Dear authors,

thank you very much for your revision work that substantially improved the paper, as also acknowledged by the two Referees. There are only two points that according to Referee #2 have to be mentioned for the sake of completeness. I kindly ask you to take these points into account in order to finish with the revision and proceed with the publication of the paper.

Best regards

We would like to thank the editor and the two reviewers for their very positive comments and for carefully reading our manuscript and formulating suggestions for improvement. We have followed the additional advice provided by Referee #2, and we believe that the paper is now mature for publication.

Anonymous Referee #1

For final publication, the manuscript should be **accepted as is**.

We are persuaded now to have come with a very good article, thanks amongst others to the reviewer's advice in the first round of reviews. Thanks for appreciating the way in which we have dealt with the advice provided!

Anonymous Referee #2

The paper deserves publication to ACP in its current form.

There are two points though that have to be mentioned for the sake of completeness:

1. Dust transport models fine-tune to AOD observations as it is well-mentioned in the text. Thus, the conversion of concentrations to extinction values are critical and have to be improved (also mentioned). What is not mentioned is the role of particle shape in these conversions, something that can be acknowledged as a factor that should be taken into account in future (e.g. for conversions but also for improvements on drag coefficient calculations that would affect deposition and transport dynamics in general).

2. It should be also mentioned that dust microphysics and consequent radiative properties such as SSA and assymetry parameter alter heating rates and atmospheric thermodynamics, affecting also transport. RTMs within dust models should follow advances and integrate new findings on dust microphysics. For example, large particles are removed more efficiently, affecting size distribution during transport along with SSA and assymetry parameter of the samples, something that is not taken into account in RTMs.

We thank very much the reviewer for reminding these two important points. We have now added a paragraph at lines 638-646 that covers both of them.