Atmos. Chem. Phys. Discuss., 10, C12081–C12082, 2011
www.atmos-chem-phys-discuss.net/10/C12081/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aura MLS observations of the westward-propagating s=1, 16-day planetary wave in the middle atmosphere: climatology and cross-equatorial propagation" *by* K. A. Day et al.

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Received and published: 7 January 2011

The authors present a climatology of the 16-day wave using Aura/MLS temperatures in the stratosphere and in the mesosphere. They show the 16-day wave to have a strong seasonal component maximizing in winter in each hemisphere.

The authors compare the ground-based phase speed of the 16-day wave with URAP winds. The URAP winds are from a seasonal composite of UARS data during the years 1992–1995. It would be much more meaningful to calculate gradient winds from Aura/MLS geopotential. In their discussion they stress the strong interannual variability, but then use seasonally composited winds from years that do not correspond to the MLS observations.

On page 23201 the authors mention studies that revealed a weaker summer-time maximum in 16-day wave amplitude. This reported feature is used implicitly later in the paper when they argue that there is cross-equatorial ducting of the 16-day wave leading to a QBO dependence. However, their own observations appear to contradict the summer-time maximum. There is no summer-time secondary maximum evident in Figure 5. The anti-correlation in the two hemispheres of the stratospheric 16-day wave amplitude argues against cross-hemispheric coupling. The 16-day wave is at least as strong in the stratosphere as in the mesosphere, and this also seems to argue against a source from the other hemisphere.

It is questionable whether 7-years is a sufficient length of time series to establish a correlation for a motion with a period of 28 months. This time series is about 3 cycles of the QBO. There are several stratospheric sudden warmings during the 7-year period that are likely to be larger perturbations on the planetary wave field, and a very deep annual cycle. There is nothing wrong with mentioning the possibility of a correlation, but it seems like a conjecture and does not belong in the conclusions. Since the 16-day wave has a large amplitude in the stratosphere, a QBO dependence might be investigated using a long data record like the UK Met Office Meto data.

The paper has some discussion of the relation between the zonal wind and 16-day wave amplitudes, but it lacks specificity. It would be interesting to investigate whether the interannual variability is related to changes in the zonal winds, if this were done year-by year.

The authors should be encouraged to do further analysis of the data, but I do not recommend publication of the manuscript in its current form.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 23197, 2010.