

Weather Clim. Dynam. Discuss., community comment CC1  
<https://doi.org/10.5194/wcd-2022-34-CC1>, 2022  
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## **Comment on wcd-2022-34**

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Community comment on "The stratosphere: a review of the dynamics and variability" by  
Neal Butchart, Weather Clim. Dynam. Discuss.,  
<https://doi.org/10.5194/wcd-2022-34-CC1>, 2022

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L595-605 There have now been several studies that show that extratropical tropospheric responses to polar vortex variability do not actually project very well onto the annular mode structure, sometimes being displaced by as much as 5-10 degrees of latitude (see, e.g., Black and McDaniel 2007a;b and Sheshadri et al. 2014 for the tropospheric response to stratosphere final warming events). This was also demonstrated by Sheshadri and Plumb (2016) in the context of the tropospheric response to temperature perturbations in the Antarctic stratosphere (due to ozone depletion).

More generally, one might argue that downward "propagation" is an inaccurate characterization of tropospheric responses to stratospheric perturbations since the word propagation is typically used in the context of the propagation of waves.