Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2018-1199-RC2, 2019

Atmospheric Chemistry and Physics Discussions

Interactive comment on "From ERA-Interim to ERA5: considerable impact of ECMWF's next-generation reanalysis on Lagrangian transport simulations" *by* Lars Hoffmann et al.

Anonymous Referee #2

Received and published: 10 January 2019

This is a well-written, well-designed, and well-structured manuscript. The authors have performed a careful analysis of transport characteristics and their differences between ECMWF's ERA-Interim and ERA-5 reanalyses. I have only a few suggestions and corrections for the authors.

Page 9, lines 7-8: suggest revising "should be conserved" to "can be conserved" or "are often mostly conserved". As acknowledged later in the manuscript, conservation of PV and other fields relies on a set of assumed conditions or histories of the tracked air parcels, which are rarely met in the troposphere and often not met in the UTLS.

Page 9, line 29: delete extra "the"

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Page 12, lines 31-32: "...by means of the mean relative..." is poor phrasing. Suggest revising to "...using the mean relative..."

Section 3.4: Suggest adding text to the third and fourth paragraphs outlining when potential temperature and PV are not conserved, as was done for specific humidity here.

Page 18, lines 2-3: assuming my interpretation is correct, suggest clarifying "(e.g., by means of ensemble simulations)" to "(e.g., by means of ensemble trajectory simulations)". If not, please clarify as appropriate.

Figure 1: for the horizontal axis, I would suggest using "layer depth" instead of "layer width" given the focus on the vertical dimension.

Figure 5: The labels for each panel here are confusing. They say "w/o diffusion", but what is being shown are deviations due to diffusion and subgrid-scale mixing. Please revise/simplify these labels and the caption to avoid confusion. This is also true for Figure 6!

Figure 6: In addition to the label issue, how are these particles collected for analysis? Based on initial position, final position, some other way? Its not clear how these regional analyses are done. A simple clarification in the caption should suffice.

Figure 12: I suggest labeling each panel by experiment number to improve reader evaluation.

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