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Plants play larger role than previously thought in cleaning air pollution

Vegetation plays an unexpectedly large role in cleansing the atmosphere, according to a study by the National Center for Atmospheric Research (NCAR). Scientists used observations, gene expression studies and computer modeling to show that deciduous plants absorb about a third more of a common class of air polluting chemicals than previously thought.

“Plants clean our air to a greater extent than we had realized,” said NCAR scientist Thomas Karl, the lead author. “They actively consume certain types of air pollution.”

The research team focused on a class of chemicals known as oxygenated volatile organic compounds (oVOCs), which can have long-term impacts on the environment and human health. The compounds form in abundance in the atmosphere from hydrocarbons and other chemicals that are emitted from both natural sources, including plants, and sources related to human activities, including vehicles and construction materials. The compounds help shape atmospheric chemistry and influence climate. Eventually, some oVOCs evolve into tiny airborne particles, known as aerosols, that have important effects on both clouds and human health.

By measuring oVOC levels in a number of ecosystems in the United States and other countries, the researchers determined that deciduous plants appear to be taking up the compounds at an unexpectedly fast rate—as much as four times more rapidly than previously thought. The uptake is especially rapid in dense forests and most evident near the tops of forest canopies, which account for as much as 97 percent of the oVOC uptake that was observed.

Once the researchers understood the extent to which plants absorb oVOCs, they fed the information into a computer model that simulates chemicals in the atmosphere worldwide. The results indicated that, on a global level, plants are taking in 36 percent more oVOCs than had previously been accounted for in studies of atmospheric chemistry. Additionally, since plants are directly removing the oVOCs, fewer of the compounds are evolving into aerosols.

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