

THE GREEN LINE

Air pollution mega-project merits mega-response

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If ever there was a laudable example of international environmental cooperation, Mexican Nobel prizewinner in Chemistry Mario Molina's "MILAGRO" project monitoring Mexico City smog is it.

MILAGRO, which stands for "Megacity Initiative: Local and Global Research Observations" (and means "miracle" in Spanish), is one of the catchiest ideas yet to mobilize lackluster local interest in the capital's air pollution problems.

Getting underway this March, the project brings outside attention to bear in a set of simultaneous field campaigns aimed not only at reducing the city's pollution but also at helping the rest of the urbanizing world to prevent the contamination contributing to disastrous global climate change.

As if MILAGRO weren't enough to raise curiosity, the first phase of the project is dubbed MIRAGE. That stands for "Megacity Impacts of Regional and Global Environments." The March 1 to 29 component is a scientists' dream come true.

It uses US\$25 million from the National Science Foundation and other sources to detect and analyze the combined impact of different contaminants from Mexico City and other pollutant sources affecting the city's airstream, including the Popocatepetl volcano and the refinery at Tula, Hidalgo.

A 350-member interdisciplinary team from Mexico and around the world picked Mexico City for this project as part of an ongoing effort to put science and public awareness into the equation of the metropolis' politically thorny air quality policy making.

Of course, they expect the project results will be applicable to other megacities — that is, those with 10 million or more inhabitants. Like Mexico City, most of those in the developing world are situated in the tropics.

The National Science Foundation classifies this as one of the most complex campaigns in the history of atmospheric chemistry. That's a lot to claim, especially considering that Molina's Nobel Prize, as you might remember, was for discovery of the way chlorofluorocarbons released by aerosols and refrigera-



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FILTHY: Scientists will study the air over Mexico City in March.

tors eat holes in the upper atmosphere, impacting earth's climate — a pretty hard act to follow. But when you get to looking at it, you have to agree.

Scientists from the National Center for Atmospheric Research in Boulder, Colo., lead the effort, which involves six airplanes, nine satellites, 10 mobile laboratories, any number of balloons, and three ground monitoring stations. Their C-130 and Twin Otter aircraft are among the planes that will be used in flying missions between the city and Veracruz to see how the capital's emissions affect the Gulf Coast state.

Information collected about the so-called pollution "plume" also will be used to conduct an exposure assessment study of children and young adults in three different areas along the path of transportation of air pollutants from Mexico City to the neighboring states, Hidalgo and State of Mexico.

The MIRAGE component operates within a larger study area stretching all the way from Acapulco and Oaxaca in the south up to Houston, Texas, in the north. The National Aeronautics and Space Association (NASA) is running the operation, using DC-8 and Jetstream 31 flying laboratories and satellites as part of its Intercontinental Chemical Transport Experiment - Phase B, to study the evolution and transport of pollution on a global scale.

Inside the MIRAGE perimeter are two smaller study areas. The Megacity Aerosol Experiment in Mexico City, or MAX-Mex, stretches to the outlying fringes of the metropolitan area. Led by the U.S. Department of Energy's Atmospheric Science Program, it examines aerosols and gas-aerosol inter-

actions, using DOE's King Air and G-1 craft. At the core of MAX-Mex is the Mexico City metropolitan area, where the Molina Center on Energy and the Environment and several Mexican agencies are leading data gathering about aerosols, gases, radiation and weather.

An "Earth Observing Laboratory" operations log allows MILAGRO followers to receive blow-by-blow updates of the monitoring effort on the internet at a level of detail that perhaps has never before been possible. It is a real achievement in the interest of transparency — not only of the air but of access to public information.

For example, on March 6, at noon it provided a briefing that reported 32 research groups having arrived at one of the three ground sites. They were in the midst of setting up 83 pieces of equipment. The equipment is an awesome array of gear understandable only to experts, including such things as an aethalometer, a nephelometer, spectroradiometers, particle counters, and vertical staring lidar. Activities underway included calibrations and sampling for radiochemical analyses.

If that isn't enough to impress the amateur smog spotter, the MIRAGE real-time chemical forecast maps should be. Also available on the internet, they actually forecast ozone, carbon monoxide, dust, and other smog components at different levels of the atmosphere.

This mega-project for the mega-cities deserves a mega-response. The analyses should be used to design policies and mechanisms that clean up the air in the Federal District and environs, the sooner the better.

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