

CLIMATE OF NORTHEASTERN NEW MEXICO

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Abstract—Northeastern New Mexico has a semiarid continental climate. Temperature changes are seasonal and range from below zero minimum to 100°F-plus maximums. Precipitation averages a little over 15 inches per year in most areas, with 70–75% falling during the months of April through October. Windy days are common; the average hourly velocity is from 12 to 15 miles per hour.

Climatological data for many stations in northeastern New Mexico have been summarized in various federal, state and privately-issued publications. The New Mexico State Engineer Technical Reports 5 and 6 (1956a, 1956b) listed all stations in New Mexico for which records were available for the period 1849 through 1954. G. F. Von Eschen, State Climatologist in 1961, prepared detailed summaries of the climatic characteristics of 35 stations—most of the principal communities—of the state (Von Eschen, 1961). That for the village of Roy is reproduced here as typical of the region. Gabin and Lesperance (1977) published an updated summary of climatological data for precipitation, temperature, evaporation and wind in New Mexico for the period 1850 through 1975. In 1984, Dr. Kenneth E. Kunkel, State Climatologist, prepared temperature and precipitation summaries (Kunkel, 1984) for selected New Mexico locations to 1983 (Fig. 1). The summaries do not contain as complete a record for some stations as the aforementioned references. To quote from Kunkel's introduction (Kunkel, 1984, p. ii):

The data from which these summaries were computed were obtained in digital form on magnetic tape from the National Climatic Data Center (Asheville, NC). Generally the earliest data included on these tapes began in 1931. However, a few stations have digitized data beginning in earlier years. The latest data included is [sic] for 1983. A few stations have only

precipitation data. Most of the stations included here have a period of record of at least 25 years and are still active. However, in order to provide good statewide coverage, a few stations are included which have shorter periods of record or are currently inactive. The locations included in this report are shown in Figure 1 and listed in Table 1. In cases where a station is some distance from a town the station name often indicates relative location. For instance, "Artesia 6 S" indicates that the station is located 6 miles south of Artesia.

With climatological data recorded in digital form on magnetic tape, the State Climatologist, Box 5702, New Mexico Department of Agriculture, New Mexico State University, Las Cruces, New Mexico 88003, can provide, at a nominal fee, up-to-date climatic data in hard copy or in digital form for any one or all stations in New Mexico. Computer printout by water year, October through September, also is available for most stations.

Examination of the various station summaries prepared by Von Eschen shows that the region included in the field conference has a relatively uniform climate. Von Eschen (1961, p. 63) presents the following information on the climate of Roy:

Roy has a semiarid continental climate. Summers are generally mild and produce most of the year's moisture. In an average year only 29 days have maximum temperatures reaching 90 degrees or higher, but temperatures of 100 degrees or higher have occurred in June, July, and August. Summer nights are usually cool, the temperature normally dropping below the 60-degree mark before morning. While winter temperatures average close to the freezing mark, many days are sunny and mild, with shade temperatures climbing to mid-40's and low 50's in the afternoon. Winter nighttime temperatures fall below the freezing mark most of the time from early November through March; yet zero temperatures are experienced on only about two days.

The annual precipitation average is around 15 inches, approximately 75 percent of this yearly moisture falling during the summer months May-October and favoring summer farm crops and normally producing good forage on extensive range lands in the country. Most of this moisture falls during brief thundershowers, which usually occur during the late afternoon or early evening. Only rarely does this area experience prolonged rainy spells. Hail may accompany the more severe summer thunderstorms, but only one tornado has been reported in Harding County during the period of record. Winter precipitation is generally light, with only one or two days a month when as much as one-tenth inch of moisture falls. Much of the winter precipitation comes as snow, and an occasional snowfall of one foot or more can be expected. Following these heavier falls, snow may lie on the ground for several days; and, occasionally, moderate-to-strong winds accompanying these storms results in blizzard conditions and heavy drifting.

Sunshine, relative-humidity, and wind records are not available for Roy area; but in general relative humidity averages about 50 percent for the year; ranging from about 70 percent in the cooler morning hours in winter to less than 30 percent during summer afternoons. The sun shines approximately 75 percent of the possible hours, with winter months mostly clear and sunny. Winds in the area average about 12 miles per hour for the year, with the late winter and spring months the windiest, when average hourly velocities are closest to 15 miles per hour. Occasionally, in later winter and spring moderate-to-strong winds persist for several hours with velocities above 25 miles per hour resulting in some blowing dust. The growing season at Roy averages about 172 days a year: from April 29, the average date of the last freezing temperatures

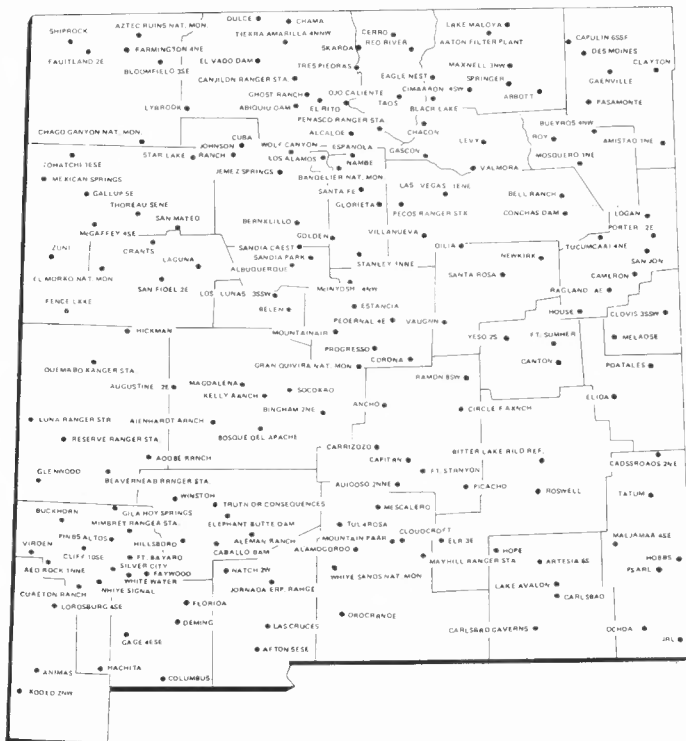


FIGURE 1. Locations of New Mexico climatological data stations (from Kunkel, 1984).

in spring, to October 14, the average date of the first freezing temperature in fall.

An update by the U.S. Weather Service, Albuquerque Office, stated that the average annual precipitation at Roy for the five-year period from 1980 to 1984 was about 15.65 inches. The lowest annual rainfall of record was 7.23 inches in 1934, and the highest was 33.86 inches in 1941. The average for the period 1931 to 1984 was 15.08 inches annually. In only six years, 1933, 1934, 1936, 1943, 1954 and 1956 was precipitation less than 11.0 inches in the period 1931 to 1960. The years 1933 to 1936 were the severest period of the so-called "Dust Bowl era."

Precipitation over the region is, in general, relatively uniform, varying by only a little more than 1.0 inches between various stations, as may be seen in Table 1. However, annual and monthly deviations from the averages can be great. The following quotation from Houghton (1970, p. 7) shows just how great these deviations can be:

Average annual rainfall in Harding County ranges from 15 to 17 inches. Extremes of precipitation include an annual total of 47.02 inches at Yates in 1941, a monthly maximum of 13.88 inches near Mosquero in September 1941, and a 24-hour total of 6.45 inches at Bueyeros on September 22, 1941. . . . Annual snowfall in Harding County localities averages from 19 to 26 inches. Extremes of snowfall include an annual total of 67.0 inches at Roy.

An examination of precipitation records for the past 75 years at Roy shows that the annual precipitation has had periodic swings from above to below normal (Fig. 2). The graph shows the accumulative departure in percent from annual mean and clearly illustrates the periods of dis-

TABLE 1. Mean precipitation at five stations, in inches, northeastern New Mexico (from Kunkel, 1984).

Month	Raton 1953-1983	Springer 1931-1983	Roy 1931-1983	Mosquero 1931-1983	Clayton 1896-1983
January	0.39	0.36	0.36	0.40	0.27
February	.45	.32	.37	.32	.40
March	.87	.57	.58	.55	.66
April	.97	.99	.90	1.02	1.27
May	2.32	1.88	2.17	2.21	2.42
June	1.75	1.59	1.75	1.86	1.86
July	2.93	2.66	2.67	2.97	2.61
August	2.96	3.20	2.35	2.91	2.18
September	1.26	1.56	1.72	1.97	1.62
October	1.03	1.12	1.19	.94	1.07
November	.70	.56	.46	.55	.49
December	.52	.36	.51	.42	.38
Annual Total	16.15	15.17	15.03	16.12	15.23

astrous drought that occurred through the High Plains from 1916 through 1957.

The significance of the graph lies in the relation of precipitation to ground-water storage. When precipitation is below normal for successive years, the water table can be expected to decline, whether or not water is removed by pumping. The cumulative departure curve thus is a reflection of natural trends in water levels that would occur in response to annual rates of precipitation. Large withdrawals from an aquifer as a result of pumping could reverse the natural trends. Pronounced declines in water levels during periods when cumulative departure graphs indicate they should be rising would be indicative of serious overdraft from the aquifer.

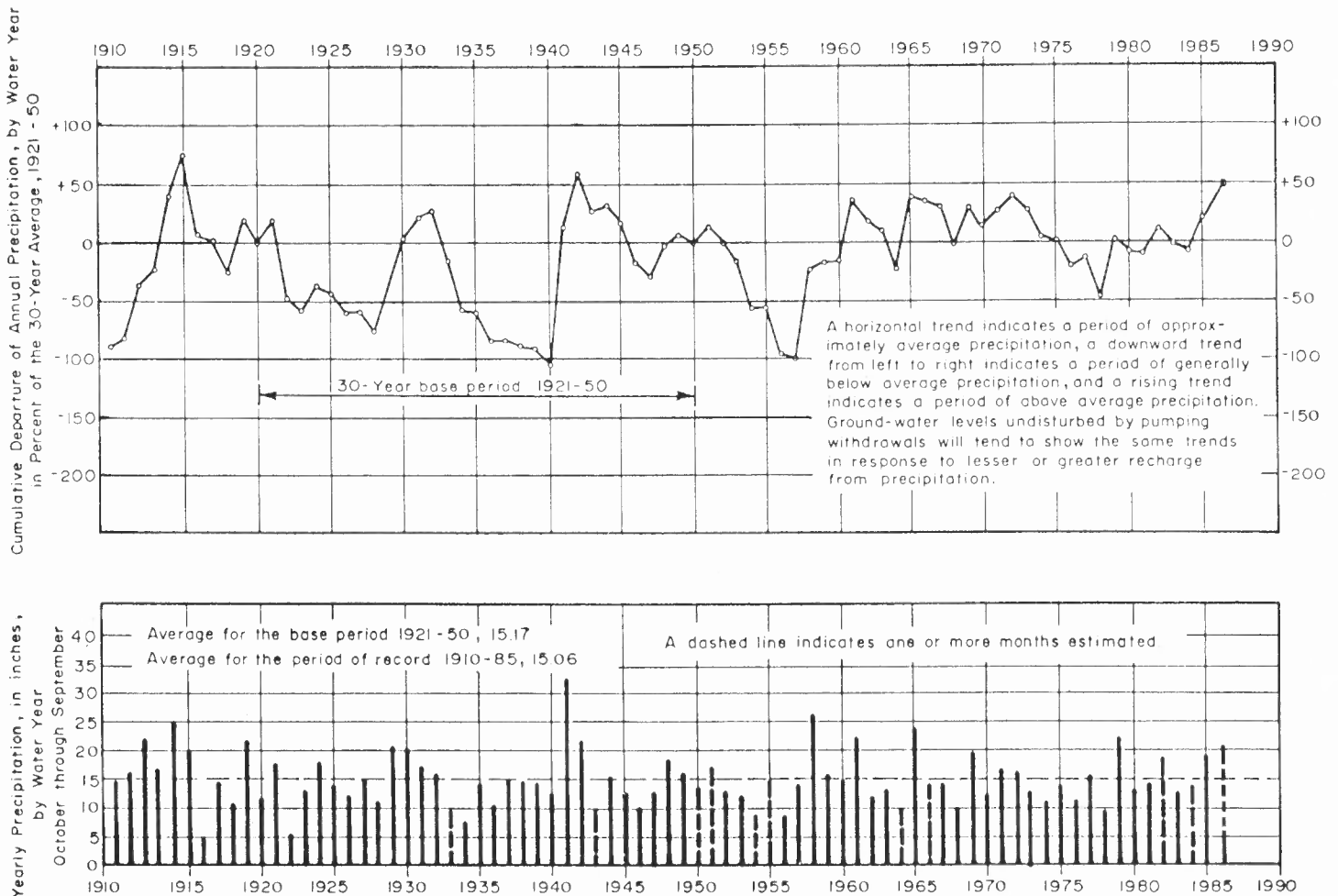


FIGURE 2. Precipitation by water year (October through September) at Roy, Harding County, New Mexico, and cumulative departure of annual precipitation from the average for the 30-year period 1921-1950 (from Trauger et al., 1986).

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Camp in Johnson's Park, Colfax County, New Mexico. Photograph by W. T. Lee, circa 1900–1910, courtesy of the U.S. Geological Survey and R. Eveleth, NMBMMR.