

Temperatures leap 40 degrees above normal as the Arctic Ocean and Greenland ice sheet see record June melting

And it may be messing with our weather.



Steffen Olsen, an Arctic researcher with the Danish Meteorological Institute, and dogs set out to retrieve oceanographic moorings and a weather station over meltwater topping sea ice in northwest Greenland on Thursday. (Steffen Olsen)

By Jason Samenow

June 14 at 12:52 PM

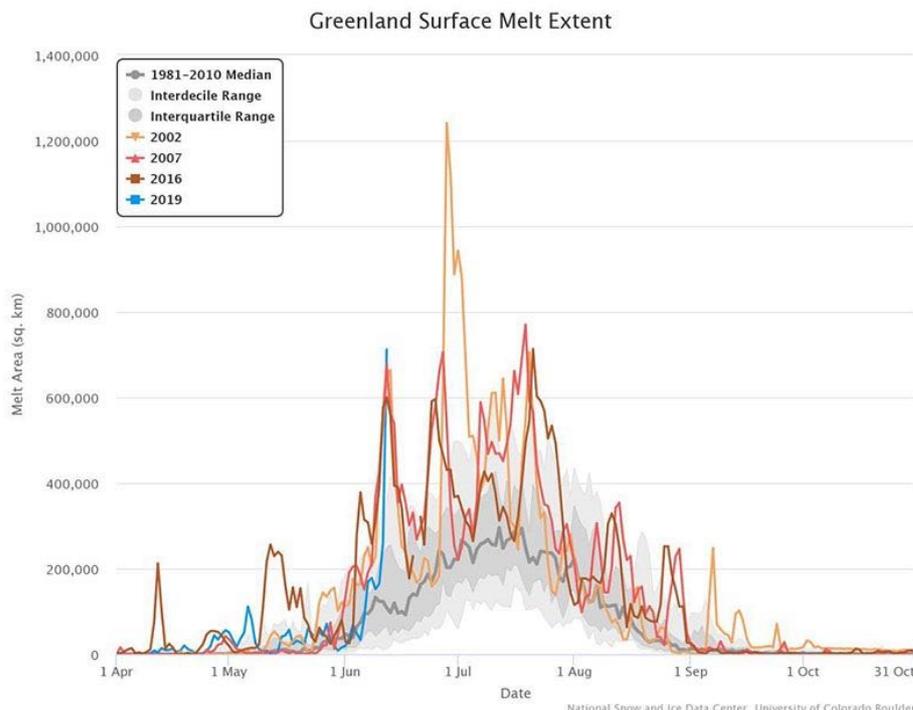
Ice is melting in unprecedented ways as summer approaches in the Arctic. In recent days, observations have revealed a record-challenging melt event over the Greenland ice sheet, while the extent of ice over the Arctic Ocean has never been this low in mid-June during the age of weather satellites.

Greenland saw temperatures soar up to 40 degrees above normal Wednesday, while open water exists in places north of Alaska where it seldom, if ever, has in recent times.

It's "another series of extreme events consistent with the long-term trend of a warming, changing Arctic," said Zachary Labe, a climate researcher at the University of California at Irvine.

And the abnormal warmth and melting of ice in the Arctic may be messing with our weather.

Greenland ice sheet



Melt extent on the Greenland Ice Sheet between April and October. The recent melt event (indicated by the blue line) appears to be the greatest on record in mid-June. (National Snow and Ice Data Center)

Data from the National Snow and Ice Data Center show that the Greenland ice sheet appears to have witnessed its biggest melt

event so early in the season on record this week (although a few other years showed similar mid-June melting).

“The melting is big and early,” said Jason Box, an ice climatologist at the Geological Survey of Denmark and Greenland.



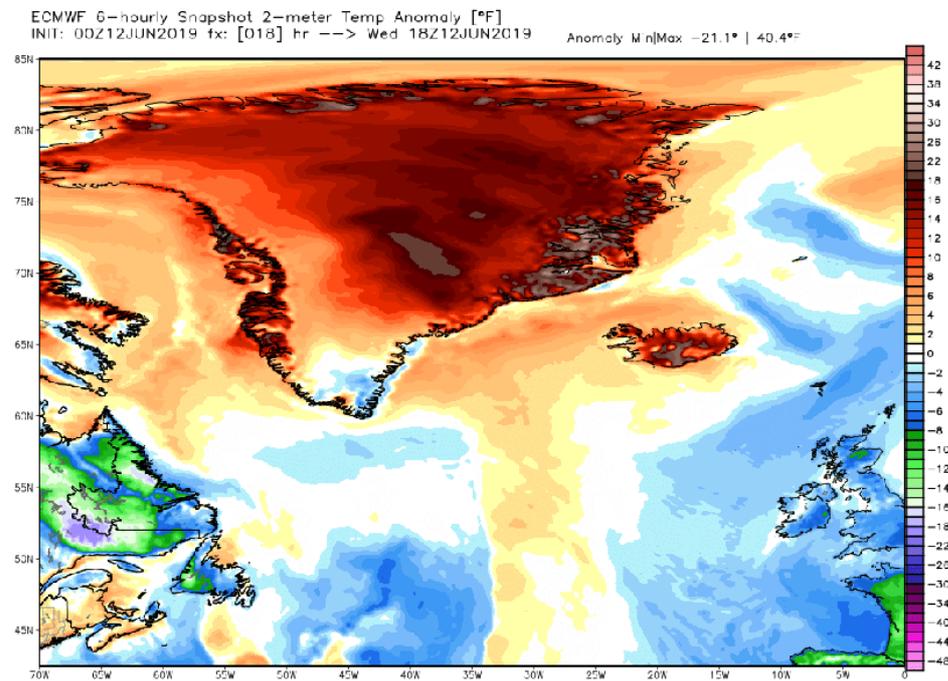
Extent of Greenland ice sheet melting on June 12. (National Snow and Ice Data Center)

Box explained that temperatures over the western Greenland ice sheet have been abnormally high while snow has been well below normal.

Marco Tedesco, an ice researcher at Columbia University, added that it has been unusually warm in east and central Greenland, as well. “This has triggered widespread melting that has reached about 45 percent of the ice sheet,” he wrote in an email.

Normally, melting this widespread over the ice sheet doesn’t occur until midsummer, if even then.

A simulation from the European Centre for Medium-range Weather Forecasting suggested that temperatures over Greenland may have peaked at around 40 degrees above normal on Wednesday.



European model simulation of temperature difference from normal over Greenland on Wednesday. (WeatherBell.com)

A big dome of high pressure has positioned itself over Greenland, resulting in sunny skies and mild temperatures, which have enabled melting. An automated weather station at the top of Greenland’s ice sheet topped freezing on June 12, a very rare event, which last occurred in July 2012.

The @NOAA automatic weather station at Summit, Greenland, suggests air temperature flickered above 0°C at 19:30 LST June 12. 😊

<https://t.co/Dyoe7uRiRx> pic.twitter.com/EpOl2R5dmV

— William Colgan, Ph.D. (@GlacierBytes) June 13, 2019

2012 is the notorious year in which the Greenland ice sheet witnessed the most melting on record. Those monitoring the ice sheet

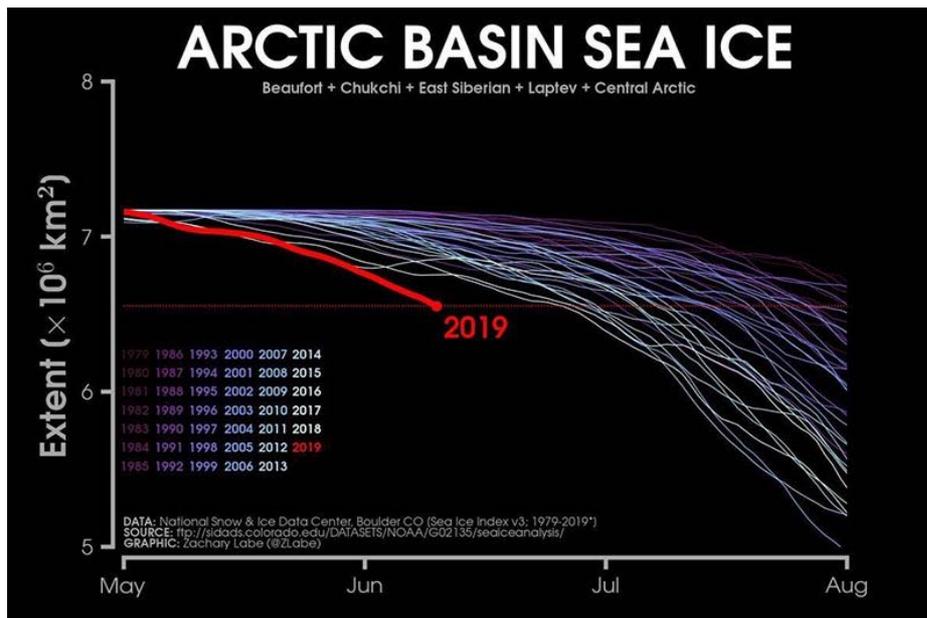
say melting in 2019 could rival it.

Weather in the coming months will determine how much more the ice sheet melts and whether 2019 is a record-setter. If high pressure holds in place, “we should break a new record,” [tweeted Xavier Fettweis](#), a climatologist at the University of Liège in Belgium.

But scientists studying the region know that Greenland’s weather is highly variable and can change rapidly.

Mike MacFerrin, a glaciologist at the University of Colorado, put it this way [in a tweet](#): “2019 has been... anomalous... so far, but also quite variable. It’s early and weather is weather, so keep your eyes peeled. ...”

Arctic sea ice



(Zachary Labe)

Weather satellites have monitored sea ice in the Arctic since 1979, and the current ice coverage is the lowest on record for mid-June.

The ice extent has been especially depleted in the part of the Arctic Ocean adjacent to the Pacific Ocean. “It’s pretty remarkable how much open water is in that area,” Labe said.

Labe explained high pressure over the Arctic has helped to pull sea ice way from the northern Alaska coast.

Unprecedented early [#seaice](#) loss from both Chukchi & Beaufort Seas north and west of Alaska. June 8th extent from [@NSIDC](#) is 1981-2010 median for Aug 01! Five lowest extents for this date are 2015 through

2019. [#akwx #Arctic @Climatologist49@CooperIslandAK @seaice_de @ajatnukpic.twitter.com/rImqEFugHo](#)

— Rick Thoman (@AlaskaWx) June 9, 2019

Sea ice loss over the Chukchi and Beaufort seas along Alaska’s northern coast has been “unprecedented” according to Rick Thoman, a climatologist based in Fairbanks.

Labe said there’s sufficient open water that you could sail all the way from the Bering Strait into a narrow opening just north of Utqiagvik, Alaska’s northernmost city, clear into the Beaufort Sea. “It’s very unusual for open water this early in this location,” he said.

The Hornburg has been breached: the last band of high concentration [#seaice](#) northeast of Utqiagvik is gone. There’s now a continuous water connection around Alaska from the Bering to Chukchi to the Beaufort

Sea. [#akwx #Arctic @Climatologist49@ajatnuk @CooperIslandAK @seaice_depic.twitter.com/Heto8mZfcA](#)

— Rick Thoman (@AlaskaWx) June 10, 2019

With all of the exposed water, ocean temperatures in this region will rise, Labe said. This should delay the customary fall freeze and will likely result in a historically low late summer sea ice minimum, typically in mid-September.

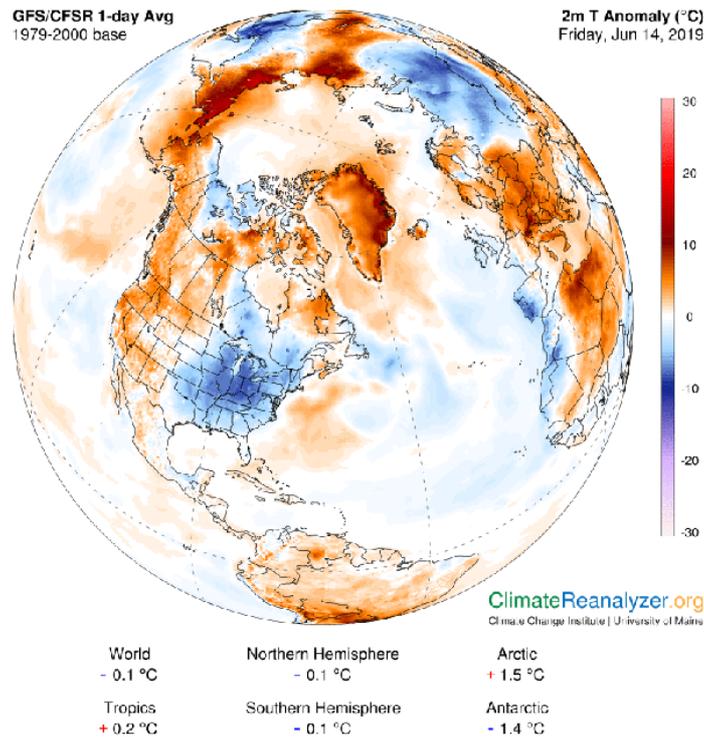
Whether the Arctic sea ice minimum is record-setting, like the Greenland ice sheet, will depend on weather in the coming months.

“There is no indication that this year will be as low as 2012,” when Arctic sea ice reached its lowest extent on record, Labe said. “If cloudy weather occurs, it would slow down the rate [of melting]. It’s really hard to predict.”

Implications for weather over the United States?

The extreme conditions in the Arctic, which have resulted in these record-challenging melt events, have far-reaching implications. There is a saying often repeated by Arctic researchers: “What happens in the Arctic doesn’t stay in the Arctic.”

The bulging zones of high pressure in the Arctic, which have facilitated the unusual warmth and intensified melting, are displacing the cold air normally contained in that region into the mid-latitudes — like a refrigerator door left open. Much of the central and eastern United States have seen lower-than-normal temperatures in the past week.



Temperature difference from normal on Friday, as analyzed by the Global Forecast System model. (University of Maine Climate Reanalyzer)

The jet stream, the high-altitude current separating cold air and warm air, has taken unusually erratic meanders.

“The jet stream this week was one of the craziest I’ve ever seen!” Jennifer Francis, one of the leading researchers who has published studies connecting Arctic change and mid-latitude weather, wrote in an email.

Francis had earlier suggested that conditions in the Arctic may have played a role in the [extreme jet stream pattern that spurred the tornado swarm and record flooding](#) in the central U.S. during the last two weeks of May.

“We can’t say that the rapid Arctic warming is causing this particularly pattern, but it certainly is consistent with that,” Francis, senior scientist at Woods Hole Research Center, said.

Greenland lost 2 billion tons of ice yesterday, which is very unusual

By [Brandon Miller](#), CNN Meteorologist

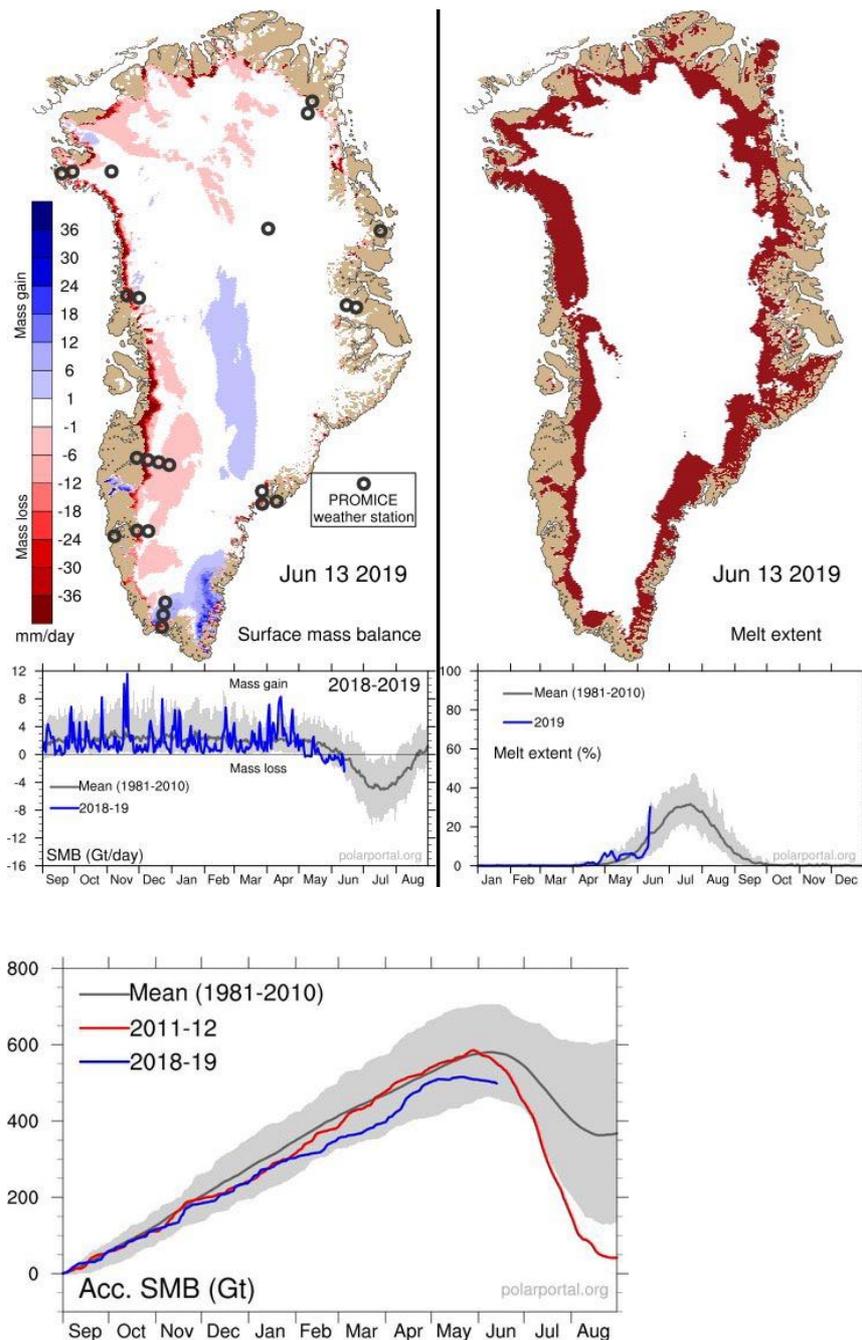
Updated 2049 GMT (0449 HKT) June 14, 2019

(CNN)Over 40% of Greenland experienced melting yesterday, with total ice loss estimated to be more than 2 gigatons (a gigaton is equal to 1 billion tons).

While Greenland is a big island filled with lots of ice, it is highly unusual for that much ice to be lost in the middle of June. The average “melt season” for Greenland runs from June to August, with the bulk of the melting occurring in July.

To visualize how much ice that is, imagine filling the National Mall in Washington DC with enough ice to reach a point in the sky eight times higher than the Washington

Monument (to borrow an analogy Meredith Nettles from Columbia University gave to the Washington Post.)



Greenland
@greenlandicesmb

Yesterday (13th June), we calculate #Greenland #icesheet lost more than 2 Gt (2 km³) of ice,, melt was widespread but didn't quite get to #SummitCamp which was just below 0°C

The high melt is unusual so early in the season but not unprecedented
<http://polarportal.dk/en/greenland/surface-conditions/>

...

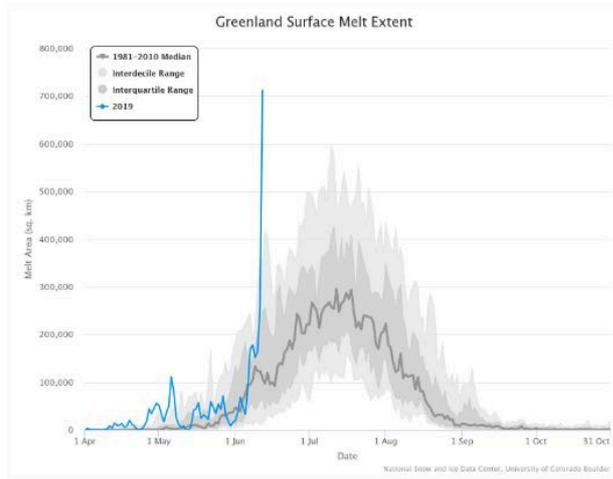
70
6:45 PM - Jun 14, 2019

106 people are talking about this

The sudden spike in melting "is unusual, but not unprecedented," according to Thomas Mote, a research scientist at the University of Georgia who studies Greenland's climate.

"It is comparable to some spikes we saw in June of 2012," Mote told CNN, referring to [the record-setting melt year of 2012](#) that saw almost the entire ice sheet experience melting for the first time in recorded history.

This much melting this early in the summer could be a bad sign, indicating 2019 could once again set records for the amount of Greenland ice loss.



Mote explained how snow and ice melt off the Greenland ice sheet, especially early in the season, makes it easier for additional melt to occur later in the summer. White snow and ice, which is bright and reflects the sun's rays back into space, reduces the amount of heat that is absorbed and helps to keep the ice sheet cold (a process known as "albedo").

"These melt events result in a changed surface albedo," according to Mote, which will allow more of the mid-summer sun's heat to be absorbed into the ice and melt it.

Predictions for a record melt season

According to Mote "all signs seem to be pointing to a large melt season," and he is far from the only scientist to think so.

Jason Box, an ice climatologist at the Geological Survey of Denmark and Greenland, predicted in late May that ["2019 will be a big melt year for Greenland."](#)

Box pointed out that this year had unusually early season melt days in April, and the melt season was "happening about three weeks earlier than average, and earlier than the record-setting melt year of 2012."

In addition to the early season melt, the snow cover is already lower than average in Western Greenland, and combining these factors "mean that 2019 is likely going to be a very big melt year, and even the potential to exceed the record melt year of 2012."

What is causing the sudden melt?

A persistent weather pattern has been setting the stage for the current spike in melting, according to Mote.

"We've had a blocking ridge that has been anchored over East Greenland throughout much of the spring, which led to some melting activity in April -- and that pattern has persisted."

That high pressure ridge pulls up warm, humid air from the Central Atlantic into portions of Greenland which leads to warmer temperatures over the ice. The high pressure also prevents precipitation from forming and leads to clear, sunny skies.

Over the past week or two, that high pressure ridge got even stronger as another high pressure front moved in from the eastern U.S. (the one that caused the prolonged hot and dry period in the Southeast earlier this month).



Melt periods like the current one are not unprecedented; Mote noted previous ones in 2012 as well as 2007 and 2010 (all major melt years). But he pointed out that until recently, they were unheard of.

"We've seen a sequence of these large melt seasons, starting in 2007, that would have been unprecedented earlier in the record," and according to Mote "we didn't see anything like this prior to the late 1990's."

If these extreme melt seasons are becoming the new normal, it could have significant ramifications around the globe, especially for sea level rise.

"Greenland has been an increasing contributor to global sea level rise over the past two decades," Mote said, "and surface melting and runoff is a large portion of that."