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CHARACTERISTICS OF THE WESTWARD-MOVING SUMMER MONSOON LOW PRESSURE SYSTEMS OVER THE INDIAN REGION AND THEIR RELATIONSHIP WITH THE MONSOON RAINFALL.

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ABSTRACT

In this study, the characteristics of the summer monsoon season Low Pressure Systems (LPS) over the Indian region in respect of their formation, life, movement, intensity, and dissipation are examined for the period 1888-1983. By LPS we mean the transitory closed low pressure system which includes the low pressure area formed and its subsequent daily locations and intensities (low, depression, cyclonic storm and severe cyclonic storm) during the life of the low pressure area. The relationships of their characteristics with the monsoon rainfall of India, and of the three divisions, north India, central India, and south India, are also examined. Information about LPS is collected from the Indian Daily Weather Report available at the library of the National Oceanic and Atmospheric Administration (NOAA) at Rockville (Maryland). Monthly rainfall data of 306 raingauge stations evenly-distributed over India are utilized to prepare monsoon rainfall series for India and its three divisions, for 1888-1983.

The frequency distribution of the number of LPS formed during the monsoon season is found to be Gaussian. The mean and SD of the distribution are 13 and 2.2 respectively. About 88% of the LPS are formed east of longitude 80°E. The percentages of LPS which form over the Bay and the land area are 64 and 30 respectively.

The series of number of LPS days over the Indian region during the monsoon season is observed to be random and Gaussian-distributed with mean 56.4 and SD 11.7. A large majority (70%) of the LPS has a life of $\leq$ 5 days. Average life per LPS is 5

days for LPS which form over the Bay and 3 days for those which form over the land. Mean number of LPS days for the period 1970-83 is significantly higher than the normal due to higher frequency of LPS with the life of one week and longer.

The series of total westward longitudinal displacement of LPS during the monsoon season is also random and Gaussian-distributed. The mean and SD of the distribution are 73.6° and 21.1° of longitude.

The central pressure anomaly at the locations of the LPS has a negatively skewed distribution, i.e., a much longer tail to the left, due to storms and severe storms. Its mean and SD are -5.7 mb and 3.6 mb. Anomaly of < -12 mb is observed at less than 5% of the locations of LPS. Central pressure anomaly over the area 20°-22°N, 84°-92°E (Head Bay and north Orissa) is found to be lower in years of good monsoon over India than that in years of deficient monsoon over India. It is also found that the LPS located over this area in good monsoon years have a mean life greater by 1 day and mean westward longitudinal displacement greater by 2.5° of longitude than the corresponding mean values in deficient monsoon years. Both of these factors tend to increase the rainfall in good monsoon years.

The number of LPS dissipating from the area 22°-26°N, 88°-92°E is found to be significantly larger in years of deficient Indian monsoon rainfall than that in years of good Indian monsoon rainfall. Larger dissipations results in smaller life and smaller longitudinal westward displacement during the season and hence lesser rainfall.

The number of LPS formed is significantly (above 5% level) and directly related to central Indian monsoon rainfall. The number of LPS days has a significant and direct relation to the Indian monsoon rainfall (above 5%) and to central India monsoon rainfall (above 1%), and the relationships generally show good stability. Total westward longitudinal displacement of the LPS and monsoon rainfall over India and central India are directly and significantly (above 1%) related and the relationships generally show good stability.

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I. INTRODUCTION

The major rain-producing systems over India and neighborhood during the summer monsoon season are, the semi-permanent monsoon trough which extends from west Pakistan to Burma, and the transitory closed Low Pressure Systems (hereafter refered to as Low Pressure Systems, LPS) forming over India and neighborhood, or entering northeast India or north Bay from east. The term LPS includes the low pressure area formed over the Indian region and its subsequent daily locations as low, depression, cyclonic storm, and severe cyclonic storm, during the period of existence of the low pressure area. According to the criteria followed by India Meteorological Department, an area of low pressure is a low if the wind speed within the associated cyclonic circulation is < 17 knots (i.e. nautical miles per hour), a depression, if the wind speed is 17-33 knots, a cyclonic storm, if the wind speed is ≥ 34 knots, a severe cyclonic storm if the wind speed is ≥ 48, and a severe cyclonic storm with a core of hurricane winds, if the wind speed is ≥ 64 knots. These criteria are generally followed for identifying the systems over the sea and adjoining coastal area. A large majority of these systems forms over north and adjoining central Bay of Bengal (north of latitude 15°N) and some form over the Indian land area north of 15°N. These systems develop in Bay either afresh or from remnants of tropical depressions/storms which strike Viet Nam and south China coast and travel westwards (Iyer, 1931, 1935 and Saha et al, 1981). On a relatively few occasions, the systems form over the Bay between 10°N and 15°N. LPS rarely form south of 10°N. During monsoon, low pressure systems form over

Arabian Sea mostly in June. Occasionally, however, the systems moving in a westerly direction across the central parts of India, emerge into Arabian Sea during the months July to September, and intensify. Number of LPS forming over the Arabian Sea during the monsoon season is very small.

A large proportion of these LPS move across north and central India in a direction between west and northwest. During September, some of these systems recurve towards north or northeast after having moved upto north Madhya Pradesh and east Rajasthan. The cyclonic storms, on crossing the coast generally weaken into depressions over the land area. Rainfall associated with the cyclonic storms is intense and heavy over a relatively small area in left front quadrant. In the case of depressions, heavy rainfall occurs in left front quadrant, but is less intense and covers an area larger than that in the case of a storm. Rainfall associated with a low covers a relatively much larger area and heavy rainfall occuring in the field of low is scattered in character. Formation of severe storm during summer monsoon season is rare.

The lows play a notable role during the monsoon season. These produce rainfall over a wide area through convergence and vertical motion associated with them. In addition, on account of transport of heat and moisture upwards over the lows, the periodical passage of these lows across the country maintains the normal location and activity of the monsoon trough which are conducive to good rainfall distribution over a large portion of the country.

Considering the fact that the rainfall resulting from storms during the monsoon season generally does not extend much inland

beyond the coastal belt, and the number of storm days in the monsoon season is small, we can see that the contribution of the storms to the Indian monsoon rainfall is small. The major contributors are thus the depressions and the lows. Since rainfall associated with the lows generally occurs over a relatively much larger area than that associated with the depressions, the lows could be considered to be at least on par with the depressions in respect of their contributions to the Indian monsoon rainfall.

Low and depression are the main components of the low pressure systems of the monsoon season. However, only the depression has been studied extensively (Pisharoty and Asnani, 1957; Lal, 1958; Raghavan, 1965; Dhar and Bhattacharya, 1973; Mooley, 1973; Venkataraman et al., 1974; Mooley, 1976; Sikka, 1977). Neither the lows nor the LPS in their totality have been studied in any detail.

India Meteorological Department (1979) has published an Atlas of Cyclonic Storms and depressions over the Bay of Bengal and the Arabian Sea during the period 1877-1970.

Sikka (1980) examined the depressions/lows which formed over India in July and August during 5 good monsoon years and 5 bad monsoon years. He observed that there was no difference between good and bad monsoon years in respect of the number of depressions and the number of depressions days, but there was a notable difference in the number of lows and the number of low days for good and bad monsoon years.

Bhalme and Mooley (1980) found that smaller frequency of depressions and shorter westward extent of their tracks are the major factors associated with large-scale droughts.

Mooley and Parthasarathy (1983), who examined the characteristics of the depressions, during all the flood and drought years of the period 1871-1980 found that westward penetration of the depressions was more in flood years as compared to that in drought years.

In view of what is mentioned above, it appears necessary to study the low pressure systems which formed during the monsoon season in their totality i.e., covering all the lows, depressions, storms which formed over the Indian land area as well as sea area, to understand inter-annual variability of Indian monsoon rainfall.

In this study, the closed Low Pressure Systems (LPS) which formed during June to September in the period 1888-1983 over the area (shown in Fig. 1a) covering India, Pakistan, Bangla Desh, the Bay of Bengal and the Arabian Sea and are observed at mean sea level on daily weather charts, have been considered. The term LPS as used here covers a low pressure area formed and its subsequent daily locations and intensities during the life of the low pressure area.

The main objective of this study of the westward-moving monsoon LP systems in their totality is to understand the contribution of these systems to the inter-annual variability of the Indian monsoon rainfall and for this purpose, the interannual variability of the characteristics of these systems has been examined with reference to their formation, location, life, intensity, movement and dissipation, and the relationship of these characteristics with the monsoon rainfall has been investigated.

2. DATA SOURCE

India Meteorological Department commenced the preparation and issue of the Indian Daily Weather Report from the year 1888. The report included the daily meteorological observations made at the observatories in India (which included at that time the present India, Pakistan, Bangla Desh, Sri Lanka and Burma) at 8 a.m., and a weather chart with isobars. These reports which are available from 1888 to 1983 in the library of the National Oceanic and Atmospheric Administration, Rockville, MD, were used in this study. Reports of a few months which were missing in NOAA library were obtained from the Massachussets Insitute of Technology, Cambridge, Massachussets.

The series of area-averaged Indian summer monsoon (June through September) rainfall (hereafter Indian monsoon rainfall) for the period 1888-1983 is taken from Mooley and Parthasarathy (1984) and Mooley et al, (1986). The series is based on monthly rainfall from a fixed network of 306 stations evenly-distributed over the plain region of India. The network of raingauge stations is shown in Fig. 1(b). Each station represents the area of the district in which it is located. District is an administrative unit in India. These 306 stations from the plain region of India cover an area of about 2.88×10^6 sq. Km. Thus, the average area represented by a raingauge station is about 9400 sq Km. The monsoon rainfall series for India and for divisions of India are area-weighted averages, the rainfall of each station being weighted by the area represented by each station. The hilly region of India is excluded. The area considered is about 88% of the total area of India and it will hereafter be referred to as the country or India. Area-averaged

monsoon rainfall series for 3 divisions of India, north, central and south, are prepared for the period 1888-1983 from the monthly rainfall of the stations.

3. PROCEDURE FOR IDENTIFYING THE LPS

A summary of the characteristics of pressure variability based on a preliminary examination of the charts and the meteorological observations contained in the Indian Daily Weather Reports is given below. These characteristics have been taken into consideration while framing the criteria for listing LPS and information in respect of these systems.

(i) Within the area of the monsoon trough the pressure variation is generally small.

(ii) Occassionally, over the trough area, the pressure falls or rises by a small amount at a few locations and this results in the appearance of a closed low or a few closed lows within the trough. However, these lows are not maintained and on the next day's chart no closed low is observed within the area of the trough. These are ephemeral lows which appear temporarily due to some apparent random pressure changes at some locations within the trough. Such ephemeral lows have not been considered in this study. These have been taken as part of the monsoon trough.

(iii) Sometimes, as a result of distinct pressure fall over some area within the trough, a low is formed within the monsoon trough and the same is maintained. The low may or may not move, but it has a distinct identity of its own. Occassionally two such lows form within the trough and these are observed on the next day's chart either at the same locations or at other

locations to which they have moved. Such lows are distinctly separate from the trough and these have been considered in the present study. The low may form either over the sea or over the land. Over the Bay, the low may also develop from the weak system which emerges into the Bay from the east after a tropical storm/depression has struck Viet Nam coast and moved westwards.

(iv) Sometimes, based on one or two slightly lower pressure values a marginal low pressure area could be drawn within the monsoon trough, and this situation is observed on the next day also. Such marginal lows even if they are found to persist on the next day, have been considered only as part of the trough and not classified as LPS.

(v) It is noticed that at times an LPS can be distinctly identified on the basis of the pressures and pressure changes at a few stations, but is not sustained till the next day, and hence cannot be located on the next day's chart. Such a distinctly identified LPS is considered in this study.

(vi) The LPS, during its life, may have the same intensity or have different intensities, depending on the number of closed isobars around the center of the system on different days. The low pressure area is classified as low, depression, cyclonic storm, severe cyclonic storm, and hurricane, on the basis of the pressure distribution at sea level around the central area of the system. Generally, these systems when over sea area are classified on the basis of the associated wind speed. Since wind speed data at the hour of observation are not

available during the earlier part of the data period and since on account of the complex boundary layer over land wind speed at the land surface is not a satisfactory indicator of the wind speed associated with LPS, it was not feasible to use wind for classification of the intensity of the low pressure systems. The classification criteria have been based on the number of isobars around the center of the LP System. Isobars are drawn for even millibar values at 2 millibar interval. The following criteria were adopted for the classification of the LPS.

(a) Low: A single closed isobar for even millibar value with pressure near center being lower than the isobar value by about 2 mb.

(b) Depression: Two closed isobars of even millibar value with pressure near center being about 4 mb lower than the outer isobar value.

(c) Cyclonic storm: About five or more closed isobars of even millibar values and estimated central pressure being about 10 mb lower than the outermost isobar value.

(d) Severe cyclonic storm: About eight closed isobars of even millibar values and estimated central pressure being 16 mb lower than the outermost isobar value.

(e) Hurricane: About ten closed isobars of even millibar values and estimated central pressure being 20 mb lower than the outermost isobar value.

While taking decision in marginal cases, the previous and subsequent classifications of the LPS are taken into account. In

classifying each pressure system, the weather charts with the isobars, and mean sea level pressures at the observatories located within the innermost isobar of the low pressure system have been considered. It may be mentioned that while objectivity in the identification of LPS has been aimed at and has been generally followed, subjectivity could not be completely eliminated. After classification of each system, information in respect of the same is noted down. The information collected consists of the date, month, year and serial number of the system, classification, expected pressure near the center, and location of the center of the system, and similar information on each subsequent day till the low pressure system ceases to exist. The information in respect of these systems is collected for the monsoon season, i.e., from 1 June through 30 September, for each of the years 1888 through 1983, except for June 1902 when due to nonavailability of the weather reports at NOAA Library, no information could be obtained for this month.

4. FORMATION OF LPS

4.1 Annual and decadal frequency.

Rao and Jayaraman (1958) who examined the frequency of depressions and cyclones over the Bay of Bengal during the period 1891-1950 did not find any trend or periodicity in the series. Bhalme (1972) who fitted orthogonal polynomial to the series of cyclonic disturbances (depressions) over the Indian region during the monsoon season for the period 1891-1970 found a significant decreasing trend.

Table 1 gives the series of the number of LPS formed over India, adjoining countries, the Arabian Sea and the Bay of Bengal (area as in Fig. 1, hereafter referred to as the Indian region) in the summer monsoon season (June through September). It has been tested for randomness against trend or oscillation by applying Swed and Eisenhart's (1943) test of runs above and below the median and Mann-Kendall rank statistic test (WMO 1966). Swed and Eisenhart's test is also used to test the homogeneity of the series. The number of runs above and below the median (i.e. 13) is 43. A number smaller than 40 would suggest trend at 5% level and greater than 56 would suggest oscillation at 5% level. Since the actual number of runs lies between these two limits, there is neither significant trend nor significant oscillation, and the series can be taken to be random and homogeneous. Mann-Kendall rank statistic τ is -0.10 and is numerically smaller than 0.14, the value significant at 5% level. Thus, both the tests suggest that the series of the annual frequency of formation of LPS is random. Fig. 2 shows the normalized anomaly of the frequency of LPS.

Table 2 lists the parameters of the series, the mean, median, standard deviation (SD), coefficient of variation (CV), the extremes and the years in which these occurred and auto-correlation coefficient with lag 1. The mean and the median are the same, viz., 13. The extreme values generally lie within 2 S.D. from the mean. SD is about one-sixth of the mean. The autocorrelation coefficient with lag 1 does not show any persistence in the series.

Figure 3 shows the frequency distribution of the number of LPS formed over the Indian region. The Gaussian distribution fitted to

the data is also shown in Fig. 3. Application of Chi-square goodness-of-fit test gives Chi-square value of 9.12 (d.f. 6) which is not significant even at 10% level. Application of Kolmogorov-Smirnov (K-S) test for normality shows that the test statistic for K-S test, i.e. the maximum absolute difference between the empirical cumulative distribution and the Gaussian cumulative distribution is 0.058 which according to table given by Lilliefors (1967) is not significant even at 20% level. Both the tests show that the distribution of the number of LPS formed is Gaussian.

Table 3 gives the number of LPS formed over the Indian region in each decade, the decadal mean and SD. None of the decadal means is significantly different from the overall mean for the period 1888-1983. The decade 1971-80 is characterized by the highest mean and the highest SD. While 1911-20 has the lowest mean, 1901-10 has the lowest SD; however, SD for the decade 1911-20 is slightly higher.

4.2 Spatial Variation

4.2.1 Over different longitudinal zones

Table 4 gives the number of LPS which formed in the longitudinal zones, east of 90.0°E, 85.1-90.0°, 80.1-85.0°, 75.1-80.0°, 70.1-75.0° and $\leq$ 70°E during the period 1888-1983, mean for each zone, percentage of the total for each zone, the highest and the lowest number of LPS formed in each zone along with the years in which these occurred. The highest number of LPS forms in the zone 85-90°E, the percentage of the total being 63. The percentage falls steeply on either side of this longitudinal zone. 88% of the LPS form over the area east of 80°E.

Figure 4(a) shows the number of LPS formed over the different 4° lat. x 4° long. blocks of the area during the period 1888-1983. The highest number, 340, of LPS formed over the block 18°-22°N, 88°-92°E. This block is located at the Head of the Bay of Bengal.

Figure 4(b) shows the number of LPS which formed over 4° lat. x 4° long. blocks of the Indian region in 15 years of good monsoon and 15 years of deficient monsoon over India during 1888-1983. The numbers at the top and bottom of each block are for deficient and good monsoon years respectively. The number of years of deficient monsoon rainfall over India during 1888-1983 was 17. Figure 4(a) gives the numbers adjusted by the factor 17/15. It can be seen that of the 6 blocks where the number exceeds 10, there are 4 blocks (22°- 26°N, 80°-92°E, and 18°-22°N, 88°-92°E) for which the number of LPS formed in deficient monsoon years exceeds that in good monson years, the difference being relatively small, and there are two (14°-22°N, 84°-88°E) for which the number of LPS formed in good monsoon years is relatively much larger.

4.2.2 Over Sea and land areas

Table 5(a) gives the number of LPS which formed over the Bay of Bengal and adjoining coastal belt (hereafter, the Bay), over the land area and over the Arabian Sea during the period 1888-1983, mean and S.D. 64% of the LPS form over the Bay and 30% over the land area and only 6% over the Arabian Sea. The contribution of the Arabian Sea LPS to the Indian monsoon rainfall is expected to be of little significance.

Figure 5 gives the frequency of LPS forming over the Bay and land area expressed as percentage of the frequency of LPS forming over the Indian area, for the period 1888-1983. While the percentage of LPS forming over land is generally much lower than that forming over the Bay, in a few years, it is higher.

Table 5(b) gives the means and SD of the frequencies of LPS which formed over the Bay and the land area in different decades. In respect of the LPS forming over the Bay, none of the decade means is significantly different from the mean for the whole period. However, for the LPS which formed over the land area, the mean for the decade 1941-50 is significantly higher (at 5%) than the mean for the whole period.

4.3 Intraseasonal variation

The frequency of LPS formed is obtained for each of the months June, July, August, and September of the period 1888-1983. Table 6 gives the mean, the mean expressed as percentage of the seasonal mean, SD and the highest and lowest frequencies. It is seen that the variation in the mean frequency over the months is relatively small. Extremes generally lie within 2 times of SD from the mean.

4.4 Relationship with rainfall

The correlation coefficients (ccs) between the number of LPS formed over the Indian region during the monsoon season and the monsoon rainfall over India/north India/central India/south India are computed. The divisions north, central, south, of India respectively cover 27.1%, 40.0%, and 32.9% of the country's area and these are shown in Fig. 6. The ccs are, 0.18, -0.07, 0.26 and

0.11 for India, north, central and south India respectively. It is seen that the cc is near 1% significance level for the monsoon rainfall over central India. Cc significant at 5% level is 0.20 and the cc with Indian monsoon rainfall fails to attain this significance level. There is no relationship with north India and with south India monsoon rainfall.

The variation in the relationship between the number of LPS formed over the Indian region during the monsoon season and the central India monsoon rainfall, over the period 1888-1983, has been examined by computing ccs for sliding 30-year period, the period sliding forward by one year at a time. Figure 7 shows these ccs. The cc is plotted at the center of the 30-year period. It is seen from this figure that the cc is positive and non-significant, but increases and becomes significant for 30-year periods from 1930 and remains significant above 5% till the end.

To see how good is the relationship with central India rainfall, rainfall contrast between groups of years with low and high frequency of LPS, as well as the contrast between LPS frequencies for deficient and good monsoon years are examined for significant difference. Low/high frequency of LPS is defined by the normalized anomaly of $\leq -1.0/\geq +1.0$. Similarly, deficient/good monsoon is defined as normalized monsoon rainfall anomaly of $\leq -1.0/\geq +1.0$. Tables 7(a) and 7(b) give respectively rainfall in years of low/high frequency of LPS formed, and number of LPS formed in years of deficient/good monsoon rainfall over central India. It is seen that in years of low LPS formation, normalized rainfall anomaly is mostly negative and is less than -1.0 in five years; however, in one year only,

rainfall anomaly has exceeded +1.0. During majority of the years of high LPS formation, rainfall anomaly is positive and in four years it exceeded +1.0; however, there are two years with rainfall anomaly of < -1.0. The contrast in rainfall anomaly in the two groups exists but is not sharp. The Student's t statistic for testing the difference between the rainfall means for the two groups is 2.08 (d.f. 26) and this is slightly higher than the t value significant at 5% level (2-tailed test). The difference between the two rainfall means is marginally significant. Mann-Whitney test also supports this inference. The normalized anomaly of the number of LPS in a majority of the deficient/good monsoon years is negative/positive; however, the contrast does not appear to be good. Student's t value for testing the difference between the means of the number of LPS for deficient/good monsoon years is 1.63 (d.f. 32) which is not significant at 5% level. Means for the deficient/good monsoon years appear to be influenced by the frequency of LPS in a few years. Application of Mann-Whitney test shows that the value of the test statistic is 87 and on 5% level (2-tailed test) the test statistic between 87 and 201 is not significant, and suggests that the contrast between the means of number of LPS formed in deficient/good monsoon just fails to attain significance at 5%. On the whole, the relationship between the number of LPS formed and the monsoon rainfall over central India though significant on the basis of cc does not appear to be good.

5. LIFE OF LPS

The number of days for which an LPS is found to exist is taken as the life of the individual LPS. If L_{ij} is the life of i^{th} LPS

in j^{th} year, then the number of LPS days in the monsoon season (hereafter, number of LPS days) in j^{th} year is defined by $\sum_{i=1}^{n_j} L_{ij}$ where n_j is the number of LPS formed over the Indian region in monsoon season of the j^{th} year.

5.1 Number of LPS days during the monsoon season.

Table 8 gives the series of the number of LPS days over the Indian region during monsoon season for the period 1888-1983. The series of the number of LPS days is tested for randomness and homogeneity by applying Swed and Eisenhart's test and Mann-Kendall rank statistic test. Both the tests show that the series is random and homogeneous. Figure 8 brings out the normalized anomaly of the number of LPS days. It may be noted from Table 8 and Fig. 8 that the number of LPS days is continuously at a higher level during the last 10 years.

Table 9 lists the parameters of the series of the number of LPS days - the mean, median, SD, CV, the extremes and the corresponding years and autocorrelation coefficient with lag 1. The mean and the median differ slightly. The SD is about 12 days which is about 20% of the mean. Practically, the whole of the distribution lies within 2 S.D. from the mean. The highest number of LPS days of 82 is noticed in 1977 in which year one single LPS sustained itself for 17 days, the longest life on record for an individual LPS. The lowest number of LPS days occurred in the drought year 1951. Auto-correlation coefficient with lag 1 suggests persistence at 5% level. This appears to be due to the effect of the last 10 years.

Figure 9 displays the frequency distribution of the number of LPS days along with the fitted Gaussian distribution. The class intervals are, 25-30, 30-35, 35-40, 40-45, etc., 80-85 days. The highest frequency is for the class-intervals 50-55 and 55-60. The distribution shows good symmetry about the mean. The Chi-square test of goodness-of-fit of the distribution is applied over 10 class-intervals with equal probability. The value of Chi-square is 6.53(d.f.7) which is not significant even at 20% level. Application of K-S test for the cummulative distribution shows that the maximum absolute difference between the cumulative distribution of the number of LPS days and the fitted Gaussian distribution is 0.073. This difference is not significant even at 20% level. Thus, both the tests bring out that the distribution of the number of LPS days is Gaussian. The probability of getting $\leq$ 33 LPS days/$\geq$ 80 LPS days is 0.025, on the basis of the Gaussian distribution.

Table 10 gives the decadal means and SD of the number of LPS days and the mean life per LPS. The difference between the mean for the decade 1971-80 and the long-term mean for the period 1888-1983 is highly significant. None of the remaining decadal means is significantly different from the long-term mean. The lowest decadal mean is for 1931-40; in fact, in this decade, in 8 years the number of LPS days was below the long-term mean. It may be noted that this decade has the highest variability. The lowest variability is observed for the decade 1901-10. An examination of the number of LPS days in the decade 1971-80 shows that in each year it is more than the long-term mean with the exception of 1974 (a drought year) when it was well below the long-term mean. We have seen in the

last section that the mean number (14.3) of LPS formed in the decade 1971-80 is not significantly different from the long-period mean. In fact, a decadal mean as high as 13.9 of LPS formed is observed for 1941-50. In view of this position, it is clear that the significantly larger mean number of LPS days for the decade 1971-80 is not due to higher frequency of LPS formed. It is seen that not only the decade 1971-80, but the period 1970-83 has a much higher mean number of LPS days in comparison to the long-period mean. The possible reason for this situation has been examined in the next sub-section.

Table 11 gives the mean contributions to the number of LPS days by LPS forming over the Bay, the land area and the Arabian Sea and also the mean contributions expressed as percentages of the number of LPS days over the Indian region, SD and average life per LPS. About three-fourths of the number of LPS days are contributed by the Bay LPS, about one-fifth by the land LPS and a very small percentage by the Arabian Sea LPS. SD in comparison to the mean is rather large for the land LPS and is very much larger for the Arabian Sea LPS. Bay LPS have the highest life of 5 days per LPS, land and Arabian Sea LPS have each an average life of 3 days per LPS. The Bay LPS thus exert a relatively much larger influence on the meteorological conditions over India. Figure 10 shows the number of LPS days for the Bay and the land LPS in each year during the period 1888-1983, expressed as percentage of the number of LPS days over the Indian region.

5.2 Spatial Variation

The number of LPS days over 4° lat. x 4° long. blocks of the Indian region is computed for monsoon season of each of the years 1888-1983. This is actually the number of days on which LPS is located in the block. From these data, the number of LPS days for each block is obtained for the period 1888-1983. Figure 11 shows the number of LPS days for the different blocks. It is seen that the block defined by 22-26°N, 80°-84°E has the highest number, 884, of LPS days and the adjoining block on the east has the next highest number (751) of LPS days.

5.3 Variation in the frequency of location of the different stages of low pressure.

The number of days when each stage of the low pressure area, i.e. low, depression and storm is located over the Indian region is obtained for each year of the period 1888-1983. Figure 12 shows the frequency of low days, depression days and storm days. It is seen from this figure that the number of low days is generally much higher than the number of depression days, and the number of storm days is very small. The mean frequency for the period 1888-1983 is 32.8 for low days, 21.7 for depression days and about 2.0 for storm days. Thus the mean frequency is 50% higher for lows than that for depressions. The lows are observed to play a major role during the monsoon season. Hence, consideration of lows along with depressions is essential for a proper understanding of the interannual variability of the Indian monsoon rainfall.

5.4 Contribution to the number of LPS days by LPS with different days of life.

Table 12 brings out the frequency of LPS for different days of life for the period 1888-1983, and the corresponding means per year. It is seen from this table that 42% of the LPS formed have a life of $\leq$ 3 days, and 81%, a life of $\leq$ 6 days. Thus, only 19% of the LPS sustain for a week or longer. On the basis of the long-period mean data given in Table 12, mean percentage contributions to the number of LPS days by LPS sustaining longer than 1, 2, 3, etc., 14 days, are computed. These are shown in Figure 13. It may be noted from this figure that LPS sustaining longer than 5 days make half the contribution to the number of LPS days. The contributions by LPS sustaining longer than 3 and 6 days are 79% and 36% respectively, which as we have seen are made by 58% and 19% of LPS formed respectively.

We have observed earlier that the period 1970 -83 has a much higher mean number of LPS days in comparison to the normal. The mean number of LPS days for the 14-year period is 69.6 days. The mean annual frequency of LPS which formed in this period is 14.3 which is not significantly different from the normal (13.0). The higher level of mean frequency of LPS formed during the period is unable to account for the significantly larger mean number of LPS days in this period. It is possible that the higher mean number of LPS days may be due to longer life of LPS in 1970-83. In order to examine this point, contributions to the number of LPS days by LPS with life $\leq$2, $\leq$3, $\leq$4, $\leq$5, $\leq$6, and >6 days have been computed for the 14-year period 1970-83. The corresponding normal contributions

for a 14-year period are computed on the basis of the whole data for the period 1888-1983. These contributions are listed in Table 13(a). This table clearly brings out that contributions by LPS with life $\leq$ 2, 3, 4, 5 and 6 days during 1970-83 differ little from the normal, but that by LPS with life of one week and longer is substantially higher (67% higher) than the normal. Thus, a cut-off of the LPS with life less than a week reveals the much higher than normal contribution to the number of LPS days by LPS which sustain for a week and longer. Table 13(b) gives frequency of LPS with life 1, 2, 3,....., 17 days for the period 1970-83 and the corresponding normal frequency for a 14-year period. This table brings out that the frequency of LPS with life less than a week is 147 for the period 1970-1983 against almost the same normal frequency of 147.6 for a 14-year period and that the frequency of LPS with life of one week and longer is 53 for the period 1970-83 against the corresponding much smaller normal frequency of 34.4. We thus see that a much higher frequency of LPS with life of one week and longer has contributed to a significantly much higher mean number of LPS days during the period 1970-83 in comparison to the normal.

5.5 Intraseasonal Variation of the number of LPS days.

The number of LPS days in each monsoon month is computed for the period 1888-1983. If n is the number of LPS which formed in the month and L_i is the life in days of the i^{th} LPS, then the number of LPS days in the month is $\sum_{i=1}^{n} L_i$ if the life of the last,

i.e. the n^{th} LPS, falls entirely within the month, and $\sum_{i=1}^{n-1} L_i + L_n'$ where L_n' is the portion of L_n which falls within the month. Figure 14 shows the year to the year variation in the life of LPS in June, July, August and September, the mean and SD for these months. The highest mean and SD are for August. The mean and SD for September are slightly smaller.

5.6 Relationship between the number of LPS days and monsoon rainfall.

The ccs between the number of LPS days and monsoon rainfall over India/north India/central India/south India are computed to examine the relationships. These ccs are respectively, 0.24, -0.05, 0.39, and 0.08. CC with central India rainfall is significant at 0.1% level and that with Indian rainfall is significant above 5% level. There is no relationship with north/south Indian rainfall.

Stability in the relationships of the number of LPS days with Indian/central India monsoon rainfall has been examined. Figure 15 shows ccs for sliding 30-year periods, commencing from 1888 and the period sliding forward by one year at a time. The ccs of the number of LPS days with Indian monsoon rainfall show stability in significance (at 5% level) for 30-year periods commencing after 1930. Those with central India monsoon rainfall are near 5% level for periods ending on or before 1920, except over a small period. After 1920, the ccs for central India rainfall are significant at 5% and after 1930, they are generally significant at 1% level.

To examine how good are the relationships with monsoon rainfall over central India/India, the contrast in rainfall in years of low/high number of LPS days as well as the contrast in the number of LPS

days in years of deficient/good monsoon is examined for significance. Test statistics t for Student's test (2-tailed) for difference in the mean rainfall for years of low/high number of LPS days are, 3.31 (d.f. 30) for central India, significant above 1%, and 2.26 (d.f. 30) for India, significant at 5% level. Application of Mann-Whitney tests (2-tailed) in these two cases shows that the test statistics are significant at 0.2% and 5% respectively. Thus, both the tests support the inference that for years of low number of LPS days monsoon rainfall over central India is smaller than that in years of high number of LPS days at a level of significance which is above 1% level, and similar inference in respect of rainfall over India, but at 5% level. Table 14 brings out the good contrast in rainfall over central India in years of low/high number of LPS days. In most of the years of low number of LPS days, rainfall anomaly is negative, and in 6 of these years rainfall is deficient, and in most of the years of high number of LPS days, rainfall anomaly is mostly positive and in 5 years rainfall is good.

The values of the test statistic for Student's t test for difference between the means of the number of LPS days in years of deficient/good rainfall over central India and India are respectively 3.33 and 2.33, significant above 1% level and at 5% level (2-tailed test). Mann-Whitney test in these cases gives similar results. Thus, the number of LPS days in deficient monsoon years is lower than that in good monsoon years at a level of significance above 1% for central India and at 5% for India. Table 15 brings out the good contrast in the number of LPS days in years of deficient/good monsoon over central India.

The above tests bring out that the relationship of the number of LPS days is very good with central India monsoon rainfall and is good with Indian monsoon rainfall. In order to understand how the larger number of days is contributed to the number of LPS days by LPS during good monsoon years in comparison to that contributed during deficient monsoon years for central India/India, the mean contributions by LPS sustaining longer than 1, 2, 3, ..., 10 days are evaluated. These contributions are compared with the normal contributions based on data for 1888-1983. Figure 16 shows these comparisons for central India and India. It is seen from this figure that the contributions are above/below normal in good/deficient monsoon years and the contrast between the deficient and the good monsoon curves which increases slowly from $\geq$ 1 day to $\geq$ 4 days, becomes marked for LPS sustaining for periods exceeding 5 days. Thus, the higher frequency of LPS with life exceeding 5 days in good monsoon years than that in deficient monsoon years actually contributes to higher rainfall over central India and India in good monsoon years.

The numbers of LPS days for each 4° lat. x 4° long. block for 15 years of good Indian monsoon and for 15 years of deficient Indian monsoon, as well as the difference, the number of LPS days in good monsoon years minus the number of LPS days in deficient monsoon years, are computed. Figures 17(a) and 17(b) respectively give the numbers for good monsoon years and the differences, for these blocks. While the number of good Indian monsoon years is 15 during 1888-1983, the number of deficient Indian monsoon years is 17, and the numbers for deficient monsoon years are adjusted by the

factor 17/15. Figure 17(b) shows that generally for the blocks over the area 18°-30°N, 64°-88°E, the number of LPS days is higher in good monsoon years than that in deficient monsoon years. The highest positive difference is 57 for the block 18°-22°N, 84°-88° E which covers north Orissa and adjoining Bay of Bengal. It may be noted that the number of LPS days over the area 18°-26°N, 88°-92°E is higher in deficient monsoon years than that in good monsoon years. This appears to be due to the combined effect of northerly track, larger dissipation of LPS over this area in deficient monsoon years and as seen from Fig. 4(b), larger number of LPS forming over this area in deficient monsoon years than that in good monsoon years.

6. NUMBER OF DAYS WITH NO LPS OVER THE INDIAN REGION

During the monsoon season, there are days without any LPS over the whole area. Such days will hereafter be referred to as LPS-free days. These are the days on which the Indian monsoon rainfall is mainly influenced by the monsoon trough. The absence of LPS is likely to influence the rainfall adversely in two ways: (i) rainfall associated with the LPS is missed, and (ii) the rainfall associated with the monsoon trough is likely to be reduced since in the absence of LPS the normal activity and the location of the trough may not be maintained. To gain an insight into the inter-annual variability of the Indian monsoon rainfall, the series of the number of LPS-free days during the monsoon season and the influence of such days on the monsoon rainfall are examined. We have seen earlier that a direct relationship exists between the number of LPS days and the monsoon rainfall over India/central India. In

view of this and in view of the inverse relationship between the number of LPS days and the number of LPS-free days, an inverse relationship between the number of LPS-free days and monsoon rainfall can be expected.

The mean and SD of the series of LPS-free days are 68.7 days and 10.3 days respectively. The median is close to the mean, being 69. The extreme normalized anomalies are 2.07 (90 days), and -2.50 (43 days) in 1951 and 1977 respectively. 1951 is a drought year for India as well as central India and 1977 is a good monsoon year for central India. For India, normalized monsoon rainfall anomaly in 1977 is only +0.35. Except for the lowest value, the whole distribution of LPS-free days lies within 2 S.D. from the mean. On about 56 per cent of the days during the monsoon season, no LPS exists to influence the monsoon rainfall and on these days monsoon trough mainly influences the rainfall. If the trough maintains the normal location and near-normal intensity, the country continues to receive the rainfall. If the trough shifts to the foot-Himalayas and a 'break' in monsoon occurs, then the plain regions of the country receive very low rainfall and the sub-Himalayan region receives excessive rainfall. The mean number of days of 'break' in the monsoon during July and August for the period 1888-1983 is 8.1 (Mooley and Shukla, 1987) and the mean number of LPS-free days during July and August for the same period is 33.3; thus, the number of days of 'break' in the monsoon is about 24% of the LPS-free days during July and August. Out of 62 days of July and August, the average number of days of 'break' is 8.1 (13.1%), that of days when only monsoon

trough lies over the Indian region is 25.2 (40.6%), and that of days when in addition to the trough a low also lies over the region is 28.7 (46.3%).

Application of Swed and Eisenhart's (1943) test for randomness shows that the series is random and homogeneous, the number of runs above and below the median being 43, suggesting neither oscillation nor trend significant at 5%.

The series of LPS-free days is tested for Gaussian distribution by the application of Chi-square and Kolmogorov-Smirnov (K-S) tests. Chi-square value is 2.96 (d.f.6) and K-S test statistic (i.e., the maximum absolute difference between the empirical and Gaussian cumulative distributions) is 0.028. Both of these test statistics are much smaller than the values significant at 20% level and the distribution of the LPS-free days can be taken to be Gaussian.

The ccs between the number of LPS-free days and monsoon rainfall of India/north India/Central India/south India are computed. These are respectively -0.23, 0.12, -0.38, and 0.21. Inverse relationship is observed for India (significant above 5% level) and for central India (significant at 0.1% level) as could be expected. However, cc for south India is slightly higher than the value significant at 5% level and shows direct relationship between the two variables.

These relationships are further examined by testing for significance the difference between the means of rainfall for years of low/high values of number of LPS-free days and also the difference between the means of number of LPS-free days for years of deficient/good monsoon. On the basis of 2-tailed Student's t tests for central India, with t = 4.96, d.f. 30, the mean rainfall in years of low

value of the number of LPS-free days is significantly (above 0.1% level) higher than that in years of high value of number of LPS-free days, and with t = 4.03, d.f. 32, the mean number of LPS-free days in years of deficient rainfall is significantly (above 0.1% level) higher than that in years of good rainfall. Thus, the inverse relationship between the number of LPS-free days and the monsoon rainfall is seen to be very good for central India and accounts for about 14.5% of the rainfall variance. This relationship is seen to be better than that between the number of LPS days and the monsoon rainfall of central India as observed from the higher significance level of the difference between the means of the number of LPS-free days in years of deficient/good monsoon and of the difference between the means of rainfall for years of high/low values of the number of LPS-free days. For India, while the difference between the means of rainfall for years of low/high values of the number of LPS-free days is significant at 0.1% level, the difference between the means of number of LPS-free days in years of deficient and good monsoon is significant at 5% level only and the inverse relationship between Indian monsoon rainfall and the number of LPS-free days can be taken to be significant at 5% level ony. For south India, both the differences are small and are not significant even at 10% level and it can be inferred that there is no relationship between monsoon rainfall of south India and number of LPS-free days, the cc slightly higher than the value significant at 5% level being due to random chance.

7. MOVEMENT OF LPS

LP systems generally move in a westerly direction across the central and adjoining parts of the country, and maintain the normal activity and normal location of the monsoon trough. Sometimes LPS which form over northeast India and north Bay move either north or northeast, i.e., they do not have any westerly movement during their existence. Such systems contribute little to the maintenance and activity of the monsoon trough. The number of such systems varies from year to year. The aspects of movement which are likely to influence rainfall are, the characteristics of the tracks of LPS, number of LPS with no westward movement, westward penetration of the LPS and the total westward longitudinal displacement of the LPS during the monsoon season. These aspects are examined. While examining these aspects, it may be mentioned that only LPS which formed along and east of 80°E are considered, since these primarily influence the monsoon rainfall and constitute about 88% of the LPS which formed over the Indian region.

7.1 Tracks of LPS and their characteristics.

7.1.1 Tracks of LPS

From the information about LPS formed over the Indian region during the monsoon season and the subsequent locations of the lows during the life of each system, tracks of the different LPS which formed during the period 1888-1983 have been prepared. Thse are given in Appendix I.

One map gives the tracks of all the LPS which formed during the monsoon season of one year, indicating the location at about 0800

hrs Indian Standard Time on ech day of life of each LPS. The date for each location is given on the scale 1 to 122 which covers days from June 1 to September 30. Dates from 1 to 30 directly denote dates in June, those from 31 to 61 denote 1 to 31 July, those from 62 to 92 denote 1 to 31 August and finally, dates from 93 to 122 denote 1 to 30 September, respectively. Low, depression and storm stages of an LPS are shown by thin discontinuous line, thicker discontinuous line and continuous line respectively, as indicated on top right portion on each map. When change of stage occurs from one date to the next date, for example from low on the first date to depression on the next date, the first half of the track between the two dates is shown as low and the second half is shown as depression. This brings out clearly the dates between which the stage change occurs and the stage of LPS on each of the two dates. The map covers an area 15°N-35°N, 65°E-95°E. The LPS tracks which fall outside this area, are shown on separate maps and such maps include tracks for groups of years. The total area covered by the information on LPS tracks is 5°-35°N, 65°-98°E.

In order to follow any particular track in the midst of a jumble of tracks, data in respect of each LPS is given in Appendix II. On each page of Appendix II, the year is given at the top. LPS in each year are serially numbered. For each LPS, the serial number is given first, then the first date is given as date and month and also within parentheses on 1 to 122 scale. Next, the stage and location are given for the first and all subsequent dates of the life of the system. Stage is given as 1 for low, 2 for depression and 3 for cyclonic storm, 4 for severe storm and 5

for severe storm with a core of hurricane winds, if any. Location is given in latitude in °N to the first decimal place and longitude in °E to first place of decimal, the decimal point being omitted.

7.1.2 Characteristics of tracks during deficient/good monsoon.

Mooley (1976) who examined the tracks of monsoon depressions over India during some of the worst summer monsoon failures over the Asiatic monsoon area, found that most of the tracks either terminated or recurved east of 80°E.

On examination of the tracks for the 17/15 years of deficient/good monsoon over India, it is observed that during deficient monsoon years most of the tracks terminate near longitude 80°E, but in good monsoon years some tracks continue upto about 70°E. Figure 18(a) and 18(b) show such typical tracks for the drought years, 1899 and 1918 and for the flood years, 1892 and 1961 respectively. During 1899 and 1918, the normalized anomalies of the Indian monsoon rainfall were -2.69 and -2.45, and the percentages of country's area under drought were 71 and 66 respectively. In 1892 and 1961, the normalized anomalies of the Indian monsoon rainfall were +1.66 and 1.98 and the percentages of the country's area under flood were 41 and 31 respectively.

The question arises, what factor or factors contribute to the higher westward penetration power of the LPS during years of good monsoon? Possibly, some specific features of the circulation exist in the upper troposphere in years of good monsoon. Mulky and Banerjee (1960) have brought out that the monsoon depressions move in a direction parallel to the wind direction at 9 km level in the area to the right of the track. The smaller/larger

westward displacement in deficient/good monsoon years suggests that the wind field in the upper troposphere (6-12 km) over and around LPS has distinctly different characertistics in deficient/ good monsoon years - may be Tibetan anticyclone may show significant differences in location and intensity. Murakami (1978) has shown that during weak summer monsoon Tibetan anticyclone at 200 mb is shifted southeastwards. The wind field over India and neighborhood at the relevant levels during deficient/good monsoon needs to be examined in detail.

7.2 Number of LPS with no westward movement.

The number of such systems is obtained for each year. The mean and S.D. of these systems are 1.8 and 1.3 respectively. The extremes are 0, recorded in 12 years, and 7 in 1904. The mean numbers of such LPS in years of deficient/good monsoon over India/north India/central India/south India are computed. The differences between the two means are, 1.0/0.3/0.8/0.6 for India/north India/central India/south India, the means for deficient monsoon years being higher than those for the good monsoon years. However, none of these differences is significant at 5% level. Such LPS do not significantly affect the monsoon rainfall.

7.3 Westward penetration of LPS

Numbers of LPS which formed at or east of 80°E and the numbers of LPS which reached longitudes 75°E and 70°E during years of deficient/good monsoon over India as well as over central India are given in Table 16. This table also gives the number of LPS which reached 75° and 70°E expressed as percentage of the number

of LPS which formed at or east of 80°E. The table clearly shows that for both the areas, India and Central India, the percentage of LPS reaching 75°E and 70°E in good monsoon years is much higher than the corresponding percentages in deficient monsoon years. In fact, the percentage of LPS reaching 70°E in good monsoon years is greater than that reaching 75°E during deficient monsoon years. These percentages bring out the higher westward penetrating power of the LPS during good monsoon years. Bhalme and Mooley (1980) and Mooley and Parthasarathy (1983) have shown for each of the months of the monsoon season that monsoon depressions have greater westward penetration during years of good monsoon over India than that during years of deficient monsoon. Since the distribution of the percentage of LPS reaching 75°E may not be Gaussian, Mann-Whitney test which is a non-parametric test has been applied to test the significance of the difference between the percentage of LPS reaching longitude 75°E in deficient and good monsoon years for India and central India. The test shows that the percentage is higher during good monsoon years than that during deficient monsoon years at a level of significance of 0.1% for India and of above 1% for central India.

The highest westward penetration, i.e. the westernmost longitude reached by any LPS during the monsoon season has been examined for years of deficient/good monsoon over India and central India. The mean values for deficient/good monsoon years are 74.1°/68.6°E in respect LPS forming at or east of 85°E and 73.5°/68.5°E in respect of LPS forming at or east of 80°E, for India. The corresponding mean values for central India are 74.4°/70.2° in respect of LPS

forming at or east of 85°E and 73.7°/70.0°E in respect of LPS forming at or east of 80°E. The highest difference between the two means for deficient and good monsoon years is 5.5° for India in respect of the LPS forming at or east of 85°E. The significance of the difference between the westernmost longitude attained during deficient/good monsoon years for India and central India is examined for LPS which formed at and east of 85°E by applying Mann-Whitney test. According to this test, the western-most longitude attained is smaller in good monsoon year than that in deficient monsoon year at a level of significance above 0.1% for India and above 1% for central India, which means notably greater maximum westward penetration in years of good monsoon. Mann-Whitney test is also applied to the westernmost longitude attained by LPS which formed at or east of 80°E, and it is found that the results are similar to those in respect of LPS which formed at or east of 85°E and the levels of significance attained are the same, viz., 0.1% for India and 1% for central India.

Considering the above results, it can be briefly stated that the LPS are characterized by larger and more westward-penetrating activity during good monsoon years than that during deficient monsoon years at a level of significance of 0.1% for India and of above 1% for central India.

7.4 Total westward longitudinal displacement of the LPS

Only the westward displacements have been taken into account. Total westward longitudinal displacement of the LPS during the monsoon season (hereafter, TWLD) is defined as

$$\sum_{j=1}^{n} \sum_{i=1}^{m-1} wd_{ij},$$

where d_{ij} is the longitudinal displacement from i^{th} to $(i+1)^{th}$ day of the j^{th} LPS, m is the number of days of life of the system which varies from one system to another, n is the number of LPS during the season and w is the weight for each displacement which is 1 for westward displacement and o for no displacement or eastward displacement. TWLD is computed for each year. The normalized TWLD series is shown in Fig. 19. The mean, median and SD of the series are 73.6 70.9 and 21.1 degrees of longitude. It is observed that the number of runs above and below the median is 42. If the number of runs lies between 39 and 57, there is neither significant trend nor significant oscillation at 5% level. Since the number of runs lies between these limits, according to Swed and Eisenhart's test, the series has neither significant trend nor significant oscillation and the series can be taken to be to be random and homogeneous. Thirteen LPS form on an average over the Indian region during the monsoon season, and the average westward longitudinal displacement per LPS comes to 5.7%. The extreme values of TWLD are 25.2° (normalized anomaly, -2.29) in 1974, a deficient monsoon year, and 137.2° (normalized anomaly, +3.01) in 1959, a good monsoon year.

Application of Chi-square and K-S tests for testing the goodness of fit of the distribtion to the Gaussian distribution shows that the test statistics for these tests are 4.01 (d.f. 5) and 0.035 respectively which clearly bring out that the distribution is Gaussian.

The ccs between TWLD and the monsoon rainfall over India/north India/central India/south India are computed. These are respectively,

0.38, -0.08, 0.52, and 0.25. For India and central India, the ccs are significant above 0.1% level, that for south India, the cc is significant above 5% level. There is no relationship with north Indian rainfall.

These direct and significant relationships are further examined to find out if the difference between the mean rainfall for years of low and high values of TWLD and the differene between the means of TWLD for deficient and good monsoon years are significant. For central India, both the differences are significant above 0.1% level; for India, the difference in the two means of TWLD for deficient and good monsoon years is significant above 0.1% but the difference between the two rainfall means for years of low and high values of TWLD is significant above 1% level. For south India, none of the two differences is significant at 5% level and it can be inferred that the relationship may be weak or it does not exist. The relationships of TWLD with central India/India monsoon rainfall explain rainfall variance of 27% and 14% respectively. Relationship with south India rainfall, if any, may explain only 5% of the rainfall variance.

Table 17 gives central India monsoon rainfall for years of low/high values of TWLD and values of TWLD for years of deficient/good monsoon over central India. Long-period mean and SD of monsoon rainfall for central India are 81.2 and 12.0 cm respectively. In 11 out of 13 years of low values of TWLD, rainfall is equal to or less than the long-period mean, and in 11 out of 14 years of high value of TWLD rainfall is above the long-period mean. In 12 out of 16 years of deficient monsoon TWLD is less than the long-

period mean of 73.6, and in 14 out of 18 years of good monsoon, TWLD is greater than long-period mean. Thus, the relationship of monsoon rainfall of central India with total westward longitudinal displacement of the LPS during the monsoon season is very good. This relationship is seen to be better than that with the number of LPS days. This is understandable since TWLD includes the number of LPS days and westerly movement and eliminates that portion of the number of LPS days which is likely to have small influence on rainfall, i.e. life in which displacement is zero or eastwards.

The variation in the relationship between total westward longitudinal displacement of the LPS and Indian/central Indian monsoon rainfall is examined over 30-year periods. Figure 20 shows the ccs between TWLD and the Indian/central Indian monsoon rainfall for sliding 30-year periods from 1888, the period sliding forward by one year at a time. The cc is shown at the center of each 30-year period. It is seen that the ccs with Indian monsoon rainfall continue to be significant and stable for 30-year periods commencing from about 1930 onwards. The ccs with central Indian monsoon rainfall are significant and stable almost throughout the whole period 1888-1983 and the ccs continue to be significant above 1% level after about 1930.

These relationships clearly bring out that when we are considering the regression approach to the problem of forecasting monsoon rainfall over India or central India, unless the predictors which we use are able to capture the westward displacements of the LPS during the monsoon season, we have to be content with explained rainfall variance upto

80-85% for India and 70-75% for central India. In the foreseeable future, it does not appear to be possible to locate such a predictor or such predictors which have good relationship with the total westward longitudinal displacement of the LPS during the monsoon season.

8. CENTRAL PRESSURE ANOMALY

Utilizing the estimated central pressure at each location of the low pressure systems and the corresponding normal pressure, anomaly of the central pressure is computed for each of the locations. The normal pressure at each location of the LPS is estimated from the normal 5-day mean charts which were prepared from the normal pressures at Indian, Bangla Desh and Pakistan stations for the period 1931-60. The main features of this anomaly and its relationship with rainfall are examined in this section.

8.1 Main features of the central pressure anomaly

Considering the central pressure anomaly at all the locations of the LPS during 1888-1983, percentage frequencies are computed for 2 mb class-intervals of central pressure anomaly. The percentage frequency distribution is shown in Fig. 21. The mean and SD of the distribution are -5.7 mb and 3.6 mb. The distribution is negatively skewed, i.e. it has a much longer tail to the left due to storms and severe storms. The modal class-interval is -4 to -6 mb and the modal frequency is 25%. About two thirds of the distribution lies between -2 to -8 mb, and 77% lies between 0 and -10. Central pressure anomaly of < -12.0 is observed at less than 5% of the locations.

8.2 Relationship between central pressure anomaly and monsoon rainfall

The relationships of the mean seasonal central pressure anomaly (i.e., anomaly averaged over all locations of LPS during monsoon season) with the monsoon rainfall over India, north India, central India and south India are examined. The ccs between the mean seasonal pressure anomaly and the monsoon rainfall are computed. These are, -0.11 for India, +0.15 for north India, -0.13 for central India and -0.18 for south India. For n=95, none of these ccs is significant at 5% level.

A further examination was made of the mean central pressure anomaly in years of deficient/good monsoon rainfall over India and the three divisions. It is seen that the difference, i.e., the average of the mean seasonal central pressure anomaly in years of deficient monsoon rainfall minus the average of the mean seasonal central pressure anomaly in years of good monsoon rainfall, is 0.2 mb for India, -0.1 mb for north India, 0.4 mb for central India and 0.8 mb for south India. Since the seasonal central pressure anomaly distribution is not Gaussian Student's t-test cannot be applied to test the significance of these differences in the two averages. Application of the non-parametric Mann-Whitney test shows that these differences are not significant even at 10% level for south India and at 20% level for India, north India and central India. We thus find that the monsoon rainfall over India and its three divisions has no significant relationship with the mean seasonal central pressure anomaly. It has been found that even if we consider median central pressure anomaly instead of

the seasonal mean central pressure anomaly, the results of application of Mann-whitney test remain the same.

It is possible that the higher proportion of weaker low pressure systems might influence the rainfall adversely. In view of this, the proportion of L.P. systems with central pressure anomaly > -6.0 mb in years of deficient/good monsoon rainfall over India and its three divisions has been examined. Application of Mann-Whitney test shows that for south India, the proportion is higher in deficient monsoon rainfall years than that in good monsoon rainfall years at just 10% level of significance. For India and central India, the difference is not significant even at 20% level and for north India, the mean proportions for deficient and good monsoon rainfall years are almost equal.

We have considered average rainfall over large areas like India and the three divisions. It is known that severe systems (like storms) with large negative central pressure anomaly give very heavy rainfall over a small area, depressions (weaker than storms) give moderate to heavy rain over a larger area and the lows (weaker than depressions) give light to moderate rain over a still larger area. From this, we can qualitatively infer that the area-weighted rainfall contributions made by these systems of different low pressure anomaly to the monsoon rainfall of India or the three divisions of India may not differ significantly, and understand the lack of significant relationship between the seasonal mean central pressure anomaly and monsoon rainfall of India/north India/central India/south India. In contrast to this, if we consider monsoon rainfall over a small area like

Orissa, we should expect to get a significant relationship between the monsoon rainfall over Orissa and the seasonal mean central pressure anomaly of LPS which affected Orissa.

8.3 Central pressure anomaly over different portions of the Indian region in years of deficient and good monsoon.

The question that is examined here is, whether central pressure anomaly over any portion of India is significantly different during years of deficient/good monsoon.

Central pressure anomaly composites for deficient/good monsoon rainfall over India are prepared in respect of LPS located in each 2° lat. x 2° long. blocks with at least 10 observations. An examination of these composites of anomalies for 2° x 2° blocks showed that the four consecutive blocks lying within the area defined by longitudes 84° - 92°E and latitudes 20-22°N have mean anomaly which is smaller for good monsoon years than that for deficent monsoon years by about 2 mb. These blocks occupy the area covered by Head Bay and north Orissa. The mean central pressure anomaly of LPS located over this area for years of deficient/good monsoon rainfall over India is computed. For deficient rainfall years the mean central anomaly is -5.5 mb (n=156) and for good monsoon rainfall years, the mean central pressure anomaly is -7.2 mb (n=149). Thus, the low pressure systems located over the Head Bay and neighbourhood are weaker in years of deficient monsoon rainfall than those in years of good monsoon rainfall. As the distribution of central pressure anomaly is not Gaussian, it is not possible to apply Student's t-test to test the significance of the difference of the means for the

deficient and good monsoon years. Hence, non-parametric median test (Conover, 1971) is applied to test whether the central pressure anomaly of the systems in years of deficient rainfall is at a signficantly higher level than that in years of good monsoon rainfall. Table 18 gives the number of occasions when central pressure anomaly was greater than, and also less than or equal to the combined median, for years of deficient and good monsoon rainfall. The null hypothesis is that both the samples come from the same population or the two medians do not differ. The cell frquencies on the basis of null hypothesis are given in parentheses in Table 18. The Chi-square for the contingency table is 9.85 (1 d.f.) and this is significant above 0.5% level. Thus the null hypothesis is contracticted, and the median central pressure anomaly of LPS in years of deficient monsoon is higher than that in good monsoon years at a level of significance above 0.5% level. In other words, the LPS located over the Head Bay of Bengal and adjoining land area are significantly weaker during years of deficient monsoon than those during years of good monsoon. These low pressure systems were examined with reference to their life and the westward longitudinal displacement for differences in years of deficient/good monsoon rainfall. It is seen that on the average, the low pressure system in deficient monsoon year has a life smaller by 1 day and westward longitudinal displacement smaller by 2.5° of longitude than the corresponding values in good monsoon year. The rainfall differences are thus due to differences in the life and in the westward longitudinal displacement of the low pressure systems located in the area 20°-22°N, 84°-92°E.

9. DISSIPATION OF LPS

The number of LPS which dissipated from the different 4° lat. x 4° long. blocks during the period 1888-1983 is shown in Fig. 22. It is seen from this figure that the 4° latitudinal belt from which maximum dissipation occurs is the belt 22°-26°N. The corresponding 4° longitudinal belt is 80°-84°E.

Figure 23 gives for each 4° lat x 4° long. block, the number of LPS dissipated during years of deficient/good monsoon rainfall over India. Upper/lower numbers in each block give the number of LPS dissipated during 15 deficient/15 good monsoon years. India experienced deficient monsoon in 17 years and good monsoon in 15 years during the period 1888-1983. To make the numbers comparable, the numbers for deficient monsoon years are adjusted by multiplying by 15/17 and these adjusted numbers are given for years of deficient monsoon in Fig. 23. An examination of Fig. 23 shows that for the block 22°-26°N, 88°-92°E the number 25 of LPS dissipated in years of deficient monsoon is much higher than that of 6 in years of good monsoon or of 10.7 which is normal for a 15-year period based on the average for the long period, 1888-1983. It is observed that even on preparation of the composites of the number of LPS which dissipated over 2° lat. x 2° long. blocks, the area of notable difference in the number of LPS dissipated in deficient and good monsoon years is the same, viz., 22°-26°N, 88°-92°E. The number of LPS which dissipated from this block is obtained for each year of deficient/good monsoon rainfall. Out of 17 years of deficient monsoon rainfall over India, the number of LPS which dissipated from this block is 0 in 4 years, 1 in 3 years, 2

and more in 10 years (28 LPS in all). Out of 15 years of good monsoon rainfall over India, the corresponding numbers of years are 11, 3 and 1 respectively. A notable difference in the dissipation is observed for the two categories of years. Application of Mann-Whitney test shows that the dissipation from this block in question in years of deficient monsoon rainfall is higher than that in years of good monsoon rainfall over India at a level of significance which is above 0.5%. The characteristics of these 28 low presssure systems during years of deficient monsoon are examined. It is found that with the exeption of 2 L.P. systems, all the systems had a small total westward longitudinal displacement. The movement was either westwards, or eastwards or mixed. Seventeen of these systems had a small life of 1 to 3 days. As we have seen earlier, small westward movement of the systems and the small life of the system, both affect the rainfall adversely. In contrast, the low pressure systems which formed in, or were located in or passed through the block in years of good monsoon rainfall over India showed that average life per system and average westward longitudinal displacement per system are 6 days and 12° of longitude which are much greater than the long-period average per low pressure system of 3.7 days and 6.5° of longitude respectively.

10. SUMMARY

This study of the characteristics of the LPS over the Indian region during the monsoon (June through September) and their relationship with the monsoon rainfall brings out the following salient features.

A. Characteristics

i. Formation

Frequency distribution of the number of LPS forming during monsoon is Gaussian with mean 13.0 and SD 2.2., and extremes 9 and 18. About 63% of the LPS form in the longitudinal sector 85°-90°E and 88% form east of 80°E. Percentages of the LPS which form over the Bay and over the land area are 64 and 30 respectively.

ii. Life

The number of LPS days is Gaussian-distributed with mean 56.4 and SD 11.7 and extremes, 32 and 82. 70.6% of the LPS have a life of $\leq$ 5 days, 27.8%, a life between 6 and 10 days and 1.6%, a life exceeding 10 days. The mean number of LPS days for the period 1970-83 is significantly higher than the overall mean mainly due to higher frequency of LPS with life of one week and longer in this period as compared to normal. The LPS which form over the Bay, the land area and Arabian Sea contribute 75%, 21%, and 4% of the number of LPS days over Indian region, and these LPS have an average life of 5, 3, and 3 days per LPS respectively. In view of this, the Bay LPS exert a large influence on the meteorological conditions over India.

iii. Movement

The distribution of the total westward longitudinal displacement of the LPS during the monsoon season is Gaussian with mean and SD, 73.6° and 21.1° of longitude respectively. With 13 as the average number of LPS formed, average westward

longitudinal displacement for an LPS is about 5.7°. The extremes of the displacement during the season are, 25.2° (in 1974, a deficient monsoon rainfall year for India) and 137.2° (in 1959, a good monsoon rainfall year for India).

iv. Central pressure anomaly

The distribution of central pressure anomaly of the LPS is negatively skewed, i.e., a much longer tail to the left, due to storm and severe storms. The mean and SD of the distribution are, -5.7 mb and 3.6 mb. At less than 5% of the locations of the LPS, the anomaly was < -12 mb.

Central pressure anomaly over Head Bay and north Orissa is found to be lower in years of good monsoon over India than that in years of deficient monsoon over India.

v. Dissipation

Dissipation of LPS from the area 22°-26°N, 88°-92°E is observed to be significantly larger in years of deficient monsoon rainfall over India than that in years of good monsoon over India. Larger dissipation over this area leads to smaller life and smaller westward longitudinal displacement of the LPS during the season and consequently to lesser rainfall.

B. Relationships with rainfall.

The number of LPS formed over the Indian region during the monsoon season is not signficantly related to monsoon rainfall over India, except for a weak relationship (significant above 5%) with central India monsoon rainfall.

The number of LPS days during the monsoon season is significantly and directly related to Indian monsoon rainfall (above 5%) and to central India monsoon rainfall (above 1%). These relationships generally show good stability in significance.

The relationships between total westward longitudinal displacemnt during the monsoon season and monsoon rainfall over India and central India are direct and highly significant (above 1% level) and show good stability.

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Table 1: Number of Low Pressure Systems which formed over India, adjoining countries, the Bay of Bengal and the Arabian Sea (the Indian region) in summer monsoon season during the period 1888-1983.

Year	Number	Year	Number	Year	Number	Year	Number
1888	12	1912	10	1936	11	1960	12
1889	15	1913	14	1937	14	1961	17
1890	14	1914	12	1938	11	1962	13
1891	16	1915	10	1939	12	1963	11
1892	12	1916	10	1940	10	1964	12
1893	11	1917	11	1941	15	1965	14
1894	12	1918	10	1942	17	1966	10
1895	14	1919	14	1943	15	1967	13
1896	13	1920	12	1944	16	1968	9
1897	15	1921	16	1945	10	1969	12
1898	15	1922	15	1946	14	1970	14
1899	11	1923	13	1947	14	1971	14
1900	14	1924	13	1948	14	1972	12
1901	12	1925	10	1949	11	1973	16
1902	data incomplete	1926	12	1950	13	1974	11
1903	15	1927	13	1951	10	1975	18
1904	17	1928	17	1952	15	1976	10
1905	15	1929	14	1953	9	1977	14
1906	12	1930	11	1954	12	1978	15
1907	14	1931	9	1955	16	1979	17
1908	14	1932	9	1956	13	1980	16
1909	12	1933	15	1957	10	1981	16
1910	13	1934	14	1958	11	1982	14
1911	11	1935	12	1959	14	1983	13

Table 2: Statistical parameters of the series of LPS formed over the Indian region in the monsoon season (1888-1983).

Parameter	Value
Mean	13
Median	13
Standard deviation (SD)	2.2
Coefficent of variations (CV)	17%
Highest & year	18 (1975)
Lowest & year	9 (1931, 1932, 1953, 1958)
Auto Cor. Coeff. with lag 1	0.12

Table 3: The total number of LPS formed over the Indian region in each decade and the decadal mean and SD.

Decade	Total number of LPS formed	Mean	SD
1891-1900	133	13.3	1.77
1901-1910 (9 yrs.)	124	13.8	1.50
1911-1920	114	11.4	1.58
1921-1930	134	13.4	2.17
1931-1940	117	11.7	2.11
1941-1950	139	13.9	2.13
1951-1960	122	12.2	2.30
1961-1970	125	12.5	2.27
1971-1980	143	14.3	2.63

Table 4: LPS formation over different longitudinal zones during the period 1888-1983.

	Longitudinal Zones						
	East of 90°E	85.1-90.0°	80.1-85.0°	75.1-80.0°	70.1-75.0°	West of 70°E	Total
Number	102	780	207	56	53	37	1235
% of total	8	63	17	5	4	3	100
Mean	1.1	8.2	2.2	0.6	0.6	0.4	13
SD	1.2	1.9	1.5	0.7	0.7	0.7	
Maximum	7	15	6	3	3	2	
year	1981	1922	1891	1944	1961, 1979		
Minimum	0	4	0				
year	1924/1963/1981						

Table 5(a): Formation of LPS over the Bay, land area and the Arabian Sea (1888-1983).

	Bay	Land area	Arabian Sea	Total
Number	790	372	73	1235
% of total	64	30	6	100
Mean	8.3	3.9	0.8	13
SD	1.8	2.0	0.8	
Highest	12	8	3	
Year	1927,1956 1975,1980 1981	1904,1921 1942,1944	1979	
Lowest	4	0	0	
Year	1949	1893,1927 1951,1956		

Table 5(b): Mean and SD of frequencies of LPS which formed over the Bay and the land area for different decades.

Decade	Bay		Land area	
	Mean	SD	Mean	SD
1891-1900	8.7	2.1	4.2	2.5
1901-1910	8.4	1.5	4.8	1.6
1911-1920	7.4	1.2	3.7	1.5
1921-1930	8.1	2.6	4.4	2.6
1931-1940	7.3	1.7	3.8	1.3
1941-1950	8.0	1.8	5.3*	2.3
1951-1960	8.9	1.5	3.0	1.2
1961-1970	8.4	1.1	3.0	1.7
1971-1980	9.1	2.4	3.6	1.3

* This decade mean is significantly (5% level) different from the mean for the whole period.

Table 6: Intra-seasonal variation in the frequency of LPS formation over the Indian region (1888-1983).

	June	July	Aug.	Sep.
Mean	2.8	3.5	3.6	3.2
(Mean as % of Seasonal)	21.3	26.7	27.5	24.4
SD	1.4	1.2	1.1	1.0
Highest	6	6	6	6
Lowest	0	0	1	1

Table 7(a): Monsoon rainfall over central India in years of low ($\leq$ 10) and high ($\geq$ 16) frequency of LPS formation.

Years of Low LPS formation	Rainfall (mm)	Years of High LPS formation	Rainfall (mm)
1912	784(-0.2)	1891	826(+0.1)
1915	582(-1.9)	1904	683(-1.1)
1916	862(0.4)	1921	798(-0.1)
1918	566(-2.0)	1928	722(-0.7)
1925	779(-0.3)	1942	971(+1.3)
1931	804(-0.1)	144	1026(+1.8)
1932	784(-0.2)	1955	870(+0.5)
1940	834(+0.2)	1961	1084(+2.3)
1945	982(+1.4)	1973	943(+1.1)
1951	632(-1.5)	1975	896(+0.7)
1953	813(0.0)	1979	618(-1.6)
1957	710(-0.8)	1980	845(+0.3)
1966	617(-1.6)	1981	749(-0.5)
1968	651(-1.3)		
1976	826(+0.1)		
Mean	749(-0.53)		849(+0.31)

$t = 2.08^{*}$ (d.f. 26)

Note: Normalized rainfall anomalies are given in parentheses.
Asterisk denotes significance at 5%.

Table 7(b): Number of LPS formed during years of deficient/good monsoon over central India.

Years of deficient monsoon	No. of LPS formed	Years of good monsoon	No. of LPS formed
1899	11(-0.91)	1892	12(-0.46)
1901	12(-0.46)	1893	11(-0.91)
1904	17(1.82)	1894	12(-0.46)
1905	15(0.91)	1903	14(0.46)
1911	11(-0.91)	1917	11(-0.91)
1915	10(-1.37)	1919	14(0.46)
1918	10(-1.37)	1926	12(-0.46)
1920	12(-0.46)	1933	15(+0.91)
1941	15(+0.91)	1934	14(+0.46)
1951	10(-1.37)	1942	17(+1.82)
1965	14(+0.46)	1944	16(+1.37)
1966	10(-1.37)	1945	10(-1.37)
1968	9(-1.82)	1956	13(0.0)
1972	12(-0.46)	1959	14(+0.46)
1974	11(-0.91)	1961	17(+1.82)
1979	17(+1.82)	1973	16(+1.37)
		1977	14(+0.46)
		1983	13(0.0)
Mean	12.3(-0.32)		13.6(+0.27)

t = 1.63 (d.f. 32)

Note: Normalized anomalies of number of LPS formed are given in parentheses.

Table 8: Number of LPS days during the monsoon season over the Indian region (1888-1983).

Year	Number of LPS (Days)	Year	Number of LPS (Days)	Year	Number of LPS (Days)	Year	Number of LPS (Days)
1888	57	1912	36	1936	43	1960	46
1889	60	1913	62	1937	55	1961	80
1890	56	1914	55	1938	33	1962	61
1891	75	1915	37	1939	59	1963	41
1892	60	1916	45	1940	49	1964	49
1893	66	1917	53	1941	55	1965	52
1894	63	1918	42	1942	60	1966	41
1895	64	1919	57	1943	55	1967	51
1896	58	1920	54	1944	70	1968	53
1897	59	1921	58	1945	42	1969	51
1898	63	1922	71	1946	54	1970	63
1899	39	1923	46	1947	70	1971	64
1900	74	1924	47	1948	60	1972	65
1901	51	1925	52	1949	38	1973	77
1902	Data incomplete	1926	58	1950	50	1974	44
1903	50	1927	59	1951	32	1975	72
1904	69	1928	63	1952	64	1976	73
1905	59	1929	68	1953	48	1977	82
1906	46	1930	51	1954	47	1978	80
1907	56	1931	37	1955	64	1979	69
1908	62	1932	49	1956	54	1980	81
1909	48	1933	74	1957	35	1981	69
1910	49	1934	55	1958	49	1982	69
1911	58	1935	38	1959	62	1983	67

Table 9: Statistical parameters of the series of the number of LPS days over the Indian region during the monsoon season (1888-1983).

Parameter	Value
Mean	56.4 days
Median	56 days
SD	11.7 days
CV	21 %
Highest & Year	82 (1977)
Lowest & Year	32 (1951)
Auto-Corr. Coeff. with lag-1	0.24*

* Marginally significant at 5% level.

Table 10: Decadal means and SD of the number of LPS days during the monsoon season over the Indian region.

Decade	Mean number of LPS days	Mean life of an LPS (days)	SD of the number of LPS days
1891-1900	62.1	4.7	10.0
1901-1910	54.4	4.3	8.0
1911-1920	49.9	4.4	9.2
1921-1930	57.3	4.3	8.4
1931-1940	49.2	4.2	12.2
1941-1950	55.4	4.0	10.4
1951-1960	50.1	4.1	11.2
1961-1970	54.2	4.3	11.5
1971-1980	70.7§	4.9	11.3

§ Difference between this decade mean and mean for the whole period is significant at 0.1%.

Table 11: Mean and SD of the number of LPS days and average life of LPS which formed over the Bay, land area and the Arabian Sea (1888-1983).

	Bay	Land Area	Arabian Sea	Total
Mean in days	41.9	12.2	2.3	56.4
Mean as % of total	(74.3%)	(21.6%)	(4.1%)	(100 %)
SD	10.6	6.8	3.2	
Average life per LPS (days)	5.0	3.1	3.0	

Table 12: Frequency of LPS for different days of life for the whole period 1888-1983.

	Number of days of life of LPS																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	TOTAL
Frequency	106	247	169	189	161	129	106	58	32	18	12	2	2	3	0	0	1	0	1235
% of total frequency	8.6	20.0	13.7	15.3	13.0	10.4	8.6	4.7	2.6	1.5	1.0	0.16	0.16	0.24	0	0	0.08	0	100
Mean frequency per year	1.12	2.60	1.78	1.99	1.69	1.36	1.12	0.63	0.34	0.19	0.13	0.02	0.02	0.03	0	0	0.01	0	13.0

Table 13(a): Comparison of the number of LPS days contributed by LPS with life less than specified days during the period 1970-83 with normal.

Period	Contribution (in days) to the number of LPS days by LPS with life ≤ 2	≤ 3	≤ 4	≤ 5	≤ 6	> 6	Total
1970-83	84	162	270	385	505	470	975
Normal†	88	163	275	393	507	282	789
Difference	-4	-1	-5	-8	-2	188	186
Average difference per year	-0.3	-0.1	-0.4	-0.6	-0.1	13.4	13.3

† Normal for a 14-year period based on the period 1888-1983.

Table 13(b): Frequency of LPS with different days of life for the period 1970-83.

Period	Number of days of life of LPS																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
1970-83	18	33	26	27	23	20	17	11	10	7	2	2	2	1	0	0	1	200
Normal	15.6	36.4	24.9	28.0	23.7	19.0	15.6	8.5	4.7	2.7	1.8	0.3	0.3	0.1	0	0	.01	≈182

1970-83	Total frequency of LPS with life < one week: 147 (Normal: 147.6)
"	" " " " " " ≥ one week: 53 (Normal: 34.4)

Table 14: Contrast in monsoon rainfall over Central India during years of low/high number of LPS days.

S. No.	Years of low number of LPS days	Normalized rainfall anomaly	Years of high number of LPS days	Normalized rainfall anomaly
1	1899	-3.0	1891	0.1
2	1912	-0.2	1900	0.6
3	1915	-1.9	1904	-1.1
4	1918	-2.0	1922	-0.1
5	1931	-0.1	1933	1.5
6	1935	-0.1	1944	1.8
7	1936	0.3	1947	0.9
8	1938	-0.4	1961	2.3
9	1945	1.4	1973	1.1
10	1949	-0.4	1975	0.7
11	1951	-1.5	1976	0.1
12	1957	-0.8	1977	1.0
13	1963	-0.3	1978	0.2
14	1966	-0.6	1979	-1.6
15	1974	-2.3	1980	0.3
16			1981	-0.5
17			1982	-0.8
Mean		-0.86		+0.38

Students' t statistic = 3.31 (d.f. 30), significant above 1% level.

Table 15: Number of LPS days during years of deficient/good monsoon rainfall over central India.

S. No.	Years of deficient rainfall	Normalized anomaly of number of LPS days	Years of good rainfall	Normalized anomaly of number of LPS days
1	1899	-1.5	1892	0.3
2	1901	-0.5	1893	0.8
3	1904	1.1	1894	0.6
4	1905	0.2	1908	0.5
5	1911	0.1	1917	-0.3
6	1915	-1.7	1919	0.1
7	1918	-1.2	1926	0.1
8	1920	-0.2	1933	1.5
9	1941	-0.1	1934	-0.1
10	1951	-2.1	1942	0.3
11	1965	-0.4	1944	1.2
12	1966	-1.3	1945	-1.2
13	1968	-0.3	1956	-0.2
14	1972	0.7	1959	0.5
15	1974	-1.1	1961	2.0
16	1979	1.1	1973	1.8
			1977	2.2
			1983	0.9
Mean		-0.45		+0.61

Student's t statistic = 3.33 (d.f. 32), significant above 1%.

Table 16: Number of LPS formed at or east of 80°E, number reached longitudes 75°E and 70°E during years of deficient/good monsoon over India and central India.

	Deficient monsoon years			Good monsoon years		
	LPS formed	LPS reached		LPS formed	LPS reached	
		75°E	70°E		75°E	70°E
India	199	15(7.5%)	3(1.5%)	180	36(20%)	15(8.3%)
Central India	177	13(7.3%)	3(1.7%)	213	39(18.3%)	16(7.5%)

Note: Figures in parentheses are the numbers of LPS reaching the specified longitudes expressed as percentages of the LPS which formed at or east of 80°E. The numbers of deficient and good monsoon years are 17 and 15 respectively for India, and 16 and 18 respectively for central India.

Table 17: Monsoon rainfall over central India in years of low/high values of TWLD and values of Total Westward Longitudinal Displacement (TWLD) in years of deficient/good monsoon over central India.

Years of low TWLD	Monsoon rainfall over central India cm	Years of high TWLD	Monsoon rainfall over central India cm	Years of deficient monsoon for central India	TWLD ° long.	Years of good monsoon for central India.	TWLD ° lo
1899	45.2	1891	82.6	1899	29.8	1892	82.0
1901	62.7	1893	95.2	1901	47.1	1893	103.
1907	72.9	1894	93.9	1904	64.9	1894	100.
1911	65.4	1900	88.5	1905	94.4	1908	62.
1915	58.2	1913	73.9	1911	74.1	1917	79.
1916	86.2	1922	79.6	1915	43.3	1919	67.0
1918	56.6	1929	83.0	1918	41.4	1926	66.
1925	77.9	1933	98.8	1920	58.1	1933	110.
1932	78.4	1944	102.6	1941	78.0	1934	60.
1935	79.8	1959	99.4	1951	60.9	1942	79.
1953	81.3	1961	108.4	1965	69.8	1944	103.9
1971	86.3	1976	82.6	1966	55.9	1945	76.
1974	53.6	1977	92.8	1968	54.7	1956	77.0
		1981	74.9	1972	93.2	1959	137.
				1974	25.2	1961	131.
				1979	67.3	1973	90.8
						1977	109.
						1983	83.0
Mean	69.6		89.7		58.2		90.
n, the number	13		14		16		18

Table 18: Significance of the difference in the median central pressure anomaly of LPS located over the area 20°-22°N, 84°-92°E in years of deficient/good monsoon rainfall.

	Deficient monsoon years	Good monsoon years	Total
No. of occasions when central pressure anomaly:			
> combined median	92 (78.3)	61 (74.7)	153
≤ combined median	64 (77.7)	88 (74.3)	152
Total	156	149	305

X^2 = 9.85 (d.f. 1), significant above 0.5% level

Note: Cell frequencies on the null hypothesis of independence are given within parentheses.

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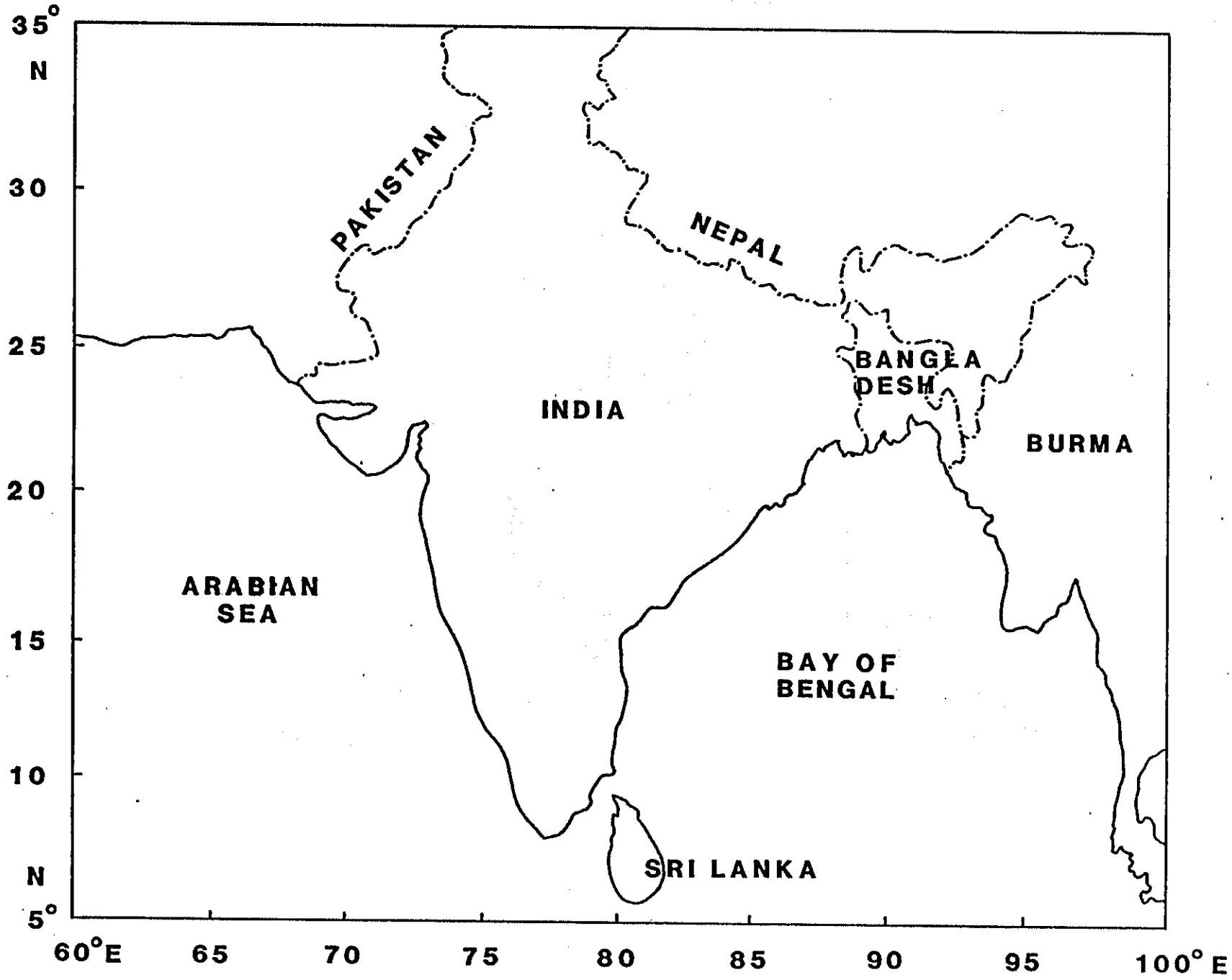


Figure 1(a): Area over which low pressure systems are considered.

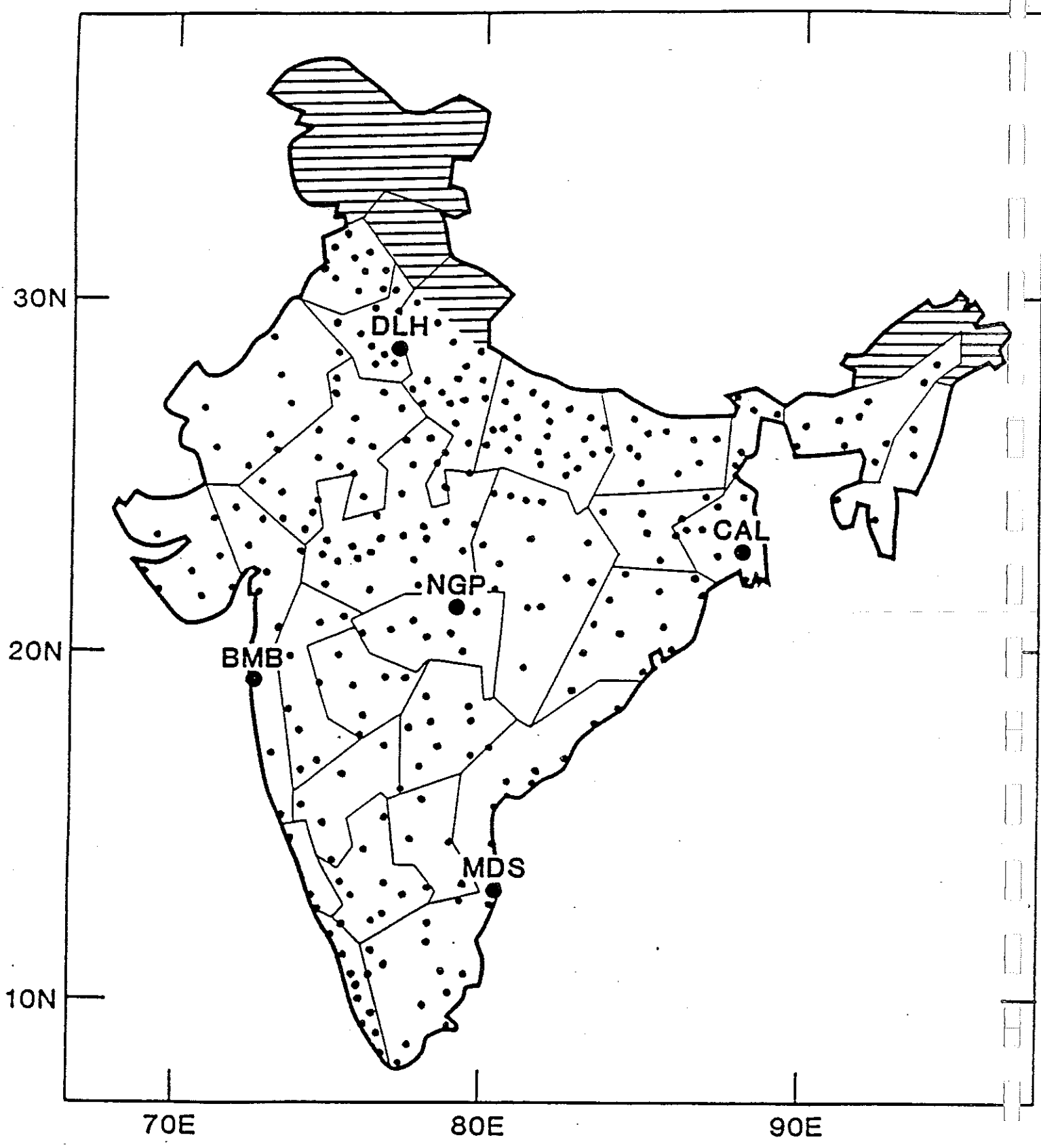


Figure 1(b): Network of rain-gauge stations over the contiguous Indian area considered. Hilly area (shown hatched) is not considered.

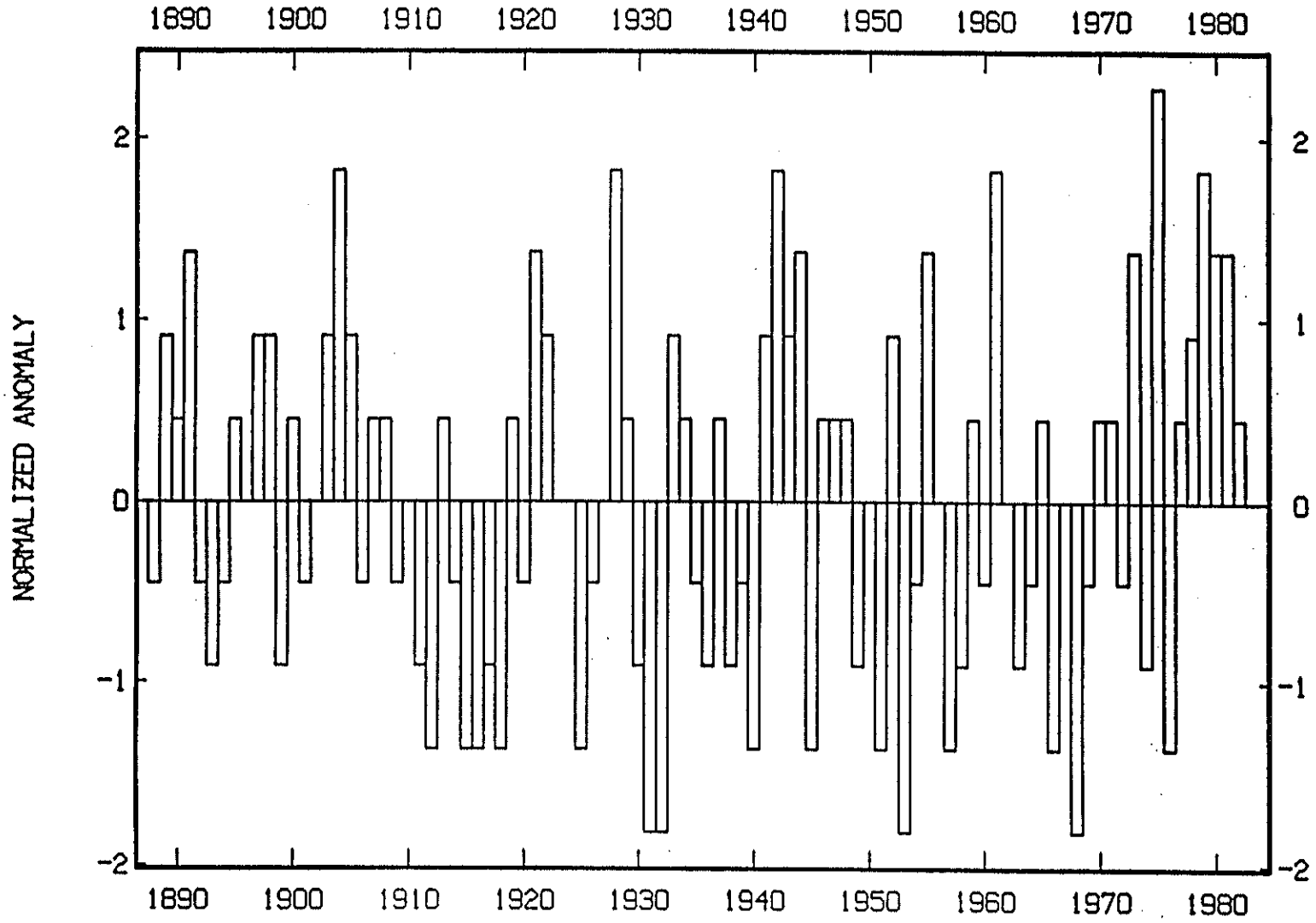


Figure 2: Normalized anomaly of the number of LPS which formed during the monsoon season over the Indian region (1888-1983).

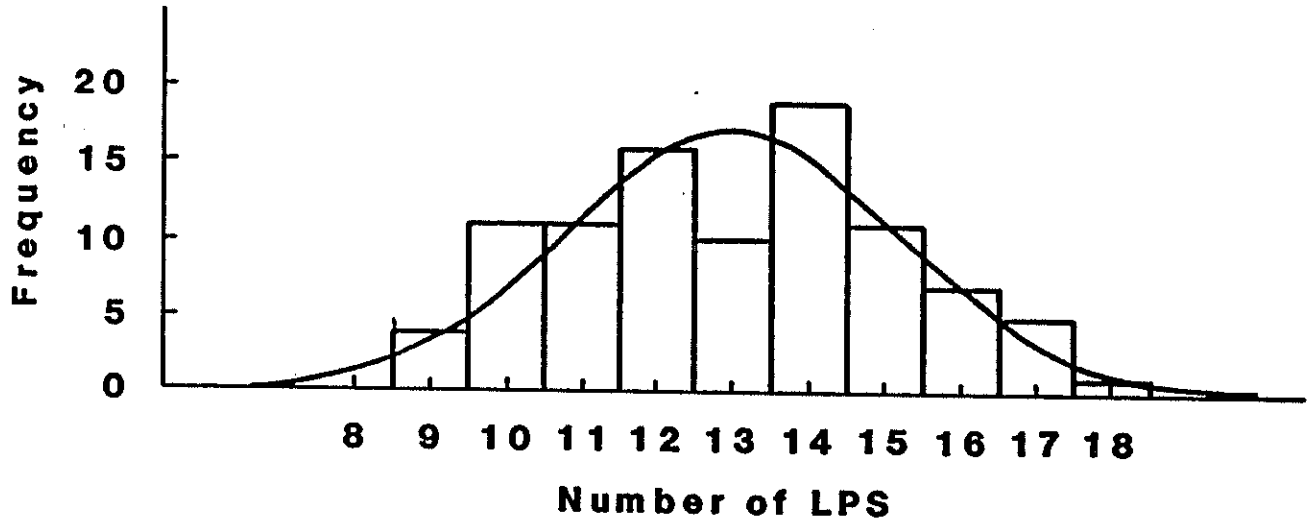


Figure 3: Frequency distribution of the number of LPS formed over the Indian region during the monsoon season. (Continuous curve is the fitted Gaussian frequency distribution) Period: 1888-1983.

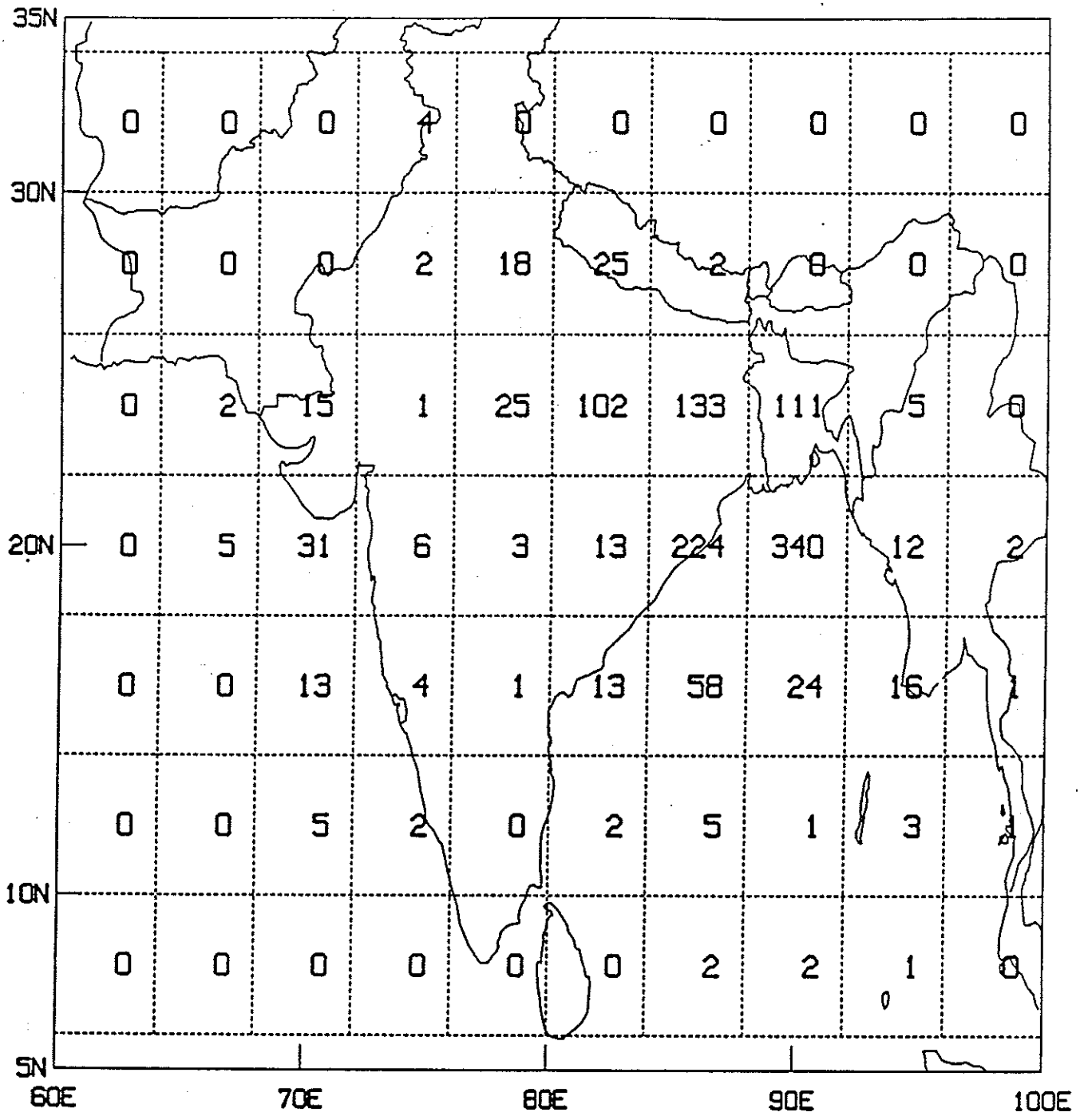


Figure 4(a): Number of LPS formed over 4° lat. x 4° long. blocks of the Indian region in the monsoon season during 1888-1983.

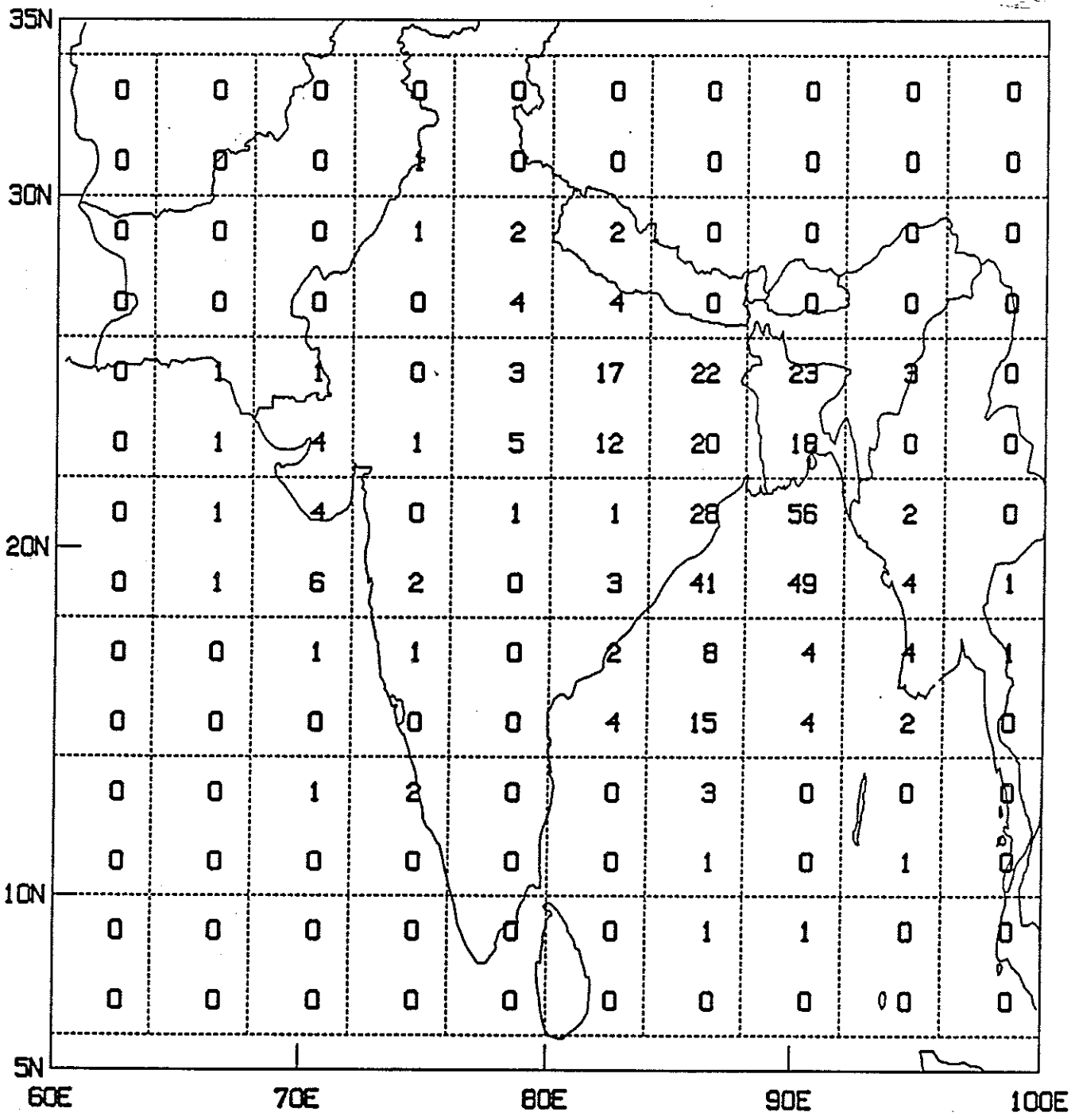


Figure 4(b): Number of LPS formed over 4° lat. x 4° long. blocks of the Indian region in 15 years of deficient monsoon/15 years of good monsoon over India. Top and bottom numbers are respectively for deficient and good monsoon.

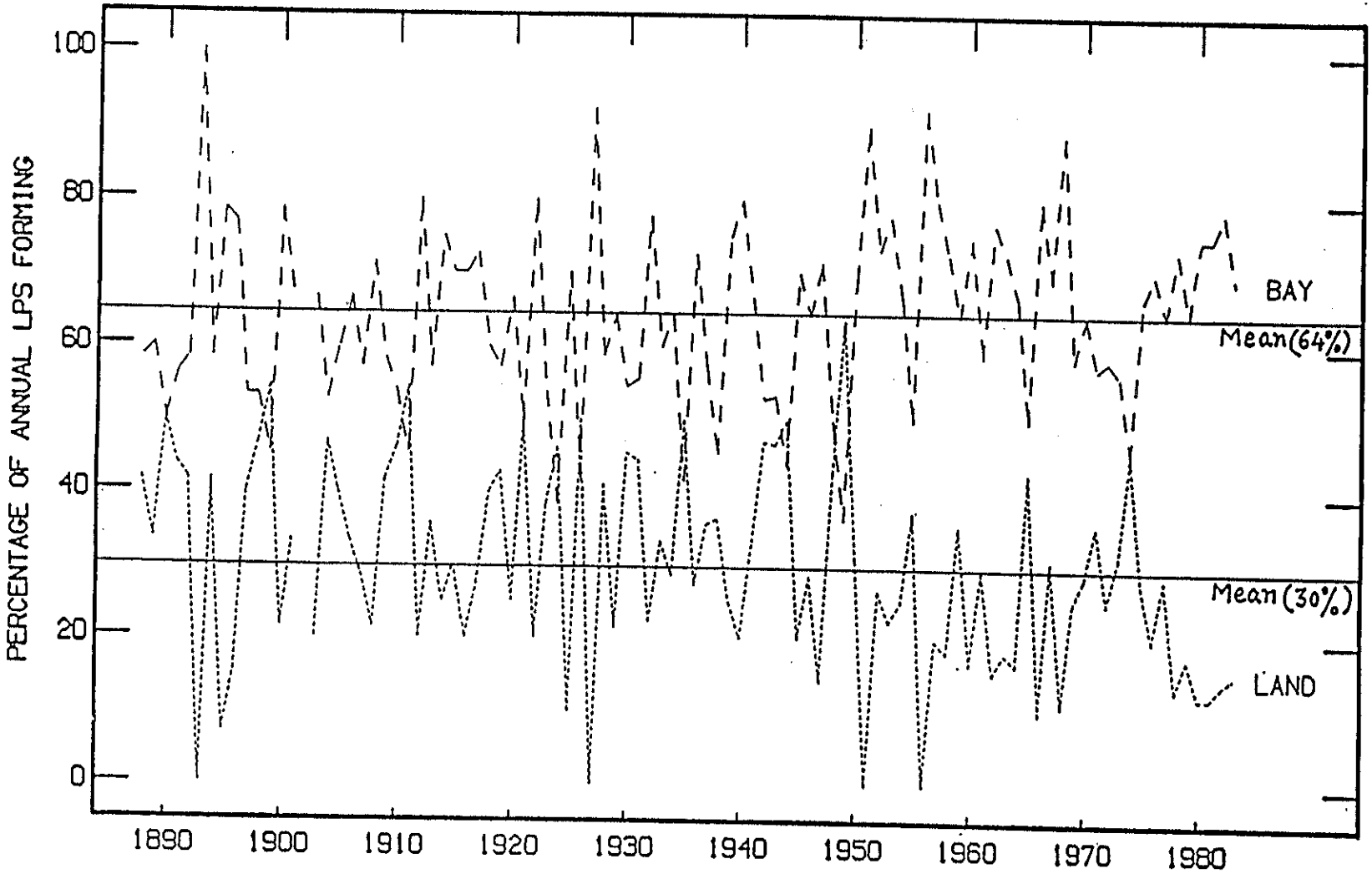
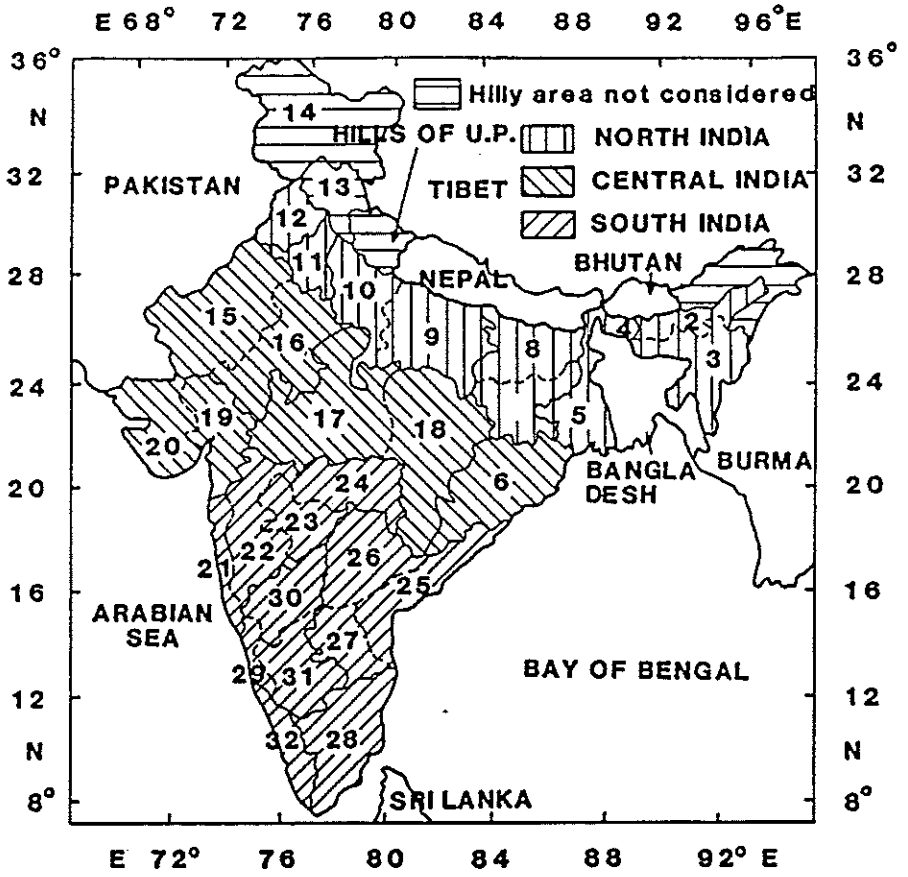
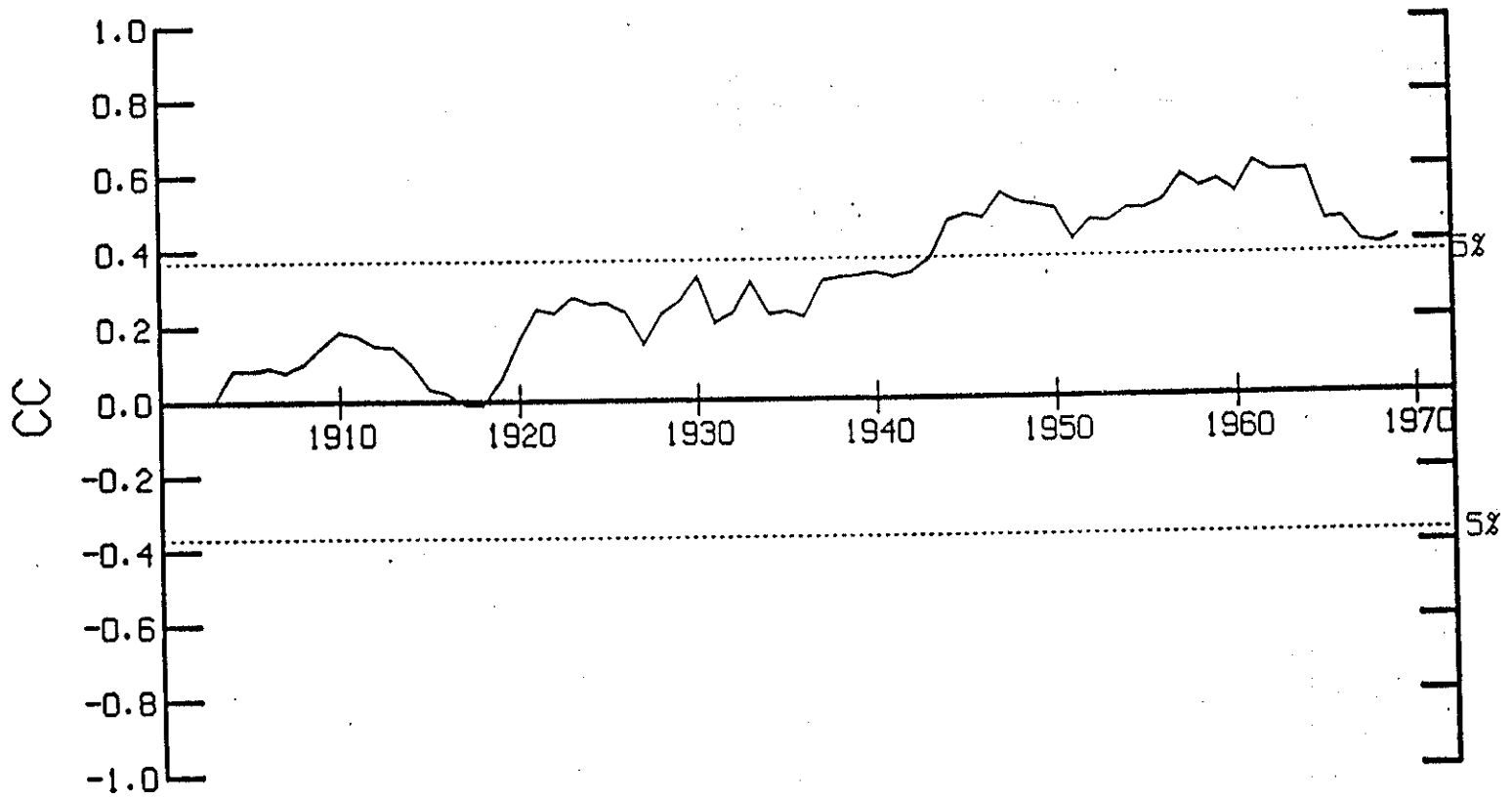


Figure 5: Frequency of LPS which formed over the Bay, and land area in the monsoon season during 1888-1983 (Expressed as percentage of the total which formed over the Indian region).



2 NORTH ASSAM
3 SOUTH ASSAM
4 SUB-HIMALAYAN WEST BENGAL
5 GANGETIC WEST BENGAL
6 ORISSA
7 BIHAR PLATEAU
8 BIHAR PLAINS
9 EAST UTTAR PRADESH
10 WEST UTTAR PRADESH PLAINS
11 HARAYANA
12 PUNJAB
13 HIMACHAL PRADESH
14 JAMMU AND KASHMIR
15 WEST RAJASTHAN
16 EAST RAJASTHAN
17 WEST MADHYA PRADESH
18 EAST MADYA PRADESH
19 GUJARAT
20 SAURASHTRA AND KUTCH
21 KONKAN
22 MADHYA MAHARASHTRA
23 MARATHWADA
24 VIDARBHA
25 COASTAL ANDHRA PRADESH
26 TELANGANA
27 RAYALSEEMA
28 TAMIL NADU
29 COASTAL KARNATAKA
30 NORTH KARNATAKA
31 SOUTH KARNATAKA
32 KERALA

Figure 6: Map showing north, central, and south India and the meteorological subdivisions of India.



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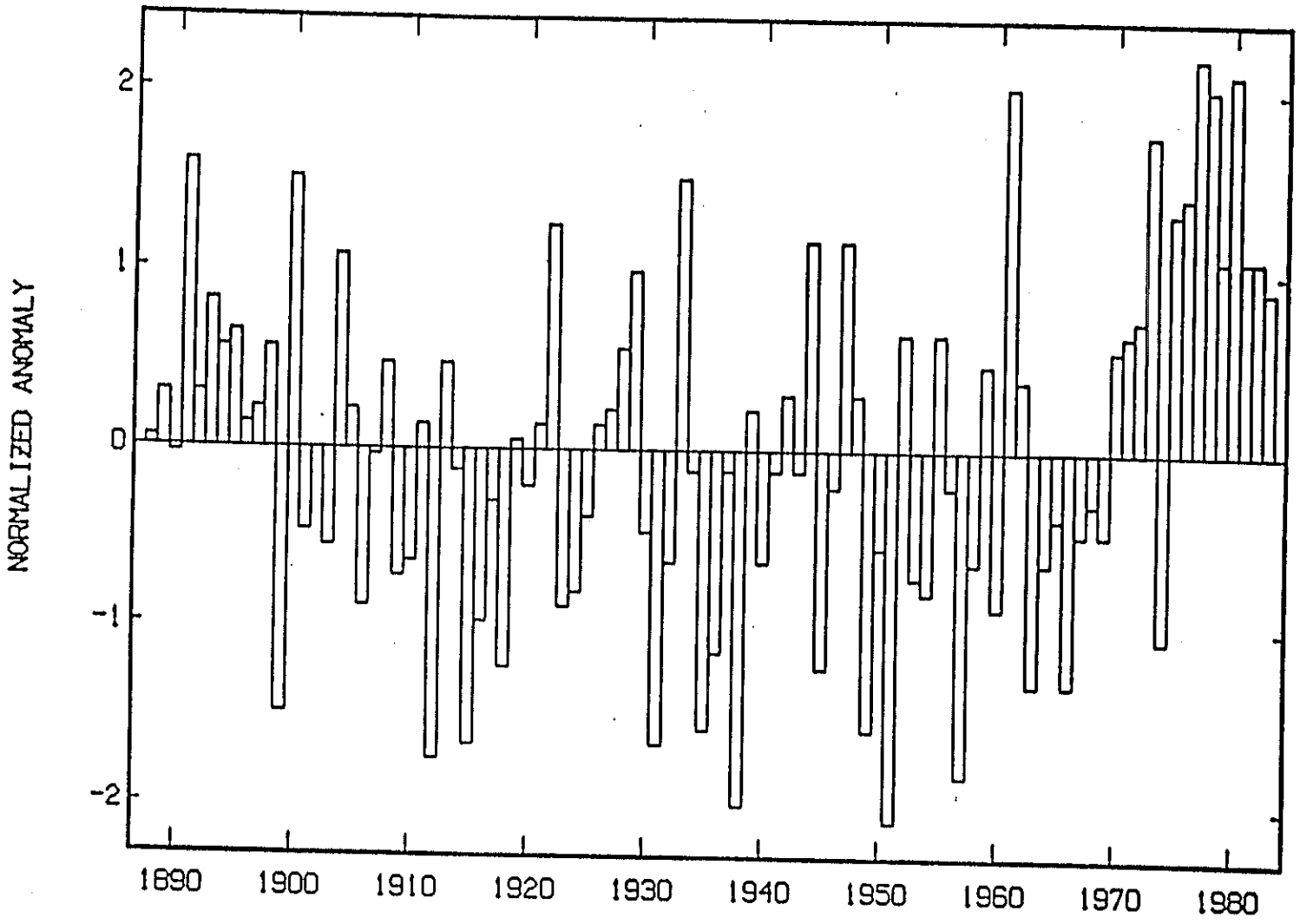

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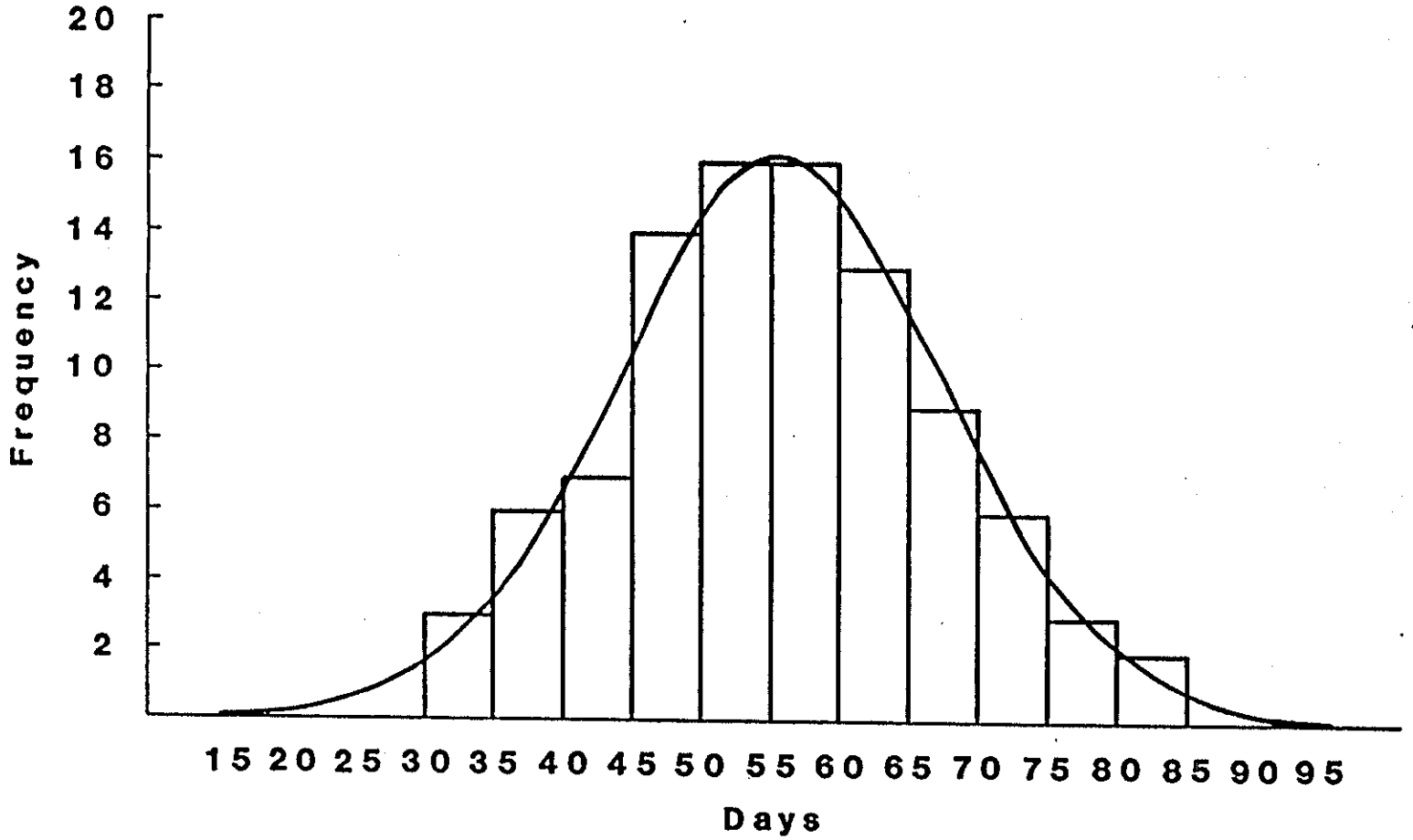

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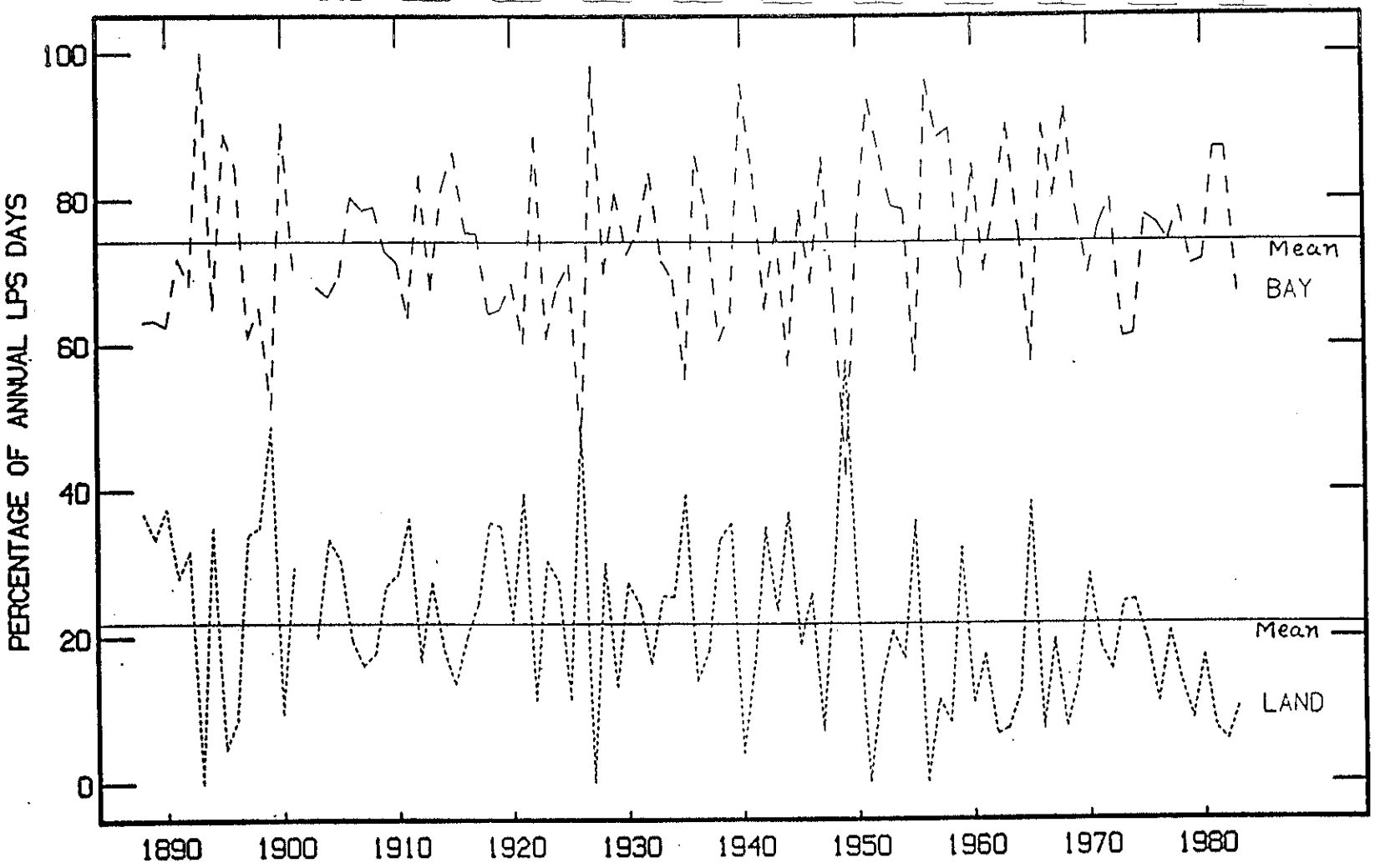

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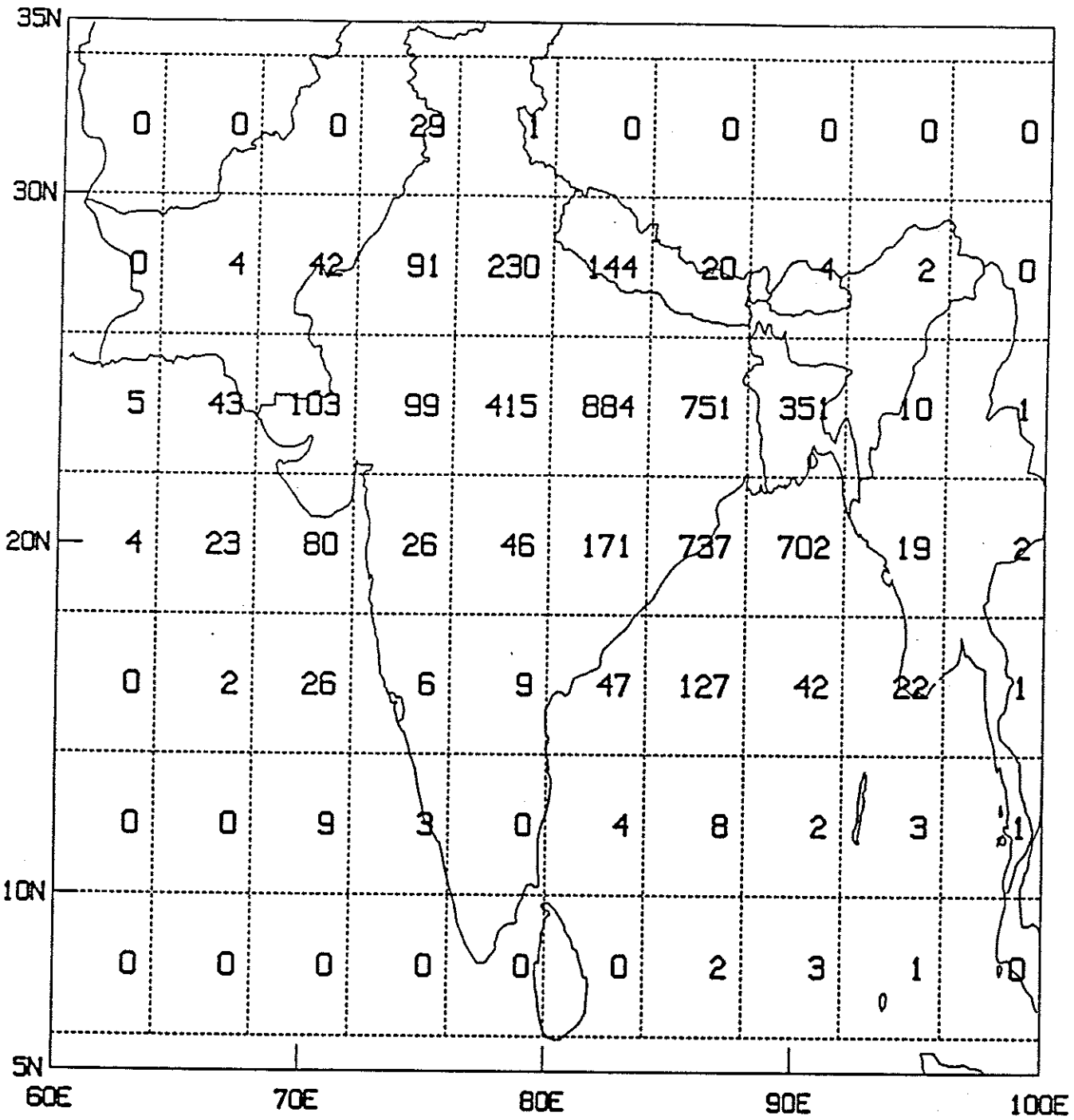

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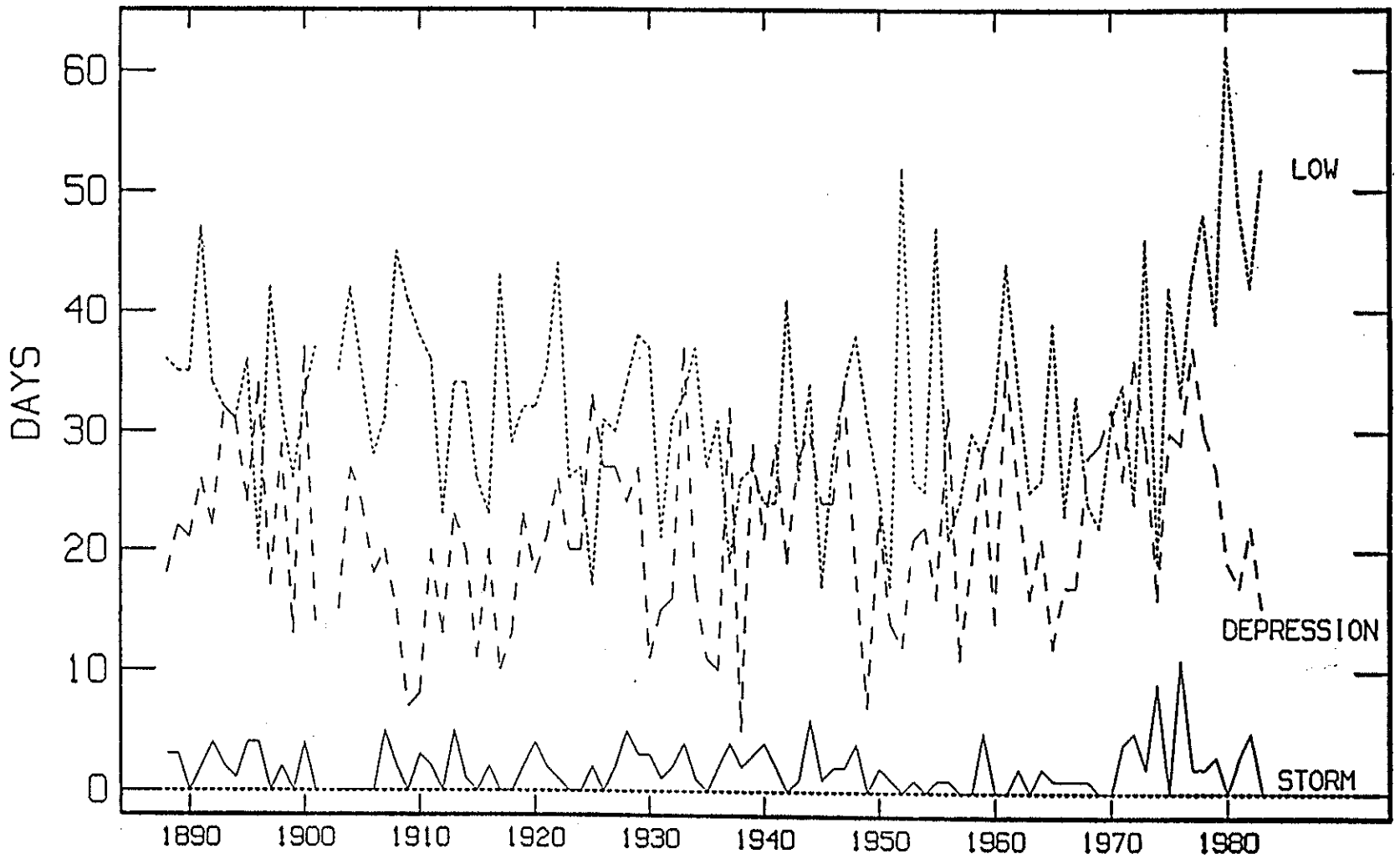

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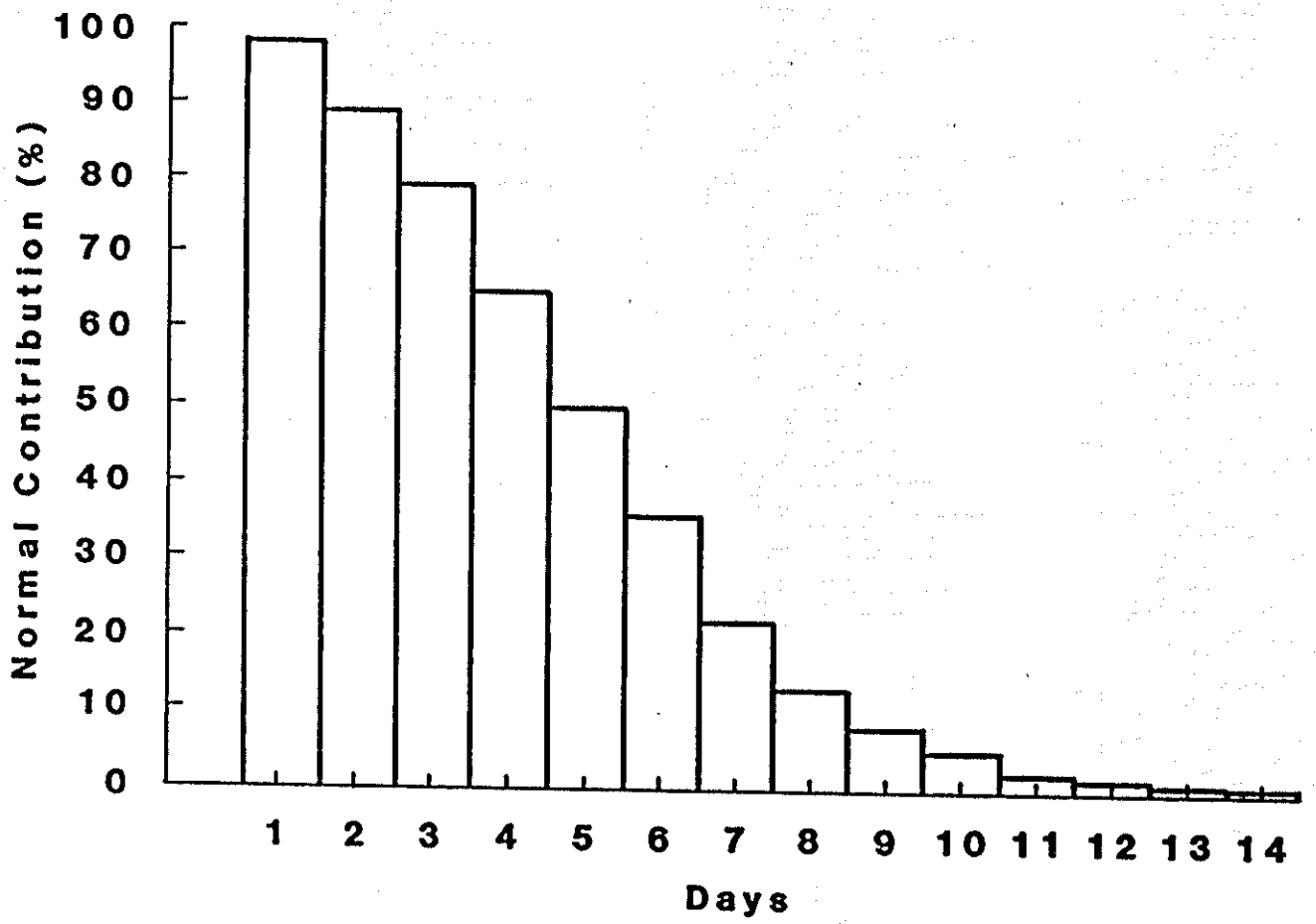

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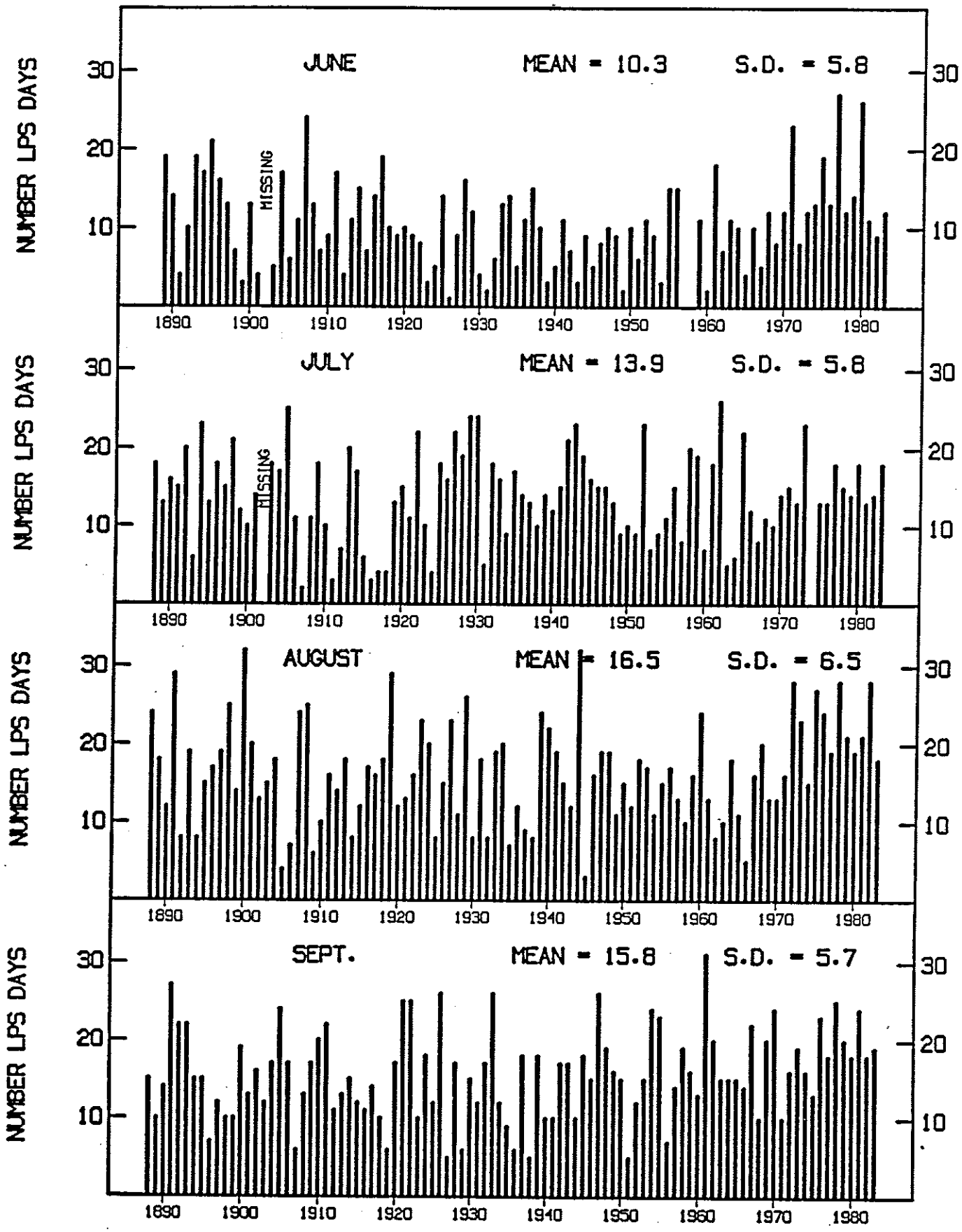
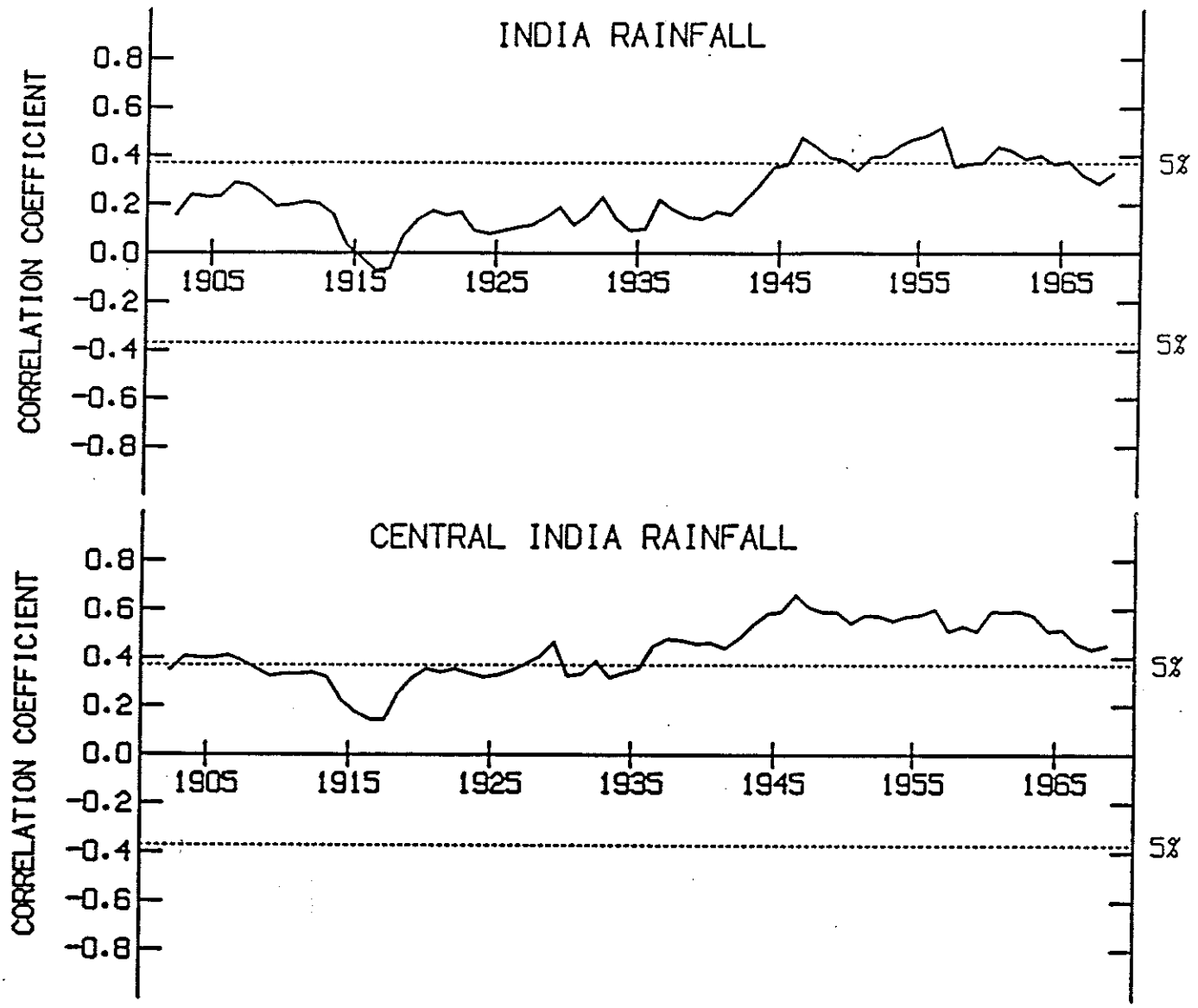


Figure 14: Monthly number of LPS days over the Indian region in June, July, August, and September (1888-1983).



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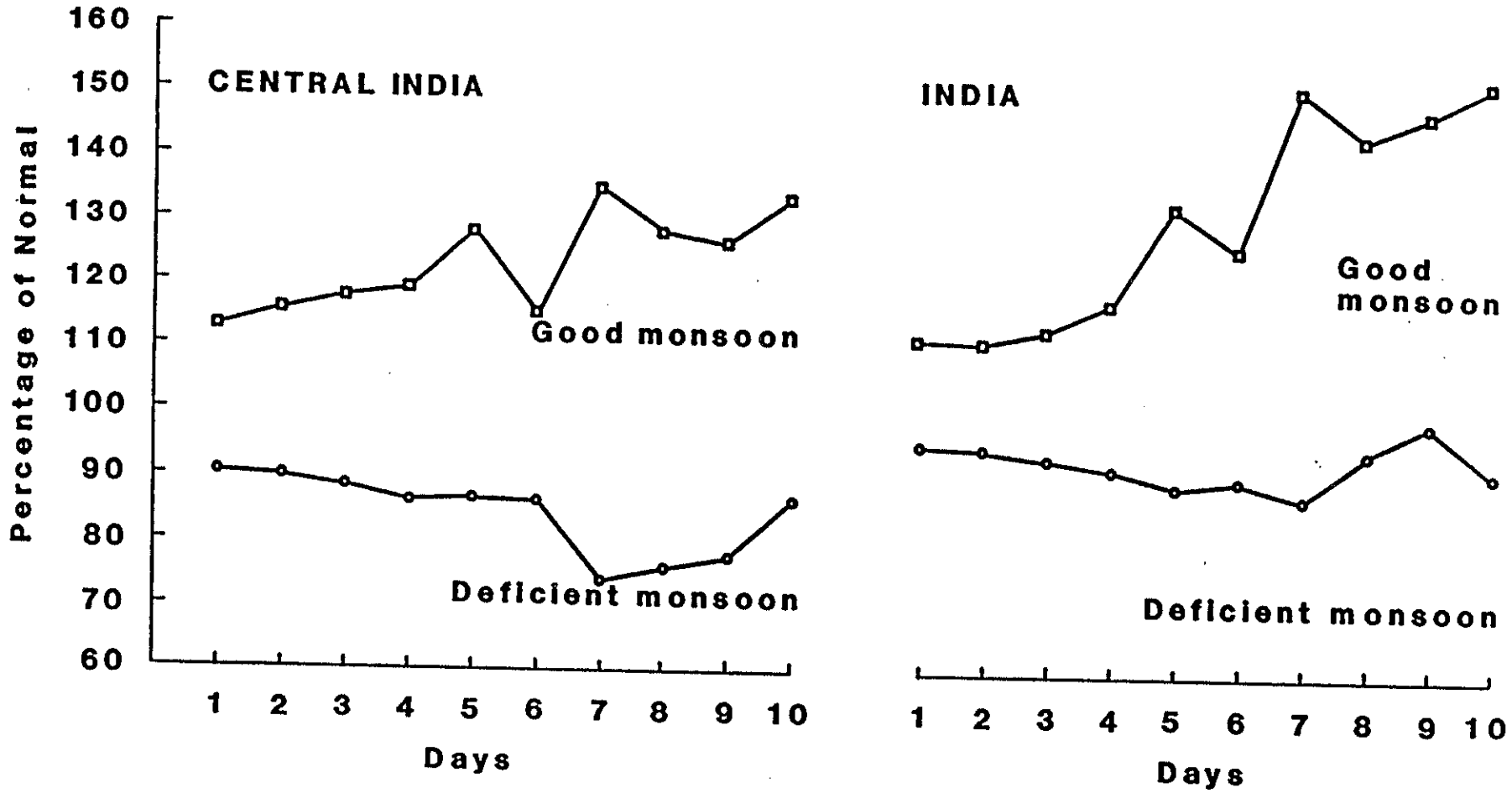

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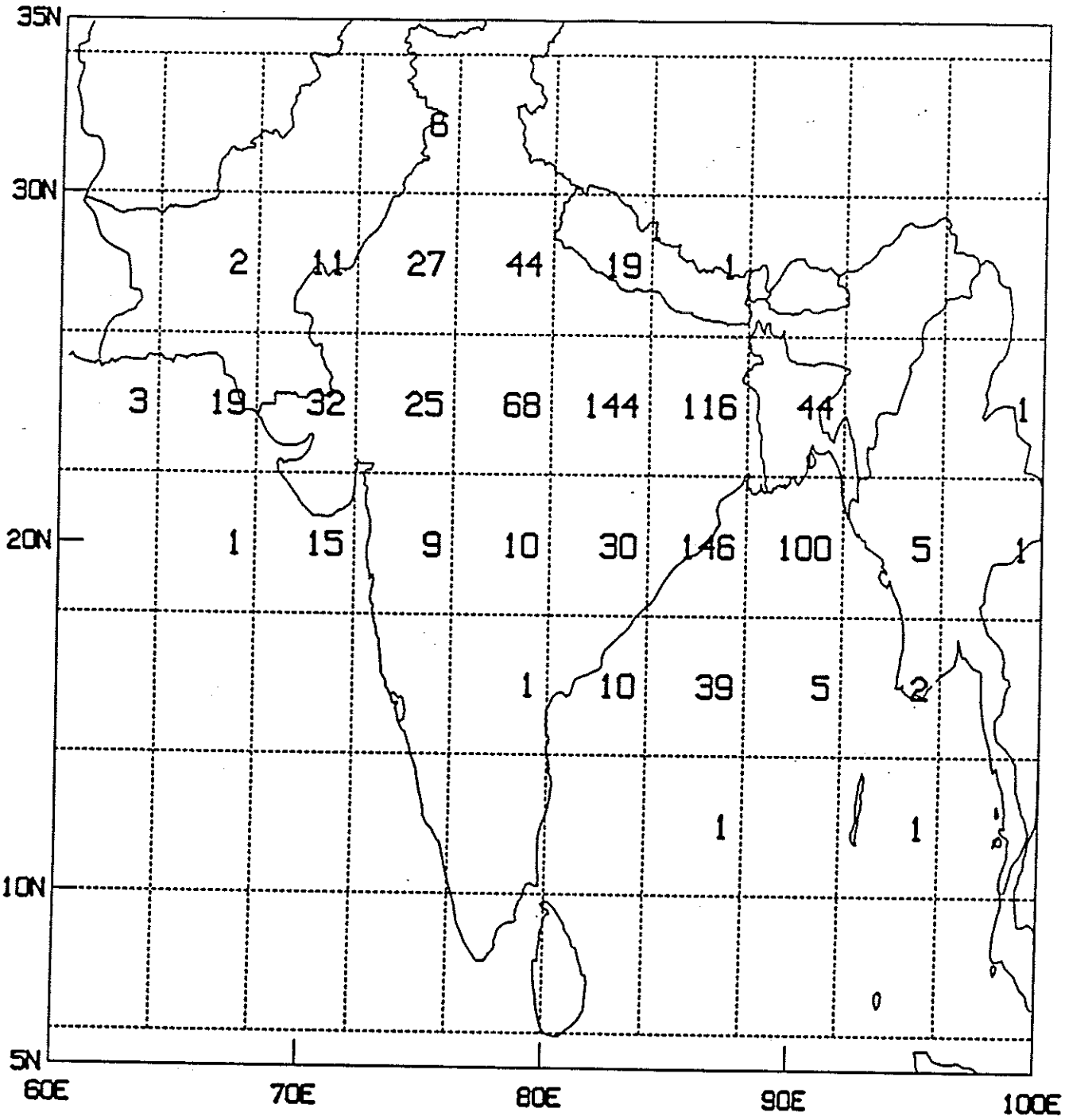

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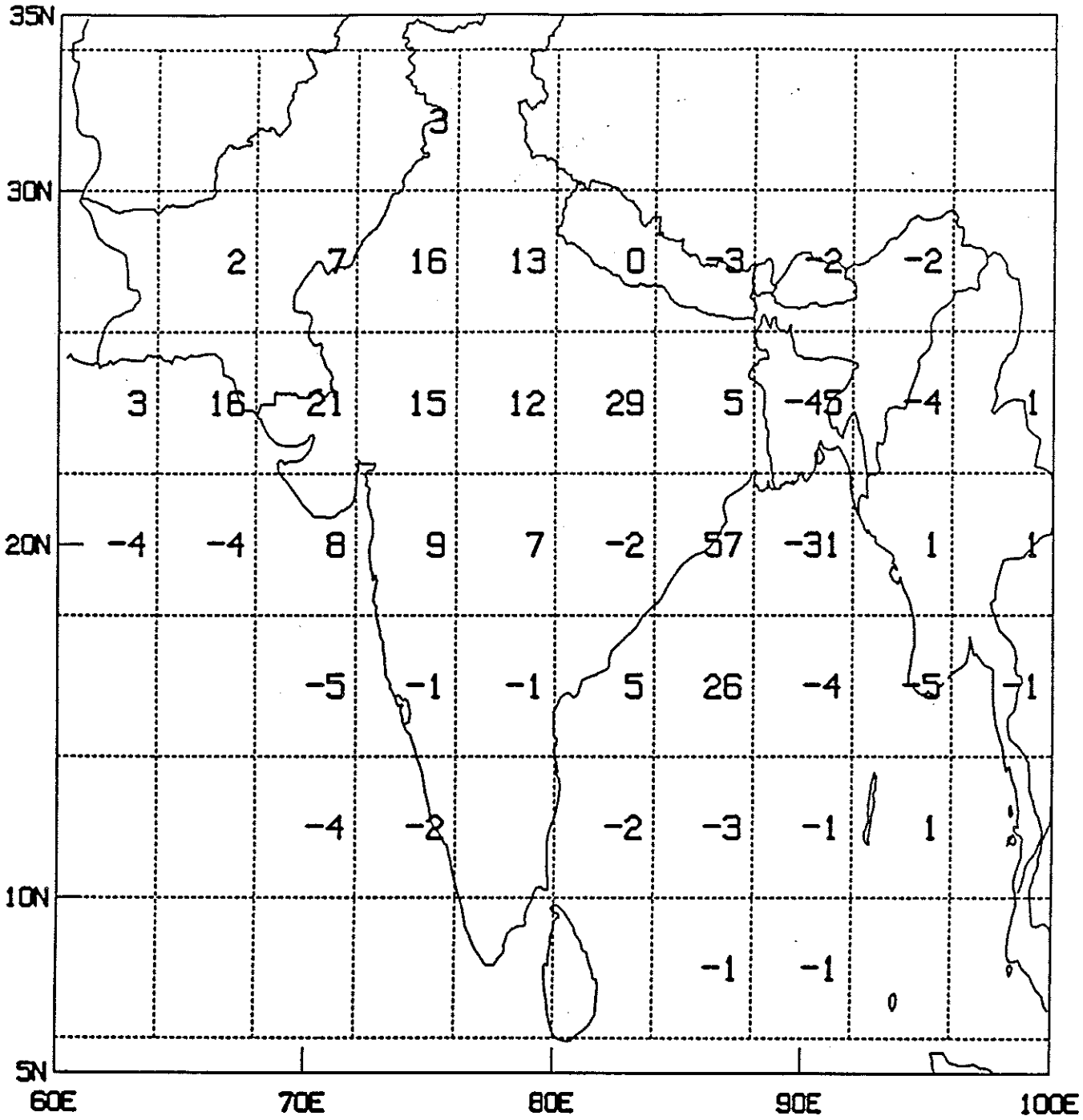

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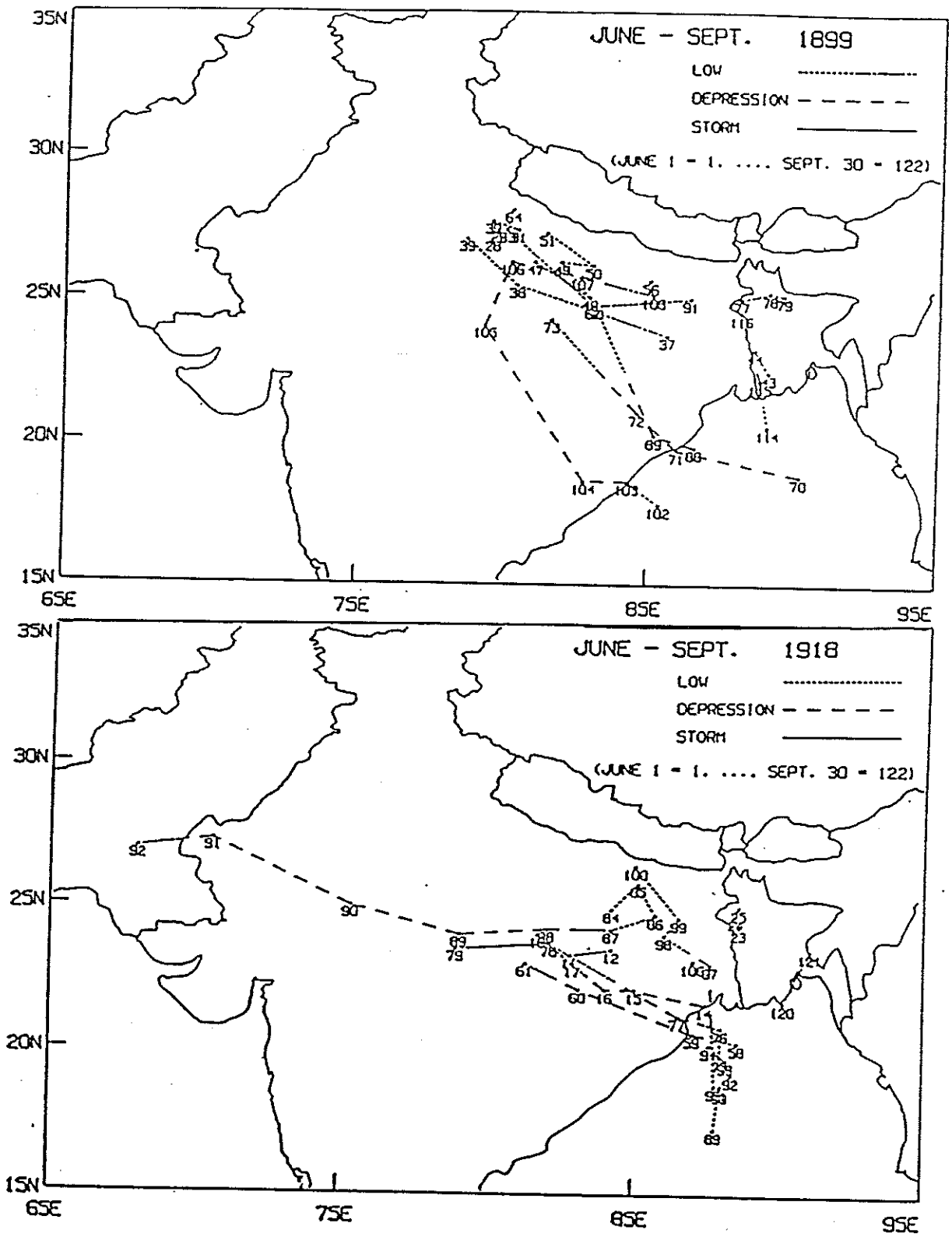

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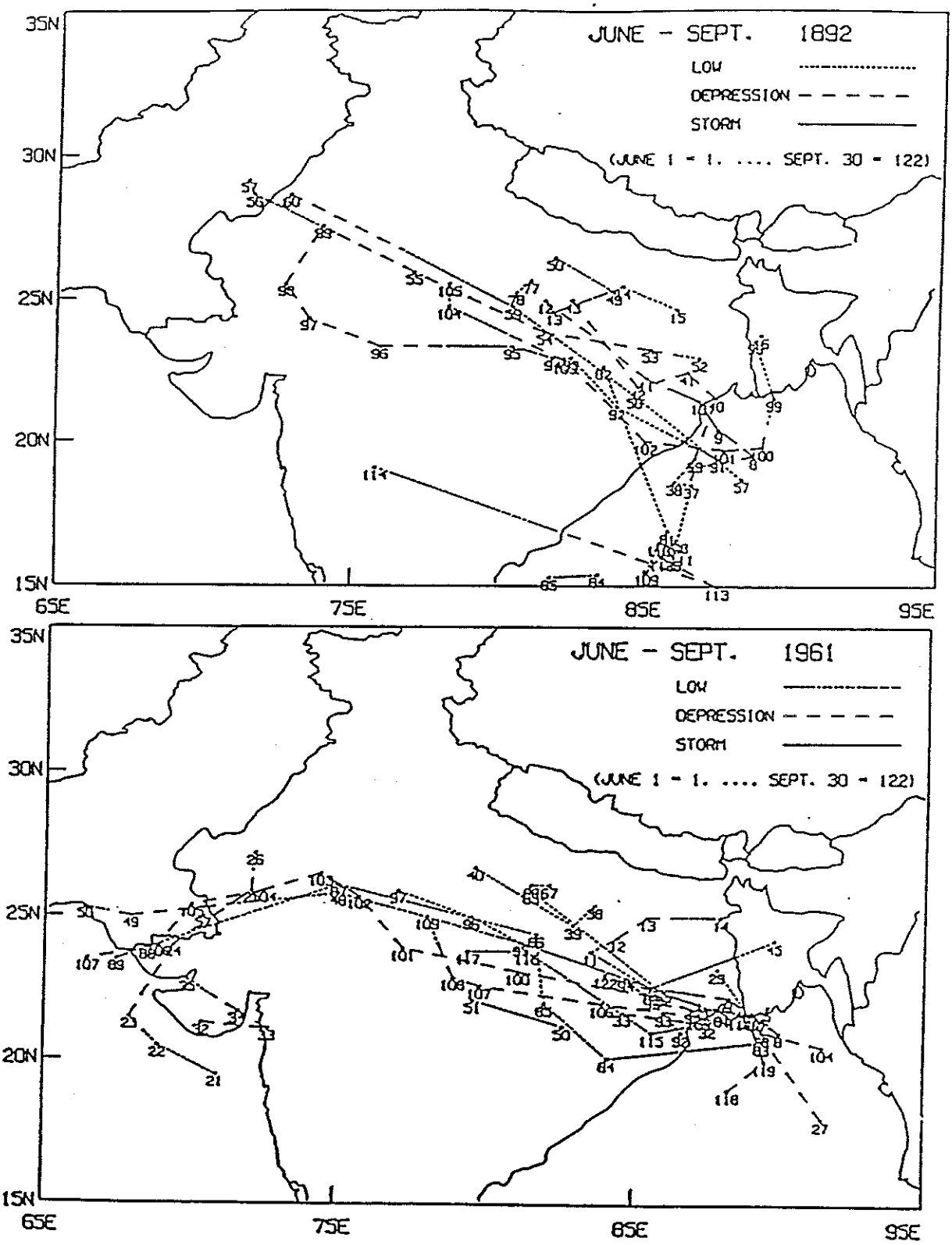
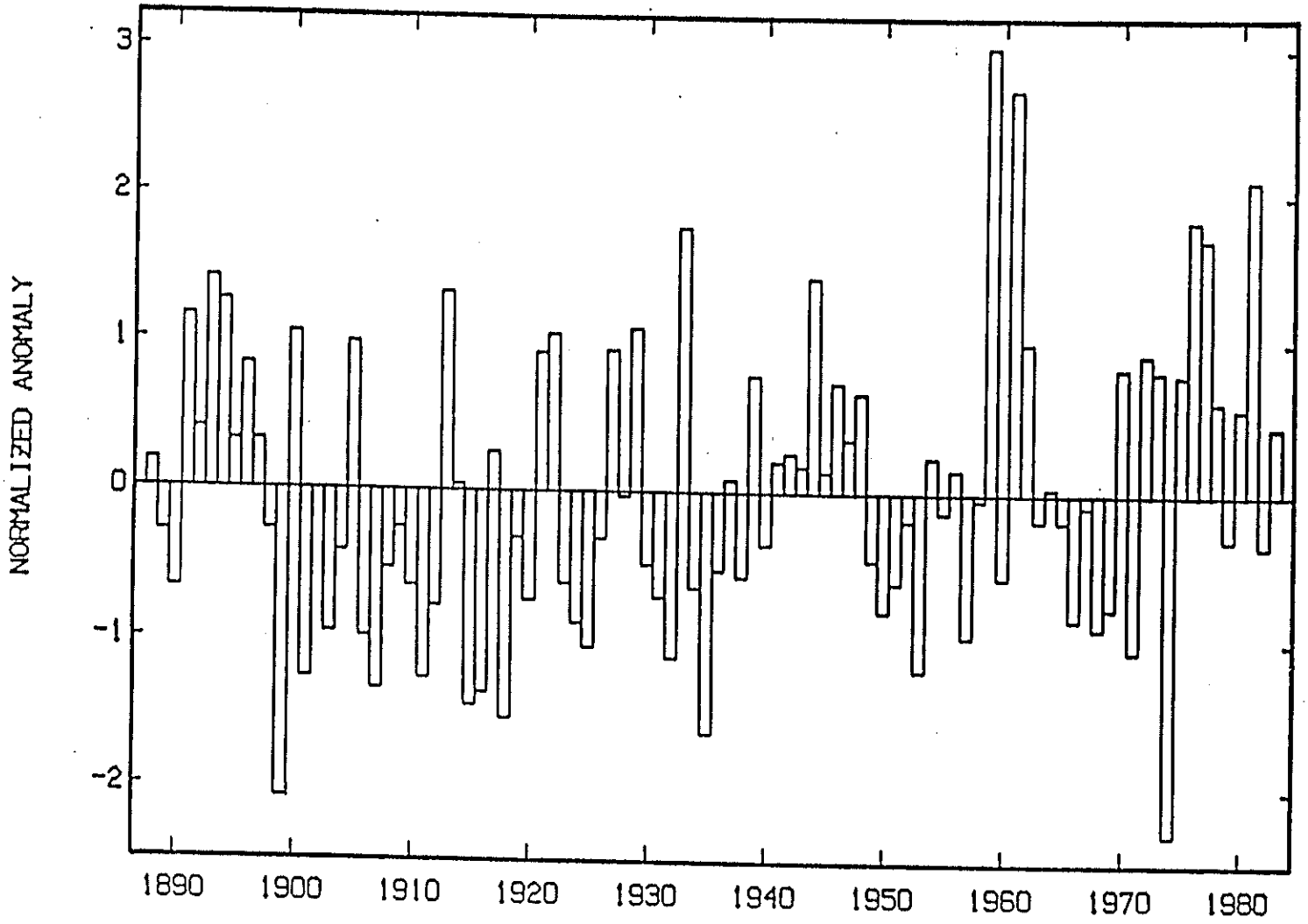


Figure 18(b): Tracks of LPS during years of good monsoon over India - 1892 and 1961.



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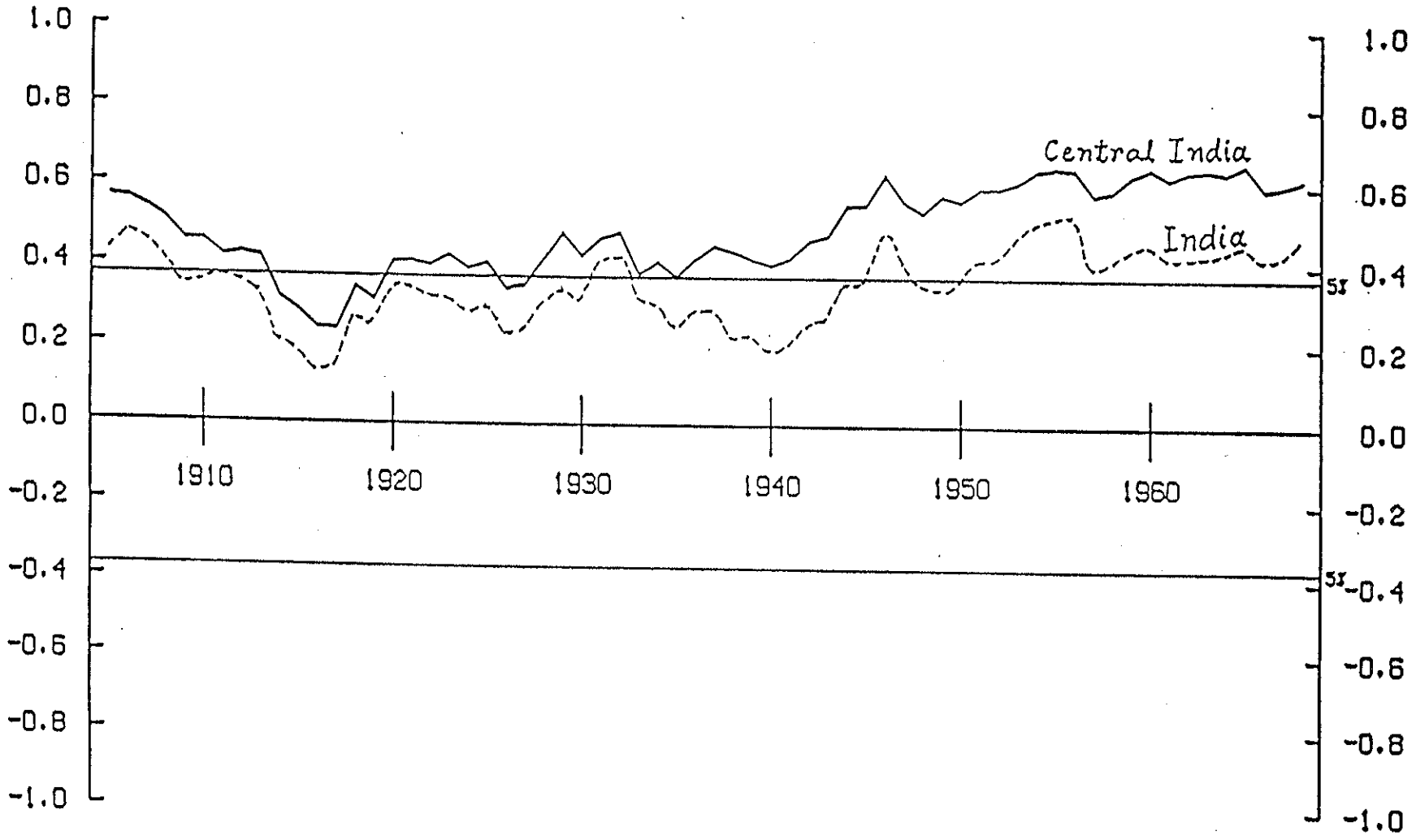

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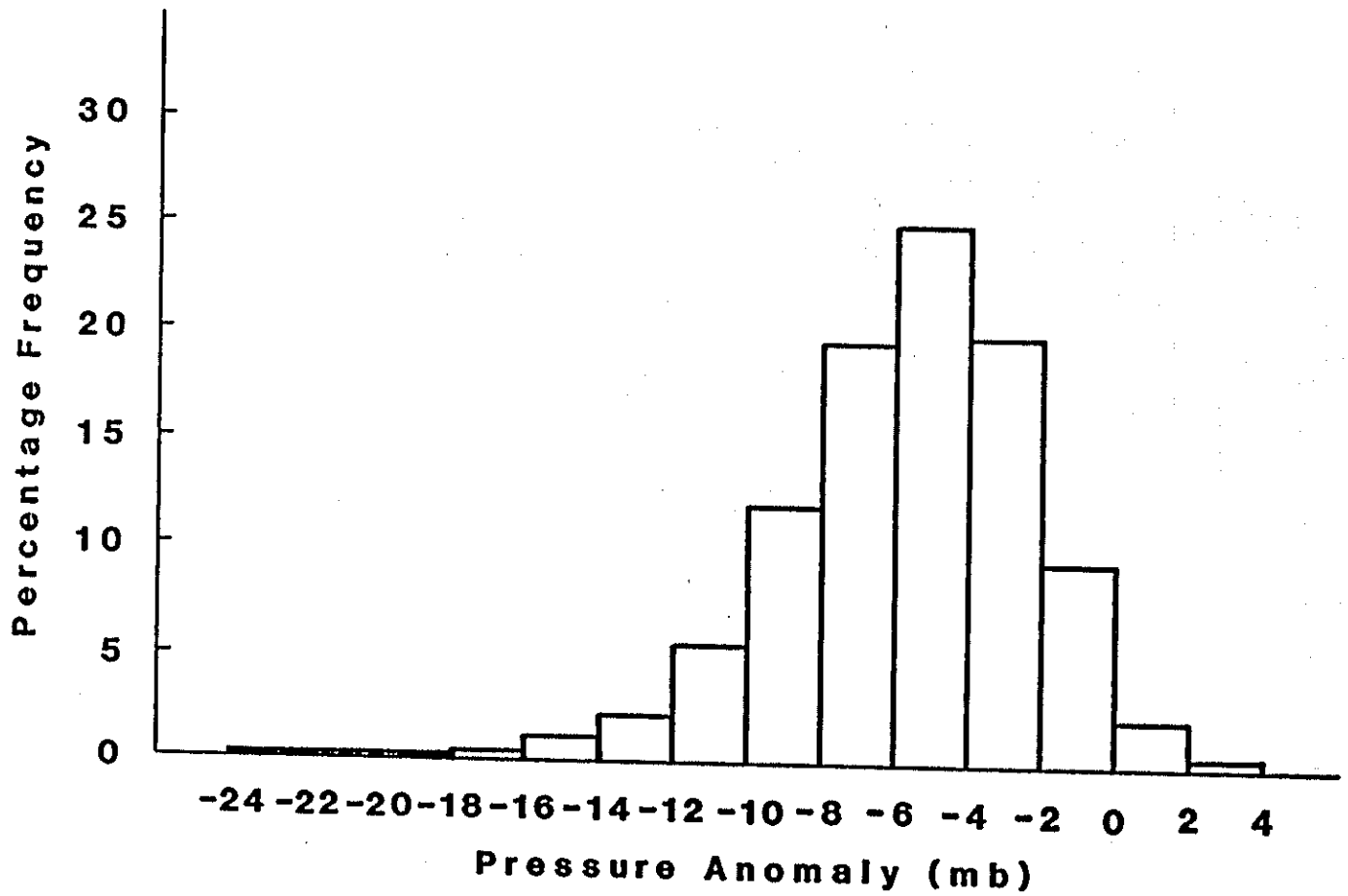


Figure 21: Percentage frequency distribution of central pressure anomaly at locations of LPS over the Indian region during the monsoon season (1888-1983).

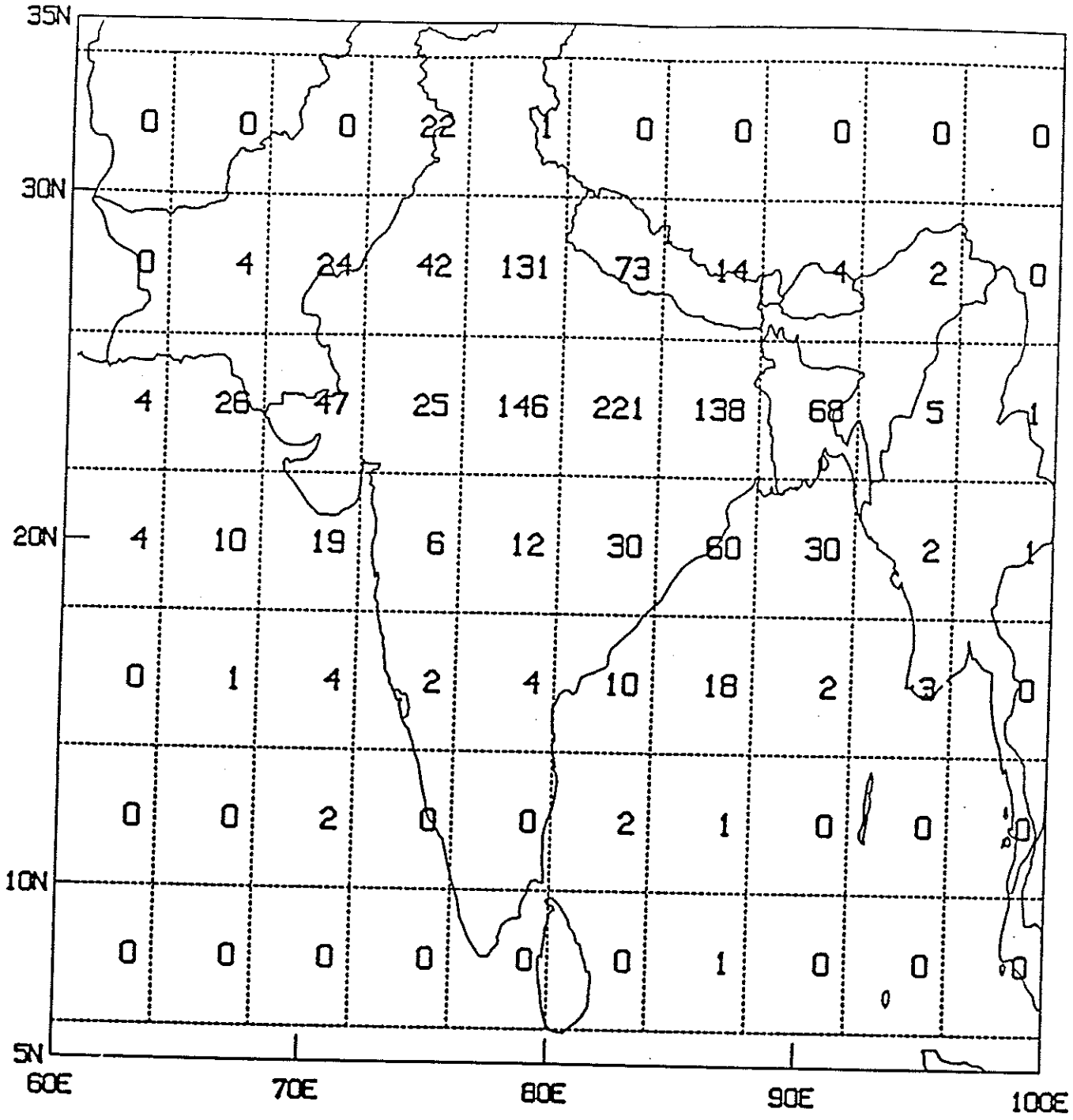
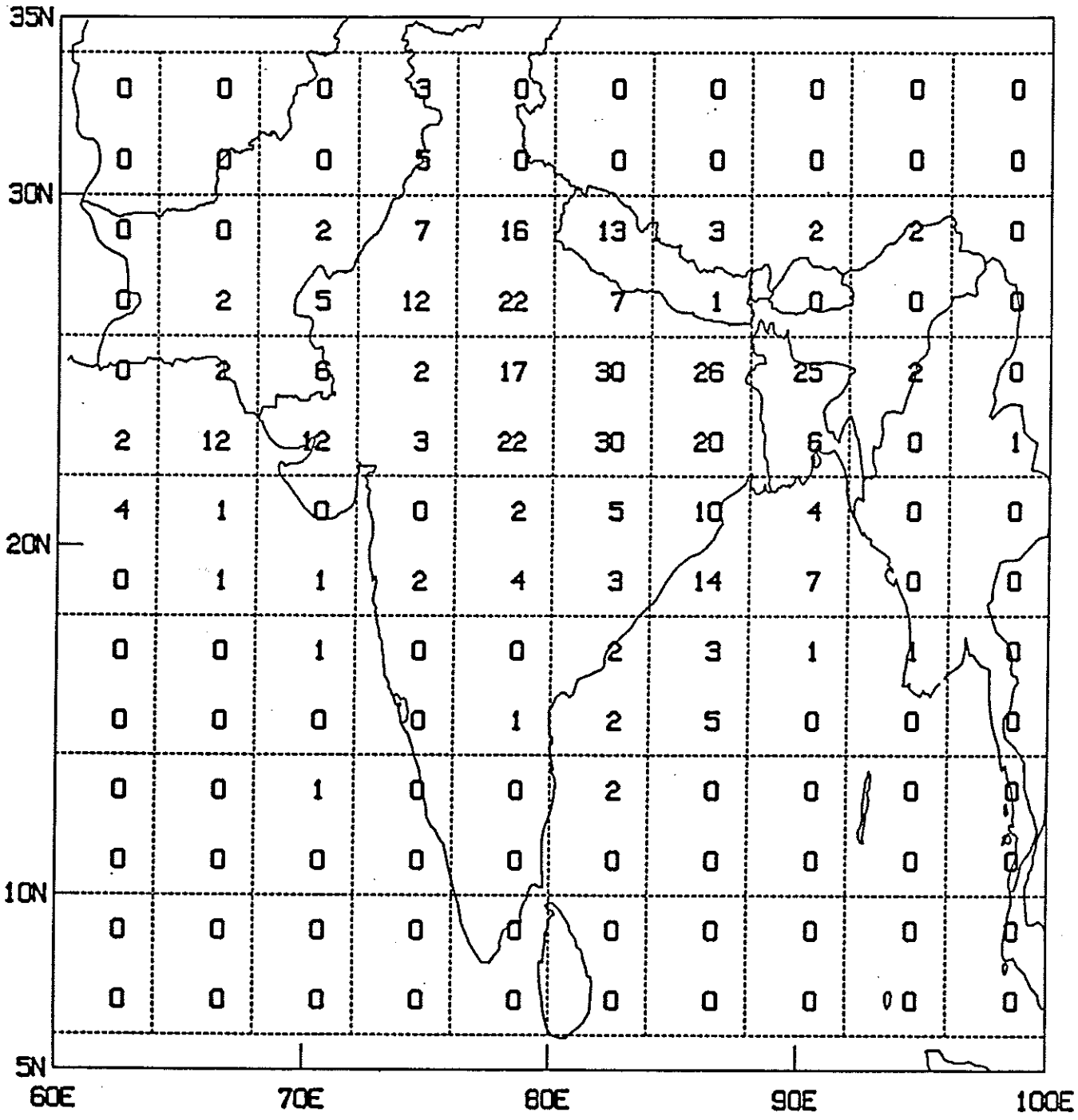


Figure 22: The number of LPS which dissipated from different 4° lat. x 4° long. blocks during the monsoon season in the period 1888-1983.



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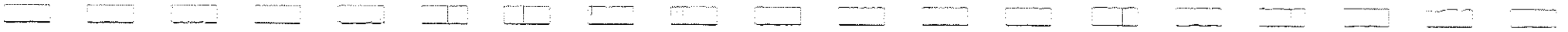
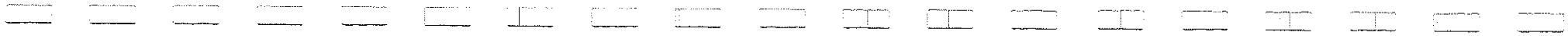
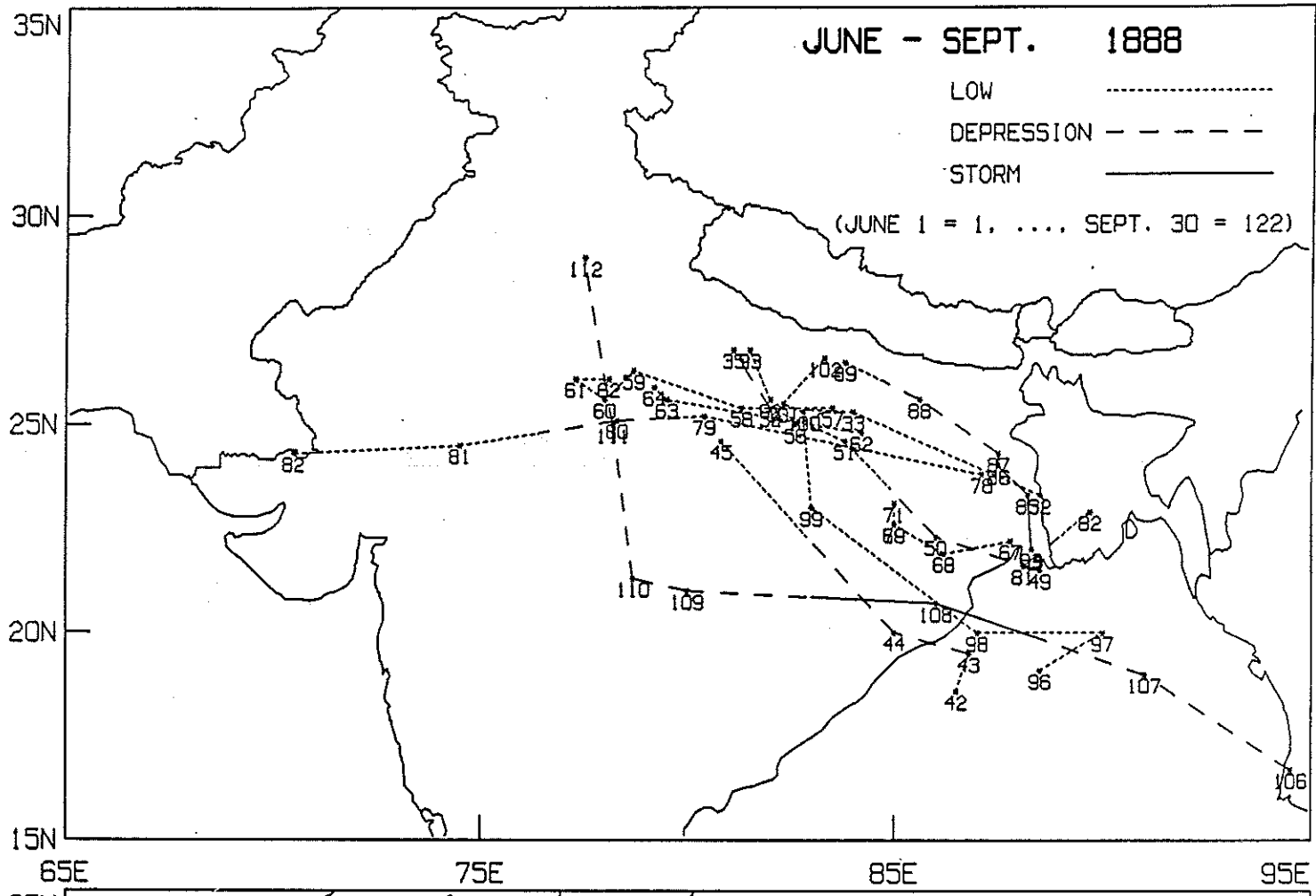
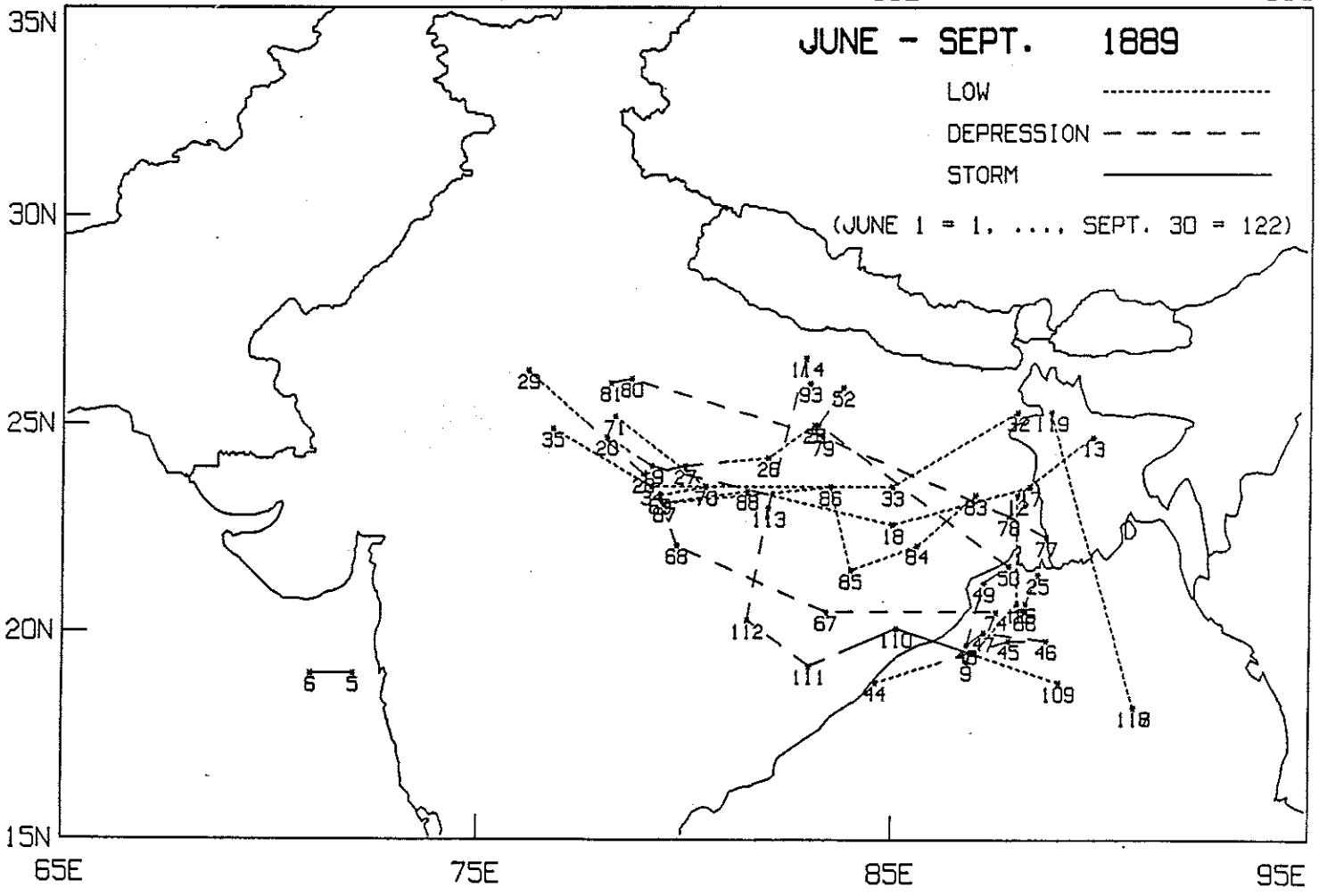


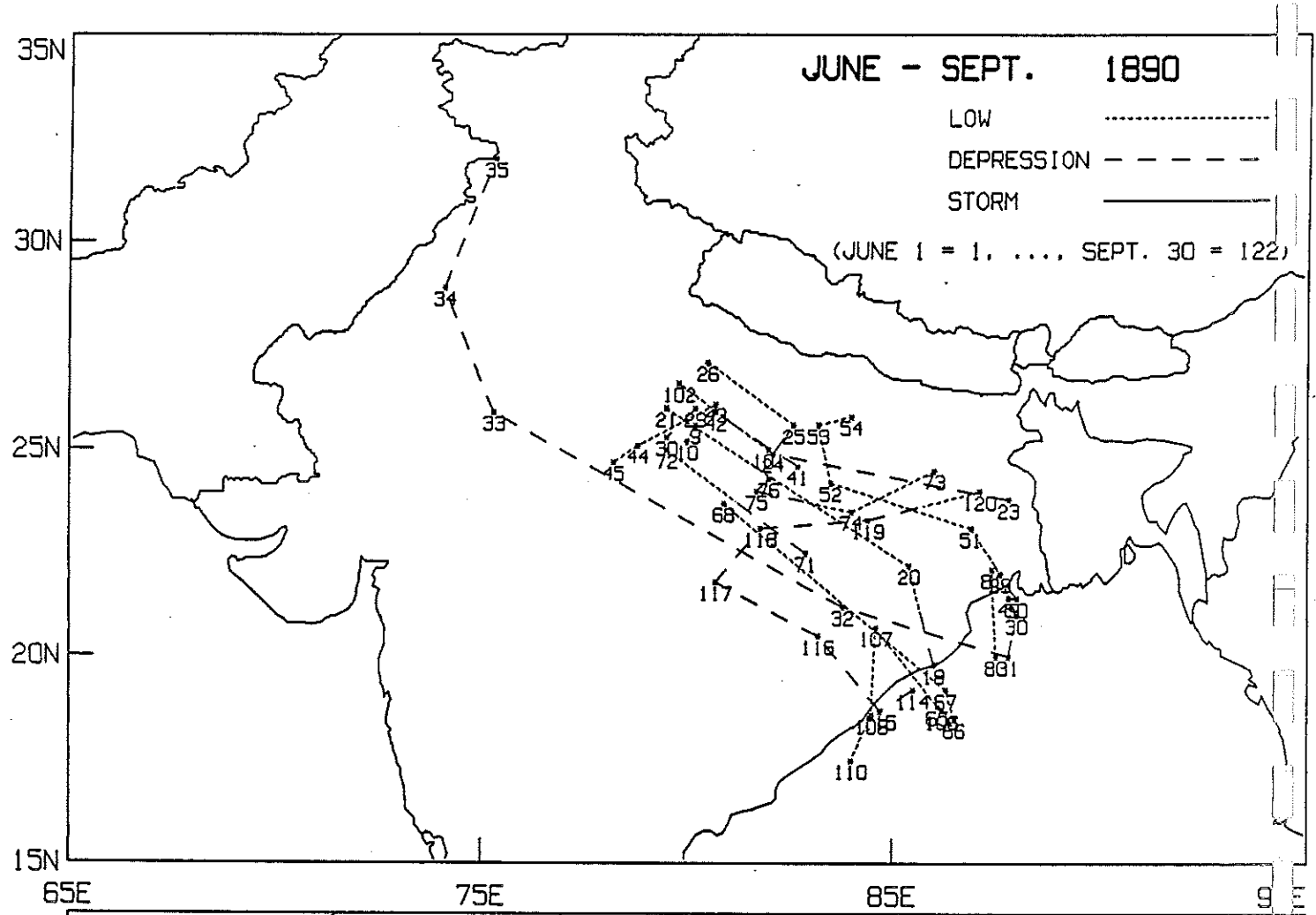
APPENDIX I

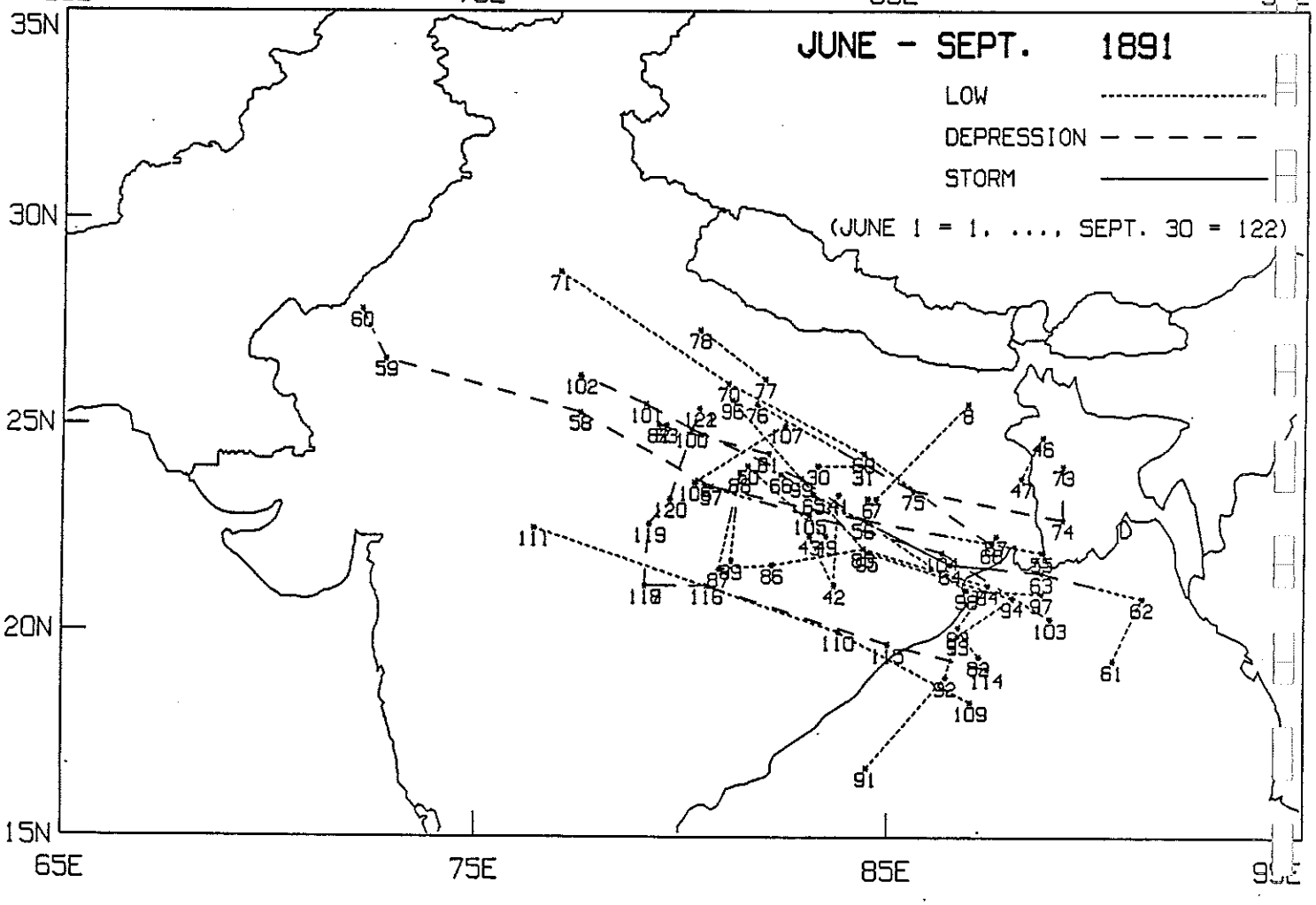
The following maps give for each year the tracks of the low pressure systems which formed during the summer monsoon season (June through September) in the period 1888-1983. The location for each date of the existence of the system is given. The date for each location is indicated on 1 to 122 scale. The stage of the system is shown by dotted line for low, discontinuous line for depression and continuous line for a storm.

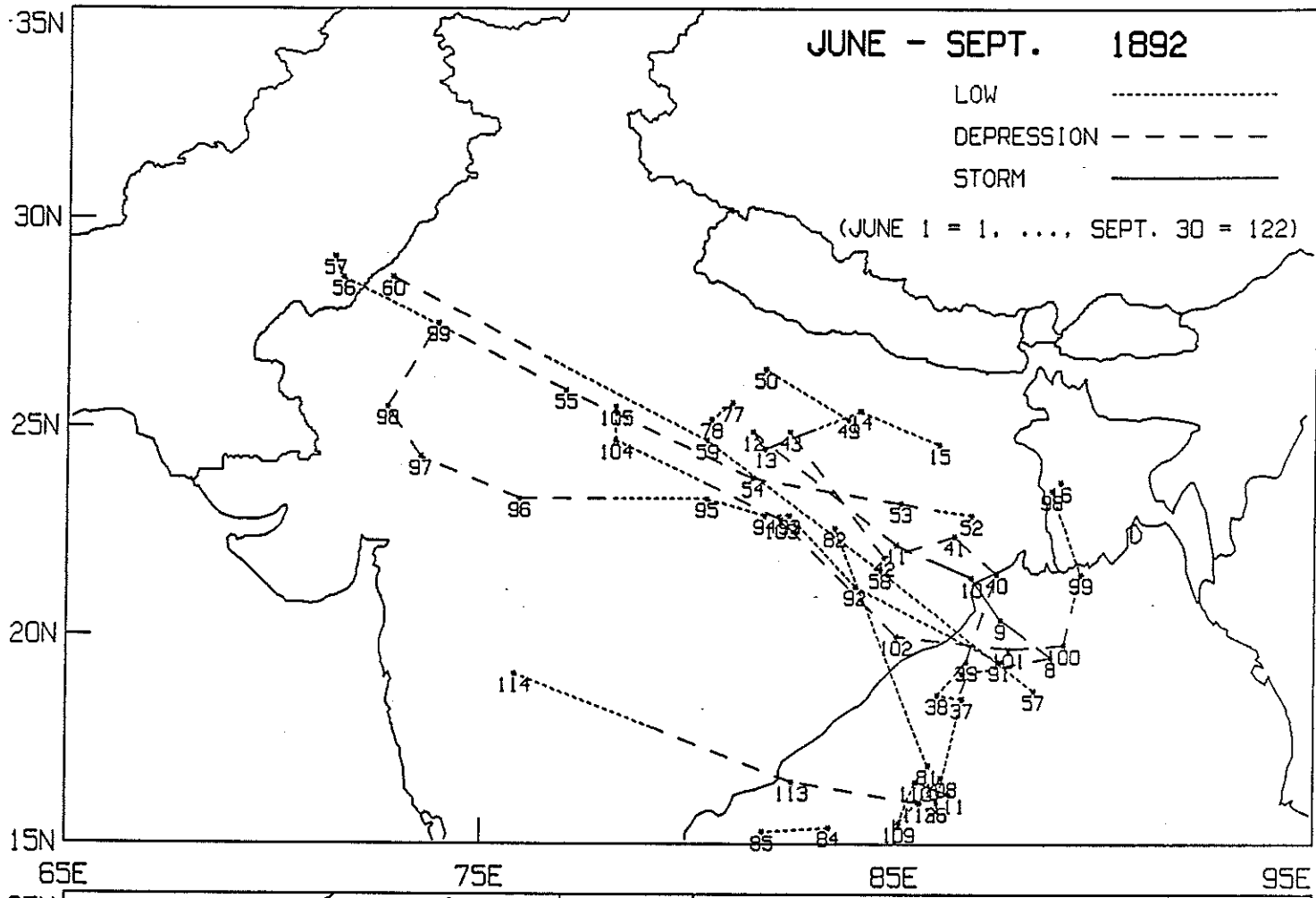


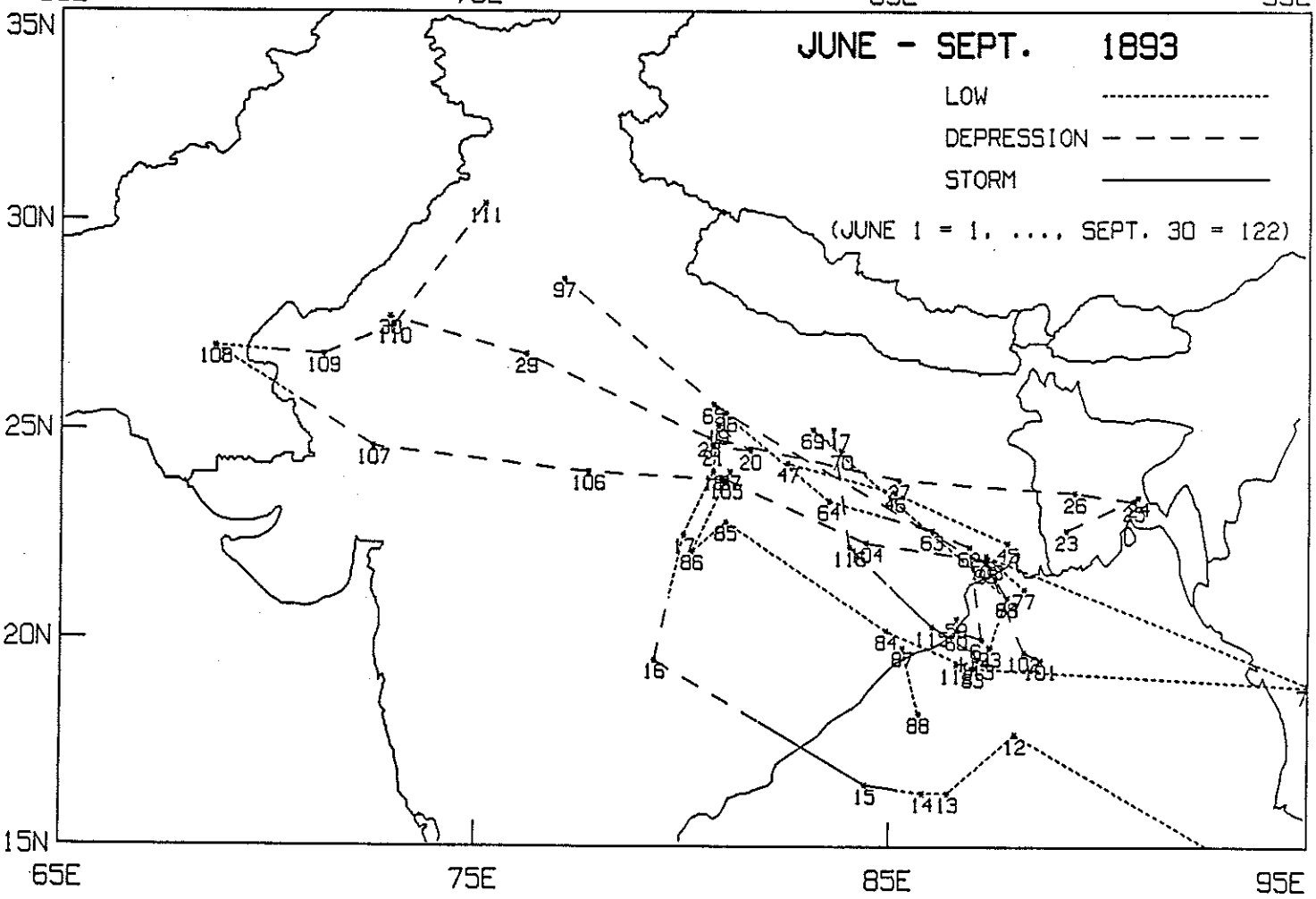

JUNE - SEPT. 1888
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

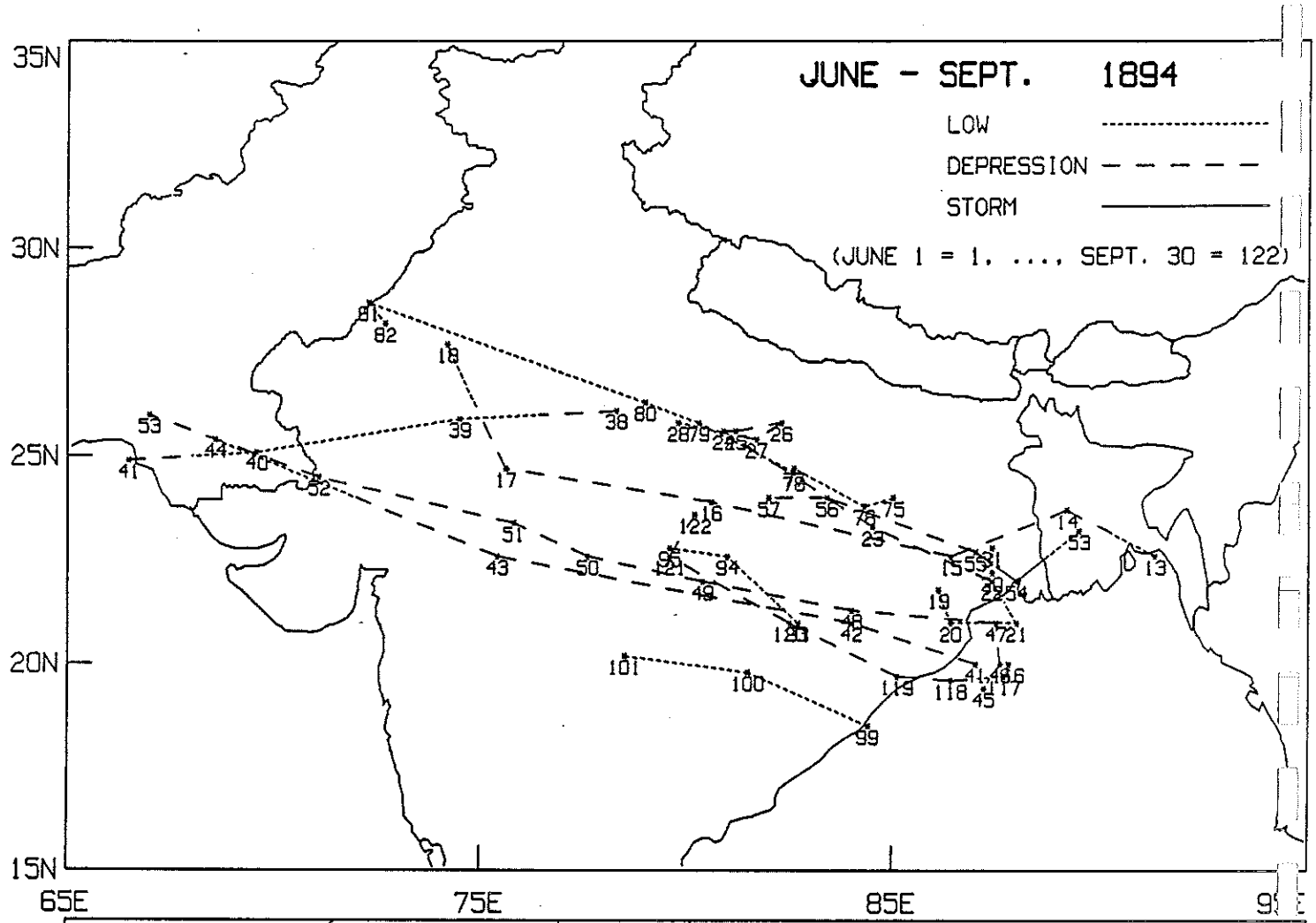

JUNE - SEPT. 1889
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

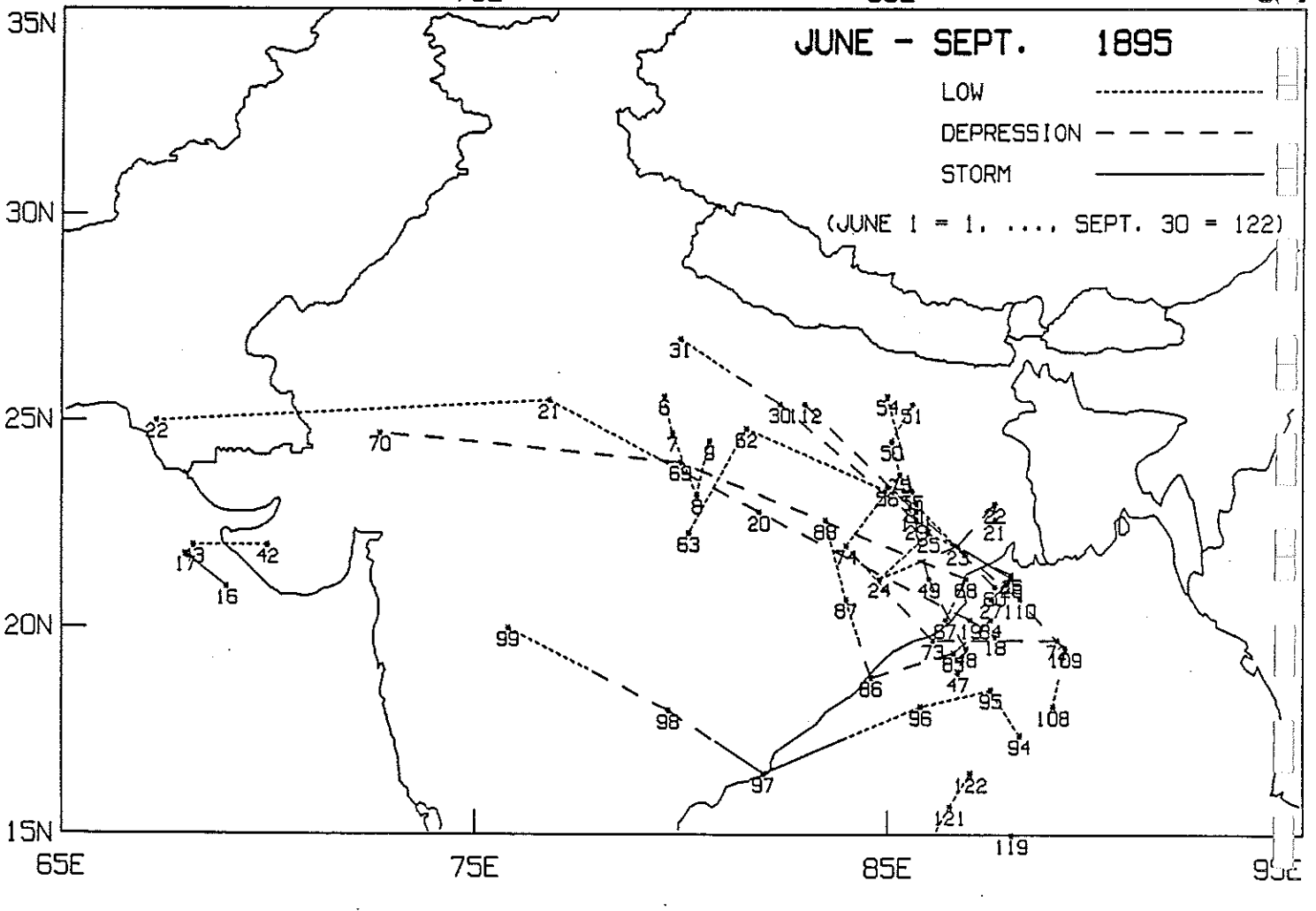

JUNE - SEPT. 1890
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

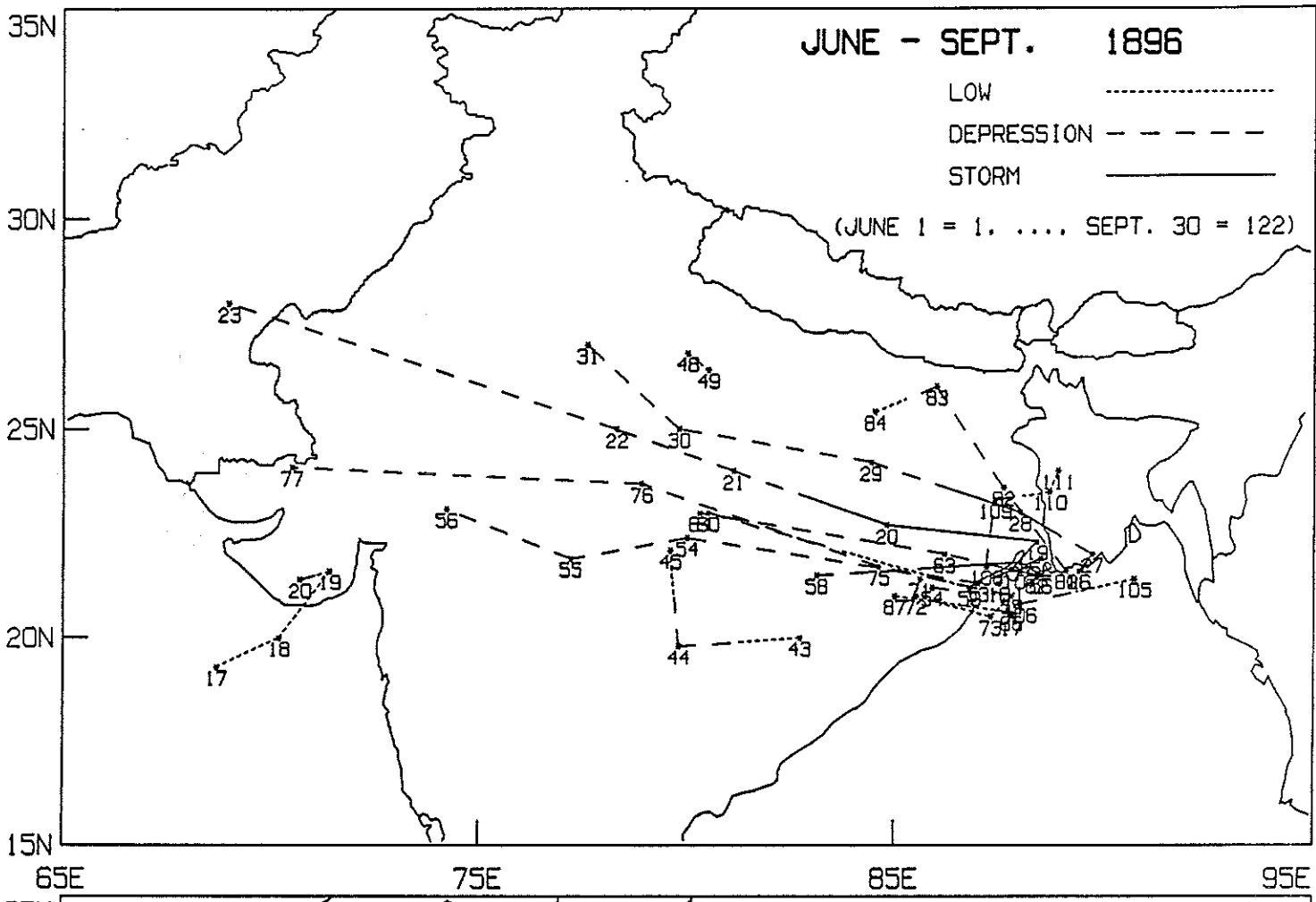

JUNE - SEPT. 1891
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

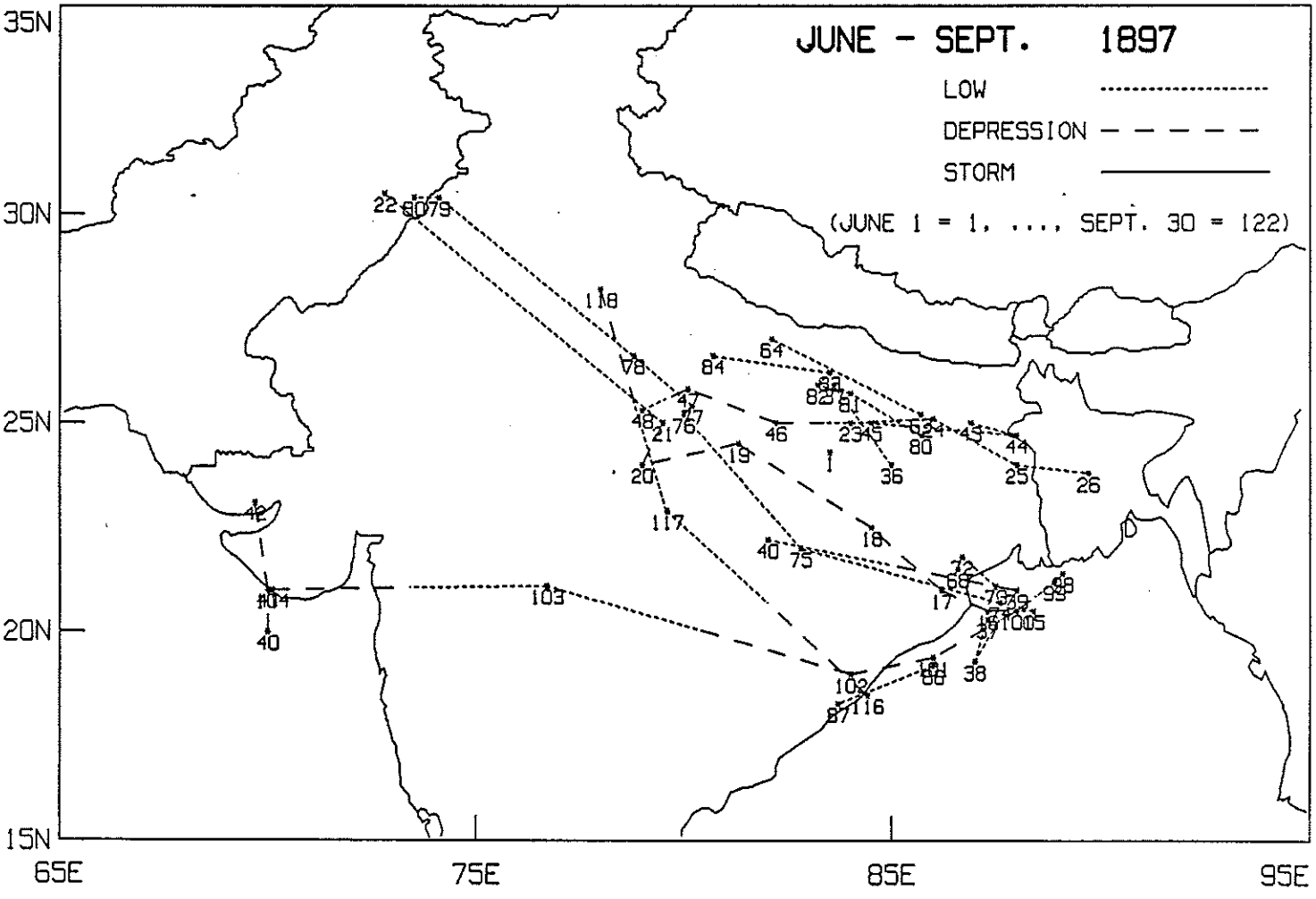

JUNE - SEPT. 1892
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

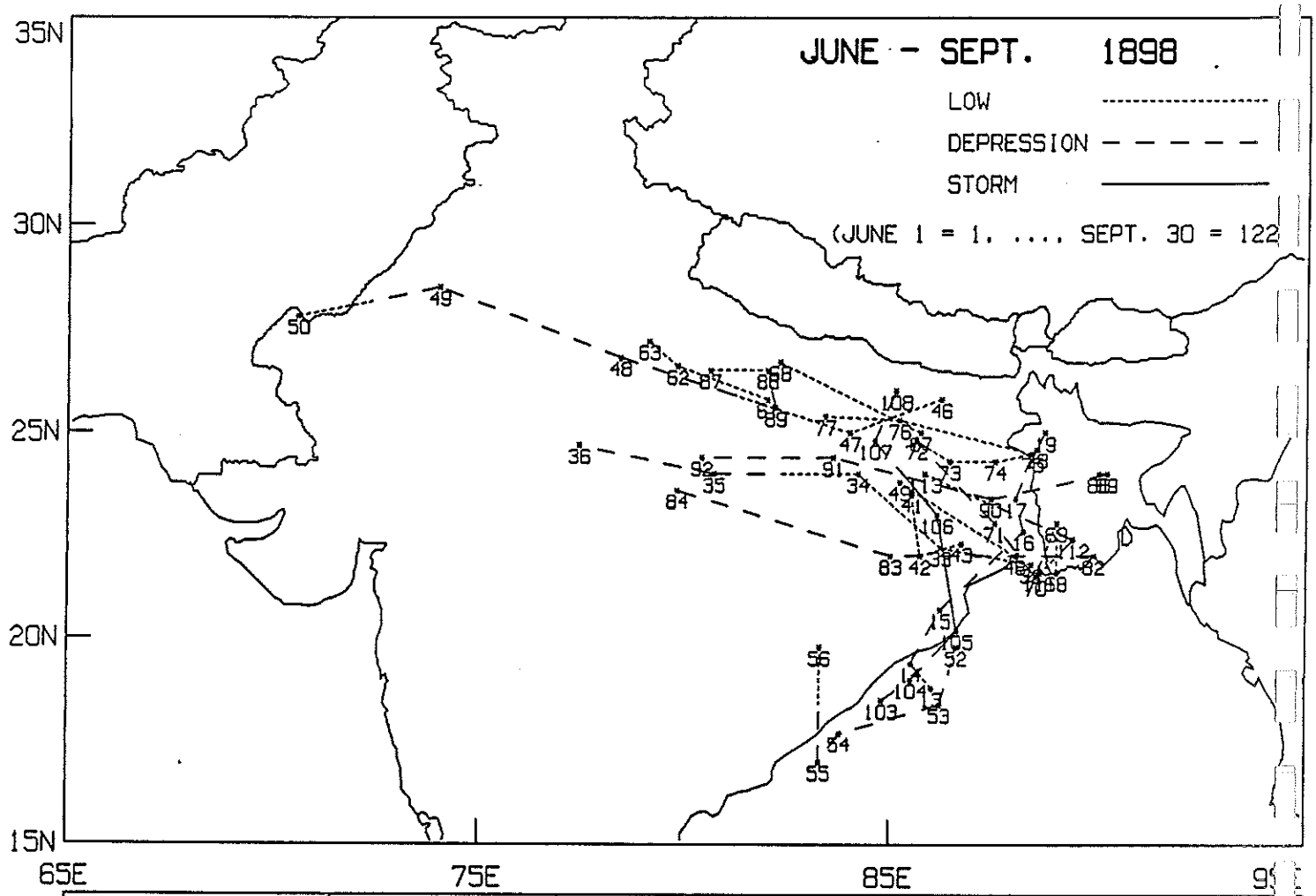

JUNE - SEPT. 1893
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

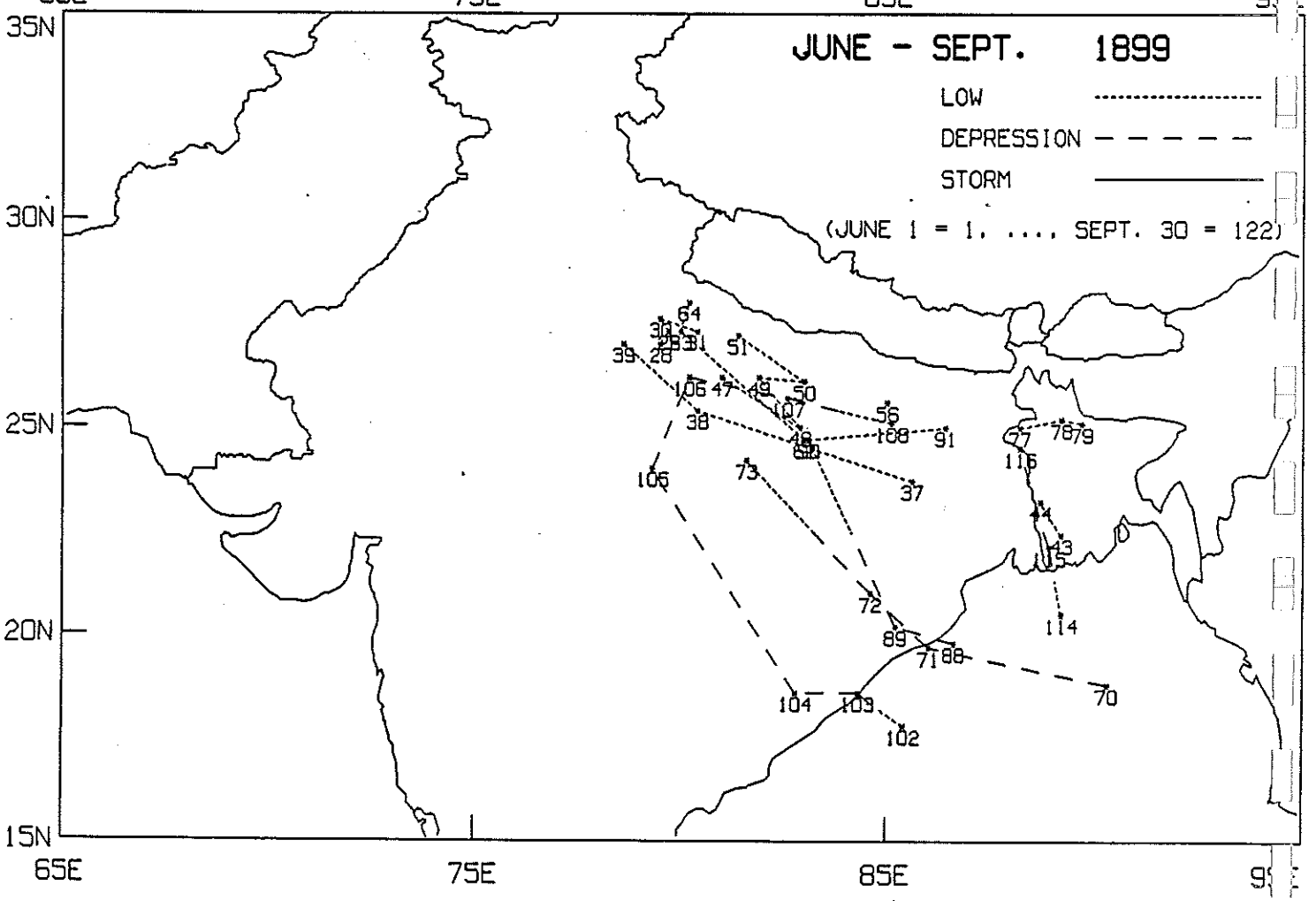

JUNE - SEPT. 1894
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

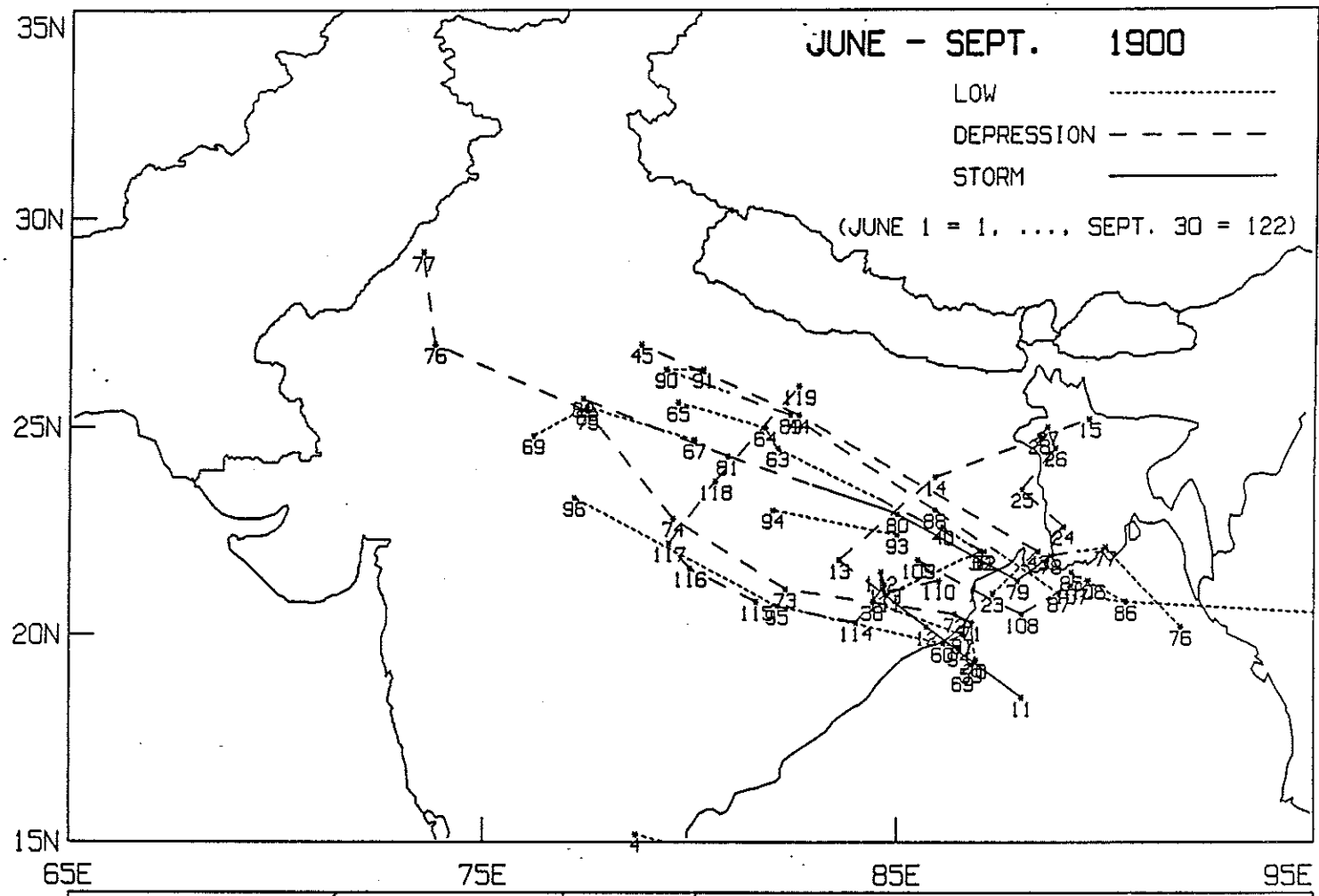

JUNE - SEPT. 1895
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

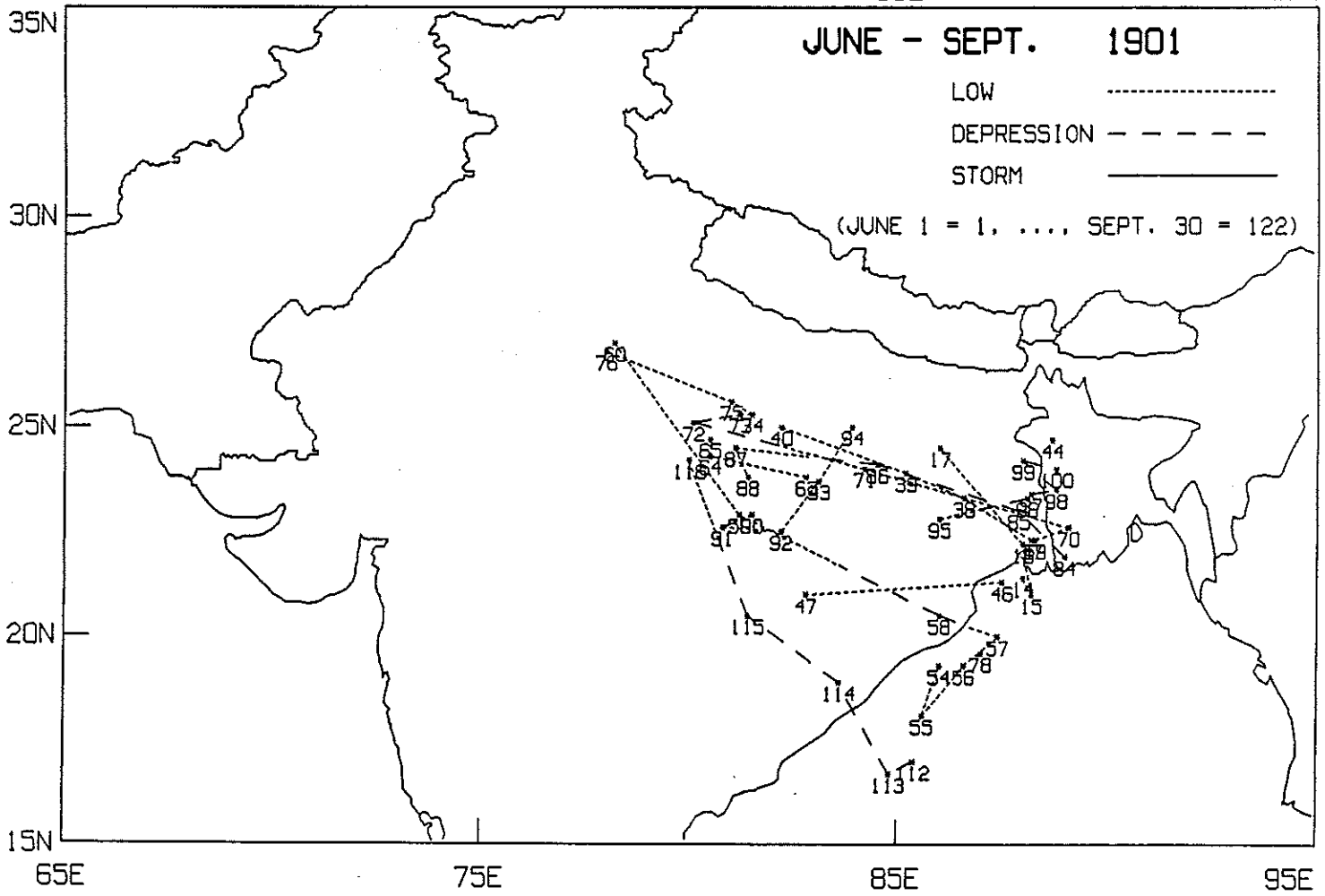

JUNE - SEPT. 1896
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

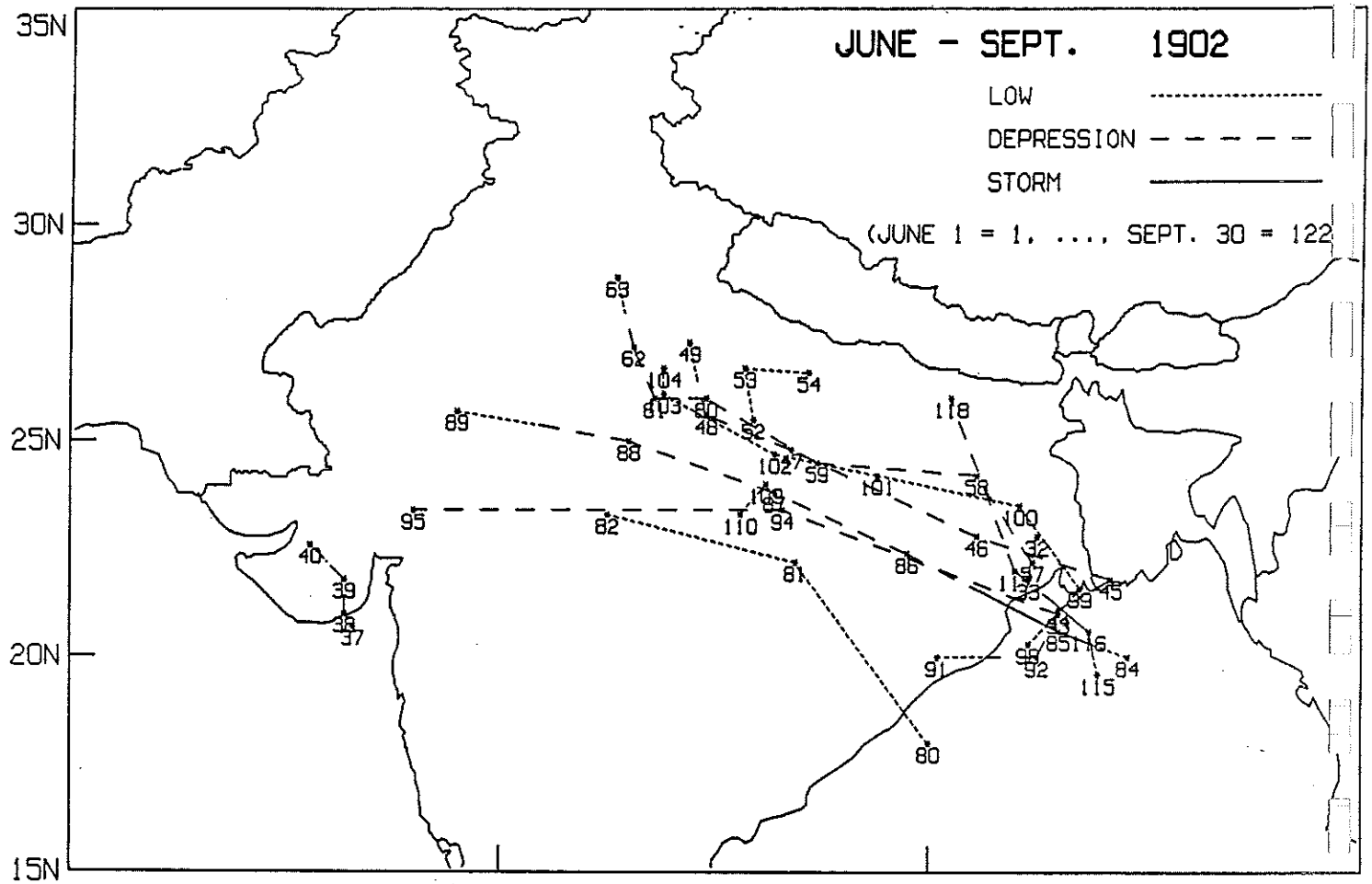

JUNE - SEPT. 1897
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

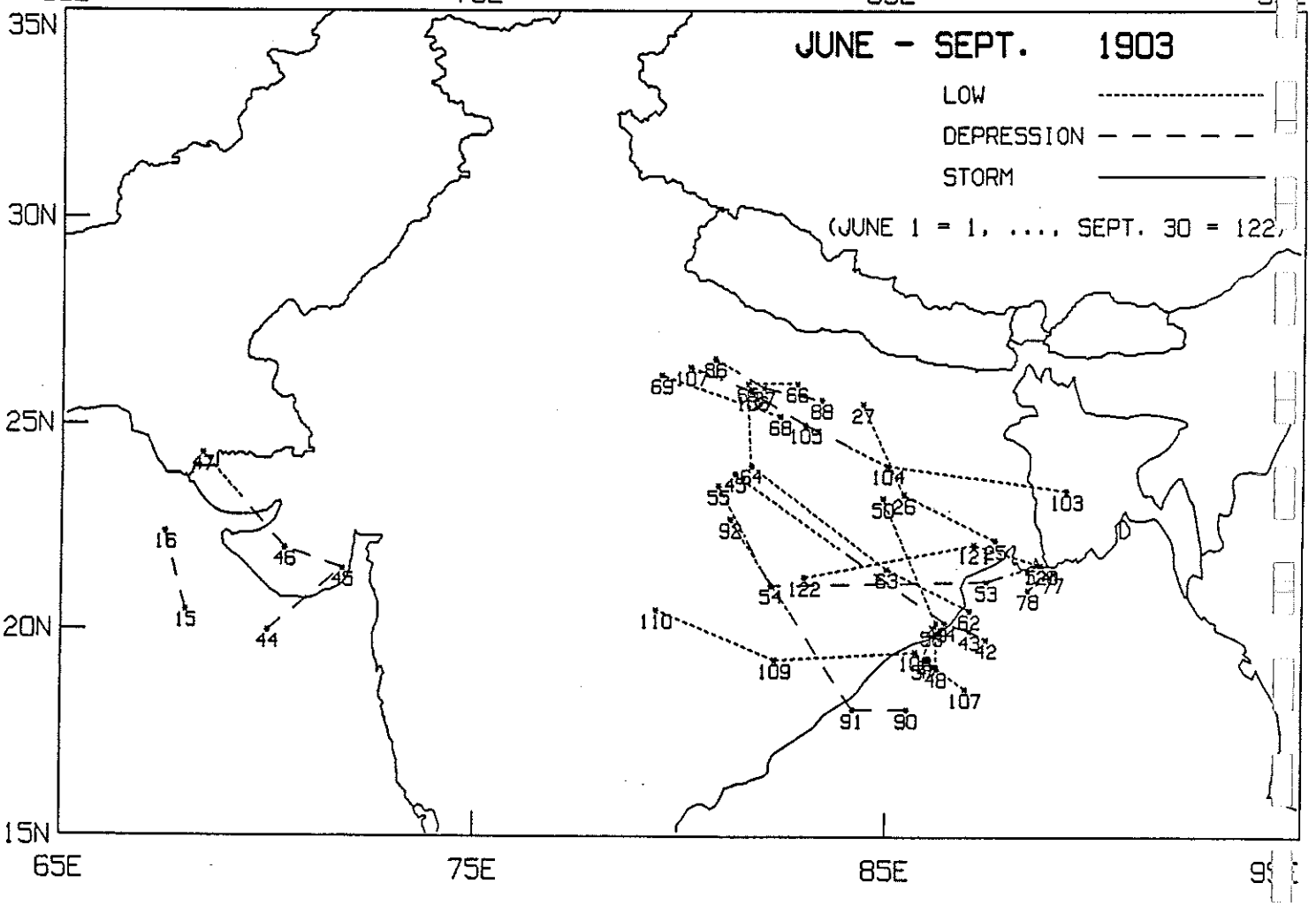

JUNE - SEPT. 1898
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122
35N
30N
25N
20N
15N
65E
75E
85E

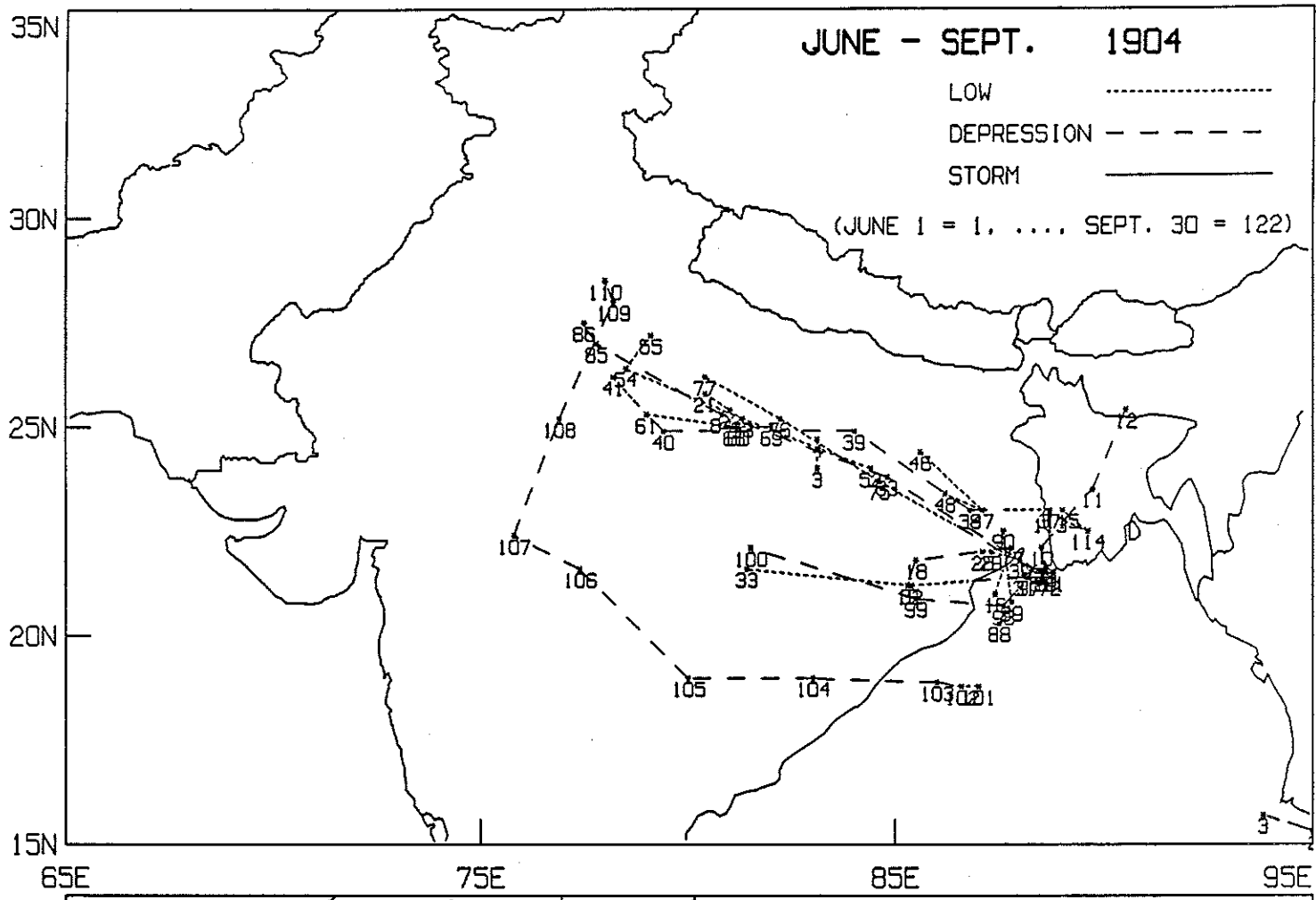

JUNE - SEPT. 1899
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

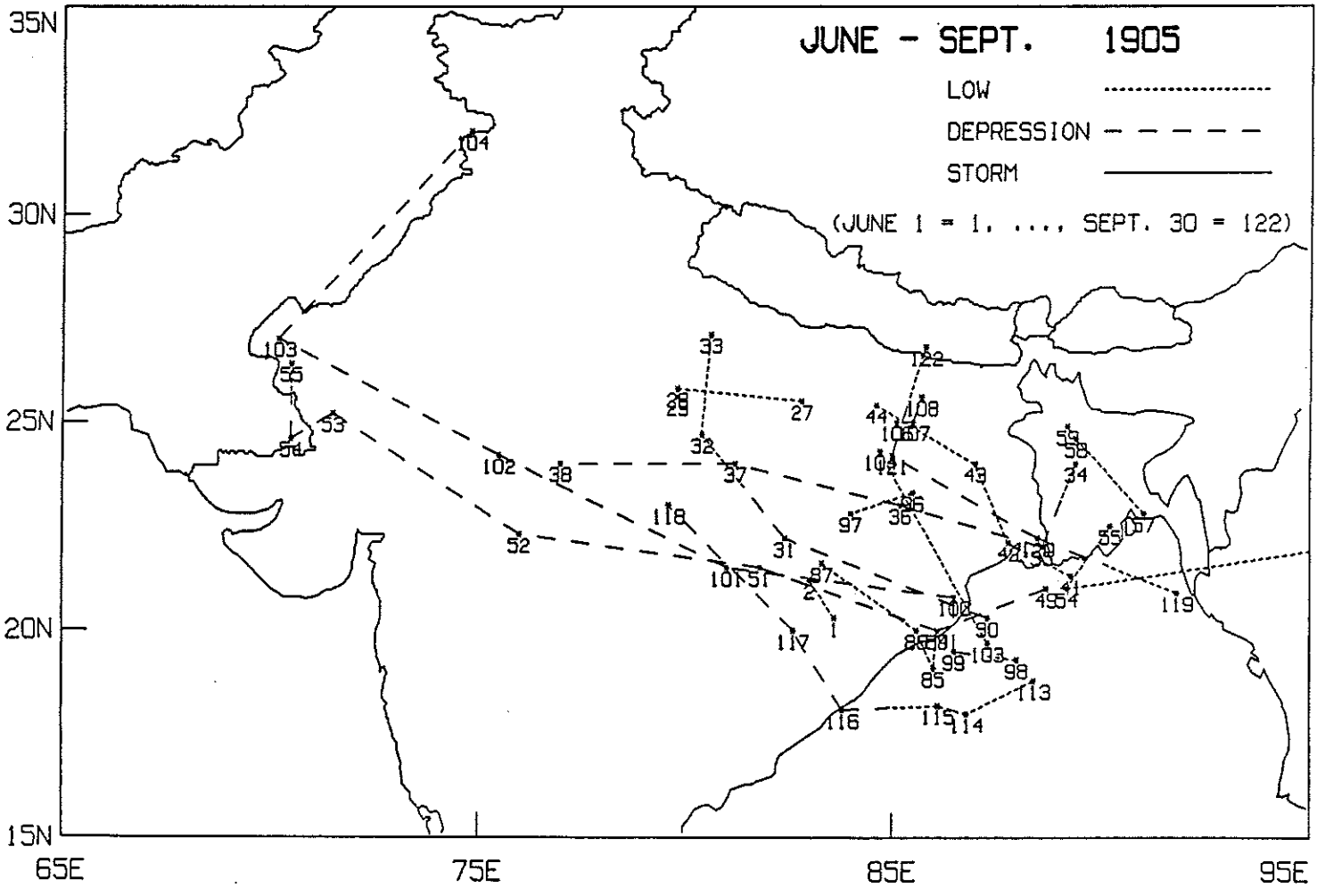

JUNE - SEPT. 1900
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

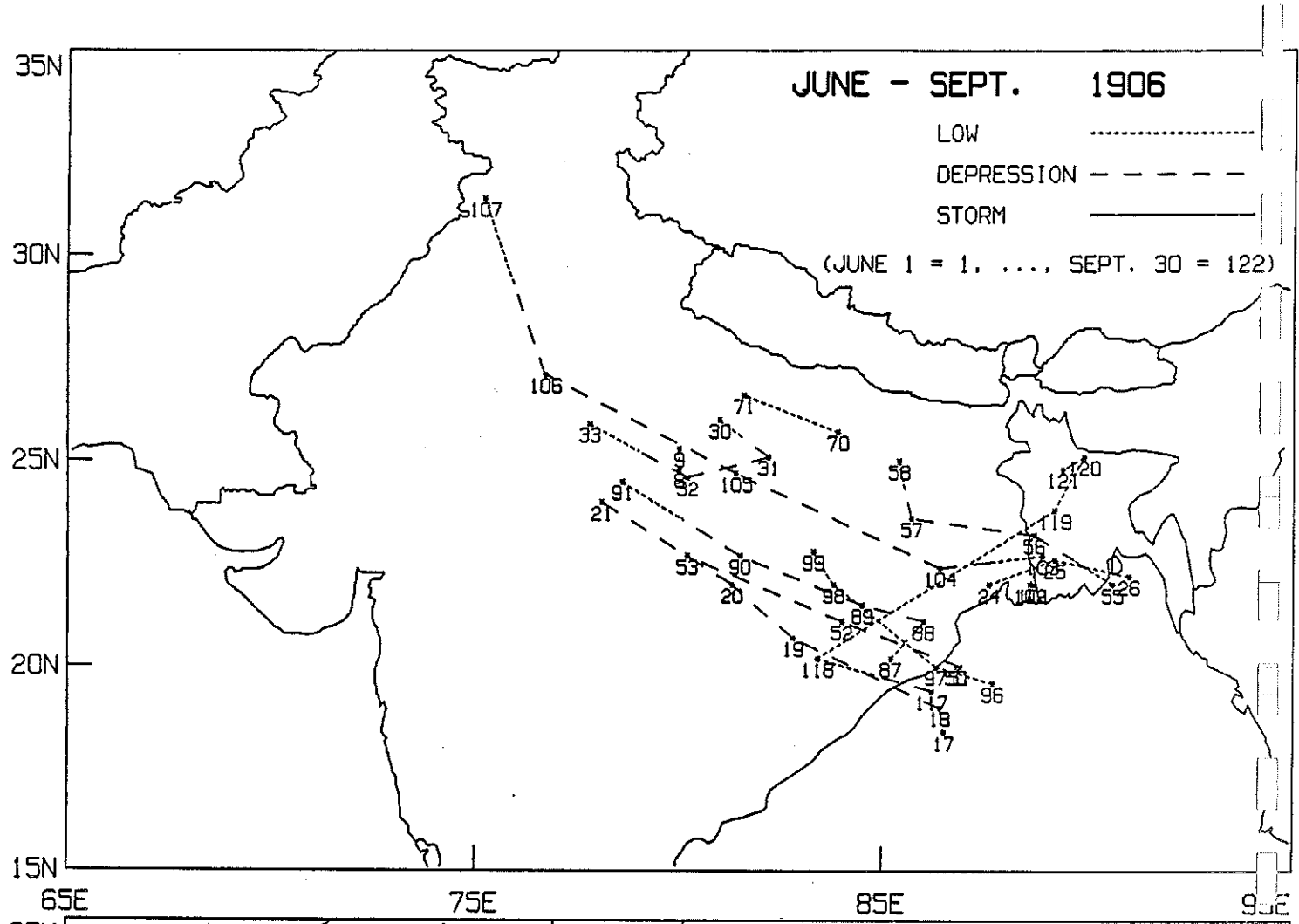

JUNE - SEPT. 1901
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

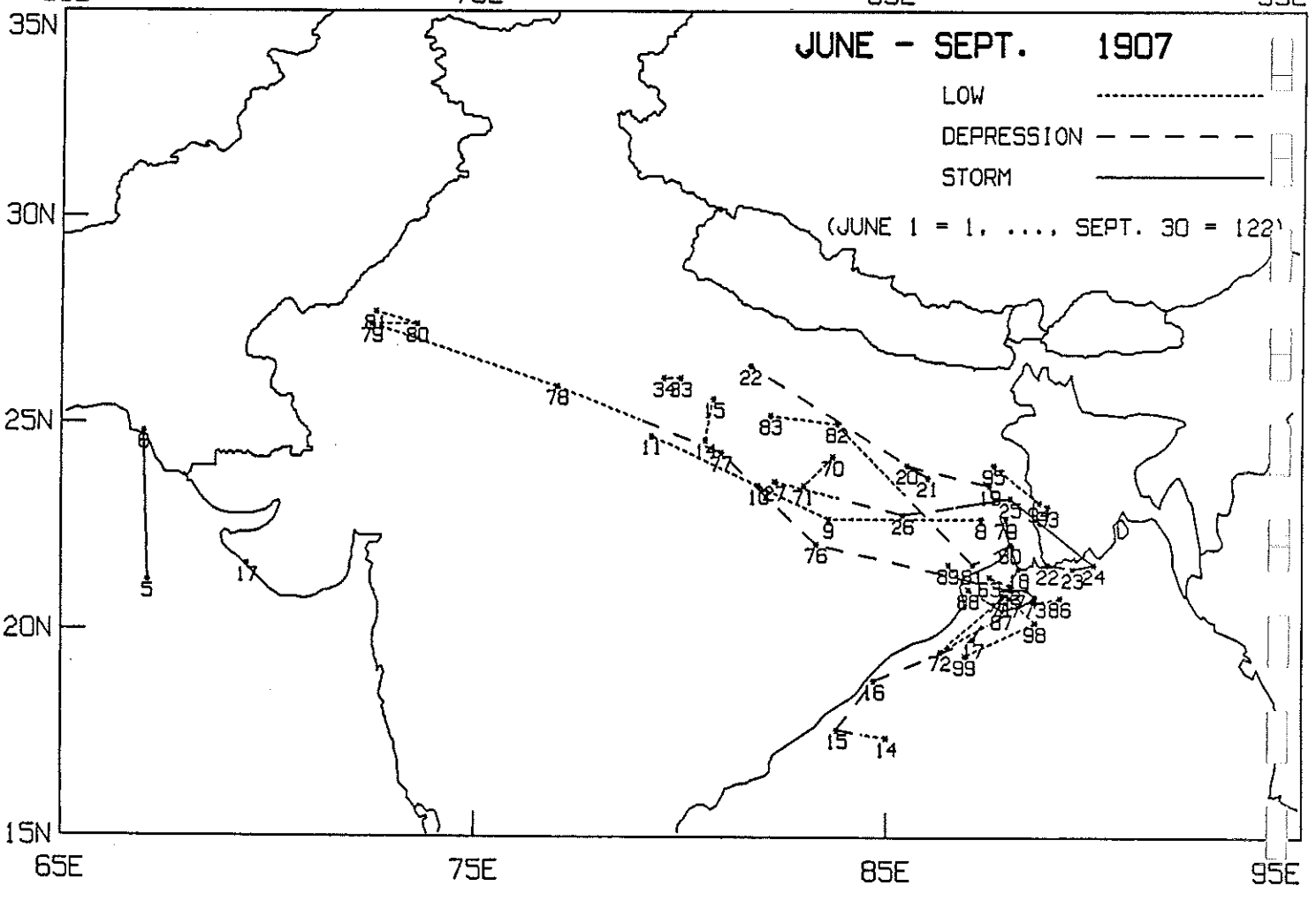

JUNE - SEPT. 1902
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122
35N
30N
25N
20N
15N
65E
75E
85E

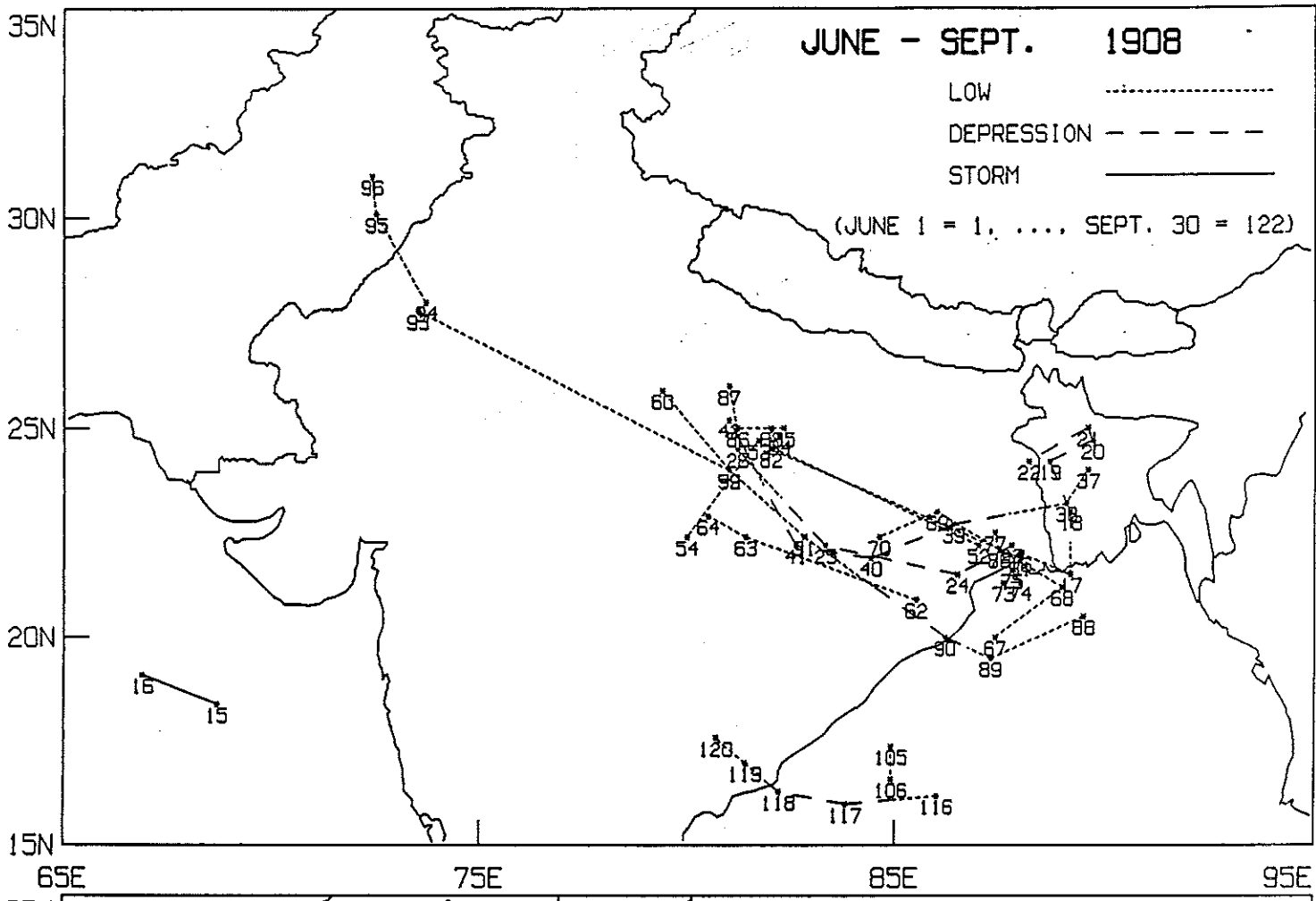

JUNE - SEPT. 1903
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122
35N
30N
25N
20N
15N
65E
75E
85E

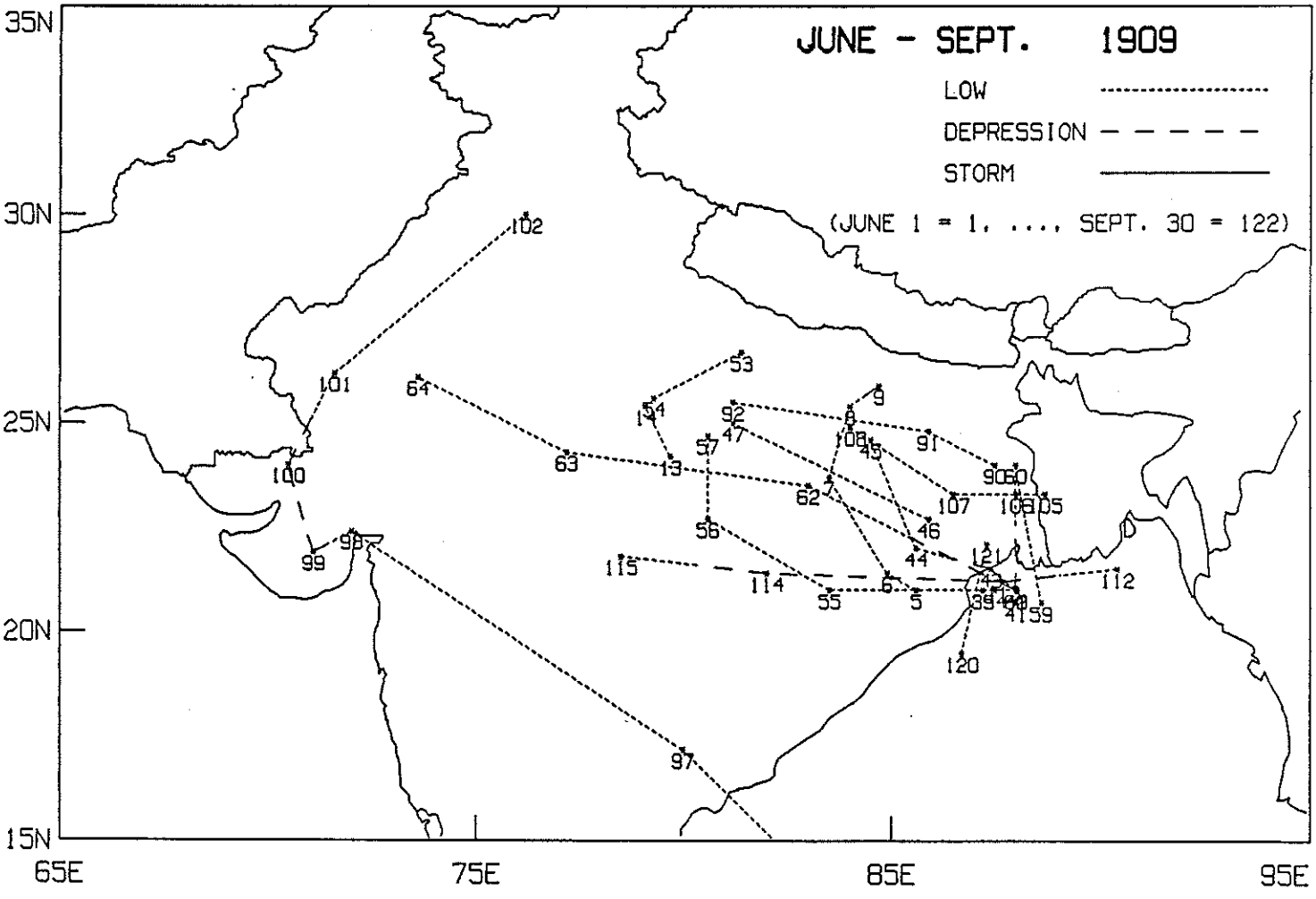

JUNE - SEPT. 1904
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

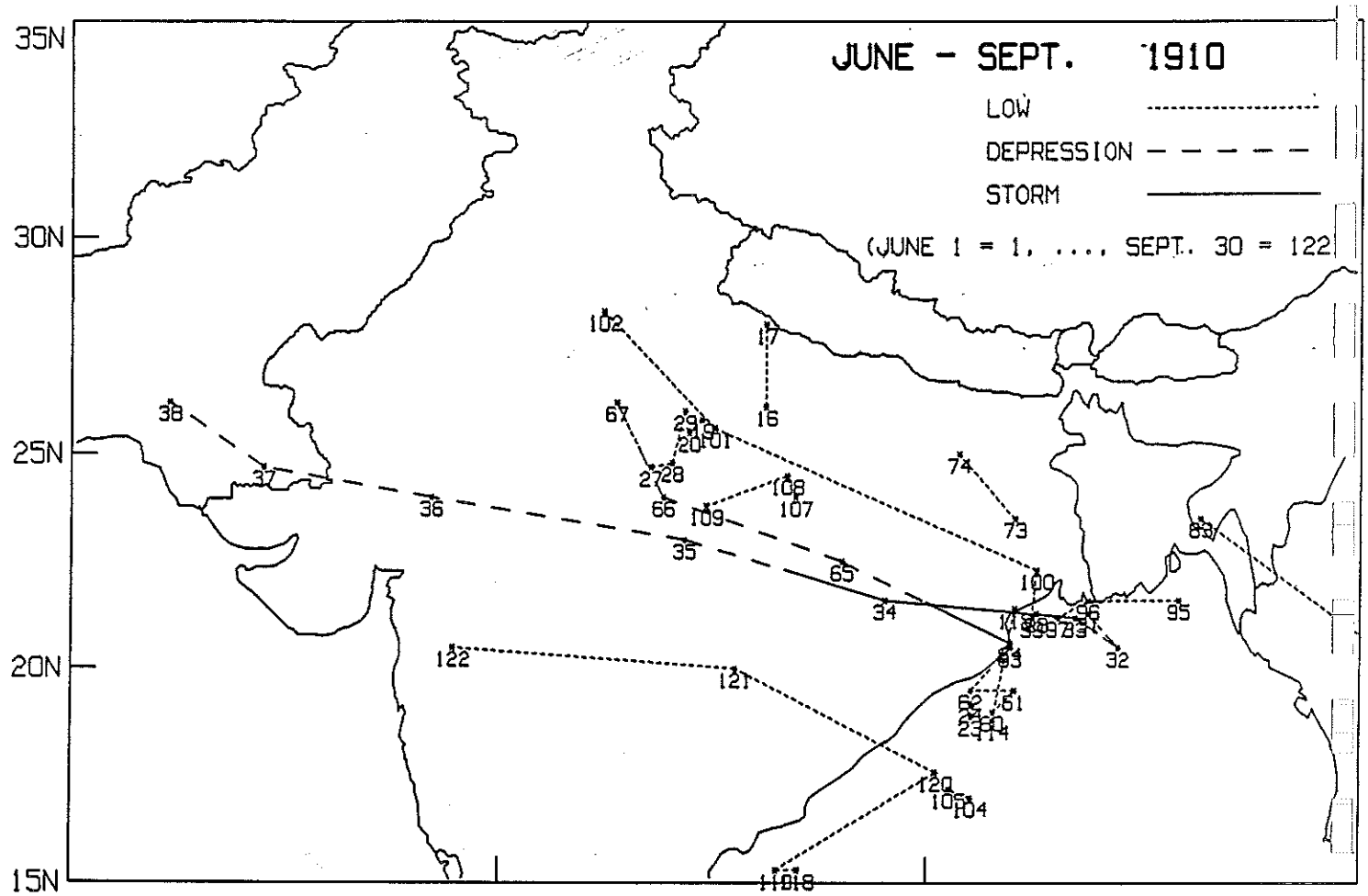

JUNE - SEPT. 1905
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

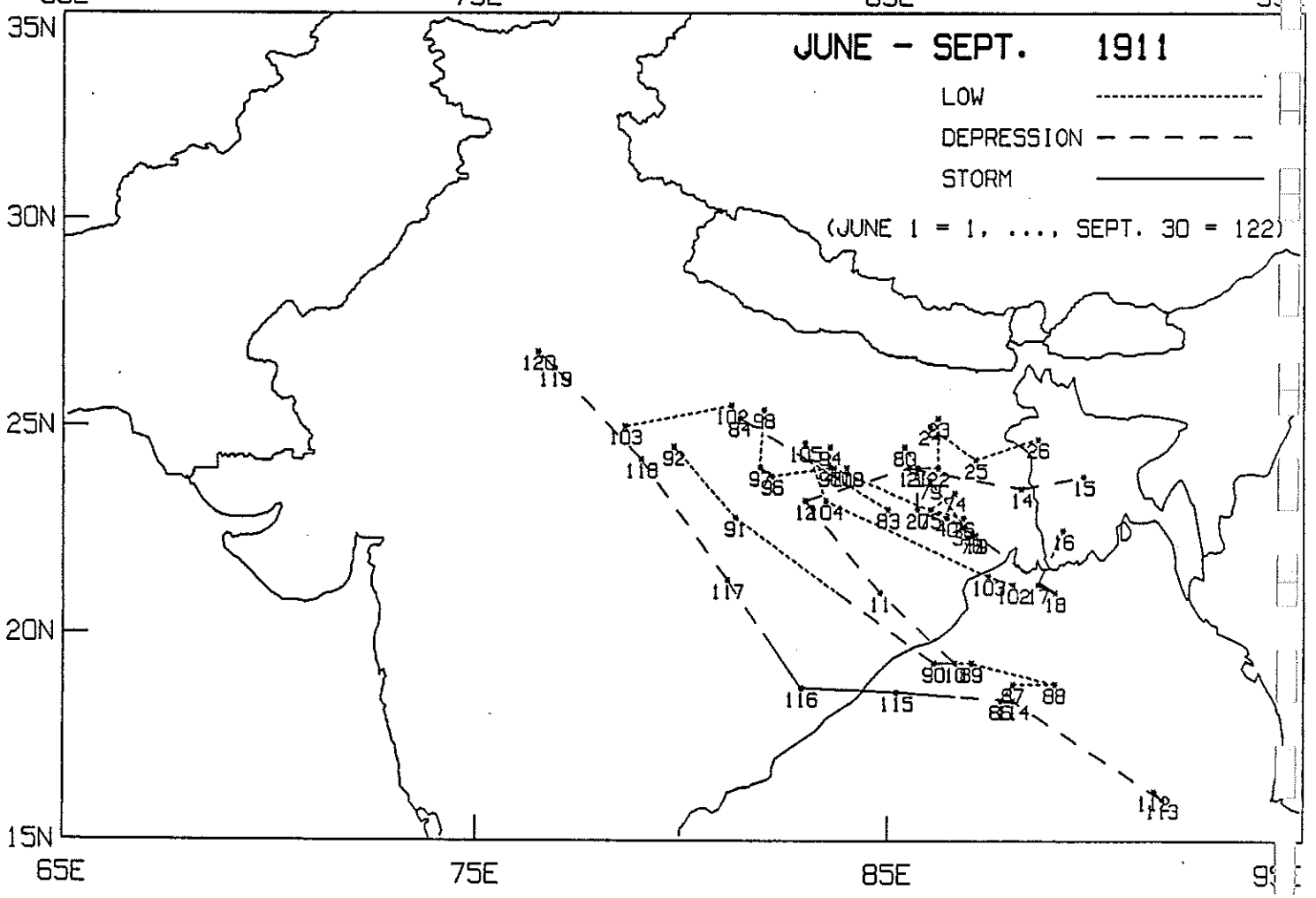

JUNE - SEPT. 1906
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

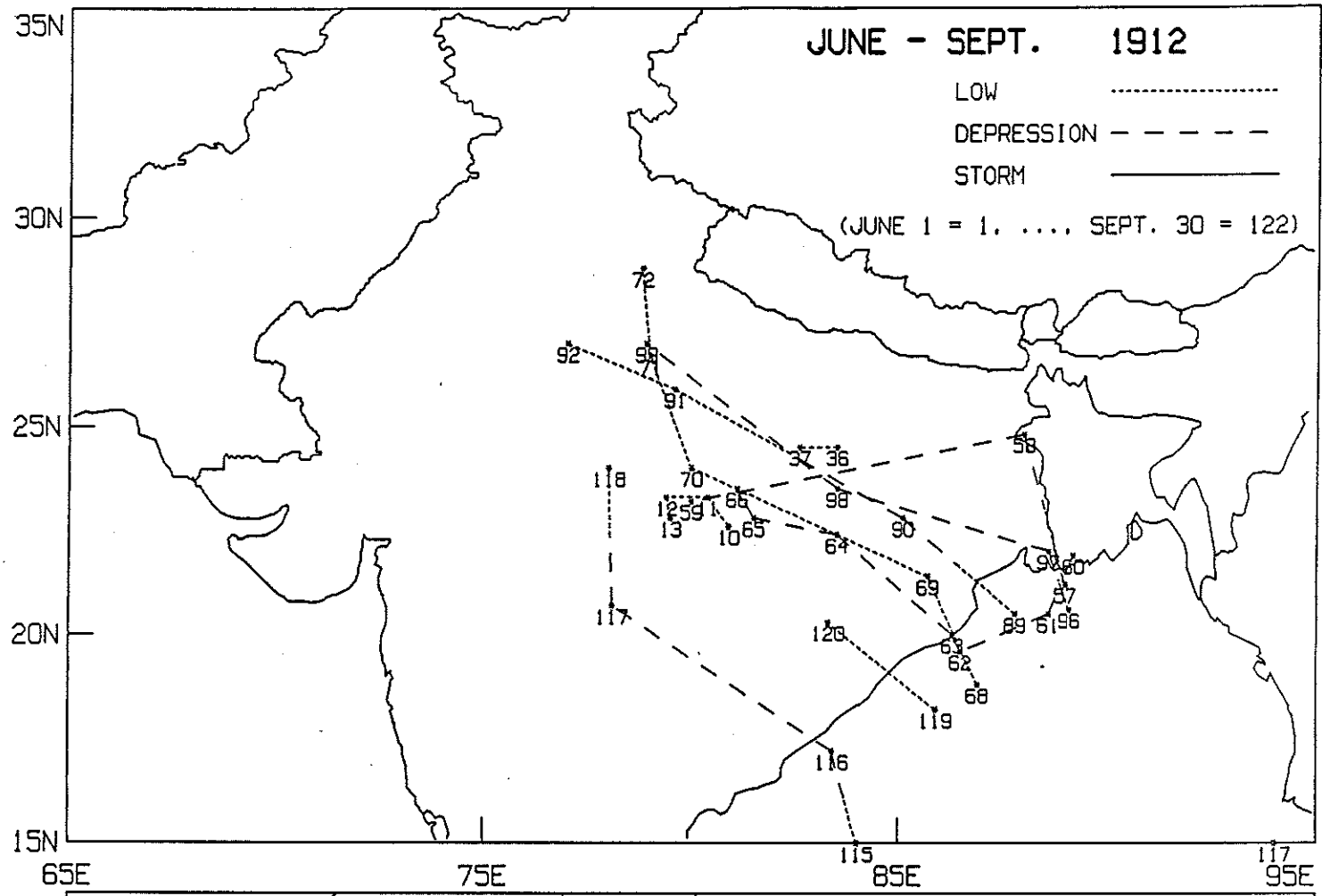

JUNE - SEPT. 1907
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

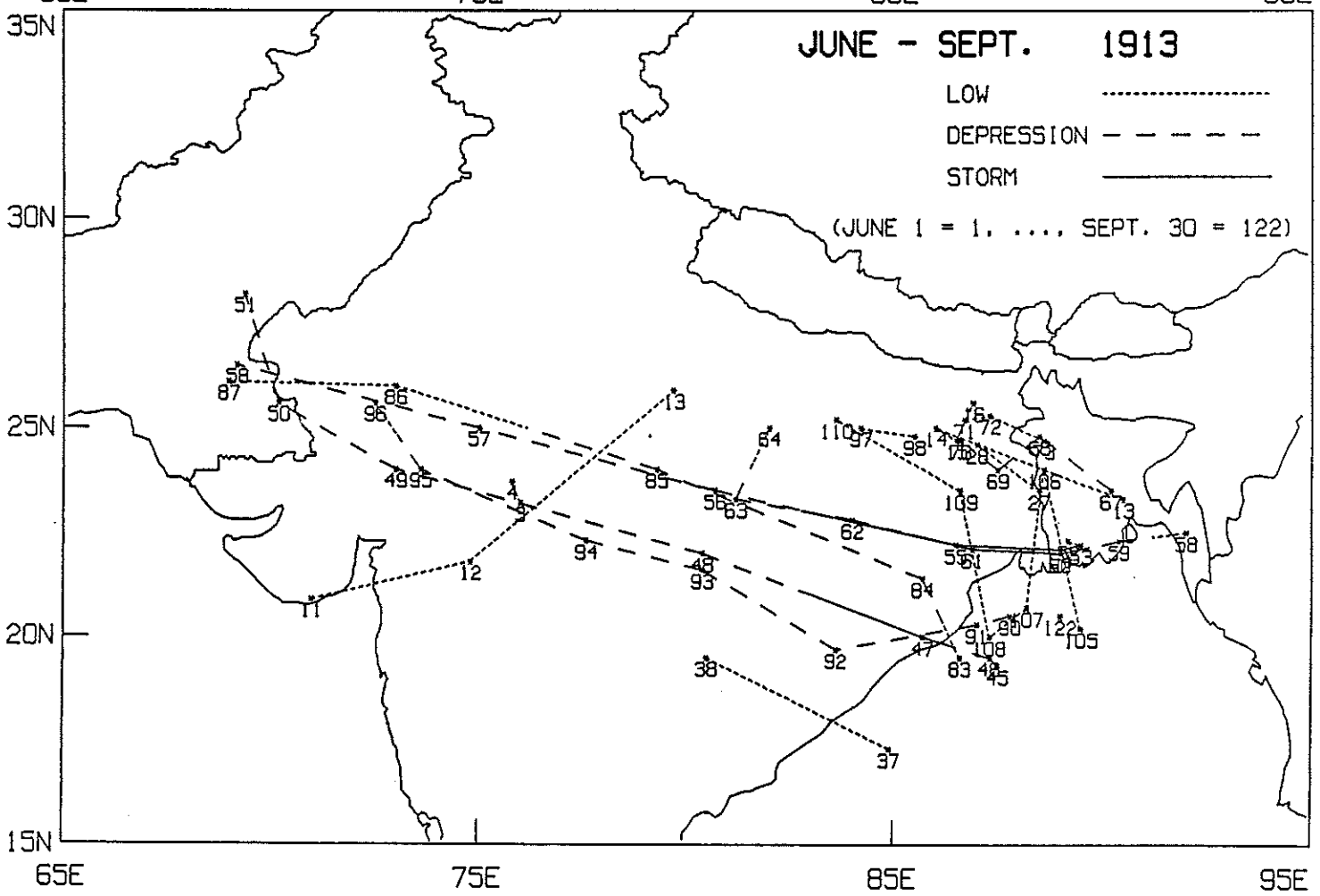

JUNE - SEPT. 1908
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

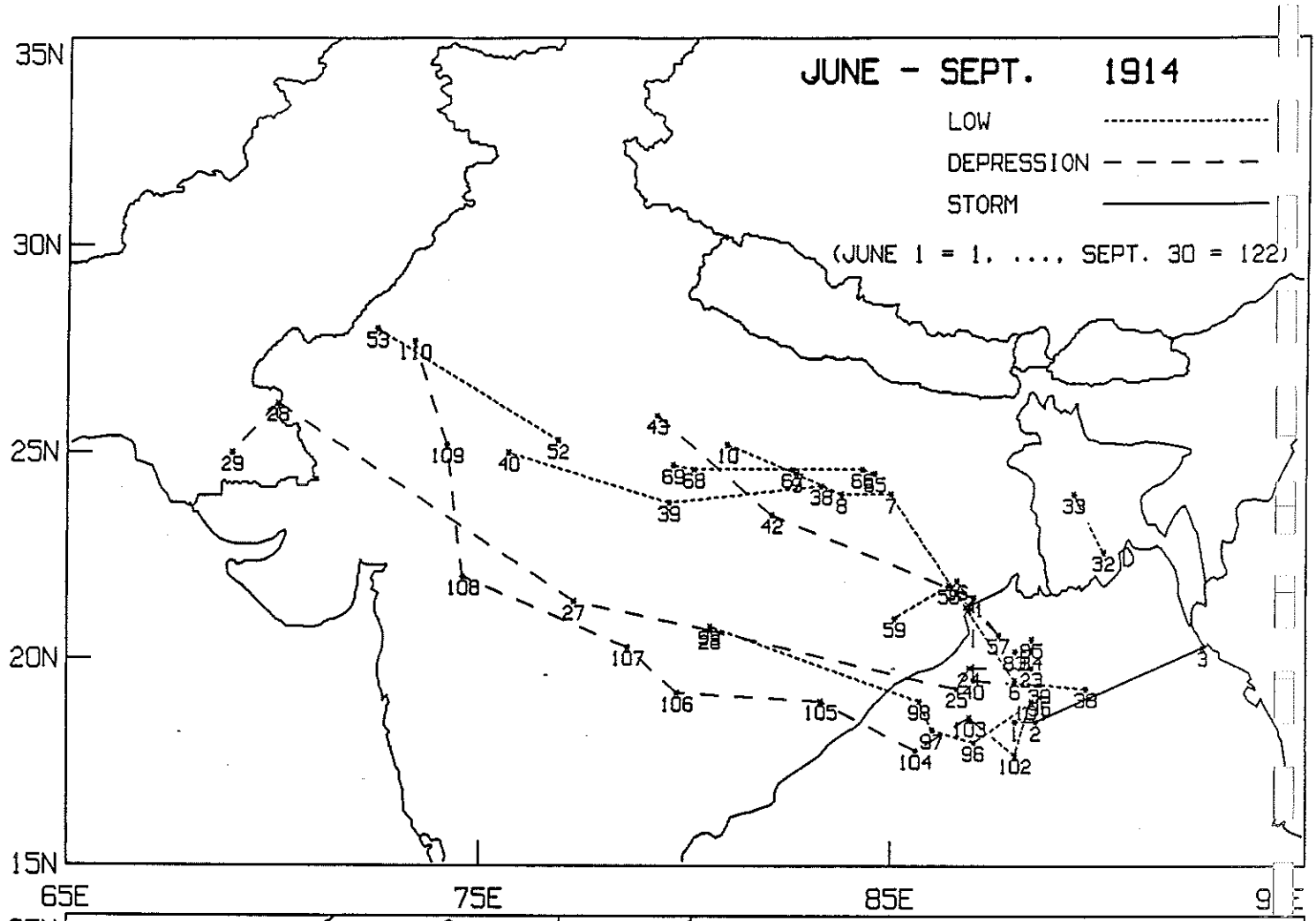

JUNE - SEPT. 1909
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

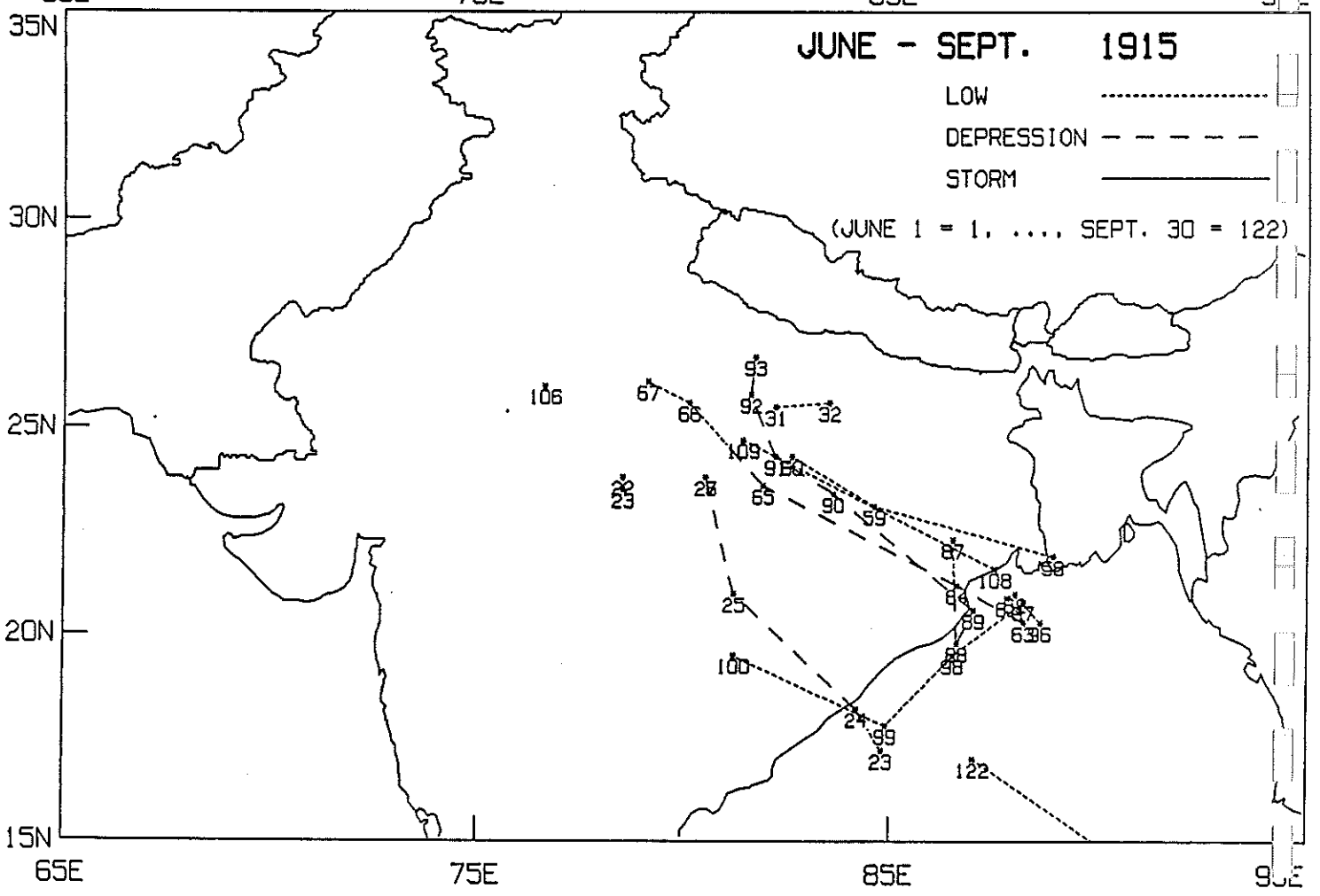

JUNE - SEPT. 1910
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

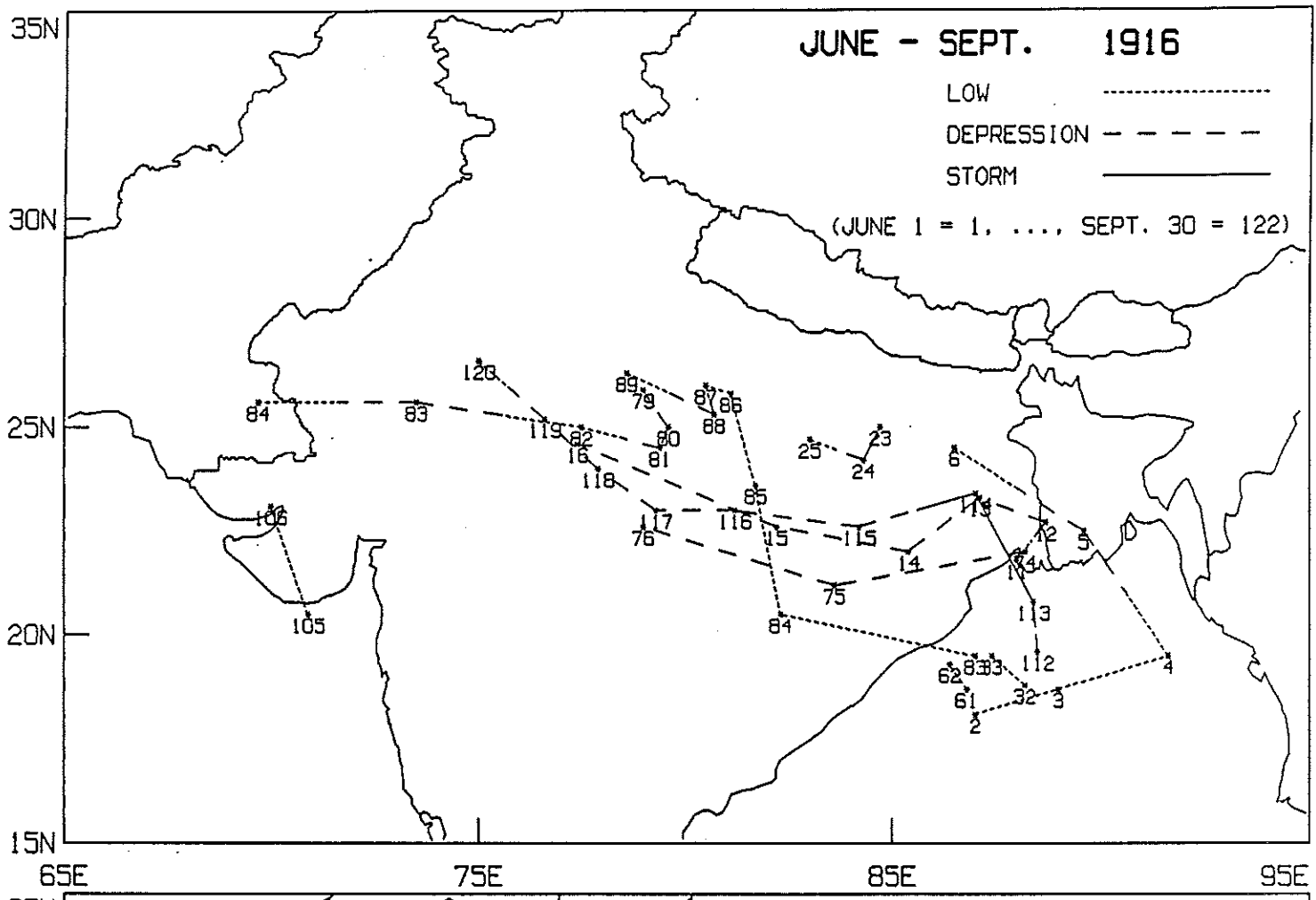

JUNE - SEPT. 1911
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

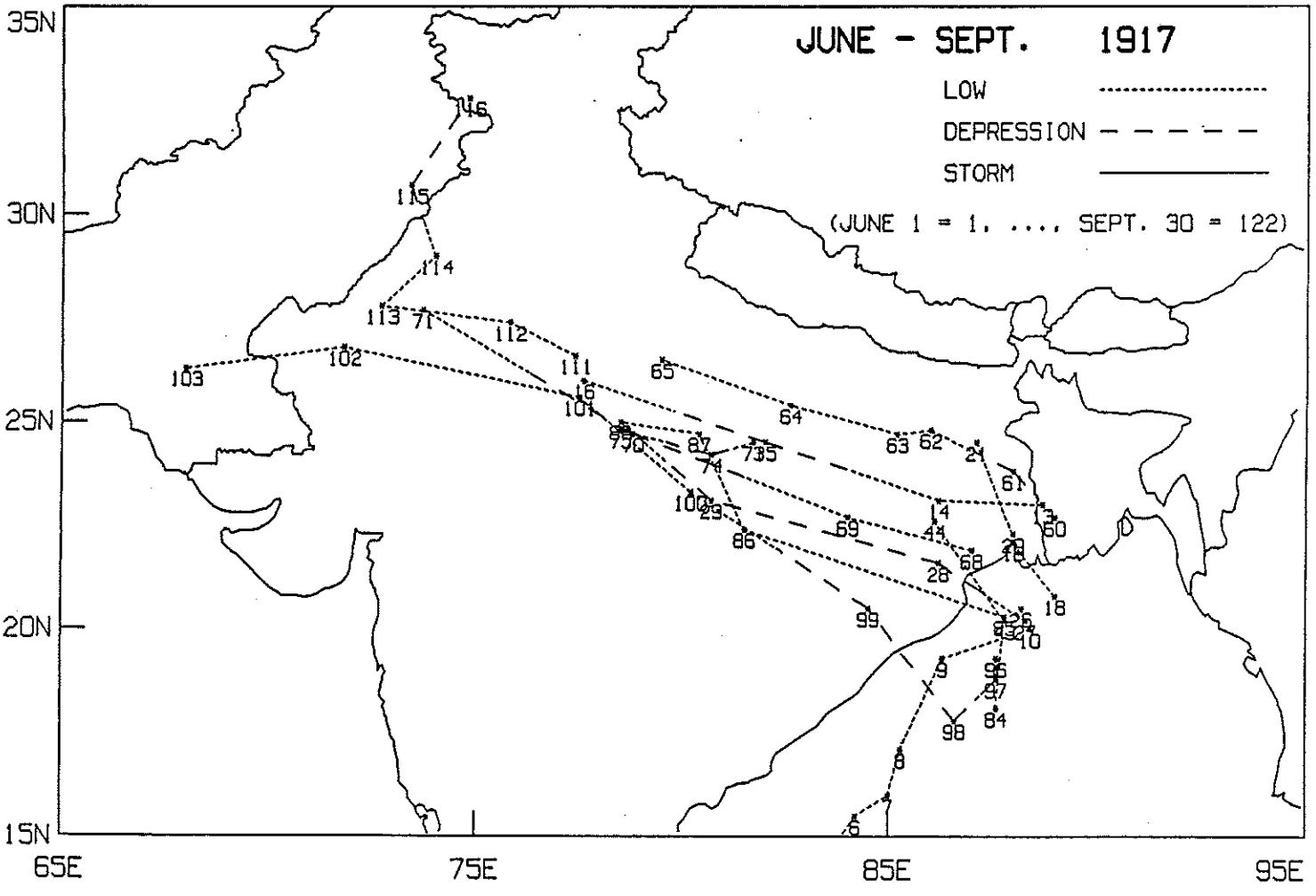

JUNE - SEPT. 1912
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

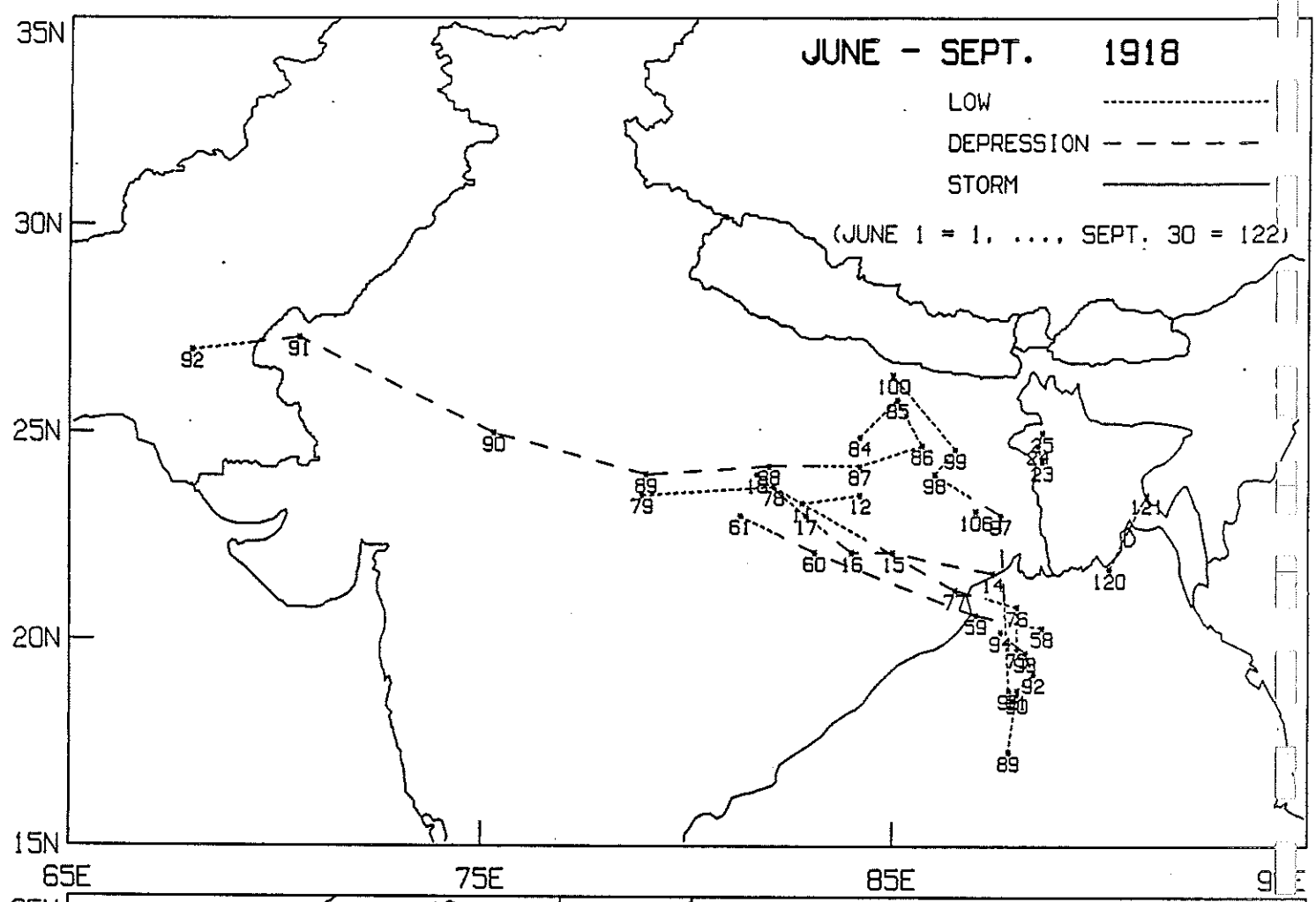

JUNE - SEPT. 1913
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

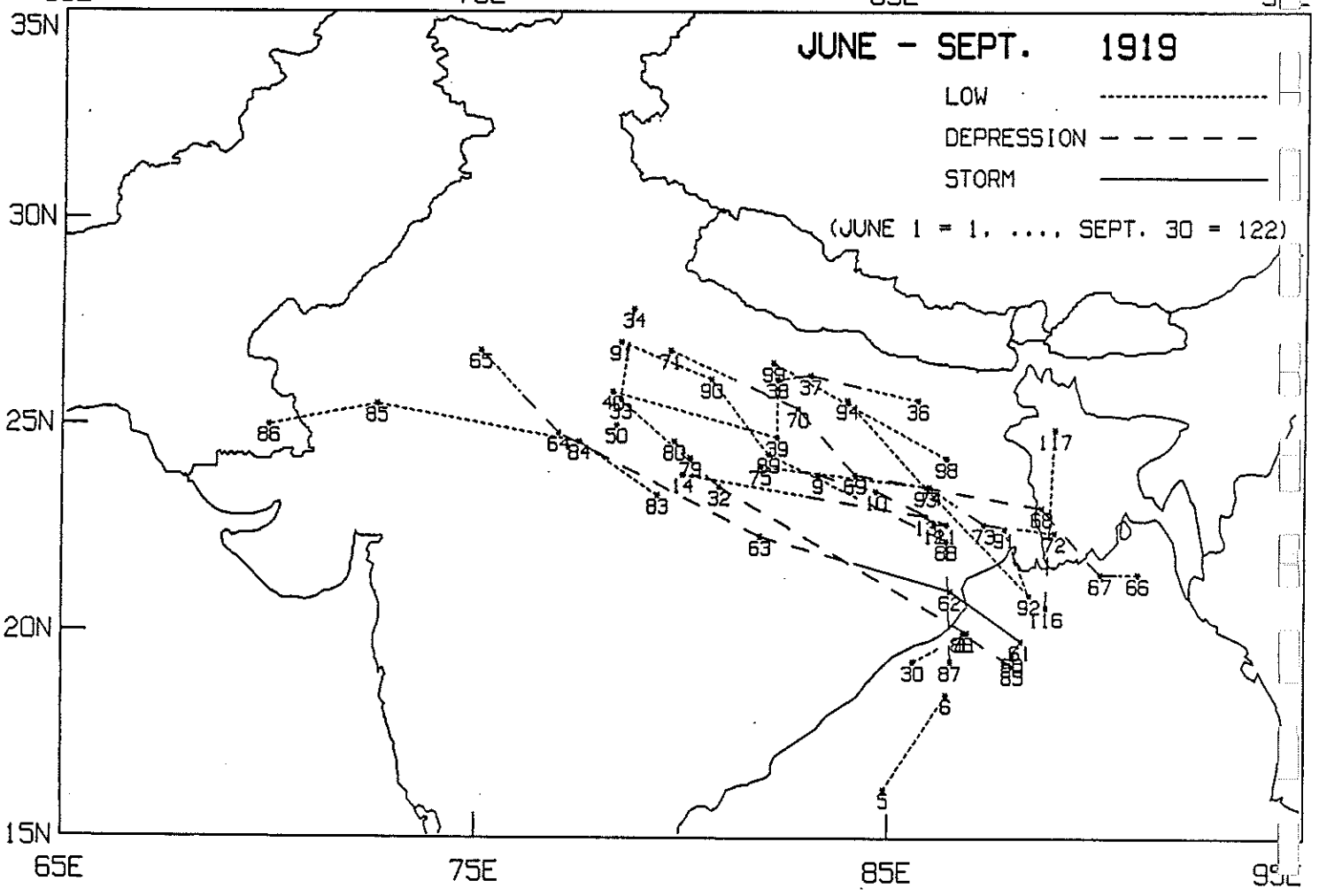

JUNE - SEPT. 1914
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

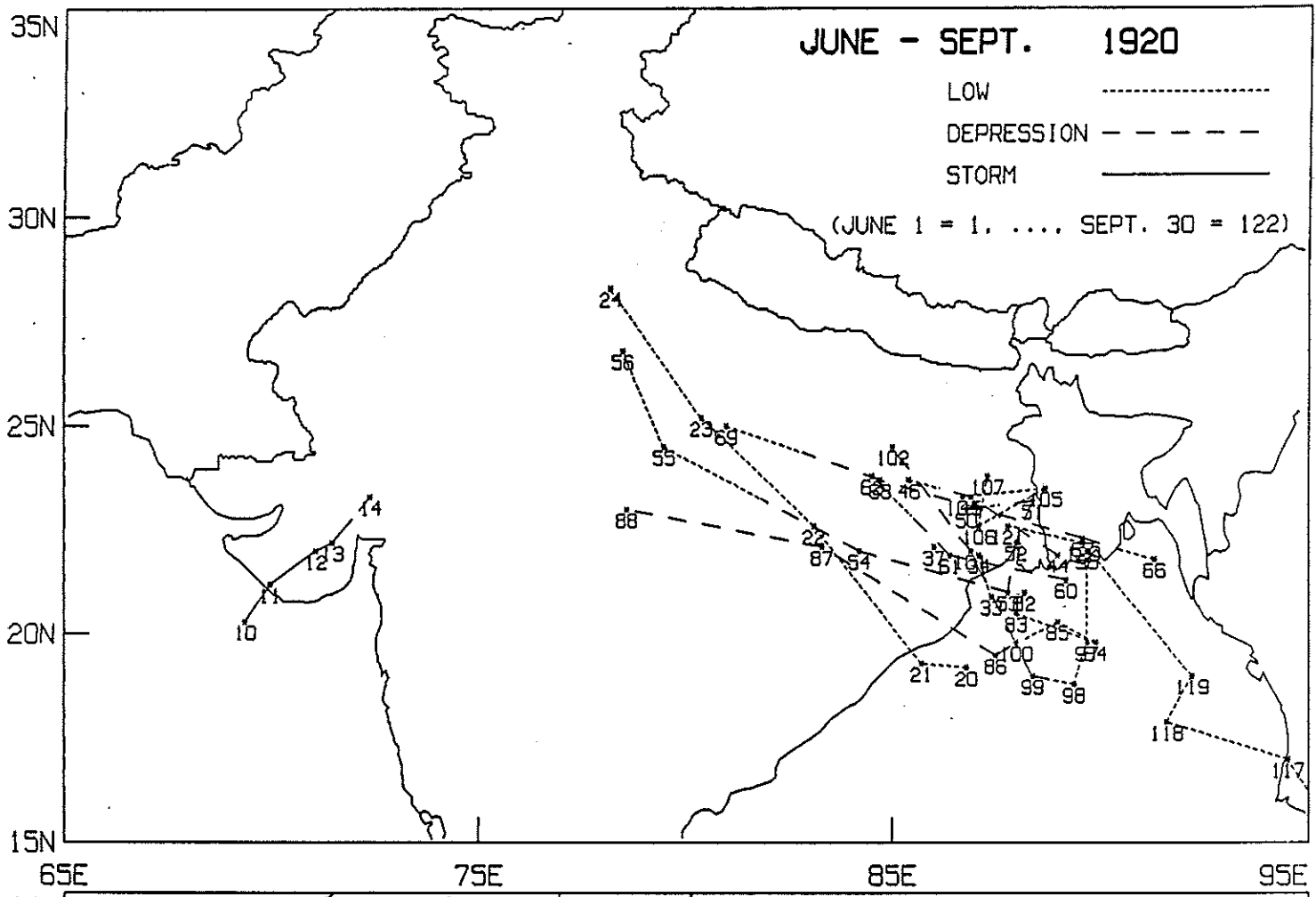

JUNE - SEPT. 1915
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

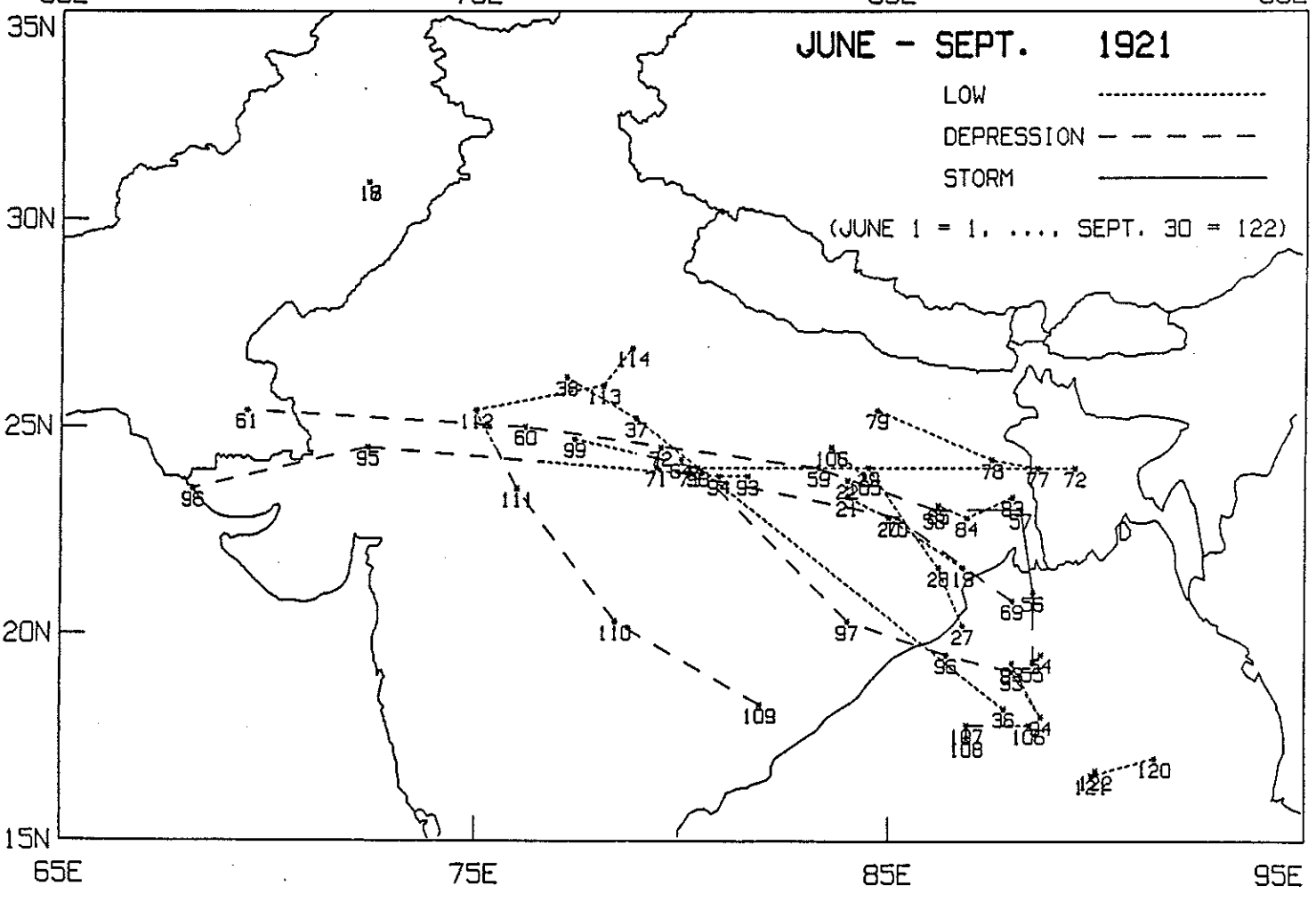

JUNE - SEPT. 1916
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

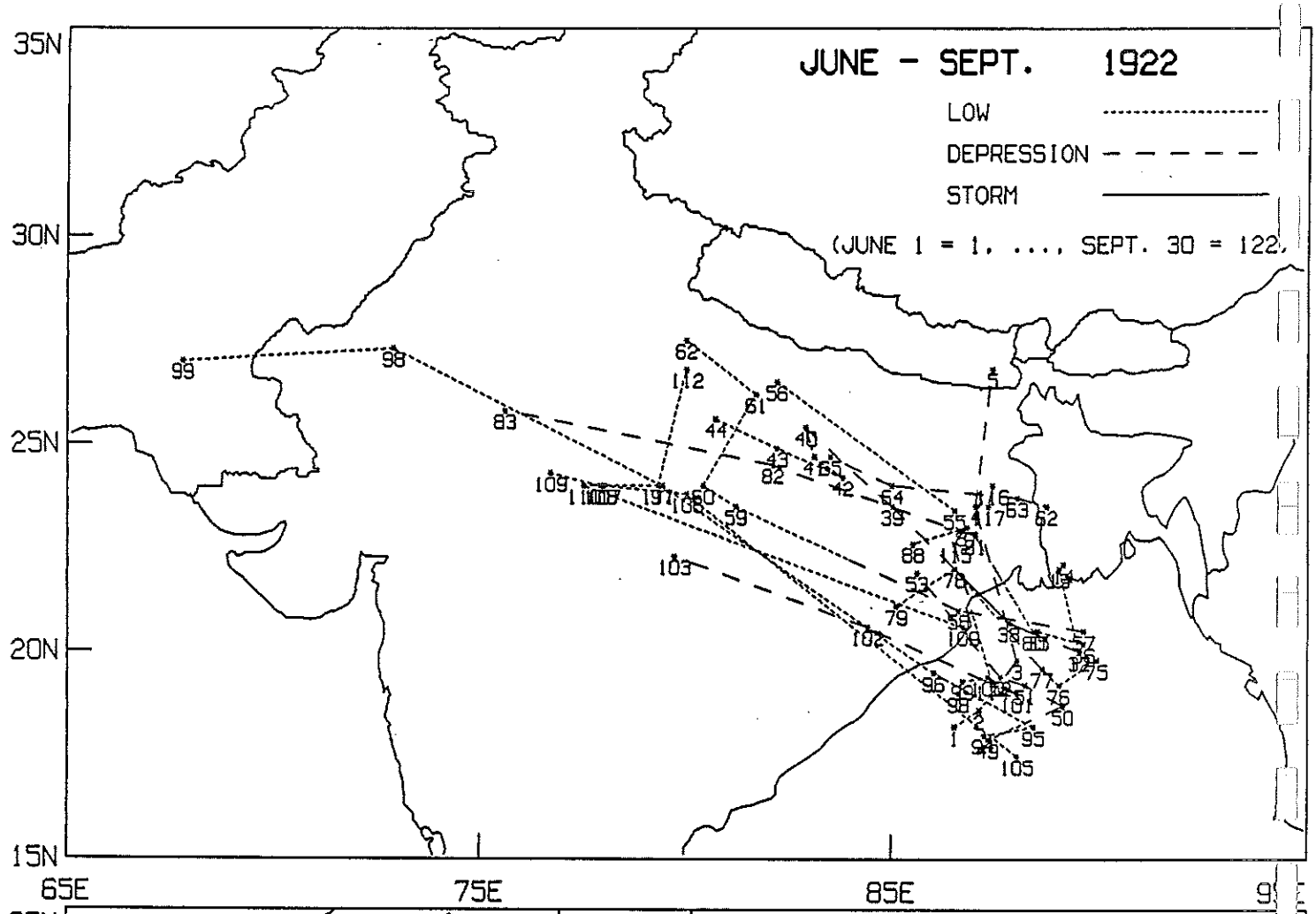

JUNE - SEPT. 1917
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

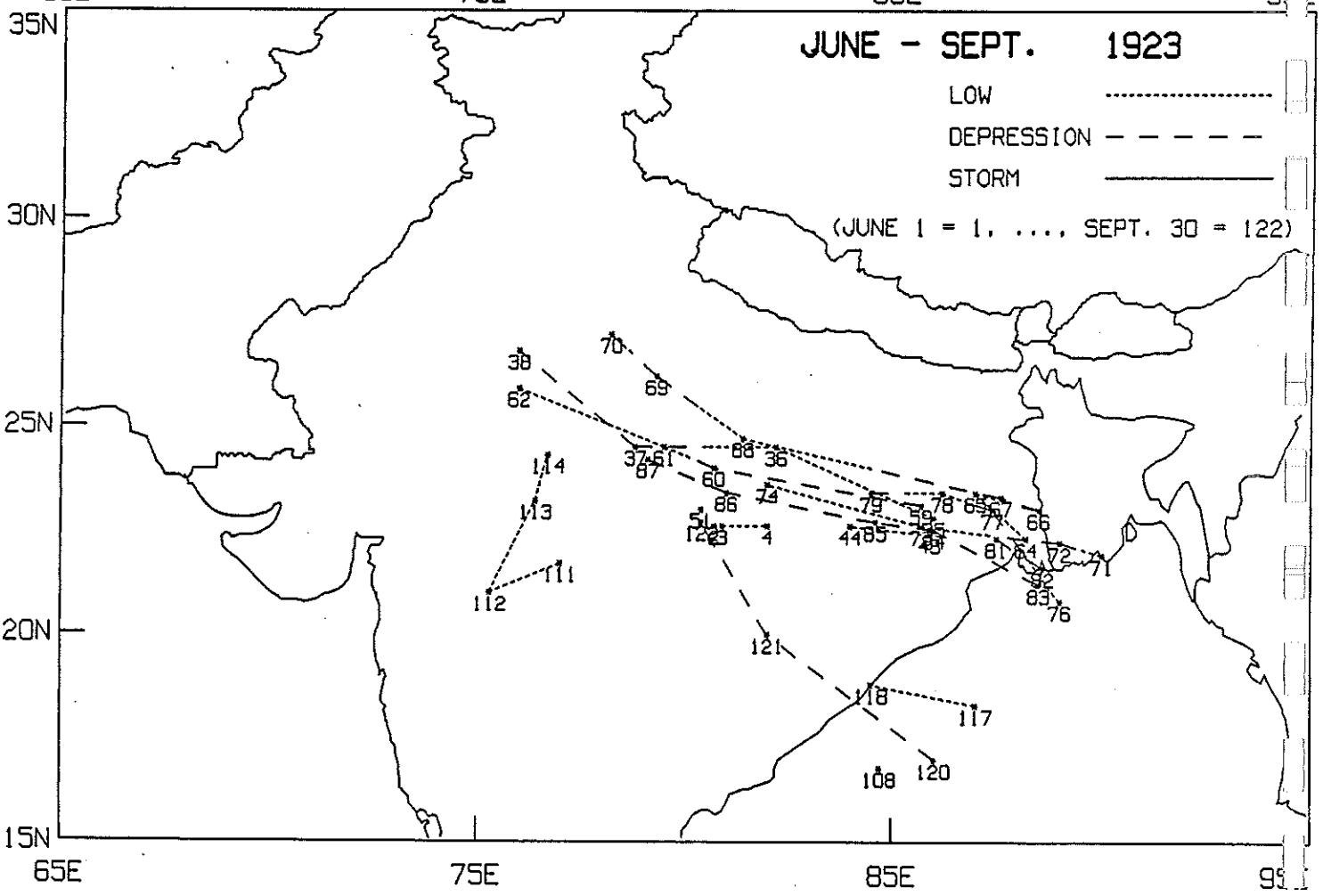

JUNE - SEPT. 1918
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

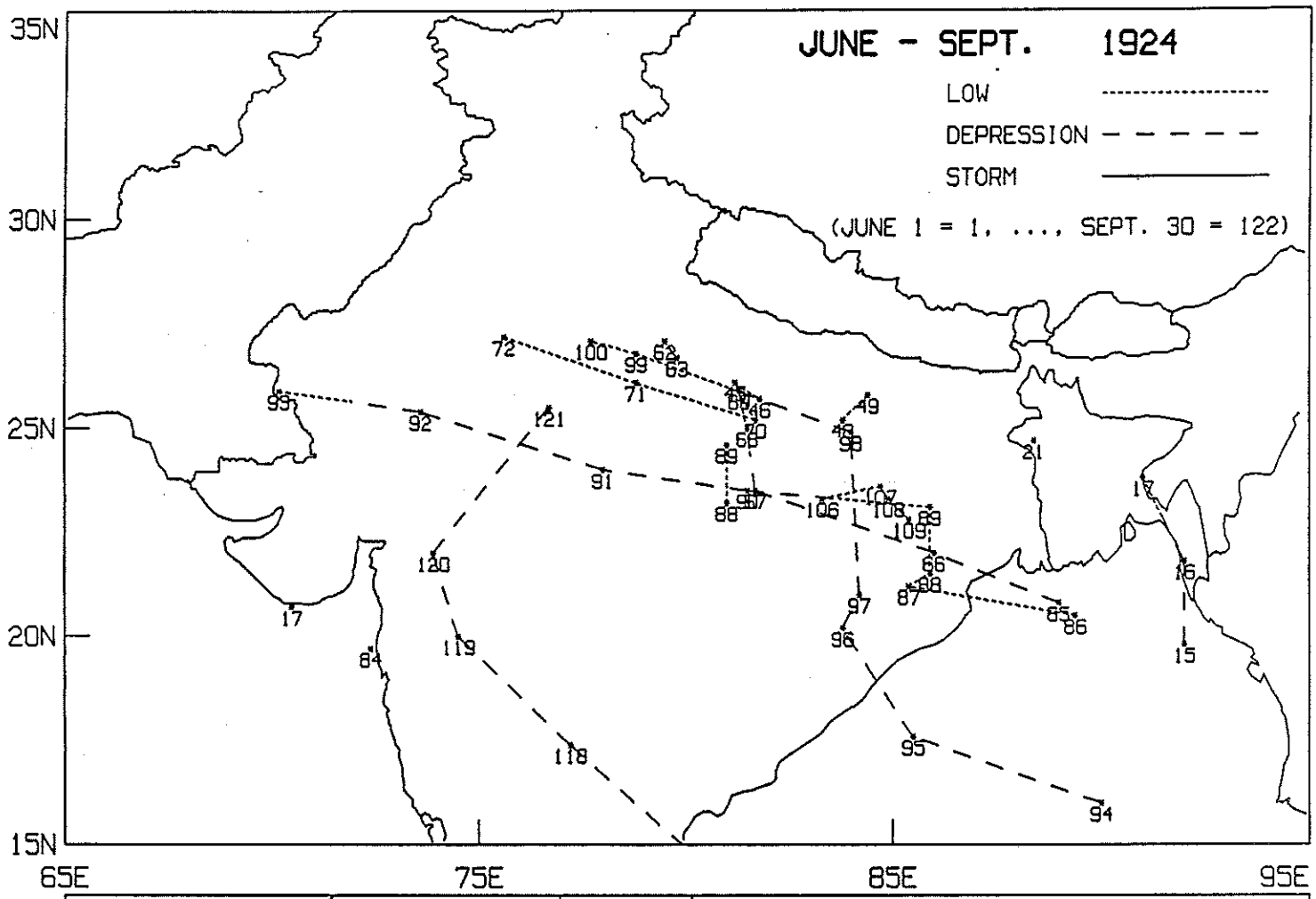

JUNE - SEPT. 1919
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

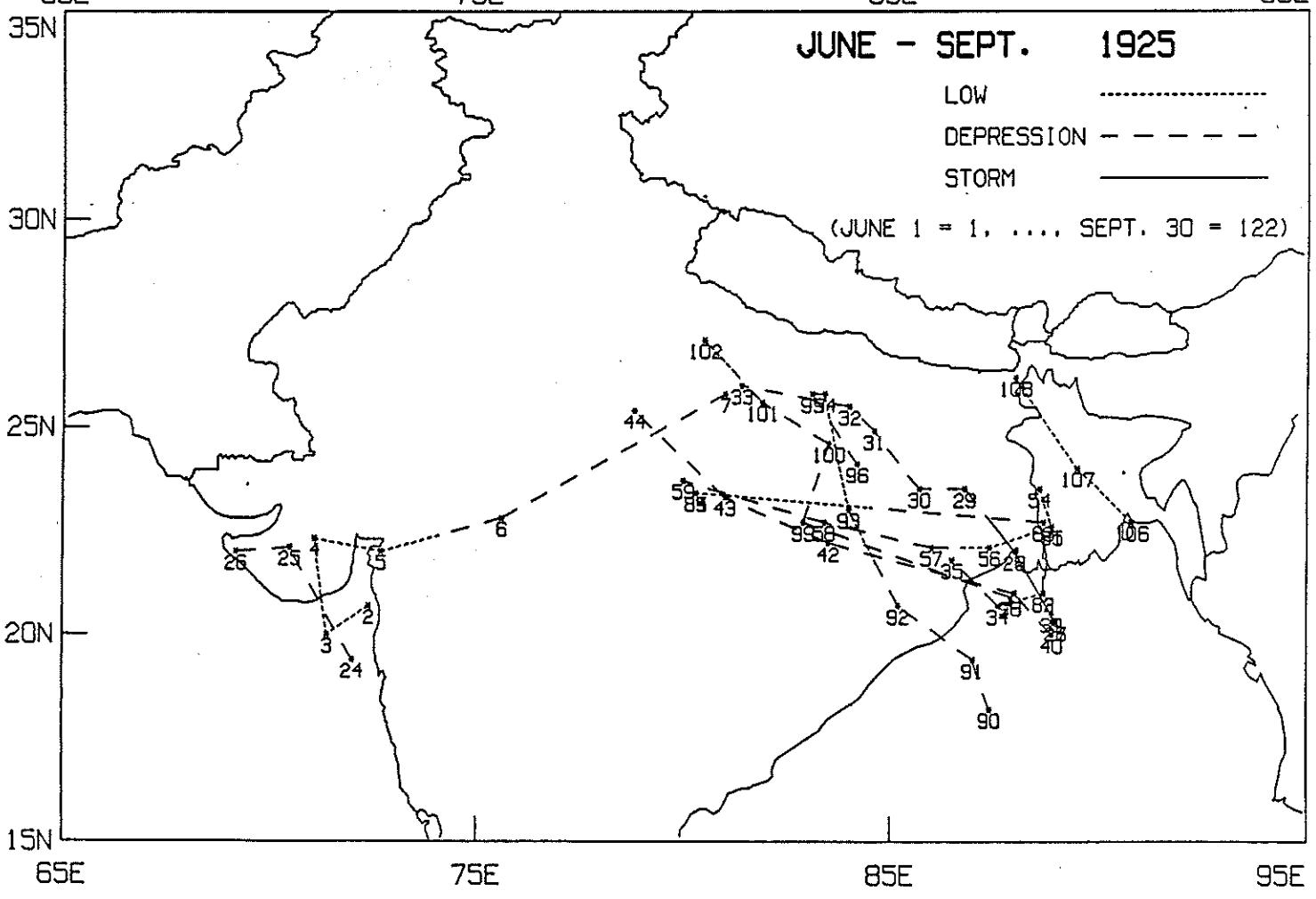

JUNE - SEPT. 1920
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

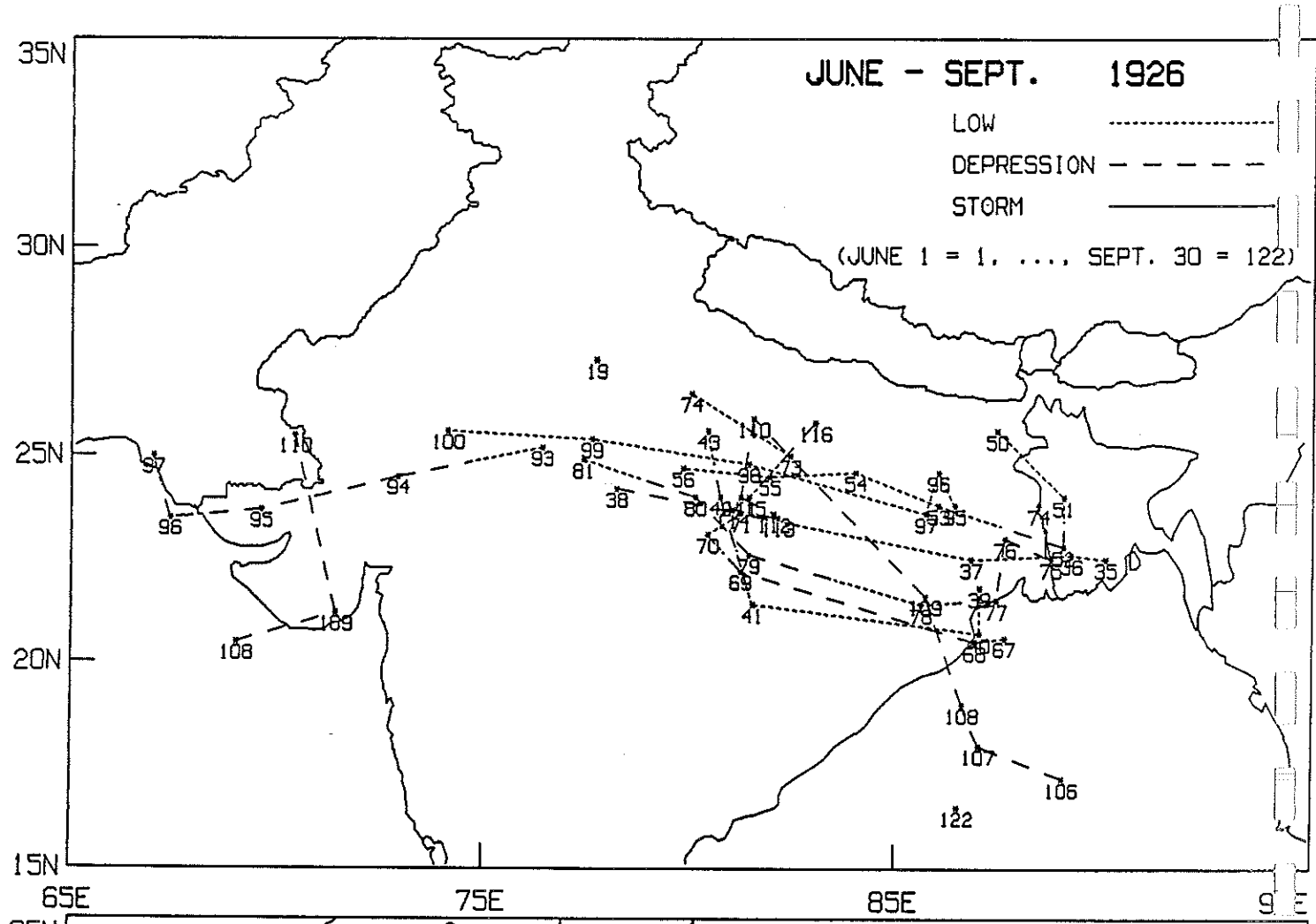

JUNE - SEPT. 1921
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

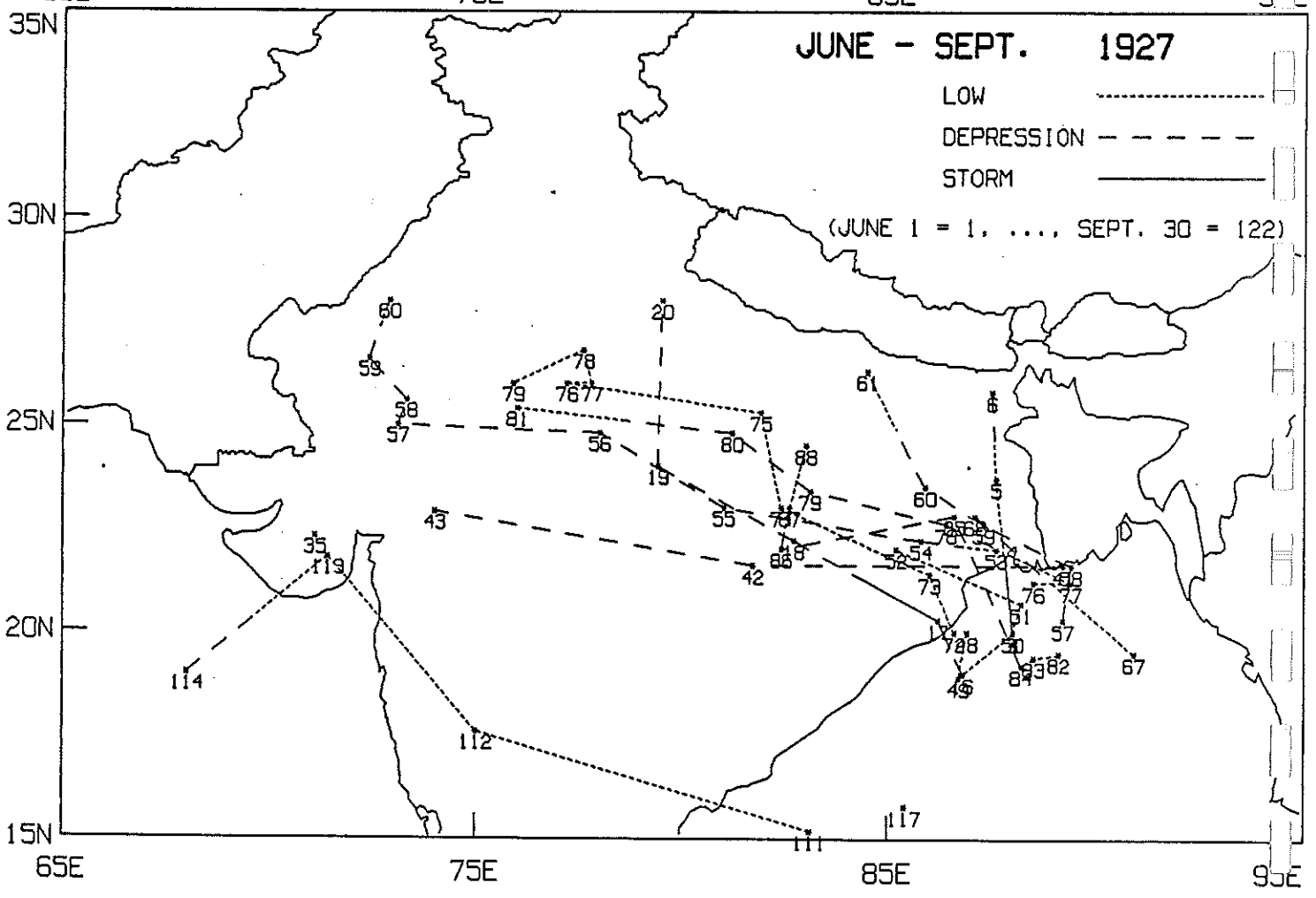

JUNE - SEPT. 1922
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

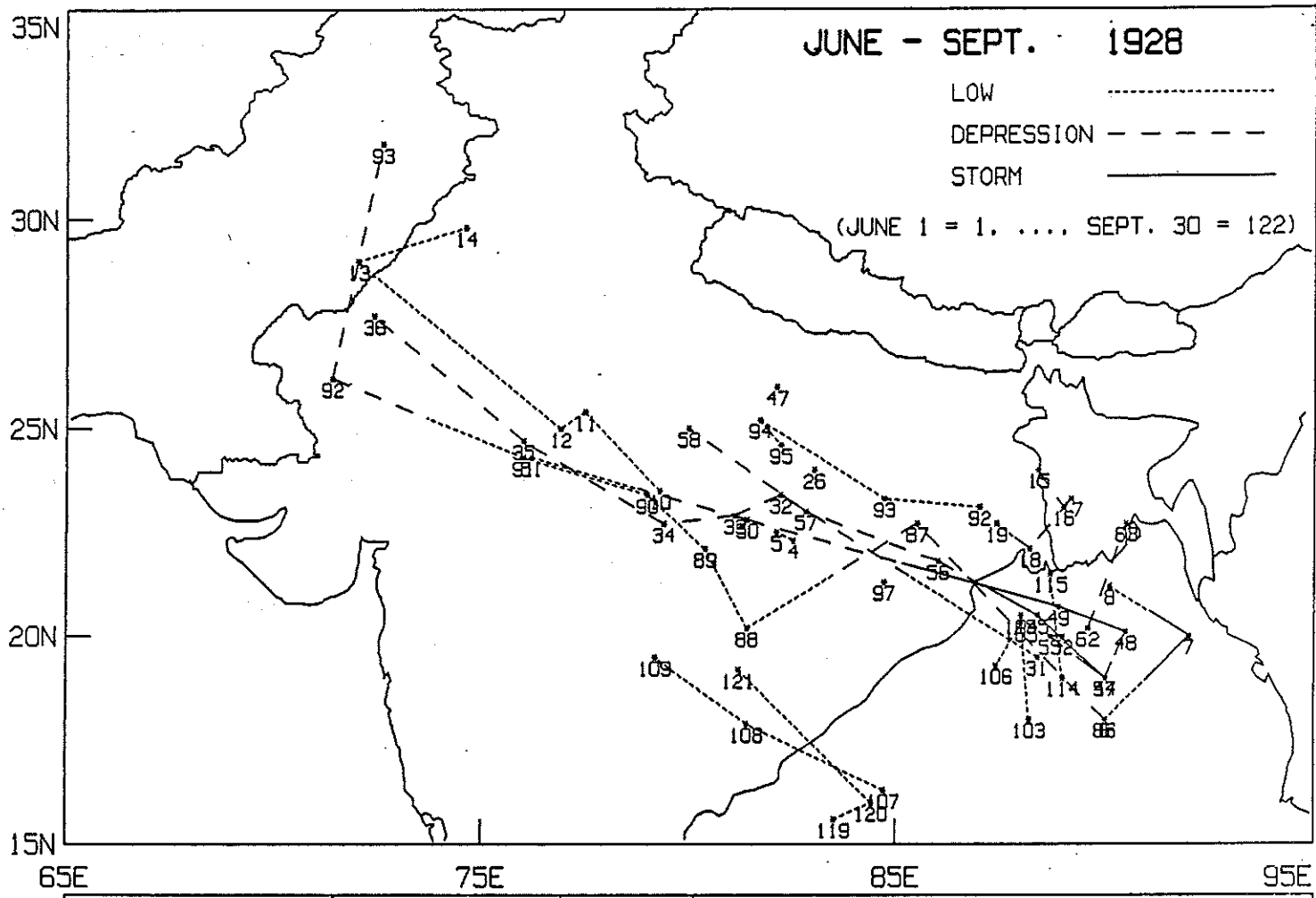

JUNE - SEPT. 1923
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

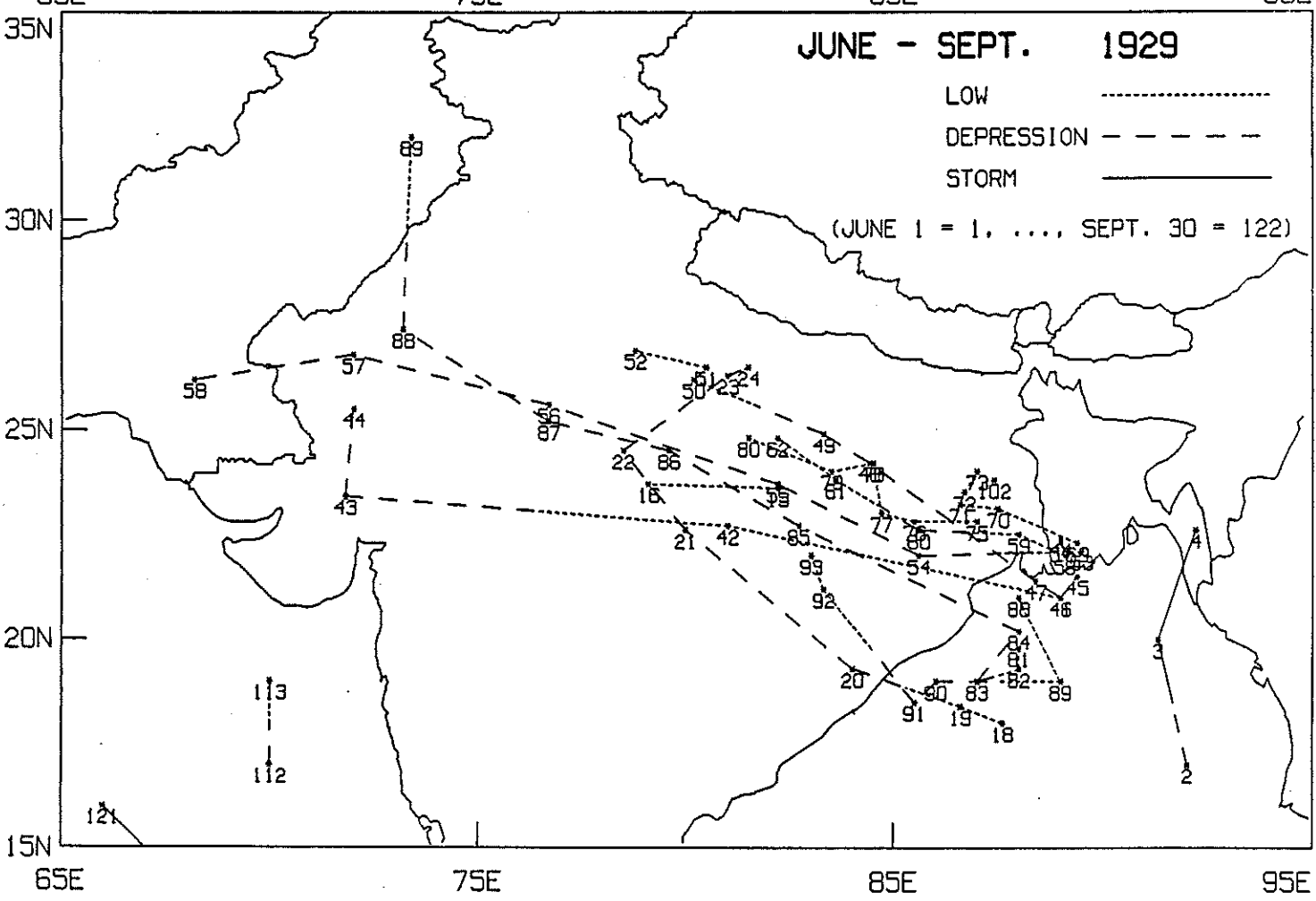

JUNE - SEPT. 1924
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

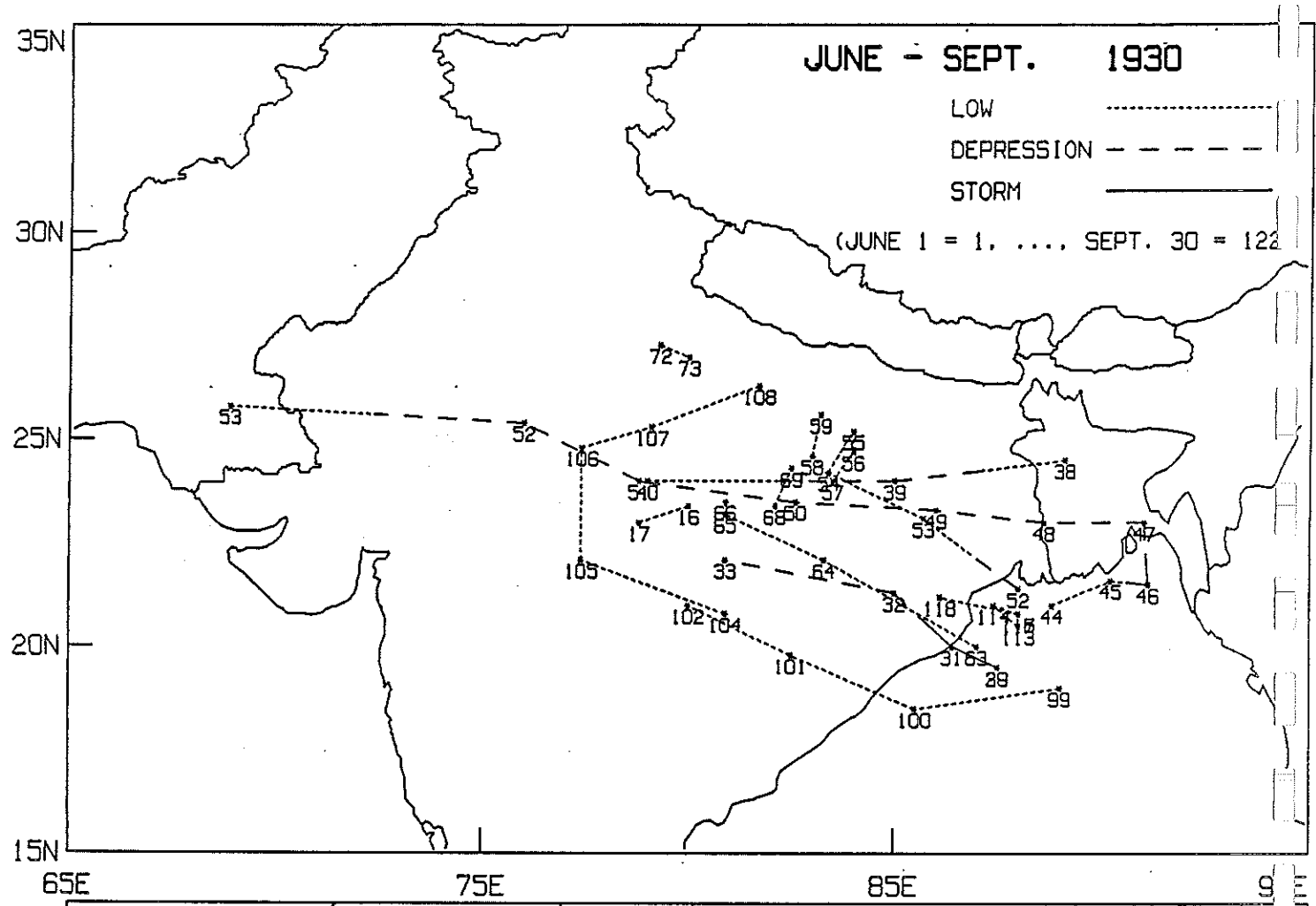

JUNE - SEPT. 1925
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

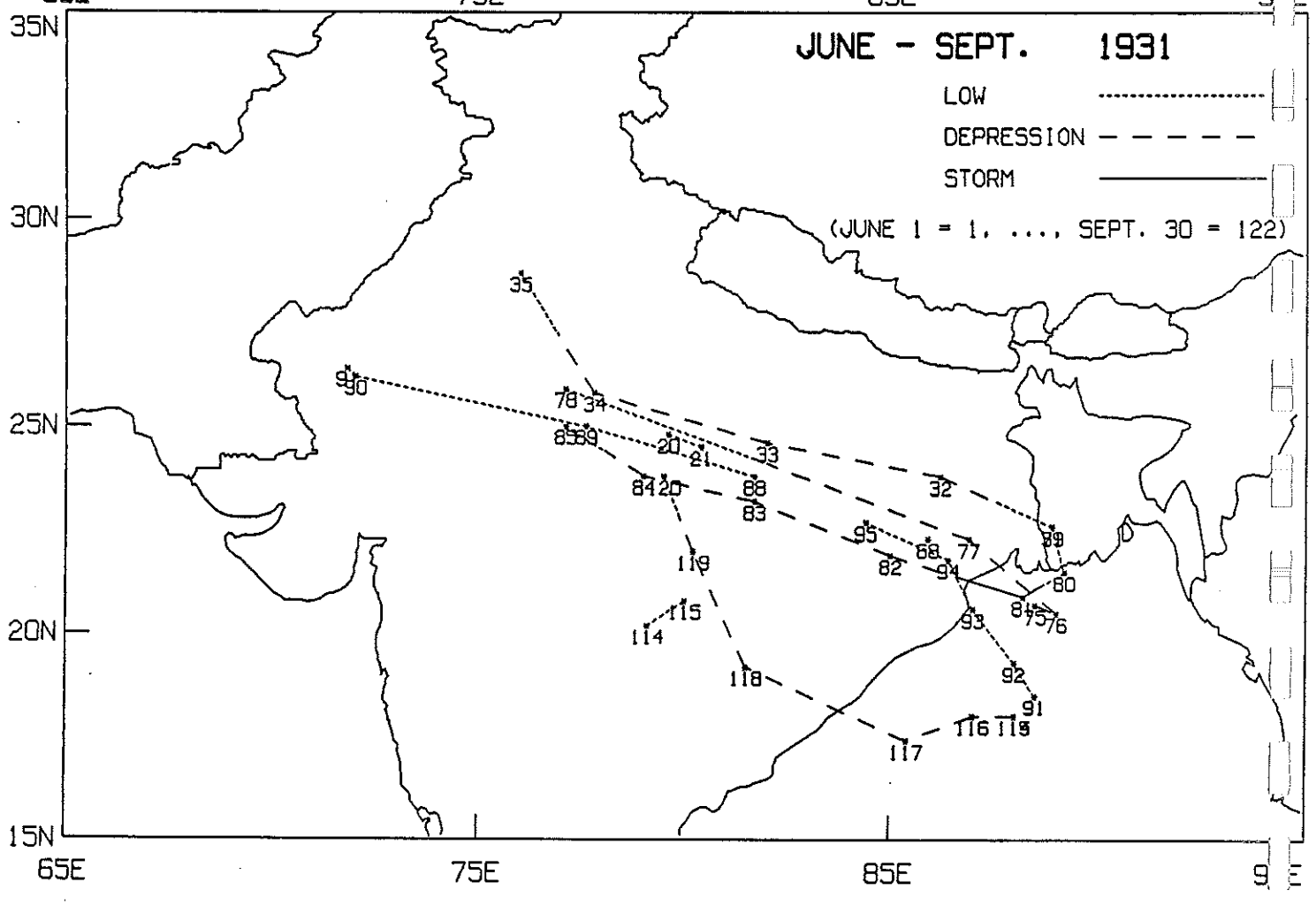

JUNE - SEPT. 1926
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

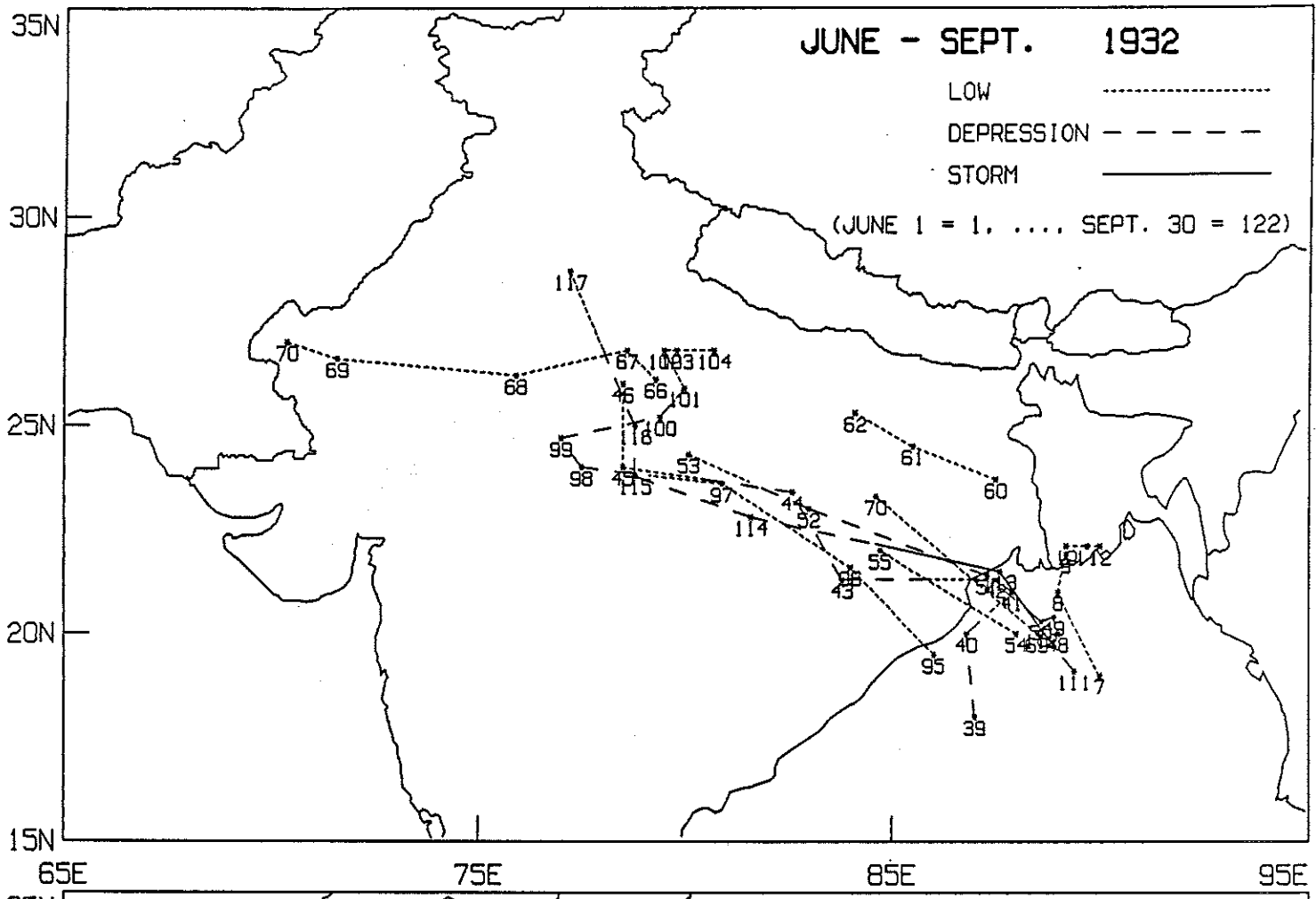

JUNE - SEPT. 1927
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

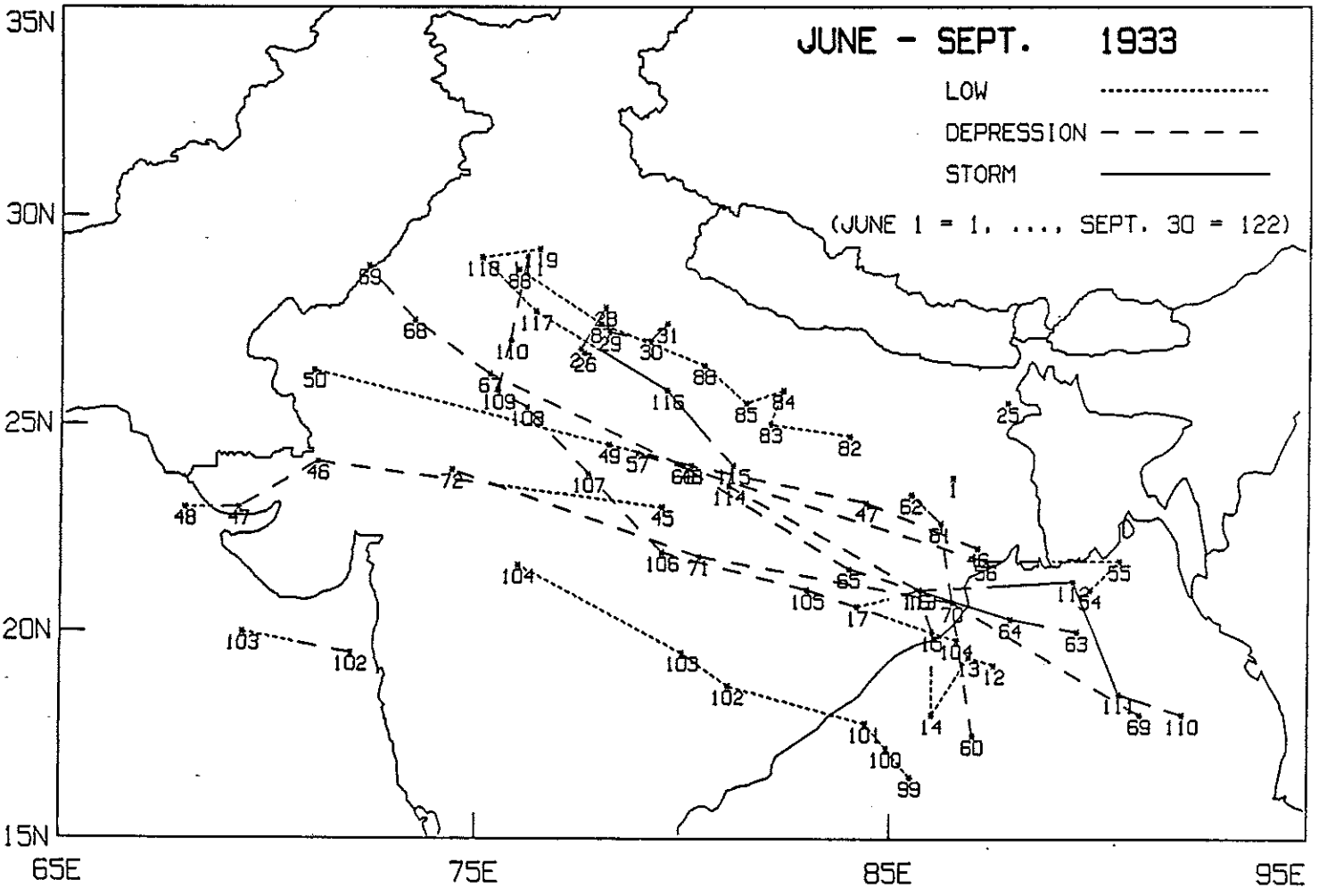

JUNE - SEPT. 1928
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

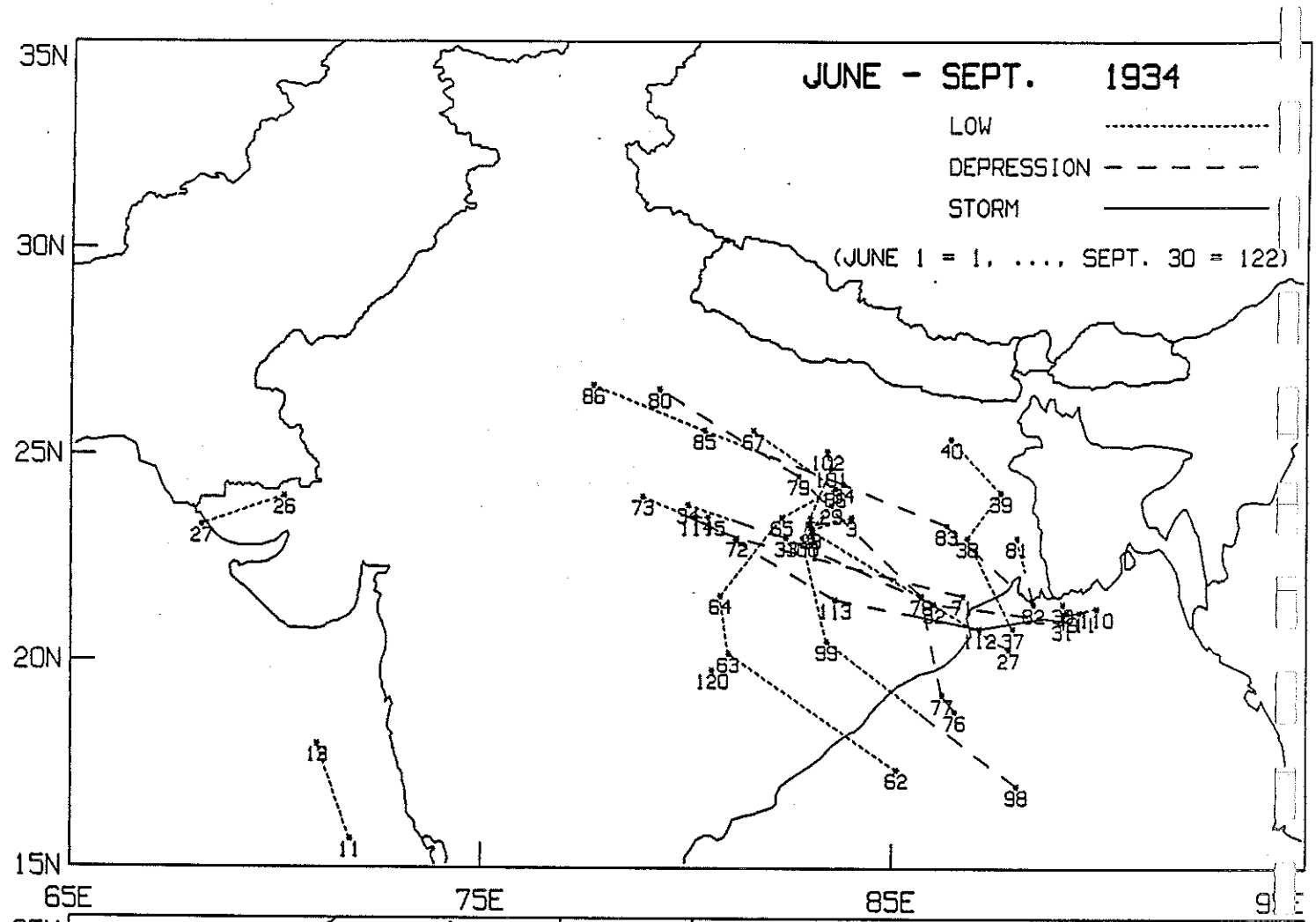

JUNE - SEPT. 1929
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

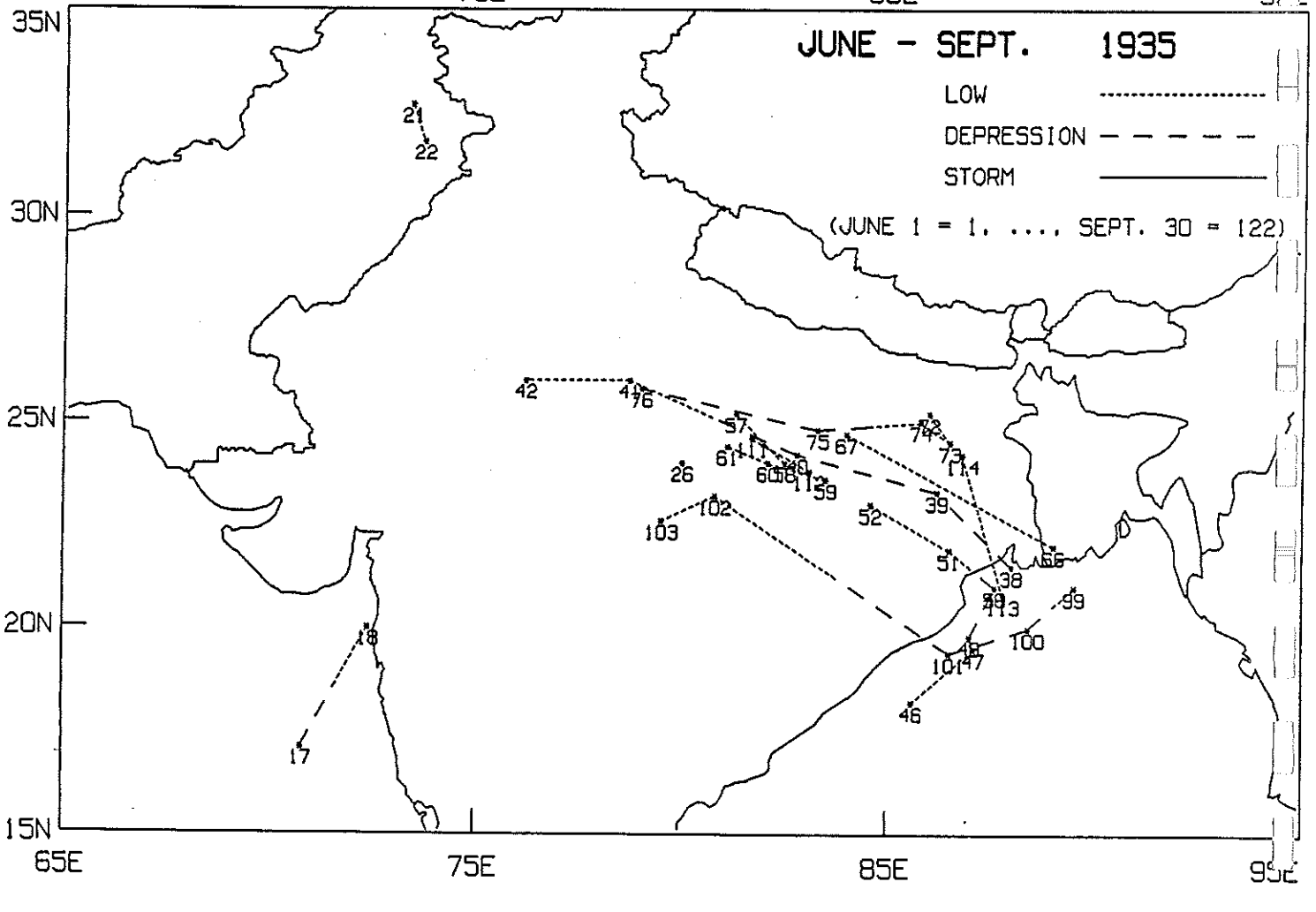

JUNE - SEPT. 1930
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

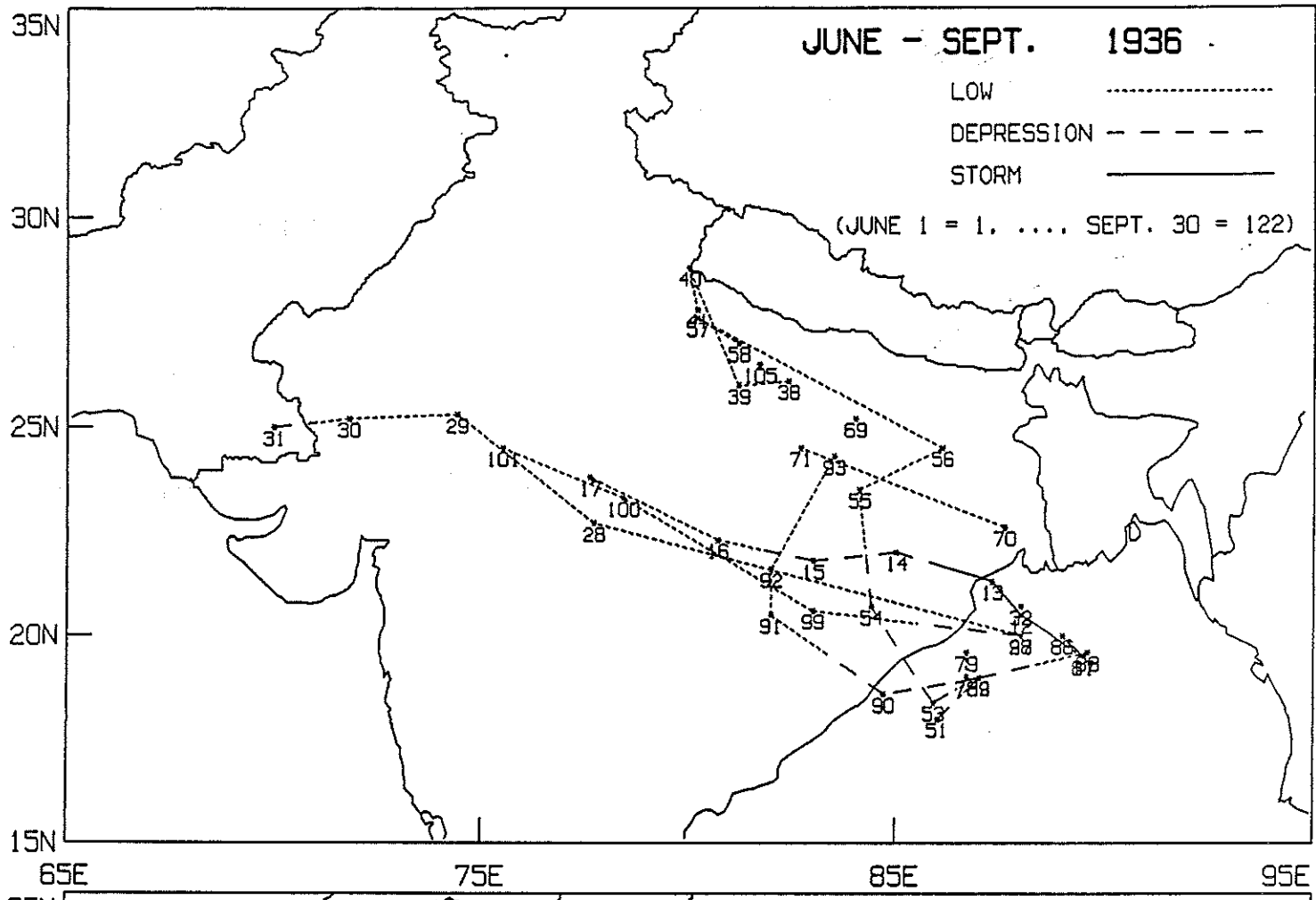

JUNE - SEPT. 1931
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

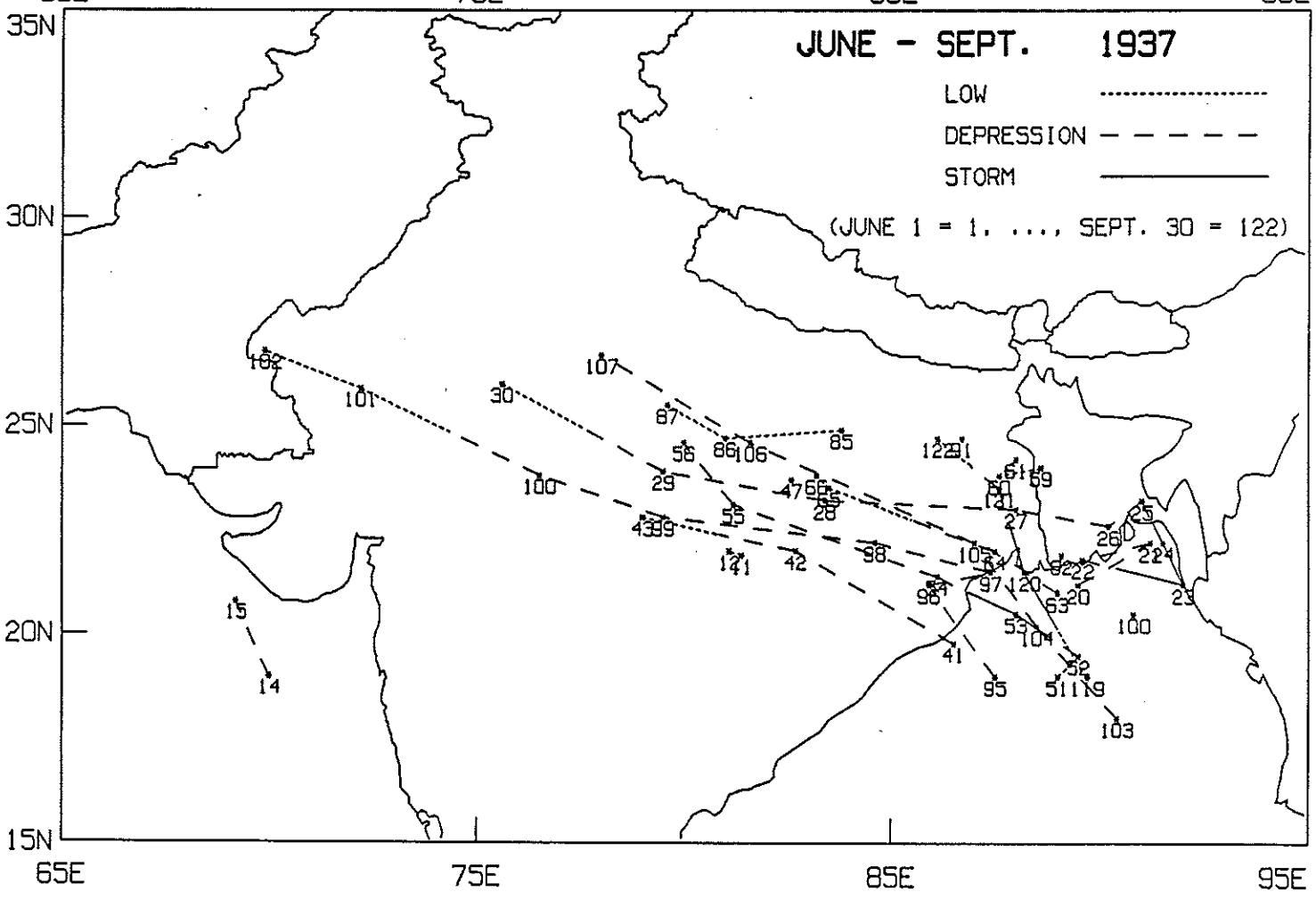

JUNE - SEPT. 1932
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

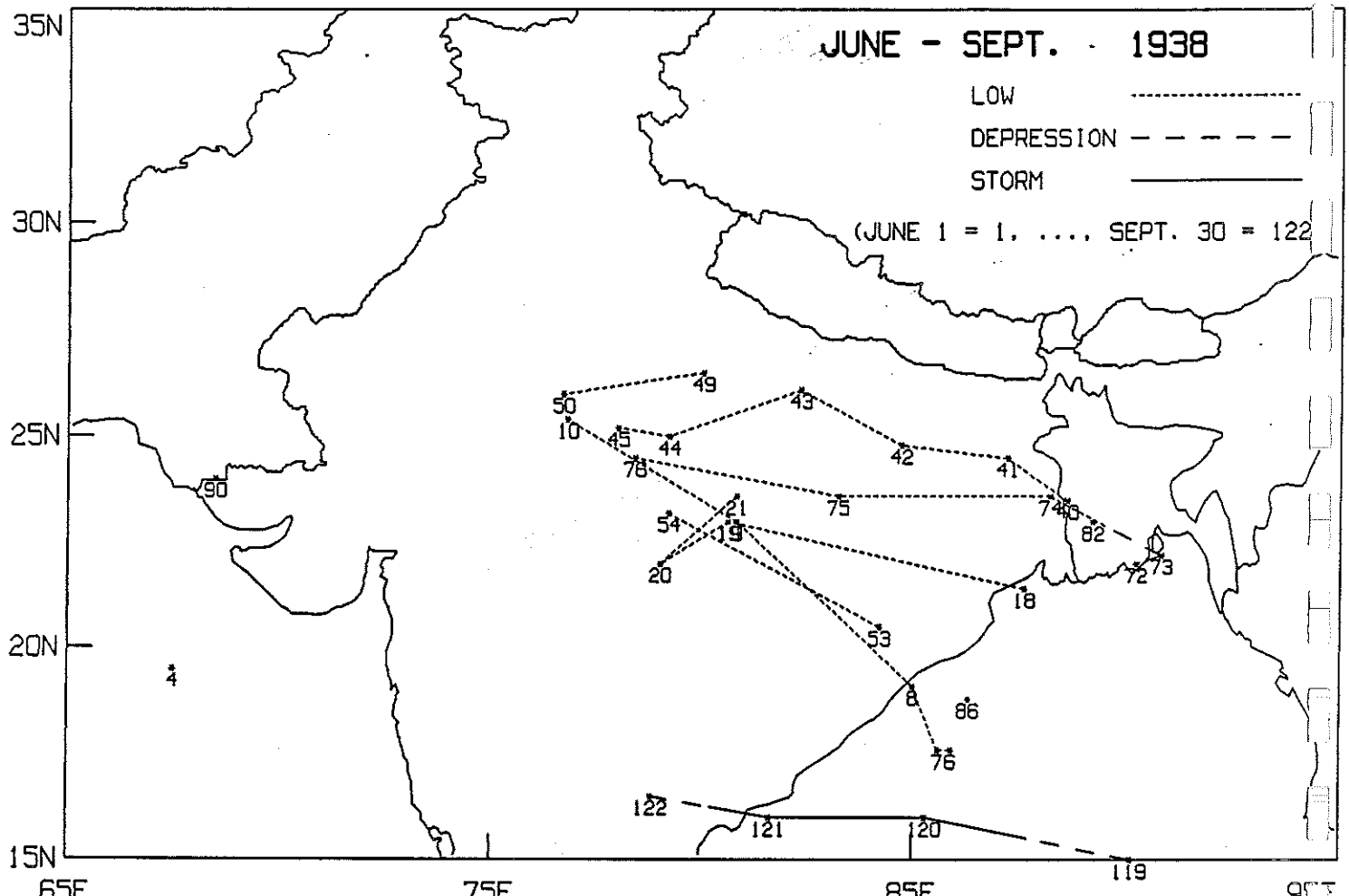

JUNE - SEPT. 1933
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

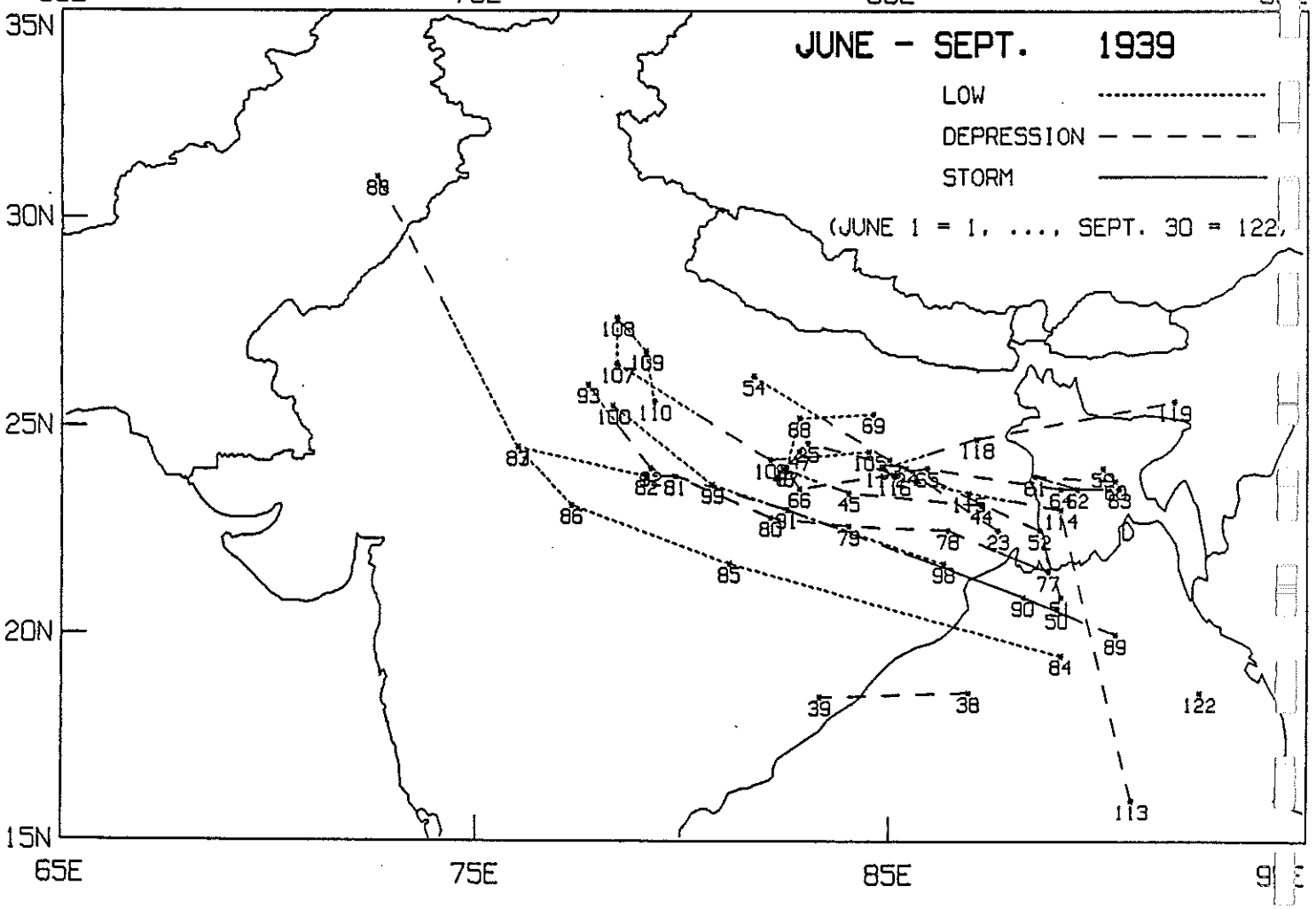

JUNE - SEPT. 1934
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

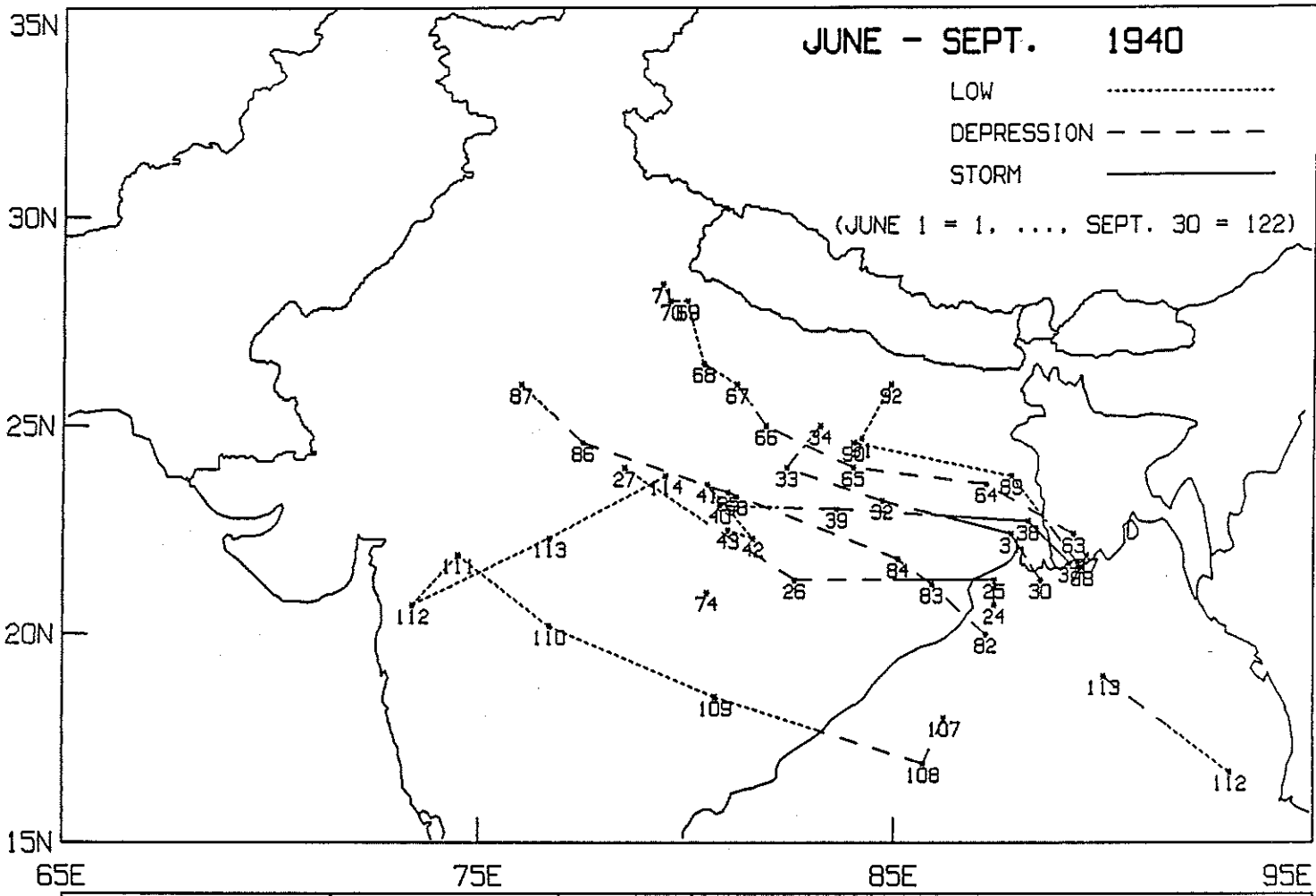

JUNE - SEPT. 1935
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

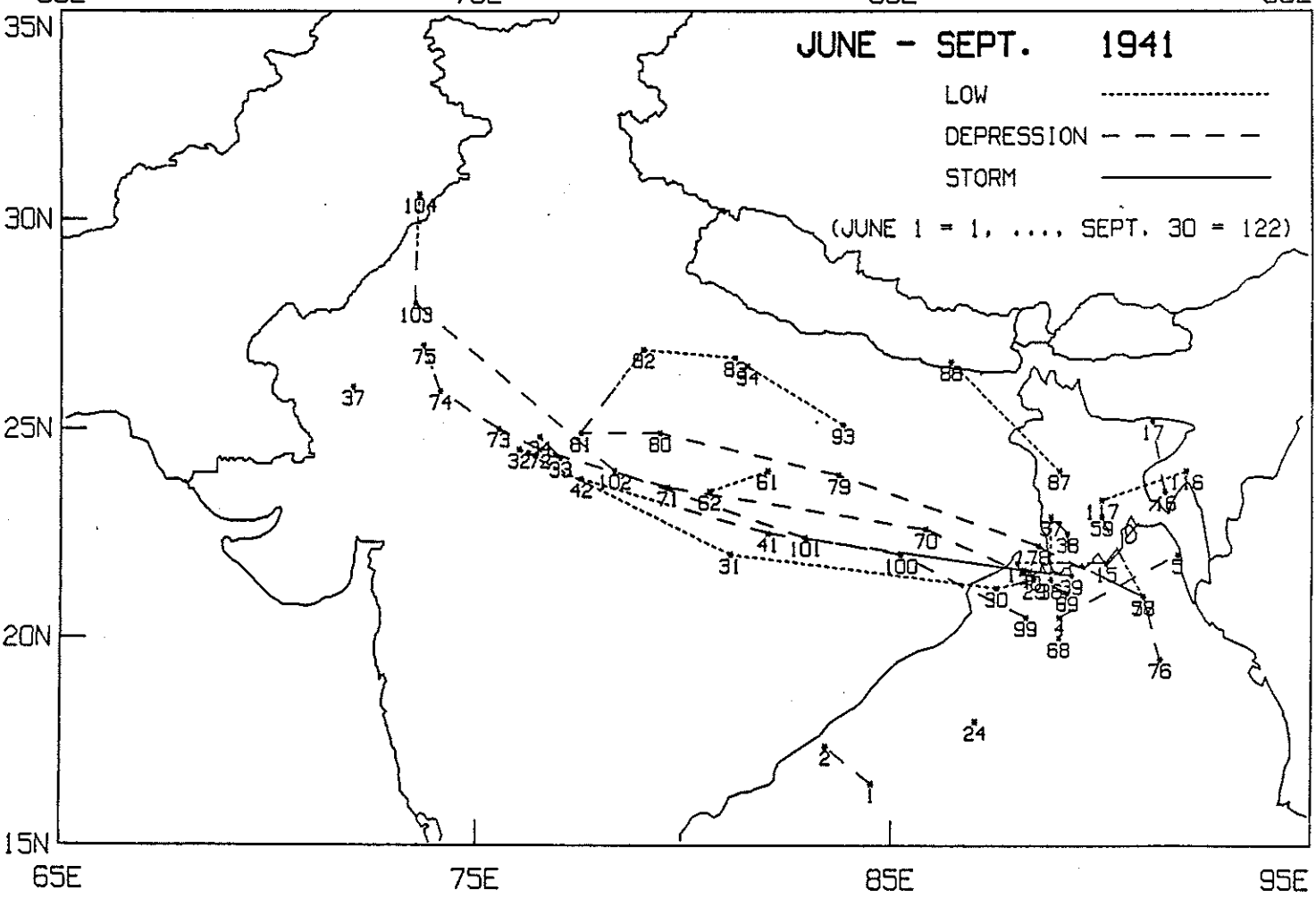

JUNE - SEPT. 1936
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

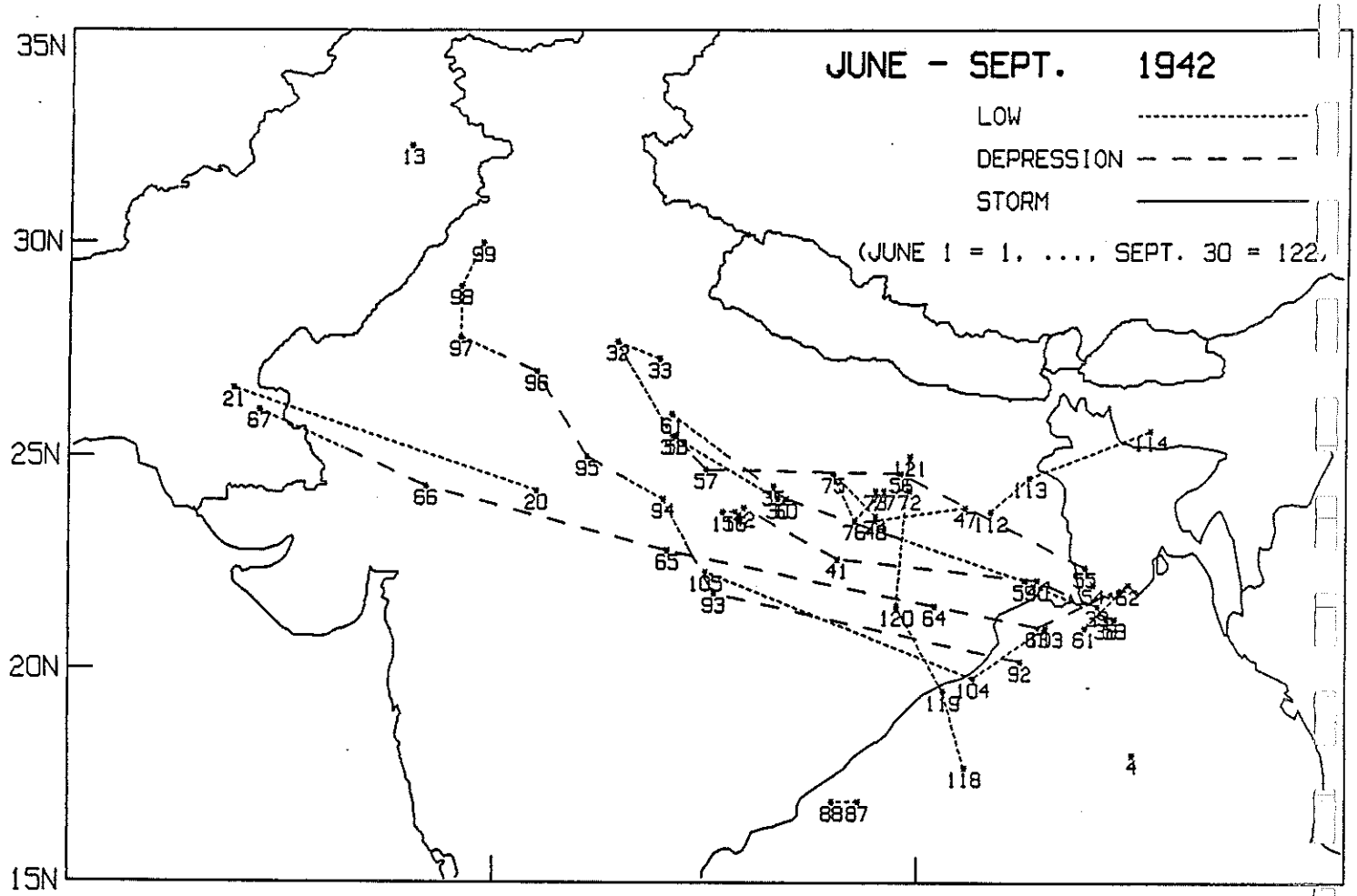

JUNE - SEPT. 1937
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

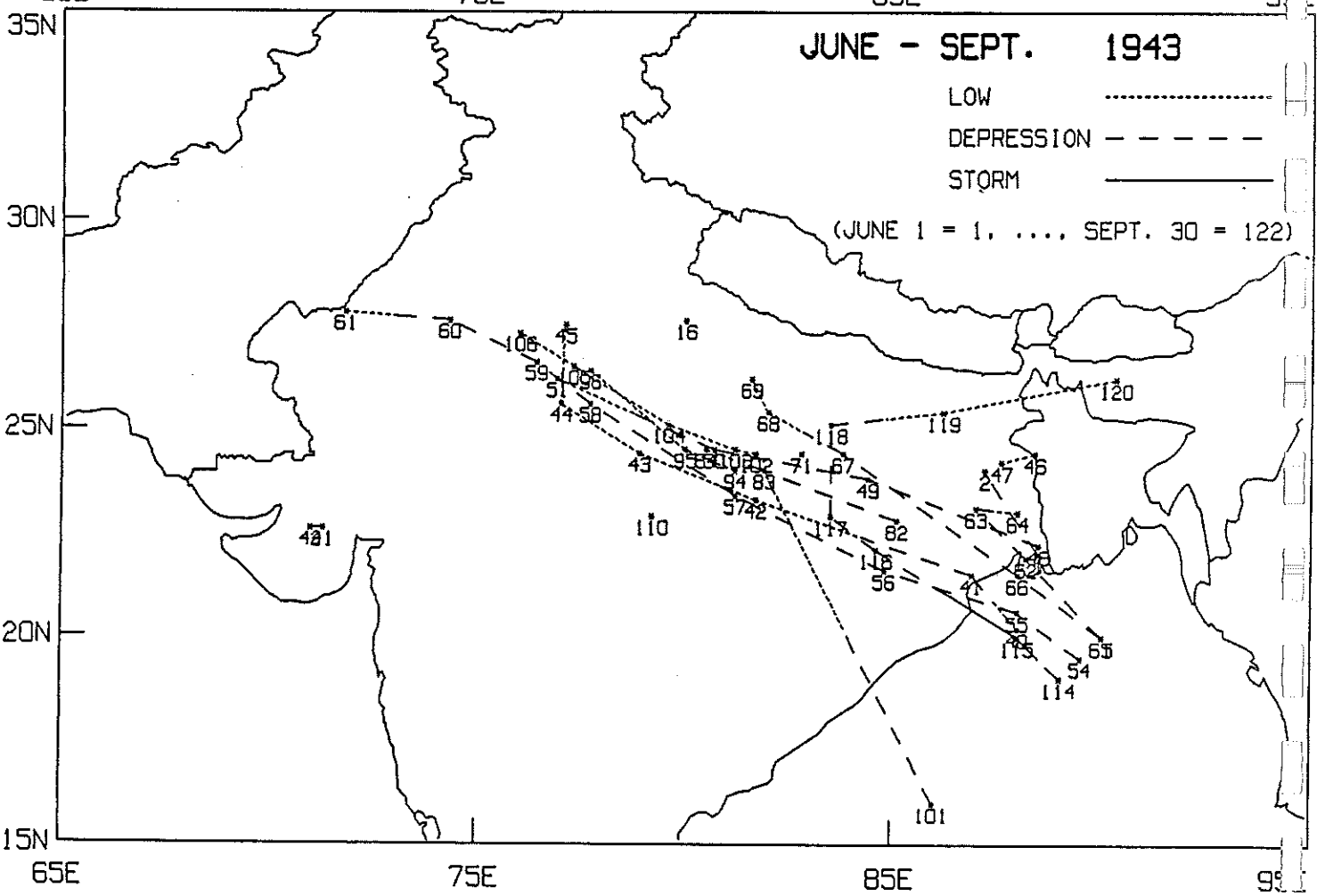

JUNE - SEPT. 1938
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122
35N
30N
25N
20N
15N
65E
75E
85E

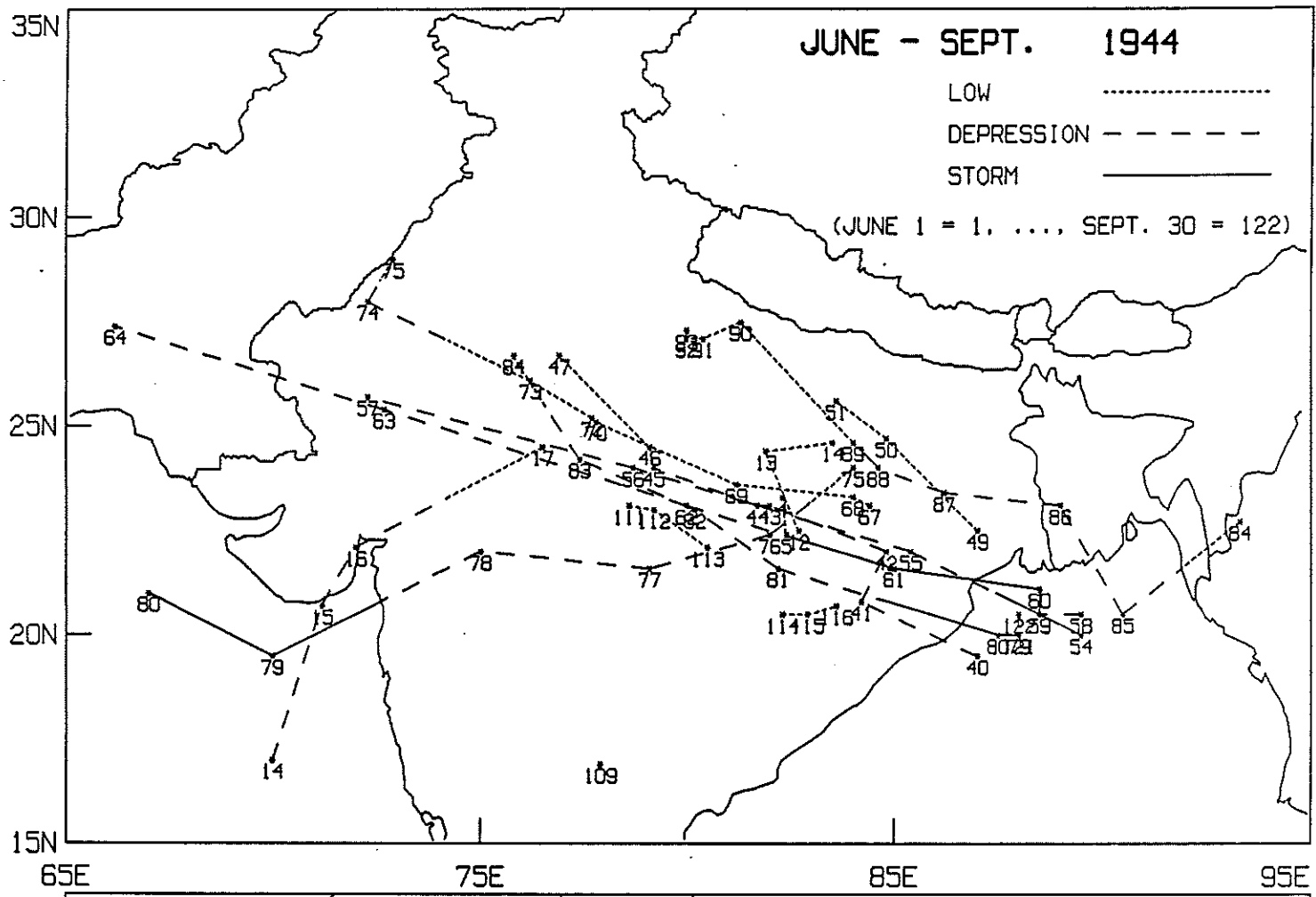

JUNE - SEPT. 1939
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122
35N
30N
25N
20N
15N
65E
75E
85E

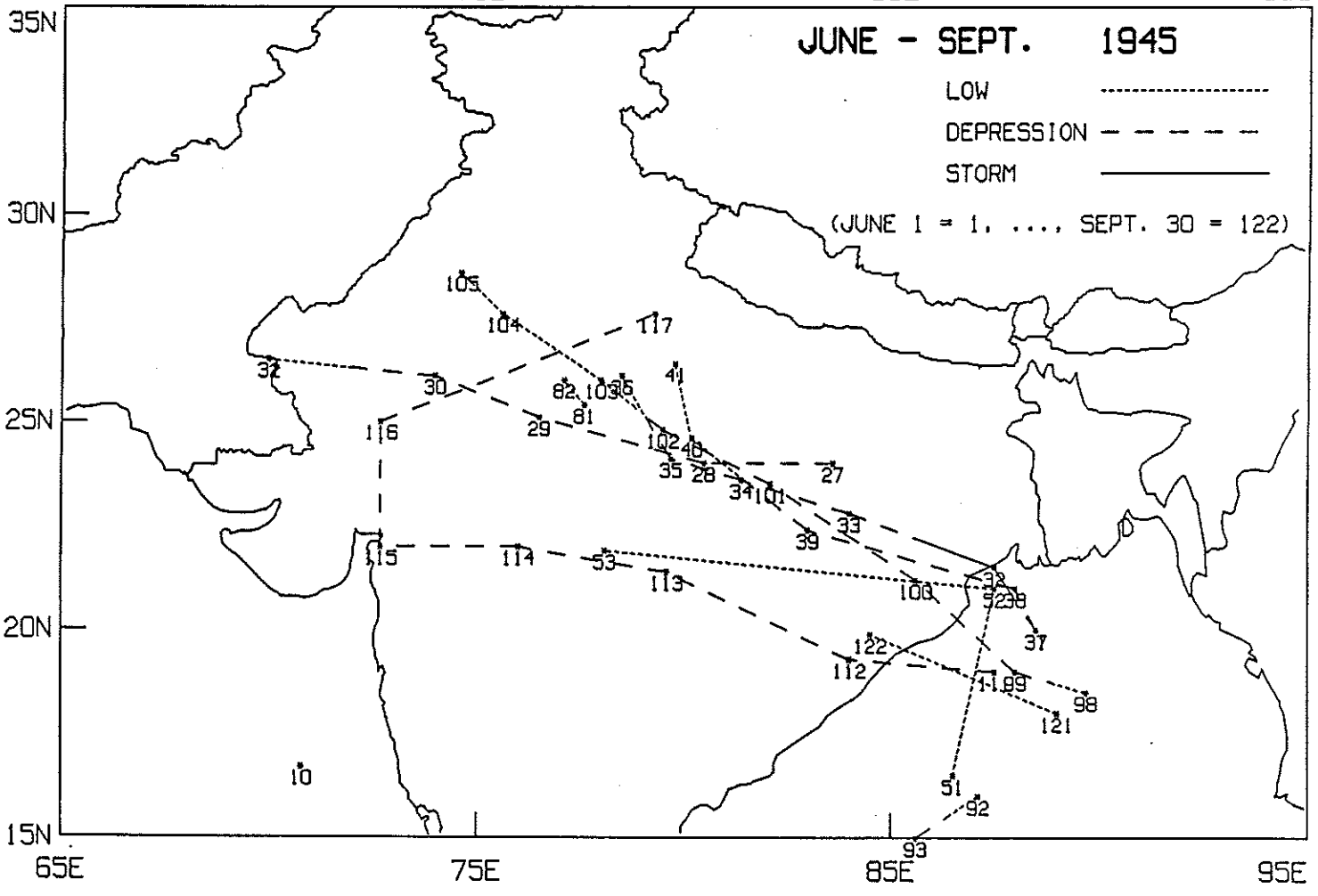

JUNE - SEPT. 1940
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

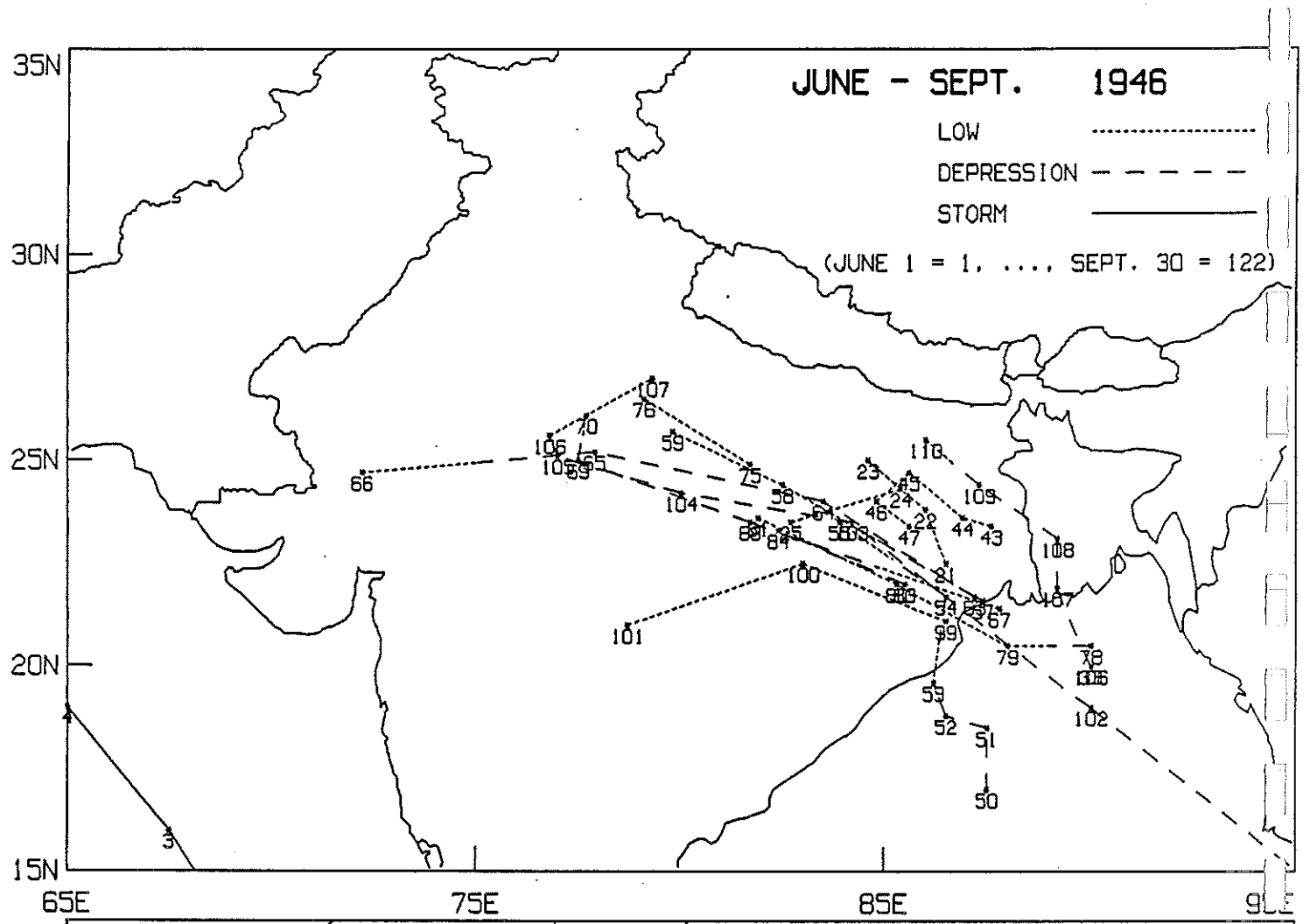

JUNE - SEPT. 1941
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

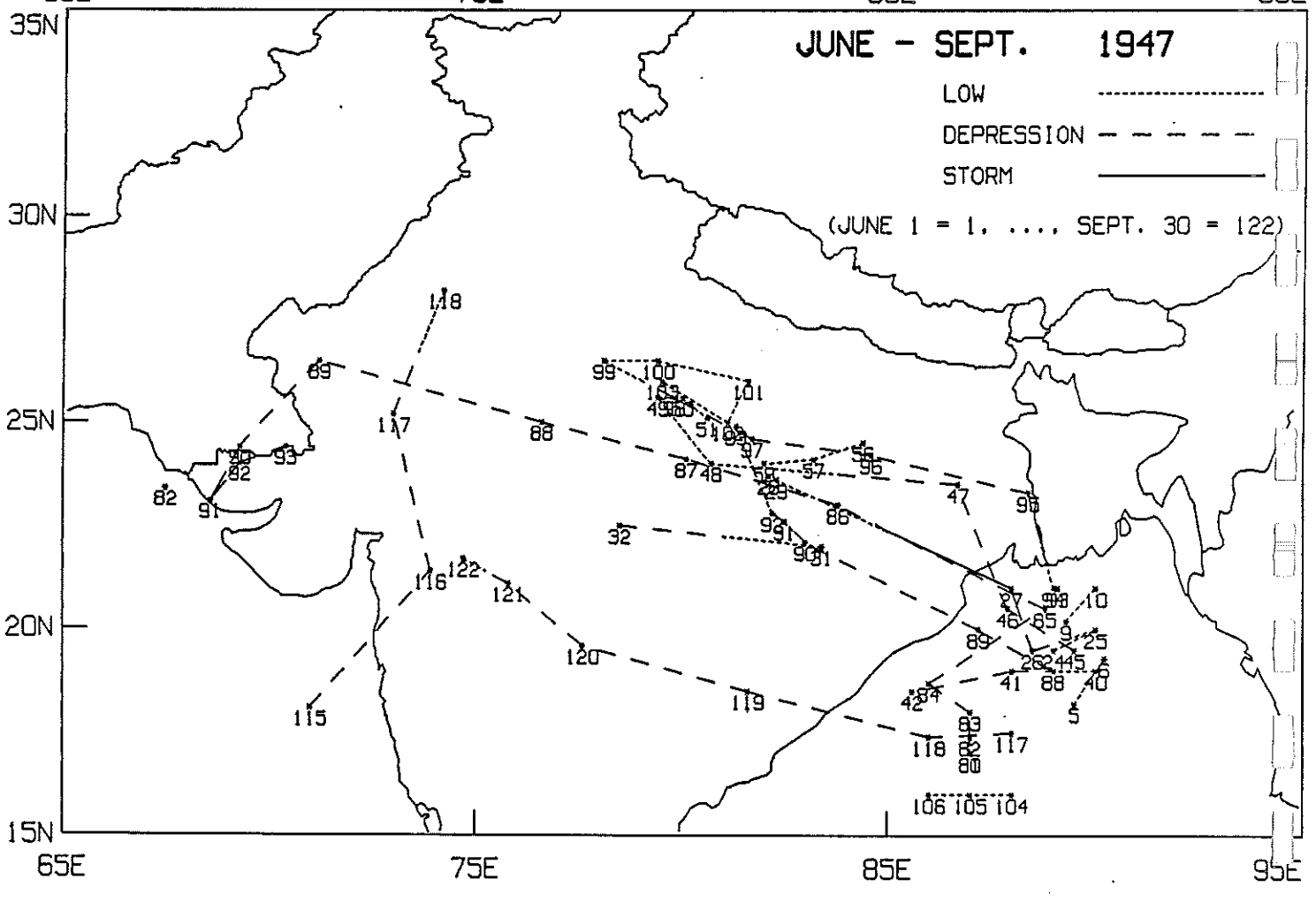

JUNE - SEPT. 1942
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

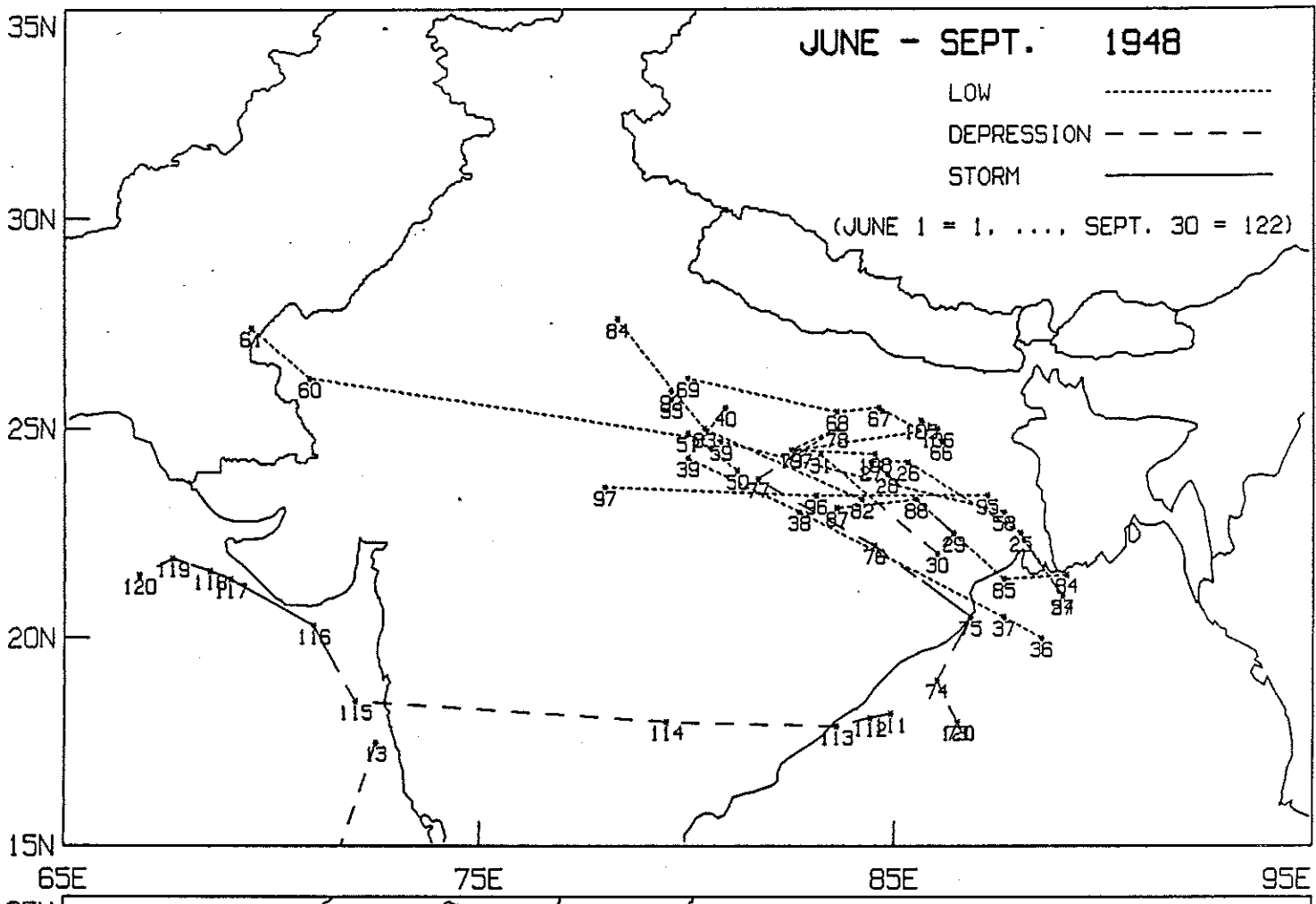

JUNE - SEPT. 1943
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

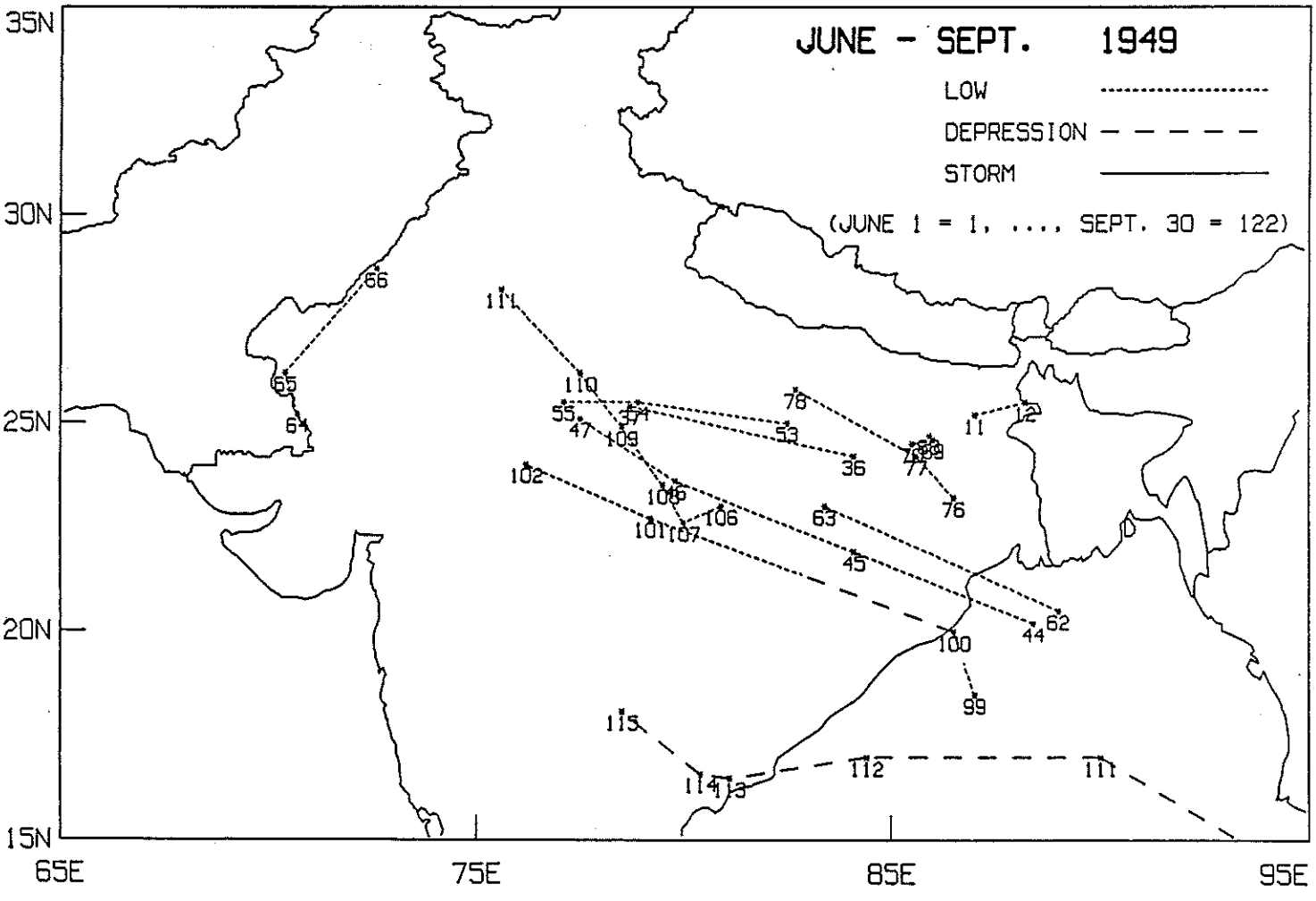

JUNE - SEPT. 1944
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

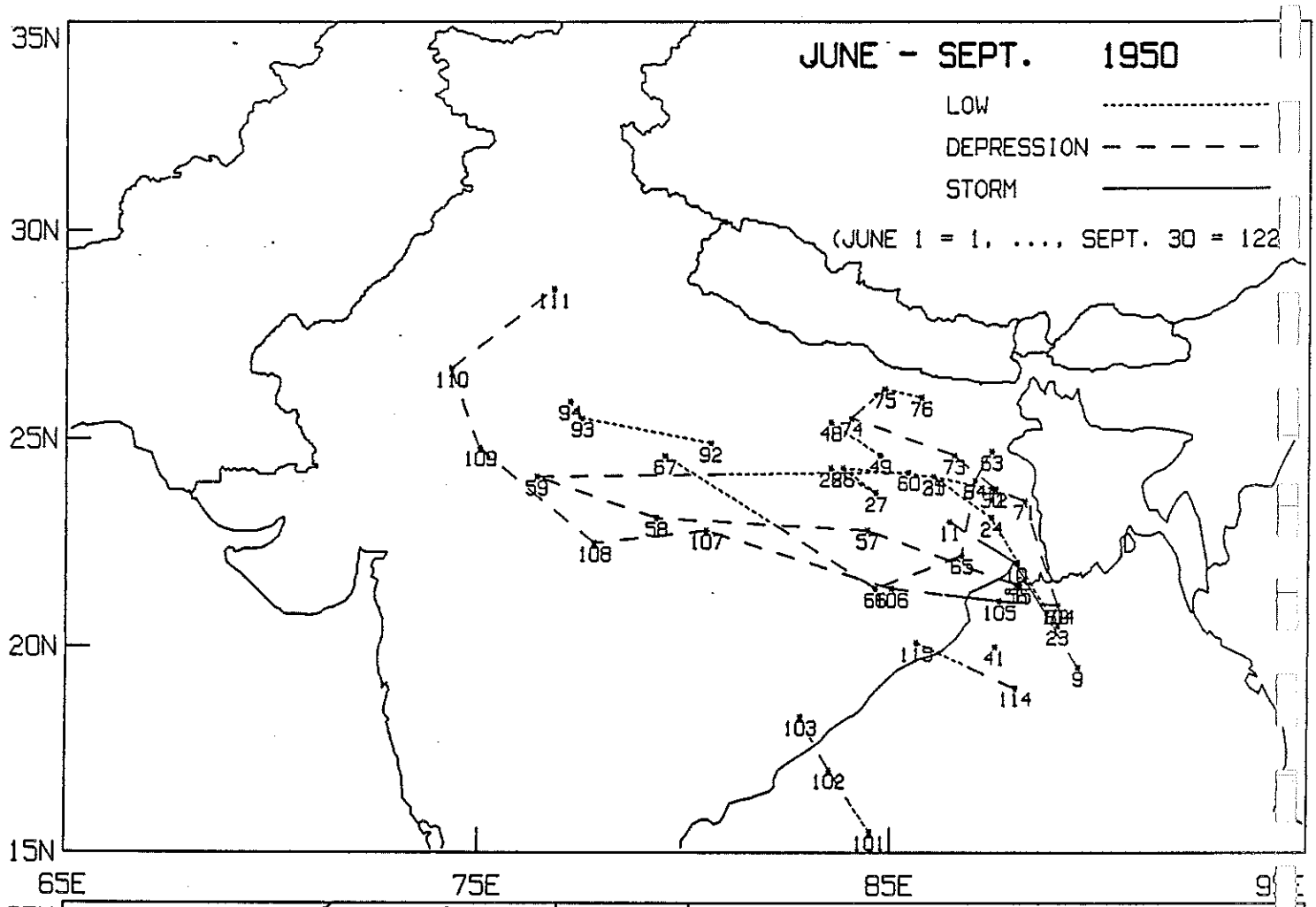

JUNE - SEPT. 1945
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

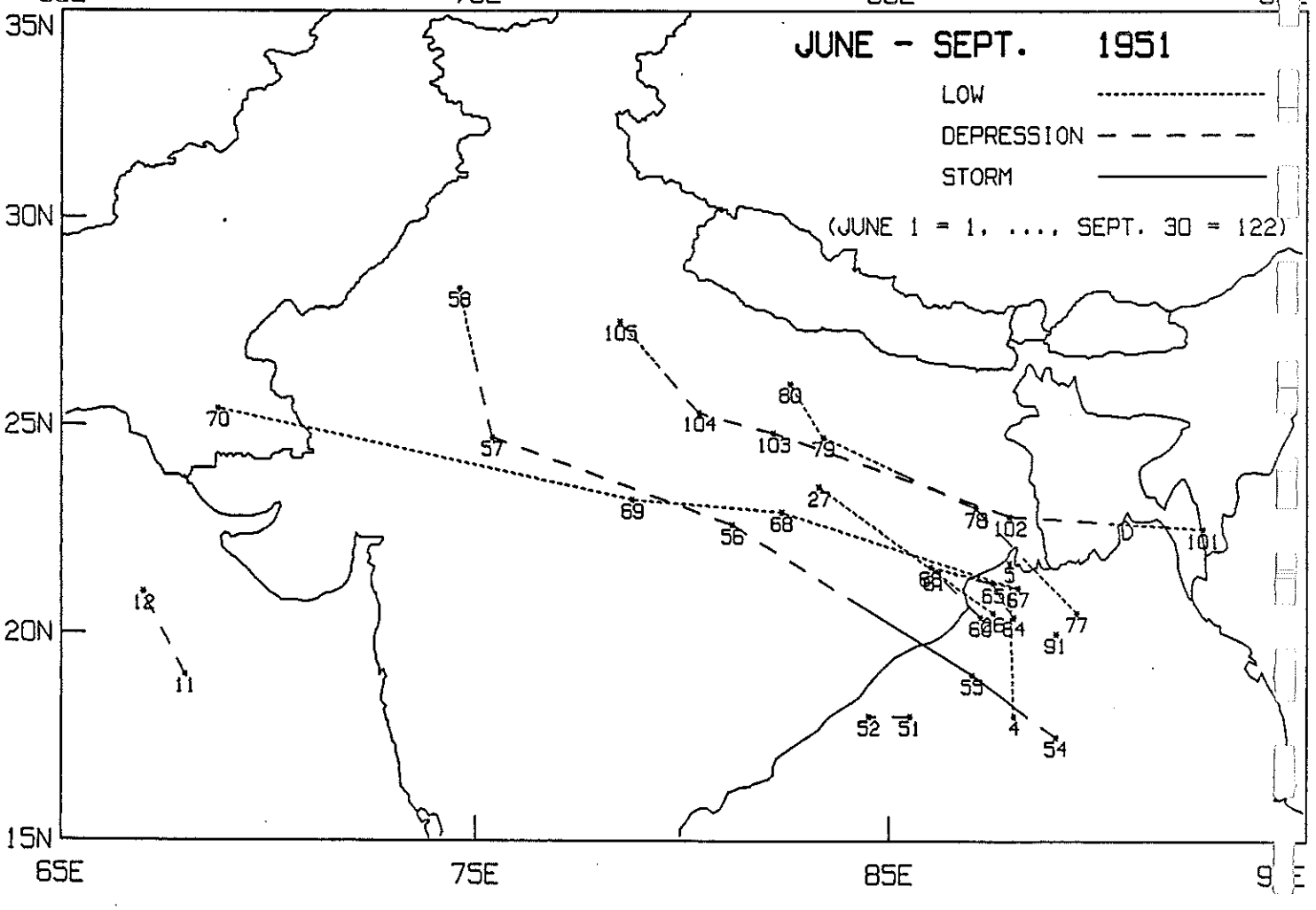

JUNE - SEPT. 1946
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

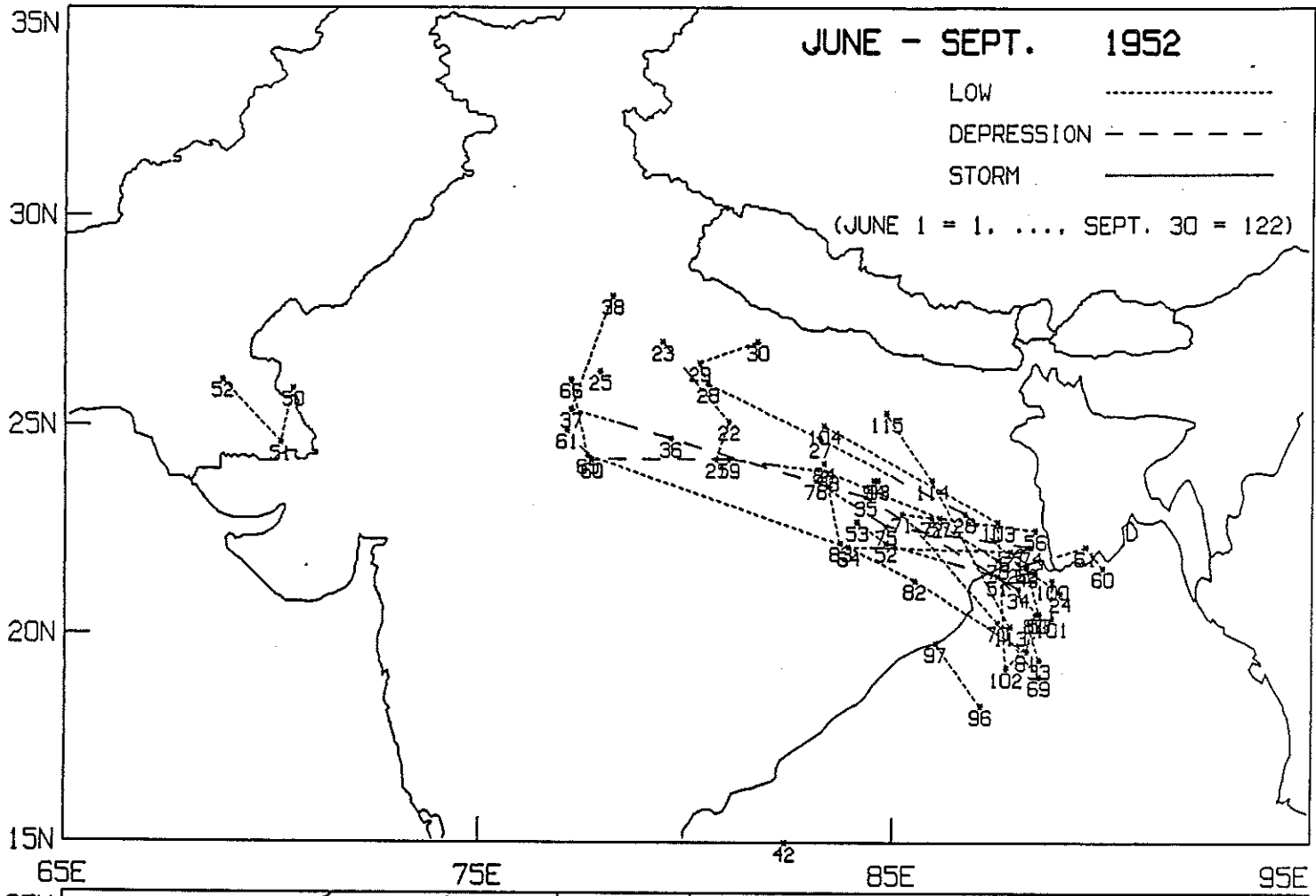

JUNE - SEPT. 1947
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

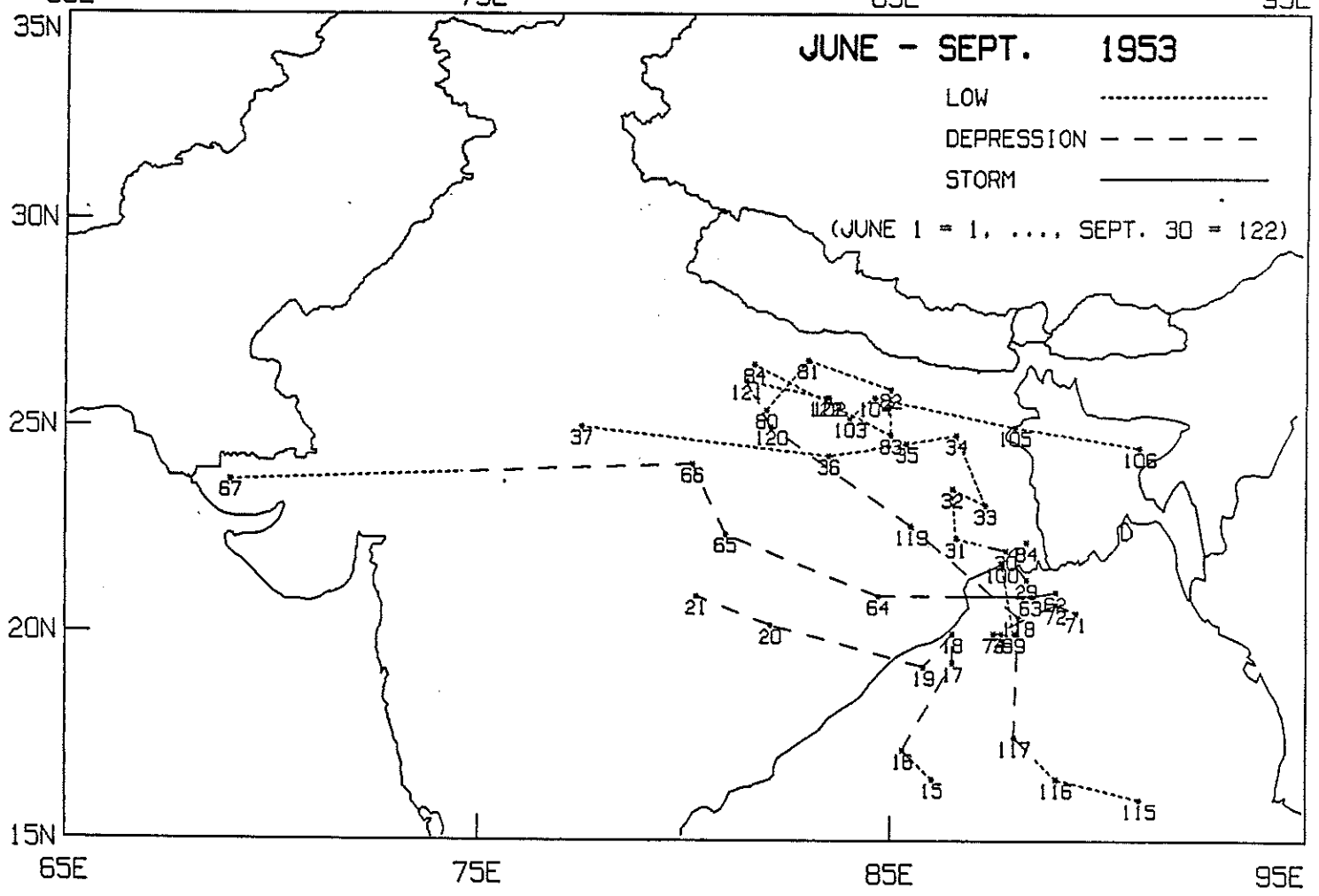

JUNE - SEPT. 1948
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

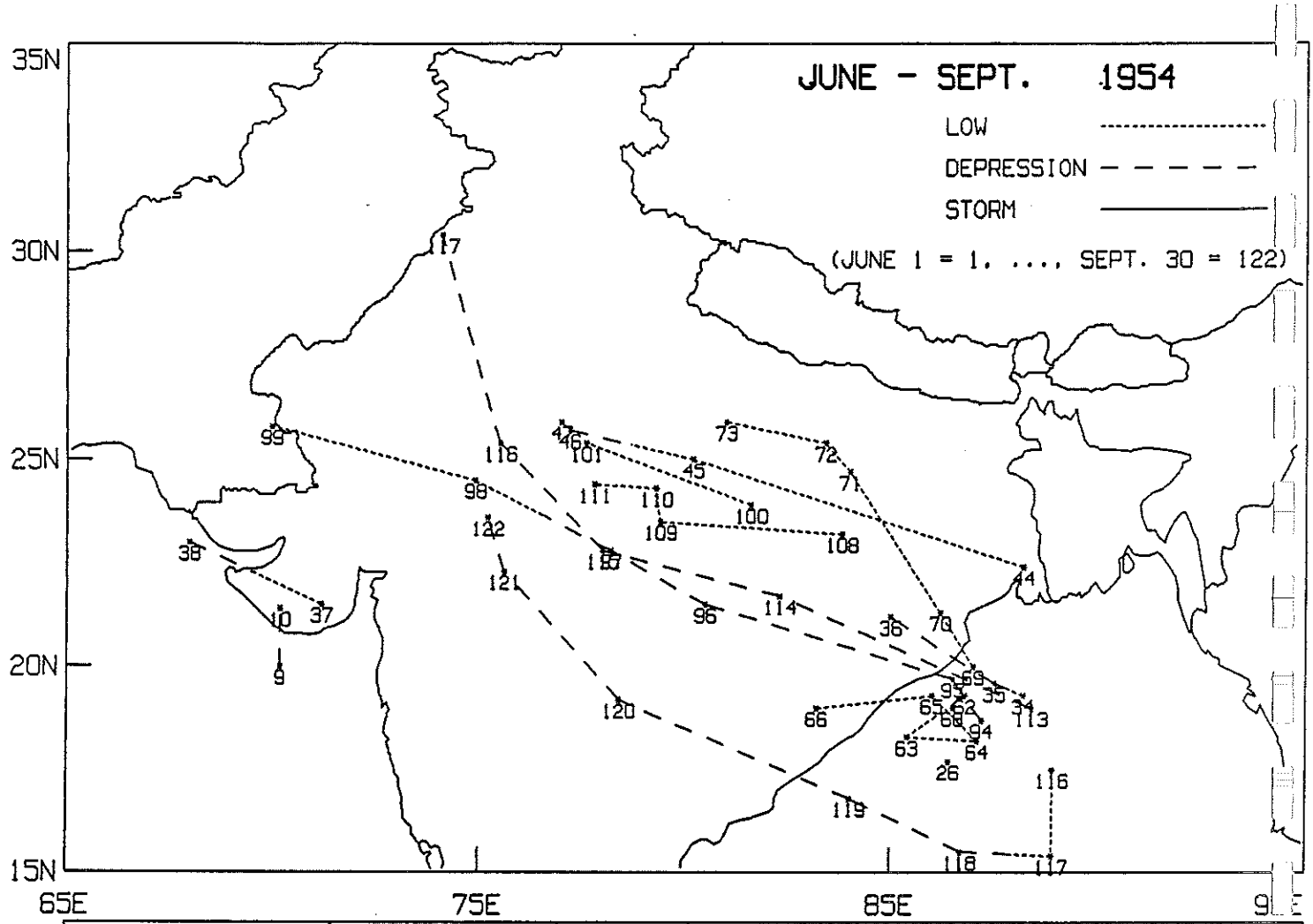

JUNE - SEPT. 1949
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

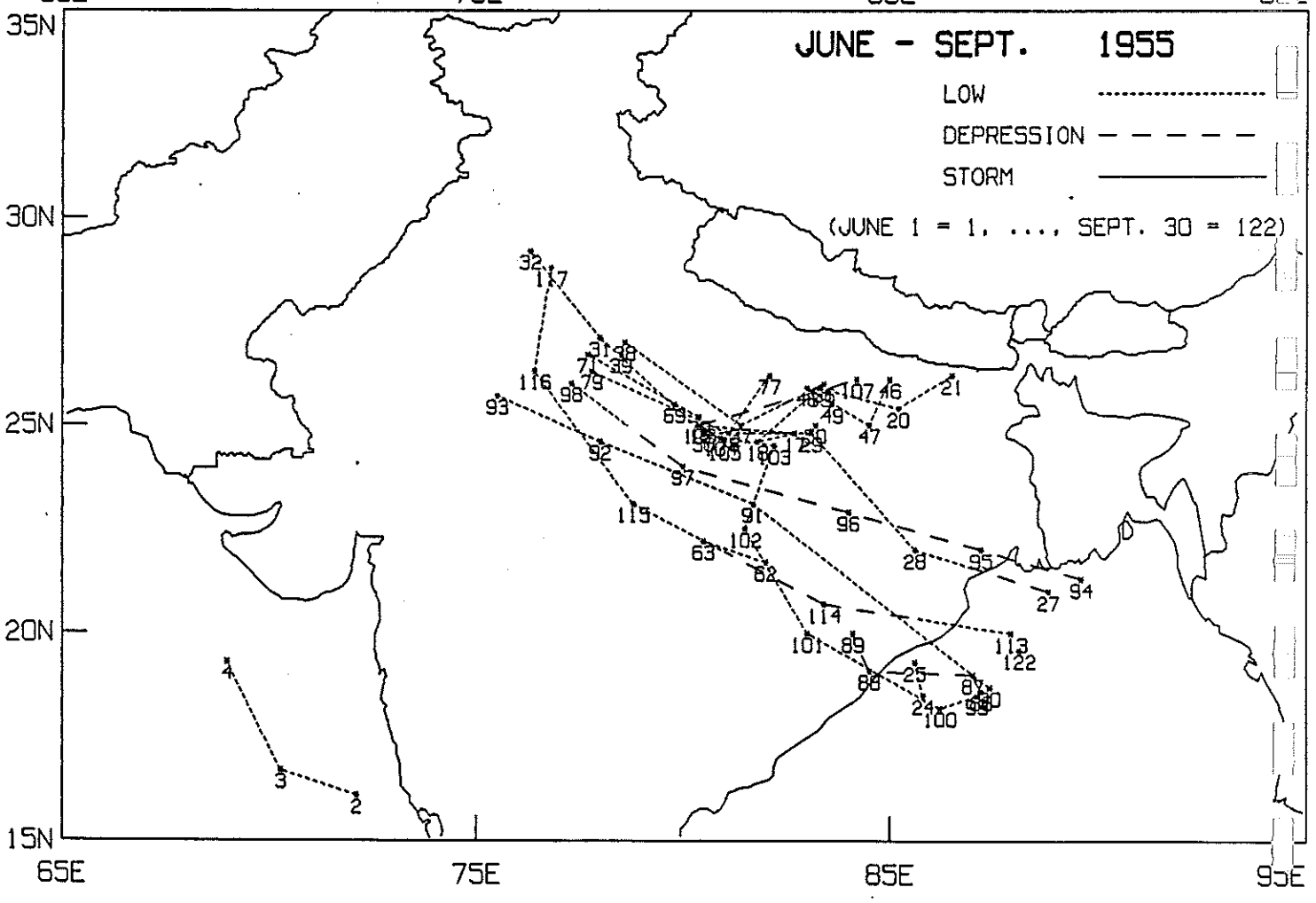

JUNE - SEPT. 1950
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

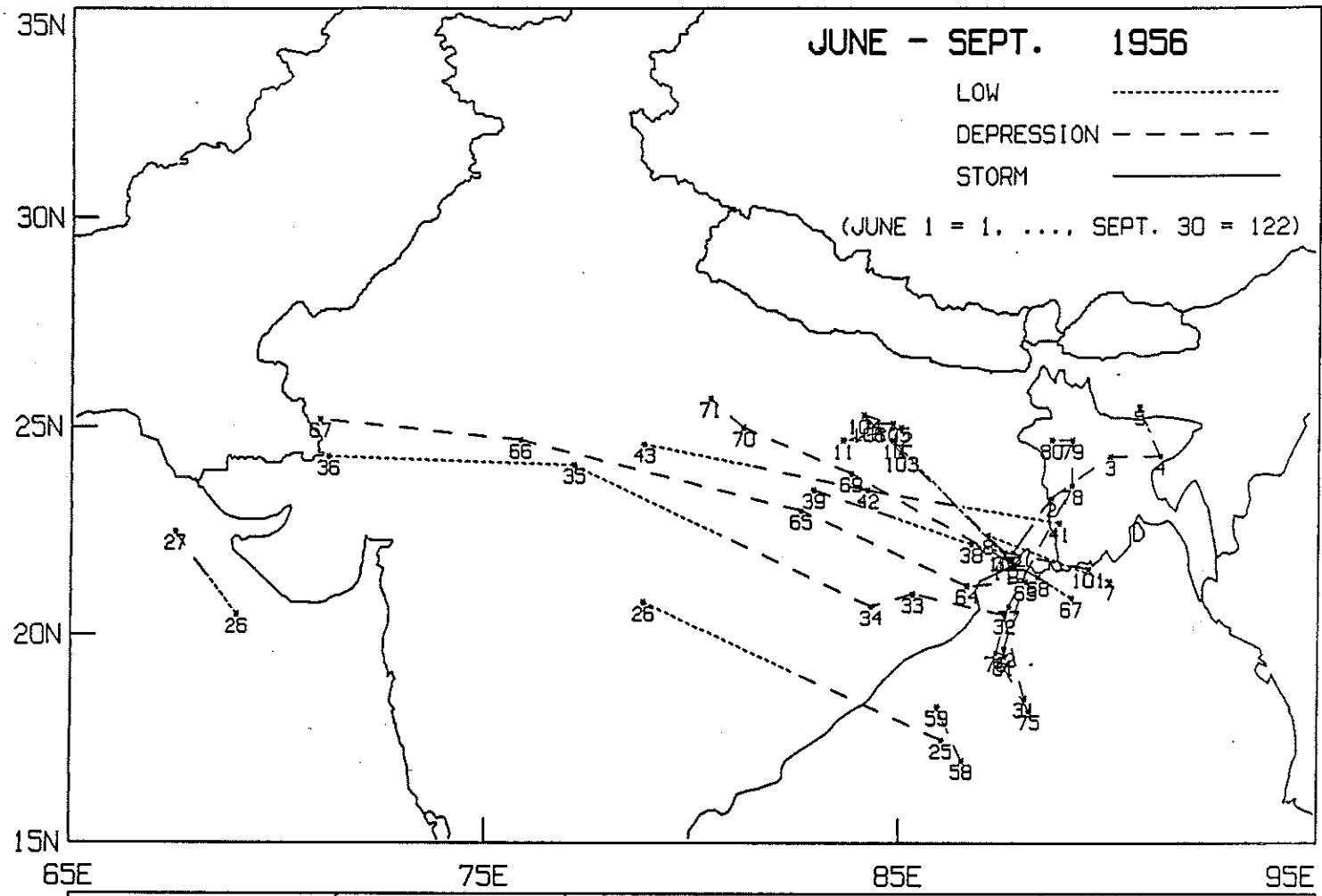

JUNE - SEPT. 1951
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

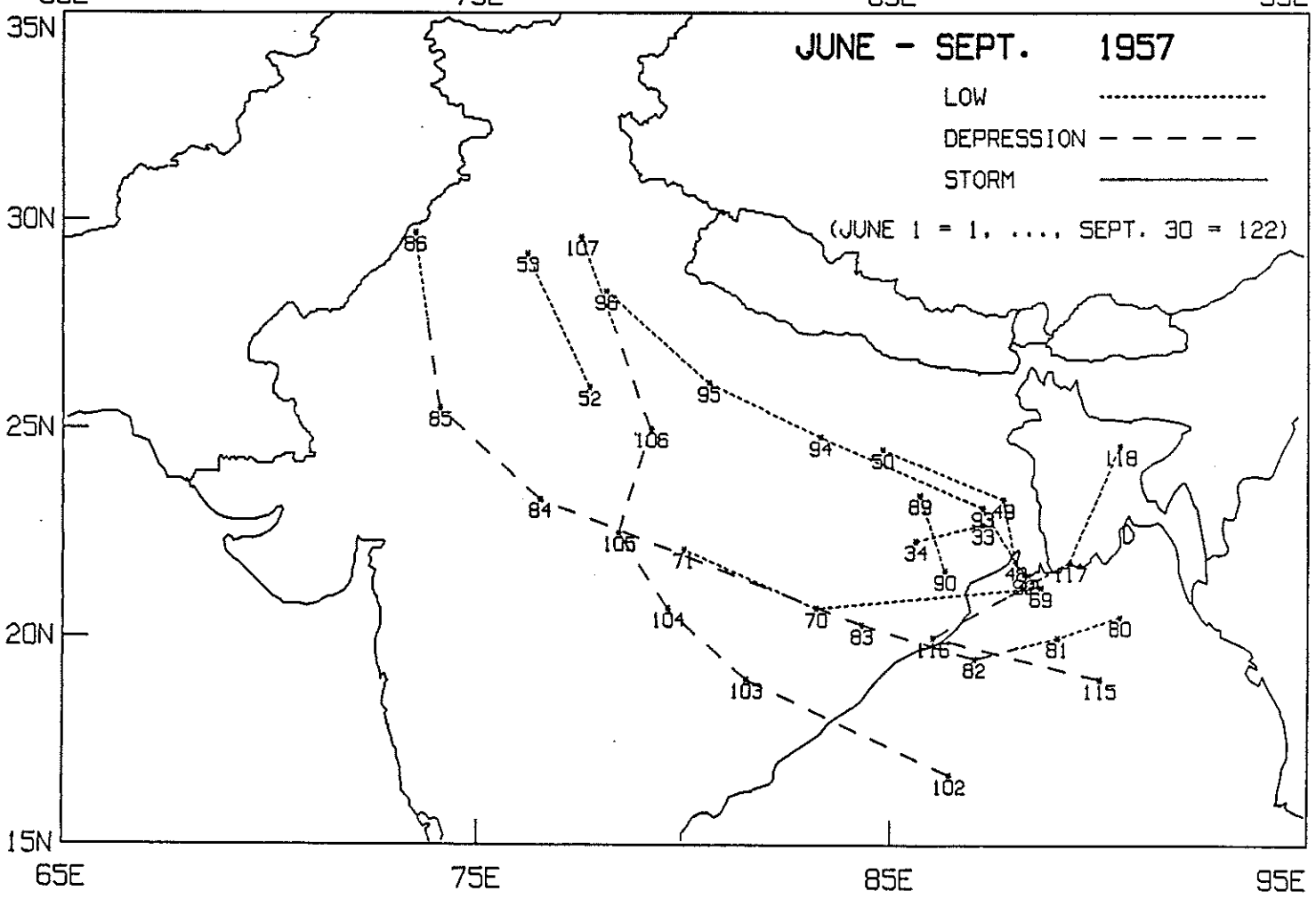

JUNE - SEPT. 1952
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

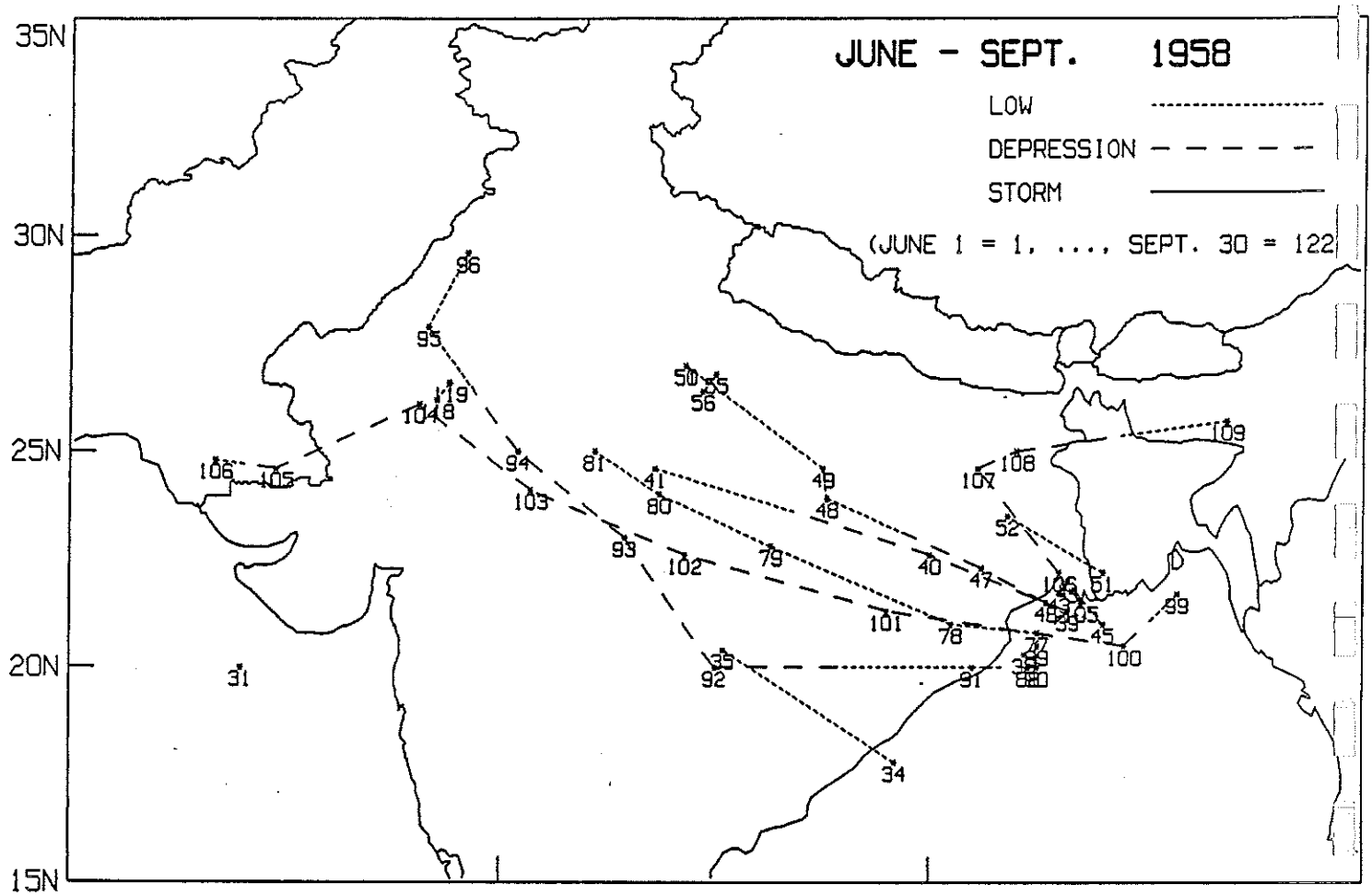

JUNE - SEPT. 1953
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

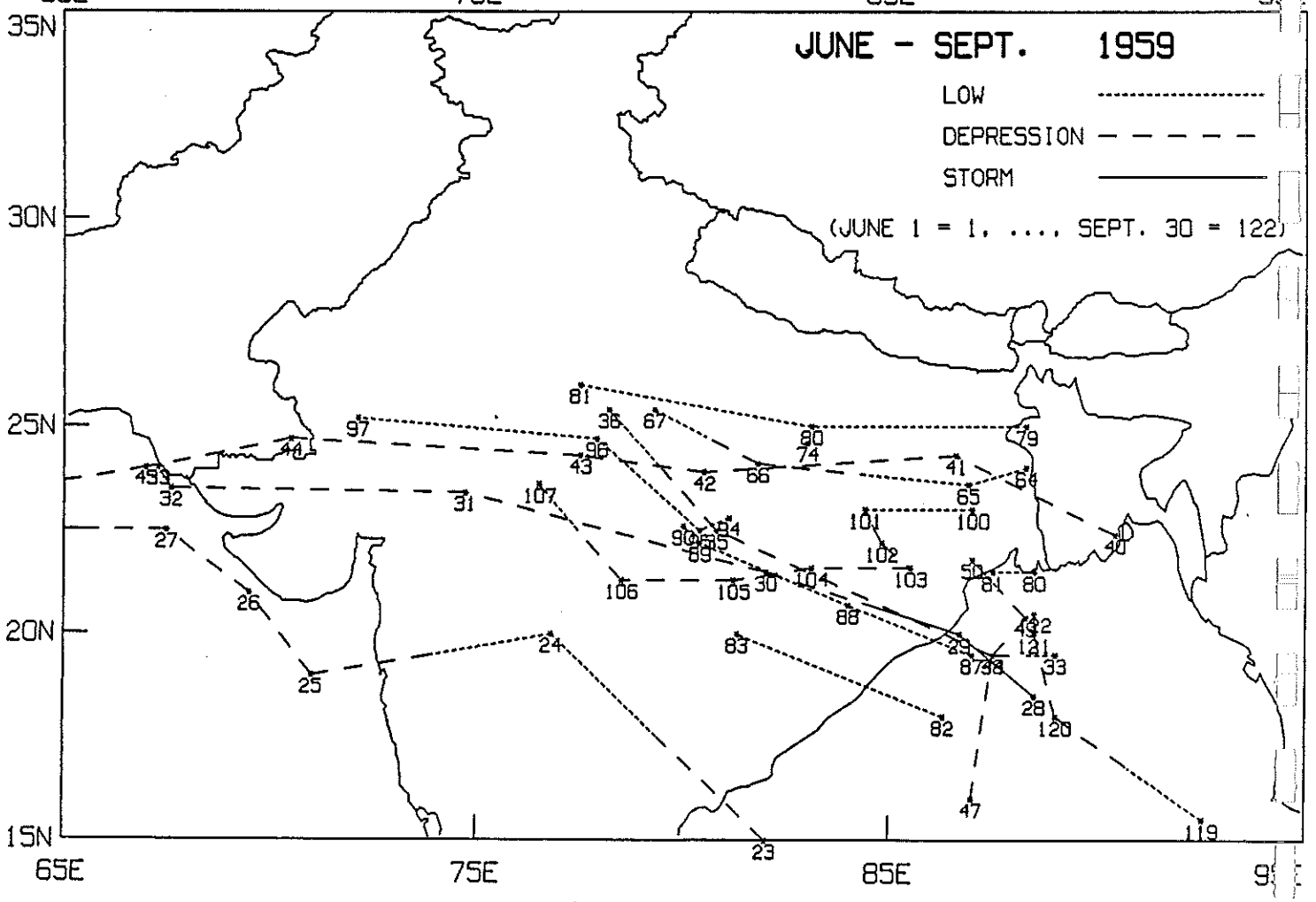

JUNE - SEPT. 1954
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

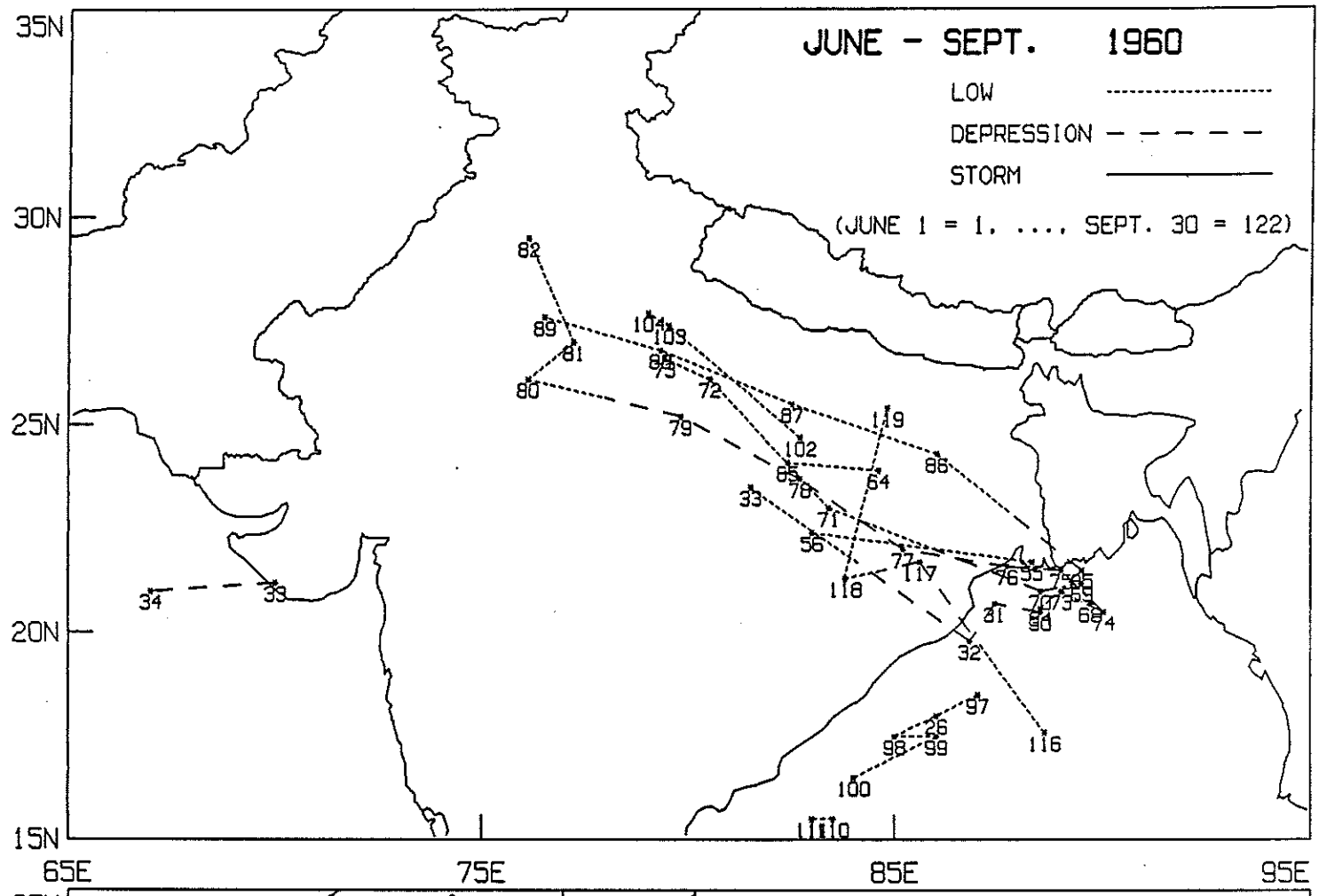

JUNE - SEPT. 1955
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

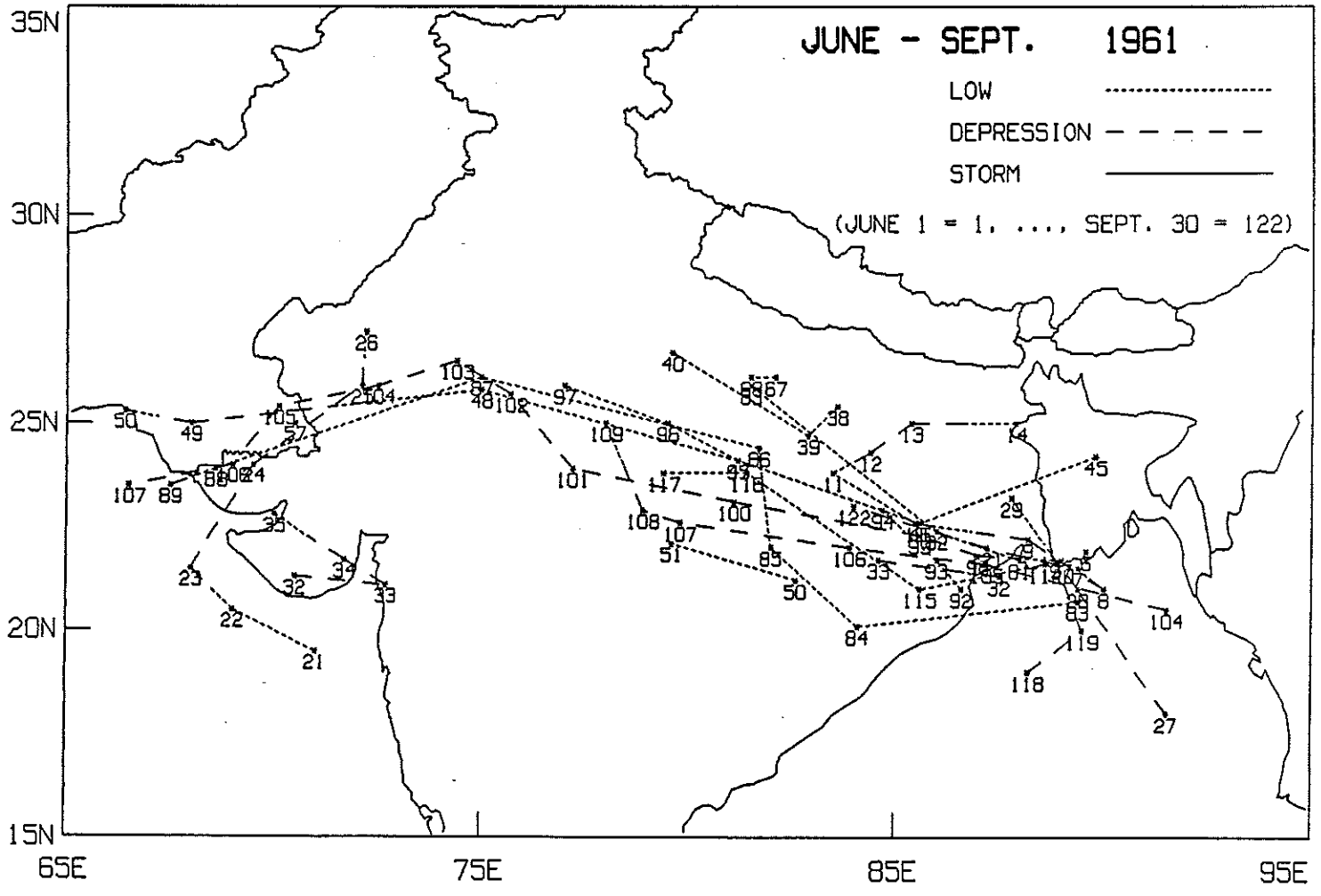

JUNE - SEPT. 1956
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

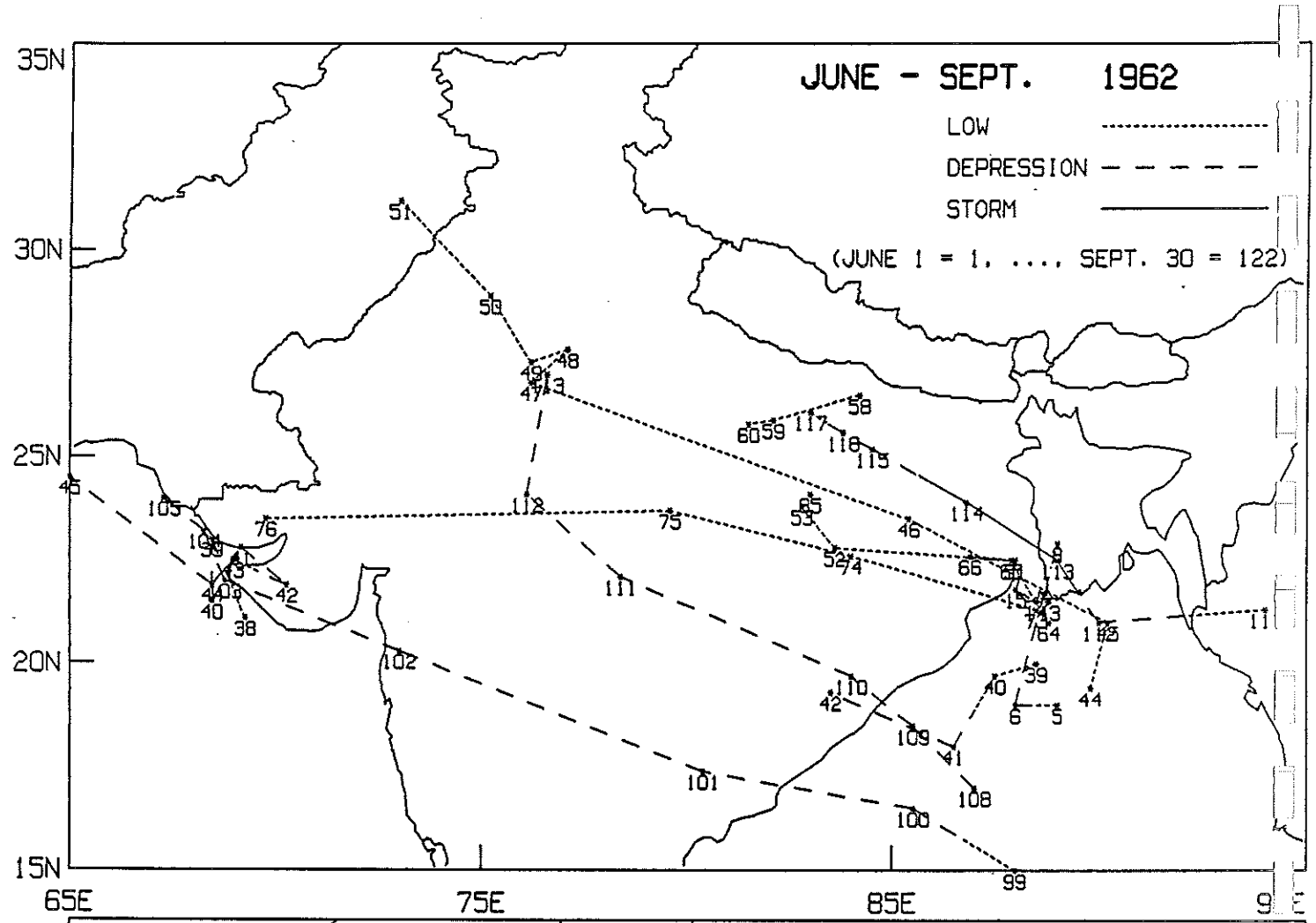

JUNE - SEPT. 1957
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

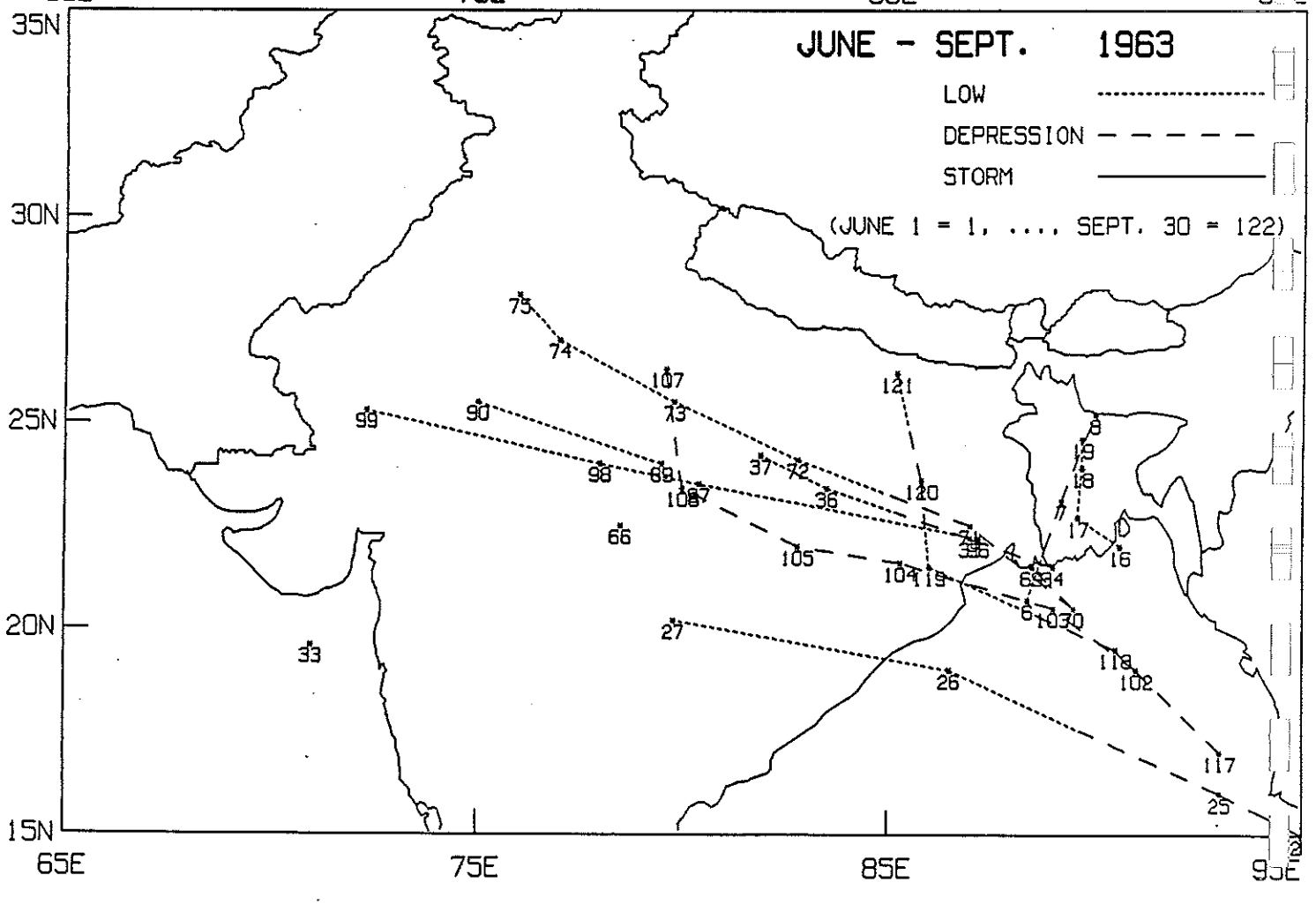

JUNE - SEPT. 1958
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

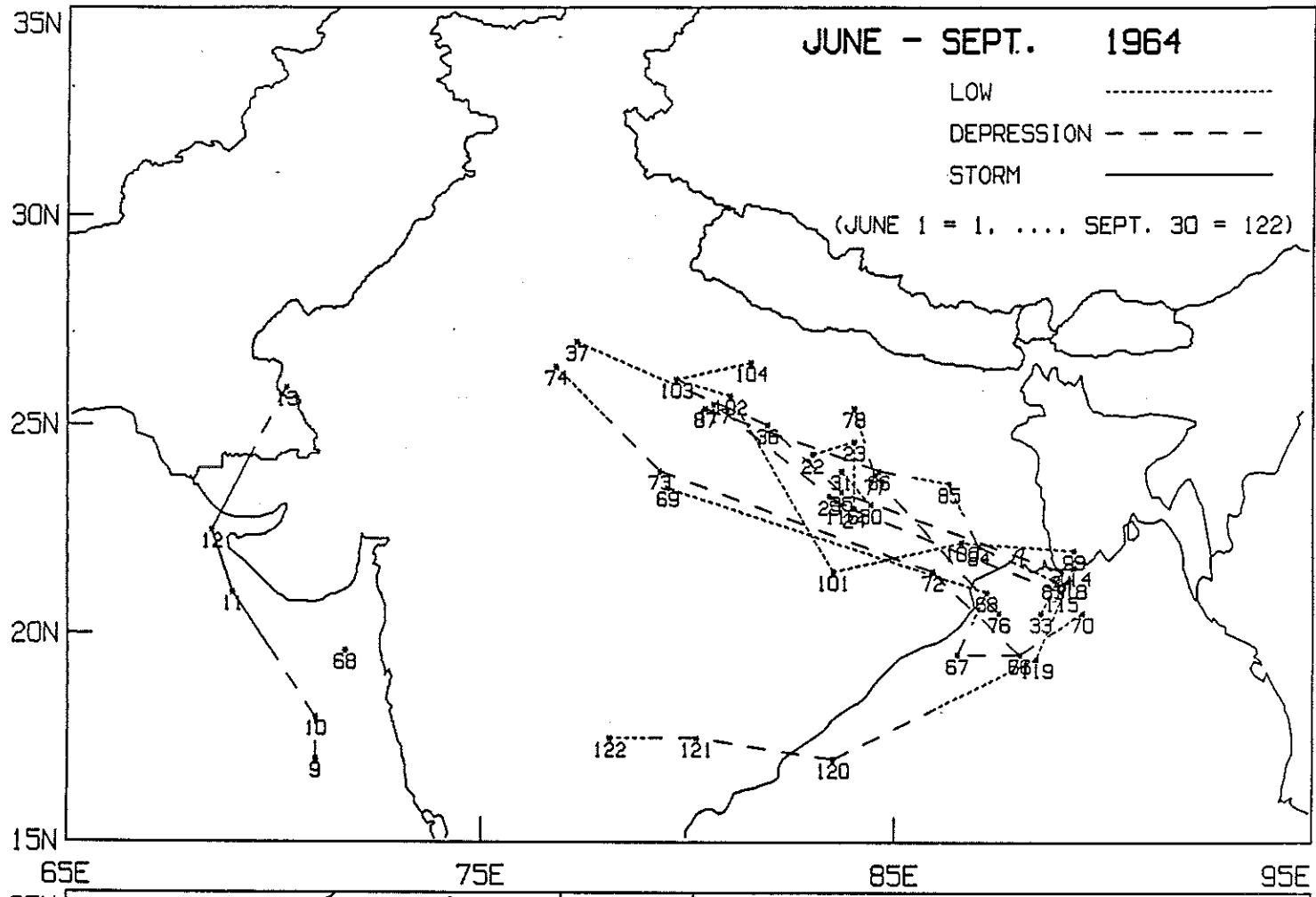

JUNE - SEPT. 1959
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

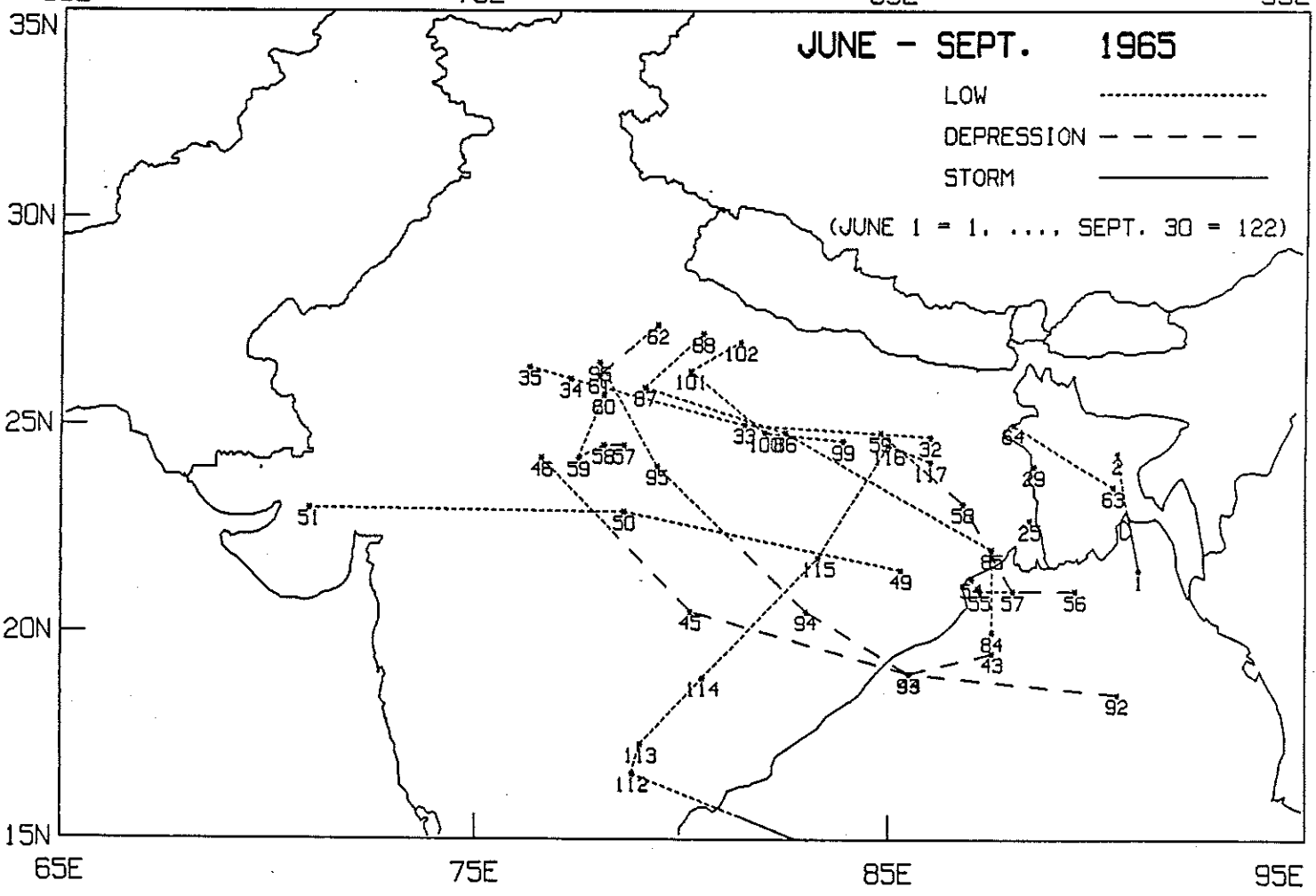

JUNE - SEPT. 1960
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

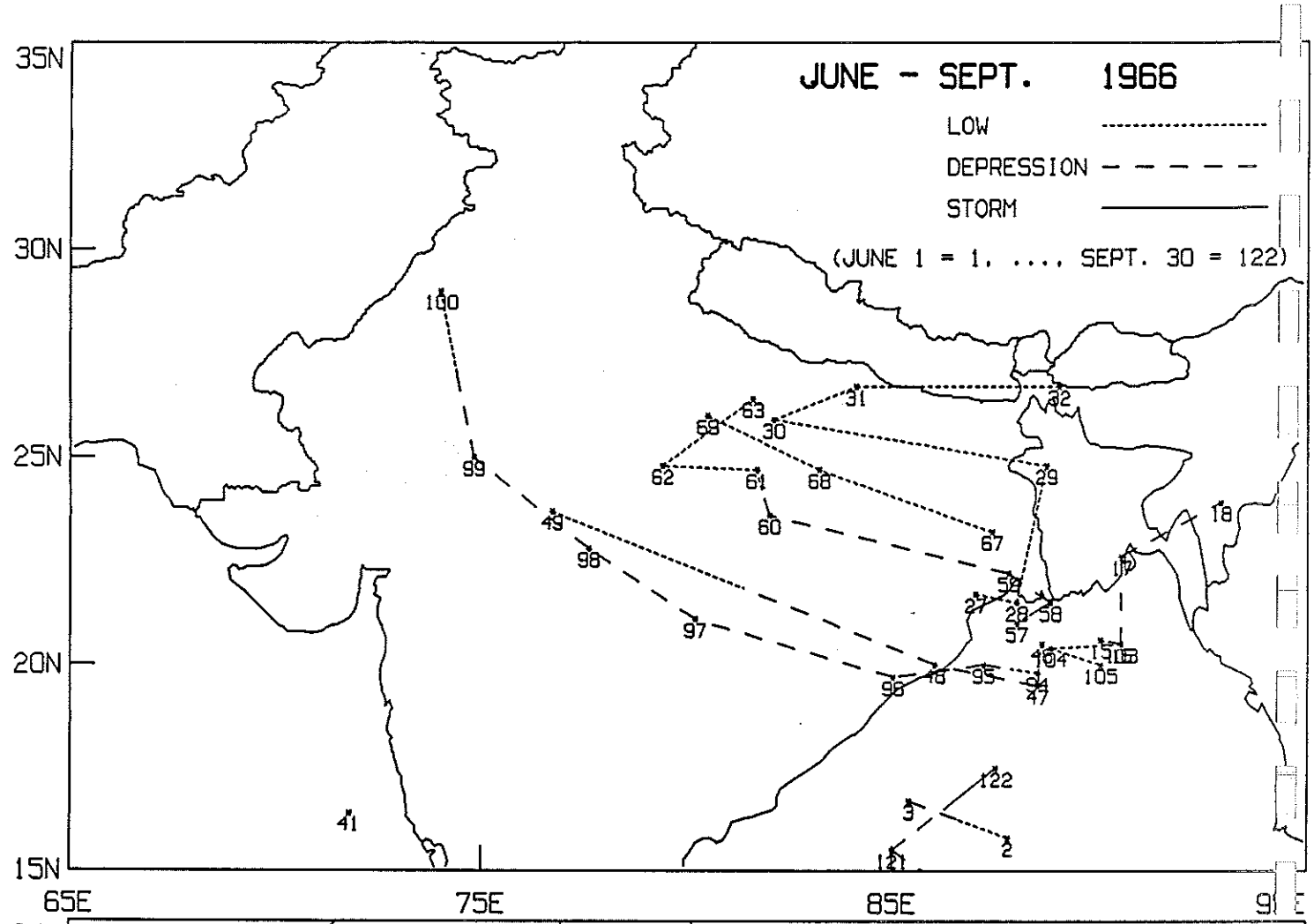

JUNE - SEPT. 1961
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

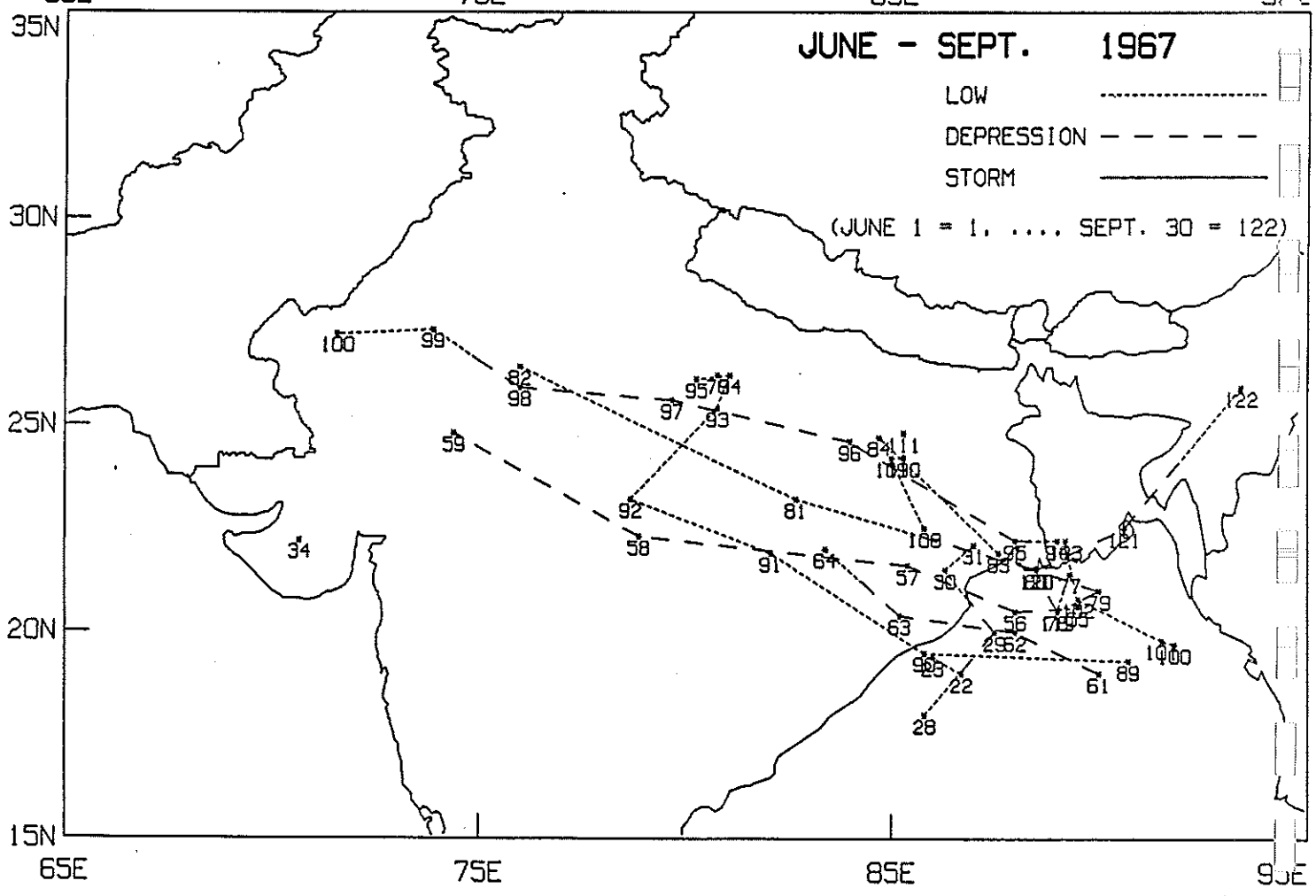

JUNE - SEPT. 1962
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

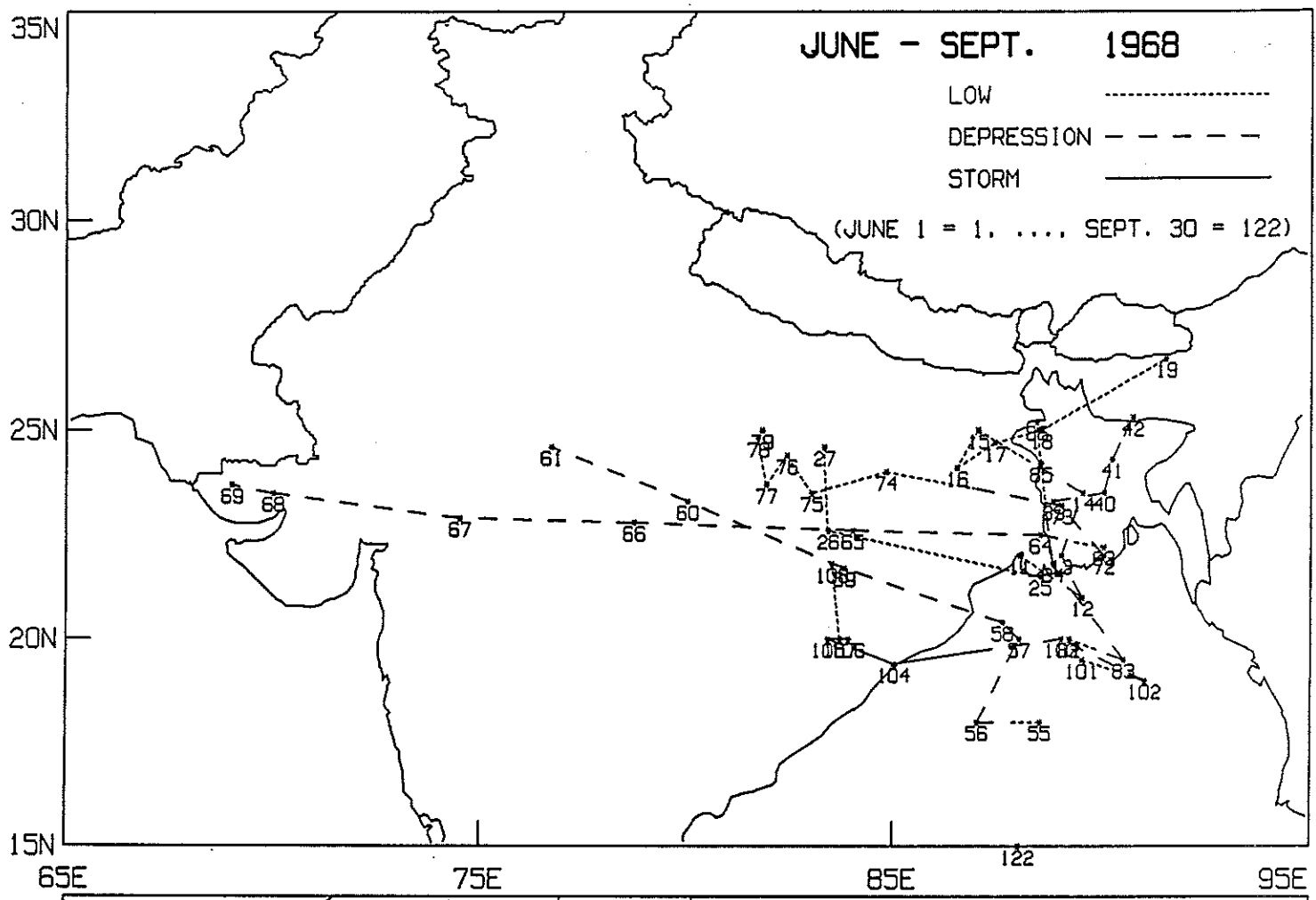

JUNE - SEPT. 1963
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

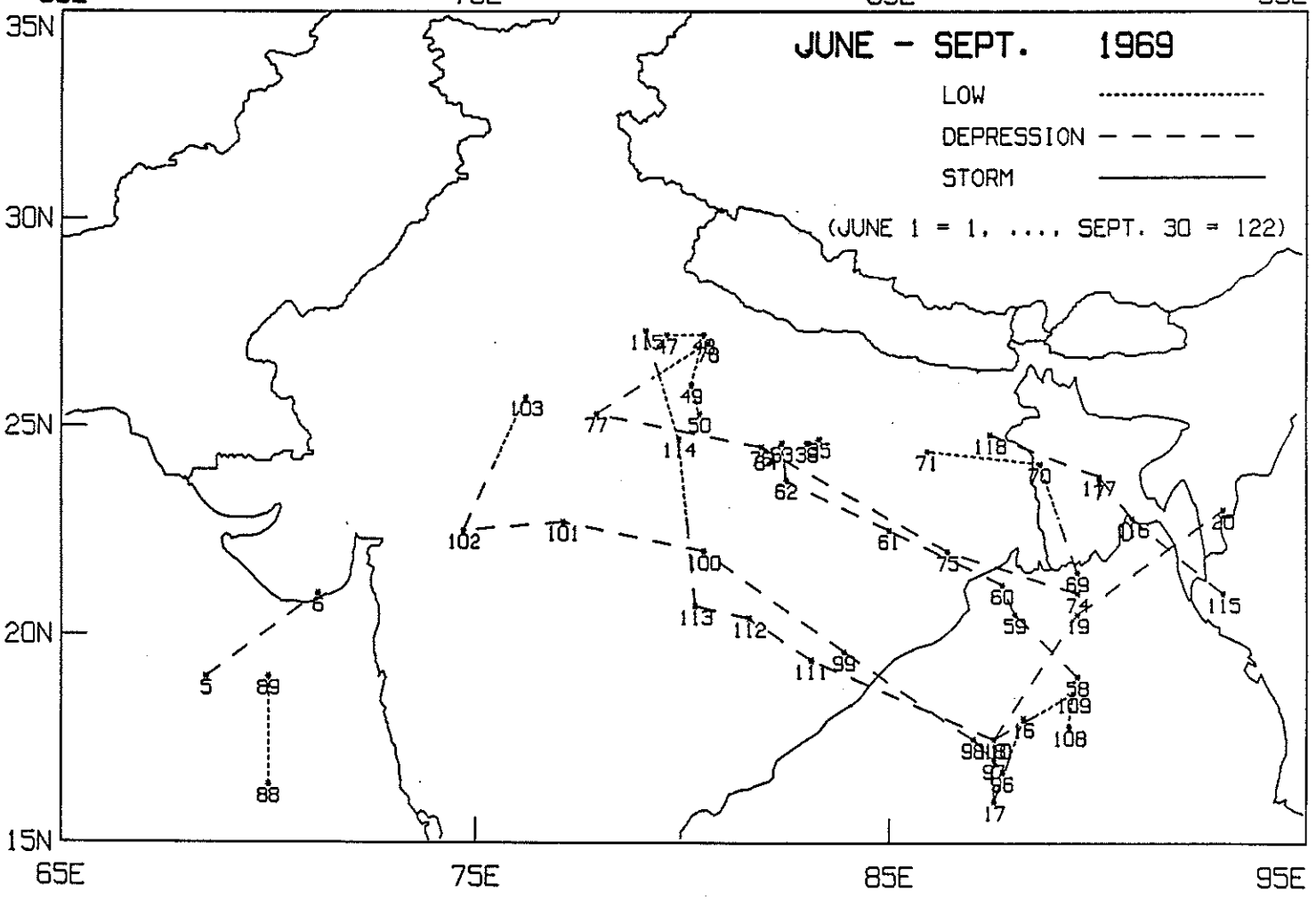

JUNE - SEPT. 1964
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

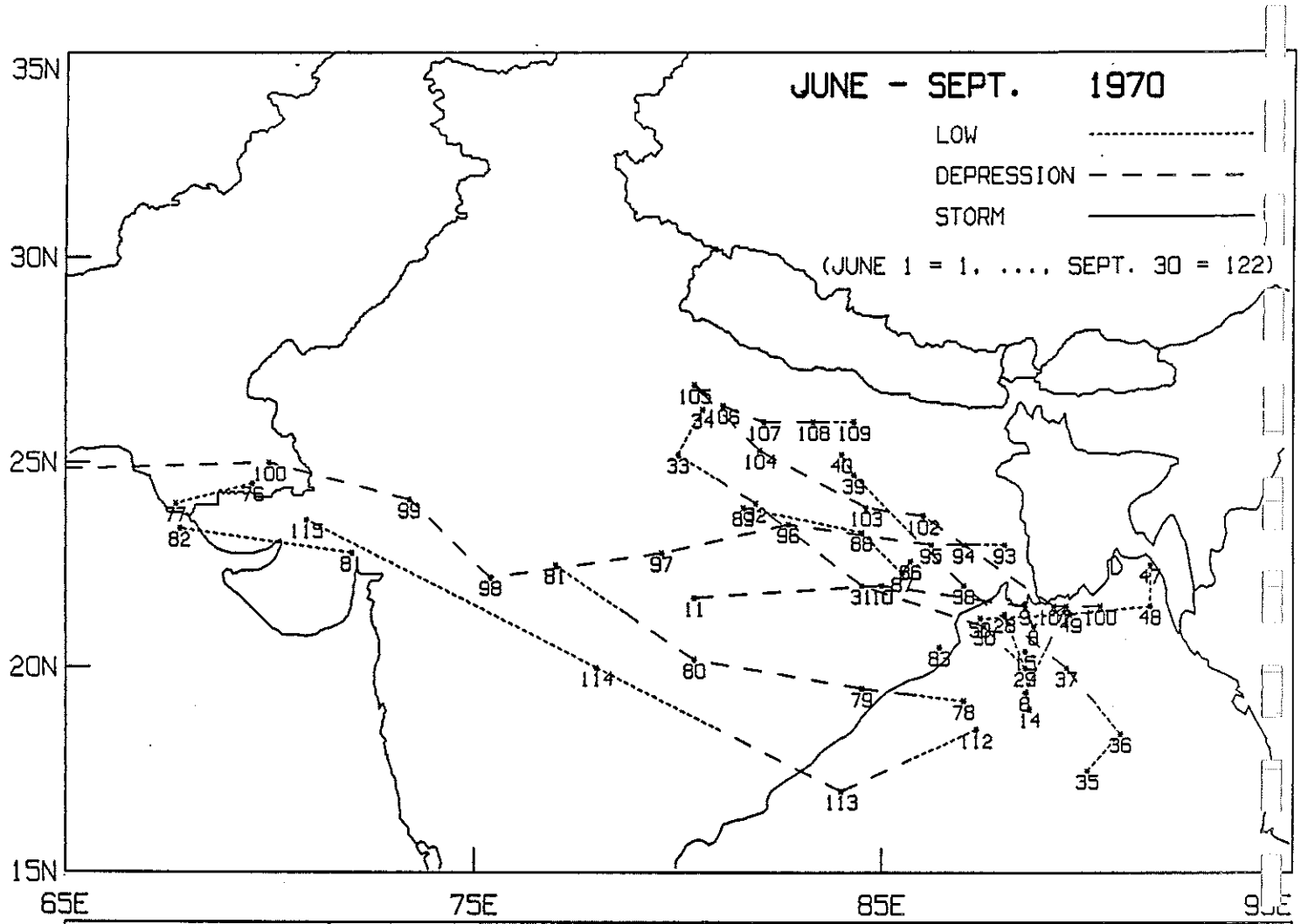

JUNE - SEPT. 1965
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

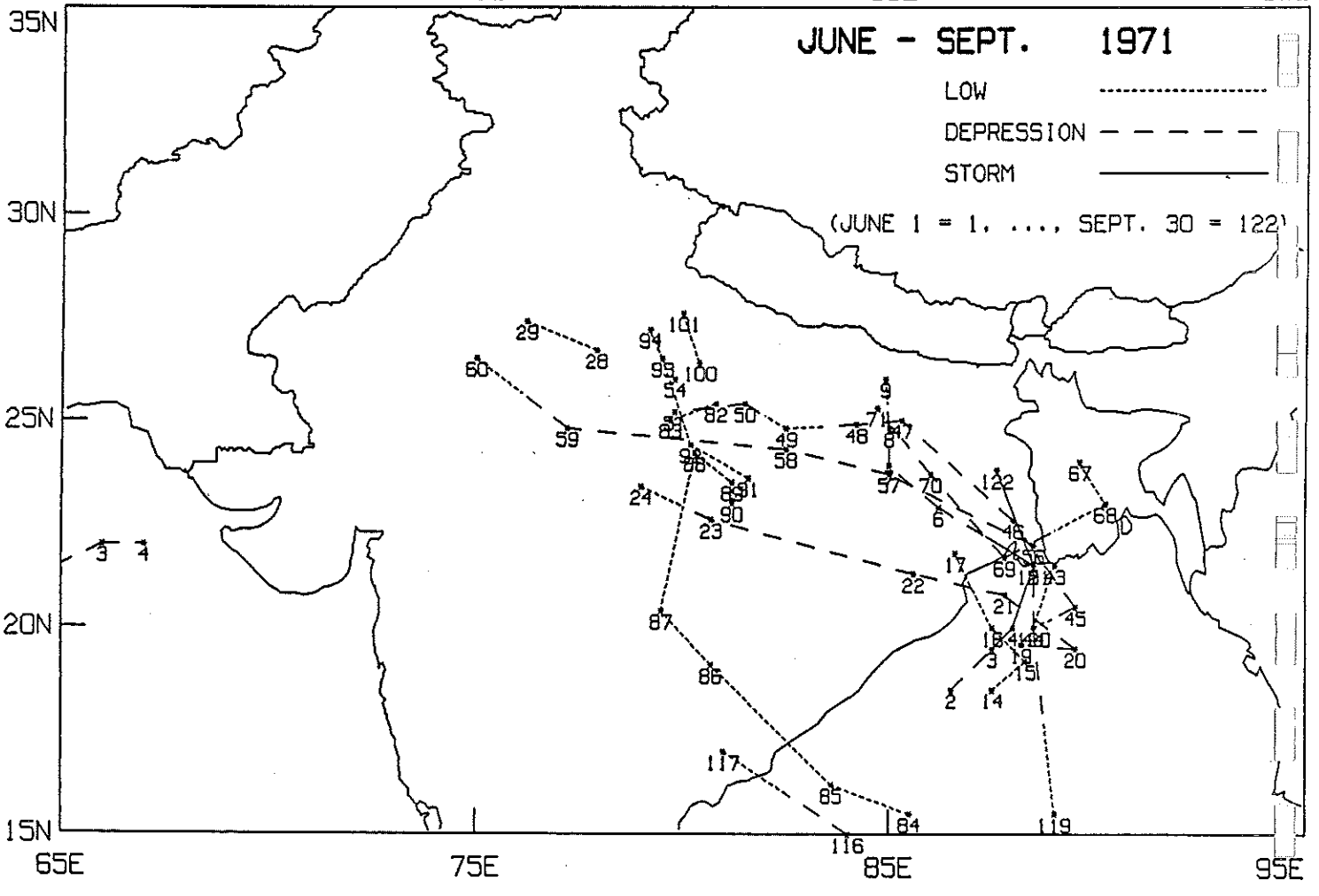

JUNE - SEPT. 1966
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

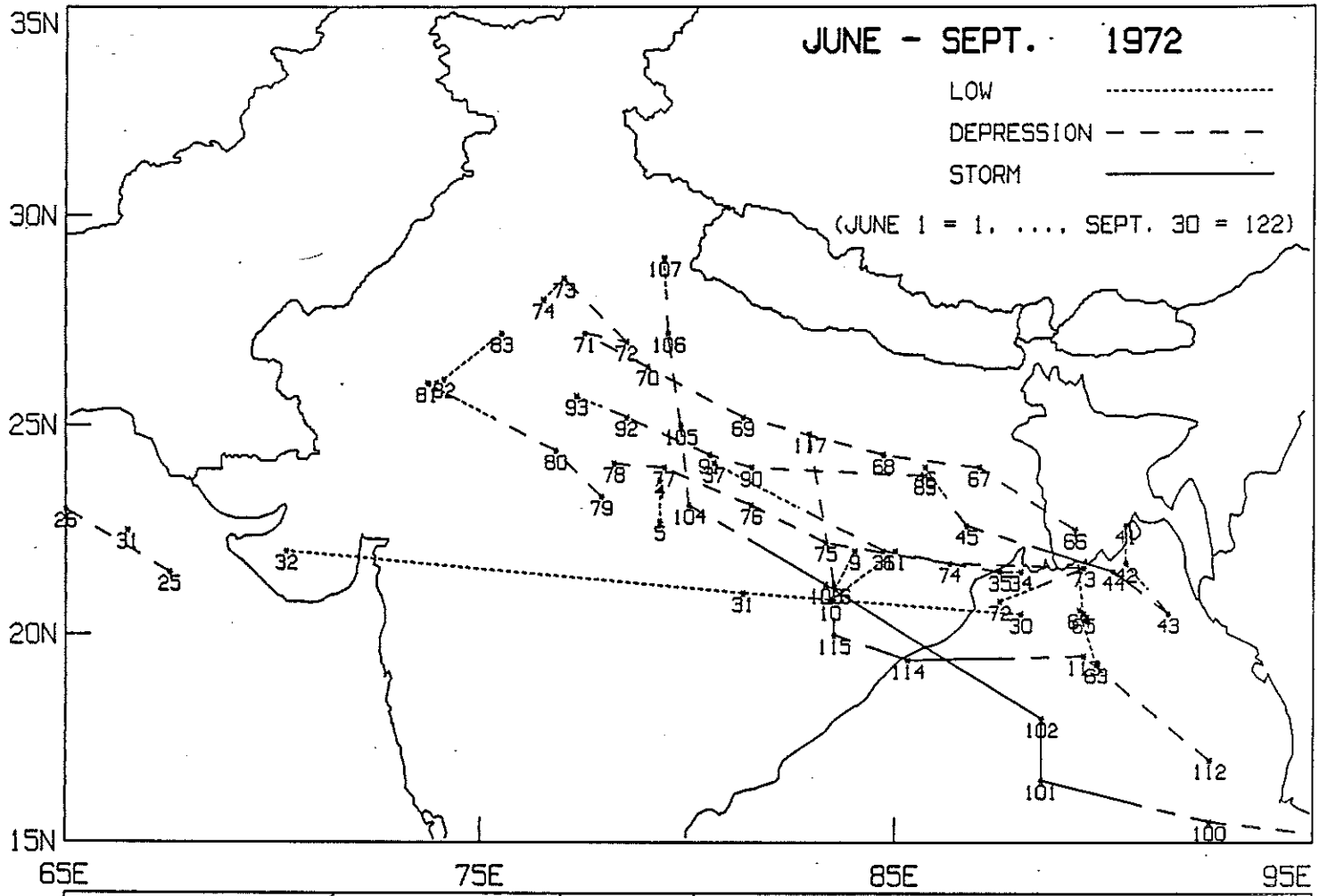

JUNE - SEPT. 1967
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

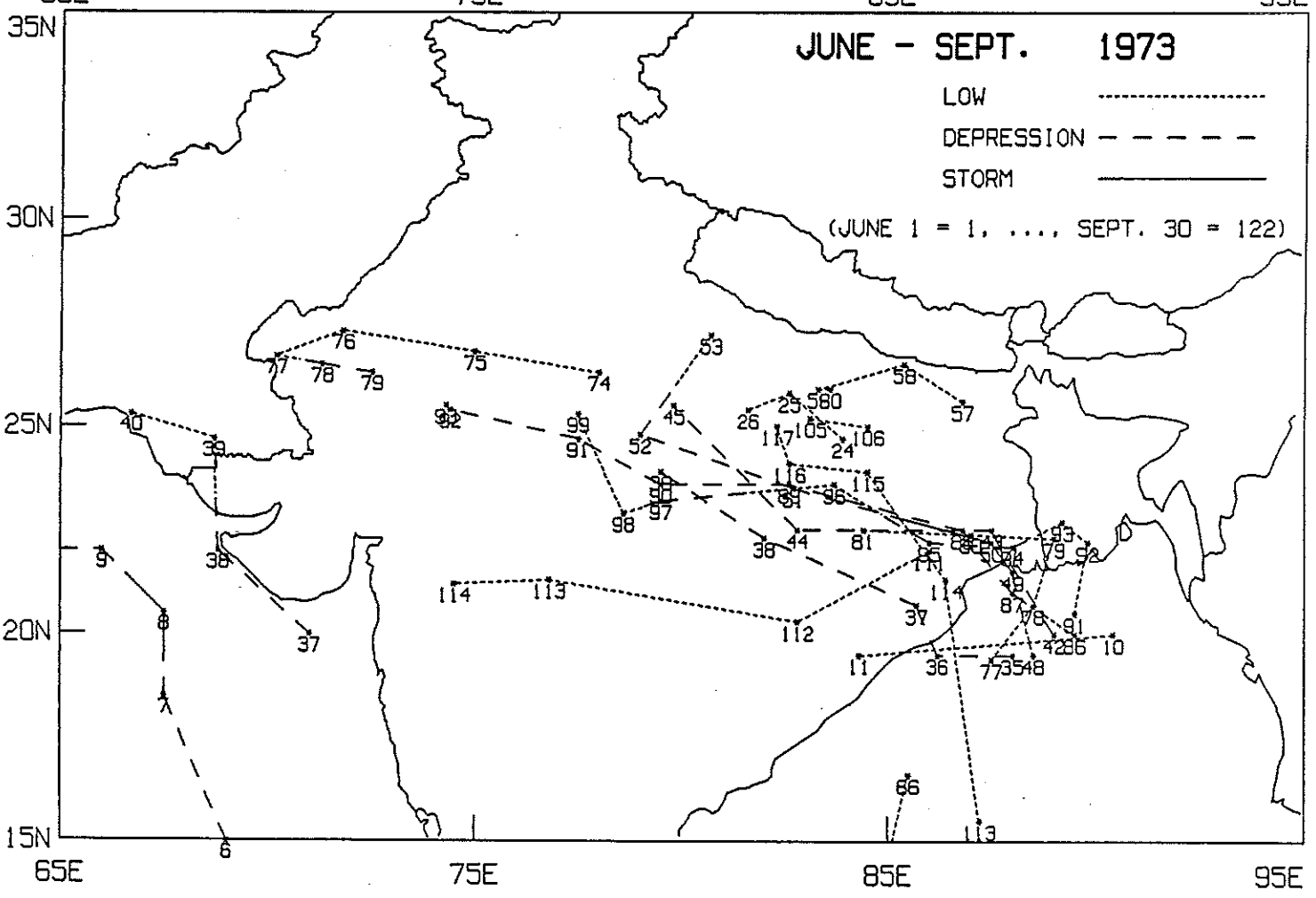

JUNE - SEPT. 1968
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

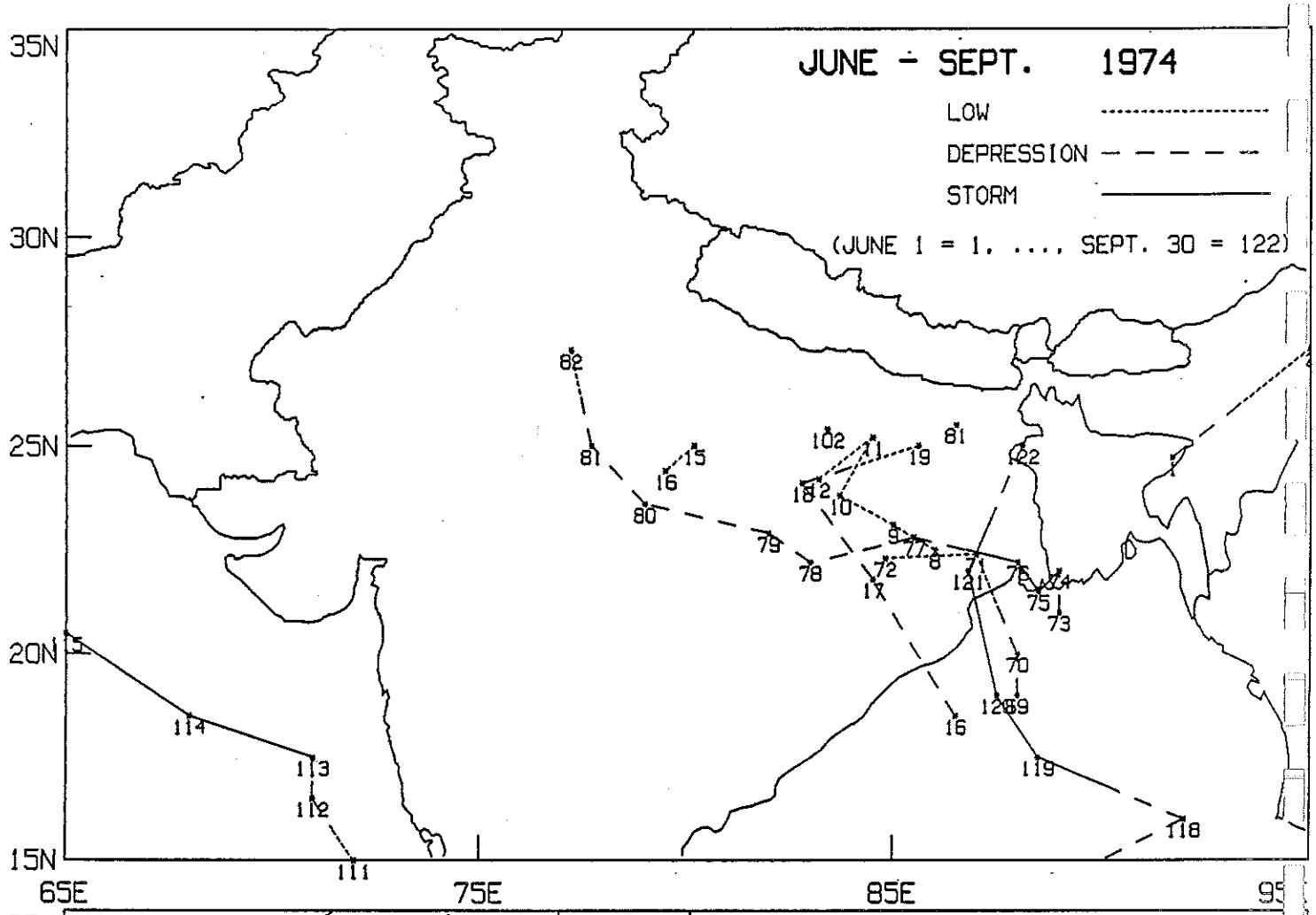

JUNE - SEPT. 1969
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

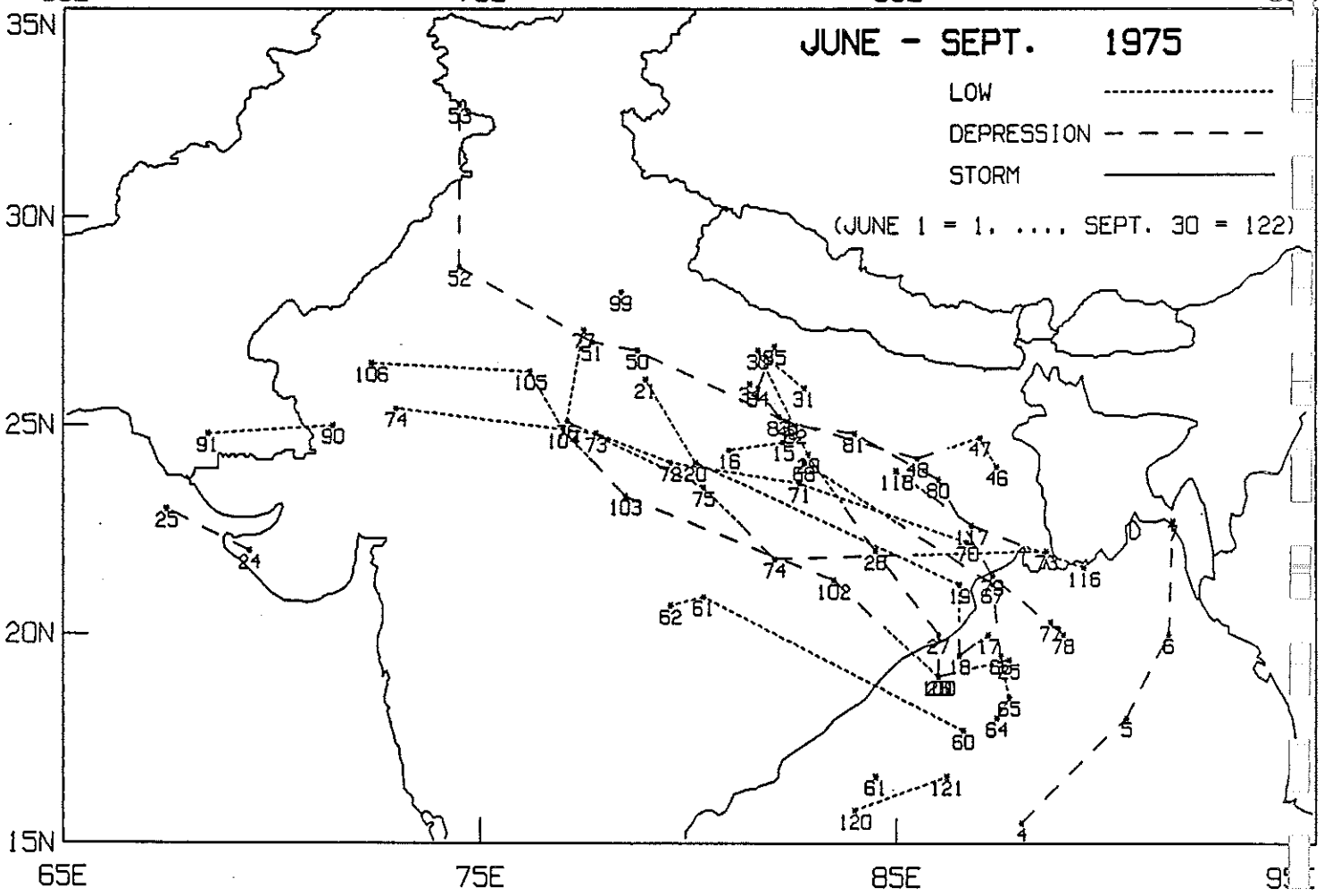

JUNE - SEPT. 1970
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

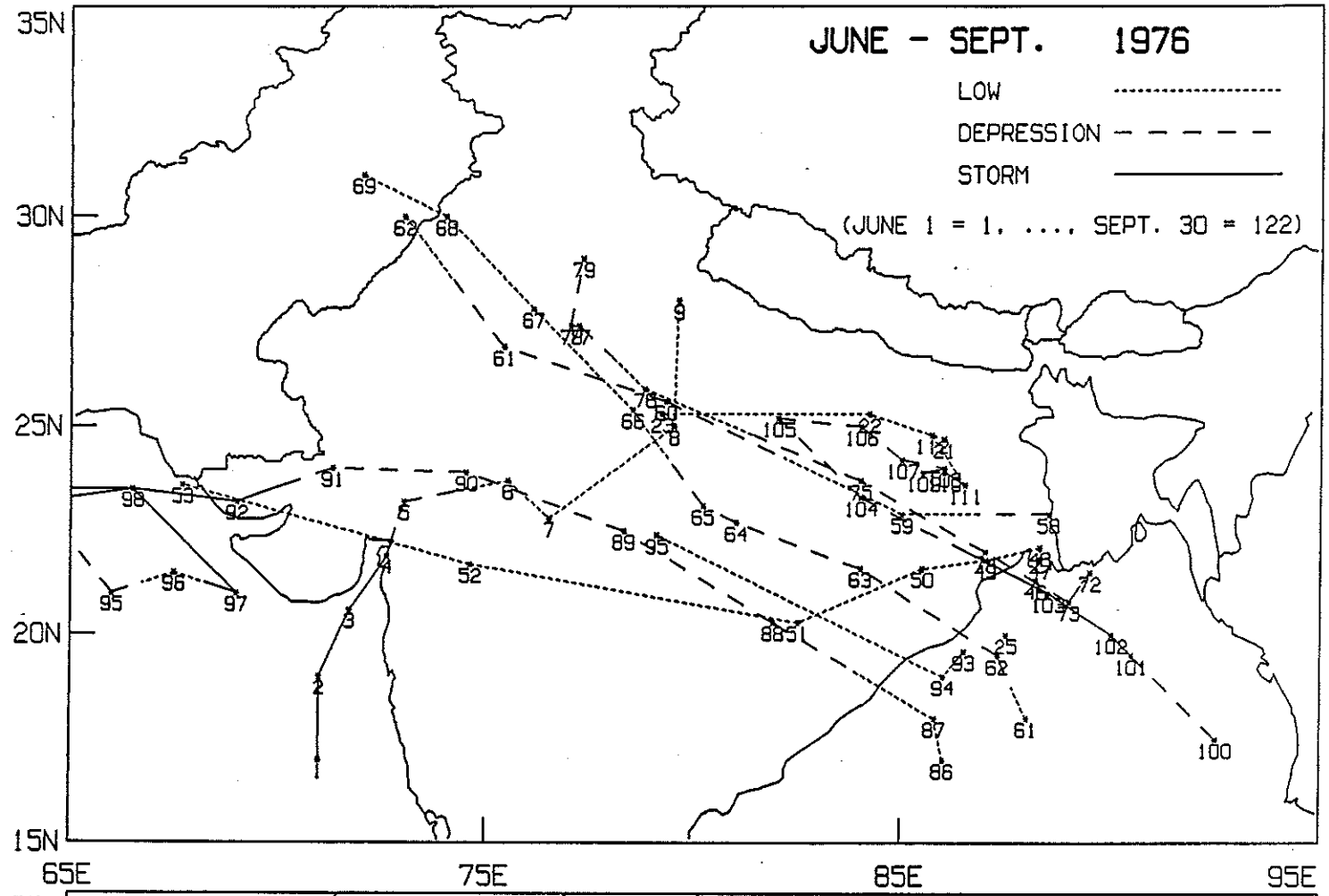

JUNE - SEPT. 1971
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

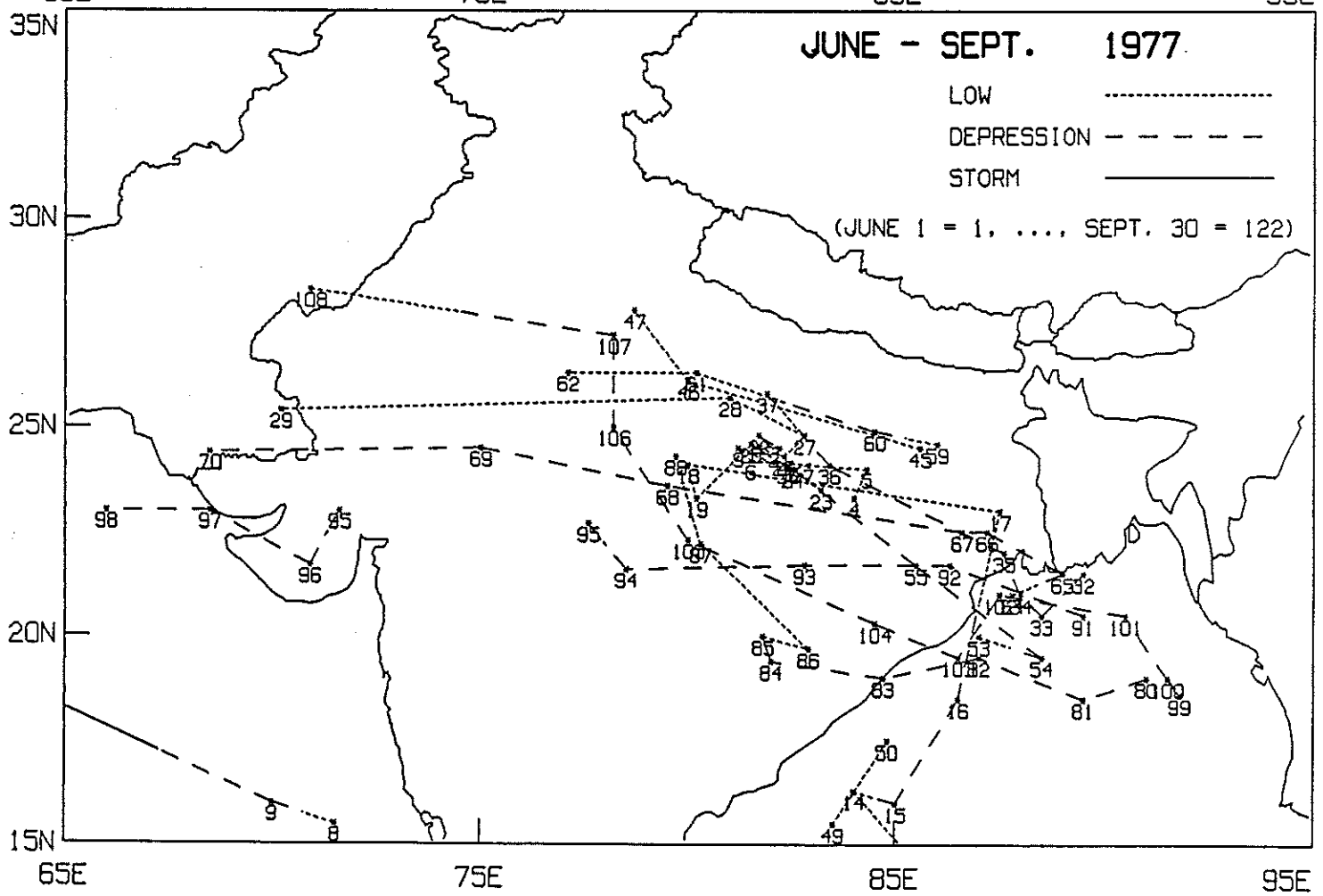

JUNE - SEPT. 1972
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

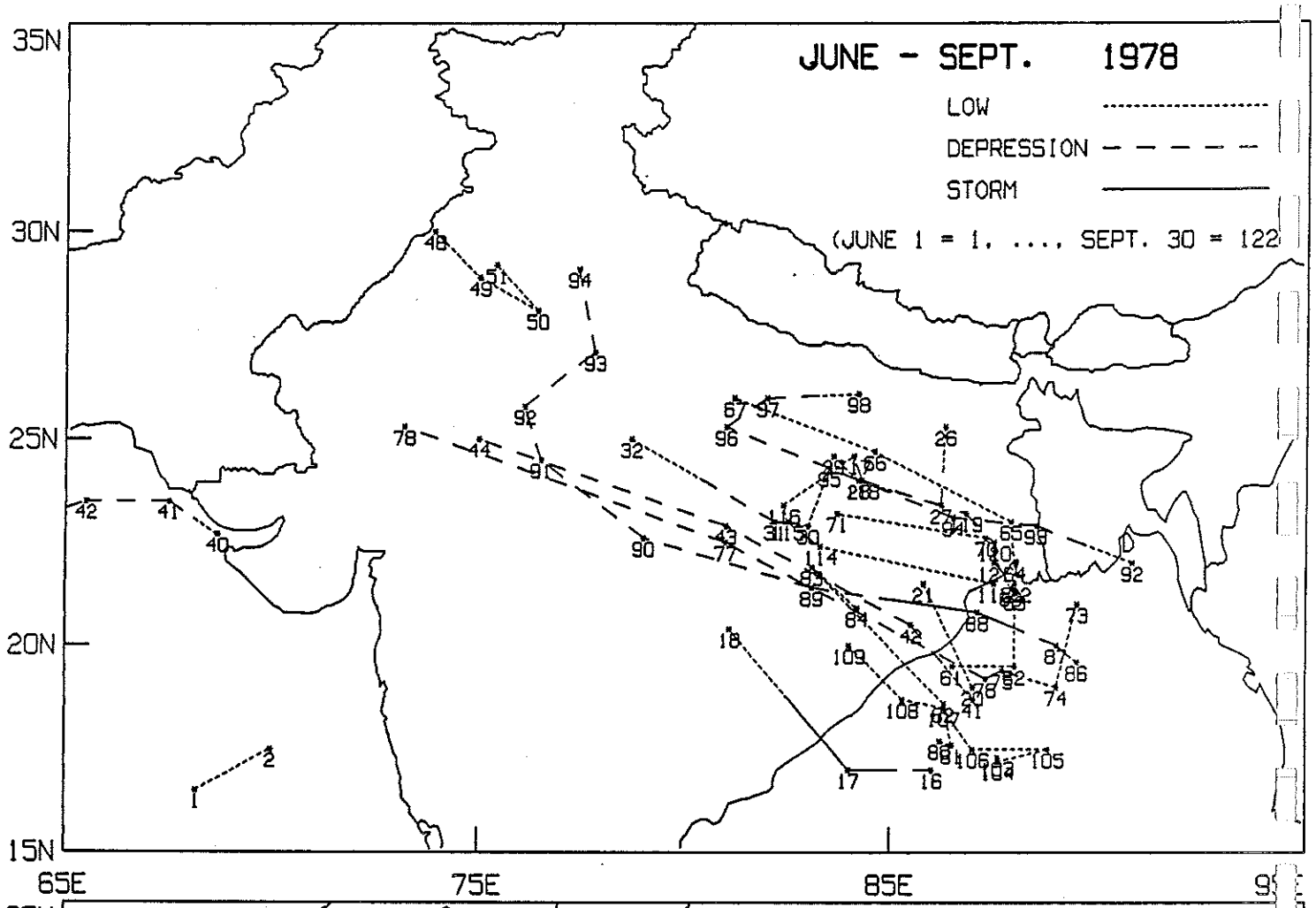

JUNE - SEPT. 1973
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

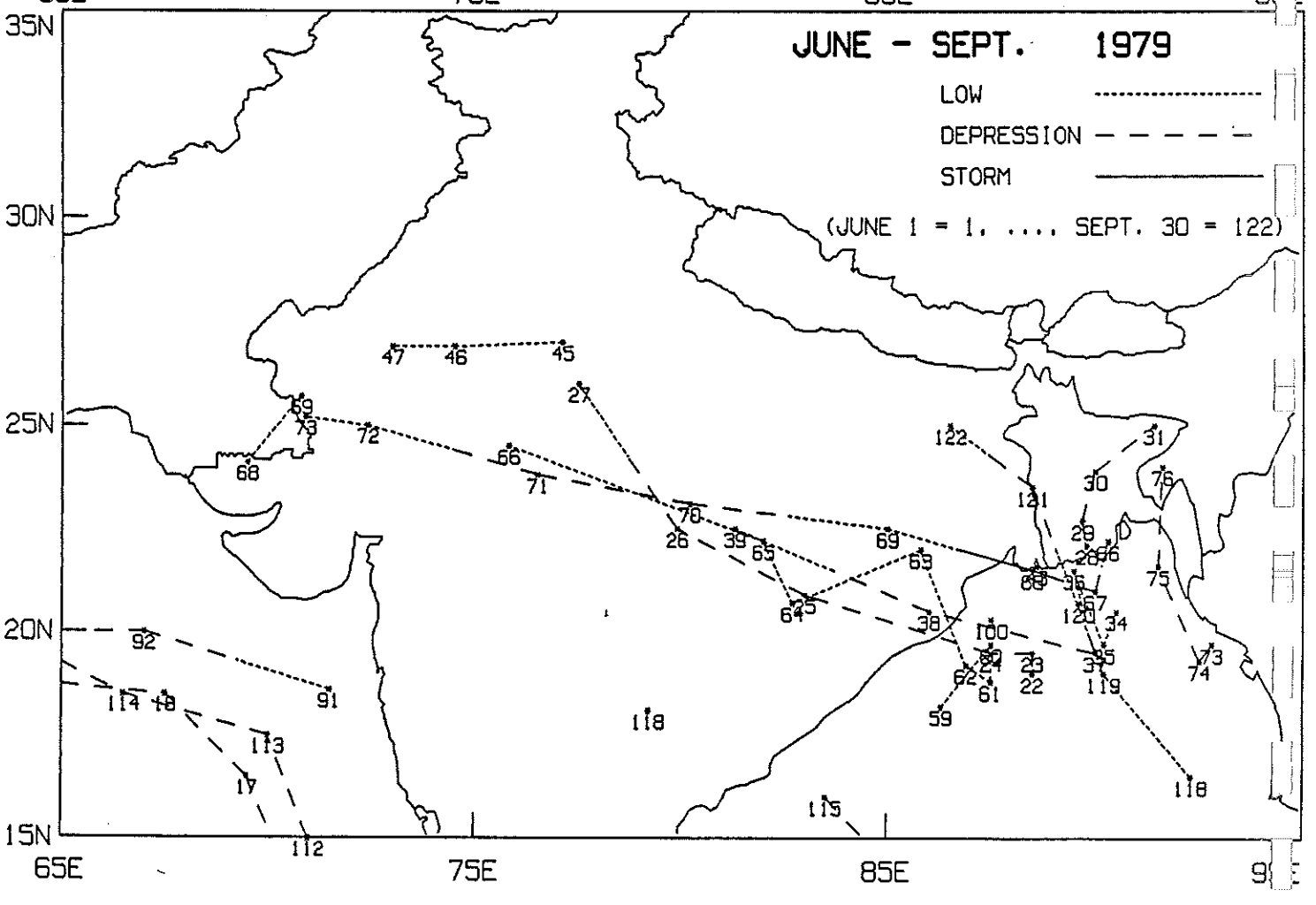

JUNE - SEPT. 1974
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

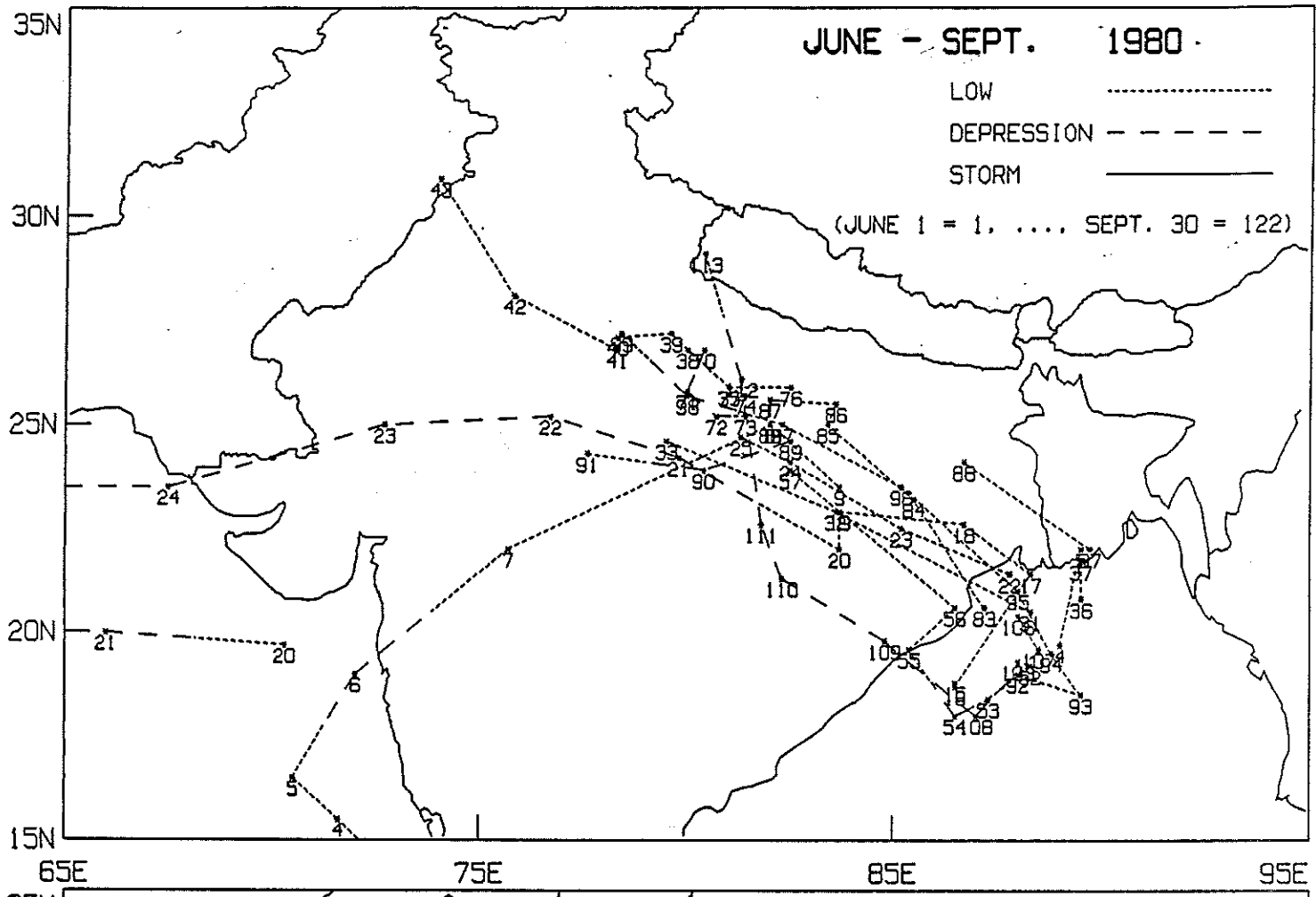

JUNE - SEPT. 1975
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

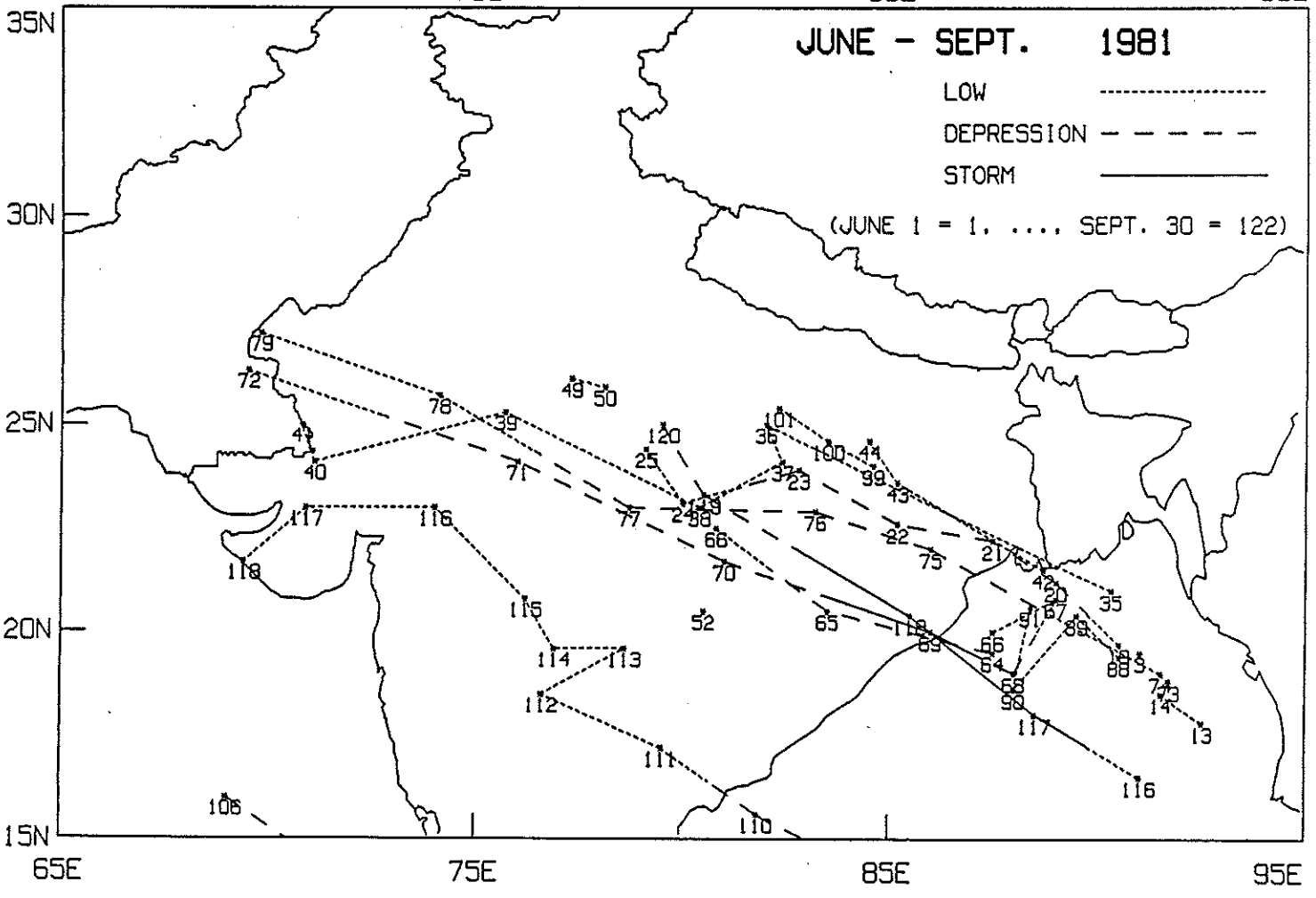

JUNE - SEPT. 1976
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

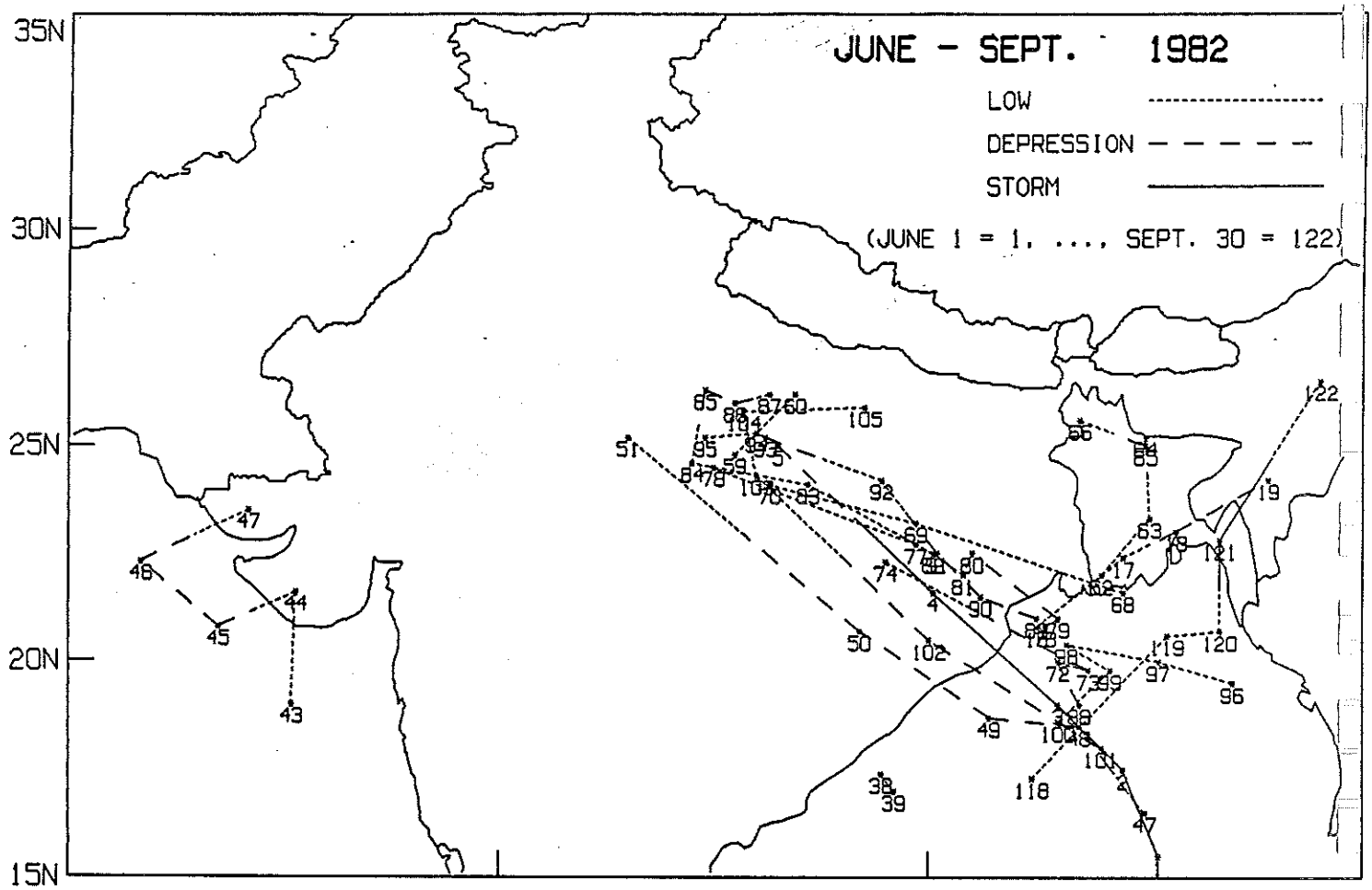

JUNE - SEPT. 1977
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

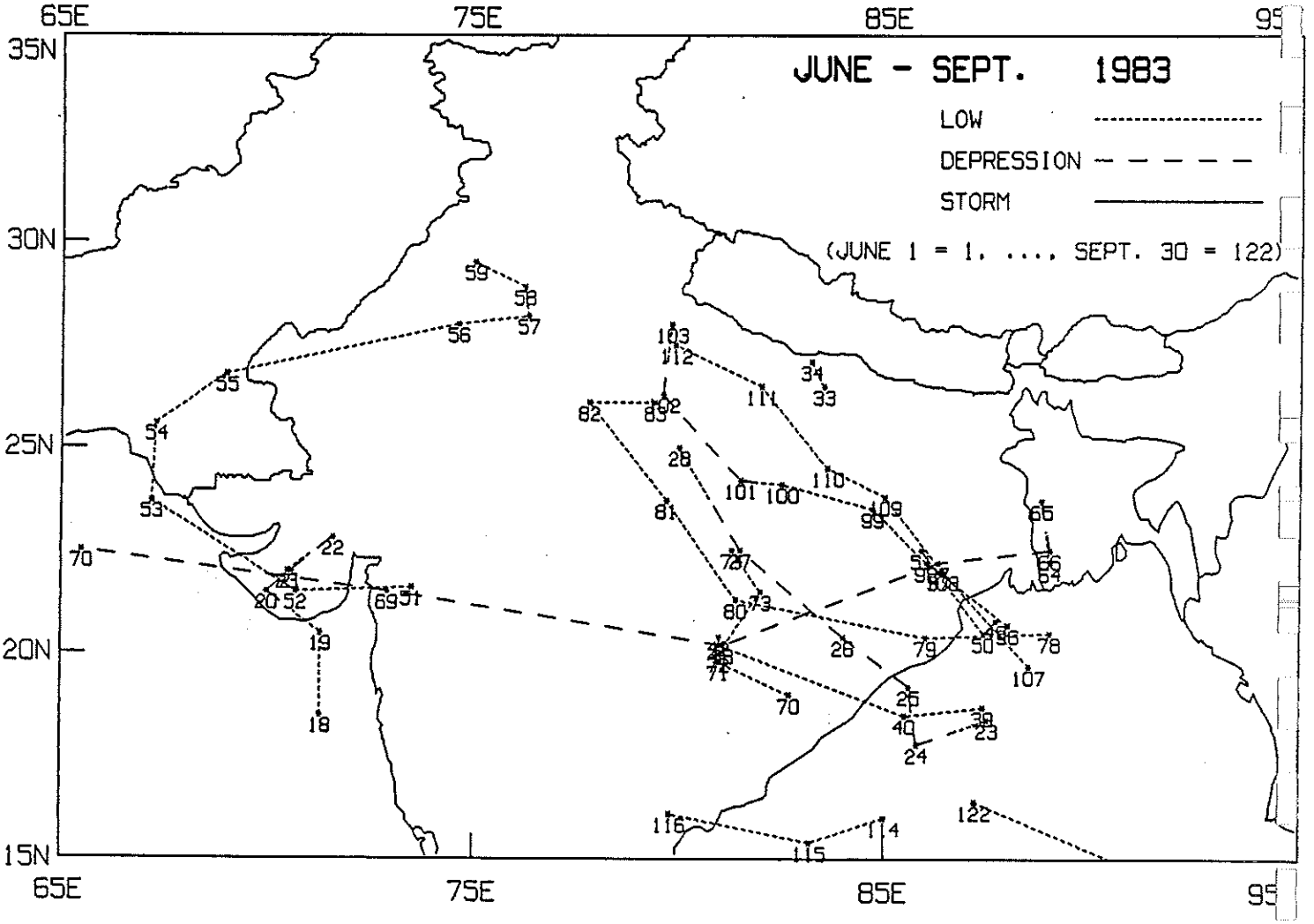

JUNE - SEPT. 1978
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

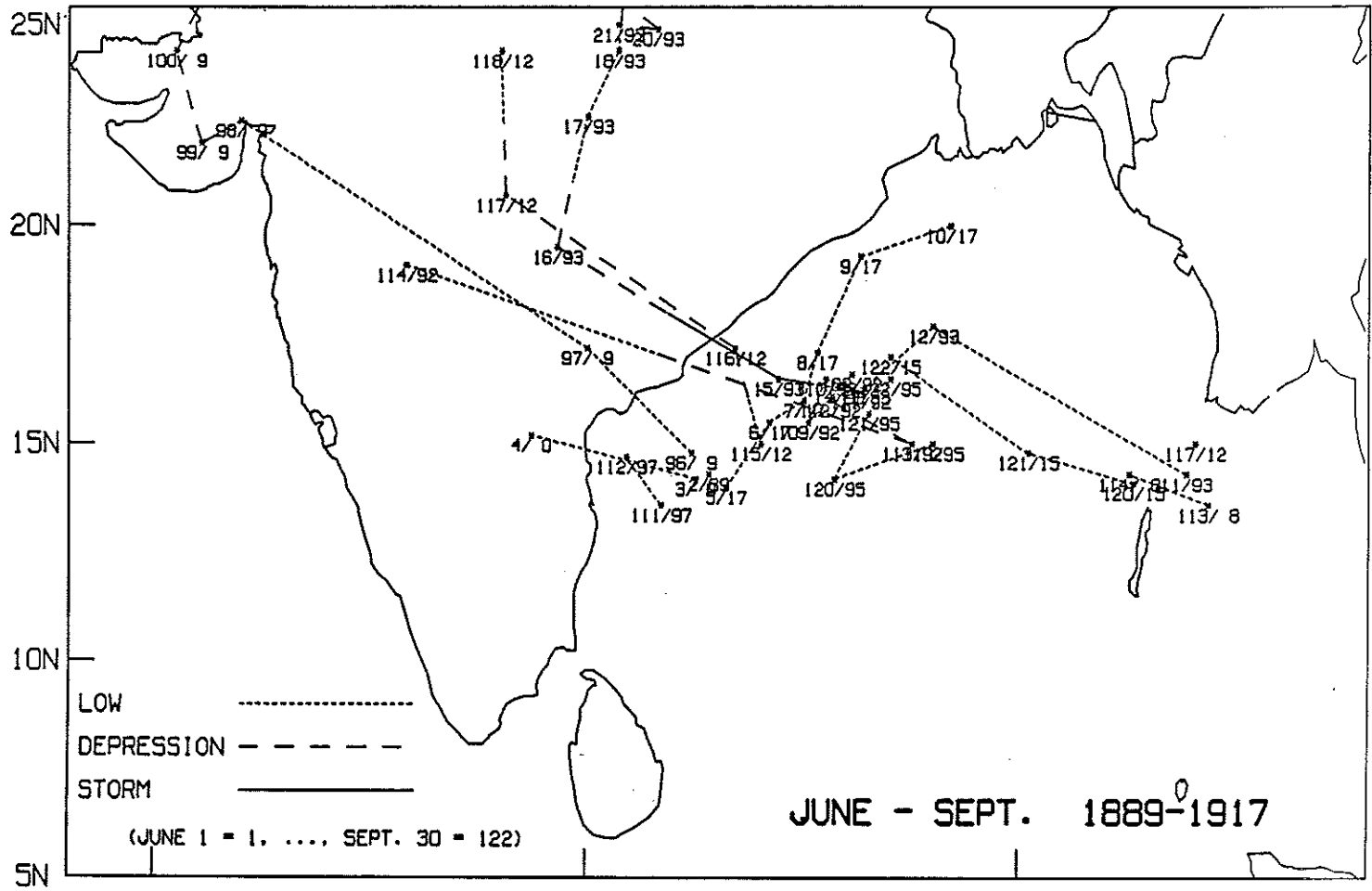

JUNE - SEPT. 1979
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E

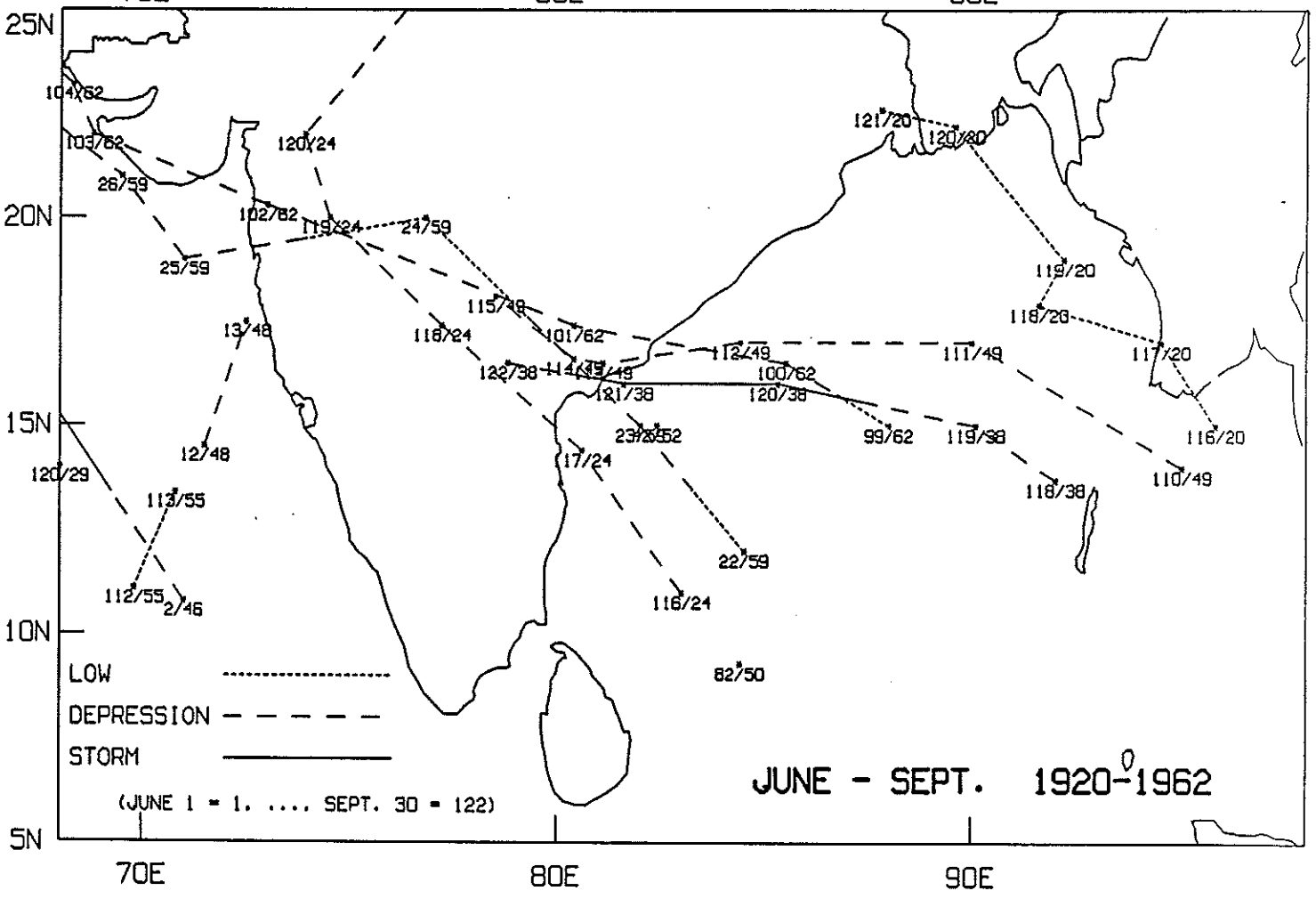

JUNE - SEPT. 1980
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

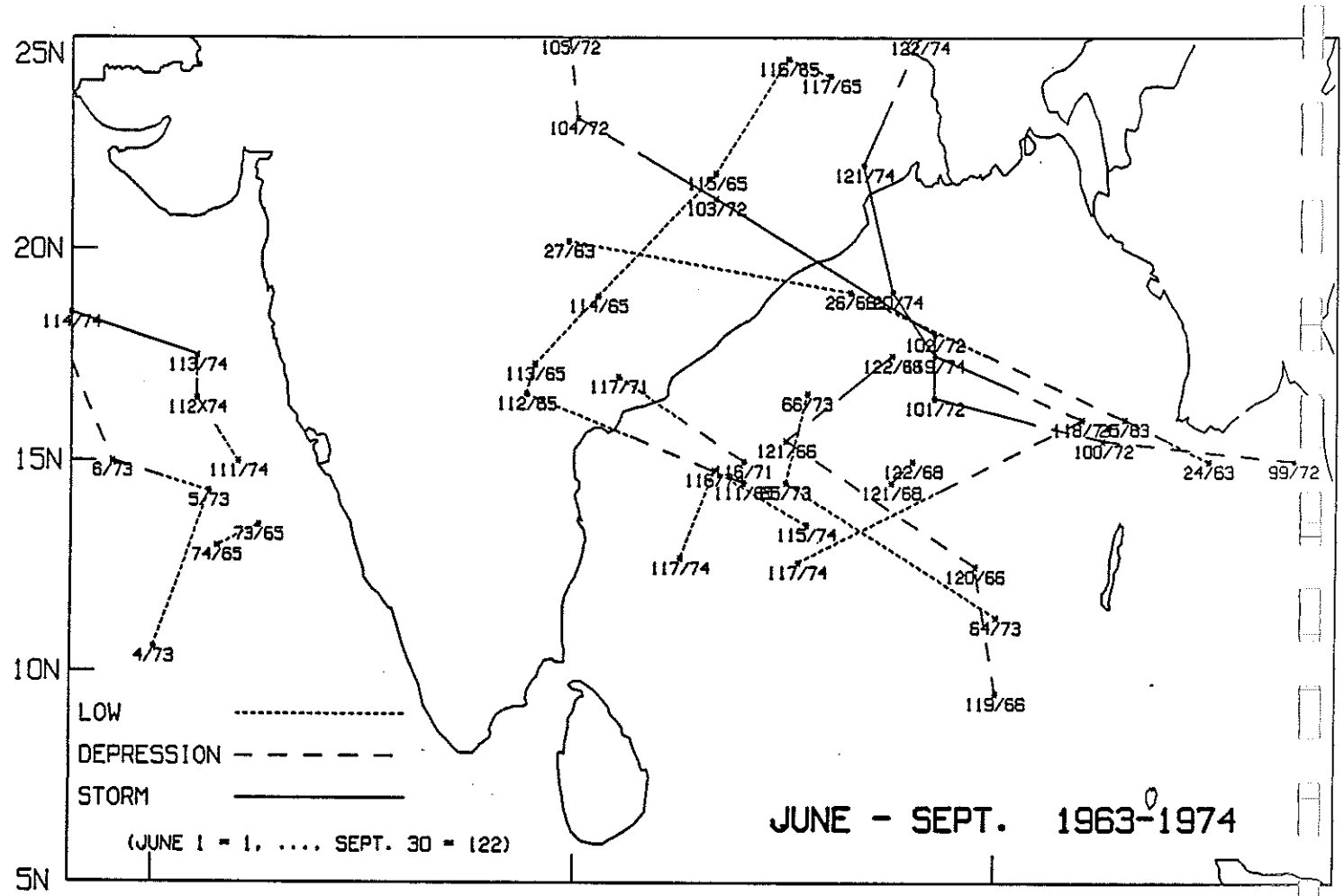

JUNE - SEPT. 1981
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E
95E

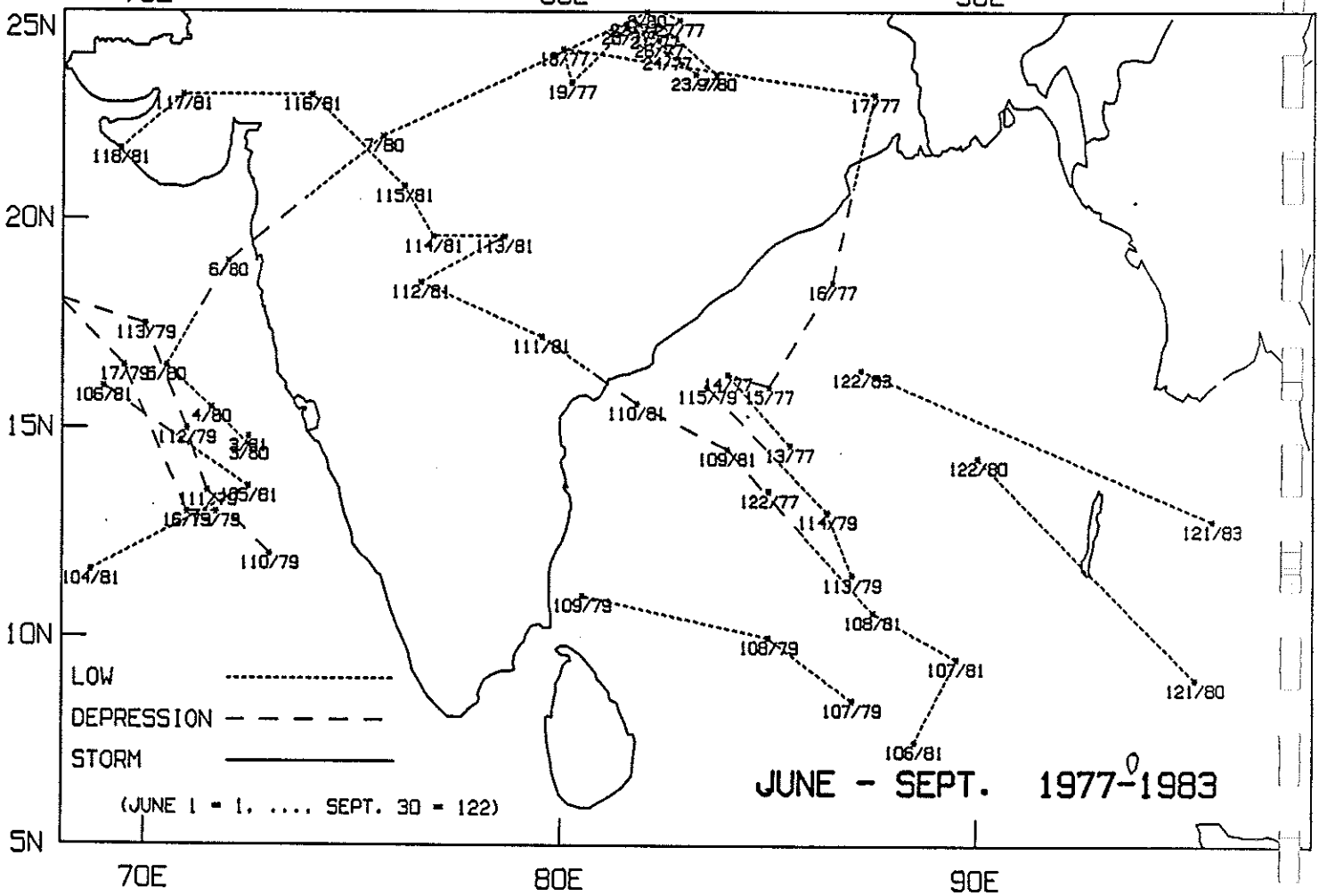

JUNE - SEPT. 1982
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E


JUNE - SEPT. 1983
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ..., SEPT. 30 = 122)
35N
30N
25N
20N
15N
65E
75E
85E


25N
20N
15N
10N
5N
70E
80E
90E
LOW
DEPRESSION
STORM
(JUNE 1 = 1. .... SEPT. 30 = 122)
JUNE - SEPT. 1889-1917


25N
20N
15N
10N
5N
70E
80E
90E
LOW
DEPRESSION
STORM
(JUNE 1 = 1. .... SEPT. 30 = 122)
JUNE - SEPT. 1920-1962


25N
20N
15N
10N
5N
70E
80E
90E
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
JUNE - SEPT. 1963-1974


25N
20N
15N
10N
5N
70E
80E
90E
LOW
DEPRESSION
STORM
(JUNE 1 = 1, ... SEPT. 30 = 122)
JUNE - SEPT. 1977-1983

APPENDIX II

This appendix gives for each low pressure system,, the serial number of the system in the year, the date of formation of the system (the date is also given on 1 to 122 scale within parentheses), the stage and location of the system on the first date. Similar information is given for each subsequent date of the existence of the system without the date. Location is given by latitude (°N to first decimal place) and longitude (°E to first decimal place), decimal being omitted. Stage is given by 1 for low, 2 for depression, 3 for storm, 4 for severe storm and 5 for severe storm with core of hurricane winds.

1888

1.	2JULY(	32)	1	233	885	1	253	840	2	254	820	2	268	811
2.	12JULY(	42)	1	186	865	2	195	868	2	200	850	1	246	808
3.	19JULY(	49)	2	215	885	2	223	860	1	246	838	1	254	820
4.	26JULY(	56)	1	250	826	1	254	835	1	254	813	1	263	787
			1	256	780	1	261	773	1	261	781			
5.	1AUG (	62)	1	248	842	1	256	795	1	259	792			
6.	6AUG (	67)	1	222	878	1	219	862	1	226	850	1	226	850
			1	231	850									
7.	17AUG (	78)	1	238	871	1	252	804	2	251	783	1	245	745
			1	243	705									
8.	20AUG (	81)	2	216	881	1	229	897						
9.	22AUG (	83)	2	220	883	3	220	883	3	233	882	2	240	875
			2	243	875	2	256	856	1	265	838			
10.	31AUG (	92)	1	256	820	1	268	815						
11.	4SEP (	96)	1	191	885	1	200	900	1	200	870	1	230	830
			1	253	828	1	255	823	1	266	833			
12.	14SEP (	106)	2	167	945	2	190	910	3	207	860	2	210	800
			2	213	787	2	250	782	2	290	775			

1889

1.	2JUNE(	2)	1	143	828										
2.	5JUNE(	5)	3	190	720	3	190	710							
3.	9JUNE(	9)	1	193	868	1	207	880	1	207	880	1	233	880
			1	247	898										
4.	17JUNE(	17)	1	235	883	1	226	850	2	240	792	1	247	781
5.	25JUNE(	25)	1	214	885	1	207	882							
6.	25JUNE(	25)	1	250	831	1	242	820	2	240	800	2	238	790
			1	263	762										
7.	2JULY(	32)	1	253	880	1	235	850	1	235	792	1	249	768
8.	14JULY(	44)	1	188	846	2	198	878	2	198	887	2	200	872
			2	197	868	2	212	872	2	216	878	2	250	832
			1	259	838										
9.	5AUG (	66)	2	205	882	2	205	834	2	221	798	1	233	794
			1	235	805	1	252	783							
10.	13AUG (	74)	1	205	875										
11.	16AUG (	77)	2	223	887	2	228	878	2	247	833	2	261	787
			2	260	782										
12.	22AUG (	83)	1	233	870	1	221	856	1	215	840	1	235	835
			1	231	795	1	234	815							
13.	1SEP (	93)	1	260	830										
14.	17SEP (	109)	1	188	890	3	201	851	2	192	830	2	203	815
			2	230	820	2	266	829							
15.	25SEP (	117)	1	182	908	1	182	908	1	253	888				

1890

1.	9JUNE(9)	1	256	802	1	252	800							
2.	18JUNE(18)	1	198	860	2	198	860	1	222	854	1	260	795	
3.	23JUNE(23)	2	238	878	2	249	821	1	256	826	1	271	805	
4.	29JUNE(29)	2	260	802	2	253	795							
5.	29JUNE(29)	1	220	876	1	210	880	2	200	878	2	212	838	
		2	259	753	2	289	741	2	320	753				
6.	11JULY(41)	2	246	827	2	259	807	1	261	807	1	251	788	
		1	247	782										
7.	19JULY(49)	1	214	878	2	214	880	1	231	869	1	242	835	
		1	256	832	1	258	840							
8.	4AUG (65)	1	188	861	1	185	865	1	192	863	1	237	809	
9.	10AUG (71)	2	225	829	1	250	795							
10.	12AUG (73)	1	245	860	1	235	840	2	240	817	1	243	820	
11.	19AUG (80)	1	200	875	1	221	874							
12.	9SEP (101)	1	250	820	1	266	798							
13.	14SEP (106)	1	187	862	1	207	846	1	186	845	1	186	845	
		1	175	840										
14.	22SEP (114)	2	192	855	2	187	847	2	205	832	2	218	807	
		2	231	818	2	233	844	1	240	871				

1891

1.	6JUNE(6)	1	232	845	1	232	847	1	255	869				
2.	30JUNE(30)	1	240	833	1	240	844							
3.	11JULY(41)	1	233	838	1	211	837	1	223	831				
4.	16JULY(46)	1	247	887	1	237	882							
5.	19JULY(49)	1	223	835	1	240	816							
6.	25JULY(55)	1	219	887	2	227	844	2	235	807	2	253	775	
		2	266	728	1	278	722							
7.	31JULY(61)	1	193	904	1	208	911	2	214	887	3	216	865	
		1	233	832	1	238	824							
8.	6AUG (67)	2	223	876	2	221	875	1	243	844	1	260	811	
		1	287	770										
9.	12AUG (73)	2	240	892	2	227	892	2	234	856	1	255	818	
		1	261	820	1	273	804							
10.	20AUG (81)	2	243	821	2	250	794	1	250	796				
11.	21AUG (82)	1	194	872	1	201	867	1	211	874	1	220	844	
		1	216	822	1	215	809	2	238	814	1	217	812	
12.	30AUG (91)	1	167	845	1	189	864	1	199	867	1	208	880	
		1	219	845	1	256	812							
13.	5SEP (97)	1	209	887	1	210	869	2	237	829	2	249	802	
		2	255	791	2	262	775							
14.	11SEP (103)	1	203	889	2	219	863	2	228	831	1	236	803	
		1	250	825										
15.	17SEP (109)	1	183	870	1	200	838	1	225	764				
16.	22SEP (114)	2	191	874	2	197	850	2	211	806	3	211	791	
		2	211	791	2	226	792	2	232	797	2	254	804	
		1	254	804	1	267	807	1	259	821				

1892

1.	7JUNE(7)	1	191	866	2	195	887	3	204	875	5	214	868
		2	222	850	2	249	815	2	245	818	1	254	841
		1	246	860									
2.	16JUNE(16)	1	237	889									
3.	6JULY(36)	1	160	860	1	185	866	1	186	860	2	194	867
		2	215	874	2	224	864	2	219	847	2	249	824
4.	19JULY(49)	1	252	838	1	264	818						
5.	22JULY(52)	1	229	868	2	232	851	2	238	815	2	259	770
		1	286	716	1	291	714						
6.	27JULY(57)	1	187	883	1	216	846	1	247	804	2	286	728
7.	16AUG (77)	1	256	810	1	252	805						
8.	20AUG (81)	1	169	858	1	226	835						
9.	23AUG (84)	1	154	834	1	153	818						
10.	30AUG (91)	1	194	875	1	212	840	1	229	824	1	229	818
		1	233	804	2	233	759	2	243	735	2	255	727
		2	275	739									
11.	6SEP (98)	1	235	887	1	215	894	2	198	890	2	197	877
		2	200	850	2	228	822	1	247	782	1	255	782
12.	16SEP (108)	1	166	861	1	155	851	1	165	855	2	162	863
		2	160	856	2	165	825	1	191	758			

1893

1.	11JUNE(11)	1	143	938	1	177	880	1	163	864	1	163	858
		3	165	844	2	195	793	1	225	800	1	240	807
		2	251	808	2	245	816	2	246	807			
2.	23JUNE(23)	2	226	892	2	234	909	2	233	908	2	235	894
		2	238	852	2	248	806	2	268	762	2	277	729
3.	15JULY(45)	1	223	878	1	235	851	1	242	825			
4.	29JULY(59)	1	205	866	1	202	866	2	200	872	2	222	869
		2	226	860	1	233	835	1	256	807			
5.	7AUG (68)	1	210	878	1	250	831	1	245	838			
6.	13AUG (74)	1	186	952	1	189	950	1	220	873	1	212	882
7.	21AUG (82)	1	188	958	1	193	870	1	202	849	1	228	810
		1	221	802	1	240	811						
8.	26AUG (87)	1	198	853	1	182	857						
9.	1SEP (93)	1	198	874	2	210	878	2	218	873	2	254	810
		2	286	771	1								
10.	9SEP (101)	2	195	886	2	197	882	2	219	873	2	223	844
		2	238	810	2	240	777	2	246	725	1	270	687
		2	268	713	2	275	730	2	304	752			
11.	20SEP (112)	1	194	866	1	195	871	2	197	870	4	203	860
		2	222	840	2	250	836						

1894

1.	13JUNE(	13)	1	226	913	2	237	892	2	226	864	2	239	806
			2	247	756	1	277	742						
2.	19JUNE(	19)	1	218	861	1	210	864	1	210	880	2	220	874
			2	233	845	2	256	809	2	256	812	2	258	823
			2	254	817	1	258	798						
3.	30JUNE(	30)	1	222	874	1	228	874						
4.	8JULY(	38)	2	261	783	1	259	745	1	251	696	2	249	665
5.	11JULY(	41)	2	200	870	2	210	840	2	226	754	1	254	686
6.	15JULY(	45)	1	194	872	2	200	876	2	210	875	2	213	840
			2	220	804	2	226	776	2	234	758	2	245	711
			2	260	670									
7.	23JULY(	53)	1	232	895	3	220	880	2	227	870	2	240	834
			2	240	820									
8.	14AUG (	75)	1	240	850	1	238	843	1	247	826	1	246	826
			1	258	803	1	263	790	1	287	723	1	282	727
9.	1SEP (	93)	1	210	827	1	226	810	1	228	796			
10.	7SEP (	99)	1	185	844	1	198	815	1	202	785			
11.	20SEP (	112)	1	202	975	1	225	967						
12.	24SEP (	116)	1	200	878	1	197	877	2	196	864	2	197	851
			2	210	825	2	226	796	2	236	802	2	247	824

1895

1.	6JUNE(	6)	1	256	796	1	247	798	1	232	804	1	245	807
2.	16JUNE(	16)	3	210	690	3	218	680						
3.	18JUNE(	18)	1	198	876	2	202	870	2	228	819	1	255	768
			1	250	673									
4.	21JUNE(	21)	1	226	876	2	230	876	2	220	867	1	212	848
			1	223	860	2	213	880	2	207	875	3	212	880
			2	226	857	2	254	824	1	270	800			
5.	12JULY(	42)	1	220	700	1	220	682						
6.	17JULY(	47)	1	189	867	2	195	869	2	212	860	1	245	851
			1	254	856									
7.	24JULY(	54)	1	256	850	2	233	856	1	234	850			
8.	30JULY(	60)	2	210	876	1	230	857	1	248	816	1	223	802
9.	6AUG (	67)	1	202	864	2	212	869	2	240	800	2	247	727
10.	11AUG (	72)	2	197	891	2	197	861	1	220	840	1	237	853
11.	23AUG (	84)	1	202	875	2	194	866	2	188	846	1	207	840
			1	226	835									
12.	2SEP (	94)	1	174	882	1	185	875	1	181	858	3	165	820
			2	180	797	1	200	758						
13.	16SEP (	108)	1	181	890	2	195	893	2	207	882	2	228	857
			2	254	830									
14.	27SEP (	119)	1	150	880	1	142	857	1	157	865	1	165	870
			3	207	870	3	237	903						

1896

1.	17JUNE(17)	1	205	878	1	213	875	3	223	884	3	227	848
		2	240	811	2	250	783	2	280	690			
2.	17JUNE(17)	1	193	687	1	200	702	1	216	714	2	214	707
3.	26JUNE(26)	2	216	894	2	220	897	3	230	880	2	242	844
		2	250	798	2	270	776						
4.	13JULY(43)	1	200	827	2	198	798	1	221	796			
5.	18JULY(48)	1	268	800	1	264	805						
6.	22JULY(52)	2	219	885	2	213	870	2	224	800	2	219	772
		2	231	742									
7.	24JULY(54)	2	212	859	1	210	878	2	215	885	3	218	880
		2	215	831									
8.	29JULY(59)	1	212	868	2	230	805						
9.	1AUG (62)	2	215	884	2	220	862	2	230	803			
10.	10AUG (71)	1	214	856	1	210	855	1	205	873	2	210	878
		2	217	846	2	237	789	2	241	705			
11.	19AUG (80)	2	216	891	2	216	891	2	236	876	2	260	860
		1	254	845									
12.	25AUG (86)	1	206	878	1	210	850						
13.	13SEP (105)	1	214	907	2	208	880	2	216	880	2	217	872
		2	233	874	1	235	887	1	240	889			

1897

1.	1JUNE(1)	1	243	835								
2.	15JUNE(15)	1	205	884	2	205	873	2	210	862	2	225	845
		2	245	813	2	240	790	1	250	795	1	305	728
3.	23JUNE(23)	1	250	840	1	251	860	1	240	880	1	238	897
4.	6JULY(36)	1	240	850	1	259	836						
5.	7JULY(37)	1	203	873	1	193	870	2	210	880	1	222	820
6.	10JULY(40)	2	200	700	2	210	700	2	231	697			
7.	13JULY(43)	1	250	869	1	247	880	1	250	845	2	250	822
		2	258	801	1	253	790						
8.	2AUG (63)	1	252	857	1	270	821						
9.	7AUG (68)	1	215	866									
10.	11AUG (72)	1	218	867	1	211	875	1	207	876	1	220	828
		1	252	800	1	254	802	1	266	788	1	304	741
		1	304	735									
11.	19AUG (80)	1	247	857	1	257	840	1	259	832	1	262	835
		1	266	807									
12.	25AUG (86)	1	192	860	1	183	837						
13.	6SEP (98)	1	214	891	1	212	889	2	205	880	2	194	860
		2	190	840	1	211	767	2	210	701			
14.	19SEP (111)	1	136	817	1	147	809						
15.	24SEP (116)	2	185	844	1	229	796	2	282	780			

1898

1.	13JUNE(13)	1	188	860	2	194	855	2	207	862	2	226	882
		2	234	880	2	246	885	2	250	887			
2.	2JULY(32)	1	218	884	1	222	862	1	240	842	2	240	807
		2	247	774									
3.	11JULY(41)	1	235	855	1	220	857	1	223	867			
4.	16JULY(46)	1	258	862	1	250	840	2	268	784	2	285	740
		1	278	706									
5.	18JULY(48)	1	220	880	1	238	852						
6.	22JULY(52)	1	198	866	2	184	862	2	177	838	2	170	833
		1	198	833									
7.	31JULY(61)	1	258	820	1	266	798	1	272	791			
8.	6AUG (67)	1	250	857	1	267	823						
9.	7AUG (68)	1	216	890	1	228	890	2	215	885	2	228	875
		2	248	856	1	243	864	1	243	875	1	245	884
		1	253	852	1	254	834						
10.	21AUG (82)	2	220	899	2	220	850	2	236	798			
11.	26AUG (87)	1	265	806	1	265	820	2	256	822			
12.	27AUG (88)	1	240	900	2	240	902	2	234	874	2	244	836
		2	244	804									
13.	11SEP (103)	2	185	848	2	190	855	3	202	866	3	230	861
		2	248	846	2	260	851						
14.	19SEP (111)	1	216	886	2	224	894	1	240	858			
15.	23SEP (115)	1	190	950									

1899

1.	28JUNE(28)	1	270	795	1	273	797	1	276	795	1	273	804
2.	7JULY(37)	1	237	856	1	254	804	1	270	786			
3.	13JULY(43)	1	224	892	1	232	887						
4.	17JULY(47)	1	262	810	1	250	829	1	262	819	1	261	830
		1	272	814									
5.	26JULY(56)	2	256	850									
6.	1AUG (62)	1	247	830	1	273	800	1	280	802			
7.	9AUG (70)	2	188	903	2	197	860	2	210	846	1	242	816
8.	16AUG (77)	1	250	882	1	252	892	1	251	897			
9.	27AUG (88)	2	198	866	2	202	852	1	247	831	1	250	864
10.	10SEP (102)	1	178	854	2	186	843	2	186	828	2	240	793
		2	262	802	2	257	826	1	251	851			
11.	22SEP (114)	1	205	892	2	221	889	2	245	882			

1900

1.	3JUNE(3)	1	142	825	1	152	787						
2.	11JUNE(11)	3	185	880	3	202	857	2	218	836	2	238	859
		2	252	896									
3.	23JUNE(23)	1	210	873	2	226	890	2	235	880	2	245	888
		2	250	886	2	248	884						
4.	7JULY(37)	1	200	866	1	208	844	1	220	870	1	226	861
5.	13JULY(43)	2	220	884	2	253	826	2	270	788			
6.	29JULY(59)	1	193	868	1	198	861	2	200	866	2	220	871
		1	245	821	1	250	818	1	256	797			
7.	6AUG (67)	1	247	801	1	255	775	1	248	762			
8.	8AUG (69)	1	191	866	1	194	869	2	203	868	2	205	864
		2	211	823	2	228	796	2	254	775	2	270	738
		2	292	735									
9.	15AUG (76)	1	202	918	1	221	900	2	219	887	3	213	879
		3	229	850	2	243	809	2	257	774			
10.	24AUG (85)	1	205	955	1	208	905						
11.	24AUG (85)	1	215	892	1	208	905	1	210	889	2	230	859
		2	253	824	1	264	794	1	264	803			
12.	1SEP (93)	1	224	850	1	230	820						
13.	2SEP (94)	1	197	865	1	207	821	1	233	772			
14.	14SEP (106)	1	213	896	1	212	892	2	205	880	2	218	855
		2	213	860	2	210	847	2	215	846	2	212	847
		2	203	840	2	208	816	2	216	800	2	222	795
		2	237	806	2	260	826						

1901

1.	14JUNE(14)	1	214	880	1	210	882	1	222	880	1	245	860
2.	7JULY(37)	1	223	882	1	233	866	1	239	852	1	250	822
3.	14JULY(44)	1	247	887									
4.	16JULY(46)	1	213	875	1	210	828						
5.	24JULY(54)	1	193	860	1	181	856	1	193	866	1	200	874
		2	205	860	1	229	812	1	270	782			
6.	2AUG (63)	1	238	828	1	243	805	1	247	805			
7.	8AUG (69)	1	223	883	1	226	891	1	240	842	2	251	801
		1	253	812	1	253	815	1	256	810	1	268	780
8.	17AUG (78)	1	196	870									
9.	23AUG (84)	2	219	890	2	230	879	2	241	845	1	245	811
		1	238	814									
10.	29AUG (90)	1	229	815	1	226	808	1	225	822	1	237	831
		1	250	839									
11.	3SEP (95)	1	228	860	2	233	881	2	234	882	2	235	888
		2	242	880	2	240	888						
12.	20SEP (112)	2	170	854	2	167	848	2	189	836	2	205	814
		1	242	800									

1902

1.	2JULY(32)	1	228	875	1	218	873					
2.	7JULY(37)	1	207	716	2	210	714	2	218	714	1	226 706
3.	14JULY(44)	1	211	880	2	218	892	2	228	861	2	248 818
		2	256	798	1	273	794					
4.	22JULY(52)	1	255	809	1	267	807	1	266	822		
5.	27JULY(57)	2	222	874	2	242	861	2	245	824	2	260 798
		2	260	786	2	272	781	1	288	777		
6.	19AUG (80)	1	180	850	1	222	819	1	233	775		
7.	23AUG (84)	1	200	896	3	206	880	2	224	845	2	238 814
		2	250	780	1	257	740					
8.	30AUG (91)	1	200	852	2	200	875	2	210	880	2	234 816
		2	234	730								
9.	6SEP (98)	1	203	873	1	216	885	1	235	871	1	242 838
		1	247	814	1	261	788	1	267	788		
10.	17SEP (109)	1	240	812	1	233	806					
11.	23SEP (115)	1	196	889	3	206	887	2	220	870	2	260 855

NOTE: Data for June, 1902 is not available

1903

1.	15JUNE(15)	2	205	680	2	224	675					
2.	25JUNE(25)	1	222	876	1	233	854	1	255	844		
3.	12JULY(42)	1	198	874	2	200	870	2	202	864	1	238 813
4.	14JULY(44)	2	200	700	2	215	718	2	220	704	1	243 684
5.	17JULY(47)	1	193	860	1	191	862	1	202	862	1	232 849
6.	22JULY(52)	1	216	886	2	212	874	2	211	822	1	235 809
7.	27JULY(57)	1	193	859	1	201	861					
8.	1AUG (62)	1	205	870	1	215	850	1	240	817	1	260 816
		1	260	828								
9.	7AUG (68)	1	252	824	1	262	795					
10.	16AUG (77)	1	214	890	1	210	884					
11.	25AUG (86)	1	266	808	2	259	820	2	256	834		
12.	29AUG (90)	2	181	855	2	181	842	1	227	812		
13.	11SEP (103)	1	234	893	1	240	850	2	250	830	2	258 817
		1	264	802								
14.	15SEP (107)	1	186	869	1	195	857	1	193	823	1	205 794
15.	28SEP (120)	1	216	887	1	221	871	1	213	830	1	233 805
		1	235	804								

1904

1.	2JUNE(2)	1	153	950	2	157	938							
2.	3JUNE(3)	1	240	831	1	247	831							
3.	9JUNE(9)	1	215	885	2	221	885	2	235	897	2	254	905	
4.	16JUNE(16)	1	210	874	2	221	878	2	218	855	1	212	853	
5.	21JUNE(21)	1	258	804	1	254	810							
6.	28JUNE(28)	1	220	871	1	220	873	2	218	880	2	214	881	
		1	212	854	1	216	814							
7.	7JULY(37)	1	230	887	2	230	868	2	249	840	2	249	794	
		1	262	782										
8.	16JULY(46)	1	244	856	1	230	871	1	234	862				
9.	22JULY(52)	1	240	844	1	252	813	1	264	785	1	272	791	
10.	30JULY(60)	1	250	812	1	253	790							
11.	7AUG (68)	1	250	811	1	250	820							
12.	11AUG (72)	1	214	887	1	216	886	2	216	883	1	237	846	
		1	252	822	1	262	804							
13.	19AUG (80)	1	215	886	2	215	888	2	215	885	2	238	848	
		2	253	808	2	270	778	1	275	775				
14.	27AUG (88)	1	203	875	1	208	878	1	225	876				
15.	5SEP (97)	1	214	882	2	207	876	2	209	855	2	221	815	
16.	9SEP (101)	1	188	870	1	188	866	2	189	860	2	190	830	
		2	190	800	2	216	774	2	224	758	2	252	769	
		2	280	782	1	285	780							
17.	21SEP (113)	1	229	887	1	225	896	1	230	890				

1905

1.	1JUNE(1)	1	203	836	1	212	830							
2.	27JUNE(27)	1	255	828	1	258	798	1	256	798				
3.	30JUNE(30)	2	203	873	2	222	824	1	247	804	1	271	806	
4.	4JULY(34)	1	240	894	2	220	886	2	230	852	2	240	812	
		2	240	770										
5.	11JULY(41)	1	213	893	1	221	878	1	240	870	1	254	846	
6.	19JULY(49)	2	210	887	2	200	861	2	215	818	2	223	760	
		2	252	715	2	246	705	1	264	705				
7.	23JULY(53)	1	220	957	1	210	892	1	225	902				
8.	27JULY(57)	1	228	910	1	246	894	1	249	892				
9.	23AUG (84)	1	200	861	1	191	860	1	200	856	1	216	833	
10.	4SEP (96)	1	233	855	1	228	840							
11.	6SEP (98)	1	193	880	2	195	865	2	208	865	2	215	810	
		2	242	755	2	270	702	2	320	748				
12.	11SEP (103)	1	197	873	1	243	847							
13.	14SEP (106)	1	250	851	2	250	855	1	256	857				
14.	21SEP (113)	1	188	884	1	180	868	1	182	861	2	181	838	
		2	200	826	2	230	796							
15.	27SEP (119)	1	209	918	2	222	885	2	242	850	1	268	858	

1906

1.	8JUNE(8)	1	248	800	1	253	800							
2.	17JUNE(17)	1	184	865	2	190	864	2	207	828	2	220	813	
		2	240	781										
3.	24JUNE(24)	1	220	876	1	226	892	1	222	910				
4.	30JUNE(30)	1	260	810	2	251	822	2	246	802	1	259	778	
5.	20JULY(50)	1	200	868	2	200	869	2	211	840	2	227	802	
6.	25JULY(55)	1	220	906	2	232	887	2	236	857	1	250	854	
7.	9AUG (70)	1	257	839	1	266	816							
8.	26AUG (87)	1	202	852	2	211	860	2	215	845	2	227	815	
		1	245	786										
9.	4SEP (96)	1	196	877	1	200	863	1	220	838	1	228	833	
10.	9SEP (101)	1	220	887	1	220	886	1	227	889	2	224	864	
		2	247	814	2	271	767	1	314	752				
11.	25SEP (117)	2	194	862	1	202	834	1	238	892	1	251	899	
		1	248	894										
12.	26SEP (118)	1	215	966										

1907

1.	5JUNE(5)	3	212	671	3	248	670							
2.	8JUNE(8)	1	227	873	1	227	836	1	235	819	1	247	793	
3.	14JUNE(14)	1	246	806	1	256	808							
4.	14JUNE(14)	1	174	850	2	176	838	2	188	847	2	198	871	
		3	215	882	2	235	875	2	240	855	2	237	860	
		2	264	817										
5.	17JUNE(17)	2	216	695										
6.	22JUNE(22)	2	216	889	2	215	895	3	216	900	4	232	880	
		2	228	854	1	236	823							
7.	3JULY(33)	1	261	800	1	261	796							
8.	1AUG (62)	1	211	880	1	213	875							
9.	9AUG (70)	1	242	837	1	235	830							
10.	10AUG (71)	1	208	878	1	195	863	2	208	886	2	210	884	
		2	210	880	2	221	833	2	243	810	1	259	770	
		1	274	725	1	274	736	1	277	726				
11.	18AUG (79)	2	227	879	2	221	880	2	216	871	1	250	838	
		1	252	822										
12.	25AUG (86)	1	208	892	2	205	878	1	210	870	1	216	865	
13.	1SEP (93)	1	230	889	1	231	887	1	240	876				
14.	5SEP (97)	1	208	880	1	202	886	1	194	869				

1908

1.	15JUNE(15)	3	184	687	3	191	669						
2.	16JUNE(16)	1	220	880	1	215	892	2	230	892	2	242	887
		2	247	897	2	250	896	2	242	882			
3.	23JUNE(23)	2	222	878	2	215	865	2	222	833	1	245	812
4.	7JULY(37)	1	240	896	1	232	891	2	227	864	2	219	844
		2	222	826	1	252	810						
5.	22JULY(52)	1	222	870	1	247	817	1	224	800			
6.	29JULY(59)	1	240	810	1	259	794						
7.	1AUG (62)	1	209	855	1	224	814	1	229	805			
8.	6AUG (67)	1	200	874	1	212	890	1	230	860	1	224	846
9.	12AUG (73)	1	213	876	2	213	880	1	216	878	1	221	875
		1	225	874									
10.	19AUG (80)	1	221	875	1	219	880	1	245	820	1	250	820
		1	248	822	1	250	823	1	250	812	1	260	810
11.	27AUG (88)	1	205	895	1	195	873	2	200	862	1	224	828
		1	240	810	1	278	735	1	280	737	1	301	725
		1	310	724									
12.	13SEP (105)	1	174	849	1	166	849						
13.	21SEP (113)	1	136	943	1	143	925						
14.	24SEP (116)	1	162	860	2	160	838	2	163	822	1	170	814
		1	176	807									

1909

1.	5JUNE(5)	1	210	856	1	214	849	1	237	835	1	254	840
		2	259	847									
2.	13JUNE(13)	1	242	797	1	254	791						
3.	9JULY(39)	1	210	872	1	210	880	1	207	880	1	210	880
		2	215	874	1	220	856	1	246	845			
4.	16JULY(46)	1	227	859	1	250	812						
5.	23JULY(53)	1	267	814	1	256	793						
6.	24JULY(54)	1	210	875	1	210	835	1	227	806	1	247	806
7.	29JULY(59)	1	207	886	1	240	880	2	210	880	1	235	830
		1	243	772	1	261	736						
8.	29AUG (90)	1	240	875	1	248	859	1	255	812			
9.	4SEP (96)	1	148	824	1	172	800	1	224	720	2	219	711
		2	240	705	1	262	716	1	300	762			
10.	13SEP (105)	1	233	887	1	233	880	1	233	865	1	249	840
11.	20SEP (112)	1	215	904	2	212	877	2	214	820	1	218	785
12.	28SEP (120)	1	195	867	1	221	873						

1910

1.	16JUNE(	16)	1	261	812	1	280	812							
2.	19JUNE(	19)	1	258	797	1	255	794							
3.	23JUNE(	23)	1	189	860	1	192	860							
4.	27JUNE(	27)	1	247	785	1	248	790	1	260	793				
5.	1JULY(	31)	1	213	887	2	205	894	3	212	884	3	216	840
			2	230	793	2	240	734	2	247	695	2	262	673
6.	30JULY(	60)	1	190	865	1	195	870	1	195	860	2	205	869
			3	206	869	2	225	830	2	240	788	1	262	777
7.	12AUG (	73)	1	235	870	1	250	857						
8.	21AUG (	82)	1	202	958	1	235	913						
9.	3SEP (	95)	1	216	908	1	216	887	1	212	880	1	213	875
			1	212	874	1	223	875	1	256	800	1	283	774
10.	12SEP (	104)	1	170	860	1	172	855						
11.	15SEP (	107)	1	240	819	1	245	817	1	238	798			
12.	22SEP (	114)	1	188	865	1	214	870						
13.	26SEP (	118)	1	153	820	1	153	815	1	176	852	1	200	805
			1	205	739	1	238	760						

1911

1.	10JUNE(	10)	2	193	866	2	210	848	2	232	830	2	240	855
			2	235	882	2	238	897						
2.	16JUNE(	16)	1	225	892	2	212	886	2	210	890	2	224	871
			2	230	857	2	240	857	1	240	862	1	252	862
			1	250	860	1	242	871	1	247	886			
3.	9JULY(	39)	1	226	868	1	228	864	1	240	837			
4.	13AUG (	74)	1	234	866	1	230	860	1	228	868	1	224	870
			1	224	870	1	237	860	1	245	854			
5.	22AUG (	83)	1	230	850	2	252	814						
6.	25AUG (	86)	1	184	877	1	188	880	1	188	890	1	193	870
			2	193	861	1	228	813	1	245	798			
7.	2SEP (	94)	1	245	836	1	240	836	1	238	822	1	240	819
			1	254	820									
8.	10SEP (	102)	1	255	812	1	250	786						
9.	10SEP (	102)	1	212	880	1	214	874	1	232	835	1	246	830
10.	17SEP (	109)	1	240	840	1	240	840						
11.	20SEP (	112)	2	162	914	2	160	916	2	184	880	3	186	852
			3	187	829	2	213	811	2	242	790	2	264	769
			2	268	765									

1912

1.	10JUNE(10)	1	226	809	1	233	804	1	233	794	1	228	795	
2.	6JULY(36)	1	245	835	1	245	826							
3.	27JULY(57)	1	212	890	2	248	880	2	232	800				
4.	30JULY(60)	1	219	892	2	205	886	2	196	865	2	200	863	
		2	224	835	2	228	815	1	235	811				
5.	7AUG (68)	1	188	869	1	214	857	1	240	800	1	267	790	
		1	288	788										
6.	28AUG (89)	1	205	878	2	228	851	1	259	796	1	270	770	
7.	4SEP (96)	1	206	891	2	220	886	2	235	835	2	270	789	
8.	23SEP (115)	1	150	840	2	172	834	2	207	781	1	240	780	
9.	25SEP (117)	1	150	940										
10.	27SEP (119)	1	182	859	1	203	833							

1913

1.	3JUNE(3)	1	232	760	1	237	758							
2.	11JUNE(11)	1	209	710	1	218	748	1	259	797				
3.	13JUNE(13)	1	233	905	1	250	860	1	247	865	1	256	869	
4.	27JUNE(27)	1	235	885	1	246	870							
5.	7JULY(37)	1	173	849	1	195	805							
6.	15JULY(45)	1	193	875	2	195	873	3	200	857	2	220	804	
		2	240	730	2	256	702	2	282	694				
7.	22JULY(52)	1	223	892	2	222	895	3	221	890	3	222	865	
		2	235	807	2	250	750	2	265	692				
8.	28JULY(58)	1	225	920	2	223	904	4	220	890	3	221	869	
		2	228	840	2	233	812	1	250	820				
9.	6AUG (67)	2	235	902	2	248	885	2	240	875	1	247	866	
		1	252	867	1	253	873	1	247	886				
10.	22AUG (83)	1	195	866	2	214	857	2	240	793	1	260	730	
		1	261	690										
11.	29AUG (90)	2	205	878	2	203	870	2	197	836	2	216	804	
		2	223	776	2	240	736	1	256	725				
12.	5SEP (97)	1	250	842	1	248	855							
13.	13SEP (105)	1	202	895	1	240	886	1	207	882	1	200	873	
		1	235	866	1	252	836							
14.	30SEP (122)	1	205	890	1	200	894							

1914

1.	1JUNE(1)	1	185	880	3	185	885	5	203	925				
2.	6JUNE(6)	1	195	880	1	240	850	1	240	838	1	245	827
		1	252	810									
3.	23JUNE(23)	1	198	884	2	198	869	2	193	866	2	207	806
		2	214	773	2	262	701	2	250	690			
4.	2JULY(32)	1	226	901	2	240	894						
5.	8JULY(38)	1	193	897	1	194	886	2	195	870	2	215	870
		2	235	821	2	259	793						
6.	8JULY(38)	1	242	833	1	238	796	1	250	757			
7.	22JULY(52)	1	253	769	1	280	725						
8.	26JULY(56)	1	219	866	2	206	876	1	218	864	1	210	851
9.	4AUG (65)	1	245	846	1	246	843	1	246	826	1	246	802
		1	247	797									
10.	22AUG (83)	1	202	880	1	202	884	1	205	884			
11.	3SEP (95)	1	191	886	1	180	870	1	183	860	1	190	857
		1	208	806									
12.	9SEP (101)	1	190	884	1	177	880	2	186	869	2	178	856
		2	190	833	2	192	798	2	203	786	2	220	746
		2	252	742	2	277	734						

1915

1.	22JUNE(22)	1	238	785	1	235	785							
2.	23JUNE(23)	1	172	848	2	182	842	2	210	812	2	238	805
		1	238	805									
3.	1JULY(31)	1	255	822	1	256	835							
4.	28JULY(58)	1	219	889	1	231	846	1	243	826				
5.	31JULY(61)	1	209	878	1	210	880	2	203	882	2	212	866
		2	236	819	1	256	801	1	261	791			
6.	26AUG (87)	1	223	865	2	198	866	2	206	870	2	234	836
		2	243	822	2	258	816	1	267	817			
7.	4SEP (96)	1	203	886	1	208	882	1	195	865	1	178	849
		1	195	812									
8.	14SEP (106)	1	260	766									
9.	16SEP (108)	1	216	875	1	247	814						
10.	28SEP (120)	1	141	926	1	148	902	1	170	870	2	174	840
		2	160	825	1	193	806	1	222	802	1	232	810
		1	240	814	2	256	824						

1916

1.	2JUNE(2)	1	181	870		1	187	890		1	195	916		2	225	896
		1	245	865												
2.	11JUNE(11)	1	218	880		2	227	887		2	233	871		2	220	854
		2	226	822		2	246	774								
3.	23JUNE(23)	1	250	847		2	242	843		1	247	830				
4.	2JULY(32)	1	188	882		1	195	874								
5.	31JULY(61)	1	187	868		1	193	864								
6.	13AUG (74)	2	220	882		2	212	836		2	226	790				
7.	18AUG (79)	1	259	790		2	250	796		2	245	794		1	250	775
		2	256	735		1	256	697								
8.	22AUG (83)	1	195	870		1	205	823		1	236	817		1	258	811
		1	260	805		2	253	807		1	263	786				
9.	13SEP (105)	1	205	709		1	231	700								
10.	20SEP (112)	2	196	885		4	208	884		3	234	870		2	226	842
		2	230	812		2	230	793		2	240	779		2	252	766
		1	266	750												

1917

1.	5JUNE(5)	1	140	832		1	155	842		1	160	850		1	171	853
		1	193	863		1	200	884								
2.	13JUNE(13)	1	230	887		1	231	862		2	245	820		1	260	776
3.	18JUNE(18)	1	208	890		1	221	880		1	223	880		1	245	871
4.	26JUNE(26)	1	205	882		1	202	883		2	216	862		2	231	807
		1	250	785												
5.	13JULY(43)	1	202	878		1	226	861								
6.	30JULY(60)	1	227	890		2	238	880		1	248	860		1	247	852
		1	254	826		1	265	795								
7.	7AUG (68)	1	219	870		1	227	840		2	247	788		1	277	737
8.	12AUG (73)	1	245	817		2	242	807		1	248	785				
9.	23AUG (84)	1	181	876		1	203	878		1	224	815		1	247	804
		1	250	785												
10.	4SEP (96)	1	193	876		1	188	876		2	178	866		2	205	845
		1	233	802		1	256	775		1	268	718		1	263	680
11.	19SEP (111)	1	266	774		1	274	758		1	278	727		1	290	740
		2	307	734		2	328	748								

1918

1.	11JUNE(11)	1	233	828	1	235	842							
2.	14JUNE(14)	2	216	874	2	221	850	2	221	840	1	230	829	
		1	240	817										
3.	23JUNE(23)	1	243	886	1	247	885	1	250	886				
4.	28JULY(58)	1	203	886	2	206	870	2	221	831	1	230	813	
5.	14AUG (75)	1	198	880	1	208	880	2	212	865	1	237	821	
		1	235	789										
6.	23AUG (84)	1	249	842	1	258	851	1	247	857	1	242	842	
		2	242	820	2	240	790	2	250	753	2	273	706	
		1	270	680										
7.	28AUG (89)	1	173	878	1	187	880	1	188	880	1	192	884	
		2	197	882	2	202	876							
8.	4SEP (96)	1	188	878	2	230	876	1	240	860	1	246	865	
		1	264	850										
9.	14SEP (106)	1	231	870										
10.	28SEP (120)	1	217	902	1	235	911							

1919

1.	5JUNE(5)	1	162	849	1	185	864							
2.	9JUNE(9)	2	238	833	2	234	847	2	226	864	2	226	861	
		2	228	859	1	238	800							
3.	30JUNE(30)	1	193	856	2	200	869	2	235	809	1	256	785	
		2	278	788										
4.	6JULY(36)	1	256	857	2	262	831	1	261	823	1	247	823	
		1	258	783										
5.	20JULY(50)	1	250	784										
6.	29JULY(59)	2	194	880	2	195	880	3	198	882	3	210	865	
		2	223	819	2	248	770	1	268	751				
7.	5AUG (66)	1	214	910	2	214	901	2	230	887	2	238	842	
		2	254	828	1	268	797							
8.	11AUG (72)	1	224	890	2	226	873	1	235	860	1	240	819	
9.	18AUG (79)	1	242	802	1	246	798							
10.	22AUG (83)	1	233	794	1	246	775	1	255	726	1	250	700	
11.	24AUG (85)	2	192	880	2	200	868	2	193	865	2	222	864	
		1	243	821	1	261	807	1	270	785				
12.	30AUG (91)	1	225	878	1	209	884	1	235	859	1	256	840	
13.	6SEP (98)	1	242	864	1	265	822							
14.	24SEP (116)	2	206	888	1	249	890							

1920

1.	10JUNE(10)	3	203	694	4	212	700	4	220	711	3	222	715
		2	233	724									
2.	20JUNE(20)	1	192	868	1	193	857	1	226	831	1	252	804
		1	283	782									
3.	3JULY(33)	1	209	874	1	219	871						
4.	7JULY(37)	1	221	860									
5.	14JULY(44)	2	219	890	2	233	869	1	237	854			
6.	20JULY(50)	1	230	868	2	232	884	2	222	880	2	210	878
		2	220	842	1	245	795	1	268	785			
7.	30JULY(60)	2	213	892	2	219	864	1	238	845			
8.	5AUG (66)	1	218	913	2	223	896	2	237	847	1	250	810
9.	21AUG (82)	1	210	882	1	205	880	1	198	899	1	203	890
		2	195	875	2	221	833	2	230	786			
10.	4SEP (96)	1	220	897	1	198	897	1	188	894	2	190	884
		2	198	880	2	220	869	2	245	850			
11.	12SEP (104)	1	233	867	1	235	887	1	226	871	1	238	873
12.	24SEP (116)	1	150	958	1	170	945	1	179	916	1	190	922
		1	222	896	1	226	878						

1921

1.	17JUNE(17)	2	309	724	2	309	724					
2.	19JUNE(19)	1	216	868	1	228	850	1	233	840	1	237	840
3.	27JUNE(27)	1	202	868	1	216	862	1	240	845			
4.	6JULY(36)	1	182	878	1	252	789	1	262	772			
5.	24JULY(54)	1	195	887	2	193	885	3	210	885	4	230	882
		2	230	861	2	240	833	2	250	762	2	254	695
6.	3AUG (64)	1	242	800									
7.	8AUG (69)	2	208	880	2	228	852	2	240	794	1	245	795
8.	11AUG (72)	1	240	895	1	240	802						
9.	16AUG (77)	1	240	886	1	242	875	1	254	847			
10.	22AUG (83)	1	233	880	1	228	869	1	231	862			
11.	1SEP (93)	1	193	880	1	180	887	2	191	880	2	195	864
		2	203	840	2	240	804	1	247	774			
12.	1SEP (93)	1	238	816	1	238	809	2	245	724	2	235	682
13.	13SEP (105)	1	238	844	1	245	836						
14.	14SEP (106)	1	178	884	2	178	869	2	175	869			
15.	17SEP (109)	2	183	819	2	203	784	2	235	760	1	254	750
		1	260	781	1	269	788						
16.	28SEP (120)	1	170	914	1	166	899	1	167	900	1	174	887

1922

1.	1JUNE(1)	1	182	865		1	186	871		2	198	880		2	235	870
		2	268	874												
2.	12JUNE(12)	1	200	895		1	220	890		2	221	891				
3.	5JULY(35)	1	205	885		1	202	896		2	200	895		3	207	878
		2	235	850		2	254	829		1	247	831		1	242	838
		1	249	822		1	256	807								
4.	19JULY(49)	1	179	873		2	187	891		2	192	882		2	194	876
		2	219	856												
5.	25JULY(55)	1	234	865		1	265	822								
6.	27JULY(57)	2	205	896		2	210	866		1	235	812		1	240	804
		1	262	817		1	275	800								
7.	1AUG (62)	1	235	887		2	237	880		2	240	850		2	247	835
8.	14AUG (75)	1	198	899		1	192	890		2	196	886		1	220	865
		1	211	851												
9.	19AUG (80)	1	205	884		2	228	870		2	245	821		2	258	756
10.	26AUG (87)	1	230	868		1	226	855								
11.	2SEP (94)	1	180	872		1	182	884		1	195	860		1	240	794
		1	273	729		1	270	678								
12.	6SEP (98)	1	190	866		1	193	867		1	194	873		2	190	880
		2	206	844		2	223	797								
13.	13SEP (105)	1	175	880		1	238	800		1	240	780		1	240	779
		1	243	767												
14.	17SEP (109)	1	206	867		1	240	775		1	240	793		1	268	800
15.	22SEP (114)	1	193	874		2	226	865		2	240	874		2	235	873

1923

1.	2JUNE(2)	1	226	807		1	226	809		1	226	820			
2.	5JULY(35)	1	228	860		1	245	822		2	245	788		2	268	760
3.	13JULY(43)	1	224	859		1	226	840								
4.	21JULY(51)	1	230	804												
5.	29JULY(59)	2	231	857		2	240	807		1	245	795		1	259	760
6.	3AUG (64)	1	223	882		1	234	870		2	230	885		2	233	876
		1	247	814		2	262	793		1	272	782				
7.	10AUG (71)	1	219	900		2	222	890		1	226	857		1	236	820
8.	15AUG (76)	1	208	890		2	230	874		1	234	862		2	234	845
9.	20AUG (81)	2	223	875		2	216	886		2	212	885		2	225	860
		2	227	846		2	234	810		2	242	791				
10.	16SEP (108)	1	168	847												
11.	19SEP (111)	1	217	770		1	210	753		1	232	764		1	243	767
12.	25SEP (117)	1	183	870		1	188	845								
13.	28SEP (120)	2	170	860		2	200	820		2	227	804		2	237	824

1924

1.	15JUNE(15)	2	198	920	2	218	920	1	238	910			
2.	17JUNE(17)	2	207	705									
3.	21JUNE(21)	1	247	884									
4.	15JULY(45)	1	261	812	1	257	818						
5.	18JULY(48)	1	252	838	1	258	844						
6.	1AUG (62)	1	271	795	1	267	798						
7.	4AUG (65)	2	208	890	2	220	860	2	235	817	1	250	815
		1	259	813	1	252	817	1	261	788	1	272	756
8.	23AUG (84)	1	197	724									
9.	25AUG (86)	1	205	894	1	212	854	1	215	859	1	231	859
		2	235	815	2	240	780	2	254	736	1	259	702
10.	27AUG (88)	1	232	810	1	246	810						
11.	2SEP (94)	2	160	900	2	176	855	2	202	838	2	210	842
		2	249	840	1	268	788	1	271	777			
12.	14SEP (106)	1	233	833	1	236	847	1	233	849	1	228	854
13.	24SEP (116)	2	110	830	2	144	806	2	174	772	2	200	745
		2	220	739	2	255	767						

1925

1.	2JUNE(2)	1	207	724	1	200	714	1	223	711	1	220	727
		2	228	756	2	258	810						
2.	24JUNE(24)	2	194	720	2	221	705	2	220	692			
3.	26JUNE(26)	2	203	890	3	203	890	3	220	880	2	235	868
		2	235	857	2	249	846	2	255	840	2	260	814
4.	3JULY(33)	1	210	887	2	207	876	2	218	865			
5.	9JULY(39)	2	205	889	2	200	889	2	210	880	2	222	835
		2	233	810	2	254	788						
6.	24JULY(54)	1	235	886	1	226	889	1	221	874	2	221	860
		2	227	834	2	237	800						
7.	20AUG (81)	2	226	889	2	210	887	2	227	887	1	234	803
		1	234	803	2								
8.	29AUG (90)	2	182	874	2	194	870	2	207	852	1	230	840
		1	258	834	2	258	831	2	241	842			
9.	6SEP (98)	2	209	879	2	227	829	2	246	835	2	256	819
		1	271	805									
10.	14SEP (106)	1	227	908	1	240	895	1	262	880			

1926

1.	19JUNE(19)	1	273	777								
2.	5JULY(35)	1	225	900	1	226	892	1	225	868	2	242	782
3.	9JULY(39)	1	218	870	1	207	870	1	214	815	2	240	807
		1	256	804									
4.	20JULY(50)	1	256	874	1	240	890	2	228	890	1	238	860
		1	246	840	1	245	819	1	247	798			
5.	6AUG (67)	1	206	876	2	205	869	2	222	812	1	231	804
		1	236	812									
6.	12AUG (73)	1	250	824	1	265	800						
7.	13AUG (74)	1	238	884	2	225	887	2	230	876	2	215	874
		1	214	856	2	226	814	2	240	801	1	249	774
8.	1SEP (93)	1	252	764	2	245	729	2	237	696	2	235	674
		1	250	670									
9.	3SEP (95)	1	238	864	1	246	860	1	236	857	1	248	814
		1	254	776	1	256	741						
10.	14SEP (106)	2	172	890	2	180	870	2	190	866	2	216	857
		2	259	815	2	240	812	2	236	820	2	235	821
		2	237	810	1	240	814	2	258	830			
11.	16SEP (108)	2	205	690	2	212	714	2	255	704			
12.	30SEP (122)	2	165	865	2	183	866	2	181	840	1	202	815

1927

1.	3JUNE(3)	1	200	880	3	200	880	1	237	876	2	258	875
2.	16JUNE(16)	2	190	868	3	203	862	2	222	827	2	240	794
		2	280	795									
3.	5JULY(35)	1	223	711									
4.	11JULY(41)	2	216	892	2	216	817	2	229	740			
5.	18JULY(48)	1	200	869	1	189	867	1	200	880	1	207	882
		1	220	852									
6.	23JULY(53)	1	220	876	2	222	858	2	230	810	2	248	780
		2	250	731	2	256	733	2	266	724	1	280	729
7.	27JULY(57)	2	203	892	2	216	894	2	226	873	2	235	859
		1	263	845									
8.	6AUG (67)	1	195	909	2	228	871						
9.	11AUG (72)	1	200	866	1	214	860	1	230	824	1	253	819
		1	260	772	1	260	778	1	268	776	1	260	759
10.	15AUG (76)	1	212	885	1	212	894	2	226	864	2	234	831
		2	248	812	1	254	760						
11.	21AUG (82)	1	195	891	1	194	885	2	192	882	2	228	866
		2	220	824	1	230	826	1	245	830			
12.	19SEP (111)	1	152	831	1	176	750	1	218	714	2	190	680
13.	25SEP (117)	2	158	854									

1928

1.	4JUNE(4)	1	223	825	1	225	821						
2.	6JUNE(6)	1	180	900	3	200	920	1	212	901			
3.	10JUNE(10)	1	235	793	1	254	775	1	250	769	1	290	720
		1	298	746									
4.	15JUNE(15)	2	240	884	2	231	890	2	233	892	2	221	882
		1	227	874									
5.	26JUNE(26)	2	240	830									
6.	1JULY(31)	1	195	884	2	234	822	2	229	811	2	227	794
		2	247	760	2	277	724						
7.	17JULY(47)	1	260	821									
8.	17JULY(47)	2	190	900	3	201	905	3	207	889	2	228	814
		1	243	762									
9.	22JULY(52)	2	200	890	2	200	887	3	190	900	3	205	884
		2	218	860	2	230	828	2	250	800			
10.	1AUG (62)	2	202	896	2	227	905						
11.	24AUG (85)	2	180	900	2	180	900	2	227	855	1	202	814
		1	221	804	1	234	790	1	243	760	2	262	714
		2	318	726									
12.	31AUG (92)	1	231	870	1	233	847	1	252	817	1	246	822
13.	5SEP (97)	1	213	847									
14.	11SEP (103)	1	180	882	1	205	880	1	203	880	1	193	874
15.	15SEP (107)	1	163	847	1	179	814	1	195	792			
16.	22SEP (114)	1	190	890	1	215	887						
17.	27SEP (119)	1	156	835	1	160	844	1	192	812			

1929

1.	2JUNE(2)	2	170	920	3	200	913	3	226	922			
2.	15JUNE(15)	1	236	822	1	237	791						
3.	18JUNE(18)	1	180	876	1	184	866	2	193	840	2	226	800
		2	245	785	2	263	810	1	265	815			
4.	11JULY(41)	1	210	890	1	227	810	2	234	718	2	255	720
5.	14JULY(44)	1	224	890	1	215	894	2	210	890	2	214	884
		2	242	844	2	249	833	1	262	802	1	265	805
		1	269	788									
6.	23JULY(53)	1	221	895	2	220	856	2	237	822	2	256	767
		2	268	720	2	262	682						
7.	27JULY(57)	1	223	890	1	220	891	1	225	880	2	226	856
		1	238	836	1	248	822						
8.	8AUG (69)	1	223	894	1	231	875	1	232	866	1	235	867
		1	240	870									
9.	14AUG (75)	1	228	870	1	228	855	1	230	847	1	242	845
		1	240	835	1	248	815						
10.	20AUG (81)	1	198	880	1	193	880	2	190	870	2	202	880
		2	227	827	2	245	796	2	252	767	2	274	732
		1	320	734									
11.	27AUG (88)	1	210	880	1	190	890	2	190	860	2	185	855
		1	212	833	1	220	830						
12.	10SEP (102)	1	238	874									
13.	20SEP (112)	2	170	700	1	190	700						
14.	28SEP (120)	2	140	680	3	160	660						

1930

1.	16JUNE(	16)	1	234	800	1	230	788							
2.	29JUNE(	29)	2	195	875	3	195	875	3	200	864	2	213	850
			2	221	809										
3.	8JULY(	38)	1	245	891	2	240	850	1	240	790				
4.	14JULY(	44)	1	210	888	1	216	902	3	215	911	2	230	910
			2	230	886	2	233	860	2	235	826	2	240	788
			2	254	760	1	258	689							
5.	22JULY(	52)	2	214	880	1	231	857	1	242	834	1	252	840
			1	247	840	1	240	835	1	246	830	1	256	832
6.	2AUG (	63)	1	200	870	1	221	833	1	232	809	1	235	809
7.	7AUG (	68)	1	234	821	1	243	825							
8.	11AUG (	72)	1	273	793	1	270	800							
9.	7SEP (	99)	1	190	890	1	185	855	1	198	825	1	210	800
10.	12SEP (	104)	1	208	809	1	221	774	1	248	774	1	253	791
			1	263	817										
11.	21SEP (	113)	1	205	880	1	210	874	1	208	880	1	208	880
			1	208	880	1	212	861							

1931

1.	20JUNE(	20)	1	248	796	1	245	804							
2.	1JULY(	31)	1	226	889	2	238	862	2	246	820	2	258	778
			1	287	760										
3.	7AUG (	68)	1	223	859										
4.	14AUG (	75)	2	207	885	2	205	890	2	223	869	1	259	771
5.	18AUG (	79)	1	226	889	1	215	892	3	209	882	2	219	850
			2	232	817	2	238	790	1	250	771				
6.	27AUG (	88)	1	238	817	1	250	776	1	262	720	1	264	718
7.	30AUG (	91)	1	185	885	1	193	880	1	206	870	1	218	864
			1	227	844										
8.	22SEP (	114)	1	202	791	1	208	800							
9.	22SEP (	114)	2	180	880	2	180	880	2	180	870	2	174	854
			2	192	815	2	220	802	1	238	795				

1932

1.	7JUNE(7)	1	190	900	1	210	890	1	219	892	1	221	892
		1	221	897	1	221	900						
2.	9JULY(39)	2	180	870	2	200	868	1	210	879	1	213	875
		2	213	838	2	234	826	1	240	785	1	260	785
3.	18JULY(48)	1	200	890	2	204	889	2	203	886	2	214	873
		2	230	830	1	243	801						
4.	24JULY(54)	1	200	880	1	220	847						
5.	30JULY(60)	1	237	875	1	245	855	1	253	841			
6.	5AUG (66)	1	261	793	1	268	786	1	262	759	1	266	716
		1	270	704									
7.	8AUG (69)	1	200	885	1	233	846						
8.	3SEP (95)	1	195	860	1	216	840	1	236	809	2	240	775
		2	247	770	2	252	794	1	259	800	2	268	795
		1	268	798	1	268	807						
9.	19SEP (111)	2	191	894	3	201	886	3	215	876	2	228	816
		2	238	788	2	250	788	1	287	772			

1933

1.	1JUNE(1)	1	237	865								
2.	12JUNE(12)	1	192	875	1	194	869	1	180	860	2	200	860
		2	210	857	1	206	842						
3.	25JUNE(25)	1	255	878									
4.	26JUNE(26)	1	267	776	2	268	775	2	278	781	2	272	782
		2	270	792	1	274	796						
5.	15JULY(45)	1	230	795	2	241	712	2	230	693	1	230	680
6.	16JULY(46)	2	220	871	2	231	844	2	240	802	1	245	782
		1	263	711									
7.	24JULY(54)	1	210	898	1	217	905	2	217	873	2	243	789
8.	30JULY(60)	2	175	870	2	226	862	1	233	855			
9.	2AUG (63)	2	200	895	3	203	879	2	215	840	2	240	800
		2	262	753	2	275	735	2	288	724			
10.	8AUG (69)	2	180	910	2	207	865	2	218	804	2	239	744
11.	21AUG (82)	1	247	840	1	250	821	1	258	824	1	255	815
		1	264	805	1	274	780	1	287	760			
12.	7SEP (99)	1	165	855	1	172	849	1	178	844	1	187	811
		1	195	800	1	216	760						
13.	10SEP (102)	2	195	720	1	200	694						
14.	12SEP (104)	1	198	866	2	210	830	2	219	795	2	238	777
		2	254	762	2	258	755	2	270	758	2	290	762
15.	18SEP (110)	2	180	920	3	185	905	3	212	894	2	210	857
		2	235	811	2	240	812	3	258	796	1	277	764
		1	290	751	1	292	765						

1934

1.	1JUNE(	1)	1	229	831	1	232	830	1	235	840	1	233	830
			1	235	830									
2.	11JUNE(	11)	1	157	718	1	180	710	1	180	710			
3.	26JUNE(	26)	1	240	702	1	233	682						
4.	27JUNE(	27)	1	203	878	1	232	830	1	238	835			
5.	30JUNE(	30)	1	214	891	2	210	891	2	214	860	2	230	824
			1	238	800									
6.	7JULY(	37)	1	208	879	1	230	868	1	241	876	1	254	864
7.	19JULY(	49)	1	212	892									
8.	1AUG (	62)	1	174	851	1	202	810	1	216	808	1	235	823
			1	242	836	1	256	816						
9.	10AUG (	71)	2	216	867	2	230	812	1	240	789			
10.	15AUG (	76)	2	188	865	2	192	862	2	216	857	2	245	827
			2	266	793									
11.	20AUG (	81)	1	230	880	2	214	884	2	233	863	2	243	838
			1	256	804	1	267	777						
12.	6SEP (	98)	2	170	880	1	205	834	1	230	828	1	247	835
			1	251	834									
13.	18SEP (110)		1	213	899	2	212	895	3	208	871	2	215	836
			2	235	802	1	235	805						
14.	28SEP (120)		1	198	806									

1935

1.	17JUNE(	17)	2	171	708	1	200	724							
2.	21JUNE(	21)	1	327	734	1	318	737							
3.	26JUNE(	26)	1	240	800										
4.	8JULY(	38)	2	215	880	2	233	862	2	242	828	1	260	787
			1	260	762										
5.	16JULY(	46)	1	182	856	1	195	871	2	198	870	2	210	876
			2	210	876	1	219	865	1	230	846				
6.	26JULY(	56)	1	240	825	1	252	813							
7.	29JULY(	59)	1	236	835	1	240	821	1	244	811				
8.	5AUG (	66)	1	220	890	1	247	840							
9.	11AUG (	72)	1	252	860	1	245	865	1	250	858	2	248	833
			2	258	790										
10.	7SEP (	99)	1	210	895	2	200	884	2	194	865	1	232	808
			1	226	795										
11.	19SEP (111)		1	246	817	1	238	831							
12.	21SEP (113)		1	208	878	1	242	868							

1936

1.	11JUNE(11)	1	195	895	3	205	880	3	213	873	2	220	850
		2	218	830	1	223	807	1	238	776			
2.	27JUNE(27)	1	200	880	1	227	777	1	253	744	1	252	718
		2	250	700									
3.	2JULY(32)	1	207	880									
4.	8JULY(38)	1	261	824	1	260	812	1	288	800	1	278	802
5.	21JULY(51)	2	180	860	1	190	870	2	184	859	2	207	844
		1	235	841	1	245	861	1	276	802	1	270	812
6.	8AUG (69)	1	252	840									
7.	9AUG (70)	1	226	876	1	245	827						
8.	17AUG (78)	1	190	867	1	196	867						
9.	25AUG (86)	1	200	890	2	195	895	1	196	896	2	190	870
		2	186	847	1	205	820	1	216	820	1	243	835
10.	6SEP (98)	2	200	880	1	206	830	1	233	784	1	245	755
11.	13SEP (105)	1	265	817									

1937

1.	11JUNE(11)	1	219	814	1	220	811					
2.	14JUNE(14)	2	190	700	2	208	692					
3.	20JUNE(20)	2	212	895	2	222	912	2	218	896	3	212	920
		3	222	915	2	232	910	2	226	902	2	230	880
		2	232	834	2	239	795	1	260	756			
4.	11JULY(41)	2	198	865	2	220	827	1	228	790			
5.	17JULY(47)	2	237	826									
6.	21JULY(51)	1	190	890	2	195	895	3	205	880	2	214	861
		2	231	812	2	246	800						
7.	29JULY(59)	1	240	886	1	238	876	1	242	880			
8.	1AUG (62)	2	219	891	2	210	890	2	220	875	1	235	835
		1	238	832									
9.	24AUG (85)	1	249	838	1	247	810	1	255	796			
10.	30AUG (91)	1	247	867									
11.	3SEP (95)	2	190	875	2	212	859	2	215	874	2	222	846
		2	228	795	2	238	765	1	259	722	1	268	699
12.	8SEP (100)	1	205	908									
13.	11SEP (103)	2	180	904	2	202	885	2	222	870	2	246	816
		2	267	780									
14.	27SEP (119)	1	190	897	3	215	882	2	235	876	1	247	861

1938

1.	4JUNE(4)	2	195	675											
2.	6JUNE(6)	1	176	859	1	176	856	1	191	850	1	230	808		
		1	254	768											
3.	18JUNE(18)	1	214	876	1	230	806	1	220	790	1	236	808		
4.	10JULY(40)	1	235	886	1	245	872	1	248	847	1	261	823		
		1	250	792	1	252	780								
5.	19JULY(49)	1	265	800	1	260	767								
6.	23JULY(53)	1	205	842	1	232	792								
7.	11AUG (72)	1	220	902	2	222	908	1	236	882	1	236	832		
		1	245	784											
8.	21AUG (82)	1	230	892											
9.	25AUG (86)	1	188	863											
10.	29AUG (90)	1	240	685											
11.	26SEP (118)	2	137	920	2	150	901	3	160	853	3	160	816		
		2	165	788	1	200	734	1	190	727	2	190	710		
		2	230	710	3	194	711	1	211	735					

1939

1.	23JUNE(23)	2	225	876	2	240	854	2	246	830					
2.	8JULY(38)	2	186	869	2	185	833								
3.	14JULY(44)	2	231	872	2	234	840	1	240	824	1	244	828		
4.	20JULY(50)	1	206	890	2	209	891	2	225	886	2	242	850		
		1	262	817											
5.	29JULY(59)	1	240	901	2	237	904	2	238	885	3	235	895		
		1	235	905	2	235	891	2	240	859	2	235	828		
		1	240	825	1	252	828	1	253	846					
6.	16AUG (77)	3	215	888	2	225	864	2	226	840	2	228	821		
		2	238	798	1	238	791	1	245	760					
7.	23AUG (84)	1	195	891	1	217	811	1	231	773	1	245	760		
		2	310	726											
8.	28AUG (89)	2	200	904	3	209	882	2	230	825	2	240	792		
		1	260	777											
9.	6SEP (98)	1	217	863	1	236	807	1	255	783					
10.	13SEP (105)	1	244	845	2	242	821	1	265	784	1	276	784		
		1	268	791	1	256	793								
11.	21SEP (113)	2	160	908	2	230	891	1	234	869	1	238	851		
		1	240	848	2	247	871	2	256	918					
12.	30SEP (122)	2	186	924	2	200	912	1	231	896					

1940

1.	24JUNE(24)	2	207	874	3	213	874	2	213	826	1	240	785
2.	30JUNE(30)	2	213	885	3	224	878	2	232	847	2	240	824
		1	250	832									
3.	7JULY(37)	3	217	892	3	227	882	2	230	836	1	231	808
		1	236	805	1	223	816	1	225	810			
4.	28JULY(58)	1	233	812									
5.	2AUG (63)	2	224	893	2	236	872	2	240	840	2	250	819
		1	260	812	1	265	804	1	280	800	1	280	796
		1	284	794									
6.	13AUG (74)	2	210	805									
7.	21AUG (82)	2	200	872	2	212	859	2	218	851	2	234	810
		2	246	775	1	260	760						
8.	26AUG (87)	2	219	896	2	216	895	1	238	878	1	246	840
		1	247	842	1	260	849						
9.	15SEP (107)	2	180	862	2	169	857	1	185	807	1	202	767
		1	219	745	1	207	734	1	223	767	1	238	795
10.	20SEP (112)	1	167	930	2	190	900						

1941

1.	1JUNE(1)	2	165	845	2	174	834					
2.	4JUNE(4)	2	205	890	2	220	918					
3.	14JUNE(14)	1	218	880	2	218	901	2	235	915	2	252	912
4.	24JUNE(24)	1	180	870									
5.	29JUNE(29)	2	214	884	1	212	875	1	220	811	1	245	760
		2	243	770	1	248	765						
6.	6JULY(36)	1	214	888	1	229	888	2	225	892	2	215	893
		3	216	883	2	225	820	1	238	775			
7.	7JULY(37)	1	260	720									
8.	28JULY(58)	1	210	910	2	229	900						
9.	31JULY(61)	1	240	820	1	235	806						
10.	7AUG (68)	1	200	890	2	211	892	2	226	858	2	236	796
		2	245	765	2	250	755	2	259	741	1	270	737
11.	15AUG (76)	2	195	914	3	210	910	2	222	885	2	239	837
		2	249	794	2	249	775	1	269	790	1	267	812
12.	26AUG (87)	1	240	890	1	266	864						
13.	1SEP (93)	1	251	838	1	265	815						
14.	7SEP (99)	2	205	882	2	220	852	2	224	829	2	240	783
		2	280	735	1	306	736						
15.	24SEP (116)	1	240	920	1	233	900						

1942

1.	4JUNE(4)	2	180	900										
2.	13JUNE(13)	2	323	730										
3.	15JUNE(15)	1	237	804	1	237	807							
4.	20JUNE(20)	1	242	760	1	266	689							
5.	30JUNE(30)	1	240	817	1	255	792	1	277	779	1	273	789	
6.	5JULY(35)	1	243	816										
7.	8JULY(38)	1	212	894	2	215	892	2	221	878	2	226	831	
		2	238	809										
8.	17JULY(47)	1	238	861	1	235	840							
9.	24JULY(54)	1	220	891	2	224	889	2	246	846	2	247	800	
		1	255	793										
10.	28JULY(58)	2	212	896	1	221	875	2	240	819	1	260	792	
11.	31JULY(61)	1	210	889	1	220	899	2	210	878	2	215	854	
		2	228	791	2	243	734	1	261	695				
12.	11AUG (72)	1	242	848	1	242	840	1	236	840	1	246	830	
		1	235	835	1	242	842							
13.	26AUG (87)	1	169	836	1	169	830							
14.	31AUG (92)	2	202	874	2	218	802	1	240	790	2	250	772	
		2	270	760	1	278	742	1	290	742	1	300	747	
15.	11SEP (103)	1	210	880	1	198	863	1	223	800				
16.	20SEP (112)	1	237	867	1	245	876	1	256	904				
17.	26SEP (118)	1	177	861	1	195	856	1	215	845	1	250	848	

1943

1.	1JUNE(1)	2	220	885	2	240	872							
2.	16JUNE(16)	1	276	800										
3.	10JULY(40)	1	202	880	2	215	869	1	233	817	1	244	789	
		1	256	770	1	275	771							
4.	11JULY(41)	2	226	713	2	226	710							
5.	16JULY(46)	1	244	884	1	242	876							
6.	18JULY(48)	2	222	885	2	238	844	2	245	807	1	262	769	
7.	24JULY(54)	2	195	895	2	206	880	2	216	848	2	234	812	
		2	256	777	2	266	764	2	276	743	1	278	718	
8.	31JULY(61)	2	200	900	2	219	882	2	231	870	1	230	880	
9.	4AUG (65)	2	200	900	2	215	880	2	244	838	1	254	820	
		1	262	816										
10.	10AUG (71)	1	244	828										
11.	21AUG (82)	2	228	851	2	240	819	1	245	805				
12.	2SEP (94)	1	240	812	1	245	800	1	264	777				
13.	9SEP (101)	2	160	860	1	244	817	1	245	812	1	251	796	
		1	265	773	1	273	760							
14.	18SEP (110)	1	229	792										
15.	22SEP (114)	2	190	890	3	200	880	2	221	846	2	229	835	
		2	251	835	1	254	862	1	262	903				

1944

1.	4JUNE(4)	1	233	823	1	224	824						
2.	12JUNE(12)	1	225	827	1	244	819	1	246	835			
3.	14JUNE(14)	2	170	700	2	207	712	2	221	720	1	245	765
4.	10JULY(40)	2	195	870	2	208	842	2	220	848	2	231	820
		2	231	817	2	240	792	1	245	791	1	267	769
5.	19JULY(49)	1	225	870	1	247	848	1	256	836			
6.	24JULY(54)	3	200	895	2	220	854	2	240	787	2	257	723
7.	28JULY(58)	2	205	895	2	205	885	3	211	885	3	216	850
		2	231	800	2	254	727	2	274	662			
8.	6AUG (67)	1	231	844	1	233	840	1	236	812	1	251	778
9.	11AUG (72)	1	252	777	1	261	762	2	280	723	1	290	729
10.	14AUG (75)	1	240	840	2	224	820	2	216	791	2	220	750
		3	195	700	3	210	670						
11.	18AUG (79)	2	200	880	3	200	875	2	216	822	2	230	802
		2	242	774	1	267	758						
12.	23AUG (84)	1	227	933	2	205	905	2	231	890	2	234	862
		2	240	846	1	246	840	1	275	813	1	271	804
		1	271	800	1	273	800						
13.	17SEP (109)	1	169	779									
14.	19SEP (111)	1	231	786	1	230	792	1	221	805			
15.	22SEP (114)	1	205	823	1	205	829	1	207	836			
16.	29SEP (121)	1	200	880	2	205	880						

1945

1.	10JUNE(10)	2	167	708									
2.	27JUNE(27)	2	240	836	2	240	805	2	251	765	2	261	740
		1	265	700	1	265	700						
3.	1JULY(31)	2	200	885	3	215	875	2	228	840	2	236	814
		2	241	797	1	261	785						
4.	7JULY(37)	2	200	885	2	210	880	2	224	830	1	246	802
		1	264	798									
5.	21JULY(51)	1	165	865	1	210	875	1	219	781			
6.	20AUG (81)	1	254	776	1	260	771						
7.	31AUG (92)	1	160	871	2	150	856						
8.	6SEP (98)	1	185	897	2	190	880	2	212	856	2	235	821
		2	248	795	1	260	780	1	276	756	1	286	746
9.	19SEP (111)	2	190	875	2	193	840	2	214	796	2	220	760
		2	220	727	2	250	727	2	276	793			
10.	29SEP (121)	1	180	890	1	199	845						

1946

1.	2JUNE(2)	2	108	710	3	160	675	3	190	650				
2.	21JUNE(21)	1	225	865	1	238	860	1	250	846	1	243	854	
		1	235	827										
3.	3JULY(33)	2	200	900										
4.	13JULY(43)	1	234	876	1	236	869	1	247	856	1	240	848	
		1	234	856										
5.	20JULY(50)	2	170	875	2	185	875	2	188	865	1	196	862	
		2	217	865	1	235	839							
6.	27JULY(57)	2	216	874	1	244	825	1	257	798				
7.	2AUG (63)	2	217	872	2	240	835	2	252	779	1	247	722	
8.	6AUG (67)	1	214	878	2	235	817	2	250	775	1	261	777	
9.	14AUG (75)	1	249	817	1	265	791							
10.	17AUG (78)	2	205	900	1	205	880	1	220	853	1	236	819	
11.	22AUG (83)	2	220	855	2	233	824							
12.	7SEP (99)	1	211	865	1	225	830	1	210	787				
13.	9SEP (101)	2	134	971	2	190	900	2	235	842	2	242	800	
		2	251	770	1	256	768	1	270	793				
14.	14SEP (106)	2	200	900	2	219	892	2	231	892	2	244	873	
		1	255	860										

1947

1.	5JUNE(5)	1	182	895	1	193	902							
2.	9JUNE(9)	1	202	893	1	210	900							
3.	24JUNE(24)	1	195	890	1	200	900	2	195	885	3	210	880	
		1	237	821	1	236	823							
4.	1JULY(31)	1	220	834	2	225	785							
5.	10JULY(40)	1	190	900	2	190	880	2	185	856				
6.	15JULY(45)	2	195	895	2	205	879	2	235	867	1	240	807	
		1	256	794	1	256	800	1	251	806				
7.	26JULY(56)	1	245	844	1	241	832	1	240	820				
8.	19AUG (80)	1	170	870	1	170	870	2	174	870	2	180	870	
		2	187	860	2	205	888	2	230	838	2	241	801	
		2	250	766	2	265	712	2	244	693	3	231	686	
		2	240	693	2	244	704							
9.	21AUG (82)	2	234	675										
10.	27AUG (88)	2	190	890	2	200	872	2	221	830	1	226	825	
		1	228	822	1	249	813							
11.	1SEP (93)	1	210	891	1	210	890	2	233	884	2	242	846	
		2	246	817	2	256	798	1	265	781	1	265	794	
		1	260	816	1	250	811	1	260	795				
12.	12SEP (104)	1	160	880	1	160	870	1	160	860				
13.	23SEP (115)	2	181	710	2	214	739	2	252	730	1	282	742	
14.	25SEP (117)	2	175	880	2	174	860	2	185	816	2	196	776	
		2	211	758	1	217	747							

1948

1.	12JUNE(12)	2	145	715	2	175	725							
2.	24JUNE(24)	1	210	890	1	225	880	1	242	853	1	242	844	
		2	239	848	2	225	864	2	220	860	1	244	832	
3.	6JULY(36)	1	200	885	1	205	876	1	230	827	1	243	800	
		1	255	809										
4.	20JULY(50)	1	240	812	1	249	800							
5.	27JULY(57)	2	210	890	1	230	876	1	247	808	1	262	709	
		1	274	695										
6.	5AUG (66)	1	247	861	1	255	846	1	254	836	1	262	800	
7.	12AUG (73)	2	180	865	2	190	860	3	205	868	2	222	845	
		2	238	817	1	250	836	1	245	825				
8.	21AUG (82)	1	233	842	1	250	804	1	276	783				
9.	23AUG (84)	1	215	891	1	214	876	1	233	855	1	231	836	
10.	31AUG (92)	1	259	796	1	257	796							
11.	3SEP (95)	1	234	872	1	234	831	1	236	780				
12.	13SEP (105)	1	252	856	1	250	860	1	245	826	1	244	845	
13.	19SEP (111)	2	182	849	2	181	844	2	179	836	2	180	795	
		2	185	720	3	203	710	3	214	690	3	216	685	
		2	219	676	2	215	668							
14.	28SEP (120)	2	180	865										

1949

1.	11JUNE(11)	1	252	870	1	255	882							
2.	6JULY(36)	1	242	841	1	254	787							
3.	14JULY(44)	1	202	884	1	219	841	1	236	798	1	251	775	
4.	23JULY(53)	1	250	825	1	255	789	1	255	771				
5.	1AUG (62)	1	205	890	1	230	834							
6.	3AUG (64)	1	252	707	1	262	704	1	287	726				
7.	7AUG (68)	1	247	859	1	246	860	1	245	855				
8.	15AUG (76)	1	232	865	1	242	856	1	258	827				
9.	7SEP (99)	1	185	870	2	200	865	1	227	792	1	240	762	
10.	14SEP (106)	1	230	809	1	226	800	1	235	795	1	249	785	
		1	262	775	1	282	756							
11.	18SEP (110)	2	140	950	2	170	900	2	170	844	2	165	811	
		2	166	804	2	181	785							

1950

1.	9JUNE(9)	2	195	895	3	220	880	2	230	864				
2.	23JUNE(23)	1	205	890	1	231	874	1	241	860	1	243	838	
		1	237	846	1	243	835							
3.	30JUNE(30)	1	238	874	1	241	860							
4.	11JULY(41)	1	200	875										
5.	18JULY(48)	1	254	835	1	246	847							
6.	25JULY(55)	1	215	881	2	215	880	2	228	844	2	231	793	
		2	241	764	1	242	854							
7.	2AUG (63)	1	247	874	2	240	870	2	222	867	2	214	846	
		1	246	795										
8.	8AUG (69)	1	210	890	2	210	890	2	235	882	2	238	875	
		2	246	865	2	255	840	1	262	848	1	260	857	
9.	21AUG (82)	1	93	844										
10.	31AUG (92)	1	249	806	1	255	775	1	259	772				
11.	9SEP (101)	1	155	845	2	170	835	1	183	828				
12.	12SEP (104)	2	210	890	3	211	876	2	214	850	2	228	805	
		2	225	778	2	248	750	2	267	743	2	286	768	
13.	22SEP (114)	2	190	880	1	201	856							

1951

1.	4JUNE(4)	1	180	880	1	217	879							
2.	11JUNE(11)	2	190	680	2	210	670							
3.	26JUNE(26)	1	205	875	1	235	833							
4.	21JULY(51)	2	180	855	2	180	845							
5.	24JULY(54)	2	175	890	3	190	870	2	226	812	2	247	754	
		1	283	746										
6.	30JULY(60)	2	204	872	2	215	861							
7.	3AUG (64)	1	204	880	2	212	875	1	216	860	1	211	881	
		1	229	824	1	232	788	1	254	688				
8.	16AUG (77)	1	205	895	2	230	871	1	247	834	1	260	826	
9.	30AUG (91)	1	200	890										
10.	9SEP (101)	1	225	925	2	228	879	2	248	822	2	253	804	
		1	275	785										

1952

1.	21JUNE(21)	1	242	807	1	251	810	2	270	794		
2.	24JUNE(24)	1	210	890	1	217	880	2	229	867	1	247 832
		1	260	805	1	265	803	1	270	817		
3.	25JUNE(25)	1	263	779								
4.	3JULY(33)	1	194	885	2	211	880	2	233	843	2	247 796
		1	254	772	1	281	782					
5.	12JULY(42)	1	150	824								
6.	19JULY(49)	1	216	882	1	205	885	2	214	875	1	222 848
		1	227	841								
7.	20JULY(50)	1	259	705	1	246	702	1	261	688		
8.	26JULY(56)	1	225	884	1	228	861	1	239	834	2	242 810
		2	242	777	2	249	771					
9.	30JULY(60)	1	216	900	1	221	896	2	217	882	1	220 878
		1	221	839	1	243	776	1	261	772		
10.	8AUG (69)	1	190	885	1	203	875	1	229	852	1	228 859
		1	218	875	2	221	883	2	226	848	1	237 831
11.	19AUG (80)	1	205	884	1	196	882	1	213	855	1	222 837
		1	241	833								
12.	1SEP (93)	1	237	846	1	237	845					
13.	4SEP (96)	1	183	871	1	198	860					
14.	8SEP (100)	1	213	888	1	204	888	1	192	877	1	227 875
		1	250	833								
15.	21SEP (113)	1	202	878	1	237	859	1	253	848		

1953

1.	15JUNE(15)	1	165	860	2	172	853	2	193	865	2	200 865
		2	192	858	2	202	821	2	209	803		
2.	29JUNE(29)	2	213	883	2	220	878	1	223	866	1	235 865
		1	231	873	1	248	866	1	246	854	1	243 835
		1	250	775								
3.	1AUG (62)	2	210	890	3	209	884	2	209	847	2	224 810
		2	241	802	1	237	690					
4.	10AUG (71)	1	205	895	2	207	890	2	200	875	2	200 875
		2	200	877								
5.	19AUG (80)	1	254	820	1	266	830	1	259	850	1	248 850
		1	265	817								
6.	23AUG (84)	2	222	883								
7.	7SEP (99)	1	200	880	1	217	877					
8.	10SEP (102)	1	257	835	1	252	840	1	257	846	1	250 880
		1	245	910								
9.	23SEP (115)	1	160	910	1	165	890	2	175	880	2	204 881
		2	226	855	2	250	821	1	261	815	1	257 834

1954

1.	9JUNE(9)	2	200	702	2	214	702					
2.	26JUNE(26)	2	177	864								
3.	4JULY(34)	1	193	882	2	196	875	2	212	850		
4.	7JULY(37)	1	215	712	2	230	680					
5.	14JULY(44)	1	224	882	1	250	802	2	257	772	1	259 770
6.	1AUG (62)	2	193	868	1	183	854	1	182	871	1	193 860
		1	190	832								
7.	7AUG (68)	1	190	865	1	200	870	1	213	862	1	247 840
		1	254	834	1	259	810					
8.	2SEP (94)	2	187	872	2	197	865	2	215	805	2	228 782
		1	245	749	1	258	700					
9.	8SEP (100)	1	239	816	1	254	776					
10.	16SEP (108)	1	232	838	1	235	794	1	243	793	1	244 778
11.	21SEP (113)	2	190	884	2	217	823	2	228	780	2	254 755
		2	304	741								
12.	24SEP (116)	1	175	889	1	154	889	2	155	867	2	168 840
		2	192	784	2	223	756	2	236	752		

1955

1.	2JUNE(2)	1	161	721	1	167	703	1	193	690		
2.	16JUNE(16)	1	250	804	1	248	827	1	246	818	1	259 833
		1	254	852	1	262	865					
3.	24JUNE(24)	1	185	858	1	193	856					
4.	27JUNE(27)	2	210	888	1	220	856	1	248	831	1	248 805
		1	271	780	1	292	763					
5.	6JULY(36)	2	260	834	1	250	814	1	270	786	1	267 785
6.	16JULY(46)	1	261	850	1	250	845	2	259	830	2	255 836
		2	250	832								
7.	1AUG (62)	1	217	820	1	222	805					
8.	8AUG (69)	1	255	798	1	252	804	1	267	777		
9.	16AUG (77)	1	262	821	1	248	811	1	263	778		
10.	25AUG (86)	2	186	872	2	190	870	2	191	845	2	200 841
11.	29AUG (90)	1	187	874	1	231	817	1	246	780	1	257 755
12.	2SEP (94)	2	213	896	2	220	872	2	229	840	2	240 800
		1	260	773								
13.	7SEP (99)	1	185	871	1	182	862	1	200	830	1	225 815
		1	245	822	1	247	809	1	246	810	2	250 804
		2	261	842								
14.	20SEP (112)	1	111	698	1	134	708					
15.	21SEP (113)	1	200	879	2	207	834	1	231	788	1	263 764
		1	288	768								
16.	30SEP (122)	3	196	881	2	203	864					

1956

1.	1JUNE(1)	3	220	877	2	233	886	2	243	900	2	243	912
		1	255	907									
2.	7JUNE(7)	1	213	900	1	224	871	1	217	877	1	247	848
		1	247	836	1	250	850						
3.	25JUNE(25)	2	175	860	1	208	788						
4.	26JUNE(26)	1	205	690	2	225	675						
5.	1JULY(31)	2	185	880	2	205	875	2	210	853	2	207	843
		1	241	771	1	243	712						
6.	7JULY(37)	1	220	875	1	222	867	2	235	829			
7.	11JULY(41)	1	227	888	2	235	842	1	246	788			
8.	28JULY(58)	2	170	865	1	183	859						
9.	31JULY(61)	1	195	875	2	197	875	2	213	880	2	212	866
		2	230	826	2	247	758	2	252	710			
10.	6AUG (67)	1	209	891	2	214	883	2	239	838	2	250	812
		2	257	804									
11.	14AUG (75)	2	182	881	2	196	873	2	207	876	2	236	891
		2	247	891	1	247	886						
12.	9SEP (101)	2	216	895	2	220	875	2	244	850	2	253	841
		2	251	848	1	251	842						
13.	23SEP (115)	1	218	876									

1957

1.	3JULY(33)	1	227	872	1	223	856							
2.	12JULY(42)	1	215	883										
3.	18JULY(48)	1	218	880	1	233	877	1	245	848				
4.	22JULY(52)	1	260	777	1	292	762							
5.	8AUG (69)	1	212	886	1	207	832	1	221	800				
6.	19AUG (80)	1	205	905	1	200	890	2	195	870	2	203	843
		2	233	765	2	255	741	1	297	735				
7.	28AUG (89)	1	234	857	1	216	863							
8.	31AUG (92)	1	215	882	1	231	872	1	248	833	1	261	806
		1	283	781										
9.	10SEP (102)	2	167	864	2	190	815	2	207	796	2	225	784
		2	250	792	1	296	775							
10.	23SEP (115)	2	190	900	2	200	860	1	218	893	1	246	905

1958

1.	1JULY(31)	2	200	690								
2.	4JULY(34)	1	178	842	1	204	802					
3.	8JULY(38)	1	203	872	2	213	882	2	226	850	1	246 786
4.	13JULY(43)	1	217	880	1	220	882	1	210	890	2	215 877
		2	223	862	1	239	826	1	246	825	1	270 793
		1	270	793								
5.	21JULY(51)	1	222	890	1	235	868					
6.	25JULY(55)	1	268	800	1	264	797					
7.	16AUG (77)	1	208	875	1	210	855	1	228	813	1	240 787
		1	250	772								
8.	27AUG (88)	1	200	873	1	205	875	2	200	875	1	200 860
		2	200	800	2	230	779	2	250	754	1	279 733
		1	296	742								
9.	7SEP (99)	1	217	907	2	205	895	2	213	840	2	226 793
		2	241	757	2	261	731	2	246	698	1	248 684
10.	13SEP (105)	2	215	885	2	222	880	2	246	861	2	250 870
		1	257	918								
11.	26SEP (118)	1	262	735	1	266	738					

1959

1.	22JUNE(22)	1	120	845	2	150	820	1	200	768	2	190 710
		2	210	695	2	225	675	3	225	640	3	230 625
2.	28JUNE(28)	3	185	885	3	200	867	2	215	820	2	234 747
		2	235	676	2	240	673					
3.	3JULY(33)	1	195	890	2	195	875	2	225	808	1	254 782
4.	10JULY(40)	2	224	904	2	243	866	2	239	805	2	243 775
		2	247	705	2	240	670	2	235	640	2	226 635
5.	17JULY(47)	2	160	870	2	195	875	2	204	883	1	218 870
6.	3AUG (64)	1	240	883	1	236	869	2	241	818	1	254 793
7.	13AUG (74)	1	246	830								
8.	18AUG (79)	1	250	883	1	250	831	1	260	775		
9.	19AUG (80)	1	215	885	1	215	875					
10.	21AUG (82)	1	180	863	1	200	813					
11.	26AUG (87)	1	195	870	1	207	840	1	222	804	1	226 800
12.	2SEP (94)	1	228	811	1	225	804	1	247	779	1	252 721
13.	8SEP (100)	1	230	870	1	230	844	2	222	848	2	216 855
		2	216	831	2	213	812	2	213	785	1	236 765
14.	27SEP (119)	1	155	925	2	180	890	2	200	885	3	205 885

1960

1.	26JUNE(	26)	1	180	860									
2.	30JUNE(	30)	2	205	885	2	207	874	2	198	868	1	235	815
3.	3JULY(	33)	2	212	700	2	210	670						
4.	25JULY(	55)	1	217	883	1	224	830						
5.	3AUG (	64)	1	239	846	1	241	824						
6.	7AUG (	68)	1	207	897	1	212	895	2	210	885	1	230	834
			1	261	805	1	266	794						
7.	12AUG (	73)	1	210	890	2	205	900	2	215	890	2	216	877
			2	220	852	2	237	827	2	252	798	1	261	761
			1	270	772	1	295	761						
8.	23AUG (	84)	1	206	885	2	215	895	1	243	860	1	255	825
			1	268	793	1	276	765						
9.	5SEP (	97)	1	185	870	1	175	850	1	175	860	1	165	840
10.	10SEP (	102)	1	247	827	1	274	795	1	277	790			
11.	18SEP (	110)	1	155	835	1	155	830						
12.	24SEP (	116)	1	176	886	2	217	856	1	213	838	1	254	848

1961

1.	6JUNE(	6)	1	219	896	1	215	894	2	210	900	2	222	882
			1	226	855	1	238	835	2	243	844	2	250	854
			1	250	879									
2.	21JUNE(	21)	1	195	710	1	205	690	2	215	680	2	240	695
			2	259	721	1	272	722						
3.	27JUNE(	27)	2	180	915	2	210	894	1	232	878			
4.	2JULY(	32)	2	213	875	2	217	846						
5.	2JULY(	32)	2	213	705	2	211	727	2	217	717	1	228	700
6.	8JULY(	38)	1	254	836	1	247	829	1	267	796			
7.	15JULY(	45)	1	242	898	1	226	856	1	241	812	1	258	750
			2	250	680	1	253	664						
8.	20JULY(	50)	1	212	826	1	221	796						
9.	27JULY(	57)	1	250	705									
10.	6AUG (	67)	1	261	821	1	261	815						
11.	20AUG (	81)	1	217	880	1	224	860	1	259	815			
12.	22AUG (	83)	1	207	894	1	201	841	1	220	820	1	244	817
			1	261	750	1	239	686	2	235	675			
13.	31AUG (	92)	1	210	866	1	217	860	1	229	847	1	241	812
			1	250	795	1	259	770						
14.	5SEP (	97)	1	217	890	2	218	870	2	223	856	2	231	811
			2	239	772	2	257	757	2	265	744	2	259	725
			2	254	701	2	240	690	2	235	665			
15.	12SEP (	104)	2	205	915	2	216	872	2	220	839	2	226	798
			2	229	789	1	250	780						
16.	22SEP (	114)	1	216	886	1	210	856	1	238	814	1	238	794
17.	26SEP (	118)	2	190	882	2	200	895	2	216	889	2	220	872
			2	230	840									

1962

1.	5JUNE(5)	1	190	890	2	190	880	2	217	887	1	229	890	
2.	13JUNE(13)	1	215	888	1	215	885	1	218	880				
3.	8JULY(38)	1	211	693	2	230	685	2	215	685	2	228	692	
		2	219	703	1	225	690	2	219	685	2	245	650	
4.	9JULY(39)	1	200	885	1	197	875	2	180	865	2	193	835	
5.	14JULY(44)	1	194	898	1	210	902	1	235	854	1	268	762	
		1	276	771	1	273	762	1	289	752	1	312	730	
6.	21JULY(51)	1	225	880	1	228	836	1	238	828				
7.	28JULY(58)	1	265	842	1	259	821	1	258	815				
8.	3AUG (64)	1	210	888	1	225	879	1	226	869				
9.	12AUG (73)	1	213	885	1	226	840	1	237	796	1	235	698	
10.	24AUG (85)	1	241	830										
11.	7SEP (99)	1	150	880	2	165	855	2	174	804	2	203	730	
		2	220	688	2	232	683	2	240	673				
12.	16SEP (108)	2	170	870	2	185	855	2	197	840	2	221	784	
		2	241	761	2	270	766							
13.	19SEP (111)	1	213	940	2	210	900	3	225	890	3	239	868	
		2	252	845	2	256	838	1	261	830				

1963

1.	6JUNE(6)	1	207	884	2	231	892	2	252	900				
2.	16JUNE(16)	1	220	906	1	227	896	1	239	897	1	246	897	
3.	24JUNE(24)	1	150	950	2	160	930	1	190	865	1	202	798	
4.	3JULY(33)	1	196	710										
5.	4JULY(34)	2	215	890	2	222	870	1	234	835	1	242	819	
6.	5AUG (66)	1	225	785										
7.	8AUG (69)	1	215	885	2	205	895	2	225	870	1	241	828	
		1	255	798	1	270	770	1	281	760				
8.	28AUG (89)	1	240	795	1	255	750							
9.	4SEP (96)	1	222	872	1	235	804	1	240	780	1	253	723	
10.	10SEP (102)	2	190	910	2	205	890	2	216	853	2	220	828	
		2	234	800	2	263	796							
11.	25SEP (117)	2	170	930	2	195	905	1	215	860	2	236	858	
		1	262	852										

1964

1.	9JUNE(9)	2	170	710	2	180	710	4	210	690	4	225	685
		2	259	703									
2.	22JUNE(22)	1	243	830	1	246	840	1	230	840	1	233	834
3.	30JUNE(30)	1	231	844	1	239	837						
4.	3JULY(33)	1	205	885	2	215	890	2	234	837	2	250	819
		1	270	773									
5.	5AUG (66)	2	195	880	2	195	865	1	210	872	1	235	795
6.	7AUG (68)	1	196	717									
7.	9AUG (70)	1	205	895	2	195	880	2	215	859	2	239	793
		1	264	768									
8.	15AUG (76)	2	205	875	2	238	845	1	254	840			
9.	22AUG (83)	1	213	888	2	221	870	1	236	863	2	239	846
		2	254	804									
10.	7SEP (99)	1	220	893	1	222	866	1	215	835	1	257	810
		1	261	797	1	265	815						
11.	22SEP (114)	1	216	893	2	210	890	2	231	837	2	255	806
12.	26SEP (118)	1	213	892	1	194	884	2	170	835	2	175	802
		1	175	781									

1965

1.	1JUNE(1)	3	215	910	1	243	905							
2.	25JUNE(25)	1	227	884										
3.	29JUNE(29)	1	240	885										
4.	2JULY(32)	1	247	860	1	250	815	1	261	773	1	264	763
5.	13JULY(43)	2	195	875	2	190	855	2	205	802	1	242	766
6.	19JULY(49)	1	215	853	1	229	786	1	230	710			
7.	24JULY(54)	1	213	870	1	210	872	2	210	895	2	210	880
		2	231	868	1	248	848						
8.	27JULY(57)	2	245	786	1	245	781	1	242	775	1	257	781
		2	262	780	1	274	794						
9.	2AUG (63)	1	235	904	1	250	880						
10.	12AUG (73)	1	135	725	1	130	715						
11.	23AUG (84)	1	200	875	1	220	875	1	248	825	1	259	791
		1	272	805									
12.	31AUG (92)	2	185	905	2	190	855	2	205	830	1	240	794
		1	265	780									
13.	7SEP (99)	1	246	839	1	248	820	1	263	802	1	270	814
14.	19SEP (111)	2	145	840	1	166	788	1	173	790	1	189	805
		1	218	833	1	245	850	1	241	860			

1966

1.	2JUNE(2)	1	158	878	2	167	854							
2.	15JUNE(15)	1	206	900	2	205	905	2	226	905	2	239	929	
3.	27JUNE(27)	1	217	870	1	215	880	1	248	887	1	259	821	
		1	267	841	1	267	890							
4.	11JULY(41)	1	164	718										
5.	16JULY(46)	1	205	886	2	195	885	2	200	860	1	237	767	
6.	27JULY(57)	1	210	880	2	215	888	2	222	878	2	236	820	
		1	247	817	1	248	794	1	264	816				
7.	6AUG (67)	1	232	874	1	247	832	1	260	805				
8.	2SEP (94)	1	198	885	2	200	872	2	197	850	2	211	802	
		2	228	776	2	250	748	1	290	740				
9.	11SEP (103)	1	205	905	1	204	888	1	200	900				
10.	27SEP (119)	2	95	900	2	125	895	2	155	850	3	175	875	

1967

1.	22JUNE(22)	1	190	867	1	194	860							
2.	28JUNE(28)	1	180	858	2	200	875	1	215	863	1	221	870	
3.	4JULY(34)	1	222	707										
4.	25JULY(55)	1	206	895	2	205	880	2	216	854	2	223	789	
		2	248	744	2									
5.	31JULY(61)	2	190	900	2	200	880	2	204	852	1	220	834	
6.	9AUG (70)	1	262	808										
7.	16AUG (77)	1	214	893	1	205	890	2	210	900	2	215	885	
		1	232	827	1	264	760							
8.	22AUG (83)	1	219	876	1	247	847							
9.	28AUG (89)	1	193	907	1	195	858	1	219	821	1	232	787	
		1	254	808	1	262	811	1	261	803				
10.	2SEP (94)	1	222	890	2	222	880	2	246	840	2	256	797	
		2	259	760	1	273	739	1	272	716				
11.	8SEP (100)	1	197	918	1	198	915	1	208	895	1	222	892	
12.	16SEP (108)	1	225	858	1	242	850	1	242	853	1	248	853	
13.	27SEP (119)	2	205	890	2	215	885	2	225	906	1	259	934	

1968

1.	11JUNE(11)	1	220	880	2	210	895	2	220	890	2	235	895
		1	250	870	1	241	865	1	247	874	1	250	885
		1	267	915									
2.	25JUNE(25)	1	215	885	1	226	834	1	246	833			
3.	9JULY(39)	2	233	888	2	235	900	2	243	902	1	253	907
4.	25JULY(55)	1	180	885	2	180	870	2	200	880	2	204	876
		2	217	838	2	233	800	2	246	767			
5.	2AUG (63)	1	222	900	2	225	885	2	226	840	2	228	787
		2	229	745	2	235	700	2	237	690			
6.	11AUG (72)	2	220	900	2	232	890	1	240	848	1	235	830
		1	244	824	1	237	819	1	248	817	1	250	818
7.	21AUG (82)	1	200	892	2	195	905	2	218	888	1	242	885
		1	252	884									
8.	9SEP (101)	1	195	895	2	190	910	2	200	890	3	194	850
		2	200	834	2	200	839	1	200	837	1	218	835
9.	29SEP (121)	2	145	875	2	150	880						

1969

1.	5JUNE(5)	2	190	685	2	210	712								
2.	7JUNE(7)	1	237	900											
3.	16JUNE(16)	1	180	882	2	160	875	2	175	875	2	205	895
		2	230	930											
4.	5JULY(35)	1	247	833	1	246	830								
5.	17JULY(47)	1	272	796	1	272	805	1	260	802	1	253	804
6.	28JULY(58)	2	190	895	2	205	880	2	212	877	2	225	850
		2	237	825	1	246	824	1	244	820			
7.	8AUG (69)	2	215	895	1	241	886	1	244	859			
8.	13AUG (74)	2	210	895	2	220	864	2	245	819	2	253	779
		1	270	806									
9.	27AUG (88)	1	164	700	1	190	700						
10.	4SEP (96)	1	167	877	1	170	875	2	175	870	2	196	839
		2	220	805	2	227	771	2	225	747	1	257	762
11.	16SEP (108)	1	178	893	1	186	894	2	175	875	2	194	831
		2	204	816	2	207	803	1	247	799	2	273	791
12.	23SEP (115)	2	210	930	2	228	908	2	238	900	2	248	874

1970

1.	1JUNE(1)	2	200	640											
2.	6JUNE(6)	1	194	885	2	215	895	2	210	887	2	215	885		
		2	220	850	2	217	804								
3.	14JUNE(14)	1	190	886	1	204	885								
4.	28JUNE(28)	1	213	880	1	200	885	2	210	875	2	220	845		
		2	240	819	1	252	800	1	263	806					
5.	5JULY(35)	1	175	900	1	184	908	2	200	895	2	220	870		
		1	247	843	1	252	840								
6.	17JULY(47)	1	225	915	1	215	915	1	213	896	1	212	874		
7.	15AUG (76)	1	245	696	1	240	677								
8.	17AUG (78)	1	192	870	2	195	845	2	202	804	1	225	770		
9.	20AUG (81)	1	228	720	1	234	678								
10.	22AUG (83)	1	205	864											
11.	25AUG (86)	1	226	857	1	223	855	1	233	845	1	239	816		
12.	1SEP (93)	1	230	880	2	230	870	2	230	862	2	235	827		
		2	228	796	2	222	754	2	241	734	2	250	700		
		2	248	635	2	235	645								
13.	8SEP (100)	2	215	903	2	215	892	2	237	860	2	239	846		
		2	253	820	2	269	804	2	264	811	2	260	821		
		2	260	833	1	260	843								
14.	20SEP (112)	1	185	873	2	170	840	1	200	780	1	236	709		

1971

1.	2JUNE(2)	2	210	640	2	220	660	2	220	670					
2.	2JUNE(2)	2	185	865	2	195	875	3	200	880	5	215	885		
		2	229	862	2	239	850	2	248	850	1	260	849		
3.	14JUNE(14)	1	185	875	1	192	883	1	200	875	1	218	866		
4.	19JUNE(19)	1	196	882	2	195	895	2	208	878	2	213	856		
		2	226	807	1	234	790								
5.	28JUNE(28)	1	267	779	1	274	762								
6.	13JULY(43)	1	215	890	1	200	885	2	205	895	2	226	880		
		2	250	853	2	249	842	1	248	825	2	254	815		
		2	252	798											
7.	24JULY(54)	1	260	798											
8.	26JULY(56)	2	220	885	2	237	850	2	243	825	2	248	772		
		1	265	750											
9.	6AUG (67)	1	240	896	1	230	902	2	217	878	2	237	860		
		1	253	847											
10.	21AUG (82)	1	254	808	1	250	797								
11.	23AUG (84)	1	155	855	1	162	836	1	191	807	1	204	795		
		1	242	803	1	235	812	1	230	812	1	236	816		
		1	244	802	1	265	795	1	272	792					
12.	8SEP (100)	1	264	804	1	276	800								
13.	24SEP (116)	2	150	840	1	170	810								
14.	27SEP (119)	1	155	890	2	200	885	5	215	885	3	238	876		

1972

1.	4JUNE(4)	1	237	793	1	227	793					
2.	9JUNE(9)	1	220	840	1	208	834	1	220	850		
3.	25JUNE(25)	2	215	675	2	230	650					
4.	30JUNE(30)	1	205	880	1	210	813	1	220	703		
5.	1JULY(31)	1	225	665								
6.	4JULY(34)	1	215	880	2	215	875	2	220	847	1	241 806
7.	11JULY(41)	1	226	905	1	217	905	2	205	915	3	215 902
		2	226	867	1	240	857					
8.	2AUG (63)	1	193	898	1	206	894	1	205	895	2	225 893
		2	240	870	2	243	847	2	252	813	2	264 790
		2	272	775	2	270	785	2	285	770	1	280 765
9.	11AUG (72)	1	208	875	2	216	895	2	217	863	2	222 833
		2	231	815	2	240	794	2	241	782	2	233 779
		2	244	768	1	260	737	1	261	741	1	272 755
10.	28AUG (89)	2	238	857	2	240	815	2	243	805	2	252 785
		1	257	773								
11.	7SEP (99)	2	150	970	2	155	925	3	165	885	5	180 885
		3	212	833	2	231	800	2	250	798	2	272 795
		1	290	794								
12.	20SEP (112)	2	170	925	2	195	895	3	194	853	2	200 835
		2	212	835	2	248	829					

1973

1.	4JUNE(4)	1	106	700	1	143	713	2	150	690	2	185 675
		3	205	675	2	220	660	2	220	625		
2.	10JUNE(10)	1	200	904	1	195	843					
3.	24JUNE(24)	1	247	839	1	258	826	1	254	816		
4.	5JULY(35)	2	195	880	2	195	862	2	207	857	2	223 820
		2	239	795								
5.	7JULY(37)	2	200	710	2	220	688	1	247	687	1	253 667
6.	12JULY(42)	2	200	890	2	225	875	2	225	828	2	255 798
7.	18JULY(48)	1	195	885	2	215	880	3	222	875	2	235 827
		2	248	790	1	272	807					
8.	27JULY(57)	1	256	868	1	265	854	1	259	833	1	259 836
9.	3AUG (64)	1	113	900	1	145	850	1	166	855		
10.	13AUG (74)	1	263	780	1	268	750	1	273	718	1	267 702
		2	265	713	2	263	725					
11.	16AUG (77)	1	194	875	1	207	885	1	223	890	1	224 870
		1	225	844								
12.	25AUG (86)	1	200	895	2	210	880	2	225	868	2	236 826
		2	236	795	2	247	775	2	254	744	1	255 743
13.	30AUG (91)	1	205	895	1	222	898	1	227	892	2	221 880
		2	222	860	1	236	837	2	232	795	1	229 786
		1	253	775								
14.	13SEP (105)	1	252	831	1	250	845					
15.	19SEP (111)	1	220	860	1	203	828	1	213	768	1	212 745
16.	21SEP (113)	1	155	872	1	213	864	1	239	845	1	241 826
		1	250	823								

1974

1.	1JUNE(1)	2	247	917	1	273	950								
2.	8JUNE(8)	1	225	860	1	231	850	1	238	837	1	252	845		
		1	242	832											
3.	15JUNE(15)	1	250	802	1	244	795								
4.	16JUNE(16)	2	185	865	2	218	845	2	241	828	1	250	856		
5.	8AUG (69)	2	190	880	2	200	880	1	224	870	1	223	848		
6.	12AUG (73)	2	210	890	2	220	890	3	215	885	4	222	880		
		2	228	855	2	222	830	2	229	820	2	236	790		
		2	250	777	1	273	772								
7.	20AUG (81)	1	255	865											
8.	10SEP (102)	1	254	834											
9.	19SEP (111)	1	150	720	2	165	710	3	175	710	3	185	680		
		4	205	650	3	215	635								
10.	23SEP (115)	1	135	855	1	148	833	1	127	825					
11.	25SEP (117)	1	126	853	2	160	920	3	175	885	3	190	875		
		3	220	868	2	250	881								

1975

1.	4JUNE(4)	2	155	880	2	180	905	2	200	915	2	227	916		
2.	15JUNE(15)	1	246	823	1	244	810								
3.	17JUNE(17)	1	200	872	2	195	865	1	212	865	1	241	802		
		1	261	790											
4.	24JUNE(24)	2	220	695	2	230	675								
5.	25JUNE(25)	1	194	877	2	190	860	2	200	860	2	220	845		
		1	243	829	1	268	817	1	259	828					
6.	4JULY(34)	1	260	815											
7.	16JULY(46)	1	240	874	1	247	870	2	242	855	2	251	824		
		2	268	788	2	270	777	2	288	745	2	327	745		
8.	30JULY(60)	1	177	866	1	209	804	1	207	796					
9.	31JULY(61)	1	166	845											
10.	3AUG (64)	1	180	874	1	185	877	2	195	875	2	212	873		
		1	241	828											
11.	9AUG (70)	1	222	867	1	236	827	1	241	796	1	248	778		
		1	254	730											
12.	12AUG (73)	1	220	886	2	218	821	1	235	804	1	251	771		
		1	273	775											
13.	16AUG (77)	1	203	887	2	200	890	2	214	873	2	237	860		
		2	248	840	2	250	826	2	252	822	2	259	817		
		2	269	821											
14.	29AUG (90)	1	250	715	1	248	685								
15.	7SEP (99)	1	282	784											
16.	8SEP (100)	1	190	860	1	190	860	2	213	835	2	233	785		
		1	249	770	1	263	762	1	265	724					
17.	24SEP (116)	1	216	895	2	226	868	1	239	850					
18.	28SEP (120)	1	158	840	1	166	862								

1976

1.	1JUNE(1)	3	170	710	4	190	710	4	206	717	4	219	726
		2	232	730	1	237	755	1	228	765	1	250	795
		1	280	796									
2.	21JUNE(21)	1	247	860	1	253	842	1	253	792			
3.	25JUNE(25)	1	200	875									
4.	16JULY(46)	1	213	882	1	218	883	1	221	883	1	218	870
		1	216	855	1	203	825	1	217	746	1	236	677
5.	28JULY(58)	2	229	885	1	229	850	2	256	793	2	269	754
		1	300	730									
6.	31JULY(61)	1	180	880	2	195	873	2	216	840	2	227	810
		2	231	802	1	254	785	1	278	761	1	300	740
		1	310	720									
7.	11AUG (72)	1	215	895	2	208	890	2	220	870	2	237	840
		1	259	788	2	274	772	2	274	770	2	290	773
8.	25AUG (86)	1	170	860	1	180	858	2	203	819	2	225	783
		2	239	745	2	240	713	3	232	690	3	235	665
		2	235	640	2	210	660	1	215	675	3	210	690
		3	235	665	3	230	630						
9.	1SEP (93)	1	196	865	1	190	860	1	224	791			
10.	8SEP (100)	2	175	925	2	195	905	3	200	900	4	210	885
		2	233	840	2	252	820	2	250	840	2	242	850
		2	240	860	2	239	855	2	239	860	1	236	865
		1	248	857									

1977

1.	4JUNE(4)	1	233	840	1	240	843	1	242	815	1	241	829
		1	240	824	1	245	812						
2.	8JUNE(8)	1	155	715	2	160	700	4	185	645	4	195	645
3.	13JUNE(13)	1	146	855	1	163	840	2	160	850	2	185	865
		1	230	875	1	241	800	1	233	802	1	246	815
		1	245	822	1	248	817	1	235	832	1	240	825
		1	246	815	1	243	823	1	248	828	1	257	810
		1	254	702									
4.	2JULY(32)	1	215	895	2	205	885	2	210	880	2	220	876
		2	241	834	1	258	819						
5.	15JULY(45)	1	245	856	1	261	800	1	278	787			
6.	19JULY(49)	1	155	835	1	175	848						
7.	23JULY(53)	1	200	870	2	195	885	2	217	855	2	241	824
8.	29JULY(59)	1	246	860	2	249	845	1	263	802	1	263	771
9.	3AUG (64)	1	210	878	2	215	890	2	225	872	2	225	866
		2	236	795	2	245	750	2	244	685			
10.	19AUG (80)	2	190	910	2	185	895	2	195	870	2	190	847
		2	194	820	1	200	818	1	197	829	1	222	803
		1	243	797									
11.	30AUG (91)	2	205	895	2	217	863	2	217	828	2	216	785
		1	227	776									
12.	3SEP (95)	1	230	716	2	217	709	2	230	685	2	230	660
13.	7SEP (99)	1	186	918	2	190	915	2	205	905	2	210	875
		2	195	865	2	203	845	2	223	800	2	250	782
		2	272	782	1	283	709						
14.	30SEP (122)	1	135	850									

1978

1.	1JUNE(1)	1	165	682	1	175	700							
2.	16JUNE(16)	2	170	860	3	170	840	1	204	811				
3.	20JUNE(20)	1	190	870	1	215	858							
4.	26JUNE(26)	1	253	863	2	234	862	1	240	842	1	246	836	
		1	229	830	2	230	822	1	250	787				
5.	10JULY(40)	1	227	687	2	235	675	2	235	655	2	230	640	
6.	11JULY(41)	1	187	870	2	205	855	2	229	810	2	250	750	
7.	18JULY(48)	1	300	739	1	289	750	1	281	764	1	292	754	
8.	31JULY(61)	1	195	865	1	195	880	1	213	880	1	220	880	
		1	230	879	1	247	846	1	260	812				
9.	8AUG (69)	1	214	879	1	226	873	1	232	837				
10.	12AUG (73)	1	210	895	1	190	890	2	194	877	2	192	873	
		2	225	810	2	253	732							
11.	19AUG (80)	1	177	862	1	176	865	1	186	863	1	219	831	
		1	209	842										
12.	25AUG (86)	1	196	895	2	200	890	3	208	871	2	214	831	
		2	226	790	2	245	765	2	258	761	2	271	778	
		2	291	774										
13.	31AUG (92)	1	220	908	2	229	885	2	231	865	2	243	835	
		2	253	810	2	260	820	1	261	842				
14.	11SEP (103)	1	173	876	1	172	876	1	175	888	1	175	870	
		1	185	863	1	187	853	1	200	840				
15.	21SEP (113)	1	215	875	1	224	833	1	230	825	1	234	824	
		1	246	841	2	240	843	2	232	868	2	225	875	
		2	220	875	2	215	880							

1979

1.	15JUNE(15)	1	130	717	2	130	710	2	165	695	2	185	675	
		3	190	615										
2.	22JUNE(22)	1	190	885	2	195	885	2	195	875	2	209	830	
		2	225	799	1	260	775							
3.	28JUNE(28)	1	221	898	2	227	897	2	239	900	2	250	914	
4.	4JULY(34)	1	205	905	1	197	902	1	215	895	2	195	900	
		2	205	860	1	225	813							
5.	13JULY(43)	1	216	886										
6.	15JULY(45)	1	270	771	1	269	745	1	269	730				
7.	29JULY(59)	1	182	863	1	197	875	1	188	875	1	192	869	
		1	220	858	1	207	827	1	222	820	1	245	758	
8.	5AUG (66)	1	222	903	2	210	900	4	215	885	1	225	850	
		2	231	802	2	238	765	1	250	724	1	252	709	
9.	7AUG (68)	1	241	695	1	257	708							
10.	12AUG (73)	1	197	928	2	193	925	2	216	915	2	240	916	
11.	30AUG (91)	1	186	715	2	200	670	2	200	630				
12.	8SEP (100)	1	203	875										
13.	15SEP (107)	1	85	870	1	100	850	1	110	805				
14.	18SEP (110)	2	120	730	2	135	715	2	150	710	2	175	700	
		2	185	665	4	205	625							
15.	21SEP (113)	1	115	870	1	130	864	2	160	835				
16.	26SEP (118)	1	181	792										
17.	26SEP (118)	1	165	923	1	190	902	1	207	896	2	235	885	
		1	250	865										

1980

1.	3JUNE(	3)	1	146	725	1	155	716	1	165	705	2	190	720
			1	220	757	1	250	820	1	235	837			
2.	4JUNE(	4)	1	197	890	1	220	895						
3.	15JUNE(	15)	1	188	865	1	187	865	1	214	883	1	226	867
			1	229	837	1	220	837	2	242	798	2	252	767
			2	250	727	2	235	675	2	235	645			
4.	20JUNE(	20)	1	197	703	2	200	660						
5.	22JUNE(	22)	1	214	878	1	225	852	1	241	825	1	247	813
6.	1JULY(	31)	1	205	883	1	229	836	1	246	795			
7.	6JULY(	36)	1	208	895	1	217	895						
8.	7JULY(	37)	1	259	810	1	268	800	1	272	796	1	271	783
			1	268	783	1	281	758	1	309	740			
9.	22JULY(	52)	1	192	883	1	184	873	2	180	865	1	196	854
			1	206	865	1	239	825						
10.	9AUG (	70)	1	268	804	2	258	800	2	252	807	1	252	814
			1	257	814	1	259	810	1	259	825			
11.	22AUG (	83)	1	206	872	1	232	855	1	250	834	1	255	836
			2	256	820	1	250	820	2	246	825	2	239	804
			1	243	776									
12.	26AUG (	87)	1	220	897	1	241	867						
13.	31AUG (	92)	1	190	880	1	185	895	1	195	888	1	210	880
			1	235	852	1	250	823	2	257	800	1	272	784
14.	11SEP (103)		1	193	880									
15.	14SEP (106)		1	204	880	1	196	885	2	180	870	2	198	848
			2	213	823	2	226	818	2	261	813	1	291	804
16.	29SEP (121)		1	90	952	1	143	900						

1981

1.	3JUNE(	3)	1	148	725										
2.	3JUNE(	3)	1	195	910										
3.	13JUNE(	13)	1	178	925	1	185	915							
4.	19JUNE(	19)	1	197	905	2	212	890	2	222	875	2	226	852
			2	239	828	1	231	800	1	244	791			
5.	5JULY(	35)	1	210	903	1	250	820	1	241	824	1	230	804
			1	253	757	1	241	711	1	250	708			
6.	12JULY(	42)	1	215	887	1	236	852	1	246	845			
7.	19JULY(	49)	1	261	773	1	259	781						
8.	22JULY(	52)	1	205	805									
9.	3AUG (	64)	2	195	875	2	205	835	1	225	808			
10.	5AUG (	66)	1	200	875	1	208	890	2	190	880	3	200	860
			2	217	810	2	241	760	1	263	695			
11.	12AUG (	73)	1	188	917	1	190	915	2	220	860	2	229	832
			2	230	787	1	257	741	1	272	698			
12.	27AUG (	88)	1	194	905	1	204	895	1	186	880	1	206	884
13.	7SEP (	99)	1	240	846	1	246	835	1	254	823			
14.	12SEP (104)		1	116	687	1	136	725	2	160	690			
15.	14SEP (106)		1	75	885	1	95	895	1	106	875	2	145	840
			2	156	818	1	172	795	1	185	766	1	196	786
			1	196	769	1	208	762	1	230	740	1	230	709
			1	217	694									
16.	24SEP (116)		1	165	910	3	180	885	3	204	855	2	233	805
			2	250	795									

1982

1.	1JUNE(1)	3	155	903	3	175	895	4	190	880	3	216	851
		2	250	815									
2.	16JUNE(16)	1	208	875	1	224	895	2	230	907	2	242	928
3.	8JULY(38)	1	174	839	1	170	842						
4.	13JULY(43)	1	190	702	1	216	703	2	208	685	2	223	667
		1	235	692									
5.	17JULY(47)	1	165	900	2	185	885	2	187	864	2	207	834
		1	252	780									
6.	29JULY(59)	1	248	805	1	262	819						
7.	1AUG (62)	1	220	890	1	233	901	2	252	900	2	250	900
		1	256	885									
8.	7AUG (68)	1	216	895	1	232	847	1	241	813			
9.	11AUG (72)	1	200	880	2	198	887	1	223	840			
10.	16AUG (77)	1	227	847	1	245	800						
11.	17AUG (78)	1	208	877	2	210	880	2	225	860	1	220	858
		1	225	851	1	241	822	1	246	795	2	263	798
		2	260	805	1	262	813						
12.	27AUG (88)	2	190	885	2	210	875	2	215	862	2	225	852
		1	242	839	2	252	812	1	253	810	1	252	798
13.	4SEP (96)	1	195	920	1	200	903	1	204	882	1	198	892
		1	186	880	2	180	890	2	205	850	1	243	810
		1	258	807	1	259	835						
14.	26SEP (118)	1	173	874	1	206	905	1	207	917	3	228	917
		1	265	940									

1983

1.	18JUNE(18)	1	185	713	1	205	713	2	215	700	2	220	706
		2	228	716	1	220	705						
2.	23JUNE(23)	1	184	875	2	178	858	2	192	856	2	204	840
		2	225	815	1	250	800						
3.	3JULY(33)	1	265	835	1	271	832						
4.	9JULY(39)	1	187	874	1	185	855	1	202	810	1	204	810
5.	19JULY(49)	1	208	877	1	205	874	1	225	859			
6.	21JULY(51)	1	216	735	1	215	707	1	237	672	1	256	673
		1	268	690	1	280	746	1	282	763	1	289	762
		1	295	750									
7.	3AUG (64)	1	222	890	2	237	888	2	225	890	2	222	863
		2	202	811	2	215	729	2	225	655			
8.	9AUG (70)	1	190	827	1	198	810	1	200	810	1	215	820
		1	225	813									
9.	17AUG (78)	1	205	890	1	204	860	1	213	814	1	237	797
		1	261	778	1	261	794						
10.	4SEP (96)	1	207	880	1	220	863	1	222	860	1	235	847
		1	241	825	2	242	815	2	263	796	1	280	798
11.	15SEP (107)	1	197	885	1	220	864	1	238	850	1	245	836
		1	265	820	1	275	799						
12.	22SEP (114)	1	160	850	1	154	832	1	161	798			
13.	29SEP (121)	1	128	956	1	164	872						