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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Humidity observations in the Arctic troposphere over Ny-Ålesund, Svalbard based on 14 years of radiosonde data" *by* R. Treffeisen et al.

Anonymous Referee #3

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In general this is a valuable piece of work on a topical subject of tropospheric humidity observations in high latitudes. The data set is new, and the presnetation is generally good. It should be publishable in ACP with some important but minor revisions.

The authors should at least discuss the impact of a solar heating bias on their measurements. This effect is not quantified, but may contibute to a dry bias for daytime measurements, which will affect the interpretation of the seasonal cycle.

Section 3.3, comparison analysis and figures 2 and 3 are not that illuminating. What is actually 'truth' in this case? The corrections look smaller (10-15% RH) than other similar values at low temperatures from Miloshevich. Perhaps these are not that cold

(some of the Milosevech values are tropical). Also, when were these 12 profiles taken? Does the solar heating bias affect them?

For Section 4.4 on the vertical extent of layers, it would be valuable to examine higher resolution than 200m, at least for part of the record, to see if that changes the statistics. Perhaps you could analyze the last 5 years of data (2000-2005) to see if 10 second data helps. Or does the balloon rise 200m in 10 seconds?

Section 4.5: can you explain the vertical shift between supersaturation and sub-visible clouds from SAGE? What is the SAGE weighting function. Perhaps you could apply the vertical weighting function to the radiosonde data when you do the comparison and this would explain it. It would be useful to at least attempt this data matching before trying to use a dynamical explanation.

There is also a recent paper by Gettelman et al that discusses supersaturation and shows some frequency maps in the Arctic. You might want to compare your values to these numbers (which may be high):

A. Gettelman, E. J. Fetzer, A. Eldering, F. W. Irion, The Global Distribution of Supersaturation in the Upper Troposphere from the Atmospheric Infrared Sounder, J.Climate, 19(23), 6089-6103, 2006

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 1261, 2007.