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Atmospheric Measurement Techniques Discussions



# *Interactive comment on* "Raman Lidar for Meteorological Observations, RALMO – Part I: Instrument description" *by* T. S. Dinoev et al.

**Anonymous Referee #3**

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This manuscript reports on a new instrument regarding the measurement of the water vapour profile using the Raman lidar techniques. A special feature is the near-range optical fiber that allows water vapour measurements close to the Earth surface. The conclusions are supported by the measurements and the results are worthwhile for publication in AMT. However, a robust error analysis regarding systematic uncertainties is not given in the paper. Despite the data source from measurements with this new instrument might be small for a detailed statistical analysis, it is mandatory to add a brief paragraph on the systematic errors which are specific to the proposed observational concept. Below there are a few other points which need to be considered before publication:

Introduction, p 6862: Raman lidars for the measurement of water vapour are in operational use at varies places. The authors should indicate the originality of the reported instrument with respect to current ones.

P 6875/6876: the authors mention several possibilities of a range-dependent calibration constant which can pose severe measurement errors. However the discussion is not clear at this point and it is recommended to add a few numbers on the estimated error contribution for the most important uncertainties which are known from previous setups.

P 6882: Eq. 7 is somewhat confusing. The description points on count rate for the lidar signal S on one hand and on radiance in mW/m2/sr/$\mu$m for the background light. Also it is not clear in the equation whether the lidar signal S has been corrected by the background light.

P 6890: What is meant by the phrasing that all systematic errors can be kept low? Also an error figure for the saturation effect should be given.

P 6891: Eqs. 3, 7, and 10 should be harmonized which respect the nomenclature for the different parameter. It is mandatory that the authors add a small paragraph on the specific sources of systematic error for this particular instrument e g. regarding the extension to near field observations using the fiber.

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Interactive comment on Atmos. Meas. Tech. Discuss., 5, 6867, 2012.