

Special Report on Current Climate Change

The Initial Experience

Our first awareness of the “problem” emerged on December 12 2013, when we stepped out of the van at Newport Forest to be assailed by a level of cold that we had never experienced in the 14-year history of our year-round visits to this recovering natural area. It was a shock. Continuing bitter cold through December, January, February and now March seems to signal a very different kind of winter in both North America and to some extent in Europe, one that looks increasingly like the beginning of a prolonged multi-year cold spell. Or will it all just go away in April like a bad dream? By the end of March we may have a much better idea.

Background: Meteorology meets Archaeology

Archaeologists have long known that the ice age which ended around 10,000 to 13,000 years ago is not necessarily over. The intervening millennia are believed by geologists to be a temporary (in geological terms) warm period known as an interstadial. Such periods are never uniformly warm in climatological terms. They are punctuated by smaller cold intervals. For example a lengthy interval of intense cold known as the “Little Ice Age” or sometimes the Maunder Minimum, began in 1300 with remnant cold spells occurring as late as 1850.

During this period, but prevailing mainly between 1645 and 1730, Europe and other areas of the globe experienced intensely cold and long winters often followed by cool summers. Agricultural productivity declined markedly and complete crop failures were not uncommon. Such food shortages resulted in frequent famines and occasional episodes of mass starvation, with human dieback that amounted to a majority in some countries. Such episodes were not confined to the narrower time frame just given, but occurred well before and well after it, although for shorter durations and less frequently.

Geologically the period was marked by the advance of all glaciers worldwide, recurring savage gales in the North Atlantic, flooding of low-lying areas and winters that lasted half the year or more. During some of the warmer years persistent year-long rains drowned crops and made fields impossible to work. More starvation. Many animal species were extirpated or severely reduced in their home

ranges, most surviving by migrating further south. For example the Herring vanished from their home range along Norway to show up soon after along the English North Sea and Channel coasts.

If all of this comes as a surprise to readers, blame the historians who tended to discount the effect of climate on history, with only a hint here and there. For example, we all know that the Vikings established viable colonies in Greenland and Vinland. These places were warm and fertile when settled in the 11th century. By 1300 they had all been abandoned as uninhabitable. Historians blamed “increasing cold” with little further comment.

It would take an archaeologist to fill the gaps in our understanding of European history, not to mention world history as a whole, during the Maunder Minimum. Luckily, a leading American archaeologist, Brian Fagan (University of California at Santa Barbara), has stepped forward to give a fuller account, as summarized above. (See reference below.) We had no idea how bad the period in question was!

Question: Does the Earth’s weather system produce these anomalies all on its own, like some precariously balanced dynamical system that occasionally teeters into chaotic behaviour, or is there another source?

The Solar Connection: Meteorology meets Astronomy

In previous issues of The Bulletin (Feb 11 # 920 & Feb 15 # 921) we first drew attention to the possible connection between the current severe winter and an anomaly in sunspot activity that had solar physicists scratching their heads last year; part way into the expected peak in solar activity of the 11-year sunspot cycle, the sunspots were far less numerous than expected. Was it just a coincidence that such a winter followed the anomaly?

In a section of his book devoted to sunspots, Fagan addresses this question, remarking on the general absence of sunspots and their accompanying earthly manifestations, the aurora borealis, during the Maunder minimum. Unfortunately, astronomers did not begin systematic observations of sunspots until the 17th century. “In 1711 English astronomer William Derham was in a position to comment on ‘great intervals’ when no sunspots were observed between 1660 and 1684.” Technically the “Maunder Minimum” refers to this period, named after astronomer E. W. Maunder who first drew attention to the sunspot-free period.

There is no theory yet that tells us just how sunspots should affect weather on our planet. Somehow, they may help to keep us warm. Perhaps they merely accompany a different source of energy. Nor is there a theory about earthly weather that enables us to make any long-term predictions. The missing theories may be related.

If we are on the verge of a new climatic minimum, there remains a chance that the slowly retreating winter is a one-off, not to be repeated for another hundred years or so. Under the present circumstances however, it is possible that the next winter will be like this one. In the meantime, it would make sense to keep watch on sunspot activity. The expected peak in sunspot activity did not materialize last year and is only peaking now, with a far lower frequency than expected. Here is a typical expression of concern about the issue to be found on the web these days, this one by Mike Hoffman, the meteorologist for the agricultural website Ag Day:

“In this country, there is evidence of extreme cold, including the "year without a summer" in the early 1800's, another very cold period in the decades around 1900, and then the warm up over the last 100 years. The sunspot cycle seems to correspond with some of those fluctuations.

'This is the cycle we are in right now and we should be at maximum...and you can see how small the peak is,' Garnavich [astrophysicist at Notre Dame_University] says. 'It is one of the weakest maximums in history.'

"There are an increasing number of solar scientists worldwide that are wondering if the sun is 'falling asleep' again as the sunspot number diminishes. Could another Maunder Minimum be coming? If that's true, then we might see more and more winters as cold, or even much colder, than we just had."

[http://www.agweb.com/article/
weather_analysis_the_science_of_sun_spots_NAA_AgDay_TV/](http://www.agweb.com/article/weather_analysis_the_science_of_sun_spots_NAA_AgDay_TV/)

Whither “Global Warming”?

Readers may as well understand that almost from the beginning of the global warming campaign, largely media driven, there have been dissenting scientists who criticized the science behind the claims of global warming as sloppy and highly selective in the data brought to the table. They are by no means few in numbers or lacking in expertise. Among them is Christopher Essex, an Applied Mathematician and climate expert who is currently the Associate Chair of the Applied Mathematics Department at Western University here in London Ontario.

His book, *Taken by Storm*, co-authored with Ross McIttick, appeared in 2006. It describes the problems behind the science of global warming and even includes an analysis of the political structure of “official science” and how it tends to jump the gun in reaching conclusions. The camp of sceptics has grown slowly, but may be about to speed up. For example, Mike Lockwood, a space environment physicist at Reading University in the UK, recently abandoned his views on global warming, taking the view that solar physics is a major driver of Earth’s weather:

<http://iceagenow.info/2013/10/real-risk-ice-age-leading-scientist/>

As for Essex, readers may sample his views of the problems with global warming in this interview by Australian television:

<http://www.youtube.com/watch?v=sUYpa5UHL2I>

Assessment :

But even if the solar furnace stokes up again, there is already a problem. We must watch even more closely the experiences of local farmers as they wait to get their crops into the ground. For example, planting of most corn and soybean crops would normally take place locally from early April through May, depending on conditions. Some farmers are already worrying that they may have to wait another few weeks before the ground can be worked, let alone planted. Commercial vegetable production normally begins with outdoor plantings starting in March. These operations are already going to be late. If all plantings are late, even with improving weather, there may well be late frosts, with some crop losses and reduced yields in any case. A cold wet spring would only exacerbate the problem.

As far as Newport Forest goes, we have extensive phenology records going back to the year 2000 that can be used as a baseline for coming observations. This is what our masthead *Monitoring Nature* means, after all. Records include first and last snowfalls, depth data and coverage over time (first and last) and temperature records, as well as records of budding and leafing out activity. We have continued the same series of observations and will be extending our monitoring activity to include surveys of tree and branch death through the coming months. When and as appropriate, we will issue summaries of the impact. In spite of whatever unusual weather we experience, we will continue the ATBI and other projects on site, under the watchful but benign eye of the Thames Talbot Land Trust.

We continue to hope that this winter's weather will turn out to be an isolated event weather-wise and not the beginning of something worse — or far worse. It is not too soon, however, to understand the implications of the kind of climate change just described or to imagine what one might do if it should actually materialize.

Kee Dewdney

Further Reading:

Brian Fagan, *The Little Ice Age*, Basic Books New York 2000.

Christopher Essex and Ross McIttick, *Taken by Storm*. Key Porter Books, Toronto, 2000.



photo: Jen Sullivan-Masters

Until the crisis is past, we will take the Snowy Owl as our symbol.