

## ***Interactive comment on “Boundary-layer water vapor profiling using differential absorption radar” by Richard J. Roy et al.***

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This manuscript presents an innovative proof of concept for profiling water vapor in boundary layer clouds. Such measurements are difficult to impossible to make in situ and totally out of reach with remote sensing. I have several relative minor issues that the authors should address.

1. At what point will multiple scattering become a limiting factor? At these high frequencies and the typical optical depths of shallow cumulus - perhaps with coexisting precipitation - it seems that multiple scattering may be an issue.
2. Will the accuracy be sufficient to measure realistic supersaturations in cumulus updrafts? It seems that from a science perspective such knowledge is key. Then

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combining this instrument with more traditional radars and lidars, one could examine aerosol cloud interaction problems by knowing the cloud droplet number concentration and humidity near cloud base where aerosol populations become activated. Additional science applications could examine the entrainment processes near cloud top where dry tropospheric air is mixed into the marine boundary layer. It seems as though the accuracy required for these topics might push the limitations of the technology.

3. For the topics identified in point 2, validation with radiosondes would be inadequate. Would current in situ technology for measuring water vapor allow for validation of the technique?

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