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Interactive comment on “Implications of albedo changes following afforestation on the benefits of forests as carbon sinks” by M. U. F. Kirschbaum et al.

Anonymous Referee #2

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I find that the paper is very interesting, well written and adds to the continuing discussion on Albedo and Afforestation.

For the methodology used, it is complete and appropriate accept for maybe one point - the calculation of daily radiative forcing (equation 7).

When I submitted a similar article and it was reviewed by an atmospheric scientist (which I am not). I also proposed a simple equation to include the impacts of the atmosphere (just like equation 7). The reviewer found the approach too simple and our paper was rejected until a more comprehensive model to include the effects of the atmosphere was included. I was not able to respond in time to the reviewer's

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request and had to pull my paper. In the end, we did redo the work using the Fu-Liou Online Model (reference below). This model includes monthly variation in atmospheric absorption and we include monthly variation in lower and upper level clouds. This made some differences to our results (unfortunately we changed other things too so the differences in the results were not only caused by the atmospheric model).

As I mentioned am I not an atmospheric scientist, so I did what I was asked to do. Was one of the other two reviewers an atmospheric scientist? If not, BEFORE IT IS ACCEPTED, I recommend that an atmospheric scientist is asked to comment on the use of equation 7.

As a minor point, even though it is beyond the scope of the paper, I also disagree with the statement that Pinus radiata and pasture have similar evapotranspiration. My experience is that trees evapotranspire about 10% more water than pastures (unfortunately it is very difficult to find papers that study both pastures and forests). The energy for this extra evaporation almost balances the extra energy absorbed by the change in surface albedo. As the authors point, this energy is returned to the atmosphere during condensation.

Fu-Liou. 2005. Fu-Liou Online 200507 (Diurnal Simulation), <http://snowdog.larc.nasa.gov/cgi-bin/rose/flp200503/sun/flsun.cgi>

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