**More Climate Problems in Artic**

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In the warming Arctic Ocean, newly forming cracks in the sea ice are releasing surprising levels of methane, a powerful greenhouse gas, according to a new study conducted with funding from NASA and other institutions.

Scientists have long known that melting permafrost allows gas trapped in the soils and ocean sediments to be released into the atmosphere. And [a study](http://www.independent.co.uk/news/science/vast-methane-plumes-seen-in-arctic-ocean-as-sea-ice-retreats-6276278.html)  last year discovered large plumes of methane bubbling up from the seabed off the Siberian cost. But this study is the first to reveal that the vast expanses of the Arctic ocean itself can also directly contribute to the rising levels of methane in the earth’s atmosphere.

The study’s authors said that they were not sure how much total methane was coming from the cracks in the polar sea ice, but that they were concerned that there may be enough of the gas to have an impact on climate change.

Methane is at least 20 times as powerful as the best-known greenhouse gas, carbon dioxide, which is far more prevalent in the atmosphere and is emitted from burning coal and oil. Methane is the key component of natural gas, and it can be emitted from drilling for oil and gas, factory farming, and natural gas pipeline leaks, for example. Methane’s effects are strongest in the short run, when it can be 70 times as effective at trapping warmth from the sun as CO2.

During five flyovers of the Arctic seas between 2009 and 2010, the NASA scientists used specialized equipment to detect unexpectedly high levels of methane in remote areas of the Arctic Ocean. There was no carbon monoxide found with the methane, which would have indicated that the gases came from burning fuels or other human activity. And because they were flying over the deep ocean, away from the shallow seabed emissions and land, the scientists ruled out known sources of emissions.

Instead, they realized that the methane was coming from the ocean’s surface itself, rising up through cracks in the ice and places where the ice cover was sporadic. When the seawater hits air, methane in the waters is released, they found, which does not happen when the seawater is frozen solid.

Marine bacteria are suspected to be the source of the methane in the ocean’s waters. The bacteria are more likely to produce methane in parts of the ocean that are low in nitrates. Plus, because cold Arctic Ocean waters tend to stay stratified in layers, the methane produced near the surface of the water stays trapped there, and doesn’t break down in the cold weather. Some scientists have postulated that the methane also breaks free from waters that are agitated by cracking sea ice.

The polar regions are generally warming faster than the rest of the planet. On land, scientists have warned about runaway global warming that could be caused by melting permafrost. As the climate slowly grows warmer, thaws could unleash methane, trapped in icy crystals called hydrates, across Siberia and the top of North America. The methane locked in Arctic soils and seas exceeds the total amount of carbon stored in the world’s coal reserves, so these land-based thaws could greatly speed up global warming.

Now, for the first time, scientists have found a similar—though potentially less polluting—process occurs at sea as well.

The study compared methane levels over the oceans to those in eastern Siberia, where the permafrost has begun to thaw, and found that, in some areas, the levels are similar to those found on land.

During the summer months, sea ice melts across more than 3.8 million square miles of the Arctic Ocean, so “the emissions rate we encountered could present a source of global consequence,” the [study says](http://www.nature.com/ngeo/journal/vaop/ncurrent/full/ngeo1452.html).

“While the methane levels we detected weren’t particularly large, the potential source region, the Arctic Ocean, is vast, so our finding could represent a noticeable new global source of methane,” Eric Kort of NASA’s Jet Propulsion Laboratory, Pasadena, Calif. and the author of the study said in a [statement](http://www.nasa.gov/topics/earth/features/earth20120422.html)“As Arctic sea ice cover continues to decline in a warming climate, this source of methane may well increase.”