

'Imported' pollution tied to poor air quality in Texas in 2004

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This image from the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua satellite shows forest fires and thick smoke over Alaska and Canada on July 13, 2004. Areas where MODIS detected active fires are outlined in red. Credit: NASA/GSFC

Scientists using NASA satellites and other data including computer models and ground sensors have demonstrated that pollutants traveling even thousands of miles can impact air quality.

The study concludes that ozone pollution levels increased significantly in the air above Houston on July 19 and 20, 2004. Researchers attribute this



increase in part as a result of smoke transported into the area over the course of a week from forest fires raging in Alaska and Canada. The study is one of only a few that has quantitatively examined the impact of remotely generated pollutants on air quality in the lower atmosphere.

As part of a NASA-led field research project in the summer of 2004, researchers sampled a variety of trace gases and aerosols -- tiny particles suspended in the air -- across North America. During the time of the study, forest fires in western Canada and eastern Alaska were consuming more acres than at any time during the last 50 years. Meteorological conditions carried smoke from these intense fires eastward and southward to the U.S. Gulf Coast.

"The combination of our balloon-borne ozone data and observations by NASA satellites, aircraft, and a network of ground stations provided unprecedented insight into the origins of locally poor air quality in Houston on those two days," said study lead author Gary Morris of Valparaiso University, Valparaiso, Ind.

The researchers relied on imagery from NASA's Moderate Resolution Imaging Spectroradiometer on the Terra satellite, aerosol data from the Total Ozone Mapping Spectrometer satellite, and carbon monoxide data from the Atmospheric Infrared Sounder on the Aqua spacecraft to track the an air mass from the region of forest fires in western Canada and eastern Alaska on July 12-13, 2004. The air mass traveled across Canada, through the mid-western United States, and all the way to Houston, arriving there on July 19.

"We found that with the arrival of the pollutants associated with these forest fires, ozone levels increased between 50-100 percent in the first 5 kilometers over Houston," said Morris. Meteorological conditions, the smoke from the distant forest fires, and the typical urban pollution generated in the Houston area provided a potent mix for increasing local



ozone concentrations.

The scientists believe that such pollution episodes will continue. Understanding the transport and transformation of gases and aerosols over long distances is needed for improved understanding and air quality forecasting.

"This event highlights the critical role imported sources can have on local air quality," said Morris. Balloon-borne data and ground observations combined with data from NASA's suite of satellites and computer models will continue to advance our understanding of the impact of pollutants on air quality. Such information will help enable environmental managers to improve air quality forecasts and propose more effective air quality solutions.

Source: NASA / Goddard Space Flight Center

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