

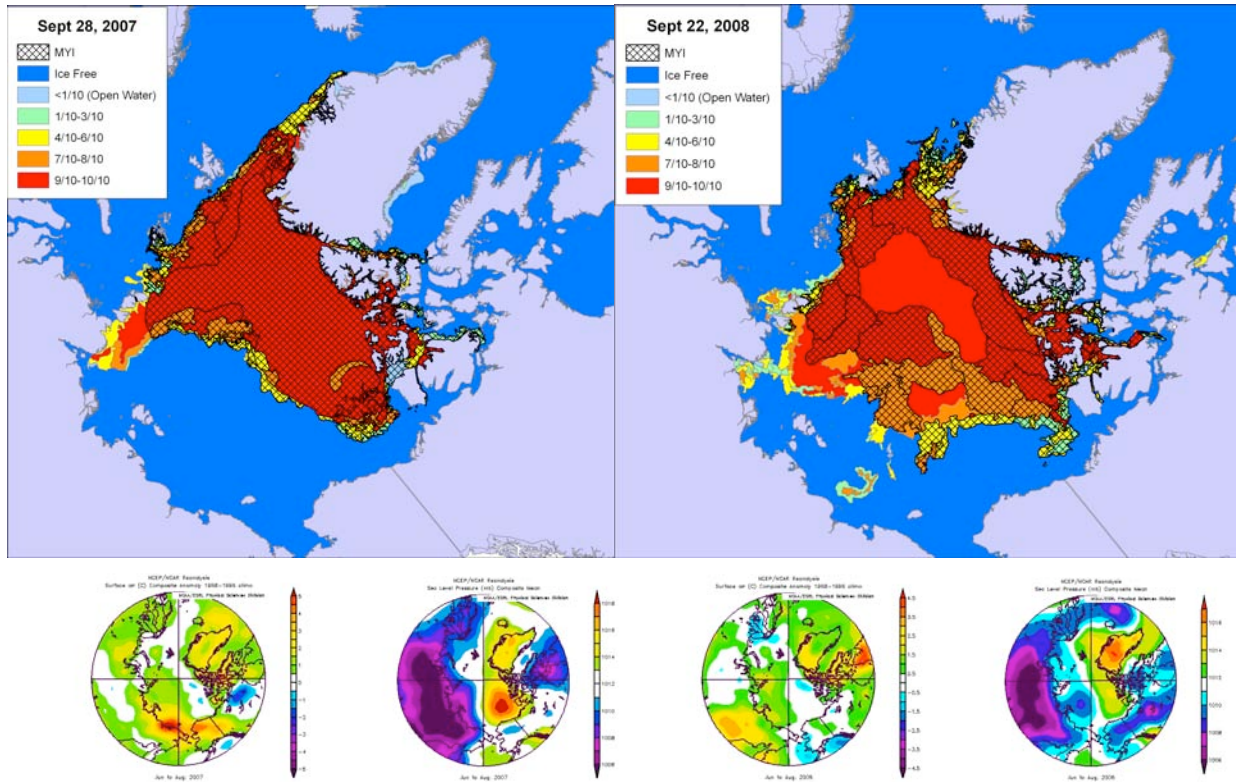
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2008 Sea Ice Minimum Summary Report

The 2008 Arctic sea ice extent minimum did not surpass the record set in 2007, but did approach it, and 2008 is now the 2nd-lowest ice extent since NIC monitoring began in 1972 (4.598 million km² as of Sept 22, 2008). Because of the excessive melt and export in 2007, 2008 did see the lowest ever recorded extent of multiyear ice (3.226 million km²). Because much of the ice in the Arctic was first-year ice, it was expected to melt more readily. In a typical year, most first-year ice does not survive the summer, while the multiyear, or perennial ice, remains intact. But 2008 was far from typical.

The summer of 2007 was characterized by a strong Siberian low and a Strong Beaufort Gyre (high), which set up a condition labeled the “Transpolar Express”. Ice drift was strong from the East Siberian Sea across the North Pole and out Fram Strait into the Greenland Sea. Surface air temperatures were warmer than normal, especially in the Beaufort and Chukchi Seas, which contributed to the strong melt, particularly as ice concentrations decreased. Because of this, there was a sharp, well-defined ice edge by the end of the melt season.

In 2008, while the strong Siberian low persisted, the Beaufort Gyre was weakened. Transpolar drift was diminished, and less ice was exported through Fram Strait. Surface temperatures were closer to average. Lacking strong transport, most the the Arctic ice remained within the basin. In early July, the Beaufort Sea experienced a period of anomalously warm temperatures coupled with a strong low over the western Canadian Archipelago. This event cleared ice out of Amundsen Gulf and the southern Beaufort Sea. By August 21, the southern route of the Northwest Passage was open. An easterly wind along the northern Siberian coast, along with warmer than average temperatures, cleared ice from the coast and pushed it west toward the Taymyr Peninsula in the Laptev Sea. The ice pack remained consolidated here long after points east had cleared. It wasn't until September 5 that an open water path appeared allowing access from the Lapteve Sea to the Vilkitsky Strait and Kara Sea; this signified the opening of the Northern Sea Route. This was the first time both the Northwest Passage and Northern Sea Route were simultaneously open since ice charting began. Both routes were closed by September 22, 2008.

Summer 2008 is also notable by how much of the region was dominated by first year ice, and by how much of this survived the summer melt season. NIC analysts identify stage of development over the course of the winter according to WMO definitions. The stage of development is carried over the summer regardless of the actual thickness of the ice. Thus, much of the ice was classified as “thick first year ice” or “medium first year ice”, although the actual thicknesses were decreasing due to melt. Typically, most of the first year ice does not survive the summer. But the central Arctic, which is usually 80-90% MYI, was mostly or totally FYI. The fact that the ice extent did stay above the all-time record low is due to weakened transport and average or lower temperatures over the Canadian side of the basin (where ice is typically thickest). Had a stronger Beaufort Gyre existed, more ice would have been transported out via Fram Strait. If the temperatures had been above average, there would have been more surface melt and heating of the ocean surface layer; this would have accelerated the melt rate of the ice.



Left: Sea ice conditions for September 28, 2008 (top), with 2007 June-July-August NCEP surface air temperature (SAT) anomalies (bottom left) and mean sea level pressure (bottom right).

Right: Sea ice conditions for September 15, 2007 (top), with 2008 June-July-August NCEP SAT anomalies (bottom left) and mean SLP (bottom right).

(NCEP images provided by the NOAA Earth Systems Research Laboratory, Boulder, Colorado, <http://www/cdc.noaa.gov>)