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WEATHER AND DISPERSION MODELING WITH OMEGA

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The Operational Multiscale Environment model with Grid Adaptivity (OMEGA) is a multiscale non-hydrostatic atmospheric simulation system based on an unstructured dynamically adaptive grid. The basic philosophy behind the OMEGA development has been the creation of an operational tool for real-time weather and aerosol and gas hazard prediction. The model development has been guided by two basic design considerations in order to meet the operational requirements: (1) the application of an unstructured dynamically adaptive mesh numerical technique to atmospheric simulation, and (2) the use of an embedded atmospheric dispersion algorithm.

An important step in proving the utility and accuracy of OMEGA involves the full scale testing of the model using simulations of real-world atmospheric events and qualitative as well as quantitative comparison of the model results against observations. OMEGA has been used to forecast severe weather events (*e.g.*, the April 1979 tornado outbreak during the SESAME field campaign) including several hurricanes (*e.g.*, Hurricane George (1998), Dennis (1999), and Floyd (1999)), and a number of gas or aerosol releases. The latter include the Kuwait Oil Field fires and the European Tracer EXperiment (ETEX).

OMEGA has been shown to be a unique addition to the current suite of weather and dispersion models. The application of this technology to air quality issues is just beginning.