

Interactive comment on “Southeast Pacific stratocumulus clouds, precipitation and boundary layer structure sampled along 20 S during VOCALS-REx” by C. S. Bretherton et al.

Anonymous Referee #1

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General comments:

This manuscript presents ample lower atmosphere observations along 20 S during VOCALS-REx, demonstrating consistency between the multiplatform in situ observations and remote sensing. The analysis makes good use of the dataset to highlight boundary layer processes/properties, cloud droplet concentration and precipitation characteristics. One conclusion stresses that the drizzle is not solely dependent on droplet concentrations, but cloud depth and liquid water path are just as important. Overall, it is a generally well-written summary and analysis of the subtropical lower troposphere during austral spring and will provide a good basis for the VOCA assessment.

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I only have some minor issues that need to be addressed.

Specific comments:

1. 15927, line 10: A reference for these slope flows in northern Chile would help (e.g., Rutllant, Fuenzalida and Aceituno 2003, JGR).
2. 15929, line 12: Is the 1 K difference a known, uncorrected instrument bias in the C130 radiometer? A brief comment on this difference is needed, especially if this data set will be used by others.
3. 15935, line 5: Is the increased variability in the transition zone basically linked to whether or not the continental air makes it out that far offshore or not? If so, is there a simple relationship between the wind and Nd that could be shown? Given the diverse back-trajectories it may not be a trivial matter, but it seems like an appropriate place to at least comment on this.

Does the variability in MODIS-derived Nd also peak in this transition zone? An indication of the standard deviation around the MODIS mean in Fig. 10 would help to illustrate/corroborate the variability.

4. 15936, line 1: A reference to these EPIC2001 observations (Bretherton et al. 2004) should be inserted here too.
5. 15941, line 19: How often do these free-tropospheric moist layers occur? Is it a few days a month? Is there enough data to give us a decent idea?
6. 15942, lines 9-11: The writing here could be improved.

Technical corrections:

1. 15922, line 10: Typo: "...stratocumulus with haccumulation-mode aerosol..."
2. 15933, line 8: Typo: "... aerosol and cconcentrations"
3. 15934, line 1: George and Wood should be 2010 not 2009.

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4. 15936, line 8: I think the authors mean Figure 11 instead of Figure 12.
5. 15937, line 28: Reference section does not include Comstock et al. 2004.
6. 15940, line 5: Reference section does not include Wyant et al. 2007.
7. 15943, line 18: "with" should be "within"

Figure 5 and 6: I have a hard time seeing the dotted lines, mostly over the darker colors (like the lower panel of Fig. 6). Perhaps larger dots would help.

Figure 8: If the lettering in the bottom right of each panel is not used, it should be removed. If it is used in the final version, they should be much bigger.

Figures 10-16: Are the figure titles really necessary? It seems like these plots were at one point individual panels in a multipanel plot and were only recently separated into individual figures:

Figure 10: In the beginning of the caption there is a '(left)' but there is only one figure.

Figure 16: The caption indicates panels (a) and (b) show in-cloud and subcloud, while in the actual figure cloud and subcloud are indicated by red and blue, respectively.

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