Oil and Climate

- The Threats to Australian Fuel and Food Security

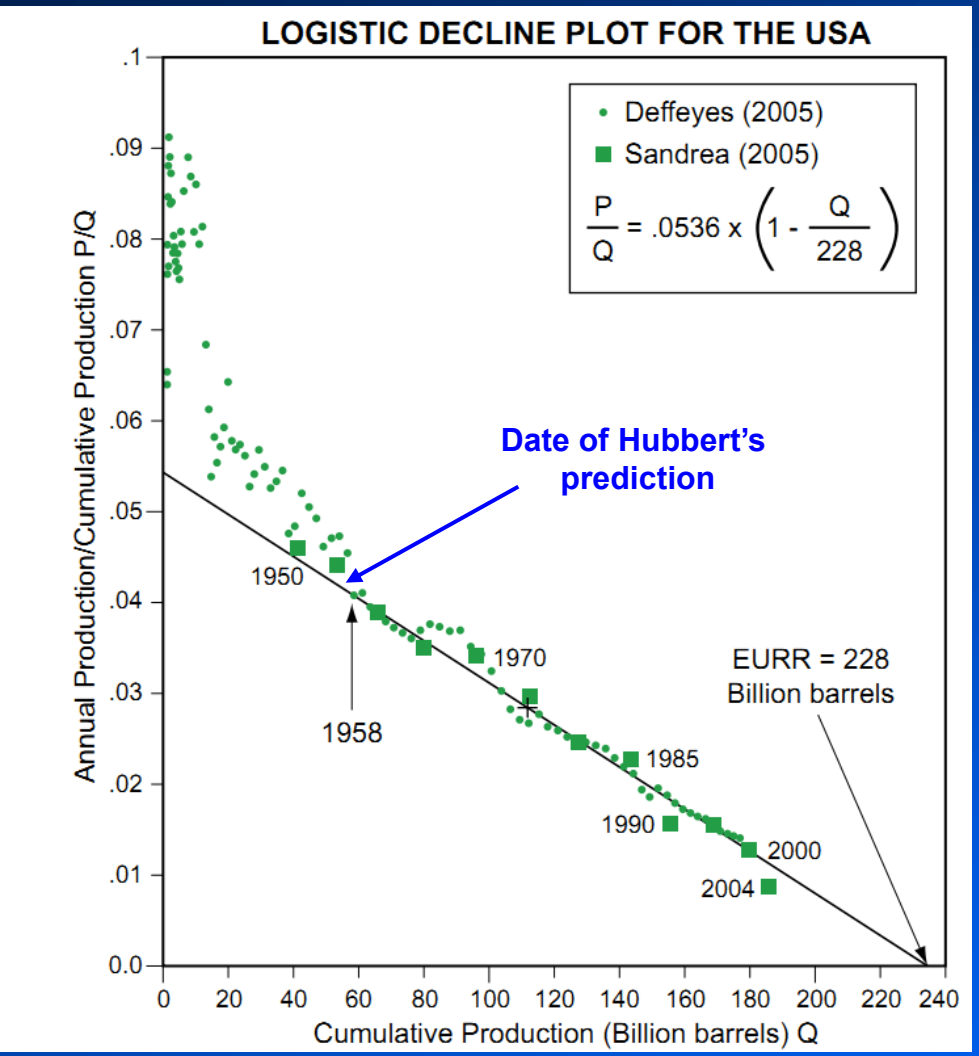
David Archibald

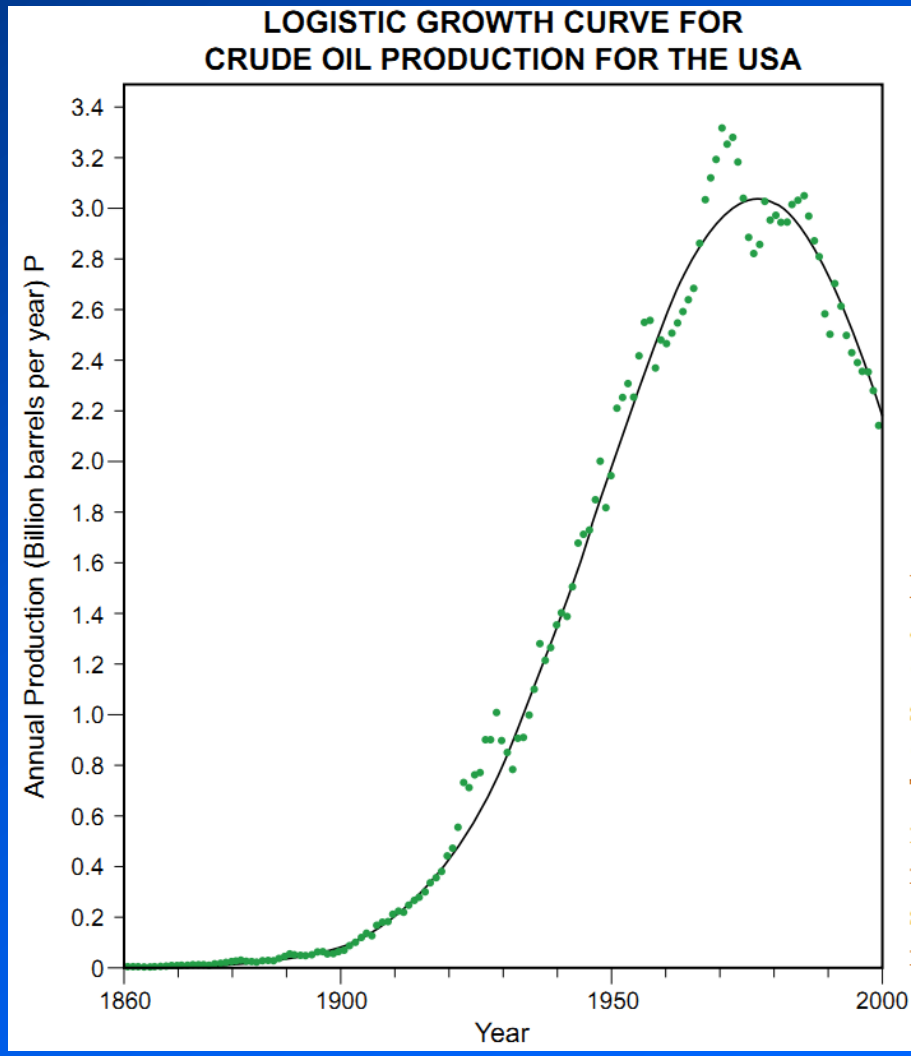
15th February 2012

11.30 am, Committee Room 1.S.5

Parliament House, Canberra

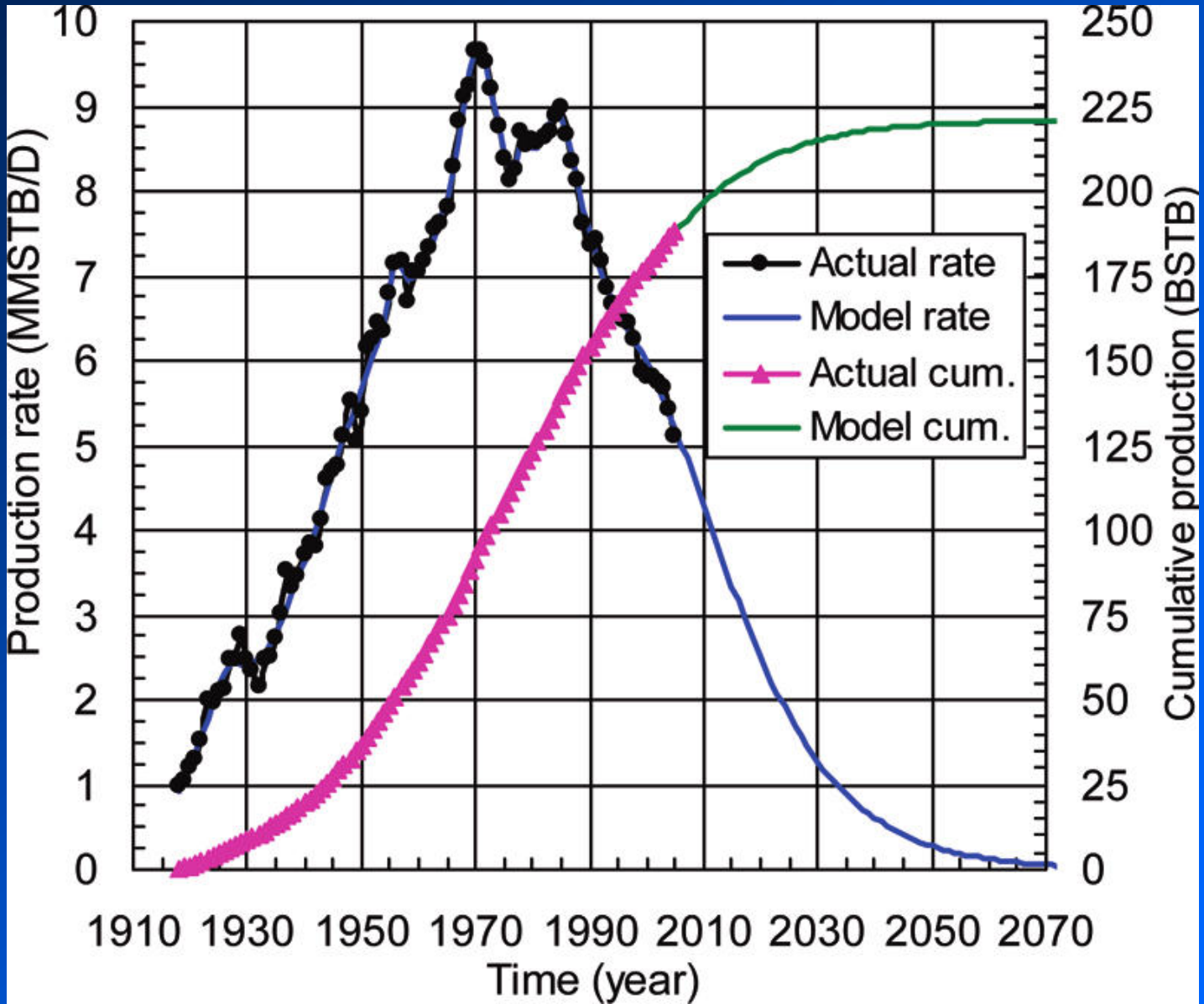
The most successful economic prediction ever made

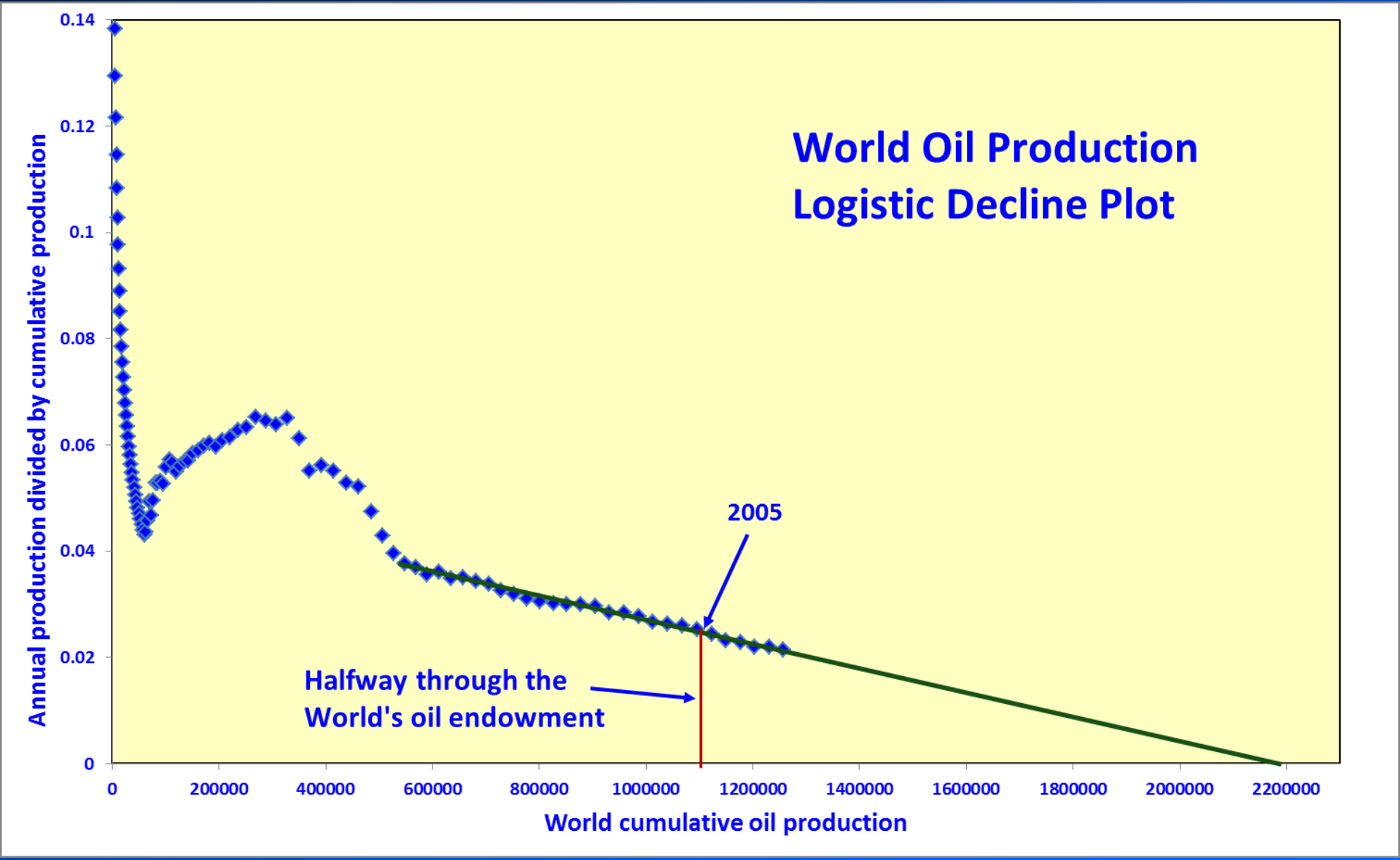




King Hubbert predicted in 1956 that US oil production would peak in 1970.

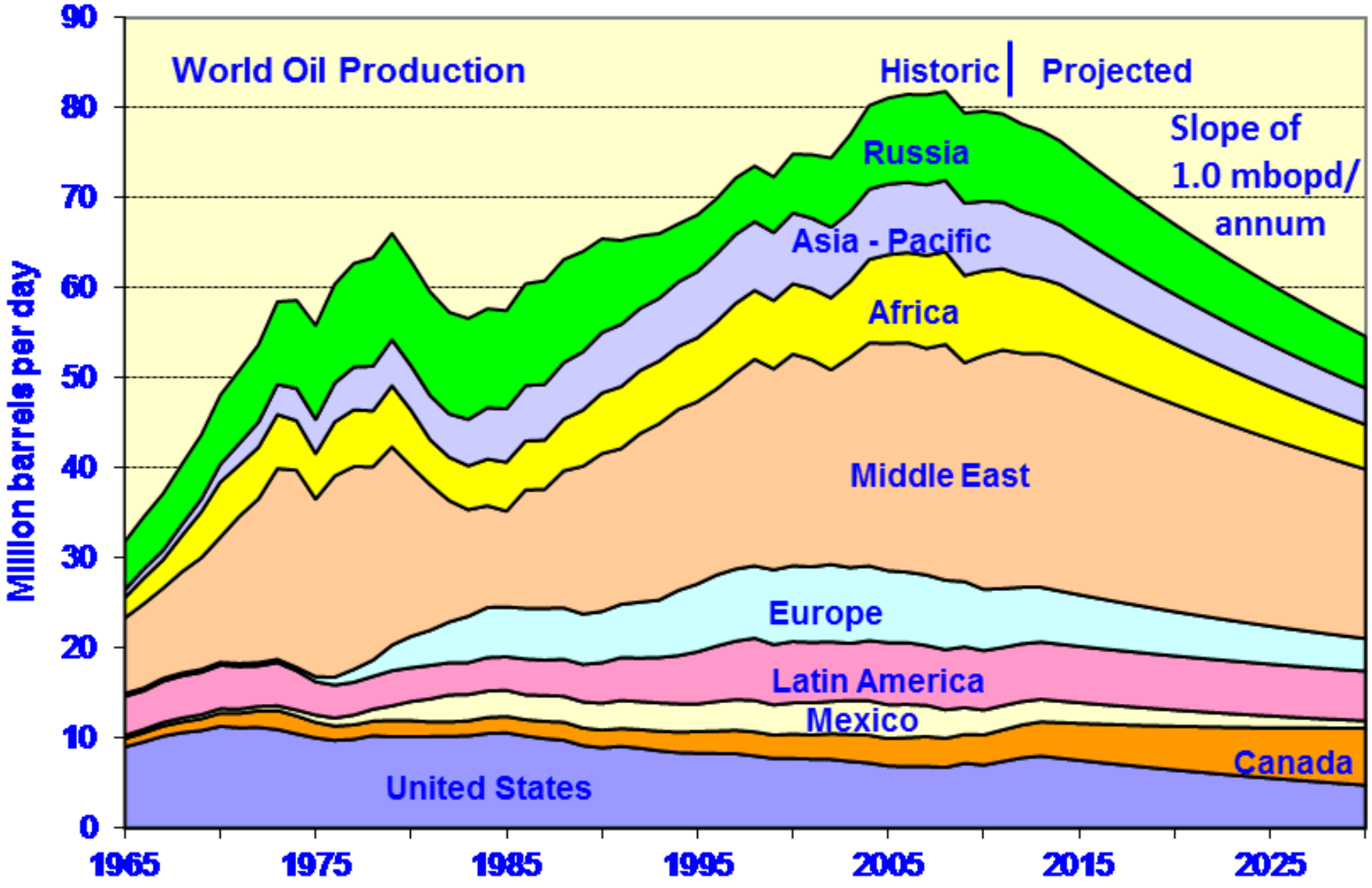
US production decline has entered its fourth decade.



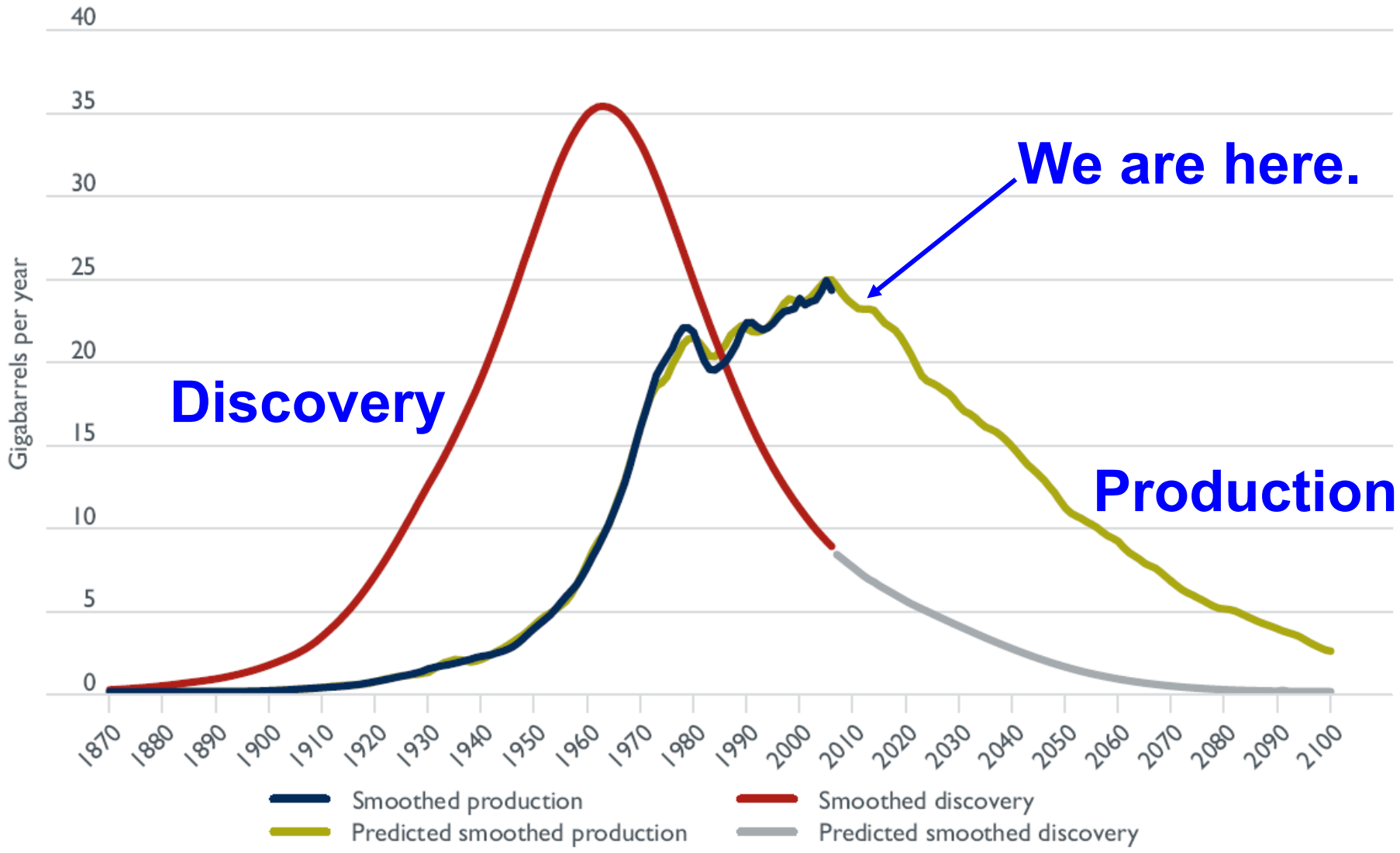


This is the cheap stuff - does not include shale oil, tar sands, natural gas liquids.

The decline will be 1.0 million barrels/day/year.



What the Australian Government doesn't want you to see: Figure 13.9 from Report 117.



Thanks to this Frenchman:

http://www.manicore.com/fichiers/Australian_Govt_Oil_supply_trends.pdf

- Cost of road crashes in Australia 2006 - Report 118 — **February 2010**

  Road crashes impose large human and financial costs on society and substantial investments are made in infrastructure and safety programs to reduce road trauma. The cost of road crashes is important to the safety debate in Australia, and the unit values particularly for a fatality, injury or cost of a fatal crash are key inputs into policy development and cost-benefit analysis for safety programs and infrastructure projects.

  This publication will incur a charge of $40.00, which includes postage and handling.

- Bass Strait Passenger Vehicle Equalisation Scheme 2007-09 — **December 2009**

  This report presents the results of the Bureau of Infrastructure, Transport and Regional Economics' (BITRE) twelfth review of the Bass Strait Passenger Vehicle Equalisation Scheme. This report covers the operation and impact of the Bass Strait Passenger Vehicle Equalisation Scheme for the period 1 July 2007 to 30 June 2009.

- Report 116 - A regional economy: a case study of Tasmania — **November 2008**

  The Department of Infrastructure, Transport, Regional Development and Local Government is committed to the prosperity of Australia's regions. In order to promote economic and social development it is important that we understand the environment in which regional economies operate. This study provides an analytical investigation of the challenges facing regional Australia.
  BITRE's study takes a multifaceted and holistic approach. The underlying principle is that economies do not work in isolation and a complex mix of interacting drivers affects a region's economic performance.
  Tasmania's economic performance has experienced changing fortunes over the past two decades. This development provided a unique opportunity to investigate the drivers of this change and to find out if there are lessons for regional policy.

- Report 115: Air transport services in regional Australia: trends and access — **July 2008**

Report 117 is missing.

– killed by Anthony Albanese

From: http://www.btre.gov.au/Info.aspx?NodeId=58
On about 15th January, 2011

Russian joke: The future is known. It is the past that keeps changing.

This is Orwellian: another report has been rebirthed as Report 117

- Report 118: Cost of road crashes in Australia 2006 **February 2010**

  Road crashes impose large human and financial costs on society and substantial investments are made in infrastructure and safety programs to reduce road trauma. The cost of road crashes is important to the safety debate in Australia, and the unit values particularly for a fatality, injury or cost of a fatal crash are key inputs into policy development and cost-benefit analysis for safety programs and infrastructure projects.

- Report 117: Aircraft Movements through Capital City Airports to 2029-30 **January 2010**

  This report presents forecasts of air passenger and aircraft movements through Australia's eight capital city airports (Adelaide, Brisbane, Canberra, Darwin, Hobart, Melbourne, Perth and
  Sydney) to 2030. The forecasts of aircraft movements have been developed on the basis of the
  long-term forecasts of air passenger movements, aircraft size and seat utilisation rates.

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From: http://www.btre.gov.au/Info.aspx?NodeId=58
On 12th February, 2011

The new Report 117

Australian Government
Department of Infrastructure and Transport
Bureau of Infrastructure, Transport and Regional Economics

Infrastructure | Transport | Aviation | Roads | Rail | Maritime | The Department

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Report 117: Aircraft Movements through Capital City Airports to 2029-30

Report 117 **Category: aviation**

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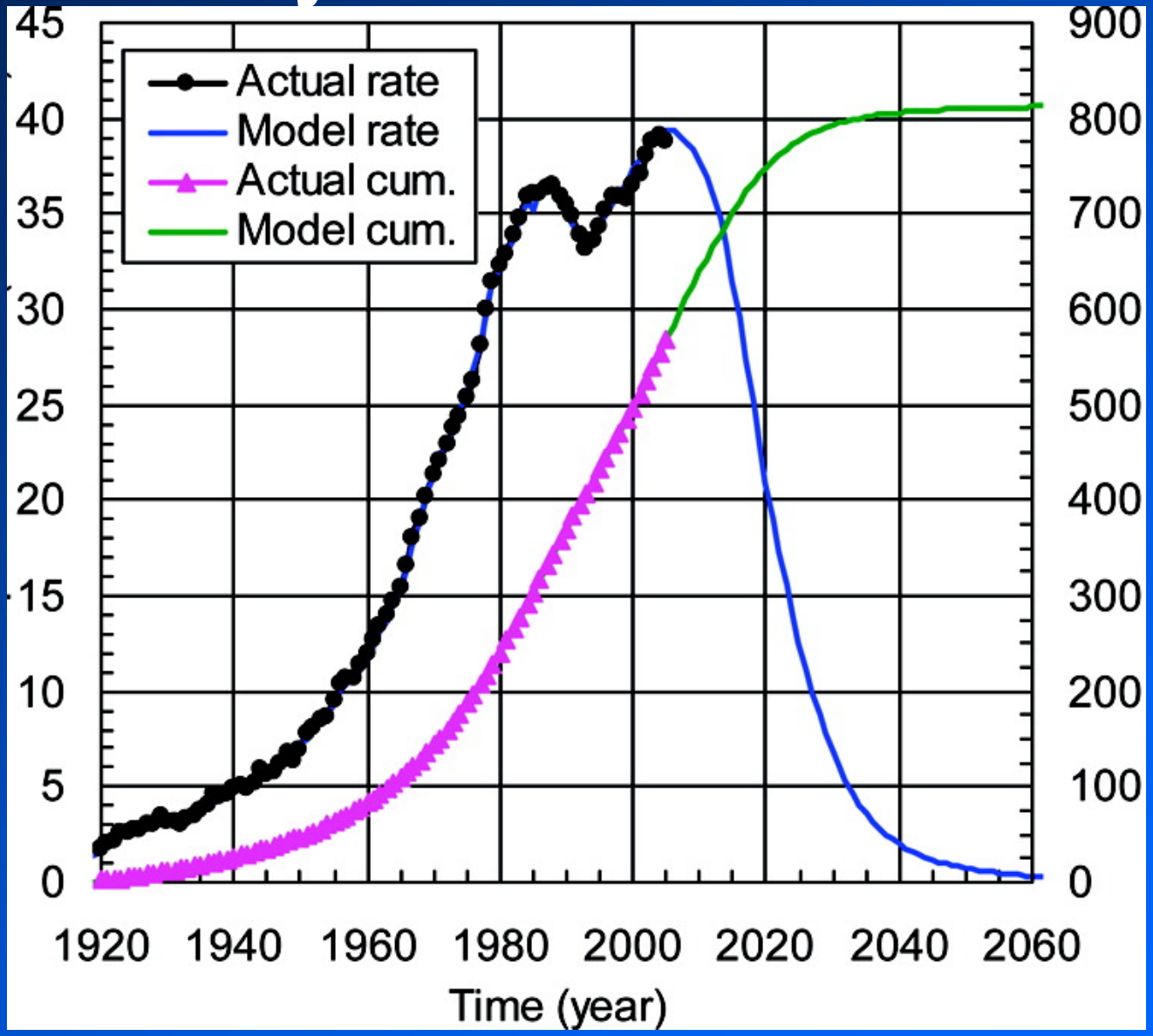
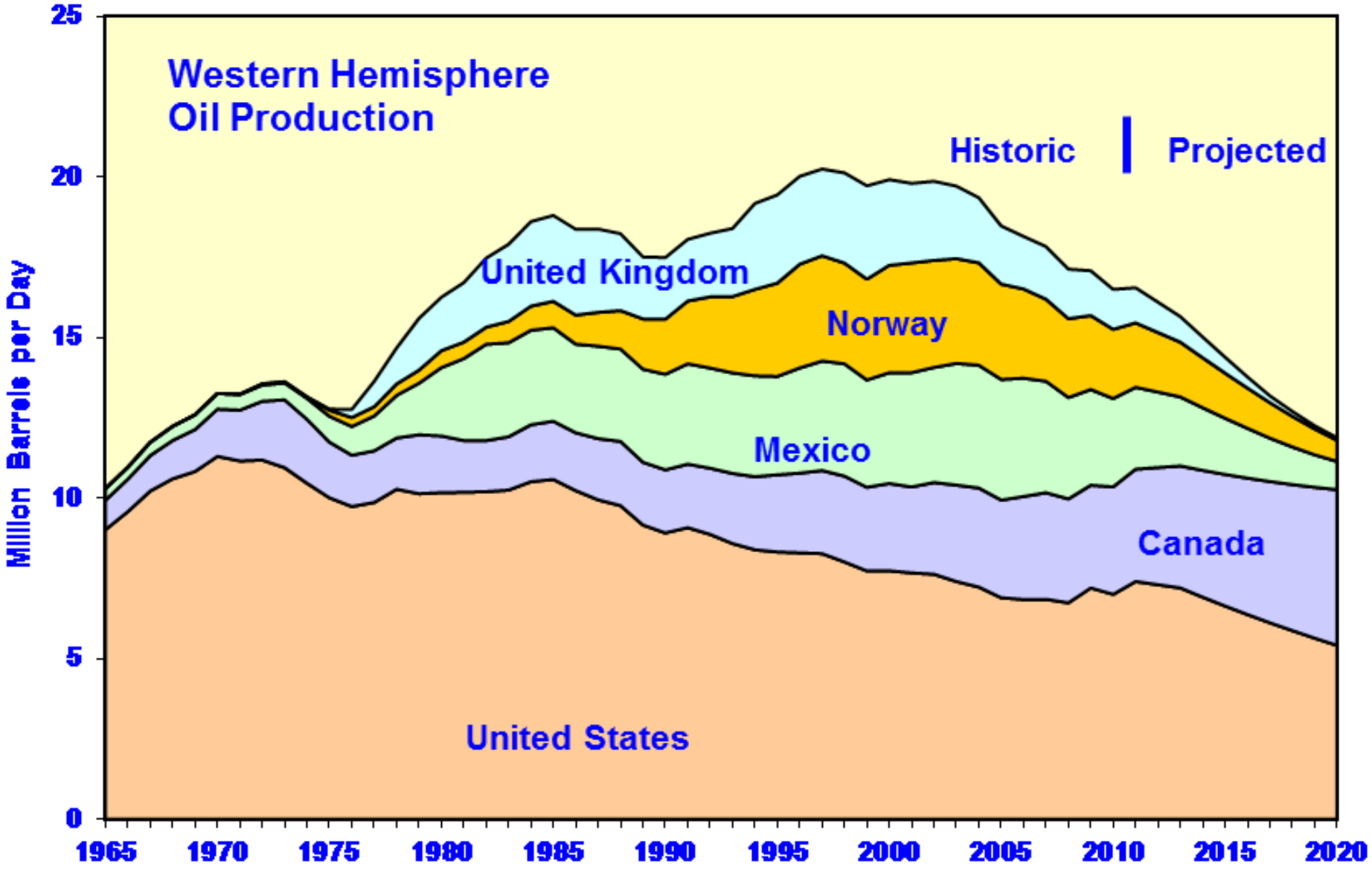
Date of Publication
January 2010

Non-OPEC production will fall 20 million BOPD by the end of the decade.

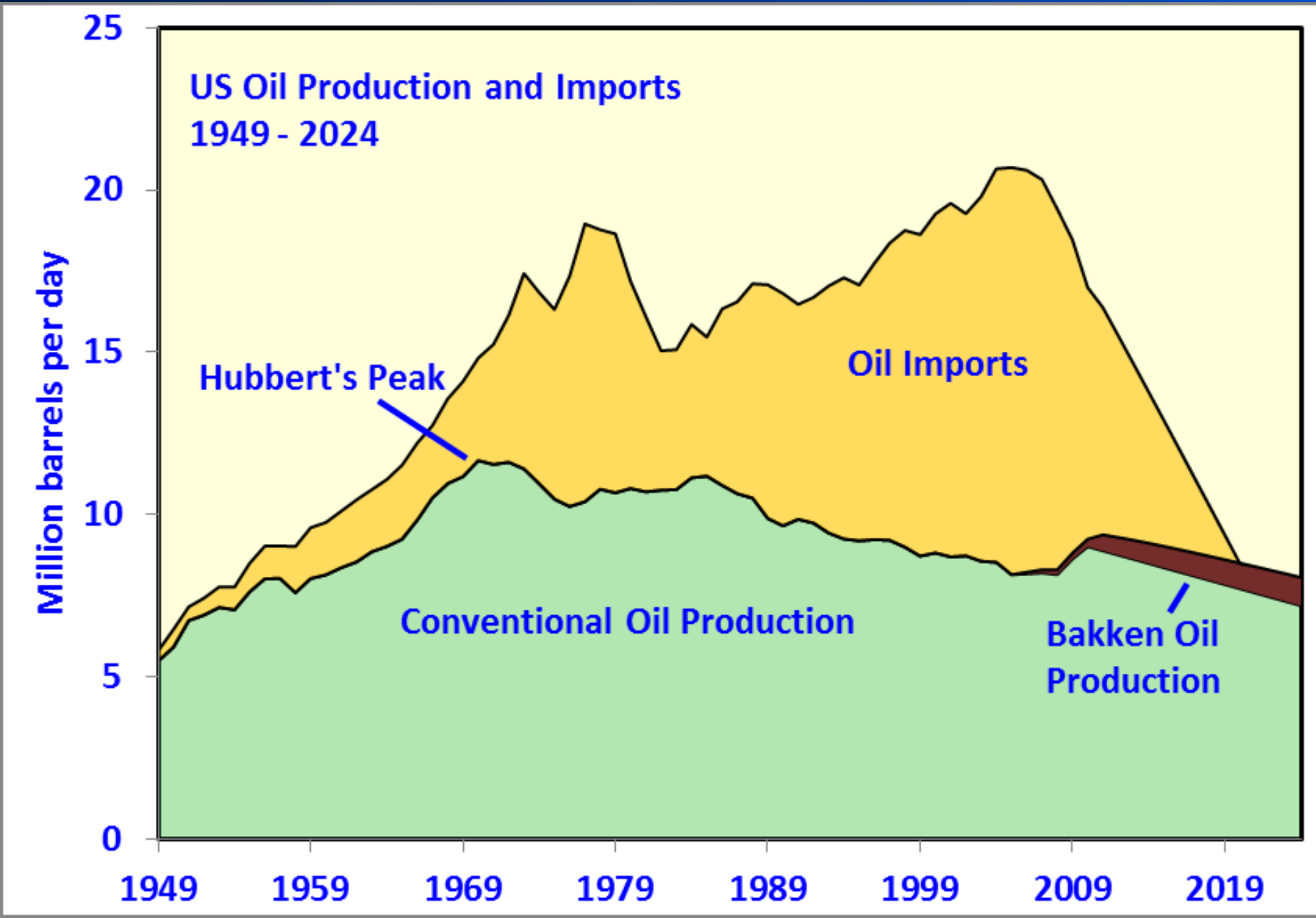


Source: http://pubs.acs.org/stoken/presspac/presspac/full/10.1021/ef901240p

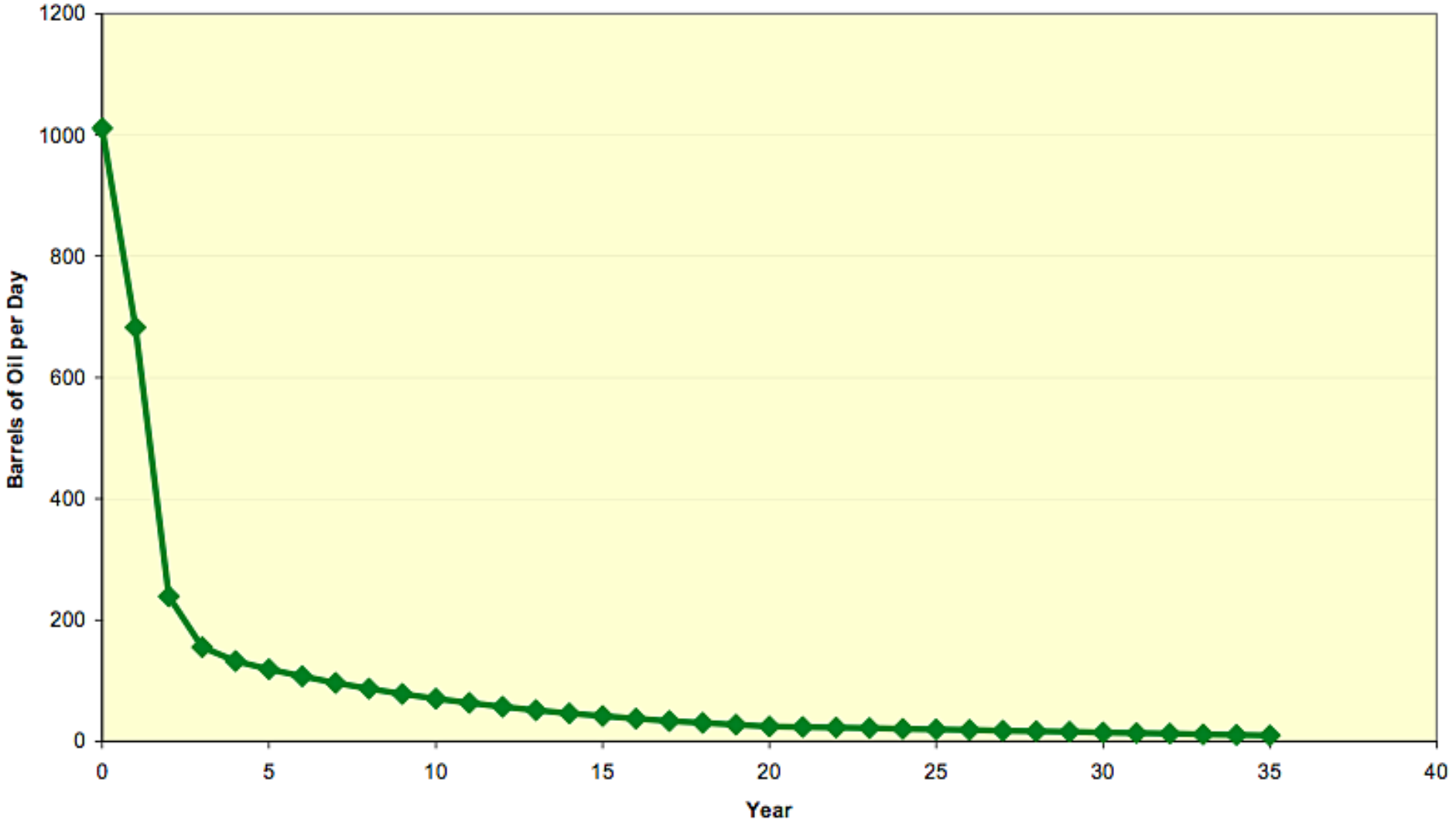
Western Hemisphere production contracts



Price-Driven US Energy Independence

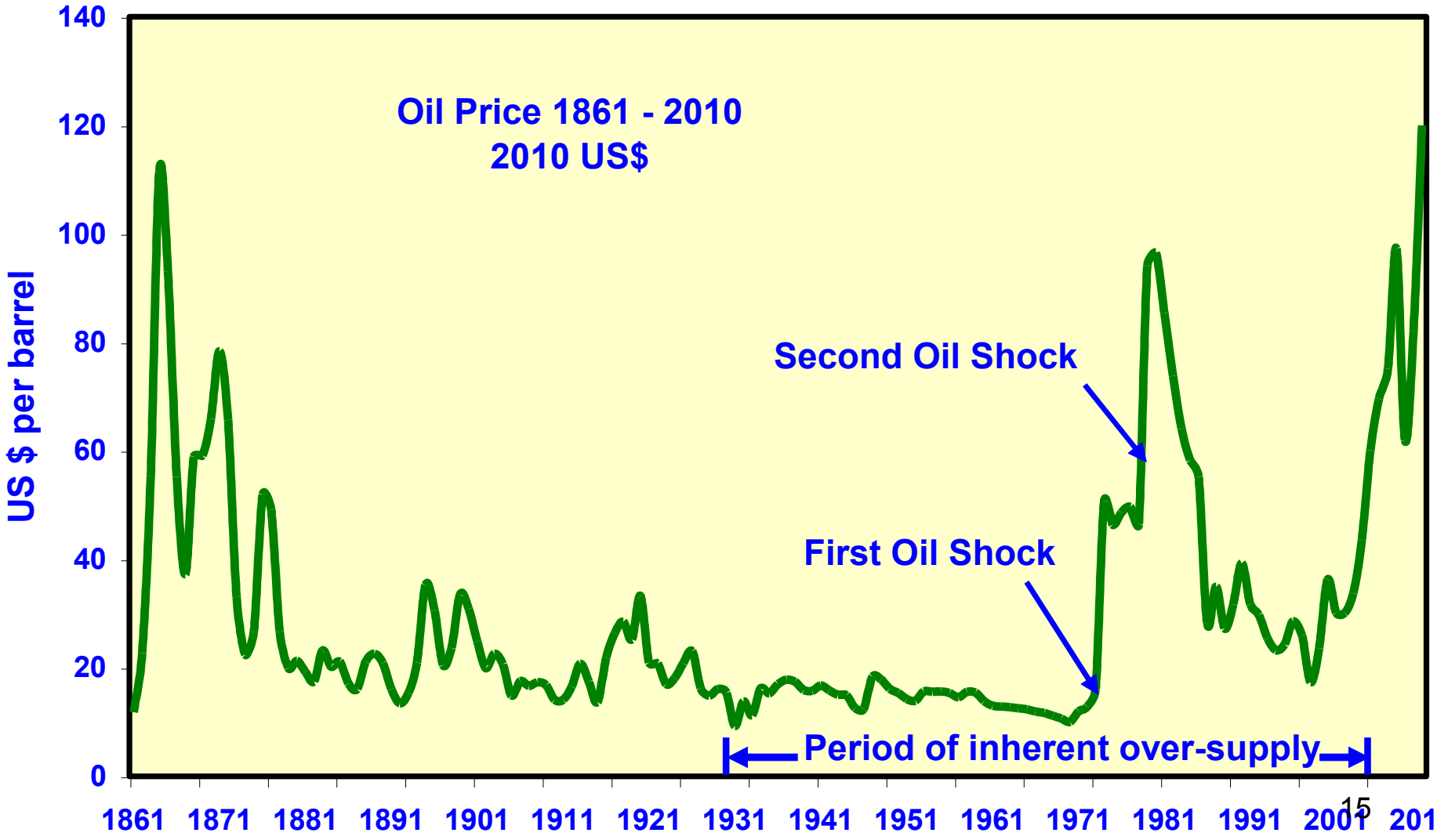


Typical Bakken shale oil production decline

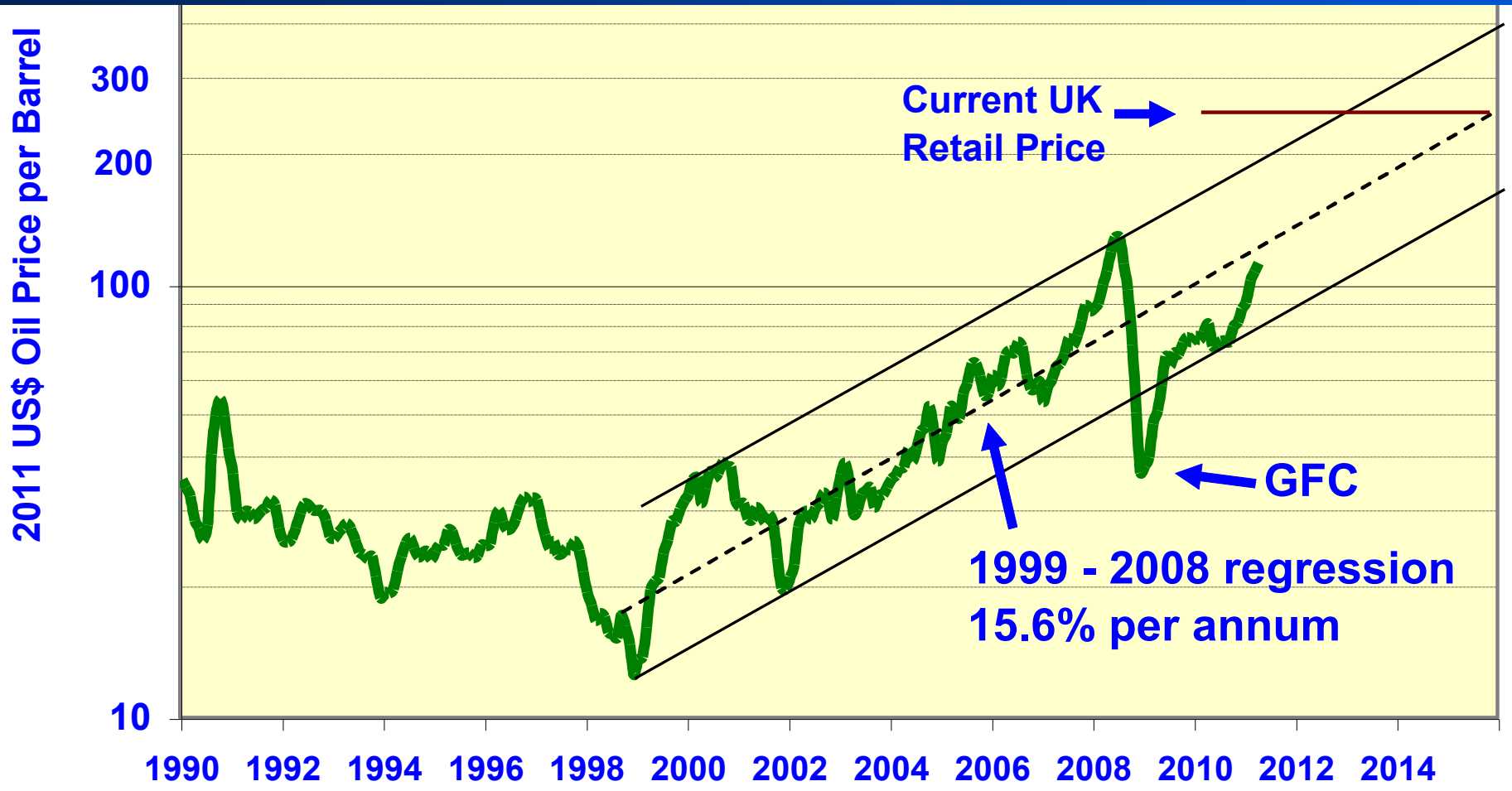


Down to 15% by year three

Historic Oil Price

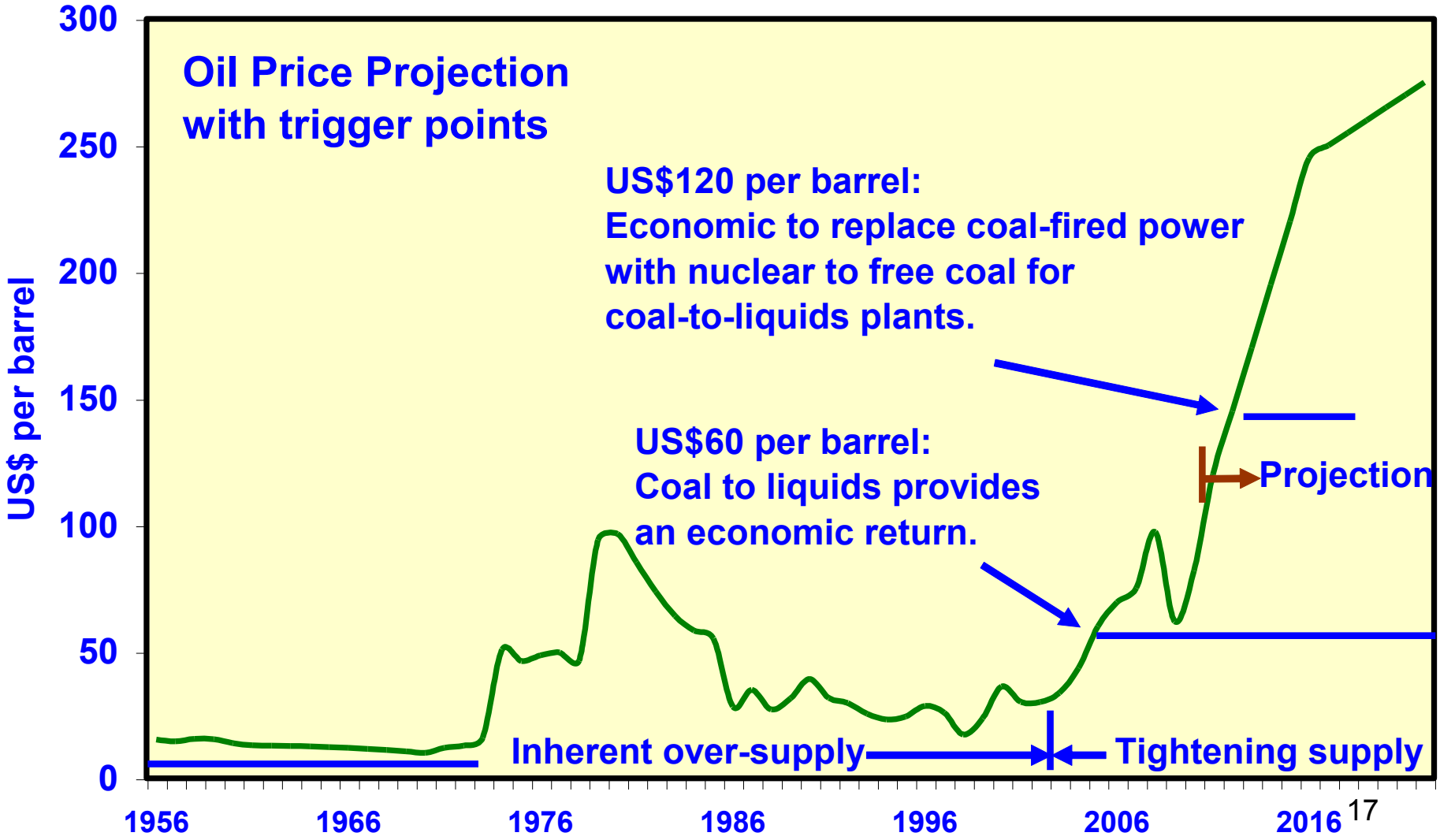


Oil Price Logarithmic Chart

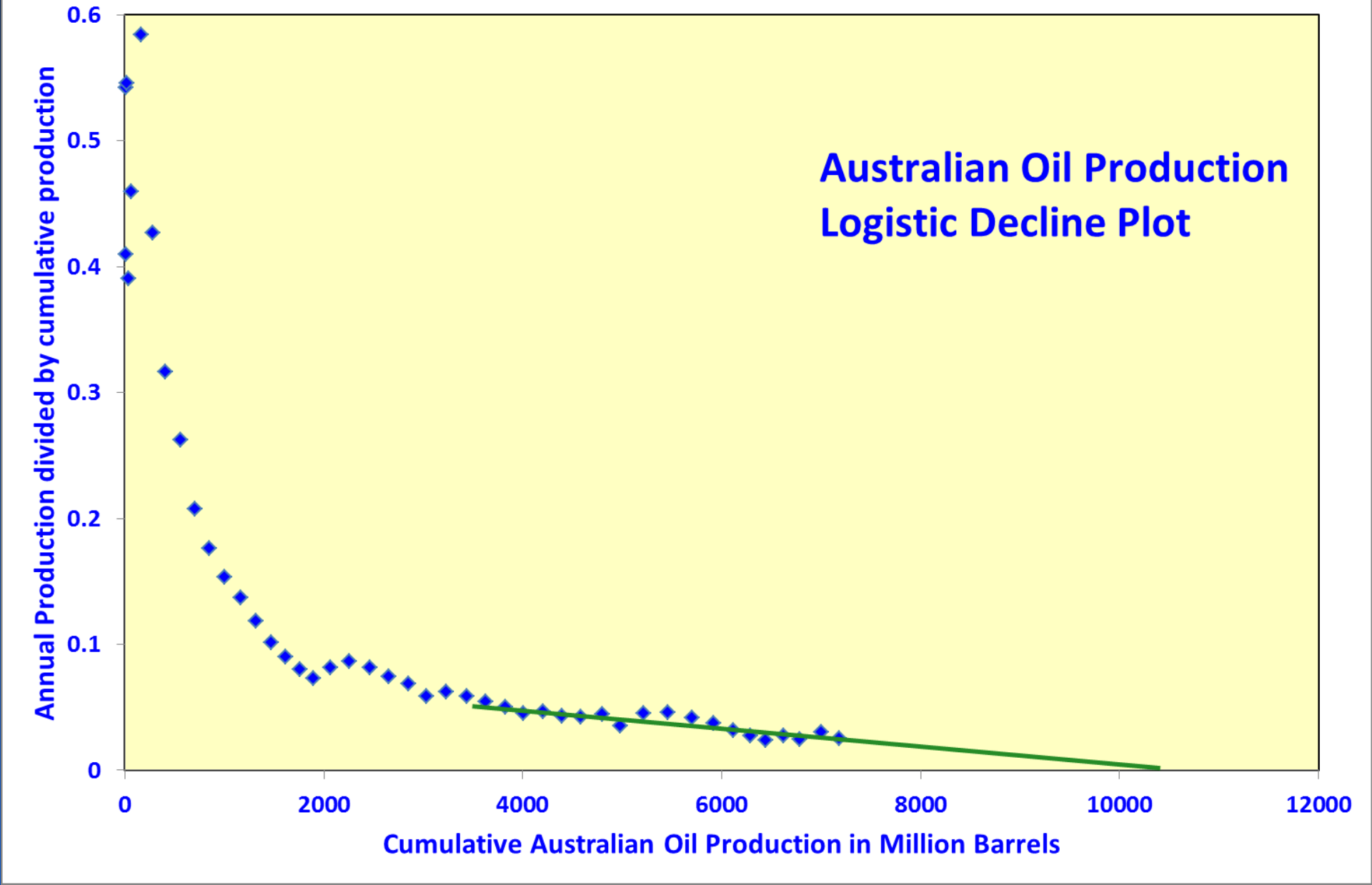


Will the established trend hold - $200/bbl by 2014?

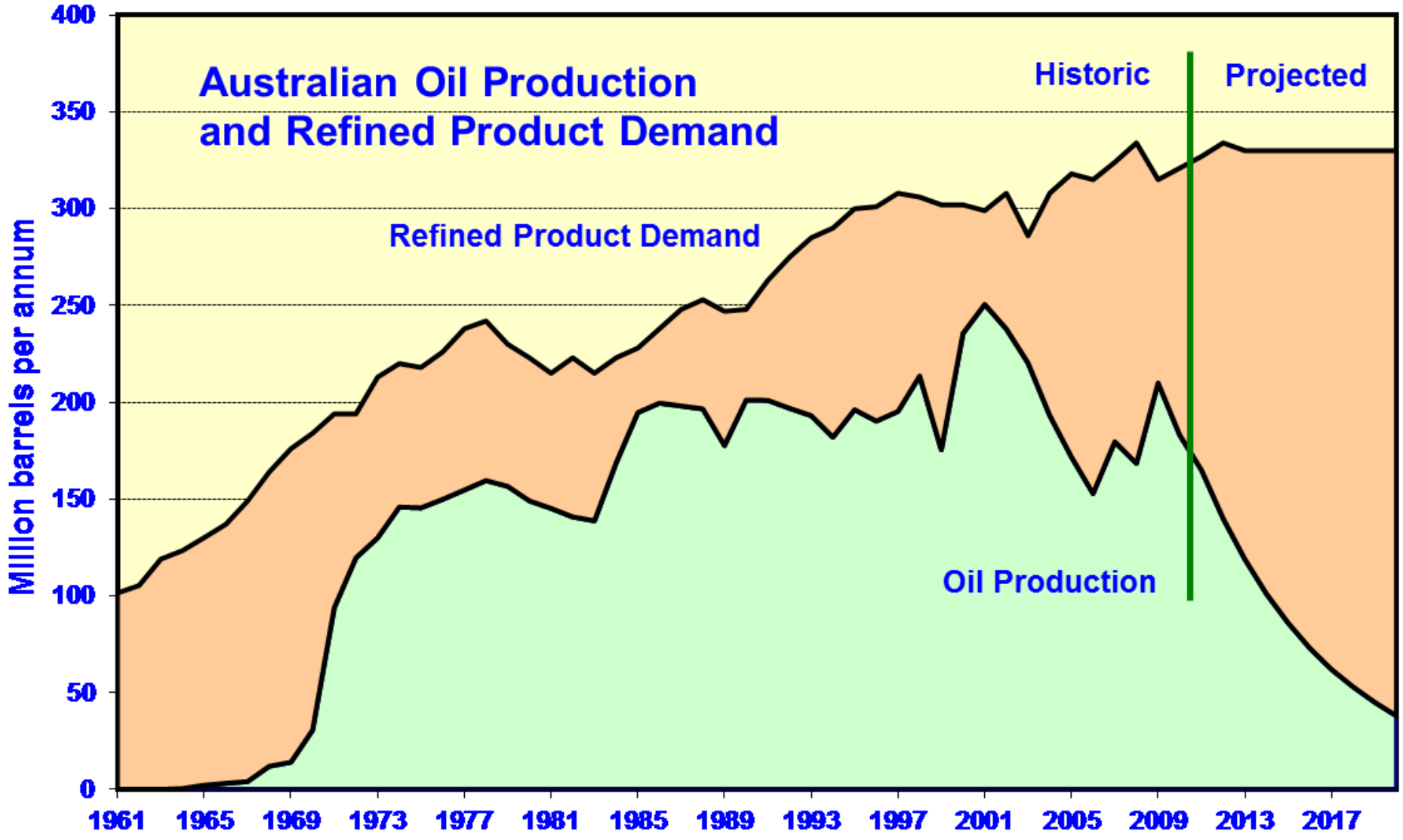
The oil price will drive nuclear plant building.



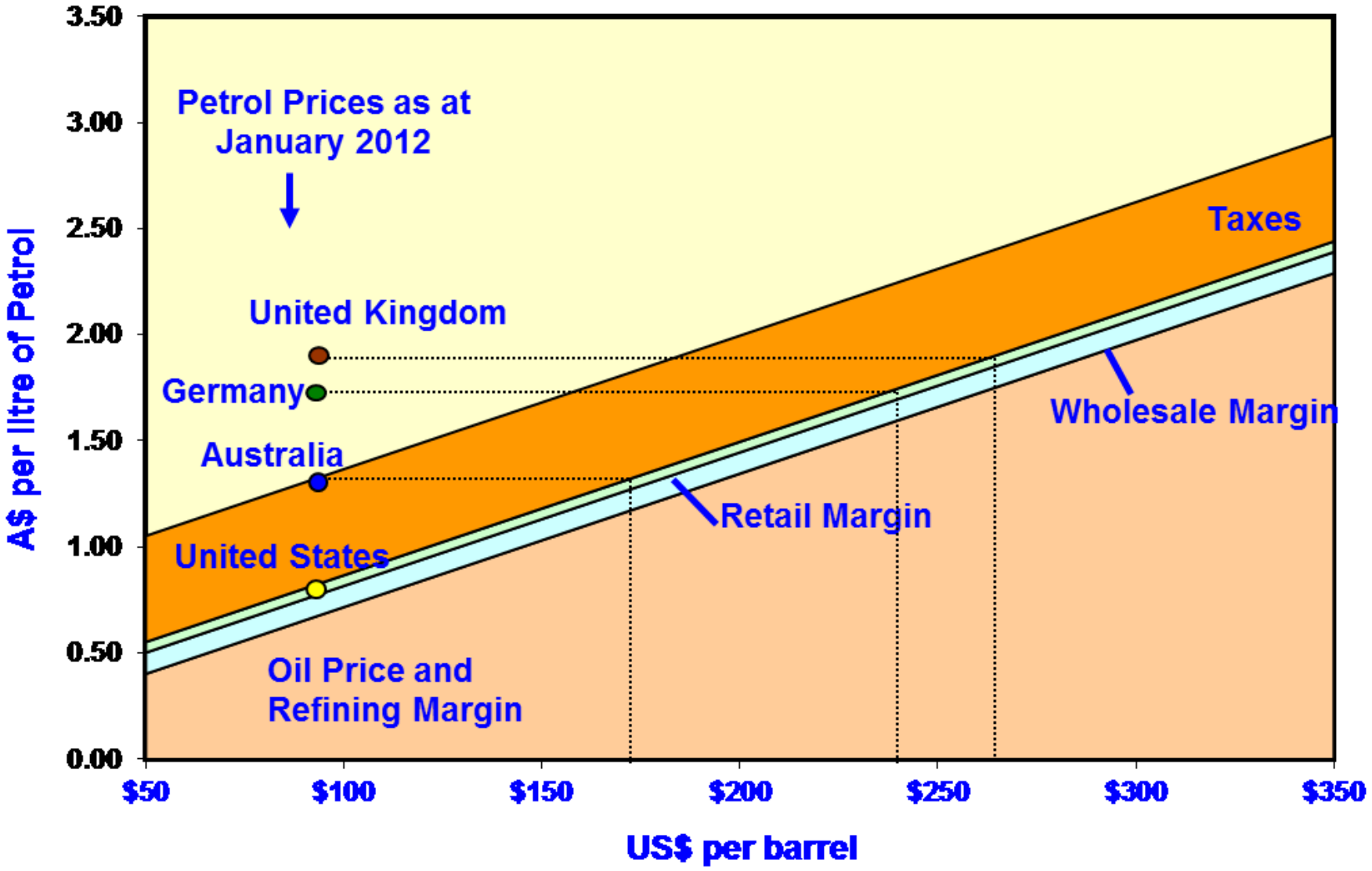
We have produced 75% of the oil Australia will ever produce.



Australian oil production falling off a cliff



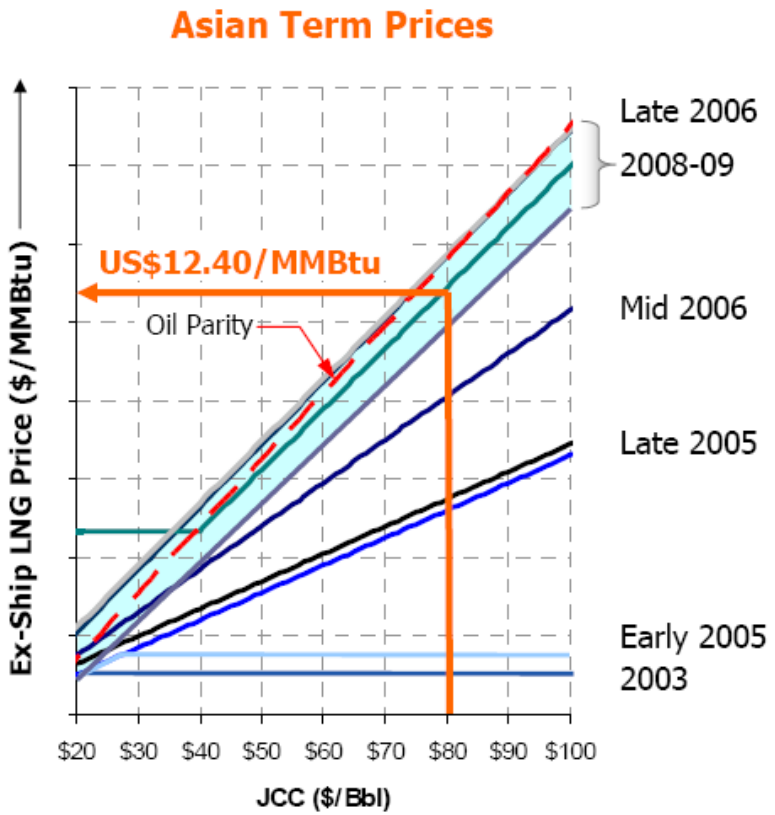
Variation with Oil Price



Australians are paying US$190/bbl for petrol, Germany US$340/bbl

The stupidity of displacing coal with natural gas to make electric power.

Continue to See Strong Long Term LNG Pricing



Source: Poten & Partners

- Recent contracts point to strong underlying demand
- Pricing reflects new supply-demand equilibrium
- Long-term Asia-Pacific pricing remains oil-linked

Might as well be burning oil.

Santos 4th March 2010

Santos
We have the energy.

The optimal solution

Rebuild the energy sector:

1. **Coal-to-Liquids (CTL) and compressed natural gas (CNG) replaces declining oil production.**
2. **Nuclear replaces coal for power generation as coal becomes too valuable as CTL feedstock.**
3. **Develop thorium reactors to replace uranium in nuclear energy.**

Two Problems

1. After four decades of being largely self sufficient in liquid fuels, Australia is now becoming highly exposed to potential supply disruption, with potentially catastrophic consequences for the economy and national security.

2. The trade deficit is going to balloon out.

Kim Beazley

Address to the Australian Institute of Company Directors

19th October, 2005

As Australians queue for petrol at around $4.00, $5.00 potentially up to $10.00 a litre even further down the track, the questions will be:

… how had our Governments not seen the writing on the wall?

… didn't our leaders foresee the soaring demand?

… didn't our leaders do their sums and realise demand would outstrip supply?

… couldn't they foresee the threats to supply?

.... why didn't they put the national interest first?

… and why was Australia so unprepared?

Binary Outcome

Either:

Australia continues as is with potential for enormous economic disruption from supply squeezes and a ballooning trade deficit.

Or:

Australia installs Coal-To-Liquids capacity, insulates itself from supply disruptions and generates a large amount of company tax in the process.

Solution: Coal-to-Liquids

- The breakeven price for CTL projects is about $70 per barrel.

- Modelling of a 50,000 bopd plant has the following results at US$100/bbl:

Capital Cost:	$4,200 million
NPV at 10% discount rate:	$8,850 million
IRR:	25%

- US$100/bbl is A$0.77 per litre pre taxes.

The Virtues of Coal-to-Liquids

1. CTL will make Australia impervious to oil supply disruptions.

2. CTL will stop an enormous blow out in the trade deficit.

3. The capital cost per annual barrel of capacity at about A$300/barrel will be not much more than the oil price.

4. Backing out 800,000 BOPD of imports by 2015 at US$200/barrel will result in $17 billion of company tax being paid.

Australian CTL Potential

- The Latrobe Valley has 200 billion tonnes of lignite – this could make 120 billion barrels of diesel and refinery feedstock.
- We have billions of tonnes of lignite in a belt stretching from Esperance in WA to east of Adelaide.
- Distributed diesel production would contribute to fuel supply security.
- The Fischer-Tropsch process can operate at very high ash levels.
- Coal is diesel that has yet to go through a Fischer-Tropsch plant.

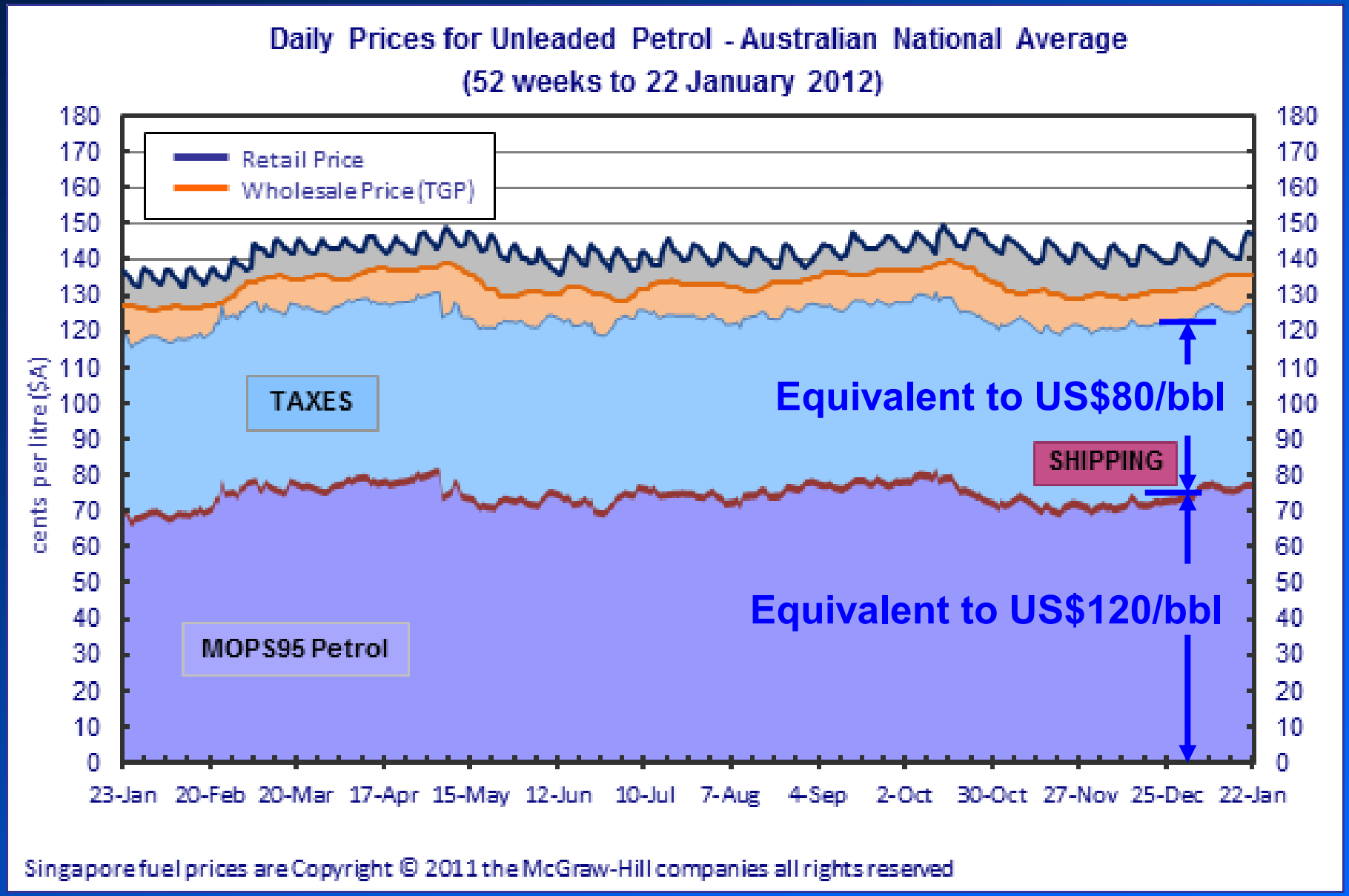
Great Plains Synfuels Plant
North Dakota

Annual consumption is 6 million tonnes of lignite to produce 54 billion cubic feet of synthetic natural Gas – equivalent to 10,000 barrels/day.

It could be making diesel, and jet fuel.

Pathfinder for Latrobe Valley CTL Plants

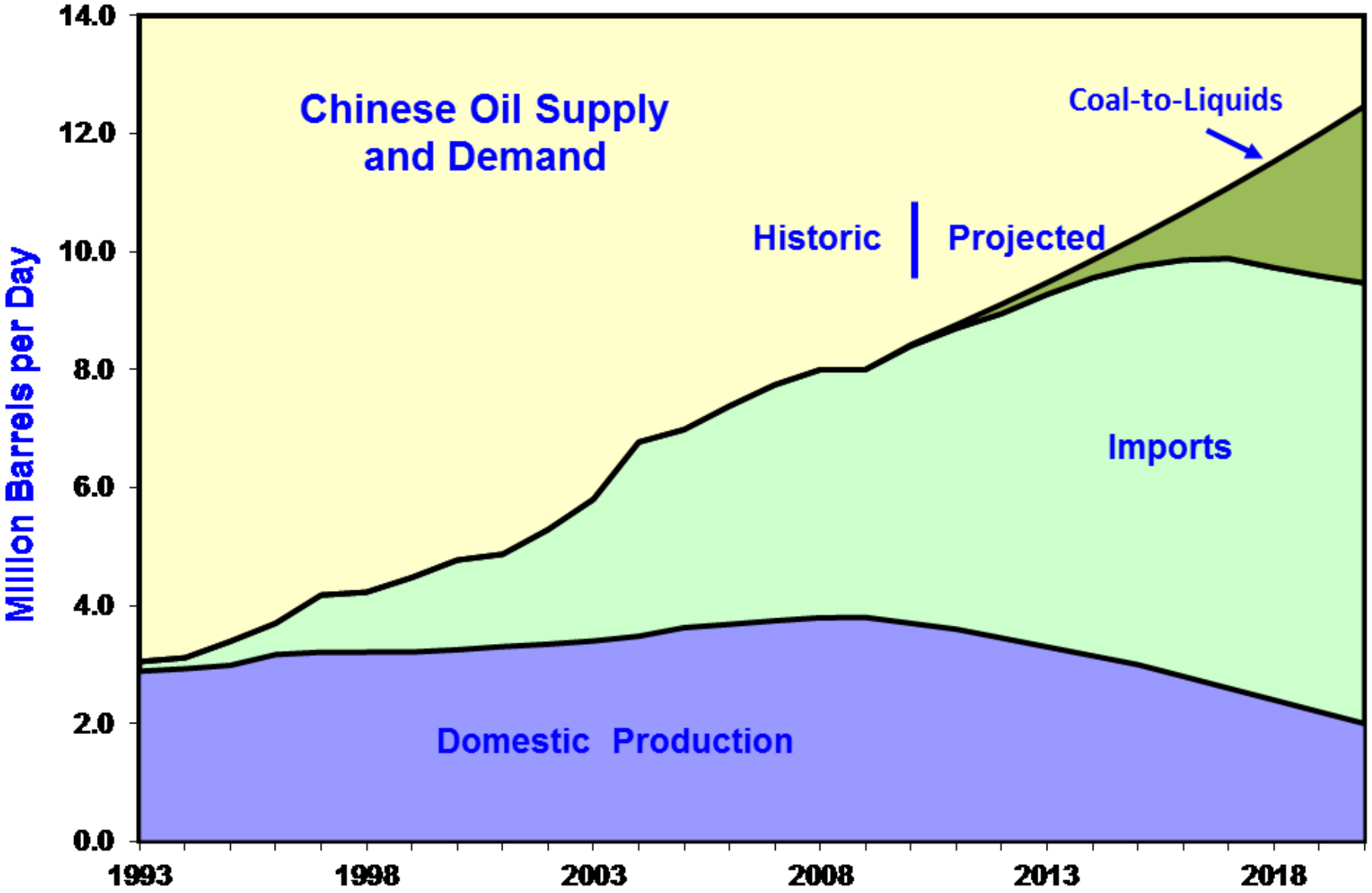
Cost Makeup of Australian Petrol



US$200/bbl = A$2.10 per litre

Source: http://www.aip.com.au/pricing/snapshot.htm

China is leaving oil before the rest of us.

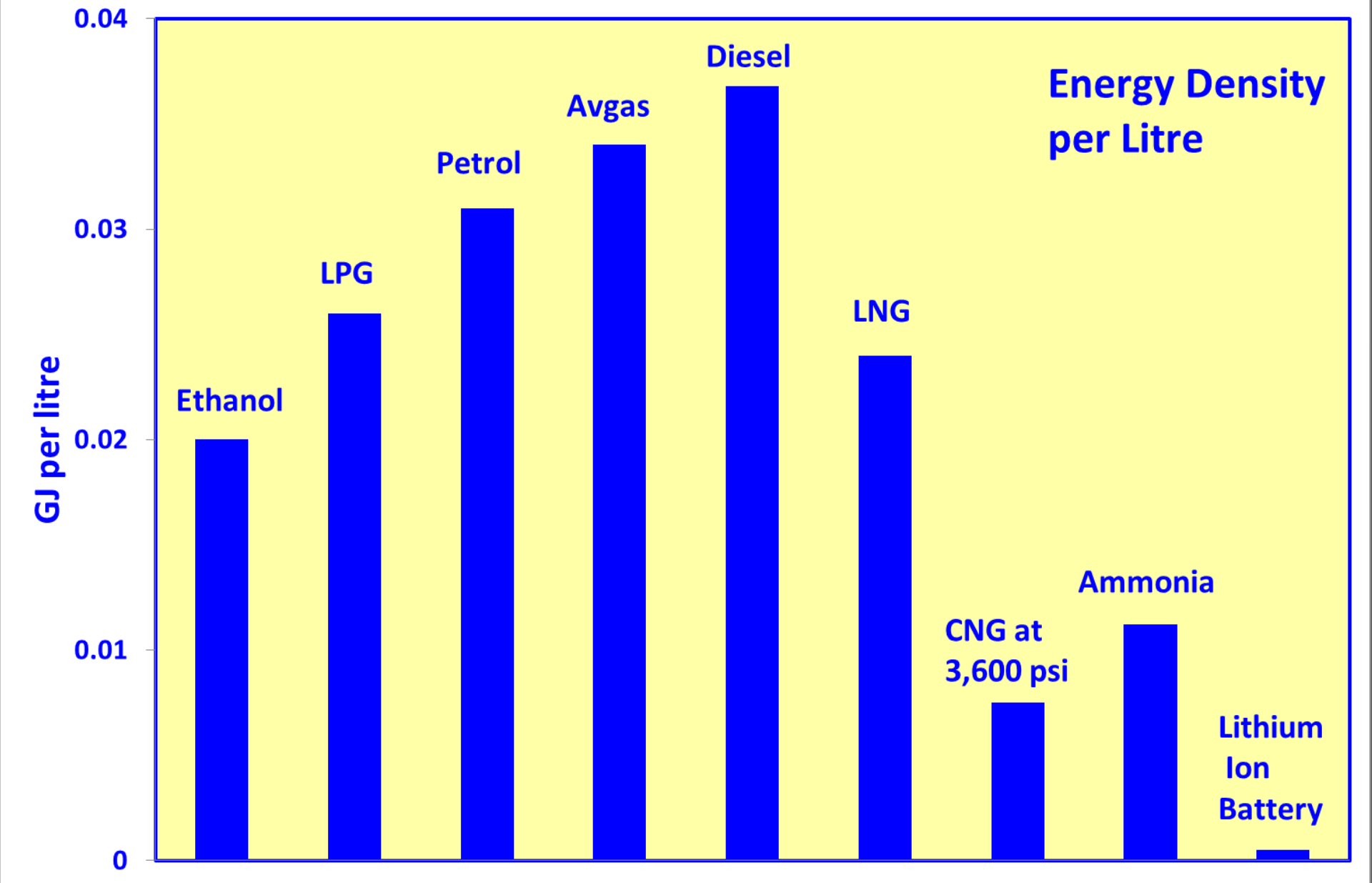


Coal-to-Liquids in China is advancing rapidly.

- Three Fischer-Tropsch and one liquefaction plant commissioned.
- A further three Fischer-Tropsch plants under construction.
- Total planned production in excess of 600,000 barrels per day.
- From ASIACHEM 2011: "Chinese CTL investors will pay active efforts in preliminary works for mega size CTL projects starting from 2011 and may realise commissioning of such projects before the year 2015"

Australia should put in as least as much CTL capacity as China is.

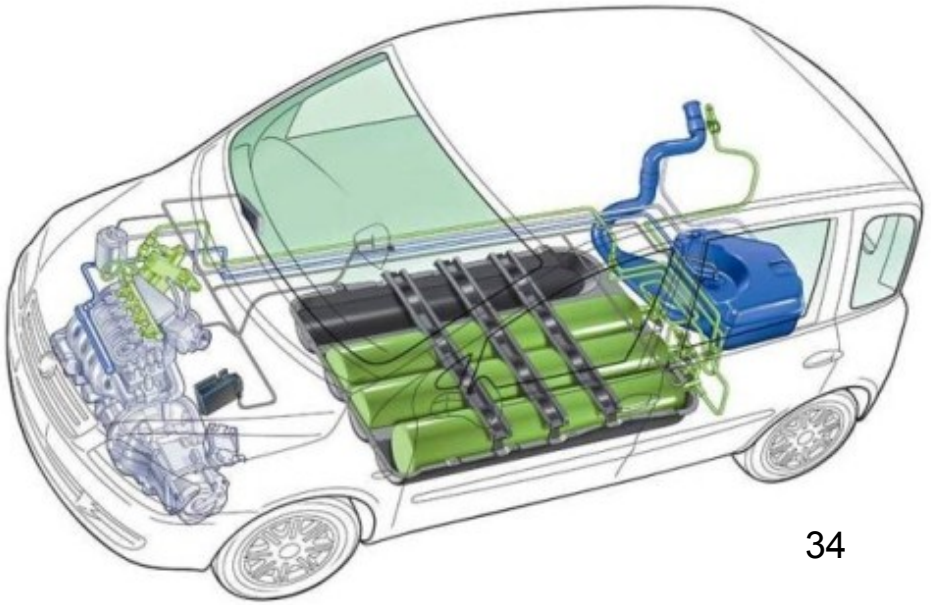
Energy Density of Transport Fuels



Natural gas vehicles – the electric car alternative

Fiat Panda with capacity for 12 kg of natural gas and has 30 litres of petrol backup

In a recent test in Europe, it did 720 km on €30 of natural gas - €0.04 per km



Relative efficiency of use of natural gas

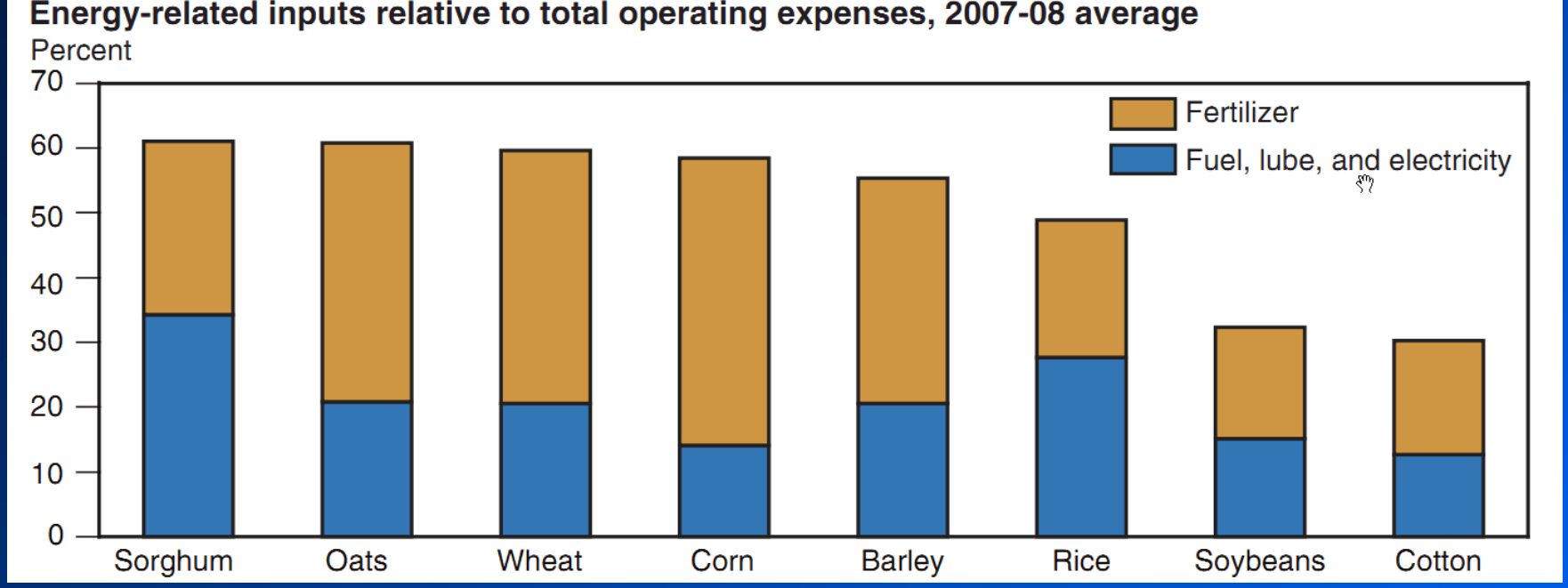
	Natural Gas Vehicle		Electric Vehicle
1.0	unit of energy	1.00	unit of energy
0.5	four stroke engine	0.40	conversion to electric power
		0.36	delivered after transmission loss
		0.25	after charge/discharge loss
0.5	power to wheels	0.25	power to wheels

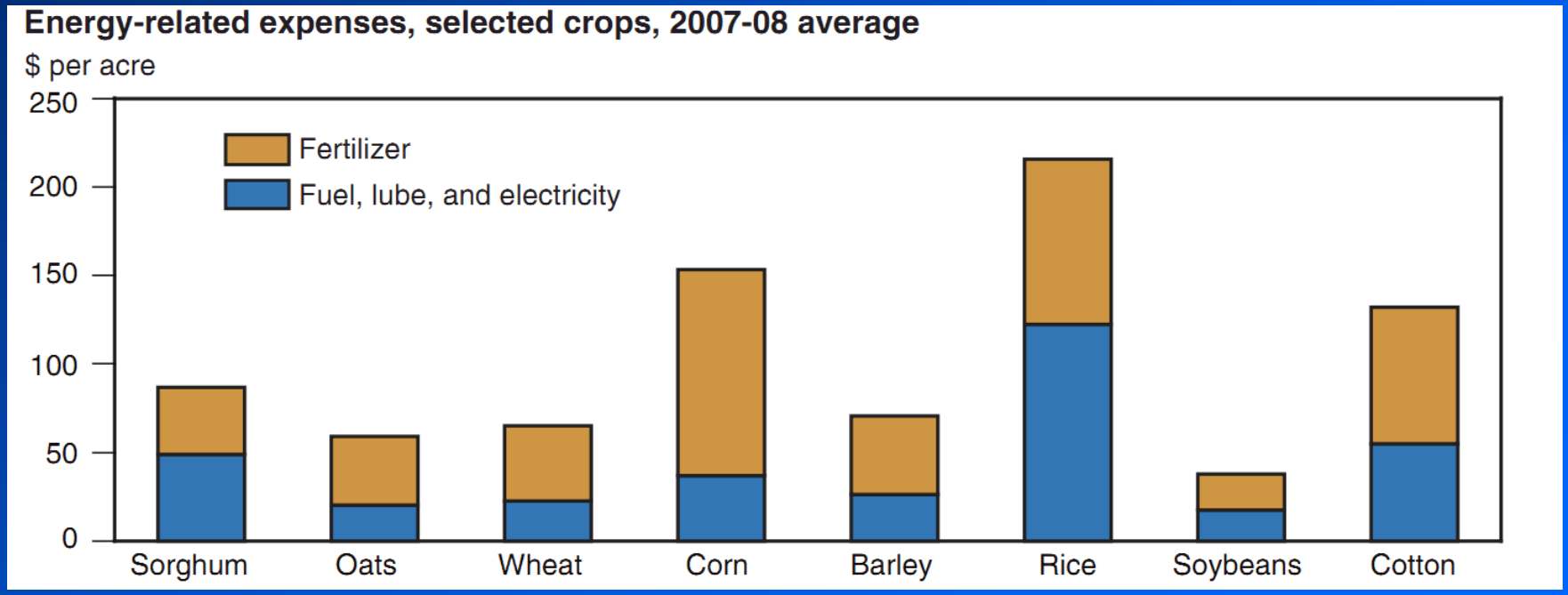
Therefore the electric car future should be nuclear-powered.

CTL will take our coal endowment 30% further than the power station / electric car route.

Coal-to-Liquids	Electric Vehicles
1.00 unit of energy	1.00 unit of energy
0.60 conversion to diesel	0.36 conversion to electric power
	0.32 delivered after transmission loss
	0.23 after charge/discharge loss
0.30 power to wheels	0.23 power to wheels

Diesel is storable, electric power isn't.



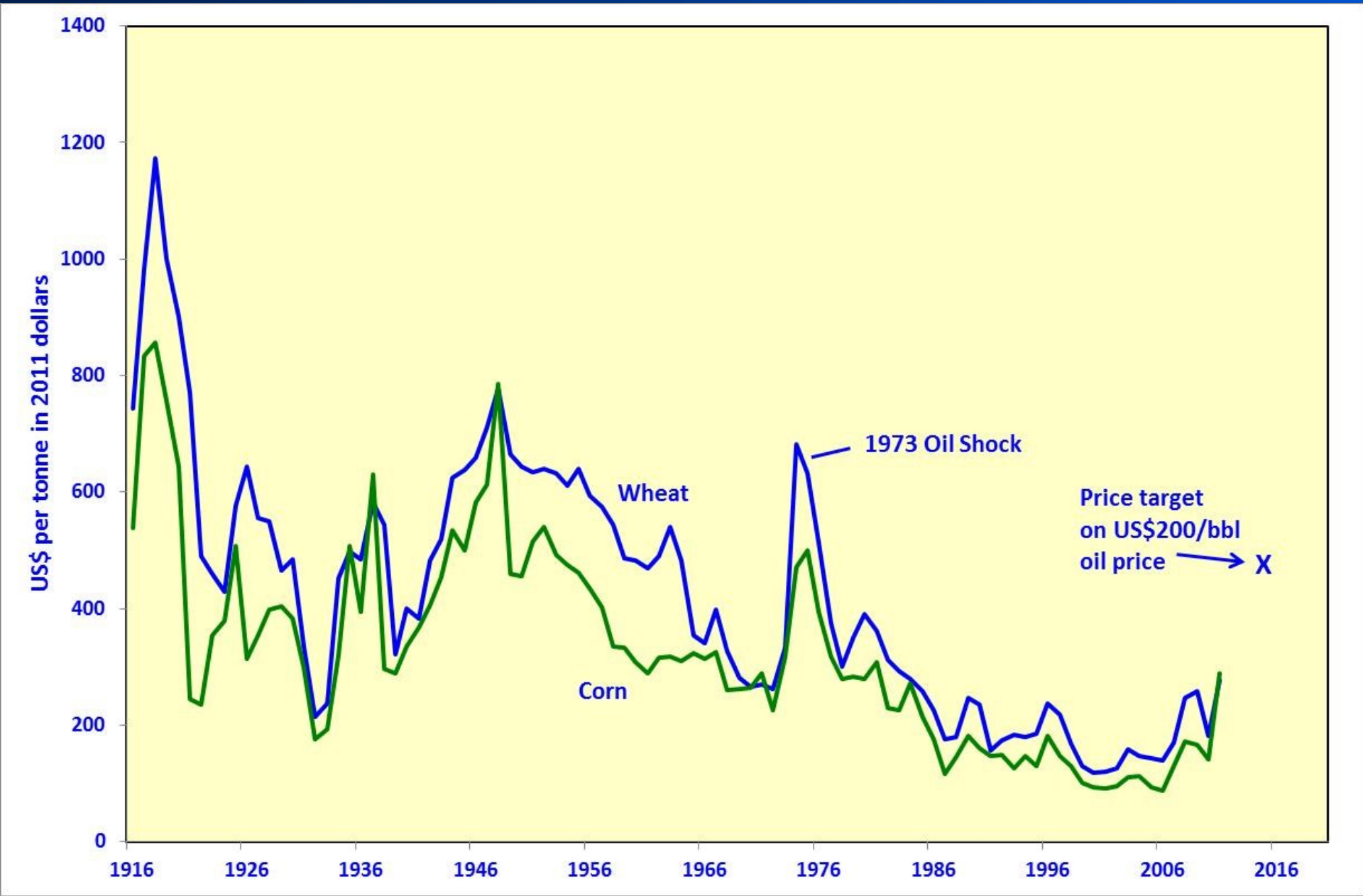


"Impacts of Higher Energy Prices on Agriculture and Rural Economies"
by Ronald Sands and Paul Westcott. ***USDA***

Based on the USDA figures and a US$200/bbl oil price:

Wheat and corn operating costs will be 60% higher in 2014.

Wheat and Corn Prices 1916 - 2011

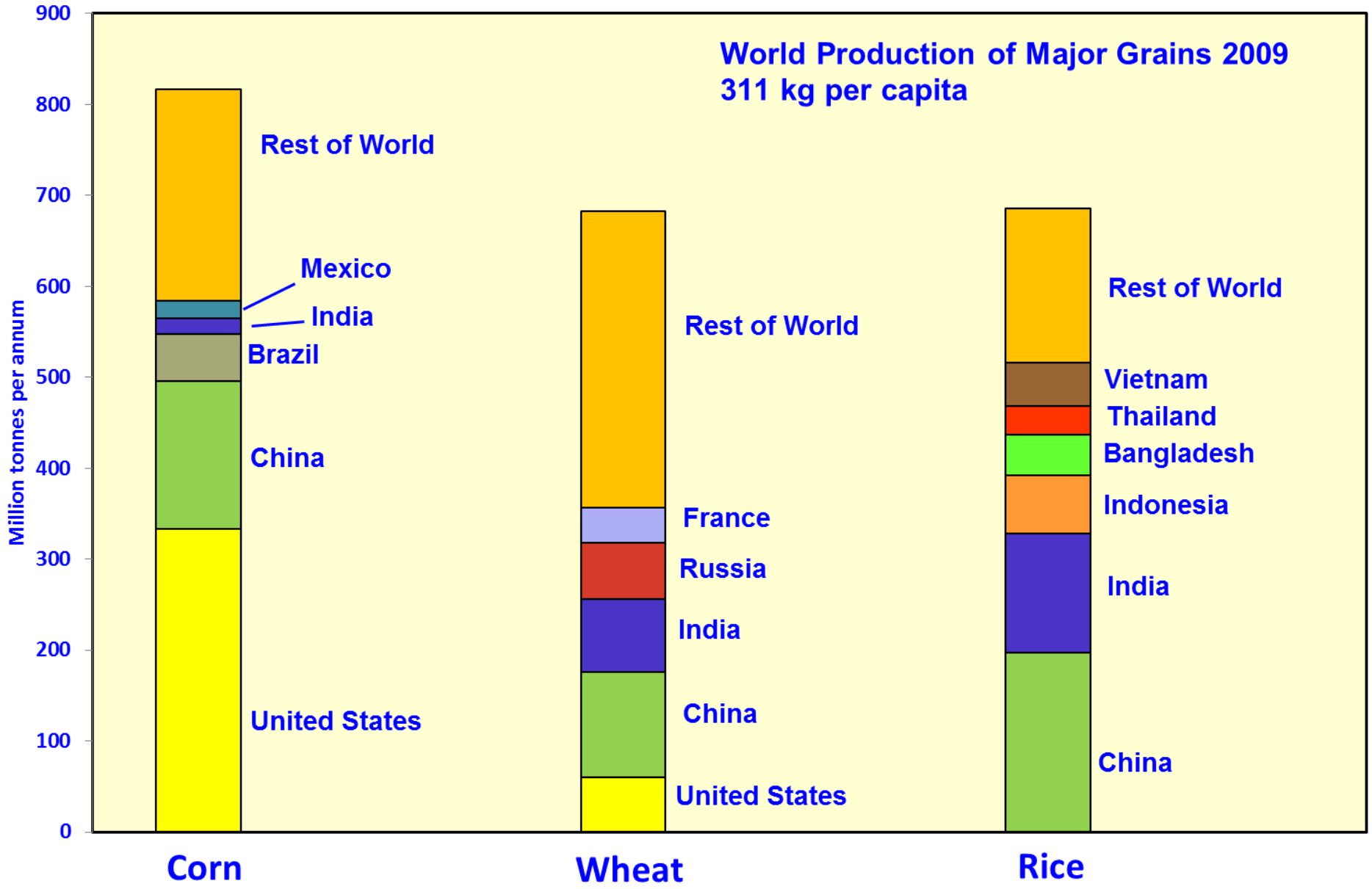


Why grain prices went down for 70 years.

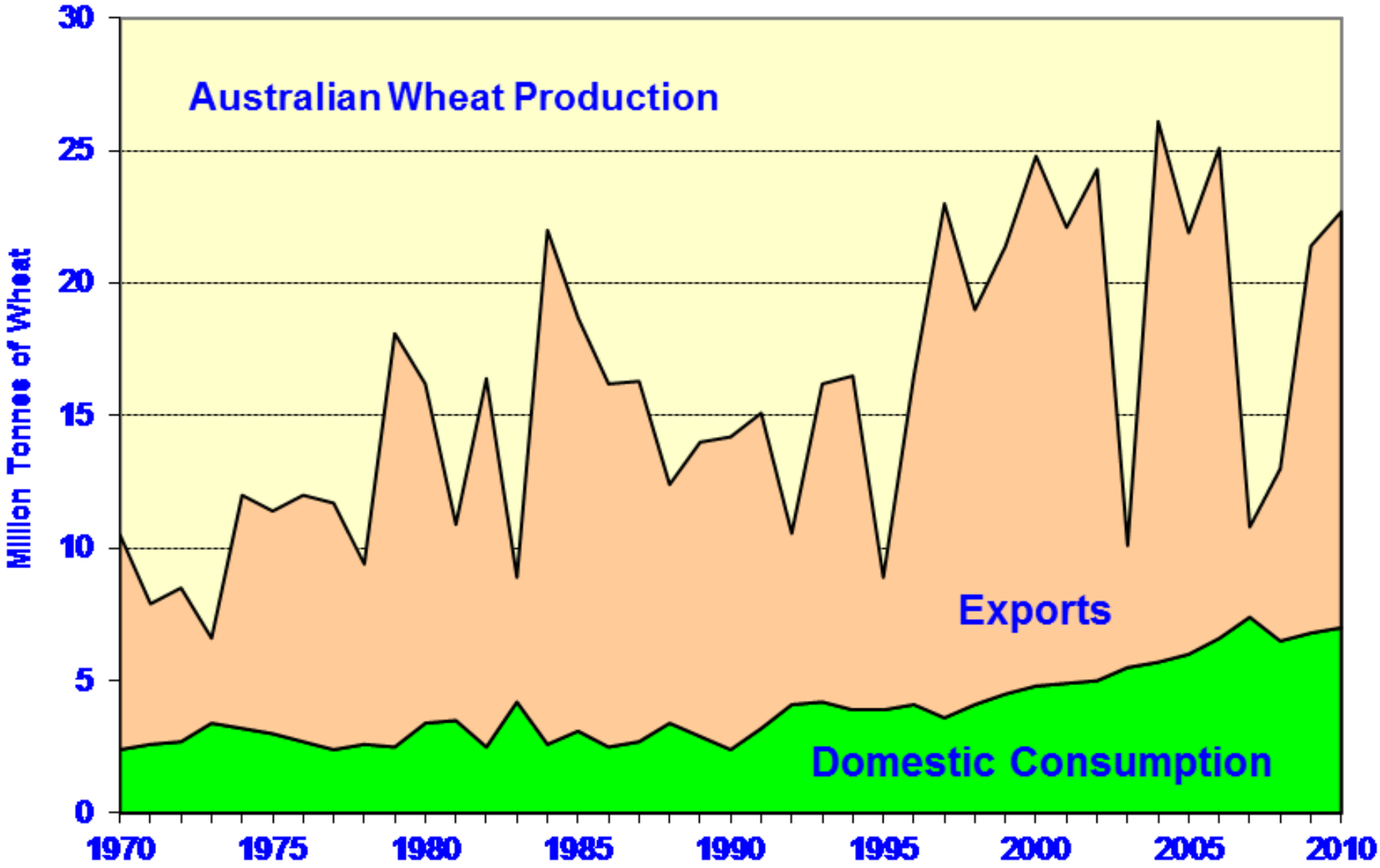
	1930	1975	2010	2010 vs 1930 % change
Population	2 billion	4 billlion	7 billion	250%
Wheat	127	355	682	437%
Corn	113	324	817	623%
Rice	89	360	679	663%
Barley	41	150	147	259%
Rye	47	24	17	-64%
Oats	64	48	24	-63%
Total	481	1261	2366	392%

Those trends will now cross over.

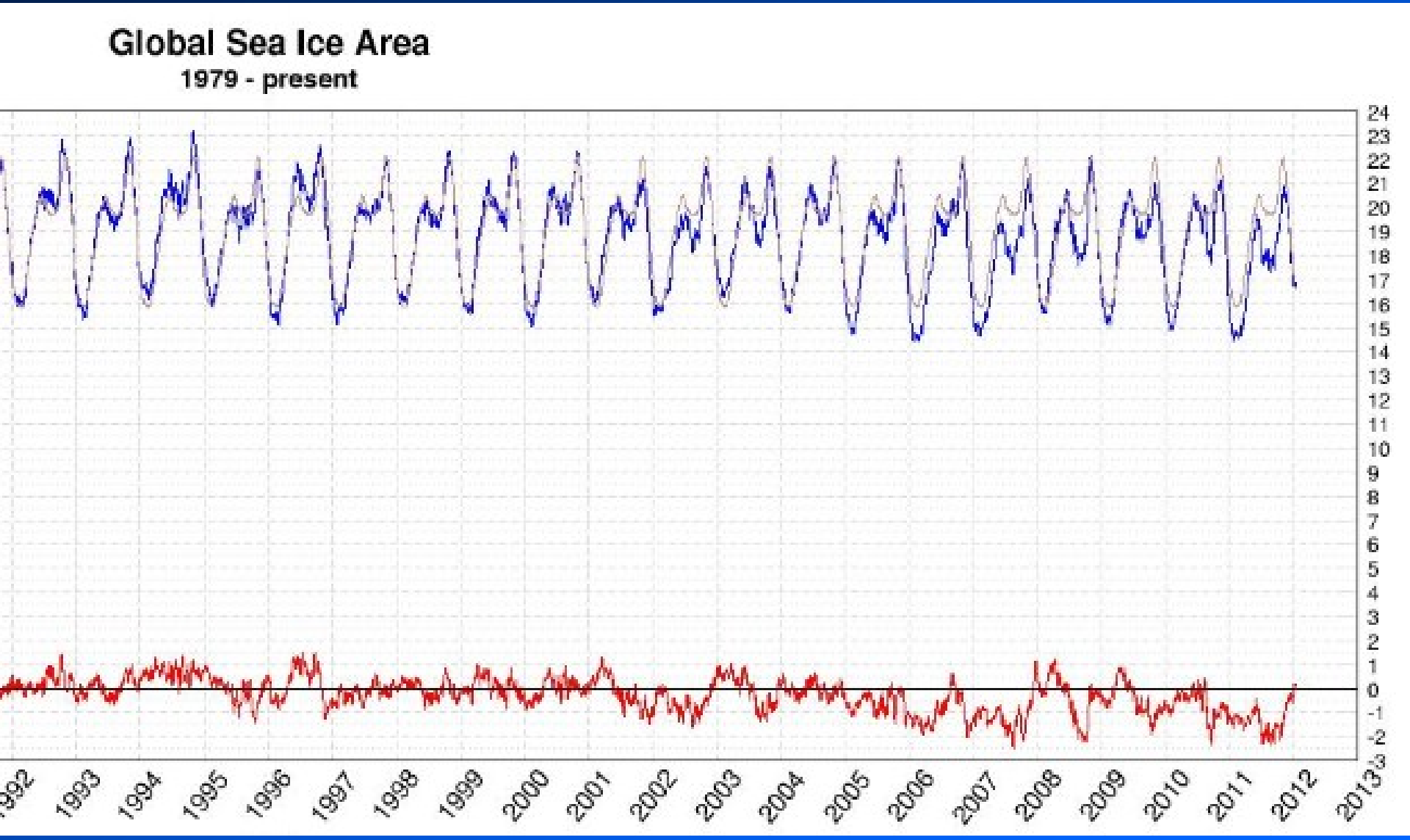
The total is about 2,200 million tonnes.



Australia doesn't have much of a buffer.



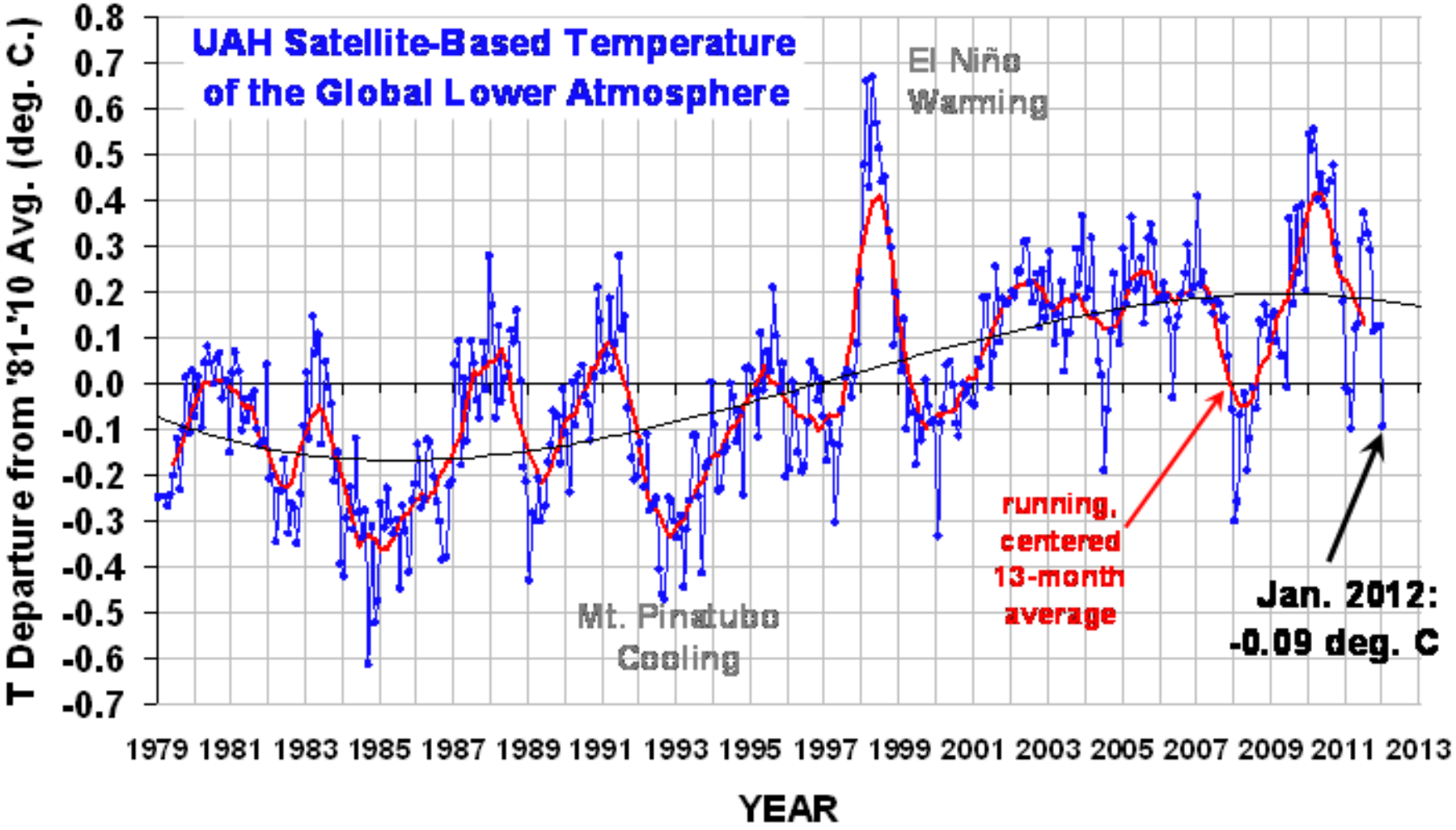
Climate: First of all, the world isn't warming.



Source: Cryosphere Today as at 11th January 2012

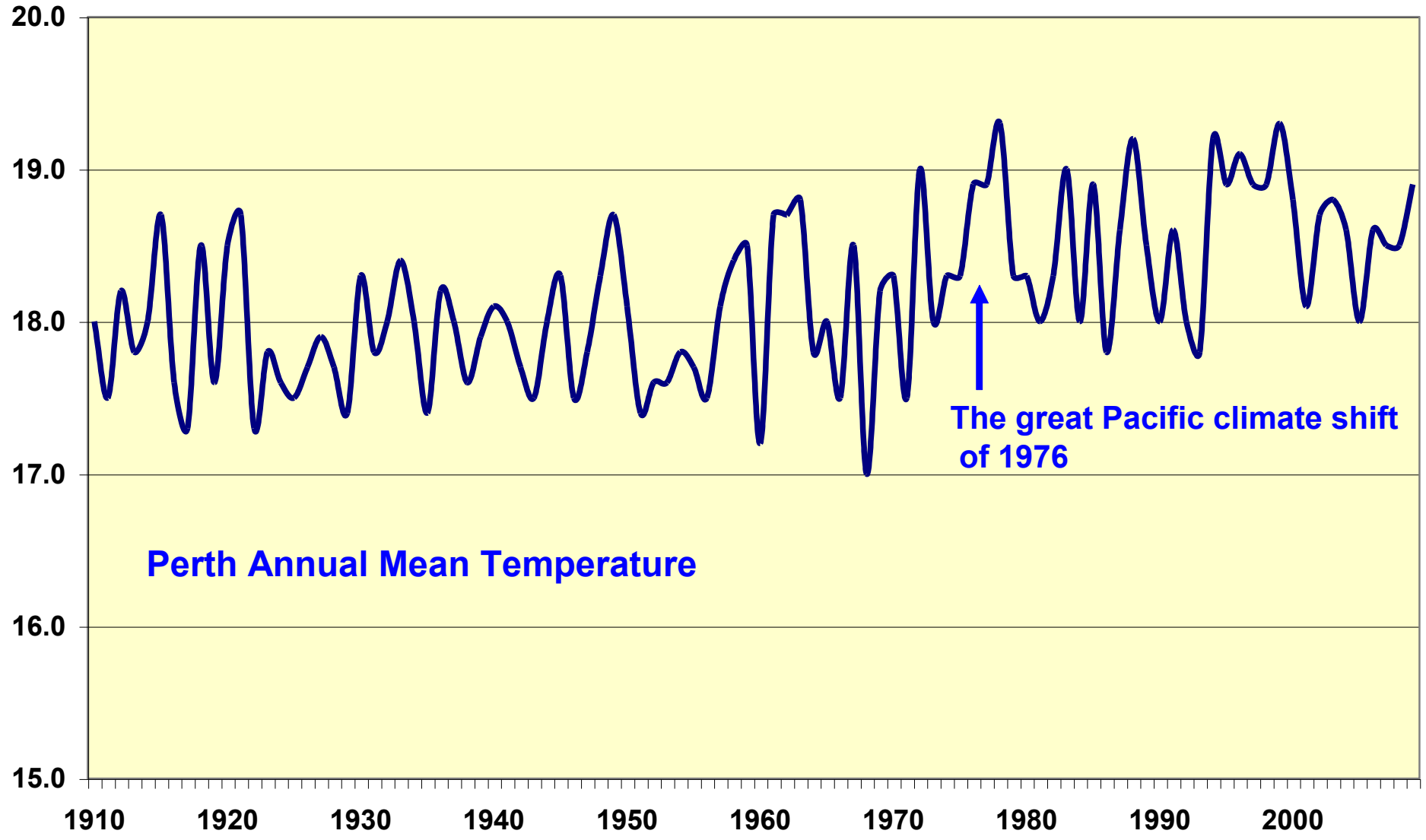
No change over 33 years

Temperature: No change over 30 years.



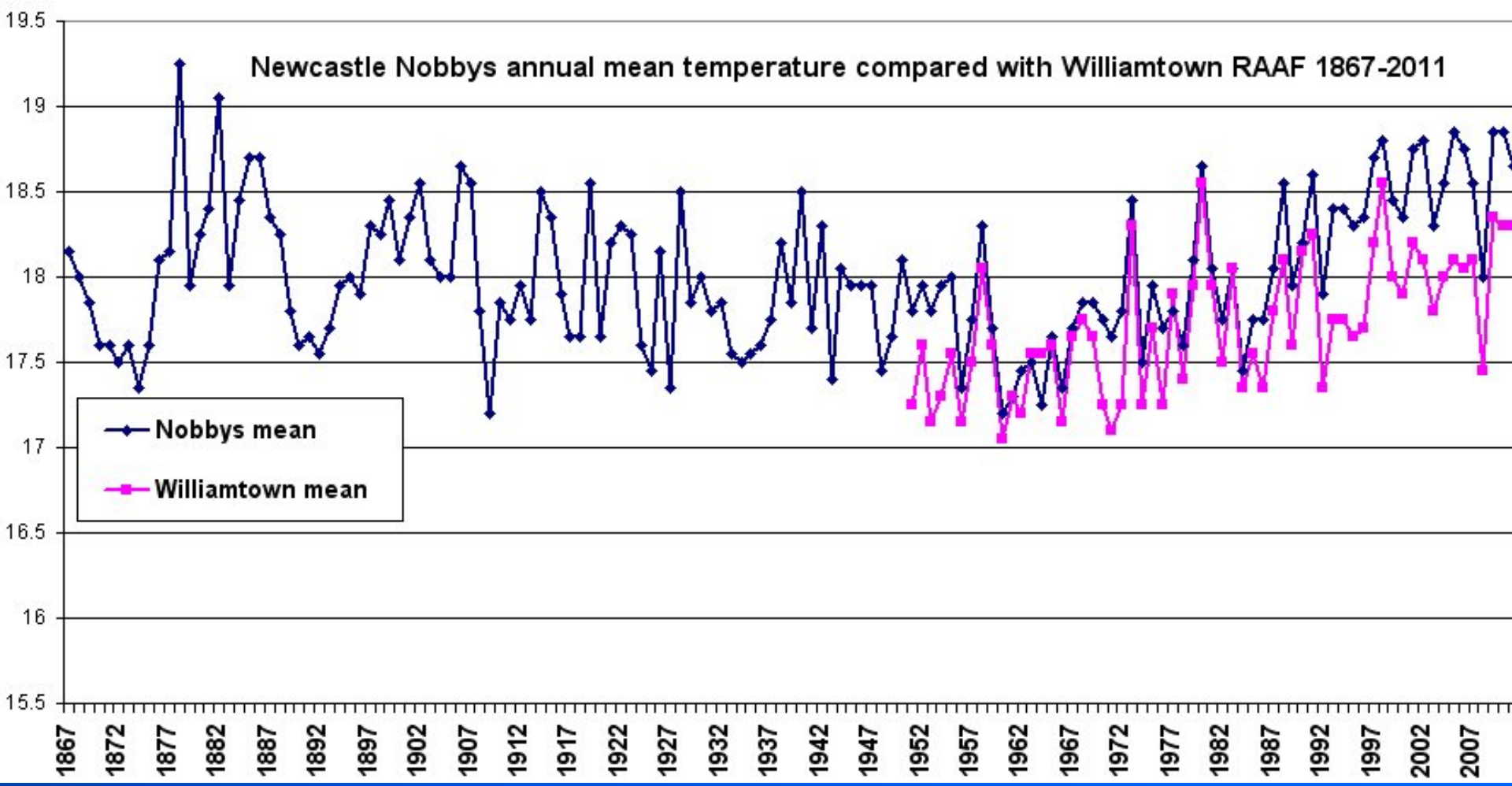
The satellite temperature record from www.drroyspencer.com

Perth 1910 - 2009



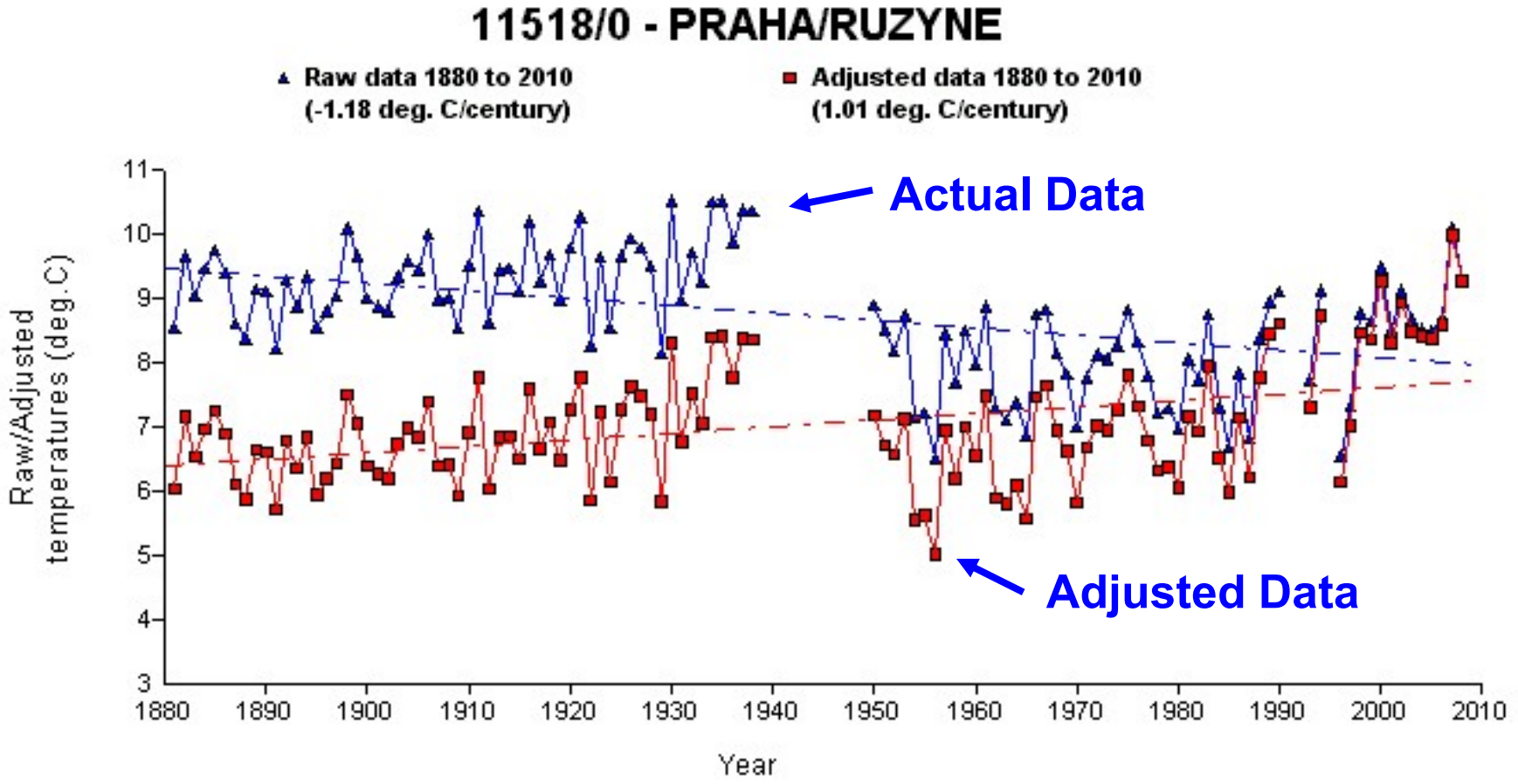
Perth's temperature has not changed for 40 years.

Newcastle 1867 - 2011

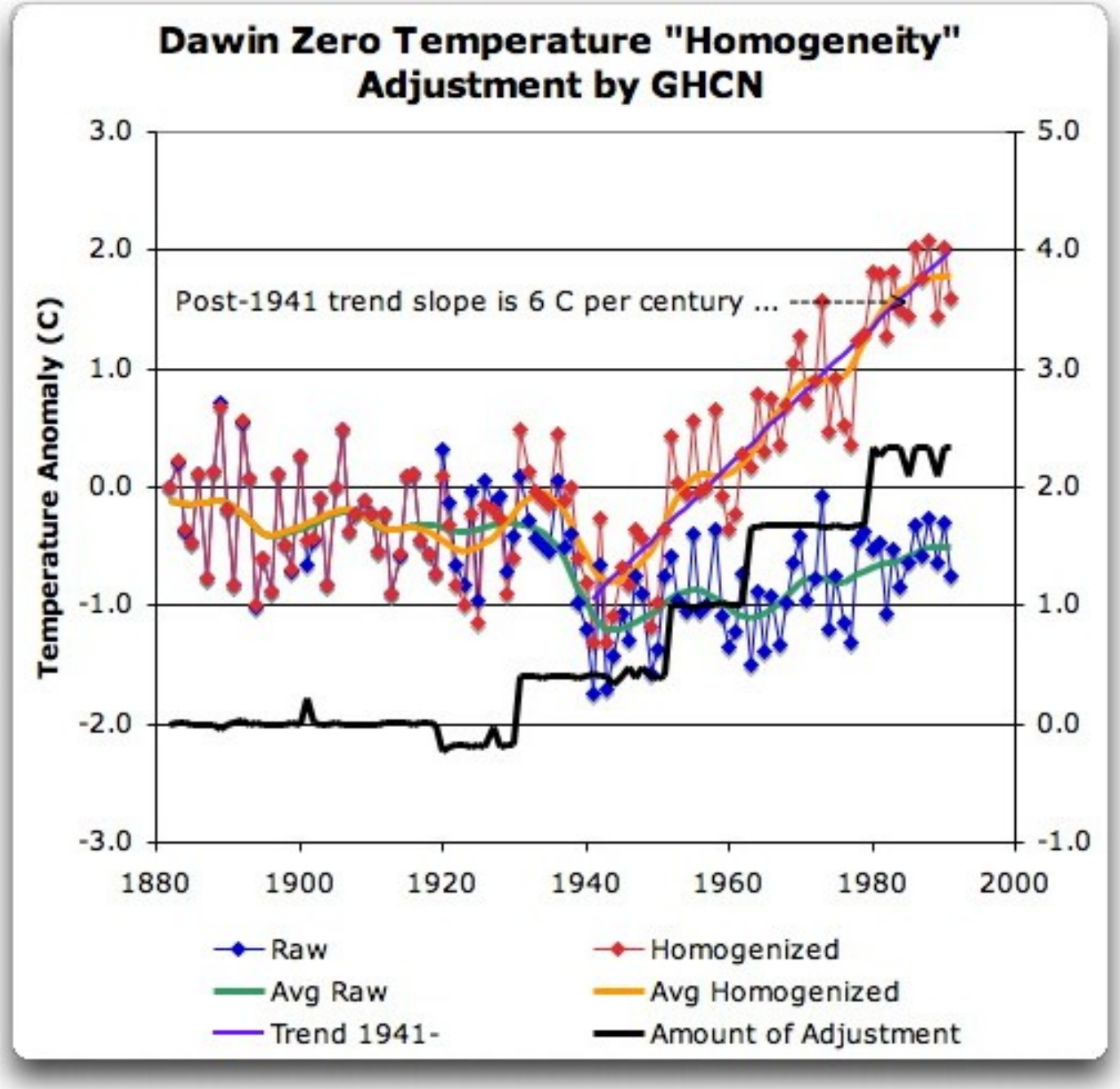


Newcastle's temperature same as 130 years ago.

Faking Prague's Temperature Record



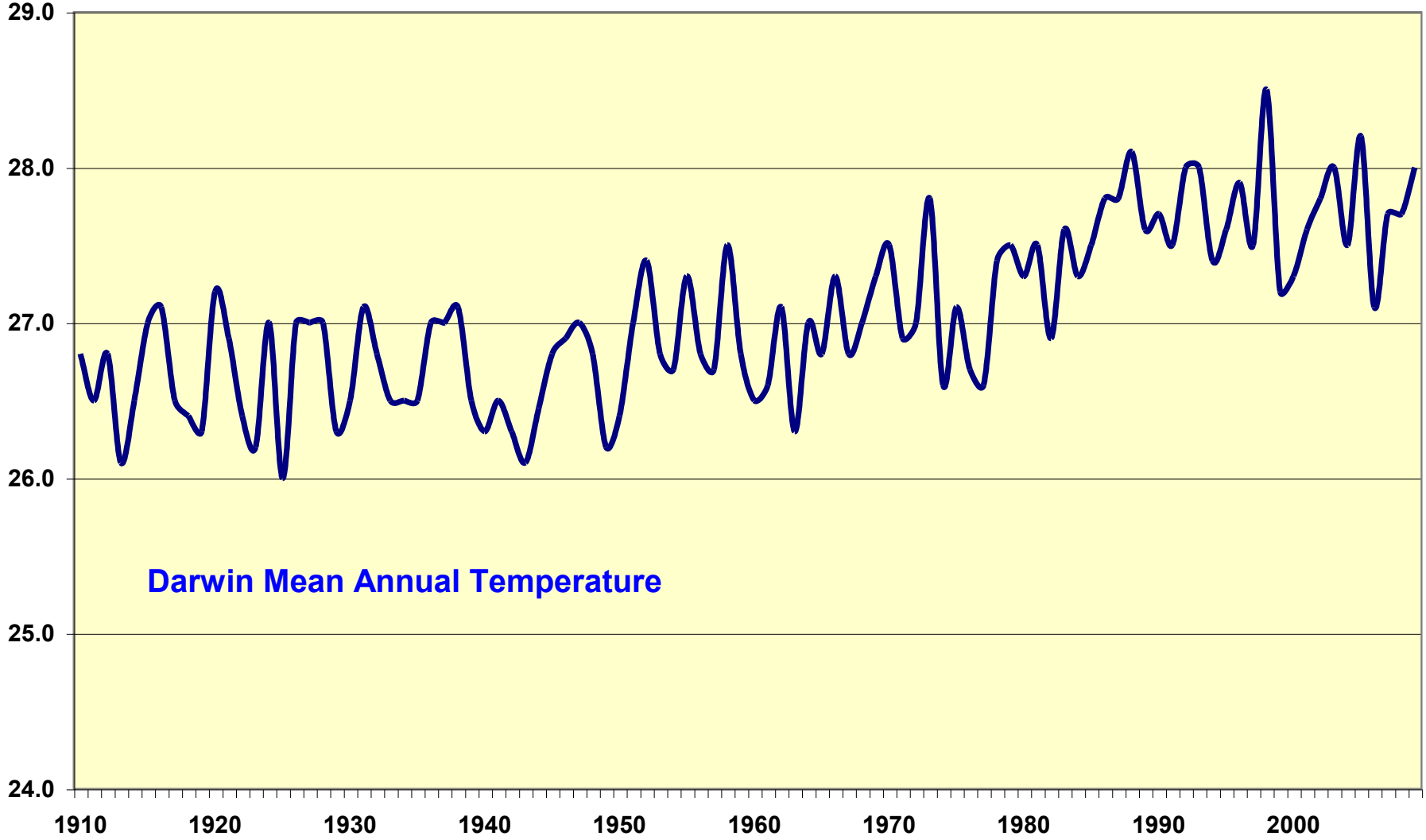
Data Source: Global Historical Climate Network (part of NOAA)



What the warmers did to Darwin – added 2.5° over 60 years

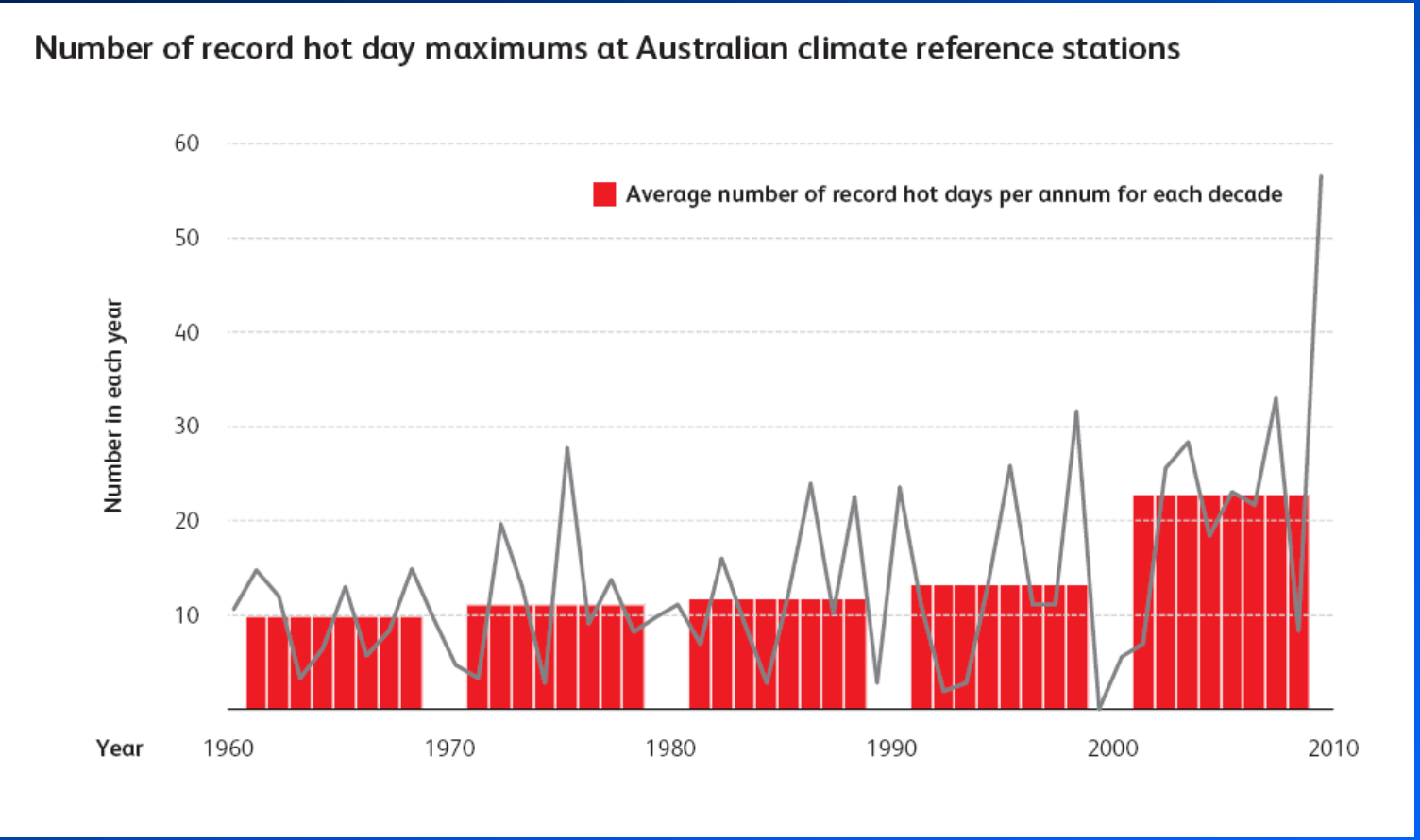
Source: http://wattsupwiththat.com/2009/12/08/the-smoking-gun-at-darwin-zero/

The Bureau of Meteorology added 1.7° to Darwin's Temperature Record – lying bastards



The data has been manipulated to suit global warming theory.

The Bureau of Meteorology and the CSIRO collude in lying.



With over 100 years of data, why do the graphs start in 1960?

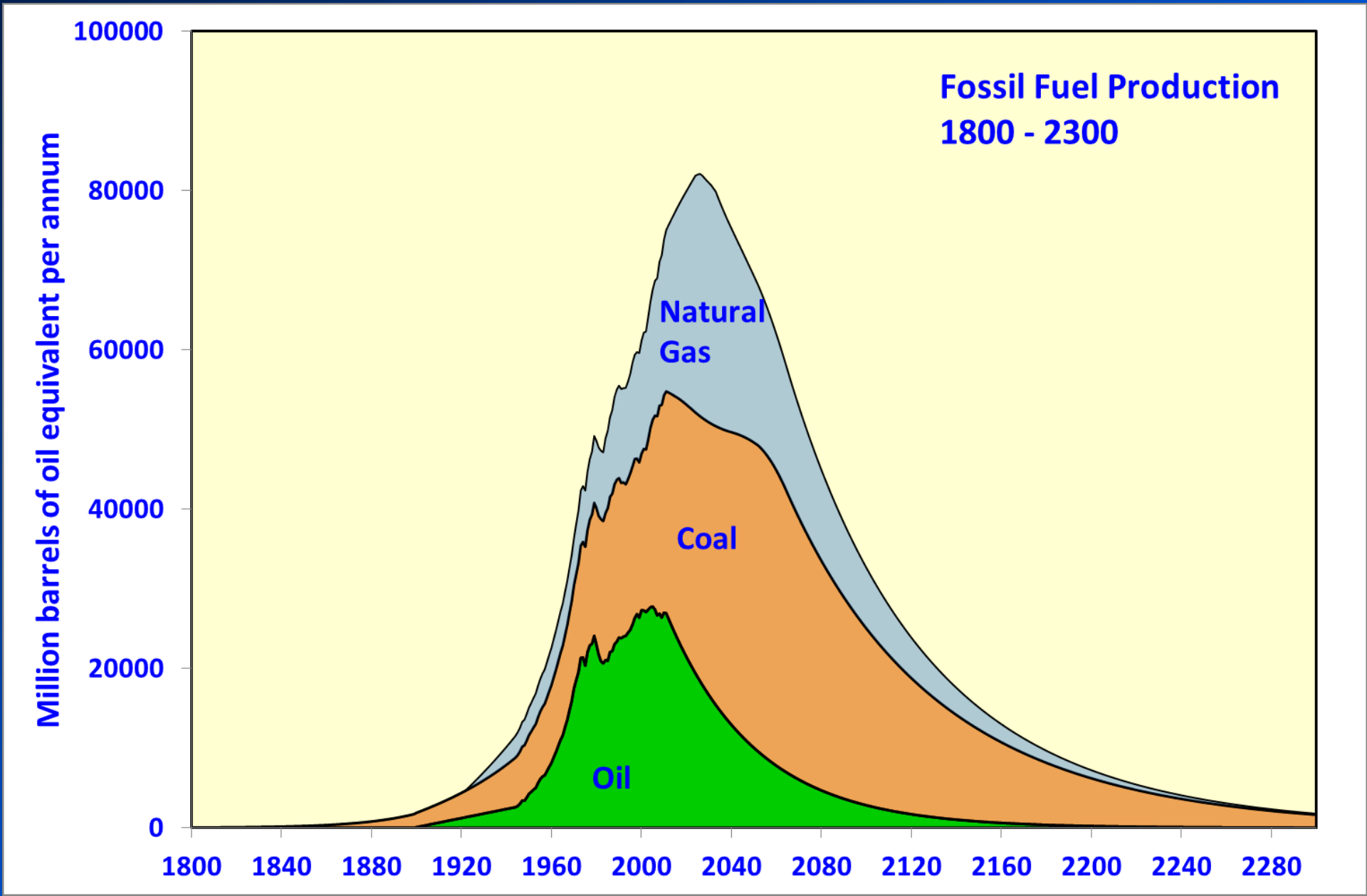
-It is the only way they could get a warming trend.

-To quote Oliver Cromwell, the CSIRO and the BOM "are a pack of mercenary wretches, and would like Esau sell your country for a mess of pottage".

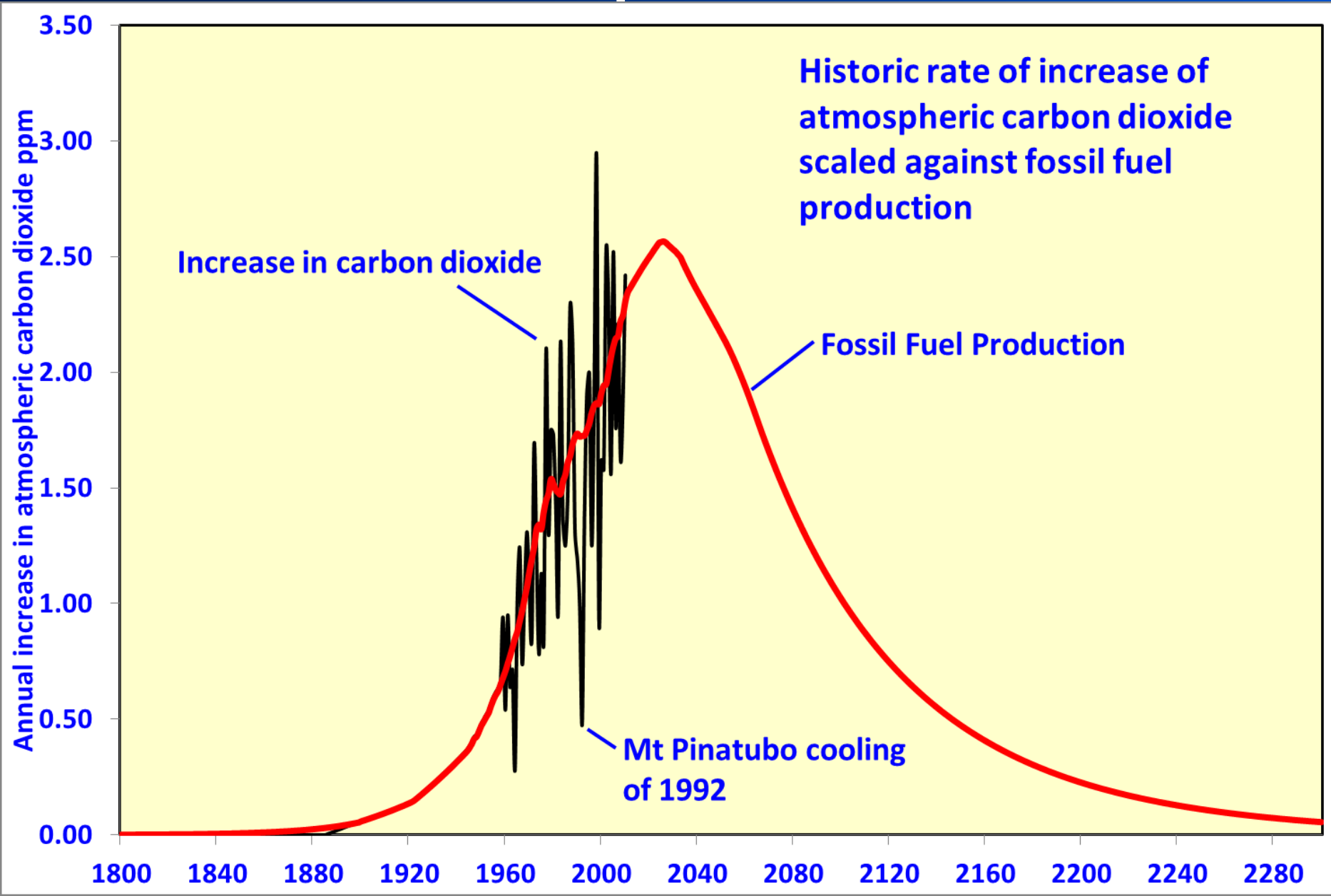
Ocean acidification – the last refuge of the global warming scoundrel

Coral reef and bubbling carbon dioxide, Dobu Island, PNG

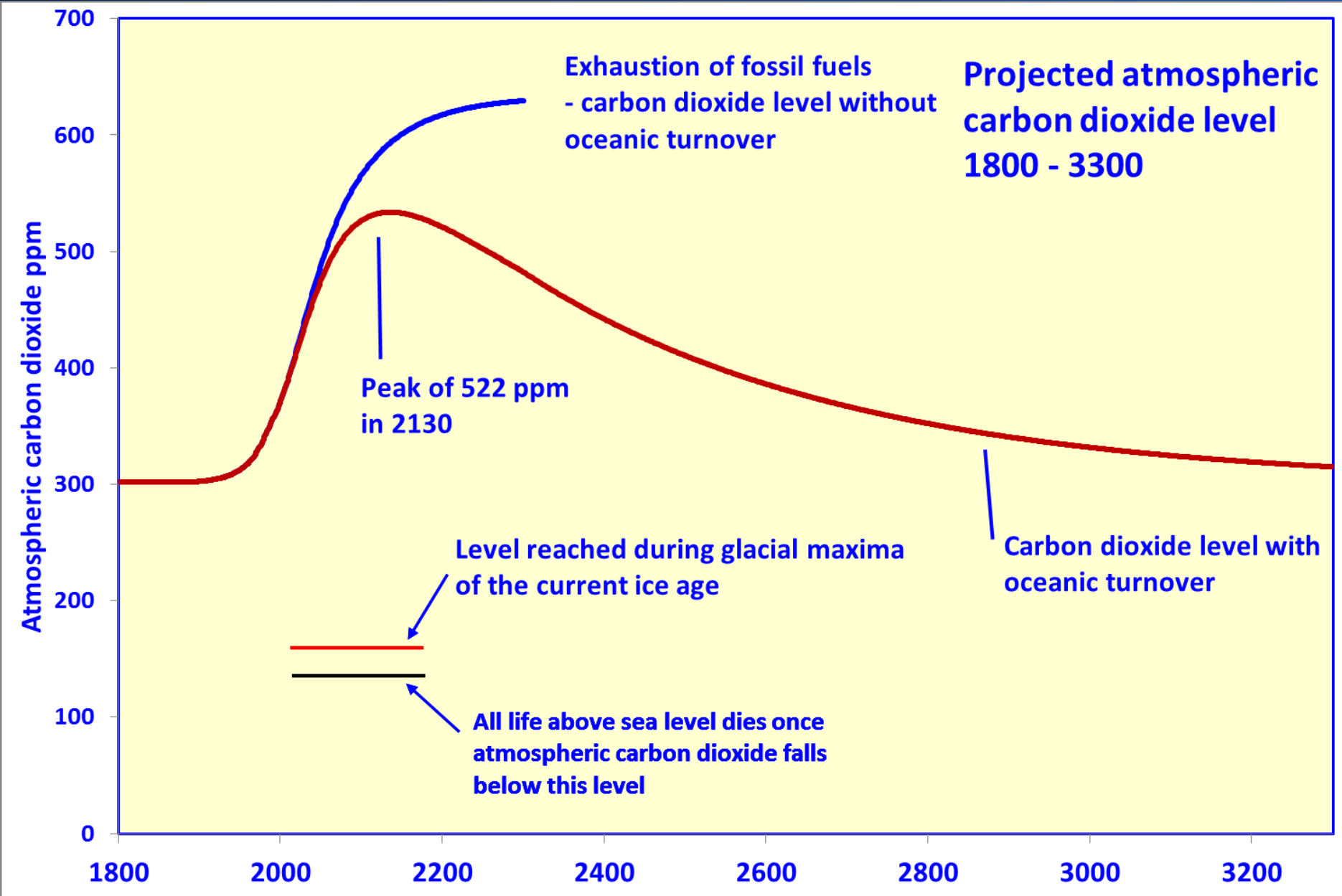
Where atmospheric carbon will come from



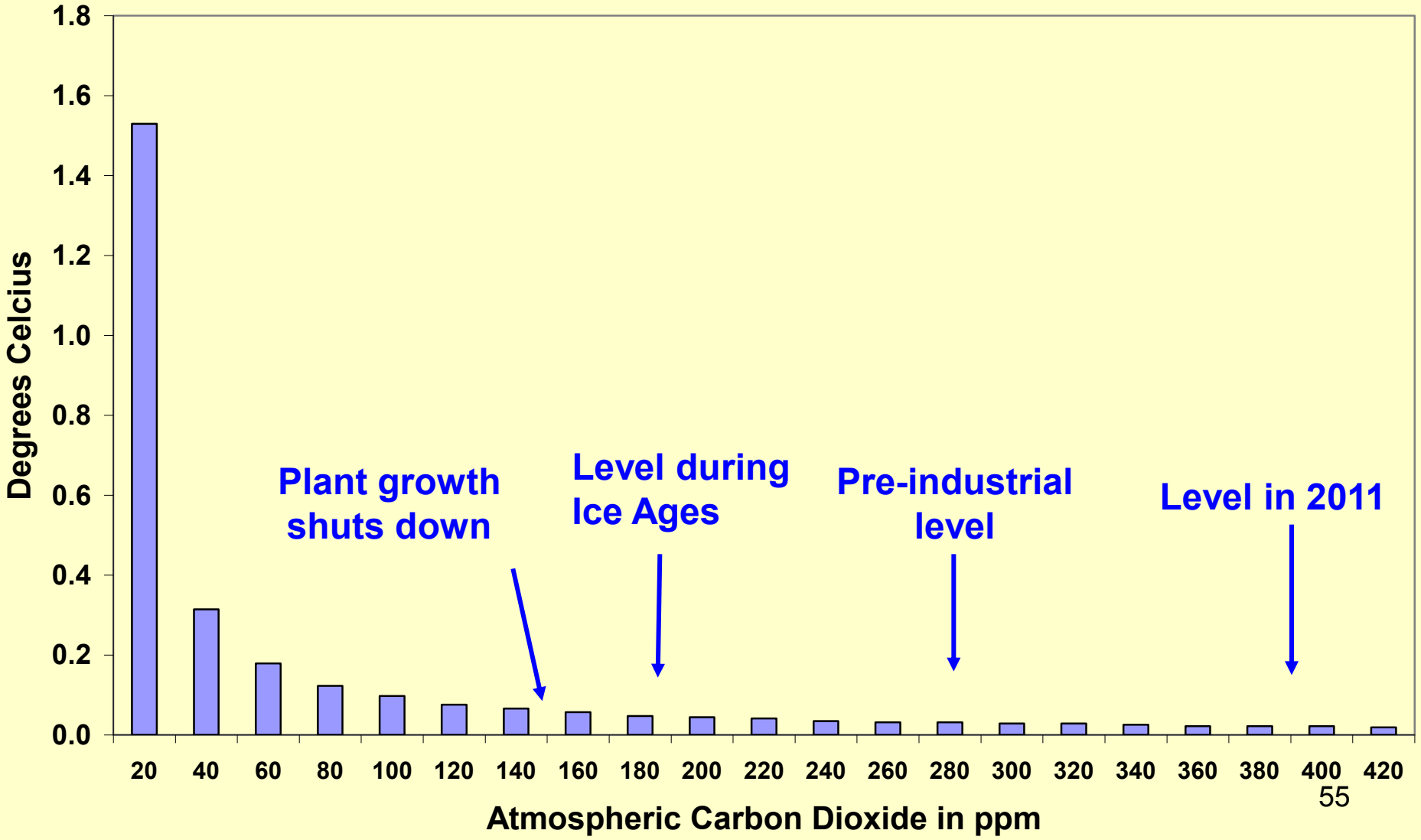
What that means for rate of increase of atmospheric CO2



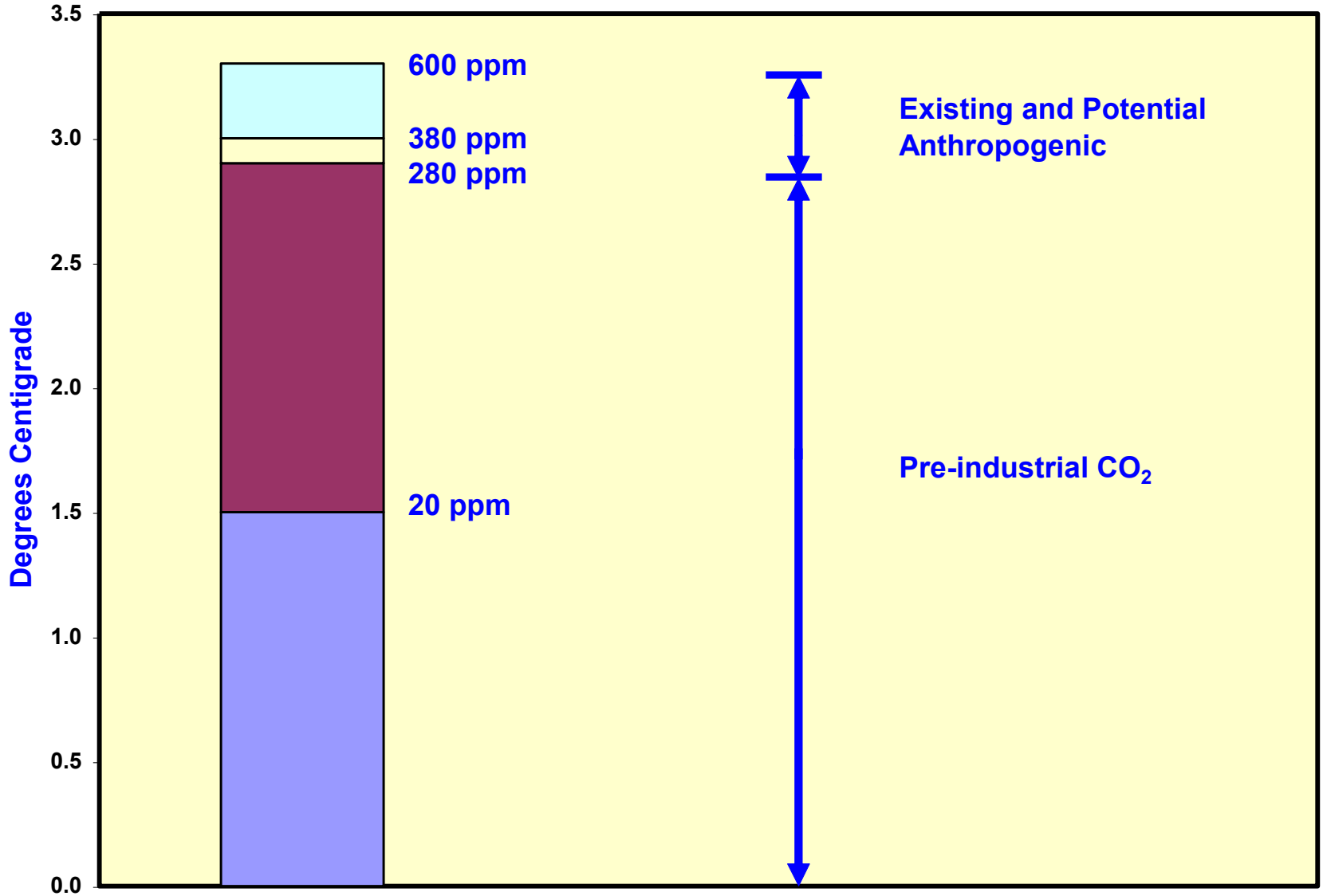
We are getting a brief burst of aerial fertiliser.



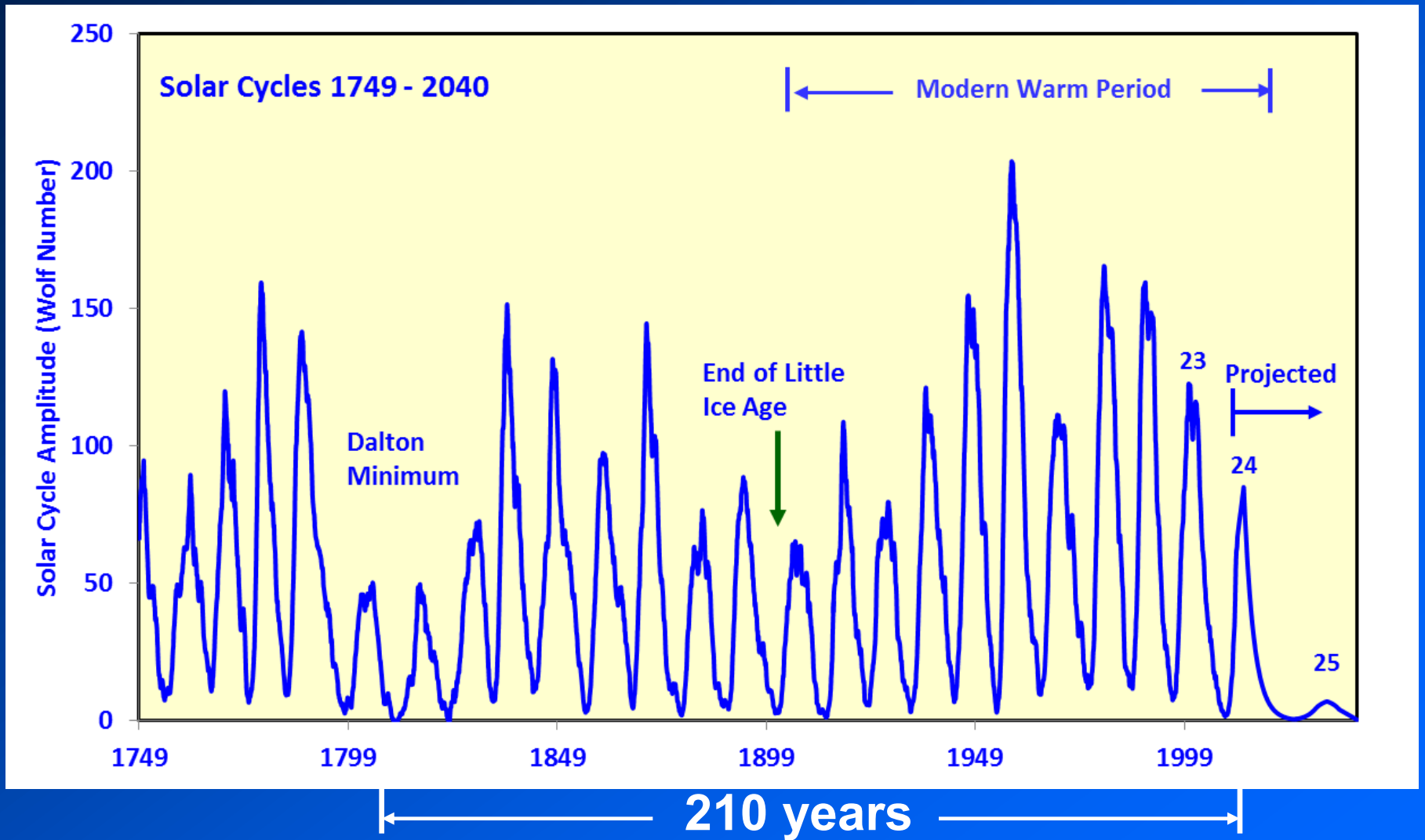
Carbon dioxide is tuckered out as a greenhouse gas.



Relative Contributions of Pre-Industrial and Anthropogenic CO2



The World won't stop having climate cycles just because they are inconvenient.



260 years of solar cycle data

Sunspot Cycle Length Relative to Temperature

Armagh, Northern Ireland 1796 – 1992 Butler and Johnson

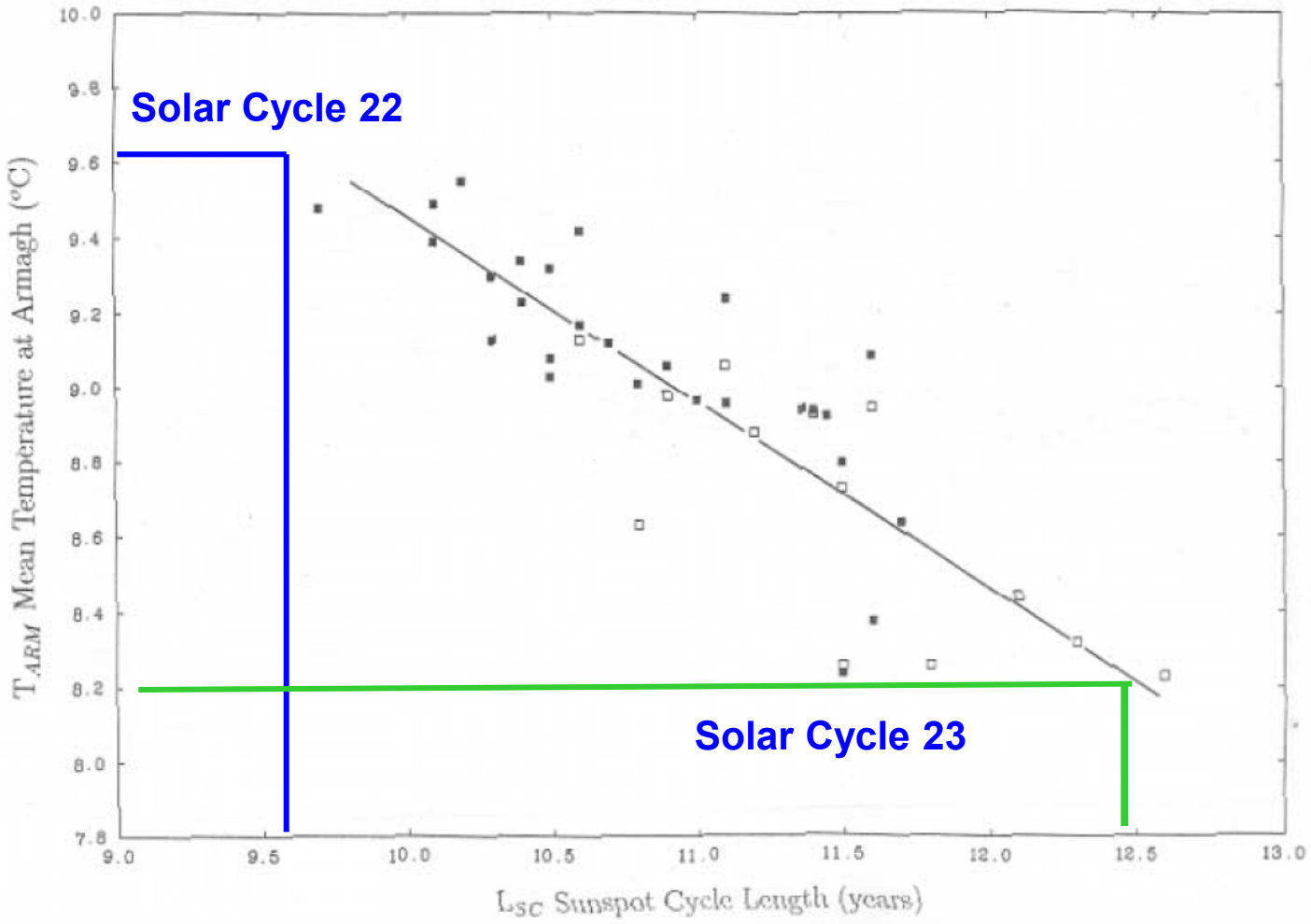
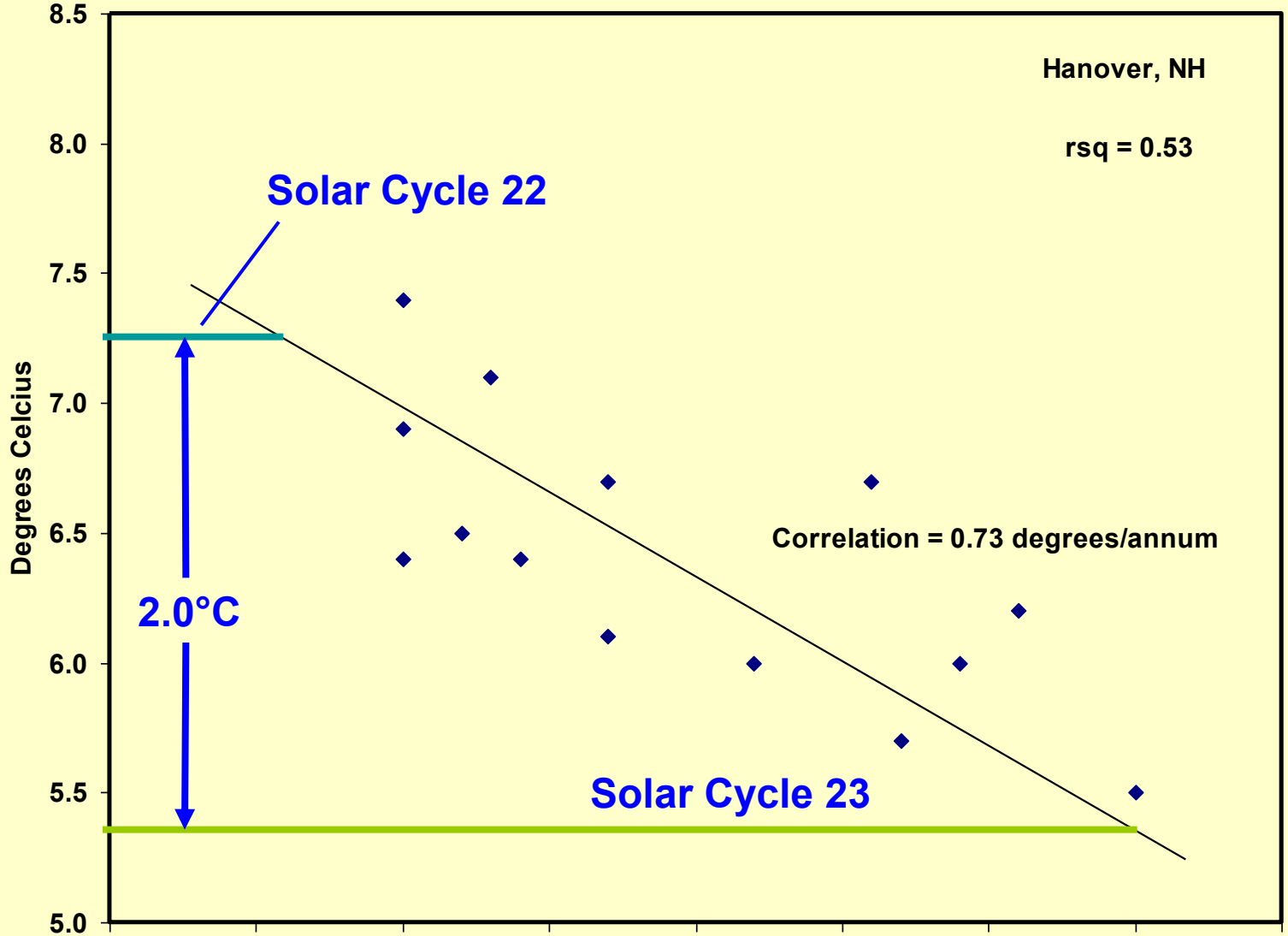
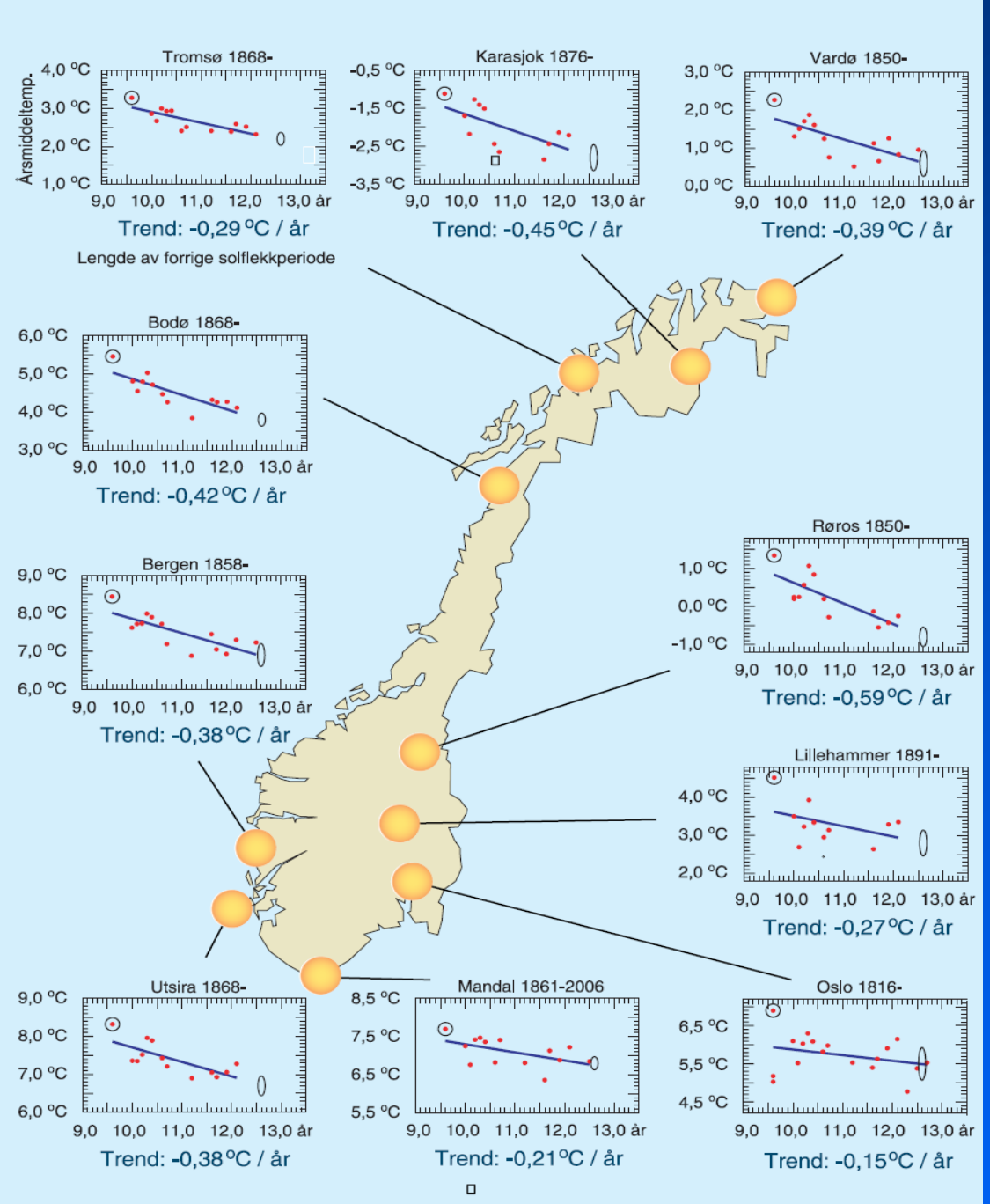


Figure 5. The mean temperature at Armagh for 11 year intervals, centred on years of sunspot maximum and minimum, plotted against the sunspot cycle length. Symbols: open squares - Series I, filled squares - Series II. The mean regression line is shown.

Hanover, New Hampshire

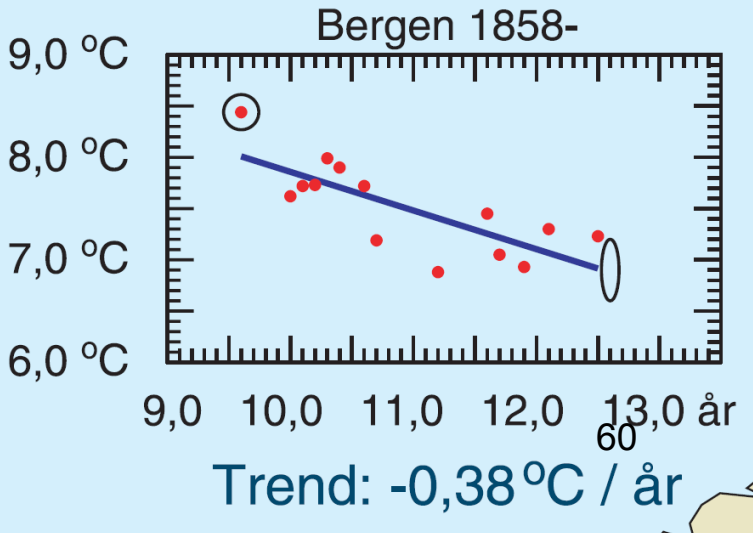




Friis-Christensen and Lassen theory, using Butler and Johnson methodolgy, applied to Norway

- 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

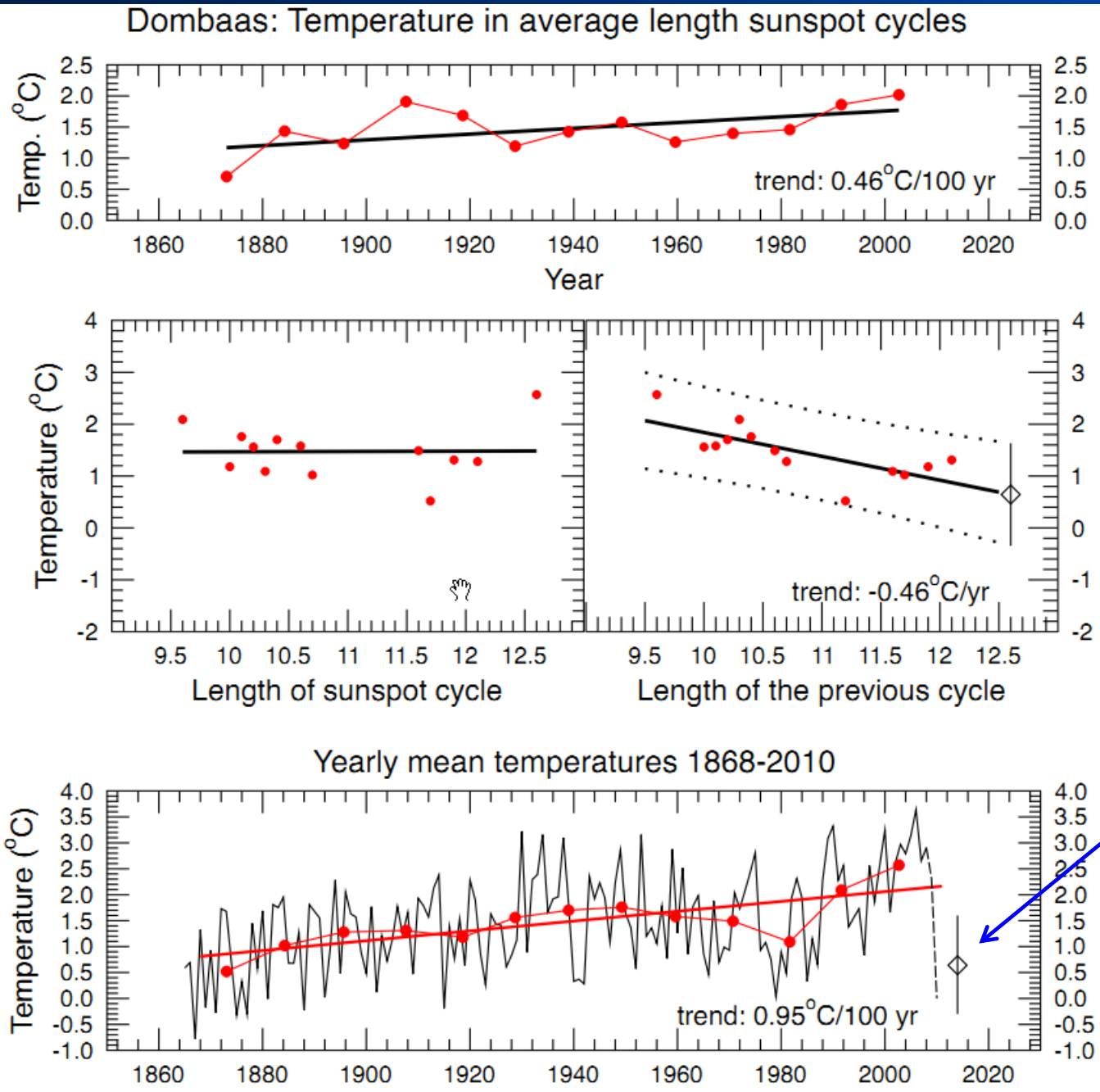
Credit me with a scientific discovery:

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.

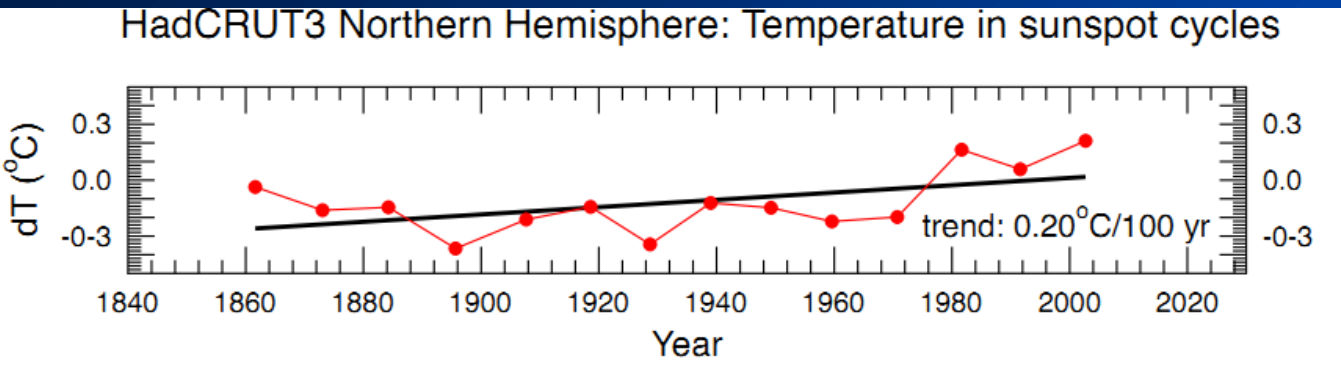
Available at: http://arxiv.org/pdf/1202.1954v1.pdf

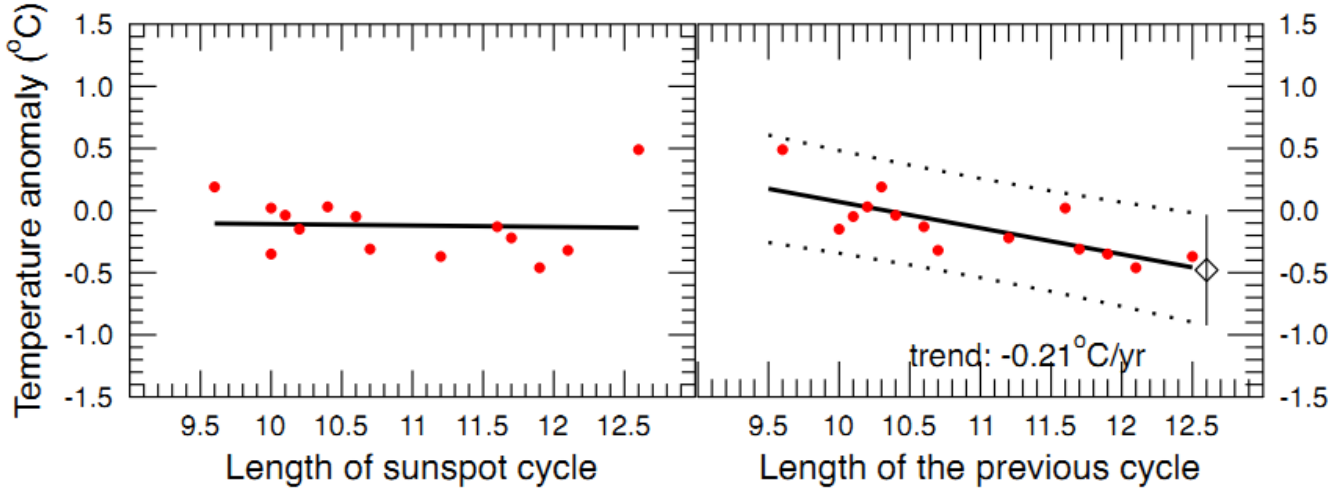
Dombaas, Norway

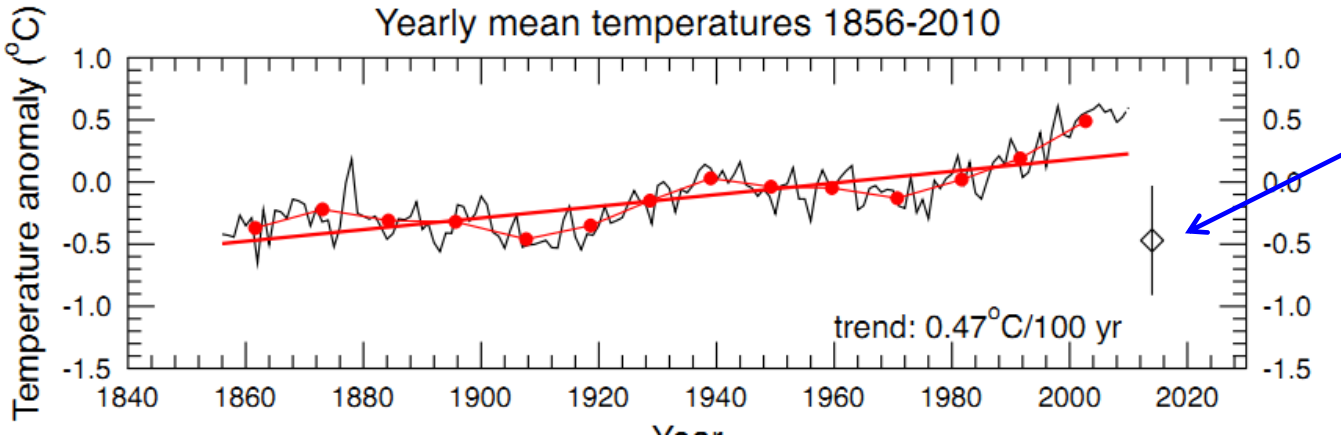


Predicted Decline

Northern Hemisphere



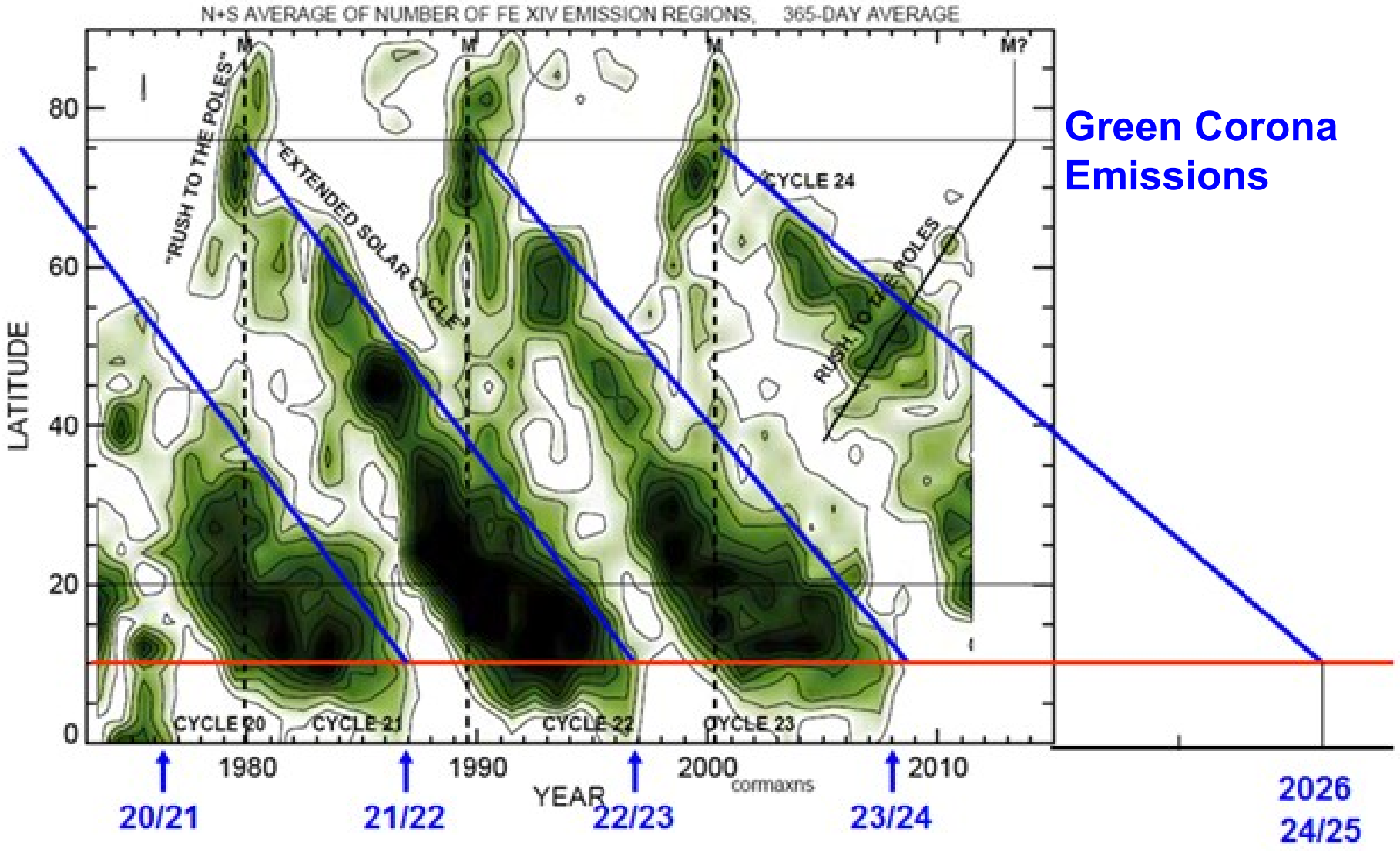




All the warming of the last 150 years will be reversed.

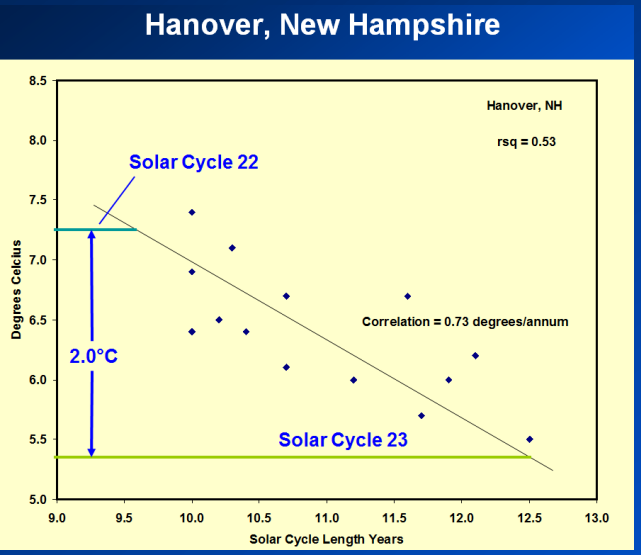
Predicted decline

Combine that with a prediction of solar activity:

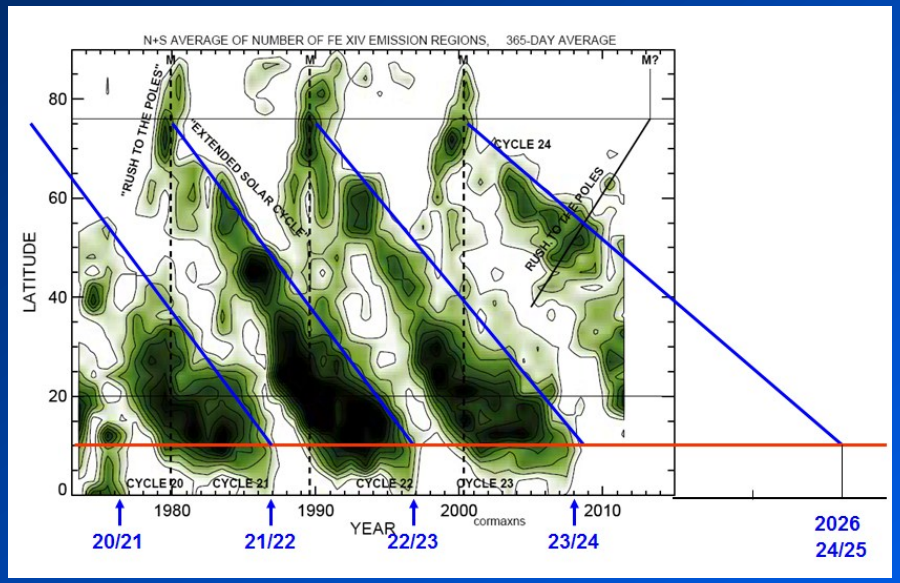


We can now predict climate to 2040.

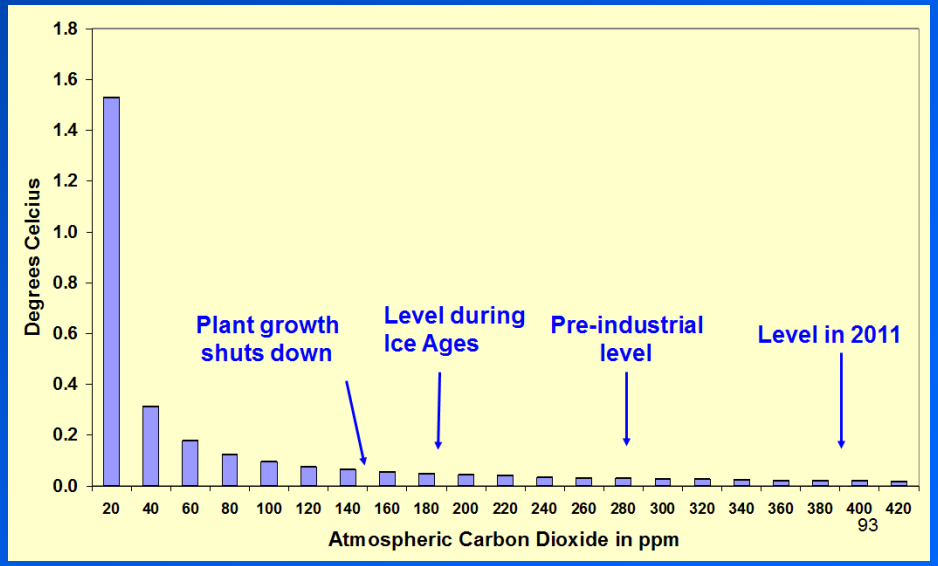
Using these three tools:



Solar cycle length - temperature

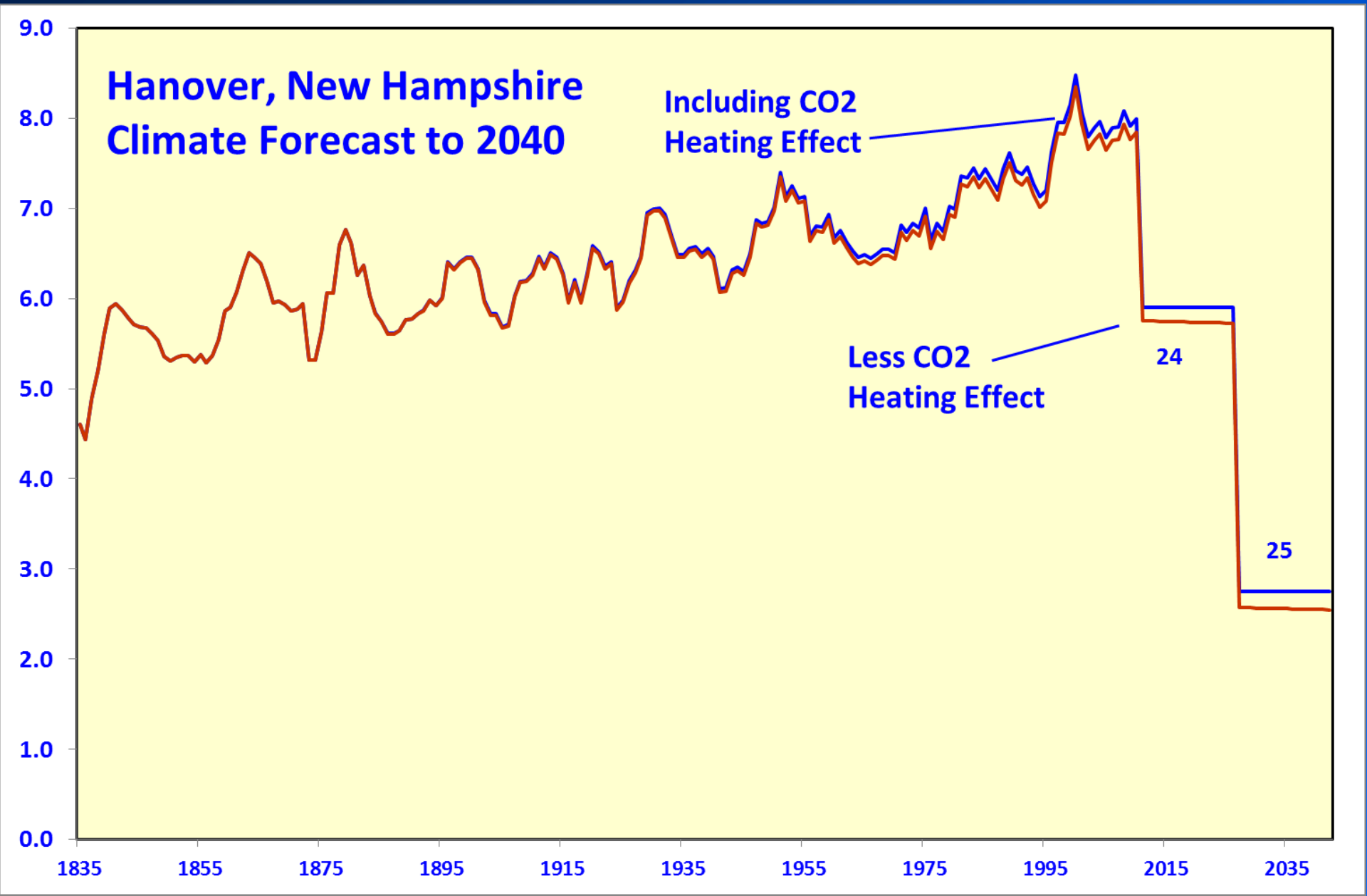


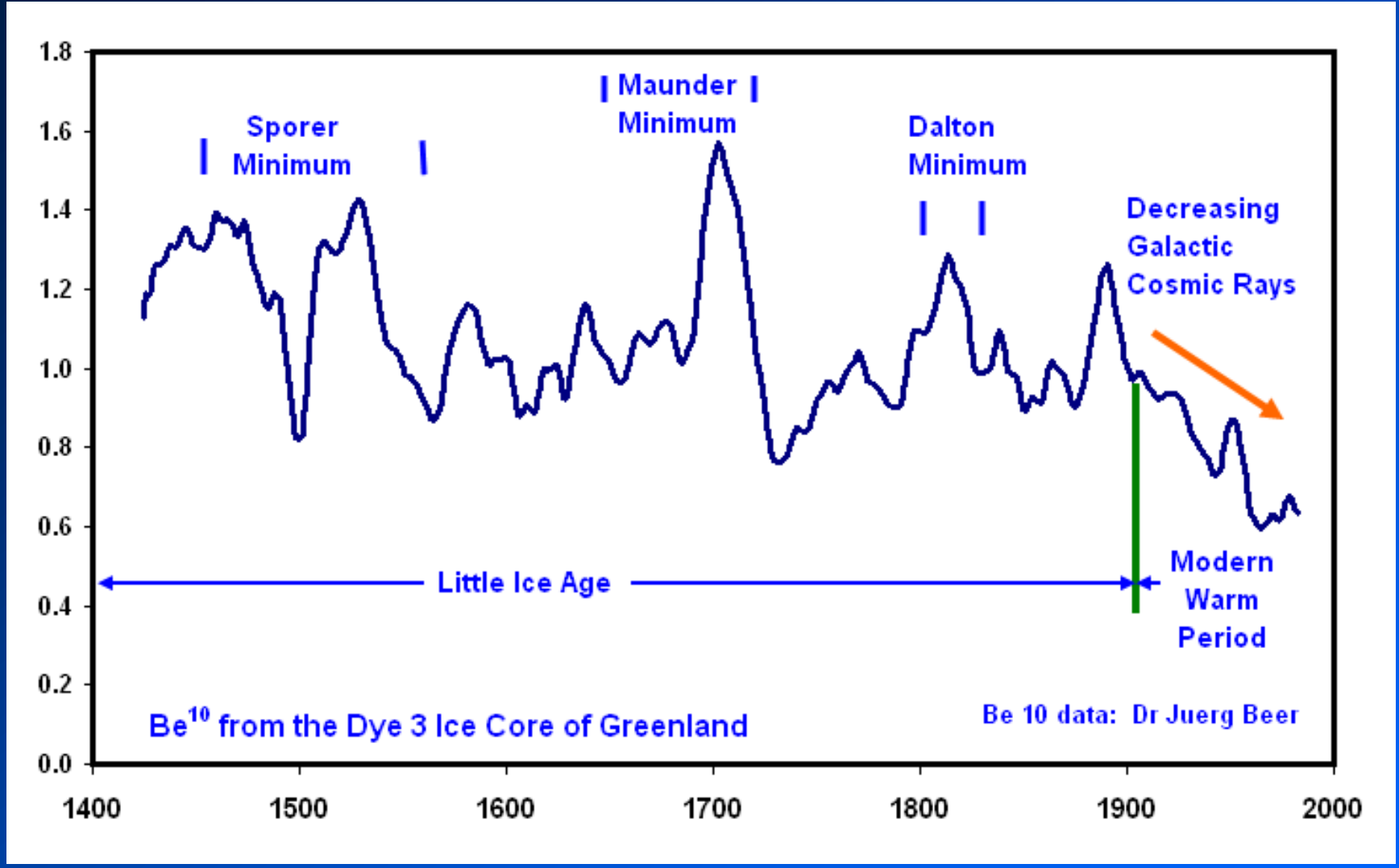
Solar activity forecast



Logarithmic heating effect of CO2

We are able to predict climate to 2040.

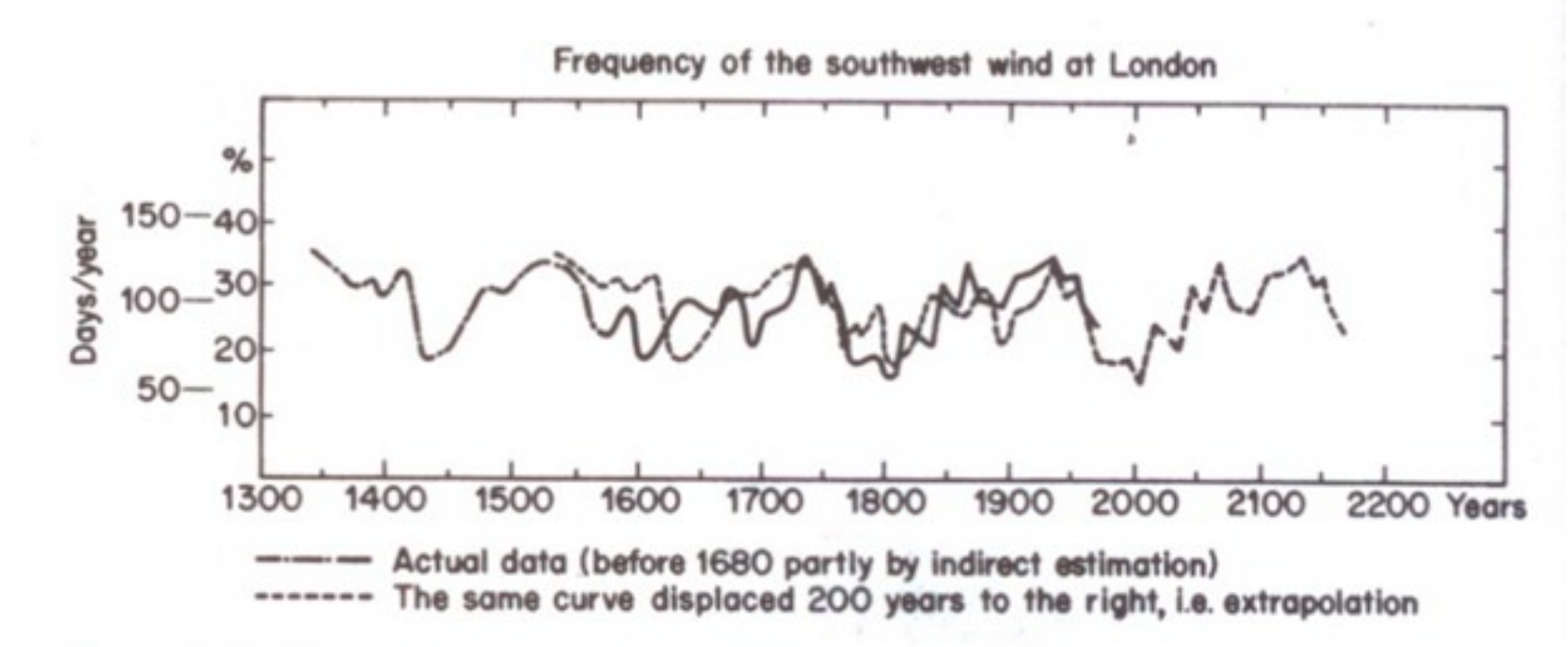




Famines in France 1693-94, Norway 1695-96 and Sweden 1696-97 claimed roughly 10% of the population of each country.

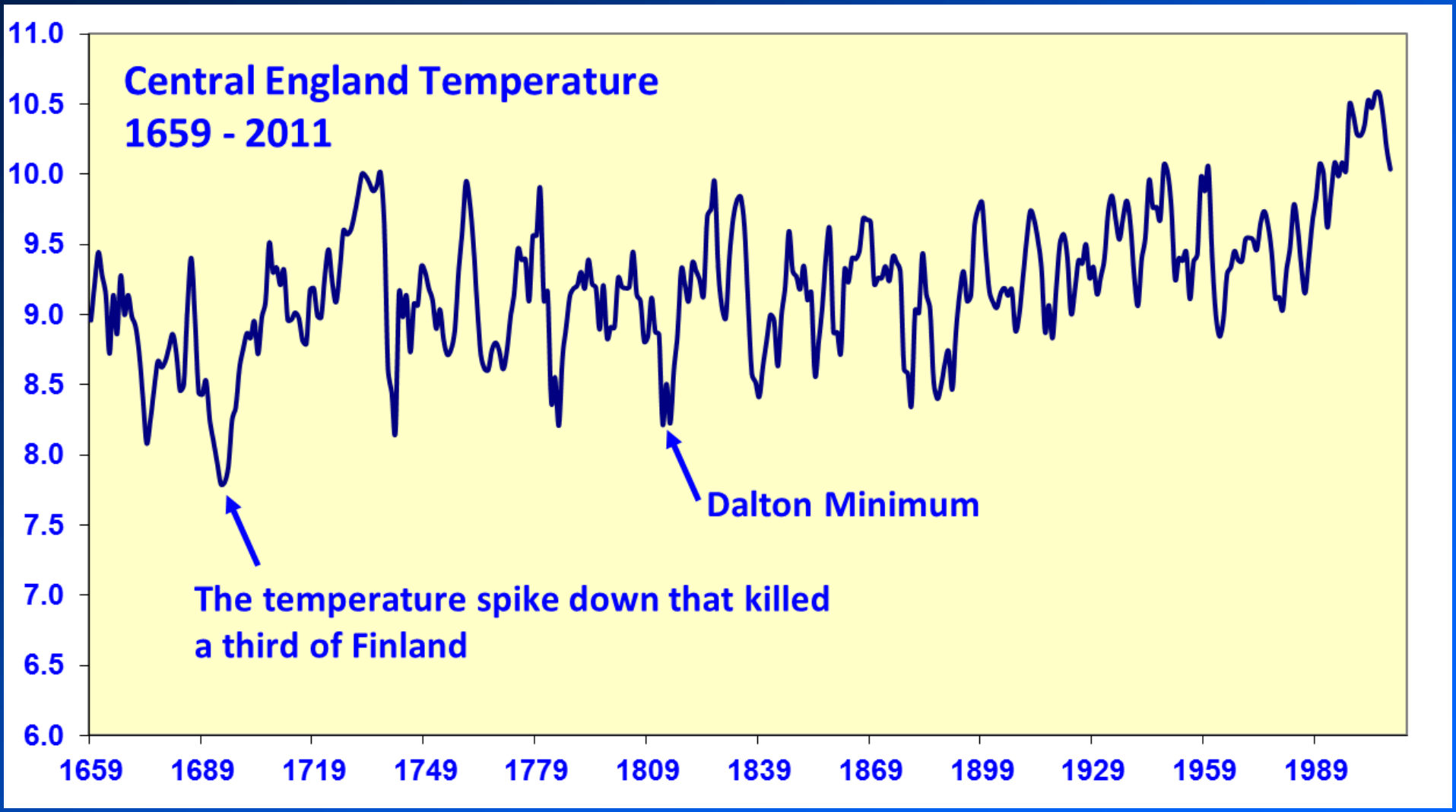
In Estonia and Finland in 1696-97, losses have been estimated at a fifth and a third of the national populations, respectively.

The current cooling was predicted in 1970.

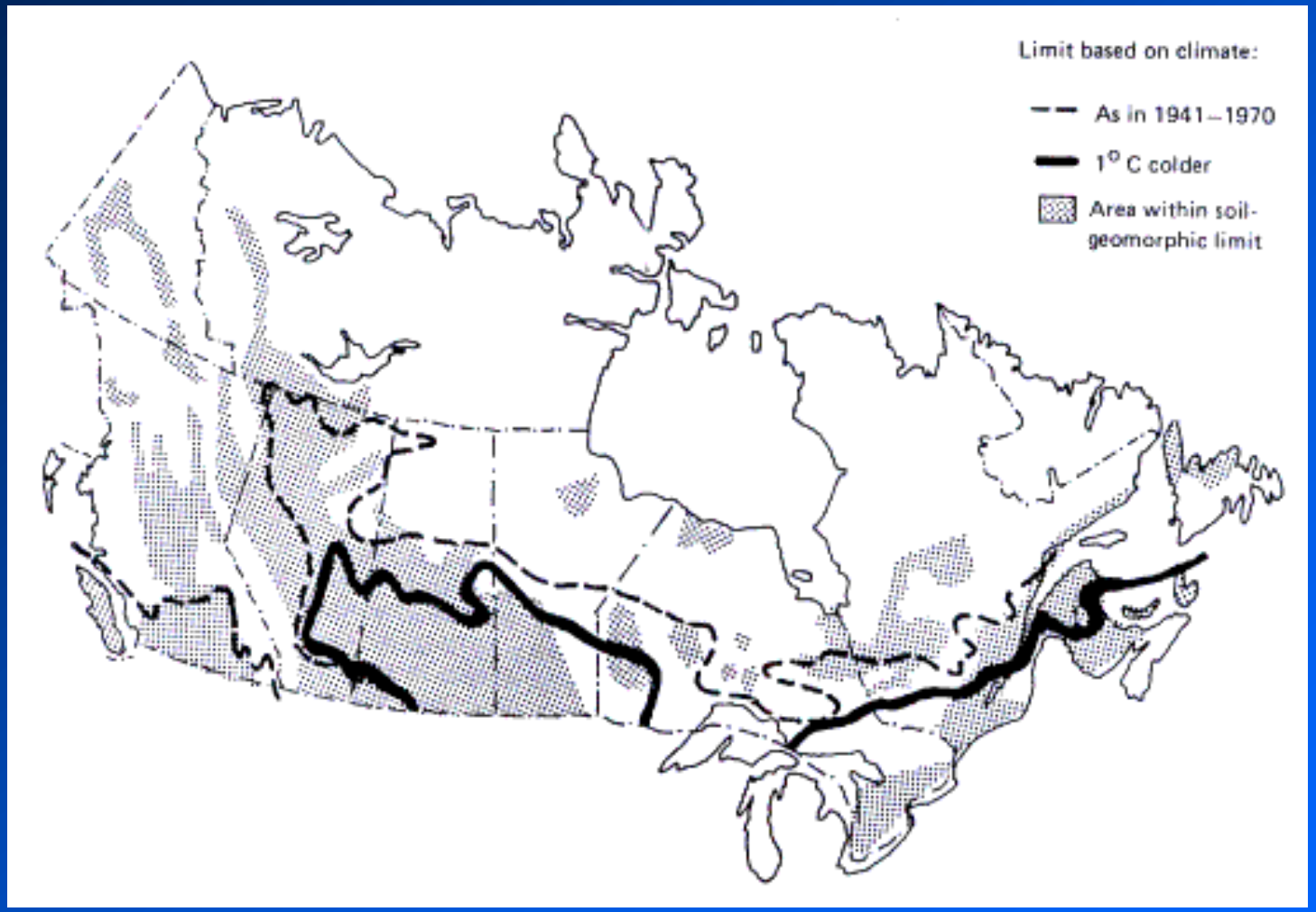


By Hubbert Lamb, the father of climatology, using 600 years of wind data, in a report for the German Navy.

We see it in the thermometer record.

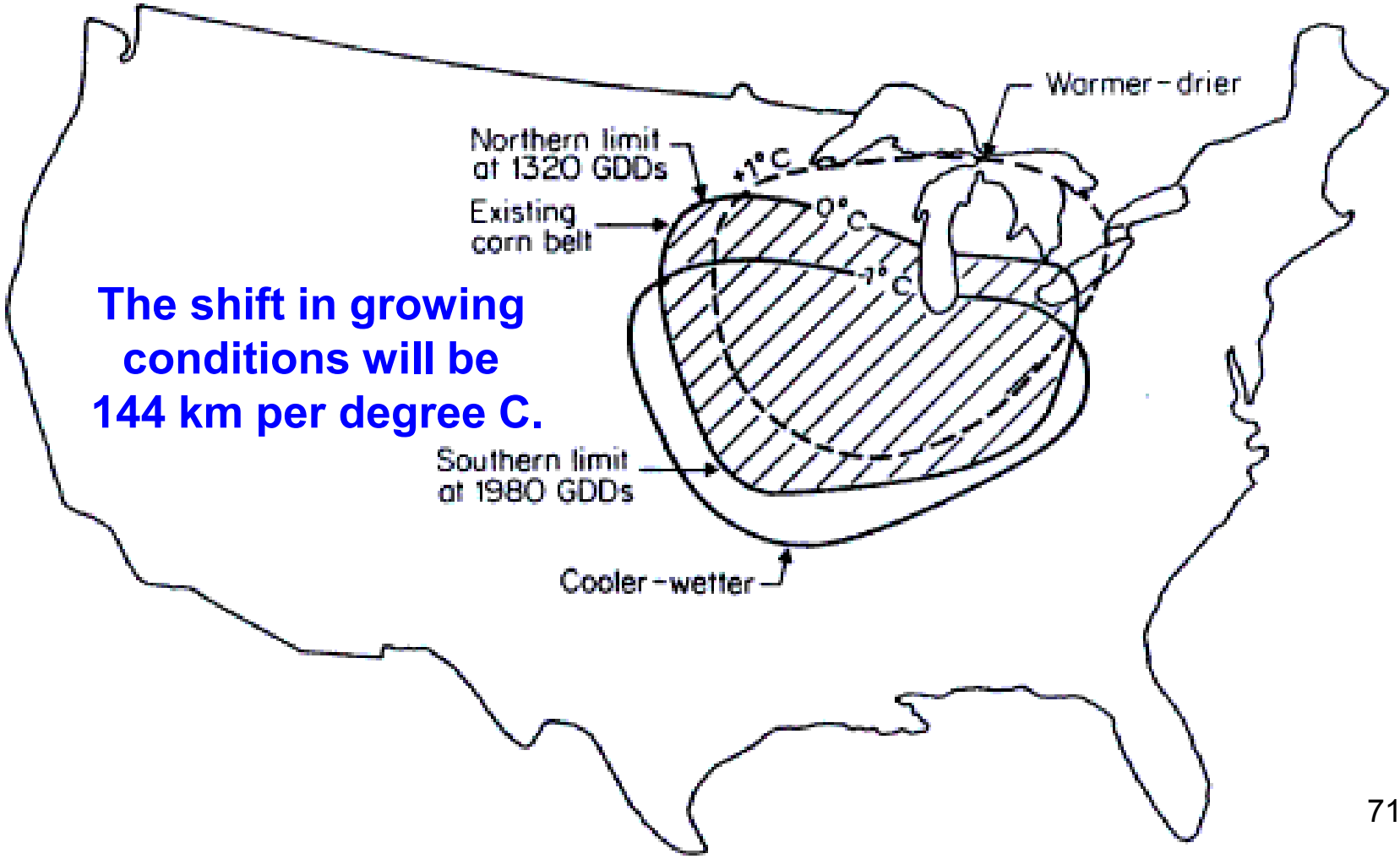


A prediction of Canadian agricultural response dating from the last cooling event 40 years ago

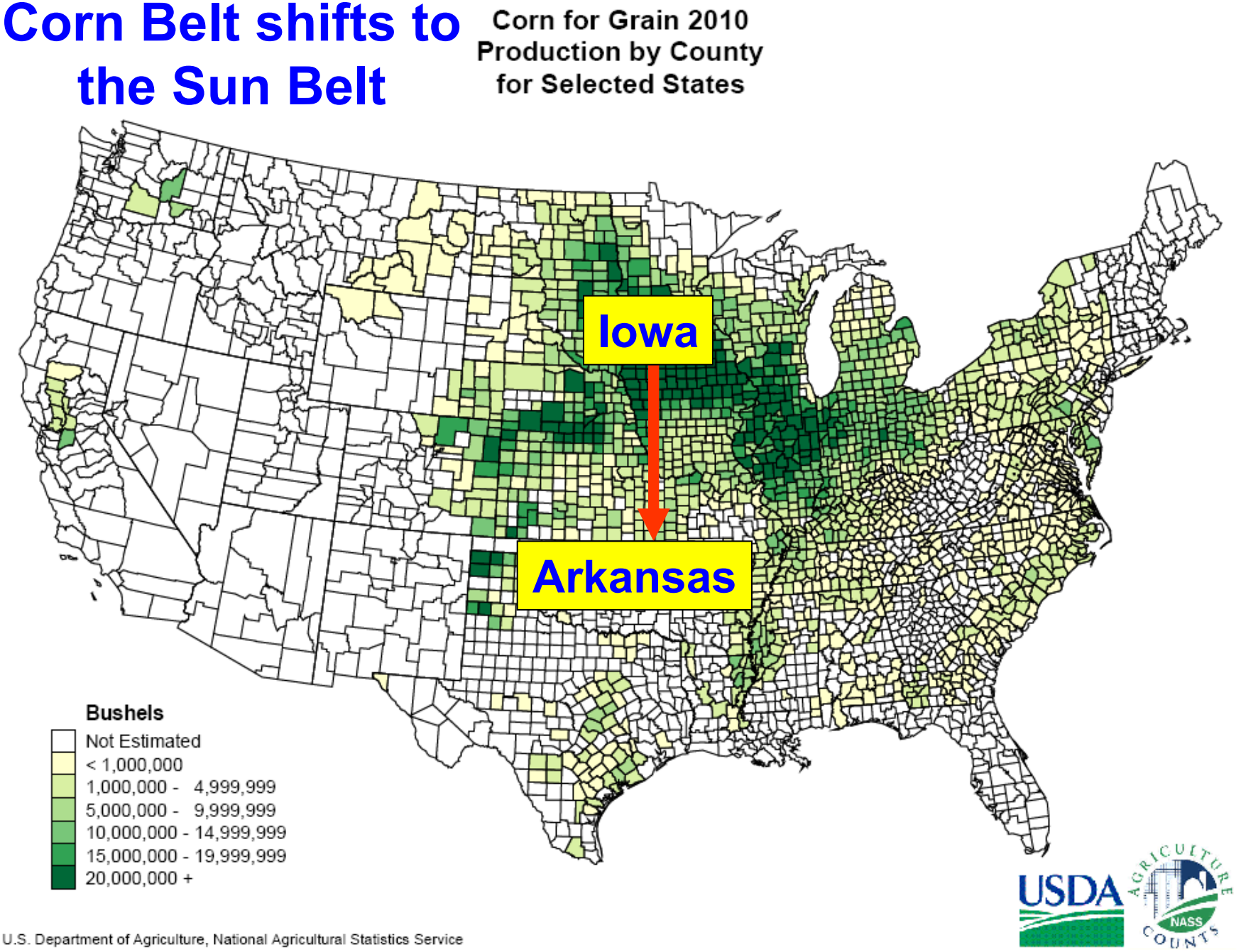


A 1° C decrease would reduce the frost-free period by 15 days.
A 2° C decrease would not allow the wheat crop to ripen before the first frost.
A 5 ° C decrease – it's all over.

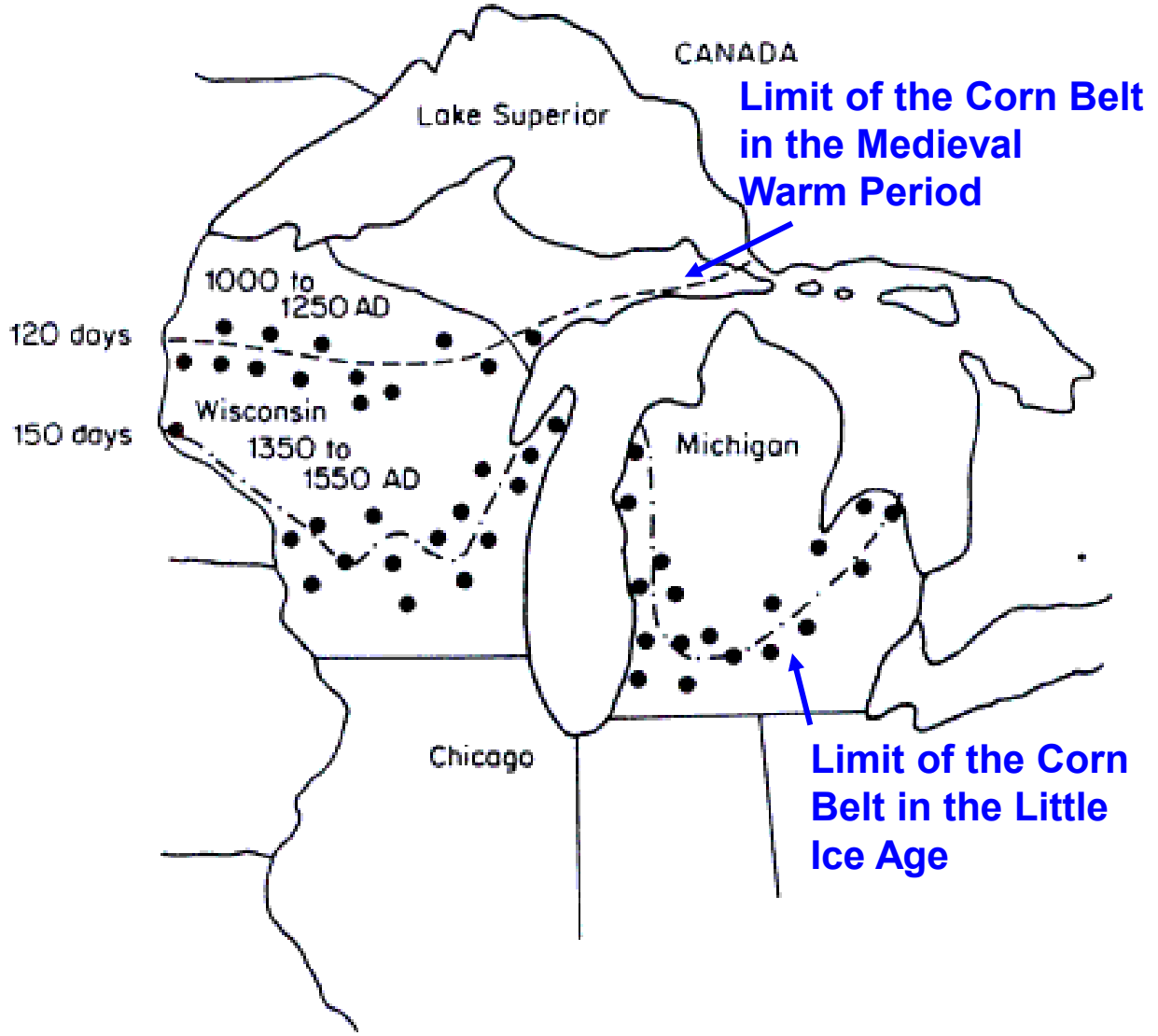
The Corn Belt shifts south but total growing area remains the same.



Corn Belt shifts to the Sun Belt



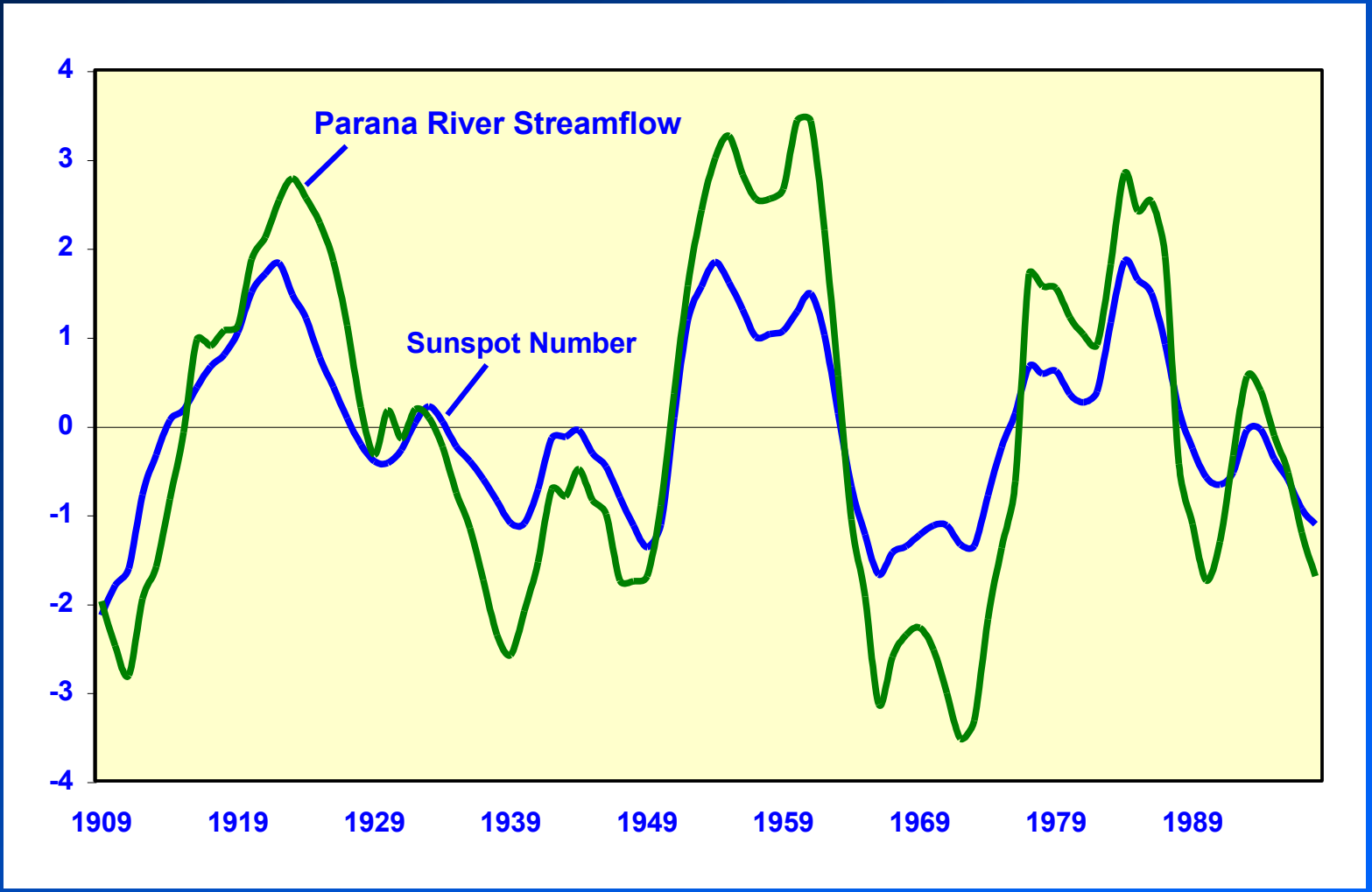
It has happened before in the US.



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

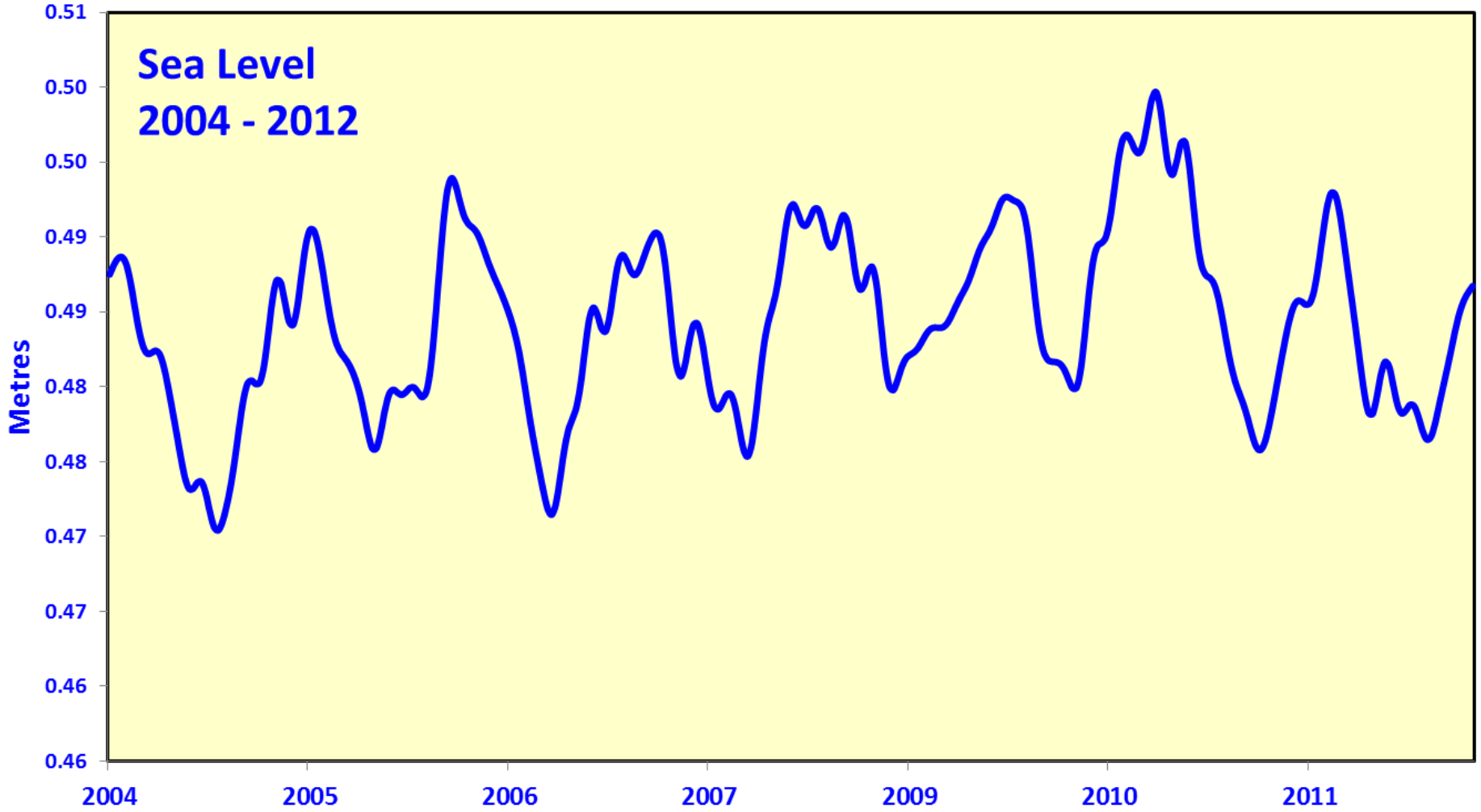
The northern limit of prehistoric maize fields appears to have retreated up to 320 km southward concurrently with cooling in the thirteenth and fourteenth centuries.

Colder is drier.



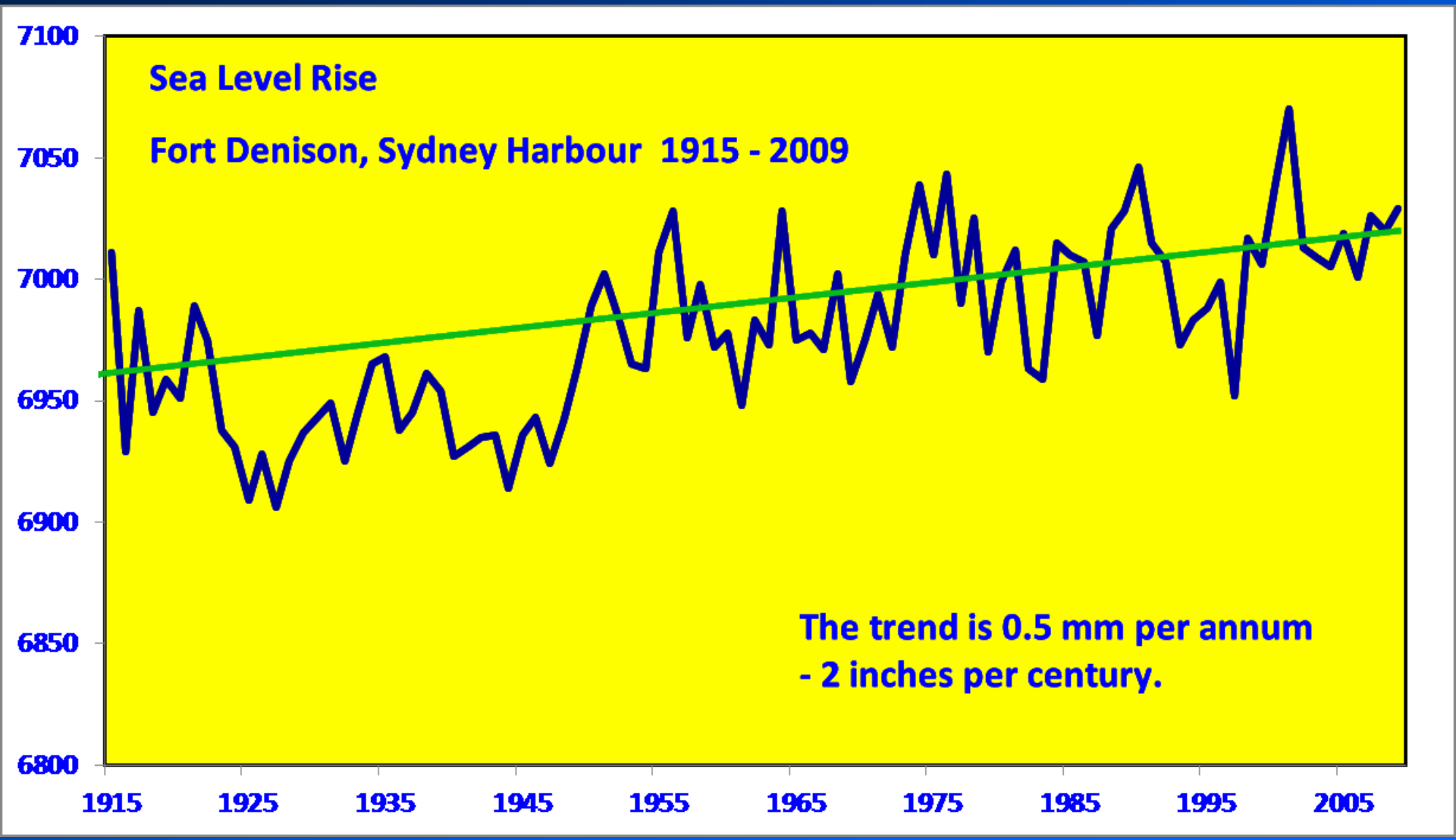
The Itaipu Dam on the Parana River provides 90% of Paraguay's electric power and 20% of Brazil's.

Sea level rise – the second last refuge of the global warming scoundrel



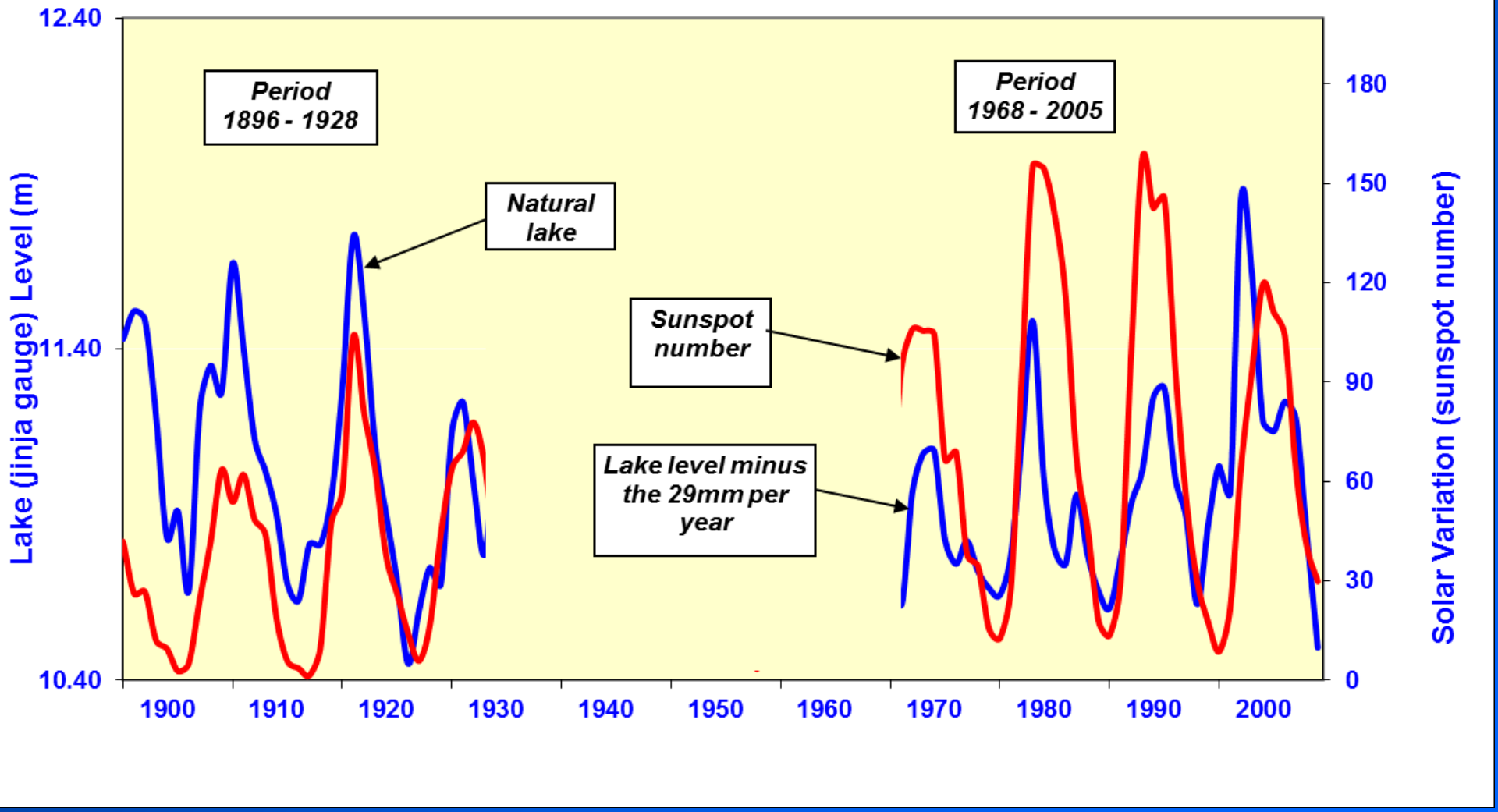
As measured by the Envisat satellite

Sea level - 100 years in Sydney



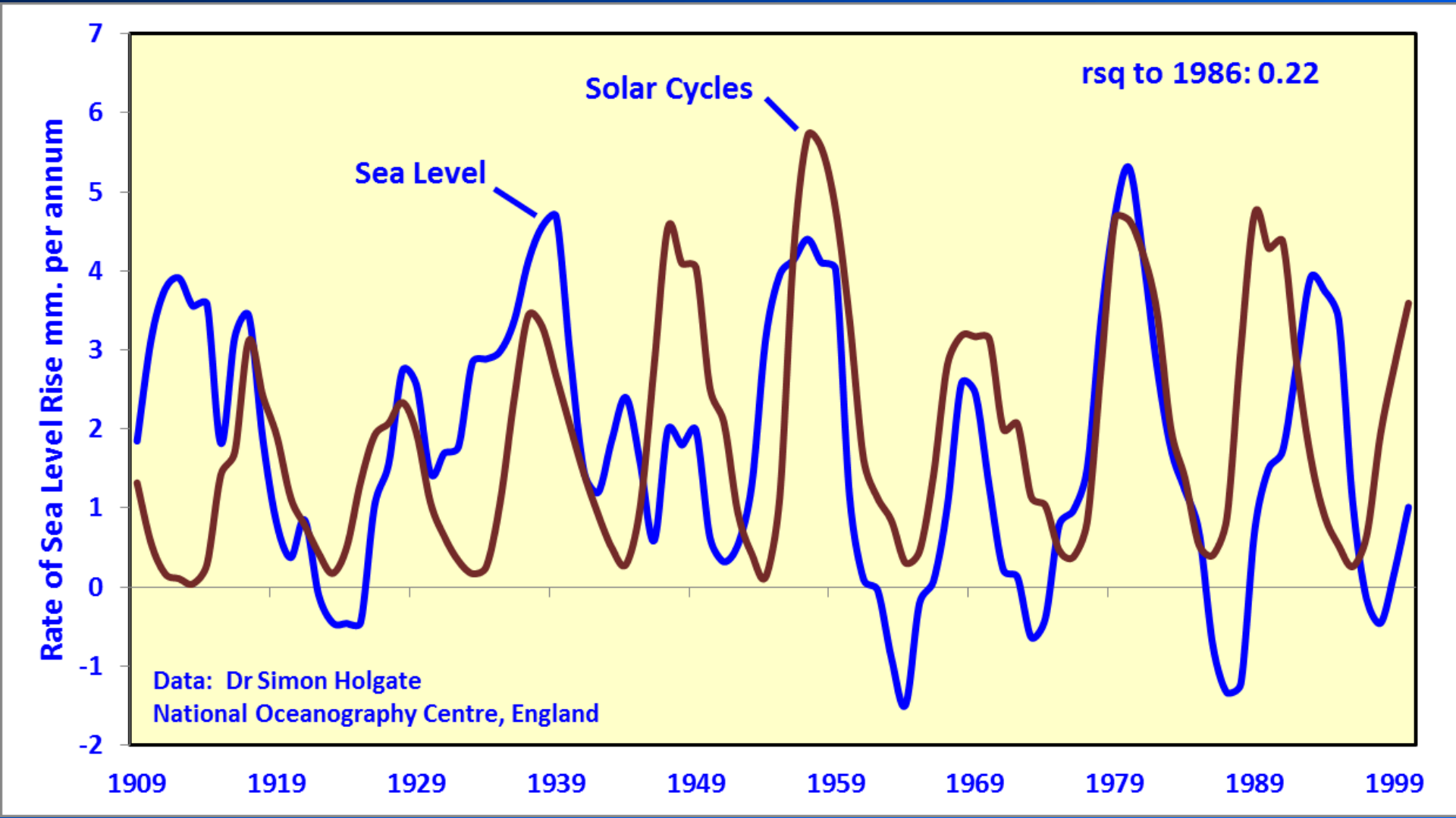
Human hair is 0.1 mm thick.

Lake Victoria Level and Solar Activity

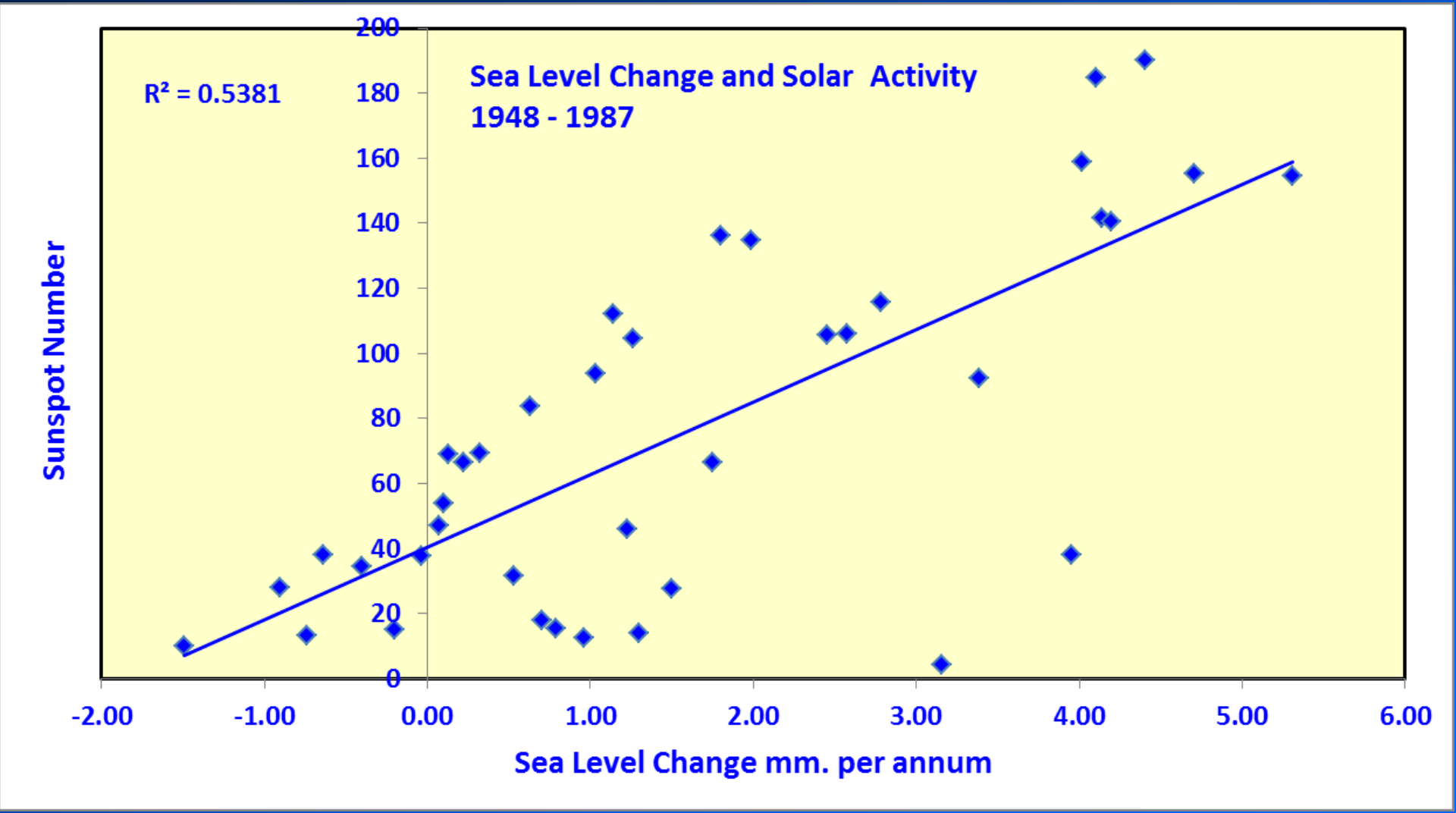


24 years of drought in train for East Africa

Rate of sea level rise is controlled by solar cycles.

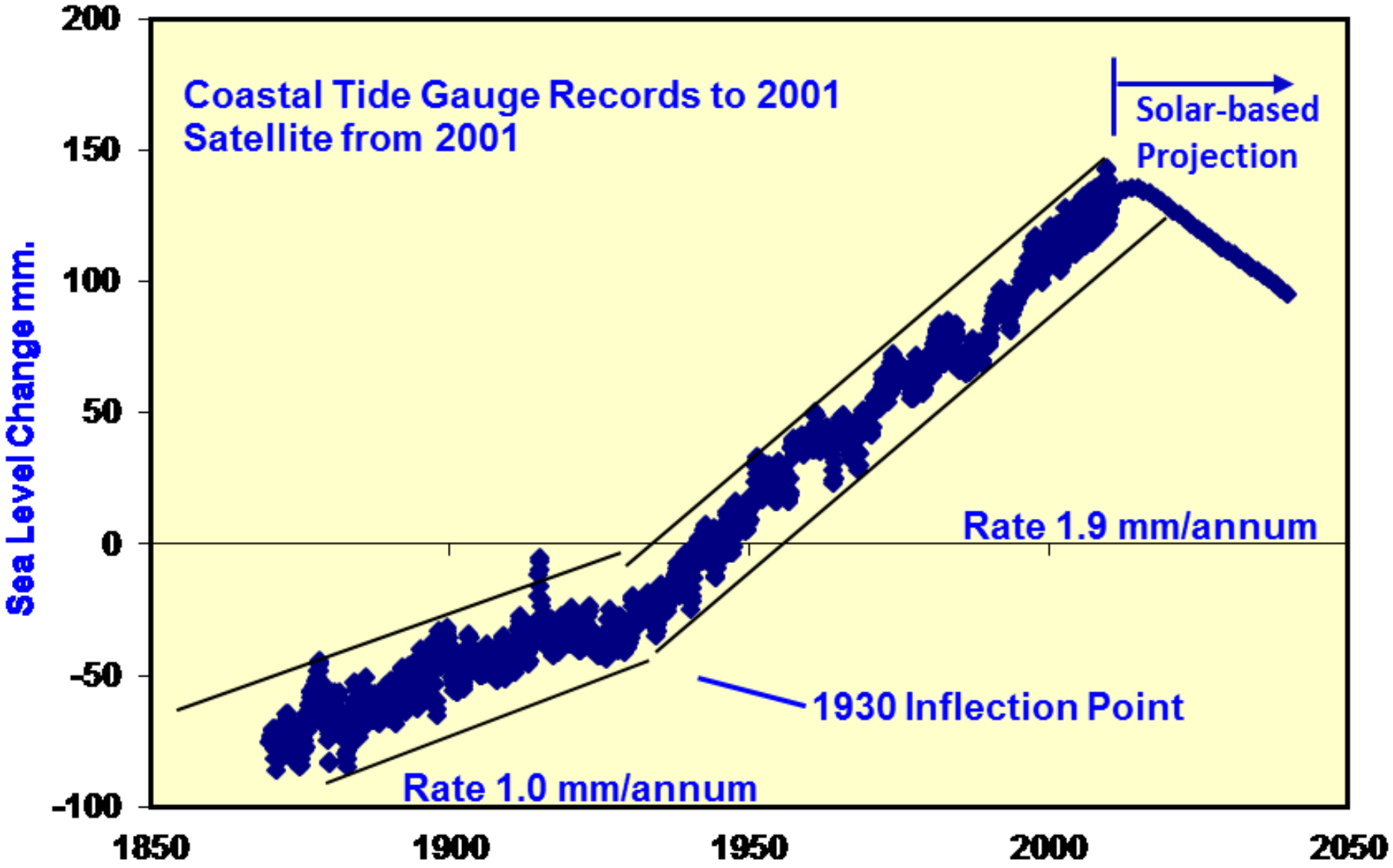


Statistically significant: R2 = 0.5381



Sea level rise/fall is 0.045 mm per unit of sunspot number.

Which makes it a predictive tool.



Summary on Climate

1. The World has entered a sharp cooling period due to lower solar activity.
2. Mid-latitude grain production under threat with potential famines.
3. Carbon dioxide's heating effect is real but minuscule.
4. Sea level now falling.