

Atmos. Chem. Phys. Discuss., referee comment RC3
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Comment on acp-2022-497

Anonymous Referee #3

Referee comment on "Monitoring sudden stratospheric warmings under climate change since 1980 based on reanalysis data verified by radio occultation" by Ying Li et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-497-RC3>, 2022

This paper uses a new approach to monitoring the SSW and uses this new approach to understanding the climatology of SSW. This paper provides a useful tool for future SSW studies. The science of this paper is interesting, and most of the text in this paper is well-structured, for example, the introduction and the conclusions. However, the analysis in this paper is very unclear and many places hard to read, and I recommend a major revision before accepting. Most of my comments are only related to how to clarify it and not about the science, so I believe the authors will eventually make it a publishable paper.

General comments:

- Many figures in this paper are (a) too complex, and (b) of poor quality. For example, in figure 1, 5, 6, and 9, the annotations overlap with each other so very hard to recognize. Especially in figure 1b-d, with so many large dots, the readers cannot read any information. In figs. 6&7, figure y-axis limits are too low, and some data is cut off. The authors should really find out a way to convey the information in your figures clearly and explicitly. At least, your text in the figures should be easy to recognize.
- Many paragraphs in section 4 should be rewritten. I recommend using an opening sentence to state the argument of this paragraph, instead of saying 'Figure 3 shows...'. What is important in your paper should be these scientific arguments, not the explanations of your figures. In my opinion, sections 4.1-4.3 are only listed results, and section 4.4 should be the scientific conclusions you should emphasize, so efforts are needed to re-organize the paper and extract out useful information.

Specific comments:

Line 90 – why there is a () in reanalysis data?

Line 150 – name-coining: what does this mean? Also, you need to rewrite this sentence, for example, you should not use (i.e.) after as such

Line 152 – secondly, second after what?

Line 180 – ‘previous published climatologies reach to 2013 only and lack quality over the 1990s decade’ I think it is not true. Also, it should be ‘previously published.’

Line 241, line 265– ‘are overall similar’, ‘appear rather similar’: conclusions like ‘similar’ and ‘appear’ are too subjective and should not be in a scientific journal article, please check the rest of the paper to clarify your statements.

Line 267 – ‘leading to somewhat’: delete somewhat

Line 296 – ‘same three events’: how to define ‘same’?

Line 339 – this long sentence is too hard to understand

Line 426 – ‘we detected a number of events’, how many?