

The paper presents the retrieval of water-vapor related profiles using a lidar with capabilities of measurement of Raman-shifted radiation by water vapor and nitrogen. Two kinds of profiles are considered, namely water-vapor mixing ratio profiles and relative humidity profiles, the latter obtained using the synergy between the lidar providing water-vapor mixing ratio profiles and a microwave radiometer delivering temperature profiles.

Concerning water-vapor mixing ratio profiles, contributions are found in an improved calibration method of the lidar against reference radiosonde data and in a statistical analysis of measurements carried out over one year of the water-vapor mixing ratio as a function of height ranges.

The retrieval of relative humidity profiles through the lidar / microwave radiometer synergy is perhaps the paper's most original contribution. In this respect, the authors should clarify if this method has been previously reported and, if not, stress its originality. A statistical analysis of relative humidity as a function of height ranges, parallel to that of water-vapor mixing ratio, is also presented.

The paper is well organized, but the labeling of the sections is a little misleading. For example, under the title of "Methodology" (section 3), one would expect not only the basics of the water-vapor mixing ratio measurement using water vapor and nitrogen Raman channels of a lidar, but also the calibration issues and the lidar / microwave radiometer synergies. It is thus suggested that sections 4 and 5 are converted into subsections of a more general "Methodology" section.

Present section 3 deals with a known method, already described in at least J. E. M. Goldsmith et al., "Turn-Key Raman Lidar for Profiling Atmospheric Water Vapor, Clouds, and Aerosols", *App. Opt.*, **37**, 21, pp. 4979-4990 (1998), and in references Mattis (2002) – which should be Mattis et al. (2002) – and Guerrero-Rascado et al. (2008) – which it closely follows, not surprisingly given common co-authors – of the present paper, and could probably be shortened by referring to these papers. Note in addition that there is a typo in Eqs. (3), (4) and (5), where the factor

$$\exp\left\{-\int_0^R [\alpha(r, \lambda_{N_2}) + \alpha(r, \lambda_{H_2O})] dr\right\} \text{ should be } \exp\left\{\int_0^R [\alpha(r, \lambda_{N_2}) - \alpha(r, \lambda_{H_2O})] dr\right\}.$$

Because the basics of the method are well known, the first sentence of the abstract ("we outline a method to obtain water vapour mixing ratio profiles from a Raman lidar") should probably be made more targeted, pointing out the particularities of the calibration method proposed.

The statistical analyses presented seem to apply to night-time data only, because of Raman lidar limitations to operate in day time. This should be clearly stated, and it is suggested that a discussion on the usefulness of the results is included in view of this restriction to night-time measurements.