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REGIONAL FLOOD FREQUENCY ANALYSIS

FOR SUB-HIMALAYAN REGION

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PREFACE

Flood magnitudes and their frequencies are often needed for planning and design of various water resources structures, bridges and culverts etc. Flood frequency analysis procedures provide such estimates from the available limited historical peak flood records. The flood frequency analysis for those gauging sites, where the historical peak discharges are available for sufficiently long period, may be carried out using at site data. However, for the ungauged sites or sites with short record lengths, such analysis may not be able to estimate the floods with desired accuracy. In such a situation, flood frequency analysis may be carried out using regional approaches with 'regional and at site data' or 'regional data' alone.

A number of studies have been carried out in India in the area of regional flood frequency analysis using U.S.G.S., regression based and Chow's methods etc. Some attempts have been made at National Institute of Hydrology and some academic institutions to study the applications of new approaches of regional flood frequency analysis for typical regions of our country. However, so far very few studies have been carried out in our country to compare the relative performance of the various flood frequency analysis methods for identifying the most robust method for a specific region.

In this report, a comparative study has been carried out for the Sub-Himalayan region by Shri R.D. Singh and Shri Rakesh Kumar, Scientists and Smt. Vibha Jain, P.R.A. of the Institute in order

to identify the most robust frequency distribution based on the descriptive ability as well as predictive ability criteria. Effect of the regional heterogeneity on the flood frequency estimates has also been examined. The flood frequency relationships developed by fitting the recommended frequency distribution would be very much useful for estimating floods of various return periods for gauged as well as ungauged catchments of the region. The study would also provide an appropriate methodology for developing regional flood frequency relationships for other hydrometeorologically homogeneous regions of the country.

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ABSTRACT

In this report, flood frequency analysis has been carried out for Sub-Himalayan region using peak flood series data of ten small and medium size catchments varying in size from 6 sq. kms. to 2072 sq. kms. The study involves application of Extreme Value Type-I(EV1), General Extreme Value(GEV) and Wakeby distributions using (i) at site data (ii) at site and regional data in combined form and (iii) regional data alone. Statistical tests based on U.S.G.S. method and coefficient of variation(CV) based method have been performed in order to test the homogeneity of the region.

Flood frequency analysis has been carried out for the two groups of the catchments. Annual maximum peak flood series data of 8 bridge sites passing the U.S.G.S. homogeneity test have been considered under Group-1; whereas the peak flood series of 5 bridge catchments, which passed the U.S.G.S. as well as CV based homogeneity tests have been considered under Group-2. The data of remaining two sites have been used for testing the methodology based on descriptive ability criteria for both the groups. Synthetic flood series have been generated using the regional EV1(Case-1), GEV(Case-2) and Wakeby(Case-3) parameters derived from the historical data of the two groups of the catchments. Generated data sets of specific record lengths(same as the record length of historical data for respective gauging sites) have been considered for both the groups of the catchments for developing the flood frequency relationships. For the two independent sites, variable record lengths viz. 1, 5, 10, 13, 20, 30 and 40 have been considered one at a time for computing the flood frequency

estimates and the predictive ability criteria such as bias, root mean square error and coefficient of variation.

The above methodology has been applied to the generated data of different sample sizes for each population, considered as Case-1, Case-2, and Case-3 populations respectively for the two independent gauging sites of the two groups of the catchments. Performance of different methods has been evaluated based on predictive ability criteria viz. bias, coefficient of variation and root mean square error. It is seen that the methods based on GEV(PWM) and Wakeby(PWM) approaches using at site and regional data in combined form provide flood frequency estimates with computationally less bias, comparable root mean square error and coefficient of variation for the two test catchments. Further, the effect of regional homogeneity on flood estimates has also ben examined using the Monte Carlo experiments. In general, it is observed that by using the SRGEV and SRWAKE methods for GEV and Wakeby populations, relatively larger percentage differences between the respective flood estimates for different recurrence intervals are obtained based on the flood estimates of the two groups of the catchments as compared to the EV1 population.

1.0 INTRODUCTION

Estimation of flood magnitudes and their frequencies have been engaging attention of the engineers the world over for planning and design of water resources projects, since time immemorial. Flood Frequency analysis procedures provide such information from the available limited historical flood records. The peak flood data used for frequency analysis should be of good quality, random, homogeneous, adequate and the sample size should be such that the population parameters can be estimated from it. In flood frequency analysis, generally various theoretical frequency distributions are fitted to historical flood records. The parameters of the distributions are estimated using one or more parameter estimation techniques. The best fit distribution is selected on the basis of some chosen goodness of fit criteria. The floods of different recurrence intervals are computed using the estimated parameters of the best fit distribution, based on those criteria.

There are various distributions and methods of parameter estimation available in the flood frequency analysis literature. Correct inference about the distributions which fit the peak flood series of a site is crucial in flood frequency analysis, as various distributions fitted to the same data result in different flood estimates in the extrapolation range. There is no general agreement among the hydrologists as to which of the various theoretical distributions available should be used for modelling the peak flood series at a site. The reason being that the hydrologists try to infer about the population distribution from the sample data which is subjected to sampling variability. The

conclusions arrived regarding the correct distribution based on the given sample data are influenced by the extent, the data satisfy the basic assumptions of flood frequency analysis and the techniques employed; like the adjustment of data, presence of outliers, historical information etc., method of parameter estimation, distribution model used and goodness of fit test adopted.

The inference about the best fit distribution for a sample data observed at a site is made based on some goodness of fit criteria. In spite of a number of attempts no uniform goodness of fit criteria has been developed for selecting the best fit distribution, so far. As a result recommendations about different, design flood estimates for the same site depend upon the adopted goodness of fit criteria. In order to avoid such subjectivity, hydrologosts are always in search of a robust frequency distribution for fitting the peak flood series. Whenever, peak flood data are available over adequate number of years the flood frequency analysis may be carried out by fitting frequency distributions to the at site records. However, the reliability of such analysis is somewhat limited for the catchments with short record lengths. Such a situation can be overcome by adopting regional flood frequency approach, based on at site and regional data. For an ungauged catchment, it is not possible to carry out at site flood frequency analysis because of absence of flow records. Regional flood frequency analysis based on regional data provides the flood frequency estimates for such catchments.

In India, regional flood frequency studies have been carried out using conventional methods such as USGS method, regression

based methods and Chow's method etc. for some typical regions. Attempts have been made to study application of the new approaches in the studies conducted at some of the Indian research institutions and academic organizations(Seth,1984-85). Very few studies have been carried out to test comparative performance of the existing rationalization techniques. Lettenmaier and Potter(1985) and Lattenmaier et al.(1987) have conducted some studies, wherein performance of various flood frequency methods were compared.

In present study, probability weighted moment based EV1, GEV and Wakeby distributions, which are simple and widely used distributions available in recent flood frequency analysis literature, have been considered to fit the annual peak flood series data of hydrometeorologically homogeneous Sub-Himalayan region. The analysis has been carried out with:

(i) at site data,
(ii) at site and regional data, and
(iii) regional data alone without considering at site data.

Annual maximum peak flood series data of 8 bridge sites passing the U.S.G.S. homogeneity test have been considered under Group-1; whereas the peak flood series of 5 bridge catchments, which passed the U.S.G.S. as well as CV based homogeneity tests have been considered under Group-2 for estimating the parameters, keeping the data of two sites for the purpose of testing the methodology based on descriptive ability criteria for both the groups.

Descriptive ability of various methods has been tested based on the three numerical measures of goodness of fit viz. (a) average of the relative deviations between computed and observed values of annual maximum discharge peak(ADF) (b) efficiency(EFF) and (c) standard error(SE).

In the second part of the study, Monte Carlo experiments have been conducted, wherein the regional parameters of EV1, GEV and Wakeby distributions are utilised for generating the respective populations at each gauging site including the two independent gauging sites. The computations are made with the generated data for an independent gauging site taking samples of different sizes viz. 1, 5, 10, 13, 20, 30 and 40 respectively. Similar computations are also repeated for the second independent gauging site. The predictive ability of various methods has been testes based on the numerical criteria such as bias(Bias), root mean square error(RMSE) and coefficient of variation(CV) computed from the generated samples of different sizes by considering 1000 replications. The results obtained from the two generated populations using the above mentioned procedures for both the groups of the catchments have been compared with an objective of selecting a robust method among various methods considered in the present study.

2.0 REVIEW

Statistical flood frequency analysis has been one of the most active areas of research since the last thirty to forty years. However, the questions such as (i) which parent distribution the data may follow? (ii) what should be the most suitable parameter estimation technique? (iii) how to account for sampling variability while identifying the distributions? (iv) what should be the suitable measures for selecting the best fit distribution? (v) what criteria one should adopt for testing the reginal homogeneity? and many others remain unresolved. The scope of frequency analysis would have been widened if the parameters of the distribution could have been related with the physical process governing floods. Such relationships, if established, would have been much useful for studying the effects of non stationarity and man made changes in the physical process on frequency analysis. Unfortunately, this has not been yet possible and the solution of identifying the parent distribution still remains empirical based on the principle of the best fit to the data. However, development of geomorphological unit hydrograph seems to be a good effort towards the physically based flood frequency analysis. Inspite of many drawbacks and limitations, the statistical flood frequency analysis remains the most important means of quantifying floods in systematic manner. Keeping this in view, various flood frequency analysis studies carried out in literature have been reviewed before taking up the present study .

Procedures for frequency analysis depend on (i) the amount and type of data used such as at site data, at site/regional data

and regional data only without at site data, (ii) type of model, and (iii) form of distribution and estimating procedure used. For the sites having adequate length of records, frequency analysis may be performed either using at site data or at site/regional data. On the other hand, at site data togather with regional data can be utilized to provide most consistent and reliable flood estimates for the gauged sites with limited data records. For ungauged sites, however, only regional data can be used for flood frequency analysis.

As such there are essentially two types of models adopted in flood frequency analysis literature: (i) annual flood series (AFS) models and (ii) partial durationseries models. Maximum amount of efforts have been made in modelling the annual flood series as compared to the partial duration series. The present study is also based on the annual flood series. Thus the literature review has been restricted to AFS studies only. A large number of peak flow distributions are available in literature among these the Normal, Log Normal, Gumbel, Log Gumbel, General Extreme Value, Pearson Type III, Log Pearson Type III and Wakeby distributions have been commonly used in most of the flood frequency studies. For the estimation of the parameters of the various distributions, the method of moments, method of maximum likelihood, method of probability weighted moment, method based on principle of maximum entropy and method of least squares are some of the methods which have been most commonly used by many investigators in frequency analysis literature. Once the parameters are estimated accurately for the assumed distrisbution, goodness of fit procedures then test whether or not the data do indeed fit the assumed distribution with a specified degree of

confidence. Various goodness of fit criteria have been adopted by many investigators while selecting the best fit distribution from the various distributions fitted with the historical data. However, most of the goodsness of fit criteria are conventional and found to be in appropriate for selecting a best fit deistribution which may provide an accurate design flood estimate corresponding to the desired recurrence interval.

Although different forms of distributions, parameters estimation procedures and goodness of fit criteria have been used by many investigators in their at site and regional flood frequency studies, but covering of the review of all the studies is beyond the scope of this report. However, a comprehensive review of various flood frequency studies may be found elsewhere(Gries, 1983; Potter; 1987 and Seth, 1984-85). Here some of the regional and at site flood frequency studies, carried out in India as well as abroad and relevant to the present study have been briefly reviewed.

2.1 Review of some Flood Frequency Studies Abroad

Dalrymple(1960) described an index flood technique to carry out regional flood frequency analysis. Benson(1962) pointed out the deficiencies in the U.S.G.S. index-flood method, proposed by Dalrymple(1960), and suggested many modifications in the U.S.G.S. index-flood method. NERC(1975) gave a method for regional flood frequency analysis based on order statistics.

Wallis(1980) recommended the method based on standardized probability weighted moments for regional flood frequency analysis. About General Extreme Value distribution recommended in the British flood studies Report, Wallis(1980) feels that its

regional application is quite specific for U.K. conditions and therefore studies should be made for GEV distribution for other region also. He concluded that regionally derived flood estimates of the extreme quantiles are preferable to at site estimates. It is true for long records also. Gries and Wood(1981) investigated the use of probability weighted moments(PWM) for improving estimates of flood recurrence quantile events in both gauged and ungauged basins.

Several new regionalisation approaches have been introduced. The most extensive work has focussed on the application of the probability weighted moments in regional flood frequency studies for various distributional choices including the Extreme Value type 1, 2 and 3 distributions(EV1, EV2, EV3). The generalized extreme value distribution(GEV) and the Wakeby distribution. Various issues involved in regionalization have been investigated by Landwehr et al.(1978, 1979a, 1979b, 1979c, 1984), Wallis(1980, 1981, 1982), Gries and Wood(1981, 1983), Kuczera(1983b), Hosking et al.(1985a, 1985b), and Lettenmaier and Potter(1985).

Stendinger(1983) proposed an approach for regionalisation based on a log space transformation after taking into consideration some theoretical limitations of the standardization used in Index Foood methods. Kuczera(1983a) proposed regionalizing the parameters of the Box-Cox power transformation, using an empirical Bayes approach. The method accounts explicitly for unequal sample variances and inter site correlation. Rossi et al.(1984) developed a regionalisation procedure for two components extreme value distribution in which annual floods are assumed to come from two distinct Extreme Value Type 1 distributions. Performance of these new regionalization techniques have not been

tested yet properly.

Inspite of the large number of existing regionalisation techniques, very few studies have been carried out with some what limited scope in order to test their comparative performances. Some of the important comparative studies conducted by many investigators include Lettenmaier and potter(1985), Gries and Wood(1981, 1983), Kuczera(1982), Lettenmaier et al.(1987) and Singh(1989).

2.2 Review of Some Flood Frequency Studies in India

There has been significant number of studies in the area of regional flood frequency Analysis in India. Goswami(1972), Thiru Vengadachari et al.(1975), Seth and Goswami(1979), Jhakade et al.(1984), Venkataraman and Gupta(1986), Venkataraman et al(1986), Thirumalai and Sinha(1986), Mehta and Sharma (1986), James et al.,Gupta(1987) and many others have conducted regional flood frequency analysis for some typical regions in India. In most of the regional flood frequency studies the conventional methods such as U.S.G.S. Method, regression based methods and Chow's method have been used. Some attempts have been made by Perumal and Seth(1985), Singh and Seth(1985), Huq et al.(1986), Seth and Singh (1987) and others to study the applications of new approaches ofregional flood frequency analysis for some of the typical regions of India for which the conventional methods have been already applied.

Although there has been a large number of application studies using conventional as well as advanced regionalisation techniques, but as such limited efforts have been made by any investigator to compare the relative performance of these approaches for any

typical region in India. Singh et al.(1990-91) compared performance of eight methods involving application of EV1 ang GEV distributions viz. EV1, SREV1-I, SREV1-II, REV1-I, REV1-II, GEV, SRGEV and RGEV of regional flood frequency analysis for Godavary basin sub-zone (3f). In this study, relative performance of the above methods as well as performane of three more methods based on Wakeby distribution i.e. WAKE, SRWAKE and RWAKE have been compared using "at site", "at site and regional" and "regional" data. The study has been taken up in order to examine some of important aspects of at site and regional flood frequency analysis, with and without at site data, which require immediate attention in the Indian context.

3.0 STATEMENT OF THE PROBLEM

The review of literature about at site and regional frequency analysis reveals that the flood estimates obtained from flood frequency analysis using regional and at site data combined together are more consistent and reliable than the at site frequency analysis estimates specially for the short records. Inspite of considerable developments in the area of flood frequency analysis, there is still a lot of controvercy regarding choice of distribution, method of parameter estimation, goodness of fit criterion, regional homogeneity tests, method of regional frequency analysis with and without at site data, and many other aspects of frequency analysis. This study, therefore, has been taken up to examine some of the important issues related with at site and regional flood frequency analysis which require immediate attention. EV1 GEV and Wakeby distributions, which are widely used in flood frequency analysis, have been considered for the study. Eleven methods involving the applications of EV1, GEV and Wakeby distributions on (a) at site data, (b) at site and regional data and (c) regional data alone without considering at site data, have been used in the study in order to achieve the following objectives:

(i) to develop/derive regional flood frequency curves/regional parameters using different methods after conducting the regional homogeneity tests.

(ii) to estimate the floods corresponding to different recurrence intervals for ten bridge catchments of sub Himalayan region(Zone-7) using the eleven different methods.

(iii)to compare the descriptive ability of different methods based on some performance criteria for each gauging site including some independent gauging sites not used in calibration.

(iv) to identify a robust regional frequency method among the methods considered in the study based on the predictive ability criteria given in the form of bias, root mean square error and coefficient of variation, computed from 1000 samples of different sizes by conducting Monte Carlo experiments on three different generated populations(regional EV1, GEV and Wakeby populations).

(v) To study the effect of regional homogeneity based on USGS homogeneity test criteria and the coeffiicient of variation test based criteria for the region.

4.0 DESCRIPTION OF STUDY AREA

The study area comprises of small and medium catchments ranging in size from 6 sq. kms. to 2072 sq. kms. in the Sub-Himalyan region. The Himalayan region upto its foot-hill, lying within the great arc passing through Madhopur near Dara Baba Nanak in the north east between 76° to 96° E longitudes and 26° to 32° N latitudes has been grouped under Zone-7; which is one of the 7 major zones in which whole of India has been divided. These seven major zones are further subdivided into 26 hydrometeorologically homogeneous sub-zones of moderate size(CWC, 1980). The locations of the railway bridges considered in the study are shown in Fig. 1.

Flood estimation for this zone is proving to be an intractable problem as the runoff from this region consists of snow melt as well as rainfall. Data availability on both these two important inputs is totally inadequate, if not nil. Though Indian Railways have collected rainfall and runoff data ranging from 5 years in the case of rainfall to 15 years and over in case of runoff from over 300 representative railway catchments in almost all the 24 sub-zones, they have but a very small number of such sites in the sub-Himalayan region. Railways have little interest in the Himalayan region but for the two narrow gauge lines they have viz., Siliguri-Darjeeling and Simla-Kalka. Any large scale development of Railway routes in the foreseeable future especially of Broad Gauge, appears to be remote, may, even far fetched, in view of the stupendous technical difficulties that are likely to be encountered. In fact, for that matter, construction of a heavy gauge line in the Himalayan region apart from up-setting the

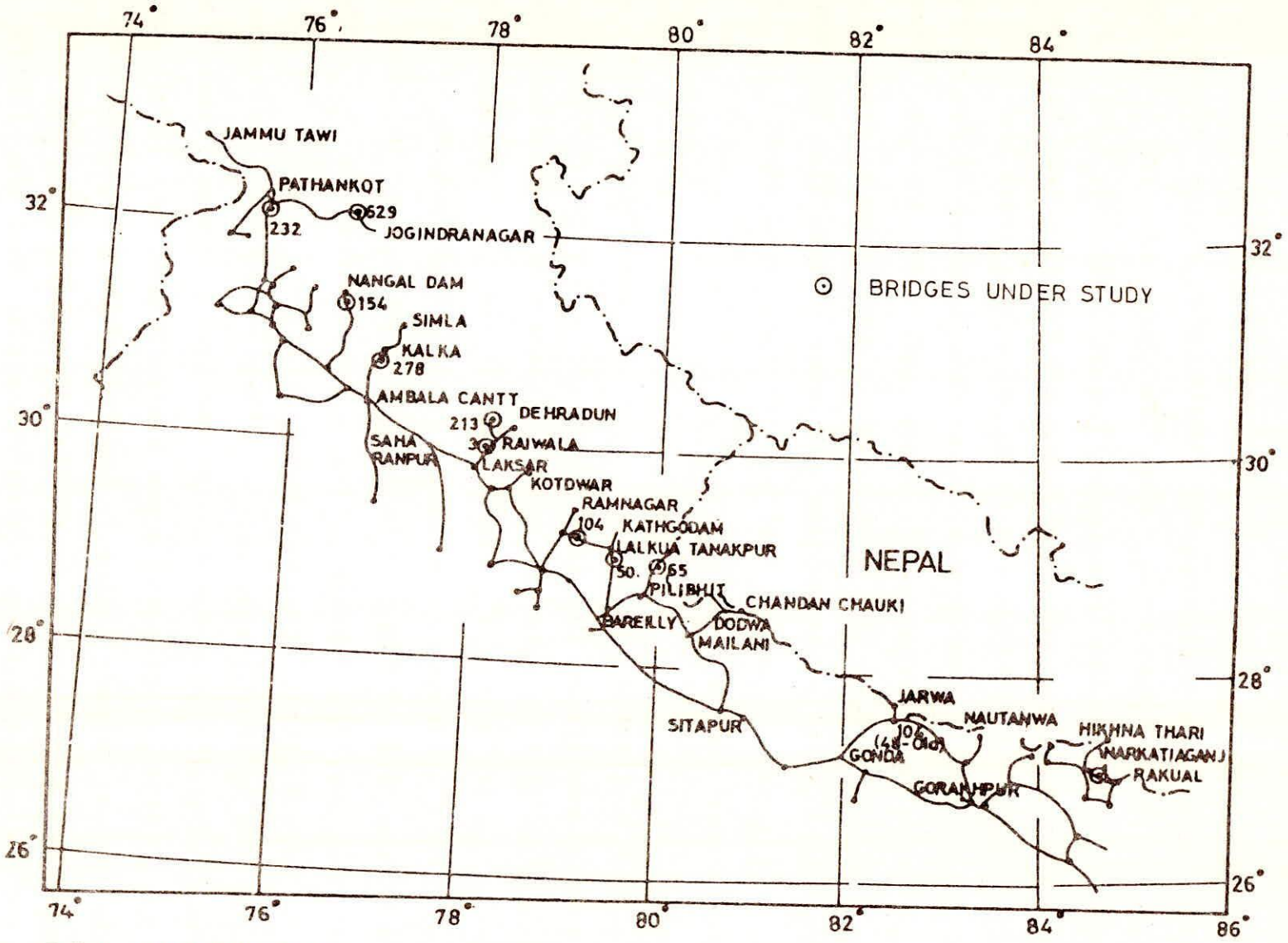

FIG. 1 - LOCATION OF RAILWAY BRIDGES IN THE STUDY AREA

ecological balance of the region may not even be possible from the engineering point of view, as the Himalayas are situated in a known seismic belt, are geologically young in age and have friable slpes leading to frequent land slides. As such the question of having a railway route in Himalayas in foreseable future can be safely ruled out and to that extent the interests of the Railways in the flood estiimation of rivers in Himalayan rivers are very much limited especially from the view point of rail route building activities(Venkatraman and Gupta, 1986)

5.0 DATA USED

The data collected by Indian railways for eleven bridge sites were available for the study(Venkatraman and Gupta, 1986). The record lengths vary from 13 to 20 years over the period of 1966 to 1985. The data of two bridge catchments i.e. one second largest and the other second smallest bridge catchments are kept independent for the purpose of testing the methodology.

6.0 METHODOLOGY

The various frequency distributions used in the study along with the different methods adopted for carrying regional flood frequency analysis are described below.

6.1 Frequency Distributions Used

Methods used in the study to carry out flood frequency analysis involved fitting of Extreme Value Type I(EV1), General Extreme Value(GEV) and Wakeby(WAKE) distributions, which are briefly discussed here under.

6.1.1 Extreme value type-I distribution(EV1)

This is a two parameter distribution and it is popularly known as Gumbel Distribution. The cummulative density function for EV1 distribution is given by:

$$F(x) = e^{-e^{\frac{-(x-u)}{\alpha}}} \qquad (1)$$

where, F(x) is the probability of non exceedence and equal to $1-1/T$; T is the recurrence interval in years,u and α are the location and shape parameters respectively. These parameters can be estimated from the sample of annual maximum peak floods using the parameters estimation techiniques available in literature. Method of probability weighted moments (PWM) is one of the parameter estimation techniques which has been successfully applied by Landerwehr et al.(1979) for estimating the parametres of EV1 distribution more efficiently with less bias. The method of

probability weighted moments which has been discussed in subsquent section was, therefore, used for estimating the EV1 distribution parameters.

6.1.2 General extreme value distribution(GEV)

GEV distribution is a generalised three parameter extreme value distribution proposed by Jenkinson (1955). Its theory and practical applications are reviewed in the Flood Studies (NERC,1975). The cummulative density function F(x) for GEV distribution is expressed as:

$$F(x) = e^{-(1-\kappa\ (\frac{x-u}{\alpha}))^{1/\kappa}} \qquad (2)$$

where u, α and κ are location, scale and shape parameters of GEV distribution respectively. For estimating these parameters, a procedure based on method of probability weighted moments (Singh,1989) which has been described in the subsquent section, is used in the study.

6.1.3 Wakeby Distribution

A random variable x is said to be distributed as Wakeby if:

$$x = m+a\ [1-(1-F)^{b}\ ] - c\ [1-(1-F)^{-d}\ ] \qquad (3)$$

where F = F(x) = 1-1/T, and
a, b, c, d and m are the parameters of Wakeby distribution which can be estimated using a special algorithm proposed by Landwehr et al.(1979) based on method of probability weighted moments.

6.2 Flood Frequency Methods used

The methods used in the study are classified in following three groups:

(A) at site flood frequency methods,

(B) at site and regional flood frequency methods, and

(C) regional flood frequency methods without using at site data.

Under the above groups the following eleven methods of flood frequency analysis have been used.

(A) At ste flood frequency methods

at site EV1(PWM) method (EV1)

at site GEV(PWM) method (GEV)

at site Wakeby(PWM) method (WAKE)

(B) At site and regional flood frequency methods

modified U.S.G.S. method based on at site and regional data (SREV1-I)

EV1(PWM) method based on at site and regional data (SREV1-II)

GEV(PWM) method based on at site and regional data (SRGEV)

Wakeby(PWM) method based on at site and regional data (SRWAKE)

(C) Regional flood frequency methods

modified U.S.G.S. method bsed on regional data (REV1-I)

EV1(PWM) method based on regional data (REV1-II)

GEV(PWM) method based on regional data (RGEV)

Wakeby(PWM) method based on regional data (RWAKE)

A brief description of each of these methods is given below.

(1) At site EV1(PWM) Method (EV1)

Methods based on probability weighted moments generally require expressing the distribution function in inverse from which is given below for EV1 distribution:

$$x = u - \alpha \ln (-\ln F) \qquad (3)$$

where, u and α as mentioned ealier are the parameters of the distribution.

Follwoing the Landwehr et al. (1979) the rth order probability weighted, M_{10r} is given by the equation:

$$M_{10r} = \frac{1}{n} \sum_{i=1}^{n} x_i \ (1 - F_i)^r \qquad (4)$$

where, F_i the probability of non exceedence, is computed using the plotting position formulae :

$$F_i = \frac{i-0.35}{n} \qquad (4a)$$

where, i is the rank in the arranged flood series,
and n is the sample size.

Putting r =0,1,2,....etc. in equation (2), M_{100}, M_{101}, M_{102}... etc..are computed from the flood series.

The parameters u and α, of EV1 distribution and quantile Q_T are computed by this method following the steps given below:

i) Arrange the flood series and compute M_{100} and M_{101} using equations (4) and (4a).

ii) Standardise the computed values of M_{100} and M_{101} obtained from step (i) dividing them by the at site mean, which is same as M_{100}. Hence :

$$m_0 = \frac{M_{100}}{M_{100}} = 1.0 \qquad (6)$$

$$m_1 = \frac{M_{101}}{M_{100}} \qquad (7)$$

iii) Estimate the parameters, u and α , using the following equations(Landwehr 1979) :

$$u = m_0 - 0.5772\ \alpha \qquad (8)$$

$$\alpha = \frac{m_0 - 2\ m_1}{\ln 2} \qquad (9)$$

iv) Estimate the T-year recurrence interval flood using the relation :

$$x_T = u - \alpha\ (\ln - \ln\ (1 - \frac{1}{T}\ )) \qquad (10)$$

v) Scale the quantiles x_T by at site mean in order to give an estimate for the site, Q :

$$Q_T = M_{100}\ x_T \qquad (11)$$

(2) At site GEV(PWM) Method (GEV)

The inverse form of the GEV distribution is :

$$x = u + \alpha\ (1 - (-\ln\ (\ F\ )^K\ )/\ K\ ) \qquad (12)$$

where u, α and K are the location, scale and shape parameters of the distribution.

For $k=0$, GEV distribution converges to the EV1 distribution. If $k < 0$ or $k > 0$, it represents the EV2 or EV3 distribution form respectively.

The parameters, u, α and k, of the distribution and quantile Q_T are estimated using the method of probability weighted moment in the following steps :

i) Arrange the flood series and compute M_{100}, M_{101}, and M_{102} using equations (4) and (4a).

ii) Standardise the computed values of M_{100}, M_{101}, and M_{102}, obtained from step (i) dividing them by the at site mean (same as M_{100}). Hence:

$$m_0 = \frac{100}{M_{100}} = 1 \qquad (13)$$

$$m_1 = \frac{M_{101}}{M_{100}} \qquad (14)$$

$$m_2 = \frac{M_{102}}{M_{100}} \qquad (15)$$

iii) From normalized values of m_0, m_1, and m_2 obtain M_{110} and M_{120} using the equations :

$$M_{110} = m_0 - m_1 \qquad (16)$$

$$M_{120} = m_0 - 2\,m_1 + m_2 \qquad (17)$$

iv) Calculate a constant C :

$$C = \left((2\,M_{110} - m_0) / (3\,M_{120} - m_0) \right) - \left(\ln 2 / \ln 9 \right) \qquad (18)$$

v) Calculate the shape parameter K using the relation :

$$K = 7.8590\ C - 2.9554\ C^2 \qquad (19)$$

vi) Calculate the scale parameter, α , using the relation:

$$\alpha = ((\ 2\ M_{10} - m_o\ )*K)\ /\ (\ \text{Gamma}(1+K)*(1.-2)^{-K}\ ) \qquad (20)$$

vii)Calculate the location parameter, u using the relation:

$$u = m_o + (\alpha\ (\text{Gamma}\ (1+K) - 1)/K) \qquad (21)$$

where, Gamma (1+K) is the value of Gamma of (1+K) computed from Gamma function subroutine.

viii) Estimate the quantile x_T using the relation:

$$x_T = u + \alpha\ (1 - (-\ln(\ 1 - \frac{1}{T}))^K\ )/K \qquad (22)$$

ix) Scale the quantiles x_T by the at site mean for the at site estimates of quantiles Q_T for a site:

$$Q_T = x_T * M_{100} \qquad (23)$$

(3) Modified U.S.G.S. method based on at site and regional data (SREV1-I)

Following sequential steps are followed :

i) Test for regional homogeneity for the selected gauged catchments using the procedure described by Dalrymple (1960) and discard those catchments which are not homogenious.

ii) Compute the flood of 2.33, 5, 10, 20 and 50 years using the parameters u and α , estimated by the method of least square

for different gauging sites after assigning the probbilites by Gringorton plottig position formula:

$$F_i = \frac{i-0.44}{n+0.12} \qquad (24)$$

iii) Compute the frequency ratios of floods of 5, 10, 20 and 50 years to mean annual flood (2.33 year flood) for each of the gauging sites and workout the median values of the frequency ratios corresponding to each recurrence interval.

iv) Draw the median values of the frequency ratios against the EV1 reduced variate corresponding to different recurrence intervals. Such curves are known as the regional frequency curves.

v) Estimate the regional frequency ratio corresponding to a recurrence interval using the regional frequency curve for the catchments lying in the region.

vi) Estimate the quantiles Q_T for a particular catchment of the region after multiplying the regional frequency ratio by the at site mean computed from the sample.

(4) Modified U.S.G.S. method bsed on regional data (REV1)

Following sequential steps are followd:

i) Repeat step (i) to step (v) described for FFA using Modified U.S.G.S. Method based on at site and regional data.

ii) Establish the relationship between mean annual flood and catchment characteristics (usually catchment area) at each station.

iii) Estimate the mean annual peak floods for each gauging sites using the relationship established between mean annual peak flood and catchment area.

iv) Estimate the quantile Q_T multiplying the mean annual peak flood obtained from the previous step with the regional frequency ratio.

(5) EV1(PWM) method based on at site and regional data (SREV1-II)

The steps are:

i) Test for regional homogeneity of data for selected gauged catchments, using either U.S.G.S. homogeneity test or CV based homogeneity test.

ii) Rank the flood series of each gauging site and compute the at site values of PWM, $M_{100,j}$ and $M_{101,j}$ as:

$$M_{100,j} = \frac{1}{n(j)} \sum_{i=1}^{n(j)} x_{i,j} \qquad (25)$$

$$M_{101,j} = \frac{1}{n(j)} \sum_{i=1}^{n(j)} x_{i,j} \quad (1. - F_{i,j}) \qquad (26)$$

where, n(j) is the record length for the jth gauging site,

$M_{100,j}$ is the zeroth order probability weighted moment for the jth gauging site (same as the at site mean).

$M_{101,j}$, is the first order probability weighted moment for the jth gauging site.

$F_{i,j}$, is the probablity of non-exceedence and computed by the

following plotting position formula:

$$F_{i,j} = \frac{(i - 0.35)}{n(j)} \qquad (27)$$

$x_{i,j}$, is the ith rank value in the sample of annual maximum peak series for the jth gauging site.

iii) Standardize the at site values of PWM obtained from the previous step by the at site mean. Thus:

$$m_{0,j} = \frac{M_{100,j}}{M_{100,j}} = 1.0 \qquad (28)$$

$$m_{1,j} = \frac{M_{101,j}}{M_{100,j}} \qquad (29)$$

where, $m_{0,j}$ is the zeroth order standardized PWM, for jth gauging site , and

$m_{1,j}$ is the first order standardized PWM for jth gauging site.

iv) Compute the regional values of the standardized PWMs averaged across the ns sites in the region in the ratio of the record lengths. Hence:

$$\bar{m}_0 = \frac{1}{L} \sum_{i=1}^{ns} m_{0,j} \quad n_j = 1.0$$

$$m_1 = \frac{1}{L} \sum_{j=1}^{ns} m_{1,j} \; n(j) \qquad (31)$$

where, $L = \sum_{j=1}^{ns} n(j)$ = Total record length (32)

$\bar{m}_0$, and $\bar{m}_1$ are the standardized regional PWMs.

v) Compute the regional EV1 parameters u and α using the relationships:

$$\alpha = \frac{\bar{m}_0 - 2\,\bar{m}_1}{\ln 2} \qquad (33)$$

$$u = \bar{m}_0 - 0.5772\,\alpha \qquad (34)$$

vi) Estimate the regional quantiles x_T using the relation:

$$x_T = u + \alpha\,(-\ln(-\ln(1.-\frac{1}{T}))^K)/K \qquad (35)$$

vii) Scale the quantities x_T by at site mean (same as $M_{100,j}$) to estimate quantiles ($Q_{T,j}$) for each gauging site.Hence:

$$Q_{T,j} = M_{100,j}\; x_T \qquad (36)$$

(6) EV1(PWM) method based on regional data (REV1-II)

The steps are:

i) Repeat step (i) to (vi) described for FFA using EV1 PWM method based on at site and regional data.

ii) Estimate the mean annual peak floods (Q_j) for each gauging

site using the relationship between the mean annual peak floods and catchment area developed for the region.

iii) Scale the quantities x_T by the mean obtained from the previous step to estimate quantilies $Q_{T,j}$ for each gauging site. Hence:

$$Q_{T,j} = \bar{Q}_j \, x_T \qquad (37)$$

(7) GEV(PWM) method based on at site and regional data (SRGEV)

The steps are:

i) Test for regional homogeneity of data for selected gauged catchments using CV based homogeneity test.

ii)Estimate at site values of PWM, $M_{100,j}$, $M_{101,j}$ and $M_{102,j}$, for each gauging site putting r = 0, 1, and 2 in the following equation , respectively :

$$M_{10r,j} = \frac{1}{n(j)} \sum_{i=1}^{n(j)} x_{i,j} \, (1 - F_{i,j})^r \qquad (38)$$

iii) Standardise the at site values of PWMs obtained from step(ii) by the at site mean :

$$m_{r,j} = \frac{M_{10r,j}}{M_{100,j}} \qquad (39)$$

where r = o, 1, and 2 respectively.

iv) Compute the regional values of standardized PWMs averaged

across the nth site in the region in the ratio of record lengths. Hence:

$$\bar{m}_r = \frac{1}{L} \sum_{j=1}^{ns} m_{r,j}\, n(j) \qquad (40)$$

v) Estimate the regional parameters, k, u and α of the GEV distribution using the procedure described for at site GEV PWM method where in place of at site standardized PWMs regional standardized PWMs are used. Thus in place of m_0, m_1, and m_2, $\bar{m}_0$, $\bar{m}_1$, and $\bar{m}_2$ are used in eq. (16) to (21).

vi) Estimate the regional quantiles x_T using the relation :

$$x_T = u + \alpha \left(1 - \left(-\ln\left(1 - \frac{1}{T}\right)\right)^{k}\right)/k \qquad (41)$$

vii) Scale the quantiles x_T by at site mean for the estimation of quantiles $Q_{T,j}$ at any gauging site :

$$Q_{T,j} = M_{100,j}\; x_T \qquad (42)$$

(8) GEV(PWM) method based on regional data (RGEV)

The steps are:-

i) Repeat step (i) to (vi) described for FFA using GEV PWM method based on at site and regional data.

ii) Estimate the mean annual peak floods ($\bar{Q}_j$) for each gauging site using the relationship between the mean annual peak floods and catchment area, developed for the region.

iii) Scale the quantiles x_T by the mean flood obtained from

the previous step to estimate quantiles $Q_{T,j}$ for each gauging site. Hence :

$$Q_{T,j} = \bar{Q}_j \, x_T \qquad (43)$$

(9) Wakeby(PWM) method based on at-site data (WAKE)

The following sequential steps are followed while carrying out at-site flood frequency analysis by this method.

i) Test for regional homogeneity of data of the gauged catchment using homogeneity test.

ii) Estimate at-site values of probablity weighted moments upto fourth order for the gauging site putting r = 0, 1, 2, 3 and 4 in equation:

$$M_{10,j} = \frac{1}{n(j)} \sum_{i=1}^{n(j)} x_{i,j} \, (1-F_{i,j})^r \qquad (44)$$

iii) Standardize the at-site values of PWMs obtained from step (ii) dividing them by the at-site mean. Hence,

$$m_{r,j} = \frac{M_{10r,j}}{M_{100,j}} \qquad (45)$$

iv) Compute the regional values of the standardlized PWMs averaged across the NS sites in the region in the ratio of the record lengths using the following equation;

$$m_r = \frac{1}{L} \sum_{i=1}^{ns} m_{r,j} \, n(j) \qquad (46)$$

From this step, the values of m_0 , m_1 , m_2 , m_3 , m_4 are obtained

v) Estimate the regional parameters of the Wakeby distribution using the special algorithm suggested by Landwehr et al.(1979) based on the regional probablity weighted moments m_0, m_1, m_2, m_3, and m_4.

vi) Estimate the regional quantiles X_T using the following relation:

$$X_T = m + a[1-(\frac{1}{T})^b - c\,[1-(\frac{1}{T})^{-d}] \qquad (47)$$

vii) Compute the T-year flood for any particular gauging site after scaling the quantiles X_T obtained from step (vi) by at-site mean.

(10) Wakeby(PWM) method based on at-site and regional data (SRWAKE)

The following sequential steps are followed while carrying out at-site and regional flood frequency analysis by this method.

i) Test for regional homogeneity of data of the selected gauged catchments using homogeneity test.

ii) Estimate at-site values of probablity weighted moments upto fourth order for the gauging site putting r = 0, 1, 2, 3 and 4 in equation:

$$M_{10,j} = \frac{1}{n(j)} \sum_{i=1}^{n(j)} X_{i,j} (1-F_{i,j})^r \qquad (48)$$

iii) Standardize the at-site values of PWMs obtained from step (ii) dividing them by the at-site mean. Hence,

$$m_{r,j} = \frac{M_{10r,j}}{M_{100,j}} \qquad (49)$$

iv) Compute the regional values of the standardlized PWMs averaged across the NS sites in the region in the ratio of the record lengths using the following equation;

$$m_r = \frac{1}{L} \sum_{i=1}^{ns} m_{r,j}\, n(j) \qquad (50)$$

From this step, the values of m_0 , m_1 , m_2 , m_3 , m_4 are obtained

v) Estimate the regional parameters of the Wakeby distribution using the special algorithm suggested by Landwehr et al.(1979) based on the regional probablity weighted moments m_0, m_1 , m_2 , m_3 , and m_4 .

vi) Estimate the regional quantiles X_T using the following relation:

$$X_T = m + a[1-(\frac{1}{T})^b - c\,[1-(\frac{1}{T})^{-d}] \qquad (51)$$

vii) Compute the T-year flood for any particular gauging site after scaling the quantiles X_T obtained from step (vi) by at-site mean.

(11) Wakeby(PWM) method based on regional data

The following sequential steps are followed while carrying regional flood frequency analysis by this method.

i) Test for regional homogeneity of data of the gauged catchments using homogeneity test.

ii) Estimate at-site values of probablity weighted moments upto fourth order for the gauging sites putting r = 0, 1, 2, 3 and 4 in equation:

$$M_{10,j} = \frac{1}{n(j)} \sum_{i=1}^{n(j)} X_{i,j}\,(1-F_{i,j})^{r} \qquad (52)$$

iii) Standardize the at-site values of PWMs obtained from step (ii) dividing them by the mean flood obtained from the relatiionship between the catchment area and the mean flood for the region. Hence,

$$m_{r,j} = \frac{M_{10r,j}}{M_{100,j}} \qquad (53)$$

iv) Compute the regional values of the standardlized PWMs averaged across the NS sites in the region in the ratio of the record lengths using the following equation;

$$m_r = \frac{1}{L} \sum_{j=1}^{ns} m_{r,j} \; n(j) \qquad (54)$$

From this step, the values of m_0 , m_1 , m_2 , m_3 , m_4 are obtained

v) Estimate the regional parameters of the Wakeby distribution using the special algorithm suggested by Landwehr et al.(1979) based on the regional probablity weighted moments m_0 , m_1 , m_2 , m_3 , and m_4 .

vi) Estimate the regional quantiles X_T using the following relation:

$$X_T = m + a[1-(\frac{1}{T})^b - c\,[1-(\frac{1}{T})^{-d}] \qquad (55)$$

vii) Compute the T-year flood for any particular gauging site after scaling the quantiles X_T obtained from step (vi) by the mean flood obtained by the relationship between catchment area and mean flood for the region.

6.3 Homogeneity Tests

In regional frequency analysis, available historical peak flood data of different sites which belong to a hydrologically homogeneous region are required to be grouped for

estimating regional parameters. In this study, the hydrologic homogeneity of the region was tested using (a) U.S.G.S. homogeneity test and (b) coefficient of variation based hmogeneity test. The procedures for the above tests are described below:

6.3.1 U.S.G.S. homogeneity test

This test has widely been used for testing homogeneity of a region. The steps involved in U.S.G.S. Homogeneity Test are:

(i) Compute the EV1 reduced variate corresponding to 10 year return period flood using the relation:

$$Y_T = -\ln\left(-\ln\left(1-\frac{1}{T}\right)\right) \qquad (56)$$

for example

$$Y_{10} = -\ln\left(-\ln\left(1-\frac{1}{10}\right)\right) \qquad (57)$$

$$=2.25$$

(ii) Compute the 10 year flood putting Y_{10} = 2.25 in the following equation developed for the different catchments using least square approach :

$$X_{10} = u + \alpha Y_{10} \qquad (58)$$

$$= u + 2.25\,\alpha \qquad (59)$$

(iii) Repeat step (i) and (ii) to compute 2.33 year flood, which is the annual mean flood for EV1 distribution, for the different catchments.

(iv) Compute the ratio of 10 year flood to annual mean flood ($Q_{2.33}$) at each gauging sites. The ratio is known as the 10 year frequency ratio.

(v) Average the 10 year frequency ratios of all the gauging sites to obtain the mean 10 year frequency ratio for the region as a whole.

(vi) Determine the EV1 reduced variate corresponding to the product of annual mean annual flood and the average 10 year frequency ratio from the linear regression equations developed for each catchment . Thus :

$$Y_T = (X_T - u)/\alpha \qquad (60)$$

(vii) Plot the EV1 reduced variates obtained from step (vi) against the effective length of records for that station on a test graph where upper and lower regional limits of 95 % confidence are already plotted using the following co-ordinate pairs :

Sample size (n)	Lower Limit (Y)	Upper Limit (Y)
5	-0.59	5.09
10	0.25	4.25
20	0.83	3.67
50	1.35	3.15
100	1.52	2.88
200	1.80	2.70

(viii) If the plotted points for all the gauging sites lie between the 95 % confidence limits , then they are considered to be homogeneous.

6.3.2 Co- efficient of variation based homogeneity test

The coefficient of variation based homogeneity test is performed in the following steps:

(i) Compute the coefficient of variation, CV_j, from sample of annual maximum flood peaks of each gauging site.

(ii) Compute the sampling variation of CV_j using the equation:

$$U_j = V/n_j \qquad (61)$$

where U_j = the sampling variation of CV_j for each site

V = the regional variance of CV and is taken as 1/12, and

n_j = the record length at each site

(iii) Compute weighted regional average value of $\overline{CV}$ given by:

$$\overline{CV} = \frac{\sum_{j=1}^{ns} CV_j / U_j}{\sum_{j=1}^{ns} 1/U_j} \qquad (62)$$

where, ns = no. of gauging sites.

(iv) Compute S -Statistic which expresses the total variation in CV within a region of ns sites using the equation :

$$S = \sum_{j=1}^{ns} \frac{(CV_j - \overline{CV})^2}{U_j} \qquad (63)$$

(v) The statistic S has the form of a ψ^2 statistic and is expected to be distributed as ψ^2 with (ns-1) degrees of freedom. Note down the critical value of ψ^2 for (ns-1) degrees of freedom for a particular level of significance from Chi-square table.

(vi) Compare the computed statistic S with the critical value of chi-square obtained at step (V). If the value of S exceeds the critical value of chi-square then the hypothesis of a homogeneous region must be rejected otherwise if S is less, then the data is considered to be regionally homogeneous and applicable for analysis.

6.4 Evaluation Criteria for Selecting a Suitable Frequency Analysis Method

Evaluation criteria for selecting an appropriate frequency analysis procedure can be divided in to two categories:i) Descriptive ability, and ii) Predictive ability

6.4.1 Descriptive ability

Descriptive ability criteria relate to ability of a chosen model to describe/reproduce chosen aspects of observed flood peak hydrology. The descriptive ability criteria used in the study are :

a) Average of the relative deviations between computed and observed values of annual maximum discharge peak (ADF)
b) Efficiency (EFF)
c) Standard error (SE)

a) Computation of ADF Values:

For computation of ADF values the following relationship is used:

$$ADF = \frac{1}{n} \sum_{i=1}^{n} | QO_i - QC_i | / QO_i \qquad (64)$$

b) Computation of EFF values:

EFF values are computed using the relations :

$$EFF = (IV - MV)/IV \qquad (65)$$

$$\text{where, } IV = \sum_{i=1}^{n} (QO_i - \bar{Q})^2 \qquad (66)$$

$$MV = \sum_{i=1}^{n} (QO_i - QC_i)^2 \qquad (67)$$

$\bar{Q}$ = Mean of the observed peak discharge series, QO_i

QC_i = ith values of the computed peak discharge series

n = sample size

c) Computation of SE values

SE values are computed, in non dimensional form using the following relationships:

$$SE = \sqrt{\frac{1}{n} \sum_{i=1}^{n} (QRO_i - QRC_i)^2} \qquad (68)$$

Where, $QRO_i = QO_i / \bar{Q}$

$QRC_i = QC_i / \bar{Q}$

6.4.2 Predictive ability criteria:

Predictive ability criteria relate to statistical

ability of procedure to achieve its assigned task, with minimum bias and maximum efficiency and robustness. In the study the following predictive ability criteria are used :

a) Bias

b) Root mean square Error (RMSE)

c) Co-efficient of variation (CV)

a) Bias (Bias)

It is a meausre which indicates the tendency to over estimate or under estimate a given event level corresponding to the population estimate. A positive Bias indicates the over estimation and a negative bias indicates the under estimation. Mathematically, it is expressed as :

$$BIAS = \frac{E(\hat{x}_T) - x_T}{x_T} * 100 \qquad (69)$$

where, $E(\hat{x}_T)$ = mean of the estimates of x_T for a given sample size.

x_T = the population estimate of flood corresponding to T-year recurrence interval.

b) Root mean square error (RMSE) :

RMSE is a common statistical measure which combines the effects of suggested methodology in fitting the population estimates. It is measured as:

$$RMSE = \frac{[\{E(\hat{x}_T - x_T)\}^2]^{1/2}}{x_T} * 100 \qquad (70)$$

c) Co-efficient of variation (CV)

The co-efficient of variation is a measure of the

precision of estimation of scatter of the estimate derived from many samples of the same sample size. It is measured as:

$$CV = \frac{[E\{X_T - E(\hat{X}_T)\}^2]^{1/2}}{X_T} * 100 \qquad (71).$$

7.0 ANALYSIS

Based on the regional homogeneity tests, the data of annual maximum peak flood series the ten bridge catchments have been considered in two groups as mentioned below.

Group-1 : Considering the annual maximum peak flood series of the 8 bridge sites, which passed the USGS homogeneity test, and

Group-2 : Considering the annual maximum peak flood series of the 5 bridge sites, which passed the USGS as well as CV based homogeneity tests.

Analysis has been carried out with historical as well as generated data for both of the groups of catchments as discussed here under.

7.1 Analysis Using Historical Data

The flood frequency analysis involving use of historical data has been performed as discussed here under.

(i) Calculate the sample statistics such as mean, standard deviation, co-effiecient of variation and skewness from the available historical records of annual maximum peak flow records for the ten gauging sites.

(ii) Test for homogeneity of data from various gauging stations using the procedures described in Section 6.3.

(iii) Carryout flood frequency analysis using the eleven different methods discussed in section 6.2. The regional parameters required for some of the methods are estimated using the historical data of flood peaks for eight gauging sites considered for calibration. The relationship between mean annual flood and catchment area (CA) developed for the region using least square method is: $\bar{Q} = 12.049\ (CA)^{0.625}$ for which correlation coefficient is, r = 0.83.

(iv) Estimate the floods for different return periods at the two independent gauging sites gauging sites not considered for calibration) using the eleven different methods. At site estimates for these two gauging sites are derived from the available annual maximum flood records of respective gauging sites.

(v) Compute ADF, EFF and SE values for each catchment by the eleven different flood frequency analysis methods using eq.(64) to (68).

7.2 Analysis Using Generated Data

Simulation study was carried out using the data generated from regional EV1, GEV and WAKE populations through Monte Carlo experiments. The regional EV1, GEV and WAKE population parameters were derived from historical records for the two groups of the catchments.

The steps followed in the analysis are given below :

i) Generate NS = 8 (no. of gauging sites) random samples

of size n(j), where j = 1...NS using regional EV1 (Case-1)population parameters, derived from historical records of eight gauging sites and at site means. Here no. of gauging sites, NS, is equal to eight for the study and n(j) is the sample size of the available historical records at the j^{th} gauging sites.

ii) Generate random samples for each independent gauging sites of the size m(j), where j = 1.. NI, using the regional EV1 population parameters (Case-1) and at site means of each independent sites respectively. Initially m(j) =1. Here m(j) is the sample size for the j^{th} independent gauging site and NI= no. of independent gauging sites.

iii) Calculate the sample means:

$$\overline{Q}_j = \sum_{i=1}^{n(j)} x_{i,j} / n(j), \quad j = 1.....NS \tag{72}$$

$$\overline{QI}_j = \sum_{i=1}^{m(j)} x_{i,j} / m(j), \quad j = 1.....NI \tag{73}$$

where, $\overline{Q}_j$ = at site mean for the j^{th} gauging site considered in calibration.

$\overline{QI}_j$ = at site mean for the j^{th} independent gauging site,and

$x_{i,j}$ = i^{th} observation at j^{th} independent gauging site.

iv) Estimate floods corresponding to T =2, 10, 20, 50, 100, 200, 500 and 1000-years recurrence intervals at each independent gauging site by:

a) EV1 method (except for sample size m(j)=1)

b) SREV1-I method

c) REV1-I method wherein the mean annual flood peaks, $\overline{QI}_j$, at the j^{th} independent gauging site are obtained from the regional regression model estimate at the required independent site The regression Model generally used is in the following form:

$$\hat{\overline{QI}}_j = a\,(CA_j)^b \exp(z) \qquad (74)$$

where, z is an $N(0,Se^2)$ variate where Se^2 is the regression model variance. CA_j is the catchment area up to j^{th} gauging site, a and b are the coefficients to be estimated from the linear regression in the log domain. The noise term z is added in every simulation because individual values of Q, rather than mean values, are being simulated.

d) SREV1-IÍ method

e) REV1-II method using the mean annual flood peaks obtained form eq.(13) for the the respective independent gauging sites.

f) GEV Method (except for sample size m(j)=1)

g) SRGEV method

h) RGEV method using the mean annual flood peaks obtained from eq.(74) for respective independent gauging sites.

i) SRWAKE method

j) RWAKE method using the mean annual flood peaks obtained from the eq.(74) for the respective independent gauging sites.

v) Store Quantiles ($\hat{Q}_T$, T = 2,10,20,50,100,200,500 and 1000 years) for each independent sites ,obtained from the applications of the eleven methods except for EV1 and GEV methods which are not applicable when sample size m(j)=1 , for subsequent calculation of bias, root mean square error and coefficient of variation estimates.

vi) Repeat steps (i) to (v), 1000 times.

vii) Calculate bias and root mean square error and coefficient of variation using the equations (69), (70) and (71) respectively.

viii) Compute weighted mean values of BIAS, RMSE and CV using the following equations:

$$R_1 = \frac{\sum_{i=1}^{m} n_i \sum_{j=1}^{NR} F_{i,j} * T_j}{\sum_{i=1}^{m} n_i \sum_{j=1}^{NR} T_j} \qquad (75)$$

$$R_2 = \frac{\sum_{i=1}^{m} \frac{1}{n_i} \sum_{j=1}^{NR} F_{i,j} * T_j}{\sum_{i=1}^{m} \frac{1}{n_i} \sum_{j=1}^{NR} T_j} \qquad (76)$$

$$R_3 = \frac{\sum_{i=1}^{m} n_i \sum_{j=1}^{NR} F_{i,j} * 1/T_j}{\sum_{i=1}^{m} n_i \sum_{j=1}^{NR} 1/T_j} \qquad (77)$$

$$R_4 = \frac{\sum_{i=1}^{m} \frac{1}{n_i} \sum_{j=1}^{NR} F_{i,j} * 1/T_j}{\sum_{i=1}^{m} \frac{1}{n_i} \sum_{j=1}^{NR} 1/T_j} \qquad (78)$$

Where, $F_{i,j}$ is either Bias or RMSE or CV for i^{th} sample and j^{th} return period and m the number of sample size considered.

ix) Repeat step (i) to (viii) using m(j) =5, 10, 13, 20, 30, and 40 respectively for the two independent gauging sites.

x) Repeat step (i) to (ix) twice with generated samples using regional GEV population parameters (Case-2) and Wakeby population parameters(Case-3), respectively in place of the generated samples of the regional EV1 population (Case-1), and at site means for each gauging site.

8.0 DISCUSSION OF RESULTS

The sample statistics computed from the historical flood records of eleven gauging sites located in Sub-Himalyan region are given in Table-1, along with their catchment area and sample size. It is seen from the table that Br. No. 213 has coefficient of variation equal to 1.368, which unusually higher as compared to other sites. The records available for Br. No. 213 are, therefore discarded from the analysis. It is observed from the table that the catchment area for the remaining ten gauging sites vary from 6 to 2072 sq. kms. The sample sizes of the historical flood record for the ten gauging sites are between 13 to 20 years.

The homogeneity of the region has been tested using U.S.G.S. homogeneity test and coefficient of variation based homogeneity test. These tests are performed using the procedures described in Section 6.3. The USGS homogeneity test graph is shown in Fig. 2. It is observed from Fig. 2 that all the ten gauging sites are within the regional confidence band which indicates the data for all ten gauging sites are regionally homogeneous as per the USGS homogeneity test, and thus suitable for regional analysis. However, on the basis of CV based homogeneity test, performed using the procedure described in Section 6.3.2, annual peak floods of only five bridge catchments i.e. Br No. 104, 104(old), 3, 48 and 278 are found to be hydrometeorological homogeneous. Therefore the regional flood frequency analysis is also carried out using the data of eight catchments out of the ten (passing the USGS homogeneity test) catchments and keeping the remaining two catchment independent for testing the methodology. The results of this analysis have been presented under Group-1. Regional flood

TABLE 1 : SAMPLE STATISTICS IN REAL SPACE

S.NO.	BR.NO.	SAMPLE SIZE	MEAN (Cumec)	STAND.DEV. (Cumec)	COEFF.OF VAR.	SKEWNESS	CATCH.AREA (Sq.Km.)
1	104	20	855.0	633.5	0.741	1.214	2072
2	104(old)	20	677.8	442.9	0.654	2.681	234
3	65	20	296.0	142.4	0.481	0.536	190
4	3	13	145.8	110.7	0.759	1.150	178
5	629	13	530.8	238.2	0.449	-0.075	104
6	154	13	264.5	106.0	0.401	-0.819	43
7	48	20	68.4	47.8	0.699	0.413	27
8	278	13	20.5	15.4	0.752	0.235	6
9	50	20	17.1	11.0	0.645	1.143	25
10	232	13	1606.8	643.6	0.401	-0.170	710
*11	213	13	68.6	93.9	1.368	0.896	45

* Note : The records available at Br.No.213 are discarded from the analysis due to unusually high value of co-efficient of variasion as compared to the other gauging sites.

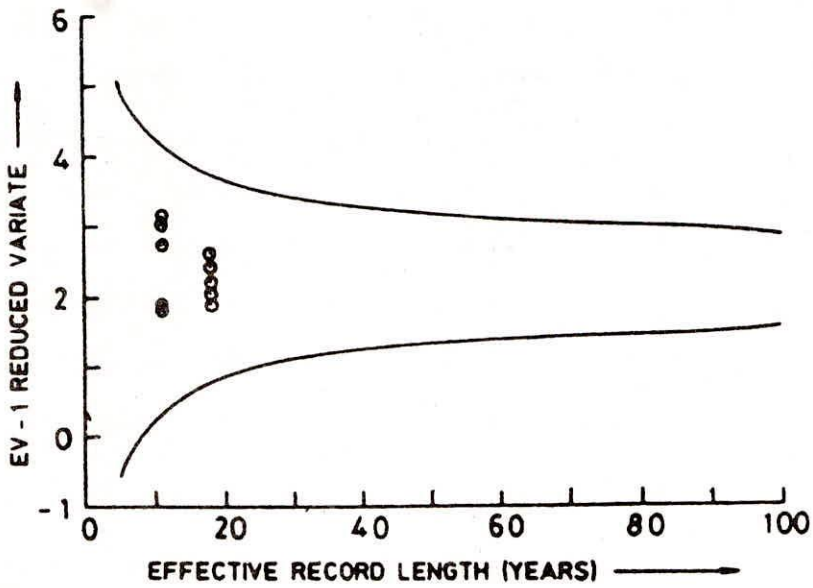

FIG : 2 HOMOGENEITY TEST GRAPH

frequency analysis has also been carriied out using the data of the five catchments passing the coefficient of variation based homogeneity test as a second group. Results of analysis carried out using the data of five catchments passing the coefficient of variation homogeneity test have been presented under Group-2. Data of the catchments defined by the bridge number 50 and bridge numberr 232 have been used to test the results of both groups. The catchment defined by bridge number 50 is the second smallest and the catchment defined by the bridge number 232 is second largest in area among all the catchments whose data have been considered in this study.

The flood estimates for different recurrence intervals obtained by the eleven different methods are given in Table 2 and Table 3 respectively for the two groups of the test catchments. The tables indicate wide range of variatios in flood estimates obtained by different methods specially at higher recurrence intervals. In order to evaluate the descriptive ability of different methods, ADF, EFF and SE values have been computed for each test catchment using eqs. (64) to (68) and these values are given in Table 4 for Group-1 and in Table-5 for Group-2. The larger values of ADF, and SE, and low values of EFF observed from the table for some of the methods may be attributed to the assumption regarding the distribution, method of parameter estimation, inaccurate assessment of the mean flood and the regional population as the data of those sites might have come from some other populations rather than the assumed one. It is observed from Tables 3 and 4 that the regional methods REV1-I, REV1-II, RGEV and RWAKE result unusually higher values of ADF and RMSE as compared to the other methods for the two test catchments.

TABLE 2 : FLOOD ESTIMATES COMPUTED BY VARIOUS METHODS

	TEST CATCHMENT -1 (BRIDGE NO. - 50)								: TEST CATCHMENT -2 (BRIDGE NO.- 232)							
METHOD	2	10	20	50	100	200	500	1000	: 2	10	20	50	100	200	500	1000
EV1	15.3	31.6	37.9	46.0	52.0	58.1	66.0	72.0	1491.4	2523.3	2917.6	3428.0	3810.5	4191.5	4694.3	5074.3
SREV1-I	15.2	31.6	37.9	46.0	52.1	58.2	66.2	72.2	1425.1	2968.8	3558.7	4322.2	4894.3	5464.4	6216.5	6784.9
REV1-I	79.9	166.5	199.5	242.3	274.4	306.4	348.5	380.4	647.0	1347.8	1615.6	1962.2	2221.9	2480.7	2822.1	3080.2
SREV1-II	15.4	31.2	37.2	45.0	50.9	56.7	64.4	70.2	1445.4	2928.6	3495.4	4228.9	4778.6	5326.4	6049.0	6595.1
REV1-II	81.0	164.2	196.0	237.1	267.9	298.6	339.1	369.8	656.2	1329.5	1586.8	1919.8	2169.4	2418.0	2746.1	2994.0
GEV	14.9	31.6	38.5	48.0	55.5	63.3	74.2	82.8	1603.5	2486.0	2717.2	2954.5	3095.5	3211.0	3332.4	3405.4
SRGEV	15.2	31.0	37.3	45.5	51.7	58.0	66.4	72.9	1424.5	2916.1	3501.0	4270.7	4857.0	5449.3	6243.6	6853.5
RGEV	79.9	163.5	196.3	239.4	272.3	305.5	350.1	384.3	646.7	1323.8	1589.4	1938.8	2205.0	2473.9	2834.4	3111.4
WAKE	15.3	30.8	38.2	49.1	58.3	68.4	83.3	95.9	1692.3	2251.2	2513.3	3030.2	3612.7	4436.5	6071.2	7913.6
SRWAKE	15.3	31.3	37.8	46.3	52.6	58.8	66.8	72.7	1439.5	2936.6	3554.1	4353.0	4944.3	5528.6	6275.2	6830.9
RWAKE	80.7	164.6	199.3	244.1	277.2	309.7	351.8	383.0	653.5	1333.1	1613.5	1976.1	2244.6	2508.0	2848.8	3101.1

TABLE 3: FLOOD ESTIMATES COMPUTED BY VARIOUS METHODS

	TEST CATCHMENT -1 (BRIDGE NO. - 50)								: TEST CATCHMENT -2 (BRIDGE NO.- 232)							
METHOD	2	10	20	50	100	200	500	1000	: 2	10	20	50	100	200	500	1000
EV1	15.3	31.6	37.9	46.0	52.0	58.1	66.0	72.0	1491.4	2523.3	2917.6	3428.0	3810.5	4191.5	4694.3	5074.3
SREV1-I	15.0	34.0	41.3	50.7	57.7	64.7	74.0	81.0	1407.9	3193.8	3876.2	4759.5	5421.4	6080.9	6950.9	7608.5
REV1-I	54.8	124.4	150.9	185.3	211.1	236.8	270.7	296.3	502.4	1139.8	1383.3	1698.5	1934.7	2170.1	2480.6	2715.3
SREV1-II	15.1	32.8	39.6	48.3	54.9	61.4	70.1	76.6	1416.5	3081.3	3717.4	4540.8	5157.9	5772.6	6583.7	7196.7
REV1-II	55.2	120.0	144.8	176.8	200.9	224.8	256.4	280.3	505.5	1099.6	1326.6	1620.5	1840.7	2060.1	2349.5	2568.3
GEV	14.9	31.6	38.5	48.0	55.5	63.3	74.2	82.8	1603.5	2486.0	2717.2	2954.5	3095.5	3211.0	3332.4	3405.4
SRGEV	14.5	32.8	40.5	51.2	59.8	68.8	81.5	91.7	1365.3	3081.0	3807.9	4813.2	5617.2	6464.2	7656.3	8617.2
RGEV	53.2	120.0	148.3	187.4	218.7	251.7	298.1	335.6	487.2	1099.5	1358.9	1717.7	2004.6	2306.9	2732.3	3075.2
WAKE	15.3	30.8	38.2	49.1	58.3	68.4	83.3	95.9	1692.3	2251.2	2513.3	3030.2	3612.7	4436.5	6071.2	7913.6
SRWAKE	14.8	32.4	39.7	50.4	59.6	69.7	84.9	97.9	1393.3	3039.8	3727.2	4737.1	5596.7	6551.1	7977.0	9195.6
RWAKE	54.3	118.4	145.1	184.5	217.9	255.1	310.6	358.1	497.2	1084.8	1330.1	1690.5	1997.3	2337.9	2846.8	3281.6

TABLE 4 : ADF EFF AND RMSE VALUES FOR TEST CATCHMENTS

	TEST CATCHMENT -1 (BRIDGE NO. - 50)			:	TEST CATCHMENT -2 (BRIDGE NO.- 232)		
METHOD	ADF	EFF	RMSE	:	ADF	EFF	RMSE
EV1	0.131	0.979	1.565		0.150	0.859	232.582
SREV1-I	0.130	0.979	1.560		0.238	0.382	486.220
REV1-I	4.309	-66.209	88.102		0.576	-1.092	894.319
SREV1-II	0.131	0.979	1.540		0.206	0.467	451.568
REV1-II	4.523	-65.279	87.490		0.566	-1.080	891.741
GEV	0.128	0.978	1.589		0.084	0.941	150.339
SRGEV	0.129	0.981	1.484		0.209	0.451	458.207
RGEV	4.496	-64.691	87.101		0.568	-1.107	897.471
WAKE	0.111	0.979	1.545		0.064	0.971	105.161
SRWAKE	0.117	0.982	1.459		0.214	0.416	472.502
RWAKE	4.464	-66.030	87.985		0.569	-1.082	892.280

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TABLE 5 : ADF EFF AND RMSE VALUES FOR TEST CATCHMENTS

	TEST CATCHMENT -1 (BRIDGE NO. - 50)			:	TEST CATCHMENT -2 (BRIDGE NO.- 232)		
METHOD	ADF	EFF	RMSE	:	ADF	EFF	RMSE
EV1	0.131	0.979	1.565		0.150	0.859	232.582
SREV1-I	0.190	0.941	2.613		0.336	-0.056	635.388
REV1-I	2.581	-29.306	59.161		0.681	-1.876	1048.543
SREV1-II	0.135	0.966	1.969		0.286	0.180	559.990
REV1-II	2.609	-27.186	57.055		0.674	-1.918	1056.193
GEV	0.128	0.978	1.589		0.084	0.941	150.339
SRGEV	0.133	0.958	2.192		0.284	0.049	603.112
RGEV	2.575	-27.844	57.716		0.672	-1.938	1059.873
WAKE	0.111	0.979	1.545		0.064	0.971	105.161
SRWAKE	0.116	0.963	2.063		0.288	0.103	585.719
RWAKE	2.556	-27.489	57.360		0.675	-1.946	1061.340

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The values of EFF are extremely low for these regional methods.

It is, therefore, difficult to identify the suitable method for the region as whole based on the computed values of ADF, EFF and SE for the two test catchments out of the remaining six methods. Neverthless, this comparative study may be useful for judging the relative performance of various methods. The flood frequency analysis is usually carried out with an objective of estimating the floods in the extrapolation range. Since the superiority of one method over others could not be established based on the descriptive ability tests, therefore one may not be able to decide which method or methods should be used for computing the floods in extrapolation range, out of the eleven methods considered in the study. It leads to carrying out the simulation study using all the methods considered in this study and test their predictive ability in order to choose the most robust method for the region.

In light of this, the simulation study has been carried out for both the groups of the catchments using the procedure described in Section 6. In the simulation study, Monte Carlo experiments have been performed using the generated data for three different populations. The generated data have been utilised to compute the performance criteria such as Bias, RMSE and CV using the eqs. (69), (70) and (71) respectively corresponding to different recurrence intervals for the two test catchments for sample sizes of 1, 5, 10, 13, 20, 24, 30 and 40 respectively. Table 6 to 12 provide the estimates of Bias obtained from the different methods for different sample sizes of Case-1 and Case-2 and Case-3 generated populations for Group-1. Table 13 to 19 give

TABLE 6 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 1									
EV1																
CASE-1	3.0	-4.0	-5.0	-6.0	-6.0	-7.0	-7.0	-8.0	-2.0	-8.0	-9.0	-10.0	-10.0	-11.0	-11.0	-11.0
CASE-2	3.0	-4.0	-6.0	-7.0	-9.0	-10.0	-11.0	-12.0	-1.0	-8.0	-10.0	-11.0	-13.0	-13.0	-15.0	-15.0
CASE-3	3.0	-4.0	-7.0	-9.0	-10.0	-10.0	-11.0	-11.0	-2.0	-8.0	-11.0	-13.0	-14.0	-14.0	-15.0	-15.0
SREV1-I																
CASE-1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-3.0	-4.0	-4.0	-4.0	-4.0	-4.0	-5.0	-5.0
CASE-2	2.0	0.0	0.0	-1.0	-2.0	-3.0	-4.0	-4.0	-2.0	-4.0	-5.0	-6.0	-6.0	-7.0	-8.0	-8.0
CASE-3	2.0	0.0	-1.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-4.0	-5.0	-7.0	-7.0	-7.0	-8.0	-7.0
REV1-I																
CASE-1	749.0	737.0	736.0	734.0	733.0	732.0	732.0	731.0	-27.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0	-29.0
CASE-2	761.0	743.0	737.0	729.0	723.0	717.0	709.0	703.0	-26.0	-28.0	-28.0	-29.0	-29.0	-30.0	-30.0	-31.0
CASE-3	752.0	738.0	726.0	714.0	710.0	707.0	707.0	708.0	-27.0	-28.0	-29.0	-30.0	-30.0	-31.0	-31.0	-31.0
SREV1-II																
CASE-1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
CASE-2	2.0	1.0	0.0	-1.0	-1.0	-2.0	-3.0	-3.0	-2.0	-3.0	-4.0	-5.0	-5.0	-6.0	-7.0	-7.0
CASE-3	2.0	1.0	-1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0	-4.0	-5.0	-6.0	-7.0	-7.0	-7.0	-7.0
REV1-II																
CASE-1	748.0	745.0	745.0	744.0	744.0	744.0	744.0	744.0	-27.0	-27.0	-27.0	-27.0	-27.0	-27.0	-27.0	-27.0
CASE-2	760.0	750.0	745.0	738.0	732.0	727.0	719.0	714.0	-26.0	-27.0	-27.0	-28.0	-28.0	-29.0	-29.0	-30.0
CASE-3	751.0	744.0	732.0	721.0	717.0	715.0	715.0	716.0	-27.0	-27.0	-28.0	-29.0	-30.0	-30.0	-30.0	-30.0
GEV																
CASE-1	49.0	-25.0	-38.0	-48.0	-54.0	-59.0	-64.0	-67.0	43.0	-29.0	-40.0	-51.0	-56.0	-61.0	-65.0	-68.0
CASE-2	51.0	-26.0	-38.0	-49.0	-55.0	-60.0	-65.0	-68.0	44.0	-29.0	-41.0	-51.0	-57.0	-62.0	-67.0	-70.0
CASE-3	50.0	-26.0	-39.0	-50.0	-56.0	-61.0	-65.0	-68.0	43.0	-29.0	-41.0	-52.0	-58.0	-62.0	-67.0	-69.0
SRGEV																
CASE-1	0.0	1.0	2.0	3.0	4.0	5.0	6.0	8.0	-4.0	-3.0	-3.0	-2.0	-1.0	0.0	2.0	3.0
CASE-2	0.0	1.0	1.0	2.0	3.0	4.0	6.0	7.0	-4.0	-4.0	-3.0	-2.0	-1.0	0.0	1.0	2.0
CASE-3	0.0	1.0	0.0	1.0	2.0	4.0	6.0	8.0	-4.0	-4.0	-4.0	-3.0	-2.0	-1.0	2.0	4.0
RGEV																
CASE-1	740.0	744.0	749.0	758.0	766.0	775.0	787.0	798.0	-28.0	-27.0	-27.0	-26.0	-25.0	-24.0	-23.0	-22.0
CASE-2	747.0	748.0	753.0	760.0	767.0	775.0	787.0	796.0	-27.0	-27.0	-27.0	-26.0	-25.0	-24.0	-23.0	-22.0
CASE-3	737.0	742.0	740.0	745.0	753.0	765.0	785.0	802.0	-28.0	-28.0	-28.0	-27.0	-26.0	-25.0	-24.0	-22.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	1.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	-3.0	-3.0	-2.0	-1.0	0.0	0.0	2.0	3.0
CASE-2	1.0	1.0	2.0	3.0	3.0	4.0	5.0	6.0	-3.0	-4.0	-3.0	-2.0	-1.0	-1.0	0.0	1.0
CASE-3	1.0	0.0	0.0	2.0	3.0	5.0	8.0	11.0	-4.0	-4.0	-4.0	-3.0	-1.0	1.0	4.0	6.0
RWAKE																
CASE-1	746.0	743.0	751.0	762.0	769.0	777.0	789.0	799.0	-27.0	-27.0	-27.0	-26.0	-25.0	-24.0	-24.0	-23.0
CASE-2	752.0	748.0	755.0	763.0	769.0	774.0	782.0	789.0	-27.0	-27.0	-26.0	-26.0	-25.0	-25.0	-24.0	-24.0
CASE-3	746.0	737.0	740.0	751.0	763.0	780.0	807.0	831.0	-28.0	-28.0	-28.0	-27.0	-26.0	-24.0	-22.0	-20.0

TABLE 7 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 5									
EV1																
CASE-1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	0.0	-1.0	-2.0	-3.0	-3.0	-4.0	-5.0	-5.0	1.0	-1.0	-2.0	-3.0	-3.0	-4.0	-5.0	-5.0
CASE-3	-1.0	-1.0	-3.0	-4.0	-5.0	-5.0	-5.0	-5.0	0.0	-1.0	-3.0	-4.0	-4.0	-5.0	-5.0	-5.0
SREV1-I																
CASE-1	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	0.0	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
CASE-2	0.0	-2.0	-3.0	-4.0	-5.0	-5.0	-6.0	-7.0	1.0	-1.0	-2.0	-3.0	-4.0	-4.0	-5.0	-6.0
CASE-3	-1.0	-2.0	-4.0	-5.0	-5.0	-6.0	-6.0	-6.0	0.0	-1.0	-3.0	-4.0	-5.0	-5.0	-5.0	-5.0
REV1-I																
CASE-1	749.0	738.0	736.0	734.0	733.0	733.0	732.0	732.0	-27.0	-28.0	-28.0	-28.0	-28.0	-29.0	-29.0	-29.0
CASE-2	761.0	744.0	737.0	729.0	723.0	717.0	710.0	704.0	-26.0	-28.0	-28.0	-29.0	-29.0	-30.0	-31.0	-31.0
CASE-3	752.0	739.0	726.0	715.0	710.0	708.0	707.0	708.0	-27.0	-28.0	-29.0	-30.0	-31.0	-31.0	-31.0	-31.0
SREV1-II																
CASE-1	-1.0	-1.0	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	0.0	-1.0	-2.0	-3.0	-4.0	-4.0	-5.0	-6.0	1.0	-1.0	-1.0	-2.0	-3.0	-3.0	-4.0	-5.0
CASE-3	-1.0	-2.0	-3.0	-4.0	-5.0	-5.0	-5.0	-5.0	0.0	-1.0	-2.0	-3.0	-4.0	-4.0	-4.0	-4.0
REV1-II																
CASE-1	748.0	745.0	745.0	744.0	744.0	744.0	744.0	744.0	-27.0	-27.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0
CASE-2	760.0	750.0	745.0	737.0	732.0	726.0	719.0	713.0	-26.0	-27.0	-28.0	-28.0	-29.0	-29.0	-30.0	-30.0
CASE-3	751.0	743.0	731.0	721.0	717.0	715.0	714.0	716.0	-27.0	-28.0	-29.0	-30.0	-30.0	-30.0	-30.0	-30.0
GEV																
CASE-1	-2.0	-3.0	-2.0	1.0	4.0	9.0	17.0	26.0	0.0	-3.0	-2.0	1.0	4.0	9.0	18.0	26.0
CASE-2	-1.0	-3.0	-3.0	0.0	3.0	8.0	16.0	24.0	0.0	-3.0	-2.0	0.0	3.0	8.0	16.0	25.0
CASE-3	-2.0	-3.0	-3.0	-1.0	2.0	7.0	16.0	26.0	-1.0	-3.0	-3.0	-1.0	2.0	7.0	16.0	26.0
SRGEV																
CASE-1	-2.0	-2.0	-1.0	0.0	1.0	2.0	4.0	5.0	-1.0	-1.0	0.0	1.0	2.0	3.0	5.0	6.0
CASE-2	-2.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	-1.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
CASE-3	-2.0	-2.0	-2.0	-1.0	0.0	1.0	4.0	6.0	-1.0	-1.0	-1.0	0.0	1.0	2.0	4.0	7.0
RGEV																
CASE-1	740.0	744.0	750.0	759.0	767.0	775.0	788.0	799.0	-28.0	-28.0	-27.0	-26.0	-26.0	-25.0	-24.0	-24.0
CASE-2	747.0	748.0	753.0	761.0	768.0	775.0	787.0	797.0	-27.0	-27.0	-27.0	-26.0	-26.0	-25.0	-24.0	-24.0
CASE-3	737.0	742.0	740.0	745.0	754.0	766.0	786.0	803.0	-28.0	-28.0	-28.0	-28.0	-27.0	-26.0	-25.0	-23.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	-1.0	-2.0	-1.0	1.0	2.0	3.0	4.0	5.0	-1.0	-1.0	0.0	2.0	2.0	3.0	5.0	6.0
CASE-2	-1.0	-2.0	-1.0	0.0	1.0	2.0	2.0	3.0	0.0	-1.0	0.0	1.0	2.0	2.0	3.0	4.0
CASE-3	-2.0	-2.0	-2.0	-1.0	1.0	3.0	6.0	9.0	-1.0	-1.0	-1.0	0.0	2.0	4.0	7.0	10.0
RWAKE																
CASE-1	745.0	744.0	752.0	762.0	768.0	775.0	784.0	793.0	-27.0	-28.0	-27.0	-26.0	-25.0	-25.0	-24.0	-23.0
CASE-2	751.0	749.0	756.0	763.0	767.0	771.0	777.0	783.0	-27.0	-27.0	-27.0	-26.0	-25.0	-25.0	-24.0	-24.0
CASE-3	745.0	738.0	741.0	751.0	763.0	777.0	801.0	823.0	-27.0	-28.0	-28.0	-27.0	-26.0	-25.0	-22.0	-20.0

TABLE 8 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 10									
EV1																
CASE-1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0
CASE-2	2.0	1.0	0.0	0.0	-1.0	-2.0	-3.0	-3.0	2.0	1.0	0.0	-1.0	-2.0	-2.0	-3.0	-4.0
CASE-3	2.0	1.0	-1.0	-2.0	-2.0	-3.0	-3.0	-2.0	2.0	1.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0
SREV1-I																
CASE-1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	2.0	0.0	0.0	-1.0	-2.0	-3.0	-4.0	-4.0	2.0	0.0	0.0	-1.0	-2.0	-3.0	-4.0	-4.0
CASE-3	2.0	0.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0	2.0	0.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0
REV1-I																
CASE-1	749.0	739.0	738.0	736.0	735.0	735.0	734.0	734.0	-27.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0
CASE-2	761.0	745.0	739.0	731.0	725.0	719.0	712.0	706.0	-26.0	-27.0	-28.0	-29.0	-29.0	-30.0	-30.0	-31.0
CASE-3	751.0	740.0	728.0	717.0	712.0	710.0	710.0	711.0	-27.0	-28.0	-29.0	-30.0	-30.0	-30.0	-30.0	-30.0
SREV1-II																
CASE-1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
CASE-2	2.0	1.0	1.0	0.0	-1.0	-2.0	-2.0	-3.0	2.0	1.0	1.0	0.0	-1.0	-2.0	-2.0	-3.0
CASE-3	2.0	1.0	0.0	-2.0	-2.0	-2.0	-2.0	-2.0	2.0	1.0	0.0	-2.0	-2.0	-2.0	-2.0	-2.0
REV1-II																
CASE-1	748.0	746.0	746.0	746.0	745.0	745.0	745.0	745.0	-27.0	-27.0	-27.0	-27.0	-27.0	-27.0	-27.0	-27.0
CASE-2	760.0	751.0	746.0	739.0	733.0	728.0	721.0	715.0	-26.0	-27.0	-27.0	-28.0	-28.0	-29.0	-30.0	-30.0
CASE-3	751.0	744.0	733.0	722.0	718.0	716.0	716.0	717.0	-27.0	-27.0	-29.0	-29.0	-30.0	-30.0	-30.0	-30.0
GEV																
CASE-1	0.0	0.0	1.0	4.0	7.0	10.0	17.0	24.0	0.0	-1.0	1.0	4.0	7.0	11.0	18.0	25.0
CASE-2	1.0	0.0	1.0	3.0	6.0	10.0	16.0	23.0	0.0	-1.0	0.0	3.0	6.0	11.0	18.0	25.0
CASE-3	0.0	-1.0	0.0	2.0	5.0	9.0	17.0	25.0	0.0	-1.0	0.0	2.0	5.0	10.0	18.0	26.0
SRGEV																
CASE-1	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	8.0
CASE-2	1.0	1.0	1.0	2.0	3.0	4.0	5.0	7.0	1.0	1.0	2.0	3.0	3.0	4.0	6.0	7.0
CASE-3	0.0	1.0	1.0	1.0	2.0	4.0	6.0	8.0	0.0	1.0	1.0	1.0	2.0	4.0	6.0	8.0
RGEV																
CASE-1	739.0	745.0	751.0	761.0	770.0	780.0	793.0	805.0	-28.0	-27.0	-27.0	-26.0	-26.0	-25.0	-24.0	-23.0
CASE-2	745.0	749.0	755.0	763.0	771.0	780.0	793.0	803.0	-27.0	-27.0	-27.0	-26.0	-26.0	-25.0	-24.0	-24.0
CASE-3	736.0	743.0	742.0	748.0	757.0	770.0	791.0	809.0	-28.0	-28.0	-28.0	-28.0	-27.0	-26.0	-24.0	-23.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	1.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	1.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
CASE-2	1.0	1.0	2.0	3.0	3.0	4.0	5.0	5.0	1.0	1.0	2.0	3.0	3.0	4.0	5.0	5.0
CASE-3	1.0	0.0	1.0	2.0	3.0	5.0	8.0	11.0	1.0	0.0	1.0	2.0	3.0	5.0	8.0	11.0
RWAKE																
CASE-1	743.0	745.0	754.0	764.0	770.0	777.0	786.0	793.0	-27.0	-27.0	-27.0	-26.0	-26.0	-25.0	-25.0	-24.0
CASE-2	749.0	751.0	758.0	765.0	770.0	773.0	779.0	783.0	-27.0	-27.0	-26.0	-26.0	-26.0	-26.0	-25.0	-25.0
CASE-3	743.0	740.0	742.0	752.0	764.0	779.0	803.0	826.0	-27.0	-28.0	-28.0	-27.0	-26.0	-25.0	-23.0	-22.0

TABLE 9 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 13									
EV1																
CASE-1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	2.0	1.0	0.0	-1.0	-1.0	-2.0	-3.0	-3.0	1.0	-1.0	-1.0	-2.0	-3.0	-4.0	-4.0	-5.0
CASE-3	1.0	1.0	-1.0	-2.0	-2.0	-3.0	-3.0	-3.0	0.0	-1.0	-2.0	-4.0	-4.0	-4.0	-4.0	-4.0
SREV1-I																
CASE-1	1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0	-1.0	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0
CASE-2	2.0	0.0	-1.0	-2.0	-3.0	-3.0	-4.0	-5.0	1.0	-1.0	-2.0	-3.0	-4.0	-4.0	-5.0	-6.0
CASE-3	1.0	0.0	-2.0	-3.0	-4.0	-4.0	-4.0	-4.0	0.0	-1.0	-3.0	-4.0	-4.0	-5.0	-5.0	-5.0
REV1-I																
CASE-1	749.0	736.0	734.0	733.0	732.0	731.0	730.0	729.0	-27.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0
CASE-2	761.0	742.0	736.0	728.0	722.0	716.0	708.0	702.0	-26.0	-27.0	-28.0	-29.0	-29.0	-30.0	-30.0	-31.0
CASE-3	752.0	737.0	724.0	713.0	708.0	706.0	705.0	706.0	-27.0	-28.0	-29.0	-30.0	-30.0	-30.0	-31.0	-30.0
SREV1-II																
CASE-1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	2.0	0.0	0.0	-1.0	-2.0	-2.0	-3.0	-4.0	1.0	0.0	-1.0	-2.0	-2.0	-3.0	-4.0	-5.0
CASE-3	1.0	0.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0	0.0	-1.0	-2.0	-3.0	-4.0	-4.0	-4.0	-4.0
REV1-II																
CASE-1	748.0	744.0	744.0	743.0	743.0	743.0	743.0	742.0	-27.0	-27.0	-27.0	-27.0	-27.0	-27.0	-27.0	-27.0
CASE-2	760.0	749.0	744.0	737.0	731.0	726.0	718.0	713.0	-26.0	-27.0	-27.0	-28.0	-28.0	-29.0	-29.0	-30.0
CASE-3	751.0	743.0	731.0	720.0	716.0	714.0	713.0	715.0	-27.0	-27.0	-28.0	-29.0	-30.0	-30.0	-30.0	-30.0
GEV																
CASE-1	0.0	0.0	1.0	3.0	5.0	8.0	14.0	19.0	-1.0	-2.0	-1.0	2.0	5.0	8.0	14.0	20.0
CASE-2	0.0	-1.0	0.0	2.0	5.0	8.0	13.0	19.0	-1.0	-2.0	-1.0	1.0	4.0	8.0	14.0	20.0
CASE-3	0.0	-1.0	0.0	1.0	4.0	7.0	14.0	20.0	-1.0	-2.0	-2.0	0.0	3.0	7.0	14.0	21.0
SRGEV																
CASE-1	0.0	0.0	1.0	2.0	3.0	4.0	6.0	7.0	-1.0	0.0	0.0	1.0	2.0	3.0	5.0	6.0
CASE-2	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	-1.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
CASE-3	-1.0	0.0	0.0	1.0	2.0	3.0	5.0	8.0	-1.0	-1.0	-1.0	0.0	1.0	2.0	5.0	7.0
RGEV																
CASE-1	740.0	743.0	749.0	759.0	767.0	776.0	789.0	800.0	-28.0	-27.0	-27.0	-26.0	-25.0	-24.0	-23.0	-22.0
CASE-2	746.0	748.0	753.0	761.0	768.0	776.0	789.0	799.0	-27.0	-27.0	-27.0	-26.0	-25.0	-24.0	-23.0	-23.0
CASE-3	737.0	741.0	740.0	745.0	754.0	766.0	787.0	805.0	-28.0	-27.0	-28.0	-27.0	-26.0	-25.0	-24.0	-22.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	0.0	0.0	1.0	3.0	4.0	4.0	6.0	7.0	0.0	-1.0	0.0	2.0	3.0	4.0	5.0	6.0
CASE-2	1.0	0.0	1.0	2.0	3.0	3.0	4.0	5.0	0.0	-1.0	0.0	1.0	2.0	3.0	4.0	4.0
CASE-3	0.0	0.0	0.0	1.0	3.0	5.0	8.0	11.0	0.0	-1.0	-1.0	1.0	2.0	4.0	7.0	10.0
RWAKE																
CASE-1	746.0	742.0	751.0	763.0	772.0	780.0	792.0	801.0	-27.0	-27.0	-27.0	-26.0	-25.0	-25.0	-24.0	-23.0
CASE-2	751.0	748.0	756.0	765.0	771.0	777.0	785.0	792.0	-27.0	-27.0	-26.0	-26.0	-25.0	-25.0	-24.0	-24.0
CASE-3	745.0	736.0	740.0	752.0	766.0	783.0	810.0	834.0	-28.0	-28.0	-28.0	-27.0	-26.0	-24.0	-22.0	-20.0

TABLE 10 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
								SAMPLE SIZE= 20								
EV1																
CASE-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	1.0	0.0	-1.0	-1.0	-2.0	-3.0	-4.0	-4.0	1.0	-1.0	-1.0	-2.0	-3.0	-3.0	-4.0	-5.0
CASE-3	1.0	0.0	-2.0	-3.0	-3.0	-3.0	-3.0	-3.0	0.0	-1.0	-2.0	-3.0	-4.0	-4.0	-4.0	-4.0
SREV1-I																
CASE-1	0.0	-1.0	-1.0	-1.0	-2.0	-2.0	-2.0	-2.0	0.0	-1.0	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0
CASE-2	1.0	-1.0	-2.0	-3.0	-3.0	-4.0	-5.0	-6.0	1.0	-1.0	-2.0	-3.0	-3.0	-4.0	-5.0	-6.0
CASE-3	1.0	-1.0	-2.0	-4.0	-4.0	-5.0	-5.0	-5.0	0.0	-1.0	-3.0	-4.0	-4.0	-5.0	-5.0	-5.0
REV1-I																
CASE-1	749.0	737.0	735.0	733.0	732.0	731.0	730.0	730.0	-27.0	-28.0	-28.0	-28.0	-28.0	-29.0	-29.0	-29.0
CASE-2	761.0	742.0	736.0	728.0	722.0	716.0	708.0	702.0	-26.0	-28.0	-28.0	-29.0	-29.0	-30.0	-31.0	-31.0
CASE-3	752.0	737.0	724.0	713.0	708.0	705.0	705.0	706.0	-27.0	-28.0	-29.0	-30.0	-31.0	-31.0	-31.0	-31.0
SREV1-II																
CASE-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	1.0	0.0	-1.0	-2.0	-2.0	-3.0	-4.0	-4.0	1.0	0.0	-1.0	-2.0	-2.0	-3.0	-4.0	-5.0
CASE-3	1.0	0.0	-2.0	-3.0	-3.0	-4.0	-4.0	-4.0	0.0	0.0	-2.0	-3.0	-4.0	-4.0	-4.0	-4.0
REV1-II																
CASE-1	748.0	745.0	744.0	744.0	744.0	743.0	743.0	743.0	-27.0	-27.0	-27.0	-27.0	-28.0	-28.0	-28.0	-28.0
CASE-2	760.0	750.0	744.0	737.0	732.0	726.0	719.0	713.0	-26.0	-27.0	-27.0	-28.0	-29.0	-29.0	-30.0	-30.0
CASE-3	751.0	743.0	731.0	721.0	716.0	714.0	714.0	715.0	-27.0	-28.0	-29.0	-29.0	-30.0	-30.0	-30.0	-30.0
GEV																
CASE-1	-1.0	-1.0	0.0	2.0	4.0	6.0	10.0	14.0	-1.0	-1.0	-1.0	1.0	3.0	5.0	9.0	13.0
CASE-2	-1.0	-1.0	0.0	2.0	3.0	6.0	10.0	13.0	0.0	-1.0	-1.0	1.0	3.0	5.0	9.0	12.0
CASE-3	-1.0	-1.0	-1.0	1.0	3.0	5.0	10.0	15.0	-1.0	-1.0	-2.0	0.0	2.0	4.0	9.0	14.0
SRGEV																
CASE-1	-1.0	0.0	0.0	1.0	2.0	3.0	5.0	6.0	-1.0	0.0	0.0	1.0	2.0	3.0	5.0	6.0
CASE-2	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
CASE-3	-1.0	0.0	-1.0	0.0	1.0	2.0	5.0	7.0	-1.0	-1.0	-1.0	0.0	1.0	2.0	4.0	7.0
RGEV																
CASE-1	740.0	744.0	749.0	758.0	766.0	774.0	787.0	797.0	-28.0	-28.0	-27.0	-26.0	-25.0	-25.0	-23.0	-22.0
CASE-2	747.0	748.0	753.0	760.0	767.0	775.0	786.0	796.0	-27.0	-27.0	-27.0	-26.0	-25.0	-24.0	-23.0	-22.0
CASE-3	737.0	742.0	740.0	745.0	753.0	765.0	785.0	802.0	-28.0	-28.0	-28.0	-27.0	-26.0	-25.0	-24.0	-22.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	0.0	0.0	1.0	2.0	3.0	3.0	5.0	6.0	0.0	0.0	1.0	2.0	3.0	3.0	5.0	6.0
CASE-2	0.0	0.0	0.0	1.0	2.0	2.0	3.0	4.0	0.0	0.0	0.0	1.0	2.0	2.0	3.0	4.0
CASE-3	0.0	-1.0	-1.0	1.0	2.0	4.0	7.0	10.0	0.0	-1.0	-1.0	0.0	2.0	4.0	7.0	10.0
RWAKE																
CASE-1	746.0	743.0	751.0	762.0	769.0	776.0	787.0	796.0	-28.0	-28.0	-27.0	-26.0	-25.0	-25.0	-24.0	-23.0
CASE-2	751.0	748.0	755.0	763.0	768.0	773.0	780.0	787.0	-27.0	-27.0	-26.0	-26.0	-25.0	-25.0	-24.0	-24.0
CASE-3	745.0	737.0	740.0	750.0	763.0	779.0	805.0	830.0	-28.0	-28.0	-28.0	-27.0	-26.0	-24.0	-22.0	-20.0

TABLE 11 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 30									
EV1																
CASE-1	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	1.0	0.0	0.0	-1.0	-1.0	-2.0	-3.0	-4.0	1.0	0.0	0.0	-1.0	-2.0	-2.0	-3.0	-4.0
CASE-3	1.0	0.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0	1.0	0.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0
SREV1-I																
CASE-1	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	1.0	-1.0	-1.0	-2.0	-3.0	-4.0	-5.0	-5.0	1.0	-1.0	-1.0	-2.0	-3.0	-4.0	-5.0	-5.0
CASE-3	1.0	-1.0	-2.0	-3.0	-4.0	-4.0	-4.0	-4.0	1.0	-1.0	-2.0	-3.0	-4.0	-4.0	-4.0	-4.0
REV1-I																
CASE-1	749.0	739.0	737.0	736.0	735.0	734.0	734.0	733.0	-27.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0	-29.0
CASE-2	761.0	745.0	739.0	731.0	725.0	719.0	711.0	706.0	-26.0	-28.0	-28.0	-29.0	-29.0	-30.0	-30.0	-31.0
CASE-3	752.0	740.0	727.0	716.0	711.0	709.0	709.0	710.0	-27.0	-28.0	-29.0	-30.0	-30.0	-31.0	-31.0	-31.0
SREV1-II																
CASE-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	1.0	0.0	-1.0	-1.0	-2.0	-3.0	-4.0	-4.0	1.0	0.0	-1.0	-1.0	-2.0	-3.0	-4.0	-4.0
CASE-3	1.0	0.0	-1.0	-3.0	-3.0	-3.0	-3.0	-3.0	1.0	0.0	-1.0	-3.0	-3.0	-3.0	-3.0	-3.0
REV1-II																
CASE-1	748.0	745.0	744.0	744.0	744.0	744.0	743.0	743.0	-27.0	-27.0	-27.0	-27.0	-27.0	-28.0	-28.0	-28.0
CASE-2	760.0	750.0	744.0	737.0	732.0	726.0	719.0	713.0	-26.0	-27.0	-27.0	-28.0	-29.0	-29.0	-30.0	-30.0
CASE-3	751.0	743.0	731.0	721.0	716.0	714.0	714.0	715.0	-27.0	-28.0	-29.0	-29.0	-30.0	-30.0	-30.0	-30.0
GEV																
CASE-1	0.0	0.0	1.0	2.0	3.0	5.0	8.0	10.0	0.0	0.0	0.0	2.0	3.0	5.0	7.0	10.0
CASE-2	0.0	0.0	0.0	2.0	3.0	5.0	8.0	10.0	0.0	0.0	0.0	2.0	3.0	5.0	7.0	10.0
CASE-3	-1.0	0.0	0.0	1.0	2.0	4.0	8.0	12.0	-1.0	0.0	-1.0	0.0	2.0	4.0	8.0	11.0
SRGEV																
CASE-1	-1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
CASE-2	0.0	0.0	0.0	1.0	2.0	3.0	4.0	6.0	0.0	0.0	0.0	1.0	2.0	3.0	4.0	6.0
CASE-3	-1.0	0.0	0.0	0.0	1.0	3.0	5.0	7.0	-1.0	0.0	0.0	0.0	1.0	3.0	5.0	7.0
RGEV																
CASE-1	741.0	744.0	749.0	757.0	764.0	772.0	783.0	793.0	-28.0	-28.0	-27.0	-26.0	-25.0	-25.0	-23.0	-23.0
CASE-2	747.0	748.0	752.0	759.0	765.0	772.0	782.0	791.0	-27.0	-27.0	-27.0	-26.0	-25.0	-25.0	-24.0	-23.0
CASE-3	738.0	742.0	740.0	744.0	751.0	762.0	781.0	798.0	-28.0	-28.0	-28.0	-27.0	-27.0	-25.0	-24.0	-22.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	0.0	0.0	1.0	2.0	3.0	4.0	5.0	5.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
CASE-2	0.0	0.0	1.0	2.0	2.0	3.0	3.0	4.0	0.0	0.0	1.0	2.0	2.0	3.0	3.0	4.0
CASE-3	0.0	-1.0	0.0	1.0	2.0	4.0	7.0	9.0	0.0	-1.0	0.0	1.0	2.0	4.0	7.0	9.0
RWAKE																
CASE-1	745.0	744.0	752.0	761.0	766.0	770.0	777.0	782.0	-28.0	-27.0	-27.0	-26.0	-25.0	-25.0	-24.0	-24.0
CASE-2	751.0	750.0	756.0	762.0	765.0	767.0	769.0	771.0	-27.0	-27.0	-26.0	-26.0	-25.0	-25.0	-25.0	-25.0
CASE-3	745.0	739.0	741.0	750.0	760.0	773.0	794.0	813.0	-28.0	-28.0	-28.0	-27.0	-26.0	-25.0	-23.0	-21.0

TABLE 12 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50)								: TEST CATCHMENT -2 (BRIDGE NO.- 232)							
	2	10	20	50	100	200	500	1000	: 2	10	20	50	100	200	500	1000
	SAMPLE SIZE= 40															
EV1																
CASE-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	1.0	0.0	0.0	-1.0	-2.0	-2.0	-3.0	-4.0	1.0	0.0	0.0	-1.0	-2.0	-2.0	-3.0	-4.0
CASE-3	1.0	0.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0	0.0	0.0	-1.0	-2.0	-3.0	-3.0	-3.0	-3.0
SREV1-I																
CASE-1	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-2.0	-2.0	-2.0	-2.0
CASE-2	1.0	-1.0	-1.0	-2.0	-3.0	-4.0	-5.0	-5.0	1.0	-1.0	-2.0	-3.0	-3.0	-4.0	-5.0	-6.0
CASE-3	1.0	-1.0	-2.0	-3.0	-4.0	-4.0	-4.0	-4.0	1.0	-1.0	-2.0	-4.0	-4.0	-5.0	-5.0	-4.0
REV1-I																
CASE-1	749.0	740.0	739.0	737.0	737.0	736.0	736.0	735.0	-27.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0	-29.0
CASE-2	760.0	746.0	740.0	732.0	727.0	721.0	713.0	708.0	-26.0	-27.0	-28.0	-29.0	-29.0	-30.0	-30.0	-31.0
CASE-3	751.0	741.0	729.0	718.0	713.0	711.0	711.0	712.0	-27.0	-28.0	-29.0	-30.0	-30.0	-31.0	-31.0	-30.0
SREV1-II																
CASE-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	1.0	0.0	-1.0	-1.0	-2.0	-3.0	-4.0	-4.0	1.0	0.0	-1.0	-2.0	-2.0	-3.0	-4.0	-5.0
CASE-3	1.0	0.0	-1.0	-3.0	-3.0	-3.0	-4.0	-3.0	1.0	0.0	-2.0	-3.0	-4.0	-4.0	-4.0	-4.0
REV1-II																
CASE-1	748.0	746.0	746.0	746.0	746.0	746.0	746.0	746.0	-27.0	-27.0	-27.0	-28.0	-28.0	-28.0	-28.0	-28.0
CASE-2	760.0	751.0	746.0	739.0	734.0	728.0	721.0	715.0	-26.0	-27.0	-27.0	-28.0	-29.0	-29.0	-30.0	-30.0
CASE-3	751.0	745.0	733.0	723.0	719.0	716.0	716.0	718.0	-27.0	-28.0	-29.0	-29.0	-30.0	-30.0	-30.0	-30.0
GEV																
CASE-1	0.0	0.0	0.0	1.0	2.0	3.0	5.0	7.0	-1.0	0.0	0.0	1.0	3.0	4.0	6.0	8.0
CASE-2	0.0	0.0	0.0	1.0	2.0	3.0	5.0	7.0	0.0	0.0	0.0	1.0	2.0	4.0	6.0	8.0
CASE-3	0.0	0.0	-1.0	0.0	1.0	3.0	6.0	9.0	-1.0	0.0	-1.0	0.0	2.0	3.0	7.0	10.0
SRGEV																
CASE-1	-1.0	0.0	1.0	2.0	3.0	4.0	5.0	7.0	-1.0	0.0	0.0	1.0	2.0	3.0	5.0	6.0
CASE-2	0.0	0.0	0.0	1.0	2.0	3.0	5.0	6.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
CASE-3	-1.0	0.0	0.0	0.0	1.0	3.0	5.0	7.0	-1.0	-1.0	-1.0	0.0	1.0	2.0	5.0	7.0
RGEV																
CASE-1	740.0	745.0	751.0	760.0	769.0	777.0	790.0	801.0	-28.0	-28.0	-27.0	-26.0	-26.0	-25.0	-24.0	-23.0
CASE-2	746.0	750.0	754.0	762.0	770.0	778.0	790.0	800.0	-27.0	-27.0	-27.0	-26.0	-26.0	-25.0	-24.0	-23.0
CASE-3	737.0	743.0	742.0	747.0	756.0	768.0	788.0	807.0	-28.0	-28.0	-28.0	-27.0	-27.0	-26.0	-24.0	-23.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	0.0	0.0	1.0	2.0	3.0	4.0	6.0	7.0	0.0	-1.0	1.0	2.0	3.0	4.0	5.0	6.0
CASE-2	0.0	0.0	1.0	2.0	2.0	3.0	4.0	5.0	0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
CASE-3	0.0	-1.0	0.0	1.0	2.0	4.0	8.0	11.0	0.0	-1.0	-1.0	1.0	2.0	4.0	7.0	10.0
RWAKE																
CASE-1	745.0	745.0	753.0	762.0	770.0	777.0	788.0	798.0	-27.0	-28.0	-27.0	-26.0	-25.0	-25.0	-23.0	-22.0
CASE-2	751.0	750.0	757.0	764.0	769.0	773.0	781.0	787.0	-27.0	-27.0	-27.0	-26.0	-25.0	-25.0	-24.0	-23.0
CASE-3	745.0	739.0	741.0	751.0	764.0	780.0	806.0	831.0	-27.0	-28.0	-28.0	-27.0	-26.0	-24.0	-22.0	-20.0

the values of Bias for the Group-2 of the catchments. Similar estimates for root mean square errors were also obtained by each method for different sample sizes considered and the same are given in Tables 20 to 26 for the Group-1 of homogeneous catchments and in Tables 27 to 33 for the Group-2 of the catchments. The CV values of the flood estimates are given in Tables 34 to 40 for the Group-1 and in Tables 41 to 47 for the Group-2 of the catchments, respectively. The flood estimates obtained for different sample sizes as given in Tables 48 to 54 for the Group-1 and in Tables 55 to 61 for the Group-2 respectively.

The weighted mean values for Bias, RMSE and CV are also computed using the eqs. (75), (76) (77) and (78), respectively, adopting four different procedures of averaging for both groups of the homogeneous catchments. These values are given in Tables 62 (Group-1) and 63(Group-2) for Bias, in Tables 64(Group-1) and 65(Group-2) for RMSE and in Tables 66(Group-1) and 67(Group-2) for CV for the Group-1 and Group-2 of the catchments, respectively. The weighted mean of flood estimates were also obtained using different averaging procedures and the same are given in Table 68 for Group-1 and in Table 69 for Group-2. The averaging method R_1 gives more weights to the estimates obtained from larger sample sizes for higher return periods. In the averaging method R_2, more weights are given to the estimates which are obtained from smaller sizes of sample for higher return periods. Thus, R_2 represents the realistic solution which is generally encountered for estimation of design flood using the field data. The averaging method R_3 and R_4 give more weights to the lower return period estimates for larger and smaller sample sizes respectively.

TABLE 13 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 1									
EV1																
CASE-1	4.0	-9.0	-11.0	-13.0	-14.0	-14.0	-15.0	-16.0	5.0	-8.0	-10.0	-12.0	-13.0	-14.0	-14.0	-15.0
CASE-2	8.0	-9.0	-13.0	-18.0	-21.0	-24.0	-27.0	-30.0	9.0	-8.0	-12.0	-17.0	-20.0	-23.0	-26.0	-29.0
CASE-3	6.0	-8.0	-11.0	-17.0	-21.0	-25.0	-30.0	-34.0	7.0	-7.0	-10.0	-15.0	-20.0	-24.0	-29.0	-33.0
SREV1-I																
CASE-1	1.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
CASE-2	5.0	0.0	-2.0	-6.0	-8.0	-11.0	-14.0	-17.0	6.0	1.0	-1.0	-4.0	-7.0	-10.0	-13.0	-16.0
CASE-3	3.0	1.0	0.0	-4.0	-8.0	-12.0	-18.0	-22.0	4.0	3.0	1.0	-3.0	-7.0	-11.0	-17.0	-21.0
REV1-I																
CASE-1	429.0	422.0	421.0	420.0	420.0	419.0	419.0	418.0	-49.0	-49.0	-49.0	-49.0	-49.0	-50.0	-50.0	-50.0
CASE-2	448.0	425.0	412.0	394.0	381.0	367.0	350.0	337.0	-47.0	-49.0	-50.0	-52.0	-53.0	-55.0	-56.0	-58.0
CASE-3	438.0	430.0	421.0	400.0	380.0	359.0	330.0	307.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
SREV1-II																
CASE-1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
CASE-2	5.0	1.0	-2.0	-5.0	-8.0	-10.0	-14.0	-16.0	6.0	2.0	-1.0	-4.0	-7.0	-9.0	-13.0	-15.0
CASE-3	3.0	2.0	0.0	-4.0	-8.0	-12.0	-17.0	-22.0	4.0	3.0	2.0	-2.0	-6.0	-10.0	-16.0	-20.0
REV1-II																
CASE-1	428.0	426.0	426.0	426.0	426.0	425.0	425.0	425.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-2	448.0	426.0	413.0	395.0	382.0	368.0	351.0	338.0	-47.0	-49.0	-50.0	-52.0	-53.0	-54.0	-56.0	-57.0
CASE-3	437.0	433.0	424.0	403.0	383.0	362.0	333.0	310.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
GEV																
CASE-1	52.0	-30.0	-42.0	-52.0	-58.0	-62.0	-67.0	-70.0	53.0	-29.0	-41.0	-52.0	-58.0	-62.0	-67.0	-70.0
CASE-2	57.0	-30.0	-43.0	-55.0	-61.0	-66.0	-72.0	-75.0	59.0	-29.0	-42.0	-54.0	-61.0	-66.0	-71.0	-75.0
CASE-3	54.0	-29.0	-42.0	-54.0	-61.0	-67.0	-73.0	-76.0	56.0	-28.0	-41.0	-54.0	-61.0	-66.0	-72.0	-76.0
SRGEV																
CASE-1	0.0	1.0	1.0	3.0	4.0	5.0	7.0	9.0	1.0	2.0	2.0	4.0	5.0	6.0	8.0	10.0
CASE-2	1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	2.0	1.0	2.0	2.0	3.0	4.0	5.0	7.0
CASE-3	-1.0	1.0	2.0	3.0	2.0	1.0	0.0	-1.0	0.0	3.0	4.0	4.0	3.0	3.0	1.0	0.0
RGEV																
CASE-1	422.0	425.0	430.0	437.0	444.0	451.0	463.0	472.0	-49.0	-49.0	-49.0	-48.0	-47.0	-47.0	-46.0	-45.0
CASE-2	426.0	423.0	425.0	429.0	433.0	439.0	448.0	456.0	-49.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-47.0
CASE-3	415.0	430.0	436.0	437.0	435.0	431.0	424.0	419.0	-50.0	-48.0	-48.0	-48.0	-48.0	-49.0	-50.0	-50.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	1.0	0.0	0.0	2.0	3.0	5.0	8.0	11.0	2.0	1.0	2.0	3.0	5.0	7.0	10.0	13.0
CASE-2	1.0	0.0	0.0	0.0	1.0	1.0	2.0	4.0	2.0	1.0	1.0	2.0	2.0	2.0	4.0	5.0
CASE-3	-1.0	1.0	0.0	-1.0	-2.0	-3.0	-3.0	-1.0	0.0	2.0	2.0	0.0	-1.0	-1.0	-1.0	0.0
RWAKE																
CASE-1	424.0	419.0	424.0	432.0	440.0	449.0	466.0	482.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-45.0	-44.0
CASE-2	427.0	423.0	424.0	426.0	428.0	431.0	438.0	445.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-48.0	-48.0
CASE-3	418.0	428.0	426.0	418.0	413.0	409.0	411.0	418.0	-49.0	-49.0	-49.0	-50.0	-51.0	-51.0	-51.0	-50.0

TABLE 16 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 13									
EV1																
CASE-1	0.0	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	4.0	-1.0	-4.0	-7.0	-10.0	-13.0	-16.0	-18.0	5.0	0.0	-2.0	-5.0	-8.0	-11.0	-14.0	-16.0
CASE-3	2.0	0.0	-2.0	-6.0	-10.0	-14.0	-19.0	-23.0	3.0	2.0	0.0	-4.0	-8.0	-12.0	-17.0	-22.0
SREV1-I																
CASE-1	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-2.0	-2.0	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	4.0	-1.0	-3.0	-6.0	-9.0	-11.0	-15.0	-17.0	5.0	0.0	-2.0	-6.0	-8.0	-11.0	-14.0	-17.0
CASE-3	2.0	1.0	-1.0	-5.0	-9.0	-13.0	-18.0	-23.0	3.0	1.0	0.0	-4.0	-8.0	-12.0	-18.0	-22.0
REV1-I																
CASE-1	429.0	422.0	421.0	420.0	419.0	419.0	419.0	418.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-2	448.0	425.0	412.0	394.0	381.0	367.0	350.0	337.0	-47.0	-49.0	-50.0	-52.0	-53.0	-54.0	-56.0	-57.0
CASE-3	438.0	430.0	421.0	400.0	380.0	359.0	330.0	307.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
SREV1-II																
CASE-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	4.0	0.0	-3.0	-6.0	-9.0	-11.0	-15.0	-17.0	5.0	0.0	-2.0	-5.0	-8.0	-11.0	-14.0	-16.0
CASE-3	2.0	1.0	-1.0	-5.0	-8.0	-12.0	-18.0	-22.0	3.0	2.0	0.0	-4.0	-8.0	-12.0	-17.0	-22.0
REV1-II																
CASE-1	428.0	426.0	426.0	426.0	425.0	425.0	425.0	425.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-2	448.0	425.0	412.0	395.0	381.0	368.0	350.0	337.0	-47.0	-49.0	-50.0	-52.0	-53.0	-54.0	-56.0	-57.0
CASE-3	438.0	432.0	423.0	402.0	383.0	361.0	332.0	310.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
GEV																
CASE-1	0.0	-3.0	-2.0	0.0	2.0	5.0	11.0	16.0	0.0	-1.0	0.0	2.0	5.0	8.0	14.0	19.0
CASE-2	0.0	-3.0	-3.0	-2.0	0.0	3.0	8.0	13.0	1.0	-1.0	-1.0	1.0	3.0	6.0	12.0	18.0
CASE-3	-1.0	-2.0	-1.0	0.0	0.0	1.0	3.0	6.0	-1.0	0.0	1.0	2.0	3.0	5.0	8.0	11.0
SRGEV																
CASE-1	-1.0	0.0	0.0	2.0	3.0	4.0	6.0	8.0	0.0	0.0	1.0	2.0	3.0	5.0	6.0	8.0
CASE-2	0.0	-1.0	-1.0	0.0	1.0	2.0	3.0	4.0	0.0	0.0	0.0	1.0	1.0	2.0	4.0	5.0
CASE-3	-2.0	0.0	1.0	2.0	1.0	0.0	-1.0	-2.0	-1.0	1.0	2.0	2.0	2.0	1.0	-1.0	-2.0
RGEV																
CASE-1	423.0	425.0	429.0	435.0	440.0	446.0	455.0	463.0	-49.0	-49.0	-48.0	-48.0	-47.0	-46.0	-45.0	-45.0
CASE-2	427.0	423.0	423.0	426.0	429.0	432.0	438.0	444.0	-49.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-46.0
CASE-3	417.0	429.0	434.0	434.0	430.0	424.0	416.0	409.0	-50.0	-48.0	-48.0	-48.0	-48.0	-49.0	-49.0	-50.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	0.0	-1.0	0.0	1.0	2.0	4.0	7.0	9.0	0.0	0.0	0.0	2.0	3.0	4.0	7.0	9.0
CASE-2	0.0	-1.0	-1.0	-1.0	-1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
CASE-3	-2.0	0.0	0.0	-2.0	-4.0	-5.0	-5.0	-4.0	-1.0	1.0	0.0	-2.0	-3.0	-4.0	-5.0	-4.0
RWAKE																
CASE-1	425.0	421.0	423.0	429.0	434.0	442.0	455.0	468.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-46.0	-45.0
CASE-2	429.0	424.0	423.0	422.0	421.0	422.0	424.0	428.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-48.0	-48.0
CASE-3	417.0	428.0	423.0	411.0	402.0	396.0	393.0	396.0	-50.0	-49.0	-49.0	-50.0	-51.0	-51.0	-52.0	-51.0

TABLE 14 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 5									
EV1																
CASE-1	2.0	-1.0	-1.0	-1.0	-2.0	-2.0	-2.0	-2.0	0.0	-4.0	-4.0	-5.0	-5.0	-5.0	-5.0	-5.0
CASE-2	6.0	0.0	-3.0	-6.0	-9.0	-12.0	-15.0	-18.0	4.0	-4.0	-6.0	-10.0	-13.0	-15.0	-19.0	-21.0
CASE-3	3.0	1.0	-1.0	-5.0	-9.0	-13.0	-18.0	-23.0	2.0	-2.0	-4.0	-9.0	-12.0	-16.0	-22.0	-26.0
SREV1-I																
CASE-1	1.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	0.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
CASE-2	5.0	1.0	-2.0	-5.0	-8.0	-10.0	-14.0	-16.0	3.0	-1.0	-4.0	-7.0	-10.0	-12.0	-15.0	-18.0
CASE-3	3.0	2.0	0.0	-4.0	-8.0	-12.0	-18.0	-22.0	1.0	0.0	-2.0	-6.0	-10.0	-14.0	-19.0	-23.0
REV1-I																
CASE-1	429.0	420.0	419.0	418.0	417.0	417.0	416.0	416.0	-48.0	-49.0	-49.0	-49.0	-50.0	-50.0	-50.0	-50.0
CASE-2	449.0	423.0	410.0	392.0	379.0	365.0	348.0	335.0	-47.0	-49.0	-50.0	-52.0	-53.0	-55.0	-56.0	-58.0
CASE-3	438.0	429.0	420.0	399.0	379.0	358.0	328.0	306.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
SREV1-II																
CASE-1	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	5.0	1.0	-2.0	-5.0	-8.0	-10.0	-14.0	-16.0	3.0	-1.0	-4.0	-7.0	-9.0	-12.0	-15.0	-18.0
CASE-3	3.0	2.0	0.0	-4.0	-7.0	-11.0	-17.0	-21.0	1.0	0.0	-1.0	-5.0	-9.0	-13.0	-19.0	-23.0
REV1-II																
CASE-1	429.0	425.0	425.0	424.0	424.0	424.0	424.0	424.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-2	449.0	425.0	412.0	394.0	380.0	367.0	349.0	336.0	-47.0	-49.0	-50.0	-52.0	-53.0	-54.0	-56.0	-57.0
CASE-3	438.0	432.0	423.0	402.0	382.0	361.0	331.0	309.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
GEV																
CASE-1	-1.0	-3.0	-1.0	3.0	8.0	13.0	24.0	34.0	0.0	-6.0	-5.0	-3.0	0.0	5.0	13.0	21.0
CASE-2	2.0	-3.0	-2.0	0.0	3.0	8.0	17.0	25.0	2.0	-6.0	-7.0	-6.0	-4.0	-1.0	5.0	12.0
CASE-3	0.0	-1.0	0.0	2.0	4.0	6.0	12.0	18.0	0.0	-5.0	-5.0	-5.0	-4.0	-3.0	0.0	4.0
SRGEV																
CASE-1	0.0	0.0	1.0	2.0	3.0	5.0	6.0	8.0	-1.0	-1.0	0.0	1.0	2.0	3.0	5.0	6.0
CASE-2	1.0	0.0	0.0	1.0	2.0	2.0	4.0	5.0	-1.0	-2.0	-2.0	-1.0	0.0	0.0	2.0	3.0
CASE-3	-1.0	2.0	3.0	2.0	2.0	1.0	-1.0	-2.0	-3.0	0.0	1.0	1.0	0.0	-1.0	-3.0	-4.0
RGEV																
CASE-1	423.0	424.0	428.0	434.0	439.0	445.0	454.0	462.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-46.0	-46.0
CASE-2	428.0	422.0	423.0	425.0	428.0	432.0	438.0	444.0	-49.0	-49.0	-49.0	-49.0	-49.0	-48.0	-48.0	-48.0
CASE-3	417.0	429.0	434.0	433.0	429.0	424.0	415.0	408.0	-50.0	-48.0	-48.0	-48.0	-49.0	-49.0	-50.0	-51.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	1.0	0.0	1.0	2.0	3.0	4.0	7.0	9.0	-1.0	-1.0	-1.0	0.0	1.0	3.0	5.0	7.0
CASE-2	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0	-1.0	-1.0
CASE-3	-1.0	1.0	1.0	-1.0	-3.0	-4.0	-4.0	-3.0	-2.0	0.0	-1.0	-3.0	-5.0	-6.0	-6.0	-5.0
RWAKE																
CASE-1	428.0	422.0	425.0	430.0	436.0	443.0	455.0	467.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-46.0	-45.0
CASE-2	428.0	422.0	421.0	420.0	420.0	420.0	422.0	425.0	-49.0	-49.0	-49.0	-50.0	-50.0	-50.0	-50.0	-50.0
CASE-3	419.0	428.0	423.0	413.0	406.0	401.0	401.0	407.0	-50.0	-49.0	-49.0	-50.0	-51.0	-52.0	-52.0	-51.0

TABLE 15 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 10									
EV1																
CASE-1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-2.0
CASE-2	5.0	0.0	-2.0	-5.0	-8.0	-11.0	-14.0	-16.0	4.0	-1.0	-3.0	-7.0	-9.0	-12.0	-15.0	-17.0
CASE-3	3.0	2.0	0.0	-4.0	-8.0	-12.0	-17.0	-22.0	2.0	1.0	-1.0	-5.0	-9.0	-13.0	-18.0	-23.0
SREV1-I																
CASE-1	1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-2.0	-2.0
CASE-2	5.0	0.0	-2.0	-6.0	-8.0	-11.0	-14.0	-17.0	4.0	0.0	-3.0	-6.0	-9.0	-11.0	-15.0	-17.0
CASE-3	3.0	1.0	0.0	-4.0	-8.0	-12.0	-18.0	-22.0	2.0	1.0	-1.0	-5.0	-9.0	-13.0	-18.0	-23.0
REV1-I																
CASE-1	429.0	422.0	421.0	420.0	420.0	419.0	419.0	419.0	-49.0	-49.0	-49.0	-49.0	-49.0	-50.0	-50.0	-50.0
CASE-2	448.0	424.0	411.0	394.0	380.0	367.0	349.0	336.0	-47.0	-49.0	-50.0	-52.0	-53.0	-55.0	-56.0	-58.0
CASE-3	438.0	430.0	420.0	399.0	380.0	358.0	329.0	307.0	-48.0	-49.0	-49.0	-51.0	-53.0	-55.0	-58.0	-61.0
SREV1-II																
CASE-1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-1.0
CASE-2	5.0	0.0	-2.0	-5.0	-8.0	-11.0	-14.0	-16.0	4.0	0.0	-3.0	-6.0	-9.0	-11.0	-15.0	-17.0
CASE-3	3.0	2.0	0.0	-4.0	-8.0	-12.0	-17.0	-22.0	2.0	1.0	-1.0	-5.0	-8.0	-12.0	-18.0	-22.0
REV1-II																
CASE-1	428.0	426.0	425.0	425.0	425.0	425.0	425.0	424.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-2	449.0	425.0	412.0	394.0	381.0	367.0	350.0	337.0	-47.0	-49.0	-50.0	-52.0	-53.0	-55.0	-56.0	-58.0
CASE-3	438.0	432.0	423.0	402.0	382.0	361.0	331.0	309.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
GEV																
CASE-1	0.0	-1.0	0.0	3.0	6.0	10.0	18.0	24.0	-1.0	-2.0	-1.0	2.0	5.0	9.0	16.0	23.0
CASE-2	1.0	-2.0	-1.0	1.0	4.0	8.0	15.0	22.0	0.0	-3.0	-2.0	0.0	3.0	6.0	13.0	21.0
CASE-3	-1.0	0.0	1.0	3.0	4.0	7.0	11.0	15.0	-2.0	-1.0	0.0	1.0	3.0	5.0	9.0	13.0
SRGEV																
CASE-1	0.0	0.0	1.0	2.0	3.0	4.0	6.0	8.0	-1.0	-1.0	0.0	1.0	2.0	4.0	5.0	7.0
CASE-2	1.0	0.0	0.0	1.0	1.0	2.0	3.0	4.0	0.0	-1.0	-1.0	0.0	0.0	1.0	2.0	4.0
CASE-3	-1.0	1.0	2.0	2.0	2.0	1.0	-1.0	-2.0	-2.0	1.0	1.0	1.0	1.0	0.0	-2.0	-3.0
RGEV																
CASE-1	424.0	425.0	428.0	433.0	438.0	444.0	453.0	460.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-46.0	-45.0
CASE-2	428.0	422.0	423.0	425.0	427.0	430.0	436.0	442.0	-49.0	-49.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0
CASE-3	418.0	429.0	433.0	432.0	428.0	423.0	414.0	407.0	-50.0	-49.0	-48.0	-48.0	-49.0	-49.0	-50.0	-51.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	1.0	0.0	0.0	1.0	3.0	4.0	7.0	9.0	0.0	-1.0	0.0	1.0	2.0	3.0	6.0	9.0
CASE-2	1.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0	1.0
CASE-3	-1.0	1.0	0.0	-2.0	-3.0	-4.0	-4.0	-3.0	-1.0	0.0	0.0	-2.0	-4.0	-5.0	-5.0	-4.0
RWAKE																
CASE-1	429.0	423.0	425.0	431.0	436.0	444.0	457.0	471.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-46.0	-45.0
CASE-2	430.0	423.0	422.0	421.0	421.0	421.0	425.0	430.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-3	420.0	428.0	423.0	412.0	404.0	399.0	397.0	402.0	-49.0	-49.0	-49.0	-50.0	-51.0	-51.0	-51.0	-51.0

TABLE 17 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 20									
EV1																
CASE-1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	5.0	1.0	-2.0	-5.0	-8.0	-10.0	-14.0	-16.0	4.0	0.0	-3.0	-6.0	-9.0	-11.0	-14.0	-17.0
CASE-3	3.0	2.0	1.0	-3.0	-7.0	-11.0	-17.0	-21.0	2.0	1.0	-1.0	-5.0	-8.0	-12.0	-18.0	-22.0
SREV1-I																
CASE-1	1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-2.0	-2.0	-2.0	-2.0
CASE-2	5.0	0.0	-2.0	-6.0	-8.0	-11.0	-14.0	-17.0	4.0	-1.0	-3.0	-6.0	-9.0	-11.0	-15.0	-17.0
CASE-3	3.0	1.0	0.0	-4.0	-8.0	-12.0	-18.0	-22.0	2.0	1.0	-1.0	-5.0	-9.0	-13.0	-19.0	-23.0
REV1-I																
CASE-1	429.0	423.0	422.0	422.0	421.0	421.0	421.0	420.0	-49.0	-49.0	-49.0	-49.0	-50.0	-50.0	-50.0	-50.0
CASE-2	448.0	425.0	412.0	395.0	382.0	368.0	351.0	338.0	-47.0	-49.0	-50.0	-52.0	-53.0	-55.0	-56.0	-58.0
CASE-3	437.0	431.0	422.0	401.0	381.0	360.0	330.0	308.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
SREV1-II																
CASE-1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	5.0	0.0	-2.0	-6.0	-8.0	-11.0	-14.0	-17.0	4.0	-1.0	-3.0	-6.0	-9.0	-11.0	-15.0	-17.0
CASE-3	3.0	2.0	0.0	-4.0	-8.0	-12.0	-17.0	-22.0	2.0	1.0	-1.0	-5.0	-9.0	-13.0	-18.0	-22.0
REV1-II																
CASE-1	428.0	426.0	426.0	425.0	425.0	425.0	425.0	423.0	49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-2	448.0	425.0	412.0	395.0	381.0	368.0	350.0	337.0	-47.0	-49.0	-50.0	-52.0	-53.0	-55.0	-56.0	-58.0
CASE-3	437.0	432.0	423.0	403.0	383.0	362.0	332.0	310.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
GEV																
CASE-1	0.0	-1.0	0.0	3.0	5.0	8.0	13.0	17.0	-1.0	-1.0	-1.0	1.0	3.0	5.0	9.0	13.0
CASE-2	0.0	-1.0	0.0	2.0	4.0	7.0	13.0	18.0	0.0	-2.0	-1.0	0.0	2.0	4.0	8.0	12.0
CASE-3	-2.0	1.0	2.0	4.0	5.0	6.0	8.0	11.0	-2.0	0.0	1.0	1.0	2.0	2.0	4.0	5.0
SRGEV																
CASE-1	0.0	0.0	1.0	2.0	3.0	4.0	6.0	7.0	-1.0	-1.0	0.0	1.0	2.0	3.0	5.0	7.0
CASE-2	1.0	0.0	0.0	0.0	1.0	2.0	3.0	4.0	0.0	-1.0	-1.0	0.0	0.0	1.0	2.0	3.0
CASE-3	-1.0	1.0	2.0	2.0	1.0	0.0	-1.0	-3.0	-2.0	0.0	1.0	1.0	0.0	-1.0	-2.0	-4.0
RGEV																
CASE-1	422.0	425.0	429.0	436.0	442.0	449.0	459.0	467.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-46.0	-46.0
CASE-2	426.0	423.0	424.0	427.0	431.0	435.0	442.0	449.0	-49.0	-49.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0
CASE-3	416.0	429.0	435.0	435.0	432.0	428.0	420.0	414.0	-50.0	-49.0	-48.0	-48.0	-49.0	-49.0	-50.0	-51.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	1.0	0.0	0.0	1.0	3.0	4.0	7.0	10.0	0.0	-1.0	0.0	1.0	2.0	3.0	6.0	9.0
CASE-2	1.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0	1.0
CASE-3	-1.0	1.0	0.0	-2.0	-4.0	-4.0	-5.0	-3.0	-2.0	0.0	-1.0	-3.0	-4.0	-5.0	-5.0	-4.0
RWAKE																
CASE-1	427.0	423.0	427.0	433.0	440.0	448.0	462.0	476.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-46.0	-45.0
CASE-2	428.0	424.0	424.0	424.0	425.0	426.0	429.0	433.0	-48.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-3	418.0	429.0	425.0	415.0	407.0	401.0	399.0	404.0	-50.0	-49.0	-49.0	-50.0	-51.0	-52.0	-52.0	-51.0

TABLE 18 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 30									
EV1																
CASE-1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	4.0	0.0	-2.0	-6.0	-8.0	-11.0	-14.0	-16.0	4.0	0.0	-3.0	-6.0	-9.0	-11.0	-14.0	-17.0
CASE-3	2.0	2.0	0.0	-4.0	-8.0	-12.0	-17.0	-22.0	2.0	1.0	0.0	-4.0	-8.0	-12.0	-18.0	-22.0
SREV1-I																
CASE-1	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-2.0	0.0	-1.0	-1.0	-2.0	-2.0	-2.0	-2.0	-2.0
CASE-2	4.0	0.0	-3.0	-6.0	-9.0	-11.0	-15.0	-17.0	4.0	-1.0	-3.0	-6.0	-9.0	-12.0	-15.0	-17.0
CASE-3	2.0	1.0	-1.0	-5.0	-9.0	-13.0	-18.0	-23.0	2.0	1.0	-1.0	-5.0	-9.0	-13.0	-19.0	-23.0
REV1-I																
CASE-1	429.0	422.0	420.0	420.0	419.0	419.0	418.0	418.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-50.0	-50.0
CASE-2	448.0	424.0	411.0	394.0	380.0	367.0	349.0	336.0	-47.0	-49.0	-50.0	-52.0	-53.0	-55.0	-56.0	-57.0
CASE-3	438.0	430.0	420.0	399.0	379.0	358.0	329.0	306.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
SREV1-II																
CASE-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-1.0	-1.0
CASE-2	4.0	0.0	-3.0	-6.0	-8.0	-11.0	-14.0	-17.0	4.0	0.0	-3.0	-6.0	-9.0	-11.0	-15.0	-17.0
CASE-3	2.0	1.0	0.0	-4.0	-8.0	-12.0	-18.0	-22.0	2.0	1.0	-1.0	-5.0	-8.0	-12.0	-18.0	-22.0
REV1-II																
CASE-1	429.0	426.0	425.0	425.0	425.0	425.0	424.0	424.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-2	449.0	425.0	412.0	394.0	381.0	367.0	350.0	337.0	-47.0	-49.0	-50.0	-52.0	-53.0	-54.0	-56.0	-57.0
CASE-3	438.0	432.0	423.0	402.0	383.0	361.0	332.0	309.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
GEV																
CASE-1	0.0	-1.0	0.0	1.0	3.0	5.0	7.0	10.0	0.0	-1.0	0.0	1.0	2.0	4.0	7.0	10.0
CASE-2	0.0	-1.0	-1.0	1.0	2.0	4.0	7.0	10.0	0.0	-1.0	-1.0	0.0	1.0	3.0	6.0	10.0
CASE-3	-1.0	0.0	2.0	2.0	2.0	2.0	3.0	3.0	-2.0	0.0	1.0	2.0	2.0	2.0	2.0	3.0
SRGEV																
CASE-1	-1.0	0.0	1.0	2.0	3.0	4.0	6.0	7.0	-1.0	-1.0	0.0	1.0	2.0	4.0	5.0	7.0
CASE-2	0.0	-1.0	0.0	0.0	1.0	1.0	3.0	4.0	0.0	-1.0	-1.0	0.0	0.0	1.0	2.0	3.0
CASE-3	-2.0	1.0	2.0	2.0	1.0	0.0	-2.0	-3.0	-2.0	0.0	1.0	1.0	1.0	0.0	-2.0	-3.0
RGEV																
CASE-1	423.0	425.0	428.0	434.0	440.0	446.0	455.0	463.0	-49.0	-49.0	-48.0	-48.0	-47.0	-47.0	-46.0	-45.0
CASE-2	427.0	422.0	423.0	426.0	429.0	433.0	439.0	444.0	-49.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-47.0
CASE-3	417.0	429.0	434.0	434.0	430.0	424.0	416.0	409.0	-50.0	-48.0	-48.0	-48.0	-48.0	-49.0	-50.0	-50.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	0.0	0.0	0.0	1.0	2.0	4.0	6.0	8.0	0.0	-1.0	0.0	1.0	2.0	3.0	5.0	8.0
CASE-2	1.0	0.0	0.0	-1.0	-1.0	-1.0	0.0	1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
CASE-3	-2.0	0.0	-1.0	-3.0	-4.0	-5.0	-6.0	-5.0	-2.0	0.0	-1.0	-3.0	-4.0	-5.0	-6.0	-5.0
RWAKE																
CASE-1	428.0	423.0	426.0	432.0	438.0	446.0	460.0	474.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-46.0	-45.0
CASE-2	430.0	424.0	423.0	423.0	423.0	424.0	427.0	432.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-3	416.0	424.0	420.0	411.0	404.0	400.0	400.0	405.0	-50.0	-49.0	-49.0	-50.0	-51.0	-51.0	-52.0	-51.0

TABLE 19 : PERCENTAGE BIAS OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 40									
EV1																
CASE-1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	5.0	1.0	-2.0	-5.0	-8.0	-10.0	-14.0	-16.0	4.0	0.0	-2.0	-6.0	-8.0	-11.0	-14.0	-16.0
CASE-3	3.0	2.0	0.0	-4.0	-7.0	-11.0	-17.0	-21.0	2.0	2.0	0.0	-4.0	-8.0	-12.0	-17.0	-22.0
SREV1-I																
CASE-1	1.0	0.0	0.0	0.0	-1.0	-1.0	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
CASE-2	5.0	0.0	-2.0	-5.0	-8.0	-10.0	-14.0	-16.0	4.0	0.0	-3.0	-6.0	-9.0	-11.0	-14.0	-17.0
CASE-3	3.0	2.0	0.0	-4.0	-8.0	-12.0	-18.0	-22.0	2.0	1.0	-1.0	-5.0	-9.0	-13.0	-18.0	-22.0
REV1-I																
CASE-1	429.0	424.0	423.0	423.0	422.0	422.0	422.0	422.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-2	448.0	427.0	414.0	396.0	383.0	370.0	352.0	339.0	-47.0	-49.0	-50.0	-52.0	-53.0	-54.0	-56.0	-57.0
CASE-3	437.0	432.0	423.0	403.0	383.0	362.0	332.0	310.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
SREV1-II																
CASE-1	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE-2	5.0	0.0	-2.0	-5.0	-8.0	-10.0	-14.0	-16.0	4.0	0.0	-3.0	-6.0	-9.0	-11.0	-14.0	-17.0
CASE-3	3.0	2.0	0.0	-4.0	-8.0	-12.0	-17.0	-22.0	2.0	1.0	-1.0	-5.0	-8.0	-12.0	-18.0	-22.0
REV1-II																
CASE-1	428.0	427.0	427.0	427.0	427.0	427.0	427.0	427.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0
CASE-2	448.0	427.0	414.0	396.0	383.0	370.0	352.0	339.0	-47.0	-49.0	-50.0	-52.0	-53.0	-54.0	-56.0	-57.0
CASE-3	437.0	434.0	425.0	404.0	385.0	363.0	334.0	311.0	-48.0	-48.0	-49.0	-51.0	-53.0	-55.0	-58.0	-60.0
GEV																
CASE-1	0.0	0.0	0.0	1.0	2.0	3.0	5.0	7.0	-1.0	-1.0	0.0	1.0	3.0	4.0	7.0	9.0
CASE-2	1.0	0.0	0.0	1.0	2.0	3.0	5.0	8.0	0.0	-1.0	0.0	1.0	2.0	4.0	7.0	9.0
CASE-3	-1.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0	-2.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0
SRGEV																
CASE-1	0.0	0.0	1.0	2.0	3.0	5.0	6.0	8.0	-1.0	0.0	0.0	2.0	3.0	4.0	6.0	7.0
CASE-2	1.0	0.0	0.0	1.0	1.0	2.0	3.0	4.0	0.0	-1.0	-1.0	0.0	1.0	1.0	3.0	4.0
CASE-3	-1.0	1.0	2.0	2.0	2.0	1.0	-1.0	-2.0	-2.0	1.0	2.0	2.0	1.0	0.0	-2.0	-3.0
RGEV																
CASE-1	422.0	426.0	431.0	438.0	444.0	451.0	462.0	470.0	-49.0	-49.0	-48.0	-48.0	-47.0	-47.0	-46.0	-45.0
CASE-2	426.0	424.0	426.0	429.0	433.0	438.0	445.0	452.0	-49.0	-49.0	-49.0	-49.0	-48.0	-48.0	-47.0	-47.0
CASE-3	415.0	431.0	437.0	437.0	434.0	430.0	422.0	416.0	-50.0	-48.0	-48.0	-48.0	-48.0	-49.0	-49.0	-50.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	1.0	0.0	1.0	2.0	3.0	4.0	7.0	10.0	0.0	-1.0	0.0	1.0	2.0	4.0	6.0	9.0
CASE-2	1.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0	1.0
CASE-3	-1.0	1.0	0.0	-2.0	-3.0	-4.0	-5.0	-4.0	-2.0	0.0	-1.0	-2.0	-4.0	-5.0	-5.0	-4.0
RWAKE																
CASE-1	425.0	424.0	428.0	435.0	440.0	448.0	461.0	474.0	-49.0	-49.0	-49.0	-48.0	-47.0	-47.0	-45.0	-44.0
CASE-2	427.0	426.0	426.0	426.0	426.0	426.0	429.0	433.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-49.0	-48.0
CASE-3	416.0	430.0	426.0	417.0	409.0	402.0	399.0	401.0	-50.0	-48.0	-49.0	-50.0	-51.0	-51.0	-51.0	-50.0

ABLE 20 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 1									
EV1																
CASE-1	62.0	58.0	58.0	57.0	57.0	57.0	57.0	57.0	59.0	55.0	55.0	55.0	54.0	54.0	54.0	54.0
CASE-2	64.0	59.0	58.0	57.0	57.0	57.0	56.0	56.0	60.0	56.0	55.0	55.0	54.0	54.0	53.0	53.0
CASE-3	63.0	59.0	58.0	57.0	56.0	56.0	56.0	56.0	59.0	56.0	55.0	54.0	54.0	54.0	54.0	54.0
SREV1-I																
CASE-1	62.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0
CASE-2	63.0	62.0	62.0	61.0	61.0	61.0	60.0	60.0	59.0	58.0	58.0	58.0	57.0	57.0	57.0	56.0
CASE-3	62.0	62.0	61.0	61.0	60.0	60.0	60.0	60.0	59.0	58.0	58.0	57.0	57.0	57.0	57.0	57.0
REV1-I																
CASE-1	1280.0	1259.0	1255.0	1253.0	1251.0	1250.0	1249.0	1248.0	97.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
CASE-2	1299.0	1268.0	1258.0	1245.0	1235.0	1226.0	1214.0	1205.0	98.0	97.0	96.0	96.0	95.0	95.0	94.0	94.0
CASE-3	1284.0	1260.0	1240.0	1222.0	1214.0	1210.0	1209.0	1211.0	97.0	96.0	95.0	95.0	94.0	94.0	94.0	94.0
SREV1-II																
CASE-1	62.0	61.0	61.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0
CASE-2	63.0	62.0	62.0	61.0	61.0	61.0	60.0	60.0	59.0	58.0	58.0	58.0	58.0	57.0	57.0	57.0
CASE-3	62.0	62.0	61.0	61.0	60.0	60.0	60.0	60.0	59.0	58.0	58.0	57.0	57.0	57.0	57.0	57.0
REV1-II																
CASE-1	1277.0	1273.0	1273.0	1272.0	1272.0	1272.0	1272.0	1272.0	97.0	97.0	97.0	97.0	98.0	98.0	98.0	98.0
CASE-2	1297.0	1281.0	1273.0	1262.0	1253.0	1244.0	1233.0	1224.0	98.0	98.0	97.0	97.0	97.0	96.0	96.0	95.0
CASE-3	1283.0	1271.0	1252.0	1236.0	1229.0	1226.0	1225.0	1227.0	97.0	97.0	96.0	96.0	95.0	95.0	95.0	95.0
GEV																
CASE-1	103.0	52.0	53.0	58.0	61.0	64.0	68.0	70.0	96.0	51.0	54.0	59.0	62.0	65.0	69.0	71.0
CASE-2	106.0	52.0	54.0	58.0	62.0	65.0	69.0	71.0	97.0	52.0	54.0	59.0	63.0	66.0	70.0	72.0
CASE-3	105.0	52.0	54.0	59.0	62.0	65.0	69.0	71.0	97.0	52.0	54.0	60.0	63.0	66.0	70.0	72.0
SRGEV																
CASE-1	61.0	61.0	62.0	63.0	64.0	65.0	67.0	69.0	58.0	58.0	58.0	59.0	60.0	61.0	63.0	65.0
CASE-2	62.0	62.0	63.0	64.0	65.0	66.0	68.0	69.0	58.0	58.0	59.0	60.0	60.0	62.0	63.0	65.0
CASE-3	62.0	62.0	62.0	63.0	64.0	65.0	68.0	70.0	58.0	58.0	58.0	59.0	60.0	61.0	64.0	66.0
RGEV																
CASE-1	1268.0	1272.0	1279.0	1293.0	1305.0	1320.0	1342.0	1361.0	96.0	97.0	98.0	99.0	100.0	101.0	103.0	104.0
CASE-2	1278.0	1278.0	1285.0	1296.0	1307.0	1321.0	1341.0	1359.0	96.0	98.0	98.0	99.0	100.0	101.0	103.0	104.0
CASE-3	1263.0	1268.0	1265.0	1272.0	1286.0	1305.0	1339.0	1370.0	96.0	97.0	97.0	98.0	99.0	100.0	102.0	104.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	62.0	61.0	62.0	63.0	64.0	65.0	67.0	69.0	58.0	58.0	59.0	59.0	60.0	61.0	63.0	65.0
CASE-2	62.0	62.0	63.0	64.0	65.0	65.0	67.0	69.0	58.0	58.0	59.0	60.0	60.0	61.0	63.0	65.0
CASE-3	62.0	62.0	62.0	63.0	64.0	66.0	70.0	73.0	58.0	58.0	58.0	59.0	60.0	62.0	65.0	69.0
RWAKE																
CASE-1	1278.0	1270.0	1283.0	1299.0	1311.0	1324.0	1344.0	1363.0	97.0	97.0	98.0	100.0	101.0	102.0	104.0	105.0
CASE-2	1287.0	1279.0	1290.0	1301.0	1310.0	1318.0	1333.0	1348.0	97.0	97.0	98.0	100.0	101.0	102.0	103.0	105.0
CASE-3	1277.0	1262.0	1265.0	1282.0	1301.0	1327.0	1372.0	1414.0	97.0	96.0	97.0	99.0	100.0	102.0	106.0	109.0

TABLE 21 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50)								TEST CATCHMENT -2 (BRIDGE NO.- 232)							
	2	10	20	50	100	200	500	1000	2	10	20	50	100	200	500	1000
	SAMPLE SIZE= 5															
EV1																
CASE-1	29.0	30.0	31.0	32.0	33.0	33.0	34.0	34.0	29.0	30.0	31.0	32.0	33.0	33.0	34.0	34.0
CASE-2	29.0	31.0	32.0	33.0	33.0	34.0	34.0	34.0	30.0	31.0	32.0	33.0	33.0	34.0	34.0	35.0
CASE-3	29.0	31.0	32.0	33.0	33.0	34.0	34.0	35.0	30.0	31.0	32.0	33.0	33.0	34.0	34.0	35.0
SREV1-I																
CASE-1	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
CASE-2	29.0	29.0	29.0	28.0	28.0	28.0	28.0	28.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
CASE-3	29.0	29.0	28.0	28.0	28.0	28.0	28.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
REV1-I																
CASE-1	1279.0	1263.0	1261.0	1259.0	1258.0	1257.0	1256.0	1256.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0
CASE-2	1298.0	1272.0	1263.0	1251.0	1241.0	1232.0	1220.0	1212.0	98.0	97.0	97.0	96.0	96.0	96.0	95.0	95.0
CASE-3	1283.0	1264.0	1245.0	1228.0	1220.0	1217.0	1219.0	1218.0	97.0	97.0	96.0	95.0	95.0	94.0	94.0	95.0
SREV1-II																
CASE-1	28.0	28.0	28.0	28.0	28.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
CASE-2	29.0	29.0	29.0	29.0	28.0	28.0	28.0	28.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
CASE-3	29.0	29.0	28.0	28.0	28.0	28.0	28.0	28.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
REV1-II																
CASE-1	1277.0	1274.0	1273.0	1273.0	1273.0	1272.0	1272.0	1272.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0
CASE-2	1297.0	1281.0	1273.0	1262.0	1253.0	1245.0	1233.0	1224.0	98.0	97.0	97.0	96.0	96.0	95.0	95.0	94.0
CASE-3	1283.0	1270.0	1251.0	1235.0	1228.0	1225.0	1225.0	1227.0	97.0	97.0	96.0	95.0	94.0	94.0	94.0	94.0
GEV																
CASE-1	30.0	29.0	33.0	41.0	51.0	64.0	86.0	110.0	31.0	29.0	33.0	42.0	52.0	66.0	90.0	116.0
CASE-2	30.0	30.0	34.0	43.0	52.0	65.0	88.0	112.0	31.0	30.0	34.0	44.0	54.0	68.0	93.0	119.0
CASE-3	30.0	30.0	34.0	43.0	52.0	65.0	89.0	114.0	31.0	30.0	34.0	43.0	54.0	67.0	93.0	120.0
SRGEV																
CASE-1	28.0	28.0	29.0	30.0	31.0	32.0	34.0	35.0	29.0	29.0	29.0	30.0	31.0	32.0	34.0	35.0
CASE-2	28.0	29.0	29.0	30.0	31.0	32.0	34.0	36.0	29.0	29.0	30.0	30.0	31.0	32.0	34.0	35.0
CASE-3	28.0	29.0	29.0	30.0	31.0	32.0	34.0	36.0	29.0	29.0	29.0	30.0	31.0	32.0	34.0	36.0
RGEV																
CASE-1	1268.0	1272.0	1279.0	1291.0	1303.0	1316.0	1337.0	1354.0	97.0	97.0	97.0	97.0	98.0	98.0	99.0	100.0
CASE-2	1279.0	1279.0	1284.0	1294.0	1304.0	1316.0	1335.0	1352.0	97.0	97.0	97.0	98.0	98.0	99.0	99.0	100.0
CASE-3	1264.0	1268.0	1264.0	1270.0	1283.0	1302.0	1334.0	1364.0	96.0	96.0	96.0	96.0	97.0	98.0	99.0	101.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	28.0	28.0	29.0	30.0	31.0	32.0	34.0	37.0	29.0	29.0	29.0	30.0	31.0	32.0	35.0	37.0
CASE-2	29.0	29.0	29.0	30.0	31.0	32.0	34.0	37.0	29.0	29.0	30.0	30.0	31.0	32.0	35.0	37.0
CASE-3	29.0	29.0	29.0	30.0	31.0	33.0	36.0	40.0	29.0	29.0	29.0	30.0	31.0	33.0	36.0	40.0
RWAKE																
CASE-1	1276.0	1274.0	1284.0	1294.0	1302.0	1311.0	1327.0	1343.0	97.0	96.0	97.0	98.0	100.0	101.0	103.0	104.0
CASE-2	1285.0	1282.0	1290.0	1296.0	1300.0	1305.0	1316.0	1329.0	98.0	97.0	97.0	99.0	100.0	101.0	102.0	104.0
CASE-3	1275.0	1265.0	1266.0	1277.0	1293.0	1315.0	1354.0	1393.0	97.0	96.0	96.0	98.0	99.0	101.0	105.0	108.0

TABLE 22 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
	SAMPLE SIZE= 10															
EV1																
CASE-1	21.0	22.0	22.0	23.0	24.0	24.0	24.0	25.0	20.0	21.0	22.0	23.0	24.0	24.0	25.0	25.0
CASE-2	22.0	23.0	23.0	24.0	24.0	24.0	25.0	25.0	20.0	22.0	23.0	24.0	24.0	25.0	25.0	25.0
CASE-3	22.0	23.0	23.0	24.0	24.0	24.0	25.0	25.0	20.0	22.0	23.0	24.0	24.0	25.0	25.0	25.0
SREV1-I																
CASE-1	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
CASE-2	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
CASE-3	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
REV1-I																
CASE-1	1278.0	1267.0	1265.0	1264.0	1263.0	1263.0	1262.0	1262.0	97.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
CASE-2	1297.0	1276.0	1268.0	1256.0	1247.0	1239.0	1227.0	1218.0	98.0	97.0	96.0	96.0	95.0	95.0	94.0	94.0
CASE-3	1282.0	1269.0	1251.0	1235.0	1228.0	1225.0	1224.0	1226.0	97.0	96.0	95.0	95.0	94.0	94.0	94.0	94.0
SREV1-II																
CASE-1	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
CASE-2	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
CASE-3	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
REV1-II																
CASE-1	1277.0	1276.0	1276.0	1276.0	1276.0	1276.0	1276.0	1276.0	97.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
CASE-2	1296.0	1283.0	1276.0	1265.0	1257.0	1249.0	1237.0	1229.0	98.0	97.0	96.0	96.0	95.0	95.0	94.0	94.0
CASE-3	1282.0	1274.0	1256.0	1240.0	1234.0	1231.0	1230.0	1233.0	97.0	96.0	95.0	95.0	94.0	94.0	94.0	94.0
GEV																
CASE-1	22.0	21.0	24.0	31.0	39.0	49.0	66.0	84.0	20.0	21.0	24.0	32.0	39.0	49.0	66.0	83.0
CASE-2	22.0	22.0	25.0	32.0	40.0	51.0	69.0	88.0	20.0	21.0	25.0	33.0	41.0	51.0	69.0	87.0
CASE-3	22.0	22.0	25.0	32.0	40.0	50.0	69.0	88.0	20.0	22.0	25.0	33.0	41.0	51.0	69.0	87.0
SRGEV																
CASE-1	21.0	21.0	21.0	22.0	23.0	24.0	26.0	28.0	19.0	20.0	20.0	21.0	22.0	24.0	26.0	28.0
CASE-2	21.0	21.0	22.0	22.0	23.0	25.0	27.0	28.0	20.0	20.0	21.0	22.0	23.0	24.0	26.0	28.0
CASE-3	21.0	21.0	21.0	22.0	23.0	24.0	27.0	29.0	20.0	20.0	20.0	21.0	22.0	24.0	26.0	29.0
RGEV																
CASE-1	1260.0	1274.0	1287.0	1308.0	1326.0	1347.0	1376.0	1402.0	97.0	96.0	97.0	97.0	98.0	98.0	99.0	100.0
CASE-2	1271.0	1281.0	1292.0	1311.0	1328.0	1347.0	1376.0	1400.0	97.0	97.0	97.0	97.0	98.0	98.0	99.0	100.0
CASE-3	1256.0	1271.0	1273.0	1286.0	1305.0	1330.0	1371.0	1407.0	97.0	96.0	96.0	96.0	97.0	97.0	99.0	101.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	21.0	21.0	22.0	22.0	23.0	25.0	27.0	30.0	20.0	20.0	20.0	21.0	22.0	24.0	26.0	29.0
CASE-2	22.0	21.0	22.0	22.0	23.0	25.0	27.0	29.0	20.0	20.0	21.0	21.0	22.0	24.0	26.0	29.0
CASE-3	22.0	21.0	21.0	22.0	23.0	25.0	29.0	33.0	20.0	20.0	20.0	21.0	22.0	24.0	28.0	32.0
RWAKE																
CASE-1	1265.0	1279.0	1294.0	1309.0	1319.0	1328.0	1343.0	1357.0	97.0	97.0	97.0	97.0	96.0	96.0	95.0	95.0
CASE-2	1274.0	1288.0	1300.0	1311.0	1318.0	1323.0	1333.0	1342.0	97.0	98.0	97.0	97.0	96.0	95.0	94.0	94.0
CASE-3	1265.0	1271.0	1276.0	1291.0	1308.0	1331.0	1369.0	1407.0	97.0	97.0	96.0	96.0	96.0	96.0	96.0	97.0

TABLE 23 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 13									
EV1																
CASE-1	18.0	18.0	19.0	20.0	20.0	21.0	21.0	21.0	18.0	19.0	20.0	21.0	21.0	22.0	22.0	22.0
CASE-2	18.0	19.0	20.0	20.0	20.0	21.0	21.0	21.0	18.0	20.0	20.0	21.0	22.0	22.0	22.0	23.0
CASE-3	18.0	19.0	20.0	20.0	21.0	21.0	21.0	22.0	18.0	20.0	21.0	21.0	22.0	22.0	23.0	23.0
SREV1-I																
CASE-1	17.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	19.0	19.0	19.0	19.0
CASE-2	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	19.0	19.0	19.0	19.0	19.0
CASE-3	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	19.0	19.0	19.0	19.0	19.0
REV1-I																
CASE-1	1281.0	1256.0	1252.0	1248.0	1247.0	1245.0	1244.0	1243.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0
CASE-2	1300.0	1265.0	1254.0	1241.0	1231.0	1222.0	1209.0	1200.0	98.0	97.0	97.0	96.0	96.0	95.0	95.0	95.0
CASE-3	1285.0	1257.0	1236.0	1218.0	1210.0	1206.0	1205.0	1206.0	97.0	97.0	96.0	95.0	95.0	95.0	95.0	95.0
SREV1-II																
CASE-1	17.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
CASE-2	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
CASE-3	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
REV1-II																
CASE-1	1278.0	1270.0	1269.0	1268.0	1267.0	1267.0	1266.0	1266.0	97.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0
CASE-2	1297.0	1278.0	1269.0	1257.0	1249.0	1240.0	1228.0	1219.0	98.0	98.0	98.0	97.0	97.0	97.0	96.0	96.0
CASE-3	1283.0	1268.0	1248.0	1232.0	1225.0	1221.0	1221.0	1222.0	97.0	98.0	97.0	96.0	96.0	96.0	96.0	96.0
GEV																
CASE-1	19.0	18.0	21.0	27.0	33.0	42.0	57.0	71.0	19.0	19.0	22.0	28.0	35.0	43.0	58.0	72.0
CASE-2	19.0	18.0	21.0	28.0	35.0	43.0	59.0	75.0	19.0	19.0	22.0	29.0	36.0	45.0	60.0	76.0
CASE-3	19.0	19.0	22.0	28.0	35.0	43.0	59.0	75.0	19.0	20.0	23.0	29.0	36.0	45.0	60.0	76.0
SRGEV																
CASE-1	17.0	18.0	18.0	19.0	20.0	21.0	24.0	26.0	18.0	18.0	18.0	19.0	20.0	22.0	24.0	26.0
CASE-2	18.0	18.0	18.0	19.0	20.0	21.0	24.0	26.0	18.0	18.0	19.0	20.0	21.0	22.0	24.0	26.0
CASE-3	18.0	18.0	18.0	19.0	20.0	21.0	24.0	27.0	18.0	18.0	19.0	19.0	20.0	22.0	25.0	27.0
RGEV																
CASE-1	1264.0	1268.0	1278.0	1294.0	1309.0	1325.0	1350.0	1371.0	96.0	98.0	98.0	99.0	100.0	100.0	102.0	103.0
CASE-2	1275.0	1275.0	1284.0	1298.0	1312.0	1327.0	1351.0	1371.0	97.0	98.0	98.0	99.0	100.0	101.0	102.0	103.0
CASE-3	1260.0	1265.0	1264.0	1274.0	1289.0	1311.0	1347.0	1380.0	96.0	97.0	97.0	98.0	99.0	100.0	102.0	104.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	18.0	18.0	18.0	19.0	20.0	22.0	25.0	28.0	18.0	18.0	19.0	20.0	21.0	22.0	25.0	28.0
CASE-2	18.0	18.0	18.0	19.0	20.0	22.0	25.0	28.0	18.0	18.0	19.0	20.0	21.0	22.0	25.0	28.0
CASE-3	18.0	18.0	18.0	19.0	20.0	22.0	26.0	31.0	18.0	18.0	19.0	20.0	21.0	23.0	27.0	31.0
RWAKE																
CASE-1	1276.0	1264.0	1282.0	1306.0	1325.0	1344.0	1372.0	1397.0	96.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0
CASE-2	1285.0	1273.0	1289.0	1309.0	1324.0	1340.0	1363.0	1384.0	97.0	99.0	99.0	98.0	98.0	97.0	97.0	97.0
CASE-3	1275.0	1255.0	1264.0	1289.0	1316.0	1349.0	1404.0	1453.0	96.0	98.0	98.0	98.0	98.0	98.0	99.0	101.0

TABLE 24 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 20									
EV1																
CASE-1	15.0	15.0	16.0	17.0	17.0	17.0	18.0	18.0	14.0	15.0	15.0	16.0	16.0	17.0	17.0	17.0
CASE-2	15.0	16.0	17.0	17.0	17.0	18.0	18.0	18.0	14.0	15.0	16.0	16.0	17.0	17.0	17.0	18.0
CASE-3	15.0	16.0	17.0	17.0	18.0	18.0	18.0	18.0	14.0	15.0	16.0	16.0	17.0	17.0	18.0	18.0
SREV1-I																
CASE-1	15.0	15.0	15.0	15.0	15.0	15.0	16.0	16.0	13.0	14.0	14.0	14.0	14.0	15.0	15.0	15.0
CASE-2	15.0	15.0	15.0	15.0	16.0	16.0	16.0	16.0	14.0	14.0	14.0	14.0	15.0	15.0	15.0	15.0
CASE-3	15.0	15.0	15.0	16.0	16.0	16.0	16.0	16.0	14.0	14.0	14.0	15.0	15.0	15.0	15.0	15.0
REV1-I																
CASE-1	1280.0	1260.0	1257.0	1255.0	1254.0	1253.0	1251.0	1251.0	97.0	96.0	95.0	95.0	95.0	95.0	95.0	95.0
CASE-2	1299.0	1269.0	1259.0	1247.0	1237.0	1228.0	1216.0	1207.0	98.0	96.0	95.0	95.0	94.0	94.0	93.0	93.0
CASE-3	1284.0	1260.0	1240.0	1223.0	1215.0	1211.0	1210.0	1212.0	97.0	96.0	95.0	94.0	93.0	93.0	93.0	93.0
SREV1-II																
CASE-1	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	13.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
CASE-2	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
CASE-3	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
REV1-II																
CASE-1	1277.0	1274.0	1274.0	1273.0	1273.0	1273.0	1273.0	1273.0	97.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
CASE-2	1296.0	1281.0	1273.0	1263.0	1254.0	1246.0	1234.0	1225.0	98.0	97.0	96.0	96.0	95.0	95.0	94.0	94.0
CASE-3	1283.0	1271.0	1252.0	1236.0	1229.0	1226.0	1226.0	1228.0	97.0	96.0	95.0	94.0	94.0	94.0	94.0	94.0
GEV																
CASE-1	16.0	15.0	18.0	23.0	28.0	34.0	44.0	54.0	14.0	14.0	17.0	22.0	27.0	33.0	43.0	53.0
CASE-2	16.0	16.0	18.0	23.0	29.0	35.0	46.0	56.0	15.0	15.0	17.0	23.0	28.0	34.0	45.0	55.0
CASE-3	16.0	16.0	18.0	23.0	29.0	35.0	46.0	57.0	14.0	15.0	18.0	23.0	28.0	34.0	45.0	56.0
SRGEV																
CASE-1	15.0	15.0	15.0	16.0	17.0	18.0	21.0	23.0	14.0	14.0	14.0	15.0	16.0	18.0	20.0	22.0
CASE-2	15.0	15.0	15.0	16.0	17.0	19.0	21.0	23.0	14.0	14.0	14.0	15.0	16.0	18.0	20.0	22.0
CASE-3	15.0	15.0	15.0	16.0	17.0	18.0	21.0	24.0	14.0	14.0	14.0	15.0	16.0	18.0	20.0	23.0
RGEV																
CASE-1	1264.0	1272.0	1282.0	1299.0	1314.0	1330.0	1355.0	1377.0	96.0	96.0	97.0	98.0	99.0	100.0	102.0	104.0
CASE-2	1275.0	1279.0	1288.0	1302.0	1316.0	1332.0	1356.0	1377.0	97.0	97.0	97.0	98.0	99.0	100.0	102.0	104.0
CASE-3	1259.0	1269.0	1267.0	1278.0	1294.0	1316.0	1354.0	1388.0	96.0	96.0	96.0	97.0	98.0	99.0	102.0	104.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.0	15.0	15.0	16.0	17.0	19.0	22.0	25.0	14.0	14.0	14.0	15.0	16.0	18.0	21.0	25.0
CASE-2	16.0	15.0	15.0	16.0	17.0	19.0	22.0	25.0	14.0	14.0	14.0	15.0	17.0	18.0	21.0	25.0
CASE-3	16.0	15.0	15.0	16.0	17.0	19.0	23.0	27.0	14.0	14.0	14.0	15.0	16.0	19.0	23.0	27.0
RWAKE																
CASE-1	1272.0	1273.0	1287.0	1304.0	1316.0	1329.0	1350.0	1369.0	96.0	97.0	97.0	98.0	99.0	99.0	100.0	101.0
CASE-2	1281.0	1281.0	1293.0	1306.0	1315.0	1325.0	1341.0	1356.0	97.0	97.0	98.0	99.0	99.0	99.0	100.0	100.0
CASE-3	1271.0	1263.0	1268.0	1286.0	1307.0	1334.0	1382.0	1427.0	96.0	96.0	97.0	98.0	98.0	100.0	102.0	104.0

TABLE 25 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	: TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 30									
EV1																
CASE-1	12.0	12.0	12.0	13.0	13.0	13.0	14.0	14.0	12.0	12.0	13.0	13.0	14.0	14.0	14.0	14.0
CASE-2	12.0	12.0	13.0	13.0	13.0	14.0	14.0	14.0	12.0	13.0	13.0	14.0	14.0	14.0	15.0	15.0
CASE-3	12.0	13.0	13.0	13.0	14.0	14.0	14.0	14.0	12.0	13.0	13.0	14.0	14.0	14.0	15.0	15.0
SREV1-I																
CASE-1	11.0	12.0	12.0	12.0	12.0	13.0	13.0	13.0	11.0	12.0	12.0	13.0	13.0	13.0	13.0	13.0
CASE-2	12.0	12.0	12.0	12.0	13.0	13.0	13.0	13.0	12.0	12.0	13.0	13.0	13.0	13.0	14.0	14.0
CASE-3	12.0	12.0	12.0	13.0	13.0	13.0	13.0	13.0	12.0	12.0	13.0	13.0	13.0	13.0	14.0	14.0
REV1-I																
CASE-1	1280.0	1260.0	1258.0	1255.0	1254.0	1253.0	1252.0	1251.0	97.0	96.0	96.0	96.0	96.0	95.0	95.0	95.0
CASE-2	1298.0	1270.0	1260.0	1248.0	1238.0	1229.0	1217.0	1208.0	98.0	96.0	96.0	95.0	95.0	94.0	94.0	93.0
CASE-3	1284.0	1262.0	1242.0	1225.0	1218.0	1214.0	1213.0	1215.0	97.0	96.0	95.0	94.0	94.0	94.0	94.0	94.0
SREV1-II																
CASE-1	11.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	11.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
CASE-2	12.0	12.0	12.0	12.0	12.0	12.0	12.0	13.0	12.0	12.0	12.0	12.0	12.0	12.0	13.0	13.0
CASE-3	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	13.0	13.0
REV1-II																
CASE-1	1278.0	1272.0	1271.0	1270.0	1270.0	1270.0	1269.0	1269.0	97.0	97.0	97.0	96.0	96.0	96.0	96.0	96.0
CASE-2	1297.0	1279.0	1271.0	1259.0	1251.0	1242.0	1231.0	1222.0	98.0	97.0	96.0	96.0	95.0	95.0	94.0	94.0
CASE-3	1283.0	1269.0	1250.0	1234.0	1227.0	1224.0	1223.0	1225.0	97.0	96.0	95.0	95.0	94.0	94.0	94.0	94.0
GEV																
CASE-1	12.0	12.0	14.0	18.0	22.0	27.0	35.0	42.0	12.0	12.0	14.0	19.0	23.0	28.0	36.0	43.0
CASE-2	12.0	12.0	14.0	19.0	23.0	29.0	37.0	45.0	12.0	13.0	15.0	19.0	24.0	29.0	38.0	45.0
CASE-3	12.0	12.0	14.0	19.0	23.0	29.0	37.0	45.0	12.0	13.0	15.0	19.0	24.0	29.0	38.0	45.0
SRGEV																
CASE-1	11.0	12.0	12.0	13.0	15.0	16.0	19.0	21.0	12.0	12.0	12.0	14.0	15.0	16.0	19.0	21.0
CASE-2	12.0	12.0	12.0	13.0	15.0	16.0	19.0	21.0	12.0	12.0	12.0	14.0	15.0	17.0	19.0	21.0
CASE-3	12.0	12.0	12.0	13.0	15.0	16.0	19.0	22.0	12.0	12.0	12.0	13.0	15.0	16.0	19.0	22.0
RGEV																
CASE-1	1268.0	1271.0	1278.0	1290.0	1301.0	1313.0	1331.0	1347.0	96.0	96.0	97.0	98.0	99.0	99.0	101.0	102.0
CASE-2	1279.0	1277.0	1283.0	1293.0	1302.0	1313.0	1330.0	1344.0	97.0	97.0	97.0	98.0	99.0	99.0	101.0	102.0
CASE-3	1263.0	1267.0	1263.0	1270.0	1282.0	1299.0	1330.0	1357.0	96.0	96.0	96.0	97.0	97.0	98.0	100.0	102.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	12.0	12.0	12.0	13.0	15.0	16.0	19.0	22.0	12.0	12.0	12.0	14.0	15.0	17.0	20.0	23.0
CASE-2	12.0	12.0	12.0	13.0	15.0	16.0	19.0	22.0	12.0	12.0	13.0	14.0	15.0	17.0	20.0	23.0
CASE-3	12.0	12.0	12.0	13.0	15.0	17.0	21.0	25.0	12.0	12.0	12.0	14.0	15.0	18.0	22.0	26.0
RWAKE																
CASE-1	1274.0	1274.0	1284.0	1293.0	1298.0	1303.0	1311.0	1319.0	96.0	97.0	97.0	98.0	98.0	98.0	98.0	99.0
CASE-2	1283.0	1282.0	1290.0	1295.0	1297.0	1298.0	1300.0	1303.0	97.0	97.0	98.0	98.0	98.0	98.0	98.0	98.0
CASE-3	1273.0	1265.0	1267.0	1277.0	1289.0	1307.0	1337.0	1367.0	97.0	97.0	96.0	97.0	97.0	98.0	100.0	102.0

TABLE 26 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 40									
EV1																
CASE-1	10.0	11.0	11.0	12.0	12.0	12.0	12.0	12.0	10.0	11.0	11.0	11.0	12.0	12.0	12.0	12.0
CASE-2	10.0	11.0	12.0	12.0	12.0	12.0	13.0	13.0	11.0	11.0	11.0	12.0	12.0	12.0	12.0	13.0
CASE-3	10.0	11.0	12.0	12.0	12.0	13.0	13.0	13.0	11.0	11.0	11.0	12.0	12.0	12.0	13.0	13.0
SREV1-I																
CASE-1	10.0	11.0	11.0	11.0	11.0	11.0	12.0	12.0	10.0	11.0	11.0	11.0	11.0	12.0	12.0	12.0
CASE-2	10.0	11.0	11.0	11.0	11.0	12.0	12.0	12.0	11.0	11.0	11.0	11.0	12.0	12.0	12.0	13.0
CASE-3	10.0	11.0	11.0	11.0	12.0	12.0	12.0	12.0	10.0	11.0	11.0	12.0	12.0	12.0	12.0	12.0
REV1-I																
CASE-1	1278.0	1268.0	1266.0	1265.0	1265.0	1264.0	1264.0	1263.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0
CASE-2	1297.0	1277.0	1268.0	1257.0	1248.0	1240.0	1228.0	1219.0	98.0	98.0	97.0	97.0	96.0	96.0	96.0	95.0
CASE-3	1282.0	1269.0	1250.0	1234.0	1227.0	1224.0	1224.0	1226.0	97.0	97.0	96.0	96.0	96.0	95.0	96.0	96.0
SREV1-II																
CASE-1	10.0	10.0	10.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	11.0	11.0	11.0	11.0	11.0	11.0
CASE-2	10.0	10.0	10.0	11.0	11.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	11.0	11.0	11.0	12.0
CASE-3	10.0	10.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
REV1-II																
CASE-1	1276.0	1278.0	1278.0	1279.0	1279.0	1279.0	1279.0	1280.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0
CASE-2	1295.0	1285.0	1278.0	1268.0	1260.0	1251.0	1240.0	1232.0	98.0	97.0	97.0	97.0	96.0	96.0	95.0	95.0
CASE-3	1282.0	1275.0	1257.0	1242.0	1235.0	1232.0	1232.0	1235.0	97.0	97.0	96.0	95.0	95.0	95.0	95.0	95.0
GEV																
CASE-1	11.0	11.0	13.0	16.0	20.0	24.0	31.0	37.0	11.0	10.0	12.0	16.0	20.0	24.0	31.0	37.0
CASE-2	11.0	11.0	13.0	17.0	21.0	26.0	33.0	39.0	11.0	11.0	13.0	17.0	21.0	25.0	32.0	39.0
CASE-3	11.0	11.0	13.0	17.0	21.0	25.0	33.0	40.0	11.0	11.0	13.0	17.0	20.0	25.0	32.0	39.0
SRGEV																
CASE-1	10.0	10.0	11.0	12.0	14.0	15.0	18.0	21.0	10.0	10.0	11.0	12.0	14.0	15.0	18.0	21.0
CASE-2	10.0	10.0	11.0	12.0	14.0	16.0	18.0	21.0	11.0	11.0	11.0	12.0	14.0	16.0	18.0	21.0
CASE-3	10.0	10.0	11.0	12.0	14.0	15.0	19.0	21.0	11.0	11.0	11.0	12.0	14.0	15.0	19.0	21.0
RGEV																
CASE-1	1268.0	1276.0	1284.0	1298.0	1310.0	1324.0	1346.0	1365.0	96.0	97.0	98.0	99.0	101.0	102.0	105.0	107.0
CASE-2	1279.0	1283.0	1289.0	1301.0	1312.0	1325.0	1345.0	1364.0	96.0	97.0	98.0	100.0	101.0	103.0	105.0	107.0
CASE-3	1263.0	1273.0	1269.0	1277.0	1291.0	1311.0	1345.0	1377.0	95.0	97.0	97.0	98.0	100.0	102.0	105.0	107.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	10.0	11.0	11.0	12.0	14.0	16.0	19.0	23.0	11.0	11.0	11.0	12.0	14.0	16.0	19.0	23.0
CASE-2	11.0	11.0	11.0	12.0	14.0	16.0	19.0	23.0	11.0	11.0	11.0	12.0	14.0	16.0	19.0	23.0
CASE-3	11.0	11.0	11.0	12.0	14.0	16.0	21.0	26.0	11.0	11.0	11.0	12.0	14.0	16.0	21.0	26.0
RWAKE																
CASE-1	1279.0	1274.0	1284.0	1298.0	1310.0	1325.0	1351.0	1376.0	96.0	97.0	98.0	99.0	101.0	102.0	106.0	110.0
CASE-2	1288.0	1283.0	1290.0	1300.0	1308.0	1319.0	1339.0	1359.0	96.0	97.0	98.0	100.0	101.0	103.0	106.0	109.0
CASE-3	1277.0	1265.0	1265.0	1280.0	1301.0	1331.0	1384.0	1435.0	96.0	97.0	97.0	99.0	100.0	103.0	107.0	112.0

TABLE 27 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	: TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 1									
EV1																
CASE-1	71.0	62.0	61.0	60.0	60.0	60.0	59.0	59.0	74.0	65.0	64.0	63.0	62.0	62.0	62.0	61.0
CASE-2	77.0	65.0	63.0	61.0	60.0	59.0	58.0	58.0	80.0	67.0	65.0	63.0	62.0	61.0	60.0	59.0
CASE-3	76.0	66.0	64.0	62.0	60.0	59.0	58.0	58.0	78.0	68.0	66.0	63.0	61.0	60.0	59.0	59.0
SREV1-I																
CASE-1	69.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	72.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0
CASE-2	75.0	72.0	70.0	68.0	66.0	65.0	63.0	62.0	78.0	74.0	72.0	70.0	69.0	67.0	65.0	64.0
CASE-3	73.0	73.0	72.0	69.0	67.0	65.0	62.0	60.0	76.0	75.0	73.0	71.0	68.0	66.0	63.0	61.0
REV1-I																
CASE-1	689.0	682.0	681.0	680.0	680.0	680.0	680.0	679.0	72.0	72.0	72.0	73.0	73.0	73.0	73.0	73.0
CASE-2	716.0	687.0	669.0	644.0	626.0	607.0	582.0	564.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0	73.0
CASE-3	701.0	694.0	681.0	652.0	625.0	594.0	553.0	521.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0	73.0
SREV1-II																
CASE-1	69.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-2	75.0	71.0	70.0	68.0	66.0	65.0	63.0	62.0	78.0	74.0	73.0	70.0	69.0	67.0	65.0	64.0
CASE-3	73.0	73.0	72.0	69.0	67.0	64.0	62.0	60.0	76.0	75.0	74.0	71.0	69.0	66.0	63.0	61.0
REV1-II																
CASE-1	688.0	686.0	686.0	686.0	686.0	686.0	686.0	686.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-2	717.0	686.0	668.0	643.0	625.0	606.0	581.0	563.0	73.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0
CASE-3	701.0	696.0	684.0	655.0	627.0	597.0	555.0	523.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0
GEV																
CASE-1	115.0	56.0	57.0	61.0	65.0	67.0	71.0	73.0	119.0	58.0	58.0	62.0	65.0	67.0	71.0	73.0
CASE-2	125.0	58.0	59.0	64.0	67.0	71.0	74.0	77.0	130.0	59.0	60.0	64.0	67.0	71.0	74.0	77.0
CASE-3	122.0	58.0	59.0	63.0	67.0	71.0	75.0	78.0	126.0	59.0	59.0	63.0	67.0	71.0	75.0	78.0
SRGEV																
CASE-1	68.0	68.0	69.0	71.0	72.0	74.0	77.0	79.0	71.0	71.0	72.0	74.0	75.0	77.0	80.0	83.0
CASE-2	72.0	71.0	72.0	73.0	74.0	76.0	78.0	81.0	74.0	74.0	75.0	76.0	77.0	79.0	83.0	86.0
CASE-3	71.0	72.0	73.0	74.0	75.0	75.0	76.0	76.0	73.0	75.0	76.0	77.0	78.0	78.0	80.0	81.0
RGEV																
CASE-1	677.0	684.0	693.0	709.0	722.0	739.0	764.0	786.0	72.0	72.0	72.0	72.0	73.0	73.0	73.0	74.0
CASE-2	682.0	681.0	687.0	699.0	711.0	726.0	750.0	773.0	72.0	72.0	72.0	72.0	73.0	73.0	73.0	74.0
CASE-3	668.0	691.0	703.0	710.0	713.0	714.0	717.0	720.0	72.0	72.0	72.0	72.0	73.0	73.0	73.0	73.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	69.0	68.0	69.0	70.0	72.0	74.0	78.0	84.0	72.0	71.0	72.0	74.0	76.0	79.0	83.0	89.0
CASE-2	72.0	72.0	72.0	72.0	73.0	74.0	78.0	82.0	75.0	74.0	75.0	76.0	77.0	79.0	83.0	87.0
CASE-3	71.0	73.0	73.0	72.0	72.0	72.0	76.0	82.0	74.0	75.0	75.0	75.0	76.0	78.0	82.0	87.0
RWAKE																
CASE-1	680.0	679.0	689.0	704.0	718.0	736.0	764.0	793.0	72.0	73.0	73.0	72.0	72.0	72.0	72.0	72.0
CASE-2	685.0	683.0	689.0	697.0	705.0	714.0	733.0	752.0	72.0	73.0	73.0	72.0	72.0	72.0	72.0	72.0
CASE-3	672.0	692.0	693.0	689.0	686.0	688.0	701.0	726.0	72.0	73.0	73.0	72.0	72.0	72.0	72.0	73.0

TABLE 28 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 5									
EV1																
CASE-1	33.0	32.0	33.0	34.0	35.0	35.0	36.0	36.0	32.0	31.0	31.0	32.0	33.0	33.0	34.0	34.0
CASE-2	35.0	37.0	37.0	38.0	38.0	38.0	38.0	39.0	34.0	34.0	35.0	35.0	36.0	37.0	37.0	38.0
CASE-3	35.0	38.0	38.0	38.0	38.0	38.0	39.0	40.0	33.0	35.0	35.0	36.0	36.0	37.0	38.0	39.0
SREV1-I																
CASE-1	32.0	32.0	32.0	32.0	32.0	32.0	33.0	33.0	31.0	31.0	31.0	31.0	31.0	32.0	32.0	32.0
CASE-2	35.0	34.0	33.0	33.0	32.0	32.0	33.0	33.0	33.0	32.0	32.0	32.0	32.0	32.0	32.0	33.0
CASE-3	34.0	34.0	34.0	33.0	32.0	32.0	33.0	35.0	33.0	33.0	32.0	32.0	32.0	32.0	33.0	35.0
REV1-I																
CASE-1	691.0	675.0	673.0	672.0	671.0	670.0	670.0	669.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-2	718.0	680.0	662.0	636.0	617.0	599.0	574.0	555.0	73.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-3	702.0	689.0	676.0	646.0	619.0	588.0	547.0	515.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0
SREV1-II																
CASE-1	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
CASE-2	35.0	34.0	33.0	32.0	32.0	32.0	32.0	32.0	33.0	32.0	31.0	31.0	31.0	31.0	32.0	32.0
CASE-3	35.0	34.0	34.0	32.0	32.0	32.0	33.0	34.0	33.0	32.0	32.0	31.0	31.0	31.0	32.0	34.0
REV1-II																
CASE-1	689.0	684.0	684.0	684.0	683.0	683.0	683.0	683.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-2	717.0	683.0	665.0	640.0	621.0	602.0	577.0	559.0	73.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-3	701.0	694.0	681.0	652.0	624.0	594.0	552.0	521.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0
GEV																
CASE-1	34.0	32.0	35.0	44.0	54.0	67.0	91.0	117.0	34.0	30.0	33.0	40.0	49.0	60.0	82.0	105.0
CASE-2	35.0	35.0	40.0	49.0	59.0	73.0	97.0	123.0	34.0	33.0	37.0	45.0	54.0	66.0	88.0	111.0
CASE-3	34.0	36.0	41.0	51.0	61.0	74.0	97.0	120.0	34.0	33.0	37.0	46.0	55.0	67.0	88.0	110.0
SRGEV																
CASE-1	32.0	32.0	32.0	34.0	35.0	36.0	39.0	41.0	31.0	31.0	31.0	32.0	34.0	35.0	38.0	40.0
CASE-2	34.0	33.0	34.0	35.0	36.0	37.0	40.0	43.0	32.0	32.0	32.0	33.0	34.0	36.0	39.0	42.0
CASE-3	33.0	34.0	35.0	35.0	36.0	37.0	39.0	41.0	32.0	32.0	33.0	34.0	35.0	36.0	38.0	40.0
RGEV																
CASE-1	682.0	683.0	688.0	698.0	708.0	719.0	736.0	752.0	73.0	72.0	72.0	72.0	71.0	71.0	71.0	71.0
CASE-2	688.0	679.0	681.0	687.0	693.0	702.0	717.0	731.0	73.0	72.0	72.0	71.0	71.0	71.0	71.0	71.0
CASE-3	674.0	690.0	698.0	699.0	696.0	692.0	686.0	682.0	73.0	72.0	72.0	71.0	71.0	71.0	71.0	71.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	33.0	32.0	33.0	34.0	35.0	37.0	40.0	45.0	31.0	31.0	31.0	32.0	33.0	35.0	39.0	43.0
CASE-2	35.0	34.0	34.0	35.0	36.0	37.0	40.0	44.0	33.0	32.0	33.0	33.0	34.0	36.0	39.0	43.0
CASE-3	34.0	35.0	35.0	35.0	36.0	37.0	41.0	47.0	33.0	33.0	33.0	34.0	34.0	36.0	40.0	44.0
RWAKE																
CASE-1	690.0	681.0	686.0	694.0	704.0	716.0	738.0	761.0	73.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0
CASE-2	692.0	682.0	682.0	682.0	683.0	686.0	695.0	707.0	73.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0
CASE-3	678.0	691.0	684.0	672.0	665.0	665.0	677.0	700.0	73.0	72.0	72.0	72.0	72.0	72.0	73.0	75.0

TABLE 29 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 10									
EV1																
CASE-1	23.0	23.0	24.0	24.0	25.0	25.0	25.0	26.0	24.0	23.0	24.0	24.0	25.0	25.0	25.0	26.0
CASE-2	25.0	26.0	27.0	27.0	28.0	28.0	29.0	30.0	25.0	27.0	27.0	27.0	28.0	29.0	30.0	30.0
CASE-3	24.0	27.0	28.0	28.0	28.0	29.0	30.0	32.0	25.0	27.0	28.0	28.0	28.0	29.0	31.0	33.0
SREV1-I																
CASE-1	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	24.0	24.0	24.0	24.0	24.0	24.0	25.0
CASE-2	25.0	24.0	24.0	24.0	24.0	24.0	25.0	26.0	25.0	25.0	25.0	25.0	25.0	25.0	26.0	27.0
CASE-3	24.0	24.0	24.0	24.0	24.0	25.0	27.0	29.0	25.0	25.0	25.0	25.0	25.0	26.0	28.0	30.0
REV1-I																
CASE-1	690.0	679.0	678.0	676.0	676.0	675.0	675.0	675.0	72.0	72.0	72.0	73.0	73.0	73.0	73.0	73.0
CASE-2	717.0	682.0	664.0	639.0	620.0	601.0	576.0	558.0	73.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0
CASE-3	702.0	689.0	676.0	646.0	618.0	588.0	546.0	515.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0
SREV1-II																
CASE-1	22.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	24.0	24.0	24.0	24.0
CASE-2	25.0	24.0	23.0	23.0	23.0	24.0	25.0	26.0	25.0	24.0	24.0	24.0	24.0	25.0	26.0	27.0
CASE-3	24.0	24.0	24.0	23.0	23.0	24.0	26.0	29.0	25.0	25.0	25.0	24.0	24.0	25.0	27.0	30.0
REV1-II																
CASE-1	689.0	684.0	684.0	683.0	683.0	683.0	683.0	683.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-2	717.0	683.0	664.0	639.0	620.0	601.0	576.0	558.0	73.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0
CASE-3	702.0	692.0	679.0	649.0	622.0	591.0	550.0	518.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0
GEV																
CASE-1	24.0	23.0	26.0	32.0	40.0	50.0	67.0	84.0	25.0	23.0	26.0	32.0	39.0	49.0	66.0	84.0
CASE-2	25.0	25.0	29.0	37.0	46.0	58.0	79.0	101.0	25.0	25.0	29.0	37.0	45.0	57.0	78.0	99.0
CASE-3	25.0	25.0	29.0	39.0	48.0	61.0	83.0	106.0	25.0	25.0	30.0	38.0	48.0	60.0	82.0	104.0
SRGEV																
CASE-1	23.0	23.0	23.0	24.0	26.0	27.0	30.0	33.0	23.0	23.0	24.0	25.0	26.0	28.0	31.0	33.0
CASE-2	24.0	24.0	24.0	25.0	26.0	28.0	32.0	35.0	25.0	24.0	25.0	26.0	27.0	29.0	32.0	35.0
CASE-3	24.0	24.0	25.0	26.0	27.0	29.0	31.0	33.0	24.0	25.0	25.0	26.0	28.0	29.0	31.0	34.0
RGEV																
CASE-1	687.0	683.0	685.0	692.0	699.0	707.0	722.0	735.0	72.0	72.0	72.0	73.0	73.0	73.0	74.0	74.0
CASE-2	693.0	679.0	678.0	680.0	683.0	689.0	701.0	713.0	72.0	72.0	72.0	72.0	73.0	73.0	74.0	74.0
CASE-3	678.0	688.0	693.0	691.0	686.0	680.0	672.0	667.0	72.0	72.0	72.0	73.0	73.0	73.0	74.0	74.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	23.0	23.0	23.0	24.0	25.0	27.0	32.0	37.0	23.0	23.0	24.0	25.0	26.0	28.0	32.0	37.0
CASE-2	24.0	24.0	24.0	25.0	26.0	28.0	32.0	36.0	25.0	25.0	25.0	26.0	27.0	29.0	32.0	36.0
CASE-3	25.0	25.0	25.0	26.0	27.0	29.0	34.0	39.0	25.0	26.0	26.0	27.0	28.0	30.0	34.0	39.0
RWAKE																
CASE-1	695.0	678.0	681.0	689.0	699.0	713.0	741.0	771.0	72.0	72.0	72.0	73.0	73.0	74.0	75.0	76.0
CASE-2	698.0	679.0	676.0	675.0	677.0	682.0	696.0	714.0	73.0	72.0	72.0	73.0	73.0	74.0	74.0	75.0
CASE-3	683.0	689.0	679.0	663.0	654.0	652.0	663.0	688.0	73.0	72.0	73.0	73.0	73.0	74.0	75.0	76.0

TABLE 30 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 13									
EV1																
CASE-1	20.0	19.0	19.0	20.0	20.0	20.0	21.0	21.0	21.0	20.0	21.0	21.0	22.0	22.0	22.0	23.0
CASE-2	21.0	21.0	22.0	23.0	23.0	24.0	26.0	27.0	22.0	23.0	24.0	24.0	25.0	25.0	26.0	27.0
CASE-3	20.0	22.0	22.0	23.0	23.0	25.0	28.0	30.0	22.0	24.0	25.0	25.0	25.0	26.0	28.0	30.0
SREV1-I																
CASE-1	19.0	20.0	20.0	20.0	20.0	20.0	20.0	21.0	20.0	20.0	20.0	20.0	21.0	21.0	21.0	21.0
CASE-2	21.0	20.0	20.0	21.0	21.0	22.0	24.0	25.0	23.0	21.0	21.0	21.0	21.0	22.0	23.0	25.0
CASE-3	20.0	21.0	21.0	21.0	21.0	23.0	26.0	28.0	22.0	22.0	21.0	21.0	22.0	23.0	25.0	28.0
REV1-I																
CASE-1	690.0	678.0	676.0	675.0	674.0	673.0	673.0	672.0	72.0	72.0	72.0	73.0	73.0	73.0	73.0	73.0
CASE-2	717.0	682.0	664.0	639.0	620.0	601.0	576.0	558.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
CASE-3	702.0	690.0	677.0	647.0	619.0	589.0	548.0	516.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	74.0
SREV1-II																
CASE-1	19.0	19.0	19.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	21.0	21.0	21.0	21.0
CASE-2	21.0	20.0	20.0	20.0	21.0	21.0	23.0	24.0	22.0	21.0	21.0	21.0	21.0	22.0	23.0	24.0
CASE-3	20.0	20.0	20.0	20.0	21.0	22.0	25.0	27.0	22.0	22.0	21.0	21.0	21.0	22.0	25.0	27.0
REV1-II																
CASE-1	689.0	685.0	685.0	685.0	685.0	684.0	684.0	684.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
CASE-2	717.0	683.0	665.0	640.0	621.0	602.0	577.0	559.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
CASE-3	702.0	693.0	680.0	650.0	622.0	592.0	550.0	519.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
GEV																
CASE-1	21.0	18.0	21.0	27.0	33.0	41.0	55.0	68.0	22.0	20.0	23.0	29.0	35.0	44.0	58.0	73.0
CASE-2	21.0	20.0	24.0	31.0	38.0	47.0	64.0	81.0	22.0	22.0	25.0	33.0	41.0	52.0	71.0	90.0
CASE-3	21.0	20.0	24.0	32.0	40.0	49.0	66.0	82.0	22.0	22.0	26.0	34.0	43.0	55.0	76.0	97.0
SRGEV																
CASE-1	19.0	19.0	20.0	21.0	23.0	25.0	28.0	31.0	20.0	20.0	21.0	22.0	23.0	25.0	29.0	31.0
CASE-2	20.0	20.0	20.0	22.0	24.0	26.0	30.0	33.0	22.0	21.0	21.0	23.0	24.0	26.0	30.0	33.0
CASE-3	20.0	20.0	21.0	23.0	24.0	26.0	29.0	32.0	21.0	21.0	22.0	23.0	25.0	26.0	29.0	31.0
RGEV																
CASE-1	683.0	684.0	688.0	696.0	704.0	713.0	727.0	740.0	72.0	73.0	73.0	73.0	74.0	74.0	76.0	77.0
CASE-2	690.0	680.0	680.0	683.0	687.0	692.0	703.0	714.0	72.0	72.0	73.0	73.0	74.0	75.0	76.0	77.0
CASE-3	676.0	689.0	695.0	694.0	689.0	683.0	674.0	668.0	72.0	73.0	73.0	73.0	74.0	74.0	75.0	76.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	20.0	19.0	20.0	22.0	24.0	26.0	32.0	37.0	21.0	21.0	21.0	22.0	24.0	26.0	30.0	35.0
CASE-2	21.0	20.0	21.0	22.0	24.0	27.0	31.0	36.0	22.0	22.0	22.0	23.0	24.0	26.0	30.0	34.0
CASE-3	21.0	21.0	22.0	23.0	25.0	28.0	34.0	40.0	23.0	23.0	23.0	24.0	25.0	28.0	32.0	38.0
RWAKE																
CASE-1	686.0	677.0	678.0	684.0	692.0	704.0	728.0	754.0	72.0	73.0	73.0	73.0	73.0	74.0	75.0	76.0
CASE-2	694.0	683.0	680.0	675.0	674.0	677.0	686.0	700.0	72.0	73.0	73.0	73.0	73.0	74.0	75.0	77.0
CASE-3	678.0	692.0	682.0	663.0	652.0	647.0	655.0	678.0	72.0	73.0	73.0	73.0	74.0	74.0	75.0	77.0

TABLE 31 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50)								TEST CATCHMENT -2 (BRIDGE NO.- 232)							
	2	10	20	50	100	200	500	1000	2	10	20	50	100	200	500	1000
	SAMPLE SIZE= 20															
EV1																
CASE-1	16.0	16.0	17.0	17.0	18.0	18.0	18.0	18.0	16.0	15.0	16.0	16.0	17.0	17.0	17.0	17.0
CASE-2	18.0	19.0	19.0	20.0	20.0	21.0	23.0	24.0	17.0	18.0	18.0	19.0	20.0	21.0	22.0	24.0
CASE-3	17.0	19.0	20.0	20.0	21.0	22.0	24.0	27.0	16.0	18.0	18.0	19.0	20.0	21.0	24.0	27.0
SREV1-I																
CASE-1	16.0	16.0	17.0	17.0	17.0	17.0	17.0	17.0	15.0	16.0	16.0	16.0	16.0	16.0	17.0	17.0
CASE-2	18.0	17.0	17.0	18.0	18.0	19.0	21.0	23.0	17.0	16.0	17.0	17.0	18.0	19.0	21.0	23.0
CASE-3	17.0	18.0	17.0	18.0	18.0	20.0	23.0	26.0	16.0	17.0	17.0	17.0	18.0	20.0	23.0	27.0
REV1-I																
CASE-1	688.0	686.0	686.0	686.0	686.0	686.0	686.0	686.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-2	715.0	689.0	671.0	647.0	629.0	610.0	585.0	567.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0
CASE-3	700.0	697.0	684.0	656.0	628.0	598.0	556.0	524.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0	73.0
SREV1-II																
CASE-1	16.0	16.0	16.0	16.0	16.0	17.0	17.0	17.0	15.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
CASE-2	18.0	17.0	17.0	17.0	18.0	19.0	20.0	22.0	17.0	16.0	16.0	17.0	18.0	19.0	21.0	22.0
CASE-3	17.0	17.0	17.0	17.0	18.0	19.0	23.0	26.0	16.0	16.0	16.0	16.0	17.0	19.0	23.0	26.0
REV1-II																
CASE-1	688.0	687.0	687.0	687.0	687.0	687.0	687.0	687.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-2	717.0	686.0	668.0	643.0	624.0	605.0	580.0	562.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0
CASE-3	701.0	696.0	684.0	655.0	627.0	597.0	555.0	523.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0
GEV																
CASE-1	17.0	16.0	19.0	25.0	30.0	37.0	49.0	60.0	17.0	15.0	18.0	23.0	28.0	35.0	46.0	56.0
CASE-2	17.0	18.0	21.0	29.0	36.0	45.0	60.0	75.0	17.0	17.0	20.0	26.0	33.0	41.0	55.0	69.0
CASE-3	17.0	18.0	22.0	30.0	38.0	47.0	62.0	77.0	17.0	17.0	20.0	27.0	34.0	43.0	57.0	71.0
SRGEV																
CASE-1	16.0	16.0	17.0	18.0	19.0	21.0	24.0	27.0	16.0	15.0	16.0	17.0	19.0	21.0	24.0	27.0
CASE-2	17.0	17.0	17.0	19.0	20.0	22.0	26.0	29.0	17.0	16.0	17.0	18.0	20.0	22.0	25.0	28.0
CASE-3	17.0	17.0	18.0	19.0	21.0	22.0	25.0	28.0	17.0	16.0	17.0	18.0	20.0	22.0	25.0	28.0
RGEV																
CASE-1	676.0	685.0	694.0	709.0	723.0	738.0	762.0	782.0	73.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-2	683.0	681.0	686.0	697.0	707.0	720.0	742.0	762.0	73.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-3	668.0	691.0	703.0	709.0	711.0	712.0	713.0	715.0	73.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	17.0	17.0	17.0	18.0	20.0	22.0	28.0	34.0	16.0	16.0	16.0	18.0	19.0	22.0	27.0	32.0
CASE-2	18.0	17.0	17.0	18.0	20.0	23.0	27.0	32.0	17.0	16.0	17.0	18.0	20.0	22.0	27.0	31.0
CASE-3	19.0	19.0	19.0	20.0	22.0	25.0	30.0	37.0	18.0	18.0	19.0	20.0	22.0	24.0	30.0	36.0
RWAKE																
CASE-1	682.0	685.0	692.0	704.0	715.0	730.0	757.0	785.0	73.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-2	685.0	686.0	688.0	691.0	695.0	701.0	714.0	730.0	73.0	72.0	72.0	72.0	72.0	71.0	71.0	72.0
CASE-3	671.0	697.0	694.0	682.0	674.0	670.0	677.0	697.0	73.0	73.0	72.0	72.0	72.0	72.0	72.0	73.0

TABLE 32 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 30									
EV1																
CASE-1	14.0	13.0	13.0	14.0	14.0	14.0	14.0	14.0	14.0	13.0	13.0	14.0	14.0	14.0	14.0	14.0
CASE-2	15.0	15.0	15.0	16.0	17.0	18.0	20.0	22.0	15.0	15.0	15.0	16.0	17.0	18.0	20.0	22.0
CASE-3	14.0	15.0	15.0	16.0	17.0	19.0	22.0	25.0	14.0	15.0	16.0	16.0	17.0	19.0	23.0	26.0
SREV1-I																
CASE-1	13.0	14.0	14.0	15.0	15.0	15.0	15.0	15.0	13.0	14.0	14.0	14.0	14.0	15.0	15.0	15.0
CASE-2	15.0	15.0	15.0	16.0	17.0	18.0	20.0	22.0	15.0	14.0	15.0	15.0	16.0	18.0	20.0	22.0
CASE-3	14.0	15.0	15.0	15.0	16.0	19.0	22.0	26.0	14.0	14.0	14.0	15.0	16.0	19.0	22.0	26.0
REV1-I																
CASE-1	690.0	679.0	678.0	677.0	676.0	676.0	675.0	675.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
CASE-2	717.0	683.0	664.0	639.0	620.0	602.0	577.0	559.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
CASE-3	702.0	689.0	676.0	646.0	619.0	588.0	547.0	515.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	74.0
SREV1-II																
CASE-1	13.0	14.0	14.0	14.0	14.0	14.0	14.0	15.0	13.0	13.0	14.0	14.0	14.0	14.0	14.0	14.0
CASE-2	15.0	14.0	14.0	15.0	16.0	17.0	19.0	21.0	15.0	14.0	14.0	15.0	16.0	17.0	19.0	21.0
CASE-3	14.0	14.0	14.0	15.0	16.0	18.0	21.0	25.0	14.0	14.0	14.0	14.0	16.0	18.0	22.0	25.0
REV1-II																
CASE-1	689.0	684.0	683.0	683.0	682.0	682.0	682.0	682.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
CASE-2	717.0	683.0	665.0	640.0	621.0	602.0	577.0	559.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
CASE-3	702.0	694.0	681.0	651.0	624.0	593.0	552.0	520.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
GEV																
CASE-1	15.0	13.0	15.0	19.0	23.0	28.0	36.0	43.0	14.0	13.0	15.0	19.0	24.0	29.0	37.0	45.0
CASE-2	15.0	14.0	17.0	22.0	27.0	34.0	44.0	53.0	14.0	14.0	17.0	23.0	28.0	35.0	46.0	56.0
CASE-3	15.0	14.0	17.0	23.0	29.0	35.0	45.0	53.0	15.0	14.0	18.0	24.0	29.0	36.0	47.0	57.0
SRGEV																
CASE-1	14.0	14.0	14.0	16.0	17.0	19.0	23.0	26.0	14.0	13.0	14.0	15.0	17.0	19.0	22.0	25.0
CASE-2	14.0	14.0	15.0	16.0	18.0	20.0	24.0	27.0	14.0	14.0	14.0	16.0	17.0	20.0	23.0	27.0
CASE-3	14.0	14.0	15.0	17.0	18.0	20.0	24.0	26.0	14.0	14.0	15.0	16.0	18.0	20.0	23.0	26.0
RGEV																
CASE-1	681.0	682.0	689.0	699.0	709.0	720.0	738.0	753.0	72.0	73.0	73.0	73.0	74.0	74.0	75.0	76.0
CASE-2	687.0	679.0	682.0	688.0	695.0	704.0	720.0	735.0	72.0	73.0	73.0	73.0	74.0	74.0	76.0	77.0
CASE-3	673.0	690.0	697.0	699.0	697.0	693.0	688.0	685.0	72.0	73.0	73.0	74.0	74.0	75.0	76.0	77.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	14.0	14.0	14.0	16.0	17.0	20.0	25.0	31.0	14.0	14.0	14.0	15.0	17.0	19.0	25.0	30.0
CASE-2	15.0	14.0	15.0	16.0	18.0	21.0	25.0	30.0	15.0	14.0	15.0	16.0	18.0	20.0	25.0	30.0
CASE-3	17.0	17.0	17.0	19.0	20.0	23.0	29.0	35.0	17.0	17.0	17.0	18.0	20.0	23.0	28.0	34.0
RWAKE																
CASE-1	689.0	679.0	684.0	695.0	708.0	725.0	757.0	789.0	72.0	73.0	73.0	73.0	73.0	74.0	74.0	75.0
CASE-2	691.0	681.0	681.0	684.0	688.0	696.0	712.0	731.0	72.0	73.0	73.0	73.0	74.0	74.0	74.0	75.0
CASE-3	677.0	687.0	682.0	672.0	668.0	669.0	685.0	712.0	72.0	73.0	73.0	74.0	74.0	75.0	76.0	77.0

TABLE 33 : PERCENTAGE RMSE OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 40									
EV1																
CASE-1	11.0	11.0	11.0	12.0	12.0	12.0	12.0	12.0	11.0	11.0	12.0	12.0	12.0	12.0	13.0	13.0
CASE-2	13.0	13.0	13.0	14.0	15.0	16.0	18.0	20.0	13.0	13.0	13.0	14.0	15.0	17.0	19.0	21.0
CASE-3	12.0	13.0	13.0	14.0	15.0	17.0	21.0	24.0	12.0	13.0	14.0	14.0	15.0	17.0	21.0	25.0
SREV1-I																
CASE-1	11.0	12.0	12.0	13.0	13.0	13.0	13.0	13.0	11.0	12.0	12.0	13.0	13.0	13.0	13.0	14.0
CASE-2	13.0	12.0	13.0	14.0	15.0	16.0	18.0	20.0	13.0	13.0	13.0	14.0	15.0	17.0	19.0	21.0
CASE-3	12.0	13.0	13.0	13.0	15.0	17.0	21.0	24.0	12.0	13.0	13.0	14.0	15.0	17.0	21.0	25.0
REV1-I																
CASE-1	688.0	686.0	686.0	686.0	686.0	686.0	686.0	686.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
CASE-2	715.0	689.0	672.0	648.0	629.0	611.0	586.0	567.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
CASE-3	700.0	698.0	686.0	658.0	630.0	600.0	558.0	526.0	72.0	73.0	73.0	73.0	73.0	73.0	73.0	74.0
SREV1-II																
CASE-1	11.0	12.0	12.0	12.0	12.0	12.0	12.0	13.0	11.0	12.0	12.0	12.0	12.0	12.0	12.0	13.0
CASE-2	13.0	12.0	12.0	13.0	14.0	15.0	18.0	20.0	13.0	12.0	12.0	13.0	14.0	16.0	18.0	20.0
CASE-3	12.0	12.0	12.0	12.0	14.0	16.0	20.0	24.0	12.0	12.0	12.0	13.0	14.0	17.0	21.0	24.0
REV1-II																
CASE-1	687.0	690.0	690.0	691.0	691.0	691.0	692.0	692.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
CASE-2	716.0	689.0	671.0	647.0	628.0	609.0	584.0	566.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0
CASE-3	700.0	699.0	687.0	658.0	630.0	600.0	558.0	526.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0
GEV																
CASE-1	12.0	11.0	13.0	17.0	20.0	24.0	31.0	37.0	12.0	11.0	13.0	17.0	20.0	24.0	31.0	37.0
CASE-2	12.0	12.0	15.0	19.0	24.0	30.0	38.0	46.0	12.0	12.0	15.0	20.0	24.0	30.0	38.0	46.0
CASE-3	12.0	12.0	15.0	21.0	26.0	31.0	40.0	47.0	13.0	13.0	15.0	21.0	25.0	31.0	39.0	46.0
SRGEV																
CASE-1	11.0	12.0	12.0	14.0	16.0	18.0	22.0	25.0	11.0	12.0	12.0	14.0	16.0	18.0	22.0	25.0
CASE-2	12.0	12.0	13.0	14.0	17.0	19.0	23.0	26.0	12.0	12.0	13.0	15.0	17.0	19.0	23.0	27.0
CASE-3	12.0	12.0	13.0	15.0	17.0	19.0	23.0	26.0	12.0	12.0	13.0	15.0	17.0	20.0	23.0	26.0
RGEV																
CASE-1	676.0	688.0	697.0	711.0	723.0	737.0	758.0	775.0	72.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0
CASE-2	682.0	685.0	690.0	699.0	708.0	719.0	737.0	754.0	72.0	72.0	72.0	72.0	72.0	73.0	73.0	73.0
CASE-3	668.0	694.0	705.0	711.0	711.0	709.0	707.0	705.0	72.0	72.0	72.0	73.0	73.0	73.0	73.0	73.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	12.0	12.0	13.0	14.0	16.0	19.0	25.0	31.0	12.0	12.0	13.0	15.0	17.0	20.0	25.0	31.0
CASE-2	14.0	13.0	14.0	15.0	17.0	20.0	25.0	30.0	13.0	13.0	14.0	16.0	18.0	20.0	25.0	30.0
CASE-3	15.0	15.0	16.0	17.0	19.0	22.0	28.0	35.0	15.0	15.0	16.0	17.0	19.0	23.0	29.0	36.0
RWAKE																
CASE-1	682.0	688.0	695.0	706.0	717.0	731.0	757.0	784.0	73.0	72.0	72.0	72.0	73.0	74.0	75.0	78.0
CASE-2	685.0	689.0	692.0	694.0	697.0	701.0	713.0	727.0	73.0	72.0	72.0	72.0	73.0	73.0	75.0	77.0
CASE-3	671.0	699.0	697.0	686.0	677.0	671.0	673.0	685.0	73.0	72.0	72.0	73.0	73.0	74.0	76.0	79.0

TABLE 34 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	: TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 1									
EV1																
CASE-1	62.3	58.3	57.7	57.1	56.8	56.6	56.3	56.2	58.6	54.9	54.3	53.7	53.5	53.2	53.0	52.8
CASE-2	63.7	59.0	58.0	57.0	56.3	55.7	55.0	54.5	59.5	55.2	54.3	53.3	52.7	52.1	51.4	50.9
CASE-3	63.3	58.8	57.4	56.2	55.6	55.2	54.9	54.9	59.4	55.2	53.9	52.7	52.1	51.8	51.5	51.5
SREV1-I																
CASE-1	61.5	61.3	61.3	61.3	61.3	61.3	61.3	61.3	57.9	57.6	57.6	57.6	57.6	57.6	57.6	57.6
CASE-2	62.8	62.2	61.9	61.4	61.0	60.7	60.2	59.8	58.8	58.1	57.8	57.3	57.0	56.6	56.2	55.8
CASE-3	62.4	62.1	61.3	60.6	60.3	60.2	60.2	60.3	58.6	58.1	57.3	56.7	56.4	56.3	56.3	56.4
REV1-I																
CASE-1	1038.1	1020.0	1017.4	1015.2	1014.0	1013.1	1012.1	1011.5	93.1	92.2	92.1	92.0	92.0	91.9	91.9	91.8
CASE-2	1052.6	1027.3	1019.2	1009.1	1001.8	994.5	985.1	978.0	94.4	92.8	92.2	91.4	90.8	90.1	89.3	88.7
CASE-3	1041.4	1021.0	1005.0	991.3	985.4	982.3	981.5	982.7	93.4	92.2	90.9	89.7	89.2	89.0	88.9	89.1
SREV1-II																
CASE-1	61.5	61.5	61.5	61.5	61.5	61.5	61.6	61.6	57.8	57.9	58.0	58.0	58.0	58.0	58.1	58.1
CASE-2	62.8	62.3	62.0	61.5	61.1	60.7	60.2	59.8	58.8	58.3	58.1	57.6	57.3	56.9	56.5	56.1
CASE-3	62.5	62.1	61.3	60.6	60.3	60.2	60.2	60.3	58.6	58.3	57.6	56.9	56.6	56.5	56.5	56.6
REV1-II																
CASE-1	1035.6	1032.4	1032.1	1031.8	1031.7	1031.6	1031.5	1031.5	92.8	93.4	93.5	93.6	93.6	93.7	93.7	93.7
CASE-2	1050.5	1038.2	1032.0	1023.5	1016.9	1010.3	1001.4	994.7	94.2	93.9	93.4	92.8	92.2	91.7	90.9	90.3
CASE-3	1039.7	1030.2	1015.7	1003.2	998.0	995.4	995.2	996.8	93.2	93.2	92.1	91.1	90.7	90.5	90.5	90.7
GEV																
CASE-1	90.7	45.3	37.9	31.3	27.7	24.9	21.9	20.1	85.3	42.6	35.7	29.5	26.1	23.4	20.6	18.9
CASE-2	92.7	45.8	38.1	31.3	27.5	24.5	21.4	19.5	86.7	42.8	35.7	29.2	25.7	22.9	20.0	18.2
CASE-3	92.2	45.7	37.7	30.8	27.1	24.3	21.4	19.6	86.4	42.8	35.4	28.9	25.4	22.8	20.1	18.4
SRGEV																
CASE-1	61.0	61.4	61.9	62.9	63.9	65.0	66.8	68.4	57.4	57.8	58.3	59.3	60.2	61.3	63.1	64.8
CASE-2	62.0	62.2	62.6	63.5	64.4	65.5	67.3	69.0	58.0	58.2	58.7	59.5	60.4	61.5	63.4	65.0
CASE-3	61.5	62.0	62.0	62.7	63.8	65.2	67.6	69.9	57.7	58.2	58.2	58.9	59.9	61.2	63.6	65.9
RGEV																
CASE-1	1029.1	1031.1	1039.9	1047.2	1057.0	1068.6	1086.6	1102.5	91.8	93.3	94.2	95.7	96.8	98.1	100.0	101.6
CASE-2	1037.4	1036.5	1041.0	1049.9	1058.6	1069.3	1086.3	1101.6	92.5	93.8	94.6	95.9	97.0	98.2	100.0	101.6
CASE-3	1025.5	1028.5	1025.5	1031.2	1042.0	1057.7	1085.1	1110.5	91.5	93.1	93.2	94.1	95.3	96.9	99.6	102.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	61.5	61.4	62.1	63.1	64.0	65.1	66.9	68.7	57.8	57.9	58.5	59.5	60.3	61.4	63.4	65.4
CASE-2	62.4	62.3	62.9	63.7	64.4	65.3	66.9	68.6	58.3	58.3	58.9	59.7	60.4	61.4	63.1	65.0
CASE-3	62.2	61.7	62.1	63.1	64.4	66.2	69.3	72.4	58.3	58.0	58.2	59.2	60.4	62.1	65.3	68.6
RWAKE																
CASE-1	1037.1	1030.7	1040.3	1052.2	1061.2	1071.3	1088.0	1104.3	92.7	93.0	94.4	96.2	97.5	98.9	101.0	102.8
CASE-2	1044.1	1037.5	1045.3	1054.0	1060.3	1067.4	1080.0	1093.1	93.3	93.6	94.8	96.3	97.4	98.6	100.3	101.9
CASE-3	1036.3	1023.9	1026.7	1039.0	1054.0	1074.3	1109.8	1144.4	92.8	92.3	93.0	94.8	96.8	99.3	103.4	107.2

TABLE 35 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 5									
EV1																
CASE-1	28.7	29.9	30.9	32.0	32.6	33.2	33.8	34.1	29.4	30.1	31.1	32.1	32.7	33.3	33.9	34.2
CASE-2	29.1	30.8	31.8	32.6	33.1	33.4	33.7	33.9	29.9	31.1	32.0	32.9	33.3	33.7	33.9	34.1
CASE-3	28.9	31.1	31.8	32.5	33.0	33.5	34.1	34.5	29.6	31.2	31.8	32.6	33.1	33.5	34.1	34.6
SREV1-I																
CASE-1	28.2	28.1	28.1	28.2	28.2	28.2	28.3	28.3	28.7	28.8	28.9	29.0	29.0	29.1	29.1	29.2
CASE-2	28.8	28.5	28.4	28.2	28.1	28.0	27.8	27.6	29.4	29.2	29.2	29.0	28.9	28.8	28.6	28.4
CASE-3	28.7	28.5	28.2	28.0	27.9	27.9	27.9	28.0	29.2	29.2	28.9	28.6	28.5	28.5	28.6	28.7
REV1-I																
CASE-1	1036.8	1025.2	1023.7	1022.4	1021.7	1021.2	1020.7	1020.4	93.0	92.5	92.4	92.4	92.3	92.3	92.3	92.3
CASE-2	1051.3	1032.1	1025.0	1015.8	1008.9	1002.0	992.9	986.0	94.3	93.2	92.7	91.9	91.4	90.8	90.0	89.4
CASE-3	1040.1	1025.9	1010.9	998.0	992.6	989.9	989.5	990.9	93.4	92.4	91.1	90.0	89.5	89.3	89.3	89.4
SREV1-II																
CASE-1	28.1	28.3	28.3	28.4	28.4	28.5	28.5	28.5	28.7	28.8	28.9	28.9	29.0	29.0	29.0	29.0
CASE-2	28.7	28.6	28.5	28.4	28.2	28.1	27.9	27.7	29.4	29.2	29.1	28.9	28.8	28.6	28.4	28.2
CASE-3	28.6	28.6	28.3	28.0	27.9	27.9	27.9	28.0	29.2	29.1	28.8	28.5	28.4	28.3	28.4	28.4
REV1-II																
CASE-1	1035.5	1032.9	1032.6	1032.4	1032.3	1032.3	1032.2	1032.2	93.0	92.7	92.7	92.7	92.7	92.7	92.6	92.6
CASE-2	1050.4	1038.4	1032.2	1023.8	1017.2	1010.6	1001.7	995.0	94.4	93.2	92.7	91.9	91.3	90.7	89.9	89.3
CASE-3	1039.8	1029.9	1015.4	1002.9	997.6	995.1	994.9	996.4	93.4	92.5	91.2	90.1	89.6	89.4	89.4	89.5
GEV																
CASE-1	29.8	28.9	32.9	41.5	50.7	62.9	84.6	106.7	30.9	28.9	33.0	42.1	52.1	65.2	88.6	112.6
CASE-2	30.0	29.6	33.8	42.7	52.2	64.6	86.8	109.4	31.1	29.6	34.0	43.5	53.8	67.4	91.7	116.7
CASE-3	29.7	29.9	34.0	42.7	52.2	64.8	87.5	110.9	30.8	29.8	33.9	43.3	53.5	67.0	91.5	116.9
SRGEV																
CASE-1	27.8	28.2	28.7	29.7	30.6	31.7	33.5	35.1	28.6	28.8	29.2	29.9	30.7	31.7	33.2	34.7
CASE-2	28.2	28.6	29.1	30.0	30.9	32.1	33.9	35.6	29.0	29.2	29.5	30.3	31.0	32.0	33.6	35.1
CASE-3	28.1	28.6	28.8	29.7	30.6	31.9	34.1	36.0	28.8	29.1	29.2	29.9	30.7	31.8	33.7	35.5
RGEV																
CASE-1	1030.4	1031.7	1036.4	1045.1	1053.5	1063.5	1079.5	1093.8	92.5	92.7	93.1	93.8	94.4	95.2	96.3	97.2
CASE-2	1038.8	1036.9	1040.2	1047.2	1054.4	1063.4	1078.2	1091.9	93.2	93.2	93.5	94.0	94.6	95.2	96.2	97.1
CASE-3	1026.5	1028.5	1024.5	1028.8	1038.4	1052.7	1078.1	1102.1	92.1	92.4	92.1	92.4	93.2	94.3	96.3	98.1
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	28.1	28.3	28.9	29.7	30.6	31.8	34.1	36.4	28.9	28.8	29.3	30.0	30.8	32.0	34.3	36.7
CASE-2	28.5	28.7	29.2	30.0	30.9	32.1	34.3	36.5	29.3	29.3	29.6	30.3	31.1	32.3	34.5	36.8
CASE-3	28.5	28.6	28.9	29.8	30.9	32.4	35.4	38.6	29.2	29.0	29.2	30.0	31.0	32.6	35.6	38.9
RWAKE																
CASE-1	1035.9	1034.1	1040.3	1046.3	1051.0	1057.2	1069.8	1084.5	93.6	92.0	93.2	95.0	96.3	97.8	100.0	101.9
CASE-2	1043.1	1040.7	1045.0	1047.6	1049.5	1052.7	1061.7	1073.7	94.2	92.6	93.7	95.1	96.2	97.4	99.2	100.8
CASE-3	1035.2	1027.2	1026.7	1033.2	1044.0	1060.2	1091.3	1123.2	93.5	91.4	92.0	93.8	95.8	98.3	102.3	106.1

TABLE 36 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 10									
EV1																
CASE-1	21.3	21.8	22.4	23.1	23.6	23.9	24.3	24.6	19.8	21.4	22.3	23.2	23.8	24.2	24.7	25.0
CASE-2	21.6	22.5	23.1	23.7	24.0	24.2	24.4	24.5	20.1	22.2	23.0	23.8	24.2	24.5	24.7	24.9
CASE-3	21.6	22.7	23.2	23.7	24.0	24.3	24.7	25.0	20.1	22.3	23.0	23.7	24.1	24.5	25.0	25.3
SREV1-I																
CASE-1	20.9	21.0	21.1	21.2	21.3	21.4	21.4	21.5	19.6	19.7	19.8	20.0	20.0	20.1	20.2	20.2
CASE-2	21.4	21.3	21.3	21.2	21.2	21.1	21.0	20.9	20.0	20.0	20.0	20.0	20.0	19.9	19.8	19.7
CASE-3	21.3	21.3	21.2	21.0	21.0	21.0	21.1	21.2	20.0	20.1	19.9	19.8	19.8	19.8	19.9	20.0
REV1-I																
CASE-1	1035.9	1028.8	1028.0	1027.4	1027.1	1026.9	1026.7	1026.6	93.1	92.1	91.9	91.8	91.8	91.7	91.7	91.7
CASE-2	1050.3	1036.2	1029.9	1021.4	1014.9	1008.3	999.4	992.7	94.4	92.7	92.1	91.3	90.7	90.1	89.2	88.6
CASE-3	1038.9	1031.1	1017.1	1005.0	1000.0	997.8	997.8	999.5	93.4	92.3	91.0	89.9	89.4	89.2	89.2	89.3
SREV1-II																
CASE-1	20.9	21.1	21.1	21.2	21.3	21.3	21.4	21.4	19.5	19.8	19.9	20.0	20.1	20.1	20.2	20.2
CASE-2	21.3	21.3	21.3	21.2	21.1	21.0	20.9	20.8	20.0	20.1	20.1	20.0	20.0	19.9	19.8	19.7
CASE-3	21.3	21.4	21.1	21.0	20.9	20.9	21.0	21.0	19.9	20.1	20.0	19.8	19.8	19.8	19.8	19.9
REV1-II																
CASE-1	1034.9	1035.2	1035.4	1035.7	1035.8	1036.0	1036.1	1036.2	93.1	92.5	92.5	92.4	92.4	92.4	92.3	92.3
CASE-2	1049.8	1040.9	1035.2	1027.2	1020.9	1014.4	1005.7	999.1	94.4	93.0	92.4	91.7	91.0	90.4	89.6	89.0
CASE-3	1038.9	1033.7	1019.8	1007.9	1003.0	1000.7	1000.8	1002.5	93.4	92.4	91.1	89.9	89.5	89.2	89.2	89.3
GEV																
CASE-1	21.7	21.2	24.4	31.2	38.5	47.8	64.2	80.8	20.3	20.9	24.4	31.5	38.7	47.9	63.7	79.5
CASE-2	21.9	21.8	25.1	32.3	39.9	49.7	67.0	84.6	20.4	21.4	25.2	32.6	40.2	49.8	66.4	83.1
CASE-3	21.6	22.0	25.3	32.4	39.9	49.6	66.9	84.7	20.0	21.6	25.4	32.7	40.2	49.8	66.6	83.5
SRGEV																
CASE-1	21.0	21.0	21.4	22.1	22.9	23.9	25.7	27.2	19.5	19.8	20.2	21.1	22.0	23.2	25.0	26.7
CASE-2	21.3	21.3	21.6	22.3	23.1	24.2	26.0	27.7	19.8	20.1	20.5	21.4	22.3	23.5	25.4	27.1
CASE-3	21.3	21.3	21.5	22.1	23.0	24.2	26.2	28.1	19.8	20.1	20.4	21.2	22.2	23.5	25.6	27.6
RGEV																
CASE-1	1021.0	1033.7	1045.3	1063.8	1079.9	1097.9	1124.7	1147.3	92.7	92.4	92.8	93.4	94.1	94.9	96.2	97.4
CASE-2	1029.2	1038.8	1049.2	1066.2	1081.4	1098.5	1124.4	1146.5	93.5	92.9	93.1	93.6	94.2	94.9	96.1	97.1
CASE-3	1018.2	1031.7	1033.8	1046.6	1063.0	1084.5	1119.7	1151.3	92.4	92.3	91.8	92.0	92.8	93.9	96.0	98.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	21.3	21.1	21.4	22.1	22.9	24.1	26.5	28.9	19.8	20.0	20.3	21.0	21.8	23.0	25.4	27.8
CASE-2	21.6	21.4	21.7	22.3	23.1	24.3	26.6	29.0	20.1	20.3	20.6	21.3	22.1	23.3	25.6	28.0
CASE-3	21.6	21.3	21.5	22.1	23.1	24.6	27.6	30.9	20.1	20.2	20.4	21.1	22.1	23.6	26.6	30.0
RWAKE																
CASE-1	1023.7	1039.6	1051.4	1063.0	1070.1	1077.3	1088.9	1100.7	92.9	93.2	93.4	93.1	92.7	92.2	91.6	91.4
CASE-2	1030.6	1046.2	1056.4	1064.9	1069.4	1073.7	1081.3	1089.9	93.6	93.8	93.8	93.2	92.5	91.8	90.8	90.3
CASE-3	1023.6	1033.4	1038.1	1049.3	1061.9	1078.7	1108.8	1139.3	92.9	92.7	92.3	92.0	92.0	92.3	93.3	94.6

TABLE 37 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	: TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 13									
EV1																
CASE-1	17.7	18.4	19.0	19.7	20.1	20.5	20.9	21.1	18.0	19.1	19.9	20.6	21.1	21.5	21.9	22.2
CASE-2	18.0	19.0	19.6	20.2	20.5	20.7	20.9	21.0	18.2	19.8	20.4	21.1	21.4	21.7	21.9	22.0
CASE-3	17.9	19.1	19.6	20.1	20.4	20.8	21.1	21.4	18.2	19.9	20.4	21.0	21.4	21.7	22.1	22.4
SREV1-I																
CASE-1	17.4	17.6	17.8	17.9	18.0	18.1	18.2	18.2	17.7	18.0	18.2	18.3	18.4	18.5	18.6	18.7
CASE-2	17.7	17.8	17.9	17.9	17.9	17.9	17.8	17.7	18.1	18.3	18.3	18.3	18.3	18.3	18.2	18.2
CASE-3	17.7	17.9	17.8	17.8	17.8	17.8	17.9	18.0	18.0	18.3	18.2	18.2	18.2	18.2	18.3	18.4
REV1-I																
CASE-1	1038.9	1016.9	1013.7	1011.0	1009.5	1008.4	1007.2	1006.5	93.0	92.5	92.4	92.4	92.4	92.4	92.4	92.4
CASE-2	1053.4	1024.2	1015.6	1005.1	997.5	990.1	980.5	973.3	94.3	93.2	92.6	91.9	91.3	90.7	90.0	89.4
CASE-3	1042.2	1018.1	1001.7	987.6	981.5	978.3	977.3	978.3	93.3	92.7	91.5	90.4	90.0	89.8	89.8	90.0
SREV1-II																
CASE-1	17.3	17.5	17.6	17.7	17.8	17.8	17.9	17.9	17.7	17.9	18.0	18.1	18.2	18.3	18.3	18.4
CASE-2	17.7	17.7	17.7	17.7	17.6	17.5	17.4	17.4	18.0	18.2	18.2	18.1	18.1	18.0	17.9	17.8
CASE-3	17.7	17.8	17.6	17.5	17.4	17.4	17.5	17.5	18.0	18.2	18.0	17.9	17.9	17.9	17.9	18.0
REV1-II																
CASE-1	1036.5	1028.9	1027.9	1027.0	1026.6	1026.2	1025.8	1025.6	92.8	93.7	93.9	94.1	94.2	94.2	94.3	94.4
CASE-2	1051.4	1034.9	1028.0	1019.0	1012.1	1005.3	996.2	989.3	94.1	94.3	93.9	93.3	92.8	92.3	91.6	91.0
CASE-3	1040.5	1027.1	1012.0	999.0	993.5	990.8	990.3	991.7	93.1	93.6	92.5	91.6	91.2	91.0	91.1	91.3
GEV																
CASE-1	18.8	18.0	20.8	26.7	33.0	41.0	54.9	68.9	18.9	18.7	21.7	28.0	34.4	42.5	56.2	69.5
CASE-2	18.9	18.5	21.4	27.6	34.2	42.6	57.4	72.5	19.0	19.2	22.4	29.0	35.8	44.3	58.8	73.0
CASE-3	18.6	18.7	21.6	27.8	34.3	42.6	57.2	71.9	18.7	19.4	22.6	29.1	35.7	44.1	58.5	72.7
SRGEV																
CASE-1	17.4	17.5	17.9	18.8	19.8	20.9	22.9	24.6	17.6	17.9	18.4	19.4	20.4	21.6	23.6	25.3
CASE-2	17.6	17.7	18.1	19.0	20.0	21.2	23.2	25.0	17.9	18.1	18.6	19.6	20.6	21.9	23.9	25.7
CASE-3	17.6	17.7	18.0	18.8	19.8	21.2	23.4	25.4	17.8	18.1	18.5	19.4	20.5	21.8	24.1	26.1
RGEV																
CASE-1	1025.7	1027.8	1035.5	1048.8	1060.9	1074.7	1095.6	1113.6	92.1	93.7	94.4	95.5	96.4	97.4	98.9	100.2
CASE-2	1033.6	1033.2	1040.0	1052.0	1063.3	1076.4	1096.6	1114.2	92.8	94.2	94.8	95.7	96.6	97.5	98.9	100.1
CASE-3	1022.4	1025.4	1024.2	1032.6	1045.5	1063.3	1093.3	1120.7	91.7	93.5	93.5	94.2	95.3	96.8	99.2	101.5
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	17.7	17.6	18.1	19.0	20.0	21.5	24.2	26.9	17.9	18.1	18.6	19.5	20.5	22.0	24.7	27.4
CASE-2	17.9	17.8	18.3	19.1	20.2	21.7	24.4	27.0	18.1	18.3	18.8	19.7	20.7	22.2	24.9	27.6
CASE-3	17.9	17.7	18.1	19.0	20.2	21.9	25.3	28.7	18.1	18.2	18.6	19.5	20.7	22.4	25.8	29.2
RWAKE																
CASE-1	1035.5	1023.4	1038.5	1059.8	1076.7	1094.6	1121.2	1144.1	92.5	94.4	94.8	94.8	94.7	94.6	94.6	94.9
CASE-2	1042.4	1030.1	1043.7	1062.3	1076.6	1092.0	1114.7	1134.6	93.1	95.0	95.3	95.0	94.7	94.3	93.9	93.9
CASE-3	1035.1	1016.2	1024.4	1046.3	1069.9	1099.2	1146.8	1190.2	92.3	93.8	93.7	93.9	94.3	95.1	96.7	98.4

TABLE 38 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 20									
EV1																
CASE-1	15.2	15.5	16.0	16.6	16.9	17.2	17.5	17.7	13.6	14.5	15.2	15.8	16.2	16.5	16.8	17.1
CASE-2	15.4	16.0	16.5	17.0	17.2	17.4	17.5	17.6	13.8	15.0	15.6	16.1	16.4	16.6	16.8	16.9
CASE-3	15.3	16.2	16.5	16.9	17.2	17.5	17.8	18.0	13.7	15.2	15.6	16.1	16.4	16.7	17.1	17.3
SREV1-I																
CASE-1	14.9	14.9	15.0	15.2	15.3	15.3	15.4	15.5	13.4	13.8	14.0	14.2	14.3	14.4	14.5	14.6
CASE-2	15.2	15.1	15.1	15.2	15.1	15.1	15.1	15.0	13.6	14.0	14.1	14.2	14.2	14.2	14.2	14.2
CASE-3	15.2	15.1	15.1	15.0	15.1	15.1	15.2	15.3	13.6	14.0	14.0	14.1	14.1	14.2	14.3	14.4
REV1-I																
CASE-1	1037.4	1022.5	1020.5	1018.8	1017.8	1017.1	1016.4	1015.9	93.3	91.4	91.1	90.8	90.7	90.6	90.5	90.4
CASE-2	1052.0	1029.6	1022.0	1012.4	1005.2	998.1	988.8	981.8	94.6	92.0	91.2	90.3	89.6	88.9	88.0	87.4
CASE-3	1041.1	1022.4	1006.7	993.2	987.5	984.5	983.8	985.1	93.6	91.4	89.9	88.7	88.1	87.8	87.7	87.8
SREV1-II																
CASE-1	14.8	14.9	15.0	15.1	15.2	15.2	15.3	15.3	13.3	13.6	13.8	13.9	14.0	14.0	14.1	14.1
CASE-2	15.1	15.1	15.1	15.1	15.0	15.0	14.9	14.8	13.6	13.8	13.8	13.9	13.8	13.8	13.8	13.7
CASE-3	15.1	15.1	15.0	14.9	14.9	14.9	14.9	15.0	13.6	13.8	13.8	13.7	13.7	13.7	13.8	13.9
REV1-II																
CASE-1	1035.4	1033.5	1033.4	1033.3	1033.3	1033.3	1033.3	1033.3	93.1	92.3	92.2	92.1	92.0	92.0	91.9	91.9
CASE-2	1050.2	1039.3	1033.4	1025.1	1018.6	1012.0	1003.2	996.5	94.5	92.8	92.2	91.4	90.7	90.1	89.3	88.7
CASE-3	1039.5	1031.1	1016.8	1004.4	999.3	996.8	996.7	998.3	93.5	92.2	90.9	89.7	89.2	88.9	88.9	89.0
GEV																
CASE-1	16.0	15.3	17.6	22.4	27.3	33.3	42.9	51.7	14.5	14.4	16.9	21.9	26.8	32.7	42.3	51.2
CASE-2	16.1	15.7	18.2	23.3	28.5	34.8	45.1	54.7	14.5	14.8	17.4	22.7	27.8	34.0	44.2	53.7
CASE-3	15.8	15.8	18.3	23.4	28.6	34.9	45.2	55.0	14.2	14.9	17.6	22.8	27.9	34.1	44.3	54.0
SRGEV																
CASE-1	15.1	14.9	15.2	16.1	17.0	18.2	20.1	21.9	13.5	13.6	14.0	15.0	16.0	17.3	19.4	21.3
CASE-2	15.3	15.1	15.4	16.2	17.2	18.4	20.5	22.3	13.7	13.8	14.2	15.1	16.2	17.6	19.8	21.8
CASE-3	15.2	15.1	15.3	16.1	17.0	18.3	20.5	22.6	13.7	13.8	14.1	15.0	16.1	17.5	19.9	22.1
RGEV																
CASE-1	1025.1	1032.2	1040.6	1054.6	1067.2	1081.7	1103.7	1122.7	91.9	92.2	93.0	94.5	95.8	97.3	99.6	101.5
CASE-2	1033.1	1037.5	1044.9	1057.6	1069.4	1083.1	1104.5	1123.3	92.6	92.7	93.4	94.8	96.0	97.5	99.6	101.5
CASE-3	1021.2	1029.3	1029.1	1038.6	1052.5	1071.3	1103.1	1132.0	91.7	92.0	92.1	93.0	94.3	96.1	99.0	101.7
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.3	15.1	15.3	16.0	16.9	18.3	21.1	24.1	13.9	13.7	14.1	15.1	16.2	17.9	20.9	24.0
CASE-2	15.5	15.3	15.5	16.1	17.0	18.5	21.3	24.3	14.1	13.9	14.3	15.2	16.4	18.1	21.2	24.2
CASE-3	15.5	15.2	15.4	16.0	17.0	18.6	21.9	25.6	14.1	13.8	14.2	15.1	16.4	18.2	21.8	25.6
RWAKE																
CASE-1	1030.6	1033.6	1044.7	1058.0	1067.9	1078.7	1096.4	1113.8	92.1	92.5	93.7	94.9	95.7	96.4	97.4	98.3
CASE-2	1037.4	1040.3	1049.9	1060.4	1067.8	1076.1	1090.1	1104.5	92.8	93.1	94.2	95.2	95.7	96.2	96.9	97.5
CASE-3	1029.4	1025.9	1029.8	1043.9	1060.9	1083.4	1122.9	1161.5	92.1	92.0	92.6	93.8	95.0	96.6	99.2	101.6

TABLE 39 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	: TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
	SAMPLE SIZE= 30															
EV1																
CASE-1	11.5	12.0	12.4	12.9	13.2	13.4	13.7	13.8	11.6	12.4	12.9	13.4	13.7	13.9	14.2	14.4
CASE-2	11.7	12.4	12.8	13.2	13.4	13.6	13.7	13.8	11.8	12.8	13.3	13.7	13.9	14.1	14.3	14.3
CASE-3	11.7	12.5	12.8	13.2	13.4	13.6	13.8	14.0	11.7	12.9	13.3	13.7	13.9	14.1	14.4	14.6
SREV1-I																
CASE-1	11.3	11.8	12.0	12.2	12.4	12.5	12.6	12.7	11.4	12.1	12.4	12.6	12.8	12.9	13.1	13.2
CASE-2	11.6	11.9	12.1	12.2	12.3	12.3	12.3	12.3	11.7	12.3	12.5	12.6	12.7	12.7	12.8	12.8
CASE-3	11.6	12.0	12.0	12.1	12.2	12.3	12.4	12.5	11.6	12.3	12.4	12.5	12.6	12.7	12.8	12.9
REV1-I																
CASE-1	1037.9	1021.1	1018.8	1016.9	1015.9	1015.1	1014.3	1013.8	93.2	91.7	91.5	91.3	91.2	91.1	91.0	91.0
CASE-2	1052.3	1028.7	1021.1	1011.4	1004.2	997.1	987.8	980.8	94.5	92.4	91.6	90.8	90.1	89.4	88.6	88.0
CASE-3	1041.0	1022.8	1007.2	993.9	988.2	985.3	984.7	986.0	93.5	91.8	90.4	89.2	88.7	88.4	88.4	88.5
SREV1-II																
CASE-1	11.3	11.6	11.7	11.9	12.0	12.0	12.1	12.2	11.4	11.8	12.0	12.1	12.2	12.3	12.4	12.4
CASE-2	11.5	11.7	11.8	11.8	11.8	11.8	11.8	11.8	11.7	11.9	12.0	12.1	12.1	12.1	12.1	12.0
CASE-3	11.5	11.8	11.7	11.7	11.8	11.8	11.9	11.9	11.6	11.9	11.9	11.9	11.9	12.0	12.1	12.1
REV1-II																
CASE-1	1036.1	1030.8	1030.2	1029.7	1029.4	1029.2	1029.0	1028.9	93.1	92.6	92.5	92.5	92.4	92.4	92.4	92.4
CASE-2	1051.0	1036.5	1030.0	1021.3	1014.6	1007.8	998.9	992.1	94.4	93.1	92.5	91.7	91.1	90.5	89.7	89.1
CASE-3	1040.2	1028.8	1014.1	1001.4	996.0	993.5	993.1	994.7	93.4	92.4	91.1	90.0	89.5	89.3	89.2	89.4
GEV																
CASE-1	12.3	11.8	13.8	18.0	22.1	26.9	34.5	41.3	12.4	12.2	14.4	18.6	22.7	27.5	35.0	41.6
CASE-2	12.4	12.1	14.3	18.8	23.2	28.3	36.5	43.8	12.5	12.6	14.9	19.4	23.8	28.9	37.0	44.2
CASE-3	12.1	12.2	14.4	18.8	23.1	28.2	36.4	43.8	12.2	12.7	15.0	19.4	23.7	28.8	36.8	44.0
SRGEV																
CASE-1	11.5	11.6	12.1	13.2	14.4	15.8	18.1	20.1	11.6	11.8	12.3	13.4	14.6	16.0	18.3	20.2
CASE-2	11.7	11.7	12.2	13.4	14.6	16.1	18.4	20.5	11.8	11.9	12.4	13.6	14.8	16.3	18.6	20.7
CASE-3	11.7	11.7	12.1	13.2	14.5	16.0	18.5	20.8	11.7	11.9	12.3	13.5	14.7	16.3	18.8	21.0
RGEV																
CASE-1	1029.1	1030.1	1035.4	1044.5	1052.8	1062.4	1076.8	1089.1	92.2	92.5	93.1	94.2	95.2	96.3	98.0	99.5
CASE-2	1037.6	1035.4	1039.3	1046.8	1053.9	1062.2	1075.2	1086.6	93.0	93.0	93.5	94.4	95.3	96.3	97.9	99.3
CASE-3	1025.4	1027.6	1024.2	1028.9	1038.3	1052.1	1076.0	1097.8	92.0	92.3	92.1	92.6	93.6	95.0	97.5	99.7
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	11.8	11.9	12.3	13.1	14.2	15.8	18.6	21.4	12.0	11.9	12.4	13.6	14.9	16.7	19.8	22.7
CASE-2	11.9	12.0	12.4	13.3	14.4	16.0	18.8	21.6	12.2	12.0	12.6	13.7	15.1	16.9	20.1	23.0
CASE-3	12.0	12.0	12.3	13.2	14.4	16.1	19.5	22.9	12.2	11.9	12.4	13.6	15.0	17.1	20.8	24.4
RWAKE																
CASE-1	1033.6	1033.5	1040.2	1045.8	1048.6	1051.4	1056.5	1062.6	92.4	93.0	93.7	94.2	94.5	94.8	95.4	96.2
CASE-2	1040.7	1040.4	1045.2	1047.3	1047.1	1046.7	1047.3	1049.8	93.1	93.6	94.1	94.3	94.4	94.4	94.7	95.2
CASE-3	1032.5	1027.4	1027.5	1033.2	1041.8	1054.0	1076.4	1098.7	92.5	92.4	92.4	93.0	93.8	95.1	97.4	99.7

TABLE 40 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 40									
EV1																
CASE-1	10.1	10.8	11.1	11.5	11.8	12.0	12.2	12.3	10.5	10.6	11.0	11.4	11.6	11.8	12.0	12.2
CASE-2	10.2	11.1	11.5	11.8	12.0	12.1	12.3	12.3	10.6	11.0	11.3	11.7	11.8	12.0	12.1	12.1
CASE-3	10.3	11.2	11.5	11.8	12.0	12.1	12.4	12.5	10.6	11.1	11.3	11.6	11.8	12.0	12.2	12.4
SREV1-I																
CASE-1	10.0	10.5	10.7	11.0	11.2	11.3	11.4	11.5	10.3	10.7	10.9	11.2	11.3	11.4	11.6	11.7
CASE-2	10.2	10.6	10.8	11.0	11.1	11.2	11.2	11.2	10.5	10.8	11.0	11.2	11.2	11.3	11.3	11.3
CASE-3	10.2	10.7	10.8	11.0	11.1	11.2	11.3	11.4	10.4	10.9	11.0	11.1	11.2	11.3	11.4	11.5
REV1-I																
CASE-1	1035.7	1029.3	1028.7	1028.1	1027.8	1027.6	1027.4	1027.3	92.9	92.8	92.8	92.9	92.9	92.9	92.9	92.9
CASE-2	1050.2	1036.5	1030.2	1021.7	1015.1	1008.5	999.7	992.9	94.2	93.6	93.1	92.4	91.9	91.3	90.6	90.0
CASE-3	1039.1	1030.2	1015.9	1003.7	998.6	996.2	996.1	997.8	93.2	93.2	92.0	91.0	90.6	90.4	90.5	90.7
SREV1-II																
CASE-1	10.0	10.3	10.4	10.6	10.7	10.7	10.8	10.9	10.2	10.5	10.6	10.8	10.9	10.9	11.0	11.1
CASE-2	10.2	10.4	10.5	10.5	10.6	10.6	10.6	10.5	10.4	10.6	10.7	10.7	**10.8**	10.8	10.7	10.7
CASE-3	10.2	10.5	10.5	10.5	10.5	10.6	10.6	10.7	10.4	10.6	10.6	10.6	10.7	10.7	10.8	10.9
REV1-II																
CASE-1	1034.4	1037.4	1038.0	1038.6	1039.0	1039.3	1039.6	1039.8	92.9	93.1	93.1	93.1	93.1	93.2	93.2	93.2
CASE-2	1049.3	1043.0	1037.7	1030.0	1023.9	1017.6	1009.0	1002.4	94.3	93.6	93.2	92.5	91.9	91.3	90.6	90.0
CASE-3	1038.5	1035.1	1021.5	1009.7	1004.9	1002.8	1002.9	1004.7	93.3	93.1	91.8	90.8	90.4	90.2	90.2	90.4
GEV																
CASE-1	10.7	10.6	12.5	16.3	19.9	24.1	30.6	36.2	11.3	10.5	12.3	16.0	19.5	23.7	30.1	35.7
CASE-2	10.8	10.9	13.0	17.0	20.9	25.4	32.4	38.6	11.3	10.8	12.7	16.6	20.5	24.9	31.8	37.9
CASE-3	10.6	11.0	13.1	17.0	20.8	25.3	32.3	38.6	11.1	10.9	12.8	16.6	20.4	24.8	31.6	37.7
SRGEV																
CASE-1	10.2	10.2	10.8	12.1	13.4	14.9	17.4	19.5	10.5	10.5	11.0	12.3	13.5	15.1	17.5	19.7
CASE-2	10.4	10.4	10.9	12.2	13.6	15.2	17.8	20.0	10.6	10.6	11.1	12.4	13.7	15.3	17.9	20.1
CASE-3	10.4	10.4	10.9	12.1	13.5	15.2	17.8	20.2	10.6	10.6	11.1	12.3	13.6	15.3	18.0	20.3
RGEV																
CASE-1	1029.9	1035.9	1041.5	1051.3	1060.7	1071.9	1089.6	1105.3	91.5	92.9	94.1	95.9	97.6	99.3	102.0	104.2
CASE-2	1038.2	1041.2	1045.5	1053.8	1062.1	1072.4	1089.1	1104.4	92.1	93.4	94.6	96.4	98.0	99.7	102.4	104.7
CASE-3	1025.9	1033.2	1030.2	1035.8	1046.6	1062.4	1090.3	1116.4	91.2	92.9	93.2	94.6	96.2	98.3	101.7	104.7
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	10.5	10.6	11.1	12.1	13.4	15.2	18.6	21.8	10.7	10.8	11.2	12.1	13.4	15.2	18.6	21.9
CASE-2	10.7	10.7	11.2	12.2	13.5	15.4	18.8	22.1	10.9	10.9	11.3	12.3	13.6	15.4	18.8	22.1
CASE-3	10.7	10.7	11.1	12.1	13.5	15.6	19.5	23.5	10.9	10.9	11.2	12.2	13.5	15.6	19.5	23.4
RWAKE																
CASE-1	1039.2	1034.1	1040.0	1050.0	1060.0	1073.1	1097.0	1121.6	92.0	92.8	93.9	95.7	97.4	99.5	103.4	107.3
CASE-2	1046.2	1041.0	1045.1	1051.8	1058.8	1068.7	1087.8	1108.2	92.6	93.5	94.5	96.1	97.6	99.5	103.1	106.8
CASE-3	1038.0	1026.7	1025.6	1036.7	1053.8	1078.6	1124.4	1170.5	92.0	92.4	93.0	94.7	96.9	99.8	105.2	110.6

TABLE 41 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 1									
EV1																
CASE-1	70.6	61.5	60.2	59.1	58.4	58.0	57.4	57.1	73.5	64.1	62.7	61.5	60.9	60.4	59.9	59.5
CASE-2	76.5	64.4	61.5	58.3	56.1	54.1	51.7	49.9	79.4	66.8	63.8	60.5	58.2	56.2	53.6	51.8
CASE-3	75.3	65.5	63.1	59.5	56.6	53.6	49.8	47.0	77.6	67.5	65.0	61.3	58.3	55.3	51.3	48.4
SREV1-I																
CASE-1	68.8	68.0	68.0	68.0	68.0	68.0	68.0	68.0	71.7	70.8	70.8	70.8	70.8	70.8	70.8	70.8
CASE-2	74.5	71.6	69.9	67.6	65.8	64.1	61.7	60.0	77.4	74.2	72.4	70.0	68.2	66.3	63.9	62.1
CASE-3	73.4	72.8	71.6	68.9	66.2	63.4	59.4	56.3	75.7	74.6	73.4	70.5	67.8	64.8	60.7	57.6
REV1-I																
CASE-1	539.1	535.5	535.3	535.2	535.2	535.2	535.2	535.2	53.5	53.1	53.1	53.1	53.1	53.0	53.0	53.0
CASE-2	558.3	539.3	526.9	509.7	496.4	483.0	465.4	452.1	55.4	53.4	52.2	50.5	49.2	47.8	46.1	44.8
CASE-3	547.6	544.5	535.9	515.2	495.5	473.8	443.9	421.0	54.4	53.8	52.9	50.9	48.9	46.8	43.8	41.5
SREV1-II																
CASE-1	68.7	68.4	68.4	68.4	68.4	68.4	68.4	68.4	71.5	71.5	71.6	71.6	71.6	71.7	71.7	71.7
CASE-2	74.6	71.5	69.8	67.4	65.6	63.8	61.4	59.7	77.3	74.4	72.7	70.2	68.4	66.5	64.1	62.2
CASE-3	73.4	72.8	71.6	68.8	66.2	63.2	59.2	56.2	75.6	75.1	73.9	71.0	68.3	65.3	61.1	58.0
REV1-II																
CASE-1	538.8	537.8	537.9	537.9	538.0	538.0	538.1	538.1	53.5	53.2	53.2	53.1	53.1	53.1	53.1	53.1
CASE-2	558.9	538.1	525.4	507.8	494.3	480.8	463.0	449.7	55.5	53.2	51.9	50.1	48.7	47.4	45.6	44.3
CASE-3	547.6	545.6	536.9	516.2	496.3	474.6	444.6	421.6	54.4	53.9	52.9	50.9	48.9	46.7	43.8	41.5
GEV																
CASE-1	102.7	47.8	39.6	32.4	28.5	25.5	22.4	20.4	107.0	49.8	41.2	33.8	29.7	26.6	23.3	21.3
CASE-2	111.5	49.9	40.4	32.0	27.4	23.8	20.1	17.9	115.7	51.8	41.9	33.2	28.4	24.7	20.9	18.5
CASE-3	109.7	50.8	41.5	32.6	27.6	23.6	19.4	16.8	113.0	52.4	42.7	33.6	28.5	24.3	20.0	17.3
SRGEV																
CASE-1	67.9	68.3	69.1	70.5	71.9	73.6	76.3	78.7	70.8	71.3	72.2	73.7	75.2	77.0	79.8	82.4
CASE-2	71.5	71.1	71.6	72.7	74.0	75.6	78.4	81.0	74.3	73.9	74.5	75.8	77.3	79.2	82.5	85.6
CASE-3	70.5	72.4	73.4	74.2	74.6	74.9	75.7	76.5	72.6	74.5	75.8	76.8	77.5	78.2	79.5	80.8
RGEV																
CASE-1	529.2	536.2	544.2	557.6	570.1	584.7	607.6	627.9	53.0	53.1	53.6	54.4	55.1	56.0	57.4	58.7
CASE-2	532.8	534.0	540.0	551.5	563.2	577.8	601.9	624.5	53.5	52.9	53.1	53.5	54.1	54.8	56.0	57.1
CASE-3	522.8	541.5	551.6	560.1	564.9	569.7	577.4	585.2	52.5	53.6	54.1	54.3	54.1	53.9	53.7	53.6
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	68.7	68.2	68.9	70.1	71.6	73.7	78.0	83.3	71.9	71.0	72.0	73.9	75.9	78.4	82.9	87.6
CASE-2	72.0	71.5	71.7	72.2	73.0	74.4	77.7	81.9	75.0	74.0	74.7	76.0	77.3	79.2	82.7	86.4
CASE-3	71.3	72.9	72.5	71.7	71.5	72.2	75.7	81.7	73.7	74.6	74.8	75.2	75.9	77.5	81.8	87.5
RWAKE																
CASE-1	532.0	533.7	542.7	556.3	568.2	582.3	606.2	630.0	53.1	53.5	53.7	53.9	54.1	54.6	55.8	57.4
CASE-2	535.1	536.8	543.0	551.7	559.5	569.4	587.3	606.2	53.3	53.7	53.4	53.0	52.6	52.4	52.7	53.5
CASE-3	527.0	543.7	547.2	547.6	548.5	552.8	568.6	593.8	52.6	54.3	53.8	52.4	51.3	50.6	50.7	52.2

TABLE 42 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	: TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 5									
EV1																
CASE-1	33.1	32.5	33.3	34.2	34.7	35.2	35.7	36.0	31.9	30.4	31.1	31.9	32.3	32.7	33.2	33.4
CASE-2	35.0	36.9	37.2	37.1	36.7	36.2	35.4	34.7	33.5	34.1	34.2	34.0	33.7	33.2	32.4	31.7
CASE-3	34.3	37.7	38.4	38.0	37.2	36.1	34.3	32.8	32.9	34.6	35.1	34.6	33.8	32.8	31.1	29.8
SREV1-I																
CASE-1	32.1	32.1	32.2	32.3	32.4	32.5	32.6	32.6	30.7	31.0	31.1	31.3	31.4	31.5	31.6	31.6
CASE-2	34.9	33.9	33.2	32.2	31.5	30.7	29.6	28.8	33.0	32.3	31.7	30.8	30.1	29.3	28.3	27.6
CASE-3	34.3	34.3	33.9	32.7	31.5	30.2	28.4	26.9	32.5	32.7	32.3	31.2	30.1	28.9	27.1	25.8
REV1-I																
CASE-1	541.0	528.5	527.1	525.9	525.3	524.8	524.3	524.0	53.7	52.5	52.4	52.3	52.2	52.2	52.1	52.1
CASE-2	560.2	532.6	519.2	501.2	487.6	474.1	456.3	443.1	55.6	52.8	51.4	49.6	48.3	46.9	45.1	43.8
CASE-3	549.1	539.4	530.0	508.8	488.9	467.2	437.5	414.7	54.6	53.2	52.2	50.1	48.1	45.9	43.0	40.7
SREV1-II																
CASE-1	32.1	32.0	32.1	32.1	32.2	32.2	32.2	32.3	30.7	30.8	30.9	31.0	31.0	31.1	31.1	31.1
CASE-2	34.9	33.5	32.8	31.7	30.9	30.0	29.0	28.1	33.1	31.9	31.1	30.2	29.4	28.6	27.6	26.8
CASE-3	34.4	34.0	33.5	32.2	31.0	29.7	27.8	26.4	32.6	32.4	31.9	30.7	29.6	28.3	26.5	25.2
REV1-II																
CASE-1	539.2	536.3	536.1	535.9	535.8	535.8	535.7	535.7	53.6	53.1	53.0	53.0	53.0	52.9	52.9	52.9
CASE-2	559.7	535.5	522.4	504.5	490.9	477.3	459.6	446.3	55.6	52.9	51.6	49.8	48.4	47.1	45.3	44.0
CASE-3	548.2	543.4	534.4	513.4	493.5	471.8	441.9	419.0	54.5	53.5	52.5	50.4	48.4	46.3	43.3	41.0
GEV																
CASE-1	34.0	31.5	35.4	43.9	53.2	65.6	88.3	111.9	33.8	29.6	32.7	40.1	48.6	60.0	81.0	102.7
CASE-2	34.5	35.0	39.7	49.1	59.1	72.2	95.8	120.0	34.2	32.4	36.1	44.4	53.4	65.6	87.6	110.3
CASE-3	34.4	35.6	40.7	50.6	60.7	73.6	95.9	118.2	34.3	32.7	36.7	45.3	54.5	66.5	87.9	109.6
SRGEV																
CASE-1	32.0	32.0	32.4	33.5	34.6	36.1	38.5	40.7	30.7	30.7	31.2	32.3	33.5	35.0	37.5	39.8
CASE-2	33.9	33.3	33.7	34.6	35.8	37.3	40.1	42.7	32.2	31.6	32.0	33.0	34.3	35.9	38.8	41.6
CASE-3	33.4	33.8	34.5	35.4	36.3	37.4	39.2	41.0	31.8	32.2	32.8	33.8	34.7	35.9	38.0	39.9
RGEV																
CASE-1	534.6	535.2	539.6	547.7	555.5	564.9	579.7	593.0	53.8	53.0	52.9	53.0	53.1	53.3	53.8	54.3
CASE-2	539.5	532.6	534.3	539.3	545.3	553.4	567.5	581.0	54.3	52.8	52.4	52.0	51.9	51.8	52.0	52.3
CASE-3	528.9	540.4	546.5	548.8	548.4	547.4	546.5	546.8	53.3	53.4	53.4	52.7	51.9	51.1	49.9	49.1
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	32.6	32.2	32.7	33.6	34.7	36.4	39.8	43.7	31.4	30.9	31.3	32.3	33.4	35.1	38.5	42.4
CASE-2	34.7	34.0	34.3	34.9	35.9	37.4	40.5	43.9	32.9	32.3	32.6	33.3	34.3	35.8	39.0	42.6
CASE-3	34.2	34.5	34.5	34.8	35.5	37.0	41.1	46.6	32.5	33.0	33.1	33.4	34.1	35.6	39.1	43.8
RWAKE																
CASE-1	541.0	534.7	538.0	544.8	552.2	562.2	581.1	601.6	54.6	52.7	52.8	53.3	53.8	54.5	56.0	57.6
CASE-2	543.5	536.1	535.9	536.5	538.3	542.4	552.6	565.5	54.8	52.5	52.3	51.9	51.8	51.8	52.2	53.0
CASE-3	533.2	542.0	537.4	530.0	527.3	529.9	545.2	570.1	54.0	53.1	52.2	51.1	50.6	50.7	51.9	53.9

TABLE 43 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50)								TEST CATCHMENT -2 (BRIDGE NO.- 232)							
	2	10	20	50	100	200	500	1000	2	10	20	50	100	200	500	1000
	SAMPLE SIZE= 10															
EV1																
CASE-1	23.1	23.0	23.7	24.4	24.8	25.1	25.5	25.7	23.5	23.2	23.8	24.4	24.7	25.0	25.4	25.6
CASE-2	24.5	26.4	26.6	26.6	26.4	26.0	25.5	25.0	25.0	26.6	26.8	26.7	26.4	26.0	25.4	24.9
CASE-3	24.1	27.1	27.7	27.5	26.9	26.1	24.8	23.8	24.7	27.5	27.9	27.6	27.0	26.2	24.9	23.8
SREV1-I																
CASE-1	22.6	22.6	22.8	23.0	23.1	23.2	23.3	23.4	22.9	23.5	23.7	24.0	24.1	24.2	24.4	24.5
CASE-2	24.6	23.9	23.6	23.0	22.5	21.9	21.2	20.7	25.0	24.7	24.4	23.8	23.3	22.8	22.0	21.5
CASE-3	24.3	24.4	24.2	23.4	22.6	21.7	20.4	19.4	24.7	25.2	25.0	24.2	23.4	22.5	21.2	20.1
REV1-I																
CASE-1	540.2	531.6	530.8	530.1	529.7	529.5	529.2	529.1	53.5	53.1	53.0	53.0	53.0	53.0	53.0	53.0
CASE-2	559.8	533.9	520.7	502.8	489.2	475.7	458.0	444.7	55.5	53.1	51.8	50.0	48.7	47.4	45.6	44.3
CASE-3	549.3	538.5	528.8	507.5	487.5	465.9	436.1	413.4	54.5	53.5	52.5	50.4	48.4	46.3	43.3	41.1
SREV1-II																
CASE-1	22.5	22.6	22.7	22.8	22.9	22.9	23.0	23.0	22.9	23.2	23.3	23.4	23.5	23.6	23.6	23.7
CASE-2	24.5	23.7	23.2	22.5	22.0	21.4	20.7	20.1	25.0	24.3	23.8	23.1	22.5	22.0	21.2	20.6
CASE-3	24.3	24.2	23.9	23.0	22.2	21.2	19.9	18.9	24.8	24.8	24.5	23.6	22.8	21.8	20.5	19.4
REV1-II																
CASE-1	539.3	535.7	535.4	535.1	535.0	534.9	534.8	534.8	53.5	53.2	53.2	53.2	53.2	53.2	53.1	53.1
CASE-2	560.0	534.4	521.1	503.1	489.4	475.8	458.0	444.7	55.6	53.1	51.8	50.0	48.6	47.3	45.5	44.2
CASE-3	548.9	540.8	531.4	510.1	490.1	468.4	438.5	415.7	54.5	53.7	52.8	50.7	48.7	46.6	43.6	41.3
GEV																
CASE-1	24.3	22.5	25.6	32.4	39.5	48.6	64.5	80.2	24.9	22.7	25.5	31.9	38.9	48.0	64.1	80.4
CASE-2	24.5	24.8	28.7	37.0	45.7	57.1	77.5	98.6	25.1	25.1	28.8	36.7	45.2	56.4	76.5	97.3
CASE-3	24.6	24.9	29.4	38.7	48.3	60.6	82.5	105.1	25.3	25.3	29.6	38.5	47.8	59.9	81.4	103.5
SRGEV																
CASE-1	22.7	22.6	23.0	24.1	25.4	26.9	29.6	32.0	23.1	23.1	23.6	24.7	25.9	27.5	30.1	32.6
CASE-2	24.1	23.6	23.9	25.1	26.4	28.3	31.4	34.4	24.6	24.1	24.5	25.6	27.0	28.8	31.9	34.8
CASE-3	23.9	24.0	24.7	25.8	27.0	28.5	31.0	33.3	24.4	24.7	25.3	26.4	27.5	29.0	31.4	33.5
RGEV																
CASE-1	540.1	534.5	535.6	539.6	544.4	550.8	561.9	572.5	53.1	53.1	53.5	54.3	55.1	56.0	57.4	58.8
CASE-2	545.3	531.9	530.0	530.6	533.3	538.3	548.4	559.2	53.6	52.8	52.9	53.4	54.0	54.8	56.1	57.4
CASE-3	534.2	538.1	540.8	539.1	536.1	532.8	529.6	528.7	52.6	53.4	54.0	54.2	54.2	54.1	54.1	54.2
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	23.0	22.8	23.2	24.0	25.2	27.1	31.0	35.7	23.5	23.4	23.8	24.7	25.8	27.6	31.3	35.8
CASE-2	24.5	24.0	24.3	25.1	26.4	28.2	32.0	36.2	25.0	24.7	25.0	25.7	26.8	28.6	32.2	36.2
CASE-3	24.7	25.1	25.2	25.8	27.0	29.1	33.7	39.3	25.2	25.8	25.9	26.4	27.4	29.3	33.6	39.0
RWAKE																
CASE-1	547.3	530.3	531.7	538.0	546.3	558.5	582.9	610.6	53.6	52.9	53.6	54.6	55.6	56.8	58.9	61.0
CASE-2	550.0	531.3	528.6	528.3	530.9	536.7	551.4	569.9	53.9	52.9	53.2	53.6	54.1	54.7	55.9	57.3
CASE-3	539.0	539.8	531.5	519.8	514.7	515.8	531.2	557.9	53.2	53.4	53.5	53.3	53.2	53.3	54.2	55.8

TABLE 44 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 13									
EV1																
CASE-1	19.8	18.6	19.1	19.6	19.9	20.2	20.5	20.7	20.8	20.4	20.9	21.4	21.8	22.0	22.3	22.5
CASE-2	20.8	21.2	21.4	21.4	21.2	20.9	20.4	20.0	21.9	23.3	23.5	23.5	23.2	22.9	22.4	22.0
CASE-3	20.4	21.7	22.0	21.8	21.3	20.7	19.7	18.8	21.6	24.1	24.5	24.3	23.8	23.1	22.0	21.0
SREV1-I																
CASE-1	19.0	19.5	19.8	20.0	20.2	20.3	20.4	20.5	20.3	20.1	20.3	20.4	20.5	20.6	20.7	20.8
CASE-2	20.5	20.5	20.3	19.9	19.5	19.1	18.5	18.0	22.0	21.2	20.8	20.3	19.9	19.4	18.8	18.3
CASE-3	20.2	20.8	20.7	20.2	19.5	18.8	17.7	16.9	21.8	21.5	21.3	20.7	20.0	19.2	18.0	17.1
REV1-I																
CASE-1	540.4	530.3	529.1	528.1	527.6	527.2	526.8	526.6	53.5	53.2	53.1	53.1	53.1	53.1	53.1	53.1
CASE-2	559.8	533.7	520.4	502.5	488.9	475.3	457.6	444.3	55.4	53.7	52.5	50.8	49.5	48.2	46.4	45.1
CASE-3	548.9	539.5	529.9	508.7	488.7	467.1	437.2	414.5	54.3	54.3	53.5	51.4	49.5	47.3	44.3	42.1
SREV1-II																
CASE-1	19.0	19.3	19.4	19.6	19.6	19.7	19.8	19.8	20.2	20.3	20.3	20.4	20.5	20.6	20.6	20.6
CASE-2	20.5	20.0	19.7	19.1	18.7	18.2	17.6	17.1	22.0	21.1	20.7	20.1	19.6	19.1	18.4	17.9
CASE-3	20.2	20.3	20.1	19.5	18.8	18.0	16.9	16.1	21.7	21.5	21.2	20.5	19.7	18.9	17.7	16.8
REV1-II																
CASE-1	539.1	536.6	536.4	536.3	536.3	536.2	536.2	536.2	53.4	53.7	53.8	53.9	53.9	53.9	54.0	54.0
CASE-2	559.9	534.8	521.5	503.5	489.8	476.2	458.4	445.2	55.4	53.7	52.5	50.8	49.4	48.1	46.4	45.0
CASE-3	548.8	541.3	532.0	510.7	490.7	469.0	439.1	416.3	54.3	54.4	53.6	51.5	49.6	47.4	44.4	42.2
GEV																
CASE-1	20.9	18.3	20.9	26.8	32.9	40.7	53.8	66.5	21.7	19.9	22.6	28.5	34.8	42.9	56.7	70.2
CASE-2	21.0	20.1	23.5	30.6	38.0	47.4	63.7	79.9	21.9	21.9	25.4	32.9	40.8	51.2	69.6	88.6
CASE-3	21.3	20.2	24.0	31.8	39.6	49.3	65.8	81.9	22.1	22.1	26.0	34.4	43.2	54.7	75.3	96.6
SRGEV																
CASE-1	19.0	19.2	19.9	21.3	22.9	24.7	27.7	30.4	20.5	20.2	20.7	21.9	23.2	25.0	27.8	30.4
CASE-2	20.0	19.8	20.5	22.0	23.8	26.0	29.6	32.8	21.7	21.0	21.4	22.6	24.1	26.1	29.4	32.5
CASE-3	19.8	20.1	21.0	22.6	24.3	26.2	29.2	31.9	21.5	21.4	22.0	23.3	24.6	26.3	29.0	31.4
RGEV																
CASE-1	536.6	535.8	538.5	544.0	549.6	556.4	567.3	577.2	52.6	53.5	54.3	55.6	56.8	58.2	60.4	62.3
CASE-2	542.3	532.5	531.8	533.3	536.3	540.9	549.9	559.0	53.0	53.3	53.8	54.9	55.9	57.2	59.4	61.4
CASE-3	531.4	538.9	542.8	541.9	538.9	535.3	530.9	528.4	52.0	54.0	54.9	55.7	56.0	56.4	56.9	57.5
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	19.9	19.4	20.1	21.7	23.5	26.0	30.8	35.9	21.1	20.7	21.1	22.1	23.4	25.4	29.3	33.7
CASE-2	20.8	20.1	20.8	22.4	24.2	26.8	31.4	36.0	22.2	21.6	21.9	22.9	24.1	26.0	29.8	33.7
CASE-3	21.3	21.4	21.9	23.3	25.1	27.8	33.3	39.5	22.5	22.5	22.8	23.7	25.1	27.3	32.0	37.6
RWAKE																
CASE-1	538.4	530.1	530.1	533.4	539.1	548.5	568.5	591.3	52.9	53.9	54.2	54.9	55.7	56.8	59.1	61.6
CASE-2	545.1	535.8	531.6	527.3	526.5	529.1	539.4	554.2	53.2	53.7	53.8	54.1	54.7	55.7	57.5	59.5
CASE-3	534.5	543.4	534.8	520.6	513.0	511.6	524.2	549.9	52.1	54.5	54.4	53.8	53.5	53.6	54.9	57.1

TABLE 45 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 20									
EV1																
CASE-1	16.3	16.3	16.7	17.2	17.5	17.8	18.0	18.2	15.9	15.4	15.8	16.2	16.5	16.8	17.0	17.2
CASE-2	17.3	18.8	19.0	19.0	18.8	18.6	18.2	17.8	16.7	17.6	17.8	17.8	17.6	17.4	17.0	16.7
CASE-3	17.0	19.3	19.7	19.6	19.2	18.7	17.8	17.0	16.4	17.9	18.3	18.2	17.8	17.3	16.4	15.7
SREV1-I																
CASE-1	16.0	16.3	16.6	16.8	17.0	17.1	17.2	17.3	15.5	15.7	15.9	16.1	16.3	16.4	16.5	16.6
CASE-2	17.4	17.2	17.1	16.8	16.5	16.1	15.7	15.3	16.6	16.4	16.3	16.0	15.7	15.4	15.0	14.6
CASE-3	17.2	17.5	17.5	17.1	16.5	15.9	15.0	14.3	16.4	16.7	16.7	16.3	15.8	15.2	14.3	13.7
REV1-I																
CASE-1	538.0	539.7	540.3	540.9	541.3	541.6	541.9	542.1	53.6	52.8	52.8	52.7	52.7	52.7	52.6	52.6
CASE-2	557.6	541.7	529.7	512.7	499.5	486.2	468.6	455.3	55.5	53.4	52.1	50.4	49.0	47.7	45.9	44.6
CASE-3	546.8	547.4	539.3	518.9	499.3	477.6	447.6	424.6	54.4	53.8	52.9	50.9	48.9	46.7	43.8	41.5
SREV1-II																
CASE-1	15.9	16.1	16.2	16.4	16.5	16.5	16.6	16.7	15.4	15.5	15.6	15.8	15.9	15.9	16.0	16.1
CASE-2	17.4	16.9	16.6	16.1	15.8	15.4	14.9	14.5	16.6	16.1	15.8	15.4	15.1	14.7	14.2	13.8
CASE-3	17.2	17.2	17.0	16.4	15.9	15.2	14.3	13.6	16.3	16.4	16.2	15.7	15.1	14.5	13.7	13.0
REV1-II																
CASE-1	538.5	538.7	538.9	539.2	539.3	539.4	539.6	539.6	53.5	53.3	53.3	53.3	53.3	53.3	53.3	53.3
CASE-2	559.0	537.8	525.0	507.4	493.9	480.4	462.7	449.4	55.5	53.2	51.9	50.2	48.8	47.5	45.7	44.4
CASE-3	547.6	545.7	537.1	516.3	496.5	474.8	444.8	421.8	54.4	53.9	53.0	50.9	49.0	46.8	43.8	41.6
GEV																
CASE-1	16.6	16.0	18.8	24.4	29.9	36.5	47.2	57.2	16.8	15.1	17.6	22.8	28.1	34.5	44.9	54.6
CASE-2	16.6	17.7	21.3	28.4	35.4	44.0	58.5	72.3	16.8	16.6	19.8	26.3	32.8	41.0	54.7	68.0
CASE-3	16.9	17.8	22.0	29.9	37.5	46.6	61.5	75.8	17.1	16.6	20.2	27.4	34.4	42.9	57.0	70.5
SRGEV																
CASE-1	16.3	16.1	16.6	17.8	19.2	20.9	23.7	26.2	15.7	15.5	16.0	17.3	18.8	20.5	23.4	25.9
CASE-2	17.3	16.7	17.2	18.5	20.1	22.1	25.4	28.5	16.6	16.0	16.5	17.9	19.5	21.6	25.0	28.1
CASE-3	17.2	17.1	17.7	19.1	20.6	22.4	25.3	27.8	16.4	16.2	16.9	18.4	20.0	21.9	24.9	27.4
RGEV																
CASE-1	528.4	537.2	545.5	559.2	571.7	586.0	608.2	627.7	53.6	53.2	53.3	53.6	54.0	54.5	55.4	56.3
CASE-2	533.0	534.0	539.5	550.1	560.8	573.9	595.5	615.5	54.0	53.0	52.8	52.7	52.9	53.2	53.9	54.7
CASE-3	522.4	541.7	551.9	560.2	564.7	569.0	575.9	582.7	53.0	53.7	53.9	53.5	53.0	52.4	51.7	51.3
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	17.2	16.5	16.9	18.0	19.6	22.0	26.9	32.3	16.5	16.1	16.5	17.6	19.1	21.4	26.0	31.2
CASE-2	17.8	16.9	17.3	18.5	20.2	22.7	27.5	32.3	16.9	16.4	16.7	17.9	19.5	22.0	26.6	31.2
CASE-3	19.5	19.2	19.4	20.4	21.9	24.4	30.0	36.7	18.4	18.4	18.7	19.7	21.2	23.8	29.4	36.0
RWAKE																
CASE-1	532.1	539.1	545.0	554.4	563.7	576.0	599.2	624.2	54.1	53.2	53.2	53.3	53.6	54.1	55.2	56.6
CASE-2	534.1	539.0	541.8	545.6	549.9	556.5	570.9	587.5	54.3	53.4	52.9	52.3	52.0	51.8	52.0	52.6
CASE-3	524.8	548.9	548.3	541.7	537.3	536.6	546.9	568.6	53.2	53.9	52.9	51.3	50.3	49.8	50.3	52.2

TABLE 46 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 30									
EV1																
CASE-1	13.8	13.0	13.3	13.7	13.9	14.1	14.3	14.4	13.5	13.1	13.4	13.7	13.9	14.1	14.3	14.4
CASE-2	14.4	14.9	15.0	15.0	14.8	14.6	14.3	14.0	14.2	15.0	15.1	15.1	14.9	14.7	14.4	14.1
CASE-3	14.1	15.2	15.4	15.3	15.0	14.5	13.8	13.2	14.0	15.4	15.6	15.5	15.2	14.7	14.0	13.4
SREV1-I																
CASE-1	13.3	14.0	14.3	14.7	14.9	15.0	15.2	15.3	13.2	13.6	13.8	14.1	14.3	14.5	14.6	14.7
CASE-2	14.3	14.5	14.5	14.3	14.1	13.9	13.5	13.2	14.3	14.2	14.2	14.0	13.8	13.6	13.2	12.9
CASE-3	14.1	14.6	14.7	14.4	14.0	13.6	12.8	12.3	14.1	14.4	14.4	14.1	13.7	13.2	12.5	12.0
REV1-I																
CASE-1	540.1	532.1	531.3	530.7	530.4	530.2	530.0	529.9	53.4	53.5	53.6	53.6	53.7	53.7	53.7	53.7
CASE-2	559.7	534.6	521.6	503.9	490.4	476.9	459.2	446.0	55.3	53.9	52.7	51.1	49.8	48.5	46.7	45.4
CASE-3	549.1	539.2	529.7	508.5	488.6	466.9	437.2	414.4	54.3	54.1	53.3	51.2	49.3	47.1	44.2	41.9
SREV1-II																
CASE-1	13.2	13.7	13.9	14.1	14.2	14.3	14.4	14.5	13.1	13.4	13.5	13.7	13.8	13.9	14.0	14.0
CASE-2	14.3	14.2	14.0	13.7	13.4	13.1	12.7	12.4	14.2	13.9	13.7	13.4	13.1	12.8	12.4	12.1
CASE-3	14.0	14.3	14.3	13.9	13.4	12.9	12.2	11.6	14.0	14.1	14.0	13.6	13.1	12.6	11.9	11.3
REV1-II																
CASE-1	539.5	535.2	534.8	534.4	534.2	534.1	534.0	533.9	53.3	53.8	53.9	54.0	54.0	54.1	54.1	54.1
CASE-2	559.8	534.9	521.6	503.7	490.1	476.5	458.7	445.4	55.4	53.8	52.6	50.9	49.6	48.3	46.5	45.2
CASE-3	548.4	542.7	533.5	512.4	492.5	470.8	440.9	418.0	54.3	54.4	53.6	51.6	49.6	47.5	44.5	42.2
GEV																
CASE-1	14.6	12.9	14.8	19.0	23.1	27.9	35.3	41.9	14.2	12.9	14.9	19.3	23.6	28.7	36.7	44.0
CASE-2	14.6	14.2	16.9	22.2	27.3	33.5	43.2	52.1	14.2	14.2	17.0	22.5	27.9	34.5	45.1	55.1
CASE-3	14.9	14.3	17.4	23.2	28.7	34.9	44.5	52.8	14.5	14.4	17.5	23.6	29.4	36.3	47.1	57.1
SRGEV																
CASE-1	13.7	13.7	14.3	15.7	17.2	19.0	22.0	24.6	13.6	13.4	13.9	15.2	16.7	18.5	21.5	24.2
CASE-2	14.5	14.1	14.6	16.1	17.8	20.0	23.5	26.7	14.5	13.8	14.3	15.7	17.4	19.6	23.2	26.3
CASE-3	14.3	14.2	15.0	16.6	18.3	20.4	23.6	26.2	14.4	14.0	14.7	16.3	18.0	20.0	23.2	25.9
RGEV																
CASE-1	533.5	534.2	539.0	547.7	556.0	565.7	581.0	594.6	52.7	53.7	54.4	55.5	56.5	57.7	59.6	61.2
CASE-2	538.0	532.0	534.3	540.2	546.9	555.6	570.6	584.9	53.0	53.5	53.9	54.8	55.7	56.9	58.8	60.5
CASE-3	528.2	539.6	545.9	548.5	548.5	548.0	548.1	549.4	51.9	54.0	55.0	55.8	56.2	56.5	57.1	57.6
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	14.2	13.9	14.3	15.6	17.3	19.8	24.7	30.1	14.0	13.7	14.2	15.3	16.9	19.2	23.9	29.0
CASE-2	14.9	14.4	14.7	16.1	17.9	20.6	25.5	30.5	14.8	14.2	14.6	15.8	17.5	20.1	24.8	29.5
CASE-3	17.1	17.2	17.4	18.4	20.0	22.6	28.1	34.2	16.8	16.8	17.1	18.1	19.8	22.4	27.9	34.0
RWAKE																
CASE-1	539.7	531.3	535.0	544.7	556.1	571.9	601.1	631.3	52.9	54.0	54.5	55.2	55.9	56.6	58.1	59.6
CASE-2	541.5	532.7	533.4	537.2	542.9	551.8	569.9	589.6	53.0	54.1	54.3	54.5	54.7	55.1	56.0	57.1
CASE-3	533.6	540.2	537.1	531.8	531.3	536.4	556.3	585.4	52.1	54.7	54.7	54.3	54.1	54.3	55.3	57.1

TABLE 47 : PERCENTAGE CV OF FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 40									
EV1																
CASE-1	11.3	11.2	11.5	11.8	12.0	12.2	12.4	12.5	11.4	11.3	11.6	12.0	12.2	12.3	12.5	12.6
CASE-2	11.9	12.8	13.0	13.0	12.8	12.7	12.4	12.2	12.0	13.0	13.1	13.1	13.0	12.8	12.6	12.3
CASE-3	11.7	13.1	13.3	13.3	13.0	12.6	12.0	11.5	11.8	13.2	13.5	13.4	13.1	12.8	12.1	11.6
SREV1-I																
CASE-1	11.0	11.9	12.3	12.6	12.9	13.0	13.2	13.4	11.2	12.0	12.4	12.8	13.0	13.1	13.3	13.5
CASE-2	11.9	12.4	12.5	12.5	12.3	12.2	11.9	11.6	12.1	12.6	12.7	12.7	12.6	12.4	12.1	11.8
CASE-3	11.8	12.6	12.8	12.6	12.3	11.9	11.3	10.8	11.9	12.8	12.9	12.8	12.5	12.1	11.5	11.0
REV1-I																
CASE-1	537.9	539.5	540.0	540.6	540.9	541.1	541.4	541.5	53.4	53.6	53.7	53.8	53.8	53.8	53.9	53.9
CASE-2	557.6	541.5	529.4	512.4	499.1	485.7	468.1	454.8	55.2	54.2	53.1	51.4	50.1	48.8	47.1	45.8
CASE-3	546.5	548.3	540.3	520.0	500.3	478.7	448.6	425.6	54.2	54.7	53.9	51.9	50.0	47.8	44.8	42.6
SREV1-II																
CASE-1	11.0	11.6	11.8	12.1	12.2	12.3	12.4	12.5	11.1	11.6	11.9	12.1	12.2	12.3	12.5	12.5
CASE-2	11.9	12.0	11.9	11.7	11.5	11.3	11.0	10.7	12.0	12.1	12.0	11.8	11.6	11.4	11.0	10.8
CASE-3	11.7	12.2	12.2	11.9	11.5	11.1	10.5	10.0	11.8	12.3	12.3	12.0	11.6	11.2	10.6	10.1
REV1-II																
CASE-1	537.7	541.6	542.3	542.9	543.3	543.6	543.9	544.1	53.4	53.5	53.5	53.5	53.6	53.6	53.6	53.6
CASE-2	558.1	540.7	528.3	511.0	497.6	484.2	466.4	453.1	55.5	53.4	52.2	50.4	49.1	47.8	46.0	44.7
CASE-3	546.9	548.0	539.7	519.1	499.4	477.7	447.6	424.5	54.4	54.1	53.3	51.2	49.2	47.1	44.1	41.8
GEV																
CASE-1	12.1	11.0	12.9	16.6	20.1	24.2	30.4	35.8	12.1	11.2	13.0	16.6	20.1	24.1	30.4	35.8
CASE-2	12.1	12.2	14.7	19.4	24.0	29.4	37.8	45.4	12.1	12.4	14.8	19.5	24.0	29.3	37.6	45.0
CASE-3	12.3	12.3	15.2	20.5	25.4	31.0	39.5	46.9	12.4	12.5	15.3	20.6	25.4	30.8	38.9	45.9
SRGEV																
CASE-1	11.5	11.5	12.3	14.0	15.7	17.8	21.0	23.8	11.5	11.6	12.4	14.2	15.9	17.9	21.1	23.9
CASE-2	12.2	11.9	12.6	14.5	16.5	18.9	22.8	26.1	12.1	12.0	12.8	14.7	16.7	19.1	23.0	26.3
CASE-3	12.1	12.0	13.0	15.0	17.0	19.4	22.8	25.6	12.0	12.1	13.2	15.3	17.3	19.7	23.1	25.9
RGEV																
CASE-1	529.0	540.5	548.2	560.2	570.8	582.7	600.8	616.3	53.1	53.4	53.8	54.4	54.9	55.6	56.7	57.6
CASE-2	533.2	537.5	542.5	551.4	560.1	570.6	587.7	603.3	53.5	53.2	53.3	53.7	54.1	54.6	55.5	56.4
CASE-3	522.9	544.6	554.0	560.3	562.6	564.2	566.6	569.3	52.4	53.9	54.5	54.5	54.3	54.0	53.5	53.2
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	12.4	12.4	12.9	14.4	16.2	19.0	24.2	29.7	12.4	12.4	13.1	14.6	16.5	19.2	24.2	29.6
CASE-2	13.6	13.1	13.7	15.2	17.3	20.1	25.1	30.1	13.3	13.2	13.9	15.5	17.5	20.3	25.2	30.0
CASE-3	14.9	15.1	15.5	16.8	18.8	21.8	28.0	35.0	14.6	14.9	15.5	17.0	18.9	22.0	28.3	35.3
RWAKE																
CASE-1	533.7	541.1	547.2	556.6	565.8	577.8	600.0	624.2	53.8	53.1	53.4	54.1	55.1	56.8	60.3	64.6
CASE-2	535.1	542.0	544.8	548.1	551.6	557.1	569.3	583.8	54.0	53.2	53.2	53.3	53.8	54.9	57.5	60.7
CASE-3	526.2	551.5	551.2	544.4	539.1	536.6	541.7	555.8	53.2	53.7	53.4	52.8	52.7	53.5	56.5	61.3

TABLE 48 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
								SAMPLE SIZE= 1								
EV1																
CASE-1	15.8	29.9	35.3	42.3	47.6	52.8	59.7	64.9	1418.7	2691.4	3177.7	3807.2	4279.0	4749.0	5369.1	5837.7
CASE-2	15.7	29.7	35.1	42.0	47.3	52.5	59.3	64.5	1408.4	2672.0	3154.8	3779.7	4248.1	4714.7	5330.3	5795.5
CASE-3	15.8	29.9	35.3	42.3	47.5	52.8	59.6	64.8	1417.4	2689.0	3174.9	3803.9	4275.2	4744.7	5364.3	5832.5
SREV1-I																
CASE-1	15.6	31.2	37.2	44.9	50.7	56.5	64.1	69.9	1402.4	2811.0	3349.2	4045.8	4567.9	5088.0	5774.2	6292.9
CASE-2	15.5	31.1	37.1	44.8	50.6	56.4	64.0	69.8	1391.4	2798.0	3335.5	4031.3	4552.6	5072.1	5757.4	6275.4
CASE-3	15.6	31.3	37.3	45.1	51.0	56.8	64.5	70.3	1399.9	2818.6	3360.7	4062.4	4588.2	5112.1	5803.3	6325.7
REV1-I																
CASE-1	130.6	261.0	310.8	375.3	423.6	471.8	535.3	583.3	1053.9	2108.5	2511.4	3033.0	3423.8	3813.3	4327.0	4715.3
CASE-2	130.5	261.7	311.8	376.7	425.3	473.8	537.7	586.0	1053.2	2114.0	2519.3	3044.0	3437.1	3828.8	4345.6	4736.2
CASE-3	130.5	262.0	312.3	377.3	426.1	474.6	538.7	587.1	1053.0	2115.8	2522.0	3047.6	3441.6	3834.0	4351.8	4743.2
SREV1-II																
CASE-1	15.6	31.5	37.6	45.4	51.3	57.2	64.9	70.8	1400.8	2833.4	3380.8	4089.3	4620.3	5149.3	5847.3	6374.8
CASE-2	15.5	31.3	37.4	45.2	51.1	56.9	64.7	70.5	1390.2	2816.4	3361.4	4066.8	4595.4	5122.1	5816.9	6342.0
CASE-3	15.6	31.5	37.6	45.4	51.3	57.2	65.0	70.9	1399.2	2833.2	3381.2	4090.4	4621.9	5151.4	5850.1	6378.1
REV1-II																
CASE-1	130.4	263.4	314.2	380.0	429.3	478.4	543.2	592.2	1052.2	2129.0	2540.4	3072.9	3472.0	3869.6	4394.2	4790.6
CASE-2	130.4	263.8	314.7	380.7	430.1	479.4	544.3	593.5	1051.9	2131.6	2544.1	3078.1	3478.3	3877.0	4403.0	4800.6
CASE-3	130.4	263.7	314.6	380.5	429.9	479.1	544.1	593.1	1052.0	2131.0	2543.2	3076.9	3476.8	3875.2	4400.9	4798.2
GEV																
CASE-1	23.0	23.2	23.2	23.2	23.2	23.2	23.2	23.2	2065.9	2089.0	2089.0	2089.0	2089.0	2089.0	2089.0	2089.0
CASE-2	22.8	23.1	23.1	23.1	23.1	23.1	23.1	23.1	2051.0	2073.9	2073.9	2073.9	2073.9	2073.9	2073.9	2073.9
CASE-3	22.9	23.2	23.2	23.2	23.2	23.2	23.2	23.2	2064.1	2087.1	2087.2	2087.2	2087.2	2087.2	2087.2	2087.2
SRGEV																
CASE-1	15.4	31.4	37.8	46.2	52.7	59.4	68.5	75.6	1387.3	2829.1	3400.6	4160.9	4747.6	5348.3	6168.4	6811.3
CASE-2	15.2	31.3	37.7	46.5	53.3	60.4	70.2	78.0	1368.0	2810.9	3394.8	4181.9	4797.3	5434.7	6316.4	7016.8
CASE-3	15.3	31.4	38.0	46.8	53.7	60.9	70.8	78.7	1375.7	2827.6	3416.9	4212.4	4835.4	5481.4	6376.2	7087.8
RGEV																
CASE-1	129.2	263.1	316.0	386.3	440.4	495.8	571.2	630.2	1041.5	2126.2	2556.6	3129.2	3571.0	4023.0	4639.4	5121.9
CASE-2	128.4	263.3	317.8	391.1	448.3	507.4	589.1	653.8	1034.5	2127.8	2570.8	3167.9	3634.6	4117.6	4785.1	5314.4
CASE-3	128.3	263.2	317.8	391.4	448.9	508.5	590.8	656.1	1033.8	2127.2	2571.2	3170.6	3639.7	4125.8	4798.2	5332.1
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.5	31.4	37.9	46.4	52.9	59.5	68.4	75.4	1396.1	2827.1	3408.6	4175.1	4759.1	5351.4	6155.1	6785.2
CASE-2	15.3	31.3	37.9	46.7	53.4	60.3	69.6	77.0	1375.0	2812.9	3405.9	4193.4	4797.8	5414.6	6256.9	6921.3
CASE-3	15.4	31.3	38.0	47.1	54.3	61.8	72.4	80.9	1388.3	2813.6	3416.4	4237.3	4883.7	5558.4	6505.3	7273.9
RWAKE																
CASE-1	130.2	262.6	316.6	387.8	442.2	497.4	572.2	630.9	1048.2	2125.0	2563.3	3140.5	3579.4	4023.5	4623.5	5091.2
CASE-2	129.2	263.2	318.6	392.3	449.0	506.8	585.8	648.1	1040.0	2129.7	2579.8	3177.1	3634.8	4100.7	4734.6	5232.1
CASE-3	129.6	261.6	317.6	394.0	454.3	517.2	605.5	677.0	1043.5	2116.7	2571.6	3190.6	3677.1	4183.6	4891.2	5461.9

TABLE 49 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
								SAMPLE SIZE= 5								
EV1																
CASE-1	15.2	30.8	36.7	44.4	50.1	55.9	63.5	69.2	1444.3	2900.4	3456.8	4177.0	4716.6	5254.3	5963.7	6499.9
CASE-2	15.1	30.6	36.5	44.2	50.0	55.7	63.2	68.9	1435.3	2888.0	3443.1	4161.6	4700.0	5236.5	5944.2	6479.1
CASE-3	15.2	30.8	36.8	44.5	50.2	56.0	63.6	69.3	1444.3	2903.9	3461.7	4183.6	4724.6	5263.6	5974.8	6512.3
SREV1-I																
CASE-1	15.2	30.4	36.3	43.8	49.4	55.1	62.5	68.1	1444.4	2890.2	3442.6	4157.6	4693.5	5227.4	5931.7	6464.1
CASE-2	15.1	30.4	36.2	43.7	49.4	55.0	62.4	68.0	1435.0	2881.3	3434.0	4149.4	4685.4	5219.5	5924.2	6456.8
CASE-3	15.2	30.6	36.5	44.0	49.7	55.4	62.9	68.6	1443.3	2901.9	3459.2	4180.6	4721.2	5259.8	5970.4	6507.5
REV1-I																
CASE-1	130.6	261.1	311.0	375.5	423.9	472.1	535.6	583.7	1054.3	2105.9	2507.7	3027.8	3417.6	3805.9	4318.3	4705.5
CASE-2	130.5	261.8	312.0	376.9	425.6	474.1	538.1	586.4	1053.5	2112.0	2516.5	3040.1	3432.4	3823.3	4339.0	4728.8
CASE-3	130.5	262.1	312.4	377.5	426.3	474.9	539.0	587.5	1053.3	2113.6	2518.8	3043.2	3436.2	3827.7	4344.3	4734.7
SREV1-II																
CASE-1	15.2	30.7	36.6	44.3	50.1	55.8	63.4	69.1	1442.6	2914.4	3476.8	4204.8	4750.3	5293.8	6010.9	6552.9
CASE-2	15.1	30.6	36.5	44.1	49.9	55.6	63.1	68.8	1433.7	2901.1	3461.8	4187.5	4731.4	5273.3	5988.2	6528.5
CASE-3	15.2	30.8	36.7	44.4	50.2	55.9	63.5	69.2	1442.5	2917.7	3481.4	4211.0	4757.8	5302.5	6021.2	6564.4
REV1-II																
CASE-1	130.4	263.4	314.2	380.0	429.3	478.4	543.1	592.1	1052.9	2123.8	2533.0	3062.6	3459.5	3854.9	4376.7	4771.0
CASE-2	130.4	263.7	314.7	380.6	430.0	479.3	544.2	593.3	1052.6	2126.4	2536.7	3067.8	3465.8	3862.4	4385.6	4781.0
CASE-3	130.4	263.6	314.5	380.4	429.7	478.9	543.8	592.9	1052.7	2125.4	2535.4	3065.9	3463.5	3859.7	4382.3	4777.3
GEV																
CASE-1	15.1	30.2	36.4	45.4	53.0	61.8	75.6	88.4	1438.2	2842.6	3426.9	4267.3	4987.1	5810.5	7118.3	8332.4
CASE-2	15.0	30.0	36.3	45.5	53.4	62.4	76.9	90.4	1423.6	2827.4	3419.2	4278.3	5021.0	5877.8	7252.2	8541.1
CASE-3	15.1	30.2	36.6	45.8	53.8	62.9	77.6	91.3	1431.6	2842.8	3438.8	4304.9	5054.4	5919.4	7307.5	8609.2
SRGEV																
CASE-1	15.1	30.7	36.9	45.1	51.5	58.0	66.8	73.8	1428.5	2910.6	3497.8	4278.2	4879.7	5494.8	6332.7	6987.9
CASE-2	14.9	30.5	36.9	45.4	52.1	59.0	68.5	76.1	1410.7	2896.0	3496.8	4305.9	4937.7	5591.1	6493.0	7207.6
CASE-3	14.9	30.7	37.1	45.7	52.5	59.5	69.2	76.8	1418.2	2912.6	3518.6	4336.1	4975.3	5637.2	6551.8	7277.4
RGEV																
CASE-1	129.2	263.1	316.1	386.5	440.7	496.2	571.7	630.7	1044.1	2121.4	2546.1	3108.7	3540.8	3981.2	4578.8	5044.2
CASE-2	128.3	263.3	317.8	391.2	448.5	507.7	589.5	654.2	1037.2	2123.2	2560.3	3147.1	3603.6	4074.2	4721.2	5231.7
CASE-3	128.2	263.1	317.8	391.6	449.2	508.9	591.4	656.8	1036.3	2122.2	2560.6	3150.0	3609.3	4083.4	4736.2	5251.9
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.2	30.6	37.0	45.3	51.7	58.1	66.9	73.7	1438.2	2907.0	3505.4	4295.0	4897.2	5508.2	6337.2	6986.9
CASE-2	14.9	30.5	37.0	45.6	52.1	58.9	68.1	75.3	1418.5	2896.4	3507.4	4319.8	4943.9	5581.0	6451.2	7137.5
CASE-3	15.1	30.5	37.1	46.0	53.1	60.4	70.7	79.1	1431.8	2896.7	3518.4	4365.8	5033.0	5728.8	6703.2	7491.1
RWAKE																
CASE-1	130.0	263.0	316.9	387.8	441.6	496.0	569.4	626.7	1052.1	2116.2	2551.0	3125.7	3564.4	4009.7	4614.0	5087.2
CASE-2	129.0	263.5	319.0	392.3	448.4	505.4	583.0	644.0	1043.9	2120.9	2567.4	3161.9	3619.0	4085.7	4723.1	5225.3
CASE-3	129.4	262.0	318.1	394.2	453.9	515.8	602.0	671.3	1047.2	2107.8	2559.4	3176.0	3662.3	4169.9	4881.5	5456.9

TABLE 50 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 10									
EV1																
CASE-1	15.6	31.5	37.5	45.4	51.3	57.1	64.8	70.7	1467.7	2949.3	3515.5	4248.3	4797.4	5344.6	6066.4	6612.0
CASE-2	15.5	31.3	37.4	45.2	51.1	56.9	64.7	70.5	1458.1	2937.7	3503.0	4234.8	4783.1	5329.5	6050.3	6595.1
CASE-3	15.6	31.5	37.6	45.5	51.4	57.3	65.1	70.9	1467.4	2956.2	3525.0	4261.3	4813.1	5362.8	6088.2	6636.3
SREV1-I																
CASE-1	15.6	31.3	37.2	45.0	50.8	56.5	64.2	69.9	1467.8	2938.2	3500.0	4227.3	4772.2	5315.2	6031.5	6572.9
CASE-2	15.5	31.2	37.1	44.9	50.7	56.4	64.1	69.8	1458.1	2928.4	3490.2	4217.4	4762.4	5305.3	6021.7	6563.1
CASE-3	15.6	31.4	37.4	45.2	51.1	56.9	64.6	70.4	1466.9	2950.6	3517.5	4251.3	4801.2	5349.1	6072.0	6618.3
REV1-I																
CASE-1	130.6	261.5	311.6	376.3	424.9	473.2	537.0	585.3	1053.7	2110.4	2514.2	3036.8	3428.5	3818.7	4333.5	4722.6
CASE-2	130.5	262.2	312.6	377.7	426.6	475.2	539.4	587.9	1053.0	2115.9	2522.0	3047.7	3441.7	3834.2	4352.0	4743.4
CASE-3	130.4	262.6	313.1	378.5	427.4	476.2	540.6	589.3	1052.6	2119.4	2527.0	3054.7	3450.1	3844.0	4363.8	4756.6
SREV1-II																
CASE-1	15.6	31.5	37.6	45.5	51.4	57.3	65.1	70.9	1465.8	2963.9	3536.3	4277.3	4832.5	5385.7	6115.6	6667.2
CASE-2	15.5	31.4	37.5	45.3	51.2	57.1	64.8	70.6	1456.6	2949.9	3520.4	4259.0	4812.4	5363.8	6091.4	6641.2
CASE-3	15.6	31.6	37.7	45.6	51.5	57.4	65.2	71.0	1466.0	2967.5	3541.2	4283.9	4840.4	5394.9	6126.4	6679.3
REV1-II																
CASE-1	130.4	263.7	314.6	380.6	430.0	479.2	544.1	593.2	1052.4	2127.3	2538.0	3069.7	3468.0	3865.0	4388.6	4784.4
CASE-2	130.4	264.0	315.1	381.2	430.7	480.1	545.2	594.4	1052.1	2129.8	2541.6	3074.6	3474.0	3872.0	4397.0	4793.8
CASE-3	130.4	263.9	314.9	381.0	430.5	479.8	544.9	594.0	1052.2	2129.1	2540.5	3073.1	3472.3	3869.9	4394.6	4791.1
GEV																
CASE-1	15.4	31.1	37.5	46.6	54.2	62.6	75.4	86.8	1447.4	2909.7	3521.2	4388.0	5112.8	5919.5	7152.5	8250.2
CASE-2	15.3	30.9	37.5	46.9	54.8	63.7	77.4	89.8	1429.8	2894.5	3518.4	4413.8	5171.9	6025.0	7346.3	8538.2
CASE-3	15.3	31.1	37.7	47.2	55.3	64.3	78.2	90.7	1437.5	2913.0	3543.1	4448.3	5215.1	6077.9	7413.0	8615.5
SRGEV																
CASE-1	15.5	31.5	37.8	46.3	52.7	59.4	68.4	75.4	1451.9	2960.0	3557.2	4350.4	4961.6	5586.3	6437.0	7101.9
CASE-2	15.3	31.3	37.8	46.5	53.4	60.4	70.1	77.8	1433.6	2944.7	3555.5	4377.8	5019.6	5683.1	6598.7	7323.8
CASE-3	15.3	31.5	38.1	46.9	53.8	60.9	70.7	78.5	1441.7	2962.3	3578.5	4409.4	5058.9	5731.2	6660.0	7396.5
RGEV																
CASE-1	129.0	263.3	316.7	387.7	442.5	498.6	575.2	635.1	1044.1	2124.7	2550.3	3113.9	3546.6	3987.8	4586.5	5052.9
CASE-2	128.2	263.5	318.4	392.5	450.4	510.3	593.1	658.8	1037.3	2126.4	2564.2	3151.6	3608.6	4079.7	4727.4	5238.7
CASE-3	128.1	263.4	318.5	392.8	451.0	511.3	594.7	661.0	1036.5	2125.6	2564.6	3154.7	3614.5	4089.0	4742.5	5259.1
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.6	31.5	37.9	46.4	52.9	59.4	68.3	75.2	1461.8	2957.6	3565.0	4365.1	4973.7	5589.6	6422.2	7071.8
CASE-2	15.3	31.3	37.9	46.7	53.4	60.2	69.5	76.8	1441.6	2946.3	3566.5	4389.7	5020.5	5662.7	6536.9	7223.2
CASE-3	15.5	31.3	38.0	47.2	54.3	61.8	72.3	80.7	1455.6	2946.7	3577.3	4435.7	5111.0	5814.8	6800.0	7596.5
RWAKE																
CASE-1	129.7	263.5	317.7	388.8	442.7	497.0	570.2	627.0	1050.5	2125.3	2557.0	3121.0	3546.4	3974.0	4547.4	4991.4
CASE-2	128.7	264.0	319.7	393.3	449.5	506.6	583.9	644.3	1042.4	2130.0	2573.3	3156.8	3600.2	4048.4	4653.4	5124.6
CASE-3	129.2	262.4	318.6	394.9	454.6	516.7	603.3	673.2	1045.7	2117.1	2565.4	3170.4	3642.5	4131.2	4810.5	5356.5

TABLE 51 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	: TEST CATCHMENT -2 (BRIDGE NO.- 232) .2	10	20	50	100	200	500	1000
								SAMPLE SIZE= 13								
EV1																
CASE-1	15.5	31.4	37.4	45.3	51.2	57.1	64.8	70.6	1445.9	2907.6	3466.2	4189.2	4730.9	5270.7	5982.9	6521.1
CASE-2	15.4	31.2	37.3	45.1	51.0	56.9	64.6	70.4	1436.4	2895.3	3452.8	4174.3	4715.0	5253.8	5964.5	6501.7
CASE-3	15.5	31.4	37.5	45.4	51.3	57.2	65.0	70.9	1445.2	2912.9	3473.7	4199.6	4743.6	5285.6	6000.7	6541.1
SREV1-I																
CASE-1	15.5	31.0	37.0	44.6	50.4	56.1	63.7	69.4	1446.5	2892.7	3445.3	4160.5	4696.5	5230.6	5935.1	6467.6
CASE-2	15.4	30.9	36.9	44.5	50.3	56.0	63.6	69.3	1436.8	2882.9	3435.5	4150.7	4686.7	5220.7	5925.3	6457.8
CASE-3	15.5	31.2	37.1	44.9	50.7	56.5	64.1	69.8	1445.2	2903.7	3461.0	4182.4	4723.0	5261.6	5972.2	6509.3
REV1-I																
CASE-1	130.7	260.7	310.4	374.7	422.9	470.9	534.3	582.1	1053.7	2110.1	2513.7	3036.2	3427.7	3817.8	4332.5	4721.4
CASE-2	130.6	261.4	311.4	376.2	424.7	473.0	536.7	584.9	1053.0	2115.9	2522.1	3047.8	3441.8	3834.3	4352.2	4743.5
CASE-3	130.5	261.7	311.8	376.7	425.3	473.8	537.7	586.0	1052.7	2118.4	2525.7	3052.8	3447.8	3841.3	4360.6	4753.0
SREV1-II																
CASE-1	15.5	31.3	37.4	45.2	51.0	56.9	64.6	70.4	1444.5	2918.8	3482.1	4211.3	4757.7	5302.1	6020.4	6563.3
CASE-2	15.4	31.2	37.2	45.0	50.8	56.7	64.3	70.1	1435.2	2904.7	3466.2	4193.0	4737.6	5280.3	5996.2	6537.3
CASE-3	15.5	31.3	37.4	45.2	51.1	57.0	64.7	70.5	1444.2	2921.4	3485.9	4216.6	4764.1	5309.6	6029.3	6573.3
REV1-II																
CASE-1	130.5	263.2	313.9	379.5	428.7	477.8	542.4	591.3	1052.0	2130.7	2542.9	3076.4	3476.3	3874.6	4400.1	4797.3
CASE-2	130.4	263.5	314.4	380.3	429.6	478.8	543.6	592.6	1051.7	2133.5	2546.9	3081.9	3482.9	3882.4	4409.4	4807.8
CASE-3	130.4	263.4	314.3	380.1	429.4	478.5	543.3	592.3	1051.8	2132.8	2545.9	3080.5	3481.2	3880.4	4407.1	4805.1
GEV																
CASE-1	15.4	31.0	37.4	46.3	53.5	61.4	73.2	83.5	1429.9	2872.9	3468.8	4304.4	4995.2	5755.6	6901.9	7907.5
CASE-2	15.2	30.9	37.4	46.5	54.1	62.5	75.2	86.5	1412.0	2857.4	3466.0	4331.0	5055.6	5862.7	7096.7	8194.8
CASE-3	15.3	31.1	37.7	46.9	54.6	63.1	76.0	87.3	1419.4	2875.4	3489.8	4363.4	5094.7	5908.5	7149.9	8251.0
SRGEV																
CASE-1	15.3	31.3	37.6	46.0	52.4	59.1	68.1	75.1	1430.1	2914.9	3503.6	4286.6	4890.4	5508.1	6350.1	7008.9
CASE-2	15.2	31.1	37.6	46.3	53.1	60.1	69.8	77.5	1411.9	2899.5	3501.8	4313.4	4947.6	5603.8	6510.1	7228.7
CASE-3	15.2	31.3	37.8	46.6	53.5	60.6	70.4	78.3	1419.5	2916.2	3523.7	4343.5	4985.1	5649.6	6568.7	7298.1
RGEV																
CASE-1	129.1	262.8	315.9	386.4	440.8	496.5	572.3	631.7	1041.7	2128.0	2558.4	3130.3	3571.1	4021.7	4635.4	5115.2
CASE-2	128.3	263.1	317.7	391.3	448.8	508.3	590.5	655.7	1034.7	2129.8	2572.8	3169.4	3635.3	4117.0	4781.8	5308.5
CASE-3	128.2	263.0	317.7	391.6	449.4	509.3	592.2	657.9	1033.7	2129.0	2573.5	3173.3	3642.5	4128.4	4800.1	5333.1
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.5	31.2	37.7	46.2	52.7	59.2	68.1	75.0	1439.9	2911.7	3512.6	4305.2	4909.0	5520.7	6348.7	6995.4
CASE-2	15.2	31.1	37.7	46.4	53.2	60.0	69.3	76.7	1419.9	2900.3	3513.7	4329.1	4955.0	5593.1	6462.9	7146.9
CASE-3	15.4	31.1	37.8	46.9	54.1	61.6	72.1	80.5	1433.4	2900.1	3524.1	4374.8	5044.6	5742.7	6719.2	7507.5
RWAKE																
CASE-1	130.1	262.4	316.7	388.5	443.3	498.8	573.9	632.6	1048.4	2127.6	2565.7	3141.1	3577.5	4017.8	4610.9	5071.8
CASE-2	129.0	263.0	318.8	393.1	450.3	508.6	588.1	650.5	1040.1	2132.4	2582.4	3178.1	3633.2	4095.4	4722.5	5213.1
CASE-3	129.5	261.4	317.8	394.9	455.6	519.0	607.5	678.8	1043.4	2119.6	2575.2	3193.6	3678.0	4160.5	4879.3	5439.7

TABLE 52 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
								SAMPLE SIZE= 20								
EV1																
CASE-1	15.4	31.1	37.2	44.9	50.8	56.6	64.3	70.1	1446.7	2913.8	3474.4	4200.0	4743.8	5285.5	6000.3	6540.5
CASE-2	15.3	31.0	37.0	44.8	50.6	56.4	64.1	69.9	1437.0	2900.8	3460.2	4184.2	4726.7	5267.3	5980.4	6519.4
CASE-3	15.4	31.2	37.2	45.1	50.9	56.8	64.5	70.3	1445.8	2918.8	3481.6	4210.1	4756.1	5300.0	6017.6	6560.0
SREV1-I																
CASE-1	15.4	30.8	36.7	44.3	50.0	55.7	63.2	68.9	1447.8	2895.3	3448.3	4164.2	4700.7	5235.2	5940.3	6473.3
CASE-2	15.3	30.7	36.6	44.2	49.9	55.6	63.1	68.8	1437.9	2884.6	3437.4	4153.0	4689.2	5223.4	5928.3	6461.0
CASE-3	15.4	31.0	36.9	44.6	50.3	56.1	63.6	69.4	1446.3	2905.0	3462.4	4183.8	4724.5	5263.1	5973.8	6510.9
REV1-I																
CASE-1	130.7	260.8	310.5	374.8	423.0	471.1	534.5	582.4	1054.3	2106.0	2507.9	3028.0	3417.8	3806.2	4318.6	4705.9
CASE-2	130.6	261.4	311.4	376.2	424.7	473.0	536.7	584.9	1053.6	2111.4	2515.6	3038.8	3430.8	3821.4	4336.8	4726.3
CASE-3	130.5	261.6	311.7	376.5	425.1	473.5	537.4	585.6	1053.3	2113.3	2518.3	3042.6	3435.5	3826.9	4343.3	4733.6
SREV1-II																
CASE-1	15.4	31.1	37.1	44.9	50.7	56.5	64.2	70.0	1445.7	2921.5	3485.4	4215.4	4762.3	5307.3	6026.3	6569.7
CASE-2	15.3	31.0	37.0	44.7	50.5	56.3	63.9	69.7	1436.3	2907.0	3468.9	4196.4	4741.5	5284.6	6001.1	6542.6
CASE-3	15.4	31.2	37.2	45.0	50.8	56.6	64.3	70.1	1445.1	2923.6	3488.6	4219.8	4767.8	5313.8	6034.1	6578.5
REV1-II																
CASE-1	130.4	263.3	314.1	379.8	429.0	478.1	542.8	591.8	1052.7	2125.7	2535.7	3066.4	3464.1	3860.4	4383.2	4778.3
CASE-2	130.4	263.6	314.6	380.5	429.9	479.1	544.0	593.0	1052.3	2128.4	2539.6	3071.9	3470.7	3868.1	4392.4	4788.7
CASE-3	130.4	263.5	314.4	380.2	429.5	478.7	543.5	592.6	1052.4	2127.8	2538.8	3070.7	3469.3	3866.4	4390.4	4786.4
GEV																
CASE-1	15.3	30.9	37.2	45.8	52.8	60.1	70.8	79.7	1436.7	2891.1	3476.4	4276.5	4918.0	5603.0	6595.3	7428.8
CASE-2	15.1	30.8	37.2	46.2	53.5	61.4	72.9	82.8	1417.7	2875.7	3475.2	4306.5	4982.5	5713.3	6787.7	7703.5
CASE-3	15.1	30.9	37.5	46.6	54.0	61.9	73.7	83.7	1424.8	2894.0	3499.6	4339.9	5023.2	5761.7	6846.0	7768.6
SRGEV																
CASE-1	15.3	31.1	37.3	45.6	52.0	58.6	67.5	74.4	1432.2	2917.7	3505.6	4286.5	4887.9	5502.6	6339.7	6993.9
CASE-2	15.1	30.9	37.3	45.9	52.7	59.6	69.2	76.8	1413.8	2901.9	3503.2	4312.5	4944.2	5597.2	6498.1	7211.7
CASE-3	15.2	31.1	37.6	46.3	53.1	60.1	69.8	77.5	1421.4	2918.5	3525.0	4342.4	4981.3	5642.5	6555.7	7279.9
RGEV																
CASE-1	129.2	263.0	315.9	386.2	440.3	495.6	570.9	629.7	1041.4	2122.9	2552.8	3125.4	3567.7	4020.6	4638.9	5123.3
CASE-2	128.4	263.2	317.7	391.0	448.2	507.3	588.9	653.4	1034.4	2124.6	2567.1	3164.2	3631.4	4115.4	4784.8	5316.3
CASE-3	128.3	263.1	317.7	391.3	448.9	508.5	590.8	656.1	1033.8	2124.0	2567.2	3166.0	3635.0	4121.1	4793.9	5328.3
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.4	31.1	37.4	45.8	52.2	58.6	67.4	74.2	1441.9	2914.8	3514.2	4303.9	4904.6	5512.6	6334.7	6976.7
CASE-2	15.2	30.9	37.4	46.1	52.7	59.4	68.6	75.8	1421.6	2903.0	3514.9	4327.2	4949.7	5583.5	6446.4	7124.4
CASE-3	15.3	30.9	37.6	46.6	53.6	61.0	71.3	79.6	1435.0	2902.6	3524.8	4371.9	5038.0	5731.9	6702.5	7486.8
RWAKE																
CASE-1	130.1	262.7	316.6	387.7	441.9	496.7	571.0	629.2	1047.4	2122.9	2561.0	3137.2	3574.4	4015.5	4609.1	5069.7
CASE-2	129.1	263.3	318.7	392.3	448.8	506.3	584.8	646.6	1039.2	2127.6	2577.6	3174.1	3630.1	4093.1	4720.5	5210.6
CASE-3	129.5	261.6	317.6	393.9	453.9	516.6	604.5	675.8	1042.8	2114.6	2569.5	3187.6	3672.4	4175.9	4876.4	5438.6

TABLE 53 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 30									
EV1																
CASE-1	15.4	31.3	37.4	45.2	51.1	57.0	64.7	70.6	1451.4	2937.9	3505.9	4241.1	4792.1	5341.0	6065.2	6612.6
CASE-2	15.3	31.2	37.2	45.1	50.9	56.8	64.5	70.4	1442.0	2925.9	3492.9	4226.8	4776.8	5324.8	6047.8	6594.1
CASE-3	15.4	31.4	37.5	45.3	51.2	57.1	64.9	70.8	1451.0	2943.6	3514.0	4252.2	4805.4	5356.6	6083.8	6633.4
SREV1-I																
CASE-1	15.5	30.9	36.9	44.5	50.2	56.0	63.5	69.2	1453.9	2908.9	3464.9	4184.5	4723.8	5261.1	5970.0	6505.7
CASE-2	15.4	30.8	36.8	44.4	50.1	55.9	63.4	69.1	1444.1	2899.3	3455.3	4175.0	4714.3	5251.6	5960.5	6496.3
CASE-3	15.5	31.1	37.0	44.7	50.5	56.3	63.9	69.6	1452.8	2919.8	3480.4	4206.0	4749.7	5291.4	6006.1	6546.3
REV1-I																
CASE-1	130.6	261.4	311.4	376.1	424.6	472.9	536.6	584.8	1054.0	2108.3	2511.2	3032.7	3423.5	3812.8	4326.5	4714.8
CASE-2	130.5	262.2	312.5	377.6	426.4	475.0	539.2	587.7	1053.2	2114.1	2519.4	3044.1	3437.3	3829.0	4345.9	4736.5
CASE-3	130.5	262.4	312.8	378.1	427.0	475.7	540.0	588.6	1053.0	2116.2	2522.5	3048.3	3442.4	3835.0	4353.0	4744.5
SREV1-II																
CASE-1	15.5	31.2	37.2	45.0	50.9	56.7	64.3	70.1	1452.1	2932.9	3498.7	4231.1	4780.0	5326.8	6048.3	6593.5
CASE-2	15.4	31.1	37.1	44.8	50.6	56.4	64.1	69.9	1442.9	2918.8	3482.8	4212.8	4759.8	5304.8	6023.9	6567.3
CASE-3	15.5	31.2	37.3	45.1	50.9	56.8	64.4	70.3	1452.0	2935.8	3502.8	4236.7	4786.6	5334.5	6057.4	6603.8
REV1-II																
CASE-1	130.4	263.3	314.1	379.8	429.1	478.2	542.9	591.8	1052.6	2126.0	2536.2	3067.1	3464.9	3861.3	4384.3	4779.5
CASE-2	130.4	263.7	314.6	380.5	429.9	479.1	544.0	593.0	1052.3	2128.6	2539.9	3072.2	3471.2	3868.6	4393.0	4789.3
CASE-3	130.4	263.5	314.4	380.2	429.5	478.7	543.5	592.5	1052.4	2127.9	2538.9	3070.8	3469.5	3866.6	4390.6	4786.7
GEV																
CASE-1	15.3	31.1	37.4	45.9	52.5	59.5	69.3	77.3	1443.6	2921.8	3508.9	4300.2	4923.4	5576.9	6500.5	7255.0
CASE-2	15.1	31.0	37.4	46.3	53.3	60.8	71.5	80.4	1424.0	2907.6	3510.8	4336.4	4996.9	5698.8	6707.1	7544.4
CASE-3	15.2	31.2	37.7	46.6	53.8	61.3	72.2	81.2	1431.0	2925.9	3535.6	4371.0	5039.5	5749.9	6769.2	7614.1
SRGEV																
CASE-1	15.3	31.2	37.4	45.8	52.2	58.8	67.7	74.7	1438.3	2929.1	3519.3	4303.3	4907.2	5524.4	6364.7	7021.4
CASE-2	15.1	31.0	37.4	46.1	52.8	59.8	69.4	77.0	1420.2	2913.8	3517.5	4329.9	4964.0	5619.4	6523.4	7239.2
CASE-3	15.2	31.2	37.7	46.4	53.2	60.3	70.0	77.8	1428.0	2930.7	3539.6	4360.3	5001.8	5665.7	6582.7	7309.7
RGEV																
CASE-1	129.3	263.0	315.8	385.7	439.5	494.2	568.5	626.4	1041.8	2123.2	2552.5	3123.6	3564.2	4015.1	4629.8	5110.9
CASE-2	128.5	263.3	317.6	390.5	447.2	505.7	586.1	649.6	1034.9	2124.9	2566.5	3161.9	3627.2	4108.7	4773.8	5301.1
CASE-3	128.3	263.1	317.6	390.9	448.0	507.1	588.4	652.7	1034.2	2124.1	2566.8	3164.2	3631.8	4116.2	4786.2	5317.9
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.4	31.2	37.6	46.0	52.3	58.7	67.3	74.0	1447.2	2928.5	3530.2	4320.4	4919.1	5522.6	6334.2	6963.6
CASE-2	15.2	31.0	37.6	46.2	52.8	59.5	68.5	75.5	1427.3	2917.1	3531.4	4344.2	4964.7	5594.1	6446.3	7111.6
CASE-3	15.3	31.0	37.7	46.7	53.7	61.1	71.2	79.3	1441.0	2917.2	3542.0	4390.1	5054.4	5743.8	6703.1	7473.2
RWAKE																
CASE-1	130.0	263.1	317.0	387.3	440.3	493.4	564.4	619.0	1047.4	2125.2	2561.7	3132.9	3564.4	3998.1	4579.2	5028.2
CASE-2	129.0	263.7	319.0	391.8	447.0	502.7	577.6	635.6	1039.3	2129.7	2577.9	3169.4	3619.5	4074.8	4689.4	5167.4
CASE-3	129.4	262.1	318.1	393.6	452.4	513.0	596.8	663.5	1042.8	2116.9	2570.3	3183.4	3662.0	4157.1	4843.6	5392.7

TABLE 54 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 40									
EV1																
CASE-1	15.4	31.3	37.3	45.1	51.0	56.8	64.5	70.3	1445.4	2932.4	3500.6	4236.0	4787.1	5336.2	6060.7	6608.2
CASE-2	15.3	31.1	37.2	45.0	50.8	56.6	64.3	70.1	1436.1	2920.3	3487.5	4221.6	4771.7	5319.8	6042.9	6589.4
CASE-3	15.4	31.3	37.4	45.2	51.1	57.0	64.7	70.5	1445.0	2938.2	3508.7	4247.2	4800.6	5352.0	6079.5	6629.3
SREV1-I																
CASE-1	15.5	31.0	36.9	44.5	50.3	56.0	63.5	69.2	1448.5	2898.3	3452.3	4169.3	4706.6	5242.0	5948.3	6482.1
CASE-2	15.4	30.8	36.8	44.4	50.2	55.9	63.4	69.1	1438.8	2888.9	3442.9	4160.1	4697.5	5233.0	5939.4	6473.3
CASE-3	15.5	31.1	37.0	44.8	50.6	56.3	63.9	69.7	1447.3	2910.2	3469.1	4192.6	4734.8	5275.0	5987.7	6526.3
REV1-I																
CASE-1	130.5	261.8	312.0	376.9	425.5	474.0	538.0	586.3	1054.0	2108.3	2511.1	3032.5	3423.3	3812.6	4326.2	4714.4
CASE-2	130.4	262.5	313.0	378.3	427.2	476.0	540.4	589.0	1053.2	2114.3	2519.7	3044.5	3437.8	3829.6	4346.6	4737.3
CASE-3	130.4	262.8	313.4	379.0	428.0	476.9	541.5	590.2	1052.9	2117.0	2523.6	3049.9	3444.3	3837.3	4355.7	4747.5
SREV1-II																
CASE-1	15.4	31.2	37.2	45.0	50.9	56.7	64.3	70.1	1446.8	2921.9	3485.5	4215.1	4761.9	5306.6	6025.3	6568.4
CASE-2	15.4	31.1	37.1	44.8	50.6	56.4	64.1	69.9	1437.6	2908.0	3469.8	4197.0	4742.0	5284.9	6001.3	6542.7
CASE-3	15.4	31.2	37.3	45.1	50.9	56.7	64.4	70.2	1446.7	2924.6	3489.3	4220.3	4768.0	5313.8	6033.8	6578.0
REV1-II																
CASE-1	130.4	263.8	314.8	380.8	430.2	479.5	544.5	593.6	1052.7	2125.0	2534.7	3065.1	3462.5	3858.5	4380.9	4775.7
CASE-2	130.3	264.1	315.2	381.4	431.0	480.4	545.5	594.8	1052.4	2127.8	2538.7	3070.5	3469.1	3866.2	4390.1	4786.1
CASE-3	130.4	264.0	315.1	381.2	430.7	480.0	545.1	594.4	1052.5	2127.1	2537.8	3069.3	3467.6	3864.5	4388.0	4783.8
GEV																
CASE-1	15.4	31.1	37.3	45.5	52.0	58.6	67.9	75.3	1437.8	2919.7	3505.4	4289.8	4902.7	5540.0	6430.4	7148.5
CASE-2	15.2	31.0	37.3	45.9	52.8	59.9	70.1	78.4	1418.0	2905.7	3508.0	4327.3	4977.7	5663.2	6636.7	7434.7
CASE-3	15.3	31.2	37.6	46.3	53.2	60.5	70.7	79.1	1424.9	2924.1	3533.0	4362.4	5021.1	5715.4	6700.8	7507.3
SRGEV																
CASE-1	15.3	31.2	37.4	45.8	52.2	58.8	67.8	74.8	1432.8	2918.0	3506.4	4288.6	4891.5	5508.1	6348.3	7005.5
CASE-2	15.1	31.0	37.4	46.1	52.8	59.8	69.5	77.2	1414.7	2902.8	3504.7	4315.5	4948.6	5603.6	6507.8	7224.5
CASE-3	15.2	31.2	37.7	46.4	53.3	60.3	70.1	77.9	1422.3	2919.4	3526.6	4345.9	4986.8	5650.5	6568.2	7296.5
RGEV																
CASE-1	129.2	263.4	316.6	387.2	441.7	497.4	573.2	632.6	1042.9	2122.2	2549.4	3116.6	3553.6	4000.1	4608.0	5083.1
CASE-2	128.3	263.6	318.4	392.0	449.5	509.0	591.1	656.2	1036.0	2124.1	2563.7	3155.5	3617.3	4094.7	4753.4	5275.1
CASE-3	128.2	263.5	318.4	392.4	450.3	510.3	593.3	659.1	1035.3	2123.4	2564.1	3157.9	3622.0	4102.1	4765.1	5290.6
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.4	31.1	37.5	46.0	52.5	59.0	68.0	75.0	1443.0	2913.3	3513.0	4305.9	4911.7	5527.5	6364.7	7022.1
CASE-2	15.2	31.0	37.5	46.2	53.0	59.8	69.2	76.6	1423.1	2902.1	3514.3	4330.0	4957.8	5599.7	6478.3	7172.5
CASE-3	15.3	31.0	37.6	46.7	53.9	61.4	71.9	80.5	1436.6	2901.9	3524.6	4375.3	5047.1	5749.4	6736.2	7536.6
RWAKE																
CASE-1	130.0	263.2	317.2	388.1	442.2	497.1	571.6	630.1	1050.8	2117.4	2551.5	3127.0	3568.4	4018.9	4635.2	5122.7
CASE-2	129.0	263.8	319.2	392.7	449.0	506.5	585.1	647.2	1042.5	2122.1	2568.2	3164.0	3624.1	4096.6	4746.8	5264.0
CASE-3	129.4	262.2	318.2	394.4	454.5	517.2	605.2	676.6	1045.9	2109.4	2560.3	3177.5	3666.3	4179.2	4903.2	5494.0

TABLE 55 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
								SAMPLE SIZE= 1								
EV1																
CASE-1	15.7	29.8	35.2	42.1	47.3	52.5	59.4	64.6	1487.9	2822.7	3332.8	3993.0	4487.8	4980.7	5631.0	6122.5
CASE-2	15.7	29.7	35.1	42.0	47.2	52.4	59.3	64.5	1489.0	2824.8	3335.3	3996.0	4491.1	4984.4	5635.2	6127.1
CASE-3	15.7	29.7	35.1	42.1	47.3	52.5	59.3	64.5	1492.2	2830.9	3342.5	4004.6	4500.8	4995.2	5647.4	6140.3
SREV1-I																
CASE-1	15.3	32.8	39.5	48.1	54.6	61.1	69.6	76.0	1450.4	3109.7	3743.7	4564.4	5179.4	5792.1	6600.6	7211.5
CASE-2	15.2	32.9	39.6	48.4	54.9	61.4	70.0	76.5	1449.6	3126.6	3767.4	4596.9	5218.4	5837.7	6654.8	7272.3
CASE-3	15.3	32.8	39.5	48.2	54.7	61.2	69.7	76.2	1454.0	3123.6	3761.6	4587.5	5206.3	5822.9	6636.3	7251.1
REV1-I																
CASE-1	79.8	171.2	206.1	251.3	285.2	318.9	363.5	397.1	729.4	1564.5	1883.5	2296.6	2606.1	2914.4	3321.3	3628.7
CASE-2	79.6	172.1	207.4	253.1	287.4	321.5	366.6	400.6	728.4	1572.3	1894.8	2312.2	2625.0	2936.6	3347.8	3658.5
CASE-3	79.7	171.5	206.6	252.0	286.1	320.0	364.7	398.5	729.1	1566.4	1886.3	2300.3	2610.6	2919.8	3327.7	3635.9
SREV1-II																
CASE-1	15.3	33.1	39.8	48.6	55.2	61.8	70.5	77.0	1448.3	3137.2	3782.6	4617.9	5243.9	5867.6	6690.4	7312.3
CASE-2	15.3	33.0	39.7	48.5	55.0	61.6	70.2	76.7	1449.8	3135.7	3779.9	4613.8	5238.6	5861.2	6682.6	7303.3
CASE-3	15.3	33.0	39.7	48.5	55.1	61.6	70.2	76.8	1453.2	3140.9	3785.8	4620.5	5246.1	5869.3	6691.5	7313.0
REV1-II																
CASE-1	79.7	172.6	208.1	254.0	288.5	322.8	368.0	402.3	728.5	1576.9	1901.1	2320.7	2635.2	2948.4	3361.8	3674.2
CASE-2	79.7	172.4	207.8	253.7	288.1	322.3	367.5	401.6	728.7	1575.2	1898.6	2317.3	2631.0	2943.5	3355.9	3667.6
CASE-3	79.7	172.3	207.8	253.6	287.9	322.1	367.3	401.4	728.8	1574.3	1897.4	2315.5	2628.9	2941.1	3353.0	3664.3
GEV																
CASE-1	22.9	23.1	23.1	23.1	23.1	23.1	23.1	23.1	2166.7	2190.9	2191.0	2191.0	2191.0	2191.0	2191.0	2191.0
CASE-2	22.8	23.1	23.1	23.1	23.1	23.1	23.1	23.1	2168.3	2192.5	2192.6	2192.6	2192.6	2192.6	2192.6	2192.6
CASE-3	22.8	23.1	23.1	23.1	23.1	23.1	23.1	23.1	2173.0	2197.3	2197.3	2197.3	2197.3	2197.3	2197.3	2197.3
SRGEV																
CASE-1	15.1	33.0	40.1	49.6	57.0	64.7	75.1	83.4	1431.3	3130.3	3806.4	4709.6	5410.1	6131.2	7122.4	7905.4
CASE-2	14.6	32.8	40.6	51.7	60.8	70.6	84.8	96.7	1391.3	3118.1	3865.2	4919.1	5781.7	6712.0	8062.7	9189.8
CASE-3	14.7	32.8	40.6	51.7	60.8	70.5	84.7	96.6	1395.0	3122.9	3870.1	4923.7	5786.3	6716.9	8068.9	9198.2
RGEV																
CASE-1	78.6	172.1	209.5	259.6	298.5	338.7	394.2	438.1	720.2	1573.6	1912.8	2365,5	2716.2	3076.9	3571.9	3962.5
CASE-2	76.4	171.4	212.6	271.0	318.9	370.8	446.3	509.6	699.7	1566.6	1941.0	2468.3	2899.3	3363.4	4035.9	4596.1
CASE-3	76.4	171.3	212.5	270.6	318.4	370.0	445.3	508.3	700.3	1565.6	1938.8	2464.1	2893.5	3355.9	4026.4	4585.4
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.2	32.7	39.7	49.2	56.6	64.5	75.8	85.3	1444.2	3111.6	3784.5	4690.8	5403.3	6151.9	7220.4	8111.5
CASE-2	14.7	32.8	40.6	51.4	60.2	69.6	83.4	95.3	1397.3	3120.2	3863.3	4895.8	5730.3	6625.6	7929.9	9034.5
CASE-3	14.7	32.7	39.8	49.8	58.2	67.6	82.6	96.8	1399.7	3108.0	3790.6	4747.4	5549.3	6454.7	7885.4	9225.1
RWAKE																
CASE-1	78.9	170.3	207.2	257.0	296.3	337.5	396.4	445.5	725.2	1564.3	1898.7	2346.7	2698.3	3067.8	3597.1	4041.6
CASE-2	76.6	171.3	212.3	269.4	315.7	365.5	438.2	499.9	702.2	1569.7	1939.3	2450.5	2862.9	3305.2	3951.3	4501.3
CASE-3	76.8	170.9	208.5	261.2	305.3	355.0	433.6	507.3	703.6	1564.7	1903.3	2372.3	2762.4	3201.7	3898.0	4556.6

TABLE 56 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 5									
EV1																
CASE-1	15.3	32.6	39.1	47.7	54.1	60.4	68.8	75.2	1420.8	2971.7	3564.3	4331.4	4906.2	5478.9	6234.5	6805.6
CASE-2	15.3	32.7	39.3	47.9	54.4	60.8	69.3	75.7	1417.9	2968.6	3561.1	4328.0	4902.7	5475.3	6230.8	6801.7
CASE-3	15.3	32.7	39.4	48.0	54.4	60.8	69.3	75.7	1419.8	2971.7	3564.7	4332.3	4907.4	5480.5	6236.6	6808.0
SREV1-I																
CASE-1	15.3	32.8	39.4	48.1	54.6	61.0	69.6	76.0	1412.1	3030.2	3648.4	4448.7	5048.4	5645.9	6434.2	7030.0
CASE-2	15.3	33.0	39.8	48.5	55.1	61.6	70.3	76.8	1407.5	3040.6	3664.6	4472.3	5077.5	5680.6	6476.2	7077.5
CASE-3	15.3	32.9	39.7	48.4	54.9	61.4	70.0	76.5	1410.5	3035.0	3655.7	4459.1	5061.1	5661.0	6452.4	7050.6
REV1-I																
CASE-1	79.8	170.7	205.4	250.3	284.0	317.5	361.8	395.2	729.5	1563.6	1882.3	2294.9	2604.0	2912.0	3318.4	3625.5
CASE-2	79.7	171.6	206.7	252.2	286.2	320.2	365.0	398.8	728.4	1572.2	1894.6	2311.9	2624.6	2936.1	3347.2	3657.9
CASE-3	79.7	171.2	206.2	251.4	285.3	319.1	363.6	397.3	729.0	1567.2	1887.4	2302.0	2612.6	2922.1	3330.4	3639.0
SREV1-II																
CASE-1	15.3	33.0	39.8	48.6	55.2	61.7	70.4	76.9	1410.5	3053.9	3681.9	4494.7	5103.8	5710.7	6511.4	7116.5
CASE-2	15.3	33.0	39.8	48.6	55.2	61.7	70.4	76.9	1408.4	3044.2	3669.3	4478.3	5084.6	5688.7	6485.7	7088.0
CASE-3	15.3	33.0	39.8	48.6	55.2	61.7	70.4	76.9	1410.4	3046.6	3671.8	4481.1	5087.5	5691.7	6488.9	7091.3
REV1-II																
CASE-1	79.7	172.3	207.6	253.4	287.7	321.9	367.0	401.1	728.4	1577.5	1901.9	2321.8	2636.5	2950.0	3363.6	3676.2
CASE-2	79.7	172.0	207.3	253.0	287.2	321.3	366.2	400.2	728.8	1574.9	1898.2	2316.7	2630.3	2942.7	3355.0	3666.5
CASE-3	79.7	172.0	207.3	253.0	287.2	321.3	366.3	400.3	728.9	1573.6	1896.4	2314.2	2627.2	2939.2	3350.7	3661.7
GEV																
CASE-1	15.0	31.9	39.2	49.8	59.1	69.7	86.8	102.7	1415.8	2910.8	3530.1	4418.4	5177.7	6045.4	7423.5	8704.6
CASE-2	14.8	31.9	39.6	51.3	61.8	74.3	94.9	114.9	1390.6	2896.2	3550.3	4519.4	5374.6	6379.6	8028.8	9611.8
CASE-3	14.8	31.9	39.6	51.3	61.8	74.2	95.0	115.1	1394.3	2898.4	3550.0	4514.6	5366.0	6367.7	8015.6	9603.3
SRGEV																
CASE-1	15.1	32.9	40.0	49.5	56.8	64.3	74.6	82.7	1395.6	3047.2	3702.4	4575.9	5252.3	5947.4	6901.5	7654.2
CASE-2	14.7	32.9	40.7	51.7	60.7	70.4	84.4	96.0	1353.5	3027.7	3749.1	4764.2	5593.1	6485.3	7777.9	8854.3
CASE-3	14.7	32.9	40.7	51.7	60.6	70.3	84.2	95.8	1356.3	3029.9	3750.1	4762.9	5589.8	6479.8	7769.5	8844.3
RGEV																
CASE-1	78.9	171.9	208.7	257.8	295.8	334.8	388.3	430.4	722.0	1574.5	1910.8	2357.2	2701.2	3053.2	3533.6	3910.5
CASE-2	76.7	171.1	211.8	268.9	315.5	365.7	438.2	498.6	701.7	1567.3	1938.1	2457.3	2879.1	3330.8	3981.2	4519.2
CASE-3	76.7	171.1	211.7	268.6	315.1	365.0	437.3	497.5	702.2	1566.0	1935.6	2452.9	2873.2	3323.3	3971.4	4507.9
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.2	32.8	39.9	49.2	56.5	64.0	74.7	83.4	1408.1	3037.4	3687.6	4554.1	5227.4	5926.9	6911.4	7720.5
CASE-2	14.7	32.9	40.6	51.3	59.8	68.8	81.8	92.7	1356.3	3031.0	3744.9	4726.9	5512.1	6346.3	7547.7	8553.4
CASE-3	14.8	32.8	39.9	49.7	57.9	67.1	81.5	95.0	1360.2	3025.2	3679.8	4587.6	5341.6	6186.6	7510.1	8737.6
RWAKE																
CASE-1	79.6	171.2	207.7	256.4	294.2	333.5	388.8	434.1	727.9	1568.2	1902.5	2346.1	2689.0	3043.4	3538.7	3942.0
CASE-2	76.8	171.1	211.3	266.5	310.7	357.6	425.0	481.3	700.7	1562.9	1928.9	2429.7	2827.8	3248.1	3848.7	4346.9
CASE-3	77.0	170.8	207.5	258.6	301.3	349.3	425.1	496.0	703.6	1561.4	1896.4	2359.6	2743.3	3172.7	3843.8	4464.8

TABLE 57 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
								SAMPLE SIZE= 10								
EV1																
CASE-1	15.2	32.8	39.5	48.2	54.7	61.2	69.8	76.3	1421.7	3053.2	3676.7	4483.6	5088.3	5690.8	6485.7	7086.4
CASE-2	15.2	32.9	39.7	48.4	55.0	61.5	70.1	76.6	1422.3	3061.1	3687.3	4497.8	5105.2	5710.4	6508.8	7112.2
CASE-3	15.3	32.9	39.7	48.5	55.0	61.5	70.1	76.7	1423.9	3065.7	3693.0	4505.0	5113.5	5719.8	6519.6	7124.1
SREV1-I																
CASE-1	15.2	32.7	39.3	48.0	54.4	60.9	69.4	75.8	1420.5	3052.0	3675.4	4482.4	5087.1	5689.5	6484.4	7085.2
CASE-2	15.2	32.9	39.6	48.4	54.9	61.4	70.0	76.5	1419.9	3068.7	3698.7	4514.2	5125.3	5734.1	6537.4	7144.5
CASE-3	15.3	32.8	39.5	48.2	54.7	61.2	69.8	76.3	1422.9	3062.4	3688.9	4499.8	5107.4	5712.8	6511.6	7115.2
REV1-I																
CASE-1	79.7	171.2	206.2	251.4	285.3	319.1	363.7	397.4	729.4	1564.1	1883.0	2295.8	2605.1	2913.3	3319.9	3627.2
CASE-2	79.7	172.0	207.3	252.9	287.1	321.2	366.2	400.2	728.6	1570.8	1892.6	2309.2	2621.3	2932.3	3342.7	3652.8
CASE-3	79.7	171.4	206.4	251.7	285.7	319.6	364.2	398.0	729.3	1565.3	1884.8	2298.3	2608.2	2916.9	3324.3	3632.1
SREV1-II																
CASE-1	15.2	32.9	39.7	48.4	55.0	61.5	70.2	76.7	1419.3	3072.5	3704.2	4521.8	5134.6	5745.1	6550.5	7159.2
CASE-2	15.2	32.9	39.7	48.4	55.0	61.5	70.1	76.6	1421.0	3070.9	3701.3	4517.3	5128.8	5738.1	6541.9	7149.4
CASE-3	15.3	33.0	39.7	48.5	55.0	61.6	70.2	76.7	1423.0	3073.0	3703.5	4519.6	5131.1	5740.4	6544.3	7151.9
REV1-II																
CASE-1	79.7	172.4	207.9	253.7	288.1	322.4	367.5	401.7	728.6	1575.9	1899.7	2318.7	2632.8	2945.6	3358.4	3670.4
CASE-2	79.7	172.1	207.5	253.2	287.5	321.6	366.6	400.7	728.9	1573.7	1896.5	2314.3	2627.4	2939.4	3351.0	3662.0
CASE-3	79.7	172.0	207.3	253.0	287.2	321.3	366.3	400.3	729.0	1572.7	1895.1	2312.4	2625.1	2936.6	3347.7	3658.3
GEV																
CASE-1	15.0	32.3	39.5	49.8	58.3	67.8	82.4	95.3	1402.4	3008.1	3676.6	4623.5	5415.9	6299.3	7654.4	8866.5
CASE-2	14.6	32.2	40.1	51.9	62.2	74.3	93.8	112.2	1367.2	2995.8	3725.1	4810.9	5766.4	6880.4	8683.5	10386.4
CASE-3	14.7	32.2	40.1	51.8	62.1	74.3	94.0	112.8	1370.4	2997.9	3725.1	4808.1	5763.0	6880.4	8700.3	10433.6
SRGEV																
CASE-1	15.0	32.8	39.9	49.3	56.6	64.1	74.3	82.4	1404.5	3065.7	3724.5	4602.5	5282.0	5980.3	6938.4	7694.1
CASE-2	14.6	32.7	40.5	51.5	60.5	70.1	84.1	95.7	1365.9	3054.3	3781.5	4804.4	5639.4	6538.0	7839.3	8922.6
CASE-3	14.7	32.8	40.6	51.5	60.5	70.1	84.0	95.7	1368.7	3056.3	3782.2	4802.7	5635.5	6531.5	7829.3	8910.2
RGEV																
CASE-1	79.0	172.0	208.8	257.7	295.5	334.2	387.3	429.1	721.3	1572.5	1909.7	2359.0	2706.5	3063.4	3552.9	3938.8
CASE-2	76.7	171.2	211.8	268.7	315.1	364.9	436.9	496.7	701.0	1565.3	1937.2	2459.8	2886.3	3344.9	4008.7	4561.0
CASE-3	76.8	171.1	211.6	268.3	314.6	364.3	436.2	496.0	701.6	1564.2	1934.8	2455.4	2880.1	3336.8	3998.1	4548.8
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.2	32.7	39.7	49.0	56.3	63.9	74.7	83.8	1417.5	3055.9	3707.4	4577.0	5255.7	5965.4	6975.3	7818.2
CASE-2	14.7	32.8	40.5	51.1	59.6	68.7	82.0	93.3	1369.8	3058.6	3776.8	4767.3	5562.9	6413.2	7649.0	8695.9
CASE-3	14.7	32.7	39.8	49.6	57.7	66.8	81.2	94.6	1373.2	3052.8	3710.6	4622.2	5380.0	6231.5	7571.6	8822.9
RWAKE																
CASE-1	79.7	171.4	207.8	256.4	294.3	333.9	390.3	437.3	727.4	1568.9	1903.2	2347.8	2693.2	3052.4	3559.5	3978.3
CASE-2	77.0	171.5	211.5	266.8	311.2	358.6	427.5	485.9	702.9	1569.4	1937.5	2443.3	2847.9	3278.2	3899.3	4420.9
CASE-3	77.1	171.0	207.6	258.2	300.3	347.6	421.9	491.2	704.9	1565.0	1903.2	2371.3	2758.9	3192.4	3869.9	4498.0

TABLE 58 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
								SAMPLE SIZE= 13								
EV1																
CASE-1	15.1	32.3	38.9	47.4	53.7	60.1	68.4	74.7	1427.4	3084.7	3717.9	4537.6	5151.8	5763.8	6571.2	7181.5
CASE-2	15.1	32.3	38.9	47.4	53.8	60.1	68.5	74.8	1428.5	3093.4	3729.5	4552.9	5169.9	5784.7	6595.8	7208.8
CASE-3	15.1	32.3	38.9	47.4	53.8	60.2	68.5	74.9	1430.7	3094.8	3730.7	4553.8	5170.5	5785.0	6595.8	7208.5
SREV1-I																
CASE-1	15.1	32.5	39.1	47.7	54.1	60.5	69.0	75.4	1428.4	3065.8	3691.4	4501.3	5108.1	5712.8	6510.5	7113.4
CASE-2	15.1	32.6	39.3	48.0	54.5	61.0	69.6	76.0	1427.9	3087.3	3721.4	4542.1	5157.1	5769.9	6578.4	7189.4
CASE-3	15.1	32.5	39.2	47.8	54.3	60.8	69.3	75.7	1431.1	3081.3	3711.8	4528.0	5139.6	5749.0	6553.0	7160.6
REV1-I																
CASE-1	79.8	171.1	206.0	251.2	285.1	318.8	363.3	396.9	729.2	1566.0	1885.7	2299.6	2609.7	2918.7	3326.4	3634.5
CASE-2	79.6	172.1	207.4	253.2	287.5	321.6	366.7	400.7	727.9	1576.0	1900.1	2319.5	2633.8	2947.0	3360.2	3672.5
CASE-3	79.7	171.5	206.6	252.0	286.1	320.0	364.7	398.5	728.6	1570.7	1892.5	2309.0	2621.1	2932.1	3342.4	3652.5
SREV1-II																
CASE-1	15.1	32.7	39.5	48.2	54.7	61.2	69.8	76.3	1426.4	3092.3	3728.8	4552.7	5170.1	5785.3	6596.9	7210.2
CASE-2	15.1	32.7	39.4	48.1	54.6	61.1	69.6	76.1	1428.7	3092.0	3727.5	4550.2	5166.7	5780.9	6591.2	7203.7
CASE-3	15.1	32.7	39.4	48.1	54.6	61.1	69.6	76.1	1430.8	3094.5	3730.2	4553.0	5169.6	5784.0	6594.5	7207.1
REV1-II																
CASE-1	79.7	172.6	208.1	254.0	288.4	322.7	368.0	402.2	728.3	1578.7	1903.6	2324.2	2639.4	2953.4	3367.7	3680.8
CASE-2	79.7	172.3	207.7	253.4	287.8	321.9	367.1	401.1	728.5	1577.0	1901.2	2320.9	2635.4	2948.7	3362.1	3674.6
CASE-3	79.7	172.2	207.5	253.2	287.5	321.7	366.7	400.8	728.6	1576.5	1900.5	2319.9	2634.1	2947.2	3360.4	3672.6
GEV																
CASE-1	15.0	31.9	38.8	48.4	56.3	64.8	77.5	88.6	1411.9	3048.5	3718.8	4652.4	5418.5	6256.2	7509.0	8599.4
CASE-2	14.6	31.8	39.3	50.4	59.9	70.8	88.1	103.9	1373.8	3037.8	3775.3	4859.4	5799.0	6878.2	8591.5	10177.1
CASE-3	14.6	31.8	39.3	50.3	59.7	70.6	87.8	103.7	1376.9	3037.0	3771.4	4851.6	5790.1	6872.4	8604.8	10226.9
SRGEV																
CASE-1	14.9	32.7	39.7	49.1	56.4	64.0	74.3	82.5	1410.5	3085.3	3751.0	4639.4	5328.0	6036.4	7009.6	7778.0
CASE-2	14.5	32.5	40.2	51.2	60.2	69.9	83.9	95.6	1372.0	3074.8	3810.1	4845.9	5692.8	6605.1	7928.0	9030.4
CASE-3	14.5	32.5	40.2	51.2	60.1	69.8	83.8	95.4	1374.8	3077.3	3811.5	4845.0	5689.7	6599.4	7918.5	9018.0
RGEV																
CASE-1	78.8	172.2	209.2	258.4	296.5	335.5	389.0	431.1	719.6	1574.9	1915.8	2371.7	2725.9	3091.1	3593.9	3992.1
CASE-2	76.6	171.4	212.1	269.4	316.1	366.2	438.7	498.9	699.0	1567.8	1943.9	2474.8	2909.9	3379.6	4062.3	4632.8
CASE-3	76.7	171.3	211.9	269.0	315.6	365.6	438.0	498.1	699.7	1567.3	1942.1	2470.6	2903.2	3369.9	4046.0	4614.6
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.0	32.5	39.5	48.9	56.2	63.8	74.7	83.8	1422.1	3073.6	3732.2	4611.9	5297.9	6013.3	7025.2	7860.5
CASE-2	14.5	32.5	40.2	50.9	59.4	68.6	81.9	93.0	1376.4	3082.5	3809.9	4812.4	5615.9	6471.5	7706.5	8742.3
CASE-3	14.5	32.4	39.5	49.2	57.3	66.4	80.7	94.0	1376.4	3068.8	3733.8	4653.7	5415.5	6267.9	7601.9	8841.4
RWAKE																
CASE-1	79.2	170.7	207.0	255.5	293.4	332.9	389.0	435.4	724.6	1571.2	1907.2	2354.5	2702.2	3063.7	3573.0	3991.0
CASE-2	76.9	171.9	212.1	267.4	311.7	358.9	427.0	484.2	701.0	1573.5	1944.4	2455.1	2864.3	3300.0	3928.7	4455.7
CASE-3	76.7	170.9	207.5	257.7	299.2	345.5	418.1	485.9	699.2	1563.9	1903.7	2373.1	2761.1	3193.8	3867.9	4490.2

TABLE 59 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
								SAMPLE SIZE= 20								
EV1																
CASE-1	15.2	32.9	39.6	48.4	54.9	61.4	70.0	76.5	1417.8	3068.2	3698.8	4515.1	5126.8	5736.2	6540.3	7147.9
CASE-2	15.2	33.0	39.8	48.6	55.2	61.8	70.4	77.0	1417.6	3072.1	3704.3	4522.6	5135.8	5746.7	6552.8	7161.9
CASE-3	15.2	33.1	39.9	48.7	55.3	61.9	70.6	77.1	1419.2	3073.4	3705.5	4523.6	5136.7	5747.6	6553.5	7162.6
SREV1-I																
CASE-1	15.2	32.7	39.3	48.0	54.5	60.9	69.4	75.8	1419.2	3046.9	3668.9	4474.0	5077.3	5678.4	6471.5	7070.8
CASE-2	15.2	32.9	39.6	48.4	54.9	61.4	70.0	76.5	1417.5	3062.6	3691.2	4504.9	5114.7	5722.2	6523.7	7129.5
CASE-3	15.3	32.8	39.5	48.2	54.7	61.2	69.8	76.2	1420.1	3055.0	3679.7	4488.3	5094.2	5698.0	6494.5	7096.4
REV1-I																
CASE-1	79.7	171.5	206.6	252.1	286.1	320.0	364.7	398.6	729.5	1563.7	1882.4	2295.0	2604.2	2912.3	3318.7	3625.8
CASE-2	79.6	172.3	207.7	253.5	287.9	322.1	367.2	401.3	728.4	1571.9	1894.2	2311.4	2624.0	2935.4	3346.4	3657.0
CASE-3	79.7	171.7	206.9	252.4	286.5	320.5	365.3	399.2	729.2	1566.2	1886.1	2300.1	2610.4	2919.5	3327.3	3635.5
SREV1-II																
CASE-1	15.2	32.9	39.7	48.4	55.0	61.5	70.1	76.6	1417.9	3067.9	3698.4	4514.5	5126.0	5735.3	6539.2	7146.8
CASE-2	15.2	32.9	39.6	48.4	54.9	61.5	70.1	76.6	1418.6	3064.2	3692.9	4506.8	5116.7	5724.3	6526.0	7131.9
CASE-3	15.3	32.9	39.7	48.4	55.0	61.5	70.1	76.6	1420.1	3065.7	3694.4	4508.3	5118.2	5725.8	6527.5	7133.4
REV1-II																
CASE-1	79.7	172.5	208.0	253.9	288.3	322.6	367.9	402.0	728.7	1575.2	1898.7	2317.3	2631.1	2943.6	3356.0	3667.7
CASE-2	79.7	172.3	207.6	253.4	287.7	321.9	367.0	401.1	729.0	1573.3	1896.0	2313.6	2626.5	2938.3	3349.7	3660.6
CASE-3	79.7	172.2	207.6	253.4	287.7	321.8	366.9	401.0	729.0	1572.8	1895.2	2312.5	2625.2	2936.7	3347.8	3658.5
GEV																
CASE-1	15.0	32.6	39.8	49.7	57.7	66.3	79.0	89.7	1407.7	3042.1	3698.5	4595.4	5314.7	6083.3	7198.5	8137.1
CASE-2	14.6	32.5	40.5	52.2	62.4	73.9	91.9	108.2	1365.5	3029.3	3757.4	4811.7	5708.1	6717.2	8276.0	9674.8
CASE-3	14.6	32.5	40.5	52.2	62.3	73.9	92.0	108.6	1369.2	3029.1	3753.1	4800.8	5692.7	6699.1	8261.6	9674.1
SRGEV																
CASE-1	15.0	32.8	39.9	49.3	56.5	64.0	74.1	82.2	1403.0	3061.7	3719.3	4595.0	5272.0	5966.9	6918.6	7667.6
CASE-2	14.6	32.7	40.5	51.4	60.4	69.9	83.8	95.2	1363.5	3048.3	3773.8	4793.3	5624.5	6517.7	7808.7	8880.9
CASE-3	14.7	32.8	40.5	51.4	60.3	69.9	83.7	95.2	1365.9	3049.7	3773.7	4790.5	5619.5	6510.2	7798.0	8868.3
RGEV																
CASE-1	78.7	172.1	209.3	259.0	297.5	337.1	391.5	434.4	721.9	1571.9	1908.0	2354.9	2700.2	3054.2	3538.9	3920.4
CASE-2	76.5	171.3	212.3	270.1	317.3	368.2	441.9	503.3	701.4	1565.2	1936.1	2456.9	2881.1	3336.8	3995.2	4542.1
CASE-3	76.5	171.3	212.2	269.8	317.0	367.8	441.5	503.1	702.1	1564.5	1934.3	2453.0	2875.4	3329.1	3984.9	4530.0
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.2	32.7	39.7	49.0	56.4	64.1	75.0	84.1	1415.3	3046.6	3699.2	4573.8	5258.2	5974.2	6990.2	7831.2
CASE-2	14.7	32.8	40.5	51.2	59.8	68.9	82.2	93.3	1369.9	3055.6	3775.6	4769.8	5568.2	6419.7	7650.4	8683.2
CASE-3	14.7	32.6	39.6	49.3	57.4	66.6	81.0	94.6	1368.3	3034.4	3689.2	4597.8	5354.2	6205.8	7552.4	8819.9
RWAKE																
CASE-1	79.4	171.6	208.5	257.8	296.3	336.6	393.7	440.8	728.6	1564.8	1898.3	2344.5	2692.9	3056.4	3570.3	3993.8
CASE-2	76.8	171.9	212.5	268.6	313.6	361.6	430.9	489.0	704.8	1569.2	1937.2	2444.4	2850.9	3283.4	3906.8	4428.6
CASE-3	76.7	171.2	208.4	259.6	302.0	349.4	423.7	493.0	700.7	1549.9	1883.0	2345.6	2731.4	3166.4	3854.6	4502.0

TABLE 60 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
								SAMPLE SIZE= 30								
EVI																
CASE-1	15.2	32.8	39.5	48.2	54.8	61.3	69.8	76.3	1419.1	3067.7	3697.6	4513.0	5124.0	5732.8	6535.9	7142.9
CASE-2	15.2	32.8	39.6	48.4	54.9	61.5	70.1	76.6	1418.8	3073.4	3705.6	4524.0	5137.2	5748.2	6554.3	7163.6
CASE-3	15.2	32.9	39.6	48.4	54.9	61.5	70.1	76.6	1420.3	3076.3	3709.0	4528.1	5141.8	5753.3	6560.1	7169.8
SREV1-I																
CASE-1	15.2	32.5	39.2	47.7	54.2	60.6	69.0	75.4	1420.7	3044.6	3665.1	4468.2	5070.1	5669.7	6460.9	7058.8
CASE-2	15.2	32.7	39.4	48.1	54.6	61.1	69.7	76.1	1418.9	3061.8	3689.5	4502.1	5111.0	5717.7	6518.1	7123.0
CASE-3	15.2	32.6	39.3	48.0	54.4	60.9	69.4	75.8	1421.6	3055.2	3679.4	4487.4	5092.9	5696.1	6492.0	7093.5
REV1-I																
CASE-1	79.8	171.0	205.9	251.1	284.9	318.6	363.1	396.7	729.3	1565.0	1884.3	2297.6	2607.3	2915.8	3323.0	3630.6
CASE-2	79.7	172.0	207.2	252.9	287.1	321.2	366.1	400.1	728.2	1573.5	1896.5	2314.5	2627.8	2939.9	3351.7	3662.9
CASE-3	79.7	171.3	206.3	251.6	285.6	319.4	364.0	397.7	729.1	1567.0	1887.2	2301.6	2612.2	2921.6	3329.9	3638.4
SREV1-II																
CASE-1	15.1	32.8	39.6	48.3	54.8	61.4	70.0	76.5	1418.7	3071.5	3703.1	4520.6	5133.2	5743.6	6548.9	7157.5
CASE-2	15.2	32.8	39.5	48.2	54.7	61.3	69.8	76.3	1419.6	3067.7	3697.5	4512.7	5123.6	5732.2	6535.2	7142.1
CASE-3	15.2	32.8	39.5	48.2	54.8	61.3	69.9	76.3	1421.2	3069.5	3699.4	4514.6	5125.5	5734.2	6537.3	7144.2
REV1-II																
CASE-1	79.7	172.4	207.8	253.7	288.0	322.3	367.4	401.6	728.2	1579.2	1904.3	2325.2	2640.6	2954.9	3369.4	3682.8
CASE-2	79.7	172.2	207.5	253.2	287.5	321.6	366.7	400.7	728.5	1577.1	1901.3	2321.1	2635.6	2948.9	3362.4	3674.8
CASE-3	79.7	172.1	207.5	253.2	287.4	321.6	366.6	400.6	728.7	1575.8	1899.5	2318.4	2632.4	2945.2	3357.9	3669.9
GEV																
CASE-1	15.0	32.6	39.6	49.0	56.4	64.2	75.3	84.4	1410.1	3049.1	3700.6	4580.0	5274.0	6003.5	7038.2	7887.3
CASE-2	14.6	32.5	40.3	51.6	61.0	71.5	87.3	101.1	1364.6	3039.7	3770.1	4818.3	5698.1	6674.2	8150.7	9443.9
CASE-3	14.6	32.5	40.3	51.5	60.8	71.3	87.0	100.9	1368.6	3041.5	3768.0	4809.4	5683.8	6655.4	8130.4	9429.4
SRGEV																
CASE-1	15.0	32.7	39.8	49.2	56.4	63.9	74.0	82.1	1403.5	3065.5	3724.6	4602.4	5281.1	5977.7	6931.8	7682.7
CASE-2	14.6	32.6	40.4	51.3	60.2	69.7	83.6	95.0	1364.2	3052.0	3778.8	4800.2	5632.9	6527.6	7820.7	8894.5
CASE-3	14.6	32.6	40.4	51.3	60.1	69.7	83.4	94.9	1366.8	3053.6	3778.9	4797.5	5627.7	6519.7	7809.2	8880.9
RGEV																
CASE-1	78.8	172.1	209.0	258.3	296.3	335.4	388.9	431.0	720.6	1576.1	1915.2	2366.6	2715.5	3073.4	3563.5	3949.0
CASE-2	76.6	171.3	212.1	269.4	316.1	366.4	439.0	499.3	700.1	1569.1	1943.1	2468.6	2896.8	3356.7	4020.9	4572.1
CASE-3	76.7	171.2	211.9	269.0	315.5	365.5	437.8	497.9	700.6	1567.7	1940.5	2464.0	2890.7	3349.1	4011.5	4561.8
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.1	32.7	39.6	48.9	56.1	63.6	74.2	83.0	1415.7	3058.9	3711.2	4578.6	5252.2	5952.7	6941.2	7756.7
CASE-2	14.6	32.7	40.4	51.0	59.4	68.4	81.3	92.2	1369.3	3063.6	3782.9	4770.4	5559.3	6397.6	7606.0	8619.5
CASE-3	14.6	32.4	39.4	49.1	57.2	66.1	80.2	93.3	1366.8	3038.5	3695.4	4604.1	5356.6	6193.2	7514.5	8736.9
RWAKE																
CASE-1	79.6	171.4	208.0	257.0	295.3	335.4	392.3	439.6	726.3	1574.1	1909.7	2354.2	2698.0	3054.0	3553.7	3963.3
CASE-2	76.9	171.7	212.1	267.8	312.6	360.4	429.6	487.8	702.3	1576.2	1946.2	2452.8	2856.3	3283.6	3896.8	4408.5
CASE-3	76.5	169.7	206.4	257.6	300.4	348.5	424.2	494.6	700.6	1561.7	1900.2	2368.6	2756.3	3189.3	3864.7	4488.8

TABLE 61 : FLOOD ESTIMATES

METHOD	TEST CATCHMENT -1 (BRIDGE NO. - 50) 2	10	20	50	100	200	500	1000	TEST CATCHMENT -2 (BRIDGE NO.- 232) 2	10	20	50	100	200	500	1000
							SAMPLE SIZE= 40									
EV1																
CASE-1	15.2	32.9	39.6	48.4	54.9	61.4	70.0	76.5	1418.3	3074.9	3707.9	4527.2	5141.2	5752.9	6560.0	7170.0
CASE-2	15.2	33.0	39.7	48.5	55.1	61.7	70.3	76.8	1418.5	3082.8	3718.8	4541.9	5158.8	5773.4	6584.2	7197.0
CASE-3	15.2	33.0	39.8	48.6	55.2	61.7	70.4	76.9	1419.9	3086.2	3722.9	4547.0	5164.6	5779.9	6591.7	7205.3
SREV1-I																
CASE-1	15.2	32.7	39.4	48.1	54.6	61.0	69.6	76.0	1419.7	3053.1	3677.2	4485.0	5090.4	5693.6	6489.4	7090.8
CASE-2	15.2	32.9	39.7	48.5	55.0	61.6	70.2	76.7	1418.5	3072.2	3704.0	4522.0	5134.9	5745.6	6551.2	7160.1
CASE-3	15.2	32.9	39.6	48.3	54.8	61.4	69.9	76.4	1421.1	3066.1	3694.7	4508.4	5118.1	5725.5	6527.0	7132.7
REV1-I																
CASE-1	79.7	171.8	207.0	252.5	286.7	320.7	365.5	399.4	728.3	1573.1	1896.0	2313.8	2627.0	2939.0	3350.6	3661.6
CASE-2	79.6	172.7	208.3	254.3	288.8	323.2	368.6	402.9	727.1	1582.6	1909.6	2332.7	2649.8	2965.8	3382.6	3697.6
CASE-3	79.6	172.2	207.6	253.4	287.7	321.9	367.0	401.1	727.7	1577.6	1902.4	2322.7	2637.7	2951.5	3365.6	3678.5
SREV1-II																
CASE-1	15.2	33.0	39.8	48.6	55.1	61.7	70.4	76.9	1418.2	3075.6	3708.9	4528.6	5142.9	5754.9	6562.4	7172.7
CASE-2	15.2	32.9	39.7	48.5	55.0	61.6	70.2	76.7	1419.7	3072.9	3704.6	4522.3	5135.0	5745.5	6550.9	7159.6
CASE-3	15.2	32.9	39.7	48.5	55.0	61.6	70.2	76.7	1421.4	3074.3	3705.9	4523.4	5136.0	5746.4	6551.7	7160.3
REV1-II																
CASE-1	79.6	173.0	208.6	254.8	289.4	323.9	369.3	403.7	727.8	1582.7	1909.3	2332.2	2649.0	2964.7	3381.2	3696.0
CASE-2	79.6	172.7	208.3	254.3	288.8	323.2	368.5	402.8	728.1	1580.3	1905.9	2327.4	2643.2	2957.9	3373.1	3686.8
CASE-3	79.6	172.6	208.1	254.1	288.6	322.9	368.2	402.5	728.3	1579.0	1904.0	2324.8	2640.1	2954.3	3368.7	3682.0
GEV																
CASE-1	15.1	32.7	39.7	48.9	56.1	63.5	73.9	82.2	1407.1	3061.1	3717.9	4599.5	5289.6	6008.1	7013.0	7823.8
CASE-2	14.6	32.7	40.5	51.6	60.8	70.9	85.9	98.8	1360.1	3054.3	3794.8	4854.1	5737.8	6710.2	8162.5	9414.6
CASE-3	14.7	32.7	40.5	51.5	60.6	70.6	85.6	98.4	1363.8	3056.5	3793.9	4848.0	5727.7	6697.2	8149.6	9407.0
SRGEV																
CASE-1	15.0	32.9	40.0	49.5	56.8	64.3	74.6	82.7	1402.5	3069.4	3731.3	4613.5	5296.3	5997.4	6958.5	7715.4
CASE-2	14.6	32.8	40.6	51.6	60.6	70.2	84.2	95.8	1363.6	3056.9	3787.0	4814.0	5652.1	6553.2	7856.5	8939.4
CASE-3	14.6	32.8	40.6	51.5	60.5	70.1	84.0	95.6	1366.1	3058.1	3786.8	4811.3	5647.2	6545.9	7846.0	8927.0
RGEV																
CASE-1	78.6	172.6	210.0	260.0	298.8	338.7	393.5	436.8	719.7	1579.7	1920.9	2375.6	2727.1	3087.8	3581.8	3970.4
CASE-2	76.4	171.8	213.0	271.2	318.8	370.1	444.4	506.2	699.1	1572.2	1948.6	2477.8	2909.4	3373.1	4043.2	4599.5
CASE-3	76.4	171.7	212.8	270.8	318.2	369.3	443.4	505.2	699.7	1570.8	1945.9	2473.3	2903.4	3365.7	4034.2	4589.7
WAKE																
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE																
CASE-1	15.2	32.8	39.8	49.2	56.5	64.1	75.0	84.1	1414.0	3056.6	3711.2	4586.9	5270.6	5985.3	7000.4	7843.7
CASE-2	14.6	32.8	40.5	51.2	59.7	68.8	82.0	93.2	1366.9	3059.8	3781.3	4776.3	5575.1	6427.4	7662.2	8703.2
CASE-3	14.6	32.6	39.7	49.5	57.6	66.7	80.9	94.2	1366.8	3046.2	3706.5	4620.5	5379.0	6229.7	7566.9	8815.4
RWAKE																
CASE-1	79.2	172.0	209.0	258.3	296.7	336.6	393.0	439.7	725.2	1572.4	1909.3	2358.7	2709.3	3075.8	3596.8	4030.4
CASE-2	76.6	172.3	213.1	269.3	314.2	361.9	430.7	488.4	701.2	1574.4	1945.6	2457.1	2867.6	3306.0	3943.0	4482.2
CASE-3	76.5	171.4	208.8	260.5	303.0	350.2	423.3	490.4	701.5	1567.7	1907.4	2377.5	2768.0	3207.1	3900.9	4553.4

TABLE 62 : AVERAGE PERCENTAGE BIAS OF FLOOD ESTIMATES COMPUTED BY DIFFERENT AVERAGING PROCEDURES

METHOD	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EV1								
CASE-1	0.3	-0.4	0.2	0.0	-5.0	-7.5	0.6	-2.5
CASE-2	-3.3	-3.7	0.8	0.6	-8.7	-11.1	0.6	-2.0
CASE-3	-3.0	-3.4	0.5	0.0	-8.4	-11.2	0.4	-2.8
SREV1-I								
CASE-1	-1.1	-1.6	0.4	0.0	-0.6	-3.7	0.4	-2.2
CASE-2	-4.7	-5.0	0.5	0.3	-4.1	-6.8	1.0	-1.7
CASE-3	-4.1	-4.3	0.3	0.0	-3.5	-6.3	0.7	-2.4
REV1-I								
CASE-1	733.3	-28.5	745.8	-27.3	731.9	-28.5	745.5	-27.3
CASE-2	710.6	-30.5	754.8	-26.5	708.8	-30.5	754.7	-26.6
CASE-3	709.8	-30.6	745.9	-27.5	708.5	-30.8	745.8	-27.5
SREV1-II								
CASE-1	0.0	0.0	0.1	0.1	0.5	-2.1	0.6	-2.0
CASE-2	-3.6	-3.9	0.7	0.6	-3.1	-5.7	1.2	-1.4
CASE-3	-3.2	-3.5	0.5	0.2	-3.1	-5.8	0.9	-2.3
REV1-II								
CASE-1	744.2	-27.8	747.2	-27.0	744.0	-27.2	747.1	-27.0
CASE-2	719.0	-29.7	756.0	-26.4	718.8	-29.5	756.0	-26.4
CASE-3	716.2	-29.9	746.8	-27.4	716.1	-29.9	746.8	-27.3
GEV								
CASE-1	9.3	9.5	0.2	-0.2	-37.4	-38.2	17.5	14.1
CASE-2	9.0	9.3	0.3	0.2	-38.4	-39.6	18.5	14.5
CASE-3	10.0	10.1	-0.1	-0.5	-38.2	-39.1	17.7	13.8
SRGEV								
CASE-1	5.4	5.1	-0.4	-0.3	6.1	3.1	0.1	-2.6
CASE-2	4.8	4.4	0.0	-0.3	5.4	2.3	0.1	-2.6
CASE-3	5.5	5.3	-0.6	-0.8	6.0	3.3	-0.1	-2.8
RGEV								
CASE-1	789.5	-23.5	742.9	-27.8	789.6	-23.1	742.6	-27.7
CASE-2	788.9	-23.6	748.4	-26.9	788.7	-23.2	748.5	-26.9
CASE-3	789.6	-23.6	739.1	-27.9	789.0	-23.5	738.9	-27.9
WAKE								
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE								
CASE-1	5.4	5.2	0.3	0.2	5.8	3.1	0.8	-1.9
CASE-2	3.8	3.7	0.3	0.2	4.6	1.4	0.8	-2.0
CASE-3	8.0	7.6	0.0	-0.1	8.4	5.4	0.4	-2.7
RWAKE								
CASE-1	786.4	-23.7	746.7	-27.3	789.4	-23.7	746.9	-27.0
CASE-2	778.7	-24.4	751.9	-26.9	782.0	-24.3	752.3	-26.9
CASE-3	807.9	-21.9	744.6	-27.6	810.6	-21.7	744.9	-27.7

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TABLE 63 : AVERAGE PERCENTAGE BIAS OF FLOOD ESTIMATES COMPUTED BY DIFFERENT AVERAGING PROCEDURES

METHOD	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EV1								
CASE-1	-0.4	-0.9	0.6	0.0	-10.6	-10.5	0.3	0.6
CASE-2	-14.3	-14.6	2.9	2.3	-23.3	-23.1	2.7	2.9
CASE-3	-18.0	-18.5	1.8	1.3	-26.5	-26.3	1.4	1.8
SREV1-I								
CASE-1	-1.2	-1.5	0.5	-0.2	-1.0	-0.5	0.6	1.1
CASE-2	-14.4	-14.8	2.8	2.2	-14.4	-14.0	3.0	3.4
CASE-3	-18.5	-18.9	1.7	1.1	-18.3	-17.9	1.9	2.3
REV1-I								
CASE-1	419.9	-49.5	427.1	-49.0	418.4	-49.8	426.8	-48.9
CASE-2	349.4	-56.2	438.6	-47.8	348.6	-56.5	438.5	-47.8
CASE-3	327.7	-58.2	432.4	-48.3	326.8	-58.2	432.5	-48.3
SREV1-II								
CASE-1	0.0	-0.5	0.6	0.1	0.7	1.1	0.9	1.3
CASE-2	-14.3	-14.7	2.8	2.3	-13.9	-13.5	3.1	3.5
CASE-3	-18.1	-18.3	1.7	1.2	-17.9	-17.1	2.0	2.4
REV1-II								
CASE-1	425.4	-49.0	427.7	-49.0	424.9	-49.0	427.5	-49.0
CASE-2	349.6	-56.1	438.9	-47.8	349.5	-56.0	438.8	-47.8
CASE-3	329.8	-58.1	433.0	-48.3	329.7	-58.1	432.8	-48.3
GEV								
CASE-1	9.6	9.3	0.2	-0.3	-38.7	-40.2	18.2	18.7
CASE-2	8.9	8.2	0.6	0.2	-43.1	-44.5	20.8	21.8
CASE-3	4.0	3.2	-0.3	-0.9	-45.3	-46.8	19.2	20.1
SRGEV								
CASE-1	-6.3	5.8	0.0	-0.6	7.1	7.5	0.3	0.8
CASE-2	3.2	2.8	0.5	-0.2	4.0	4.7	0.7	1.1
CASE-3	-1.4	-2.0	-0.6	-1.2	-0.5	-0.2	-0.4	0.1
RGEV								
CASE-1	459.1	-45.8	424.5	-48.9	461.6	-45.8	424.3	-48.9
CASE-2	442.6	-47.3	426.1	-49.0	446.4	-47.4	426.1	-49.0
CASE-3	417.3	-49.8	420.4	-49.5	420.4	-49.8	420.1	-49.5
WAKE								
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE								
CASE-1	7.3	6.7	0.6	0.0	8.2	9.2	0.8	1.2
CASE-2	1.0	0.1	0.6	-0.2	2.2	2.7	0.7	1.0
CASE-3	-4.2	-4.5	-1.1	-1.5	-2.4	-1.8	-0.7	-0.2
RWAKE								
CASE-1	463.0	-45.5	426.7	-48.9	466.5	-45.2	425.1	-48.9
CASE-2	429.0	-48.8	427.3	-48.9	435.3	-48.6	426.5	-49.0
CASE-3	402.1	-50.9	418.6	-49.7	410.9	-50.7	419.8	-49.3

TABLE 64: AVERAGE PERCENTAGE RMSE OF FLOOD ESTIMATES COMPUTED BY DIFFERENT AVERAGING PROCEDURES

METHOD	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EV1								
CASE-1	16.7	16.7	14.6	14.4	46.8	44.8	48.3	46.2
CASE-2	17.1	17.3	14.8	14.8	46.3	44.5	49.5	47.0
CASE-3	17.2	17.5	14.9	14.8	46.3	45.0	49.0	46.5
SREV1-I								
CASE-1	15.3	15.2	14.2	13.9	48.2	46.3	48.6	46.1
CASE-2	15.4	15.6	14.5	14.5	47.7	45.3	49.4	46.6
CASE-3	15.4	15.5	14.5	14.3	47.7	45.6	48.8	46.6
REV1-I								
CASE-1	1256.0	96.1	1274.3	96.8	1251.0	96.2	1273.8	96.8
CASE-2	1219.8	94.5	1288.6	97.6	1215.1	94.4	1288.3	97.6
CASE-3	1218.6	94.6	1274.4	96.7	1213.5	94.2	1273.8	96.6
SREV1-II								
CASE-1	14.7	14.4	14.1	13.8	48.9	46.2	48.6	46.1
CASE-2	14.8	14.8	14.4	14.2	47.6	45.6	49.4	46.6
CASE-3	14.7	14.6	14.4	14.2	47.5	45.5	48.8	46.6
REV1-II								
CASE-1	1273.7	96.6	1276.3	96.9	1272.1	97.6	1276.0	97.0
CASE-2	1234.0	94.8	1290.2	97.7	1232.2	95.3	1290.5	97.8
CASE-3	1229.3	94.6	1276.1	96.7	1227.5	94.8	1276.1	96.8
GEV								
CASE-1	44.7	45.1	16.1	15.6	68.9	70.2	68.1	64.7
CASE-2	46.9	47.1	16.2	16.0	70.3	71.7	69.7	65.4
CASE-3	47.2	47.1	16.2	15.9	70.5	71.8	69.3	65.4
SRGEV								
CASE-1	21.6	21.4	14.2	14.2	54.5	51.8	48.3	46.2
CASE-2	21.7	21.5	14.5	14.6	54.9	51.9	49.0	46.4
CASE-3	22.1	21.9	14.5	14.6	55.3	52.5	49.0	46.3
RGEV								
CASE-1	1349.8	102.6	1270.6	96.5	1347.7	102.2	1270.9	96.6
CASE-2	1349.3	102.7	1280.1	96.9	1346.8	102.2	1279.8	96.8
CASE-3	1351.6	102.5	1264.6	96.0	1348.3	101.9	1264.8	96.3
WAKE								
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE								
CASE-1	22.8	22.9	14.6	14.6	54.9	52.2	48.8	46.3
CASE-2	22.8	22.9	15.0	14.6	55.0	52.2	49.2	46.4
CASE-3	24.8	25.0	15.0	14.6	57.6	54.7	49.2	46.3
RWAKE								
CASE-1	1345.2	101.6	1277.3	96.5	1346.5	102.7	1278.1	97.1
CASE-2	1333.8	101.1	1285.5	97.0	1335.3	102.4	1286.3	97.3
CASE-3	1381.5	103.4	1273.3	96.6	1380.4	105.1	1274.4	96.9

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TABLE 65: AVERAGE PERCENTAGE RMSE OF FLOOD ESTIMATES COMPUTED BY DIFFERENT AVERAGING PROCEDURES

METHOD	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EV1								
CASE-1	17.0	17.2	16.0	16.1	48.6	50.0	54.1	56.0
CASE-2	22.7	22.9	17.9	17.8	49.4	50.3	58.1	59.8
CASE-3	25.0	25.4	17.2	17.3	49.9	50.5	57.7	58.9
SREV1-I								
CASE-1	17.1	17.4	15.8	15.8	53.9	56.0	54.2	56.1
CASE-2	21.7	22.0	17.6	17.6	51.4	52.8	58.2	59.9
CASE-3	24.2	24.5	16.9	17.0	51.1	51.9	57.2	59.0
REV1-I								
CASE-1	680.2	72.8	687.1	72.2	677.8	72.8	686.8	72.1
CASE-2	578.6	72.9	703.3	72.3	578.9	72.8	703.4	72.2
CASE-3	548.5	73.3	694.4	72.2	547.6	72.9	694.4	72.0
SREV1-II								
CASE-1	16.7	16.6	15.7	15.7	53.8	56.4	54.1	56.2
CASE-2	21.1	21.3	17.4	17.4	51.1	52.6	58.1	59.8
CASE-3	23.6	23.9	16.8	16.8	50.9	51.7	57.3	59.0
REV1-II								
CASE-1	686.5	72.4	687.7	72.1	685.3	72.1	687.5	72.0
CASE-2	578.5	72.7	703.6	72.2	578.6	72.5	703.8	72.7
CASE-3	550.4	72.9	695.1	72.1	550.3	72.8	695.0	72.0
GEV								
CASE-1	45.9	45.7	17.7	17.6	71.8	70.6	75.5	77.7
CASE-2	55.2	55.1	18.4	18.3	77.2	76.0	81.3	83.7
CASE-3	56.5	56.8	18.5	18.9	78.0	77.2	79.7	81.7
SRGEV								
CASE-1	25.7	25.5	16.1	16.2	62.5	64.8	53.9	55.9
CASE-2	26.9	26.9	16.9	17.0	64.2	67.2	56.8	58.2
CASE-3	26.4	26.4	16.9	17.0	61.8	64.5	56.4	57.9
RGEV								
CASE-1	749.1	73.7	682.9	72.3	758.5	73.3	682.5	72.2
CASE-2	729.7	73.9	685.6	72.3	743.2	73.3	684.8	72.2
CASE-3	695.6	73.9	677.9	72.3	706.9	72.9	677.3	72.2
WAKE								
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE								
CASE-1	29.5	29.0	16.7	16.6	65.6	68.5	54.6	56.5
CASE-2	29.0	28.7	17.9	17.7	64.8	67.8	57.1	58.9
CASE-3	32.6	32.4	19.2	19.2	65.1	68.2	56.9	58.7
RWAKE								
CASE-1	759.2	74.7	686.7	72.5	763.6	72.6	684.4	72.3
CASE-2	713.1	74.4	688.1	72.6	726.4	72.5	687.3	72.4
CASE-3	684.1	75.6	678.4	72.6	701.9	73.2	678.2	72.4

TABLE 66: AVERAGE PERCENTAGE CV OF FLOOD ESTIMATES COMPUTED BY DIFFERENT AVERAGING PROCEDURES

METHOD	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EV1								
CASE-1	16.7	16.8	14.6	14.4	46.3	44.1	48.4	46.0
CASE-2	16.7	16.8	14.8	14.7	45.4	43.0	49.3	46.5
CASE-3	16.9	17.0	14.8	14.6	45.5	43.3	49.0	46.4
SREV1-I								
CASE-1	15.1	15.1	14.2	14.0	48.5	46.0	48.4	45.9
CASE-2	14.8	14.7	14.4	14.3	47.5	44.9	49.3	46.5
CASE-3	14.9	14.8	14.4	14.2	47.7	45.1	49.0	46.4
REV1-I								
CASE-1	1019.6	91.8	1033.2	92.8	1014.5	91.9	1032.8	92.8
CASE-2	991.7	89.4	1044.3	93.8	986.7	89.3	1043.9	93.8
CASE-3	990.5	89.4	1033.4	92.9	985.5	89.2	1033.0	92.8
SREV1-II								
CASE-1	14.7	14.6	14.1	13.9	48.6	46.3	48.4	45.9
CASE-2	14.4	14.2	14.4	14.2	47.5	45.0	49.3	46.6
CASE-3	14.4	14.3	14.4	14.1	47.6	45.1	49.0	46.4
REV1-II								
CASE-1	1033.7	92.8	1034.9	92.9	1031.8	93.4	1034.7	93.0
CASE-2	1002.8	90.1	1045.8	93.9	1001.0	90.6	1045.6	94.0
CASE-3	999.1	89.9	1034.6	92.9	997.1	90.4	1034.4	93.0
GEV								
CASE-1	43.3	43.3	15.8	15.7	37.5	37.3	59.5	56.5
CASE-2	45.5	45.5	16.1	15.9	38.0	37.8	60.6	57.2
CASE-3	45.6	45.5	15.9	15.8	38.2	37.9	60.3	57.0
SRGEV								
CASE-1	20.8	20.7	14.4	14.2	54.1	51.6	48.3	45.9
CASE-2	21.2	21.1	14.6	14.4	54.6	51.9	49.0	46.3
CASE-3	21.3	21.3	14.6	14.3	55.0	52.2	48.7	46.1
RGEV								
CASE-1	1094.8	99.8	1031.0	92.4	1092.1	99.4	1031.1	92.5
CASE-2	1094.5	99.9	1038.2	93.0	1091.8	99.4	1038.3	93.1
CASE-3	1097.0	99.7	1026.4	92.0	1093.3	99.4	1026.5	92.1
WAKE								
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE								
CASE-1	22.1	22.3	14.7	14.5	54.6	52.3	48.7	46.2
CASE-2	22.3	22.5	14.8	14.7	54.7	52.2	49.3	46.6
CASE-3	23.3	23.5	14.9	14.6	56.9	54.3	49.1	46.5
RWAKE								
CASE-1	1091.5	98.7	1036.2	92.7	1090.7	100.0	1036.9	93.1
CASE-2	1082.7	98.1	1042.6	93.3	1082.5	99.3	1043.3	93.7
CASE-3	1120.7	101.0	1033.2	92.5	1117.5	102.8	1034.0	92.9

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TABLE 67: AVERAGE PERCENTAGE CV OF FLOOD ESTIMATES COMPUTED BY DIFFERENT AVERAGING PROCEDURES

METHOD	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EV1								
CASE-1	17.1	17.1	16.1	16.1	47.4	48.8	53.8	55.5
CASE-2	17.1	17.0	17.2	17.2	43.4	44.4	57.5	59.2
CASE-3	16.5	16.5	17.1	17.2	41.7	42.4	57.1	58.4
SREV1-I								
CASE-1	17.3	17.2	15.9	15.9	53.9	55.7	54.1	55.9
CASE-2	15.5	15.5	16.9	16.9	48.8	50.2	57.8	59.5
CASE-3	14.8	14.7	16.8	16.8	46.8	47.6	57.4	58.7
REV1-I								
CASE-1	535.2	53.4	538.1	53.4	533.1	52.9	537.9	53.4
CASE-2	462.2	46.4	549.8	54.6	462.1	45.9	549.8	54.5
CASE-3	440.0	44.0	543.5	54.0	439.5	43.4	543.5	53.9
SREV1-II								
CASE-1	16.6	16.5	15.7	15.8	54.1	56.2	54.1	55.9
CASE-2	14.7	14.7	16.8	16.8	48.4	50.0	57.8	59.5
CASE-3	14.1	14.0	16.7	16.7	46.5	47.6	57.4	58.7
REV1-II								
CASE-1	538.7	53.6	538.6	53.4	537.5	53.2	538.5	53.4
CASE-2	460.8	45.9	549.9	54.6	460.8	45.5	549.9	54.6
CASE-3	440.7	43.8	543.8	54.0	440.8	43.5	543.8	53.9
GEV								
CASE-1	44.2	44.2	17.4	17.5	38.5	38.2	66.6	68.9
CASE-2	53.7	53.9	18.2	18.2	40.4	39.9	71.4	73.7
CASE-3	55.6	56.2	18.5	18.5	40.4	40.1	70.8	72.6
SRGEV								
CASE-1	24.9	24.8	16.2	16.2	62.1	64.4	53.9	55.8
CASE-2	26.7	26.6	17.0	17.0	64.2	66.9	56.6	58.3
CASE-3	26.4	26.3	17.0	17.0	61.9	64.4	56.3	57.6
RGEV								
CASE-1	592.0	57.8	535.2	53.3	601.5	57.3	534.5	53.2
CASE-2	579.9	56.7	537.2	53.5	594.2	55.9	536.3	53.5
CASE-3	556.4	54.4	531.7	52.9	568.0	53.4	530.9	52.9
WAKE								
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE								
CASE-1	28.7	28.1	16.8	16.8	65.0	67.7	54.4	56.5
CASE-2	29.2	28.6	17.8	17.7	64.8	67.5	57.0	58.9
CASE-3	33.3	32.0	19.3	19.1	64.9	68.2	57.0	58.4
RWAKE								
CASE-1	601.6	59.2	538.2	53.6	604.8	56.9	536.6	53.4
CASE-2	569.5	56.4	539.2	53.7	581.5	53.6	538.6	53.5
CASE-3	553.4	55.7	533.6	53.1	569.1	52.4	533.1	53.0

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TABLE 68: AVERAGE FLOOD ESTIMATES COMPUTED BY DIFFERENT AVERAGING PROCEDURES

METHOD	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EV1								
CASE-1	65.0	6082.5	21.2	1989.6	61.6	5620.5	21.0	1918.2
CASE-2	64.8	6064.2	21.1	1979.1	61.3	5588.1	20.9	1905.6
CASE-3	65.2	6100.8	21.3	1991.3	61.7	5622.5	21.0	1917.5
SREV1-I								
CASE-1	64.0	6003.7	21.1	1982.0	64.3	5881.0	21.2	1939.1
CASE-2	63.9	5994.0	21.0	1972.2	64.2	5866.6	21.1	1928.0
CASE-3	64.4	6041.4	21.2	1985.3	64.7	5913.3	21.3	1941.0
REV1-I								
CASE-1	540.7	4360.8	178.5	1439.9	539.8	4361.0	178.4	1439.9
CASE-2	543.2	4380.5	178.7	1441.6	542.2	4380.2	178.6	1441.6
CASE-3	544.1	4388.7	178.7	1442.3	543.2	4387.0	178.7	1442.1
SREV1-II								
CASE-1	64.9	6085.0	21.2	1989.8	65.2	5957.7	21.3	1946.5
CASE-2	64.6	6060.5	21.1	1978.8	64.9	5929.2	21.2	1934.3
CASE-3	65.0	6093.9	21.2	1990.7	65.3	5962.8	21.3	1946.1
REV1-II								
CASE-1	547.9	4420.2	179.1	1445.6	547.6	4426.4	179.1	1446.2
CASE-2	549.0	4429.4	179.2	1446.4	548.8	4435.4	179.2	1446.9
CASE-3	548.6	4427.1	179.2	1446.2	548.4	4433.0	179.2	1446.7
GEV								
CASE-1	71.2	6706.9	21.2	1990.7	40.4	3744.9	22.4	2044.5
CASE-2	73.5	6924.1	21.1	1978.5	41.0	3797.9	22.3	2030.5
CASE-3	74.2	6985.5	21.2	1990.4	41.3	3826.4	22.4	2043.2
SRGEV								
CASE-1	68.6	6430.4	21.2	1987.7	69.0	6304.8	21.3	1944.4
CASE-2	70.4	6602.7	21.1	1975.2	70.8	6469.6	21.1	1930.7
CASE-3	71.1	6664.2	21.2	1986.8	71.5	6531.2	21.3	1942.4
RGEV								
CASE-1	578.2	4672.6	179.0	1444.1	578.2	4680.7	178.9	1444.5
CASE-2	597.3	4827.2	178.9	1443.7	597.3	4835.4	178.9	1444.2
CASE-3	599.5	4840.7	178.9	1443.4	599.2	4850.0	178.8	1443.9
WAKE								
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE								
CASE-1	68.5	6423.2	21.3	1995.7	68.9	6292.2	21.4	1951.9
CASE-2	69.7	6543.2	21.1	1982.0	70.2	6404.7	21.2	1937.0
CASE-3	72.8	6826.5	21.3	1997.6	73.2	6681.6	21.4	1952.4
RWAKE								
CASE-1	576.0	4656.8	179.6	1449.5	578.0	4665.9	179.7	1450.3
CASE-2	590.2	4772.8	179.5	1448.4	592.3	4781.9	179.5	1449.1
CASE-3	612.1	4946.8	179.8	1450.9	614.2	4957.0	179.8	1451.6

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TABLE 69 : AVERAGE FLOOD ESTIMATES COMPUTED BY DIFFERENT AVERAGING PROCEDURES

METHOD	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2	TEST CATCH. NO.: 1	TEST CATCH. NO.: 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EV1								
CASE-1	70.2	6578.4	21.6	2022.4	63.1	5932.1	21.1	1987.4
CASE-2	70.5	6597.9	21.7	2024.7	63.1	5938.5	21.1	1988.5
CASE-3	70.6	6603.3	21.7	2026.7	63.2	5948.6	21.1	1992.2
SREV1-I								
CASE-1	69.9	6533.5	21.6	2017.5	70.1	6610.7	21.7	2043.3
CASE-2	70.5	6592.2	21.6	2023.1	70.6	6664.6	21.7	2048.5
CASE-3	70.3	6566.1	21.6	2022.5	70.3	6643.7	21.7	2049.5
REV1-I								
CASE-1	367.2	3359.1	113.3	1036.0	366.3	3349.0	113.2	1035.1
CASE-2	370.2	3389.1	113.5	1038.5	369.4	3376.5	113.5	1037.4
CASE-3	368.4	3370.1	113.4	1036.9	367.6	3356.9	113.3	1035.8
SREV1-II								
CASE-1	70.7	6611.4	21.7	2025.2	71.0	6696.9	21.8	2051.7
CASE-2	70.6	6599.2	21.7	2024.8	70.8	6686.2	21.7	2051.4
CASE-3	70.6	6601.1	21.7	2026.5	70.8	6693.2	21.7	2054.7
REV1-II								
CASE-1	371.3	3397.8	113.7	1039.8	370.9	3390.4	113.7	1039.2
CASE-2	370.4	3390.5	113.6	1039.2	370.3	3383.9	113.6	1038.6
CASE-3	370.2	3386.9	113.6	1038.9	370.1	3380.8	113.6	1038.4
GEV								
CASE-1	77.8	7276.4	21.6	2023.4	43.2	3967.2	22.5	2119.9
CASE-2	90.8	8468.8	21.6	2018.2	46.9	4292.0	22.4	2119.1
CASE-3	90.6	8465.5	21.6	2020.4	47.0	4296.6	22.5	2123.0
SRGEV								
CASE-1	75.3	7036.4	21.6	2022.9	75.9	7152.3	21.7	2049.3
CASE-2	85.7	8007.5	21.6	2016.0	86.4	8154.7	21.6	2042.3
CASE-3	85.6	7997.0	21.6	2017.9	86.3	8156.4	21.6	2045.8
RGEV								
CASE-1	395.8	3611.9	113.6	1038.7	397.6	3611.1	113.5	1038.0
CASE-2	450.3	4109.5	113.1	1034.7	453.4	4110.8	113.1	1034.1
CASE-3	449.5	4099.4	113.1	1034.4	452.5	4100.9	113.1	1033.9
WAKE								
CASE-1	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-2	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
CASE-3	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
SRWAKE								
CASE-1	76.0	7102.1	21.7	2027.8	76.8	7261.5	21.7	2054.5
CASE-2	83.6	7806.4	21.6	2016.2	84.8	7996.1	21.6	2043.3
CASE-3	83.5	7809.5	21.4	1999.7	85.0	8042.6	21.5	2030.0
RWAKE								
CASE-1	398.9	3632.9	113.8	1040.8	401.4	3647.3	113.4	1039.1
CASE-2	438.5	3996.7	113.2	1034.7	444.1	4014.7	113.1	1033.7
CASE-3	436.9	4005.5	112.0	1024.8	445.1	4019.4	112.3	1026.7

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For the four different procedures of averaging, first three best methods have been identified for Case-1, Case-2 and Case-3 populations based on Bias, RMSE and CV and flood estimates for the test catchments of Group-1 and Group-2. Tables-70(Group-1) and 71(Group-2) provide a comparison of average Bias, Tables 72, 73 give a comparison of average RMSE, Tables 74(Group-1) and 75(Group-2) provide a comparison of average CV and Tables 76(Group-1) and 77(Group-2) provide a comparison of average flood estimates for the first three best methods for the Group-1 and Group-2 respectively.

It is also observed that the methods REV1-I, REV1-II, RGEV and RWAKE have generally larger Bias, RMSE and CV as compared to the other methods. Whenever small generated samples are used to estimate higher recurrence interval floods, the computed Bias values are quite high using the at site methods. It indicates that at site flood frequency methods are not capable of providing the reliable estimates of floods in the extrapolation range from the samples of the size generally available for the historical flood records in our country. The regional methods without using at site data are rejected as the computed Bias as well as RMSE and CV values are unusually high even for the larger sample sizes. Thus the regional methods together with at site data may be preferred for flood frequency analysis. Out of four regional and at site methods(SREV1-I, SREV1-II, SRGEV, and SRWAKE), SREV1-I and SREV1-II SRGEV and SRWAKE methods estimate floods with relatively less bias as well as RMSE and CV using generated samples for the different populations particularly for the samples of smaller sizes at higher recurrence intervals. The computed values of Bias

TABLE 70 : COMPARISION OF AVERAGE BIAS VALUES FOR FIRST THREE BEST METHODS

R1		R2		R3		R4	
CATCHMENT-1							
CASE-1							
SREV1-II	0.0	SREV1-II	0.5	SREV1-II	0.1	SRGEV	0.1
EV1	0.3	SREV1-I	-0.6	EV1	0.2	SREV1-I	0.4
SREV1-I	-1.1	EV1	-5.0	GEV	0.2	EV1.SREV1-II	0.6
CASE-2							
EV1	-3.3	SREV1-II	-3.1	SRGEV	0.0	SRGEV	0.1
SREV1-II	-3.6	SREV1-I	-4.1	GEV	0.3	EV1	0.6
SRWAKE	3.8	SRWAKE	4.6	SRWAKE	0.3	SRWAKE	0.8
CASE-3							
EV1	-3.0	SREV1-II	-3.1	SRWAKE	0.0	SRGEV	-0.1
SREV1-II	-3.6	SREV1-I	-3.5	GEV	-0.1	EV1	0.4
SREV1-I	-4.1	SRGEV	6.0	SREV1-I	0.3	SRWAKE	0.4
CATCHMENT -2							
CASE-1							
SREV1-II	0.0	SREV1-II	-2.1	EV1	0.0	SRWAKE	-1.9
EV1	-0.4	SRGEV	3.1	SREV1-I	0.0	SREV1-II	-2.0
SREV1-I	-1.6	SRWAKE	3.1	SREV1-II	0.1	SREV1-I	-2.2
CASE-2							
EV1	-3.7	SRWAKE	1.4	GEV	0.2	SREV1-II	-1.4
SRWAKE	3.7	SRGEV	2.3	SRWAKE	0.2	SREV1-I	-1.7
SREV1-II	-3.9	SREV1-II	-5.7	SREV1-I	0.3	EV1	-2.0
				SRGEV	-0.3	SRWAKE	-2.0
CASE-3							
EV1	-3.4	SRGEV	3.3	EV1	0.0	SREV1-II	-2.3
SREV1-II	-3.5	SRWAKE	5.4	SREV1-I	0.0	SREV1-I	-2.4
SREV1-I	-4.3	SREV1-II	-5.8	SRWAKE	-0.1	SRWAKE	-2.7

TABLE 71 : COMPARISION OF AVERAGE BIAS VALUES FOR FIRST THREE BEST METHODS

R1		R2		R3		R4	
CATCHMENT-1							
CASE-1							
SREV1-II	0.0	SREV1-II	0.7	SRGEV	0.0	EV1.SRGEV	0.1
EV1	-0.4	SREV1-I	-1.0	GEV	0.2	SREV1-I	0.6
SREV1-I	-1.2	SRGEV	7.0	SREV1-I	0.5	SRWAKE	0.8
CASE-2							
SRWAKE	1.0	SRWAKE	2.2	SRGEV	0.5	SRGEV.SRWAKE	0.7
SRGEV	3.2	SRGEV	4.0	GEV	0.6	EV1	2.7
GEV	8.9	SREV1-II	-13.9	SRWAKE	0.6	SREV1-I	3.0
CASE-3							
SRGEV	-1.4	SRGEV	-0.5	GEV	-0.3	SRGEV	-0.4
GEV	4.0	SRWAKE	-2.4	SRGEV	-0.6	SRWAKE	-0.7
SRWAKE	-4.2	SREV1-II	-17.9	SRWAKE	-1.1	EV1	1.4
CATCHMENT -2							
CASE-1							
SREV1-II	-0.5	SREV1-I	-0.5	EV1,SRWAKE	0.0	EV1	0.6
EV1	-0.9	SREV1-II	1.1	SREV1-II	0.1	SRGEV	0.8
SREV1-I	-1.5	SRGEV	7.5	SREV1-I	-0.2	SREV1-I	1.1
CASE-2							
SRWAKE	0.1	SRWAKE	2.7	GEV	0.2	SRWAKE	1.0
SRGEV	2.8	SRGEV	4.7	SRGEV	-0.2	SRGEV	1.1
GEV	8.2	SREV1-II	-13.5	SRWAKE	-0.2	EV1	2.9
				SREV1-I	2.2		
CASE-3							
SRGEV	-2.0	SRGEV	-0.2	GEV	-0.9	SRGEV	0.1
GEV	3.2	SRWAKE	-1.8	SREV1-I	1.1	SRWAKE	-0.2
SRWAKE	-4.5	SREV1-II	-17.1	SREV1-II	1.2	EV1	1.8
				SRGEV	-1.2		

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TABLE 72 : COMPARISION OF AVERAGE RMSE VALUES FOR FIRST THREE BEST METHODS

R1		R2		R3		R4	
CATCHMENT-1							
CASE-1							
SREV1-II	14.7	EV1	46.8	SREV1-II	14.1	EV1,SRGEV	48.3
SREV1-I	15.3	SREV1-I	48.2	SREV1-I	14.2	SREV1-I	48.6
EV1	16.7	SREV1-II	48.9	SRGEV	14.2	SREV1-II	48.6
CASE-2							
SREV1-II	14.8	EV1	46.3	SREV1-II	14.4	SRGEV	49.0
SREV1-I	15.4	SREV1-II	47.6	SREV1-I	14.5	SRWAKE	49.2
EV1	17.1	SREV1-I	47.7	SRGEV	14.5	SREV1-I	49.4
						SREV1-II	49.4
CASE-3							
SREV1-II	14.7	EV1	46.3	SREV1-II	14.4	SREV1-I	48.8
SREV1-I	15.4	SREV1-II	47.5	SREV1-I	14.5	SREV1-II	48.8
EV1	17.2	SREV1-I	47.7	SRGEV	14.5	EV1,SRGEV	49.0
CATCHMENT -2							
CASE-1							
SREV1-II	14.4	EV1	44.8	SREV1-II	13.8	SREV1-I	46.1
SREV1-I	15.2	SREV1-II	46.2	SREV1-I	13.9	SREV1-II	46.1
EV1	16.7	SREV1-I	46.3	SRGEV	14.2	EV1,SRGEV	46.2
CASE-2							
SREV1-II	14.8	EV1	44.5	SREV1-II	14.2	SRGEV	46.4
SREV1-I	15.6	SREV1-I	45.3	SREV1-I	14.5	SRWAKE	46.4
EV1	17.3	SREV1-II	45.6	SRGEV	14.6	SREV1-I	46.6
				SRWAKE	14.6	SREV1-II	46.6
CASE-3							
SREV1-II	14.6	EV1	45.0	SREV1-II	14.2	SRGEV	46.3
SREV1-I	15.5	SREV1-II	45.5	SREV1-I	14.3	SRWAKE	46.3
EV1	17.5	SREV1-I	45.6	SRGEV	14.6	EV1	46.5
				SRWAKE	14.6		

TABLE 73 : COMPARISION OF AVERAGE RMSE VALUES FOR FIRST THREE BEST METHODS

R1		R2		R3		R4	
CATCHMENT-1							
CASE-1							
SREV1-II	16.7	EV1	48.6	SREV1-II	15.7	SRGEV	53.9
EV1	17.0	SREV1-II	53.8	SREV1-I	15.8	SREV1-II,EV1	54.1
SREV1-I	17.1	SREV1-I	53.9	EV1	16.0	SREV1-I	54.2
CASE-2							
SREV1-II	21.1	EV1	49.4	SRGEV	16.9	SRGEV	56.8
SREV1-I	21.7	SREV1-II	51.1	SREV1-II	17.4	SRWAKE	57.1
EV1	22.7	SREV1-I	51.4	SREV1-I	17.6	SREV1-II,EV1	58.1
CASE-3							
SREV1-II	23.6	EV1	49.9	SREV1-II	16.8	SRGEV	56.4
SREV1-I	24.2	SREV1-II	50.9	SREV1-I	16.9	SRWAKE	56.9
EV1	25.0	SREV1-I	51.1	SRGEV	16.9	SREV1-I	57.2
				EV1	17.2		
CATCHMENT -2							
CASE-1							
SREV1-II	16.6	EV1	50.0	SREV1-II	15.7	SRGEV	55.9
EV1	17.2	SREV1-I	56.0	SREV1-I	15.8	EV1	56.0
SREV1-I	17.4	SREV1-II	56.4	EV1	16.1	SREV1-I	46.2
CASE-2							
SREV1-II	21.3	EV1	50.3	SRGEV	17.0	SRGEV	58.2
SREV1-I	22.0	SREV1-II	52.6	SREV1-II	17.4	SRWAKE	58.9
EV1	22.9	SREV1-I	52.8	SREV1-I	17.6	EV1,SREV1-II	59.8
CASE-3							
SREV1-II	23.9	EV1	50.5	SREV1-II	16.8	SRGEV	57.9
SREV1-I	24.5	SREV1-II	51.7	SREV1-I	17.0	SRWAKE	58.7
EV1	25.4	SREV1-I	51.9	SRGEV	17.0	EV1	58.9
				EV1	17.3		

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TABLE 74: COMPARISION OF AVERAGE CV VALUES FOR FIRST THREE BEST METHODS

R1		R2		R3		R4	
CATCHMENT-1							
CASE-1							
SREV1-II	14.7	GEV	37.5	SREV1-II	14.1	SRGEV	48.3
SREV1-I	15.1	EV1	46.3	SREV1-I	14.2	EV1.SREV1-I	48.4
EV1	16.7	SREV1-I	48.5	SRGEV	14.4	SREV1-II	48.4
CASE-2							
SREV1-II	14.4	GEV	38.0	SREV1-II	14.4	SRGEV	49.0
SREV1-I	14.8	EV1	45.4	SREV1-I	14.4	SRWAKE,EV1	49.3
EV1	16.7	SREV1-I	47.5	SRGEV	14.6	SREV1-I	49.3
		SREV1-II	47.5			SREV1-II	49.3
CASE-3							
SREV1-II	14.4	GEV	38.2	SREV1-II	14.4	SRGEV	48.7
SREV1-I	14.9	EV1	45.5	SREV1-I	14.4	EV1,SREV1-I	49.0
EV1	16.9	SREV1-II	47.6	SRGEV	14.6	SREV1-II	49.0
CATCHMENT -2							
CASE-1							
SREV1-II	14.6	GEV	37.3	SREV1-II	13.9	SREV1-I	45.9
SREV1-I	15.1	EV1	44.1	SREV1-I	14.0	SREV1-II	45.9
EV1	16.8	SREV1-I	46.0	SRGEV	14.2	SRGEV	45.9
						EV1	46.0
CASE-2							
SREV1-II	14.2	GEV	37.8	SREV1-II	14.2	SRGEV	46.3
SREV1-I	14.7	EV1	43.0	SREV1-I	14.3	EV1	46.5
EV1	16.8	SREV1-I	44.9	SRGEV	14.4	SREV1-I	46.5
CASE-3							
SREV1-II	14.3	GEV	37.9	SREV1-II	14.1	SRGEV	46.1
SREV1-I	14.8	EV1	43.3	SREV1-I	14.2	EV1	46.4
EV1	17.0	SREV1-I	45.1	SRGEV	14.3	SREV1-I	46.4
		SREV1-II	45.1			SREV1-II	46.4

TABLE 75: COMPARISION OF AVERAGE CV VALUES FOR FIRST THREE BEST METHODS

R1		R2		R3		R4	
			CATCHMENT-1				
CASE-1							
SREV1-II	16.6	GEV	38.5	SREV1-II	15.7	EV1	53.8
EV1	17.1	EV1	47.4	SREV1-I	15.9	SRGEV	53.9
SREV1-I	17.3	SREV1-I	53.9	EV1	16.1	SREV1-II	54.1
						SREV1-I	54.1
CASE-2							
SREV1-II	14.7	GEV	40.4	SREV1-II	16.8	SRGEV	56.6
SREV1-I	15.5	EV1	43.4	SREV1-I	16.9	SRWAKE	57.0
EV1	17.1	SREV1-II	48.4	SRGEV	17.0	EV1	57.5
CASE-3							
SREV1-II	14.1	GEV	40.4	SREV1-II	16.7	SRGEV	56.3
SREV1-I	14.8	EV1	41.7	SREV1-I	16.8	SRWAKE	57.0
EV1	16.5	SREV1-II	46.5	SRGEV	17.0	EV1	57.1
			CATCHMENT -2				
CASE-1							
SREV1-II	16.5	GEV	38.2	SREV1-II	15.8	RGEV	53.2
EV1	17.1	EV1	48.8	SREV1-I	15.9	REV1-II	53.4
SREV1-I	17.2	REV1-I	52.9	EV1	16.1	REV1-I.RWAKE	53.4
CASE-2							
SREV1-II	14.7	GEV	39.9	SREV1-II	16.8	RGEV.RWAKE	53.5
SREV1-I	15.5	EV1	44.4	SREV1-I	16.9	REV1-I	54.5
EV1	17.0	REV1-II	45.5	SRGEV	17.0	REV1-II	54.6
CASE-3							
SREV1-II	14.0	GEV	40.1	SREV1-II	16.7	RGEV	52.9
SREV1-I	14.7	EV1	42.4	SREV1-I	16.8	RWAKE	53.0
EV1	16.5	REV1-I	43.4	SRGEV	17.0	REV1-I	53.9
						REV1-II	53.9

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TABLE 76 : COMPARISION OF AVERAGE FLOOD ESTIMATES FOR FIRST THREE BEST METHODS

R1		R2		R3		R4	
			CATCHMENT-1				
CASE-1							
AV.POP.	64.9	AV.POP.	64.9	AV.POP.	21.2	AV.POP.	21.2
SREV1-II	64.9	SREV1-II	65.2	EV1,SREV1-II	21.2	SREV1-I	21.2
EV1	65.0	SREV1-I	64.3	GEV,SRGEV	21.2	SREV1-II	21.3
SREV1-I	64.0	EV1	61.6	SREV1-I	21.1	SRGEV	21.3
				SRWAKE	21.3		
CASE-2							
AV.POP.	67.1	AV.POP.	67.1	AV.POP.	21.1	AV.POP.	21.1
EV1	64.8	SREV1-II	64.9	EV1,SREV1-II	21.1	SREV1-I,SRGEV	21.1
SREV1-II	64.6	SREV1-I	64.2	GEV,SRGEV	21.1	SREV1-II	21.2
SRWAKE	69.7	SRWAKE	70.2	SRWAKE	21.1	SRWAKE	21.2
CASE-3							
AV.POP.	67.2	AV.POP.	67.2	AV.POP.	21.3	AV.POP.	21.3
EV1	65.2	SREV1-II	65.3	EV1,SRWAKE	21.3	SREV1-I,SRGEV	21.3
SREV1-II	65.0	SREV1-I	64.7	SREV1-I,SRGEV	21.2	SREV1-II	21.3
SRGEV	71.1	SRGEV	71.5	SREV1-II,GEV	21.2	SRWAKE	21.4
			CATCHMENT-2				
CASE-1							
AV.POP.	6097.9	AV.POP.	6097.9	AV.POP.	1988.4	AV.POP.	1988.4
SREV1-II	6085.0	SREV1-II	5957.7	SRGEV	1987.7	SRWAKE	1951.9
EV1	6082.5	SRWAKE	6292.2	EV1	1989.6	SREV1-II	1946.5
SREV1-I	6003.7	SRGEV	6304.8	SREV1-II	1989.8	SRGEV	1944.4
CASE-2							
AV.POP.	6305.2	AV.POP.	6305.2	AV.POP.	1976.0	AV.POP.	1976.0
SRWAKE	6543.2	SRWAKE	6404.7	SRGEV	1975.2	SRWAKE	1937.0
EV1	6064.2	SRGEV	6469.6	GEV	1978.5	SREV1-II	1934.3
SREV1-II	6060.5	SREV1-II	5929.2	SREV1-II	1978.8	SRGEV	1930.7
CASE-3							
AV.POP.	6317.1	AV.POP.	6317.1	AV.POP.	1998.0	AV.POP.	1998.0
EV1	6100.8	SRGEV	6531.2	SRWAKE	1997.6	GEV	2043.2
SREV1-II	6093.9	SREV1-II	5962.8	EV1	1991.3	SRWAKE	1952.4
SREV1-I	6041.4	SRWAKE	6681.6	SREV1-II	1990.7	SREV1-II	1946.1

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TABLE 77 : COMPARISION OF AVERAGE FLOOD ESTIMATES FOR FIRST THREE BEST METHODS

R1		R2		R3		R4	
CATCHMENT-1							
CASE-1							
AV.POP.	70.7	AV.POP.	70.7	AV.POP.	21.6	AV.POP.	21.6
SREV1-II	70.7	SREV1-II	71.0	EV1,SREV1-I	21.6	SREV1-I	21.7
EV1	70.2	SREV1-I	70.1	GEV,SRGEV	21.6	SRGEV,SRWAKE	21.7
SREV1-I	69.9	SRGEV	75.9	SREV1-II	21.7	SREV1-II	21.8
				SRWAKE	21.7		
CASE-2							
AV.POP.	82.8	AV.POP.	82.8	AV.POP.	21.5	AV.POP.	21.5
SRWAKE	83.6	SRWAKE	84.8	SREV1-I,GEV	21.6	SRGEV,SRWAKE	21.6
SRGEV	85.7	SRGEV	86.4	SRGEV,SRWAKE	21.6	SREV1-I	21.7
GEV	90.8	SREV1-II	70.8	EV1,SREV1-II	21.7	SREV1-II	21.7
CASE-3							
AV.POP.	87.1	AV.POP.	87.1	AV.POP.	21.6	AV.POP.	21.6
SRGEV	85.6	SRGEV	86.3	SREV1-I,GEV	21.6	SRGEV	21.6
GEV	90.6	SRWAKE	85.0	SRGEV	21.6	SRWAKE	21.5
SRWAKE	83.5	SREV1-II	70.8	EV1,SREV1-II	21.7	SREV1-I	21.7
						SREV1-II	21.7
CATCHMENT-2							
CASE-1							
AV.POP.	6638.6	AV.POP.	6638.6	AV.POP.	2026.0	AV.POP.	2026.0
SREV1-II	6611.4	SREV1-I	6610.7	SREV1-II	2025.2	SREV1-I	2043.3
EV1	6578.4	SREV1-II	6696.9	SRWAKE	2027.8	SRGEV	2049.3
SREV1-I	6533.5	SRGEV	7152.3	GEV	2023.4	SREV1-II	2051.7
CASE-2							
AV.POP.	7784.4	AV.POP.	7784.4	AV.POP.	2020.1	AV.POP.	2020.1
SRWAKE	7806.4	SRWAKE	7996.1	GEV	2018.2	SRGEV	2042.3
SRGEV	8007.5	SRGEV	8154.7	SREV1-I	2023.1	SRWAKE	2043.3
GEV	8468.8	SREV1-II	6686.2	SRWAKE	2016.2	SREV1-I	2048.5
CASE-3							
AV.POP.	8182.0	AV.POP.	8182.0	AV.POP.	2028.5	AV.POP.	2028.5
SRGEV	7997.0	SRGEV	8156.4	EV1	2026.7	SRWAKE	2030.0
GEV	8465.5	SRWAKE	8042.6	SREV1-II	2026.5	SRGEV	2045.8
SRWAKE	7809.6	SREV1-II	6693.2	SREV1-I	2022.5	SREV1-I	2049.5

using SRGEV and SRWAKE methods are much lower than those of the other methods for the generated data of all the three cases, even when the samples of size one have been considered. Similar conclusions are also drawn by analysing other samples of different sizes for the two test catchments, except that the minor decrease in the computed values of Bias are evident with increase in sample size. Further, it is also observed that the computed values of RMSE and CV by different methods have been considerably reduced with increase in sample sizes except for the regional methods without using at site data, wherein such patterns are missing.

Figs. 3 to 5 show flood estimates for SRGEV and SRWAKE methods for both the groups of the catchments viz. Group 1 and Group-2 for all the three cases (Case-1, Case-2 and Case-3) of the generated data for a sample size of 30. It is observed from these figs. that, in general, the flood estimates obtained by analyzing the data of the Group-1 are lower than those obtained for the Group-2, for both the methods. For example, the flood estimates of the Group-1 are lower by 6.9%, 10.7% and 10.0% than those of the Group-2 for Case-1, Case-2 and Case-3 respectiively for the return period of 50 years for SRGEV method and sample size 30. For a return period of 100 years the SRGEV method for the Group-1, as compared to Group-2 provides flood estimates lesser by 7.6%, 13.5% and 12.5% for the three cases respectively for the sample size of 30. For the return period of 1000 years the flood estimates for the Group-1, as compared to Group-2 are lower by 9.4%, 22.9% and 21.5% for the three cases respectively.

In case of the SRWAKE method for a sample size of 30 the

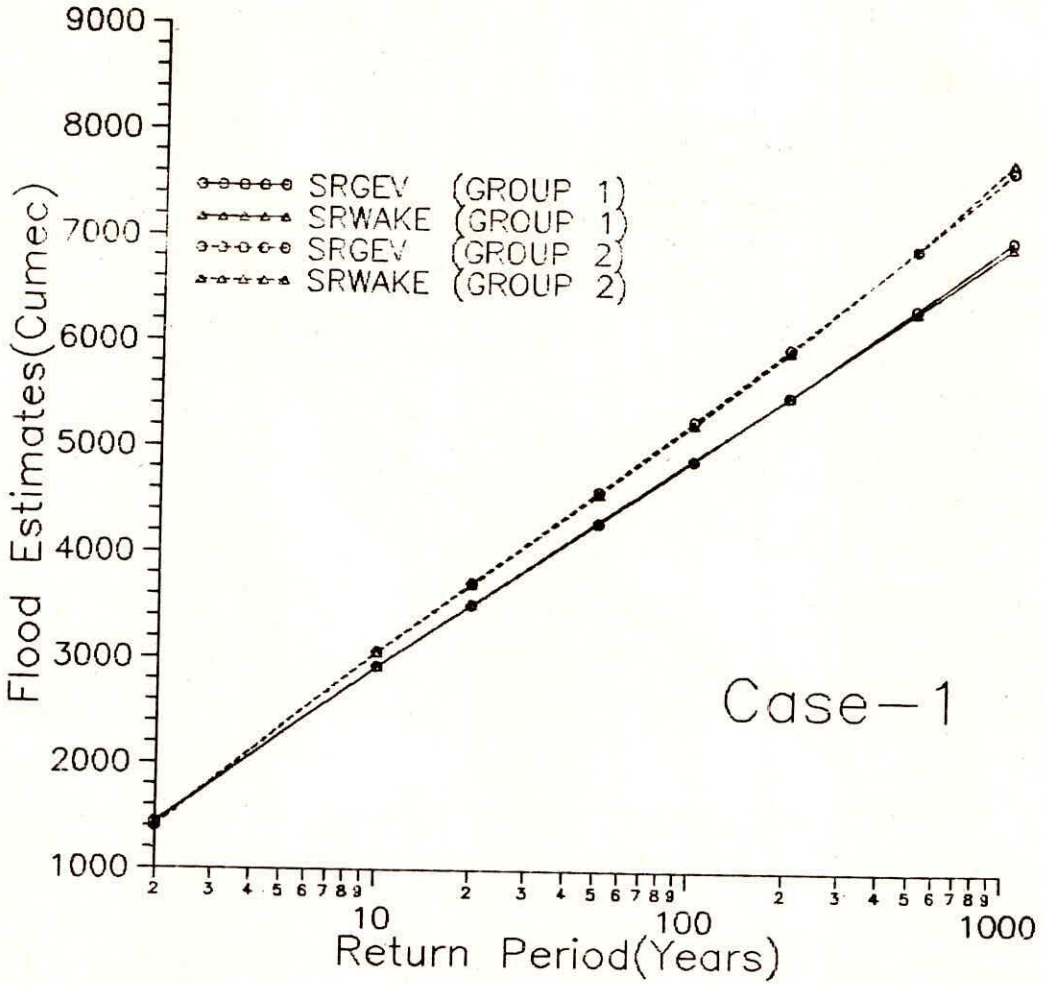

Fig.3 Flood estimates for SRGEV & SRWAKE for sample size 30

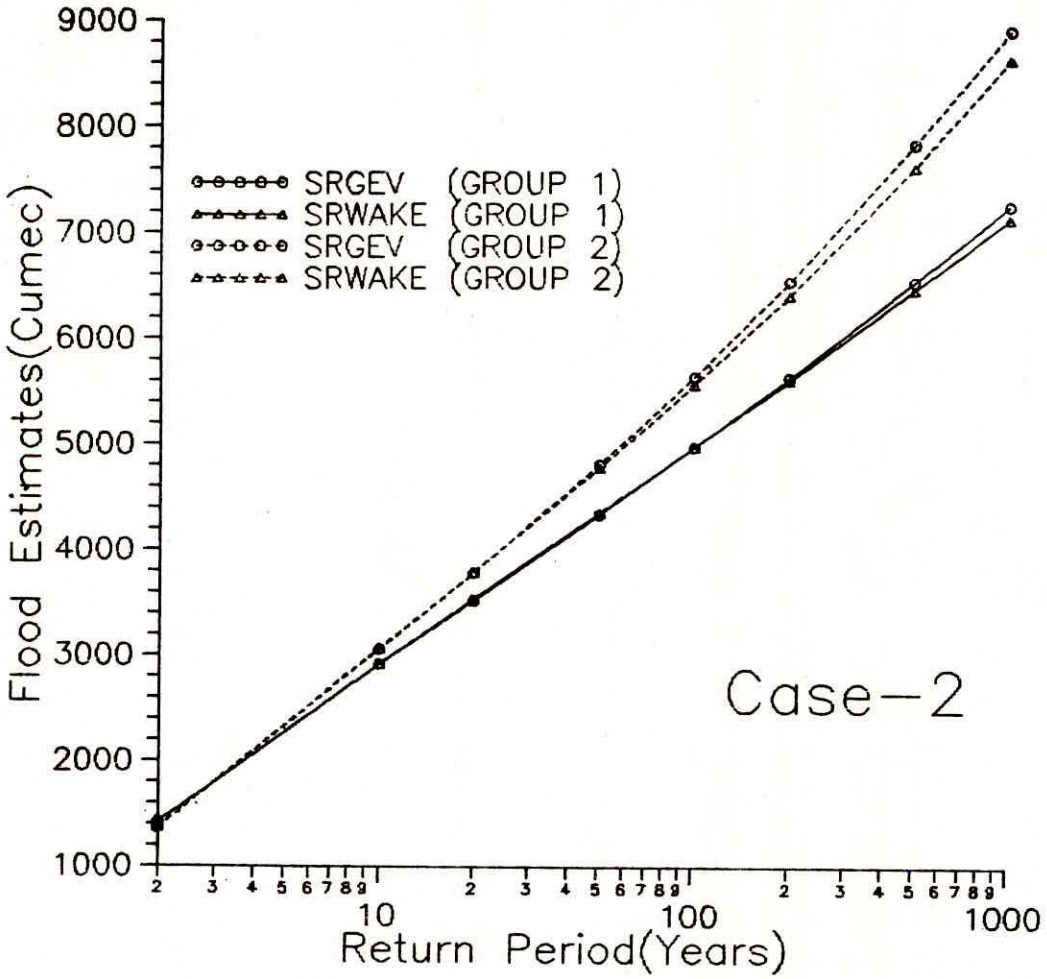

Fig.4 Flood estimates for SRGEV & SRWAKE for sample. size 30

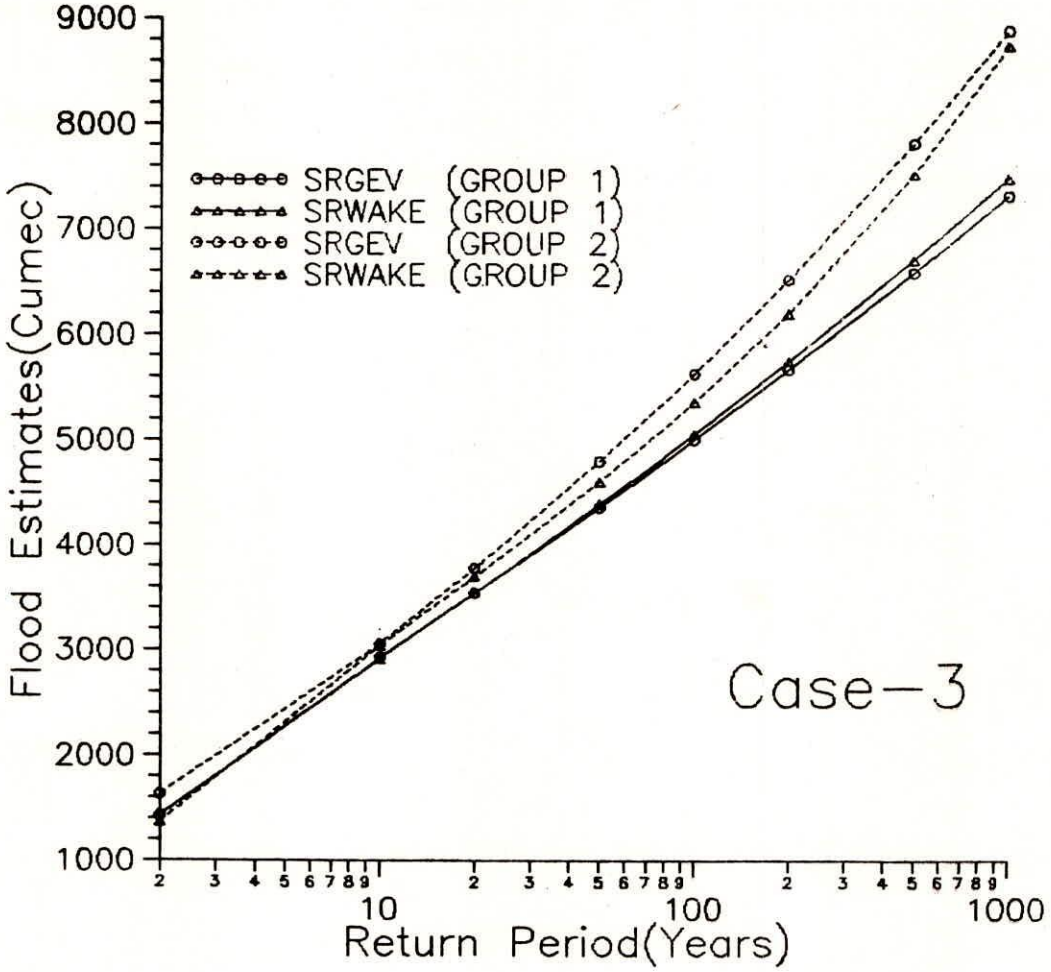

Fig.5 Flood estimates for SRGEV & SRWAKE for sample size 30

following observations are made regarding the flood estimates obtained for the two groups of the catchments. The flood estimates of Group-1 are lower than those of the Grloup-2 by 5.9%, 9.9% and 4.9% for the return period of 50 year for the three cases respectively. For the return period of 100 years the flood estimates are lower by 6.7%, 11.9% and 5.9% for the three cases. Whereas, for the return period of 1000 years the flood estimates of the Group-1 are lower by 11.4%, 21.2% and 16.9% than those of the Group-2 for the three cases respectively.

9.0 CONCLUSIONS

The regional flood frequency analysis has been carried out for Sub-Himalayan region using the eleven different methods considering (i) at site data, (ii) at site and regional data together, and (iii) regional data alone without using at site data. From the study the following conclusions are drawn.

(a) The superiority of one method over others could not be established based on the computed values of ADF, EFF and SE.

(b) At-site EV1(PWM), GEV(PWM) and WAKE(PWM) methods are not applicable for analysing the samples of size one. WAKE(PWM) method has not been used to analyse the at site data.

(c) All regional methods without considering at site data (REV1-I, REV1-II, RGEV and RWAKE) estimate the floods with larger Bias, RMSE and CV for both the gauging sites. It indicates the unreliability associated with the regional methods without considering the at site data while estimating the floods for different recurrence intervals. Efforts, therefore, should be made to collect the historical flood records even from indirect sources in order to obtain some at site data for regional frequency analysis.

(d) At-site methods generally estimate the floods for higher recurrence intervals with larger Bias from the samples of the size of the historical records i.e. sample size less than 20, which are generally available in India. Thus at-site methods may not always be able to provide reliable and consistent flood estimates in the extrapolation range which are usually needed for design of medium

and major water resources structures.

(e) PWM based at-site and regional SRGEV and SRWAKE methods in general estimate the floods with less bias, and comparable root mean square error and coefficient of variation for the two test catchments. Thus, out of the studied eleven methods, SRGEV and SRWAKE methods may be considered suitable methods for this region, particularly when dealing with limited data situations.

(f) For 50 or 100 years return period floods the percent difference obtained from the flood frequency relationships developed based on the consideration of the two groups of the catchments (sample size 30) are observed to be less than 14%. However, the percentage difference for a flood of 1000 years return period is maximum of the order of 23%.

(g) It is also observed that the percentage difference between flood estimates obtained for the two groups for the Case-1 series i.e. the generated series using EV1 population is relatively lower than the Case-2 and Case-3 series which are generated series of GEV and Wakeby populations respectively. It indicates that the effect of regional homogeneity on the flood estimates is less significant for the EV1 population as compared to the GEV and Wakeby populations. However, further studies are required to be carried out to examine effect of regional homogeneity on the flood frequency estimates for various regions having annual maximum peak flood series data for a large number of catchments.

REFERENCES

1. Benson ,M.A. (1962),'Evolution of Methods for Evaluating the occurrence of Floods', U.S. Geological Survey, Water Supply Paper 1580-A.

2. C.W.C. (1980),'Flood Estimation Report for Lower Godavari Sub-Zone(3f)', Design Office Report No.3/1980.

3. Dalrymple, T (1960) ,'Flood Frequency Methods',U. S. Geol, Survey Water Supply Paper 1543-A , pp. 11-51, Washington.

4 Goswami, A. (1972) ,'Regional Flood Frequency Analysis of Brahmputra Basin in North- East India', Journalof Institution of Engineers (india), Civil Engg. Div.,Vol. 52,pp 169-174.

5. Gries, N.P. (1983),'Flood Frequency Analysis: A Review of 1979-1982', Reviews of Geophysics and Space Physics, Vol. 21,No.3,pp.699-706,April.

6. Gries,N.P. and and E.F. Wood (1983),'Regional Flood Frequency Estimation and Network Design', Water Resources Research, Vol.19,No. 4,pp. 1167-1177.

7. Gries, N.P. and E.F. Wood (1983),'Reginal Flood Frequency Estimation and Network Design - Correction', Water Resources Research , Vol. 19, No.2,pp.589-590.

8. Gupta, P.N. (1987),'Regional Flood Frequency Approach

Estimation of Flood Peaks for Mahi and Sabarmati Basin (Sub-Zone 3a)',Proceedings, National Symposium on Hydrology, Roorkee, Vol. I,pp I-16-26.

9. Hosking,J.R.M. , J.R. Wallis and E.F. Wood (1985 a),'Appraisal of the Regional Flood Frequency Procedure in the U.K. Flood Studies Report',Hydrological Sciences, Vol.30,No. 1,pp. 85-109.

10. Hosking, J.R.M. , J.R. Wallis and E.F. Wood (1985 b),'Estimation of the Genaralized Extreme Value Distribution by the Method of Probability Weighted Moments', Technometries, Vol. 27,No.3 , pp. 251.

11. Huq, S. M.,R. Nair and S.S. Sil (1986),'Frequency Flood Formulae for Countrywide Application', Proceedings, 53rd Annual R & D Session, CBIP, Bhubaneshwar , pp 405-416.

12. Jakhade, G.S., A.S. Murti and S. Sethuraman (1984),'Frequency Floods in Brahmputra Valley - Regional Flood Frequency Approach', CBIP, Journal, New Delhi, Vol. 41,No. 1, pp 41-48.

13. James, E.J., K.D. Nambudripad, K. E. Sreedharan and R. Mohanan (1987),' Rainfall- Runoff Criteria for the Chaliar Basin of Western Ghats Region', Final Report, CBIP Project, CWRDM, Kozhikode,pp.99-103.

14 Kuczera,G. (1982),' Combining Site Specific and Regional Information: An Emperical Bayes Approach', Water Resources Research, Vol.18, No.2, pp.306-314.

15. Kuczera, G. (1983 a),'A Bayesian Surrogate for Reginal Skew in Flood Frequency Analysis', Water Resources Research, Vol.19, No.3, pp. 821-832.

16. Kuczera, G. (1983 b),'Effect of Sampling Uncertainty and Spatial Correlation on An Empirical Bayes Procedure for Combining Site and Regional Information', J. Hydrology, Vol. 65, pp 373 -398.

17. Landwehr , J. M. ,N. C. Metalas and J. R. Wallis (1978), 'Some Comariosons of Flood Statitistics in Real and Log Space', Water Resources Research, Vol. 14, No.5, pp. 902.

18. Landwehr , J. M. ,N. C. Matalas and J. R. Wallis (1979 a),' Probability Weighted Moments Compared with Some Traditional Techniques of Estimating Gumbel Parameters and Quantiles', Water Resources Research , Vol.15, No.5, pp. 1055.

19. Landwehr, J. M. ,N. C. Matalas and J. R. Wallis (1979 b),' Estimation of Parameters and Quantiles of Wakeby Distributions : 1. Known Lower Bounds', Water Resources Research, Vol. 15, No. 6, pp. 1361.

20. Landwehr, J. M.,N. C. Matalas and J. R. Wallis (1979 c),' Estimation of Parameters and Quantiles of Wakeby Distributions: 2. Unknown Lower Bounds ', Water Resorces Research ,Vol. 15, No.6, pp 1373.

21 Landerwehr, J. M. , N. C. Matalas and J.R. Wallis (1984),' A note on the Applicability of The James- Stein Estimator in

Regional Hydrologic Studies', Water Resources Research, Vol. 20, No.11, pp.1630- 1638.

22. Lettenmaier, D.P. and K. W. Potter (1985),' Testing Flood Frequency Estimation Methods Using a Regional Flood Generation Model', Water Resources Research,Vol. 21, pp. 1903-1914.

23. Lettenmaier, D. P., J. R. Wallis and E. F. Wood (1987),' Effect of Regional Heterogeneity on Flood Frequency Estimation', Water Resources Research, Vol. 23, pp. 313-323.

24. Mehta, H. L. and D. K. Sharma (1986),'Flood Frequency Analysis', Proceedings of Workshop on Flood Estimation in Himalayan Region, Roorkee (U.P.),pp.13-23.

25. NERC (1975),' Flood Studies Report Volume 1 - Hydrological Studies', Natural Environment Research Council,London.

26. Perumal, M. and S. M. Seth (1985),' Regional Flood Frequency Analysis Using Power Transformation - A case Study ', Proceedings, Seminar on Flood Frequency Analysis , New Delhi, pp.93-108.

27. Potter, K. W. (1987), ' Reserch on Flood Frequency Analysis :1983-1986', Reviews of Geophysics , Vol. 25, No.2, pp.113-118, March

28. Rossi, F., M. Fiorentino and P. Versace (1984),' Two Component Extreme Value Distribution for Flood Frequeny Analysis', Water Resources Research, Vol. 20,No. 7, pp.847-856.

29. Seth, S. M. (1984-85),' Reginal Flood Frequency Analysis ',National Institute of Hydrology ,Roorkee,Report No. RN-14.

30. Seth, S. M. and B. N. Goswami (1972),' Reginal Flood Frequency Analysis With Limited Data', Proceedings, Third World Congress on Water Resources, Mexico City.

31. Seth, S. M. and R. D. Singh (1987),' Flood Estimation in India Using Regional Frequency Analysis', Proceedings, National Symposium on Hydrology, Roorkee,Vol. 1,pp. I-1-15.

32. Singh, R. D. (1989),' Flood Frequency Analysis Using At Site and Regional Data', M. Sc (Hydrology), Dissertation, International Post Graduate Course in Hydrology, University College Galway,Ireland , January.

33. Singh, R. D., S.M. Seth Rakesh Kumar(1990-91), 'Regional Flood Frequency Analysis for Gogavari Basin : Sub-zone 3(f)', NIH Technical Report, TR - 59.

34. Stendinger, J. R. (1983),'Estimating a Reginal Flood Frequency Distribution', Water Resources Research, Vol. 19, No.2, pp. 503-510.

35. Thirumalai, S. and P. B. Sinha (1986),' Flood Estimation for Small and Medium Catchments in Krishna Basin by Chow's Approach Modified by Nash', Proceedings, Seminar on Flood Estimation and Control ,Roorkee,pp. III- 43-51.

36. Thiruvengadachari, S., S. V. Nayak and G. Ranganna (1975),' Flood in Cauvery Basin: Magnitude and Frequency ', Proceedings, National Symposium on Hydrology, Roorkee, pp.G-17-21.

37. Venkatraman, R. and P. N. Gupta (1986),' Flood Estimation for Small and Medium Ctachments in Sub-Himalayan Region', Proceedings, Workshop on Flood Estmation in Himalayan Region, Roorkee,pp. 123-140.

38. Venkatraman, R., S. Thirumalai and P. N. Gupta (1986),' Regional Flood Frequency Analysis for Small and Medium Catchments in Lower Godavari Basin - A Critical Review', Proceedings, Seminar on Flood Estimation and Control, Roorkee,pp. II-58-77

39. Wallis, J. R. (1980),'Risk and Uncertainties in the Evaluation of Flood Events for the Design of Hydrologic Structures', Keynote Adress, Seminar on Extreme Hydrological Events : Floods and Droughts, Erice, Italy.

40. Wallis, J. R. (1981),' Hydrologic problems associated with Oilshale Development in Environmental System Analysis and Management', Edited by J. Rinaldi, North Holland Publishing Co., Amsterdam, The Netherlands.

41. Wallis, J. R. (1982),' Probable and Improbable Rainfall in California', IBM Research Report No. RC- 9350.

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