Response to Editor

I'm OK to proceed with the article going through as a normal ACP publication.

I thank Blaž for accepting this manuscript for publication in ACP as a regular research article.

I have a last minor point on the title:

First, I think "Assessing the impact of gravity wave activity on TTL cirrus formation" is a real improvement compared to the previous titles, moving the framing from the methodology to the atmospheric process itself.

That said, it still describes what the study does rather than what it finds, and the ACP author guidelines prefer titles that highlight the result. In my understanding, since the impact of gravity waves on TTL cirrus is already well established, your specific contribution is (in my understanding) that the statistics of the vertical wind fluctuations, especially their amplitude distribution, control the nucleation outcome. A title stating this directly, e.g. "Gravity wave vertical wind distributions shape homogeneous ice nucleation in tropical tropopause layer cirrus," would capture that nicely. Please rebut that if you wish, but don't forget the ACP author recommendations when doing so.

Agreed, I use this title as proposed.

If possible, I would also suggest pairing that more result-

based title with a slightly sharper/clearer result sentence in the abstract.

I am grateful for this suggestion. I have rephrased much of the abstract and noted that the present study contains a comparative evaluation of several parameterizations and empirical data. I have added the outcome of the comparison between the two microphysical models and am more specific regarding the improvement of future wave-cirrus parameterizations as following from this study.

In addition, I have added a reference in line 471 to justify the statement regarding the occurrence of turbulence in the TTL, adjusted the first sentence of the second summary paragraph (lines 423ff), and corrected a few wording issues to resolve potential ambiguity (not marked as they are minor edits).