

Interactive comment on “Differential Absorption Radar Techniques: Water Vapor Retrievals” by Luis Millan et al.

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Received and published: 17 May 2016

These results are fairly limited because obviously the authors seem to omit the analysis of noise errors in the derivation of water-vapor profiles in clouds. The DAR is extremely sensitive to the SNR of the online and offline signals because the relative error in the derivation of water vapor is inversely proportional to the differential optical thickness. There is a vast of literature from the investigation of water-vapor differential absorption lidar, which is nearly equivalent to DAR but is it not mentioned by the authors. I expect that it will turn out that the SNR of the return signals is far away from enabling reasonable measurements of water vapor in clouds from space. Before this analysis is done and this omission is healed, it is hardly possible to make a reasonable judgement of this technique. I strongly recommend that the methodological analysis of DAR is extended by system noise error propagation. Therefore, also the argument

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that the accuracy of the measurement is increased by averaging is incorrect because the authors are dealing with systematic errors but not with uncorrelated noise. In this connection, I am wondering how useful a precision of 89% is (or an error of a factor of 2). In this case, it is probably better to guess the water vapor content of the cloud by the temperature profile. An NWP output will likely produce more accurate results.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-72, 2016.

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