

## ***Interactive comment on* “The relationship between tropospheric wave forcing and tropical lower stratospheric water vapor” by S. Dhomse et al.**

**S. Dhomse et al.**

Received and published: 16 February 2007

report **Reply to interactive comment by S. Fueglistaler on "The relationship between tropospheric wave forcing and tropical lower stratospheric water vapor" by S. Dhomse et al.**

by **S. Dhomse**

*(Reviewers comments are in italics.)*

*Dhomse et al. present an interesting correlation between tropical lower stratospheric water vapour and 50hPa eddy heat flux. In essence, they attribute much of interannual variability of stratospheric water vapour to variability in eddy heat flux, a result that*

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*contrasts somewhat with the conclusions of Fueglistaler and Haynes [2005], namely that the interannual variability of the 1990's is dominated by the QBO, and to some extent by ENSO. The drop observed around 2000 indeed may be attributed to changes in the BD-circulation. One difficulty certainly is the attribution of interannual temperature variability at tropical tropopause levels to processes, but for some years, Figure 2 of Fueglistaler and Haynes quite convincingly shows the role of the QBO. For example, the year 1997, which is an outlier in the Dhomse et al. correlation, is well explained by their calculations. Conversely, 1998 appears to be a consequence of ENSO. In all likelihood there exist some correlations between these phenomena and eddy heat flux at 50hPa, but it appears to me that the direct attribution of the water anomalies to the BD-circulation (again: apart from the drop observed in 2000), may be less clear than what the correlations shown by Dhomse et al. suggest, and hence deserve some more discussion.*

*References: Fueglistaler, S., P.H. Haynes, Control of interannual and longer-term variability of stratospheric water vapor, J. Geophys. Res., 110, D24108, doi:10.1029/2005JD006019, 2005.*

We thank Stefan Fueglistaler for pointing out at one of the missing link in our manuscript. In our revised version, we clearly stress out the important aspects of Fueglistaler and Haynes (2005) that WV VMRs are strongly correlated with the cold point temperature and that the modelled WV VMRs are in agreement with observations. The QBO and extra-tropical wave driving are strongly coupled with each other through the Holton-Tan mechanism and hence the influence of these two processes can not really be separated. The exception of the years 1991 and 1997 from this relationship clearly show that the BD circulation do not explain all the variability in the WV observations.