

Review on Different aerosol effects on the daytime and nocturnal cloud-to-ground lightning in the Sichuan Basin, by Wang et al.  
January 2023.

This version of the paper is a large improvement on the previous version. There are now physical explanations for the results, and the paper is now much more informative than it was before. I have a few comments:

- (1) Lines 12-17: The authors first claimed that “the difference in lightning flashes between the clean and polluted subset was not obvious in the afternoon”, however, the authors continued to say that “increasing AOD will lead to an increase in lightning flashes in the afternoon and night”. These two statements are contradictory. The abstract is very important for readers, and the authors are expected to write it as clearly as possible.
- (2) Lines 232-235: Why are the correlation coefficients between lightning flashes and temperature the same ( $R = 0.68$ ) in the afternoon and evening? The relationships in Figs. 8a and 8e are not linear relationship, but here it is called a positive relationship? Namely, “Positive relationships can be found in lightning flashes and T both in the afternoon and at night”. This description is inaccurate. Please clarify.
- (3) In addition, what is the reason for the above nonlinear relationship?
- (4) Lines 255-258: The authors claimed that “The CG lightning flashes increase with the increase of TCLW when the TCLW is relatively low ( $< \sim 0.1 \text{ kg m}^{-2}$ ), but decrease with the rise of TCLW when its value exceeds about  $0.1 \text{ kg m}^{-2}$ ”. But the explanation given by the authors cannot convince me. Zhao et al. (2020) also discussed the relationship between these two and indicated that it was related to different regions in this region. Please discuss these two different explanations.

Zhao P, Li Z, Xiao H, et al. Distinct aerosol effects on cloud-to-ground lightning in the plateau and basin regions of Sichuan, Southwest China[J]. Atmospheric Chemistry and Physics, 2020, 20(21).

- (5) Lines 279-284: The results show that “TCLW was negatively correlated with T in

the afternoon and at night”. And the authors gave two different explanations for this phenomenon. Firstly, “The thicker and wider clouds will block more solar radiation from reaching the ground, thus reducing the surface temperature” (line 278). Secondly, “too much liquid water in the cloud may promote a warm-rain process, The precipitation falling to the ground will significantly reduce the surface temperature” (lines 283-284). Please provide the references for these two explanations separately. And which factor is more important?

- (6) Line 287: The authors claimed that “This may be because the ice water content in clouds is related to more factors”. Please provide these factors and the references accordingly.
- (7) Lines 331: In which region are these analyses conducted? Please clarify.
- (8) Lines 339-340: What the authors claimed “reduce the solar radiation reaching the ground” is not the “microphysical effects” of aerosols. The usage of proper nouns should be checked in the paper.
- (9) I grew tired well reading the paper, which is an indication that the writing needs to be improved.