

## Abstract

Distribution of air pollutant emission can be significantly affected by wind speed, wind direction and etc. Monitoring stations placed at appropriate locations are thus necessary to track air pollutant distribution. However, air quality monitoring station siting requires a series of tasks include data collection, information analysis, model simulation, results interpretation and making the siting decision that are mostly time consuming and tedious. Besides, poor integration among related tasks and inadequate analysis of information may lead to a poor decision. An integrated system that can provide friendly environment with proper tools to support the decision making process of this siting problem is thus desirable. This study therefore developed a web-based decision support system to facilitate the analysis for air quality monitoring station siting.

A typical decision-making procedure requires several analysts to work together and to interact with the decision maker(s). A conventional single-machine system is not efficient for this kind of cooperative tasks. The system developed in this study by using several network tools can be used under a web-based environment that can be accessed at anytime and anywhere on the Internet for implementation of related decision-making tasks. The system includes five major modules: data management, data analysis, modeling, siting analysis and miscellany. Data management module is a database system that manages monitoring, meteorology and source inventory data with functions provided for drawing statistical figures and querying data from a web-GIS interface. Data analysis module provides tools to analyze source data. Modeling module uses ISC3 as the modeling tool to simulate air pollutant distribution under various scenarios. Siting analysis module applies a rule-based method to facilitate siting analyses and to compare results obtained based on different rules. Miscellaneous module includes

emission regulation and model manuals.

A case study for Hsinchu Science Park was implemented to demonstrate the effectiveness of the developed system. Three pollutants were selected in the case study. Siting results obtained based on different rules were analyzed, discussed and compared. The results show that the system is capable of integrating and managing data efficiently, analyzing data directly with rapid response, and providing a friendly interface that can be accessed from anywhere and anytime on the Internet. The quality of siting decision is expected to be significantly improved with the developed system, although there are functions should be developed or enhanced in other future studies.

**Keywords:** Web-based decision support system, monitoring station siting, ISC3 model, ambient air quality.

