Atmos. Chem. Phys. Discuss., 7, S273–S274, 2007
www.atmos-chem-phys-discuss.net/7/S273/2007/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Interannual variability of the stratospheric wave driving during northern winter" *by* A. J. Haklander et al.

Anonymous Referee #1

Received and published: 23 February 2007

The paper analyzes the interannual variability in a quantity, the eddy heat flux, related to the vertical component of the Eliassen Palm flux at the the tropopause level. The paper splits the eddy heat flux in different zonal wave numbers as well as transient and stationary parts and use linear correlation analysis to relate the different parts of the eddy heat flux at the tropopause level to the eddy heat flux elsewhere in the meridional plane.

The vertical component of the Eliassen Palm flux is an important quantity as it is central for the understanding of the dynamical coupling of the stratosphere and troposphere. I find that the paper is well written and that it contributes with new although not very surprising information.

However, when the authors discuss and interpret the results (for example on top of p75 and in the introduction) they seem to be under the impression that EP-flux is a simple measure of the wave activity propagating from below. This is far from correct as wave activity can be generated by instabilities in the stratosphere and influence the EP-flux at the tropopause level. A very good example is the modelling studies of the downward propagation from the stratosphere to the troposphere. Even models without an explicit troposphere can generate large and realistic variability in the stratosphere (see Stratospheric vacillations in a general circulation model, Christiansen, J. Atmos. Sci., 56, 1858-1872, 1999). This point should be discussed in more detail in the paper.

The authors should also explain why the eddy heat flux is a good approximation for the vertical Eliassen Palm flux. Why are the other terms not important?

The authors give significance levels and error bars for their results. This is admirable but they should discuss the methods behind these calculations and their assumptions. Something is clearly wrong in the bottom of page 72. You should not be able to find several statistical significant 20-years trends in your time-series. This suggests that your method is wrong - perhaps you overestimate the degrees of freedom.

If the authors address these three concerns satisfactorily I will be ready to suggest that the paper is accepted for publication.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 65, 2007.

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