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Response of Lightning Activity to Aerosol Concentration Change in Beijing Region

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Increased pollution is expected to lead to a creation of more lightning flashes (Orville et al., 2001). This study makes use of aerosol optical depth (AOD) observations from aerosol robotic Network (AERONET), together with lightning data observed by Beijing Lightning Network (BLNET) from 2015 to 2017 to analyze trends and the possible relationships between AOD and lightning activities in Beijing. BLNET is a lightning location network with capability of intracloud (IC) and cloud-to-ground (CG) lightning detection and has better detection efficiency and location accuracy in the coverage of the network (Wang Yu et al., 2015; Srivastav et al,.2017).
The radiative effect and microphysical effect of aerosol may be the reasons for the variation of lightning flash density. The temporal and spatial distribution of AOD and lighting flash density is investigated first. Then, the monthly and weekly variation of AOD and lightning frequency in Beijing was further studied. A weekly cycle of surface particulate matter (PM) during weekdays was reported in eastern China (Song et al, 2017) The lightning activities also checked to find if a weekly cycle existed. By comparing the weekly variation of AOD and lightning flashes, the possible relationship between lightning frequency and aerosol is investigated.

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