

Carbon emissions increasing acidity in Alaskan seas

Carbon emissions affect more than the climate. Scientists now suspect they are also making Alaskan seas more acidic.



The August sun sets over Alaska's Kenai Mountains and Resurrection Bay. Carbon dioxide emissions have increased the acidity of the bay's water.

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By [Yereth Rosen](#) / December 4, 2009

Seward, Alaska

Beneath the sparkling waters of Resurrection Bay, where rich runs of salmon support thriving commercial fish harvests and humpback whales can be seen breaching just offshore in summertime, Jeremy Mathis sees signs of the way greenhouse gases are changing the world's oceans.

For years, scientists have presented mounting evidence that carbon dioxide emissions are contributing to a change in global climate – raising temperatures, melting polar ice, and perhaps fueling extreme weather. For Dr. Mathis, it is clear that these emissions are also having an effect beneath the waves.

In short, they are turning seawater more acidic. Ocean acidification is often called the twin of climate change. Just as increased carbon in the atmosphere triggers effects that change the climate, increased carbon in the atmosphere – when absorbed by the oceans – triggers acidification in the water.

At this point, the effects are subtle – a small dip in the waters' pH balance, and a gradual depletion of the minerals that make Alaskan waters so productive for sea life. Indeed, the very characteristics that help make Alaskan waters so rich – the cold temperatures that hold more carbon and shallow waters saturated with nutrients – also make them more susceptible to acidification, experts say.

As with climate change – which has already thawed permafrost, melted sea ice, and shrunk glaciers in Alaska – carbon-caused ocean acidification will likely hit home here first.

"Waters off Alaska are sort of preconditioned to become more acidified," says Mathis, a University of Alaska, Fairbanks, oceanographer.

Two-centuries-old trend

During the past two centuries, the oceans have absorbed one-quarter of the carbon dioxide emitted into the atmosphere by human activities, according to the United Nations' Intergovernmental Panel on Climate Change (IPCC). While that has helped to lessen the impact of carbon dioxide emissions on the climate, it has been at a cost. This carbon dioxide - the same gas that makes fizzy beverages corrosive – is altering the oceans' alkaline-acid balance, known as pH.

The average pH levels in the world's oceans have dropped from 8.21 at the start of the Industrial Age (in the late 18th century) to an average 8.1 on the 1-to-14 scale, according to the IPCC. Changes will be more dramatic in coming years, the IPCC warns. Average pH levels are expected to decrease by as much as 0.4 by the end of the century, continuing the move in the acidic direction, the committee says.

Mathis and his fellow researchers are trying to understand how – and when – these changes might affect Alaska. They are making spring and fall voyages into the Bering Sea, Arctic Ocean, and Gulf of Alaska to analyze the contents of water retrieved from capsules plunged into the water column.

He cannot yet assign a specific average pH value to Alaskan waters, but other data show a clear trend line.