

Response to the reviewer comments on the manuscript:
“Airborne observations of cloud properties during their evolution from organized streets to isotropic cloud structures along an Arctic cold air outbreak”

We thank the anonymous reviewer for carefully reading reviewing our manuscript again. They comments are very useful to improve the manuscript even more. A list of the reviewer comments (written in *italics*) as well as our response (written in regular) is given below. Whenever we provide information in which line changes were made we refer to the line numbering of the revised manuscript.

Comments Reviewer 1:

“I appreciate the detailed response. The Introduction is much stronger. Just a few minor comments:

“isotropic cloud pattern” is mentioned often. I suggest mentioning that that, given the high cloud fraction, this pattern broadly corresponds with “closed-cell cloud pattern”, a terminology used in many other papers (e.g.,

McCoy et al. 2017, <https://doi.org/10.1002/2017jd027031> ;

Wu and Ovchinnikov 2022 <https://doi.org/10.1029/2021JD035966> ;

Lackner et al. 2024, <https://doi.org/10.1029/2024JD041651>).

These 3 references refer to the CAO cloud regime. The isotropic cloud pattern shown here has relatively small cells, but then, the BL depth is very shallow also, and maybe cell size and BL depth roughly scale (change proportionally) as suggested by Wu and Ovchinnikov (2022), in other words, these cells are not too small and this cloud pattern can be called closed-cell?

Great comment. Thanks! We added a sentence in line 135.

L14: “inforce” is the wrong word. Enhance?

Thanks! We changed it.

L25: comma missing after “studies,”

That’s right. We fixed it.

L35 and elsewhere: according to google and my experience, “e.g.” (exempli gratia) is used before the examples to illustrate a point. It’s not used at the end of the example.

Correct. We don’t like it either and just removed it.

L40: “reasons for roll convection are controversially discussed in the literature”. Better state: “the environmental drivers for roll convection remain controversial ...”

Thanks, we changed it like you suggested it.

L341: at this point in Section 6, I recommend listing the key conclusions as a bulleted list. The first conclusion is your sentence: “A finding of this case study is that decreasing wind speed drives the transition from organized cloud streets to isotropic cloud patterns.” A sentence from higher up in the paper states this conclusion more accurately and more forcefully: (I copy) “Although based on a small sample size, these airborne observations provide the first direct in situ confirmation, to our knowledge, of the theoretical link between decreasing wind speed and the transition from cloud streets to isotropic cloud patterns, as previously suggested by modeling studies (e.g. Gryschka and Raasch, 2005)”

Thanks for this great idea. We changed the structure of the conclusions and use now four bullet points.