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Interactive comment on "Future Meridional Wind Trends Through the Lens of Subseasonal Teleconnections" *by* Dor Sandler and Nili Harnik

Anonymous Referee #2

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Sandler & Harnik analyse the sub-seasonal structure of the wave-5 circumglobal teleconnection pattern in northern hemisphere winter circulation. Using on reanalysis- and model data they identify preferred phases, investigate the models' skill in the representation of the pattern, discussing the regional structures and respective trends.

Major Comments

Are the EOFs for DJF the same as for each month separately? Is there one Month that dominates the seasonal signature? For reference, Ding and Wang 2005 showed that the CTP had different signatures throughout JJA.

Could the authors quantify which models have been most accurate in the representation of the CTP compared to reanalysis? In the light of the 'strong disagreements'

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Discussion paper

between models, this might allow some careful statements which model is more reliable in terms of future projections.

Could the authors expand on what intrinsic mid-latitudinal mechanisms might trigger and maintain the CTP and its preferred phase?

Some unusual wording and unspecific terminology make it hard to understand the authors at times (see minor comments for some examples).

Minor Comments: -Include 'wintertime' in title. Further 'teleconnections' refer to patterns such as 'ENSO' or 'MJO' could this be further specified in the title to avoid confusion? -(p.1, l.2) '..variability ARE upper tropospheric..' -(p.1,l.4) Others have used the abbreviation CGT (see e.g. Ding & Wang 2005), consider changing CTP to CGT to stay consistent with the terminology used in the literature. -Try to avoid effusive / inessential expressions such as 'dramatically' (p.1. l.1), 'surprisingly' (p.1 l.4), (p.3. l.78) and (p.12 l.381), 'first described two decades ago' (p.2,l.25) 'most definitely' (p.14 l.437), 'unsurprisingly' (p.9 l270), 'most definitely' (p.14, l.437) -Could the authors add a few sentences on differences to summer Circumglobal / stationary waves to the introduction? -(p.1, l.4) Maybe change 'likeliness .. emerges' their 'frequency increases' or similar. -(p.1, l.6) Name the timescales (Monthly and 3-day mean right?) -(p.1,l.11) 'This categorization strongly corresponds to the ensemble spread in local trend magnitude.' It is not clear to me what this means in this context. -(p.1 l.15) 'Thus, we conclude that this hemisphere-wide climate change signature is actually comprised of several regional effects'. –What hemisphere wide climate change signature? Better use 'response'. Also the authors highlight in the paragraph before, that changes are found visible on a more regional level, how is it a hemisphere-wide signal? Please be a bit more concise. (p.1, l.20) 'Projections of future circulation trends, driven by anthropogenic climate change, commonly display large scale patterns.' It feels like this statement requires a reference. (p.1 l.21) '..in order to provide dynamical reasoning and theory.' In order to test hypotheses and theories? (p.1 l22.) '..development on finer scales?' What scales, higher temporal resolution? (p.1 l22.) 'changes in subseasonal to seasonal fluctuations' –

changes in variability or changes in subseasonal circulation patterns? (p.2 l.26.) 'term' change to 'pattern' (p.2 and later) The 'CTP' is described as 'a pattern' and then as 'the wave' or and then as 'waves'. Later it is described as 'a class of related patterns', all of them 'waves'. It would be helpful if the authors could rewrite that part while being more precise in terminology. The sentence in l. 37 should come a bit earlier to clarify the hierarchy among the terms, which are seemingly used synonymous earlier in the paragraph. (p.3. l70) is it an acceleration or a poleward shift (or both)? (p.23, l.74) works -> studies (p.3 l.79) please further specify what the conceptual gap is. (p.4 l.98) do the patterns depend on the chosen mid-lat range? (p.4 l.105) this sentence seems grammatically wrong? (p.5 l. 143) over which years is the climatology defined for re-analysis datasets? (p.5 l. 148 ff) Wouldn't a negative projection score mean a preferred phase opposite to the one in question while a score of zero would refer to an arbitrary phase? (p.6 l.159) why is a running mean of three days chosen? (p.6 l.163) 'future' (p.6 167) OLR – provide full expression before using an Acronym, here: outgoing long-wave radiation? (p.6 l171) What are the signatures of the other EOFs? Are they more local and excluded from the analysis for that reason? (p.7. l. 220) Please be more specific, I don't understand this sentence. (p.9 l.264) future , past (p.9 l.275) what is meant by temporal frequency here, their occurrence on subseasonal timescales? (p.9 l.281) can this statement be quantified? (p.9 l.286) as a three-day running mean was applied it is incorrect to speak of days in this context. Better use 'timestep' or similar. (p.10. l.288) How are events filtered? (p. 10 l. 290) change 'observational' to 'reanalysis' (here and everywhere else) (p.10 l. 299) 'much along the lines' -> similar to (p.11 l.340) The conclusion is hard to understand, could this be re-formulated? In the Discussion / Conclusion section: Could the authors provide the Figures in which each of the discussed findings is shown? (p.12 l.363) change 'business as usual' to 'high emission'. (p.12 l.364) what does 'decent skill' mean in this context? (p.12 l.369) add a short statement on consquences for predictability / future surface weather. (p.12 l.379). Where are those regions? (p.12 l.383) Reference? (p.12 l.385) 'Seemingly'? Does it or doesn't it? (p.13 l.397) 'However. . .' I don't understand this sentence. (p.13

l.406) ‘Another important scale is the spatial one’. Consider removing this sentence. (p.14 l.435) ‘There is difficultie in singling out..’ Could the authors be more specific? (p.14, l.437) provide reference (p.14 l.441) What else could provide relevant forcing? Consider citing Garfinkel et al. 2020 (https://journals.ametsoc.org/doi/10.1175/JCLI-D-19-0181.1?mobileUi=0) (p.14 l.446) PV = potential vorticity (p.14 l. 447) ‘It should be interesting. . .’ -> ‘Future analysis will focus on. . . ‘

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