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Discussions

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Interactive comment on "Modeling near-surface firn temperature in a cold accumulation zone (Col du Dôme, French Alps): from a physical to a semi-parameterized approach" *by* A. Gilbert et al.

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Review of the paper Title "Modeling near-surface firn temperature in a cold accumulation zone (Col du Dôme, French Alps): from a physical to a semi-parameterized approach" by Gilbert et. al.

General comments: The paper covers an important topic of modeling firn temperatures in high alpine regions. The paper is well written and structured. The paper is publishable if the below question are addressed adequately.

I have three questions concerning the numerical simulations of temperature profiles in the surface layer of firn and for the deep layer.

Specific comments: 1) At line 24 on page 5549 you assume "zero flux" at a depth of 16 m. However, in figure 12 it is obvious that the temperature gradient at 20 m depth is not zero, and I am sure that at 16 m, they are not zero either. I guess that your assumption is based on the assumption that at 16 m depth, there are no variations in the flux (or temperature) due to annual surface variations? However, this would only imply that the flux is constant, but not necessarily zero. How do you justify "zero flux", and have you tested, what impact a different constant flux would have on the results?

2) On lines 15/16 on page 5558 you wrote that "The basal heat flux is specified at 150 m depth in the bedrock because it can be considered to be constant at this depth..." Have you tested this for your multidecadal model runs?

3) Your model runs span the period 1907-2012. What are the initial conditions? Have you tested to what extent your results for the present can be influenced by the choice of initial conditions?

Heinz Blatter