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Influence of aerosol on fog microphysics over suburban area in Taoyuan, Taiwan

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In this presentation, we will present our preliminary results on the interactions of aerosol and fog based on in-situ observations carried out at the National Central University, Taoyuan, Taiwan during the period of December 2018 – January 2019. During the experiment, a cloud drop spectrometer (FSSP-100) was used to observe the particle size distribution of fog droplets and further to estimate the liquid water content (LWC). Data collected from the Thermo Scientific TEOM 1405 PM2.5 and PM10 monitor, Joss-Waldvogel Disdrometer (JWD) raindrop spectrometer, and automatic meteorological towers were applied in this study. Based on assessments of visual observation and auxiliary data, total 5 fogging events (2 radiation fog and 3 advection fog) were selected during the period. Our results show that with the number of fog drops greater than 5 μm increased, the concentration of PM10 and PM2.5 has a tendency to decrease. This phenomenon may cause by the particle size of the droplets increased with nucleation process of the fog, and the concentration of PM10 and PM2.5 may decrease, which so-call nucleation scavenging. According to previous study, sedimentation and collisional coagulation may also cause above mentioned phenomenon, but we suggest they can be ignored in most cases. Finally, we found that in the suburban area of Taoyuan, when PM10 is between 10 μg m-3 and 45 μg m-3, it is easier to form larger fog droplets. On the other hand, when PM10 is less than 10 μg m-3 or greater than 45 μg m-3, the fog droplets are not easy to form.