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Atmospheric Measurement Techniques Discussions

Interactive comment on "The Aerosol Limb Imager: acousto-optic imaging of limb scattered sunlight for stratospheric aerosol profiling" *by* B. J. Elash et al.

Anonymous Referee #1

Received and published: 13 January 2016

General comments:

This is a very well written manuscript on a newly developed balloon-borne acousto-optical spectrometer for the retrieval of stratospheric aerosol information (extinction profiles at multiple wavelengths as well as particle size) from limb-scatter observations. The instrument design and calibration are presented in detail and the manuscript also contains first retrieval results from a stratospheric balloon launch carried out in 2014. The measurement technique provides an advance in the limb remote sensing of stratospheric aerosols, because it combines 2-D imaging with spectrally resolved measurements.

I have no major objections to the publication of this manuscript, but I ask the authors to consider the specific comments below.

Specific comments:

Page 13286, line 13: "Preliminary analysis ... indicates"

Page 13287, line 23: "1970's" -> "1970s"

Page 13288, line 26: Perhaps Taha et al. (2011) should be mentioned here, too: Taha, et al., SCIAMACHY stratospheric aerosol extinction profile retrieval using the OMPS/LP algorithm, Atmos. Meas. Tech., 4, 547-556, doi:10.5194/amt-4-547-2011, 2011.

Page 13291, line 3: "from at" -> "from"

Page 13292, line 3: "AOTFs' " -> "AOTFs "

Page 13292, line 15: "acousto wave" -> "acoustic wave" ?

Page 13293, line 7: "ATOF"

Page 13293, line 13: "not constant angle with wavelength" -> "not constant with wavelength" ?

Page 13295, equation (3) : "t" has not been defined, as far as I can tell.

Page 13295, line 25: "with an extinction ratio greater than 10ˆ-5"

Should this read "10ˆ5" rather than "10ˆ-5" ?

Page 13296, line 15: "change of less than 1% change" -> "change of less than 1%" ?

Page 13298, line 17: "Dekemper et al. (2012) reports" -> "Dekemper et al. (2012) report"

Page 13299, line 13: "had a spectral resolution of 1.2 nm, which is much less than the factory specified resolution of the ATOF"

Well, it's not much less than the FWHM shown in Fig. 3c at, e.g. 600 nm. Perhaps "much" should be deleted? In the same sentence: "ATOF" -> "AOTF"

Caption, Fig. 7, line 3: delete "is" in "of the horizontal field of view is"

Caption Fig. 8: Perhaps you can briefly mention what speeds blue, green and red colors roughly correspond to.

Page 13304, line 26: "The spectra displays" -> "The spectra display"

Page 13307, lines 5 and 9: different spelling of "Angstrom"

Page 13307, bottom line: "The difference .. were less"

Page 13308, line 8: "However, the OSIRIS and ALI extinctions do not agree within error between 20 to 25 km."

The errors of the OSIRIS profile are not shown. Since the differences between the OSIRIS profile and the ALI upper error limit are relatively small between 20 and 25 km, I imagine that the two profiles agree within combined errors.

Page 13308, line 21: "This is also the first polarized limb scatter retrieval to our knowledge"

McLinden et al. (1999) already retrieved stratospheric aerosol information from polarized limb radiation observations with the CPFM instrument flown on the ER-2. Here the full reference: McLinden et al., Observations of stratospheric aerosol using CPFM polarized limb radiances, JAS, 56, 233 – 240, 1999.

Acknowledgements, line 4: "The optical design analysis was performed in thanks to Synopsys for the use of a Code V software license"

Figure 8, panel (b): I think you didn't mention what the pink line corresponds to. First light?

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 13285, 2015.