

Atmos. Chem. Phys. Discuss., referee comment RC1  
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## Comment on acp-2022-677

Anonymous Referee #1

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Referee comment on "Very-long-period oscillations in the atmosphere (0–110 km) – Part 2: Latitude– longitude comparisons and trends" by Dirk Offermann et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-677-RC1>, 2022

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This is interesting paper, which confirms previous results of authors. It shows as a new result that the last potential external source, impact of land surface/vegetation also does not have any substantial influence on the observed internal atmospheric oscillations in the whole interval of altitudes 0 – 80(110) km. However, the paper requires some improvements, I would say moderate revision - see comments below.

Comments:

Tables 1 and 2. Periods in these Tables differ to some extent. For 50°N: Hammonia 28.5 years corresponds to ECHAM6 periods 27.3 and 30.2, Hammonia period 22.8 corresponds ECHAM6 periods 22.1 and 23.8, ECHAM6 periods 20.9 and 20 do not have HAMMONIA counterparts. Have you some explanation for these differences? Make a comment on that in the paper. Would it be possible to get some shorter ECHAM6 periods for comparison with HAMMONIA?

Table 3: Period 206.7 years should be moved from line 17 to line 18.

Figures 2 and 4: Main peaks in 0–80 km, located near 70 and 40 km, occur in both Figures. You can use it as another supporting evidence for your results.

Figure 7: Why the profiles in Fig. 7 differ so clearly from those in Fig. 4. They differ not

only in the different positions of minimums at 30 versus 50 km but also by presence/absence of maximum near 70 km. Can you make a broader comment in the paper about this difference. Figure itself – I recommend remove “D” and “std” (in fact both are std).

Summertime profiles are strongly damped compared to wintertime profiles due to direction of zonal wind. Does it mean/indicate that the observed oscillations propagate from below?

Why the profiles are so structured? Does it mean/indicate in-situ generation in individual layers?

Line 676: Could you specify typical time scales? This might be important for long-term trend determination.

References: Steiner et al. (2020) is missing in the list of references. Pisoft et al. – is it in press (list of references) or (2021) (in the text)?

Wording and misprints:

- 301: “16” should be “160” !!