



New Agreement Casts Spotlight on Efforts to Inventory Black Carbon

by Lucas Laursen on 31 May 2013, 11:45 AM | [0 Comments](#)

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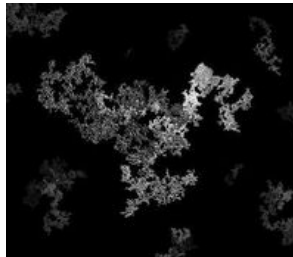
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Researchers are about to take a big step toward better understanding a tiny air pollutant. A U.N. expert panel earlier this month agreed on a technical road map that will guide the first multinational effort to create a standardized emissions inventory of black carbon, a kind of microscopic soot particle. Scientists say that black carbon emissions play an important but poorly understood role in both global climate change and air pollution.

"The increased emphasis on complete reporting across the countries ... is clearly an important step forward," says atmospheric scientist Chris Dore, chair of the U.N. task force, which helps implement the 1979 Geneva Convention on Long-range Transboundary Air Pollution. Fifty-one nations, including the United States and members of the European Union, abide by the convention.

The move reflects growing concern about black carbon particles, which are produced by burning an array of fuels, including oil, wood, crop residues, and even garbage. [Health researchers consider airborne soot particles smaller than 2.5 micrometers a major health threat](#), causing lung disease and premature death. And climate scientists say that black carbon is a key player in global warming because it can absorb solar radiation and accelerate ice melting.

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Count it. A new voluntary agreement is expected to advance efforts to inventory emissions of black carbon, such as this soot particle captured in an x-ray image.

Credit: Duane Loh and Andy Freeberg, SLAC National Accelerator Laboratory

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Efforts to calculate black carbon's full impact, however, suffer from incomplete emissions data. A January study in the *Journal of Geophysical Research: Atmospheres*, for instance, concluded that existing climate models underestimate black carbon's climate-changing contribution by up to a factor of three as a result of data gaps in key regions. Existing inventories, such as those created by measuring emissions from smokestacks and tailpipes, contain large uncertainties, says atmospheric physicist Philip Stier of the University of Oxford in the United Kingdom. In part, that's because they are often designed to show only that a nation is complying with air pollution rules and don't include soot sources such as forest and cooking fires, or particles that settle on roadways and are lofted into the air by passing cars. "Black carbon is a poorly defined substance," Stier says. "It's always measured in a slightly different way, [which] doesn't always refer to the same material."

The new road map—unveiled on 20 May after a meeting of the United Nations Economic Commission for Europe's Task Force on Emission Inventories and Projections in Istanbul, Turkey—aims to put nations on the same page. The voluntary plan calls for nations to start measuring black carbon emissions from an array of sources, including transportation, the energy industry, and agriculture. Nations will add the data to annual emissions reports and dig into existing data to calculate past emissions going back to the year 2000. The plan also requests emissions projections out to 2050.

Dore expects a U.N. steering body to approve the plan later this year, and nations will begin reporting in 2015, although a few could start in 2014. Some nations may go beyond the guidelines to collect additional data, including

measures of black carbon sources not covered by the road map. The voluntary guidelines could one day become mandatory, following a path taken by other pollutants covered by the convention.

The inclusion of black carbon emissions in the annual reports is "really important," says aerosol scientist Catherine Lioussé of the Midi-Pyrenees Observatory in Toulouse, France. It will encourage nations that now don't measure such emissions to start and enable better comparisons of existing inventories by promoting standard methods.

Researchers, meanwhile, are working to develop better methods for getting a broader picture of black carbon in the atmosphere. One \$3 million study sent a Gulfstream jet with air-sampling instruments on undulating flights—from 150 meters to 13,500 meters—in five study areas around the world over several years. Other researchers are mounting low-cost black carbon detectors on ultralight aircraft and drones. Their goal is to better understand the role black carbon is playing in different parts of the atmosphere: While climate researchers may care more about soot interactions with frozen water droplets, for instance, health researchers want to compare how different-sized particles affect the lungs.

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