Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2020-7-RC2, 2020

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Lagrangian Gravity Wave spectra in the lower stratosphere of current (re)analyses" *by* Aurélien Podglajen et al.

Anonymous Referee #2

Received and published: 7 May 2020

The authors use balloon data to assess the gravity wave spectrum in various reanalyses and one operational analysis. Although they find that that reanalyses represent the shape of the spectrum well, the variability is lacking compared to the balloons especially at higher intrinsic frequencies. Models with higher horizontal and vertical resolution represent the gravity wave variability better, although vertical resolution seems to have less of an effect than might be expected. They also show that including the balloon observations in the reanalyses improves the representation of gravity wave variance at low frequencies.

This paper is very well written and clearly organized. The results are very relevant and of great interest to modelers. These results will help give guidance to modelers trying to improve the representation of gravity waves in their models, both explicit and param-

Printer-friendly version

Discussion paper

eterized waves. I recommend this paper be published with a few minor considerations below.

p. 5, line 24: “Furthermore, due to their expected small horizontal scale the importance of non hydrostatic effects. . .” Should there be an “and” in here? Otherwise this sentence doesn’t really make sense to me.

p.10, line 19: According to this equation, R(ω) should go to 0 as ω approaches f, but the Figure shows R(ω) goes to infinity as ω approaches f.

p. 12, line 21: I would say “The latter behavior. . .” instead of “This last behavior. . .”

p. 15, line 29: I would say “. . . , it is more prevalent at the lowest intrinsic frequencies. . .” also, pronounced would be a better word than prevalent.

p. 15, lines 29-34: What about the influence of vertical resolution on this plot? In particular it seems like there is a clear distinction between the higher vertical resolution models and lower vertical resolution models in the u’w’ columns for both pole and tropics.

p. 15, line 30: This sentence doesn’t really make sense grammatically: “Indeed, while Ekh than for variables with variance primarily contained at large w.” I suggest maybe “Indeed, the dependency on horizontal resolution is more pronounced for Ekh than for variables with variance primarily at large w.”

p. 16, lines 6-14: What about adding the truncated ERA5 to Figure 8? Would this provide more clues to the importance of horizontal vs vertical resolution?

p. 16, line 10: broken off sentence: “. . . arise from the different propagation properties and .”

p. 25, Figure 4: The labels are quite tiny.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-7,

2020.