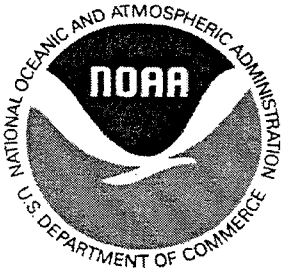


NOAA TECHNICAL MEMORANDUM
NWS WR-256

CLIMATE OF SAN DIEGO, CALIFORNIA

Thomas E. Evans, III
NEXRAD Weather Service Office
San Diego, California

Donald A. Halvorson
San Diego County Air Pollution Control District
National Weather Service (Retired)
San Diego, California

October 1998

U.S. DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

National Weather Service

NOAA TECHNICAL MEMORANDA
National Weather Service, Western Region Subseries

The National Weather Service (NWS) Western Region (WR) Subseries provides an informal medium for the documentation and quick dissemination of results not appropriate, or not yet ready, for formal publication. The series is used to report on work in progress, to describe technical procedures and practices, or to relate progress to a limited audience. These Technical Memoranda will report on investigations devoted primarily to regional and local problems of interest mainly to personnel, and hence will not be widely distributed.

Papers 1 to 25 are in the former series, ESSA Technical Memoranda, Western Region Technical Memoranda (WRTM); papers 24 to 59 are in the former series, ESSA Technical Memoranda, Weather Bureau Technical Memoranda (WBTM). Beginning with 60, the papers are part of the series, NOAA Technical Memoranda NWS. Out-of-print memoranda are not listed.

Papers 2 to 22, except for 5 (revised edition), are available from the National Weather Service Western Region, Scientific Services Division, 125 South State Street - Rm 1210, Salt Lake City, Utah 84138-1102. Paper 5 (revised edition), and all others beginning with 25 are available from the National Technical Information Service, U.S. Department of Commerce, Sills Building, 5285 Port Royal Road, Springfield, Virginia 22161. Prices vary for all paper copies; microfiche are $3.50. Order by accession number shown in parentheses at end of each entry.

ESSA Technical Memoranda (WRTM)

2 Climatological Precipitation Probabilities. Compiled by Lucianne Miller, December 1965.
3 Western Region Pre- and Post-FP-3 Program, December 1, 1965, to February 20, 1966. Edward D. Diemer, March 1966.
5 Station Descriptions of Local Effects on Synoptic Weather Patterns. Philip Williams, Jr., April 1966 (Revised November 1967, October 1969). (PB-17800)
8 Interpreting the RAREP. Herbert P. Benner, May 1966 (Revised January 1967).
11 Some Electrical Processes in the Atmosphere. J. Latham, June 1966.
17 A Digitalized Summary of Radar Echoes within 100 Miles of Sacramento, California. J. A. Youngberg and L. B. Overaas, December 1966.
21 An Objective Aid for Forecasting the End of East Winds in the Columbia Gorge, July through October. D. John Coparanis, April 1967.
22 Derivation of Radar Horizons in Mountainous Terrain. Roger G. Pappas, April 1967.

ESSA Technical Memoranda, Weather Bureau Technical Memoranda (WBTM)

25 Verification of Operation Probability of Precipitation Forecasts, April 1966-March 1967. W. W. Dickey, October 1967. (PB-176240)
26 A Study of Winds in the Lake Mead Recreation Area. R. P. Augulis, January 1968. (PB-177830)
28 Weather Extremes. R. J. Schmidli, April 1968 (Revised March 1986). (PB86 177672/AS). (Revised October 1991 - PB92-115062/AS)
29 Small-Scale Analysis and Prediction. Philip Williams, Jr., May 1968. (PB178425)
30 Numerical Weather Prediction and Synoptic Meteorology. CPT Thomas D. Murphy, USAF, May 1968. (AD 673365)
31 Precipitation Detection Probabilities by Salt Lake ARTC Radars. Robert K. Belesky, July 1968. (PB 179084)
32 Probability Forecasting--A Problem Analysis with Reference to the Portland Fire Weather District. Harold S. Ayer, July 1968. (PB 179289)
36 Temperature Trends in Sacramento--Another Heat Island. Anthony D. Lentini, February 1969. (PB 183055)
37 Disposal of Logging Residues Without Damage to Air Quality. Owen P. Cramer, March 1969. (PB 183057)
39 Upper-Air Lows Over Northwestern United States. A.L. Jacobson, April 1969. PB 184296)
40 The Man-Machine Mix in Applied Weather Forecasting in the 1970s. L.W. Snellman, August 1969. (PB 185068)
43 Forecasting Maximum Temperatures at Helena, Montana. David E. Olsen, October 1969. (PB 185762)
44 Estimated Return Periods for Short-Duration Precipitation in Arizona. Paul C. Kangieser, October 1969. (PB 187763)
46 Applications of the Net Radiometer to Short-Range Fog and Stratus Forecasting at Eugene, Oregon. L. Yee and E. Bates, December 1969. (PB 190476)
47 Statistical Analysis as a Flood Routing Tool. Robert J.C. Burnash, December 1969. (PB 188744)
48 Tsunami. Richard P. Augulis, February 1970. (PB 190157)
49 Predicting Precipitation Type. Robert J.C. Burnash and Floyd E. Hug, March 1970. (PB 190962)
50 Statistical Report on Aeroallergens (Pollens and Molds) Fort Huachuca, Arizona, 1969. Wayne S. Johnson, April 1970. (PB 191743)
51 Western Region Sea State and Surf Forecaster's Manual. Gordon C. Shields and Gerald B. Burdwell, July 1970. (PB 193102)
52 Sacramento Weather Radar Climatology. R.G. Pappas and C. M. Veliquette, July 1970. (PB 193347)
54 A Refinement of the Vorticity Field to Delineate Areas of Significant Precipitation. Barry B. Aronovitch, August 1970.
55 Application of the SSARR Model to a Basin without Discharge Record. Vail Schermerhorn and Donal W. Kuehl, August 1970. (PB 194394)
56 Areal Coverage of Precipitation in Northwestern Utah. Philip Williams, Jr., and Werner J. Heck, September 1970. (PB 194389)
57 Preliminary Report on Agricultural Field Burning vs. Atmospheric Visibility in the Willamette Valley of Oregon. Earl M. Bates and David O. Chilcote, September 1970. (PB 194710)
58 Air Pollution by Jet Aircraft at Seattle-Tacoma Airport. Wallace R. Donaldson, October 1970. (COM 71 00017)
59 Application of PE Model Forecast Parameters to Local-Area Forecasting. Leonard W. Snellman, October 1970. (COM 71 00016)
60 An Aid for Forecasting the Minimum Temperature at Medford, Oregon, Arthur W. Fritz, October 1970. (COM 71 00120)
63 700-mb Warm Air Advection as a Forecasting Tool for Montana and Northern Idaho. Norris E. Woerner, February 1971. (COM 71 00349)
64 Wind and Weather Regimes at Great Falls, Montana. Warren B. Price, March 1971.
65 Climate of Sacramento, California. Richard Honton and Tony Martini (Retired), August 1996. (Fifth Revision) (PB89 207781/AS)
66 A Preliminary Report on Correlation of ARTCC Radar Echoes and Precipitation. Wilbur K. Hall, June 1971. (COM 71 00829)
69 National Weather Service Support to Soaring Activities. Ellis Burton, August 1971. (COM 71 00956)
71 Western Region Synoptic Analysis-Problems and Methods. Philip Williams, Jr., February 1972. (COM 72 10433)
74 Thunderstorms and Hail Days Probabilities in Nevada. Clarence M. Sakamoto, April 1972. (COM 72 10554)
75 A Study of the Low Level Jet Stream of the San Joaquin Valley. Ronald A. Willis and Philip Williams, Jr., May 1972. (COM 72 10707)
76 Monthly Climatological Charts of the Behavior of Fog and Low Stratus at Los Angeles International Airport. Donald M. Gales, July 1972. (COM 72 11140)
77 A Study of Radar Echo Distribution in Arizona During July and August. John E. Hales, Jr., July 1972. (COM 72 11136)
78 Forecasting Precipitation at Bakersfield, California, Using Pressure Gradient Vectors. Earl T. Riddiough, July 1972. (COM 72 11146)
79 Climate of Stockton, California. Robert C. Nelson, July 1972. (COM 72 10920)
80 Estimation of Number of Days Above or Below Selected Temperatures. Clarence M. Sa[illegible] October 1972. (COM 72 10021)
81 An Aid for Forecasting Summer Maximum Temperatures at Seattle, Washington. E[illegible] Johnson, November 1972. (COM 73 10150)
82 Flash Flood Forecasting and Warning Program in the Western Region. Philip Williams, Jr., Chester L. Glenn, and Roland L. Raetz, December 1972, (Revised March 1978). (COM 73 10251)
83 A comparison of Manual and Semiautomatic Methods of Digitizing Analog Wind Records. Glenn E. Rasch, March 1973. (COM 73 10669)
86 Conditional Probabilities for Sequences of Wet Days at Phoenix, Arizona. Paul C. Kangieser, June 1973. (COM 73 11264)
87 A Refinement of the Use of K-Values in Forecasting Thunderstorms in Washington and Oregon. Robert Y.G. Lee, June 1973. (COM 73 11276)
89 Objective Forecast Precipitation Over the Western Region of the United States. Julia N. Paegle and Larry P. Kieruliff, September 1973. (COM 73 11946/3AS)
91 Arizona "Eddy" Tornadoes. Robert S. Ingram, October 1973. (COM 73 10465)
92 Smoke Management in the Willamette Valley. Earl M. Bates, May 1974. (COM 74 11277/AS)
93 An Operational Evaluation of 500-mb Type Regression Equations. Alexander E. MacDonald, June 1974. (COM 74 11407/AS)
94 Conditional Probability of Visibility Less than One-Half Mile in Radiation Fog at Fresno, California. John D. Thomas, August 1974. (COM 74 11555/AS)
95 Climate of Flagstaff, Arizona. Paul W. Sorenson, and updated by Reginald W. Preston, January 1987. (PB87 143160/AS)
96 Map type Precipitation Probabilities for the Western Region. Glenn E. Rasch and Alexander E. MacDonald, February 1975. (COM 75 10428/AS)
97 Eastern Pacific Cut-Off Low of April 21-28, 1974. William J. Alder and George R. Miller, January 1976. (PB 250 711/AS)
98 Study on a Significant Precipitation Episode in Western United States. Ira S. Brenner, April 1976. (COM 75 10719/AS)
99 A Study of Flash Flood Susceptibility-A Basin in Southern Arizona. Gerald Williams, August 1975. (COM 75 11360/AS)
102 A Set of Rules for Forecasting Temperatures in Napa and Sonoma Counties. Wesley L. Tuft, October 1975. (PB 246 902/AS)
103 Application of the National Weather Service Flash-Flood Program in the Western Region. Gerald Williams, January 1976. (PB 253 053/AS)
104 Objective Aids for Forecasting Minimum Temperatures at Reno, Nevada, During the Summer Months. Christopher D. Hill, January 1976. (PB 252 866/AS)
105 Forecasting the Mono Wind. Charles P. Ruscha, Jr., February 1976. (PB 254 650)
106 Use of MOS Forecast Parameters in Temperature Forecasting. John C. Plankinton, Jr., March 1976. (PB 254 649)
107 Map Types as Aids in Using MOS PoPs in Western United States. Ira S. Brenner, August 1976. (PB 259 594)
108 Other Kinds of Wind Shear. Christopher D. Hill, August 1976. (PB 260 437/AS)
109 Forecasting North Winds in the Upper Sacramento Valley and Adjoining Forests. Christo[illegible] Fontana, September 1976. (PB 273 677/AS)
110 Cool Inflow as a Weakening Influence on Eastern Pacific Tropical Cyclones. William J. [illegible] November 1976. (PB 264 655/AS)
112 The MAN/MOS Program. Alexander E. MacDonald, February 1977. (PB 265 941/AS)
113 Winter Season Minimum Temperature Formula for Bakersfield, California, Using Multiple Regression. Michael J. Oard, February 1977. (PB 273 694/AS)
114 Tropical Cyclone Kathleen. James R. Fors, February 1977. (PB 273 676/AS)
116 A Study of Wind Gusts on Lake Mead. Bradley Colman, April 1977. (PB 268 847)
117 The Relative Frequency of Cumulonimbus Clouds at the Nevada Test Site as a Function of K-Value. R.F. Quiring, April 1977. (PB 272 831)
118 Moisture Distribution Modification by Upward Vertical Motion. Ira S. Brenner, April 1977. (PB 268 740)
119 Relative Frequency of Occurrence of Warm Season Echo Activity as a Function of Stability Indices Computed from the Yucca Flat, Nevada, Rawinsonde. Darryl Randerson, June 1977. (PB 271 290/AS)
121 Climatological Prediction of Cumulonimbus Clouds in the Vicinity of the Yucca Flat Weather Station. R.F. Quiring, June 1977. (PB 271 704/AS)
122 A Method for Transforming Temperature Distribution to Normality. Morris S. Webb, Jr., June 1977. (PB 271 742/AS)
124 Statistical Guidance for Prediction of Eastern North Pacific Tropical Cyclone Motion - Part I. Charles J. Neumann and Preston W. Leftwich, August 1977. (PB 272 661)
125 Statistical Guidance on the Prediction of Eastern North Pacific Tropical Cyclone Motion - Part II. Preston W. Leftwich and Charles J. Neumann, August 1977. (PB 273 155/AS)
126 Climate of San Francisco. E. Jan Null, February 1978. (Revised by George T. Pericht, April 1988 and January 1995). (PB88 208624/AS)
127 Development of a Probability Equation for Winter-Type Precipitation Patterns in Great Falls, Montana. Kenneth B. Mielke, February 1978. (PB 281 387/AS)
128 Hand Calculator Program to Compute Parcel Thermal Dynamics. Dan Gudgel, April 1978. (PB [illegible] 080/AS)
129 Fire whirls. David W. Goens, May 1978. (PB 283 866/AS)
130 Flash-Flood Procedure. Ralph C. Hatch and Gerald Williams, May 1978. (PB 286 014/AS)
131 Automated Fire-Weather Forecasts. Mark A. Mollner and David E. Olsen, September 1978. (PB 289 916/AS)
132 Estimates of the Effects of Terrain Blocking on the Los Angeles WSR-74C Weather Radar. R.G. Pappas, R.Y. Lee, B.W. Finke, October 1978. (PB 289767/AS)
133 Spectral Techniques in Ocean Wave Forecasting. John A. Jannuzzi, October 1978. (PB291317/AS)
134 Solar Radiation. John A. Jannuzzi, November 1978. (PB291195/AS)
135 Application of a Spectrum Analyzer in Forecasting Ocean Swell in Southern California Coastal Waters. Lawrence P. Kierulff, January 1979. (PB292716/AS)
136 Basic Hydrologic Principles. Thomas L. Dietrich, January 1979. (PB292247/AS)
137 LFM 24-Hour Prediction of Eastern Pacific Cyclones Refined by Satellite Images. John R. Zimmerman and Charles P. Ruscha, Jr., January 1979. (PB294324/AS)
138 A Simple Analysis/Diagnosis System for Real Time Evaluation of Vertical Motion. Scott He[illegible] James R. Fors, February 1979. (PB294216/AS)
139 Aids for Forecasting Minimum Temperature in the Wenatchee Frost District. Robert S. R[illegible] April 1979. (PB298339/AS)
140 Influence of Cloudiness on Summertime Temperatures in the Eastern Washington Fire Weather district. James Holcomb, April 1979. (PB298674/AS)
141 Comparison of LFM and MFM Precipitation Guidance for Nevada During Doreen. Christopher Hill, April 1979. (PB298613/AS)
142 The Usefulness of Data from Mountaintop Fire Lookout Stations in Determining Atmospheric Stability. Jonathan W. Corey, April 1979. (PB298899/AS)

NOAA TECHNICAL MEMORANDUM
NWS WR-256

CLIMATE OF SAN DIEGO, CALIFORNIA

Thomas E. Evans, III
Nexrad Weather Service Office
San Diego, California

Donald A. Halvorson
San Diego County Air Pollution Control District
National Weather Service (Retired)
San Diego, California

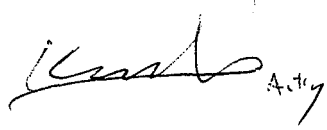
October 1998

UNITED STATES
DEPARTMENT OF COMMERCE
William M. Daley, Secretary

National Oceanic and
Atmospheric Administration
D. James Baker, Under
Secretary and Administrator

National Weather Service
John J. Kelly, Jr., Assistant
Administrator for Weather Services

This publication has been reviewed and is approved for publication by Scientific Services Division, Western Region



Delain A. Edman, Chief
Scientific Services Division
Salt Lake City, Utah

TABLE OF CONTENTS

LIST OF FIGURES, CHARTS AND TABLES

THE CLIMATE OF SAN DIEGO, CALIFORNIA

Thomas E. Evans, III
Nexrad Weather Service Office, San Diego, California

Donald A. Halvorson
San Diego County Air Pollution Control District
National Weather Service (Retired), San Diego, California

I. INTRODUCTION

The city of San Diego, California has a moderated Mediterranean climate with some surprising and unique features. The National Weather Service has not issued a climatology of San Diego, but in 1913 the San Diego Chamber of Commerce, in cooperation with the National Weather Service (at that time known as the United States Weather Bureau), published a book entitled "The Climate and Weather of San Diego, California." The climatological stations used in the 1913 San Diego climatology and in this study were based on the official weather stations in the downtown area. Many agencies had responsibility for taking and recording observations for San Diego. These agencies included the National Weather Service (U.S. Weather Bureau), Medical Corps of the Army and the Army Signal Corps (Signal Service). There have been many changes in the location and monitoring practices of the observations, but each one was, and still is, considered official.

Today, several departments maintain weather observing equipment within, and just outside of, the city. These agencies include the National Weather Service, Federal Aviation Administration, U.S. Forest Service, State of California Department of Water Resources, San Diego Flood Control District, City of San Diego Water Utilities Department, U.S. Geological Survey, Caltrans, International Boundary Commission, San Diego Air Pollution Control District and the Department of Defense.

This paper represents an effort to assemble the latest relevant climatological data for the city of San Diego. Within this paper, long-term temperature records are analyzed, precipitation trends are fully discussed and research into many other significant weather factors which affect the city are outlined, including hurricanes, Santa Ana winds and thunderstorms. Many tables are included as well to help understand the climate of San Diego. The result is designed to be an overview of the local climate of the downtown area, including Lindbergh Field, for the city of San Diego. Included in some sections are proverbs and folklore.

The city of San Diego has a fairly long-term official weather record dating back to the middle of the last century. It has been said that San Diego has the shortest thermometer in the United States.

II. THE CITY OF SAN DIEGO

In the southwest corner of southern California on the San Diego Bay lies the city of San Diego. The prevailing winds and weather are moderated by the Pacific Ocean, resulting in cool summers and warm winters in comparison with other places along the same general latitude. Temperatures of freezing or below have rarely occurred at the station since the record began in 1871, but hot weather, 90 degrees or above, is more frequent.

Dry easterly winds sometimes blow in the vicinity for several days at a time, allowing temperatures to reach into the 90s and occasionally above 100, especially in the eastern sections of the city and the outlying suburbs. As these hot winds are predominant in the fall, most of the highest temperatures occur in the months of September and October. June is the only other month in which the 100 degree mark has been surpassed. These 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 the daytimes are much warmer in the summer and the nights are noticeably cooler in the winter. Also, freezing occurs much more frequently than in the city. Although records show unusually small daily temperature ranges in the city, only about 15 degrees between the highest and lowest readings, a few miles inland these ranges increase to 30 degrees or more.

Strong winds and gales associated with Pacific or tropical storms are infrequent due to the latitude. The predominant winds during the day are from the west-northwest, with light southeasterly winds generally occurring at night. Occasionally, south to southwest winds will develop during the day due to a coastal eddy formation. When an eddy is present the low clouds that normally dissipate in the morning become widespread and can remain over the area throughout the day.

The seasonal rainfall is about 10 inches in the city, but increases with elevation and distance from the coast. 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, with the mountains also having an occasional thunderstorm in the summer. Eighty-five percent of the rainfall occurs from November through March, but wide variations take place in monthly and seasonal totals. Infrequent amounts of hail occur in San Diego and snow is practically unknown at the official downtown weather station. In each occurrence of snowfall only a trace was recorded officially, but in some locations amounts of one half inch or slightly more 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 leaving the afternoons clear.

Considerable fog occurs along the coast, with the fall and winter months usually the foggiest. Visibilities are good as a rule with only 23 days, on average, when dense fog (visibility of 1/4 mile or less) occurs, generally in the early mornings. The sunshine is plentiful for a marine location, with a marked increase as one travels towards the interior. As for thunderstorms, they are rare, averaging about three a year in the city.

III. HISTORY

As Captain Juan Rodriguez Cabrillo entered San Diego Bay in September, 1542, he recorded in his ship's log:

> *A very great gale blew from the southwest; the port being good, we felt nothing.*

This is the first record of a meteorological observation in San Diego's history. However, official United States Government records of weather have only been available in San Diego since July 1, 1849. At that time, the observations were taken and recorded under the supervision of the Medical Corps of the Army at the San Diego Mission de Alcala, which was located on Presidio Hill in Presidio Park. It was the responsibility of the Post Surgeon to record the temperature and overall weather conditions. While under the care of the Medical Corps the observing location was moved twice. In 1850 the new site became Old Fort Stockton, south of the mission, but still in Presidio Park, and in 1860 the second move was onto the new U.S. Military Post at the H Street (currently called Market Street) barracks. This agreement continued until instruments and records were transferred to the Signal Service in 1871.

On November 1, 1871, the United States Congress assigned responsibility for forecasting storms on lakes and seacoasts to the War Department. The Army Signal Corps (Signal Service) was given these new duties. Since the Army Signal Corps took charge of weather services in San Diego, observations were again moved and taken in Horton Square on D Street (currently called Broadway) between 3rd and 4th Avenues. Through the next 6 decades, until January, 1930, the observing site changed several more times, but remained in the downtown area. Each of the downtown sites were located within a 1000 foot radius of the present day Horton Plaza.

By the year 1890, the Weather Bureau was founded and its office/observing site was located on 5th Avenue between E and F Streets. The Weather Bureau moved to its final downtown location on April 1, 1914, where observations continued through January, 1940. On January 15, 1930, another Weather Bureau Office was established at the Lindbergh Municipal Airport, 1½ miles northwest of the city office. Observations were taken but did not become official until February 1, 1940.

The final move of the observation equipment, to its present location, was made on August 13, 1969, to the Port of San Diego General Aviation Building at Lindbergh Field, San Diego's International Airport. To finish out the official observing sites of San Diego, the Automated Surface Observation System (ASOS) that was commissioned on August 1, 1996 must be mentioned. This study does not include information from the ASOS since the data compiled only includes the interval from July 1, 1849, through June 30, 1996.

IV. TEMPERATURES

The temperatures in San Diego are highly dependent on the direction of the low level flow and the associated airmass upwind. For example, a southwest wind will increase the marine layer depth, thus mild temperatures will result. For the most part, the surface wind has a westerly component. This allows the marine layer to develop in the evenings and dissipate in the mornings. The morning burn-off time of the low clouds determines the amount of heating the surface receives and, therefore, how hot the afternoon will get. Likewise, the time the velo cloud (early name for the marine layer) develops at night will determine the rate of cooling and affect the morning's low temperature. With this in mind, the strength of the onshore low level flow will help to determine both the dissipating time in the morning and the redevelopment time in the evening. Again, this is the normal situation.

When an offshore low level flow develops, the winds may become easterly and not allow the marine layer to develop at all. This is when the area can receive its hottest days (mainly in the summer) and its coldest nights (mainly in the winter).

The average annual temperature in the downtown area, based on the data from 1961-1990, is 64.2. The average daily maximum temperature is 70.8 and the average daily low is 57.6. Average daily maximum temperatures peak in August at 78, dropping to 65 in late December and early January. The average daily minimum temperatures peak at 68 in August and early September and drop to 48 around New Year's Day.

Although moderate temperatures are the routine due to the marine influence, temperature extremes do occur. The highest temperature recorded occurred during a Santa Ana wind event on September 26, 1963. The lowest temperature took place on the morning of January 7, 1913, during a cold downslope, offshore wind event. A description of these episodes follows.

Temperature Extremes

As one can see from the following examples, the temperature extremes almost always occur during offshore flow. During the Summer and early Fall the airmass to the east of the area has the potential of becoming quite hot. During the Winter and early Spring the airmass to the east of the area has the potential of becoming quite cold. Both of these air masses are generally dry and generate under surface high pressure.

Hot weather is not always associated with offshore flow. Sometimes, high temperatures occur with light winds while strong high pressure resides overhead. In this situation, temperatures can reach 85 to 95 degrees in the Summer. San Diego has only been at or above 100 degrees 24 times in its 121 years of records. The highest temperature recorded downtown was 111, on September 26, 1963.

As with the high temperatures, lower temperatures are not always associated with offshore flow. Sometimes chilly conditions occur when the synoptic patterns advect cold air from the north to the area. Generally, this cold air originates over Canada. San Diego has only been at or below freezing 11 times.

The lowest temperature was 25, recorded on January 7, 1913.

The Hottest Day in History

THURSDAY, SEPTEMBER 26, 1963:

A SCORCHING HEAT WAVE SPREAD OVER ALL OF SOUTHERN CALIFORNIA AS SEVERE SANTA ANA CONDITIONS DEVELOPED WITH EXTREMELY HIGH TEMPERATURES, LOW HUMIDITIES, AND STRONG, GUSTY, EASTERLY WINDS.

A MASSIVE HIGH PRESSURE AREA OVER NEVADA AND UTAH PUSHED WINDS UP TO 50 MILES PER HOUR THROUGH THE MOUNTAINS. TREES WERE DOWNED AND FLYING DEBRIS BROKE OR SHORTED MANY POWER LINES. WINDS WERE UP TO 30 MILES PER HOUR IN MANY PARTS OF THE CITY. LINDBERGH FIELD HAD A PREVAILING WIND FOR THE DAY FROM THE EAST-NORTHEAST AND THE AVERAGE SPEED WAS 6.9 MILES PER HOUR. THE STRONGEST GUST WAS 18 MPH FROM THE EAST.

SAN DIEGO SIZZLED AS THE TEMPERATURE SOARED TO A RECORD HIGH OF 111 DEGREES, SURPASSING THE PREVIOUS RECORD OF 110 DEGREES SET 50 YEARS EARLIER ON SEPTEMBER 17, 1913. THIS WAS A NEW HIGH FOR THE DAY, FOR THE MONTH, AND FOR THE YEAR. THIS WAS THE WORST HEAT WAVE IN HISTORY, DUE NOT ONLY TO THE EXTREMELY HIGH TEMPERATURES BUT ALSO THE DURATION OF THOSE EXTREMES. IT WAS UNUSUAL IN THAT IT STARTED OUT WARM, WITH A LOW OF 73 AFTER THE PREVIOUS DAY'S HIGH OF 96, WARMED UP VERY QUICKLY, AND THEN STAYED HOT THE REMAINDER OF THE DAY. THIS REMAINS THE ONLY DAY THE TEMPERATURE WAS 95 DEGREES AT 8 IN THE MORNING. THERE WERE 11 HOURS OF 90 DEGREES AND HIGHER, 7 HOURS OVER 100, AND 6 HOURS OF 105 AND WARMER, WITH A TEMPERATURE OF 111 DEGREES HOLDING FOR MORE THAN ONE HOUR. RELATIVE HUMIDITY WAS AS LOW AS 6 PERCENT AT LINDBERGH FIELD AND 12 PERCENT AT EL CAJON.

TEMPERATURES OVER THE ENTIRE COUNTY WERE UP INTO TRIPLE DIGITS WITH ONLY ONE MAJOR EXCEPTION, AND THAT BEING THE MOUNTAINS. SKYLINE LODGE ON PALOMAR MOUNTAIN REPORTED A 78 AND WARNER SPRINGS A 91. EVEN THE BEACHES WERE HOT, WITH WINDS BLOWING FROM THE LAND OUT OVER THE OCEAN. CARLSBAD AND OCEANSIDE BOTH REPORTED A 108, IMPERIAL BEACH HAD A 109, BUT CORONADO ONLY HAD A 96. THOUSANDS OF BEACH GOERS PEERING OUT AT THE OCEAN AT MISSION BEACH HAD WINDS AT THEIR BACKS AND A TEMPERATURE OF 100 DEGREES JUST A FEW FEET FROM THE SURF. THE SURF-LINE WATER TEMPERATURE HAD DROPPED FROM 70 DEGREES THE DAY BEFORE DOWN TO 64 BECAUSE OF UPWELLING PROBABLY ASSOCIATED WITH THE SANTA ANA AND THE PREVAILING EASTERLY WINDS.

SAN DIEGO STATE UNIVERSITY HAD A 107 ALONG WITH LEMON GROVE, LA MESA, AND ESCONDIDO. GILLESPIE FIELD REPORTED A 108 ALONG WITH CHULA VISTA, BUT THE CITY OF EL CAJON HAD A 112. NATIONAL CITY, VISTA, AND FALLBROOK ALL HAD READINGS OF 106.

UNOFFICIAL REPORTS HAD BOTH LA JOLLA AND PACIFIC BEACH AT 113, LOGAN HEIGHTS AT 122, 118 IN NORTH PARK AND 115 AT MIRAMAR.

THIS HEAT WAVE WAS THE WORST IN HISTORY. IT DAMAGED CROPS AND KILLED 30,000 CHICKENS AND 200,000 RABBITS. THREE PEOPLE WERE TREATED FOR HEAT PROSTRATION. ICE CREAM AND SOFT DRINK SALES SOARED. AIR CONDITIONED THEATERS AND MOTELS FILLED

RAPIDLY. CARS WERE STALLED BY VAPOR LOCK AND BOILING RADIATORS. COMPUTERS WERE TURNED OFF AT THE NAVAL SUPPLY CENTER WHEN THEY BECAME TOO HOT. THE CITY AUTHORIZED ALL FEMALE EMPLOYEES TO LEAVE EARLY BECAUSE OF ADVERSE WORKING CONDITIONS. POLICEMEN LEFT THEIR TIES OFF AND ROLLED UP THEIR SLEEVES.

STIFLING HEAT TURNED MANY CITY AND COUNTY CLASSROOMS INTO OVENS ON THE 26TH, AND SEVERAL SCHOOL DISTRICTS, INCLUDING SAN DIEGO, DECLARED ABBREVIATED SESSIONS FOR THE 27TH. CITY JUNIOR COLLEGES REMAINED ON THEIR REGULAR SCHEDULE. IT WAS THE FIRST TIME SINCE SEPTEMBER, 1939 THAT CITY SCHOOLS HAVE BEEN DISMISSED BECAUSE OF HIGH TEMPERATURES.

BACK COUNTRY FIRE DANGER INCREASED BECAUSE OF EXTREME DRYNESS AND GUSTY WINDS BUT NO SERIOUS FIRES WERE REPORTED.

DESERTS WERE ALSO HOT, WITH BLYTHE AND EL CENTRO AT 107, THERMAL AT 108, AND BORREGO SPRINGS AT 104. FARTHER NORTH HAD LITTLE CHANGE WITH BURBANK AT 105, LONG BEACH AT 110, LOS ANGELES AT 109, AND SANTA BARBARA AT 103. THE MARINE CORPS AIR STATION AT EL TORO WAS OFFICIALLY THE HOTTEST SPOT IN THE UNITED STATES WITH 113, AND SAN DIEGO WAS SECOND WITH 111.

DESPITE THE HEAT IN SOUTHERN CALIFORNIA, AND ESPECIALLY SAN DIEGO, THE OFFICIAL CITY TEMPERATURE WAS NOT QUITE AS HIGH AS THAT AT 4TH AVENUE AND B STREET. THE TEMPERATURE SIGN THERE FLASHED 134.

The Coldest Day in History

TUESDAY, JANUARY 7, 1913:

PROPHETS AND SEERS, FOR EITHER OCCULT REASONS OR SUPERSTITIONS, HAD FILLED THE PUBLIC WITH PROMISES OF CALAMITIES IN A YEAR, ENDING IN 13, DEVOID OF LUCK.

WITH SOME MORNING LOW CLOUDS, NORTHEAST WINDS, A LOW OF 48 AND HIGH OF 61, JANUARY 1, 1913, WAS A NEAR NORMAL DAY. IT THEN STARTED TO WARM UP AS NORTH TO NORTHEAST WINDS AND 100 PERCENT SUNSHINE CONTINUED. A HIGH OF 73 ON THE 2ND WAS FOLLOWED BY 78 ON THE 3RD, WHICH WAS 16 DEGREES ABOVE NORMAL. WINDS BECAME EASTERLY ON THE 4TH AND THE MAXIMUM TEMPERATURE WAS 20 DEGREES LOWER THAN THE DAY BEFORE. IT CONTINUED TO GET COLDER WITH STRONGER NORTHEAST WINDS AND SKIES REMAINING MOSTLY CLEAR. A LOW OF 36 AND A HIGH OF ONLY 47 WERE RECORDED ON THE 5TH. THE MINIMUM TEMPERATURE ON THE MORNING OF THE 6TH WAS 28.4 UNDER CLEAR SKIES AND A 5 KNOT NORTHEAST WIND. THE THERMOMETER CLIMBED VERY SLOWLY AND ONLY REACHED 45 BY NOON, THE LOWEST MAXIMUM EVER RECORDED, AND STILL NOT A CLOUD IN THE SKY.

SAN DIEGANS WERE BEGINNING TO BUNDLE UP AND GATHER AT THE WEATHER KIOSK IN THE PLAZA TO WATCH THE THERMOMETERS. WITH FROSTED BREATH THEY PRESSED THEIR NOSES AGAINST THE PROTECTIVE GLASS TO SEE THE CURRENT TEMPERATURE. NATIVES WERE BEWILDERED, AS THEY HAD NEVER EXPERIENCED COLD WEATHER LIKE THIS. TEMPERATURES AT THE KIOSK WERE ABOUT 6 DEGREES LOWER THAN AT THE WEATHER BUREAU AT 5TH AND F, SO THE HIGH TEMPERATURE IN THE PLAZA COULD HAVE BEEN AS LOW AS 40.

TEMPERATURES BEGAN TO DROP THAT AFTERNOON, BUT PEOPLE REMAINED IN THE PLAZA WITH OVERCOATS ON AND HANDS IN POCKETS. THE TEMPERATURE DROPPED TO 32

AT 9 P.M. AND 29 AT MIDNIGHT. PEOPLE WERE STILL HUDDLING AGAINST THE COLD AND OCCASIONALLY STRUCK MATCHES TO SEE HOW LOW THE TEMPERATURE WAS. AT 1 A.M. IT WAS DOWN TO 24, AND THE LAST READING AT 2 A.M. WAS 22. THE WEATHER BUREAU LOW, WHICH WAS RECORDED AT 6 AM, WAS 24.9 DEGREES. AT MIDNIGHT, THE KIOSK TEMPERATURE WAS 4 DEGREES LOWER THAN THE WEATHER BUREAU'S, SO THE PLAZA MINIMUM WOULD HAVE BEEN LOWER THAN 24.9, AND POSSIBLY AS LOW AS 21. SKIES WERE CLEAR WITH LIGHT NORTHEAST WINDS AS THE SUN ROSE ON THE COLDEST MORNING IN SAN DIEGO HISTORY.

LOS ANGELES ONLY HAD A 34 THAT MORNING, AS THE COLD AIR HAD SWEPT ACROSS BRITISH COLUMBIA, SLIDING SOUTHWARD ON THE EAST SIDE OF THE SIERRAS, DOWN OVER NEVADA, AND ACROSS EXTREME SOUTHERN CALIFORNIA.

OTHER LOW TEMPERATURES THAT BITTERLY COLD MORNING WERE CAMPO 4, CUYAMACA 9, ALPINE 13, JULIAN AND LAKESIDE 15, EL CAJON 20, LEMON GROVE 22, LA MESA 24, AND CHULA VISTA 26. THERE WAS A KILLING FREEZE ALL OVER THE COUNTY.

FRUIT GROWERS WERE UNPREPARED AND NO ARRANGEMENTS HAD BEEN MADE. SOME HASTILY ATTEMPTED TO BUILD SMUDGE FIRES, BUT SOON LEARNED THERE WAS NO FUEL ON HAND TO BURN, WHILE OTHERS PASSED THE NIGHT PICKING AS MUCH AS POSSIBLE.

IT WAS NOT MUCH BETTER IN OTHER PARTS OF SOUTHERN CALIFORNIA, AS SMUDGE POTS BY THE THOUSANDS WERE FIRED UP IN A FIGHT TO SAVE A CITRUS CROP VALUED AT $50,000,000. DENSE CLOUDS OF BLACK PUNGENT SMOKE FROM THE BURNING OF CRUDE OIL HOVERED OVER ORANGE AND LEMON LADEN TREES. BLAZING DISTILLATE BURNERS DOTTED HILLSIDES AND VALLEYS, ILLUMINATING SMOKE CLOUDS OVERHEAD.

SOME WATER PIPES FROZE AND A FEW BURST. SUBURBAN TROLLEY LINES WERE DISRUPTED BY FREEZING OF AIR BRAKE LINES. FLOWERS WERE DESTROYED. THE COLD PREVENTED SAN DIEGO FISHERMEN FROM MAKING THEIR DAILY TRIPS AS NETS WERE FROZEN TO THE REELS AND

IT WAS IMPOSSIBLE TO THAW THEM SUFFICIENTLY TO BE USED.

MANY YOUNGSTERS WENT TO THE PLAZA FOUNTAIN TO SEE MOTHER NATURE'S ICE FOR THE FIRST TIME, AND CLIMBED OVER THE RIM AND STOOD ON THE 3/4 INCH THICK ICE. ONE BOY FROM THE NORTHERN PART OF THE COUNTRY, WHO BROUGHT ICE SKATES WITH HIM, SKATED IN THE FOUNTAIN AND WAS THE ENVY OF THE LOCAL BOYS. HE WAS OFFERED A POCKET KNIFE, AND EVEN UP TO 10 CENTS IN ACTUAL MONEY, BUT REFUSED TO PART WITH THE SKATES FOR EVEN A SHORT TIME. THEN THE BOYS POOLED THEIR MONEY AND HUNTED EVERY HARDWARE STORE IN TOWN. THEY THOUGHT THEY COULD GET A PAIR FOR ABOUT A DOLLAR BUT FOUND THAT NONE HAD BEEN STOCKED. THERE WERE A FEW PEOPLE WHO BROKE UP THE ICE, WRAPPED IT UP IN PAPER, AND TOOK IT HOME FOR SOUVENIRS.

OFFICIAL TEMPERATURES WERE BELOW 32 FOR 7 HOURS, BUT AT THE KIOSK, APPROXIMATELY 12 HOURS. NEVER BEFORE IN HISTORY, OR SINCE, HAS SAN DIEGO EXPERIENCED SUCH BITTER COLD.

WEATHER BUREAU FORECASTER E. HERBERT NIMMO EXPLAINED IT THIS WAY:

"THE WEATHER REPORTS FROM THE GULF AND ATLANTIC STATES BEING MISSING, WE ARE

FORCED TO REPORT SOMEWHAT TO SPECULATION IN ACCOUNTING FOR CONDITIONS HERE. BUT I FEEL PRACTICALLY CERTAIN THAT THE EXTENSIVE HIGH BAROMETER AREA IN THE NORTHWEST HAS BEEN RETARDED IN ITS EASTWARD MOVEMENT BY EXCEPTIONAL CONDITIONS IN THE EAST. A LOW BAROMETER AREA HAS ALSO MADE ITS APPEARANCE OVER NORTHERN ALBERTA MONDAY AND IS MUCH STRONGER THIS MORNING. THIS, OF COURSE, TENDS TO FORCE THE HIGH, COLD AREA SOUTH."

THIS METEOROLOGICAL CONDITION OF OFFSHORE FLOW NOW HAS A NAME; IT'S CALLED A SANTA ANA.

V. PRECIPITATION

Since rainfall in the San Diego area is generally a late fall through early spring phenomenon (occurring from the end of October through April), statistics are normally presented on a "water year" basis, as opposed to a calendar year format. The water year displays a more coherent picture of rainfall data. The National Weather Service computes the water year from July 1 through June 30.

The annual average precipitation downtown, based on a continuous and homogeneous 146-year record from July 1850 through June 1996, is 10.02 inches. The current and official 30-year average (1961-1990) is 9.90 inches. This long term precipitation record has an unusual statistic included in it. All of the measurable amount of precipitation at the official station location has fallen in the form of rain. This means that snow, ice pellets and hail have never accounted for more than 0.005 inch of the water equivalent.

Most of the rain falls during the months of November through March with January, on average, receiving the maximum rainfall at 1.80 inches. Only 10 percent of the total seasonal rainfall normally occurs from May through October and only 2 percent occurs during the three-month period from June through August.

Heaviest rains are associated with storms approaching California from the west, which frequently tap into a moisture supply from the subtropics. Heavy rains, up to 3.23 inches in a calender day, have been recorded in the downtown area. The probable maximum precipitation at San Diego, based on statistical analysis, is located on page 66.

Thunderstorms

Thunderstorms are rare for San Diego, but when they happen it is generally during the winter. Sometimes they produce small hail and gusty winds. The number of thunderstorms the area receives varies greatly throughout the year, but the average is 3.0. Some years will produce no thunderstorms at all but, on the other hand, during the year of 1936 there were 11. Most thunderstorms have just 1 or 2 claps of thunder and are short lived, although there has been almost constant rumbling for several hours. The longest thunderstorms lasted for almost 8 hours on two different dates: May 20, 1920 and December 8, 1926.

About every other summer, a thunderstorm will work its way off of the mountains and quickly move through the downtown area. This type of occurrence is associated with the monsoonal, or easterly, flow aloft that develops almost yearly, during the summer season. The

airmass is generally not unstable enough to sustain a thunderstorm for more than the normal length of a pulse-type thunderstorm (approximately 1 hour) to allow it to move past the valleys and into the coastal areas of San Diego county.

Snowfall History for San Diego

Many years ago there was a small village, where only several hundred people lived in adobe houses, located on a sand flat at the foot of a hill. This was San Diego in December 1847, which is the area we now call Old Town. Light snow had fallen over the nearby hills but heavier amounts of snow had fallen to the east and near the mountains. There was even a possibility that a few flakes fell in town but details of this storm lived only in the memories of early settlers.

Weather observations were started in July 1849, followed by a newspaper, which greatly helped documentation and reporting of the next storm which was "The Great Storm of January 1882."

This storm was accompanied by a blustery surge of very cold air and moved into San Diego County on the 12th and, even though officially documented, has no entries for snow. From the Daily Journal for January 12, 1882: "At a few minutes before 7 a.m. light rain began falling accompanied by sleet for a few moments at 7:20 a.m." And from a U. S. Signal Service report: "On the morning of the 14th snow flakes were observed melting as fast as they fell, a phenomenon never before noted at this station." Sleet also fell at 8 a.m. at the residence of Mr. G. W. Barnes.

It snowed quite heavily outside of town, and by noon there were 3 inches in the El Cajon Valley, 4 inches on Poway Grade, and 1 inch in the valley. Measurable snow fell in Del Mar and it was reported that roofs of houses in the San Pasqual Valley caved in from the weight of the snow. Snow varying in depth from 2 to 5 inches was reported in other areas within 15 to 25 miles of the station and Julian had 15 inches. It was the coldest storm on record and magnificent white robed hills awed those early residents. The snow line had never before come so near the bay, according to residents, some of whom had lived in the area for 40 years.

The biggest story, however, was the severe unabated storm in the mountains. It started snowing in Campo at 7 a.m. on the 12th, and by 3 p.m. there was a foot on the ground and the telegraph lines were down. Snow measured 20 inches on the 13th, and brisk easterly winds prevailed causing severe drifting. Snow was up to 2 feet deep on the 14th, and finally ended at 1:40 p.m. on the 15th. After nearly 4 days there were 3 feet of snow on the ground, many drifts 8 feet deep, hundreds of birds killed, and stock suffering severely. The roads were still impassable on the 18th due to the deep drifts. Snow softened and melted very slowly but heavy rains on the 24th and 25th began to wash away the snow rapidly. Not until then were officials able to repair the telegraph lines and open the roads. Campo was isolated no longer.

Actual snow flurries fell at Lindbergh Field from 4:10 to 5:30 a.m. on January 21, 1937, and were reported by a Weather Bureau Observer on duty. This was the only time that snow in flake form had fallen at the airport but it was not even

given dignity by being entered in the record books because it did not happen at the official station.

Residents in the eastern and northern parts of the city awakened to find those delicate snowflakes gently floating down outside their windows. Some graupel was also reported. Snow was on the roofs for as long as an hour and in some areas there was enough for small snowballs. Meanwhile, back at the Federal Building at Union and F Streets where the official weather observer was on duty, the phone began to ring with inquiries from the newspaper and residents. It was reported that, "he craned his neck and scanned the horizon, but not a snowflake was in sight." That was official and that is what was recorded. At that time, the U. S. Weather Bureau staffed 2 offices in San Diego but only the City Office observations were entered in the record books.

The weakest storm occurred on February 11, 1946, as early morning showers were followed by icy winds (up to 72 mph in the mountains) and cold rain. A few brief snow flurries were reported in several parts of the city. Lindbergh Field had no snow and only 7 hundredths of an inch of precipitation.

"Blizzard Lashes San Diego County," headlined the Tribune-Sun on January 10, 1949, as winter arrived in Southern California with a vengeance, bringing wind, snow, hail, sleet, rain and blocked highways; a severe gas shortage resulted.

Snowfall was the heaviest in history with 3 feet at Mount Laguna, 18 inches at Cuyamaca, 12 inches at Julian and 4 to 8 inches as low as 1000 feet. There was a light covering at Escondido, Spring Valley, and other points surrounding the city, which was enough for snowballs. A few patches were visible in the early morning hours within the city limits at Camp Miramar, Rose Canyon, Mt. Helix, East San Diego, North Park, La Jolla, Point Loma and El Cajon. Traffic was snarled in many areas.

Howling winds accompanied the snowfall and drifting snow closed major highways and secondary roads in the mountain areas. Wind speeds reached 75 miles per hour at the Airways Communication Station. Power failures were scattered throughout the city during the night as winds gusted up to 40 mph. A party of 8 Girl Scouts and 5 adults was marooned at their Cuyamaca camp. A plane crash took 5 lives and injured one as it smashed into a mountain near Julian.

San Diego Gas and Electric announced a gas emergency for the second time in a week and asked for cooperation in conserving gas by using it only for cooking and water heating. They later eased the request by asking that heating be restricted to one room in each house but warned that users might be asked to eliminate all use of gas for heating to avoid a complete shutdown of gas service in some sections.

This was the only time in history that snow had fallen in the city on successive days. Lindbergh Field reported snow pellets from 6:55 to 8:20 on the evening of the 10th, with heavy snow pellets from 4:45 to 5:00 the morning of the 11th.

January 1949, besides having the raging blizzard and snow in the city, was and still

is the coldest month on record. Days and nights were both cold, with the lowest temperature dipping to 29 degrees.

Palomar Airport, near Carlsbad, at 10 a.m. had a temperature of 33 degrees with 2 inches of snow on the ground. This was on December 13, 1967, as the second major storm of the century, and within 18 years of the first, brought winter to southern California.

Snow was preceded by numerous thunderstorms, hail and lightning, icy winds, and rain. Marble size hail fell at Palomar Mountain State Park with smaller hail reported in other areas. Snow to a depth of 2 feet fell at Palomar Mountain, 12 to 18 inches at higher elevations, and 6 inches at Temecula.

Strong gusty winds accompanied the storm, and all the schools closed in Fallbrook Union, Julian Union, and Mountain Empire Unified School Districts. Chains were required on most mountain highways, but none was completely blocked. The County Engineer put 65 units, including all snowplows and graders, in the field in an effort to keep county roads open. Borrego Springs had 3 inches of snow, Anza Borrego State Park had 4 ½, and a few flurries mixed with hail and cold rain fell at El Centro.

Snow covered most areas including Del Mar, Encinitas, Vista and La Jolla. Up to 5 inches fell in Fallbrook. Winds were calm that night as big snowflakes floated down over North Park, East San Diego, Clairemont, University City and along Interstate 8, above Mission Valley. San Diego Police Sgt. John E. Mansfield said from his Traffic Control Helicopter, "The whole city of San Diego was white." Students at Kearny High School left classrooms to go outside and throw snowballs. Snow in pellet form fell at Lindbergh Field from 7:50 to 8:50 am.

There were so many minor traffic accidents that law enforcement officials were forced to tell people to move on and file reports later. High winds created numerous brief power outages. Telephone switchboards were jammed at both the Evening Tribune and the Weather Bureau by excited people calling in to report snow in their areas.

San Diego almost had a white Christmas as a cold winter storm entered the region on December 24, 1987. Snow fell in the Laguna Mountains and chains were required on all vehicles. Snow flurries or flakes were reported during the late afternoon from many areas, including some within the city limits. Residents of Descanso and Jamul played in a winter wonderland with snow covering the ground and snowballs filling the air. Lindbergh Field did not even report a sprinkle.

A Winter Storm Warning was in effect on January 17, 1990 as a cold and windy storm reached Southern California, causing rapidly dropping snow levels. Mt. Laguna reported 14 inches of snow on the ground, which covered most of the mountain roads. Snow flakes or flurries were reported within the city limits, including several coastal communities, but once again Lindbergh Field did not report snow.

Genuine snow, whether it be in the form of sleet, ice pellets, snow pellets, graupel, or flakes, has fallen in the city on at least 10 days, with only 3 of them considered official.

Tropical Cyclones

The tropical cyclone, by definition, is a rotating storm that originates over the tropical oceans. The tropical cyclone season in the Pacific Ocean is from the end of May through November, but can start as early as May first and last into December. It is rare for downtown San Diego to experience the direct effects of a tropical cyclone; there are only 16 documented cases in which the city has had a firsthand account of this type of atmospheric phenomenon. The effects of tropical cyclones on the city of San Diego are normally minor since most cyclones move in a westerly direction and dissipate without incident in the Pacific Ocean. The moisture left over from these storms can be collected by mid latitude troughs and advected over southern California, thus producing the few and far between significant summer rain events of downtown San Diego. For the mountains, on the other hand, the tropical moisture will increase the chance for thunderstorms which can cause heavy warm rains and flash flooding.

Although tropical cyclones defined as hurricanes have never moved within 150 nautical miles (278 kilometers) of San Diego, a few tropical storms and depressions have brought copious rain to southern California. One in particular, tropical cyclone Kathleen, hit the area at tropical storm strength (winds of 34 to 63 knots) on the ninth through the twelfth of September, 1976. Kathleen caused flooding mainly in the deserts of southern California and set daily rainfall records. At San Diego's International Airport (Lindbergh Field) the new records for September ninth and tenth were 0.09 inch and 0.87 inch respectively.

VI. WIND

Reliable wind observations date back to the mid 1880s and have varied in elevation from the current of 20 feet to a high of 102 feet. Due to the Pacific Ocean to the west of the city, a sea breeze is commonplace in the late mornings through evenings. The mechanism that drives this wind is the differential heating between the ocean surface and the land. In the afternoon a westerly flow at an average speed of 10 miles per hour (mph) results. The overall yearly average is 7 mph from the west-northwest. The greatest peak gust of 64 mph from the west last occurred in January of 1988.

Santa Ana Winds

Santa Ana winds are generally defined as warm, dry winds that blow from the east or northeast (offshore). These winds occur below the coastal mountain ranges of Southern California and are strongest through and below the passes and canyons. Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon (the canyon from which the wind derives its name). Forecasters usually reserve the use of "Santa Ana" for winds greater than 25 knots.

The complex topography of Southern California combined with various atmospheric conditions create numerous scenarios that may cause widespread or isolated Santa Ana Wind events. Commonly, Santa Ana winds develop when a region of high pressure builds over the Great Basin (the high plateau east of the Sierra Mountains and west of the Rocky Mountains, including most of Nevada and Utah). Clockwise circulation

around the center of this high pressure area forces air down the mountain slopes from the high plateau. The air warms as it descends toward the California coast, at the rate of 5 degrees Fahrenheit per 1000 feet, due to compressional heating. Thus, compressional heating provides the primary source of warming. The air is normally dry since it originates in the desert, and continues to dry even more as it is forced down the mountains and heated.

Santa Ana winds commonly occur between October and February with December having the highest frequency of events. Summer events are rare. Winds are typically between north and east at a speed of 35 knots through and below passes and canyons with gusts to 50 knots. Stronger Santa Ana Winds can have gusts greater than 60 knots over widespread areas, and gusts greater than 100 knots in favored areas, such as the Santa Ana Canyon. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of a sea breeze. The sea breeze, which typically blows onshore daily, can moderate the Santa Ana winds during the late morning and afternoon hours.

VII. PRESSURE

The mercurial barometer at Lindbergh Field, which was removed when the ASOS was commissioned, had its ivory point at an elevation of 28 feet above sea level. The average station pressure is 1014.3 millibars. The twice daily symmetrical swing of the atmospheric pressure is rather striking, with maxima occurring at about 10 a.m. and 10 p.m. and minima at about 4 a.m. and 4 p.m. (page 48). These can be described, in a general fashion, as daily "pressure tides." As the tides are repeated at the same solar time day after day, it is beyond doubt that they are caused in some way by the sun. The low pressure tide at about 4 p.m. results from air aloft being heated and rarified. The reasons for the other tides are not well understood, but most likely depend on delayed heating and cooling as well as ionization at upper levels.

The highest sea level pressure ever recorded in the downtown area is 30.53 inches of mercury on February 17, 1883. The lowest is 29.37 on March 3, 1983.

VIII. RELATIVE HUMIDITY

Humidity is an indicator of the amount of water vapor in the air. Relative humidity is the ratio between the amount of water vapor actually in the air at a certain temperature and the theoretical amount of water vapor present when the air is saturated at that same temperature. This is usually expressed as a percentage.

Relative humidity averages 69 percent at San Diego on an annual basis. The average daily maximum relative humidity is 82 percent, generally occurring in the early morning hours around sunrise. The average daily minimum is 54 percent, usually occurring around noon.

Humidities are higher than the annual average, by 10 to 20 percent, May through October. During the months of November through February the relative humidities are generally lower than the average by 10 to 20 percent. Moist

conditions are commonplace in San Diego. Near 100 percent relative humidity is typical for the late nights and early mornings of the marine layer seasons of Spring and Summer.

Very low relative humidity is rare in San Diego but, when it happens, a Santa Ana wind condition is normally to blame. With strong offshore flow and downslope winds, the air dries rapidly as the land breeze develops. Relative humidities of less than 5 percent have been recorded in the city with this type of situation.

IX. AIR QUALITY

Air pollution existed even before life appeared on the planet. This contamination was caused by volcanic eruptions, forest and brush fires, wind storms, dust, pollen and miscellaneous gases. Stone age men were probably driven from unventilated caves by smoking fires.

The name "SMOG" originated in 1905 and was used to describe a combination of smoke and fog. More recently it has been applied to a mixture of pollutants from automobiles and industrial wastes, and their reaction products that have accumulated in the atmosphere. Rapid growth and increasing population, as well as the widespread use of automobiles after World War II, started an escalation of smoggy days. Geography, topography, climate, population and a high concentration of vehicular traffic are key elements to the distribution and development of pollutants.

Precursor emissions, mainly oxides of nitrogen and hydrocarbons, are generated in the populated coastal plain and drift inland with the daily sea breeze and primarily affect inland sections. On some occasions precursors, or even ozone, are generated in the heavily populated Los Angeles area, carried out over the ocean during a mild Santa Ana Wind condition, and then picked up by the sea breeze which brings them back onshore and into San Diego. It has been estimated that about 60 percent of these precursors are being generated by cars and trucks. For San Diego, ozone remains the major air pollution problem. It results from complex reactions that occur in the presence of sunlight. Ozone is the primary component of photochemical smog.

In addition to pollution being advected over San Diego, it is common for a layer of warm dry air to lie above a moist cool marine layer which creates a temperature inversion. The temperature inversion prevents polluted air from rising and mixing with the air above, thus causing hazy conditions.

Due to the drastic increase in pollution, monitoring began in 1955 followed by air pollution programs, which are regulated on both state and federal levels. All air quality reports in the United States are based on the Pollutant Standards Index. For ground level ozone, values greater than 75 on the index exceed the State Standard for clean air and values greater than 100 exceed Federal Standards. At a value of 138 a Health Advisory will be issued. When this level is reached the air is considered unhealthy, with 15 parts of ozone per hundred million parts of air. At 200, a Stage 1 Alert is declared and a Stage 2 Alert is proclaimed at 275. These stages are considered very unhealthy.

Air quality was the worst in the 1960s and 1970s prior to passage of the Clean Air Act. In San Diego Stage 2 Alerts were reached once in 1978 and three times in 1979. Stage 1 alerts were also frequent, with 11 in both 1978 and 1979. San Diego has not had a Stage 2 episode since 1979 or a Stage 1 since 1991.

The Federal Standards were violated on 90 days in 1978 and 87 days in 1980. From there the trend continued downward resulting in only 2 days above Federal Standards in 1996. State standards were violated 151 days in 1978 but a record 192 days in 1981. Again, after 1981 the general trend was downward indicating improving air quality. This was especially realized in 1996, in which only 51 days violated the State Standard; the cleanest year on record.

Pollutants play a very important part in our daily weather by not only causing hazy conditions but also being the nuclei for the formation of fog. Because of the improving air quality throughout the last few decades, the yearly number of days with either fog or haze reported has also decreased dramatically. So not only is the air becoming cleaner, it is becoming clearer.

X. SKY COVER, CLOUDS, FOG AND HAZE

San Diego is a mostly sunny place with an average of 146 clear days per year. A clear day represents less than four-tenths of the sky covered in clouds during the hours from sunrise to sunset. Approximately 117 days are considered partly cloudy (4 tenths to 7 tenths sky coverage), and 102 days on average have cloudy skies. Most of these partly cloudy and cloudy days are due to the marine layer or "velo" cloud, as it was called many centuries ago.

Fog that produces very low visibilities, ¼ mile or less, on average occurs 23 days a year. This dense fog is usually caused by airmass advection of a shallow marine layer. The peak time during the year for dense fog is from October through February. Lower visibilities in fog, not considered dense, also occur during the winter season (December, January and February) and are mainly associated with rain.

When visibilities are below 7 miles an observer is required to report a restriction to visibility. If the restriction is not associated with water vapor and is not obvious, such as smoke or rain, haze is generally reported. Haze is fine dust or salt particles dispersed through a portion of the atmosphere. The particles are so small that they cannot be felt or individually seen with the naked eye, but they diminish horizontal visibility. On average, San Diego has 146 days of haze. This is normally associated with a dissipating marine layer where the low clouds have retreated but the particles in the air have not allowed the visibility to increase to 7 miles.

XI. COASTAL EDDY

During the spring and summer months, Southern California coastal areas and valleys experience many days with low clouds and fog in the early morning and late evening. At times, usually on the coast and less often in the valleys, there are days when the low clouds and fog

persist into the afternoon and occasionally all day. A coastal eddy is often the cause when low clouds and fog last into the afternoon. In Southern California, coastal eddies are often generically referred to as Catalina Eddies (for the island that the coastal eddy forms about).

A Catalina Eddy forms when upper level large-scale flow off Point Conception interacts with the complex topography of the Southern California coastline. As a result, a counter-clockwise circulating low pressure area forms with its center in the vicinity of Catalina Island. Catalina Eddy formation is accompanied by a southerly shift in coastal winds, a rapid increase in the depth of the marine layer, and a thickening of the coastal stratus. Catalina Eddies occur predominantly during the "stratus season" which is between April and September with a peak occurrence in June.

The effects of the Catalina Eddy on the weather over Southern California can be quite dramatic from one day to the next. Usually, the increased thickness of the stratus clouds inhibits the typical morning/early afternoon dissipation. Coastal temperatures will be several degrees cooler than the day before since cloud cover reduces the amount of surface heating from the sun. Air quality may be improved since the Catalina Eddy disrupts the ever present inversion over the coast and allows pollutants to be mixed through a greater depth of the atmosphere. Also, increased cloudiness reduces photochemical reactions. On the downside, air travel may be affected due to reduced visibilities at airports.

A typical Catalina Eddy will allow coastal low clouds and fog to persist into the afternoon. At other times, when the circulation of a Catalina Eddy is stronger, there is a deeper layer of low clouds that may reach as far inland as the intermediate valley of Riverside and San Bernardino Counties. When the Catalina Eddy is at its strongest, the depth of the low clouds may extend to 6000 feet and these clouds will move through the inland valleys and reach into the high deserts.

XII. OUR CHANGING CLIMATE

"The American public is familiar on all sides with elaborate and detailed statements on the weather at a thousand and one resorts. If we may believe all we read in such reports, the temperature never reaches the eighties, the sky is flecked with just enough clouds to perfect the landscape, the breezes are always balmy, and the nights ever cool. There is possibly one place in the United States where such conditions obtain: a bit of country about forty miles square, at the extreme southwestern part of the United States, in which San Diego, California is located."

This quotation from General A. W. Greely, a former resident of San Diego and head of the United States Weather Service as Chief Signal Officer of the Army, was first published in the Climate of the United States in 1888. This was an accurate description of San Diego weather at that time, but slow and gradual changes have been taking place in the climate over the past several decades. Indications of these changes are most evident to those who follow the record high and low temperatures. This is where

the most noticeable changes have occurred.

Since the records began in 1874, most of the daily record low temperatures were recorded before 1900 and record highs in the past few decades. Out of a possible 365 days, 366 during leap year, 196 record lows have been set, and still not broken, in the first 26 years of record. This computes to 54 percent, leaving 46 percent, or 169 days, of record lows set in the last 96 years. The frequency of new records declined drastically after the 1940s with only 7 records established in the last 25 years. Disregarding irregularities from one year to another, the general trend has been for diminishing amounts. Maximum temperature record trends are almost the reverse. The majority of daily record high temperatures have occurred recently, with 126 days, or 35 percent, happening within the past 25 years. Only 45 days, or 12 percent, happened before the turn of the century. The remaining 53 percent of the daily record high temperatures are scattered throughout the century. Again, disregarding the irregularities, the general overall trend has been for increasing record high temperatures as time progresses.

Throughout the period of record, the city of San Diego has also been in transition. It started out with wood buildings, dirt streets and considerable open space. Then, in what seems to be a not so gradual development of the city, San Diego expanded with ribbons of concrete criss-crossing the city: streets of black asphalt, sidewalks made of cement, huge paved parking lots, and steel, brick and concrete buildings, leaving very little open space. What has developed over the many years of growth is a "Heat Island," also known as "Urban Thermal Pollution," and described as a large bubble of hot air that overlies the metropolitan area. The temperature of a densely constructed business district can be as much as 20 degrees higher than the lowest observed suburban temperature on a calm clear night, but normally the difference is near 7 degrees. This is most evident at night because solar radiation is more readily absorbed in the city by the buildings and paving materials that possess large heat storage and retain this heat through the afternoon. As night falls, these materials begin to release their heat slowly. By morning, this heat has still not entirely dissipated and the next day begins with a thermal edge. As the city grows, the heat advantage continues to get stronger with accumulative effects. This will continue in the years to come with only major global climate changes affecting these results.

XIII. ACKNOWLEDGMENTS

We appreciate the assistance of the former and current San Diego National Weather Service staff including, but not limited to, James Reynolds, Richard Stitt, Wally Cegiel, Holly Snell and Amy Sundquist, who helped to compile and format the climatological data in this study. We also value the contributions of Andrea Evans, Ivory Small, Armando Garza, and Edwin Clark for the review and comments on this Technical Memorandum.

XIV. REFERENCES

Carpenter, F.A., 1913: *The Climate and Weather of San Diego, California.* San Diego Chamber of Commerce.

Court, A., 1980: Tropical Cyclone Effects of California. National Oceanic and Atmospheric Administration, National Weather Service, Technical Memorandum WR-159.

Department of Sanitation and Flood Control, Tropical Storm Kathleen Storm Report, 1976, San Diego County, California.

Garriott, E. B., 1903: *Weather Folk-Lore and Local Weather Signs*. Government Printing Press, Washington, D.C.

Humphreys, W. J., 1923: *Weather Proverbs and Paradoxes*. Williams and Wilkins Company, Maryland.

Huschke, R.E., 1959: *Glossary of Meteorology*. American Meteorology Society, Massachusetts.

Larson, J. L., 1977: Tropical Storm Kathleen. CALTRANS Report.

Lee, A., 1976: *Weather Wisdom*. Doubleday and Company, Inc., New York.

Lessard, A. G., 1982: *Station Pressure for San Diego, California*. Local study, Weather Service Office San Diego, California.

Mitchell, J. M. Jr., 1961: The Temperature of Cities. *U.S. Weather Bureau*.

National Oceanic and Atmospheric Administration, National Weather Service, Local Climatological Data, 1850-1996, San Diego, California.

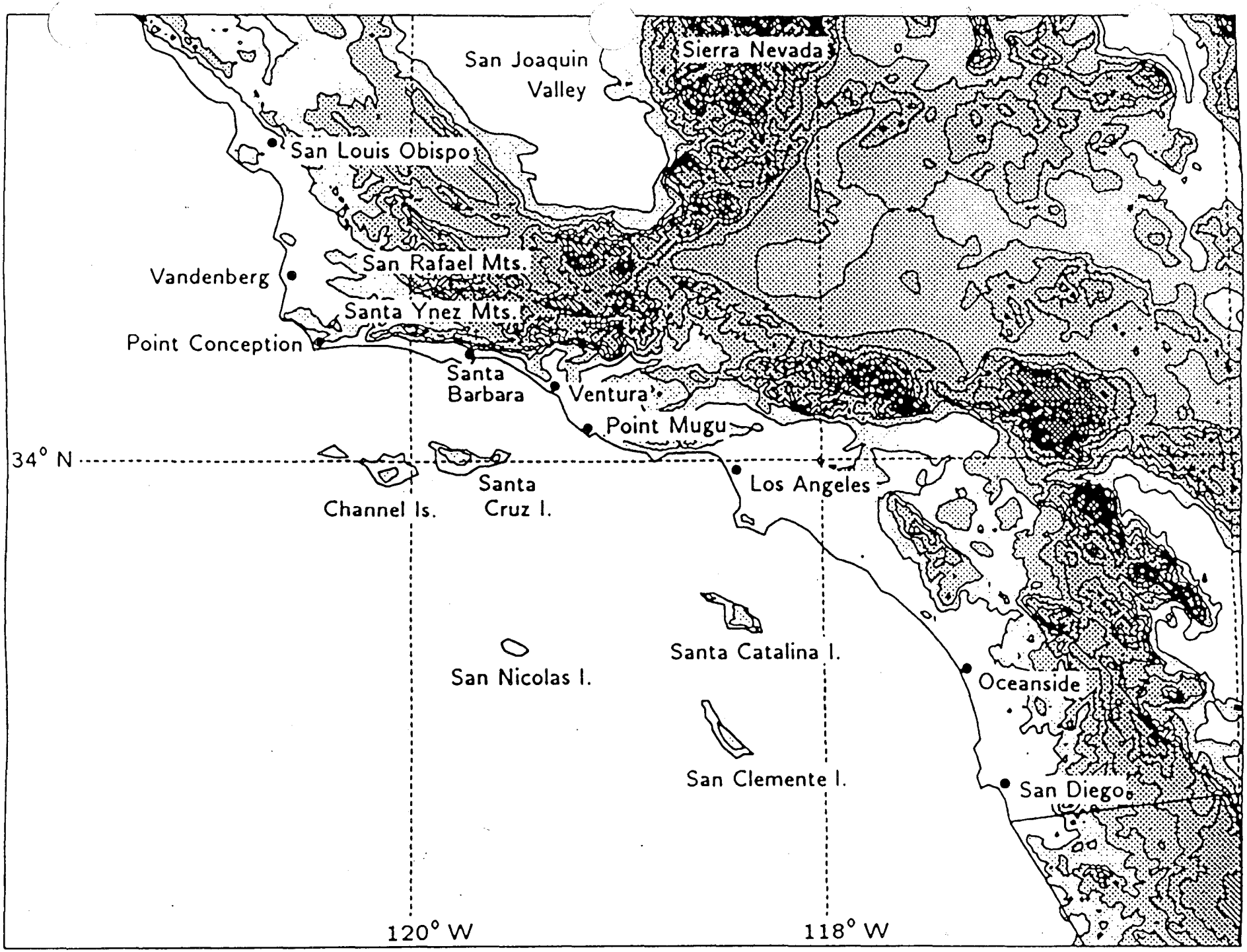
San Diego, California, Media Guide to Products and Services, 1996.

San Diego, California, Station Logs.

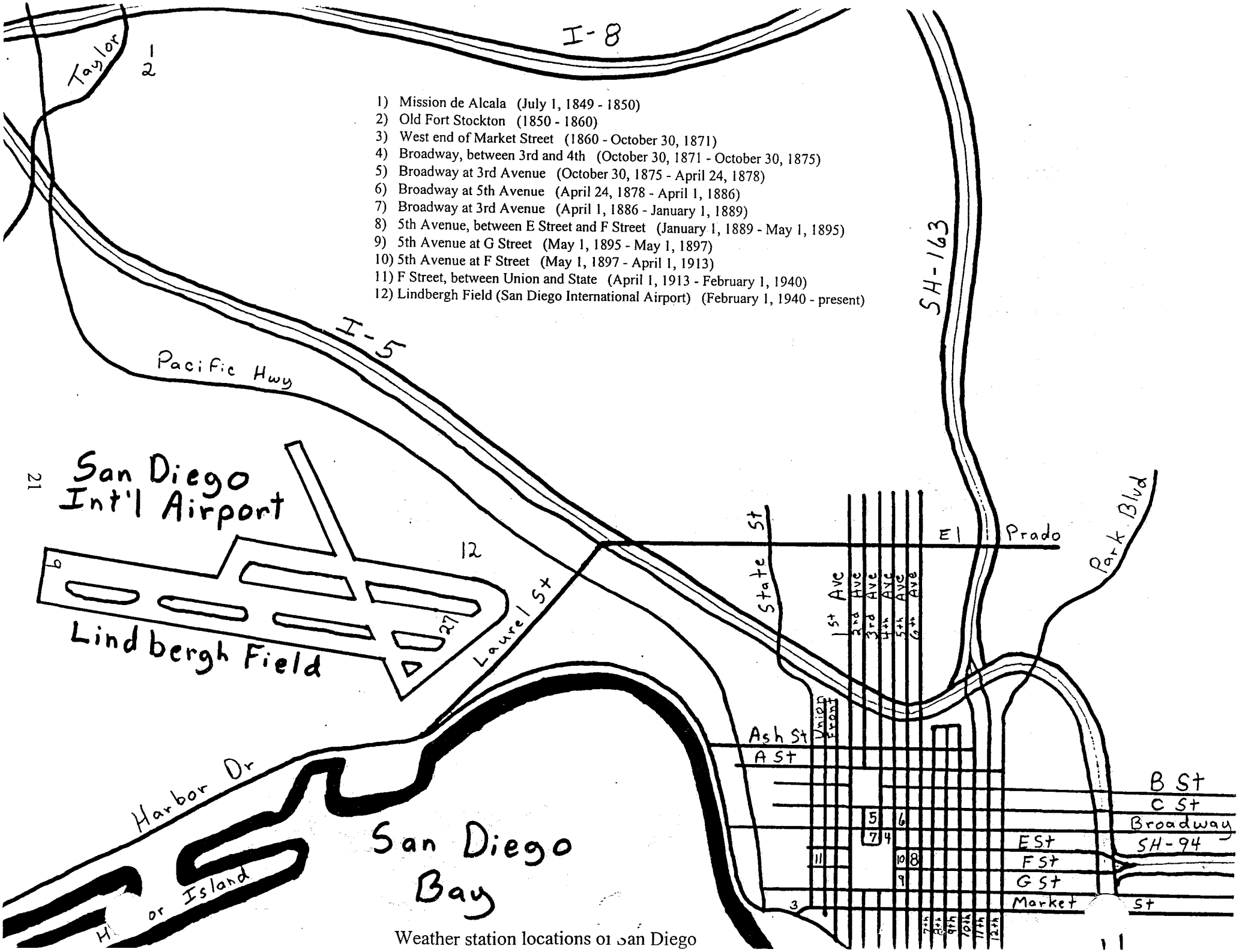
Small, I. J., 1995: *Santa Ana Winds and The Fire Outbreak of Fall 1993*. National Oceanic and Atmospheric Administration, National Weather Service, Technical Memorandum WR-230.

Ueyoshi, K. and Roads. J. O., 1993: Simulation and Prediction of the Catalina Eddy. *Monthly Weather Review*, **121**, 2975.

Ulrickson, B. L., J. S. Hoffmaster, J. Robinson and D. Vimont, 1995: A Numerical Modeling Study of the Catalina Eddy. *Monthly Weather Review*, **123**, 1364-1373.



Topography and geographical locations of southern California, redrafted from Ueyoshi and Roads, 1993. Terrain contours every 250 meters.



Weather station locations of San Diego

MISCELLANEOUS MEANS[1] AND EXTREMES

San Diego, California

Latitude: 43° 44' 05" North, Longitude: 117° 10' 07" West, Elevation: 13 feet.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Percent of Possible Sunshine	72	71	70	68	59	58	68	70	69	68	75	73	68
Mean Sky Cover (oktas)													
Sunrise to Sunset	4.1	4.2	4.2	4.2	4.6	4.4	3.6	3.2	3.2	3.5	3.3	3.7	3.9
Midnight to Midnight	3.9	4.4	4.5	4.1	5.1	5.0	4.3	4.0	4.0	3.8	3.4	3.5	4.2
Mean Number of Days:													
Sunrise to Sunset													
-Clear	12.3	10.2	10.8	10.3	8.5	9.3	12.7	15.1	15.0	13.7	14.7	13.6	146.2
-Partly Cloudy	7.6	7.6	9.5	10.0	11.3	11.8	12.8	11.5	9.5	9.7	8.0	7.7	117.0
-Cloudy	11.2	10.5	10.8	9.8	11.2	9.1	5.1	4.4	5.5	7.6	7.3	9.6	102.1
Precipitation													
-.01 inch or more	6.3	5.3	6.6	4.3	2.2	1.1	0.5	0.6	1.5	2.3	5.0	5.5	41.2
-1.00 inch or more	0.3	0.2	0.3	0.1	*	0.0	0.0	*	0.0	0.0	0.3	0.3	1.5
Snow, Ice Pellets, Hail													
-1.0 inch or more	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
Thunderstorms	0.2	0.3	0.4	0.2	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.4	3.1
Dense Fog-Visibility (1/4 mile or less)	3.0	2.5	1.5	1.1	0.6	0.6	0.7	0.6	2.2	3.2	3.5	3.9	23.4
Temperature in Fahrenheit													
-Maximum													
[illegible] and above	0.0	0.0	0.1	0.2	0.1	0.5	0.3	0.2	1.4	0.9	0.2	0.0	3.9
[illegible]nd below	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
[illegible]nimum													
32° and below	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
Mean Sea-level Pressure (in.)	30.06	30.05	30.02	29.97	29.95	29.92	29.93	29.92	29.90	29.95	30.03	30.06	29.98
Relative Humidity (%)													
-Mean	63	66	67	67	71	74	75	74	73	69	66	64	69
-Hour 04 PST	70	73	75	75	77	81	82	81	80	76	73	70	76
-Hour 10 PST	55	58	60	60	65	69	69	68	66	61	56	54	62
-Hour 16 PST	56	58	59	59	64	66	66	66	65	63	61	58	62
-Hour 22 PST	70	72	72	72	75	78	80	79	78	75	73	71	75
Wind:													
Mean Speed (mph)	6.0	6.6	7.5	7.8	8.1	7.8	7.5	7.3	7.0	6.5	5.8	5.6	7.0
Prevailing Direction (ref: true north)	NW	WNW	WNW	WNW	WNW	SSW	WNW	WNW	NW	WNW	NE	NE	WNW
Peak Gust													
-Direction (ref: true north)	W	SW	S	SW	NW	W	SW	SW	W	NW	SW	NW	W
-Speed (mph)	64	46	44	40	40	35	30	29	35	32	37	44	64
-Date	1988	1993	1995	1988	1988	1996	1985	1991	1994	1991	1985	1991	Jan 1988

[1] - means are reference to the 30 year period from 1961-1990

* - indicates the value is between 0.0 and 0.05

DAILY NORMALS OF TEMPERATURE, HEATING AND COOLING DEGREE DAYS AND PRECIPITATION 1961-1990

Daily	December						January						February					
	Temperature			Degree Days			Temperature			Degree Days			Temperature			Degree Days		
	MAX	MIN	AVG	Heating	Cooling	Precip	MAX	MIN	AVG	Heating	Cooling	Precip	MAX	MIN	AVG	Heating	Cooling	Precip
1	67	51	59	6	0	.05	65	48	57	8	0	.05	66	50	58	7	0	.06
2	67	50	59	6	0	.05	65	48	57	8	0	.05	66	50	58	7	0	.06
3	67	50	58	7	0	.05	65	48	57	8	0	.05	66	50	58	7	0	.06
4	67	50	58	7	0	.05	66	48	57	8	0	.05	66	50	58	7	0	.06
5	67	50	58	7	0	.05	66	48	57	8	0	.05	66	50	58	7	0	.06
6	67	50	58	7	0	.05	66	48	57	8	0	.06	67	50	58	7	0	.05
7	67	50	58	7	0	.05	66	48	57	8	0	.06	67	50	58	7	0	.05
8	67	49	58	7	0	.05	66	48	57	8	0	.06	67	50	58	7	0	.05
9	66	49	58	7	0	.05	66	49	57	8	0	.06	67	50	58	7	0	.05
10	66	49	58	7	0	.05	66	49	57	8	0	.06	67	50	58	7	*	.05
11	66	49	57	8	0	.05	66	49	57	8	0	.06	67	50	58	7	*	.05
12	66	49	57	8	0	.05	66	49	57	8	0	.06	67	51	59	7	*	.05
13	66	49	57	8	0	.05	66	49	57	8	0	.06	67	51	59	7	*	.05
14	66	49	57	8	0	.05	66	49	57	8	0	.06	67	51	59	7	*	.05
15	66	49	57	8	0	.05	66	49	57	8	0	.06	67	51	59	7	*	.05
16	66	49	57	8	0	.05	66	49	57	8	0	.06	67	51	59	7	*	.05
17	66	49	57	8	0	.05	66	49	57	8	0	.06	67	51	59	7	*	.05
18	66	48	57	8	0	.05	66	49	57	8	0	.06	67	51	59	7	*	.05
19	66	48	57	8	0	.05	66	49	57	8	*	.06	67	51	59	7	*	.05
20	66	48	57	8	0	.05	66	49	58	8	*	.06	66	51	59	7	*	.05
21	66	48	57	8	0	.05	66	49	58	8	*	.06	66	51	59	7	*	.06
22	66	48	57	8	0	.05	66	49	58	8	*	.06	66	51	59	6	*	.06
23	66	48	57	8	*	.05	66	49	58	8	*	.06	66	51	59	6	*	.06
24	66	48	57	8	*	.05	66	49	58	8	*	.06	66	51	59	6	0	.06
25	66	48	57	9	*	.05	66	49	58	8	*	.06	66	51	59	6	0	.06
26	65	48	57	9	*	.05	66	49	58	8	*	.06	66	52	59	6	0	.06
27	65	48	57	9	*	.05	66	50	58	8	*	.06	66	52	59	6	0	.06
28	65	48	57	9	*	.05	66	50	58	8	*	.06	66	52	59	6	0	.06
29	65	48	57	9	*	.05	66	50	58	7	*	.06						
30	65	48	57	9	*	.06	66	50	58	7	*	.06						
31	66	48	57	9	*	.06	66	50	58	7	0	.05						
Monthly	66.1	48.8	57.4	243	7	1.57	65.9	48.9	57.4	245	9	1.80	66.5	50.7	58.6	189	10	1.53
Winter	66.2	49.5	57.8	677	26	4.90	Notes: Degree days are based on temperatures of 65 degrees Fahrenheit, Temperature units are in degree Fahrenheit, Precipitation units are in inches, * - indicates less than 1 but greater than 0											
Annual	70.8	57.6	64.2	1256	984	9.90												

DAILY NORMALS OF TEMPERATURE, HEATING AND COOLING DEGREE DAYS AND PRECIPITATION 1961-1990

Daily	March						April						May					
	Temperature			Degree Days			Temperature			Degree Days			Temperature			Degree Days		
	MAX	MIN	AVG	Heating	Cooling	Precip	MAX	MIN	AVG	Heating	Cooling	Precip	MAX	MIN	AVG	Heating	Cooling	Precip
1	66	52	59	6	0	.06	67	54	61	5	*	.04	69	57	63	3	1	.01
2	66	52	59	6	0	.06	67	54	61	5	*	.04	69	58	63	3	1	.01
3	66	52	59	6	0	.06	67	54	61	5	*	.04	69	58	63	3	1	.01
4	66	52	59	6	0	.06	68	54	61	5	*	.04	69	58	63	3	1	.01
5	66	52	59	6	0	.06	68	54	61	4	*	.04	69	58	63	3	1	.01
6	66	52	59	6	0	.06	68	55	61	4	*	.04	69	58	63	3	1	.01
7	66	52	59	6	0	.06	68	55	61	4	*	.04	69	58	63	3	1	.01
8	66	52	59	6	0	.06	68	55	61	4	*	.03	69	58	63	3	1	.01
9	66	52	59	6	0	.06	68	55	62	4	1	.03	69	58	63	3	1	.01
10	66	52	59	6	0	.06	68	55	62	4	1	.03	69	58	63	3	1	.01
11	66	52	59	6	0	.06	68	55	62	4	1	.03	69	58	63	3	1	.01
12	66	52	59	6	0	.06	68	55	62	4	1	.03	69	59	64	2	1	.01
13	66	53	59	6	0	.06	68	55	62	4	1	.03	69	59	64	2	1	.01
14	66	53	59	6	0	.06	68	55	62	4	1	.03	69	59	64	2	1	.01
15	66	53	59	6	*	.06	68	56	62	4	1	.03	69	59	64	2	1	.01
16	66	53	60	6	*	.06	69	56	62	4	1	.02	69	59	64	2	1	.01
17	66	53	60	6	*	.06	69	56	62	4	1	.02	69	59	64	2	1	.01
18	66	53	60	6	*	.06	69	56	62	4	1	.02	69	60	65	2	2	.01
19	66	53	60	6	*	.06	69	56	62	4	1	.02	69	60	65	2	2	.01
20	66	53	60	6	*	.06	69	56	62	3	1	.02	69	60	65	2	2	.00
21	66	53	60	6	*	.06	69	56	62	3	1	.02	69	60	65	2	2	.00
22	66	53	60	6	*	.06	69	56	63	3	1	.02	69	60	65	2	2	.00
23	67	53	60	5	*	.05	69	56	63	3	1	.02	69	60	65	2	2	.00
24	67	53	60	5	*	.05	69	57	63	3	1	.02	69	60	65	2	2	.00
25	67	53	60	5	*	.05	69	57	63	3	1	.02	69	60	65	2	2	.00
26	67	54	60	5	*	.05	69	57	63	3	1	.02	69	60	65	2	2	.00
27	67	54	60	5	*	.05	69	57	63	3	1	.02	69	60	65	2	2	.00
28	67	54	60	5	*	.05	69	57	63	3	1	.01	69	60	65	2	2	.00
29	67	54	61	5	*	.05	69	57	63	3	1	.01	70	60	65	2	2	.00
30	67	54	61	5	*	.05	69	57	63	3	1	.01	70	60	65	2	2	.00
31	67	54	61	5	*	.05							70	60	65	2	2	.00
Monthly	66.3	52.8	59.6	177	9	1.77	68.4	55.6	62.0	113	23	.79	69.1	59.1	64.1	73	45	.19
Spring	68.0	55.9	61.9	363	77	2.75	Notes: Degree days are based on temperatures of 65 degrees Fahrenheit, Temperature units are in degree Fahrenheit, Precipitation units are in inches, * - indicates less than 1 but greater than 0											
Annual	70.8	57.6	64.2	1256	984	9.90												

DAILY NORMALS OF TEMPERATURE, HEATING AND COOLING DEGREE DAYS AND PRECIPITATION 1961-1990

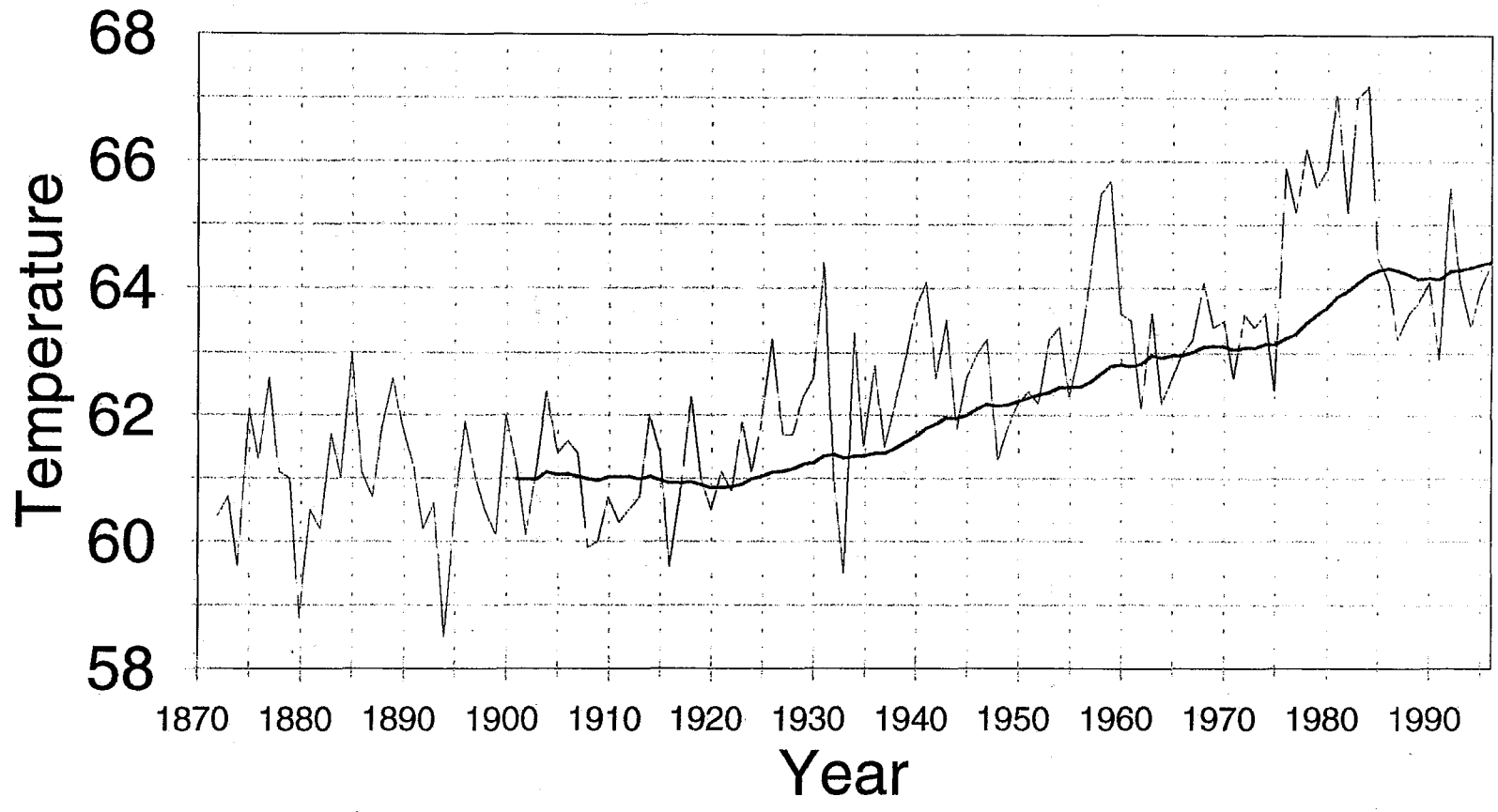
Daily	June						July						August					
	Temperature			Degree Days			Temperature			Degree Days			Temperature			Degree Days		
	MAX	MIN	AVG	Heating	Cooling	Precip	MAX	MIN	AVG	Heating	Cooling	Precip	MAX	MIN	AVG	Heating	Cooling	Precip
1	70	60	65	2	2	.01	74	64	69	1	5	.01	77	67	72	0	7	.00
2	70	61	65	2	2	.01	74	64	69	1	5	.01	77	67	72	0	7	.00
3	70	61	65	2	2	.01	74	64	69	1	5	.00	77	67	72	0	7	.00
4	70	61	65	2	2	.01	75	64	70	1	6	.00	77	67	72	0	7	.00
5	70	61	66	2	3	.01	75	64	70	1	6	.00	77	67	72	0	7	.00
6	70	61	66	2	3	.01	75	65	70	1	6	.00	78	67	72	0	7	.00
7	70	61	66	2	3	.01	75	65	70	1	6	.00	78	67	72	0	7	.00
8	71	61	66	2	3	.00	75	65	70	1	6	.00	78	67	72	0	7	.00
9	71	61	66	2	3	.00	75	65	70	1	6	.00	78	67	73	0	8	.00
10	71	61	66	2	3	.00	76	65	70	1	6	.00	78	67	73	0	8	.00
11	71	61	66	2	3	.00	76	65	70	1	6	.00	78	68	73	0	8	.00
12	71	61	66	2	3	.00	76	65	70	1	6	.00	78	68	73	0	8	.00
13	71	61	66	2	3	.00	76	65	70	1	6	.00	78	68	73	0	8	.00
14	71	62	66	2	3	.00	76	66	71	0	6	.00	78	68	73	0	8	.00
15	71	62	67	2	4	.00	76	66	71	0	6	.00	78	68	73	0	8	.00
16	72	62	67	2	4	.00	77	66	72	0	7	.00	78	68	73	0	8	.00
17	72	62	67	2	4	.00	77	66	72	0	7	.00	78	68	73	0	8	.00
18	72	62	67	2	4	.00	77	66	72	0	7	.00	78	68	73	0	8	.00
19	72	62	67	2	4	.00	77	66	72	0	7	.00	78	68	73	0	8	.00
20	72	62	67	2	4	.00	77	66	72	0	7	.00	78	67	73	0	8	.00
21	72	62	67	2	4	.00	77	66	72	0	7	.00	78	67	73	0	8	.00
22	72	63	68	1	4	.00	77	66	72	0	7	.00	78	67	73	0	8	.01
23	73	63	68	1	4	.00	77	66	72	0	7	.00	78	67	73	0	8	.01
24	73	63	68	1	4	.00	77	67	72	0	7	.00	78	67	73	0	8	.01
25	73	63	68	1	4	.00	77	67	72	0	7	.00	78	67	73	0	8	.01
26	73	63	68	1	4	.00	77	67	72	0	7	.00	78	67	73	0	8	.01
27	73	63	68	1	4	.00	77	67	72	0	7	.00	78	67	73	0	8	.01
28	74	63	69	1	5	.00	77	67	72	0	7	.00	78	67	72	0	8	.01
29	74	64	69	1	5	.00	78	67	72	0	7	.00	78	67	72	0	8	.01
30	74	64	69	1	5	.00	78	67	72	0	7	.00	78	67	72	0	8	.01
31							78	67	72	0	7	.00	77	67	72	0	8	.01
Monthly	71.6	61.9	66.8	51	105	.07	76.2	65.7	71.0	13	199	.02	77.8	67.3	72.6	0	240	.10
Summer	75.3	65.0	70.2	64	544	.19	Notes: Degree days are based on temperatures of 65 degrees Fahrenheit, Temperature units are in degree Fahrenheit, Precipitation units are in inches, * - indicates less than 1 but greater than 0											
Annual	70.8	57.6	64.2	1256	984	9.90												

DAILY NORMALS OF TEMPERATURE, HEATING AND COOLING DEGREE DAYS AND PRECIPITATION 1961-1990

Daily	September						October						November					
	Temperature			Degree Days			Temperature			Degree Days			Temperature			Degree Days		
	MAX	MIN	AVG	Heating	Cooling	Precip	MAX	MIN	AVG	Heating	Cooling	Precip	MAX	MIN	AVG	Heating	Cooling	Precip
1	78	67	72	*	8	.00	76	64	70	*	5	.01	72	57	65	2	2	.03
2	78	67	72	*	8	.01	76	64	70	*	5	.01	72	57	65	2	2	.03
3	78	67	72	*	8	.01	76	63	70	*	5	.00	72	57	64	2	1	.04
4	78	67	72	*	8	.01	76	63	70	*	5	.00	72	57	64	2	1	.04
5	78	67	72	*	8	.01	76	63	69	*	4	.00	72	56	64	2	1	.04
6	78	67	72	*	8	.01	76	63	69	*	4	.00	71	56	64	2	1	.04
7	78	66	72	*	8	.01	76	63	69	*	4	.00	71	56	64	2	1	.04
8	77	66	72	*	8	.01	76	63	69	*	4	.00	71	56	64	2	1	.04
9	77	66	72	*	8	.01	76	62	69	*	4	.00	71	55	63	3	1	.05
10	77	66	72	*	7	.01	75	62	69	*	4	.01	71	55	63	3	1	.05
11	77	66	72	*	7	.01	75	62	69	*	4	.01	71	55	63	3	1	.05
12	77	66	72	*	7	.01	75	62	68	*	4	.01	70	55	63	3	1	.05
13	77	66	72	*	7	.01	75	62	68	*	4	.01	70	54	62	4	1	.05
14	77	66	72	*	7	.01	75	61	68	1	4	.01	70	54	62	4	1	.05
15	77	66	72	*	7	.01	75	61	68	1	4	.01	70	54	62	4	1	.05
16	77	66	72	*	7	.01	75	61	68	1	4	.01	70	54	62	4	1	.05
17	77	66	71	*	7	.01	75	61	68	1	4	.01	70	53	62	4	1	.05
18	77	65	71	*	7	.01	74	61	68	1	4	.01	69	53	61	4	0	.05
19	77	65	71	*	7	.01	74	60	67	1	3	.01	69	53	61	4	0	.05
20	77	65	71	*	7	.01	74	60	67	1	3	.01	69	53	61	4	0	.05
21	77	65	71	*	7	.01	74	60	67	1	3	.01	69	53	61	4	0	.05
22	77	65	71	*	7	.01	74	60	67	1	3	.02	69	52	61	4	0	.06
23	77	65	71	*	7	.01	74	59	67	1	3	.02	69	52	61	4	0	.06
24	77	65	71	*	7	.01	74	59	66	1	2	.02	69	52	60	5	0	.06
25	77	65	71	*	7	.01	73	59	66	1	2	.02	68	52	60	5	0	.06
26	77	64	70	*	6	.00	73	59	66	1	2	.02	68	52	60	5	0	.06
27	76	64	70	*	6	.00	73	59	66	1	2	.02	68	51	60	5	0	.05
28	76	64	70	*	5	.00	73	58	66	1	2	.02	68	51	60	5	0	.05
29	76	64	70	*	5	.00	73	58	66	1	2	.03	68	51	59	6	0	.05
30	76	64	70	*	5	.00	73	58	65	2	2	.03	68	51	59	6	0	.05
31							73	58	65	2	2	.03						
Monthly	77.1	65.6	71.4	19	211	.24	74.6	60.9	67.7	24	107	.37	69.9	53.9	62.0	109	19	1.45
Autumn	73.9	60.2	67.1	152	337	2.06												
Annual	70.8	57.6	64.2	1256	984	9.90												

Notes: Degree days are based on temperatures of 65 degrees Fahrenheit, Temperature units are in degree Fahrenheit, Precipitation units are in inches, * - indicates less than 1 but greater than 0

Mean Annual Temperatures



TEMPERATURE READINGS OF 100 DEGREES AND HIGHER

BY SEVERITY		CHRONOLOGICALLY	
Temperature	**Date**	**Temperature**	**Date**
111	September 26, 1963	100	September 25, 1989
110	September 17, 1913	107	September 4, 1988
107	September 4, 1988	104	October 3, 1987
107	October 14, 1961	100	September 8, 1984
106	September 21, 1939	100	June 16, 1981
104	October 3, 1987	100	September 15, 1979
104	October 22, 1965	101	June 10, 1979
104	September 27, 1963	101	September 25, 1978
104	September 1, 1955	103	September 23, 1975
103	September 23, 1975	101	October 6, 1971
102	September 11, 1959	104	October 22, 1965
101	October 6, 1971	101	October 21, 1965
101	June 10, 1979	104	September 27, 1963
101	September 25, 1978	111	September 26, 1963
101	October 21, 1965	107	October 14, 1961
101	September 22, 1939	102	September 11, 1959
101	September 22, 1883	104	September 1, 1955
100	September 25, 1989	101	September 22, 1939
100	September 8, 1984	106	September 21, 1939
100	June 16, 1981	100	July 30, 1930
100	September 15, 1979	110	September 17, 1913
100	July 30, 1930	100	September 16, 1909
100	September 16, 1909	101	September 22, 1883
100	September 11, 1878	100	September 11, 1878

TEMPERATURE READINGS OF 32 DEGREES AND COLDER

BY SEVERITY		CHRONOLOGICALLY	
Temperature	**Date**	**Temperature**	**Date**
25	January 7, 1913	32	December 25, 1879
28	January 6, 1913	32	January 31, 1880
29	January 4, 1949	32	January 21, 1883
30	January 5, 1949	32	December 26, 1891
30	January 22, 1937	32	January 7, 1894
31	January 13, 1963	28	January 6, 1913
32	January 7, 1894	25	January 7, 1913
32	December 26, 1891	30	January 22, 1937
32	January 21, 1883	29	January 4, 1949
32	January 31, 1880	30	January 5, 1949
32	December 25, 1879	31	January 13, 1963

MEAN YEARLY TEMPERATURES IN DESCENDING ORDER

Year	Temp	Year	Temp	Year	Temp
1984	67.2	1956	63.1	1907	61.4
1981	67.1	1946	63.0	1915	61.4
1983	67.0	1966	63.0	1876	61.3
1978	66.2	1885	63.0	1948	61.3
1980	65.9	1939	62.9	1903	61.2
1976	65.9	1991	62.9	1901	61.2
1959	65.7	1936	62.8	1891	61.2
1992	65.6	1877	62.6	1924	61.1
1979	65.6	1945	62.6	1921	61.1
1958	65.5	1965	62.6	1886	61.1
1977	65.2	1942	62.6	1878	61.1
1982	65.2	1930	62.6	1919	61.0
1985	64.5	1889	62.6	1897	61.0
1996	64.4	1971	62.6	1884	61.0
1931	64.4	1904	62.4	1932	61.0
1957	64.2	1951	62.4	1879	61.0
1993	64.1	1975	62.4	1922	60.8
1941	64.1	1955	62.3	1917	60.8
1968	64.1	1918	62.3	1873	60.7
1990	64.1	1929	62.3	1887	60.7
1986	64.1	1964	62.2	1910	60.7
1995	64.0	1938	62.2	1913	60.7
1989	63.8	1950	62.2	1893	60.6
1940	63.7	1952	62.2	1898	60.5
1963	63.6	1875	62.1	1895	60.5
1972	63.6	1962	62.1	1881	60.5
1974	63.6	1925	62.0	1912	60.5
1988	63.6	1914	62.0	1920	60.5
1960	63.6	1900	62.0	1872	60.4
1970	63.5	1923	61.9	1911	60.3
1943	63.5	1896	61.9	1882	60.2
1961	63.5	1949	61.8	1892	60.2
1973	63.4	1890	61.8	1902	60.1
1969	63.4	1888	61.8	1899	60.1
1994	63.4	1944	61.8	1909	60.0
1954	63.4	1883	61.7	1908	59.9
1934	63.3	1928	61.7	1916	59.6
1926	63.2	1927	61.7	1874	59.6
1967	63.2	1906	61.6	1933	59.5
1953	63.2	1937	61.5	1880	58.8
1947	63.2	1935	61.5	1894	58.5
1987	63.2	1905	61.4		

MEAN MONTHLY TEMPERATURE

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1872	52.7	55.2	56.4	56.0	60.4	64.9	66.6	68.9	66.0	62.5	59.4	55.4	60.4
1873	57.0	53.0	57.0	58.0	60.0	62.0	67.0	69.0	68.0	62.0	61.0	54.0	60.7
1874	54.7	52.6	52.6	56.2	60.5	63.2	68.3	68.1	65.7	62.2	57.0	53.8	59.6
1875	55.0	54.6	55.2	61.2	62.2	65.8	68.6	70.9	68.5	65.6	60.8	57.1	62.1
1876	51.6	56.0	53.7	59.6	61.4	66.0	68.8	69.5	66.1	64.9	60.0	57.8	61.3
1877	57.1	58.4	59.2	60.8	60.8	67.4	69.3	68.9	68.6	63.8	60.8	56.4	62.6
1878	55.2	55.8	56.8	58.4	62.5	65.4	67.8	68.2	68.2	62.8	58.0	54.2	61.1
1879	52.4	55.0	58.4	59.8	61.5	65.6	67.0	69.0	67.2	65.1	56.6	53.8	61.0
1880	52.8	50.5	52.1	57.0	61.2	63.4	64.4	66.4	63.8	61.6	56.6	56.0	58.8
1881	52.5	55.2	54.5	60.9	62.8	64.6	68.0	68.2	66.6	61.2	56.4	55.1	60.5
1882	50.3	51.2	55.0	56.8	62.3	65.0	67.6	70.8	67.0	61.8	57.0	57.6	60.2
1883	53.6	54.2	57.8	57.7	61.1	67.6	69.8	69.7	70.6	61.8	58.9	57.3	61.7
1884	58.1	55.8	55.4	56.8	61.3	65.2	69.2	70.4	65.8	61.6	58.6	53.8	61.0
1885	57.9	57.8	59.2	62.4	64.1	64.6	68.6	71.8	68.4	64.2	59.7	57.3	63.0
1886	55.8	59.0	55.1	57.4	61.0	64.0	67.9	71.5	67.5	60.0	57.9	56.3	61.1
1887	54.2	52.6	57.4	59.2	62.2	66.0	67.4	66.5	66.2	64.8	57.4	54.4	60.7
1888	51.5	54.4	55.5	61.4	61.9	66.4	68.4	69.2	69.7	65.0	59.9	58.2	61.8
1889	54.8	58.0	59.2	60.4	60.8	64.0	67.6	70.8	70.2	65.4	62.0	57.4	62.6
1890	51.0	54.3	56.4	58.6	60.4	64.1	68.5	69.8	69.1	64.6	63.8	60.8	61.8
1891	54.6	53.3	56.9	58.2	60.8	63.6	69.0	72.4	70.2	63.8	59.4	52.2	61.2
1892	55.1	55.0	56.0	57.8	61.0	62.0	64.9	67.8	65.4	62.7	60.9	54.2	60.2
1893	57.4	54.4	54.2	57.5	61.0	63.4	67.4	70.0	64.6	62.7	57.6	57.4	60.6
1894	49.5	50.5	52.6	56.4	58.6	61.4	64.8	67.0	66.0	62.8	57.1	54.8	58.5
1895	53.2	55.8	55.4	57.8	61.9	63.0	65.6	67.1	67.4	64.4	59.4	55.0	60.5
1896	55.5	57.7	58.2	56.5	62.0	64.8	68.6	69.4	66.7	64.2	59.7	59.0	61.9
1897	55.8	54.7	54.2	59.8	60.9	63.4	67.0	69.9	68.1	62.4	60.2	55.0	61.0
1898	50.8	55.2	54.5	59.1	58.8	63.8	66.7	70.6	68.5	62.3	59.4	56.6	60.5
1899	55.5	53.4	56.4	58.2	57.7	61.4	65.6	65.8	65.5	62.7	60.8	58.7	60.1
1900	57.8	57.6	59.2	56.8	60.9	64.4	67.6	66.2	65.6	63.1	64.6	60.4	62.0
1901	56.2	57.5	60.0	57.4	60.0	62.5	65.8	68.2	64.8	62.8	60.8	57.8	61.2
1902	56.4	54.8	54.8	57.2	60.2	62.2	65.4	66.8	66.2	62.6	58.3	55.8	60.1
1903	56.8	52.2	57.6	58.4	60.5	63.2	66.2	68.4	67.9	63.5	61.6	57.8	61.2

MEAN MONTHLY TEMPERATURE

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1904	55.7	54.6	56.4	58.9	60.5	64.5	66.7	71.0	70.2	66.8	64.2	58.8	62.4
1905	58.1	59.0	59.6	59.1	59.9	62.7	65.2	67.4	66.4	63.8	59.2	56.0	61.4
1906	54.6	58.0	57.8	58.2	60.0	64.8	68.7	68.5	68.2	65.4	58.2	56.4	61.6
1907	52.8	60.1	56.6	59.4	60.8	62.9	68.1	67.2	65.1	64.9	61.2	57.8	61.4
1908	56.9	54.0	56.8	59.4	57.4	60.1	66.8	68.0	66.6	61.6	57.8	53.8	59.9
1909	54.2	54.2	54.5	59.0	59.8	62.6	65.2	68.6	66.6	63.8	57.2	53.8	60.0
1910	52.2	52.9	57.2	61.7	61.1	62.0	67.0	67.8	67.8	64.0	58.7	56.2	60.7
1911	56.2	52.2	58.0	57.7	59.3	62.4	66.2	67.4	66.2	63.0	61.7	53.4	60.3
1912	57.0	56.2	55.2	56.1	60.6	63.2	66.9	66.4	65.8	63.3	61.2	54.1	60.5
1913	50.6	53.4	55.1	58.0	59.7	62.8	68.2	68.9	70.3	65.5	60.8	55.4	60.7
1914	56.3	57.4	61.4	61.4	60.2	63.8	65.8	66.2	66.0	66.0	64.4	54.6	62.0
1915	55.2	55.4	59.4	59.7	60.6	64.8	67.5	69.5	66.4	62.8	59.6	55.6	61.4
1916	52.5	56.4	59.2	60.2	60.8	61.4	65.0	67.0	64.4	59.3	56.5	52.4	59.6
1917	51.6	54.7	54.6	57.0	58.4	63.7	68.9	68.6	68.2	64.6	60.8	58.6	60.8
1918	54.4	55.1	58.5	60.4	60.8	66.8	68.0	69.8	70.6	68.1	59.8	54.8	62.3
1919	56.6	53.6	55.0	59.2	61.0	66.2	68.6	68.4	66.5	62.0	58.6	56.6	61.0
1920	54.6	56.8	55.6	57.6	59.8	63.6	67.0	70.4	66.2	61.4	58.2	54.8	60.5
1921	53.6	55.2	57.5	57.4	58.4	63.1	68.4	68.2	66.8	64.6	60.4	59.3	61.1
1922	52.5	53.7	54.6	56.3	60.3	64.3	67.7	70.7	70.0	64.0	58.0	58.0	60.8
1923	56.3	55.2	58.4	59.0	63.2	62.3	67.0	67.8	68.2	64.4	64.0	57.4	61.9
1924	55.2	59.0	56.6	59.4	63.0	65.5	67.0	67.0	66.4	60.5	60.0	54.0	61.1
1925	54.4	56.6	57.2	58.6	62.3	64.6	70.2	68.8	66.6	63.6	60.8	60.3	62.0
1926	56.7	59.7	62.4	63.4	63.8	66.2	67.6	69.3	66.0	64.0	63.8	55.2	63.2
1927	55.4	56.4	56.6	58.2	61.4	63.3	69.2	69.0	66.4	64.6	63.3	56.0	61.7
1928	57.8	57.5	59.4	59.6	63.0	64.0	66.6	67.2	66.2	62.2	60.2	56.1	61.7
1929	54.4	53.2	55.6	57.5	62.7	65.2	69.4	72.0	68.2	66.7	62.1	60.3	62.3
1930	55.8	57.9	59.6	62.0	60.0	64.6	69.6	70.3	66.9	64.8	63.0	57.1	62.6
1931	57.7	59.2	61.9	63.8	66.2	68.7	73.6	73.8	69.7	66.6	57.2	53.8	64.4
1932	52.2	55.6	59.0	60.2	61.8	63.8	65.6	66.0	65.6	63.2	64.2	54.2	61.0
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

MEAN MONTHLY TEMPERATURE

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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	63.7
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	55.8	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	55.9	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	55.9	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	62.2
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

MEAN MONTHLY TEMPERATURE

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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
1973	55.6	59.9	58.1	61.5	63.4	68.0	69.1	70.5	68.8	66.8	60.6	58.2	63.4
1974	56.9	58.2	59.1	62.0	63.3	66.9	71.4	70.2	70.3	66.8	62.2	56.3	63.6
1975	56.1	56.4	57.5	58.7	62.2	65.0	69.4	68.9	71.5	65.9	60.4	56.9	62.4
1976	58.9	59.6	60.3	61.0	65.2	69.7	71.1	72.4	73.8	71.2	66.8	60.7	65.9
1977	60.3	61.7	57.5	61.4	61.9	65.8	71.6	73.1	72.2	68.9	64.9	63.3	65.2
1978	61.0	60.9	64.3	63.4	68.2	71.3	71.6	72.9	74.0	70.1	61.7	55.2	66.2
1979	56.9	56.9	60.1	63.4	65.6	70.2	71.8	73.9	76.3	68.7	62.4	60.6	65.6
1980	61.1	63.5	61.5	63.9	63.8	68.5	72.9	74.2	70.4	67.3	62.7	60.8	65.9
1981	61.3	62.2	61.1	64.4	67.3	72.9	75.6	75.8	73.7	67.1	63.5	60.3	67.1
1982	56.6	60.7	60.5	63.8	65.8	66.7	71.9	73.5	73.1	70.1	62.1	57.4	65.2
1983	60.7	60.9	62.0	62.4	66.2	68.1	72.6	77.4	76.8	72.2	64.4	60.6	67.0
1984	61.2	60.2	63.7	64.3	68.1	69.9	77.2	76.6	78.9	68.5	61.4	56.7	67.2
1985	57.0	57.2	58.9	63.6	64.8	69.0	75.3	72.4	69.8	67.9	60.1	58.0	64.5
1986	61.0	58.9	60.5	62.8	64.6	67.4	69.6	71.8	66.9	65.5	62.8	57.6	64.1
1987	55.4	58.0	59.1	63.4	64.7	65.8	67.1	69.9	69.9	69.5	61.8	53.9	63.2
1988	56.7	59.9	61.6	62.4	63.9	64.9	70.4	71.0	70.0	66.7	60.1	56.0	63.6
1989	54.7	56.7	59.8	65.6	63.7	66.0	70.1	71.0	70.4	66.3	63.1	58.7	63.8
1990	56.6	55.4	58.7	63.2	64.3	69.0	72.3	71.6	71.7	68.6	62.7	55.6	64.1
1991	57.4	59.4	56.5	61.7	62.1	64.1	67.4	68.9	69.4	68.0	62.3	57.3	62.9
1992	57.4	61.1	60.4	67.0	68.0	68.1	71.8	74.9	72.4	68.2	62.6	55.3	65.6
1993	56.9	58.0	61.3	63.8	66.0	68.6	69.8	70.2	69.0	67.3	61.6	57.0	64.1
1994	57.9	56.5	60.4	61.0	62.1	68.1	69.5	74.0	72.5	66.8	56.4	55.8	63.4
1995	56.9	61.4	60.4	61.5	62.0	64.8	69.0	71.9	72	67.1	63.2	58.3	64.0
1996	57.6	58.8	60.1	64.4	66.8	67.8	70	72.8	71	64.3	61.6	57.8	64.4

HIGHEST AND LOWEST DAILY TEMPERATURES FOR JANUARY

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	78	1898	53	1917*	57	1981*	35	1919*
2	80	1893	53	1910	57	1986	35	1919*
3	83	1943	51	1910	58	1940	34	1949
4	86	1969	51	1971	57	1991*	29	1949
5	80	1969	49	1913	63 X	1978	30	1949
6	78	1958*	45 X,Y	1913	61	1978	28	1913
7	81	1963*	49	1913	60	1993	25 X,Y	1913
8	78	1983*	52	1888	60	1984*	33	1894*
9	85	1923	52	1913	60	1980	35	1891
10	88 X	1953	48	1949	61	1980	34	1888
11	83	1983	46	1949	62	1981	35	1913*
12	82	1986	50	1882	62	1981*	34	1882
13	83	1904	49	1882	62	1980	31	1963
14	82	1975*	54	1949	63 X	1980	35	1963
15	80	1976*	52	1882	61	1980	34	1888
16	86	1976	53	1987*	59	1993*	34	1947
17	86	1977	53	1933	61	1980	34	1888
18	81	1971	55	1922*	57	1978*	34	1888
19	80	1975*	52	1917	59	1983*	39	1948*
20	80	1976*	52	1937*	58	1970	33	1883
21	82	1912	50	1945	62	1976	32	1883
22	76	1910	52	1937*	57	1977*	30	1937
23	81	1953	51	1937	58	1981	37	1937
24	82	1951	51	1898	57	1983	35	1932
25	81	1951	51	1949	60	1969	36	1949*
26	79	1986*	54	1902	59	1980	36	1949
27	83	1984	54	1971	58	1980	37	1950*
28	83	1962	54	1922*	58	1980*	36	1948
29	81	1984*	53	1922*	60	1911	33	1880
30	82	1984	50	1975	61	1980*	34	1949
31	82	1953	53	1932*	58	1980	32	1880

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR FEBRUARY

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	84	1935	52	1923	58	1984*	36	1880
2	82	1954	51	1903	60	1884	35	1880
3	85	1963*	52	1978*	61	1935	37	1932*
4	82	1963*	53	1903*	57	1978*	37	1922
5	80	1963	52	1899	61	1978	38	1894*
6	83	1952	50 X	1899	62	1978	34 X	1899
7	88	1954	53	1949*	60	1920	37	1899
8	85	1954	54	1939	59	1978*	37	1883
9	77	1907	54	1908	60	1978	38	1929*
10	81	1988	52	1939	59	1970	34 X	1891
11	83	1988	53	1880	59	1981	34 X	1894
12	86	1943	55	1949*	58	1957	35	1880
13	87	1943	50 X	1949	60	1980*	35	1894
14	85	1943	51	1903	62	1980	36	1903
15	85	1943	52	1911	63	1980	35	1903
16	81	1981*	53	1932	63	1980	34 X	1911
17	84	1930	55	1898	62	1980	36	1894*
18	80	1981*	54	1918*	63	1980	37	1894*
19	90 X	1995	53	1882	61	1980	38	1955*
20	81	1982	54	1890	61	1980	37	1882
21	83	1981	53	1922	61	1980	39	1953*
22	82	1881	55	1967	59	1977*	38	1897
23	85	1954	53	1953	59	1983*	38	1887
24	89	1921	55	1987	60	1982	38	1897*
25	82	1926	55	1913	58	1989*	41	1956*
26	87	1926	55	1911*	57	1994*	38	1894
27	83	1883	53	1911	61	1988*	39	1876
28	83	1901	56	1971	64 X	1978	40	1890
29	74	1924	58	1892*	58	1988	45	1996*

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR MARCH

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	82	1901	56	1915*	63	1901	41	1888
2	78	1994*	54	1886	60	1978	39	1971
3	79	1931	51 X	1894	59	1989*	38	1894
4	85	1987	52	1894	60	1884	39	1894
5	86	1899	56	1896*	60	1987	36 X	1894
6	83	1899	56	1893	60	1905	38	1880
7	88	1914	57	1935*	59	1905	41	1891
8	85	1996	58	1925*	60	1983	39	1882
9	85	1934	54	1893	59	1943	42	1939*
10	84	1934	54	1876	59	1983	40	1935
11	88	1959	52	1922	62	1983*	40	1935*
12	84	1947*	55	1917	62	1983	38	1922
13	87	1994	55	1969*	61	1984	40	1917*
14	83	1951	53	1881	59	1984*	38	1898
15	80	1978*	57	1895	59	1993	39	1880
16	91	1978	54	1881	60	1980	38	1895
17	93	1978	56	1922*	59	1993	40	1881
18	82	1960*	55	1898	64 X	1978	41	1920
19	82	1984*	56	1913*	62	1978	39	1880
20	84	1931	54	1894	62	1978	42	1898*
21	90	1931	56	1919*	61	1978	37	1894
22	82	1887	57	1909	61	1978	38	1894
23	88	1926	55	1929	60	1993*	40	1898*
24	85	1896	55	1913*	60	1993*	43	1929*
25	89	1988	56	1936*	62	1984	41	1880
26	93	1988	55	1898	62	1984	41	1936
27	82	1952	58	1939*	61	1984*	41	1880
28	95	1879	58	1935*	62	1978	41	1920
29	99 X	1879	54	1897	63	1978	43	1884
30	81	1910	56	1905*	62	1879	39	1875
31	84	1945*	57	1913	60	1983*	38	1905

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR APRIL

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	87	1985	57	1906	60	1981	41	1892
2	92	1960	58	1937*	60	1885	42	1906
3	89	1960	58	1898	59	1992*	41	1945
4	91	1971	56	1921	62	1992	43	1945*
5	95	1989	57	1922	63	1989	43	1945
6	98 X	1989	55	1875	65	1989	41	1875
7	93	1989	58	1912*	64	1989	39 X	1875
8	82	1885	57	1922	61	1989*	41	1875
9	90	1968	58	1922*	60	1989*	43	1893*
10	85	1968	58	1927*	65	1885	44	1935
11	90	1940	54 X	1912	62	1984	44	1945*
12	93	1888	57	1912	62	1978	43	1927*
13	95	1940	57	1883	62	1978*	44	1911
14	91	1964	56	1921	62	1989	42	1883
15	90	1948	57	1917	60	1990*	44	1913*
16	87	1948	55	1917	61	1989*	45	1887*
17	82	1879	57	1917	62	1958	46	1967*
18	83	1914	55	1933	62	1992	44	1896*
19	85	1914	59	1902	62	1992	42	1880
20	93	1899	57	1883	63	1980	42	1896
21	88	1899	58	1925*	62	1958	43	1896
22	95	1910	59	1900	62	1958	44	1878
23	96	1910	59	1899	64	1910	46	1963*
24	83	1995*	59	1899	62	1981	44	1880*
25	83	1992	59	1911*	63	1992*	44	1883*
26	83	1992*	56	1900	63	1992	47	1932*
27	87	1986	57	1884	62	1992*	45	1883
28	88	1921	58	1933*	62	1982*	45	1900*
29	87	1996	57	1898	66 X	1992	43	1894
30	86	1996	57	1915	65	1981	46	1942*

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR MAY

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	81	1929	56 X	1915	65	1981	47	1932
2	87	1929	59	1913	63	1982*	45 X	1883
3	90	1953	58	1892	64	1980	45 X	1915
4	90	1953	59	1930	64	1992*	47	1930
5	96	1953	60	1921*	64	1984*	46	1910
6	87	1990	58	1899	65	1992	47	1892
7	85	1941	60	1930*	64	1992	49	1964*
8	81	1941	60	1930*	62	1992*	49	1965*
9	87	1984	57	1922	63	1987*	47	1908
10	85	1943	56 X	1933	65	1981	48	1933
11	83	1996	60	1933*	65	1992	47	1879
12	88	1979	57	1908	65	1992	46	1890
13	94	1979	60	1920*	64	1992*	48	1908
14	87	1956	60	1911*	65	1981	46	1880
15	91	1956	58	1953	65	1978	46	1880
16	92	1956	61	1950*	65	1992	45 X	1894
17	94	1956	61	1922*	64	1956	48	1894
18	87	1892	60	1899	64	1978	48	1880*
19	87	1943	60	1916*	65	1978	49	1894*
20	89	1883	60	1927*	65	1978	48	1896
21	85	1941	60	1903*	63	1985*	49	1948
22	88	1893	60	1909	65	1984*	48	1878
23	82	1932	59	1917	65	1984	48	1879
24	95	1896	58	1917	65	1984*	48	1879
25	98 X	1896	61	1917*	70 X	1896	49	1879
26	87	1896	60	1908	67	1896	50	1916*
27	84	1915*	61	1921*	66	1984*	50	1917
28	84	1880	61	1971*	66	1981	52	1893
29	88	1978	61	1917*	67	1984*	52	1895
30	88	1879	59	1908	67	1984	50	1878
31	94	1879	58	1899	65	1992*	52	1906

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR JUNE

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	89	1879	62	1899*	65	1981	52	1916*
2	93	1879	58 X	1908	66	1984	51	1967*
3	91	1919	62	1908	67	1981	51	1890
4	88	1898	62	1908*	66	1981	50 X	1908
5	85	1890	61	1908	66	1993*	52	1880
6	93	1890	61	1899	67	1981	52	1948
7	92	1890	63	1917*	68	1981	53	1906
8	81	1890	63	1964*	67	1993	52	1950
9	93	1877	63	1971*	67	1984	54	1950*
10	101 X	1979	62	1901	68	1877	52	1892
11	98	1979	62	1899	70	1877	51	1892
12	90	1979	62	1901	72 X	1979	50 X	1894
13	90	1979	62	1911*	70	1979	50 X	1894
14	87	1917	62	1911	66	1984*	50 X	1943*
15	97	1981	64	1911	66	1984	52	1907*
16	100	1981	61	1908	69	1981	54	1897*
17	93	1957	62	1908	68	1981	52	1879
18	97	1957	63	1897	70	1981	54	1886
19	90	1957	63	1908	69	1981	53	1894*
20	90	1973	63	1908	67	1981*	53	1909*
21	88	1973	64	1916*	69	1981	54	1893
22	86	1978	63	1912	71	1981	55	1916
23	90	1978	61	1901	70	1981	51	1886
24	96	1931	64	1933*	70	1984*	53	1892
25	88	1931	65	1965*	71	1981	54	1943*
26	94	1990*	65	1920*	70	1981	52	1885
27	91	1990	63	1910	69	1984	52	1884
28	95	1980	63	1910	70	1976	56	1950*
29	84	1980	64	1902	70	1980	56	1910*
30	96	1985	64	1902	69	1984*	54	1910*

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR JULY

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	95	1985	66	1933*	73	1985	56	1890
2	94	1985	64 X	1910	73	1985	56	1908
3	90	1981	64 X	1912	71	1985	57	1910*
4	89	1957	65	1902	71	1981	54 X	1880
5	84	1981	66	1933	72	1981	55	1948
6	83	1981	65	1912	73	1981	57	1948*
7	86	1954	66	1909*	71	1984	56	1915
8	86	1984*	65	1902	73	1984	57	1899*
9	95	1985	66	1909*	74	1984	57	1948*
10	93	1959	67	1916*	73	1985*	57	1882
11	89	1959	66	1965*	72	1985*	58	1952*
12	85	1983	67	1909	71	1985*	55	1888
13	85	1984	66	1908	72	1984	55	1902*
14	93	1911	66	1905	73	1984	55	1902
15	90	1984	66	1899	75	1984	56	1908
16	85	1995*	67	1962*	74	1984	54 X	1884
17	86	1984	66	1894	74	1984	56	1884
18	83	1992*	67	1905	74	1984	56	1884
19	87	1951	66	1916	75	1984	58	1894
20	86	1974*	67	1880	74	1984	57	1894*
21	86	1877	66	1911	73	1984*	57	1894
22	87	1960	66	1899	72	1984	59	1940*
23	89	1960	68	1932*	72	1984	58	1892
24	84	1959	67	1899*	73	1984	56	1878
25	88	1891	68	1932*	72	1931	57	1893
26	87	1977*	67	1901	74	1984	59	1932*
27	86	1972*	67	1909	74	1984	58	1892
28	92	1972	67	1905	74	1984	59	1909
29	89	1972	67	1914	73	1984	57	1893
30	100 X	1930	68	1903*	76 X	1980	56	1896
31	92	1930	67	1903	75	1980	58	1924

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR AUGUST

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	90	1972	67	1903	74	1980	60	1944*
2	85	1971	67	1905	72	1980	59	1944
3	85	1971	68	1909*	72	1984	57	1888
4	86	1971	68	1990*	71	1984*	59	1880
5	88	1961	68	1911*	72	1971	56	1912
6	89	1884	68	1990*	75	1982	56	1912
7	87	1983	67	1894	76 X	1983	55	1894
8	94	1936	68	1980*	75	1983	58	1944
9	89	1965	68	1932*	74	1983	60	1948*
10	85	1994*	67	1900	72	1983*	58	1894
11	86	1994	68	1907	72	1994*	58	1894
12	94	1991	68	1902	73	1984*	57	1894
13	93	1994	68	1916	76 X	1983	57	1892
14	90	1994	67	1987	74	1992*	57	1892
15	92	1884	66 X	1899	74	1992*	58	1880
16	88	1983	68	1916*	76 X	1983	59	1881*
17	88	1992*	67	1916*	75	1984	58	1932
18	90	1986	68	1912*	75	1984	59	1932*
19	88	1986	68	1902	75	1984	54 X	1884
20	89	1897	67	1924*	75	1984	58	1912
21	89	1982	69	1899	75	1984	58	1916*
22	90	1972	66 X	1924	74	1984	59	1916*
23	89	1968	69	1903*	73	1984	55	1878
24	85	1985*	67	1902*	73	1984	58	1899
25	89	1985*	66 X	1908	74	1984	57	1906
26	92	1981	68	1912	75	1981	58	1890
27	91	1915	67	1880	74	1981	58	1881
28	90	1983	67	1880	75	1984	54 X	1887
29	88	1896	67	1908*	76 X	1984	54 X	1895*
30	93	1909	67	1912*	75	1984	56	1880*
31	98 X	1955	68	1933*	73	1984	58	1942*

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR SEPTEMBER

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	104	1955	67	1898	73	1983	58	1881
2	99	1955	68	1916*	76	1955	56	1898*
3	92	1988	67	1933	74	1984	58	1916*
4	107	1988	66	1910	76	1984	55	1899
5	97	1988	66	1899	76	1984	54	1912
6	90	1952	67	1965	73	1995*	56	1942*
7	92	1949	65	1899	73	1984	55	1911*
8	100	1984	65	1933	75	1984	55	1893*
9	96	1956	67	1933*	78 X,Y	1984	54	1911
10	95	1878	67	1933	76	1984	55	1876
11	102	1959	64 X	1933	75	1984*	56	1924*
12	97	1878	64 X	1933	75	1984	54	1884*
13	92	1971*	64 X	1933	75	1984	55	1909
14	92	1879	65	1933	76	1984	53	1894*
15	100	1979	66	1933*	76	1984	52	1884
16	100	1909	66	1933	76	1984	51	1884
17	110	1913	65	1908*	78 X,Y	1984	53	1908
18	93	1939	65	1908	77	1984	50 X	1882
19	96	1939	66	1932	77	1984	50 X	1882
20	99	1939	67	1933*	76	1984*	53	1893*
21	106	1939	66	1933*	77	1939	53	1893
22	101	1939*	66	1880	77	1939	53	1944
23	103	1975	65	1933	76	1939	52	1941
24	99	1978	66	1928*	73	1982	52	1881
25	101	1978	66	1916*	74	1978	52	1920
26	111X,Y	1963	66	1908	73	1984*	50 X	1907
27	104	1963	66	1901	73	1984*	52	1908
28	99	1963	64 X	1933*	73	1963	53	1880*
29	91	1918	66	1933*	73	1984	50 X	1880
30	91	1906	64 X	1899	70	1984*	51	1880

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR OCTOBER

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	93	1965*	64	1903	70	1978*	52	1893
2	94	1945	63	1908	68	1978*	50	1925
3	104	1987	62	1916	69	1985*	48	1884
4	97	1987	63	1912	70	1985	48	1884
5	97	1971	64	1912	69	1984	48	1884
6	101	1971	64	1916*	70	1971	47	1884
7	91	1951	64	1939*	69	1976	48	1916
8	93	1899	64	1933	69	1983*	49	1883
9	99	1994	64	1932*	71	1983	50	1879
10	92	1991*	62	1924	70	1984	47	1879
11	89	1991*	63	1899	69	1984	46	1879
12	96	1939	65	1928*	67	1993*	47	1886
13	94	1912	62	1879	68	1991*	48	1886
14	107 X	1961	62	1899*	68	1984*	48	1892*
15	97	1961	62	1910*	73 X	1961	47	1881
16	97	1958	61	1916	68	1983*	48	1892*
17	98	1958	57 X	1895	69	1983	47	1938*
18	91	1940	63	1916*	69	1976	47	1881
19	97	1964	62	1920	68	1983	46	1892*
20	95	1964	62	1916	70	1976	46	1949
21	101	1965	63	1924*	68	1978*	45	1949*
22	104	1965	63	1916	68	1965*	46	1906
23	93	1965	62	1941	67	1982	47	1886
24	94	1965*	63	1924*	69	1982	47	1892
25	95	1983	61	1924*	67	1982	48	1879
26	92	1983*	63	1924*	71	1983	46	1874
27	91	1879	61	1883	71	1983	47	1885
28	92	1879	62	1946*	69	1983	47	1874
29	89	1931	61	1971	69	1983	45	1971
30	89	1962	61	1920*	68	1983	43 X	1971
31	90	1918	60	1886	67	1983	45	1894

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR NOVEMBER

	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	97 X	1966	61	1916*	68 X	1983	45	1916*
2	90	1966	61	1935	63	1983	44	1886
3	93	1921	61	1916	65	1888	47	1876
4	97 X	1976	62	1924*	63	1983*	44	1935*
5	92	1976	59	1905	68 X	1983	42	1881
6	90	1949	59	1905	64	1983	46	1935*
7	89	1956	60	1890	62	1983*	46	1874
8	93	1904	62	1946*	64	1983	46	1881*
9	96	1956	59	1879	63	1992*	42	1881
10	91	1956	59	1912	62	1991*	44	1919
11	86	1974*	59	1909	63	1980	43	1915*
12	91	1974	60	1938*	68 X	1983	42	1938
13	89	1949	59	1910	66	1983	40	1880
14	87	1949	59	1964*	61	1983*	39	1916
15	89	1940	58	1894	60	1875	38	1964
16	86	1912	59	1958	62	1966	42	1958
17	88	1976	57	1964	64	1986	41	1958
18	86	1949	55	1893	62	1983*	38	1881
19	85	1917*	59	1994*	62	1967	39	1994
20	86	1914	59	1898	62	1967	38	1964
21	86	1954	56	1905	62	1936	40	1941
22	86	1939	57	1906	61	1976	40	1931
23	86	1950*	56	1906	61	1965	38	1931
24	87	1932	56	1909*	60	1981*	38	1931*
25	89	1953	58	1908	61	1989	39	1906
26	85	1956	58	1906	64	1976	41	1880
27	83	1903	54 X	1919	61	1903	40	1948*
28	82	1980	56	1919	59	1977*	36 X	1919
29	86	1907	54 X	1906	60	1982	41	1919*
30	85	1964	56	1908*	59	1892*	40	1931*

* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

HIGHEST AND LOWEST DAILY TEMPERATURES FOR DECEMBER

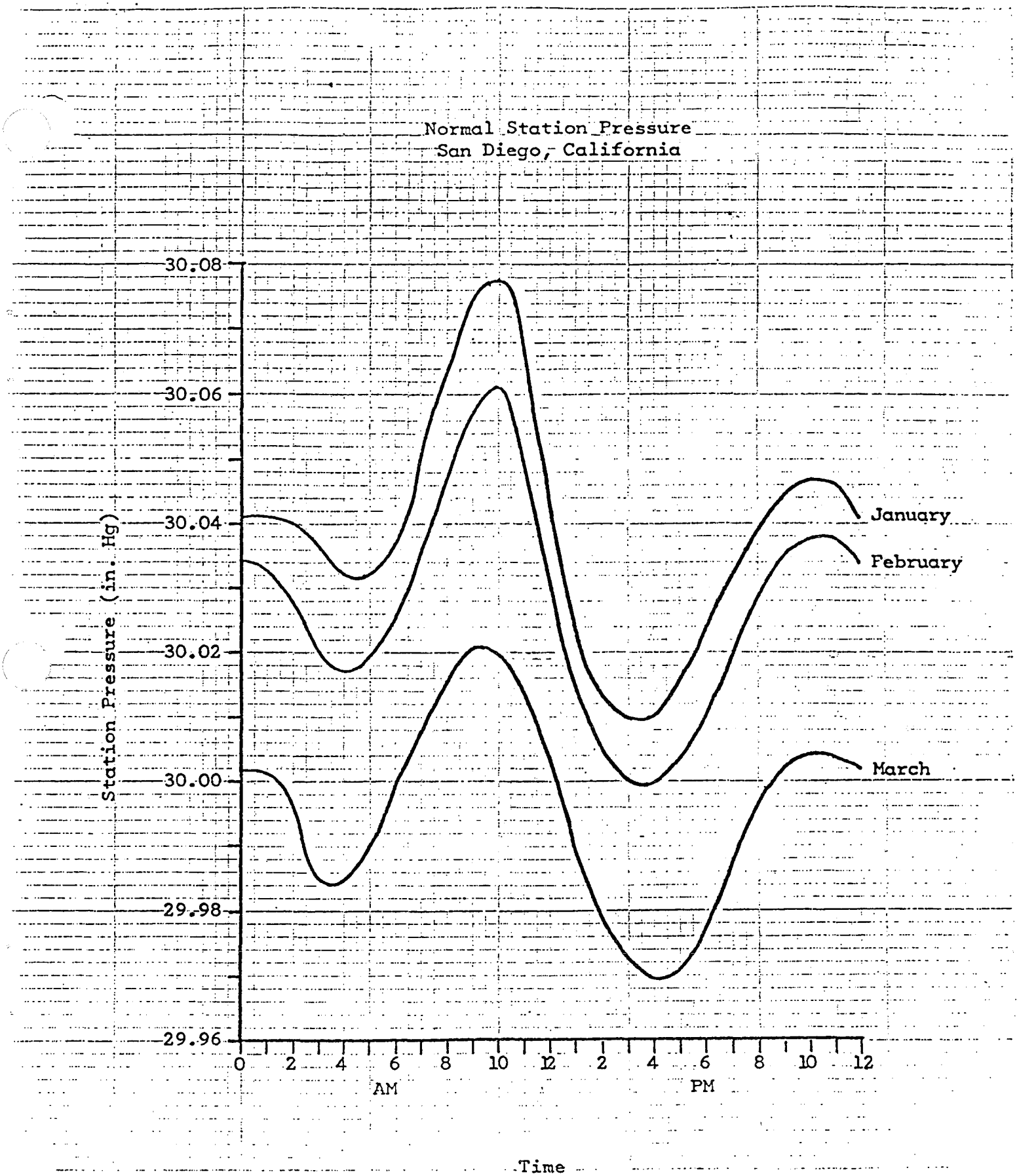
	MAXIMUM TEMPERATURES				MINIMUM TEMPERATURES			
DAY	HIGH	YEAR	LOW	YEAR	HIGH	YEAR	LOW	YEAR
1	83	1959	59	1933*	60	1983*	38	1884
2	83	1959	58	1909*	59	1925	42	1991
3	85	1958	57	1909*	59	1969*	42	1909*
4	83	1979	57	1908	60	1980	39	1909
5	83	1965	54	1909	60	1966	38	1948
6	85	1979	59	1995	59	1995	40	1891
7	80	1989*	57	1909	57	1900	37	1891
8	84	1938	51	1884	62	1988	34	1978
9	84	1957	55	1972	60	1977	35	1960
10	84	1950	54	1972	60	1991	40	1884
11	84	1958	53	1927	61	1977*	39	1947
12	81	1952	56	1932*	59	1934	36	1949
13	81	1952	55	1901	59	1922	35	1901
14	83	1953	55	1987*	59	1889	36	1878
15	81	1958	54	1967	60	1977	35	1878
16	84	1980	55	1948*	62	1957*	38	1892*
17	82	1979	54	1924	57	1962*	38	1916
18	78	1985*	55	1897	58	1977*	36	1892*
19	80	1954	54	1916	59	1921	36	1909
20	82	1954	55	1990	59	1969	37	1878
21	80	1906	53	1990	59	1969*	37	1968*
22	80	1899	52	1990	61	1977	36	1968*
23	78	1989*	53	1879	61	1977	36	1990
24	79	1989	52	1879	59	1977*	36	1879
25	83	1925	52	1916	63	1977	32 X	1879
26	79	1919*	51	1916	62	1977	32 X	1891
27	85	1956	54	1916	64	1977	37	1987*
28	84	1919	54	1916	63	1977	37	1987
29	88 X	1963	54	1879	62	1977	38	1966*
30	87	1980	49 X	1915	61	1977	34	1895
31	80	1958	53	1905	65 X	1977	35	1918

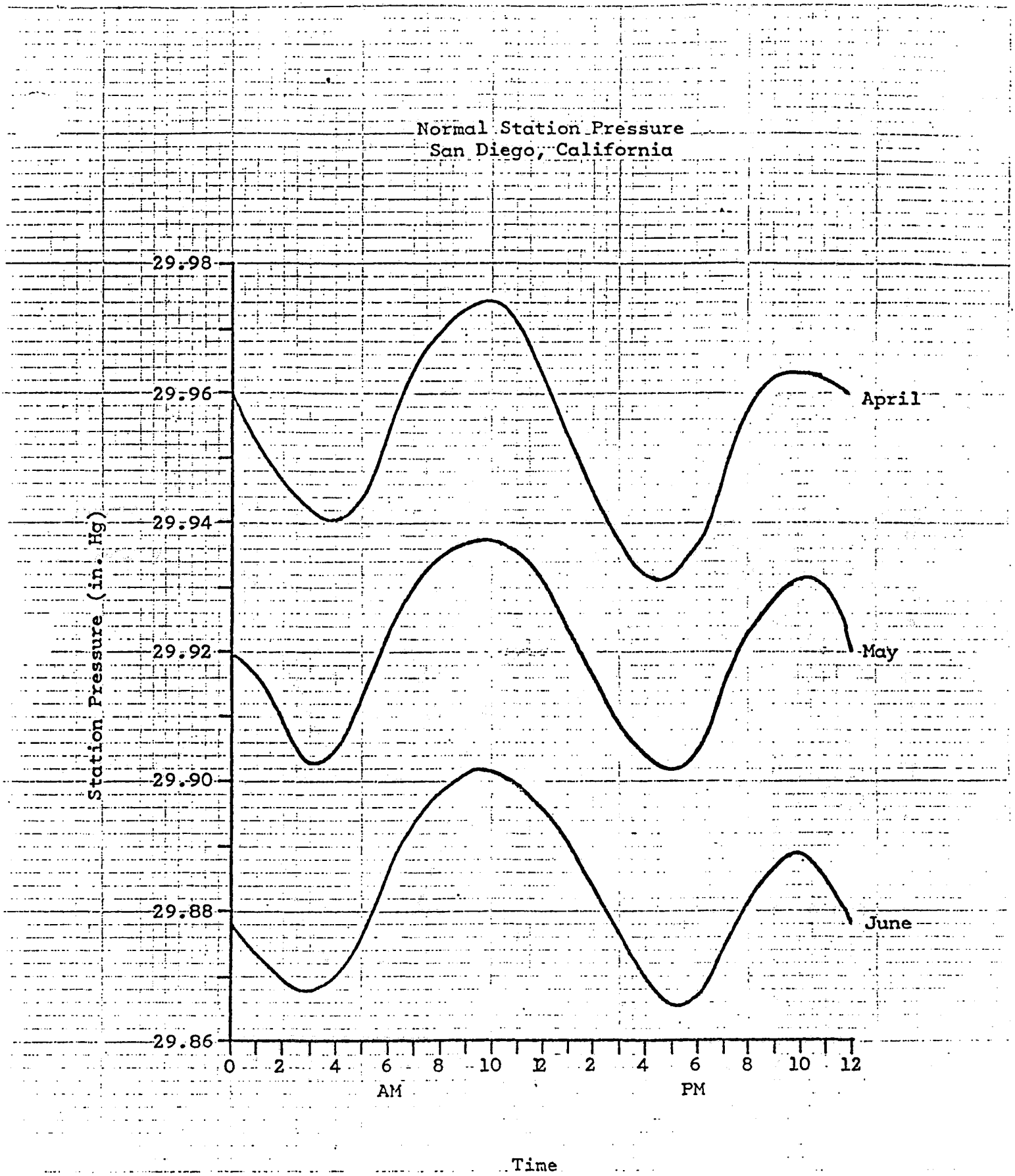
* - LAST OF SEVERAL OCCURRENCES
X - RECORD FOR THE MONTH Y - RECORD FOR THE YEAR

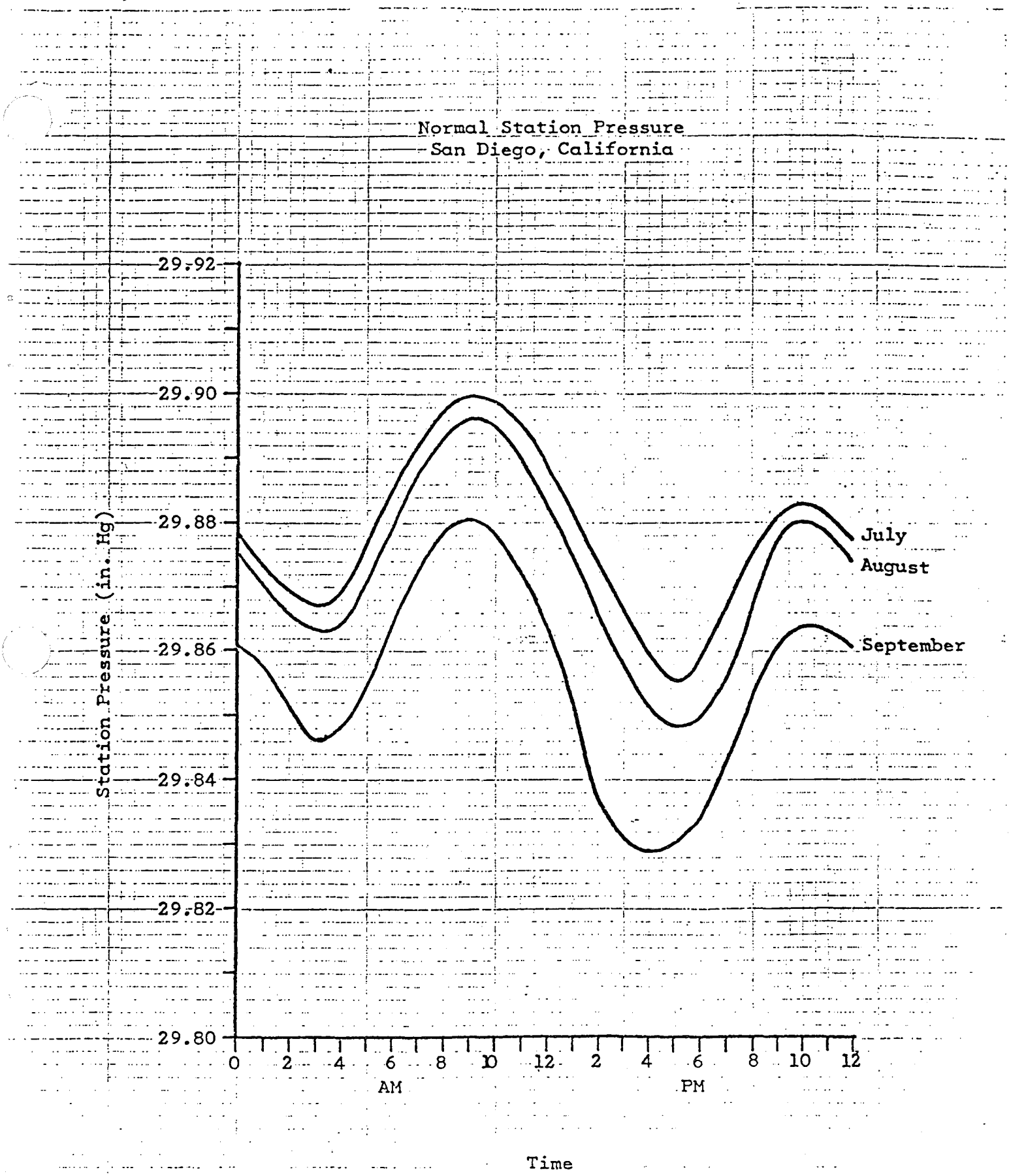
PRESSURE STATISTICS

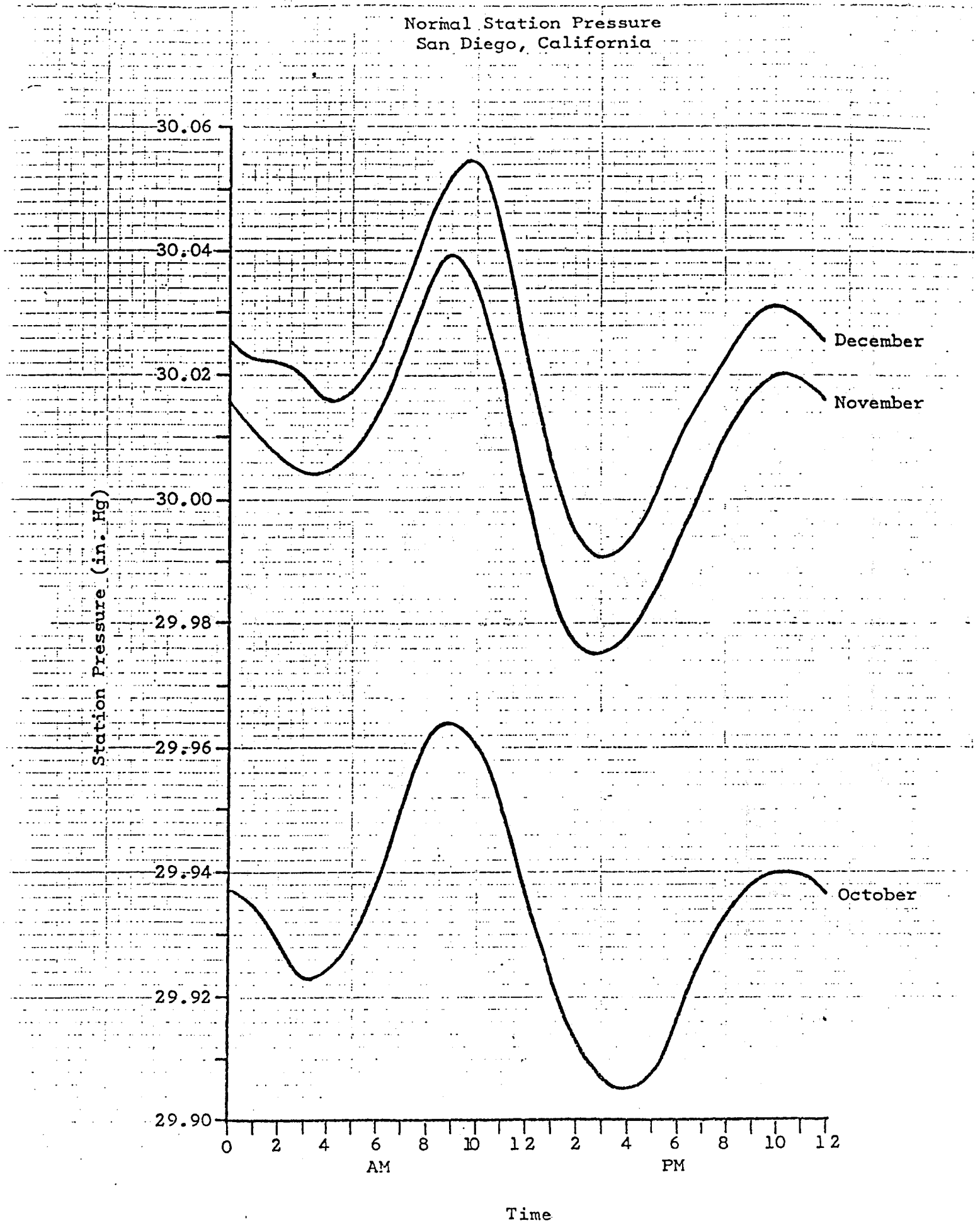
Two Highest Monthly Sea Level Pressures in inches			Average Station Pressure	Two Lowest Monthly Sea Level Pressures in inches		
January	30.48	1913	1017.0 mb	**January**	29.46	1988
	30.47	1916	30.03 in		29.48	1882
February	30.53	1883	1017.0 mb	**February**	29.48	1913
	30.49	1916	30.03 in		29.50	1980
March	30.45	1917, 1971	1015.2 mb	**March**	29.37	1983
	30.41	1890	29.98 in		29.46	1912
April	30.36	1875	1015.0 mb	**April**	29.61	1941
	30.33	1945	29.97 mb		29.67	1886, 1932
May	30.26	1879	1013.3 mb	**May**	29.67	1902
	30.22	1983	29.92 in		29.68	1876, 1923, 1937
June	30.17	1953	1012.3 mb	**June**	29.65	1976
	30.12	1873,1971, 1975	29.89 in		29.66	1904
July	30.17	1980	1012.5 mb	**July**	29.66	1936
	30.13	1974	29.90 in		29.68	1934
August	30.16	1896	1012.3 mb	**August**	29.64	1906,1933, 1981
	30.10		29.89 in		29.66	1995
September	30.16	1972	1011.5 mb	**September**	29.53	1927
	30.14	1889	29.87 in		29.59	1896, 1930, 1963, 1976, 1984
October	30.27	1957	1013.9 mb	**October**	29.57	1887, 1928
	30.24	1886	29.94 in		29.60	1925,1959
November	30.41	1975	1015.8 mb	**November**	29.52	1919
	30.40	1979	30.00 in		29.60	1931
December	30.53	1978	1017.2 mb	**December**	29.49	1959
	30.46	1953	30.04 in		29.51	1940

Extreme Highest		Yearly Average	Extreme Lowest	
30.53 in	February 1883 and December 1978	1014.4 mb 29.955 in	29.37 in	March 1983

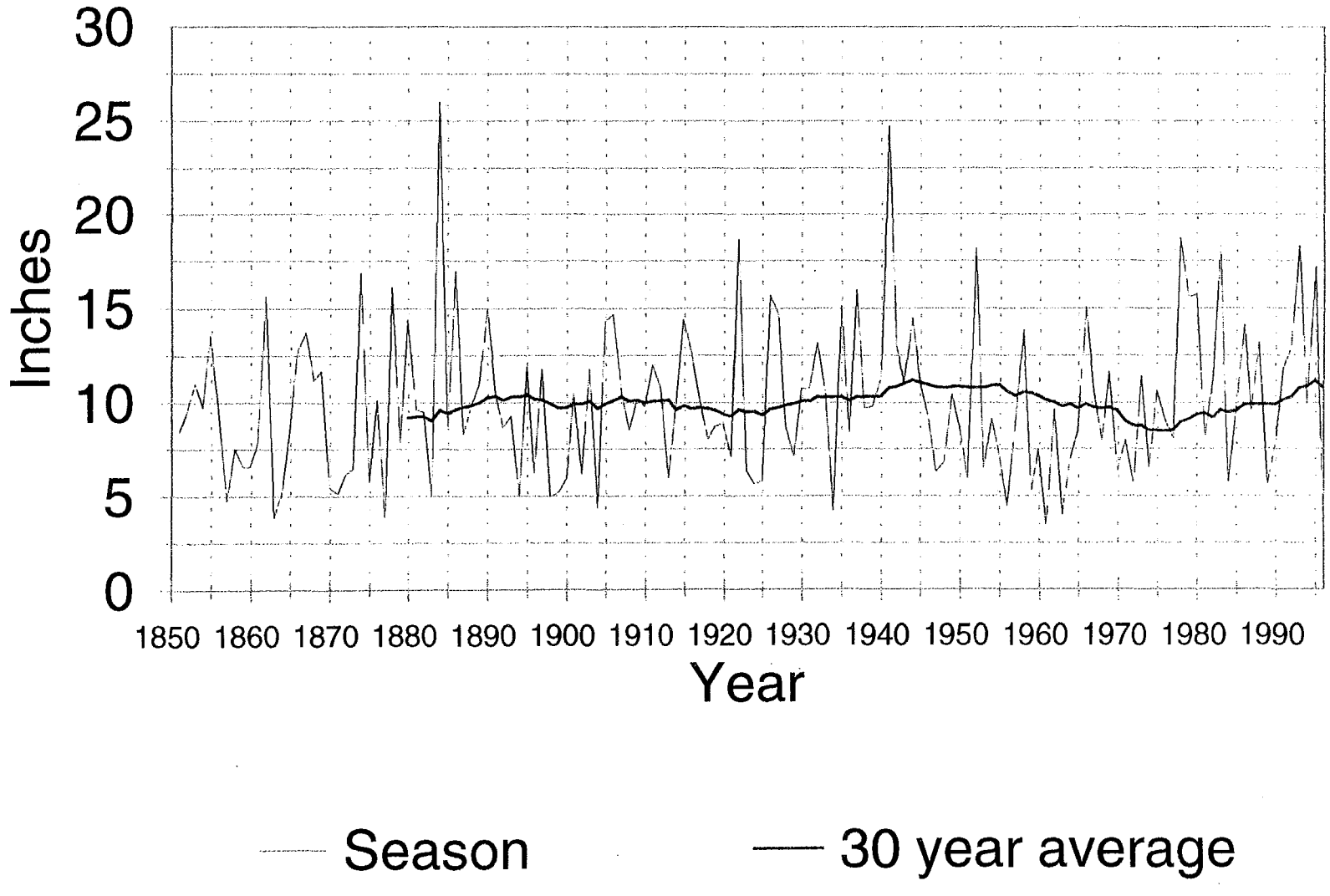

Normal Station Pressure
San Diego, California
30.08
30.06
30.04
30.02
30.00
29.98
29.96
Station Pressure (in. Hg)
January
February
March
0
2
4
6
8
10
12
2
4
6
8
10
12
AM
PM
Time


Normal Station Pressure
San Diego, California
29.98
29.96
29.94
29.92
29.90
29.88
29.86
Station Pressure (in. Hg)
April
May
June
0
2
4
6
8
10
12
2
4
6
8
10
12
AM
PM
Time


Normal Station Pressure
San Diego, California
29.92
29.90
29.88
29.86
29.84
29.82
29.80
Station Pressure (in. Hg)
July
August
September
0
2
4
6
8
10
12
2
4
6
8
10
12
AM
PM
Time


Normal Station Pressure
San Diego, California
30.06
30.04
30.02
30.00
29.98
29.96
29.94
29.92
29.90
Station Pressure (in. Hg)
December
November
October
0
2
4
6
8
10
12
2
4
6
8
10
12
AM
PM
Time

Seasonal Precipitation



MONTHLY AND SEASONAL PRECIPITATION (in inches)

Year	July	August	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	Season
1850-51	0	0	0	0.19	2.82	1.93	0.03	1.51	0.34	0.87	0.71	0.01	8.41
1851-52	0	0	0.02	0.01	0.25	3.74	0.58	1.84	1.87	0.85	0.32	0	9.48
1852-53	0	0.4	0	0.06	1.45	4.5	0.5	0.2	1.52	0.25	2.1	0.05	11.03
1853-54	0	0.21	0	0	1.28	1.77	0.99	2.56	1.88	0.89	0.18	0.01	9.77
1854-55	0.07	1.36	0.09	0.27	0.04	3.29	1.97	3.59	1.3	1.52	0.06	0	13.56
1855-56	0	0.04	0	0.11	2.15	0.41	1.27	1.86	1.59	2.17	0.29	0	9.89
1856-57	0	0	0.07	0	1.22	1.3	0.26	1.76	0	0.04	0.08	0.03	4.76
1857-58	0	0.02	0.01	0.49	2.16	1.3	1.52	0.44	1.24	0.17	0	0.19	7.54
1858-59	0	0.04	0.1	0.47	0.28	3.1	0	1.89	0.2	0.36	0.17	0	6.61
1859-60	0.02	0	0	0.18	1.49	1.79	0.72	1.49	0.15	0.65	0.04	0.05	6.58
1860-61	0.14	0	0	0	2.88	2.99	0.82	0.79	0.05	0.04	0	0.19	7.9
1861-62	0	0	1.59	0.05	1.19	3.2	5.56	1.39	0.97	1.05	0.16	0.48	15.64
1862-63	0.11	0	0	0.89	0.05	0.93	0.32	1.09	0.33	0.13	0.02	0	3.87
1863-64	0	0	0.36	0	0.73	0.04	0.04	2.5	0.2	0.01	1.25	0.01	5.14
1864-65	0.11	0	0	0.04	2.41	1.04	1.28	3	0	0.56	0	0.01	8.45
1865-66	1.29	0	0	0.02	0.52	0.84	5.05	3.43	1.47	0.11	0.09	0	12.82
1866-67	0	0.1	0	0	0.24	1.82	2.32	0.85	7.88	0.48	0.04	0	13.73
1867-68	0	0.3	0	0.34	0.45	3.06	3.37	1.63	0.73	1.2	0.15	0	11.23
1868-69	0.51	0	0.05	0	2	1.52	2.88	1.88	1.98	0.53	0.33	0	11.68
1869-70	0.05	0	0	0.05	2.32	0.94	0.54	0.77	0.33	0.2	0.28	0	5.48
1870-71	0.04	0.07	0	1.54	0.18	0.42	0.52	1.35	0.01	0.7	0.34	0	5.17
1871-72	0	0	0	0	1.33	1.39	0.99	1.63	0.46	0.26	0.12	0	6.18
1872-73	0	0.18	0	0	0	1.43	0.44	4.21	0.11	0.1	0.03	0	6.5
1873-74	0	1.95	0	0	0.77	5.46	3.11	3.73	1.2	0.34	0.32	0	16.88
1874-75	0.12	0	0.13	0.53	0.88	0.55	2.38	0.37	0.45	0.12	0.2	0.02	5.75
1875-76	0	0.21	0.39	0	2.25	0.41	2.47	2.44	1.78	0.06	0.05	0.05	10.11
1876-77	0.03	0.06	0.03	0.08	0.04	0.15	1.05	0.18	1.44	0.26	0.43	T	3.75
1877-78	0	0	T	0.81	0.06	3.89	1.45	4.83	1.41	2.91	0.58	0.16	16.1
1878-79	0	T	0	0.96	T	1.57	3.54	1.04	0.1	0.6	T	0.07	7.88

T indicates a trace - unmeasurable

MONTHLY AND SEASONAL PRECIPITATION (in inches)

Year	July	August	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	Season
1879-80	0	0	0	0.29	2.77	6.32	0.61	1.5	1.43	1.34	0.06	0.06	14.38
1880-81	0.09	0.32	0	0.53	0.28	4.15	0.52	0.45	1.88	1.35	0.04	0.05	9.66
1881-82	0	0.01	0.04	0.24	0.12	0.3	4.53	2.55	1.02	0.45	0.18	0.07	9.51
1882-83	0	T	0.01	0.41	0.39	0.13	1.09	0.95	0.41	0.31	1.14	0.08	4.92
1883-84	0	0	0	2.01	0.2	1.82	1.34	9.05	6.23	2.84	2.17	0.31	25.97
1884-85	0	T	0.07	0.35	0.11	5.12	0.35	0.02	0.78	1.2	0.61	0.06	8.67
1885-86	T	0.13	T	0.31	1.56	0.71	6.95	1.51	3.73	1.95	0.04	0.07	16.96
1886-87	T	T	0	0.05	0.95	0.1	0.04	4.51	0.02	2.14	0.47	0.04	8.32
1887-88	0.01	T	T	T	2.08	1.14	1.96	1.48	2.79	0.1	0.22	0.04	9.82
1888-89	0.01	T	0.04	0.26	1.83	2.84	1.72	1.8	2.2	0.19	0.03	0.1	11.02
1889-90	T	0.04	T	2.12	0.12	7.71	2.79	1.7	0.41	0.05	0.08	0	15.02
1890-91	0	T	0.65	0.01	0.72	1.61	1.21	4.84	0.27	0.76	0.35	0.05	10.47
1891-92	T	0	0.08	0.04	0.1	1.29	1.58	2.96	0.96	0.41	1.15	0.13	8.7
1892-93	0	0.05	T	0.22	0.94	0.69	0.78	0.47	5.5	0.22	0.39	T	9.26
1893-94	T	0	0	0.11	0.91	1.91	0.29	0.49	1.05	0.11	0.09	0.01	4.97
1894-95	0	0.04	0.01	T	0	2.26	7.33	0.53	1.43	0.11	0.19	0	11.9
1895-96	0	0	0.01	0.27	1.19	0.27	1.27	0.02	2.89	0.25	0.03	0.01	6.21
1896-97	T	0.13	T	0.97	0.98	2.18	3.13	2.72	1.53	0.02	0.12	T	11.78
1897-98	0.01	T	T	1.06	0.02	0.32	1.71	0.06	0.91	0.22	0.66	0.02	4.99
1898-99	0	0	0.07	0	0.15	0.87	2.34	0.3	0.85	0.29	0.1	0.27	5.24
1899-1900	0	0.07	0	0.35	0.86	0.65	0.69	0.03	0.53	1.26	1.45	0.08	5.97
1900-01	0	T	T	0.3	1.43	0	2.08	4.77	1.07	0.01	0.77	0.02	10.45
1901-02	T	T	0.06	0.28	0.41	0.02	1.7	1.57	1.86	0.21	0.06	T	6.17
1902-03	0.92	T	T	0.06	1.53	3.58	0.69	2.27	1.17	1.4	0.14	T	11.76
1903-04	0	T	T	0.07	T	0.35	0.04	1.5	2.17	0.15	0.12	0	4.4
1904-05	0	T	T	0.17	0	2.46	2.16	5.9	2.98	0.3	0.35	T	14.32
1905-06	0.16	0	0.5	0.25	3.38	0.38	0.98	2.62	4.68	0.98	0.72	0.03	14.68
1906-07	T	0.1	0.12	0.03	0.62	4.02	3.27	0.45	1.62	0.13	0.07	0.19	10.62
1907-08	0.03	0	0	1.71	0.05	0.43	2.8	2.41	0.61	0.35	0.16	0	8.55
1908-09	0	0.64	0.2	0.15	1	0.27	3.57	1.76	2.62	0.02	T	T	10.23

T indicates a trace - unmeasurable

MONTHLY AND SEASONAL PRECIPITATION (in inches)

Year	July	August	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	Season
1909-10	T	T	0.02	0	2.39	3.76	2	0.19	1.3	0.08	0.05	0	9.79
1910-11	0.01	0.05	0.17	1.35	0.4	0.15	3.35	4.92	0.92	0.65	0.01	0.01	11.99
1911-12	0.12	0	0.1	0.28	0.02	1.39	0.66	0	5.72	2.13	0.17	0.16	10.75
1912-13	0.14	0.26	0	0.89	0.4	0.03	1.19	2.4	0.42	0.08	0.07	0.09	5.97
1913-14	0.06	0.02	0.02	T	2.23	0.72	3.59	1.9	0.36	0.85	0.08	T	9.83
1914-15	0	0	T	1.05	0.86	2.21	4.91	3.62	0.33	1.15	0.28	T	14.41
1915-16	T	0	T	0	0.73	2.6	7.56	0.66	0.98	0.01	0.01	T	12.55
1916-17	0.02	0.01	0.25	0.87	0.05	1.14	4.32	1.84	0.26	1.06	0.31	T	10.13
1917-18	T	T	T	0.17	0.08	T	1.64	1.52	4.57	T	T	0.06	8.04
1918-19	T	0.11	0.08	0.42	1.91	1.68	0.61	1.46	1.83	0.3	0.34	0	8.74
1919-20	T	0.01	0.26	1.04	0.43	0.48	0.43	2.87	2.46	0.47	0.44	0.02	8.91
1920-21	T	0.01	0.08	0.18	0.19	0.54	2.02	0.35	1.13	0.04	2.54	T	7.08
1921-22	T	T	1.24	0.67	0.3	9.26	3.45	1.86	1.34	0.17	0.36	T	18.65
1922-23	0.01	T	0	0.09	0.75	1.21	1.34	1.53	0.34	1.05	0	0.04	6.36
1923-24	0.01	T	0.03	0.37	0.16	1.65	0.26	T	2.41	0.77	0	T	5.66
1924-25	0	T	0	0.35	0.55	1.34	0.08	0.3	1.78	1.11	0.15	0.15	5.81
1925-26	T	0.01	0	3.67	1.16	1.5	0.78	2.33	0.82	5.37	0.01	0.01	15.66
1926-27	T	0.05	0	0.21	0.59	3.89	0.32	6.68	2.05	0.71	0.12	0.12	14.74
1927-28	0	0.01	0.04	1.76	0.05	4.57	0.21	0.79	0.69	0.14	0.36	0.09	8.71
1928-29	T	0.03	T	0.14	0.63	2.42	0.9	1.14	1.22	0.57	0.05	T	7.1
1929-30	0	0	0.26	0	T	0	3.9	0.66	3.02	1.06	1.81	0.02	10.73
1930-31	T	T	T	0.22	1.04	0	3.72	4.11	0.06	1.38	0.24	0.01	10.78
1931-32	T	0.08	T	0.05	1.95	3.56	1.45	5.15	0.42	0.5	0.01	0.01	13.18
1932-33	T	0	0	1.1	0.3	2.4	4.32	0.02	0.13	1.75	0.53	0.08	10.63
1933-34	0.02	0.01	0.02	0.16	0.03	1.1	0.3	1.88	0.24	0.01	0.02	0.47	4.26
1934-35	T	0.02	0.18	0.42	1.95	3.38	2.15	4.54	1.42	1.02	0.02	0	15.1
1935-36	T	0.18	0.01	0.05	0.07	0.74	0.75	5.18	0.92	0.48	T	0.01	8.39
1936-37	0.01	0.28	0.04	1.86	0.44	4.45	1.52	4.22	2.65	0.13	0.32	0.01	15.93
1937-38	0.16	0	T	T	0.02	1.06	0.89	3.26	3.73	0.44	0.15	0.01	9.72
1938-39	T	0.03	0	0.23	0.02	4.25	2.38	1.23	1.17	0.47	0.01	0	9.79

T indicates a trace - unmeasurable

MONTHLY AND SEASONAL PRECIPITATION (in inches)

Year	July	August	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	Season
1939-40	T	T	2.58	0.61	1.04	0.48	1.75	3.56	0.82	0.46	T	T	11.3
1940-41	T	T	0.08	1.5	0.49	6.09	2.03	5.31	5.89	3.35	T	T	24.74
1941-42	0.06	0.03	0.28	2.9	2.23	2.85	0.21	1.06	1.91	1.4	0.11	0.01	13.05
1942-43	0	T	0	0.27	0.27	0.69	6.26	1.4	1.66	0.52	0.02	0.01	11.1
1943-44	0	T	0.04	0.2	0.03	7.6	1.22	3.65	0.8	0.61	0.22	0.1	14.47
1944-45	T	T	T	T	4.93	1.53	0.42	1.91	2.03	0.03	0.04	0.15	11.04
1945-46	T	0.87	0.03	T	0.13	3.62	0.89	0.6	2.67	0.52	0.01	0	9.34
1946-47	0	T	T	0.34	2.53	1.18	0.35	0.43	0.97	0.36	0.17	T	6.33
1947-48	0	0	0.18	0.08	0.72	3.02	T	1.07	1.6	0.13	0.01	0.02	6.83
1948-49	T	0	T	1.32	0.1	2.38	3.56	1.81	0.75	0.09	0.41	T	10.42
1949-50	T	T	T	0.23	1.16	0.86	3.31	1.62	1	0.28	0.09	T	8.55
1950-51	0.08	0	T	0.01	1.23	0.05	1.6	0.5	0.5	1.95	0	T	5.92
1951-52	0	0.85	0.04	0.68	1.23	3.87	4.24	0.6	4.97	1.54	0	0.14	18.16
1952-53	T	T	T	T	1.83	2.2	0.58	0.58	0.79	0.33	0.09	0.14	6.54
1953-54	T	T	T	0.07	0.8	0.03	2.76	1.03	4.31	0.09	0.01	0.03	9.13
1954-55	T	T	0	0	0.74	0.55	3.59	0.56	0.38	0.9	0.49	T	7.21
1955-56	T	0.11	T	T	0.55	0.33	1.65	0.22	T	1.56	0.1	T	4.52
1956-57	T	T	T	0.68	0	0.18	4.8	0.5	0.75	0.84	0.88	0.26	8.89
1957-58	T	T	0.37	1.76	0.59	1.38	0.62	3.15	3.98	1.65	0.4	T	13.9
1958-59	T	T	0.62	0.01	0.44	0.06	0.08	3.76	T	0.31	T	T	5.28
1959-60	T	T	0.04	0.23	0.02	1.44	2.99	1.45	0.55	0.56	0.17	T	7.45
1960-61	T	0	0.06	0.04	1.01	0.22	1.21	0.06	0.85	T	0.01	T	3.46
1961-62	T	0.04	T	0.2	0.79	1.45	2.71	3.08	0.64	0.01	0.62	0.09	9.63
1962-63	T	T	0	0.01	0.01	0.22	0.11	1.22	1.33	0.71	0.09	0.28	3.98
1963-64	0	T	1.9	0.13	1.85	0.1	1.3	0.37	0.97	0.2	0.15	0.08	7.05
1964-65	0	T	0	0.02	1.01	1.17	0.4	0.52	1.79	3.58	T	0.01	8.5
1965-66	0.02	T	0.29	T	5.82	6.6	1.29	0.86	0.17	T	0.02	T	15.07
1966-67	T	0	T	0.8	0.82	3.22	2.2	0	1.14	2.24	0.05	0.16	10.63
1967-68	0.01	0.14	0.08	0	3.53	1.66	0.35	0.22	1.55	0.34	0.08	T	7.96
1968-69	0.13	T	T	0.04	0.36	0.61	4.78	4.34	0.94	0.21	0.17	0.02	11.6

T indicates a trace - unmeasurable

MONTHLY AND SEASONAL PRECIPITATION (in inches)

Year	July	August	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	Season
1969-70	T	0.01	T	0.04	0.79	0.46	0.86	2.58	1.5	0.09	0.01	T	6.34
1970-71	T	0	T	0.07	2.05	2.22	0.3	1.27	0.2	0.93	0.95	0.01	8
1971-72	T	0.03	T	1.66	0.06	3.27	0.07	0.1	T	0.02	0.1	0.38	5.69
1972-73	T	0.02	0.44	0.58	3.16	1.61	1.68	1.63	2.26	0.05	T	T	11.43
1973-74	T	T	0.02	0.01	1.63	0.19	2.96	0.04	1.7	0.02	0.01	0.02	6.6
1974-75	0.01	T	T	1.03	0.14	2.2	0.49	0.96	3.79	2	0.01	0.02	10.65
1975-76	T	T	T	0.09	0.64	0.37	T	5.4	0.99	1.33	0.27	0.02	9.11
1976-77	0.02	0.01	1	0.38	0.75	1.06	2.36	0.06	0.61	0.01	1.79	0.03	8.08
1977-78	T	2.13	T	0.5	0.05	1.67	5.95	2.64	5	0.73	0.04	T	18.71
1978-79	0	T	0.72	0.05	2.09	2.19	5.82	0.85	3.71	0.02	0.09	0.01	15.55
1979-80	0.09	0.01	0	0.73	0.27	0.02	5.58	4.47	2.71	1.18	0.65	0.01	15.72
1980-81	T	0	T	0.05	0	0.31	1.48	2.26	3.74	0.22	0.04	0	8.1
1981-82	T	0	0.03	0.14	1.79	0.54	2.71	0.88	4.74	0.62	0.01	0.04	11.5
1982-83	0	T	0.38	0.05	2.1	1.43	2.1	3.88	6.57	1.74	0.01	T	18.26
1983-84	0.01	0.39	0.21	0.4	1.94	1.53	0.46	0.09	0.04	0.62	0	0.04	5.73
1984-84	0.19	0.06	T	0.29	2.37	4.55	0.52	0.77	0.58	0.32	T	T	9.65
1985-86	0	T	0.2	0.29	4.92	1.06	0.75	2.59	3.12	1.17	0	T	14.1
1986-87	T	0	1.04	1.39	1.16	0.95	1.68	1.53	1.04	0.78	0.03	T	9.6
1987-88	0.03	0.01	0.7	1.74	1.33	2.73	0.89	1.37	0.59	3.71	0.08	0	13.18
1988-89	T	T	T	T	1.39	2.23	0.42	0.7	0.69	0.12	0.04	0.06	5.65
1989-90	0	T	0.23	0.47	0.09	1.01	2.52	1.13	0.25	0.76	0.51	0.87	7.84
1990-91	T	0.01	T	T	0.65	0.59	1.06	2.46	6.96	0.05	0.01	T	11.79
1991-92	0.24	0.01	0.28	0.69	0.05	1.7	1.81	3.34	4.42	0.28	0.07	0.04	12.93
1992-93	0.03	0.05	0	0.18	0.03	2.56	9.09	4.73	1.22	0	0.01	0.41	18.31
1993-94	0.03	T	T	0.22	0.77	0.78	0.7	2.75	3.67	0.93	0.07	T	9.92
1994-95	0.03	0.01	T	0.01	0.46	0.8	8.06	1.93	3.81	0.96	0.59	0.46	17.12
1995-96	0.05	0	T	T	0.3	0.88	1.52	0.88	1.1	0.36	0.02	0	5.11
Averages	0.04	0.09	0.13	0.41	0.98	1.81	1.96	1.91	1.66	0.71	0.26	0.06	10.02

T indicates a trace - unmeasurable

GREATEST DAILY PRECIPITATION

	JANUARY		FEBRUARY		MARCH		APRIL	
DAY	HIGHEST	YEAR	HIGHEST	YEAR	HIGHEST	YEAR	HIGHEST	YEAR
1st	.70	1910	.99	1880	1.64	1981	.77	1958
2nd	1.53	1879	1.64	1905	1.95	1992	.51	1880
3rd	.62	1917	1.52	1884	1.32	1896	.55	1965
4th	2.24	1995	1.13	1935	.80	1876	.75	1926
5th	.99	1992	1.13	1935	1.18	1981	3.23	1926
6th	1.19	1993	2.71	1937	1.44	1975	1.13	1986
7th	1.27	1957	.78	1983	2.11	1952	.57	1965
8th	.96	1931	1.71	1976	1.33	1968	1.21	1965
9th	1.02	1980	2.39	1901	.79	1884	.82	1912
10th	1.76	1911	1.21	1915	.98	1980	1.03	1952
11th	1.56	1886	.86	1959	1.77	1995*	1.18	1941
12th	2.49	1882	1.03	1931	1.10	1941	.83	1956
13th	1.29	1952	1.01	1878	1.28	1941	.28	1886
14th	2.12	1978	1.84	1927	1.39	1942*	.69	1988
15th	1.80	1993	1.96	1887	1.40	1930	.82	1878
16th	1.12	1993	1.67	1932	1.32	1958	.86	1917
17th	1.55	1916	1.31	1884	2.03	1982	.61	1903
18th	1.35	1874	.81	1980	.57	1886	.42	1983
19th	2.15	1895	1.47	1993	1.15	1991	.70	1881
20th	1.37	1962	1.41	1980	.98	1919	1.42	1988
21st	1.67	1915	1.03	1959	1.83	1893	1.33	1988
22nd	1.53	1967	1.50	1941	1.39	1954	.46	1914
23rd	2.23	1943	1.09	1891	.81	1904	.25	1980
24th	.62	1941	1.17	1873	2.36	1906	.28	1967
25th	1.99	1995	.90	1889	.67	1991	.86	1951
26th	2.04	1914	1.14	1902	.98	1991	1.06	1931
27th	2.19	1916	1.61	1911	.92	1991	.80	1885
28th	1.32	1915	1.64	1970	.99	1896	1.34	1933
29th	1.92	1980	.75	1888	.47	1925	.46	1983
30th	.80	1966			1.00	1946	.88	1930
31st	2.57	1979			1.18	1941		

* last of several occurrences

GREATEST DAILY PRECIPITATION

	MAY		JUNE		JULY		AUGUST	
DAY	HIGHEST	YEAR	HIGHEST	YEAR	HIGHEST	YEAR	HIGHEST	YEAR
1st	.54	1980	.25	1899	.03	1994	.01	1991*
2nd	.23	1905	.05	1944*	.05	1902	.03	1971
3rd	.95	1892	.13	1952	.02	1912	T	1955*
4th	.85	1900	.12	1945	T	1980*	.02	1961
5th	1.01	1921	.38	1993	.01	1986	.05	1926
6th	.31	1921	.29	1934	.03	1968	.02	1983
7th	.32	1971	.07	1879	.02	1992	.15	1983
8th	1.49	1977	.03	1878	.08	1950	.25	1936
9th	.22	1893	.38	1990	T	1959*	.64	1908
10th	.38	1933	.49	1990	.09	1996	.03	1945*
11th	.42	1957	.26	1963	.02	1880	.15	1873
12th	.69	1883	.14	1967	T	1958*	1.80	1873
13th	.28	1955	.15	1884	T	1990*	.05	1992
14th	.40	1884	.05	1878	.16	1905	.17	1983
15th	1.05	1884	.13	1995	.07	1880	.07	1918
16th	.07	1921	.17	1995	.05	1995	1.44	1977
17th	.29	1883	.14	1995	.12	1912	.69	1977
18th	.17	1922	.08	1953	.01	1922*	.83	1945
19th	.44	1887	.02	1928*	T	1994*	.01	1933
20th	.25	1878	.28	1972	.09	1979	.08	1906
21st	.58	1921	.01	1982	.02	1911	T	1975*
22nd	.36	1921	.04	1992	.09	1874	T	1924
23rd	.17	1882	.01	1918	T	1954*	T	1959*
24th	.07	1917	.03	1918	T	1990*	.13	1885
25th	.19	1931	.03	1913	.83	1902	.18	1935
26th	.10	1942	.01	1952*	.05	1941	.01	1994*
27th	.10	1962	.02	1913	.13	1984	.04	1894
28th	.49	1990	.06	1925	.10	1968	.76	1951
29th	.20	1877	.16	1912	.14	1937	.11	1912
30th	.09	1884	T	1972*	.01	1923	.21	1875
31st	.11	1925			.23	1991	.14	1967

* last of several occurrences

GREATEST DAILY PRECIPITATION

	SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
DAY	HIGHEST	YEAR	HIGHEST	YEAR	HIGHEST	YEAR	HIGHEST	YEAR
1st	.02	1909	.44	1921	.30	1995	.94	1889
2nd	T	1950*	.23	1916	.44	1875	1.06	1925
3rd	.07	1884	.55	1914	.14	1960	1.03	1928
4th	.86	1963	2.95	1925	.28	1957	2.52	1873
5th	.44	1939	.55	1925	1.69	1905	1.34	1966
6th	.65	1939	.35	1912	.62	1905	.73	1966
7th	.37	1957	.57	1939	.77	1931	1.15	1992
8th	.16	1982	.24	1889	.52	1946	1.66	1884*
9th	.09	1976	.74	1932	2.68	1879	1.53	1926
10th	.87	1976	.91	1986	.96	1949	2.56	1943
11th	.02	1939*	.51	1987	1.96	1944	1.22	1943
12th	.30	1939	.45	1941	1.71	1941	1.01	1943
13th	.28	1941	1.54	1889	1.11	1950	.85	1902
14th	.29	1875	.78	1887	1.12	1944	1.18	1889
15th	.12	1906	.96	1878	1.07	1965	2.35	1938
16th	.07	1965	.68	1971	1.25	1965	1.36	1987
17th	.48	1963	.72	1971	1.08	1986	1.76	1902
18th	.41	1963	1.00	1948	.58	1973	1.93	1921
19th	.19	1939	.23	1949*	.70	1913	.75	1970
20th	.24	1991	.59	1979	1.46	1963	2.09	1921
21st	.07	1947	.32	1976	1.22	1967	1.07	1921
22nd	.70	1987	.91	1941	1.53	1965	2.60	1945
23rd	.14	1958	.88	1941	1.75	1887	2.31	1940
24th	.48	1958	1.00	1919	.62	1984	1.47	1940
25th	.90	1986	.80	1940	2.04	1985	1.50	1921
26th	.13	1919	.44	1991	.95	1909	1.90	1921
27th	.15	1890	1.82	1883	.75	1939	2.15	1879
28th	.16	1905	.60	1974*	1.32	1981	1.01	1989*
29th	.37	1890	.43	1974	.92	1970	1.38	1879
30th	1.23	1921	.68	1957	.33	1982	1.96	1951
31st			1.01	1927			.81	1904

* last of several occurrences

NUMBER OF CONSECUTIVE DAYS WITH NO MEASURABLE PRECIPITATION

Days	Year	Time Period	# of Traces
165	1988	May 30 to November 10	11
164	1915	May 25 to November 4	4
164	1924	April 25 to October 5	5
161	1893	May 14 to October 21	2
153	1914	May 2 to October 1	10
152	1949	May 20 to October 18	15
149	1954	June 14 to November 9	12
148	1956	May 28 to October 22	9
147	1944	June 11 to November 4	13
145	1966	May 12 to October 3	9
139	1917	May 30 to October 15	12
138	1959	April 27 to September 11	5
136	1877	May 30 to October 12	2
135	1909	April 19 to August 31	6
133	1952	June 27 to November 6	12
131	1904	May 27 to October 4	3
128	1903	May 26 to September 30	4
128	1940	April 28 to September 2	12
128	1970	May 28 to October 2	12
127	1946	May 27 to September 30	3

YEARS THAT MEASURABLE PRECIPITATION FELL EVERY MONTH

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1854	.99	2.56	1.88	.89	.18	.01	.07	1.36	.09	.27	.04	3.29	11.63
1876	2.47	2.44	1.78	.06	.05	.05	.03	.06	.03	.08	.04	.15	7.24
1933	4.32	.02	.13	1.75	.53	.08	.02	.01	.02	.16	.03	1.10	8.17

MAXIMUM MONTHLY PRECIPITATION WITH FOUR INCHES OR MORE

Amount	Date	Amount	Date	Amount	Date
9.26	December 1921	5.58	January 1980	4.68	March 1906
9.09	January 1993	5.56	January 1862	4.57	December 1927
9.05	February 1884	5.50	March 1893	4.57	March 1918
8.06	January 1995	5.46	December 1873	4.55	December 1984
7.88	March 1867	5.40	February 1976	4.54	February 1935
7.71	December 1889	5.37	April 1926	4.53	January 1882
7.60	December 1943	5.31	February 1941	4.51	February 1887
7.56	January 1916	5.18	February 1936	4.50	December 1852
7.33	January 1895	5.15	February 1932	4.47	February 1980
6.96	March 1991	5.12	December 1884	4.45	December 1936
6.95	January 1886	5.05	January 1866	4.42	March 1992
6.68	February 1927	5.00	March 1978	4.34	February 1969
6.60	December 1965	4.97	March 1952	4.32	January 1933
6.57	March 1983	4.93	November 1944	4.32	January 1917
6.32	December 1879	4.92	November 1985	4.31	March 1954
6.26	January 1943	4.92	February 1911	4.25	December 1938
6.23	March 1884	4.91	January 1915	4.24	January 1952
6.09	December 1940	4.84	February 1891	4.22	February 1937
5.95	January 1978	4.83	February 1878	4.21	February 1873
5.90	February 1905	4.80	January 1957	4.15	December 1880
5.89	March 1941	4.78	January 1969	4.11	February 1931
5.82	January 1979	4.77	February 1901	4.02	December 1906
5.82	November 1965	4.74	March 1982		
5.72	March 1912	4.73	February 1993		

GREATEST RAINFALL FOR A CALENDAR DAY

Amount	Date	Amount	Date
3.23	April 5, 1926	2.04	January 26, 1914 November 25, 1985
2.95	October 4, 1925	2.03	February 17, 1982
2.71	February 6, 1937	2.01	January 14, 1969
2.68	November 9, 1879	1.99	January 25, 1995
2.60	December 22, 1945	1.96	February 15, 1887 November 11, 1944 December 30, 1951
2.57	January 31, 1979	1.95	March 2, 1992
2.56	December 10, 1943	1.93	December 18, 1921
2.52	December 4, 1873	1.92	January 29, 1980
2.49	January 12, 1882	1.90	December 26, 1921
2.39	February 9, 1901	1.85	January 29, 1950
2.36	March 24, 1906	1.84	February 14, 1927
2.35	December 15, 1938	1.83	March 21, 1893
2.31	December 23, 1940	1.82	October 27, 1883
2.24	January 4, 1995	1.80	August 12, 1873 January15, 1993
2.23	January 23, 1943	1.79	December 20, 1879
2.19	January 27, 1916	1.77	March 11, 1918 March 11, 1995
2.15	January 19, 1895 December 27, 1879 December 10, 1965	1.76	January 10, 1911 February 6, 1935 December 17, 1902
2.12	January 14, 1978	1.75	January 15, 1895 November 23, 1887 December 15, 1889
2.11	March 7, 1952	1.73	February 15, 1927
2.09	December 20, 1921	1.71	February 8, 1976 November 12, 1941

PRECIPITATION STATISTICS BY THE MONTH (in inches)

	January	February	March	April	May	June
Greatest Daily Precipitation	2.49 on the 12th in 1882	2.71 on the 6th in 1937	2.36 on the 24th in 1906	3.23 on the 5th in 1926	1.49 on the 8th in 1977	.29 on the 6th in 1934
Normal for the Month	1.80	1.43	1.60	.78	.24	.06
Maximum Monthly Precipitation	9.09 in 1993	9.05 in 1884	7.88 in 1867	5.37 in 1926	2.54 in 1921	.87 in 1990
Minimum Monthly Precipitation	0 in 1850 and 1859	0 in 1912 and 1967	0 in 1865 and 1857	T in 1918, 1961, and 1966	0 in 1952 and 1984	0 in 1946*
Normal Seasonal[1] through the Month	5.55	7.08	8.85	9.64	9.83	9.90
Maximum Seasonal[1] through the Month	14.92 in 1921-22	16.78 in 1921-22	21.39 in 1940-41	24.74 in 1940-41	25.66 in 1883-84	25.97 in 1883-84
Minimum Seasonal[1] through the Month	0.35 in 1962-63	1.57 in 1962-63	2.86 in 1955-56	3.32 in 1876-77	3.46 in 1960-61	3.46 in 1960-61
Greatest in 5 minutes	.26 on the 5th in 1935	.27 on the 14th in 1981*	.33 on the 1st in 1983*	.28 on the 8th in 1926	.19 on the 4th in 1930	.09 on the 6th in 1934
Greatest in 10 minutes	.36 on the 5th in 1935	.49 on the 14th in 1927	.48 on the 9th in 1926	.35 on the 5th in 1926	.21 on the 8th in 1977*	.16 on the 6th in 1934
Greatest in 15 minutes	.49 on the 10th in 1955	.63 on the 14th in 1927	.59 on the 9th in 1926	.47 on the 5th in 1926	.25 on the 8th in 1977	.17 on the 6th in 1934
Greatest in 30 minutes	.68 on the 10th in 1955	.76 on the 14th in 1927	.94 on the 15th in 1905	.75 on the 5th in 1926	.33 on the 8th in 1977	.17 on the 6th in 1934
Greatest in 60 minutes	.87 on the 19th in 1933	1.12 on the 28th in 1970	1.21 on the 7th in 1952	1.16 on the 5th in 1926	.46 on the 8th in 1977	.19 on the 6th in 1934
Greatest in 2 hours	1.06 on the 10th in 1096	1.50 on the 28th in 1970	1.64 on the 7th in 1952	2.09 on the 5th in 1926	.62 on the 8th in 1977	.39 on the 10th in 1990
Greatest in 24 hours	2.65 on the 14-15 in 1978*	2.90 on the 6-7 in 1937	2.40 on 7-8 in 1952 and 24-25 in 1906	3.23 on the 5th in 1926	1.50 on 8-9 in 1977	.38 on 5-6 in 1934

* Last of Several Occurrences

[1] The season begins on July 1st

PRECIPITATION STATISTICS BY THE MONTH (in inches)

	July	August	September	October	November	December
Greatest Daily Precipitation	.83 on the 25th in 1902	1.80 on the 12th in 1873	1.23 on the 30th in 1921	2.95 on the 4th in 1925	2.68 on the 9th in 1879	2.60 on the 22nd in 1945
Normal for the Month	.01	.11	.19	.33	1.10	1.36
Maximum Monthly Precipitation	1.29 in 1865	2.13 in 1977	2.58 in 1939	3.67 in 1925	5.82 in 1965	9.26 in 1921
Minimum Monthly Precipitation	0 in 1978*	0 in 1970*	0 in 1964*	0 in 1967*	0 in 1956*	0 in 1930*
Normal Seasonal[1] through the Month	.02	.12	.36	.73	2.18	3.75
Maximum Seasonal[1] through the Month	1.29 in 1865	2.14 in 1977	2.58 in 1939	3.68 in 1925	6.13 in 1965	12.73 in 1965
Minimum Seasonal[1] through the Month	0 in 1978*	0 in 1995*	0 in 1883*	0 in 1871	.02 in 1962	.24 in 1962
Greatest in 5 minutes	.07 on the 25th in 1902	.15 on the 14th in 1983	.20 on the 22nd in 1905	.20 on the 10th in 1966	.32 on the 21st in 1967	.31 on the 1st in 1947
Greatest in 10 minutes	.12 on the 25th in 1902	.16 on the 14th in 1983	.34 on the 7th in 1957	.28 on the 10th in 1966	.51 on the 21st in 1967	.47 on the 20th in 1921
Greatest in 15 minutes	.15 on the 25th in 1902	.16 on the 14th in 1983	.35 on the 7th in 1957	.40 on the 7th in 1939	.65 on the 27th in 1939	.54 on the 10th in 1965
Greatest in 30 minutes	.20 on the 25th in 1902	.31 on the 16th in 1977	.36 on the 7th in 1957	.41 on the 7th in 1939	.81 on the 21st in 1967	.85 on the 10th in 1965
Greatest in 60 minutes	.25 on the 25th in 1902	.48 on the 16th in 1977	.41 on the 24th in 1958	.57 on the 10th in 1966	.95 on the 21st in 1967	1.36 on the 10th in 1965
Greatest in 2 hours	Incom-plete data	.63 on the 16th in 1977	.55 on the 25th in 1986	.83 on the 10th in 1986	1.11 on the 21st in 1967	1.77 on the 10th in 1965
Greatest in 24 hours	.83 on the 24-25 in 1902	2.13 on the 16-17 in 1977	1.50 on 9/30-10/1 in 1921	3.24 on 4-5 in 1925	2.75 on the 9-10 in 1879	3.62 on the 23-24 in 1940

* Last of Several Occurrences

[1] The season begins on July 1st

RETURN PERIOD[1] - MAXIMUM PRECIPITATION

Return Period in Years	5 Minutes	10 Minutes	15 Minutes	30 Minutes	1 Hour	2 Hours	24 Hours
2	.17	.25	.31	.42	.54	.70	1.62
5	.23	.34	.43	.59	.76	1.01	2.23
10	.27	.40	.50	.70	.91	1.21	2.63
20	.30	.46	.58	.81	1.05	1.40	3.02
25	.31	.48	.60	.84	1.09	1.46	3.14
40	.34	.51	.65	.91	1.18	1.58	3.39
50	.35	.53	.67	.94	1.22	1.64	3.50
100	.38	.59	.74	1.04	1.35	1.82	3.86
200	.41	.64	.81	1.14	1.47	1.99	4.21
1,000	.49	.76	.97	1.36	1.76	2.39	5.01
10,000	.59	.92	1.18	1.67	2.16	2.94	6.11
Theoretical Max Ever	1.10	1.75	2.25	3.19	4.13	5.67	11.60

[1] A return period is defined as a statistical parameter used in frequency analysis as a measure of the average time interval between the occurrence of a given quantity and that of an equal or greater quantity.

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR JANUARY

2.0 INCHES OR MORE				LESS THAN OR EQUAL TO .50	
Amount	**Date**	**Amount**	**Date**	**Amount**	**Date**
9.09	1993	3.37	1868	.50	1853
8.06	1995	3.35	1911	.49	1975
7.56	1916	3.31	1950	.46	1984
7.33	1895	3.27	1907	.44	1873
6.95	1886	3.13	1897	.43	1920
6.26	1943	3.11	1874	.42	1945, 1989
5.95	1978	2.99	1960	.40	1965
5.82	1979	2.96	1974	.35	1885, 1947, 1968
5.58	1980	2.88	1869	.32	1863, 1927
5.56	1862	2.80	1908	.30	1934, 1971
5.05	1866	2.79	1890	.29	1894
4.91	1915	2.76	1954	.26	1857, 1924
4.80	1957	2.71	1962, 1982	.21	1928, 1942
4.78	1969	2.52	1989	.11	1963
4.53	1882	2.47	1876	.08	1925, 1959
4.32	1917,	2.38	1875, 1939	.07	1972
	1933	2.36	1977	.04	1887, 1904, 1864
4.24	1952	2.34	1899	.03	1851
3.90	1930	2.20	1967	T	1948, 1976
3.72	1931	2.16	1905	.00	1850, 1859
3.59	1914,	2.15	1935		
	1955	2.10	1983		
3.57	1909	2.08	1901		
3.56	1949	2.03	1941		
3.54	1879	2.02	1921		
3.45	1922	2.00	1910		

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR FEBRUARY

2.0 INCHES OR MORE				LESS THAN OR EQUAL TO .50	
Amount	Date	Amount	Date	Amount	Date
9.05	1884	3.56	1940	.50	1951, 1957
6.68	1927	3.43	1866	.45	1881, 1907
5.90	1905	3.34	1992	.44	1858
5.40	1976	3.26	1938	.43	1947
5.31	1941	3.15	1958	.37	1875, 1964
5.18	1936	3.08	1962	.35	1921
5.15	1932	3.00	1865	.30	1899, 1925
4.92	1911	2.96	1892	.22	1956, 1958
4.84	1891	2.87	1920	.20	1853
4.83	1878	2.75	1994	.19	1910
4.77	1901	2.72	1897	.18	1877
4.73	1993	2.64	1978	.10	1972
4.54	1935	2.62	1906	.09	1984
4.51	1887	2.59	1986	.06	1898, 1961, 1977
4.47	1980	2.58	1970	.04	1974
4.34	1969	2.56	1854	.03	1900
4.22	1937	2.55	1882	.02	1885, 1896, 1933
4.21	1873	2.50	1864	T	1924
4.11	1931	2.46	1991	.00	1912, 1967
3.88	1983	2.44	1876		
3.76	1959	2.41	1908		
3.73	1874	2.40	1913		
3.65	1944	2.33	1926		
3.62	1915	2.27	1903		
3.59	1855	2.26	1981		

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR MARCH

1.50 INCHES OR MORE				LESS THAN OR EQUAL TO .50	
Amount	Date	Amount	Date	Amount	Date
7.88	1867	2.67	1946	.50	1951
6.96	1991	2.65	1937	.46	1872
6.57	1983	2.62	1909	.45	1875
6.23	1884	2.46	1920	.42	1913, 1932
5.89	1941	2.41	1924	.41	1883, 1890
5.72	1912	2.26	1973	.38	1955
5.50	1893	2.20	1889	.36	1915
5.00	1978	2.17	1904	.34	1851, 1923
4.97	1952	2.05	1927	.33	1863, 1870, 1915
4.74	1982	2.03	1945	.27	1891
4.68	1906	1.98	1869	.26	1917
4.57	1918	1.91	1942	.25	1990
4.42	1992	1.88	1854, 1881	.24	1934
4.31	1954	1.87	1852	.20	1859, 1864, 1971
3.98	1958	1.86	1902	.17	1966
3.81	1995	1.83	1919	.15	1860
3.79	1975	1.79	1965	.13	1933
3.74	1981	1.78	1876, 1925	.11	1873
3.73	1886, 1938	1.70	1974	.10	1879
3.71	1979	1.66	1943	.06	1931
3.67	1994	1.62	1907	.05	1861
3.12	1986	1.60	1948	.04	1984
3.02	1930	1.59	1856	.02	1877
2.98	1905	1.55	1968	.01	1871
2.89	1896	1.53	1897	T	1956, 1959, 1972
2.79	1888	1.52	1853	.00	1857, 1865
2.71	1980	1.50	1970		

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR APRIL

.75 INCH OR MORE				LESS THAN OR EQUAL TO .20	
Amount	Date	Amount	Date	Amount	Date
5.37	1926	1.33	1976	.20	1870, 1964
3.71	1988	1.26	1900	.19	1889
3.58	1965	1.20	1868, 1885	.17	1858, 1922
3.35	1941	1.18	1980	.15	1904
2.91	1878	1.17	1986	.14	1928
2.84	1884	1.15	1915	.13	1863, 1907, 1937, 1948
2.24	1967	1.11	1925	.12	1875, 1989
2.17	1856	1.06	1917, 1930	.11	1866, 1894, 1895
2.14	1887	1.05	1862, 1923	.10	1873, 1888
2.13	1912	1.02	1935	.09	1850, 1949, 1954, 1970
2.00	1975	.98	1906	.08	1910, 1913
1.95	1886, 1951	.96	1995	.06	1876
1.75	1933	.93	1971, 1994	.05	1890, 1973, 1991
1.74	1983	.90	1955	.04	1857, 1861, 1921
1.65	1958	.89	1854	.03	1945
1.56	1956	.87	1851	.02	1897, 1909, 1972, 1979
1.54	1952	.85	1852, 1914	.01	1864, 1901, 1916, 1977
1.52	1855	.84	1957	T	1918, 1961, 1966
1.40	1903, 1942	.78	1987	.00	1993
1.38	1931	.77	1924		
1.35	1881	.76	1891, 1990		
1.34	1880				

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR MAY

.25 INCH OR MORE				LESS THAN .02	
Amount	**Date**	**Amount**	**Date**	**Amount**	**Date**
2.54	1921	.58	1878	.01	1911, 1916, 1926, 1932, 1939, 1946, 1948, 1954, 1961, 1970, 1974, 1975, 1982, 1983, 1991, 1993
2.17	1884	.53	1933		
2.10	1853	.51	1990		
1.81	1930	.49	1955	T	1879, 1909, 1918, 1936, 1940, 1941, 1959, 1965, 1973, 1985
1.79	1977	.47	1887		
1.45	1900	.44	1920	.00	1850, 1858, 1861, 1865, 1923, 1924, 1951, 1952,1984, 1986
1.25	1864	.43	1877		
1.15	1892	.41	1949		
1.14	1883	.40	1958		
.95	1971	.39	1893		
.88	1957	.36	1922, 1928		
.77	1901	.35	1891, 1905		
.72	1906	.34	1871, 1919		
.71	1851	.33	1869		
.66	1898	.32	1852, 1874, 1937		
.65	1980	.31	1917		
.62	1962	.29	1856		
.61	1885	.28	1870, 1915		
.59	1995	.27	1976		

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR JUNE

.05 INCH OR MORE		LESS THAN .02	
Amount	**Date**	**Amount**	**Date**
.87	1990	.01	1851, 1854, 1864, 1865, 1894, 1896, 1911, 1926, 1931, 1932, 1936, 1937, 1938, 1942, 1943, 1965, 1971, 1979, 1983
.68	1850		
.48	1862		
.47	1934	T	1877, 1893, 1897, 1902, 1903, 1905, 1909 1914, 1915, 1916, 1917, 1921, 1922, 1924, 1929, 1940, 1941, 1947, 1949, 1950, 1951, 1955, 1956, 1958, 1959, 1960, 1961, 1966, 1968, 1970, 1973, 1978, 1983, 1985, 1986, 1987, 1991, 1994
.46	1995		
.41	1993		
.38	1972		
.31	1884		
.28	1963		
.27	1899	.00	1852, 1855, 1856, 1859, 1863, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1890, 1895, 1904, 1908, 1910, 1919, 1935, 1939, 1946, 1981, 1988
.26	1957		
.19	1858, 1861, 1907		
.16	1878, 1912, 1967		
.15	1925, 1945		
.14	1952, 1953		
.13	1892		
.12	1927		
.10	1889, 1944		
.09	1913, 1928, 1962		
.08	1883, 1900, 1933, 1964		
.07	1879, 1882, 1886		
.06	1880, 1885, 1918, 1989		
.05	1853, 1860, 1876, 1881, 1891		

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR JULY[1]

.10 INCH OR MORE		LESS THAN .10	
Amount	**Date**	**Amount**	**Date**
1.29	1865	.09	1880, 1979, 1996
.92	1902	.08	1950
.51	1868	.07	1854
.24	1991	.06	1913, 1941
.19	1984	.05	1869, 1995
.16	1905, 1937	.04	1870
.14	1860, 1912	.03	1876, 1907, 1987, 1992, 1993, 1994
.13	1968	.02	1859, 1916, 1933, 1965, 1976
.12	1874, 1911	.01	1887, 1888, 1897, 1910, 1922, 1923, 1936, 1967,1974, 1983, 1986
.11	1862, 1864		

[1] - This is all of the measurable precipitation for July

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR AUGUST[1]

.50 INCH OR MORE		LESS THAN .50	
Amount	**Date**	**Amount**	**Date**
2.13	1977	.40	1852
1.95	1873	.39	1983
1.36	1854	.32	1880
.87	1945	.30	1867
.85	1951	.28	1936
.64	1908	.26	1912
		.21	1853, 1875
		.18	1872, 1935
		.14	1967
		.13	1885, 1896
		.11	1918, 1955
		.10	1866, 1906
		.08	1931
		.07	1870, 1899
		.06	1876, 1984
		.05	1892, 1910, 1926, 1992
		.04	1855, 1858, 1889, 1894, 1961
		.03	1928, 1938, 1941, 1971
		.02	1857, 1913, 1934, 1972
		.01	1881, 1916, 1919, 1920, 1925, 1927, 1933, 1969, 1976. 1979, 1987, 1990, 1991, 1994, 1995

[1] - This is all of the measurable precipitation for August

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR SEPTEMBER

.10 INCH OR MORE		LESS THAN .10	
Amount	**Date**	**Amount**	**Date**
2.58	1939	.09	1854
1.90	1963	.08	1891, 1918, 1920, 1940, 1967
1.59	1861	.07	1856, 1884, 1898
1.24	1921	.06	1901, 1960
1.04	1986	.05	1868
1.00	1976	.04	1881, 1888, 1927, 1936, 1943, 1951, 1959
.72	1978	.03	1876, 1923, 1945, 1981
.70	1987	.02	1851, 1909, 1913, 1933,1973
.65	1890	.01	1857, 1882, 1894, 1895, 1935
.62	1958		
.50	1905		
.44	1972		
.39	1875		
.38	1982		
.37	1957		
.36	1863		
.29	1965		
.28	1941, 1991		
.26	1919, 1929		
.25	1916		
.23	1989		
.21	1983		
.20	1908, 1985		
.18	1934, 1947		
.17	1910		
.13	1874		
.12	1906		
.10	1858, 1911		

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR OCTOBER

.25 INCH OR MORE				LESS THAN .01	
Amount	Date	Amount	Date	Amount	Date
3.67	1925	.73	1979	.00	1853, 1856, 1860, 1863, 1866, 1868, 1871, 1872, 1873, 1875, 1898, 1909, 1915, 1929, 1954, 1967
2.90	1941	.69	1991		
2.12	1889	.68	1951, 1956		
2.01	1883	.67	1921		
1.86	1936	.61	1939	Trace	1887, 1894, 1913, 1937, 1944, 1945, 1952, 1955, 1965, 1988, 1990, 1995
1.76	1927, 1957	.58	1972		
1.74	1987	.53	1874, 1880		
1.71	1907	.50	1977		
1.66	1971	.49	1857		
1.54	1870	.47	1858, 1989		
1.50	1940	.42	1918, 1934		
1.39	1986	.41	1882		
1.35	1910	.40	1983		
1.32	1948	.38	1976		
1.10	1932	.37	1923		
1.06	1897	.35	1884, 1899, 1924		
1.05	1914	.34	1867, 1946		
1.04	1919	.31	1885		
1.03	1974	.30	1900		
.97	1896	.29	1879, 1985, 1984		
.96	1878	.28	1901, 1911		
.89	1862, 1912	.27	1854, 1895, 1942		
.87	1916	.26	1888		
.81	1877	.25	1905		
.80	1966				

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR NOVEMBER

ONE INCH OR MORE				LESS THAN .10	
Amount	Date	Amount	Date	Amount	Date
5.82	1965	1.95	1931, 1934	.10	1891, 1948
4.93	1944	1.94	1983	.09	1989
4.92	1985	1.91	1918	.08	1917
3.53	1967	1.85	1963	.07	1935
3.38	1905	1.83	1888, 1952	.06	1877, 1971
3.16	1972	1.79	1981	.05	1862, 1907, 1916, 1927,
2.88	1860	1.63	1973		1977, 1991
2.82	1850	1.56	1885	.04	1854, 1876
2.77	1879	1.53	1902	.03	1933, 1943, 1992
2.53	1946	1.49	1859	.02	1897, 1911, 1937, 1938,
2.41	1864	1.45	1852		1959
2.39	1909	1.43	1900	.01	1962
2.37	1984	1.39	1988	T	1878, 1903, 1929
2.32	1869	1.33	1871, 1987	.00	1872, 1894, 1904, 1956,
2.25	1875	1.28	1853		1980
2.23	1913, 1941	1.23	1950, 1951		
2.16	1857	1.22	1856		
2.15	1855	1.19	1861, 1895		
2.10	1982	1.16	1925, 1949, 1986		
2.09	1978	1.04	1930, 1939		
2.08	1887	1.01	1960, 1964		
2.05	1970	1.00	1908		
2.00	1868				

SIGNIFICANT MAXIMUM AND MINIMUM MONTHLY RAINFALL FOR DECEMBER

2.0 INCHES OR MORE				LESS THAN .10	
Amount	Date	Amount	Date	Amount	Date
9.26	1921	3.27	1971	.10	1886, 1963
7.71	1889	3.22	1966	.06	1958
7.60	1943	3.20	1861	.05	1950
6.60	1965	3.10	1858	.04	1863
6.32	1879	3.06	1867	.03	1912, 1953
6.09	1940	3.02	1947	.02	1901, 1979
5.46	1873	2.99	1860	T	1917
5.12	1884	2.85	1941	.00	1900, 1929, 1930
4.57	1927	2.84	1888		
4.55	1984	2.73	1987		
4.50	1852	2.60	1915		
4.45	1936	2.56	1992		
4.25	1938	2.46	1904		
4.15	1880	2.42	1928		
4.02	1906	2.40	1932		
3.89	1877, 1926	2.38	1948		
3.87	1951	2.26	1894		
3.76	1909	2.23	1988		
3.74	1851	2.22	1970		
3.62	1945	2.21	1914		
3.58	1902	2.20	1952, 1974		
3.56	1931	2.19	1978		
3.38	1934	2.18	1896		
3.29	1854				

SUNRISE AND SUNSET AT SAN DIEGO, CALIFORNIA

NO. 1043

PACIFIC STANDARD TIME

DAY	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.	
	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.	Rise A.M.	Set P.M.
1	6 51	4 54	6 44	5 21	6 17	5 46	5 37	6 09	5 02	6 30	4 42	6 51	4 44	7 01	5 02	6 47	5 23	6 14	5 43	5 34	6 06	4 58	6 33	4 42
2	6 51	4 54	6 43	5 22	6 16	5 47	5 36	6 09	5 01	6 31	4 41	6 52	4 45	7 00	5 03	6 46	5 24	6 12	5 43	5 32	6 07	4 57	6 34	4 42
3	6 51	4 55	6 42	5 23	6 14	5 47	5 34	6 10	5 00	6 32	4 41	6 53	4 45	7 00	5 04	6 45	5 24	6 11	5 44	5 31	6 08	4 56	6 35	4 42
4	6 52	4 56	6 42	5 24	6 13	5 48	5 33	6 11	4 59	6 32	4 41	6 53	4 45	7 00	5 04	6 45	5 25	6 10	5 45	5 30	6 09	4 55	6 35	4 42
5	6 52	4 57	6 41	5 25	6 12	5 49	5 32	6 11	4 58	6 33	4 41	6 54	4 46	7 00	5 05	6 44	5 26	6 08	5 45	5 28	6 10	4 55	6 36	4 42
6	6 52	4 58	6 40	5 26	6 11	5 50	5 31	6 12	4 57	6 34	4 40	6 54	4 46	7 00	5 06	6 43	5 26	6 07	5 46	5 27	6 11	4 54	6 37	4 42
7	6 52	4 58	6 39	5 27	6 10	5 50	5 29	6 13	4 56	6 35	4 40	6 55	4 47	7 00	5 06	6 42	5 27	6 06	5 47	5 26	6 11	4 53	6 38	4 42
8	6 52	4 59	6 38	5 28	6 08	5 51	5 28	6 14	4 55	6 35	4 40	6 55	4 47	7 00	5 07	6 41	5 28	6 05	5 47	5 25	6 12	4 52	6 38	4 43
9	6 52	5 00	6 38	5 29	6 07	5 52	5 27	6 14	4 55	6 36	4 40	6 56	4 48	6 59	5 08	6 40	5 28	6 03	5 48	5 23	6 13	4 52	6 39	4 43
10	6 52	5 01	6 37	5 30	6 06	5 53	5 26	6 15	4 54	6 37	4 40	6 56	4 48	6 59	5 08	6 39	5 29	6 02	5 49	5 22	6 14	4 51	6 40	4 43
11	6 52	5 02	6 36	5 31	6 04	5 54	5 24	6 16	4 53	6 37	4 40	6 56	4 49	6 59	5 09	6 38	5 30	6 01	5 50	5 21	6 15	4 50	6 41	4 43
12	6 52	5 03	6 35	5 31	6 03	5 54	5 23	6 16	4 52	6 38	4 40	6 57	4 50	6 59	5 10	6 37	5 30	5 59	5 50	5 20	6 16	4 49	6 41	4 43
13	6 52	5 04	6 34	5 32	6 02	5 55	5 22	6 17	4 51	6 39	4 40	6 57	4 50	6 58	5 10	6 36	5 31	5 58	5 51	5 18	6 17	4 49	6 42	4 44
14	6 51	5 04	6 33	5 33	6 01	5 56	5 21	6 18	4 51	6 40	4 40	6 58	4 51	6 58	5 11	6 35	5 31	5 56	5 52	5 17	6 18	4 48	6 43	4 44
15	6 51	5 05	6 32	5 34	5 59	5 56	5 19	6 19	4 50	6 40	4 40	6 58	4 51	6 58	5 12	6 34	5 32	5 55	5 53	5 16	6 19	4 48	6 43	4 44
16	6 51	5 06	6 31	5 35	5 58	5 57	5 18	6 19	4 49	6 41	4 40	6 58	4 52	6 57	5 13	6 33	5 33	5 54	5 53	5 15	6 19	4 47	6 44	4 45
17	6 51	5 07	6 30	5 36	5 57	5 58	5 17	6 20	4 49	6 42	4 40	6 59	4 52	6 57	5 13	6 32	5 33	5 52	5 54	5 14	6 20	4 47	6 45	4 45
18	6 51	5 08	6 29	5 37	5 55	5 59	5 16	6 21	4 48	6 42	4 40	6 59	4 53	6 56	5 14	6 31	5 34	5 51	5 55	5 12	6 21	4 46	6 45	4 45
19	6 50	5 09	6 28	5 38	5 54	5 59	5 15	6 21	4 47	6 43	4 41	6 59	4 54	6 56	5 15	6 29	5 35	5 50	5 56	5 11	6 22	4 46	6 46	4 46
20	6 50	5 10	6 27	5 38	5 53	6 00	5 14	6 22	4 47	6 44	4 41	6 59	4 54	6 55	5 15	6 28	5 35	5 48	5 56	5 10	6 23	4 45	6 46	4 46
21	6 50	5 11	6 26	5 39	5 52	6 01	5 12	6 23	4 46	6 44	4 41	7 00	4 55	6 55	5 16	6 27	5 36	5 47	5 57	5 09	6 24	4 45	6 47	4 47
22	6 49	5 12	6 25	5 40	5 50	6 02	5 11	6 24	4 46	6 45	4 41	7 00	4 56	6 54	5 17	6 26	5 37	5 46	5 58	5 08	6 25	4 44	6 47	4 47
23	6 49	5 13	6 24	5 41	5 49	6 02	5 10	6 24	4 45	6 46	4 41	7 00	4 56	6 53	5 17	6 25	5 37	5 44	5 59	5 07	6 26	4 44	6 48	4 48
24	6 48	5 14	6 23	5 42	5 48	6 03	5 09	6 25	4 45	6 46	4 42	7 00	4 57	6 53	5 18	6 24	5 38	5 43	6 00	5 06	6 27	4 44	6 48	4 48
25	6 48	5 15	6 21	5 43	5 46	6 04	5 08	6 26	4 44	6 47	4 42	7 00	4 58	6 52	5 19	6 22	5 39	5 42	6 00	5 05	6 28	4 44	6 49	4 49
26	6 47	5 16	6 20	5 43	5 45	6 04	5 07	6 26	4 44	6 48	4 42	7 00	4 58	6 52	5 19	6 21	5 39	5 40	6 01	5 04	6 28	4 43	6 49	4 49
27	6 47	5 17	6 19	5 44	5 44	6 05	5 06	6 27	4 43	6 48	4 43	7 00	4 59	6 51	5 20	6 20	5 40	5 39	6 02	5 03	6 29	4 43	6 50	4 50
28	6 46	5 18	6 18	5 45	5 42	6 06	5 05	6 28	4 43	6 49	4 43	7 01	5 00	6 50	5 21	6 19	5 41	5 38	6 03	5 02	6 30	4 43	6 50	4 51
29	6 46	5 18	6 18	5 46	5 41	6 06	5 04	6 29	4 43	6 50	4 43	7 01	5 00	6 49	5 21	6 17	5 41	5 36	6 04	5 01	6 31	4 43	6 50	4 51
30	6 45	5 19			5 40	6 07	5 03	6 29	4 42	6 50	4 44	7 01	5 01	6 49	5 22	6 16	5 42	5 35	6 04	5 00	6 32	4 43	6 51	4 52
31	6 44	5 20			5 38	6 08			4 42	6 51			5 02	6 48	5 22	6 15			6 05	4 59			6 51	4 53

Add one hour for Daylight Saving Time if and when in use.

I certify that the above data are the result of an accurate and true computation by the Nautical Almanac Office, United States Naval Observatory, an agency charged by Federal Statute (9 Stat. L. 374, 375) with the duty of making such computations and publishing the results.

E. W. WOOLARD
Director Nautical Almanac
U. S. Naval Observatory

C. G. CHRISTIE
Captain, USN
Superintendent
U. S. Naval Observatory

UNITED STATES
GOVERNM ITING OFFICE
WAS N: 1959

NUMBER OF DAYS WITH FOG[1] REPORTED

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1942	11	4	4	6	4	7	4	4	8	8	12	9	81
1943	8	5	3	9	5	10	12	4	23	17	14	3	113
1944	4	3	6	1	9	4	7	16	13	6	2	6	77
1945	11	8	4	12	4	6	10	8	8	8	11	9	99
1946	11	11	13	8	1	12	8	10	17	7	9	14	121
1947	10	17	5	5	5		12		15	11	7	3	90
1948	26	5	1	1	9	2	13	5	14	16	9	8	109
1949	4	5	4	5	6	2	4	11	11	4	12	12	80
1950	11	19	12	11	6	7	8	11	11	16	16	24	152
1951	9	7	5	3	5	2	5	13	19	12	10	11	101
1952	6	4		10	11	5	14	11	12	23	7	3	106
1953	12	8	6	4	1	9	5	4	10	6	9	4	78
1954	14	14	9	13	4	6	9	3	8	16	12	7	115
1955	7	5	4	6	4	7		6	12	14	13	15	93
1956	21	5	15	7	2	7		3	11	6	2	11	90
1957	6	8	5	5	5	12	10	1	10	7	6	7	82
1958	5	11	4	5	3	4	5	1	12	13	13	19	95
1959	15	2	8	4		2	7	1	2	15	11	8	75
1960	7	5	15	7	7	10	9	3	6	10	10	14	103
1961	6	6	6	8	2	6	4	1	8	7	11	18	83
1962	9	9	5	14	1	10	3	9	11	13	14	18	116
1963	4	11	7	5	1	5	5	2	8	3	8	8	67
1964	4		1	2	4	10	7	5	5	15	5	10	68
1965	8	8	3	12	3	1	6	4	6	7	11	5	74
1966	9	5	12	8	3	2	7		1	6	13	13	79
1967	17	10	8	1	8	7	5	4	1	12	7	8	88
1968	5	14	2	3	5	5		4	1	12	13	9	73
1969	11	4	4	2	6	7	8	8	8	4	3	9	74
1970	15	8	5		4	4	5	5	8	5	14	7	80
1971	10	10	6	5	7	10	6	1	7	8	12	10	92
1972	12	16	6	1	5	7	2	6	7	6	6	5	79

[1] - Includes days with dense fog.

NUMBER OF DAYS WITH FOG[1] REPORTED

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1973	7	6	5	1	8	9	8	5	3	10	7	13	82
1974	9	6	7	7	4	9	2	4	7	7	4	9	75
1975	12	13	12	4	5	2	4	12	6	7	13	14	104
1976	4	16	4	3	8	4	3	7	3	9	10	5	76
1977	8	10	3	9	7	9	9	5	6	16	10	17	109
1978	15	11	15	4	3	4	5	3	5	16	14	9	104
1979	10	10	7	4	10	10	8	8	15	9	11	5	107
1980	20	15	6	7	8	9	12	11	8	17	8	16	137
1981	18	14	6	2	7	9	2	4	13	6	18	22	121
1982	12	11	11	4	7	9	7	10	11	4	9	11	106
1983	10	15	16	8	11	11	8	10	6	7	8	16	126
1984	8	8	11	7	11	5	3	8	8	7	15	14	105
1985	8	13	7	15	3	10	5	11	7	9	11	13	112
1986	14	12	17	4	11	13	6	13	5	15	12	10	132
1987	8	9	7	8	10	7	4	9	19	18	8	10	117
1988	8	11	8	14	8	9	6	8	6	18	19	11	126
1989	11	8	14	2	6	11	10	5	17	15	12	13	124
1990	10	5	9	10	3	6	5	1	10	15	7		81
1991	11	17	9	6	7	6	10	20	19	18	11	14	148
1992	12	15	10	11	5	5	12	9	13	17	6	6	121
1993	17	10	17	10	5	13	4	9	16	13	12	7	133
1994	12	6	13	12	8	15	7	10	5	10	5	13	116
1995	19	12	15	8	8	14	20	21	16	21	25	17	196
1996	15	17	12	12	4	11	16	18	9	18	12	22	166

[1] - Includes days with dense fog.

NUMBER OF DAYS WITH DENSE FOG[1] REPORTED

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1942									3	1	3	2	9
1943	3	1	1	2	3	2	1		4	4	4		25
1944		1			1			3	3			4	12
1945	5	2	2	1				1	1	3	3	5	23
1946	4	4	3	1		2			4	1	5	10	34
1947	6	8		1	3		4		5	6	4	3	40
1948	17	2			4		3	2	10	5	2	2	47
1949			2	2	2			1	4	2	10	7	30
1950	4	10	5	3	1	2		2	1	5	9	13	55
1951	2	4	2			1		1	8	5	5	1	29
1952	2	1		5	1		1	2	4	9	3	2	30
1953	4	4	2						2	3	1	4	20
1954	5	7	2	4			3		4	8	9		42
1955	2	3	2	1		1		3	3	3	7	8	33
1956	9	2	6	2		2		2	4	3	2	5	37
1957			3	2		5	3		2	1		4	20
1958	1	2	1	1			3		5	5	7	6	31
1959	7		7				1		1	7	4	1	28
1960	1	2	4	4	1	1	3		5	1	5	10	37
1961		2		2		1			3	4	5	11	28
1962	6	5	2	8	1	2			1	6	7	9	47
1963	2	4	1						2	1	3	5	18
1964	2		1	1		1	1		1	6	1	2	16
1965	4	2		4					1	5	2		18
1966	6	2	4	1			1			4	5	6	29
1967	7	5	1		1					9	4	4	31
1968	1	5	1		1	1			1	8	8	5	31
1969	1		2			1		1	2	1	2	3	13
1970	4		2		3			1	1	1	5	2	19
1971	4	4	2	2		3	1		1	2	5		24
1972	5	6	1		1			1				2	16

[1] - Visibility of ¼ mile or less

NUMBER OF DAYS WITH DENSE FOG[1] REPORTED

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1973	2	1			2	3	1			7	2	2	20
1974	2	1	4	1					2	2	1	5	18
1975	5	4			1			2	1	3	6	8	30
1976	1	3				2		3		3	7		19
1977		5	1	1			1		1	4	4	5	22
1978		1	2		2					3	2	4	14
1979		6	2	1		2	1		6		1	3	22
1980	4	4		1		1		1	2	3	1	9	26
1981	4	2	1						1	3	7	12	30
1982	3	3		1					1	1		5	14
1983	3	1											4
1984	3	2		1					1	1	1	1	10
1985		2		3		3	1	1	3		2	6	21
1986	3	3	3							5	1	2	17
1987				1	1				1	3		2	8
1988	1	1		1					3	2	1	1	10
1989		1	2						2	3	3	4	15
1990	2		4		1				2	5	1		15
1991	1	2	1	1					1	3	4	2	15
1992	1	2					1		4	3			11
1993	3		3						5	2			13
1994	6		1					1				3	11
1995	1	3					1			1	8	3	17
1996	2	4			1		3	2		5	4	4	25

[1] - Visibility of ¼ mile or less

NUMBER OF DAYS WITH HAZE REPORTED

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1942	11	7	5	3	5	9	14	4	16	19	21	18	132
1943	7	0	2	8	14	11	14	6	21	18	19	12	132
1944	11	6	1	2	8	7	18	25	19	26	11	19	153
1945	17	8	11	8	5	11	20	18	13	14	9	8	142
1946	4	4	6	10	6	5	10	13	16	11	7	10	102
1947	8	15	7	3	10	7	22	9	19	19	8	8	135
1948	19	7	3	3	8	8	18	22	18	17	12	9	144
1949	0	6	4	6	2	5	15	13	17	11	12	9	100
1950	7	16	9	5	3	5	11	15	14	17	8	19	129
1951	6	9	5	6	8	10	10	19	27	11	12	10	133
1952	4	4	2	7	15	6	24	21	19	28	10	8	148
1953	16	9	9	5	1	10	14	17	15	12	17	9	134
1954	15	8	11	14	11	11	20	8	22	21	16	11	168
1955	4	9	7	4	6	10	14	14	17	25	13	16	139
1956	19	8	18	7	8	7	12	10	20	13	11	9	142
1957	5	17	11	9	4	13	19	14	14	11	14	12	143
1958	11	8	2	7	14	8	13	13	19	17	15	20	147
1959	18	3	13	12	0	11	16	9	9	18	12	8	129
1960	7	5	18	13	7	21	13	10	15	15	10	12	146
1961	11	11	6	9	1	20	15	19	16	14	15	20	157
1962	12	8	7	14	7	8	22	24	25	21	18	24	190
1963	13	21	7	8	6	9	21	16	16	14	14	18	163
1964	7	5	5	4	15	16	18	17	18	21	7	11	144
1965	11	11	5	13	10	7	22	19	10	19	13	6	146
1966	14	10	20	12	10	16	20	8	12	19	17	14	172
1967	12	13	7	2	13	13	16	25	13	22	17	8	161
1968	7	20	9	10	10	22	13	11	15	20	17	13	167
1969	11	8	11	9	19	11	22	27	23	11	7	19	178
1970	15	10	11	6	15	15	23	21	22	14	18	14	184
1971	21	19	20	8	12	19	30	17	21	12	21	8	208
1972	22	18	25	15	17	22	20	21	22	13	13	12	220

NUMBER OF DAYS WITH HAZE REPORTED

1973	8	18	5	15	22	23	25	29	25	21	12	26	229
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	13	13	17	15	17	25	16	22	25	16	20	17	216
1975	13	13	12	8	24	24	21	23	25	14	15	21	213
1976	13	11	11	6	13	16	21	14	16	21	14	17	173
1977	11	15	4	18	5	20	27	19	12	24	15	18	188
1978	12	10	7	2	11	12	24	16	8	25	11	11	149
1979	5	10	10	5	7	13	20	11	21	13	14	9	138
1980	4	16	4	9	7	15	20	17	15	16	16	13	152
1981	18	14	8	9	8	20	10	22	18	8	19	23	177
1982	7	11	1	5	9	6	15	23	10	13	13	14	127
1983	4	10	2	3	16	15	19	14	11	15	11	8	128
1984	14	7	10	6	18	8	7	8	12	4	11	12	117
1985	11	11	11	18	7	17	15	15	7	10	10	16	148
1986	14	6	11	1	12	14	6	13	5	15	5	11	113
1987	6	5	5	9	9	11	8	8	21	21	10	10	123
1988	7	7	5	8	7	7	9	8	3	19	13	2	95
1989	3	6	8	8	8	11	9	2	13	12	9	11	100
1990	5	4	10	6	3	8	7	8	10	17	5	0	83
1991	14	19	1	5	6	10	13	16	18	19	11	9	141
1992	8	5	5	16	8	6	12	16	18	17	3	3	117
1993	6	4	11	6	4	11	3	9	15	10	6	6	91
1994	11	0	9	10	7	16	11	10	9	5	1	6	95
1995	5	9	4	3	4	15	21	14	12	10	21	13	131
1996	8	8	5	4	9	10	8	16	14	16	8	3	109

AVERAGE DAILY SURFLINE WATER TEMPERATURE FOR MISSION BEACH

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	58	57	58	60	62	64	65	68	68	65	63	60
2	57	57	58	60	61	64	65	68	68	65	63	60
3	57	57	58	60	61	64	66	69	68	65	62	60
4	57	57	58	60	61	64	66	69	68	65	62	59
5	57	57	58	60	61	64	66	69	67	65	62	59
6	57	58	58	60	61	64	66	69	67	65	62	59
7	57	58	58	60	61	64	66	69	67	65	62	59
8	57	57	58	60	62	64	66	69	67	65	62	59
9	57	57	58	60	62	64	67	69	67	65	62	59
10	57	57	58	60	62	64	66	68	67	65	62	59
11	57	57	58	60	62	64	67	69	67	65	62	59
12	57	57	59	60	62	64	67	69	67	64	62	59
13	57	58	58	60	62	65	67	69	67	65	62	59
14	57	58	59	60	62	65	67	69	67	64	62	59
15	57	58	59	60	62	65	67	69	66	64	62	59
16	57	58	59	61	62	64	67	69	67	64	61	58
17	57	58	59	61	63	65	67	68	67	64	61	58
18	57	58	59	60	62	65	67	68	67	64	61	58
19	57	58	59	61	63	65	67	69	67	64	61	58
20	57	58	59	61	63	65	67	69	67	64	61	58
21	57	58	59	61	63	65	67	69	66	64	61	58
22	57	58	59	61	63	65	67	69	66	64	60	58
23	57	58	59	61	63	65	67	68	66	64	60	58
24	57	58	59	61	63	65	68	68	66	64	60	58
25	57	58	59	61	63	65	68	68	66	64	60	58
26	57	58	59	61	63	65	68	68	66	64	60	58
27	57	58	59	61	63	65	67	68	66	64	60	58
28	57	58	59	61	64	65	67	68	66	64	60	58
29	57	58	59	61	64	65	68	68	66	63	60	57
30	57		59	61	63	65	68	68	65	63	60	57
31	57		59		64		68	68		63		57
MEAN	57	58	58.6	60.5	62.4	65	67	68.5	67	64.3	61.3	58.5

ABSOLUTE HIGHEST WATER TEMPERATURE: 78 on August 15 and 18, 1971
ABSOLUTE LOWEST WATER TEMPERATURE: 47 on March 4, 1975

MEAN MONTHLY WIND DIRECTION FOR EACH HOUR OF THE DAY

A.M.												P.M.												
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	Mean
January																								
NE	NE	NE	NE	NE	NE	NE	NE	E	SE	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NE	NE	NE	NW
February																								
NE	NE	NE	NE	NE	NE	NE	E	NE	S	NW	W	W	W	NW	NW	NW	NW	NW	NW	NW	NW	E	E	NW
March																								
NE	NE	NE	NE	E	NE	NE	E	NW	NW	W	W	W	W	W	W	NW	NW	NW	NW	NW	NW	NW	NW	NW
April																								
NW	NW	NE	NE	E	NE	E	NW	S	W	W	W	W	W	W	W	W	NW	NW	NW	NW	NW	NW	NW	NW
May																								
NW	SW	SW	NW	NW	NW	NW	S	SW	W	W	W	W	W	W	W	W	W	NW	NW	NW	NW	NW	NW	W
June																								
NW	NW	NW	NW	N	N	NW	NW	W	W	W	W	W	W	W	W	W	W	NW	NW	NW	NW	NW	NW	W
July																								
NW	NW	NW	NW	NW	N	NW	NW	W	W	W	W	W	W	W	W	W	W	NW	NW	NW	NW	NW	NW	W
August																								
NW	NW	NW	NW	NW	NW	NW	NW	W	W	W	W	W	W	W	W	W	W	NW	NW	NW	NW	NW	NW	NW
September																								
NW	NW	NW	NW	NW	NW	NW	NW	NW	W	W	W	W	W	W	W	NW	NW	NW	NW	NW	NW	NW	NW	NW
October																								
NW	N	N	NE	NE	NE	NE	NW	NW	NW	W	W	W	W	W	W	NW	NW	NW	NW	NW	NW	NW	NW	NW
November																								
NE	NE	NE	NE	NE	NE	NE	NE	NE	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	N	NE	NE	NW
December																								
NE	NE	NE	NE	NE	NE	NE	NE	E	SE	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	E	E	NE	NE	NW

MEAN MONTHLY WIND SPEED FOR EACH HOUR OF THE DAY IN KNOTS

A.M.												P.M.												
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	Mean
January																								
4.2	4.3	4.4	4.4	4.4	4.4	4.4	4.3	4.1	4.6	5.5	6.7	8.1	8.8	8.9	8.5	7.2	5.3	4.6	4.5	4.1	4.1	4.2	4.2	5.3
February																								
4.5	4.6	4.7	4.5	4.6	4.7	4.7	4.6	4.8	5.6	6.7	8.1	9.4	10.1	10.2	9.7	8.7	7.0	5.5	4.8	4.6	4.6	4.6	4.5	6.1
March																								
4.5	4.7	4.7	4.7	4.7	4.6	4.5	4.5	5.2	6.4	7.9	9.2	10.3	10.7	10.6	10.2	9.2	7.8	6.1	5.2	4.8	4.6	4.6	4.6	6.4
April																								
4.5	4.6	4.7	4.6	4.5	4.5	4.4	4.9	5.3	7.4	8.9	10.1	10.9	11.1	10.9	10.3	9.4	8.2	6.8	5.5	4.8	4.5	4.6	4.5	6.7
May																								
4.4	4.4	4.4	4.3	4.3	4.3	4.5	5.1	6.2	7.9	9.4	10.3	10.9	11.0	10.7	10.1	9.2	8.2	7.0	5.8	5.0	4.5	4.3	4.3	6.7
June																								
3.9	4.9	4.0	4.1	4.0	4.1	4.3	4.9	6.2	7.8	9.2	10.1	10.7	10.6	10.3	9.7	9.0	8.0	6.9	5.8	4.8	4.2	3.9	3.9	6.5
July																								
3.4	3.4	3.5	3.6	3.6	3.6	3.8	4.5	6.0	7.7	9.2	10.0	10.5	10.5	10.2	9.6	8.9	8.0	6.8	5.8	4.7	4.0	3.6	3.5	6.2
August																								
3.4	3.4	3.5	3.5	3.4	3.5	3.8	4.2	5.7	7.5	9.1	10.1	10.6	10.6	10.3	9.6	8.8	7.8	6.6	5.5	4.4	3.9	3.5	3.4	6.1
September																								
3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	5.1	7.0	9.0	10.2	11.0	11.0	10.6	9.8	8.9	7.6	6.1	4.9	4.1	3.8	3.6	3.6	6.0
October																								
3.5	3.6	3.6	3.6	3.7	3.6	3.7	3.7	4.4	6.0	7.3	9.3	10.3	10.4	10.0	9.2	7.9	6.2	4.7	4.0	3.8	3.6	3.7	3.6	5.6
November																								
3.7	3.7	3.7	3.7	3.7	3.8	3.9	3.6	3.8	4.7	6.2	7.9	9.3	9.6	9.5	8.8	7.1	5.1	4.1	3.8	3.7	3.6	3.6	3.6	5.2
December																								
4.2	4.3	4.3	4.2	4.3	4.2	4.2	4.1	3.9	4.5	5.5	6.8	8.1	8.8	8.8	8.2	6.7	5.1	4.4	4.3	4.2	4.1	4.1	4.2	5.3

NUMBER OF DAYS NOT SATISFYING THE AIR QUALITY STANDARDS IN PARTS OF OZONE PER HUNDRED MILLION PARTS OF AIR (PPHM)

YEAR	STATE (75 PPHM)	FEDERAL (100 PPHM)
1978	151	90
1979	138	70
1980	167	87
1981	192	78
1982	120	47
1983	125	61
1984	146	51
1985	148	50
1986	138	46
1987	127	40
1988	160	45
1989	158	55
1990	139	39
1991	106	27
1992	97	19
1993	90	14
1994	79	9
1995	96	12
1996	51	2

143 The Depth of the Marine Layer at San Diego as Related to Subsequent Cool Season Precipitation Episodes in Arizona. Ira S. Brenner, May 1979. (PB298817/AS)
144 Arizona Cool Season Climatological Surface Wind and Pressure Gradient Study. Ira S. Brenner, May 1979. (PB298900/AS)
146 The BART Experiment. Morris S. Webb, October 1979. (PB80 155112)
147 Occurrence and Distribution of Flash Floods in the Western Region. Thomas L. Dietrich, December 1979. (PB80 160344)
149 Misinterpretations of Precipitation Probability Forecasts. Allan H. Murphy, Sarah Lichtenstein, Baruch Fischhoff, and Robert L. Winkler, February 1980. (PB80 174576)
Annual Data and Verification Tabulation - Eastern and Central North Pacific Tropical Storms and Hurricanes 1979. Emil B. Gunther and Staff, EPHC, April 1980. (PB80 220486)
NMC Model Performance in the Northeast Pacific. James E. Overland, PMEL-ERL, April 1980. (PB80 196033)
152 Climate of Salt Lake City, Utah. William J. Alder, Sean T. Buchanan, William Cope (Retired), James A. Cisco, Craig C. Schmidt, Alexander R. Smith (Retired), Wilbur E. Figgins (Retired), February 1998 - Seventh Revision (PB98-130727)
153 An Automatic Lightning Detection System in Northern California. James E. Rea and Chris E. Fontana, June 1980. (PB80 225592)
154 Regression Equation for the Peak Wind Gust 6 to 12 Hours in Advance at Great Falls During Strong Downslope Wind Storms. Michael J. Oard, July 1980. (PB91 108367)
155 A Raininess Index for the Arizona Monsoon. John H. Ten Harkel, July 1980. (PB81 106494)
156 The Effects of Terrain Distribution on Summer Thunderstorm Activity at Reno, Nevada. Christopher Dean Hill, July 1980. (PB81 102501)
157 An Operational Evaluation of the Scofield/Oliver Technique for Estimating Precipitation Rates from Satellite Imagery. Richard Ochoa, August 1980. (PB81 108227)
158 Hydrology Practicum. Thomas Dietrich, September 1980. (PB81 134033)
159 Tropical Cyclone Effects on California. Arnold Court, October 1980. (PB81 133779)
160 Eastern North Pacific Tropical Cyclone Occurrences During Intraseasonal Periods. Preston W. Leftwich and Gail M. Brown, February 1981. (PB81 205494)
161 Solar Radiation as a Sole Source of Energy for Photovoltaics in Las Vegas, Nevada, for July and December. Darryl Randerson, April 1981. (PB81 224503)
162 A Systems Approach to Real-Time Runoff Analysis with a Deterministic Rainfall-Runoff Model. Robert J.C. Burnash and R. Larry Ferral, April 1981. (PB81 224495)
163 A Comparison of Two Methods for Forecasting Thunderstorms at Luke Air Force Base, Arizona. LTC Keith R. Cooley, April 1981. (PB81 225393)
164 An Objective Aid for Forecasting Afternoon Relative Humidity Along the Washington Cascade East Slopes. Robert S. Robinson, April 1981. (PB81 23078)
165 Annual Data and Verification Tabulation, Eastern North Pacific Tropical Storms and Hurricanes 1980. Emil B. Gunther and Staff, May 1981. (PB82 230336)
166 Preliminary Estimates of Wind Power Potential at the Nevada Test Site. Howard G. Booth, June 1981. (PB82 127036)
167 ARAP User's Guide. Mark Mathewson, July 1981, Revised September 1981. (PB82 196783)
168 Forecasting the Onset of Coastal Gales Off Washington-Oregon. John R. Zimmerman and William D. Burton, August 1981. (PB82 127051)
169 A Statistical-Dynamical Model for Prediction of Tropical Cyclone Motion in the Eastern North Pacific Ocean. Preston W. Leftwich, Jr., October 1981. (PB82195298)
170 An Enhanced Plotter for Surface Airways Observations. Andrew J. Spry and Jeffrey L. Anderson, October 1981. (PB82 153883)
171 Verification of 72-Hour 500-MB Map-Type Predictions. R.F. Quiring, November 1981. (PB82-158098)
172 Forecasting Heavy Snow at Wenatchee, Washington. James W. Holcomb, December 1981. (PB82-177783)
Central San Joaquin Valley Type Maps. Thomas R. Crossan, December 1981. (PB82 196064)
ARAP Test Results. Mark A. Mathewson, December 1981. (PB82 198103)
Approximations to the Peak Surface Wind Gusts from Desert Thunderstorms. Darryl Randerson, June 1982. (PB82 253089)
177 Climate of Phoenix, Arizona. Robert J. Schmidli and Austin Jamison, April 1969 (Revised July 1996). (PB96-191614)
178 Annual Data and Verification Tabulation, Eastern North Pacific Tropical Storms and Hurricanes 1982. E.B. Gunther, June 1983. (PB85 106078)
179 Stratified Maximum Temperature Relationships Between Sixteen Zone Stations in Arizona and Respective Key Stations. Ira S. Brenner, June 1983. (PB83 249904)
180 Standard Hydrologic Exchange Format (SHEF) Version I. Phillip A. Pasteris, Vernon C. Bissel, David G. Bennett, August 1983. (PB85 106052)
181 Quantitative and Spacial Distribution of Winter Precipitation along Utah's Wasatch Front. Lawrence B. Dunn, August 1983. (PB85 106912)
182 500 Millibar Sign Frequency Teleconnection Charts - Winter. Lawrence B. Dunn, December 1983. (PB85 106276)
183 500 Millibar Sign Frequency Teleconnection Charts - Spring. Lawrence B. Dunn, January 1984. (PB85 111367)
184 Collection and Use of Lightning Strike Data in the Western U.S. During Summer 1983. Glenn Rasch and Mark Mathewson, February 1984. (PB85 110534)
185 500 Millibar Sign Frequency Teleconnection Charts - Summer. Lawrence B. Dunn, March 1984. (PB85 111359)
186 Annual Data and Verification Tabulation eastern North Pacific Tropical Storms and Hurricanes 1983. E.B. Gunther, March 1984. (PB85 109635)
187 500 Millibar Sign Frequency Teleconnection Charts - Fall. Lawrence B. Dunn, May 1984. (PB85-110930)
188 The Use and Interpretation of Isentropic Analyses. Jeffrey L. Anderson, October 1984. (PB85-132694)
189 Annual Data & Verification Tabulation Eastern North Pacific Tropical Storms and Hurricanes 1984. E.B. Gunther and R.L. Cross, April 1985. (PB85 1878887AS)
190 Great Salt Lake Effect Snowfall: Some Notes and An Example. David M. Carpenter, October 1985. (PB86 119153/AS)
191 Large Scale Patterns Associated with Major Freeze Episodes in the Agricultural Southwest. Ronald S. Hamilton and Glenn R. Lussky, December 1985. (PB86 144474AS)
192 NWR Voice Synthesis Project: Phase I. Glen W. Sampson, January 1986. (PB86 145604/AS)
193 The MCC - An Overview and Case Study on Its Impact in the Western United States. Glenn R. Lussky, March 1986. (PB86 170651/AS)
194 Annual Data and Verification Tabulation Eastern North Pacific Tropical Storms and Hurricanes 1985. E.B. Gunther and R.L. Cross, March 1986. (PB86 170941/AS)
195 Radid Interpretation Guidelines. Roger G. Pappas, March 1986. (PB86 177680/AS)
196 A Mesoscale Convective Complex Type Storm over the Desert Southwest. Darryl Randerson, April 1986. (PB86 190998/AS)
197 The Effects of Eastern North Pacific Tropical Cyclones on the Southwestern United States. Walter Smith, August 1986. (PB87 106258AS)
Preliminary Lightning Climatology Studies for Idaho. Christopher D. Hill, Carl J. Gorski, and Michael C. Conger, April 1987. (PB87 180196/AS)
199 Heavy Rains and Flooding in Montana: A Case for Slantwise Convection. Glenn R. Lussky, April 1987. (PB87 185229/AS)
200 Annual Data and Verification Tabulation Eastern North Pacific Tropical Storms and Hurricanes 1986. Roger L. Cross and Kenneth B. Mielke, September 1987. (PB88 110895/AS)
201 An Inexpensive Solution for the Mass Distribution of Satellite Images. Glen W. Sampson and George Clark, September 1987. (PB88 114038/AS)
202 Annual Data and Verification Tabulation Eastern North Pacific Tropical Storms and Hurricanes 1987. Roger L. Cross and Kenneth B. Mielke, September 1988. (PB88-101935/AS)
203 An Investigation of the 24 September 1986 "Cold Sector" Tornado Outbreak in Northern California. John P. Monteverdi and Scott A. Braun, October 1988. (PB89 121297/AS)
204 Preliminary Analysis of Cloud-To-Ground Lightning in the Vicinity of the Nevada Test Site. Carven Scott, November 1988. (PB89 128649/AS)
205 Forecast Guidelines For Fire Weather and Forecasters -- How Nighttime Humidity Affects Wildland Fuels. David W. Goens, February 1989. (PB89 162549/AS)
206 A Collection of Papers Related to Heavy Precipitation Forecasting. Western Region Headquarters, Scientific Services Division, August 1989. (PB89 230833/AS)
207 The Las Vegas McCarran International Airport Microburst of August 8, 1989. Carven A. Scott, June 1990. (PB90-240268)
208 Meteorological Factors Contributing to the Canyon Creek Fire Blowup, September 6 and 7, 1988. David W. Goens, June 1990. (PB90-245085)
209 Stratus Surge Prediction Along the Central California Coast. Peter Felsch and Woodrow Whitlatch, December 1990. (PB91-129239)
210 Hydrotools. Tom Egger. January 1991. (PB91-151787/AS)
211 A Northern Utah Soaker. Mark E. Struthwolf, February 1991. (PB91-168716)
212 Preliminary Analysis of the San Francisco Rainfall Record: 1849-1990. Jan Null, May 1991. (PB91-208439)
213 Idaho Zone Preformat, Temperature Guidance, and Verification. Mark A. Mollner, July 1991. (PB91-227405/AS)
214 Emergency Operational Meteorological Considerations During an Accidental Release of Hazardous Chemicals. Peter Mueller and Jerry Galt, August 1991. (PB91-235424)
215 WeatherTools. Tom Egger, October 1991. (PB93-184950)
216 Creating MOS Equations for RAWS Stations Using Digital Model Data. Dennis D. Gettman, December 1991. (PB92-131473/AS)
217 Forecasting Heavy Snow Events in Missoula, Montana. Mike Richmond, May 1992. (PB92-196104)
218 NWS Winter Weather Workshop in Portland, Oregon. Various Authors, December 1992. (PB93-146785)
219 A Case Study of the Operational Usefulness of the Sharp Workstation in Forecasting a Mesocyclone-Induced Cold Sector Tornado Event in California. John P. Monteverdi, March 1993. (PB93-178697)
220 Climate of Pendleton, Oregon. Claudia Bell, August 1993. (PB93-227536)
221 Utilization of the Bulk Richardson Number, Helicity and Sounding Modification in the Assessment of the Severe Convective Storms of 3 August 1992. Eric C. Evenson, September 1993. (PB94-131943)
222 Convective and Rotational Parameters Associated with Three Tornado Episodes in Northern and Central California. John P. Monteverdi and John Quadros, September 1993. (PB94-131943)
223 Climate of San Luis Obispo, California. Gary Ryan, February 1994. (PB94-162062)
224 Climate of Wenatchee, Washington. Michael W. McFarland, Roger G. Buckman, and Gregory E. Matzen, March 1994. (PB94-164308)
225 Climate of Santa Barbara, California. Gary Ryan, December 1994. (PB95-173720)
226 Climate of Yakima, Washington. Greg DeVoir, David Hogan, and Jay Neher, December 1994. (PB95-173688)
227 Climate of Kalispell, Montana. Chris Maier, December 1994. (PB95-169488)
228 Forecasting Minimum Temperatures in the Santa Maria Agricultural District. Wilfred Pi and Peter Felsch, December 1994. (PB95-171088)
229 The 10 February 1994 Oroville Tornado--A Case Study. Mike Staudenmaier, Jr., April 1995. (PB95-241873)
230 Santa Ana Winds and the Fire Outbreak of Fall 1993. Ivory Small, June 1995. (PB95-241865)
231 Washington State Tornadoes. Tresté Huse, July 1995. (PB96-107024)
232 Fog Climatology at Spokane, Washington. Paul Frisbie, July 1995. (PB96-106604)
233 Storm Relative Isentropic Motion Associated with Cold Fronts in Northern Utah. Kevin B. Baker, Kathleen A. Hadley, and Lawrence B. Dunn, July 1995. (PB96-106596)
234 Some Climatological and Synoptic Aspects of Severe Weather Development in the Northwestern United States. Eric C. Evenson and Robert H. Johns, October 1995. (PB96-112958)
235 Climate of Las Vegas, Nevada. Paul H. Skrbac and Scott Cordero, December 1995. (PB96-135553)
236 Climate of Astoria, Oregon. Mark A. McInerney, January 1996.
237 The 6 July 1995 Severe Weather Events in the Northwestern United States: Recent Examples of SSWEs. Eric C. Evenson, April 1996.
238 Significant Weather Patterns Affecting West Central Montana. Joe Lester, May 1996. (PB96-178751)
239 Climate of Portland, Oregon. Clinton C. D. Rockey, May 1996. (PB96-17603)
240 Downslop Winds of Santa Barbara, CA. Gary Ryan, July 1996. (PB96-191697)
241 Operational Applications of the Real-time National Lightning Detection Network Data at the NWSO Tucson, AZ. Darren McCollum, David Bright, Jim Meyer, and John Glueck, September 1996. (PB97-108450)
242 Climate of Pocatello, Idaho. Joe Heim, October 1996. (PB97-114540)
243 Climate of Great Falls. Montana. Matt Jackson and D. C. Williamson, December 1996. (PB97-126684)
244 WSR-88D VAD Wind Profile Data Influenced by Bird Migration over the Southwest United States. Jesus A. Haro, January 1997. (PB97-135263)
245 Climatology of Cape for Eastern Montana and Northern Wyoming. Heath Hockenberry and Keith Meier, January 1997. (PB97-133425)
246 A Western Region Guide to the Eta-29 Model. Mike Staudenmaier, Jr., March 1997. (PB97-144075)
247 The Northeast Nevada Climate Book. Edwin C. Clark, March 1997. (First Revision - January 1998 - Andrew S. Gorelow and Edwin C. Clark - PB98-123250)
248 Climate of Eugene, Oregon. Clinton C. D. Rockey, April 1997. (PB97-155303)
249 Climate of Tucson, Arizona. John R. Glueck, October 1997.
250 Northwest Oregon Daily Extremes and Normans. Clinton C. D. Rockey, October 1997.
251 A Composite Study Examining Five Heavy Snowfall Patterns for South-Central Montana. Jonathan D. Van Ausdall and Thomas W. Humphrey. February 1998. (PB98-125255)
252 Climate of Eureka, California. Alan H. Puffer. February 1998. (PB98-130735)
253 Inferenced Oceanic Kelvin/Rossby Wave Influence on North American West Coast Precipitation. Martin E. Lee and Dudley Chelton. April 1998. (PB98-139744)
254 Conditional Symmetric Instability—Methods of Operational Diagnosis and Case Study of 23-24 February 1994 Eastern Washington/Oregon Snowstorm. Gregory A. DeVoir. May 1998. (PB98-144660)
255 Creation and Maintenance of a Comprehensive Climate Data Base. Eugene Petrescu. August 1998.

NOAA SCIENTIFIC AND TECHNICAL PUBLICATIONS

The National Oceanic and Atmospheric Administration was established as part of the Department of Commerce on October 3, 1970. The mission responsibilities of NOAA are to assess the socioeconomic impact of natural and technological changes in the environment and to monitor and predict the state of the solid Earth, the oceans and their living resources, the atmosphere, and the space environment of the Earth.

The major components of NOAA regularly produce various types of scientific and technical information in the following kinds of publications.

PROFESSIONAL PAPERS--Important definitive research results, major techniques, and special investigations.

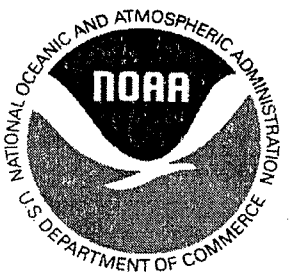
CONTRACT AND GRANT REPORTS---Reports prepared by contractors or grantees under NOAA sponsorship.

ATLAS--Presentation of analyzed data generally in the form of maps showing distribution of rainfall, chemical and physical conditions of oceans and atmosphere, distribution of fishes and marine mammals, ionospheric conditions, etc.

TECHNICAL SERVICE PUBLICATIONS --Reports containing data, observations, instructions, etc. A partial listing includes data serials; prediction and outlook periodicals; technical manuals, training papers, planning reports, and information serials; and miscellaneous technical publications.

TECHNICAL REPORTS--Journal quality with extensive details, mathematical developments, or data listings.

TECHNICAL MEMORANDUMS--Reports of preliminary, partial, or negative research or technology results, interim instructions, and the like.



Information on availability of NOAA publications can be obtained from:

NATIONAL TECHNICAL INFORMATION SERVICE

U. S. DEPARTMENT OF COMMERCE

5285 PORT ROYAL ROAD

SPRINGFIELD, VA 22161