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REVIEW ON PROBABILITY ANALYSIS OF RAINFALL

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ABSTRACT

Climate change is global in nature but potential changes are not expected to be globally uniform rather then there may be a climatic regional difference. The considered efforts should be made to understand climatic changes at different region. The probability and frequency of rainfall pattern is one of the important issues for long term planning of agricultural operations, irrigation schemes as well as for watershed management. The main aim of this paper, therefore, is to review the benefit from rainfall analysis through reference to various publish scientific data. The analysis not only help in providing input data for a management system but is also enables the development of optimal water allocation policies and management stratigies to bridges the gap between water needs and optimal water supply under possible drought conditions.

I.INTRODUCTION

Water is one of the most valuable natural resource and vital to all form of life .water is also used for transportation is sources of power and serves many other useful purpose for domestic consumption agriculture,and industry .The main important sources of water in any area is rain . The amount and availability of various purpose is very much depending upon precipitation in that particular area . Excess or extended absence of rainfall will cause flooding and drought , respectivally precipitation information is essential for understanding the hydrological balance on global scale . Rainfall is the meteorological phenomenon that has the greatest impact on human activities and the most important environment factor limiting the developing of semiarid region . Understanding the rainfall availability is essential to optimal manage the scarce water resources that are under continuous stress due to increasing population ,water demand and economical development.

II.LITERATURE REVIEW

DA MOOLEY *et al.* (1984) studied all-India summer monsoon (June to sept) rainfall for the period 1871 to 1978 has been made in order to understand the interannual and long term variability of monsoon on a country level , India receives 85.31 cm mean monsoon rainfall which is 78per of the rainfall .The coefficient of variation of monsoon rain fall of the country level is 9.5% .The high & low rainfall level where observed in the year 1961-1877 respcetively the range being 41 cm abaut 48% of thew long term avg. there are 13year of large scale defict access in the 108 yrs periods. There is a continuous rise in the 10 yrs mean rainfall 1899-1953.

There are 4 major climatic periods in the series.however detail examination indicated that this cycle have developed during the last 30yrs of the data period.

KUMAR K. RUPA (1992) developed a model long term changes in the india monsoon rainfall on regional and local scale have important social and economic consequence .To present a comprehensive picture of such changes the monthly rainfall data at 366 station well spread over india have been analyzed over 114 years (1871-1984), for a long term trend some board contiguous areas showing statistically significant trends have been indentified .Areas of increasing trend in monsoon

JEFFERY A. NYSTVEN (1995) developed Acoustical Rainfall analysis Algorithm (ARA) and tested it for several dozen rainfall events and found to provide excellent estimates of rainfall rate, rainfall accumulation, and rainfall reflectivity. High temporal resolution variations in drop size distribution within the rain can be studied using ARA.

PAUL T. WILLS *et al.* (1996) has shown that their observed data severely underestimated the higher, predominantly connective, rainfall rate. They have also shown that this underestimate does not appear to be the case in the idealized situations. They utilized the WSR-88D radar data to produce a high-resolution product delineating the fresh water flux input over the Florida Bay/Everglades system for ecological studies, physical evaluation, and water management planning and decisions.

NORTHROP. P. (1997) has assumed that storms arrive in a Poisson process in time, and each storm gives rise to a random number of elliptical rain cells. Each rain cell is assumed to move with a random velocity for a random time before termination. The cell at a random intensity deposits rain, which is constant over the area of the cell and over its lifetime. The main properties of this model are studied analytically wherever possible.

CHANDLER *et al.* (1997) presented a method for improving the spatial resolution of rainfall fields generated by atmospheric General Circulation Models. They used ideas from Bayesian image analysis to improve the resolution of the binary wet/dry image, and showed the clear advantage over the existing methods that 23 incorporated both the spatial and the temporal memory of the rainfall field.

FELICIDAD V. VILLAREAL and PEREZ .T. (1999) developed a two dimensional theoretical model capable of describing the radial distribution of tropical cyclone rainfall. The model used primitive equation written in cylindrical coordinate. The grid system was non uniform with smaller grids located near the center and at the surface, to give emphasis to the eye of the tropical cyclone. The results of the modified model simulation showed many realistic features typical of a matured tropical cyclone. It realistically simulated the inflow at lower levels, the upward motion near the center and the outflow at upper levels. The model determined the location of maximum rainfall rate and maximum wind. It showed that the location of maximum rainfall was closer to the center than the location of maximum wind regardless of tropical cyclone intensity.

STEWART *et al.* (1999) presented the use of rainfall growth extension method. A growth factor is the ratio of the T-year extreme value to an index extreme value such as the mean of annual maxima whereas a record length

of ten or more years may suffice to estimate the index variable. It was generally necessary to blend data from several sites if estimates of exceptional extreme values were to be 24 obtained. Methods of rainfall growth estimation were reviewed, including traditional methods, which extend frequency curves to long return period by a distributional assumption, and methods, which studied spatial dependence in extreme rainfalls.

M BRUNETTI *et al.* (2000) studied on changes in precipitation intensity encompassing north AMERICA have found evidence for an increasing in the relative amount of precipitation contributed by heavy and extreme rainfall events in the last 80 years with this contest the purpose of this paper is very within such single can also be detached in ITALY The analysis is performed by applying the non -parametric Mann-kendall test to mean anomaly series.

BHATTI and MAHMOOD B. (2000) had exhibiting scale invariance behaviour over a range of space and time scales. Although various approaches have been taken to investigate and model the various scaling aspects of rainfall and floods, theoretical work has been done on the relation between the scaling of rainfall and flood. They used a two-step approach to investigate the relationship between exponent of peak flows and the scaling of rain. First, they used data analysis to verify existing theories that relate the multiscaling behaviour of rainfall to the simple scaling behaviour of the IDFs. Secondly, they used a model to relate the scaling of the IDFs to the scaling of peak flows with basin area. They found that, although temporal rainfall showed multi scaling, the IDFs exhibited simple scaling and peak floods showed simple or mild multiscaling

GUNTER A. *et al.* (2001) Suggested that, a temporal rainfall disaggregation model was to be applied to convert daily time series into an hourly resolution. The model was based on the principles of random multiplicative cascade processes. Its parameters were dependent on the volume and the position in the rainfall sequence of the time interval with rainfall to be disaggregated. The aim was to compare parameters and performance of the model between two contrasting climates with different rainfall generating mechanisms, a semi-arid tropical (Brazil) and a temperate (United Kingdom) climate. In the range of time scales studied, the scale-invariant assumptions of the model were approximately equally well fulfilled for both climates. The model parameters differ distinctly between climates, reflecting the dominance of convective processes in the Brazilian rainfall and of advective processes associated with frontal passages in the British rainfall. Transferability of parameters in time was associated with larger uncertainty in the semi-arid climate due to its higher interannual variability and lower percentage of rainy intervals. For parameter transferability in space, no restrictions were found between the Brazilian stations whereas in the UK regional differences restrictions 26 were more pronounced. The overall high accuracy of disaggregated data supported the potential usefulness of the model in hydrological applications.

KUMAR S. (2001) Studied the behaviour of rainfall dynamics at different temporal scales and identified the type of approach most suitable for transformation of rainfall data from one scale to another. The correlation dimension method is employed to identify the behaviour of rainfall dynamics. A possible implication of this might be that the rainfall processes at these scales are related through a chaotic 29 (scale-invariant) behaviour.

However, a comparison of the correlation dimension and coefficient of variation of each of the time series reveals an inverse relationship between the two (higher dimension for lower coefficient of variation and vice versa). The presence of a large number of zeros in the higher resolution time series (that could result in an underestimation of the dimension) and the possible presence of a higher level of noise in the lower resolution time series (that could result in an overestimation of the dimension) might account for such results.

FRANKS (2002) Showed that in the case of the Australian climate, previous studies on the climatic conditions of the Indian and Pacific Oceans had indicated marked multi-decadal variability in both mean Sea Surface Temperatures (SST) and typical circulation patterns. In this light, data from 40 stream gauges around New South Wales were examined to determine whether flood frequency data were indeed independent and distributed identically. Given likely correlation in flood records between gauges, an assessment of the regional significance of observed changes in flood frequency was required. To achieve this, flood observations were aggregated into a regional index. A simple non-parametric test was then employed to identify the timing and magnitude of any change in mean annual flood. Finally, it was 30 shown that the identified change in flood frequency corresponds directly to an observed shift in SST and circulation. The performances of the models are then compared and the improvement in the efficiency of the discharge forecasts achievable is demonstrated when i) short term rainfall forecasting is performed, ii) the discharge is updated and iii) both rainfall forecasting and discharge updating are performed in cascade. The proposed techniques, especially those based on ANNs, allow a remarkable improvement in the discharge forecast, compared with the use of heuristic rainfall prediction approaches or the not updated discharge forecasts given by the deterministic rainfall-runoff model alone.

PATHIRANA *et al*. (2003) Suggested a multi fractional model based on the scaling properties of temporal distribution of rainfall intensities, which was formulated to investigate the intensity distribution relationships in the available scaling regime. Using a discrete cascade algorithm based on the log-Levy generator, synthetic hourly rainfall series were generated from the multiracial statistics of daily accumulated rainfall. Several properties of rainfall time series that are relevant to the use of rainfall data in surface hydrological studies were used to determine, statistically, the degree of agreement between the synthetic hourly series and observed hourly rainfall.

BUISHAND *et al.* (2003) Have compared daily and monthly downscaling models for precipitation in three places. Moreover they have also used Generalized Linear Models for the statistical description of rainfall occurrence, the wet-day precipitation amounts and the monthly precipitation totals. Fitting a generalized linear model to daily rainfall data generally results in larger regression coefficients than fitting the same model to monthly data. For rainfall occurrence this can be attributed mostly to the non-linearity of the function that links the wet-day probabilities to the predictor variables, whereas for rainfall amounts there is, apart from non-linearity, also a bias in the estimated 33 regression coefficients of the monthly models caused by averaging predictor variables over both wet and dry days. Due to the squared correlation coefficient r2 between the observed and predicted, values of the daily models is low, aggregating the results from these models to monthly

values gives r 2 values comparable to those in the direct fit to the monthly data. The temporal variation of the predicted annual amounts from the daily and monthly relationships is almost the same. They have shown that the daily models are more preferable

JAIN S. (2013) developed a model for Northeast region (NER) of INDIA which cover an area of 26 million km^2. This region is one of the highest rainfall receiving regions on the planet. Consequently it has huge water and hydro power potential and analysis of rainfall and temperature trends would be of interest to water and energy planner . Trends would of interest of water and energy planner monthly ,seasonal , and rainfall and temperature on the subdivision and scale of the NER were examined in study.

III.CONCLUSION

Based on various study it can be concluded that long term changing in the INDIA monsoon rainfall on regional and local scale have important social and economic consequences. Studies in different part of the world indicate that global warming has altered the precipitation patterns resulted in the frequent extreme weather events. The probability analysis of rainfall is major concern of study in field of agriculture and civil construction work in water resources the intensity of rainfall and behavior of rainfall varies throughout the year. The underestimation and overestimation of rainfall greatly affect the statistical analysis model of rainfall. In INDIA, the rainfall pattern change throughout the year it depends upon the regional condition like mean sea level humidity, temperature, etc. during the study of rainfall pattern the meteorological condition should be condition. Based upon the probability analysis result the optimal operation of reservoir has controlled. The discharge of water in the different region of the catchment area of behavior is based upon the model of rainfall.

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