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Hydrology and Earth System Sciences Discussions

Interactive comment on "Hydrologic system complexity and nonlinear dynamic concepts for a catchment classification framework" *by* B. Sivakumar and V. P. Singh

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The other three reviewers have been rather polite and measured even while quietly raising their concerns with this paper. I have enormous respect for the authors' work, their substantial contributions and reputation, but in this instance I am afraid I have to be honest and express serious concerns in my personal capacity – I have serious objections to the publication of this paper in its present form and recommend rejection.

The paper argues that hydrologic system complexity is an appropriate basis for a catchment classification framework and nonlinear dynamic concepts constitute a suitable

methodology. Even while I am not in agreement with this (I have not seen any results to convince me), I would have been prepared to give the authors an opportunity to demonstrate their method.

The authors say they offer a three-step procedure for a classification framework: (1) detection of possible patterns and determination of complexity levels of hydrologic systems; (2) classification of hydrologic systems into groups and sub-groups based on patterns and complexity; and (3) verification of the classification framework through establishing relationships between the data patterns/complexity and the catchment/ process properties.

Remarkably, that is where the paper ends: a proposal.

The authors themselves say that their previous work, Sivakumar et al. (2007), has already used complexity as a way to classify catchments. If it is already in the literature why do we need another paper on the same idea? What is new? Is it this proposal? If so, this is not at all satisfactory to me.

So what else is there in this rather long manuscript? (i) a rehash of ideas recycled from previous papers presented as review, which I have seen several times before. (ii) another brief historical review of classification efforts, to add to the many that are already in the literature. (iii) then there is the whole litany of ideas and definitions of complexity, deterministic chaos etc that are drawn from the work of Sivakumar – but which is already well established in the literature in volumes.

And then follows the proposal that I mentioned above. To be publishable the proposal must be put to the test: the authors should apply their method to a collection of actual catchments along the lines of their proposal, come back with results to demonstrate that the approach is capable of accomplishing the classification they promise, that the classification has hydrological meaning, that it can be used to separate catchments and their behaviour into meaningful classes, and that this will lead to harmonization of models and model types.

The paper will have no basis for publication without such concrete results. I will eagerly await publication of such results. It does not matter if the proposal ends up being a success or failure. What matters is that work is actually done along the lines of the proposal, and we get to see and assess the outcomes. Such a process by itself could be useful to the community.

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