Investigating of spatial variations of PM2.5 concentration in Suzhou using remote sensing imagery

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Suzhou is located at the center of Yangtze Delta, suffering the air pollution from construction of mega city, industrial emission and traffic development. Particulate matter not greater than 2.5 micrometers (PM2.5) is now considered as the most important pollutants in the air in East China. For Suzhou city, some studies on PM2.5 temporal variations based on ground measurements have been conducted. However, until now, there is limited remote sensing based research to investigate the spatial pattern of PM2.5 in Suzhou.

MODIS is often used to evaluate the spatial variabiilty of air quality, however, due to its low spatial resolution (250m), we have adopted China launched HJ-1 satellite with 30 m resolution of CCD sensor. Following the solar radiation S6 model and dark object atmospheric correction method (Kaufman,et al., 2000), atmospheric optical depth (AOD) was estimated. A statistical relationship has been built up between AOD and PM2.5.

We have retrieved the spatial distribution of PM2.5 across Suzhou city in the winter of 2014. Results indicate that PM2.5 has the highest value in Kunshan (East of Suzhou) and Changshu and Taicang (NE of Suzhou) due to the heavy-polluted industry, while in the island of the Taihu Lake, the PM2.5 is significantly lower than other places maybe because of high deposition rate of PM2.5 over water and forest surfaces. The spatial variation also shows that traffic has less contribution to the PM2.5 generation than the industry.

We believe this study will be very useful to identify the causes of local PM2.5 pollution. The findings could also benefit local management and policy making.