The PCAPS dataset is unique. The authors addressed some interesting issues, which fit the BLM interests. The manuscript is well organized.

1) The explanations of the abrupt changes are possible, but they also raised some questions.

If the mountain wave (the LES simulation looks like a rotor to me and the wind direction at SM6 reversed, see Smith and Skyllingstad, JAS, 2009) is responsible for forming a warm front, the relationship between the passing of the trough and the enhanced wind over the ridge for generating the mountain wave is not clear to me. The soundings from PCAPS are useful to link the wind change associated with the trough.

2) Following the traditional discuss of rotors, for example, Smith and Skyllingstad, the air motion within the rotor reverses wind direction. The turbulence inside the rotor should be strong and the warm air downstream (relative to the upper background flow) of the rotor is associated with the adiabatic downslope flow, which is relatively calm, or less turbulent. But the data analysis presented in the manuscript seems to suggest that the warm air sector is associated with the strong turbulent mixing, which brings the warm air down. This makes sense to me, but seems to be inconsistent with the rotor simulation in Smith and Skyllingstad, for example. In addition, mountain waves or rotors tend to be stationary relative to mountains. The northward movement of the warm front associated with mountain waves need to be better explained.

3) Based on the observations presented in the manuscript, it seems to me that wind speed increase is closely associated with the abrupt warming at the ground, which is consistent with the observed relationship between wind speed and turbulent fluxes under near neutral conditions by Sun et al. (2012, JAS). Maybe the authors can check the role of the downward turbulent sensible heat flux in the warming or the "displacement" events. I suspect that the abrupt warming events are associated with the sudden increase of wind speed, which leads to the strong downward heat flux transport and the increase of the air temperature near the ground. Then the question is why wind speed increases "randomly".

Detailed comments

L.53 "the CAP depth collapses"?

L.103 "In this scenario, the CAP thins, but also strengthens, in time." The sentence can be constructed better.

L. 210. There are 7 yellow dots in the SE area. I guess the cluster of 6 yellow dots are SM1-SM6.

L.215 How about the southern string of green dots in Fig.1?

L.259 20m/s at 2200 m?

L.263 How do you define the depth of the CAP?
L.268. SM6 should be at the extreme northern end instead of the southern end.
Figure 2 DAQ is not introduced in section 2.
L.276 "displacement" in the title sounds like a pure advection process. These abruptions could be due to turbulent mixing as mentioned later in the manuscript. Maybe the authors can come up with a better title to reflect the focus of the paper.
L.333 The plot in Fig.6 starts from 00 UTC, the reader cannot tell the shift at 00UTC.
L.347. ~10C over 2 km. Is there an elevation change in this temperature change?
L.375. From here, the upstream sounding is mentioned at several places. Where is the sounding location?
L.424. How about the lower boundary condition?
Eq.8 The only way to get the approximation is the zero $\left(\overline{u'w'}\right)_{top}$, and the bottom $\left(\overline{u'w'}\right)_{bot} = -k_m\, \partial u/\partial z$.
L.504. What is the elevation difference between ISS-S and KSLC?
L.607. The turbulent mixing may not be strong enough to eliminate the CAP in this case. However, the turbulent mixing is evident from the temperature profile at KSLC considering the heat sink at the ground.