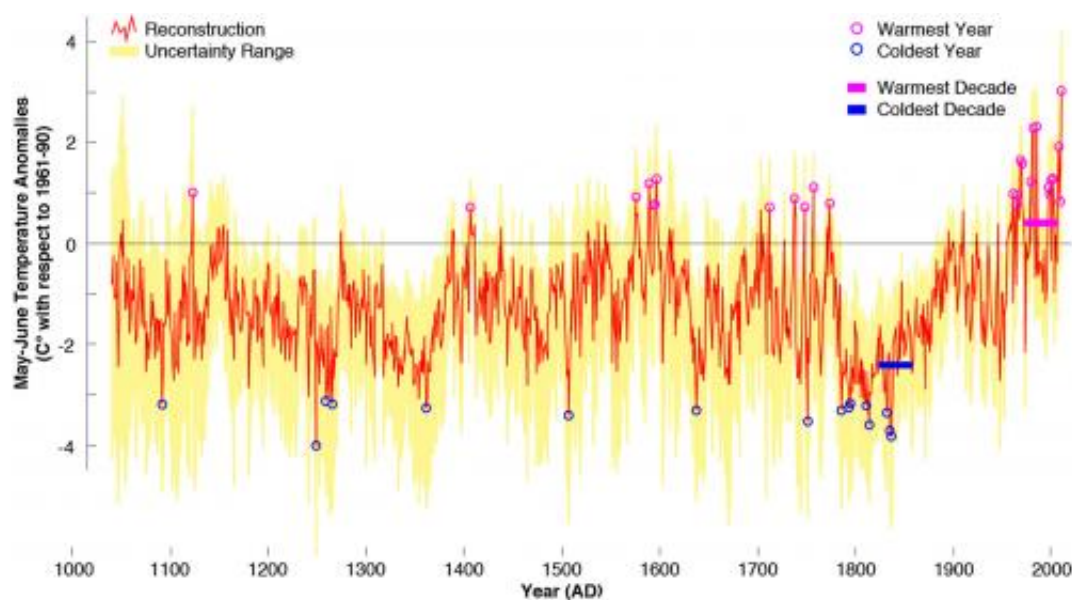


Tree ring sampling shows cold spells in Eastern Europe led to unrest over past thousand years

January 15 2013, by Bob Yirka



Annually resolved variations of May-June temperature between 1040 and 2011 AD, based on 545 samples of living trees and historical timbers (*Larix decidua* Mill.) from the Slovakian Tatra Mountains in the northwestern Carpathian arc. Credit: Ulf Büntgen (WSL)

(Phys.org)—A team of Swiss, Czech, Canadian and German researchers has found that prolonged cold spells in Eastern Europe over the last thousand years has led to wars, plagues and civil unrest. In their paper published in the *Proceedings of the National Academy of Sciences*, the

team compares evidence from tree ring samples taken from the Tatra region in Eastern Europe dating back to 1040 A.D., with archival histories to track human activities during the same period.

In the study, led by paleoclimatologist Ulf Büntgen, of the Swiss Federal Research Institute, the researchers examined ring samples from 282 living trees and 263 from wood used in construction of old wood buildings – wider rings indicate [warm periods](#), narrower, cooler. In analyzing the data, they were able to plot spring-time temperatures in the region going back nearly a thousand years. Next they compared average temperatures over extended cold periods and found they coincided with historical events such as the French invasion of Russia, the plague and the Thirty Years War. The group suggests food shortages during repeated cold springs might have led to civil unrest and the spread of diseases.

Predictably, the team also found that [average temperatures](#) over the past five decades exceed anything they saw in the historical record they had created, adding yet another piece of evidence to the mountain of data already in existence that suggests the planet is truly experiencing an unprecedented period of global warming.

The team made clear also that cold snaps aren't necessarily an indicator of sudden unrest, more that extended periods of [cold weather](#) have in the past tended to lead to some very bad times for the people that lived through them or in many cases died as a result of the changes that were wrought.

Creating a [temperature record](#) from tree rings in Eastern Europe has an increased significance over some other areas, the team adds, because written historical records don't go back in time as far as those for Western Europe and other parts of the world. To gain an accurate picture of average global temperatures over a given period, they suggest,

requires gathering evidence from a variety of locations that cover a significant amount of time, rather than relying on data from just a few locations.

More information: Filling the Eastern European gap in millennium-long temperature reconstructions, *PNAS*, Published online before print January 14, 2013, [doi: 10.1073/pnas.1211485110](https://doi.org/10.1073/pnas.1211485110)

Abstract

Tree ring–based temperature reconstructions form the scientific backbone of the current global change debate. Although some European records extend into medieval times, high-resolution, long-term, regional-scale paleoclimatic evidence is missing for the eastern part of the continent. Here we compile 545 samples of living trees and historical timbers from the greater Tatra region to reconstruct interannual to centennial-long variations in Eastern European May–June temperature back to 1040 AD. Recent anthropogenic warming exceeds the range of past natural climate variability. Increased plague outbreaks and political conflicts, as well as decreased settlement activities, coincided with temperature depressions. The Black Death in the mid-14th century, the Thirty Years War in the early 17th century, and the French Invasion of Russia in the early 19th century all occurred during the coldest episodes of the last millennium. A comparison with summer temperature reconstructions from Scandinavia, the Alps, and the Pyrenees emphasizes the seasonal and spatial specificity of our results, questioning those large-scale reconstructions that simply average individual sites.

[Press release](#)

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