This manuscript tries to investigate the uncertainties resulting from different hydrological model components when assessing the impacts of climate change on streamflow. To do so, they design a modeling framework that incorporates three runoff yield schemes, one runoff routing scheme, several GCM and RCP. I think the topic is interesting and the manuscript is overall well-prepared. However, I think there are still several issues have to be addressed before considering for publication in HESS.

(1) The authors choose annual mean discharge, annual peak discharge or 100-yr flood discharge to analyze the uncertainties. I doubt if it's meaningful to investigate annual mean values in a 750 $km^2$ catchment. In figure 5 they even investigate changes and uncertainties in much smaller sub-basin. Because I think, according to their methodology, in such a small catchment the annual mean runoff is simply controlled by precipitation and evaporation. On the other hand, when investigate the annual peak values (here it's not clear how they define 'peak' values, from daily or hourly?), the routing may play a more significant role in the timing and magnitude of simulated streamflow. My concern is if the authors can still reach the same conclusions if they use daily streamflow when perform uncertainties analysis because I believe in such small catchment different runoff yield schemes have more effects on daily streamflow instead annual streamflow.

(2) I also want to hear opinions from the authors regarding the choose of runoff yield scheme. When perform regional or global simulations using LSM, people usually can only use one runoff yield option, either saturation-excess (e.g. NoahMP, CLM) or infiltration-excess (e.g. VIC). However, when focus on the specific catchment, you can definitely choose a runoff yield scheme that is suitable for the hydrological regime of that catchment. I'm not challenging your work, just want to hear some discussion.

(3) Line 134-141. The authors use MODIS products to estimate the PET, However, they don't provide any detail regarding how to convert PET into ET for runoff yield simulation. In eq(1)~(7) I don't see any variable related to ET.

(4) Line 255. The authors calibrate several parameters related to runoff. But they don't document how they fix the value of soil depth, from dataset or by calibration. In Line 233 they state that the soil depth is based on a previous study but I don't see any description in (Feng et al., 2019). In their modeling framework, they use quite simple water balance scheme to account for the soil water movement, in this case the soil depth is an important variable determining the soil water holding capacity.

(5) Line 256. sim-topmodel uses groundwater depth to calculate runoff yield. Do you spin up the model to reach the equilibrium state?

(6) Line 290. If I understand correctly, here should be "parameter", which is different from "parameterization"