06	2.35	0.45	3.45	0.36	0.38	14.55
1941	0.47	0.34	1.96	2.60	7.87	4.24	1.57	2.48	2.57	5.30	0.18	0.75	30.33
#1942	0.17	0.11	T	1.66	0.70	0.11	1.78	3.76	1.79	1.40	0.08	2.33	13.89
1943	0.12	T	0.41	0.30	2.83	1.74	1.83	0.09	0.59	0.31	0.86	1.48	10.56
1944	0.63	1.41	T	0.23	1.74	4.47	0.25	1.67	4.97	0.52	2.20	0.88	18.97
1945	0.84	0.28	0.79	0.02	0.06	0.79	4.62	0.45	1.21	2.37	T	0.19	11.62
#1946	3.18	0.04	0.00	T	0.12	1.49	0.00	1.81	1.96	1.43	0.00	0.56	10.59
1947	0.51	0.00	1.60	0.00	1.85	1.09	0.95	0.50	0.91	1.78	0.93	0.62	10.74
#1948	0.25	0.65	T	0.42	1.67	0.77	3.41	0.17	0.83	1.68	T	0.20	10.05
1949	3.66	0.41	0.21	2.85	1.88	3.93	2.50	2.18	2.07	2.15	0.00	0.35	22.19
1950	0.53	0.23	T	0.87	2.58	1.31	2.35	1.11	1.57	0.58	0.00	T	11.13
1951	0.01	0.39	0.26	0.40	0.86	0.05	0.05	1.26	0.34	0.42	0.05	0.15	4.24
1952	0.07	0.27	0.21	0.95	1.15	0.37	2.34	1.07	2.34	0.00	0.80	0.58	10.15
1953	T	0.48	0.72	0.87	0.08	0.06	0.09	0.18	0.68	4.09	T	0.20	7.45
1954	0.26	0.12	0.04	1.39	4.11	1.97	T	1.26	0.15	2.55	0.01	0.12	11.98
1955	0.68	0.14	0.01	T	2.06	1.88	2.95	0.46	0.35	1.04	0.20	T	9.77
1956	0.16	0.16	0.04	1.15	1.41	1.40	1.71	1.73	0.17	1.42	T	0.27	9.62
1957	0.39	1.15	0.09	0.44	4.30	2.55	0.40	1.19	1.56	1.78	1.56	0.17	15.58
1958	1.97	1.57	0.83	0.78	3.24	0.50	0.89	3.84	3.42	2.40	0.88	T	20.32
1959	0.06	0.62	0.16	0.39	4.99	1.89	4.46	0.90	2.48	2.75	0.68	1.01	20.39
1960	1.17	0.60	0.17	0.28	1.55	0.42	3.33	2.59	0.14	2.29	0.16	1.88	14.58
1961	1.33	0.43	1.12	0.02	2.63	2.96	6.73	0.21	3.12	0.03	1.63	0.33	20.54
1962	0.17	0.03	0.48	0.79	0.14	1.83	2.12	2.66	4.06	0.87	0.38	0.58	14.11
1963	0.01	0.75	T	0.95	2.62	2.61	1.17	1.24	0.39	0.17	0.77	0.28	10.96
1964	0.40	0.27	0.64	0.00	2.14	0.40	0.24	0.58	2.19	0.19	0.20	0.40	7.65
1965	0.06	1.71	0.06	0.33	3.04	0.90	0.06	3.23	0.78	1.41	0.29	0.29	12.16
1966	0.48	0.20	0.41	2.44	2.86	2.91	0.17	3.37	3.29	0.80	0.04	0.02	16.99
1967	0.00	0.03	1.45	0.44	0.56	1.17	1.64	0.17	1.59	0.20	0.44	0.78	8.47
1968	1.07	1.06	1.62	1.59	4.96	1.02	1.01	2.10	1.39	0.19	2.32	0.18	18.51
1969	0.02	1.79	0.51	2.10	3.28	2.68	0.74	0.32	1.53	2.52	0.85	0.60	16.94
1970	0.01	1.40	2.86	0.29	0.18	0.99	0.23	0.87	2.00	0.78	T	0.11	9.72
1971	T	0.01	T	0.81	2.77	1.07	0.79	3.27	2.55	0.67	0.42	0.24	12.60
1972	0.37	0.04	T	0.29	1.20	1.70	0.58	3.80	1.05	2.26	0.22	0.15	11.66
RECORD MEAN	0.67	0.61	0.48	0.83	2.12	1.67	1.67	1.60	1.81	1.43	0.54	0.57	14.00

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0.0	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	T
#1934-35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#1935-36	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6
1936-37	0.0	0.0	0.0	0.0	0.0	0.0	T	0.1	0.0	0.0	0.0	0.0	0.1
1937-38	0.0	0.0	0.0	0.0	0.0	T	0.1	0.2	0.0	T	0.0	0.0	0.3
1938-39	0.0	0.0	0.0	0.0	T	0.0	0.0	T	0.0	0.2	0.0	0.0	0.2
1939-40	0.0	0.0	0.0	0.0	0.0	4.7	2.8	2.7	0.0	0.0	0.0	0.0	10.2
1940-41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	T	0.0	0.0	0.0	1.0
#1941-42	0.0	0.0	0.0	0.0	0.0	0.0	1.5	T	T	T	0.0	0.0	1.5
1942-43	0.0	0.0	0.0	0.0	0.0	0.0	T	0.0	T	0.0	0.0	0.0	T
1943-44	0.0	0.0	0.0	0.0	0.0	6.3	1.9	0.0	0.0	0.0	0.0	0.0	8.2
1944-45	0.0	0.0	0.0	0.0	T	T	0.0	0.7	0.0	0.0	0.0	0.0	0.7
#1945-46	0.0	0.0	0.0	0.0	0.0	T	0.7	0.0	0.0	0.0	0.0	0.0	0.7
1946-47	0.0	0.0	0.0	0.0	0.0	5.6	5.1	0.0	3.2	0.0	0.0	0.0	13.9
#1947-48	0.0	0.0	0.0	0.0	0.0	T	2.5	T	0.0	0.0	0.0	0.0	2.5
1948-49	0.0	0.0	0.0	0.0	0.0	T	7.7	0.0	0.0	T	0.0	0.0	7.7
1949-50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	T
1950-51	0.0	0.0	0.0	0.0	0.0	T	T	2.2	T	0.0	0.0	0.0	2.2
1951-52	0.0	0.0	0.0	0.0	T	0.0	T	1.5	0.0	0.0	0.0	0.0	1.5
1952-53	0.0	0.0	0.0	0.0	0.0	0.0	T	T	0.0	0.0	0.0	0.0	T
1953-54	0.0	0.0	0.0	0.0	0.0	T	T	0.0	T	0.0	0.0	0.0	T
1954-55	0.0	0.0	0.0	0.0	0.0	1.2	5.9	T	0.0	0.0	0.0	0.0	7.1
1955-56	0.0	0.0	0.0	0.0	0.4	0.0	0.8	1.5	T	0.0	0.0	0.0	2.7
1956-57	0.0	0.0	0.0	0.0	T	T	T	0.0	T	0.0	0.0	0.0	T
1957-58	0.0	0.0	0.0	0.0	1.1	0.0	3.7	T	1.0	0.0	0.0	0.0	5.8
1958-59	0.0	0.0	0.0	T	0.0	T	0.3	0.3	T	0.0	0.0	0.0	0.6
1959-60	0.0	0.0	0.0	0.0	T	T	T	2.8	T	0.0	0.0	0.0	2.8
1960-61	0.0	0.0	0.0	0.0	0.0	4.8	2.0	2.2	T	0.0	0.0	0.0	9.0
1961-62	0.0	0.0	0.0	0.0	T	T	1.6	T	3.5	0.0	0.0	0.0	5.1
1962-63	0.0	0.0	0.0	0.0	0.0	0.7	T	2.7	0.0	0.0	0.0	0.0	3.4
1963-64	0.0	0.0	0.0	0.0	0.0	T	T	0.4	T	0.0	0.0	0.0	0.4
1964-65	0.0	0.0	0.0	0.0	0.0	T	0.0	3.5	1.0	0.0	0.0	0.0	4.5
1965-66	0.0	0.0	0.0	0.0	0.0	T	3.6	T	0.0	0.0	0.0	0.0	3.6
1966-67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	T
1967-68	0.0	0.0	0.0	0.0	0.0	1.2	0.8	1.7	0.2	0.0	0.0	0.0	3.9
1968-69	0.0	0.0	0.0	0.0	4.5	T	0.0	0.0	1.5	0.0	0.0	0.0	6.0
1969-70	0.0	0.0	0.0	0.0	1.3	0.5	0.1	1.7	5.9	0.0	0.0	0.0	9.5
1970-71	0.0	0.0	0.0	0.0	0.0	0.0	T	0.1	T	0.0	0.0	0.0	0.1
1971-72	0.0	0.0	0.0	0.0	0.0	T	2.4	T	T	0.0	0.0	0.0	2.4
1972-73	0.0	0.0	0.0	0.0	0.6	T							

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1930.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above: Sea level: Ground at temperature site	Ground: Wind instruments	Ground: Extreme thermometers	Ground: Psychrometer	Ground: Telepsychrometer	Ground: Tipping bucket rain gage	Ground: Weighing rain gage	Ground: 8" rain gage	Ground: Hygrothermometer	Sea level: Pyranometer	Remarks
Sloan Field, 9 miles WSW of Post Office	6/01/30	9/30/35		31° 56'	102° 12'	2856	20	12	12		4		4			
Bankhead Highway at Texas Street	10/01/35	8/31/36	9.5 mi. ENE	32° 00'	102° 04'	2779		6					3			H. T. Sloan, Co-op Observer.
Sloan Field, 9 miles WSW of Post Office	9/01/36	2/28/42	9.5 mi. WSW	31° 56'	102° 12'	2856	20	12	12		4		4			Record resumed by Signal Corps 9/1/36. Air Force took over records 2/14/41.
Midland Air Force Base 9.3 miles WSW of P. O.	2/28/42	2/28/46	1 mile NW	31° 56'	102° 12'	2858	20	12	12		4	4	4			
Gulf Oil Pumping Station 3.8 miles ENE of P. O.	3/01/46	1/31/48	13.1 mi. ENE	32° 01'	102° 12'	2740		6				4	3			Air Force discontinued operations. Gulf Refining Company Co-op Observer. Weighing gage operative 4/3/47 - 11/14/53.
Midland Air Terminal 9.3 miles WSW of P. O.	2/01/48	11/14/53	13.1 mi. WSW	31° 56'	102° 12'	2858	a42	5	4				4		2890	a - 30 feet to 4/14/48 and 44 feet to 2/12/51.
Midland Air Terminal	11/14/53	12/04/59	Office not moved	31° 56'	102° 12'	2854	a36	6	5			4	2			Instrumental addition and relocation. a - 42 feet to 9/30/54.
Midland Air Terminal* *Name changed 2/15/67 to Midland-Odessa Regional Airport	12/04/59	4/24/72	360 feet E	31° 56'	102° 12'	b2851	22	31	30			c5	31	a4	2885	Thermometer exposure on roof poor. a - Commissioned 2100 feet east of thermometer site 6/30/63. b - 2854 feet to 6/30/63. c - 31 feet until moved 120 feet NNW 5/11/65.
NWS Building Midland-Odessa Regional Airport	4/24/72	Present	1.0 mi. ENE	31° 57'	102° 11'	2851	d22	4	4			5	4	d4	2867	d - Same site as prior to 4/24/72.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

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LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

PHOENIX, ARIZONA

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

Phoenix is located in about the center of the Salt River Valley, a broad, oval-shaped, nearly flat plain. The Salt River runs from east to west through the valley but, owing to impounding dams upstream, it is usually dry. The climate is of a desert type with low annual rainfall and low relative humidity. Daytime temperatures are high throughout the summer months. The winters are mild. Nighttime temperatures frequently drop below freezing during the three coldest months, but afternoons are usually sunny and warm.

At an elevation of about 1100 feet, the station is in a level or gently sloping valley running east and west. The Salt River Mountains are located about 6 miles to the south and rise to 2600 feet m.s.l. The Phoenix Mountains lie 8 miles to the north-northwest and have a maximum elevation of 2300 feet m.s.l. Eighteen miles to the southwest lies the 3300-foot Estrella Mountain, and 25 miles to the west are found the White Tank Mountains with an elevation of 4000 feet m.s.l. The Superstition Mountains are approximately 40 miles to the east and rise to 4600 feet m.s.l.

The central floor of the Salt River Valley is irrigated by water from dams built on the Salt River system. To the north and west of the gravity flow irrigated district there is considerable agricultural land irrigated by pump water. There is no evidence that the irrigation has in any way affected the relative humidity in the valley. The average daytime relative humidity is about 30 percent based on observations at 11:00 a.m. and 5:00 p.m.

There are two separate rainfall seasons. The first occurs during the winter months from November to March when the area is subjected to occasional storms from the Pacific Ocean. While this is classed as a rainfall season, there can be periods of a month or more in this or any other season when practically no precipitation occurs. Snowfall occurs very rarely in the Salt River Valley, while light snows occasionally fall in the higher mountains surrounding the valley. The second rainfall period occurs during July and August when Arizona is subjected to widespread thunderstorm activity whose moisture supply originates in the Gulf of Mexico. These thunderstorms are extremely variable in intensity and location.

The spring and fall months are generally dry, although precipitation in substantial amounts has fallen on occasion during every month of the year.

Since the Phoenix area is primarily agricultural, minimum temperatures and their variation over the valley have been studied closely. During the winter months the temperature is marginal for some types of crops, such as citrus. Areas with milder temperatures around the edges of the valley are utilized by these crops. However, the valley is subject to occasional killing and hard freezes in which no area escapes damage.

The valley floor, in general, is rather free of wind. During the spring months southwest and west winds predominate and are associated with the passage of low pressure throughs. During the thunderstorm season there are often local gusty winds, usually flowing from an easterly direction. Throughout the year there are periods, often several days in length, in which winds remain under 10 miles an hour.

Sunshine in the Phoenix area averages 86 percent of the possible amount, ranging from a minimum monthly average of 77 percent in January and December to a maximum of 94 percent in June. During the winter, skies are sometimes cloudy, but clear skies predominate and temperatures are mild. During the spring, skies are also predominately clear with warm temperatures during the day and mild pleasant evenings. Beginning with June, daytime weather is hot. During July and August, there is often considerable afternoon cloudiness associated with cumulus clouds building up over the nearby mountains. Summer thundershowers seldom occur in the valley before evening.

The autumn season, beginning during the latter part of September, is characterized by sudden changes in temperature. The change from the heat of summer to mild winter temperatures usually occurs during October. The normal temperature change from the beginning to the end of this month is the greatest of any of the twelve months in central Arizona. By November, the mild winter season is definitely established in the Salt River Valley region.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: PHOENIX, ARIZONA SKY HARBOR INTL AIRPORT Standard time used: MOUNTAIN Latitude: 33° 26' N Longitude: 112° 01' W Elevation (ground): 1117 feet Year: 1972

Month	Temperature Averages: Daily maximum	Daily minimum	Monthly	Temperature Extremes: Highest	Date	Lowest	Date	Degree days (Base 65°): Heating	Cooling	Precipitation: Total	Greatest in 24 hrs.	Date	Snow, Ice pellets: Total	Greatest in 24 hrs.	Date	Relative humidity: Hour 05	Hour 11	Hour 17	Hour 23 (Local time)	Wind &: Resultant Direction	Resultant Speed	Average speed	Peak gust Speed	Peak gust Direction	Peak gust Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days: Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Maximum: 90° and above ‡	32° and below	Temperatures Minimum: 32° and below	0° and below	** Average daily solar radiation - langleys
JAN	67.2	35.5	51.4	75	15	26	5	414	0	0.00	0.00		0.0	0.0		55	33	18	41	11	1.9	5.8	28	ENE	15+	91	3.1	20	3	8	0	0	0	0	0	0	7	0	
FEB	75.1	43.1	59.1	86	28+	31	3	174	11	T	T	15 +	0.0	0.0		37	21	12	26	12	2.2	6.3	23	ENE	3	85	5.1	10	9	10	0	0	0	0	0	0	3	0	
MAR	86.7	54.4	70.6	95	10	39	29	22	200	T	T	22	0.0	0.0		34	17	11	22	20	1.4	7.7	31	W	29	96	2.6	19	9	3	0	0	0	0	17	0	0	0	
APR	86.8	56.0	71.4	94	5	47	15	12	212	T	T	12 +	0.0	0.0		28	15	10	18	20	2.0	8.5	36	WSW	13	94	3.4	17	5	8	0	0	0	0	13	0	0	0	
MAY	93.3	63.2	78.3	100	28+	57	22	0	419	T	T	30 +	0.0	0.0		29	15	10	19	21	1.6	8.3	44	SE	29	95	2.7	21	5	5	0	0	1	0	25	0	0	0	
JUN	101.2	74.3	87.8	112	30	68	25	0	691	1.70	1.64	21-22	0.0	0.0		41	24	17	30	20	0.5	8.5	59	S	7	92	2.6	21	4	5	3	0	6	0	30	0	0	0	
JUL	106.8	81.9	94.4	115	31	71	17	0	919	0.72	0.39	7	0.0	0.0		39	25	17	26	23	1.2	8.4	49	NNE	17	93	2.0	24	5	2	2	0	4	0	31	0	0	0	
AUG	102.2	77.5	89.9	116	1	72	19	0	780	1.20	0.68	5-6	0.0	0.0		49	32	22	35	17	0.7	7.5	54	SE	12	88	2.6	22	6	3	3	0	6	0	31	0	0	0	
SEP	98.5	71.0	84.8	105	5+	61	20	0	599	0.28	0.21	7	0.0	0.0		48	27	19	35	14	2.1	7.2	44	SE	7	94	2.8	21	4	5	3	0	5	0	30	0	0	0	
OCT	81.1	62.7	71.9	103	1	45	31	38	259	4.40	2.27	18-19	0.0	0.0		71	53	42	61	14	1.9	6.7	30	SSE	6	65	5.6	13	5	13	9	0	3	1	9	0	0	0	
NOV	70.3	45.9	58.1	84	7	37	30	205	4	1.01	0.58	11-12	0.0	0.0		72	45	31	58	13	2.3	6.3	33	SW	17	83	3.2	17	8	5	2	0	2	0	0	0	0	0	
DEC	64.2	40.0	52.1	76	4	29	12	395	0	1.56	1.15	27-28	0.0	0.0		68	48	34	59	12	1.7	6.9	41	W	5	73	4.5	14	7	10	5	0	1	0	0	0	3	0	
YEAR	86.1	58.8	72.5	116	AUG. 1	26	JAN. 5	1260	4094	10.87	2.27	OCT. 18-19	0.0	0.0		48	30	20	36	15	1.3	7.3	59	S	JUN. 7	88	3.4	219	70	77	27	0	28	1	186	0	13	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature Normal: Daily maximum	Daily minimum	Monthly	Temperature Extremes: Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation: Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets: Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity: Hour 05	Hour 11	Hour 17	Hour 23 (Local time)	Wind &: Mean speed	Prevailing direction	Peak gust ∅ Speed	Direction	Year	† Pct. of possible sunshine	$ Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Max.: 90° and above ‡	32° and below	Temperatures Min.: 32° and below	0° and below	** Average daily solar radiation - langleys
(a)	(b)	(b)	(b)	12		12		(b)	(b)	35		35		35		35	35		35		12	12	12	12	27	18	35	35		77	27	35	35	35	33	35	33	35	12	12	12	12	
J	64.0	35.3	49.7	88	1971	19	1971	474	0.73	2.41	1955	0.00	1972+	1.31	1951	T	T	1962+	T	1962+	66	43	30	56	4.9	E	49	WNW	1965	78	4.7	14	7	10	4	0	*	1	0	0	7	0	
F	68.1	38.9	53.5	89	1963	26	1964	328	0.85	2.23	1944	0.00	1967	1.07	1944	T	0.6	1939	0.6	1939	59	37	25	48	5.6	E	49	SSE	1959	80	4.4	13	6	9	4	0	1	*	0	0	3	0	
M	75.0	42.9	59.0	95	1972+	25	1966	217	0.66	4.16	1941	0.00	1959+	1.32	1941	0.0	0.0		0.0		57	32	22	42	6.3	E	50	WNW	1956	83	4.2	15	8	8	3	0	1	*	2	0	1	0	
A	83.9	50.4	67.2	101	1962	37	1968	75	0.32	2.10	1941	0.00	1962+	1.38	1941	T	T	1949	T	1949	44	23	16	29	6.6	E	45	NW	1957+	88	3.5	17	7	6	2	0	1	0	8	0	0	0	
M	92.9	57.1	75.0	108	1970+	40	1967+	0	0.13	0.94	1944	0.00	1952+	0.94	1944	0.0	0.0		0.0		36	18	13	22	6.7	E	59	SSE	1954	93	2.7	21	6	4	1	0	*	0	22	0	0	0	
J	101.6	65.5	83.6	116	1970	51	1965	0	0.09	1.70	1972	0.00	1971+	1.64	1972	0.0	0.0		0.0		36	19	13	23	6.6	E	59	S	1972	94	1.9	23	5	2	1	0	1	0	29	0	0	0	
J	104.6	75.0	89.8	115	1972	67	1968+	0	0.77	4.19	1955	T	1947	1.97	1955	0.0	0.0		0.0		47	28	20	33	6.9	W	71	N	1959	85	3.7	17	10	4	4	0	6	0	31	0	0	0	
A	101.6	73.4	87.5	116	1972	61	1968+	0	1.12	5.56	1951	0.02	1967	3.07	1943	0.0	0.0		0.0		56	36	25	42	6.4	E	60	SSW	1953	85	3.4	17	10	4	5	0	8	0	31	0	0	0	
S	98.2	67.3	82.8	110	1971	47	1965	0	0.73	4.23	1939	0.00	1968+	2.43	1970	0.0	0.0		0.0		55	33	24	42	6.1	E	75	SW	1950	89	2.1	22	5	3	3	0	3	0	27	0	0	0	
O	86.7	54.6	70.7	103	1972	34	1971	22	0.46	4.40	1972	0.00	1952+	2.27	1972	0.0	0.0		0.0		55	30	22	43	5.5	E	48	SSW	1956	88	2.7	20	6	5	3	0	1	*	14	0	0	0	
N	73.7	42.4	58.1	92	1967	31	1966	234	0.49	3.04	1952	0.00	1956+	1.07	1952	0.0	0.0		0.0		62	39	29	53	5.1	E	45	WSW	1963+	84	3.5	18	6	6	2	0	*	*	*	0	*	0	
D	66.1	37.0	51.6	82	1965	24	1968	415	0.85	3.98	1967	0.00	1958	1.89	1967	T	T	1968+	T	1968+	70	49	36	61	4.9	E	68	W	1953	77	4.0	15	6	10	4	0	1	1	0	0	4	0	
YR	84.7	53.3	69.0	116	AUG. 1972+	19	JAN. 1971	1765	7.20	5.56	AUG. 1951	0.00	JAN. 1972+	3.07	AUG. 1943	T	0.6	FEB. 1939	0.6	FEB. 1939	53	32	23	41	6.0	E	75	SW	SEP. 1950	86	3.4	212	82	71	34	0	23	2	163	0	15	0	

∅ Peak Gust observed during Airway observational program from January 1938 through October 1953; from recorder charts thereafter.
† Combined record from Post Office, August 1895 through October 1953, and from Sky Harbor Airport, November 1953 to date.
$ Broken record: 1940, 1941, and 1948 to date.
Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 118 in July 1958+; lowest temperature 16 in January 1913; maximum monthly precipitation 6.47 in July 1911; maximum precipitation in 24 hours 4.98 in July 1911; maximum monthly snowfall 1.0 in January 1937 and earlier; maximum snowfall in 24 hours 1.0 in January 1937 and earlier.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	48.6	49.6	61.9	64.7	72.6	87.6	95.0	92.4	86.8	76.8	62.7	54.6	71.1
1934	54.5	60.8	70.0	74.8	83.2	83.8	94.0	90.0	84.8	75.5	61.4	56.0	74.1
1935	53.8	57.9	57.6	69.4	74.1	89.2	92.0	88.4	84.6	72.6	57.2	54.3	70.9
#1936	52.8	56.4	64.6	73.1	81.7	90.3	93.2	91.1	83.6	73.2	61.8	53.2	72.9
#1937	43.2	54.7	59.9	67.6	78.6	85.3	91.8	92.2	86.9	74.8	62.3	56.9	71.2
1938	52.6	54.4	57.8	66.6	78.7	83.4	88.8	88.2	84.4	69.2	53.2	53.6	69.2
1939	50.7	47.0	61.0	70.2	77.5	84.6	92.0	90.3	82.0	69.4	62.5	55.5	70.2
1940	54.6	55.2	63.6	69.5	80.8	89.1	92.0	91.3	85.0	72.7	57.7	55.6	72.3
1941	53.3	57.3	58.4	61.6	74.5	80.6	88.6	86.2	79.2	66.4	60.0	52.3	68.2
1942	52.4	51.0	57.0	64.8	73.4	83.2	91.8	87.6	83.3	70.6	61.9	54.5	69.3
1943	51.7	57.6	63.2	70.7	77.5	83.6	91.0	87.4	84.0	71.1	59.4	52.4	70.8
1944	49.9	51.6	56.0	64.0	74.0	79.6	88.6	90.3	83.0	73.2	56.6	52.0	68.2
1945	50.4	54.6	55.8	65.4	75.1	81.2	91.1	89.6	83.8	73.8	57.6	49.3	69.0
1946	49.6	52.0	60.8	72.4	75.8	86.2	90.1	88.8	83.8	66.4	54.3	53.6	69.5
1947	48.5	58.1	62.7	68.2	78.8	83.7	92.9	88.8	86.2	72.7	55.0	49.2	70.4
1948	51.6	52.6	56.3	69.2	76.4	84.2	91.2	91.4	85.6	73.6	54.8	50.1	69.8
1949	43.7	51.8	59.1	70.6	76.0	85.3	90.4	87.6	86.1	68.5	64.4	51.3	69.6
1950	49.7	58.9	62.6	72.5	76.0	84.9	90.5	90.3	82.2	78.3	64.2	57.5	72.3
1951	51.9	56.1	60.7	67.8	76.7	83.0	92.5	87.2	83.2	71.9	58.6	52.1	70.1
#1952	51.4	54.2	55.6	67.5	79.6	84.5	89.9	90.9	85.8	76.8	57.1	51.0	70.4
1953	54.5	53.3	61.5	66.6	70.9	85.0	90.8	89.3	84.1	71.6	61.5	49.3	69.9
1954	52.3	61.1	58.3	71.6	78.2	84.7	91.3	88.4	86.2	74.9	64.6	54.0	72.1
1955	48.7	50.9	61.6	66.7	75.6	83.7	86.7	86.6	82.9	75.7	59.1	55.8	69.5
1956	56.0	50.9	61.6	66.1	76.9	86.9	87.9	85.8	84.6	69.7	57.8	53.3	69.8
1957	54.0	61.4	61.8	66.5	72.9	87.1	91.4	88.0	83.2	70.6	56.4	55.0	70.7
#1958	53.0	58.0	57.0	66.7	81.3	89.1	93.6	92.7	86.6	76.6	61.4	56.0	72.7
1959	53.8	53.9	63.6	73.5	76.3	90.3	94.0	88.1	83.3	72.7	60.9	53.6	72.0
#1960	48.5	51.5	65.1	70.4	77.8	90.0	92.4	89.7	85.9	70.6	60.5	50.5	71.1
1961	54.2	55.6	59.6	69.2	75.6	88.6	91.7	88.6	80.6	69.6	57.1	52.3	70.2
1962	51.5	55.7	56.0	72.3	73.5	83.1	90.2	91.7	84.3	71.6	61.9	55.0	70.6
1963	48.4	60.2	61.0	65.8	80.0	81.7	92.0	87.1	85.1	76.2	61.9	51.8	71.0
1964	46.7	49.3	56.5	65.2	73.7	82.6	90.6	86.2	80.9	74.9	55.5	52.0	67.8
1965	52.7	52.4	56.1	63.4	71.8	79.0	91.0	89.0	79.2	73.8	62.1	52.9	68.6
1966	48.2	49.7	61.2	69.8	80.1	86.8	93.0	90.9	82.9	70.9	60.5	52.0	70.5
1967	50.7	55.7	62.8	62.4	75.1	81.1	91.6	91.0	84.8	73.5	63.9	48.2	70.1
1968	52.4	59.7	59.9	66.7	76.6	86.2	90.2	86.5	83.6	72.7	59.2	49.5	70.3
1969	54.9	53.0	56.9	68.5	78.3	84.2	93.1	94.4	86.0	69.5	62.1	54.8	71.3
1970	52.1	60.2	59.5	64.7	79.6	88.1	95.0	92.5	82.2	69.1	61.4	52.6	71.4
1971	52.2	56.3	63.3	66.5	73.3	85.3	94.9	89.6	85.6	69.3	59.7	50.2	70.5
1972	51.4	59.1	70.6	71.4	78.3	87.8	94.4	89.9	84.8	71.9	58.1	52.1	72.5
RECORD MEAN	51.5	55.4	60.5	67.7	75.9	85.0	90.8	88.9	83.4	71.6	59.8	52.4	70.3
MAX	65.0	69.1	74.8	83.0	91.8	101.4	104.1	101.7	97.7	86.8	74.6	65.8	84.7
MIN	38.0	41.7	46.2	52.4	59.9	68.6	77.4	76.0	69.1	56.4	45.0	38.9	55.8

TOTAL DEGREE DAYS

PHOENIX, ARIZONA

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0	0	0	0	85	323	325	117	6	14	7	0	877
1934-35	0	0	0	0	178	284	347	204	239	17	0	0	1269
1935-36	0	0	0	22	237	328	378	246	77	31	0	0	1319
#1936-37	0	0	0	8	118	367	681	287	173	34	5	0	1673
#1937-38	0	0	0	0	119	252	311	243	187	30	0	0	1142
1938-39	0	0	0	25	357	352	440	503	194	15	0	0	1886
1939-40	0	0	0	12	106	292	312	281	103	17	0	0	1123
1940-41	0	0	0	29	229	282	361	215	202	136	11	0	1465
1941-42	0	0	0	57	165	396	387	391	246	63	6	0	1711
1942-43	0	0	0	24	106	323	413	209	86	45	0	0	1206
1943-44	0	0	0	37	171	393	467	388	282	57	2	0	1797
1944-45	0	0	0	0	267	404	452	291	286	103	0	0	1803
1945-46	0	0	0	6	235	487	479	365	150	17	0	0	1739
1946-47	0	0	0	37	323	350	513	194	102	25	0	0	1544
1947-48	0	0	0	6	304	485	412	361	266	21	0	0	1855
1948-49	0	0	0	15	312	464	664	368	184	42	0	0	2049
1949-50	0	0	0	59	53	431	469	167	107	11	4	0	1301
1950-51	0	0	0	0	72	226	399	249	147	36	16	0	1145
1951-52	0	0	0	11	186	394	414	306	295	43	0	0	1649
#1952-53	0	0	0	0	252	429	318	322	131	49	6	0	1507
1953-54	0	0	0	19	148	479	388	114	206	7	4	0	1365
1954-55	0	0	0	14	39	336	500	390	117	37	3	0	1436
1955-56	0	0	0	1	181	278	271	402	131	55	0	0	1319
1956-57	0	0	0	47	214	356	334	117	107	48	7	0	1230
#1957-58	0	0	0	12	253	303	365	191	245	68	0	0	1437
1958-59	0	0	0	4	124	271	341	306	66	0	3	0	1115
1959-60	0	0	0	26	119	342	506	388	56	14	0	0	1451
#1960-61	0	0	0	16	153	445	326	259	166	6	0	0	1371
1961-62	0	0	0	51	233	388	414	255	277	2	0	0	1620
1962-63	0	0	0	1	115	301	507	148	151	50	0	0	1273
1963-64	0	0	0	0	133	403	558	450	277	69	23	0	1913
1964-65	0	0	0	0	281	396	375	346	269	133	14	0	1814
1965-66	0	0	4	7	116	370	516	423	145	12	0	0	1593
1966-67	0	0	0	8	139	397	437	256	102	93	10	0	1442
1967-68	0	0	0	6	72	512	384	151	167	39	0	0	1331
1968-69	0	0	0	0	173	473	306	327	265	12	13	0	1569
1969-70	0	0	0	12	95	307	393	134	166	60	0	0	1167
1970-71	0	0	0	19	119	376	396	241	123	53	0	0	1327
1971-72	0	0	0	79	185	455	414	174	22	12	0	0	1341
1972-73	0	0	0	38	205	395							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
#1933	2.31	0.15	0.00	1.11	T	0.23	0.30	0.38	1.62	0.38	0.62	T	7.10
1934	0.40	0.99	0.10	0.07	0.10	0.03	0.11	1.07	0.66	0.00	0.63	1.71	5.87
1935	0.95	3.18	1.39	0.09	0.14	0.00	0.93	1.27	1.30	0.13	0.56	0.39	10.33
#1936	0.80	1.01	0.50	0.14	T	T	2.49	0.32	0.43	0.13	0.35	2.12	8.29
#1937	0.83	0.76	1.58	T	0.08	T	0.49	0.05	1.17	T	0.00	0.41	5.37
1938	0.51	0.68	0.77	0.02	T	0.36	0.08	0.97	T	0.00	0.00	1.62	5.01
1939	0.27	0.59	0.11	0.11	0.00	0.00	0.77	1.18	4.23	0.10	0.47	T	7.83
1940	0.01	0.51	T	0.04	T	T	0.33	0.54	1.47	1.05	0.29	3.94	8.18
1941	0.97	2.02	4.16	2.10	0.81	T	0.79	0.85	1.82	0.52	1.16	1.06	16.26
1942	0.36	0.21	0.22	0.69	0.00	0.00	1.14	1.29	0.07	0.60	T	0.29	4.87
1943	0.66	0.06	0.55	0.05	0.01	0.02	0.38	4.91	0.78	0.19	0.00	1.42	9.03
1944	0.37	2.23	0.99	0.49	0.94	0.00	0.65	0.07	0.23	0.33	1.12	1.28	8.70
1945	1.01	0.10	0.79	T	0.00	0.00	1.31	0.58	T	0.53	0.00	0.44	4.76
1946	1.16	0.15	0.02	0.02	0.00	0.00	1.50	2.41	2.42	0.05	0.82	0.83	9.38
1947	0.03	0.13	T	T	0.32	T	T	1.10	0.34	0.04	0.59	0.45	3.00
1948	0.00	1.31	0.16	T	T	0.08	0.91	0.41	T	0.60	0.00	0.68	4.15
1949	1.71	0.12	0.35	0.18	0.09	0.33	0.44	0.48	0.99	0.82	0.31	0.92	6.74
1950	0.41	1.15	0.26	T	T	0.11	0.76	0.37	0.49	0.00	0.04	0.03	3.62
1951	1.58	0.29	0.44	1.02	0.20	T	1.06	5.56	0.32	0.52	0.73	0.64	12.37
#1952	0.56	0.29	2.20	1.94	0.00	0.06	0.54	1.11	0.23	0.00	3.04	0.68	10.65
1953	0.23	0.53	0.74	0.02	0.71	T	0.88	0.31	0.00	T	0.07	0.07	3.56
1954	0.88	0.58	1.22	0.02	0.11	0.02	0.36	0.55	0.44	0.12	T	0.01	4.31
1955	2.41	0.09	T	T	0.02	0.95	4.19	1.80	T	0.13	0.05	0.18	9.82
1956	0.67	0.64	0.00	0.03	T	0.01	0.92	0.46	0.02	0.06	0.00	0.01	2.82
1957	1.57	0.21	0.53	0.12	0.43	0.26	0.72	0.85	0.00	2.66	0.02	0.23	7.60
#1958	0.07	1.15	1.94	0.89	0.08	0.05	0.31	0.72	2.25	0.50	0.16	0.00	8.12
1959	0.23	0.63	0.00	0.05	T	T	0.45	1.36	0.04	1.75	0.43	3.46	8.40
1960	0.85	0.04	0.57	0.00	T	T	0.25	0.82	0.12	0.67	T	0.07	3.39
1961	0.23	0.01	0.41	T	T	T	0.40	2.11	0.22	0.08	0.12	0.85	4.43
1962	1.20	0.83	0.50	0.00	T	0.12	0.10	0.25	0.39	T	0.03	0.48	3.90
1963	0.55	1.16	0.20	0.33	T	0.00	0.03	2.68	T	1.46	0.73	T	7.24
1964	0.22	0.01	0.37	0.10	T	0.00	0.60	1.29	1.80	0.17	0.35	1.09	6.00
1965	1.22	0.91	1.39	1.35	0.16	0.91	0.16	0.18	0.60	0.20	0.92	3.19	11.19
1966	0.35	0.95	0.24	T	T	0.22	0.09	2.17	2.00	0.25	0.38	0.52	7.27
1967	0.25	0.00	0.43	0.08	0.05	0.47	0.99	0.02	0.13	0.67	1.27	3.98	8.34
1968	0.19	1.20	1.04	T	T	0.00	1.70	0.59	0.00	0.35	0.91	0.69	6.67
1969	1.37	0.78	0.56	0.03	0.26	0.00	0.28	0.14	2.11	0.08	0.65	0.68	6.94
1970	T	0.30	2.26	T	T	0.00	0.48	1.02	2.85	0.44	0.02	0.26	7.63
1971	0.22	0.35	T	0.13	T	0.00	0.24	0.99	0.92	0.27	T	0.47	3.59
1972	0.00	T	T	T	T	1.70	0.72	1.20	0.28	4.40	1.01	1.56	10.87
RECORD MEAN	0.76	0.73	0.66	0.35	0.12	0.11	0.90	1.05	0.79	0.50	0.60	0.89	7.46

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
#1933-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1934-35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1935-36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#1936-37	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0
#1937-38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1938-39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.6
1939-40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1940-41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1941-42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1942-43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1943-44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1944-45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1945-46	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1946-47	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1947-48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1948-49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	T
1949-50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950-51	0.0	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	T
1951-52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#1952-53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1953-54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1954-55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1955-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1956-57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#1957-58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1958-59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1959-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960-61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1961-62	0.0	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	T
1962-63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1963-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1964-65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1965-66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1966-67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1967-68	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	T
1968-69	0.0	0.0	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	T
1969-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1970-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971-72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972-73	0.0	0.0	0.0	0.0	0.0	0.0							

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1896.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table. Temperature, Precipitation, and Snowfall are from City Office locations through 1937. Heating Degree Days are from City Office locations through June 1938. All data for later periods are from Airport locations.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above: Sea level									Elevation above: Sea level	Remarks
							Ground									
						Ground at temperature site	Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	
CITY																
Adobe Building Corner of Center and Washington	1/28/76	1/19/78		33° 27'	112° 04'	1085										
Center Street, between Washington & Jefferson	1/19/78	8/05/95	100 ft. S	33° 27'	112° 04'	1085		4	4				a3			a - 19 feet to 12/31/81. Several breaks in records.
Wharton Block 38 N Center Street	8/06/95	8/01/01	250 ft. N	33° 27'	112° 04'	1085	57	47	47				37			
Talbot Building SW corner First Avenue at Adams	8/01/01	3/24/13	300 ft. NW	33° 27'	112° 05'	1085	56	50	50		b41		41			b - Added 6/1/06.
Federal Building 230 N First Avenue	3/24/13	6/27/16	500 ft. NNW	33° 27'	112° 05'	1086	81	76	76		68		68			
Water Users Building 145 W Van Buren Street	6/27/16	9/04/24	100 ft. W	33° 27'	112° 05'	1086	81	11	11		68		68			Wind instruments & rain gage equipment left on roof of Federal Building. Thermometer shelter moved to lawn between the buildings.
Ellis Building Basement 137 N Second Avenue	9/04/24	8/22/33	300 ft. S	33° 27'	112° 05'	1086	82	10	10		56		56			Thermometer shelter in Ellis Court, exposure poor, moved back to Federal Bldg. lawn on 7/18/25.
Ellis Building 5th Floor 137 N Second Avenue	8/22/33	10/22/36	No change	33° 27'	112° 05'	1086	107	10	10		81		81			Ellis Building was raised 2 stories.
Post Office Building 500 N Central Avenue	10/22/36	12/16/36	1200 ft. NNE	33° 27'	112° 04'	1083	51	39	39		36		36			Shelter on flat gravelled roof.
Post Office Building 500 N Central Avenue	12/16/36	10/22/53	No change	33° 27'	112° 04'	1083	87	39	39		36		36			Psychrometric observations moved to WBAS at Sky Harbor Airport on 7/1/39.
Post Office Building 500 N Central Avenue	10/22/53	8/15/68	No change	33° 27'	112° 04'	1083		39				39	36			Combined at Airport effective 10/22/53, weighing rain gage added 11/1/53. Psychrometer, wind equipment and tipping bucket removed same date.
AIRPORT																
Sky Harbor Airport Administration Building 3 miles ESE Phoenix P. O.	5/02/33	12/19/52		33° 26'	112° 02'	1108	29	5	5	a5			3		b 1128	Station closed 7/27/35 to 1/1/38. Cotton Region Shelter moved 110 feet NE & Standard Shelter added 10/1/40. a - Commissioned 6/1/49. b - Added 6/4/49.
Sky Harbor Airport New Terminal Building	12/19/52	5/29/58	0.8 mi. SE	33° 26'	112° 01'	1114	32	5	5	5		5	3		1128	Weighing Rain Gage added 11/1/53.
Sky Harbor Airport † FAA Operations Building	5/29/58	Present	0.3 mi. NW	33° 26'	112° 01'	d1117	e18	5	5	5		4	3	c5	1139	c - Commissioned 3900 feet E of office 12/12/60. d - 1109 feet to 12/12/60. e - 41 feet to 12/12/60.

† Sky Harbor International Airport effective in 1971.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

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LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

SALT LAKE CITY, UTAH

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

Salt Lake City is located in northern Utah on the western slope of the Wasatch Mountains, a range rising to heights of 8,500 to nearly 12,000 feet above sea level. Due to the proximity of this mountain range, about three to five inches more precipitation per year can be expected along the eastern edge of the city than over the valley a few miles to the west.

Aside from the altitude (approximately 4,200 feet above sea level) and the Wasatch Mountains, the most influential natural condition affecting the climate of Salt Lake City is the Great Salt Lake. This large inland body of water, which never freezes over due to its high salt content, tends to moderate the temperature of cold winter winds blowing from the west and northwest. Of lesser importance are the Oquirrh Mountains located twenty miles to the southwest. This range, with several peaks to above 10,000 feet, shelters the Salt Lake Valley somewhat from storms associated with southwesterly winds.

Salt Lake City has a semi-arid continental climate, with four well-defined seasons. Summers are characterized by hot, dry weather; but the high temperatures during this season are usually not oppressive, since the relative humidity is generally low and the nights usually cool. July is the hottest month with average maximum readings in the nineties.

The average daily temperature range is about thirty degrees in the summer and eighteen degrees during the winter. Temperatures above 102° in the summer or colder than 10° below zero in the winter are likely to occur one season out of four.

Winters are cold, but usually not severe. Mountains to the north and east act as a barrier to frequent invasions of cold continental air. The average annual snowfall ranges from 52 inches at the Airport to over 70 inches in the foothill area of the eastern portion of the city. Similarly, the average maximum depth of snow during the winter varies from 9 to about 13 inches. The average duration of continuous snow cover is 29 days. Precipitation, generally light during the summer and early fall, reaches a maximum in spring when storms from the Pacific Ocean are moving through the area more frequently than at any other season of the year. Winds are usually light, although occasional high winds have occurred in every month of the year, particularly in March.

The growing season, or freeze-free period, is quite long, averaging over five months in length. Yard and garden foliage generally are making good gro th by the end of March or the first week in April, even though the last freezing temperature in the spring usually occurs in late April.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: SALT LAKE CITY, UTAH INTERNATIONAL AIRPORT Standard time used: MOUNTAIN Latitude: 40° 46' N Longitude: 111° 58' W Elevation (ground): 4220 feet Year: 1972

Month	Temperature Averages Daily maximum	Daily minimum	Monthly	Extremes Highest	Date	Lowest	Date	Degree days (Base 65°) Heating	Cooling	Precipitation Total	Greatest in 24 hrs.	Date	Snow, Ice pellets Total	Greatest in 24 hrs.	Date	Relative humidity Hour 05 (Local time)	Hour 11	Hour 17	Hour 23	Wind & Resultant Direction	Resultant Speed	Average speed	Fastest mile Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Maximum 90° and above ‡	Maximum 32° and below	Minimum 32° and below	Minimum 0° and below	** Average daily solar radiation - langleys
JAN	38.9	20.6	29.8	57	23	3	4	1085	0	1.22	0.31	27-28+	10.5	5.5	12-13	70	60	61	69	18	3.1	9.4	34	W	23	56	6.5	7	10	14	10	4	0	0	0	8	25	0	
FEB	48.4	27.1	37.8	69	28	0	2	783	0	0.48	0.36	24-25	7.6	6.4	24-25	73	52	50	70	18	1.1	8.2	33	W	29	71	7.2	5	5	19	4	3	0	0	0	4	21	1	
MAR	60.0	33.7	46.9	75	22+	22	28+	556	0	1.18	0.50	23	1.4	1.3	26	66	43	36	60	17	1.6	9.8	34	SE	22+	77	6.3	7	13	11	6	1	2	0	0	0	11	0	
APR	60.2	36.0	48.1	77	24	28	30	499	0	3.62	1.28	17-18	15.0	8.4	13-14	70	46	37	63	29	1.2	10.6	38	SE	11	63	6.5	9	8	13	11	2	1	0	0	0	10	0	
MAY	75.5	45.4	60.5	91	31	28	1	168	34	0.14	0.12	6-7	0.0	0.0		55	27	21	50	18	1.2	9.5	35	NE	20	81	5.6	11	6	14	2	0	3	0	1	0	2	0	
JUN	85.4	58.3	71.9	97	30	48	19	2	213	0.15	0.08	3-4	0.0	0.0		58	28	24	48	17	3.1	10.4	37	N	17+	77	5.5	10	11	9	7	0	10	0	8	0	0	0	
JUL	93.3	61.0	77.2	104	29	52	21	0	386	0.06	0.05	20	0.0	0.0		47	22	16	35	15	0.8	9.4	32	SE	24	89	3.3	18	8	5	2	0	4	0	27	0	0	0	
AUG	91.4	60.2	75.8	102	11+	48	24	0	340	0.21	0.13	13-14	0.0	0.0		51	24	24	43	15	3.5	9.9	37	S	28	85	3.5	16	12	3	5	0	9	0	20	0	0	0	
SEP	77.2	50.6	63.9	89	17	37	25	110	85	1.36	0.66	4-5	0.0	0.0		59	33	27	52	16	3.4	10.0	55	NW	5	79	4.3	13	10	7	6	0	4	0	0	0	0	0	
OCT	63.5	43.6	53.6	79	3	24	31	347	0	2.74	0.65	19-20	6.0	6.0	28-29	71	52	48	70	16	2.6	8.9	35	S	14	56	6.6	7	8	16	12	2	6	0	0	0	4	0	
NOV	46.8	32.0	39.4	62	4	20	29	761	0	1.36	0.73	4-5	1.1	0.8	28	73	61	59	72	17	4.5	9.0	31	S	7	25	8.3	2	5	23	10	0	1	1	0	0	12	0	
DEC	31.9	13.5	22.7	56	2	-15	15	1307	0	3.22	1.82	28-29	35.2	18.1	28-29	69	67	68	71	17	2.1	8.7	36	SE	4	36	7.7	4	6	21	14	8	0	7	0	16	25	9	
YEAR	64.4	40.2	52.3	104	JUL. 29	-15	DEC. 15	5618	1058	15.74	1.82	DEC. 28-29	76.8	18.1	DEC. 28-29	64	43	39	59	17	2.2	9.5	55	NW	SEP. 5	69	5.9	109	102	155	89	20	40	8	56	28	110	10	

NORMALS, MEANS, AND EXTREMES

Month	Temperature Normal Daily maximum	Daily minimum	Monthly	Extremes Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity Hour 05 (Local time)	Hour 11	Hour 17	Hour 23	Wind & Mean speed	Prevailing direction	Fastest mile Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Max. 90° and above ‡	Max. 32° and below	Min. 32° and below	Min. 0° and below	** Average daily solar radiation - langleys
(a)	(b)	(b)	(b)	13		13		(b)	(b)	44		44		44		44	44		44		13	13	13	13	43	32	37	37		35	37	44	44	44	44	44	44	44	13	13	13	13	
J	36.8	17.5	27.2	61	1971	-18	1963	1172	1.35	3.14	1940	0.09	1961	1.36	1953	13.1	32.3	1937	9.7	1962	76	68	66	76	7.7	SSE	52	SE	1950+	47	7.1	6	7	18	10	4	*	4	0	10	27	2	
F	42.0	22.9	32.5	69	1972	-4	1960	910	1.18	3.22	1936	0.12	1946	1.05	1958+	9.7	27.9	1969	8.7	1944	77	63	57	75	8.2	SE	56	SE	1954	55	7.0	6	6	16	9	3	1	2	0	4	24	*	
M	52.0	28.8	40.4	78	1960	2	1966	763	1.56	3.67	1944	0.10	1956	1.83	1944	9.1	35.6	1952	15.4	1944	70	50	44	67	9.1	SSE	71	NW	1954	65	6.5	8	8	15	9	3	1	*	0	1	21	0	
A	63.4	36.4	49.9	85	1962	22	1971	459	1.76	4.90	1944	0.45	1934	2.41	1957	4.4	23.6	1970	11.1	1958	67	44	38	61	9.4	SE	57	NW	1964	67	6.3	7	10	13	10	1	2	*	0	0	9	0	
M	74.0	43.8	58.9	92	1961+	25	1965	233	1.40	3.37	1957	T	1934	2.03	1942	0.5	5.3	1965+	5.3	1965	63	36	30	56	9.3	SE	57	NW	1953	73	5.6	9	11	11	8	*	5	*	1	0	2	0	
J	83.7	51.0	67.4	104	1961	35	1962	84	0.98	2.93	1947	0.01	1946+	1.88	1948	T	T	1968+	T	1968+	62	33	28	53	9.2	SSE	63	W	1963	78	4.4	14	10	6	6	0	6	0	8	0	0	0	
J	94.1	59.6	76.9	107	1960	40	1968	0	0.58	2.52	1962	T	1963	2.35	1962	0.0	0.0		0.0		51	25	19	41	9.3	SSE	49	W	1936	84	3.5	17	10	4	4	0	7	0	26	0	0	0	
A	90.8	58.2	74.5	103	1960	37	1965+	0	0.87	3.66	1968	T	1944	1.96	1932	0.0	0.0		0.0		55	30	23	46	9.5	SSE	58	SW	1946+	83	3.6	16	11	4	6	0	8	0	21	0	0	0	
S	80.3	48.5	64.4	96	1967	27	1965	81	0.53	2.80	1970	T	1951+	2.19	1970	0.1	4.0	1971	4.0	1971	61	35	28	54	9.0	SE	61	W	1952	83	3.5	17	8	5	5	*	4	0	3	0	1	0	
O	65.2	38.2	51.7	89	1963	16	1971	419	1.15	3.61	1946	0.00	1952	1.47	1947	1.2	16.6	1970	8.5	1971	68	43	40	66	8.4	SE	67	NW	1950	73	4.5	14	8	9	6	*	2	*	0	*	7	0	
N	47.5	25.9	36.7	75	1967	11	1959	849	1.30	2.57	1934	0.01	1939	1.13	1954	5.9	18.5	1931	11.0	1930	74	58	59	73	7.7	SSE	63	NW	1937	54	6.0	9	8	13	7	2	*	1	0	*	19	0	
D	39.0	21.2	30.1	67	1969	-15	1972	1082	1.24	3.82	1964	0.28	1962	1.82	1972	12.3	35.2	1972	18.1	1972	78	72	72	78	7.4	SSE	54	S	1955	44	7.1	7	6	18	9	4	*	4	0	11	28	1	
YR	64.1	37.7	50.9	107	JUL. 1960	-18	JAN. 1963	6052	13.90	4.90	APR. 1944	0.00	OCT. 1952	2.41	APR. 1957	56.3	35.6	MAR. 1952	18.1	DEC. 1972	67	46	42	62	8.7	SSE	71	NW	MAR. 1954	69	5.4	130	103	132	88	17	35	10	59	26	137	3	

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Lowest temperature -30 in February 1933; maximum monthly precipitation 5.81 in November 1875; maximum precipitation in 24 hours 2.72 in May 1901; maximum monthly snowfall 39.1 in December 1948.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≤ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

\# To 8 compass points only.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	24.3	16.2	39.0	45.4	52.2	73.0	79.5	72.4	65.7	56.2	42.0	37.8	50.3
1934	33.9	42.2	48.2	56.6	66.7	67.6	78.6	76.6	62.0	54.9	42.6	31.2	55.2
1935	32.0	36.9	39.9	49.0	54.8	69.0	78.4	75.6	67.8	51.4	36.3	30.7	51.8
1936	29.0	32.4	40.4	53.2	61.8	70.4	78.2	75.5	61.9	52.4	36.2	33.6	52.1
1937	13.2	30.7	41.0	46.4	61.6	66.8	77.6	76.4	67.4	54.4	43.6	36.3	51.2
1938	35.7	36.9	40.0	50.0	55.2	67.8	73.8	74.0	68.7	54.0	32.4	34.1	51.9
1939	30.5	22.6	41.6	52.6	60.5	64.8	75.6	74.4	64.2	52.2	43.0	36.3	51.5
1940	30.2	37.8	45.0	51.2	63.7	71.8	79.4	77.2	65.4	55.6	35.6	32.6	53.8
1941	30.6	38.6	43.0	46.9	60.2	65.6	75.6	73.8	59.7	49.2	40.0	34.4	51.4
1942	20.4	27.0	35.8	50.6	53.2	64.8	78.2	74.4	64.2	52.7	40.6	33.2	49.6
1943	31.0	33.6	40.2	55.6	56.0	63.8	76.0	75.7	67.6	54.8	39.9	31.2	52.1
1944	19.2	29.4	36.4	46.2	58.9	63.0	76.0	73.8	63.8	56.2	38.4	30.9	49.4
1945	32.1	36.4	38.9	44.8	58.6	60.2	75.9	73.5	60.6	55.1	39.2	30.0	50.4
1946	27.1	34.3	44.0	54.6	57.1	69.0	77.3	75.4	63.4	46.6	38.4	35.8	51.9
1947	22.0	38.4	44.6	48.6	62.8	63.6	77.6	74.1	65.0	56.4	35.5	29.8	51.5
1948	30.1	33.2	35.6	49.7	59.0	68.0	75.7	75.6	66.0	53.1	35.4	25.2	50.6
1949	11.6	22.8	42.4	53.6	60.1	67.0	76.8	76.0	67.1	48.3	44.3	30.1	50.0
1950	26.6	36.2	40.8	48.5	54.3	66.0	74.3	73.8	63.4	57.9	41.6	35.4	51.6
1951	29.6	36.3	37.1	50.3	59.0	63.7	75.8	73.5	64.6	50.5	37.1	26.1	50.3
1952	27.0	28.6	33.3	51.8	60.6	67.8	74.6	76.3	68.1	57.5	34.3	32.0	51.0
1953	39.5	37.0	43.2	46.4	52.9	66.7	78.5	75.7	68.2	54.1	46.1	29.9	53.2
#1954	34.0	36.4	38.5	53.7	61.5	65.3	78.3	73.2	64.8	52.3	44.0	30.3	52.7
1955	21.1	24.0	36.7	45.7	56.8	66.3	75.5	76.3	65.0	52.8	35.7	37.1	49.4
1956	35.5	26.4	42.4	49.9	60.4	69.6	76.4	72.7	67.0	52.1	34.3	30.0	51.4
1957	26.0	40.3	43.1	48.4	57.2	66.8	77.0	76.5	64.6	52.2	34.5	33.4	51.7
1958	30.7	41.7	39.2	47.2	65.1	70.6	74.9	77.8	65.4	55.3	38.8	36.2	53.6
#1959	33.9	36.1	41.4	51.6	55.7	71.5	77.2	74.1	62.0	51.0	37.7	27.8	51.7
1960	25.6	28.7	42.5	50.8	58.7	71.0	81.2	74.2	68.2	51.6	40.4	29.6	51.9
1961	28.7	38.1	42.9	50.1	60.8	74.7	79.9	77.8	60.0	50.0	35.3	28.2	52.2
1962	20.5	31.4	35.1	52.8	58.7	68.2	75.9	73.1	65.8	55.3	41.6	28.4	50.6
1963	19.5	38.6	39.4	44.3	60.7	63.3	77.8	77.9	67.8	57.8	38.9	24.4	50.9
1964	21.9	25.8	32.0	45.6	55.8	63.2	77.5	71.9	61.5	53.0	37.8	33.3	48.3
1965	31.0	33.0	36.8	51.0	54.7	64.8	75.0	70.9	57.5	54.5	46.1	30.2	50.5
1966	30.6	29.4	41.6	49.6	62.7	69.2	80.1	74.1	67.5	49.9	43.1	29.2	52.3
1967	29.4	37.5	44.2	46.1	56.3	64.6	78.4	78.6	66.7	52.4	43.0	25.1	51.8
1968	24.5	38.2	44.7	45.4	56.4	67.5	78.3	69.4	61.4	51.7	38.5	26.8	50.2
1969	32.2	28.7	38.4	50.4	64.0	64.8	76.6	77.6	69.7	47.7	39.5	32.4	51.9
1970	34.6	40.4	40.6	44.2	58.8	67.6	76.6	77.7	59.0	47.1	42.6	29.2	51.5
1971	32.4	34.9	40.4	48.2	56.6	67.5	76.4	76.9	59.8	47.5	37.6	26.9	50.4
1972	29.8	37.8	46.9	48.1	60.5	71.9	77.2	75.8	63.9	53.6	39.4	22.7	52.3
RECORD MEAN	28.1	33.2	40.6	49.1	58.3	68.0	77.2	75.4	65.1	53.1	40.5	31.4	51.7
MAX	36.2	41.4	50.2	59.9	70.3	81.3	91.1	88.9	78.4	64.8	50.1	39.2	62.7
MIN	20.0	24.9	31.0	38.3	46.2	54.7	63.3	61.9	51.8	41.3	30.9	23.5	40.7

TOTAL DEGREE DAYS

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0	26	81	276	689	840	964	637	484	268	56	28	4349
1934-35	0	0	152	305	670	1026	1018	788	781	480	325	29	5574
1935-36	0	0	52	424	863	1066	1117	947	763	345	172	64	5813
1936-37	2	0	140	392	864	970	1607	963	743	555	131	81	6448
1937-38	0	0	48	337	643	891	906	785	777	451	319	29	5186
1938-39	23	6	18	344	982	957	1068	1187	726	374	159	113	5957
1939-40	0	0	86	400	661	888	1081	787	620	415	75	37	5050
1940-41	0	0	69	291	885	1009	1068	741	683	546	181	101	5574
1941-42	0	3	195	486	784	1050	1379	1062	907	437	365	72	6740
1942-43	0	7	109	382	733	984	1055	878	771	283	304	155	5661
1943-44	1	19	26	327	749	1045	1423	1035	888	565	213	109	6400
1944-45	0	2	96	281	797	1057	1022	803	807	603	202	185	5855
1945-46	1	1	211	307	774	1087	1172	856	649	318	252	39	5667
1946-47	0	0	137	573	801	908	1330	745	630	495	134	98	5851
1947-48	0	1	110	279	885	1091	1084	920	912	460	234	42	6018
1948-49	6	4	86	380	890	1232	1658	1183	702	349	177	54	6721
1949-50	0	0	58	520	624	1077	1184	805	741	488	334	76	5907
1950-51	3	0	135	225	697	912	1092	795	861	435	198	93	5446
1951-52	0	1	64	443	832	1199	1170	1052	971	388	151	41	6312
1952-53	0	0	36	231	915	1014	784	779	664	551	367	64	5405
#1953-54	0	0	28	341	560	1086	951	793	813	335	163	100	5170
1954-55	2	5	93	399	622	1070	1353	1142	871	572	257	85	6471
1955-56	2	0	120	374	873	858	908	1114	694	446	172	35	5596
1956-57	0	12	58	398	915	1077	1203	685	667	489	238	70	5812
1957-58	0	1	101	401	909	971	1053	649	794	527	106	13	5525
1958-59	0	0	116	300	778	887	956	804	722	404	296	34	5297
#1959-60	1	0	170	423	814	1142	1212	1049	692	419	227	14	6163
1960-61	0	19	16	419	730	1088	1116	743	678	440	183	14	5446
1961-62	0	0	207	461	881	1132	1373	936	921	369	220	75	6575
1962-63	3	17	59	322	695	1128	1403	731	787	614	135	98	5992
1963-64	0	1	18	243	777	1252	1331	1130	1016	576	303	125	6772
1964-65	0	44	134	365	808	975	1046	889	869	414	316	61	5921
1965-66	0	20	239	317	564	1069	1058	989	717	456	140	40	5609
1966-67	0	4	57	460	649	1101	1097	763	638	564	287	76	5696
1967-68	0	0	57	387	653	1228	1246	772	622	583	276	57	5881
1968-69	3	49	166	407	786	1174	1009	1010	818	433	75	67	5997
1969-70	1	0	17	530	759	1003	935	681	754	619	218	69	5586
1970-71	0	0	218	550	667	1103	1002	836	754	499	258	55	5942
1971-72	0	0	201	535	817	1176	1085	783	556	499	168	2	5822
1972-73	0	0	110	347	761	1307							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
#1933	1.44	0.71	1.34	1.23	3.12	0.01	0.08	0.15	0.36	0.83	0.30	0.54	10.11
1934	1.22	2.01	0.48	0.45	T	0.64	0.48	0.81	0.40	0.77	2.57	1.61	11.44
1935	0.17	0.75	1.20	2.33	2.70	0.17	0.04	0.80	0.54	0.17	0.71	0.76	10.34
1936	2.02	3.22	1.21	0.85	0.35	1.81	1.44	0.67	0.16	1.69	0.99	1.88	16.29
1937	1.76	1.12	1.18	1.09	1.05	0.14	1.21	0.48	0.83	2.24	0.69	1.27	13.06
1938	0.55	0.89	3.11	1.13	2.04	0.12	0.51	0.23	0.09	1.49	1.48	1.41	13.05
1939	1.23	1.78	0.78	0.92	0.51	1.08	0.30	0.14	0.88	1.14	0.01	0.59	9.36
1940	3.14	1.66	1.07	1.61	0.01	0.22	0.14	0.23	1.52	1.72	2.25	1.35	14.92
1941	0.98	1.30	2.11	2.87	1.56	1.35	1.05	1.12	0.51	2.30	1.81	1.83	18.79
1942	1.18	1.17	1.54	1.33	3.16	0.47	0.37	0.20	0.13	0.57	1.68	1.48	13.28
1943	0.95	1.70	1.23	1.14	0.68	2.09	0.15	0.47	T	1.61	0.05	0.83	10.90
1944	1.67	1.11	3.67	4.90	1.67	2.78	0.04	T	0.52	0.18	1.44	0.51	18.49
1945	0.39	1.19	1.49	1.37	0.90	2.73	1.92	3.28	0.64	0.58	2.30	0.92	17.71
1946	1.01	0.12	1.43	1.59	2.59	0.01	0.55	0.95	0.30	3.61	1.44	1.91	15.51
1947	0.95	0.81	0.58	2.32	1.88	2.93	0.01	1.38	1.01	2.43	1.88	0.79	16.97
1948	0.34	0.86	2.30	1.56	0.26	2.47	0.39	0.49	0.59	0.87	1.71	2.63	14.47
1949	2.31	0.64	2.95	1.25	2.66	0.17	0.30	0.70	0.64	2.79	0.88	1.41	16.70
1950	1.80	1.19	0.98	1.29	2.18	0.16	1.06	0.03	1.73	0.58	2.00	0.49	13.49
1951	1.69	0.64	1.26	2.60	0.87	0.09	2.17	1.79	T	1.90	1.59	2.90	17.50
1952	2.20	1.84	3.56	1.86	1.07	1.07	1.09	0.19	0.02	0.00	1.08	1.16	15.14
1953	2.73	0.39	0.86	2.77	1.05	0.51	0.81	0.88	0.13	0.32	0.96	0.91	12.32
#1954	0.90	0.81	1.50	0.65	0.63	1.83	0.91	1.77	0.59	0.54	1.61	0.69	12.43
1955	1.34	1.31	0.20	2.04	1.35	0.95	0.80	0.44	0.97	0.90	2.24	1.09	13.63
1956	2.39	1.10	0.10	1.50	2.33	0.63	0.08	0.03	0.14	1.86	0.56	1.67	12.39
1957	1.37	0.72	2.18	3.24	3.37	1.47	0.31	1.69	0.33	0.78	1.37	1.61	18.44
1958	0.87	2.20	2.19	2.92	0.30	0.04	0.05	0.23	0.25	T	1.13	0.54	10.72
1959	1.60	1.41	0.79	1.61	2.05	1.38	0.19	1.76	1.66	0.22	0.10	1.05	13.82
1960	0.96	1.58	2.45	1.11	0.73	0.39	0.02	1.33	0.49	1.19	1.73	0.39	12.37
1961	0.09	2.06	1.85	0.95	0.24	0.09	0.54	1.20	1.10	1.60	1.15	0.88	11.75
1962	0.84	1.43	2.34	2.98	2.12	0.49	2.52	0.26	0.27	0.93	0.44	0.28	14.90
1963	0.53	0.67	2.11	3.86	0.23	1.67	T	0.54	1.08	1.05	1.56	0.79	14.09
1964	0.94	0.35	2.26	2.69	2.77	2.61	0.26	0.17	0.13	0.45	1.42	3.82	17.87
1965	2.13	1.13	0.14	2.30	2.02	1.87	1.50	2.08	1.93	0.39	1.13	1.81	18.43
1966	0.41	1.19	1.21	1.43	0.51	0.07	0.33	0.22	0.83	1.18	0.75	0.86	8.99
1967	2.05	0.67	1.94	2.08	2.15	2.73	1.14	0.07	0.73	0.66	0.66	1.64	16.52
1968	0.46	2.32	2.21	2.82	2.18	1.58	0.09	3.66	0.56	1.64	1.32	2.27	21.11
1969	1.69	2.84	0.57	1.38	0.18	2.83	1.51	0.34	0.18	1.96	0.92	1.69	16.09
1970	1.24	0.94	1.01	3.25	0.89	1.63	0.86	0.57	2.80	1.61	2.27	2.80	19.87
1971	1.06	2.13	1.01	2.16	1.34	0.64	0.94	2.15	1.75	3.23	1.03	1.35	18.79
1972	1.22	0.48	1.18	3.62	0.14	0.15	0.06	0.21	1.36	2.74	1.36	3.22	15.74
RECORD MEAN	1.29	1.35	1.80	2.00	1.72	0.91	0.60	0.88	0.86	1.41	1.36	1.39	15.57

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0.0	0.0	0.0	T	1.0	4.3	8.3	1.0	T	2.0	0.0	0.0	16.6
1934-35	0.0	0.0	0.0	T	10.2	13.0	2.5	6.5	6.4	0.1	0.0	0.0	38.7
1935-36	0.0	0.0	0.0	0.2	4.6	9.3	10.4	20.9	10.1	0.2	T	0.0	55.7
1936-37	0.0	0.0	0.0	0.0	6.5	17.7	32.3	8.8	5.5	2.2	0.0	0.0	73.0
1937-38	0.0	0.0	0.0	0.0	T	1.0	2.4	12.5	13.9	T	0.3	0.0	30.1
1938-39	0.0	0.0	0.0	T	1.5	2.8	11.8	20.1	7.4	0.0	0.0	0.0	43.6
1939-40	0.0	0.0	0.0	0.0	0.0	3.5	9.0	6.0	T	0.0	0.0	0.0	18.5
1940-41	0.0	0.0	0.0	0.0	8.8	4.7	8.2	0.5	1.8	6.1	0.0	0.0	30.1
1941-42	0.0	0.0	0.0	T	11.1	15.2	12.6	8.4	11.4	T	T	0.0	58.7
1942-43	0.0	0.0	0.0	T	1.8	2.1	6.7	13.6	7.2	T	T	T	31.4
1943-44	0.0	0.0	0.0	T	T	9.3	24.7	20.1	30.8	6.4	0.0	0.0	91.3
1944-45	0.0	0.0	0.0	0.0	6.2	4.0	5.3	2.2	13.4	6.8	T	0.0	37.9
1945-46	0.0	0.0	0.0	T	14.3	5.2	13.3	1.5	1.6	0.9	0.0	0.0	36.8
1946-47	0.0	0.0	T	T	9.5	10.1	14.9	6.5	2.8	3.9	0.0	0.0	47.7
1947-48	0.0	0.0	0.0	T	11.4	9.1	3.7	7.7	20.5	1.9	T	0.0	54.3
1948-49	0.0	0.0	0.0	T	11.2	34.3	30.1	10.3	2.3	0.0	0.0	T	88.2
1949-50	0.0	0.0	0.0	1.1	T	19.0	22.8	2.3	4.0	1.8	2.2	0.0	53.2
1950-51	0.0	0.0	T	0.0	2.5	3.8	15.7	3.4	8.9	1.7	T	0.0	36.0
1951-52	0.0	0.0	0.0	T	11.5	26.0	25.2	19.0	35.6	T	0.0	0.0	117.3
1952-53	0.0	0.0	0.0	0.0	5.6	14.1	11.4	T	10.1	5.3	0.1	0.0	46.6
#1953-54	0.0	0.0	0.0	T	0.4	12.7	10.6	5.6	10.7	0.0	T	T	40.0
1954-55	0.0	0.0	0.0	T	1.6	4.2	22.5	16.5	0.6	21.8	2.9	0.0	70.1
1955-56	0.0	0.0	0.0	T	15.8	10.1	6.5	18.6	2.2	2.7	T	0.0	55.9
1956-57	0.0	0.0	0.0	10.4	7.0	11.8	18.4	0.3	4.2	5.1	T	0.0	57.2
1957-58	0.0	0.0	0.0	0.0	6.3	11.1	7.6	9.5	15.7	15.5	0.0	0.0	65.7
1958-59	0.0	0.0	0.0	T	10.4	2.9	11.8	15.2	0.4	1.3	0.0	0.0	42.0
1959-60	0.0	0.0	0.0	T	0.6	10.6	13.5	18.2	11.4	0.7	1.0	0.0	56.0
1960-61	0.0	0.0	0.0	T	5.0	4.5	0.1	16.0	4.9	0.8	T	0.0	31.3
1961-62	0.0	0.0	0.0	8.3	11.1	8.5	15.6	10.1	25.3	1.6	0.0	0.0	80.5
1962-63	0.0	0.0	0.0	T	2.4	0.9	7.4	0.5	16.0	14.3	0.0	0.0	41.5
1963-64	0.0	0.0	0.0	T	7.6	12.9	18.2	8.0	33.5	1.9	5.3	0.0	87.4
1964-65	0.0	0.0	0.0	0.0	6.7	6.2	15.7	9.5	1.1	2.4	5.3	0.0	46.9
1965-66	0.0	0.0	2.2	0.0	2.6	12.8	5.9	18.1	17.4	2.8	0.0	0.0	61.8
1966-67	0.0	0.0	0.0	3.6	3.2	8.7	30.4	4.5	11.8	11.4	1.0	0.0	74.6
1967-68	0.0	0.0	0.0	0.0	4.2	27.1	6.8	13.6	8.4	14.2	T	T	74.3
1968-69	0.0	0.0	0.0	T	8.7	33.3	13.7	27.9	5.4	0.2	0.0	0.0	89.2
1969-70	0.0	0.0	0.0	0.1	5.6	16.0	2.8	3.9	5.2	23.6	0.0	0.0	57.2
1970-71	0.0	0.0	0.0	0.3	0.7	25.8	13.6	8.7	8.9	1.7	1.4	0.0	61.1
1971-72	0.0	0.0	4.0	16.6	5.4	17.7	10.5	7.6	1.4	15.0	0.0	0.0	78.2
1972-73	0.0	0.0	0.0	6.0	1.1	35.2							

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in May 1874 based on data from the Dooley Block through June 1909, and from the Boston Building through 1928, and from Airport locations thereafter.
# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above: Sea level	Ground								Sea level	Remarks
						Ground at temperature site	Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	
CITY																
Exchange or Godbe Bldg. Main & 1st South Sts.	3/19/74	6/29/76		40° 46'	111° 54'	4310	53	31	31				65			
Wasatch Hotel Main & 2nd South Sts.	6/29/76	7/31/91	790 feet S	40° 46'	111° 54'	4290	89	93	93				79			
Board of Trade Building 154 West 2nd South St.	7/31/91	3/15/99	1190 feet W	40° 46'	111° 54'	4280	90	83	83				75			
Dooley Block W. Temple & 2nd South St.	3/15/99	7/01/09	400 ft. ESE	40° 46'	111° 54'	4285	110	105	105		97		97			
Boston Building Main & Exchange Place	7/01/09	12/01/32	1450 ft. SE	40° 46'	111° 54'	4267	210	163	163		156		156			
501 Federal Building Main & 4th South Sts.	12/01/32	8/15/54	350 feet SW	40° 46'	111° 54'	4260	a210	85	85		b83	c83	d83			Airport became official station 7/1/40. a - Discontinued 6/30/41. b - Removed 11/17/41. c - Installed 11/16/40 & continued after office closed. d - 74 feet to 4/1/35.
AIRPORT																
Small house in SE Corner of Airport, East of UAL Hangar	5/01/28	6/11/33		40° 46'	111° 58'	4222	47	5	5				3			Airway, Pibal and evaporation observations.
Administration Building Municipal Airport	6/11/33	7/02/54	800 feet N	40° 47'	111° 58'	4222	a58	33	32		b41	c41	b41			a - 46 feet to 3/11/44. b - 30 feet to 4/1/44. c - Installed 4/1/44.
FAA-WBO Building Municipal Airport † 175 N. 23rd West Street † International Airport effective in July 1968	7/02/54	Present	325 feet SE	40° 46'	111° 58'	4220	a20	6	6		3	5	3	b5	c4225	a - Commissioned 3600 feet NW of office 7/29/60. Previous exposure was 33 feet with triple register sensors at 29 feet. b - Commissioned 3600 feet NW of office 9/1/59. c - Commissioned 7/19/66.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

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LOCAL CLIMATOLOGICAL DATA
ANNUAL SUMMARY WITH COMPARATIVE DATA
SAN DIEGO, CALIFORNIA

1972 U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

The city of San Diego is located on San Diego Bay in the southwest corner of southern California. The prevailing winds and weather are tempered by the Pacific Ocean, with the result that summers are cool and winters warm in comparison with other places along the same general latitude. Temperatures freezing or below have occurred only 11 times at the station since the record began in 1871, but hot weather (90° F. or above) is more frequent.

Dry easterly winds sometimes blow in the vicinity for several days at a time, bringing temperatures in the nineties, and at times even in the hundreds, in the eastern sections of the City and outlying suburbs. At the National Weather Service station itself, however, there have been only 14 days on which 100° or higher was reached.

As these hot winds are predominant in the fall, highest temperatures occur in the months of September and October. Records show that 62 percent of the days with 90° or higher have occurred in these two months. High temperatures are almost invariably accompanied by very low relative humidities, which often drop below 20 percent and occasionally below 10 percent.

A marked feature of the climate is the wide variation in temperature within short distances. In nearby valleys daytimes are much warmer in summer and nights noticeably cooler in winter, and freezing occurs much more frequently than in the City. Although records show unusually small daily temperature ranges, averaging only about 13° between the highest and lowest readings, a few miles inland these ranges increase to 30° or more.

Strong winds and gales are infrequent in the region, and in San Diego harbor (which is landlocked) velocities over 30 m.p.h. occur only about once each year on the average.

The seasonal rainfall is near 10 inches in the City, but increases with elevation and distance from the coast, and in the mountains to the north and east the average is between 20 and 40 inches, depending on slope and elevation. Most of the precipitation falls in winter, except in the mountains where there is an occasional thundershower. Seventy-five percent of the rainfall occurs from November through March, but wide variations take place in monthly and seasonal totals. Irrigation is extensively practiced, not only during the long dry summers and autumns, but also in years with deficient rainfall. Infrequent measurable amounts of sleet and hail occur in San Diego, but only twice has snow been observed at the Weather Bureau Office location. The first occurrence was on January 10, 1949. Light snow, mixed with rain, melted as it fell. On December 13, 1967, snow pellets (or graupel) fell between 7:30 and 8:50 a.m. A trace was recorded, and remained on the ground for about 5 minutes before melting. Some nearby areas within 5 miles of the station, received larger amounts of snow, both in pellet and flake form. In some locations amounts up to or slightly exceeding a half-inch fell, and remained on the ground for an hour or more.

As on the rest of the Pacific Coast, a dominant characteristic of spring and summer is the nighttime and early morning cloudiness. Low clouds form regularly, and frequently extend inland over the coastal valleys and foothills, but they usually dissipate during the morning and the afternoons are generally clear.

Considerable fog occurs along the coast, but the amount decreases with distance inland. The fall and winter months are usually the foggiest. Thunderstorms are rare, averaging about three a year in the City. Visibilities are good as a rule. The sunshine is plentiful for a marine location, with a marked increase towards the interior.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: SAN DIEGO, CALIFORNIA LINDBERGH FIELD Standard time used: PACIFIC Latitude: 32° 44' N Longitude: 117° 10' W Elevation (ground): 13 feet Year: 1972

Month	Temperature: Averages: Daily maximum	Daily minimum	Monthly	Extremes: Highest	Date	Lowest	Date	Degree days (Base 65°): Heating	Cooling	Precipitation: Total	Greatest in 24 hrs.	Date	Snow, Ice pellets: Total	Greatest in 24 hrs.	Date	Relative humidity: Hour 04	Hour 10	Hour 16	Hour 22 (Local time)	Wind &: Resultant: Direction	Resultant: Speed	Average speed	Fastest mile: Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures: Maximum: 90° and above ‡	Maximum: 32° and below	Minimum: 32° and below	Minimum: 0° and below	Average daily solar radiation - langleys
JAN	64.1	45.6	54.9	76	15	37	5	310	0	0.07	0.07	26	0.0	0.0		66	52	53	65	31	2.4	5.6	19	W	28+	82	4.4	12	11	8	1	0	0	5	0	0	0	0	
FEB	65.9	49.7	57.8	75	12+	40	3	203	0	0.10	0.10	5	0.0	0.0		71	59	59	71	31	3.2	6.1	19	NW	22+	72	6.3	5	11	13	1	0	0	6	0	0	0	0	
MAR	65.5	54.9	60.2	74	2	48	28	139	0	T	T	18 +	0.0	0.0		77	66	64	75	29	4.0	7.5	18	NW	31+	62	6.7	4	11	16	0	0	0	1	0	0	0	0	
APR	69.1	55.5	62.3	76	5	48	20	78	4	0.02	0.02	13	0.0	0.0		76	58	58	75	29	4.6	8.2	25	N	19	80	4.3	15	7	8	1	0	0	0	0	0	0	0	
MAY	70.0	59.3	64.7	79	29+	55	20+	34	33	0.10	0.09	19-20	0.0	0.0		76	61	62	73	27	5.4	8.8	19	NW	27+	66	5.9	5	18	8	3	0	0	1	0	0	0	0	
JUN	71.4	62.6	67.0	77	11	59	30	0	68	0.38	0.28	20	0.0	0.0		78	70	66	76	27	4.7	8.7	24	NE	20	54	6.3	9	9	12	6	0	1	0	0	0	0	0	
JUL	78.7	66.7	72.7	92	28	63	7+	0	247	T	T	5	0.0	0.0		76	64	62	72	29	6.4	9.1	22	NW	27	78	4.2	14	11	6	0	0	0	0	1	0	0	0	
AUG	77.7	66.6	72.2	90	22+	62	21	0	230	0.02	0.02	12	0.0	0.0		79	68	66	76	26	4.4	8.8	21	S	2	72	4.8	12	13	6	1	0	0	1	2	0	0	0	
SEP	74.0	63.4	68.7	85	4	59	14+	0	117	0.44	0.38	5-6	0.0	0.0		84	70	70	81	29	4.4	8.4	19	NW	3	65	5.9	8	10	12	4	0	0	0	0	0	0	0	
OCT	72.0	59.1	65.6	87	5	47	31	29	53	0.58	0.30	17-18	0.0	0.0		79	62	64	78	31	4.1	7.4	24	N	30	58	6.2	9	5	17	8	0	0	0	0	0	0	0	
NOV	68.0	51.6	59.8	76	29	47	25	149	0	3.16	1.70	16-17	0.0	0.0		67	53	60	68	29	2.0	7.0	29	SE	14	77	3.2	19	7	4	7	0	0	0	0	0	0	0	
DEC	66.0	49.0	57.5	81	25	41	15	224	1	1.61	0.98	4	0.0	0.0		57	45	50	57	30	2.7	6.6	28	NW	8	68	4.9	14	4	13	4	0	0	2	0	0	0	0	
YEAR	70.2	57.0	63.6	92	JUL. 28	37	JAN. 5	1166	753	6.48	1.70	NOV. 16-17	0.0	0.0		74	61	61	72	29	3.9	7.7	29	SE	NOV. 14	69	5.3	126	117	123	36	0	1	16	3	0	0	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature: Normal: Daily maximum	Daily minimum	Monthly	Extremes: Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation: Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets: Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity: Hour 04	Hour 10	Hour 16	Hour 22 (Local time)	Wind &: Mean speed	Prevailing direction	Fastest mile: Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures: Max.: 90° and above ‡	Max.: 32° and below	Min.: 32° and below	Min.: 0° and below	Average daily solar radiation - langleys
(a)	(b)	(b)	(b)	12		12		(b)	(b)	32		32		32		32	32		32		12	12	12	12	32	15	29	29		32	32	32	32	32	32	32	32	32	12	12	12	12	
J	64.6	45.4	55.0	86	1969	31	1963	313	2.01	6.26	1943	T	1948	2.65	1943	T	T	1949	T	1949	69	54	55	69	5.6	NE	39	SW	1955	71	4.9	13	8	10	6	0	*	4	0	0	*	0	
F	65.4	46.9	56.2	85	1963	38	1965	249	2.15	5.31	1941	0.00	1967	1.71	1941	0.0	0.0		0.0		73	57	58	72	6.3	WNW	35	S	1969+	72	5.0	11	7	10	6	0	*	3	0	0	0	0	
M	67.7	50.2	59.0	85	1964	39	1971	202	1.57	5.89	1941	T	1972+	2.40	1952	0.0	0.0		0.0		74	59	59	72	7.1	WNW	46	SW	1945	71	5.1	12	9	10	6	0	*	2	0	0	0	0	
A	69.2	53.8	61.5	91	1971+	44	1965	123	0.79	3.58	1965	T	1966+	1.40	1965	0.0	0.0		0.0		75	58	59	72	7.6	WNW	37	S	1958	65	5.3	10	10	10	5	0	*	2	*	0	0	0	
M	70.9	57.0	64.0	91	1967	48	1967	84	0.15	0.95	1971	0.00	1952+	0.42	1957	0.0	0.0		0.0		77	64	64	74	7.6	WNW	27	SW	1947	59	5.6	9	12	10	2	0	*	1	*	0	0	0	
J	72.6	59.8	66.2	82	1970+	51	1967	36	0.05	0.38	1972	0.00	1946	0.28	1972	0.0	0.0		0.0		81	70	67	78	7.5	SSW	26	S	1948	56	5.6	9	12	9	1	0	*	1	0	0	0	0	
J	76.8	63.4	70.1	92	1972	57	1964	6	0.01	0.13	1968	0.00	1964+	0.10	1968	0.0	0.0		0.0		82	69	67	80	7.0	WNW	23	NW	1968+	69	4.4	13	13	5	*	0	*	1	*	0	0	0	
A	78.0	65.5	71.8	90	1972	60	1968	0	0.08	0.87	1945	0.00	1970+	0.83	1951	0.0	0.0		0.0		81	67	66	79	6.9	WNW	23	SW	1945	70	4.1	15	12	4	*	0	*	1	*	0	0	0	
S	77.6	62.2	69.9	111	1963	56	1966+	15	0.15	1.90	1963	0.00	1964+	0.90	1963	0.0	0.0		0.0		79	65	65	77	6.6	NW	25	W	1955	69	3.9	16	9	5	1	0	*	3	1	0	0	0	
O	74.4	57.8	66.1	107	1961	43	1971	37	0.49	2.90	1941	0.00	1967+	1.20	1941	0.0	0.0		0.0		74	58	61	74	6.2	WNW	31	N	1961	67	4.2	15	9	7	2	0	*	4	1	0	0	0	
N	72.1	51.4	61.8	97	1966	38	1964	123	0.90	5.82	1965	0.00	1956	2.44	1944	0.0	0.0		0.0		74	58	64	74	5.6	NE	51	SE	1944	74	4.1	15	8	7	5	0	*	4	*	0	0	0	
D	67.0	47.2	57.1	88	1963	36	1968	251	2.05	7.60	1943	0.03	1953	3.07	1945	T	T	1967	T	1967	71	56	58	71	5.5	NE	34	S	1951	70	4.7	14	8	9	6	0	*	4	0	0	0	0	
YR	71.4	55.1	63.2	111	SEP. 1963	31	JAN. 1963	1439	10.40	7.60	DEC. 1943	0.00	AUG. 1970+	3.07	DEC. 1945	T	T	DEC. 1967+	T	DEC. 1967+	76	61	62	74	6.6	WNW	51	SE	NOV. 1944	67	4.7	152	117	96	41	0	3	28	3	0	*	0	

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows:
Lowest temperature 25 in January 1913; maximum monthly precipitation 9.26 in December 1921; maximum precipitation in 24 hours 3.62 in December 1940; fastest mile of wind 53 from Southeast in February 1938.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

\# To 8 compass points only.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	52.8	52.7	57.0	57.8	58.2	61.6	65.4	66.6	62.8	62.4	61.4	55.1	59.5
1934	56.1	58.3	61.8	62.3	64.7	64.0	69.0	69.0	69.7	64.9	61.2	59.1	63.3
1935	56.0	57.4	54.6	60.0	61.6	63.4	67.8	70.4	67.3	64.1	58.0	57.4	61.5
1936	56.6	56.3	57.4	58.2	63.2	65.3	70.6	71.4	68.0	65.0	63.7	58.1	62.8
1937	49.2	54.4	56.6	59.7	62.1	64.9	68.4	68.8	69.4	64.6	60.0	60.2	61.5
1938	58.4	57.2	57.2	60.0	61.6	63.2	66.8	69.5	70.4	63.6	59.2	59.6	62.2
1939	55.6	52.4	55.2	61.0	62.2	64.8	68.1	70.1	72.8	67.8	63.8	61.0	62.9
#1940	58.6	57.9	60.3	62.6	64.8	65.2	68.4	69.0	68.7	66.4	61.1	60.8	63.6
1941	57.6	59.9	62.0	60.9	67.2	66.4	69.4	70.8	68.0	65.6	63.4	57.6	64.1
1942	57.7	55.6	57.9	60.2	63.3	64.9	69.6	70.0	67.8	66.0	61.0	57.5	62.6
1943	57.0	59.7	60.0	61.0	65.0	65.2	69.0	71.2	68.7	65.8	61.7	57.8	63.5
1944	56.4	54.6	58.7	59.5	62.8	64.2	66.8	69.4	66.9	64.6	59.8	58.2	61.8
1945	55.2	56.8	58.8	58.4	62.6	65.0	69.0	71.8	71.4	67.4	60.0	57.3	62.6
1946	56.1	54.4	57.1	62.4	63.7	68.0	70.8	72.4	71.0	64.2	58.2	57.1	63.0
1947	53.5	58.5	60.8	62.7	63.9	66.7	69.4	71.0	71.1	66.6	58.4	55.8	63.2
1948	55.7	54.2	58.9	61.2	62.4	64.6	67.0	68.2	68.3	64.1	60.0	53.6	61.3
1949	47.8	52.7	56.2	61.3	63.0	67.2	69.4	70.2	70.0	64.3	64.6	54.8	61.8
1950	52.1	55.6	58.3	60.7	61.2	64.1	69.7	68.2	67.5	66.8	62.5	59.8	62.2
1951	55.7	55.6	58.7	60.7	62.2	65.7	69.3	69.0	67.8	66.8	61.6	55.5	62.4
1952	54.4	57.8	58.9	59.7	64.1	63.9	68.3	70.2	70.5	65.2	59.6	56.4	62.2
1953	60.0	57.0	57.7	58.9	62.9	64.8	70.8	69.9	68.1	67.4	63.1	57.7	63.2
1954	55.0	61.2	57.2	61.0	62.9	65.0	71.9	71.0	69.3	64.2	63.7	58.2	63.4
1955	53.9	55.5	59.7	59.6	61.7	64.7	68.3	72.4	71.5	63.3	60.0	57.1	62.3
1956	55.4	53.5	58.1	58.8	64.5	66.3	69.4	69.7	72.1	65.7	64.2	59.9	63.1
1957	56.5	60.1	59.7	60.7	63.2	68.2	71.3	73.3	70.1	65.6	60.7	61.4	64.2
1958	59.5	60.5	57.6	63.8	65.9	68.0	70.1	73.0	72.7	70.9	61.9	61.9	65.5
1959	59.7	57.1	63.3	64.7	64.3	68.2	73.7	73.6	71.6	67.2	65.3	60.2	65.7
1960	54.9	56.9	60.0	62.9	64.8	66.4	71.2	71.2	72.3	66.0	60.5	56.3	63.6
#1961	60.7	59.0	58.9	61.9	61.5	64.7	70.1	72.6	69.6	66.7	60.3	56.1	63.5
1962	56.7	56.5	55.7	61.8	62.6	63.9	68.3	70.5	68.4	64.6	59.8	56.4	62.1
1963	55.1	61.2	57.5	58.7	63.6	64.7	68.2	72.1	74.3	68.2	61.2	58.5	63.6
1964	55.3	56.7	57.8	60.2	60.9	64.0	69.2	70.7	67.7	68.6	59.1	55.6	62.1
1965	56.0	55.9	58.6	60.7	62.5	63.7	67.7	72.0	68.5	69.4	60.9	55.1	62.6
1966	53.9	54.6	58.1	61.3	63.5	66.5	69.2	72.6	69.9	67.6	61.9	57.2	63.0
1967	55.0	57.8	59.0	56.5	63.5	63.6	70.4	73.1	72.0	68.1	64.1	55.5	63.2
1968	57.2	60.7	60.7	62.4	63.9	65.8	71.7	72.2	71.3	66.6	61.7	54.9	64.1
1969	58.1	54.9	56.8	61.7	62.9	65.5	69.4	72.8	69.9	66.0	64.1	59.1	63.4
1970	57.0	59.7	60.5	60.1	63.6	65.6	70.4	72.8	69.7	66.3	61.4	55.4	63.5
1971	54.3	55.4	57.8	60.7	61.5	64.9	69.4	75.4	72.2	65.7	59.5	54.2	62.6
1972	54.9	57.8	60.2	62.3	64.7	67.0	72.7	72.2	68.7	65.6	59.8	57.5	63.6
RECORD													
MEAN	55.0	56.0	57.5	59.7	61.9	64.6	68.3	69.8	68.3	64.6	60.5	56.8	61.9
MAX	63.3	63.8	64.8	66.2	67.4	69.8	73.6	75.2	74.4	71.7	69.1	65.2	68.7
MIN	46.7	48.2	50.2	53.1	56.4	59.3	62.9	64.3	62.1	57.5	51.9	48.3	55.1

TOTAL DEGREE DAYS

SAN DIEGO, CALIFORNIA

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	23	6	66	100	138	302	275	187	119	79	28	34	1357
1934-35	1	0	6	42	123	185	280	221	321	151	111	51	1492
1935-36	5	0	1	59	214	238	260	253	238	204	59	21	1552
1936-37	0	0	0	25	75	214	488	296	260	161	93	23	1635
1937-38	0	0	1	43	149	147	208	222	243	161	112	52	1338
1938-39	7	0	0	77	175	178	294	353	305	137	99	22	1647
#1939-40	3	0	1	21	56	132	195	205	144	98	28	13	896
1940-41	0	0	0	25	130	136	229	143	98	125	11	5	902
1941-42	0	0	0	35	83	232	221	260	221	145	64	21	1282
1942-43	0	1	0	26	127	232	252	163	158	121	28	32	1140
1943-44	0	0	0	32	111	217	266	303	191	164	76	32	1392
1944-45	3	2	6	25	157	208	301	232	287	200	76	19	1516
1945-46	0	0	1	12	160	239	275	296	243	91	48	0	1365
1946-47	0	0	0	55	206	246	358	185	143	102	45	0	1340
1947-48	0	0	0	6	198	289	294	315	283	138	84	26	1633
1948-49	2	0	6	50	152	353	532	344	272	117	74	1	1903
1949-50	0	0	1	60	80	313	395	258	207	127	111	29	1581
1950-51	0	0	0	5	119	160	287	258	191	123	79	4	1226
1951-52	0	0	1	17	105	285	321	206	280	153	32	30	1430
1952-53	1	0	1	21	171	259	156	223	224	172	94	27	1349
1953-54	0	0	3	15	86	223	302	124	234	116	57	20	1180
1954-55	0	0	0	35	64	207	336	260	163	158	103	15	1341
1955-56	0	0	1	54	154	236	290	327	208	182	57	8	1517
1956-57	0	0	0	35	75	156	259	146	161	122	53	4	1011
1957-58	0	0	0	8	126	117	170	122	221	79	11	0	854
1958-59	0	0	0	1	93	108	156	216	73	29	25	0	701
1959-60	0	0	0	11	23	150	309	228	151	89	45	4	1010
#1960-61	0	0	0	25	129	261	136	160	182	100	103	43	1139
1961-62	0	0	0	33	152	269	257	231	280	103	77	33	1435
1962-63	0	0	1	25	154	258	299	114	227	180	43	21	1322
1963-64	0	0	0	6	115	202	296	234	222	154	125	40	1394
1964-65	0	0	0	8	187	280	277	249	195	138	73	35	1442
1965-66	3	0	0	9	118	303	335	284	209	107	40	4	1412
1966-67	0	0	0	4	113	236	302	197	183	245	72	48	1400
1967-68	0	0	0	3	42	288	239	119	135	85	47	8	966
1968-69	0	0	0	9	104	306	214	274	248	101	63	9	1328
1969-70	0	0	0	14	44	178	240	142	133	143	58	12	964
1970-71	0	0	0	12	107	290	331	266	215	143	109	29	1502
1971-72	0	0	0	78	160	326	310	203	139	78	34	0	1328
1972-73	0	0	0	29	149	224							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	4.32	0.02	0.13	1.75	0.53	0.08	0.02	0.01	0.02	0.16	0.03	1.10	8.17
1934	0.30	1.88	0.24	0.01	0.02	0.47	T	0.02	0.18	0.42	1.95	3.38	8.87
1935	2.15	4.54	1.42	1.02	0.02	0.00	T	0.18	0.01	0.05	0.07	0.74	10.20
1936	0.75	5.18	0.92	0.48	T	0.01	0.01	0.28	0.04	1.86	0.44	4.45	14.42
1937	1.52	4.22	2.65	0.13	0.32	0.01	0.16	0.00	T	T	0.02	1.06	10.09
1938	0.89	3.26	3.73	0.44	0.15	0.01	T	0.03	0.00	0.23	0.02	4.25	13.01
1939	2.38	1.23	1.17	0.47	0.01	0.00	T	T	2.58	0.61	1.04	0.48	9.97
#1940	1.75	3.56	0.82	0.46	T	T	T	T	0.08	1.50	0.49	6.09	14.75
1941	2.03	5.31	5.89	3.35	T	T	0.06	0.03	0.28	2.90	2.23	2.85	24.93
1942	0.21	1.06	1.91	1.40	0.11	0.01	0.00	T	0.00	0.27	0.27	0.69	5.93
1943	6.26	1.40	1.66	0.52	0.02	0.01	0.00	T	0.04	0.20	0.03	7.60	17.74
1944	1.22	3.65	0.80	0.61	0.22	0.10	T	T	T	T	4.93	1.53	13.06
1945	0.42	1.91	2.03	0.03	0.04	0.15	T	0.87	0.03	T	0.13	3.62	9.23
1946	0.89	0.60	2.67	0.52	0.01	0.00	0.00	T	T	0.34	2.53	1.18	8.74
1947	0.35	0.43	0.97	0.36	0.17	T	0.00	0.00	0.18	0.08	0.72	3.02	6.28
1948	T	1.07	1.60	0.13	0.01	0.02	T	0.00	T	1.32	0.10	2.38	6.63
1949	3.56	1.81	0.75	0.09	0.41	T	T	T	T	0.23	1.16	0.86	8.87
1950	3.31	1.62	1.00	0.28	0.09	T	0.08	0.00	T	0.01	1.23	0.05	7.67
1951	1.60	0.50	0.50	1.95	0.00	T	0.00	0.85	0.04	0.68	1.23	3.87	11.22
1952	4.24	0.60	4.97	1.34	0.00	0.14	T	T	T	T	1.83	2.20	15.52
1953	0.58	0.58	0.79	0.33	0.09	0.14	T	T	T	0.07	0.80	0.03	3.41
1954	2.76	1.03	4.31	0.09	0.01	0.03	T	T	0.00	0.00	0.74	0.55	9.52
1955	3.59	0.56	0.38	0.90	0.49	T	T	0.11	T	T	0.55	0.33	6.91
1956	1.65	0.22	T	1.56	0.10	T	T	T	T	0.68	0.00	0.18	4.39
1957	4.80	0.50	0.75	0.84	0.88	0.26	T	T	0.37	1.76	0.59	1.38	12.13
1958	0.62	3.15	3.98	1.65	0.40	T	T	T	0.62	0.01	0.44	0.06	10.93
1959	0.08	3.76	T	0.31	T	T	T	T	0.04	0.23	0.02	1.44	5.88
1960	2.99	1.45	0.55	0.56	0.17	T	T	0.00	0.06	0.04	1.01	0.22	7.05
1961	1.21	0.06	0.85	T	0.01	T	T	0.04	T	0.20	0.79	1.45	4.61
1962	2.71	3.08	0.64	0.01	0.62	0.09	T	T	0.00	0.01	0.01	0.22	7.39
1963	0.11	1.22	1.33	0.71	0.09	0.28	0.00	T	1.90	0.13	1.85	0.10	7.72
1964	1.30	0.37	0.97	0.20	0.15	0.08	0.00	T	0.00	0.02	1.01	1.17	5.27
1965	0.40	0.52	1.79	3.58	T	0.01	0.02	T	0.29	T	5.82	6.60	19.03
1966	1.29	0.86	0.17	T	0.02	T	T	0.00	T	0.80	0.82	3.22	7.18
1967	2.20	0.00	1.14	2.24	0.05	0.16	0.01	0.14	0.08	0.00	3.53	1.66	11.21
1968	0.35	0.22	1.55	0.34	0.08	T	0.13	T	T	0.04	0.36	0.61	3.68
1969	4.78	4.34	0.94	0.21	0.17	0.02	T	0.01	T	0.04	0.79	0.46	11.76
1970	0.86	2.58	1.50	0.09	0.01	T	T	0.00	T	0.07	2.05	2.22	9.38
1971	0.30	1.27	0.20	0.93	0.95	0.01	T	0.03	T	1.66	0.06	3.27	8.68
1972	0.07	0.10	T	0.02	0.10	0.38	T	0.02	0.44	0.58	3.16	1.61	6.48
RECORD MEAN	1.83	1.89	1.46	0.70	0.28	0.06	0.04	0.08	0.12	0.42	0.96	1.90	9.74

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1875 for temperature and 1850 for precipitation.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table. Data are from City Office locations through January 1940 and from Airport locations thereafter.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above Sea level: Ground at temperature site	Elevation above Ground: Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Sea level: Pyranometer	Remarks
CITY																
Daugherty Building Broadway Between 3rd and 4th Streets	10/25/71	10/30/75		32° 43'	117° 10'	43	39	20	19				4			Broadway formerly named "D" Street.
Horton Bank Building Broadway at 3rd	10/30/75	4/24/78	100 ft. W	32° 43'	117° 10'	45	60	65	64				42			
Broadway at 5th	4/24/78	4/01/86	500 ft. E	32° 43'	117° 10'	49	49	20	19				30			
Horton Bank Building Broadway at 3rd	4/01/86	1/01/89	500 ft. W	32° 43'	117° 10'	45	60	65	64				42			
Greely-Nesmith Building 5th Between E & F Sts.	1/01/89	5/01/05	900 ft. SE	32° 43'	117° 10'	44	85	73	72				66			
Cole Building 5th & G Streets	5/01/95	5/01/97	500 ft.SSW	32° 43'	117° 10'	35	70	59	58				52			SW to SE winds affected by higher building.
McNeece Building 5th & F Streets	5/01/97	4/01/13	300 ft. N	32° 43'	117° 10'	40	102	94	93		a86		86			a - Installed 1898.
U. S. Post Office & Court House Building F between Union & State Streets	4/01/13	2/01/40	1500 ft. W	32° 43'	117° 10'	26	70	62	61		55		55			
AIRPORT																
Lindbergh Municipal AP 1.5 mi. NW of City Office	1/15/30	8/19/32		32° 44'	117° 10'	19	24	6	5							
Lindberg Field Municipal Airport	8/19/32	8/13/69	100 ft. NW	32° 44'	117° 10'	d13	b21	20	19		27		27	c5		b - 47 feet to 12/18/36 and 63 feet to 2/1/61. c - Commissioned 1600 feet SSW of Administration Building 2/1/61. d - 19 feet to 2/1/61.
Port of San Diego General Aviation Bldg. Lindbergh Field	8/13/69	Present	200 ft. N	32° 44'	117° 10'	13	14	s37	s37		37		37	e5		e - 3300 feet WNW of previous site (moved 2/17/69).

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

Sale Price: 15 cents per copy. Checks and money orders should be made payable to Department of Commerce, NOAA. Remittances and correspondence regarding this publication should be sent to: National Climatic Center, Federal Building, Asheville, N. C. 28801. Attn: Publications.

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A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

SANTA MARIA, CALIFORNIA

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

Located 150 miles west-northwest of Los Angeles and 250 miles south of San Francisco, Santa Maria has a maritime climate partaking in some measure of those of both these neighbors. Year-round mild temperatures moving through gradual transitions characterize the climate more than do clearly defined seasons. The annual range of average temperatures is about 13° F., while the daily temperature range seldom exceeds 20° F. at any time of the year.

Santa Maria Valley is a flat, fertile valley opening on the Pacific Ocean at its widest and tapering inland a distance of approximately 30 miles. The valley is 10 miles wide at the site of the station, which is located 13 miles inland at an elevation of 236 feet and is bounded by the foothills of the San Rafael Mountains, the Solomon Hills, and the Casmalia Hills ranging from 1,300 up to 4,000 feet.

The area is primarily agricultural, with vegetable and other produce crops thriving successfully the year round. Minimum temperatures of 32° F. or slightly lower occur, on the average, about 15 times during the winter months and necessitate the rotation of crops to the hardier varieties during this season. Precipitation, particularly during the summer months, is insufficient for some crops and is supplemented by irrigation from subterranean water reserves. High humidity and moderate temperatures, however, substantially limit the irrigation requirement.

The rainfall season, typical of the mid-California coast, is in the winter. About three-fourths of the total annual rainfall occurs from December through March in connection with Pacific cold fronts and storm centers passing inland. During the remainder of the year, and particularly from June to October, the northward displacement and intensification of the semipermanent Pacific anticyclone produces a circulation resulting in little or no precipitation here. Thunderstorms are rare.

During most days, clear, sunshiny afternoons prevail. But under the influence of the Pacific anticyclone considerable advectional and radiational cooling results in the almost nightly occurrence of low stratus clouds -- the California stratus -- and often of early-morning radiational fog. Both clouds and fog, however, are generally dissipated before noon.

The unequal daytime solar heating over land and ocean, in conjunction with the Pacific "high", gives rise to a consistent and prevailing westerly sea-breeze during most afternoons, the winds generally decreasing to a calm by sundown. Thus the two factors of nighttime stratus and daytime sea-breezes effectively combine to maintain relatively cool days and warm nights with little diurnal change.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: SANTA MARIA, CALIFORNIA SANTA MARIA PUBLIC AP Standard time used: PACIFIC Latitude: 34° 54' N Longitude: 120° 27' W Elevation (ground): 236 feet Year: 1972

Month	Temperature Averages Daily maximum	Daily minimum	Monthly	Extremes Highest	Date	Lowest	Date	Degree days (Base 65°) Heating	Cooling	Precipitation Total	Greatest in 24 hrs.	Date	Snow, Ice pellets Total	Greatest in 24 hrs.	Date	Relative humidity Hour 04	Hour 10	Hour 16	Hour 22	Wind & Resultant Direction	Resultant Speed	Average speed	Fastest mile Speed	Direction	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Maximum 90° and above ‡	Maximum 32° and below	Minimum 32° and below	Minimum 0° and below	** Average daily solar radiation - langleys
JAN	60.7	35.9	48.3	73	15	26	5	510	0	0.16	0.11	27	0.0	0.0			61	56	77								3.7	16	7	8	2	0			0	0	8	0	
FEB	65.4	40.5	53.0	75	27+	29	3	340	0	0.31	0.20	22	0.0	0.0			64	66	86								5.1	9	12	8	3	0			0	0	2	0	
MAR	68.4	42.9	55.7	84	5	29	27	284	2	0.01	0.01	7	0.0	0.0			55	62	87								4.4	12	14	5	1	0			0	0	3	0	
APR	69.0	41.9	55.5	83	26	31	20	280	0	0.19	0.18	11	0.0	0.0			49	54	83								3.5	21	2	7	2	0			0	0	1	0	
MAY	68.1	45.3	56.7	85	28	38	9	252	1	T	T	19+	0.0	0.0			60	59									3.8	17	7	7	0	0			0	0	0	0	
JUN	70.8	51.3	61.1	87	12	45	12	116	2	0.01	0.01	6	0.0	0.0			64	63									4.6	10	17	3	1	0			0	0	0	0	
JUL	74.0	53.3	63.7	86	8	47	28	53	19	0.05	0.04	20	0.0	0.0			66	60									4.1	14	14	3	2	0			0	0	0	0	
AUG	73.8	54.0	63.9	93	21	47	16	56	30	T	T	12	0.0	0.0			65	64									3.0	21	9	1	0	0			1	0	0	0	
SEP	72.8	52.0	62.4	87	20	41	12	91	19	T	T	10+	0.0	0.0			69	68									4.7	12	10	8	0	0			0	0	0	0	
OCT	70.7	50.1	60.4	93	6	32	31	146	10	0.60	0.54	12	0.0	0.0			62	62									5.4	10	9	12	3	0			1	0	1	0	
NOV	64.2	41.1	52.7	76	30+	33	21	363	0	4.28	1.20	10-11	0.0	0.0			63	70	86								3.5	17	7	6	8	0			0	0	0	0	
DEC	59.8	36.1	48.0	75	20	25	10	521	0	1.14	0.58	6-7	0.0	0.0			62	61	83								3.8	15	10	6	6	0			0	0	11	0	
YEAR	68.1	45.4	56.8	93	OCT. 6+	25	DEC. 10	3012	83	6.75	1.20	NOV. 10-11	0.0	0.0			62	62									4.1	174	118	74	28	0			2	0	26	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature Normal Daily maximum	Daily minimum	Monthly	Extremes ∅ Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity ¢ Hour 04	Hour 10	Hour 16	¢ Hour 22	Wind & ¢ Mean speed	Prevailing direction	Fastest mile Speed	Direction	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	% Thunderstorms	% Heavy fog	Temperatures Max. 90° and above ‡	Max. 32° and below	Min. 32° and below	Min. 0° and below	** Average daily solar radiation - langleys
(a)	(b)	(b)	(b)	9		9		(b)	(b)	30		30		30		30	30		30		19	9	9	19	15	21					30	30	30	30	30	30	22	22	9	9	9	9	
J	62.3	38.1	50.2	84	1971	23	1971	459	2.84	7.09	1969	0.01	1948	2.55	1943	T	T	1962+	T	1962+	81	63	60	81	6.7	WNW					4.9	13	7	11	7	0	*	5	0	0	7	0	
F	63.1	40.4	51.8	84	1971	22	1971	370	2.50	9.69	1962	T	1953	2.34	1969	T	T	1962	T	1962	84	61	60	83	7.2	WNW					4.9	12	6	10	7	0	*	4	0	0	5	0	
M	64.6	41.9	53.3	85	1966	24	1971	363	2.06	4.68	1958	T	1959+	2.55	1970	0.0	0.0		0.0		86	61	62	84	8.3	WNW					4.8	13	8	10	7	0	*	5	0	0	2	0	
A	66.4	44.7	55.6	95	1966	31	1972+	282	1.19	4.24	1958	0.03	1970+	1.60	1960	0.0	0.0		0.0		88	59	60	87	8.0	WNW					4.6	13	9	8	5	0	*	6	*	0	1	0	
M	68.1	47.1	57.6	100	1970	31	1964	233	0.22	1.03	1957	T	1972+	0.80	1971	0.0	0.0		0.0		91	61	61	87	8.3	WNW					4.5	14	9	8	2	0	*	6	*	0	*	0	
J	69.5	49.7	59.6	90	1966	38	1971	165	0.14	0.26	1957	T	1971+	0.26	1957	0.0	0.0		0.0		92	64	63	88	7.9	WNW					3.8	16	10	4	1	0	*	7	*	0	0	0	
J	71.6	52.8	62.2	87	1970	43	1964	99	0.03	0.62	1950	0.00	1959	0.62	1950	0.0	0.0		0.0		88	65	62	86	6.5	WNW					3.4	17	12	2	*	0	*	8	0	0	0	0	
A	71.9	52.9	62.4	93	1972	45	1970	93	0.03	0.11	1961+	0.00	1971+	0.11	1961+	0.0	0.0		0.0		93	65	63	91	6.2	W					3.4	17	12	2	*	0	*	10	*	0	0	0	
S	74.1	51.5	62.8	99	1968	39	1970	96	0.16	1.57	1958	T	1972+	1.11	1958	0.0	0.0		0.0		91	63	62	89	5.9	W					3.4	17	10	3	1	0	*	12	2	0	0	0	
O	73.3	47.5	60.4	100	1965	26	1971	146	0.60	2.07	1960	T	1967+	2.07	1960	0.0	0.0		0.0		85	54	59	85	6.2	W					3.5	17	9	5	2	0	*	12	2	0	1	0	
N	70.4	41.8	56.1	92	1966	28	1964	270	1.02	4.74	1965	0.00	1959+	1.93	1965	0.0	0.0		0.0		78	62	65	77	6.6	WNW					4.2	15	7	8	5	0	*	7	*	0	1	0	
D	65.0	39.8	52.4	80	1969	21	1967	391	2.58	4.82	1955	0.13	1963	3.07	1955	0.0	0.0		0.0		79	63	62	79	6.4	WNW					4.7	14	7	10	7	0	*	6	0	0	7	0	
YR	68.4	45.7	57.0	100	MAY 1970+	21	DEC. 1967	2967	13.37	9.69	FEB. 1962	0.00	AUG. 1971+	3.07	DEC. 1955	T	T	FEB. 1962+	T	FEB. 1962+	86	62	62	85	7.0	WNW					4.2	178	106	81	45	0	2	87	5	0	24	0	

∅ For the period June 1963 through the current year.
Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows:
Highest temperature 109 in June 1929; maximum monthly precipitation 10.31 in January 1909; maximum precipitation in 24 hours 3.55 in February 1938.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

% Through 1964. The station did not operate 24 hours daily. Fog and thunderstorm data may be incomplete.

¢ Through 1963.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	48.4	48.0	53.9	54.8	53.9	58.6	62.2	63.4	60.4	60.4	58.2	49.2	56.0
1934	53.5	55.8	61.2	59.0	61.4	60.6	62.6	63.6	64.1	61.4	57.4	53.4	59.5
1935	51.2	54.2	51.3	57.8	58.1	59.6	60.8	62.8	62.3	60.2	52.8	52.4	57.0
1936	52.7	52.8	54.8	56.6	60.8	62.6	64.7	63.6	63.3	61.0	58.5	52.2	58.6
1937	43.8	49.0	53.2	56.2	59.3	61.1	63.0	64.0	62.2	61.3	55.8	55.5	57.0
1938	54.2	52.8	52.2	57.0	58.4	60.7	63.2	63.8	62.8	60.5	55.6	55.2	58.0
1939	50.1	48.6	51.8	57.8	57.9	59.1	61.2	63.8	67.6	62.2	57.1	55.6	57.7
1940	54.9	54.9	58.2	59.1	60.8	62.0	63.5	63.2	64.8	62.4	57.7	57.8	59.9
1941	53.9	55.9	58.0	57.0	63.4	61.2	63.8	63.6	63.0	61.2	59.0	53.8	59.5
#1942	53.6	51.2	54.2	57.4	59.2	59.8	64.2	63.4	61.2	60.4	56.2	53.1	57.8
1943	51.4	54.2	55.4	56.4	57.5	60.3	62.8	61.4	63.6	60.2	58.4	53.3	57.9
1944	51.6	50.6	54.3	52.9	57.4	60.0	61.6	60.8	62.6	61.3	54.8	53.8	56.8
1945	51.0	52.4	50.2	53.5	56.9	60.8	63.7	62.1	64.1	61.4	55.6	53.9	57.1
#1946	49.9	50.0	53.4	57.1	56.8	59.4	62.1	61.6	62.7	57.7	52.8	51.0	56.2
1947	49.0	53.6	55.8	57.8	59.2	61.9	60.6	62.8	61.8	61.0	51.5	50.5	57.1
1948	52.8	49.3	50.6	55.2	56.7	61.0	60.7	61.6	61.3	59.0	55.0	48.0	55.9
1949	43.2	47.2	51.8	57.0	58.0	60.9	60.8	61.4	62.2	56.6	60.4	50.7	55.8
1950	46.0	52.2	53.9	56.6	55.8	58.6	63.8	61.6	63.1	61.2	60.0	55.6	57.4
1951	50.9	51.2	53.1	54.8	57.3	59.4	61.4	62.0	62.7	62.6	56.1	49.2	56.7
1952	48.6	53.4	50.3	57.1	57.7	58.0	62.0	61.6	62.5	58.5	54.2	50.8	56.2
1953	55.8	52.5	52.1	52.7	56.3	57.8	63.4	61.4	62.7	60.4	56.9	52.9	57.1
#1954	49.6	56.9	51.7	56.6	57.7	58.6	63.3	61.8	61.1	58.4	58.0	51.9	57.1
1955	46.8	48.8	53.1	51.5	54.6	57.3	58.3	61.2	60.9	59.4	54.7	52.7	55.0
1956	50.8	46.6	52.4	52.6	57.7	58.7	60.7	59.7	63.1	57.9	57.8	53.2	56.0
1957	46.6	54.5	53.5	53.8	57.9	61.8	63.5	61.8	64.0	60.6	54.1	54.3	57.2
1958	52.3	54.6	51.2	56.7	58.6	60.4	62.1	66.0	66.5	62.7	56.5	56.5	58.7
1959	54.1	50.6	56.8	58.7	56.1	59.4	64.3	64.2	62.5	63.4	58.7	53.7	58.5
1960	49.3	51.3	54.8	56.2	56.5	61.2	62.7	60.7	61.9	58.8	53.4	50.7	56.4
1961	54.1	53.7	52.4	55.3	54.5	60.3	63.5	64.4	62.0	60.3	53.2	51.2	57.1
1962	50.4	50.3	49.9	56.4	54.2	57.9	60.4	62.8	60.5	59.8	55.7	53.0	55.9
#1963	49.3	58.3	51.1	52.6	56.9	58.7	60.4	62.8	65.4	62.4	55.6	50.7	57.0
1964	48.7	49.6	49.7	52.4	53.5	58.0	60.8	62.2	60.4	60.9	51.6	52.0	55.0
1965	52.1	50.5	52.7	55.3	55.8	58.3	61.6	64.7	62.3	64.2	56.3	48.8	56.9
1966	48.1	48.1	53.8	57.4	58.2	60.9	61.1	63.6	63.4	61.4	56.3	49.9	56.9
1967	51.1	51.9	50.9	48.4	57.2	58.7	63.8	64.3	64.9	62.4	58.2	49.5	56.8
1968	50.9	56.8	54.3	55.7	58.0	61.6	64.2	64.7	63.9	61.4	57.5	49.9	58.3
1969	53.2	51.0	51.3	53.8	58.2	60.7	62.9	62.4	62.7	60.3	58.5	52.2	57.2
1970	53.9	54.8	54.3	53.0	59.4	59.2	62.2	60.3	61.3	57.8	55.5	49.1	56.7
1971	49.9	49.6	51.0	50.6	54.2	58.6	61.5	65.1	63.3	55.7	50.8	45.6	54.6
1972	48.3	53.0	58.7	55.5	56.7	61.1	63.7	63.9	62.4	60.4	52.7	48.0	56.8
RECORD													
MEAN	50.3	51.9	52.7	54.8	56.9	59.7	62.1	62.5	62.7	60.3	55.7	51.4	56.8
MAX	62.6	63.8	64.3	66.2	67.2	69.7	71.8	72.3	74.1	73.1	68.8	63.9	68.2
MIN	38.0	40.0	41.1	43.4	46.5	49.6	52.4	52.6	51.3	47.4	42.5	38.9	45.3

TOTAL DEGREE DAYS

SANTA MARIA, CALIFORNIA

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1942-43							422	305	291	258	237	158	
1943-44	76	110	65	156	200	362	413	416	330	363	235	144	2870
1944-45	104	138	89	132	308	346	434	352	461	345	252	128	3089
#1945-46	44	96	45	114	291	348	466	419	363	249	257	167	2859
1946-47	91	109	111	239	366	436	493	324	285	252	183	94	2983
1947-48	136	81	107	127	405	447	377	454	445	294	258	122	3253
1948-49	136	106	132	200	303	526	673	499	410	242	225	128	3580
1949-50	134	118	99	272	162	445	582	349	335	247	280	187	3210
1950-51	37	102	76	132	177	285	434	379	365	300	233	163	2683
1951-52	118	86	79	110	263	480	500	330	446	235	219	209	3075
1952-53	97	101	88	199	321	431	279	344	392	366	274	210	3102
1953-54	79	105	78	172	235	367	469	224	406	249	218	183	2785
#1954-55	63	94	121	202	208	398	558	449	365	395	316	225	3394
1955-56	196	129	149	179	318	374	436	530	384	366	228	191	3480
1956-57	126	153	82	215	225	359	564	289	351	327	215	113	3019
1957-58	55	90	53	137	317	324	387	283	421	253	194	132	2646
1958-59	83	10	26	75	251	268	329	399	250	193	269	162	2315
1959-60	51	43	83	92	186	342	482	391	308	267	256	113	2614
1960-61	90	133	104	195	340	433	330	311	385	290	319	138	3068
1961-62	59	38	106	182	348	421	444	407	461	257	327	209	3259
#1962-63	136	91	131	162	274	366	477	184	423	365	245	184	3038
1963-64	135	70	34	80	275	436	500	441	468	378	347	205	3369
1964-65	127	90	149	142	398	395	394	400	376	286	279	192	3228
1965-66	111	42	79	92	253	495	515	467	342	235	205	124	2960
1966-67	113	44	67	128	268	463	424	361	430	490	244	183	3215
1967-68	40	24	26	97	197	474	431	233	326	276	212	96	2432
1968-69	34	25	54	116	225	462	359	386	419	328	207	124	2739
1969-70	66	78	71	147	190	385	335	279	322	356	188	167	2584
1970-71	99	141	144	218	279	486	471	425	427	426	330	188	3634
1971-72	110	22	76	301	421	596	510	340	284	280	252	116	3308
1972-73	53	56	91	146	363	521							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	6.08	0.30	0.94	0.18	0.38	1.96	0.00	0.02	0.03	0.32	0.03	2.91	13.15
1934	1.12	1.52	0.20	T	0.26	1.30	0.01	0.01	0.01	3.14	2.19	1.78	11.54
1935	4.16	1.64	3.11	3.09	0.00	0.00	0.01	0.26	0.17	0.50	2.02	1.71	16.67
1936	1.31	5.32	1.23	1.06	0.13	0.08	0.02	0.01	0.14	1.83	T	5.69	16.82
1937	3.59	4.83	4.65	0.20	0.01	0.00	0.01	0.00	0.00	0.17	0.26	2.88	16.60
1938	4.72	7.39	4.09	2.01	0.04	0.02	0.02	0.02	0.59	0.18	0.23	1.73	21.04
1939	3.25	2.18	2.39	0.22	0.03	0.00	T	0.00	1.50	0.46	1.03	1.36	12.42
1940	5.51	2.64	1.98	1.74	0.00	0.00	0.00	0.02	0.08	0.73	0.12	5.25	18.07
1941	5.04	8.40	7.84	3.15	0.10	T	0.09	0.03	0.01	1.04	0.32	7.93	33.95
#1942	1.38	1.32	1.95	2.85	0.08	0.00	0.00	0.03	0.02	0.82	0.84	2.94	12.23
1943	5.88	0.87	1.92	0.95	T	T	T	T	T	1.11	0.32	3.26	14.31
1944	1.25	5.18	0.46	1.39	0.09	0.01	T	T	0.03	0.14	1.88	1.88	12.31
1945	0.45	2.79	2.78	0.07	0.02	0.03	T	0.11	T	0.61	0.56	2.68	10.10
#1946	0.64	1.57	3.97	0.09	0.08	T	T	T	T	0.42	3.39	1.61	11.77
1947	0.33	0.71	1.15	0.15	0.32	0.12	T	T	0.04	0.54	0.06	0.56	3.98
1948	0.01	1.42	2.96	1.97	0.69	0.01	T	T	T	0.11	0.03	2.99	10.19
1949	1.28	1.44	3.12	0.07	0.77	T	T	0.01	T	0.04	0.68	2.57	9.98
1950	2.54	1.39	1.16	0.85	0.15	T	0.62	0.01	0.05	0.93	1.39	1.27	10.36
1951	1.97	1.88	0.18	1.50	0.01	0.02	0.01	0.01	0.06	0.61	0.99	3.60	10.84
1952	5.03	0.77	4.38	0.37	T	0.11	T	T	T	0.04	3.41	4.13	18.24
1953	1.27	T	0.91	1.15	0.02	0.08	T	T	0.02	0.01	1.97	0.28	5.71
#1954	3.34	1.28	3.44	0.25	0.02	0.04	T	T	T	T	0.78	1.88	11.03
1955	4.41	1.22	0.28	2.25	0.41	T	T	T	T	T	1.59	4.82	14.98
1956	2.54	0.66	T	1.99	0.45	T	0.02	T	T	0.81	0.00	0.36	6.83
1957	2.13	1.93	0.52	0.94	1.03	0.26	0.02	0.01	0.02	1.18	0.36	2.12	10.52
1958	2.46	4.67	4.68	4.24	0.21	T	T	T	1.57	T	0.24	0.16	18.23
1959	2.02	4.37	T	0.26	T	T	0.00	T	0.20	T	0.00	0.45	7.30
1960	3.17	4.01	0.93	2.05	T	T	T	T	T	2.07	2.83	0.80	15.86
1961	0.91	0.16	0.71	0.24	0.17	T	0.03	0.11	0.01	T	1.80	1.73	5.87
1962	2.01	9.69	1.23	0.04	0.10	0.03	T	T	T	0.50	T	0.26	13.86
1963	1.03	3.30	3.59	2.57	0.43	0.03	T	0.03	0.39	1.04	1.73	0.13	14.27
1964	1.23	0.05	2.38	0.34	0.27	0.09	0.06	0.10	T	1.64	2.43	1.34	9.93
1965	0.74	0.35	1.69	3.42	T	T	0.01	T	T	0.01	4.74	2.47	13.43
1966	1.05	0.92	0.20	0.03	0.01	0.03	0.16	T	0.16	0.02	2.04	2.86	7.48
1967	3.53	0.51	2.31	3.63	0.22	0.23	T	T	0.18	T	1.91	1.33	13.85
1968	0.60	0.90	1.90	0.65	0.05	T	T	T	T	1.89	0.76	1.41	8.16
1969	7.09	7.57	0.66	1.74	0.01	0.01	T	T	0.13	0.14	0.94	0.29	18.58
1970	2.15	2.67	1.98	0.03	T	0.06	T	T	T	0.01	2.88	3.47	13.25
1971	0.61	0.10	0.35	1.01	0.98	T	T	0.00	0.04	0.24	0.49	2.80	6.62
1972	0.16	0.31	0.01	0.19	T	0.01	0.05	T	T	0.60	4.28	1.14	6.75
RECORD													
MEAN	2.06	2.09	1.66	1.15	0.22	0.04	0.03	0.01	0.10	0.49	1.48	1.82	11.15

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1934.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table. Data are from Cooperative locations through 1942 and from Airport locations thereafter.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above: Sea level	Elevation above: Ground								Elevation above: Sea level	Remarks
						Ground at temperature site	Wind instruments	Extreme thermometers	Psychrometer	Dew Cell	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	
COOPERATIVE																
NW corner Main and Broadway Street	1/1885	5/1917		34° 58'	120° 26'	212										Record by Mr. Blockman, 1885 to 1912 and by Bank of Santa Maria from 1912 to 1917.
Vicinity of 115 E Jones Street	5/1917	4/1959	6 blocks S	34° 57'	120° 26'	218										Observations by City Water Employees 1917-1920. Observations after 7/1920 by Mr. A. A. Howard.
AIRPORT																
Control Tower Hangar Building, Hancock Field	6/06/38	11/23/42		34° 56'	120° 25'	230	40									On call station.
Santa Maria Army Airbase	11/23/42	3/01/43	3 mi. SSW	34° 54'	120° 27'	230	24	5	5				4			Six regular observations and "on call" observations.
Santa Maria Army Airbase, Hangar Building #1308	3/01/43	2/14/44	Short Distance	34° 54'	120° 27'	236	50	5	5			4	4			
Santa Maria Army Airbase, Building #1216	2/14/44	1/31/46	Short Distance	34° 54'	120° 27'	228	53	5	5			4	4			
Hancock Field, Hangar Building, 1 mile SE of P. O.	1/31/46	10/21/54	3 mi. NNE	34° 56'	120° 25'	231	47	5	5			4	4			Program included solar radiation observations from January 1949.
Santa Maria Public Airport (former Army Airbase)	10/21/54	2/01/55	3 mi. SSW	34° 54'	120° 27'	238	54	6	6	6		4	4		244	Moved to Public Airport from privately operated field.
Santa Maria Public Airport	2/01/55	2/15/72	No Change	34° 54'	120° 27'	e236	c24	6	6	a38	4	4		d5	b289	a - 6 feet to 5/17/59; removed 12/1/63. b - 252 feet to 11/27/63. c - 54 feet to 5/11/63. d - Commissioned 1900 feet SSW of office 5/11/63. e - 238 feet to 5/11/63.
Santa Maria Public Airport	2/15/72	Present	990 feet SE	34° 54'	120° 27'	236	f24	6	16		19	19		f5	268	f - Same site as prior to 2/15/72.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

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LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

TUCSON, ARIZONA

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

Within 10 to 15 miles of the station the terrain is flat or gently rolling, with many dry washes. There is a general increase in elevation from north and northwest to south and southeast. Rugged mountain ranges and jutting hills encircle the valley floor. The higher mountains to the north, east, and south reach up to over 5,000 feet above the airport, and are at distances of 25 to 40 miles. To the west, the hills and smaller mountains range from 500 to 4,000 feet above the airport; all are more than 5 miles distant.

The soil cover is rather sandy, and native vegetation is mostly brush, cacti, and small trees, typical of the low latitude desert climate. The metropolitan area of Tucson lies at the foot of the Catalina Mountains, to the north of the airport. As a result of the lower elevation and more protected location of the City, recorded maximum temperatures are usually higher there than at the airport and minimum temperatures are correspondingly lower than at the airport.

As might be expected from its geographical situation, the climate of Tucson is prominently characterized by a long, hot season, beginning in April and ending in October. From May through September, maximum temperatures above 90° are the rule, with the mean maximum occasionally exceeding 100° in July. Under usual conditions, the diurnal temperature range is large, averaging almost 30°, although it may exceed 40°. Clear skies or very thin high clouds permit intense surface heating during the day and active radiational cooling at night, a process enhanced by the characteristic atmospheric dryness. The average growing season in the Tucson area approximates 250 days.

The distribution of precipitation through the year is such that more than 50 percent of the annual amount usually falls between July 1 and September 15 and a secondary maximum from December through March provides over 20 percent of the yearly precipitation. During the July-September period scattered convective or orographic showers and thunderstorms occur that often fill dry washes to overflowing. On occasion, brief, torrential downpours cause spectacular and destructive flash floods in sections of the metropolitan area, sometimes from short-period falls of over 1.50 inches. Hail rarely falls in thunderstorms, and sleet is an almost unknown form of precipitation. The December through March precipitation is more general and occurs as prolonged rainstorms that provide much needed replenishment of ground water. During these storms, snow often falls on the higher mountains, but snow in Tucson itself is infrequent, particularly in accumulations exceeding an inch in depth.

Relative humidity shows a pronounced daily oscillation in line with the usual large daily range in temperature. From near the first of the year, the average relative humidity decreases steadily until July and the beginning of the thunderstorm season, when it shows a marked increase. By the middle of September, and end of the thunderstorm season, it decreases again, resuming the upward climb in late November. Only occasionally during the summer is relative humidity high enough to produce appreciable physical discomfort, and then only for short periods. During the hot season, relative humidity values may fall below 10 percent during afternoons, and sometimes below 5 percent. The low average wet bulb temperature during hot weather makes evaporative air coolers effective most of the time.

Tucson lies in the zone receiving more sunshine than any other section of the United States; the persistence of the bright sunshine is one of the most noteworthy features of this desert climate. Cloudless days are commonplace, and average cloudiness, much of it being very thin cirriform clouds, is low.

Surface winds are generally light, with no important seasonal changes in either velocities or prevailing direction. Occasional windstorms cause localized duststorms, particularly in the outlying sections of Tucson where the ground has been disturbed in numerous development areas. During the spring months, winds may briefly be strong enough to cause some damage to trees and buildings. Wind velocities and directions are influenced to an important extent by the surrounding mountains, as well as by the general slope of the terrain. With weak pressure gradients, local winds tend to be in the SE quadrant during the night and early morning hours, veering to NW during the day. Highest velocities usually occur with winds from the SW and E to S.

While dust and haze of local origin are frequently visible, their effect on the general clarity of the atmosphere is not great. Visibility values are normally high; and fog is extremely rare.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: TUCSON, ARIZONA INTERNATIONAL AIRPORT | Standard time used: MOUNTAIN | Latitude: 32° 07' N | Longitude: 110° 56' W | Elevation (ground): 2584 feet | Year: 1972

Month	Temperature – Averages – Daily maximum	Daily minimum	Monthly	Extremes – Highest	Date	Lowest	Date	Degree days (Base 65°) – Heating	Cooling	Precipitation – Total	Greatest in 24 hrs.	Date	Snow, Ice pellets – Total	Greatest in 24 hrs.	Date
JAN	65.7	35.0	50.4	77	25	23	4	444	0	0.00	0.00		0.0	0.0	
FEB	71.8	39.8	55.8	83	28+	30	2	259	1	0.00	0.00		0.0	0.0	
MAR	81.0	49.0	65.0	91	10	35	31+	73	82	0.01	0.01	22	0.0	0.0	
APR	82.5	49.1	65.8	92	5	37	15	50	82	0.00	0.00		0.0	0.0	
MAY	88.4	56.2	72.3	95	27+	48	20	0	236	0.24	0.19	30	0.0	0.0	
JUN	96.0	67.1	81.6	105	30	61	26	0	506	0.68	0.30	21	0.0	0.0	
JUL	99.5	73.7	86.6	107	2+	66	17+	0	678	3.49	2.31	15-16	0.0	0.0	
AUG	94.6	71.1	82.9	107	1	64	16	0	563	2.93	0.72	12	0.0	0.0	
SEP	91.5	65.6	78.6	97	5	55	25	0	414	1.09	0.76	1-2	0.0	0.0	
OCT	77.1	55.9	66.5	97	1	38	31	96	150	4.51	1.86	18-19	0.0	0.0	
NOV	65.7	40.2	53.0	78	7+	32	1	358	1	1.30	0.77	17	0.0	0.0	
DEC	61.2	36.7	49.0	74	3	26	15	489	0	0.61	0.30	27-28	0.0	0.0	
YEAR	81.3	53.3	67.3	107	AUG. 1+	23	JAN. 4	1769	2713	14.86	2.31	JUL. 15-16	0.0	0.0	

Month	Relative humidity – Hour 05 (Local time)	Hour 11	Hour 17	Hour 23	Wind & – Resultant – Direction	Resultant – Speed	Average speed	Fastest mile – Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Maximum – 90° and above ‡	Maximum – 32° and below	Minimum – 32° and below	Minimum – 0° and below	Average daily solar radiation - langleys **
JAN	57	31	21	51	15	3.4	7.7	32	W	3	90	3.5	16	10	5	0	0	0	0	0	0	9	0	
FEB	39	20	14	31	16	3.0	8.7	26	SE	4	83	4.9	11	10	8	0	0	0	0	0	0	4	0	
MAR	38	19	14	28	20	2.2	8.9	31	S	9	95	2.5	21	5	5	1	0	0	0	2	0	0	0	
APR	30	15	11	22	23	2.5	8.7	35	SW	17	90	4.0	15	5	10	0	0	0	0	3	0	0	0	
MAY	32	16	12	25	19	3.0	8.7	34	E	14	88	3.3	18	8	5	2	0	1	0	12	0	0	0	
JUN	50	27	23	38	20	2.8	8.3	45	W	21	82	3.3	19	7	4	9	0	11	0	27	0	0	0	
JUL	54	31	24	42	19	2.7	8.1	45	SE	28	89	4.3	14	12	5	7	0	11	0	30	0	0	0	
AUG	62	38	32	53	19	2.3	7.2	42	E	9	85	3.2	20	8	3	12	0	9	0	28	0	0	0	
SEP	59	35	28	48	16	3.4	7.8	47	N	1	86	3.8	18	7	5	6	0	7	0	23	0	0	0	
OCT	78	51	44	71	18	2.4	7.2	32	SW	6	66	4.9	15	7	9	8	0	6	0	5	0	0	0	
NOV	77	46	38	73	16	2.6	7.4	32	NW	8	87	3.0	18	10	2	4	0	2	0	0	0	1	0	
DEC	68	44	37	65	16	3.0	8.5	37	SE	15	74	4.2	16	4	11	4	0	0	1	0	0	8	0	
YEAR	54	31	25	46	18	2.6	8.1	47	N	SEP. 1	85	3.7	201	93	72	53	0	47	1	130	0	22	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature – Normal – Daily maximum	Daily minimum	Monthly	Extremes – Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation – Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year
(a)	(b)	(b)	(b)	32		32		(b)	(b)	32		32		32	
J	62.6	37.0	49.8	87	1953	16	1949	471	0.82	2.37	1957	T	1970+	1.40	1946
F	66.0	39.8	52.9	92	1957	20	1955+	344	0.84	2.27	1941	0.00	1972	1.49	1942
M	72.2	43.8	58.0	92	1950	20	1965	242	0.53	2.26	1952	0.00	1956	1.19	1952
A	81.1	50.6	65.9	102	1943	27	1945	75	0.27	1.66	1951	0.00	1972+	0.75	1952
M	89.4	57.5	73.5	107	1958+	38	1950	6	0.13	0.89	1943	0.00	1964+	0.89	1943
J	98.2	67.1	82.7	111	1970+	47	1955	0	0.29	1.46	1954	0.00	1969+	1.27	1954
J	98.5	74.1	86.3	111	1958	63	1960+	0	2.06	5.20	1958	0.27	1947	3.93	1958
A	94.7	71.5	83.1	109	1944	61	1956	0	2.88	7.93	1955	0.46	1953	2.48	1961
S	93.3	67.4	80.4	107	1950+	44	1965	0	1.00	5.11	1964	0.00	1953	3.05	1964
O	83.2	56.8	70.0	101	1955	26	1971	25	0.64	4.51	1972	0.00	1952	1.86	1972+
N	71.9	44.2	58.1	90	1947	24	1958	231	0.62	1.90	1952	0.00	1970+	1.86	1968
D	64.9	38.9	51.9	84	1954	18	1954	406	0.92	5.02	1965	0.00	1958	1.54	1967
YR	81.3	54.1	67.7	111	JUN. 1970+	16	JAN. 1949	1800	11.00	7.93	AUG. 1955	0.00	APR. 1972+	3.93	JUL. 1958

Month	Snow, Ice pellets – Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity – Hour 05 (Local time)	Hour 11	Hour 17	Hour 23	Wind & – Mean speed	Prevailing direction	Fastest mile – Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days – Sunrise to sunset – Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures – Max. – 90° and above ‡	Max. – 32° and below	Min. – 32° and below	Min. – 0° and below	Average daily solar radiation - langleys **
(a)	32	32		31		32	32	32	32	27	15	25	25		25	31	32	32	32	32	32	32	32	32	32	32	32	
J	0.3	4.7	1949	3.5	1949	62	39	32	56	7.9	SE	40	E	1962+	82	4.6	14	7	10	4	*	*	*	0	0	7	0	
F	0.2	3.9	1965	3.9	1965	58	34	26	49	8.0	SE	59	E	1952	83	4.4	13	6	9	3	*	*	*	*	0	5	0	
M	0.3	5.7	1964	5.7	1964	51	27	22	41	8.5	SE	41	SE	1955	86	4.4	15	7	9	4	*	*	*	*	0	1	0	
A	T	1.0	1956	1.0	1956	42	21	16	31	8.8	SE	46	SE	1952	91	3.4	17	7	6	2	*	1	0	4	0	*	0	
M	0.0	0.0		0.0		33	16	12	23	8.6	SE	42	NE	1965	93	2.8	20	7	4	1	0	1	0	18	0	0	0	
J	0.0	0.0		0.0		33	17	13	24	8.5	SSE	50	SE	1961	93	2.2	22	6	2	1	0	2	0	28	0	0	0	
J	0.0	0.0		0.0		57	33	28	47	8.2	SE	71	SE	1971	77	5.3	10	12	9	10	0	14	0	29	0	0	0	
A	0.0	0.0		0.0		67	39	34	55	7.6	SE	54	NE	1969+	80	4.7	12	12	7	10	0	14	0	28	0	0	0	
S	0.0	0.0		0.0		55	32	27	44	8.1	SE	54	SE	1960	87	2.8	20	6	4	4	0	5	0	24	0	0	0	
O	T	T	1959	T	1959	53	30	25	43	8.1	SE	47	SE	1948	89	2.8	20	7	4	3	0	2	0	9	0	*	0	
N	0.2	6.4	1958	6.4	1958	55	32	29	49	8.0	SE	55	E	1951	85	3.5	18	6	6	3	*	*	*	*	0	1	0	
D	0.4	6.8	1971	6.8	1971	62	40	35	57	7.8	SE	44	W	1949	79	4.4	15	6	10	4	*	*	*	0	0	5	0	
YR	1.4	6.8	DEC. 1971	6.8	DEC. 1971	52	30	25	43	8.2	SE	71	SE	JUL. 1971	86	3.8	196	89	80	50	1	40	1	141	0	21	0	

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows:
Highest temperature 112 in June 1902; lowest temperature 6 in January 1913.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≥ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

\# To 8 compass points only.

** The National Weather Service considers the accuracy of solar radiation data questionable; therefore, publication is suspended pending determination of corrected values.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	47.7	47.5	57.8	60.6	67.1	82.4	87.4	85.8	81.6	72.0	59.4	52.2	66.8
1934	49.4	56.4	63.9	69.0	78.4	79.8	87.8	83.6	79.6	70.6	56.7	52.3	69.0
1935	52.1	55.0	55.0	64.7	67.6	82.0	85.7	82.3	78.3	68.8	54.6	51.5	66.5
1936	48.8	53.2	59.0	66.9	75.3	83.8	86.8	83.8	77.6	68.6	59.9	50.8	67.9
1937	41.2	52.8	56.0	62.8	73.8	81.2	86.3	86.0	81.8	71.0	59.4	54.3	67.2
1938	52.4	54.2	57.6	65.5	71.3	81.8	84.4	83.3	81.2	70.0	54.8	53.0	67.5
1939	50.4	45.5	59.2	67.2	74.0	82.6	87.2	84.6	79.4	67.5	62.2	56.2	68.0
#1940	52.6	52.8	59.6	65.4	76.0	83.4	87.2	84.4	80.8	70.7	56.8	56.5	68.9
1941	52.6	56.5	56.9	59.8	72.9	80.2	86.4	83.2	79.4	67.2	60.6	52.0	67.3
1942	53.0	50.8	55.8	63.6	73.1	82.9	89.8	85.2	81.6	69.4	63.2	54.2	68.5
1943	52.8	58.7	61.8	70.4	76.3	83.2	88.0	83.9	82.0	70.8	61.6	52.5	70.2
1944	50.4	50.7	56.4	63.0	73.4	80.6	87.4	86.4	79.6	72.8	55.9	52.3	67.4
1945	50.7	53.6	54.6	63.4	73.6	78.9	86.5	84.2	80.9	71.6	58.5	50.4	67.2
1946	48.0	52.0	59.4	70.6	73.0	85.4	86.0	84.0	80.9	65.9	54.8	55.6	68.0
1947	48.4	57.8	59.6	64.8	76.8	82.1	88.2	83.7	83.0	70.4	54.2	48.2	68.1
#1948	51.5	50.8	54.0	68.0	75.1	83.4	86.8	85.2	82.6	71.1	53.6	51.2	67.8
1949	43.0	50.2	57.6	67.4	73.4	83.0	85.0	84.2	82.2	66.4	64.3	50.8	67.3
1950	50.4	57.2	60.7	69.2	71.6	81.6	82.8	84.7	78.3	76.8	63.0	56.9	69.4
1951	50.3	53.7	57.4	64.4	74.0	80.5	88.8	84.9	83.2	72.5	58.5	51.5	68.3
1952	51.7	51.6	52.7	65.1	76.8	83.4	86.0	85.3	83.3	76.4	56.4	50.1	68.2
1953	53.9	52.2	60.6	65.2	68.9	84.1	86.8	86.4	82.9	71.0	61.6	48.6	68.5
1954	53.5	60.3	59.3	71.5	75.9	83.1	86.8	83.4	82.9	74.2	62.7	53.3	70.6
1955	46.7	48.8	59.6	64.4	71.8	82.3	84.6	81.8	81.2	74.3	58.5	55.5	67.4
1956	56.1	48.7	60.2	64.2	75.8	86.2	85.4	84.0	84.3	70.2	57.8	52.5	68.8
1957	53.8	61.1	59.6	66.2	71.2	85.3	88.1	84.2	81.3	67.9	54.3	54.9	69.0
#1958	51.4	55.8	54.2	64.5	79.1	84.9	86.9	84.5	80.5	71.9	57.8	55.6	68.9
1959	53.8	51.5	58.2	69.2	72.5	85.4	86.6	81.8	80.2	69.7	58.5	51.4	68.2
1960	46.8	47.8	61.0	65.7	71.9	83.5	86.0	84.2	81.2	67.3	59.2	49.1	67.0
1961	52.5	53.0	58.2	66.2	72.9	84.7	86.1	81.8	77.1	68.5	54.4	50.5	67.1
1962	49.0	54.7	53.3	70.1	71.7	80.3	84.9	87.0	81.3	70.6	61.5	54.0	68.2
1963	48.3	57.5	57.7	64.0	77.3	80.5	87.6	82.3	82.4	73.2	59.3	52.7	68.6
1964	47.5	47.7	54.8	63.2	73.2	82.0	86.2	81.6	76.3	72.1	55.2	52.4	66.0
1965	53.6	51.1	55.1	64.5	70.1	77.6	85.0	84.0	76.8	71.9	62.6	52.1	67.1
1966	47.7	47.8	60.1	66.8	76.1	82.8	85.3	82.9	78.3	68.1	61.1	52.4	67.4
1967	51.4	55.6	62.1	62.1	71.9	80.7	85.4	84.6	80.7	71.6	62.9	48.6	68.1
1968	52.4	59.1	58.7	63.2	73.3	83.5	84.9	81.3	80.7	71.7	58.3	50.6	68.1
1969	55.5	53.1	54.3	66.6	74.9	80.7	86.1	86.3	81.2	66.8	58.6	52.4	68.0
1970	50.0	57.0	58.9	61.1	75.2	83.4	87.2	84.8	76.4	65.1	60.1	51.8	67.3
1971	50.5	52.3	59.8	62.8	69.3	81.2	87.5	81.3	79.1	64.2	56.8	47.1	66.0
1972	50.4	55.8	65.0	65.8	72.3	81.6	86.6	82.9	78.6	66.5	53.0	49.0	67.3
RECORD MEAN	50.3	53.1	57.8	64.5	72.6	81.9	86.1	83.9	79.9	69.4	58.2	51.2	67.4
MAX	64.5	67.6	73.2	80.9	89.5	98.7	99.2	96.6	94.1	85.0	73.3	65.2	82.3
MIN	36.0	38.5	42.4	48.1	55.6	65.0	72.9	71.2	65.7	53.7	43.0	37.1	52.4

TOTAL DEGREE DAYS

TUCSON, ARIZONA

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1934-35	0	0	0	18	276	394	395	276	310	63	41	0	1773
1935-36	0	0	0	56	317	413	493	341	246	83	6	0	1955
1936-37	0	0	0	36	171	444	738	344	281	95	0	0	2109
1937-38	0	0	0	0	176	333	389	302	233	83	22	0	1538
1938-39	0	0	0	20	327	368	455	542	218	32	0	0	1962
1939-40	0	0	0	29	120	280	385	352	169	61	0	0	1396
1940-41	0	0	0	36	255	269	383	241	241	175	33	0	1633
1941-42	0	0	0	59	159	405	372	399	285	93	6	0	1778
1942-43	0	0	0	31	82	328	375	190	125	48	0	0	1179
1943-44	0	0	0	43	118	386	458	414	269	95	4	0	1787
1944-45	0	0	0	2	287	392	448	315	324	137	1	0	1906
1945-46	0	0	2	7	206	451	526	370	196	22	0	0	1780
1946-47	0	0	0	51	308	304	513	205	175	76	2	0	1634
1947-48	0	0	0	19	337	518	417	408	341	41	0	0	2081
#1948-49	0	0	0	23	344	428	683	414	230	64	0	0	2186
1949-50	0	0	0	78	56	442	445	216	154	22	21	0	1434
1950-51	0	0	0	0	72	242	448	321	230	81	25	0	1419
1951-52	0	0	0	18	187	413	404	386	383	69	0	0	1860
1952-53	0	0	0	0	275	456	339	352	161	64	38	0	1685
1953-54	0	0	0	30	152	499	352	127	179	5	6	0	1350
1954-55	0	0	0	13	91	364	560	445	175	74	13	0	1735
1955-56	0	0	0	0	198	288	268	468	167	84	0	0	1473
1956-57	0	0	0	47	223	378	340	128	167	50	18	0	1351
1957-58	0	0	0	41	314	306	416	252	329	100	0	0	1758
#1958-59	0	0	0	27	215	284	340	370	205	8	10	0	1459
1959-60	0	0	0	45	189	416	556	493	136	68	5	0	1908
1960-61	0	0	0	37	183	486	381	331	206	41	9	0	1674
1961-62	0	0	0	61	312	444	491	285	357	5	7	0	1962
1962-63	0	0	0	13	137	336	515	215	234	79	0	0	1529
1963-64	0	0	0	2	186	372	533	497	321	107	27	0	2045
1964-65	0	0	0	5	293	383	348	383	305	114	21	0	1852
1965-66	0	0	8	33	110	396	532	473	166	26	0	0	1744
1966-67	0	0	0	20	126	386	416	256	115	113	20	0	1452
1967-68	0	0	0	14	89	502	384	170	200	91	0	0	1450
1968-69	0	0	0	4	204	440	288	328	339	34	35	0	1672
1969-70	0	0	0	55	188	384	455	224	274	132	8	0	1720
1970-71	0	0	0	58	143	403	445	350	200	111	12	0	1722
1971-72	0	0	0	120	249	548	444	259	73	50	0	0	1743
1972-73	0	0	0	96	358	489							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	0.93	0.24	0.00	0.03	0.00	0.10	1.60	2.23	1.62	2.00	0.47	0.38	9.60
1934	0.50	0.30	0.39	0.03	0.05	0.14	1.16	2.41	1.07	T	0.50	2.04	8.59
1935	1.25	2.43	1.46	T	0.14	T	0.87	5.61	0.88	0.00	1.89	1.24	15.77
1936	0.96	0.92	0.55	0.07	T	0.06	2.82	3.03	1.51	0.34	1.13	0.85	12.24
1937	1.62	0.23	0.63	0.01	0.25	T	2.06	1.29	1.43	0.05	0.19	0.67	8.43
1938	0.65	0.88	0.43	0.08	0.11	2.07	0.78	2.37	0.50	0.00	0.09	0.93	8.89
1939	0.35	1.60	0.69	0.04	0.00	T	0.61	1.24	1.53	0.18	0.54	0.27	7.05
#1940	0.45	1.42	0.04	0.21	0.52	1.19	0.68	3.51	1.89	0.17	1.75	3.07	14.90
1941	1.43	2.27	1.46	1.06	0.74	T	2.51	1.99	1.20	0.53	0.65	2.01	15.85
1942	0.50	1.92	0.23	0.79	0.00	0.00	0.68	0.90	1.78	0.60	T	0.47	7.87
1943	0.44	0.39	1.27	0.03	0.89	0.13	1.09	3.04	3.59	0.25	0.00	0.79	11.91
1944	0.36	1.10	1.01	0.56	0.37	0.04	1.77	1.78	2.08	1.13	1.78	1.55	13.53
1945	0.58	0.47	0.53	0.11	0.00	0.00	2.84	4.31	0.14	1.13	0.00	0.47	10.58
1946	2.22	0.22	0.50	0.14	0.00	0.04	2.44	3.61	2.26	0.82	1.10	0.46	13.81
1947	0.14	0.02	0.39	T	0.04	0.05	0.27	2.24	0.47	0.80	0.70	0.41	5.53
#1948	T	2.00	0.29	T	0.00	0.06	3.02	1.08	1.11	0.56	0.06	0.93	9.11
1949	1.19	0.20	0.19	0.38	0.00	0.02	1.42	1.92	0.81	0.52	0.17	0.84	7.66
1950	0.30	1.48	0.26	T	0.01	1.24	3.72	0.86	1.15	T	T	0.27	9.29
1951	1.12	0.13	0.12	1.66	0.01	T	1.49	2.66	0.34	1.91	1.27	0.99	11.70
1952	0.24	0.08	2.26	1.51	0.02	0.30	3.25	1.56	0.80	0.00	1.90	0.73	12.65
1953	0.06	0.96	0.60	0.06	T	0.03	2.87	0.46	0.00	T	0.18	0.12	5.34
1954	0.78	0.75	1.01	0.00	0.47	1.46	2.03	2.00	3.05	0.02	0.00	0.06	11.63
1955	1.89	0.19	0.03	T	0.03	0.03	5.10	7.93	0.05	0.32	T	0.33	15.90
1956	1.08	0.54	0.00	0.31	T	0.36	2.77	1.12	0.37	0.27	T	0.22	7.04
1957	2.37	0.36	0.93	0.16	0.33	0.17	1.25	3.92	T	2.62	0.56	0.89	13.56
#1958	T	1.15	1.82	0.48	0.02	0.51	5.20	0.91	0.21	1.21	1.09	0.00	12.60
1959	0.03	0.28	T	0.01	0.00	T	3.92	2.79	T	0.70	0.29	1.97	9.99
1960	2.01	0.42	0.25	0.00	0.08	0.25	0.73	2.09	1.20	0.71	0.07	0.93	8.74
1961	0.95	0.01	0.41	T	0.00	0.26	1.81	4.28	0.51	0.65	0.44	1.57	10.89
1962	1.39	0.33	0.25	T	0.00	0.25	1.38	0.48	2.86	0.22	0.49	0.93	8.58
1963	0.59	0.81	0.34	0.32	T	T	1.66	2.86	1.45	0.60	1.26	0.08	9.97
1964	0.14	0.13	0.81	0.67	0.00	0.01	4.82	3.90	5.11	0.91	0.68	0.81	17.99
1965	0.45	0.64	0.27	0.23	T	0.01	2.13	1.12	0.82	0.07	0.77	5.02	11.53
1966	1.74	2.25	0.19	0.12	0.11	0.02	2.57	3.31	3.53	0.32	0.06	0.19	14.41
1967	0.04	0.13	0.41	0.29	0.62	0.42	2.72	2.00	1.35	1.03	0.48	3.44	12.93
1968	0.18	0.99	1.79	0.62	T	0.00	1.97	1.12	T	0.09	1.86	0.32	8.94
1969	0.74	0.50	0.34	0.60	0.46	0.00	1.51	2.57	1.31	0.03	1.06	0.82	9.94
1970	T	0.34	1.13	0.45	0.03	0.33	2.53	1.43	3.58	1.73	0.00	0.43	11.98
1971	0.04	0.50	T	0.56	0.01	T	2.18	3.29	1.75	1.18	0.69	1.97	12.17
1972	0.00	0.00	0.01	0.00	0.24	0.68	3.49	2.93	1.09	4.51	1.30	0.61	14.86
RECORD MEAN	0.78	0.81	0.69	0.37	0.19	0.26	2.23	2.20	1.28	0.62	0.78	1.04	11.25

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1900.

# Indicates a break in the data sequence during the year, or *season*, due to a station move or relocation of instruments. See Station Location table. Temperature and precipitation are from the University of *Arizona* location through May 1940 and from Airport locations thereafter. Heating Degree Days from Airport locations for the entire period of the table.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above Sea level: Ground at temperature site	Elevation above Ground: Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Elevation above Sea level: Pyranometer	Remarks
COOPERATIVE																
University of Arizona	10-1891	Present		32° 14'	110° 57'	2391	a40	b5	b5				3		# 2440	a - 45 ft. to September, 1894. b - 11 ft. to September, 1894. # - Added June, 1946.
AIRPORT																
Tucson Municipal (Later Davis-Monthan Air Force Base)	1/22/30	10/14/48		32° 11'	110° 55'	2553	c33	g5	g5		f14	d14	e14			Army Signal Service to Nov. 1932. c - Installed 6/17/40 d - Installed 6/17/40 at 3 ft. and moved to roof 7/23/47. e - Unknown to 6/17/40, 5 ft. to 7/23/47. f - Installed 10/1/47. g - Unknown prior to 6/17/40.
Tucson Municipal	10/14/48	10/15/58	4.9 mi. SW	32° 08'	110° 57'	2558	33	5	5	4	5		5			New Airport
Tucson Municipal ††	10/15/58	Present	4500 ft. E	32° 07'	110° 56'	2584	20	5	5	5	3		4			†† Tucson International Airport effective 3/13/63.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

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LOCAL CLIMATOLOGICAL DATA

ANNUAL SUMMARY WITH COMPARATIVE DATA

YUMA, ARIZONA

1972

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ENVIRONMENTAL DATA SERVICE

NARRATIVE CLIMATOLOGICAL SUMMARY

The climate of Yuma is definitely a desert product. During the winters, home-heating is necessary from late October until the 10th of April; but work or play can be conducted comfortably out-of-doors from about 10 a.m. to 5 p.m. during the winter, which is a period of mostly clear skies and abundant sunshine. Frosts are not uncommon in the nearby valleys and must be expected occasionally on higher lands.

In the period from November 1 to April 1 there are, on the average, 16 daylight hours with rain, a little more than three a month. There are places in the world where more rain has fallen in a single year than has fallen at Yuma during the past 90 years.

The sun does not shine all of every day, but it comes nearer doing so at Yuma than any other place in the United States for which we have records. Even in December and January the lower Colorado River Valley averages better than eight hours of sunshine a day.

The summers in this country are long and hot. Afternoon temperatures reach 100°, on the average, from June 5 to September 23, and 105° from June 29 to August 19. An extreme of 120° has been reached four times and the absolute high of 123° was registered on September 1, 1950.

The hot air, ballooning upwards, draws in moisture-laden air from the Gulf of Lower California. Water content of the air from mid-July to mid-September is higher than might be expected over a desert area. This condition results from the relative nearness to the Gulf of Lower California. Evaporative coolers are very effective for cooling purposes during all the months except July, August, and September, during which months the wet bulb temperatures are frequently between 75° and 80° -- a condition that makes the ordinary water cooler somewhat ineffective.

EXTREME WEATHER CONDITIONS RECORDED AT YUMA ARE INDICATED BELOW.

The greatest number of consecutive days with:

Maximum temperature 90° or higher, 152 in 1956.
Maximum temperature 100° or higher, 101 in 1937.
Maximum temperature 110° or higher, 14 in 1955.
Minimum temperature 32° or lower, 8 in 1913.
Minimum temperature 80° or higher, 30 in 1959.
Rainfall 0.01 inch or more, 7 in 1897.
No rainfall as great as 0.01 inch, from December 29, 1879, to December 15, 1880, 351 days.

Other statistics show:

Yuma's warmest day with a mean temperature of 103.5° was recorded on July 31, 1957.

Warmest month was July 1959 with a mean temperature of 96.7°. The average maximum was 109.4°, and the minimum temperature averaged 83.9°.

Warmest year was 1958 with a mean temperature of 76.3°. The average maximum temperature was 90.6°, and the minimum averaged 61.9°.

Coldest day was January 6, 1913, with a mean temperature of 31°. The maximum temperature reading was 38° and the minimum temperature was 24°.

Coldest month was January 1937 with an average of 44.9°. The maximum temperature averaged 55.9°, and the minimum 33.9°.

Coldest year was 1909 with an average of 70.4°+. The average maximum was 85.7° and the minimum 55.2°.

Highest temperature ever recorded at Yuma was 123° on September 1, 1950.

Lowest temperature ever recorded at Yuma was 22° on January 24, 1937, December 26, 1911, and January 20, 1883.

Wettest year on record, 1905 with 11.41 inches of rainfall.

Driest year on record, 1956 with 0.30 inch of rainfall.

Snow entries in the records indicate a trace in December 1932, January 1937, and December 1967.

METEOROLOGICAL DATA FOR THE CURRENT YEAR

Station: YUMA, ARIZONA MCAS/YUMA INTL AIRPORT Standard time used: MOUNTAIN Latitude: 32° 40' N Longitude: 114° 36' W Elevation (ground): 194 feet Year: 1972

Month	Temperature Averages: Daily maximum	Daily minimum	Monthly	Extremes: Highest	Date	Lowest	Date	Degree days (Base 65°): Heating	Cooling	Precipitation: Total	Greatest in 24 hrs.	Date	Snow, Ice pellets: Total	Greatest in 24 hrs.	Date	Relative humidity Hour 05 (Local time)	Hour 11	Hour 17	Hour 23	Wind &: Resultant Direction	Resultant Speed	Average speed	Fastest mile Speed	Direction #	Date	Percent of possible sunshine	Average sky cover sunrise to sunset	Number of days: Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Maximum 90° and above ‡	Maximum 32° and below	Minimum 32° and below	Minimum 0° and below	Average daily solar radiation - langleys
JAN	66.8	38.9	52.9	74	23	32	6	372	0	0.00	0.00		0.0	0.0		46	30	19	37	36	5.8	7.4	36	NW	4	91	3.0	20	5	6	0	0	0	0	0	0	1	0	
FEB	76.7	45.6	61.2	89	28	36	1	129	21	0.00	0.00		0.0	0.0		46	28	19	38	36	2.5	6.2	34	NW	2	85	4.5	13	7	9	0	0	0	0	0	0	0	0	
MAR	87.5	54.6	71.1	95	17+	42	28	11	206	0.00	0.00		0.0	0.0		51	23	14	36	25	2.2	6.2	23	N	30+	96	2.2	22	6	3	0	0	0	0	15	0	0	0	
APR	87.8	56.6	72.2	97	5	45	20	9	230	T	T	19 +	0.0	0.0		40	20	13	29	29	4.2	7.7	30	W	13+	93	2.7	20	7	3	0	0	0	0	14	0	0	0	
MAY	93.5	63.7	78.6	102	15+	57	21+	0	428	T	T	29 +	0.0	0.0		42	21	13	30	26	2.5	7.9	28	SE	28	95	1.9	24	5	2	0	0	0	0	24	0	0	0	
JUN	101.8	73.1	87.5	113	30	67	23	0	683	0.27	0.26	5-6	0.0	0.0		52	28	18	37	18	4.9	8.2	40	SE	5	94	1.9	24	4	2	3	0	3	0	30	0	0	0	
JUL	107.8	81.5	94.7	115	31	74	22	0	929	0.01	0.01	29	0.0	0.0		46	31	20	38	18	6.8	9.2	29	SE	29+	93	2.4	22	5	4	1	0	1	0	31	0	0	0	
AUG	102.2	77.9	90.1	116	1	70	17	0	784	0.26	0.26	29	0.0	0.0		61	37	26	45	17	6.5	9.5	33	E	6	93	1.9	26	4	1	1	0	1	0	31	0	0	0	
SEP	98.4	71.4	84.9	105	5	61	20	0	603	0.00	0.00		0.0	0.0		60	37	22	42	19	3.0	7.1	25	SE	18	94	2.1	24	2	4	0	0	0	0	29	0	0	0	
OCT	81.3	62.0	71.7	104	1	47	31	13	226	2.49	2.20	5-6	0.0	0.0		69	48	42	60	34	1.9	6.6	27	N	30	68	5.5	9	11	11	6	0	1	0	4	0	0	0	
NOV	72.1	47.5	59.8	81	4	40	24	147	1	0.19	0.15	16-17	0.0	0.0		64	37	31	53	36	3.1	7.1	28	S	11	88	2.1	22	4	4	3	0	0	0	0	0	0	0	
DEC	65.2	42.1	53.7	76	4+	30	31+	344	0	0.06	0.03	27 +	0.0	0.0		50	35	26	45	36	5.6	8.8	33	NW	5	83	4.0	15	9	7	3	0	0	0	0	0	2	0	
YEAR	86.8	59.6	73.2	116	AUG. 1	30	DEC. 31+	1025	4111	3.28	2.20	OCT. 5-6	0.0	0.0		52	31	22	41	26	0.7	7.7	40	SE	JUN. 5	90	2.9	241	69	56	17	0	6	0	178	0	3	0	

NORMALS, MEANS, AND EXTREMES

Month	Temperature Normal: Daily maximum	Daily minimum	Monthly	Extremes Ø: Record highest	Year	Record lowest	Year	Normal heating degree days (Base 65°)	Precipitation: Normal total	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets: Mean total	Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity Hour 05 (Local time)	Hour 11	Hour 17	Hour 23	Wind &: Mean speed	Prevailing direction	Fastest mile Speed	Direction #	Year	Pct. of possible sunshine	Mean sky cover sunrise to sunset	Mean number of days: Sunrise to sunset Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog	Temperatures Max. 90° and above ‡	Max. 32° and below	Min. 32° and below	Min. 0° and below	Average daily solar radiation - langleys
(a)	(b)	(b)	(b)	8		8		(b)	(b)	22		22		22		22	22		22		8	8	8	8	22	13	22	22		22	22	22	22	22	22	22	22	22	8	8	8	8	
J	66.8	40.0	53.4	88	1971	24	1971	363	0.39	1.29	1955	T	1970+	0.56	1955	0.0	0.0		0.0		55	38	26	46	7.3	N	41	NW	1964	84	4.1	16	7	8	2	0	0	*	0	0	1	0	
F	71.1	43.4	57.3	89	1972+	31	1965	228	0.36	1.82	1958	0.00	1972+	1.34	1958	0.0	0.0		0.0		54	33	22	44	7.5	N	50	W	1964	88	3.6	16	6	6	1	0	*	*	0	0	*	0	
M	78.0	48.0	63.0	98	1966	34	1971	130	0.24	0.82	1970	0.00	1972+	0.61	1970	0.0	0.0		0.0		51	28	19	39	7.8	WNW	43	N	1956	92	3.5	18	7	6	2	0	*	0	4	0	0	0	
A	86.1	55.0	70.6	102	1965	42	1967	29	0.09	1.20	1965	0.00	1962+	1.08	1965	0.0	0.0		0.0		46	24	16	34	8.3	W	47	NW	1954	94	2.4	21	5	4	1	0	*	0	9	0	0	0	
M	93.9	62.1	78.0	109	1970	46	1967	0	0.01	0.37	1965	0.00	1970+	0.37	1965	0.0	0.0		0.0		44	22	15	32	8.3	WNW	38	NW	1957	96	1.8	24	5	2	*	0	*	0	21	0	0	0	
J	101.9	70.0	86.0	116	1968	56	1971	0	0.01	0.27	1972	0.00	1971+	0.26	1972	0.0	0.0		0.0		45	24	15	31	8.5	SSE	42	SW	1966	98	1.2	26	3	1	*	0	*	0	27	0	0	0	
J	106.9	78.7	92.8	115	1972	70	1971+	0	0.23	1.07	1958	T	1971+	1.06	1958	0.0	0.0		0.0		49	32	23	39	9.5	SSE	52	NE	1961	90	2.7	20	8	3	1	0	2	0	31	0	0	0	
A	104.9	78.3	91.6	116	1972	63	1968	0	0.50	1.31	1955	0.00	1956+	1.14	1970	0.0	0.0		0.0		59	37	27	46	9.0	SSE	54	S	1954	91	2.5	21	7	3	2	0	2	0	31	0	0	0	
S	101.1	71.5	86.3	114	1971	53	1965	0	0.38	2.47	1963	0.00	1972+	2.42	1963	0.0	0.0		0.0		57	34	23	45	7.1	SSE	42	SE	1969+	94	1.5	25	3	2	1	0	1	*	28	0	0	0	
O	89.5	59.4	74.5	104	1972+	35	1971	0	0.38	2.68	1957	0.00	1967+	2.20	1972	0.0	0.0		0.0		53	30	22	42	6.5	N	47	S	1964	92	2.1	23	5	3	1	0	1	0	15	0	0	0	
N	76.7	46.6	61.7	94	1966	33	1964	148	0.12	1.66	1969	0.00	1971+	1.42	1969	0.0	0.0		0.0		59	36	29	50	6.8	N	47	N	1957	86	3.1	19	6	5	1	0	*	*	*	0	0	0	
D	68.4	41.6	55.0	83	1966	27	1968	319	0.32	1.67	1965	0.00	1963+	1.37	1961	T	T	1967	T	1967	62	43	34	54	7.2	N	47	W	1959	82	3.7	17	6	8	2	0	*	1	0	0	1	0	
YR	87.1	57.9	72.5	116	AUG. 1972+	24	JAN. 1971	1217	3.03	2.68	OCT. 1957	0.00	SEP. 1972+	2.42	SEP. 1963	T	T	DEC. 1967	T	DEC. 1967	53	32	22	42	7.8	N	54	S	AUG. 1954	91	2.7	246	68	51	15	0	7	1	167	0	3	0	

Ø For period April 1964 through the current year.
Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 123 in September 1950; lowest temperature 22 in January 1937 and earlier date; maximum monthly precipitation 6.25 in August 1909; maximum precipitation in 24 hours 4.01 in August 1909; fastest mile of wind 56 from Northwest in March 1949.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.
(b) Climatological standard normals (1931-1960).
* Less than one half.
\+ Also on earlier dates, months, or years.
T Trace, an amount too small to measure.
Below zero temperatures are preceded by a minus sign.
The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
‡ ≤ 70° at Alaskan stations.

Unless otherwise indicated, dimensional units used in this bulletin are: temperature in degrees F.; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent. Heating degree day totals are the sums of negative departures of average daily temperatures from 65° F. Cooling degree day totals are the sums of positive departures of average daily temperatures from 65° F. Sleet was included in snowfall totals beginning with July 1948. The term "Ice pellets" includes solid grains of ice (sleet) and particles consisting of snow pellets encased in a thin layer of ice. Heavy fog reduces visibility to 1/4 mile or less.

Sky cover is expressed in a range of 0 for no clouds or obscuring phenomena to 10 for complete sky cover. The number of clear days is based on average cloudiness 0-3, partly cloudy days 4-7, and cloudy days 8-10 tenths.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

\# To 8 compass points only.

AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	51.1	53.0	65.3	66.6	72.9	85.2	93.6	92.0	87.5	79.2	65.2	57.1	72.4
1934	57.5	62.6	73.0	76.0	81.8	81.2	93.0	91.8	85.6	76.2	63.8	57.8	75.0
1935	56.0	61.2	61.4	70.7	74.6	87.8	91.3	90.6	87.4	73.1	59.5	56.2	72.5
1936	55.4	59.6	67.5	73.8	80.6	88.0	93.0	93.0	85.1	74.0	63.8	56.0	74.1
1937	44.9	57.8	63.3	70.2	78.1	85.6	92.8	93.4	89.6	76.8	64.1	60.3	73.1
1938	58.5	58.2	62.2	70.8	77.4	85.2	90.6	90.4	87.5	73.2	59.0	57.9	72.6
1939	55.1	53.2	65.5	73.8	79.0	85.1	91.8	92.6	83.2	74.2	66.5	61.0	73.4
1940	59.2	59.6	67.8	72.2	81.7	88.0	91.6	92.1	85.3	75.6	61.0	59.0	74.4
1941	56.4	62.5	64.8	67.0	80.2	82.6	91.9	87.2	80.8	71.1	65.2	57.7	72.3
1942	58.2	57.5	63.0	68.1	76.3	84.8	94.2	91.0	84.7	75.4	65.8	59.0	73.2
1943	57.8	62.6	68.0	73.4	79.9	83.8	92.3	91.0	88.8	76.2	64.3	56.4	74.5
1944	55.6	55.4	63.2	68.0	76.8	80.6	89.6	92.0	86.8	75.8	60.2	57.4	71.8
1945	55.1	59.2	60.6	69.5	77.0	82.8	92.7	92.0	86.7	77.2	62.2	55.0	72.5
1946	56.0	56.9	63.6	74.6	77.4	86.8	91.6	92.9	87.0	70.4	59.9	58.5	73.0
1947	53.8	63.2	65.8	71.0	80.2	84.4	92.4	89.9	88.0	75.2	59.2	53.6	73.1
#1948	56.8	57.1	59.8	71.2	76.7	83.9	90.8	91.8	86.2	74.7	59.2	51.9	71.7
1949	46.8	55.2	63.2	74.9	78.4	88.8	93.6	92.8	92.2	73.8	69.8	54.8	73.7
#1950	52.7	63.2	67.4	75.5	78.1	86.6	91.8	93.6	85.6	81.5	69.5	63.0	75.7
1951	56.3	59.7	64.8	71.6	80.2	85.9	94.9	91.9	90.6	77.2	64.0	55.6	74.4
1952	53.8	59.4	60.2	72.0	84.1	85.6	93.9	94.9	90.4	82.9	61.1	55.4	74.5
1953	61.5	59.0	65.4	69.9	73.6	85.8	95.2	93.2	88.2	76.4	66.4	55.6	74.2
1954	56.6	66.6	63.1	76.4	81.2	85.8	94.3	90.8	88.9	77.9	67.5	56.4	75.4
1955	52.0	55.0	64.7	68.7	76.7	85.5	90.2	92.0	88.7	79.7	63.6	58.4	72.9
1956	59.0	54.7	65.8	70.1	79.2	89.0	91.9	90.9	91.9	74.8	63.4	57.8	74.0
1957	56.2	65.8	66.6	71.4	75.6	90.7	96.3	92.4	88.0	73.5	61.0	59.6	74.7
1958	58.1	63.0	61.9	72.5	84.9	88.6	94.1	94.9	89.4	81.0	64.4	62.1	76.3
1959	60.1	58.2	68.4	76.8	77.7	92.0	96.7	93.2	86.2	77.5	66.5	57.5	75.9
1960	53.0	58.1	69.8	74.2	79.7	92.3	95.8	94.2	89.8	76.3	64.8	56.1	75.4
1961	59.7	62.4	65.7	73.6	77.7	90.9	94.0	93.2	84.6	75.0	61.7	56.1	74.6
1962	56.8	60.2	61.3	77.4	76.2	86.2	93.3	95.9	89.1	77.0	68.0	59.8	75.1
1963	53.2	67.5	64.4	68.3	81.2	84.3	93.6	91.7	89.9	79.3	65.4	57.6	74.7
#1964	53.5	56.2	61.6	68.1	75.8	84.8	93.2	91.4	84.7	79.1	[illegible]8.9	55.8	71.9
1965	56.6	58.4	61.2	69.7	75.8	81.0	92.4	92.5	82.4	77.6	65.0	54.4	72.2
1966	52.2	55.0	65.4	73.6	81.2	86.4	92.8	93.2	86.6	74.2	64.0	57.2	73.5
1967	55.1	60.6	65.3	63.2	77.4	83.1	93.9	93.3	84.4	76.7	66.9	52.4	72.7
1968	55.2	64.3	66.1	70.1	78.7	86.9	91.4	88.8	84.9	74.9	63.4	51.8	73.0
1969	59.6	56.9	62.8	71.0	80.3	83.4	93.4	95.9	88.8	71.6	63.8	56.5	73.7
1970	54.9	61.0	62.4	65.9	79.3	86.6	94.5	93.8	84.4	72.3	63.1	54.1	72.7
1971	54.8	58.2	64.0	67.4	73.1	84.5	92.9	90.6	85.7	69.0	60.1	51.5	71.0
1972	52.9	61.2	71.1	72.2	78.6	87.5	94.7	90.1	84.9	71.7	59.8	53.7	73.2
RECORD MEAN	54.9	58.9	64.2	70.6	77.3	85.2	91.9	91.2	85.5	74.1	62.8	55.7	72.7
MAX	67.3	72.5	78.6	86.2	93.4	101.9	106.2	104.8	100.5	89.2	76.6	67.9	87.1
MIN	42.4	45.3	49.7	54.9	61.1	68.5	77.6	77.5	70.5	59.0	48.9	43.5	58.2

TOTAL DEGREE DAYS

YUMA, ARIZONA

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1933-34	0	0	0	0	62	246	233	78	2	3	0	0	624
1934-35	0	0	0	0	119	228	288	130	134	10	0	0	909
1935-36	0	0	0	10	169	270	297	166	52	16	0	0	980
1936-37	0	0	0	0	74	281	623	200	87	8	0	0	1273
1937-38	0	0	0	0	60	148	206	191	104	14	0	0	723
1938-39	0	0	0	3	178	230	303	330	92	6	0	0	1142
1939-40	0	0	0	2	28	142	189	158	22	6	0	0	547
1940-41	0	0	0	4	136	190	267	80	40	36	0	0	753
1941-42	0	0	0	2	84	234	133	207	86	8	0	0	754
1942-43	0	0	0	4	40	187	224	100	5	22	0	0	582
1943-44	0	0	0	6	65	266	295	274	80	9	0	0	995
1944-45	0	0	0	0	169	237	307	164	154	59	0	0	1090
1945-46	0	0	0	0	121	314	275	226	81	9	0	0	1026
1946-47	0	0	0	14	157	206	343	71	42	13	0	0	846
1947-48	0	0	0	0	186	352	262	242	167	7	0	0	1216
#1948-49	0	0	0	7	181	406	562	277	84	10	0	0	1527
#1949-50	0	0	0	25	7	328	378	69	40	2	2	0	851
1950-51	0	0	0	0	32	82	273	168	74	9	2	0	640
1951-52	0	0	0	3	71	286	342	156	186	2	0	0	1046
1952-53	0	0	0	0	168	294	119	171	69	19	0	0	840
1953-54	0	0	0	1	74	283	258	40	87	0	0	0	743
1954-55	0	0	0	2	13	263	398	282	67	22	2	0	1049
1955-56	0	0	0	0	96	202	178	292	72	25	0	0	865
1956-57	0	0	0	13	103	214	265	67	31	13	0	0	706
1957-58	0	0	0	0	125	162	205	62	106	28	0	0	688
1958-59	0	0	0	0	88	106	151	188	9	0	0	0	542
1959-60	0	0	0	16	34	231	362	195	13	8	0	0	859
1960-61	0	0	0	0	59	269	159	73	38	0	0	0	598
1961-62	0	0	0	18	118	266	253	138	149	0	0	0	942
1962-63	0	0	0	0	36	165	359	28	74	28	0	0	690
#1963-64	0	0	0	0	63	222	349	249	140	38	19	0	1080
1964-65	0	0	0	0	199	278	258	190	126	64	1	0	1116
1965-66	0	0	0	0	65	321	390	273	71	3	0	0	1123
1966-67	0	0	0	0	82	249	299	126	56	70	1	0	883
1967-68	0	0	0	0	37	385	296	69	41	14	0	0	842
1968-69	0	0	0	0	67	403	167	219	146	3	9	0	1014
1969-70	0	0	0	3	67	257	306	116	108	53	0	0	910
1970-71	0	0	0	4	75	333	331	195	105	36	4	0	1083
1971-72	0	0	0	76	155	415	372	129	11	9	0	0	1167
1972-73	0	0	0	13	147	344							

TOTAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1933	1.16	0.12	0.00	0.91	0.01	T	T	0.27	0.20	0.78	0.02	0.09	3.56
1934	0.03	0.18	0.18	0.00	0.00	T	T	0.74	T	0.00	0.54	0.65	2.32
1935	0.74	0.66	0.11	0.01	T	0.00	T	0.59	0.84	0.00	0.03	0.30	3.28
1936	0.24	0.18	T	0.00	0.00	T	0.18	0.11	0.02	T	0.42	0.14	1.29
1937	0.14	0.08	1.47	0.00	T	0.09	0.46	T	1.71	0.00	0.00	0.35	4.30
1938	0.07	0.58	0.61	T	0.00	T	0.18	0.25	0.35	T	0.00	0.88	2.92
1939	0.91	0.19	0.01	T	0.00	0.00	0.11	0.12	5.13	T	0.19	0.00	6.66
1940	0.04	0.25	0.21	0.00	0.00	T	T	0.10	0.53	0.41	T	0.79	2.33
1941	0.83	0.50	1.54	0.28	0.00	0.00	0.17	2.16	0.08	0.36	0.37	0.42	6.71
1942	0.19	0.84	0.17	T	0.00	0.00	0.08	1.08	0.00	0.04	0.00	0.01	2.41
1943	0.33	T	0.27	T	0.00	T		1.29	0.04	0.03	0.00	0.46	2.42
1944	0.20	1.25	0.20	T	T	0.00	0.00	0.00	0.21	0.64	1.22	0.35	4.07
1945	0.37	1.05	0.39	T	0.00	0.00	0.09	1.81	T	0.54	0.00	0.05	4.10
1946	0.07	T	T	T	0.00	0.00	0.44	0.19	0.55	T	0.12	0.88	2.25
1947	0.00	T	0.18	T	T	0.00	T	0.57	0.17	T		0.11	1.03
#1948	0.00	0.02	0.17	0.00	0.00	0.07	0.22	T	0.02	1.07	0.00	0.26	1.83
1949	2.83	0.02	0.04	T	0.32	0.00	0.13	T	T	0.35	T	0.29	3.98
#1950	0.05	0.16	T	T	0.00	0.00	0.76	T	0.45	0.00	T	T	1.42
1951	0.39	T	T	0.40	T	0.00	0.55	1.13	T	0.27	0.10	0.11	2.95
1952	0.34	0.26	0.62	0.34	0.00	T	0.02	0.00	T	0.00	0.37	0.97	2.92
1953	0.01	0.10	0.18	T	0.00	T	T	0.02	0.00	T	T	T	0.31
1954	0.05	0.05	0.25	0.00	T	T	0.10	0.02	T	0.12	0.02	T	0.61
1955	1.29	0.01	0.00	0.00	0.00	0.00	0.34	1.31	0.00	T	T	T	2.95
1956	0.04	0.06	0.00	T	0.00	T	0.20	0.00	T	T	0.00	0.00	0.30
1957	0.66	0.05	0.27	0.10	0.00	0.00	T	1.03	0.00	2.68	T	0.05	4.84
1958	T	1.82	0.34	0.01	0.05	T	1.07	0.08	T	0.57	0.08	0.05	4.02
1959	0.02	0.22	T	0.01	0.03	0.00	0.11	0.11	0.02	0.03	0.01	1.07	1.63
1960	0.74	0.07	0.03	T	0.01	0.02	T	0.01	0.42	T	T	0.12	1.42
1961	0.24	T	0.01	0.00	T	T	0.02	0.39	0.00	T	0.08	1.43	2.17
1962	0.48	0.05	0.17	0.00	T	T	T	T	T	0.05	0.04	0.37	1.16
1963	0.50	0.13	0.16	T	0.00	0.00	0.05	0.06	2.47	0.92	0.19	0.00	4.48
1964	T	0.14	T	0.78	T	0.00	0.02	0.49	T	0.24	0.22	0.09	1.98
1965	0.56	0.38	0.04	1.20	0.37	0.00	0.03	0.02	0.00	0.00	0.58	1.67	4.85
1966	0.41	0.17	0.06	T	0.00	T	0.20	0.08	0.04	0.03	T	0.02	1.01
1967	0.25	0.00	0.07	T	T	T	0.01	0.37	1.97	0.00	1.45	0.65	4.77
1968	T	0.27	0.33	T	0.00	0.00	0.91	0.10	0.00	T	T	0.06	1.67
1969	0.68	0.03	0.02	0.08	0.05	0.00	T	T	0.23	0.01	1.66	0.67	3.43
1970	T	0.56	0.82	T	0.00	0.00	T	1.21	0.02	0.02	0.02	0.01	2.66
1971	0.04	0.03	0.00	0.17	T	0.00	T	0.80	1.27	T	0.00	0.15	2.46
1972	0.00	0.00	0.00	T	T	0.27	0.01	0.26	0.00	2.49	0.19	0.06	3.28
RECORD MEAN	0.41	0.38	0.30	0.11	0.03	0.01	0.20	0.54	0.40	0.30	0.24	0.46	3.38

TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total

Record mean values above (not adjusted for instrument location changes listed in the Station Location table) are means for the period beginning in 1879 for temperature and 1876 for precipitation.

# Indicates a break in the data sequence during the year, or season, due to a station move or relocation of instruments. See Station Location table. Data are from City Office locations through 1948 and from Airport locations thereafter.

STATION LOCATION

Location	Occupied from	Occupied to	Airline distance and direction from previous location	Latitude North	Longitude West	Elevation above Sea level	Elevation above Ground								Sea level	Remarks
						Ground at temperature site	Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Sunshine Switch	
CITY																
Fort Yuma (Present Indian School Hill)	11/18/73	7/07/85		32° 44'	114° 37'								a21			a - 26 feet to 1882.
Quartermaster Building Fort Yuma, North end of Second Avenue	7/07/85	7/1891	1/2 mi.WSW	32° 44'	114° 37'	138	50	b16	b16				c2			b - 5' to 1889. c - 21' to 1886; 22' to 1888; 1' to 1890.
Quartermaster Building Fort Yuma, North end of Second Avenue	7/1891	8/26/49	No change	32° 44'	114° 37'	138	d57	e9	e9		3		2		55	d - 50' to 1903; 47' to 1904; 46' to 1905; 58' to 1941. e - 16' to 1908. Tipping bucket installed 1922; Sunshine Switch 1909. Maximum and minimum temperatures and precipitation only after 9/7/48.
AIRPORT																
Yuma Army Airfield 4 miles SSE of Post Office	8/1929	2/1935		32° 40'	114° 36'	203										
Yuma Army Airfield South wing of Room T-114	12/02/42	1/09/46	1 mi. SSE	32° 39'	114° 35'	203	64	19	19				14			
Yuma Army Airfield East wing of Room T-114	1/11/46	9/07/48		32° 39'	114° 35'	203	24	4	4				4			
Yuma Army Airfield South wing of Room T-114	9/07/48	7/01/50		32° 39'	114° 35'	203	23	4	4		14		14		19	
Administration Building Marine Corps Air Station Yuma International AP (Yuma County Airport to October 1962)	7/01/50	Present	1 mi. NNW	32° 40'	114° 36'	i194	f20	4	4	h4	4		4		17	f - 27' until remoted to field site 1/19/58. g - Installed 3/21/58. h - Commissioned 810' NW of thermometer site 3/24/64. i - 199' to 3/24/64.

Requests for additional information should be directed to the National Weather Service Office for which this summary was issued.

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APPENDIX B

INSOLATION CLIMATOLOGY DATA BASE

APPENDIX B
INSOLATION CLIMATOLOGY DATA BASE

B.1 GENERAL

This insolation climatology is designed to provide direct and total insolation and associated weather data for solar power studies. Since insolation is of prime importance, data have been drawn from a number of sources which were in several different formats. The data have all been converted into a single format, which this document describes. The stations included in the Data Base are listed in Table B-1 along with the station numbers by which they are identified, their geographic positions, and the sources of data used. The time period covered is 1962 and 1963.

The data for each year for each station form a separate file. The data for each day form a separate block on the file. The data for each hour are contained as coded information in a 130 character record. Each block consists of 24 records for the 24 hours of a day. There is a record on the file for every hour of every day for the two years covered, even if no data are presently available for entry into that record. The records are arranged in sequential time order from the first to the last of the file.

The format of the individual record is based on the Deck 280 - Hourly Record of Solar Radiation provided by the National Climatic Center of NOAA, except that the units are metric. The record length has been expanded from 80 characters to 130 characters to allow room for additional information.

TABLE B-1 *

Insolation Data Base Stations and Data Sources

Station	Number	Weather Data Source[1]	Total Insolation Source[1,2]	Time Zone	Latitude (deg)	Longitude (deg)	Parameter Set[3]
Albuquerque, N. M.	23050	280	280	Mountain	35.05	106.62	1
Edwards AFB, Ca.	23114	144	Est.	Pacific	34.90	117.90	1
Riverside, Ca.	23119	144	Mans.	Pacific	33.95	117.45	1
Los Angeles Airport, Ca.	23174	280	280	Pacific	33.93	118.38	1
San Diego, Ca.	23188	144	Est.	Pacific	32.73	117.18	1
Yuma, Ariz.	23195	144	Est.	Mountain	32.65	114.62	1
Santa Maria, Ca.	23273	280	280	Pacific	34.90	120.45	1
Inyokern/China Lake, Ca.	93104	144	Mans.	Pacific	35.68	117.68	1
L. A. Civic Center, Ca.	93134	APCD	APCD	Pacific	34.05	118.23	1
Fort Worth, Tx.	03927	280	280	Central	32.83	97.05	2
Dodge City, Kansas	13985	280	280	Central	37.77	97.97	2
Tucson, Ariz.	23160	144	Mans.	Mountain	32.23	110.95	2
Phoenix, Ariz.	23183	280	280	Mountain	33.43	112.02	2
Omaha, Nebraska	94918	280	280	Central	41.37	96.02	1
Ely, Nevada	23154	280	280	Pacific	39.28	114.85	1
El Paso, Tx.	23044	280	280	Mountain	31.80	106.40	1
Fresno, Ca.	93193	280	280	Pacific	36.77	119.72	3
Midland, Tx	23023	144	Est.	Central	31.93	102.20	1
Salt Lake City, Utah	24127	144	Mans.	Mountain	40.78	111.92	1
Grand Junction Co.	23066	144	Est.	Mountain	39.12	108.53	1

* Note that this table is identical with Table 3.1.

NOTES TO TABLE B-1

1. "280" signifies the Deck 280 format archived by the National Climatic Center for daylight hours only. "144" signifies the surface weather data Deck 144 archived by the National Climatic Center covering 24 hours per day (although not all data are recorded every hour). APCD indicates that the data were obtained from Los Angeles Air Pollution Control District records.

2. "Mans." indicates the hourly total insolation data were obtained in manuscript form from the National Weather Records Center. "Est." indicates total insolation values were estimated from weather data as described in the report.

3. Parameter set numbers refer to the set of total insolation estimating parameters employed to fill in data values when measured total insolation values were unavailable. See Table 4.1 for definition.

The locations of various data elements in the individual records are specified in Table B-2. In that table, the heading character should be interpreted as character position in the hourly record.

Every record contains, as a minimum, the information listed in Table B-3. Included, if the sun is above the horizon, are values for the total and normal incidence (direct) insolation. These latter quantities are estimated if measured values are unavailable. Except for insolation data and those entries which can be unambiguously computed, there are no estimated or interpolated values in the data base.

Leading zeroes in a field may appear as either blanks or zeroes.

B-2 INSOLATION VALUES

Normal-incidence insolation is estimated by a linear relation from the percent of possible total extra-terrestrial insolation. The coefficients in this linear relation were obtained from a statistical study of measured data at Blue Hill, Massachusetts, and Albuquerque, New Mexico. All estimated values are flagged.

Measured total insolation values are used where available. When measured values are not available, values of the percent of extra-terrestrial radiation are estimated and, from this, the total insolation is calculated. If opaque sky cover is available for that hour, this is used to estimate the percent of extra-terrestrial radiation. If opaque sky cover is not available, total sky cover is used. If total sky cover is not available, then the percent of possible total insolation from the following hour is used. If this is not available, opaque or total sky cover from the hour following the missing data is used. If none of these quantities are available for the following hour, a search for the same quantities during the hour preceding the missing data is used. If no data are available for that hour, a mean value is used for the percent of extra-terrestrial radiation. For no location was it necessary to use this arbitrary value for more than 2% of the possible observations. If cloud cover is

TABLE B-2

INSOLATION DATA BASE

Hourly Record

August 1973

Character	Item	Symbol	Code	Code Definition	Remarks
	Missing Data		Blank	Missing or unknown data	
			X	11 punch	
			X/	X or 11 overpunch	
1-5	Station Number		00001-99999	WBAN Number	
			X0001-X9999	Cooperative Station Index Number	
6-7	Year		51-99	Last two digits of year	
8-9	Month		01-12	January - December	
10-11	Day		01-31	Day of month	
12-13	Hour LST		00-23	Hour, Local Standard Time	See TIME VALUES discussion in Preamble.
14-17	Total Solar Radiation		0000-9999	0.0 - 9.999 k watts/m^2	The radiation is Hemispheric Solar Radiation and is that received (direct and diffuse) on a horizontal surface. For some stations these data are estimated. See Character 28. Solar radiation data are recorded in solar time. The value is for the solar hour ending at the hour punched in Columns 38-39. The value is ascribed to the hour of observation (LST), Columns 12-13, that occurs within the solar hour (TST).
18-19	Solar Elevation		01-90	1 - 90 Whole Degrees	Computed for the midpoint of the solar hour listed in Characters 38-39 from the declination listed in Characters 118-121 and the latitude of the station listed in the Preamble to the tape.
			X1	Solar Elevation less than 0	

Table B-2 (Continued)

Character	Item	Symbol	Code	Code Definition	Remarks
20-22	Extra-Terrestrial Radiation		000-999	0 - 9.99 k watts/m^2	The integrated radiation computed for the solar hour listed in Characters 38-39 from the declination listed in Characters 118-121 and the latitude of the station listed in the Preamble. The solar constant is taken as 135.1 mW/cm^2 (1.936 Langleys/min).
23-24	Sunshine		00-60	0 - 60 Minutes	The value is for the hour ending at the hour punched in Columns 12-13. Where the sunshine record is maintained at a local but separate office, such as a downtown city office, the minutes of sunshine from that location will be used in the absence of data from the pyrheliometer site.
25	Snow Cover		0 or Blank	None or Trace of Snow	Some stations left this column blank to indicate none or trace. The snow cover is at the time of the nearest synoptic hour to the local standard hour in Columns 12-13.
			1	One inch or more	
26-27	None		Blank		
28	Estimated Total Insolation Flag		X	Estimated Value	This flag is set if the total insolation in Characters 14-17 is estimated from cloud data or indicated as estimated in the original Deck 280 data from which some of the present data are copied.
			Blank	Measured Value	
29	Estimated Normal Incidence Insolation Flag		X	Estimated Value	This flag is set if the normal incidence insolation is estimated. Interpolation of the data reported in the Climatological Data National Summary for different airmass is not counted as estimation.
			Blank	Measured Value	
30-32	Normal Incidence Radiation		000-999	0 - 9.99 k watts/m^2	For many stations these data are estimated, by means described in the Preamble, for the solar time indicated in Columns 38 and 39. See Character 29.
33	None		Blank		
34-35	Solar Week		01-52	Solar Week of Year	Punching of solar week was discontinued 1 Jan 63. Solar weeks are seven day periods with the first week beginning 1 Jan of each year, except that the last solar week of Dec is an eight day period. During leap year, the solar week beginning 24 Jun is an eight day period.

Table B-2 (Continued)

Character	Item	Symbol	Code	Code Definition	Remarks
36	Opaque Sky Cover		0	Less than 1 tenth	Tenths of sky hidden by clouds and/or obscuring phenomena. Sky cover through which the sky is visible is disregarded. 1 Jun 62, opaque was re-defined as follows: Those portions of cloud layers or obscurations which hide the sky and/or higher clouds. Translucent sky cover which hides the sky but through which the sun and moon (not stars) may be dimly visible is considered opaque. *This column* corresponds to Column 79 in Card Deck 144.
			1-9	1 - 9 tenths	
			X	10 tenths	
37	None		None		
38-39	Solar Hour		00-24	Solar Hour - True Solar Time	Solar radiation data are tabulated in True Solar Time (TST). The scheduled time of observation (LST) that occurs within the solar hour (TST) is punched in Columns 12-13.*
40-41	Percent of Possible Radiation		00-99	0 - 99%	Quotient is derived by division of radiation (Columns 14-17) by extra-terrestrial radiation (Columns 20-22). Values greater than 100% are set to 99%.
42-44	Visibility	VVV	000-970	kilometers in tenths	
			999	greater than 97 km	
45-51	Weather and/or Obstructions to Vision				These columns correspond to Columns 25-31 in Card Deck 144.
45	Liquid Precipitation		0	None	
		R-	1	Light rain	
		R	2	Moderate rain	
		R+	3	Heavy rain	
		RW-	4	Light rain showers	
		RW	5	Mod. rain showers	
		RW+	6	Heavy rain showers	
		ZR -	7	Light freezing rain	
		ZR	8	Mod. freezing drizzle	
		ZR+	9	Heavy freezing drizzle	

*Hour 24 is Hour 0 of the following day.

Table B-2 (Continued)

Character	Item	Symbol	Code	Code Definition	Remarks
46	Liquid Precipitation		0	None	
		L-	4	Light drizzle	
		L	5	Mod. drizzle	
		L+	6	Heavy drizzle	
		ZL-	7	Light freezing drizzle	
		ZL	8	Mod. freezing drizzle	
		ZL+	9	Heavy freezing drizzle	
47	Frozen Precipitation		0	None	
		S-	1	Light snow	
		S	2	Mod. snow	
		S+	3	Heavy snow	
		SP-	4	Light snow pellets	
		SP	5	Mod. snow pellets	
		SP+	6	Heavy snow pellets	
		IC-	7	Light ice crystals	Card code 7 was discontinued 1 Apr 63.
		IC	8	Ice crystals	Card code 8 was "Mod. Ice crystals" prior to 1 Apr 63.
		IC+	9	Heavy ice crystals	Card code 9 was discontinued 1 Apr 63.
48	Frozen Precipitation		0	None	
		SW-	1	Light snow showers	
		SW	2	Mod. snow showers	
		SW+	3	Heavy snow showers	
		SG-	7	Light snow grains	
		SG	8	Mod. snow grains	
		SG+	9	Heavy snow grains	
49	Frozen Precipitation		0	None	
		E-	1	Light sleet	Sleet showers is coded as sleet.
		E	2	Mod. sleet	
		E+	3	Heavy sleet	
		A-	4	Light hail	Card code 4 was discontinued 1 Sep 56.
		A	5	Hail	Card code 5 was "Mod. Hail" prior to 1 Sep 56.
		A+	6	Heavy hail	Card code 6 was discontinued 1 Sep 56.
		AP-	7	Light soft hail	Card code 7 was discontinued 1 Sep 56.
		AP	8	Small hail	Card code 8 was "Mod. soft hail" prior to 1 Sep 56.
		AP+	9	Heavy soft hail	Card code 9 was discontinued 1 Sep 56.

Table B-2 (Continued)

Character	Item	Symbol	Code	Code Definition	Remarks
50	Obstructions to vision		0	None	
		F	1	Fog	
		IF	2	Ice Fog	
		GF	3	Ground Fog	
		BD	4	Blowing dust	
		BN	5	Blowing sand	
51	Obstructions to vision		0	None	
		K	1	Smoke	
		H	2	Haze	
		KH	3	Smoke and haze	
		D	4	Dust	
		BS	5	Blowing snow	
		BY	6	Blowing spray	Card code 6 was effective 1 Jul 52.
52-54	Dry Bulb	TTT	000-099	$0^{\circ}C - 99^{\circ}C$ whole degrees	Column 52 is punched X for values below zero.
			X01-X99	$-1^{\circ}C - -99^{\circ}C$	
55-57	Dew Point Temperature	T_dT_d	000-099	$0^{\circ}C - 99^{\circ}C$ whole degrees	Column 55 is punched X for values below zero.
			X01-X99	$-1^{\circ}C - -99^{\circ}C$	
58-80	Clouds and Obscuring Penomena				These columns correspond to Columns 56-78 in Card Deck 144. Provision was made for as many as four layers of cloud and/or obscuring phenomena existing at one time. If more than four layers existed, the data for levels above the fourth were entered in the Remarks portion of WBAN 10B, and were not punched. Their presence is indicated by the entry for total sky cover. Layers were punched in ascending order of elevation. All fields above a layer which prevented observation were left blank. If two or more types of clouds were observed at the same height, only the predominating type was punched, their amounts being combined. For each layer, the amount, type and height were punched, and for the second and third layer, the summation amount at the level involved was punched, reflecting the total amount of sky covered by that layer and those below it. The summation total for the fourth layer is obviously the total sky cover. The summation total is not necessarily the sum of the individual layers.

Table B-2 (Continued)

Character	Item	Symbol	Code	Code Definition	Remarks
58	Total Amount		0, 1-9	Tenths	
			X	10 Tenths	
59	Amount of Lowest Layer		0, 1-9	Tenths	
			X	10 Tenths	
60	Type of Cloud Lowest Layer		0	None	
		F	1	Fog	
		St	2	Stratus	
		Sc	3	Stratocumulus	
		Cu	4	Cumulus	
		Cb	5	Cumulonimbus	
		As	6	Altostratus	
		Ac	7	Altocumulus	
		Ci	8	Cirrus	
		Cs	9	Cirrostratus	
		Sf	X/2	Stratus Fractus	Prior to 1 May 61, code X/2 was Fractostratus (Fs)
		Cf	X/4	Cumulus Fractus	Prior to 1 May 61, code X/4 was Fractocumulus (Fc)
		Cm	X/5	Cumulonimbus Mamma	
		Ns	X/6	Nimbostratus	
		Acc	X/7	Altocumulus Castellanus	
		Cc	X/9	Cirrocumulus	
			X	Obscuring phenomenon other than fog	
61-63	Height of Lowest Layer		000-990	kilometers to tenths	
			888	Unknown height of a cirroform layer	Effective 1 Sep 56.
			XXX	Unlimited vertical visibility.	

Table B-2 (Continued)

Character	Item	Symbol	Code	Code Definition	Remarks
64	Amount of Second Layer		0, 1-9 X	Tenths 10 Tenths	
65	Type of Second Layer		0, 1-9 X/	See Column 60	
66-68	Height of Second Layer		000-990 XXX	See Columns 61-63	
69	Summation Amount at Second Layer		0, 1-9 X	Tenths 10 Tenths	
70	Amount of Third Layer		0, 1-9 X	Tenths 10 Tenths	
71	Type of Third Layer		0, 1-9 X/	See Column 60	
72-74	Height of Third Layer		000-990 XXX	See Columns 61-63	
75	Summation Amount at Third Layer		0, 1-9 X	Tenths 10 Tenths	
76	Amount of Fourth Layer		0, 1-9 X	Tenths 10 Tenths	
77	Type of Third Layer		0, 1-9 X/	See Column 60	
78-80	Height of Fourth Layer		000-990 XXX	See Columns 61-63	

Table B-2 (Continued)

Character	Item	Symbol	Code	Code Definition	Remarks
81-82	Wind Direction	dd	00-36	True direction, in tens of degrees, from which wind is blowing	
83-84	Wind Speed	ff	00-99	Meters/sec	
85-88	Station Pressure	PPPP	0000-9999	Hundreds of Newtons/m^2 (millibars)	Station pressure is the pressure at the assigned station elevation.
89-117	Blanks				Allowed for further expansion of the data base.
118-121	Solar Declinations		-240 to 240	Solar declination in tenths of a degree	
122-125	Solar Azimuth		-180 to 180	The azimuth angle from south to the sun in whole degrees. Negative values are towards the east.	
126-130	Modified Julian Day		00000-99999	The Julian day - 2400000 during which the day in Characters 6-11 begins at Greenwich.	

Table B-3. Quantities Which Are Included for Every Hour for All Stations

Item	Character Location	Notes
Station Number	1-5	
Year	6, 7	
Month	8, 9	
Day	10, 11	
Hour Local Standard Time	12, 13	
Total Insolation	14-17	1, 3
Solar Elevation	18, 19	2
Extra-Terrestrial Radiation	20-22	1
Normal-Incidence Radiation	30-32	1
Solar Hour	38, 39	1
Percent of Possible Total Radiation	40, 41	4
Declination of the Sun	118-121	
Azimuth of the Sun	122-125	1
Modified Julian Day	126-130	

Notes

[1]Zero unless Solar Elevation >0.

[2]Set to -1 if Solar Elevation <0.

[3]During sunrise and sunset hours Total Insolation may be nonzero even if the tabulated solar elevation is less than zero.

[4]Blank unless Solar Elevation >0.

used, the percent of possible total insolation is estimated by a linear relation in airmass and a cubic relation in the sky cover. See the main body of the report for details of the estimation procedures employed.

B-3 TIME VALUES

The weather data are obtained approximately on the hour of local standard time. This is the time base on which the data base is organized. The insolation data are measured in terms of solar time, which will agree with local standard time only at one longitude per time zone. The solar-time-related quantities are labeled with the hour occurring at the end of an observation, e.g., the total insolation labeled 11 hours solar time is the integral of the radiation observed between 10 hours and 11 hours. Within the data base the tabulation of insolation related quantities in terms of solar time has been retained. This makes the time dependence of these measurements independent of the longitude of the particular site chosen to characterize the region. So that the solar time will be as close to the local standard time as possible in the data base, the solar time is associated with the local standard time which occurs within the solar hour. This means, for example, that for all locations east of the time meridian in a time zone, the solar time tag in the data base will be one hour later than the local time tag. All geometrical factors relating to the solar time are evaluated for the midpoint of the solar hour. The declination of the sun is computed once per day for noon on the time zone longitude meridian.

B-4 RELIABILITY OF DATA

The data base has information resulting from calculations made by computer during the generation of the data base, information copied from external sources, and information computed from information copied from external sources. For quantities which were computed entirely by the computer, a sufficient check is to assure, by spot checks, that the computer coding is generating the correct numbers. All computer-generated quantities were checked by comparing samples of the numbers generated with the results of independent hand calculations. The copied quantities are unverified except to insure that they are being copied into the correct locations in the data records, and if units conversion is required, that the units conversion is being done correctly. For calculated quantities based on copied data, the calculation coding has been checked by comparison with independent hand computations, but the basic data are unverified. Table B-4 lists which quantities were computer-generated and which are copied from the input data so the user can ascertain the relative reliability of the various data elements.

B-5 HEADER FILES

The insolation data files are preceded by two additional short files. The first of these files has general information about the data base and includes, in abbreviated form, the information provided in Table B-2 of this document.

The second of these header files contains station peculiar data, such as the latitude and longitude of the station.

Both of these header files consist of 80 character coded records blocked 20 records per block for a total of 1600 characters per block. On most computers, it should be possible to access this header information by simply listing these files.

Table B-4. Reliability of Quantities in the Data Base

Characters	Item	Reliability
1-5	Station Number	Computer-generated to be the same on all hourly records in a single run. The files for each station were generated on separate runs.
6-11	Date	Computed from the Julian Day.
12-13	Hour	Computer-generated.
14-17	Total Insolation	Copied if available, estimated if not available. See Table B-2. Estimation coding checked by spot checks. If available data were partially estimated, the flag used in Deck 280 was removed and the flag set in character 28.
18-19	Solar Elevation	Computer-generated.
20-22	Extra-terrestrial Radiation	Computer-generated.
23-25	Sunshine, Snow Cover	Copied from input data if available.
26-27	Blanks	Computer-generated.
28-29	Insolation Estimated Flags	Computer-generated. Spot checks were made to assure their being set for all appropriate conditions.
30-32	Normal-Incidence Insolation	If data were available, computer interpolated to appropriate airmass, otherwise estimated. See Table B-2.
33	Blank	Computer-generated.
34-35	Solar Week	Copied if available. No checks made.
36	Opaque Sky Cover	Copied if available. No checks made.

Table B-4. Reliability of Quantities in the Data Base (Continued)

Characters	Item	Reliability
37	Blank	Computer-generated.
38-39	Solar Hour	Computer-generated. See Table B-2 and preamble for Relation to Local Standard Time.
40-41	Percent of Possible Total Insolation	Computer-generated.
42-54	Weather Data	Copied if available. No checks made.
55-57	Dew Point Temp.	Copied if available. No checks made. For Los Angeles Civic Center the dew point was computed from Relative Humidity Data actually available.
58-80	Clouds and Obscuring Phenomena	Copied if available. No checks made.
81-82	Wind Direction	Code converted to direction in degrees if data were available. No other checks made.
83-84	Wind Speed	Copied if available. No checks made.
85-88	Station Pressure	Copied if available. No checks made.
89-117	Blanks	Computer-generated.
118-121	Sun's Declination	Computer-generated.
122-125	Sun's Azimuth	Computer-generated.
126-130	Mod. Julian Day	Computer-generated to increment by one each day. This assures that all days will be included in the data base, since the date appearing in columns 6-11 is derived from the Julian date.

APPENDIX C

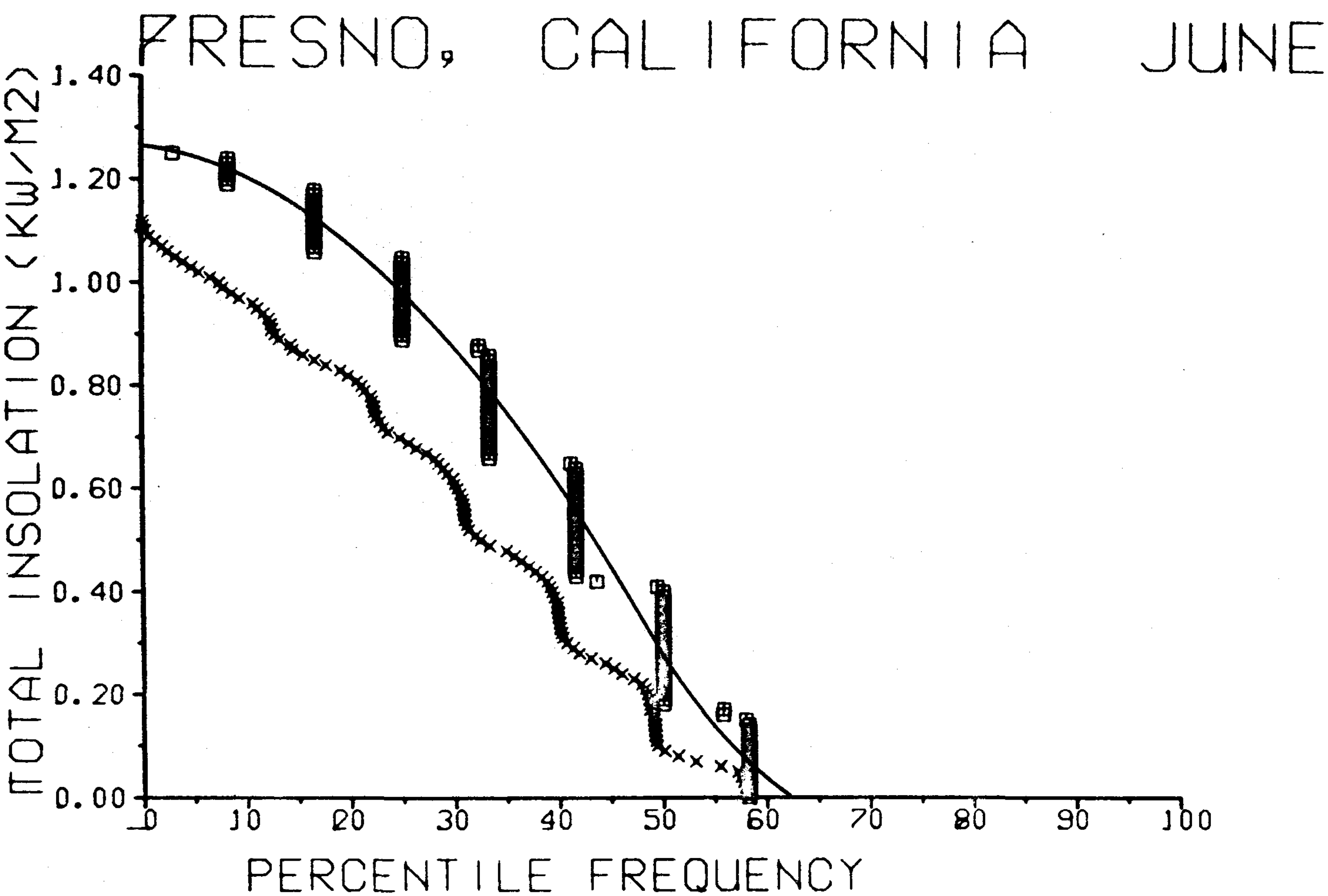
PERCENTILE FREQUENCY OF TOTAL INSOLATION

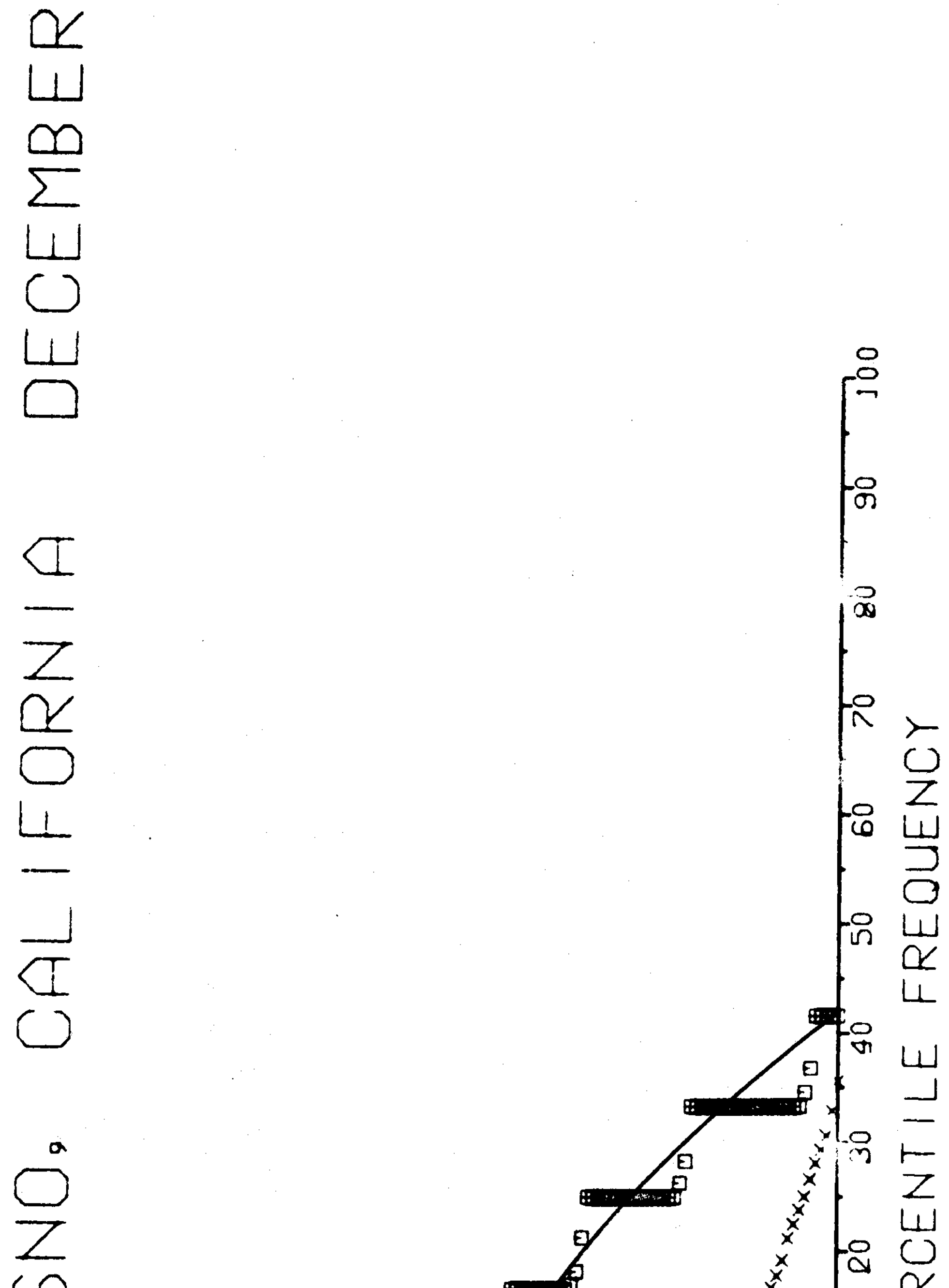
APPENDIX C
PERCENTILE FREQUENCY OF TOTAL INSOLATION

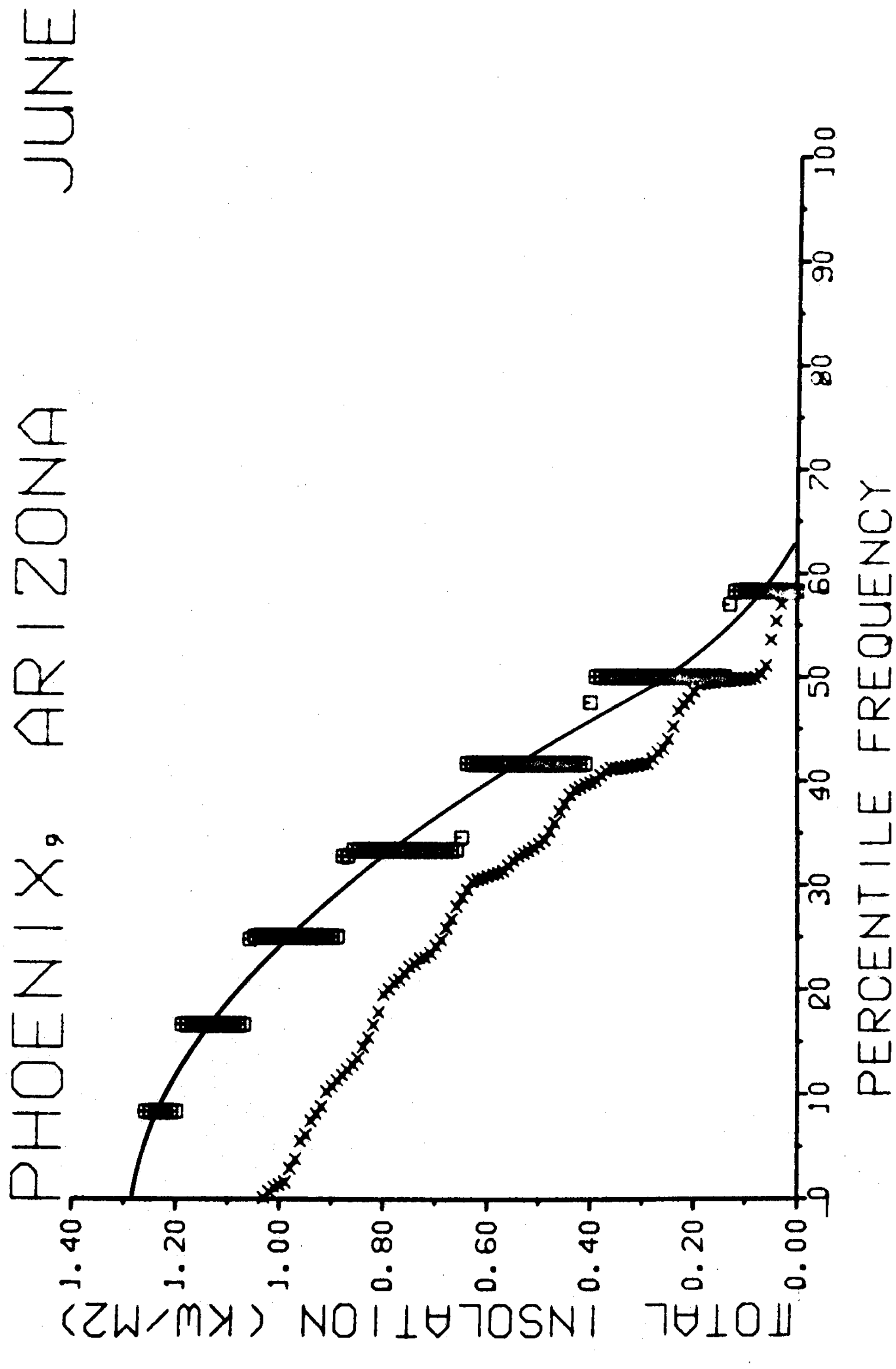
Plots of the percentile frequency of total insolation for June and December at 11 Southwestern United States locations, as determined from 1962-63 hourly data, are provided in this appendix.

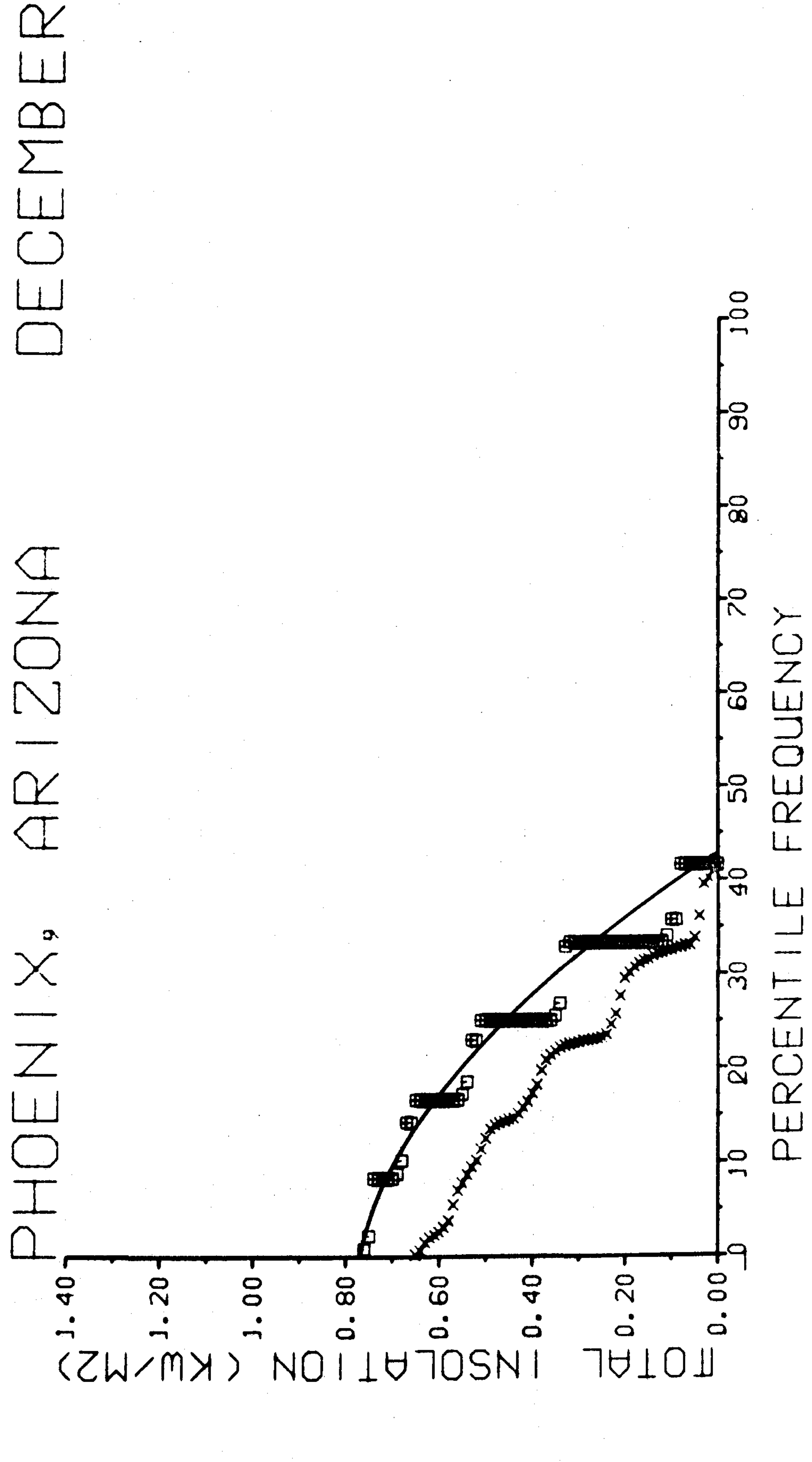
The rather strange step function appearance of the plots, particularly the extraterrestrial radiations plots, is an artifact of the hourly quantization of the data. For months when the solar declination is changing slowly, this hourly division of the data tends to bunch the extraterrestrial radiation values at specific points. Smoothed curves have been drawn through the plotted data to eliminate this artifact.

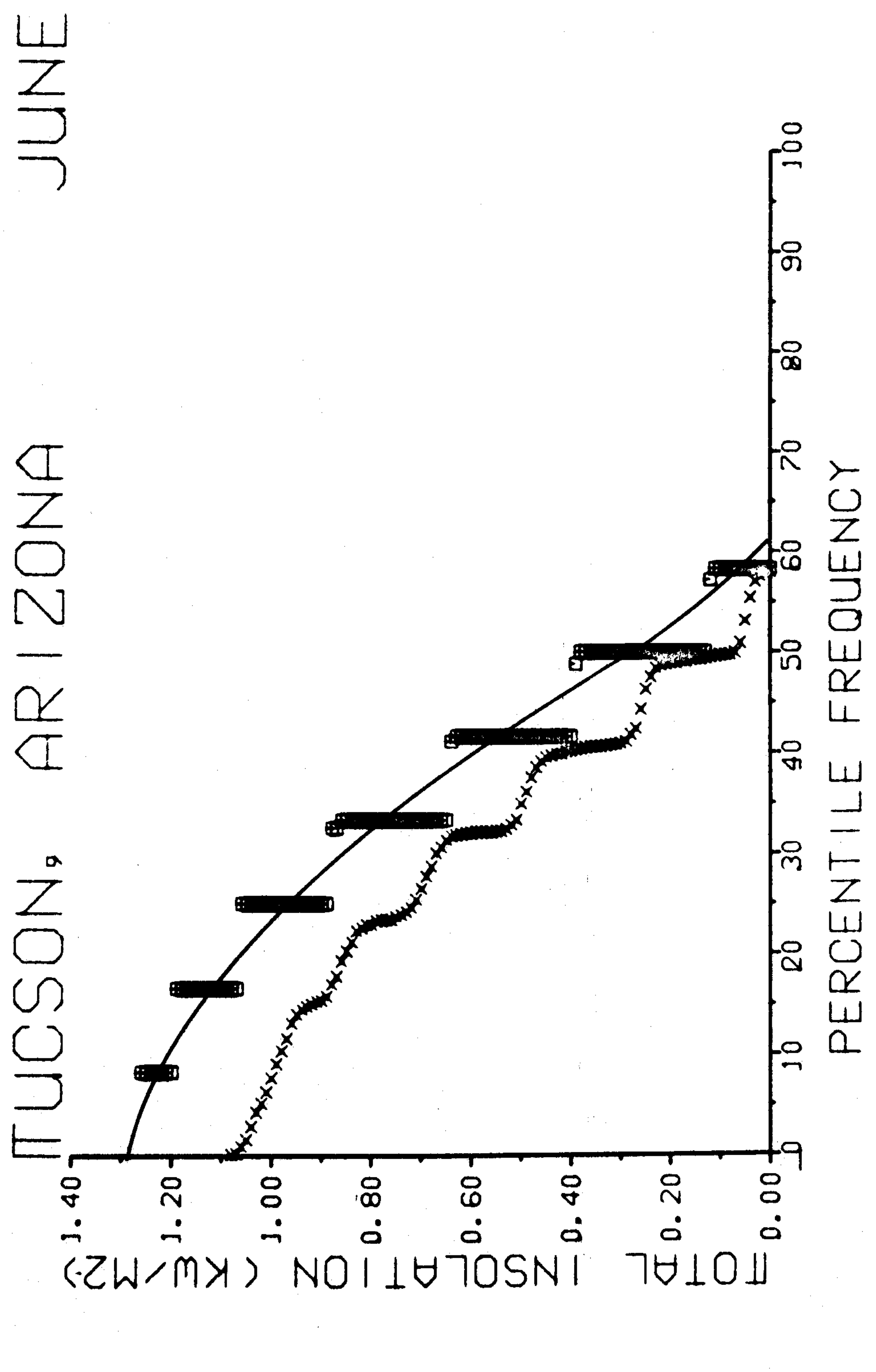
The curves indicated by xxxxx are for the measured or estimated total insolation. The curves indicated by ——— are for the calculated extraterrestrial total insolation.

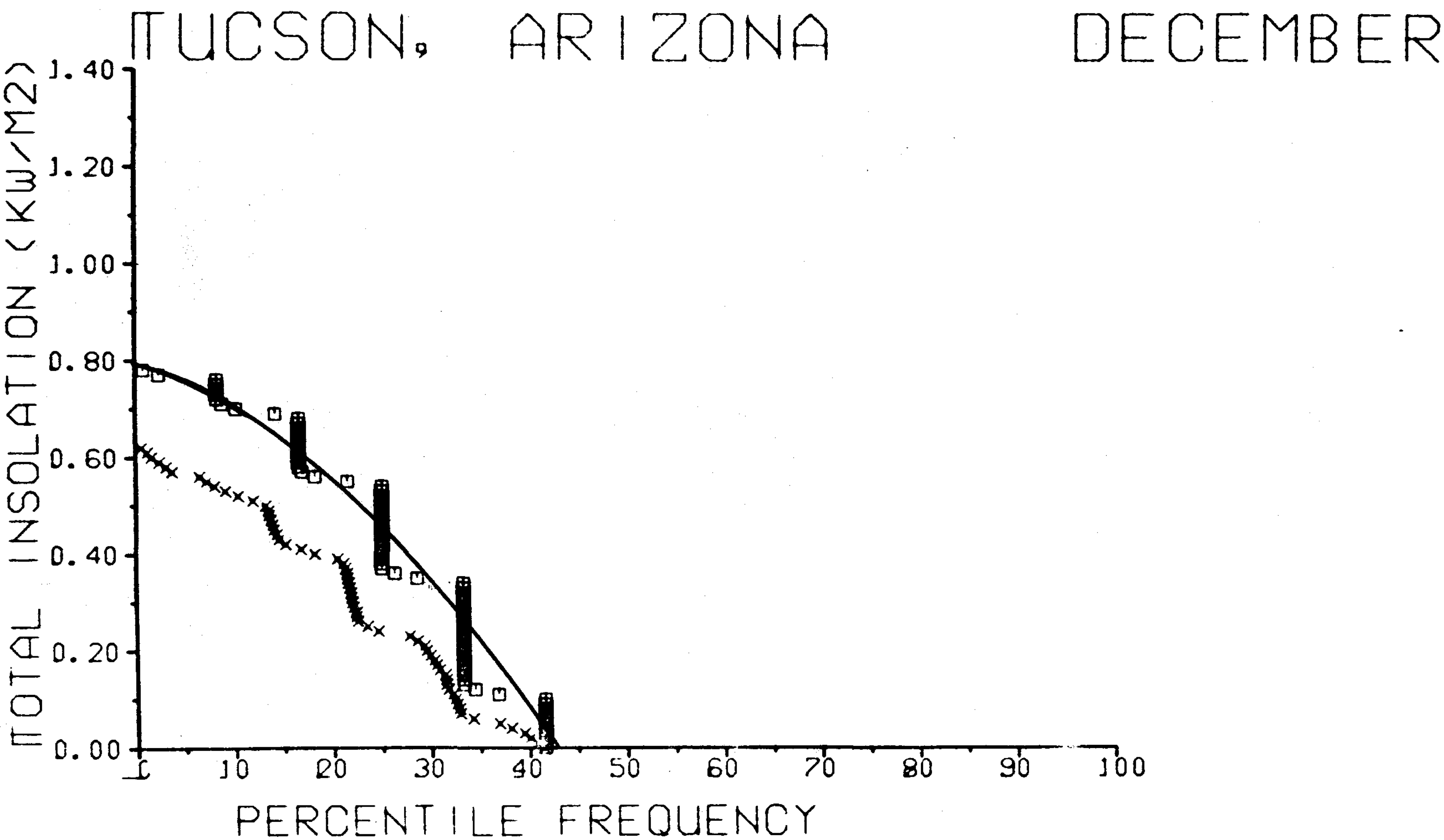

FRESNO, CALIFORNIA JUNE
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY

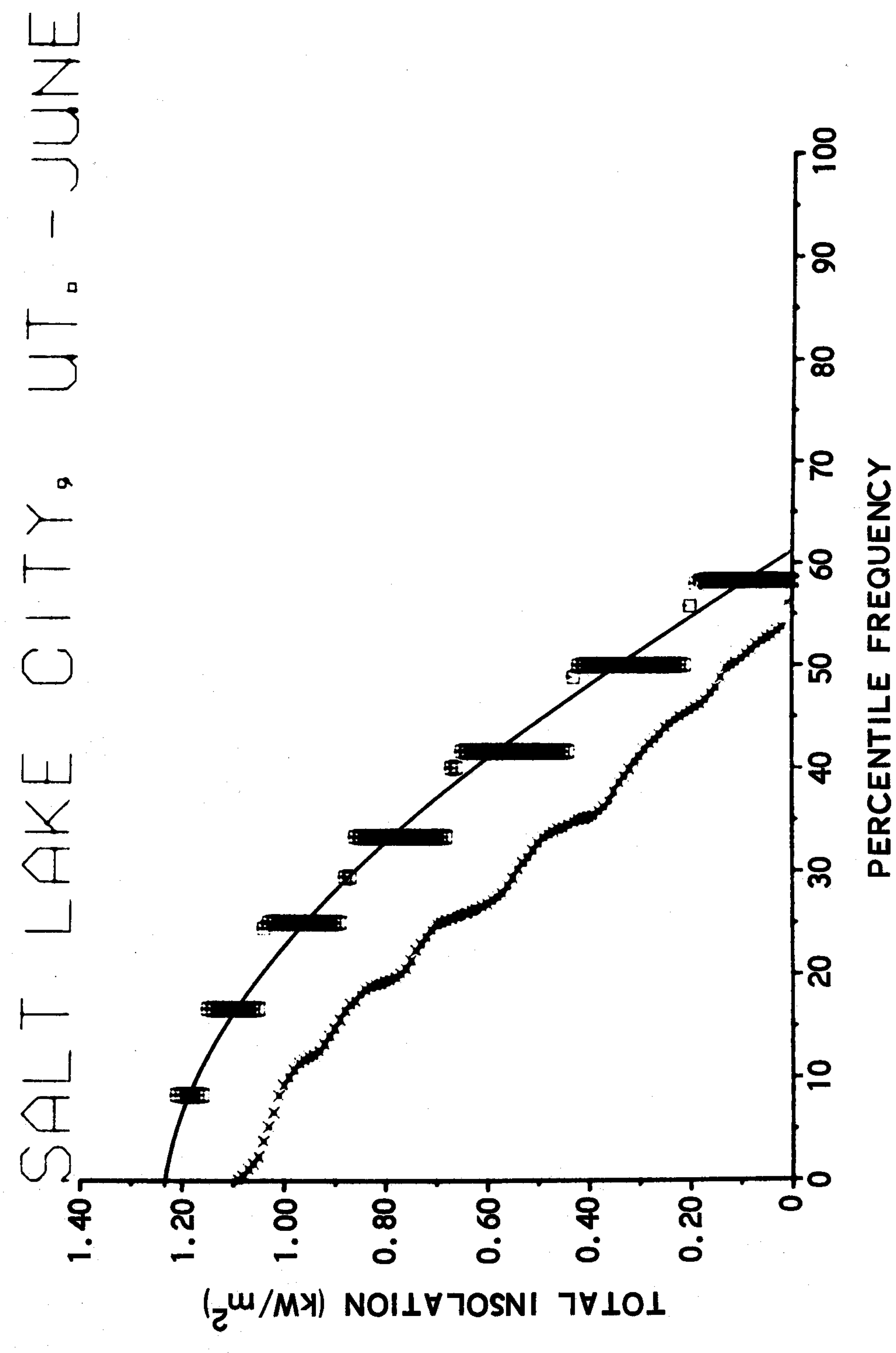

FRESNO, CALIFORNIA DECEMBER
TOTAL INSOLATION (KW/M2)
PERCENTILE FREQUENCY
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
0
10
20
30
40
50
60
70
80
90
100


PHOENIX, ARIZONA JUNE
PERCENTILE FREQUENCY
0
10
20
30
40
50
60
70
80
90
100
TOTAL INSOLATION (KW/M2)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40

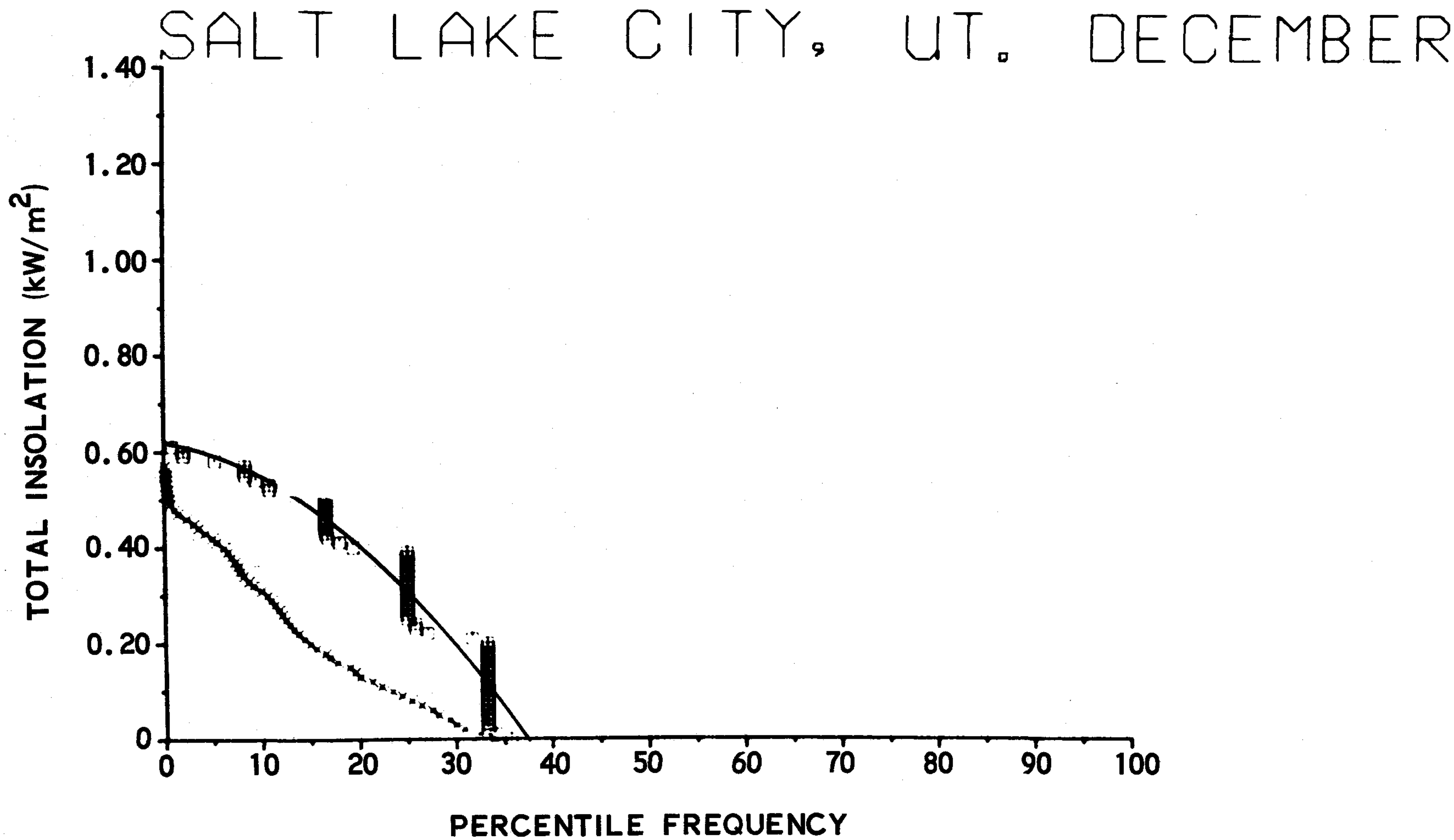

PHOENIX, ARIZONA DECEMBER
TOTAL INSOLATION (KW/M2)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY

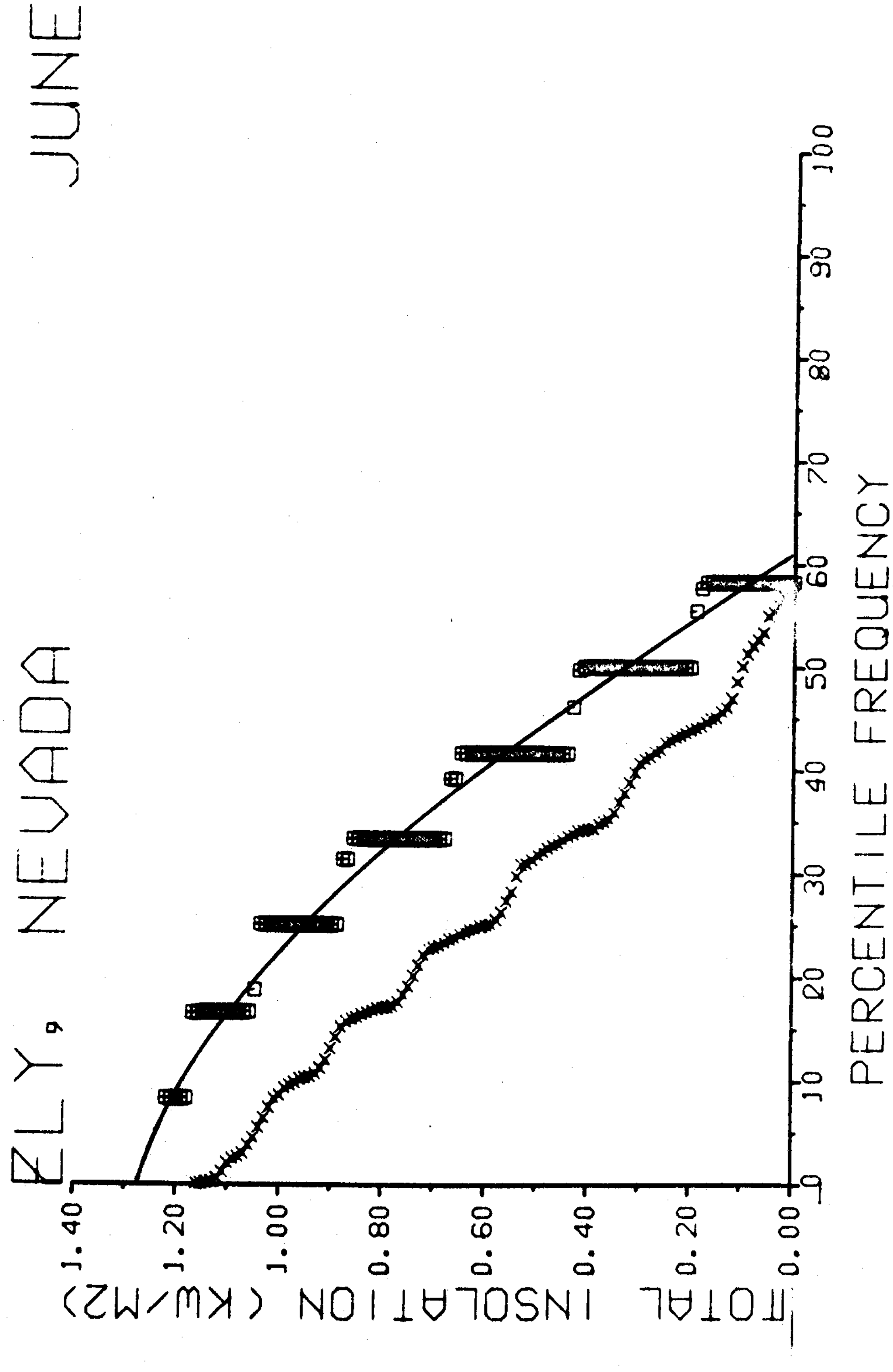

TUCSON, ARIZONA JUNE
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY

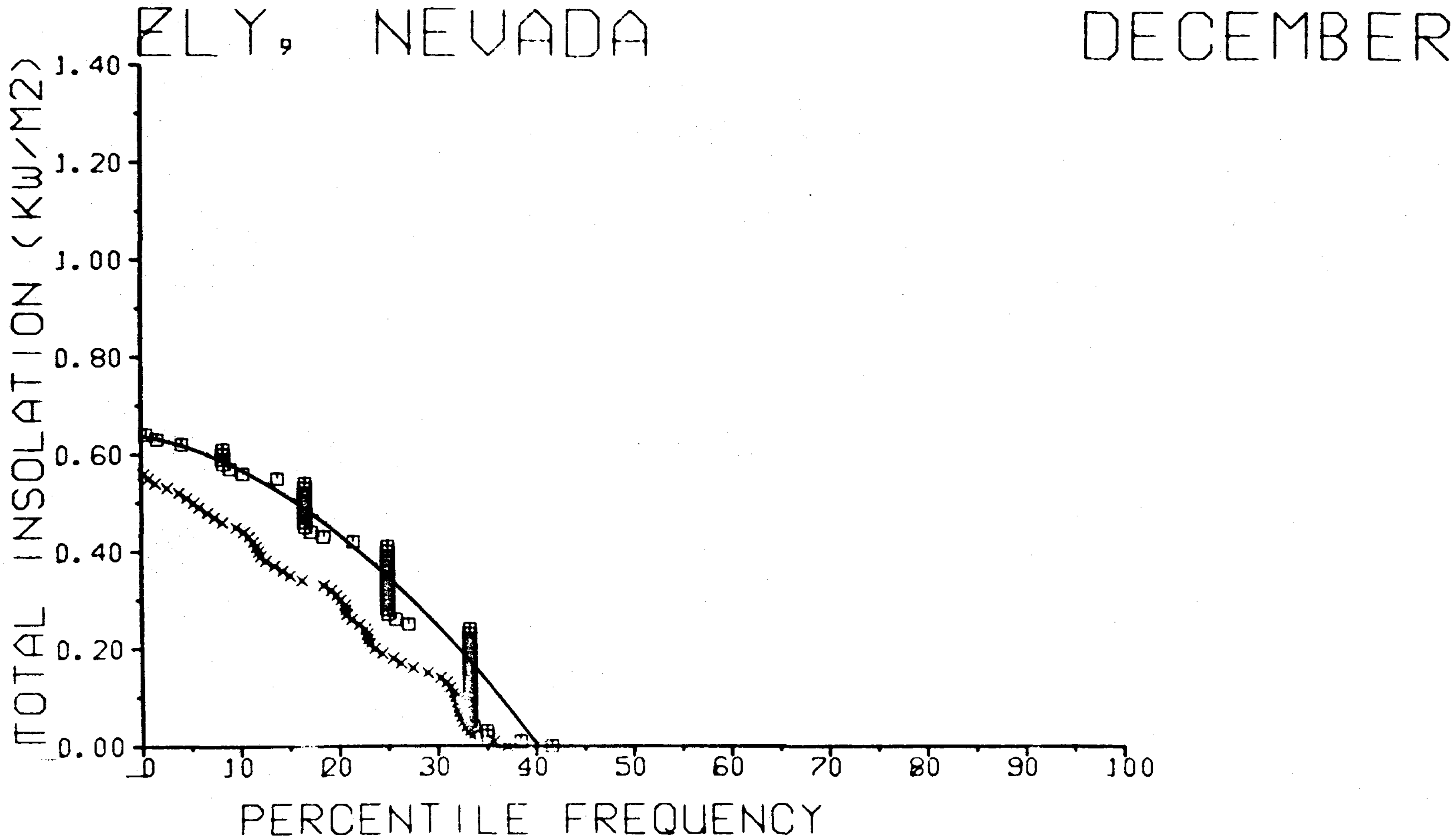

TUCSON, ARIZONA DECEMBER
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY

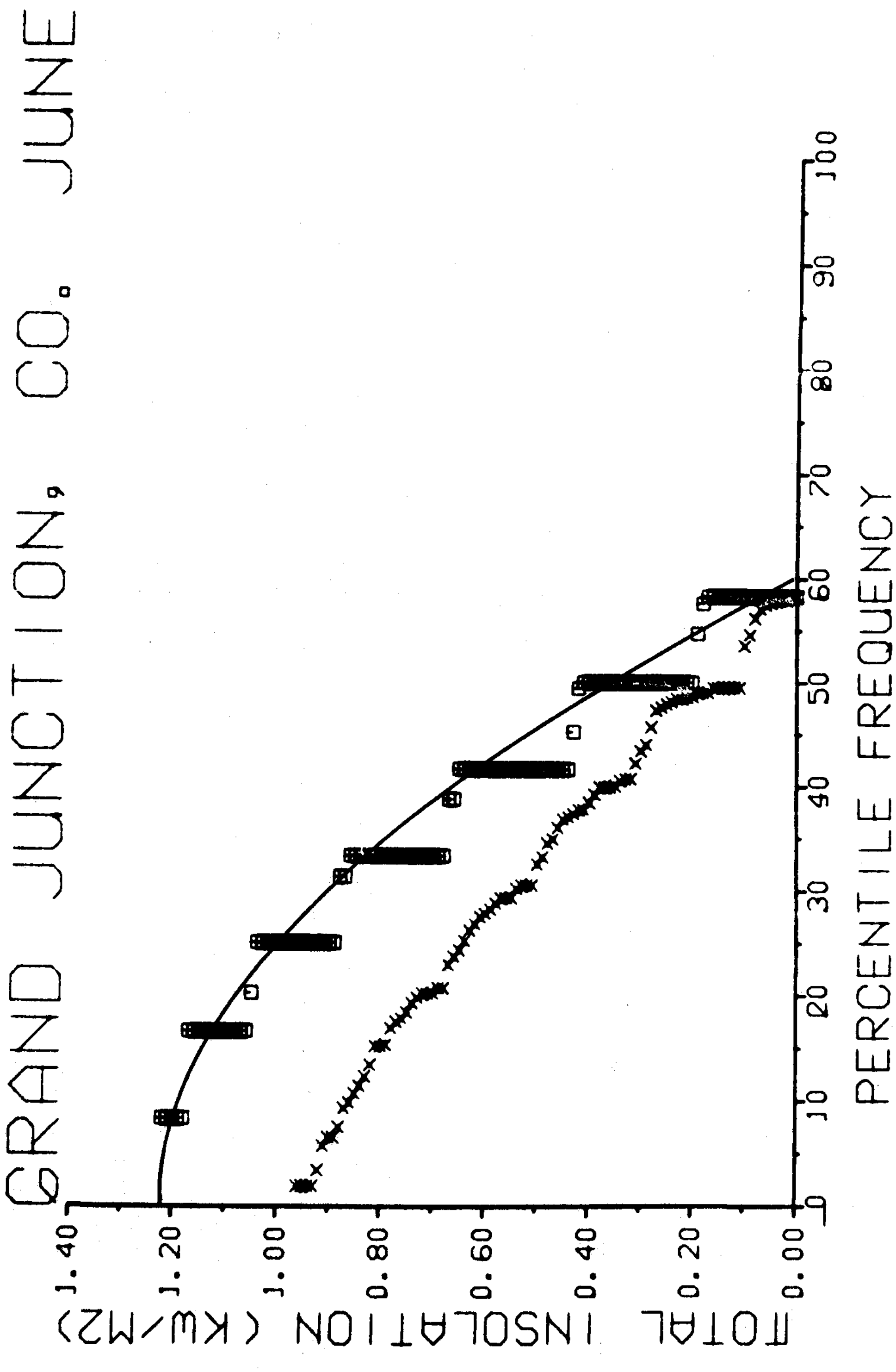


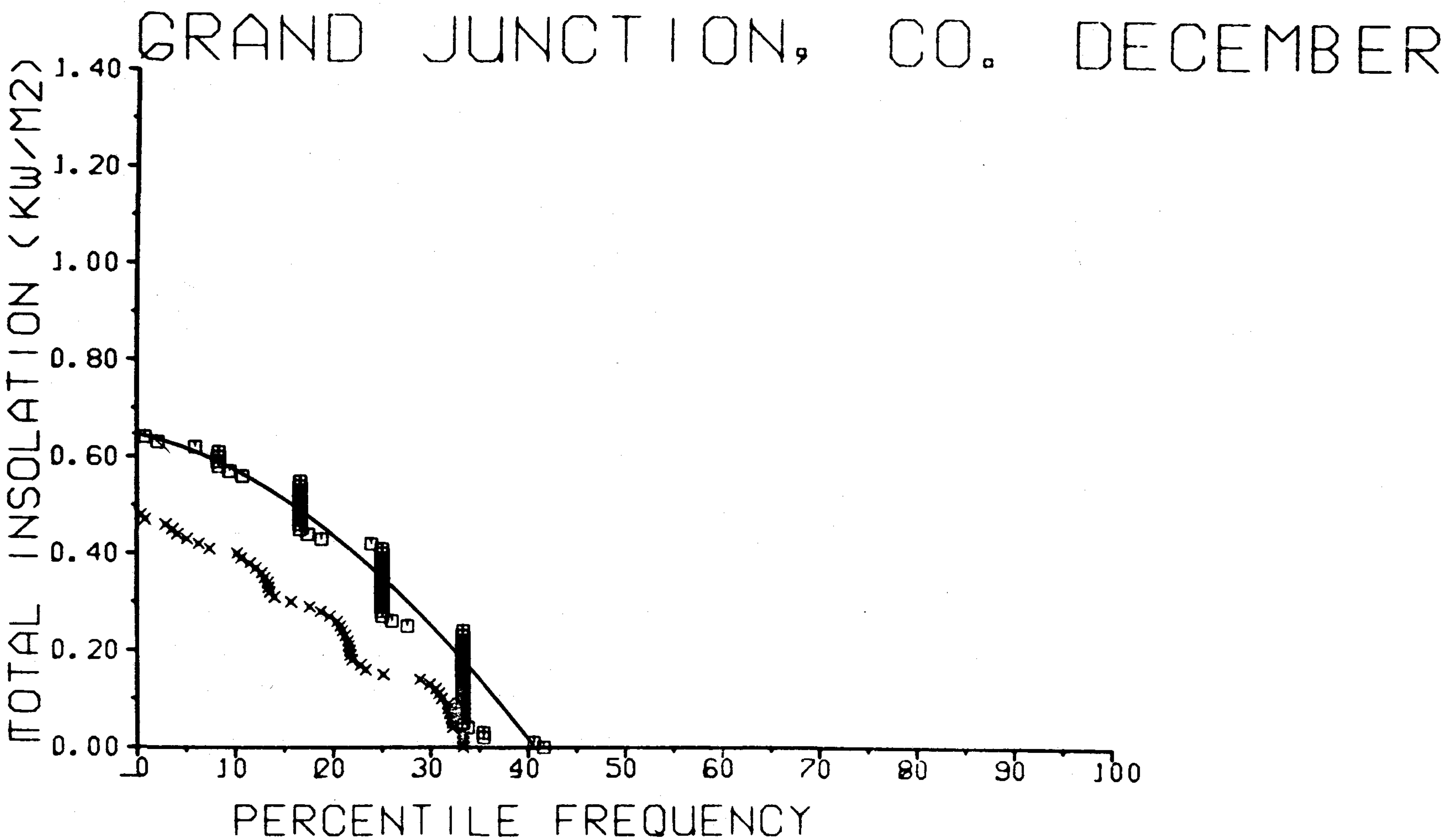
SALT LAKE CITY, UT. - JUNE
TOTAL INSOLATION (KW/m2)
PERCENTILE FREQUENCY
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0
0
10
20
30
40
50
60
70
80
90
100

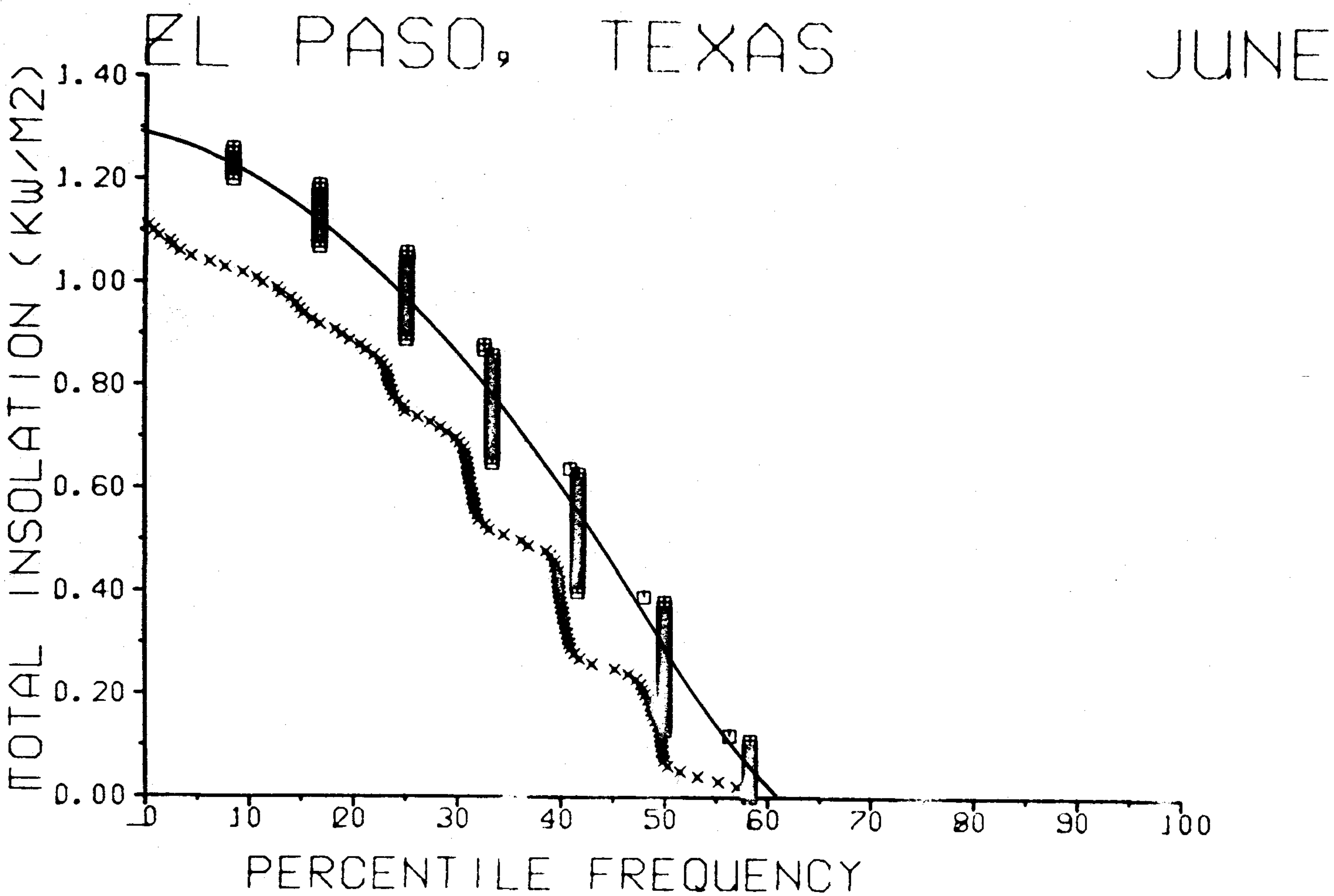

SALT LAKE CITY, UT. DECEMBER
TOTAL INSOLATION (kW/m²)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY

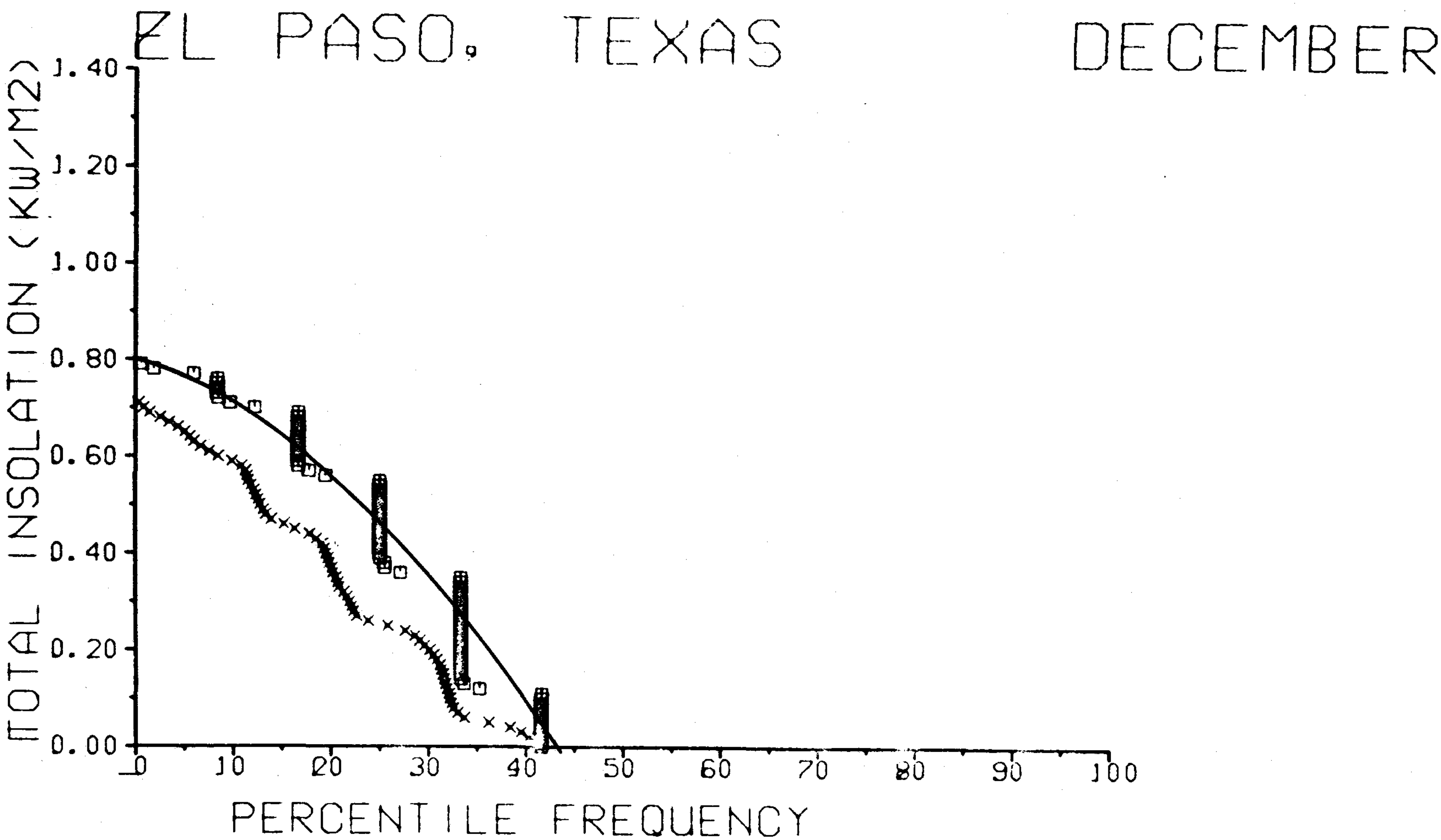

ELY, NEVADA
JUNE
TOTAL INSOLATION (KW/M2)
PERCENTILE FREQUENCY
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100

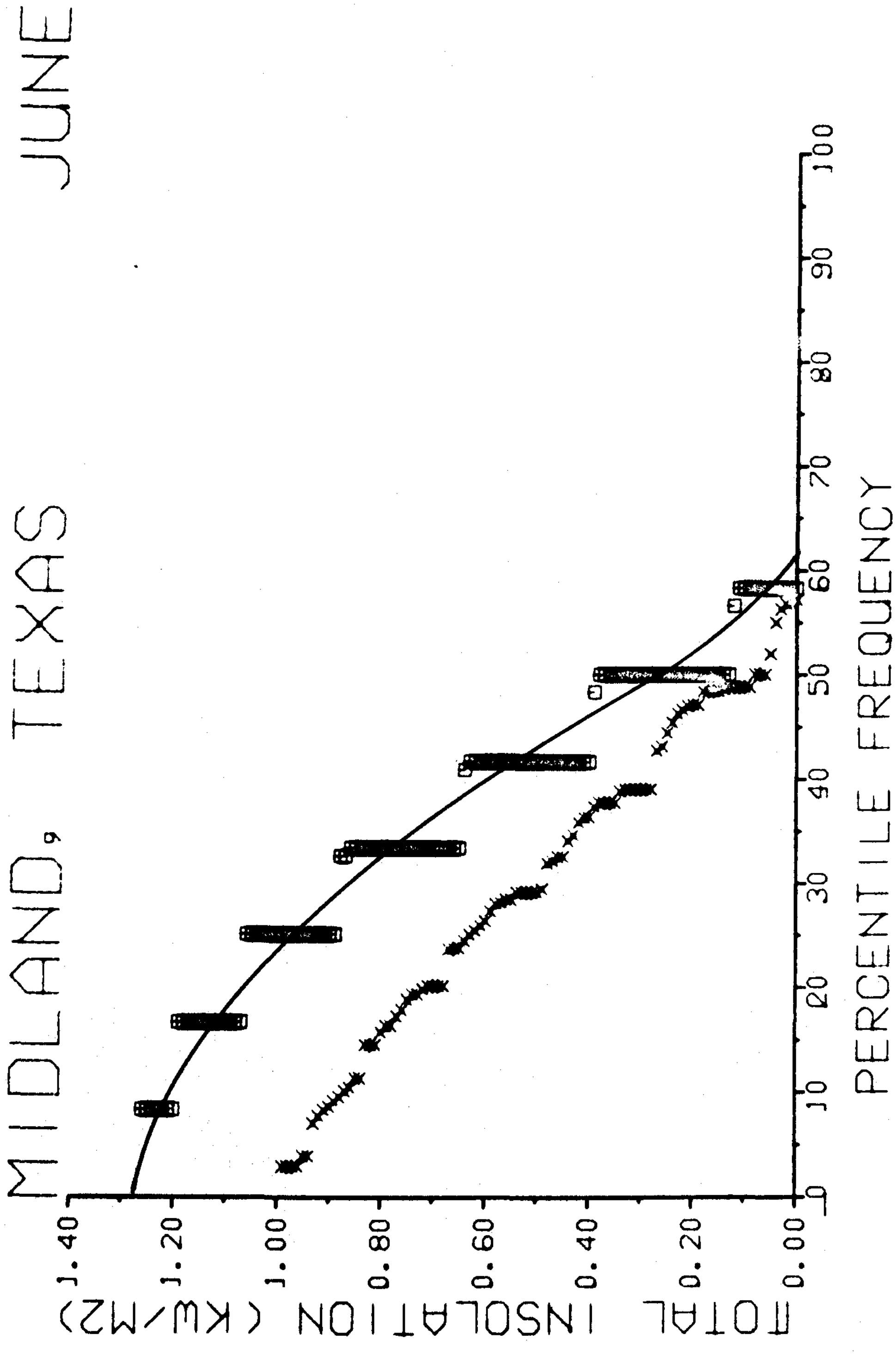

ELY, NEVADA
DECEMBER
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY


GRAND JUNCTION, CO. JUNE
TOTAL INSOLATION (KW/M2)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
PERCENTILE FREQUENCY
0
10
20
30
40
50
60
70
80
90
100

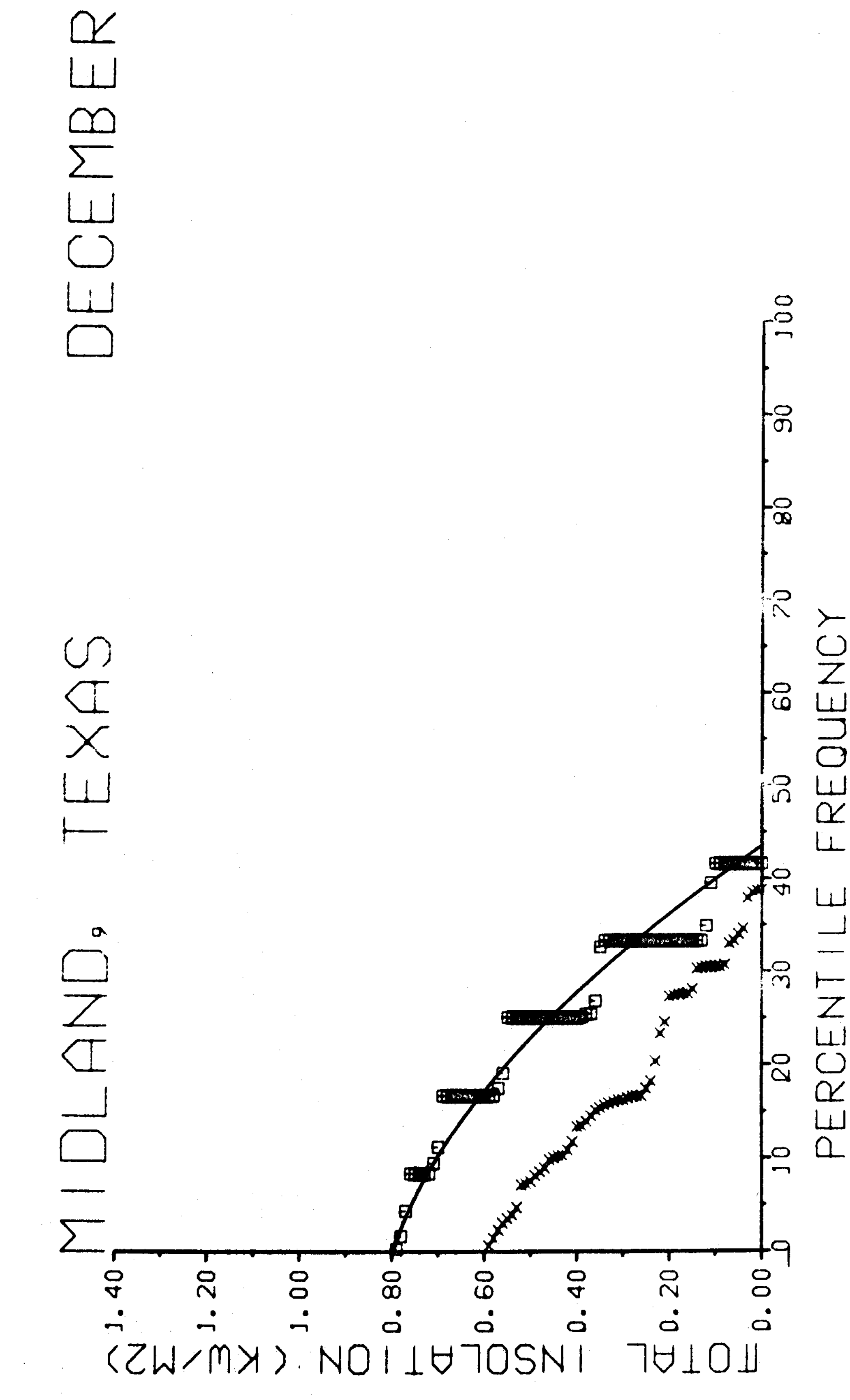

GRAND JUNCTION, CO. DECEMBER
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY

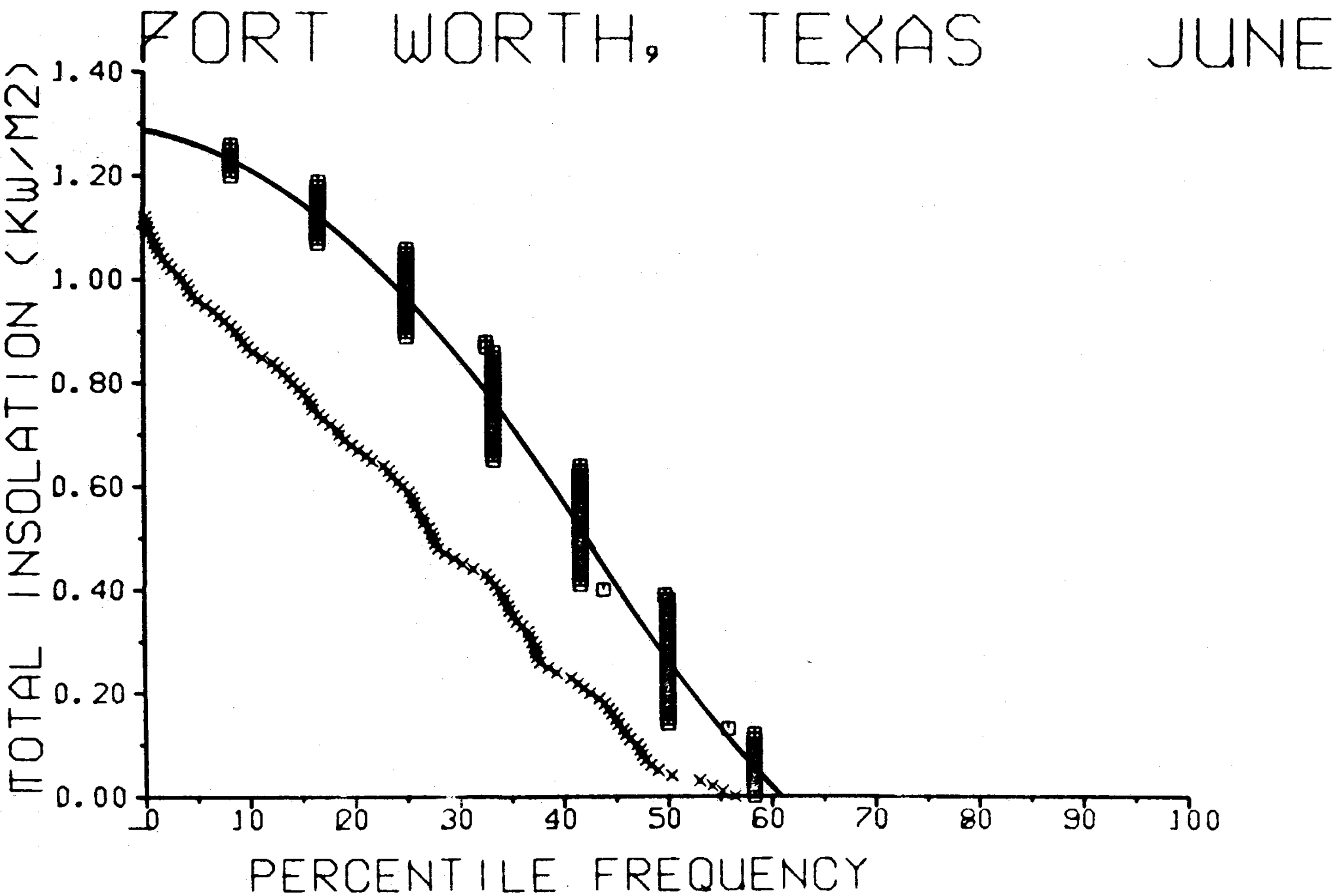

EL PASO, TEXAS
JUNE
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY


EL PASO, TEXAS
DECEMBER
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY

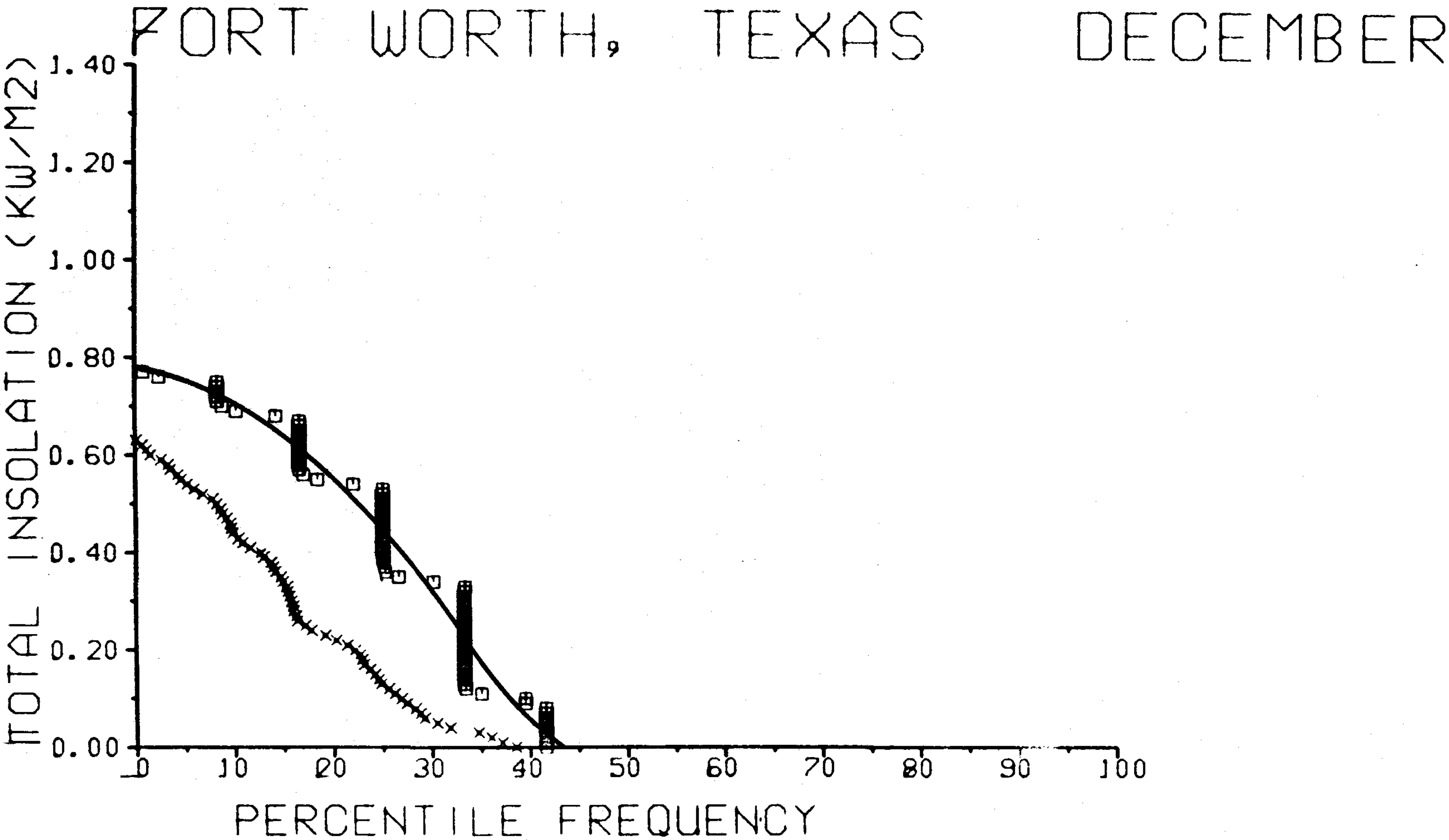


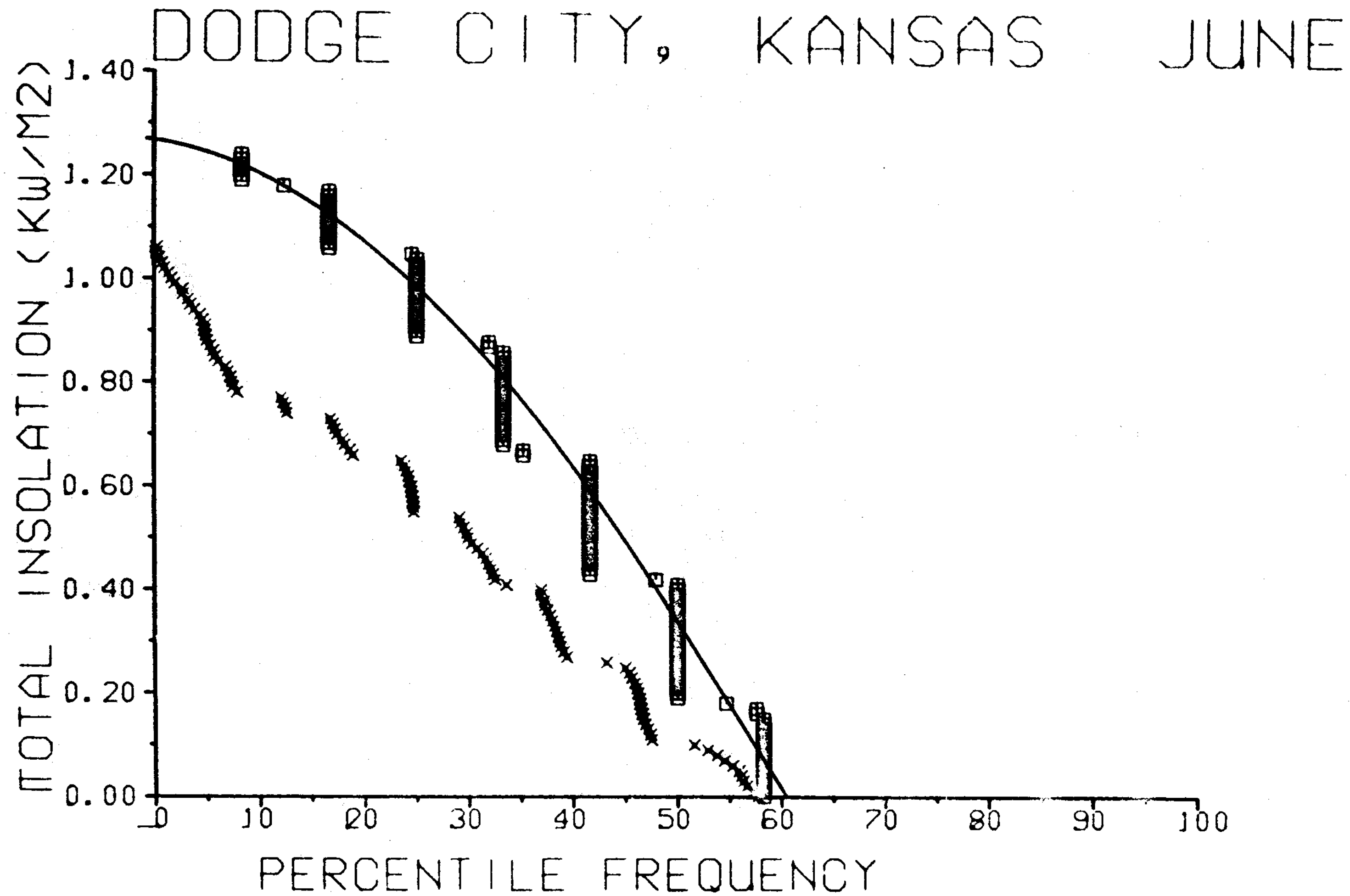
MIDLAND, TEXAS JUNE
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY

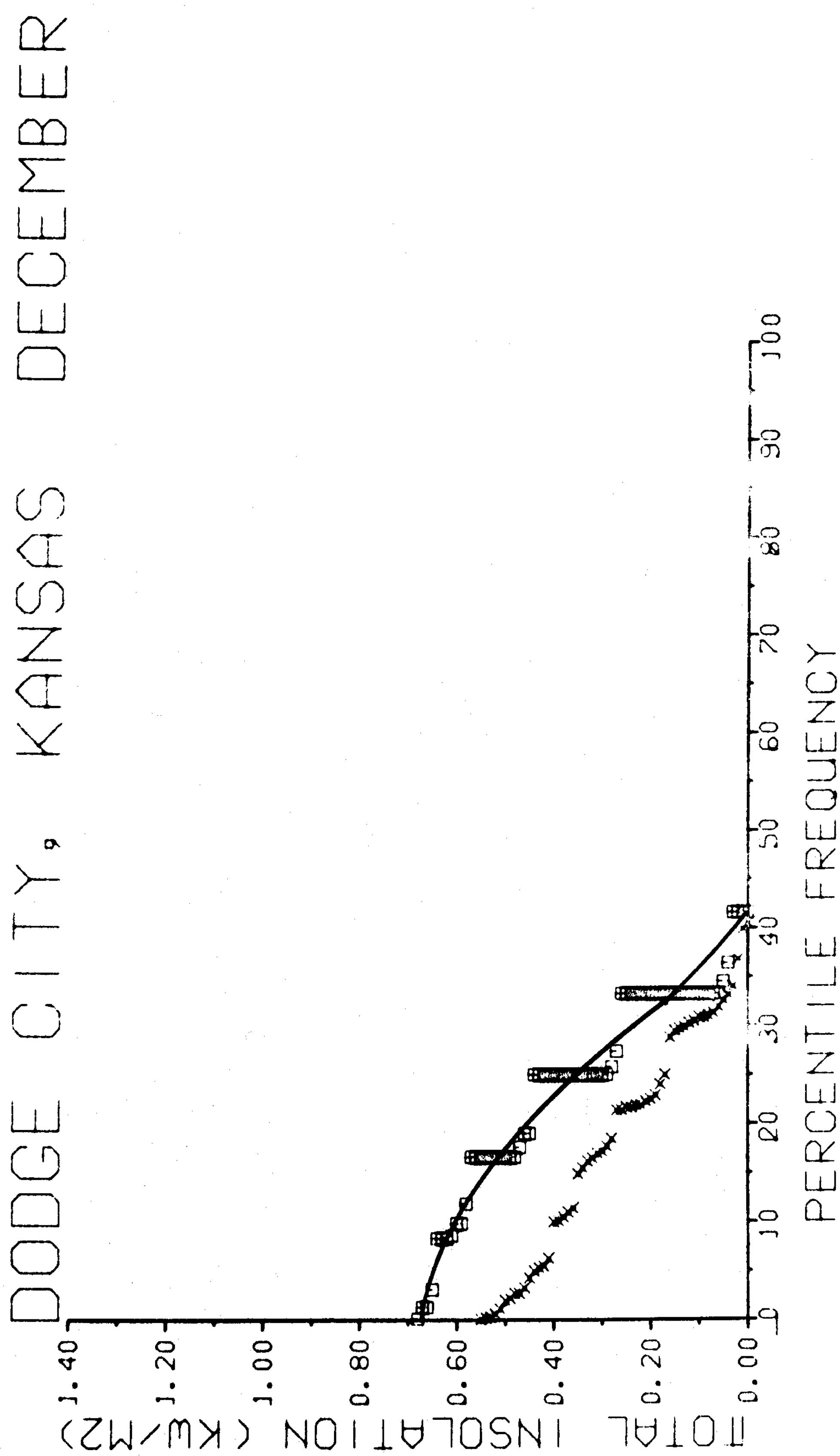

MIDLAND, TEXAS
DECEMBER
TOTAL INSOLATION (KW/M2)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
PERCENTILE FREQUENCY
0
10
20
30
40
50
60
70
80
90
100

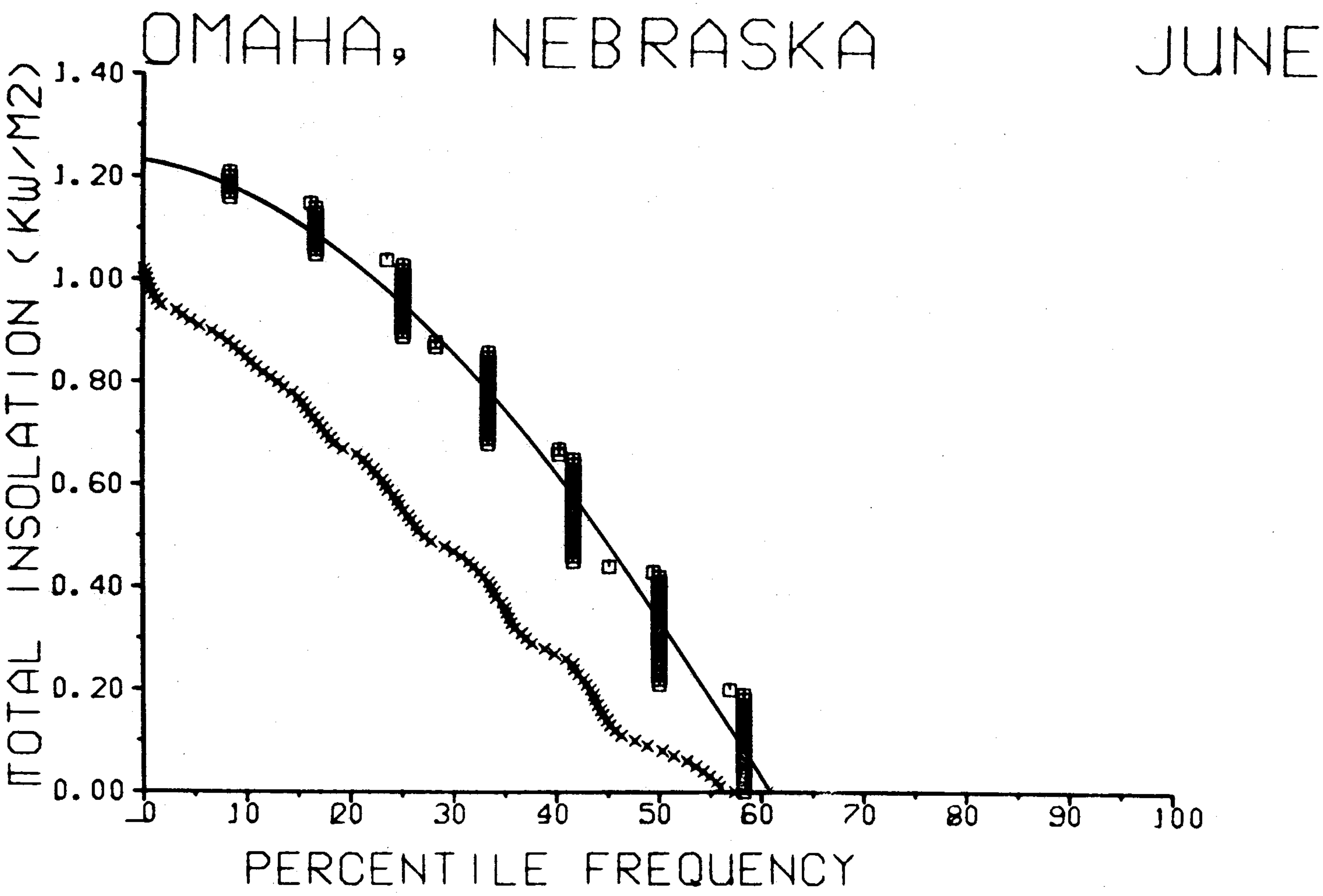


FORT WORTH, TEXAS JUNE
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY

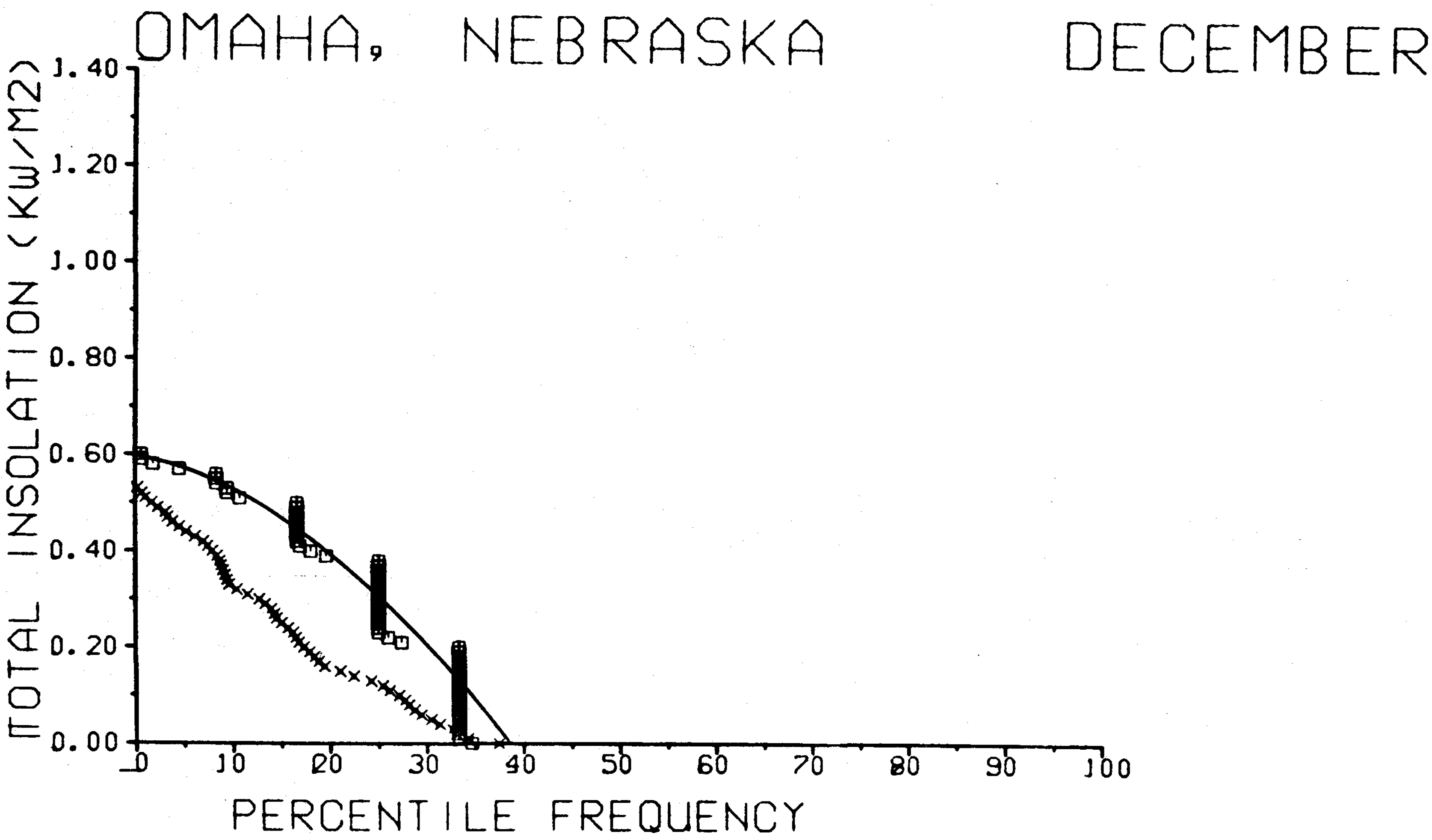

FORT WORTH, TEXAS DECEMBER
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY


DODGE CITY, KANSAS JUNE
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY


DODGE CITY, KANSAS DECEMBER
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
PERCENTILE FREQUENCY
0
10
20
30
40
50
60
70
80
90
100



OMAHA, NEBRASKA
JUNE
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY



OMAHA, NEBRASKA
DECEMBER
TOTAL INSOLATION (KW/M2)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
10
20
30
40
50
60
70
80
90
100
PERCENTILE FREQUENCY

APPENDIX D

COMPLETE DATA BASE CONTENTS FOR SAMPLE DAYS

APPENDIX D
COMPLETE DATA BASE CONTENTS FOR SAMPLE DAYS

The entire contents of the data base for Inyokern and Albuquerque for sample clear days early in April, August, and December of 1962 are listed. In this listing columns 91 through 117 of the data for each hour have been eliminated in order to fit the listing on a standard-sized sheet of paper. In the present data base these columns are allotted for future expansion and, therefore, always contain blanks. The organization of the data for each hour and the codes used are specified in detail in Appendix B.

9310462	4	5 0		-1000	000	0	01	24100000000014006000---00---000---000---23030940	61	037760
9310462	4	5 1		-1000	000	0	02	24100000000014006000---00---000---000---23020940	61	037760
9310462	4	5 2		-1000	000	0	03	24100000000013004000---00---000---000---23020940	61	037760
9310462	4	5 3		-1000	000	0	04	24100000000012003000---00---000---000---27010940	61	037760
9310462	4	5 4		-1000	000	0	05	24100000000011003000---00---000---000---00000941	61	037760
9310462	4	5 5		-1000	000	0	06	24100000000009002000---00---000---000---00000942	61	037760
9310462	4	5 6	13410	23	- 61	0	0759241000000000009002000---00---000---000---00000942		61	-9137760
9310462	4	5 7	36022	50	- 77	0	0872241000000000012003000---00---000---000---23010943		61	-8237760
9310462	4	5 8	59334	75	- 86	0	0980241000000000016003000---00---000---000---15010943		61	-7137760
9310462	4	5 9	78645	95	- 90	0	1083241000000000017005000---00---000---000---00000943		61	-5837760
9310462	4	510	92254	109	- 92	0	11852410000000002300008888 00---000---000---00000943		61	-4037760
9310462	4	511	98760	116	- 93	0	128524100000000024-02000---00---000---000---02010943		61	-1537760
9310452	4	512	98560	116	- 92	0	138524100000000026-0200301500---000---000---05010942		61	1537760
9310462	4	513	91554	109	- 92	0	148424100000000027-0100301500---000---000---11020942		61	4037760
9310452	4	514	78745	95	- 90	0	158324100000000027-0200301800---000---000---27010941		61	5837760
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9310462	4	516	34022	50	- 72	0	176824100000000029-0400301800---000---000---27020940		61	8237760
9310462	4	517	12410	23	- 56	0	185524100000000028-03000---00---000---000---00000940		61	9137760
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9310462	4	519		-1000	000	0	20	2410000000024-01000---00---000---000---13010941	61	037760
9310462	4	520		-1000	000	0	21	2410000000024-01000---00---000---000---31040941	61	037760
9310462	4	521		-1000	000	0	22	2410000000023-01000---00---000---000---31030942	61	037760
9310462	4	522		-1000	000	0	23	2410000000021-05000---00---000---000---31050943	61	037760
9310462	4	523		-1000	000	0	24	2410000000020-05000---00---000---000---05010943	61	037760

Insolation Data Base Contents for 5 April 1962, Inyokern California.

9310462	8	2 0	-1000	000	0	01 2410000000025002000---00---000---000---23050933	177	037879
9310462	8	2 1	-1000	000	0	02 2410000000024003000---00---000---000---25060933	177	037879
9310462	8	2 2	-1000	000	0	03 2410000000024003000---00---000---000---25040933	177	037879
9310462	8	2 3	-1000	000	0	04 2410000000024004000---00---000---000---23050933	177	037879
9310462	8	2 4	-1000	000	0	05 2410000000023004000---00---000---000---25020934	177	037879
9310462	8	2 5	65 4 10	- 69	0	0665241000000022004000---00---000---000---18040934	177	-10937879
9310462	8	2 6	27816 37	- 82	0	0775241000000022004000---00---000---000---27020935	177	-10037879
9310462	8	2 7	51028 62	- 89	0	0882241000000022002000---00---000---000---00000936	177	-9237879
9310462	8	2 8	72440 85	- 93	0	0985241000000026004000---00---000---000---11010936	177	-8337879
9310462	8	2 9	88952104	- 94	0	1086241000000028003000---00---000---000---00000936	177	-7237879
9310462	8	210101453117		- 95	0	1187241000000031004000---00---000---000---11030935	177	-5437879
9310462	8	211106571124		- 94	0	1286241000000032003000---00---000---000---20080934	177	-2237879
9310462	8	212106371124		- 94	0	1386241000000034000000---00---000---000---20080934	177	2237879
9310462	8	213100563117		- 94	0	1486241000000036-0400401900---000---000---20090933	177	5437879
9310462	8	214	88652104	- 93	0	1586241000000037-0400401900---000---000---20100932	177	7237879
9310462	8	215	69840 85	- 89	0	1682241000000037-04000---00---000---000---20110931	177	8337879
9310462	8	216	46328 62	- 80	0	1775241000000036-04000---00---000---000---20130931	177	9237879
9310462	8	217	23016 37	- 66	0	18632410000000036002004021000---000---000---20110930	177	10037879
9310462	8	218	62 4 10	- 64	0	19612410000000034003004021000---000---000---20090930	177	10937879
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9310462	8	221	-1000	000	0	22 2410000000029003000---00---000---000---23060932	177	037879
9310462	8	222	-1000	000	0	23 2410000000028003000---00---000---000---23080932	177	037879
9310462	8	223	-1000	000	0	24 2410000000027002000---00---000---000---18080932	177	037879

Insolation Data Base Contents for 2 August 1962, Inyokern Ca.

931046212	6 0	-1000	000	0	01 2410000000006-0211888800---100---100---25020942	-225	038005
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931046212	6 2	-1000	000	0	03 2410000000004-0411888800---100---100---25010942	-225	038005
931046212	6 3	-1000	000	0	04 2410000000004-0311888800---100---100---00000941	-225	038005
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931046212	6 7	47 4 9	- 54	0	0854241000000001-0600888800---000---000---00000941	-225	-5938005
931046212	6 8	24014 32	- 79	0	09742410000000004-05000---00---000---000---27010941	-225	-4938005
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931046212	611	59531 72	- 90	0	12822410000000014-0211888800---100---100---00000941	-225	-838005
931046212	612	59431 72	- 89	0	1382241000000001800811888800---100---100---00000941	-225	838005
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931046212	622	-1000	000	0	23 2410000000007-05000---00---000---000---23020941	-225	038005
931046212	623	-1000	000	0	24 2410000000006-05000---00---000---000---25010941	-225	038005

Insolation Data Base Contents for 6 December 1962, Inyokern Ca.

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2305062 412 0      -1000        000         0                                                            87     037767
2305062 412 1      -1000        000         1                                                            87     037767
2305062 412 2      -1000        000         2                                                            87     037767
2305062 412 3      -1000        000         3                                                            87     037767
2305062 412 4      -1000        000         4                                                            87     037767
2305062 412 5      -1000        000         5                                                            87     037767
2305062041206      -1000210     000 150 06   965000000000005-0800301800---000---000---                   87     037767
2305062041207 19711 26600        62 150 0776965000000000007-07000---00---000---000---                   87  -9337767
2305062041208 43923 53600        81 150 0883965000000000008-07000---00---000---000---                   87  -8437767
2305062041209 67035 78600        89 150 0986643000000000011-07000---00---000---000---                   87  -7437767
2305062041210 86247 98500        95 150 1088643000000000014-0611888800---100---100---                   87  -6237767
2305062041211 97457112500        97 150 1187804000000000017-0777 888800---700---700---                  87  -4337767
230506204121210525311960         99 150 1288804000000000018-0822888800---200---200---                   87  -1637767
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2305062041216 64435 78500        89 150 1683804000000000022-1600888800---000---000---                   87   7437767
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2305062 41221      -1000        000        21                                                            87     037767
2305062 41222      -1000        000        22                                                            87     037767
2305062 41223      -1000        000        23                                                            87     037767
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Insolation Data Base Contents for 12 April 1962, Albuquerque N. M.

2305062 8	5 0	-1000		000		0	170	037882
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2305062 8	5 2	-1000		000		2	170	037882
2305062 8	5 3	-1000		000		3	170	037882
2305062 8	5 4	-1000		000		4	170	037882
2305062 8	5 5	-1000		000		5	170	037882
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230506208	507	24415	35600	73	310	07699650000000019002000---00---000---000---	170	-10037882
230506208	508	46128	61600	87	310	08759650000000022002000---00---000---000---	170	-9237882
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230506208	510	84352103600		96	310	10829650000000025002000---00---000---000---	170	-7137882
230506208	511	95563117600		97	310	11829650000000026001000---00---000---000---	170	-5437882
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230506208	514	95953117600		97	310	14829650000000031002000---00---000---000---	170	5437882
230506208	515	82352103600		95	310	15809650000000032002000---00---000---000---	170	7137882
230506208	516	64940	84600	92	310	16779650000000032002000---00---000---000---	170	8337882
230506208	517	45928	51600	85	310	177596500000000320000403000---000---000---	170	9237882
230506208	518	24215	35600	73	310	18689650000000032-03000---00---000---000---	170	10037882
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2305062 8	521	-1000		000		21	170	037882
2305062 8	522	-1000		000		22	170	037882
2305062 8	523	-1000		000		23	170	037882

Insolation Data Base Contents for 5 August 1962, Albuquerque, N. M.

230506212	4 0	-1000	000		0		-223	038003
230506212	4 1	-1000	000		1		-223	038003
230506212	4 2	-1000	000		2		-223	038003
230506212	4 3	-1000	000		3		-223	038003
230506212	4 4	-1000	000		4		-223	038003
230506212	4 5	-1000	000		5		-223	038003
230506212	4 6	-1000	000		6		-223	038003
230506212	407	-1000600	000	490	07	8040000000000-0200301508888000---000---	-223	038003
230506212	408	34 4 10600	- 30	490		08348040000000001-0100301507036008888000---	-223	-5938003
230506212	409	26514 34600	- 85	490		09799650000000000500000703608888000---000---	-223	-4938003
230506212	410	46723 53600	- 96	490		10889650000000000700000703600---000---000---	-223	-3838003
230506212	411	60929 67600	-100	490		11919650000000000800000301500---000---000---	-223	-2438003
230506212	412	68432 74600	-102	490		129296500000000009000103018188883100---100---	-223	-838003
230506212	413	69032 74600	-103	490		13939650000000001100010301818888100---100---	-223	838003
230506212	414	61029 67600	-100	490		14919650000000001100020301828888200---200---	-223	2438003
230506212	415	46023 53600	- 95	490		15879650000000001200030301838888300---300---	-223	3838003
230506212	416	26814 34550	- 86	490		1679965000000000012-0220301828888200---200---	-223	4938003
230506212	417	80 4 10	-- 86			1780	-223	5938003
230506212	418	-1000	000		18		-223	038003
230506212	419	-1000	000		19		-223	038003
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230506212	421	-1000	000		21		-223	038003
230506212	422	-1000	000		22		-223	038003
230506212	423	-1000	000		23		-223	038003

Insolation Data Base Contents for 4 December 1962, Albuquerque N. M.