

BLACK CARBON LINKED TO PREMATURE MORTALITY

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

The Indo-Gangetic plain has a high burden of black carbon with serious implications for regional climate and human health. | Photo Credit: [AFP](#)

Black carbon (BC), a form of particulate matter that results from carbon emissions, was most associated with premature mortality, according to a study that tracked mortality rates from different classes of air pollutants in Varanasi, Uttar Pradesh.

The study was funded by the Department of Science and Technology (DST) and conducted by researchers at the Indian Institute of Technology, Banaras Hindu University (BHU); St. Johns Medical College, Bengaluru, and the DST-Mahamana Centre of Excellence in Climate Change Research, BHU.

It appears in the peer-reviewed journal *Atmospheric Environment*.

The Indo-Gangetic plain has a high burden of black carbon with serious implications for regional climate and human health. Several cities in this belt routinely find themselves at the top of the list of the most polluted cities in India as well as the world. Black carbon results from incomplete burning of fossil fuel and studies have previously linked it to global warming. It's a relatively short-lived pollutant in the atmosphere but influences cloud formation and atmospheric heat absorption processes.

“However, most of the pollutions-based epidemiological studies essentially relate exposure to particulate mass concentration (PM 10 and/or PM 2.5) that invariably generalise all particulates with equal toxicity without distinguishing individuals by its source and composition, which genuinely have different health consequences. Importantly, the health effects in terms of mortality due to BC aerosol exposure have never been evaluated in India,” the authors note in a statement issued by the DST.

A 10-point increase in air pollution from black carbon led to an average 5% increase in mortality whereas a similar rise in PM 2.5 led to an average 1% increase in mortality. Nitrogen dioxide (NO₂) and Sulphur Dioxide (SO₂) were both associated with a 2.3% and 1.3% increase in mortality, according to calculations by the team.

The detrimental effect of pollutants was higher for males, age group 5-44 years and, in winter. They found that the adverse effect of air pollutants was not limited to current day of exposure but could extend to as late as five days after exposure. Including BC as a potential health hazard inspires and provided a background for more epidemiological studies to provide evidence of health effects of air pollutants from different parts of India, the authors note.

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