

Arctic being 'transformed' by warming

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WASHINGTON (AP) -- NASA scientists released new evidence this week that the Arctic region is warming up and its sea ice cover is diminishing, with implications for further climate change throughout the globe.



Satellite data compiled by Josefino Comiso, a senior research scientist at the National Aeronautics and Space Administration's Goddard Space Flight Center, show that compared with the 1980s, surface temperatures across most of the Arctic warmed significantly in the last decade, with the biggest temperature increases occurring over North America.

"Previously, similar studies used data from very few points scattered in various parts of the Arctic region," Comiso said. "These results show the large spatial variability that only satellite data can provide."

When compared with ground-based surface temperatures, the rate of warming in the Arctic between 1981 and 2001 was eight times the rate of warming over the last 100 years, said Comiso, whose work will be published November 1 in the American Meteorological Society's Journal of Climate. "The Arctic is in the process of being transformed," he said.

The data came from thermal infrared images taken by polar-orbiting satellites run by the National Oceanic and Atmospheric Administration.

Researchers found that warming is prevalent over most of the Arctic -- some areas bucked the trend, including Greenland, where temperatures appear to be cooling by about 0.2 degrees per year.

Springtime arrived earlier and was warmer, while warmer autumns lasted longer. Most important, temperatures increased by an average of just more than 2 degrees Fahrenheit per decade over sea ice during Arctic summers.

This summer, a lengthened melt season appears to be affecting the volume and extent of permanent sea ice.

Another NASA-funded researcher, Mark Serreze of the University of Colorado-Boulder, reported Thursday that the extent of Arctic summer sea ice in 2002 reached the lowest level ever recorded by satellites.

"It appears that the summer of 2003, if it does not set a new record, will be very close to the levels of last year," Serreze said.

"How much of this warming is due to natural fluctuations and how much is caused by human activity, we don't really know," he added. "But the fact is, the climate is changing, and in the Arctic it is changing rapidly."

Last month, U.S.-Canadian researchers reported that the Arctic's largest ice shelf, the 270-square mile Ward Hunt Ice Shelf along the north shore of Ellesmere Island, had fractured for the first time in several thousand years, draining a freshwater lake that it had contained and raising the prospect that it could break into large icebergs like those seen from disintegrating Antarctic ice shelves.

And a team of Chinese scientists who completed a 74-day Arctic expedition in September found that the thickness of the sea ice now averages 8.8 feet, down from an average of more than 15 feet in the 1980s.

Beyond having more open water and accelerating local changes, such as erosion, in the Arctic, warming trends and changes in ice cover could greatly affect ocean climate processes, said Michael Steele, an oceanographer at the University of Washington, Seattle.

Liquid water absorbs more of the sun's energy rather than reflecting it away from the surface as ice does. That means the Arctic could get even warmer, and even more ice could melt. Steele said such dynamics could change the temperature of ocean layers; impact ocean circulation and salinity; change marine habitats; and affect shipping.

Ocean circulation changes, particularly in the Arctic and North Atlantic, can affect weather patterns over much of the globe.

For instance, Chinese scientists have already found a link between sea ice cover and temperature and rainfall in the Yangtze River basin during the rainy season.

And circulation around the Arctic for the past 20 years or so has been in a general pattern that allows more frequent bursts of cold air to move into the heart of North America during the winter, noted David Rind, a senior researcher at NASA's Goddard Institute of Space Studies in New York.

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