

**Editor comments:** You have addressed the referee comments satisfactorily in your response. However, some of these responses should be also added to the manuscript. In addition, I have some minor/technical comments that should be considered before final acceptance.

#### Main comments

1) Referee #3 had asked about reasons for the low NO<sub>3</sub> concentration predicted by M8. In the response, you wrote that NH<sub>3</sub> production is very low. However, in the manuscript, you only mention that the N<sub>2</sub>O<sub>5</sub> hydrolysis is missing (l. 193). Please add here and/or at a different appropriate place also the lower NH<sub>3</sub> 'production'. Please also clarify what you mean by this. I assume that you mean NH<sub>3</sub> emission ('production' would imply a chemical formation) that leads to ammonia, which in turn, then leads to enhanced NH<sub>4</sub>NO<sub>3</sub> levels (?)

2) Finally in the last response to the referee report, you added an explanation why the M7 and M8 did not include sea-salt emission ('turned off by mistake'). Since both referees were puzzled why the models did not include these emissions, this information should be added (e.g. in line 305). It is completely acceptable to admit in a paper that mistakes were made in the model set-up.

3) In the last referee report, Reviewer #2 commented on the discussion in lines 397ff (in the most recent manuscript version). In the response to the referee, you gave some very brief explanation why you prefer comparing the wash-out ratio rather than comparing C(depo). Please expand on this explanation and add it to the manuscript.

4) In the last referee report, Reviewer #2 suggested that also uncertainties on OH and/or ozone concentration may lead to uncertainties in the predicted gas-aerosol conversion of S and N. Only in the conclusion section, you vaguely mention this possibility (l. 430 ff). Are there any previous model studies that discuss such uncertainties? In any case, possible uncertainties in the oxidant levels should already be discussed earlier, in Section 3.2.

#### Minor/technical comments

Add units to all parameters used in the equations.

l. 29/30 and 41/42: This text is repetitive. Please reword or remove accordingly.

l. 132: 'Particles participate in the cloud condensation nuclei' should be reworded.

l. 171: replace 'satisfied' by 'satisfying'

l. 174: replace 'intensively located' by 'concentrated'

l. 193: replace 'sever as an import formation process' by 'serve as an important formation process'

l. 212: replace 'process' by 'processes'

l. 212 and 214: replace 'group' by 'groups'

l. 213: replace 'but' by 'a'

l. 283: '...the differences between the two are smaller' – please clarify: smaller than what?

l. 301: replace 'comes' by 'come'

l. 366: replace 'succeed' by 'succeeds'