

Climate Change in the Arctic

by Anika Nykanen

The Arctic is invaluable to the stability of Earth's climate. With a unique ecosystem and an immense climatological influence over the rest of the world, this region of our planet is delicate and important, and climate change has had a greater impact upon it than anywhere else. In this essay I will discuss what the Arctic's climate looks like under normal circumstances, Arctic amplification, the perceived benefits of Arctic warming, and the effects of climate change on the Arctic.

The Arctic is located above the Arctic Circle in the northernmost region of Earth. Scientists have different definitions of where the Arctic starts and stops. Some say it is a matter of temperature, while others say simply that it includes the area north of the Arctic tree line. No state has a claim to the North Pole or the Arctic Ocean, although the countries that surround it have an economic zone of two hundred nautical miles encompassing their coasts. These countries include Canada, Iceland, Denmark, Sweden, Finland, Russia and Norway. Climate in the Arctic is defined by cold summers and even colder winters. The average winter temperatures can get down to -40°C . Contrary to popular belief, precipitation is low, mainly appearing in the form of snow. The average snowfall for most of the area is less than 50cm annually, but high winds often whip up snow which creates the appearance of endless snowfall.

Over the last four decades, the Arctic has seen a dramatic rise in temperature. Most scientists attribute this to human-caused climate change. Scientists find rising temperatures in the Arctic concerning, not only because of regional effects but because of feedback effects that are felt around the globe. These feedback effects are known as Arctic amplification. An example of Arctic amplification is when the sea ice cover recedes in the summer, leaving dark water with a low albedo to absorb more solar energy. Another example is the melting of permafrost. Permafrost in the Arctic holds a huge amount of methane. The permafrost melts due to rising temperatures and methane escapes into our atmosphere. Methane is a lethal greenhouse gas, trapping even more heat than carbon dioxide. These effects raise temperatures further, the polar ice cap continues to recede, permafrost melts, sea levels rise, and so on. This is an economic and environmental catastrophe. What heightens the situation is the magnitude of temperature rise in the Arctic. The Arctic's temperature increase is half as large again as the global increase.

The effect that a dwindling polar ice cap will have is worldwide in scale. Oceans cover seventy percent of the planet, and if that figure increases it means 'game over' for a number of coastal nations. For every degree Celsius that the average global temperature rises, we can expect a two meter rise in sea levels. However, some see the demise of the polar ice caps as an opportunity for economic growth. With an expanding Arctic Ocean, access to prodigious natural resources has brought the area into the spotlight. Increased mining,

drilling and maritime shipping has made the region desirable to nations that share Arctic coasts as well as the world's largest energy consumer, China. The Arctic holds thirteen percent of the world's oil and thirty percent of its natural gas. Currently, it is home to some of the world's most productive mineral mines, including the famed zinc mine, Red Gog, in northern Alaska. The cherry on top is the apparent cooperation of the fiscally fit nations surrounding the Arctic, who have put aside territorial disputes in favor of working together for a shared interest in profit. In the eyes of many, the benefit of Arctic warming appears overwhelming.

But there is another side to this story. "Regardless of whether the actual economic impacts of global warming wind up being on the low end or the high end of the scale, the bottom line is that focusing only on the benefits of Arctic warming, as many policymakers have tended to do, is problematic at best," says Chris Hope, a policy modeler at Judge Business School at the University of Cambridge. The worldwide impacts of Arctic warming could cost an estimated sixty trillion dollars, almost equal to the entire global economy in 2012 which was seventy trillion. And despite the cooperation of the countries that share the Arctic Ocean, they also jostle to claim extra territory. One major tussle began on August 2, 2007, when the Russian explorer Artur Chilingarov led two minisubmarines two miles below the ice-covered North Pole. Once they descended to the ocean floor, a titanium Russian flag was dropped and the territory was symbolically claimed for Russia. "The Arctic has always been Russian and will remain so!" Chilingarov exclaimed upon his return to Moscow. "If a hundred or a thousand years from now someone goes down where we were, they will see the Russian flag."

Unfortunately for Russia, ownership of undersea areas is dictated by the 1982 United Nations Convention on the Law of the Sea, which says that a nation may claim ownership of undersea land, beyond its given two hundred miles, only if it can prove the land to be an addition of its own continental shelf. By those guidelines, Sweden, Finland, and Iceland may not claim territory because they do not have a continental shelf on the Arctic Ocean, but Russia and the United States both do. As a result, climate change in the Arctic not only poses environmental problems for our planet but also poses political problems that threaten the stability of the current global order. The changes occurring in the Arctic have affected and will continue to affect the rest of the world in many different ways.