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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Extensive reduction of surface UV radiation since 1750 in world's populated regions" *by* M. M. Kvalevåg et al.

Anonymous Referee #1

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This manuscript of Kvalevåg et al. investigates the changes in erythemally weighted UV radiation since pre-industrial times caused by anthropogenic changes in several factors (e.g. ozone, aerosol direct effect, aerosol indirect effect, land use, snow cover), by using global CTM. This is an interesting work, focusing also on the other effects than changes in stratospheric ozone. Since this is a modeling study, the relevance of the results is strongly dependent on the model input related assumptions, for instance how well can one describe the actual surface albedo changes since pre-industrial times. Now this kind of background is written in a very compact way, giving references for further details. However, the reader would be interested in somewhat more detailed description. Examples of these are discussed below. I think the manuscript can be published in ACP after a minor revision, if the comments below are considered.

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Method section should be somewhat extended. For instance, now albedo change (both by snow cover change and land use change) is described by two sentences with several references. It would of interest to get a better idea how the snow cover changes affected the albedo used in the modeling. For instance, was the snow depth also included, in addition to snow cover information (since it affects the regional albedo of snow-covered and vegetated surfaces).

The description of aerosol optical properties could be also clarified. Now in the Table 3, aerosol optical properties are given. Please explain how biomass burning case was distinguished from BC and OC in the model setup, since the two latter ones are also components of the biomass burning emissions. Also, you now write (line 7 of block 10462) "... refractive indexes as in ..." This is not the case, since this reference gives the values at visible, while the information in the Table 3 is more suitable for this study. Please check these.

Line 29 of block 10464, it seems that there is a mistake in the reference given here for the validation study that included Ispra and Thessaloniki. Maybe Arola et al. 2005 was meant instead of Fioletov et al. 2002, but please check and make sure.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 10457, 2009.