

We thank Anonymous Referee #1 for the valuable comments and for the suggestions on future work. Please find our answer to the comments below. Answer given as green text.

This paper reports on the nature of large-scale structures observed in Feb-Apr 2023 O2 limb emissions from the MATS satellite, which is in a Sun-synchronous ascending/descending dusk/dawn (17:30/05:30) orbit. It is well-written, provides new insights into the interaction between dynamics and chemistry, and is a nice addition to the literature.

specific comments

The authors do an excellent job explaining the complexities of the measurements in terms of dependencies on ascending vs descending, dayglow vs. nightglow, solar zenith angle, and month, so that geographical dependencies in the emissions can be ascribed to the underlying atmospheric dynamics.

The authors make creative use of the CTMT vertical winds to explain the equatorial enhancements in the 17:30 LST emissions at the equator and some aspects of the latitude and longitude dependencies, although this approach is limited by the fact that the Feb-April 2023 dynamics probably differs to any unknown degree from the 7-year climatology represented by the CTMT.

The authors also credibly argue that the emissions at high latitudes are modulated by the quasi-10-day planetary wave.

The arguments put forth by the authors in the context of previously published work is at about the right level, and the references to the literature are sufficient.

In future work the authors may wish to consider looking for eastward-propagating 2d-4d period ultra-fast Kelvin wave signals in their 10S-10N VER emissions.

I recommend publication of this paper as is.

technical corrections

Figure 1 caption should explain the meaning of the grey shading and cross-hatching.

We agree that an explanation for the shading and cross-hatching is missing. The caption and the text referring to the figure has been updated in the new version of the manuscript.