

A Study of Air Pollution with Different Synoptic Weather Systems in Taiwan

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Both of air pollution emissions and meteorological condition are important factors that affecting the air quality. In Taiwan, previous studies have focused mostly on the control of emission sources but still lack of detail discussion on meteorological and transport of pollutants, as the air pollution events happened in autumn and winter frequently are consistent with the time of lee-side vortex generation.

This study presents the different synoptic weather systems of spatial distribution correlation between the PM_{2.5} concentration and lee-side vortex in Taiwan during air pollution events, 2013-2015. Weather Research and Forecasting Model (WRF) and Community Multi-scale Air Quality Model (CMAQ) are used to discuss the temporal and spatial distribution of the pattern of the ambient flow related with the PM_{2.5} pollutant concentration. The results show when continental high pressure moving to Pacific Ocean, ambient airflow changes to the east to pitching Taiwan, lee-side vortices will be formed in Taiwan Strait, these vortices transport air pollutants to specific areas and cause to high air pollution accumulation. The findings provide valuable reference to understanding air-terrain-emission correlation and also for the improvements of air quality policy.

Keywords: PM2.5, Vortex, Synoptic weather systems