Satellite Remote Sensing of Air Quality over Mega Cities

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Several research studies in past couple of years have shown that advancement in satellite remote sensing provides power tool for air quality monitoring over global urban areas. Research conducted over many location around the world shows that there is good degree of correlation between satellite derived aerosol optical thickness and surface measured PM2.5 mass concentration. These studies also conclude that satellite derived AOT product can be used as surrogate for monitoring particulate matter air quality over global urban areas. Studies also shown that there are other factors such as aerosol type, aerosol vertical distribution, local meteorological conditions, and surface properties which can affect PM2.5-AOT relationship up to certain extend. But, nevertheless, these satellite observations have potential and provide very good mean to monitor particulate matter air quality.

Present research utilized satellite derived air quality index over 20 mega-cities of the world. We will discuss and compare air quality conditions in different part of the world based on MODIS derived aerosol optical thickness and air quality categories as defined by the United States Environmental Protection Agency (US EPA). Since increase in human population is directly associated with increase in human activities and hence increase in environmental (both air and water) pollution. To extend the discussion one step further relationship between satellites derived air quality and human population in all mega cities as well as over regional scale will be presented. Spatial distribution of air quality categories and human population will be presented. The main source of anthropogenic pollution comes from use of coal and petroleum as fuel in industries and automobiles. The global distribution of consumption of energy, coals and petroleum for last 20 years will also be presented.