

Interactive comment on “Mean winds, temperatures and the 16- and 5-day planetary waves in the mesosphere and lower thermosphere over Bear Lake Observatory (42deg; N 111deg W)” by K. A. Day et al.

Anonymous Referee #1

Received and published: 22 December 2011

Review of K. A. Day, M. J. Taylor, and N. J. Mitchell “Mean winds, temperatures and the 16- and 5-day planetary waves in the mesosphere and lower thermosphere over Bear Lake Observatory (42N 111W)” ACPD 11, 30381–30418, 2011

General

This paper presents new data from a meteor radar at BLO and as such will be of interest to the MLT community. This paper firstly covers the background wind observed over several years and then proceeds to discuss 5- and 16-day oscillations observed in

C13533

the radar and temperatures from the Aura satellite. The paper is in general reasonably well written although I believe that some of the key results require a greater degree of scrutiny than they are currently afforded in the manuscript. The subject matter is appropriate for the journal. I would recommend publication after satisfactory resolution of the points detailed below line by line:

P30382 L7 “at all observed heights” or “at all meteor ablation heights”

P30382 L8 “speed” is a scalar quantity, and in this case cannot have a negative value (implying a negative distance or time going backwards!) – I think the authors repeatedly use “speed” when they mean “velocity” (northwards or eastwards positive) e.g. P30393 L27 and throughout the manuscript.

P30382 L17 “significant” are they significant, at what level of statistical significance, or do you mean “large”?

P30383 L3 are there really 32 occurrences used here? I count 16 green and 8 blue dots on Fig 10. See comment below on the presented values of AT and AW

P30384 L9 I am unaware of any studies that state the BD (or DB) circulation, driven by planetary wave breaking, drives the pole to pole circulation at meteor ablation altitudes other than through the selective filtering of upward propagating gravity waves. The authors should expand on this point (which is also repeated in the discussion) and support it with references.

P30384 L24 what is a “significant meridional wind”?

P30385 L23 some references required as to previous use of these period ranges

P30387 L17 typo, delete “they”

P30388 L7 typo, delete “on”

P30388 L26 and fig 1 I don’t see the “two distinct episodes of maximum flow” on these plots, please explain this clearly

C13534

P30388 L28 can you really say the lag is “two weeks” when you are using monthly mean winds and temperatures? This is one of your key results (stated in the abstract), but I don’t see how you can “resolve” any differences smaller than one month? Please explain.

P30390 L18 typo “difference”

P30392 L23 which solstice?

P30393 L2 some references to the previous work are required here.

P30393 L17 I would describe the summer peak here as a secondary maximum with minima around the equinoxes

P30394 L3-7 why do all the values in this paragraph suddenly “appear to be” rather than “are”?

P30394 L16 some references to PW damping during SSWs are required here.

P30394 L29 and P30395 L3 what are the statistical significance (if any) of the correlation coefficients presented here?

P30395 and fig 10 is there any statistical significance on the gradients of the (linear) fits presented here? This is another of your key results and needs an error analysis. In particular, have you forced the fits to pass through (0,0) and if so, why?

P30397 L8 and L15 are these agreements really “remarkable” or just “good”?

P30397 L21 what “measurement biases”? Why are measurements made by Na lidars biased from those made by meteor radars? Also P30398 L4 discusses “measurement biases” what are these biases and how do they arise and how large are they?

P30398 L13 typo, “nd”

P30399 L19 typo “sites”

C13535

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 30381, 2011.

C13536