A snow cover climatology for the Pyrenees from MODIS snow products (hess-2014-424)

Author's Response to reviewers

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The referees comments are marked in *italic blue* and our response in black.

General comments

I would like to thank the authors for their revision. The objectives are now clearly defined and results clearly presented. I have only a two minor comments which might be considered before publication of the manuscript. These include a more in depth link of published results with existing literature (in Discussion section) and some improvement of the figures. The details of my suggestion are given in specific comments below.

Overall, I enjoyed to read the revised version of the paper and look forward to see it published after some minor revision.

We would like to warmly thank J Parajka again for his time spent on evaluating our manuscript.

Specific comments

1) I would suggest to consider following extension of the Discussion section:

(a) In section 4.2 - to present some more comparisons with other studies comparing Landsat and MODIS (e.g. Dery et al., 2005, etc.)

(b) In section 4.3 to compare more the results with studies evaluating the efficiency of cloud filling methods (e.g. Hall et al., 2010, Gao et al., 2011, etc)

(c) In section 5.1 to compare more the results with studies looking on the variability of snowline elevation (e.g. Fig. 7 and Fig 8 of Krajci et al. 2014, among others)

We have incorporated some references as suggested.

(a) In Sect. 4.2 we now refer to Déry et al., (2005) and Rittger et al. (2013) about the Landsat comparison since they also identified misdetections along the snow cover edges.

(b) In Sect 4.3 we now refer to Parajka & Blöschl (2008), Hall et al. (2010) an Gao et al. (2011) about the usefulness of the the temporal filter. We also added a reference to Gafurov & Bardossy (2009) in the method since it also inspired our gap-filling algorithm.

(c) We added a reference to Krajčí et al. 2014 “This analysis was restricted to the mean snow cover duration, however, interannual variability in the snowline elevation can modify these general features (Krajčí et al., 2014), as illustrated in the next section.”

2) The clarity and consistency of Figures might be enhanced. I would suggest to use the same layout (template) for similar figures, which include also the same font, size, secondary x,y axes style, etc.

Additionally, I have following remarks:

(a) Symbols in Figure 1 are difficult to see. Please consider to make them more visible.

(b) Legend of Figure 4 is small and difficult to read. May be it will be enough to present it only once, but larger.

(c) Please consider to use the same colors (the same color legend) for seasons in both Figures 5 and 6.

We have modified Fig 4, Fig 6, Fig 9 and Fig 11.

Fig 11 and Fig 12 now have the same size, same axes.

Fig 5 and Fig 6 have the same color legend as requested. We also added a black edge to the markers so it is now similar to the subpanel in Fig 5.

We removed 4 out of 6 subplots in the Fig. 4. We now only show the results for MOD10A1 vs. SD (all stations) and MOD10A1 vs. SWE. It means that we removed the subplots for MYD10A1 and the snow depth at telenivometer stations only. We think it is now much clearer and it does not affect the message of the figure. In addition all the quantitative results are reported in Tab.2 anyway.

Additional modifications

1) We added this sentence to the abstract: “However, we also find a seasonal trend in the optimal SWE and SD thresholds, reflecting the hysteresis in the relationship between the depth of the snowpack (or SWE) and its extent within a MODIS pixel..” This result was obtained thanks to J Parajka first review and we think it is worth mentioning it in the abstract.

2) We replaced the word “obstruction” by “obscuration” based on Hall et al., (2010), Gao et al., (2011).

References

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