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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.

Anonymous Referee #2

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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.

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Interactive Discussion
Discussion Paper

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.

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