

***Interactive comment on* “Bifurcation of potential vorticity gradients across the Southern Hemisphere stratospheric polar vortex” by Jonathan Conway et al.**

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Dear authors,

I think that it is absolutely vital for your study to reconsider your results with respect to the recently published work by Serra et al. (2017). Their geodesic method identifies a materially optimal vortex boundary. More to that, Serra et al. (2017) show also a comparison of their method with a "Nash" vortex boundary. To cite some of their conclusions: "Nash method is frame dependent and nonmaterial, hence a priori unsuitable for a self-consistent detection of coherent transport barriers." "Given its Eulerian (non-material) nature, the Nash edge evolves discontinuously, with visible jumps in position

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and shape over time."

My personal opinion would be that your analysis of PV gradients may be untouched, but the relationship to mixing barriers needs to tackle these new findings.

Best regards, Petr Šácha

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Uncovering the Edge of the Polar Vortex Serra, M., P. Sathe, F. Beron-Vera, and G. Haller *Journal of the Atmospheric Sciences* 2017 74:11, 3871-3885

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