

CONTROL ID: 2473400

TITLE: MODELLING SEASONAL RAINFALL AT FINE TIME-SCALES USING DOUBLY STOCHASTIC POISSON PROCESSES

PRESENTATION TYPE: Oral

CURRENT METHODOLOGICAL TOPIC AREA: Application Areas | Application Areas | Application Areas

CURRENT APP. AREAS/STATISTICAL TOPICS: Environmental research | Ecological research | Bioinformatics

ABSTRACT BODY:

Abstract Body: Point process theory lends itself to the modelling of rainfall data and has been widely used for this purpose. The doubly stochastic Poisson process or Cox process, introduced in a seminal paper by Cox (1955), is a point process whose rate of occurrence is determined by a stochastic process. Models based on the doubly stochastic Poisson process provide a solid framework for analysing fine time-scale rainfall data. One form of the model arises when the underlying stochastic process becomes a continuous-time irreducible Markov process $X(t)$ on a finite state space. Models of this form have been used to analyse rainfall data by several authors, since their likelihood can be calculated and maximized numerically.

Ramesh et al. (2012) explored this class of models for analysing tipping-bucket rainfall data at a single-site. The purpose of this paper is to extend the univariate class of models for fine time-scale rainfall to accommodate seasonality in the analysis of winter season rainfall data. Seasonal doubly stochastic Poisson process models are developed and their application is illustrated in an analysis of tipping-bucket rain gauge data from Bracknell, England. One advantage of using this class of models is that their likelihood can be calculated by conditioning on the underlying Markov process. As a result, the maximum likelihood method is utilised to estimate the parameters of the proposed model. Second-order properties of the sub-hourly rainfall aggregations in discrete time intervals are used for model assessment.

Ramesh, N.I., Onof, C. and Xie, D. (2012). Doubly Stochastic Poisson Process models for precipitation at fine time-scales, *Advances in Water Resources*, 2012; 45: 58-64.

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