A STUDY OF SPATIAL PATTERNS FOR THE CHANGES OF RAIN USING MARKOV CHAIN MODELS I

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Second order Markov chain models were fitted to chances of rain at each of eleven sites, seven from the dry zone, two from the intermediate zone and two from the wet zone. A four harmonic of a Fourier series provided a good description of the variation of the chance of rain through the year at each site. Each model yielded thirty six parameter estimates which were subsequently converted to amplitudes and phases.

Regression models were fitted separately for parameter estimates and amplitudes/phases in order to indentify spatial characteristics within zones (intra-zonal) and between zones (inter-zonal). After eliminating the model dependent effects, altitudes, longtitudes and latitudes were used as spatial explanatory variables.

There was evidence that the parameter estimates differed significantly from zone to zone under the inter-zonal analysis. This was also observed for amplitudes and phases. Locational variables had no effect on parameter estimates as well as phase within each zone.

Within the dry zone, there was no evidence of effect of locational variables on parameter estimates and amplitudes after eliminating model dependent effects.

References:

Seneviratne, E.K. (1985). A model fitting analysis of daily rainfall data with applications in agricultural planning for Sri Lanka (PhD Thesis)

Stern, R.D. and Coe, R. (1984) A model fitting analysis of daily rainfall data. J.R.S.S. A:147: 1 - 34

Opeitum, A. (1988). Analysis of spatial patterns of rainfall events using daily rainfall data from Sri Lanka.