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# ***Interactive comment on “Net influence of an internally-generated QBO on modelled stratospheric climate and chemistry” by M. M. Hurwitz et al.***

## **Anonymous Referee #3**

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The paper describes the impact of an internally generated QBO in a version of the GEOSCCM. The same model version is run for two 50 year time-slice integrations. In the one integration a strong non-orographic GWG is specified and generates a QBO. In the other integration a weak forcing is specified that does not generate a QBO. Both model runs are compared to each other, and differences between them are discussed. Even though the paper is generally suitable for publication in ACP(D), I would suggest some revisions to lift the paper above the level of a technical note.

My major concern is that the authors seem to imply that the QBO is “doing something to the high latitudes”. They skip the interesting and important point of how, for exam-

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ple, planetary wave propagation is changing, where resolved and unresolved waves dissipate and why transport barriers are changing. It would be nice to show the non-orographic wave drag and to discuss changes in the propagation characteristics of planetary waves (amplitudes / phases), “communicating” the equatorial changes to high latitudes.

The title mentions a “net influence” and I am still not quite sure what this is. Certainly the tropical variance should increase, and the mean will change, so presumably Figure 2 is showing the “net influence”. Maybe this wording could be avoided?

The paper focuses on the Q-N differences (Q/N ratios). MERRA is shown once, but I find it very hard to decode the model biases and how they change between Q and N. Maybe the authors could consider a slightly more detailed discussion of the general model biases with respect to the reanalysis data? This would help the reader to understand the basic behaviour (improvements?) of biases and planetary wave propagation better (which will hopefully be mentioned in the next paper version).

Short questions and comments:

P13502, L15: I don’t understand the point about water vapour. It seems counter intuitive and doesn’t mention the role of temperature changes. Please clarify!

P13503, L21: capital “S”

P13504, L16: Which month? Is the Holton-Tan relationship always there? Why not discuss the planetary waves and show the HT relationship explicitly?

Is the change in tropical age-of-air significant (Figure 9)?

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