

# Temporal and Spatial Distribution Characteristics of AOT (Aerosol Optical Thickness) and Its Implication in Yangtze River Delta, China

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The spatial distribution, seasonal, inter-annual and the periodic variation tendency of aerosol optical thickness (AOT) in Yangtze River Delta were observed with ATSR and MODIS data from 1995 to 2015. Relationships between AOT and urban construction area, car ownership, high pollution industry product output and the consumption of electric power, coal, and fuel are analyzed and the economic and social impacts on aerosol optical thickness over the Yangtze River Delta. The result shows that:

- 1) The AOT yearly change in Yangtze River Delta shows a gradual increase from 1995-2015 with the average growth rate of 0.04/10a, is consistent with that of the national's, and plays a stimulating role with the rate of 82%. Three stages can be distinguished: 1995-2002 (the first stage) and 2010-2015 (the third stage) shown an upgrade trend, and the 2002-2010 (the second stage) fluctuates. However, the AOT in this study area grown faster than the national's in the first stage, whereas the third stage is on the opposite.
- 2) The AOT monthly change over Yangtze River Delta is in “W” shape with greater fluctuation in contrast to the wave shape of the country. The Yangtze River Delta is characterized with AOT the most obvious enhancement in autumn.
- 3) The Yangtze River Delta is one of the areas suffering heavy AOT in China. The AOT distribution is impacted greatly by the topography with the high AOT distributing in the low-lying northern plains, while the southern hilly area exhibiting low AOT. The high AOT zone distributes along the western and northern area of Shanghai mega city, and gradually extends northward and south of Jiangsu Province.
- 4) Transportation, high pollution industry production and fossil energy consumption are common factors impacting the annual variation of AOT in Yangtze River Delta. The decrease of high pollution industry product output recently contributes a lot to the reduction of AOT in Shanghai, which is in consistent with downward increasing trend of AOT during 2010-2015.

Keywords: ATSR, MODIS, AOT, Yangtze River Delta, Human activity