Review of “Aircraft observations of five pockets of open cells sampled during VOCALS REX”

The authors describe the aerosol, cloud, precipitation and boundary layer characteristics for POCs and compare these with those from the areas surrounding these features observed over the southeastern Pacific during VOCALS REX. This work adds to our understanding of the properties of POCs, the processes that maintain these characteristics, and the variability. It also illustrates that the strong aerosol-cloud-precipitation interactions that are working within the POCs. Overall, the manuscript is well written and includes excellent graphics. This manuscript is clearly acceptable for publication with some attention to the minor issues raised.

The only main concern is with the title. This is a very general title but with a degree of specificity that may not attract a wide range of readers who are not familiar with either POCs or VOCALS REX. Not sure that the number of POCs studied adds much information. Also, would it be better to give a geographical location? The addition of some key words like aerosols, precipitation, clouds, and boundary layer would be useful in making a more interesting title that might be more enticing to a larger audience.

Minor Points:

Page 8292; line 23-24; What is the length (or duration) of the level legs? From Fig. 1 this looks to be about 150-250 km. This information is important for the vertical velocity variance estimates given later. A few words could be added here to clarify.

Page 8297; line 23-24: Confusing sentence construction. As written it reads as “evolution” caps “the cloud top height”

Page 8297, line 25: Although the difference in temperature and water vapor can cause some bias in the retrieved SSTs, this effect should be minimal when using the Heimann since it makes measurements in the window region (9.6-11.5 microns). But another potential reason for a cold bias would be the small IR reflection from the sky, that would be less in the POCs than in the overcast areas. For an IR sea surface reflectivity of 0.01 (emissivity of 0.99) and a 50% cloud fraction, there could be a cold bias in the SST of about 0.5 ^{o}C compared with a completely overcast case, since the clear-sky downward emission is less than that from a low solid cloud. More can be found in the literature about this point.

Page 8297, line 25: Temperatures should not be described as hot or cold (just like vapor pressure would not be characterized as moist or dry). Air or other substances can be given attributes such as hot, cold, heavy, light etc. but temperature, pressure, mass etc. should not. In this sentence it would be better to write the lowest temperature rather than the coldest.

Page 8300; It is unclear how the vertical velocity variance is calculated. In Table 3 there is a quantity $CL\ \overline{w'^2}$ that is not defined in the table description. This appears to be cloud layer vertical velocity variance described in the text. Some clarification should be included in the text and the table descriptor. Are the lengths (or duration) of the legs the same? Since there may be substantial mesoscale variability in the POCs, sampling times may be an issue. Are trends removed? Or is just the

mean removed in the calculation? Some clarification would help. In Fig. 4 a vertical velocity variance from a 21-second running (mean?) is plotted.

Page 8303; lines 8-10: Awkward sentence construction.

Page 8303; line 16: Still unclear how the vertical velocity variance is calculated. Here this may be the 21-second running mean describe in the Table 4 descriptor.

Page 8306; lines 14-17: Long sentence is not very effective.

Page 8306; section 6.3: The aerosol equilibrium solution that the authors are seeking follows the simple treatment of cloud-aerosol-precipitation interactions made by that Baker and Charlson (1990) to give bi-modal solutions. Their study should probably be cited.

Page 8307; lines 7-9: Could remove “at the surface” from this sentence to simplify. Also are the references to the surface layer in this section really references to the subcloud layer? In boundary layer meteorology there is usually a distinction made between the surface layer and the sub-cloud (well-mixed) layer.

Page 8307; paragraph starting at line 10 is very long and would be much more effectively if it were split into two or three paragraphs.

Figure 3; a word or two is apparently missing in the last sentence of the caption.