A new low for global warming: Sea ice retreats to furthest point on record

Scientists warn that neither the cause nor the consequence of today’s new record retreat for Arctic sea ice should be ignored. But with drilling opportunities at stake, which interest will prevail?

Steve Connor

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The news that came yesterday should be, environmental campaigners said, a global wake-up call. The ice cap covering the top of the world is now smaller than it has been at any point since scientists started to measure it precisely from space.

Satellite data released last night show that the sea ice floating on the Arctic Ocean has reached a record low, retreating further than it has done since detailed records began more than 30 years ago.

The US National Snow and Ice Data Centre in Boulder, Colorado said that the 2007 record was broken on Sunday with two or three weeks of the melt season still remaining, suggesting that this year's sea ice will retreat substantially further than at any time in the satellite era. The snow and ice centre said that the surface area of the Arctic Ocean covered by floating sea ice fell to 4.10 million square kilometres (1.58m square miles), which was 70,000 square kilometres below the previous record minimum of 4.17 square kilometres set in September 2007.

This means that since 1979, when satellite readings began, the six lowest sea-ice extents have all occurred in the past six years, from 2007 to 2012. The sea ice retreat was particularly rapid this August and may have been exacerbated by an intense storm over the Arctic region.

However, scientists believe that global warming caused by rising levels of carbon dioxide in the atmosphere is the only plausible explanation for the continued loss of Arctic sea ice, which is one of the most visible consequences of man-made climate change.

"By itself, it's just a number, and occasionally records are going to get set. But in the context of what's happened in the last several years and throughout the satellite record, it's an indication that the Arctic sea ice cover is fundamentally changing," said Walt Meier, a sea-ice specialist at the snow and ice data centre.

"The Arctic used to be dominated by multi-year ice, or ice that stayed around for several years. Now it's becoming more of a seasonal ice cover and large areas are now prone to melting out in summer," Dr Meier said.

Mark Serreze, director of the data centre, said that the previous record set in 2007 occurred because of near-perfect summer weather for melting sea ice, with clear skies and intense sunshine dominating the region's weather.

"Apart from one big storm in early August, weather patterns this year were unremarkable. The ice is so thin and weak now, it doesn't matter how the winds blow," Professor Serreze said.

It is normal for sea ice floating on the Arctic Ocean to ebb and flow with the seasons. It thickens and grows in the cold winter months and melts and retreats again in the summer, reaching a seasonal minimum each summer during early September.

However, since 1979 Arctic scientists have observed that the September minimum is significantly smaller in terms of surface area of the ocean covered by sea ice. This trend has accelerated in recent years. Computer models of how the sea ice would respond to global warming initially suggested that the region could be free of summer sea ice by the end of the century. Later models suggested this could occur as early as 2030 or even earlier, but none had predicted the rapidity of the observed loss of sea ice.

Sea ice is seen as important because of its disappearance could lead to other important changes to the Arctic environment. One immediate effect is the opening up of shipping lanes that could lead to new oil and gas explorations within the region, triggering political tensions as well as further releases of carbon dioxide from the mining and burning of fossil fuel.

The record minimum was announced just two days after the Royal Dutch Shell's drilling ship, the Noble Discoverer, took advantage of reduced sea ice and started sailing from Alaska to the Chukchi Sea, in anticipation of final US government approval for oil exploration in the region.

Scientists have already observed a link between disappearing sea ice and the release of methane, a greenhouse gas that is more than 20 times more potent than carbon dioxide, from beneath the Arctic Ocean. Researchers flying over the melting sea ice reported last May that significant quantities of methane are being released from between the cracks in the ice.

"When we flew over completely solid sea ice, we didn't see anything in terms of methane. But when we flew over areas were the sea ice had melted, or where there were cracks in the ice, we saw the methane levels increase," said Eric Kort, of Nasa's Jet Propulsion Laboratory in Pasadena, California.

"We were surprised to see these enhanced methane levels at these high latitudes. Our observations really point to the ocean surface as the source, which is not what we had expected," he said.

Other scientists have observed huge plumes of methane being released from beneath the permafrost of the East Siberian Arctic Shelf off northern Russia. The Arctic is known to have huge stores of trapped methane in the form of gas hydrates, which some experts fear may be released if Arctic permafrost continues to melt.

John Sauven, executive director of Greenpeace, said that the latest data on how fast the sea ice is in retreat should be a warning to the world.

"Let's be clear about what today means – our planet is warming up at a rate that puts billions of people's future in jeopardy," Dr Sauven said.

"These figures are the effects of man-made global warming caused by our reliance on dirty fossil fuels," he said.

***Reflection:***

***How can an understanding of surface area better help people to understand their world? You may use examples from the article but also try to think of other ways that this knowledge of mathematics may help you understand your world.***