NOAA Technical Memorandum NWS WR-155

A RAININESS INDEX FOR THE ARIZONA MONSOON

Salt Lake City, Utah
July 1980

U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration / National Weather Service

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A RAININESS INDEX FOR THE ARIZONA MONSOON

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Phoenix, Arizona

July 1980

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I. ABSTRACT

A raininess index is derived for Arizona for each summer day from 1897 through 1979. Mean values for each season and each date are tabulated, graphed and compared to other measures of monsoon activity. Column (date) means are used to derive a normal curve for the Arizona Monsoon. Some individual seasons are then compared to the normal curve.

II. BACKGROUND

Arizona's summer rainy season has been called a "Monsoon" because it coincides with a seasonal shift of the winds aloft (from west to southeast). Although rainfall is lighter and much less frequent than that of the Asian Monsoon, it is seasonal, and it does depend on a seasonal wind shift. The name "Arizona Monsoon" has been used locally for many years and will be used here.

Most attempts to document the Arizona Monsoon have employed data from a few individual stations having a long period of record. Time-frequency graphs from such records show great day to day and station to station variability in rainfall. They give an impression of randomness in both a spatial and temporal sense.

The experience of the author in operational forecasting at Phoenix is that there are large systematic variations in raininess, from one day to another, and also for periods of a week or more. However, attempts to understand and anticipate these changes have had little success.

Before such changes can be studied, they must be documented. An index of rainfall coverage is needed, which is not subject to chance occurrence at fixed locations, and which can be averaged over a long period of record.

Bryson and Lowry (1955) devised a raininess index that used all available rain reports including those from unpaid "cooperative" observers, about 200 at the time. A two-day running mean was taken to reduce second-day error, caused when some observers took their readings on the following day (morning). Reiter (1957) employed a similar index. These authors tabulated their index for only the first part (onset) of the rainly season, and for only a 30-year period of record.

The following tabulation is for the entire summer, June 1 through September 30, from 1897 to 1979(see appendix).

III. DATA

Daily substation rainfall from the Arizona Section of "U.S. Climatological

Data" (or it's equivalent) were used to find a raininess index for each day. The index, hereafter, called the "Monsoon Index" or "M.I.", is defined as:

$$M.I._{(D)} = \frac{100 \times R}{N}$$

where N is the number of reporting stations having a complete record for the month and R is the number of stations reporting .01 inch or more of rain on a given day (D).

Values of M.I. were tablulated without any attempt to correct for second-day error. This type of error is discussed later.

The tabulation starts with 1897, the first year for which daily rainfall was included in the climatic data. At that time, there were 41 stations. There are now nearly 200.

The areal distribution of climatic stations has not changed very much. Since 1897, there has been a concentration of stations in the central and southeast sections. This roughly coincides with the region of maximum summer rainfall.

Figure 1 shows the distribution of stations in July 1979. Stations included in the tabulation are marked with a large black dot. The area that normally receives more than two inches of rain in July is shaded, the areas with over four inches are darkly shaded.

About one quarter of the state's area averages more than two inches of rain in July; and over one half (111 out of 188) of the reporting stations are within this area. Thus, the M.I. is weighted toward the area that normally has the most rainfall.

There is a close relationship between rainfall amount and areal coverage - for those years for which an average statewide rainfall was computed, the correlation between it and the average Monsoon Index is near 0.90 (slightly less in September).

IV. TABLES

The M.I. is tabulated by month; each row represents a year, each column a date. The average and standard deviation for each row (year) are shown on the right, and to the right of the September table, the seasonal average and standard deviation are shown. These are for the entire 122 days of the summer.

Rounded (Integer) averages for the columns are shown below (after 1979) for each day. These averages, along with standard deviation, and moment coefficients of skewness and kurtosis, are tabulated separately, in single precision (6-place) accuracy. (See Appendix.)

V. ANALYSIS

Daily (column) means are plotted in Figure 2. A normal curve was hand-fitted to the data points, then a polynominal fit was attempted. The equation:

$$M.I. = 28.34 + 0.02 \text{ x } - 0.016 \text{ x } D^2 + 0.000085 \text{ x } D^3 + 0.000003 \text{ x } D^4 - 0.00000027 \text{ x } D^5$$

explains 95.68% of the variance in M.I. Here, D is the day number, zero on August 1.

Figure 3 shows the individual season (Row) means for each year since 1897, and Figure 4 shows the monthly means for July, for comparison. Note the relatively small standard deviation, especially for the season totals.

Figures 5-7 compare individual seasons to the handfitted normal curve. The year 1900 (Figure 5) was very dry, the year 1931 (Figure 6) was very wet. The most recent year, 1979, is shown in Figure 7. Note the very high peak in early August, (August 12), a day of extensive flash flodding. Yet, the season was overall a very dry one.

VI. DISCUSSION

Much can be learned simply by visual inspection of the tables. Note that rainy periods of several days do occur in August, supposedly a wet month. There have been many "breaks" in the monsoon similar to those of August 1976 and 1977, which caused much comment and speculation about a "failure" of the monsoon.

Very high peaks (over 80% coverage) are more common after the end of July, and especially in September, when frontal type precipitation and also hurricanes sometimes occur.

Skewness of the daily samples is very large in June, and again in September, because of the high frequency of dry days (M.I.=0). Kurtosis, a measure of the "peak-ness" of a distribution, also is high. This is typical of an arid climate, which Arizona's certainly is, most of the time.

Near the peak monsoon period, late July, skewness approaches zero and kurtosis nears the value 3, approaching the values of a normal distribution. This is not characteristic of aridity.

VII. OTHER MEASURE OF MONSOON ACTIVITY

In recent years hourly ARTC radar maps have been composited for 12-hour periods, 0000-1200 GMT and 1200-0000 GMT, daily. These composite maps can be used to estimate how much of a geographic area has been subjected to rainfall, assuming all areas covered by a radar echo at least once in the 12-hour period had rain.

Unfortunately, until recently, no one had been keeping a record of these charts. They were collected at WSFO Phoenix for the summer of 1979, and rainfall coverage estimated using a template.

This gives us a fair estimate (subject to uneven radar coverage and infrequent reports) of the actual areal coverage of rainfall, with which we can try to correct the Monsoon Index for its "wrong day" error.

The following model was tested, using stepwise linear regression:

adjusted M.I. ≅ Radar Coverage (%) = BØ + B1 x M.I. (today) + B2 x M.I. (next day) + B3 x M.I. (yesterday) + B4 x M.I. (second day).

at the 5% confidence level, the only variables selected were the M.I. for "today" and "tomorrow", with the latter value having the greatest weight. The equation:

Radar Coverage = .184 + .296 x M.I. (today) + .68 x M.I. (tomorrow)

explained 86.2% of the variance in radar coverage.

An attempt was then made to screen in other predictors for individual stations having a record extending back to 1897. Parameters that would be available for use since that year include dewpoint, maximum and minimum temperature, rainfall and sky cover. The resulting equation:

R.C. = .254 x M.I. today + .644 x M.I. tomorrow + 1.45 x [1/3 (Sky cover PHX + Sky cover TUS + Sky cover INW)] - 0.16 x (PHX dewpoint at 000Z)

explained 88.04% of the variance in R.C. (Radar Coverage).

All of the single station variables were strongly dependent on Radar Coverage. It is likely that much of the unexplained variance in radar coverage is caused by incomplete radar coverage , and by too infrequent radar observations. Also, no attempt was made to "weight" the radar data toward the east central and southeast parts of Arizona, where the Monsoon Index is weighted.

Even so, the technique looks promising and another attempt will be made as soon as two or three more years of radar data are collected. If it is possible to reduce the variance by 90% or more, one could then eliminate most of the "second-day" observational error for the entire period of record (since 1897).

VIII. COMMENTS, SUGGESTIONS FOR RESEARCH

The monsoon rains in Arizona change character from great variability at start and finish to dependability near their peak. In addition, the rains are well known to be associated with southeast winds aloft. This implies the main cause of the monsoon is a seasonal shift in the mean circulation, which is subject to interruption early and late in summer.

One may speculate that these interruptions are caused by small scale waves, travelling in the westerlies, or in the easterlies, or both; or they may be caused by large-scale shifts in the latitude of the westerlies, or the east-west axis of the subtropical high.

Another (wetting) mechanism was postulated by Hales ("Surges of Maritime Tropical Air Northward Over the Gulf of California, 1971"). This "Gulf Surge" has proven easy to spot once is starts, but almost impossible to forecast.

In any case, too little is known about the circulation in the region south of Arizona. It obviously plays a vital role in the monsoon since the moisture bearing winds blow from the south or southeast.

So far, the only mean-circulation maps available are those prepared by Sadler (1975); 300 mb and 200-mb 10-year means. The monsoon peak coincides with the establishment of a 200-mb anticyclone over northwest Mexico, and the farthest northward retreat of the westerly jet. It also coincides with the maximum northward displacement of the northeast Trades. (See "The Upper Tropospheric Circulation Over the Global Tropics" Part 1, Page 9, upper right graph).

Similar mean charts should be prepared for the lower troposphere, in particular, for the surface - 600-mb layer analyzed by the National Hurricane Center since 1968. Composite maps should be prepared for several cases of peak monsoon activity, and also for several cases of abnormally low activity, to find out what circulation patterns are associated with these abnormalities.

Individual case studies can be made using NHC 200-mb and SFC-600-mb analyses, both available on micro-film from the Hurricane Center. The Monsoon Index records could be used to spot abnormalities to be investigated.

The index tables themselves can be studied in more detail. Has there been any significant change in the Monsoon over the 83-year period? What is the frequency of dry days, or days with more than 50% coverage, in July, or August? What is the probability of a sequence of, say, 3 dry days in a row, or more than one "wet" day in a week?

These are all ideas that should have been explored locally (at Phoenix) in the course of operational forecasting; but have not been, because of a lack of time and resources. Hopefully, more time and resources will become available, but meanwhile it is hoped that the historical data will be of use to others.

The index tables were printed and statistics generated using a TRS-80 microcomputer. The data are stored on a 5-inch mini-disc.

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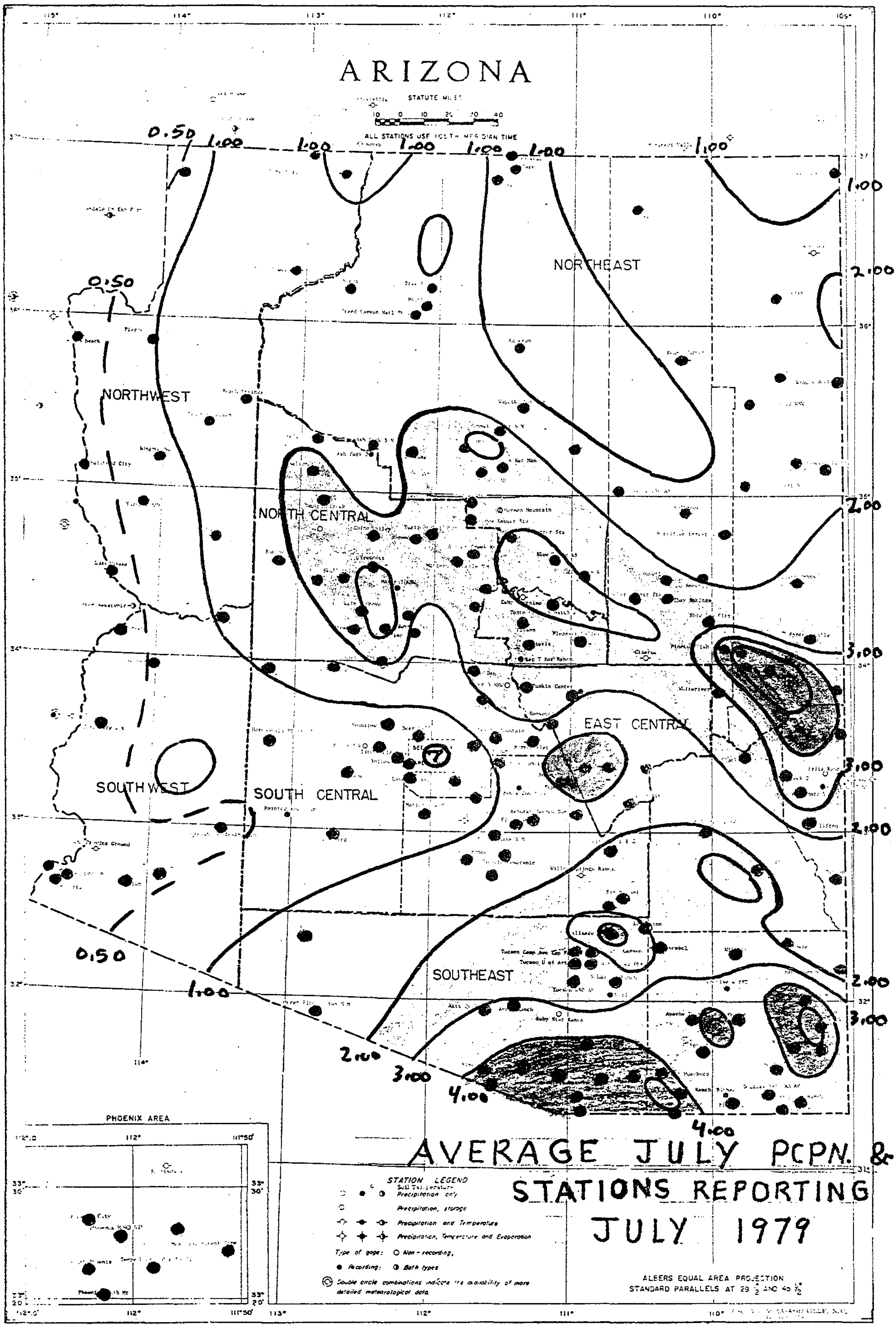
ARIZONA
STATUTE MILES
ALL STATIONS USE 105TH MERIDIAN TIME
NORTHEAST
NORTHWEST
NORTH CENTRAL
EAST CENTRAL
SOUTHWEST
SOUTH CENTRAL
SOUTHEAST
0.50
1.00
2.00
3.00
4.00
PHOENIX AREA
AVERAGE JULY PCPN. &
STATIONS REPORTING
JULY 1979
STATION LEGEND
Precipitation only
Precipitation, storage
Precipitation and Temperature
Precipitation, Temperature and Evaporation
Type of gage: Non-recording,
Recording:
Both types
Double circle combinations indicate the availability of more detailed meteorological data
ALBERS EQUAL AREA PROJECTION
STANDARD PARALLELS AT 29 1/2 AND 45 1/2

FIGURE 1

AVERAGE DAILY MONSOON INDEX JUNE 1 - SEPT 30

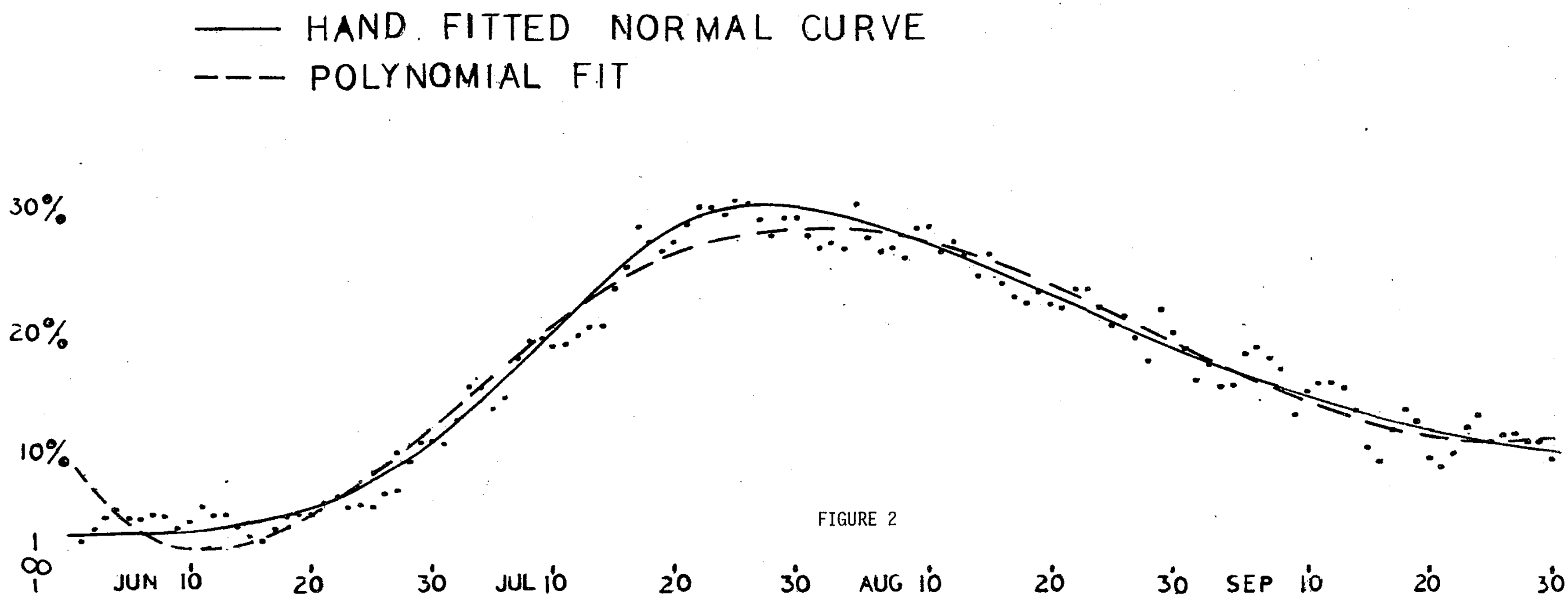

FIGURE 2

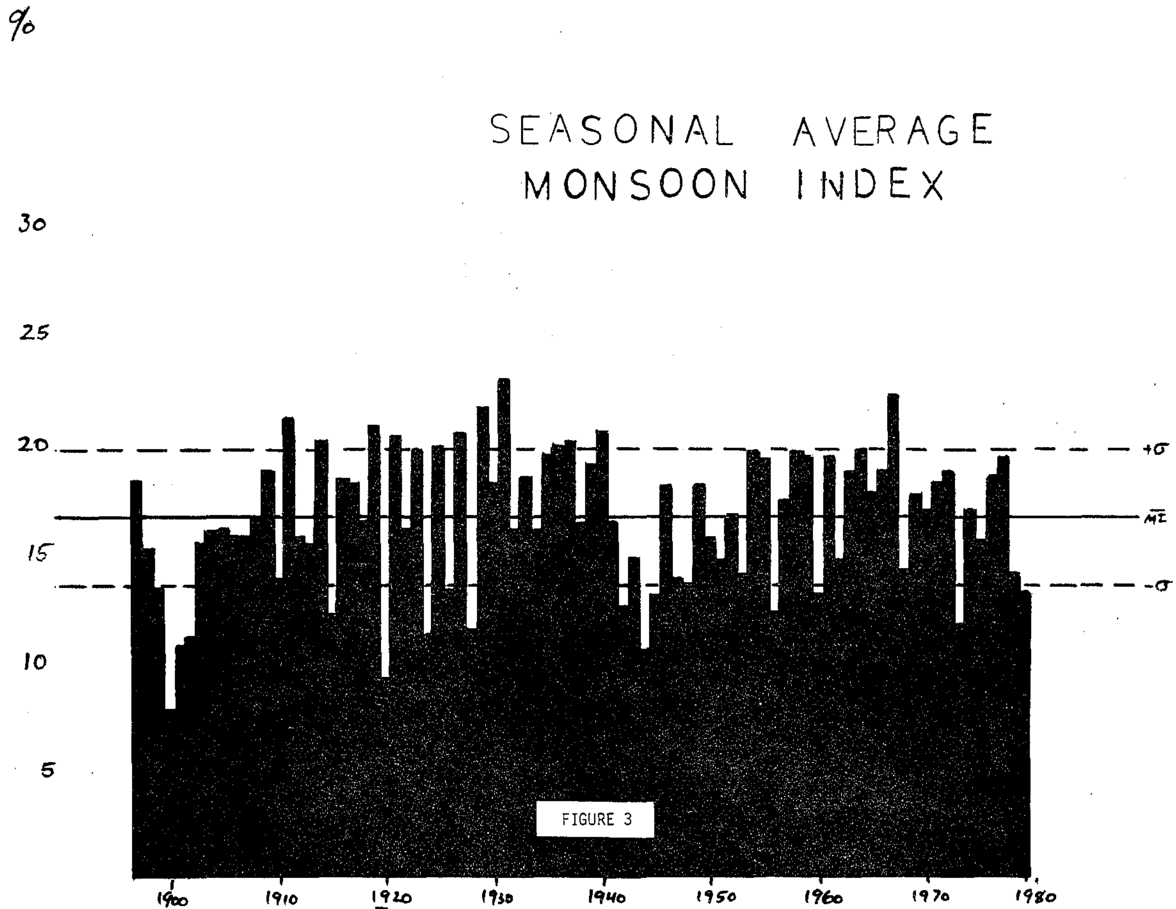

FIGURE 3

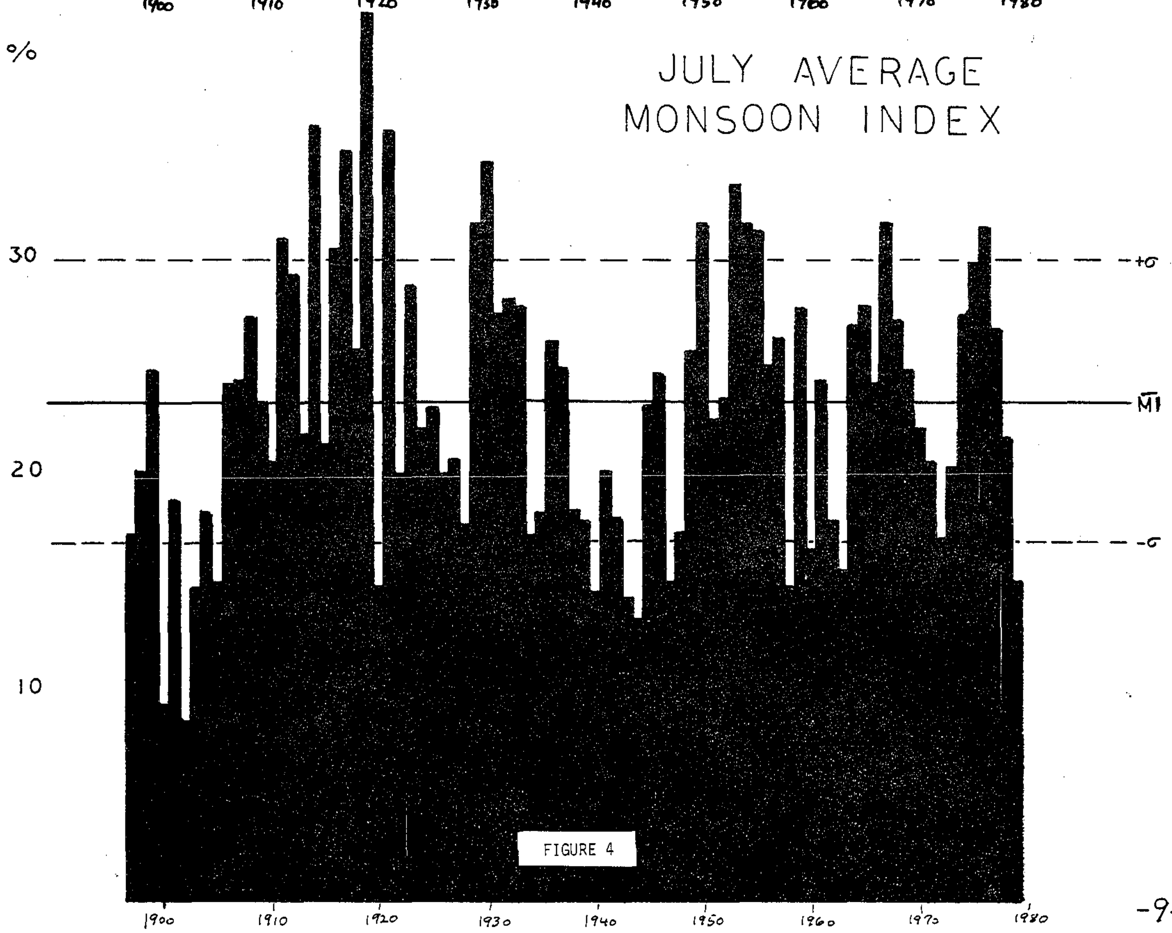

FIGURE 4

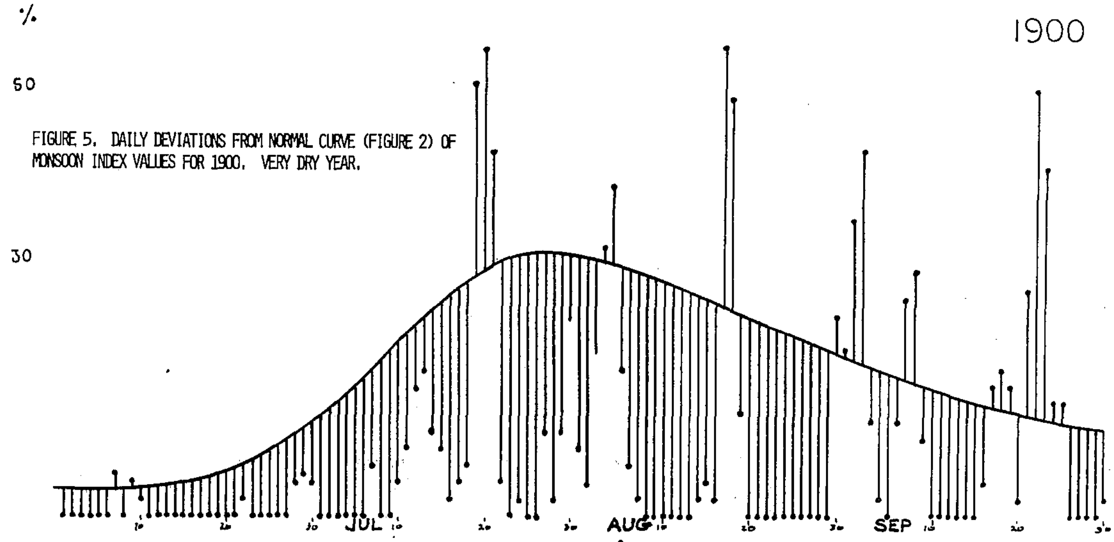

FIGURE 5. DAILY DEVIATIONS FROM NORMAL CURVE (FIGURE 2) OF MONSOON INDEX VALUES FOR 1900. VERY DRY YEAR.

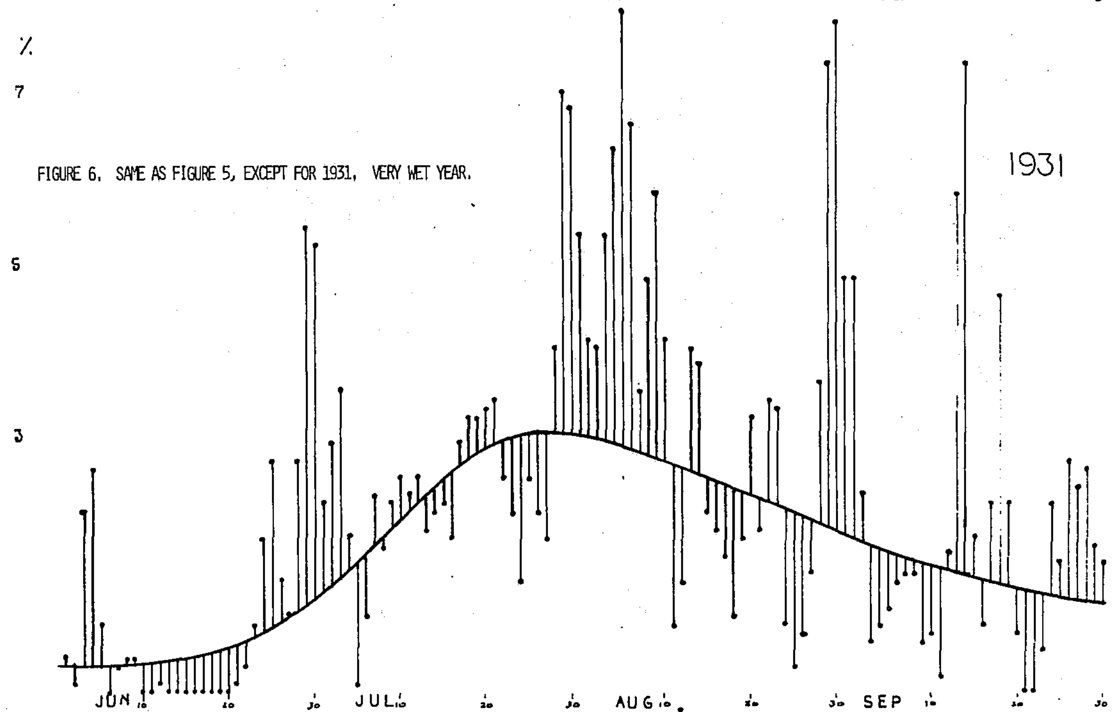

FIGURE 6. SAME AS FIGURE 5, EXCEPT FOR 1931. VERY WET YEAR.

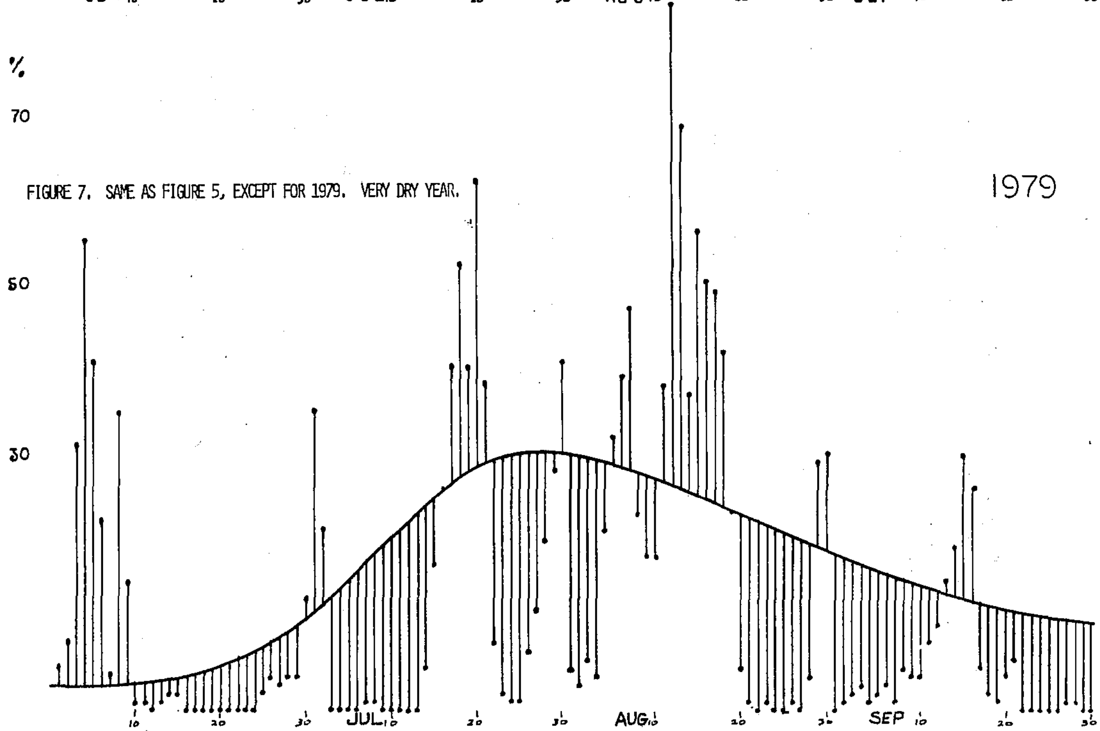

FIGURE 7. SAME AS FIGURE 5, EXCEPT FOR 1979. VERY DRY YEAR.

X. APPENDIX - 1897-1979 DATA TABULATIONS

1. DAILY MONSOON INDEX VALUES BY MONTH (JUNE THROUGH SEPTEMBER).
2. MEANS, STANDARD DEVIATIONS, SKEWNESS AND KURTOSIS OF DAILY MONSOON INDEX DATA.

DAILY MONSOON INDEX VALUES BY MONTH (JUNE THROUGH SEPTEMBER)

MONSOON INDEX FOR JUNE UNCORRECTED % STATIONS REPORTING RAIN >= .01 INCH

YEAR \ DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	AVG.	STD. DEV.
1897	00	00	00	00	00	00	00	02	12	10	10	05	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	10	24	2.4	5.48
1898	00	00	00	00	00	00	02	02	18	22	14	02	02	00	00	00	00	06	20	12	53	31	04	02	00	00	00	02	04	22	7.3	12.19
1899	28	53	11	02	00	00	00	00	00	00	00	00	00	00	00	02	02	00	07	19	11	18	18	37	33	07	00	09	09	04	9.0	13.34
1900	00	00	00	00	00	00	05	00	04	02	00	00	00	00	00	00	00	00	00	00	00	02	00	00	00	00	00	04	05	04	0.9	1.7
1901	00	00	00	00	00	00	00	00	00	00	00	00	04	02	00	00	00	00	00	00	02	00	00	00	00	02	00	00	00	00	0.3	.92
1902	00	00	00	00	00	00	02	00	05	02	02	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	11	35	1.9	6.63
1903	00	00	00	11	27	18	13	04	09	33	35	51	27	18	00	00	04	00	00	00	00	00	00	00	00	00	00	00	00	00	8.3	13.57
1904	00	00	02	00	00	00	04	02	00	00	00	00	02	09	18	15	05	02	02	00	00	00	00	00	05	02	02	05	04	00	2.6	4.38
1905	00	00	00	00	00	00	37	57	40	10	10	02	00	00	07	00	02	00	00	00	00	00	00	00	00	00	00	00	00	00	5.5	13.86
1906	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	06	00	00	00	00	00	00	00	00	00	00	01	00	00	00	0.2	1.1
1907	06	00	00	03	00	00	02	31	00	00	00	00	00	00	00	00	05	14	15	08	02	00	00	00	00	00	00	00	00	00	2.9	6.64
1908	00	00	00	00	00	03	03	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	06	21	03	02	00	00	00	1.3	3.98
1909	00	00	00	00	06	05	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	12	06	09	22	19	2.7	5.74
1910	01	17	20	03	00	00	00	00	00	00	00	00	00	00	00	00	01	00	01	00	00	01	00	00	06	28	61	32	03	00	5.8	13.48
1911	00	00	00	00	00	00	00	04	01	12	35	16	30	10	05	01	02	05	25	37	11	05	00	00	00	01	01	13	25	43	9.4	12.91
1912	00	00	00	01	01	08	30	14	03	01	00	00	00	00	00	00	00	01	01	08	30	25	16	24	04	11	15	24	38	09	8.8	11.35
1913	00	00	00	00	00	00	00	01	02	01	00	00	00	00	02	08	22	11	10	07	12	15	04	01	00	00	00	00	00	00	3.2	5.59
1914	54	39	03	03	00	03	04	01	21	35	15	00	01	13	02	03	13	26	08	01	00	00	01	00	02	01	02	12	38	51	11.7	16.12
1915	02	07	45	51	05	02	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	3.8	12.15
1916	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	02	01	00	00	00	00	00	00	00	00	00	00	00	0.1	.4
1917	00	00	00	00	00	00	00	00	00	00	00	00	00	01	01	00	00	02	04	04	01	09	05	00	00	01	01	01	04	09	1.4	2.51
1918	00	00	01	00	02	02	04	05	02	02	01	05	16	24	47	28	32	34	41	27	32	37	21	10	06	03	02	02	09	17	13.7	14.62
1919	00	00	01	00	01	00	00	00	00	01	00	00	01	00	01	00	00	02	02	01	02	05	02	05	02	07	09	11	20	38	3.7	7.79
1920	00	00	12	17	08	02	01	01	00	00	08	26	12	01	00	00	00	00	00	00	00	00	00	02	21	48	54	47	16	01	9.2	15.49
1921	00	00	00	04	11	06	00	03	00	05	17	29	34	30	10	00	00	00	00	00	00	00	00	00	00	00	00	00	01	01	5.0	9.71
1922	01	00	00	00	01	00	00	00	00	00	00	00	03	00	00	00	00	00	01	02	12	17	14	29	37	44	38	36	17	02	8.5	13.99
1923	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	06	00	00	00	07	07	02	01	00	00	00	0.8	2.05
1924	00	00	00	00	00	00	00	00	00	00	00	00	00	02	01	00	00	00	00	00	00	00	00	00	00	01	02	07	21	32	2.2	6.9
1925	00	00	01	09	03	01	01	00	00	00	00	00	00	01	11	16	16	06	22	44	48	33	15	30	17	12	15	25	60	61	14.9	18.24
1926	03	02	04	10	09	06	00	00	01	01	03	04	03	00	00	00	00	00	00	00	00	00	00	01	02	03	04	09	09	29	3.4	5.76
1927	01	00	00	01	00	00	00	00	01	42	58	46	21	15	08	00	00	00	05	00	01	00	01	03	08	40	58	35	10	00	11.8	18.74
1928	00	02	00	00	00	00	02	00	00	00	00	10	03	00	00	00	00	00	00	00	00	00	00	01	04	01	01	00	00	00	0.8	2.01
1929	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	04	03	05	11	08	11	1.4	3.2
1930	01	01	00	00	00	01	00	01	00	05	00	00	00	02	10	29	21	37	37	11	25	21	08	02	01	00	01	00	00	03	7.2	11.52
1931	04	01	21	26	08	00	03	04	04	00	00	01	00	00	00	00	00	00	00	00	01	03	08	18	27	13	09	27	54	52	9.5	14.71
1932	00	01	20	46	18	04	01	00	00	00	00	00	00	00	00	00	00	00	00	00	01	03	02	01	00	03	02	06	27	39	5.8	11.98
1933	00	00	00	00	00	02	03	00	00	00	00	01	08	19	41	36	47	31	17	08	11	13	10	00	02	00	00	00	00	00	8.3	13.48
1934	00	00	00	00	03	19	01	00	00	00	00	00	00	00	02	04	01	00	00	00	00	02	32	30	03	00	00	03	09	16	4.2	8.62
1935	00	01	00	00	00	00	09	04	05	09	12	13	10	00	00	00	00	00	00	00	00	00	01	06	01	00	01	00	00	00	2.4	4.08
1936	00	00	00	00	00	00	00	00	00	00	01	02	00	05	02	02	01	00	02	03	04	06	21	17	14	31	24	18	08	00	5.4	8.49
1937	00	01	10	05	07	09	00	00	00	00	00	00	00	00	00	00	00	01	00	00	05	07	08	09	17	21	32	56	38	19	8.2	13.35
1938	00	00	00	00	02	01	01	00	01	01	00	00	05	00	00	00	00	00	00	00	02	09	10	03	02	16	27	84	69	24	8.6	19.83
1939	00	00	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	01	08	08	02	00	03	02	07	1.1	2.35
1940	00	00	00	00	00	00	00	00	00	00	00	00	00	00	05	01	00	00	03	24	44	42	40	23	12	36	26	10	37	16	10.6	15.41
1941	00	02	10	14	24	20	17	21	11	01	00	00	00	07	02	00	00	00	00	02	02	07	15	15	05	00	00	00	00	00	5.8	7.64
1942	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	00	00	00	00	00	00	04	0.2	.75
1943	01	01	01	00	00	00	00	00	00	13	14	06	03	00	00	00	01	00	03	01	01	00	00	03	03	06	13	23	35	24	5.1	8.73
1944	00	01	01	00	00	00	00	00	00	00	02	01	01	01	00	00	00	00	00	00	01	02	01	02	06	01	00	01	07	14	1.4	2.9
1945	00	01	00	01	02	01	00	02	00	09	13	00	00	00	00	00	00	00	00	00	00	02	00	00	00	00	00	00	00	00	1.0	2.83
1946	00	00	00	00	01	01	00	00	00	00	00	00	00	03	07	09	04	01	00	00	00	00	00	00	00	02	00	00	00	00	0.9	2.16
1947	00	02	05	00	00	01	00	00	00	00	01	00	00	00	00	01	12	21	10	01	10	01	00	00	00	00	00	00	00	00	2.2	4.84
1948	14	22	01	01	01	34	33	03	03	01	03	00	00	00	00	00	00	00	01	01	03	06	04	00	00	01	02	00	01	06	4.7	9.09
1949	00	01	12	13	10	25	16	20	22	20	26	19	01	00	00	01	32	70	15	09	07	10	12	16	02	00	00	00	01	05	12.2	14.37
1950	06	03	06	00	00	07	02	00	00	00	00	00	00	00	00	00	00	00	00	03	14	53	20	02	00	00	00	00	01	02	4.0	10.31
1951	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0.0	.18
1952	08	61	62	06	01	00	00	00	00	00	00	00	00	00	00	00	00	04	03	03	00	00	00	00	00	01	01	02	01	01	5.1	15.44
1953	00	00	00	00	00	01	06	00	00	00	10	28	17	04	01	01	01	00	00	00	00	00	00	00	00	00	00	00	01	03	2.4	6.05
1954	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	04	01	00	07	32	68	63	14	00	00	10	6.6	17.28
1955	00	00	00	00	00	00	00	00	00	00	01	50	75	44	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	5.7	17.71
1956	02	04	07	01	01	00	00	00	02	04	05	06	00	00	00	00	00	00	00	00	00	00	01	01	01	02	07	25	37	59	5.5	12.83
1957	01	04	06	08	09	05	00	00	02	49	55	10	01	00	00	00	00	01	10	04	00	00	00	00	02	04	02	08	14	18	7.1	13.09
1958	00	00	00	01	07	13	06	00	00	00	00	00	00	01	04	05	03	03	06	34	46	26	03	00	00	03	05	15	18	18	7.2	11.21
1959	00	00	00	00	00	00	00	00	00	00	00	00	18	25	20	11	08	21	29	21	22	06	09	03	02	00	00	00	14	16	7.5	9.53
1960	02	01	07	09	19	24	30	15	05	08	11	01	01	00	00	00	03	02	02	00	00	00	04	03	00	00	00	00	00	00	4.9	7.73
1961	00	00	00	00	00	00	00	00	00	01	02	02	00	00	07	13	18	11	08	07	03	03	08	12	18	13	06	05	07	09	5.1	5.62
1962	02	03	01	00	00	00	00	00	00	00	00	00	00	00	00	01	03	00	00	00	00	00	00	00	00	10	27	49	48	16	5.3	13.08
1963	10	05	01	00	00	00	00	00	00	00	12	01	01	01	00	00	00	02	00	00	00	00	00	00	00	00	00	00	00	00	1.1	2.88
1964	00	00	00	00	00	00	01	02	00	00	00	00	00	00	00	00	01	00	00	00	00	00	01	07	05	14	28	33	11	01	3.5	8.12
1965	00	00	02	10	09	04	00	09	37	12	19	07	00	00	02	10	00	00	00	00	02	03	55	46	02	00	00	00	00	03	7.7	14
1966	01	00	00	00	00	00	00	00	01	00	00	00	00	02	05	06	08	01	06	50	07	01	00	01	02	10	16	18	31	38	6.8	12.35
1967	00	00	16	34	25	03	00	00	00	00	04	02	06	04	00	02	03	45	67	22	02	00	00	05	14	14	05	01	00	02	9.2	15.58
1968	00	00	01	01	00	03	22	33	21	05	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	2.9	7.89
1969	01	00	03	02	05	01	02	00	00	01	06	03	03	00	02	03	15	06	00	00	00	00	00	04	06	02	00	00	00	00	2.2	3.15
1970	00	00	00	01	10	22	16	05	02	05	06	00	02	01	00	00	00	00	00	00	00	04	04	01	00	06	03	16	17	01	4.1	6.06
1971	00	00	00	00	00	00	00	00	01	01	02	03	00	00	00	00	01	01	00	00	00	00	00	08	03	00	00	00	00	00	0.7	1.63
1972	13	16	25	41	54	62	78	59	29	06	11	19	16	25	15	03	03	01	01	10	38	59	30	00	00	00	00	00	00	00	20.5	22.67
1973	38	31	13	06	00	00	00	00	00	00	01	14	67	34	00	00	00	00	00	00	01	01	01	00	00	00	00	01	00	07	7.2	15.5
1974	00	00	00	00	00	00	00	01	00	00	00	00	00	00	00	01	01	00	00	00	00	00	02	07	10	07	03	01	00	04	1.2	2.53
1975	00	00	00	00	00	01	03	04	02	01	00	00	00	00	00	00	00	06	03	04	00	00	00	00	00	00	00	00	00	00	0.8	1.58
1976	00	00	00	00	01	02	03	01	00	00	01	00	00	00	00	00	00	00	00	01	03	04	00	00	00	00	00	05	23	31	2.5	6.87
1977	04	12	18	26	30	18	28	37	24	02	00	00	00	00	00	00	00	00	00	01	05	19	14	14	21	10	03	04	07	03	10.0	11.02
1978	00	00	00	00	05	03	00	01	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	05	23	40	26	07	3.7	9.29
1979	05	08	31	55	41	22	04	35	15	01	01	00	01	02	02	00	00	00	00	00	00	00	00	00	02	04	03	04	04	13	8.4	14.16
AVG	3	4	5	5	4	4	5	5	4	4	5	5	5	4	3.	3	4	5	5	5	6	6	5	6	5	6	7	9	11	11		

JUNE

DAILY MONSOON INDEX VALUES BY MONTH (JUNE THROUGH SEPTEMBER)

MONSOON INDEX FOR JULY UNCORRECTED % STATIONS REPORTING RAIN >= .01 INCH

YEAR \ DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	AVG.	STD. DEV.
1897	14	00	00	00	00	07	33	67	23	28	33	02	02	02	05	14	19	37	05	07	21	56	19	00	12	07	16	28	28	16	30	17.1	16.61
1898	27	22	27	69	51	41	14	06	31	35	14	18	18	27	47	37	12	00	02	06	08	08	09	09	09	09	04	16	14	12	14	19.9	16.08
1899	04	02	05	09	11	16	18	11	37	44	32	33	33	28	25	37	39	44	53	23	32	19	18	40	23	18	21	18	14	21	35	24.6	12.96
1900	00	00	00	00	00	00	06	00	00	04	08	15	17	10	08	02	04	06	50	54	42	04	00	02	00	00	10	02	10	23	08	9.2	14.41
1901	00	02	00	00	00	00	00	00	14	04	02	04	02	02	06	06	06	06	14	31	33	33	45	53	49	43	47	45	63	39	25	18.5	20.44
1902	05	00	00	00	00	00	00	00	00	16	07	09	05	09	31	31	18	11	04	13	24	20	13	24	09	04	04	00	02	00	02	8.4	9.51
1903	00	00	00	00	02	08	18	14	18	14	08	24	18	30	74	28	02	02	04	36	26	36	34	14	28	10	04	00	00	00	00	14.6	16.52
1904	00	00	00	00	00	00	02	05	03	00	00	00	02	14	12	09	07	03	24	43	50	40	45	26	50	57	21	22	48	50	24	18.0	19.83
1905	00	00	00	00	00	00	00	00	00	02	25	27	27	15	02	00	02	05	15	15	23	13	07	12	23	35	43	43	55	42	27	14.8	16.22
1906	01	00	37	41	34	24	30	16	27	31	11	33	41	23	59	29	07	03	06	14	23	23	10	16	39	56	40	19	14	11	26	24.0	15.09
1907	00	02	08	09	12	11	09	35	24	14	12	21	40	17	08	03	08	17	30	26	38	44	65	79	64	23	08	03	21	51	44	24.1	20.44
1908	01	00	01	00	01	03	23	17	30	30	25	36	41	52	57	55	52	32	10	03	19	38	32	32	52	41	51	49	14	29	13	27.1	18.96
1909	26	23	31	40	16	04	01	00	00	00	00	00	00	04	13	21	52	68	69	40	40	60	48	51	57	34	00	00	01	03	13	23.1	23.49
1910	00	00	01	10	01	00	00	01	08	07	06	15	50	76	26	46	29	10	10	01	14	53	44	24	26	31	36	39	21	35	11	20.4	19.58
1911	82	61	20	11	11	25	29	12	24	40	39	30	23	31	22	40	52	30	57	55	55	20	11	37	27	52	37	17	02	00	00	30.7	19.6
1912	01	01	02	04	00	00	00	00	00	05	08	41	64	37	18	31	47	48	45	35	39	49	41	67	45	52	40	60	57	52	10	29.0	23.32
1913	00	00	01	01	02	13	21	19	22	13	03	08	21	29	27	49	49	68	66	62	78	32	05	03	02	00	00	00	14	21	43	21.7	23.38
1914	42	59	68	52	09	08	16	32	59	24	20	33	47	54	46	25	32	37	23	41	28	13	23	39	47	48	45	39	46	34	21	35.8	15.32
1915	05	10	11	03	00	00	00	00	00	09	32	14	02	07	04	18	18	27	34	48	59	62	49	68	65	46	29	29	04	02	02	21.2	22.31
1916	00	00	00	01	03	13	42	40	56	65	47	42	25	21	23	21	16	16	27	26	22	36	33	26	57	59	50	45	40	34	50	30.2	18.82
1917	24	31	36	24	29	10	14	26	36	33	28	23	16	30	25	19	22	33	32	52	36	36	49	47	44	76	44	53	72	42	33	34.7	15.03
1918	33	27	42	18	34	30	33	57	53	41	51	61	21	09	11	08	06	20	22	33	27	19	12	26	05	01	04	11	11	32	34	25.5	16.3
1919	45	56	40	31	49	53	57	41	33	44	60	64	60	68	78	68	76	57	22	16	24	08	07	07	06	22	56	38	19	15	56	41.2	21.85
1920	06	04	01	00	00	00	00	00	00	02	00	03	11	13	26	25	10	07	04	18	43	48	28	21	22	31	33	34	11	26	28	14.7	14.28
1921	00	01	30	22	03	00	15	16	36	34	36	47	44	49	38	28	35	21	31	34	28	37	43	53	60	55	57	52	47	72	79	35.6	19.96
1922	01	01	04	00	12	21	24	19	11	02	00	02	06	02	08	26	39	31	44	50	26	04	06	19	30	42	30	08	24	58	63	19.8	18.14
1923	00	00	01	03	31	39	44	31	11	10	18	55	65	55	39	10	13	23	20	36	66	73	43	32	06	16	30	14	30	31	39	28.5	20.28
1924	29	30	36	44	24	33	57	41	35	31	11	01	01	06	23	22	15	16	05	01	00	00	11	17	34	38	41	30	14	12	18	21.8	15.22
1925	37	45	55	33	07	01	04	12	16	13	09	08	19	14	13	08	05	19	14	21	26	19	11	20	40	34	40	36	52	37	43	22.9	15.19
1926	19	21	33	25	17	09	00	00	02	03	26	20	04	07	08	22	19	00	03	20	20	27	22	38	40	55	62	29	17	15	30	19.8	15.29
1927	00	08	28	51	32	36	45	47	18	11	10	11	04	00	00	00	02	11	26	09	19	14	30	43	45	39	29	24	16	08	19	20.5	15.82
1928	00	00	00	01	04	01	02	00	01	08	06	10	32	36	38	43	40	34	32	24	16	08	06	00	17	20	26	19	21	40	58	17.5	16.5
1929	04	09	10	10	05	05	04	14	35	37	37	38	31	33	33	49	37	26	30	34	39	43	22	34	66	54	39	43	40	56	54	31.3	16.83
1930	02	07	08	04	12	13	37	68	74	56	57	44	34	29	33	32	22	38	41	53	49	39	21	24	26	38	51	44	31	34	40	34.2	18.04
1931	22	29	35	18	01	09	23	17	22	25	23	25	19	21	22	18	29	32	32	33	34	25	21	13	25	21	18	40	70	68	53	27.2	14.62
1932	65	57	19	01	04	18	24	43	31	24	16	22	21	18	38	27	13	20	07	11	06	05	24	28	36	47	44	56	64	46	26	27.8	17.82
1933	03	06	11	34	48	45	40	25	19	17	20	39	32	29	41	41	50	26	18	15	41	30	49	30	07	15	21	32	35	16	16	27.5	13.41
1934	23	31	39	21	06	00	04	04	01	01	04	05	03	04	11	24	18	26	54	54	25	13	14	08	18	19	17	33	15	15	16	17.0	14.16
1935	00	00	00	00	01	00	01	05	10	13	25	21	26	27	23	09	37	57	51	34	09	10	05	00	01	17	31	37	30	39	39	18.0	16.81
1936	01	01	07	11	11	04	26	60	57	52	23	00	01	05	08	12	22	27	43	24	23	30	32	19	55	59	36	36	39	34	44	25.9	18.9
1937	11	15	37	43	42	46	45	52	55	64	56	13	02	01	03	07	05	05	04	13	19	20	27	15	24	27	29	47	24	09	07	24.7	18.88
1938	04	01	00	00	00	00	01	01	03	07	31	51	22	09	26	44	39	20	30	14	20	21	28	16	25	28	31	49	25	09	07	18.1	15.33
1939	13	35	36	12	00	00	01	18	13	07	01	00	00	12	07	14	06	13	10	15	27	47	38	22	28	37	46	38	20	12	17	17.6	14.29
1940	00	00	00	01	00	01	00	03	04	09	06	06	10	14	31	55	55	19	01	13	10	13	30	46	48	26	10	14	13	04	04	14.4	16.7
1941	00	00	00	08	16	13	23	32	21	10	13	09	15	19	20	19	56	50	43	25	16	25	59	64	45	15	04	01	00	00	00	20.0	18.77
1942	19	20	19	13	02	05	07	06	06	02	01	01	09	34	56	63	31	09	04	10	20	19	09	17	28	16	23	30	36	16	21	17.8	14.96
1943	05	01	00	00	01	08	14	11	09	01	03	11	25	25	13	04	03	11	34	47	18	03	03	09	16	21	25	19	30	28	38	14.1	12.45
1944	15	27	36	12	07	05	06	15	07	01	00	00	00	01	02	02	15	24	26	32	36	36	68	20	01	00	01	05	04	01	02	13.1	15.93
1945	01	10	23	19	05	11	25	39	11	02	02	01	05	08	22	23	35	39	36	30	26	46	37	14	15	25	27	37	46	52	42	23.0	15.17
1946	01	09	17	31	23	09	06	07	14	21	34	44	38	12	08	12	33	67	57	33	36	45	24	18	18	15	18	39	19	29	19	24.4	15.5
1947	03	08	14	10	17	38	40	33	12	02	01	02	03	19	44	12	04	07	11	20	27	28	12	00	01	07	14	12	24	23	14	14.9	12.17
1948	12	09	06	00	02	02	00	00	00	00	00	00	00	00	00	11	16	36	33	41	45	62	56	49	53	36	41	09	06	00	06	17.1	20.79
1949	25	54	43	50	38	30	08	03	24	46	61	26	16	08	12	07	08	18	29	32	22	47	57	44	19	03	01	01	05	20	32	25.5	18.06
1950	10	12	16	24	53	70	68	74	47	23	04	00	09	07	04	19	54	50	28	27	48	52	49	45	31	18	17	15	17	42	39	31.4	21.14
1951	03	03	02	01	06	03	02	01	00	02	18	13	20	20	35	33	34	38	43	17	14	25	29	40	56	47	47	60	20	18	41	22.3	18.11
1952	00	00	01	36	63	54	37	35	22	09	03	00	00	00	04	02	02	01	07	12	18	28	41	50	16	44	63	58	55	44	17	23.3	22.22
1953	01	03	05	11	17	30	39	45	63	40	29	37	51	48	37	53	78	50	13	16	09	11	17	25	30	35	42	37	46	70	38	33.1	19.7
1954	20	31	38	44	11	05	09	19	38	35	38	55	54	09	12	37	42	33	24	26	61	65	72	71	38	12	05	04	14	23	24	31.3	19.91
1955	00	00	00	01	01	00	01	00	00	05	21	25	45	39	38	48	68	50	47	40	39	51	77	79	85	44	07	09	40	52	50	31.0	26.99
1956	14	02	00	00	00	00	01	01	03	10	29	39	54	32	18	19	34	35	39	32	17	20	21	35	51	43	32	30	48	58	51	24.8	18.43
1957	01	00	04	12	24	38	36	34	45	43	23	12	19	15	16	29	69	55	46	22	06	04	15	17	38	62	34	27	27	14	20	26.0	17.61
1958	21	19	09	02	19	13	01	00	00	00	00	00	01	09	09	21	20	28	06	03	00	00	23	46	31	27	10	17	68	37	12	14.6	15.83
1959	22	24	23	25	20	14	18	09	15	08	14	15	23	28	28	33	31	34	30	40	38	23	24	27	17	37	51	38	47	56	42	27.5	11.96
1960	00	05	14	15	13	12	18	17	10	04	02	00	02	03	04	04	17	18	14	09	18	27	45	19	22	43	32	21	23	57	17	16.3	13.55
1961	17	41	80	37	07	12	17	12	09	07	05	07	15	26	18	15	23	14	16	18	20	28	37	20	18	28	32	41	51	39	38	24.1	15.92
1962	04	06	10	40	14	06	01	00	07	06	01	02	00	01	00	01	08	09	23	23	45	37	36	34	21	35	38	37	32	40	30	17.6	15.79
1963	02	08	21	11	05	02	08	12	20	36	21	08	02	01	01	06	09	13	27	33	26	30	13	10	10	16	28	26	21	18	33	15.4	10.57
1964	01	01	01	01	01	02	06	22	29	18	22	29	36	44	57	09	10	20	21	23	38	35	42	70	52	42	15	14	29	61	73	26.6	21.03
1965	05	02	00	01	07	11	19	19	20	33	43	30	16	26	44	47	66	49	17	15	22	44	39	52	35	28	24	37	70	24	09	27.5	18.38
1966	14	03	01	03	02	00	03	10	15	20	09	04	09	09	16	28	31	31	28	42	51	44	27	33	42	19	51	43	66	51	38	24.0	18.48
1967	01	03	12	18	22	46	51	18	33	49	57	48	31	37	37	46	66	21	09	06	22	47	22	17	27	41	43	34	26	48	35	31.4	16.65
1968	00	08	20	40	62	62	27	05	03	05	00	00	01	00	00	00	03	06	22	31	41	53	45	33	47	54	62	59	42	44	60	26.9	23.73
1969	09	06	08	12	01	00	00	09	08	09	21	27	16	14	20	33	64	61	50	39	26	35	53	33	38	46	30	37	31	10	18	24.6	17.97
1970	09	17	16	14	14	21	38	31	22	22	18	03	03	07	08	15	17	22	25	50	55	45	35	37	26	25	25	21	15	07	15	21.9	13.03
1971	06	13	09	05	13	31	16	07	07	02	00	00	07	13	24	45	42	25	39	39	31	39	34	28	11	15	20	16	19	33	43	20.4	14.01
1972	00	00	00	00	06	16	30	25	22	16	08	10	03	06	17	42	62	22	21	09	03	09	26	44	45	14	07	14	19	14	11	16.8	15.01
1973	04	05	10	10	12	12	20	25	18	24	36	40	39	38	48	48	27	18	09	00	00	00	00	00	01	11	39	36	36	31	25	20.1	15.7
1974	07	18	09	01	09	19	53	49	02	00	00	01	16	43	68	44	35	40	56	67	56	55	31	13	09	10	28	24	28	23	25	27.1	21.05
1975	06	29	33	40	28	33	42	55	37	29	45	57	51	31	21	32	40	14	08	03	14	21	19	19	32	36	39	31	46	18	04	29.5	14.53
1976	23	04	01	01	11	10	11	09	16	25	37	45	42	23	15	40	41	52	47	31	28	35	62	61	58	43	40	38	47	44	28	31.2	17.75
1977	11	19	43	52	32	06	01	00	04	16	42	32	22	24	27	34	35	49	32	29	32	41	66	43	21	18	19	18	24	15	15	26.5	15.47
1978	00	00	00	00	00	01	03	13	33	40	27	18	11	21	26	18	24	32	18	20	27	34	39	49	55	43	34	09	12	23	37	21.5	15.72
1979	35	21	00	00	00	00	01	01	00	00	00	00	00	05	17	26	40	52	40	62	38	08	02	01	01	07	12	20	28	41	05	14.9	18.34
AVG	11	13	15	15	13	14	18	19	19	19	19	20	20	20	23	25	29	27	27	27	29	30	30	30	31	30	29	28	29	29	28		

JULY

DAILY MONSOON INDEX VALUES BY MONTH (JUNE THROUGH SEPTEMBER)

MONSOON INDEX FOR AUGUST UNCORRECTED % STATIONS REPORTING RAIN >= .01 INCH

DAY / YEAR	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	AVG.	STD. DEV.
1897	50	64	39	14	11	30	36	27	39	39	45	50	39	39	32	14	02	09	23	18	09	07	05	14	39	50	09	05	00	07	18	25.3	17.51
1898	14	20	31	45	47	14	20	14	16	10	06	06	06	08	25	20	18	24	20	33	45	59	51	24	43	63	39	20	24	49	63	28.3	17.4
1899	46	59	17	02	20	15	19	22	14	05	08	00	00	03	39	07	02	00	00	00	03	05	05	00	03	02	10	17	32	14	08	12.2	14.59
1900	04	19	31	38	17	06	02	00	00	00	00	00	00	02	04	02	54	48	12	00	00	00	00	00	00	00	00	00	00	23	19	9.1	15.1
1901	30	30	48	52	30	02	04	10	28	32	34	46	44	26	20	22	36	20	10	00	02	00	06	04	02	08	14	20	32	14	02	20.3	15.73
1902	08	17	13	42	23	34	30	53	42	26	19	51	38	00	04	15	02	02	06	04	15	53	47	42	34	02	17	04	19	02	00	21.4	17.74
1903	00	02	02	13	19	42	38	45	57	28	28	19	23	21	08	13	13	15	17	21	15	12	15	23	25	23	17	10	21	15	17	19.9	12.41
1904	27	25	31	40	40	42	18	20	38	36	15	20	49	22	44	65	55	29	29	18	36	58	47	38	18	27	40	40	47	24	16	34.0	13.19
1905	23	18	07	15	11	15	31	46	36	48	16	10	07	16	20	21	08	10	13	21	30	30	31	43	30	43	30	07	13	26	18	22.4	12.13
1906	80	14	12	20	18	33	55	29	23	36	17	09	06	38	45	45	35	67	68	88	58	17	00	00	00	21	42	48	23	15	24	31.8	23.35
1907	32	51	52	15	08	06	06	14	17	18	09	23	31	22	28	26	25	55	43	58	45	23	20	22	29	40	29	17	63	32	03	27.8	16.25
1908	23	52	46	30	19	14	33	39	25	35	28	16	30	26	17	39	45	41	30	19	25	17	06	20	64	28	04	00	14	25	20	26.8	14.03
1909	36	30	30	31	58	29	29	42	53	35	42	30	26	58	78	52	40	42	14	09	10	14	36	34	17	05	21	31	45	71	49	35.4	17.46
1910	16	29	33	05	03	00	23	26	41	42	33	18	01	03	14	15	18	30	38	05	10	23	21	34	11	27	21	36	64	33	07	21.9	14.76
1911	00	01	00	00	00	00	05	08	32	42	21	26	21	24	19	20	17	14	20	33	63	58	26	12	46	50	49	10	06	01	02	20.2	18.63
1912	04	05	14	11	05	02	01	00	00	09	18	41	44	32	11	19	11	15	16	08	07	11	38	25	27	25	67	49	32	49	38	20.5	17.29
1913	35	24	21	09	26	36	27	34	23	60	43	28	13	08	03	00	01	15	29	24	14	19	14	32	41	33	19	21	16	29	37	23.7	13.24
1914	12	19	15	26	41	26	25	15	17	04	08	13	17	17	07	05	32	19	13	15	42	40	27	26	28	21	04	26	61	38	08	21.5	13.1
1915	02	02	11	14	45	23	11	01	00	01	07	08	21	20	22	14	06	02	00	01	15	25	11	18	30	44	40	29	22	17	00	14.9	13.09
1916	24	25	22	37	33	27	16	21	12	15	27	66	58	66	46	36	10	01	02	03	02	18	59	52	38	39	15	23	54	30	10	28.6	19.18
1917	23	50	43	41	23	13	12	25	18	28	45	51	24	15	21	20	09	00	00	00	01	02	07	26	23	21	09	00	01	02	04	18.0	15.57
1918	20	11	16	43	35	72	57	42	52	44	11	22	41	14	00	01	01	00	00	01	16	20	10	03	09	14	06	04	03	06	22	19.2	19.44
1919	66	51	18	01	04	05	17	18	09	06	10	11	07	10	38	50	23	09	13	13	01	06	11	13	23	35	10	06	13	23	57	18.6	17.07
1920	25	43	37	13	17	22	17	22	36	26	24	24	51	21	11	32	16	37	49	16	08	07	07	46	38	03	00	00	00	00	00	20.9	15.64
1921	33	03	25	35	24	36	30	40	32	29	18	16	34	34	44	26	11	29	56	72	79	37	49	31	34	15	15	23	33	44	47	33.4	16.15
1922	44	21	04	06	02	08	19	46	74	43	17	10	14	21	41	50	42	61	32	23	37	34	33	01	03	04	18	11	04	04	23	24.2	19.19
1923	14	10	23	17	23	20	22	31	67	66	68	66	36	37	39	45	48	29	36	39	15	07	23	39	47	34	10	13	30	36	54	33.7	17.7
1924	18	19	34	24	07	03	07	05	11	17	29	26	06	07	01	01	03	00	00	00	00	03	11	08	05	06	06	15	20	28	29	11.3	10.3
1925	16	07	09	33	45	42	31	27	43	35	19	07	01	06	06	10	30	33	19	19	14	27	42	42	52	35	31	31	22	42	60	27.0	15.2
1926	15	19	19	21	36	33	49	19	10	18	13	25	29	31	39	32	12	00	00	00	01	00	01	01	00	00	01	05	05	01	01	14.1	14.34
1927	46	29	28	63	35	19	17	08	07	17	28	35	34	26	43	30	12	34	37	13	18	22	12	33	38	50	51	49	34	09	10	28.6	14.56
1928	49	55	14	02	00	01	01	01	04	19	39	41	35	30	25	15	07	03	03	06	27	47	38	25	34	17	28	42	14	15	09	20.8	16.66
1929	33	48	48	65	35	22	32	54	47	57	42	29	26	27	24	28	37	18	09	08	18	36	28	23	36	32	39	18	07	18	17	31.0	14.38
1930	44	35	18	48	21	42	63	71	43	48	52	19	06	08	03	01	00	00	01	02	08	20	25	10	10	08	06	10	27	10	07	21.5	20.33
1931	41	40	53	63	79	66	35	48	58	41	08	13	40	38	21	19	16	09	18	32	19	34	33	08	03	07	14	36	73	78	48	35.2	22.01
1932	11	04	05	17	23	20	14	29	50	31	02	01	02	10	20	06	14	25	29	31	29	19	36	33	36	57	41	15	03	00	00	19.8	15.24
1933	26	21	15	20	27	45	39	33	20	19	09	03	09	17	07	21	22	24	48	41	30	21	09	09	34	20	06	03	13	06	13	20.3	12.3
1934	10	13	37	62	23	14	43	43	27	27	30	45	44	22	21	22	29	39	28	22	47	50	35	31	36	46	51	47	48	39	29	34.2	12.65
1935	45	49	36	21	28	35	53	39	25	20	40	36	51	63	77	52	10	08	12	18	28	45	75	74	36	22	12	30	31	42	49	37.5	18.76
1936	56	37	44	61	30	35	33	51	57	38	24	30	26	31	24	12	35	48	40	35	15	02	00	00	20	28	09	22	26	19	20	29.3	16
1937	13	25	32	39	59	37	52	42	20	15	31	48	65	37	05	00	00	00	00	00	02	20	34	37	37	22	15	18	31	34	71	27.1	19.87
1938	13	02	04	18	11	29	31	11	15	20	08	23	24	40	37	27	39	32	27	25	33	30	49	29	15	19	28	31	20	31	38	24.5	11.15
1939	28	56	59	55	57	72	58	21	20	32	22	06	22	26	23	17	22	21	23	16	15	32	37	20	27	33	36	46	28	08	02	30.3	17.22
1940	12	16	26	40	30	19	21	09	10	15	28	24	39	40	23	12	16	38	37	31	32	37	47	70	56	12	00	00	03	08	27	25.1	16.36
1941	01	04	22	56	38	40	57	42	63	67	15	05	16	58	57	43	29	06	04	12	11	15	08	06	01	01	00	08	43	35	09	24.9	22.06
1942	52	34	32	36	62	49	32	27	35	38	12	07	15	16	20	19	21	16	17	21	10	14	23	28	17	09	06	02	01	01	00	21.7	15.45
1943	57	62	63	32	14	21	35	22	41	36	30	21	23	37	57	36	06	11	06	08	12	09	13	35	27	14	13	21	38	20	07	26.7	16.77
1944	03	02	00	01	08	12	27	65	48	29	06	10	09	10	13	20	18	31	36	11	03	01	18	18	02	01	01	00	00	00	00	13.0	15.64
1945	41	46	30	21	44	35	45	32	61	54	54	20	03	08	10	15	33	17	07	12	19	17	10	16	07	08	19	17	10	01	14	23.4	16.67
1946	20	22	43	36	27	11	18	31	39	55	51	30	22	24	23	22	24	19	40	51	40	18	22	32	07	22	37	08	18	51	36	29.0	12.87
1947	07	19	16	48	35	34	41	48	62	36	14	27	34	29	58	52	34	17	16	27	54	38	14	05	06	16	21	20	16	20	32	28.9	15.7
1948	16	38	45	62	58	55	61	17	07	12	30	38	28	11	07	08	20	13	08	22	38	20	11	05	01	00	00	01	09	06	06	21.1	19.17
1949	23	30	43	33	16	37	57	59	27	01	00	01	00	00	00	00	02	00	00	00	05	38	51	07	06	00	00	00	00	00	01	14.1	19.54
1950	10	02	14	15	36	14	04	01	01	34	66	52	16	07	06	01	02	09	13	07	09	14	21	25	20	12	10	07	02	00	00	13.9	15.24
1951	65	76	77	36	13	12	01	01	03	01	00	02	05	18	23	22	20	34	39	42	41	22	10	19	13	33	77	90	73	20	00	28.6	27.06
1952	10	05	07	19	27	24	17	20	32	14	17	31	44	32	35	58	33	29	46	42	17	18	28	45	27	38	53	20	21	10	00	26.4	14.22
1953	27	08	00	00	00	00	03	13	39	42	25	19	29	21	17	14	07	08	18	17	28	41	14	02	15	40	57	53	33	00	00	19.0	16.48
1954	40	17	40	69	71	36	20	19	27	62	19	44	24	08	19	08	09	11	18	27	14	24	20	21	03	00	00	00	01	12	33	23.1	19.02
1955	43	47	48	64	22	40	69	35	35	36	47	42	60	25	31	38	28	24	46	49	38	38	53	69	29	18	24	15	04	10	06	36.5	17.03
1956	33	07	00	00	05	07	04	03	00	04	27	57	39	34	44	47	36	33	04	07	14	16	05	15	13	15	06	03	00	00	00	15.4	16.61
1957	25	34	26	42	58	44	07	07	11	24	38	53	36	29	27	27	37	45	56	68	38	20	32	42	30	45	26	19	39	40	26	33.9	14.23
1958	14	27	30	30	45	47	49	18	13	29	59	35	42	47	59	31	53	24	39	41	44	33	31	22	09	09	18	22	27	06	07	31.0	15.2
1959	32	64	49	58	40	44	48	32	43	24	63	27	38	36	39	20	49	67	54	29	38	39	39	61	37	18	13	09	03	01	00	35.9	18.54
1960	10	03	05	19	21	20	21	28	40	52	25	16	18	20	27	31	00	00	07	13	33	67	30	05	00	05	04	00	01	10	41	18.5	16.48
1961	25	43	47	47	19	19	17	15	38	29	51	16	22	46	85	37	23	53	54	31	24	38	58	26	08	02	01	21	82	51	31	34.2	20.3
1962	27	30	12	01	01	00	00	02	02	01	02	05	05	07	17	29	32	25	33	14	24	52	21	02	07	08	02	02	00	00	00	11.7	13.6
1963	54	51	39	60	63	72	49	36	16	21	23	17	30	41	49	60	66	31	36	33	39	62	38	19	31	64	35	13	27	63	61	41.9	17.22
1964	77	74	39	29	35	20	14	26	39	28	30	55	47	56	15	04	15	17	21	16	04	00	00	06	24	57	50	08	04	01	01	26.2	21.97
1965	13	29	10	03	02	02	04	15	22	19	32	28	28	42	40	40	74	36	15	07	10	06	05	00	04	02	02	08	40	42	18	19.3	17.53
1966	26	17	19	24	11	24	12	16	12	35	41	36	24	28	22	22	40	52	56	35	14	08	16	13	12	07	06	05	17	52	57	24.5	15.2
1967	32	19	36	33	48	50	32	24	42	37	51	24	17	26	39	39	33	16	32	26	16	13	21	27	11	07	14	11	15	20	32	27.2	12.03
1968	42	43	39	60	53	37	52	16	32	39	43	35	18	05	00	00	00	00	08	43	21	01	01	00	06	23	19	08	15	26	29	23.0	18.69
1969	38	32	25	18	20	27	26	42	14	11	32	43	43	39	06	08	16	24	19	07	07	23	34	37	24	33	29	42	63	20	13	26.3	13.38
1970	22	32	50	63	34	30	24	25	30	36	38	31	16	36	49	47	48	45	44	33	13	13	27	21	15	12	10	02	04	03	10	27.8	15.74
1971	41	22	39	57	37	47	26	26	34	55	57	30	44	28	49	22	38	49	67	64	49	40	28	36	33	52	35	45	17	12	14	38.5	14.23
1972	02	03	05	16	46	42	39	37	35	23	19	52	46	21	09	03	06	21	17	08	01	00	00	01	11	59	48	33	41	32	26	22.6	18.11
1973	15	19	34	28	24	24	03	00	00	03	10	09	22	27	22	30	27	14	25	44	33	17	09	04	02	01	03	16	27	28	14	17.2	11.85
1974	45	60.	49	63	56	38	28	37	04	04	02	01	03	07	16	12	10	13	14	04	05	06	16	16	12	08	03	03	03	00	01	17.4	19.27
1975	00	00	00	00	01	10	11	17	23	22	34	47	22	05	02	06	00	03	07	49	43	20	16	06	01	05	03	05	00	00	00	11.5	14.56
1976	09	05	03	01	00	00	09	19	28	21	13	09	09	00	00	00	21	12	14	23	19	28	40	20	21	19	30	22	21	13	10	14.2	10.41
1977	15	14	20	15	02	04	12	27	35	47	30	55	37	42	61	80	52	15	14	17	22	26	32	20	03	01	01	00	00	01	06	22.8	20.43
1978	38	46	46	41	21	12	30	34	35	32	34	53	19	04	00	00	05	06	22	23	28	29	11	13	10	01	00	02	01	04	05	19.5	16.25
1979	03	06	04	21	32	39	47	23	18	18	38	84	68	37	56	50	49	42	23	05	01	00	01	00	00	01	00	04	29	30	00	23.5	23.02
AVG	27	27	27	30	28	26	27	26	28	28	27	27	26	24	26	24	23	22	23	22	22	23	23	22	20	21	19	18	22	20	19		

AUGUST

DAILY MONSOON INDEX VALUES BY MONTH (JUNE THROUGH SEPTEMBER)

MONSOON INDEX FOR SEPTEMBER UNCORRECTED % STATIONS REPORTING RAIN >= .01 INCH

YEAR / DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	AVG.	STD. DEV.	AVG.	STD. DEV.
1897	48	48	00	14	39	34	36	36	23	50	73	32	27	07	07	18	18	09	64	52	20	07	25	48	23	11	07	34	16	16	28.1	18.5	18.27	15.14
1898	24	06	02	00	06	20	31	14	04	16	06	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	4.3	8.23	15.08	4.44
1899	02	04	04	06	20	33	28	48	22	09	11	02	02	19	07	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	7.2	12.01	13.34	6.66
1900	34	42	11	02	00	11	25	28	09	00	00	00	00	00	00	04	15	17	15	02	26	49	40	13	13	00	00	00	00	02	11.9	14.58	7.79	8.81
1901	00	02	04	02	00	02	00	05	05	38	11	04	00	00	00	00	00	00	02	00	00	02	00	00	02	00	00	00	02	07	2.9	7.11	10.66	3.7
1902	00	02	06	40	02	06	20	06	06	30	10	20	22	26	60	18	02	16	24	42	12	02	00	00	02	00	04	00	00	00	12.6	15.13	11.15	9.2
1903	21	04	06	15	54	35	19	15	12	10	10	00	00	00	00	00	02	00	00	10	17	23	19	38	23	19	94	81	06	29	18.7	22.86	15.42	13.81
1904	02	07	30	14	00	02	02	07	20	04	13	43	21	29	18	09	04	02	00	02	05	09	05	00	02	00	00	00	05	00	8.5	10.74	15.94	6.41
1905	19	47	61	50	32	15	21	15	02	02	02	00	00	03	06	08	02	00	00	00	13	31	50	55	65	10	10	66	56	00	21.4	23.27	16.04	14.67
1906	00	08	03	00	00	01	07	08	00	00	01	00	10	30	17	06	00	00	00	00	00	00	04	32	25	11	08	06	03	01	6.0	8.94	15.72	5.09
1907	03	05	55	28	22	09	03	03	02	00	02	03	14	20	12	11	17	02	00	00	03	00	00	00	02	00	00	00	05	00	7.4	11.75	15.70	6.58
1908	15	21	09	00	00	13	63	65	38	16	00	04	00	01	00	00	00	00	00	06	01	01	04	46	09	06	00	00	00	00	10.6	18.33	16.60	10.08
1909	18	10	18	74	78	49	10	05	12	15	14	05	00	00	00	00	00	00	01	00	00	00	00	04	27	24	24	03	00	00	13.0	20.54	18.71	11.53
1910	04	11	24	07	00	00	00	01	03	01	03	19	23	12	04	03	05	15	19	09	09	00	01	01	11	00	03	00	00	03	6.4	7.28	13.74	4.51
1911	08	11	19	20	06	01	03	09	13	15	34	76	56	44	16	13	18	33	27	09	11	05	00	03	16	48	35	39	65	65	23.9	21.05	21.13	14.6
1912	25	17	00	02	01	00	00	01	05	00	01	05	00	00	00	00	00	00	00	00	00	00	00	00	01	00	00	00	18	43	4.0	9.6	15.70	5
1913	47	37	08	21	40	51	30	11	09	07	07	11	05	11	04	00	00	00	00	01	11	30	14	11	03	02	01	00	00	00	12.4	14.98	15.36	9.08
1914	01	01	03	03	11	07	06	08	15	22	36	11	05	03	12	27	06	05	09	12	18	08	00	00	00	02	27	27	28	13	10.9	9.95	20.12	6.77
1915	11	36	20	01	00	00	00	00	01	00	01	00	09	12	03	03	28	20	16	09	08	02	04	31	29	01	01	00	00	00	8.2	10.91	12.11	6.41
1916	11	07	07	22	26	11	20	72	68	25	07	01	01	02	14	14	08	09	05	08	09	01	01	00	02	05	03	01	11	29	13.3	17.38	18.25	10.28
1917	06	07	02	08	17	34	27	18	19	52	48	45	38	00	02	12	06	17	41	53	31	17	02	00	00	00	00	01	04	21	17.6	17.49	18.06	11.46
1918	23	41	45	20	03	00	05	03	09	06	04	00	01	00	00	00	02	10	02	08	05	08	03	00	00	00	00	00	00	00	6.6	11.41	16.38	6.27
1919	25	17	05	05	14	52	67	74	15	02	07	22	20	16	02	00	00	07	21	14	00	04	04	04	06	58	73	19	06	00	18.6	22.51	20.68	13.65
1920	02	02	06	38	52	29	29	04	00	00	02	01	22	26	21	36	33	09	04	06	13	05	01	00	01	00	00	01	08	02	11.8	14.53	14.20	8.75
1921	19	02	00	00	00	00	00	00	00	01	15	05	00	01	06	08	06	02	01	00	00	05	13	06	00	01	03	15	15	61	6.2	11.79	20.27	6.36
1922	25	63	27	11	17	17	14	08	19	08	07	01	02	01	01	10	02	12	17	11	06	01	00	02	04	08	23	16	01	00	11.1	12.61	15.99	7.83
1923	35	16	11	11	17	19	04	07	06	17	17	46	28	35	25	22	49	44	07	01	01	06	20	01	01	01	04	00	00	00	15.0	14.8	19.69	9.73
1924	13	16	24	38	26	09	06	20	41	39	28	00	00	00	03	10	02	00	00	00	00	00	00	00	00	00	00	00	00	00	9.2	13.41	11.20	7.67
1925	30	51	39	15	07	05	03	00	01	00	00	08	05	01	03	40	67	74	53	08	01	01	01	01	01	00	00	00	00	00	13.8	22.08	19.75	12.35
1926	03	19	14	05	01	24	68	29	10	13	27	13	04	06	15	10	00	01	00	01	03	04	03	10	26	72	57	20	06	01	15.5	19.16	13.25	11.53
1927	14	03	03	09	17	49	65	26	22	20	37	79	38	06	06	42	51	20	15	06	08	21	40	10	01	00	00	00	01	04	20.4	20.86	20.40	13.5
1928	07	04	12	22	15	03	01	09	10	01	01	00	00	01	00	00	00	00	00	00	05	01	00	00	15	56	21	01	00	00	6.2	11.45	11.46	6.21
1929	19	56	65	56	45	04	01	02	02	08	25	05	00	00	08	08	52	54	33	36	29	34	41	29	24	07	00	04	02	04	21.8	20.94	21.53	13.92
1930	17	06	05	10	26	49	63	27	01	00	00	00	00	00	00	00	00	00	00	00	01	01	00	00	00	00	00	00	31	26	8.8	16.15	18.09	8.77
1931	48	23	06	08	10	13	14	14	06	07	02	16	58	73	18	08	22	46	22	07	00	00	05	22	15	27	24	26	17	15	19.1	17.1	22.87	11.75
1932	00	00	00	01	01	01	03	00	00	03	05	03	02	04	04	02	01	01	02	08	17	19	47	29	21	09	07	36	46	33	10.2	14.19	16.01	8.22
1933	10	16	11	03	01	01	24	73	49	51	27	14	11	16	08	02	22	41	22	38	31	02	00	00	00	00	02	02	16	22	17.2	18.32	18.40	11.64
1934	05	00	00	00	14	20	22	15	02	01	04	08	00	00	00	14	12	03	04	03	00	37	59	15	01	00	00	00	00	00	8.0	13.08	15.98	7.27
1935	57	38	12	24	11	09	12	07	00	00	00	00	00	00	01	00	08	14	26	32	17	31	52	83	48	33	40	18	05	00	19.3	21.02	19.43	13.24
1936	36	47	18	04	02	01	11	11	26	70	41	54	29	02	00	01	11	41	36	26	33	14	01	03	02	09	12	03	00	01	18.2	19.04	19.80	12.19
1937	58	40	11	10	38	46	33	17	07	18	21	12	19	10	02	02	00	02	02	16	37	46	27	06	01	00	01	10	52	44	19.6	17.89	20.01	12.19
1938	43	38	47	33	19	36	21	03	13	48	26	04	04	03	09	24	05	07	04	01	01	02	05	03	02	00	00	01	01	04	13.6	15.73	16.27	9.68
1939	03	06	34	64	64	65	69	38	31	40	63	62	53	11	07	10	13	12	13	16	03	00	02	24	48	40	02	00	01	00	26.5	24.56	18.95	16.6
1940	55	57	53	12	19	36	25	13	10	20	61	64	29	13	02	20	86	79	29	04	19	35	18	04	05	08	22	56	63	37	31.8	23.88	20.47	18.05
1941	04	04	01	01	00	04	05	01	00	00	02	21	66	46	14	03	22	39	06	09	10	27	04	00	00	00	15	76	41	02	14.1	20.25	16.32	11.64
1942	00	03	27	25	43	29	04	00	01	31	45	16	10	10	03	00	01	13	21	05	01	02	01	00	00	00	00	00	00	00	9.7	13.57	12.46	7.86
1943	01	00	08	09	04	01	00	00	02	01	01	06	11	06	07	01	00	01	02	01	00	08	52	75	74	77	30	07	01	01	12.9	23.62	14.77	12.84
1944	00	01	03	04	06	05	01	00	03	01	04	17	21	15	54	53	13	01	00	00	00	01	10	37	40	47	38	31	19	01	14.2	17.38	10.48	10.57
1945	20	07	02	00	00	02	07	11	16	11	04	02	00	03	04	04	01	01	01	02	05	00	00	00	00	00	00	04	08	03	3.9	4.99	13.02	2.98
1946	11	04	04	08	02	00	01	01	10	18	17	17	17	30	35	11	43	67	57	13	01	00	01	00	03	09	30	22	38	41	17.0	18.02	17.98	11.49
1947	08	02	00	07	11	17	28	26	13	03	01	00	00	01	00	08	16	26	49	27	07	02	01	00	02	01	00	00	00	00	8.5	11.99	13.76	6.93
1948	02	01	01	00	02	08	09	03	01	05	06	03	00	01	32	69	26	25	13	02	00	00	00	00	00	25	43	17	08	21	10.8	15.85	13.51	9.05
1949	03	09	19	25	20	14	19	36	63	57	39	20	68	55	21	01	00	00	06	13	01	05	10	06	06	23	21	30	20	02	20.4	19.25	18.06	12.91
1950	01	10	14	12	30	49	51	34	09	08	00	00	00	00	00	03	22	32	37	06	27	25	01	03	00	00	00	00	00	10	12.8	15.66	15.61	9.46
1951	00	00	01	02	01	17	26	14	01	00	03	00	00	00	00	00	00	01	00	00	05	02	00	00	00	00	01	21	80	29	6.8	16.08	14.62	8.41
1952	00	00	00	04	05	09	09	03	02	02	00	00	00	01	05	11	05	00	03	51	85	45	30	10	01	01	11	27	12	03	11.2	19.04	16.64	10.5
1953	01	01	00	00	00	01	02	01	02	01	00	02	02	00	02	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0.5	.78	13.98	.44
1954	47	68	35	17	19	08	05	03	04	12	44	55	08	00	00	00	00	00	08	00	01	16	61	67	22	04	00	01	00	00	16.8	22.38	19.58	13.15
1955	00	00	00	00	02	01	03	05	03	01	00	03	02	01	00	16	24	11	09	00	00	00	00	00	00	00	00	00	00	00	2.7	5.5	19.23	2.94
1956	00	00	00	01	03	20	24	04	00	00	00	00	00	00	00	00	00	00	00	00	02	00	03	04	02	00	00	03	02	13	2.7	5.87	12.23	3.1
1957	14	03	03	00	07	04	03	01	05	08	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	1.6	3.22	17.37	1.72
1958	17	29	29	43	37	20	28	39	14	25	39	64	62	10	01	00	00	02	00	00	00	23	58	43	09	35	46	42	37	07	25.3	19.85	19.57	14.63
1959	00	00	00	00	00	00	00	00	01	11	29	21	11	15	19	10	05	00	00	00	00	00	02	22	01	00	00	00	03	16	5.5	8.45	19.34	4.78
1960	60	47	19	08	24	33	31	11	25	32	08	05	09	04	03	04	04	07	09	11	02	01	02	00	00	00	00	00	00	07	12.2	15.2	13.03	9.12
1961	06	02	26	00	01	05	09	60	55	27	24	22	31	28	18	14	40	25	08	01	00	00	01	00	00	00	00	00	00	00	13.4	17	19.37	10.15
1962	01	01	03	07	31	54	20	24	11	02	08	13	22	21	07	10	08	10	20	45	34	40	60	61	50	54	44	42	18	00	24.0	19.58	14.68	14.14
1963	30	14	27	53	35	19	07	17	24	36	10	06	42	49	12	03	14	46	10	10	06	03	01	00	00	00	00	00	00	01	15.8	16.53	18.72	10.6
1964	00	02	01	11	14	34	18	26	49	31	16	19	42	67	56	15	03	05	35	08	14	32	45	36	39	21	03	02	01	01	21.5	18.57	19.56	13.01
1965	08	35	60	45	42	13	08	26	17	09	27	29	08	04	00	01	17	44	41	35	01	00	00	00	02	00	00	00	00	00	15.7	17.92	17.67	11.1
1966	28	14	02	03	03	11	02	00	00	09	39	65	68	74	58	13	00	10	37	15	06	07	05	07	03	02	15	31	29	18	19.1	21.83	18.69	13.52
1967	48	66	54	22	37	28	33	22	13	17	21	06	10	16	04	06	03	04	10	03	05	12	15	41	53	32	12	09	03	10	20.5	17.52	22.19	12.33
1968	16	12	06	00	00	07	04	00	02	06	07	07	03	09	04	00	00	00	00	00	00	00	00	00	00	04	05	01	07	00	3.3	4.16	14.22	2.5
1969	13	20	21	25	46	31	28	18	09	09	31	56	49	44	52	17	25	02	01	01	01	02	00	00	00	00	01	01	01	00	16.8	18.18	17.61	11.49
1970	05	02	17	89	85	60	18	10	08	10	04	22	19	08	00	00	00	02	04	00	00	02	00	00	00	00	00	08	06	19	13.3	23.33	16.89	12.78
1971	28	35	08	02	01	08	11	23	11	00	00	00	04	03	01	03	24	23	07	00	01	10	09	05	00	00	01	02	78	80	12.6	20.37	18.22	11.36
1972	32	44	39	07	13	29	24	24	30	25	13	07	08	11	15	09	19	42	46	08	00	01	00	00	00	00	00	00	00	00	14.9	15.09	18.71	9.79
1973	00	00	00	00	02	04	02	00	05	19	07	00	00	01	03	02	01	01	01	06	00	00	00	00	02	01	00	00	00	00	1.9	3.75	11.70	2.01
1974	04	10	27	29	28	27	12	02	04	04	01	03	28	42	36	12	19	44	46	44	42	41	24	23	25	28	33	01	00	00	21.3	15.72	16.84	12
1975	12	26	27	36	44	62	78	66	35	12	16	25	46	37	03	01	10	12	18	12	04	00	00	00	00	00	00	00	00	08	19.7	21.97	15.45	13.71
1976	27	16	07	22	70	63	27	17	44	53	39	04	01	00	04	00	00	00	00	01	25	25	50	87	84	64	28	05	02	01	25.5	27.18	18.43	17.29
1977	16	28	22	15	28	19	02	03	11	58	75	54	19	14	02	01	01	00	00	01	00	21	24	01	00	21	60	36	00	00	17.7	20.69	19.34	12.71
1978	15	12	11	17	27	09	07	09	05	02	00	02	09	19	22	26	34	03	00	00	11	15	14	21	11	10	03	01	01	01	10.6	9.07	13.93	6.37
1979	01	02	03	01	02	03	01	05	04	04	08	10	15	19	30	26	05	02	01	04	06	00	00	00	00	00	01	01	00	00	5.1	7.67	13.11	4.36
AVG	16	17	15	15	18	19	18	16	13	15	16	16	15	13	10	9	12	14	13	10	9	10	12	13	11	11	11	11	11	9				

SEPTEMBER

MEANS, STANDARD DEVIATIONS, SKEWNESS AND KURTOSIS OF DAILY MONSOON INDEX DATA.

	MEAN	STD. DEVIATION	SKEWNESS	KURTOSIS
JUNE 1	2.53012	8.04308	4.71337	26.7165
JUNE 2	3.6506	10.6456	3.88229	18.3122
JUNE 3	4.59036	10.2124	3.39397	16.4114
JUNE 4	5.08434	11.6569	2.90281	10.8771
JUNE 5	4.42169	9.51779	3.09366	13.4632
JUNE 6	4.39759	9.6043	3.50144	18.1259
JUNE 7	4.77108	11.5867	3.92948	21.7408
JUNE 8	4.62651	11.6428	3.2038	13.112
JUNE 9	3.6988	8.31358	2.745	10.1136
JUNE 10	4.0241	9.29329	3.19092	13.2373
JUNE 11	5.14458	10.9334	3.14858	13.7236
JUNE 12	4.63855	10.7665	2.99152	11.7406
JUNE 13	4.75904	12.6082	3.95199	19.9873
JUNE 14	3.68675	8.61922	2.79149	10.4707
JUNE 15	2.89157	7.65413	4.14928	21.8245
JUNE 16	2.62651	6.55504	3.38478	14.837
JUNE 17	3.50602	8.23048	3.21427	14.0304
JUNE 18	4.53012	11.5445	3.51082	16.5436
JUNE 19	4.6747	10.7421	3.51003	17.2994
JUNE 20	4.81928	10.1827	2.74003	10.2504
JUNE 21	5.77108	12.1237	2.55176	8.61475
JUNE 22	6.15663	12.1188	2.57041	9.46354
JUNE 23	5.22892	9.78342	2.76717	11.8137
JUNE 24	5.50602	9.77725	2.2211	7.44394
JUNE 25	5.27711	10.4056	3.51277	18.5287
JUNE 26	6.40964	12.0679	2.7205	10.4781
JUNE 27	6.78313	13.1567	2.56426	9.38917
JUNE 28	9.06024	15.4765	2.39631	9.49693
JUNE 29	10.747	15.5523	1.75125	5.63103
JUNE 30	10.8916	15.23	1.61613	4.88972
JULY 1	10.5663	15.0172	2.28877	9.49857
JULY 2	12.506	16.049	1.50185	4.50047
JULY 3	15.2289	17.4763	1.29144	4.47579
JULY 4	15.1446	17.0731	1.06028	3.12838
JULY 5	13.3614	15.656	1.46917	4.50057
JULY 6	14.4217	16.6478	1.34961	4.10543
JULY 7	17.6988	17.3337	.821114	2.74212
JULY 8	19.012	18.9785	1.03312	3.26043
JULY 9	19.3253	17.5639	.975005	3.40238
JULY 10	18.6747	16.8256	.832629	2.79517
JULY 11	18.9639	17.1054	.744808	2.63488
JULY 12	19.5783	18.0353	.655709	2.3207
JULY 13	20.1325	17.8611	.730527	2.56109
JULY 14	20.2892	16.574	.997375	3.8125
JULY 15	23.3976	18.0257	.935854	3.49704
JULY 16	25.2169	16.6316	.361193	2.31738
JULY 17	28.6627	20.1835	.555016	2.4206
JULY 18	27.1566	17.6175	.491241	2.4421
JULY 19	26.5301	16.8569	.408399	2.36398
JULY 20	27.2289	15.9758	.360996	2.47455
JULY 21	28.8675	15.6523	.557945	3.3324
JULY 22	30.1807	17.4581	.143947	2.27576
JULY 23	30.0723	18.427	.426731	2.52014
JULY 24	29.9518	19.6108	.552857	2.73588
JULY 25	30.747	19.0582	.288882	2.44947
JULY 26	30.3976	17.3802	.140047	2.25796
JULY 27	29.0482	16.4464	-.0225968	2.19098
JULY 28	27.8916	16.2766	-7.36155E-04	2.1531
JULY 29	29.2169	18.645	.552571	2.49467
JULY 30	29.2651	18.6849	.265601	2.2031
JULY 31	27.5663	17.8265	.510038	2.82291
AUG 1	26.747	18.3442	.675162	3.05672
AUG 2	27.253	19.5197	.519887	2.38663
AUG 3	26.8434	17.3701	.27447	2.44554
AUG 4	30.4096	20.2744	.215588	1.94062
AUG 5	27.6265	18.7868	.470508	2.62349
AUG 6	26.3253	17.821	.484657	2.89006
AUG 7	26.9036	17.759	.393525	2.2473
AUG 8	26	16.0973	.380561	2.77038
AUG 9	28.3614	18.064	.295683	2.41975
AUG 10	28.4699	16.5237	.215406	2.51848
AUG 11	26.7349	16.7362	.440718	2.52695
AUG 12	27.2048	18.3268	.559203	2.82284
AUG 13	26.0361	16.5142	.302757	2.46605
AUG 14	24.4458	15.5079	.467724	2.80859
AUG 15	26.3614	19.7735	.774396	3.16705
AUG 16	23.8554	17.8934	.685891	3.00319
AUG 17	22.8916	17.3219	.62408	2.76584
AUG 18	22.2048	17.2554	.642144	2.7213
AUG 19	23.0723	17.4025	.618018	2.58544
AUG 20	22.0361	18.5173	1.12286	4.29081
AUG 21	21.9036	16.7555	.840019	3.42731
AUG 22	23.2651	16.7092	.608223	2.72812
AUG 23	23.4217	16.7406	.59361	2.80538
AUG 24	21.9277	17.2879	.844901	3.59086
AUG 25	20.2651	15.4841	.474988	2.41643
AUG 26	21.1687	17.8037	.676277	2.44729
AUG 27	19.3374	17.933	.986792	3.33573
AUG 28	17.506	16.7058	1.44017	5.88302
AUG 29	21.9518	20.0194	.991125	3.46962
AUG 30	19.9759	18.2883	.925723	3.39783
AUG 31	18.5783	18.7702	.989995	3.01785
SEP 1	15.9639	16.615	1.06949	3.20052
SEP 2	17.1566	18.7724	1.09591	3.0398
SEP 3	15.2651	16.8161	1.31414	3.92246
SEP 4	15.3976	18.3316	1.76933	6.21287
SEP 5	18.0482	19.8069	1.29279	4.32087
SEP 6	18.6747	18.2858	.955644	2.84131
SEP 7	17.8072	18.9746	1.47845	4.67818
SEP 8	15.9036	18.5365	1.69282	5.3705
SEP 9	13.012	15.1452	1.78295	5.83463
SEP 10	15	16.9892	1.33449	3.96573
SEP 11	15.6386	18.0876	1.4121	4.47165
SEP 12	15.6627	20.6429	1.56254	4.36166
SEP 13	15.2892	18.9791	1.34874	3.85974
SEP 14	13.3494	17.7801	1.7224	5.49916
SEP 15	10.241	14.5641	2.02989	6.59899
SEP 16	9.26506	12.5524	2.35282	9.70717
SEP 17	11.8072	16.6451	2.09491	7.93841
SEP 18	13.5783	18.6979	1.65821	5.14085
SEP 19	12.5301	16.161	1.35954	3.92514
SEP 20	9.53012	13.8514	1.84624	5.41784
SEP 21	8.78313	13.4283	2.83265	14.2416
SEP 22	10	13.6158	1.33452	3.55576
SEP 23	11.988	18.3306	1.50999	3.87525
SEP 24	13.0723	21.0932	1.85374	5.73845
SEP 25	10.8916	18.3037	2.11079	7.10566
SEP 26	11.1687	18.8646	1.88983	5.68843
SEP 27	11.4337	18.8124	2.10041	7.60505
SEP 28	10.9277	18.1079	2.0324	6.91573
SEP 29	10.9036	18.8295	2.14911	6.90158
SEP 30	9.37349	16.31	2.2749	8.21842

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