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 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?