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Atmospheric Measurement Techniques Discussions

Interactive comment on "Assessment of the performance of a compact concentric spectrometer system for Atmospheric Differential Optical Absorption Spectroscopy" *by* C. Whyte et al.

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The authors are grateful to the referee for some insightful comments.

The impact of the latter limitation is minimised by translating the used CCD through a 2 x N (number N missing in the manuscript!) array, to map the full focal plane.

Regarding the movement of the CCD within the focal plane through a 2 $\times$ N grid, the criticism seems to be unfounded as the original paper states that the grid had the form of a 2 $\times$ 4 assembly.

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Interactive Discussion

Discussion Paper

SC1) The driving requirements for the spectrometer are not clearly identified

The driving requirements for the CompAQS instrument have been clarified and have been put into the context of meeting the requirements for the upcoming ESA Sentinel 5 mission.

SC2) The successful application of a spectrometer for DOAS ...

Some measurements of instrument stray light have been made, focussing on the contribution of the higher wavelengths of the instrument bandwidth and their stray light contribution to the radiation observed in the UV area of the focal plane. These have been included at the end of the paper and discussed in the context of the demonstrator instrument.

SC3) As it is obvious that such a compact design could be favourable ...

Comparisons between the performance capabilities of the proposed CompAQS system and other competing technologies, both existing and planned, have been made in terms of spectral and spatial resolution and signal-to-noise, where the target signal-to-noise of the space quality CompAQS instrument is quoted. However, the authors feel that the referee's request to discuss the alignment and robustness of the CompAQS instrument with respect to these other technologies is difficult, as we do not have all the performance information to critically evaluate and pass "judgement" on the design and construction of alternative technologies. The concentric spectrometer instrument has been built as a demonstrator of the technology and therefore has not been built to the exacting standards of a space based system, as has been made clear in the existing text. Therefore any comparison made between the current demonstrator to existing or proposed spectrometers can be made from the data in this paper.

SC4) The usage of the references Bovensmann et al 2002 and ...

The references to the Bovensmann papers of 2002 and 2004 have been clarified in the text with respect to how they can further inform the reader on potential applications of

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the concentric spectrometer design for earth observation.

SC5) In chapter 2 the "operational" is used too often ...

As per the referees request the word “operational” has been almost completely removed from the text, since it was a largely redundant word.

SC6) There seems to be some redundance ...

Figure 9 has been removed following the referee’s comment that there was some redundancy in figures 6 and 9, as they effectively showed the same spectra. Instead, the important features of figure 9 are now noted in the text. The authors have been mindful of the number of images within the paper and with the inclusion of more data from the stray light experiments it was decided that figure 7, which showed the arrangement of the auto collimator to check the alignment of the concentric components has also been removed.

SC7) The origin of the intensity background ...

The origins of the background noise signal in the spectra has been accounted for and explained as coming from the high dark noise of the CCD system as it is operating at a relatively high temperature of 13°C.

SC8) The statement at the end of chapter 3 (page 1912, row 19-20)

With the corrections that have been made, and with the inclusion of the stray light data the authors feel that the statement made at the end of chapter 3 stating that the concentric design is suitable for DOAS applications is now fully justified.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 1901, 2009.