

Interactive comment on “The Cache la Poudre river basin snow water equivalent modeling with NewAge-JGrass” by G. Formetta et al.

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General comments

The manuscript presents a snow melt model implemented in the NewAge-JGrass platform. The advantage of its integration is the availability of different packages, which can be used i.e. for model input preparation, automatic parameter calibration or visualisation of the results. The snow melt algorithm is based on a degree-day approach, which additionally accounts for some solar radiation correction. The model implements also a smoother filter for threshold temperature used for rain/snow estimation. The modeling system is tested on the Cache la Poudre river basin (CO, USA) and the verification is presented for three SNOTEL stations measuring SWE. Finally, the authors present an example of distributed snow simulations.

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This is potentially an interesting contribution, however, there are several points which need to be clarified and revised before considering for publication. I fully agree with reviewer #1 (B. Schaeffli) and in addition, I have following comments:

- 1) The novel contribution is not clear. Maybe I missed something, but I did not find a paragraph (in the introduction section) clearly stating the main objectives of the paper and what is going to be novel. In case, it is a novel approach for snowmelt modeling, it needs to be tested more thoroughly against some existing approaches (e.g. by comparing the approach with simple degree-day model, SRM model, etc.). In the methodology section, It is essential to clearly state what part of the model is to be tested and why?
- 2) The authors should very carefully select the validation examples. It is not only the Nash-Sutcliffe efficiency, which demonstrates the model performance. For example, I have some problems to interpret the parameter values presented for different stations. Why is the adjustment for measurement errors for rain larger than for snow? In this case I would not consider the option for automatic calibration as an automatic advantage of the modeling system. In this context, I would suggest to add some discussion about the compensation effects of model parameters on model performance.
- 3) I would suggest to present some verification of the simulated spatial patterns (i.e. by using freely available MODIS snow cover data). Validation of spatial patterns will clearly demonstrate and justify the value of newly implemented procedure for smoothing the threshold temperature and radiation correction of degree-day factor or show some advantages related to different packages used for model inputs preparation or model calibration.
- 4) In order to reproduce the results, it would be interesting and useful to provide more technical information on how to download, setup and use the system (e.g. by providing some brief tutorial and data example).

Specific comments

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1) Abstract: The presented snowmelt model is based on a conceptual degree-day approach, so I do not agree that it accounts on the main physical processes. Please consider to revise the text accordingly. The last sentence is also not clear, please revise.

2) Introduction, p. 4450, l.2: "..in this dissertation...". please revise.

3) p.4449: snow water depletion curve? Is it not snow cover depletion curve?

4) p.4457, l.16: SNOOTEL.

5) p. 4458: what is the GOF?

6) The discussion section is missing. Please consider to discuss your finding with respect to existing approaches (literature).

7) Table 1: Are the longitude values correct?

8) Fig.2: Decimal numbers in legend are not necessary.

Interactive comment on Geosci. Model Dev. Discuss., 6, 4447, 2013.