

## ***Interactive comment on “HYDROGEIOS: A semi-distributed GIS-based hydrological model for disturbed river basins” by A. Efstratiadis et al.***

### **Anonymous Referee #3**

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General comments: The paper presents a modelling tool which is supposed to serve in water resources management, especially with respect to hydrosystems that are subject to major anthropogenic influences. The tool actually corresponds to a sequence of interrelated models of different types (surface hydrology model, groundwater model, water management model), partially implemented in a GIS environment.

Specific comments: In their introduction, the authors pinpoint the problem related to the overparameterisation of models and also provide a long discussion on parameter uncertainty and calibration. It is thus somewhat surprising to see that the model sequence turns up to be based on as many as 100 parameters. This complicated model structure is then to be used for calculating only monthly discharge values. There seems to be a clear discrepancy between the complexity of the model and the objectives that

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are to be reached. The authors should at least comment on this in their paper. Concerning the evaluation of the performance of the model, why have the authors fit the parameters on multiple criteria, only to weigh them afterwards in a single performance measure? Does this not represent a massive loss of information that would have been useful when it comes up to evaluate the performance of the model and the discussion on weaknesses or shortcomings of the model? This needs clarification, since the authors say in section 5.2. that it is essential to use multiple criteria. Also related to the above aspects is the absence of a detailed description of the discharge regime and the spatio-temporal variability of rainfall in the studied river basin. Presumably, the study area is located in a mediterranean region, where one might expect strong rainfall events, with limited spatial extension, rather than long lasting advective rainfall sequences, covering large areas. This would also need some clarification, in the sense that anthropogenic influences might well have a more or less strong influence on the rainfall-runoff transformation process, according to the type of rainfall event. This type of description of the rainfall-runoff regime in the study area would then also help to better justify the choice of monthly discharge simulations.

The overall structure of the paper, the references provided, the presentation of methods and results, as well as the discussion are correct. Probably each of these sections offers opportunities for cutting the overall length of the paper. This would in turn offer some space for providing additional information on the issues listed above.

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