EGU2020-1971
https://doi.org/10.5194/egusphere-egu2020-1971
EGU General Assembly 2020


# Impact of air transport and secondary formation on haze pollution in the Yangtze River Delta: In situ online observations in Shanghai and Nanjing

**Peng Sun**
Joint International Research Laboratory of Atmospheric and Earth System Sciences, School of Atmospheric Sciences, Nanjing University, Nanjing, 210023, China(sunpeng123ll@163.com)

Despite frequent haze pollution in China in recent years, our knowledge of regional pollution episodes associated with air transport and synoptic weather systems is limited. In this study, we conducted two intensive campaigns simultaneously to measure the highly time-resolved chemical composition of fine particles ($PM_{2.5}$) in suburban Shanghai and Nanjing during the winter of 2017 and the summer of 2018. The average $PM_{2.5}$ mass concentrations were 53.9 (65.7) μg $m^{-3}$ and 32.8 (37.3) μg $m^{-3}$ in Shanghai (Nanjing) in winter and summer, respectively. In winter, extreme haze episodes were observed synchronously with enhanced contributions of nitrate at both sites and of low-volatile oxidized organic aerosol (LV-OOA) in Shanghai. Long-range transport from Northern China was demonstrated to play an important role in the episodes, which occurred simultaneously at both sites. Influenced by the cold fronts, Nanjing had a relatively longer pollution duration, whereas Shanghai exhibited faster PM increases. In summer, air masses passing though the city-clusters of the YRD were responsible for the pollution episodes. Low wind speeds, which favored the accumulation of primary aerosols, and strong photochemical activity indicated by high ozone level, which promoted the formation of secondary aerosols, resulted in elevated contributions of nitrate, Hydrocarbon-like organic aerosol (HOA) and semi-volatile oxidized organic aerosol (SV-OOA) to PM in Shanghai. In addition, a pollution episode dominated by increases of nitrate and organic aerosols was observed in Nanjing two days later despite the clean situation in Shanghai. Our results highlight the importance of regional or sub-regional emission control to mitigate haze pollution in city clusters, such as the YRD in Eastern China.