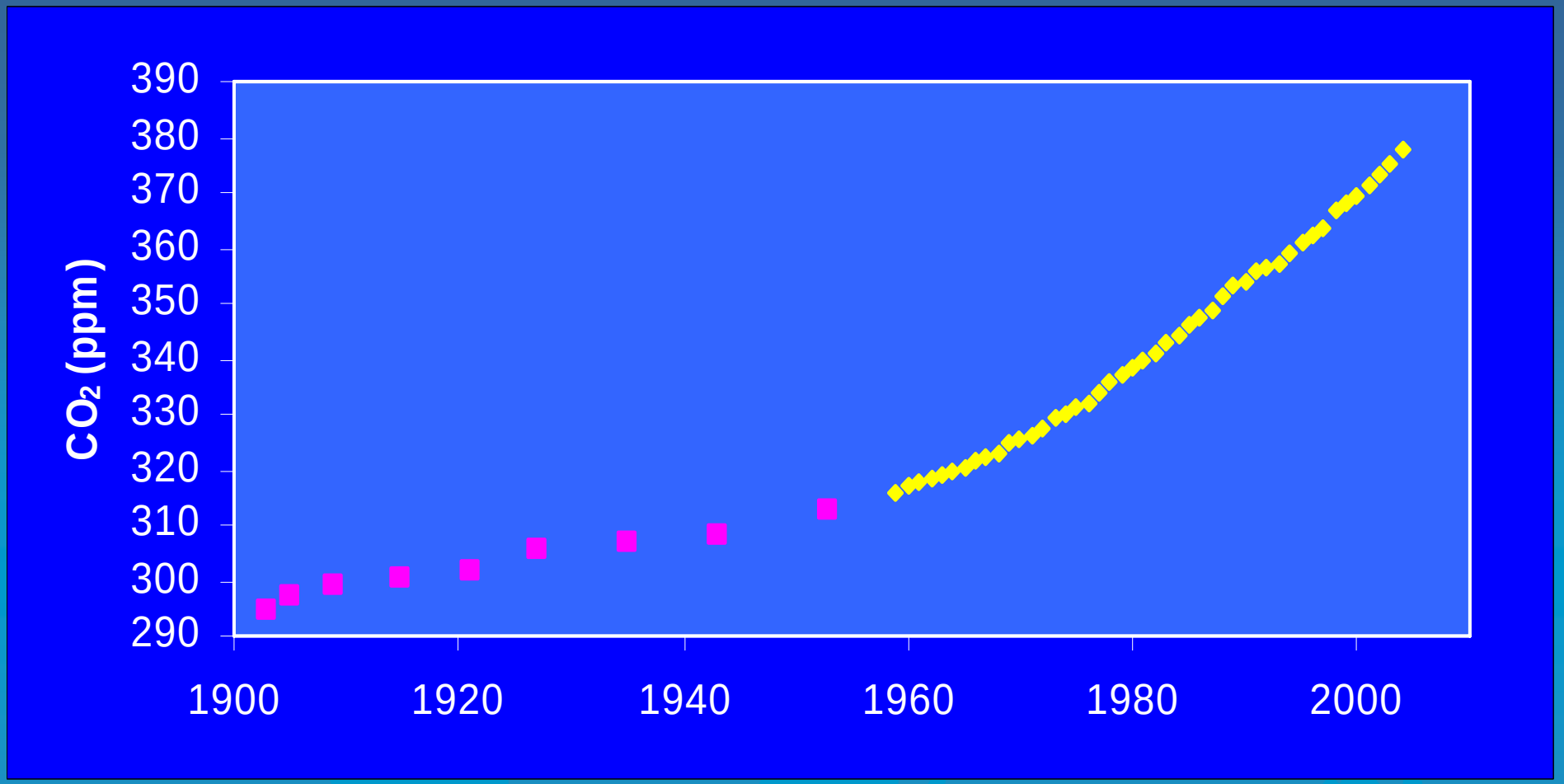
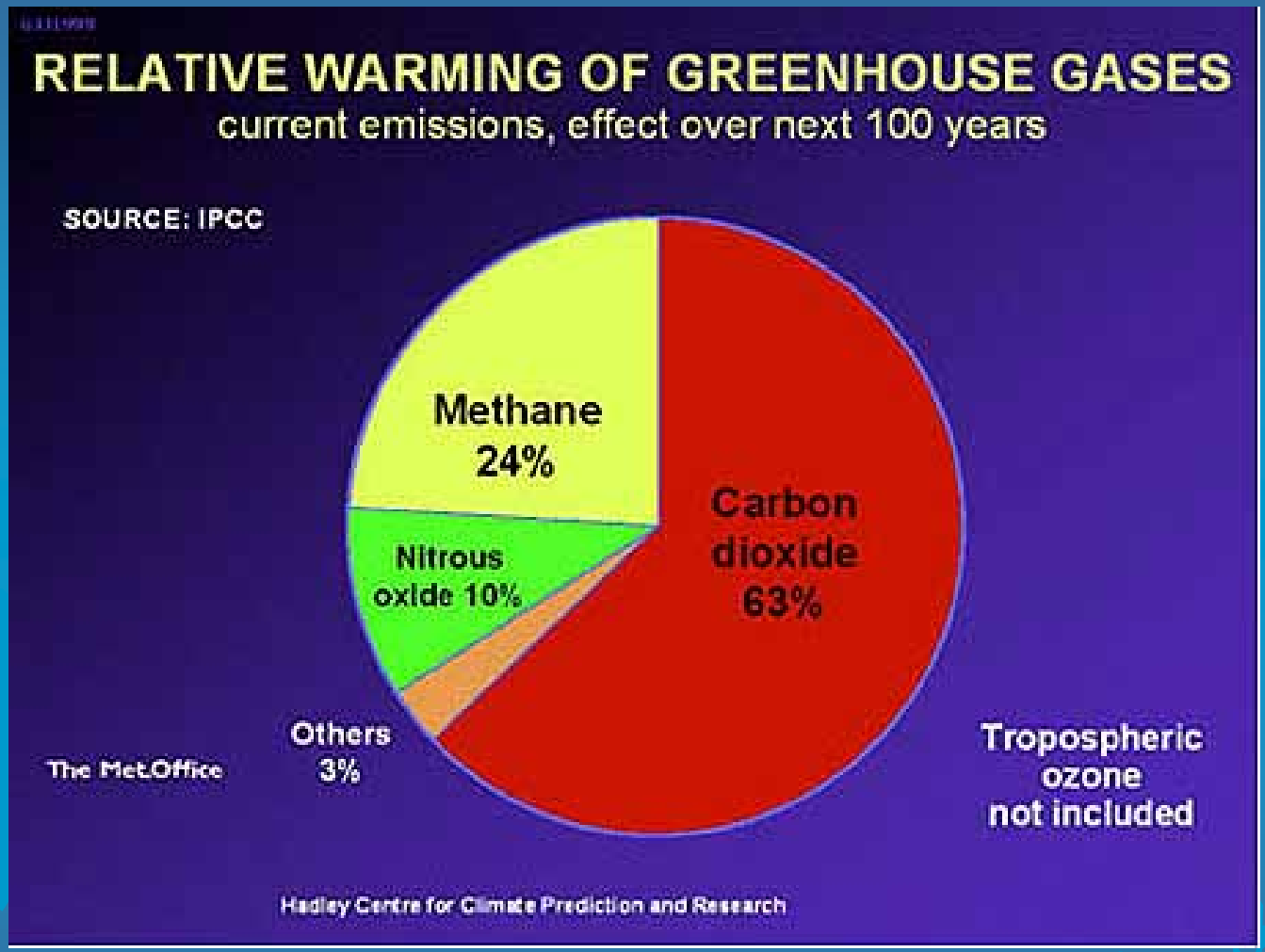
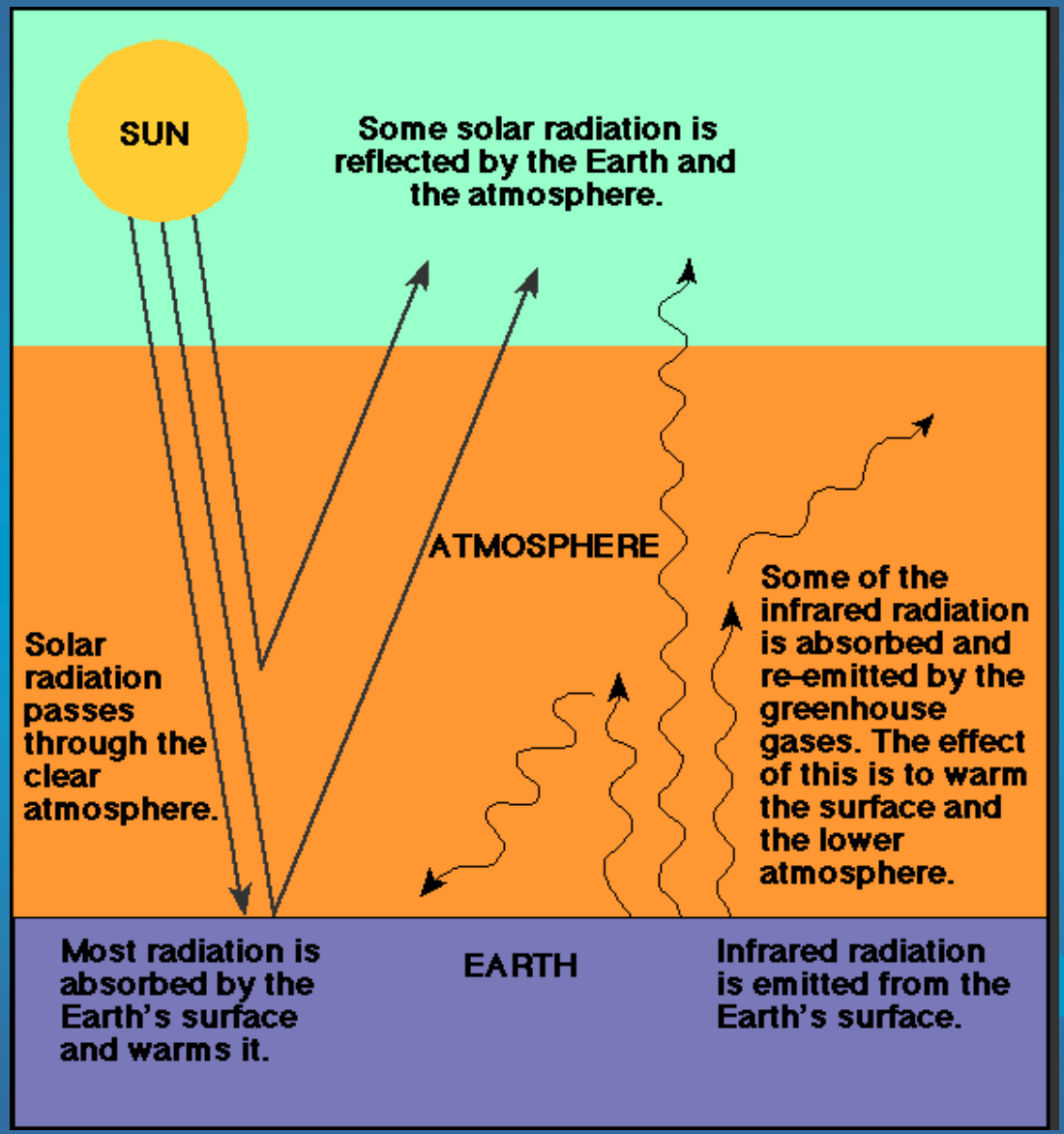

390
380
370
360
350
340
330
320
310
300
290
CO_2 (ppm)
1900
1920
1940
1960
1980
2000

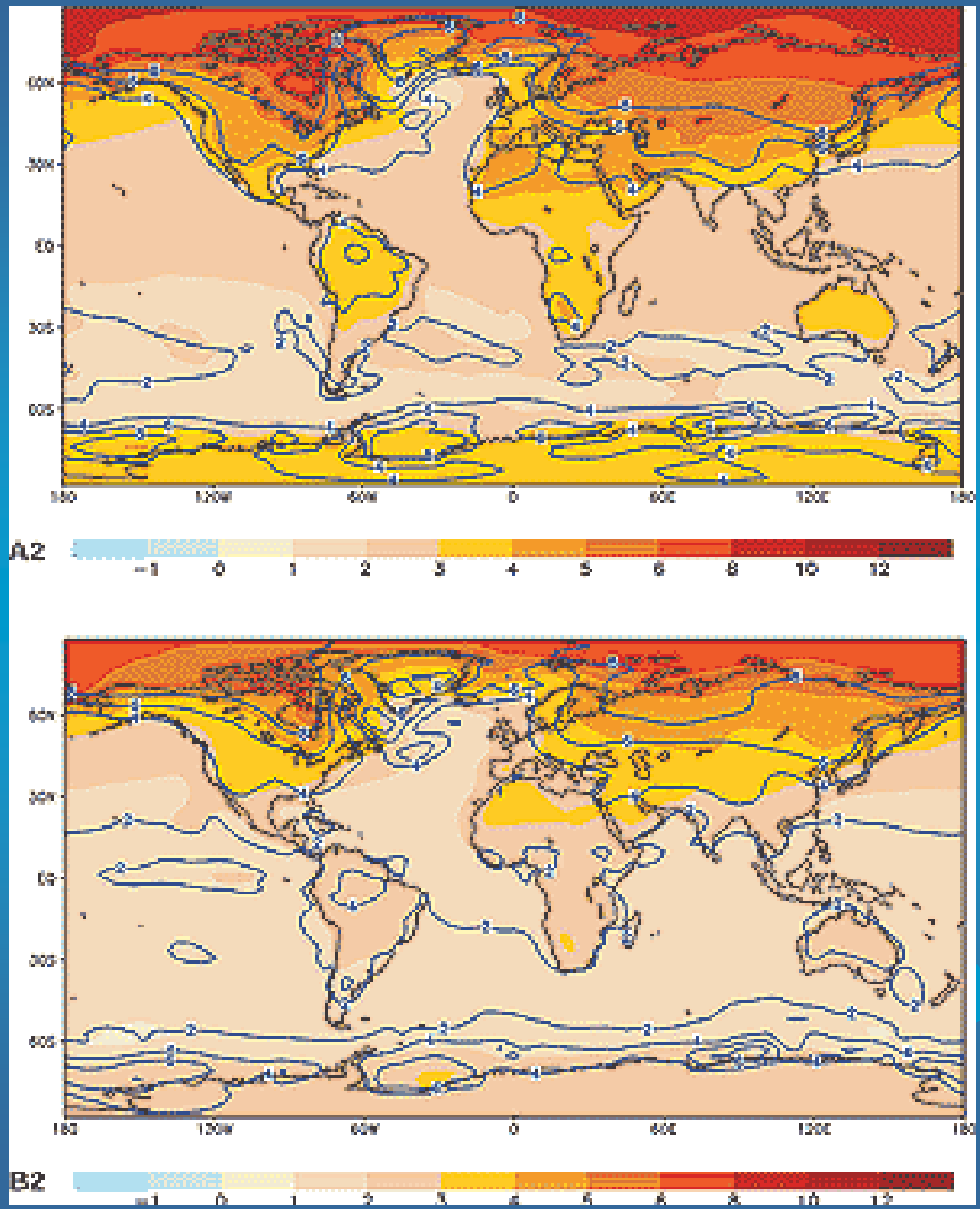
Carbon dioxide is not the only "problem"



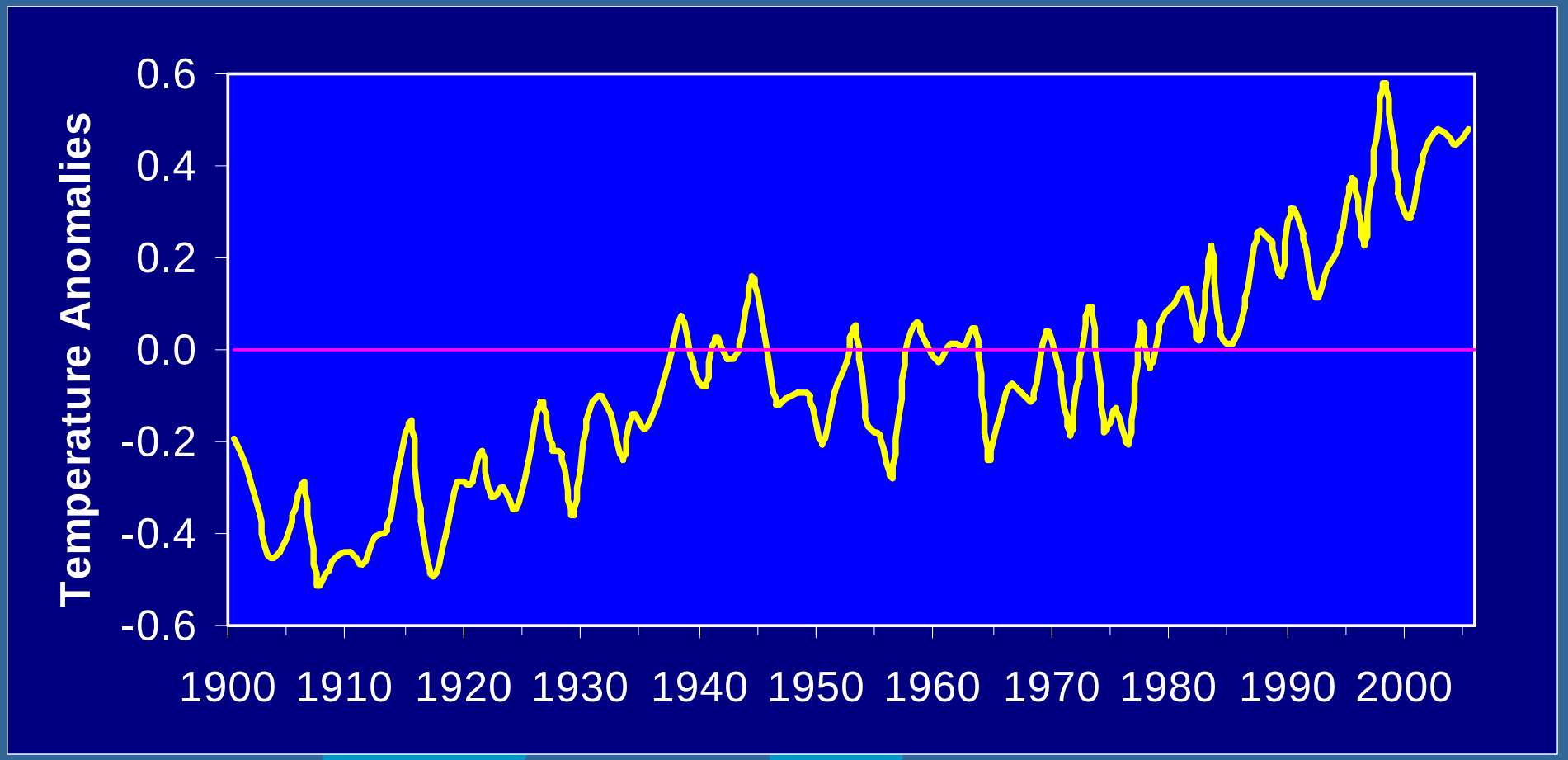
The greenhouse effect is real!

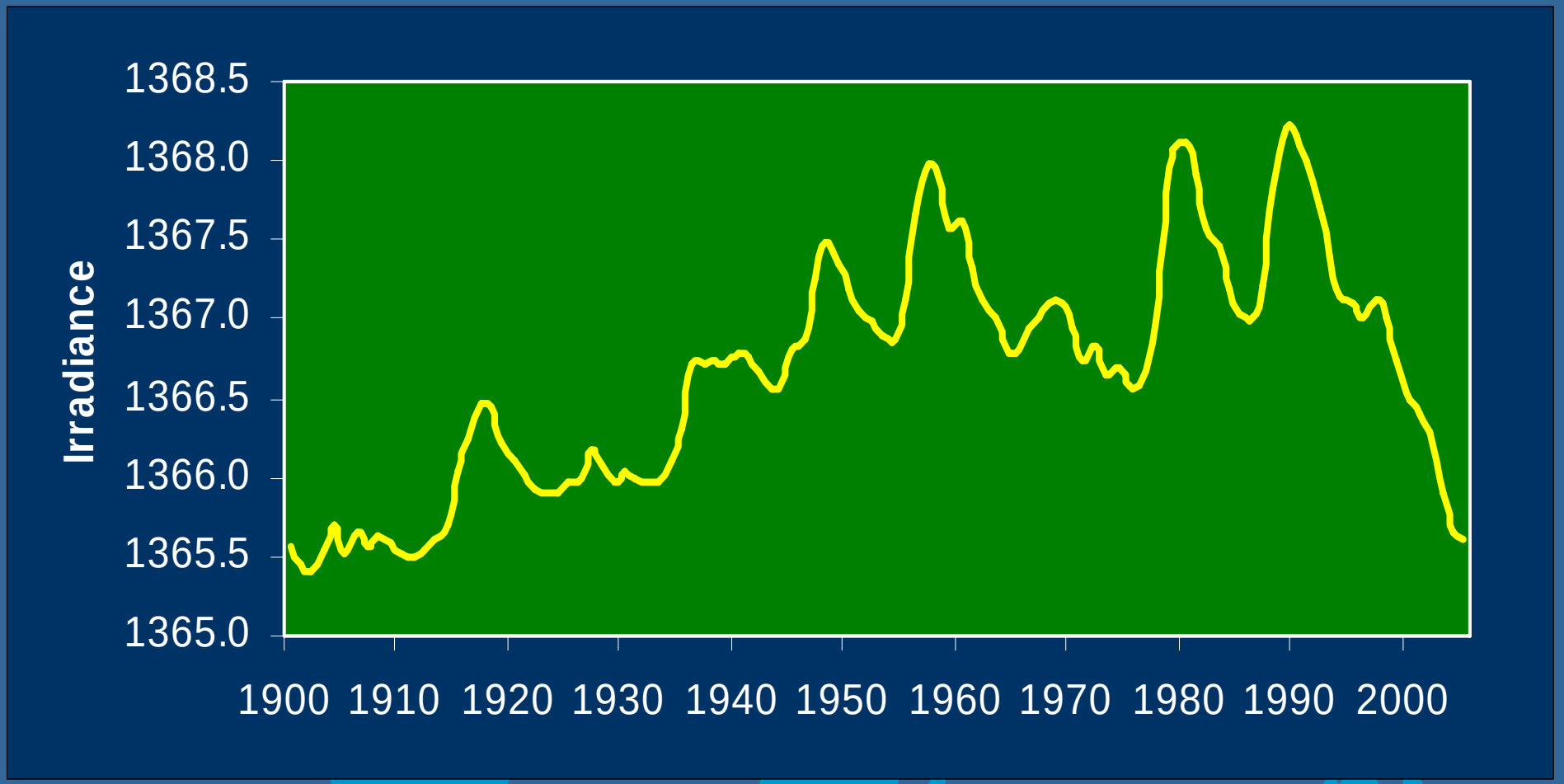


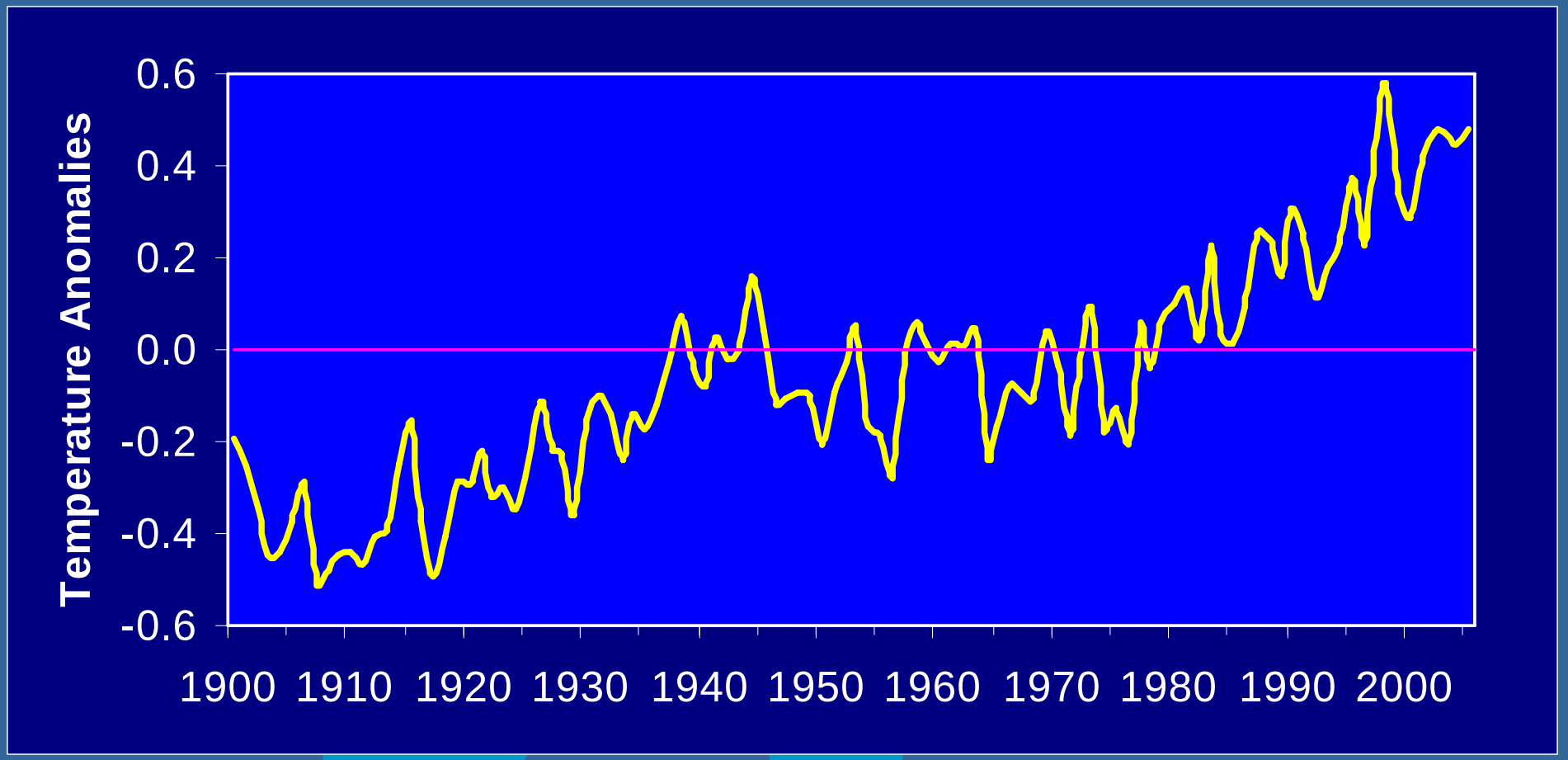
Warming in high latitudes, land areas, Northern Hemisphere, in winter, and at night



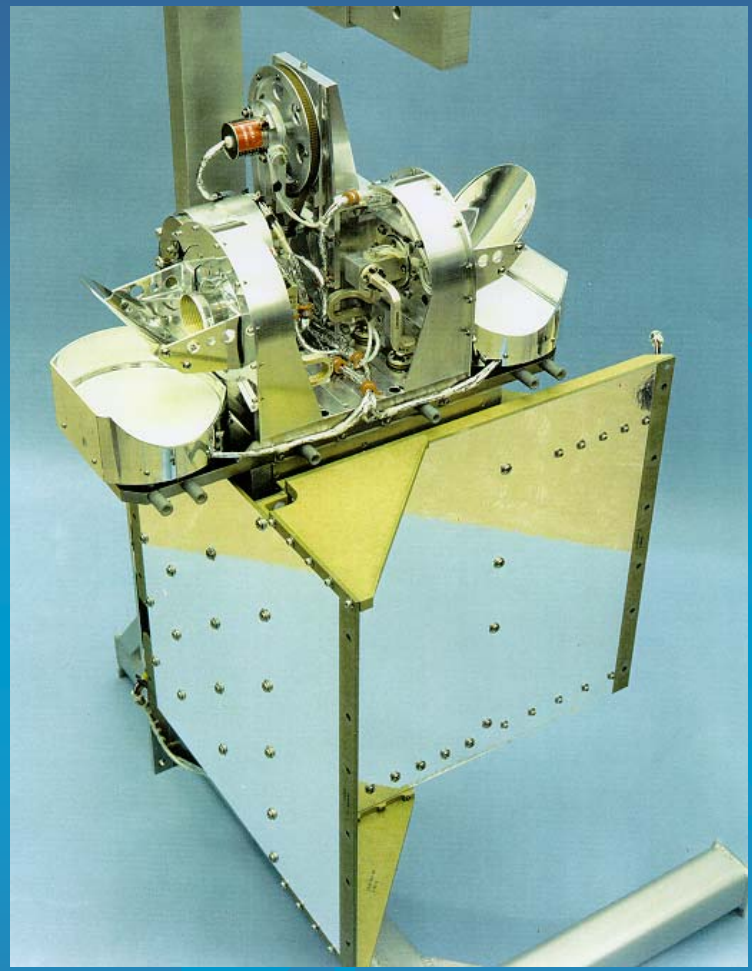
Very tough to model?

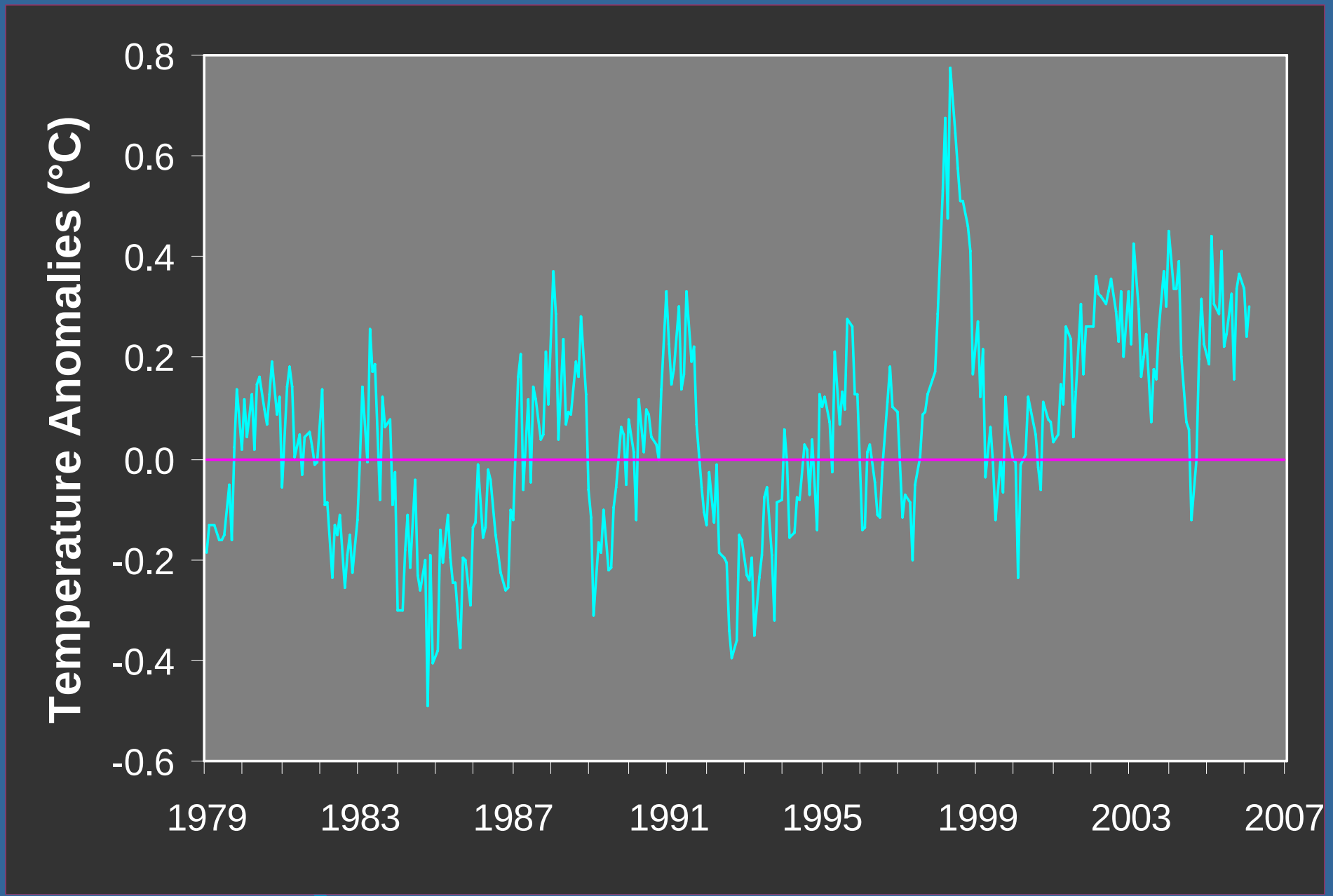

Temperature Anomalies
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000

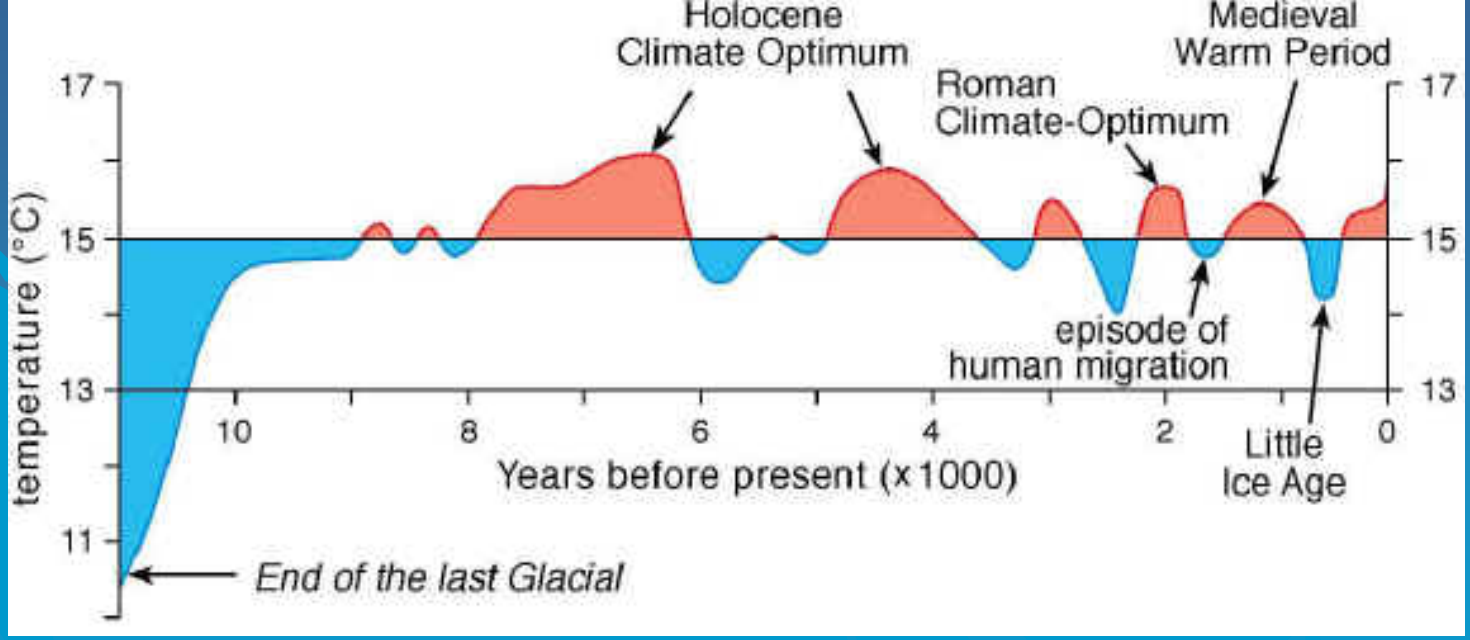

Irradiance
1368.5
1368.0
1367.5
1367.0
1366.5
1366.0
1365.5
1365.0
1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000

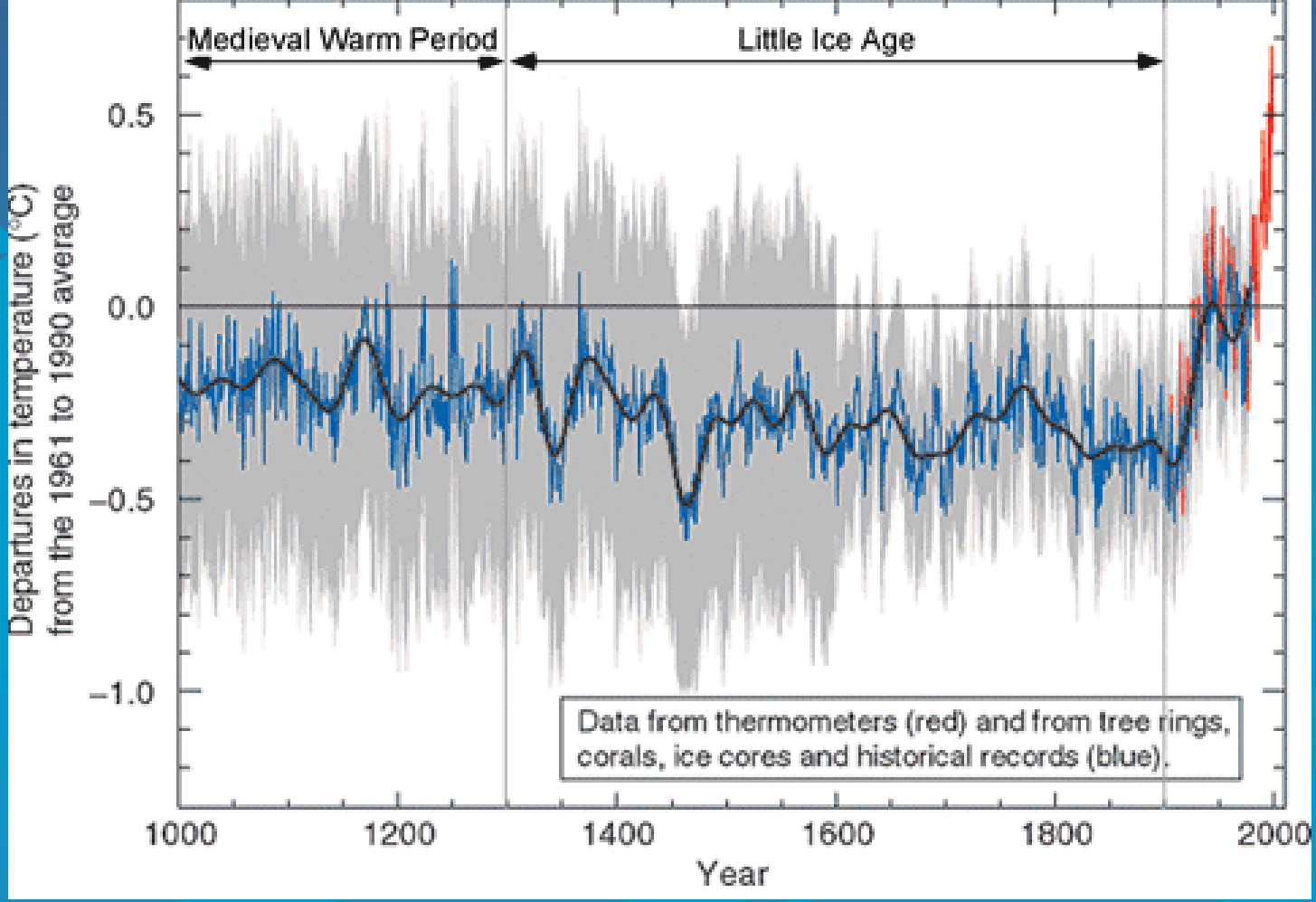

Temperature Anomalies
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000

Microwave Sounding Unit




Temperature Anomalies (°C)
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
1979
1983
1987
1991
1995
1999
2003
2007


Holocene
Climate Optimum
Roman
Climate-Optimum
Medieval
Warm Period
17
15
13
11
temperature (°C)
10
8
6
4
2
0
Years before present (x1000)
episode of
human migration
Little
Ice Age
End of the last Glacial


Medieval Warm Period
Little Ice Age
0.5
0.0
−0.5
−1.0
Departures in temperature (°C)
from the 1961 to 1990 average
Data from thermometers (red) and from tree rings,
corals, ice cores and historical records (blue).
1000
1200
1400
1600
1800
2000
Year

More Hurricanes?

"... climate models give no consistent indication whether tropical storms will increase or decrease in frequency or intensity as climate changes; neither is there any evidence that this has occurred over the past few decades."

IPCC, 1990 (p. xxv)

"In conclusion, it is not possible to say whether the frequency, area of occurrence, time of occurrence, mean intensity or maximum intensity of tropical cyclones will change."

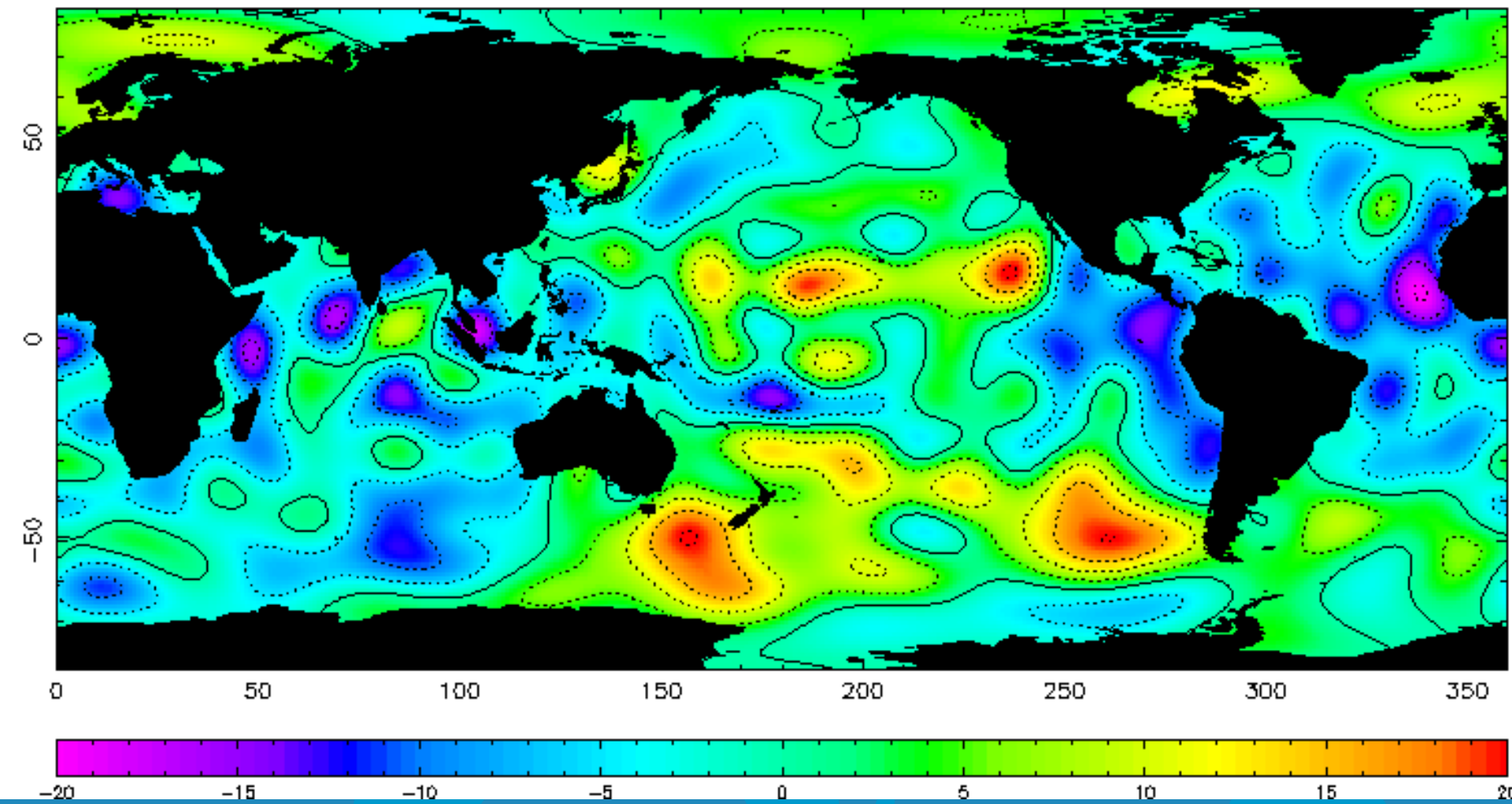
IPCC, 1996, p. 334

"Changes globally in tropical and extra-tropical storm intensity and frequency are dominated by inter-decadal and multi-decadal variations, with no significant trends evident over the 20th century."

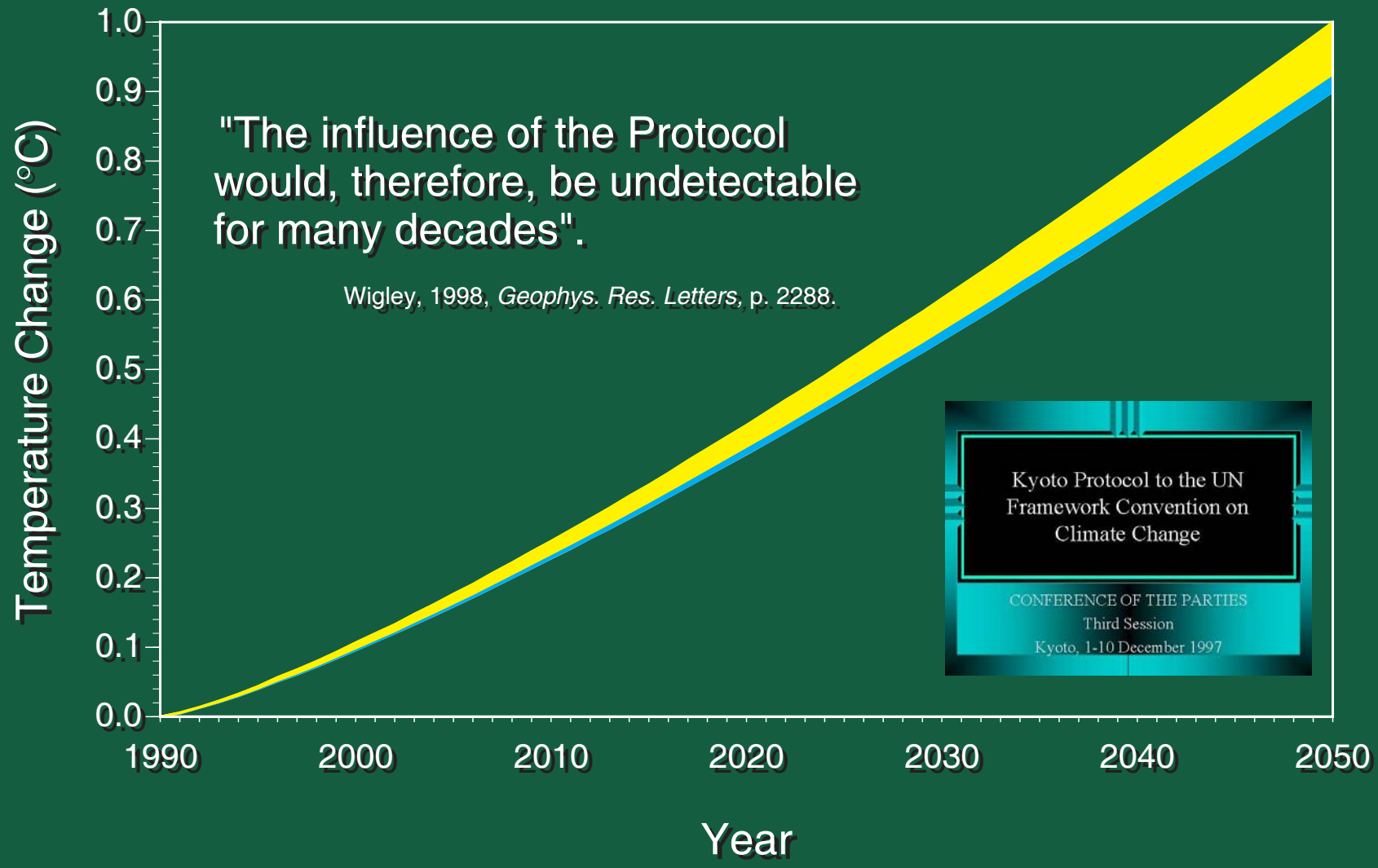
IPCC, 2001, p. 5

"No systematic changes in the frequency of tornadoes, thunder days, or hail events are evident in the limited areas analysed."

IPCC, 2001, p. 5



“decadal variability in sea level is observed, but to date there is no detectable secular increase in the rate of sea level rise over the period 1950-2000” Church et al., *J. Climate*, 2004, p. 2624.


"The influence of the Protocol would, therefore, be undetectable for many decades".
Wigley, 1998, *Geophys. Res. Letters,* p. 2288.
Kyoto Protocol to the UN Framework Convention on Climate Change
CONFERENCE OF THE PARTIES
Third Session
Kyoto, 1-10 December 1997
Temperature Change (°C)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1990
2000
2010
2020
2030
2040
2050
Year