Relations between cyclones and ozone changes in the Arctic using data from satellite instruments and the MOSAiC ship campaign

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Referee comments

We thank the reviewer for the helpful feedback on our manuscript! All comments were implemented in the paper. Our responses to the individual comments can be found below. The reviewer comments are given in red and our answers in black.

Referee #1

This paper nicely shows that well known connections between ozone, potential vorticity, tropopause height, and, more generally, tropospheric weather also work in the Arctic. I think the paper is well written and well illustrated and deserves publication in ACP.

I have only few suggestions for changes.

1) The color scale for ozone seems unfortunate in Figs. 1, 2, 3, 11. Especially in Figs. 1 to 3 everything is just dark blue and there is very little to see. Maybe a logarithmic color scale, say from 50 to 1000 ppb , would work much better. It would expand variations at low ppb, and compress variations at high ppb. I strongly suggest that the authors test this.

Color scale and color scheme changed for Figs. 1,2,3,11 to display also the ozone distribution in the range 46 – 100 ppb.

2) Also in Figs. 1 to 3: I am missing/ not seeing the red line for the tropopause. Please add.

Added the missing red line for the tropopause.

3) 2.2 Vertical resolution of 3 to 10 meters. While ozone sondes may give data points every few meters, the time constant of the ozone reaction cell is about 20 seconds - which corresponds to a vertical resolution of about 100m for ozone. This is still much finer than OMPS Limb profiles, which also integrate over a few hundred kilometers horizontally. The finer structures seen by the sonde, and their intrinsic measurement noise may well explain another good part of the lower correlations mentioned later in 4.2.3.

Changed the vertical resolution in the text to ~100m for the MOSAiC ozone sondes. Added a discussion (see section 3.2.3), that the finer structures could be another possible explanation for the lower correlation, but to test this we calculated the correlation between the ERA5 partial ozone column from 0 – 25 km and the ERA5 dynamical tropopause height for the same location and time as the MOSAiC ozone sondes and also got the same lower correlation of r = -0.51, which implies that the absence of cyclones are the main reason for the lower correlation.