



Development of a Micro-scale Air Monitoring and Modeling System for a Urban District Air Quality Management

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As the city is urbanized, its landscape is getting more complex due to the construction of high-rise buildings. The smaller scale wind-field in an urban district may change frequently due to the complex terrain, the diverse landuse, and high-rise buildings. It also leads to dynamic changes of air pollution in that area. The conventional urban scale air quality management system, however, is too coarse to effectively manage such a small area.

In this study, we set up a micro-scale air quality management testbed near Konkuk University, Seoul, Korea. A ubiquities sensor monitoring network, high resolution emission database, and CFD-based air quality modeling system were developed, and then applied to the testbed. A sensor data management system using wireless technology and multi-modal scientific visualization module were combined in support of the management system. The sensor based monitoring system shows reasonably good performance for wind speed, temperature, and carbon dioxide from inter-comparison study against conventional large format analyzers. The sensor data have been successfully collected using a wireless sensor data collection network during a 6months operation period from July, 2009. The fire pollution event simulation using the CFD model reveals the effect of high rise buildings in the testbed.