

Interactive comment on “The quantification of NO_x and SO₂ point source emission flux errors of mobile DOAS on the basis of the Gaussian dispersion model: A simulation study” by Yeyuan Huang et al.

Anonymous Referee #1

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In this work, simulations based on a Gaussian dispersion model are used to quantify the NO_x and SO₂ point source emission flux errors of mobile DOAS measurements. In the first part of the manuscript, the dispersion model and the modifications implemented in order to make it appropriate for SO₂ and NO_x VCDs are described. In the second part, simulation results obtained by varying the model parameters are analysed and recommendations are given on the conditions where mobile DOAS measurements are appropriate to quantify point source emissions.

This manuscript is overall well written, clearly structured, and presents interesting re-

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sults which fit well with the scope of AMT. I recommend its publication after addressing the following minor comments:

Page 8, lines 185-187: the dispersion model accuracy significantly decreases in the case of too low and too high wind speeds. The upper wind speed has been fixed to 8m/s. How do the results depend on this value ? Did you make sensitivity tests before fixing this value to 8m/s ?

Page 9, lines 202-203: From where those reaction rate values come from ? Literature source(s) should be added here.

Page 12, lines 273-275: For low plume heights, the SCD could be assumed to be equal to the VCD. Did you determine from which plume height this assumption is not valid anymore ?

Page 14, lines 308-309: Typical errors on NO₂ and SO₂ VCDs coming from previous studies are mentioned here and are used as is in the present work. These studies should be cited. Are the conditions assumed in those studies similar to the ones assumed by the authors, i.e. that $SCD \sim VCD$ and therefore the AMF error can be neglected ?

Page 15, Table 4: the detection limits for NO₂ and SO₂ SCDs are assumed to be two times the corresponding retrieval errors. This should be justified.

Pages 27-28, Section 4.6: If we want to use several scans to reduce the flux error, the elapsed time between two scans at the same distance from the source is then also an important parameter. I think this point should be at least briefly discussed here.

Technical corrections:

The abstract is much too long. Only the most relevant findings should be reported here.

Pages 3-4, lines 79-82: first letter of the first name should be removed in all the references that appear on these lines.

Figure 2: Point 4 in the list of dispersion simulation parameters: 'Disersion' -> 'Dispersion'

Page 7, line 164: Is there a reference for Pasquill and Gifford ? If, yes it should be included in the list of references.

Page 8, line 186: maybe 'high' is preferable than 'strong' ?

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