

# ***Interactive comment on “Assessment of the Hype Model for Simulation of Water and Nutrients in the Upper uMngeni River Catchment in South Africa” by Jean N. Namugize et al.***

## **Anonymous Referee #2**

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This paper assesses the capability of the Hydrological Predictions for the Environment (HYPE) model in simulating streamflow, dissolved inorganic nitrogen (DIN) and total phosphorus (TP), in uMngeni Catchment in KwaZulu-Natal province, South Africa. The model was manually calibrated using stepwise approach and tested against observation and its performances were assessed based on the Nash-Sutcliffe efficiency (NSE), percent bias (PBIAS) and Pearson’s correlation coefficients. Authors concluded that the Hype model was successful in simulating streamflow, DIN and TP in the upper uMngeni catchment.

The paper is a good application of the Hype model rather than an improvement in hy-

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drological/nutrient processes understanding and modelling approach in general and in the region. There are many shortcomings in the manuscript, most importantly the lack of uncertainty analysis. I think that a sensitivity analysis and uncertainty assessment of the Hype model particularly to land use and soil parameterization could improve the quality of the paper. In addition, the paper misses a through discussion about the limitation of the Hype model for discharge and nutrient simulation in the uMngeni catchment. Authors just enumerated few of them in the conclusions but these statements are not directly supported by the findings of the paper.

Detailed comments - Land use and soil data were desegregated from coarser scale which could be not coherent with the hydrological model scale. The Hype model is quite sensitive to the land use and soil-type information. Does the scale and the resolution of these inputs affect the model performances?

- There is a wide panoply of techniques for automatic calibration of model parameter in literature which are faster and provide an insight on parameter sensitivity and uncertainty. So, what are the reasons behind using manual calibration in this work?
- P6, L, 181. Why a third thick soil layer was added during the calibration of the model?
- P7, L.213. The HYPE model has over one hundred parameters. How did you identified the most sensitive parameters for the calibration process?

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