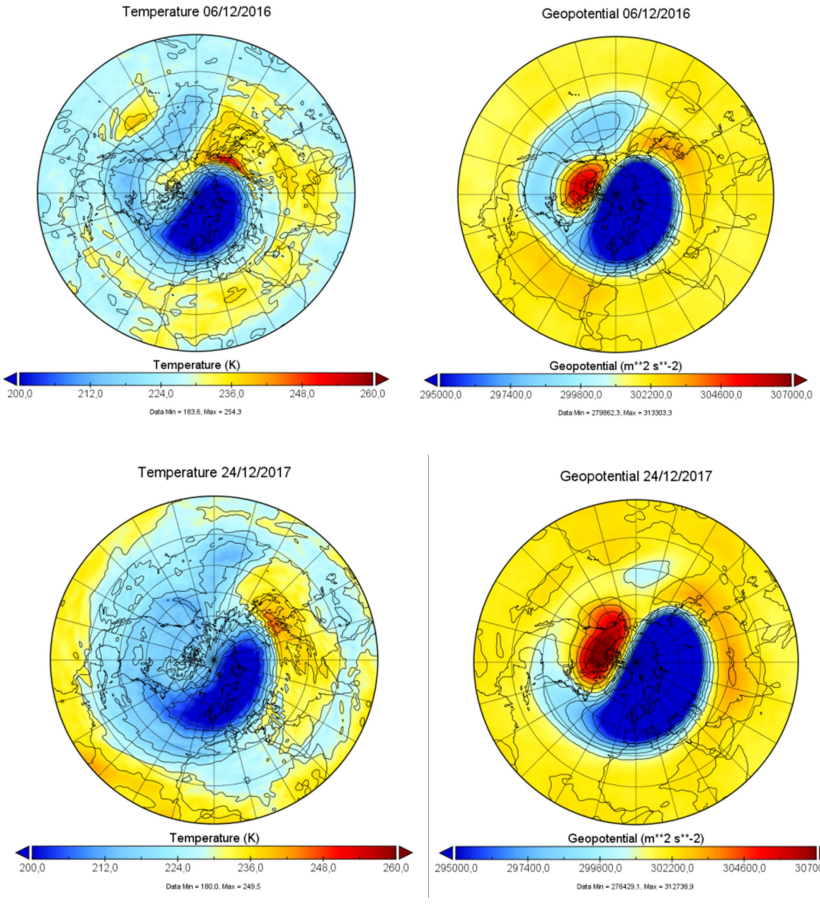
RC1:

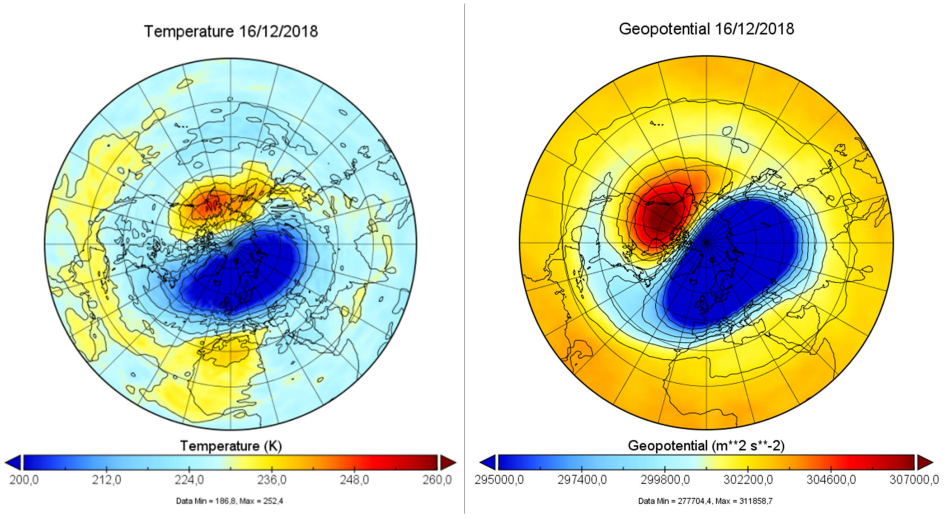
1) I do not understand why the term “stationary planetary wave” is used. The amplitude of the planetary wave (PW) is computed from ERA5 data from the given day but we do not know if the PW is stationary or travelling. The information of the phase evolution is needed to distinguish between stationary waves (constant longitude of the maximum) and travelling waves (longitude of the maximum shifting with time). It would be more appropriate to use only the term “planetary wave” or to show that the longitude of the PW is more or less constant.

AC - Indeed, we have chosen the term "stationary planetary wave" incorrectly. We have replaced this term on "planetary wave" in the text and in figure captions (Fig 3,6,9,12,14,15,17,18).

2) Observations are made on a middle latitude site (47.6N). The influence of PW phase should be considered. The TOR is at a longitude often close to position of the PW. To interpret the results I recommend to indicate also the spatial structure of SPWs as it is made for SSW (lines 113-115 and Figure 4. Is it the same for all SPW events ?

AC – We reviewed 10 hPa synoptic charts for all winters. Usually, a stratospheric anticyclone occurs over the North Pacific and then it moves to the north of Canada. The temperature rises to the west of the anticyclone just in the observatory area, then the heat region shifts to the northeast. I give below pictures for days when there were high amplitudes of planetary waves. As you can see, the figures are similar. Perhaps, upon detailed analysis of the PW location, we will notice a difference. But in our opinion, the processes in the middle and upper atmosphere are global and we will register a response to PW and SSW, no matter where they developed - in the western or eastern hemisphere.





3) Line 145. Please indicate why you consider the 2019-2020 SSWs are atypical.

AC - We call the 2019-2020 SSWs atypical because the warmings started one month later than usual. We wanted to emphasize the atypically late appearance of SSW. The wording "atypical" has been removed from the text (line 149). We assume that the timing of the SSW occurrence may be important. It is possible that the conditions for the PW propagation into the upper atmosphere begin to change at a time close to spring. Perhaps this explains the unusual reaction of the upper atmosphere to SSW in the 2019-2020 winter. We hope that we will accumulate more statistics and will be able to draw more informed conclusions.

4) Page 16, section 3.2., first paragraph. A more detailed description of the results is needed in this paragraph. It is said that the low emission is always observed during the increased activity of SPW1. This is not the case in 2019-2020 as well as for the increase of temperature. The temperature increase during SSWs does not occur always in the same part of the SSW period, at the beginning for SSW1 in 2016-2017, at the end for SSW 2 in 2016-2017, in the middle for SSWs in 2017-2018 and 2018-2019 and outside of the period for SSW 1 and 2 in 2019-2020.

AC - We followed the recommendation and added a more detailed description to section 3.2. (line 163-193)

5) Line 183. It would be more logical to inverse the sentence: “the stronger the wind inversion in the stratosphere, the stronger the wind inversion in the MLT”.

AC - We corrected (line 199).

6) Figure 16. Please add the signification of the three panels in the figure legend, not only in the text.

AC - Legend added (Fig. 16)

7) Line 227. What is the NNE ? It is not defined.

AC - This is a typo, right - SSW. Corrected line 247.

8) Section 3.4, lines 229-230. The increase in temperature standard deviation during SSW events is attributed to the increase in MLT tide amplitude. However the cause of this increase is not discussed in this section. Also it is not clear if the sentence refers only to winter 2019-2020 or to all winters. Looking at Figure 18, it seems that it is true also for other winters. An explanation is given in the conclusion

where the increase in tide amplitude is attributed to the increase in the altitude of the emission layer during the SSW. This interpretation should be also discussed in section 3.4.

AC - We have added interpretation to section 3.4, line 249-255.

RC2:

1) The work done on the extraordinary event of the first major Antarctic SSW which had as result the ozone hole split in Sep. 2002 has been ignored and must be cited.

AC – We cited papers (line 33).

2) The Lomb-Scargle (LS) periodogram method used must be elaborated for the readers convenience, citing Lomb, N. R. 1976, Ap&SS, 39, 447 and Scargle, J. D. 1982, ApJ, 263, 835.

AC – We cited paper (line 217).

3) The use of the term planetary waves (SPWs is incompatible with the theory of the ˙ study and not accurate.

AC - Indeed, we have chosen the term "stationary planetary wave" incorrectly. We have replaced this term on "planetary wave" in the text and in figure captions (Fig 3,6,9,12,14,15,17,18).

4) There are many spelling and grammatical errors in the text, and they need to be corrected.

AC - The final version of the text was revised by Prof. A. Kaplunenko, Head of The Translation Science Subdepartment at the Irkutsk State University.