

## Response to Reviewer #1

Reviewer's comments are in bold. Authors' responses are in blue.

This is a reasonable paper suitable for ACP. The authors have addressed most of the comments but improvements and corrections are needed in a couple of places (see below).

Thank you! We have addressed the single points below.

**1. Reviewer #2, Specific comments #1.** The reviewer recommended the citation of NAS (1992) and Budyko (1969). However, the authors cited a later paper by Budyko (1978) without explanation. Based on the titles, I think that NAS (1992) and Budyko (1969) are more suitable references here.

Thank you for pointing this out. We have substituted the Budyko (1978) reference with the correct Budyko (1969) one in the manuscript.

**2. Reviewer #2, Specific comments #3 – Fig 1 caption.** The revised caption is still not clear enough and there exist errors. The authors should carefully proofread the writings.  
(1) Caption mentions panels a), b), c), and d) but in the plots, there are multiple panels with "a" although these "a" are distinguished by SO<sub>4</sub>, D, SS. Should try to be consistent throughout the plot, caption, and text.  
(2) 4th line from bottom: On the right, panels d)?  
(3) 3rd line from bottom: "c) and d)" should be "c"?)

We thank the reviewer for their feedback. In the text, we have been more consistent in naming the single panels as in the figure. In the figure, we included two separation lines between the three species for clarity. In the caption we fixed the two mistakes found by the reviewer and carefully checked for consistency throughout.

**Other comments:**

**Line 373:** "negative in the longwave" should be "positive in the longwave"?

Corrected, thank you.

## Response to Reviewer #2

Reviewer's comments are in bold. Authors' responses are in blue.

The authors have addressed my comments sufficiently. Two minor changes:

**1. in the abstract (Line 3), change "and internal mixing between different aerosol species is often assumed." to "and internal mixing between different aerosol species within an aerosol mode is often assumed."**

Done!

**2. in the abstract (Line 6), there are two "some" in this sentence. You can remove the second one.**

Done! And thank you for help us improving our manuscript.