

# Local sources major cause of US near-ground aerosol pollution

November 16 2007

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A cloud of pollution hangs over the Eastern United States in this image captured in July 2002 by NASA's Moderate Resolution Imaging Spectroradiometer (MODIS). The majority of such haze originates locally in North America, and only a small amount is imported from other continents, new research suggests. Credit: Jacques Descloitres, MODIS Land Rapid Response Team, NASA/GSFC

A new NASA study estimates that most ground-level particulate pollution in the United States stems from regional sources in North America and only a small amount is brought to the country from other parts of the world.

Researchers using an innovative global aerosol tracking model have for the first time produced a global estimate of sources and movements of

aerosols near the ground where they can affect human health and run afoul of environmental regulations. Previously, researchers studying aerosols moving between continents focused primarily on tracking a single type of aerosol, such as dust or black carbon, or measuring their quantities throughout the atmosphere. This left gaps in understanding where ground-level particulate pollution comes from.

"This is the first study to comprehensively consider the origin, composition and type of fine particles over the United States and connect them to both domestic and foreign sources." said Mian Chin, an atmospheric scientist at NASA's Goddard Space Flight Center, Greenbelt, Md., and lead author of the study.

Aerosols are airborne particles that arise from both human sources such as burning fossil fuels, and natural sources such as fires, dust and volcanoes. They are also a major source of near-ground pollution. Since 1970, particulate matter has been regulated in the United States by the Clean Air Act. A more recent concern has been aerosols that arrive here from distant shores carried by the wind.

Chin and colleagues set out to investigate how much and what type of aerosols made the intercontinental journey in 2001. The team employed the help of a computer model using known air chemistry and wind patterns to trace a region's aerosols – everything from fossil fuel and biofuel combustion, biomass burning, and volcanic sources, desert dust and sea salt – back to their sources.

"Using the model, we followed the path of aerosols to find out how much is local and how much is from outside a region," Chin says.

Chin and colleagues estimate that between 65-70 percent of surface particulate matter in the eastern U.S. originates from regional pollution aerosols from fuel combustion in North America. The report was in the

Nov. 1 edition of the European Geosciences Union's Atmospheric Chemistry and Physics.

They also found that 30-40 percent of fine particulates in the western U.S. come from local pollution sources. The model results estimated that just 2-6 percent of U.S. surface fine particulates come from fuel combustion particles emitted outside of North America, including Asia and Europe. About 50 percent of surface fine particulate matter in the western U.S. stems from a natural source: dust transported from Asia or from local deserts and organic aerosols from vegetation.

"Our results indicate that controlling regional pollution emissions will be the most effective and most responsible way to manage U.S. air quality," Chin says.

Source: by Kathryn Hansen, Goddard Space Flight Center

Citation: Local sources major cause of US near-ground aerosol pollution (2007, November 16)  
retrieved 23 April 2024 from  
<https://phys.org/news/2007-11-local-sources-major-near-ground-aerosol.html>

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