

Orte et al., 2019:

“Analysis of a southern sub-polar short-term ozone variation event using a Millimeter-Wave Radiometer”.

General comments:

The authors present a study about an atypical event of polar vortex and ozone hole influence over Río Gallegos during November of 2014. This event was detected from the Millimeter Wave Radiometer (MWR) measurements at 27 and 37 km and the advected potential vorticity (APV) was calculated from the high-resolution advection model MIMOSA (Modélisation Isentrope du transport Mésoéchelle de l’Ozone Stratosphérique par Advection) at 675 and 950 K to understand and explain the atmospheric dynamic related to ozone rapid variation during the passage of the polar vortex. In addition, the MWR dataset were compared for first time with Microwave Limb Sounder (MLS) to 27 km, 37 km and 65 km and with the Differential Absorption Lidar (DIAL) installed in Observatorio Atmosférico de la Patagonia Austral (OAPA) between October 2014 and 2015.

This work is a useful representation of the important contribution made by the Millimeter Wave Radiometer (MWR) at Río Gallegos and certainly, understand the ozone hole influence over Río Gallegos is of fundamental importance in many environmental processes which can lead to increases in the UV radiation on the surface. This increase in the UV radiation related to ozone reductions can be dangerous to life on earth and it represents a significant scientific advance.

After the first review, major corrections were suggested and in general the authors were able to remedy the main failures observed. The Point-by-point response to the referee comment’s was very clear and precise in most points, however small details can still be improved especially in discussing results in the literature, although this has already been greatly improved.

Because of these I would recommend to accept with Minor Revisions this manuscript. Also, because I am not a English language native speaker, I suggest to the editor to check if the English is proper for publication.

Specific comments:

- In the **abstract:** Requested modifications are made.
 - In the **1. Introduction:** Requested modifications are ok.
 - In the **2. Materials and methods:** Requested modifications are ok. However, a subsection should be created describing the UV radiation data used in this new version of the manuscript.
- 2.3
Why the comparison of the MWR with DIAL occurs only for the 27 km height. It could also occur for 37 km. Or is there any impediment?

➤ In the **3. Results**: Requested modifications are ok.

- Y axis of figure 7a (top) should contain values throughout the graph and contemplate values close to 230 DU observed.

➤ In the **4. Discussion**

Creating a discussion section instead of discussing the results as they occur in the text is always a dilemma. You can make the mistake of not discussing some results in the literature. Comparing the results with what was discussed. It is observed that not all results were properly discussed as listed below:

- In Pg 11, line 5: “The difference between measurements can be attributed to the typical uncertainties of each instrument, although another source of difference is introduced due to the non-collocated measurements inter-compared”. This affirmation was discussed but not referenced.
- Discussion on results related to UV radiation should be attached.
- Discussion on results related to AOH influences should be improved, mainly in relation to the advection of potential vorticity process which caused the observed ozone reduction.
- The first paragraph of the discussion has affirmations without reference.
- The present affirmation was not discussed: “When we compare the MWR with the MLS, it is considered that both instruments are measuring the same air masses, although the location of the satellite measurements differs from the location of the MWR measurements, which can introduce a difference in the ozone mixing ratio measured.”
- The present affirmation was not discussed: “One reason why the correspondence between the MWR and the DIAL is greater with respect to the MLS may be that the two instruments installed on the ground (MWR and DIAL) are monitoring the same air mass, while the distance with the location of the MLS observations could be introducing differences in the comparison”.

- The present affirmation was not discussed: “It is important to note that the MWR and DIAL instruments retrieve ozone in different fundamental units. While the MWR 30 provides the ozone mixing ratio, the DIAL provides the ozone number density as a function of altitude. The DIAL unit was converted to the MWR unit for the inter-comparison using the temperature and pressure retrieved from the DIAL. Thus, uncertainties in these parameters could be adding uncertainties in the ozone amount in ppm from the DIAL”.

➤ **Conclusions**

- Requested modifications are ok.