

Tall waves bash Arctic ice, another sign climate change is warming the seas

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A ship makes its way through Arctic ice. Photo: Pixabay / tpsdave

The waves in the Arctic seas have gotten a lot bigger.

That's what scientists have realized since Aleksey Marchenko made an accidental discovery in 2010. Marchenko is a researcher at The University Center in Svalbard, Norway. On May 2, 2010, he and a group of his students set out on a research trip in the Arctic.

Huge islands of ice cover much of the chilly Arctic waters near the North Pole. Near the edges, the ice is made up of tiny floating pieces. Farther inside, however, it is packed into a nearly solid mass.

Ice Cracks, Waves Break It

Marchenko's ship can usually pick its way slowly through it. In years before, the chunks of ice were solid enough to camp on.

This time, things turned out differently. Marchenko stopped the boat near a large chunk of ice. He and his students were going to explore it, but Marchenko checked it out first.

“We were ready to go but when I went out, I discovered many cracks around,” he remembers.

He decided to move the boat deeper into the ice for safety. The farther in he went, he thought, the more stable the ice would become. As they pushed on, however, the ship encountered small waves, and then bigger ones. Soon, the waves broke up the ice around the ship into thousands of smaller pieces.

Within an hour, Marchenko and his team saw a wave that was about 13 feet high. The boat's navigation system recorded waves more than 20 feet tall. These waves were the largest ever measured in icy waters.

Bouncing Chunks Of Ice Around

Marchenko remembers seeing even bigger waves in the distance. He says they were 30 feet high, or more.

Back on solid ground, Marchenko gave his measurements to Clarence Collins, who worked at the U.S. Naval Research Laboratory (NRL). He looked at Marchenko's measurements to try to figure out how the waves got to be so big.

Collins found that the ice near the outer edge of a cluster of ice absorbed some of the energy of arriving waves. At the same time, the outer layer of ice focused the remaining energy. It was so strong that it lifted up huge chunks of ice, letting the waves roll beneath.

As waves bounced chunks of ice up and down, the ice started to break. Once broken, the smaller ice chunks allowed the largest waves to pass through and attack solid ice farther in.

Warmer Seas, Bigger Storms

The ice went from blocking almost all the wave energy to none at all within just one hour. The process happened so fast, in fact, that Collins calculated waves were destroying the ice at a rate of over 10 miles of ice an hour.

Scientists had never imagined that Arctic waves could break up ice so quickly. Historically, the waves in these regions were small. So much of the oceans were covered with ice that there was little open space left where storms could whip up big waves.

Climate change has brought milder winters, warmer sea temperatures and bigger storms. This is a dangerous combination. Warmer temperatures lead to less ice and more open seas. Waves then build up energy on the open water and crash into the arctic ice, breaking it up and clearing even more open ocean.

People, Animals In Danger

The presence of large waves makes these waters more dangerous. The speed and power of the waves makes it impossible to know when they're coming. That could spell disaster for sailors, oil companies and communities of native peoples who are unprepared for large waves or rely on sea ice to protect them. Wildlife like polar bears and walrus that rely on Arctic ice are also in danger.

Collins does not expect the record waves that Marchenko observed in 2010 to remain a record for long. As waves break up ice, the Arctic seas will become more open, and as a result, waves will become even stronger. For the Arctic Ocean, there are stormy times ahead.

Quiz

- 1 Which answer choice best explains the article's main idea?
 - (A) Arctic waves are now so large that they are breaking records, leading more scientists to begin studying them.
 - (B) A group of students and scientists discovered large waves in the arctic, proving that Arctic ice is melting very slowly.
 - (C) Scientists have discovered that large waves are breaking up Arctic ice, which could be dangerous for animals and humans.
 - (D) While visiting the Arctic, a scientist and his students recorded the size of waves and shared the information with a laboratory.

- 2 Which paragraph from the section "Ice Cracks, Waves Break It" BEST explains why Marchenko's findings were important?

- 3 According to the article, how did scientists' thoughts about polar pack ice change after larger waves were discovered?
 - (A) They thought the ice would melt, but the large waves kept the ice from melting.
 - (B) They thought the ice would break, but the waves were too weak to break the ice.
 - (C) They thought the ice was solid, but the waves broke it into small pieces.
 - (D) They thought the ice would get harder, but the waves made the ice slippery.

- 4 According to the article, what did the researchers at the U.S. Naval Research Laboratory do with the information from Marchenko?
 - (A) They used his data to figure out how the waves got so big.
 - (B) They collected more information about the size of the waves.
 - (C) They went to the Arctic to take their own measurements.
 - (D) They used it to develop a plan to protect polar pack ice.