

## ***Interactive comment on “Aircraft millimeter-wave retrievals of cloud liquid water path during VOCALS-REx” by P. Zuidema et al.***

**Anonymous Referee #3**

Received and published: 8 September 2011

### General Comments

The paper presents a nice application of measurements from the G-band Vapor Radiometer together with ancillary data to provide estimates of water vapor and liquid water path in stratus conditions during the VOCALS project. Demonstration of the capability of the GVR to retrieve WVP/LWP in these conditions and interpretation of results in the context of the cloud conditions in the southeast Pacific provide potentially meaningful contributions to the understanding of processes observed during VOCALS. I suggest that the paper be published following revisions as described below.

### Specific Comments

I believe the title could be revised so as to be more descriptive of the content of the

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paper, which includes more than LWP retrievals.

The WVP and LWP retrieval methods are described and referred to in various sections of the paper, though not in a rigorous way. A separate section dedicated to descriptions of the retrieval methods should be included. Are the retrievals based on individual channels? Why not combine all four channels to make use of all available information?

Similarly, I would have preferred a summary of all the airborne instrumentation you refer to be included early in the paper. For example, cloud base temperatures were obtained from the aircraft infrared radiometer (p. 19591), but I don't see any information about the type of radiometer, where it was mounted on the aircraft (upward, downward-looking?), etc. Relevant specifications for the lidar and radar (wavelength, resolution, etc.) should be included also, since you refer to that data throughout the paper.

p.19583, lines 9-10: I'm not sure what you mean by “the zenith view of a stable cold space background eases the LWP retrievals”. Can you be more precise?

p.19583, line 17: replace “NCAR C-130 microphysical probes” with “NCAR C-130 wing-mounted canisters”

p.19856: Description of calibration procedures seems a bit skimpy.

p. 19591, lines 9-12: Regarding use of the IR radiometer to obtain cloud base temperature, it isn't clear why you used the larger of the radiometer temperature and the temperature calculated from the dry adiabatic lapse rate. Also, there can be significant uncertainty in the estimate of temperature from airborne radiometers. How does this affect your results?

p. 19595: The term “clear-sky LWP” is confusing.

Figure 7: I assume the four traces show data from the four channels of the GVR. Should state in caption.

Figure 8: should label panels with a and b, as used in caption

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