

Overseas NO_x Could Be Boosting Ozone Levels in U.S.

February 16 2006



A smoggy day in Atlanta town. NO_x arriving in the U.S. from across the Pacific could be boosting ozone levels, a major component of smog. (Photo courtesy K. Baumann)

Large amounts of a chemical that boosts ozone production are being transported to North America from across the Pacific Ocean in May, according to a new report by researchers from Georgia Tech. These higher levels of nitrogen oxides (NO_x), arriving in late spring, could be contributing to significant increases in ozone levels over North America. The research appeared in volume 33 of the journal *Geophysical Research Letters*.

“It’s well-known that pollutants don’t always stay in the region in which they are produced. What’s not understood as well is where and when they

travel,” said Yuhang Wang, associate professor in the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology. “Finding this large amount of NO_x traveling from across the Pacific is important because it will allow us to build better models so we can better understand how pollutants created in one region of the world are affecting the other regions.”

Wang, along with colleagues from Tech, the University of California, Irvine, and the National Center for Atmospheric Research studied data from the Tropospheric Ozone Production about the Spring Equinox (TOPSE) experiment when they found much larger amounts of an array of chemicals, including NO_x, and ozone than predicted by current models.

Formed when fuel burns at a high temperature, any of the sources of NO_x are manmade, with automobile exhaust, electric utilities and industrial activity responsible for the bulk of human-produced NO_x. The amount of NO_x available largely determines how much ozone, a major component of smog, is produced in most regions of the atmosphere.

“With a very small amount of NO_x sitting around, as long as you have all these emissions of carbon monoxide and hydrocarbons, the NO_x sits there and continuously produces ozone. So in a way you really don’t need a lot of it, but when you have a lot of it, it tends to produce ozone faster,” said Wang.

Current models have shown these chemical species coming across the Pacific at lower altitudes, but those peak in March and April. Wang’s finding that the higher altitude transport occurs in May is significant, not only because they found a large amount of NO_x unaccounted for by current models, but the fact that it’s occurring in May means the NO_x is more efficient at making ozone.

“For the same amount of NO_x, ozone production is faster in May than April because there is more ultraviolet light and water vapor available in May,” said Wang.

While it’s not clear whether this trans-Pacific transport is coming from Asia or as far away as Europe, given Asia’s proximity and its burgeoning industrial activity, Wang suggests it is the more likely source. The next step in this research is to study chemical measurements over east Asia to see if there is indeed a link to this seasonal transition and emissions from Asia.

Source: Georgia Institute of Technology

Citation: Overseas NO_x Could Be Boosting Ozone Levels in U.S. (2006, February 16) retrieved 9 April 2024 from <https://phys.org/news/2006-02-overseas-nox-boosting-ozone.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--