

Key emergency response technologies for abrupt air pollution accidents

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Abstract

The Abrupt air pollution accidents can endanger people's health and destroy the local ecological environment. The appropriate emergency response can minimize the harmful effects of accidents and protect people's lives and property. This paper provides an overview of the key emergency response technologies for abrupt air pollution accidents around the globe with emphasis on the major achievements that China has obtained in recent years. With decades of effort, China has made significant progress in emergency monitoring technologies and equipment, source estimation technologies, pollutant dispersion simulation technologies and others. Many effective domestic emergency monitoring instruments (e.g., portable DOAS/FT-IR systems, portable FID/PID systems, portable GC-MS systems, scanning imaging remote sensing systems, and emergency monitoring vehicles) had been developed which can meet the demands for routine emergency response activities. A monitoring layout technique combining air dispersion simulation, fuzzy comprehensive evaluation, and a post-optimality analysis was proposed to identify the optimal monitoring layout scheme under the constraints of limited monitoring resources. Multiple source estimation technologies, including the forward method and the inversion method, have been established and evaluated under various scenarios. Multi-scale dynamic pollution dispersion simulation systems with high temporal and spatial resolution were further developed. A comprehensive emergency response platform integrating database support, source estimation, monitoring schemes, fast monitoring of pollutants, pollution predictions and risk assessment was developed based on the technical idea of "source identification - model simulation - environmental monitoring" dynamic interactive feedback. It is expected that the emergency response capability for abrupt air pollution accidents will gradually improve in China.

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Biography

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