

Interactive comment on “Albedo-induced radiative forcing from mountain pine beetle outbreaks in forests, south-central Rocky Mountains: magnitude, persistence, and relation to outbreak severity” by M. Vanderhoof et al.

Anonymous Referee #2

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Review of Albedo-induced radiative forcing from mountain pine beetle outbreaks in forests, south-central Rocky Mountains: magnitude, persistence, and relation to outbreak severity

by M. Vanderhoof, C. A. Williams, Y. Shuai, D. Jarvis, D. Kulakowski, and J. Masek

General comments

This study uses extensive field measurements coordinated with USDA forest disturbance polygons and MODIS and LANDSAT albedo data to evaluate the albedo change

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in forests in the Rocky Mountains of Wyoming and Colorado following mountain pine beetle outbreaks for several decades. This is important work because these albedo changes (combined with carbon flux changes, not discussed here) from forest disturbances represent possible feedbacks to climate change from the biosphere. The study seems like it was executed well and the paper is well-written and without major flaws. However, I have a few specific reservations about the paper, especially the presentation of results. Also, I am not sure whether it is appropriate for this special issue as it does not relate to extreme weather.

Specific comments

Because of lack of precision in the USDA polygons and potential errors in georeferencing multiple datasets, other studies have excluded spatial data (e.g. MODIS albedo) around the edges of the masking polygons (e.g. USDA data). It does not appear that you have done this, even though you comment on the significant difference between “plot level” and “landscape level” analysis. Could you please elaborate on this effect and explain why you chose not to mask around the edges of polygons, or explain how you treated selection of pixels around the edges?

Along the same lines as the previous comment, the discussion of the “plot level” vs. “landscape level” results in the discussion needs significant expansion. These results appear in the discussion without having been outlined in the methods or results. There are also no figures to support these results, but they seem significant (i.e. “166% higher increase in albedo in summer”, p.11948, line 19). The authors cite a paper in review to support these findings, but until that paper is published, I suggest that more info needs to be included in the current manuscript. How was the 166% increase calculated? I suggest it is inappropriate to include this in the discussion unless it can be supported with methods and results, or the other paper is published.

Figure 2 is the central figure that presents the albedo results, but it convolutes both MODIS and LANDSAT data across multiple seasons and annual scale, all on a single

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bar graph. I think the figure could be improved. Perhaps the authors chose a bar graph because the data have been clustered in time? A connected line graph would give a better sense of the time progression of the data. I would be comfortable with that if the points on a connected line graph had X error bars to indicate the time grouping in addition to the Y error bars already presented. Then perhaps break the figure into a couple of panels. I appreciate that all the data are presented in one figure so that the various values are easily comparable, but I have a hard time quickly discerning the overall patterns in the data because seasonal and annual results across two different data sources are jumbled together. The color scheme does nothing to help this.

I also think figure 5 might work better as a connected line graph, rather than bar, unless the discrete time groups need to be emphasized.

I also think the figures would look more professional if rendered in something other than Excel.

Interactive comment on Biogeosciences Discuss., 10, 11935, 2013.