

# Arctic Sea Ice Shatters All Previous Record Lows: Diminished Ice Leads To Northwest Passage Opening

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Arctic sea ice during the 2007 melt season plummeted to the lowest levels since satellite measurements began in 1979, according to researchers at the University of Colorado at Boulder's National Snow and Ice Data Center.

The average sea ice extent for the month of September was 1.65 million square miles (4.28 million square kilometers), the lowest September on record, shattering the previous record for the month by 23 percent, which was set in 2005. At the end of the melt season, September 2007 sea ice was 39 percent below the long-term average from 1979 to 2000.

If ship and aircraft records from before the satellite era are taken into account, sea ice may have fallen by as much as 50 percent from the 1950s. The September rate of sea ice decline since 1979 is now more than 10 percent per decade, said the CU-Boulder research team.

NSIDC is part of the Cooperative Institute for Research in Environmental Sciences, a joint institute of CU-Boulder and the National Oceanic and Atmospheric Administration.

Arctic sea ice has long been recognized as a sensitive climate indicator, said CU-Boulder Research Professor Mark Serreze of CIRES and NSIDC. "Computer projections have consistently shown that as global temperatures rise, the sea ice cover will begin to shrink," he said. "While

a number of natural factors have certainly contributed to the overall decline in sea ice, the effects of greenhouse warming are now coming through loud and clear."

One factor that contributed to this fall's extreme decline was that the ice was entering the melt season in an already weakened state, said CIRES Research Associate Julienne Stroeve of NSIDC. "The spring of 2007 started out with less ice than normal, as well as thinner ice. Thinner ice takes less energy to melt than thicker ice, so the stage was set for low levels of sea ice this summer."

Another factor that conspired to accelerate the ice loss this summer was an unusual atmospheric pattern, with persistent high atmospheric pressures over the central Arctic Ocean and lower pressures over Siberia. The scientists noted that skies were fairly clear under the high-pressure cell, promoting strong melt.

At the same time, the pattern of winds pumped warm air into the region. While the warm winds fostered further melt, they also helped push ice away from the Siberian shore. "While the decline of the ice started out fairly slowly in spring and early summer, it accelerated rapidly in July," said Walt Meier, a CIRES researcher at NSIDC. "By mid-August, we had already shattered all previous records for ice extent."

Arctic sea ice receded so much that the fabled Northwest Passage completely opened for the first time in human memory, said the team. Explorers and other seafarers had long recognized that this passage, through the straits of the Canadian Arctic Archipelago, represented a potential shortcut from the Pacific to the Atlantic.

Roald Amundsen began the first successful navigation of the route starting in 1903. It took his hardy group two-and-a-half years to leapfrog through narrow passages of open water, with their ship locked in the

frozen ice through two cold, dark winters. More recently, icebreakers and ice-strengthened ships have on occasion traversed the normally ice-choked route.

However, by the end of the 2007 melt season, a standard ocean-going vessel could have sailed smoothly through. On the other hand, the Northern Sea Route, a shortcut along the Eurasian coast that is often at least partially open, was completely blocked by a band of ice this year, said the researchers.

In addition to the record-breaking retreat of sea ice, the team also noted that the date of the lowest sea ice extent, or the absolute minimum, has shifted to later in the year. This year, the five-day running minimum occurred on Sept 16. From 1979 to 2000, the minimum usually occurred on Sept. 12.

CIRES Research Associate and NSIDC Senior Scientist Ted Scambos said, "What we've seen this year fits the profile of lengthening melt seasons, which is no surprise. As the system warms up, spring melt will tend to come earlier and autumn freezing will begin later."

Changes in sea ice extent, timing, ice thickness and seasonal fluctuations are already having an impact on the people, plants, and animals that live in the Arctic. "Local people who live in the region are noticing the changes in sea ice," said Arctic resident Shari Gearheard of CU-Boulder's NSIDC. "The earlier break up and later freeze up affect when and where people can go hunting, as well as safety for travel."

The CU-Boulder research team monitors and studies Arctic sea ice year round, analyzing satellite data and seeking to understand the regional changes and complex feedbacks, said Serreze. "The sea ice cover is in a downward spiral and may have passed the point of no return," he said. "As the years go by, we are losing more and more ice in summer, and

growing back less and less ice in winter.

"We may well see an ice-free Arctic Ocean in summer within our lifetimes," said Serreze, noting scientists agree such an event could occur by 2030. "The implications for global climate, as well as Arctic animals and people, are disturbing."

Source: University of Colorado at Boulder

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