

Interactive comment on “Is the groundwater reservoir linear? Learning from data in hydrological modelling” by F. Fenicia et al.

Anonymous Referee #2

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General comments

In hydrological modelling the attention during calibration is often concentrated on fitting the high flows. The objective functions are constructed in such a way as to produce this effect. The submitted paper describes a calibration procedure the result of which is that both the low flows and the high flows are simulated well. This procedure looks good and might ensure a better and more realistic fit of the rainfall runoff models. Further, an attempt is made to generalize the findings from the relationship between the storage and discharge of the groundwater reservoir found on 8 catchments in Luxemburg on the basis of 3 years of observation. This generalization is inappropriate because there might be various other functional relationships than the linear which is suggested and there might be thresholds in the behaviour of the catchment as the groundwater reservoir is being depleted. The MRC can be composed of several segments. For

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finding those relationships the 3 years are not long enough series of data. No attempt at estimating uncertainty has been made.

Specific comments:

The data used are 3 years of hourly rainfall runoff data. If a particular attention is devoted to low flows then a much longer period of data should be selected. This task could be performed on a daily time series. Only a long series can give some idea about storage and storage deficits. There might also be problems with the quality of measurements of the low flows.

The authors do not say if they rejected some depletion curves when constructing MRC on the ground of raining during depletion or too much evapotranspiration.

The introduction should contain more on published results on MRC from other catchments.

The term “averaging” leading to relative simplicity on larger catchments would be enough - why to use an unexplained term “self-organisation”?

Chapters 1 (Introduction), 2 (The representation of the groundwater reservoir in hydrological models), 8 (Discussion) and 9 (Conclusions) are too long and do not give relevant information about findings on other catchments. Analyses of longer series with long dry periods should be done to improve the paper.

Technical corrections

A long list of technical corrections has already been provided by the referee B. Schaeffli. I have not found anything more.

Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 1717, 2005.

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