

Author and all co-authors would like to thank all Reviewers once again for their attention to the manuscript, which allowed it to be further improved. The clarifications have been made to the text in accordance with the Reviewers minor comments.

Reviewer #1

The authors have satisfactorily addressed my comments and the resulting manuscript is much improved. My only remaining comment is that I believe the discussion section could still benefit from a bit more nuance and detail about the broader implications. In the revision, you addressed my comments about the implications of the waves on the polar vortex with the addition of statements like "and therefore affects the strength of the stratospheric polar vortex". While this is an improvement, I think your paper would benefit from a little more detail about (1) what ways the strength of the vortex is affected and (2) why this matters. Other than this, I think the paper should be accepted for publication.

Discussion section have been extended (L379-386 in Author's track-changes file), and references were added (L413-414, 419-420, and 557-559 in Author's track-changes file).

Reviewer #2

The authors have done a thorough and high-quality job of finalizing the article, taking into account all comments made in the previous reviews. The changes made have strengthened the scientific value, clarity, and validity of the presented study. The introduction and conclusion have been expanded and revised. A detailed description of the numerical experimental design in MUAM has also been added; this addition is the most significant improvement in terms of scientific rigor and reproducibility. Key findings on the influence of QBO/ENSO phase combinations on the amplitudes and wave activity fluxes of different PWs (SPW1, SPW2, 5-, 10-, 7-day waves), including shifts in latitudinal distribution and amplification/weakening effects, are presented clearly and supported by the results. Thanks to these revisions, the article has reached a high level of quality. This work makes a valuable contribution to understanding the complex interaction of tropical oscillations and planetary waves in the atmosphere and their role in large-scale circulation. I recommend accepting the article for publication in its current form.

Thank you!

Reviewer #3

I am satisfied with the revisions to the paper introduced in the methods, discussion and conclusions. I recommend the paper be published once the following minor technical clarifications are addressed.

L 106 in tracked changes document "Ion friction, molecular and turbulent viscosity..."

I am assuming these are not part of the radiation unit, and part of a "dynamical unit"? I am not deeply familiar with the MUAM infrastructure, however if they are part of the radiation unit, please could you caveat that "Heating due to ion friction, ... and 3-dimensional ozone distribution are also taken into account"

Clarifications have been added to the text in the specified section (L101-102 in Author's track-changes file).

L 136 in tracked changes: "implicates" -> "activates"?

Thanks, revised (L130 in Author's track-changes file).

L 167 in tracked changes - "Besides ... were founded in EOS MLS"

The meaning here is not clear to me, were the various wave amplitude maxima, and the PW nonlinear interactions simulated by MUAM consistent with EOS MLS? Please could you make the meaning more clear, e.g., change "besides" -> "Additionally", and "founded" -> "found" if so.

Clarifications have been added to the text in the specified section (L159-161 in Author's track-changes file).

Yours sincerely.

K.A. Didenko and co-authors