

The Arctic just received its annual report card, and it's not good

Doyle Rice, USA TODAY 2:42 p.m. EST December 13, 2016



(Photo: Mario Hoppmann, AFP/Getty Images)

The world's air conditioner is on the fritz. Unprecedented, record-breaking warmth in the Arctic this year triggered declines in sea ice, snow, the Greenland ice sheet and a remarkable delay in the annual freeze of sea ice in the fall.

Overall, the Arctic experienced its warmest year ever recorded.

"Rarely have we seen the Arctic show a clearer, stronger or more pronounced signal of persistent warming and its cascading effects on the environment than this year," said Jeremy Mathis, director of NOAA's Arctic research program, which released its annual Arctic Report Card on Tuesday.

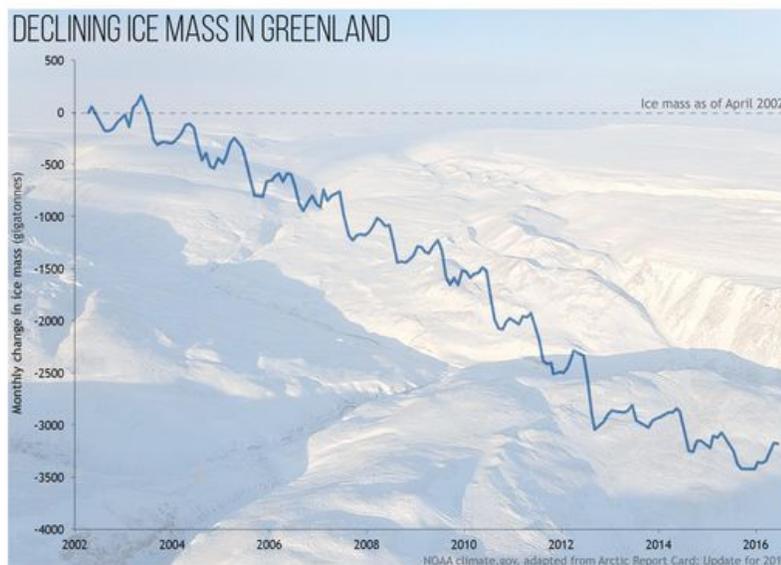
Even more worrisome: The trends are deepening and show no signs of letting up anytime soon. "All signs point to continuing on this trajectory," Mathis said.

Changes in Arctic climate have now seeped into the winter months, instead of just the summer, Mathis said. "It's not just the loss of sea ice in the summer, it's year-round now," he said.

It's not hard to pinpoint a cause of the changes: The Arctic environmental system continues to be influenced by long-term upticks in global carbon dioxide and air temperatures, in addition to natural seasonal and regional variability, the report said. Natural factors would include El Niño, for instance, which did play some of a role this year.

The burning of fossil fuels such as oil, coal and gas releases carbon dioxide and other "greenhouse" gases have warmed the planet to levels that cannot be explained by natural factors alone, scientists say.

Additionally, unlike Las Vegas, "what happens in the Arctic, doesn't stay in the Arctic," Mathis said. Warmth in the Arctic and the lack of ice and snow there could be affecting jet stream patterns across the Northern Hemisphere, potentially leading to weird weather extremes down here in the U.S.

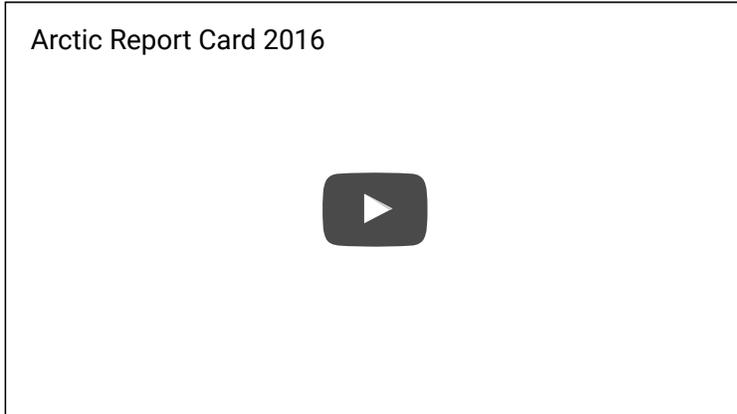


Monthly change in the total mass (in gigatonnes) of the Greenland Ice Sheet between April 2002 and April 2016, (Photo: NOAA)

Some of the report's findings:

- **Warmer air temperature:** Average annual air temperature over land areas was the highest on record, with a 6.3 degree increase since 1900.

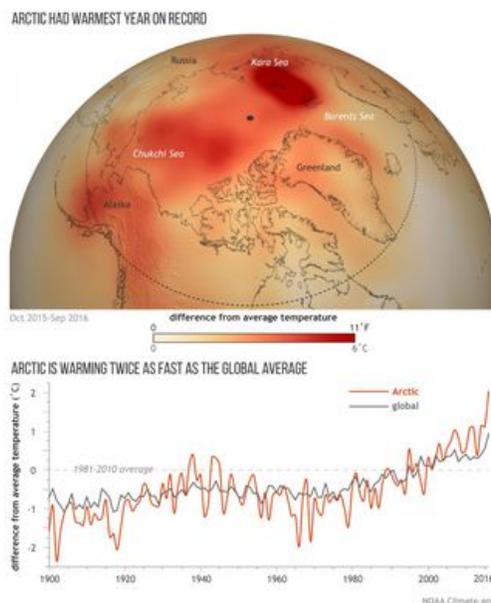
- **Record low snow cover:** Spring snow cover set a record low in the North American Arctic, where the May snow cover extent fell below 1.5 million square miles for the first time.
- **Smaller Greenland ice sheet:** The Greenland ice sheet continued to lose mass in 2016, as it has since 2002 when satellite-based measurement began.
- **Record low sea ice:** The Arctic sea ice this fall was the lowest since recording began in 1979.
- **Above-average Arctic Ocean temperature:** Sea surface temperature in August was 9 degrees above average.
- **Arctic Ocean productivity:** Springtime melting and retreating sea ice allowed for more sunlight to reach the upper layers of the ocean, stimulating widespread blooms of algae.



“The 2016 Arctic Report Card further documents the unraveling of the Arctic and the crumbling of the pillars of the global climate system that the Arctic maintains,” said Rafe Pomerance, a member of the Polar Research Board of the National Academy of Sciences, who was not involved in the report.

“Governments must urgently work together to establish a future Arctic that minimizes ever greater warming from the loss of sea ice and snow cover and thawing permafrost and massive sea level rise from the shrinking Greenland ice sheet and other Arctic glaciers,” he said.

NOAA began its annual Arctic report in 2006. This year’s peer-reviewed report was compiled by 61 authors from 11 countries and was issued during a briefing at the American Geophysical Union’s annual meeting in San Francisco.



Yearly temperatures since 1900 compared to the average for the Arctic (orange line) and the globe (gray). (Photo: NOAA Arctic Report Card)