

Numerical Modeling of Atmospheric Flows and Pollutant Dispersion in Urban Areas

Abstract: The past half century has seen an unprecedented growth of the world's urban population. While urban areas proffer the highest quality of life, they also inflict environmental degradation that pervades a multitude of space-time scales - from small turbulent eddies (e.g., that carry nano/micro scale particulates and gaseous pollutants) to global change (e.g., climate change). The stresses of human activities are mainly imparted in the urban atmospheric boundary layer, and communicated to regional and global scales via atmospheric transport. Particulate matter (PM) as an air pollutant has been a problem for the Greater Phoenix area for many years. Maricopa County has been classified by the USEPA as a "serious PM10 nonattainment area" since June 1996. Both from a public health and a regional economic perspective, the continuing PM10 exceedances pose a major challenge to the Greater Phoenix community. Numerical modeling is a very useful tool for atmospheric flow and pollutant dispersion research and forecasting. Examples of numerical modeling application to regional and local scales of ambient particulate matter concentrations in metropolitan Phoenix will be presented.