

Analysis of particles and meteorology in Shanghai during a haze event in December 2014

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Keywords: haze, Shanghai, aerosol concentration, meteorology.

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With the rapid expansion of China's economy and urbanization, the emissions of primary particles and gaseous pollutants, as well as the secondary particles formed by photochemical reaction has gradually increased (Hao et al., 2010). Recently heavy haze events occurred frequently in many eastern Chinese cities' winter. For example, the number of haze days in Shanghai city has increased from 0 day in the 1960's to 102 days in 2003. Especially in December 2014, over 50% of the annual haze days occurred.

By using meteorological data from 11 stations (MX, BS, JD, CM, XJH, HN, JS, QP, PD, SJ and FX) as well as aerosol data from 5 stations (XJH, BS, CM, JS, PD) of PM₁₀ and PM_{2.5} concentration in Shanghai from December 1st (00h~23h) to December 31th (00h~23h) were investigated.

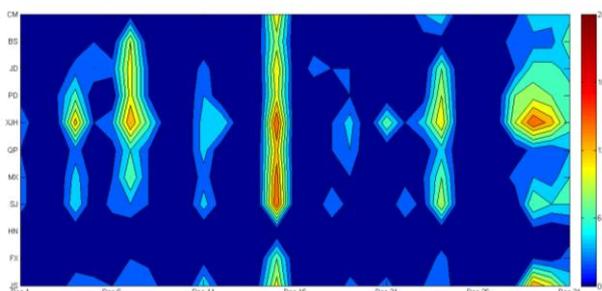


Figure.1 temporal variation (31days*24hours) of haze days from 11 stations in Shanghai

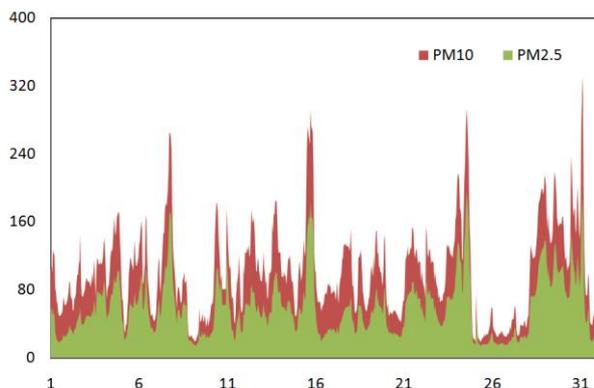


Figure.2 hourly mean concentration of PM₁₀ and PM_{2.5} (units: ug/m³) in Shanghai in December 2014

Meteorological factor is the main factor affecting the aerosol concentration of the atmospheric environment, and indirectly influencing the formation of

haze. Fig.1 shows that the heaviest haze periods on Dec 28th-31th, the peak of daily average hazy hours occurs in Dec 29th (16 hours). Fig.2 shows that hourly mean concentration of PM₁₀ and PM_{2.5} in Shanghai in December 2014.

According to the statistics, in severe haze episode (Dec 28-31), no precipitation (precipitation= 0mm) cannot help remove some of the particles in the air. Small wind (wind speed= 0.9 m/s) led to the surface atmosphere relatively stable and the anthropogenic emissions (hourly mean concentration of PM₁₀ = 331.9 ug/m³ and PM_{2.5} = 195.0 ug/m³) are higher.

Acknowledgements

This work was supported by the CMA's special Funds for climate change (No. CCSF201439), the CMA's special Funds for key technologies (No. CMAGJ2014M57) and MEP's Special Funds for Research on Public Welfares (No. 201409002).

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