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NSIDC Analysis
2008 Sea Ice Minimum Summary Report

The summer 2008 melt season offered several surprises. As the melt season began, the Arctic was covered by a record areal-proportion of first-year ice. Since first-year ice, being rather thin, is more likely to melt out during summer than older and generally thicker ice, this suggested a very low, quite possibly another record, minimum extent.

However, as the melt season progressed into July, the seasonal decline did not accelerate as it had in 2007. This was primarily due to comparatively cooler conditions. Early July of 2007 saw the onset of persistent high atmospheric pressure (an anticyclone) over the Beaufort Sea and low pressure over eastern Siberia. This led to warm southerly winds north of Siberia. Clear skies under the anticyclone near the summer solstice contributed further to rapid melt. July of 2008 saw a different atmospheric pattern not as conducive to strong melt

By the end of July, the 2008 extent was well above that for 2007, though still far below normal. However, while August is generally a time when the decline rate begins to slow in response to decreasing solar radiation, this year the extent decline actually accelerated. The strong ice loss for August appears to have reflected the melt out of large regions of first-year ice, especially north of Siberia where a shift in atmospheric circulation led to fairly warm conditions.

The seasonal minimum of 4.52 million square km occurred on September 14. This is only about 9% higher than the value of 4.13 million square km that was measured on September 16 of 2007. However, in examining ice area – the extent weighted by concentration – the seasonal minimum in 2008 was nearly identical to that of 2007. Put differently, the 2008 melt season ended with a more dispersed (lower concentration) ice pack than in 2007. This appears to be at least partly due to differences in winds. Toward the end of the 2007 melt season, strong northward winds resulted in convergence of sea ice and a more tightly-knit ice pack. The ice motion late in the 2008 melt season was variable and did not result in strong convergence.

The 2008 melt season ended with a large amount of first-year ice remaining. This was due to cooler conditions, as well as the fact that so much first-year ice was found at far northern latitudes where, compared to lower latitudes, the surface receives less solar radiation over the summer season.

This first-year ice that has survived the summer will become second-year ice and will thicken through the winter. Depending on conditions through this winter and next summer, this thicker second-year ice could be more resilient and less likely to melt. This may result in a stabilization of the ice extent for a few years with summer minimums staying in the range of 4.0 to 4.5 million square kilometers. Much will depend on conditions through the winter and the following melt season. Regardless, with a growing radiative forcing, an eventual transition to ice-free summers seems inevitable.