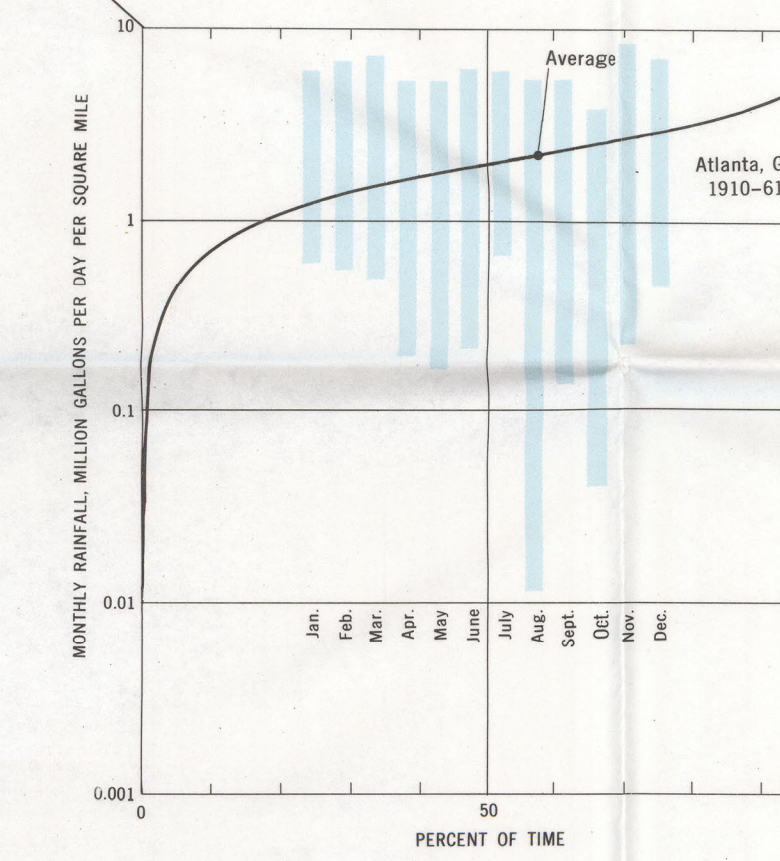
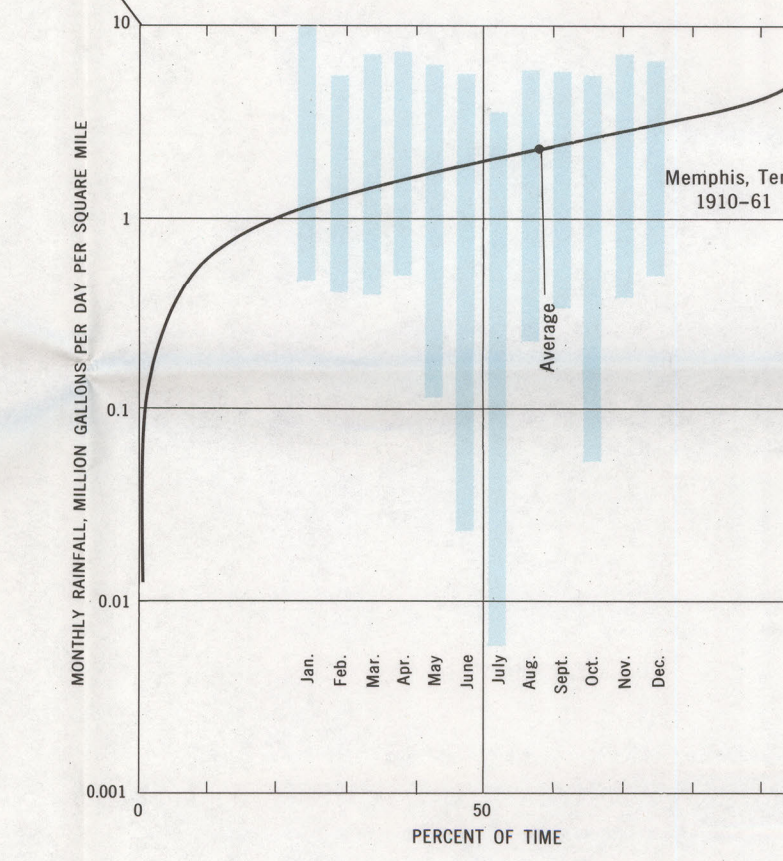
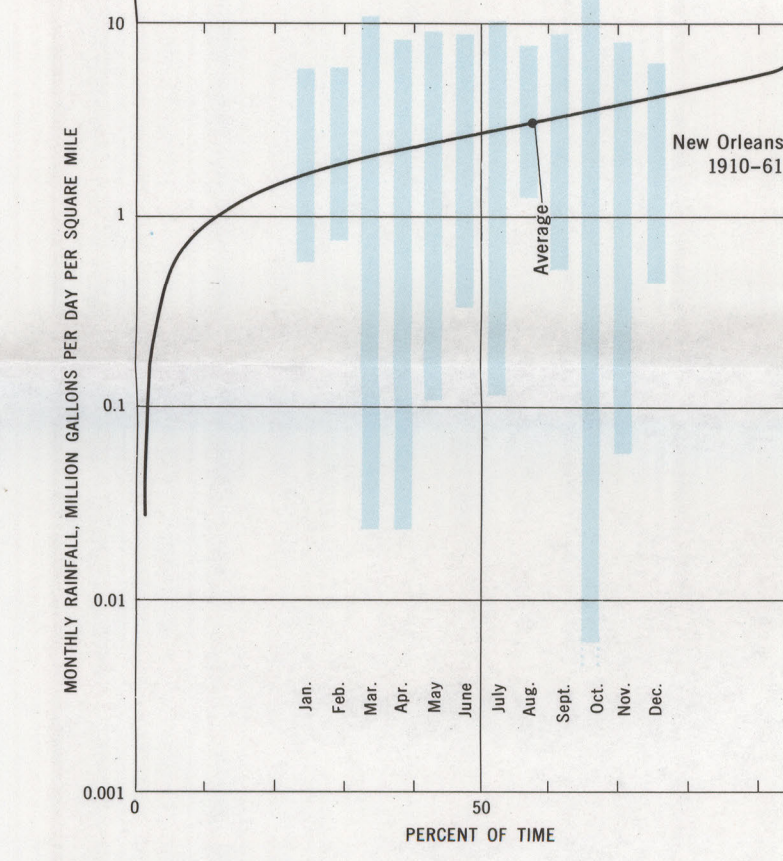
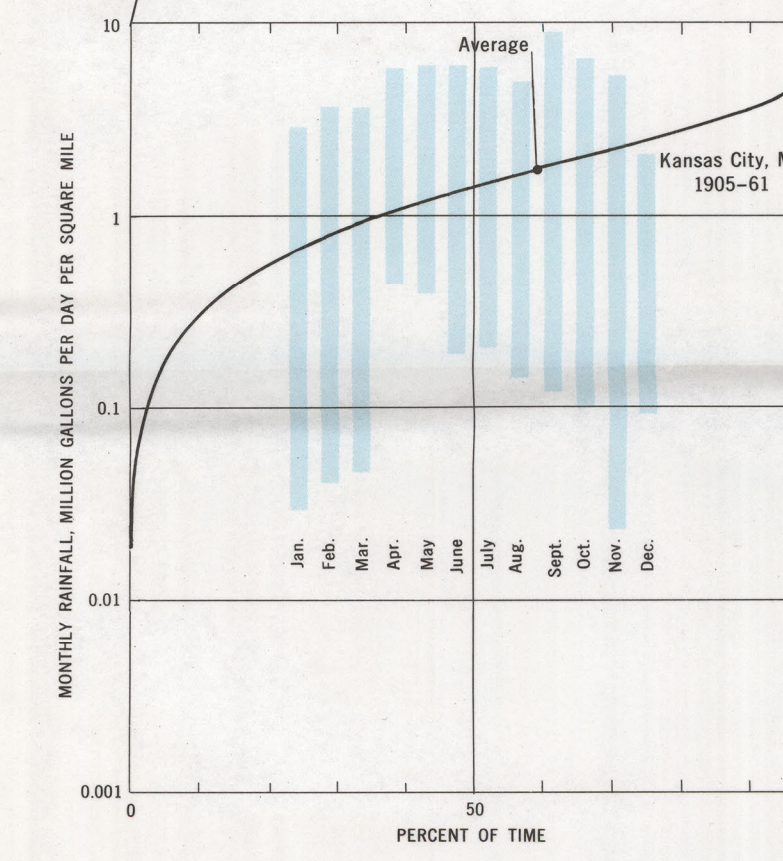
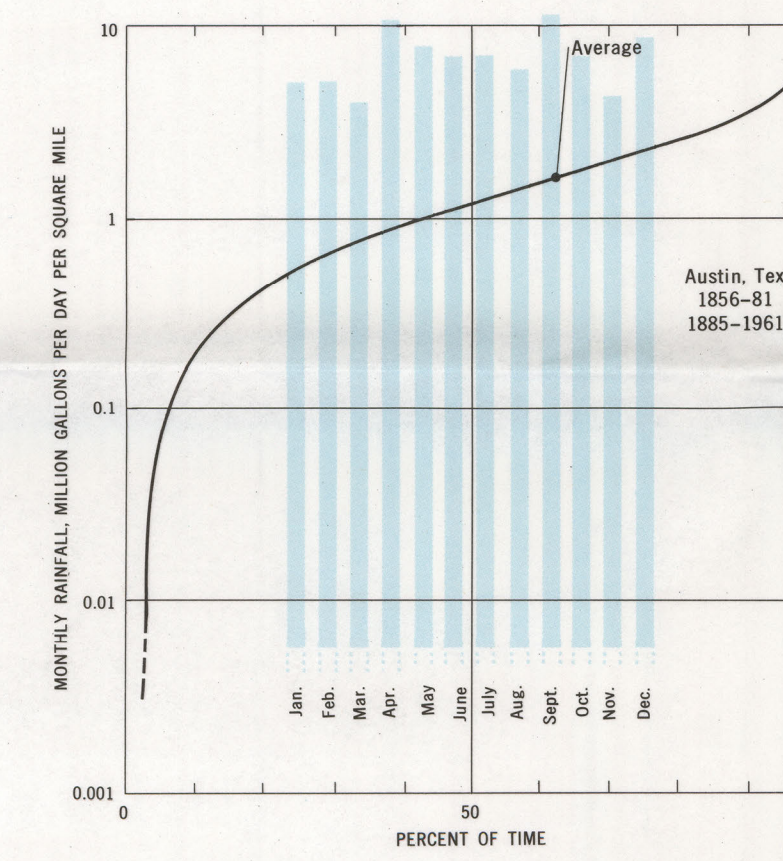
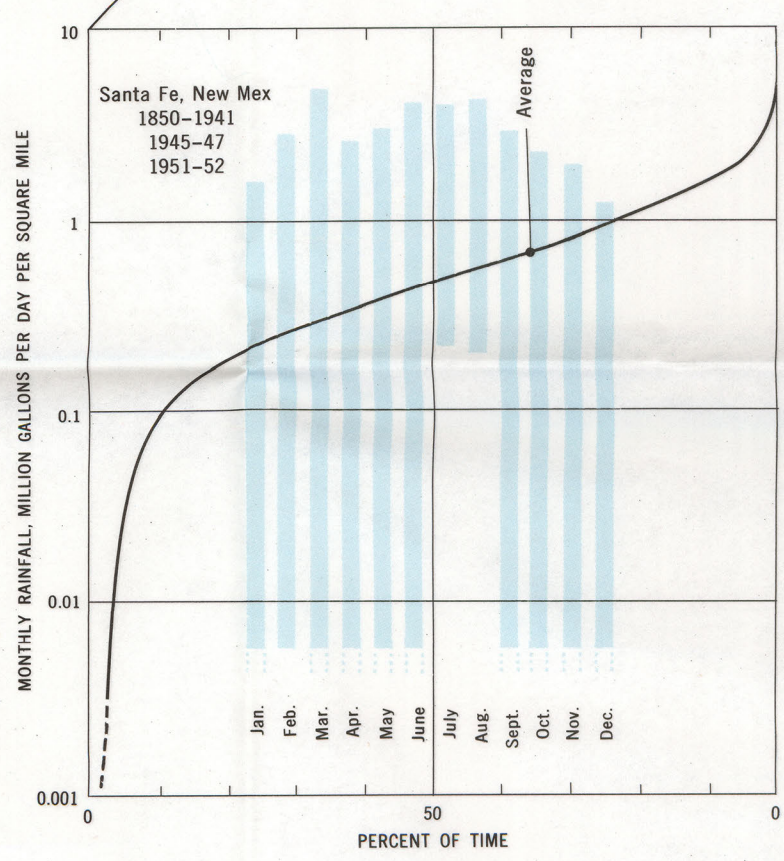


Base by U.S. Geological Survey, 1961



AVERAGE PRECIPITATION AND VARIATION
IN PRECIPITATION AT CERTAIN STATIONS

On the map, average precipitation is shown in mgd per mi² (million gallons per day per square mile). Sustained for a year, 1 mgd per mi² is equivalent to 21.0 inches depth; 1 inch per year is equivalent to 0.05 mgd per mi².

Eastward from about the 98th meridian, average precipitation everywhere exceeds 1 mgd per mi²; westward from that meridian, average precipitation equals or exceeds that amount only on the higher parts of mountainous areas. Average precipitation exceeds 4 mgd per mi² only locally on the Pacific slope in Washington and Oregon.

Each of the diagrams around the map comprises a duration curve and a bar chart of variability in monthly precipitation. The diagrams show the following general characteristics:

1. The higher the duration curve on its diagram, the greater the average monthly precipitation. The greatest shown is that at New Orleans, La.; the least, that at Yuma, Ariz.

2. The less the slope of the duration curve the more nearly uniform is precipitation through the year. The most uniform shown is that at Syracuse, N. Y., and other stations on the Atlantic slope; the least uniform, stations on the Pacific slope. Other measures of variability are (a) the ratio of average monthly precipitation (marked on each of the diagrams) to median monthly precipitation (that which is exceeded in half of the months) and (b) the ratio between the upper and lower deciles of the duration array—that is, between the limits that exclude the wettest 10 percent and the driest 10 percent of the months. The following table derives these ratios.

Monthly rainfall at the 19 stations

Station	Rainfall		Decile limits			
	Average (mgd per mi ²)	Median (mgd per mi ²)	Average Median	Upper (mgd per mi ²)	Lower (mgd per mi ²)	Upper Lower
Reno.....	0.34	.18	1.9	0.88	.00057	150
Portland.....	2.01	1.52	1.3	4.5	.19	24
Salt Lake City.....	.74	.61	1.2	1.5	.13	12
Great Falls.....	.70	.51	1.4	1.5	.11	14
Minneapolis.....	1.24	.94	1.3	2.8	.24	12
Chicago.....	1.56	1.33	1.2	2.8	.50	5.6
Syracuse.....	1.74	1.58	1.1	2.7	.90	3.0
Boston.....	1.94	1.78	1.1	3.2	.75	4.3
Grass Valley.....	2.50	1.35	1.8	6.9	.0057	1,200
San Francisco.....	1.04	.44	2.4	3.1	.057	540
Denver.....	.69	.50	1.4	1.6	.10	16
Yuma.....	.15	.017	8.5	.47	.0057	82
Santa Fe.....	.68	.47	1.4	1.6	.092	17
Austin.....	1.59	1.19	1.3	3.5	.19	18
Kansas City.....	1.71	1.41	1.2	3.5	.29	12
New Orleans.....	3.02	2.69	1.2	5.9	.92	5.6
Memphis.....	2.25	1.92	1.2	4.2	.62	6.8
Atlanta.....	2.27	2.01	1.1	4.1	.70	5.9
Charleston.....	2.11	1.68	1.3	4.1	.32	7.9

New Orleans and Grass Valley rank first and second, respectively, in average monthly precipitation but are nearly the least variable and the most variable, respectively, as measured by the ratio between decile limits. Yuma ranks last, by far, in average and median precipitation but is less variable than San Francisco or Reno in terms of the decile-limit ratio.

3. If the duration curve sweeps widely downward at its left end, months of zero or nominal precipitation are numerous. (Compare the curves for Yuma, Grass Valley, and Atlanta.) Among these three stations, median monthly precipitation is in the ratio of 1:80:18; the respective climates are arid, superhumid, and humid. On the other hand, the number of months whose precipitation is less than 0.1 mgd per mi² (0.2 inch) are in the ratio of 87:32:1. Grass Valley is thus much more like Yuma than it is like Atlanta, even though its "average" climate is superhumid.

Conversely, a wide upward sweep at the right end of the duration curve signifies inordinately heavy precipitation at relatively frequent intervals. (Compare the curve for Boston, which has a slight upward sweep, with those for Reno and Yuma, which have pronounced upward sweeps.) Median monthly precipitation at Boston is roughly 10-fold greater than at Reno and 100-fold greater than at Yuma. However, the greatest monthly precipitation is only 1.7 times that at Reno and 1.9 times that at Yuma.

4. The bar charts indicate range of precipitation, not only in each month but also from season to season. Note, for example: (a) At most stations on the Pacific slope, the seasonal range is large, the maximum occurring in December or January and the minimum in July or August; furthermore, variability in each month increases from north to south. (b) At stations on the east slope of the Rocky Mountains, seasonal maximum commonly is from early- to mid-summer, minimum, from December to February; variability is somewhat less than on the Pacific slope at the same latitude. (c) In north-central and northeastern States there is a less pronounced seasonal range; a maximum generally occurs in late summer but in late spring in some years and at some places; over all the Nation variability is least in these States. (d) In southeastern and Gulf States the seasonal range is moderate to small; variability is commonly extreme.

The few long-term records suggest that in many parts of the Nation, if not all, average and median yearly precipitation during the half century just ended has been from 5 to 10 percent less than during the whole century. (See, for example, the two duration curves for Charleston, S.C.) Thus, although the available information on the amount, distribution, and variability of precipitation probably is biased by the greater number of short-term records, that bias probably leads to water-supply estimates that are somewhat too small rather than too large.