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Quantifying the single scattering albedo for the January 2017 Chile wildfires from simulations of the OMI absorbing aerosol index, by Jiyunting Sun J. Pepijn Veefkind, Peter van Velthoven¹, Pieter F. Levelt.

Reviewer comments.

The manuscript presents technique to retrieve single scattering albedo (SSA) and parameterized aerosol vertical profile from OMI absorbing aerosol index (AAI). The approach first models AAI using external information on aerosol optical and microphysical parameters and then matches simulated and observed AAI by varying SSA and aerosol vertical profile.

The manuscript presents sensitivity of AAI to aerosol complex index of refraction, particle size, and vertical distribution along with surface reflection, surface elevation and OMI viewing geometry. The conditions for optimal OMI observation geometry are outlined.

The technique is applied to Chile wildfire biomass burning event on January 2017 utilizing MODIS aerosol optical depth (AOD), AERONET complex index of refraction and particle size. The results are compared to AERONET retrieved SAA and the closest CALIOP profile of aerosol backscattering.

I believe that manuscript is clearly in scope of AMT and can be published after the following comments will be answered.

1. On page 6 authors write: “the fine and coarse mode are derived separately from AERONET”. This is not true. AERONET inversion algorithm primarily retrieves aerosol size distribution (ASD) in 22 discrete radius points. The separation in two modes is done after the inversion by finding inflection point in between two ASD peaks and then approximation each part of ASD by log-normal distribution. The parameters of these approximations are provided as ASD parameters for fine and coarse modes. The detailed description of this procedure can be found at https://aeronet.gsfc.nasa.gov/new_web/Documents/Inversion_products_V2.pdf. Therefore the averaging of SSA of two modes is not needed. The total SSA for the initially retrieved ASD (at 22 points) can be used instead. I am wondering how close averaged SSA to the total SSA is provided by AERONET. In addition, SSA for fine and coarse modes are not advised to use because retrieval is implemented under assumption that complex index of refraction is the same for all the sizes.
2. On page 1 authors mention that retrieved SSA (0.84) is **slightly** lower than AERONET value. I encourage authors to replace or remove word slightly because the absolute difference 0.06 is significant in terms of radiative forcing estimation.

3. Page 2. “The foremost advantage of the AAI is its independence from assumptions on aerosol types, which significantly reduce the retrieval uncertainty”. This statement is confusing because the simulation of AAI is still dependent on aerosol type.
4. Page 3. What wavelength interpolation is used for? Index of refraction or aerosol optical parameters?