

Reply to Review of **Large synthesis of in situ field measurements of the size distribution of mineral dust aerosols across their lifecycle**

by Paola Formenti and Claudia Di Biagio

We would like to thank Referee # 2 for his/her thoughtful review of our manuscript. Our answers are in indicated in blue

Formenti and Di Biagio present a reference data set of mineral dust size distributions, compiled from a large set of harmonized datasets from a variety of field campaigns. The original data were corrected according to the applied set of instruments and mapped to a common log-scale size grid for easy use in atmospheric modelling. The procedure of correction and mapping is precisely described and statistical parameters like mean, median, standard deviation, and percentiles, are presented for three classes of mineral dust (source, mid-range transport, long-range transport) are provided. The presented dataset is of invaluable benefit since it provides for the first time a harmonized data set of mineral dust size distributions prepared for direct use in atmospheric modelling.

The manuscript is clearly structured and very well written. It is recommended for publication after a few minor revisions have been taken into account.

There is one general question to be asked before moving on to the minor comments: Is there a reason why the authors do not provide parameterized size distributions for the three dust categories? Of course, these parameterizations can be implemented by the individual researchers using the data. But the provision of parameterized size distributions may help making results from model studies on mineral dust more comparable.

This is indeed a very good question, and an issue we discussed many times prior submission. We thank Referee #2 to help us making the step, which we had refrained from because of the inherent degree of subjectivity. We have now added Table 2 with parameters of the four modal lognormal fits and a short accompanying discussion (lines 345-354).

Minor Comments

1. In the reference list, many journal names are not provided, the format of the reference list needs to be checked. Furthermore, check the use of names like Schütz or Müller, often they are given as Schutz and Muller.

We apologize for this inconvenience. Indeed, almost all journal names are missing. We really do not understand what happened. This should now be correct.

2. The expression “providing with” is often used, but to my opinion not always in the correct manner. This should be checked.

We have asked to native English speakers whom have confirmed our use of the expression. With the permission of the reviewer, we would like to keep it in our paper.

3. The abstract may be shortened without losing its information content.

We aimed to write the abstract in the most comprehensive way possible so that a reader would know what to expect from the paper. We propose here a shortened version to comply with the suggestion of the Referee.

4. Line 36: Mineral dust particles do not emit solar radiation. The sentence should be rephrased.

Referee is right, we have rephrased as “Because of their native mineralogical composition and size distribution, they interact with solar and infrared radiation,”

Typos

All the typos have been corrected, we thank the Referee for the careful reading

1. Line 48: “orders of magnitude”
2. Line 51: “... and attributed THIS to clays ...”
3. Line 110: “consist of “
4. Line 111: “one data point” should be rephrased as “one data set”.
5. Line 186: “i.e., only one data set ...”
6. Line 247: Suggested title “Limitations of the chosen approach”
7. Line 334: The expression “The intensity of the particle volume ...” should be rephrased, e.g., as “the magnitude of the particle volume ...”.