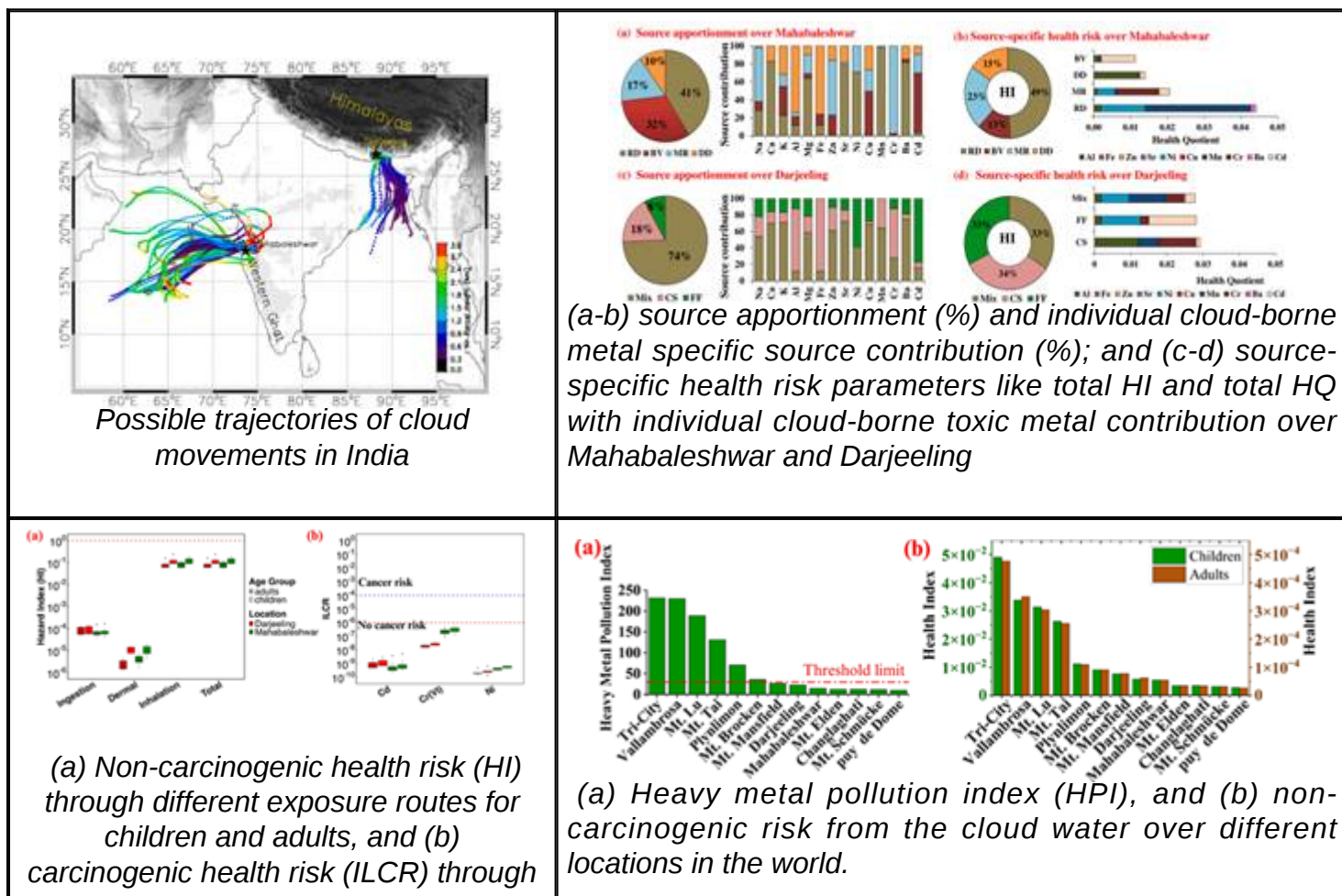


In the lofty heights of the Himalayas, where clouds drift over snow-capped peaks, a dangerous secret is being carried on the wind. A new scientific study has found that clouds—once believed to offer the purest drinking water—are silently ferrying toxic heavy metals from polluted lowlands to some of Earth's highest, most fragile ecosystems.

Metals in the cloud is a matter of growing concern due to its adverse impact on human health on a wider scale through continental long-range transport. However, information regarding metal contamination of low-level clouds, particularly the late summer and early monsoon clouds in India is lacking.

Bose Institute, an autonomous institute of the Department of Science and Technology (DST) spotted toxic metals in non-precipitating clouds during the onset of monsoon over the Western Ghats and Eastern Himalayas. They also found that clouds over the Eastern Himalayas had 1.5 times higher pollution levels due to an increase in 40-60% higher loading of toxic metals like Cd, Cu, and Zn emitted from heavy traffic and industrial emissions that cause high health risk factors from carcinogenic diseases.



The Atmospheric research team, led by Dr. Sanat Kumar Das, Associate Professor, Bose Institute quantified the risk of carcinogenic and non-carcinogenic diseases through inhalation, ingestion, and dermal absorption. They conducted a detailed study using statistical models to identify the possible sources of these metals.

The results from the current observation and simulations showed that children are at 30% higher risk from such toxic metals than adults in India. Inhalation of polluted clouds over Eastern Himalayas containing high concentrations of toxic metals is the most potential route for non-carcinogenic diseases.

Besides, the study showed that health risk for the occurrence of carcinogenic diseases has increased due to inhalation of dissolved Cr present in clouds. The study highlights that Eastern Himalayas experience higher polluted clouds containing toxic metals like Cd, Cr, Cu, and Zn coming from vehicular and industrial emissions over foothill regions. Inhalation of such polluted clouds is the potential cause of carcinogenic and non-carcinogenic diseases in India.

Clouds acting as transport medium, carry dissolved heavy metals, posing serious health risks to people, due to carcinogenic and non-carcinogenic diseases, through skin contact, inhalation, and consumption of precipitation-collected water in high-altitude regions.

The study published in *Environmental Advances* opens up a new direction for research on atmospheric pollution and public health. However, the analysis shows that Indian clouds till now remain relatively less polluted, placing India in a safer health zone compared to countries like China, Pakistan, Italy, and the USA.

NKR/PSM

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