

# Finland is warming twice as fast than the rest of the planet

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Finnish researchers analyzed meteorological data gathered over the past 166 years and found the country's average monthly temperatures have increased by more than 2 degrees Celsius. Over the same period, the rest of the planet has warmed by only 0.8 degrees C on average. Overall, Finland and other sub-Arctic countries are warming at double the rate of the world's global warming.

## The fastest warming country in the world



The Lampivaara amethyst mine in Finland. Here, the average winter temperature is around minus 4 C and can drop to minus 30 C. Image: [Pajaratorio Flickr](#)

The fact that global warming affects the Northern Hemisphere more than the rest of the planet is well known, but this extreme rate may surprise some. In 1896, the Swedish chemist Svante August Arrhenius was the first to propose that changing concentrations of CO<sub>2</sub> in the atmosphere would lead to more temperature variability in the poles.

Some of you might find it ironic that the iciest places in the world are warming the fastest, though. Once you delve into it, however, it soon becomes elementary. Ice acts like an insulating cover, reflecting sunlight and keeping the water below cold. In more technical terms, losing sea ice reduces Earth's albedo: the lower the albedo, the more a surface absorbs heat from sunlight rather than reflecting it back to space. Nowadays, the newly ice-free parts of the ocean take in much more heat than they used to during the summer, and once air temperatures fall this extra heat is released during the autumn and winter. The higher atmospheric temperatures lead to even more ice melt and prevent new ice from forming, creating a feedback loop.

“You would expect that the temperatures in the north would be rising faster than the global average,” said Ari Laaksonen, a professor in the Department of Applied Physics at the University of Eastern Finland and a co-author of the study. “But [researchers] expected a rate that was 50 percent faster; Finland’s temperature is rising by almost 100 percent.”

In order to find out how average monthly temperatures had changed from 1847 to 2013, the researchers used an advanced statistical time series approach to figure out what changes in temperature were due to natural variability and what changes represented a long-term trend. Also, because in the mid XIXth century there weren't that many weather stations the researchers also used measurements collected by neighboring stations in Sweden, Norway and Russia.

Over the past 166 years, monthly temperatures have increased by more than 2 degrees Celsius in Finland. Since the rate of warming increased from 0.2 to 0.4 C per decade after the 1960s, when the effects of the massive energy boom following WWII could be seen, this suggests that the warming is predominantly man-made.

All the measurements are consistent with data collected in the past 135 years at NASA's Goddard Institute for Space Studies (GISS). Researchers at NASA found an average increase in temperature of 0.93 C for the Northern Hemisphere, while countries at latitudes around 60 degrees north or above had an average temperature increase of 1.8 C. Why Finland registered a 2.0 C warming, thus making it the fastest warming country in the world, may be due to a more refined view made by the Finish researchers.

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