

Tipping Points

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By Melanie Lenart

One drink too many. The last straw that broke the camel's back. We're all familiar with tipping points, even if we don't call them that.

Soon we may need to add another ultimate to the list: The final ton of carbon dioxide that thawed the Arctic.

This month, news reports suggested we're closer than we think to an Arctic meltdown. The carbon dioxide in our modern air is roughly the same as the levels that pushed Arctic summer temperatures above freezing during the Pliocene age some three to five million years ago.

If global warming builds up enough to tip the scales toward an Arctic meltdown, we'll feel the heat even in the subtropical, landlocked Southwest. Hotter summers here will be part of the package.

During the warmer Pliocene age, frogs, beavers and an ancestor to the black bear lived among larch and northern white cedar trees on Ellesmere Island – which is located well within the Arctic Circle.

In modern times, the island is frozen tundra supporting a bonsai version of willows but no sizable trees. The animals that live there now, such as wolves and caribou, are well adapted to cold climate, where even summer temperatures average below freezing.

As in the ancient Arctic, forests and wetlands tended to expand during past hothouses – including to the poles. That's partly because a few degrees of global change translates into a world of difference at the poles.

During that hotter Pliocene, Arctic temperatures averaged about 34 degrees Fahrenheit higher than they do today, as Ashley Ballantyne of the University of Colorado and her colleagues concluded. Yet the global average then was only about four or five degrees Fahrenheit higher than in recent times – that is, before we started burning coal, oil and gas.

Already our planet is about one degree Fahrenheit warmer than before we started burning the fossil fuels that release heat-trapping carbon dioxide. We're on track to add another four or five degrees or more this century unless we dramatically change our fuel use. Even with that, we'll need to promote forest growth to pull existing carbon dioxide from the air.

We're already seeing a more extreme temperature rise around the poles compared to other parts of the planet. The shrinking sea ice in the Arctic is one warning sign.

In early July, the extent of Arctic Sea ice hit a record low for that time of year. It was even smaller than during early July of 2007 – the year ships traveled in late summer through the Arctic’s Northwest Passage for the first time in recorded history.

The melting of sea ice doesn’t raise sea levels, just as the melting of ice cubes in a Marguerita doesn’t flood the salted rim. But a meltdown does remove some of the ice cover that helps reflect the sun’s rays.

Without its reflective cloak, the Arctic sea absorbs more heat – encouraging the spiral toward warmer temperatures. A complete meltdown of land-based ice in the Arctic, including Greenland, would raise sea levels by some 20 feet.

Sure, it takes time for the extra greenhouse gases to trap enough heat to thaw out the Arctic – much as, on a smaller scale, it takes time for the ice in the cooler to melt down, leaving that one last beer too warm to enjoy. Still, we’ve all observed that the ice will melt faster on a hot day than a cool one.

Any way you slice it, we’ve got hotter days ahead. Just how hot will depend in part on whether the Arctic reaches an unfortunate tipping point.

Like my drinks, I prefer my planet with ice.

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