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Arctic Sea Ice Gone in Summer Within Five Years?

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An already relentless melting of the Arctic greatly accelerated this summer—a sign that some scientists worry could mean [global warming](#) has passed an ominous tipping point.

One scientist even speculated that summer sea ice could be gone in five years.

Greenland's ice sheet melted nearly 19 billion tons more than the previous high mark, and the volume of Arctic sea ice at summer's end was half what it was just four years ago, according to new NASA satellite data obtained by the Associated Press (AP).

"The Arctic is screaming," said Mark Serreze, senior scientist at the government's snow and ice data center in Boulder, Colorado.

2012

Just last year two top scientists surprised their colleagues by projecting that the Arctic sea ice was melting so rapidly that it could disappear entirely by the summer of 2040.

This week, after reviewing his own new data, NASA climate scientist Jay Zwally said: "At this rate, the Arctic Ocean could be nearly ice-free at the end of summer by 2012, much faster than previous predictions."

So scientists in recent days have been asking themselves these questions: Was the record melt seen all over the Arctic in 2007 a blip amid relentless and steady warming? Or has everything sped up to a new climate cycle that goes beyond the worst case scenarios presented by computer models?

"The Arctic is often cited as the canary in the coal mine for climate warming," said Zwally, who as a teenager hauled coal. "Now as a sign of climate warming, the canary has died. It is time to start getting out of the coal mines."

The burning of coal, oil, and other fossil fuels produces carbon dioxide and other greenhouse gases that are responsible for man-made global warming. For the past several days, government diplomats have been debating in Bali, [Indonesia](#), the outlines of a new climate treaty calling for tougher limits on these gases.

What happens in the Arctic has implications for the rest of the world. Faster melting there means eventual sea level rise and more immediate changes in winter weather because of less sea ice.

In the United States, a weakened Arctic blast moving south to collide with moist air from the Gulf of Mexico can mean less rain and snow in some areas, including the drought-stricken Southeast, said Michael MacCracken, a former federal climate scientist who now heads the nonprofit Climate Institute.

Some regions, like Colorado, would likely get extra rain or snow.

More than 18 scientists told the AP that the level of ice melt this year surprised them.

"I don't pay much attention to one year ... but this year the change is so big, particularly in the Arctic sea ice, that

you've got to stop and say, 'What is going on here?' You can't look away from what's happening here," said Waleed Abdalati, NASA's chief of cyrospheric sciences. "This is going to be a watershed year."

The Facts

2007 shattered records for Arctic melt in the following ways:

—About 552 billion tons of ice melted this summer from the Greenland ice sheet, according to preliminary satellite data to be released by NASA Wednesday. That's 15 percent more than the annual average summer melt, beating 2005's record.

—A record amount of surface ice was lost over Greenland this year, 12 percent more than the previous worst year, 2005, according to data the University of Colorado released Monday. That's nearly quadruple the amount that melted just 15 years ago. It's an amount of water that could cover Washington, D.C., a half-mile deep, researchers calculated.

—The surface area of summer sea ice floating in the Arctic Ocean this summer was nearly 23 percent below the previous record. The dwindling sea ice already has affected wildlife, with 6,000 [walruses](#) coming ashore in northwest [Alaska](#) in October for the first time in recorded history. Another first: the Northwest Passage was open to navigation.

—Still to be released is NASA data showing the remaining Arctic sea ice to be unusually thin—another record. That makes it more likely to melt in future summers. Combining the shrinking area covered by sea ice with the new thinness of the remaining ice, scientists calculate that the overall volume of ice is half of 2004's total.

—Alaska's frozen permafrost ([see magazine article](#)) is warming, although it's not quite thawing yet. But temperature measurements 66 feet deep in the frozen soil rose nearly four-tenths of a degree from 2006 to 2007, according to measurements from the University of Alaska. While that may not sound like much, "it's very significant," said University of Alaska professor Vladimir Romanovsky.

—Surface temperatures in the Arctic Ocean this summer were the highest in 77 years of record-keeping, with some places eight degrees Fahrenheit above normal, according to research to be released Wednesday by University of Washington's Michael Steele.

"New Regime"

Greenland, in particular, is a significant bellwether. Most of its surface is covered by ice. If it completely melted—something key scientists think would likely take centuries, not decades—it could add more than 22 feet to the world's sea level.

However, for nearly the past 30 years, the data pattern of its ice sheet melt has zigzagged. A bad year, like 2005, would be followed by a couple of lesser years.

According to that pattern, 2007 shouldn't have been a major melt year, but it was, said Konrad Steffen, of the University of Colorado, which gathered the latest data.

"I'm quite concerned," he said. "Now I look at 2008. Will it be even warmer than the past year?"

Other new data, from a NASA satellite, measure ice volume. NASA geophysicist Scott Luthcke, reviewing it and other Greenland numbers, concluded: "We are quite likely entering a new regime."

Melting of sea ice and Greenland's ice sheets also alarms scientists because they become part of a troubling spiral.

White sea ice reflects about 80 percent of the sun's heat off Earth, NASA's Zwally said. When there is no sea ice, about 90 percent of the heat goes into the ocean which then warms everything else up. Warmer oceans then lead to more melting.

"That feedback is the key to why the models predict that the Arctic warming is going to be faster," Zwally said. "It's getting even worse than the models predicted."

Tiping Point

NASA scientist James Hansen, the lone-wolf researcher often called the godfather of global warming, on Thursday was

to tell scientists and others at the American Geophysical Union scientific in San Francisco that in some ways Earth has hit one of his so-called tipping points, based on Greenland melt data.

"We have passed that and some other tipping points in the way that I will define them," Hansen said in an email. "We have not passed a point of no return. We can still roll things back in time — but it is going to require a quick turn in direction."

Last year, Cecilia Bitz at the University of Washington and Marika Holland at the National Center for Atmospheric Research in Colorado startled their colleagues when they predicted an Arctic free of sea ice in just a few decades. Both say they are surprised by the dramatic melt of 2007.

Bitz, unlike others at NASA, believes that "next year we'll be back to normal, but we'll be seeing big anomalies again, occurring more frequently in the future."

And that normal, she said, is still a "relentless decline" in ice.

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