Biogeosciences

Discussions

BGD

Interactive
comment

Interactive comment on "Monitoring changes in forestry and seasonal snow using surface albedo during 1982–2016 as an indicator" *by* Terhikki Manninen et al.

Anonymous Referee #2

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Manninen et al. use a series of albedo and snow datasets along with the JSBACH land model to evaluate how the characteristics of snowmelt are changing across Finland. They find that some regions exhibit a transition to an earlier start to the melt, but that the melt duration is prolonged. The analysis is very detailed but lacks clarity at some points making it difficult to follow. Although limited in its spatial domain, this paper would be of interest to the community and could be a useful contribution after some issues are addressed.

General comments:

1) My main issue with this manuscript has to do with its readability. There are numerous

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[Discussion paper]

grammatical errors throughout, some of which are pointed out below. A native English speaker should edit the paper before resubmission.

2) The authors tend to make some broad sweeping conclusions based on trends that are only significant across a small fraction of the total study region. I would like to see more discussion of the full picture (like Figure 9). Pg 10 L2 and Pg11 L5 are two instances where the discussion is too narrow in focus.

Specific comments:

L25-27: Confusing sentence - reword.

L27: "Change in albedo" to "albedo change". Also, albedo change isn't really a mechanism, but a result of changing forest/snow cover/properties.

L30 and Pg2 L2: "enhances the climate change" – remove the

Pg2 L8: Remove "The forest management changes albedo and carbon sequestration".

L11: remove second "in"

L14: change water to rain

L15: Change to "On average, the precipitation changes..."

L19: Change "snow precipitation" to "snowfall"

L19: "The Arctic warming has resulted in decline of the Arctic Ocean ice cover" Awkward wording, change to this or similar: Arctic warming has caused Arctic sea ice cover to decline rapidly.

L20: Change "such decline" to "such a decline"

L24: since 2005

L26: Based on the prior paragraphs, the authors should mention how well models represent recent changes in snow cover (e.g., Derksen and Brown, 2012, GRL; Thackeray

et al., 2016, J Climate).

Pg3 L23-26: This sentence should be reworded.

Pg4 L5: Change "the spatial resolution" to "a spatial resolution".

L10: remove second "of Finland" here.

L11: change "forest associated variables"

L17-19: Confusing sentence, reword.

Pg5 L19: Change to "if the forest floor"

L21: Confused by "15-20 FSC %-units".

L23: Confusing first sentence, reword.

Pg7 L17-23: This paragraph seems as though it would be a better introduction to this section.

Pg8 L4: Change "composes" to "is composed"

L22: This sentence is poorly worded. Do the authors mean to say that Snow melt-off day is derived from FSC maps?

L23: Change "however ignoring" to "but ignores"

Pg9 L25: Change to "Seasonal snowmelt timing" or similar?

Pg10 L1: Since these changes are so small across many regions, I recommend changing the units from days per year to days per decade (Table 3,4,5, etc).

L2: What about the other eight vegetation zones?

L20: Change "The land ecosystem model results" to "Results from JSBACH"

L21-22: Awkward sentence, reword.

L33: Not clear what this means: "the southeastern -northwestern zones of equal timing are obvious".

Pg11 L5: What about the two regions with a decreasing melting period length of a similar magnitude?

L6: Change to "Start of the Growing Season"

L9: should be "on the forest floor"

L27: Remove "the" to start the sentence and change "quality" to "type".

L29: Remove "as form of snow or water"

L29: Capitalize arctic

Combine Tables 3, 4 and 5 into one to save space?

Table 3-5: state in the caption why some entries are bold.

Figure 1, 6, 8: Use white background with black outlines. Include latitude/longitude gridlines.

Figure 7: remove "out[161]=" from plot

Figure 8: Include a panel showing the explicit albedo change from the 1982-1986 panel to the 2011-2015 panel. This will make it easier for the reader to comprehend the change.

Figure 9: Narrow the y-axis on these plots to make the interannual variability and change more apparent (10 or 20 to 60%?).