

Earth's future is being written in fast-melting Greenland

August 20 2019, by Seth Borenstein



In this Aug. 16, 2019, photo, large Icebergs float away as the sun rises near Kulusuk, Greenland. Scientists are hard at work, trying to understand the alarmingly rapid melting of the ice. (AP Photo/Felipe Dana)

This is where Earth's refrigerator door is left open, where glaciers dwindle and seas begin to rise.

New York University air and ocean scientist David Holland, who is tracking what's happening in Greenland from both above and below, calls it "the end of the planet." He is referring to geography more than the future. Yet in many ways this place is where the planet's warmer and watery future is being written.

It is so warm here, just inside the Arctic Circle, that on an August day, coats are left on the ground and Holland and colleagues work on the watery melting ice without gloves. In one of the closest towns, Kulusuk, the morning temperature reached a shirtsleeve 52 degrees Fahrenheit (10.7 degrees Celsius).

The ice Holland is standing on is thousands of years old. It will be gone within a year or two, adding yet more water to rising seas worldwide.

Summer this year is hitting Greenland hard with record-shattering heat and extreme melt. By the end of the summer, about 440 billion tons (400 billion metric tons) of ice—maybe more—will have melted or calved off Greenland's giant ice sheet, scientists estimate. That's enough water to flood Pennsylvania or the country of Greece about a foot (35 centimeters) deep.



In this Aug. 16, 2019, photo, a boat navigates at night next to a large iceberg in eastern Greenland. Summer 2019 is hitting Greenland hard with record-shattering heat and extreme melt. Scientists estimate that by the end of the summer, about 440 billion tons (400 billion metric tons) of ice, maybe more, will have melted or calved off Greenland's giant ice sheet. (AP Photo/Felipe Dana)

In just the five days from July 31 to Aug. 3, more than 58 billion tons (53 billion metric tons) melted from the surface. That's over 40 billion tons more than the average for this time of year. And that 58 billion tons doesn't even count the huge calving events or the warm water eating away at the glaciers from below, which may be a huge factor.

And one of the places hit hardest this hot Greenland summer is here on the southeastern edge of the giant frozen island: Helheim, one of

Greenland's fastest-retreating glaciers, has shrunk about 6 miles (10 kilometers) since scientists came here in 2005.

Several scientists, such as NASA oceanographer Josh Willis, who is also in Greenland, studying melting ice from above, said what's happening is a combination of man-made climate change and natural but weird weather patterns. Glaciers here do shrink in the summer and grow in the winter, but nothing like this year.

Summit Station, a research camp nearly 2 miles high (3,200 meters) and far north, warmed to above freezing twice this year for a record total of 16.5 hours. Before this year, that station was above zero for only 6.5 hours in 2012, once in 1889 and also in the Middle Ages.



In this Aug. 16, 2019, photo, a woman stands next to an antenna at an NYU base camp at the Helheim glacier in Greenland. Summer 2019 is hitting the island hard with record-shattering heat and extreme melt. Scientists estimate that by the end of the summer, about 440 billion tons of ice, maybe more, will have melted or calved off Greenland's giant ice sheet. (AP Photo/Felipe Dana)

This year is coming near but not quite passing the extreme summer of 2012—Greenland's worst year in modern history for melting, scientists report.

"If you look at climate model projections, we can expect to see larger areas of the ice sheet experiencing melt for longer durations of the year and greater mass loss going forward," said University of Georgia ice scientist Tom Mote. "There's every reason to believe that years that look like this will become more common."

A NASA satellite found that Greenland's ice sheet lost about 255 billion metric tons of ice a year between 2003 and 2016, with the loss rate generally getting worse over that period. Nearly all of the 28 Greenland glaciers that Danish climate scientist Ruth Mottram measured are retreating, especially Helheim.

At Helheim, the ice, snow and water seem to go on and on, sandwiched by bare dirt mountains that now show no signs of ice but get covered in the winter. The only thing that gives a sense of scale is the helicopter carrying Holland and his team. It's dwarfed by the landscape, an almost imperceptible red speck against the ice cliffs where Helheim stops and its remnants begin.



In this Aug. 15, 2019, photo, early morning fog shrouds homes in Kulusuk, Greenland. In tiny Kulusuk, resident Mugu Utuaq says the winter that used to last as long as 10 months when he was a boy, can now be as short as five months. Scientists are hard at work in Greenland, trying to understand the alarmingly rapid melting of the ice. (AP Photo/Felipe Dana)



In this Aug. 16, 2019, photo, New York University air and ocean scientist David Holland, left, and field safety officer Brian Rougeux, right, are helped by pilot Martin Norregaard as they carry antennas out of a helicopter to be installed at the Helheim glacier, in Greenland. Holland and his NYU team are tracking what's happening in Greenland from both above and below. He calls it "the end of the planet" referring to geography more than the future. Yet in many ways Greenland is where the planet's warmer and watery future is being written. (AP Photo/Felipe Dana)



In this Aug. 16, 2019, photo, Brian Rougeux, NYU Field Safety Officer, installs a GPS antenna at the Helheim glacier, in Greenland. An NYU team is tracking what's happening in Greenland from both above and below. The head of the New York University team, air and ocean scientist David Holland, calls Greenland "the end of the planet" referring to geography more than the future. Yet in many ways Greenland is where the planet's warmer and watery future is being written. (AP Photo/Felipe Dana)



In this Aug. 16, 2019, photo, Brian Rougeux, NYU Field Safety Officer, walks after installing a flag to help identify a GPS position at the Helheim glacier, in Greenland. Summer 2019 is hitting the island hard with record-shattering heat and extreme melt. Scientists estimate that by the end of the summer, about 440 billion tons of ice, maybe more, will have melted or calved off Greenland's giant ice sheet. Helheim glacier has shrunk about 6 miles (10 kilometers) since scientists visited in 2005. (AP Photo/Felipe Dana)



In this Aug. 16, 2019, photo, a helicopter flies over hundreds of icebergs floating near the Helheim glacier, in Greenland. Summer 2019 is hitting the island hard with record-shattering heat and extreme melt. Scientists estimate that by the end of the summer, about 440 billion tons of ice, maybe more, will have melted or calved off Greenland's giant ice sheet. Helheim glacier has shrunk about 6 miles (10 kilometers) since scientists visited in 2005. (AP Photo/Felipe Dana)



In this Aug. 15, 2019, photo, a boat navigates at night next to a large iceberg in eastern Greenland. Summer 2019 is hitting Greenland hard with record-shattering heat and extreme melt. By the end of the summer, about 440 billion tons (400 billion metric tons) of ice, maybe more, will have melted or calved off Greenland's giant ice sheet, scientists estimate. (AP Photo/Felipe Dana)



In this Aug. 15, 2019, photo, a large Iceberg floats away as the sun sets near Kulusuk, Greenland. Greenland is where Earth's refrigerator door is left open, where glaciers dwindle and seas begin to rise. Scientists are hard at work there, trying to understand the alarmingly rapid melting of the ice. For Greenland is where the planet's future is being written. (AP Photo/Felipe Dana)



In this Aug. 16, 2019, photo, Mugu Utuaq, left, reloads his rifle as he rides with other boats hunting whales near Kulusuk, Greenland. Summer in 2019 is hitting the island hard with record-shattering heat and extreme melt. Scientists estimate that by the end of the summer, about 440 billion tons of ice, maybe more, will have melted or calved off Greenland's giant ice sheet. (AP Photo/Felipe Dana)



In this Aug. 15, 2019, photo, boys carry plastic bags full of fish in Kulusuk, Greenland. According to local resident Mugu Utuaq, the winter that used to last as long as 10 months when he was a boy can now be as short as five months. Scientists are hard at work in Greenland, trying to understand the alarmingly rapid melting of the ice. (AP Photo/Felipe Dana)



In this Aug. 15, 2019, photo, crosses stand in a cemetery as an iceberg floats in the distance during a foggy morning in Kulusuk, Greenland. Kulusuk's resident Mugu Utuaq says the winter that used to last for as long as 10 months when he was a boy can now be as short as five months. Scientists are hard at work in Greenland, trying to understand the alarmingly rapid melting of the ice. (AP Photo/Felipe Dana)



In this Aug. 15, 2019, photo, a boat navigates next to a large iceberg in eastern Greenland. Greenland's ice has been melting for more than 20 years, but in 2019, it's as if Earth's refrigerator door has been left open, and it means a potentially large rise in the world's sea levels. (AP Photo/Felipe Dana)



In this Aug. 15, 2019, photo, a boat navigates at night next to large icebergs near the town of Kulusuk, in eastern Greenland. Greenland's ice has been melting for more than 20 years, but in 2019, it's as if Earth's refrigerator door has been left open, and it means a potentially large rise in the world's sea levels. (AP Photo/Felipe Dana)

Those ice cliffs are somewhere between 225 feet (70 meters) and 328 feet (100 meters) high. Just next to them are Helheim's remnants—sea ice, snow and icebergs—forming a mostly white expanse, with a mishmash of shapes and textures. Frequently water pools amid that white, glimmering a near-fluorescent blue that resembles windshield wiper fluid or Kool-Aid.

As pilot Martin Norregaard tries to land his helicopter on the broken-up

part of what used to be glacier—a mush called a melange—he looks for ice specked with dirt, a sign that it's firm enough for the chopper to set down on. Pure white ice could conceal a deep crevasse that leads to a cold and deadly plunge.

Holland and team climb out to install radar and GPS to track the ice movement and help explain why salty, warm, once-tropical water attacking the glacier's "underbelly" has been bubbling to the surface

"It takes a really long time to grow an ice sheet, thousands and thousands of years, but they can be broken up or destroyed quite rapidly," Holland said.



In this Aug. 16, 2019, photo, a helicopter carrying New York University air and ocean scientist David Holland and his team sits on the ice as they install a radar

and GPS at the Helheim glacier, in Greenland. Scientists are hard at work there, trying to understand the alarmingly rapid melting of the ice. (AP Photo/Felipe Dana)

Holland, like NASA's Willis, suspects that warm, salty water that comes in part from the Gulf Stream in North America is playing a bigger role than previously thought in melting Greenland's ice. And if that's the case, that's probably bad news for the planet, because it means faster and more melting and higher sea level rise. Willis said that by the year 2100, Greenland alone could cause 3 or 4 feet (more than 1 meter) of sea level rise.

So it's crucial to know how much of a role the air above and the water below play.

"What we want for this is an ice sheet forecast," Holland said.

In this remote landscape, sound travels easily for miles. Every several minutes there's a faint rumbling that sounds like thunder, but it's not. It's ice cracking.



In this Aug. 16, 2019, photo, NYU student researchers sit on top of a rock overlooking the Helheim glacier in Greenland. Summer 2019 is hitting the island hard with record-shattering heat and extreme melt. Scientists estimate that by the end of the summer, about 440 billion tons of ice, maybe more, will have melted or calved off Greenland's giant ice sheet. Helheim glacier has shrunk about 6 miles (10 kilometers) since scientists visited in 2005. (AP Photo/Felipe Dana)

In tiny Kulusuk, about a 40-minute helicopter ride away, Mugu Utuaq says the winter that used to last as much as 10 months when he was a boy can now be as short as five months. That matters to him because as the fourth-ranked dogsledder in Greenland, he has 23 dogs and needs to race them.

They can't race in the summer, but they still have to eat. So Utuaq and

friends go whale hunting with rifles in small boats. If they succeed, which this day they didn't, the dogs can eat whale.

"People are getting rid of their dogs because there's no season," said Yewlin, who goes by one name. He used to run a sled dog team for tourists at a hotel in neighboring Tasiilaq, but they no longer can do that.

Yes, the melting glaciers, less ice and warmer weather are noticeable and much different from his childhood, said Kulusuk Mayor Justus Paulsen, 58. Sure, it means more fuel is needed for boats to get around, but that's OK, he said.



In this Aug. 15, 2019, photo, a boat navigates at night next to large icebergs in eastern Greenland. Greenland's ice has been melting for more than 20 years. (AP Photo/Felipe Dana)

"We like it because we like to have a summer," Paulsen said.

But Holland looks out at Helheim glacier from his base camp and sees the bigger picture. And it's not good, he said. Not for here. Not for Earth as a whole.

"It's kind of nice to have a planet with glaciers around," Holland said.

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