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Atmospheric Measurement Techniques Discussions

Interactive comment on "Calibration and validation of water vapour lidar measurements from Eureka, Nunavut using radiosondes and the Atmospheric Chemistry Experiment fourier transform spectrometer" *by* A. Moss et al.

Anonymous Referee #2

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Overall the paper gives significant contribution to a region where a lot of changes have been happening lately due reasonable amount of warming in our climate. The presence of specialized equipment such as a water vapor raman lidar is extremely useful to verify the water vapor budget in e atmosphere. The paper is well written and well structured. There are some weak points though that should be covered in order to allow its publication in AMT, mainly regarding some lack of comments on aspects related to calibration given in the literature that are worth mentioning in this paper. Also when the

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word climatology comes to the discussion, 3 years is a very poor sampling period and I would rather call it "TRENDS" other than climatology. There are also some issues I would recommend revising and will list below:

Introduction Page 5667 Line 5 I would put the LAT,LON coordinates right here. Line 11 calibration factor enter the analysis, then the calibration factor are determined - this could be improved. Line 14 Climatology could be exchanged by trends in face of the sampling periods applied to this paper

The CEC LIDAR Page 5667 Line 24 Rapid Ozone variations - How rapid ?

Transmitter and receiver Page 5668 Line 11 converting a portion... INTO 353 nm General Comment - What is the energy per pulse in each wavelength. Perhaps a Laser Feature Table might be handy instead of the writing throughout the text Line 17 and 18 Is the secondary mirror really at the focus of the telescope ?

Data acquisition system A schematic drawing of the system might be useful here too.

Section 3.1 Equations 1 and 3 Are the Δ_q^ω and Δ_τ^w the same quantity. If so why the difference in naming the super and subscripts ?

Page 5670 Line 16. For the CEC Lidar measurements the latter option is necessary. Maybe more explanation is needed here. I would mention papers by Sherlock and Leblanc which propose alternative means to derive the calibration which are cited in Whiteman's paper, but for the sake of self-consistency should be discussed in the present paper as well.

Page 5671 Calibration In your results both day and night measurements were used ?

Page 5673 Line 24 Changed enough - Please provide some numbers ?

Section 3.3 Please add more discussion - How good were your fits ? What could be an average and standard deviation for your results. The number of used nights (10 ?) should be improved in which extent to give better results ?

AMTD

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Section 4. In my opinion the comparison with satellite data is valid only qualitatively.

Section 6 - Conclusions - More could be added in here. In terms of what could be improved and how are mentioning such as the CFH and first principles but not discussed here. For example how narrow are your filters ? What about overlap corrections and so on .

References - A good number of papers cover the calibration and intercomparison and fron the references I would search for more titles in the subject.

Fig 1. This figure could be improved with larger fonts and less blurry. Fig 2. How did you figure out your Sonde RMS ? Fig 3. Details of the how good your fit was are needed. Or even through the text. Fig 4. Some comments as above Fig 7 and 8 - Could they be merged ? Also can you make the fonts larger ?

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 5665, 2012.