

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

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We will add the following enhanced description of the Rotation-Raman method to the Instrument and observation section:

"The transmission of the whole detector depending on wavelength has been measured with a high resolution spectrometer in the relevant wavelength range. The measured filter transmission curves and the calculated Rotational Raman spectrum for an example temperature of 250 K is shown in Figure 2. The quantum physical constants given by Butcher et al. (1971), Arshimov et al. (1983) and Vaughan et al. (1993) have been used to calculate the backscattered power of each single line by elemental, temperature dependent quantum physical laws. For both wavelength channels we have integrated the backscattered power at the various lines multiplied by the respective

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filter transmission. This procedure results in a function of temperature depending on the power ratio of the two wavelength channels for the specific experimental configuration of the IAP RMR lidar. Additionally, we launch radiosondes for control on special occasions. At the lowest kilometers of the atmosphere the broadening of the Rayleigh line by Brillouin scatter might induce some additional, pressure-dependent signal in the rotational Raman channels. But it has been shown by Nedeljkovic et al. (1993) that with a sufficient narrow laser wavelength the contribution of the Rayleigh line can be neglected even at surface pressure. For the injection-seeded monomode laser of the IAP RMR lidar we can assume the Brillouin effect to be neglectable compared with the statistical error in the lowest bins."

The former sentences "We use ... special occasions." (p. 929, l. 5-8) will be deleted.

We will include a figure which shows a power plot of calculated Rotational Raman lines for the center wavelength of the IAP RMR laser emitter (532.05 nm) and an example temperature of 250 K combined with the transmission curves of the two IF filters used for Rotational Raman measurements with the IAP RMR lidar. For consideration of all beam divergence and optics transmission effects, the transmission curves are measured with a high resolution spectrometer not in a separate test environment but in the optical path of the real lidar detector.

The text above also includes the requested paper citations and reflects on the comment of P. Keckhut concerning the Brillouin effect.

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