

QC
995
.U68
no.28
1983

NOAA Technical Memorandum NWS WR-28



WEATHER EXTREMES

Robert J. Schmidli

Salt Lake City, Utah
December 1983
(Revised)

**U.S. DEPARTMENT OF
COMMERCE**

National Oceanic and
Atmospheric Administration

National Weather
Service



NOAA TECHNICAL MEMORANDA
National Weather Service, Western Region Subseries

Region (WR) Subseries provides an informal medium for the documentation and quick dissemination of results not publication. The series is used to report on work in progress, to describe technical procedures and practices. These Technical Memoranda will report on investigations devoted primarily to regional and local problems of not be widely distributed.

SA Technical Memoranda, Western Region Technical Memoranda (WRTM); papers 24 to 59 are in the former series, chnical Memoranda (WBMT). Beginning with 60, the papers are part of the series, NOAA Technical Memoranda NWS.

Papers 2 to 22, except for 5 (revised edition), are available from the National Weather Service Western Region, Scientific Services Division, P. O. Box 11188, Federal Building, 125 South State Street, Salt Lake City, Utah 84147. Paper 5 (revised edition), and all others beginning with 25 are available from the National Technical Information Service, U. S. Department of Commerce, Sillis Building, 5285 Port Royal Road, Springfield, Virginia 22151. Prices vary for all paper copy; \$3.50 microfiche. 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 (WBMT)

- 25 Verification of Operational 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 December 1983)
- 29 Small-Scale Analysis and Prediction. Philip Williams, Jr., May 1968. (PB-178425)
- 30 Numerical Weather Prediction and Synoptic Meteorology. Capt. Thomas D. Murphy, U.S.A.F., 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)
- 35 Joint ESSA/FAA ARTC Radar Weather Surveillance Program. Herbert P. Benner and Devon B. Smith, December 1968 (revised June 1970). AD-681857)
- 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 1970's. L. W. Snellman, August 1969. (PB-185068)
- 42 Analysis of the Southern California Santa Ana of January 15-17, 1966. Barry B. Aronovitch, August 1969. (PB-185670)
- 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)

NOAA Technical Memoranda (NWS WR)

- 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.
- 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. Sakamoto, October 1972. (COM-72-10021)
- 81 An Aid for Forecasting Summer Maximum Temperatures at Seattle, Washington. Edgar G. 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. Kierulff, Sept. 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)
- 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. Christopher E. Fontana, September 1976. (PB-273-677/AS)
- 111 Cool Inflow as a Weakening Influence on Eastern Pacific Tropical Cyclones. William J. Denney, 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. Qard, February 1977. (PB-273-694/AS)
- 114 Tropical Cyclone Kathleen. James R. Fors, February 1977. (PB-273-676/AS)
- 115 A Study of Wind Gusts on Lake Mead. Bradley Colman, April 1977. (PB-268-847)
- 116 Relative Frequency of Cumulonimbus Clouds at the Nevada Test Site as a Function of K-Value. R. F. Quiring, April 1977. (PB-272-831)
- 117 Distribution Modification by Upward Vertical Motion. Ira S. Brenner, April 1977. (PB-268-740)
- 118 Frequency of Occurrence of Warm Season Echo Activity as a Function of Stability Indices Computed from the Yucca Flat, Nevada, Rawinsonde. (PB-271-290/AS)

9C
995
U68
no. 28
1983

NOAA Technical Memorandum NWS WR-28

WEATHER EXTREMES

"

Robert J. Schmidli

National Weather Service Forecast Office
Phoenix, Arizona

First printed April 1968
Revised December 1983

NOAA CENTRAL LIBRARY

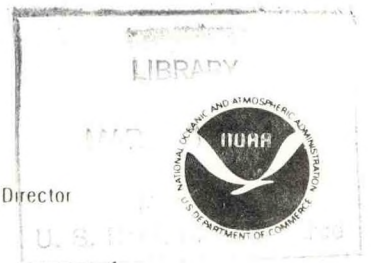
MAR 12 2018

National Oceanic &
Atmospheric Administration
US Dept of Commerce

UNITED STATES
DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary

National Oceanic and
Atmospheric Administration
John V. Byrne, Administrator

National Weather
Service
Richard E. Hallgren, Director



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

A handwritten signature in cursive script that reads "Glenn E. Rasch".

Glenn E. Rasch, Chief
Scientific Services Division
Western Region Headquarters
Salt Lake City, Utah

TABLE OF CONTENTS

	<u>Page</u>
Preface	iv-v
Table 1. Highest Temperature (Fahrenheit)	1
Table 2. Lowest Temperature (Fahrenheit)	2
Table 3. Greatest Precipitation in One Hour (Inches)	3
Table 4. Greatest Precipitation in Twenty-Four Hours (Inches)	4
Table 5. Greatest Precipitation in One Calendar Month (Inches)	5
Table 6. Greatest Precipitation in One Calendar Year (Inches)	6
Table 7. Least Precipitation in One Calendar Year (Inches)	7
Table 8. Greatest Snowfall in Twenty-Four Hours (Inches)	8
Table 9. Greatest Snowfall in One Storm (Inches)	9
Table 10. Greatest Snowfall in One Calendar Month (Inches)	10
Table 11. Greatest Snowfall in One Season (Inches)	11
Table 12. Greatest Depth of Snow on the Ground (Inches)	12
Table 13. Highest Sea-Level Pressure (Millibars and Inches)	13
Table 14. Lowest Sea-Level Pressure (Millibars and Inches)	14
Table 15. Highest Wind Speed (Miles per Hour)	15

PREFACE

The purpose of this publication is to provide National Weather Service personnel with a ready reference of information that may be useful when preparing weather stories and radio scripts, when talking to mass-media reporters, and when answering questions from the general public. This sixth revision differs from the fifth revised tabulation in that a number of new extremes have been updated and previous errors have been corrected.

The Memorandum is organized into fifteen categories covering the elements of temperature, precipitation, snowfall, atmospheric pressure, and wind. The fourteen western cities, thirteen western states, United States, North America, and world are each listed in the various categories.

Only official observations are included in this Memorandum. The exception being, a few well-accepted unofficial extremes, such as the twenty-four hour precipitation of 38.70 inches at Yankeetown, Florida, the 38.20 inches at Thrall, Texas, and the 43.00 inches at Alvin, Texas.

Several unofficial observations of maximum rainfall amounts far exceed the data published here but were excluded largely on the advice of state climatologists.

An example of such an unofficial extreme was found in the August 1898 "Climate and Crop Service." It was the account of the observer at Fort Mohave, Arizona. "On the 28th, we had the biggest rain in 10 or 15 years, and to my regret, between the rain and the furious wind, my rain gauge was upset. To give an idea of the amount of rain that fell, and which lasted only 45 minutes, I had a wash tub set out on the mesa, clear of everything, and the water after the rain, measured 8 inches."

There was some question regarding the greatest snowfall in one storm for a few states. The problem is one of separating storms. When does one end and another begin? For example, the 84.6 inches of snowfall at Flagstaff, Arizona, in December 1967 was not included because it resulted from two storms with 27 hours of no precipitation between them. Although the Ruby, Colorado, snowstorm that produced 141.0 inches was included, there was some doubt that this storm actually lasted a full week.

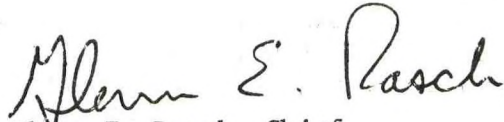
Data are for a combination of city office and airport locations. In case dual records were kept over some period of time, and an event occurred during that period, the most extreme value was used.

There is little doubt that more extreme values have occurred than have been listed here. First of all, very few observing stations have records more than 100 years in duration. Secondly, the areas where weather extremes are most likely to occur are usually the most sparsely settled and where observations are not generally available.

We gratefully acknowledge the assistance of the Meteorologists in Charge of various cities and the former climatologists for the various states in checking the data for this revision.

Special acknowledgment is given to Mr. Marvin Magnuson, former Assistant Chief, Scientific Services Division, for his assistance.

The data in this Technical Memorandum are considered accurate through September 1983.

A handwritten signature in cursive script that reads "Glenn E. Rasch". The signature is written in dark ink and is positioned above the typed name and title.

Glenn E. Rasch, Chief
Scientific Services Division

TABLE 1

HIGHEST TEMPERATURE (FAHRENHEIT)

ALBUQUERQUE	105	Jun 28 1974	Jul 14 1979	Jun 29 1980	Jul 5/18 1980
ANCHORAGE	86	Jun 25 1953			
BOISE	111	Jul 19 1960			
CHEYENNE	100	Jul 14/15 1881	Jul 11 1939	Jun 23 1954	
DENVER	105	Aug 8 1878			
HELENA	105	Aug 24 1969			
HONOLULU	93	Oct 11 1979			
LAS VEGAS	117	Jul 24 1942			
LOS ANGELES	110	Sep 1 1955	Sep 26 1963		
PHOENIX	118	Jul 16 1925	Jun 24 1929	Jul 11 1958	
PORTLAND	107	Jul 2 1942	Jul 30 1965	Aug 10 1981	
SALT LAKE CITY	107	Jul 26 1960			
SAN FRANCISCO	106	Jun 14 1961			
SEATTLE	100	Jul 16 1941	Jun 9 1955		
ALASKA	100	Fort Yukon	Jun 27 1915		
ARIZONA	127	Fort Mohave	Jun 15 1896	Parker	Jul 7 1905
CALIFORNIA	134	Greenland Ranch	Death Valley	Jul 10 1913	
COLORADO	118	Bennett	Jul 11 1888		
HAWAII	100	Pahala	Apr 27 1931		
IDAHO	118	Orofino	Jul 28 1934		
MONTANA	117	Glendive	Jul 20 1893	Medicine Lake	Jul 5 1937
NEVADA	122	Leeland	Aug 12/18 1914	Overton	Jun 23 1954
NEW MEXICO	116	Artesia	Jun 29 1918	Orogrande	Jul 14 1934
OREGON	119	Prineville	Jul 29 1898	Pendleton	Aug 10 1898
UTAH	116	Saint George	Jun 28 1892		
WASHINGTON	118	Wahluke	Jul 24 1928	Ice Harbor Dam	Aug 5 1961
WYOMING	114	Basin	Jul 12 1900		
UNITED STATES	134	Greenland Ranch	Death Valley	California	Jul 10 1913
NORTH AMERICA	134	Greenland Ranch	Death Valley	California U.S.	Jul 10 1913
WORLD	136	Azizia	Libya	Sep 13 1922	

TABLE 2

LOWEST TEMPERATURE (FAHRENHEIT)

ALBUQUERQUE	-17	Jan 7 1971			
ANCHORAGE	-38	Feb 3 1947			
BOISE	-23	Dec 10 1972			
CHEYENNE	-38	Jan 9 1875			
DENVER	-30	Feb 8 1936			
HELENA	-42	Jan 31 1893	Jan 25 1957		
HONOLULU	53	Jan 31 1972	Feb 1/2 1976	Feb 9 1981	Feb 12 1983
LAS VEGAS	8	Jan 25 1937	Jan 13 1963		
LOS ANGELES	23	Jan 22 1937			
PHOENIX	16	Jan 7 1913			
PORTLAND	-3	Feb 2 1950			
SALT LAKE CITY	-30	Feb 9 1933			
SAN FRANCISCO	20	Dec 14 1932			
SEATTLE	0	Jan 31 1950			
ALASKA	-80	Prospect Creek (25 SE Bettles)	Jan 23 1971		
ARIZONA	-40	Hawley Lake	Jan 7 1971		
CALIFORNIA	-45	Boca	Jan 20 1937		
COLORADO	-60	Taylor Park	Feb 1 1951	Maybell	Jan 1 1979
HAWAII	12	Mauna Kea Observatory	May 17 1979		
IDAHO	-60	Island Park Dam	Jan 18 1943		
MONTANA	-70	Rogers Pass	Jan 20 1954		
NEVADA	-50	San Jacinto	Jan 8 1937		
NEW MEXICO	-50	Gavilan	Feb 1 1951		
OREGON	-54	Ukiah	Feb 9 1933	Seneca	Feb 10 1933
UTAH	-50	Woodruff	Feb 6 1899	Strawberry East Portal	Jan 5 1913
WASHINGTON	-48	Mazama	Dec 30 1968	Winthrop	Dec 30 1968
WYOMING	-63	Moran	Feb 9 1933		
UNITED STATES	-80	Prospect Creek (25 SE Bettles)	Alaska	Jan 23 1971	
NORTH AMERICA	-81	Snag Yukon Territory	Canada	Feb 3 1947	
WORLD	-129	Vostok Antarctica	El 11220 Ft	Jul 21 1983	
	-121	Plateau Station Antarctica	El 11890 Ft	Aug 24 1966	
	-110	South Pole Antarctica	El 9186 Ft	Jul 14 1963	
	-90	Oimekon Siberia U.S.S.R.	El 2625 Ft	Feb 6 1933	
	-90	Verkhoyansk Siberia U.S.S.R.	Feb 5/7 1892		
	-87	Northice Greenland	El 7690 Ft	Jan 9 1954	

TABLE 3

GREATEST PRECIPITATION IN 60 MINUTES (INCHES)

ALBUQUERQUE	1.63	Jul 8 1961
ANCHORAGE	0.45	Sep 12 1972
BOISE	1.12	Sep 11 1976
CHEYENNE	2.51	Jun 14 1926
DENVER	2.20	Aug 23 1921
HELENA	1.60	Aug 21 1983
HONOLULU	3.41	Apr 21 1924
LAS VEGAS	1.36	Aug 21 1957
LOS ANGELES	1.87	Nov 19 1967
PHOENIX	1.72	Aug 18 1966
PORTLAND	1.31	Jun 7 1927
SALT LAKE CITY	1.94	Jul 13 1962
SAN FRANCISCO	1.40	Dec 3 1980
SEATTLE	0.84	Jun 29 1952
ALASKA	1.05	Annette Oct 29 1958
ARIZONA	3.52	Tempe Citrus Experiment Station Sep 14 1969
CALIFORNIA	11.50	Campo Aug 12 1891 (80-minute amount)
COLORADO	3.45	Lake George Jul 31 1945
HAWAII	12.00	Kilauea Sugar Plantation Jan 24/25 1956
IDAHO	1.50	Cottonwood Aug 1 1948
MONTANA	1.86	Billings Jul 2 1958
NEVADA	3.66	Elko Aug 27 1970
NEW MEXICO	2.81	Raton Jun 17 1965
OREGON	2.17	Copper Jun 8 1943
UTAH	2.13	Blanding Aug 1 1968
WASHINGTON	1.65	Grotto May 25 1945
WYOMING	2.51	Cheyenne Jun 14 1926
UNITED STATES	12.00	Holt Missouri Jun 22 1947
	12.00	Kilauea Sugar Plantation Hawaii Jan 24/25 1956
NORTH AMERICA	12.00	Holt Missouri U.S. Jun 22 1947
WORLD	12.00	Holt Missouri U.S. Jun 22 1947
	12.00	Kilauea Sugar Plantation Hawaii U.S. Jan 24/25 1956

TABLE 4

GREATEST PRECIPITATION IN TWENTY-FOUR HOURS (INCHES)

ALBUQUERQUE	2.26	Sep 27/28 1893
ANCHORAGE	2.06	Jul 30/31 1956
BOISE	2.72	Mar 5 1871
CHEYENNE	4.70	Jul 15 1896
DENVER	6.53	May 21/22 1876
HELENA	3.67	Jun 4/5 1908
HONOLULU	17.41	Mar 5/6 1958
LAS VEGAS	2.59	Aug 20/21 1957
LOS ANGELES	7.36	Dec 31 1933-Jan 1 1934
PHOENIX	4.98	Jul 1/2 1911
PORTLAND	7.66	Dec 12/13 1882
SALT LAKE CITY	2.72	May 2/3 1901
SAN FRANCISCO	5.71	Jan 4/5 1982
SEATTLE	3.74	Oct 5/6 1981
ALASKA	15.20	Angoon Oct 12 1982
ARIZONA	11.40	Workman Creek (30 NNW Globe) Sep 4/5 1970
CALIFORNIA	26.12	Hoeges Camp Jan 22/23 1943
COLORADO	11.08	Holly Jun 17 1965
HAWAII	38.00	Kilauea Sugar Plantation Jan 24/25 1956
IDAHO	7.17	Rattlesnake Creek (Elmore County) Nov 23 1909
MONTANA	11.50	Circle Jun 20 1921
NEVADA	7.13	Mt. Rose Highway Station (near Reno) Jan 31 1963
NEW MEXICO	11.28	Lake Maloya May 19 1955
OREGON	10.17	Glenora Dec 21 1915
UTAH	6.00	Bug Point (24 E Blanding) Sep 5 1970
WASHINGTON	12.00	Quinault Ranger Station Jan 21 1935
WYOMING	5.50	Dull Center May 31 1927
UNITED STATES	43.00	Alvin Texas Jul 25/26 1979
	38.70	Yankeetown Florida Sep 5/6 1950
	38.20	Thrall Texas Sep 9/10 1921
NORTH AMERICA	43.00	Alvin Texas U.S. Jul 25/26 1979
	38.70	Yankeetown Florida U.S. Sep 5/6 1950
	38.20	Thrall Texas U.S. Sep 9/10 1921
WORLD	73.62	Cilaos La Reunion Mar 15/16 1952

TABLE 5

GREATEST PRECIPITATION IN ONE CALENDAR MONTH (INCHES)

ALBUQUERQUE	8.15	Jun 1852
ANCHORAGE	5.91	Aug 1934
BOISE	7.66	Mar 1871
CHEYENNE	7.66	Apr 1900
DENVER	8.57	May 1876
HELENA	6.67	May 1927
HONOLULU	20.79	Mar 1951
LAS VEGAS	3.39	Sep 1939
LOS ANGELES	15.80	Dec 1889
PHOENIX	6.47	Jul 1911
PORTLAND	20.14	Dec 1882
SALT LAKE CITY	7.04	Sep 1982
SAN FRANCISCO	24.36	Jan 1862
SEATTLE	15.33	Dec 1933
ALASKA	70.99	Mac Leod Harbor Nov 1976
ARIZONA	16.95	Crown King Aug 1951
CALIFORNIA	71.54	Helena Mine Jan 1909
COLORADO	23.28	Ruby Feb 1897
HAWAII	107.00	Kukui Mar 1942
IDAHO	28.23	Roland Dec 1933
MONTANA	16.79	Circle Jun 1921
NEVADA	33.03	Mt. Rose Highway Station (Near Reno) Dec 1964
NEW MEXICO	16.21	Portales May 1941
OREGON	50.20	Glenora Nov 1909
UTAH	19.14	Buckboard Flat (6 W Montecello) Oct 1972
WASHINGTON	57.04	Petersons Ranch (Near Cougar) Dec 1933
WYOMING	12.78	Alva May 1962
UNITED STATES	107.00	Kukui Hawaii Mar 1942
NORTH AMERICA	88.01	Swanson Bay British Columbia Canada Nov 1917
WORLD	366.14	Cherrapunji India Jul 1861

TABLE 6

GREATEST PRECIPITATION IN ONE CALENDAR YEAR (INCHES)

ALBUQUERQUE	16.30	1958	LAS VEGAS	10.72	1941
ANCHORAGE	21.34	1981	LOS ANGELES	40.29	1884
BOISE	25.80	1871	PHOENIX	19.73	1905
CHEYENNE	23.69	1942	PORTLAND	67.24	1882
DENVER	23.31	1967	SALT LAKE CITY	23.67	1875
HELENA	20.94	1975	SAN FRANCISCO	38.82	1884
HONOLULU	45.51	1963	SEATTLE	55.14	1950
ALASKA	332.29	Mac Leod Harbor 1976			
ARIZONA	58.92	Hawley Lake 1978			
CALIFORNIA	153.54	Monumental 1909			
COLORADO	92.84	Ruby 1897			
HAWAII	704.83	Kukui 1982			
		624.10	Mt. Waialeale Jul 24 1947 through Jul 27 1948		
IDAHO	81.05	Roland 1933			
MONTANA	55.51	Summit 1953			
		184.64	Grinnell Glacier Jul 17 1958 through Aug 4 1959		
NEVADA	59.03	Mt. Rose Resort 1969			
NEW MEXICO	62.45	White Tail 1941			
OREGON	168.88	Valsetz 1937			
UTAH	94.74	Alta 1982			
WASHINGTON	184.56	Wynoochee Oxbow (25 NNE Aberdeen) 1931			
WYOMING	55.46	Grassy Lake Dam 1945			
UNITED STATES	704.83	Kukui Hawaii 1982			
		624.10	Mt. Waialeale Hawaii Jul 24 1947 through Jul 27 1948		
NORTH AMERICA	332.29	Mac Leod Harbor Alaska U.S. 1976			
WORLD	905.12	Cherrapunji India 1861			
		1041.78	Aug 1860 through Jul 1861		

TABLE 7

LEAST PRECIPITATION IN ONE CALENDAR YEAR (INCHES)

ALBUQUERQUE	3.29	1917	
ANCHORAGE	8.08	1969	
BOISE	6.64	1966	
CHEYENNE	5.94	1964	
DENVER	6.27	1954	
HELENA	6.26	1973	
HONOLULU	9.97	1953	
LAS VEGAS	0.56	1953	
LOS ANGELES	3.12	1947	
PHOENIX	2.82	1956	
PORTLAND	23.37	1944	
SALT LAKE CITY	8.70	1979	
SAN FRANCISCO	8.73	1976	
SEATTLE	19.52	1952	
ALASKA	1.61	Barrow	1935
ARIZONA	0.07	Davis Dam	1956
CALIFORNIA	0.00	Greenland Ranch Death Valley	1929
	0.00	Bagdad	1913
COLORADO	1.69	Buena Vista	1939
HAWAII	0.19	Kawaihae	1953
IDAHO	2.09	Grand View	1947
MONTANA	2.97	Belfry	1960
NEVADA	Trace	Hot Springs	1898
NEW MEXICO	1.00	Hermanas	1910
OREGON	3.33	Warm Springs Reservoir	1939
UTAH	1.34	Hanksville	1956 Myton 1974
WASHINGTON	2.61	Wahluke	1930
WYOMING	1.28	Lysite	1960
UNITED STATES	0.00	Greenland Ranch Death Valley California	1929
	0.00	Bagdad California	1913
NORTH AMERICA	0.00	Greenland Ranch Death Valley California U.S.	1929
	0.00	Bagdad California U.S.	1913
WORLD	0.00	Greenland Ranch Death Valley California U.S.	1929
	0.00	Bagdad California U.S.	1913
	0.00	Iquique Chile	Nov 1945 through May 1957
	0.00	Arica Chile	Oct 1903 through Dec 1917
	0.00	Kharga Egypt	Dec 1957 through Mar 1960
	0.00	Wadi Halfa Sudan	Jun 1945 through Apr 1949

TABLE 8

GREATEST SNOWFALL IN TWENTY-FOUR HOURS (INCHES)

ALBUQUERQUE	14.2	Dec 28/29 1958
ANCHORAGE	17.7	Dec 28/29 1955
BOISE	17.0	Dec 16/17 1884
CHEYENNE	19.8	Nov 20 1979
DENVER	23.6	Dec 24 1982
HELENA	21.5	Nov 11/12 1959
HONOLULU	0.0	
LAS VEGAS	9.0	Jan 4/5 1974
LOS ANGELES	2.0	Jan 15 1932
PHOENIX	1.0	Jan 20 1933 Jan 20/21 1937
PORTLAND	16.0	Jan 31 - Feb 1 1937
SALT LAKE CITY	18.1	Dec 28/29 1972
SAN FRANCISCO	3.7	Feb 5 1887
SEATTLE	21.5	Feb 2 1916
ALASKA	62.0	Thompson Pass Dec 29 1955
ARIZONA	38.0	Heber Ranger Station Dec 14 1967
CALIFORNIA	67.0	Echo Summit Jan 4/5 1982
COLORADO	75.8	Silver Lake Apr 14/15 1921
HAWAII		(Regular measurements of the snowfall on MAUNA KEA and MAUNA LOA are not made)
IDAHO	30.0	Pierce Ranger Station Dec 28 1968
MONTANA	44.0	Summit Jan 20 1972
NEVADA	25.0	Mt. Rose Resort Jan 20 1969
NEW MEXICO	34.0	Red River Nov 29 1975
OREGON	39.0	Bonneville Dam Jan 8/9 1980
UTAH	38.0	Alta Dec 1/2 1982
WASHINGTON	52.0	Winthrop Jan 21 1935
WYOMING	41.0	Glenrock Apr 19 1973
UNITED STATES	75.8	Silver Lake Colorado Apr 14/15 1921
NORTH AMERICA	75.8	Silver Lake Colorado U.S. Apr 14/15 1921
	44.0	Livingston Ranger Station Alberta Canada Jun 29 1963

TABLE 9

GREATEST SNOWFALL IN ONE STORM (INCHES)

ALBUQUERQUE	14.2	Dec 28-29 1958
ANCHORAGE	35.7	Dec 26-30 1955
BOISE	23.6	Dec 15-17 1884
CHEYENNE	25.6	Nov 19-21 1979
DENVER	45.7	Dec 1-6 1913
HELENA	28.5	Dec 5-14 1917
HONOLULU	0.0	
LAS VEGAS	9.0	Jan 4-5 1974
LOS ANGELES	2.0	Jan 15 1932
PHOENIX	1.0	Jan 20 1933 Jan 20-21 1937
PORTLAND	27.5	Dec 21-24 1892
SALT LAKE CITY	21.6	Mar 13-14 1944
SAN FRANCISCO	3.7	Feb 5 1887
SEATTLE	32.5	Jan 31-Feb 2 1916
ALASKA	175.4	Thompson Pass Dec 26-31 1955
ARIZONA	67.0	Heber Ranger Station Dec 13-16 1967
CALIFORNIA	189.0	Mt. Shasta Ski Bowl Feb 13-19 1959
COLORADO	141.0	Ruby Mar 23-30 1899
HAWAII		(Regular measurements of the snowfall on MAUNA KEA and MAUNA LOA are not made)
IDAHO	60.0	Roland West Portal Dec 25-27 1937
MONTANA	77.5	Summit Jan 17-22 1972
NEVADA	75.0	Mt. Rose Resort Jan 18-22 1969
NEW MEXICO	45.5	Red River Nov 25-30 1975
OREGON	119.0	Crater Lake Mar 16-25 1975
UTAH	105.0	Alta Jan 24-30 1965
WASHINGTON	129.0	Laconia Feb 24-26 1910
WYOMING	58.0	Glenrock Apr 18-20 1973
UNITED STATES	189.0	Mt. Shasta Ski Bowl California Feb 13-19 1959
NORTH AMERICA	189.0	Mt. Shasta Ski Bowl California U.S. Feb 13-19 1959

TABLE 10

GREATEST SNOWFALL IN ONE CALENDAR MONTH (INCHES)

ALBUQUERQUE	14.7	Dec 1959
ANCHORAGE	48.5	Feb 1955
BOISE	36.6	Dec 1884
CHEYENNE	46.5	Apr 1905
DENVER	57.4	Dec 1913
HELENA	46.4	Dec 1880
HONOLULU	0.0	
LAS VEGAS	16.7	Jan 1949
LOS ANGELES	2.0	Jan 1932
PHOENIX	1.0	Jan 1933 Jan 1937
PORTLAND	41.4	Jan 1950
SALT LAKE CITY	41.9	Mar 1977
SAN FRANCISCO	3.7	Feb 1887
SEATTLE	57.2	Jan 1950
ALASKA	346.1	Thompson Pass Feb 1964
ARIZONA	123.0	Sunrise Mountain Mar 1973
CALIFORNIA	390.0	Tamarack Jan 1911
COLORADO	249.0	Ruby Mar 1899
HAWAII		(Regular measurements of the snowfall on MAUNA KEA AND MAUNA LOA are not made)
IDAHO	143.8	Burke Jan 1954
MONTANA	131.1	Summit Jan 1972
NEVADA	124.0	Mt. Rose Resort Jan 1969
NEW MEXICO	144.0	Anchor Mine Mar 1912
OREGON	256.0	Crater Lake Jan 1933
UTAH	184.0	Alta Dec 1981
WASHINGTON	363.0	Rainier Paradise Ranger Station Jan 1925
WYOMING	188.5	Bechler River Jan 1933
UNITED STATES	390.0	Tamarack California Jan 1911
NORTH AMERICA	390.0	Tamarack California U.S. Jan 1911
	202.0	Kemano Kildala Pass British Columbia Canada Feb 1954

TABLE 11

GREATEST SNOWFALL IN ONE SEASON (INCHES)

ALBUQUERQUE	37.4	1972-1973
ANCHORAGE	321.6	1954-1955
BOISE	50.0	1916-1917
CHEYENNE	121.5	1979-1980
DENVER	118.7	1908-1909
HELENA	112.8	1880-1881
HONOLULU	0.0	
LAS VEGAS	16.7	1948-1949
LOS ANGELES	2.0	1931-1932
PHOENIX	1.0	1932-1933 1936-1937
PORTLAND	60.9	1892-1893
SALT LAKE CITY	117.3	1951-1952
SAN FRANCISCO	3.7	1886-1887
SEATTLE	67.5	1968-1969
ALASKA	974.5	Thompson Pass 1952-1952
ARIZONA	400.9	Sunrise Mountain 1972-1973
CALIFORNIA	884.0	Tamarack 1906-1907
COLORADO	837.5	Wolf Creek Pass 1978-1979
HAWAII		(Regular measurements of the snowfall on MAUNA KEA and MAUNA LOA are not made)
IDAHO	441.8	Roland West Portal 1949-1950
MONTANA	418.1	Cooke City 1977-1978
NEVADA	323.0	Mt. Rose Resort 1968-1969
NEW MEXICO	483.0	Anchor Mine 1911-1912
OREGON	879.0	Crater Lake 1932-1933
UTAH	846.8	Alta 1982-1983
WASHINGTON	1122.0	Rainier Paradise Ranger Station 1971-1972
WYOMING	491.6	Bechler River 1932-1933
UNITED STATES	1122.0	Rainier Paradise Ranger Station Washington 1971-1972
NORTH AMERICA	1122.0	Rainier Paradise Ranger Station Washington U.S. 1971-1972
	880.0	Kemano Kildala Pass British Columbia Canada 1956-1957

TABLE 12

GREATEST DEPTH OF SNOW ON THE GROUND (INCHES)

ALBUQUERQUE	14	Dec 29 1958
ANCHORAGE	47	Dec 30/31 1955 Jan 1 1956
BOISE	22	Dec 17 1884
CHEYENNE	26	Nov 22/23 1979
DENVER	33	Dec 6 1913
HELENA	24	Dec 13 1917 Jan 27 1969
HONOLULU	0	
LAS VEGAS	8	Jan 5 1974
LOS ANGELES	2	Jan 15 1932
PHOENIX	1	Jan 20 1933 Jan 21 1937
PORTLAND	19	Feb 6 1893
SALT LAKE CITY	23	Jan 31 1942
SAN FRANCISCO	4	Feb 5 1887
SEATTLE	29	Feb 2 1916
ALASKA	190	Thane Camp #4 Mar 28 1917
ARIZONA	91	Hawley Lake Dec 21 1967
CALIFORNIA	451	Tamarack Mar 11 1911
COLORADO	254	Ruby Mar 30 1899
HAWAII		(Regular measurements of the depth of snow on the ground on MAUNA KEA and MAUNA LOA are not made, but drifts of more than 8 feet have been observed on the summit of MAUNA KEA)
IDAHO	182	Mullan Pass Feb 20 1954
MONTANA	190	Summit Feb 1 1972
NEVADA	173	Tahoe Meadows Feb 27 1969
NEW MEXICO	95	Sandia Crest Apr 4 1973
OREGON	246	Timberline Lodge Mar 19 1950
UTAH	179	Alta Apr 5 1958
WASHINGTON	367	Rainier Paradise Ranger Station Mar 9 1956
WYOMING	96	Bechler River Mar 3 1939 Snake River Mar 8/9 1974
UNITED STATES	451	Tamarack California Mar 11 1911
NORTH AMERICA	451	Tamarack California U.S. Mar 11 1911

TABLE 13

HIGHEST SEA-LEVEL PRESSURE (MILLIBARS AND INCHES)

ALBUQUERQUE	1044.7 / 30.85	Dec 22 1967
ANCHORAGE	1053.2 / 31.10	Jan 18 1962
BOISE	1054.2 / 31.13	Jan 21 1930
CHEYENNE	1054.5 / 31/14	Jan 10 1962
DENVER	1057.9 / 31/24	Jan 10 1962
HELENA	1063.3 / 31.40	Jan 9 1962
HONOLULU	1062.8 / 30.32	Feb 10 1919
LAS VEGAS	1043.0 / 30.80	Dec 22 1967
LOS ANGELES	1035.9 / 30.59	Feb 17 1883
PHOENIX	1036.9 / 30.62	Dec 24 1898 Jan 24 1938
PORTLAND	1044.4 / 30.84	Feb 2 1880
SALT LAKE CITY	1052.8 / 31.09	Dec 8/9 1956
SAN FRANCISCO	1037.6 / 30.64	Mar 4 1902
SEATTLE	1044.0 / 30.83	Dec 3 1921
ALASKA	1064.3 / 31.43	Barrow Jan 3 1970
ARIZONA	1056.8 / 31.21	Grand Canyon Dec 22 1967
CALIFORNIA	1041.0 / 30.74	Sacramento Feb 17 1883
COLORADO	1060.6 / 31.32	Alamosa Dec 14 1964
HAWAII	1026.8 / 30.32	Honolulu Feb 10 1919 Lihue Jan 27 1955
IDAHO	1058.0 / 31.24	Idaho Falls Jan 1 1979
MONTANA	1063.3 / 31.40	Helena Jan 9 1962
NEVADA	1053.5 / 31.11	Elko Dec 9 1956
NEW MEXICO	1051.9 / 31.06	Farmington Dec 22 1967
OREGON	1054.7 / 31.15	Baker Jan 1 1979
UTAH	1054.2 / 31.13	Milford Dec 9 1956
WASHINGTON	1053.4 / 31.11	Walla Walla Jan 1 1979
WYOMING	1060.3 / 31.31	Casper Jan 9 1962
UNITED STATES	1064.3 / 31.43	Barrow Alaska Jan 3 1970
NORTH AMERICA	1067.6 / 31.53	Mayo Yukon Territory Canada Jan 1 1974
WORLD	1083.8 / 32.01	Agata Siberia U.S.S.R. Dec 31 1968
	1078.9 / 31.86	Barnaul Siberia U.S.S.R. Jan 23 1900
	1075.2 / 31.75	Irkutsk Siberia U.S.S.R. Jan 14 1893

TABLE 14

LOWEST SEA-LEVEL PRESSURE (MILLIBARS AND INCHES)

ALBUQUERQUE	983.1 / 29.03	Oct 5 1948
ANCHORAGE	952.9 / 28.14	Jan 1 1948
BOISE	981.0 / 28.97	Dec 23 1955
CHEYENNE	977.3 / 28.86	Jan 12 1932
DENVER	976.3 / 28.83	Feb 9 1960
HELENA	979.3 / 28.92	Jan 11 1932
HONOLULU	993.6 / 29.34	Feb 3 1926
LAS VEGAS	987.8 / 29.17	Dec 10 1949
LOS ANGELES	990.9 / 29.26	Mar 10 1912
PHOENIX	992.9 / 29.32	May 18 1902
PORTLAND	967.2 / 28.56	Jan 9 1880
SALT LAKE CITY	982.4 / 29.01	Nov 30 1982
SAN FRANCISCO	977.0 / 28.85	Jan 27 1916
SEATTLE	973.9 / 28.76	Jan 12 1980
ALASKA	925.0 / 27.31	Dutch Harbor Oct 25 1977
ARIZONA	987.1 / 29.15	Flagstaff Feb 7 1937
CALIFORNIA	975.6 / 28.81	Point Reyes Jan 27 1916
COLORADO	975.0 / 28.79	Lamar Mar 13 1973
HAWAII	972.0 / 28.70	Barking Sands Nov 23 1982
IDAHO	981.0 / 28.97	Boise Dec 23 1955
MONTANA	975.3 / 28.80	Havre Jan 11 1932
NEVADA	979.7 / 28.93	Winnemucca Jan 27 1916
NEW MEXICO	978.7 / 28.90	Clayton Feb 8/9 1960
OREGON	967.2 / 28.56	Portland Jan 9 1880
UTAH	982.4 / 29.01	Salt Lake City Nov 30 1982
WASHINGTON	967.5 / 28.57	Tatoosh Island Dec 6 1952
WYOMING	977.3 / 28.86	Cheyenne Jan 12 1932
UNITED STATES	892.3 / 26.35	Matecumbe Key Florida Sep 2 1935
NORTH AMERICA	892.3 / 26.35	Matecumbe Key Florida U.S. Sep 2 1935
WORLD	870.0 / 25.69	520 miles northwest of Guam by dropsonde in eye of Typhoon Tip (16° 44'N, 137° 46'E) Oct 12 1979
	876.0 / 25.87	264 miles west of Guam by dropsonde in eye of Typhoon June Nov 19 1975
	877.0 / 25.90	750 miles east of Luzon Philippines by dropsonde in eye of Typhoon Ida Sep 24 1958
	877.4 / 25.91	420 miles east of Manila Philippines by dropsonde in eye of Typhoon Nora Oct 6 1973

TABLE 15

HIGHEST WIND SPEED (MILES PER HOUR)

ALBUQUERQUE	90	Fastest Mile	Dec 9 1943
ANCHORAGE	74	Peak Gust	Jan 15 1971
	66	Fastest Mile	Apr 14 1945 Nov 23 1950
BOISE	61	Fastest Mile	Jul 29 1944
CHEYENNE	75	Fastest Mile	Mar 6 1972
DENVER	70	Peak Gust	Apr 16 1960 Jul 25 1965
	65	Fastest Mile	May 22 1933
HELENA	73	Fastest Mile	Jan 17 1944 Feb 16 1949
HONOLULU	83	Peak Gust	Jan 17 1959
	67	Fastest Mile	Jan 17 1959
LAS VEGAS	75	Peak Gust	Jul 14 1971
	64	Fastest Mile	Jul 14 1971 Jul 29 1976
LOS ANGELES	62	Peak Gust	Mar 1 1952
PHOENIX	86	Peak Gust	Jul 7 1976
PORTLAND	90	Peak Gust	Oct 12 1962
	88	Fastest Mile	Oct 12 1962
SALT LAKE CITY	94	Peak Gust	Jun 3 1963
	71	Fastest Mile	Mar 10 1954
SAN FRANCISCO	58	One Minute	Jan 30 1963
SEATTLE	66	Fastest Mile	Nov 14 1981
ALASKA	94	Fastest Mile	Valdez Jan 10 1980
	93	One Minute	Kotzebue Feb 25 1951
	159	Peak Gust	Attu Dec 7 1950
ARIZONA	92	Peak Gust	Mesa Aug 13 1983
CALIFORNIA	101	Peak Gust	Sandberg Mar 25 1975
	77	One Minute	Sandberg Feb 10 1960
COLORADO	80	Fastest Mile	Pueblo Jan 17 1950
	143	Peak Gust	Boulder Jan 11 1972
HAWAII	103	Peak Gust	Kilauea Point Aug 7 1959
IDAHO	72	Fastest Mile	Pocatello Mar 24 1955
MONTANA	82	Fastest Mile	Great Falls Dec 10 1956
NEVADA	80	Fastest Mile	Reno Jan 10 1968 Mar 12 1968
NEW MEXICO	108	Peak Gust	Raton Feb 1 1963
	90	Fastest Mile	Albuquerque Dec 9 1943
OREGON	96	Peak Gust	Astoria Oct 12 1962
	88	Fastest Mile	Portland Oct 12 1962
UTAH	94	Peak Gust	Salt Lake City Jun 3 1963
	71	Fastest Mile	Salt Lake City Mar 10 1954
WASHINGTON	113	Fastest Mile	North Head Jan 29 1921
WYOMING	96	Peak Gust	Sheridan Nov 27 1949
	84	Fastest Mile	Sheridan Nov 27 1949
UNITED STATES	231	Peak Gust	Mt. Washington New Hampshire Apr 12 1934
	188	Five Minute	Mt. Washington New Hampshire Apr 12 1934
NORTH AMERICA	231	Peak Gust	Mt. Washington New Hampshire U.S. Apr 12 1934
	188	Five Minute	Mt. Washington New Hampshire U.S. Apr 12 1934
WORLD	231	Peak Gust	Mt. Washington New Hampshire U.S. Apr 12 1934
	188	Five Minute	Mt. Washington New Hampshire U.S. Apr 12 1934
	207	Peak Gust	Thule Air Base Greenland Mar 8 1972

- 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)
- 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 Gudgeal, April 1978. (PB-283-080/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. (PB289767/AS)
- 133 Spectral Techniques in Ocean Wave Forecasting. John A. Jannuzzi, October 1978. (PB291317/AS)
- 134 Solar Radiation. John A. Jannuzzi, November 1978. (PB29195/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., Jan. 1979. (PB294324/AS)
- 138 A Simple Analysis/Diagnosis System for Real Time Evaluation of Vertical Motion. Scott Heflick and James R. Fors, February 1979. (PB294216/AS)
- 139 Aids for Forecasting Minimum Temperature in the Wenatchee Frost District. Robert S. Robinson, 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)
- 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)
- 145 On the Use of Solar Radiation and Temperature Models to Estimate the Snap Bean Maturity Date in the Willamette Valley. Earl M. Bates, August 1979. (PB80-160971)
- 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)
- 150 Annual Data and Verification Tabulation - Eastern and Central North Pacific Tropical Storms and Hurricanes 1979. Emil B. Gunther and Staff, EPHC, April 1980. (PB80-220496)
- 151 NMC Model Performance in the Northeast Pacific. James E. Overland, PMEL-ERL, April 1980. (PB80-196033)
- 152 Climate of Salt Lake City, Utah. Wilbur E. Figgins, June 1980. (PB80-225493) (Out of print.)
- 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. (PB81-108367)
- 155 A Raininess Index for the Arizona Monsoon. John H. TenHarkel, 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 Eversal, April 1981. (PB81-224495)
- 163 A Comparison of Two Methods for Forecasting Thunderstorms at Luke Air Force Base, Arizona. Lt. Colonel 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. (PB81-230784)
- 165 Annual Data and Verification Tabulation, Eastern North Pacific Tropical Storms and Hurricanes 1980. Emil B. Gunther and Staff, May 1981. (PB82-230386)
- 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.
- 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)
- 173 Central San Joaquin Valley Type Maps. Thomas R. Crossan, December 1981. (PB82-196064)
- 174 ARAP Test Results. Mark A. Mathewson, December 1981. (PB82-193103)
- 175 Annual Data and Verification Tabulation Eastern North Pacific Tropical Storms and Hurricanes 1981. Emil B. Gunther and Staff, June 1982. (PB82-252420)
- 176 Approximations to the Peak Surface Wind Gusts from Desert Thunderstorms. Darryl Randerson, June 1982. (PB82-253089)
- 177 Climate of Phoenix, Arizona. Robert J. Schmidt, April 1969 (revised March 1983).
- 178 Annual Data and Verification Tabulation, Eastern North Pacific Tropical Storms and Hurricanes 1982. E. B. Gunther, June 1983.
- 179 Stratified Maximum Temperature Relationships Between Sixteen Zone Stations in Arizona and Respective Key Stations. Ira S. Brenner, June 1983. (PB83-245904)
- 180 Standard Hydrologic Exchange Format (SHEF) Version I. Phillip A. Pasteries, Vernon C. Bissel, David G. Bennett, August, 1983.
- 181 Quantitative and Spatial Distribution of Winter Precipitation Along Utah's Wasatch Front. Lawrence B. Dunn, August, 1983.

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:

**ENVIRONMENTAL SCIENCE INFORMATION CENTER (D822)
ENVIRONMENTAL DATA AND INFORMATION SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE**

**6009 Executive Boulevard
Rockville, MD 20852**

