

Julie Reclaims the Air

Wood Smoke and Black Carbon Soot

A Major Contributor to Global Warming



Julie Mellum founded Take Back the Air, a Minneapolis grassroots organization dedicated to cleaning up the top neighborhood air pollutants that invade other people's airspace without their permission, exacerbating asthma and causing a host of other health problems.

Take Back the Air's goals are to encourage others to join us in spreading awareness, to encourage neighbors and businesses to switch to non-toxic products that do not affect the airspace of others.

The mission of Take Back the Air is to inform the public about the hazards of wood smoke and fragrance chemicals and to provide information on healthier alternatives.

In the frenzied search for solutions to the global warming crisis, climatologists, policy makers, and other concerned environmentalists have overlooked one of the leading causes of rising temperatures around the globe—soot—the black residue that coats fireplaces and darkens vehicle exhaust. Black carbon soot may in fact be the second largest contributor to global warming next to the greenhouse gas carbon dioxide.

According to Stanford environmental engineering Professor Mark Z. Jacobson, “Soot, or black carbon, may be responsible for 15 to 30 percent of global warming, yet it is not even considered in any of the discussions about controlling climate change.” (“New Study Reveals A Major Cause Of Global Warming -- Ordinary Soot”, ScienceDaily, Feb. 9, 2001). Jacobson also observed that human beings produce most of the soot particles that pollute the atmosphere. He maintains that soot consists primarily of elemental carbon and that 90 percent of it comes from the consumption of fossil fuels (particularly coal, diesel fuel, jet fuel, natural gas, and kerosene) and the burning of wood and other biomass. Jacobson also claims that a worldwide reduction in soot emissions and controlling biomass burning could quell the alarming pace of global warming and also reduce our reliance on soot-producing fuels.

Besides its impact on global warming, soot is bad for our health. The World Health Organization reports that approximately 2.7 million people die each year from air pollution and that reduction of wood and other biomass burning would mitigate global warming and would also save lives and improve people's health.

Other studies have dispelled the myth that burning wood and other biomass is “green or carbon neutral” and that the fine particulates emitted during the combustion process actually hasten climate change. (“Science” and “Global Warming” www.burningissues.org).

The warming effect of black carbon soot is far greater than previously estimated. Atmospheric scientist V. Ramanathan of the Scripps Institution of Oceanography and University of Iowa chemical engineer Greg Carmichael found that “black carbon soot, from burning wood and other biomass, cooking with solid fuels and diesel exhaust has a warming effect in the atmosphere three to four times greater than prevailing estimates.” (Nature Geoscience | 221-227 March 24, 2008). They calculated that soot and other forms of black carbon particulates may represent as much as 60 percent of the current global warming effect of carbon dioxide and their findings correlated with similar studies from Stanford, Caltech, and NASA.

“Reducing soot from wood smoke would offer nearly instant benefits in improving atmospheric conditions.”



A simplified explanation for the warming effect is that wood smoke's fine particulates thin clouds. And as total airborne particulates increase, cloud cover decreases, allowing more sunlight to reach the earth. According to Ramanathan, approximately 35 percent of black carbon in the global atmosphere comes from China and India. Yet per capita emissions of black carbon soot from the United States and some European countries are still comparable to those from Asia. "Ramanathan's research also found that the warming effects of black carbon smog appear to be accelerating the melt of Himalayan glaciers, leading to early drying of a major source of drinking water for billions of people throughout Asia."

The International Global Panel on Climate Change (IGPCC) agreed that black carbon soot is a major contributor to global warming. The 2007 Nobel-winning IGPCC panel of approximately two thousand scientists concluded that black carbon soot has a dire atmospheric warming effect. This was significant because soot had previously been unaddressed as a major contributor to global warming. The amplification of black carbon's warming effect previously had not been taken into account when mixed with other aerosols, creating additional secondary fine particulates.

Studies of fine particulates from wood smoke in various communities.

An EPA study cites that, "In some neighborhoods, on some days, 90% of the particle pollution is from residential wood burning." (Jane Koenig and

Timothy Larson, A Summary of Emissions Characterization and Non-Cancer Respiratory Effects of Wood Smoke, USEPA DOC #453/R-93-036,1-919-541-0888).

A study in two San Jose, California locations showed that wood smoke pollution was 4.4 times that of gasoline or diesel fueled vehicles. (San Jose Speciation Trends Network. A Comparison of Source Apportionments of Fine Particulate Matter at Two San Jose, CA Locations.)

The next step

Because the urgency of reducing black carbon emissions cannot be overstated, reducing soot from wood smoke would offer nearly instant benefits in improving atmospheric conditions in the United States. It would also offer immediate societal and health benefits. This would facilitate political and regulatory momentum towards mitigation of black carbon emissions.

It is urgent to advance public awareness of wood smoke's crucial role in global warming with education and policy changes.

For those interested in more scientific and educational data about wood smoke, see www.burningissues.org. The Burning Issues site was founded in 1988 as a special particulate pollution project of the Bay Area Loma Prieta / Silicon Valley Chapter of the Sierra Club.

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