Geosci. Model Dev. Discuss.,
doi:10.5194/gmd-2017-56-RC2, 2017

Geoscientific Model Development Discussions
Open Access
EGU

Interactive comment on "Implementation of a physically based water percolation routine in the Crocus (V7) snowpack model" *by* Christopher J. L. D'Amboise et al.

Anonymous Referee #2

Received and published: 30 May 2017

Overall, this is an interesting modeling paper that describes the improvements in the Crocus(V7) snowpack model. The current modification improves the modeling of the water storage in the snowpack, and once further validated, could be an invaluable contribution to the state of art in snowpack modeling. Below I have a couple questions and minor suggestions, most of which are editorial.

—

Abstract L15. Pendular and funicular regime (scientific jargon). Need to explain that first.

Section 2. First paragraph. I am confused. Is it a three models coupled system (SUR-

Printer-friendly version

Discussion paper

FEX, ISBA, and Crocus)? If yes, then title should be changed.

The current formulation of the Richards equation 1 does not account for presence of ice and air in snowpack. How do authors think the results would change by introducing them in the equation 1?

P4. L30. h should it be H?

P5. L2,5. The notation is confusing pressure head (h), and retention curve h(theta)?

P5. L10. Equation 3. If it is water retention curve function then should be h(theta)

When water percolates through the snow layer and freezes at the bottom. The pressure and volume at the bottom grid cell increases due to ice formation. How does the model handle the increase in pressure due to ice formation?

It would be interesting to plot pressure head changes with time on Figures 8 and 9.

Section 6.6. Authors are referring to the different routines, like 'C13' and so on. It is confusing to read those notations and have no idea where they come from. For clarity, I suggest to make a chart including all the important routines.

There are figures, like Figure 11, which have the same legend. I suggest to make one legend, and put A) and B) as a subtitle or place the text inside the figure.

Interactive comment on Geosci. Model Dev. Discuss., doi:10.5194/gmd-2017-56, 2017.