Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2016-190-RC2, 2016

Atmospheric Measurement Techniques Discussions
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Interactive comment on "The CU Mobile Solar Occultation Flux instrument: structure functions and emission rates of NH_3, NO_2 and C_2H_6" *by* Natalie Kille et al.

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Received and published: 10 October 2016

General comments:

This manuscript presents a general description of the University of Colorado mobile Solar Occultation Flux instrument consisting of a digital mobile solar tracker coupled to a Fourier Transform Spectrometer (FTS) and a UV-Visible Spectrometer (UV-Vis). The paper describes the characterization of the instrument with respect to the ILS. These spectrometers are used to measure the absorption of NH3, NO2 and C2H6 along the solar beam from a ground-based moving laboratory. Furthermore it demonstrates the first application of the instruments to characterize structure functions and quantify emission fluxes of NH3, NO2 and C2H6. Collocated measurements next to a

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Discussion paper

high resolution FTS at the National Center for Atmospheric Research were performed to check the precision and accuracy of NH3 and C2H6 for the low resolution FTS instrument. The manuscript gives an overview of the assessment of errors and biases in the vertical column density (VCD) of NH3, NO2 and C2H6. The paper gives innovative measurement techniques which will be an added value to the satellite and in-situ community. Therefore I recommend it for the AMT publication with some minor additions as outlined below in the specific and technical comments.

Specific comments:

I would appreciate if you could give the precision and accuracy of the NO2 measurements with the UV-Vis spectrometer even though in section 2.1 and 2.3 you have made reference to the comparison paper made by Baidar et al., 2016.

A Stirling cooled detector has been used for the experiment; do you see any vibration related problems in your results? Perhaps a comment on this would be helpful for the reader in section 2.2

Page 13 Line 358: I suppose the error in the wind calculation cannot be divided by the sqrt of the number of days.

Technical comments:

Page 3 Line 74: I would include the formula for acetaldehyde here.

Page 4 Line 110: I would include the full name of SCIAMACHY here.

Page4 Line 111: for NO2

Page 5 Line 117: May be “Experimental setup” or “Experimental design” is better suited?

Page 5 Line 121: please mention the resolution of the FTIR here.

Page 5 Line 128: The instrumentation was mounted inside a trailer with the solar

tracker placed on top of the trailer.

Page 5 Line 139: . . . and N2O lines at UV-Vis wavelengths.

Page 6 Line 146: “to change the optical path difference” – this sentence is not so clear?

Page 6 Line 148: what is the temperature of the detector?

Page 6 Line 160: “The MCT spectra were background corrected” this sentence is repeated – see two lines above.

Page 6 Line 166: . . . and water vapor taken from NCEP

Page 8 Line 197: Prior to field deployment, collocated measurements were performed with the mobile laboratory at the National Center for Atmospheric Research (NCAR) in Boulder, CO with a high resolution . . .

Page 10 Line 267: . . . variability is 50 % of the maximum value . . .

Page 10 Line 273: I suggest giving a plot reference here.

Page 11 Line 298: While driving around a source area

Page 15 Line 391: . . . a source point that is at a distance . . .

Page 21 Line 583: The list of acronyms is not complete: for example you may add RD, NEI,

Page 38 Figure 1: I suggest labeling the components in the UV-Vis spectrometer and the mirror in the FTS spectrometer.

Page 41 Figure 4: Labelling of the X and Y axis are missing.

Page 43 Figure 6: Labelling of the X and Y axis are missing.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-190, 2016.