

The manuscript investigated the summertime distributions of air pollutants obtained by MAX-DOAS and lidar measurements, especially for ozone and its precursors. In this study, sensitivity study of different a priori shapes to the MAX-DOAS aerosol profile retrieval were carried out, which shows significant influences on the aerosol and trace gases profile retrieval. Moreover, the MAX-DOAS measured tropospheric NO₂ VCDs show a good agreement with OMI satellite observations, indicating that the accuracy of satellite products over polluted area can be improved by introducing local atmospheric parameters in the AMF simulation. It was suitable and meaningful for the ACP community. However, there still some concerns need to be addressed before it can be accepted for publication on ACP journal.

1. Section 2.1, Line 109: what's kind of influence from the stratosphere? Please explain clearly.
2. Section 2.1 mentioned the lowest elevation angle is 3 degree. Please clarify why these angles were chosen, as lower elevation angles are more sensitive to the near ground aerosol and trace gases.
3. In section 2.1 the author mentioned that the measurement sequence takes 5-15 minutes, however, section 2.1.3 wrote that a fix temporal resolution of 15 minutes is used. Did the author average the DSCDs if more than one sequence were measured within 15 minutes? Please describe the procedure in more detail.
4. Section 2.3, please provide the information of the measurement instruments use for PM_{2.5}, PM₁₀, NO₂ and O₃ measurements on the balloon.
5. Section 3.1, the sensitivity study indicates that the Gaussian a priori profile is the most realistic option for aerosol retrieval during this campaign. Could the authors explain more about the possible reasons for this vertical aerosol distribution?
Line 190: Is Table 2 the summary of the aerosol retrieval performance or just a case?
6. Section 3.3: There a peak of ozone vertical fluxes around May 16 noontime can be observed in Fig. 7. However, the authors have concluded the ozone concentration is less impacted by the vertical and horizontal transportation (line 279-280). Are they contradictory?

Technique corrections:

The quality of writing and style of English should be improved in general. A careful check over the entire manuscript about the typing errors, use of the notations, citations, etc, is also required. A few examples of the technical errors are corrected as the followings:

There are lack of much space in the manuscript, e.g. Line 32: add a space between "NO₂" and "Vertical". Please read the whole manuscript carefully and make the corrections.

Line 75: Lidar→lidar

Line 105: calculated depending on → adjusted according to

Line 107: by a mechanical shutter→using a ...

Line 108: delete "of"

Line 240: The discrepancy→These discrepancies

Line 245: The NASA→the NASA

Line 283: 8:00→08:00

Fig. 4: please indicate the date using the unify format in the whole manuscript, e.g.
mm/dd