Referee Report

This manuscript presents a technique to retrieve aerosol SSA from satellite data by simulating near UV AAI and constraining AOD. This is similar to- and draws from the same philosophical lines as the study of Satheesh et al., 2009. The authors have chosen to retrieve SSA at 550 nm by using MODIS-AOD at 550 nm from the simulated AAI. This makes the UV-Vis spectral dependency of aerosols under investigation a key parameter. Since the simulation of AAI is driven by aerosol microphysics, complex refractive index from the nearest AERONET site which determines this spectral dependency. This raises a flag on its representativeness on the simulation and in-turn the retrieved properties far away from the site (at least for the case presented here – smoke plume travels up to 3000 km away from source fires and AERONET site). I think the authors should include some discussion in the manuscript about this representativeness and reliability of technique for studying such long-range transport of aerosols.

Few general points (in no specific order) the author should take care of, before the paper is ready for a final publication.

1) The purpose of the study mentioned in L 73 – 74, should also be presented in the abstract before they say "In the first part of this study…….and later we present…." with the reference wavelength of the SSA retrieval.
2) Line 17 : This sentence sounds like it is the instrument's deficiency. It is not. Please make it clear. Something like "The CALIOP overpasses over the region failed to capture the complete evolution…."
3) Line 21 : replace 'observations' with 'satellite observations'
4) Line 69 – 71 : Poorly phrased. Please re-write it.
5) Line 108 :'linearly' should be 'linear'.
6) Line 207 – 209 : Poorly phrased. Please re-write it.
7) Line 234 – 235 : I am not sure what the authors are saying here. Firstly, the Santiago_Beauchef site has near-UV AERONET measurements. Secondly, the aerosol complex refractive index is provided in their Inversion product that is always only for 440, 675, 880 and 1020 nm. So, what does "site only covers the visible band" and "absence of observations" mean there ?
8) Line 286 : Please mention the wavelength of SSA retrieval.
9) Line 295 : What do mean by "may even fail to capture the elevated plume" ?
10) Line 305, 307 : It should be '... for 26 January ….'.
11) Line 306 : low RMSE ? Not really. For a quantity like AAI which is varying from 0 – 4, an RMSE of 0.5 or 0.6 is not low. Further the measures RMSE and correlation alone cannot confirm an agreement or disagreement between model and observations. Probably one could try using a T-test and say at what confidence level the agreement is statistically significant, I am not sure if your sample size allows for it ?
12) In Table 2, please also provide RMSE for the SSA to be consistent with the AAI report.
13) Please provide the sample size (number of pixels) for which statistics are derived in the Table 2 and also in figure 8 (i – l).
14) Line 313 : Is this 'accounting' or 'contributing' ?

15) Line 319 – 321 : I think, the authors should also report absolute difference in SSA with the AERONET before drawing parallels with the study mentioned here. It is confusing to compare percent difference in ni and absolute difference in SSA.
16) The spectral dependency retrieved in the study should also be compared with the in-situ measurements and other studies on biomass burning in the literature and include in the discussion (L 320 – 330).
17) Line 374 : "The retrieved SSA is out of typical uncertainty…." this statement does not make sense and should be removed or re-phrase appropriately. At least for the case presented here the authors did not come up with a quantitative estimate of the uncertainty in SSA and clearly it is difficult if not impossible because of the multiple error sources.