

**Use of Earth Observation in Support of Major Sport Events: Case Study for the Athens, Beijing and London Olympic Games**  
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This Project aimed at the needs of making use of earth observation technology to support major sports events. There are three main studies were made based on the research of progress and problems of aerosol satellite remote sensing. Firstly, two methods were applied to retrieve PM10. The first one: The distribution of aerosol optical depth (AOD) was studied on an urban-scale. The AOD data was obtained from 30m resolution Landsat Thematic Mapper (TM) imagery. This method is suitable for city imagery under a variety of atmospheric and surface conditions. The results show that the AOD distribution over Beijing could be retrieved by this method. The urban scale PM10 distribution matches the AOD distribution retrieved by TM imagery quite well. The AOD result retrieved from Landsat TM are compared against the MODIS MOD4 Level 3 AOD with the spatial resolution 10km. The result show very good agreement with high correlation coefficients, 0.985\0.864 etc.

The second one: This study built a model with DVI, which is computed by near-infrared and red bands of SPOT-5 image, and observed concentration of PM10 to retrieve concentration of PM10 in SPOT-5 image of Beijing urban acquired in 2007. Spatial distribution trends of PM10 are basically identical between retrieved result and observed data.

Secondly, the air pollution boundary layer height data were obtained for Beijing in summer, which is important to link AOD and pollutant by statistical experiential model, for the assumption that aerosol was accumulated within the height of mixing layer is incorrect in particular cases.

Using this information, High spatial resolution AOT distribution with spatial resolution up to 30m is derived over the urban areas. This high resolution AOT distribution information provided a powerful way to monitor and study urban and regional air pollution problems. It confirms that satellite derived AOT can be very useful in the regional air pollution studies. Detailed case studies over Beijing demonstrate that local emissions and regional transports are both important factors in determining the level of urban air pollution. Some dramatic cases provided by the ground-based data and satellite remote sensing retrieved result make it clear that remote sensing AOT from satellite Landsat TM are effective tools and relative importance of various aerosol emission, pollutant resources, and the subsequent transports of aerosol in a local, regional and/or continental perspective. The relationships between the atmospheric concentrations of several main contaminations, such as SO<sub>2</sub>, NO<sub>2</sub> and PM<sub>10</sub>, and several meteorological elements, such as wind speed, temperature and precipitation were analyzed. The non-linear regressive equations were developed to describe the relationships. The spatial and temporal distribution pattern of thermal environment in Beijing capital region has been investigated using meteorological data, multi-source remote sensing data. Effects of different land use types, vegetation coverage and the typical urban landscape on the IPM environment.