Response to Third Round of Reviewers: Comments on "Analysis of Migrating and Non-Migrating Tides of the Extended Unified Model in the Mesosphere and Lower Thermosphere" by Griffith and Mitchell

Quotes from the reviewer are in bold, and responses are indented. We first wish to thank the reviewer for the useful comments provided on the third version of the manuscript. We have made some modifications to the paper accordingly and believe the manuscript is strengthened as a result.

1) New Reviewer Comment: I agree that keeping the paper at a reasonable length is important. However, I must push back on this boilerplate response. In my opinion, there must be some discussion about the tidal phases, especially given the lack of dissipative mechanisms (i.e., lack of eddy and molecular diffusion) in the MLT region in this version of ExUM. It is extremely important to know where the tides are no longer vertically-propagating and or dissipated versus generated in-situ. I strongly suggest the authors provide at the very least some comments and additional text on the most notable tidal components, e.g., DW1, DE3, SW2, SE3, etc phases. Simply not looking and or reporting on the tidal phases is neglecting one of the two characteristics that make a wave, a wave.

1. We believe the paper has useful scientific merit studying the amplitudes without considering tidal phases. Indeed, both initial reviewers were happy with this.
2. Including a proper treatment of phases would greatly increase the length of the paper. We stress that the paper is intended to be a short presentation of initial results from the ExUM which lays the groundwork for future in depth studies, such as tidal phases.

2) New Reviewer Comment: Eddy and molecular diffusion are certainly important below 150 km, especially eddy diffusion, which is dominant between 90-105 km. Specifically the turbopause is defined as where the time scale of molecular diffusion becomes shorter than that of eddy diffusion (Schunk and Nagy, 2009). This has been known and shown for some time in the MLT and thermospheric communities. If you say molecular diffusion does not become dominant up until about 150 km, that would be more correct, although I think a more accurate altitude would be between 110-120 km. Below I have provided just a few references for the authors' so that these statements can be revised. Stating they are not included in the model is fine, but then one wonders how are the tides dissipated in ExUM. Stating they are not important until 150 km is not what is generally accepted in the MLT and thermospheric communities. Please revise these statements with appropriate referencing to be more accurate and completely describe how the tides are dissipated in ExUM.

We thank the reviewer for bringing this to our attention and we have corrected the manuscript to address this (Footnote 2 on Page 5). In this initial stage of development of the model, tidal dissipation is primarily driven by an increase in the vertical damping coefficient which is a proxy for these dissipative processes in the model. The focus of future model development will be to include physical processes such as eddy and molecular diffusion in the model.