SELECTION OF STATISTICAL DISTRIBUTIONS FOR EXTREMES OF PRECIPITATION IN SOUTH EAST REGION OF BANGLADESH

By

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In partial fulfillment of the requirement for the degree of Master of Science in Engineering (Water Resources)

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CERTIFICATE

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ABSTRACT

Large-scale planning for improved land and water management and expanding water resources development has made it increasingly important that a consistent approach be adopted for estimating the magnitude-frequency relationships for point rainfall extremes (EP). The aim of frequency analysis is to select or fit probability distributions to observed data and then values needed by hydrologists and engineers may be extrapolated beyond the range of recorded observations. In this study five distributions viz, normal, log-normal, Gumbel, Pearson Type III and log-Pearson Type III were compared for their ability to fit maximum rainfall values of durations one to three days for the south eastern part of the country. Daily rainfall amounts from 35 stations varying from 27 to 29 years in length provided the basic data for the study. Statistical tests indicated that EV1, log-normal and normal distributions fitted data better than others. EV1 distribution seems to be slightly better, but it did not show any marked superiority over the other two. However, for the sake of uniformity and considering its popularity EV1 distribution may be applied.

Comparison of the method of moments, maximum likelihood and probability weighted moments indicated that the maximum likelihood method may be used for estimating parameters of

this distribution. Of the six plotting position formulae compared, Weibull formula appeared suitable for fitting empirical distributions to extreme values of rainfall. Finally reliability of analysis was investigated and maps of isovalues of parameters for EV1 distribution is presented for practical use. Continuing study leading toward improvement or revision of methods is recommended.

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Chapter 1

INTRODUCTION

1.1 Importance of Rainfall Frequency Analysis

The statistics of extreme rainfall events are important for providing criteria for the planning and design of water resources projects, especially irrigation, drainage and flood control projects. To estimate extremes of rainfall for return period longer than the length of record, the choice of probability distribution in the analysis of extremes becomes important. It is used as input to flood models for analysis associated with a wide range of hydraulic structures to determine design sizes and risk of overtopping or failure. In order that the rainfall design data be practical for design purposes it is necessary first to determine magnitude-return period-duration relationship, also known as intensity-frequency-duration relationship, with care for any location.

Hydrologic systems are often impacted by extreme events, such as severe storms, floods, and droughts. The magnitude of an extreme events is inversely related to its frequency of occurrence, very severe events occurring less frequently than more moderate events. The objectives of frequency analysis of hydrologic data is to relate the magnitude of extreme events to their frequency of occurrence through the use of probability distributions. A probability distribution is a function representing the probability of occurrence of a random variable.

A primary assumption of hydrological frequency analysis is that the series of events being considered have random magnitudes, which are mutually independent and identically distributed. In practice, this is often achieved by selecting the annual maximum of the variables being analyzed (e.g., the annual maximum discharge, which is the largest instantaneous peak flow occurring any time during the year or the annual daily maximum rainfall) with expectation that successive observations of this variable from year to year will be independent. Flood or rainfall frequency analysis is not an end in itself but provides vital information for many engineering purposes: for the design of dams, bridges, culverts, road embankments, irrigation projects, flood control structures, and for determining the economic value of flood control structures, and risk assessment in flood plain use.

Analysis of rainfall record is necessary for estimating flood magnitudes and frequencies at sites without discharge records or with discharge records of few years which are required for conservation, economical planning and design of river basin projects, and utilization of water for various purposes.

The aim of frequency analysis is to select and fit distribution type to observed data. The values needed by hydrologist and engineers may be extrapolated beyond the observed range of record. The disadvantage of using the wrong form of distribution for extremes of precipitation is that of over-and-under design of project facilities and related hydraulic structures.

1.2 Purpose of Rainfall Studies

Choosing a statistical distribution for rainfall frequency analysis has remained a difficult problem for hydrologist, designers of hydraulic structures, irrigation engineers and planners of water resources. Several distribution types are used to estimate extremes of flows and precipitations but the merit of their applicability to different types of data and for different purposes have not been clearly established. The reason for operational use of a particular distribution type in many countries are frequently subjective or historical, as confirmed by the WMO survey (1981).

Accordingly, the primary objective of this research is to investigate the merits of different distribution types and provide some guidance on the selection of distribution types for extremes of rainfall in the south eastern part of the country. Once a distribution is selected for use, however, the analysis becomes objective, and the extrapolation can be made after determination of the sample statistics - mean, standard deviation, and coefficient of skew, etc. of the station data.

It is obvious for the climate of Bangladesh that storms having durations of several days are the most important in causing floods on large river basins just like short duration storms lasting a few hours or even less than an hour serve as design rainfall for small watersheds. Therefore, it seems reasonable to analyze rainfall records of one-day, two-day, and three-day, etc. durations for providing reliable long-term rainfall frequencies for these durations for use in flood frequency analysis, storage capacity determination and other important hydrological analysis and design.

Except in mountainous terrain, rainfall depth-frequency variations over short distances may be expected to be small. Thus, it is practical to prepare maps of isovalues for parameters of the best fit probability distribution for maximum rainfall depth which will provide a good basis for estimating maximum rainfall depth for the given durations of one, two, and three, etc. days for any return periods throughout the south eastern part of the country where the scales are small enough for reliable interpolation.

In the investigation of extreme values, especially the maximum values, various distribution functions such as normal, log-normal, Pearson Type III , log-Pearson Type III (LP3) and extreme Value Type I (EV1) or Gumbel have so far been used and will be considered in this study.

1.3 Summary of Previous Studies

Considerable research has been conducted on rainfall frequency analysis. Yarnell (1935), W.S. weather Bureau(1955) and others provided information on rainfall frequency for periods of 5 minutes to 24 hours. Huff and Neill (1959) performed analysis to determine the return period of heavy rainfall amounts encompassing periods of one to ten days. The frequency distribution tested include the log-normal, log-skew (Chow, 1954) , Gumbel, Frechet (Gumbel,1956) and Jenkinson (1955). Results indicated no marked superiority to any of the five distributions.

BENSON (1968) applied six probability distribution functions to flood series, namely (1) Two-parameter Gamma distribution, (2) Gumbel distribution, (3) Log-Gumbel distribution, (4) Log-normal distribution, (5) Log-Pearson Type III distribution, and (6) Hazen method. He suggested to use the log-Pearson Type III distribution as the base distribution function for annual flood peaks for the United States.

LINSLEY et al. (1958) indicated that the concept of flood probabilities can be applied to precipitation probabilities. They also indicate that annual maximum, hourly or daily amounts, ordinarily conform a Fisher-Tippet (Extreme value type I), log-Pearson, log-normal or Gamma distribution. In humid areas, where mean is high, monthly, seasonal, or annual totals can approximately be normally distributed. In drier areas, a skewed distribution, such as log-Pearson, log-normal, Gamma, square-root or cube-root normal may give a better fit. Chow (1954) has shown that most frequency distributions can be generalized to

$$X = \overline{X} + K\sigma_x \quad \ldots \quad \ldots \quad \ldots \qquad (1.1)$$

where X is an event of specific probability, $\overline{X}$ is the mean, σ_x is the standard deviation of the series, and K is the frequency factor defined by specific distribution and the probability level of x.

An abbreviated chronology of frequency analysis of floods and precipitation is given in WMO guidelines (Sevruk and Geiger, 1981). There is no firm theoretical support for the exclusive use of one or another distribution. However, there is some theoretical justification for the application of the extreme value theory (Gumbel,1958; Jenkinson,1969), the Pearson distribution (Kryukov,1973) and the log-normal distribution (Chow, 1954) to extremes of precipitation analysis.

As stated by Gumbel (1958), the good fit to extremes of precipitation cannot be foreseen from the theory. Frequently various distributions are fitted to the data and the one with the best fit is selected. Thus the decision is made in an empirical basis by using subjective visual techniques or more objective statistical tests.

Guidance on the selection of distribution types for extremes of precipitation was published in a WMO report (Sevruk and Geiger, 1981). More than 400 references related to frequency analysis of extremes of precipitation and floods have been listed. Similar guidelines on the selection of probability distributions for flood frequency analysis has also been presented in another WMO Report (Cunnane, 1989).

A number of rainfall studies have been conducted in Bangladesh. In 1972, International Bank for Reconstruction and Development (IBRD) studied 36 years of rainfall data for the period from 1934 to 1969 for agricultural planning and drainage design purposes. Results presented include rainfall intensity-duration-frequency relationships and probability profiles of reaching or exceeding specified rainfall amounts in any week for nine stations, viz., Barisal, Bogra, Chittagong, Comilla, Dhaka, Khulna, Mymensingh, Rangpur and Rajshahi. For the determination of drainage requirements, maximum values of rainfall received in 1,2,3,5,7,10 and 15 consecutive days were also computed. Manalo (1976) carried out a more detailed analysis of rainfall for crop planning. He prepared mean monthly rainfall histogram for various regions of the country. Isohyetal maps of mean seasonal (June-October) and mean annual rainfall for the whole country and a climatic map showing the number of wet and dry months during a year in different parts of the country were also prepared. Khan (1976) estimated empirical probabilities of rainfall in two-week periods using daily rainfall data for 36 years from 1934 to 1969 for 13 different locations. This analysis was performed for calculating supplementary irrigation requirement and determining cropping pattern. Bangladesh Water Development Board (BWDB) and United Nations Development Programme (UNDP) performed a study in 1982 for 8 climatic stations maintained and operated by Bangladesh Meteorological Department. The stations included in the study were Comilla, Dhaka, Mymensingh, Srimangal, Sylhet, Bogra, Dinajpur and Rangpur. Rainfall data for the 1947-80 period were analyzed to determine probability of one through six-day annual maximum rainfall to be used in drainage design. Rainfall depth-duration-frequency relationships were also plotted.

Matin (1984) analyzed short duration extreme value rainfall derived for such periods as 5, 10, 15, 30 minutes, 1 hour and 2 hours using empirical approaches developed for the United States (Harshfield, 1962). Using EV1 (Gumbel) distribution, prediction equations were developed for one-day maximum rainfall corresponding to return periods of 2,5, 10, 20,30 and 100 years. An empirical equation was also proposed for calculating daily rainfall for various return periods using two-year one-day maximum rainfall value. Ahmed (1986) conducted a similar study for the north-western region of the country. But he analyzed 1, 5,7,10 an 15-day maximum rainfall using Gamma and Gumbel distributions. In general, Gumbel distribution fitted the data better.

The studies conducted so far in Bangladesh were limited in scope in that most of these studies were based on one or two probability distributions which were either chosen arbitrarily or based on experiences elsewhere as reported in the literature on rainfall frequency analysis. A comprehensive evaluation is needed as to the suitability of the frequently used distributions, such as log-normal, Pearson Type III, log-Pearson Type 3, extreme value type I for the extremes of rainfall in Bangladesh.

There has been hardly any comprehensive study for evaluating the suitability of the frequently used distribution for rainfall studies. The objectives of this research is to fill this need and put the issue of rainfall frequency analysis in perspective and deal with the subject in a more systematic manner.

1.4 Objective of the Study

The main objective of this research is to investigate the suitability of commonly used statistical distributions for estimating the magnitudes of point rainfall extremes in the south eastern part of Bangladesh. The main emphasis is on the selection of correct distribution types for use. The specific objectives are as follows:

(1) To test the applicability of different distribution types to annual maximum 1-day, 2-day, 3-day rainfall observed at different stations in south eastern part of the country.

(2) To study the influence of parameter estimation methods on analytical or mathematical technique of fitting distribution.

(3) To examine the effect of choice of plotting position formula on graphical or empirical fitting of distributions.

(4) To establish an extreme precipitation magnitude-frequency relationship.

(5) To estimate the reliability of results of frequency analysis.

Methods of frequency analysis have developed along divergent lines, with resulting non-uniformity in methods of analysis and, hence, in results. No general agreement has been reached as to the preferable technique and no standard have been established for design purposes. Methods used have been different, and situations have arisen where conflicting values for the same situation have been furnished to the public, thus causing confusion and questioning of such results. There is a need for objective criteria to test the applicabilty of different distribution to extreme values of precipitation. So the first objective is to establish the merits of the applicabilty of the distributions to different types of data and for different situations. This involves fitting the selected distributions, namely normal, log-normal, PT3, LP3 and EV1 to annual maximum rainfall having durations of one, two, and three, etc. days for various rainfall stations in the south eastern part of the country; and to recommend the best probability distribution function of the annual maximum rainfall amounts for such selected durations. This is especially important in view of many programmers of national scope involving large expenditures of public funds that depends on both flood and rainfall frequency analysis. It is in the interest that a sound method of rainfall and flood frequency analysis be used and that a consistent approach be adopted so that costs and benefits may be assessed on a uniform basis. So it is very important that studies be conducted with the aim of selecting " best" distribution for nationwide use.

The second objective is to suggest a suitable method of parameter estimation for fitting probability distribution to a set of hydrological data. Parameter estimation can be done by methods of moments, (Karl Pearson 1902), maximum likelihood (Fisher, 1922) and probability weighted moments (Greenwood et al,1979). The method of maximum likelihood is the most theoretically correct method of fitting probability distributions to data in sense that it produces the most efficient parameter estimates those which estimate the population parameters with least average error. In general,the method of moments is easier to apply than the method of maximum likelihood and is usually used for practical hydrological analysis. So the second objective of this research is to investigate which parameter estimation method would be suitable for a given distribution in analyzing rainfall data of the south eastern part of Bangladesh.

In most countries there is no "standard" or adopted distribution, and graphical method based on plotting position is frequently used. Among the plotting positions, Weibull formula is by far the most favoured one followed by the Gringorten, Hazen, and Blom formulas (Sevruk and Geiger, 1981). So the third objective of this research is to investigate the effects of the plotting position formula on goodness of fit.

The fourth objective is to relate the magnitude of annual maximum rainfall of one, two, and three etc. day durations to their frequency of occurrence through the use of probability distribution function, and

The fifth objective is to estimate the reliability of the results obtained by frequencies analysis.

Chapter 2

BASIC CONCEPTS AND THEORETICAL CONSIDERATIONS

2.1 Basic Concept of Rainfall Frequency Analysis

Annual maximum rainfall frequency analysis enables the magnitude of maximum rainfall of a selected probability of exceedence or return period to be estimated by statistical analysis of recorded maximum rainfall data. Frequency analysis for annual maximum values may be carried out graphically and analytically. In the former, the observed data are plotted on probability paper and a frequency curve is drawn subjectively. With the latter approach, a probability distribution is fitted mathematically to the observed data, and maximum rainfall corresponding to selected probability can be calculated. Although either method can be used independently, it is preferable to view them as complementary rather than alternative procedures. For frequency analysis of annual extreme values of rainfall of specified duration, first the time series is extracted from the record of observed data. Extreme values can be either annual maximum or annual minimum values. Most commonly used time series are the annual series and the partial duration series which are described next.

2.2 Annual and Partial Duration Series

Frequency analysis can be done either on annual or partial duration series. Annual series consists of observations which include only one event from each year e.g. the maximum daily precipitation for each year. An objection most frequently encountered with respect to annual series is that all other extreme events during each year are ignored, despite that the less extreme events in one year may be higher than the maximum during other years. This disadvantage is remedied in the partial duration series method.

Partial duration series include all events above a certain lower limit, irrespective of how many times that event occurs during each year. Usually the lower limit is set so that at least one event occurs each year.

The actual return period varies depending on whether an annual or a partial duration series is used in the analysis. Langbein (1949) theoretically compared the corresponding return period for annual and partial duration series and concluded that the relationships between return periods were approximately as follows:

Table 2.1 : Return Periods in Years for Annual and Partial Duration Series

Type of Series	Corresponding Return Periods in Year							
Partial Duration Series	0.5	1.0	1.45	2.0	5.0	10	50	100
Annual series	1.16	1.58	2.00	2.54	5.52	10.5	50.5	100.5

From the data tabulated the significant difference between the return periods are only evident for low return periods i.e. below the 2 to 5 year return periods.

2.3 Plotting Position Formulae

Plotting position is the location on the probability paper where the data are plotted.

There is no general agreement on which plotting position formula is the best. It may ne noted that all the methods for determining the plotting positions give virtually the same results in the middle of distributions but produce different results towards the extreme end of the distribution. The selection of plotting position formula thereby becomes important. Gumbel (1947) stated four prerequisites to be satisfied by any plotting position formula. These were

(1) The plotting position must be such that all observations can be plotted.

(2) The return period of a value equal to or larger than the largest observation and the return period of a value equal to or smaller than, the smallest observation should converge towards N, the number of observations.

(3) The observations should be equally spaced on the frequency scale, that is the difference between the plotting position of the $(m+1)$th and m'th observation should be a function of n only and independent of m.

(4) The plotting position ought to be analytically simple and have an intuitive meaning.

A number of different plotting position formulae have been proposed and their backgrounds and formulation are described below. In all formulas, the probability p is calculated from the rank m and the total number of events N in the data set.

2.3.1 California's Plotting Position

The oldest and simple method is known as California formula and in the form of

$$p = m/N \quad \ldots \quad \ldots \quad \ldots \quad \ldots(2.1)$$

This produces a probability of 100% for $m = N$ which may not be easily plotted on a probability scale.

2.3.2 Weibull's Plotting Position

For extreme value events Weibull introduced to plot all the observations and the formula is

$$p = m / (N+1) \quad \ldots \quad \ldots \quad \ldots \quad \ldots(2.2)$$

This method simply adds one to the highest rank and thus introduced a bias on the largest events.

2.3.3 Beard's Plotting Position

It is the compromising formula between California and Weibull and it is in the form of

$$p = (m - 0.31)/(N+0.4) \quad \ldots \quad \ldots \quad (2.3)$$

This formula is widely used in U.S.S.R. and eastern European countries.

2.3.4 Blom's Plotting Position

Cunnane (1978) recommended the Blom (1958) formula which is in the form of

$$p = (m - 3/8)/(N+1/4) \quad \ldots \quad \ldots \quad \ldots \quad (2.4)$$

For normally distributed samples this plotting position is closest to being unbiased.

2.3.5 Hazen's Plotting Position

This formula is widely used in flood frequency analysis and is also a compromised or modified form of California formula. The plotting position is

$$p = (m - 0.5)/N \quad \ldots \quad \ldots \quad \ldots \quad \ldots(2.5)$$

One objection of this formula is that the return period for the largest (m=1) event is 2N or twice of the record length.

2.3.6 Tukey's Plotting Position

An unbiased formula proposed by Tukey is

$$p = (3m - 1)/(3N+1) \quad \ldots \quad \ldots \quad \ldots \qquad (2.6)$$

2.3.7 Gringorten's Plotting Position

Gringorten recognized that the true return period of the higher values are probably longer than those calculated by Weibull formula. To account for this he proposed a plotting position formula that gives longer return periods for the higher values in a series. The formula is

$$p = (m - 0.44)/(N+0.12) \quad \ldots \quad \ldots \quad \ldots \qquad (2.7)$$

Among all these plotting position formulae the most widely used is the Hazen and Weibull formula. Many of the formula are simply an extension of Weibull formula. The Weibull formula was known to be unbiased in terms of probability for systematic records only, while it was found to be biased in case of nonuniform distribution, especially for positive skewed distribution (Cunnane, 1978). If the objective of the probability plot is to obtain an unbiased probability estimate corresponding to a particular value, the Weibull formula is mostly favoured.

In general plotting position in terms of exceedence probability can be written as

$$p = (m - a)/(N+1-2a) \quad \ldots \quad \ldots \quad \ldots \quad (2.8)$$

where m = Rank of the maximum rainfall value in the series (rank of the highest value is 1), N = Number of years of record, and constant a takes values: (1) 0 (Weibull, 1939), (2) 0.31 (Beard, 1943), (3) 0.5 (Hazen, 1914), (4) 3/8 (Blom, 1958), (5) 1/3 (Tukey, 1962), and (6) 0.44 (Gringorten, 1963).

2.4 Length of Record

For a given event magnitude, the recurrence interval is overestimated or the annual exceedence probability is underestimated if the length of record is not sufficient. To maximize the confidence in the fitted distribution record length should be as long as possible, as extrapolation of data based on small data set will result in uncertain prediction. If the estimate involves little or no extrapolation of the observed range of data and especially if the skew is small, the effect of bias is small. However, if the extrapolation is required and high skews are involved, the bias can be large. Comparisons of extreme of precipitation using various length of records show that 15 to 25 years of observation periods are not sufficient in many cases to define a stable distribution (WMO, 1981). The error due to insufficient length of record may cause 30-50% error in the range of extrapolation. In general, a record of 40 to 50 years is satisfactory is most cases (WMO, 1981).

2.5 Probability Distributions for Frequency Analysis

There are several distributions that can be used to estimate extreme values of precipitation. Some of the commonly used distribution are described in the following paragraphs.

i) Normal Distribution:

The normal distribution is a symmetrical, bell-shaped frequency function also known as the Gaussian distribution. This distribution has two parameters, the mean (μ) and the standard deviation (σ). The probability density function is

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-[(x-\mu)^2/2\sigma^2]} \quad \ldots \quad \ldots \quad \ldots \quad -\alpha \leq x \leq \alpha \qquad (2.9)$$

ii) Log-normal Distribution

If the logarithm of variable x are normally distributed, then the variable x is said to be logarithmic normally distributed. This is a two parameter distribution and a special case of log Pearson Type III distribution when the coefficient of skewness is zero. The probability density function is

$$f(y) = \frac{1}{x\sigma_y \sqrt{2\pi}} \exp^{-[(y-\mu y)^2 / 2\sigma_y^2]} \quad \infty \le y \le \infty$$
$$0 \le x \le \infty \ldots \quad (2.10)$$
$$y = \ln x$$

iii) Gumbel Distribution

The Gumbel distribution of extreme values results from any initial distribution of the exponential type. The probability density function is

$$f(x) = \alpha \exp\{ -\alpha(x-\beta)\, e^{-\alpha(x-\beta)} \} \; -\infty \le x \le \infty \ldots \quad (2.11)$$

where α and β are scale and location parameters respectively and mean $\mu = \beta + 0.5772/\alpha$, standard deviation $\sigma^2 = \pi^2 / 6\alpha^2$

iv) Pearson Type III Distribution

This distribution may be regarded as a form of gamma distribution and uses a three parameter function. The probability density function is expressed as:

$$f(x) = \frac{1}{\beta^{\gamma}\sqrt{\gamma}} \quad (x-x_0)^{\gamma-1} \exp\left[-\frac{(x-x_0)}{\beta} \right] \qquad x_0 \le x \le \infty$$
$$(2.12)$$
$$= 0 \qquad\qquad \text{otherwise}$$

where γ , β and X_0 are the shape , scale and location parameters respectively, and mean $\mu = \gamma\beta + x_0$, standard deviation $\sigma^2 = \beta\sqrt{\gamma}$, coefficient of skewness $C_s = 2/\sqrt{\gamma}$

v) Log Pearson Type III Distribution

Benson (1968) reported on a method of flood frequency analysis based on the log Pearson Type III distribution which is obtained when the logs of observed data are used along with Pearson Type III distribution.

This is also three parameter distribution and when skew is zero the LP3 distribution is identical to the log-normal distribution. The probability density function is.

$$f(x) = \frac{(y-\gamma)^{\alpha}}{\beta^{\alpha}x\Gamma\alpha+1} \exp\left[\frac{-(y-\gamma)}{\beta}\right] \quad \begin{matrix} -\infty \le y \le \infty \\ 0 \le x \le \infty \end{matrix} \quad ...(2.13)$$

where $y = \ln x$, and mean $\mu_y = \gamma + \beta(\alpha+1)$, standard deviation $\sigma_y^2 = \beta^2(\alpha+1)$

2.6 Parameter Estimation for Fitting Distributions

Various methods for estimation of parameters have been devised and the method employed for this study are (1) method of moments (2) maximum likelihood method (3) probability weighted method.

The graphical method relies on the plotting of the observed maximum rainfall on various probability papers to determine the best fitted distribution type to the annual maximum rainfall values.

The analytical method relies on computing statistical parameters of the maximum rainfall series including mean, standard deviation and skew co-efficient. In estimating the values of parameters of the parent population the following properties of estimation are desirable.

(a) Consistent estimators - meaning that the probability of the absolute value of the deviation of estimator from the population parameter is less than any small quantity ϵ, tends to infinity i.e Probability$(|\hat{\theta} - \theta|) < \epsilon \to 1$ as $n \to \alpha$.

(b) Unbiased estimators or the expected value of estimator is equal to the population parameters. $E(\hat{\Theta}) = \Theta$ with biasedness being defined as $E(\hat{\Theta}) - \Theta$ and

(c) Efficient estimator or among the class of consistent estimators, the minimum unbiased estimator $\hat{\Theta}$ has the smallest variance.

Method of moment estimates parameters by moment generating functions.

Maximum likelihood method, developed by R.A. Fisher, is based upon likelihood function L. This function is maximized by setting the first derivative of Lnk (natural logarithm) with respect to Θ equal to zero, and solving the resulting equation for Θ.

$$\frac{\delta(\text{Ln } L)}{\delta\Theta} = \frac{\delta\{\sum_{i=1}^{N} \ln[f(k_i,\Theta)]\}}{\delta\Theta} \quad \dots \quad \dots \quad \dots \quad \dots \qquad (2.14)$$

where k is the density function.

Probability Weighted moments (PWM) estimation is simple and unbiased. They are useful in deriving expressions for parameters of distributions whose inverse forms $x = x(F)$ can be explicitly defined. EV1 and General Extreme value (GEV) can be expressed in both form F= F(x) and x = x (F) and hence their parameters can be estimated by PWM. All parameter estimation methods are not equally good for any one distribution. The ordinary moment method is simple for EV1 and less so for General Extreme Value (GEV) distribution because the moments involve gamma function. For EV1 maximum likelihood, an iterative procedure in this case, is more efficient (smaller standard error) but more biased than PWM. Moreover, parameter estimation by PWM is generally unaffected by outlier.

2.7 Method of Selection of Probability Distributions

The test of goodness of fit are most commonly based on the discrepancies between observed or calculated frequencies of events and the expected or theoretical frequencies of the events for a given distribution. To select appropriate distribution type there remains mainly two techniques. These are

a) Visual inspection of goodness of fit to the plotted sample data.

b) Analytical method of testing of goodness of fit.

Visual judgement is nothing but a graphical procedure where observed relative frequency curve is compared with theoretical relative frequency curve. Statistical test involves plot of observed data on a specified / appropriate probability paper to judge whether or not the plotted points lie on or close to the best fit line.

In testing the goodness of fit of a sample to a theoretical probability distribution, the X^2- test and the Kolmogorov - Smirnov test are most commonly used as analytical approach.

2.7.1 Chi-square Test

The well known Chi - square test has been widely used since its inception by Karl Pearson around 1900. Chi - square test compares the observed and expected frequencies of data ponts in minimum five equally probability ranges which sets degree of freedom at 2 for the two parameter distribution and 1 for the three parameter distribution. In the Chi-square test, the statistics X^2- is calculated by the following relationship

$$Xc^2 = k/N \; \Sigma \; o_j^2 - N \quad \ldots \quad \ldots \quad \ldots \qquad (2.15)$$

where k = number of class interval.

o_j = observed frequencies of each class and

N = total number of observation.

The hypothesis is rejected if Xc^2 is greater than the tabulated $X^2{}_{1-\alpha,k-p-1}$, where α is chosen significance level and p is the number of estimated parameters.

Table 2.2: Critical Value of X^2- Statistic

Degree of Freedom	Significance Level		
	0.90	0.95	0.99
1	2.71	3.84	6.63
2	4.61	5.99	9.21
3	6.25	7.81	9.35

2.7.2 The Kolmogorov - Smirnov Test

This goodness - of - fit test is of more recent origin and is based on (cumulative) distribution function. Kolmogorov (1933) originally derived the statistic, and the test procedure was developed by Smirnov (1948) and by others. This test finds out the absolute maximum of the differences between the observed cumulative frequency o_j and the expected cumulative frequency E_j. The test statistics $\triangle$ is defined as

$$\triangle = \text{Max} \left[\; (E_j - O_j) \ldots \qquad \ldots \qquad (2.16) \right.$$

The hypothesis is rejected if for any chosen significance level the calculated Kolmogorov-Smirnov statistic is greater than or equal to the critical tabulated value of Kolmogorov - Smirnov statistic.

Table 2.3: Critical Value of K-S Statistics

No of Year	Significance Level		
	0.90	0.95	0.99
29	0.224	0.246	0.296
28	0.228	0.250	0.302
27	0.232	0.256	0.308

2.7.3 W^2- , U^2-, and A^2- Tests

Besides these two tests, which can be applied to any distribution, Stephens (1977) introduced three other tests for the case of EV1 distribution. These are W^2-, U^2- and A^2- tests and the corresponding statistics are defined as follows.

$$W^2 = \Sigma (Z_i - P_i)^2 + 1/12N \quad \ldots \quad \ldots \quad \ldots \quad (2.17)$$

$$U^2 = W^2 - N(\overline{Z} - 1/2)^2 \quad \ldots \quad \ldots \quad \ldots \quad (2.18)$$

$$A^2 = \frac{-[\Sigma (2i-1)\{\ln Z_i + \ln(1-Z_{n+1-i})\}]}{N} - N \quad \ldots \quad (2.19)$$

where $Z_i = F(x_i)$, P_i is the value of the empirical distribution function corresponding to rank i of x_i. This function is given by the plotting position formula employed or chosen for the distribution. For a specified significance level, the hypothesis H_0 has to be rejected if the statistic is higher than the corresponding tabulated critical value.

Table 2.4: Percentage Points for Stephens Statistics

Modified Statistics	Upper Tail Percentage Points 0.90	0.95	0.99
W^2	0.102	0.124	0.175
U^2	0.097	0.117	0.165
A^2	0.637	0.757	1.038

2.8 Reliability of Frequency Analysis

After fitting a given set of hydrologic data to an assumed probability distribution, it is important to know how well the distribution fits i.e. the reliability of the results of frequency analysis. It is estimated by confidence limits and standard error. The confidence limits enclose the confidence interval and confidence intervals gives the range within which the actual population is expected to lie with a selected level of probability.

(a) Confidence Limits

Statistical estimates are often presented with a range, or confidence interval, within which the true value can reasonably be expected to lie. The size of the confidence interval depends on the confidence level. The upper and the lower boundary values of the confidence interval are called confidence limits.

Corresponding to the confidence level ß in a significance level α , is given by

$$\alpha = (1-\beta)/2 \quad \dots \quad \dots \quad \dots \quad \dots \quad (2.20)$$

For estimating the event magnitude for return period T, the upper limit U_{T},α and lower limit L_{T},α, may be specified by adjustment of the frequency factor equation.

$$U_{T,\alpha} = \bar{y} + s_y K^{U}_{T},\alpha \quad \dots \quad \dots \quad \dots \quad (2.21)$$

and

$$L_{T},\alpha = \bar{y} + s_y K^{L}_{T},\alpha \quad \dots \quad \dots \quad \dots \quad (2.22)$$

where K^{U}_{T},α and K^{L}_{T},α , are the upper and lower confidence limit factors, which can be determined for normally distributed data using the non central t distribution. The same factor are used to construct approximate confidence limits for Pearson type -III distribution. For log-Pearson type -III distribution the data converted y = logx and use the same formula.

$$K^{U}_{T,\alpha} = \frac{K_T + \sqrt{K^2 T - ab}}{a} \quad \ldots \quad \ldots \quad \ldots \quad (2.23)$$

$$K^{L}_{T,\alpha} = \frac{K_T + \sqrt{K^2 T - ab}}{a} \quad \ldots \quad \ldots \quad \ldots \quad (2.24)$$

In which $a = 1 - Z^2_\alpha/[2(n-1)]$ ... ... (2.25)

and $b = K^2_T - Z^2_\alpha /n$ ... ... (2.26)

The quantity $Z\alpha$ is the standard normal variable with exceedence probability α and K_T is the frequency factor.

(b) Standard Error of Estimate

The standard error of estimate S_e is a measure of the standard deviation of the computed event magnitude from samples about the true event magnitude. Formulas for the standard error of estimates for the normal and extreme value type I distribution are

For normal distribution

$$S_e = \sqrt{[(2+z^2)/n]}.s \quad \ldots \quad \ldots \quad (2.27)$$

For extreme value type I distribution

$$S_e = \{(1/n)(1+1.396\ K_T + 1.1\ K^2_T)\}^{1/2}.s \quad \ldots \quad \ldots \quad (2.28)$$

where s is the standard deviation of the original samples of size n, z is the standard normal variate of standard normal distribution which equal to the frequency factor K_T for normal distribution and K_T is the frequency factor for extreme value type I distribution . Standard errors may also be used to construct confidence limits. In this case the confidence limits for significance level are defined as ,

$$X_T \pm S_e . Z \quad \ldots \quad \ldots \quad \ldots \qquad (2.29)$$

where X_T is the estimated hydrologic event and Z is the standard normal variate with exceedence probability α .

Chapter 3

DATA COLLECTION AND METHOD OF ANALYSIS

3.1 Source of Data

As mentioned in Chapter 1, five probability distributions will be applied to annual maximum rainfall of selected durations at stations in the south eastern part of the country which includes Comilla, Noakhali and Chittagong Hill Tracts. Daily rainfall data were collected from Water Resources Planning Organization (WARPO) for 50 stations. Only long term record stations were considered because their underlying rainfall distribution are less apt to be obscured by erratic chance variations. Stations having missing records of more than three years were discarded. Gaps in the records were filled in by arithmetic average and normal ratio method as described later. A list of rainfall stations included in the study is given in Table 3.1 and location of the study area and rainfall stations are shown in Figure 3.1 and 3.2 respectively.

3.2 Estimation of Missing Records

The missing data were filled in for one or two years with the help of rainfall recorded at the surrounding or index station by

a) **Arithmetic Average Method :** If the normal annual rainfall at each of the index station is within 10% of that for the

Table 3.1: List of Rainfall Stations with Locations in South Eastern Part of Bangladesh

Sl No	Station Number and Name		Latitude	Longitude	Period of Record	Years of Records
1	R101	Bhairab Bazar	24° 2.7′ N	90° 59.3′ E	1962-1990	28
2	R103	Brahmanbaria	23° 58.7′ N	91° 7.0′ E	1961-1990	29
3	R132	Nasirnagar	24° 11.8′ N	91° 12.0′ E	1962-1990	28
4	R302	Anwara	22° 13.8′ N	91° 54.8′ E	1962-1990	28
5	R303	Bandarbon	22° 12.5′ N	92° 12.8′ E	1961-1990	29
6	R306	Chittagong	22° 21.0′ N	91° 48.5′ E	1961-1990	29
7	R311	Fatikchari	22° 40.9′ N	91° 46.9′ E	1961-1990	29
8	R313	Hathazari	22° 30.0′ N	91° 49.2′ E	1962-1990	28
9	R315	Kaptai	22° 29.5′ N	92° 13.7′ E	1961-1990	29
10	R317	Lama	21° 47.0′ N	92° 12.0′ E	1961-1990	29
11	R320	Mirersarai	22° 47.0′ N	91° 34.3′ E	1961-1990	29
12	R323	Narayanhat	22° 49.0′ N	91° 43.5′ E	1962-1990	28
13	R324	Nazirhat	22° 38.0′ N	91° 47.8′ E	1962-1990	28
14	R325	Patiya	22° 17.8′ N	91° 59.0′ E	1962-1990	28
15	R328	Rangamati	22° 39.0′ N	92° 11.8′ E	1961-1990	29
16	R330	Rangonia	22° 28.0′ N	92° 4.2′ E	1961-1990	29
17	R331	Sandwip	22° 29.0′ N	91° 26.5′ E	1961-1990	29
18	R332	Satkania	22° 4.5′ N	92° 2.0′ E	1961-1990	29
19	R351	Bancharampur	23° 44.5′ N	90° 45.7′ E	1961-1990	29
20	R354	Chandpur	23° 14.3′ N	90° 49.8′ E	1961-1990	29
21	R355	Chagalnaiya	23° 2.5′ N	91° 32.8′ E	1961-1990	29
22	R356	Comilla	23° 27.5′ N	91° 11.0′ E	1961-1990	29
23	R357	Daudkandi	23° 32.0′ N	90° 43.0′ E	1962-1990	28
24	R358	Feni	23° 1.0′ N	91° 24.0′ E	1961-1990	29
25	R359	Gunabati	23° 5.8′ N	91° 17.5′ E	1961-1990	29
26	R360	Hajiganj	23° 15.2′ N	90° 52.3′ E	1962-1990	28
27	R361	Hatia	22° 16.5′ N	91° 7.5′ E	1962-1989	27
28	R363	Laksham	23° 14.3′ N	91° 7.0′ E	1961-1990	29
29	R364	Lakhsmipur	22° 56.2′ N	90° 50.2′ E	1962-1990	28
30	R366	Muradnagar	23° 38.3′ N	90° 56.3′ E	1962-1990	28
31	R369	Noakhali	22° 50.3′ N	91° 6.0′ E	1961-1990	29
32	R370	Purshuram	23° 12.8′ N	91° 27.0′ E	1962-1990	28
33	R372	Raipur	23° 2.5′ N	90° 45.8′ E	1962-1989	27
34	R376	Senbag	22° 59.2′ N	91° 14.5′ E	1961-1990	29
35	R377	Sunaimuri	23° 1.9′ N	91° 6.5′ E	1962-1990	28

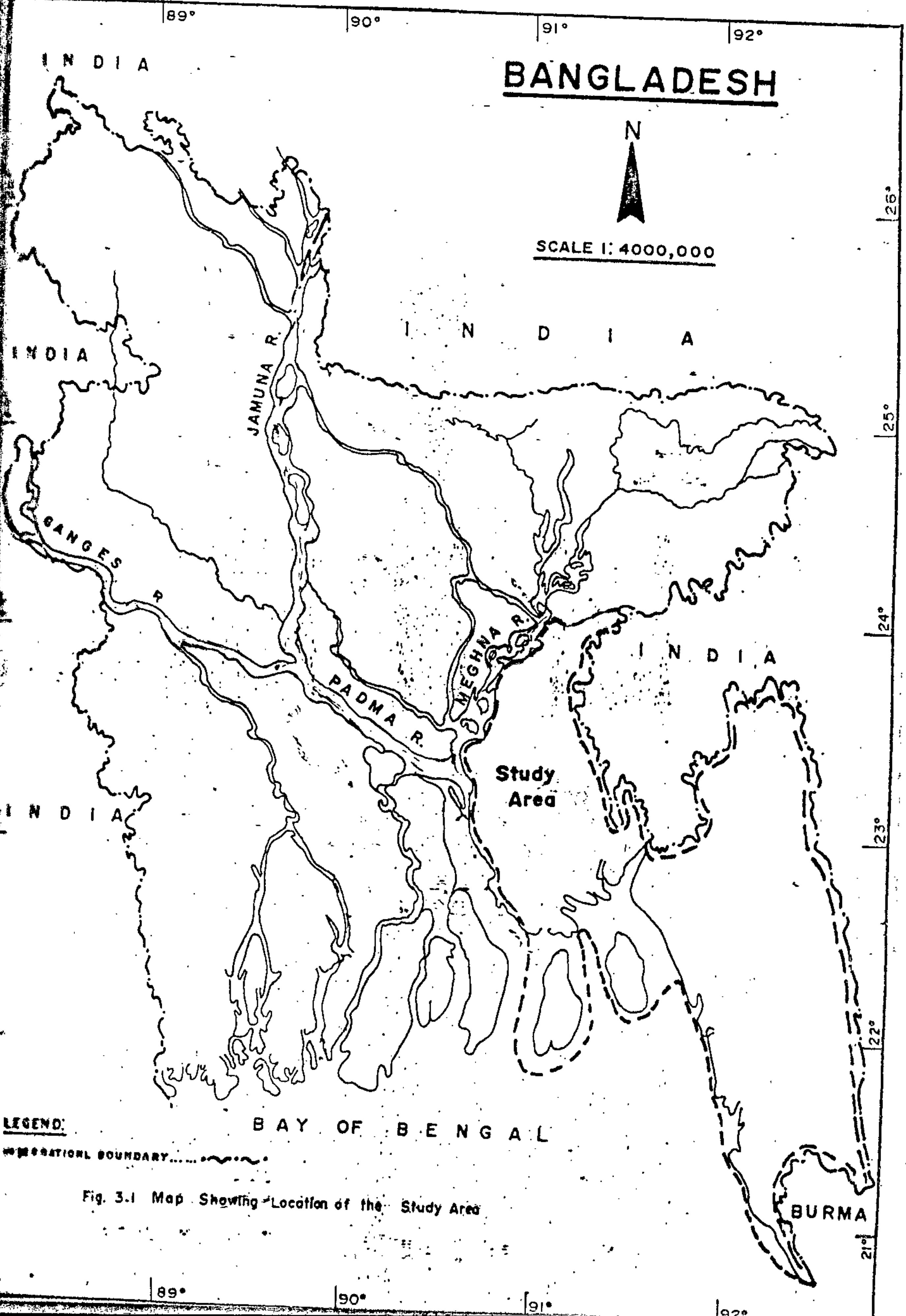


Fig. 3.1 Map Showing Location of the Study Area

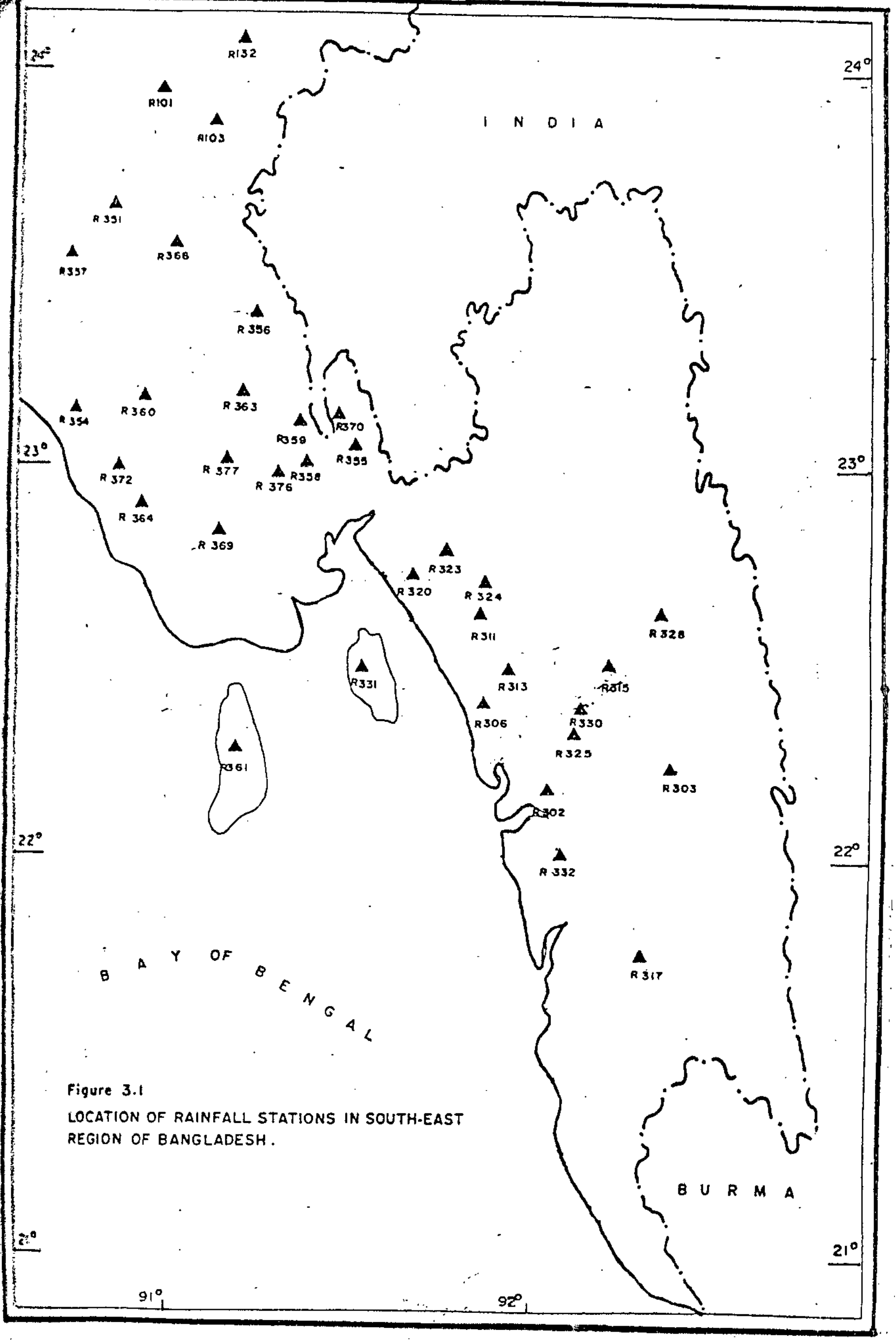


Figure 3.1
LOCATION OF RAINFALL STATIONS IN SOUTH-EAST REGION OF BANGLADESH.

station with missing records, a simple arithmetic average of the precipitation of the index station provides the estimated amount i.e.

$$P_X = (P_A + P_B + P_C)/3 \quad \ldots \quad \ldots \quad \ldots \quad (3.1)$$

where Px is the missing record and P_A, P_B, and P_C are the rainfalls of the surrounding stations.

b) Normal Ratio Method : If the normal annual precipitation at any of the index station differs from that of the station in question by more than 19%, this method is used. The missing precipitation is estimated by the weighted average of the precipitation at the index stations as follows.

$$P_X = 1/3 \left\{ \frac{N_X}{N_A} P_A + \frac{N_X}{N_B} P_B + \frac{N_X}{N_C} P_C \right\} \ldots \quad \ldots \quad (3.2)$$

In which N_X / N_A, N_X / N_B, N_X / N_C are the ratios of the normal annual precipitation of the surrounding stations.

Based on the above criteria 35 stations were selected for this study throughout south eastern part of the country.

3.3 Method of Analysis

Steps of analysis performed in this study are given below.

3.3.1 Development of Annual Maximum Rainfall Series

Annual maximum series for rainfall of one-day, two-day, and three-day for each water year were developed as follows.

In Bangladesh the water year spans from April to March. This is probably done to ensure continuous record through both the monsoon and dry season. Annual maximum one-day /daily rainfall is the maximum value in the year. For two-day and three-day durations running totals technique (Stall and Neill, 1961; Chow, 1964) were used. Running totals technique is basically screening procedure which eliminate overlapping of data and repeated appearances of extreme values in frequency analysis of sequential events. The number of observations in each series was equal to the number of years of record.

3.3.2 Selection of Distribution Type

This part of analysis consists of two parts : (1) Fitting various selected distribution to the developed annual one-day, two-day, and three-day rainfall series for each of the stations and (2) testing the goodness of fit for each distribution.

3.3.2.1 Fitting Distributions

The following five probability distributions were applied to annual maximum values of one-day, two-day and three-day durations.

i) Normal distribution

ii) Two-parameter log-normal distribution

iii) Extreme value type-I or Gumbel distribution

iv) Pearson type III distribution

v) Log Pearson type-III distribution.

According to Chow (1951) most frequency distributions can be generalized to

$$X_T = \bar{X} + K_T\sigma \quad \ldots \quad \ldots \quad \ldots \qquad (3.3)$$

where X_T is an event with return period T years. $\bar{X}$ is the mean and σ is the standard deviation of the series, and K_T is the frequency factor defined by specific distribution. For a given return period, the frequency factor can be determined from the K-T relationship for the proposed distribution and the magnitude is computed by equation 3.3.

Frequency factors for five selected distributions were estimated for one-day, two-day and three-days annual maximum rainfall series by the method of moment.

3.3.2.2 Goodness of Fit Tests

The Chi-square and Kolmogorov-Smirnov tests were used to evaluate the goodness-of-fit. In the Chi-square test all the class intervals (or cells) were determined so that the expected number of observations in each interval were the same and the number of class intervals chosen as 6 (as discussed in Chapter 4). Based on X^2- and Kolmogorov-Smirnov tests a preliminary screening of the distribution were performed. The distribution which exhibited a better fit to the data from most of the stations was selected for further statistical analysis.

3.3.3 Selection of Parameter Estimation Method

As will be seen in chapter 4, for rainfall data all the distribution tested, EV1 fitted data for most of the stations. For EV1 distribution method of moment (MM), method of maximum likelihood (ML) and probability weighted moments (PWM) are considered and it will be investigated which method yield a better fit.

The EV1 distribution can be expressed in cumulative form as

$$F(x) = \exp\{-\exp\{-\alpha(x-\beta\}]$$

$$= \exp\{-\exp(-y)\} \quad \ldots \quad \ldots \quad (3.4)$$

where $F(x)$ is the probability of an event not exceeding x, α and β are the two parameters and $y = \alpha(x-\beta)$ is the reduced variate. By differentiating the density function is

$$f(x) = \alpha \exp\{-y \exp\{-y)\} \quad \ldots \quad \ldots \quad \ldots \quad (3.5)$$

with reduce variate defined by $y= \alpha(x-\beta)$ and α and β are location and scale parameters respectively

Equation 3.4 and 3.5 are unbounded probability density functions with the x axis as the asymptote. The mean and variance of this distribution is given by

$$\mu = \beta + 0.5772/\alpha \quad \ldots \quad \ldots \quad \ldots \quad (3.6)$$

$$\sigma^2 = \pi^2/6\alpha^2 \quad \ldots \quad \ldots \quad \ldots \quad (3.7)$$

The moment estimates α_0 and β_0 for the population parameters α and β can be obtained from the sample data as

$$\alpha_0 = 1.2825/S \quad \ldots \quad \ldots \quad \ldots \quad (3.8)$$

$$\beta_0 = \bar{X} - 0.45\ S \quad \ldots \quad \ldots \quad \ldots \quad (3.9)$$

where $\bar{X}$ and S are the sample mean and sample standard deviation respectively.

The maximum likelihood estimates α and β are obtained by solving the following equations.

$$\alpha = \left[\ \bar{X} - \frac{\{\Sigma\ x_i \exp(-\hat{\alpha} x_i)\}}{\Sigma \exp(-\hat{\alpha} x_i)}\right] \ldots \quad \ldots \quad \ldots \quad (3.10)$$

$$\beta = (1/\hat{\alpha})\ \ln\ [N\ \Sigma\ \exp(-\hat{\alpha} x_i)] \quad \ldots \quad \ldots \quad \ldots \quad (3.11)$$

where ln stands for natural logarithm, N is the sample size and Σ is sum over all N values of $i=1 \ldots\ldots\ldots N$

Equation 3.10 was solved numerically for α by iterative method. Moment estimate α_0 is used as the initial guess for the first iteration. After obtaining the value of α, β is calculated by equation 3.11

In the probability weighted moment (PWM) method the parameter α and β are estimated by

$$M_{1,0,0} = M(0) = \beta + 0.5772\alpha \quad \ldots \quad \ldots \quad \ldots \quad (3.12)$$

$$M_{1,0,1} = M(1) = (\beta + a(0.5772 - \ln 2))/2 \quad \ldots \quad \ldots \quad (3.13)$$

where M(o) and M(1) are sample PWM of order o and 1 respectively. The sample PWM(r) of order r can be obtained using a plotting position that is an estimate of $F(x_i)$. An unbiased estimator of M(r) is (Landwehr et al., 1979)

$$M(r) = \frac{1/N \; \Sigma \; (i-1)(i-2)....(i-r) \; x_i}{(N-1)(N-2).....(N-r)} \quad \ldots \quad \ldots \quad (3.14)$$

where N is the sample size and x_i are the ordered value of observed rainfall data so that $x_1 \leq x_2 \leq ....x_N$. It is seen that the M(o) is simply the sample mean.

3.3.3.1 Comparison Parameter Estimation Methods

For comparison of the three methods of parameter estimation viz method of moment, method of maximum likelihood and probability weighted method, X^2-, Kolmogorov-Smirnov tests, A^2-, W^2-, and U^2- were employed. X^2- and K-S tests have been discussed before be applied to any type of distribution. Stephens (1977) introduced three other tests, such as A^2-, W^2-, and U^2- tests for the case of EV1 and is used for the comparison. Maps of isovalues for the best parameter estimation method will be prepared for practical use.

3.3.4 Effect of Plotting Position Formulae on Empirical Distribution Fitting

For the EV1 distribution the effect of different plotting position formulae (already discussed in Chapter 2) was investigated by computing Kolmogorov-Smirnov value using those formulas.

3.3.5 Reliability Analysis

Finally reliability of the results of selected frequency distribution was demonstrated by drawing confidence limit.

Chapter 4

RESULTS AND DISCUSSIONS

4.1 Introduction

Five probability distributions were applied to annual maximum one-day, two-day and three-day rainfall sequences at different stations in the study area. Several computer programs were written in FORTRAN (presented in Appendix - C) to perform a succession of analysis as outlined in chapter 3. In this chapter results of these analyses are presented.

4.2 Selection of Best Fit Distribution

The selection of a distribution was made on the basis of how well each of the several distributions fitted a common and extensive set of data. To judge the goodness of fit of a sample to a theoretical probability distribution, the X^2-test and Kolmogorov-Smirnov tests were employed at 10% significance level. Estimation of parameters for fitting the distributions was accomplished by method of moments because of its simplicity and lack of bias (Lowery and Nash, 1970).

The hypothesis H_0 being tested is that a sample comes from a given theoretical distribution. Computed test statistics are compared with the critical values for a chosen significance level of 10%, a value commonly used in design calculations. For the specified significance level, the hypothesis H_0 is rejected if the computed statistic is higher than the corresponding tabulated value.

4.2.1 Chi-Square Test

The X^2 statistic clearly depends upon the number of classes employed as well as the class division points. Since there is no generally accepted method for determination of the number of class intervals, numerous rules have been suggested by many statisticians. According to these rules, the number of class intervals should not be smaller than about 10 and not larger than 20, but these practical rules have no theoretical basis. Nevertheless, a guide for the systematic choice of the number of class intervals has been developed. Based upon some these theoretical considerations, several mathematical formulas have been suggested for the number of class intervals for different sample sizes. In such a situation, a practical rule commonly used by many statistician is applied in this study. The rule states that the number of class intervals should be closer so that average expected frequency of any class intervals is at least five. Since the observed sample size used in this study ranges from 27 to 29 with an average of about 28, the total number of class intervals selected is six. The choice of the length of class intervals should be done in such a manner that the main characteristics features of the observed distribution are emphasized and chance of variation are observed. Basically, there are two concepts for choice of the length of class intervals: (a) equal lengths and (b) equal probabilities.

Equal lengths of class intervals are extensively used even though there is no theoretical formulation for it. However, it has some advantage in graphical representation of observed distributions, since the comparability is difficult to carry out by inspection where there exist inequalities in class intervals.

Equal probabilities of class intervals, which can be considered as special case of unequal lengths, have some advantages over the previous method. The arbitrary steps for equal lengths may be avoided by choosing intervals of equal probabilities instead of intervals of equal lengths. The required intervals are obtained from probability integral transformation. This method is more convenient and much simpler for numerical analysis than the previous one and is used for this research.

4.2.2 Kolmogorov-Smirnov (K-S) Test

The Kolmogorov-Smirnov test depends upon plotting position formula used in representing the empirical distributions. The Weibull plotting position formula was used in computing the K-S statistic in judging the goodness-of-fit of various distributions.

4.3 Comparison of Distributions

The X^2- and K-S statistics for each of 35 stations are assembled separately in Appendix-A (Table A.1 to A.35). These tables show whether data for each individual station fits a given distribution. Results of these tests are summarized in Table 4.1 which shows how well individual distributions fits rainfall sequences of different durations considering all stations together. For example, Gumbel or EV1 distribution fitted the data from 26, 28 and 32 stations, respectively out of a total of 35 stations and for rainfall durations of 1, 2, and 3 days according to X^2 test. On the other hand, K-S test yielded good fit to one-, two-, and three-day duration rainfall values for all 35 stations (Table 4.1b). The average number of stations considering all of rainfalls sequences which fitted the indicated distributions for both statistical tests are shown in Table 4.1(c).

Table 4.1(a) shows that Gumbel distribution fits one-day and three-day rainfall sequences better whereas the log-normal distribution exhibits better fit to two-day rainfall values. However, looking at the average X^2-

statistics for three rainfall sequences considered together, Gumbel distribution shows slightly better fit which is followed by log-normal and normal distributions.

The computed values of the K-S statistic indicate that five of the distributions except Pearson Type-III (PT3) distribution fit the rainfall data for all stations when the rainfall sequences are considered separately (Table 4.1b) or together (Table 4.1c). Even the PT3 distribution is seen to represent observed rainfall extremes at more than 90% of the stations included in this analysis. This shows that K-S test is not very sensitive.

The statistical tests established no marked superiority of any of the three distributions: Gumbel, lognormal and normal distributions in fitting the rainfall observations. Although statistical tests indicated no significant differences, one base method is preferable to three in the interest of uniformity of results obtained.

The log-normal and Gumbel distributions, which have been commonly used in the investigation of extreme values and especially maximum values, are characterized by two parameters, the mean and a measure of dispersion. The log-normal distribution assumes that the logarithms of the data are normally distributed. The Gumbel distribution

Table 4.1(a): Number of Stations Showing the Acceptance Status of Distribution According to X^2-test at 10% Significance Level

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	(a)	(b)	(a)	(b)	(a)	(b)
Normal	23(66%)	12(34%)	30(86%)	5(14%)	29(83%)	6(17%)
Log Normal	25(71%)	10(29%)	31(89%)	4(11%)	29(83%)	6(17%)
Gumbel	26(74%)	9(26%)	28(80%)	7(20%)	32(91%)	3(9%)
Pearson Type III	18(51%)	17(49%)	18(51%)	17(49%)	19(54%)	16(46%)
Log Pearson Type III	19(54%)	16(46%)	23(66%)	12(34%)	22(63%)	13(37%)

Table 4.1(b): Number of Stations Showing the Acceptance Status of Distribution According to K-S test at 10% Significance Level

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	(a)	(b)	(a)	(b)	(a)	(b)
Normal	35(100%)	0(0%)	35(100%)	0(0%)	35(100%)	0(0%)
Log Normal	35(100%)	0(0%)	35(100%)	0(0%)	35(100%)	0(0%)
Gumbel	35(100%)	0(0%)	35(100%)	0(0%)	35(100%)	0(0%)
Pearson Type III	33(94%)	2(6%)	32(91%)	3(9%)	33(94%)	2(6%)
Log Pearson Type III	35(100%)	0(0%)	35(100%)	0(0%)	35(100%)	0(0%)

Table 4.1(c): Average X^2- and K-S Statistics (1-day, 2-day, 3-day average)

Distribution Type	X^2		K-S	
	(a)	(b)	(a)	(b)
Normal	27(78%)	8(22%)	35(100%)	0(0%)
Log Normal	28(81%)	7(19%)	35(100%)	0(0%)
Gumbel	29(82%)	6(18%)	35(100%)	0(0%)
Pearson Type III	18(52%)	17(48%)	33(93%)	2(7%)
Log Pearson Type III	21(61%)	14(39%)	35(100%)	0(0%)

Note : (a), (b) show number (percentage) of stations where distribution fitted and did not fit, respectively at 10% significance level assumes a constant coefficient of skewness of 1.14 and remains most widely adopted in practical situations.

Subsequent analysis concerning comparison of parameter estimation methods and empirical distributions expressed by plotting position formulae will be based on Gumbel distribution.

4.4 Comparison of Parameter Estimation Methods

Various methods of parameter estimation are available for fitting distributions. These include methods of moments (MM), method of maximum likelihood (ML), probability weighted moments (PWM), and least square method. Among these methods, MM, ML and PWM are widely used and also considered for this part of analysis. The purpose is to examine how the parameters estimated by each of these methods affect fitting of EV1 distribution. Lowery and Nash (1970) compared the various methods of estimating the parameters of EV1 distribution and concluded that next to the method of maximum likelihood, the method of moments is most accurate. The PWM is of more recent origin and the estimates are unaffected by outliers and can be applied to such distribution as EV1 whose inverse forms can be explicitly defined.

4.4.1 Statistical Tests

In addition to X^2- and K-S tests, three other tests have been introduced by Stephens (1977). These are known as A^2-, U^2- and W^2- tests. The K-S test depends upon plotting position formula used in representing the empirical distribution. This also applies to W^2- and U^2- tests. Since A^2- and X^2- tests, are independent of the plotting position formula, these are used in this comparison.

The A^2- and X^2- statistics are presented stations-wise in Appendix-B (Table B.1 and B.2) and summarized in Tables 4.2 and 4.3. Results presented in Table 4.2 indicates that based on A^2- test maximum likelihood method fits rainfall data for the highest percent of stations for all sequences of rainfalls. In case of X^2- test only three-day rainfall sequence exhibits better fit when either ML or PWM estimates are inserted.

Table 4.3 shows the percentage of the stations where minimum values of A^2- and X^2- statistics were obtained for each rainfall duration. The ML method yields smallest values for both of A^2- and X^2- tests. These observations make the ML more favourable for application.

Table 4.2: Stations (%) where Various Parameter Estimating Methods Fitted the Data at 10% Significance Level According to A^2- and X^2- Statistic

Statistics Type	1-day Rainfall			2-day Rainfall			3-day Rainfall			Average(1,2,3)		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
A^2	63	77	69	80	86	83	86	97	94	76.	87	82
X^2	74	86	77	80	83	80	91	89	91	82	86	83

Table 4.3: Stations (in %) Where Various Parameter Estimation Method Produced Minimum Value of A^2- and X^2- Statistic

Statistics Type	1-day Rainfall			2-day Rainfall			3-day Rainfall			Average(1,2,3)		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
A^2	8	72	20	14	60	26	8	61	31	8	65	27
X^2	24	43	33	33	36	31	35	36	29	31	38	31

Note MM : Method of moment
ML : Method of maximum likelihood
PWM : Method of probabilty weighted moment

4.5 Comparison of Plotting Position Formulas

Various plotting position formulas are employed for fitting empirical distributions. Six formulas tested here includes those of Weibull, Beard, Hazen, Blom, Tukey and Gringorten formulae. As mentioned before only EV1 distribution will be considered in this phase of analysis concerned with choice of suitable plotting position formulas.

The tests employed were K-S test as well as W^2- and U^2-tests. The results of these tests for individual stations are presented in Appendix B (Tables B.3 through B.37). Summary for the K-S, W^2- and U^2- tests are given in Tables 4.4 to 4.6. The hypothesis H_0 that EV1 distribution fits the data is accepted according to K-S W^2- and U^2- tests for each of the plotting position formulae for all stations and for all annual maximum rainfall sequences.

Tables 4.7 to 4.9 give the percent of stations where the smallest values of the K-S, W^2- and U^2- statistics were obtained. Based on K-S test Weibull formula produced the smallest value for the highest percent of stations while Hazen formula yielded smallest values for more stations in case of W^2- and U^2-test. Considering the overall performance of each plotting position formula, Weibull formula seems to give better results.

Table 4.4: Stations (%) Where Various Parameter Estimation Methods Fitted the Emperical Distribution Based on Plotting Position Formulae According to Kolmogorov-Smirnov Statistic at 10% Signinficance Level

Plotting position formula	1-day Rainfall			2-day Rainfall			3-day rainfall			Average(1,2,3)		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	100	100	100	100	100	100	100	100	100	100	100	100
Beard	100	100	100	100	100	100	100	100	100	100	100	100
Hazen	100	100	100	100	100	100	100	100	100	100	100	100
Blom	100	100	100	100	100	100	100	100	100	100	100	100
Tukey	100	100	100	100	100	100	100	100	100	100	100	100
Gringorten	100	100	100	100	100	100	100	100	100	100	100	100

Table 4.5: Stations (%) Where Various Parameter Estimation Methods Fitted the Emperical Distribution Based on Plotting Position Formulae According to W^2-Statistic at 10% Signinficance Level

Plotting position formula	1-day Rainfall			2-day Rainfall			3-day Rainfall			Average(1,2,3)		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	69	83	80	83	89	86	94	97	97	82	91	89
Beard	69	80	74	83	89	86	94	97	97	82	89	86
Hazen	69	80	77	83	89	86	94	97	97	82	89	87
Blom	69	80	74	83	89	86	94	97	97	82	89	86
Tukey	69	80	74	83	89	86	94	97	97	82	89	86
Gringorten	69	80	71	83	89	86	94	97	97	82	89	85

Table 4.6: Stations (%) Where Various Parameter Estimation Methods Fitted the Emperical Distribution Based on Plotting Position Formulae According to U^2-Statistic at 10% Signinficance Level

Plotting position formula	1-day Rainfall			2-day Rainfall			3-day Rainfall			Average(1,2,3)		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	66	83	83	83	89	89	91	97	97	80	90	90
Beard	74	80	83	86	89	89	94	97	97	85	89	90
Hazen	74	80	83	86	89	89	94	97	97	86	89	90
Blom	74	80	83	86	89	89	94	97	97	85	89	90
Tukey	74	80	83	86	89	89	94	97	97	85	89	90
Gringorten	74	80	83	86	89	89	94	97	97	85	89	90

Note MM : Method of moment
ML : Method of maximum likelihood
PWM : Method of probabilty weighted moment

Table 4.7: Stations (%) Where Various Parameter Estimation Methods Produced Minimum Value of Kolmogorov-Smirnov Statistic Based on Different Plotting Position Formulae

Plotting position formula	1-day Rainfall			2-day Rainfall			3-day Rainfall			Average(1,2,3)		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	43	44	49	49	54	69	54	56	69	49	51	62
Beard	14	6	6	3	0	6	2	5	7	6	4	6
Hazen	29	28	19	43	34	17	32	22	18	35	28	18
Blom	2	8	6	5	6	3	5	5	2	4	7	4
Tukey	7	6	6	0	0	3	2	5	2	3	4	4
Gringorten	5	8	14	0	6	2	5	7	2	3	6	6

Table 4.8: Stations (%) where Various Parameter Estimation Methods Produced Minimum Value of W^2-Statistic Based on Different Plotting Position Formulae

Plotting position formula	1-day Rainfall			2-day Rainfall			3-day Rainfall			Average(1,2,3)		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	22	42	43	26	33	41	18	33	45	22	36	43
Beard	5	14	11	5	5	13	3	10	19	5	10	14
Hazen	68	33	23	54	42	22	63	29	12	62	35	19
Blom	0	3	7	5	5	7	5	6	7	3	4	8
Tukey	3	0	11	8	5	10	3	10	7	5	5	9
Gringorten	2	8	5	2	10	7	8	12	10	3	10	7

Table 4.9: Stations (%) where Various Parameter Estimation Methods Produced Minimum Value of U^2-Statistic Based on Different Plotting Position Formulae

Plotting position formula	1-day Rainfall			2-day Rainfall			3-day Rainfall			Average(1,2,3)		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	22	42	44	26	33	35	18	31	35	22	36	38
Beard	5	14	12	5	4	14	3	12	19	5	10	15
Hazen	68	33	22	54	44	26	63	29	14	62	35	21
Blom	0	3	7	5	4	9	4	7	16	3	4	10
Tukey	2	0	10	8	4	4	3	10	9	5	5	8
Gringorten	3	8	5	2	16	12	9	14	7	3	10	8

Note MM : Method of moment
ML : Method of maximum likelihood
PWM : Method of probabilty weighted moment

4.6 Intensity-Duration-Frequency-Relationships

By using the procedure outlined in chapter 3, the maximum likelihood estimates of the parameters a and b of Gumbel distribution are determined for all selected rainfall stations throughout south eastern part of the country. The equation relating the Gumbel variate x with the reduce variety y is

$$x = b + a\,y \quad \ldots \quad \ldots \quad \ldots \quad \ldots \qquad (4.1)$$

where a and b are defined as follows:

$$a = 1/\alpha \text{ and } b = \beta \quad \ldots \quad \ldots \quad \ldots \qquad (4.2)$$

$$\text{and} \quad y = -\ln\,(-\ln(1-1/T) \quad \ldots \quad \ldots \qquad (4.3)$$

where T is the return period in years.

The parameter a, of the Gumbel distribution is a function of standard deviation only, but b is a function of mean and the standard deviation. Knowing the values of parameters a, b the megnitude of rainfall of stated duration and frequency or return period can be estimated. The fitted equations for Gumbel distribution for each station are given in Table 4.10.

4.7 Maps of Isovalues for Parameters of Gumbel Distribution

Throughout the south eastern part of the country map of isovalues of parameters a and b of the Gumbel distribution were drawn as shown Figure 4.1 to 4.6 with a convenient interval (normally 5 or 10) for each rainfall station of studied duration.

Table 4.10 Fitted Intensity-Duration-Frequency Relationship for Individual Stations

Station No	One-day Rainfall	Two-day Rainfall	Three-day Rainfall
R101	x = 128.20 + 40.00y	x = 173.29 + 51.02y	x = 206.74 + 58.47y
R103	x = 144.32 + 37.50y	x = 187.46 + 49.50y	x = 244.27 + 63.69y
R132	x = 118.89 + 29.49y	x = 170.53 + 46.02y	x = 210.44 + 56.17y
R302	x = 144.59 + 38.46y	x = 229.88 + 59.88y	x = 293.68 + 77.52y
R303	x = 167.67 + 95.23y	x = 257.36 + 95.24y	x = 317.61 +112.35y
R306	x = 204.13 + 64.51y	x = 297.77 + 92.59y	x = 366.45 +100.00y
R311	x = 150.68 + 47.62y	x = 222.04 + 68.49y	x = 278.11 + 96.15y
R313	x = 176.90 + 76.34y	x = 257.74 +107.53y	x = 312.15 +133.33y
R315	x = 158.49 + 55.86y	x = 232.72 + 87.72y	x = 277.76 +105.26y
R317	x = 168.93 + 34.96y	x = 270.26 + 64.10y	x = 349.94 + 74.62y
R320	x = 183.49 + 45.87y	x = 262.67 + 65.78y	x = 321.07 + 85.47y
R323	x = 162.68 + 40.16y	x = 243.10 + 63.69y	x = 302.32 + 76.92y
R324	x = 152.89 + 45.45y	x = 236.63 + 68.02y	x = 299.97 + 97.08y
R325	x = 160.53 + 48.31y	x = 239.95 + 74.63y	x = 292.58 + 89.20y
R328	x = 167.59 + 68.49y	x = 239.97 + 96.15y	x = 286.95 +120.48y
R330	x = 169.51 + 51.54y	x = 258.07 + 73.53y	x = 309.79 + 93.45y
R331	x = 159.02 + 62.50y	x = 243.92 +105.26y	x = 305.96 +135.13y
R332	x = 135.25 + 52.35y	x = 203.90 + 74.63y	x = 260.55 +100.00y
R351	x = 116.25 + 47.39y	x = 160.86 + 60.60y	x = 192.18 + 75.18y
R354	x = 113.33 + 42.55y	x = 155.24 + 49.26y	x = 179.66 + 55.24y
R355	x = 151.90 + 51.02y	x = 222.24 + 66.22y	x = 267.45 + 75.18y
R356	x = 115.92 + 30.95y	x = 167.48 + 36.49y	x = 195.60 + 48.30y
R357	x = 110.08 + 26.46y	x = 173.66 + 34.96y	x = 210.52 + 51.02y
R358	x = 156.24 + 51.02y	x = 228.46 + 70.92y	x = 274.93 + 83.33y
R359	x = 146.68 + 47.80y	x = 210.75 + 47.62y	x = 256.49 +101.01y
R360	x = 103.70 + 32.89y	x = 150.43 + 48.07y	x = 177.34 + 57.54y
R361	x = 156.34 + 38.16y	x = 233.34 + 56.17y	x = 281.52 + 70.42y
R363	x = 110.90 + 40.16y	x = 172.65 + 52.08y	x = 203.88 + 64.52y
R364	x = 105.70 + 36.63y	x = 163.74 + 52.08y	x = 202.71 + 60.24y
R366	x = 83.98 + 53.47y	x = 117.66 + 70.92y	x = 142.67 + 86.95y
R369	x = 166.82 + 37.59y	x = 234.88 + 45.04y	x = 275.22 + 51.28y
R370	x = 140.15 + 36.36y	x = 195.50 + 49.01y	x = 239.88 + 52.63y
R372	x = 103.80 + 39.22y	x = 151.19 + 50.76y	x = 181.77 + 55.56y
R376	x = 160.09 + 44.64y	x = 225.37 + 54.94y	x = 270.87 + 79.36y
R377	x = 140.72 + 38.61y	x = 196.94 + 51.02y	x = 232.88 + 60.24y

This was accomplished by plotting the values of a and b separately at each station location for each rainfall duration, and then drawing lines connecting points having same values of parameters a, b, respectively. Between adjacent stations, lines of isovalues are drawn by linear interpolation. Figures 4.1 to 4.3 show maps of isovalues of the scale parameter a for one day, two day and three day annual maximum rainfall values, respectively.

The maps of isovalues of parameter b are presented in Figure 4.4 to 4.6 for one day, two day and three day annual maximum rainfall values, respectively.

4.8 Reliability of Frequency Studies

The reliability of the results of frequency analysis depends on how well the assumed probabilistic model applies to a given set of hydrologic data. It is to be noted that the standard errors of estimate, and therefore the reliability are a function of a sample size.

Statistical estimates are often presented with a range or confidence interval, within which the true value can reasonably be expected to lie. Figure 4.7, 4.8, 4.9, 4.10 and 4.11 show the confidence limits for one-day maximum rainfall values at Sunaimuri (station R377), Nasirnagar (station R132), Lama (station R317), Chandpur (station R354) and Rangamati (station R328) respectively. The figures show that all observed rainfall values lie within the confidence intervals both for 90% and 95% confidence limits.

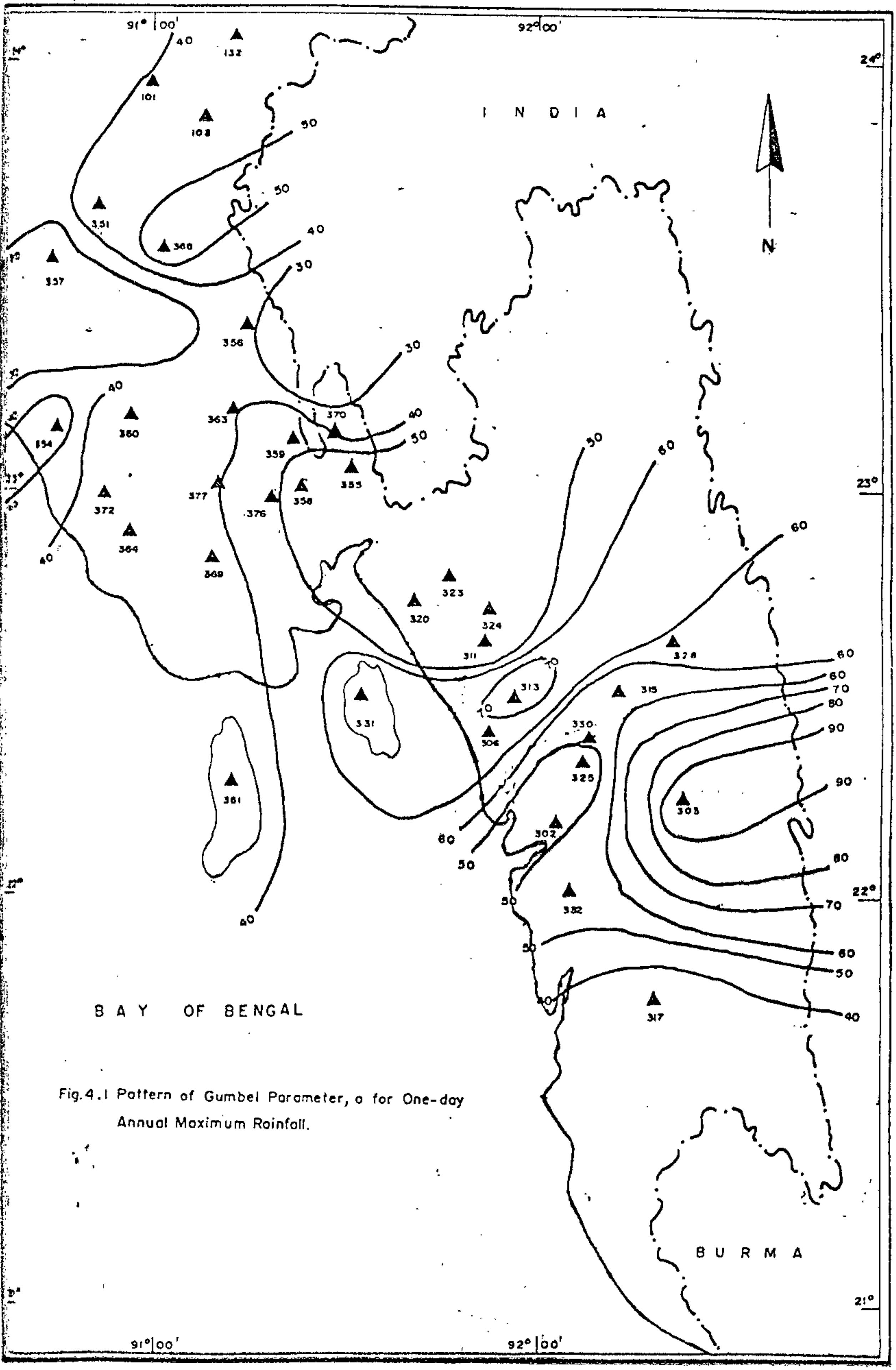


Fig. 4.1 Pattern of Gumbel Parameter, α for One-day Annual Maximum Rainfall.

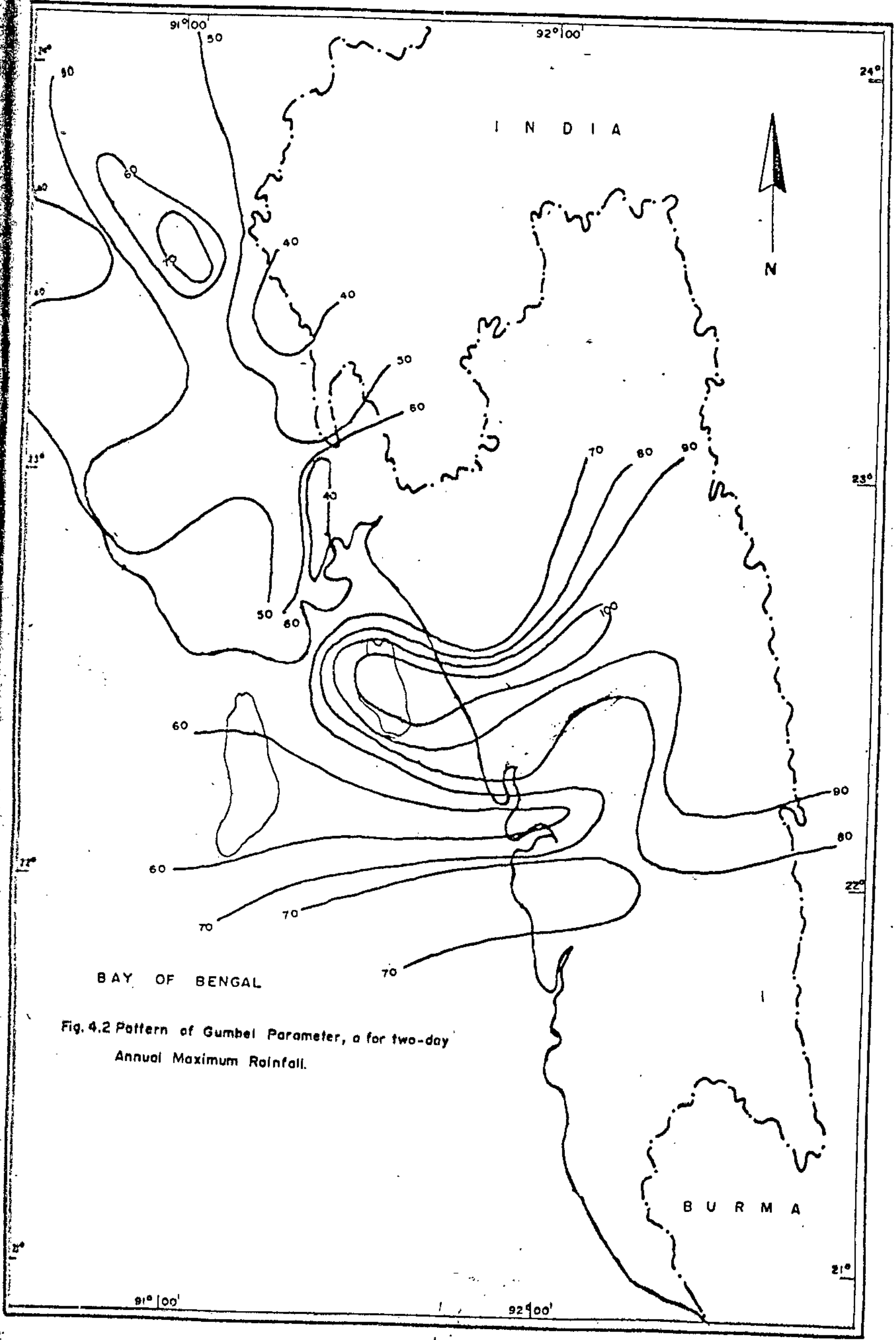


Fig. 4.2 Pattern of Gumbel Parameter, a for two-day Annual Maximum Rainfall.

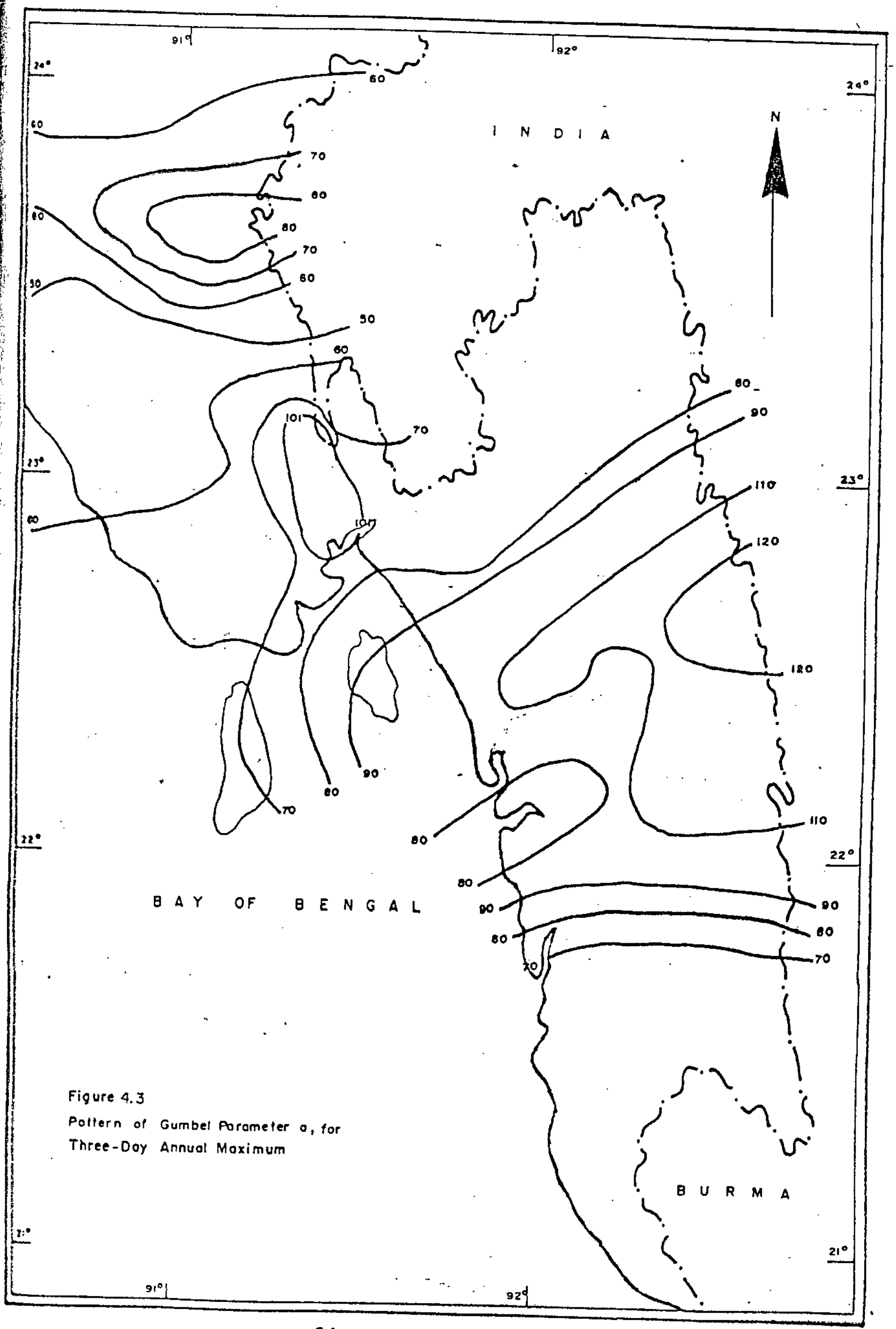


Figure 4.3
Pattern of Gumbel Parameter a, for
Three-Day Annual Maximum

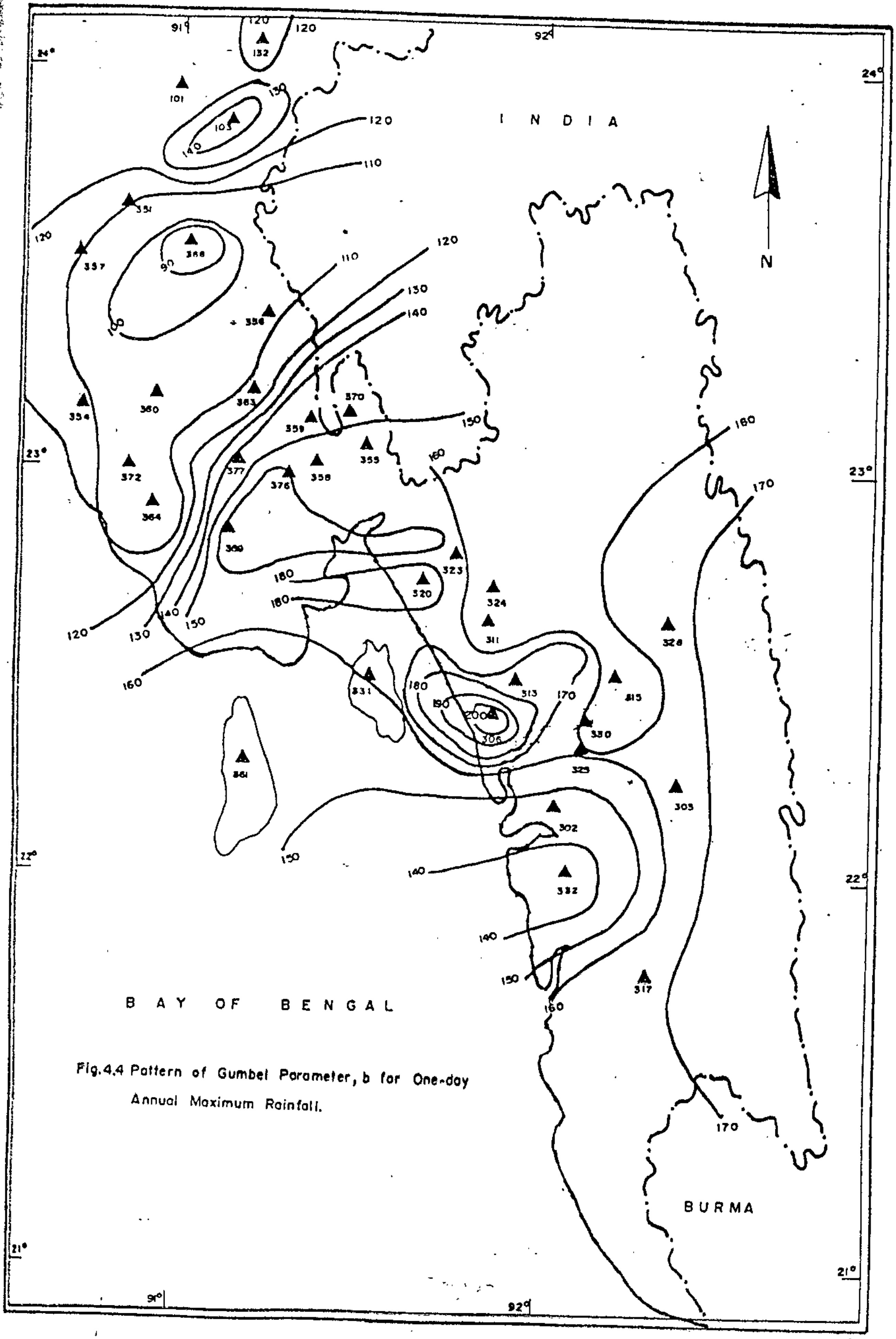


Fig.4.4 Pattern of Gumbel Parameter, b for One-day Annual Maximum Rainfall.

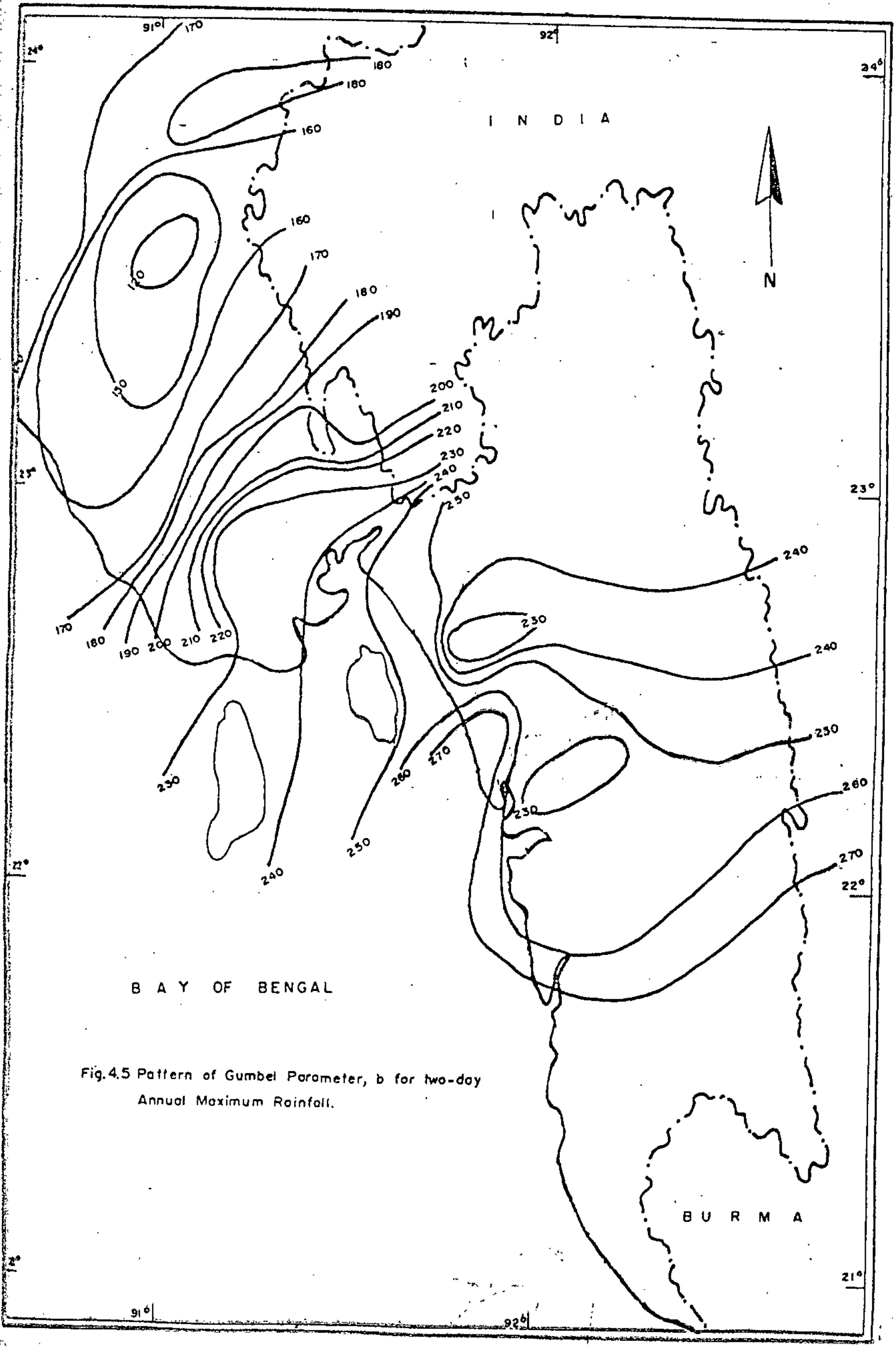


Fig. 4.5 Pattern of Gumbel Parameter, b for two-day Annual Maximum Rainfall.

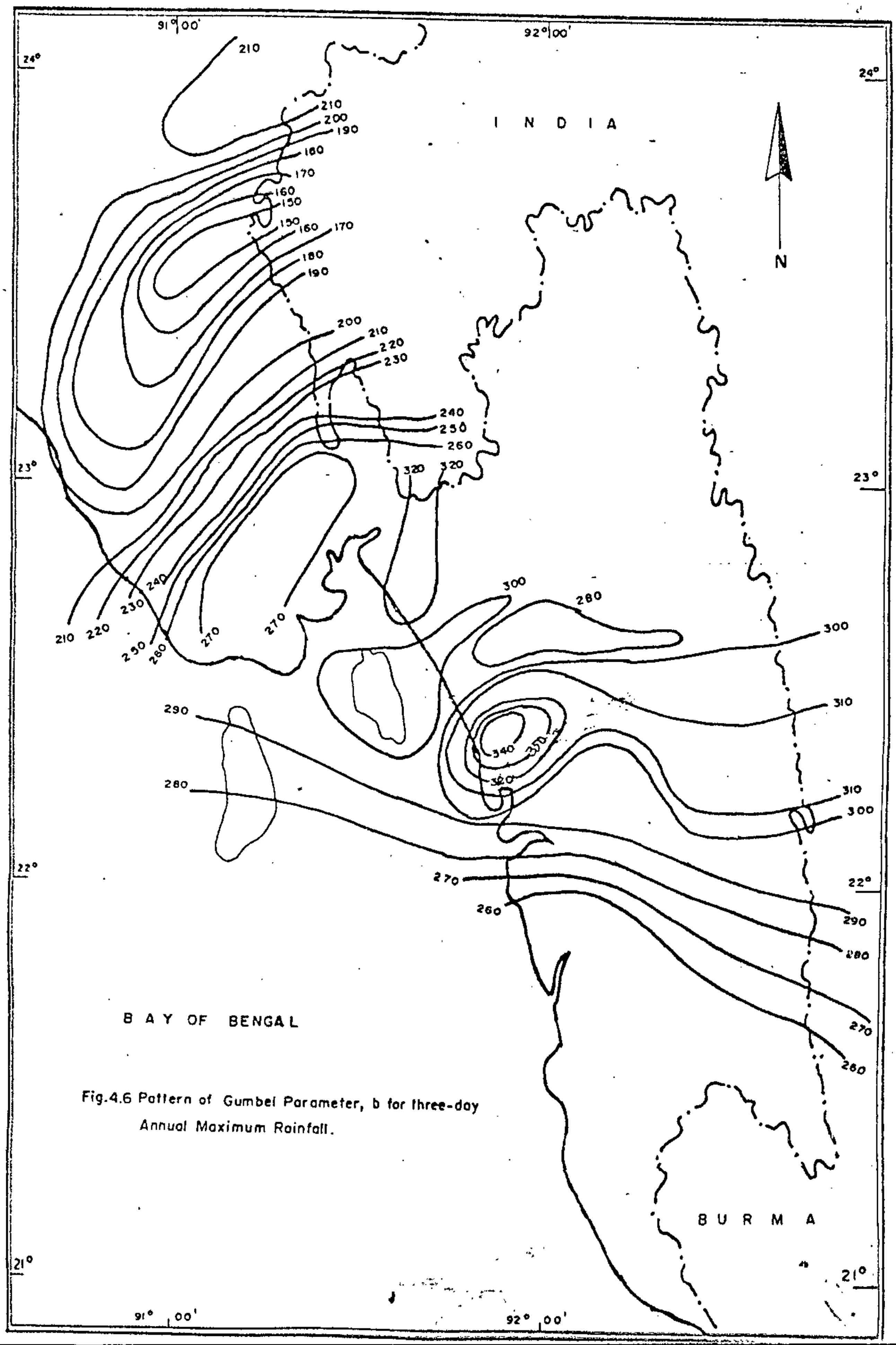
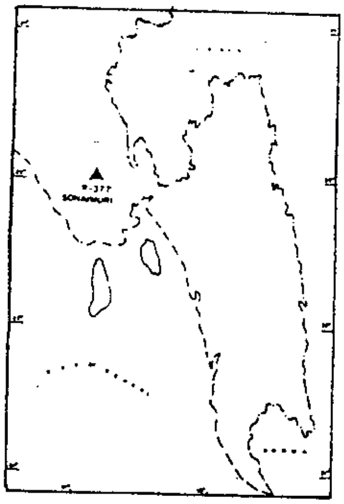


Fig.4.6 Pattern of Gumbel Parameter, b for three-day Annual Maximum Rainfall.



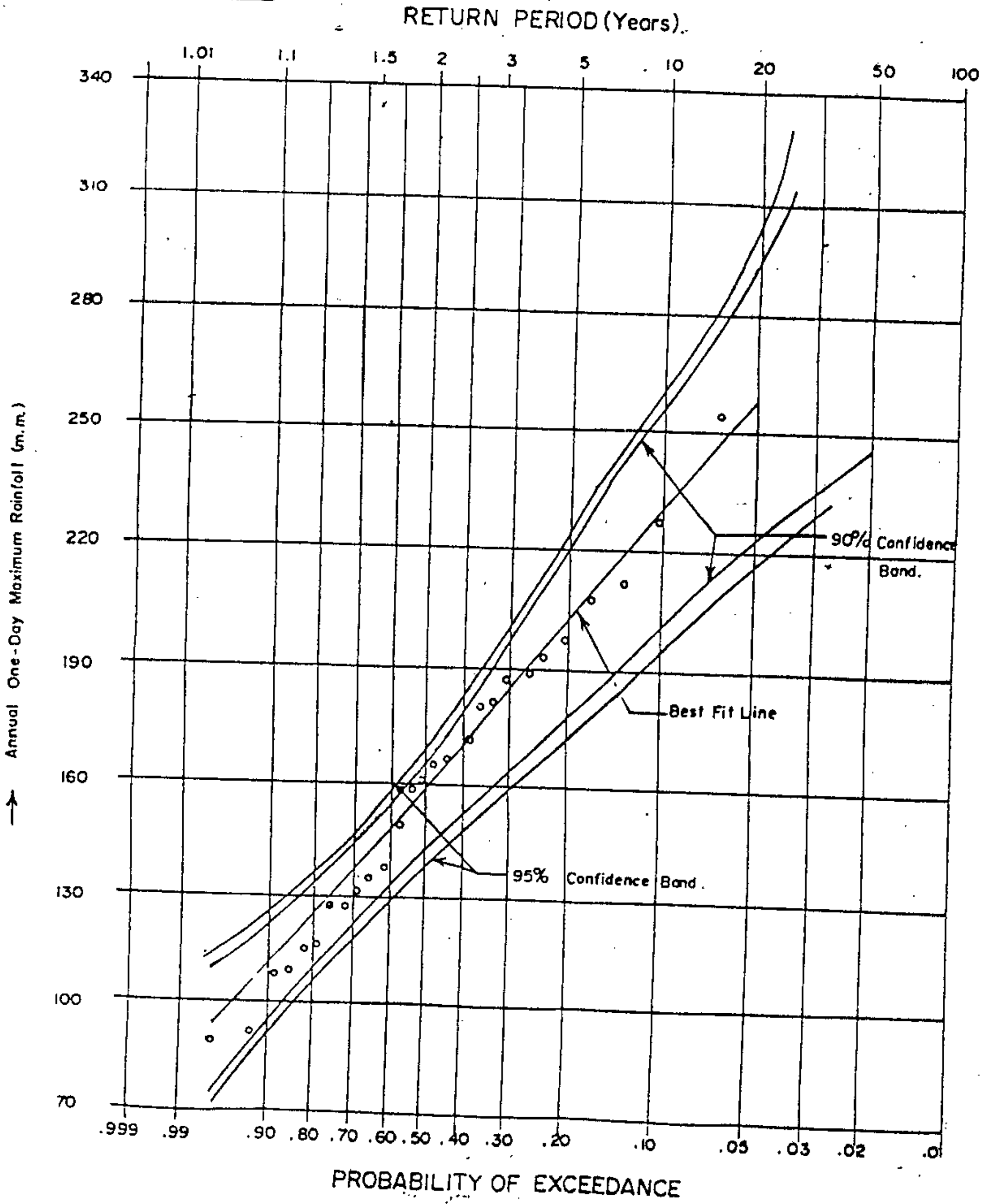
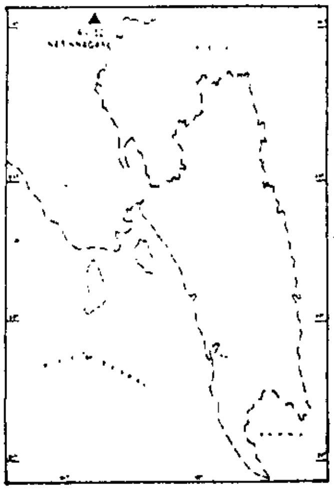


Fig. 4.7 CONFIDENCE LIMITS FOR 1 DAY ANNUAL MAXIMUM RAINFALL AT SONAIMURI STATION R377 USING EVI DISTRIBUTION



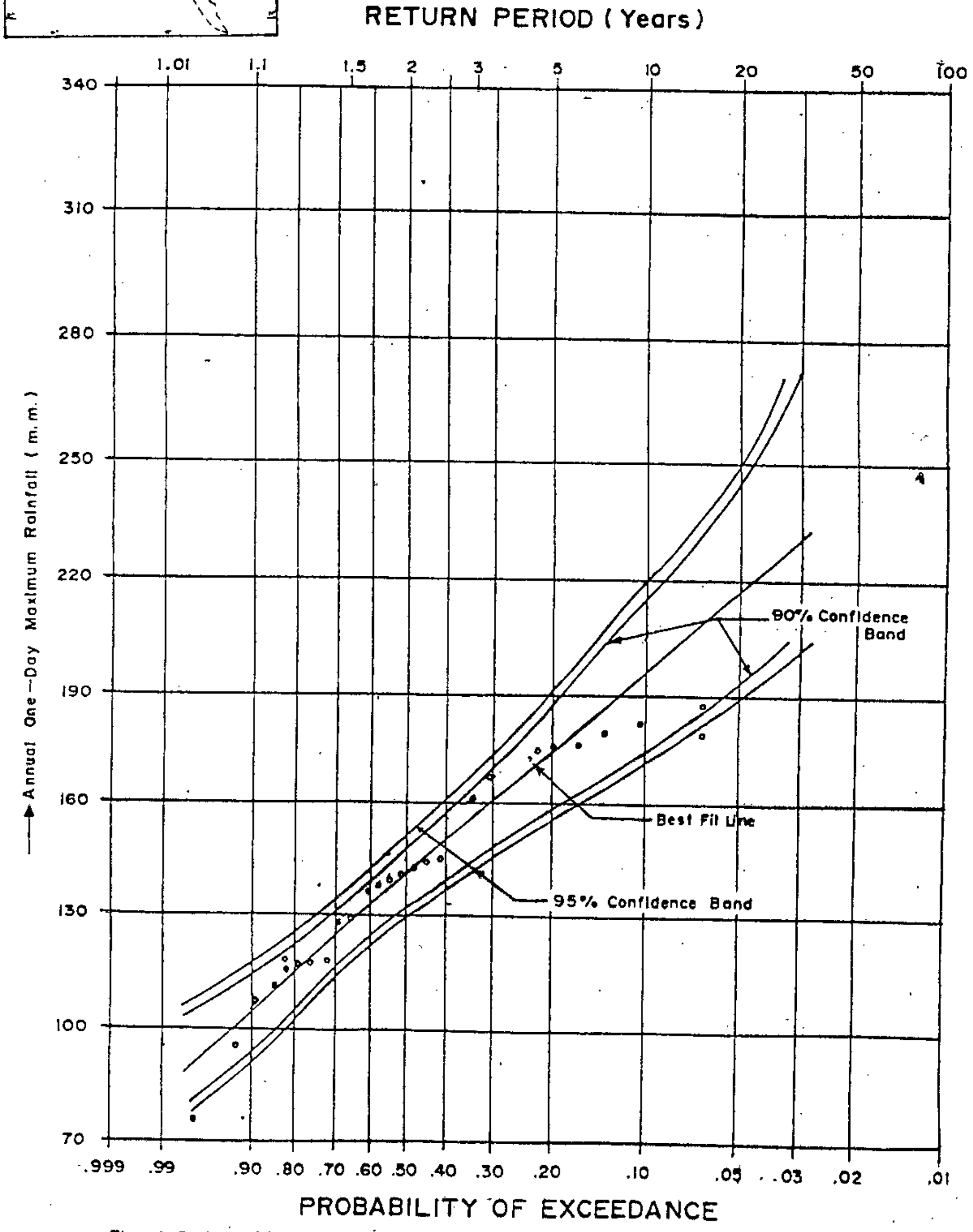
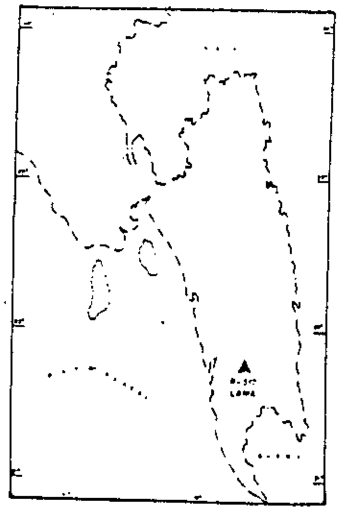


Fig. 4.8 CONFIDENCE LIMITS FOR 1 DAY MAXIMUM RAINFALL AT NASIRNAGAR (R-132) USING EVI DISTRIBUTION



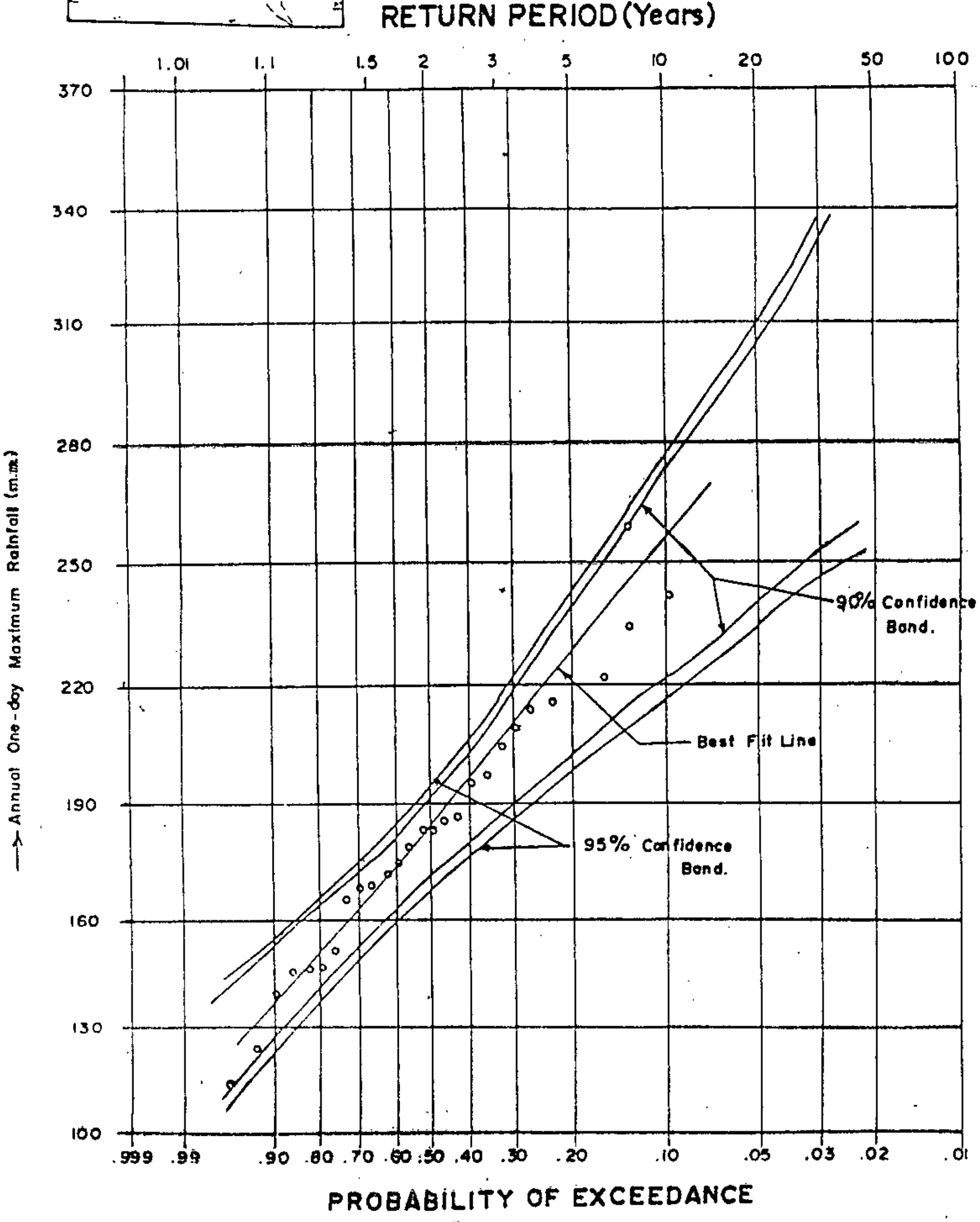


Fig. 4.9 CONFIDENCE LIMITS FOR 1 DAY MAXIMUM RAINFALL AT LAMA STATION R - 317 USING EVI DISTRIBUTION

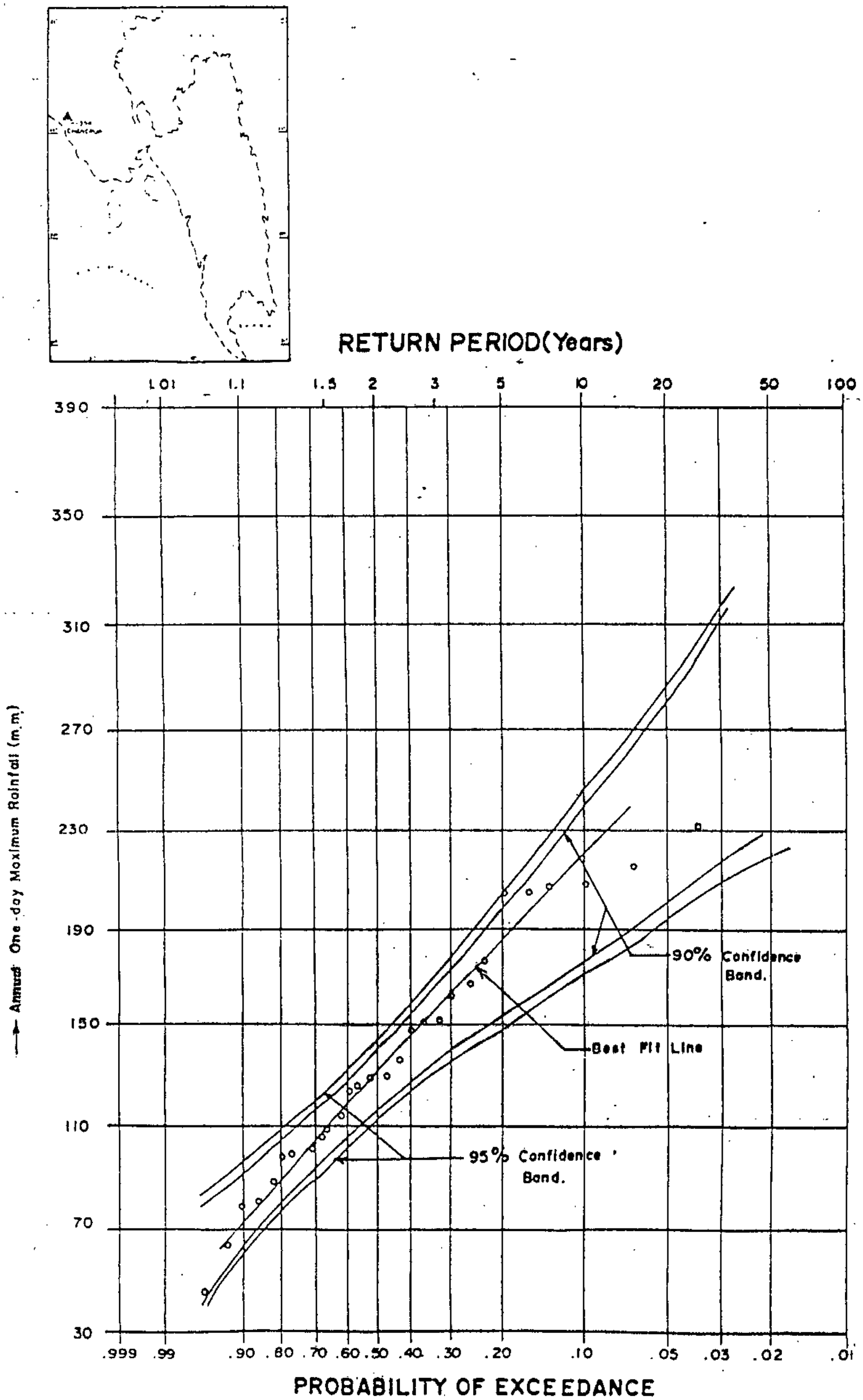


Fig. 4.10 CONFIDENCE LIMITS FOR 1 DAY MAXIMUM RAINFALL AT CHANDPUR STATION R-354 USING EVI DISTRIBUTION

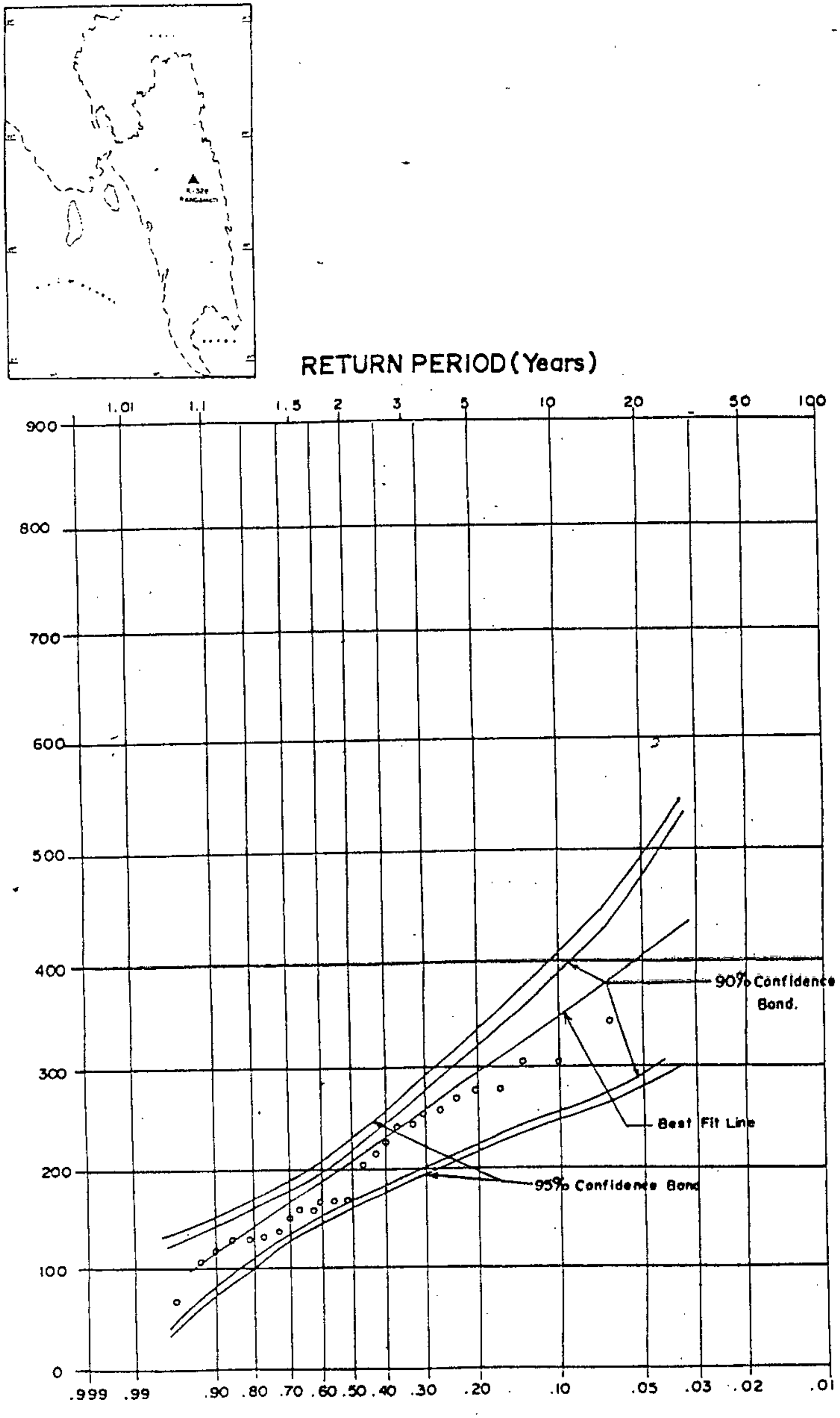


Fig. 4.11 CONFIDENCE LIMITS FOR 1 DAY MAXIMUM RAINFALL AT RANGAMATI STATION R-328 USING EVI DISTRIBUTION

Chapter 5

SUMMARY AND CONCLUSIONS

5.1 Summary

A succession of analyses were performed using annual maximum rainfall values for the south eastern part of the country. Observed daily rainfall amounts from 35 stations provided the basic data for the study. The data records at different stations ranged from 27 to 29 years in length spanning 1961-1990 period. In the first phase of analysis, five probability distributions: Normal, Lognormal, Gumbel, Pearson type-III and Log-Pearson type III were compared for their ability to fit the maximum rainfall values of durations varying from one to three days for the selected stations. The goodness of fit of each of the distributions were tested by statistical tests for individual stations and considering the stations together. EV1, log-normal and normal distributions fitted data reasonably well. Although EV1 distribution exhibited slightly better results, it did not show any marked superiority over the other two distributions. However, in the interest of uniformity and considering the popularity, EV1 distribution was chosen for further analysis.

Then three methods of parameter estimation , viz. method of moments, method of maximum likelihood and probability weighted moments were compared using X^2- and A^2- test. These tests show that method of maximum likelihood estimates appeared to be better than those obtained by other two methods for fitting EV1 distribution.

Effect of the selection of plotting position formulae were also studied. Among Weibull, Beard, Hazen, Blom, Tukey and Gringorten plotting position formulae, the first one seemed to represent the empirical distribution better.

Maps of isovalues of parameters of Gubmel distribution were also constructed for practical use. Finally reliability of analysis were performed and confidence limits for rainfall values of selected duration were constructed.

5.2 Conclusions

Based on the results of analyses performed in this study the following conclusions can be drawn.

(1) Extreme value type I, log-normal and normal distributions appeared to be preferable in the indicated order considering number of stations where these distributions fitted the observed annual maximum rainfall sequences of one to three day duration.

(2) In the interest of uniformity, one base method may be preferable to three distributions. Considering its popularity and common use, EV1 may be adopted as a base method for analyzing rainfall frequencies with provisions for departure and use of other methods that may show good conformance with the data.

(3) The choice of a base method should not be considered as final and should not freeze hydrologic frequency analysis practice into any set pattern. In view of the increasing importance of frequency analysis in water resources development, studies should be continued for the purpose of resolving uncertainties, improving methods of analysis, and reviewing all work in the field.

(4) For parameter estimation, method of maximum likelihood (ML) may be used for fitting EV1 distribution.

(5) Weibull plotting position formula may be used for fitting empirical distributions. This formula produced minimum deviations between observed and computed values according to EV1 distribution.

(6) As far as the statistical tests are concerned, K-S test seems to be insensitive because it tends to exhibit good fit to data for the case studies.

5.3 Recommendation for Further Study

1. Instead of annual maximum series, similar type of study may be conducted for partial duration series.

2. Similar type of study may be conducted for other regions of Bangladesh.

3. Storms having smaller durations may cause flood in small watershed as storms having larger durations causes flood in big watersheds. So this type of study may be conducted for durations of less than one-day, such as durations ranging from several hours to day .

4. Continuing study of rainfall frequency analysis and updating of results should prove useful as more data become available in future.

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APPENDIX-A

Table A.1(a): Goodness of fit assessed by X^2-test (Station R101)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	6.27	-	4.13	+	4.13	+
Log-normal	2.84	+	2.84	+	3.70	+
Gumbel	3.27	+	2.41	+	1.94	+
Pearson Type-III	4.13	+	14.85	-	9.26	-
Log Perason Type-III	2.84	+	1.99	+	4.56	+

Table A.1(b): Goodness of fit assessed by K-S test (Station R101)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1118	+	.1330	+	.1214	+
Log-normal	.0572	+	.0597	+	.0598	+
Gumbel	.0691	+	.0657	+	.0571	+
Pearson Type-III	.0695	+	.2828	-	.2076	+
Log Perason Type-III	.0567	+	.0607	+	.0611	+

Table A.2(a): Goodness of fit assessed by X^2-test (Station R103)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	8.03	-	4.31	+	7.62	-
Log-normal	5.12	+	0.59	+	6.37	-
Gumbel	7.19	-	1.00	+	2.24	+
Pearson Type-III	8.03	-	5.97	-	10.52	-
Log Perason Type-III	7.19	-	.59	+	4.31	+

Table A.2(b): Goodness of fit assessed by K-S test (Station R132)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1408	+	.1315	+	.0975	+
Log-normal	.0890	+	.0872	+	.0721	+
Gumbel	.0843	+	.0951	+	.0733	+
Pearson Type-III	.1006	+	.1228	+	.0834	+
Log Perason Type-III	.0874	+	.1059	+	.0713	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.3(a): Goodness of fit assessed by X^2-test (Station R132)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	7.56	-	1.14	+	4.13	+
Log-normal	1.99	+	0.28	+	7.98	-
Gumbel	4.56	+	5.00	+	7.13	-
Pearson Type-III	7.56	-	1.56	+	5.84	-
Log Perason Type-III	2.42	+	1.14	+	4.98	-

Table A.3(b): Goodness of fit assessed by K-S test (Station R132)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0996	+	.0910	+	.1141	+
Log-normal	.1125	+	.1003	+	.0939	+
Gumbel	.1461	+	.1225	+	.1168	+
Pearson Type-III	.0987	+	.0953	+	.1015	+
Log Perason Type-III	.0844	+	.0938	+	.0921	+

Table A.4(a): Goodness of fit assessed by X^2-test (Station R302)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	5.83	+	2.42	+	1.99	+
Log-normal	8.42	-	4.95	+	6.27	-
Gumbel	7.98	-	6.30	-	4.97	+
Pearson Type-III	7.98	-	2.46	+	3.70	+
Log Perason Type-III	8.84	-	9.68	-	7.12	-

Table A.4(b): Goodness of fit assessed by K-S test (Station R302)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1183	+	.1035	+	.0764	+
Log-normal	.1726	+	.1540	+	.1273	+
Gumbel	.1596	+	.1658	+	.1398	+
Pearson Type-III	.0919	+	.1014	+	.0949	+
Log Perason Type-III	.1203	+	.1135	+	.1037	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.5(a): Goodness of fit assessed by X^2-test (Station R303)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	0.59	-	5.13	+	7.61	-
Log-normal	3.06	+	9.26	-	6.38	-
Gumbel	3.06	+	12.17	-	5.53	+
Pearson Type-III	4.30	+	6.38	-	7.62	-
Log Perason Type-III	2.24	+	19.20	-	10.24	-

Table A.5(b): Goodness of fit assessed by K-S test (Station R303)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0908	+	.0981	+	.0860	+
Log-normal	.0974	+	.1475	+	.1132	+
Gumbel	.0964	+	.1943	+	.1571	+
Pearson Type-III	.0788	+	.1103	+	.0862	+
Log Perason Type-III	.0745	+	.1094	+	.0815	+

Table A.6(a): Goodness of fit assessed by X^2-test (Station R306)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	3.66	+	1.82	+	1.41	+
Log-normal	3.07	+	0.59	+	3.89	+
Gumbel	3.06	+	0.59	+	2.24	+
Pearson Type-III	3.06	+	1.82	+	2.65	+
Log Perason Type-III	3.88	+	1.41	+	2.65	+

Table A.6(b): Goodness of fit assessed by K-S test (Station R306)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0897	+	.0683	+	.0962	+
Log-normal	.0898	+	.0797	+	.0609	+
Gumbel	.1097	+	.0918	+	.0813	+
Pearson Type-III	.0739	+	.0538	+	.0623	+
Log Perason Type-III	.0714	+	.0686	+	.0589	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.7(a): Goodness of fit assessed by X^2-test (Station R311)

Distribution Type	One-day Rainfall		Two-day Rainfall		THree-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	8.85	-	1.41	+	3.06	+
Log-normal	3.89	+	8.44	-	3.06	+
Gumbel	3.48	+	8.03	-	1.83	+
Pearson Type-III	8.85	-	0.51	+	2.64	+
Log Perason Type-III	12.16	-	25.92	-	9.28	-

Table A.7(b): Goodness of fit assessed by K-S test (Station R311)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1033	+	.0762	+	.0874	+
Log-normal	.1354	+	.1371	+	.0672	+
Gumbel	.1131	+	.1425	+	.0785	+
Pearson Type-III	.2048	+	.0932	+	.0694	+
Log Perason Type-III	.1094	+	.0829	+	.0694	+

Table A.8(a): Goodness of fit assessed by X^2-test (Station R313)

Distribution Type	One-day Rainfall		Two-day Rainfall		THre-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	2.00	+	1.56	+	7.56	-
Log-normal	5.84	+	3.71	+	2.84	+
Gumbel	1.99	+	1.57	+	4.64	+
Pearson Type-III	2.42	+	3.27	+	11.40	-
Log Perason Type-III	3.71	+	8.84	-	3.27	+

Table A.8(b): Goodness of fit assessed by K-S test (Station R313)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0605	+	.0755	+	.0993	+
Log-normal	.0807	+	.1182	+	.1255	+
Gumbel	.0739	+	.0634	+	.0708	+
Pearson Type-III	.0507	+	.0673	+	.0912	+
Log Perason Type-III	.0744	+	.1154	+	.1043	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.9(a): Goodness of fit assessed by X^2-test (Station R315)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	12.58	-	9.27	-	5.95	+
Log-normal	8.44	-	3.06	+	3.48	+
Gumbel	6.79	-	3.48	+	7.62	-
Pearson Type-III	13.82	-	13.80	-	13.80	-
Log Perason Type-III	3.91	+	2.24	+	3.89	+

Table A.9(b): Goodness of fit assessed by K-S test (Station R315)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1859	+	.1431	+	.1372	+
Log-normal	.1094	+	.0892	+	.0977	+
Gumbel	.1178	+	.1030	+	.1071	+
Pearson Type-III	.1216	+	.0922	+	.0988	+
Log Perason Type-III	.0925	+	.0647	+	.0765	+

Table A.10(a): Goodness of fit assessed by X^2-test (Station R317)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	2.24	+	4.73	+	4.32	+
Log-normal	2.65	+	2.24	+	5.55	+
Gumbel	4.72	+	1.41	+	5.55	+
Pearson Type-III	1.41	+	5.96	-	4.32	+
Log Perason Type-III	4.30	+	6.54	-	6.94	-

Table A.10(b): Goodness of fit assessed by K-S test (Station R317)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0537	+	.1174	+	.1291	+
Log-normal	.0552	+	.0923	+	.1157	+
Gumbel	.0704	+	.0868	+	.1070	+
Pearson Type-III	.0510	+	.0771	+	.0943	+
Log Perason Type-III	.0526	+	.0799	+	.1024	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.11(a): Goodness of fit assessed by X^2-test (Station R320)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	Ho	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	2.24	+	2.24	+	3.06	+
Log-normal	3.06	+	2.24	+	0.99	+
Gumbel	3.32	+	1.00	+	1.00	+
Pearson Type-III	3.88	+	5.54	-	2.29	+
Log Perason Type-III	3.06	+	2.92	+	1.00	+

Table A.11(b): Goodness of fit assessed by K-S test (Station R320)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0822	+	.0987	+	.1080	+
Log-normal	.0722	+	.0706	+	.0631	+
Gumbel	.0765	+	.0873	+	.0698	+
Pearson Type-III	.1392	+	.0870	+	.0648	+
Log Perason Type-III	.0712	+	.0780	+	.0610	+

Table A.12(a): Goodness of fit assessed by X^2-test (Station R323)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	Ho	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	4.13	+	2.42	+	2.42	+
Log-normal	3.71	+	2.85	+	5.42	+
Gumbel	5.61	+	9.67	-	4.13	+
Pearson Type-III	2.42	+	3.17	+	1.14	+
Log Perason Type-III	4.12	-	4.12	+	4.56	+

Table A.12(b): Goodness of fit assessed by K-S test (Station R323)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	Ho	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0832	+	.1590	+	.0941	+
Log-normal	.0977	+	.1466	+	.1119	+
Gumbel	.1456	+	.1747	+	.1349	+
Pearson Type-III	.0891	+	.1588	+	.0896	+
Log Perason Type-III	.0879	+	.1498	+	.1051	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.13(a): Goodness of fit assessed by X^2-test (Station R324)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	5.84	+	3.71	+	1.14	+
Log-normal	5.42	+	2.42	+	0.71	+
Gumbel	3.28	+	3.28	+	0.29	+
Pearson Type-III	4.99	-	16.99	-	4.13	+
Log Perason Type-III	6.27	-	4.56	+	0.71	+

Table A.13(b): Goodness of fit assessed by K-S test (Station R324)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1502	+	.0996	+	.0659	+
Log-normal	.0949	+	.0700	+	.0622	+
Gumbel	.1034	+	.0754	+	.0708	+
Pearson Type-III	.1740	+	.0967	+	.0513	+
Log Perason Type-III	.1050	+	.0802	+	.0637	+

Table A.14(a): Goodness of fit assessed by X^2-test (Station R325)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	2.84	+	1.14	+	1.98	+
Log-normal	3.69	+	0.29	+	1.99	+
Gumbel	6.69	-	0.29	+	2.41	+
Pearson Type-III	5.84	-	3.69	+	2.42	+
Log Perason Type-III	5.83	-	0.29	+	1.99	+

Table A.14(b): Goodness of fit assessed by K-S test (Station R325)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0966	+	.1015	+	.0714	+
Log-normal	.0788	+	.0731	+	.0740	+
Gumbel	.0892	+	.0777	+	.0844	+
Pearson Type-III	.0807	+	.0790	+	.0602	+
Log Perason Type-III	.0768	+	.0723	+	.0740	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.15(a): Goodness of fit assessed by X^2-test (Station R328)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	15.88	-	12.57	-	14.23	-
Log-normal	3.06	+	1.83	+	1.83	+
Gumbel	4.72	+	6.38	-	3.07	+
Pearson Type-III	4.85	-	26.26	-	4.02	+
Log Perason Type-III	4.72	-	1.42	+	2.24	+

Table A.15(b): Goodness of fit assessed by K-S test (Station R328)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1582	+	.1569	+	.1750	+
Log-normal	.1140	+	.0775	+	.0794	+
Gumbel	.1120	+	.1015	+	.1054	+
Pearson Type-III	.2622	-	.2561	-	.2386	-
Log Perason Type-III	.0994	+	.0682	+	.0512	+

Table A.16(a): Goodness of fit assessed by X^2-test (Station R330)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	6.78	-	6.37	-	4.40	+
Log-normal	1.41	+	2.39	+	2.23	+
Gumbel	2.23	+	1.83	+	2.64	+
Pearson Type-III	12.99	-	6.37	-	12.16	-
Log Perason Type-III	2.29	+	0.59	+	2.65	+

Table A.16(b): Goodness of fit assessed by K-S test (Station R330)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1291	+	.1332	+	.1378	+
Log-normal	.0957	+	.0884	+	.0718	+
Gumbel	.0685	+	.0727	+	.0684	+
Pearson Type-III	.0893	+	.0986	+	.0702	+
Log Perason Type-III	.0693	+	.0973	+	.0543	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.17(a): Goodness of fit assessed by X^2-test (Station R331)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	3.89	+	0.59	+	0.99	+
Log-normal	6.74	-	8.02	-	3.06	+
Gumbel	5.13	+	9.68	-	2.24	+
Pearson Type-III	3.89	+	3.07	+	0.54	+
Log Perason Type-III	17.14	-	9.69	-	3.06	+

Table A.17(b): Goodness of fit assessed by K-S test (Station R331)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0692	+	.0895	+	.0591	+
Log-normal	.1465	+	.1214	+	.1053	+
Gumbel	.1688	+	.1014	+	.0964	+
Pearson Type-III	.0734	+	.0932	+	.0687	+
Log Perason Type-III	.0885	+	.0967	+	.0823	+

Table A.18(a): Goodness of fit assessed by X^2-test (Station R332)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	3.06	+	1.82	+	1.83	+
Log-normal	1.83	+	3.06	+	6.37	-
Gumbel	2.65	+	2.23	+	3.89	+
Pearson Type-III	3.06	+	1.82	+	2.82	+
Log Perason Type-III	2.24	+	8.45	-	6.37	-

Table A.18(b): Goodness of fit assessed by K-S test (Station R332)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0770	+	.0700	+	.0965	+
Log-normal	.1098	+	.1274	+	.0792	+
Gumbel	.1202	+	.1148	+	.1143	+
Pearson Type-III	.0791	+	.0768	+	.0959	+
Log Perason Type-III	.0663	+	.0779	+	.0709	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.19(a): Goodness of fit assessed by X^2-test (Station R351)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2 - Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	3.48	+	2.24	+	1.83	+
Log-normal	7.21	+	2.24	+	4.87	+
Gumbel	9.68	-	2.24	+	6.37	-
Pearson Type-III	7.20	-	2.65	+	9.68	-
Log Perason Type-III	7.21	-	4.30	+	7.62	-

Table A.19(b): Goodness of fit assessed by K-S test (Station R351)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0727	+	.0679	+	.1256	+
Log-normal	.1170	+	.0877	+	.0998	+
Gumbel	.1300	+	.0902	+	.0895	+
Pearson Type-III	.0805	+	.0584	+	.0852	+
Log Perason Type-III	.0887	+	.0683	+	.0836	+

Table A.20(a): Goodness of fit assessed by X^2-test (Station R354)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	2.24	+	3.49	+	2.11	+
Log-normal	2.24	+	1.42	+	4.31	+
Gumbel	2.23	+	1.83	+	2.65	+
Pearson Type-III	17.15	-	4.31	+	2.65	+
Log Perason Type-III	2.65	+	3.06	+	3.06	+

Table A.20(b): Goodness of fit assessed by K-S test (Station R354)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1139	+	.0830	+	.0707	+
Log-normal	.0837	+	.0704	+	.0503	+
Gumbel	.1072	+	.0820	+	.0918	+
Pearson Type-III	.1089	+	.0584	+	.0545	+
Log Perason Type-III	.0945	+	.0666	+	.0634	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.21(a): Goodness of fit assessed by X^2-test (Station R355)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	1.83	+	3.47	+	5.54	+
Log-normal	1.41	+	5.14	+	5.54	+
Gumbel	4.29	+	5.14	+	5.54	+
Pearson Type-III	1.41	+	4.73	+	3.06	+
Log Perason Type-III	3.89	+	2.67	+	5.54	-

Table A.21(b): Goodness of fit assessed by K-S test (Station R355)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0952	+	.1392	+	.1605	+
Log-normal	.0605	+	.0817	+	.1097	+
Gumbel	.0740	+	.0760	+	.1176	+
Pearson Type-III	.0646	+	.0881	+	.1223	+
Log Perason Type-III	.0609	+	.0731	+	.1086	+

Table A.22(a): Goodness of fit assessed by X^2-test (Station R356)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	5.54	+	12.17	-	7.63	-
Log-normal	1.42	+	8.85	-	3.89	+
Gumbel	3.89	+	4.71	+	3.89	+
Pearson Type-III	8.45	-	14.65	-	14.65	-
Log Perason Type-III	2.74	+	5.97	-	3.89	+

Table A.22(b): Goodness of fit assessed by K-S test (Station R356)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1325	+	.1719	+	.1123	+
Log-normal	.0967	+	.1222	+	.0675	+
Gumbel	.0880	+	.1023	+	.0822	+
Pearson Type-III	.0659	+	.1051	+	.0752	+
Log Perason Type-III	.0851	+	.0832	+	.0582	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.23(a): Goodness of fit assessed by X^2-test (Station R357)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	Ho	X^2-Statistics	Ho	X^2-Statistics	Ho
Normal	15.12	-	1.99	+	3.27	+
Log-normal	0.72	+	2.84	+	3.27	+
Gumbel	0.72	+	3.70	+	1.99	+
Pearson Type-III	1.98	+	3.70	+	6.69	-
Log Perason Type-III	0.72	+	2.84	+	3.28	+

Table A.23(b): Goodness of fit assessed by K-S test (Station R357)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_o	K-S Statistics	H_o	K-S Statistics	Ho
Normal	.1866	+	.1077	+	.1358	+
Log-normal	.1358	+	.0696	+	.0870	+
Gumbel	.1225	+	.0762	+	.0716	+
Pearson Type-III	.2045	+	.0797	+	.0847	+
Log Perason Type-III	.1047	+	.0673	+	.0927	+

Table A.24(a): Goodness of fit assessed by X^2-test (Station R358)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_o	X^2-Statistics	H_o	X^2-Statistics	H_o
Normal	4.30	+	1.42	+	7.24	-
Log-normal	8.44	-	4.31	+	4.73	+
Gumbel	5.96	+	3.07	+	3.07	+
Pearson Type-III	2.65	+	1.42	+	10.52	-
Log Perason Type-III	18.79	-	7.62	-	11.35	-

Table A.24(b): Goodness of fit assessed by K-S test (Station R358)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_o	K-S Statistics	H_o	K-S Statistics	H_o
Normal	.0772	+	.0807	+	.0984	+
Log-normal	.0971	+	.0976	+	.0850	+
Gumbel	.1407	+	.1237	+	.1151	+
Pearson Type-III	.0839	+	.0803	+	.0838	+
Log Perason Type-III	.1269	+	.1018	+	.0919	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.25(a): Goodness of fit assessed by X^2-test (Station R359)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_o	X^2-Statistics	H_o	X^2-Statistics	H_o
Normal	4.31	+	0.59	+	0.99	+
Log-normal	3.06	+	3.48	+	0.99	+
Gumbel	1.41	+	0.59	+	2.24	+
Pearson Type-III	3.87	+	0.59	+	2.24	+
Log Perason Type-III	7.67	-	3.05	+	1.87	+

Table A.25(b): Goodness of fit assessed by K-S test (Station R359)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_o	K-S Statistics	H_o	K-S Statistics	H_o
Normal	.0697	+	.0991	+	.0485	+
Log-normal	.1374	+	.0978	+	.0757	+
Gumbel	.1232	+	.0948	+	.0999	+
Pearson Type-III	.0683	+	.0487	+	.0532	+
Log Perason Type-III	.1219	+	.0595	+	.0613	+

Table A.26(a): Goodness of fit assessed by X^2-test (Station R360)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_o	X^2-Statistics	H_o	X^2-Statistics	H_o
Normal	13.54	-	5.41	+	4.12	+
Log-normal	4.56	+	4.35	+	4.56	+
Gumbel	8.40	-	4.56	+	5.41	+
Pearson Type-III	17.40	-	10.12	-	2.43	+
Log Perason Type-III	1.99	+	5.12	-	5.84	-

Table A.26(b): Goodness of fit assessed by K-S test (Station R360)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_o	K-S Statistics	H_o	K-S Statistics	H_o
Normal	.1805	+	.1072	+	.0883	+
Log-normal	.1189	+	.1070	+	.0690	+
Gumbel	.1558	+	.0953	+	.0913	+
Pearson Type-III	.3520	-	.2524	-	.0588	+
Log Perason Type-III	.1403	+	.0971	+	.0693	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.27a: Goodness of fit assessed by X^2-test (Station R361)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	11.88	-	3.00	+	3.00	+
Log-normal	4.50	+	0.77	+	0.77	+
Gumbel	5.67	+	2.10	+	0.77	+
Pearson Type-III	21.22	-	3.44	+	3.38	+
Log Perason Type-III	7.44	-	1.67	+	0.77	+

Table A.27(b): Goodness of fit assessed by K-S test (Station R361)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1479	+	.1037	+	.0948	+
Log-normal	.1161	+	.0714	+	.0504	+
Gumbel	.1202	+	.0710	+	.0561	+
Pearson Type-III	.1029	+	.0676	+	.0465	+
Log Perason Type-III	.0793	+	.0666	+	.0474	+

Table A.28(a): Goodness of fit assessed by X^2-test (Station R363)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	1.42	+	3.06	+	1.42	+
Log-normal	1.42	+	3.48	+	2.66	+
Gumbel	1.83	+	2.24	+	2.24	+
Pearson Type-III	2.24	+	1.83	+	2.24	+
Log Perason Type-III	4.36	+	2.65	+	2.24	+

Table A.28(b): Goodness of fit assessed by K-S test (Station R363)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0683	+	.0781	+	.0699	+
Log-normal	.0851	+	.0768	+	.0714	+
Gumbel	.0983	+	.0958	+	.0699	+
Pearson Type-III	.0598	+	.0684	+	.0501	+
Log Perason Type-III	.0557	+	.0595	+	.0537	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.29(a): Goodness of fit assessed by X^2-test (Station R364)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	1.09	+	3.26	+	4.59	+
Log-normal	1.92	+	0.67	+	4.63	+
Gumbel	1.92	+	1.08	+	4.63	+
Pearson Type-III	7.96	-	6.70	-	11.86	-
Log Perason Type-III	1.92	+	2.01	+	4.63	-

Table A.29(b): Goodness of fit assessed by K-S test (Station R364)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1169	+	.1261	+	.1135	+
Log-normal	.0633	+	.0637	+	.0624	+
Gumbel	.0685	+	.0555	+	.0575	+
Pearson Type-III	.0724	+	.0819	+	.0785	+
Log Perason Type-III	.0626	+	.0726	+	.0516	+

Table A.30(a): Goodness of fit assessed by X^2-test (Station R366)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	2.85	+	2.85	+	3.70	+
Log-normal	10.12	-	7.92	+	10.55	-
Gumbel	7.12	-	6.69	-	4.98	+
Pearson Type-III	1.56	+	5.00	-	7.12	-
Log Perason Type-III	18.26	-	10.76	-	8.84	-

Table A.30(b): Goodness of fit assessed by K-S test (Station R366)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0762	+	.1171	+	.1287	+
Log-normal	.1459	+	.1303	+	.1197	+
Gumbel	.1326	+	.1134	+	.0844	+
Pearson Type-III	.0938	+	.1016	+	.1140	+
Log Perason Type-III	.0998	+	.1109	+	.1172	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.31(a): Goodness of fit assessed by X^2-test (Station R369)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	3.06	+	1.42	+	5.57	+
Log-normal	6.77	+	1.41	+	3.88	+
Gumbel	5.54	+	4.73	+	2.24	+
Pearson Type-III	3.06	+	1.42	+	8.44	-
Log Peason Type-III	8.84	-	3.06	+	3.89	+

Table A.31(b): Goodness of fit assessed by K-S test (Station R369)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1086	+	.0801	+	.1235	+
Log-normal	.1120	+	.0882	+	.0942	+
Gumbel	.1480	+	.1269	+	.0769	+
Pearson Type-III	.1092	+	.0768	+	.1037	+
Log Peason Type-III	.1079	+	.0787	+	.0963	+

Table A.32(a): Goodness of fit assessed by X^2-test (Station R370)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	4.13	+	5.41	+	4.98	+
Log-normal	7.98	-	3.65	+	1.14	+
Gumbel	7.98	-	3.65	+	1.99	+
Pearson Type-III	9.27	-	25.12	-	5.03	-
Log Peason Type-III	7.28	-	3.71	+	1.57	+

Table A.32(b): Goodness of fit assessed by K-S test (Station R370)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.0915	+	.1255	+	.1377	+
Log-normal	.1179	+	.0904	+	.0764	+
Gumbel	.1404	+	.1043	+	.0646	+
Pearson Type-III	.0931	+	.1260	+	.0607	+
Log Peason Type-III	.0915	+	.0130	+	.0471	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.33(a): Goodness of fit assessed by X^2-test (Station R372)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	7.40	-	4.76	+	1.66	+
Log-normal	1.67	+	3.88	+	6.54	+
Gumbel	2.11	+	1.22	+	2.76	+
Pearson Type-III	9.21	-	6.04	-	1.67	+
Log Perason Type-III	3.42	+	3.44	+	5.67	-

Table A.33(b): Goodness of fit assessed by K-S test (Station R372)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1035	+	.0808	+	.0753	+
Log-normal	.0643	+	.1070	+	.0921	+
Gumbel	.0743	+	.1293	+	.1237	+
Pearson Type-III	.0604	+	.0871	+	.0750	+
Log Perason Type-III	.0650	+	.0809	+	.0797	+

Table A.34(a): Goodness of fit assessed by X^2-test (Station R376)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_0	X^2-Statistics	H_0	X^2-Statistics	H_0
Normal	12.16	-	5.13	+	4.72	+
Log-normal	6.93	-	5.95	+	1.83	+
Gumbel	7.63	-	5.13	+	1.83	+
Pearson Type-III	12.37	-	14.32	-	4.03	+
Log Perason Type-III	8.09	-	3.89	+	1.83	+

Table A.34(b): Goodness of fit assessed by K-S test (Station R376)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_0	K-S Statistics	H_0	K-S Statistics	H_0
Normal	.1444	+	.1159	+	.1166	+
Log-normal	.1268	+	.1022	+	.0790	+
Gumbel	.1282	+	.0888	+	.0781	+
Pearson Type-III	.1640	+	.2066	+	.0782	+
Log Perason Type-III	.1230	+	.0858	+	.0766	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

Table A.35(a): Goodness of fit assessed by X^2-test (Station R377)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	X^2- Statistics	H_o	X^2-Statistics	H_o	X^2-Statistics	H_o
Normal	1.83	+	3.47	+	5.54	+
Log-normal	1.41	+	5.14	+	5.54	+
Gumbel	4.29	+	5.14	+	5.54	+
Pearson Type-III	1.41	+	4.73	+	3.06	+
Log Perason Type-III	3.89	+	2.67	+	5.54	-

Table A.35(b): Goodness of fit assessed by K-S test (Station R377)

Distribution Type	One-day Rainfall		Two-day Rainfall		Three-day Rainfall	
	K-S Statistics	H_o	K-S Statistics	H_o	K-S Statistics	H_o
Normal	.0952	+	.1392	+	.1605	+
Log-normal	.0605	+	.0817	+	.1097	+
Gumbel	.0740	+	.0760	+	.1176	+
Pearson Type-III	.0646	+	.0881	+	.1223	+
Log Perason Type-III	.0609	+	.0731	+	.1086	+

Note: + Hypothesis is accepted at 10% significance level
- Hypothesis is rejected at 10% significance level

APPENDIX-B

Table B.1 :Computed Values of X^2-Statistic for EV1 distribution corresponding to (1) methods of moment (2) method of maximum likelihood (3) probabilty weighted method

Stn No	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
R101	3.27 +	3.27 +	3.27 +	2.41 +	1.14 +	2.85 +	1.94 +	2.41 +	1.94 +
R103	7.19 -	5.12 +	9.68 -	1.00 +	3.06 +	3.06 +	2.24 +	2.24 +	5.54 +
R132	4.56 +	1.75 +	1.76 +	1.56 +	0.29 +	1.14 +	7.13 -	4.13 +	4.55 +
R302	7.98 -	7.96 -	6.71 -	6.30 -	6.26 -	6.26 -	4.97 +	7.84 -	2.84 +
R303	3.06 +	3.06 +	3.06 +	12.17 -	7.61 -	9.68 -	5.53 +	6.37 -	6.37 -
R306	3.06 +	3.07 +	7.12 -	0.59 +	0.59 +	6.69 -	2.24 +	2.65 +	4.55 +
R311	3.48 +	3.48 +	3.07 +	8.03 -	5.56 +	8.03 -	1.83 +	0.59 +	0.59 +
R313	1.99 +	0.79 +	1.14 +	1.57 +	2.42 +	1.14 +	4.56 +	4.13 +	4.56 +
R315	6.79 -	3.89 +	6.79 -	3.48 +	2.64 +	5.54 +	7.62 -	3.07 +	6.36 -
R317	4.72 +	4.30 +	4.30 +	1.41 +	1.41 +	1.41 +	5.55 +	4.30 +	6.37 -
R320	3.32 +	3.06 +	2.64 +	1.00 +	1.00 +	2.66 +	1.00 +	1.00 +	1.41 +
R323	5.61 +	3.67 +	4.82 +	9.67 -	4.12 +	6.26 +	4.13 +	4.98 +	4.98 +
R324	3.28 +	1.99 +	5.41 +	3.28 +	4.56 +	1.97 +	0.29 +	0.29 +	0.29 +
R325	6.69 -	4.98 +	0.29 +	0.29 +	0.29 +	0.29 +	2.41 +	2.41 +	1.14 +
R328	4.72 +	2.24 +	3.07 +	6.38 -	1.52 +	3.76 +	3.06 +	3.88 +	3.48 +
R330	2.23 +	2.24 +	1.41 +	1.83 +	0.59 +	1.83 +	2.64 +	2.51 +	2.51 +
R331	5.13 +	4.72 +	5.13 +	9.68 -	6.37 -	5.13 +	2.24 +	1.41 +	1.41 +
R332	2.65 +	1.42 +	1.41 +	2.23 +	3.06 +	2.64 +	3.89 +	5.96 +	2.24 +
R351	9.68 -	7.21 -	7.21 -	2.24 +	9.00 -	2.24 +	6.37 -	5.14 +	5.14 +
R354	2.23 +	2.23 +	3.06 +	1.83 +	1.83 +	1.83 +	2.65 +	3.89 +	3.06 +
R355	4.29 +	2.65 +	1.83 +	5.14 +	12.17 -	5.14 +	5.54 +	5.54 +	5.54 +
R356	3.89 +	2.24 +	3.89 +	4.71 +	4.71 +	4.71 +	3.89 +	3.89 +	3.89 +
R357	0.71 +	1.14 +	0.82 +	3.70 +	3.70 +	3.70 +	1.99 +	2.42 +	3.37 +
R358	5.96 +	4.72 +	7.33 -	3.07 +	13.41 -	5.54 +	3.07 +	6.79 -	3.48 +
R359	1.41 +	4.30 +	2.23 +	0.59 +	1.83 +	0.99 +	2.24 +	3.06 +	2.64 +
R360	8.40 -	2.42 +	2.85 +	4.56 +	4.12 +	4.56 +	5.44 +	5.41 +	3.27 +
R361	5.67 +	2.55 +	5.67 +	2.10 +	2.10 +	1.22 +	0.77 +	0.78 +	1.22 +
R363	1.83 +	1.41 +	1.41 +	2.24 +	3.07 +	2.24 +	2.24 +	1.83 +	2.24 +
R364	1.92 +	1.99 +	3.91 +	1.08 +	1.14 +	0.71 +	4.63 +	4.63 +	3.70 +
R366	7.12 -	7.12 -	7.12 -	6.69 -	6.69 -	6.69 -	4.98 +	4.55 +	4.55 +
R369	5.54 +	8.85 -	8.86 -	4.73 +	3.89 +	3.06 +	2.24 +	3.05 +	2.88 +
R370	7.98 -	9.26 -	9.26 -	3.65 +	3.65 +	2.89 +	1.99 +	1.56 +	2.42 +
R372	2.11 +	2.11 +	2.88 +	1.22 +	3.78 +	1.22 +	2.76 +	6.55 -	4.32 +
R376	7.63 -	5.54 +	5.26 +	5.13 +	3.06 +	5.13 +	1.83 +	1.83 +	1.00 +
R377	3.71 +	3.27 +	3.27 +	5.84 +	5.84 +	4.56 +	1.14 +	1.14 +	1.56 +

Note
MM : Method of moment
ML : Method of Likelihood
PWM: Probability Weighted Moment Method
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% siginificance level

Table B.2: Computed Values of A^2-Statistic for EV1 distribution corresponding to (1) method of moments, (2) metod of maximum likelihood and (3) probabilty weighted method

Stn No	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
R101	.2094 +	.2095 +	.2251 +	.3774 +	.1705 +	.2781 +	.2782 +	.2298 +	.2757 +
R103	.3749 +	.3463 +	.3463 +	.5367 +	.3478 +	.3811 +	.2825 +	.2759 +	.2907 +
R132	.8596 −	.5383 +	.6292 +	.4198 +	.2563 +	.2892 +	.5204 +	.3334 +	.3739 +
R302	2.5510 −	1.4702 −	2.0332 −	1.8119 −	1.1357 −	1.4321 −	.6868 −	.4490 +	.5068 +
R303	.3030 +	.2729 +	.2848 +	1.0754 −	.7753 −	.9182 −	1.1227 −	.6569 −	.8320 −
R306	.5786 +	.3571 +	.3972 +	.3232 +	.2199 +	.2178 +	.2607 +	.2049 +	.2180 +
R311	.8898 −	.6714 −	.7524 −	.6702 −	.6007 +	.6203 +	.3750 +	.2644 +	.2978 +
R313	.3172 +	.2252 +	.2566 +	.3735 +	.4210 +	.3699 +	.3299 +	.3404 +	.3302 +
R315	.4942 +	.4918 +	.4983 +	.4546 +	.5130 +	.4594 +	.3673 +	.4327 +	.3713 +
R317	.3301 +	.2370 +	.2704 +	.2740 +	.3086 +	.2425 +	.3142 +	.3362 +	.2825 +
R320	.3482 +	.2529 +	.2798 +	.1855 +	.1838 +	.2104 +	.2719 +	.2448 +	.2448 +
R323	.7680 −	.5997 +	.6386 −	1.3574 −	.8932 −	.9105 −	.6081 +	.4036 +	.3865 +
R324	.3104 +	.3077 +	.3216 +	.3254 +	.3554 +	.3207 +	.2734 +	.2210 +	.1937 +
R325	.4798 +	.4212 +	.4352 +	.3245 +	.3007 +	.2525 +	.2167 +	.2009 +	.1634 +
R328	.5283 +	.4470 +	.4564 +	.5773 +	.3743 +	.4772 +	.7197 −	.4758 +	.6090 +
R330	.3997 +	.2966 +	.3401 +	.3038 +	.2801 +	.3084 +	.1470 +	.1469 +	.1683 +
R331	1.4088 −	.9201 −	1.1917 −	.5505 +	.4803 +	.4948 +	.4842 +	.3874 +	.3922 +
R332	.9053 −	.5109 +	.6607 −	1.5517 −	.9219 −	1.2358 −	.8772 −	.5207 +	.6616 −
R351	.8310 −	.5113 +	.5972 +	.4534 +	.3037 +	.3057 +	.3340 +	.3187 +	.3169 +
R354	.3893 +	.2474 +	.2790 +	.2841 +	.2252 +	.2195 +	.2155 +	.1961 +	.2120 +
R355	.2614 +	.2306 +	.2042 +	.3291 +	.3295 +	.3421 +	.4596 +	.4558 +	.4672 +
R356	.2806 +	.3315 +	.2887 +	.5526 +	.6128 +	.5700 +	.2737 +	.2802 +	.2709 +
R357	.3116 +	.2606 +	.3326 +	.2260 +	.2319 +	.2716 +	.4267 +	.4587 +	.4634 +
R358	.9686 −	.8719 −	.8577 −	.8655 −	.7005 −	.7470 −	.6060 +	.5516 +	.5548 +
R359	1.1160 −	1.0272 −	1.0401 −	.5857 +	.3929 +	.4595 +	.4130 +	.2608 +	.3084 +
R360	1.2215 −	.7418 −	.8071 −	.4918 +	.5583 +	.4901 +	.3365 +	.3053 +	.3212 +
R361	.4782 +	.5338 +	.4916 +	.2211 +	.2523 +	.2083 +	.1379 +	.1332 +	.1288 +
R363	.3858 +	.2029 +	.2406 +	.4752 +	.3100 +	.3566 +	.3014 +	.2289 +	.2510 +
R364	.2285 +	.2385 +	.2098 +	.1593 +	.1453 +	.1563 +	.2699 +	.2347 +	.2856 +
R366	.8172 −	.5954 +	.6746 −	.5992 +	.5861 +	.5901 +	.4294 +	.4432 +	.4220 +
R369	1.0933 −	.6471 −	.7412 −	1.1158 −	.5743 +	.6703 −	.3679 +	.2694 +	.2944 +
R370	1.2001 −	.7673 −	.9013 −	.4692 +	.4648 +	.4819 +	.3432 +	.2901 +	.3626 +
R372	.1742 +	.1699 +	.1691 +	.4273 +	.2714 +	.3129 +	.7034 −	.5478 +	.5939 +
R376	.5749 +	.6120 +	.5184 +	.2607 +	.2643 +	.2839 +	.1729 +	.1624 +	.1525 +
R377	.4466 +	.3059 +	.3054 +	.5912 +	.5844 +	.4302 +	.1750 +	.1877 +	.1629 +

Note
MM : Method of moment
ML : Method of Likelihood
PWM: Probability Weighted Moment Method
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% siginificance level

Table B.3(a): Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R101)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0691 +	.0683 +	.0714 +	.0657 +	.0535 +	.0614 +	.0570 +	.0728 +	.0571 +
Beard	.0702 +	.0694 +	.0725 +	.0706 +	.0464 +	.0663 +	.0601 +	.0671 +	.0596 +
Hazen	.0710 +	.0701 +	.0733 +	.0737 +	.0441 +	.0694 +	.0652 +	.0635 +	.0646 +
Blom	.0705 +	.0696 +	.0728 +	.0717 +	.0448 +	.0674 +	.0618 +	.0654 +	.0613 +
Tukey	.0703 +	.0695 +	.0726 +	.0710 +	.0458 +	.0667 +	.0607 +	.0667 +	.0602 +
Gringorten	.0707 +	.0699 +	.0760 +	.0727 +	.0433 +	.0684 +	.0636 +	.0647 +	.0630 +

Table B.3(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R101)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0235 +	.0236 +	.0246 +	.0310 +	.0158 +	.0220 +	.0298 +	.0328 +	.0296 +
Beard	.0233 +	.0230 +	.0266 +	.0395 +	.0138 +	.0276 +	.0331 +	.0303 +	.0329 +
Hazen	.0242 +	.0238 +	.0290 +	.0459 +	.0135 +	.0321 +	.0363 +	.0298 +	.0360 +
Blom	.0235 +	.0232 +	.0273 +	.0416 +	.0136 +	.0290 +	.0341 +	.0300 +	.0338 +
Tukey	.0233 +	.0231 +	.0269 +	.0402 +	.0137 +	.0281 +	.0335 +	.0302 +	.0332 +
Gringorten	.0238 +	.0234 +	.0281 +	.0438 +	.0135 +	.0306 +	.0352 +	.0298 +	.0349 +

Table B.3(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R101)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0234 +	.0236 +	.0240 +	.0308 +	.0140 +	.0206 +	.0296 +	.0318 +	.0294 +
Beard	.0232 +	.0230 +	.0261 +	.0393 +	.0120 +	.0261 +	.0329 +	.0293 +	.0326 +
Hazen	.0242 +	.0237 +	.0284 +	.0457 +	.0117 +	.0307 +	.0361 +	.0288 +	.0358 +
Blom	.0234 +	.0232 +	.0248 +	.0413 +	.0118 +	.0275 +	.0339 +	.0290 +	.0336 +
Tukey	.0233 +	.0231 +	.0263 +	.0400 +	.0119 +	.0266 +	.0332 +	.0292 +	.0330 +
Gringorten	.0238 +	.0234 +	.0276 +	.0436 +	.0117 +	.0291 +	.0350 +	.0289 +	.0347 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.4(a): Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R103)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0844 +	.0796 +	.0869 +	.0951 +	.0755 +	.0785 +	.0733 +	.0701 +	.0777 +
Beard	.0807 +	.0824 +	.0897 +	.0888 +	.0748 +	.0798 +	.0698 +	.0785 +	.0861 +
Hazen	.0825 +	.0842 +	.0915 +	.0861 +	.0754 +	.0821 +	.0720 +	.0839 +	.0915 +
Blom	.0813 +	.0830 +	.0903 +	.0874 +	.0746 +	.0800 +	.0690 +	.0803 +	.0879 +
Tukey	.0809 +	.0826 +	.0899 +	.0833 +	.0747 +	.0793 +	.0695 +	.0792 +	.0867 +
Gringorten	.0819 +	.0836 +	.0909 +	.0863 +	.0745 +	.0811 +	.0703 +	.0822 +	.0897 +

Table B.4(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R103)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0601 +	.0577 +	.0585 +	.0716 +	.0423 +	.0498 +	.0348 +	.0309 +	.0328 +
Beard	.0578 +	.0571 +	.0598 +	.0633 +	.0405 +	.0473 +	.0329 +	.0317 +	.0341 +
Hazen	.0573 +	.0577 +	.0617 +	.0590 +	.0403 +	.0468 +	.0327 +	.0333 +	.0360 +
Blom	.0575 +	.0572 +	.0604 +	.0617 +	.0403 +	.0470 +	.0327 +	.0322 +	.0346 +
Tukey	.0577 +	.0571 +	.0600 +	.0627 +	.0404 +	.0472 +	.0328 +	.0319 +	.0343 +
Gringorten	.0574 +	.0574 +	.0610 +	.0603 +	.0403 +	.0461 +	.0327 +	.0327 +	.0353 +

Table B.4(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R103)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0598 +	.0574 +	.0566 +	.0691 +	.0399 +	.0427 +	.0342 +	.0307 +	.0305 +
Beard	.0575 +	.0567 +	.0580 +	.0608 +	.0380 +	.0402 +	.0323 +	.0315 +	.0319 +
Hazen	.0570 +	.0574 +	.0599 +	.0565 +	.0379 +	.0397 +	.0321 +	.0331 +	.0338 +
Blom	.0572 +	.0569 +	.0586 +	.0592 +	.0379 +	.0399 +	.0321 +	.0319 +	.0324 +
Tukey	.0574 +	.0568 +	.0582 +	.0602 +	.0380 +	.0401 +	.0322 +	.0317 +	.0321 +
Gringorten	.0574 +	.0571 +	.0592 +	.0578 +	.0378 +	.0398 +	.0321 +	.0325 +	.0331 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.5(a): Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R132)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1461 +	.1044 +	.1297 +	.1226 +	.0967 +	.1059 +	.1168 +	.1002 +	.1114 +
Beard	.1434 +	.1017 +	.1270 +	.1184 +	.0926 +	.1017 +	.1164 +	.0998 +	.1110 +
Hazen	.1418 +	.1000 +	.1253 +	.1158 +	.0899 +	.0991 +	.1162 +	.0996 +	.1108 +
Blom	.1429 +	.1012 +	.1265 +	.1175 +	.0917 +	.1008 +	.1163 +	.0997 +	.1109 +
Tukey	.1432 +	.1015 +	.1268 +	.1181 +	.0923 +	.1014 +	.1164 +	.0998 +	.1110 +
Gringorten	.1423 +	.1006 +	.1259 +	.1166 +	.0908 +	.0999 +	.1162 +	.0997 +	.1109 +

Table B.5(b): Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R132)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1197 -	.0652 +	.0906 +	.0592 +	.0318 +	.0402 +	.0848 +	.0523 +	.0643 +
Beard	.1109 -	.0675 +	.0884 +	.0502 +	.0303 +	.0381 +	.0775 +	.0514 +	.0645 +
Hazen	.1065 -	.0700 +	.0880 +	.0463 +	.0304 +	.0378 +	.0739 +	.0519 +	.0623 +
Blom	.1093 -	.0683 +	.0882 +	.0488 +	.0302 +	.0374 +	.0762 +	.0515 +	.0623 +
Tukey	.1104 -	.0678 +	.0883 +	.0497 +	.0303 +	.0380 +	.0770 +	.0514 +	.0624 +
Gringorten	.1078 -	.0691 +	.0881 +	.0474 +	.0303 +	.0378 +	.0750 +	.0516 +	.0623 +

Table B.5(c): Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R132)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1087 -	.0585 +	.0731 +	.0548 +	.0290 +	.0332 +	.0794 +	.0464 +	.0545 +
Beard	.1000 -	.0609 +	.0708 +	.0468 +	.0275 +	.0301 +	.0721 +	.0475 +	.0526 +
Hazen	.0955 +	.0634 +	.0705 +	.0429 +	.0276 +	.0298 +	.0685 +	.0480 +	.0525 +
Blom	.0983 -	.0616 +	.0706 +	.0454 +	.0274 +	.0299 +	.0707 +	.0475 +	.0525 +
Tukey	.0944 -	.0611 +	.0707 +	.0463 +	.0274 +	.0300 +	.0716 +	.0475 +	.0525 +
Gringorten	.0968 -	.0961 +	.0705 +	.0440 +	.0275 +	.0298 +	.0695 +	.0477 +	.0524 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.6(a): Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R302)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1596 +	.1898 +	.1778 +	.1658 +	.1652 +	.1738 +	.1398 +	.1383 +	.1478 +
Beard	.1660 +	.1932 +	.1842 +	.1700 +	.1693 +	.1779 +	.1432 +	.1417 +	.1512 +
Hazen	.1700 +	.1973 +	.1883 +	.1726 +	.1720 +	.1806 +	.1453 +	.1438 +	.1533 +
Blom	.1673 +	.1946 +	.1856 +	.1709 +	.1702 +	.1788 +	.1439 +	.1424 +	.1519 +
Tukey	.1665 +	.1937 +	.1847 +	.1703 +	.1696 +	.1782 +	.1434 +	.1419 +	.1514 +
Gringorten	.1687 +	.1960 +	.1870 +	.1718 +	.1711 +	.1797 +	.1442 +	.1427 +	.1522 +

Table B.6(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R302)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.2559 -	.2209 -	.2599 -	.2427 -	.1871 -	.2303 -	.1117 -	.0792 +	.0963 +
Beard	.2550 -	.2313 -	.2626 -	.2390 -	.1922 -	.2303 -	.1056 -	.0795 +	.0951 +
Hazen	.2555 -	.2390 -	.2653 -	.2378 -	.1965 -	.2314 -	.1029 -	.0937 +	.0954 +
Blom	.2551 -	.2330 -	.2634 -	.2385 -	.1936 -	.2306 -	.1046 -	.0799 +	.0951 +
Tukey	.2550 -	.2322 -	.2628 -	.2389 -	.1927 -	.2304 -	.1053 -	.0796 +	.0951 +
Gringorten	.2553 -	.2365 -	.2643 -	.2381 -	.1951 -	.2310 -	.1043 -	.0800 +	.0952 +

Table B.6(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R302)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1899 -	.1953 -	.1972 -	.2103 -	.1722 -	.1977 -	.1025 -	.0734 +	.0834 +
Beard	.1890 -	.2057 -	.1998 -	.2066 -	.1724 -	.1977 -	.0965 +	.0738 +	.0822 +
Hazen	.1895 -	.2133 -	.2025 -	.2054 -	.1817 -	.1988 -	.0808 +	.0750 +	.0855 +
Blom	.1891 -	.2082 -	.2006 -	.2061 -	.1787 -	.1980 -	.0954 +	.0741 +	.0822 +
Tukey	.1890 -	.2065 -	.2001 -	.2064 -	.1778 -	.1978 -	.0961 +	.0739 +	.0822 +
Gringorten	.1893 -	.2108 -	.2015 -	.2057 -	.1802 -	.1984 -	.0951 +	.0743 +	.0823 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.7(a): Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R303)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0964 +	.0899 +	.0957 +	.1910 +	.1716 +	.1883 +	.1571 +	.1357 +	.1532 +
Beard	.0964 +	.0899 +	.0957 +	.1924 +	.1730 +	.1897 +	.1578 +	.1364 +	.1539 +
Hazen	.0964 +	.0899 +	.0957 +	.1933 +	.1739 +	.1906 +	.1582 +	.1368 +	.1543 +
Blom	.0964 +	.0899 +	.0957 +	.1927 +	.1733 +	.1900 +	.1579 +	.1365 +	.1540 +
Tukey	.0964 +	.0899 +	.0957 +	.1926 +	.1731 +	.1098 +	.1578 +	.1364 +	.1539 +
Gringorten	.0964 +	.0899 +	.0957 +	.1929 +	.1735 +	.1903 +	.1580 +	.1366 +	.1542 +

Table B.7(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R303)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0470 +	.0413 +	.0456 +	.2006 -	.1493 -	.1822 -	.1753 -	.1104 -	.1477 -
Beard	.0449 +	.0415 +	.0457 +	.1961 -	.1520 -	.1807 -	.1669 -	.1109 -	.1438 -
Hazen	.0447 +	.0427 +	.0468 +	.1942 -	.1548 -	.1808 -	.1627 -	.1123 -	.1424 -
Blom	.0447 +	.0418 +	.0460 +	.1953 -	.1529 -	.1806 -	.1654 -	.1113 -	.1433 -
Tukey	.0448 +	.0416 +	.0458 +	.1958 -	.1523 -	.1807 -	.1664 -	.1110 -	.1436 -
Gringorten	.0447 +	.0420 +	.0464 +	.1951 -	.1533 -	.1806 -	.1648 -	.1115 -	.1428 -

Table B.7(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R303)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0440 +	.0397 +	.0417 +	.1862 -	.1424 -	.1674 -	.1588 -	.1011 -	.1281 -
Beard	.0424 +	.0399 +	.0418 +	.1836 -	.1452 -	.1659 -	.1504 -	.1016 -	.1242 -
Hazen	.0421 +	.0411 +	.0429 +	.1818 -	.1480 -	.1660 -	.1461 -	.1030 -	.1227 -
Blom	.0422 +	.0402 +	.0421 +	.1829 -	.1460 -	.1658 -	.1484 -	.1010 -	.1236 -
Tukey	.0423 +	.0400 +	.0419 +	.1834 -	.1455 -	.1659 -	.1499 -	.1017 -	.1239 -
Gringorten	.0421 +	.0403 +	.0425 +	.1827 -	.1464 -	.1058 -	.1483 -	.1022 -	.1231 -

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.8(a): Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment

(Station R306)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1097 +	.0901 +	.0997 +	.0919 +	.0844 +	.0880 +	.0813 +	.0666 +	.0762 +
Beard	.1076 +	.0880 +	.0975 +	.0911 +	.0837 +	.0873 +	.0742 +	.0708 +	.0805 +
Hazen	.1063 +	.0867 +	.0962 +	.0907 +	.0833 +	.0868 +	.0698 +	.0735 +	.0831 +
Blom	.1072 +	.0875 +	.0971 +	.0910 +	.0836 +	.0871 +	.0727 +	.0717 +	.0814 +
Tukey	.1075 +	.0878 +	.0974 +	.0911 +	.0837 +	.0872 +	.0737 +	.0711 +	.0808 +
Gringorten	.1076 +	.0871 +	.0966 +	.0908 +	.0834 +	.0869 +	.0712 +	.0726 +	.0823 +

Table B.8(b): Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R306)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1016 +	.0599 +	.0712 +	.0478 +	.0315 +	.0320 +	.0337 +	.0279 +	.0316 +
Beard	.0921 +	.0566 +	.0669 +	.0404 +	.0276 +	.0293 +	.0296 +	.0271 +	.0318 +
Hazen	.0871 +	.0555 +	.0652 +	.0367 +	.0261 +	.0286 +	.0281 +	.0276 +	.0330 +
Blom	.0903 +	.0561 +	.0662 +	.0391 +	.0270 +	.0290 +	.0290 +	.0272 +	.0321 +
Tukey	.0915 +	.0564 +	.0666 +	.0399 +	.0274 +	.0292 +	.0294 +	.0271 +	.0319 +
Gringorten	.0886 +	.0558 +	.0657 +	.0378 +	.0265 +	.0287 +	.0285 +	.0273 +	.0326 +

Table B.8(c): Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R306)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0975 -	.0563 +	.0632 +	.0462 +	.0297 +	.0276 +	.0324 +	.0267 +	.0276 +
Beard	.0879 +	.0530 +	.0589 +	.0387 +	.0257 +	.0248 +	.0283 +	.0259 +	.0278 +
Hazen	.0829 +	.0519 +	.0572 +	.0350 +	.0243 +	.0241 +	.0268 +	.0264 +	.0290 +
Blom	.0862 +	.0525 +	.0562 +	.0374 +	.0252 +	.0245 +	.0277 +	.0260 +	.0281 +
Tukey	.0873 +	.0528 +	.0586 +	.0382 +	.0255 +	.0247 +	.0281 +	.0259 +	.0279 +
Gringorten	.0845 +	.0522 +	.0576 +	.0361 +	.0247 +	.0242 +	.0272 +	.0262 +	.0286 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.9(a): Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment

(Station R311)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1132 +	.1370 +	.1223 +	.1425 +	.1318 +	.1466 +	.0786 +	.0617 +	.0653 +
Beard	.1089 +	.1448 +	.1301 +	.1453 +	.1346 +	.1495 +	.0736 +	.0674 +	.0676 +
Hazen	.1087 +	.1497 +	.1350 +	.1471 +	.1364 +	.1512 +	.0705 +	.0709 +	.0712 +
Blom	.1080 +	.1464 +	.1317 +	.1459 +	.1352 +	.1501 +	.0726 +	.0686 +	.0688 +
Tukey	.1086 +	.1453 +	.1307 +	.1456 +	.1348 +	.1497 +	.0733 +	.0678 +	.0681 +
Gringorten	.1071 +	.1481 +	.1324 +	.1466 +	.1358 +	.1507 +	.0715 +	.0698 +	.0701 +

Table B.9(b): Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R311)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0971 +	.0766 +	.0902 +	.0821 +	.0809 +	.0892 +	.0361 +	.0267 +	.0345 +
Beard	.0927 +	.0827 +	.0904 +	.0820 +	.0899 +	.0904 +	.0314 +	.0284 +	.0341 +
Hazen	.0910 +	.0876 +	.0915 +	.0831 +	.0967 +	.0935 +	.0295 +	.0306 +	.0348 +
Blom	.0921 +	.0843 +	.0907 +	.0823 +	.0921 +	.0914 +	.0306 +	.0291 +	.0342 +
Tukey	.0925 +	.0832 +	.0905 +	.0821 +	.0907 +	.0907 +	.0311 +	.0287 +	.0341 +
Gringorten	.0915 +	.0854 +	.0908 +	.0827 +	.0945 +	.0924 +	.0300 +	.0298 +	.0345 +

Table B.9(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R311)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0849 +	.0705 +	.0725 +	.0655 +	.0748 +	.0670 +	.0312 +	.0236	.0256 +
Beard	.0805 +	.0766 +	.0727 +	.0655 +	.0838 +	.0702 +	.0265 +	.0254	.0252 +
Hazen	.0788 +	.0816 +	.0739 +	.0665 +	.0906 +	.0733 +	.0245 +	.0276	.0260 +
Blom	.0799 +	.0782 +	.0730 +	.0657 +	.0860 +	.0712 +	.0257 +	.0260	.0254 +
Tukey	.0803 +	.0772 +	.0728 +	.0656 +	.0846 +	.0706 +	.0262 +	.0256	.0253 +
Gringorten	.0793 +	.0799 +	.0731 +	.0661 +	.0883 +	.0723 +	.0251 +	.0268	.0257 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.10(a): Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment†

(Station R313)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0739 +	.0679 +	.0765 +	.0634 +	.0804 +	.0663 +	.0708 +	.0933 +	.0885 +
Beard	.0728 +	.0703 +	.0784 +	.0593 +	.0876 +	.0735 +	.0795 +	.1020 +	.0972 +
Hazen	.0739 +	.0758 +	.0796 +	.0591 +	.0921 +	.0780 +	.0850 +	.1075 +	.1026 +
Blom	.0731 +	.0722 +	.0788 +	.0584 +	.0891 +	.0750 +	.0814 +	.1038 +	.0990 +
Tukey	.0728 +	.0710 +	.0785 +	.0590 +	.0891 +	.0740 +	.0802 +	.1026 +	.0978 +
Gringorten	.0735 +	.0741 +	.0792 +	.0576 +	.0907 +	.0756 +	.0832 +	.1057 +	.1009 +

Table B.10(b): Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R313)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0473 +	.0284 +	.0394 +	.0226 +	.0303 +	.0248 +	.0325 +	.0310 +	.0304 +
Beard	.0419 +	.0289 +	.0376 +	.0209 +	.0374 +	.0264 +	.0304 +	.0342 +	.0313 +
Hazen	.0396 +	.0303 +	.0375 +	.0209 +	.0430 +	.0285 +	.0302 +	.0372 +	.0330 +
Blom	.0410 +	.0293 +	.0375 +	.0208 +	.0392 +	.0270 +	.0302 +	.0351 +	.0318 +
Tukey	.0416 +	.0290 +	.0375 +	.0209 +	.0380 +	.0266 +	.0303 +	.0345 +	.0315 +
Gringorten	.0402 +	.0297 +	.0375 +	.0208 +	.0411 +	.0273 +	.0302 +	.0362 +	.0324 +

Table B.10(c): Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R313)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0427 +	.0257 +	.0321 +	.0183 +	.0290 +	.0173 +	.0320 +	.0309 +	.0284 +
Beard	.0374 +	.0262 +	.0303 +	.0166 +	.0361 +	.0189 +	.0299 +	.0340 +	.0293 +
Hazen	.0351 +	.0276 +	.0303 +	.0166 +	.0417 +	.0210 +	.0297 +	.0371 +	.0310 +
Blom	.0365 +	.0266 +	.0302 +	.0165 +	.0379 +	.0195 +	.0297 +	.0350 +	.0298 +
Tukey	.0371 +	.0263 +	.0303 +	.0165 +	.0367 +	.0191 +	.0298 +	.0344 +	.0295 +
Gringorten	.0357 +	.0271 +	.0302 +	.0165 +	.0398 +	.0198 +	.0296 +	.0360 +	.0000 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.11(a): Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R315)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1177 +	.0969 +	.1179 +	.1030 +	.1031 +	.1001 +	.1071 +	.1055 +	.1049 +
Beard	.1234 +	.1025 +	.1236 +	.1037 +	.1038 +	.1008 +	.1092 +	.1035 +	.1070 +
Hazen	.1269 +	.1061 +	.1271 +	.1042 +	.1042 +	.1013 +	.1105 +	.1029 +	.1084 +
Blom	.1246 +	.1037 +	.1248 +	.1039 +	.1039 +	.1010 +	.1097 +	.1029 +	.1075 +
Tukey	.1238 +	.1029 +	.1239 +	.1038 +	.1038 +	.1009 +	.1094 +	.1032 +	.1072 +
Gringorten	.1258 +	.1049 +	.1260 +	.1040 +	.1041 +	.1011 +	.1101 +	.1025 +	.3713 +

Table B.11(b): Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R315)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0666 +	.0643 +	.0665 +	.0646 +	.0783 +	.0619 +	.0593 +	.0782 +	.0546 +
Beard	.0700 +	.0617 +	.0702 +	.0649 +	.0719 +	.0633 +	.0582 +	.0790 +	.0549 +
Hazen	.0731 +	.0611 +	.0735 +	.0660 +	.0688 +	.0652 +	.0585 +	.0675 +	.0562 +
Blom	.0710 +	.0615 +	.0712 +	.0652 +	.0707 +	.0638 +	.0582 +	.0697 +	.0563 +
Tukey	.0703 +	.0616 +	.0705 +	.0650 +	.0715 +	.0634 +	.0582 +	.0705 +	.0550 +
Gringorten	.0720 +	.0612 +	.0724 +	.0656 +	.0697 +	.0645 +	.0583 +	.0685 +	.0557 +

Table B.11(c): Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R315

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0636 +	.0604 +	.0639 +	.0596 +	.0726 +	.0584 +	.0555 +	.0741 +	.0524 +
Beard	.0670 +	.0578 +	.0676 +	.0599 +	.0661 +	.0598 +	.0543 +	.0670 +	.0527 +
Hazen	.0702 +	.0572 +	.0710 +	.0611 +	.0630 +	.0617 +	.0546 +	.0635 +	.0540 +
Blom	.0680 +	.0575 +	.0686 +	.0602 +	.0650 +	.0604 +	.0543 +	.0657 +	.0531 +
Tukey	.0673 +	.0577 +	.0679 +	.0600 +	.0657 +	.0600 +	.0543 +	.0665 +	.0528 +
Gringorten	.0691 +	.0573 +	.0698 +	.0606 +	.0639 +	.0610 +	.0544 +	.0645 +	.0535 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.12(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R317)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0704 +	.0746 +	.0855 +	.0868 +	.0885 +	.0647 +	.1070 +	.1075 +	.0873 +
Beard	.0663 +	.0795 +	.0904 +	.0840 +	.0857 +	.0630 +	.1049 +	.1054 +	.0880 +
Hazen	.0694 +	.0827 +	.0935 +	.0822 +	.0840 +	.0688 +	.1035 +	.1041 +	.0883 +
Blom	.0674 +	.0806 +	.0914 +	.0834 +	.0851 +	.0650 +	.1044 +	.1050 +	.0882 +
Tukey	.0677 +	.0799 +	.0908 +	.0838 +	.0855 +	.0637 +	.1047 +	.1053 +	.0881 +
Gringorten	.0684 +	.0817 +	.0918 +	.0828 +	.0845 +	.0670 +	.1040 +	.1045 +	.0882 +

Table B.12(b): Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R317)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0475 +	.0327 +	.0425 +	.0517 +	.0601 +	.0307 +	.0641 +	.0704 +	.0439 +
Beard	.0429 +	.0333 +	.0433 +	.0454 +	.0523 +	.0294 +	.0586 +	.0639 +	.0433 +
Hazen	.0410 +	.0347 +	.0449 +	.0425 +	.0483 +	.0297 +	.0561 +	.0608 +	.0444 +
Blom	.0421 +	.0337 +	.0438 +	.0444 +	.0508 +	.0294 +	.0576 +	.0628 +	.0435 +
Tukey	.0426 +	.0334 +	.0435 +	.0451 +	.0518 +	.0294 +	.0582 +	.0635 +	.0434 +
Gringorten	.0415 +	.0342 +	.0440 +	.0434 +	.0495 +	.0295 +	.0568 +	.0617 +	.0435 +

Table B.12(c): Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R317)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0429 +	.0297 +	.0333 +	.0507 +	.0598 +	.0307 +	.0639 +	.0704 +	.0434 +
Beard	.0383 +	.0304 +	.0342 +	.0445 +	.0519 +	.0294 +	.0584 +	.0639 +	.0428 +
Hazen	.0364 +	.0318 +	.0358 +	.0416 +	.0480 +	.0296 +	.0560 +	.0608 +	.0434 +
Blom	.0376 +	.0308 +	.0346 +	.0434 +	.0505 +	.0294 +	.0575 +	.0628 +	.0429 +
Tukey	.0380 +	.0305 +	.0343 +	.0441 +	.0514 +	.0294 +	.0581 +	.0635 +	.0428 +
Gringorten	.0369 +	.0312 +	.0348 +	.0424 +	.0491 +	.0295 +	.0567 +	.0617 +	.0430 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.13(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R320)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0765 +	.0856 +	.0945 +	.0873 +	.0850 +	.0918 +	.0698 +	.0723 +	.0819 +
Beard	.0807 +	.0898 +	.0987 +	.0894 +	.0872 +	.0940 +	.0724 +	.0766 +	.0861 +
Hazen	.0834 +	.0925 +	.1014 +	.0908 +	.0885 +	.0953 +	.0751 +	.0792 +	.0888 +
Blom	.0816 +	.0807 +	.0996 +	.0899 +	.0876 +	.0944 +	.0734 +	.0775 +	.0870 +
Tukey	.0810 +	.0801 +	.0990 +	.0896 +	.0873 +	.0941 +	.0728 +	.0769 +	.0864 +
Gringorten	.0825 +	.0916 +	.1005 +	.0903 +	.0881 +	.0949 +	.0743 +	.0784 +	.0880 +

Table B.13(b): Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R320)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0431 +	.0336 +	.0412 +	.0246 +	.0243 +	.0287 +	.0307 +	.0293 +	.0340 +
Beard	.0387 +	.0343 +	.0417 +	.0248 +	.0251 +	.0316 +	.0289 +	.0298 +	.0308 +
Hazen	.0370 +	.0358 +	.0431 +	.0259 +	.0267 +	.0345 +	.0289 +	.0312 +	.0379 +
Blom	.0380 +	.0347 +	.0421 +	.0251 +	.0255 +	.0325 +	.0288 +	.0302 +	.0364 +
Tukey	.0385 +	.0345 +	.0418 +	.0249 +	.0252 +	.0318 +	.0289 +	.0299 +	.0360 +
Gringorten	.0375 +	.0352 +	.0425 +	.0255 +	.0261 +	.0335 +	.0288 +	.0306 +	.0372 +

Table B.13(c): Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R320)

Plotting Position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0397 +	.0312 +	.0338 +	.0241 +	.0240 +	.0267 +	.0293 +	.0283 +	.0306 +
Beard	.0353 +	.0319 +	.0343 +	.0241 +	.0248 +	.0296 +	.0276 +	.0288 +	.0323 +
Hazen	.0336 +	.0334 +	.0357 +	.0252 +	.0264 +	.0324 +	.0275 +	.0302 +	.0345 +
Blom	.0347 +	.0323 +	.0347 +	.0244 +	.0252 +	.0304 +	.0275 +	.0292 +	.0330 +
Tukey	.0350 +	.0320 +	.0344 +	.0242 +	.0249 +	.0298 +	.0276 +	.0289 +	.0325 +
Gringorten	.0341 +	.0328 +	.0352 +	.0248 +	.0258 +	.0314 +	.0275 +	.0297 +	.0337 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.14(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R323)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1456 +	.1352 +	.1442 +	.1747 +	.1612 +	.1667 +	.1349 +	.1229 +	.1249 +
Beard	.1467 +	.1364 +	.1453 +	.1751 +	.1615 +	.1671 +	.1338 +	.1218 +	.1238 +
Hazen	.1474 +	.1371 +	.1460 +	.1753 +	.1618 +	.1673 +	.1331 +	.1211 +	.1231 +
Blom	.1469 +	.1366 +	.1456 +	.1752 +	.1616 +	.1672 +	.1353 +	.1215 +	.1236 +
Tukey	.1468 +	.1364 +	.1454 +	.1751 +	.1616 +	.1671 +	.1337 +	.1217 +	.1237 +
Gringorten	.1472 +	.1369 +	.1457 +	.1753 +	.1617 +	.1673 +	.1333 +	.1213 +	.1233 +

Table B.14(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R323)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1300 -	.1027 -	.1151 -	.2508 -	.1685 -	.1746 -	.1095 -	.0736 +	.0703 +
Beard	.1252 -	.1025 -	.1142 -	.2367 -	.1613 -	.1673 -	.0990 +	.0677 +	.0659 +
Hazen	.1233 -	.1035 -	.1147 -	.2289 -	.1578 -	.1638 -	.0933 +	.0650 +	.0642 +
Blom	.1245 -	.1028 -	.1143 -	.2340 -	.1600 -	.1660 -	.0970 +	.0667 +	.0653 +
Tukey	.1249 -	.1026 -	.1142 -	.2357 -	.1608 -	.1668 -	.0982 +	.0673 +	.0657 +
Gringorten	.1238 -	.1031 -	.1143 -	.2313 -	.1588 -	.1648 -	.0950 +	.0658 +	.0647 +

Table B.14(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R323)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1225 -	.0977 -	.1049 -	.2474 -	.1642 -	.1670 -	.1071 -	.0707 +	.0641 +
Beard	.1177 -	.0976 -	.1040 -	.2333 -	.1570 -	.1598 -	.0966 +	.0649 +	.0598 +
Hazen	.1150 -	.0986 -	.1045 -	.2255 -	.1535 -	.1562 -	.0909 +	.0622 +	.0581 +
Blom	.1170 -	.0979 -	.1041 -	.2306 -	.1557 -	.1585 -	.0946 +	.0639 +	.0591 +
Tukey	.1175 -	.0977 -	.1040 -	.2323 -	.1565 -	.1593 -	.0958 +	.0645 +	.0595 +
Gringorten	.1163 -	.0982 -	.1042 -	.2279 -	.1545 -	.1573 -	.0926 +	.0630 +	.0585 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is rejected at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.15(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R324)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1034 +	.0991 +	.1067 +	.0754 +	.0798 +	.0821 +	.0709 +	.0720 +	.0718 +
Beard	.1075 +	.1033 +	.1108 +	.0795 +	.0762 +	.0862 +	.0712 +	.0723 +	.0722 +
Hazen	.1102 +	.1059 +	.1135 +	.0822 +	.0788 +	.0889 +	.0715 +	.0726 +	.0725 +
Blom	.1084 +	.1041 +	.1117 +	.0804 +	.0771 +	.0871 +	.0713 +	.0724 +	.0723 +
Tukey	.1078 +	.1036 +	.1126 +	.0798 +	.0765 +	.0865 +	.0713 +	.0724 +	.0722 +
Gringorten	.1093 +	.1050 +	.1126 +	.0813 +	.0780 +	.0880 +	.0714 +	.0724 +	.0724 +

Table B.15(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R324)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0518 +	.0508 +	.0533 +	.0423 +	.0479 +	.0400 +	.0320 +	.0339 +	.0247 +
Beard	.0544 +	.0517 +	.0569 +	.0408 +	.0444 +	.0405 +	.0276 +	.0291 +	.0232 +
Hazen	.0571 +	.0533 +	.0603 +	.0409 +	.0433 +	.0419 +	.0259 +	.0271 +	.0233 +
Blom	.0552 +	.0521 +	.0580 +	.0407 +	.0439 +	.0409 +	.0269 +	.0280 +	.0231 +
Tukey	.0547 +	.0518 +	.0573 +	.0408 +	.0442 +	.0406 +	.0274 +	.0288 +	.0232 +
Gringorten	.0561 +	.0527 +	.0591 +	.0408 +	.0435 +	.0414 +	.0264 +	.0277 +	.0232 +

Table B.15(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R324)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0516 +	.0508 +	.0529 +	.0422 +	.0478 +	.0394 +	.0317 +	.0335 +	.0234 +
Beard	.0542 +	.0517 +	.0565 +	.0407 +	.0443 +	.0399 +	.0273 +	.0287 +	.0219 +
Hazen	.0569 +	.0533 +	.0599 +	.0408 +	.0431 +	.0413 +	.0256 +	.0267 +	.0221 +
Blom	.0550 +	.0521 +	.0571 +	.0406 +	.0438 +	.0403 +	.0266 +	.0280 +	.0219 +
Tukey	.0545 +	.0518 +	.0569 +	.0406 +	.0441 +	.0400 +	.0271 +	.0284 +	.0219 +
Gringorten	.0560 +	.0527 +	.0587 +	.0407 +	.0434 +	.0408 +	.0260 +	.0273 +	.0219 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is rejected at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.16(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R325)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0892 +	.0833 +	.0898 +	.0777 +	.0757 +	.0670 +	.0844 +	.0796 +	.0587 +
Beard	.0880 +	.0866 +	.0931 +	.0705 +	.0678 +	.0591 +	.0788 +	.0739 +	.0578 +
Hazen	.0892 +	.0892 +	.0957 +	.0660 +	.0620 +	.0572 +	.0752 +	.0703 +	.0609 +
Blom	.0884 +	.0875 +	.0940 +	.0690 +	.0661 +	.0574 +	.0775 +	.0727 +	.0588 +
Tukey	.0882 +	.0869 +	.0934 +	.0700 +	.0672 +	.0585 +	.0783 +	.0735 +	.0581 +
Gringorten	.0888 +	.0884 +	.0949 +	.0674 +	.0644 +	.0565 +	.0771 +	.0722 +	.0599 +

Table B.16(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R325)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0759 +	.0664 +	.0723 +	.0438 +	.0404 +	.0294 +	.0362 +	.0335 +	.0215 +
Beard	.0734 +	.0666 +	.0724 +	.0371 +	.0345 +	.0271 +	.0295 +	.0275 +	.0193 +
Hazen	.0728 +	.0677 +	.0736 +	.0339 +	.0318 +	.0268 +	.0264 +	.0248 +	.0190 +
Blom	.0731 +	.0669 +	.0727 +	.0359 +	.0335 +	.0269 +	.0284 +	.0265 +	.0191 +
Tukey	.0735 +	.0667 +	.0725 +	.0367 +	.0341 +	.0271 +	.0291 +	.0271 +	.0192 +
Gringorten	.0729 +	.0673 +	.0731 +	.0348 +	.0326 +	.0268 +	.0279 +	.0261 +	.0190 +

Table B.16(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R325)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0722 +	.0639 +	.0667 +	.0438 +	.0403 +	.0286 +	.0362 +	.0333 +	.0204 +
Beard	.0696 +	.0641 +	.0669 +	.0371 +	.0344 +	.0263 +	.0295 +	.0273 +	.0182 +
Hazen	.0690 +	.0652 +	.0680 +	.0339 +	.0317 +	.0260 +	.0264 +	.0246 +	.0179 +
Blom	.0693 +	.0643 +	.0672 +	.0359 +	.0334 +	.0261 +	.0283 +	.0263 +	.0180 +
Tukey	.0695 +	.0641 +	.0670 +	.0367 +	.0340 +	.0262 +	.0291 +	.0270 +	.0181 +
Gringorten	.0691 +	.0647 +	.0676 +	.0348 +	.0315 +	.0260 +	.0279 +	.0259 +	.0179 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is rejected at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.17(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R328)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1120 +	.1321 +	.1230 +	.1015 +	.0898 +	.0937 +	.1053 +	.0815 +	.1032 +
Beard	.1120 +	.1321 +	.1230 +	.1086 +	.0870 +	.1007 +	.1103 +	.0834 +	.1067 +
Hazen	.1120 +	.1321 +	.1230 +	.1130 +	.0852 +	.1052 +	.1134 +	.0856 +	.1097 +
Blom	.1120 +	.1321 +	.1230 +	.1101 +	.0864 +	.0954 +	.1113 +	.0841 +	.1076 +
Tukey	.1120 +	.1321 +	.1230 +	.1091 +	.0808 +	.1013 +	.1106 +	.0836 +	.1070 +
Gringorten	.1120 +	.1321 +	.1230 +	.1116 +	.0858 +	.1038 +	.1124 +	.0849 +	.1087 +

Table B.17(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R328)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0590 +	.0769 +	.0596 +	.0650 +	.0428 +	.0552 +	.0921 +	.0612 +	.0825 +
Beard	.0652 +	.0733 +	.0622 +	.0744 +	.0418 +	.0614 +	.1028 -	.0595 +	.0896 +
Hazen	.0702 +	.0720 +	.0699 +	.0815 +	.0422 +	.0664 +	.1107 -	.0595 +	.0952 +
Blom	.0668 +	.0728 +	.0631 +	.0767 +	.0418 +	.0565 +	.1054 -	.0594 +	.0914 +
Tukey	.0658 +	.0731 +	.0625 +	.0752 +	.0418 +	.0619 +	.1037 -	.0595 +	.0902 +
Gringorten	.0685 +	.0723 +	.0640 +	.0792 +	.0420 +	.0647 +	.1081 -	.0594 +	.0933 +

Table B.17(C):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R328)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0587 +	.0750 +	.0578 +	.0634 +	.0374 +	.0503 +	.0883 +	.0499 +	.0727 +
Beard	.0650 +	.0713 +	.0605 +	.0728 +	.0364 +	.0565 +	.0990 -	.0482 +	.0798 +
Hazen	.0700 +	.0701 +	.0632 +	.0799 +	.0368 +	.0614 +	.1068 -	.0482 +	.0854 +
Blom	.0666 +	.0708 +	.0613 +	.0751 +	.0365 +	.0516 +	.1016 -	.0481 +	.0816 +
Tukey	.0656 +	.0711 +	.0608 +	.0736 +	.0364 +	.0570 +	.0999 -	.0482 +	.0804 +
Gringorten	.0683 +	.0704 +	.0622 +	.0775 +	.0366 +	.0598 +	.1042 -	.0481 +	.0833 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is rejected at 10% significance level
\- : Hypothesis is rejected at 10% significance level

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Table B.18(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R330)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0685 +	.1064 +	.0788 +	.0727 +	.0973 +	.0733 +	.0684 +	.0646 +	.0698 +
Beard	.0730 +	.1036 +	.0760 +	.0748 +	.0938 +	.0755 +	.0727 +	.0611 +	.0741 +
Hazen	.0766 +	.1018 +	.0788 +	.0762 +	.0915 +	.0768 +	.0753 +	.0638 +	.0767 +
Blom	.0742 +	.1030 +	.0754 +	.0753 +	.0930 +	.0759 +	.0736 +	.0620 +	.0750 +
Tukey	.0734 +	.1034 +	.0758 +	.0750 +	.0935 +	.0756 +	.0730 +	.0614 +	.0744 +
Gringorten	.0754 +	.1024 +	.0748 +	.0757 +	.0922 +	.0764 +	.0745 +	.0629 +	.0759 +

Table B.18(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R330)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0331 +	.0446 +	.0378 +	.0373 +	.0447 +	.0373 +	.0182 +	.0235 +	.0176 +
Beard	.0392 +	.0396 +	.0344 +	.0405 +	.0411 +	.0407 +	.0182 +	.0196 +	.0193 +
Hazen	.0441 +	.0374 +	.0306 +	.0435 +	.0398 +	.0439 +	.0193 +	.0182 +	.0214 +
Blom	.0408 +	.0387 +	.0355 +	.0414 +	.0406 +	.0417 +	.0185 +	.0190 +	.0199 +
Tukey	.0398 +	.0393 +	.0348 +	.0408 +	.0409 +	.0411 +	.0183 +	.0194 +	.0195 +
Gringorten	.0425 +	.0380 +	.0366 +	.0424 +	.0401 +	.0428 +	.0189 +	.0186 +	.0206 +

Table B.18(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R330)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0323 +	.0418 +	.0284 +	.0363 +	.0430 +	.0365 +	.0176 +	.0228 +	.0175 +
Beard	.0384 +	.0368 +	.0322 +	.0394 +	.0394 +	.0399 +	.0177 +	.0189 +	.0192 +
Hazen	.0433 +	.0346 +	.0284 +	.0425 +	.0381 +	.0431 +	.0188 +	.0175 +	.0213 +
Blom	.0400 +	.0360 +	.0333 +	.0404 +	.0388 +	.0409 +	.0180 +	.0184 +	.0198 +
Tukey	.0390 +	.0365 +	.0326 +	.0397 +	.0392 +	.0402 +	.0178 +	.0187 +	.0194 +
Gringorten	.0417 +	.0352 +	.0344 +	.0414 +	.0384 +	.0420 +	.0183 +	.0179 +	.0206 +

Note MM : Method of Moments
ML : Method of Likelihood
PWM: Probability Weighted Moment Method
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.19(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R331)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1685 +	.1460 +	.1669 +	.1014 +	.1012 +	.1053 +	.0964 +	.0914 +	.0953 +
Beard	.1699 +	.1474 +	.1683 +	.1042 +	.1040 +	.1081 +	.0964 +	.0914 +	.0953 +
Hazen	.1708 +	.1483 +	.1682 +	.1060 +	.1058 +	.1099 +	.0964 +	.0914 +	.0953 +
Blom	.1702 +	.1477 +	.1686 +	.1048 +	.1046 +	.1087 +	.0964 +	.0914 +	.0953 +
Tukey	.1700 +	.1476 +	.1684 +	.1044 +	.1042 +	.1083 +	.0964 +	.0914 +	.0953 +
Gringorten	.1705 +	.1481 +	.1689 +	.1054 +	.1052 +	.1093 +	.0964 +	.0914 +	.0953 +

Table B.19(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R331)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1817 -	.1448 -	.1779 -	.0950 +	.0820 +	.0872 +	.0770 +	.0605 +	.0633 +
Beard	.1792 -	.1510 -	.1781 -	.0905 +	.0799 +	.0848 +	.0700 +	.0564 +	.0593 +
Hazen	.1786 -	.1559 -	.1792 -	.0887 +	.0796 +	.0842 +	.0666 +	.0548 +	.0579 +
Blom	.1789 -	.1526 -	.1784 -	.0898 +	.0797 +	.0845 +	.0687 +	.0558 +	.0587 +
Tukey	.1791 -	.1515 -	.1782 -	.0902 +	.0798 +	.0846 +	.0695 +	.0562 +	.0591 +
Gringorten	.1787 -	.1542 -	.1788 -	.0892 +	.0796 +	.0843 +	.0676 +	.0532 +	.0582 +

Table B.19(C):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R331)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-Day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1532 -	.1326 -	.1482 -	.0918 +	.0795 +	.0828 +	.0745 +	.0582 +	.0591 +
Beard	.1506 -	.1387 -	.1483 -	.0873 +	.0773 +	.0803 +	.0675 +	.0541 +	.0552 +
Hazen	.1500 -	.1437 -	.1495 -	.0855 +	.0770 +	.0798 +	.0641 +	.0527 +	.0537 +
Blom	.1503 -	.1403 -	.1486 -	.0866 +	.0771 +	.0800 +	.0663 +	.0534 +	.0546 +
Tukey	.1505 -	.1393 -	.1484 -	.0870 +	.0772 +	.0802 +	.0671 +	.0538 +	.0550 +
Gringorten	.1501 -	.1420 -	.1490 -	.0859 +	.0770 +	.0799 +	.0650 +	.0529 +	.0541 +

Note MM : Method of Moments
ML : Method of Likelihood
PWM: Probability Weighted Moment Method
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% siginificance level

Table B.20(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R332)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1198 +	.0970 +	.1161 +	.1148 +	.1149 +	.1166 +	.1144 +	.0846 +	.1009 +
Beard	.1198 +	.0970 +	.1161 +	.1089 +	.1213 +	.1201 +	.1094 +	.0860 +	.1011 +
Hazen	.1198 +	.0970 +	.1161 +	.1112 +	.1253 +	.1224 +	.1063 +	.0869 +	.1032 +
Blom	.1198 +	.0970 +	.1161 +	.1097 +	.1226 +	.1209 +	.1084 +	.0863 +	.1026 +
Tukey	.1198 +	.0970 +	.1161 +	.1092 +	.1217 +	.1204 +	.1091 +	.0861 +	.1025 +
Gringorten	.1198 +	.0970 +	.1161 +	.1104 +	.1240 +	.1216 +	.1073 +	.0860 +	.1030 +

Table B.20(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R332)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1175 -	.0697 +	.0993 +	.1563 -	.1244 -	.1566 -	.1016 +	.0606 +	.0891 +
Beard	.1095 -	.0710 +	.0959 +	.1523 -	.1329 -	.1565 -	.0945 +	.0646 +	.0887 +
Hazen	.1055 -	.0729 +	.0947 +	.1508 -	.1393 -	.1575 -	.0910 +	.0682 +	.0861 +
Blom	.1080 -	.0715 +	.0983 +	.1517 -	.1349 -	.1567 -	.0932 +	.0657 +	.0863 +
Tukey	.1090 -	.0712 +	.0957 +	.1512 -	.1336 -	.1566 -	.0940 +	.0650 +	.0865 +
Gringorten	.1067 -	.0722 +	.0950 +	.1512 -	.1371 -	.1571 -	.0920 +	.0670 +	.0861 +

Table B.20(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R332)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1017 -	.0611 +	.0797 +	.1127 -	.1084 -	.1114 -	.0823 +	.0518 +	.0654 +
Beard	.0937 +	.0624 +	.0763 +	.1088 -	.1168 -	.1112 -	.0752 +	.0558 +	.0650 +
Hazen	.0897 +	.0643 +	.0751 +	.1073 -	.1232 -	.1122 -	.0718 +	.0594 +	.0624 +
Blom	.0923 +	.0630 +	.0787 +	.1082 -	.1189 -	.1115 -	.0740 +	.0569 +	.0626 +
Tukey	.0932 +	.0626 +	.0761 +	.1086 -	.1175 -	.1113 -	.0748 +	.0562 +	.0628 +
Gringorten	.0909 +	.0636 +	.0754 +	.1077 -	.1211 -	.1118 -	.0728 +	.0581 +	.0624 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.21(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R351)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1300 +	.1096 +	.1218 +	.0902 +	.0783 +	.0846 +	.0895 +	.0883 +	.0925 +
Beard	.1286 +	.1082 +	.1204 +	.0832 +	.0818 +	.0881 +	.0916 +	.0904 +	.0946 +
Hazen	.1277 +	.1073 +	.1195 +	.0787 +	.0841 +	.0903 +	.0929 +	.0918 +	.0959 +
Blom	.1283 +	.1079 +	.1201 +	.0816 +	.0826 +	.0889 +	.0920 +	.0909 +	.0950 +
Tukey	.1285 +	.1081 +	.1203 +	.0826 +	.0821 +	.0884 +	.0917 +	.0906 +	.0947 +
Gringorten	.1280 +	.1076 +	.1198 +	.0801 +	.0834 +	.0896 +	.0925 +	.0913 +	.0955 +

Table B.21(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R351)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1252 -	.0809 +	.1000 +	.0606 +	.0427 +	.0455 +	.0536 +	.0511 +	.0523 +
Beard	.1159 -	.0782 +	.0951 +	.0528 +	.0388 +	.0421 +	.0520 +	.0504 +	.0526 +
Hazen	.1111 -	.0775 +	.0930 +	.0489 +	.0374 +	.0409 +	.0520 +	.0511 +	.0538 +
Blom	.1192 -	.0779 +	.0943 +	.0514 +	.0382 +	.0416 +	.0519 +	.0506 +	.0529 +
Tukey	.1153 -	.0781 +	.0948 +	.0523 +	.0386 +	.0419 +	.0520 +	.0505 +	.0527 +
Gringorten	.1125 -	.0776 +	.0936 +	.0500 +	.0377 +	.0412 +	.0519 +	.0508 +	.0533 +

Table B.21(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R351)

Plotting Position Formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1181 -	.0754 +	.0897 +	.0586 +	.0404 +	.0408 +	.0523 +	.0501 +	.0501 +
Beard	.1088 -	.0727 +	.0849 +	.0508 +	.0365 +	.0373 +	.0507 +	.0494 +	.0503 +
Hazen	.1040 -	.0721 +	.0828 +	.0469 +	.0351 +	.0362 +	.0508 +	.0501 +	.0516 +
Blom	.1071 -	.0724 +	.0841 +	.0494 +	.0359 +	.0369 +	.0506 +	.0496 +	.0507 +
Tukey	.1082 -	.0726 +	.0846 +	.0503 +	.0363 +	.0372 +	.0507 +	.0495 +	.0504 +
Gringorten	.1055 -	.0722 +	.0834 +	.0480 +	.0355 +	.0365 +	.0507 +	.0498 +	.0511 +

Note MM : Method of Moments
ML : Method of Likelihood
PWM: Probability Weighted Moment Method
+ : Hypothesis is accepted at 10% significance level
- : Hypothesis is rejected at 10% significance level

Table B.22(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R354)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1072 +	.0861 +	.0942 +	.0820 +	.0750 +	.0745 +	.0918 +	.0873 +	.0944 +
Beard	.1009 +	.0797 +	.0878 +	.0785 +	.0718 +	.0738 +	.0932 +	.0887 +	.0958 +
Hazen	.0969 +	.0757 +	.0838 +	.0763 +	.0714 +	.0733 +	.0941 +	.0896 +	.0967 +
Blom	.0995 +	.0784 +	.0927 +	.0777 +	.0717 +	.0736 +	.0935 +	.0890 +	.0948 +
Tukey	.1004 +	.0792 +	.0874 +	.0782 +	.0718 +	.0737 +	.0933 +	.0888 +	.0959 +
Gringorten	.0982 +	.0770 +	.0851 +	.0770 +	.0715 +	.0735 +	.0938 +	.0893 +	.0964 +

Table B.22(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R354)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0476 +	.0265 +	.0336 +	.0512 +	.0407 +	.0364 +	.0359 +	.0277 +	.0304 +
Beard	.0401 +	.0249 +	.0308 +	.0451 +	.0366 +	.0340 +	.0327 +	.0271 +	.0303 +
Hazen	.0363 +	.0249 +	.0300 +	.0422 +	.0350 +	.0335 +	.0317 +	.0277 +	.0313 +
Blom	.0387 +	.0248 +	.0328 +	.0440 +	.0360 +	.0337 +	.0322 +	.0272 +	.0302 +
Tukey	.0396 +	.0249 +	.0306 +	.0447 +	.0363 +	.0334 +	.0325 +	.0271 +	.0304 +
Gringorten	.0374 +	.0248 +	.0301 +	.0430 +	.0354 +	.0336 +	.0319 +	.0274 +	.0309 +

Table B.22(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R354)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0455 +	.0245 +	.0280 +	.0505 +	.0399 +	.0339 +	.0347 +	.0270 +	.0273 +
Beard	.0379 +	.0229 +	.0251 +	.0443 +	.0358 +	.0315 +	.0314 +	.0264 +	.0273 +
Hazen	.0341 +	.0229 +	.0244 +	.0415 +	.0342 +	.0320 +	.0304 +	.0271 +	.0283 +
Blom	.0365 +	.0228 +	.0270 +	.0433 +	.0352 +	.0313 +	.0310 +	.0266 +	.0271 +
Tukey	.0374 +	.0229 +	.0250 +	.0439 +	.0356 +	.0314 +	.0313 +	.0265 +	.0274 +
Gringorten	.0352 +	.0228 +	.0245 +	.0423 +	.0346 +	.0311 +	.0307 +	.0268 +	.0279 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.23(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R355)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0740 +	.0662 +	.0558 +	.0760 +	.0741 +	.0784 +	.1176 +	.1162 +	.1229 +
Beard	.0684 +	.0606 +	.0581 +	.0817 +	.0755 +	.0840 +	.1218 +	.1205 +	.1271 +
Hazen	.0648 +	.0570 +	.0599 +	.0852 +	.0789 +	.0876 +	.1245 +	.1231 +	.1298 +
Blom	.0672 +	.0594 +	.0588 +	.0829 +	.0766 +	.0853 +	.1227 +	.1214 +	.1280 +
Tukey	.0680 +	.0602 +	.0584 +	.0821 +	.0758 +	.0845 +	.1221 +	.1208 +	.1274 +
Gringorten	.0660 +	.0582 +	.0590 +	.0841 +	.0778 +	.0865 +	.1236 +	.1223 +	.1289 +

Table B.23(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R355)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0402 +	.0345 +	.0261 +	.0428 +	.0418 +	.0448 +	.0748 +	.0753 +	.0795 +
Beard	.0338 +	.0293 +	.0238 +	.0449 +	.0420 +	.0481 +	.0780 +	.0796 +	.0843 +
Hazen	.0307 +	.0271 +	.0232 +	.0472 +	.0432 +	.0513 +	.0811 +	.0834 +	.0884 +
Blom	.0326 +	.0285 +	.0235 +	.0456 +	.0423 +	.0491 +	.0790 +	.0808 +	.0856 +
Tukey	.0334 +	.0290 +	.0237 +	.0451 +	.0421 +	.0485 +	.0783 +	.0800 +	.0848 +
Gringorten	.0316 +	.0277 +	.0235 +	.0464 +	.0427 +	.0502 +	.0800 +	.0821 +	.0870 +

Table B.23(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R355)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0402 +	.0342 +	.0250 +	.0428 +	.0418 +	.0447 +	.0735 +	.0748 +	.0773 +
Beard	.0337 +	.0291 +	.0227 +	.0448 +	.0420 +	.0480 +	.0767 +	.0791 +	.0821 +
Hazen	.0307 +	.0269 +	.0222 +	.0472 +	.0432 +	.0512 +	.0798 +	.0829 +	.0862 +
Blom	.0326 +	.0283 +	.0224 +	.0456 +	.0423 +	.0490 +	.0777 +	.0803 +	.0834 +
Tukey	.0333 +	.0288 +	.0226 +	.0451 +	.0421 +	.0484 +	.0771 +	.0795 +	.0826 +
Gringorten	.0316 +	.0275 +	.0224 +	.0464 +	.0427 +	.0501 +	.0788 +	.0816 +	.0849 +

Note

MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.24(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R356)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Thre-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0880 +	.1023 +	.0750 +	.1023 +	.1117 +	.1022 +	.0822 +	.0807 +	.0742 +
Beard	.0845 +	.0987 +	.0714 +	.1056 +	.1110 +	.1064 +	.0829 +	.0814 +	.0949 +
Hazen	.0822 +	.0965 +	.0692 +	.1082 +	.1106 +	.1091 +	.0833 +	.0819 +	.0754 +
Blom	.0837 +	.0980 +	.0707 +	.1065 +	.1109 +	.1073 +	.0830 +	.0816 +	.0751 +
Tukey	.0842 +	.0985 +	.0712 +	.1059 +	.1110 +	.1082 +	.0829 +	.0815 +	.0750 +
Gringorten	.0829 +	.0972 +	.0699 +	.1074 +	.1107 +	.1082 +	.0832 +	.0817 +	.0752 +

Table B.24(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R356)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0429 +	.0579 +	.0371 +	.0815 +	.0894 +	.0782 +	.0429 +	.0438 +	.0399 +
Beard	.0409 +	.0518 +	.0377 +	.0827 +	.0837 +	.0817 +	.0407 +	.0410 +	.0413 +
Hazen	.0407 +	.0490 +	.0391 +	.0845 +	.0811 +	.0849 +	.0403 +	.0403 +	.0432 +
Blom	.0408 +	.0508 +	.0381 +	.0832 +	.0827 +	.0827 +	.0827 +	.0404 +	.0407 +
Tukey	.0409 +	.0514 +	.0378 +	.0829 +	.0833 +	.0838 +	.0406 +	.0409 +	.0415 +
Gringorten	.0407 +	.0498 +	.0385 +	.0838 +	.0818 +	.0838 +	.0403 +	.0405 +	.0425 +

Table B.24(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R356)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0420 +	.0571 +	.0370 +	.0762 +	.0832 +	.0750 +	.0429 +	.0438 +	.0394 +
Beard	.0400 +	.0510 +	.0376 +	.0774 +	.0776 +	.0792 +	.0406 +	.0410 +	.0408 +
Hazen	.0398 +	.0482 +	.0390 +	.0792 +	.0750 +	.0824 +	.0402 +	.0403 +	.0427 +
Blom	.0399 +	.0500 +	.0380 +	.0779 +	.0766 +	.0802 +	.0404 +	.0407 +	.0413 +
Tukey	.0400 +	.0507 +	.0377 +	.0775 +	.0772 +	.0813 +	.0405 +	.0409 +	.0401 +
Gringorten	.0398 +	.0490 +	.0385 +	.0785 +	.0757 +	.0813 +	.0403 +	.0405 +	.0420 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.25(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R357)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1225 +	.1151 +	.1227 +	.0762 +	.0798 +	.0932 +	.0716 +	.0801 +	.0801 +
Beard	.1266 +	.1193 +	.1264 +	.0811 +	.0847 +	.0981 +	.0725 +	.0873 +	.0858 +
Hazen	.1292 +	.1219 +	.1290 +	.0842 +	.0878 +	.1012 +	.0760 +	.0918 +	.0893 +
Blom	.1275 +	.1202 +	.1273 +	.0822 +	.0858 +	.0991 +	.0737 +	.0888 +	.0870 +
Tukey	.1269 +	.1196 +	.1267 +	.0815 +	.0851 +	.0984 +	.0728 +	.0878 +	.0862 +
Gringorten	.1284 +	.1211 +	.1282 +	.0832 +	.0868 +	.1002 +	.0749 +	.0904 +	.0882 +

Table B.25(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R357)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0423 +	.0387 +	.0439 +	.0297 +	.0304 +	.0373 +	.0506 +	.0607 +	.0609 +
Beard	.0466 +	.0382 +	.0491 +	.0298 +	.0332 +	.0415 +	.0543 +	.0674 +	.0671 +
Hazen	.0504 +	.0390 +	.0535 +	.0310 +	.0361 +	.0453 +	.0577 +	.0727 +	.0721 +
Blom	.0478 +	.0384 +	.0505 +	.0301 +	.0341 +	.0427 +	.0553 +	.0691 +	.0687 +
Tukey	.0470 +	.0383 +	.0496 +	.0299 +	.0335 +	.0410 +	.0546 +	.0679 +	.0676 +
Gringorten	.0491 +	.0387 +	.0520 +	.0305 +	.0351 +	.0440 +	.0563 +	.0709 +	.0704 +

Table B.25(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R357)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0417 +	.0374 +	.0436 +	.0286 +	.0300 +	.0336 +	.0495 +	.0605 +	.0582 +
Beard	.0460 +	.0369 +	.0489 +	.0287 +	.0328 +	.0378 +	.0532 +	.0672 +	.0644 +
Hazen	.0499 +	.0377 +	.0533 +	.0299 +	.0356 +	.0416 +	.0566 +	.0725 +	.0694 +
Blom	.0472 +	.0371 +	.0503 +	.0290 +	.0337 +	.0390 +	.0542 +	.0689 +	.0660 +
Tukey	.0465 +	.0370 +	.0494 +	.0288 +	.0331 +	.0381 +	.0535 +	.0677 +	.0649 +
Gringorten	.0485 +	.0373 +	.0518 +	.0294 +	.0346 +	.0403 +	.0554 +	.0708 +	.0677 +

Note

MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.26(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R358)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1407 +	.1125 +	.1406 +	.1237 +	.1132 +	.1181 +	.1151 +	.0850 +	.1054 +
Beard	.1421 +	.1139 +	.1420 +	.1230 +	.1223 +	.1174 +	.1123 +	.0942 +	.1022 +
Hazen	.1430 +	.1148 +	.1429 +	.1225 +	.1281 +	.1169 +	.1105 +	.1000 +	.1008 +
Blom	.1424 +	.1142 +	.1423 +	.1228 +	.1243 +	.1172 +	.1117 +	.0961 +	.1020 +
Tukey	.1422 +	.1140 +	.1422 +	.1229 +	.1230 +	.1173 +	.1121 +	.0949 +	.1024 +
Gringorten	.1427 +	.1145 +	.1427 +	.1227 +	.1263 +	.1171 +	.1111 +	.0981 +	.1014 +

Table B.26(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R358)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1191 -	.0964 +	.1091 -	.1178 -	.0739 +	.0997 -	.0754 +	.0539 +	.0653 +
Beard	.1161 -	.1086 -	.1103 -	.1124 -	.0814 +	.0989 -	.0713 +	.0598 +	.0654 +
Hazen	.1152 -	.1174 -	.1122 -	.1100 -	.0872 +	.0994 -	.0697 +	.0646 +	.0665 +
Blom	.1157 -	.1115 -	.1109 -	.1115 -	.0833 +	.0990 -	.0707 +	.0613 +	.0657 +
Tukey	.1159 -	.1096 -	.1165 -	.1121 -	.0821 +	.0989 -	.0711 +	.0603 +	.0655 +
Gringorten	.1154 -	.1145 -	.1115 -	.1107 -	.0853 +	.0991 -	.0701 +	.0630 +	.0661 +

Table B.26(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R358)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0978 -	.0889 +	.0825 +	.1037 -	.0683 +	.0806 +	.0687 +	.0512 +	.0542 +
Beard	.0948 +	.1011 -	.0838 +	.0983 -	.0758 +	.0797 +	.0646 +	.0571 +	.0543 +
Hazen	.0939 +	.1099 -	.0856 +	.0959 +	.0816 +	.0820 +	.0631 +	.0619 +	.0555 +
Blom	.0944 +	.1040 -	.0843 +	.0974 -	.0777 +	.0798 +	.0640 +	.0587 +	.0546 +
Tukey	.0946 +	.1021 -	.0839 +	.0980 -	.0765 +	.0798 +	.0644 +	.0576 +	.0544 +
Gringorten	.0941 +	.1070 -	.0849 +	.0966 +	.0797 +	.0800 +	.0635 +	.0603 +	.0550 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.27(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R359)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1232 +	.1307 +	.1326 +	.0948 +	.0784 +	.0750 +	.0999 +	.0925 +	.1028 +
Beard	.1274 +	.1350 +	.1359 +	.0871 +	.0841 +	.0761 +	.1013 +	.0939 +	.1042 +
Hazen	.1301 +	.1376 +	.1395 +	.0822 +	.0875 +	.0797 +	.1022 +	.0947 +	.1051 +
Blom	.1284 +	.1359 +	.1378 +	.0854 +	.0852 +	.0773 +	.1016 +	.0942 +	.1045 +
Tukey	.1278 +	.1353 +	.1371 +	.0865 +	.0844 +	.0765 +	.1014 +	.0940 +	.1043 +
Gringorten	.1293 +	.1368 +	.1387 +	.0837 +	.0864 +	.0786 +	.1019 +	.0945 +	.1048 +

Table B.27(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R359)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0839 +	.1247 -	.0986 +	.0570 +	.0408 +	.0556 +	.0528 +	.0339 +	.0463 +
Beard	.0866 +	.1398 -	.1044 -	.0520 +	.0454 +	.0548 +	.0472 +	.0345 +	.0446 +
Hazen	.0894 +	.1505 -	.1091 -	.0499 +	.0493 +	.0554 +	.0447 +	.0358 +	.0446 +
Blom	.0875 +	.1433 -	.1059 -	.0512 +	.0466 +	.0549 +	.0463 +	.0348 +	.0445 +
Tukey	.0869 +	.1411 -	.1049 -	.0517 +	.0458 +	.0549 +	.0469 +	.0346 +	.0446 +
Gringorten	.0884 +	.1470 -	.1076 -	.0505 +	.0480 +	.0551 +	.0454 +	.0353 +	.0445 +

Table B.27(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R359)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0514 +	.1137 -	.0620 +	.0438 +	.0348 +	.0379 +	.0462 +	.0298 +	.0361 +
Beard	.0542 +	.1288 -	.0678 +	.0388 +	.0394 +	.0371 +	.0406 +	.0303 +	.0347 +
Hazen	.0570 +	.1395 -	.0725 +	.0367 +	.0433 +	.0377 +	.0381 +	.0317 +	.0347 +
Blom	.0550 +	.1323 -	.0693 +	.0380 +	.0406 +	.0372 +	.0397 +	.0307 +	.0346 +
Tukey	.0545 +	.1301 -	.0682 +	.0385 +	.0398 +	.0372 +	.0403 +	.0304 +	.0346 +
Gringorten	.0560 +	.1360 -	.0709 +	.0373 +	.0420 +	.0374 +	.0388 +	.0312 +	.0346 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.28(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R360)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1558 +	.1060 +	.1136 +	.0953 +	.1020 +	.0949 +	.0913 +	.0792 +	.0912 +
Beard	.1629 +	.1132 +	.1207 +	.1032 +	.1099 +	.1028 +	.0916 +	.0795 +	.0916 +
Hazen	.1675 +	.1177 +	.1253 +	.1082 +	.1149 +	.1078 +	.0919 +	.0798 +	.0918 +
Blom	.1645 +	.1149 +	.1223 +	.1049 +	.1116 +	.1045 +	.0911 +	.0796 +	.0917 +
Tukey	.1635 +	.1137 +	.1212 +	.1038 +	.1105 +	.1034 +	.0917 +	.0796 +	.0916 +
Gringorten	.1660 +	.1163 +	.1238 +	.1066 +	.1133 +	.1062 +	.0918 +	.0797 +	.0918 +

Table B.28(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R360)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1724 -	.0817 +	.0964 +	.0466 +	.0578 +	.0462 +	.0551 +	.0401 +	.0482 +
Beard	.1933 -	.0928 +	.1095 -	.0536 +	.0680 +	.0532 +	.0520 +	.0422 +	.0488 +
Hazen	.2077 -	.1010 +	.1189 -	.0591 +	.0755 +	.0586 +	.0511 +	.0446 +	.0503 +
Blom	.1981 -	.0955 +	.1126 -	.0554 +	.0704 +	.0549 +	.0516 +	.0429 +	.0492 +
Tukey	.1950 -	.0938 +	.1104 -	.0542 +	.0688 +	.0538 +	.0518 +	.0424 +	.0489 +
Gringorten	.2030 -	.0938 +	.1158 -	.0573 +	.0730 +	.0568 +	.0513 +	.0437 +	.0497 +

Table B.28(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R360)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1714 -	.0812 +	.0957 +	.0430 +	.0576 +	.0426 +	.0522 +	.0388 +	.0426 +
Beard	.1923 -	.0923 +	.1088 -	.0500 +	.0677 +	.0496 +	.0491 +	.0409 +	.0432 +
Hazen	.2060 -	.1004 -	.1181 -	.0556 +	.0752 +	.0550 +	.0482 +	.0433 +	.0447 +
Blom	.1971 -	.0950 +	.1118 -	.0518 +	.0702 +	.0513 +	.0487 +	.0416 +	.0436 +
Tukey	.1940 -	.0932 +	.1097 -	.0506 +	.0686 +	.0502 +	.0490 +	.0411 +	.0433 +
Gringorten	.2020 -	.0977 -	.1151 -	.0537 +	.0728 +	.0532 +	.0480 +	.0424 +	.0441 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.29(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R361)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1202 +	.1230 +	.1141 +	.0710 +	.0793 +	.0580 +	.0561 +	.0561 +	.0458 +
Beard	.1210 +	.1238 +	.1149 +	.0638 +	.0720 +	.0507 +	.0520 +	.0521 +	.0496 +
Hazen	.1210 +	.1238 +	.1154 +	.0591 +	.0674 +	.0503 +	.0520 +	.0521 +	.0542 +
Blom	.1211 +	.1240 +	.1151 +	.0622 +	.0704 +	.0493 +	.0512 +	.0512 +	.0512 +
Tukey	.1210 +	.1239 +	.1150 +	.0632 +	.0715 +	.0502 +	.0517 +	.0518 +	.0501 +
Gringorten	.1213 +	.1242 +	.1152 +	.0606 +	.0689 +	.0498 +	.0503 +	.0503 +	.0527 +

Table B.29(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R361)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0769 +	.0950 +	.0718 +	.0365 +	.0420 +	.0222 +	.0234 +	.0223 +	.0135 +
Beard	.0772 +	.0891 +	.0744 +	.0310 +	.0347 +	.0216 +	.0183 +	.0175 +	.0131 +
Hazen	.0772 +	.0891 +	.0772 +	.0286 +	.0311 +	.0223 +	.0183 +	.0175 +	.0140 +
Blom	.0776 +	.0881 +	.0753 +	.0301 +	.0334 +	.0217 +	.0174 +	.0167 +	.0133 +
Tukey	.0773 +	.0888 +	.0747 +	.0307 +	.0342 +	.0216 +	.0180 +	.0172 +	.0132 +
Gringorten	.0780 +	.0872 +	.0762 +	.0293 +	.0322 +	.0220 +	.0167 +	.0161 +	.0132 +

Table B.29(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R361)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0735 +	.0908 +	.0704 +	.0354 +	.0415 +	.0222 +	.0234 +	.0222 +	.0124 +
Beard	.0738 +	.0849 +	.0730 +	.0298 +	.0342 +	.0216 +	.0183 +	.0174 +	.0119 +
Hazen	.0738 +	.0849 +	.0758 +	.0274 +	.0306 +	.0223 +	.0183 +	.0174 +	.0128 +
Blom	.0742 +	.0839 +	.0739 +	.0289 +	.0329 +	.0217 +	.0174 +	.0167 +	.0121 +
Tukey	.0739 +	.0845 +	.0733 +	.0295 +	.0337 +	.0216 +	.0180 +	.0171 +	.0120 +
Gringorten	.0746 +	.0830 +	.0748 +	.0281 +	.0317 +	.0220 +	.0167 +	.0160 +	.0120 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.30(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R363)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0984 +	.0807 +	.0912 +	.0958 +	.0801 +	.0845 +	.0699 +	.0750 +	.0827 +
Beard	.0969 +	.0742 +	.0898 +	.0932 +	.0858 +	.0876 +	.0735 +	.0785 +	.0862 +
Hazen	.0961 +	.0784 +	.0911 +	.0912 +	.0893 +	.0912 +	.0757 +	.0808 +	.0884 +
Blom	.0966 +	.0789 +	.0895 +	.0924 +	.0878 +	.0888 +	.0742 +	.0793 +	.0869 +
Tukey	.0968 +	.0791 +	.0897 +	.0928 +	.0862 +	.0880 +	.0717 +	.0788 +	.0864 +
Gringorten	.0963 +	.0786 +	.0892 +	.0918 +	.0882 +	.0900 +	.0750 +	.0880 +	.0877 +

Table B.30(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R363)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0594 +	.0293 +	.0402 +	.0675 +	.0407 +	.0544 +	.0357 +	.0298 +	.0364 +
Beard	.0509 +	.0270 +	.0367 +	.0609 +	.0414 +	.0527 +	.0323 +	.0306 +	.0369 +
Hazen	.0466 +	.0266 +	.0401 +	.0578 +	.0428 +	.0526 +	.0312 +	.0321 +	.0369 +
Blom	.0494 +	.0268 +	.0363 +	.0598 +	.0418 +	.0526 +	.0318 +	.0310 +	.0373 +
Tukey	.0504 +	.0269 +	.0366 +	.0605 +	.0415 +	.0527 +	.0321 +	.0307 +	.0370 +
Gringorten	.0479 +	.0267 +	.0359 +	.0587 +	.0423 +	.0526 +	.0314 +	.0316 +	.0370 +

Table B.30(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R363)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0552 +	.0259 +	.0322 +	.0616 +	.0370 +	.0440 +	.0323 +	.0275 +	.0300 +
Beard	.0468 +	.0237 +	.0287 +	.0550 +	.0376 +	.0424 +	.0289 +	.0283 +	.0305 +
Hazen	.0425 +	.0233 +	.0321 +	.0519 +	.0391 +	.0424 +	.0278 +	.0298 +	.0305 +
Blom	.0453 +	.0234 +	.0283 +	.0539 +	.0380 +	.0423 +	.0284 +	.0287 +	.0309 +
Tukey	.0462 +	.0236 +	.0286 +	.0546 +	.0378 +	.0424 +	.0287 +	.0289 +	.0306 +
Gringorten	.0438 +	.0233 +	.0279 +	.0528 +	.0385 +	.0423 +	.0280 +	.0293 +	.0306 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.31(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R364)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0685 +	.0722 +	.0592 +	.0555 +	.0593 +	.0572 +	.0575 +	.0603 +	.0599 +
Beard	.0670 +	.0651 +	.0602 +	.0589 +	.0627 +	.0605 +	.0639 +	.0592 +	.0663 +
Hazen	.0672 +	.0643 +	.0633 +	.0611 +	.0648 +	.0627 +	.0679 +	.0584 +	.0703 +
Blom	.0671 +	.0642 +	.0623 +	.0597 +	.0634 +	.0613 +	.0652 +	.0589 +	.0677 +
Tukey	.0670 +	.0645 +	.0606 +	.0592 +	.0630 +	.0605 +	.0643 +	.0591 +	.0668 +
Gringorten	.0672 +	.0643 +	.0623 +	.0604 +	.0642 +	.0620 +	.0666 +	.0587 +	.0690 +

Table B.31(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R364)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0367 +	.0378 +	.0287 +	.0222 +	.0186 +	.0174 +	.0296 +	.0272 +	.0313 +
Beard	.0324 +	.0328 +	.0279 +	.0184 +	.0165 +	.0174 +	.0328 +	.0272 +	.0355 +
Hazen	.0672 +	.0643 +	.0284 +	.0611 +	.0648 +	.0185 +	.0679 +	.0584 +	.0393 +
Blom	.0671 +	.0642 +	.0280 +	.0597 +	.0634 +	.0177 +	.0652 +	.0589 +	.0367 +
Tukey	.0670 +	.0645 +	.0279 +	.0592 +	.0630 +	.0175 +	.0643 +	.0591 +	.0360 +
Gringorten	.0672 +	.0643 +	.0282 +	.0604 +	.0642 +	.0180 +	.0666 +	.0587 +	.0380 +

Table B.31(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R364)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0363 +	.0377 +	.0287 +	.0221 +	.0185 +	.0162 +	.0292 +	.0262 +	.0312 +
Beard	.0320 +	.0327 +	.0278 +	.0183 +	.0165 +	.0162 +	.0324 +	.0262 +	.0354 +
Hazen	.0303 +	.0306 +	.0284 +	.0170 +	.0162 +	.0173 +	.0354 +	.0272 +	.0392 +
Blom	.0313 +	.0319 +	.0279 +	.0178 +	.0163 +	.0165 +	.0333 +	.0264 +	.0366 +
Tukey	.0317 +	.0324 +	.0279 +	.0181 +	.0164 +	.0163 +	.0327 +	.0262 +	.0358 +
Gringorten	.0308 +	.0312 +	.0281 +	.0174 +	.0162 +	.0169 +	.0344 +	.0268 +	.0379 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.32(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R366)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1326 +	.1164 +	.1267 +	.1134 +	.1112 +	.1109 +	.0894 +	.0981 +	.0874 +
Beard	.1307 +	.1146 +	.1070 +	.1070 +	.1048 +	.1049 +	.0921 +	.0916 +	.0900 +
Hazen	.1295 +	.1144 +	.1057 +	.1057 +	.1046 +	.1066 +	.0937 +	.0926 +	.0917 +
Blom	.1303 +	.1145 +	.1056 +	.1056 +	.1035 +	.1094 +	.0926 +	.0914 +	.0906 +
Tukey	.1306 +	.1146 +	.1065 +	.1065 +	.1044 +	.1051 +	.0923 +	.0912 +	.0902 +
Gringorten	.1299 +	.1144 +	.1052 +	.1052 +	.1041 +	.1061 +	.0932 +	.0920 +	.0912 +

Table B.32(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R366)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1190 -	.0924 +	.1068 -	.0934 +	.0912 +	.0930 +	.0553 +	.0567 +	.0545 +
Beard	.1120 -	.0901 +	.1026 -	.0930 +	.0913 +	.0931 +	.0588 +	.0556 +	.0569 +
Hazen	.1087 -	.0898 +	.1009 +	.0938 +	.0925 +	.0941 +	.0621 +	.0559 +	.0594 +
Blom	.1108 -	.0899 +	.1019 +	.0932 +	.0916 +	.0929 +	.0598 +	.0556 +	.0576 +
Tukey	.1116 -	.0901 +	.1023 -	.0930 +	.0914 +	.0931 +	.0591 +	.0556 +	.0571 +
Gringorten	.1096 -	.0898 +	.1014 +	.0935 +	.0920 +	.0937 +	.0609 +	.0557 +	.0555 +

Table B.32(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R366)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1139 -	.0883 +	.1000 -	.0917 +	.0898 +	.0911 +	.0552 +	.0565 +	.0542 +
Beard	.1069 -	.0860 +	.0957 +	.0913 +	.0900 +	.0911 +	.0587 +	.0554 +	.0566 +
Hazen	.1036 -	.0857 +	.0945 +	.0921 +	.0911 +	.0922 +	.0620 +	.0557 +	.0591 +
Blom	.1057 -	.0858 +	.0951 +	.0915 +	.0903 +	.0909 +	.0597 +	.0554 +	.0513 +
Tukey	.1065 -	.0860 +	.0955 +	.0913 +	.0901 +	.0912 +	.0590 +	.0554 +	.0568 +
Gringorten	.1046 -	.0857 +	.0945 +	.0917 +	.0907 +	.0917 +	.0608 +	.0555 +	.0582 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.33(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R369)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1480 +	.1304 +	.1408 +	.1269 +	.1124 +	.1242 +	.0769 +	.0689 +	.0732 +
Beard	.1424 +	.1332 +	.1456 +	.1199 +	.1145 +	.1236 +	.0762 +	.0682 +	.0802 +
Hazen	.1388 +	.1350 +	.1454 +	.1205 +	.1158 +	.1276 +	.0757 +	.0681 +	.0847 +
Blom	.1410 +	.1330 +	.1442 +	.1190 +	.1140 +	.1267 +	.0760 +	.0680 +	.0817 +
Tukey	.1420 +	.1334 +	.1438 +	.1194 +	.1146 +	.1264 +	.0761 +	.0681 +	.0807 +
Gringorten	.1400 +	.1344 +	.1448 +	.1197 +	.1151 +	.1272 +	.0760 +	.0680 +	.0832 +

Table B.33(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R369)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1834 -	.1158 -	.1426 -	.1505 -	.0849 +	.1100 -	.0524 +	.0357 +	.0383 +
Beard	.1743 -	.1149 -	.1397 -	.1398 -	.0835 +	.1068 -	.0461 +	.0342 +	.0387 +
Hazen	.1695 -	.1154 -	.1389 -	.1340 -	.0836 +	.1058 -	.0432 +	.0343 +	.0401 +
Blom	.1727 -	.1150 -	.1394 -	.1377 -	.0834 +	.1064 -	.0451 +	.0342 +	.0391 +
Tukey	.1737 -	.1149 -	.1396 -	.1392 -	.0834 +	.1067 -	.0457 +	.0342 +	.0389 +
Gringorten	.1710 -	.1152 -	.1391 -	.1370 -	.0834 +	.1061 -	.0446 +	.0342 +	.0396 +

Table B.33(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R369)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1709 -	.1077 -	.1256 -	.1347 -	.0743 +	.0884 +	.0513 +	.0345 +	.0326 +
Beard	.1618 -	.1068 -	.1227 -	.1239 -	.0729 +	.0852 +	.0450 +	.0330 +	.0330 +
Hazen	.1571 -	.1073 -	.1219 -	.1182 -	.0731 +	.0842 +	.0421 +	.0331 +	.0343 +
Blom	.1602 -	.1069 -	.1223 -	.1219 -	.0729 +	.0848 +	.0440 +	.0330 +	.0333 +
Tukey	.1612 -	.1068 -	.1226 -	.1233 -	.0729 +	.0850 +	.0446 +	.0330 +	.0331 +
Gringorten	.1585 -	.1071 -	.1221 -	.1211 -	.0729 +	.0844 +	.0435 +	.0330 +	.0338 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.34(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R370)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1404 +	.1339 +	.1452 +	.1043 +	.1003 +	.1091 +	.0646 +	.0758 +	.0656 +
Beard	.1430 +	.1366 +	.1478 +	.1092 +	.1052 +	.1140 +	.0695 +	.0732 +	.0704 +
Hazen	.1447 +	.1382 +	.1495 +	.1123 +	.1083 +	.1171 +	.0726 +	.0715 +	.0736 +
Blom	.1436 +	.1371 +	.1484 +	.1103 +	.1063 +	.1151 +	.0706 +	.0726 +	.0715 +
Tukey	.1432 +	.1368 +	.1480 +	.1096 +	.1056 +	.1144 +	.0649 +	.0730 +	.0708 +
Gringorten	.1442 +	.1377 +	.1490 +	.1113 +	.1073 +	.1161 +	.0716 +	.0720 +	.0726 +

Table B.34(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R370)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1642 -	.1265 -	.1530 -	.0638 +	.0615 +	.0686 +	.0336 +	.0329 +	.0345 +
Beard	.1590 -	.1287 -	.1522 -	.0685 +	.0659 +	.0744 +	.0378 +	.0284 +	.0395 +
Hazen	.1567 -	.1313 -	.1529 -	.0725 +	.0698 +	.0792 +	.0415 +	.0266 +	.0438 +
Blom	.1581 -	.1295 -	.1524 -	.0697 +	.0671 +	.0759 +	.0390 +	.0277 +	.0409 +
Tukey	.1587 -	.1290 -	.1523 -	.0689 +	.0663 +	.0749 +	.0382 +	.0281 +	.0400 +
Gringorten	.1574 -	.1304 -	.1526 -	.0711 +	.0685 +	.0776 +	.0403 +	.0271 +	.0423 +

Table B.34(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R370)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1472 -	.1171 -	.1332 -	.0627 +	.0611 +	.0669 +	.0310 +	.0289 +	.0326 +
Beard	.1420 -	.1194 -	.1325 -	.0674 +	.0655 +	.0727 +	.0352 +	.0244 +	.0377 +
Hazen	.1398 -	.1219 -	.1331 -	.0714 +	.0694 +	.0775 +	.0390 +	.0266 +	.0420 +
Blom	.1412 -	.1202 -	.1326 -	.0686 +	.0668 +	.0742 +	.0364 +	.0236 +	.0390 +
Tukey	.1417 -	.1197 -	.1325 -	.0678 +	.0660 +	.0732 +	.0356 +	.0241 +	.0381 +
Gringorten	.1404 -	.1217 -	.1328 -	.0700 +	.0681 +	.0758 +	.0377 +	.0230 +	.0405 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.35(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R372)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0743 +	.0735 +	.0644 +	.1293 +	.1035 +	.1180 +	.1237 +	.0873 +	.1149 +
Beard	.0678 +	.0670 +	.0579 +	.1269 +	.1011 +	.1155 +	.1221 +	.0970 +	.1133 +
Hazen	.0637 +	.0629 +	.0574 +	.1254 +	.0996 +	.1140 +	.1213 +	.1032 +	.1123 +
Blom	.0664 +	.0656 +	.0566 +	.1264 +	.1006 +	.1150 +	.1218 +	.0991 +	.1129 +
Tukey	.0673 +	.0665 +	.0575 +	.1267 +	.1009 +	.1154 +	.1220 +	.0977 +	.1132 +
Gringorten	.0650 +	.0642 +	.0556 +	.1258 +	.1001 +	.1145 +	.1214 +	.1012 +	.1126 +

Table B.35(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R372)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0256 +	.0242 +	.0196 +	.0741 +	.0388 +	.0525 +	.0858 +	.0576 +	.0766 +
Beard	.0216 +	.0206 +	.0190 +	.0661 +	.0378 +	.0496 +	.0809 +	.0645 +	.0764 +
Hazen	.0202 +	.0195 +	.0197 +	.0621 +	.0383 +	.0488 +	.0788 +	.0699 +	.0775 +
Blom	.0210 +	.0202 +	.0191 +	.0646 +	.0379 +	.0492 +	.0801 +	.0662 +	.0767 +
Tukey	.0214 +	.0205 +	.0190 +	.0656 +	.0378 +	.0494 +	.0806 +	.0651 +	.0765 +
Gringorten	.0205 +	.0198 +	.0194 +	.0633 +	.0381 +	.0489 +	.0794 +	.0681 +	.0770 +

Table B.35(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R372)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0254 +	.0242 +	.0194 +	.0697 +	.0358 +	.0442 +	.0695 +	.0510 +	.0553 +
Beard	.0214 +	.0206 +	.0188 +	.0617 +	.0348 +	.0412 +	.0645 +	.0578 +	.0552 +
Hazen	.0200 +	.0195 +	.0195 +	.0577 +	.0353 +	.0405 +	.0625 +	.0633 +	.0562 +
Blom	.0209 +	.0201 +	.0189 +	.0602 +	.0344 +	.0409 +	.0637 +	.0595 +	.0554 +
Tukey	.0212 +	.0204 +	.0188 +	.0611 +	.0348 +	.0411 +	.0642 +	.0584 +	.0553 +
Gringorten	.0204 +	.0197 +	.0192 +	.0589 +	.0350 +	.0406 +	.0630 +	.0614 +	.0558 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.36(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R376)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1282 +	.1357 +	.1179 +	.0982 +	.1039 +	.0860 +	.0781 +	.0751 +	.0629 +
Beard	.1226 +	.1301 +	.1122 +	.0961 +	.1018 +	.0856 +	.0717 +	.0737 +	.0615 +
Hazen	.1190 +	.1265 +	.1087 +	.0947 +	.1001 +	.0900 +	.0758 +	.0728 +	.0600 +
Blom	.1213 +	.1289 +	.1160 +	.0956 +	.1013 +	.0860 +	.0764 +	.0734 +	.0612 +
Tukey	.1221 +	.1246 +	.1118 +	.0954 +	.1010 +	.0861 +	.0766 +	.0735 +	.0613 +
Gringorten	.1201 +	.1276 +	.1098 +	.0952 +	.1004 +	.0886 +	.0761 +	.0730 +	.0608 +

Table B.36(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R376)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0920 +	.0948 +	.0749 +	.0410 +	.0450 +	.0379 +	.0321 +	.0301 +	.0199 +
Beard	.0868 +	.0882 +	.0735 +	.0402 +	.0426 +	.0398 +	.0275 +	.0252 +	.0185 +
Hazen	.0845 +	.0850 +	.0737 +	.0408 +	.0422 +	.0420 +	.0250 +	.0231 +	.0187 +
Blom	.0859 +	.0870 +	.0735 +	.0403 +	.0424 +	.0399 +	.0266 +	.0244 +	.0185 +
Tukey	.0865 +	.0877 +	.0735 +	.0403 +	.0425 +	.0400 +	.0272 +	.0249 +	.0185 +
Gringorten	.0851 +	.0859 +	.0736 +	.0405 +	.0422 +	.0412 +	.0257 +	.0237 +	.0185 +

Table B.36(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R376)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0899 +	.0939 +	.0748 +	.0410 +	.0448 +	.0377 +	.0331 +	.0301 +	.0191 +
Beard	.0847 +	.0873 +	.0734 +	.0402 +	.0424 +	.0396 +	.0275 +	.0252 +	.0178 +
Hazen	.0824 +	.0841 +	.0736 +	.0407 +	.0420 +	.0418 +	.0250 +	.0231 +	.0179 +
Blom	.0838 +	.0861 +	.0734 +	.0403 +	.0422 +	.0377 +	.0266 +	.0244 +	.0177 +
Tukey	.0844 +	.0868 +	.0734 +	.0402 +	.0423 +	.0398 +	.0272 +	.0249 +	.0177 +
Gringoreon	.0830 +	.0850 +	.0735 +	.0405 +	.0420 +	.0410 +	.0257 +	.0237 +	.0178 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

Table B.37(a):Computed Values of Kolmogorov-Smirnov Statistic for Method of moment, Method of Likelihood, and Method of Probabilty weighted moment (Station R377)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.1003 +	.0965 +	.1025 +	.1288 +	.1324 +	.1132 +	.0942 +	.0955 +	.0698 +
Beard	.1015 +	.0976 +	.1036 +	.1239 +	.1275 +	.1083 +	.0901 +	.0914 +	.0656 +
Hazen	.1022 +	.0983 +	.1043 +	.1208 +	.1244 +	.1052 +	.0875 +	.0888 +	.0630 +
Blom	.1017 +	.0971 +	.1038 +	.1228 +	.1265 +	.1072 +	.0892 +	.0905 +	.0647 +
Tukey	.1016 +	.0977 +	.1037 +	.1235 +	.1272 +	.1079 +	.0898 +	.0911 +	.0653 +
Gringorten	.1020 +	.0983 +	.1041 +	.1218 +	.1254 +	.1061 +	.0883 +	.0896 +	.0638 +

Table B.37(b):Computed Values of W^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R377)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0861 +	.0584 +	.0583 +	.0924 +	.0899 +	.0525 +	.0303 +	.0331 +	.0173 +
Beard	.0776 +	.0543 +	.0553 +	.0816 +	.0792 +	.0479 +	.0249 +	.0264 +	.0165 +
Hazen	.0731 +	.0527 +	.0545 +	.0759 +	.0735 +	.0460 +	.0225 +	.0241 +	.0171 +
Blom	.0761 +	.0536 +	.0549 +	.0796 +	.0771 +	.0471 +	.0240 +	.0259 +	.0166 +
Tukey	.0771 +	.0540 +	.0552 +	.0809 +	.0784 +	.0470 +	.0246 +	.0266 +	.0165 +
Gringorten	.0746 +	.0531 +	.0546 +	.0776 +	.0752 +	.0465 +	.0232 +	.0249 +	.0168 +

Table B.37(c):Computed Values of U^2-Statistic for Method of moment, Method of Likelihood and Method of Probabilty weighted moment (Station R377)

Plotting position formula	One-day Rainfall			Two-day Rainfall			Three-day Rainfall		
	MM	ML	PWM	MM	ML	PWM	MM	ML	PWM
Weibull	.0841 +	.0562 +	.0530 +	.0914 +	.0898 +	.0524 +	.0299 +	.0331 +	.0170 +
Beard	.0756 +	.0521 +	.0499 +	.0807 +	.0791 +	.0477 +	.0245 +	.0269 +	.0162 +
Hazen	.0713 +	.0505 +	.0491 +	.0749 +	.0734 +	.0458 +	.0222 +	.0240 +	.0168 +
Blom	.0740 +	.0514 +	.0496 +	.0786 +	.0771 +	.0470 +	.0236 +	.0258 +	.0163 +
Tukey	.0750 +	.0518 +	.0493 +	.0799 +	.0784 +	.0474 +	.0242 +	.0265 +	.0163 +
Gringorten	.0726 +	.0509 +	.0493 +	.0767 +	.0751 +	.0463 +	.0228 +	.0248 +	.0165 +

Note MM : Method of Moments.
ML : Method of Likelihood.
PWM: Probability Weighted Moment Method.
\+ : Hypothesis is accepted at 10% significance level
\- : Hypothesis is rejected at 10% significance level

APPENDIX-C

```
c       Normal Distribution
        integer year(50),DUM1,ndata,mt
        dimension X(50),p(50),ps(50),diff(50),z(50),w(50),gz(50)
        character a*80,f*30
        READ(1,'(a)') A
        READ(1,'(22X,I3)') MT
        write(2,*) A
        write(2,'(a20,i4,a6)')'Moving Total For',mt,'days'
        PRINT *, 'How many years ?'
        READ *, NDATA
        XSUM=0.0
        DO 10 I=1,NDATA
        read(1,'(2x,i4,8x,f7.2)') year(i),x(i)
        XSUM=XSUM + X(I)
 10     CONTINUE
        XMEAN= XSUM/NDATA
        SN=0.0
        DO 20 J =1,NDATA
 20     SN= SN + (X(j)-XMEAN)**2
        SD= sqrt(SN/(NDATA-1))

C       NOW DATA WILL BE ARRANGED IN THE DESCENDING ORDER
C
        DUM=-99.0
        DO 400 L=1,NDATA
        DO 50 M=L,NDATA
        IF(x(M) .GT. DUM) THEN
        DUM=x(M)
        II= M
        ENDIF
 50     CONTINUE
        DUM1=YEAR(II)
        YEAR(II)=YEAR(L)
        YEAR(L)=DUM1
        x(ii)=x(l)
        x(l)=DUM
        dum=-99.0
 400    CONTINUE
C
        PRINT *, 'ENTER PLOTTING POSITION NAME '
        READ (*,'(a15,f5.3)') f,pp
c       write(2,*) '                    '
        Write(2,'(4x,a15,f5.3)') f,pp
        DO 60 N=1,NDATA
        P(N)= (float(N)-pp)/(NDATA+1-2*pp)
        Z(N)= (X(n)-xmean)/sd
        G=1.0
 55     A1= 2.515517+0.802853*G+.010328*G**2
        B = 1+1.432788*G+0.189269*G**2+.001308*G**3
```

```
      C= 2.79+0.93*G+0.151*G**2
      D=1+C/A1
      G = G -(G-(A1/B)-abs(z(n)))/D
      E =(G-A1/B-abs(z(n)))/abs(z(n))
      if(abs(E). ge. .001) go to 55
      w(n)=G
      ps(n) = sqrt(exp(-w(n)**2))
      if (p(n).gt.0.5) go to 72
      diff(n)=p(n)-ps(n)
      go to 60
 72   diff(n)= p(n)+Ps(n)-1
      ps(n) = 1-ps(n)
 60   continue
      dmax = abs(diff(1))
      do 65 i=1,ndata-1
      if ( dmax . lt.abs(diff(i+1)))then
      dmax = abs(diff(i+1))
      endif
 65   continue
      write (2,*) '                              '
      write(2,*) '   K - S  Test for Normal Distribution '
      write(2,*) '                    '
      write(2,*) '   Mean      Std Dev  '
      write(2,'(3x,f7.2,4x,f7.2,/)') Xmean ,sd
      write(2,*) '     Year       Rmax      P     EPP      Diff    Z
     4  W '
      write(2,*) '                '
      write(2,'(4x,i4,1x,i4,2x,f7.2,2x,f5.4,2x,f5.4,2x,f7.4,1x,f7.4,1x,
     4 f8.4)')(year(k),year(k)+1,x(k),p(k),ps(k),diff(k),z(k),
     4 w(k),k=1,ndata)
      write(2,*) '              '
      write(2,'(a45,2x,f5.4)') '    Computed Kolmogrov - Smirnov ( k-s )
     4 Value',dmax
      stop
      end
```

```
c       Lognormal Distrubution
        integer year(50).DUM1,ndata,mt
        dimension X(50).p(50).ps(50),diff(50).z(50),w(50),y(50),gz(50)
        character a*80,f*50
        READ(1,'(a)') A
        READ(1,'(22X,I3)') MT
        write(2,*) A
        write(2,'(a20,i4,a6)')'Moving Total For',mt,'days'
        PRINT *, 'How many years ?'
        READ *, NDATA
        YSUM=0.0
        DO 10 I=1,NDATA
        read(1,'(2x,i4,8x,f7.2)') year(i),x(i)
10      continue
        do 20 I=1,ndata
        Y(i)= alog10(x(i))
        YSUM=YSUM + Y(I)
20      CONTINUE
        YMEAN= YSUM/NDATA
        SN=0.0
        DO 21 J =1,NDATA
21      SN= SN + (y(j)-YMEAN)**2
        SD= sqrt(SN/(NDATA-1))

C       NOW DATA WILL BE ARRANGED IN THE DESCENDING ORDER
C
        DUM=-99.0
        DO 400 L=1,NDATA
        DO 50 M=L,NDATA
        IF(y(M) .GT. DUM) THEN
        DUM=y(M)
        II= M
        ENDIF
50      CONTINUE
        DUM1=YEAR(II)
        YEAR(II)=YEAR(L)
        YEAR(L)=DUM1
        y(ii)=y(l)
        y(l)=DUM
        dum=-99.0
400     CONTINUE

C
        PRINT *, 'ENTER PLOTTING POSITION NAME '
        READ (*,'(a15,f5.3)') f,pp
c       write(2,*) '                   '
        Write(2,'(4x,a15,f5.3)') f,pp
```

```
      DO 60 N=1,NDATA
      P(N)= (float(N)-pp)/(NDATA+1-2*pp)
      Z(N)= (y(n)-ymean)/sd
      G=1.0
55    A1= 2.515517+0.802853*G+.010328*G**2
      B = 1+1.432788*G+0.189269*G**2+.001308*G**3
      C= 2.79+0.93*G+0.151*G**2
      D=1+C/A1
      G = G -(G-(A1/B)-abs(z(n)))/D
      E =(G-A1/B-abs(z(n)))/abs(z(n))
      if(abs(E). ge. .001) go to 55
      w(n)=G
      ps(n) = sqrt(exp(-w(n)**2))
      if (p(n).gt.0.5) go to 72
      diff(n)=p(n)-ps(n)
      go to 60
72    diff(n)= p(n)+Ps(n)-1
      ps(n)=1-ps(n)
60    continue
      dmax = abs(diff(1))
      do 65 i=1,ndata-1
      if ( dmax . lt.abs(diff(i+1)))then
      dmax = abs(diff(i+1))
      endif
65    continue
      write(2,*) '   K - S  Test for Log Normal Distribution '
      write(2,*) '                           '
      write(2,*) '   Mean       Std Dev   '
      write(2,'(1x,f7.2,4x,f7.2,/)') ymean ,sd
      write(2,*) '     Year        Rmax      P       EPP       Diff     Z
     4  W '
      write(2,*) '                           '
      write(2,'(4x,i4,1x,i4,2x,f7.2,2x,f5.4,2x,f5.4,2x,f7.4,1x,f7.4,1x,
     4 f8.4)')(year(k),year(k)+1,y(k),p(k),ps(k),diff(k),z(k),
     4 w(k),k=1,ndata)
      write(2,*) '                           '
      write(2,'(a50,2x,f5.4)')'   Computed Kolmogrov - Smirnov ( k-s )
     4 Value = ',dmax
      stop
      end
```

```
c       Gumbel Distribution
        integer year(50),DUM1,ndata,mt
        dimension X(50),p(50),ps(50),diff(50),b(50),gz(50)
        character a*80,f*30
        READ(1,'(a)') A
        READ(1,'(22X,I3)') MT
        write(2,*) A
        write(2,'(a20,i4,a6)')'Moving Total For',mt,'days'
        PRINT *, 'How many years ?'
        READ *, NDATA
        XSUM=0.0
        DO 10 I=1,NDATA
        read(1,'(2x,i4,8x,f7.2)') year(i),x(i)
        XSUM=XSUM + X(I)
10      CONTINUE
        XMEAN= XSUM/NDATA
        SN=0.0
        DO 20 J =1,NDATA
20      SN= SN + (X(j)-XMEAN)**2
        SD= sqrt(SN/(NDATA-1))

C       NOW DATA WILL BE ARRANGED IN THE DESCENDING ORDER
C
        DUM=-99.0
        DO 400 L=1,NDATA
        DO 50 M=L,NDATA
        IF(x(M) .GT. DUM) THEN
        DUM=x(M)
        II= M
        ENDIF
50      CONTINUE
        DUM1=YEAR(II)
        YEAR(II)=YEAR(L)
        YEAR(L)=DUM1
        x(ii)=x(l)
        x(l)=DUM
        dum=-99.0
400     CONTINUE

C
        PRINT *, 'ENTER PLOTTING POSITION NAME '
        READ (*,'(a15,f5.3)') f,pp
c       write(2,*) '         '
        Write(2,'(4x,a15,f5.3)') f,pp
        DO 60 N=1,NDATA
        P(N)= (float(N)-pp)/(NDATA+1-2*pp)
        b(N)= 1/(0.77976*sd)*(x(n)-xmean+0.45*sd)
        ps(N)= 1-exp(-exp(-b(n)))
        diff(n)= p(n)-ps(n)
60      continue
```

```
      dmax = abs(diff(1))
      do 65 i=1,ndata-1
      if ( dmax . lt.abs(diff(i+1)))then
      dmax = abs(diff(i+1))
      endif
65    continue
      wsum=0.0
      Zsum=0.0
      Asum=0.0
      do 11 i=1,ndata
      gz(i)= ps(i)
      wsum = wsum+diff(i)**2
      Zsum=Zsum+gz(i)
11    continue
      Wsq= wsum+1/(12*ndata)
      Usq= Wsq-ndata*(zsum/ndata-0.5)**2
      do 12 i=1,ndata
12    Asum=asum+(2*i-1)*(alog(gz(i))+alog(1-gZ(ndata+1-i)))
      Asq = -Asum/ndata -  ndata
      write(2,*) '   K - S  Test for Gumbel Distribution '
c     write(2,*) '                     '
c     write(2,*) '   Mean        Std Dev   '
c     write(2,'(3x,f7.2,4x,f7.2,/)') Xmean ,sd
c     write(2,*) '     Year          Rmax       P      EPP     Diff    '
c     write(2,*) '                     '
c     write(2,'(4x,i4,1x,i4,2x,f7.2,2x,f5.4,2x,f5.4,2x,f7.4)')(year(k),
c    4 year(k)+1,x(k),p(k),ps(k),diff(k),k=1,ndata)
c     write(2,*) '                     '
     write(2,'(a50,2x,f5.4)') '   Computed Kolmogrov - Smirnov ( k-s ) .
    4 Value = ',dmax
      Write(2, '(a40)') '    W**2            U**2              A**2   '
      write(2, '(f8.4,7x,f8.4,7x,f8.4)') wsq,usq,asq
      stop
      end
```

```
c       Pearson Type -III Distribution
        integer year(50).DUM1,ndata,mt
        dimension X(50),p(50),ps(50),diff(50),z(50),w(50) ,fkt(50)
        character a*80 ,f*40
        READ(1,'(a)') A
        READ(1,'(22X,I3)') MT
        write(2,*) A
        write(2,'(a20,i4,a6)')'Moving Total For',mt,'days'
        PRINT *, 'How many years ?'
        READ *, NDATA
        XSUM=0.0
        DO 20 I=1,NDATA
        read(1,'(2x,i4,8x,f7.2)') year(i),x(i)
        XSUM=XSUM + X(I)
 20     CONTINUE
        XMEAN= XSUM/NDATA
        SN=0.0
        CN = 0.0
        DO 21 J =1,NDATA
        SN= SN + (X(j)-XMEAN)**2
 21     CN = CN + (X(j)-XMEAN)**3
        SD= sqrt(SN/(NDATA-1))
        CS = ndata*CN/((ndata-1)*(ndata-2)*SD**3)
 C      NOW DATA WILL BE ARRANGED IN THE DESCENDING ORDER
 C
        DUM=-99.0
        DO 400 L=1.NDATA
        DO 50 M=L,NDATA
        IF(x(M) .GT. DUM) THEN
        DUM=x(M)
        II= M
        ENDIF
 50     CONTINUE
        DUM1=YEAR(II)
        YEAR(II)=YEAR(L)
        YEAR(L)=DUM1
        x(ii)=x(l)
        x(l)=DUM
        dum=-99.0
 400    CONTINUE
 C
        PRINT *. 'ENTER PLOTTING POSITION NAME '
        READ (*,'(a15,f5.3)') f,pp
        Write(2,'(4x,a15,f5.3)') f,pp
        DO 60 N=1,NDATA
        p(n)= (float(N)-pp)/(NDATA+1-2*pp)
         fkt(N)= (x(n)-xmean)/sd
c        if ( fkt(n) .gt. tt) then
c        fkt(n) = tt
c        endif
```

```
      fk= cs/6
      ZZ=0.1
 75   a11=ZZ+fk*(ZZ**2-1)+(1/3)*(ZZ**3-6*ZZ)*fk**2-(ZZ**2-1)*fk**3
     4+ZZ*(fk**4)+(1/3)*fk**5
      CC= 1+2*fk*ZZ+(fk**2)*(ZZ**2)-2*fk**2-2*(fk**3)*ZZ+fk**4
      ZZ=ZZ-(a11-fkt(n))/CC
      EE = (A11-fkt(n))/fkt(n)
      if (abs (EE). ge. .00001) go to 75
      z(n) = ZZ
      G = 1
 55   A1= 2.515517+0.802853*G+.010328*G**2
      B = 1+1.432788*G+0.189269*G**2+.001308*G**3
      C= 2.79+0.93*G+0.151*G**2
      D=1+C/A1
      G = G -(G-(A1/B)-abs(z(n)))/D
      E =(G-A1/B-abs(z(n)))/abs(z(n))
      if(abs(E). ge. .00001) go to 55
      w(n)=G
      ps(n) = sqrt(exp(-w(n)**2))
      if (p(n).gt.0.5) go to 72
      diff(n)=p(n)-ps(n)
      go to 60
 72   diff(n)= p(n)+Ps(n)-1
      ps(n)=1-ps(n)
 60   continue
      dmax = abs(diff(1))
      do 65 i=1,ndata-1
      if ( dmax . lt.abs(diff(i+1)))then
      dmax = abs(diff(i+1))
      endif
 65   continue
c     write(2,*) '                                          '
      write(2,*) '    K - S  Test for Pearson Type III Distribution '
c     write(2,*) '                                          '
c     write(2,*) '   Mean          Std Dev            Coff of Skew'
c     write(2,'(3x,f7.2,3x,f7.2,10x,f7.3/)') xmean ,sd,CS
c     write(2,*) '       Year          Rmax        P        EPP        Diff      Z
c    4  W '
c     write(2,*) '                                          '
c     write(2,'(4x,i4,1x,i4,2x,f7.2,2x,f5.4,2x,f5.4,2x,f7.4,1x,f7.4,1x
c    4 f8.4)')(year(k),year(k)+1,x(k),p(k),ps(k),diff(k),z(k),
c    4 w(k),k=1,ndata)
      write(2,'(a50,2x,f5.4)') '   Computed Kolmogrov - Smirnov ( k-s )
     4 Value = ',dmax
      stop
      end
```

```
c       Log Pearson Type III Distribution
        integer year(50),DUM1,ndata,mt
        dimension X(50),p(50),ps(50),diff(50),z(50),w(50),y(50) ,fkt(50)
        character a*80 ,f*40
        READ(1,'(a)') A
        READ(1,'(22X,I3)') MT
        write(2,*) A
        write(2,'(a20,i4,a6)')'Moving Total For',mt,'days'
        PRINT *, 'How many years ?'
        READ *, NDATA
        YSUM=0.0
        DO 10 I=1,NDATA
        read(1,'(2x,i4,8x,f7.2)') year(i),x(i)
10      continue
        do 20 I=1,ndata
        Y(i)= alog10(x(i))
        YSUM=YSUM + Y(I)
20      CONTINUE
        YMEAN= YSUM/NDATA
        SN=0.0
        CN = 0.0
        DO 21 J =1,NDATA
        SN= SN + (y(j)-YMEAN)**2
21      CN = CN + (y(j)-YMEAN)**3
        SD= sqrt(SN/(NDATA-1))
        CS = ndata*CN/((ndata-1)*(ndata-2)*SD**3)
C       NOW DATA WILL BE ARRANGED IN THE DESCENDING ORDER
C
        DUM=-99.0
        DO 400 L=1,NDATA
        DO 50 M=L,NDATA
        IF(y(M) .GT. DUM) THEN
        DUM=y(M)
        II= M
        ENDIF
50      CONTINUE
        DUM1=YEAR(II)
        YEAR(II)=YEAR(L)
        YEAR(L)=DUM1
        y(ii)=y(l)
        y(l)=DUM
        dum=-99.0
400     CONTINUE

C
        PRINT *, 'ENTER PLOTTING POSITION NAME '
        READ (*,'(a15,f5.3)') f,pp
        Write(2,'(4x,a15,f5.3)') f,pp
c       write(*,*) cs
c       print *, 'Critical value for cs '
c       read *, tt
```

```
      DO 60 N=1,NDATA
      p(n)= (float(N)-pp)/(NDATA+1-2*pp)
      fkt(N)= (y(n)-ymean)/sd
c     if ( fkt(n) .gt. tt) then
c     fkt(n) = tt
c     endif
      fk= cs/6
      ZZ=0.1
75   a11=ZZ+fk*(ZZ**2-1)+(1/3)*(ZZ**3-6*ZZ)*fk**2-(ZZ**2-1)*fk**3
    4+ZZ*(fk**4)+(1/3)*fk**5
c    CC= 1+2*fk*ZZ+(fk**2)*(ZZ**2)-2*fk**2-2*(fk**3)*ZZ+fk**4
      ZZ=ZZ-(a11-fkt(n))/CC
      EE = (A11-fkt(n))/fkt(n)
      if (abs (EE). ge. .00001) go to 75
      z(n) = ZZ
      G = 1
55    A1= 2.515517+0.802853*G+.010328*G**2
      B = 1+1.432788*G+0.189269*G**2+.001308*G**3
      C= 2.79+0.93*G+0.151*G**2
      D=1+C/A1
      G = G -(G-(A1/B)-abs(z(n)))/D
      E =(G-A1/B-abs(z(n)))/abs(z(n))
      if(abs(E). ge. .00001) go to 55
      w(n)=G
      ps(n) = sqrt(exp(-w(n)**2))
      if (p(n).gt.0.5) go to 72
      diff(n)=p(n)-ps(n)
      go to 60
72    diff(n)= p(n)+Ps(n)-1
      ps(n)=1-ps(n)
60    continue
      dmax = abs(diff(1))
      do 65 i=1,ndata-1
      if ( dmax . lt.abs(diff(i+1)))then
      dmax = abs(diff(i+1))
      endif
65    continue
      write(2,*) '   K - S  Test for Log Pearson Type III Distribution'
      write(2,*) '                    '
      write(2,*) '   Mean       Std Dev          Coff of Skew'
      write(2,'(1x,f7.2.2x,f7.2,12x,f7.3/)') ymean ,sd,CS
      write(2,*) '     Year         Rmax      P      EPP       Diff    Z
    4  W '
      write(2,*) '                    '
      write(2,'(4x,i4,1x,i4,2x,f7.2,2x,f5.4,2x,f5.4,2x,f7.4,1x,f7.4,1x,
    4 f8.4)')(year(k),year(k)+1,y(k),p(k),ps(k),diff(k),z(k),
    4 w(k),k=1,ndata)
      write(2,*) '                    '
      write(2,'(a50,2x,f5.4)')' Computed Kolmogrov - Smirnov ( k-s )
    4 Value = ',dmax
      stop
      end
```

বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়
নং..............
তাং..............
লাইব্রেরী, ঢাকা