

## ***Interactive comment on “On an improved sub-regional water resources management representation for integration into earth system models” by N. Voisin et al.***

### **Anonymous Referee #2**

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The paper is well written with specific questions raised about integration of water resources management within the earth systems model. The case study region selected is appropriate for evaluating the methodology.

1. The conclusions discuss more of the validation of the models developed and several associated difficulties and errors. The conclusions section should reflect on how improvements are achieved in the ESM models. What changes led to the improvements in the validation of the model with respect to system representation and similarity of the model response to the existing physical system response.

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2. It is not clear from the manuscript if some of the operating rules in place in the river basin are optimized or not. If optimized, are they considered in place of generic operating rules used in the model?
3. The subscripts used for the variables in the equations can be simplified so should be the notation so that readers can appreciate the constraints/equations.
4. It is not explicitly evident from the manuscript, what improvements achieved in system response based on improved representation of the water management components in the ESM. Can this improvement be quantified ?
5. What are the issues if optimization is used considering the complexity of improved representation? Is the system tractable if optimization is used considering curse of dimensionality issues (with dynamic programming) and computational tractability due to solver issue imposed by nonlinear constraints and solution methods.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 3501, 2013.

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