

Response to Referee's Comments

We would like to thank the referee for taking the time to read the paper again and provide helpful suggestions to improve the paper. We have revised the paper according to the referee's comments carefully, where the revised parts are indicated by blue font. The detailed revisions are described as follows:

Some last comments/ questions :

1. In general there are still some grammatical and language mistakes, however, all in all it has improved. Perhaps the language editorial service offered by the journal might solve this as you mentioned in your response.

Response: We have improved some grammatical and language mistakes. If it is not still meet the quality required by the journal, we can get help from language editorial service offered by the journal.

2. Starting on page 6 last line until page 7 line 2, for me this sentence is really hard to understand. Perhaps you could rephrase this one.

Response: We have rephrased it, line 30, Page 6 and line 1-4, Page 7.

3. Page 7, line 2-3: I would write: "Fit examples for NO₂ and SO₂ are illustrated in Fig. 3."

Response: We have corrected it, line 4, Page 7.

4. In the first version of you manuscript you used the Greenblatt et al., 1990 O₄ cross-section. You argued that the error is around 1 % and therefore negligible, however, you are now using the Thalman et al. cross-section. Is this correct?

Response: Maybe we have not express clearly in the first response. We want to tell that we have tested the effects of the O₄ cross sections from Greenblatt et al., 1990 and the Thalman et al. cross-section on the NO₂ results. It is found that the difference of NO₂ value based on usage of the two different O₄ cross sections is around 1% for three different scenarios e.g. high NO₂ VCD, middle NO₂ VCD and low NO₂ VCD. Compared with other error source, we ignore the difference in this study. However, in order to follow the latest fit settings, we now change the newer one, the Thalman O₄ cross-section.

5. I think in Table 2 something went wrong. I guess not all the cross-sections are from Bogumil et al., 2003. Please correct this in the final version.

Response: I have checked the fit settings for SO₂ analysis carefully again. Thank you for reading carefully and it really has something wrong in NO₂ and HCHO cross sections in Table 2. We have now corrected them in Table 2.

6. One further point: on page 7, line 17 you cite Hönninger et al., 2004, here (and also in the bibliography) you missed the two dots on the “ö”, this should be corrected in the final version.

Response: Because the “ö” is a German character. We could not type it from my computer. But now we copy this character from above sentence into the manuscript, line 18, Page 7 and line 12, Page 18.

7. Page 8, lines 13 – 16: here you could give a short cross reference to section 2.1

Response: We have corrected it, line 17, Page 8.

Thanks for your opinions and very appreciated your time again.

If you have any questions about the manuscripts, please let me know.