SRNL
SAVANNAH RIVER NATIONAL LABORATORY

Factsheet

Advanced Atmospheric Modeling

FASTfacts

- SRNL Atmospheric Technologies Center provides its forecasters real-time access to sources of local, national, and international meteorological data
- Using state-of-the-art computational tools, the SRNL Atmospheric Technologies Center provides guidance to emergency response teams regarding transport and consequences of radiological and other toxic releases

U.S. DEPARTMENT OF ENERGY

Overview

Using state-of-the-art computational tools, SRNL scientists tackle a spectrum of atmospheric modeling problems. The issues range from long-range transport of toxic or radioactive gases to predicting forest fire risk to investigating the effect of large cooling towers on local atmospheric conditions. Diverse applications, such as these, require flexible modeling capabilities and creative approaches. The projects serve the needs of many customers, including the DOE Office of International Material Protection & Emergency Cooperation and the U.S. Forest Service.

The SRNL Atmospheric Technologies Center provides comprehensive weather support for a variety of needs.

Areas of Technological Leadership

Many of the models and tools included are:

- Regional Atmospheric Modeling System (RAMS)
- Long-Range Transport Modeling
- Mesoscale Modeling
- Small Scale Modeling
- Operational Modeling
- Mesoeta Modeling
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Applications

Emergency Response

Advanced models such as RAMS/LPDM (Lagrangian Particle Dispersion Model) predict long-range transport and diffusion of pollutants for both emergency response or air quality assessment. Using these models, on-site scientists participated in the European Tracer EXperiment (ETEX). During this

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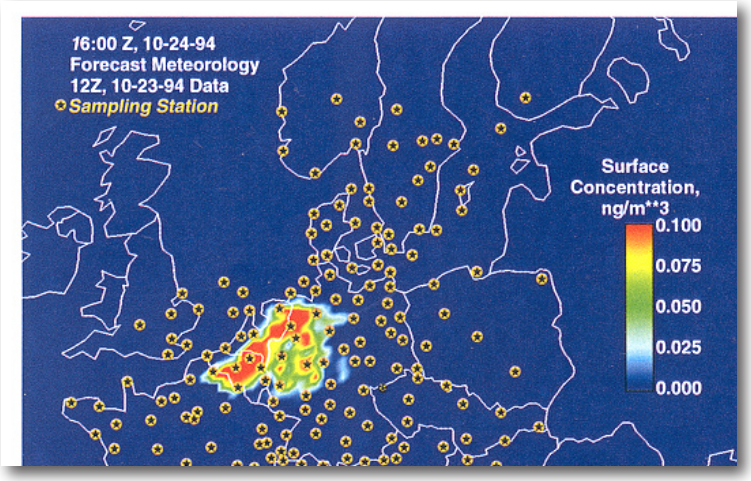
scenario, a tracer gas was released near Rennes, France. As one of three groups in the U.S. performing real-time modeling, scientists developed and deployed an advanced emergency response modeling system for the ETEX real-time predictions. A 60-hour forecast of the tracer gas transport and diffusion was performed within five hours of receiving the release notification. This type of modeling can be rapidly prepared for any predetermined region of concern.



Advanced atmospheric transport and dispersion models predicted this near-surface concentration field of a tracer gas 24 hours after its release from western France.

Operational Support

It has become feasible to use advanced, 3-D models like RAMS and LPDM for operational purposes. The RAMS prognostic model is being used to provide regional forecasts for a variety of applications at one particular DOE site. Emergency response dispersion models use the space- and time-dependent meterological data provided by this model to supplement local and regional observations.

Graphic output is also used at a local level to aid in forecasting, and regionally, to provide forecasts of potential hurricane landfall. Recently modeled hurricane events of significance include Bonnie (1998), Dennis (1999), and Floyd (1999).

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