

Interactive comment on “Incorporating changes in albedo in estimating the climate mitigation benefits of land use change projects” by D. N. Bird et al.

D. N. Bird et al.

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Thank-you for your comments.

I agree that the models are simple. The purpose of the research was to build a simple model (i.e. first order approximation) that used readily available information to incorporate changes in surface albedo in the estimation of the greenhouse gas emission reductions from afforestation / reforestation projects. Currently, estimates are made ignoring changes in albedo. Project developers do not have access to complicated models or measurement, but still need to assess the benefits of their projects.

Please see my responses to reviewer #2.

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The conversion from surface albedo to TOA albedo may be too simple, and I will endeavour to use a better model (probably STREAMER) in a revised document.

As well, I agree that the Yin model is outdated and albedo based on actual measurements from MODIS is required.

Clearly the paper is not conclusive and requires more work. Nevertheless, I believe that the paper in the current form does have some limited policy implications.

1. The decrease in climate mitigation benefits of afforestation / reforestation projects due to the change in surface albedo SHOULD be included and one needs to develop a simple method to take this into account.
2. Of specific concern is the equivalent emission that results from the change in albedo during the first 20 - 50 years of the project. This is not good if we are trying to reduce warming in the next 100 years.
3. The sensitivity analysis does show that the results are very sensitive to cloud parameters. It is only when clouds are not included ($A_b = 0$, or $k_c = 0$) that the albedo change leads to a warming for an average forest stand in Prince George.
4. Also the sensitivity analysis shows that it is only for the poorest growing conditions with an average cloud model does the afforestation / reforestation cause overall warming.

Interactive comment on Biogeosciences Discuss., 5, 1511, 2008.

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