

Interactive comment on “Stand age and species composition effects on surface albedo in a mixedwood boreal forest” by Mohammad Abdul Halim et al.

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Halim and co-authors present an interesting analysis on the age and species effect on albedo.

In the introduction previous reports are cited to list possible drivers. Stand age is, however, not among the listed drivers. In the discussion the authors do a reasonable good job in focusing the discussion on the physical drivers (fraction of deciduous trees, charcoal, stand structure, ...). From this perspective it is surprising that the results section uses stand age as one of the independent variables to explain the changes in albedo (as reflected in the statistical models and the table). In my opinion, the authors

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should better explain that the analysis with age is simply to describe the temporal evolution but that the additional analysis are intended to explain the physical drivers of these age trends. If this indeed reflects the thinking of the authors, the paper should be edited towards this message, e.g. no models should be fitted against age and several sentences throughout the manuscript should be rephrased. Nevertheless, if the authors interpret their results as an indication that age itself is a physical driver of albedo, it should be discussed how stand age (rather than structure) affects albedo.

The importance of this study for climate modelling should be rewritten in line with the state of art of albedo modelling through canopy radiative transfer models and the simplified canopy radiative transfer schemes that are used in the land surface schemes of climate models. The authors seems not be aware of recent work (Naudts et al 2016, Luyssaert et al 2018) that does account for the effect of stand structure, tree species, and forest management on albedo and the climate (including not only albedo but also transpiration and roughness). The impact on modelling efforts of the albedo observations presented in this study is largely overstated. Canopy radiative transfer schemes combine scattering parameters and simulated canopy structures to simulate the albedo. The albedo values reported in this study can be used to evaluate existing models but are unlikely to be useful to improve existing models as claimed in the text. It may be best to delete all references to model developments and focus the discussion and conclusions on the underlying processes and the remaining unknowns.

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