

Interactive comment on “The research on small-scale structures of ice particle density and electron density in the mesopause region” by Ruihuan Tian et al.

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Dear Reviewer, Thank you for your insightful comments concerning our manuscript entitled “The research on small-scale structures of ice particle density and electron density in the mesopause region”. Those comments are all valuable and very helpful for revising and improving our paper, as well as the important guiding significance to our researches. We have studied these comments carefully and have made corrections which we hope make our paper more acceptable. The responds to the comments are as following. Once again, special thanks to you for good comments and hope that the correction will meet with approval.

Responses to Reviewer

This paper presents a model where they investigate whether gravity, the neutral drag force, and ice particle growth by adsorption of water vapor can explain why ice particles near the polar mesopause are frequently seen to be confined into small-scale structures in summer. Much has now been understood about these ice particles, and we know how, once these small-scale structures have been created, the polar mesosphere summer radar echoes (PMSE) arise. However, we still do not have a good understanding of the formation mechanism of these small-scale structures, which this paper aims to improve. I therefore think that a paper on this topic is well worth publishing. However, I do have some minor questions regarding their model, which should be resolved before this paper is considered for publication. 1. In line 126, “Substituting Eq. (9) into Eq. (2)...” should be changed to “Substituting Eq. (9) into Eq. (3)...”

Response

Thank you very much for pointing it out. We have corrected this incorrect description.

2. In line 133-134, there are two predicates in the sentence “It is set that $z_0 = 0$ for the lower boundary and $z_0 = h$ for the upper one, here h is the distance between the two boundaries.”

Response

Thank you very much for pointing it out. We have corrected this grammatical error and gone over the text further. Some English usage and grammar mistakes have been revised to make it easier to understand.

3. Authors should add some new references showing new progress in pmse.

Response

Thank you very much for your instructive suggestions. We have added more references about influence of small-scale particle density structures on plasma in PMSE region in

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the introduction.

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