Average temperature in Finland has risen by more than two degrees

December 22 2014

Over the past 166 years, the average temperature in Finland has risen by more than two degrees. During the observation period, the average increase was 0.14 degrees per decade, which is nearly twice as much as the global average.

According to a recent University of Eastern Finland and Finnish Meteorological Institute study, the rise in the temperature has been especially fast over the past 40 years, with the temperature rising by more than 0.2 degrees per decade. "The biggest temperature rise has coincided with November, December and January. Temperatures have also risen faster than the annual average in the spring months, i.e., March, April and May. In the summer months, however, the temperature rise has not been as significant," says Professor Ari Laaksonen of the University of Eastern Finland and the Finnish Meteorological Institute. As a result of the temperature rising, lakes in Finland get their ice cover later than before, and the ice cover also melts away earlier in the spring. Although the temperature rise in the actual growth season has been moderate, observations of Finnish trees beginning to blossom earlier than before have been made.

Temperature has risen in leaps

The annual average temperature has risen in two phases, the first being from the beginning of the observation period to the late 1930s, and the second from the late 1960s to present. Since the 1960s, the temperature

has risen faster than ever before, with the rise varying between 0.2 and 0.4 degrees per decade. Between the late 1930s and late 1960s, the temperature remained nearly steady. "The stop in the temperature rise can be explained by several factors, including long-term changes in solar activity and post-World War II growth of human-derived aerosols in the atmosphere. When looking at recent years' observations from Finland, it seems that the temperature rising is not slowing down," University of Eastern Finland researcher Santtu Mikkonen explains.

The temperature time series was created by averaging the data produced by all Finnish weather stations across the country. Furthermore, as the Finnish weather station network wasn't comprehensive nation-wide in the early years, data obtained from measurement stations in Finland's neighbouring countries was also used.

Finland is located between the Atlantic Ocean and the continental Eurasia, which causes great variability in the country's weather. In the time series of the average temperature, this is visible in the form of strong noise, which makes it very challenging to detect statistically significant trends. The temperature time series for Finland was analysed by using a dynamic regression model. The method allows the division of the time series into sections indicating mean changes, i.e. trends, periodic variation, observation inter-dependence and noise. The method makes it possible to take into consideration the seasonal changes typical of Nordic conditions, as well as significant annual variation.

More information: "Stochastic Environmental Research and Risk Assessment," Online First, 17 Dec 2014 DOI: 10.1007/s00477-014-0992-2 . dx.doi.org/10.1007/s00477-014-0992-2

Provided by University of Eastern Finland