

RC2 Comments

Specific Comments:

In Figure 8 the MERRA-2 profile between 40 and 60 km jumps around 10 m/s between altitudes. This is surprising for averaged model data over 3000 profiles. Can the authors double check that these in fact are coming out of the MERRA-2 data and if real, add a statement to the paper explaining why this is occurring.

The jumpiness in the figure is “real” in that it is representative of the data, but in reality it is likely more smooth. Each MERRA-2 profile has slightly different heights which creates the variations described. Added clarity to the MERRA-2 section:

*“All ACE line-of-sight wind speed measurements in 2019 and their corresponding MERRA-2 wind speeds are averaged and compared in Fig. 10. **Note that there are ~10 m/s jumps in MERRA-2 wind speeds, best seen between 40 and 60 km. These are not real and are due to each MERRA-2 profile having data available at varying altitudes. However, the profile produced is real.** There is a large profile disagreement between 40 and 60 km for ACE v.5.2 sunrises that now shows good agreement in v.5.3. Comparing the sunsets, we see similar profile agreement but a decrease in bias, particularly at lower altitudes.* “

Also added a note in the Fig 10 caption:

*“(a) Average wind speed profiles from all ACE sunrise measurements in 2019 for ACE v.5.2 (3535 occultations), ACE v.5.3 (3535 occultations), and MERRA-2. (b) Average wind speed profiles from all ACE sunset measurements in 2019 for ACE v.5.2 (3419 occultations), ACE v.5.3 (3422 occultations), and MERRA-2. MERRA-2 wind speeds were converted using the ACE v.5.3 heading angles. **Note that the sharp jumps in MERRA-2 wind speeds are a product of our processing of the MERRA-2 data, which have varying altitudes in each vertical profile.**”*

Why does Figure 9 not have a legend like the rest of the Figures? The same strangeness in Figure 8 is seen in the differences as well.

Added legends to each tile of Figure 9.

On line 286 the paper states that “It is not reasonable for a model to predict wind patterns within the polar vortex during winter...”. There are models that reasonably predict this wind pattern (MERRA-2 for example). This is just a reference to HMW14 and not models in general?

*Changed to: “It is not reasonable for **the climatology** to predict wind patterns within the winter polar vortex, so measurements during those periods are removed.”*

It appears that in Figure 12, there is an error in plotting. Figures 12a-c are the same as Figures 12d-f. Please fix this and make sure the discussion of this figure in the body of the work is still correct with the correct figures.

Updated tiles d-f. The original text was based on the correct plot, so no changes were made.