

Review of “Dynamically induced displacements of a persistent cold air pool” by Lareau and Horel

This paper provides strong observational evidence of temporal displacements of cold-air pools and how such displacements occur. It is well written, the explanations are very clear and compelling. Therefore, I recommend it be accepted pending only minor revisions. Specific suggestions are below.

- 1) Page 4, lines 171-176: there is a reference to points west of and east of the Jordan River. I can't make out most of the river in Fig. 1. Can the authors please make the river outline darker?
- 2) Page 4, lines 373-398: I find the use of  $Fr$  to be a little suspect in real, 3D flows because it is very difficult to assign what level to use or what horizontal location upstream of the terrain to use. In this case, it is a little tougher than average to accept given the complexity of the terrain. I was also confused as to where the sounding data was taken. The text says the profiles were taken upstream of the Traverse mountains, but upstream could be either N or the ridge (as the low-level flow was northerly at times) or S of the ridge, as the upper-level flow was southerly. Since there are no markers S of the ridge, I presume the sounding was taken at one of the points to the N, but I'm not clear on which one. Can the authors please clarify and add some thoughts as to the representativeness of that location?
- 3) Page 14, lines 583-588: the authors discuss blowing waves in Fig. 16a. It seems they are suggesting I should see a billow-like structure in the shading in Fig. 16a, but I don't really. I see turrets of aerosol backscatter, but not a curving structure where high values overtop low values. Can the authors please clarify?
- 4) Fig. 5: Please indicated from what site in the caption and what day in the x-axis.
- 5) Fig. 16: Please give the instrument locations used in this figure.
- 6) Page 9, line 417-page 10, line 451: I found the inclusion of a large-eddy simulation to be out of place given that the remained of the paper is observational only. I don't think this section is necessary.