

Interactive comment on “Characterization and verification of ACAM slit functions for trace gas retrievals during the 2011 DISCOVER-AQ flight campaign” by C. Liu et al.

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The authors compare measured and derived slit functions of the Aircraft Compact Atmospheric Mapper (ACAM). It is an interesting study analyzing how well an instrument's slit function can be determined based on solar observations only. This is an important concept for situations where either no laboratory measurements of the slit function exist or where the slit function changes significantly during operation. I do not see any conceptual flaws in this paper, but have some additional questions and comments, which should be addressed.

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A slit function characterized by 5 parameters ('broadened Gaussian') is used in this paper. A useful additional paragraph in the paper would be a short discussion on the number of parameters used. Would similar results as in figure 6 also be achieved with less parameters (e.g. fixing a_g and a_t)? Would an even more complex parameterization also give stable retrievals and improve the precision even more? Is there a conclusion of what number of parameters is the best (at least for ACAM)? Such additional paragraph would be useful for other researchers that want to apply the same concept.

Additional comments:

Figure 1: Do you have an explanation, why the residuals for the NO₂ window (bottom panel, red line) are so large?

Figure 5: Add the parameters based on the slit functions measured in the laboratory to this figure (except for the bottom panel of course).

Page 11, top: "...leads to comparable fitting precisions..." What do you use as a fitting precision?

Page 11, bottom: "...and show some fluctuations afterwards, probably due to uncertainties in the calibration..." What type of calibration is meant here?

Page 12, top: "...shows wavelength shifts of up to ~ 0.4 nm, which are removed by..." What does 'removed' mean? Do you correct the dispersion by the polynomial?

Page 12, top: "In a following paper, we will ... and satellite measurements." Remove this paragraph. I have seen too many of such indications, where the 'following paper' never appeared. This does of course not mean that I do not encourage you to write such a follow up paper.

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