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Exploring cause and effect of climate change

Dr. Rose Cory collects water samples at her field site in the Arctic.

UNC Gillings School of Global Public Health researchers aren't just holding their breath when it comes to protecting our atmosphere.

Jason West, PhD, assistant professor of environmental sciences and engineering (ESE), studies how methane, nitrogen oxide (NOx), carbon monoxide and black carbon – particulates formed through the incomplete combustion of fossil fuels – affect air pollution and climate change.

"We would like to be able to lay out a menu of options for policymakers," West says, noting that simply decreasing the quantity of these elements won't improve air and climate automatically. "For example, methane reduction is good for both, but NOx reduction, while good for air quality, may be bad for climate change."

The Arctic is the focal point for Rose Cory, PhD, another ESE assistant professor, and Collin Ward, an ESE doctoral student working with her.

"The Arctic is warming faster than much of the rest of the earth due to climate change," Cory explains. "This warming is causing thawing of permafrost. In those frozen soils, there is a lot of naturally occurring organic carbon that, in a sense, has been locked up in a freezer. Thawing is releasing this organic carbon to the warmth and sunlight at the earth's surface."

Based on her preliminary results, exposing this organic carbon to sunlight is accelerating the development of carbon dioxide, a greenhouse gas that contributes to "global warming." That's because microorganisms, which eat organic carbon and release carbon dioxide through respiration, now have more carbon at their disposal.

Cory is early in a multi-year project to further understand this phenomenon. She plans to conduct research in the Arctic for the next three summers.

– Susan Shackelford