

# ICE LOSS TO ADD 0.4 DEGREES CELSIUS TO GLOBAL TEMPERATURES: STUDY

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

Arctic summer sea ice levels have declined by more than 10% each decade since the late 1970s and mountain glaciers have shed roughly 250 billion tonnes of ice annually over the last century.

| Photo Credit: [REUTERS](#)

The loss of billions of tonnes of ice from Earth's frozen spaces is likely to increase global temperatures by an additional 0.4 degrees Celsius, according to research Tuesday highlighting the danger of a "vicious circle" of warming.

Arctic summer sea ice levels have declined by more than 10% each decade since the late 1970s and mountain glaciers have shed roughly 250 billion tonnes of ice annually over the last century.

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Ice loss from the West Antarctic and Greenland ice sheets is accelerating and already outstripping what scientists until recently believed to be the worst-case melt scenarios.

Decades of studies have sought to quantify how Earth's melting ice will contribute to sea level rise — Antarctica and Greenland alone contain enough frozen water to boost oceans' height by around 60 metres.

But little research has tried to predict how ice loss will add to the already 1.0 degree C of global warming emissions from fossil fuels since the start of the Industrial Era.

Scientists at Germany's Potsdam Institute for Climate Impact Research (PIK) used a climate model that includes components on atmosphere, ocean, sea- and land-ice data to predict temperature change from ice loss under a variety of emissions scenarios.

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They found that under current levels of atmospheric CO<sub>2</sub> — roughly 400 parts per million — the melting of Arctic sea ice, mountain glaciers and the polar ice caps would raise temperatures by 0.4C.

That's on top of the 1.5C of warming our current emissions levels have rendered all but inevitable, and the safer cap on global warming aimed for in the Paris climate accord.

The main driver of temperature gain from ice loss would be due to a process known as albedo feedback, in which heat reflective bright ice is replaced by absorbant darker sea water and/or soil.

"If global ice masses shrink, this changes how much of the sunlight that hits the Earth's surface is reflected back into space," said lead author Nico Wunderling.

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He likened the albedo effect to wearing either white or black clothes in summer.

“If you wear dark, you heat up more easily,” Mr. Wunderling noted.

This is one of Earth’s so-called climate “feedback loops”, in which increased temperatures lead to further ice loss, which in turn further increases temperatures.

Other ways that temperatures would rise further as ice receded include increased water vapour in the atmosphere, increasing the greenhouse effects, said authors of the study published in Nature Communications.

Looking solely at Arctic sea ice — which unlike polar ice caps might be totally absent during summer months within decades — they found its melt would contribute 0.2C to global temperatures alone.

Also Read | [Arctic ice melt is disrupting key ocean current, may alter climate in Western Europe: Study](#)

The largest ice masses in Greenland and West Antarctica, by comparison, are huge and will likely take centuries to melt fully even if emissions continue their unabated growth.

But the authors highlighted the risk that those enormous bodies of frozen water could soon reach a point of no return as temperatures creep ever higher.

Given the unknowns surrounding ice cap tipping points, Mr. Wunderling told *AFP* it would be best to act in “a risk-averse” way and try to drag down emissions as soon as possible.

Also Read | [Data: Sea ice extent in Arctic lowest in July since 1979; in Antarctic, it surpassed average level in Sept.](#)

“With continued global warming, it becomes more and more likely that we cross tipping points -- not just in the ice-sheets, but also in other parts of the climate system,” he said.

“If the Paris Agreement is fulfilled we can avoid many of the strongest and potentially irreversible impacts on Earth’s ice masses, the global climate and humanity.”

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