



*Bunbury WA, June 2010*

# Why I am sceptical about human-induced climate change

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# Constant cyclical climate change

Known Cycles	
variable	tectonic
143 million year	galactic
100,000 years	orbital
41,000 years	orbital
23,000 years	orbital
1,500 years	solar
210 years	solar
87 years	solar
22 years	solar
18.7 years	lunar
11 years	solar





# The next climate change:

The future is written in the past

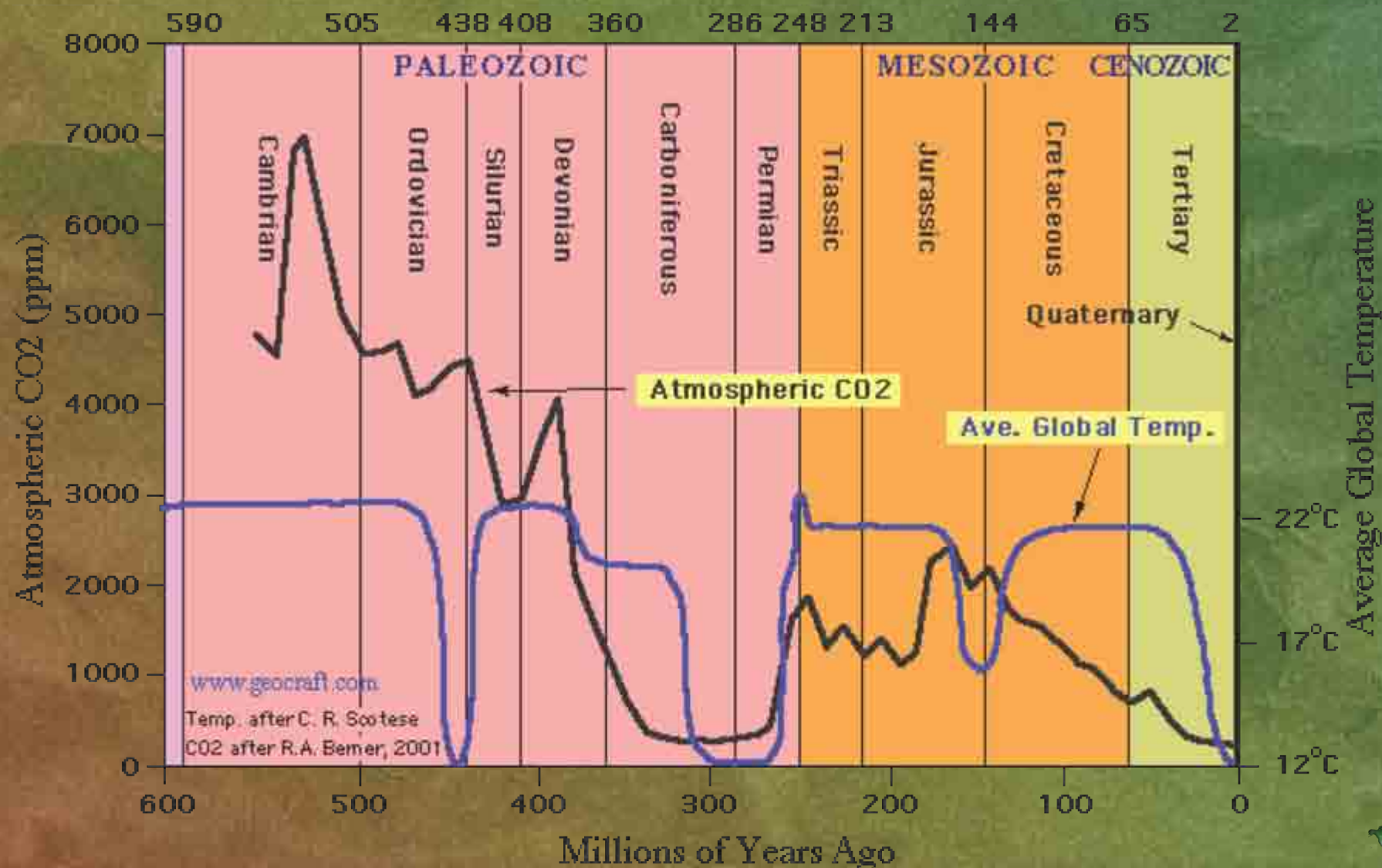
Pleistocene ice age	110,000 to 14,700 years ago
Bölling	14,700 to 13,900 years ago
Older Dryas	13,900 to 13,600 years ago
Allerød	13,600 to 12,900 years ago
Younger Dryas	12,900 to 11,600 years ago
Holocene warming	11,600 to 8,500 years ago
Egyptian cooling	8,500 to 8,000 years ago
Holocene Warming	8,000 to 5,600 years ago
Akkadian cooling	5,600 to 3,500 years ago
Minoan Warming	3,500 to 3,200 years ago
Bronze Age Cooling	3,200 to 2,500 years ago
Roman Warming	500 BC to 535 AD
Dark Ages	535 AD to 900 AD
Medieval Warming	900 AD to 1300 AD
Little Ice Age	1300 AD to 1850 AD
Modern Warming	1850 AD to ....





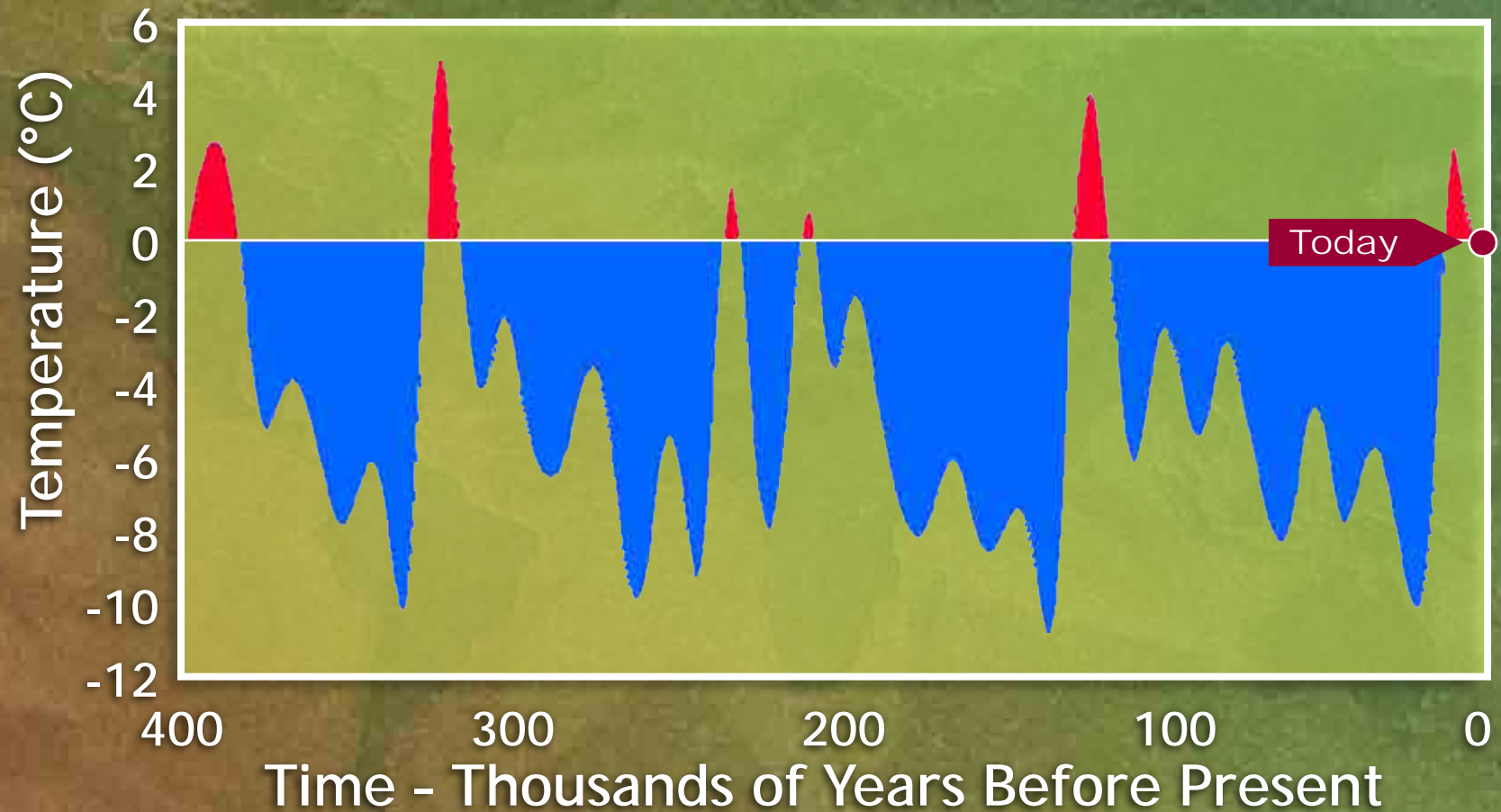


# Climate change over time

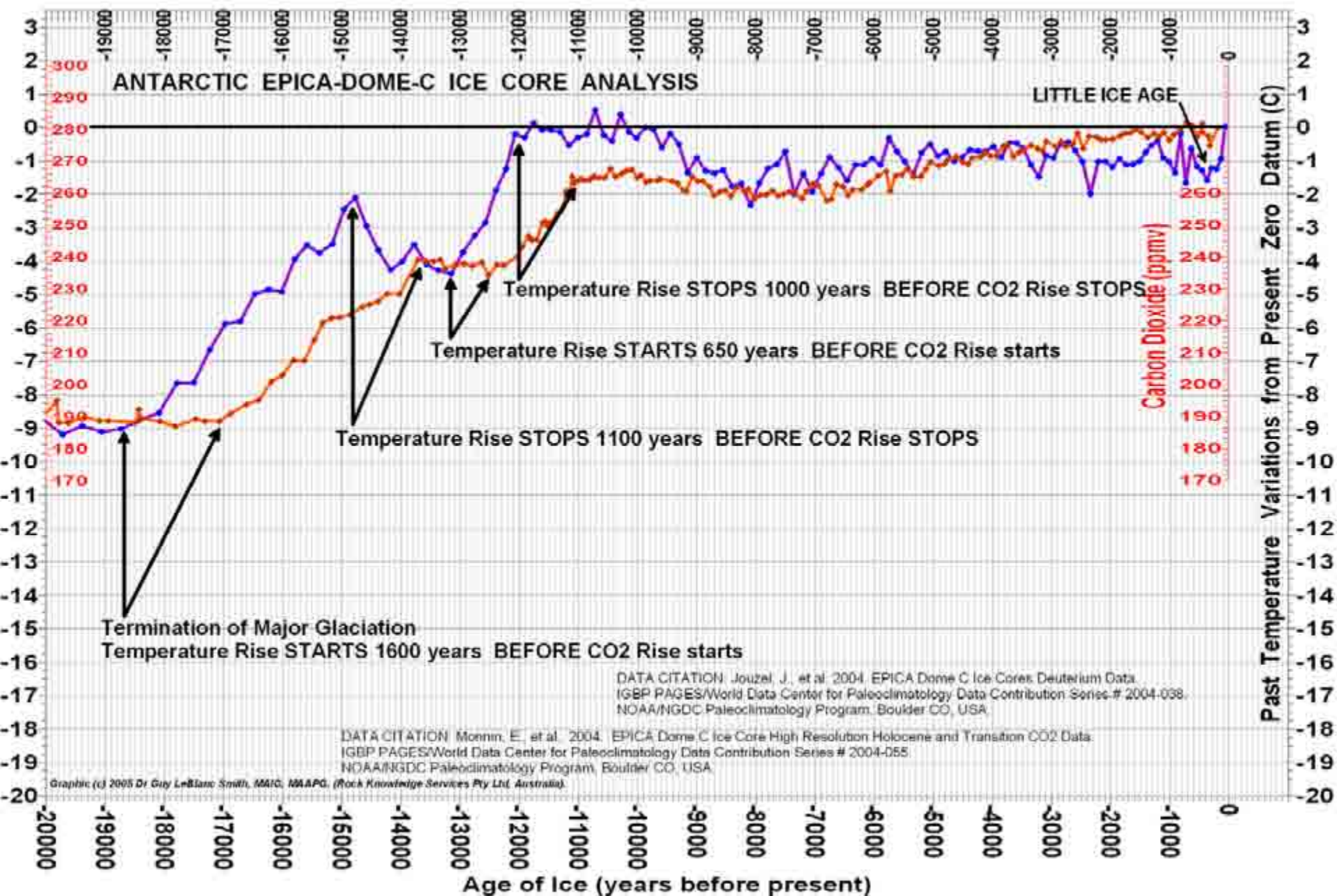




Is the speed and degree of modern climate change unprecedented?



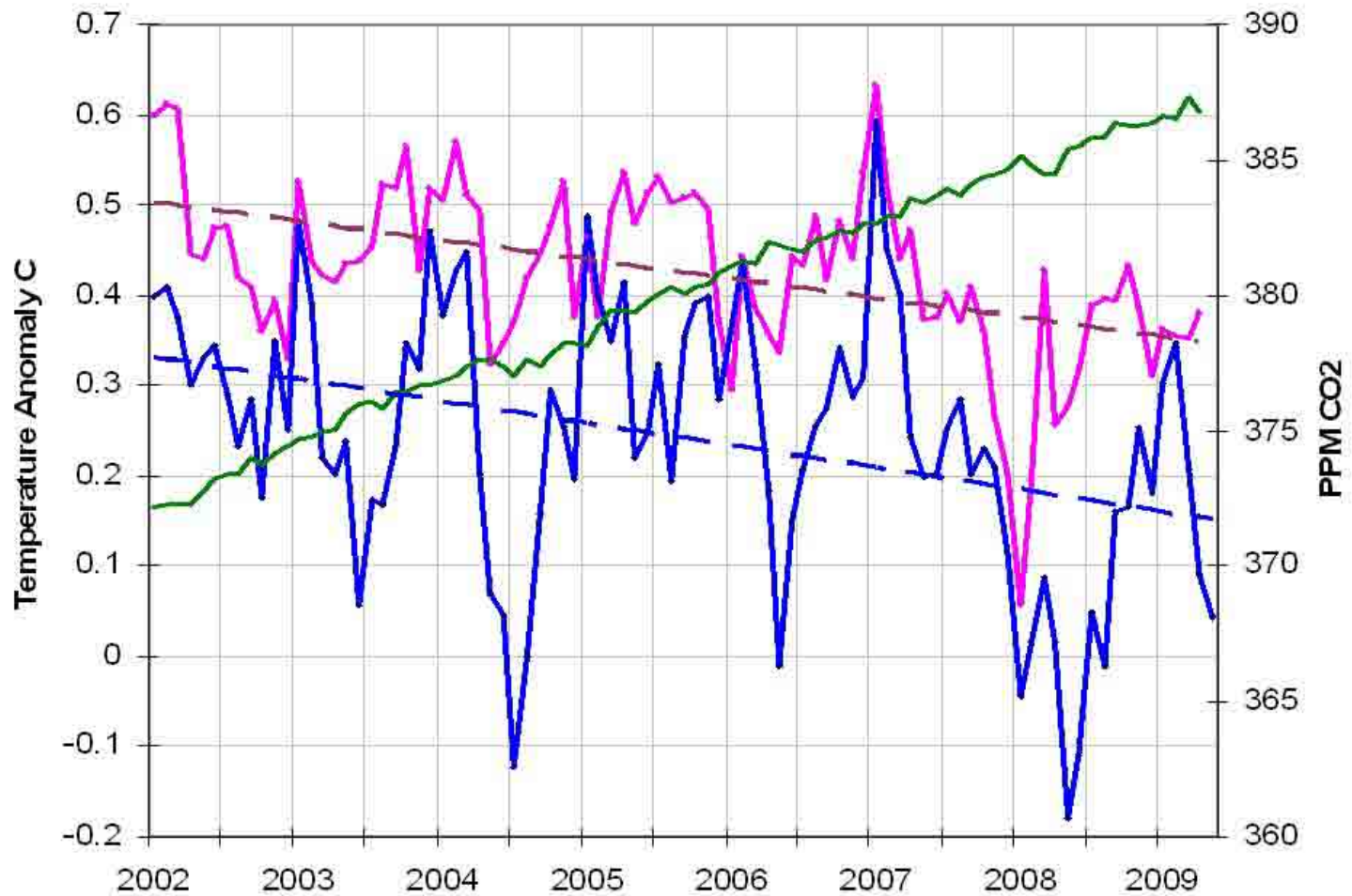






# Cooling with increasing CO<sub>2</sub>

Hadley CRUT3v and UAH MSU vs CO<sub>2</sub>

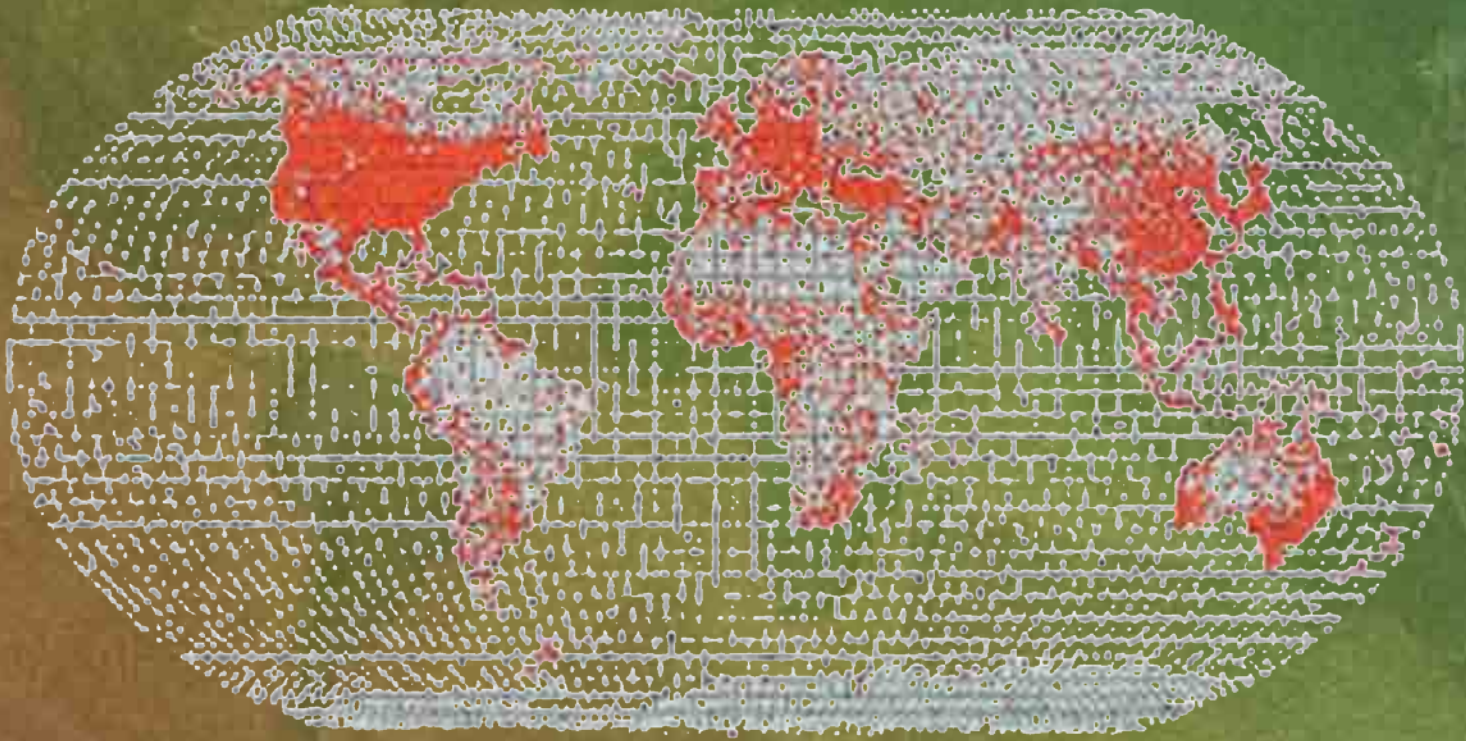






Temperature

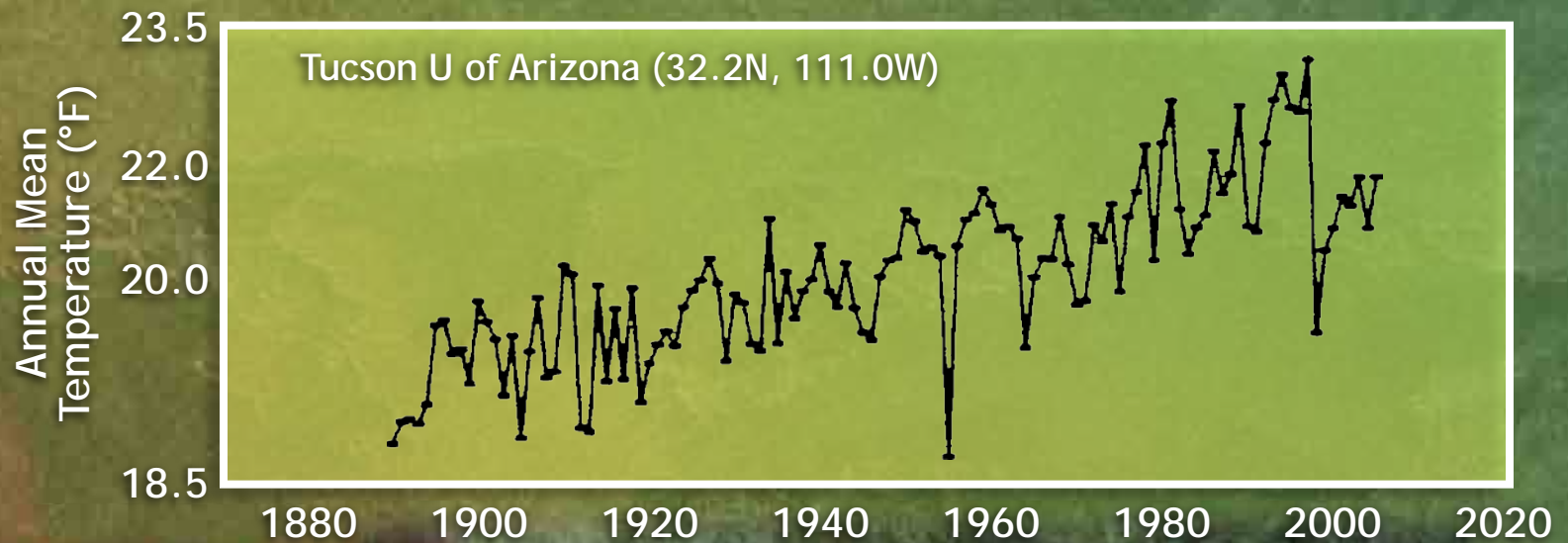
**Location, location, location.....**





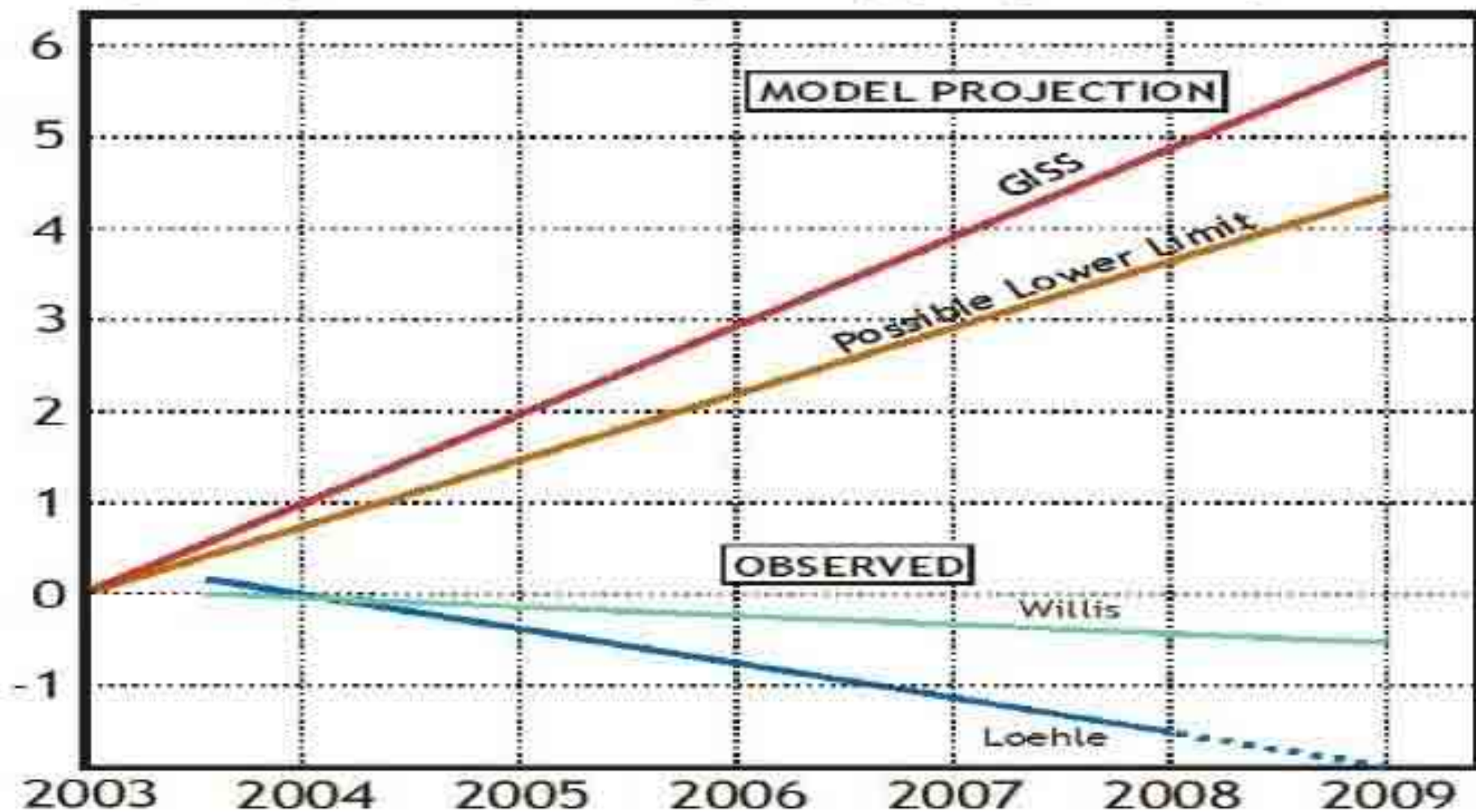


# Urban heat island effect





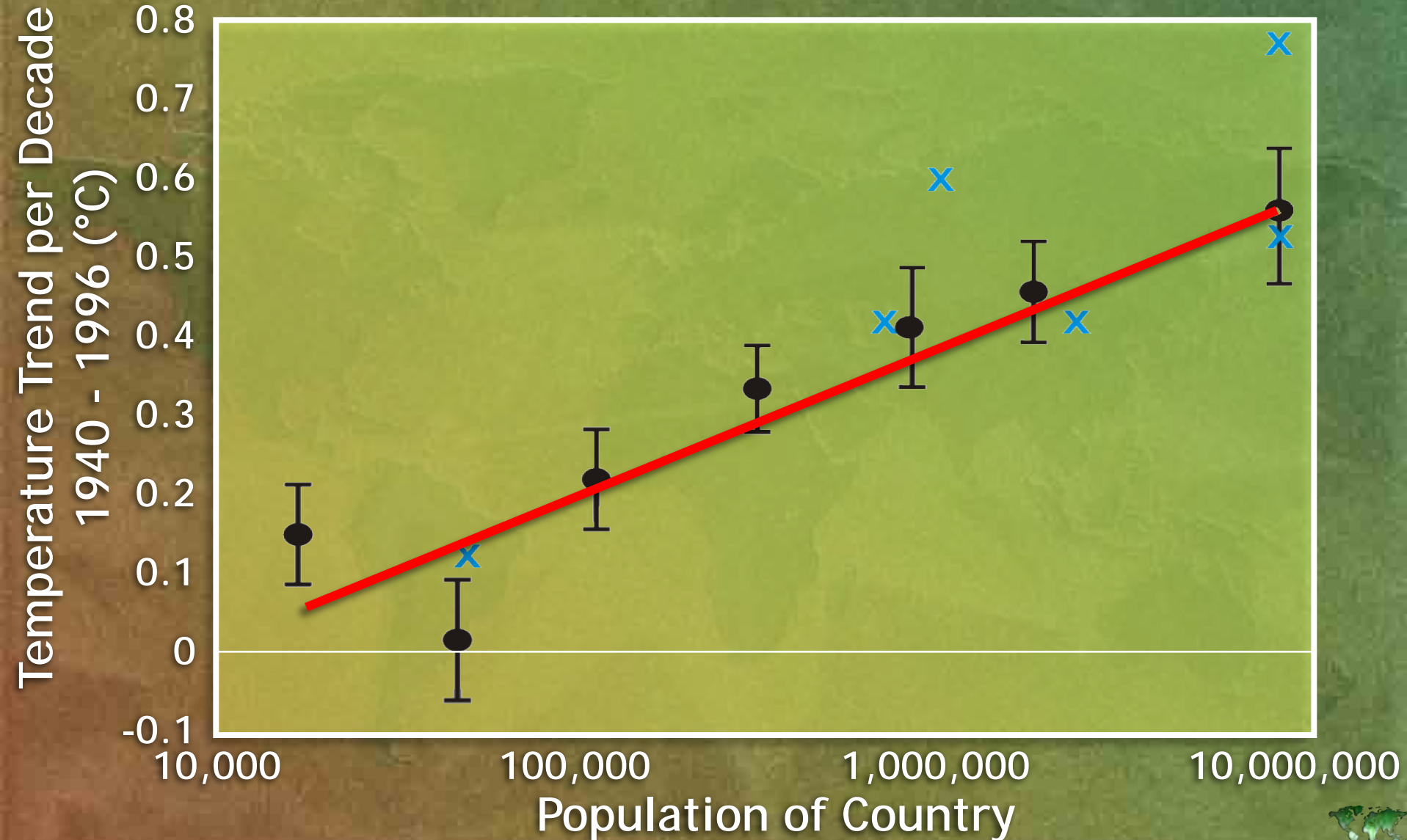
## Five years' global ocean cooling: reality yet again disobeys models







What is really measured?

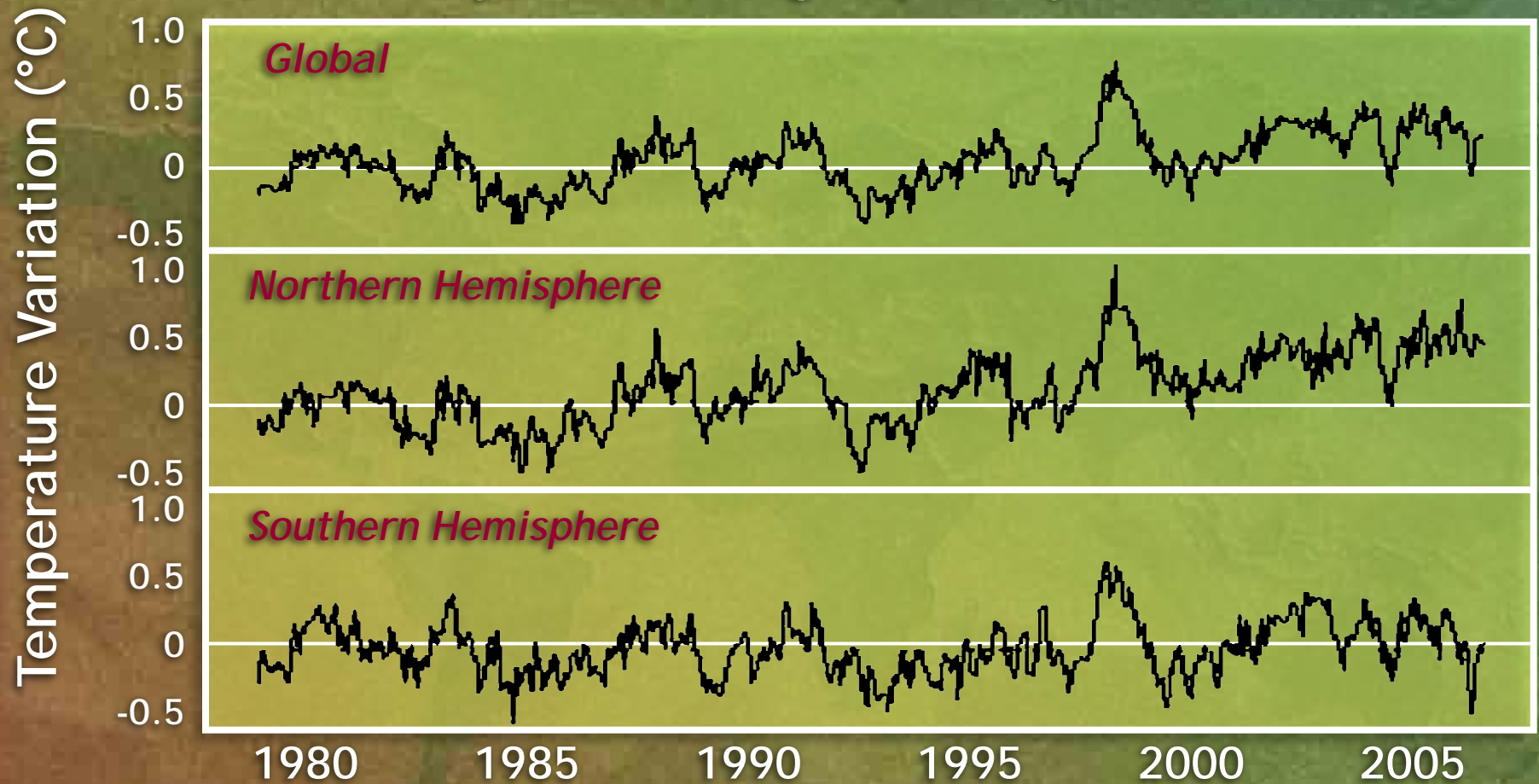






## Reliability of surface measurements

### The 28 years of high quality satellite data

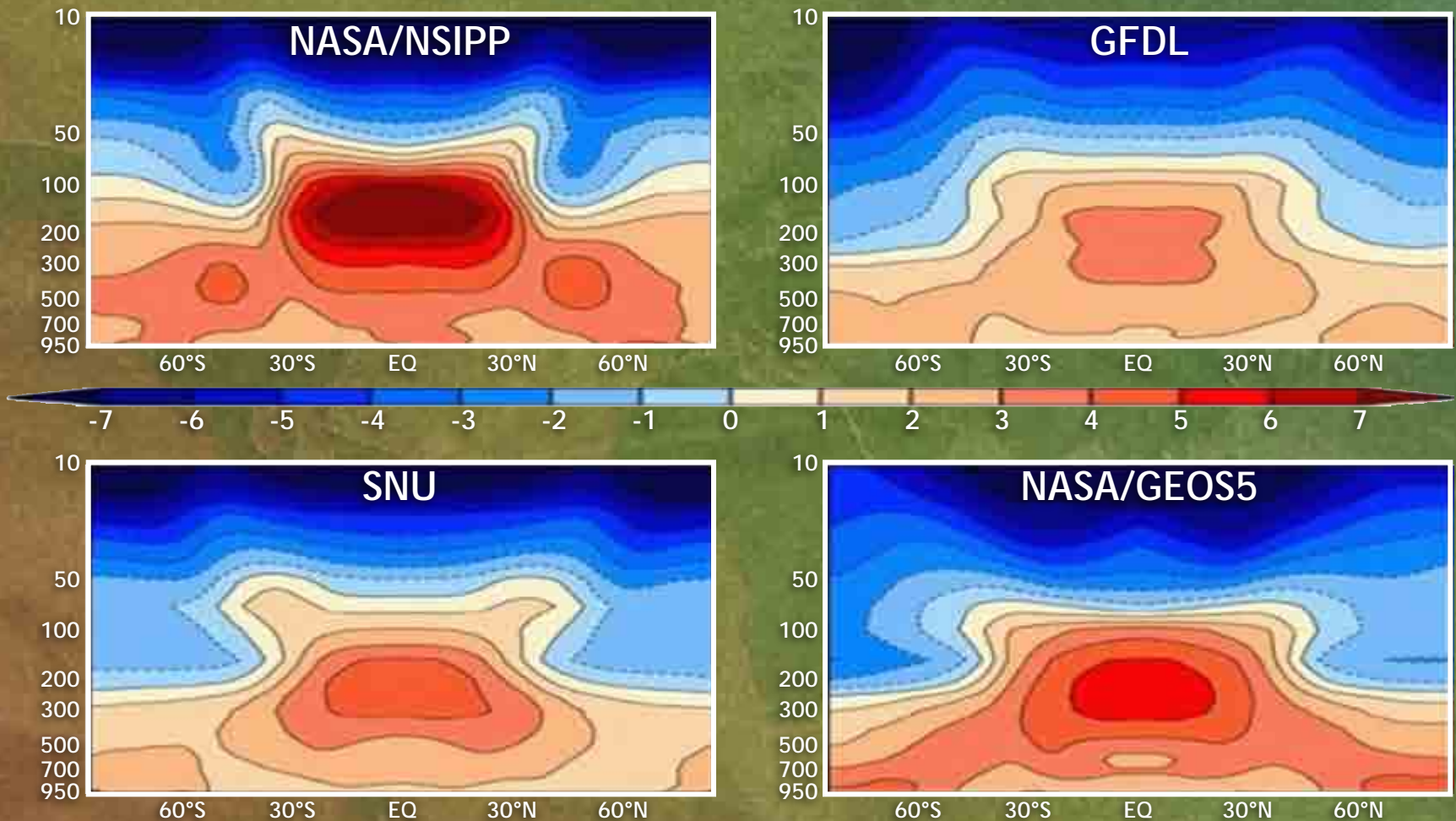


*The Southern Hemisphere is the same temperature it was 28 years ago,  
The Northern Hemisphere has warmed slightly*





## Models for atmospheric temperature



*Zonally-averaged distributions of predicted temperature change in °K at CO<sub>2</sub> doubling (2xCO<sub>2</sub>-control), as a function of latitude and pressure level, for four general-circulation models (Lee et al., 2007)*

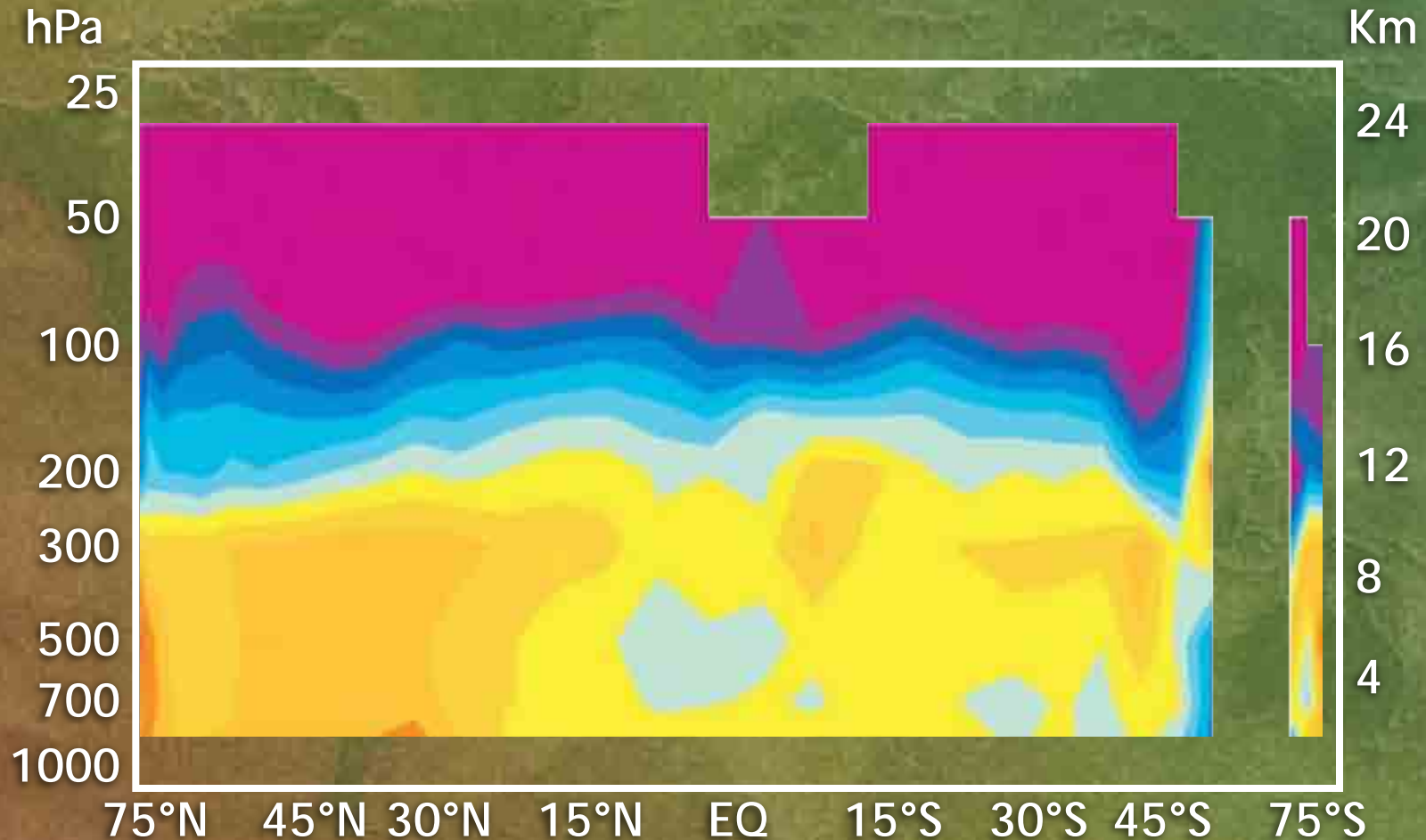






## Radiosonde measurements

No “greenhouse warming” signature is observed in reality

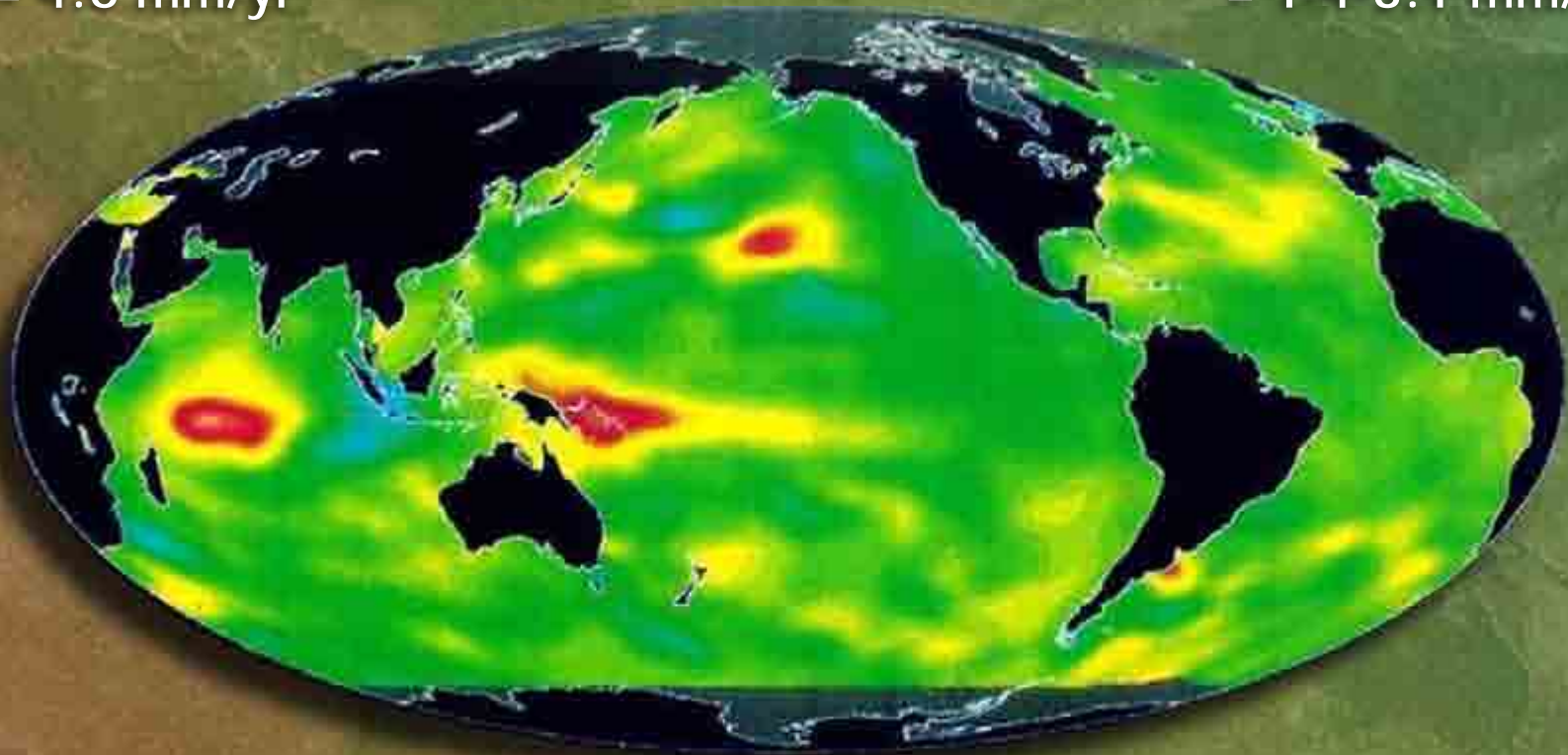




# Sea level change

1992-95  
Global average rise  
= 4.6 mm/yr

1992-98  
Global average rise  
= 1-4-3.1 mm/yr

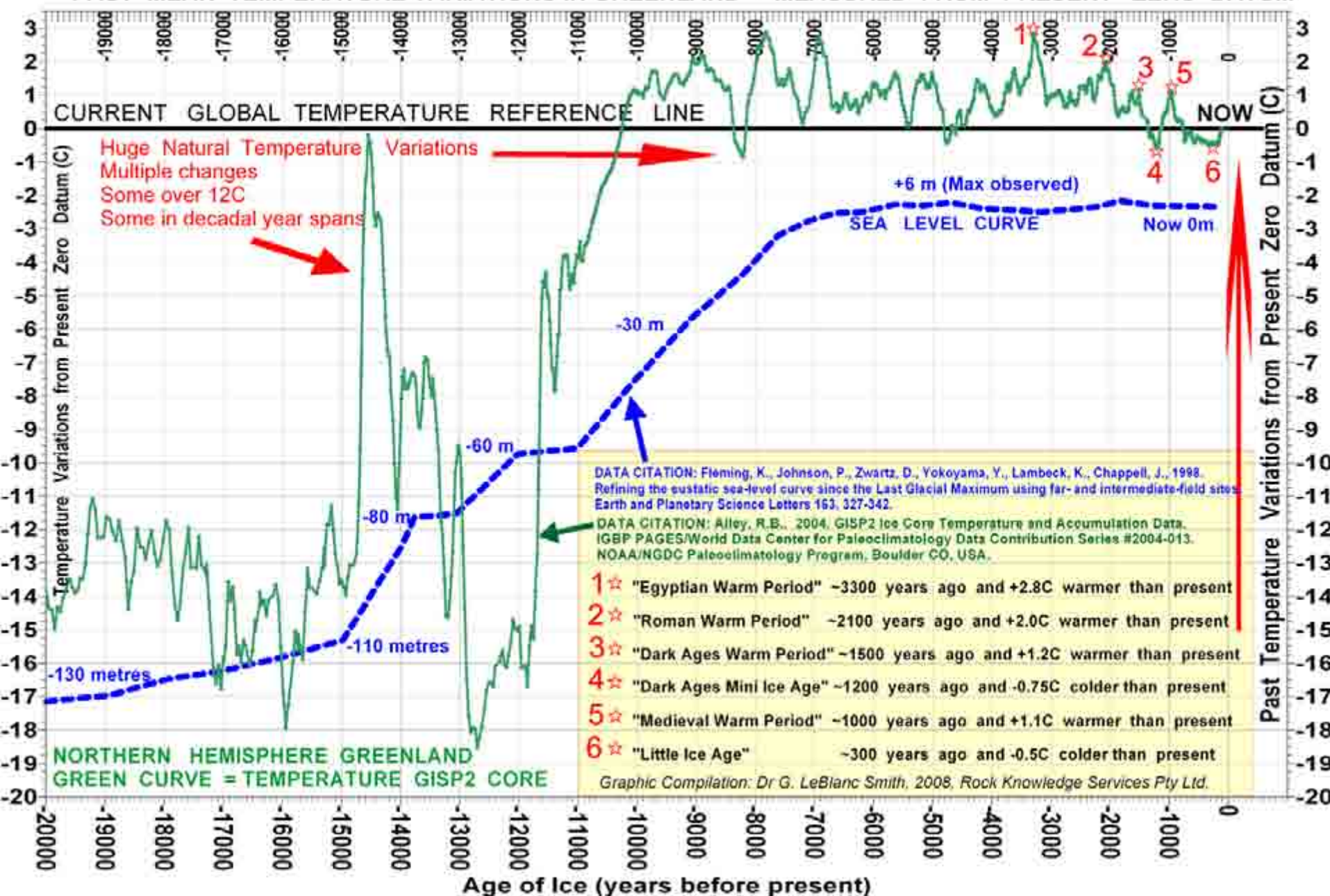


-60 -30 0 30 60 mm/yr

*TOPEX/Poseidon measurements, September 1992 - August 1995  
(patterns dominated by international ocean variability, e.g. ENSO)*



# PAST MEAN TEMPERATURE VARIATIONS IN GREENLAND - MEASURED FROM PRESENT ZERO DATUM

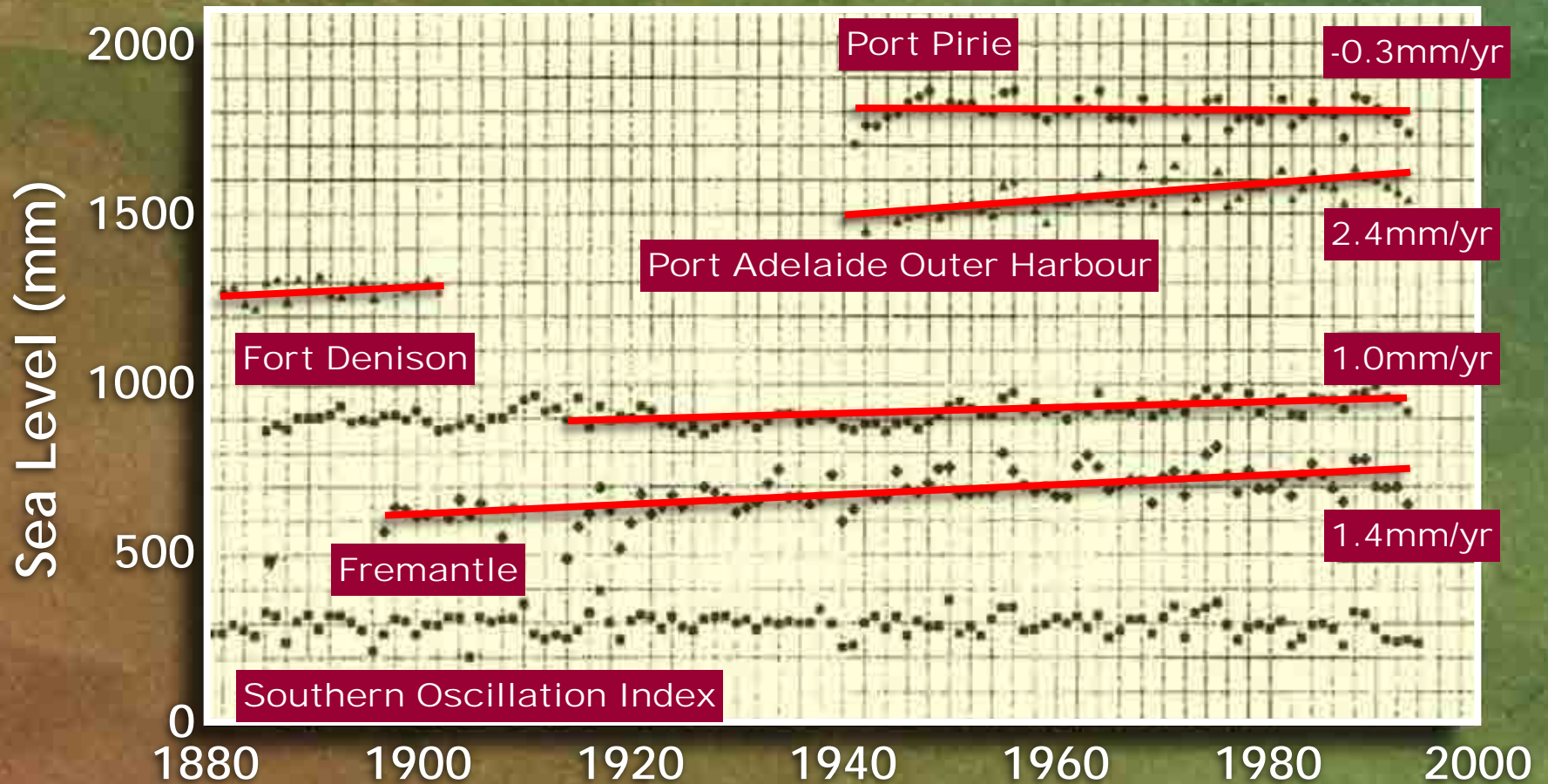






We'll all be rooned

## Measurement of historic sea levels



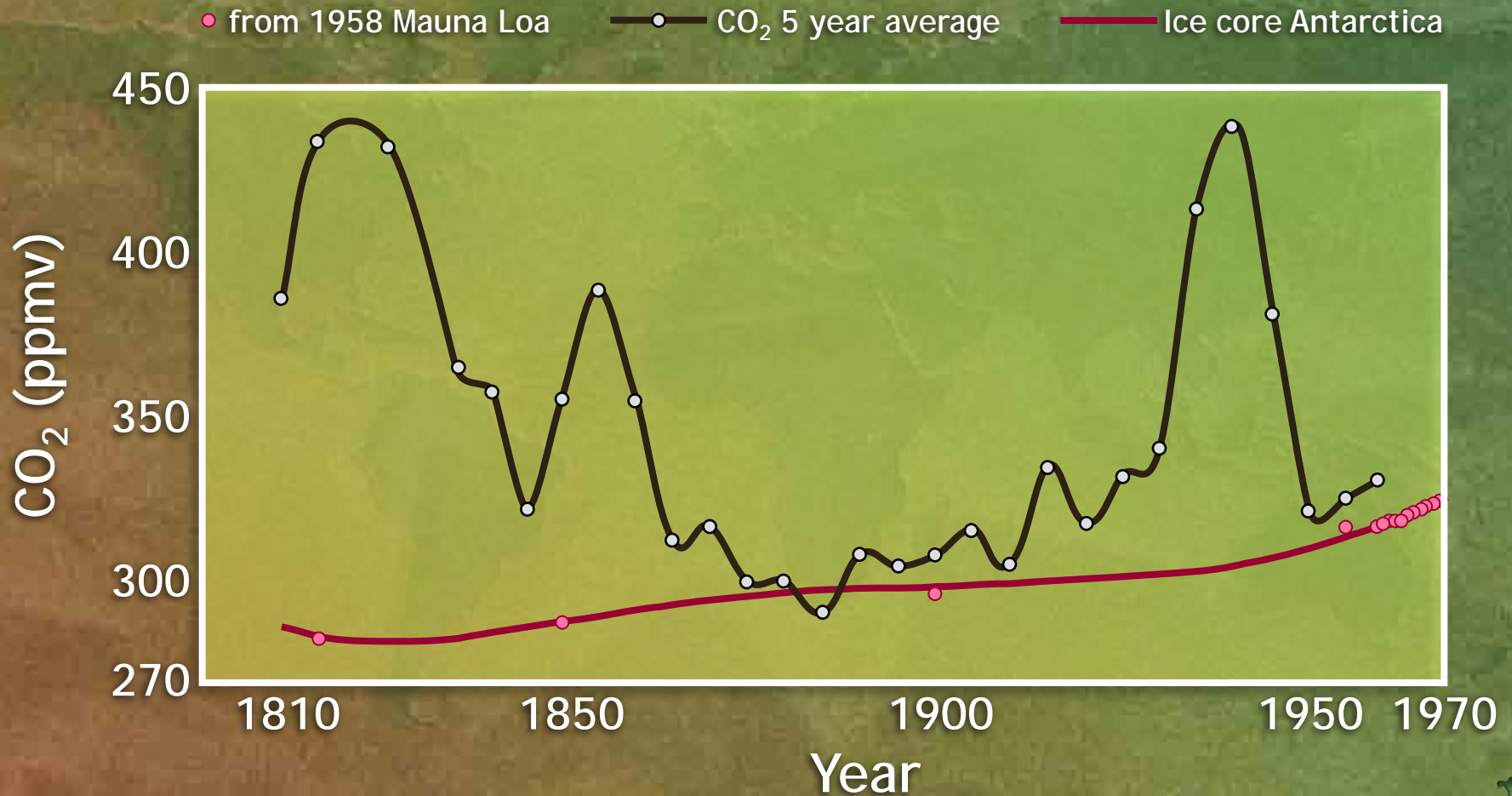
*Global average of tide gauges for 20<sup>th</sup> Century sea level rise is 1-2mm/yr (IPCC, 2001)*





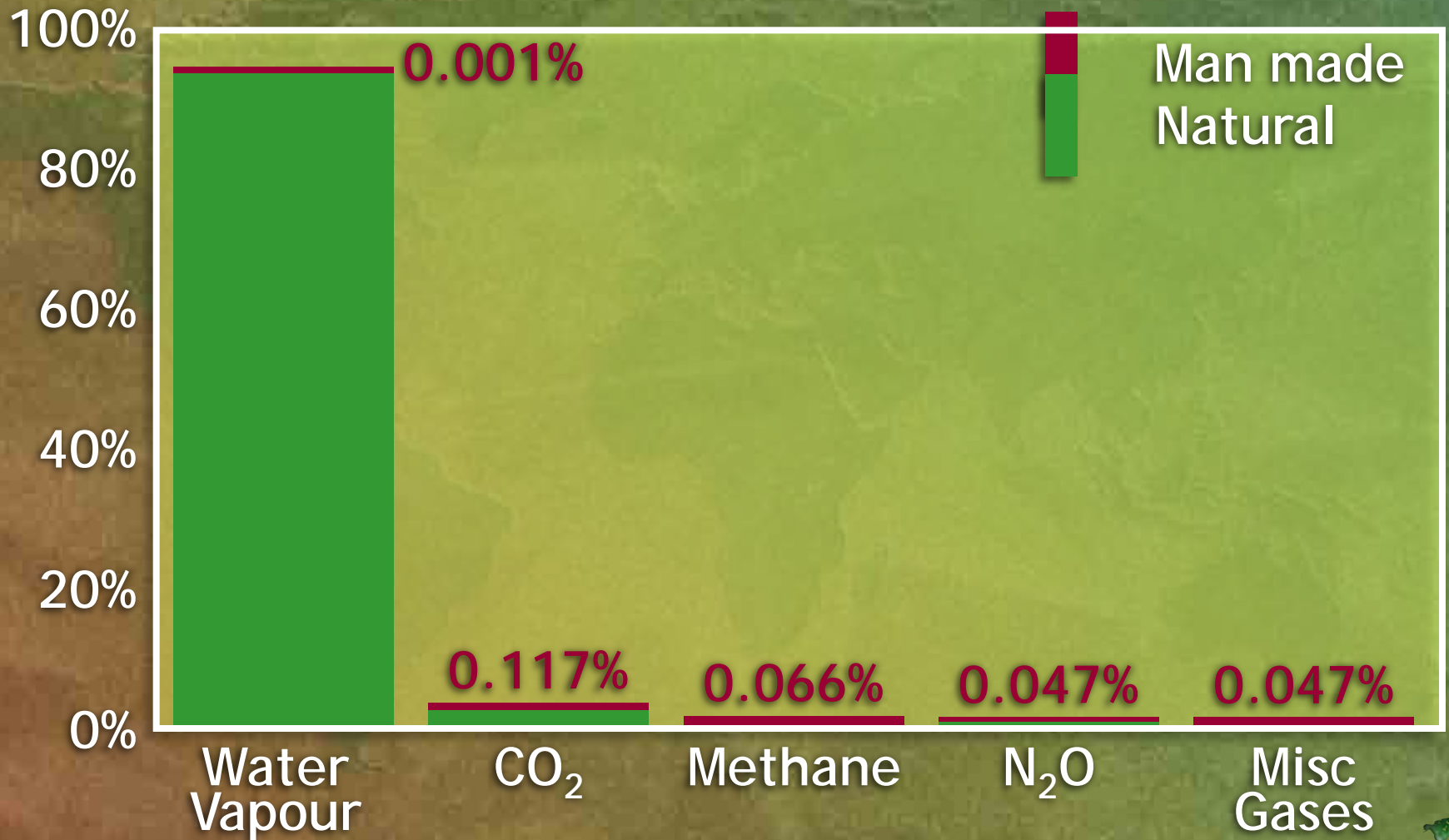
Smoothing of ice core CO<sub>2</sub> data  
– why pre-industrial choice of 280ppm?

## 1812-2004 Northern Hemisphere, Chemical Measurement





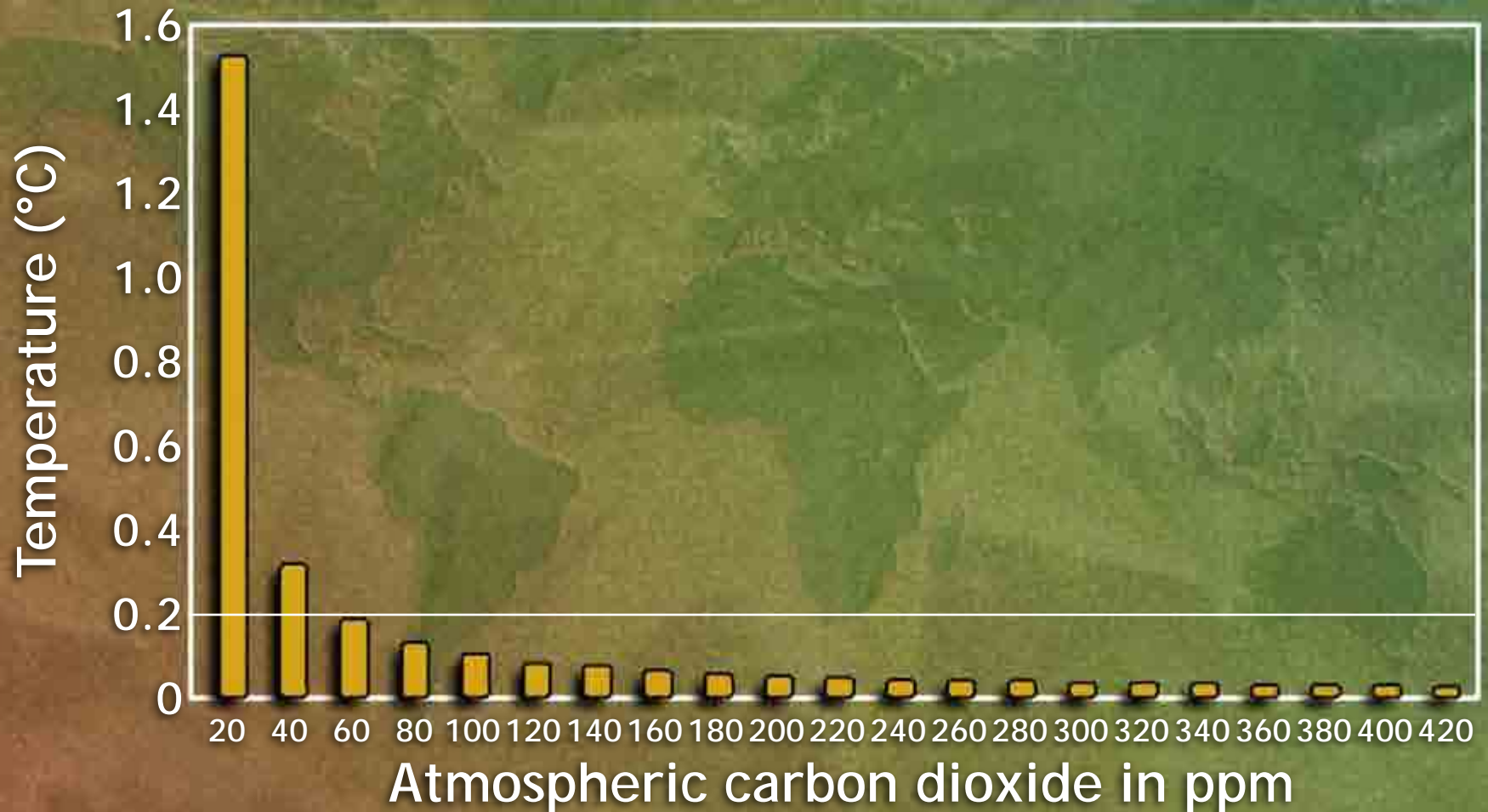
Water: Main greenhouse gas  
& driver of CO<sub>2</sub>





Doubling  $\text{CO}_2$  at 385ppm  
has no effect

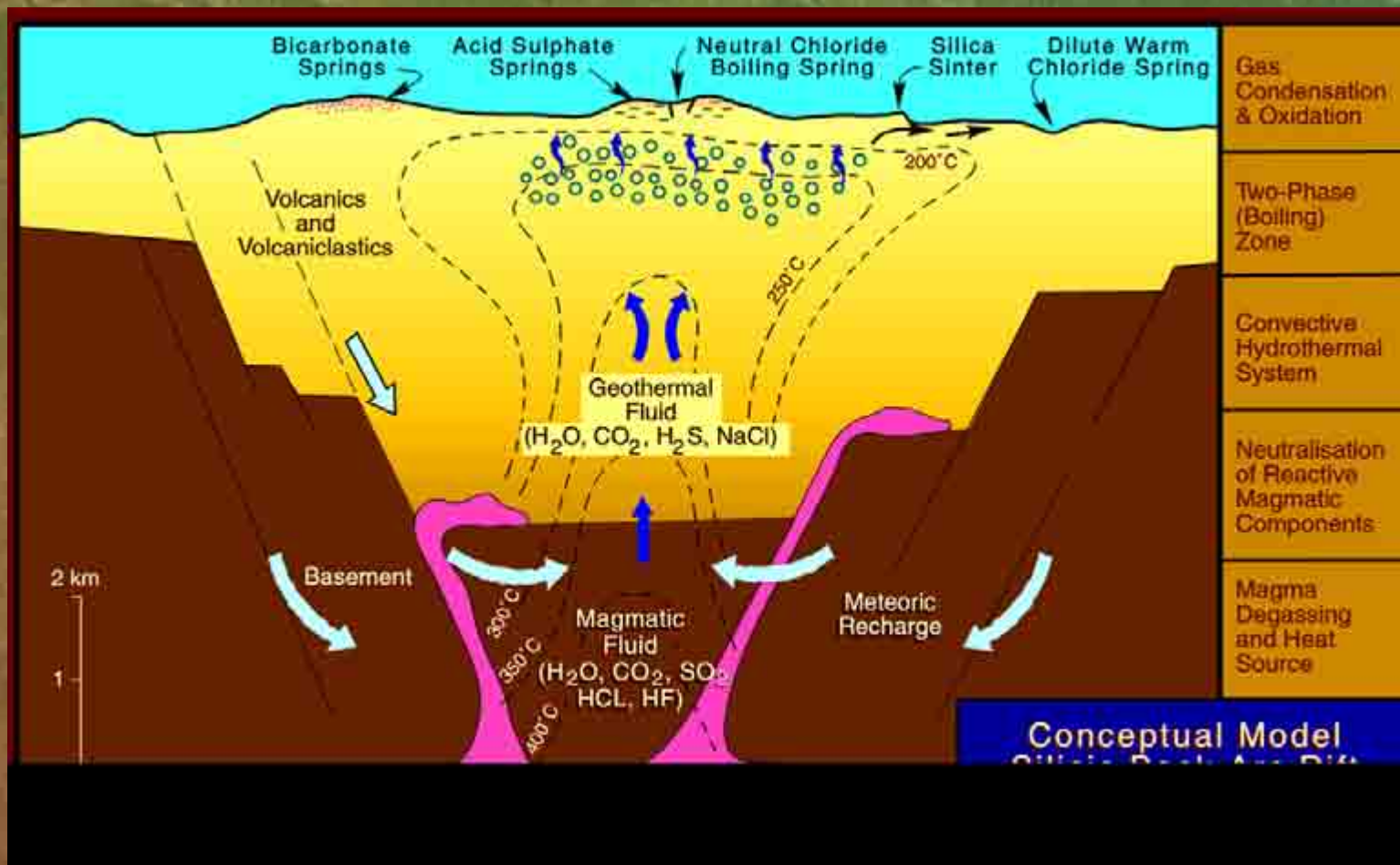
## The warming effect of atmospheric carbon dioxide







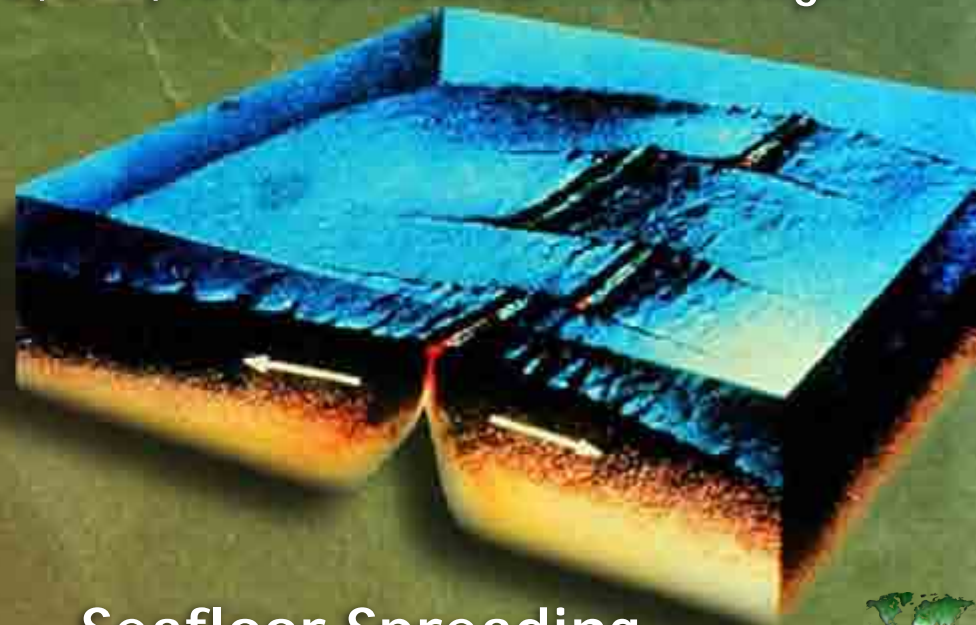
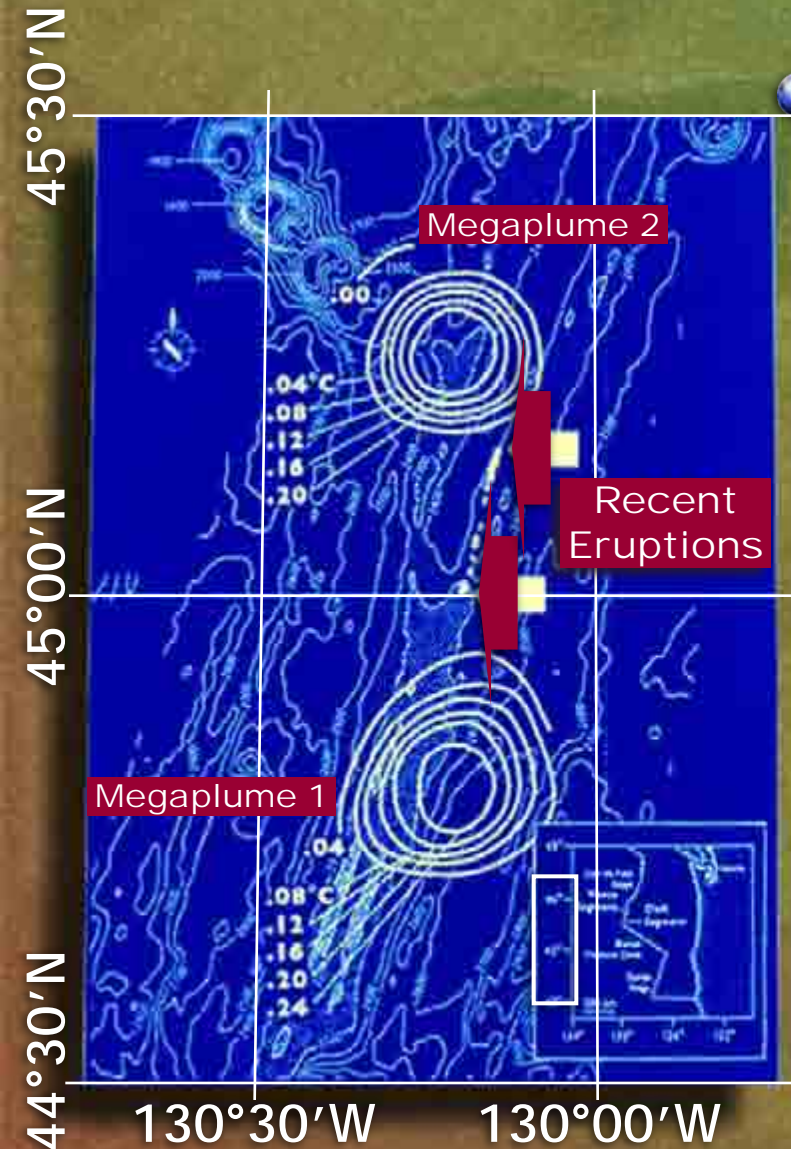
## ● TERRESTRIAL: Geothermal systems





# Submarine volcanicity

- Terrestrial volcanoes change weather (e.g. Tambora 1815)
- Submarine supervolcanoes add heat and  $\text{CO}_2$  to oceans and change climate (64,000km ridges)
  - 10,000  $\text{km}^3/\text{a}$  of cooling water
  - >85% Earth's volcanoes)
  - 3,477,403 seamounts >100m high



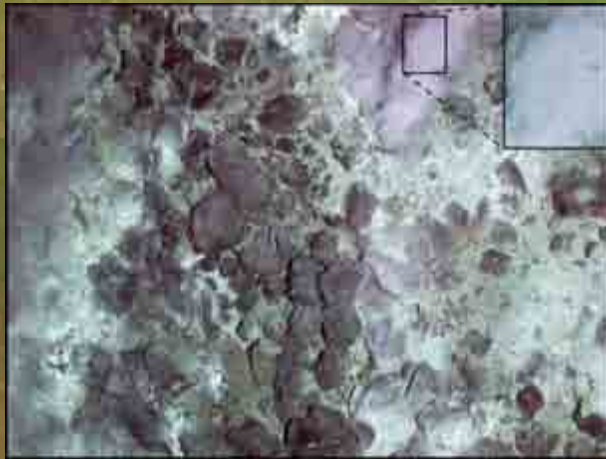
Seafloor Spreading







# 🌐 SUBMARINE: CO<sub>2</sub> vent exhalation





## Ocean 'acidity'

- Weathering: hydration, oxidation, CO<sub>2</sub> removal
- Increase in volume, decrease in density
- Driven by the atmosphere, rainwater [currently pH 5.6] and micro-organisms
- Henry's Law
- $2\text{KAlSi}_3\text{O}_8 + 2\text{H}^+ + \text{H}_2\text{O} \rightleftharpoons \text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4 + 2\text{K}^+ + 4\text{SiO}_2$
- $\text{KAl}_2\text{AlSi}_3\text{O}_{10}(\text{OH})_2 + 3\text{Si}(\text{OH})_4 + 10\text{H}^+ \rightleftharpoons \text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4 + 2\text{K}^+ + 4\text{SiO}_2$
- $2\text{NaAlSi}_3\text{O}_8 + 2\text{H}^+ + \text{H}_2\text{O} \rightleftharpoons \text{Al}^{3+} + \text{K}^+ + 6\text{SiO}_2 + 12\text{H}_2\text{O}$
- $\text{CaAl}_2\text{Si}_2\text{O}_8 + 2\text{H}^+ + \text{H}_2\text{O} \rightleftharpoons \text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4 + \text{Ca}^{2+}$
- $\text{CO}_2 + \text{CaSiO}_3 \rightleftharpoons \text{CaCO}_3 + \text{SiO}_2$
- $\text{CO}_2 + \text{MgSiO}_3 \rightleftharpoons \text{MgCO}_3 + \text{SiO}_2$

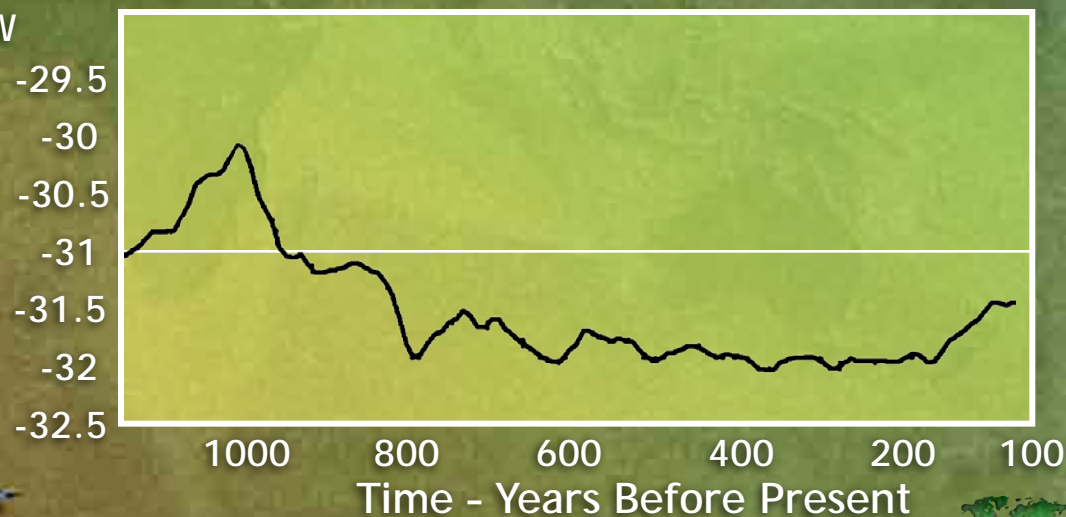
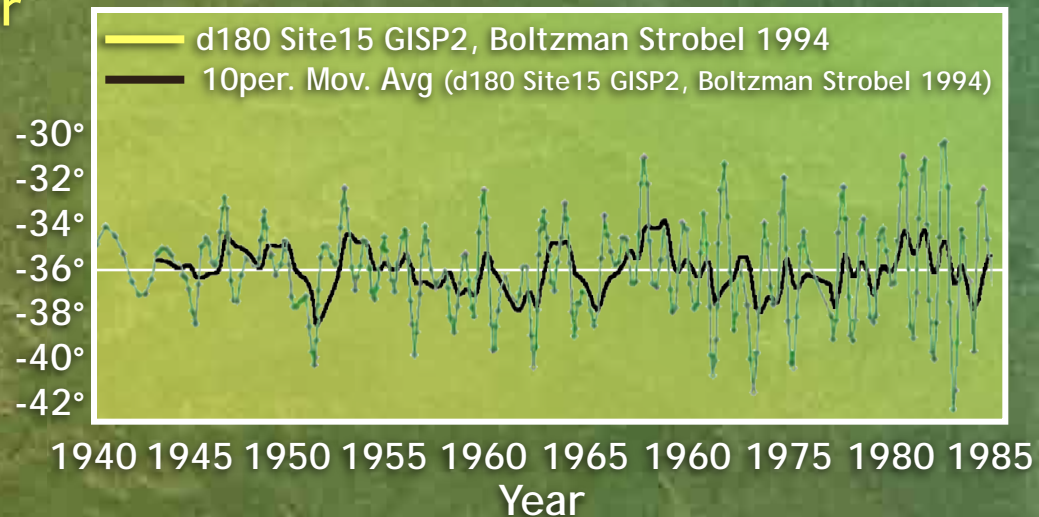
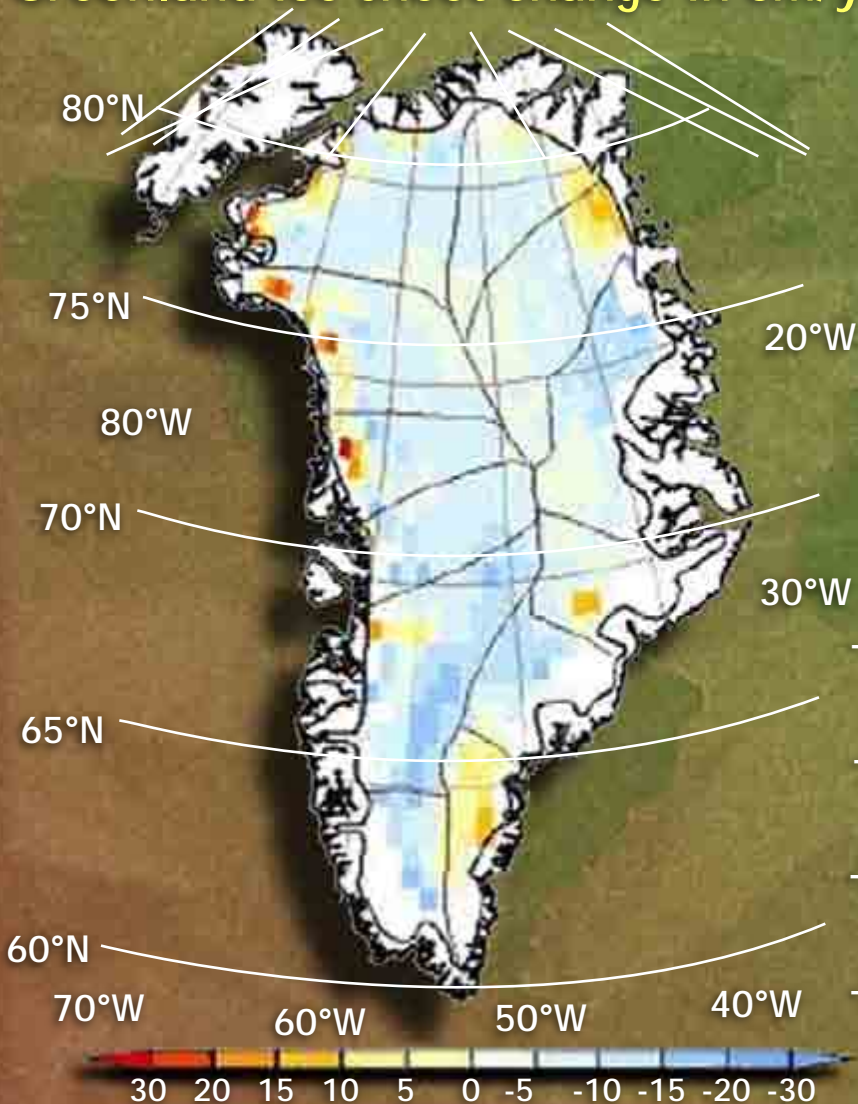


# Greenland ice sheet

5.4cm/yr

increase\*

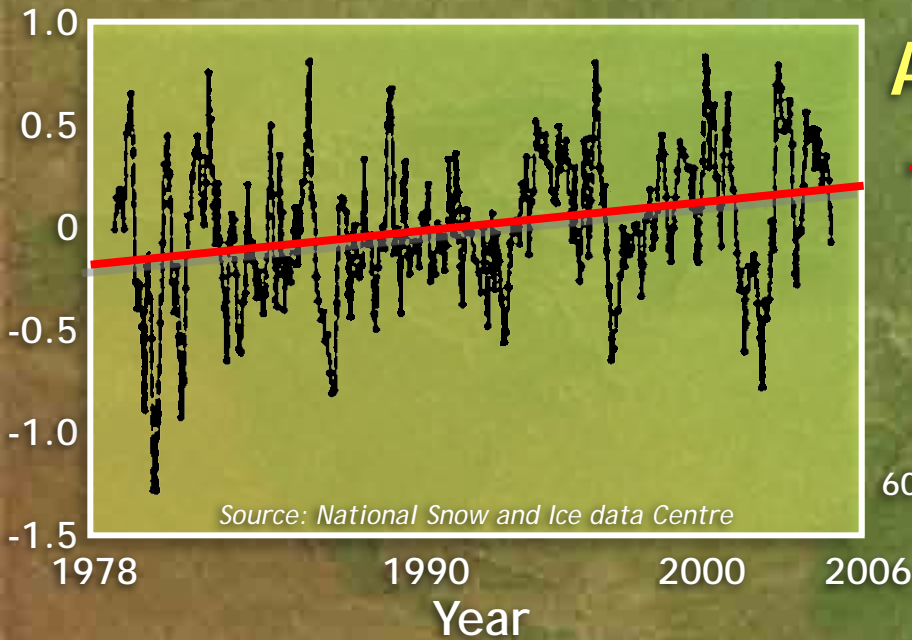
## Greenland ice sheet change in cm/yr



\*Derived from 11 years of ERS-1/ERS-2 satellite altimeter data, 1992-2003

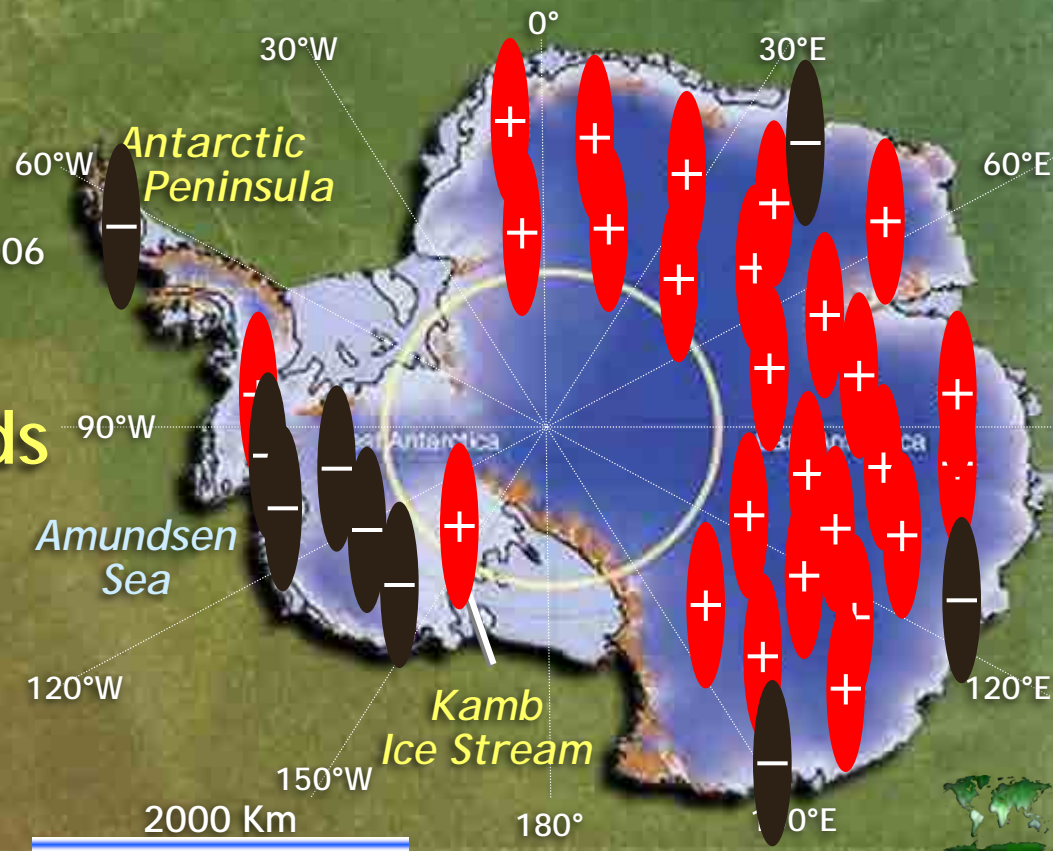


Is global warming melting the ice caps and reducing sea ice? **NO!**



**Antarctic Sea Ice Trends**  
**.... going up!**

**Antarctic Land Ice Trends**  
**.... going up over most of the continent!**

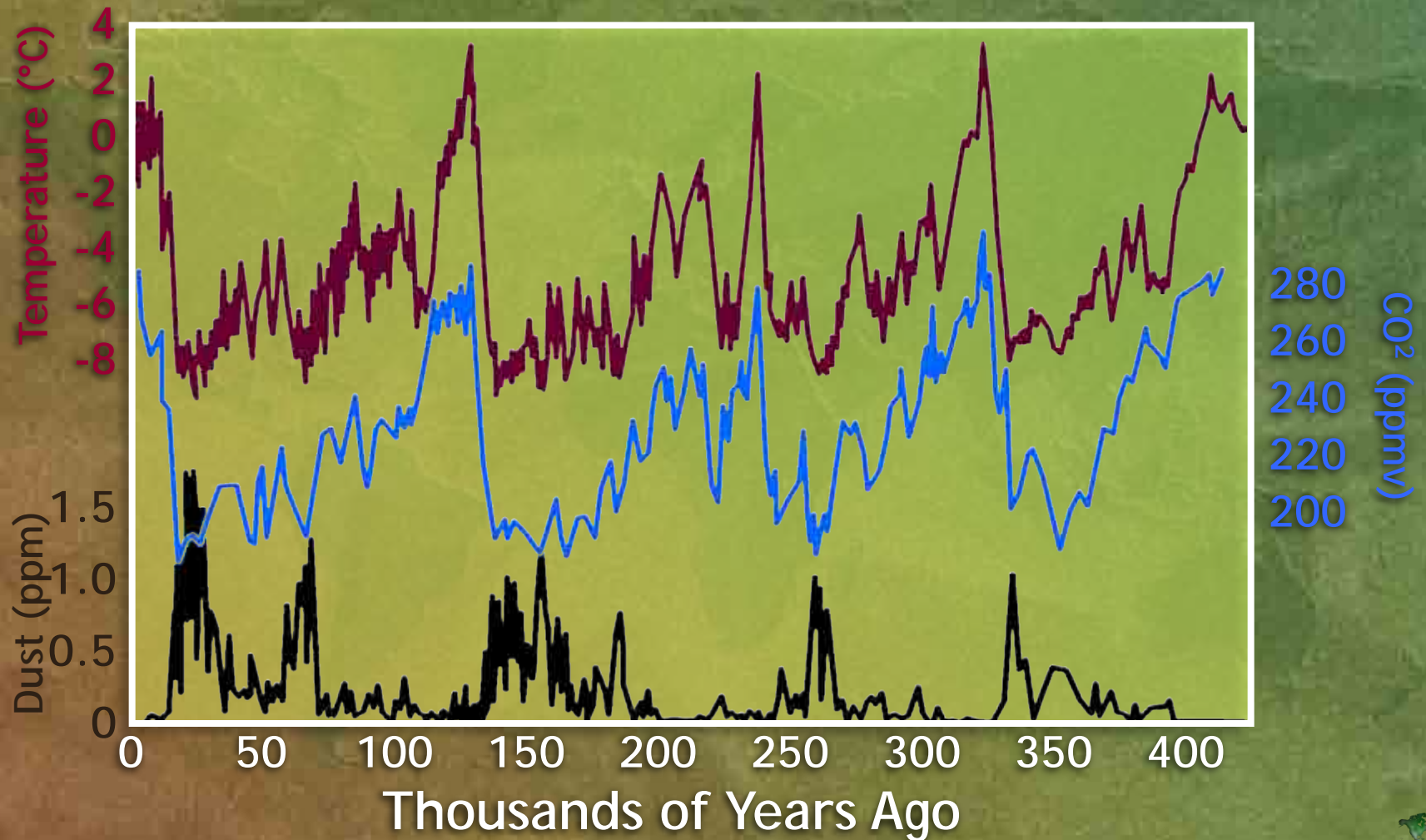






Temperature proxy

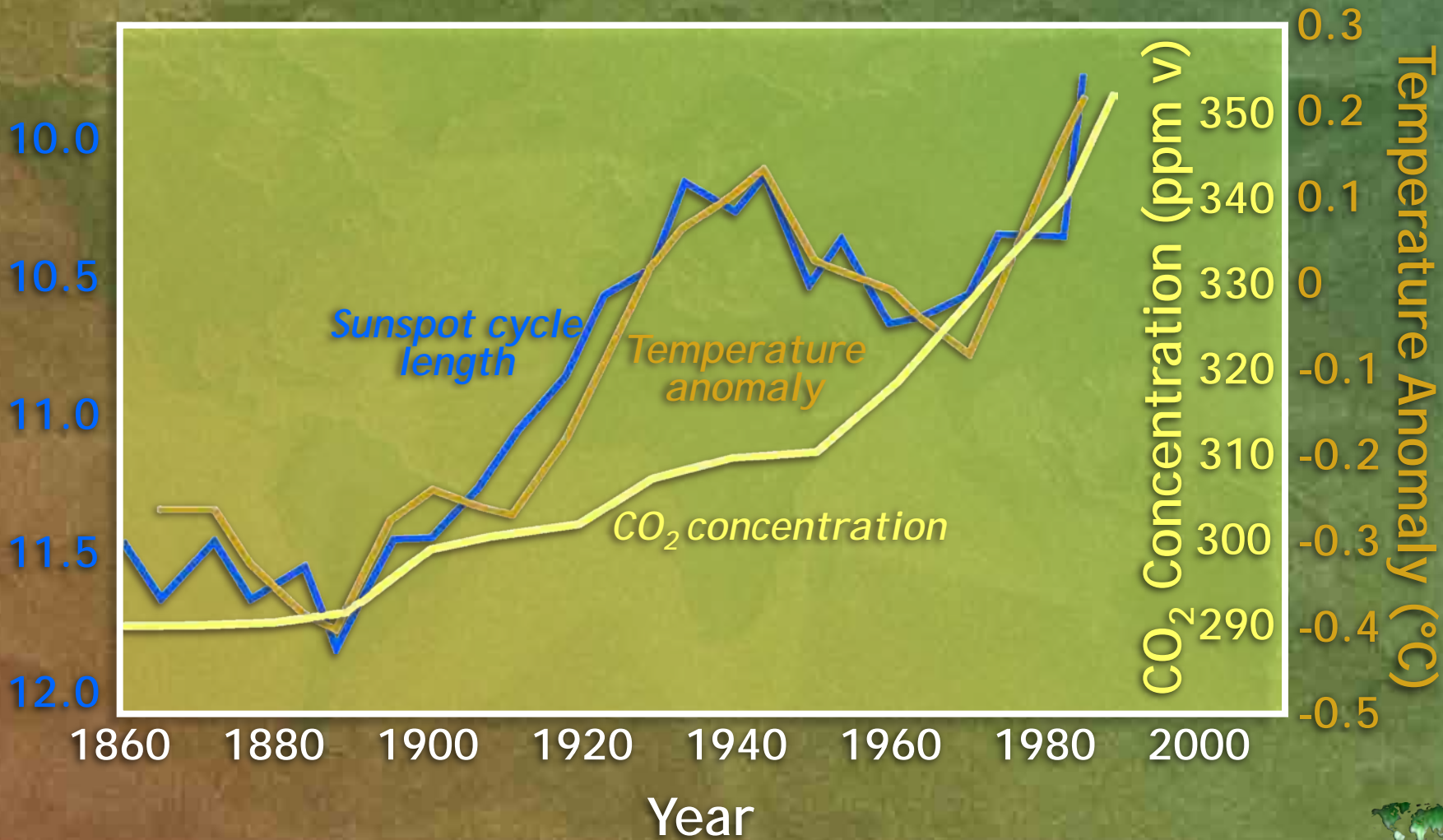
$\text{H}_2\text{O}_{(\text{vap})}$  buffer to maximum and minimum temperature





# Temperature, sunspots and CO<sub>2</sub>

Sunspot Cycle Length (y)

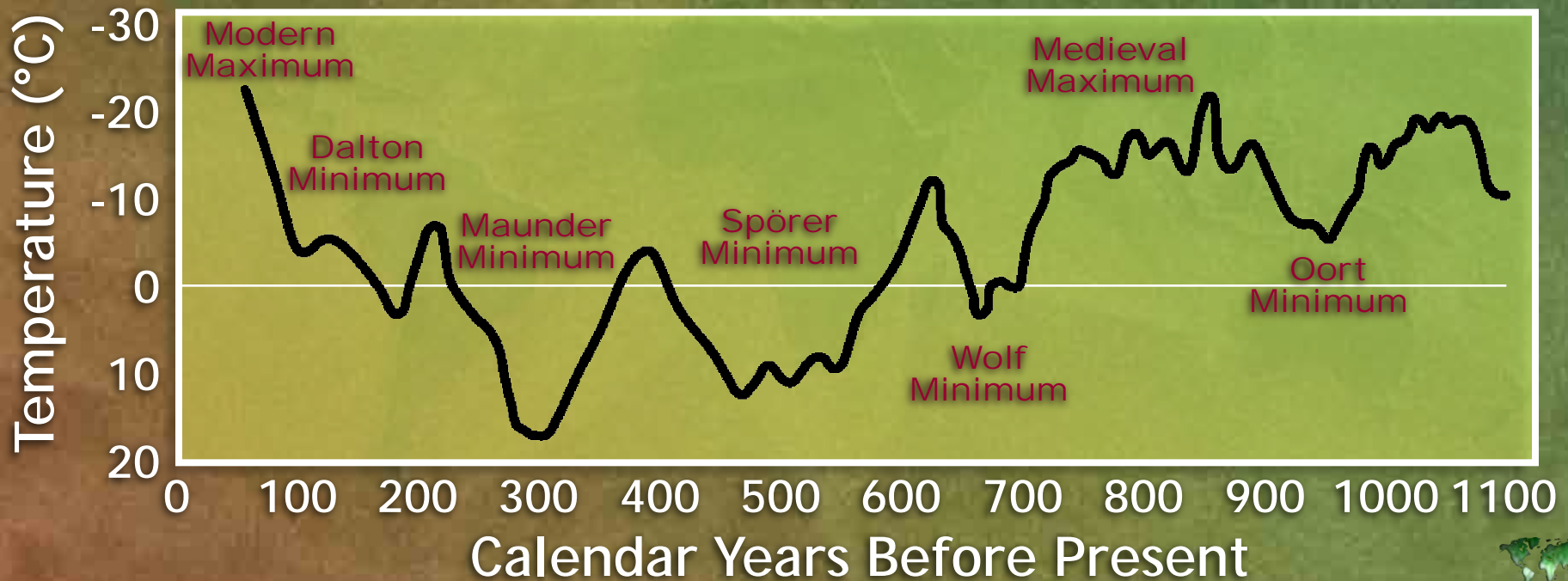
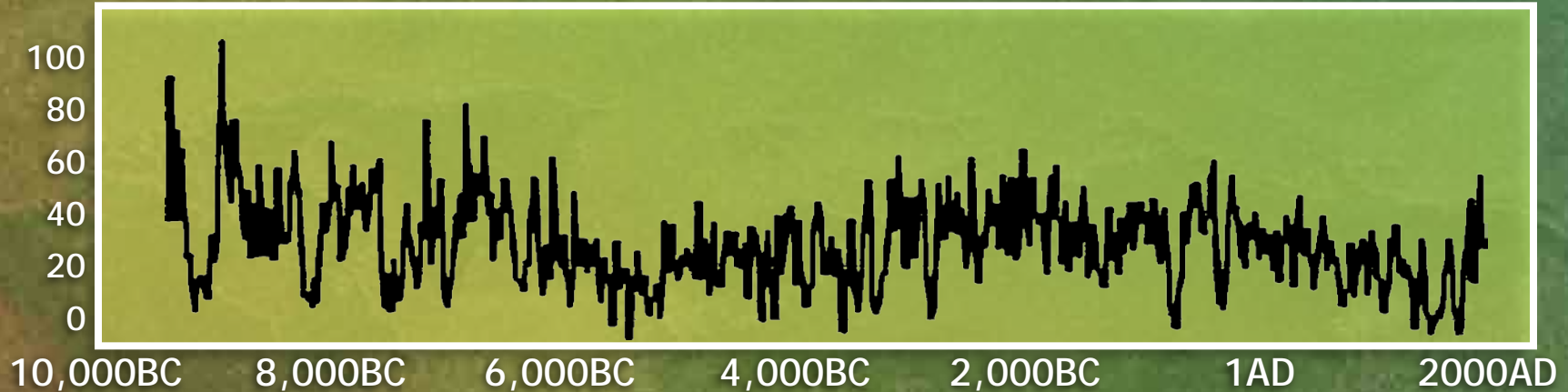






# Temperature proxy

Cosmogenic isotopes ( $C^{14}$ ; also  $Be^{10}$ ,  $Al^{26}$ ,  $Cl^{36}$ ,  $Ca^{41}$ ,  $Ti^{44}$ ,  $I^{129}$ )





It's easy to stop climate change –  
All we have to do is:

- **STOP** bacteria doing what bacteria do
- **STOP** ocean currents changing
- **STOP** plate tectonics and continent movement
- **STOP** orbital changes to Earth
- **STOP** variations in energy released from Sun
- **STOP** orbit of Solar System in Galaxy
- **STOP** supernoval eruptions

When we've stopped these natural processes,  
if human-induced then:  
PERSUADE China and India to stay poor







# A few little problems

Warmings in industrial age (1860-1880, 1910-1940, 1975-1998; CO<sub>2</sub> rise only correlates with 1975-1998 warming)

Industrial age coolings when CO<sub>2</sub> increasing (1880-1910, 1940-1975, 1998-present)

Peak of Little Ice Age coolings (Dalton, Maunder, Spörer, Wolf) when few sunspots; 20th Century solar maximum and no sunspots

Pre-industrial Minoan, Roman and Medieval Warmings (with no sea level changes); SL rise of 130m 12,000-6,000 years ago, SL fall of 2m over last 6,000 years

Greater past variability and changes

Five of six great ice ages when atmospheric CO<sub>2</sub> up to 1000 times higher than now

Arctic warming (fanfare); Antarctic, oceanic (PDO) and atmospheric cooling (silence)

What if I am wrong?

What if the warmers are wrong?