Institute for Governance & Sustainable Development

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Cutting Black Carbon Soot Could Save Arctic

Washington, DC, July 29, 2010 – Reducing emissions of black carbon, the dark component of soot, could be the best – and perhaps only – way to save the Arctic from warmer temperatures that are melting its snow and ice, according to a study published today in the *Journal of Geophysical Research*. Dr. Mark Jacobson of Stanford University studied the short-term effects of reducing black carbon and other greenhouse gases, including CO_2 and methane, over a 15-year period of time, with black carbon reductions appearing to be the fastest way to avoid further Arctic ice loss and warming.

Jacobson's study found that aggressive reductions in black carbon emissions produced from both the burning of fossil fuels and burning of biomass, could lower temperatures in the Arctic by 1.7˚C within the next 15 years. The Arctic has warmed at least 2.5˚C over the past century – a reduction of this magnitude could help slow ice loss and potentially save it from reaching a tipping point where it would be impossible to recover its snow and ice cover.

"The Arctic is a critical defense shield for the Earth's climate system. Its vast expanse of ice and snow is reflecting significant incoming heat back into space. We cannot afford to lose the Arctic," said Durwood Zaelke, President of the Institute for Governance & Sustainable Development. "Targeting black carbon with aggressive, fast action today is the most important strategy for saving the Arctic."

Black carbon has a particularly negative impact on the Arctic and other regions with snow and ice, such as the Tibetan Plateau in Asia. After a few days or weeks, the black carbon particles are washed out of the atmosphere and deposited on the ground below, darkening the reflective white surface and leading to greater absorption of solar radiation. This leads to more melting and larger pools of dark water, which then absorb more heat, continuing a dangerous feedback cycle.

Besides its damaging impact on the Arctic, black carbon emissions have a significant effect on the overall warming of the earth. After studying the different climate forcers' impacts on Arctic temperatures, as well as clouds and precipitation, Jacobson was able to conclude that black carbon may be the second largest contributor to warming after CO_2, echoing the conclusion by several other scientists, including Dr. V. Ramanathan at the Scripps Institution at the University of California, San Diego and Dr. Drew Shindell at NASA's Goddard Institute for Space Studies.

"On top of all this, black carbon is a killer," added Zaelke. "Nearly a million and a half people die every year from breathing air polluted by black carbon and contracting deadly respiratory diseases. Black carbon is bad news for development, which depends on a healthy population, and

we need to get rid of it now."

Fortunately, as Jacobson notes in his paper, fairly simple technologies such as diesel particulate filters for vehicles and more efficient cookstoves, are available now and can effectively reduce black carbon emissions.

"We have the technology to solve this problem, and now we need to make it a priority," said Zaelke.

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Jacobson, Mark Z. Short-term effects of controlling fossil-fuel soot, biofuel soot and gases, and methane on climate, Arctic ice, and air pollution health. *Journal of Geophysical Research*, 2010: http://www.stanford.edu/group/efmh/jacobson/PDF%20files/BCClimRespJGR0710.pdf.

See also:
Reducing abrupt climate change risk using the Montreal Protocol and other regulatory actions to complement cuts in CO2 emissions, by Mario Molina, Durwood Zaelke, K. Madhava Sarma, Stephen O. Andersen, Veerabhadran Ramanathan, and Donald Kaniaru. *Proceedings of the National Academy of Sciences*, 2009. http://www.pnas.org/content/early/2009/10/09/0902568106.full.pdf+html

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