Response to Referee #2's comments

Thank you very much for your comments. The suggestions will be incorporated in the revised version.

Minor comments/revisions

1. Page 6, Line 1+: "This estimates the snowfall that would have likely occurred that minimizes the difference between observed and simulated discharge at the basin outlet and the difference between MODIS-derived and simulated snow cover pixels in the basin, given the physics of the model." This is the nugget of the entire paper and a description of what is being done. I think this could be stated more clearly.

Answer: Thank you for the suggestion. The clear description will be given in the revised version.

2. Page 6, Line 4+: ": : :Yagisawa Basin: : :where water use in spring is completely dependent on snowmelt discharge." It would be better to add here some more quantitative descriptions of the water supply by season, role of groundwater, versus surface storage, etc. If there is any groundwater contributing to discharge, that might undermine some of the methodology.

Answer: There is no groundwater contribution to discharge in spring. The sentence will be restructured to clarify this point.

3. Page 8: Line 7+: "The basin partly supplies drinking water to 29 million people in the Tokyo metropolitan area." This statement would be more powerful (and convincing as a study motivation) with a number attached such as "the basin typically supplies X% of the Tokyo metropolitan water supply.

Answer: The basin typically supplies 14.27 % of the water to Tone-Ara river system to feed water supply to Tokyo metropolitan area. Furthermore, 14.11 m^3/s and 2.918m^3/s discharge is used for irrigation water and city water respectively in Gunma prefecture. The descriptions will be added in the revised version.

4. Page 8: Section 2.2 Study area. Why was this small basin chosen over all of the others? There appear to be no precipitation observations in the basin at all to ground validate the MODIS data, for example. Potential biases in MODIS are discussed, but ground observations would have strengthened the conclusions of the paper.

Answer: This basin is the head catchment of Tone River which is not affected by artificial structures so that the snowfall correction approach can be efficiently applied to obtain reliable estimate of snowmelt discharge. This basin also receives the heaviest snowfall in the Upper Tone region. Hence, this basin was chosen although AMeDAS precipitation gauges are not available inside the basin to validate the MODIS data.

5. Page 10: Section 2.2.4 MODIS snow cover area. The MODIS is available daily. Why are the authors using the 8 day product for a model that runs hourly?

Answer: Daily MODIS product have large missing values due to cloud cover. MODIS 8 day product represents the maximum extent of snow cover over eight days, which effectively provides a temporal filter of MODIS daily data minimizing cloud coverage. This clarification will be added in the revised manuscript.

6. Page 12: Line 1-2: "attained by running the model several times, until hydrologic equilibrium was reached." Please be more specific. The model was run X number of times until equilibrium was reached as defined by Y and Z.

Answer: Thank you very much for specific comment. The lines will be revised.

7. Page 14: Section 3: Results and discussion. Why was 2002-2003 chosen as the calibration period?

Answer: The year 2002-2003 was chosen as the calibration year because the length of snow cover period is larger in this season (i.e. from mid-October to early-June). The snowfall amount is the greatest in this season. The clarification for the selection of this year will be included in the section 3 of the revised version.

8. Figure 7: the Watershed boundaries and topography seem inconsistent.

Answer: *Watershed boundary is the prepared for 500 m grid and the values in the contour lines indicate the values of snowfall. This will be clarified in the figure caption.*