


'Extraordinarily hot' Arctic temperatures alarm scientists

Danish and US researchers say warmer air and sea surface could lead to record lows of sea ice at north pole next year



A large pool of melt water over ice on top of the Beaufort Sea in the Arctic Ocean. Photograph: Operation IceBridge/Nasa

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The [Arctic](#) is experiencing extraordinarily hot sea surface and air temperatures, which are stopping ice forming and could lead to record lows of sea ice at the north pole next year, according to scientists.

Danish and US researchers monitoring satellites and Arctic weather stations are surprised and alarmed by air temperatures peaking at what they say is an unheard-of 20C higher than normal for the time of year. In addition, sea temperatures averaging nearly 4C higher than usual in October and November.

“It’s been about 20C warmer than normal over most of the Arctic Ocean, along with cold anomalies of about the same magnitude over north-central Asia. This is unprecedented for November,” said research professor Jennifer Francis of Rutgers university.

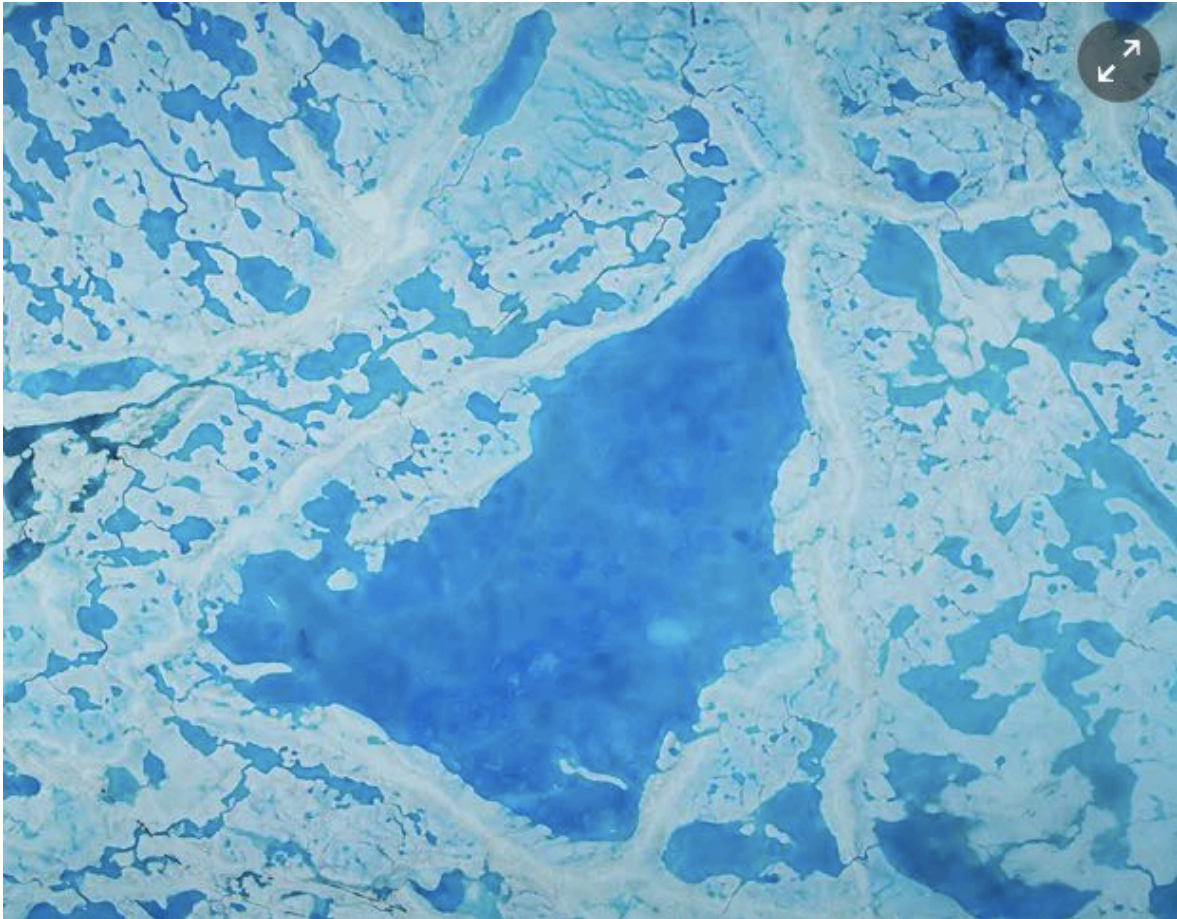
Temperatures have been only a few degrees above freezing when -25C should be expected, according to Francis. “These temperatures are literally off the charts for where they should be at this time of year. It is pretty shocking. The Arctic has been breaking records all year. It is exciting but also scary,” she said.

Arctic sea ice extent shrank to its second lowest record this year, and is unusually low this winter

Arctic sea ice, million sq km

Average 1981-2010 2012 2016

0



October

Guardian graphic | Source: National Snow & Ice Data Center

Francis said [the near-record low sea ice extent this summer](#) had led to a warmer than usual autumn. That in turn had reduced the temperature difference between the Arctic and mid-latitudes.

“This helped make the jet stream wavier and allowed more heat and moisture to be driven into Arctic latitudes and perpetuate the warmth. It’s a vicious circle,” she added.

Sea ice, which forms and melts each year, has declined more than 30% in the past 25 years. This week it has been at the lowest extent ever recorded for late November. According to the US government’s National Snow and Ice Data Centre, (NSIDC), around 2m square kilometres less ice has formed since September than average. The level is far below the same period in 2012, [when sea ice went on to record its lowest ever annual level](#).

Francis said she was convinced that the cause of the high temperatures and ice loss was climate change. “It’s all expected. There is nothing but climate change that can cause these trends. This is all headed in the same direction and picking up speed.”

Rasmus Tonboe, a sea ice remote sensing expert at the Danish Meteorological Institute in Copenhagen, said: “Sea surface temperatures in the Kara and Barents

seas are much warmer than usual. That makes it very difficult for sea ice to freeze.



Record-breaking temperatures 'have robbed the Arctic of its winter'

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“When we have large areas of open water, it also raises air temperatures, and it has been up to 10/15C warmer. Six months ago the sea ice was breaking up unusually early. This made more open water and allowed the sunlight to be absorbed, which is why the Arctic is warmer this year,” he said.

“What we are seeing is both surprising and alarming. This is faster than the models. It is alarming because it has consequences.”

Julienne Stroeve, the professor of polar observation at University College London said ice that should be growing at this time of year was retreating. “It’s been a crazy year. There is no ice at Svalbard yet. In the last few days there has been a decline in sea ice in the Bering sea. Very warm air has flooded into the Arctic from the south, pressing the ice northwards.

“Air temperature drives the formation of the ice. It has been really delayed this year so the ice is also much thinner than it usually is. The speed at which this is happening surprises me. In the Arctic the trend has been clear for years, but the speed at which it is happening is faster than anyone thought,” said Strove.

“Ice is very sensitive to weather. There is a huge high pressure over the Kara sea, and Eurasia and Canada. We are seeing very strong winds bringing warm air north.”

The significance of the ice forming late is that this affects its growth the following year, with consequences for climate. “Extreme wind and high air temperatures [now],” she said, “could see ice extent drop next year below the record 2012 year”.

She added: “The ice could be even thinner than it was at the start of 2012. This is definitely a strange year.”

Ed Blockley, the lead scientist of the UK Met Office’s polar climate group, said: “The sea ice is extremely low. It is freezing but very slowly. Last week the Barents sea reduced its ice cover. There was less ice at the end than the start.

“These temperature anomalies are not unprecedented but this is certainly extraordinary. We are seeing a continual decline in ice. It is likely to be a hiccup but it puts us in a bad starting position for next year.”

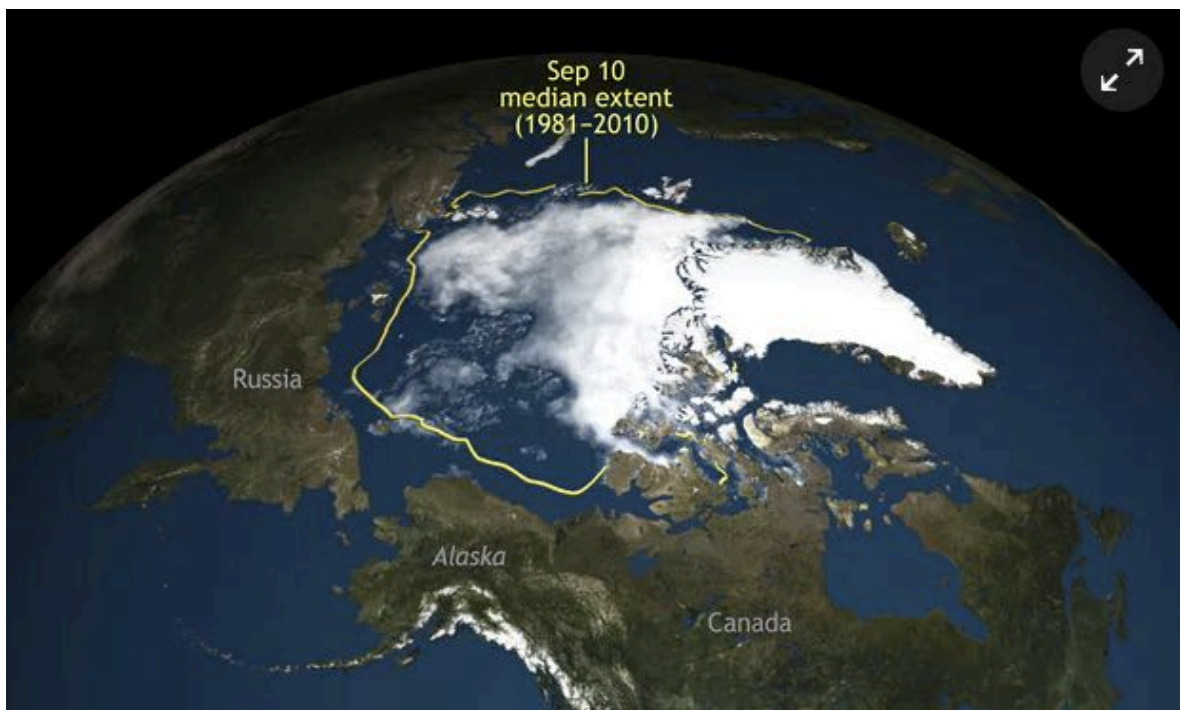
Arctic sea ice shrinks to second lowest level ever recorded

‘Tremendous loss’ of ice reinforces clear downward trend towards ice-free summers due to effects of climate change

Arctic sea ice this summer shrank to its second lowest level since scientists started to monitor it by satellite.
Photograph: AP

Associated Press

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[Arctic](#) sea ice this summer shrank to its second lowest level since scientists started to monitor it by satellite, with scientists saying it is another ominous signal of global warming.

The National Snow and Ice Data Center in Colorado said the sea ice [reached its summer low point](#) on Saturday, extending 4.14m sq km (1.6m sq miles). That's behind only [the mark set in 2012](#), 3.39m sq km.

Center director Mark Serreze said this year's level technically was 10,000 sq km less than 2007, but that's so close the two years are essentially tied.

Even though this year didn't set a record, "we have reinforced the overall downward trend. There is no evidence of recovery here," Serreze said. "We've always known that the Arctic is going to be the early warning system for climate change. What we've seen this year is reinforcing that."

This year's minimum level is nearly 2.56m sq km smaller than the 1979 to 2000 average. That's the size of Alaska and Texas combined.

"It's a tremendous loss that we're looking at here," Serreze said.

It was an unusual year for sea ice in the Arctic, Serreze said. In the winter, levels were among their lowest ever for the cold season, but then there were more storms than usual over the Arctic during the summer. Those storms normally keep the Arctic cloudy and cooler, but that didn't keep the sea ice from melting this year, he said.

"Summer weather patterns don't matter as much as they used to, so we're kind of entering a new regime," Serreze said.

Serreze said he wouldn't be surprised if the Arctic [was essentially ice free](#) in the summer by 2030, something that will affect international security.

"The trend is clear and ominous," National Center for Atmospheric Research senior scientist Kevin Trenberth said in an email. "This is indeed why the polar bear is a poster child for human-induced climate change, but the effects are not just in the Arctic."

One recent theory divides climate scientists: Melting sea ice in the Arctic may change the jet stream and weather further south, especially in winter.

"What happens in the Arctic doesn't stay in the Arctic," Pennsylvania State University climate scientist Michael Mann said. "It looks increasingly likely that the dramatic decrease in Arctic sea ice is impacting weather in mid-latitudes and may be at least partly responsible for the more dramatic, persistent and damaging weather anomalies we've seen so many of in recent years."