ARCTIC CLIMATE CHANGE UPDATE 2019

UPDATES SINCE THE 'SNOW, WATER, ICE AND PERMAFROST IN THE ARCTIC (SWIPA) 2017' ASSESSMENT

ARCTIC WARMING CONTINUES UNABATED

Observed and projected annual average warming in the Arctic continues to be more than twice the global mean, with higher increases in winter. Arctic annual surface air temperatures over the past five years have exceeded those of any year since records began in 1900. Sea-surface temperatures are also increasing over much of the Arctic Ocean.

Changes in temperature drive many of the changes underway in the Arctic. Rising air, surface, and ocean temperatures accelerate the melting of snow and ice (including glaciers) and affect the Arctic's interconnected physical, chemical, and biological systems in direct and indirect ways. Arctic warming can also have effects far beyond the region. Increases in precipitation and humidity are also important drivers of Arctic change. Higher humidity in the atmosphere, partly from loss of sea ice, contributes to amplified warming and snowmelt in the Arctic.

ARCTIC SEA ICE IS INCREASINGLY VULNERABLE

Arctic winter sea ice maximums in the past four years were at record low levels, and the volume of Arctic sea ice present in the month of September has declined by 75 percent since 1979. Sea ice has gone through a transition from mostly thick multi-year sea ice to younger and thinner seasonal sea ice.

CLIMATE CHANGE IS AFFECTING THE ARCTIC TERRESTRIAL AND MARINE ENVIRONMENT

Warming temperatures and extreme events are affecting the Arctic terrestrial landscape through expansion of shrubs into tundra, increased vulnerability to insect disturbances, regional declines in tundra vegetation, and increases in severe fire years. Wildfires occurred in western Greenland in 2017, including an unusually large fire that lasted several weeks and burned at least 1,200 hectares of tundra. In 2018, Sweden experienced its hottest May on record followed by an unusually heavy wildfire season. The number of wildfires ignited by lightning has risen in Canada's Northwest Territories and in interior Alaska since 1975. Increases in temperature and precipitation correlate with increases in the number of lightning-caused wildfire ignitions. Changes in the frequency and intensity of wildfires may affect the distribution of caribou and reindeer, with implications for livestock husbandry and subsistence in northern communities.

Marine environments are also affected. The loss of sea ice has triggered shifts in the timing and intensity of marine algal blooms, with potential impacts throughout the food web including krill, fish, birds, and mammals in marine ecosystems. Areas experiencing double blooms (one in spring and one in autumn) have increased in regions with the greatest loss of sea ice. Some algal blooms produce toxins that have subsequently been observed in shellfish and in the bodies of marine mammals, raising public health concerns in the Arctic.

These and other impacts of climate change in the Arctic have consequences for the entire global climate system and pose fundamental risks to many ecosystem services, affecting the livelihoods of Indigenous Peoples and other inhabitants of the High North.

CLIMATE CHANGE AFFECTS ARCTIC COMMUNITIES, PUBLIC HEALTH AND ECONOMIES

Climate change interacts with other environmental and health stressors together with a range of social, economic, and political factors that are fundamentally changing the nature of the Arctic. These changes challenge the ability of Arctic communities to adapt and maintain resilience. The trend toward shorter snow seasons in the Arctic affects traditional activities such as hunting and access to certain food sources, with implications for health, disposable income, and Indigenous cultures and economies. Many coastal communities in the Arctic are affected by the loss of sea ice (which serves as hunting and fishing platforms) as well as increasing exposure to storms, coastal erosion, and flooding of coastal wetlands. Thawing permafrost disrupts transportation and affects buildings and infrastructure. Wildfires accelerate the loss of natural resources, pose direct risks to human health and safety, and can affect traditional land use by Indigenous Peoples and other residents.

Photo: Fernando Ugarte

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