



EGUsphere, referee comment RC2
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Comment on egusphere-2022-693

Anonymous Referee #2

Referee comment on "Reanalysis representation of low-level winds in the Antarctic near-coastal region" by Thomas Caton Harrison et al., EGU sphere,
<https://doi.org/10.5194/egusphere-2022-693-RC2>, 2022

Review of

Reanalysis representation of low-level winds in the Antarctic near-coastal region

by Thomas Caton Harrison co-workers.

Summary

This paper assesses how well Antarctic coastal (predominantly easterly) winds are represented in three contemporary reanalyses products. The authors use self-organizing maps to assess under which synoptic settings these products perform best/worst. The topic of this paper is original and important, as Antarctic coastal winds are pivotal for the interaction between the ocean and ice sheet (melt) underneath ice shelves. The paper is well written albeit somewhat long. The figures could be clarified here and there, please see suggestions below. All in all, these comments should be addressable with minor revisions.

Major comments

l. 48: Important to make clear from the outset how 'synoptic' and 'katabatic' forcing are defined, and what the other processes (advection, thermal wind) entail. "...but its offshore extent is a source of uncertainty". By its definition, katabatic winds become zero over flat terrain (as confirmed in Figure 6); the resulting winds are either driven by momentum advection or thermal wind effects.

l. 87: Why was the neutral wind product used, and how large is the difference with the non-neutral product? Stability effects can be significant in polar regions. In l. 100 u^* is used to calculate the neutral winds, but usually, u^* already has the stability correction

applied, please confirm/comment.

I. 122: As the authors acknowledge, ASCAT is assimilated into all three products. This is then the place to comment on how suitable such a product is to assess the quality of the reanalyses. What causes any remaining differences anyway?

Minor and textual comments

I. 23: "Coastal winds also modify sea ice concentrations" Of course they do, but winds over Ross ice shelf are forced differently (barrier winds) and are predominantly south-north, rather than east-west. So perhaps not the best example for this particular study.
"

Figure 1: Include in the caption that arrows represent vector average wind speed, and so go to zero length in regions with zero directional constancy.

Figure 2: per row please include the name of the station.

Fig. 3a and b: Please include a color legend in the graph.

I. 252: surface -> near-surface (throughout for wind)

I. 260: "although the effects of atmospheric stability are accounted for in our analysis."
Unclear, do you use neutral wind speeds?