

Interactive comment on “Airborne multi-axis DOAS measurements of atmospheric trace gases on CARIBIC long-distance flights” by B. Dix et al.

Anonymous Referee #2

Received and published: 9 March 2009

Review of Dix et al., Airborne multi-axis DOAS measurements of atmospheric trace gases on CARIBIC long-distance flights

This paper describes in details the first DOAS instrument installed and operated for long-term onboard a long-distance passenger aircraft, within the framework of the CARIBIC project (Civil Aircraft for the Regular Investigation of the atmosphere Based on an Instrument Container). A selection of measurement results is also presented. Being well written and clearly structured, this paper is very useful for people involved in the DOAS research field, mostly for those interested in instrumental developments. The major weakness of the paper is the way the authors have discussed their first scientific results, which is to my opinion too succinct (even if it is clear that the main goal of the paper is to present a description of an instrumental set up and that more scientific

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papers on the measurement results will be published in the near future). I recommend the paper for publication in AMT after addressing the following comments:

Page 276, lines 24-29: Please add that these measurements have been made in the nadir mode.

Page 278, lines 1-8: Could you give more details about the way you estimated the cloud properties (parameters you used + their values) ? In order to convert the HONO VCD into a VMR, you have to make an assumption on the thickness of the cloud. How did you proceed ? Maybe you can show a plot with measured and modelled O₄ SCDs. Which AMF value did you derive ?

Page 279, line 16: In order to derive VMRs of BrO, NO₂, and O₃, you need again to convert your slant columns into VCDs using AMFs. How did you proceed ? You have to elaborate more on this in the present paper. What is the error bar on your 6ppt BrO ?

Page 280, line 1-9: The presentation of the results is again too concise. Could you add a plot with measured and modelled O₄ SCDs as well as a plot with the retrieved aerosol profile ? This will make the paper more robust.

Page 280, line 12-13: What is the trace of the averaging kernel matrix ? This parameter quantifies the information contained in the measurements.

Technical corrections:

Page 267, line 5: First time that the DOAS acronym is used in the text (except the Abstract), so please add '(Differential Optical Absorption Spectroscopy)'

Page 267, line 24: 'von Glasow'; instead of 'v. Glasow'

Page 285, line 30: 'J. Quant. Spectrosc. Radiat. Transfer' instead of 'J. Quant. Spectrosc. Ra.'

Page 290, Fig. 1: Please add a separation (e. g., a dashed line) between the boundary

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layer and the free troposphere to avoid any confusion.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 265, 2009.

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2, S30–S32, 2009

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