

General review:

This paper investigates the characteristics of vertical propagating gravity waves (GWs) using observational data from co-located photometers, all-sky imagers, and meteor radars at São João do Cariri. The focus is on quantifying the momentum flux and potential energy associated with GWs as they propagate vertically through various atmospheric layers. The study leverages airglow emissions and rotational temperature data to analyze phase progression and vertical wavelength across different altitudes. The results emphasize the dynamics of momentum and energy transfer under varying propagation conditions, including ducted and near-vertical propagation scenarios.

Areas for improvement:

The paper includes a vast amount of technical detail but lacks an initial high-level summary that could provide readers with an overview of the key findings and their significance. Add a summary at the beginning that outlines the study's objectives, methodology, key findings, and implications in a concise format.

The study does not explore how the findings can be applied to broader atmospheric modeling or real-world scenarios like weather prediction or satellite operation. Please Add a summary at the beginning that outlines the study's objectives, methodology, key findings, and implications in a concise format.

The selection of the two gravity wave events could benefit from a more explicit justification regarding their uniqueness or representativeness. Please Provide a stronger rationale for selecting the specific GW events analyzed and discuss how they compare to other observed events.

Minor suggestions:

Line 567, thee -> the