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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Hydrological model assessment for flood early warning in a tropical high mountain basin" *by* M. C. Rogelis et al.

Anonymous Referee #1

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1. General comments: (1)This manuscript is a rather comprehensive work that aims to find the most appropriate hydrological model, among a lumped model, a semi-distributed model, and a distributed model, to perform discharge/streamflow simulation in a Colombian basin. The results of rainfall-runoff model comparisons may provide reliable basis for model selection for flood early warning in the selected Colombian basin. However, comparison of different types of rainfall-runoff model has been a constant and classical topic in hydrological research fields, as many similar works have been carried out, for instance recently the research done by Orth et al (2015), where additional soil moisture validation in hydrological model is accounted for and more catchments with different climate regimes are investigated. In general, there is no noteworthy innovation in theory or method except for reinventing the wheel. (2)The time and energy that the authors put into the whole preparation of this manuscript are always to be appreciated.

For example, for the semi-distributed TOPMODEL and the distributed TETIS model, the effect of variation of pixel size on model performance is explored, though similar work has been done by numerous pervious work such as Zhang and Montgomery (1994). Besides, the uncertainty of precipitation is also well accounted for through three interpolation and correction methods. These parts are undoubtedly time-consuming, but bring out no new insight to improve the perception of the hydrological processes since they have already been done in last decade or even earlier. (3)This makes the manuscript tend to be a technical report covering many aspects of a task rather than a research article to shed the light on a particular aspect of a problem. Frankly speaking, this manuscript is just not good enough for journals like HESS.

2. Other comments: (1)As mentioned, the KGE metric used in this manuscript for model calibration is newly proposed and has not been used widely yet. Thus, it is necessary to address the reason why KGE is chosen as the objective function and metric for model performance, instead of NSE (Nash-Sutcliffe efficiency), which is probably the most commonly used objective function in rainfall-runoff modeling. In addition, the equation of calculating the KGE value should be given. (2)For table 8, an alternative form such as a figure may be a better choice to present the ensemble discharges for the three models applied in this work, which provides a better visual sense of the uncertainty in the period of analysis. (3)Given the purpose of flood early warning, it seems no measures have been taken to place greater emphasis on ensuring the peak flows are simulated accurately. (4)In this work, the uncertainty of model parameters, another important basis for model selection, does not seem to be taken into consideration. (5)Figure 3 can be improved. For instance, the labels should not cover the river or the boundary.

3. References: (1)Orth R, Staudinger M, Seneviratne SI, Seibert J, Zappa M. (2015). Does model performance improve with complexity? A case study with three hydrological models. J HYDROL, 523, 147-159. doi: 10.1016/j.jhydrol.2015.01.044 (2)Zhang W, Montgomery DR. (1994). Digital elevation model grid size, landscape represen-

tation, and hydrologic simulations. WATER RESOUR RES, 30(4), 1019-1028. doi: 10.1029/93WR03553

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