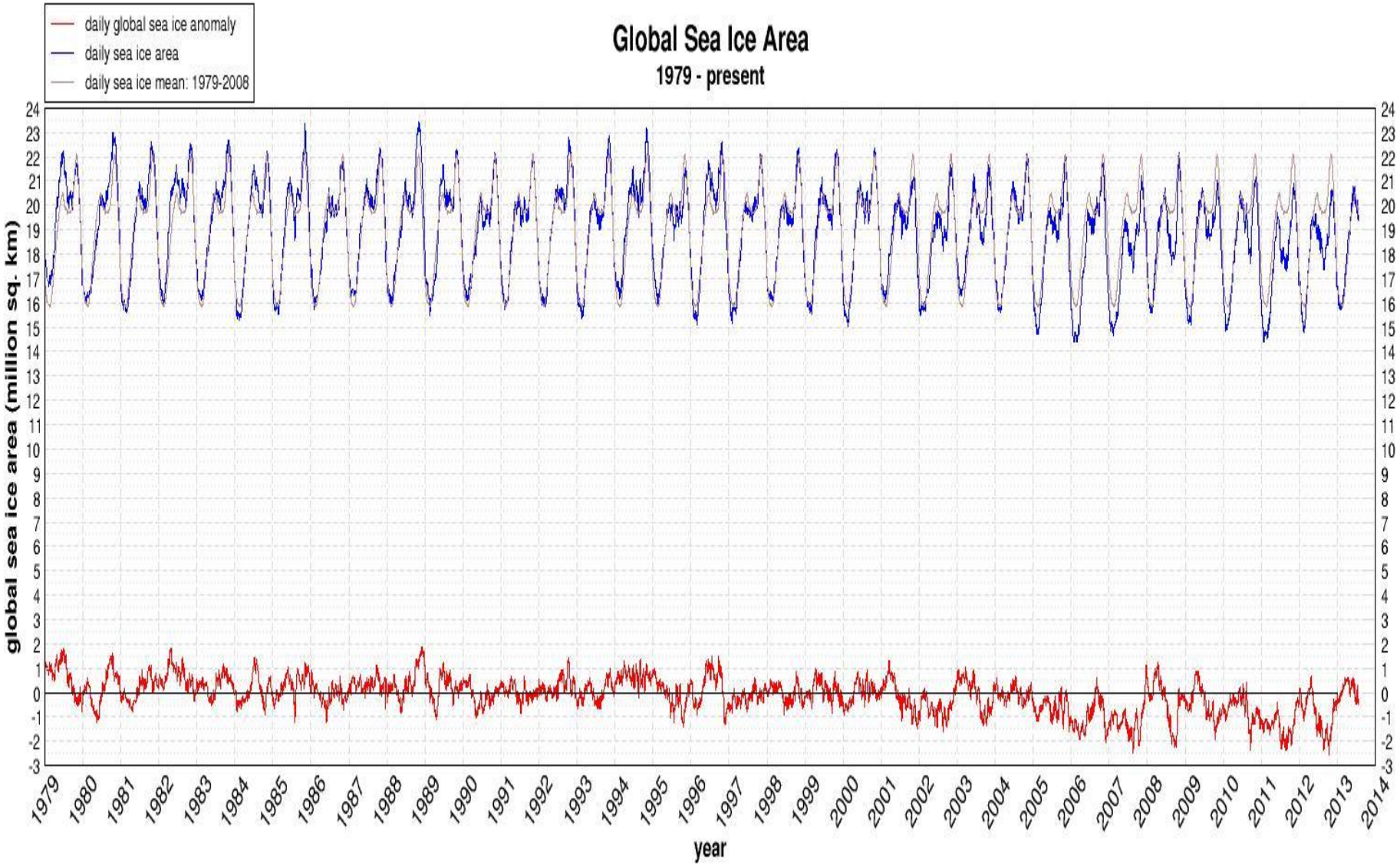
Our Cooling Climate

David Archibald

Room 2325, Rayburn House Office Building
16th September, 2013

1. Has the world warmed?
2. Has warming happened in the past?
3. Is warming linked to CO2?
4. Is there a more logical reason for the temperature rise of the 20th Century?
5. What is going to happen?

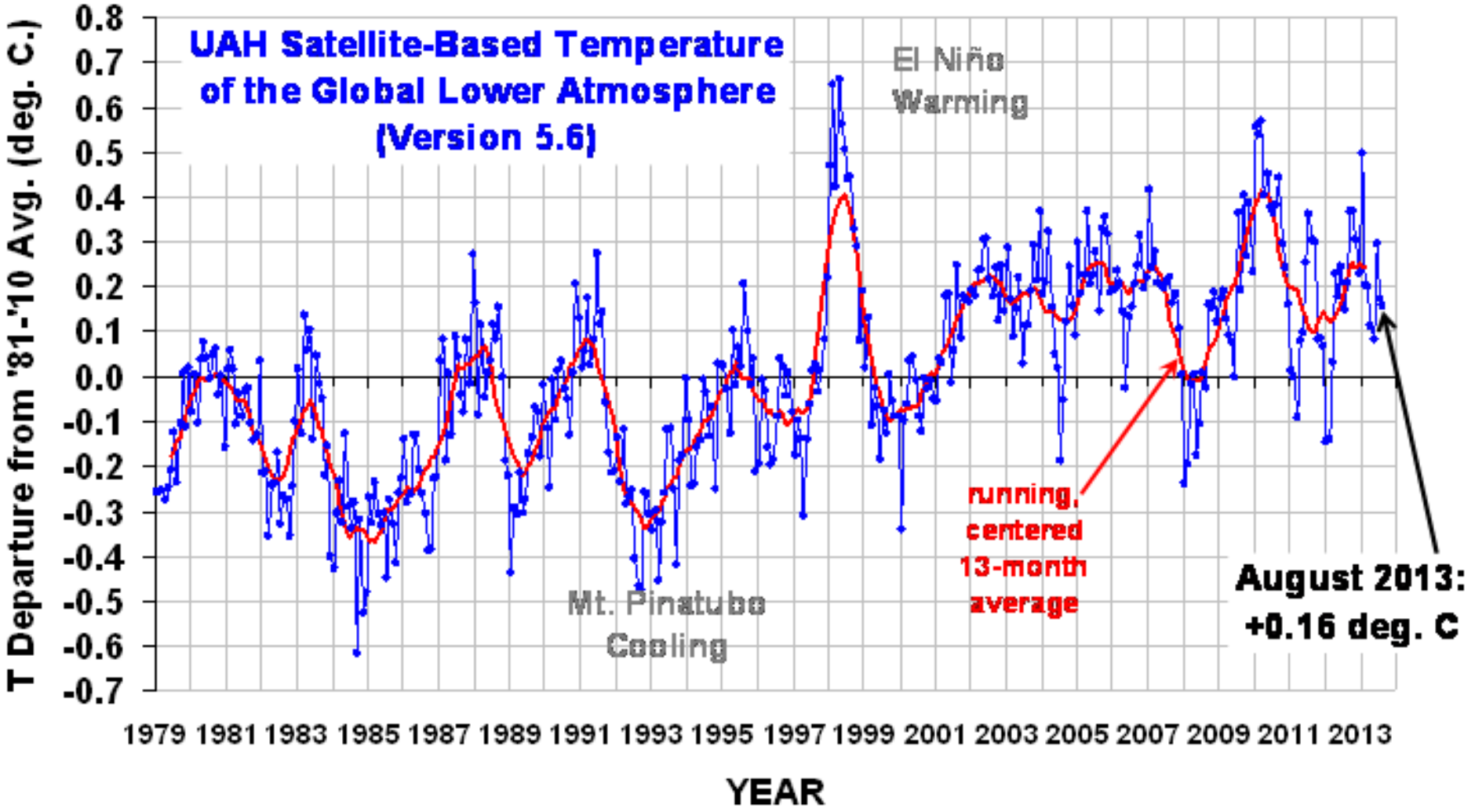
Section 1: Has the World warmed?



Source: Cryosphere Today as at 1st August 2013

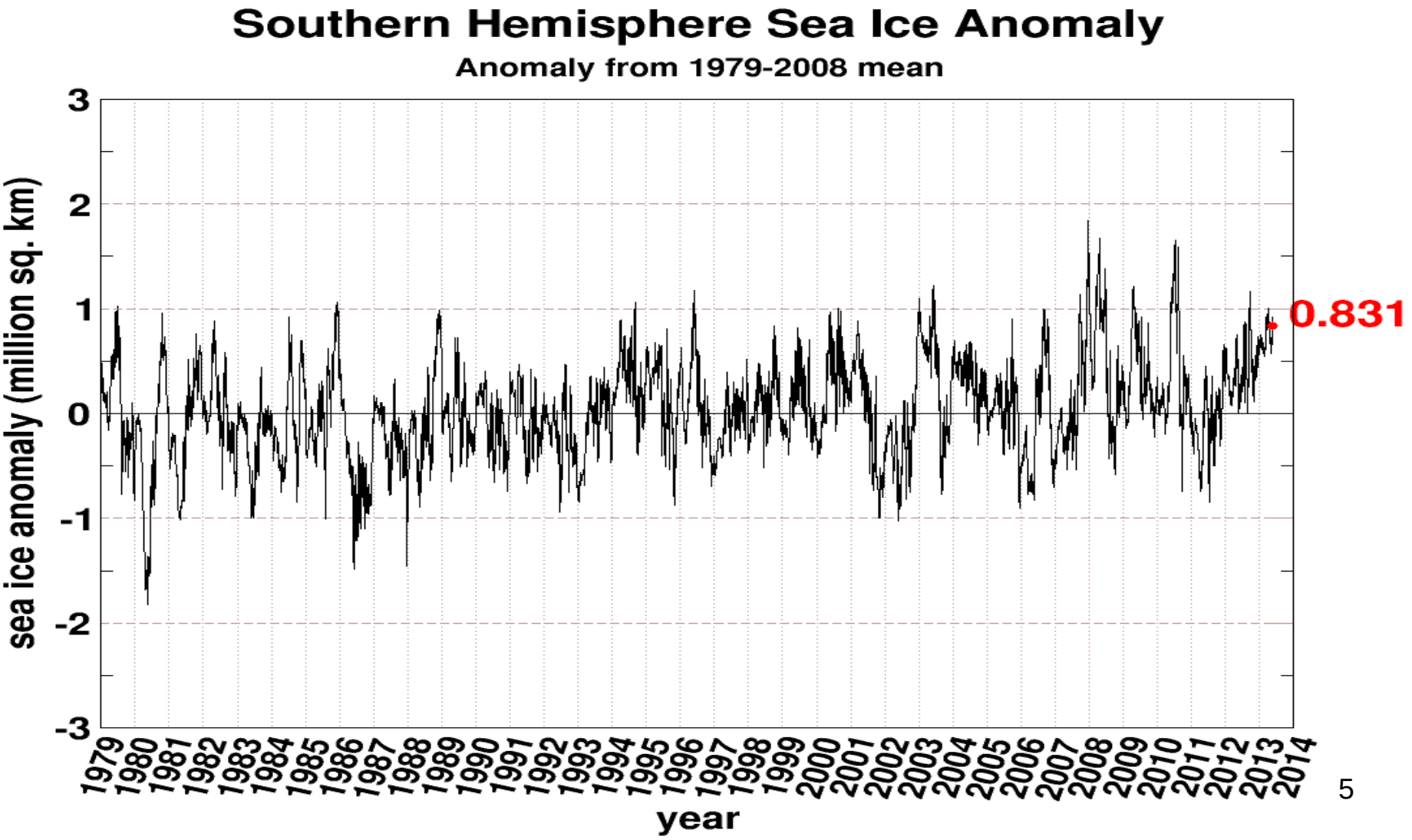
No change over 33 years

The temperature of the planet is the same as it was 30 years ago.

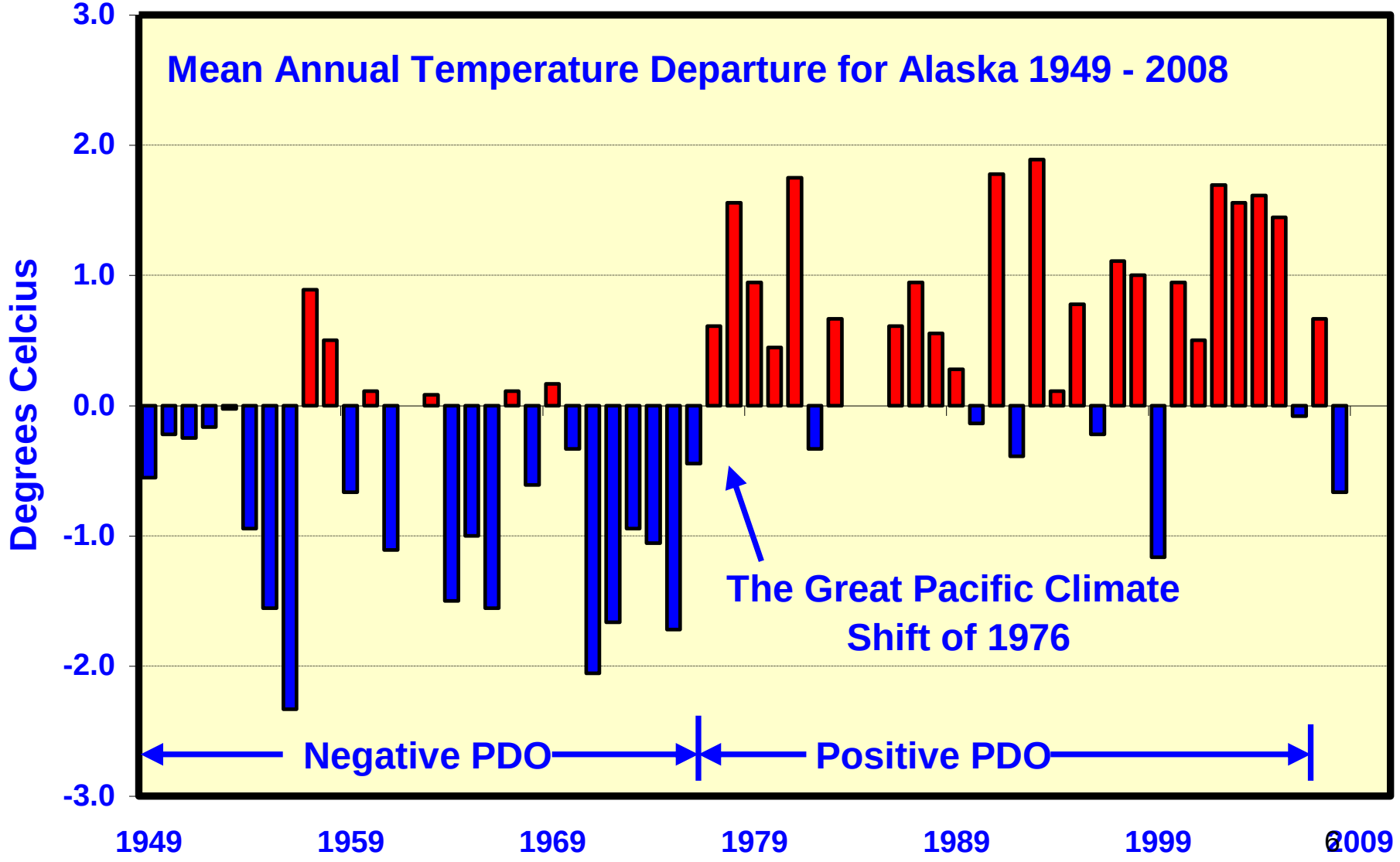


The satellite temperature record from www.drroyspencer.com

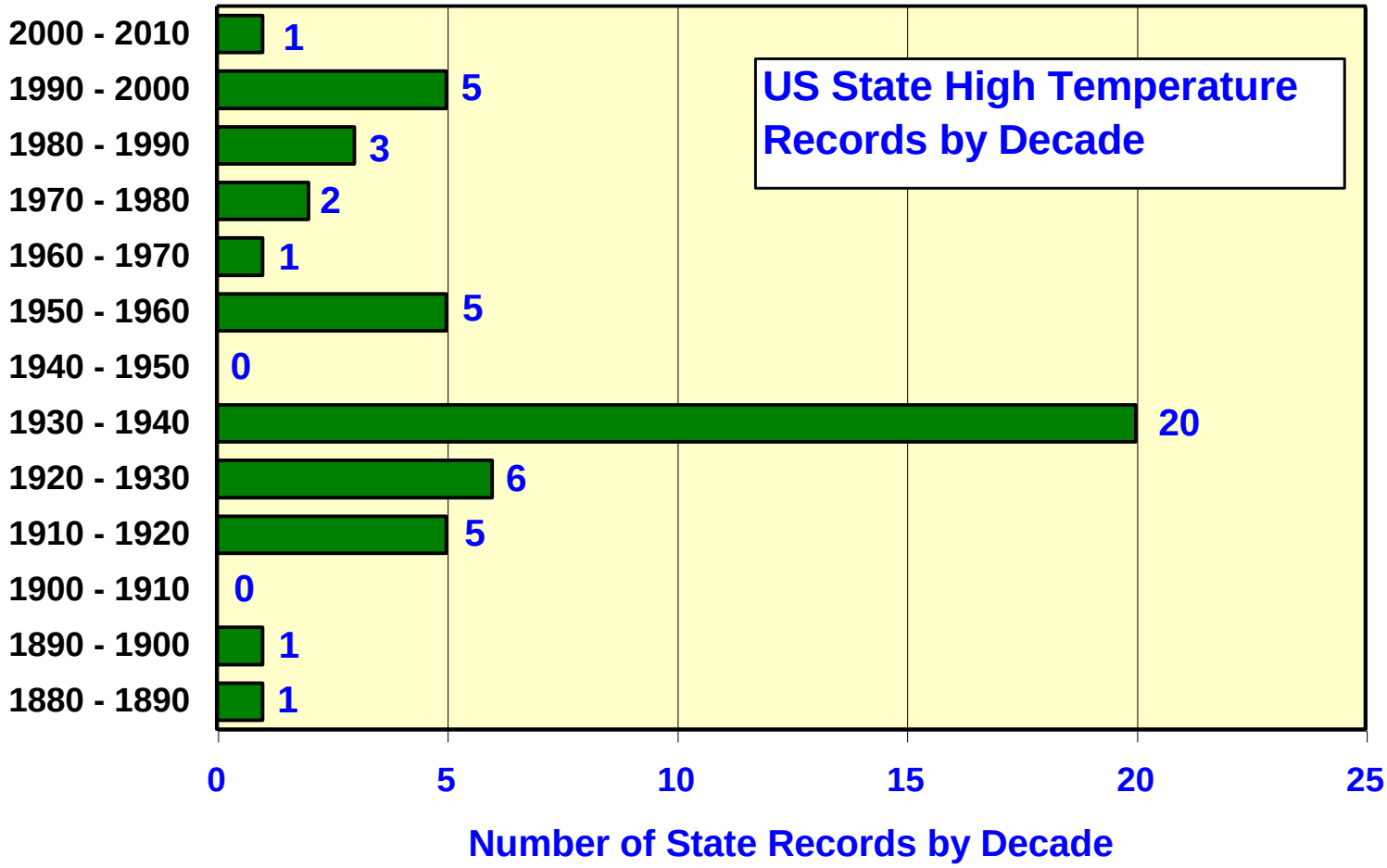
Antarctic Sea Ice has increased.



What has happened in Alaska.

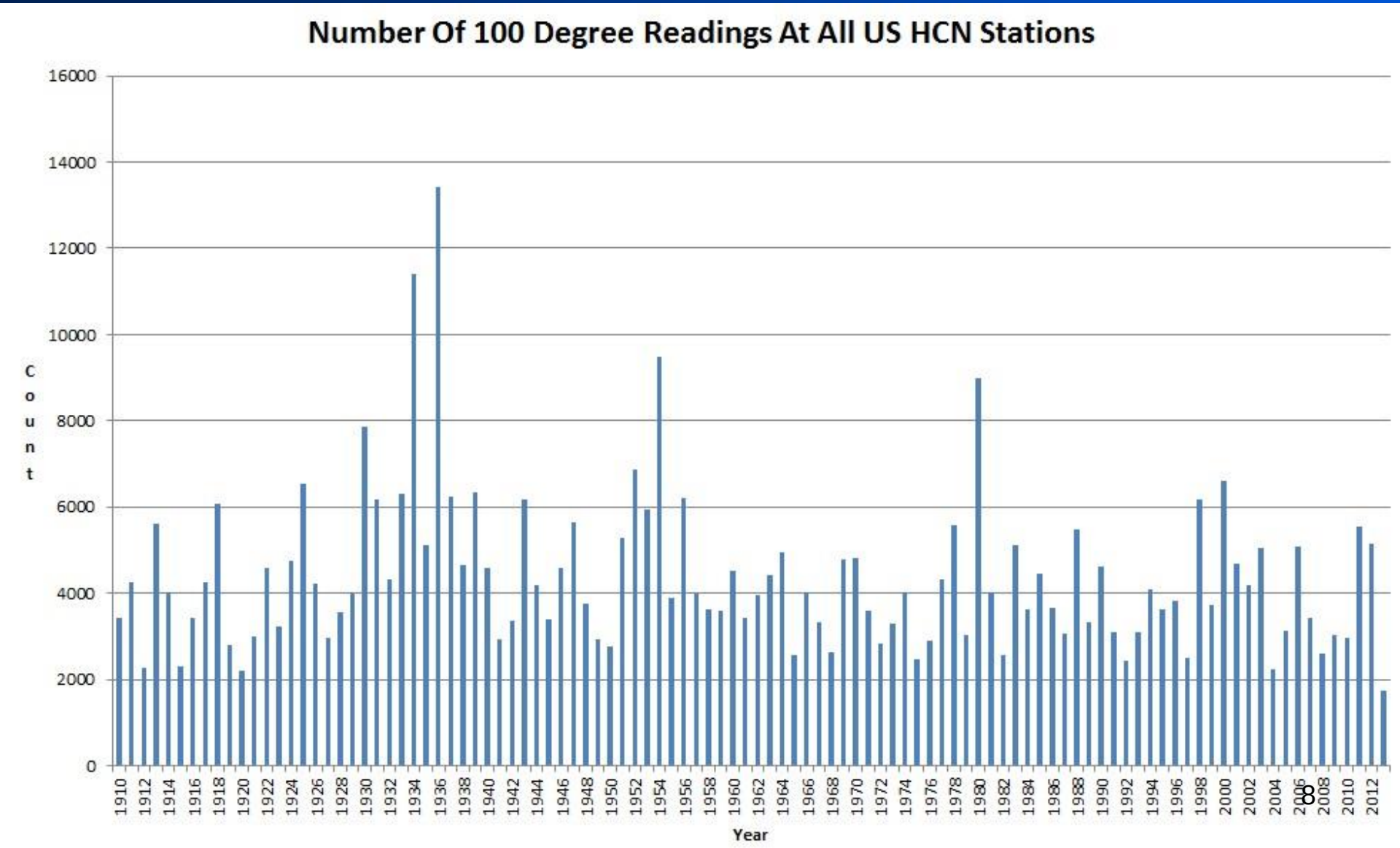


US Record High Temperatures by Decade

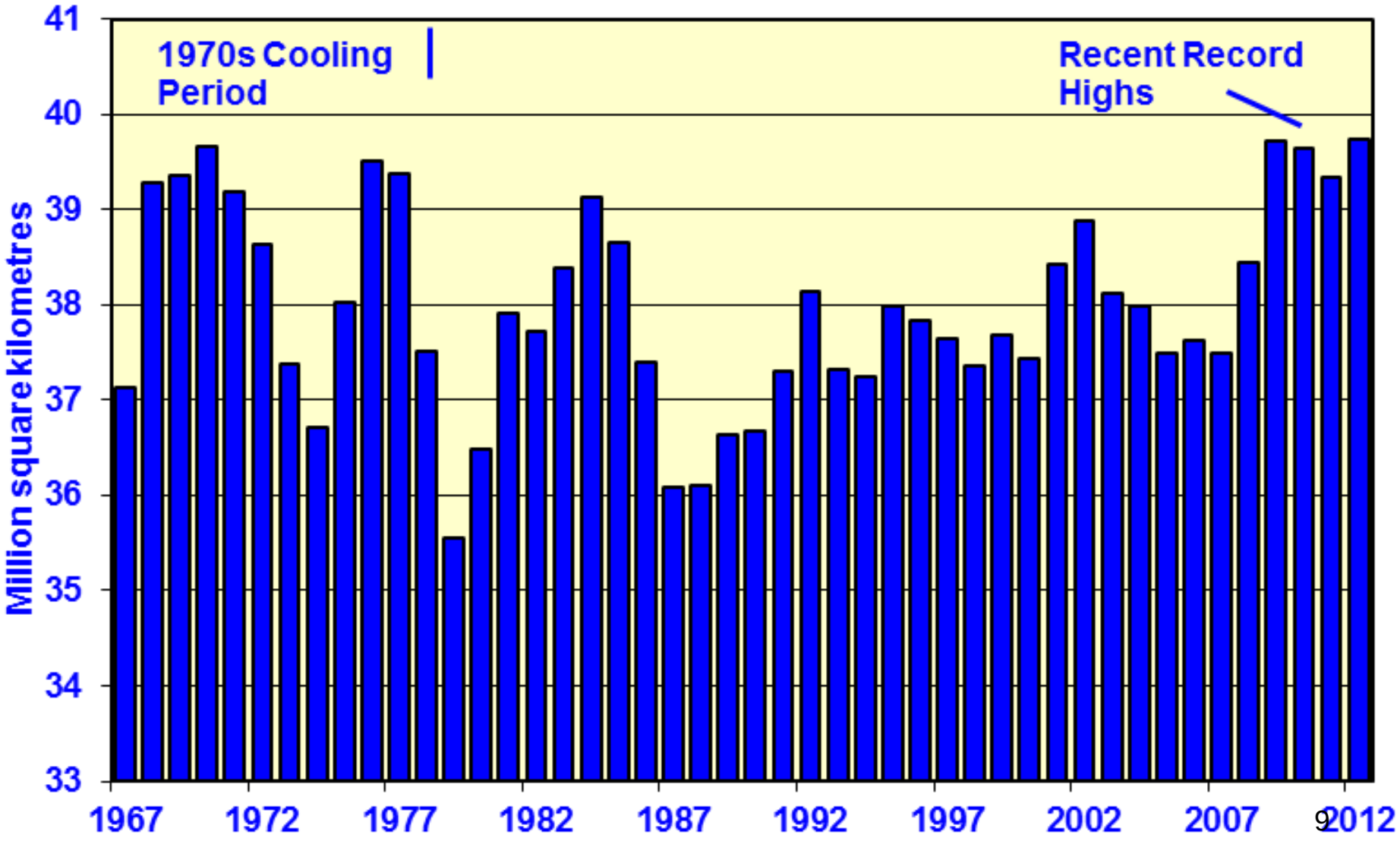


66% of US high temperature records are prior to 1940.

The biggest run of high temperatures in the US is now over 80 years ago.



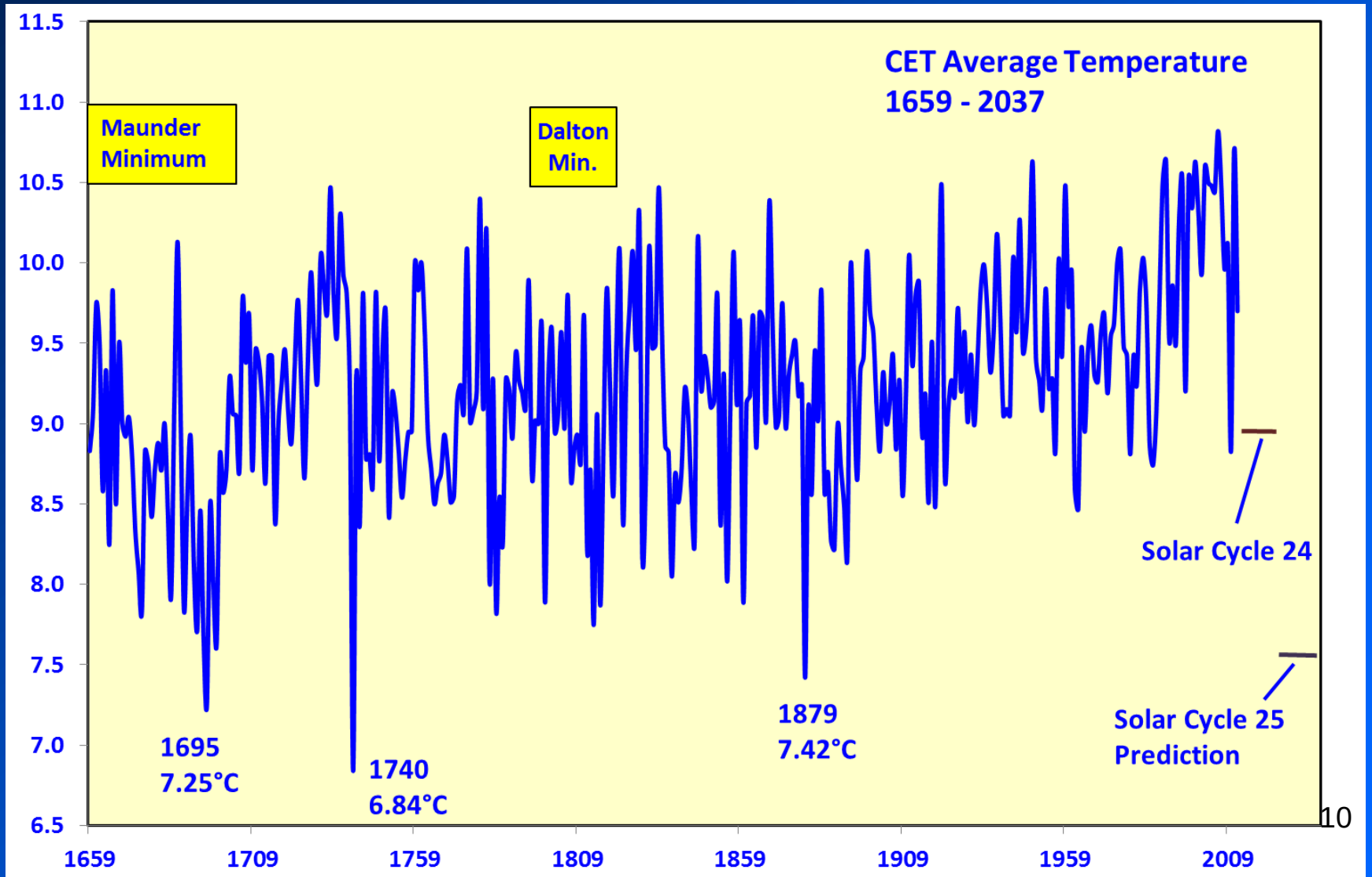
Northern Hemisphere Average Snow Cover
October - March



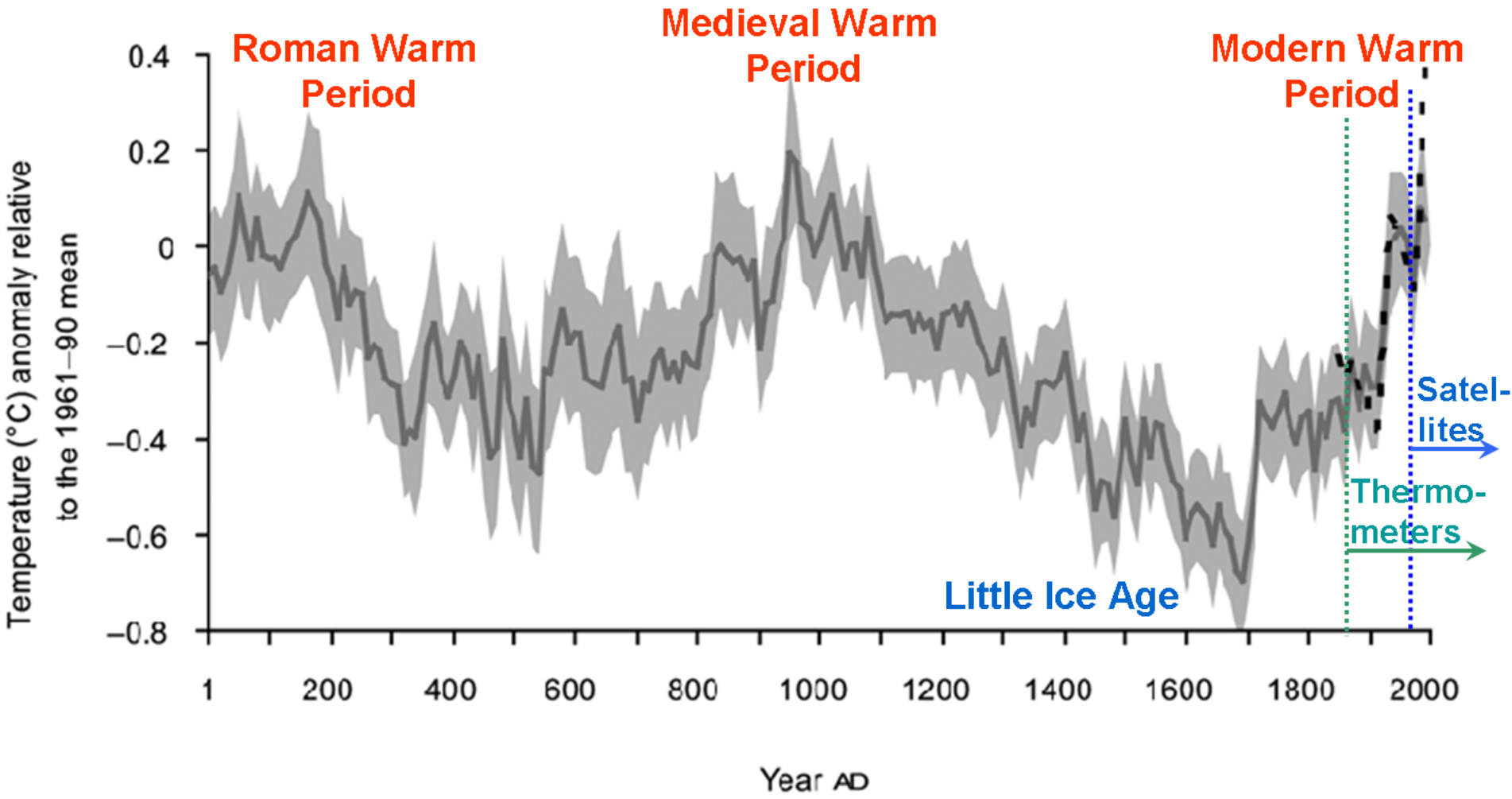
Section 2: Has warming happened in the past?

A 300 Year Thermometer Record

Central England Temperature

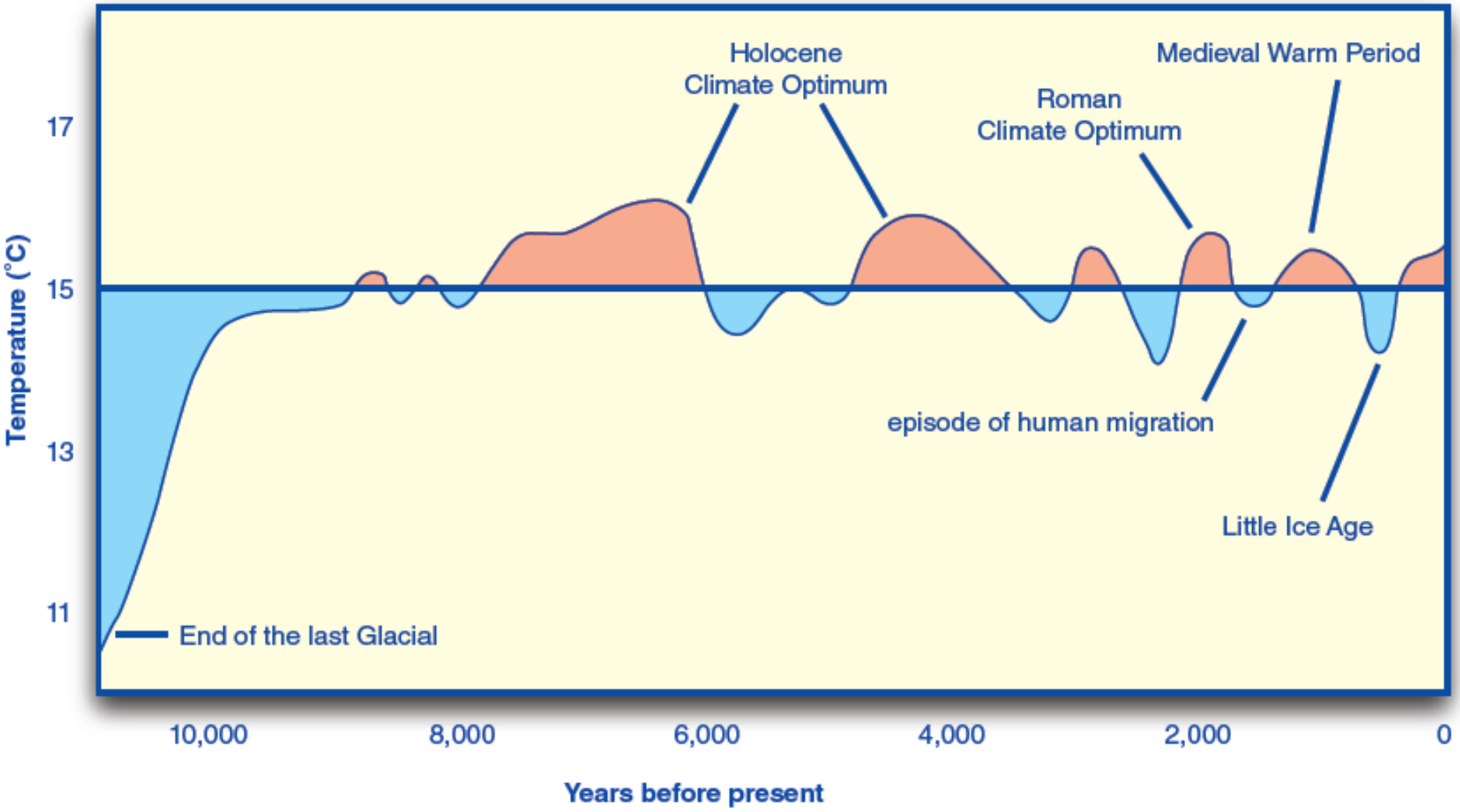


Temperature Reconstruction* for N. Hemisphere, 1 - 2000 AD
Shows Modern Warm Period Not Exceptional

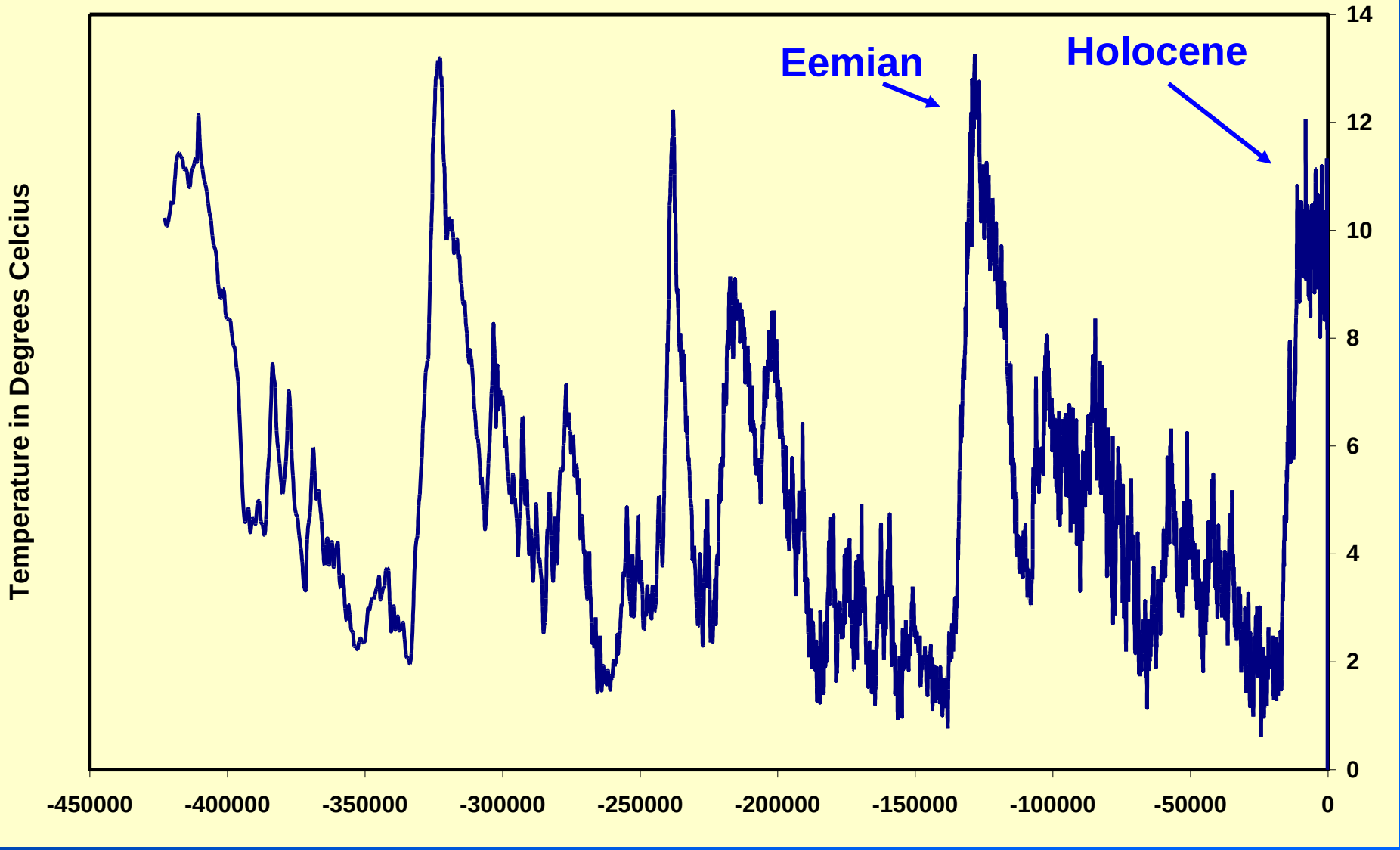


*Ljungqvist, F.C. 2010. A new reconstruction of temperature variability in the extra-tropical Northern Hemisphere during the last two millennia. Geografiska Annaler: Physical Geography, Vol. 92 A(3), pp. 339-351, September 2010. DOI: 10.1111/j.1468-0459.2010.00399.x

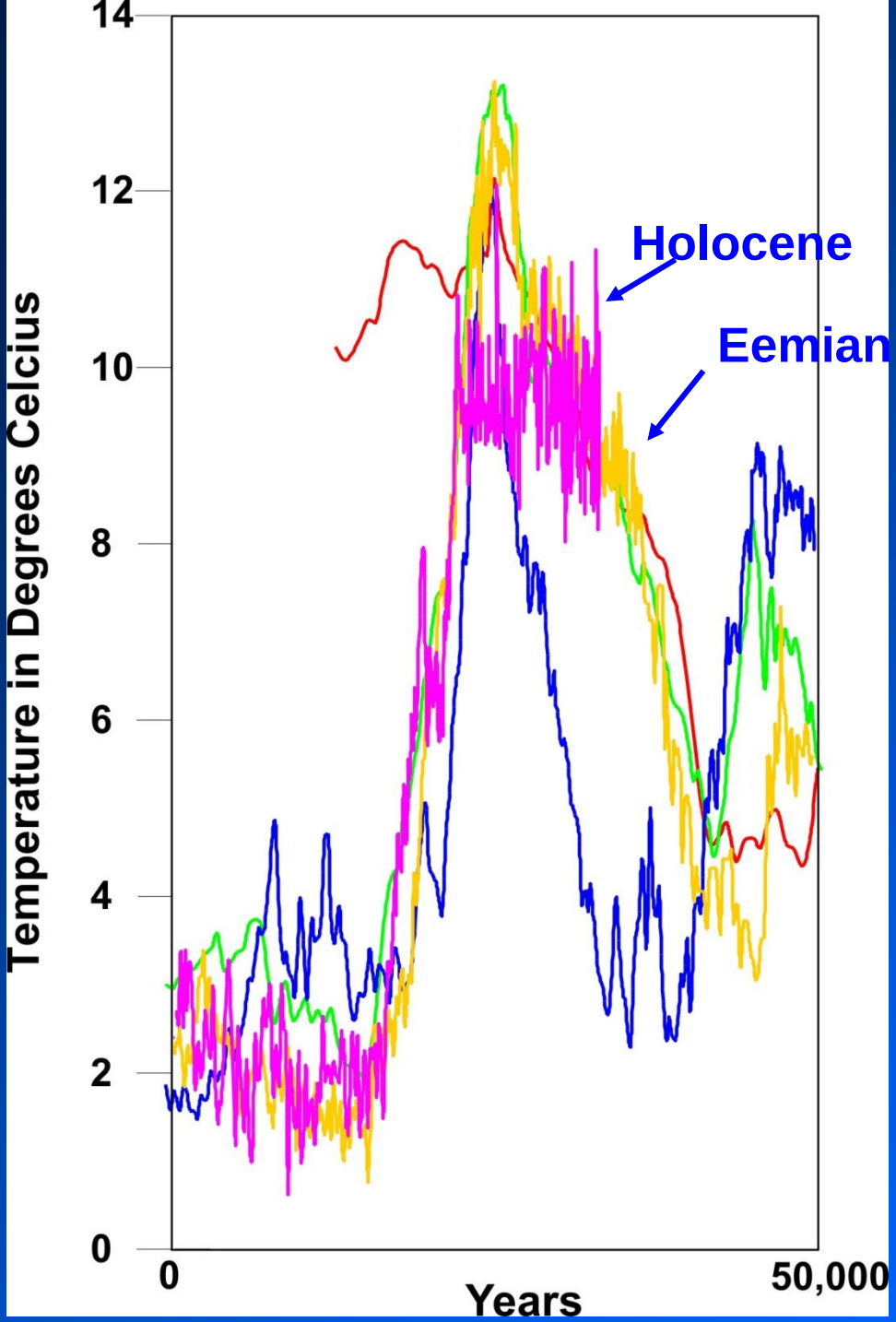
The Holocene Optimum

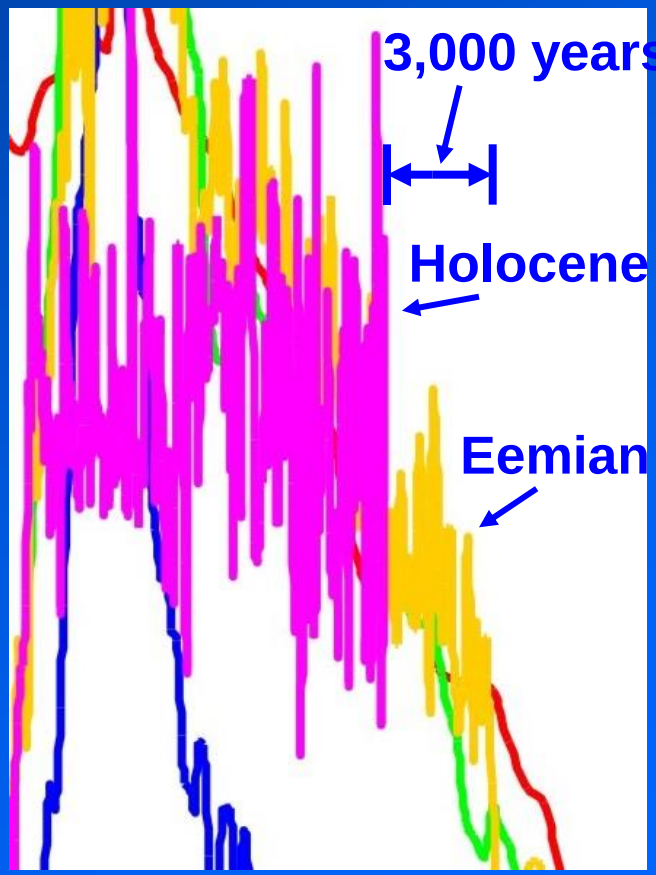


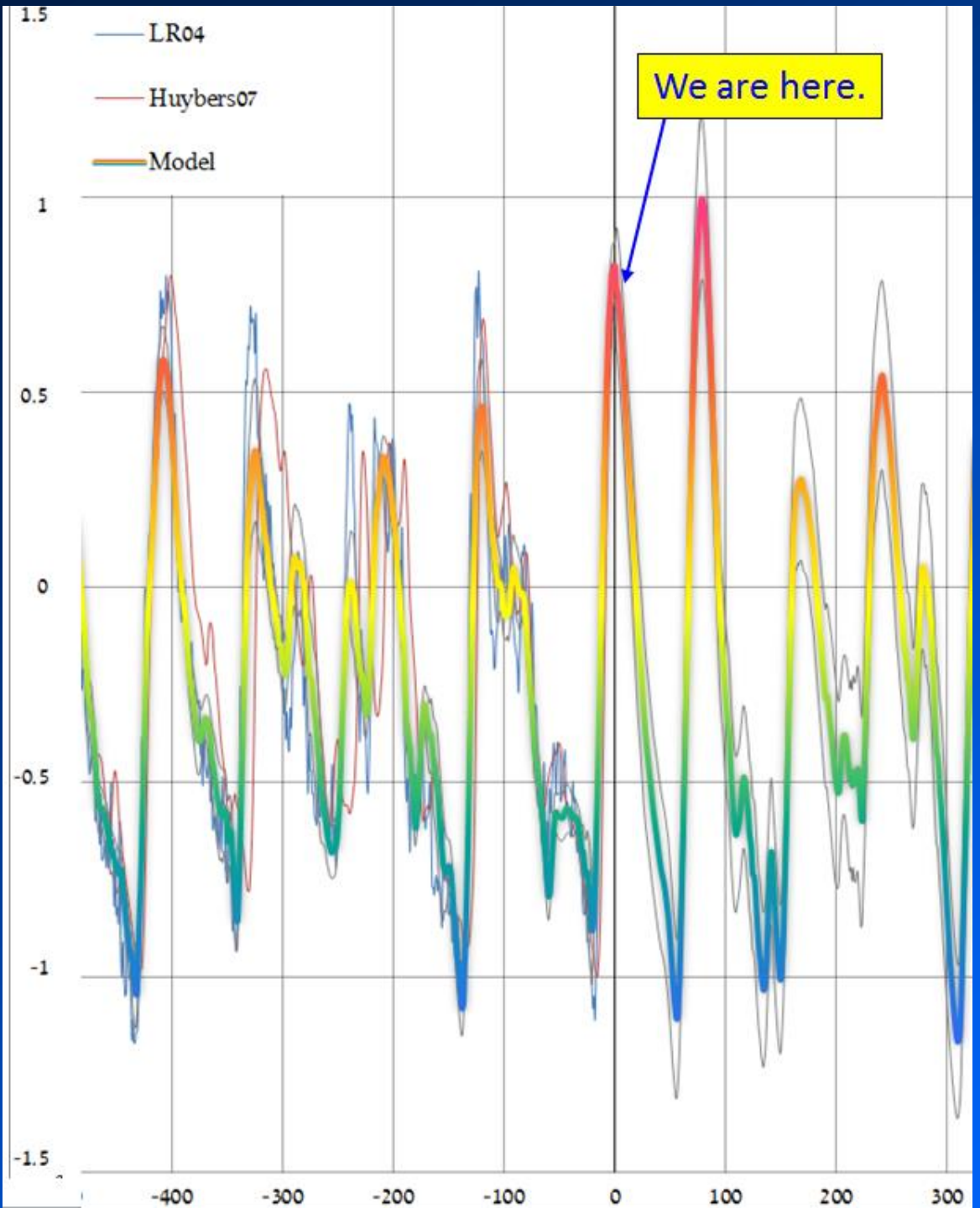
Vostok Ice Core Temperature



Vostok Interglacials Superimposed and aligned on Peak Temperature

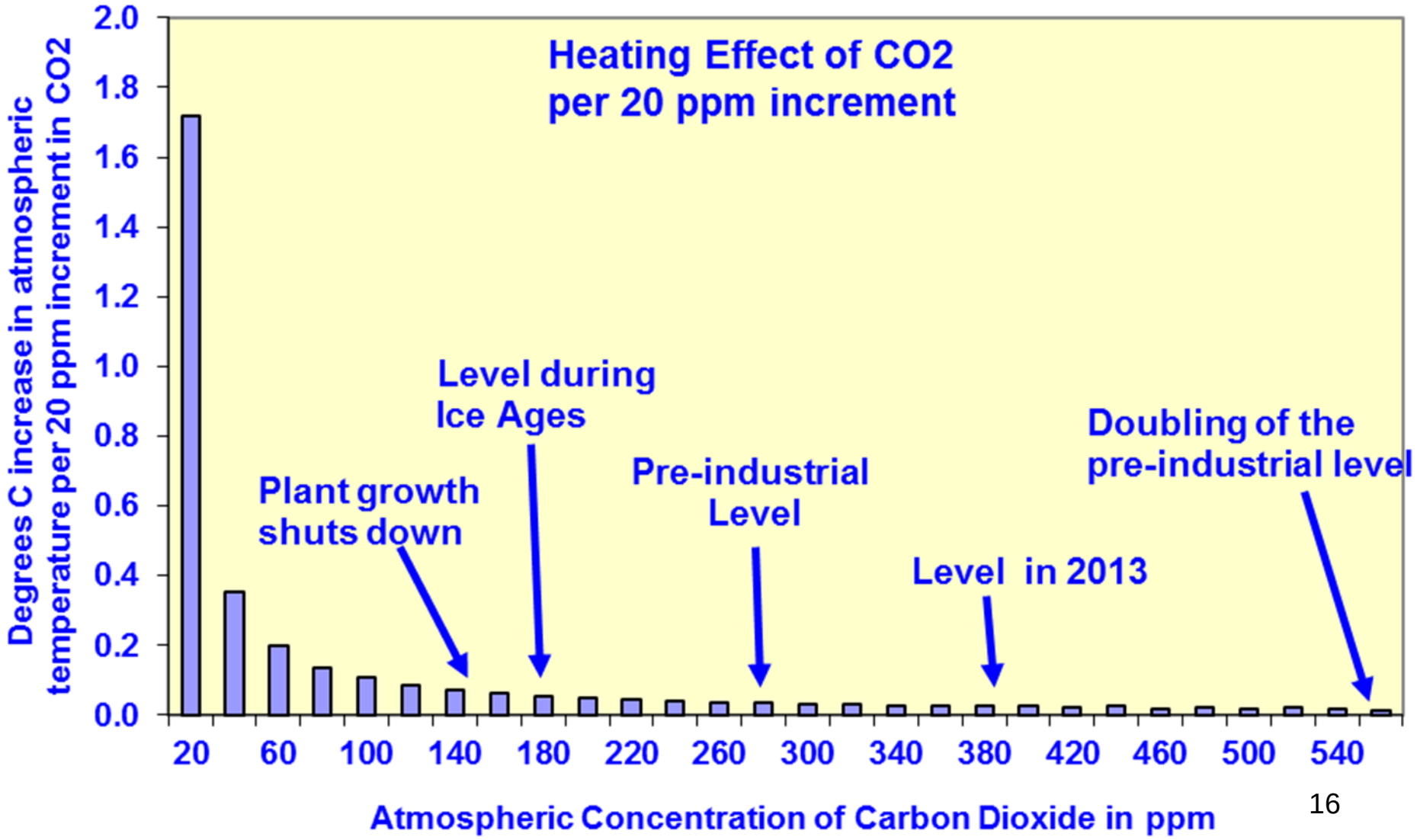




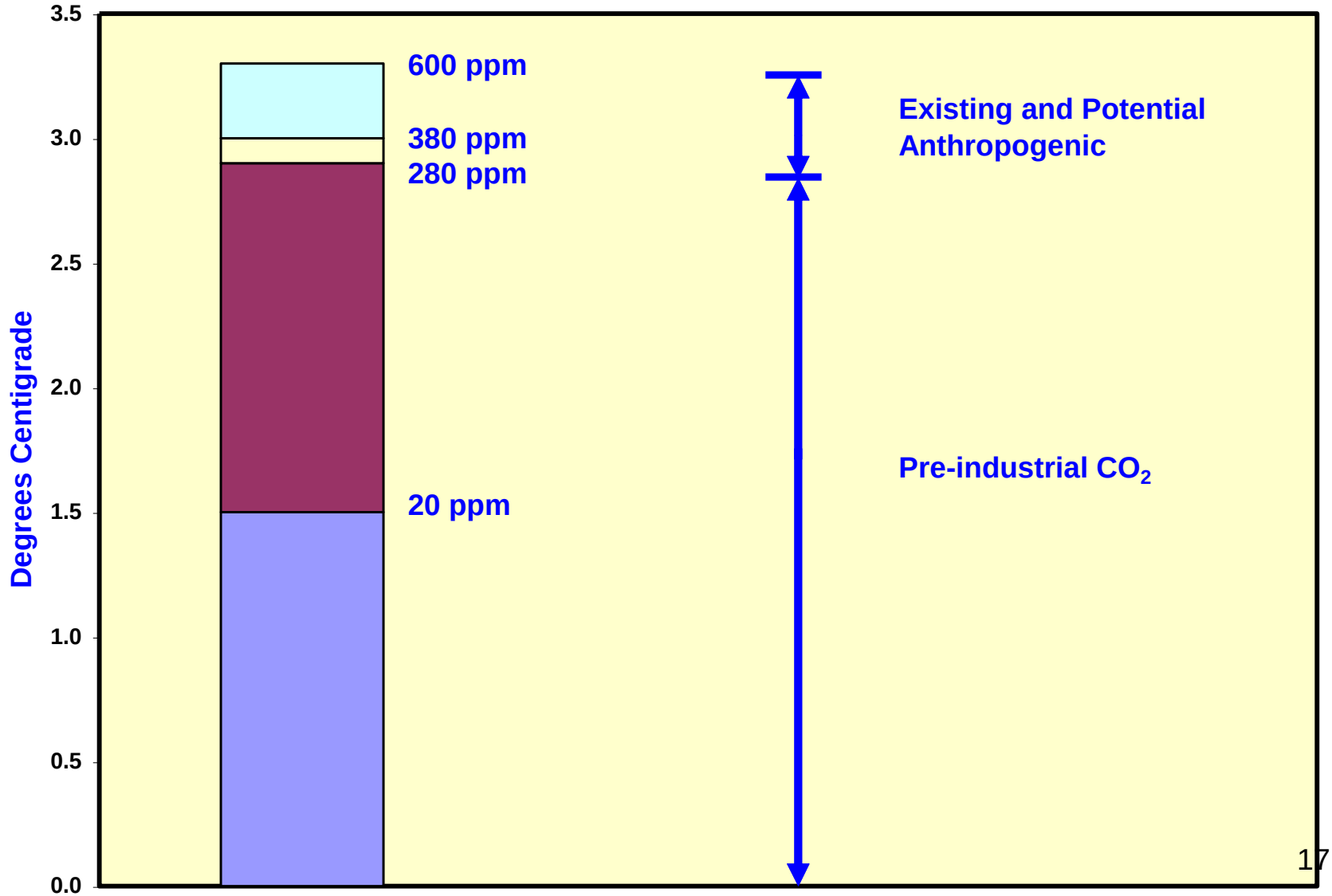


The next glacial period will be fully developed in 55,000 years.

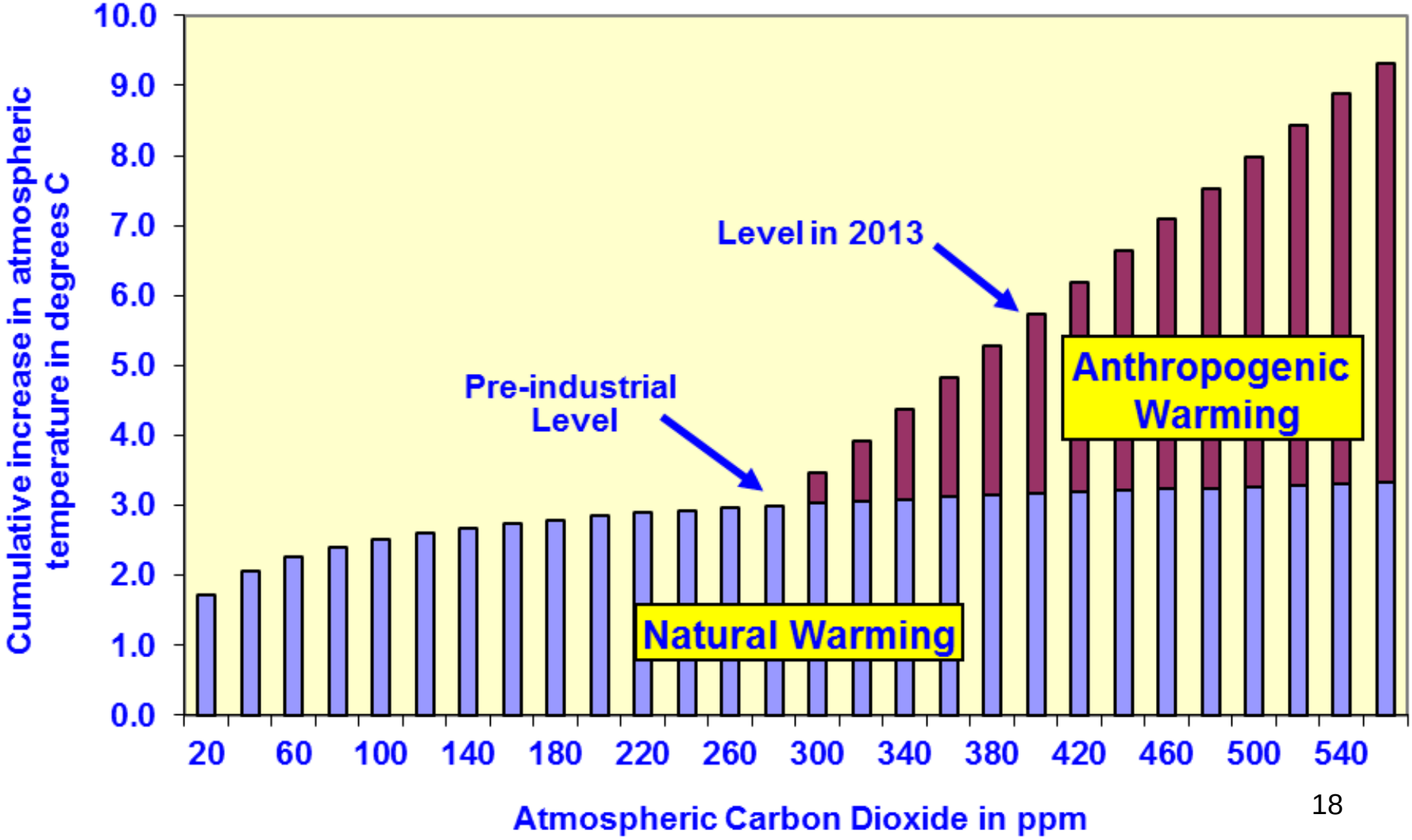
Section 3: Is warming linked to CO2?



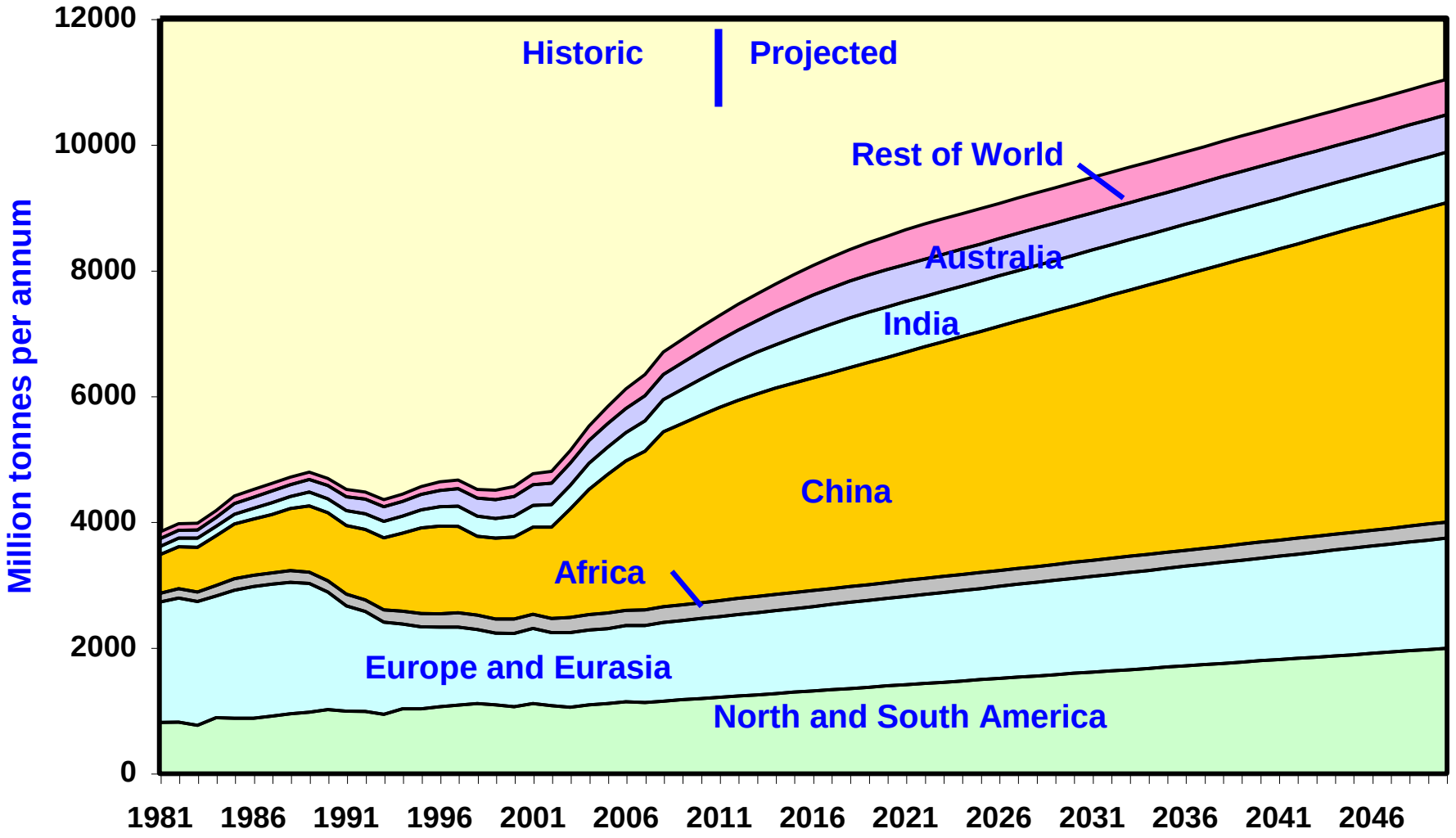
Relative Contributions of Pre-Industrial and Anthropogenic CO2



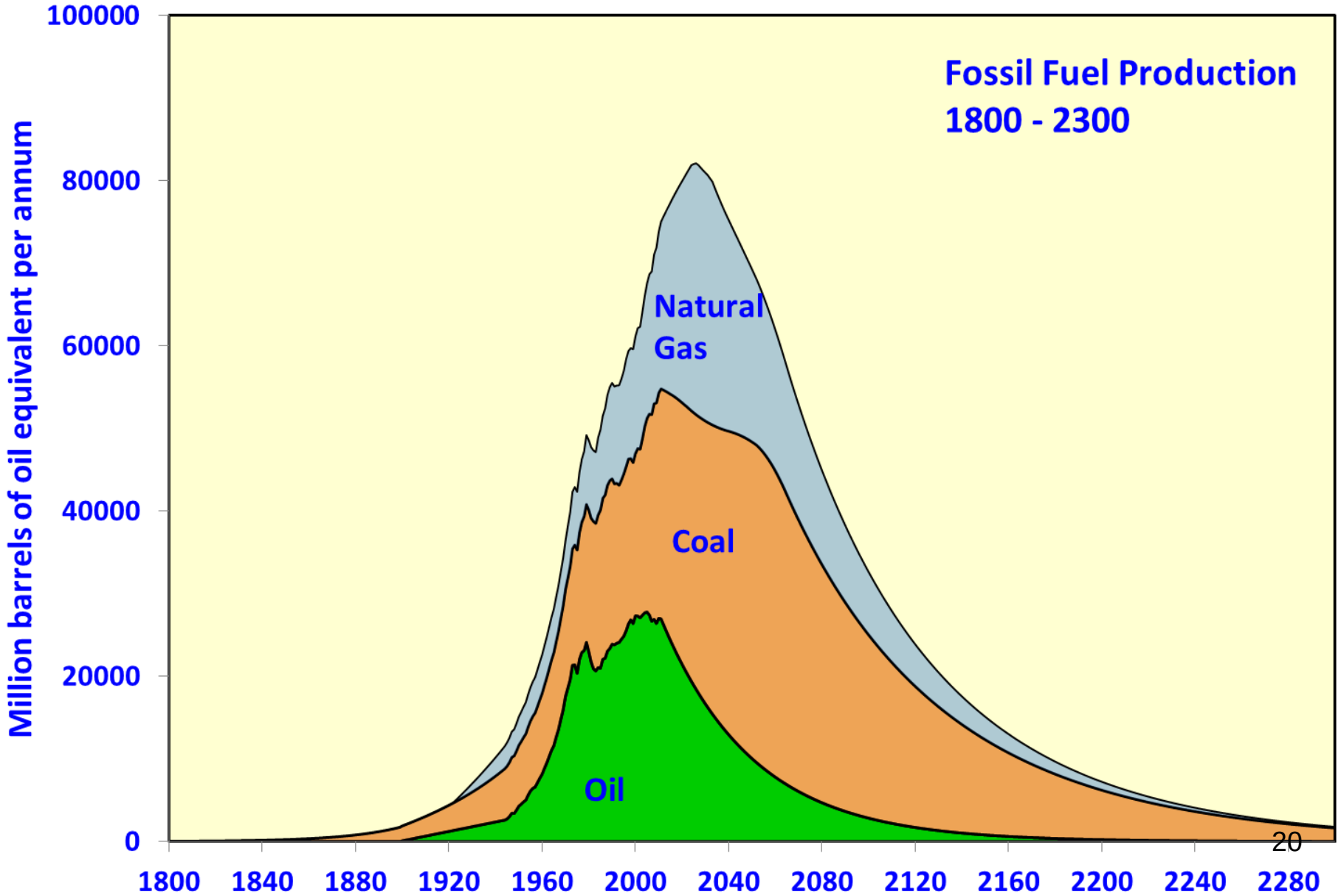
What the AGW Belief System requires



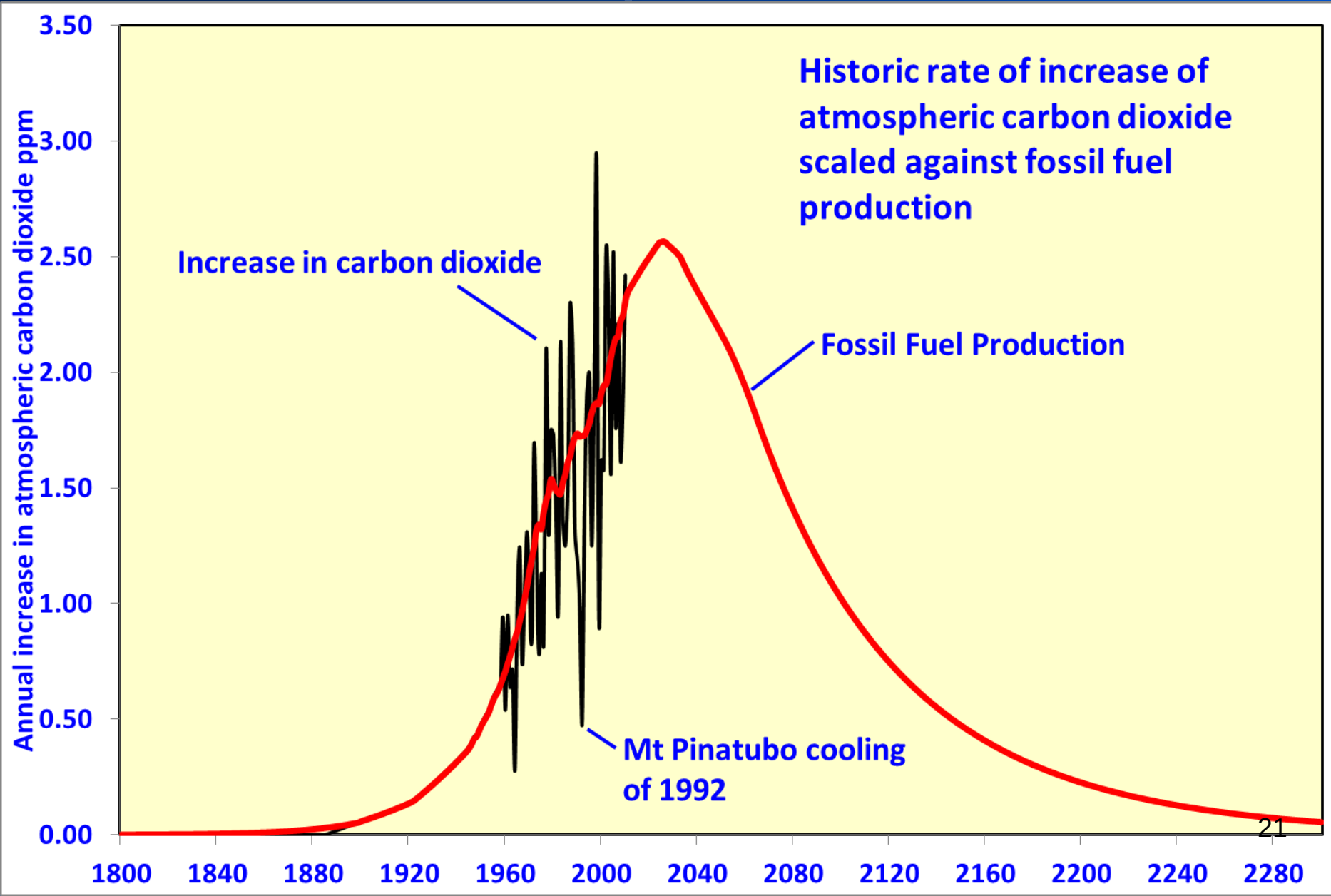
World Coal Production



Where atmospheric carbon will come from



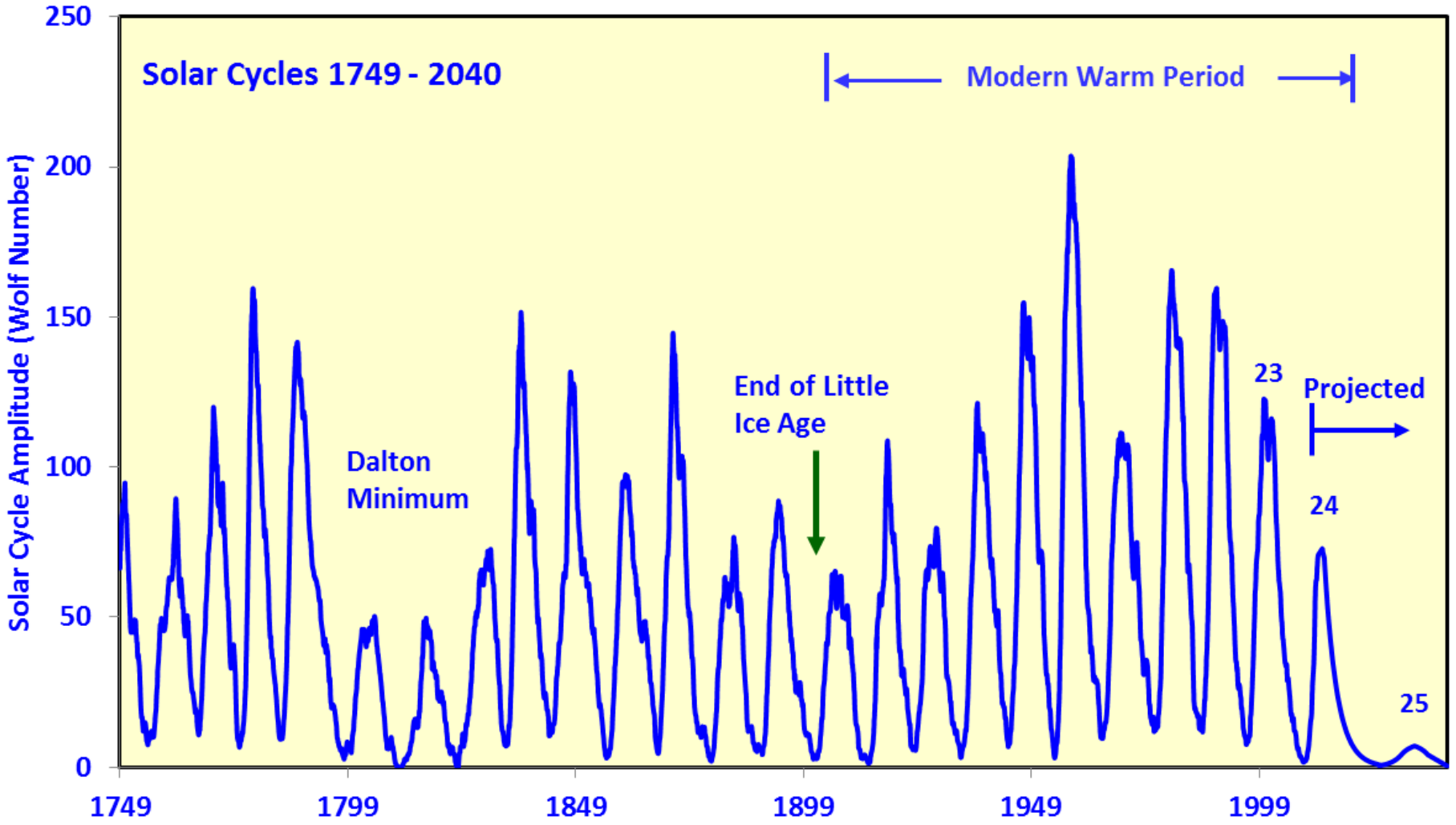
What that means for rate of increase of atmospheric CO2



Ocean acidification – the last refuge of the global warming scoundrel

Coral reef and bubbling carbon dioxide, Dobu Island, PNG

Section 4: Is there a more logical reason for the temperature rise of the 20th Century?



300 years of solar cycle data

The Sun was more active in the second half of the 20th century than it had been in the previous 8,000 years.

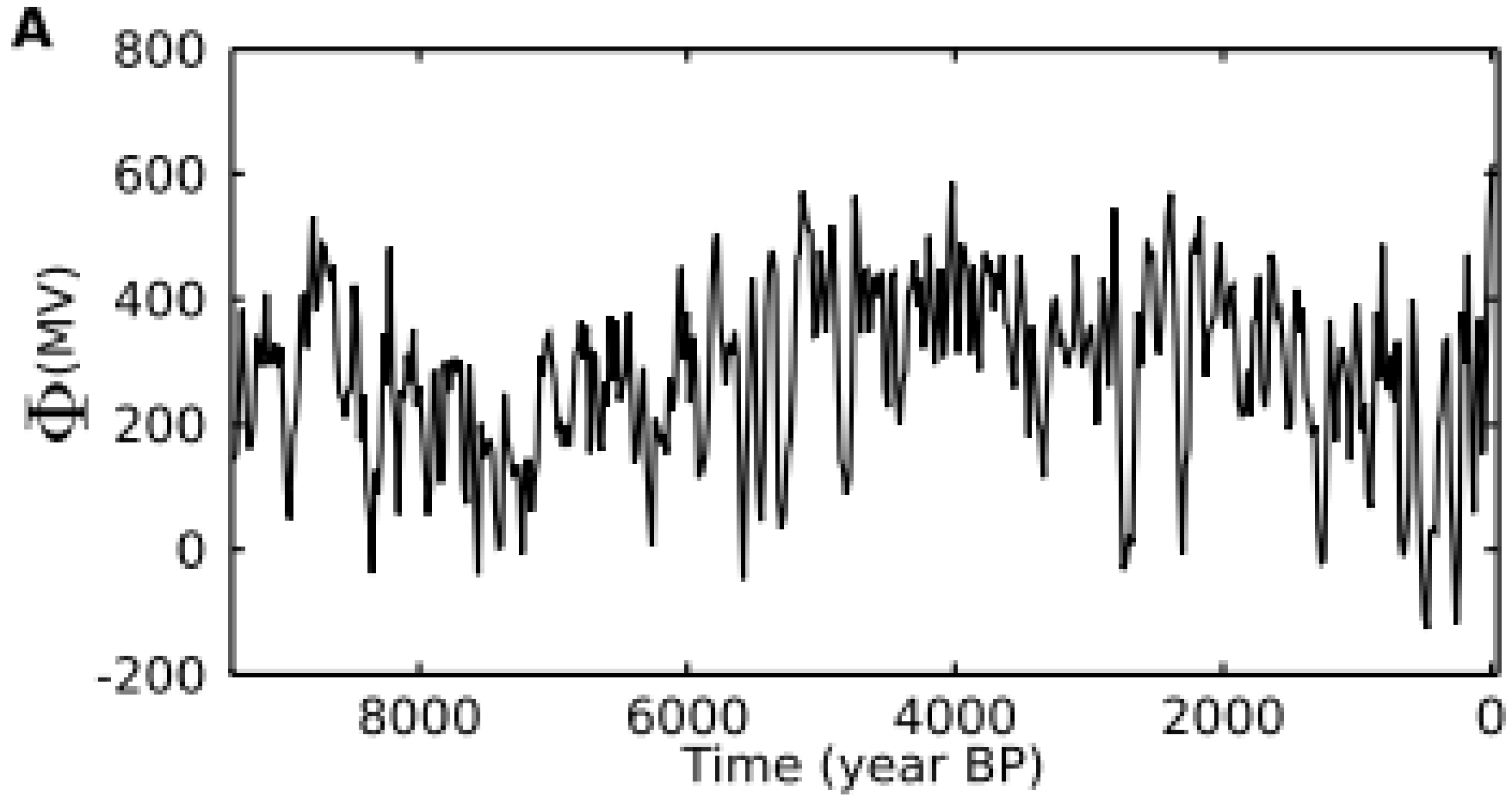


Figure 1(a) from Steinhilber and Beer, 2013, *Prediction of solar activity for the next 500 years*

JOURNAL OF GEOPHYSICAL RESEARCH: SPACE PHYSICS, VOL. 118, 1–7, doi:10.1002/jgra.50210, 2013

Sunspot Cycle Length Relative to Temperature

Armagh, Northern Ireland 1796 – 1992 Butler and Johnson

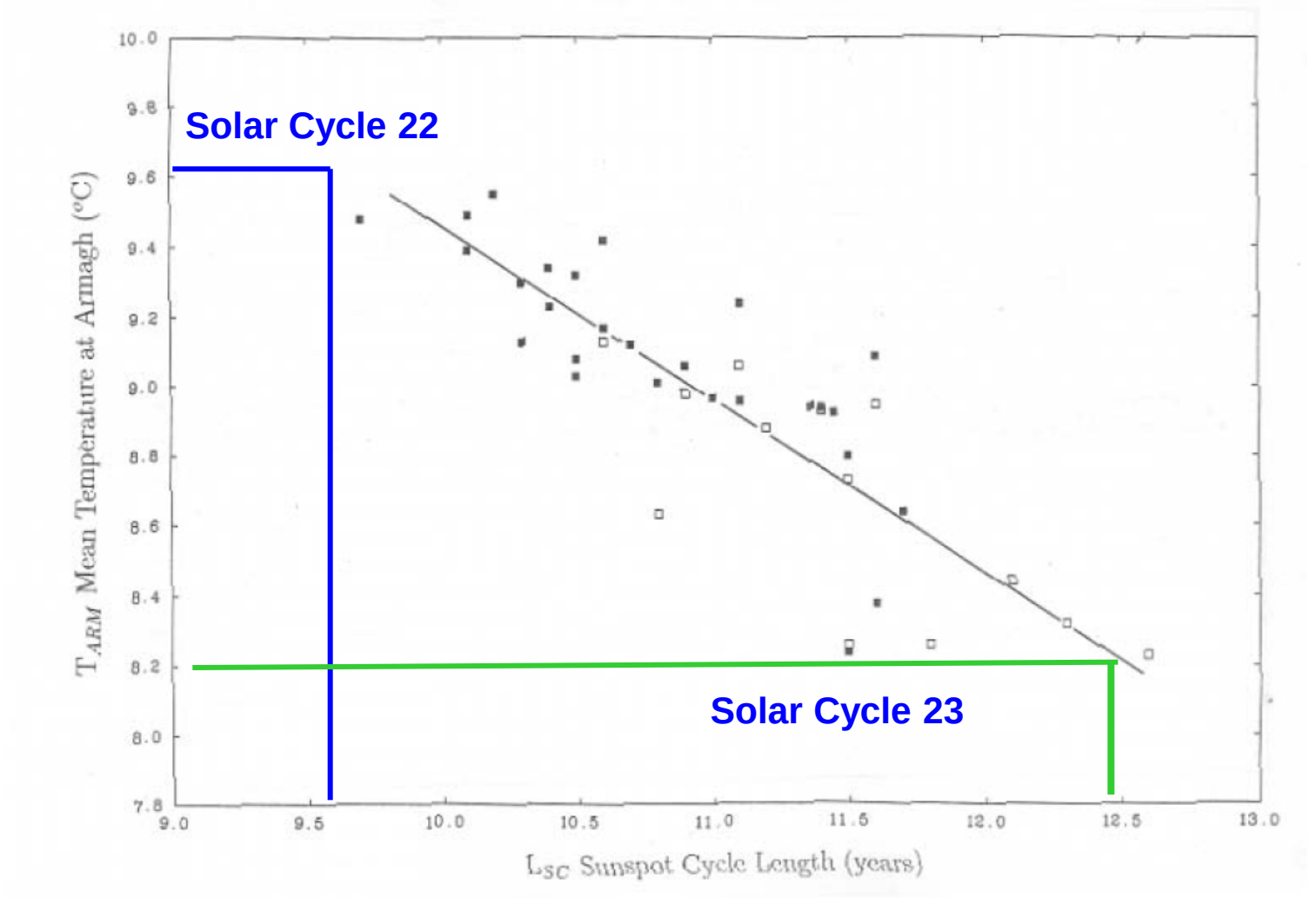
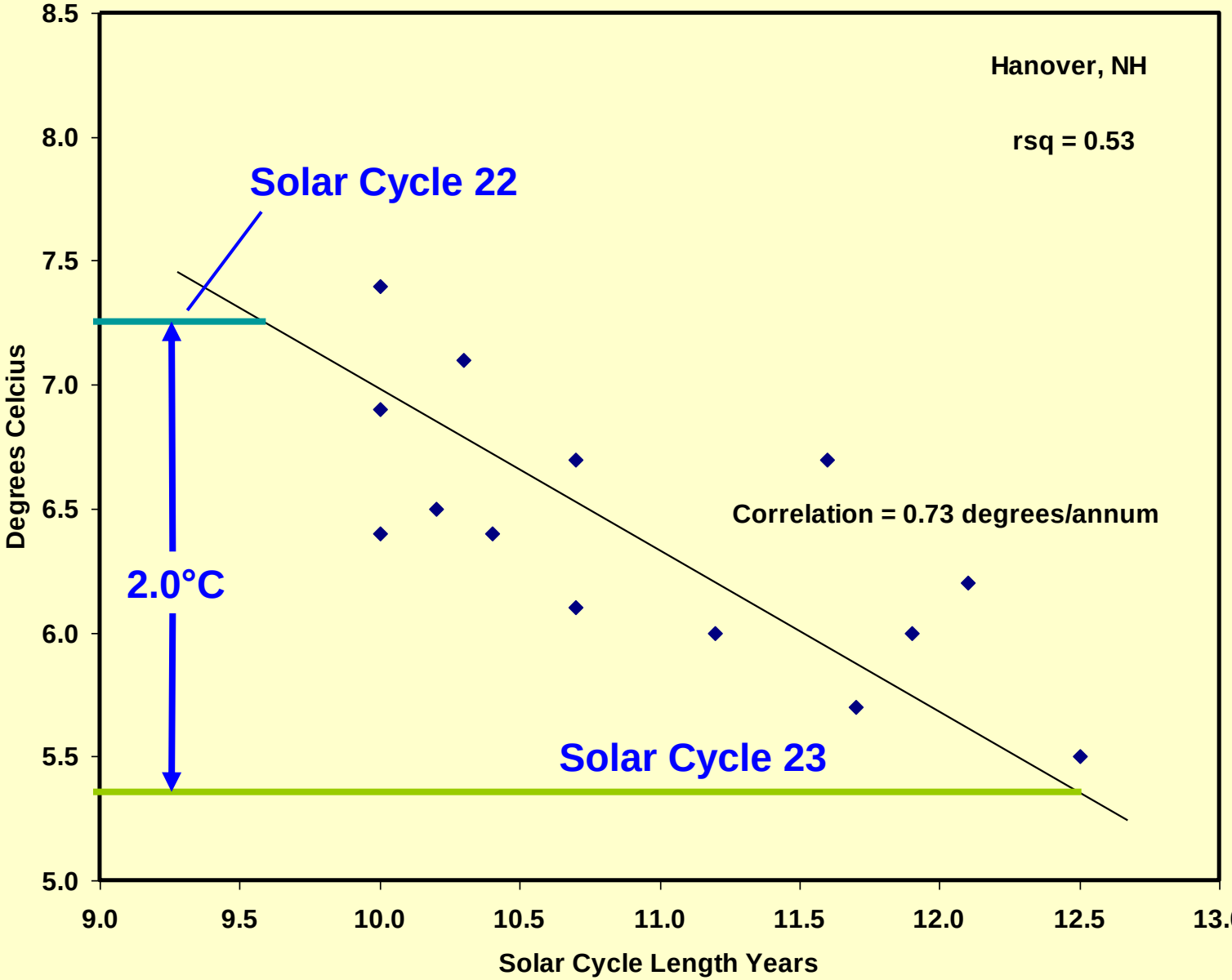
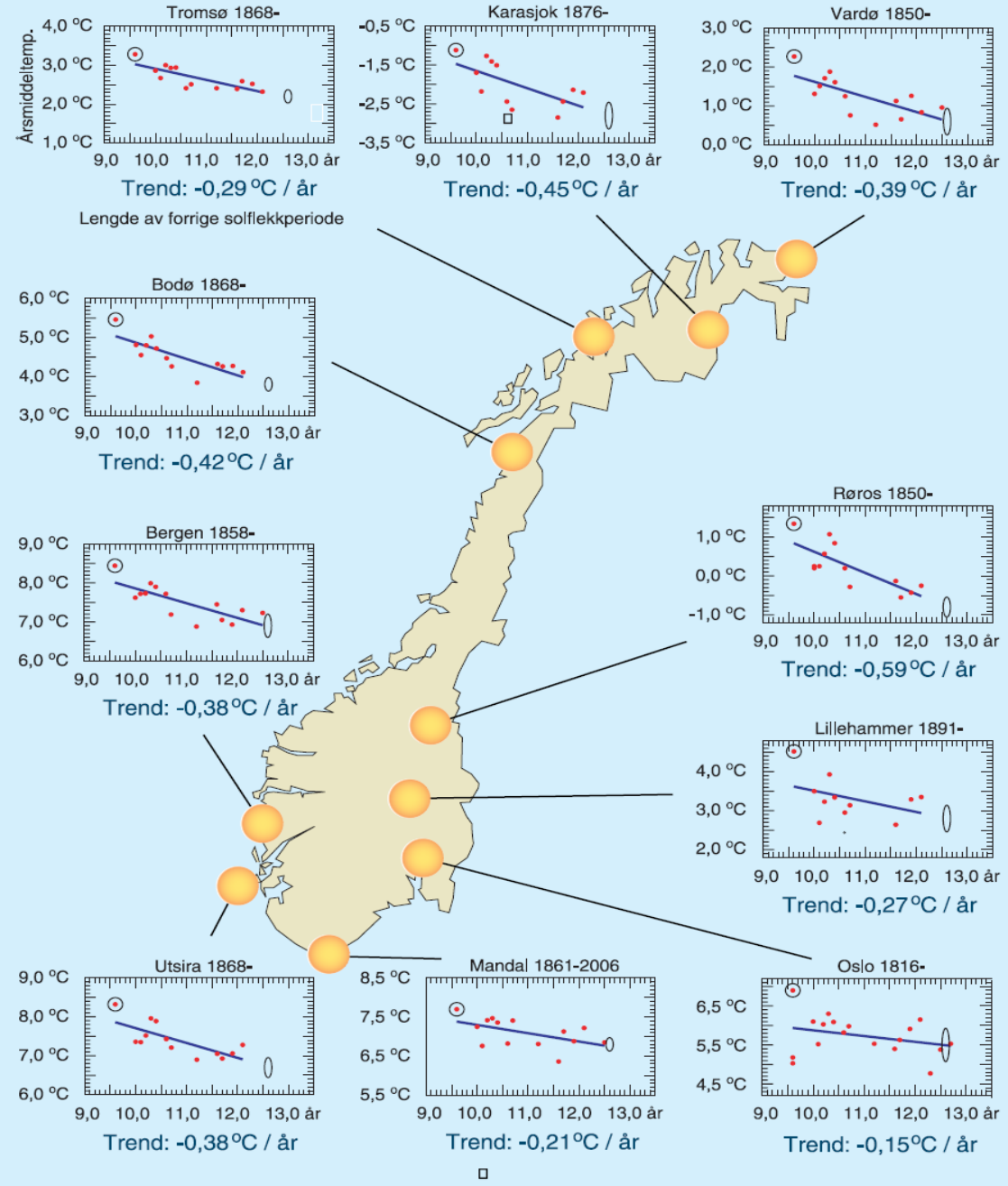


Figure 5. The mean temperature at Armagh for 11 year intervals, centred on years of sunspot maximum and minimum, plotted against the sunspot cycle length. Symbols: open squares - Series I, filled squares - Series II. The mean regression line is shown.

Hanover, New Hampshire

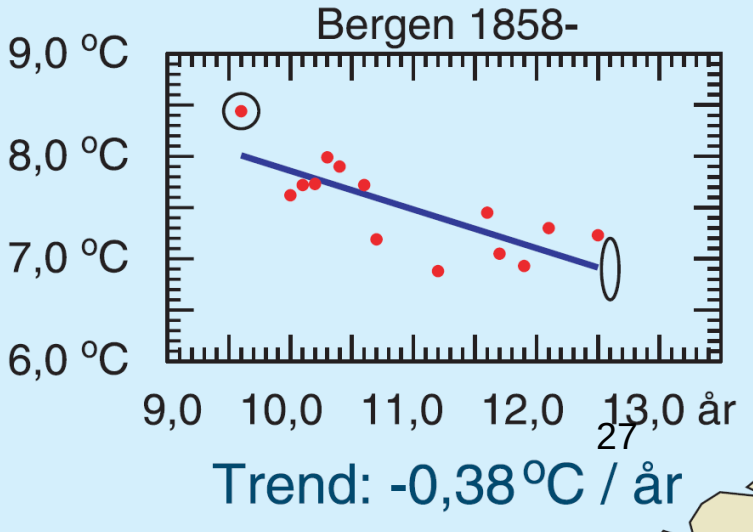




Friis-Christensen and Lassen theory, using Butler and Johnson methodolgy, applied to Norway

- a 1.5° C cooling underway

Work by Professor Jan-Erik Solheim of Oslo University



Three wise Norwegians:

Jan-Erik Solheim*

Department of Physics and Technology, University of Tromsø, N-9037, Tromsø, Norway

Kjell Stordahl

Telenor Norway, Fornebu, Norway

Ole Humlum

Department of Geosciences, University of Oslo, Norway

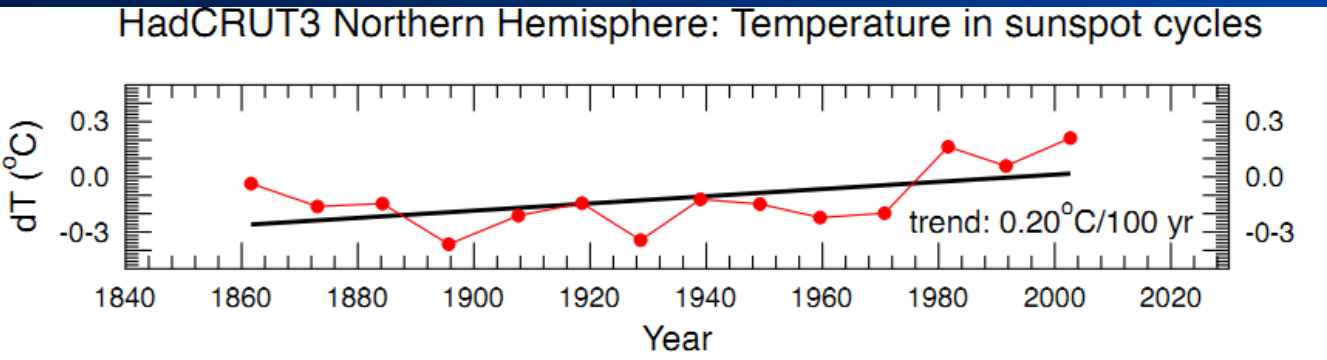
Credit me with a scientific discovery:

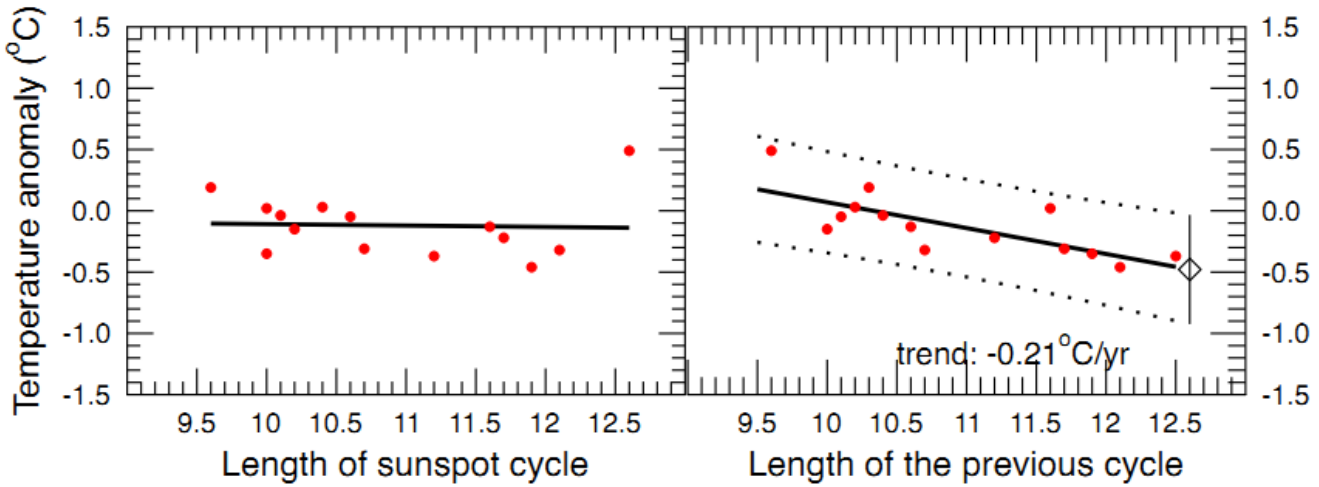
Archibald (2008) was the first to realize that the length of the previous sunspot cycle (PSCL) has a predictive power for the temperature in the next sunspot cycle, if the raw (unsmoothed) value for the SCL is used. Based on

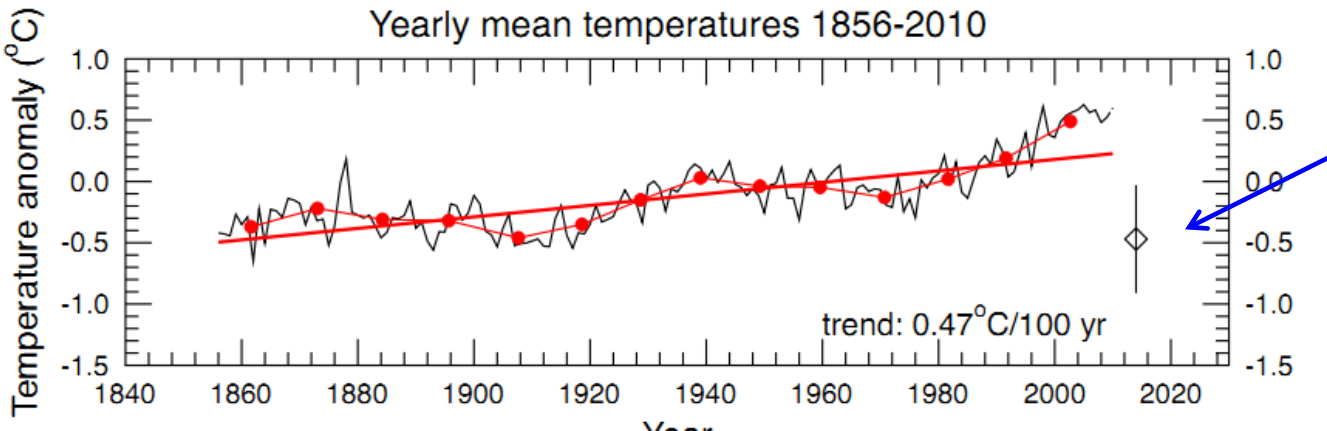
That enables climate to be predicted with great accuracy.

Available at: http://arxiv.org/pdf/1202.1954v1.pdf

Section 5: What is going to happen?



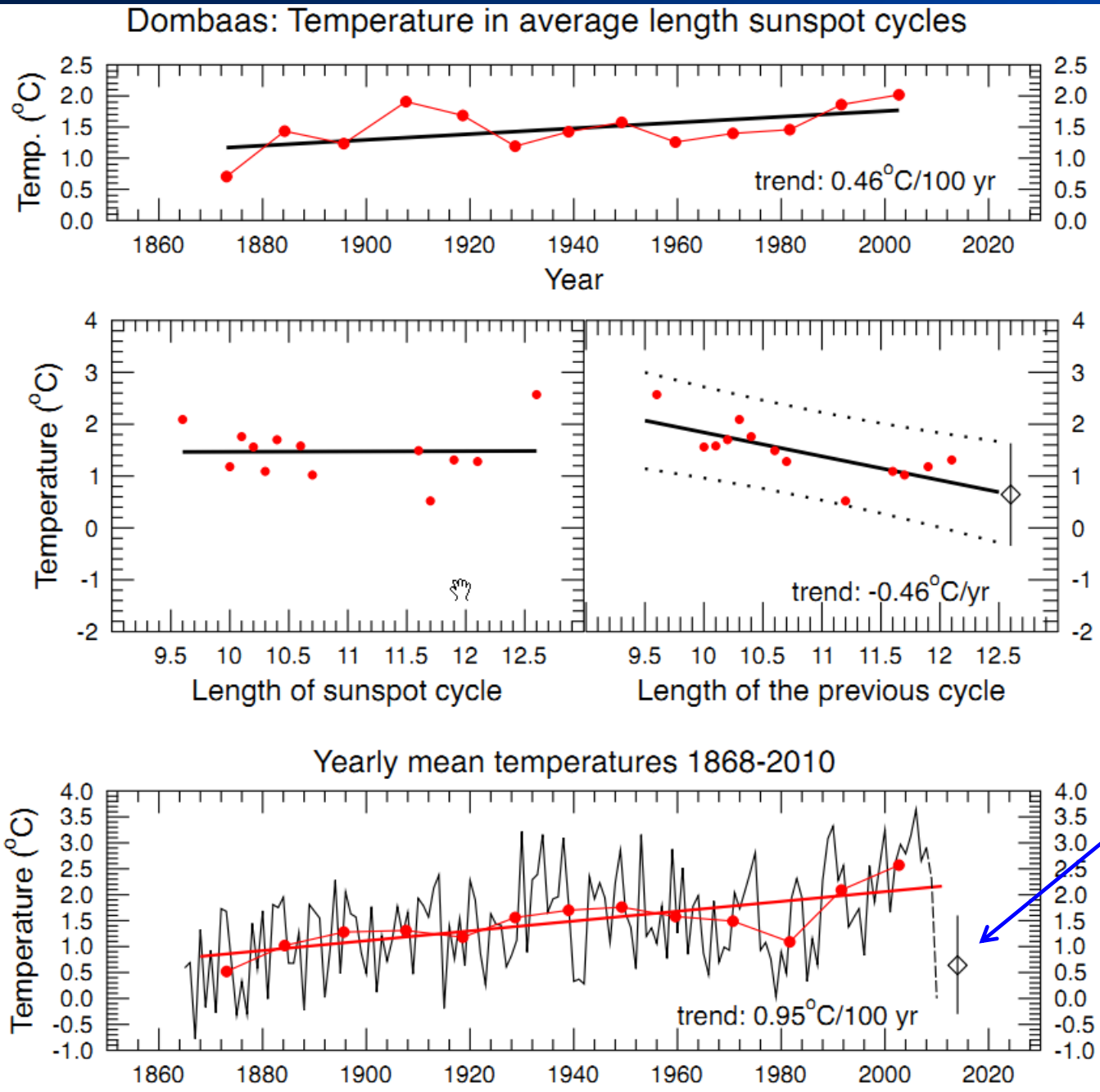




All the warming of the last 150 years will be reversed.

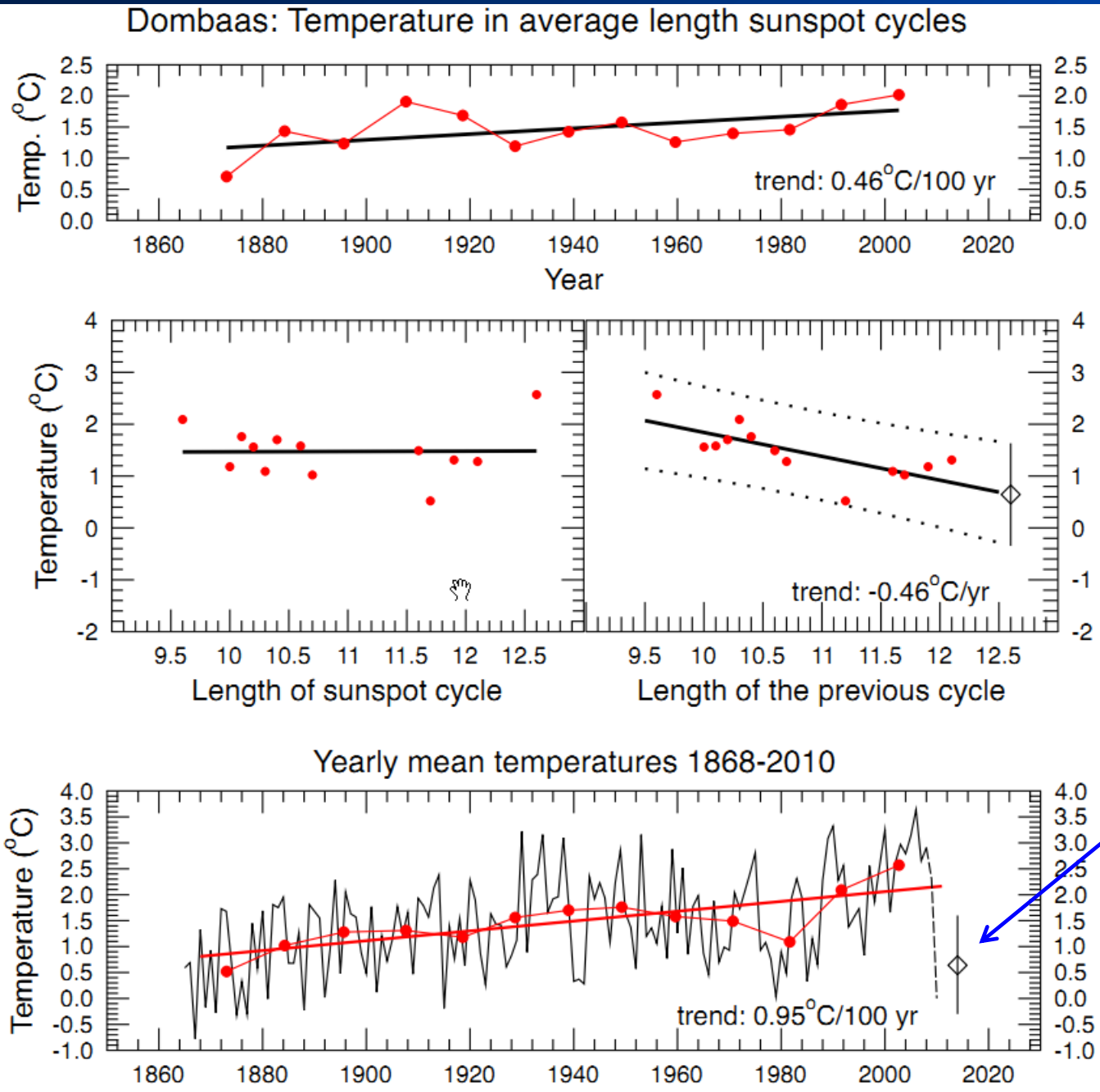
Predicted decline

Dombaas, Norway



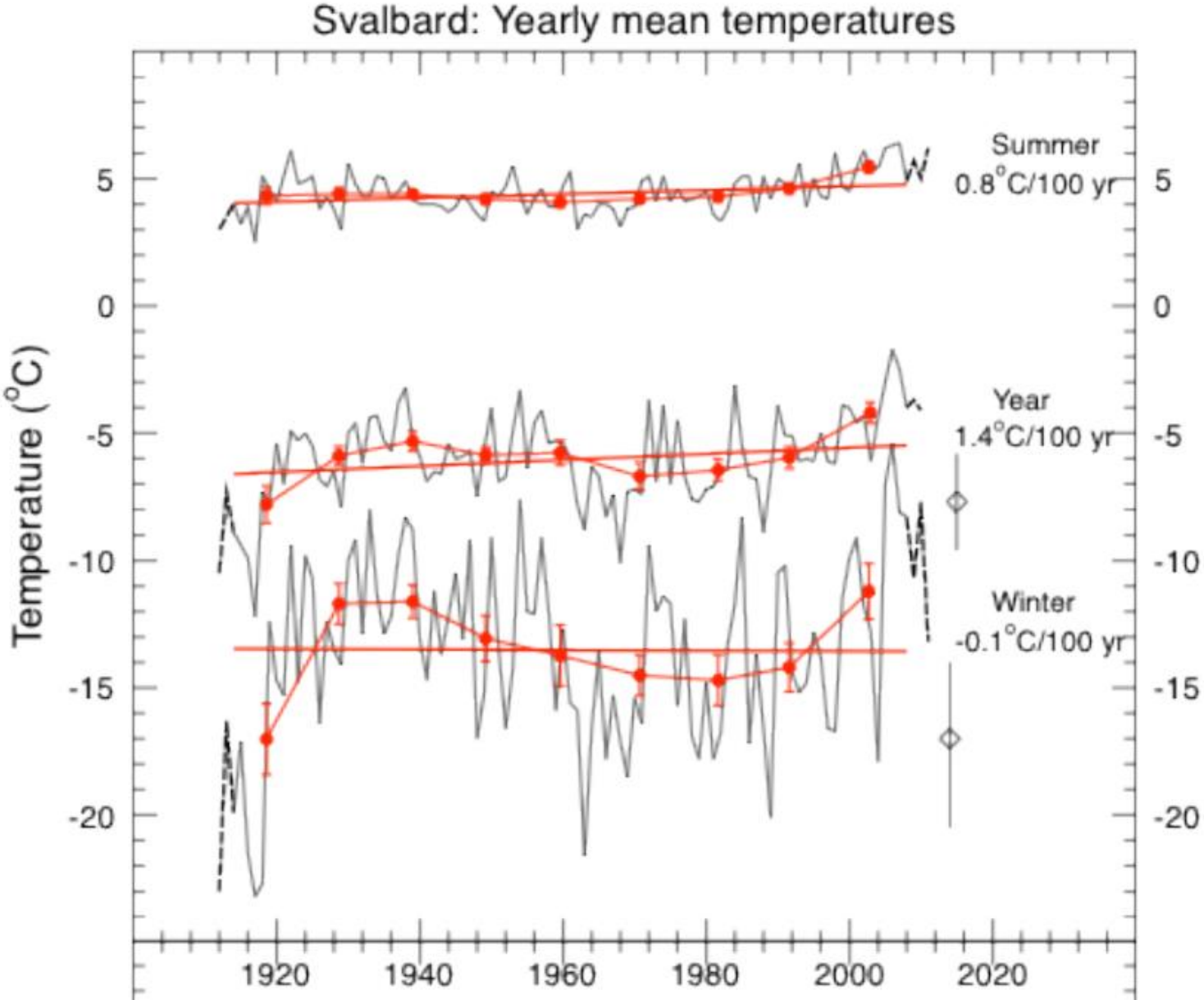
Predicted Decline

Dombaas, Norway



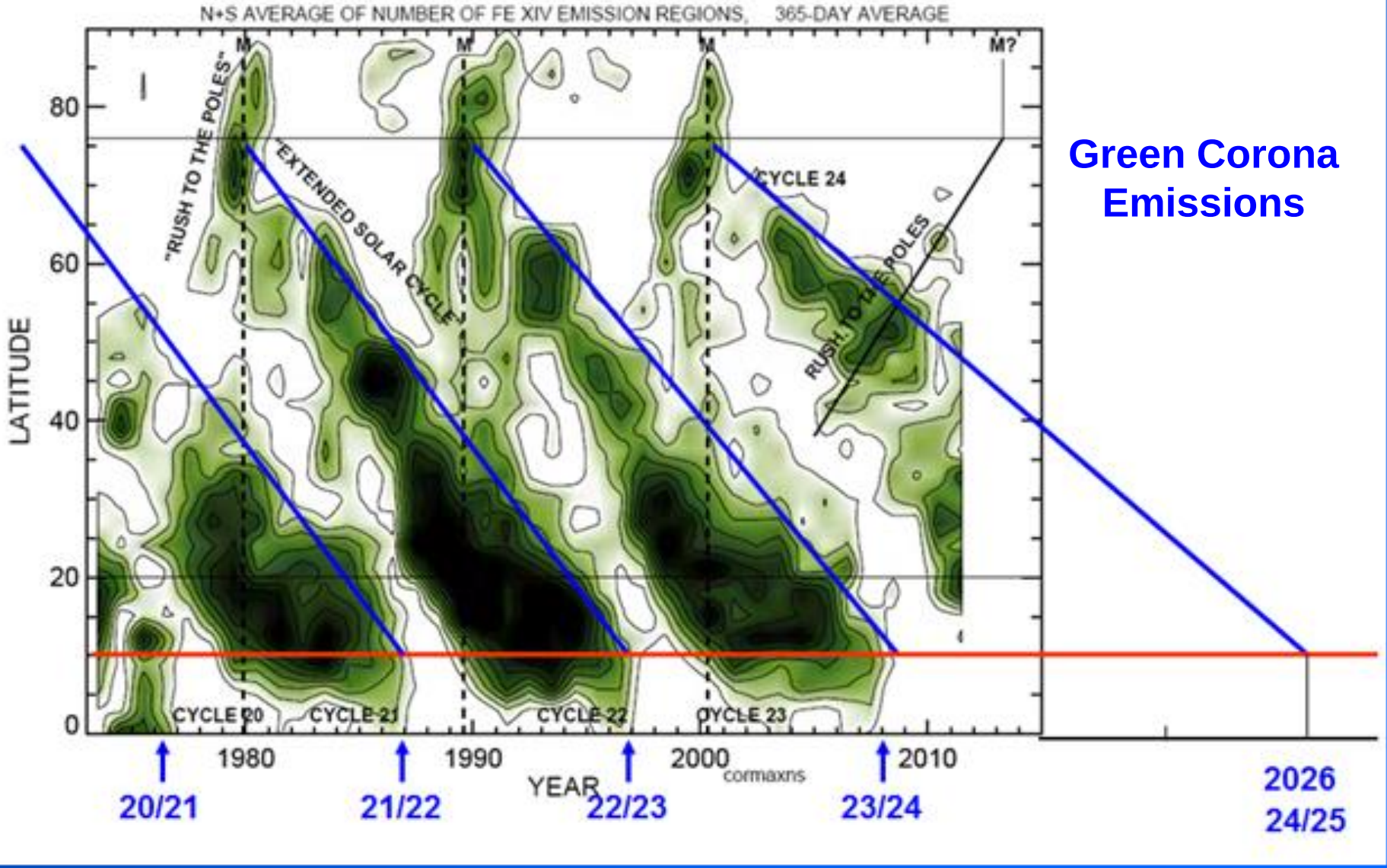
Predicted Decline

Svalbard is going to get the polar amplification really bad in winter.



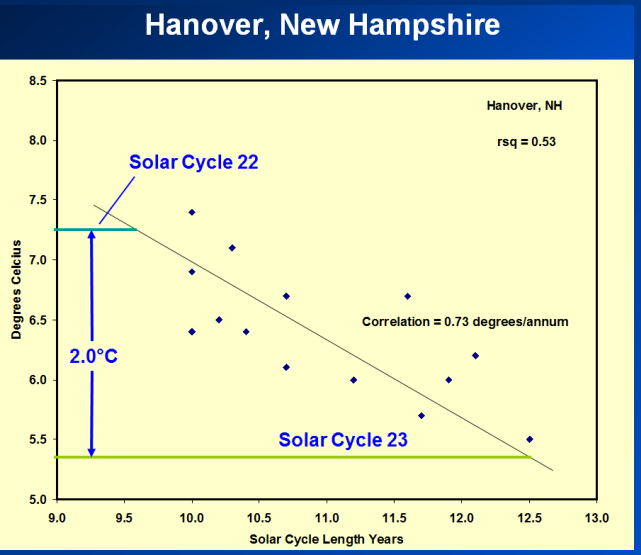
6°C decline

Combine that with a prediction of solar activity:

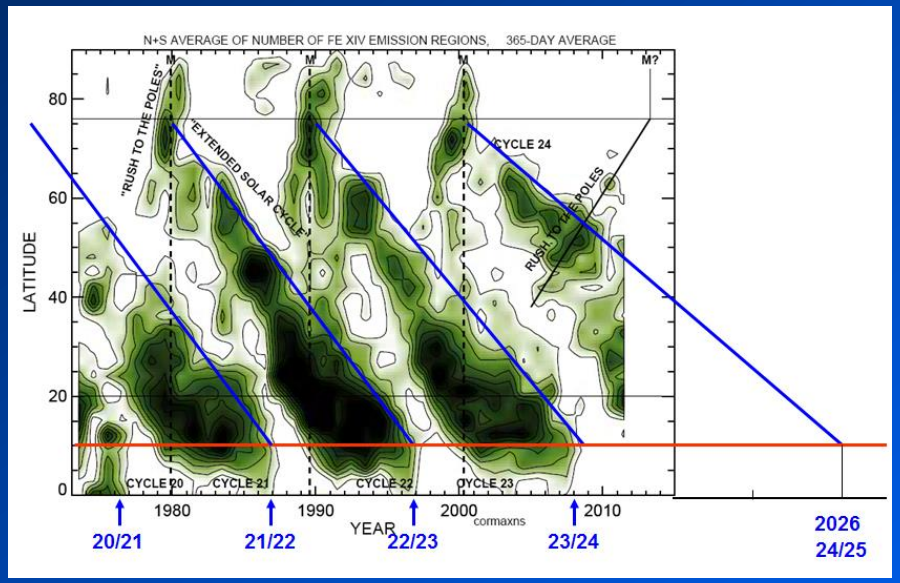


We can now predict climate to 2040.

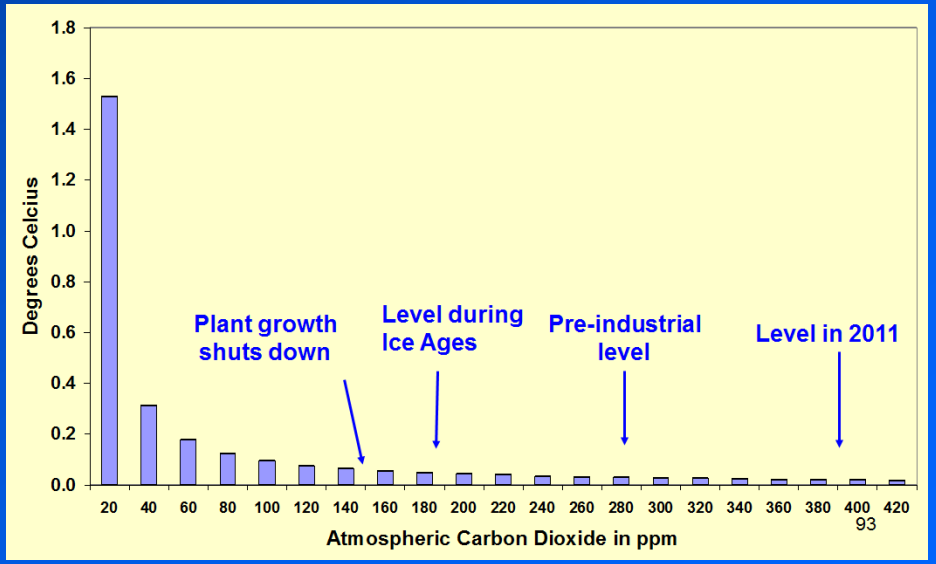
Using these three tools:



Solar cycle length - temperature

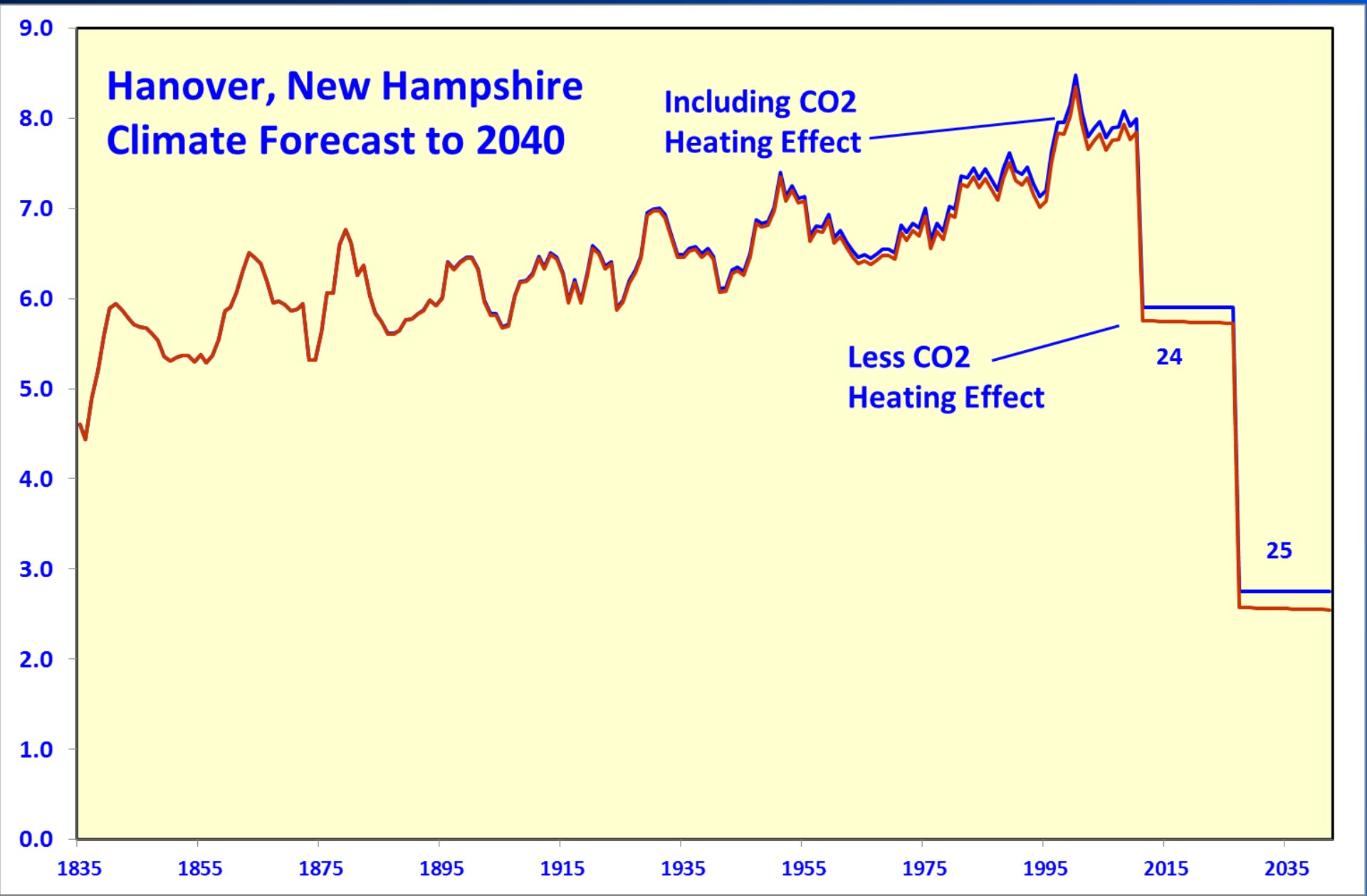


Solar activity forecast

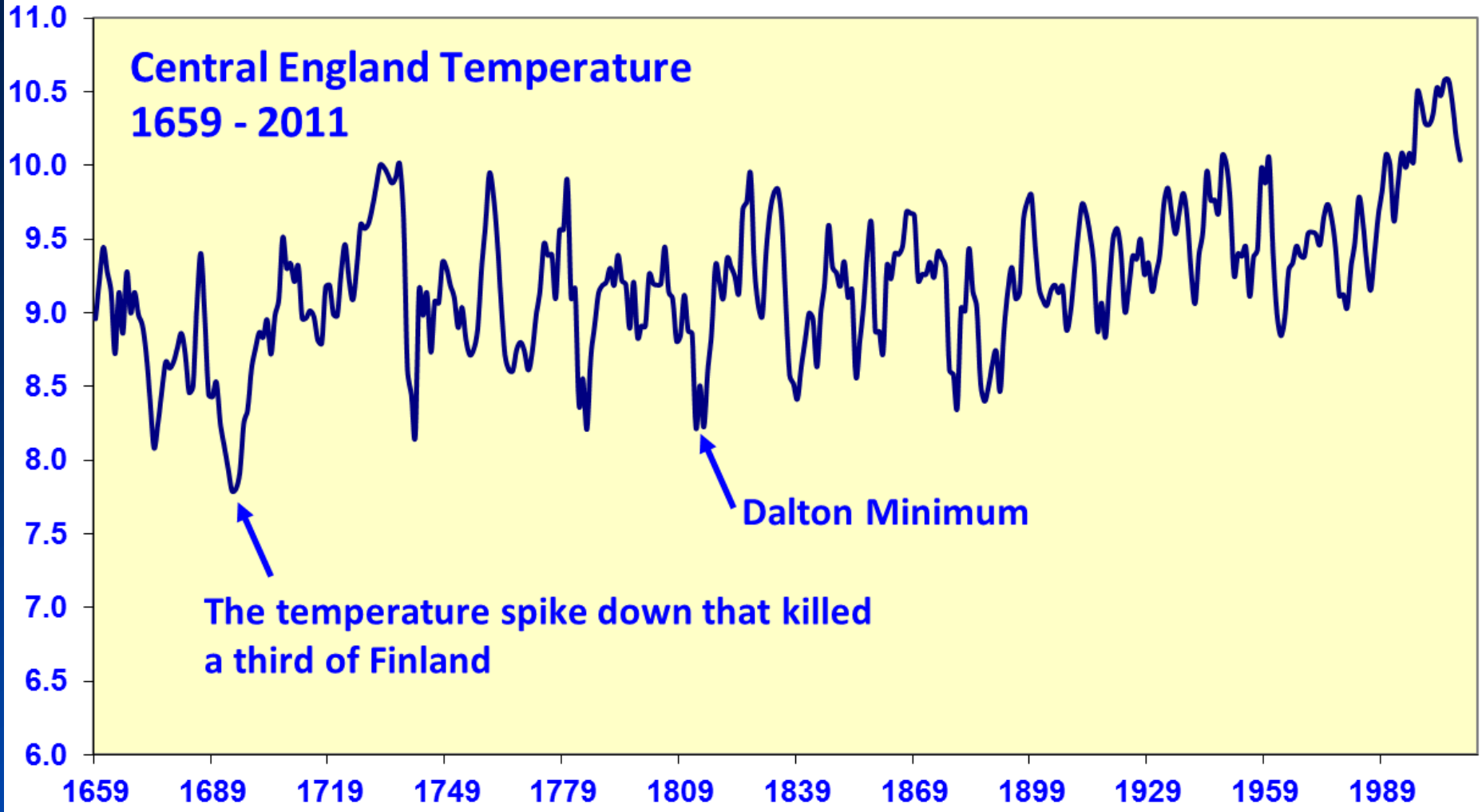


Logarithmic heating effect of CO2

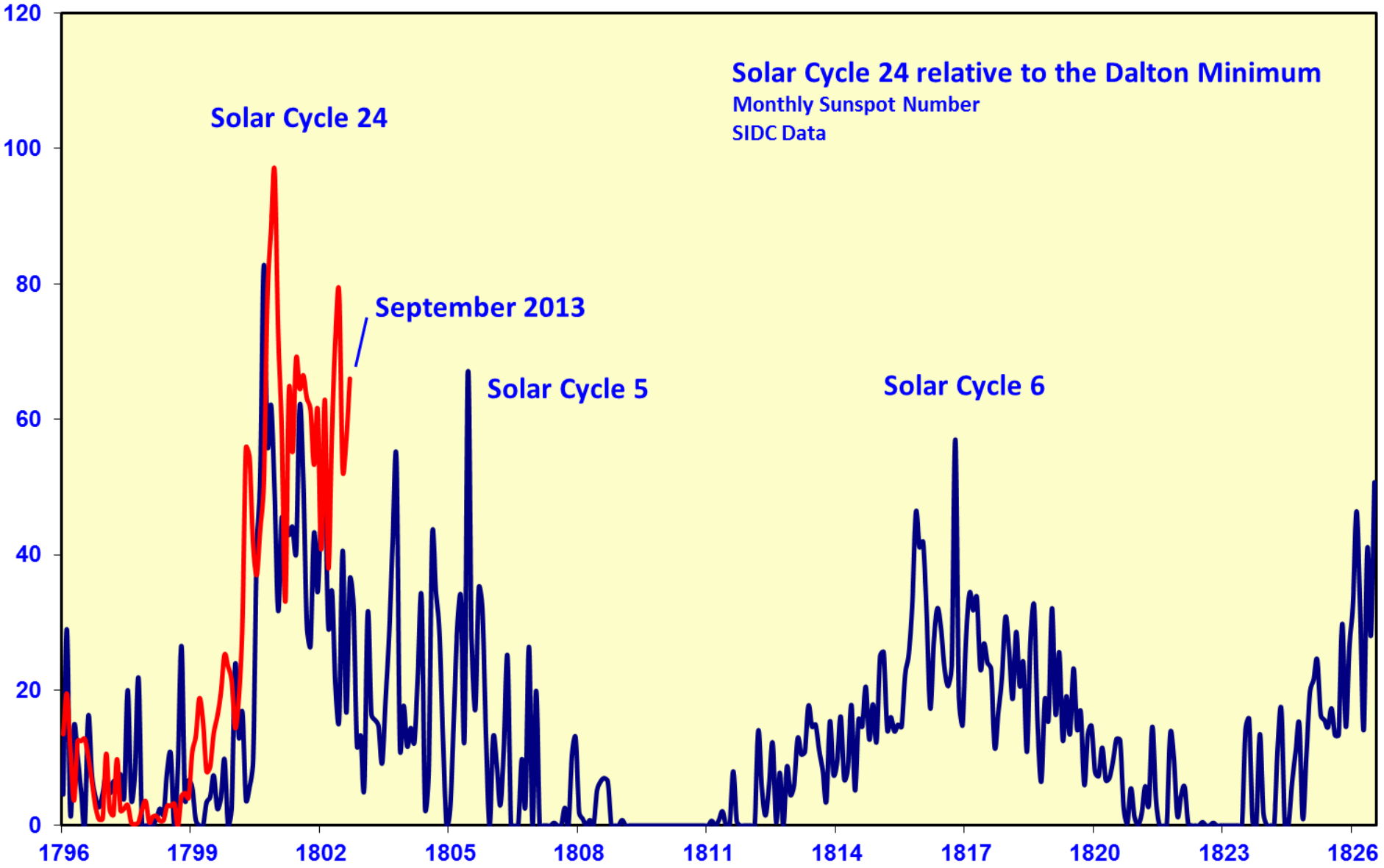
We are able to predict climate to 2040.



We see it in the thermometer record.

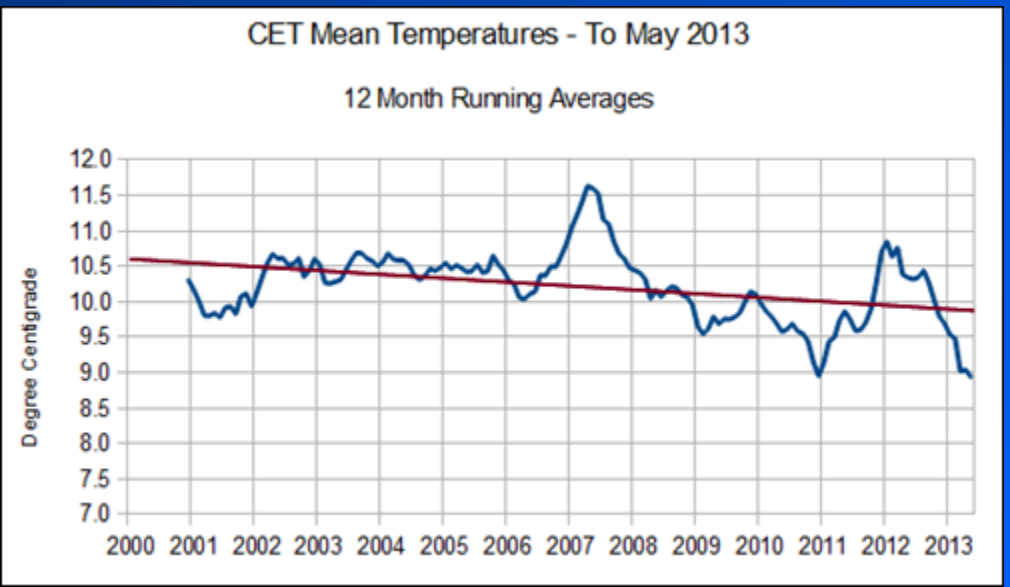


So far, tracking the Dalton Minimum



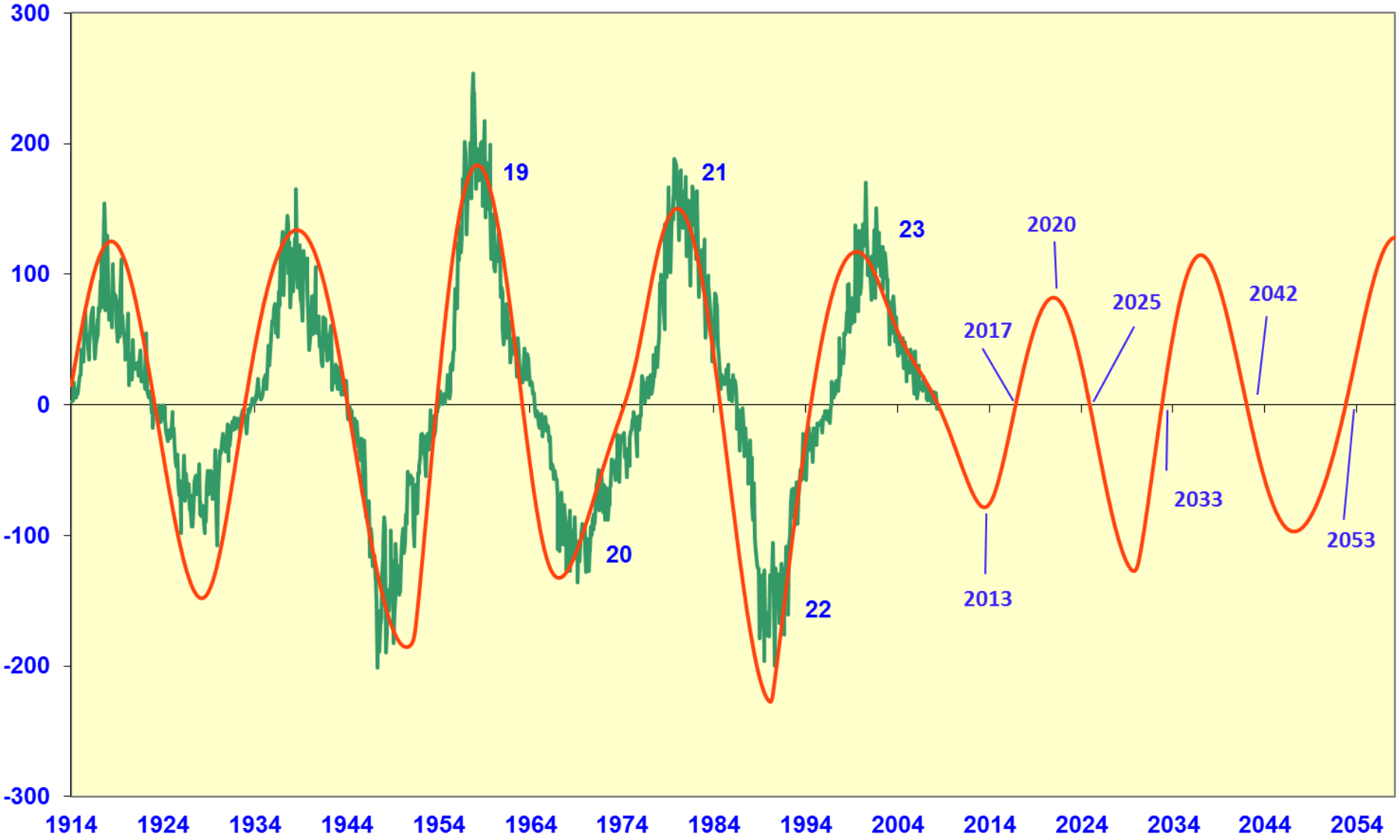
The rate of cooling is in line with the modeled prediction.

Snow in County Durham,
UK on 23rd May 2013



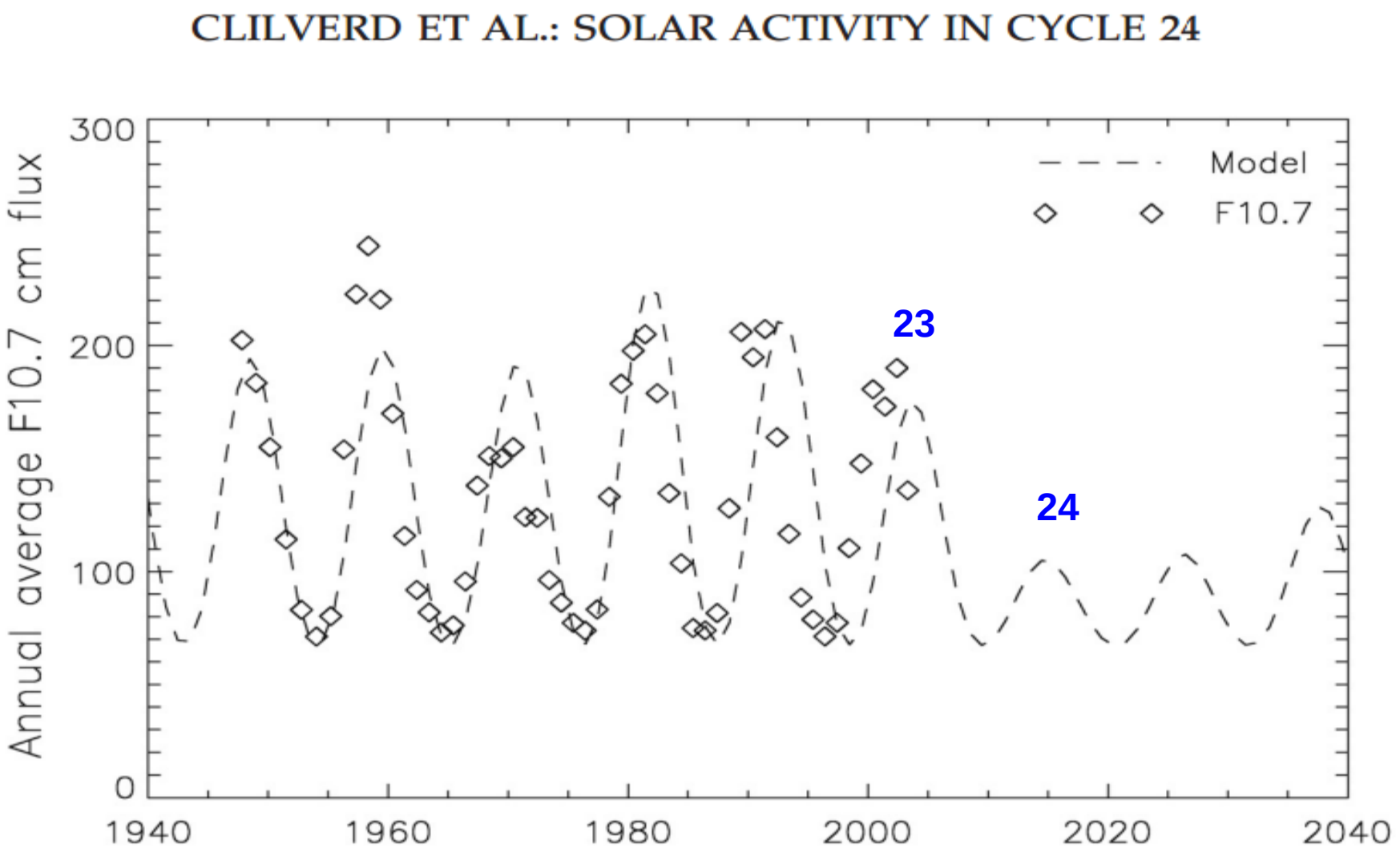
Central England Temperature
2000 - 2013

Predicting longer term solar activity



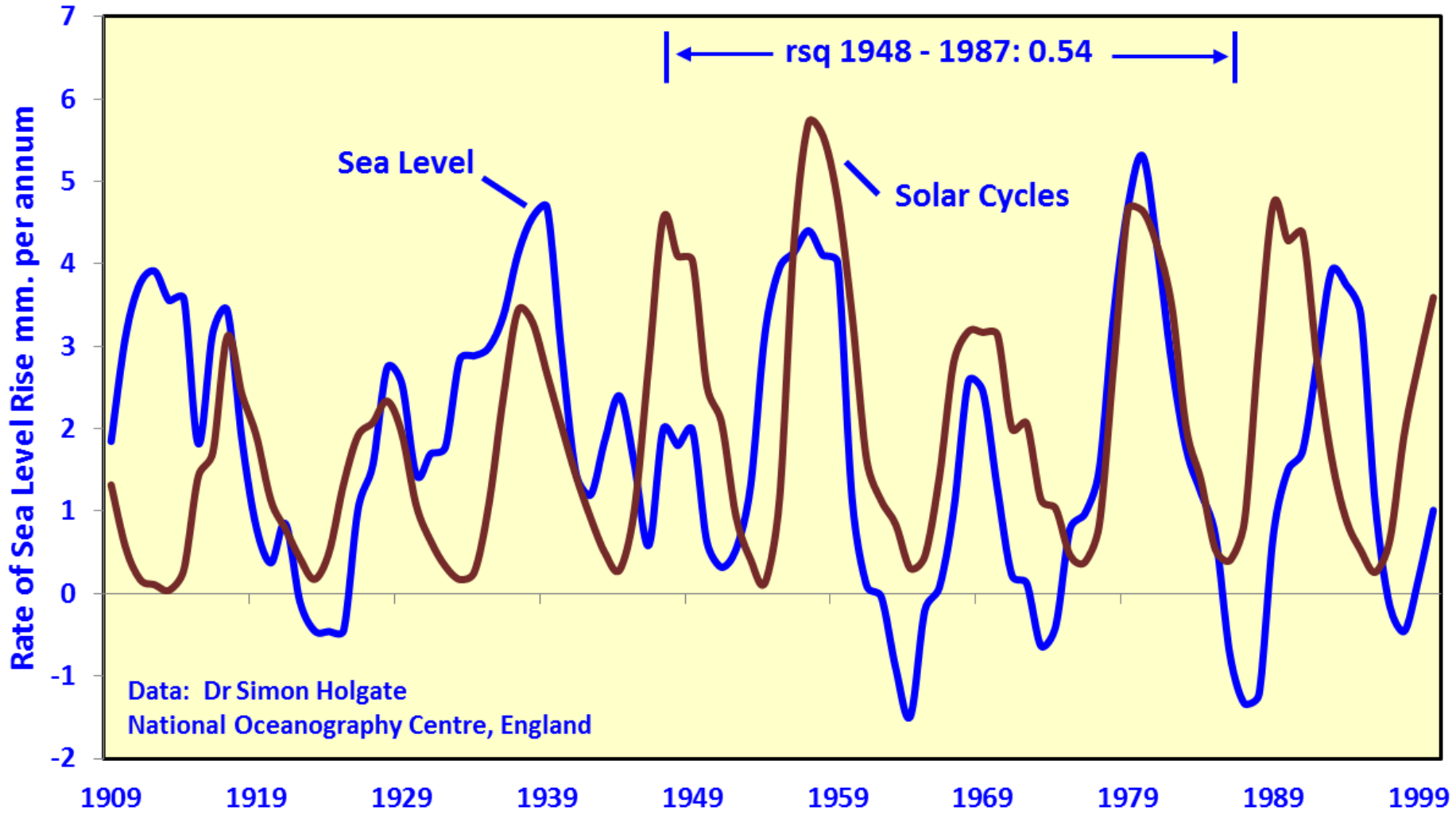
Ed Fix's model: the hindcast match is very good.

Predicting longer term solar activity 2

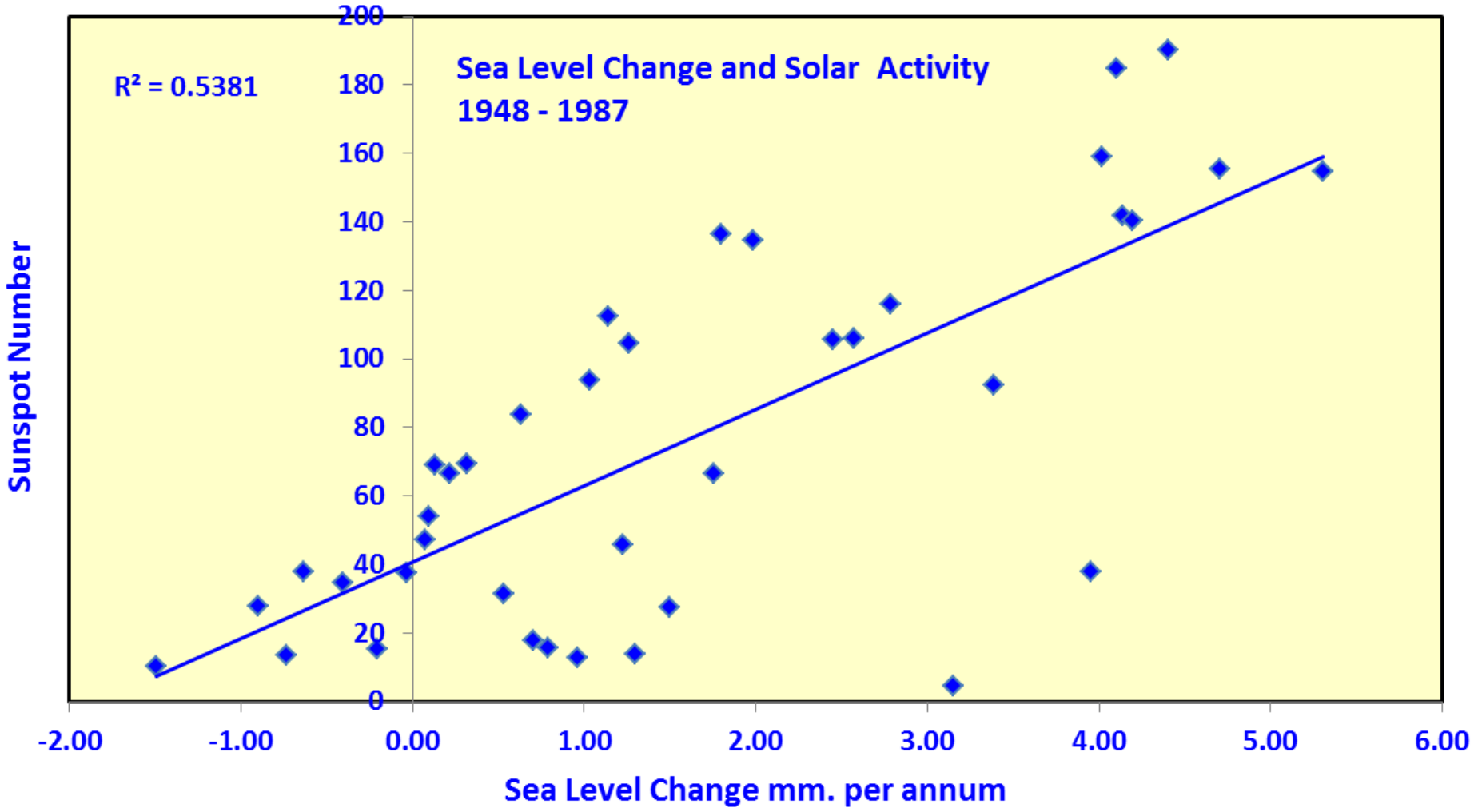


Using low frequency oscillations with periods of 22, 53, 88, 106, 213 and 420 years

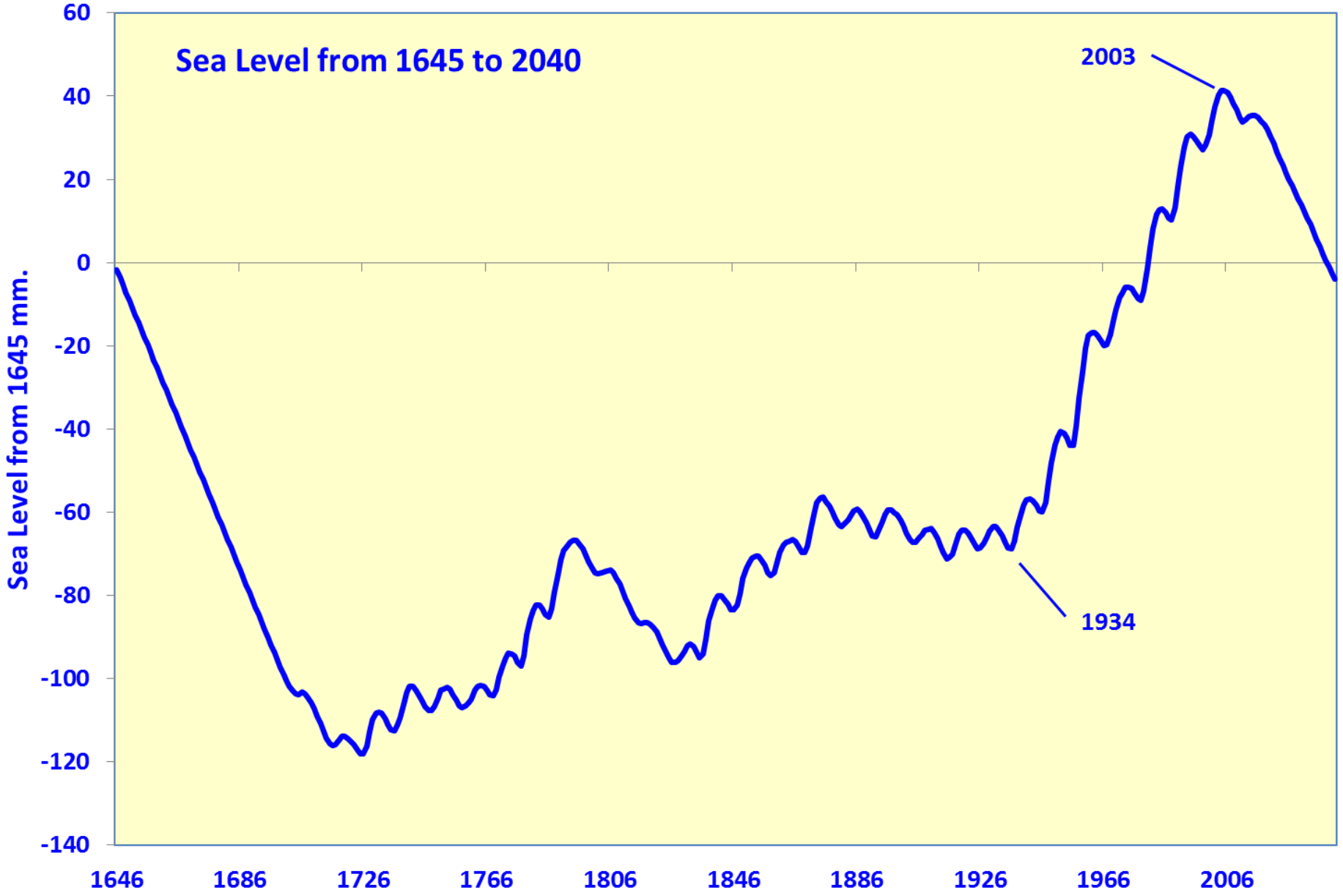
Yes, solar activity drives sea level.



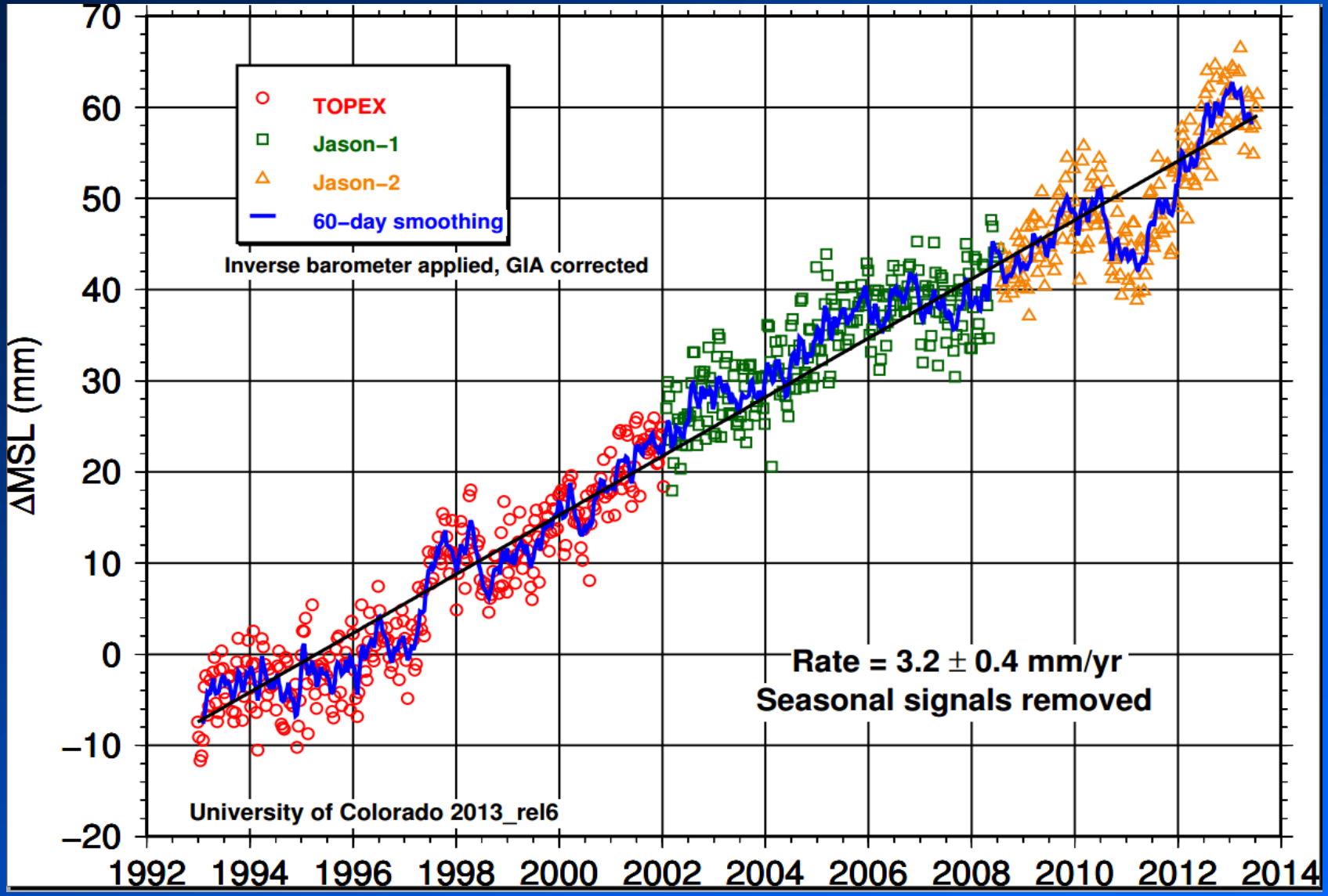
The relationship: 0.045 mm of rise per 1 sunspot number



Sea level will start falling again.



Official Sea Level Rise - University of Colorado



Three inches over 20 years – relentless, remorseless, unremitting and certainly very frightening.

How that was created.

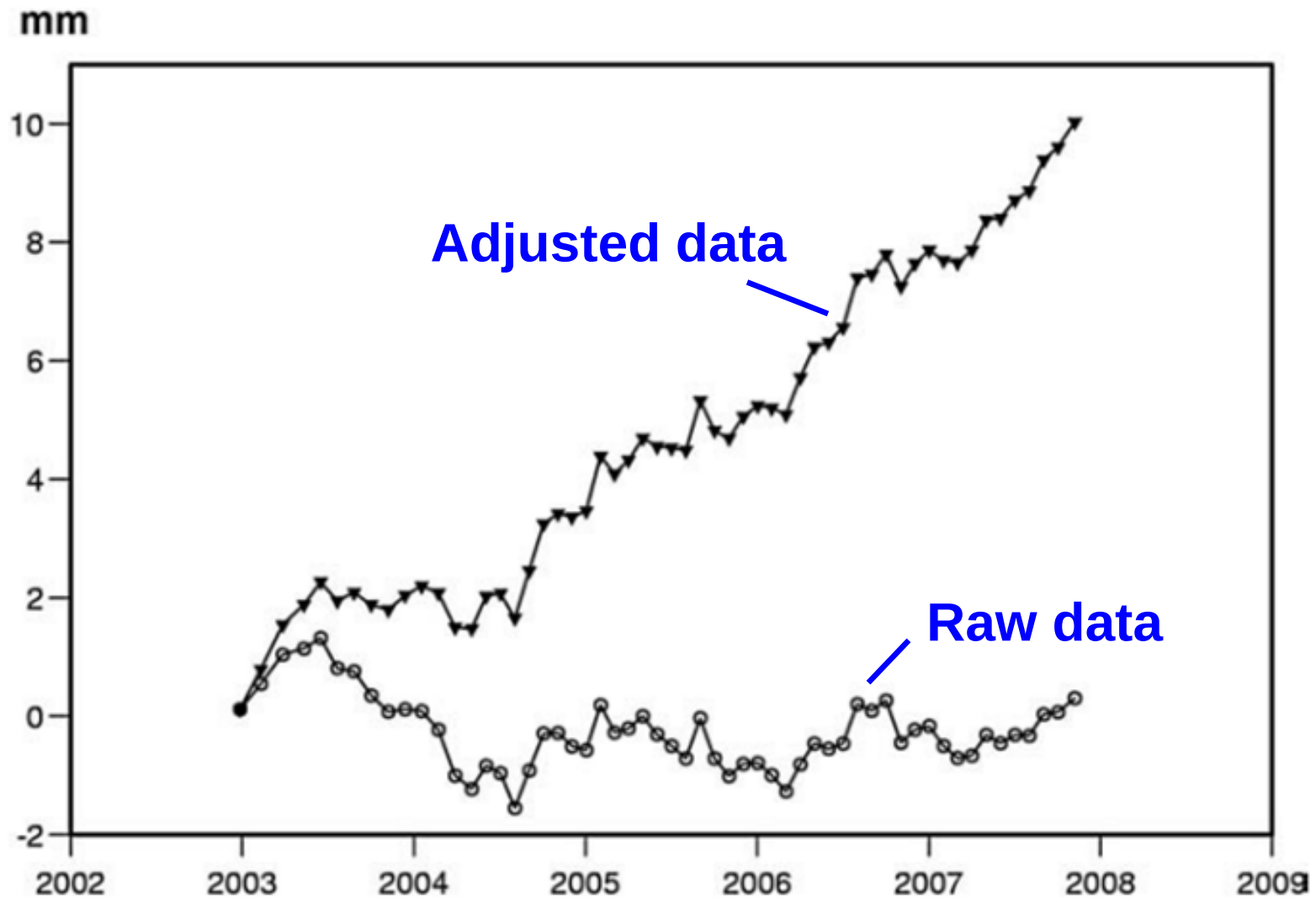
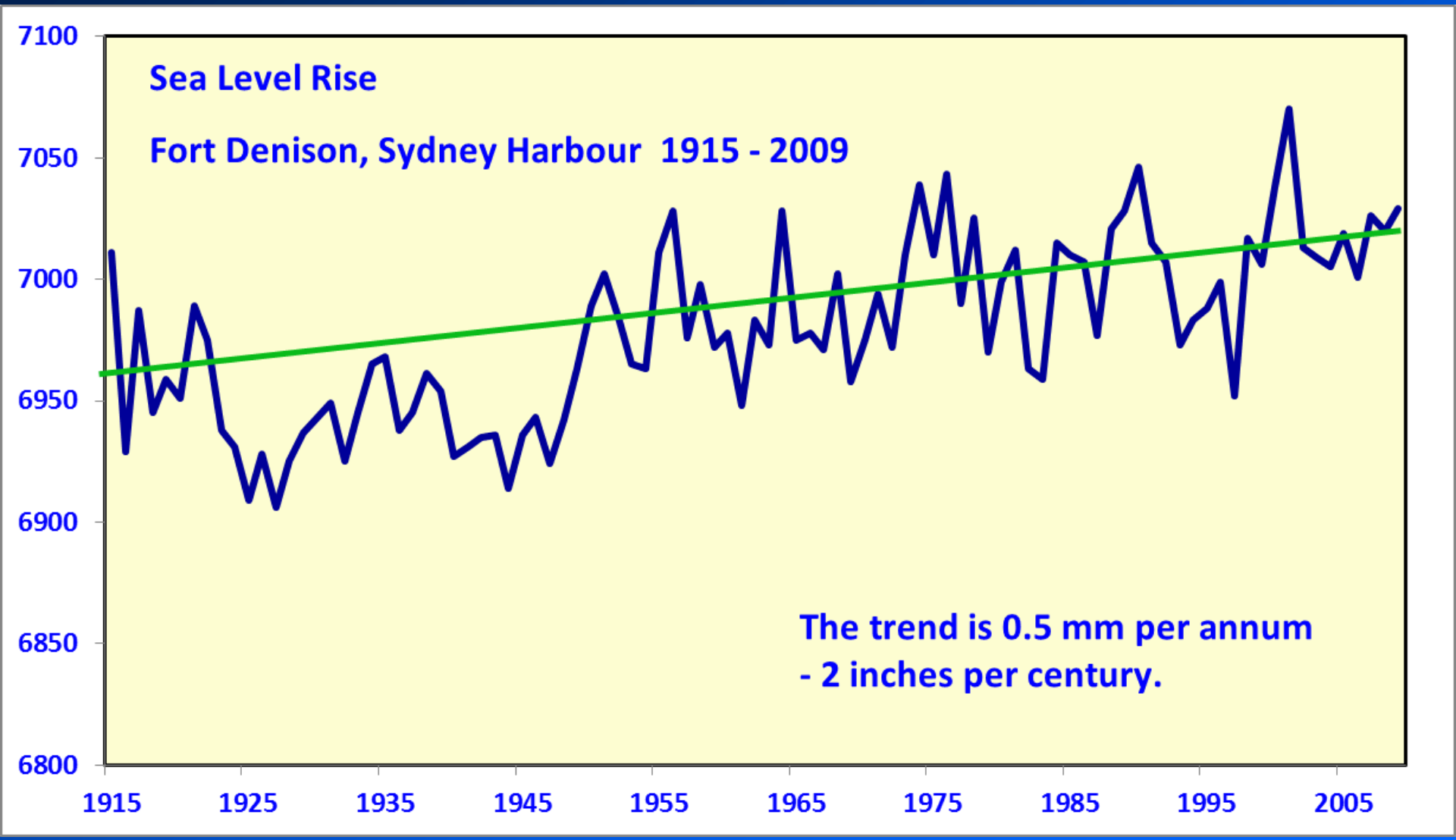


Fig. 1. Ocean mass change from GRACE over 2003–2008. The open circled curve is the raw time series. The black triangles curve corresponds to the GIA corrected time series.

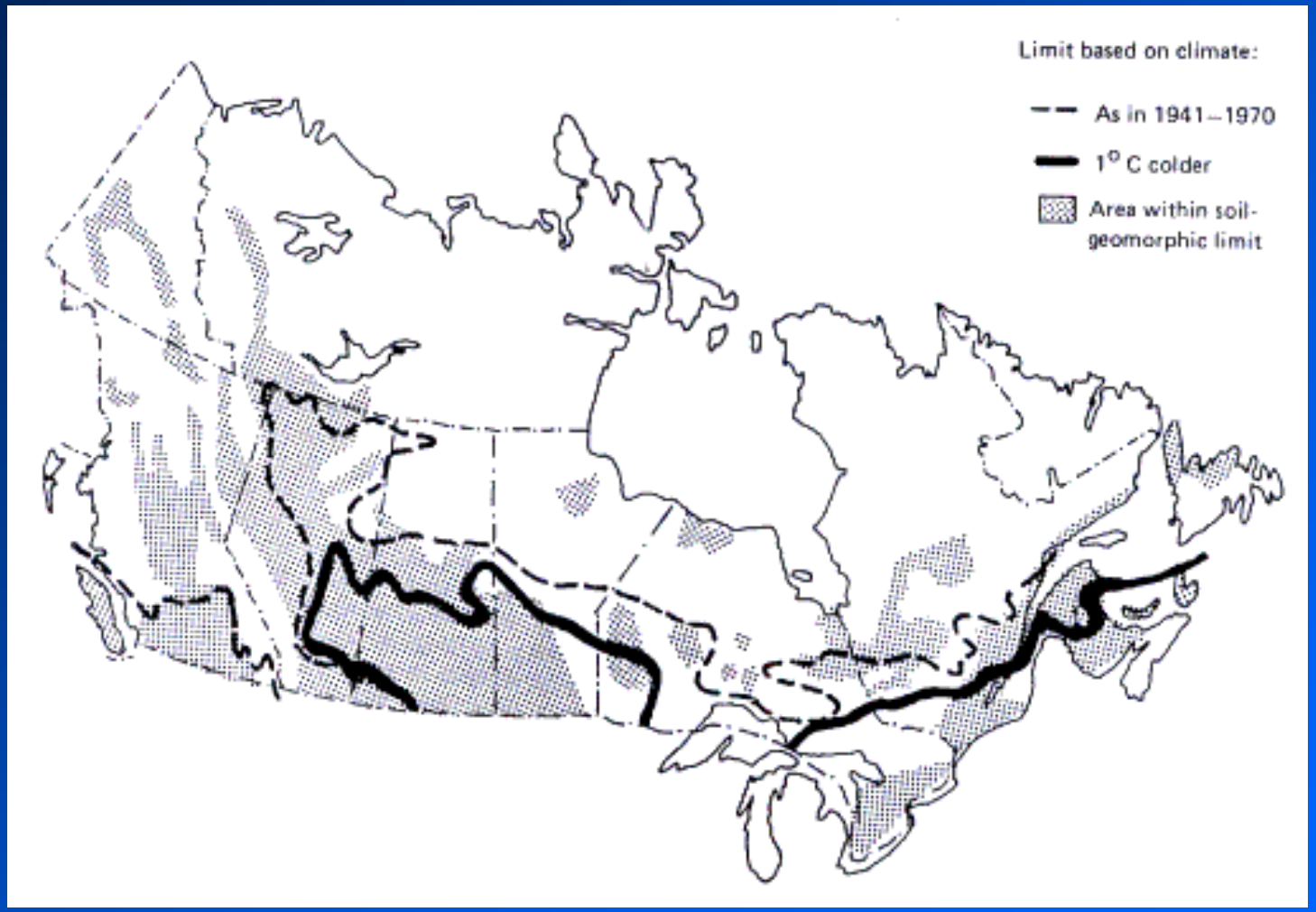
Cazenave, A., et al., Sea level budget over 2003–2008: A reevaluation from GRACE space gravimetry, satellite altimetry and Argo, Glob. Planet. Change (2008), doi:10.1016/j.gloplacha.2008.10.004

Real Data



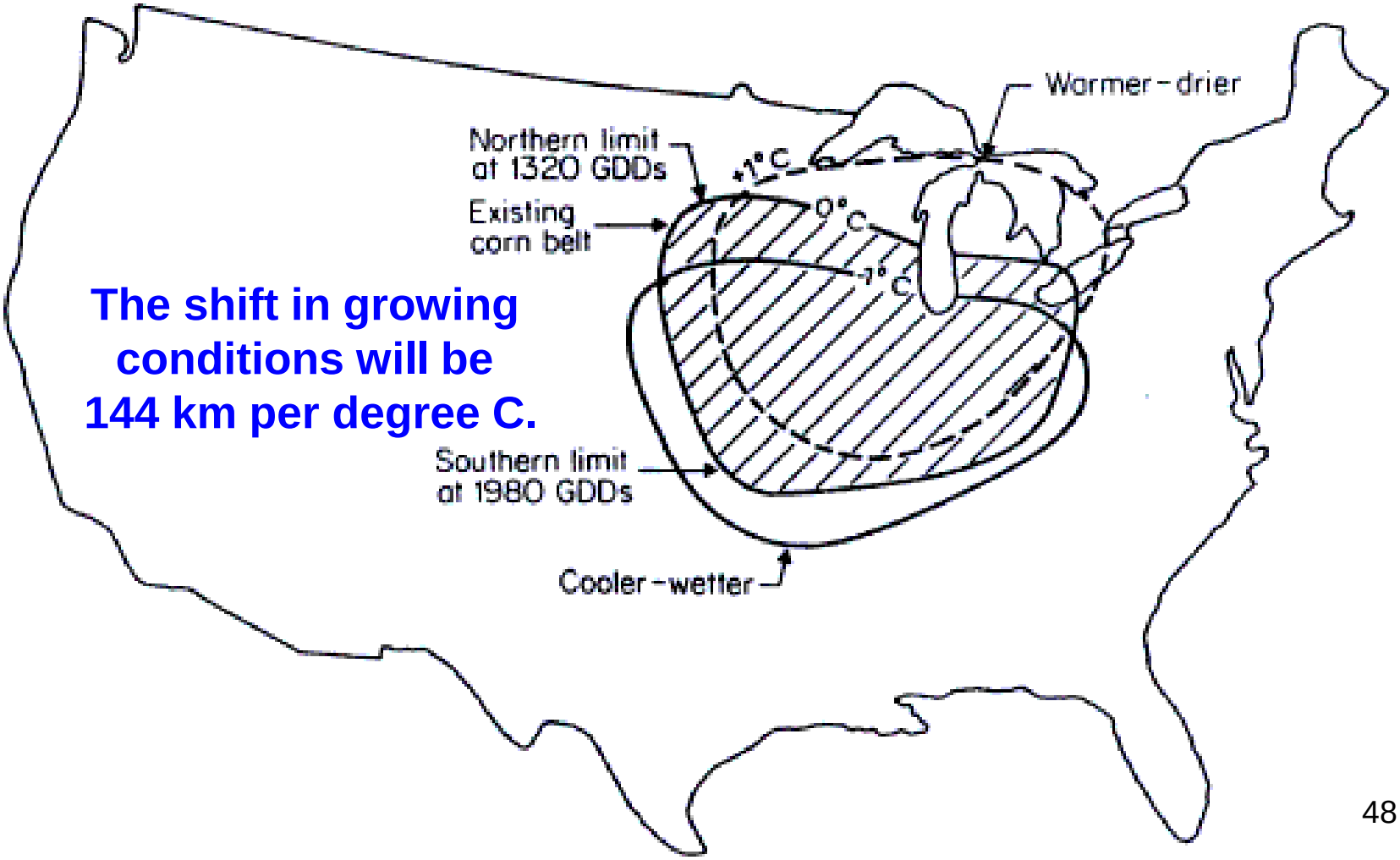
2 inches per century – not so frightening.

A prediction of Canadian agricultural response dating from the last cooling event 40 years ago

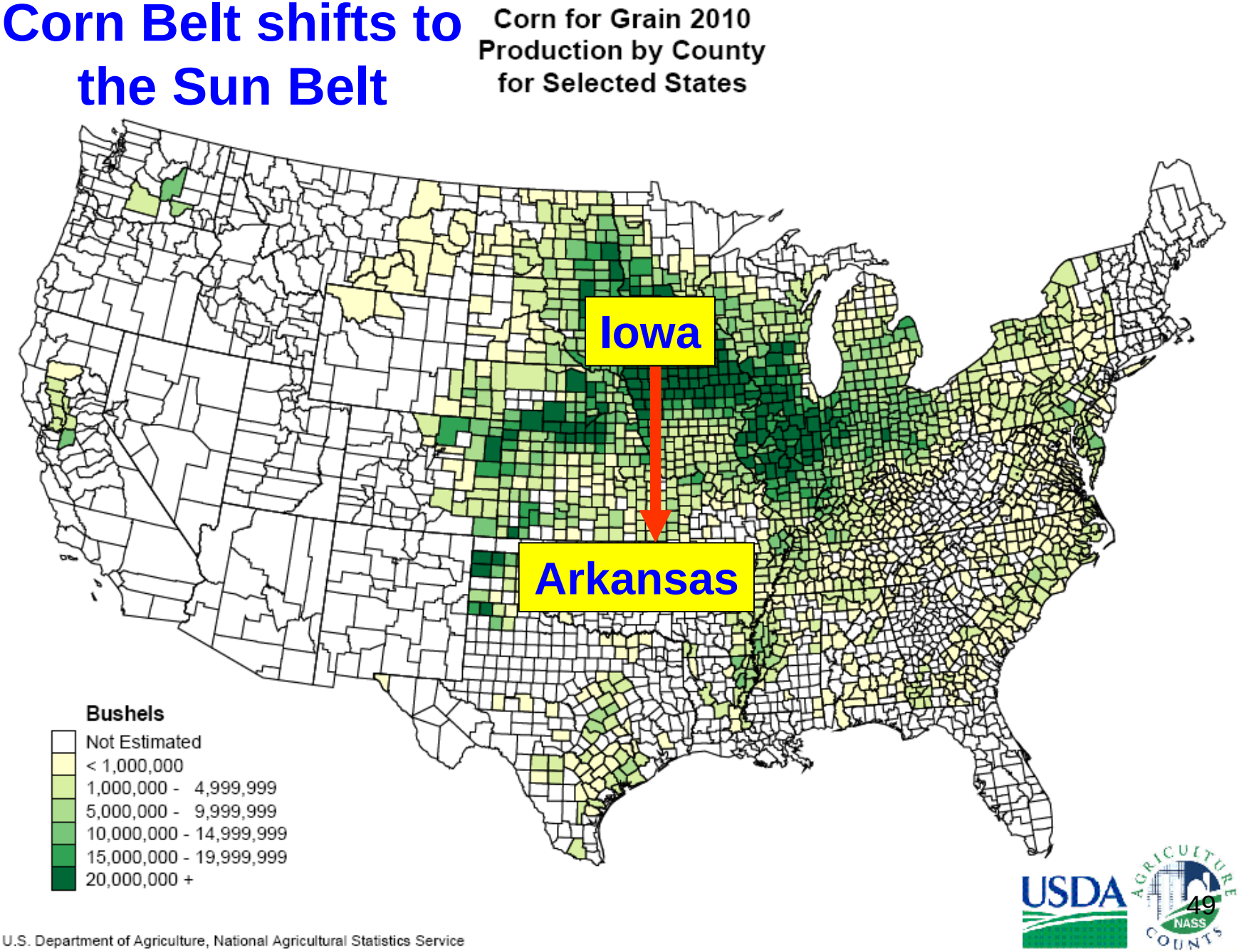


A 1° C decrease would reduce the frost-free period by 15 days.
A 2° C decrease would not allow the wheat crop to ripen before the first frost.
A 5 ° C decrease – it's all over.

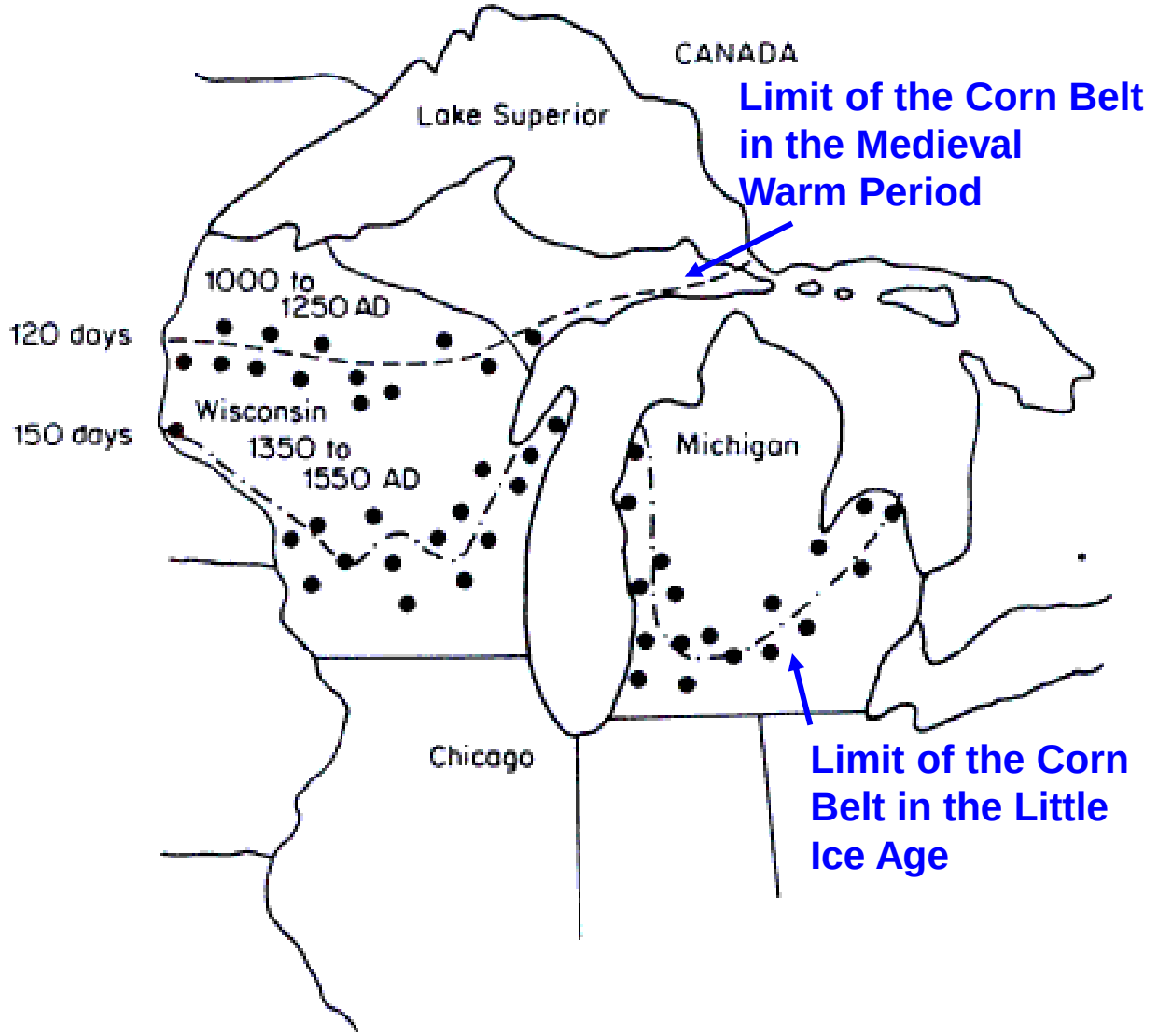
The Corn Belt shifts south but total growing area remains the same.



Corn Belt shifts to the Sun Belt



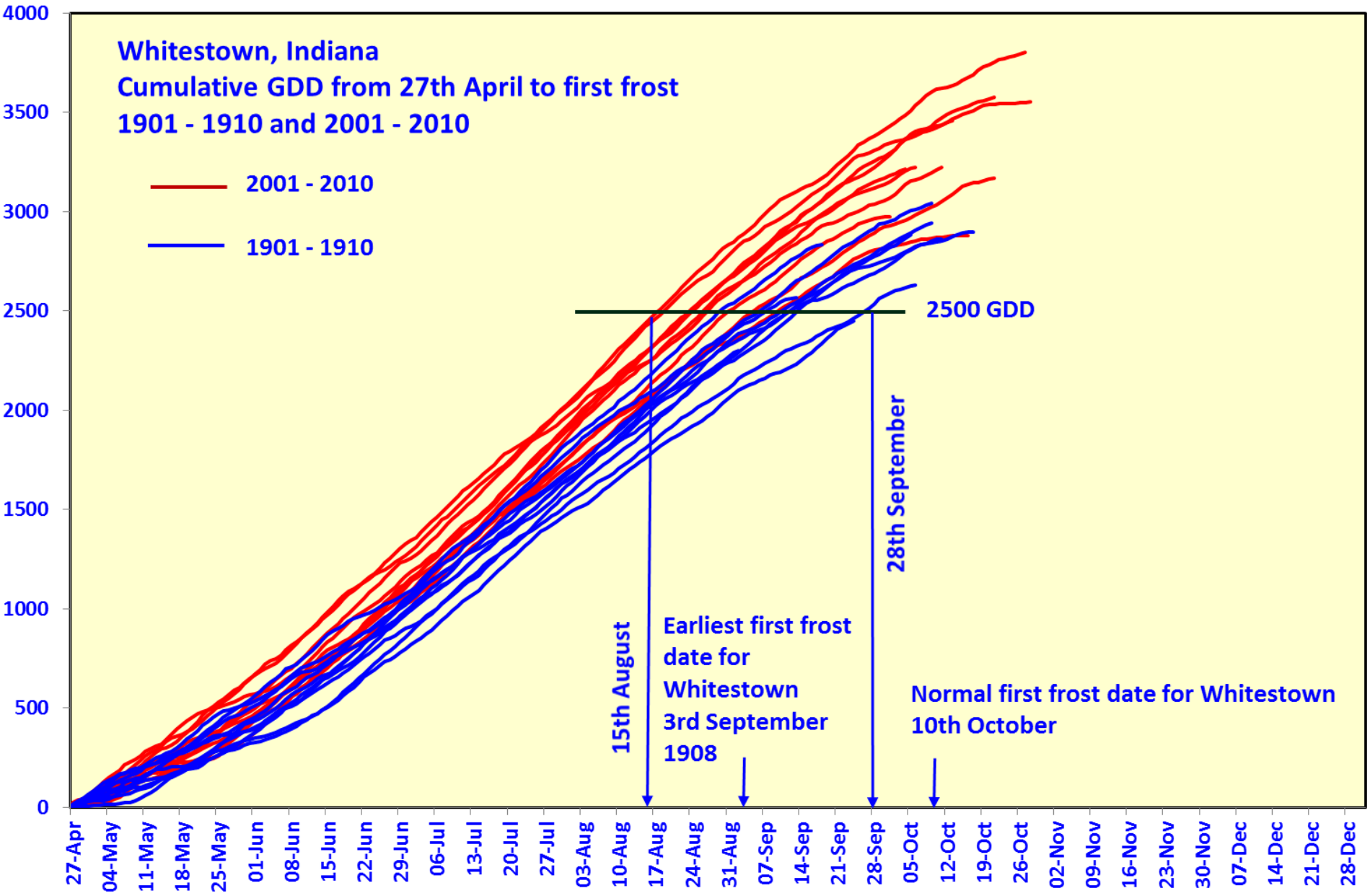
It has happened before in the US.



Distribution of prehistoric ridge-furrow maize gardens in relation to present-day frost-free seasons.

The northern limit of prehistoric maize fields appears to have retreated up to 320 km southward concurrently with cooling in the thirteenth and fourteenth centuries.

A return to conditions of 100 years ago would make the Corn Belt erratic for high-yielding corn.



Premonitions of the Fall in Temperature 1

1974 CIA Climate Report

"The western world's leading climatologists have confirmed recent reports of a detrimental global climate change. The stability of most nations is based upon a dependable source of food, but this stability will not be possible under the new climatic era. A forecast by the University of Wisconsin projects that the earth's climate is returning to that of the neo-boreal era (1600- 1850) – an era of drought, famine and political unrest in the western world."

"Climate has not been a prime consideration of intelligence analysis because, until recently, it has not caused any significant perturbations to the status of major nations. This is so because during 50 of the last 60 years the Earth has, on the average, enjoyed the best agricultural climate since the eleventh century."

http://www.climatemonitor.it/wp-content/uploads/2009/12/1974.pdf

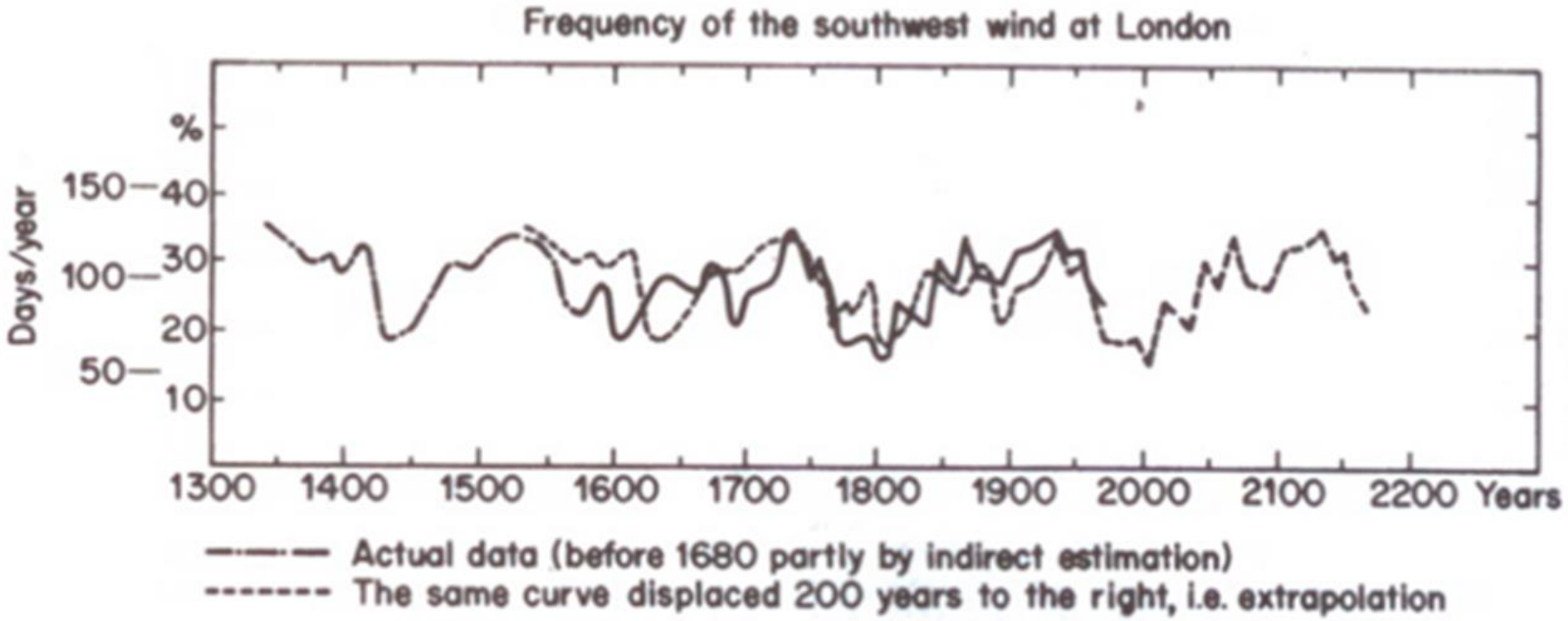
A Study of Climatological Research as it Pertains to Intelligence Problems

This document is a working paper prepared by the Office of Research and Development of the Central Intelligence Agency for its internal planning purposes. Therefore, the views and conclusions contained herein are those of the author and should not be interpreted as necessarily representing the official position, either expressed or implied, of the Central Intelligence Agency.

August 1974

CIA Climate Report of 1974

Premonitions of the Fall 2



Hubert Lamb 1978: forecasting by wiggle matching

Premonitions of the Fall 3

When she and Pandolfi project their curves into the future, they show lower average temperatures from now through the mid-1980s. "Then," Dr. Libby added, "we see a warming trend (by about a quarter of 1 degree Fahrenheit) globally to around the year 2000. And then it will get really cold – if we believe our projections. This has to be tested."

How cold? "Easily one or two degrees," she replied, "and maybe even three or four degrees."

Libby, L.M. and Pandolfi, L.J. 1979, Tree Thermometers and Commodities: Historic Climate Indicators, Environment International Vol 2, pp 317-333

Premonitions of the Fall 4

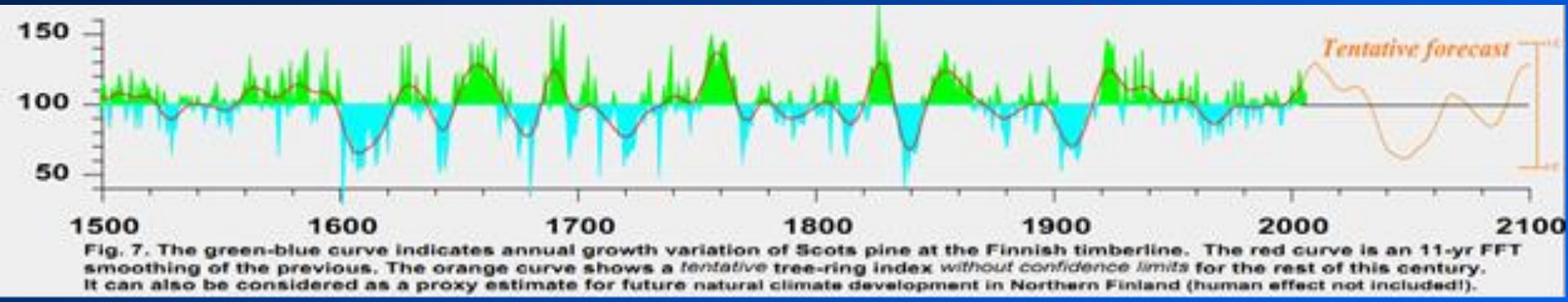
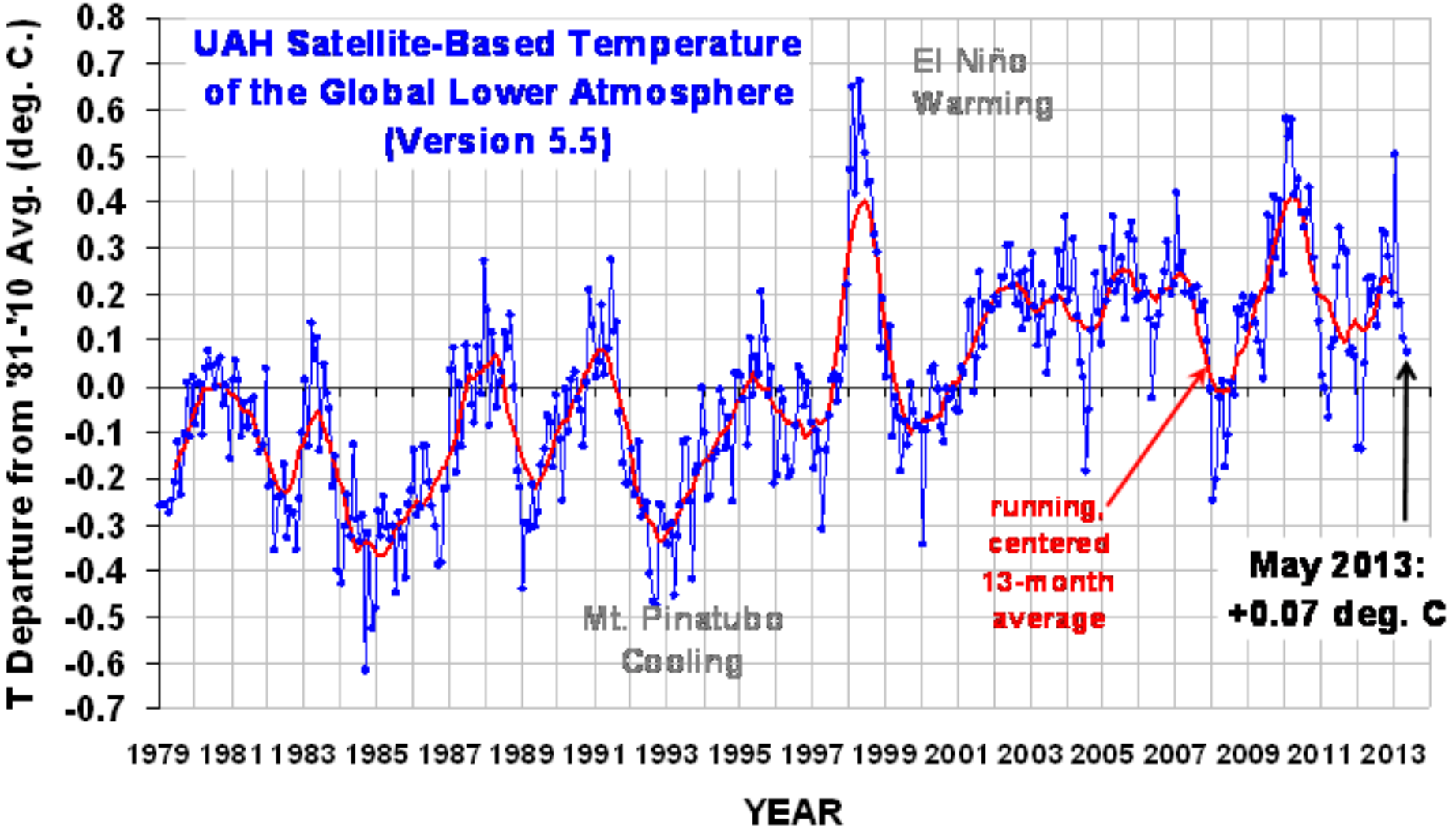


Fig. 7. The green-blue curve indicates annual growth variation of Scots pine at the Finnish timberline. The red curve is an 11-yr FFT smoothing of the previous. The orange curve shows a *tentative* tree-ring index *without confidence limits* for the rest of this century. It can also be considered as a proxy estimate for future natural climate development in Northern Finland (human effect not included!).

Finnish tree ring study predicts the biggest cold period for 500 years.

Timonen, M., Helema, S., Holopainen, J., Ogurtsov, M., Eronen, M., Lindholm, M., Merilainen, J and Mielikainen, K. 2007 "Climate patterns in Northern Fennoscandinavia during the Last Millenium" Xvii INQUA Congress

If a Mt Pinatubo-type eruption is overprinted on a solar-driven cooling event:

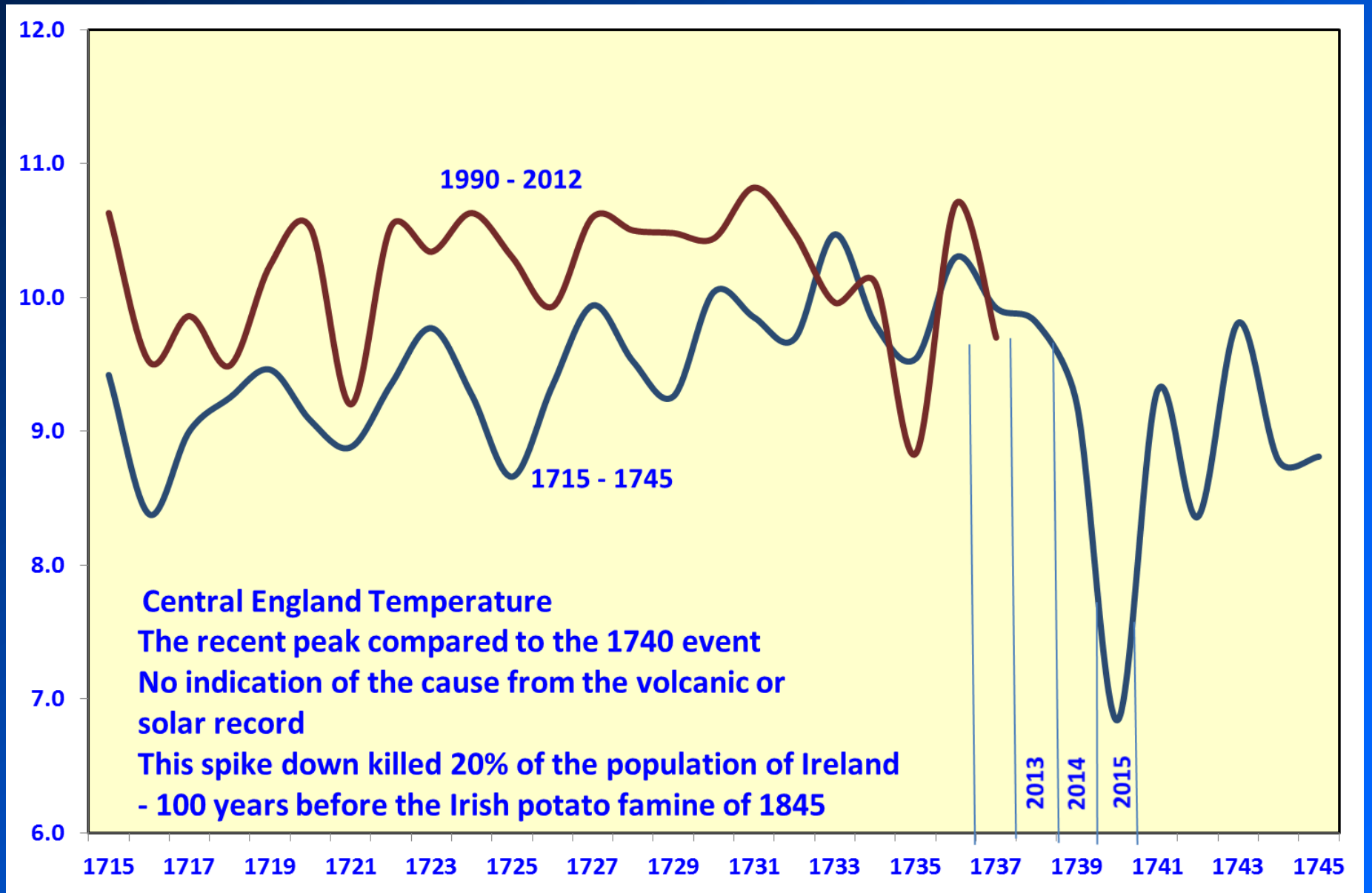


Then we get an 1816 – type crop failure event.

1816 Event – 50% Chance

- Mt Tambora in Indonesia erupted on 10th April, 1815.
- Average global temperatures decreased by 0.4 – 0.7° C.
- On 4th June 1816, frosts were reported in Connecticut.
- On 6th June 1816, snow fell in Albany and Maine.
- Oats rose from 12 cents a bushel to 92 cents a bushel.
- For the last 500 years, major volcanic eruptions averaged 45 years apart.
- One of these could easily reduce world grain production by 400 million tonnes.

And sometimes severe cooling comes out of the blue



Recommendations

1. Update the tree ring studies of Libby and Pandolfi and others to further refine their forecasts.

2. Develop the planetary-solar model of Ed Fix.

3. Model what the Corn Belt would produce each year for the period 1800 – 1850 using daily temperature data for that period. This will give an idea of the volatility in annual agricultural production coming.

Summary

1. The carbon dioxide heating effect is real but minuscule.
2. Carbon dioxide's heating effect is lost in the noise of the climate system.
3. There is a major solar-driven cooling under way.
4. The growing season will lose two weeks or more at each end with increased likelihood of killing frosts.

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