

Interactive comment on “Validation of the Aura High Resolution Dynamics Limb Sounder geopotential heights” by L. L. Smith and J. C. Gille

Anonymous Referee #2

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The authors present a validation of HIRDLS v7 geopotential height (GPH) compared with NCEP and ERA-Interim. Based on these comparisons, they conclude that HIRDLS GPH is scientifically useful to within 200 m, having a precision of between 2–30 m. Overall, I think the analysis method is sufficient to demonstrate the usefulness of the data up to 1 mbar. I recommend that the paper be published with a few revisions.

1) The authors infer scientific usefulness up to .01 mbar, but show comparisons no higher than 1 mbar. This conclusion is reached based solely on the usefulness of temperatures up to this pressure level and the fact that the GPH is derived from the temperature. Since this is one of the main conclusions, it would be nice to know how useful it is above 1 mbar. Comparison to other datasets such as SABER could greatly enhance this conclusion and quantify the degree to which it's useful above 1 mbar.

C343

2) There is no discussion of the quality of the data sets HIRDLS is being compared with. Are we to take these as “truth”, or is there an inherent bias with these that we should be aware of in our interpretation of the results? Also, you mention a few times the GPH comparing well with WACCM in analysis not shown. I am curious to know what version of WACCM this is, if it is the Specified Dynamics (SD) or a free-running version, and if it's free running, how you are comparing specific days in HIRDLS to WACCM (for example: page 1009 line 20–22). I am also somewhat surprised that GEOS-5, WACCM, and NCEP are all in good agreement as this suggests.

Specific Comments:

pg. 1005 ln. 17: What does the Kapton tape have to do with this?

pg. 1007 ln. 1–4: Why do you do this?

Sentence beginning on pg. 1007 ln. 28: Why is this? Because the derivatives are within the .04mkm⁻¹ criteria? I can see it in the figure, but it would help if you state it explicitly.

Pg. 1008 ln. 5–6: Reference? I believe ÅñFrance et al. 2012 first showed the usefulness of the temperatures up to 0.01 mbar.

Pg. 1009 ln. 20: How similar are these comparisons? Are GEOS-5, WACCM, and NCEP all in agreement?

pg. 1011 ln. 18: What do you mean by “significant”? It appears that there are biases near 30S between 5–10m/s. Are these not significant?

Pg. 1012 ln. 7: To what degree do the winds agree? For a validation, this seems fairly qualitative.

Pg. 1012 ln. 12: What altitudes do these precision values correspond to?

The conclusions section should be expanded to include results from the geostrophic wind analysis.

C344

Technical Comments:

pg. 1003 ln. 20: comma after “limb” and “horizon”

Sentence beginning on pg. 1003 ln. 25: Consider rewording

pg. 1004 ln. 13: remove comma at end of line

pg. 1006 ln. 5: You already define this acronym on pg 1003

pg. 1006 ln. 13: consider a comma after “km”

pg. 1006 ln. 16: remove comma after “temperatures”

pg. 1006 ln. 24: consider a comma after “figure”

pg. 1006 ln. 18-19: Did you mean: “and varies only slightly from the upper...”

pg. 1006 ln. 25-26: This is actually a maximum in the precision. While the value is lower, to call it a minimum in precision is misleading.

pg. 1007 ln. 18: change “to” to “and”

pg. 1007 ln. 24: remove comma after “wind”

pg. 1008 ln. 7-9: consider changing to: “In an effort to determine the extent and magnitude of any bias, we compare HIRDLSv7 zonal mean GPH...”

sentence beginning on pg. 1016 ln. 16: incomplete sentence

pg. 1008 ln. 28: be consistent with use of GEOS5 or GEOS-5

pg. 1008 ln. 29: consider putting “the” in front of “Whole”

sentence beginning on pg. 1009 ln. 20: Consider rewording (same with pg. 1009 7-11)

pg. 1009 ln. 27: replace comma with “and”

pg. 1010 ln. 5: “know” should be “known”

C345

There appear to be gaps at 0E in Figures 5, 6, 8, and 10. Can you remove these?

Figures 3,4: Should the secondary vertical axes be Approximate Height?

Many of the axes and color bar labels are too small.

Figures 8, 10: Consider using a different color table for the difference plots. Adjust the color bar so that the plots don't saturate.

Figures 9,11: If the winds at low latitudes are unusable, then why not adjust the color bar to accentuate the mid to high latitude features?

France, J. A., V. L. Harvey, M. J. Alexander, C. E. Randall, and J. C. Gille (2012), High Resolution Dynamics Limb Sounder observations of the gravity wave-driven elevated stratopause in 2006, *J. Geophys. Res.*, 117, D20108, doi:10.1029/2012JD017958.

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C346