

## ***Interactive comment on “Reanalysis comparisons of upper tropospheric/lower stratospheric jets and multiple tropopauses” by Gloria L. Manney et al.***

### **Anonymous Referee #2**

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#### General Comments

In this paper Manney et al. present an intercomparison of UT/LS and stratospheric jets and tropopause diagnostics derived from five recent meteorological reanalyses. The study covers ERA-Interim, JRA-55, MERRA, MERRA-2, and NCEP's CFSR for a 35-year time period (1980-2014). The study found very good qualitative agreement between the climatological features. It is speculated that quantitative differences, which are found to be largely related to differences in resolution of the forecast models and output grids, would still be important for transport and variability studies.

Overall, I found this to be a carefully designed study. The paper is well-written and fits in the scope of ACP. I would recommend it for publication once the few remaining minor comments and technical corrections listed below have been considered.

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#### Specific Comments

p4, l16: It might be worthwhile mentioning some of the updates from MERRA to MERRA-2 that are possibly relevant for this study at this point?

p6, l7-11: I was wondering if the estimation of tropopause heights does involve any kind of higher-order interpolation (e.g. cubic spline) of the coarse-grid temperature profiles from the reanalyses on a fine vertical grid?

p6, l14: Why doesn't it make sense to construct means of frequency distributions from multiple reanalyses?

p6, l17-21 (and other places): It might be more clear if arithmetic differences of percentages would be referred to as "percentage points (pp)" rather than using "%" as the unit for these differences.

p8, l9-16: Can you provide a physical explanation of the northward shift of the jets between the MERRA-2 ASM and ANA fields?

p9, l12-21: Here I was also wondering if you could possibly provide a more detailed physical reasoning for the differences, the jet shifts in particular?

#### Technical Corrections

p6, l14: doesn't -> does not

p10, l18-19: "in the both the" -> "in both the"

p12, l9-11: A verb seems to be missing in this sentence.

p18, l1: The acronym "JETPAC" was not introduced before.

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