

Dear Editor,

Please extend our deepest acknowledgements to Anonymous Reviewer #1 for his/her comments on our work.

Please find below in italic the comments received by Anonymous Referee #1 after submission to ANGEOD, followed by our replies in normal style.

Anonymous Referee #1

The contribution by Erika Brattich and colleagues reports the measurement and modelling of charged aerosols in the stratosphere. The manuscript is very well written, logically constructed, easy to follow and informative. The manuscript starts with a substantial review of the relevant literature, followed by a thorough theory section that explains the basis for the simulations. Compared to these first two sections, the consecutive section on the experimental results is rather terse and provides little guidance to the reader as to how the individual findings reported in the list of Figures contribute to the key points of the paper. As a result, it would be helpful to expand this section to make the narrative more clear. It is also somewhat surprising that Fig. 5 is not listed in this section, perhaps because it is not considered to be a result of the conducted work. The final sections with the discussion and conclusions emphasise to a large degree the agreement of the findings with previous work. While it is undoubtedly important to put the findings of this study into context, it makes it harder for the reader to appreciate the novelty of the presented work which becomes less clear. It therefore appears to be beneficial for these two sections to distinguish more clearly between known facts and novel findings. Besides this apparent imbalance between the first and second part of the manuscript, I think it is a valuable contribution to the scientific literature as the current knowledge on charged aerosols in the stratosphere and their spatiotemporal variabilities is somewhat limited at present.

We thank the reviewer for his/her constructive comments. We have included Fig.5 in the narrative of the experimental results section. In addition, the final sections (Sections 4 Results, 5 Discussion, and 6 Conclusions) were revised in accordance to the guidelines provided by the reviewer

Some minor suggestions on how to improve the manuscript are given below.

(1) Fig 2: The concentrations of negative ions appear to be large compared to previous findings. Is there any explanation for this? It is also not clearly explained how the total concentration of aerosols can be smaller than the concentration of negative ions. Is the reader supposed to infer from this that the aerosols <200 nm mainly contribute to the negative ions?

The detection of high concentrations of negative ions is probably due to the fact we added a separate suitable instrument for measuring ions in this flight. Because of the LOAC lower limit of detection of aerosols at 200 nm, we can expect to have ions concentrations greater than the aerosol detected total concentrations due to the presence of aerosols with aerodynamic diameter less than 200 nm. Since the number of ions is greater than the detected aerosol, this indicates that aerosol smaller than 200 nm are the main contributor to negative ions. This comment was added in the revised version of the manuscript.

(2)Fig 3: 19 channels are listed in the legend, but only 8 height dependent traces can be distinguished. It is practically impossible to infer any useful information for the PBL.

The text in the revised version of the manuscript was changed to better describe the vertical profiles of the different particles' sizes presented in the Figure. Information on the fact that the information on the PBL, partially commented but out of the scope of the paper, was also added. The combination of the large size-classes in a few super-size classes can be misleading and potentially losing information on the real size of the biggest particles.

(3)Fig 4: The x-axis labels are rather sparse and could be more populated.

The x-axis is in logarithmic scale; however, ticks were added to have a more populated x-axis.

(4)Fig 5: Again, only 9 curves are shown for 19 channels listed in the legend, as in Fig. 3. Would it not be better to combine some of these channels for the benefit of clarity?

As previously replied, the combination of the large size-classes in a few super-size classes can be misleading and potentially losing information on the real size of the biggest particles.

(5)The arrangement in the table appears somewhat unfortunate to me. The first two rows seem to be unrelated to the remainder of the table and the table deserves a heading to state the unit (nm) for the first column and a symbol with unit for the second column.

The arrangement of the table is rather customary for a correlation table: the table presents the correlation coefficients between the variables presented in each row (here, ions and particles' number detected in each size range) and those presented in the columns (here, positive and negative ions). The units were added to the table.

(6)The acknowledgments have distinct font variations disturbing this reader.

The font variations in the acknowledgements were removed in the revised version of the paper.