

## ***Interactive comment on “Carbon storage versus albedo change: Radiative Forcing of forest expansion in temperate mountainous regions of Switzerland” by J. Schwaab et al.***

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I just happened to read this paper and I would like to pose my comments. It is a interesting paper that calculate RF at very fine scale. Here are my comments.

P10127 L5: RF affects global mean temperature. Technically, estimating RF can be done at very fine scale. But I am thinking RF at very fine scale, even it is positive, may have negligible impact on regional/global climate. However, the local impact of forest expansion is much larger than RF change. This is not for your paper, it is just my consideration on this question.

L6: Why forest cover increased in temperate mountains region? Is that because tree  
C3454

line moves up to higher altitude due to global warming?

L20: What drives forest expansion in Switzerland? Natural causes or forestry? Or due to reasons listed in P10128 L16-17?

For methodology part: How reliable are the climate data (global radiation) and carbon stock (soil carbon. . .) at such high spatial scale? It seems to me that spatial data of carbon stock are derived from assigning averaged values of each land class to an existing land cover map? Accurately mapping carbon stock is still a challenge.

Please check the label of each sub-figure and its captions of figure 3.

Figure 3: Does Albedo difference have seasonal variations due to phenology during snow free season?

P10131 L10: How do you estimate delta mc (carbon sequestrated)? Do you mean carbon stock here?

P10139 L28-29 You said "The carbon sequestration potential of forests decreased with altitude". But why CO<sub>2</sub> - forcing in figure 5 becomes more negative as altitude increases in the three region on the righthand?

P10140 L5: The word "carbon sequestration" sounds to me is a time dependent rate that forest remove carbon from atmosphere, e.g., NEP/NEE, kgC/year. Carbon stock refers to the current state about the existing mass of carbon in forest biomass.

I think some contents in discussion are more suitable to appear in Results (e.g., second paragraph of discussion). There are too many things in current discussion which is a bit too long and lacks of focus that I get lost. It can be improved by better organize key points and condensation in language.

RFs of albedo change and CO<sub>2</sub> have different climate sensitivities, if you want to use RF to consider their contribution to temperature change, you should keep in mind about this. (see Zhao, KG, 2014, Biophysical forcings of land-use changes from potential

forestry activities in North America; Hansen, J., et al. 2005. Efficacy of climate forcings. Journal of Geophysical Research—Atmospheres 110:D18104.)

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