

## ***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 #1**

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The paper is devoted to modeling and studying the propagation of acoustic-gravity waves in the atmosphere from pressure variations on the Earth's surface. As far as I know, the problem of wave propagation from pressure variations on a surface was not previously solved, but also was not even mathematically posed. The correct formulation of such a problem was formulated and proved in the previous recent works of the authors. Thus, the paper contains a new idea. Consideration of such a problem seems to be expedient since in modeling the wave propagation from tropospheric sources we encounter an obvious difficulty: detailed experimental information about tropospheric sources is usually lacking due to very complex spatial and temporal behavior of these sources. At the same time, these tropospheric sources lead to wave

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pressure oscillations at the surface of the Earth, which are relatively easily recorded, and this experimental information can be used in simulations of atmospheric wave processes. The paper analyzes the observations of pressure variations for 2016 in the Moscow region. The case of extreme pressure variations is selected. For this event, the problem of vertical wave propagation is solved, which allows estimating in 200 K the temperature amplitude of the generated waves in the considered extreme event. The paper also contains an estimate of the amplitude of acoustic-gravity waves in the upper atmosphere, generated under calm meteorological conditions. In my opinion, the work is of interest to the journal and can be published after minor changes. I think, it would be good to check in detail the mathematical formulas, of which there are many, and more carefully check English. There are also the following specific comments:

Page 2 line 12: What does the word “development” mean in this context?

Page 2 line. 29: It is written 10<sup>-4</sup>, probably 10<sup>-4</sup> actually.

Page 4 line 10: There is no explanation of  $Q_{viscous}$ .

Page 6 line 8: Instead of T must be  $\tau$ ?

Page 5, line 23: What is meant by “input boundary source”?

Page 6 line 23 The text states “In Fig.4b, d, the wave field after 40 minutes and in Fig.4c, e 55 minutes”. However, in the caption to the figure, 40 minutes corresponds to the image b, e, and 55 minutes - c, f. Correct it.

Please also note the supplement to this comment:

<https://www.ann-geophys-discuss.net/angeo-2019-16/angeo-2019-16-RC1-supplement.pdf>

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

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