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Interactive comment on “Evanescent acoustic-gravity modes in the isothermal atmosphere: systematization, applications to the earth’s and solar atmospheres” by Oleg K. Cheremnykh et al.

Anonymous Referee #2

Received and published: 10 March 2019

The paper presents a comprehensive study of acoustic-gravity waves in a stratified atmosphere. This research topic has important applications in astrophysics and geophysics. In general, the paper is well-written, but I believe it would benefit from resolving the issues summarised below:

The title: Perhaps, the authors should modify the title of the paper, as it addresses also the case of a vertically non-isothermal atmosphere.

p. 1, l. 23: "... consisting of acoustic and gravity regions" - are those regions on the

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dispersion plane or in different parts of the atmosphere?

p. 2, l. 30: the authors claim that the possibility of the existence of a new type of evanescent acoustic-gravity modes is proved in the paper. Could the authors explain why this mode has been missing from the vast amount of previous studies of this problem? In other words, which novel element (assumption or method) allowed the authors to identify this previously unknown mode.

p. 3, l. 8: Please mention that the sound speed is determined by the temperature.

Eq. (11): the RHS of the equation may be confusing: it is not clear that it actually consists of two different lines corresponding to different signs on the LHS. Please modify the equation, by, e.g., adding a comma after k_x in the top raw, and a full stop after k_x in the bottom raw.

It would be instructive to link the term "anelastic" with the terms "compressive" or "incompressive", which are commonly used in the solar atmospheric research.

The term "an unlimited atmosphere" would perhaps sound better as "an unbounded atmosphere".

p. 10, l. 8: Please give the physical meaning of this boundary condition. In other words, the continuity of which physical quantity or quantities should be kept across the interface?

Throughout the paper: please use "equation" instead of "equality".

p. 11, l. 1: It is not clear how the 8th order polynomial in Eq. (31) is obtained from Eq. (30) which has a 4th order polynomial in the numerator.

p. 15, l. 4: "the f-mode observed on the Sun should not be compared with the non-divergent ND mode, but with non-divergent pseudo-mode NDp." First of all, I think that the word "associated" would be better than "compared" in this context. Anyway, please explain the physical implications of this association (or comparison).

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Table 2 and 3: Please remind the abbreviations used in the tables (i.e., "L", "Lp", "BV", "BVp", etc.) in the captions. It would allow using those tables in review papers and presentations.

Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2019-1>, 2019.

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