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ANALYSES OF STANDARD PRECIPTATION INDEX FOR DROUGHT INTENSITY DROUGTH - SEVERITY ASSESMENT OF DHARWAD DISTRICT, KARNATAKA

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Abstract

The Standard Precipitation Index (SPI) is employed to predict, track the upcoming, recurring drought intensity and magnitude. The standard precipitation index has several characteristics that are an improvement over previous indices, including its simplicity and temporal flexibility, that allow its application for water resources an all times cables. In this work regarding analysis of drought severity of Dharwad District, Karnataka by taking 30years of rainfall data .By use of standard precipitation index finding the future drought prone area in and most rainfall receiving are in that district. As Dharwad contains very few rivers and water bodies the water source is majorly dependent on rainfall, hence this study places an important role in predicting and getting of upcoming drought in Dharwad district.

Keywords: Drought Analysis; Standard Precipitation Index; Magnitude and Intensity of Drought; Dharwad Rainfall.

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1. Introduction

The standard precipitation index is a widely used index to characterized meteorological drought on a range of time span. The SPI can be compared across regions with markedly different climates over the years many drought indices world developed and used by methodologists and climetoglist around the world. This ranged from simple indices such as percentage of normal precipitation and precipitation percentiles to more complicated indices such as Palmer drought severity index. However, scientist in the United States realized that in index needed to be simple,

easy to calculate and statististacally relevant and meaningful. More over the understanding that a deficit of precipitation as different impacts on ground water, reservoirs storage, soil moisture, snowpack and stream flow let American scientist McKee, Doesken and Kleist to develop the standard precipitation index in 1993 [1].

The standard precipitation index is a powerful, flexible index that is simple to calculate it requires only input parameters. In addition, it is just as effective in analyzing wet periods/ cycles as it is in analyzing dry periods/cycles. Ideally, one needs at least 20-30 years of monthly values, with 50-60 years being optimal and preferred [2].

Advantages

- Use precipitation only; can characterized drought or abnormal wetness at different time scales which correspond with the time availability of different water resources.
- More comparable across regions with different climates than the Palmer severity drought index.
- Fewer complexes to calculate than the PSID [3].
- Dharwad district is situated in the Western sector of the northern half of Karnataka state. It contains Hubli, Kundgol, Navalgudi, and Kalghatgi as sub divisions of district (Taluka's).

The district studies show that people from early paleolathic age inhabited Dharwad district. Few places of antiquarian interest and several sites of historic are found in the district.

The district was ruled by various dynasties from the 5th century onwards. Important among them are Badami and Kalyan Chalukyas, Rastrekutas, Vijayanagar, Adishshi, Mysore Kingdom and Peshwas of pune.

Due to the rule os Peshwas, influence of Marathi is seen in the early decades of the 19th century. During the British Rule, Dharwad became the divisional headquarter of educational administration and Karnataka the vernacular language of the people gained prominence.

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2. Methodology

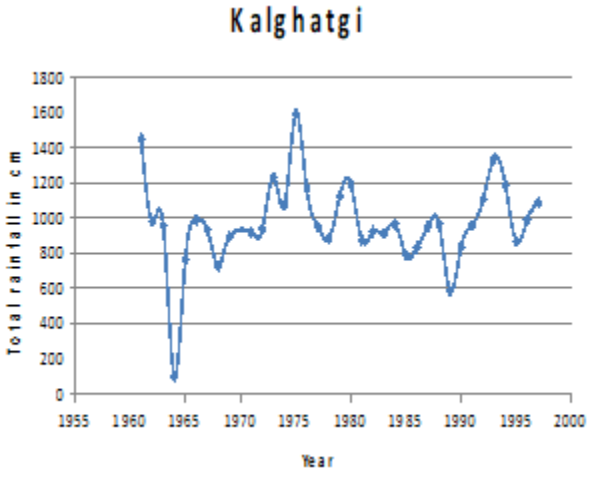
In this study the daily rainfall data of 30 meteorological stations over a period of 30 years, which are well distributed in the Dharwad district area, were used for draught analysis. The SPI is based on the cumulative probability of a given rainfall event occurring at a station. The 30 years' rainfall data of the station is fitted to a gamma distribution, as the gamma distribution has been found to fit the precipitation distribution quite well. This s done through a process of maximum likely wood estimation of the gamma distribution parameters, α and β in simple terms the process described above allows the rainfall distribution at the station to be effective represented by a mathematical cumulative probability function. Therefore, based on the 30 years rainfall data n analyst can then tell what is the probability of the rainfall being less than or equal to a certain amount. Drought severity/ magnitude is calculated as the cumulative deficiency of precipitation below the threshold level and drought intensity is obtained by drought severity/ magnitude by drought duration [4] [5].

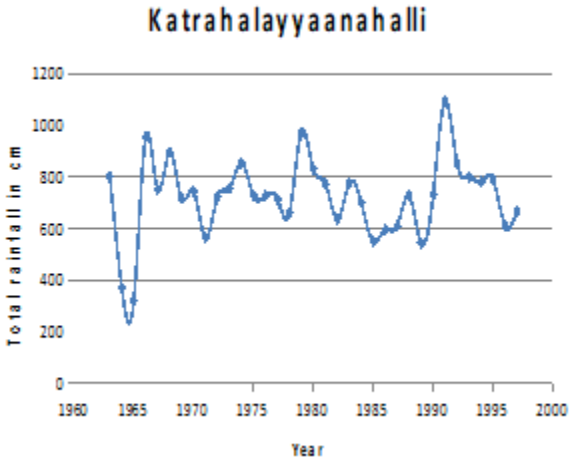
This transformed probability is SPI value, the intensities resulting from the SPI classified by the table below.

Table 1. SPI values

2.0+	extremely wet
1.5 to 1.99	very wet
1.0 to 1.49	moderately wet
-.99 to .99	near normal
-1.0 to -1.49	moderately dry
-1.5 to -1.99	severely dry
-2 and less	extremely dry

3. Results and Discussions





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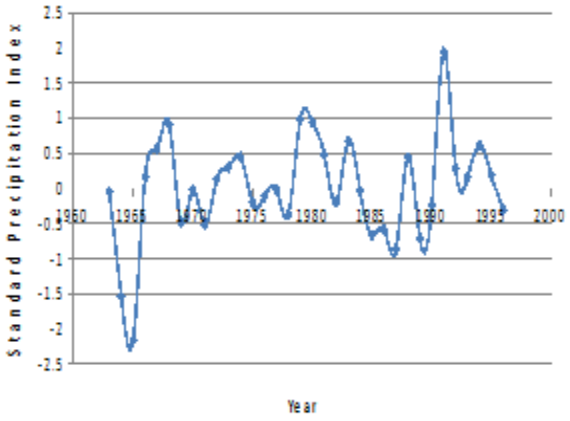

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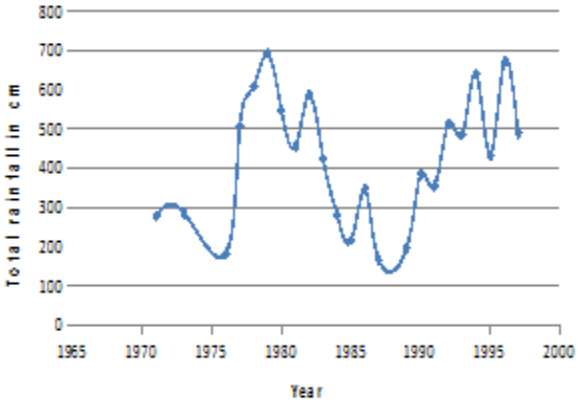

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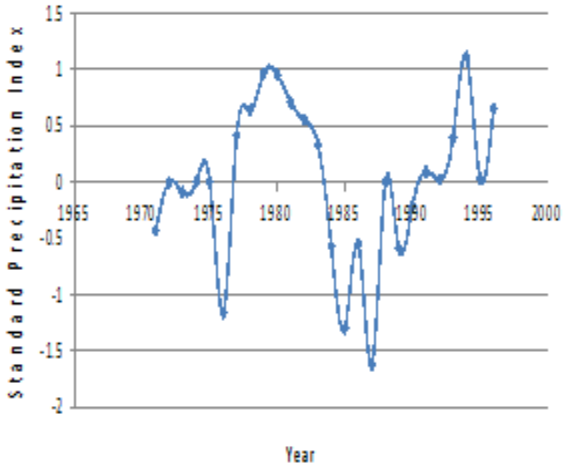

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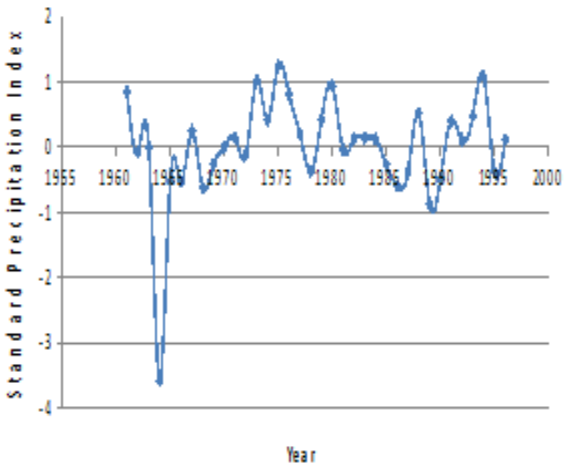

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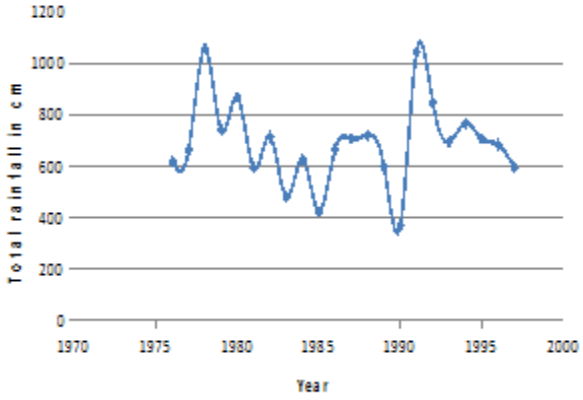

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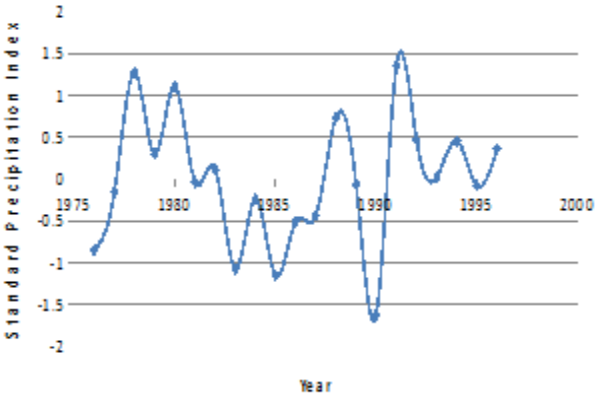

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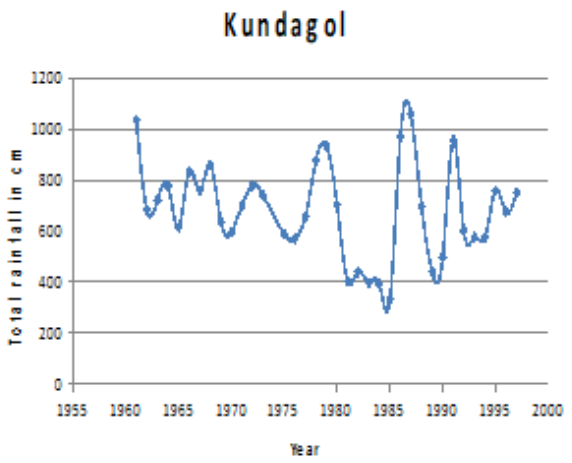

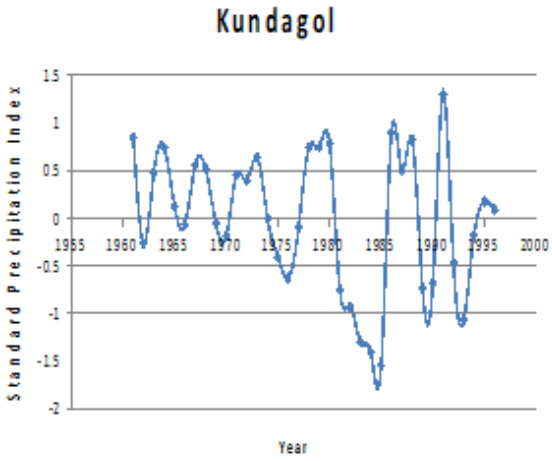

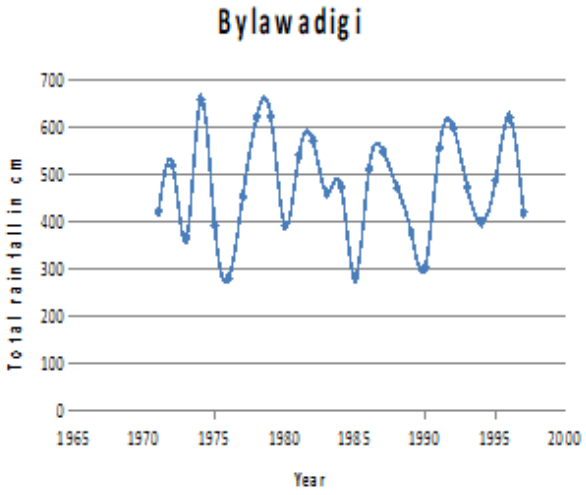

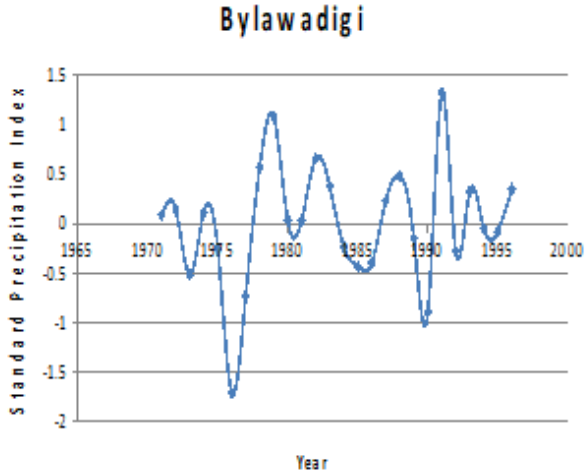

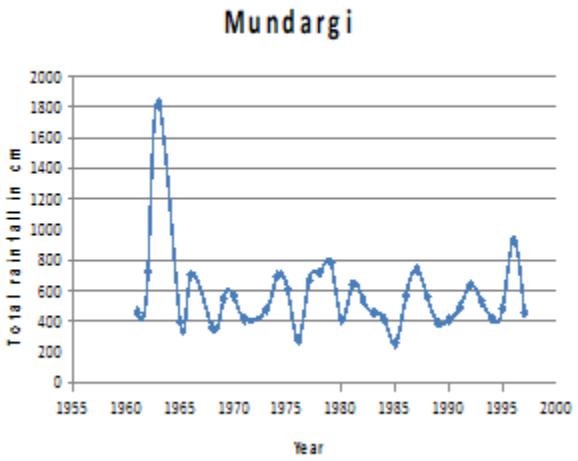

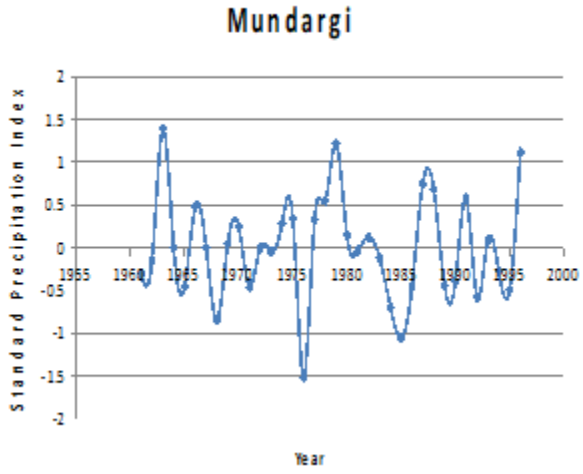

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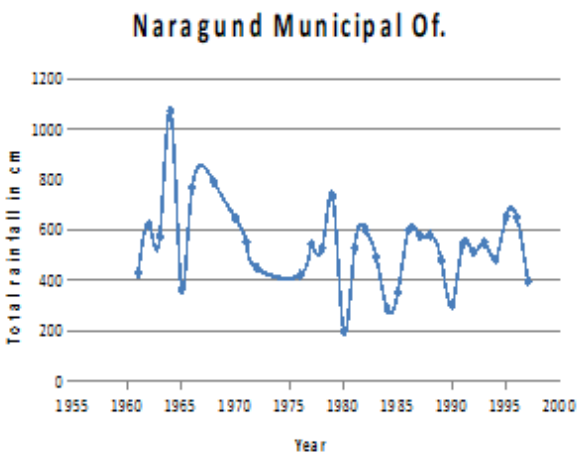

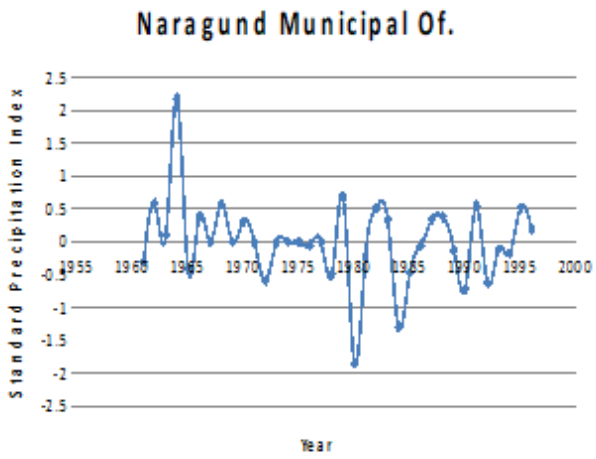

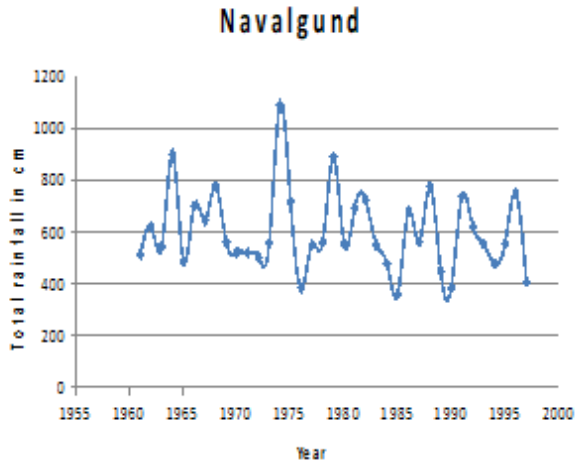

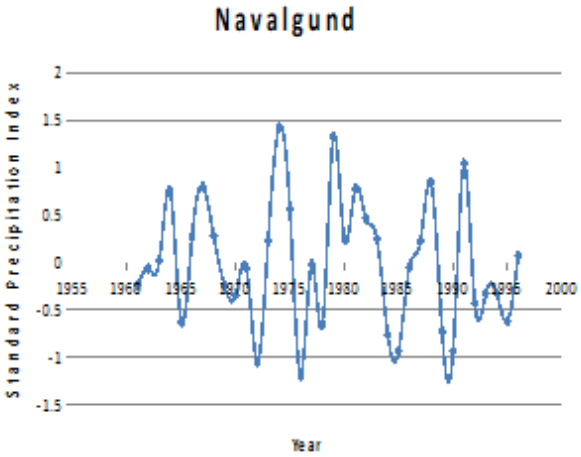

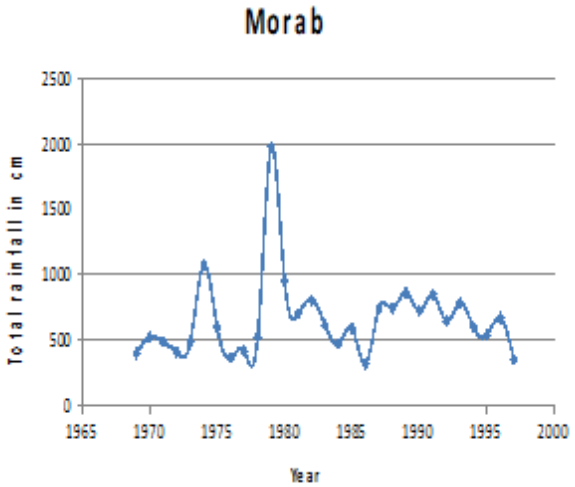

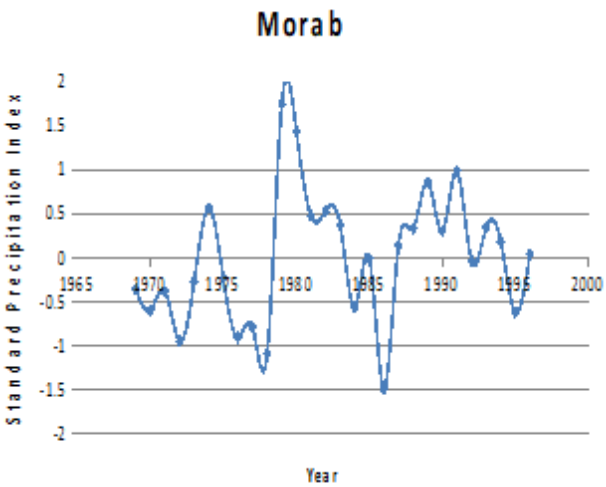

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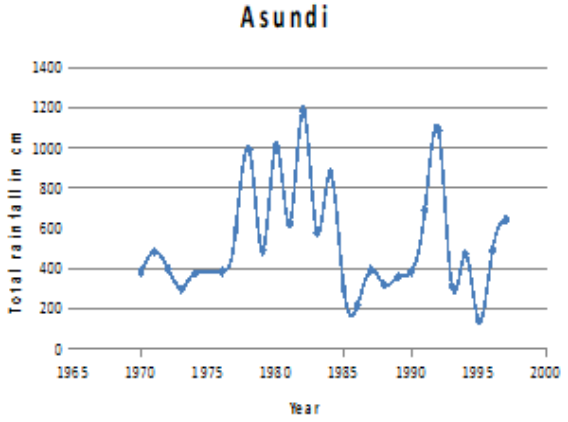

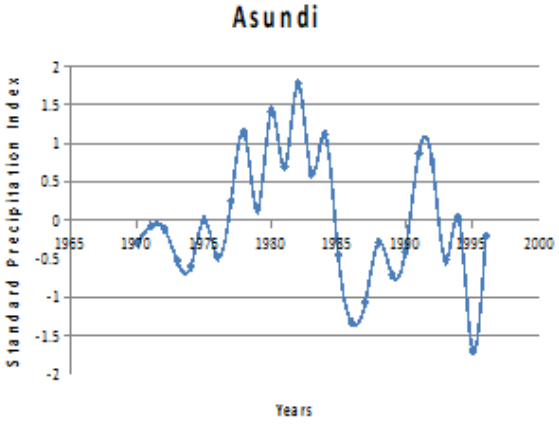

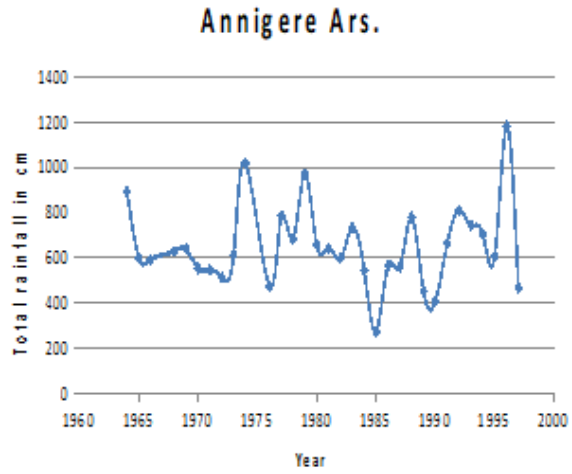

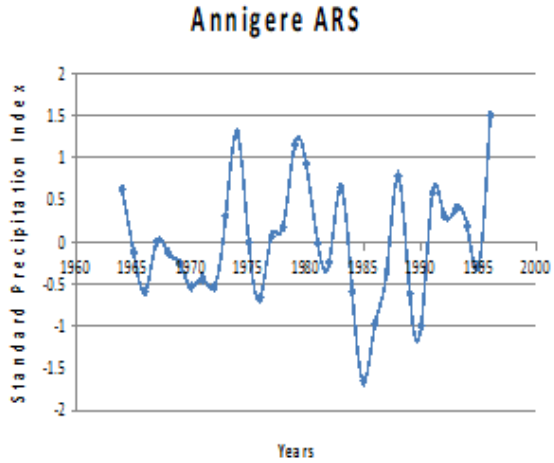

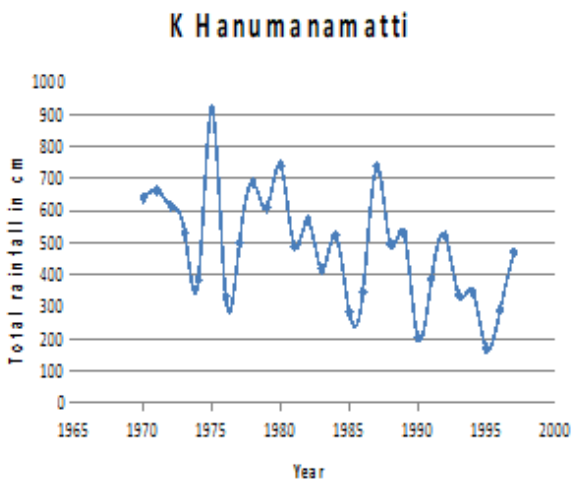

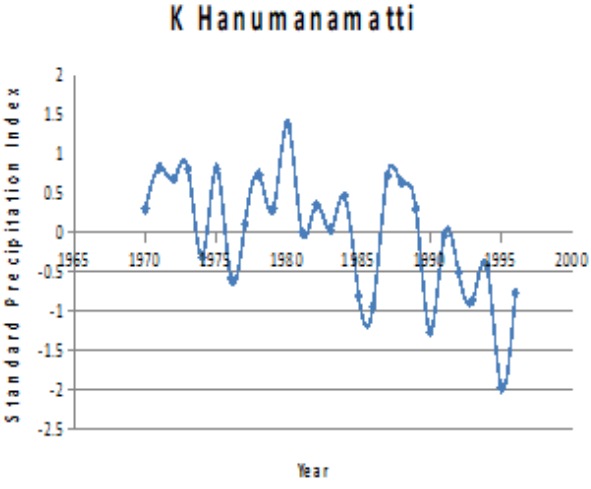

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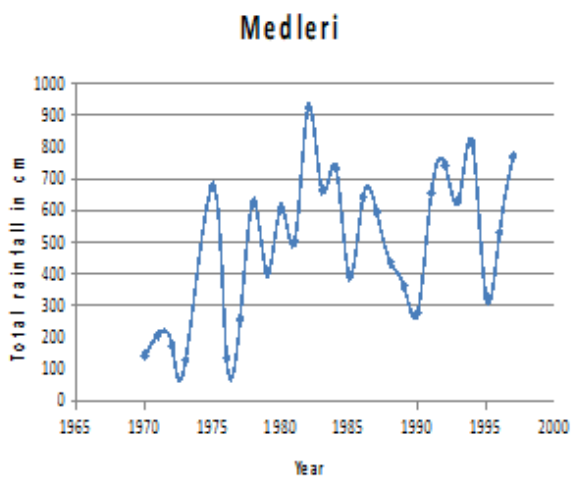

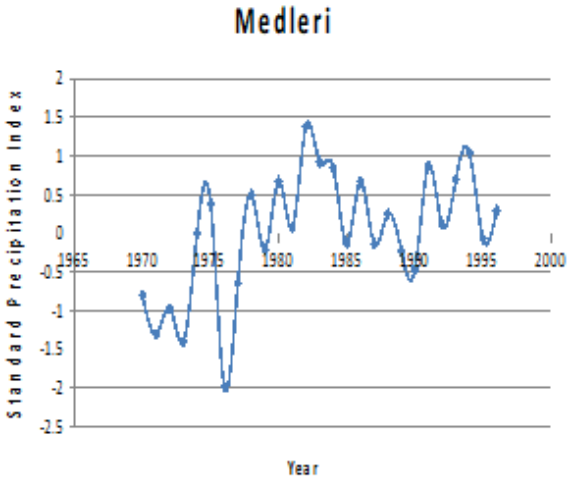

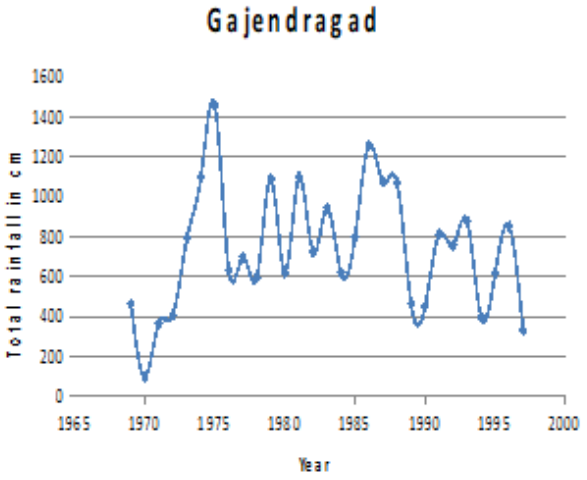

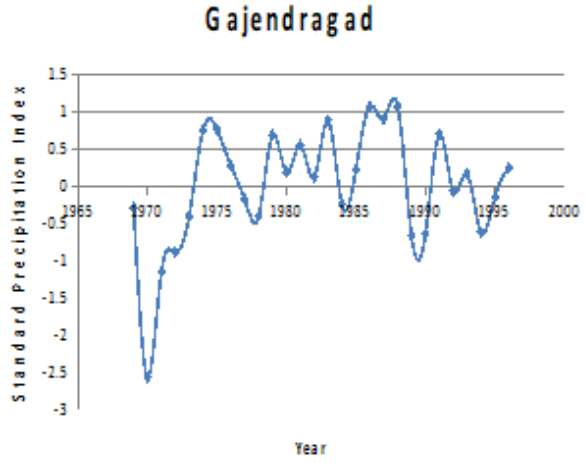

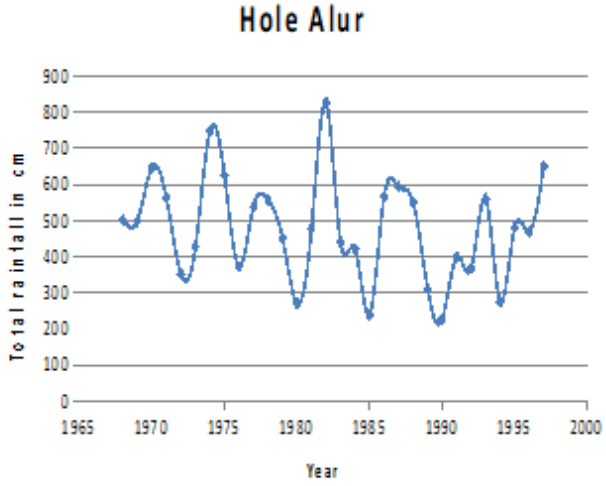

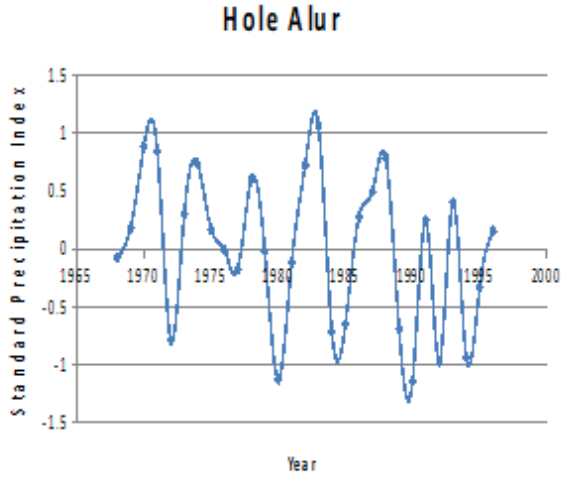

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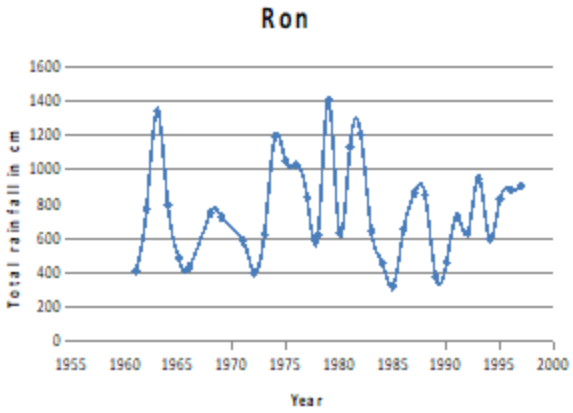

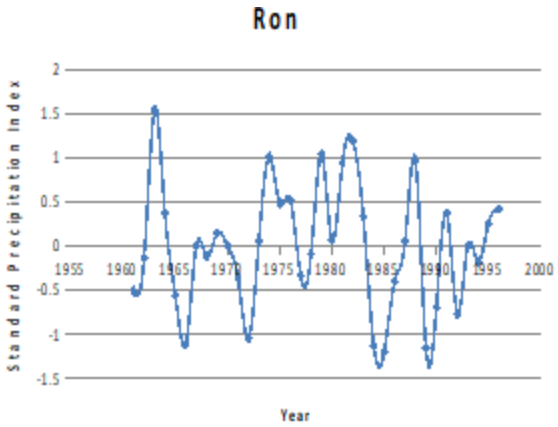

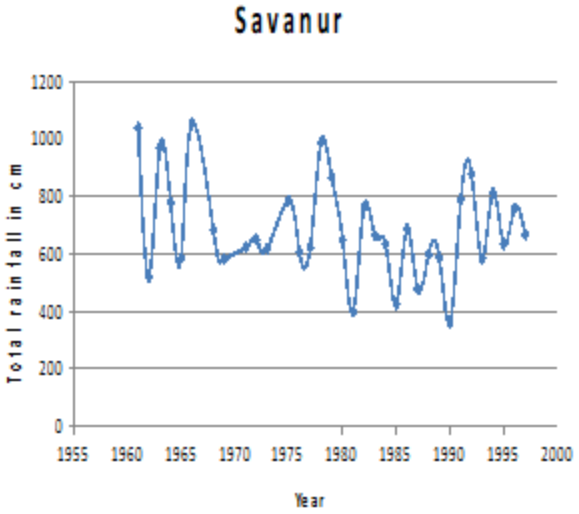

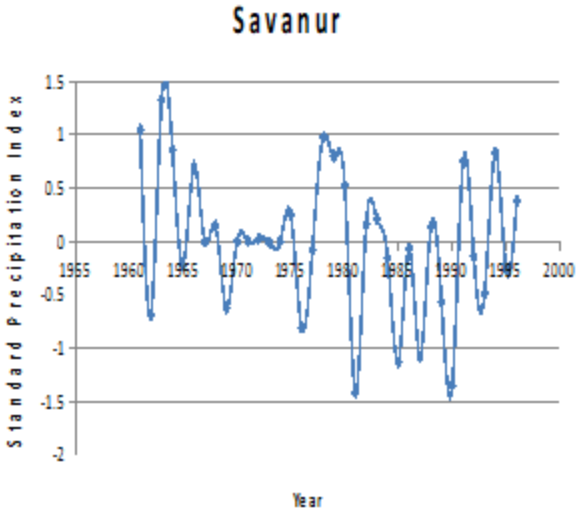

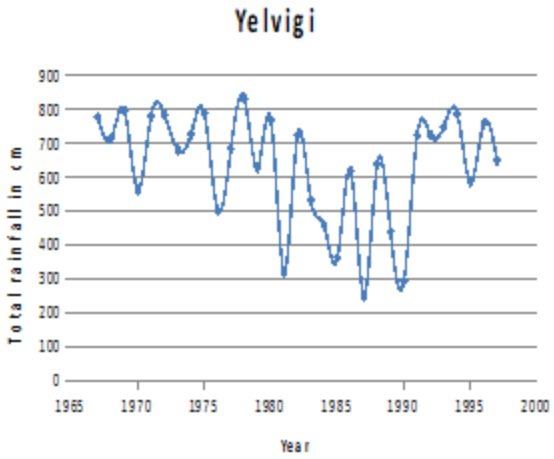

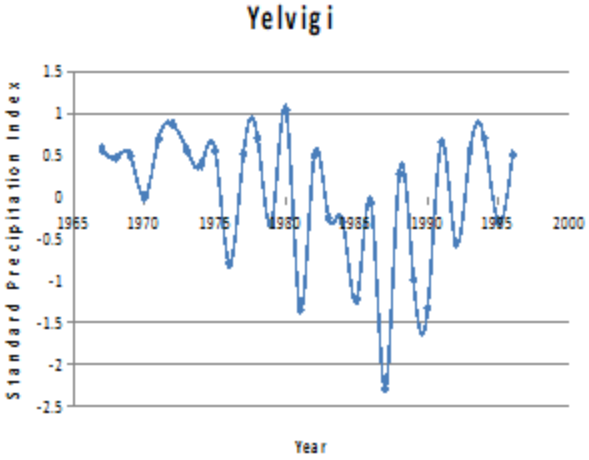

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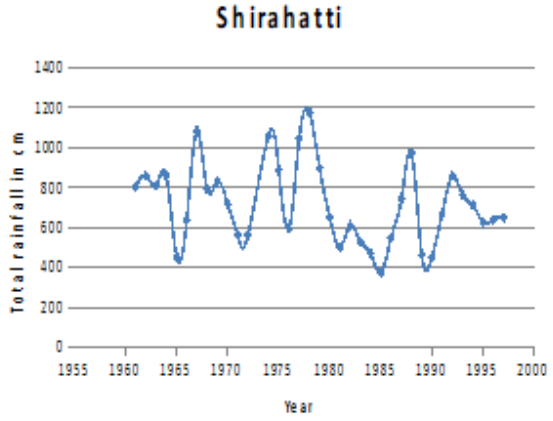

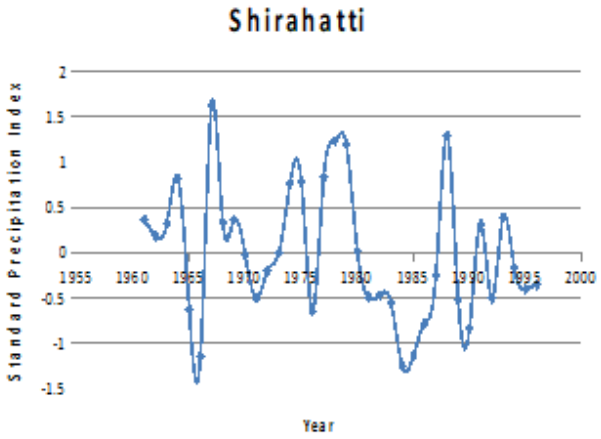

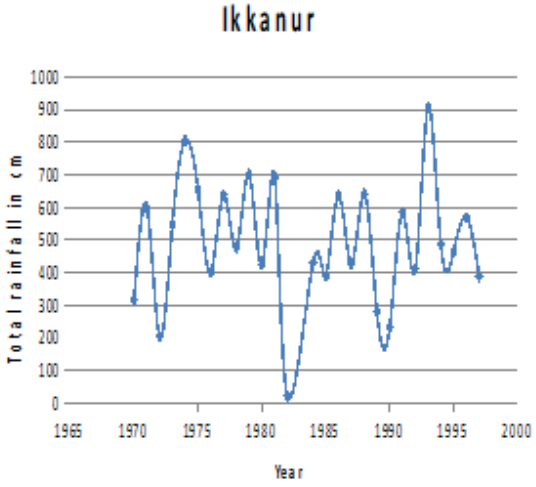

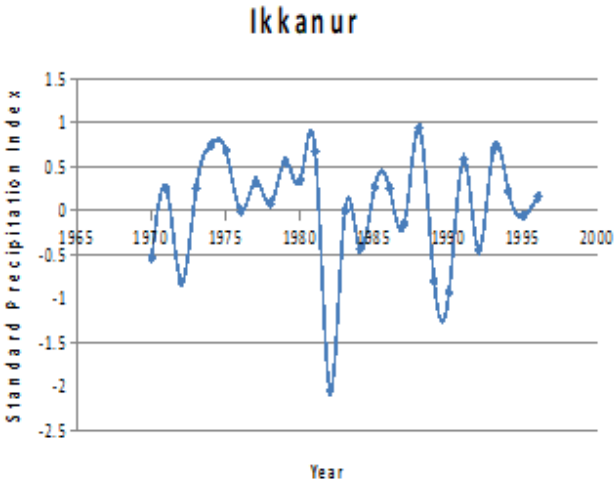

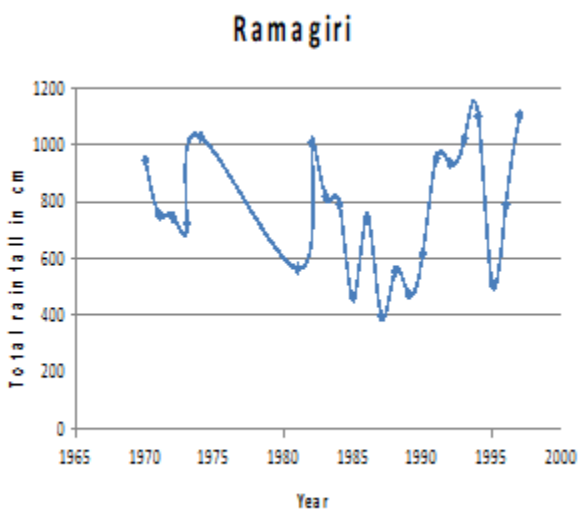

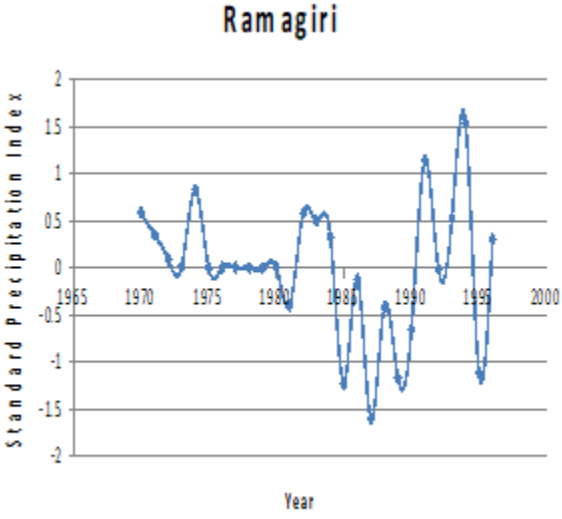

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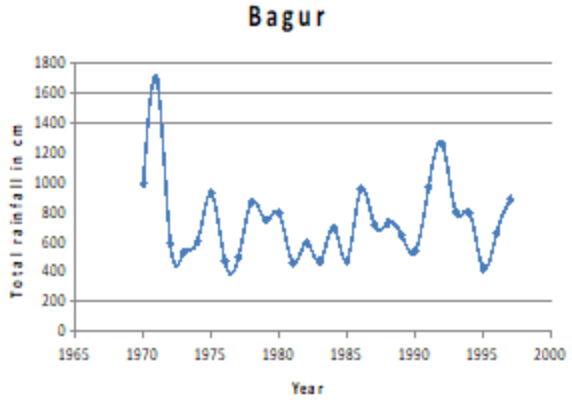

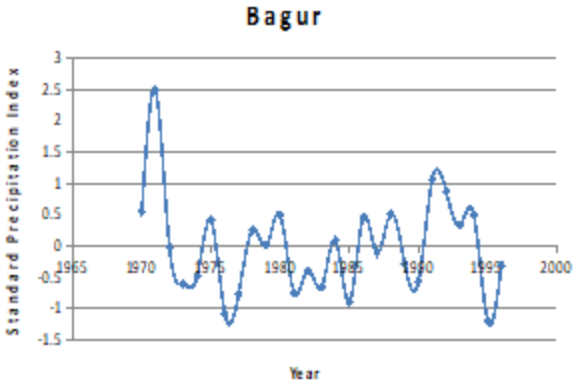

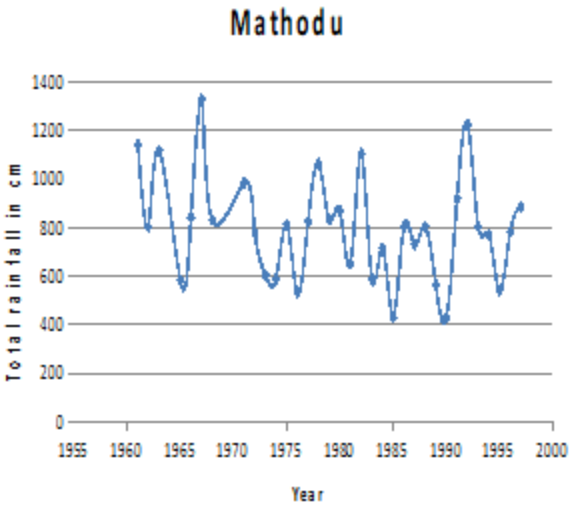

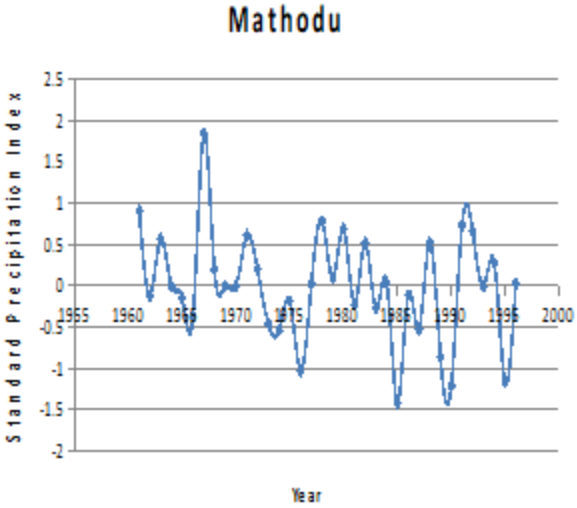

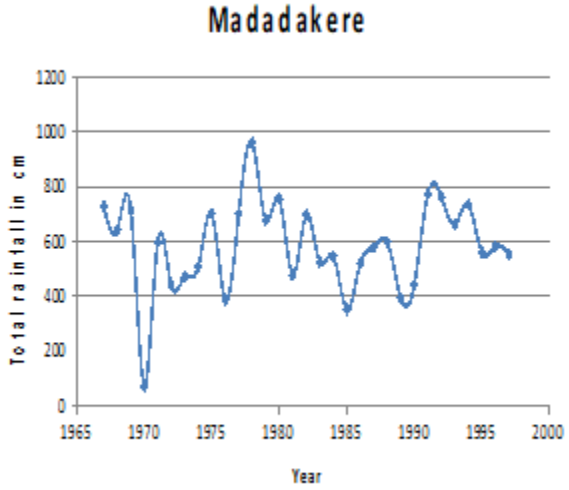

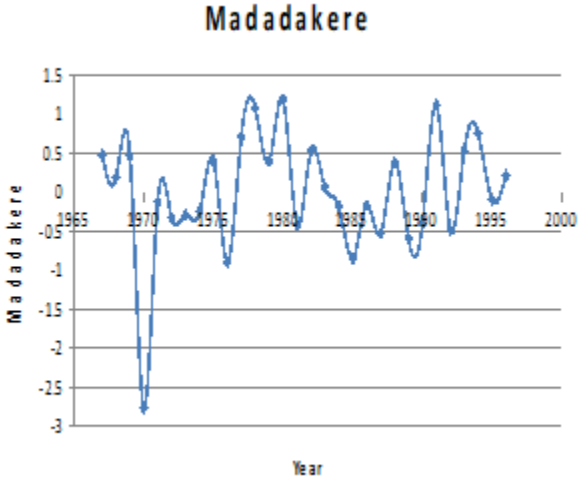

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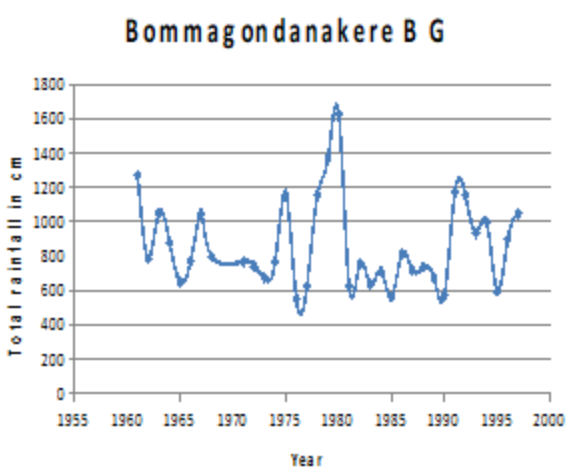

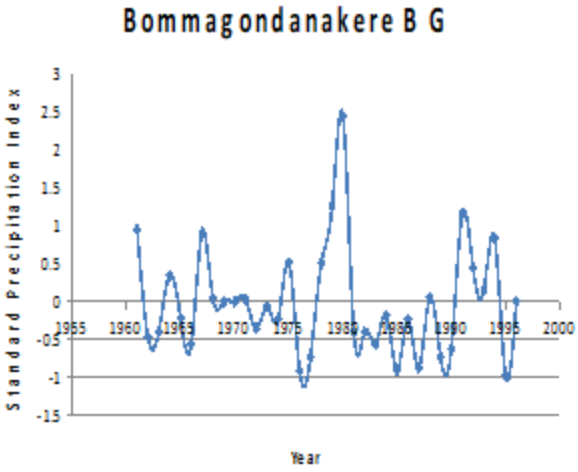

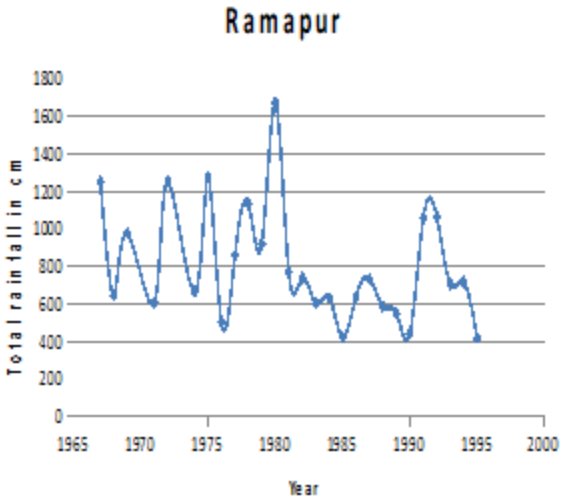

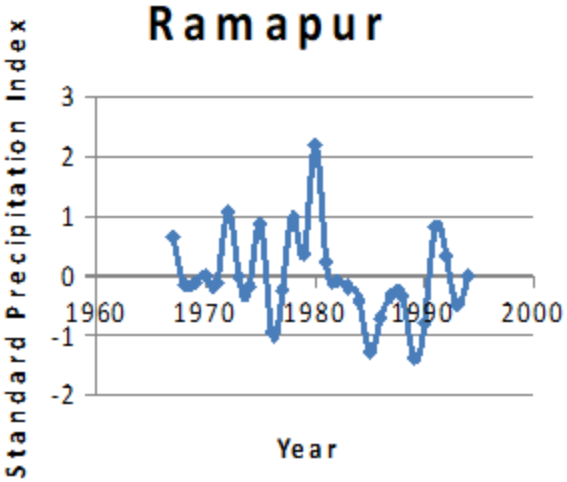

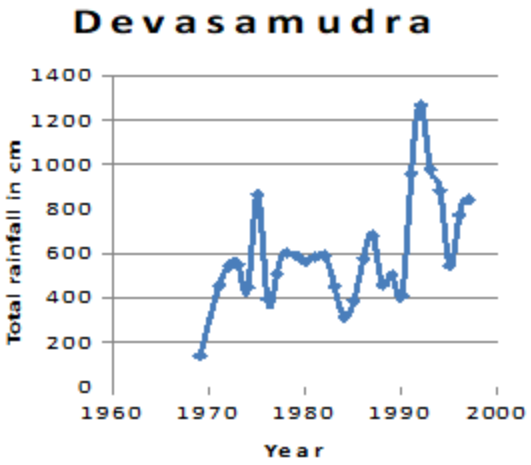

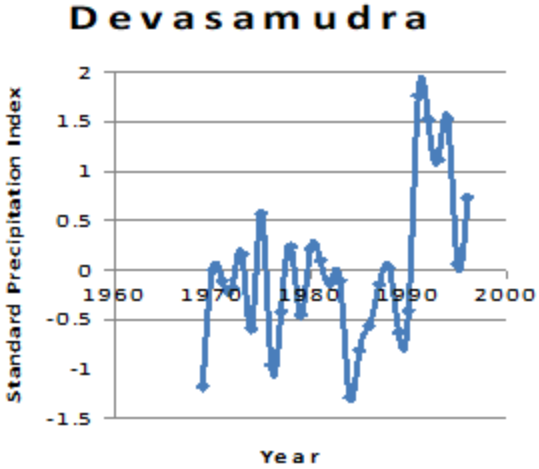

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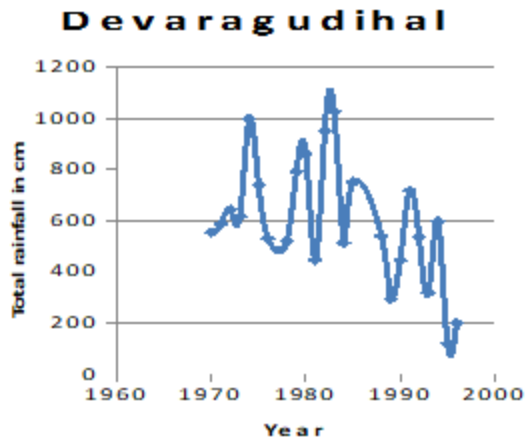

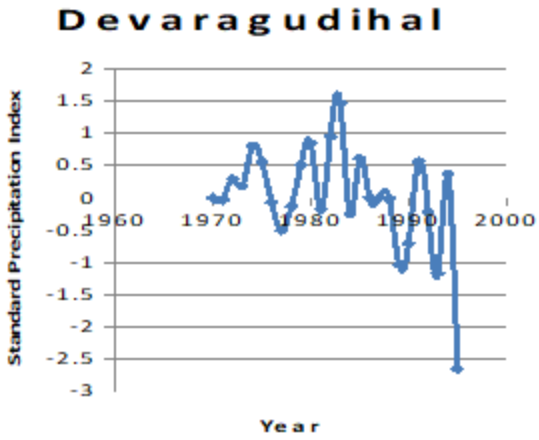

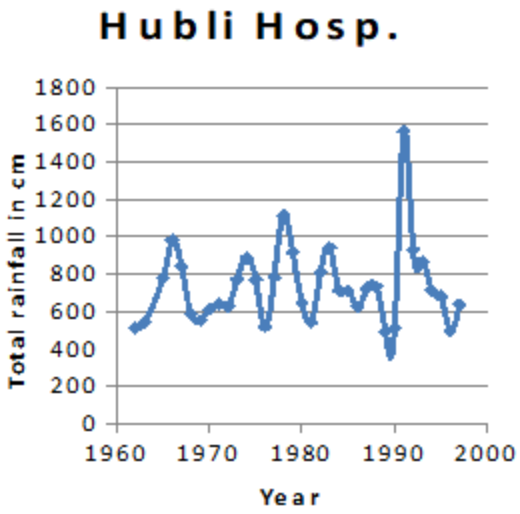

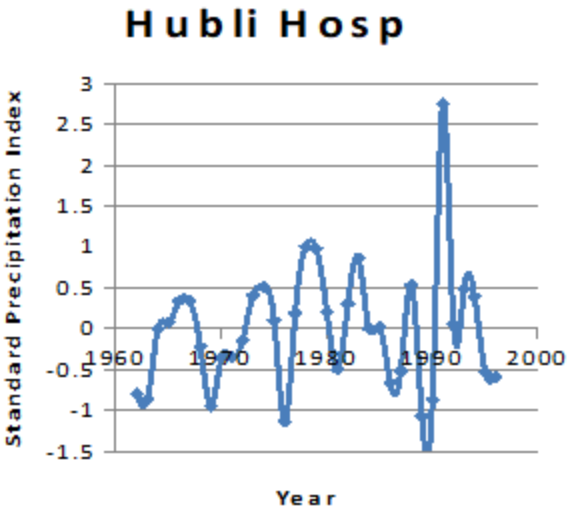

4. Conclusions & Recommendations

It is necessary that the most important drought-indices must be tested in different regions only those indices, which are appreciate for particular region for monitoring and analysis of drought conditions.

The combination of more than one index may give better results.

Extension and awareness activities should reinforce awareness that droughts recur_ and the focus should be more on sustainable natural resources management even before drought comes, rather than responding to the drought when imminent

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