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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The Climate Impact of Aerosols on Lightning: Is it Detectable from Long-term Aerosol and Meteorological Data?" *by* Qianqian Wang et al.

Anonymous Referee #1

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This work investigated impacts of âĂĺmeteorology and aerosols on lightning activities in Africa based on products from TRMM, MODIS and MERRA and so on. Authors examined six meteorological variables to analyze the dominant role by thermodynamics and attributed the differences in lightning under clean and polluted conditions to aerosol effect. They separated the northern Africa and the southern Africa dominated by dust and smoke aerosols, respectively. And they found different radiative effects of different aerosol species. This work presents valuable information to understand aerosol effects on lightning. Some minor questions/suggestions need to be solved are listed in the following:

Comment and Question:

1. Both MODIS and MERRA can provide aerosol optical depth and aerosol species, why did authors choose two datasets than one? How did authors combine aerosols, lightning and meteorological information from different platforms together?

2. Page 5, Line 85: Referring to dust effect on drought, following articles should be cited.

Huang, J., T. Wang, W. Wang, Z. Li, and H. Yan, Climate effects of dust aerosols over East Asian arid and semiarid regions, Journal of Geophysical Research: Atmospheres, 119 (2014), 11398–11416, doi:10.1002/2014JD021796.

Huang J., Y. Li, C. Fu, F. Chen, Q. Fu, A. Dai, M. Shinoda, Z. Ma, W. Guo, Z. Li, L. Zhang, Y. Liu, H. Yu, Y. He, Y. Xie, X. Guan , M. Ji, L. Lin, S. Wang, H. Yan and G. Wang, 2017: Dryland climate change recent progress and challenges. Reviews of Geophysics, 55, 719-778, doi:10.1002/2016RG000550.

3. The potential temperature is conserved for a parcel of air that is unsaturated and remains unsaturated as it rises and sinks. For deep convection condition, it is far away from adiabatic process. So why don't use the pseudo-equivalent potential temperature?

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