

Interactive comment on “Response of Trace Gases to the Disrupted 2015–2016 Quasi-Biennial Oscillation” by Olga V. Tweedy et al.

Anonymous Referee #1

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The QBO showed a behavior in 2015–2016 which has never been seen before. The development of the meteorological fields has been described elsewhere but the present paper contributes by describing how ozone and HCL changes during the event. I find that the paper contributes with new information and that it is well written. However, I have a few relatively minor points that the authors should consider before the paper is accepted.

Major comments:

In the introduction the QBO in ozone is described. However, I find this description somewhat confusing. First of all I miss a statement about if the ozone QBO is in phase with the QBO in the zonal mean wind. I am also confused about the statements about the seasonal synchronization (line 33 and 57). There is only a weak seasonal signal in

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the QBO in the zonal wind.

There is only very little mention of statistical significance (line 214). The statistical significant regions should be indicated in Figs. 1 and 3 and the method to calculate the significance should be described in more details.

Minor comments:

l49: downward -> downward propagating?

l88: How can temperature and ozone have different vertical resolutions (3 and 4 km) when they both are reported on 12 pressures per decade?

l186: The authors could be more specific here. Will the interfering make it more difficult to determine the trends? In fact, one could argue that the disruption will make it easier to establish the connection between QBO and ozone and therefore easier to determine the residual trend.

Figure 2. I am not sure this figure helps and I can not see that this analysis is used elsewhere in the paper. I would suggest that it is removed or, if the authors find it important, that also the EOFs are shown and the amount of variance they explain is mentioned. Actually, a similar figure was shown in Dunkerton 2016 (GRL 10.1002/2016GL070921) which should be cited.

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