

Interactive comment on “Effect of spectrally varying albedo of vegetation surfaces on shortwave radiation fluxes and direct aerosol forcing” by L. Zhu et al.

Anonymous Referee #1

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Zhu et al. presented a new algorithm for the correction of MODIS surface albedo for vegetation surfaces in the manual script, Effect of spectrally varying albedo of vegetation surfaces on shortwave radiation fluxes and direct aerosol forcing. The MODIS enhanced vegetation albedo (MEVA) are tested again various vegetation types and it improves the flux and radiative forcing results at TOA. The algorithm is described clearly and the results are quite convincing. It is an interesting paper and the MEVA approach will be useful for other MODIS surface albedo users.

According to the simulations, the results are very good for surface with green leaves

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(vegetation). Do the authors plan to improve MEVA for the yellow leaf color and dry leaves? If some vegetation has seasonal variation, for example green leaves in summer and yellow leaves in winter, the MEVA might give more accurate aerosol radiative forcing in summer than in winter. This could be an artifact if MEVA is used to analyze the seasonal variation of aerosol radiative forcing over vegetation. Is it possible to find spectral surface albedo measurements over vegetation in different seasons? Then the improvement of the accuracy for shortwave flux and aerosol forcing at TOA for every season can be estimated.

Specific comments

P4047 lines 8-10

How many wavelength bands are used in the simulations with SBDART? Could the authors give a short introduction about the SBDART model?

P4047 Lines 15-16

Why $AOD = 0.32$, $SSA = 0.89$ are used for aerosols? Are they typical aerosol properties over vegetation? What is the aerosol type? Are there any references for the aerosol properties? What kind of scattering phase function is used?

P4050 Lines 22-25

Are the authors taken into account the wavelength dependence of the imaginary refractive index for the aerosol particles?

P4051 Line 10-13

Do the surface albedo values ("true" albedo and MODIS albedo) vary with SZA in the daily averaged flux calculations? If yes, please give some explanation.