

Answer to Referee #2

We thank referee #2 for his constructive comments and on his suggestions, which greatly helped improving the paper.

As suggested, the paper is now reoriented towards an examination of how the various satellites are seeing the longitudinal differences in O₃ and NO₂ columns between the continental Bauru and oceanic Reunion stations, and which satellite is capturing best SAOZ observations there, and if not, the possible reasons for that. Indeed, if the data of the SAOZ network have been extensively used in various studies of satellite products at all latitudes, column measurements in the tropics are very particular because of the high content of tropospheric ozone often masked by high altitude cirrus clouds and thunderstorm anvils which make satellite retrievals particularly difficult.

In line with this objective, the paper has been deeply re-organized, the title changed, and the text re-written.

Specific comments

Page 4855 Section 2.3 Why the authors don't use GOME5.0 version, which is the latest official and fully validated version from ESA?

At the time of the initial writing, the GOME GDP5 version was not available. It is still not included but the authors have looked at the difference with GOME GDP4 described in the GOME-ER2 GDP5 Validation report available from <http://earth.eo.esa.int/pcs/ers/gome/reprocessing/>. The change in the new version is the use of the GODFIT radiative transfer calculation. Since, according to the report, the change in total ozone do not exceed the percent level at low and moderate SZA, the GDP4 version is still be used here.

However for SCIAMACHY the SGP version 5.02 version available earlier is now added in the analyses

Page 4860 Line 25-30 "The way longitudinal variations are treated in the retrievals" What do the authors exactly mean with that and how do they justify this. As it is written is confusing and rather speculative.

Indeed the writing was confusing. As explained above the major difficulty of satellite column measurements in the tropics is the way the tropospheric contribution, frequently masked by high clouds, is treated in the retrievals and the various assumptions made for that. For a better understanding of the products we tried to better explain the procedure used by each retrieval.

There is limited information in the paper how the merging of the satellite data have been performed (both for NO₂ and O₃)

The criteria used are: smallest biases, dispersion, drift and seasonality compared to SAOZ. After selection of the two best series of data, the only correction applied is a bias correction. As shown the resulting satellite merged series fully agree with SAOZ observations in both Bauru and Reunion, with the exception of the latter in Oct-Nov where satellites are showing a little more total ozone because of the presence of an African biomass burning plume in the mid-troposphere underestimated in the SAOZ zenith sky measurements at twilight.