Interactive comment on "Modelling stream flow with a discrete rainfall–runoff model and 37 GHz PDBT microwave observations: the Xiangjiang River basin case study" *by* Haolu Shang et al.

Anonymous Referee #2

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The authors have developed a discrete rainfall-runoff model which uses ground data as well as retrievals of Water Saturated Soil (WSS) and inundation area from 37GHz microwave observations. I had a difficulty in understanding the objective, finding, and the contribution of this manuscript. There are many questions which were not addressed by authors clearly, for example.

1. Use of 37 Ghz (which sensor/satellite?) for WSS and inundation estimation why not other frequencies, which are commonly used for soil moisture and inundation area estimation?

2. What is discrete rainfall-runoff model, why it is better than other models?

3. Why the model was used at a time step of 10 days? Under which circumstances this approach is valid?

4. What is the purpose of 3 step implementation? Where do get the evapotranspiration data from? What happened to this approach if we do not enough data from the ground (e.g water table) 5. What is the role of calibration in the model results?

6. What is the purpose of this manuscript? Model development? Or use of satellite observation for improving model simulation?

In addition, manuscript was not well written and arranged . I recommend authors to restructure the paper in a way that readers can understand the concept, their applications to solve the practical issues using your model or approach.

Specific issues are listed here for future modification.

Page 2: Line 1-5: Introduction does not explain the advantages and short coming of 37 GHz for estimating soil wetness and inundation area. I do think that use of 37 GHz for the estimation of soil wetness as well as inundation area is not the right choice since it is affected by clouds and water vapor and thus affecting the PDBT significantly. I believe the authors may know much better about the soil moisture estimation from low frequency microwave observation (1, 6.9 and 10 GHz). Provide reasons why 37 GHz was used rather than 6.9 and 10 GHz. I could not able to understand why does the discrete rainfall-runoff modeling approach better than other available or physical model approaches and what are the advantages?. If you use 36 GHz for inundation why not use 89 GHz which has high resolution than 36 GHz.

Page 2-5: Mixer of everything very difficult to follow. Better to improve the introduction and move equations and description of model to Section:Method, especially page 5.

Page4: Equation 3: Confusing. Weight w is divided by P and again multiplied by P? Please simplify and explain clearly.

Page 10: Line 10-25. What happened to evapotranspiration? What data was used to

calculate evapotranspiration to solve eq. 3?

Page 11: why does the model have the time steps of 10 days? What is the advantage of this approach? Can you use this approach for simulating peak discharge?

Page 11-15: what is the target this manuscript? Reproduction of stream flow? In that case why other available physical model cannot be used? How to understand that WSS and inundation area really improved the model performance?

I could not able to follow the results and discussion completely since the previous sections could not explain clearly.

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