Fractional snow-covered area parameterization over complex topography

N. Helbig, A. van Herwijnen, J. Magnusson, and T. Jonas

Final referee report

The manuscript presents a new parameterization analysis to assess snow cover over complex topography. The snow depth data have been retrieved from digital photogrammetry and airborne laser scanner. The parameterization has been related to terrain parameters and mean snow depth indicator. This approach has been applied and tested in three different regions in Switzerland and Spain. The proposed parameterization performed better than the previously presented ones cited from literature. According to the presented results authors conclude that they developed a parameterization of fractional snow covered area over complex topography independent of a specific geographic region.

The topic of the paper is certainly relevant for HESS and its interests have been described in the introduction section of the manuscript. Results are innovative and promising.

I present some general comments:

1) The hypothesis and the limits of the paper outcome are now clearly stated and explained and the conclusions are now more appropriate and better explained.
2) Paper results are now better discussed and well interpreted in terms of their relevance and their physical meaning
3) The value of this research would deserve much more data availability, but snow data lack is a well known issue. Whenever new dataset would be available a new validation study would be desirable.
4) A further step forward for a coming study could be to check what happens removing the homogeneous melt hypothesis and to validate the paper outcome during depletion period.

In conclusion the paper is proposing promising results for fractional snow cover parameterization and it is suitable for publication as it is.