Interactive comment on "Using modelled discharge to develop satellite-based river gauging: a case study for the Amazon Basin" *by* Jiawei Hou et al.

Anonymous Referee #3

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This study focusses on the estimation of river discharge from remote sensing observations. The authors developed a methodology, called satellite gauging reaches (SGRs), to derive river discharge over the Amazon Basin from optical (MODIS) or passive microwave (GFDS) observations. Other attempts to retrieve river discharge from remote sensing can be found in the literature, as noted by the authors in the introduction. I would have appreciated some kind of comparison with existing methods (at least in terms of potential errors). Here, either MODIS or GFDS is used to calibrate a relationship between surface water extent and discharge modelled by the W3 hydrological model. Performances of two methods (Optimal Grid Cell Selection and Window Mean) and five window sizes are compared for both MODIS and GFDS. The method and

window size that provide the best results are then selected to apply the SGRs over a few locations (15) where correlation is high enough. Discharge derived from SGR and modelled discharge are finally compared to observations from in situ gauge stations. Results show that SGR provides reasonable discharge estimates.

The idea of SGR is quite interesting, but its performances should be evaluated more comprehensively, especially for potential application in ungauged regions (as suggested by the authors). For instance, how would SGR behave over pixels where the correlation between surface water extent and modelled discharge is low (pixels excluded from the study)? How does the method compare with existing ones? What are the main limitations?

The paper is quite well organized, but could be improved by: - explaining the concept of SGR in the introduction - providing a workflow scheme of the overall methodology - better justifying the interest and added value of SGR compared to existing methods and models

Minor comments:

P6L3-4. Is there any quantitative criterion which motivated this choice?

P6L12-13. Not clear

P7L30-31. Is it a quantitative or qualitative result?

Figure 4. Colors of SGR sites (purple and black) are not clearly visible.

Figure 5. The figure is too small.

P12L14. Not clear

P12L29-30. Is it because of model biases?