Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2016-135-RC1, 2016

Atmospheric Measurement Techniques Discussions
Open Access
EGU

Interactive comment on "Mesospheric temperature soundings with the new, daylight-capable IAP RMR lidar" *by* M. Gerding et al.

Anonymous Referee #1

Received and published: 3 June 2016

Initial review of Mesospheric temperature soundings with new, daylight capable IAP RMR lidar by Gerding et al.

This paper provides a technical description and sample data and measurements of the daylight-capable Rayleigh-Mie-Raman (RMR) lidar at the Institute of Atmospheric Physics (IAP). This lidar system is a state-of-the-art instrument and the daytime measurement capabilities are a major contribution to the observation of the middle atmosphere. The instrument is not just significant because of it's measurement capabilities that allow observations over full diurnal cycles, but also because of it's stable operation that allows ready acquisition of observations (∼1000 h per year). The work is appropriate to Atmospheric Measurement Techniques and will be of interest to researchers.

Printer-friendly version

Discussion paper

The paper serves as an important technical companion paper to the recent paper by Kopp et al. (JASTP 2015) that presented measurements of the tides by the RMR lidar and highlighted the importance of full-day and multi-day operation in accurately characterizing the tides and their variability. I would like to see some of the technical and operational details expanded.

1) Can the authors add a raw data profile showing the signals in all four channels (3 Rayleigh, and 1 Raman)? A plot showing raw data profiles (that shows total signal including signal and background) representing observations over one hour at midnight and noon would be a valuable addition to the presentation.

2) Can the authors discuss the stability of the system in terms of the following key elements; a) Line center and line width of the laser transmitter. What is the accuracy and precision of the wave meter? Is the wave meter wavelength recorded on a per-shot basis? Is the b) Line canter of the pressure tuned Fabry-Perot etalons. What is the sensitivity of the line center to changes in pressure and temperature? How are the temperature and pressure monitored and maintained? c) Pointing jitter in the steering mirrors. How does the jitter compare with the 12 micro-radian margin between the receiver field-of-view (62 micro-radian) and transmitter beam divergence (50 micro-radian)? d) Do any of the variations (a-c) impact the narrowband filter correction, and if so can you characterize this uncertainty in the temperature retrievals?

3) The presentation of the narrowband filter correction is valuable (Figure 5). A third curve showing the difference between Tnew-uc and Tnew-c would be useful. The authors colds also cite maximum, minimum and typical differences in the uncompensated and compensated temperatures.

4) The presentation of the filter and line shape in Figure 4 might be clearer if the intensity and transmission were plotted on a logarithmic scale. Several of the curves are hard to distinguish.

5) The temporal resolution of the temperature measurements in Figure 7 is not re-

ported. From the pixels it appears to be about 15 minutes. Can the authors please cite the resolution of the measurement?

6) While comparison with ECMWF is interesting, is it possible to show a comparison with SABER?

7) Is Figure 7 the downward phase progressions appear to change phase speed above 70 km. The authors report tidal amplitudes unto 75 km. Do the authors feel that the change in phase above 70 km is geophysical in origin or perhaps reflects the initialization of the temperature retrievals at 85km?

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-135, 2016.

Printer-friendly version

Discussion paper