The revision has improved the manuscript, the writing flows better and the efforts to reduce the length has also improved it. That said it is clearly not written by someone whose first language is English, and it would benefit from edits by one of the more experienced writers on the long authorship list. The introduction is improved but could still use more polish. I also strongly object to the continued use of the term 'Shapiro-Keyser' without including clear language on what distinguishes a 'Shapiro-Keyser' cyclone from a regular cyclone. This work will rightly appeal to more than just the AC3 research cohort and should be written for a larger audience. Some readers may think differently about cyclones.

Abstract:
Line 16: what is 'aged subpolar warm air' - in particular what does the 'aged' refer to? I suspect the adjective can be removed without loss.

Line 19: agree w reviewer 1 that 'staying within the 10-90th percentiles' can be removed, you already say 'within the climatological variability' , that's enough.

Line 27: 'temporal shifts up to one day' - not sure what this means. Temporal shifts in what?

'Potential future studies' (line 22) and 'future analyses' (line 31) is redundant. Would suggest removing the first mention although I personally think the last sentence can be removed. It is what we call in the US a 'motherhood and apple pie' statement - something so general, bland and well-accepted that it doesn't need mention.

Introduction:
Line 40: 'the tendency' -> 'the jet stream's tendency'
Line 45: "the frequency of meridional transport': what does this mean? Transport of what? Frequency measured how? At what altitude ?
Line 50: 'meridional transport' of what? Probably also need to relate transport to a budget, e.g. if the meridional temperature gradient decreases while the tropics warm up, the meridional transport of temperature could increase but still have less impact on the high-latitude temperature budget than when the gradient was stronger.

I am not an expert on the larger-scale perspective either, and a larger lack of confidence is helping to drive Arctic research. I would suggest attempting to communicate that 'questions remain' as opposed to the current more assertive comments, e.g, 'xxx hypothesize that weaker, meandering jet streams will result in….' Then end the paragraph with something on 'most research has relied on global models unable to resolve mesoscale features well, leaving open questions on….'

Perhaps the more senior authors can step up here, to help polish the introduction a bit further? The first paragraph on p.4 is now confusing because the authors communicate instead a focus on MCAOs as opposed to the ARs of the previous paragraph. I think the paragraph may just need an additional connecting sentence to make the segue.

p. 9 top of page: please recognize somewhere that comparing a recent time period from ERA5 will assimilated soundings to earlier years with less data assimilation introduces a form of bias.

p. 13 line 323: please remove the presumptive description 'Omega block' here . Such terms get thrown around colloquially in weather discussions but unless they are a major focus of the writing they should not be used. Just describe what you have to say.

p. 17, top of page: sorry, not okay to just throw out the term 'Shapiro-Keyser' without describing what it is. Again it may be something that was tossed around within the AC3

weather discussions by a small group of people, but the audience for this manuscript can be anticipated to be larger, some of whom are likely to think about cyclones differently from the AC3 weather forecasting team. Currently what this writing communicates is an author list hiding behind a shorthand they can't explain, which then suggests that perhaps they also don't understand. Give this another try and also try not to rely on this term quite so much, it still appears in many places.

Line 423: what makes air 'aged' ? I find this an odd term. Does it matter?

p. 20-21, lines 445-450: again this reliance on a short-hand - Polar Low - that just comes across as slang. How is this mesoscale cycle a 'Polar Low' as opposed to simply a mesoscale cyclone? Do circulation features need to meet a quantitative criteria? This is all discussed in more depth in section 4.3, I would suggest just calling it a mesoscale cyclone at this stage in the manuscript.

p. 24 line 526: again this strange habit of calling air 'aged'. What the heck does this mean? Aerosol can be 'aged' but what distinguishes 'aged' air from 'fresh' air?

p. 28 line 609: nice to see some comparison between ERA5 and the dropsondes, showing that even with the data assimilation ERA5 isn't getting the full moisture flux. This is worth mentioning I feel.

Section 4.3: so fulfilling 5 of the 7 (or 4 out of 6) conditions put forth by Radowan qualifies a cyclone as a Polar Low? I would suggest stating that explicitly if so. As written the authors are appearing to presume the cyclone is a polar low and then just characterize it using Radowan's criteria. The discussion between lines 709-715 is nice and I'm fine with the system being called a Polar Low but would suggest rewriting the language so that it is not so initially presumptive.