



2015 – A Year of Extremes in the Arctic

KEY FACTS

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July and August 2015

The combined acreage burned in wildfires in Siberia, Canada and Alaska by early August 2015 was over 31 million acres or over 48,000 square miles – bigger than the land area of New York (47,126 square miles). Much of area was in the Arctic and Sub-Arctic. Smoke from the fires has encircled the northern hemisphere.

As of 10 August 2015: 5,081,585.90 acres (5.1 million acres) of forest in Alaska has burned from wildfires. <http://fire.ak.blm.gov/content/aicc/sitreport/current.pdf>

In July 2015 the combined average temperature over global land and ocean surfaces for was the highest for July in the 136-year period of record, and was also the highest among all 1627 months in the record that began in January 1880. The July temperature is currently increasing at an average rate of 0.65°C per century. <https://www.ncdc.noaa.gov/cag/time-series/global>

We are experiencing record temperatures in the Barents Sea in the Arctic. For the oceans, the July global sea surface temperature was 0.75°C (1.35°F) above the 20th century average of 16.4°C (61.5°F), the highest departure not only for July, but for any month on record. <http://www.ncdc.noaa.gov/sotc/global/201507>

Sea Ice

September Arctic sea ice is now declining at a rate of 13.3 percent per decade, relative to the 1981 to 2010 average. NASA, <http://climate.nasa.gov/vital-signs/arctic-sea-ice/>

Arctic sea-ice extent has decreased in every season and in every successive decade since 1979 (when satellite monitoring began). Year-round reductions in Arctic sea ice are projected for all scenarios considered by the Intergovernmental Panel on Climate Change. The panel believes that without major changes in our patterns of energy consumption, the Arctic Ocean will be nearly ice-free in September before 2050. http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

Through 2014, the linear rate of decline for September Arctic ice extent over the satellite record is 13.3% per decade, relative to the 1981 to 2010 average. The ten lowest September ice extents over the satellite record have all occurred in the last ten years <http://nsidc.org/arcticseaicenews/2014/10/>

Land

Arctic permafrost near the surface (upper 3.5 m) will decrease markedly over the next few decades. This will likely result in vegetation changes (tundra to woody vegetation, northward advance of treeline) changing important habitat for Arctic animals. IPCC, http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

The amount of acreage burned in Alaska during June 2015 shattered the previous acreage record set in June 2004 by more than 700,000 acres delivering a sobering piece of news for Alaskan residents. NASA

Alaska's melting glaciers are losing 75 billion tons of ice a year according to the study, by scientists from the University of Alaska Fairbanks, the U.S. Geological Survey and University of Washington. The study found that tidewater glaciers are losing mass at substantially slower rates than other glaciers in Alaska and collectively contribute to only 6% of the regional mass loss. Study: Alaska's melting mountain glaciers have big impact on sea level rise.

<http://onlinelibrary.wiley.com/doi/10.1002/2015GL064349/abstract>

Climate change is expected to drastically increase the size and frequency forest fires in North America and Siberia. This is expected to affect local environments and people, and will also contribute more greenhouse gases to the atmosphere, and black carbon, increasing warming and melting.

<http://www.pnas.org/content/111/38/13888.full.pdf+html>

Effects on Wildlife

Polar bears will lose important habitat as sea ice extent and duration both shrink, and snowfall is insufficient for polar bears' primary prey species (ringed seals) to successfully reproduce. A projection shows that under a "business as usual" climate scenario, even the longest-lasting summer sea ice may not be sufficient to sustain healthy bear populations by 2100.

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0113746>

Other marine mammals associated with sea ice, such as narwhals, walrus, and some species of seals will likely also decline. The whole arctic food web is likely to change as plankton associated with sea ice give way to species associated with open water, and invasive species move northward.

<http://www.caff.is/sea-ice-associated-biodiversity/sea-ice-publications/254-life-linked-to-ice-a-guide-to-sea-ice-associated-biodiversity-in-this-time-of-ra>

In some parts of the Arctic, fish species are moving northward at a rate of as much as 160 km per decade. This shift is changing the ecology of those places.

<http://www.nature.com/nclimate/journal/v5/n7/full/nclimate2647.html>

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