We thank the anonymous reviewer for the helpful comments. These comments helped to substantially improve the manuscript. Below we give detailed answers to the individual reviewer comments in blue.

This paper characterizes the response of the PHIPS-HALO probe that was introduced in the Part 1 paper published last year. In addition to the laboratory characterization of the light scattering detection system, imaging system and electronics, some first results from two field campaigns in the Arctic and in the vicinity of Colorado during the ARISTO 2017 field campaign are presented. I find that the probe does offer a unique way of looking at data from having stereoscopic images and from having scattering phase functions of individual particles coincident with the scattering properties, and will likely allow some fundamental questions describing the relation to cloud microphysics and radiation to be answered in the near future. Thus, I think its publication in AMT is appropriate. However, I am recommending a few minor revisions that I think will improve the quality and readability of the paper.

1) The paper discusses the PHIPS-HALO in isolation from any other imaging probes and scattering probes that are currently available. It would be nice to compare the advantages and disadvantages of PHIPS-HALO with some of these other probes. Perhaps a table could be constructed where some parameters of different probes that image particles and scattering phase functions could be compared (e.g., sample area, number of crystals imaged in given time period, range of particle sizes, sizes of particles detected, data volume, etc.). This would be helpful for future users of the probe.

We agree that future users of the probe might find it helpful to have a comparison of basic instrument parameters with other existing probes. However, a detailed comparison of PHIPS-HALO with the the Polar Nephelometer (PN) and the Cloud Particle Imager (CPI) is already given in Part 1 (Tables 1 and 2 therein). Further characterizations of the instrument have now quantified the size of the sensing area A_{sa}, which was not compared in Part 1. Therefore, we added the following paragraph to the Subsection "Trigger detector" of Section 2:

"The sensing area of PHIPS-HALO and, therefore, its volume sampling rate, is significantly smaller compared to other imaging probes (e. g. the Cloud Imaging Probe CIP (DMT, Boulder): A_{sa}=1.6 cm^2 or the Cloud Particle Imager CPI (SPEC Inc., Boulder): A_{sa}=0.04 cm^2), but is comparable to the sensing area of conventional single particle light scattering probes (e. g. the Cloud and Aerosol Spectrometer CAS (DMT, Boulder): A_{sa}=0.0025 cm^2 or the Fast Cloud Droplet Probe FCDP (SPEC Inc., Boulder): A_{sa}=0.0025cm^2). The reason for this small sensing area used in PHIPS-HALO is that angular light scattering functions are measured on a particle-by-particle basis for typical cloud situations up to 1000 particles per cm^{-3} (see the discussion of the coincidence characteristics below). The Polar Nephelometer (PN) instrument from Laboratoire de Météorologie Physique (LaMP), Université Blaise Pascal, Clermont-Ferrand, France (Gayet et al., 1997) uses a significantly larger sensing area of A_{sa}=0.5cm^2. In contrast to PHIPS-HALO, the PN is constructed to measure the angular light scattering function of particle ensembles with the aim that scattering features related to single ice crystals and their specific orientations are averaged out (Gayet et al., 1997). A comparison of further parameters of PHIPS- HALO with the PN and the CPI are given in Tables 1 and 2 of Part 1, respectively."

2) I think that the authors should exhibit more caution in some conclusions that they make out of a very limited set of data. I think the current paper is very powerful at showing the types of questions the probes can answer, but less powerful at actually answering these questions given the very limited amount of data that are presented. Some of the conclusions in Sections 3.2 and 3.3.1 are especially problematic. For example, the authors claim that the images in Fig. 13 show that a highly structured crystal (b) gives flat and featureless phase functions, whereas less structured crystals (a) exhibit peaks at two specific angles. I found this less than convincing: when I compare the (a) and (b) images I only see that the image in (b) is darker, as later commented on by the author. If the b particle is indeed more structured, the authors need to show the specific places on the crystals (perhaps circled) where this structure is seen. I am also not convinced that the particles in (a) and (b) are similarly oriented. They look to me that they could be oriented with different angles. Can the authors do some simple scattering simulations to show how different orientations of the same particle affect the scattering phase function? If there is a difference in 10 degrees, for example, is this sufficient to show different scattering functions? Over what angles would the scattering patterns be similar, and how close do the scattering functions need to be in order to be classified as similar?

We agree with the reviewer that our conclusions are not always fully justified by these limited examples given in Section 3 "First results". This might be related to the excitement the authors experience when presenting these unique data from PHIPS-HALO.

In the specific case of the example given in Figure 13, we do not fully agree with the reviewer that a darker appearance of a non-absorbing object in a bright field micrograph doesn't tell anything about its structural complexity and, consequently, its spatial light scattering behavior, but acknowledge that further detailed analyses including also light scattering simulations are necessary. We, therefore, addressed the reviewer concerns by rephrasing the paragraph in Sec. 3.2 describing the single particle light scattering results shown in Figure 13:

"Figure 13 gives single particle angular scattering functions measured for two plate-like ice particles during the ARISTO2017 project. These two plates were selected because (i) they have a similar size and (ii) they are similarly oriented, though the orientation of their c-axes differ by at least 10° in the horizontal plane. An inspection of the stereo images reveals that crystal (b) appears darker than crystal (a). A darker appearance of a non-absorbing object in bright field microscopy is the consequence of more object-air interface interactions of the light rays that incide and penetrate the object. This means that, in case of the ice crystals shown in Fig. 13, crystal (b) has likely more surface distortions in terms of steps, roughness, indentations, and air inclusions compared to crystal (a), which appears more transparent. As a consequence of this structural difference, the angular light scattering properties of the two crystals differ in terms of a higher fraction of diffuse light scattering (reflection) in case of the more structured crystal (b) compared to the less structured crystal (a). The corresponding measured angular light scattering functions of the the two crystals, shown on the right side of Fig. 13, support this conclusion. Crystal (b) induces scattering intensities measured at the side- and backward directions that exceed those of the less structured crystal (a) by up to one order of magnitude. It is acknowledged, however, that detailed light scattering simulations, like in the work of Shcherbakov et al. (2006), are necessary to unambiguously prove that the observed differences can be attributed to differences in the ice crystal complexity."

Similarly, I am concerned with the analysis in Section 3.3.1 where the authors make the overarching claim that "particle ensembles composed of ice crystals that show a significant complexity on a single particle basis possess similar flat and featureless average angular scattering function even if their basic crystal habit differ (columnar vs. plate-like in this case)." I think a much more thorough analysis needs to be done, including using scattering models to see how different orientations of crystals and different constructions of bullet rosettes with varying numbers of rosettes and orientations, affect the scattering properties before making such a conclusion. The authors themselves seem to explicitly acknowledge this when they stated that the "above examples have demonstrated that this question can be addressed by measurements with PHIPS-HALO, [but] further detailed analyses with larger data sets are necessary to come to statistically significant conclusions." I would recommend toning down the earlier statements, and supplying some scattering simulations, to better justify the discussions in the earlier part of the paper.

We agree with the reviewer that the conclusion made from the habit-specific averaged scattering functions presented in Sec. 3.3.1 are too far-reaching. We therefore rephrased the appropriate paragraph:

“Interestingly, by comparing the habit-specific averaged scattering functions of Figs. 14 and 15 it becomes obvious that these functions do not significantly differ but show a featureless and rather flat angular dependence. Whether this is a general feature of complex atmospheric ice particle ensembles or a coincidence of the two selected cases, requires a more thorough analysis with larger single particle data sets and including state of the art ice particle optical models that is certainly beyond the scope of this technical paper. However, the presented habit-specific analysis of single particle light scattering data demonstrates the potential of PHIPS-HALO to answer the question which microphysical property of ice clouds dominate their angular light scattering behavior – the crystal habit or the crystal complexity in terms of distortions, inclusions, and surface roughness. This will be the subject of future studies after PHIPS-HALO has been participated in further cloud related aircraft projects.“

Minor Comments:

Page 3, line 1: How does the sample area (and other parameters) compare with other probes? See major comment 1.

Changed accordingly. See answer to major comment 1.

Page 8, line 21 bits not bit

Corrected.

Page 8, line 26: lose not loosing

Corrected.

Page 9, line 19, was not were

Corrected.

Page 9 line26: Remove was

Corrected.

Page 10, line 3: I don't think ARISTO was designed to test instrumentation from SOCRATES, even though many of the experiments used in ARISTO will ultimately be used in SOCRATES

Agreed and rephrased.

Page 10, lines 15-16: I don't think it is true that there are always portions of the particle in other imaging probes that are out of focus. While I think it is true that some portions of the particles imaged that are out of focus, but there are individual particles that are entirely in focus. I'm not sure if this is a misinterpretation of the English that is written, but it should be noted that entire particles are in focus in other probes (though some particles are entirely out of focus).

Agreed and rephrased.

Page 13, line 32: missions not mission

Corrected.