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The Cryosphere Discussions

Interactive comment on "Inter-annual variations of snow days over Switzerland from 2000–2010 derived from MODIS satellite data" *by* N. Foppa and G. Seiz

Anonymous Referee #2

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The manuscript presents a gap-filling approach to remove cloud cover from the MOD10C1 products to produce daily cloud free (?) products, which were then used to provide the snow cover duration (SCD) maps for the study area. Three in situ station data were used to validate the SCD and it is found the MODIS SCD in good match with the in situ SCD, with an overall overestimation, in particular in those snow transition months. Overall the paper has merit for publication, after careful addressing the recommended revisions and comments detailed below.

Comment 1. Gap-filling approach was first used in the Hall et al. 2010 (cited already in the paper). Not sure how different they are? Need some clarifications. also I see some

confusions about forward and backward. Please make clear, using the previous days, it calls backward; using the later days, it calls forward. I also wondering why you do not use the closest days (when it is cloud free)? After the filling, I believe your so-called daily product (not daily any more) is cloud free, right?

Comment 2. Almost all studies used the MOD10A1 or 10A2 products for such studies, since they have better resolution (500m), while the paper uses the 10C1 which has around 5km pixel size. Based on our studies, 500 m is already kind of coarse for such type of studies (validation and producing SCD maps), why the paper uses the 10C1? Need some rational and explanations, in particular, for alpine snow pack, the snow cover variation is large.

Comment 3. Since you treat the in situ SCD as ground truth, when you do a difference, you should use MODIS_SCD – In Situ_SCD, not the reverse. So I strongly recommend you to change all of them (tables and figures and text). So when you talk about MODIS overestimates, the difference is positive, not the negative, as you presented in the paper.

Comment 4. Suggest to read this paper below and make comparsion of their results with your results (for the validation of SCD maps), also it is strongly recommended to calculate the snow cover index as proposed in the paper below, so you can provide more information about the snow condition for each hydrological year.

Wang, X. and H. Xie, 2009. New methods for studying the spatiotemporal variation of snow cover based on combination products of MOIDS Terra and Aqua. Journal of Hydrology, Vol 371:192-200. doi:10.1016/j.jhydrol.2009.03.028

Comment 5. I am kind of confusing of your validation of SCD compared with other papers that did validation of snow cover accuracy. You conclude your results are in agreement with other studies. Please clarify this. To me, there are very few papers validate the SCD, besides the Wang and Xie, 2009 above, you might want to read this paper as well:

Gao, Y., H. Xie, and T. Yao, 2011. Developing snow cover parameters maps from MODIS, AMSR-E and blended snow products. Photogrammetric Engineering and Remote Sensing. Vol 77(4):351-361

Interactive comment on The Cryosphere Discuss., 5, 2409, 2011.