Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2020-416

Anonymous Referee #2

Referee comment on "STEMMUS-UEB v1.0.0: integrated modeling of snowpack and soil water and energy transfer with three complexity levels of soil physical processes" by Lianyu Yu et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2020-416-RC2, 2021

This study presents a new integrated modelling of snowpack and soil water/energy transfers, called STEMMUS-UEB, presenting three levels of soil transfer complexities. The model is evaluated on one site equipped with soil temperature, moisture and energy fluxes sensors. The performances of the 3 options of the model are discussed. This is an interesting paper but quite difficult to follow and some questions need to be addressed before further consideration for publication.

A general issue is that the test site seems to be poorly influenced by snow. I am therefore wondering if it is really appropriate for the model evaluation.

The model description in the main paper lacks on the description of the thawing/freezing processes: how is the fraction of liquid/solid water calculated and what about the soil hydraulic conductivity ? how the rainfall/snowfall partition is done ?

Figure 2 is too small and difficult to read

Figures 6 and 7 are also difficult to understand: the precipitation events are rainfall or snowfall ? what is the amount of SWE during that periods? It is surprising to see that the model without snow modeling performs generally better in the simulation of the latent heat flux compared to the snow model. It would be necessary to elaborate a bit more on that result.

In the title, I suggest to replace “mass” by “water” to be more precise.

The English need to be revised

The abstract need to be rewritten to better highlight the main findings of the work