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Discussions

Interactive comment on "Uncertainty quantification in application of linear lumped rainfall-runoff models" *by* Ching-Min Chang and Hund-Der Yeh

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This technical note develops analytical expressions for the first two moments of rainfall and runoff time-series. I.e. to model a time series of the mean and variance of rainfall and runoff. The main assumptions, which are clearly noted, are that evaporation is negligible, the rainfall is an autoregressive process, the rainfall-runoff is a linear storage, and the initial rainfall and runoff are zero.

The technical note is generally well written: concise and clear. I lack expertise to comment on the accuracy of the mathematical solutions, however assuming they are accurate, they are clearly and concisely presented. However, I can query the derivation of Eq. 8 from 7b: the right hand side of 7b also needs divided by 'a'? Therefore, the

authors should re-inspect the accuracy of this and all equations.

The practical value is limited by the assumptions. In particular the method is only applicable to storm events in catchments where the linear rainfall-runoff relationship suffices. The realism of the AR rainfall model is questionable. No validation is attempted, in fact no time-series results are shown, so it's difficult for the reader to judge whether or not the results are plausible. No critical discussion of applicability is provided.

I note the comment of the first reviewer that there is no mention of some of the classical work on linear rainfall-runoff modelling, and certainly the technical note should be put in context of these established methods.

I am also not expert enough to comment on the novelty of applying the nonstationary Fourier-Stieltjes representation to rainfall-runoff. If indeed this is novel, it seems to be a neat analytical solution, worthy of publication as a technical note.

Therefore assuming the equations are correct and this is a novel approach to rainfall-runoff analysis, I recommend major revisions, consisting of adding context, an illustration of time-series results, a brief critical discussion of applicability.

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