



Identify the impacts of climate on the regional transportation of haze pollution and inter-cities correspondence within the Yangtze River Delta Region

Hang Xiao (1,2), Zhongwen Huang (1,2), Huiling Zhang (1,2), Lei Tong (1,2)

(1) Innovation Center for Excellence in Urban Atmospheric Environment, Institute of Urban Environment, Chinese Academy of Sciences, Xiamen, China (hxiao@iue.ac.cn), (2) Ningbo Urban Environment Observation and Research Station-NUEORS, Chinese Academy of Sciences, Ningbo, China

Regional haze pollution has become an important environmental issue in the Yangtze River Delta (YRD) area. Aerosol samples from Nanjing, Shanghai, Ningbo and Li'an were collected and analyzed for their chemical compositions and stable carbon and nitrogen isotope ratios. The routine air monitoring data reported from national atmospheric monitoring networks was also collected to identify the impacts of the subtropical monsoon. Regional PM_{2.5} pollution was confirmed in the YRD region by significant correlations and similar cyclical characteristics of PM_{2.5} among study cities. The analysis of backward trajectory reveals that northerly is the prevailing wind from October to March, while the prevailing wind direction is from southeast for the other time. The Granger causality test results indicate that strong causal correlations exist between the cities along the pathways of seasonal monsoons. Variance decomposition of the multiple time series of PM_{2.5} from study area also indicated the upwind area cities contribute significantly to that of downwind area cities, which suggested the regional transportation of aerosol is governed by the prevailing air mass movement, i.e. the seasonal monsoons. Moreover, the variations of carbon and nitrogen isotope ratios of particle samples from the cities downwind direction demonstrate significant lag behind that of upwind direction city. Eventually, these statistical methodologies can be applied to forecast the daily PM_{2.5} concentrations in each city on a regional scale, and as well serve as an important reference for the regional air pollutant control during the policy making process.