The paper by Floutsi et al. presents measurements of three key intensive parameters derived from lidar measurements at several ground-based stations. The paper is important because it compiles measurements of different types of aerosols by ground-based lidar that can be used to provide a universal basis for classifying aerosols and thus improving the retrieval of other parameters such as extinction from lidar measurements. These are particularly useful for determining the aerosol type so that the extinction can be calculated from backscatter measurements that typically need to assume a lidar ratio based on the type of aerosol. The identification of the aerosol type is important for radiation since the radiative transfer depends on the extinction. Though not acknowledged in the paper, aerosol type is important for air quality since the impact on human health depends on the composition of the particles ingested. The paper is well written and easy to follow though I found several areas that could benefit from some clarification and in some cases errors and typos which I will try to address below.

The abstract and introduction are generally well written and comprehensive with the following minor typos
Line 11 - emitted smoke into the stratosphere showing ~~significant~~ significantly different optical properties

Line 13 - The paper contains the ~~currently~~ most up-to-date comprehensive…

Line 70 “automized” is not an English word. Please write “automated” instead and replace “automized” throughout the document

Line 102 – The HETEAC paper by Wandinger et al is now in AMTD and is beyond “in preparation”. Please update citation
Line 117 different locations t~~hroughout~~ over many years.

Line 157 Does the statement “The near-range telescope allows the detection of scattered light (at 355, 387, 532 and 607 nm) from an altitude of around 60–80 m above ground level (AGL)” refer to the overlap height between the laser beam and the receiver field of view of a lidar system, the so-called overlap distance? Please clarify.
Line 158 - Is the maximum height the same for all wavelengths?
Line 164 – Please define the particle linear depolarization using equations to avoid ambiguity
Line 174 – You use Tab. instead of Table. Please use Table throughout the paper.

Table 1. For each aerosol type please specify the values obtained by each measurement individually. This will help the reader to understand the variability between different measurements for each type of aerosol. For example, for ash provide the values obtained Groß et al. (2012), Sicard et al. (2012), Kanitz (2012) separately along with the number of measurements that were used to calculate the respective mean values and standard deviations.

Please present an overview of the types before presenting Table 1. For example how do you define Ash – is it only the silicon quartz mineral content of volcanic eruptions or does it also include sulfuric acid droplets? The composition determines the aerosol properties. While I understand it is difficult to know the composition precisely, you can offer a theory based on the intensive properties and the location of the eruption. This is also why it is important to itemize Table 1 provide the location and campaign for each of the measurements

Also discuss why the intensive properties are invariant with wavelength for smoke but not for stratospheric smoke. Is this true for all campaigns? Can you offer a theory why?
Why is the 532 nm lidar ratio for stratospheric smoke so high?

In Table 2 what are the ± values. As in Table 1, please provide values from individual campaigns for each type/wavelength . Also provide an equation definition AE

Figures 2 and 3 are interesting and do have quite a bit of utility but not in the current form. This is because it's difficult to extract quantitative information from the figures. If I was to use this figure to develop an aerosol typing algorithm that uses the intensive properties presented, I could not because the figure is quite busy. I suggest finding a way to present these results quantitatively. Also, the figures do not present which is the better measure to use for typing the different aerosol types. I would imagine the 532 nm-based relations (Fig 3) are better for the larger particles such as dust and they sold whereas the 355 nm-based relations (Fig 2) are better for fine particles such as smoke and pollution. However, this is just speculation on my part and can be easily verified or discounted by a quantitative measure of for example how wide are the clusters as denoted by the standard deviation oh how far apart are they median values mean values of the different types depicted.

Line 340 – Please present the frequency of the measurements instead writing "…were rare at the time …"

Line 344 – You mean data base (instead of data basis)?

Line 361 – Provide a theory why stratospheric smoke has high depolarization – speculation that can be verified or discounted by others is useful to move these studies forward.

Line 369 – You write "This is a significant finding, as aerosol particles in the stratosphere were usually attributed to volcanic origin (or e.g., generically classified as "stratospheric features" This is no longer true in the latest version of CALIPSO (see Tackett et al in AMTD - https://amt.copernicus.org/preprints/amt-2022-289/)
If you want to keep this sentence, at least qualify it by writing "depolarizing aerosol particles in the stratosphere"

Line 380 – What is the frequency of relative humidity less the 45% in the marine environment so that the reader can appreciate the probability of crystallized seasalt?

What is the optical depth of the Central European Background aerosol? Is the extinction so low that the effect of a higher lidar ratio is not significant because the impact on radiation is very low? If the optical depths of these background layers are consistently lower than 0.05 then we may not need to pay so much attention to them.

Please use the latest CALIPSO publications for your comparisons with CALIPSO. In particular Tackett et al. above can be a great resource.

Line 476 To get a better appreciation of the radiative effects of different aerosol types and subtypes it might help to look at variabilities in the single scattering albedo and asymmetry parameter in addition to the extinction properties.