

Interactive comment on “Seasonal evolution of snow permeability under equi-temperature and temperature-gradient conditions” by F. Domine et al.

Anonymous Referee #2

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This is a very well designed study. Three topics are addressed in this manuscript: 1) is the dependence of snow permeability (K) upon its metamorphism process (under equi-temperature (ET) or temperature-gradient (TG) conditions) . 2) an evaluation of the empirical equation for K using the specific surface area (SSA) and density (s) data; and 3) a model for K using the output from the detailed snowpack model. The three topics are well organized. The manuscript is very well written, and I cannot see any problems with the analysis or presentation. I think it is worthy of publication in The Cryosphere after fairly minor edits. Below I give my specific editorial comments and suggestions for improvement of the arguments in the manuscript.

Specific comments:

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The modeling of SSA in Crocus is necessary to calculate K . There is no description of how to calculate SSA in Crocus, such as what parameters are used to calculate SSA in the model etc. A brief description of this would be very useful for readers to follow the discussion.

The definition of grain radius (r) in Eq. (2) is different from that in Eq. (3). Therefore, I think r in Eq. (2) should be replaced by another letter to avoid confusion. Additionally, although the authors were following the method of Calonne et al. (2012), Fig. 5 is misleading because of this confusion.

Suggestions for improvements:

P2739 L20. I do not agree with the argument that “it aerodynamic drag will . . .” because K becomes larger as grain size increase according to Eq. (2) or (3). Please add more detailed discussion to explain your argument.

Line 2 in the figure caption of Fig. 7 has a typing error: (a, c, d) should be (a, c, e).

The style of figure captions of Fig. 8 should be consistent with Fig. 7.

The scales of the X axes in Fig. 10 and 11 are difficult to understand. Please make these figures clearer.

Interactive comment on The Cryosphere Discuss., 7, 2725, 2013.

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