30 June 2006

By: Sci/Tech News Staff, -

New Model to Assess World Trade Center Fallout

Scientists assess the air pollution that followed the WTC collapse

The environmental and health consequences of the terrorist attacks on the World Trade Center have been the subject of controversy almost from the beginning. Scientists at Rutgers, The State University of New Jersey, have created a computerized model that will help public health officials understand the degree of harmful exposure in the immediate aftermath of the attacks. Georgiy Stenchikov of Rutgers was interested in modeling the convective storm and local air pollution. Paul Lioy, Nilesh Lahoti, and Panos Georgopoulos of the Environmental, Occupational and Health Sciences Institute have interests that include complex source to dose modeling. David J. Diner and Ralph Kahn of the NASA Jet Propulsion Laboratory are leading scientists on the NASA Earth Observing System's Multi-angle Imaging SpectroRadiometer (MISR) instrument, a key source of satellite data used in the study.The new paper describes the dispersion of the plume of aerosols -- tiny particles suspended in air -- from the World Trade Center disaster, and provides a way to evaluate the human exposure to that plume. Aerosols were injected into the urban atmosphere by the collapse of the WTC main structures and by the fires at Ground Zero, forming a plume of smoke and fine particulate matter. It rose 1.25 kilometers into the sky, and blew over lower Manhattan, Brooklyn, and Queens shifting direction with the wind, so people in New Jersey and Northern Manhattan also smelled the plume until rain on Sept. 14 damped it down. Anyone who witnessed the attacks and saw the fire that followed might expect that people in the plume vicinity could be at health risk; the work of Stenchikov and his co-authors addresses to how much and where, giving public health authorities much more information about contaminant distribution and the physical process involved.New York, like most big cities, had air-quality monitoring systems in place on the morning of the attack. But there were three problems: first, they weren't designed to monitor the fallout from such a massive event; second, many sensors in lower Manhattan went offline when the power was cut; and, finally, many became clogged with debris. But not all of the sensors went down; enough stayed in action to help Stenchikov and his colleagues to test and calibrate their model predictions. The satellite data provided a regional map of plume height and extent, used to better initialize the model and to constrain the simulations.The scientists built their model to fill the gaps in observations and crack a puzzle of missing pieces. To reconstruct the dispersion of contaminants, they first "down-scaled" the output from the best weather forecast model available, using the Regional Atmospheric Modeling System (RAMS) to obtain high-quality micrometeorological fields with a spatial resolution of 250 meters. Then they fed this information into another mathematical model, the Hybrid Particle and Concentration Transport (HYPACT), which allowed them to calculate contaminant transport and distribution. Stenchikov and his colleagues combine their modeling results with the surface-based and space-based observations. With this combination, they took a major step in characterizing the air-pollution generated by the 9/11 tragedy in the New York City and nearby areas.This information will be crucial for further studies of the impact of air pollution on people and the environment, and will be of use to researchers tracking the specific health effects of the plume from the Sept. 11 attacks."The integration of model results and observations allows us to roughly estimate the amount of aerosol produced and conclude, for example, that the maximum concentration of contaminants in Brooklyn and Queens during a few days following the attack was about an order of magnitude less than in Manhattan," Stenchikov said.

Copyright (c) 2001-2009 Softpedia. All rights reserved. Softpedia™ and Softpedia™ logo are registered trademarks of SoftNews NET SRL.