

Interactive comment on “Mesospheric Anomalous Diffusion During Noctilucent Clouds” by Fazlul I. Laskar et al.

Anonymous Referee #1

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The authors reported the difference for D_a measured by the meteor radars during the existence of NLCs and considered the possible mechanism related with the observations. However, the deduced conclusions from the analysis seemed to be more clarified before publication. My main concerns are listed as follows:

1. The paper used daily D_a , which is proportion to the T and P, and can be obtained from satellite observations (such as SABER or MLS). Using the D_a from satellite measurements during the same period, i.e., 2012-2016 should be better than WACCM-DART data during 2007.
2. Figure 3, the authors claim the obvious difference of D_a during yNLC/nNLC for high-, middle- and low- latitude stations. Is the result statistically significant? If using a random sampling during the lidar observation period to re-group the yNLC and nNLC,

how about the response of Da at different latitudes?

3. The Da in Figure 3 is separated according to the lidar measurements. The lidar has time resolution of 15 min. Are the Da measured by radar at different location fully covered the lidar sampling period? For example, are the Da at Andenes, Juliusruh and Biak all available for 107/89 hrs of yNLC/nNLC period during 2012 (the first row of Figure 3)? If not, what's the proportion of the data coverage?

4. The authors indicate the global tide are responsible for the observed difference at different latitudes. However, (1) the dominant tidal model also depends on the latitudes. For example, the semi-diurnal tide is dominant at high latitude, while, diurnal tide is dominant at low latitude. This situation can also be found in Figure 4. (2) is the local time response of NLC and tide correlated? In Figure 5, except for the year of 2013, the NLC did not show significant local time dependence. According to the comments above, I am a little confused, since the NLC did not show significant local time dependence, how to explain the observed difference at middle and low latitude region? Especially under the scenario of the different dominant tidal modes and different local time dependence for different latitude?

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Discussion paper

