

Arctic sea ice melting on par with 2007 record

Andrew Freedman for Climate Central, part of the Guardian Environment Network
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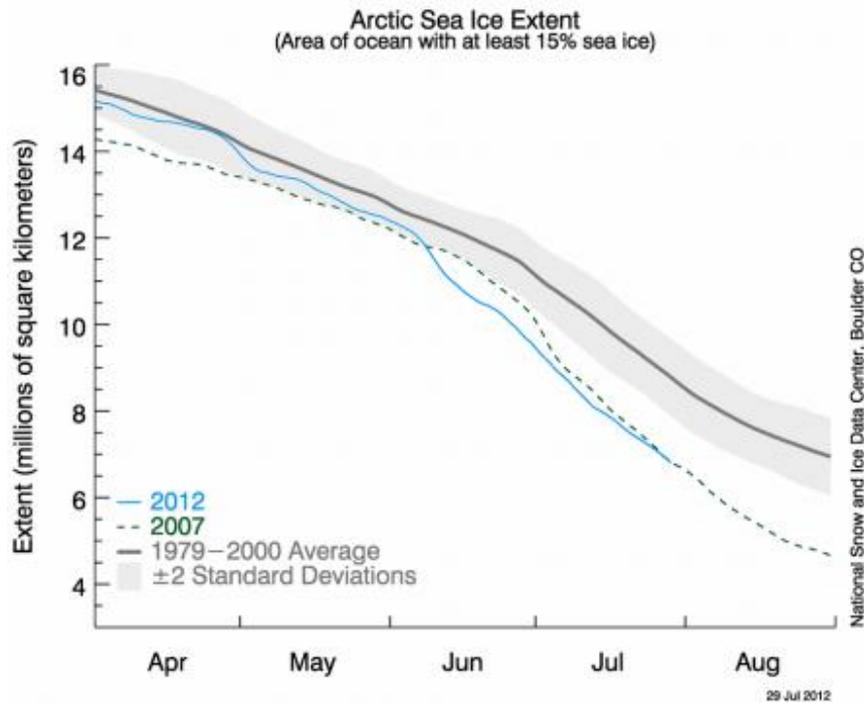
Sea ice extent and thickness slightly lower than same time during record lows in 2007, and well below long-term average



Arctic sea ice melt in 2012 is even greater than the records set in 2007. Photograph: Steven J Kazlowski/Alamy

With about a month and a half remaining in the Arctic melt season, sea ice cover continues to decline at a rapid pace, and is currently on par with where the 2007 record melt season stood at the same time of year. Arctic sea ice extent has been declining at a rate of about 12 percent per decade since the start of satellite measurements in 1979, and a [new study](#) suggests that natural climate variability explains some, but not the majority, of this trend. The study concludes that manmade global warming is the most plausible explanation for recent sea ice decline.

According to the [National Snow and Ice Data Center](#) (NSIDC) in Boulder, Colo., Arctic sea ice extent tracked at "very low levels" during July, setting daily records early in the month. Sea [ice volume measurements](#), which incorporates measurements of ice extent as well as thickness, is currently running below where it was at this time during 2007, and well below the 1979-2011 average.

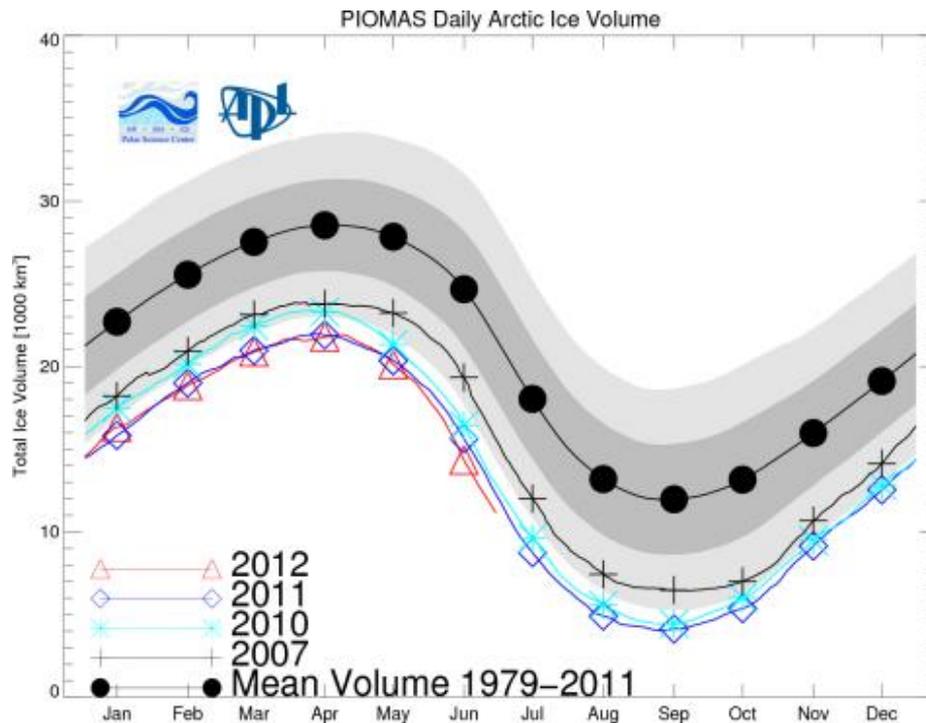


Arctic sea ice extent trend in 2012 compared to the 1979-2000 average and the record low melt season in 2007. Click on image for a larger version. Credit: NSIDC.

This follows an unusually early start to the melt season in most areas of the Arctic, and the region experienced its largest June sea ice loss in the satellite era, when about 1.1 million square miles of ice — equivalent to the combined land area of Alaska, California, Florida, and Texas, melted.

According to the NSIDC, ice extent as of mid-July was especially low in the Barents, Kara, and Laptev Seas where open ocean extended "as far north as typically seen during September, the end of the summer melt season," the [NSIDC said in a July 24 statement](#). Ice extent in the Chukchi Sea, north of Alaska, was near average levels.

Weather conditions during each melt season play a major role in determining the severity of seasonal ice loss. So far this year the weather pattern has generally promoted sea ice loss, but winds and air temperatures have not been nearly as conducive to melting as they were in 2007, when unusually clear skies brought more sunshine than normal, and winds flushed older sea ice into the North Atlantic near Greenland.



Arctic sea ice volume showing the volume of the mean annual cycle, the volume of the current year, the volume in 2010 (the previous September volume minimum), and the volume in 2007 (the year of minimum sea ice extent in September). Click on image for a larger version. Credit: University of Washington Polar Science Center.

One blogger who closely follows Arctic sea ice trends wrote that the significant melt this season despite the absence of ideal melting conditions may demonstrate that the thinner sea ice cover in recent years is making the ice more vulnerable to melting, regardless of weather conditions.

"There comes a point when large parts of the ice pack become so thin that it doesn't matter what the weather does. Sure, ideal conditions will cause a nosedive, but the train keeps chugging along, even when the weather isn't so great for melt, transport and compaction," wrote the blogger Neven on his eponymous [sea ice blog](#).

The 2012 melt season is playing out as scientists work to untangle the various causes of the sharp decline in sea ice. The general consensus among Arctic climate and sea ice specialists is that manmade emissions of greenhouse gases, such as carbon dioxide, are a major factor behind the recent decline, but natural climate variability is also playing a role. The computer models that scientists use to simulate the climate system have consistently underestimated the speed and scope of recent sea ice trends.

The [new study](#), published on July 26 in the journal *Environmental Research Letters*, examines two key natural factors that are thought to influence sea ice extent: a weather pattern known as the Arctic Oscillation, and a natural pattern of climate variability called the Atlantic Multidecadal Oscillation, or AMO.

The study found that the Arctic Oscillation does help move sea ice around, but it does not have much of an influence on sea ice extent at the end of the melt season.

However, the study found that the AMO, which involves long-term changes to the circulation of water in the Atlantic Ocean, does have an influence on sea ice extent during the melt season. "We find that between 5 and 30 percent of the decrease in sea ice we have seen is due to the AMO," said J.J. Day of the University of Reading in the U.K. in a [video statement](#) accompanying the study.

By accounting for these two natural factors, the authors conclude that manmade global warming is a plausible explanation for the majority of sea ice loss seen during the past three decades. "That is a fair amount to be attributed to natural causes; on the other hand it implies that 70-95 percent of the changes are caused by human-induced global change."

However, the researchers did not conduct a formal analysis of how manmade global warming is causing sea ice decline.

"We do not explicitly account for human causes. In the video abstract and the press release we assert that the most likely cause of the rest is man made global warming," Day said in an email conversation. This assertion is based on previous studies that have attributed between 50 to 100 percent of sea ice decline to manmade causes, he said, and the "lack of another hypothesis . . . to account for the rest of the decline."

Judging from the pace of sea ice decline so far this season and predictions of a largely seasonally ice-free Arctic Ocean sometime during the next few decades, by the time scientists sort out with more precision how much of sea ice decline is from manmade causes, and how much is naturally driven, there may not be much ice left.