Dear Reviewer,

Thank you very much for your positive evaluation and comments on our manuscript. We took your comments into account in the revised version of the manuscript. Please find below our detailed replies (black font) on your comments (blue font).

Reviewer #1

2 Specific Comments

One of the major points of the paper are longitudinal variations in both the climatological ozone distribution and in ozone trends, especially at higher northern latitudes. A good part of these variations seems related to intensity and position of the Aleutian stratospheric anti-cyclone. Unfortunately, the chosen map-projection does not show this anti-cyclone very clearly. Therefore, I strongly suggest to add a few polar projection plots, especially polar projection plots that show the climatological ozone distribution along with the decadal trends for a few selected levels and months or seasons.

Authors:
We plotted the climatology distributions and the trends also in polar projections (for both hemispheres) and included these figures in the Supplement. We do not observe a clear relation of ozone distribution and trends to the position of the Aleutian anti-cyclone. The observed regional trends might be related to the average position of the polar vortex. However, more detailed analyses are needed in order to confirm/reject this hypothesis. Such future analyses might include, for example, analyses of seasonal dependence of ozone trends or winter-spring trends related to the position of the polar vortex. This is discussed in slightly more detail in the revised version of our paper.

Reviewer #1

pg. 3 It would be good to give URLs and/or References for all the data used here, including ERA-Interim.

Authors: In Table 1, the references to the publications describing the individual datasets are collected. In the revised version, we added the reference to the ERA-Interim data and updated the reference to the HARMOZ_ALT dataset.

Reviewer #1

pg. 4, line 83: Are the used ozone profiles exactly the same as in the HARMOZ dataset, or are newer versions or reprocessed data used? Please clarify.

Authors: it is the updated HARMOZ dataset, we indicated this in the revised version.

Reviewer #1

pg. 4, line 95: It would be good to show some plots of H. Also, for instruments with many samples (large N), the standard error off the mean might be too small / underestimated, if not all N samples are independent. The authors should probably comment on that.

Authors:
An illustration of inhomogeneity measures *H* is now included in the Supplement. In the revised version, we also added a note: “The spatial bins are covered rather uniformly by the data. The inhomogeneity measure *H* is very close to zero for the instruments with dense sampling (MIPAS, SCIAMACHY, MLS,

OMPS). For OSIRIS and GOMOS, *H* is usually below 0.1 (good homogeneity of the data) with a few exceptions for some months and locations"

We added also a caveat about possible influence of correlations caused by orbital sampling on the standard error of the mean estimate with the reference to Toohey and von Clarmann (2013), and indicated that this is an approximation.

Reviewer #1
In many places, the English could be improved. The paper would benefit from copyediting by a native speaker.

Authors: The paper has been improved and will also be corrected by professionals who have a formal education in the English language.

Reviewer #1
3 Minor Comments
pg 1, line 27: delete "areas of"?

pg. 6, line 122: replace "in two" by "between two"
pg. 6, line 123: replace "selected" by "two different longitude"

Corrected

Figure 3: the high ozone in winter at 50 to 60 N, 120 to 140 E is a consequence of the Aleutian anti-cyclone. The authors might should mention that here.

As written above, we do not observe a clear relation with the Aleutian anticyclone.

pg. 7, line 142: which period? Please explain.

Corrected