Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2019-270-RC5, 2019

Atmospheric Measurement Techniques Discussions

Interactive comment on "In-flight calibration and monitoring of the TROPOMI-SWIR module" *by* Tim A. van Kempen et al.

Anonymous Referee #4

Received and published: 1 October 2019

General Comments: As most of the issues in this paper were already covered by the comments of anonymous referees #1,#2 and #3, I will mostly focus on issues not sufficiently covered by the other reviewers.

I agree with referee #3, that the techniques discussed in this manuscript have already been presented elsewhere in the literature and therefore are not novel, but the documentation of the TROPOMI instrument status is in itself a useful and important work. Therefore I also recommend publication after minor corrections.

As however the manuscript seems largely to be extracted from a status report, I would suggest changing the title of the manuscript to "Technical Note: In-flight calibration and monitoring of the TROPOMI-SWIR module".

Printer-friendly version

Discussion paper

I also recommend adding consistent captions to all figures (e.g. figure 6: [e-/sec] is missing, figure 8: electronic offset is reported in V, rather than in [e-] and therefore magnitude and variation of the offset could not be compared quickly to the magnitude of the DC variation).

I also wonder, why the eclipse side of the Earth was assumed pre-launch as dark, as black body radiance at $\sim$ 293K is non zero in the spectral range > $\sim$ 1750 nm. Therefore it is not astonishing, that the TROPOMI-SWIR module detects thermal radiation of the earth with the FFM open.

When discussing the DC, it should be mentioned that the DC consists of two primary components, Detector DC and DC introduced by the thermal radiation of the instruments optical bench itself.

Reviewer #3 also asks if there is a mask implemented on the detector. Some literature research (i.e. Paul et al., Characterization and correction of stray light in TROPOMI-SWIR) reveals, that “In the grey area, the light is blocked by the entrance slit of the spectrometer (top and bottom) or a shield at the detector (left and right)”, see caption “Figure 2” of this manuscript. As shielded rows represent an excellent possibility to disentangle detector dark current from ambient dark current (produced from the optical bench), I would strictly recommend expanding the DC analysis including that dataset, given that such data is available. Such data could also reveal potential problems with dark signal shifts known to exist when illuminating larger parts of MCT-SWIR detectors, see for instance: Chapman et. al, “Spectral and Radiometric Calibration of the Next Generation Airborne Visible Infrared Spectrometer (AVIRIS-NG)”, and according explanation of pedestrial shift.

As mentioned by Paul et al. light on the SWIR detector is also blocked by the entrance slit on top and bottom of the spectrometer. Typically, such measurement could be used to assess the In-Band stray light level of the instrument. Therefore I recommend to add an according analysis, if such data is available for the TROPOMI SWIR spectrometer

module.

Can you furthermore give more explanation on the possible cause of the fringes observed in Fig. 12, top (DLED measurements) ?

In addition I would recommend adding sketches of the optical path for the different measurement configuration as these will ease up to follow the different optical configurations mentioned in the manuscript.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-270, 2019.

Printer-friendly version

Discussion paper