# Regionalization of Precipitation in Andhra Pradesh and Telangana State

**Gore Vikas Sudam[1] and K. V. Jayakumar[2]**
**[1]M.Tech Student, gvikas1@student.nitw.ac.in**
**[2] Professor, kvj@nitw.ac.in**
Water & Environmental Division, Department of Civil Engineering
National Institute of Technology Warangal

**Abstract**: - Precipitation is one of the most important climatic variables for sustaining civilization. It is characterized by extremely high variability in space and time. The magnitude and frequency of precipitation is of great significance in hydrologic and hydraulic design and has wide application in various areas. However, precipitation data is available only in those regions where the rain gauges are installed. The conventional practice was to delineate regions as geographically contiguous areas based on physiography and/or political or administrative boundaries. As such regions may not have any definite relationship to causal or explanatory variables influencing rainfall and regions based on those factors need not be homogeneous in rainfall. The magnitude and frequency of precipitation in ungauged sites can be assessed by grouping areas with similar characteristics. The procedure of grouping of areas having similar behaviour is termed as "Regionalization". In this paper, Elementary Linkage Analysis which is based on the correlation coefficient between precipitation time series corresponding to all possible pairs of rain gauge (grid cells) station in study area, the hypothesis testing of using t-distribution table with level of 5 % significance for one tail test and critical values for judging significance of Pearson product moment correlation identify the homogenous regions of precipitation mapped by using ArcMap in the States of Andhra Pradesh (AP) and Telangana (TS). Based on the results, use of this precipitation time series dataset is recommended to identify the precipitation regimes for arid and semi-arid regions of Rayalseema region of Andhra Pradesh. Four regions which have similar precipitation pattern are found after the testing. The negative correlation between pairs of rain gauges , like between northern part of TS and southern part of of the AP, north of the AP and south of the AP show that there are different pattern of precipitation among this regions. Regionalization of precipitation is necessary for various applications that include the (i) meteorological drought analysis and agricultural planning to cope with water shortages that are likely due to low rainfall, (ii) forecasting and downscaling of precipitation, (iii) design of water control (e.g., barrages, dams, levees) and conveyance structures (e.g., culverts, storm sewers, spillways) to mitigate damages that are likely due to floods triggered by extreme precipitation, and (iv) land-use planning and management.

Keywords: Precipitation, Regionalization, Elementary Linkage Analysis, Correlation, Pearson Product Moment, Hypothesis, t-Distribution, ArcMap

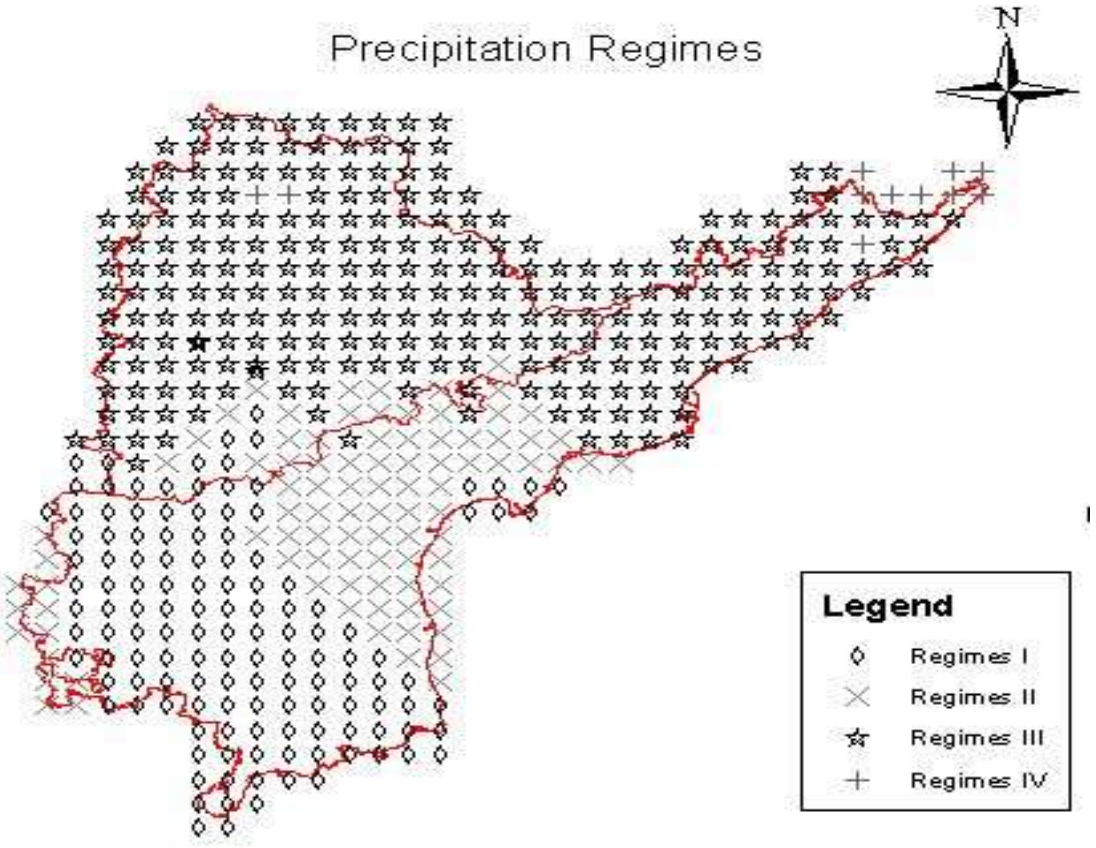


Fig. 1 Precipitation regions in the States of AP and TS