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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Reliability, sensitivity, and uncertainty of reservoir performance under climate variability in basins with different hydrogeologic settings" *by* C. Mateus and D. Tullos

Anonymous Referee #3

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The manuscript 'Reliability, sensitivity, and uncertainty of reservoir performance under climate variability in basins with different hydrogeologic settings' investigates the future reservoir performance of two reservoir systems under two climate change scenarios. The work suggests, that the hydrogeologic settings in the basins play a mayor role in the predictability of water resources in basins with substantial groundwater interactions.

The authors cite two papers (Rosero et al., 2010; Surfleet and Tullos, 2013) that show that "uncertainty for groundwater basins (. . .) is likely a result uncertainty associated

with transfer of model parameters in the groundwater model." But those fundamental questions do not get addressed in the required detail. Therefore the suggested unpredictability of water resources in basins with substantial groundwater interactions can not be verified properly.

In conclusion the overall scientific contribution of the work is low. The authors use well known models in a classical model chain. The more challenging part, the Bayesian approach DREAM, is not discussed at all. Only a reference is given, thus limiting the self-independence of the work. Limitations in the quality of the work restrict its usefulness as a case study regarding questions of climate change impact on water resources. The reviewer can therefore not recommend to accept the work.

The reviewer recommends to work on the following issues: Since the assessment of the future water resources and its uncertainties is a vital part of the work, it needs to be clear how the inflows to the reservoir model are modeled. Crucial information about the climate change scenarios are missing. Which GCMs are used? Quantify the uncertainties of the ensemble. Using only the ensemble mean can reduce the overall uncertainty thus underestimating it. Why was only the ensemble mean used? For good reasons to do so, provide a discussion. The ensemble mean likely will impact the evaluation of the floods and their frequencies. Provide details about the Delta-Hybrid method, this seems to be a critical step in the model chain. The discussion on the hydrological modelling is very limited. Please provide discussion about calibration and validation. How did the models perform? No details at all were given about the VIC model. What are the differences between the models? What parameter sets where calibrated? What is DREAM and how was it used? Why was DREAM only used for GSFLOW model? The cited paper does not help that much and the citation seams wrong. What are the possible effects of using two very different models (with different sets / numbers of parameters) on the overall predictability?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 13891, 2014.