

The study of Tong et al. focuses on testing the possibility of improving the hydrograph prediction in ungauged basins, by adding ASCAT soil moisture and MODIS snow cover data to runoff. For this aim, the study applies multi-objective calibration with changing weights between soil moisture, snow cover and runoff. Coupling the TUW model with eight typical regionalization methods, this study compares the differences and impacts of adding soil moisture and snow cover data from three aspects in 213 assumed ungauged Austria basins. The authors conclude that the calibration variant has a larger impact on runoff prediction accuracy than the selection of regionalization methods in ungauged catchments. Overall, the authors present a thorough analysis, the results seem convincing and the study is valuable for related research. However, there are several issues that still exist and need to be clarified further as indicated in the following.

First, the manuscript needs further editorial work to improve the paragraph structure and some vague expressions. The results section, figures 2-4 and tables 2-4 evaluate the prediction from two different aspects (median value and the 50% confidence interval, respectively), the text is thus suggested to set in two separate paragraphs. In addition, please pay attention to vague expressions in this manuscript, such as line 394 "This study suggests that the future evaluation of the transfer of model parameters to ungauged sites will benefit from examining what type of information will improve the calibration and transfer of model parameters related to the runoff generation and routing", which is really confusing. There are other similar sentences, so I hope the authors make a thorough change to improve the clarity of the manuscript.

Another major issue in this manuscript is that the Results section can be made more concise and to-the-point. Information presented in Figures 2-4 and table 2-4 includes both calibration and validation results, which are mostly similar, and limited text for validation result presented in current version. Thus, I would suggest that the authors focus more on one of the cases and improves the presentation of figures and tables to make sure the key messages stand out. Moving the validation information to the Supplement may be an option.

Furthermore, the conclusions are mixed with discussion in current version, which is not easy for the readers to get the key messages from the study. I would suggest that the authors conclude the findings in a separate section, and make more concise and clearer conclusions.

To conclude, I generally like the approach and methodology, but some moderate improvements are needed. I hope the authors find my comments useful and I am looking forward to an improved version of the manuscript.

Technically I have a couple of comments for current version:

- (1) L138: "...with cloud cover less than a threshold 50%." Is 50% a subjective value? If so, please clarify the reason, otherwise, add the reference.
- (2) L140: "... over a threshold of 25% in the zone." The same comment as above.
- (3) L204-206: "...between climatic zones...the catchments were split into two groups...elevation below 900 m a.s.l. ... elevation above 900 m a.s.l.". The reference is the climatic regions, but the classification in this study is only based on elevation. Please make a clarification here, for instance, adding a table presenting the climatic statistics between two groups.
- (4) L249: "Besides, to exclude invalid ASCAT measurements ... or snow cover exceeds 30 % of the pixel." Vague expression, please modify.
- (5) Results: The model performance is missing. Please add a figure or table showing the assessment of model simulation accuracy in calibration and validation period. At least, show some general

information in text.

- (6) L256: "The results for the runoff weight =1.0 represent ... without using observed runoff." This information is repeated, may delete it here.
- (7) L259-261: "..., for weights below 0.4. ... larger than 0.4." It is not easy to see the difference before and after 0.4 from Figure 2, please modify the text or figure.
- (8) L259-261: "... In this case, ...". Here "this" is confusing, please modify the expression.
- (9) L275: "The largest difference occurs ...". Please clarify "difference" here.
- (10) L276: "An exception is ...". Please add reasons after this sentence.
- (11) L305: "... Also here, ...". Vague expression, please modify.
- (12) L320: "The results indicate the smallest difference in snow efficiency between the transferred methods". What or who is "the smallest"? please clarify and modify the expression here.
- (13) L321: "A much larger difference...". Please add information about the comparison components.
- (14) L323: "... between 1 and 3% ... between 8 and 17%." How did you derive this conclusion? Fig 4 shows the transfer methods individually, that readers cannot obtain this information. Please add more text information or modify the figure.
- (15) L326: "... regional variability...". Please clarify its definition.
- (16) L342: "... Positive efficiency values...". Please add efficiency information before this sentence, in order to connect the figure and text information.
- (17) L347: "... very similar (i.e. within 1% range)...". How can the readers derive this conclusion? The legend unit in the figure is 5%.
- (18) L355: "... and the improvement is larger in the alpine than the lowland catchments". In my opinion, this is an important and the most obvious finding in Figure 5 and 6, I would suggest to modify the text with an emphasis on this conclusion.
- (19) L369: "... the improvement is largest..." → "... the improvement is large..."
- (20) L370: "... of the efficiencies of the different..." → "... of the efficiencies between different..."
- (21) L375: "... we examined all 30 transfer approaches ... fewer than tested in Parajka et al. (2005)." This information is not really relevant in discussion, delete maybe.
- (22) L394: This paragraph is supposed to conclusion section, the expression is not precise and clear enough for readers in current version. Please pay more attention in the logical expression and modify the conclusions more precise and clearer.