

Interactive comment on “Satellite observations of middle atmosphere gravity wave activity and dissipation during recent stratospheric warmings” by Manfred Ern et al.

Manfred Ern et al.

m.ern@fz-juelich.de

Received and published: 18 July 2016

Dear Editor, Dear Reviewers,

Many thanks to the Editor and also many thanks to all Referees for their very helpful comments that significantly helped to improve the manuscript!

This is a short summary of the changes that are made in the revised manuscript. For more details see out point-by-point reply to all reviewer comments.

The main concerns by Reviewer #1 can be summarized as follows:

C1

- (1) Are there indications for stratospheric gravity wave sources?
- (2) Are there differences in gravity wave momentum fluxes and drag comparing Hitchcock and Shepherd (2013) (HS13) with our work?
- (temporal evolution of magnitude/time scale of recovery during PJO events)
- (3) Is there really an enhancement of gravity wave activity prior to/around SSW central dates?

The main concerns by Reviewer #2 can be summarized as follows:

- (4) What could be the reason for enhancements of gravity wave activity prior to/around SSW central dates?

The main concerns by Reviewer #3 can be summarized as follows:

- (5) Title of paper is not fully appropriate!
- (6) Role of residual circulation for thermal structure and changes of background wind should be discussed more clearly!

These main concerns have been addressed, and the manuscript has been modified as follows:

1. We have added the statement that, from the observations alone, it is difficult to decide whether sources of observed gravity waves are located in the stratosphere.
2. Just after the central date, observed gravity wave momentum flux seems to be stronger than in HS13. This information has been included. Further, a new Fig. 4 has been added in order to show that time scales of recovery in our work are similar as in HS13.
3. From the new Fig. 4, it is indicated that gravity wave squared amplitudes can be enhanced before or around the central date of vortex split events.

C2

4. We have added some reasoning why gravity wave sources may be enhanced for vortex splits.
5. We have changed the title of the paper to:
“Satellite observations of middle atmosphere gravity wave absolute momentum flux and of its vertical gradient during recent stratospheric warmings”
6. The role of anomalies in the residual circulation is now discussed in more detail in Sect. 4.3. Further, some misleading statements were removed.

For details and our reply to all other comments see the point-by-point reply and the revised manuscript.

Again, thank you very much for your effort!

Sincerely,
Manfred Ern

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-276, 2016.