

Interactive comment on “Moment-based Metrics for Global Sensitivity Analysis of Hydrological Systems” by Aronne Dell’Oca et al.

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This paper addresses the important topic of Sensitivity analysis of the output produced by hydrological models. The method is novel and provides a more mathematically rigorous framework for the evaluation of parameter sensitivity and a methodology for approximating the output produced by models in case they are demanding in terms of computational resources (PCE).

Three examples are investigated: 1) a synthetic case (the Ishigami function); 2) an analytical solution for seawater intrusion in a coastal aquifer (Pool and Carrera, 2011) and 3) A laboratory scale model of a solute transport. These three cases are all calculated and the relevant measures are presented.

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Without any doubt this paper is substantial contribution and could lead to a better handling of complex hydrological systems.

I would suggest to address a number of issues, which could make the paper attractive to an audience that is less familiar with the mathematical formulation of the method and more sensitive to its impact.

The presented cases are for either analytical solutions (cases 1 and 2) or small scale settings (case 3). Therefore it could be of value to discuss how this suggested methodology could be applied to hydrological problems (regional groundwater flow models, flow and transport models and or density dependent seawater intrusion), what would be the steps needed to be taken and what would be the implications in terms of required computational resources.

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