The paper presents and discussed the comparison of the scattering ratio products retrieved from ALADIN and CALIOP observations. The paper is interesting and falls within the skopes of the AMT. The manuscript is well structured and well written in the majority of it's extent. I would suggest the publication of this work after the consideration from the authors to revise the manuscript based on the following comments/suggestions, targeted to improve the clarity of their results.

General comment:

The authors should state clearly in the title that this study is dedicated to cloud products only.

The study should include a quantification to some extent, and discussion, on the percentage of the clouds not detected from the 2 lidars with the methodology used. Additionally a discussion is needed on the effect of these cloud-miss-detections on the results of the intercomparison per altitude (low, mid, high-level clouds).

Although the title clearly states that this is a comparison of the scattering ratio products retrieved from the 2 systems, in the discussion throughout the paper the authors comments are attributed to the 2 systems only. It should be more clear that different approaches for cloud detection products from the 2 missions could lead to different results. See also specific comment below.

Specific comments

Page 1, line 22: "the ALADIN product demonstrates lower sensitivity because of lower backscatter at 355 nm": This statement is not clear. The backscatter at 355 nm is not expected to be lower than at 532nm. Please explain and revise accordingly.

Page 2, line 43: "Despite an excellent daily coverage and daytime/nighttime observation capability (Menzel et al., 2016; Stubenrauch et al., 2017), the height uncertainty of the cloud products retrieved from the observations performed by these spaceborne instruments is limited by the width of their channels' contribution functions, which is on the order of hundreds of meters, and the vertical profile of the cloud cannot be retrieved with accuracy needed for climate feedback analysis." The sentence is confusing. Consider revising to make it easier to follow. Possible suggestion: "...is limited by the width of their channels' contribution functions (which is on the order of hundreds of meters), and their uncapability to retrieve the vertical profile of the cloud with accuracy needed for climate feedback analysis.

Page 2, line 47: "This drawback is eliminated by active sounders, the very nature of which is based on altitude-resolved detection of backscattered radiation, and the vertical profiles of the cloud parameters are available from the CALIOP (Cloud-Aerosol Lidar with Orthogonal Polarization)lidar (Winker et al., 2003)and CloudSat radar (Stephens et al., 2002) since 2006, CATS (Cloud-Aerosol Transport System) lidar on-board ISS provided measurements for over 33 months starting from the beginning of 2015(McGill et al., 2015).": Too big sentence, difficult to read. Consider revising.

Page 4, line 106: "In Fig.1(a-c), we show the observation geometry and sampling of ALADIN's L2A product as well as three variables retrieved from its observations..": consider revising as: "...as three simulated variables that can be retrieved from its observations..".

Page 4, line 110: "..the horizontal variability of the observed scene is nearly the same in latitudinal and longitudinal directions at 100 km distance": This is only valid for homogeneous scenes. Please revise accordingly.

Page 4, line 120: "The cloud variability along the satellite's track has been estimated from the gridded EAMv1 data using the parameterization of (Boutle et al., 2014). Figure1 also serves as an illustration to theoretically achievable cloud detection agreement discussed below.": Although the cloud variability is estimated, in the plot the scene is cloud free. As the paper mainly investigates clouds, it would be interesting to have a cloudy demonstration also in addition to Figure 1.

Page 4, line 123: "...scattering ratio (SR)..": Please write how the scattering ratio is calculated.

Page 4, line 124: "An important companion of such a column is a corresponding quality flag column,..... which can be then compared with that of CALIOP.": The description is vague, please write more clearly what filtering you used in the data.

Page 5, line 141: "Since the CALIOP is not a HSRL, the detailed information on AMB and APB is not available, and one has to compare the SR products.": One could also use the temperature and pressure profiles from NWP (provided with Aeolus & CALIPSO) to produce the particulate backscatter coefficient, and convert/compare these parameters. So this part should be revised to highlight the choice of this study and not state it as the only option.

Page 5, line 145-150: "The choice of the fitting parameter is not crucial for the purposes of the present work ... collocated data.": I strongly advise the authors to follow the comment of the first reviewer regarding the wavelength conversions. Alternatively, if they decide to keep the analysis as is, then please provide a detailed discussion on the uncertainties induced from this simplified conversion.

Page 6, line 167: "To avoid the risks associated with the solar contamination, we picked up only the night-time cases": As Aeolus is in dusk-dawn, still variability is expected in the PBL with the CALIPSO nighttime observations above land. Can you comment on that in the manuscript?

Page 6, line 172: "...we have performed a numerical experiment using the same calculated data as we used in Fig.1": Shouldn't they be stated as "simulations"?

Page 6, line 173 – 180: "This time... the passive observations": It is very hard to follow the approach. A scheme/flowchart would be useful.

Page 6, line 182: "Overall, we considered about 1E5 pairs of pseudo-collocated data and we present the results of cloud detection in Fig.3": Please include also the region and season(s) used to produce these pseudo-collocated data, which represent the outputs of Figure 3.

Page 6, line 184: "or each altitude bin, the cloud detection agreement is a ratio of a number of cases when both instruments have detected a cloud (SR>5) ….": Please elaborate this choice of cloud cut off (e.g. literature) and comment on the uncertainties on the cloud detection

induced from this choice for different altitudes. Could you include in results (Figure 3) and discuss, the percentage of the clouds missed to be detected, from the 2 sensors in your simulation, with the presented methodology?

Page 7, section 3.1. It should be stated clearly in the section that the discussion refers to the RS retrieved products used in this study from the 2 sensors. As for example, a study with the cloud statistics from the Atlid L2A and CALIPSO L2 backscatter coefficient product products may provide different results.

Page 8, line 224: "In Appendix A, we demonstrate the correlation between individual pairs of CALIOP and ALADIN SR profiles; the conclusion of this exercise is that it justifies using Eq.1, but the uncertainties of the analysis do not allow to refine the conversion coefficients". This statement is very strong. One could refine the conversion coefficients, independently of the uncertainties of the analysis. I support that the authors should formulate this statement to correctly reflect the choices and limitations.

Page 8, line 229: "This observation gives a hint that the instrumental part provides the backscatter information sufficient for some cloud detection up to 20km, but the detection algorithm suppresses noisy solutions." This sentence is not clear. Please improve the phrasing.

Page 8, line 246: "Below, we will also discuss the YES_YES statistics normalized to cloud amount, but at this point we also want to study the other cases, which cannot be normalized this way" Consider to improve the phrasing.

Page 9, line 283: "This exercise is not aimed at revealing any altitude offset in backscatter signal registration, because this part of experimental setup is robust in both instruments". Consider improving the phrasing.

Page 9, line 10: "For each local peak found, we have searched for a peak or for a maximal value of CALIOP's SR profile in the vicinity of ± 3 km from the peak height determined from ALADIN". Consider including the information that only the 82% of the clouds are used for this comparison (according to the statistics presented in line 296-297.

Page 9, line 304: "As for the clouds between ~3km and ~10km height, the height sensitivity effects skew the effective cloud height detected by ALADIN downwardsby 0.5–1.0km", It is not clear which are the high sensitivity effects between 3 to 10 km. Maybe the authors could summarize them in a sentence again here. Also, please comment to what extent could the actual 100-km-cloud-variability at these altitudes be responsible for the deviation in the altitudes seen by Aladin and Caliop in these altitudes. It is not clear if the authors point out on the Aeolus capability to detect the top of the cloud, on the SR methodology capability for the same, or on the effect of the natural variability between the 2 instruments on their products.

Figure 1: "...ALADIN's observation paths for centers of averaged profiles ...": How they are averaged? In Aladin L2A resolution?

Figure 1: "This inclination is schematically shown as an inclined line lying in lidar curtain plane whereas the real projection to the same plane should be a vertical line": This part is hard to understand. Same comment for the part inside the manuscript.

Figure 2: Can the authors comment on the absence of collocated points between 0-60° lon at Δ time < 6hrs?

Figure 7: No data is difficult to be distinguished from the -2km color, both have dark purple. Consider changing the no data color.

Figure 9: Consider adding the colorbar here also in the upper panel. Additionally, consider stating what the error bars account for.

Figure A1: The red points are not scaled in the same frequency ranges as the occurrence frequencies. Wouldn't that be better?

Technical corrections:

Page 4, line 101: "According to Flamant et al. (2017)."
Page 6, line 182: "Ansmann et al. (2007)"
Page 7, line 195: "...between the two products.."
Page 7, line 200: "..for the thw instruments"
Page 7, line 203: "Analyzing the Fig. 4"
Page 8, line 242: consider rephrasing to "from the sensitivity study.."
Page 8, line 237: consider rephrasing to "..behavior of the SR cloud detection product agreement.."
Figure 3: "...to the total number of simulations .."
Figure 7: "...+-3km vertical vicinity..."