AN ALTERNATIVE RENEWAL PROCESS MODEL FOR DAILY RAINFALL

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Most of the early work on modelling rainfall occurrence centred on the modelling of wet and dry spell lengths (e.g. Williams (1952) Lawerence (1954), Hills and Modern (1981)). The distributions used include the Poisson, geometric, logarithmic series and Polya's distribution.

Buishand (1977) proposed an alternating renewal process model (ARP) which was based around modelling wet and dry spells. The implicit assumption made by such models is that the length of successive wet and dry spell is independant. The distributions used by Buishand (1977) included the logarithmic series, shifted negative binominal (SNB) and zero-truncated negative binominal (TNB). The major advantage of such ARP models is their ability to incorporate any long term persistence of wet and dry spells (Buishand (1977), Lawrence (1984). When using Markov chain models of the form outlined in Stern and Coe (1984), the spell lengths are described by a geometric distribution. In general, the zero-truncated negative binomial has been found to fit the 'tail' of the observed frequencies better than the geometric distribution. As a result, in applications where the persistence of wet and dry spells is of importance, the ARP models are more suitable than the standard Markov chain models.

This paper provides results obtained by fitting Buishand's ARP models to Sri Lankan rainfall data. Some of the major shortcomings of the model are outlined and methods for overcoming them are discussed. A modified ARP model is outlined and results from fitting this model are also provided.

References:

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