Arctic ice at multi-millennium low: researchers

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Courtesy of Ohio State University
and World Science staff

Less ice covers the Arctic today than at any time in the past few thousand years. So says an international group of researchers that has compiled what they call the first comprehensive history of Arctic ice.

For decades, scientists have strived to collect sediments from the difficult-to-access Arctic Ocean floor, to find out what the Arctic was like in the past. Their most recent goal: to bring a long-term perspective to the ice loss we see today.

Arctic sea ice extent in August 2009 – the area of the Arctic Ocean covered by floating ice – as measured by NASA satellites. It was the third lowest extent since satellite measurements were first made in 1979. (Courtesy NASA)

Now, in an upcoming issue of the journal *Quarternary Science Reviews*, a team led by Ohio State University has re-examined the data from nearly 300 past and ongoing studies and combined them to form a big-picture view of the pole's climate history.

"The ice loss that we see today—the ice loss that started in the early 20th Century and sped up during the last 30 years—appears to be unmatched over at least the last few thousand years," said Leonid Polyak, a research scientist at Byrd Polar Research Center at Ohio State University. Polyak is lead author of the paper and a preceding report that he and his coauthors prepared for the U.S. Climate Change Science Program.

Satellites can provide detailed measures of how much ice is covering the pole right now, but sediment cores are like fossils of the ocean's history, he explained. A sediment core is a pole-shaped sample of sediments obtained by pushing a hollow tube into the sediment and then pulling it out. This allows scientists to examine many layers of sediment corresponding to different time periods.

"Sediment cores are essentially a record of sediments that settled at the sea floor, layer by layer, and they record the conditions of the ocean system during the time they settled," said Polyak. "When we look carefully at various chemical and biological components of the sediment, and how the sediment is distributed—then, with certain skills and luck, we can reconstruct the conditions at the time the sediment was deposited."

For example, scientists can search for a biochemical marker that is tied to certain species of algae that live only in ice. If that marker is in the sediment, then that location was likely covered in ice at the time. Scientists call such markers “proxies” for the thing they actually want to measure—in this case, the geographic extent of the ice in the past.

While knowing the loss of surface area of the ice is important, Polyak said that this work can’t yet reveal an even more important fact: how the total volume of ice—thickness as well as surface area—has changed over time. “Underneath the surface, the ice can be thick or thin. The newest satellite techniques and field observations allow us to see that the volume of ice is shrinking much faster than its area today. The picture is very troubling. We are losing ice very fast,” he said.