Hydrology and Earth System Sciences Discussions

Interactive comment on "Sensitivity analysis of Takagi-Sugeno-Kang rainfall-runoff fuzzy models" *by* A. P. Jacquin and A. Y. Shamseldin

Anonymous Referee #2

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The paper presents a global sensitivity study of parameters of a fuzzy rule-based rainfall-runoff model developed by the authors. The authors implement a Regional Sensitivity Analysis and Sobol's variance decomposition to analyse the sensitivity of the model to its parameters. The paper is written well and the results are interesting. I have some comments that I feel the authors need to address to make some points clearer.

Specific Comments

Page 1985, lines 3-6: It is not clear why R2 emphasizes the model errors in the high

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flow zone. It gives equal weights to the model errors across the entire spectrum of the flow. The similarity of the parameter sensitivity with respect to the two measures of performance could probably be due to a systematic over or underestimation of the high flows by the model and that a large proportion of the errors is in the high flow zones. Could you clarify this point? It is also indicated in the first two lines on page 1987 that no sensitivity to some of the model parameters was noted when REVF was used as a measure of performance. It would be good if the authors tried to interpret this in terms of the model performance.

Pages 1985-86, section 5.2.1: Wouldn't it make more sense to compare the results of the Regional Sensitivity Analysis with the results reported in Tables 7 and 8 instead of those in Tables 5 and 6? I understand that sampling of the model parameters in the RSA method was performed by randomly varying all the model parameters. There-fore, one can not separately evaluate the sensitivity to a single parameter without its interaction with the other parameters.

What cut-off points are used to categorize sensitivities as high, moderate, etc in tables 5-8? The authors sometimes categorize values as high as 0.18 as depicting insensitive case while they also declare values much lower than this value as non-negligible (page 1986, line 4)

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