View Letter

Dear Editor and reviewers:
Many thanks for the review comments that we received to our paper. They have contributed to improving the quality of the manuscript. We have carefully addressed the reviewers' comments and suggestions. Typos are corrected. Please find below (in blue) are our point-by-point responses to each of the reviewer's comments.

Interactive comment on **"The impact of initial conditions on convection-permitting simulations of flood events"** *by* **Lu Li et al.**

Anonymous Referee #1

Received and published: 6 November 2019

Review of manuscript "The impact of initial conditions on convection-permitting simulations of flood events " (hess-2019-402) by Li et al.

The manuscript is well written and clearly shows the impact of spinup time and different snow cover on discharge modeling with WRF-Hydro. This work is of high interest for the hydrological modeling community. It should therefore be considered for publication in nhess.

Minor comments: For clarity and conciseness I think the size of the abstract should be reduced to less than 300 words (currently 438 words)

- We have reduced the abstract to less than 300 words.

Page 10, line 285: add units to the values of bias and RMSE. By the way, please consider formulating the bias in percentages instead of mm, in order to facilitate the interpretation of the results.

- Thanks for the comment. We have added the units 'mm' in this sentence: "the Bias and RMSE decrease from 6.74 to 0.56 mm and from 1.2 to 0.55 mm". This correction has been made throughout the manuscript.
  We have also added the bias (%) in percentage in Table 5 for a clearer interpretation. The relevant paragraph is also updated in the revised manuscript:
  "The Nash-Sutcliffe-Efficiency coefficient (NSE) of daily discharge increases from 0.41 to 0.86, while the Bias and RMSE decrease from 5.29 mm (0.88 %) to -0.42 mm (-0.07 %) and from 19.05 mm to 9.03 mm, respectively. …
  Regarding the Bias and RMSE values, they are -0.42 mm (-0.07 %) and 9.03 mm from calibrated WRF-Hydro, 2.52 mm (0.42 %) and 11.3 mm from the upper benchmark, and 7.65 mm (1.27 %) / 2.95 mm (0.49 %) and 18.43 mm / 14.13 mm from two lower benchmarks ($R_{lower/random}$ / $R_{lower/regional}$)."

Page 10, line 289: I guess this "correlation coefficient" comes from the PEST method. Please clarify.

- Yes, the correlation coefficient is from PEST method. We have added the clarification and citation in the Method section: "In addition, the correlation

coefficient matrix of calibrated parameters is also estimated by the PEST method (Doherty, 2015). It tells which two parameters might be linearly dependent (if the correlation coefficient is greater than 0.8)."

Page 11, lines 299-302: this result implies that the runoff coefficient, that is the ratio between discharge and precipitation, is slightly above 1! in order to argue that this is realistic, the authors may emphasize the fact that the case study is in "polar region" and that at the end of October not much ET is expected.

- Thanks for the suggestion. We have added the clarification in the section of 4.1: "ET is small for all the catchments. This is due to the low temperatures at the end of October in western Norway, which lies very close to the Arctic Circle and is dominated by mountainous terrain (Engeland et al., 2004)."

Page 12, line 333: it would be useful to also add the values in %, in order to better assess that the "differences are fairly small".

- Agree. We have added the values of " ±1 %" in the sentence.

Page 12, line 346: "discharge MAE": the whole paragraph is about precipitation so I find it confusing to have this comment about discharge at this place. Is it a typo? Otherwise, this could be moved to the next paragraph.

- We have removed this sentence in order to avoid misunderstanding.

Page 13, line 367: "Unsurprisingly, the snowmelt is due to positive surface temperatures and precipitation" In the Noah LSM, the snowmelt occurs when surface temperature is positive, independently of precipitation. Another land surface model such as NoahMP, which distinguishes between solid and liquid phase in the snowpack would be need to assess the effect of precipitation on snowmelt. So I suggest to remove the comment that the snowmelt is due to precipitation, as the Noah LSM which is used here does not allow to asses that, I think.

- Thanks for the comment. We have now removed this comment.

Page 13, line 374: same comment

- We have corrected it to be: "This is because the limit of melting snow is controlled by the temperature in Noah LSM and a maximum of around 0.5 m snow will be melted away in this case."

Section 5: this section is rather a summary of what has already been explained in the result section, than a discussion. Please consider renaming this section, and also use the past tense.

We have changed this section to be section of "Conclusions" and used the past tense in this section in the revised manuscript.

Typos Page 3, line 87: "in to improve" –> "in order to improve"

- We have corrected it.

Page 15, line 399: "1m" –> "1 m", line 406: "69%" –> "69 %", apply to the entire manuscript

- We have corrected them and applied to the entire revised manuscript.

Page 15, line 429: "performance is depends " –> "performance depends"

- We have corrected it.

Figures

Fig. 6: labels a) and b) are missing

- Labels a) and b) have been added to Figure 6.

Fig 8: Maybe the symbols could be shifted so that they can be all seen?

- We have made a shift so that all the symbols can be seen in the revised Figure 8.