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Atmospheric Measurement Techniques Discussions

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 #2

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In this manuscript, the authors proposed the MODIS enhanced vegetation albedo (MEVA) to improve the estimation of outgoing flux at the top of the atmosphere and aerosol forcing with the SBDART model. With the auxiliary channels, the MEVA characterizes the red edge and also the significant water absorption spectral which are not sensed by MODIS and improves the flux and aerosol forcing estimation at TOA over various vegetation types during growing season. It's an interesting paper and convinces the importance of surface albedo for the estimation of the flux and direct aerosol forcing.

General comments:

1. Does the SBDART model require high spectral resolution data? Maybe that's why the MEVA is better than the traditional methods. If so I would suggest comparing the MEVA estimated flux and aerosol forcing with simulated canopy spectral from the MODIS data and canopy spectral model (e.g. PROSPECT+SAIL).

2. The spatial resolution of MODIS pixel is 500 m, so most pixels are mixed by different land types. The signal is the combination of vegetation and soil if the vegetation is sparse and savanna is the mixture of sparse trees with grass. More discussion is needed for this issue. And in this manuscript, only leaf spectral are tested. The canopy albedo are also significant affected by the canopy structure. It's not accurate to use the leaf reflectance in lieu of canopy albedo.

3. Please describe the determination of 40% of the reflectance at 1.24um for 1.44um and 20% of the reflectance at 1.63um for 1.92um. Are they for healthy green leaves? But this may change a lot based on the water content of leaves.

4. In the conclusion part, please acknowledge the limitation of the application of MEVA.

Specific comments:

1. P4042, line 8, "correction" should be "gap filled" because the MODIS instruments miss that part, not acquire wrong spectral.

2. P4047, line 14, the surface is assumed to be Lambertian, I would suggest to discuss the surface BRDF effect over the accuracy of the results.

3. P4047, line 23, the authors pick the leaf spectral over the MODIS bands? Have you used real MODIS data? Are the MODIS spectral response function applied?

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 4041, 2012.