Average Canadian household destroys hockey rink-sized stretch of sea ice every 8 years

Study finds 3 square metres of Arctic sea ice melts for every tonne of CO_2 produced

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Children play amid icebergs on the beach in Nuuk, Greenland, on June 5.

Scientists have come up with a shockingly simple formula that lets individuals calculate exactly how much they are contributing to climate change.

For every tonne of carbon dioxide (CO2) a person produces, three square metres of Arctic sea ice melts, according to researchers in Germany, the U.K. and the United States.

The findings, based on observational data from the 1960s to the present, were published in the journal Science.

"So far, climate change has often felt like a rather abstract notion. Our results allow us to overcome this perception," says Julienne Stroeve, an expert in sea ice satellite measurements.

Taking a 4,000-kilometre road trip? That's three square metres of Arctic sea ice gone, by the team's calculations. A round-trip flight from London to San Francisco is five square metres. Canadians emitted 20.6 tonnes of CO2 per person in 2014, according to Environment and Climate Change Canada. If the average Canadian household has about three people, according to the formula, it would take them about 8.5 years to destroy 1,579 square metres of Arctic sea ice — roughly the size of an NHL rink, not taking into account the thickness of the ice.

How much time do we have?

In a stable ice pack, the warming effect of infrared radiation generated by the sun is balanced by cold temperatures in the atmosphere. But increasing levels of carbon dioxide prevent those infrared rays from escaping into space. As a result, the ice retreats northward where there's less solar radiation. "The ice is migrating to re-establish equilibrium," said Stroeve.

Arctic ice is melting at a rapid pace, which is bad news for wildlife and for people.

Establishing that hard link between CO2 and sea ice has important consequences.

Rutgers University marine scientist Jennifer Francis, who wasn't part of the study, told The Associated Press the link is so clear and direct that "we know beyond a shadow of a doubt that Arctic sea ice is disappearing because of increased carbon dioxide."

For years, climate modellers have attempted to pinpoint when summer sea ice is likely to disappear. Some scientists have estimated the end of this century; others have said it should already be gone.

The study's authors say the most likely date is sometime around mid-century — unless CO2 emissions slow significantly.

A seasonally open Arctic would ease northern shipping and resource development. It would be catastrophic for plants and animals that live on sea ice, as well as for the people who depend on them.

It would also have unknown consequences for climate around the world. Sea ice is often referred to as the Earth's air-conditioning unit and it has been linked to the behaviour of the jet stream, a high-altitude river of air that influences rainfall, drought and extreme instances of both.

Sea ice affects more than just polar bears, said Stroeve. "We are all ice-dependent species."

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