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Climate change made ‘relentless’ Nordic heatwave at least ten times more likely

Intensifying heatwaves pose new threats to cold-climate countries, researchers warn

Human-caused climate change made the two-week heatwave that led to overcrowded hospitals, algal blooms, wildfires and sightings of reindeer in urban areas in Norway, Sweden and Finland about 2°C hotter and at least ten times more likely, a rapid analysis has found.

The study by World Weather Attribution highlights how heatwaves intensified by climate change are disrupting healthcare and wildlife and warns that similar events will become another five times more frequent by 2100 unless countries more rapidly shift from fossil fuel to renewable energy.

Key findings include:

- Climate change made the heatwave about 2°C hotter and at least ten times more likely.
- At 2.6°C of warming, which is expected this century, similar events will be five times as likely and a further 1.4°C hotter than today.
- With 0.2°C of global warming since 2018, similar two-week heatwaves have become almost twice as likely – showing how small increases in warming exposes people to more frequent bouts of dangerous heat.
- Climate change-driven heat is putting strain on healthcare, ecosystems and Sámi reindeer herders.

Dr Clair Barnes, Researcher at the Centre for Environmental Policy Imperial College London, said:

“This heatwave was relentless. Two weeks of temperatures above 30°C in this region is unusual and of course, highly concerning.

“Climate change is fundamentally reshaping the world we live in. Cold-climate countries like Norway, Sweden and Finland, are now experiencing unfamiliar levels of heat, as recently seen in strained health systems and sightings of reindeer seeking shade in urban areas.

“We found that the likelihood of a prolonged period of heat like this has almost doubled since 2018, when the region last experienced such an intense heatwave – and this trend is going to continue if we don’t stop filling the atmosphere with planet-heating gasses. A rapid transition from fossil fuels to renewable energy is the only way to slow and, hopefully, ultimately stop this warming.”

Norway, Sweden and Finland were gripped by two weeks of unusually hot weather from mid-July with temperatures above 30°C. Finland experienced 22 consecutive days with temperatures above 30°C, its longest heatwave on record. The persistent heat led to people fainting during outdoor events, overcrowded and overheated hospitals, wildfires, algal blooms, and a surge in drownings. Reindeer, which normally roam forests, were seen in towns seeking shade, with drivers warned about the risk of encountering them in tunnels and some were reported to have died due to the heat.

The scientists found that the heatwave was intensified by the burning of fossil fuels, which release both planet-heating carbon emissions and harmful air pollutants that cause health issues and death. In a 1.3°C cooler world, without climate change, similar two-week heatwaves would be extremely rare, the study found. But today, with 1.3°C of warming, these heatwaves have become at least ten times more likely and are now expected about every 50 years. They also found that climate change made the event about 2°C hotter.

The research also found that Norway, Sweden and Finland will face more dangerous heatwaves as the climate warms. If warming reaches 2.6°C, which is expected by 2100 unless the world more rapidly shifts away from oil, gas and coal, similar two-week spells of hot weather are expected to become five times as frequent and become a further 1.4°C hotter.

The heatwave is similar to a two-week heatwave that hit the region in 2018. In just seven years, similar heatwaves have become almost twice as likely due to the increase in global temperatures from 1.1 to 1.3°C. The finding underscores how every fraction of a degree of warming greatly increases the chance of dangerous heatwaves and why working to keep warming below the 1.5°C target of the Paris Agreement is so important, the scientists say.

The dangerous heat could have caused hundreds of heat-related deaths, the researchers say. When Sweden was hit by the 2018 heatwave, about 750 excess deaths were estimated for over a five-week period from early July. Heatwaves are often called ‘silent killers’. Unlike other extreme events, where human deaths are immediately reported, the impact from extreme heat is less visible. Excess death figures can take weeks or months to be published and because many victims have existing health conditions, heat is not always mentioned as the cause of death. During the recent heatwave, in Finland, a hospital in North Ostrobothnia noted an increase in patients, particularly elderly, while in Norway, temperatures were high in hospitals, with the conditions described as 'torture' by staff.

Adaptation is needed to protect people from heatwaves in the region, the researchers say. Each country has developed heat action plans, which are proven to be effective at saving lives during heatwaves. However, the researchers say increased coordination is needed between governments and vulnerable sectors like elderly care facilities, kindergartens, and schools.

The study highlights how climate change is threatening ecosystems. Heatwaves in Norway, Sweden and Finland have been linked to a wide range of environmental impacts, including toxic algal blooms, northward shifts in animal populations to seek cooler temperatures, die back of trees, wildfire and melting of permafrost that releases methane into the atmosphere.

During the heatwave, reindeer were spotted in towns and cities, highlighting how climate change is threatening the livelihoods of Indigenous Sámi communities, who have herded them in the region for more than 1,000 years. In summer, reindeer normally move to higher areas to escape blood-sucking insects and heat, but warmer conditions on hills and mountains mean those areas now offer less relief, the researchers say. Hotter summer temperatures can also cause reindeer to overheat, and struggle with limited food and water. Meanwhile, warmer winters cause more snow to fall as rain and alternating periods of freeze and thaw creates layers of ice that prevent reindeer from digging for food.

The study was conducted by 24 researchers as part of the World Weather Attribution group, including scientists from universities and meteorological agencies in Finland, Norway, Sweden, the Netherlands, the United Kingdom and the United States.

Amalie Skålevåg, Climate researcher, Norwegian Meteorological Institute, said:

“In Norway, it's rare to have high temperatures lasting this long.

“While many enjoyed the summer warmth, for others the prolonged heat brought demanding working conditions, sleepless nights, and even health risks – a reminder of what we need to be ready for in a future warmer world.”

Prof Erik Kjellström, Professor in climatology at the Swedish Meteorological Institute, said:

“In Sweden, particularly the northern parts experienced a very long heat wave with high temperatures.

“In addition, absence of precipitation led to dry conditions and numerous forest fires were reported.”

Dr Mika Rantanen, Researcher at the Finnish Meteorological Institute, Finland, said:

“Summer heat extremes in northern Fennoscandia are emerging outside of their range of natural variability.

“Last summer was the warmest in two millennia, and this year we have experienced the longest heatwave ever recorded.”

Maja Vahlberg, Technical Advisor at Red Cross Red Crescent Climate Centre, and Climate Consultant at Swedish Red Cross, Sweden, said:

“This heatwave was a stark reminder of the threat of climate change in cold-climate countries that aren’t normally considered vulnerable.

“Our infrastructure was not built to withstand these extreme temperatures and our aging population is increasingly susceptible to dangerous heat.

“We’ve seen some progress in adaptation and preparedness, particularly since 2018, when we experienced our last big heatwave. But we still need to do more to ensure our cold-adapted infrastructure and systems are also ready for high temperatures.”

Prof Friederike Otto, Professor in Climate Science at the Centre for Environmental Policy Imperial College London, said:

“Even comparably cold Scandinavian countries are facing dangerous heatwaves today with 1.3°C of warming. This event should be taken as another reminder that no country is safe from climate change.

“In recent weeks, sweltering temperatures have hit the US, Japan, South Korea and triggered huge wildfires in France and Türkiye.

“Burning oil, gas, and coal is killing people today. Fossil fuels are supercharging extreme weather and polluting the air we breathe. To stop the climate from becoming more dangerous, we need to stop burning fossil fuels and shift to renewable energy.”

Notes

Methods
Climate change is making heatwaves hotter, longer and more frequent around the world. To quantify the effect of human-caused warming on the extreme heat, scientists analysed climate data to compare how these types of events have changed between today’s climate, with approximately 1.3°C of global warming, and the cooler pre-industrial climate. The analysis looked at the hottest two-week periods annually in Sweden, Norway and Finland.

Study webpage
The study “Intense two-week heatwave in Fennoscandia hotter and more likely due to climate change” will be published on Thursday 14 August, 2am Central European Summer Time/ 3am

Eastern European Summer Time.

When the embargo lifts, the study will be available at:

https://www.worldweatherattribution.org/intense-two-week-heatwave-in-fennoscandia-hotter-and-more-likely-due-to-climate-change

World Weather Attribution
World Weather Attribution is an international collaboration that analyses and communicates the possible influence of climate change on extreme weather events, such as storms, extreme rainfall, heatwaves, and droughts.

The group has completed more than 100 studies on a range of extreme weather events around the world using peer-reviewed methods. To date, 26 of these studies have been submitted and published in peer reviewed journals and their results have remained unchanged.

The Intergovernmental Panel on Climate Change included research by World Weather Attribution to provide evidence that human-caused climate change is already intensifying weather extremes in every region of the world in its Sixth Assessment Report published in March, 2023.

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