General comments: The authors developed a synergy algorithm that combines direct airborne measurements of above-cloud aerosol optical depth (ACAOD) and the top-of-atmosphere (TOA) spectral reflectance from NASA near-UV OMI and visible-NIR MODIS satellites to retrieve the single scattering albedo (SSA) of aerosols and the cloud optical depth (COD) for the scenarios in which light-absorbing aerosols are lofted above clouds. Applying the lidar (HSRL-2) and sunphotometer (4STAR) measured ACAOD during ORACLES field campaign in 2016-2018 over southeastern Atlantic Ocean and collocated OMI and MODIS observations into this algorithm, the SSA in both near-UV and visible-NIR for smoke above clouds were retrieved successfully with reasonable positive bias (0.01-0.02) by validating using airborne and in situ measurements. The differences of COD retrievals caused by smoke absorbing above clouds were also analyzed. Furthermore, the sensitivity analysis was done to quantify theoretical uncertainties in the retrieved SSA from errors in the measured ACAOD, aerosol layer height, and the ratio of the imaginary part of the refractive index (spectral dependence) of aerosols. I think this algorithm is new and first try to combine airborne and satellite data to retrieve SSA of aerosol above clouds, and could be extended to involve spaceborne lidar measurements to get global retrievals. It will be of interests to many readers of AMT. This manuscript is well organized and written, so I recommend it to be published after addressing the following specific comments.

Specific comments

1. Section 3.1: When the airborne measurements are introduced here, I suggest to add some descriptions about different flight modes of ER-2 and P3 since a few comparisons and different data processing methods are mentioned later. Actually, I don't fully understand the observation mode about how P3 aircraft profiled the atmosphere between the surface to 6 km. Did it only measure the atmosphere when flying vertically? What is the vertical resolution for the profiles?

2. Section 3.3.2: Should the "C1*Alt" in the first two equations here be the "C1*GPSAlt" and "C1*CldTopAlt", respectively?

3. Line 329-331: "The spectral dependence of the imaginary part of the refractive index in the visible-near-IR wavelength range (470-860 nm) is described by the AERONET dataset" is mentioned here, but it is unclear that how to describe this spectral dependence. Is any linear or exponential assumption used?

4. Line 342-344: It is mentioned here that "HSRL-2 was mounted on P3-Orion aircraft and measured the aerosol profiles below the aircraft level and above the cloud top". Since the aerosol vertical profile is assumed to follow a quasi-Gaussian distribution around the mean extinction-weighted aerosol layer height (ALH) from HSRL-2 measurements, if the peak height of this quasi-Gaussian distribution in reality is higher than the aircraft level where HSRL-2 cannot detect, ALH calculated from HSRL-2 measurements

will have larger difference with the peak height. Is this situation considered in the measurements?

5. Section 4.2: Some fixed microphysical parameters of cloud particles are mention here, including the effective radius, cloud layer height and cloud layer thickness. How will these parameters affect the aerosol-corrected COD retrieval? Given the effective radius comes from an old paper and the resources of cloud layer height and cloud layer thickness are not mentioned here, can they represent the climatology of clouds in the southeastern Atlantic Ocean? Maybe some references could be added.

6. Figure 6: Comparing Panel a and b, the SSA at 860 nm shows larger differences than that at 470 nm, even larger than other measurements in the rest of panels in this figure. Do you think what could be the possible reasons for this difference between HSRL-2 and 4STAR retrievals?

7. Section 7: The possible uncertainties in SSA retrievals from errors in aerosol properties are well analyzed in this section, but how will these properties affect aerosol-corrected COD? Similarly, how is the sensitivity of aerosol-corrected COD with respect to the cloud properties in the cloud model?