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NEW LAKES IN ALASKA IS RELEASING BUBBLES FULL OF METHANE

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

The Big Trail Lake in Fairbanks, Alaska, is a ‘thermokarst lake’ that has come into existence over the last 50 years. Image for Representation. | Photo Credit: AP

New lakes are emerging in Alaska due to thawing permafrost and releasing methane—a greenhouse gas—into the atmosphere.

The Big Trail Lake in Fairbanks, Alaska, is one such ‘thermokarst lake’ that has come into existence over the last 50 years or so and is continuously belching bubbles filled with methane gas, according to a blog post by NASA.

Permafrost is ground that stays frozen all year around. In Alaska, the permafrost also contains massive wedges of ice locked within the ground. When the ice melts, the ground surface collapses and forms a sinkhole that is filled with water, creating a thermokarst lake.

Katey Walter Anthony is a researcher collaborating with NASA’s Arctic Boreal Vulnerability Experiment (ABoVE) which is a large-scale study of environmental change and its implications for social-ecological systems. She has been studying the formation of thermokarst lakes and how the process influences Earth’s climate change.

“Lakes like Big Trail are new, they’re young, and they are important because these lakes are what’s going to happen in the future,” she explained.

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The methane bubbles emerging from these newly formed lakes are caused by microbial activity. The microbes digest the dead plants and organic matter in the previously frozen ground, which produces carbon dioxide and methane. Permafrost thaw can also form under-lake chimneys that allow gases like methane to escape from where they were trapped underground.

“At Big Trail Lake, it’s like opening your freezer door for the first time and giving all the food in your freezer to microbes to decompose. As they decompose it, they are belching out methane gas,” says Walter Anthony.

An easy way to test if the lake is emitting old methane is to light a match near the collected gas sample from the lake. As a flammable gas, it will catch fire easily until the supply is maintained. Scientists use field measurements, collected samples and airborne radar data to estimate how much methane these lakes are releasing across a large area.

Methane is the primary contributor to the formation of ground-level ozone, a hazardous air pollutant. A powerful greenhouse gas, it is 80 times more potent at warming than carbon dioxide over a period of 20 years, as per aUNEPreport. Though it has a much shorter atmospheric lifetime than carbon dioxide, methane is responsible for 30% of the rise in global temperatures since the industrial revolution. In fact, it is proliferating faster now than at any other time since record-keeping began in the 1980s, says a study by the United States National Oceanic and Atmospheric Administration.

Only recently formed in Alaska, these types of lakes are abundant in the Arctic. Some Arctic lakes are hundreds or thousands of years old and the microbes in them have run out of permafrost organic matter to decompose. As a result, these ancient lakes do not release as much methane as the newer ones in Alaska, such as the Big Trail Lake.

“So what’s a concern for the future, when we think about permafrost carbon feedback, are areas that are newly thawed,” says Walter Anthony.

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