

## Curbing soot, smog could help limit temperature rise

Date: 2011-06-15

Contact: Robert Monroe or Mario Aguilera

Phone: (858) 534-3624

Email: [scrippsnews@ucsd.edu](mailto:scrippsnews@ucsd.edu)



### Climate scientist Veerabhadran Ramanathan

SAN DIEGO — Fast action on pollutants such as black carbon, ground-level ozone and methane may help limit near term global temperature rise and significantly increase the chances of keeping temperature rise below 2 degrees C (3.6 degrees F) — and perhaps even 1.5 degrees C (2.7 degrees F), a new assessment says.

Protecting the near-term climate is central to significantly cutting the risk of "amplified global climate change" linked with rapid and extensive loss of Arctic ice on both the land and at sea, said assessment authors including [Veerabhadran Ramanathan](#), a climate and atmospheric scientist at Scripps Institution of Oceanography, UC San Diego.

Fast action might also reduce losses of mountain glaciers linked in part with black carbon deposits while reducing projected warming by two thirds in the Arctic over the coming decades by two thirds.

"The proposed measures for reducing black carbon, methane and ozone levels in the atmosphere significantly increase our chances to keep global warming below dangerous levels during this century," said Ramanathan, a vice chair of the assessment team. "Some of the measures, such as improved cookstove technologies and cutting down diesel emissions of black carbon also have the fantastic co-benefit of reducing one million or more fatalities every year among women and children."

The findings, released today (June 15) in Bonn, Germany, during a meeting of the UN Framework Convention on Climate Change (UNFCCC) have been compiled by an international team of more than 50 researchers chaired by Drew Shindell of the National Aeronautics and Space Administration (NASA). Ramanathan is organizing a related briefing today in Washington, D.C., for several federal

agencies on how to reduce emissions of global warming pollutants such as carbon dioxide, black carbon and ozone and prevent human deaths from traditional biomass burning cook stoves in developing nations.

The scientists behind the assessment, coordinated by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO), whose Secretariat is provided by the Stockholm Environment Institute (SEI), also point to numerous public health and food security opportunities above and beyond those linked with tackling climate change.



Big cuts in emissions of black carbon will improve respiratory health and reduce hospital admissions and days lost at work due to sickness. Close to 2.5 million premature deaths from outdoor air pollution could on average be avoided annually worldwide by 2030 with many of those lives saved being in Asia, it is estimated. Big cuts in ground level ozone could also contribute to reduced crop damage equal to between 1 to 4 percent of the annual global maize, rice, soybean and wheat production.

Cutting these so-called 'short-lived climate forcers' can have immediate climate, health and agricultural benefits, the report concludes. This is because, unlike carbon dioxide (CO<sub>2</sub>) which can remain in the atmosphere for centuries, black carbon for example persists only for days or weeks.

The researchers, however, also underline the fact that while fast action on black carbon and ground-level ozone could play a key role in limiting near-term climate, immediate and sustained action to cut back CO<sub>2</sub> is crucial if temperature rises are to be limited over the long-term.

It is the combination of action on short-lived climate forcers and long-lived greenhouse gases which improves the chances of keeping below the 2-degree target throughout the 21st century.

Achim Steiner, UN under-secretary general and UNEP executive director, said: "There are now clear, powerful, abundant and compelling reasons to reduce levels of pollutants such as black carbon and tropospheric ozone along with methane: their growing contribution to climate change being just one of them.

"This assessment underlines how the science of short lived climate forcers has evolved to a level of maturity that now requires and requests a robust policy response by nations. The experts spotlight how a small number of emission reduction measures — targeting, for example, recovery of methane in the coal, oil and gas sectors through to the provision of cleaner burning cook stoves; particle traps for diesel vehicles and the banning of open burning of agricultural wastes — offer dramatic public health, agricultural, economic and environmental benefits," he added.

The UNEP/WMO Integrated Assessment of Black Carbon and Tropospheric Ozone suggests that action could be catalyzed through not only the UN climate convention process but also via, for example, strengthening existing national and regional air quality agreements.

Michel Jarraud, director general of the WMO, said: "Combating climate change will not be possible unless there are significant reductions of the main greenhouse gas, CO<sub>2</sub>. However, over recent years

it has become clear that a range of other pollutants such as black carbon and tropospheric ozone are aggravating that challenge. This report highlights how improved scientific understanding of the role of other pollutants can inform policy decisions related to climate change mitigation."

Drew Shindell of NASA's Goddard Institute for Space Studies said: "This report has brought clarity to the complexity of the heating and cooling effects of a range of pollutants and uses the science to show that there are clear and concrete measures that can be undertaken to help protect the global climate in the short to medium term. Perhaps the most intriguing link is between emissions of methane and the formation of tropospheric ozone. Methane is a powerful greenhouse gas in its own right, but it has emerged that it is also triggering a great deal more global warming by contributing to the formation of significant levels of ground level ozone—indeed more than was previously supposed. The win-win here for limiting climate change and improving air quality is self-evident and the ways to achieve it have become far clearer as a result of this assessment."

Today (June 15) the government of Sweden announced support for a comprehensive and forward-looking policy assessment to assist governments on the next steps towards fast action on short-lived climate forcers (SLCFs). This is in line with Sweden's strategy on SLCFs and its policy to integrate climate change and air pollution policies.

The work, to be coordinated by UNEP, is expected to be ready in advance of the next Climate Convention meeting scheduled later in the year in Durban, South Africa.

Black carbon is a major component of soot and is formed from the incomplete combustion of fossil fuels, wood and biomass. Key sources include emissions from cars and trucks, cookstoves, forest fires and some industrial facilities. It affects the climate by intercepting and absorbing sunlight and darkens snow and ice when deposited, while also influencing cloud formation. It also is a health hazard.



Tropospheric ozone is a major component of urban smog and is a powerful greenhouse gas and air pollutant harmful to human health and ecosystems. The threefold increase in concentrations in the northern hemisphere in the past 100 years has made it the third most important global greenhouse gas.

Tropospheric ozone is formed from other gases including methane — itself a potent greenhouse gas emitted from sources such as waste tips, livestock and the oil and gas industry.

### **About Scripps Institution of Oceanography**

Scripps Institution of Oceanography at University of California, San Diego, is one of the oldest, largest and most important centers for global science research and education in the world. Now in its second century of discovery, the scientific scope of the institution has grown to include biological, physical, chemical, geological, geophysical and atmospheric studies of the earth as a system. Hundreds of research programs covering a wide range of scientific areas are under way today in 65 countries. The institution has a staff of about 1,400, and annual expenditures of approximately \$170 million from federal, state and private sources. Scripps operates robotic networks, and one of the largest U.S. academic fleets with four oceanographic research ships and one research platform for worldwide exploration. Birch Aquarium at Scripps serves as the

interpretive center of the institution and showcases Scripps research and a diverse array of marine life through exhibits and programming for more than 415,000 visitors each year. Learn more at [scripps.ucsd.edu](https://scripps.ucsd.edu).

### **About UC San Diego**

Fifty years ago, the founders of the University of California, San Diego, had one criterion for the campus: It must be distinctive. Since then, UC San Diego has achieved the extraordinary in education, research and innovation. Sixteen Nobel laureates have taught on campus; stellar faculty members have been awarded Fields Medals, Pulitzer Prizes, MacArthur Fellowships and many other honors. UC San Diego — recognized as one of the top 10 public universities by U.S. News & World Report and named by the Washington Monthly as number one in the nation in rankings measuring "what colleges are doing for the country" — is widely acknowledged for its local impact, national influence and global reach. UC San Diego is celebrating 50 years of visionaries, innovators and overachievers. [50th.ucsd.edu](https://50th.ucsd.edu)