



EGUsphere, referee comment RC3  
<https://doi.org/10.5194/egusphere-2022-351-RC3>, 2022  
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## **Comment on egusphere-2022-351**

Anonymous Referee #3

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Referee comment on "The composite development and structure of intense synoptic-scale Arctic cyclones" by Alexander F. Vessey et al., EGU sphere,  
<https://doi.org/10.5194/egusphere-2022-351-RC3>, 2022

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### Summary:

Overall very interesting and well-written paper. The paper studies the climatology of intense Arctic cyclones, something that has previously been done mostly based on case studies. The authors utilize a system-centered composition analysis following the cyclones through their lifetime allowing for complete and easily comparable climatologies to be made. The paper extends our knowledge on summer Arctic cyclones and makes the important point that Arctic cyclones can be structurally different depending on the season. Some minor corrections could be made into the text to enhance readability and clearing out some of the method choices made.

### Comments:

- Line 69: Any newer references on this topic? Maybe Varino et al. (2018) or Wicktröm et al. (2017)?
  
- Line 99: How are the identified cyclones grouped as cyclone tracks? The authors mention the nearest neighbor approach, but I assume there has to be some sort of limit, as to how far connected cyclone instances can exist from one another in order to be considered part of the same cyclone?



In text references:

Varino, F., Arbogast, P., Joly, B. *et al.* Northern Hemisphere extratropical winter cyclones variability over the 20th century derived from ERA-20C reanalysis. *Clim Dyn* **52**, 1027–1048 (2019). <https://doi.org/10.1007/s00382-018-4176-5>

Wickström, S, Jonassen, MO, Vihma, T, Uotila, P. Trends in cyclones in the high-latitude North Atlantic during 1979–2016. *Q J R Meteorol Soc.* 2020; 146: 762– 779. <https://doi.org/10.1002/qj.3707>

Valkonen, E., Cassano, J., & Cassano, E. (2021). Arctic cyclones and their interactions with the declining sea ice: A recent climatology. *Journal of Geophysical Research: Atmospheres*, 126, e2020JD034366. <https://doi.org/10.1029/2020JD034366>