



This is the print version of the [Skeptical Science](http://sks.to/lia) article '[We're coming out of the Little Ice Age](http://sks.to/lia)', which can be found at <http://sks.to/lia>.

## What ended the Little Ice Age?

### What The Science Says:

The sun was warming up then, but the sun hasn't been warming since 1970.

### Climate Myth: We're coming out of the Little Ice Age

"The global temperature has been rising at a steady trend rate of 0.5°C per century since the end of the little ice age in the 1700s (when the Thames River would freeze over every winter; the last time it froze over was 1804) ...

...

The IPCC blames human emissions of carbon dioxide for the last warming. But by general consensus human emissions of carbon dioxide have only been large enough to be significant since 1940—yet the warming trend was in place for well over a century before that." ([David Evans](#))

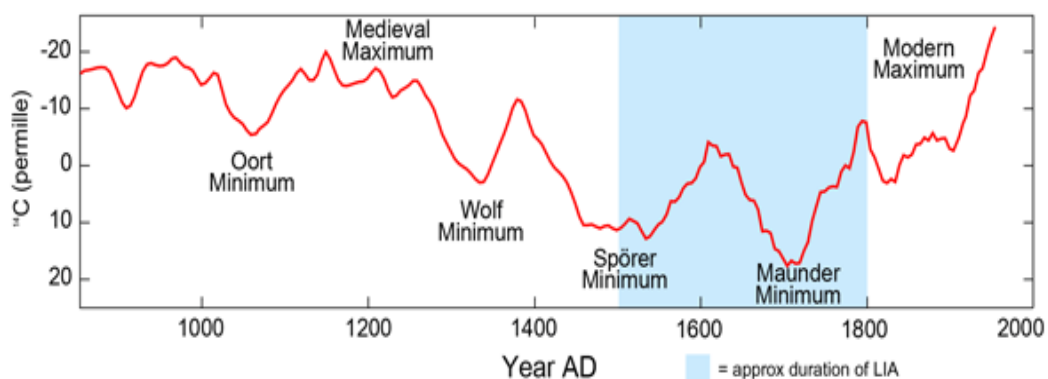
Climate change sceptics suggest that because the climate has changed dramatically in the past – and without man's intervention – it is possible that current changes to the Earth's climate are also a natural event. You may be familiar with paintings depicting Londoners skating on the frozen River Thames, when winters, at least in the northern hemisphere, were more severe. The beginning and end of this period are subject to various interpretations, but the period is referred to as the Little Ice Age (LIA) and occurred between the 16th to 19th centuries.

### Limited History

If we are to understand the LIA, we need to figure out what caused it. Scientists have examined several important strands of evidence about the LIA, including the activity of the sun, of volcanoes, and ocean heat circulation, principle drivers of natural climate change.

The activity of the sun can be assessed by looking at proxies – processes we know are affected by the sun's activity. One of these is the formation of the radioactive isotope Carbon-14 in the atmosphere, which plants then absorb. By measuring carbon-14 in tree rings and other materials we know are from a certain period, we can estimate how active the sun was at the time. This graph shows the sun's activity over the last millennium:

## Solar Activity Events recorded in Carbon 14



The carbon-14 data used in this graph go up to 1950. The graph below gives a fuller picture, showing that in the last three decades, the sun's normal cycle of activity has remained steady, while temperatures have shot up:

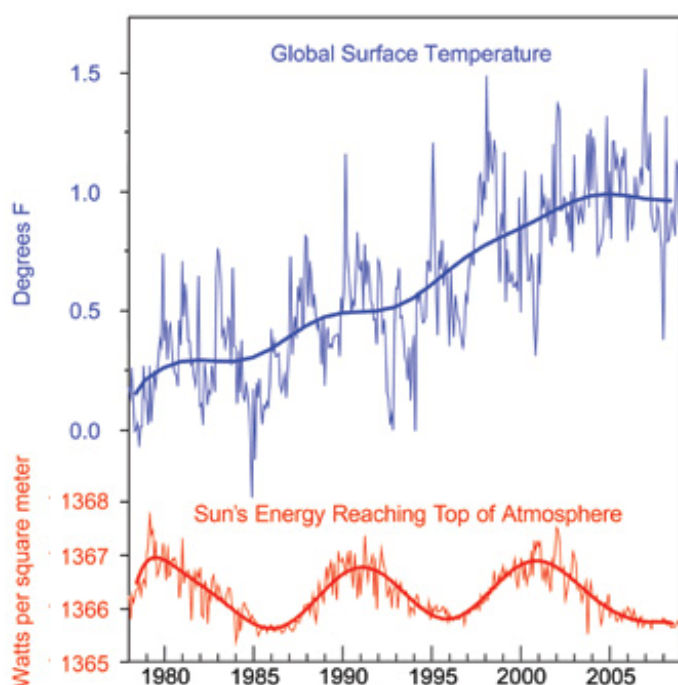


Figure 2. Satellite observations show no increasing trend in solar output. The 11-year solar cycle is evident, but this cannot be driving the overall increase in global average temperatures. (GCRP, 2009, p. 20)

Yet while the dips in solar activity correlate well with the LIA, there are other factors that, in combination, may have contributed to the climate change:

- Volcanic activity was high during this period of history, and we know from modern studies of volcanism that eruptions can have strong cooling effects on the climate for several years after an eruption.
- The 'ocean conveyor belt' - thermohaline circulation - might have been slowed down by the introduction of large amounts of fresh water e.g. from the Greenland ice cap, the melting by the previous warm period (the Medieval Warm Period).
- Sudden population decreased caused by the Black Death may have resulted in a decrease of agriculture and reforestation of agricultural land.

## Can We Draw a Conclusion?

In truth, not really. The Little Ice Age remains for the present the subject of speculation. The most likely influence during this period is variable output from the sun combined with pronounced volcanic activity. We know that from the end of the LIA to the 1950s the sun's output increased. But since WW2 the sun has slowly grown quieter, yet the temperature on Earth has gone up.

The sceptical argument that current warming is a continuation of the same warming that ended the LIA is unlikely. There is a lack of evidence for a suitable forcing (e.g. the sun) and numerous correlations with known natural forcings that can account for the LIA itself, and the subsequent climate recovery. Taken in isolation, the LIA might cast doubt on the theory of climate change. Considered alongside the empirical evidence, model predictions and a century of scientific research into the climate, recovery from the LIA is not a plausible theory to explain the observed evidence and rate of global climate change.

Basic rebuttal written by [GPWayne](#)

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### Update July 2015:

Here is the relevant lecture-video from [Denial101x - Making Sense of Climate Science Denial](#)

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Skeptical Science explains the science of global warming and examines climate misinformation through the lens of peer-reviewed research. The website won the Australian Museum 2011 Eureka Prize for the Advancement of Climate Change Knowledge. Members of the Skeptical Science team have authored peer-reviewed papers, a [college textbook on climate change](#) and the book [Climate Change Denial: Heads in the Sand](#). Skeptical Science content has been used in university courses, textbooks, government reports on climate change, television documentaries and numerous books.



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