

Interactive comment on “Climatology of the mesopause density using a global distribution of meteor radars” by Wen Yi et al.

Anonymous Referee #1

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The work is a comprehensive analysis of atmospheric density based on several meteor radar measurements at various latitudes. It is the first study of this kind that provides a near-global view of mesopause density variations based on ground-based instruments. The analysis is thorough and the figures and presentations are very clear. The discrepancies with MSIS and WACCM are especially interesting and should motivate further research to understand them. I recommend publication of this work after the following comments are addressed:

Major:

One factor that could cause large seasonal variations is different heights the density is inferred from. Although the meteor radar data used are all from 85-95 km range, there is clearly seasonal variations of the vertical distributions of detected meteors, as

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shown in Figure 2(a). Thus the derived densities are weighted differently in vertical, which may introduce a ‘false’ seasonal variation. Please address this issue carefully so the comparison with MSIS and WACCM can be more appropriate.

Minor:

P2L23: This sentence is confusing. How can a ‘maxima of a yearly variation’ still have ‘temporal variation’? ‘as the latitude decreases’ seems to suggest the variation is with latitude, not time. Please clarify.

P2L28 (and other places). The 30-60 days oscillation found is similar to that of MJO, but there is no evidence in this analysis that it is actually due to MJO. It is only speculation so claiming that it is “related to” MJO is too strong a claim.

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