

Interactive comment on “Smoke-charged vortices in the stratosphere generated by wildfires and their behaviour in both hemispheres: comparing Australia 2020 to Canada 2017” by Hugo Lestrelin et al.

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C1

Answer to reviewer #2

Scientific points

1. *Line 90 Müller & Günther uses Π_g for $\epsilon = -4$ and Π_L for $\epsilon = 9/2$. Maybe the authors could use the same convention, and add a comment to explain why they use different values of ϵ .*

We have added a comment regarding the choice of ϵ , which depends on the background temperature profile. However, we prefer to leave the notation as is to avoid introducing unnecessary new symbols, since the precise value of ϵ is not central to our argumentation and mainly included so that the analysis is reproducible.

2. *Line 114, the authors state ‘mean at the same latitude and altitude’. Do they mean a zonal average or a time average?*

It is a zonal mean.

3. *Can the volume integrated PV be determined for each vortex from the available data? If yes, can anything meaningful be discussed, in particular during the vortex evolution and the splitting events? Alternatively, does the nature of the way PV is obtained make such an analysis irrelevant?*

This is an interesting diagnostic that we have not yet developed and which could be combined with the aerosol sections provided by CALIOP. We would like to delay this development to another work in which we will study the life cycle of the vortices.

Minor wording points

1. *Line 30, sentence ‘It is a natural..’. Possibly rephrase to read ‘Investigating... is a*

C2

natural extension to [ADD REF(S)]

Done

2. *Line 37, maybe insert 'Australian' between '2020' and 'case'*

Done

3. *Line 116, if the steps $n-1$, n and $n+1$ refer to times, it may be worth mentioning is explicitly.*

Done

4. *Line 133, 'to dissociate/dissociating': the verb/term 'to split/splitting' is the most often used when discussing vortex breaking.*

Agreed and corrected

5. *Line 147, Please check the use of the word 'thalweg'.*

It has been replaced by the more common "trough".

6. *Lin 153, insert 'a' between 'month' and 'half'.*

Done

7. *Line 175, fix the reference to the figure*

Fixed

8. *Line 201 'formation' may be better than 'birth'; 'decay' or 'destruction' may be better than 'loss' (also line 118)*

Birth has been changed into formation but loss has been kept as we cannot say how long the vortices survived after we could not track them anymore. We have added a sentence mentioning this point.

C3

9. *Line 279, NH is not explicitly defined. Although line 331 suggests the authors refer to Northern Hemisphere.*

The few instances of NH and SH have been expanded.

10. *Line 313, SW is not explicitly defined.*

Expanded to shortwave

11. *Overall revise the punctuation. Some sentences are long and could be split into several shorter sentences. Additional commas could also help readability.*

We tried, however, to do our best in this respect. We have cut a few long sentences and added some commas.

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