# Global Particulate Matter Air Quality Assessment Using Satellite Observations

PAWAN GUPTA[1], AND SUNDAR A. CHRISTOPHER[1, 2]

[1]*Earth System Science Center, University of Alabama in Huntsville*
[2]*Department of Atmospheric Science, University of Alabama in Huntsville*
*320 Sparkman Drive, Huntsville, AL 35805, USA*
*Email: gupta@nsstc.uah.edu, Phone: 1-2569617936*

Recent developments in satellite remote sensing of aerosols over land provide new tools for monitoring particulate matter air quality with high temporal and spatial resolution. Monitoring particulate matter air quality from space borne measurements is largely confined to relating columnar satellite retrievals of aerosol optical thickness (AOT) with ground measurements of PM2.5 mass concentration. However, vertical distribution of aerosols and meteorological effects such as wind speed, temperature, and humidity also play a major role in this AOT-PM2.5 relationship. In this study, multi year of coincident hourly PM2.5 mass concentration (PM2.5 or PM2.5), Moderate Resolution Imaging Spectroradiometer–derived AOT, and rapid update cycle meteorological fields, we developed multiple regression equations and neural network models as function of season over the continental United States. Our goal is to examine whether the use of meteorological fields will improve the relationship between PM2.5 and AOT. A 20–50% improvement in root-mean square error is observed when adding temperature and boundary layer height to the AOT-PM2.5 relationship. We will also discuss PM2.5 monitoring using satellite data in other parts of the world such as India, Australia, China and Europe. These results and analysis are useful to research and operational communities that seek to improve the use of satellite information for assessing surface PM2.5.