

Interactive comment on “Temperature lidar measurements from 1 to 105 km altitude using resonance, Rayleigh, and Rotational Raman scattering” by M. Alpers et al.

M. Alpers et al.

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The referee has mentioned some technical aspects that need to be discussed for our system. As far as this has not been done in the paper, we will add some description:

- "No information on the Raman part can be seen."

Figure 1 shows the Rotational Raman part of the detector. The vibrational Raman part is only outlined because it is without function for the temperature soundings, yet.

- Potassium lidar: The referee is right that the K lidar detector should be added to Fig. 1, despite it has been published elsewhere. We have done this to provide an overview of the whole detector system.

- Rotational Raman calibration in general: See our answers to comment RC S383.

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- "Why the temperature derived with Rayleigh scattering is not used to calibrate the Raman part."

We have addressed this topic by adding the following text to the introduction section, p. 926, l. 27: "In general also the Rayleigh temperature data can be used for the calibration. Typically the Rotational Raman temperature profiles are retrieved up to about 25 km. Above this region the statistical error exceeds 10 K and is always larger than 2 K above 20 km. Therefore for a calibration factor a large uncertainty would remain, if the calibration is limited to the Rayleigh altitude range. Moreover, the elastic backscatter profiles are affected by additional Mie scattering below about 30 km and the temperature profiles have to be corrected with respect to this. A calibration of the Rotational Raman data would be dependent on the correct estimation of the stratospheric aerosol, which can not be given. The independent calibration allows a quality check of the Rayleigh data at the lower end of the profiles. By the method applied at IAP the Rotational Raman data provide temperatures completely independent from the Rayleigh results, as the temperatures from the potassium resonance measurements do at the top of the Rayleigh altitude range."

- "Also other paper have already coupled two techniques and authors should cited them."

Beside the existing citation of Dao et al (1995) we have added the following sentence on page 927, l. 2: " Keckhut et al. (1990) and Gross et al. (1997) used vibrational Raman scattering to extend their mesospheric/stratospheric temperature profiles down to the tropopause region."

- Citation of Nedeljkovic et al.: Done. See also answer on other comment RC S383.

- Mechanical chopper: Already included (See text page 928, line 11 and Figure 1). The chopper is now explicitly described in Fig. 1.

- Saturation effects: Saturation of the photon counting detectors is meant, we assume.

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This is already discussed in the paper (see page 931, line 16ff).

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 923, 2004.

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