Weather Clim. Dynam. Discuss., referee comment RC3
https://doi.org/10.5194/wcd-2021-16-RC3, 2021

Reply on AC1

Gloria Manney (Referee)

Referee comment on "Dynamical and surface impacts of the January 2021 sudden stratospheric warming in novel Aeolus wind observations, MLS and ERA5" by Corwin J. Wright et al., Weather Clim. Dynam. Discuss., https://doi.org/10.5194/wcd-2021-16-RC3, 2021

In light of the author's proposed path for splitting the paper, I had a chat with Michael Schwartz, who is the cognizent scientist for MLS temperature and GPH. With any version previous to v5 of MLS GPH, he (and therefore I) would have been uncomfortable with basing this kind of dynamical study on MLS GPH / temperature, and would have strongly recommended using the reanalysis data instead. MLS GPH, however, has been substantially improved in v5 such that Michael (and therefore I) would recommend it for this kind of use (though he does still opine that the reanalyses are probably better anywhere below about 10hPa or so, and that because the MLS GPH is built up from its temperatures, biases and oscillations in those are reflected in the GPH). Another important caveat is that a significant part of the improvement in MLS GPH in v5 was achieved by building it on top of the 100hPa GEOS5 analysis (very nearly identical to the MERRA2 reanalysis at this level, but available in NRT). Thus if joining to a reanalysis to get tropospheric fields, one should either (1) join to MERRA2, or (2) in order to appropriately "correct the origin", subtract off 100hPa GPH from the MLS GPH fields and add back in (point by point and time by time) the 100hPa (and use those below 100hPa) fields from the reanalysis used (presumably ERA5 if you don't want to use MERRA2).

If this sort of approach was taken, I would in principle (obviously in practice and for specifics, one would have to see the revised paper(s)) support the approach the authors are proposing for revising the paper.