

Review of

Multi-year assimilation of IASI and MLS ozone retrievals: variability of tropospheric ozone over the tropics in response to ENSO. By Peiro et al:

General:

Although the authors have revised the manuscript in accordance with the referee comments, there are still some points to be clarified and corrected for the manuscript to be accepted for a publication on ACP. Please consider the following suggestions and revise the manuscript accordingly. The authors are requested to make a response file with answer to the comments/suggestions.

Major:

1. A thorough language editing is inevitable at this stage.
2. Except in Introduction, there are small paragraphs in all sections, although they are very much connected. This paragraph separation makes the reading a bit difficult, as there is a feeling that the authors are discussing some other aspect (e.g. IASI and MLS measurement description paragraphs, and Section 2.2.1).
3. Please avoid starting a sentence with an abbreviation. There are many in the article.
4. It is necessary to add a few sentences in conclusion about the importance of this study in a perspective of climate variability, such as the ENSO and chemistry connection, and how that would affect the tropospheric chemistry in climate change scenario. In addition, the authors also need to state the advantage of IASI or similar satellite measurements to be used for studies on ENSO dynamics.
5. Is there any longitudinal variation in the linearized chemistry scheme? If not, can this be used for atmospheric/constituent changes induced by the Walker circulation? Please write a few sentences about this in the appropriate section.

Specific:

There are many language/editorial corrections. Some are listed below. Please go through your manuscript thoroughly and correct them.

Page 01

Line 5: for six years

Line 8: A horizontal resolution

Line 10: The MLS and

Line 10: 4-D variational

Line 14: "correctly reproduce" is not correct here, as the model cannot/did do this. Perhaps, you could use "well reproduce" or something similar.

Line 15: "for the period of study"
Line 16: The IASI-MLS analysis
Line 17: Pacific Ocean, although a correction is required

Page3

Line 9: "by analyzing the OMI-MLS data"
Line 12: "The MLS and TES data"
Line 12: "chemistry-climate model"
Line 17: MLS and OMI data (not "determinations")
Line 23: "Because of its stretched spatial coverage"? or something similar
Line 26: "well suited to"
Line 30: "using eight years of measurements"

Page4

Line 8: Is this the LINOZ scheme?
Line 13: "tropospheric retrievals from satellite measurements"
Line 18: "layout" is not good word choice
Line 25: "is one of the instruments onboard the polar-orbiting satellite MetOp-A"
Line 26: The MetOp-A satellite was launched on ...
Line 29: "The detectors cover the thermal"

Page 5:

Line 14: delete "a" before "partial"
Line 19: constituents or trace gases not "parameters"
Line 22: "and 6 km, depending altitude"

Page 6

Line 1: "Validation measurements"
Line 7: "Retrieval errors"
Line 16: "There is no single ..."
Line 16: delete "able"
Line 18: delete "one"
Line 19: Based on thirty years of satellite measurements ...
Line 27: not "by Zeimke", but cite his article here, and then write "... were derived from the NCEP data"

Page 8:

Line 8: The tropospheric height is very high in the tropics, about 14—16 km. So the 0-6 km column represents the tropospheric column?
Line 14: Are you talking about the convolution / smoothing? Then please state that.

Page 9:

Line 14: spatial variability of TCO
Line 16: "...reproduce the observed ozone variability"
Line 20: delete "one "

Line 21: delete "second one"

Line 22: "Validation with ozonesonde measurements". There are other sounders too.

Line 24: The O₃ data have been..

Page 10:

Line 4: "...South Africa regions"

Line 8: What is RSD?

Line 27: MLS-a, respectively

Page 11

Line 2: ranges "from"

Line 8: fewer number of measurements

Line 18: variability of ozone concentration *changes*?

Line 23: LaNina is the second phase of ENSO?

Page 12

Line 19-20: "The biases are limited over the period under study". How can it be? You estimated the bias using the same set of measurements

Page 13:

Line 5: water-induced

Line 6: warm SST

Line 7: occurred between

Line 7: September not Septembre

Line 8: the strengthening of

Line 12: OMI-MLS data have been

Line 18: opposite structure to that of TCO?

Line 19: "between 110° and"

Line 30-321: underestimated by both simulations

Page 15

Line 21: Vertical structure of O₃

Please merge the first three paragraphs of section 3.2.3 to one paragraph

Page 17:

Line 29-30: delete the sentence starting with "The computational.."

This is not concluding statement.

Line 32: "assimilation process, such as the balloon and aircraft measurements."

Page 18:

Line 5: "my PhD", the first author's?

Please read carefully and correct others. Thank you.