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Reply on RC2

Tinna L. Gunnarsdottir et al.

Author comment on "Modulation of polar mesospheric summer echoes (PMSEs) with high-frequency heating during low solar illumination" by Tinna L. Gunnarsdottir et al., Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2022-16-AC2>, 2022

We the authors thank you **Stephan C. Buchert** for your comments and help in making our manuscript better. We will review the paper and try to make it more straightforward and to the point.

Figure 3c and line 198: Unfortunately due to operation problems with the heater this part of the observation could not be included in the analysis.

Line 454: Yes you are right, it is $\lambda_{\text{irreg}} = \lambda_R/2$. An unfortunate mistake that has caused the calculated diffusion timescales to be much too large.

No the temperature ratio is taken from the simulation and not the radar data. Values for T_e/T_i at 0 seconds is assumed to be 1 before the heater is turned on, for values at 48 seconds we use the ratios given in figure 16 (simulation on right). $T_e/T_i = 8$ for interval A and $T_e/T_i = 5$ for intervals B and C. Values for Z_d come from figure 17 (left) taken at 0 seconds and 48 seconds and n_{d0}/n_e is taken from given values in figure 16(right).

For the estimation of t_{diff} in table 3 only Z_d is assumed to change from 0 sec to 48 sec not the ratio n_{d0}/n_e where we have used the value for Z_d from figure 17. The ratio for n_{d0}/n_e we have used the values from figure 16(right) and assumed that it is the same for both 0 sec and 48 sec.

We have decided to remove table 3 from the manuscript, as its main purpose was to examine the neutral density effect of the diffusion timescale however the diffusion time scale should be calculated using numerical results and not estimated in a few instances as we have done here. We will rather focus on the figures that show the ratio of the two timescales connected to the simulation and only mention involvement of neutral density.

We apologize for the link not working we will make sure to fix this.

Thank you for your discussion and comments.