Africa: An air pollution wildcard

December 14 2018, by Marie Denoia Aronsohn

The NASA Atmospheric Tomography Mission has been flying around the world to analyze pollution chemistry in the air and oceans. And the results so far have been surprising. Credit: Roisin Commane

For the past four years, atmospheric scientists have been flying around

the world with NASA on a mission to analyze pollution chemistry in the air and oceans. The NASA Atmospheric Tomography Mission or ATom, which flew its last campaign this spring, discovered unexpected levels of pollutants over the Pacific, Atlantic and Arctic oceans.

"There's pollution everywhere in the world. The magnitude of it surprised me," said Róisín Commane, an atmospheric scientist at Columbia's Lamont-Doherty Earth Observatory who participated in the mission.

Analyzing the data gathered during the four-year campaign is Commane's work for the next year or more. She joined Lamont in September as an assistant professor to start a new research group on atmospheric composition. During the fall meeting of the American Geophysical Union, she presented her ongoing analysis, highlighting one of the most surprising findings so far: the impact of African emissions on the atmospheric composition over the tropical Atlantic.

"The aim of the ATom project was to look at areas where pollution gets oxidized and dies, and to discover how much clean atmosphere is out there," explained Commane. And while she and colleagues expected to gather a collection of well-mixed gases that would be consistent with previous research and modeling, what they found was, at times, quite unexpected.

"We're seeing pollution in places we didn't think we'd see it. We're seeing chemical processes producing chemicals we never knew we should be looking for," said Commane. Halfway between Africa and South America, investigators were astounded to see dense pollution in the middle of the ocean, so far from the source regions.

Africa produces nearly half of the world's carbon monoxide from biomass burning. However, the research demonstrates that human-

related emissions are much higher than models had indicated.

"Should we have been surprised by the magnitude? That's what we'll spend the next year or two asking as we analyze this data," said Commane.

"It's a huge continent with a lot of people. One in five people now live in Nigeria. They have a rapidly developing economy and large oil and gas industry, and they have a lot of pollution because they're dealing with emissions from transport where they, like many countries, are using high sulfur diesel which is cheaper but much more polluting. So we should be helping these countries target what would make the biggest improvements in air quality."

The question now, said Commane, is whether the whole continent is generating so much pollution. "We don't know."

Some countries are now measuring emissions on the ground, with Rwanda, Ivory Coast and Nigeria leading the way. However, there are many that do not and much is still unknown. "With ATom, we were measuring what flows out of the continent. Not what's happening on the ground at the time."

Finding out what's happening on the ground, and making information available to inform regulators, is critical.

"The analysis will inform people who want to start reducing the pollution, help them decide what they should focus on first. That's why we do all of this—to try to provide the information that will give countries the tools they need to make a difference, to help. But that's a long way down the road."

This story is republished courtesy of Earth Institute, Columbia University