

Interactive comment on “A Global Analysis of Dust Diurnal Variability Using CATS Observations” by Yan Yu et al.

Anonymous Referee #3

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The investigation proposed by Yu et al. is very promising: the diurnal variability of the dust around the globe is an essential information for many scientific fields and for the variety of dust impacts and potential applications. Nevertheless, I would suggest a major and careful revision of the paper which should take into account the comments of the other 2 reviewers. Additionally, from my side I want to underline the following as points to which authors should pay attention:

- CATS daytime measurements are demonstrated to have some issues and are less accurate than the nighttime ones. Using daytime and nighttime info in the analysis should take into account this.

- It is not clearly reported why the authors used CATS data and not CALIPSO ones. Is there any advantage in CATS data for doing so? I think yes, but the authors should

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stress it more.

- As the other reviewers pointed out, the vertical information is completely missing here: lidar big advantage is the profiling capability and authors simply disregarded it. This is really frustrating

- But more frustrating is expecting to see information about the variability and not getting it at all from the paper: the results of the paper are about where the variability is observed and significant (the exact meaning of this term is not fully clear here). How much DOAD change in 3 hours? Not a number about this for the interested regions. Please reconstruct the results and discussion part reporting really the variability information.

Finally, I found really strange the extremely low values observe in Australia (DAOD from Ridley et al., ACP 2016 is around 0.005-0.01!). Is there any problems for not tropics regions in CATS data/algorithms?

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