

## ***Interactive comment on “Propagation to the upper atmosphere of acoustic-gravity waves from atmospheric fronts in the Moscow region” by Yuliya Kurdyeva et al.***

### **Anonymous Referee #2**

Received and published: 19 April 2019

This work aims to determine the vertical propagation of acoustic-gravity waves due to surface pressure variations on the upper atmosphere. The work uses microbarograph observations of pressure as well as MERRA reanalysis data as inputs into a 3D model. The 3D model then simulates the corresponding perturbations in the atmosphere. Unfortunately, this manuscript does not show that the goal is achieved. The use of observations and MERRA reanalysis is good. However, it isn't clearly proved that these pressure variations are due to acoustic-gravity waves. Also, the results section do not give a more physics-based description of the corresponding temperature perturbations. For example, why do the perturbations solely start above 100 km? What do we know of the propagation conditions for acoustic-gravity waves and why do we say that these

C1

perturbations are indeed characteristic of acoustic-gravity waves? If the authors can clearly prove that these pressure variations and temperature perturbations are indeed due to acoustic-gravity waves, then this paper is definitely worth publishing. Otherwise, this paper appears to solely be determining the upper atmosphere temperature perturbation of pressure changes in the surface. This isn't really a publishable result. As for the quality of writing, this manuscript needs a lot of grammar correction. The sentence constructions also need improvement.

Page 1, Line 13: Change 'medium state' to 'state of the atmosphere'.

Page 1, Lines 14-15: maximum of efficiency of what?

Page 1, Line 15: Add 'and' before 'mesoscale turbulence'.

Page 1, Line 19: Replace 'Dissipation of waves reached the upper atmosphere' to 'AGWs dissipating in the upper atmosphere'.

Page 1, Line 19: Replace 'Atmospheric waves' with AGWs.

Page 2, Lines 2-4: I don't understand the long sentence "So, the authors noted in (Miller (1999), Fovell et al. (1992), Snively and Pasko (2003)) that meteorological sources excite short-period acoustic-gravity waves; the spectrum and the space-time pattern of the simulated wave process are in good agreement with the observations."

Page 2, Line 8: Remove 'layers of the'.

Page 2, Lines 10 - 12: The sentence "Phase transitions of water in the atmosphere are accompanied by the release/absorption of heat during the formation and evolution of clouds and alter the atmospheric pressure." seems out of place. Consider removing.

Page 2, Lines 17 - 19: I think temperature and density does affect the wave picture.

Page 3, Line 2: Change 'data of a real experiment' to 'observational data'.

Page 4 Lines 3 - 11: Describe briefly each equation.

C2

Figure 1: Include a latitude-longitude axis on the figure.

Figure 2-3: Perhaps plot also the pressure variations from MERRA over the time-series in figure 2 for easier comparison.

Figure 4-5: Change z-axis to kilometers.

---

Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2019-16>, 2019.