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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The 16-day wave in the Arctic and Antarctic mesosphere and lower thermosphere" *by* K. A. Day and N. J. Mitchell

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Firstly, we would like to thank the reviewer for their suggestions for improving our paper. Our paper has thus been revised in light of the comments and we think that our paper is significantly stronger as a result.

Response to small critical remark: With regards to "explain that the observed periodic wind variations are in the ïňĄrst order oscillations of winds which can be related to and interpreted as planetary waves", we have added a sentence explaining that we are interpreting these quasi-period oscillations as a signature of the 16-day planetary wave as follows;

This period range was chosen because the wavelet analysis in Figure 1 demonstrates

that there is significant wave activity within this period range and the theoretical work mentioned above suggests that this is due to a global-scale wave number one planetary wave. Hereafter we will refer to oscillations within this period range and as the "16-day wave".

Response to numbered remarks:

1. A paragraph has been added at the end of section 4 linking our observations to the proposed excitation mechanisms of the wave and suggesting how further studies might discriminate between the two main proposed excitation mechanisms of the summer-time wave. 2. There is no simple relationship between wind and temperature amplitudes predicted by the models, it varies as a function of height and latitude. However, our temperature amplitudes appear similar to those predicted by Forbes et al. (1995). 3. Our understanding is that the temperature fluctuations caused by the planetary wave result from the small vertical motions caused by the wave. The meteor temperature method itself has been extensively described in the three papers referenced, Hocking (1999), Hocking et al. (2001 and 2004). We therefore believe the temperature measurements to be reasonably robust.

Response to minor comments:

1. We have changed the order of the two sentences in the Abstract as suggested. Comparing Abstract and Conclusion maximum amplitude, they have been checked and altered appropriately. 2. We have used a Butterworth filter because such filters have been commonly used in previous studies of the 16-day wave. Our filter is actually the standard Butterworth filter found in MatLab and we now mention this in the text. We agree with the reviewer that this is only one of a number of ways of identifying a 16-day signal in the wind/temperature time-series. 3. Agree and changed. 4. Agree and changed. 5. Agree and changed. 6. Agree and changed. 7. Agree and changed. 8. Agree and changed.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 25213, 2009.