

Dear Professor Harald Saathoff,

We appreciate your careful consideration of our manuscript. We have carefully responded to all of your **point-by-point** comments and have revised the manuscript accordingly. These revisions are described in detail below.

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General comments

I think you have addressed the reviewer comments well and improved your manuscript significantly. Therefore, I have only a few final comments which I would like you to take into account.

10 **Response:** Thank you so much for your positive comments.

Specific comments:

Line 136: "...of Fe and Mn were..." -> "...**of iron and manganese were...**"

Response: Thank you. It has been corrected in **line 136** in the revised manuscript.

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Lines 188-189: "Around 50 % of NH_4NO_3 remained in the mixture due to evaporation"
-> "Around 50% of **the** NH_4NO_3 remained in the **mixture even after heating and potential evaporation**"

Response: Thank you. It has been corrected in **lines 188-189** in the revised manuscript.

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Lines 299-300: "On the other hand, secondary transform of SO_2 to sulfate should also have influence on the SOR" -> "On the other hand, secondary **transformation** of SO_2 to sulfate should also have **an** influence on the SOR"

Response: Thank you. It has been corrected in **lines 299-300** in the revised manuscript.

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Line 400: "...4.2 calculated..." -> "...**4.2 as calculated...**"

Response: Thank you. It has been corrected in **line 400** in the revised manuscript.

Lines 436-437: "It should be noted the mass transfer of SO_2 was not thought as the

30 RDS...” -> “It should be noted **that** the mass transfer of SO₂ was not **assumed to be** the RDS...”

Response: Thank you. It has been corrected in [lines 436-437](#) in the revised manuscript.

Line 441: “...might be greatly overestimated...” -> “...**might have been overestimated...**”

35 **Response:** Thank you. It has been corrected in [lines 441-442](#) in the revised manuscript.

Lines 510-511: “...salts overall underestimated around 13 % of that calculated...” -> “...**salts is underestimated by around 13% compared to that calculated...**”

Response: Thank you. It has been corrected in [lines 510-511](#) in the revised manuscript.

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Line 583: “...while a small value was...” -> “...while a **smaller** value was...”

Response: Thank you. It has been corrected in [line 583](#) in the revised manuscript.

Line 642: “Aerosol acidity is one of important factors...” -> “Aerosol acidity is one of
45 **the** important factors....”

Response: Thank you. It has been corrected in [line 643](#) in the revised manuscript.

Lines 644-646: “...aerosol liquid phase decreases as a function of pH because the oxidation of S(IV) by transition metals is the dominant path and is negatively dependent
50 on aerosol pH” -> “.....aerosol **liquid phase decreases with decreasing pH because** the oxidation of S(IV) by transition metals is the dominant path **and is decreasing with aerosol pH**”

Response: Thank you. It has been corrected in [lines 645-647](#) in the revised manuscript.