Answer to referee #1

We thank the reviewer for the valuable comments and for the time and effort invested for this. Our replies to the comments raised by the reviewer follow. The revision has incorporated all the suggestions and comments from both reviewers.

GENERAL COMMENTS

I recommend it be edited for readability.

Done.

SPECIFIC COMMENTS

pg. 7642, lines 1719: Is this 40-50% at Rio Gallegos in Oct-.Nov. 20082009 and 25-35% at Kergulen in Oct-.Nov. 2005-2009?

The sentence has been simplified.

pg. 7646, line 515: Are the SCIAMACHY data used retrieved using all three viewing modes? If not specify which one(s) are used.

No, nadir viewing observations only. We have stated this in the text.

pg. 7650, line 1 and Fig. 4: Is it possible to indicate these three phases of ozone loss on Figure 4? Perhaps with shading?

Since there are already 13 shades of colours, while plotting the measured points on an additional shade, some of them fade out especially the lighter colour ones. Therefore, we have marked the phases in a slightly different manner.

pg. 7650, Section 3.3.1: a) what coincidence criteria were used for OMI and SCIA? b) Can any of the differences between the ground-based instruments and satellite instruments be explained by differences in geographical location of the measurements? c) Were the models sampled at the same time as the data?

a. The overpass measurements are within 100 km radius of each station position and the mean distance varies from 1 to 100 km depending on day and year, while SAOZ measurements are displaced 200-300 km in the direction of the sun.

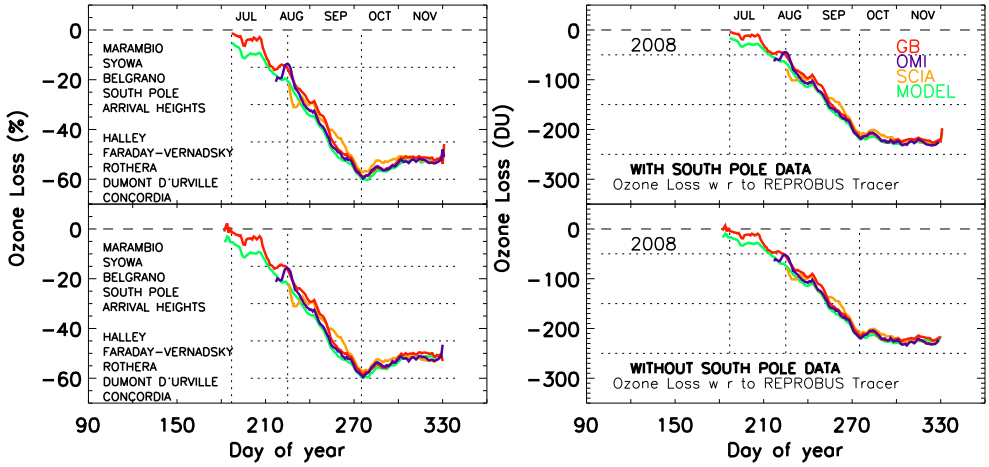
b. This may explain some differences in daily measurements (e.g. when the vortex moves rapidly) but has no impact on average. More important, as shown by a recent comparison among SAOZ and satellites by Hendrick et al (in prep.), would be the errors in the satellite data because of their temperature dependence and possible problems in the retrievals. However, OMI and ground-based observations are in general very good agreement (within 2%). Nevertheless, the geographical difference between the position of the stations compared to that of the vortex can induce some spread in the ozone loss estimates.

c. Models are sampled at the location of each station. The integrated columns are the diurnal averages.

We have included these points in the text.

pg. 7652, lines 24: What effect does excluding the South Pole have on the other data sets?

The differences are very small (0.5% or 1-2 DU) without the South Pole. As expected, the changes are found only in October-November. We tested this for ground-based and OMI data in 2008. Please find the resulted figure for the comparison. The upper panel includes and the lower panel excludes the South Pole data in the ozone loss analyses.



pg. 7652, lines 1011: What anomaly in the OMI data?

Because of this anomaly, they have now reprocessed the data. We have used this new set of data (version 8.5) for the revised version of the article. So the statement is invalid. We have removed it.

pg. 7652, lines 2627: Is there a reason that the loss from the model is smaller than from the data? It seems odd that 2006 would be different from the other years where the agreement was much better

The main reason might be the possible inaccuracies of the meteorological files used in the simulations (e. g. Bocara et al, 2008). Though there is no authoritative paper, it is known that there are some inter-annual changes in errors in ECMWF temperatures, due to changes in the operational system. Since there are no other changes in the input data for the model runs in 2006, the only possible explanation can be an inaccurate chlorine activation due to a wrong representation of PSCs, either because of inaccurate model temperatures (particularly over the Peninsula), or systematic errors in NAT or STS PSC threshold as indicated by CALIPSO measurements (Pitts et al., 2007). This has been mentioned in the revised text.

pg. 7653, line 1415: In Section 4 it is stated that the first signs of depletion occur in July for 2007-2009.

Corrected!

TECHNICAL CORRECTIONS

Throughout the paper: SCIAMACHY should be fully capitalized.

Done.

I found it a bit distracting that the paper switched between South Pole and AmundsenScott. Pick one and use it throughout.

We use now 'South Pole' throughout the paper.

pg. 7644, line 4: spell out AURA and SCIAMACHY here, as this is the first time they are used.

Done. However, AURA is Aura itself!

pg. 7644, line 21: AMFs (no apostrophe)

Corrected.

pg. 7653, line 13: small differences (instead of insignificant)

Replaced.

pg. 7760, line 26: Should be O'Connor

Changed.

Figure 3: Move the last sentence of the caption to before "Top: ...".

Done.