

Interactive comment on “Direct observation of two dimensional trace gas distribution with an airborne Imaging DOAS instrument” by K.-P. Heue et al.

Anonymous Referee #1

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Heue et al. introduce a novel technique airborne Imaging DOAS for investigation of two dimensional trace gases distribution on a small scale. The measurements of NO₂ distributions by aircraft over the industrialized area in South Africa are presented. The NO₂ columns were used to estimate NO₂ flux and compared with satellite data. The manuscript is well written. The topics addressed here are well within the scope of ACP. However, some specific comments are as following:

Page 11885, line8-9: "A normal in-flight spectrum in a remote and clean area is usually taken as the reference here". To have a good reference spectrum is very important for retrieving the weak absorptions by DOAS fitting. Is the reference spectrum sensitive

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to the ground surface, e.g. grass, water and concrete etc? I suggest adding more discussion.

Page 11886, first paragraph: For converting the SCD to VCD, the good weather conditions normally are chosen for simplifying the AMF calculation. I suggest adding sentences about suitable weather condition for the flight measurement.

Page 11885, line13: "Hence the results presented in Sect. 3 constitute lower limits of true troposphere SCDs". What is the meaning of "lower limits"?

Page 11886, section 3.1: It is better to have a table to list flight height, flight time, weather condition at each flight for easy reading. Is there any special concern about the flight track design?

Page 11887, line1-6: For the description of 2nd flight, there is no graph or data to support the text.

Page 11888, line 20: "The position of the stack in Fig. 11 is determined based on the method described in Sect. 2.2". There is no clear relevant description in Sect. 2.2.

Minor corrections:

Page 11890, line 3: In the body text "the flight on 7 October 2006 in Fig. 14" whereas in Fig 14 caption "the averaged iDOAS column density data from 6 October 2006"

Fig 14: The text font size on the graph indicating locations is too small to see.

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