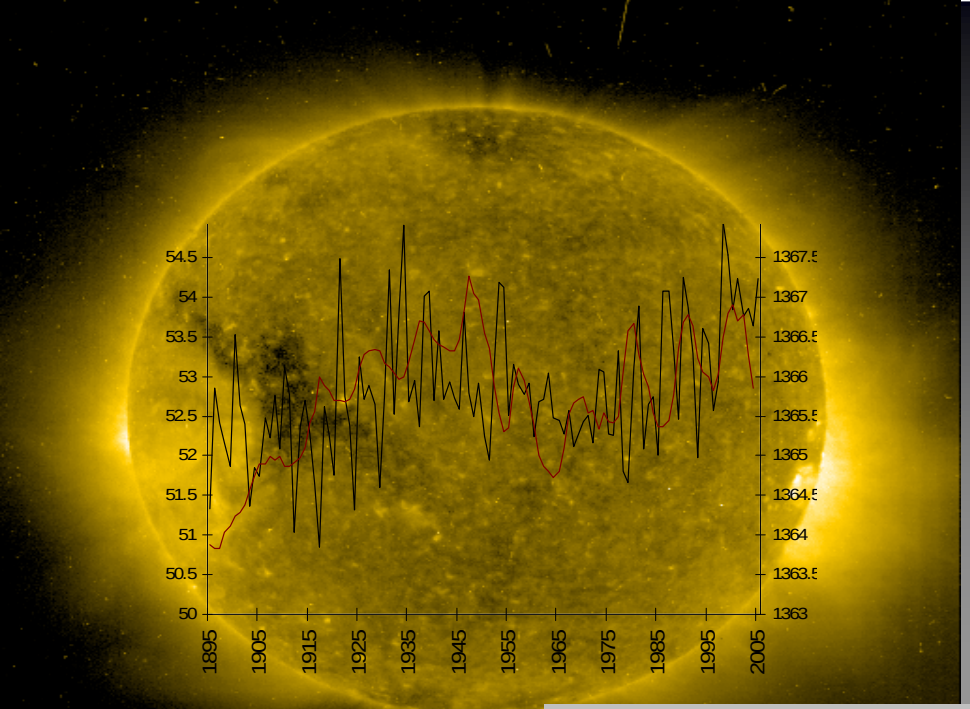
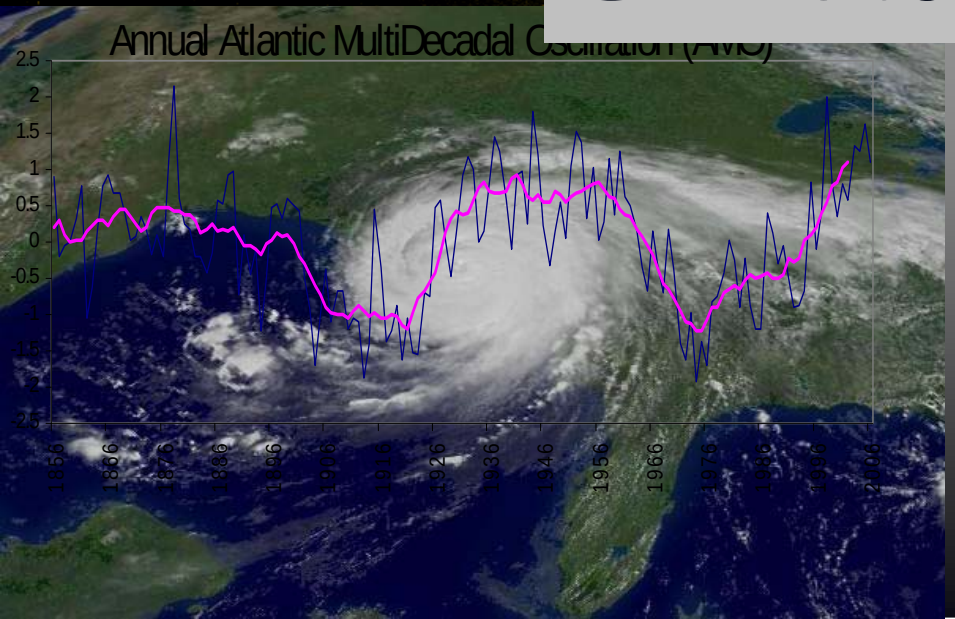
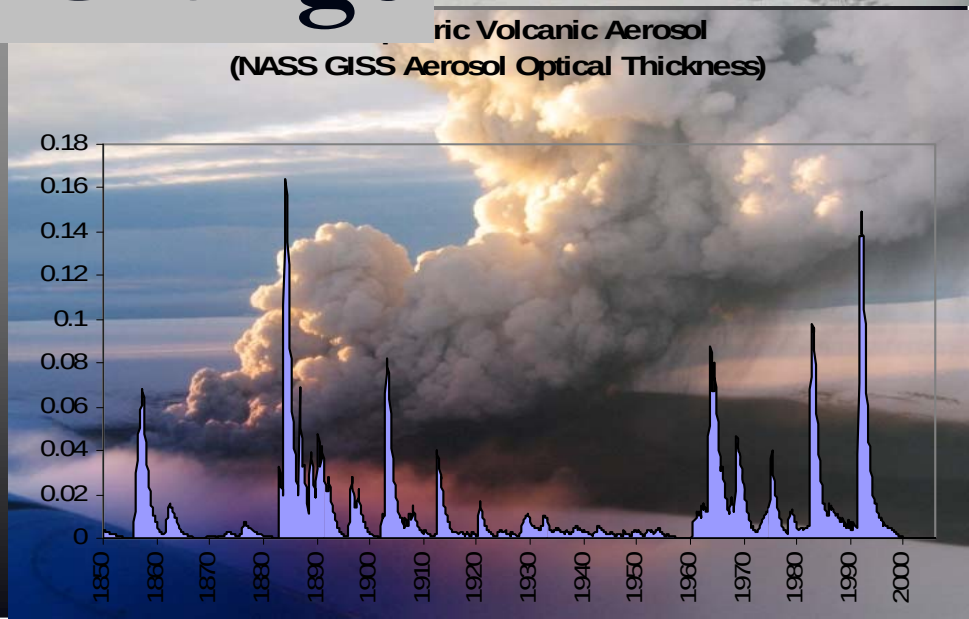


Climate Change






By far the most terrifying film
you will ever see.
aninconvenienttruth
A GLOBAL WARNING
LOREM NOSTRUD PRESENTS A DOLOR AMET PRODUCTION A CORPER SUSCIPIT FILM CONSEC ETUER "AUTEM VENSIET" LOBORTIS NISL MAGNA MINIM COMMODO CONSEX
VENTAME NOSTUD MUSIC BY DOLORE MAGNA COSTUME DESIGNER ESSE MOLESTAIE VISUAL EFFECTS SUPERVISOR EOSE T. ACCUSAM EDITED BY ISMOD TINCIDUM A.C.E. PRODUCTION DESIGNER EXER CITATION DIRECTOR OF PHOTOGRAPHY UTAGNA LASEOR A.S.C.
EXECUTIVE PRODUCER LORTIS NAJEYDI XUIS NOSTUD STORY BY VOLUPTATE VELIT SCREENPLAY BY ACCUSAM ADIPSCING PRODUCED BY DOLOR AMET DIRECTED BY CORPER SUSCIPIT

The Movie's/Media's Premise

- Global warming no longer in question but action to remedy it is being undermined by political inertia and because of doubt created by big oil and a few remaining 'skeptics'
- The warming is unprecedented and is already having major effects on our weather and climate and the environment, and we are nearing a 'tipping point' which could trigger catastrophic consequences

Measuring Carbon Dioxide

- Since late 1950s has been measured at Mauna Loa, a volcano (which emits CO2)
- Prior estimates done by Callendar from many world-wide measurements from varying methods. He cherry picked values that showed a smooth curve and the increase that Arrhenius had projected
- He ignored spike in 1940s

Callendar cherry-picked past data points. Actual average 1800s early 1900s was 345. Spike in 1940s was ignored

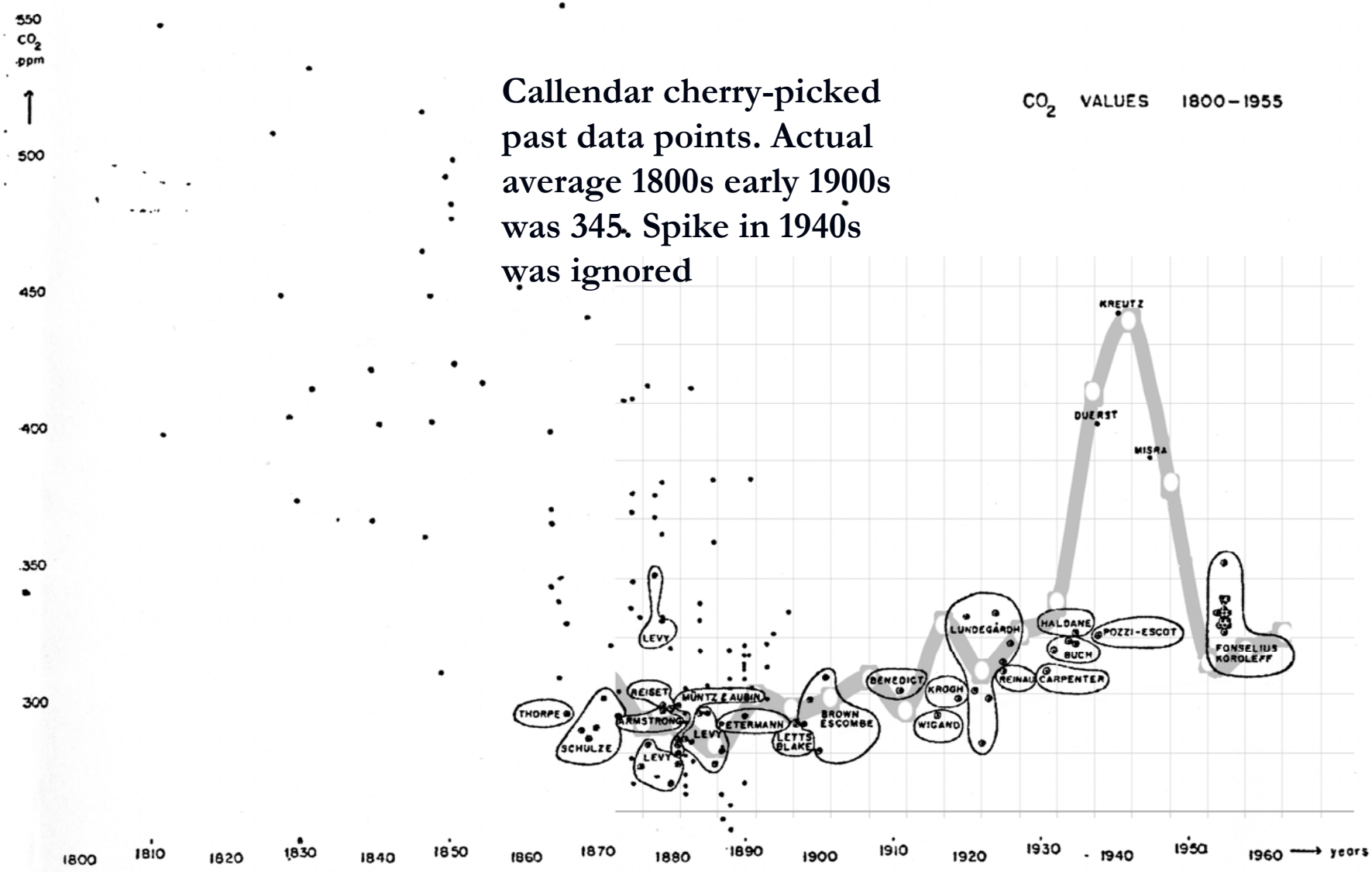
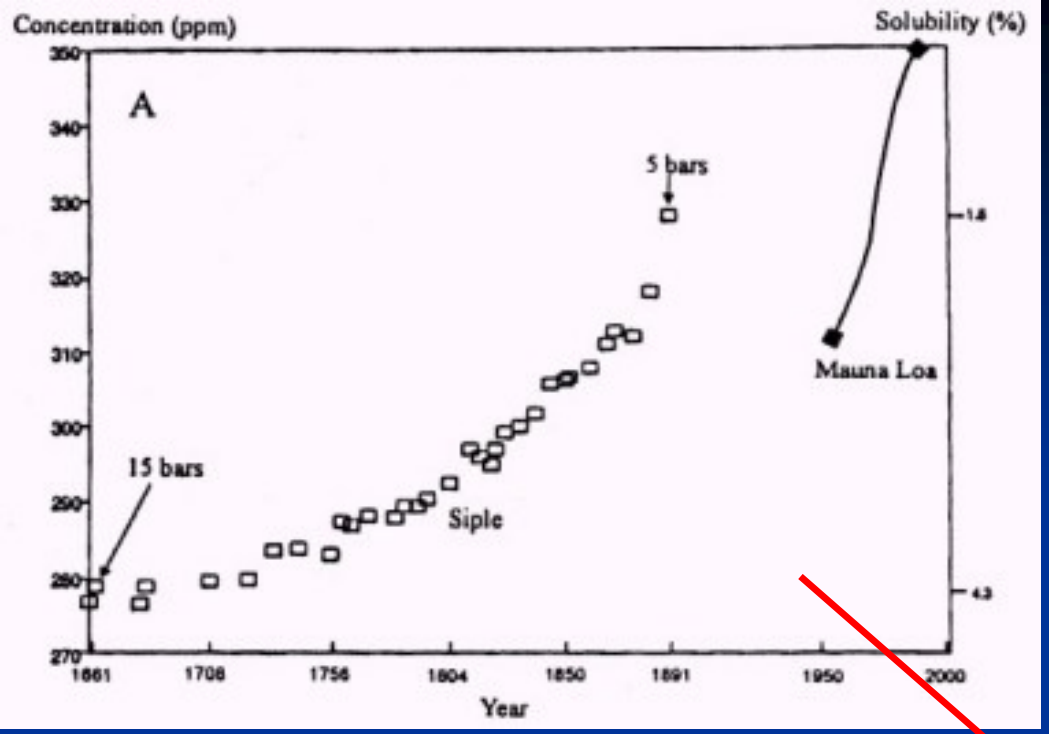


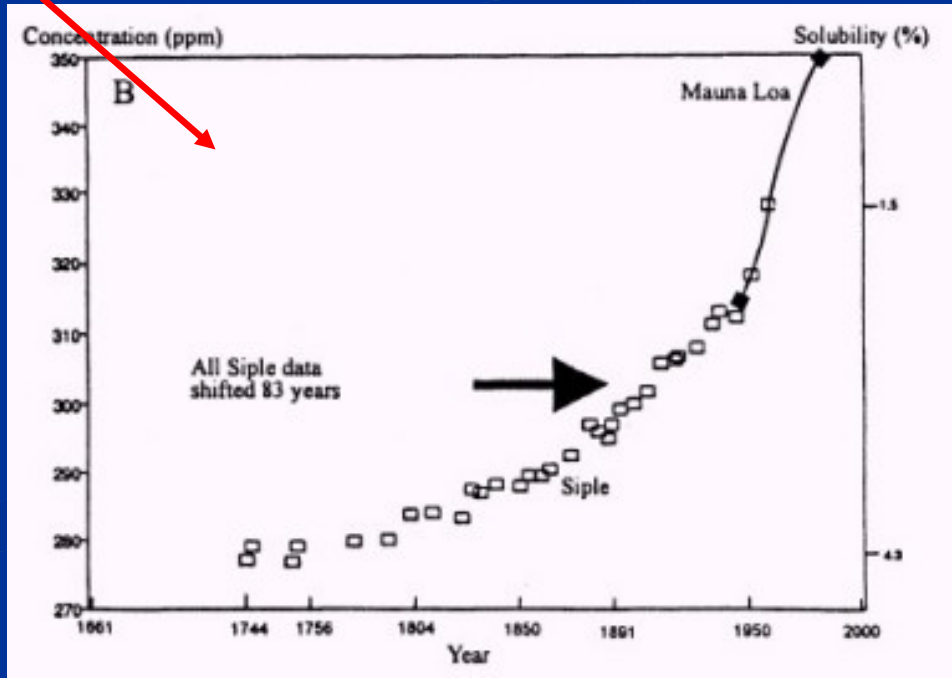
Fig. 1. The mean values of the CO_2 measurements from the beginning of 1800 up to present time taken from the literature. Encircled the values used by Callendar and the results from the Scandinavian network 1955.

Measuring Carbon Dioxide

- Prior estimates were supported by Vostok ice cores but Joworowski, Segalstad and Beck have shown that these ice cores can not accurately measure old CO2 values due to chemical changes from great pressure and associated with liquid water in ice and chemicals from drilling equipment.
- Ice core data was arbitrarily adjusted by Siple to align with the Mauna Loa data
- Direct chemical measurements are considered by geologists and chemist to be the mot accurate measures.



Siple curve after arbitrary adjustment By IPCC



Current Level

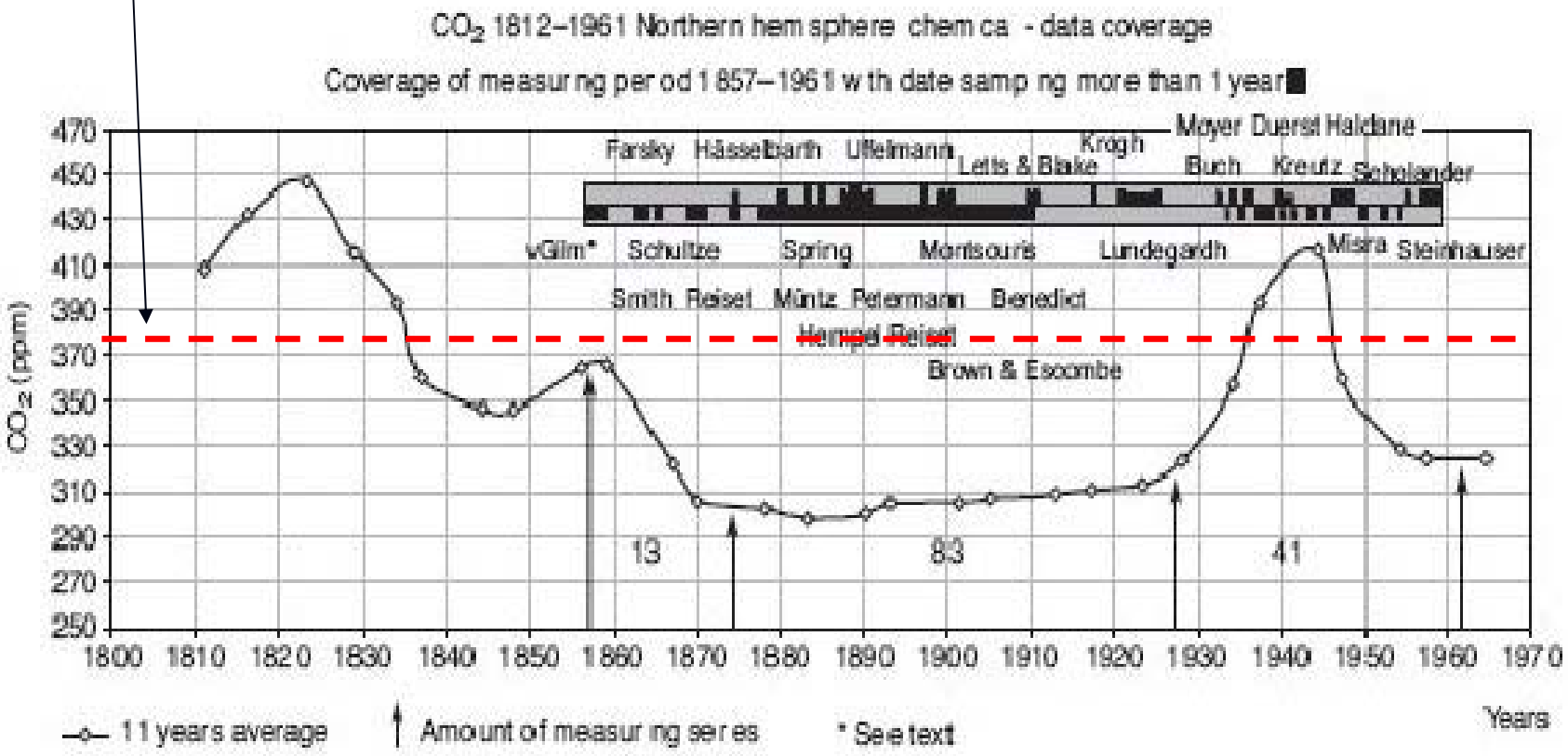


Figure 11: Local CO_2 concentration for the northern hemisphere, determined through chemical analysis between 1812 and 1861. Data plotted as an 11 year average. Data coverage and important scientists indicated in dark grey/black. The curve delineates three major maxima in CO_2 content, though the one situated around 1820 must be treated as provisional only. Data series used: time window 1857–1873: 13 yearly averages, 83 until 1927 and up to 1961 41 data records (eleven interpolated).

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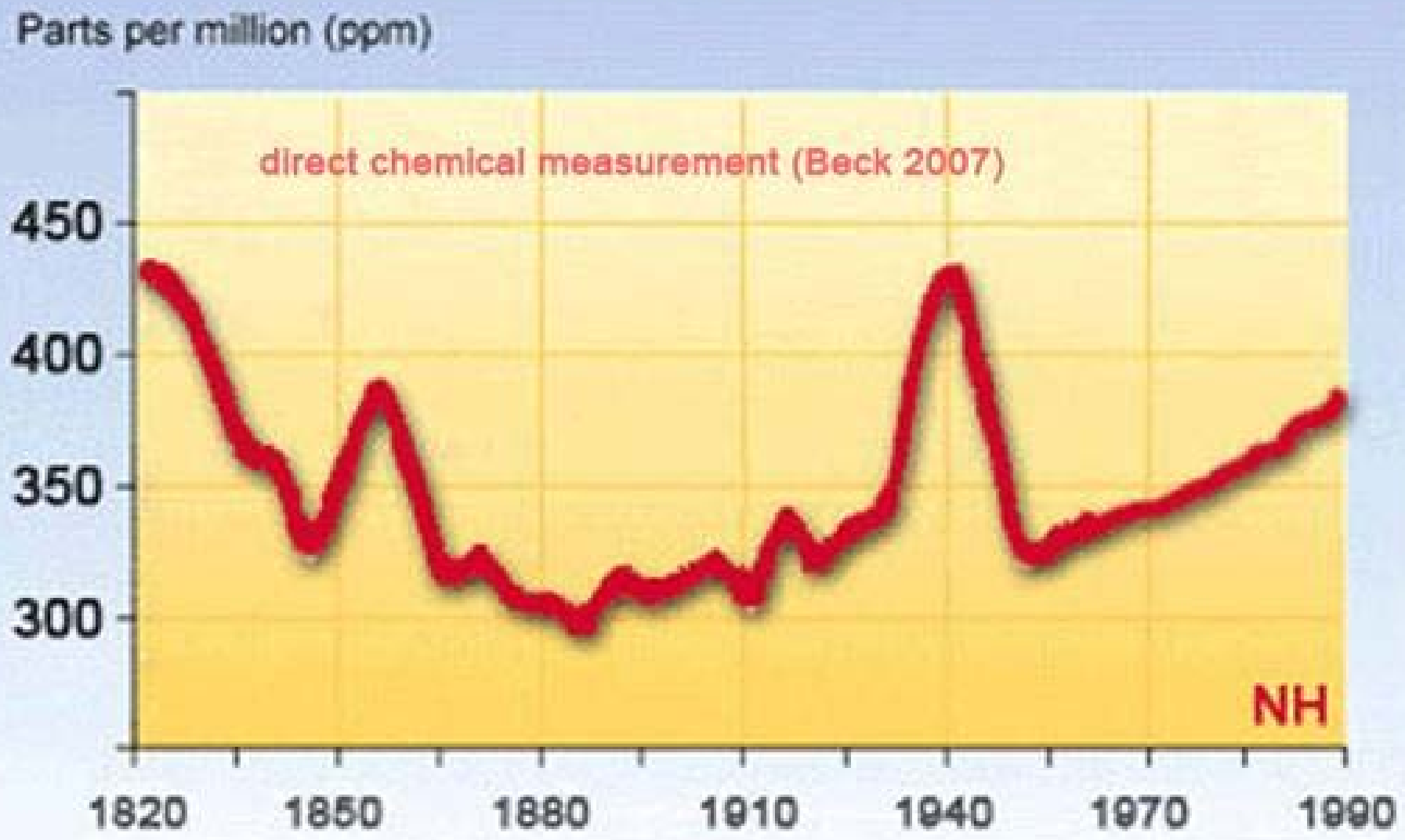
CO_2 concentration in air

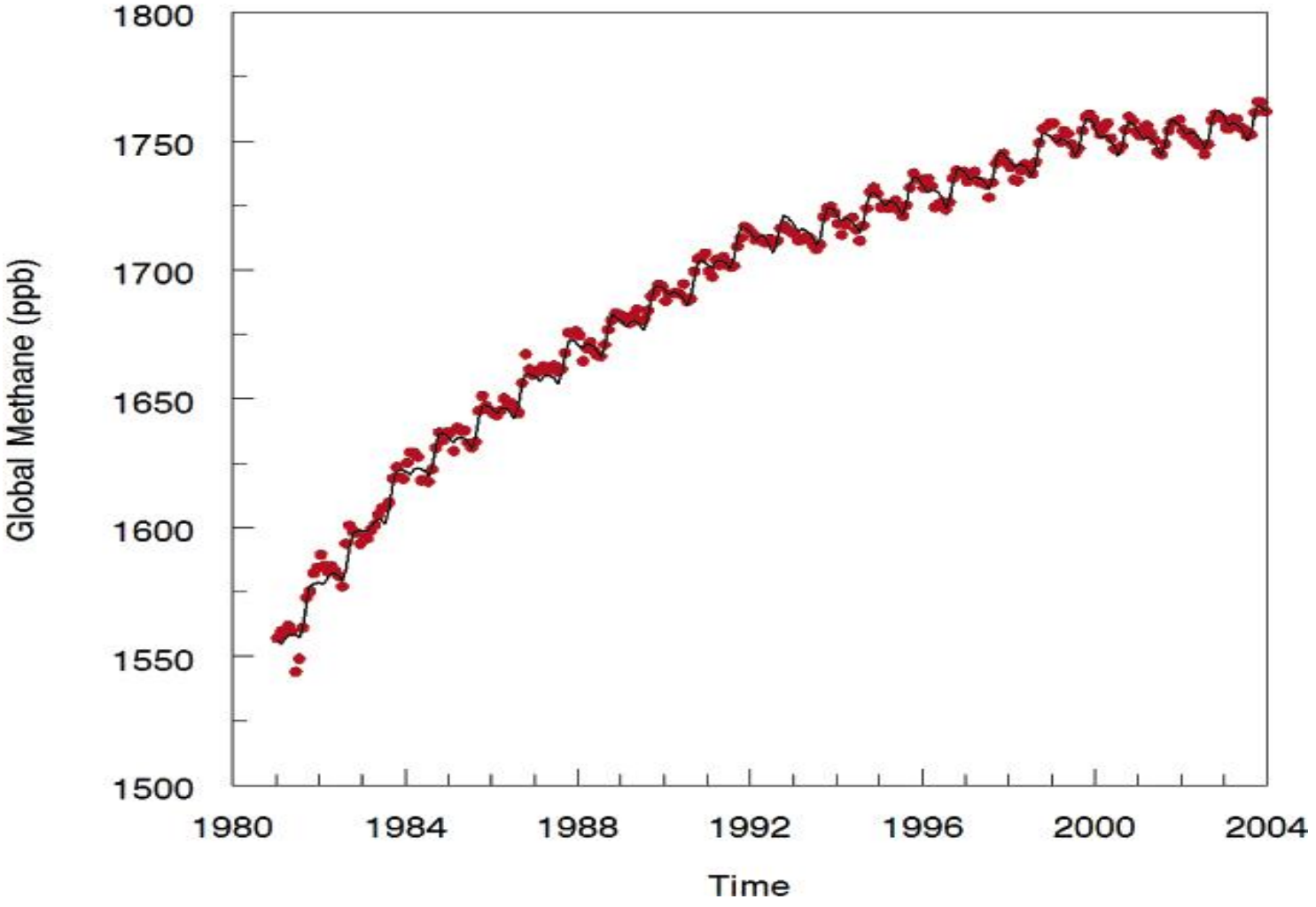


Pettenkofer, Schulze, Spring, Krogh, Warburg, Lundegardh, Kreutz
and hundreds more

Greenhouse Effect

- Carbon dioxide is in fact a 'minor' greenhouse gas. Man contributes only 4% through fossil fuel burning. Climate models assume increase of 1% per year when average since 1958 has been 0.43%.
- Climate models consider the oceans to be distilled water and greatly underestimate the buffer capacity of the oceans (said to be infinite – Segalstad). According to his estimates, burning all the fossil fuels could only increase CO2 by 20%. It could never double.
- Methane is a far more powerful greenhouse gas and although it has increase 150% since 1750, according to Portland State University and Oregon Graduate Institute it has slowed and leveled off with no changes since 2000

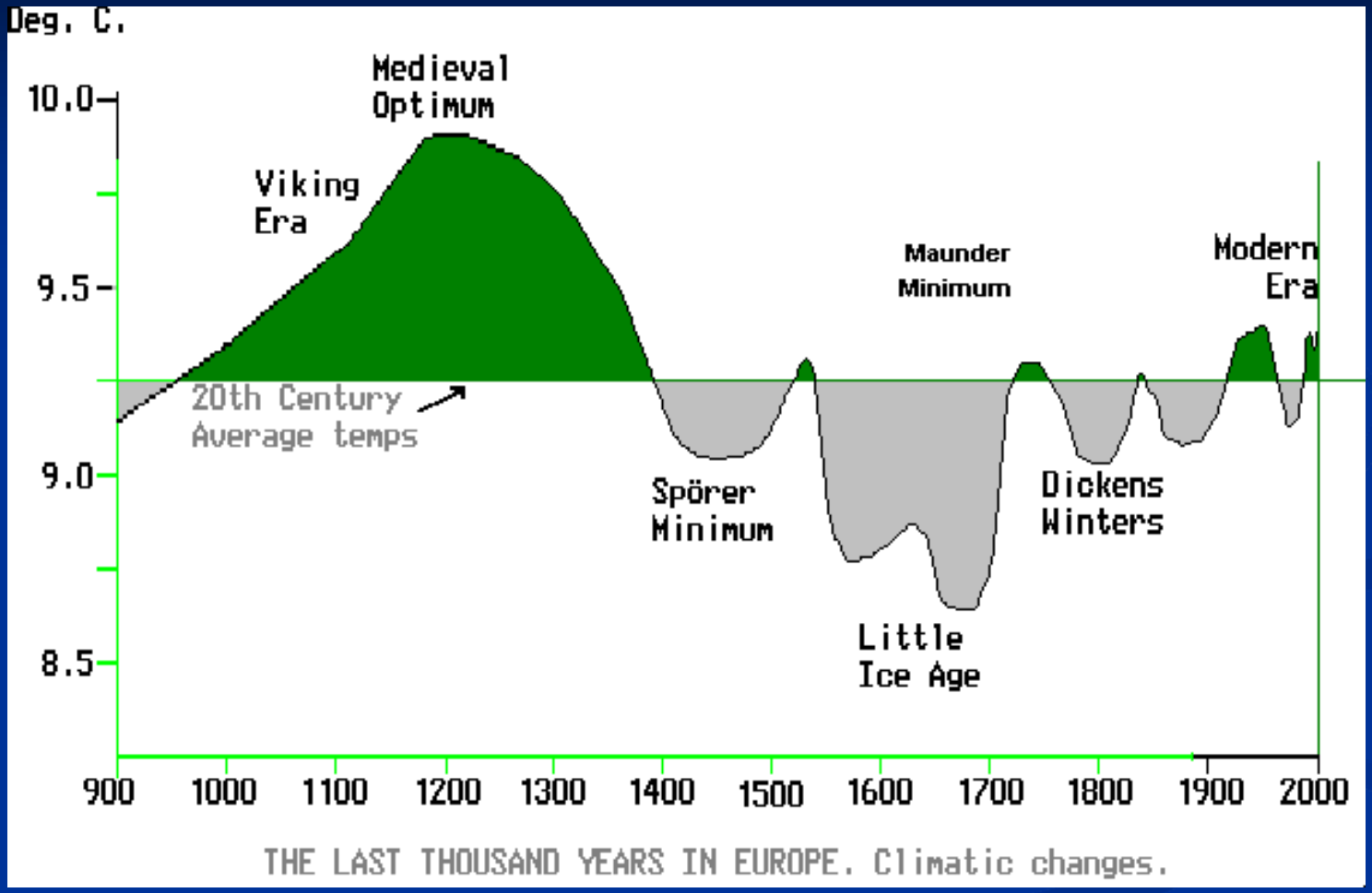
Atmospheric Methane



Water Vapor

- By far the most important greenhouse gas (95%)
- Most of the climate models with the greatest warming have this as a strong positive feedback.
- There is empirical evidence that that is not to be case.
- Both water vapor and clouds are listed as having a high degree of uncertainty by IPCC and could have a huge impact on the changes

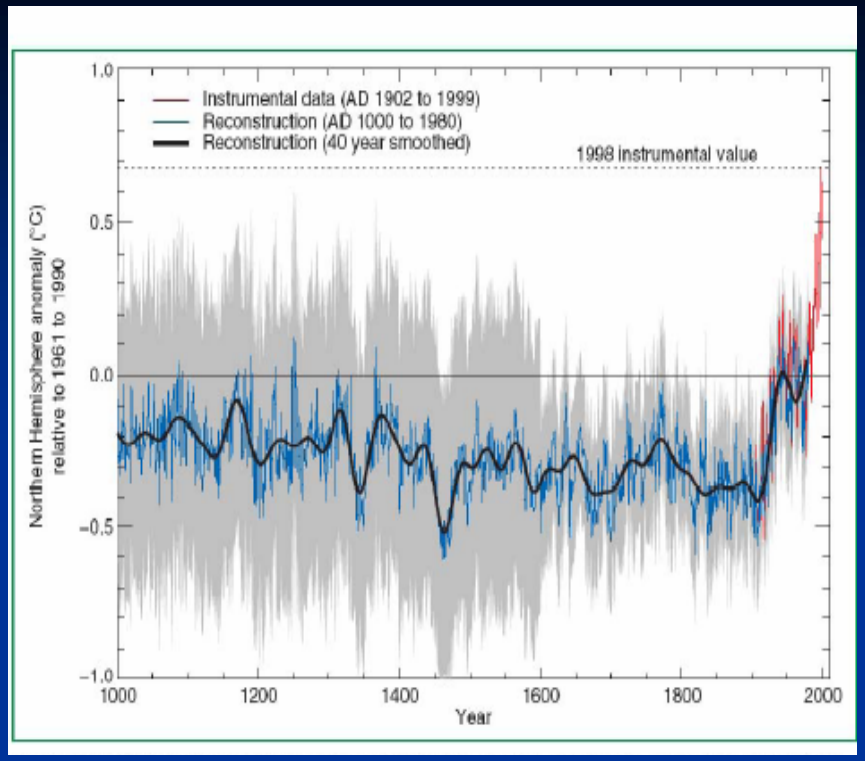
Only Constant in Nature is Change



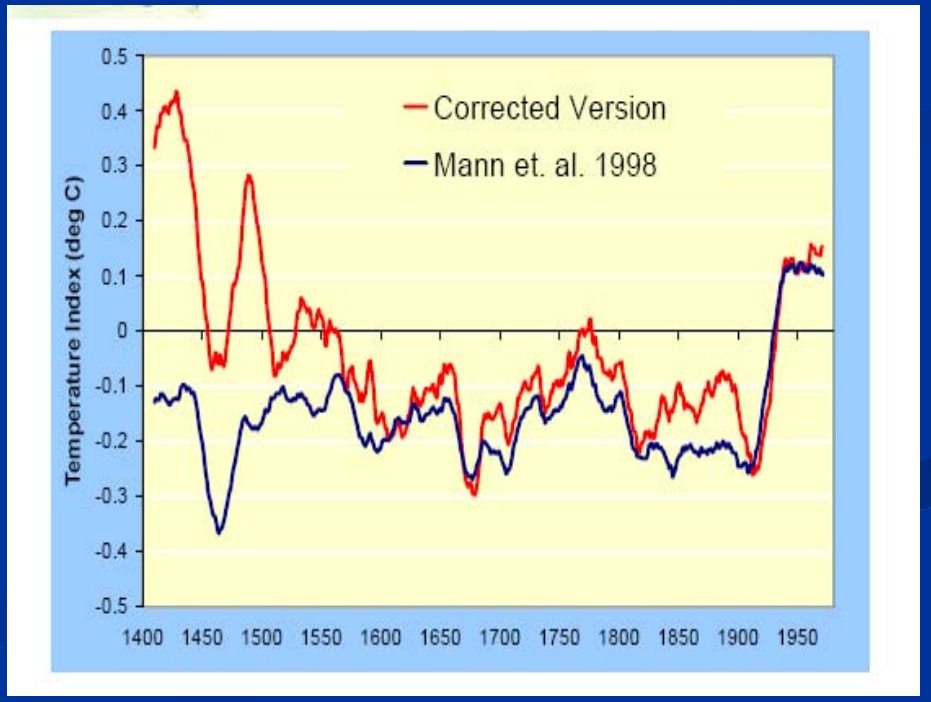
Until 1998, the accepted historical record. Made recent warming look insignificant.

Medieval Warming Dilemma

- Dr. David Deming (University of Oklahoma)
  - “ Around 1996, I became aware of how corrupt and ideologically driven current climate research can be. A major researcher working in the area of climate change confided in me that the factual record needed to be altered so that people would become alarmed over global warming. He said, "We have to get rid of the Medieval Warm Period."



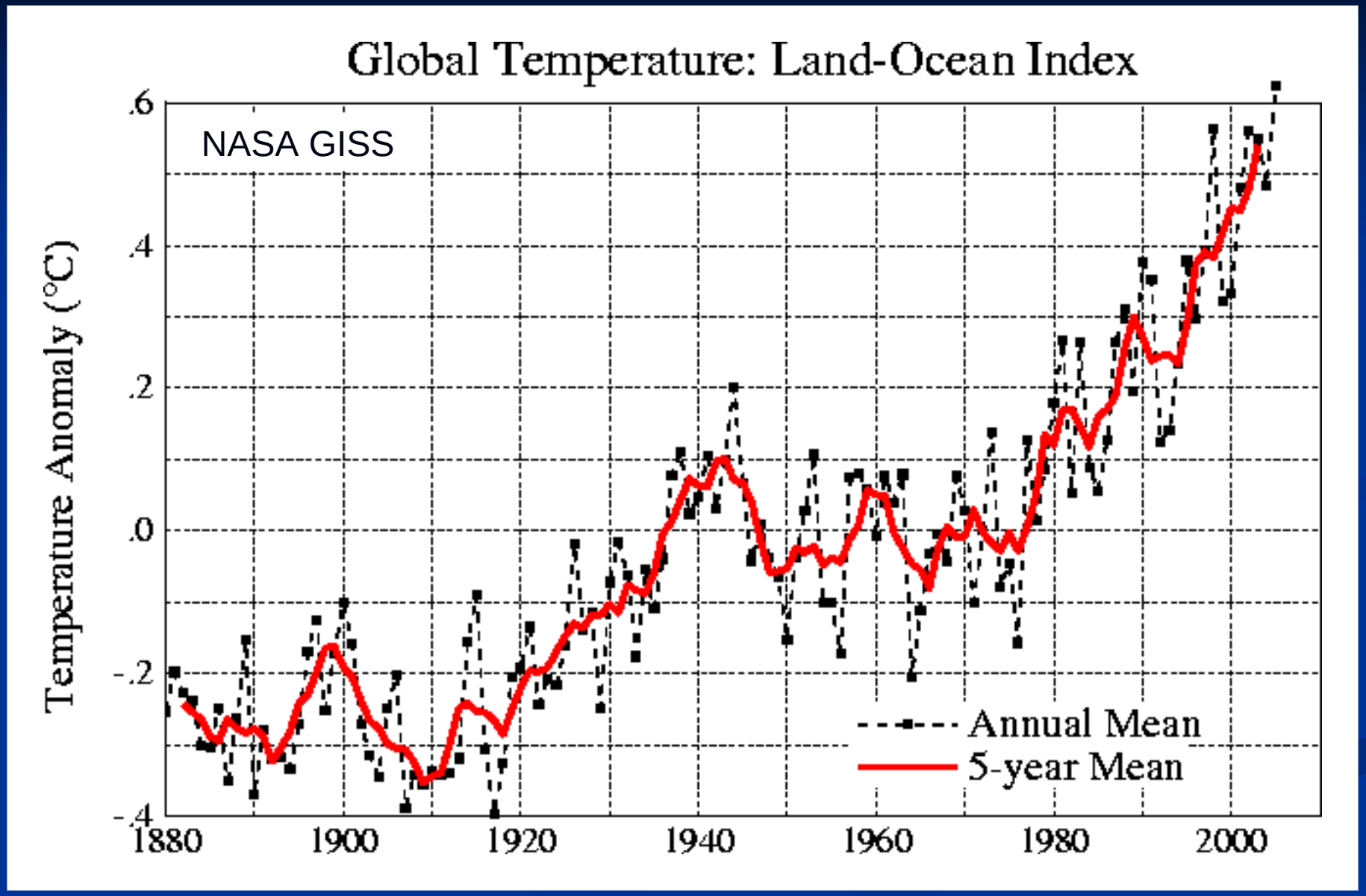
Solution: Mann et al. '98 paper did away with prior warm period.. The so-called Hockey Stick was published everywhere as proof of Global warming. It was shown prominently in IPPC 3rd Assessment and in the movie An Inconvenient Truth



Many flaws in the MBH work (data and algorithm) were found by McKitrick and McIntyre and then Wegman et al and others which when corrected, restored earlier warmth

See www.climateaudit.org

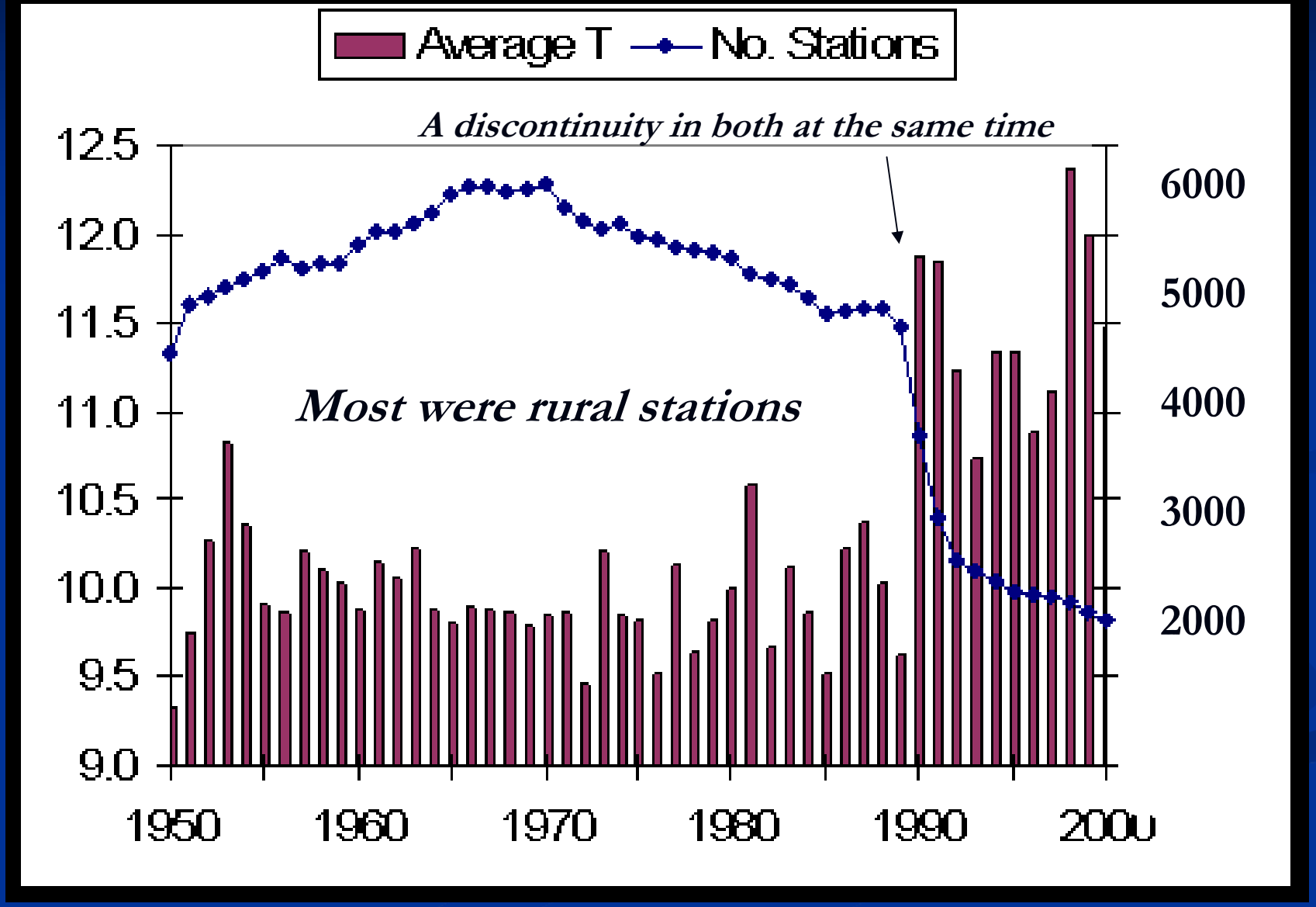
Still the government graphs are alarming…but are they right?



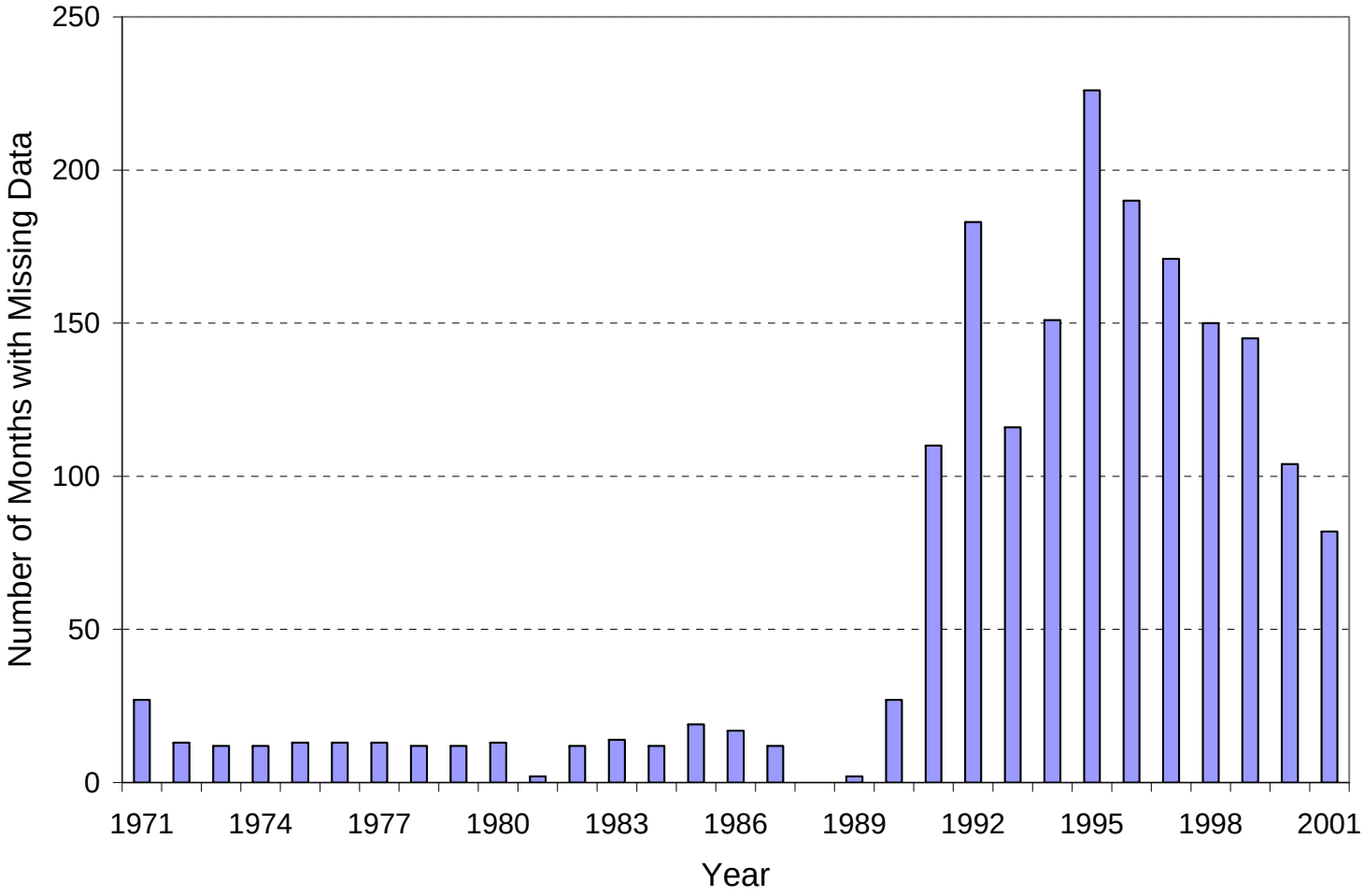
Issues with the Global Station Data

- Station dropout (6000 to 2000, most significant since 1990). The dropout is shown in a visually striking animation here: http://climate.geog.udel.edu/~climate/html_pages/Ghcn2_images/air_loc.mpg.
- Large increases in missing monthly data in Asia and especially the FSU after 1990
- Questions about sufficient urban and site adjustment

Station Dropout and Global Temps



Number of Missing Months



For the 110 Russian weather stations reporting weather data continuously from 1971 to 2001, the total number of missing monthly observations each year (McKitrick and Michaels)

SVERDLOVSK, RUSSIA

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1987	-18.6	-8.3	-5.5	0.9	14.9	20	19.3	16.2	8.6	2.1	-11.2	-11.5
1988	-12.7	-9.6	-2.6	4.8	10.3	19.5	22.6	18.3	9.7	3.9	-7	-9.9
1989	-15.1	-9.6	-0.3	1.5	11.9	21.4	22.8	14.2	10.2	2.8	-4.2	-10.2
1990	-14.2	-6.8	0.1	5.3	9.6	999.9	19	16.4	999.9	1.2	-5	-8.3
1991	999.9	-12.6	-7.1	9.2	15.5	999.9	17.6	13.6	10.6	7.2	-3.6	-13.6
1992	-12	-9.2	-4.1	1.8	10.1	14	16.3	13.8	10.9	2.1	-5.3	999.9
1993	-8.9	-11.8	-6	3.2	10.8	17.9	18.6	16.5	5.8	2.4	-13.2	-9.9
1994	-10.2	-17.2	999.9	999.9	11.4	999.9	999.9	14.9	11	6.6	-7	-14
1995	-10.2	-4.2	-0.6	10.7	13	17	999.9	16.9	999.9	3.9	-3.7	-12.7
1996	-14.1	-11.2	-3.9	0.6	12.2	19.1	19.2	999.9	7.1	1.9	-2.3	-10.2
1997	-18.4	-9.4	-2.1	6.2	12	16.7	15.9	14	11.2	5.9	-7.3	-14.7
1998	-11	-14.8	-3.3	-1.4	11.8	18.5	21.6	17.6	8.3	3.5	-12.7	-7.1
1999	-12.6	-7.8	-8.6	4.8	9	15.1	20.2	15.6	9.3	7	-10.4	-6.4
2000	-12.9	-6.9	-1.7	7.2	8.3	19.1	20.5	999.9	8.9	2.3	-6.5	-12.2
2001	-12.1	-14.9	-3.4	6.8	13	14.6	17.9	999.9	10.7	0.6	-4.6	-12.3
2002	-9.2	-4.2	-1	3	9.3	14	19	13.1	11.1	2.1	-3.7	-18.5

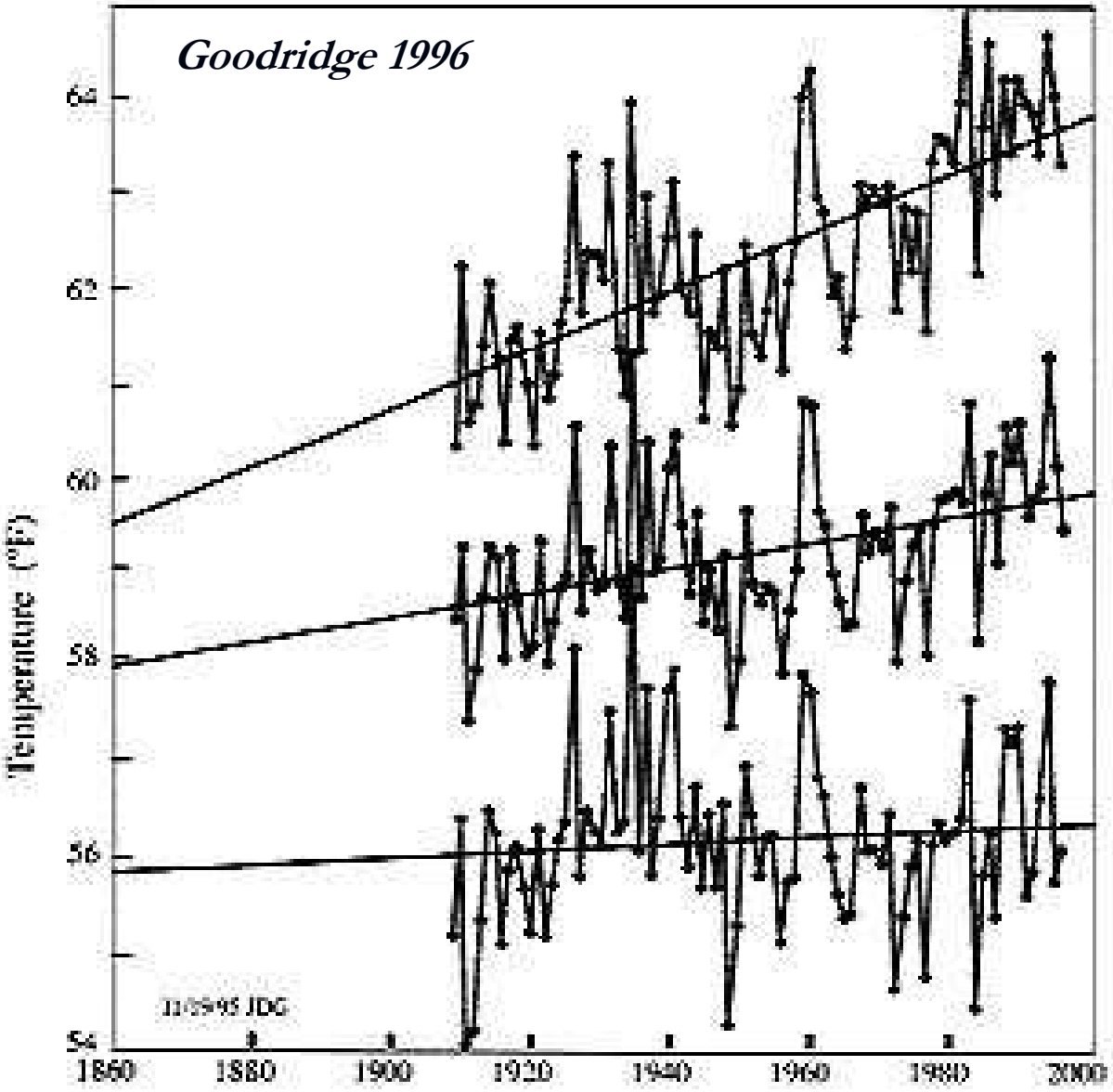
Station Dropout and Missing Data

- Since many of the stations that dropped out were the smaller stations, the bias in the remaining stations is towards larger metro area stations where there is more warmth
- Infilling of data is very difficult. Some of the methods used (NASA GISS substitutes annual average anomaly) can introduce a warm bias

Urban Heat Island Effect

Urban Heat Island Effect

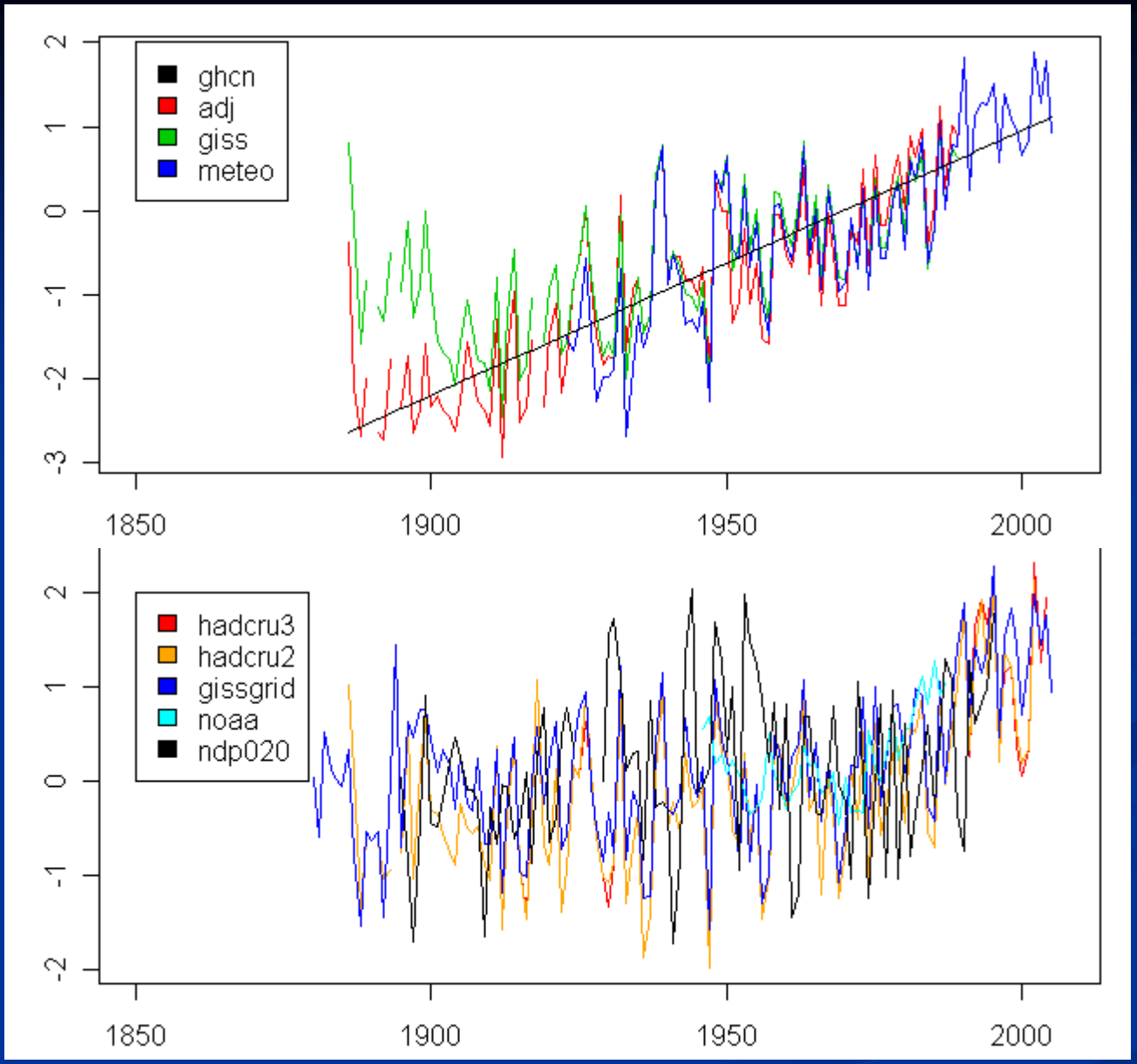
- In cities, vertical walls, steel and concrete absorb the sun's heat and are slow to cool at night, which can be 10 or more degrees warmer in cities than in rural areas
- More and more of the world is urbanized
- Cities grow around airports where we measure temperatures
- Urban areas with population >10,000 are adjusted in global data
- Oke (1973) and Hoyt (2002) have shown towns with much smaller populations can have warming (town of 1000 up to 2C or 3F) especially in winter
- Hinkel et al (2003) showed even the village of Barrow, Alaska with a population of 4600 has shown a warming of 2.2C (3.4F) in winter over surrounding rural areas
- **Insufficient adjustments introduces a warm bias in data**



Counties in CA with >1 million Population (+4F since 1910)

Counties in CA with between 100,000 and 1 million population (+1F since 1910)

Counties in CA with less than 100,000 Population (0F since 1910)



Update: Here are a couple of graphics showing gridded and station data for Ulan-Ude and its gridcell. Several versions of station data are shown here. The station data shows a rather remarkable increase since the 19th century in the GHCN adjusted version (which does not incorporate recent Russian data.) McIntyre

Siting Issues

- Pielke and Davey have found a majority of stations including climate stations in eastern Colorado did not meet WMO requirements for proper siting
- State climatologist teams found siting issues in surveys in Georgia, Alabama, Kentucky, Oregon and New England.
- Even in Oklahoma where the Oklahoma Mesonet is the gold standard for observation networks, issues developed with time (growth of vegetation that changed wind and temperature profiles)
- **All these siting issues introduce a warm bias**


TOYOTA

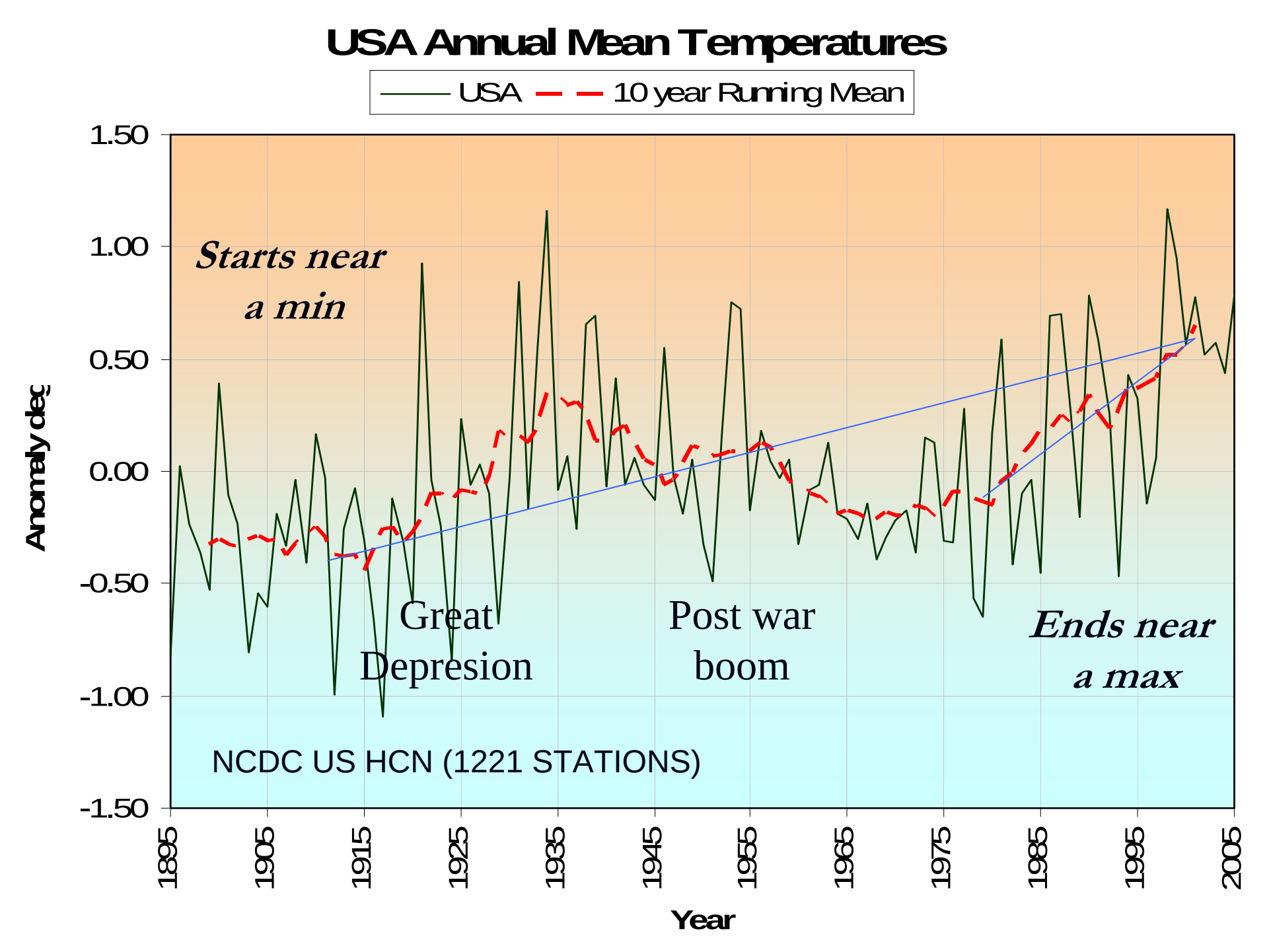
Contamination of the Data Bases

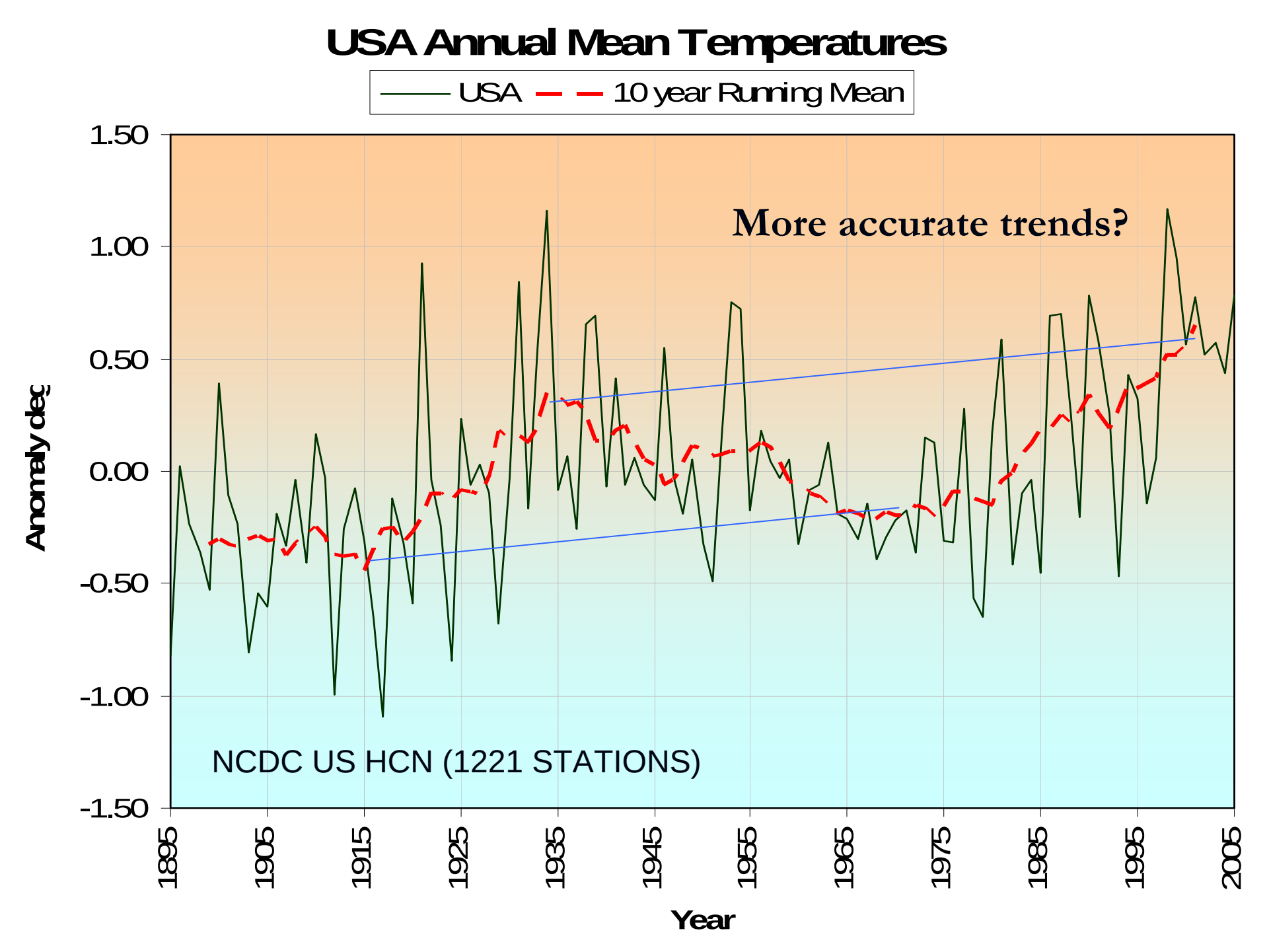
- A number of peer-reviewed papers ignored by the IPCC have estimated that these problems with the observing networks may account for up to one half the warming since 1880 (Michaels and Balling, Michaels and McKitrick, Kalney and Cai, de laat and Maurellis, Pielke and Davey)

NCDC USHCN Data

- National Climate Data Center maintains a database of 1221 stations across the contiguous 48 United States. Adjustments have been made to account for changes over time in the time of observations, missing data, type of instrumentation, changes in station siting, and urban warming (Karl, 1988)
- It WAS the 'best' available station data set for assessing change as unlike the global data bases, there is not a big station dropout, less missing data and there was a better urbanization adjustment (although some siting adjustment issues may remain (Pielke et al 2005, 2006)

USHCN Station Hopkinsville, KY (Pielke et al 2006)	*Max/Min sensor near John Martin Reservoir, CO (Davey 2005,*


USA Annual Mean Temperatures
USA
10 year Running Mean
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
Anomaly dec
Starts near
a min
Great
Depresion
Post war
boom
Ends near
a max
NCDC US HCN (1221 STATIONS)
1895
1905
1915
1925
1935
1945
1955
1965
1975
1985
1995
2005
Year


USA Annual Mean Temperatures
USA
10 year Running Mean
More accurate trends?
NCDC US HCN (1221 STATIONS)
Anomaly dec
Year
1.50
1.00
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-0.50
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1895
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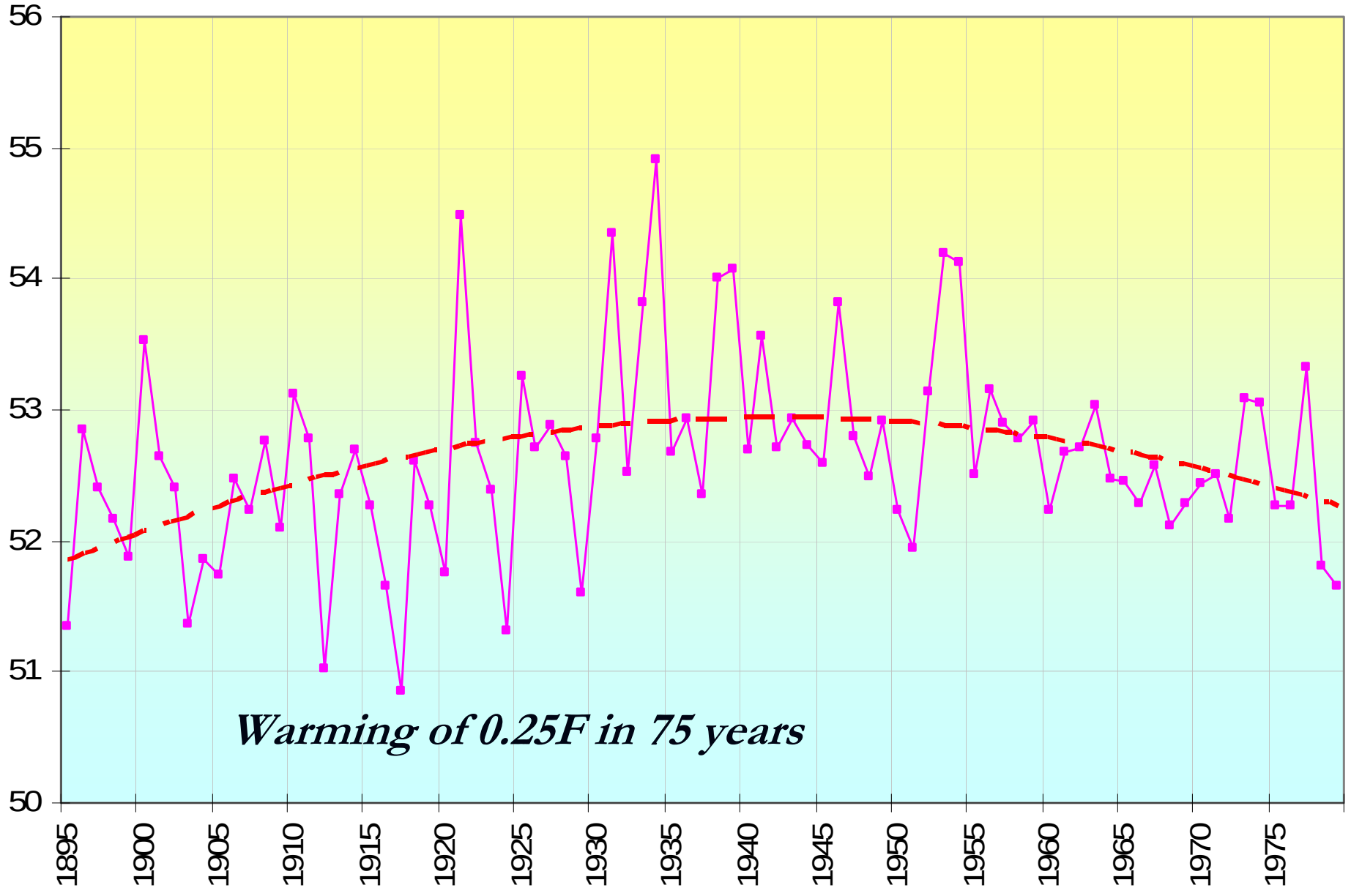
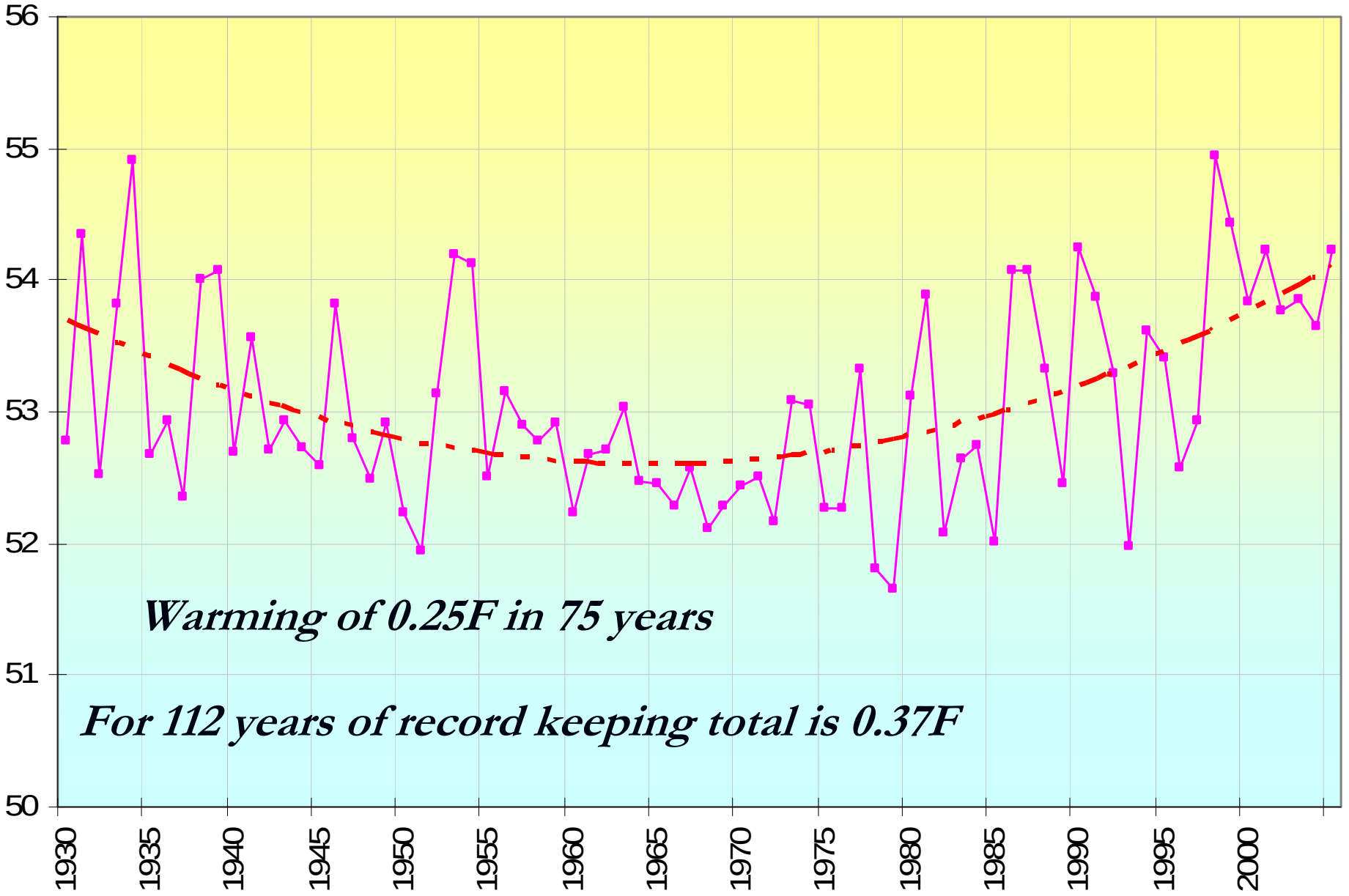
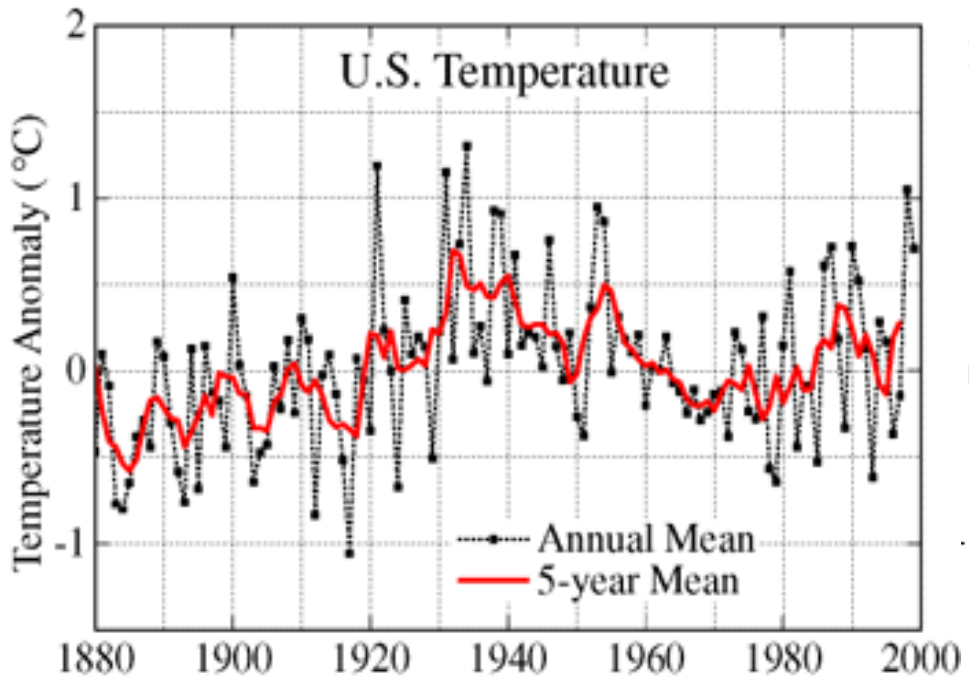
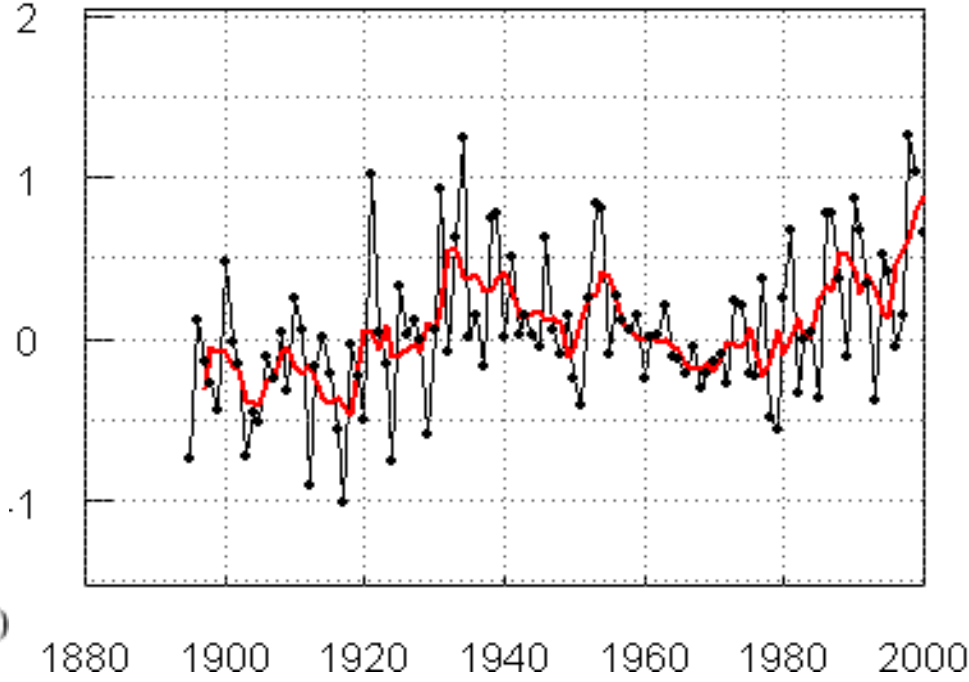
NCDC Annual Mean Temperatures



NCDC Annual Mean Temperatures

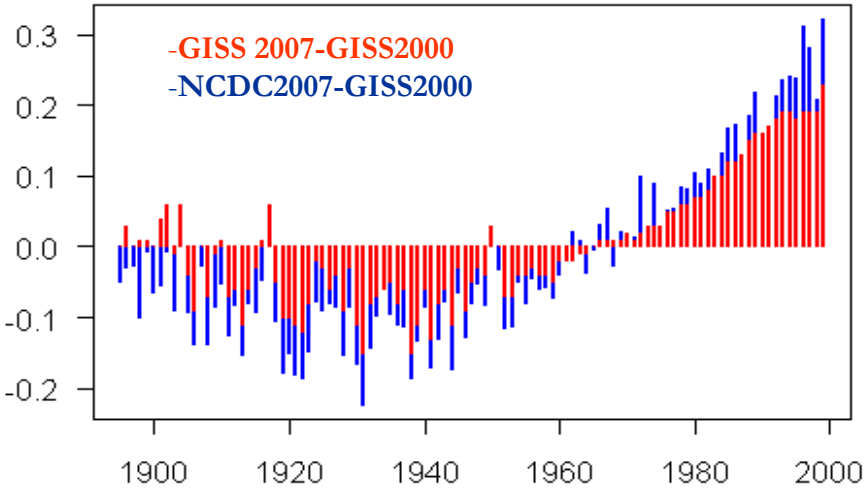


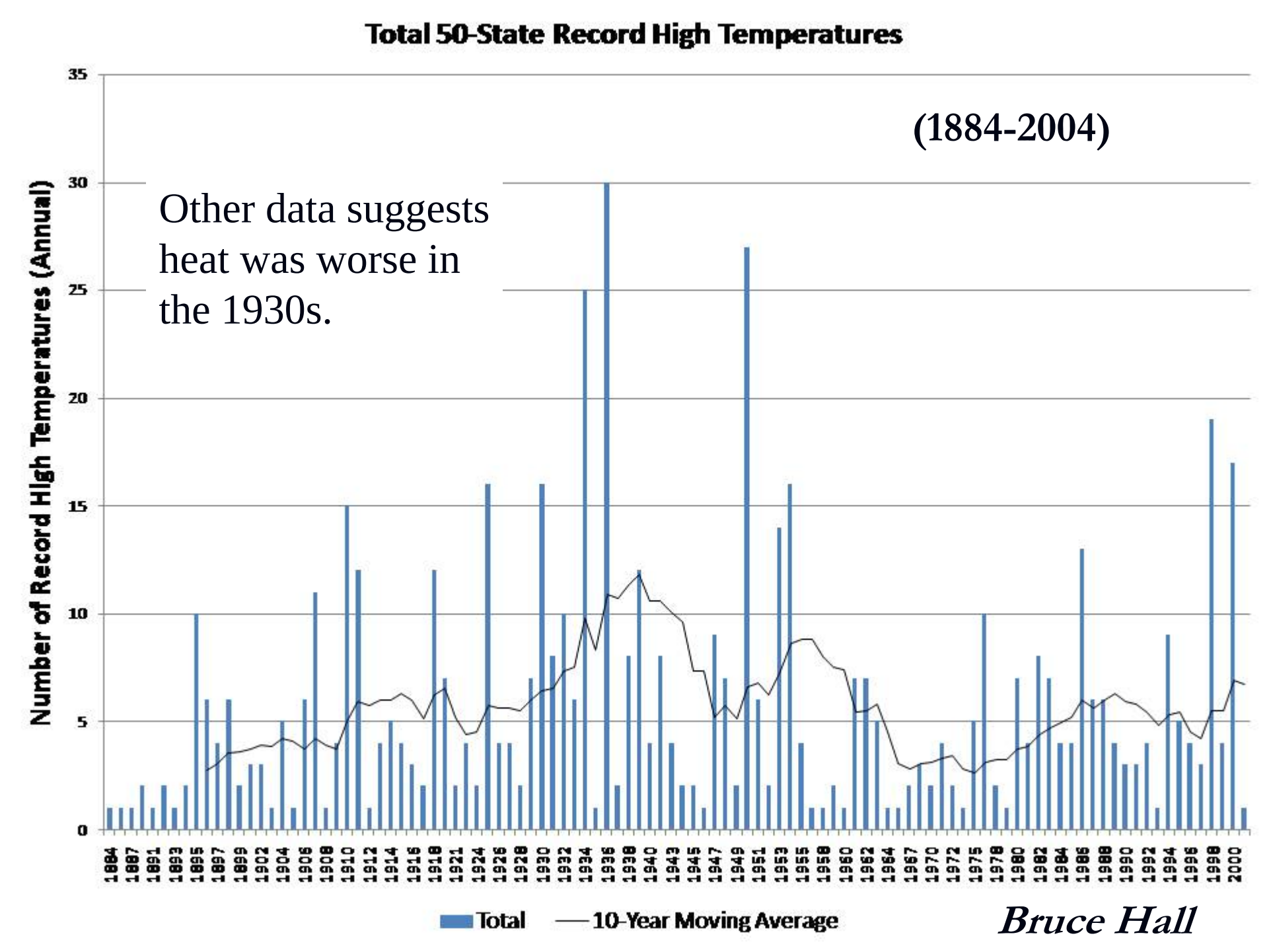




In order to reconcile some of the differences between the US and global data, the GISS US data was adjusted in 2007

The difference (2000-2007) is not small




Total 50-State Record High Temperatures
(1884-2004)
Other data suggests heat was worse in the 1930s.
Number of Record High Temperatures (Annual)
35
30
25
20
15
10
5
0
1884 1887 1891 1893 1895 1897 1899 1902 1904 1906 1908 1910 1912 1914 1916 1918 1921 1924 1926 1928 1930 1932 1934 1936 1938 1940 1943 1945 1947 1949 1951 1953 1955 1958 1960 1962 1964 1967 1970 1972 1975 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000
Total
10-Year Moving Average
Bruce Hall

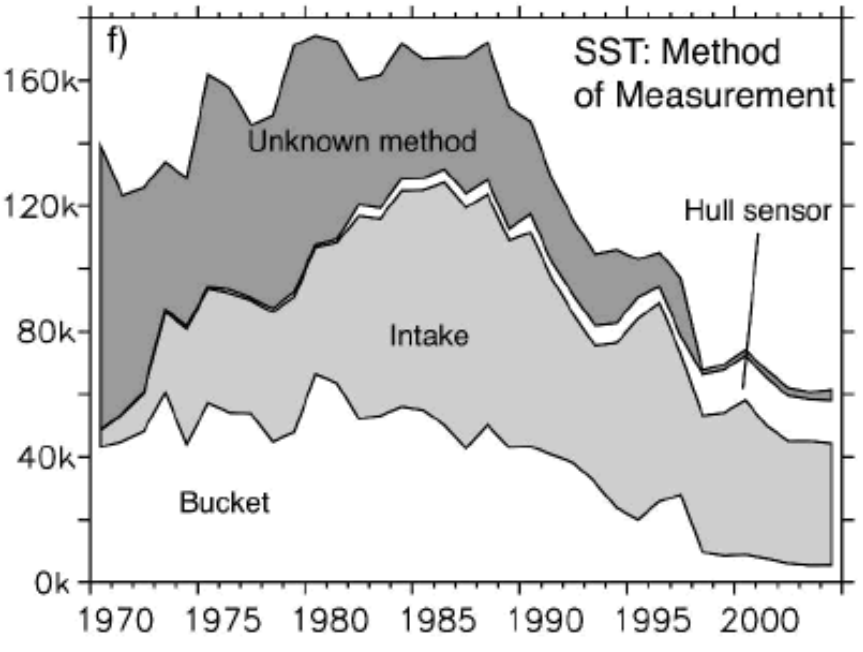
Oceans Also Not Warming

- Hoyt reports in "The Collapse of Arguments for High Climate Sensitivity"* *http://www.warwickhughes.com/blog/?p=87*

  that because of

  - Gouretski and Koltermann's (2007) finding "the ocean heat content increase since the 1950s must be reduced by a factor of 0.62" due to instrumental errors
  - Lyman et al (2006) finding that "20% of the original warming since the 1950's disappeared in 2003-2005",

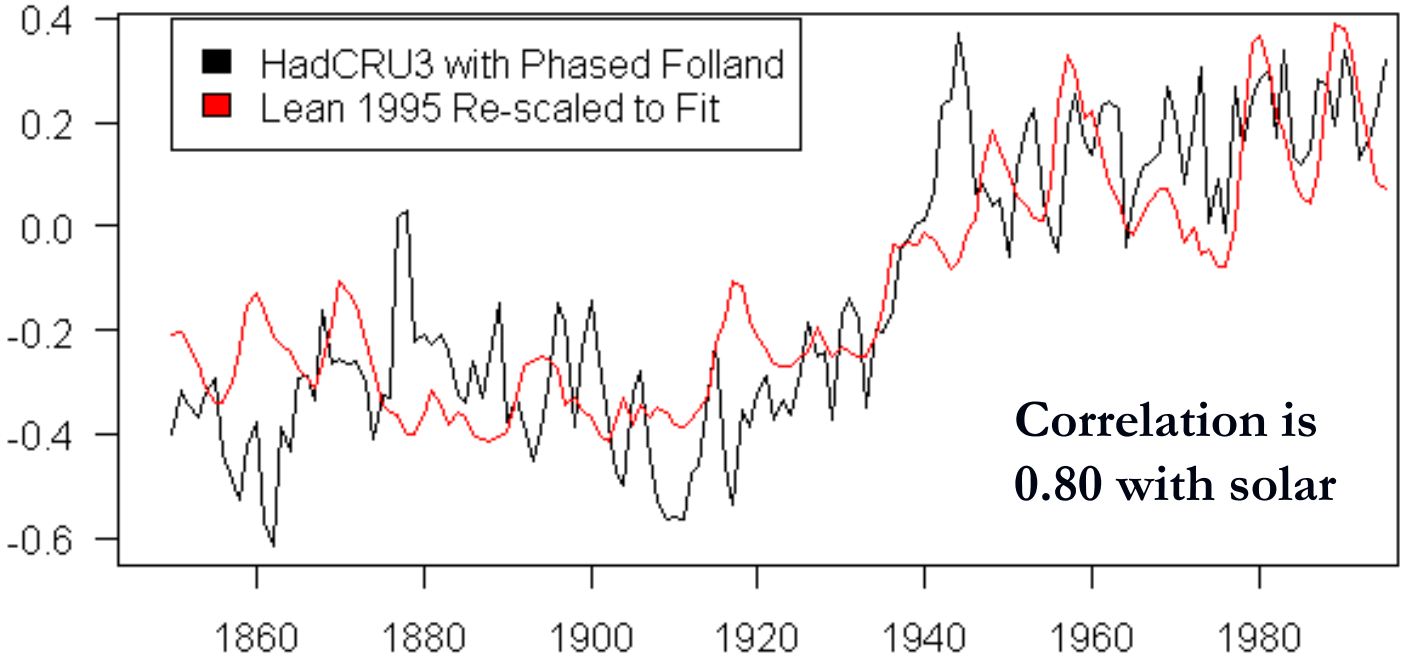
  that the total net warming of the ocean surface to 3000 meters depth is **just 0.03 C since 1948**!*
- Hoyt believes the works of Gouretski and Koltermann and Lyman are very important and have essentially invalidated all the climate models.
- This suggests a sensitivity to CO2 doubling of just 0.4C. Most of that may have already occurred!

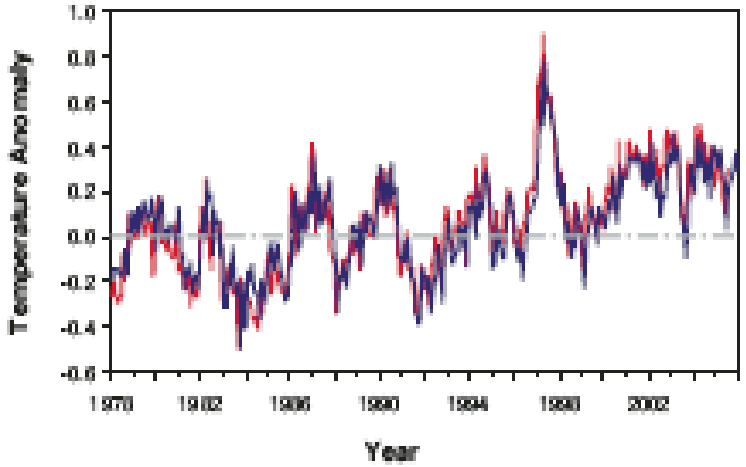


Adjusting sea surface temperatures for slower transition from bucket to ship intake. Global Temperatures assumed abrupt transition WWII 1941 (Folland)

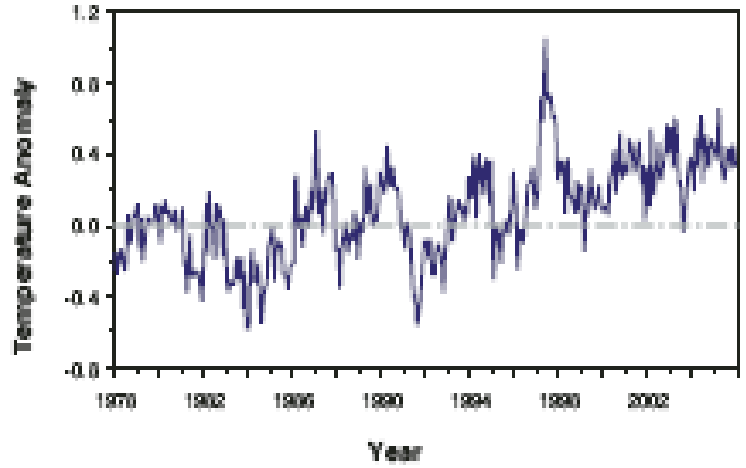
McIntyre Climate Audit

http://www.climateaudit.org/index.php?p=1276&cp=3#comments

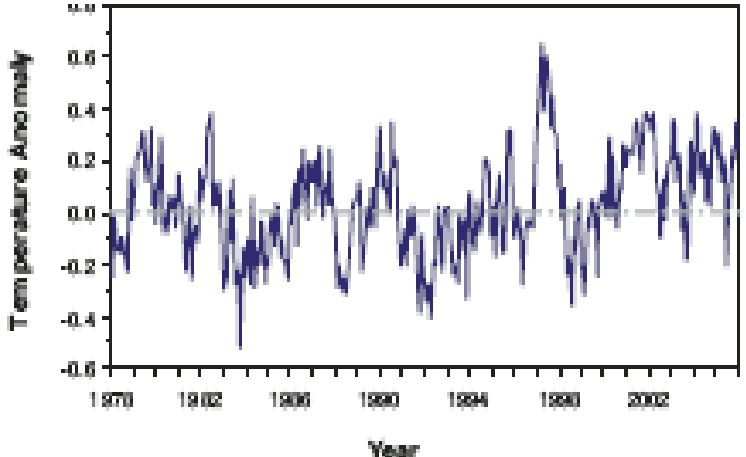




Global



Northern Hemisphere



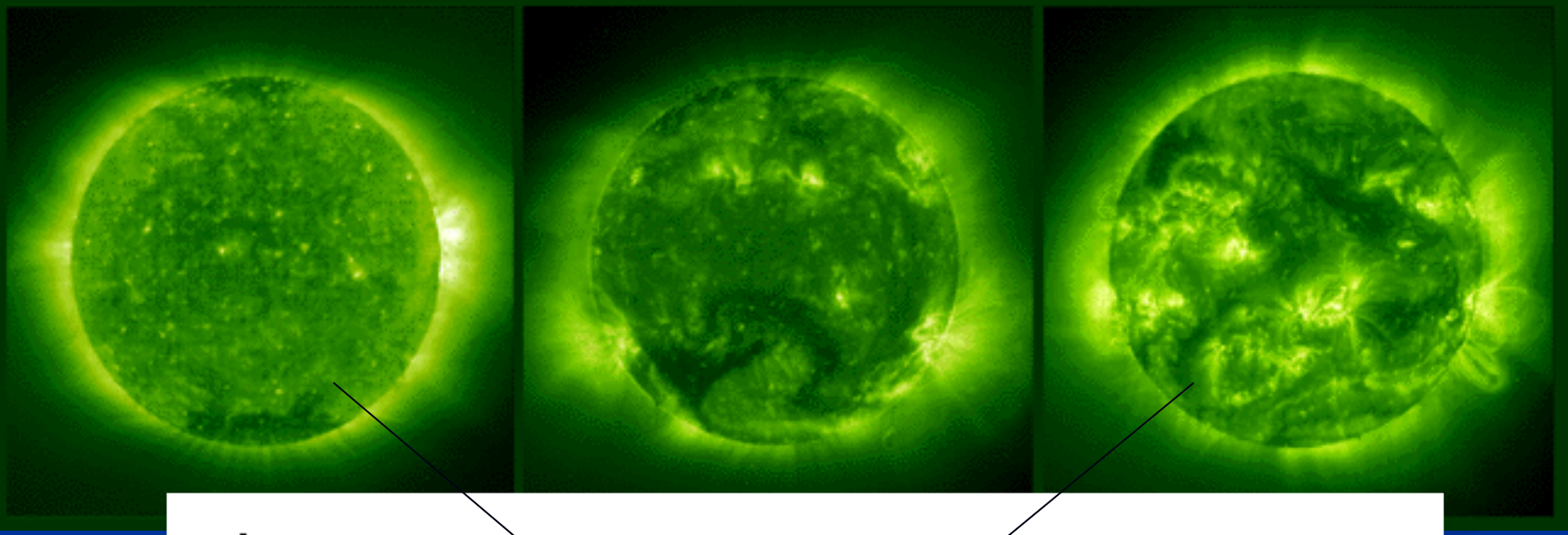
Southern Hemisphere

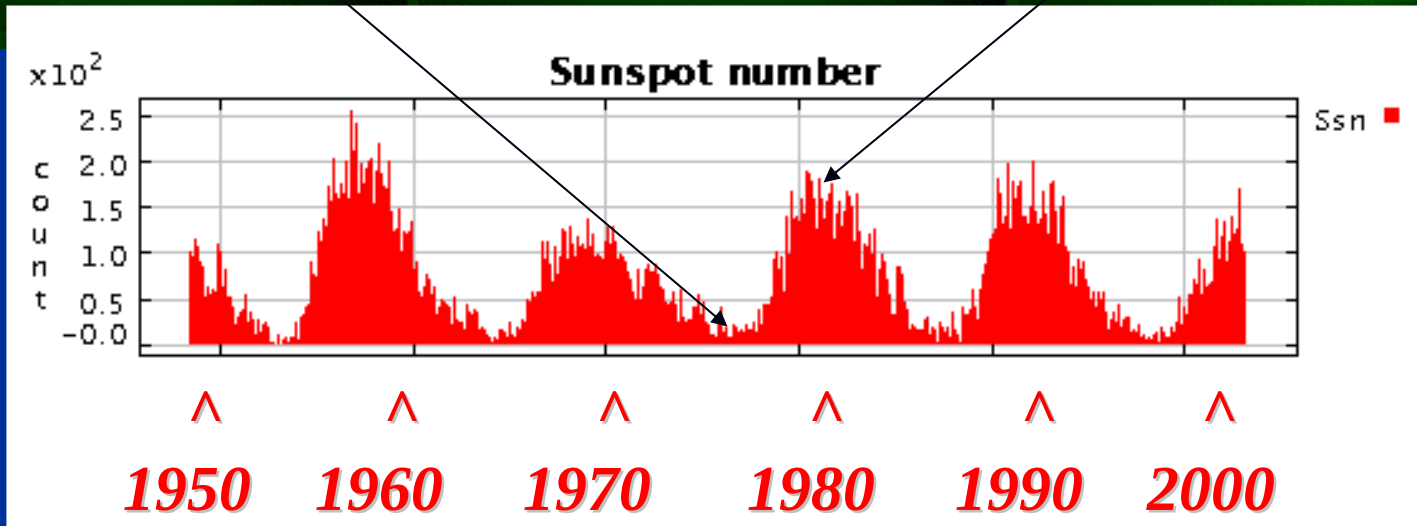
Satellite derived lower atmospheric temperatures <u>since 1979</u> also rising much less.

But again we are not denying any recent warming only the amount and the causes

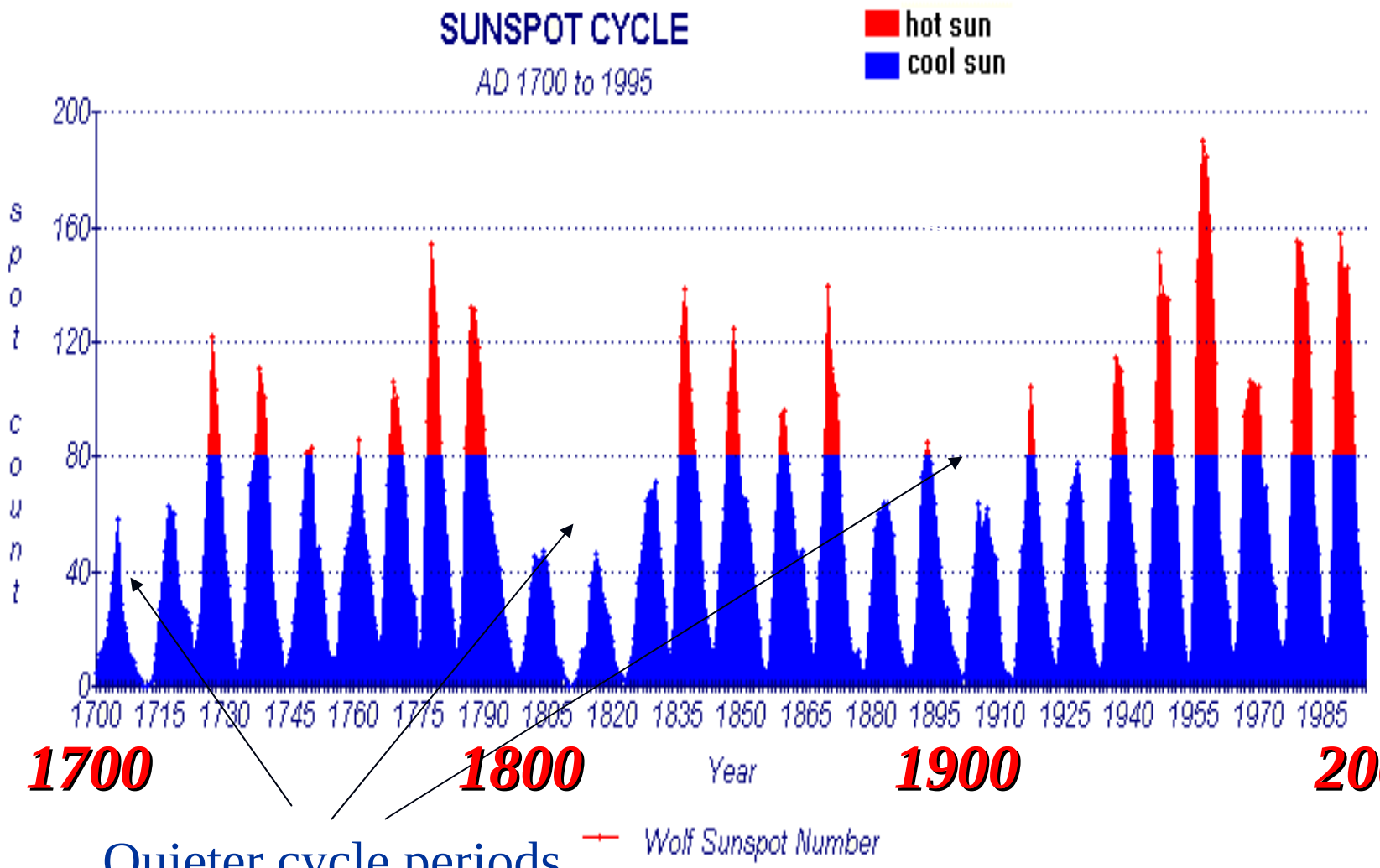
Cyclical Factors

11 YEAR SOLAR SUNSPOT CYCLE





11 year solar cycles themselves vary in their strength on a longer term with cycles of 80 to 100 years

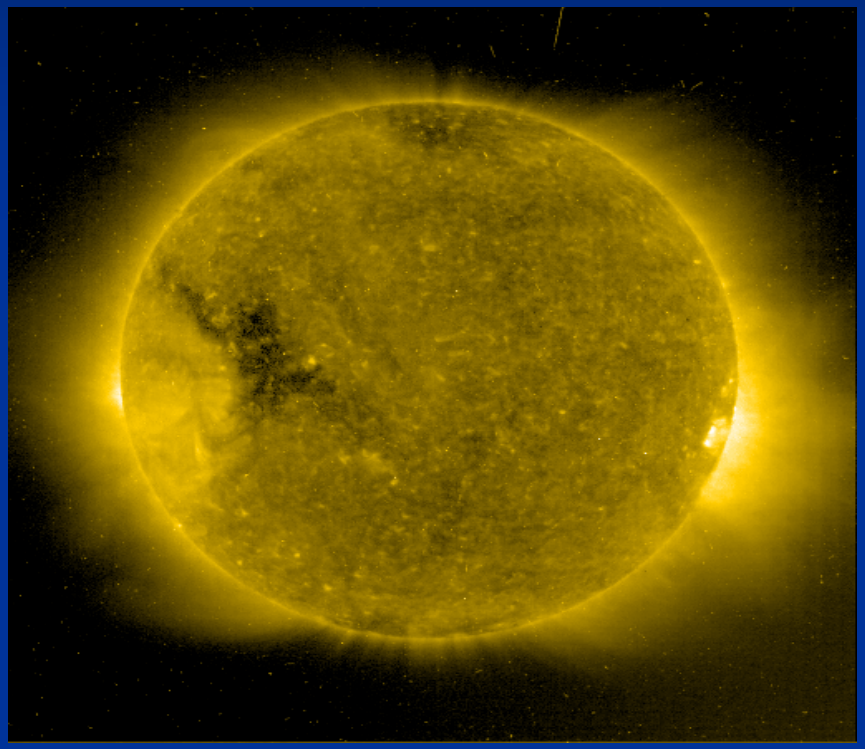


1700 **1800** **1900** **2000**

Quieter cycle periods

Gleissberg Cycle

The Solar Connection



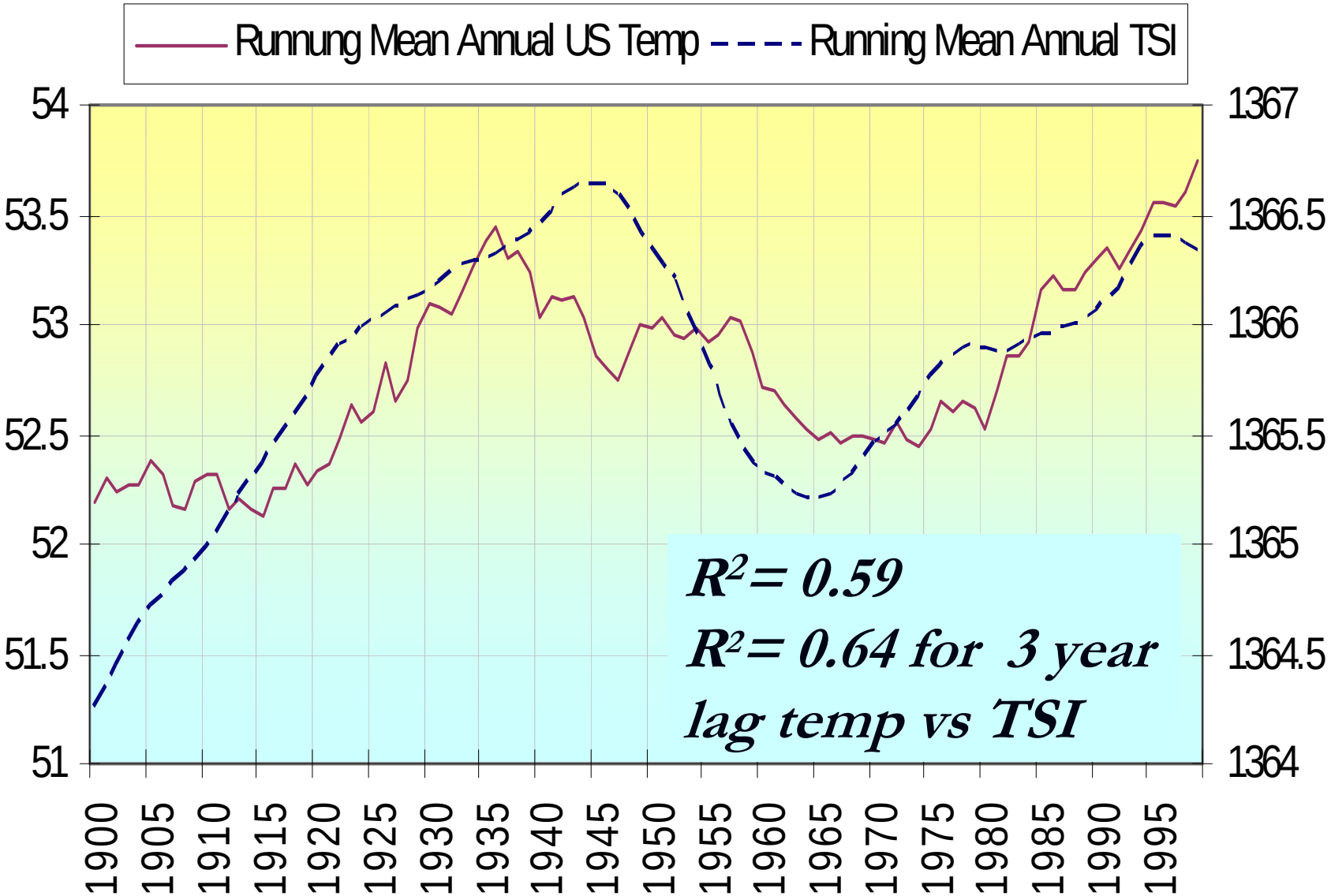
- ***DIRECT EFFECTS***
  - Direct effects of changes in solar brightness or irradiance likely relatively small
- ***INDIRECT EFFECTS***
  - UV warming through ozone chemistry high up in low and mid latitudes
  - Geomagnetic activity /solar wind effects that warm higher latitudes and may reduce low clouds through reduction of cosmic rays

Solar Irradiance (Brightness)

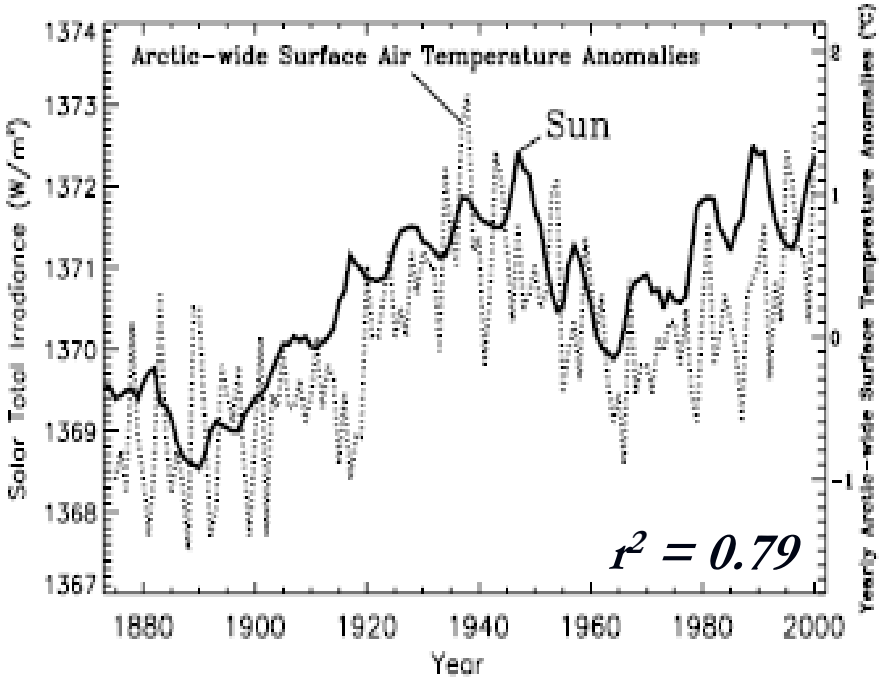
- Scafetta and West (GRL 2006) assumed that the Total Solar Irradiance (Lean) was a proxy for the total solar effect (direct and indirect). They estimated the changes in the sun **could account for 50% of the Northern Hemispheric changes since 1900**

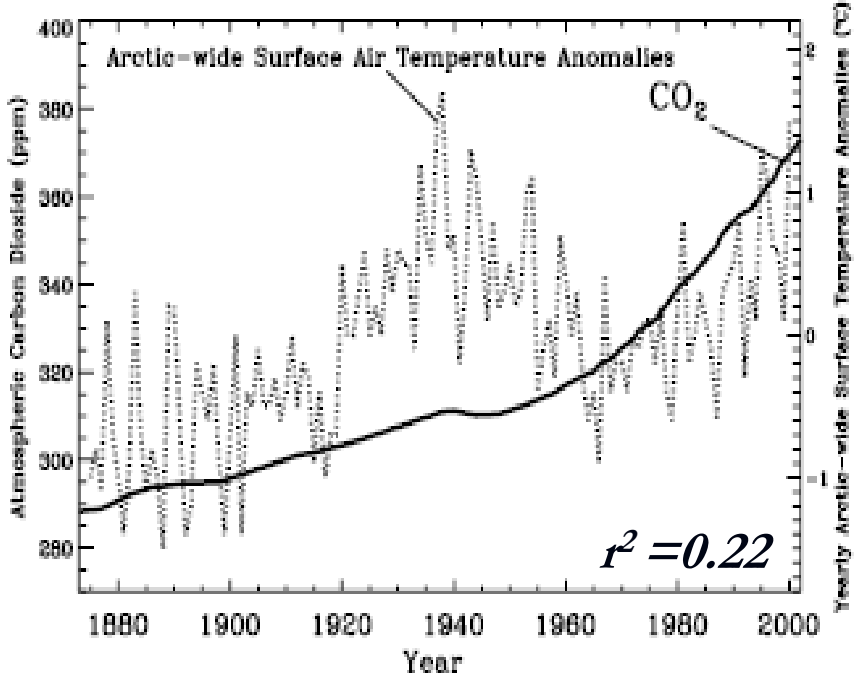
- Shaviv (2005) estimated that the combination of cosmic ray cloud effects and brightness related increases in irradiance since 1900 **could account for 77% of the changes in global temperatures.** He found relationship held going back 600 million years.

NCDC Annual Mean US Temperature vs Hoyt Schatten TSI



Gleissberg Cycle



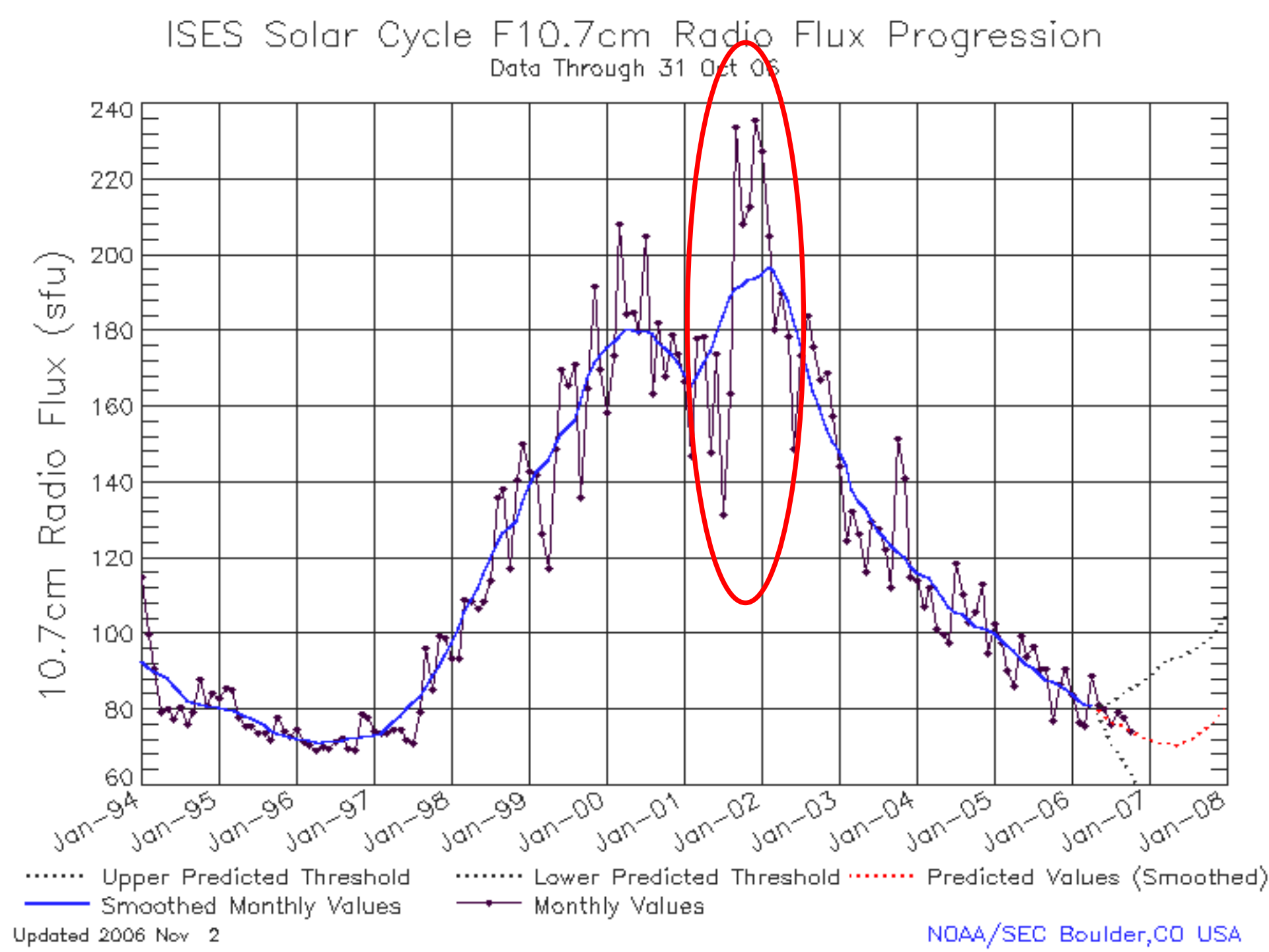


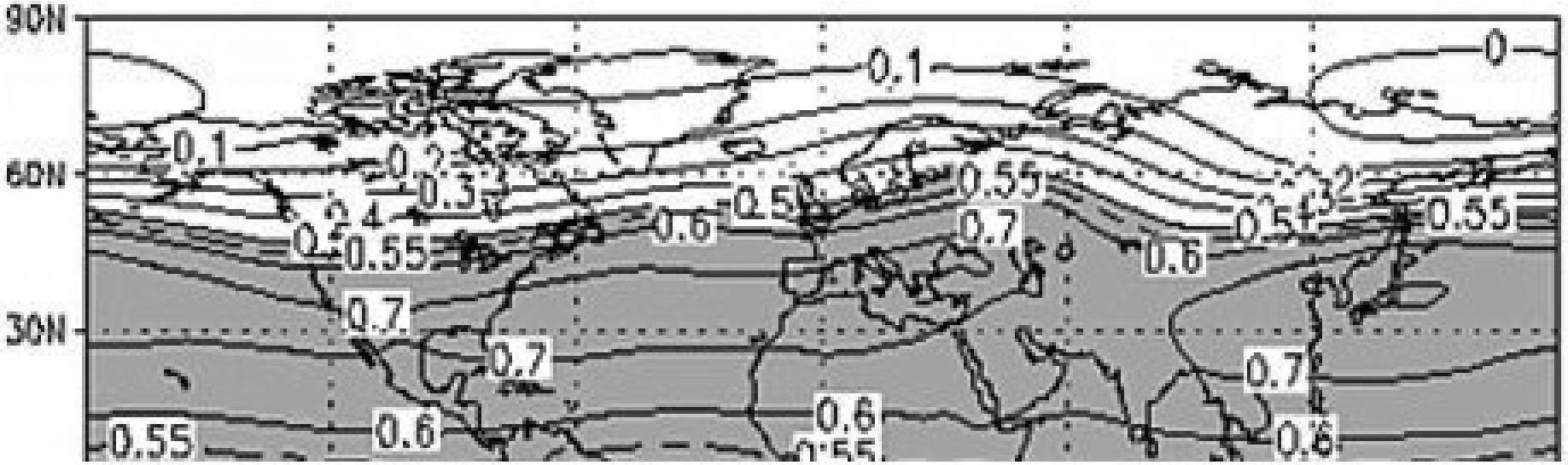
Arctic Annual Mean Temperatures vs Solar Irradiance
(Soon GRL 2005)

Fit is much better of solar irradiance with arctic temperatures (Polyakov) than with CO^2

Ultraviolet Radiation and Ozone

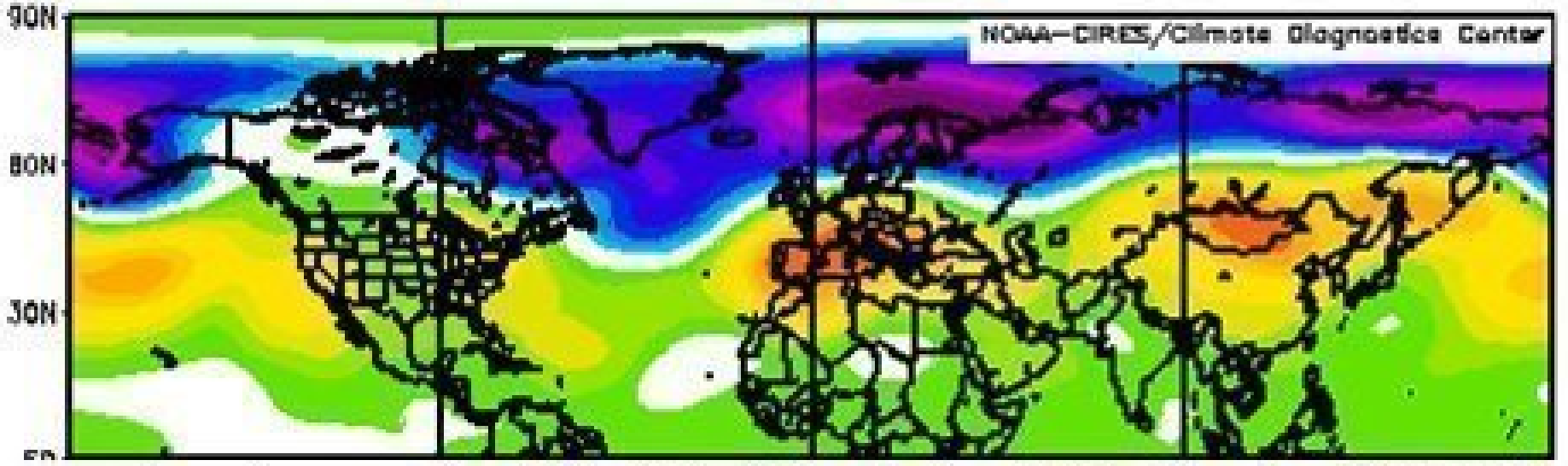
- Though solar irradiance varies only 0.1% over the 11 year cycle, radiation at longer UV wavelengths are known to increase by several percent with still larger changes (factor of two or more) at extremely short UV and X-ray wavelengths (Baldwin and Dunkerton, JAS 2004).
- Labitzke has shown statistically significant differences of heights and temperatures in the lower stratosphere into the middle troposphere with the 11 year solar cycle (using solar flux which correlates well with UV radiation)
- Shindell et al NASS GISS (1999) showed results from a global climate model including a parameterization of stratospheric chemistry, how UV induced stratospheric ozone changes may amplify observed irradiance effects and have them penetrate into the troposphere, in effect confirming Labitzke's findings


ISES Solar Cycle F10.7cm Radio Flux Progression
Data Through 31 Oct 06
10.7cm Radio Flux (sfu)
240
220
200
180
160
140
120
100
80
60
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Upper Predicted Threshold
Lower Predicted Threshold
Predicted Values (Smoothed)
Smoothed Monthly Values
Monthly Values
Updated 2006 Nov 2
NOAA/SEC Boulder,CO USA



Correlation high atmosphere heights with solar flux (Labitzke)

Pattern fit the findings of Labitzke and Shindell's models



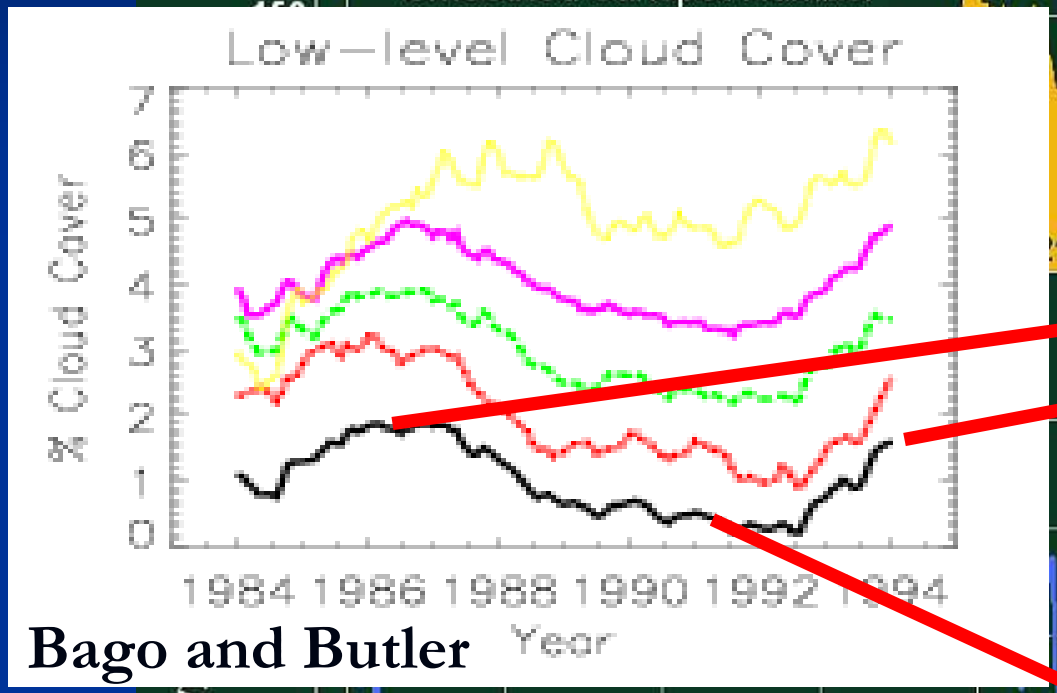
Actual anomalies 500mb heights during high flux Jan/Feb 2002

Cosmic Rays and Low Clouds

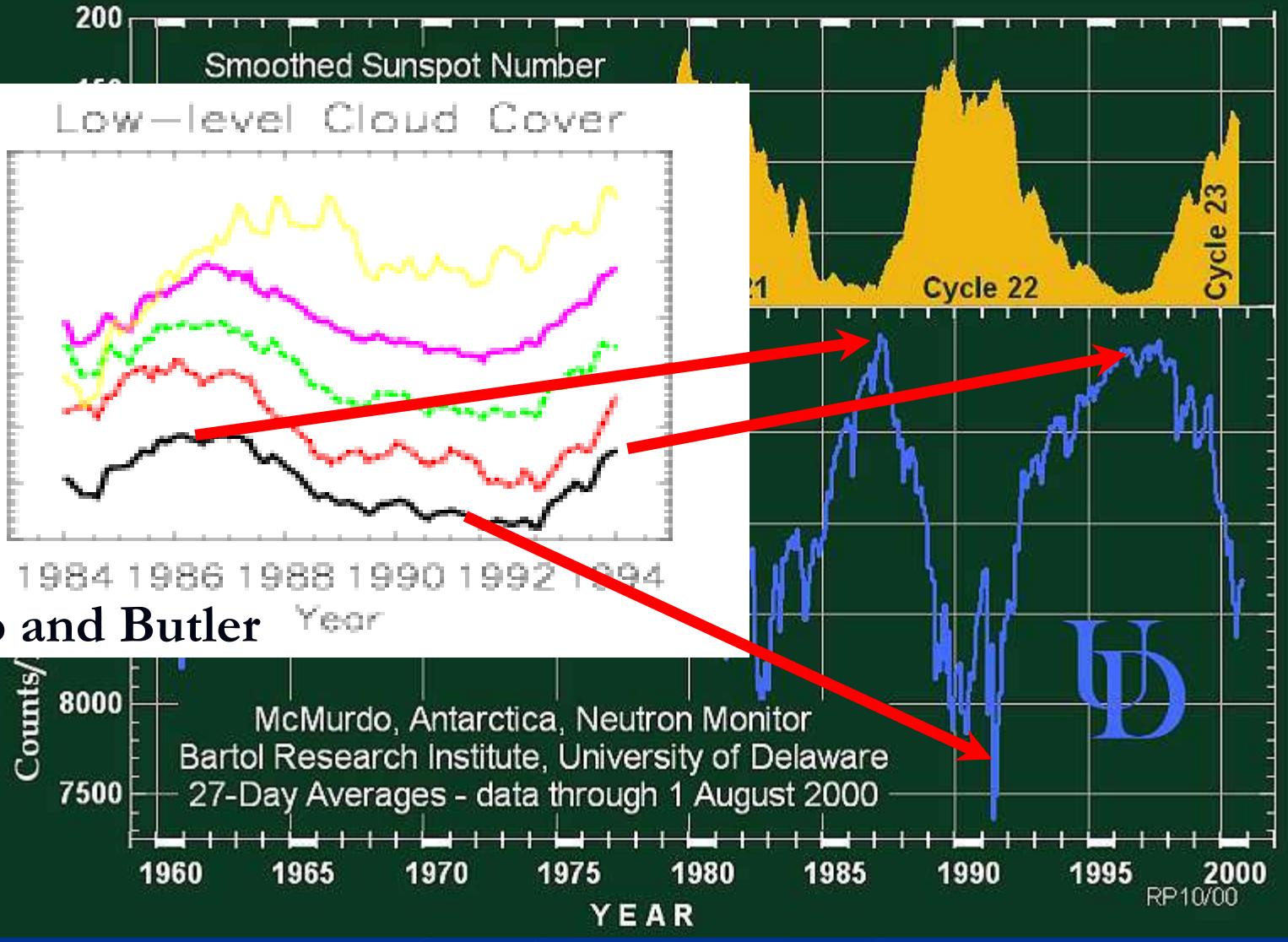
- *Also an active sun leads to less cosmic rays and a reduction in the amount of low level (water droplet) cloudiness. Low clouds have a cooling effect by reflecting energy back to space.*
- *This was first proposed by Svensmark (1997), Bago and Butler (Astronomy and Geophysics 2000), and Yu and Tinsley (AGU 2002).*
- *Recently Svensmark was able to replicate water cloud droplet nucleation in a laboratory (Royal Society Proceedings A 2006)*
- *Shaviv (2005) estimated that the combination of cosmic ray cloud effects and brightness related increases in irradiance since 1900 could account for 77% of the changes in global temperatures.*

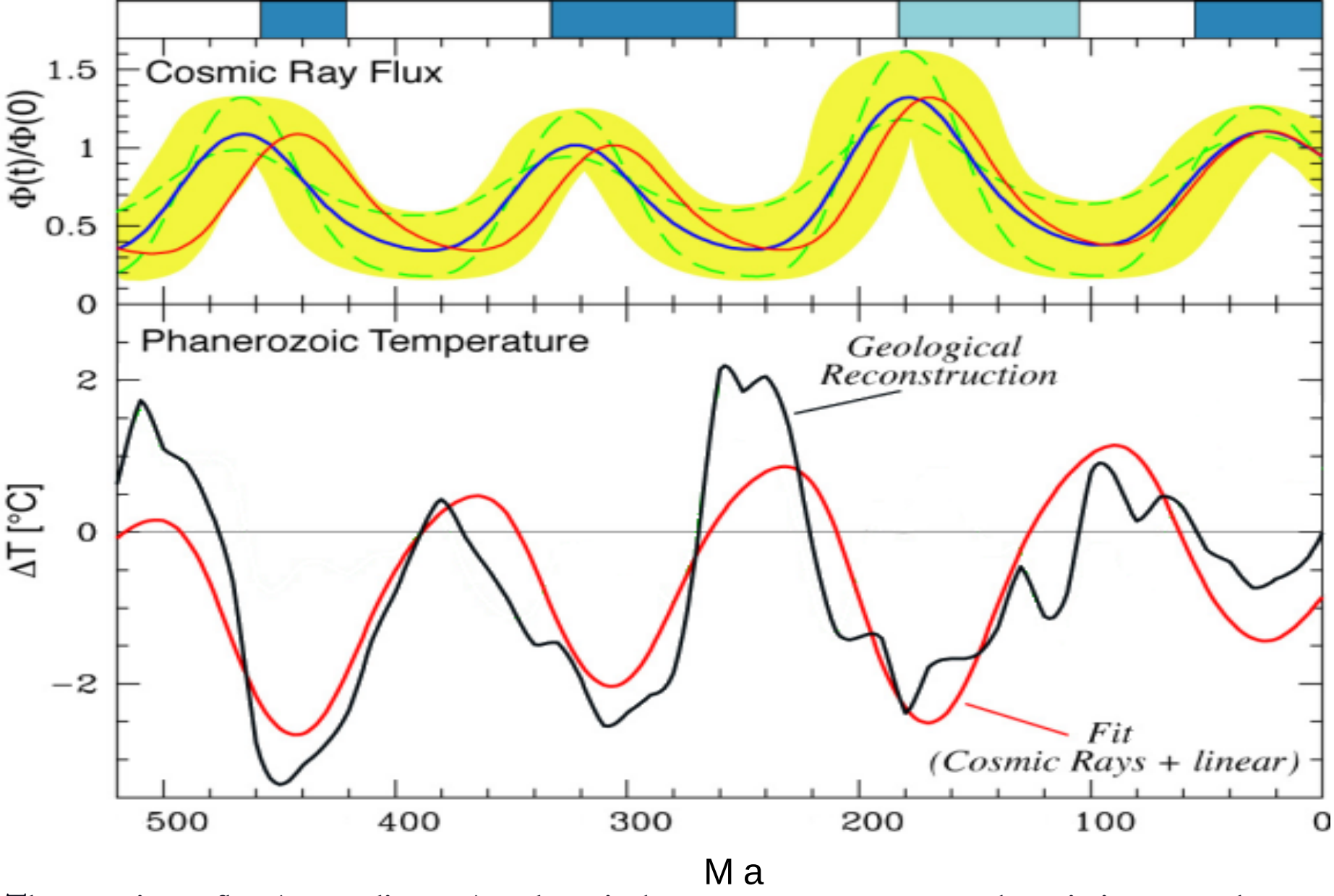
An inverse relationship

Cosmic Rays and the Solar Cycle



Bago and Butler





The cosmic ray flux (upper diagram) and tropical ocean temperature anomaly variations over the past 500 million years (Shaviv and Veizer, 2003). Upper curve based meteorite exposure ages (Shaviv, 2002), lower curves shows fit of cosmic rays with temperature anomaly reconstruction (Veizer et al., 2000).

Warming on Other Planets

- MIT astronomers in a report in Nature found Neptune's moon Triton seems to have warmed significantly since 1989
- A UC Berkeley study showed Jupiter has a new red spot and may be in midst of a climate change with a warming of 10F or more
- NASA using Mauna Loa Observatory telescope has shown Pluto may have warmed 3.5 degrees over the past 14 years
- National Geographic story showed how NASA Mars Global surveyor discovered the Mars polar ice caps have been diminishing in the last several years

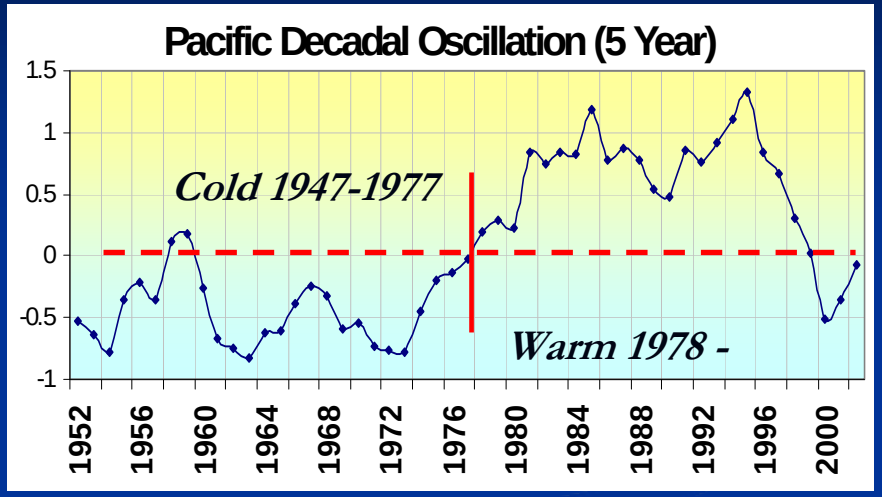
All these point to the role of the sun!!!!

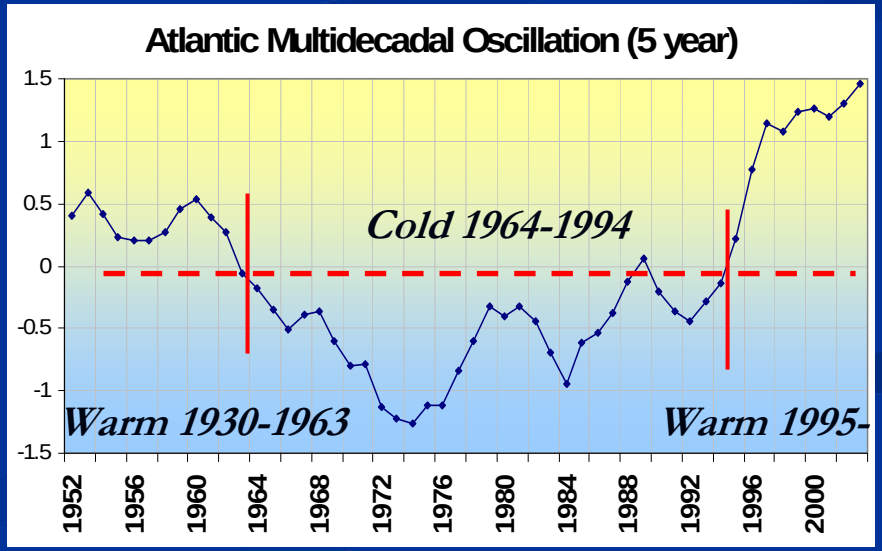
Solar in Climate Models

- Only the small direct brightness changes have been used for historical
- For the future, the small direct average solar irradiance is the only forcing factor and it is assumed constant

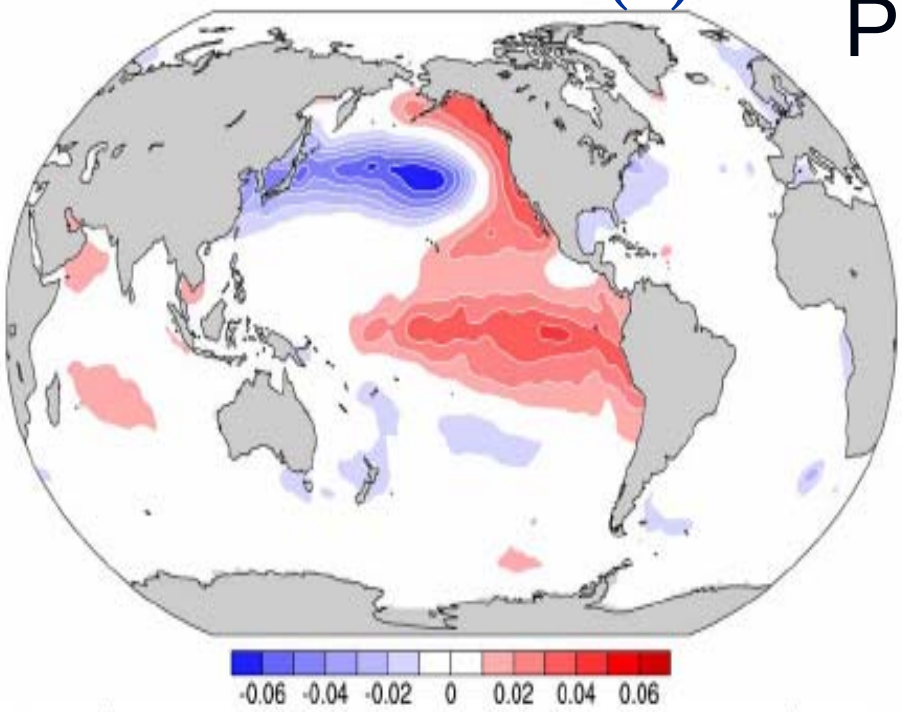
Cyclical Factors - Oceans

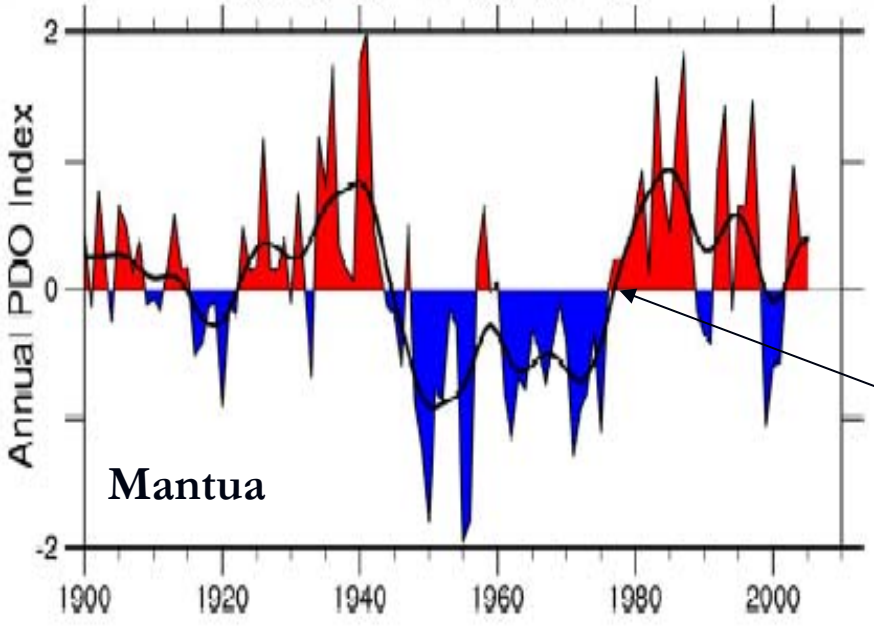
- Multi-decadal cycles in the ocean temperature patterns in both Pacific and Atlantic
  - Pacific Decadal Oscillation
  - Atlantic Multidecadal Oscillation
- These are due to multi- decadal changes in the thermohaline circulation
- They have a major influence on temperatures over adjacent land areas



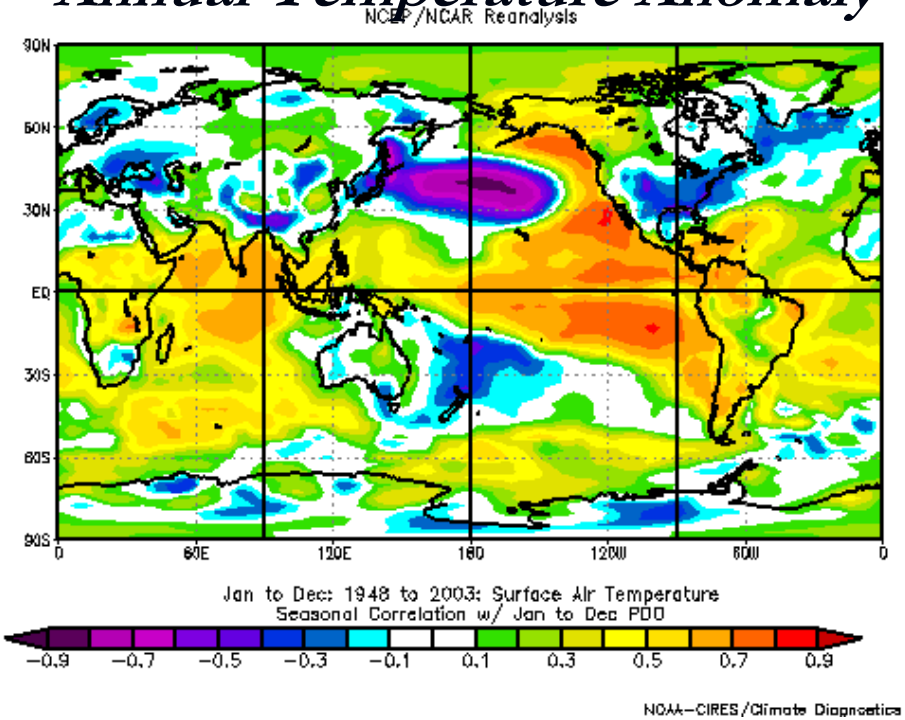


Pacific Decadal Oscillation

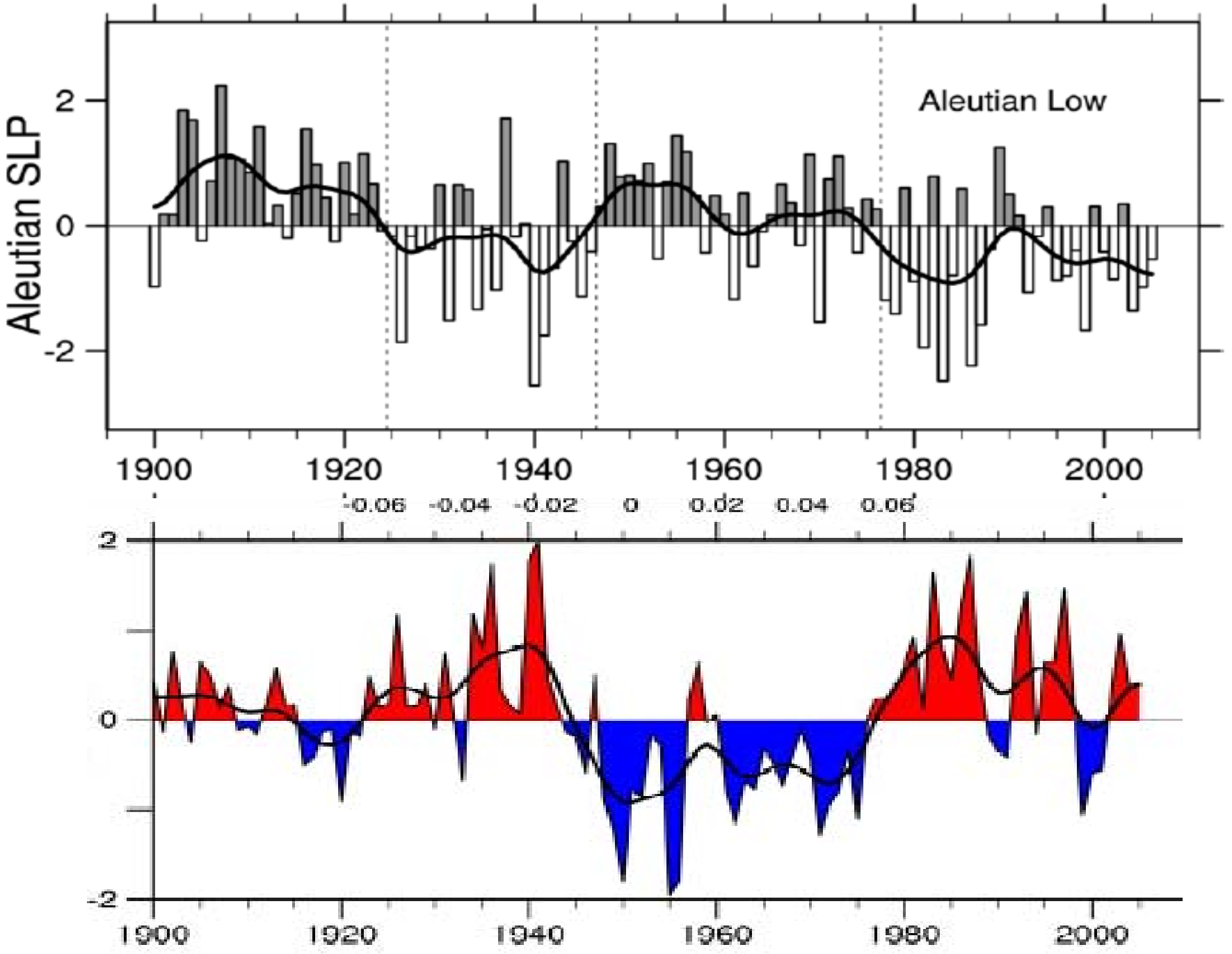


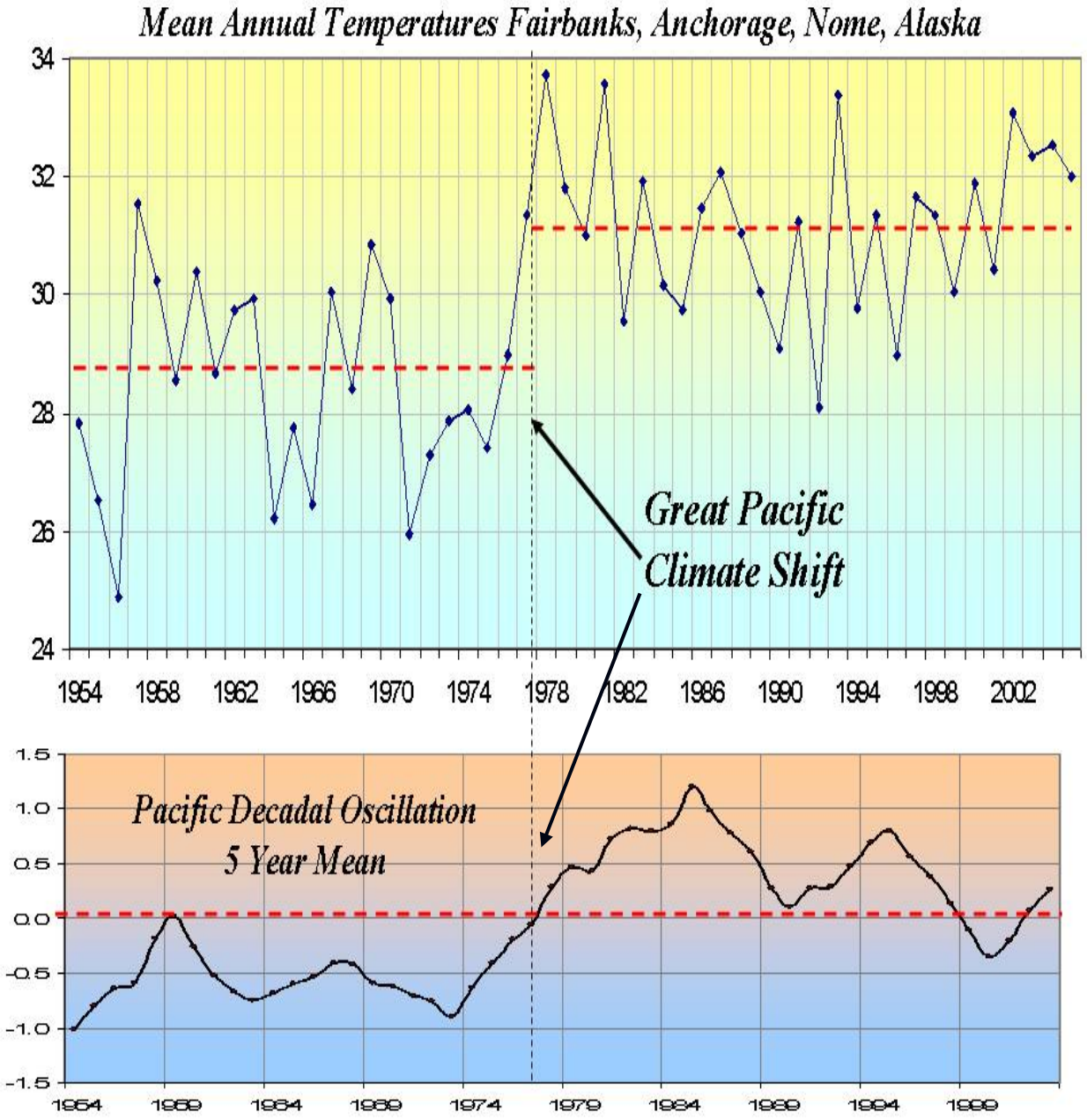


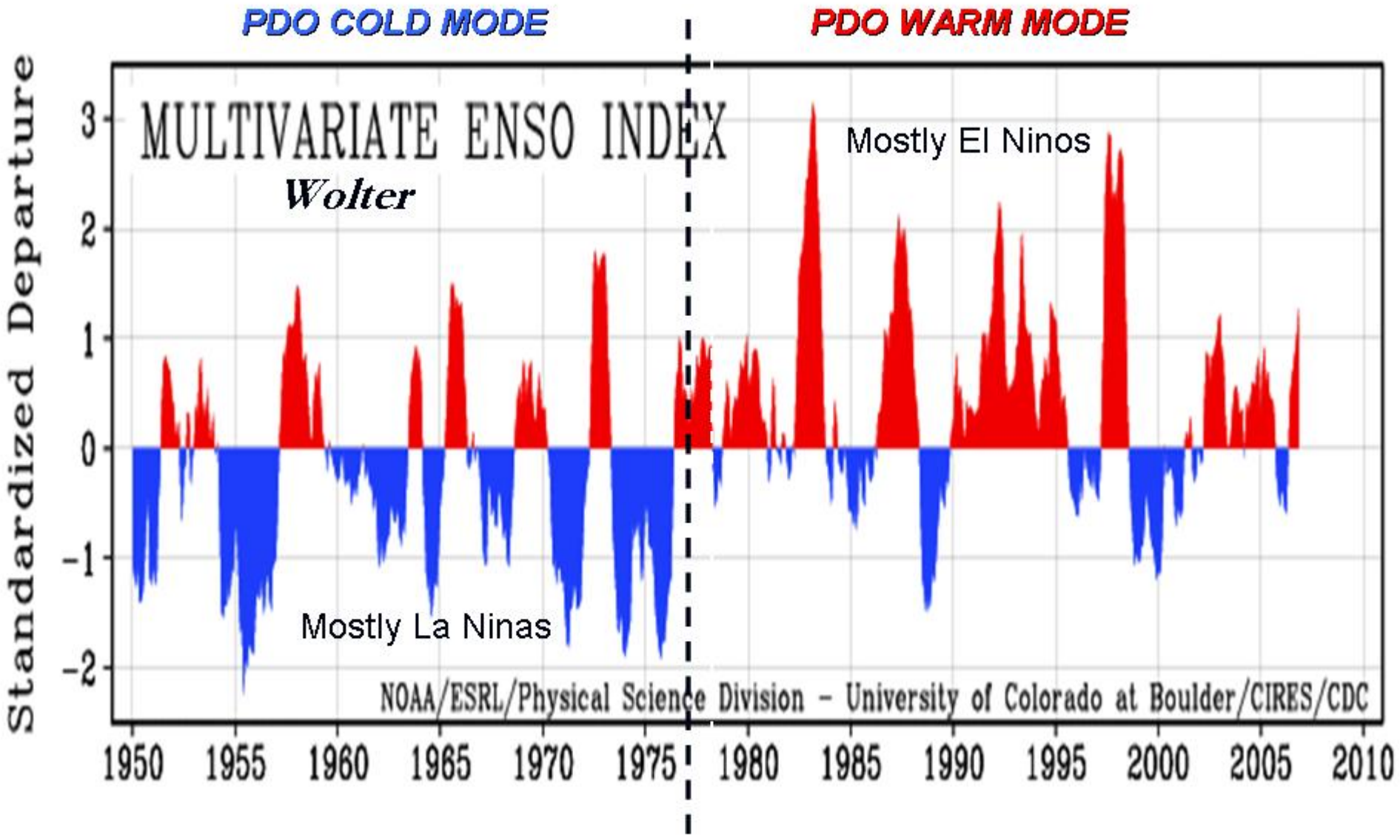
Annual Temperature Anomaly

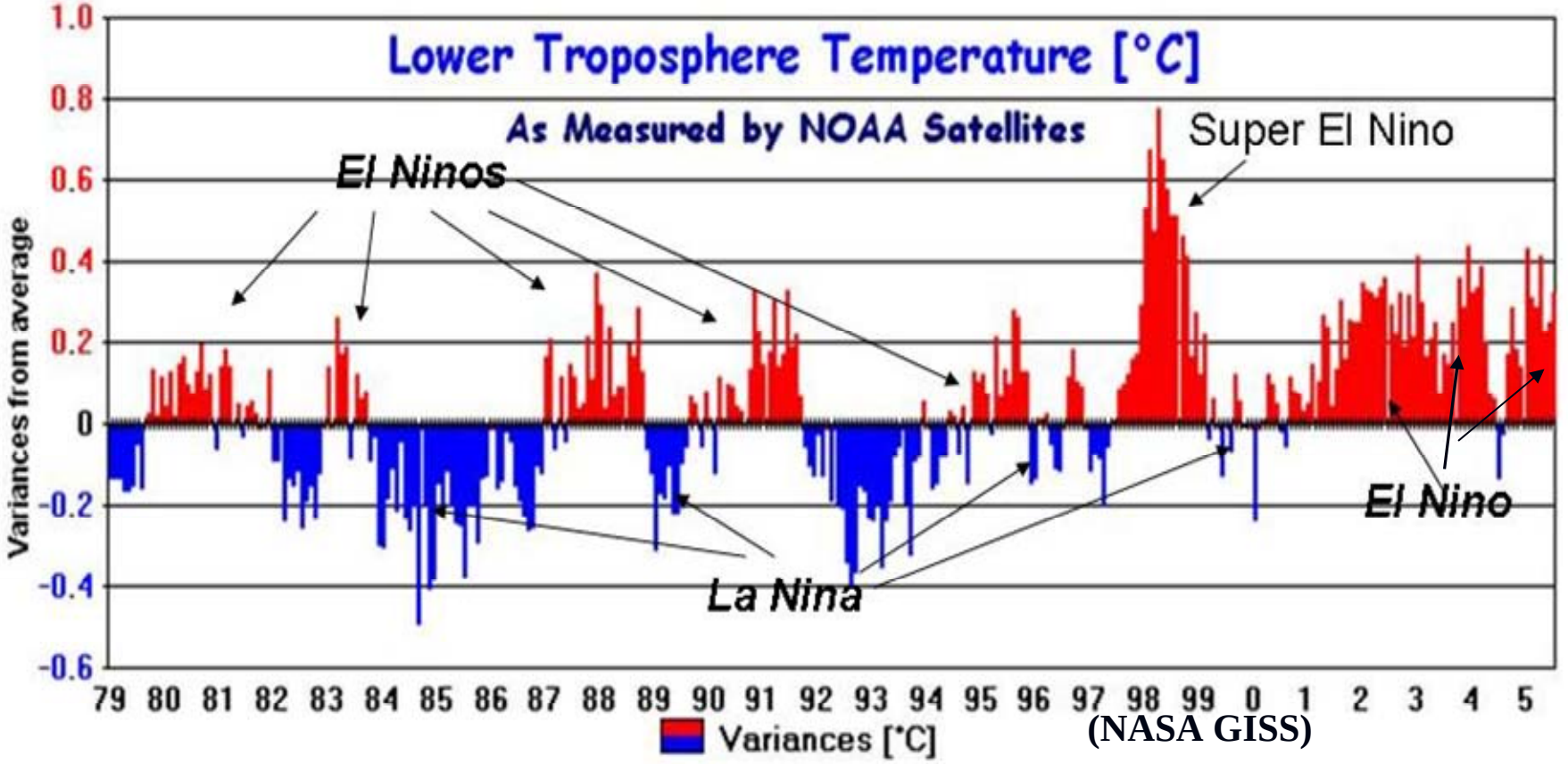


Great Pacific Climate Shift


Aleutian SLP
Aleutian Low
2
0
-2
1900
1920
1940
1960
1980
2000
-0.06
-0.04
-0.02
0
0.02
0.04
0.06

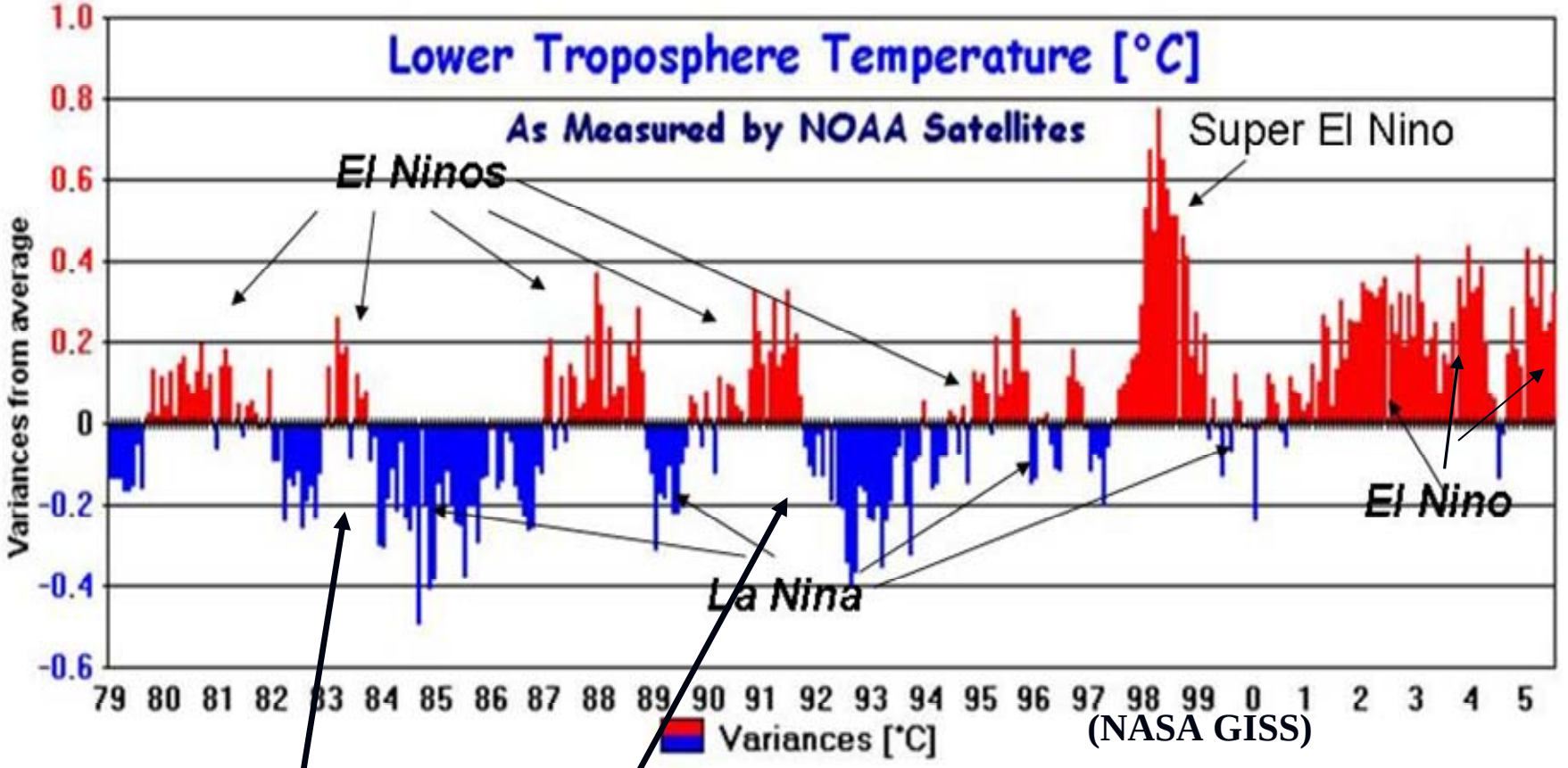

Mean Annual Temperatures Fairbanks, Anchorage, Nome, Alaska
34
32
30
28
26
24
1954
1958
1962
1966
1970
1974
1978
1982
1986
1990
1994
1998
2002
Great Pacific
Climate Shift
Pacific Decadal Oscillation
5 Year Mean
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
1964
1969
1974
1979
1984
1989
1994
1999


PDO COLD MODE
PDO WARM MODE
MULTIVARIATE ENSO INDEX
Wolter
Mostly El Ninos
Mostly La Ninas
NOAA/ESRL/Physical Science Division - University of Colorado at Boulder/CIRES/CDC
Standardized Departure
3
2
1
0
-1
-2
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010



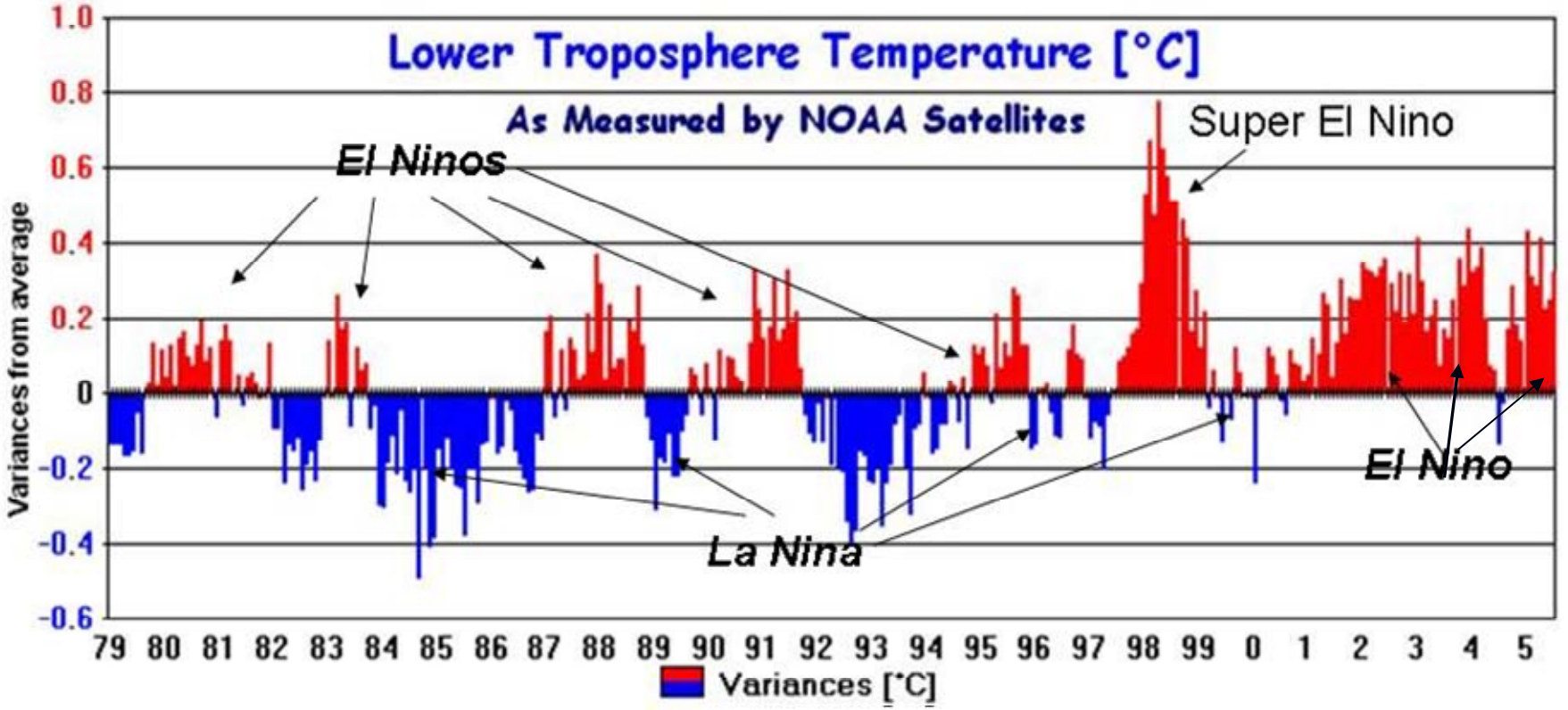
El Ninos lead to global warming and La Ninas to cooling

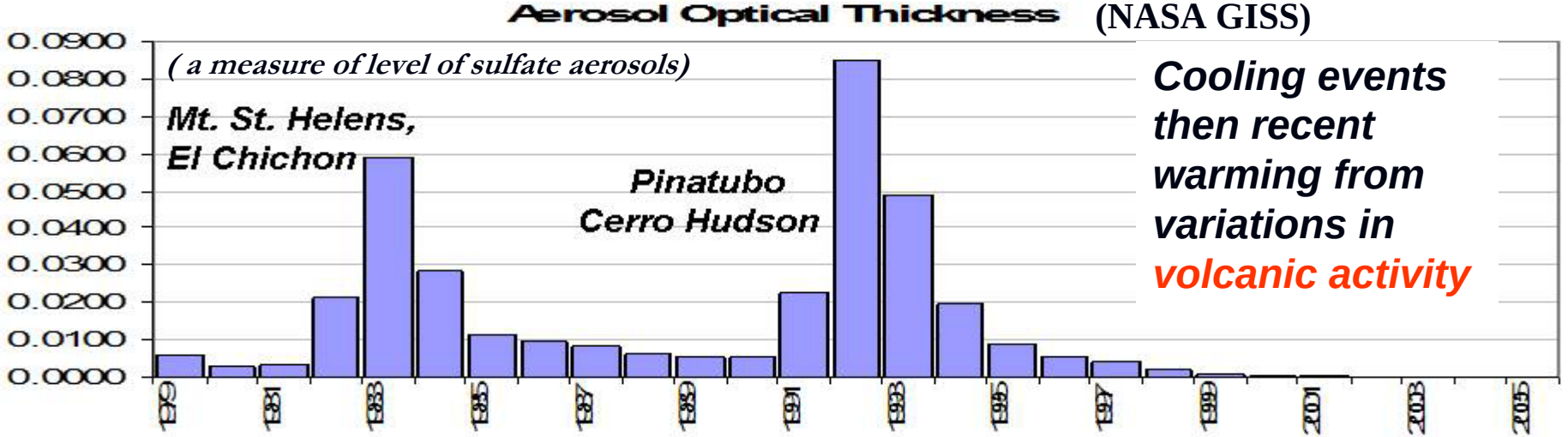
MSU data Spencer Christy

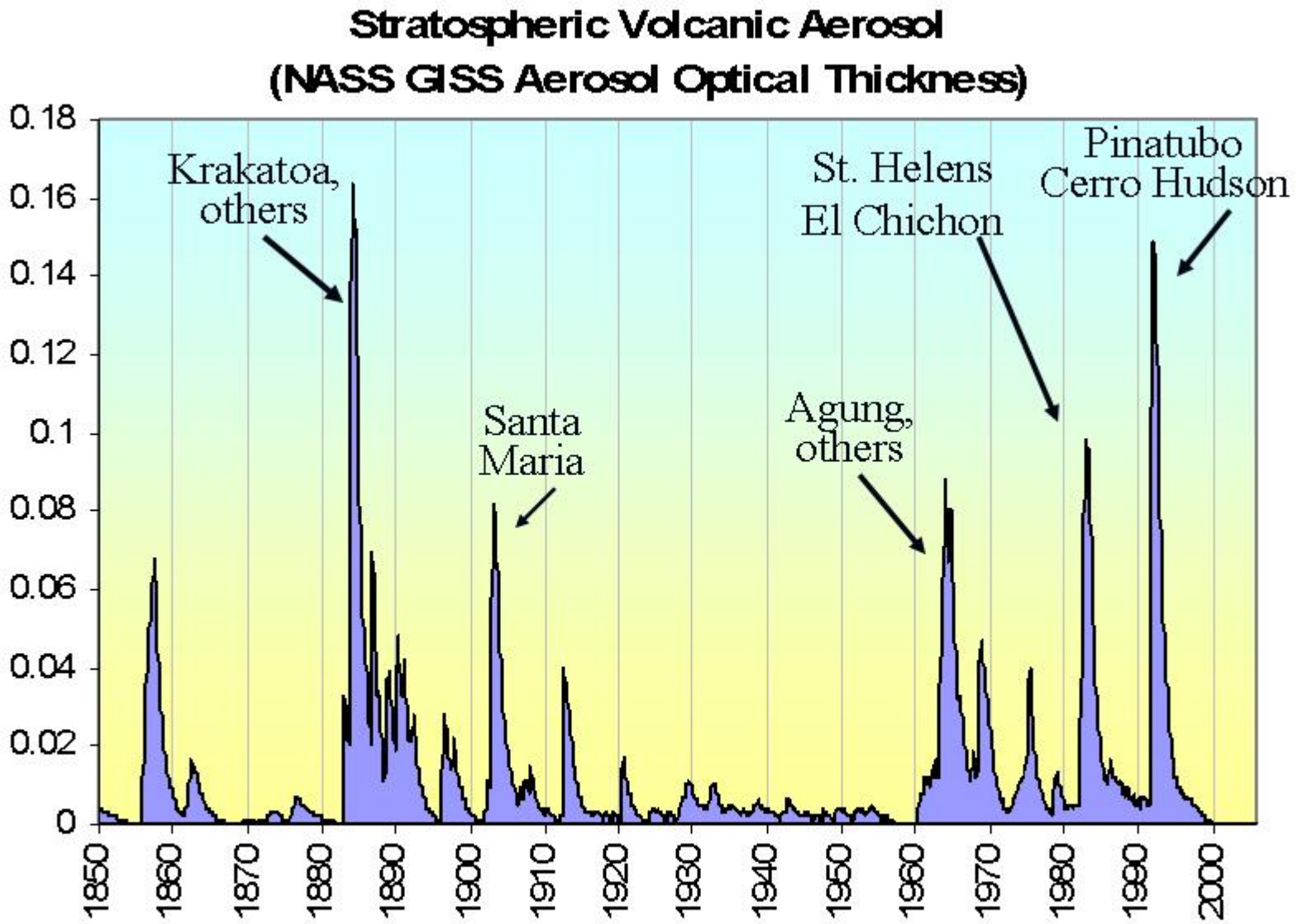


(NASA GISS)

What about the minor warming then cooling after of the super El Nino of 1982/83 and the cooling with and following the El Nino of 1992/93?


Lower Troposphere Temperature [°C]
As Measured by NOAA Satellites
El Ninos
Super El Nino
El Nino
La Nina
Variances from average
1.0
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 0 1 2 3 4 5
Variances [°C]

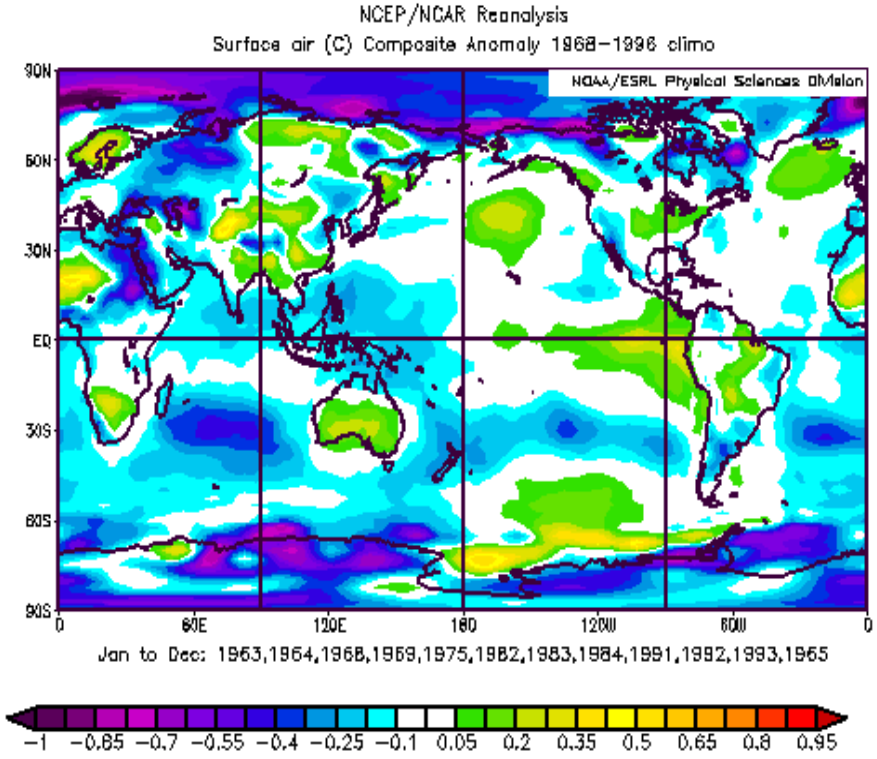

Aerosol Optical Thickness (NASA GISS)
(a measure of level of sulfate aerosols)
Mt. St. Helens,
El Chichon
Pinatubo
Cerro Hudson
Cooling events then recent warming from variations in volcanic activity
0.0900
0.0800
0.0700
0.0600
0.0500
0.0400
0.0300
0.0200
0.0100
0.0000
79 81 83 85 87 89 91 93 95 97 99 01 03 05



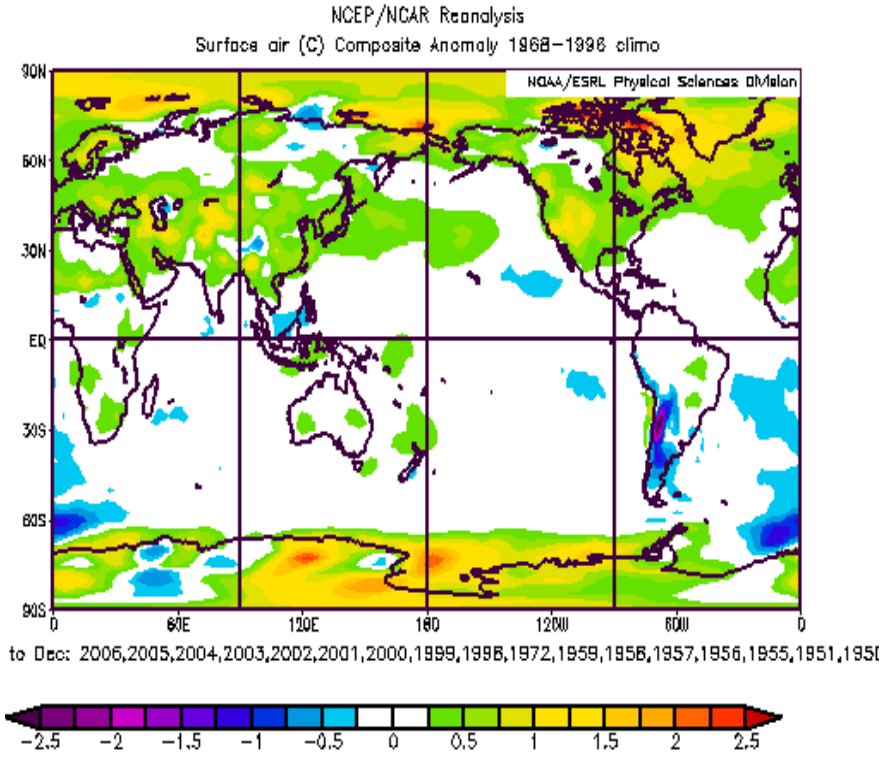
Volcanic aerosols in the high atmosphere block solar radiation and increase cloud cover leading to widespread cooling, especially significant in summer

Years with more than ½ STD departures stratospheric aerosols

More than 1/2 STD Above



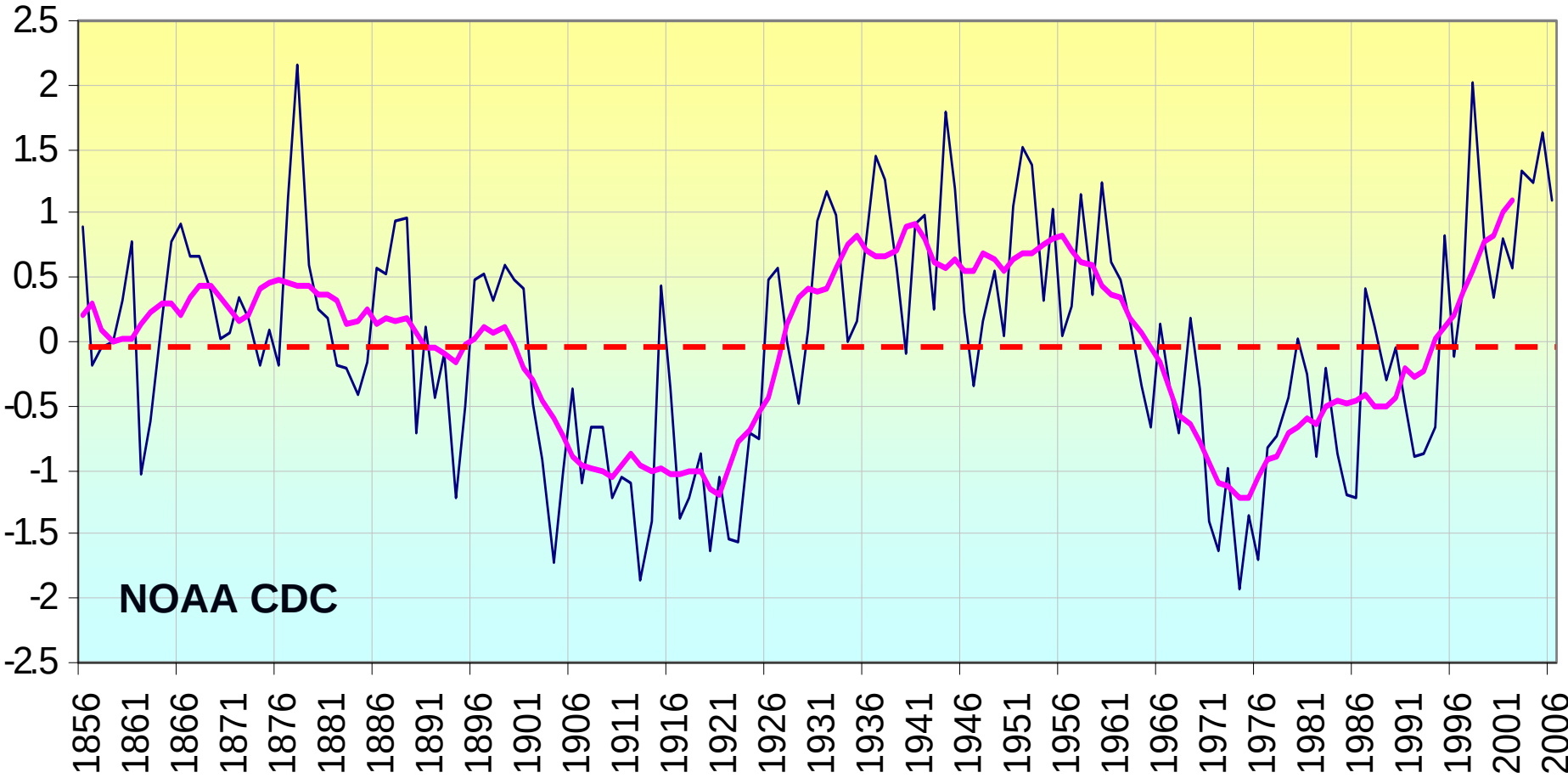
More than ½ STD Below



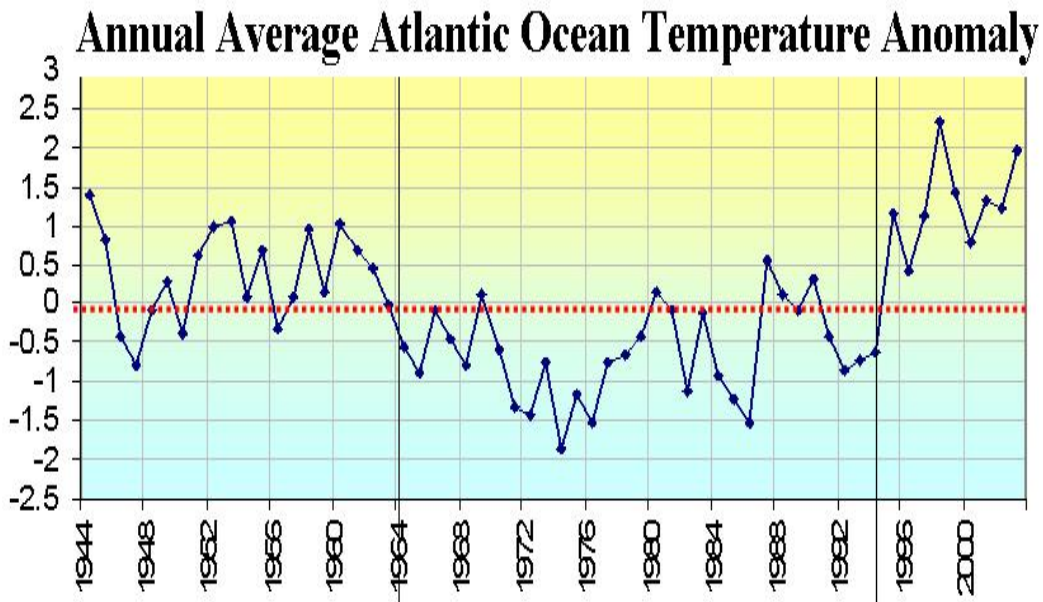
January to December Annual Temperature Anomalies

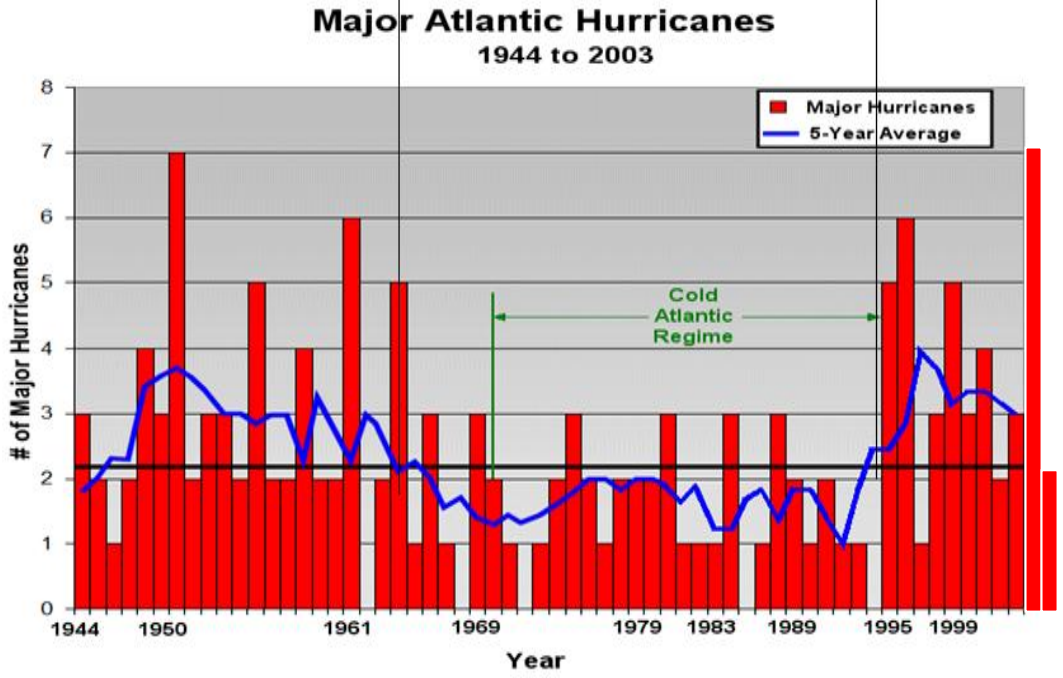
Data NASA GISS, CDC

Annual Atlantic MultiDecadal Oscillation (AMO)



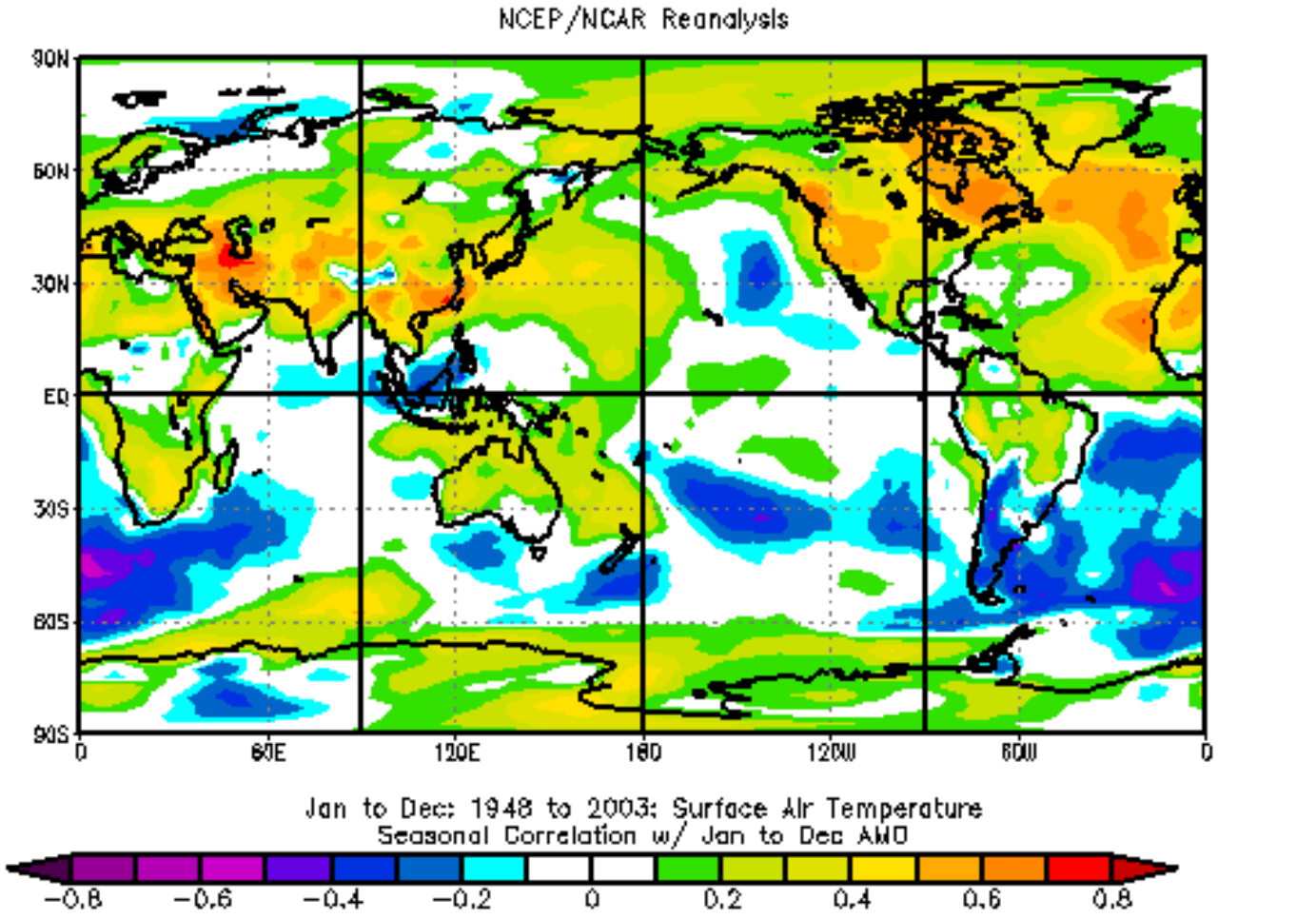
Mean ocean temperature anomalies in the Atlantic from 0 to 70N


Annual Average Atlantic Ocean Temperature Anomaly
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
1944
1948
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000


Major Atlantic Hurricanes
1944 to 2003
Major Hurricanes
5-Year Average
Cold Atlantic Regime
# of Major Hurricanes
0
1
2
3
4
5
6
7
8
1944
1950
1961
1969
1979
1983
1989
1995
1999
Year

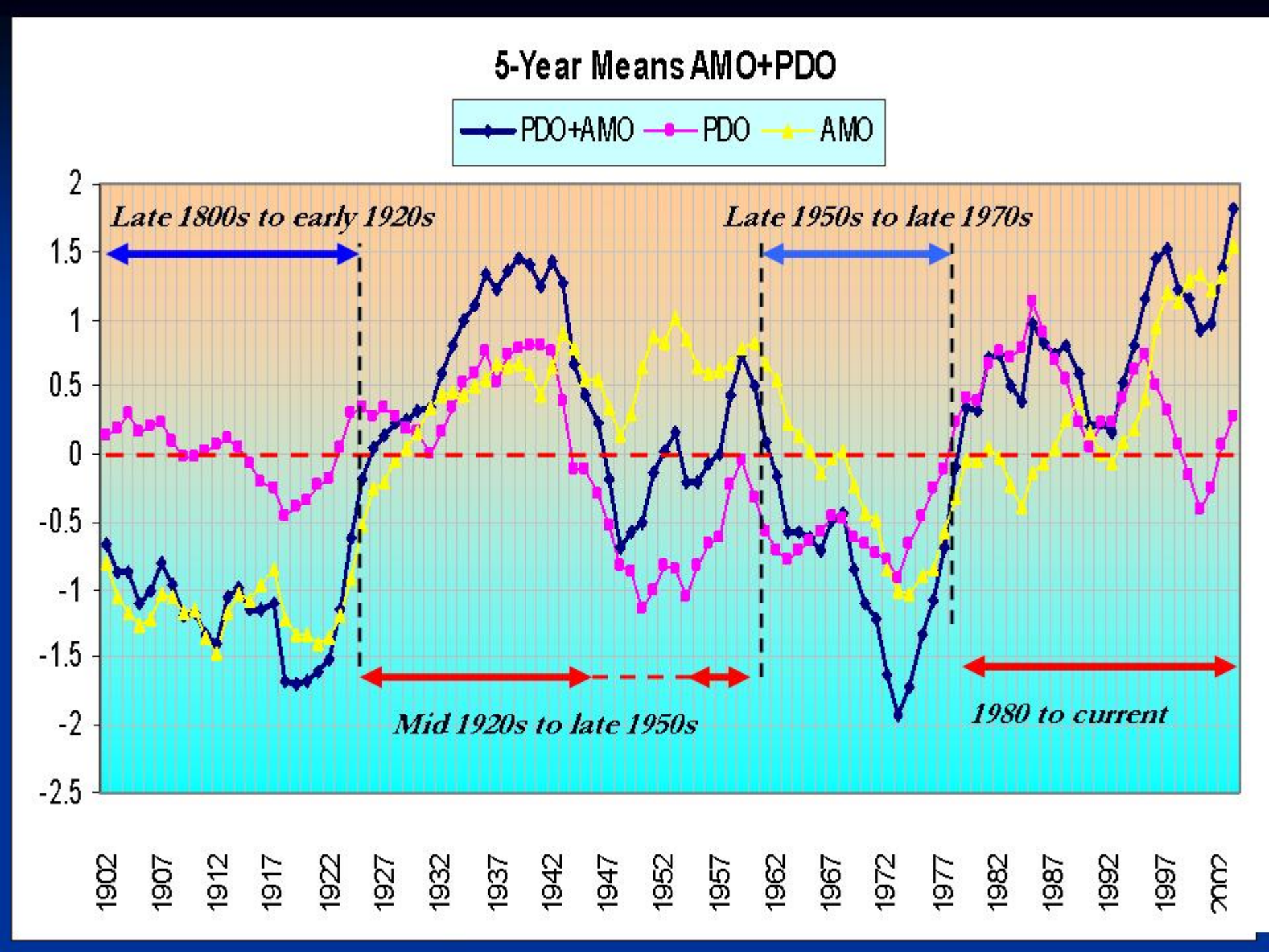
Atlantic Multidecadal Oscillation

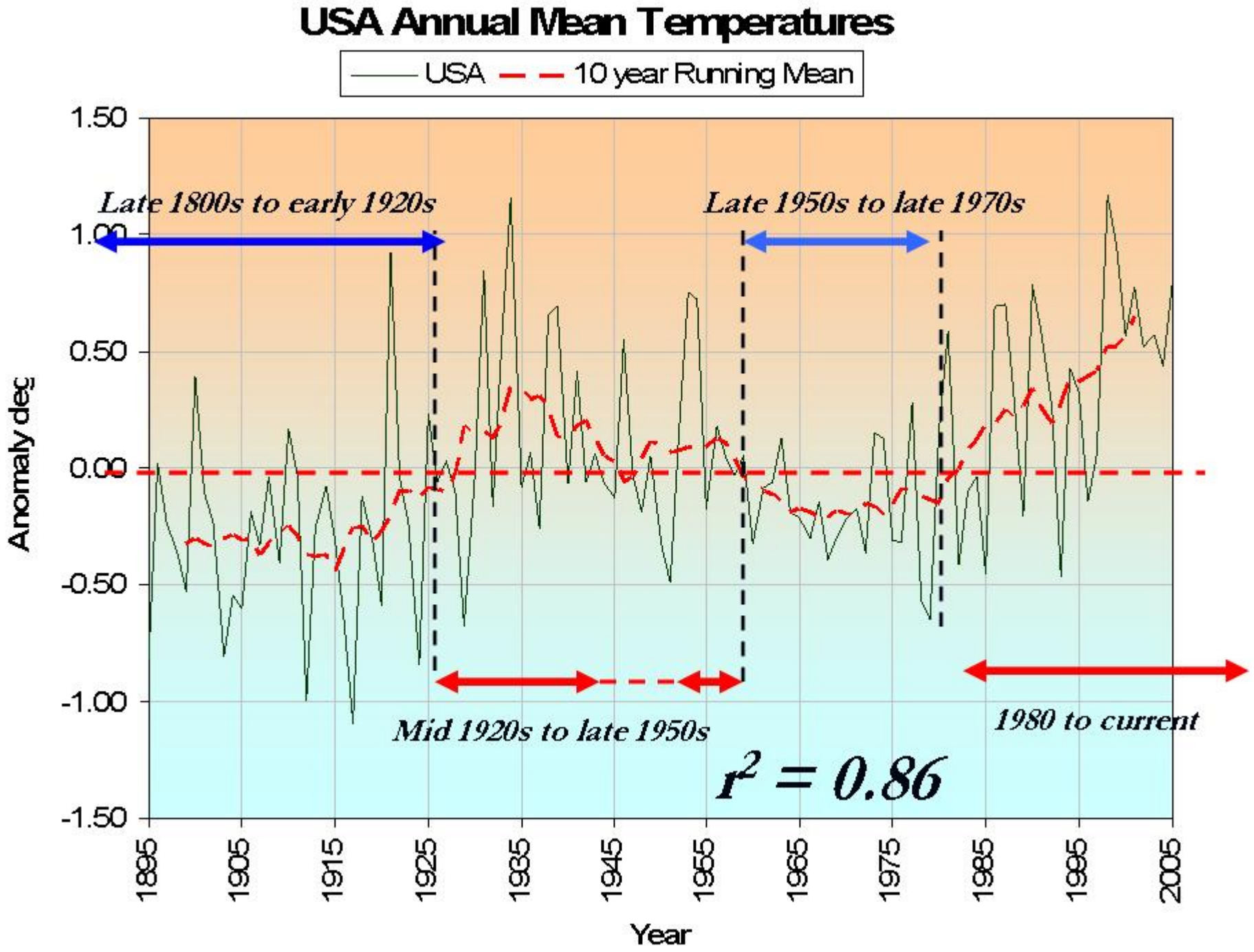
Correlates with general warmth, statistically significant in places



PDO, AMO and Global Warming

- If + PDO relates to more El Ninos which lead to global warming and if +AMO relates to general global warmth, the sum of the two may be useful in identifying warm periods (and when negative cold periods)


5-Year Means AMO+PDO
PDO+AMO
PDO
AMO
Late 1800s to early 1920s
Late 1950s to late 1970s
Mid 1920s to late 1950s
1980 to current
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
1902
1907
1912
1917
1922
1927
1932
1937
1942
1947
1952
1957
1962
1967
1972
1977
1982
1987
1992
1997

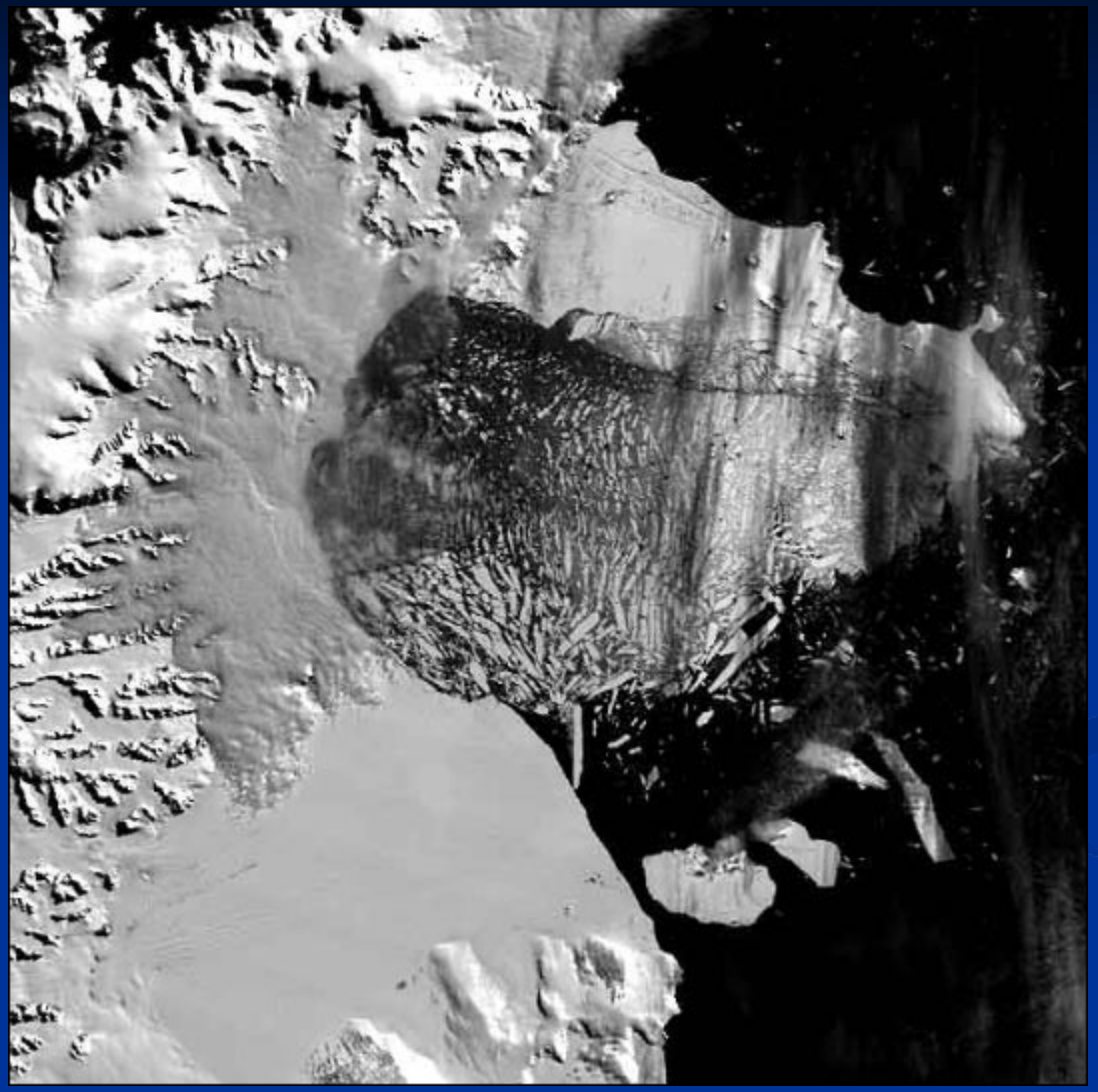

USA Annual Mean Temperatures
USA
10 year Running Mean
Late 1800s to early 1920s
Late 1950s to late 1970s
Mid 1920s to late 1950s
1980 to current
r² = 0.86
Anomaly dec
Year
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
1895
1905
1915
1925
1935
1945
1955
1965
1975
1985
1995
2005

Oceans and Climate Models

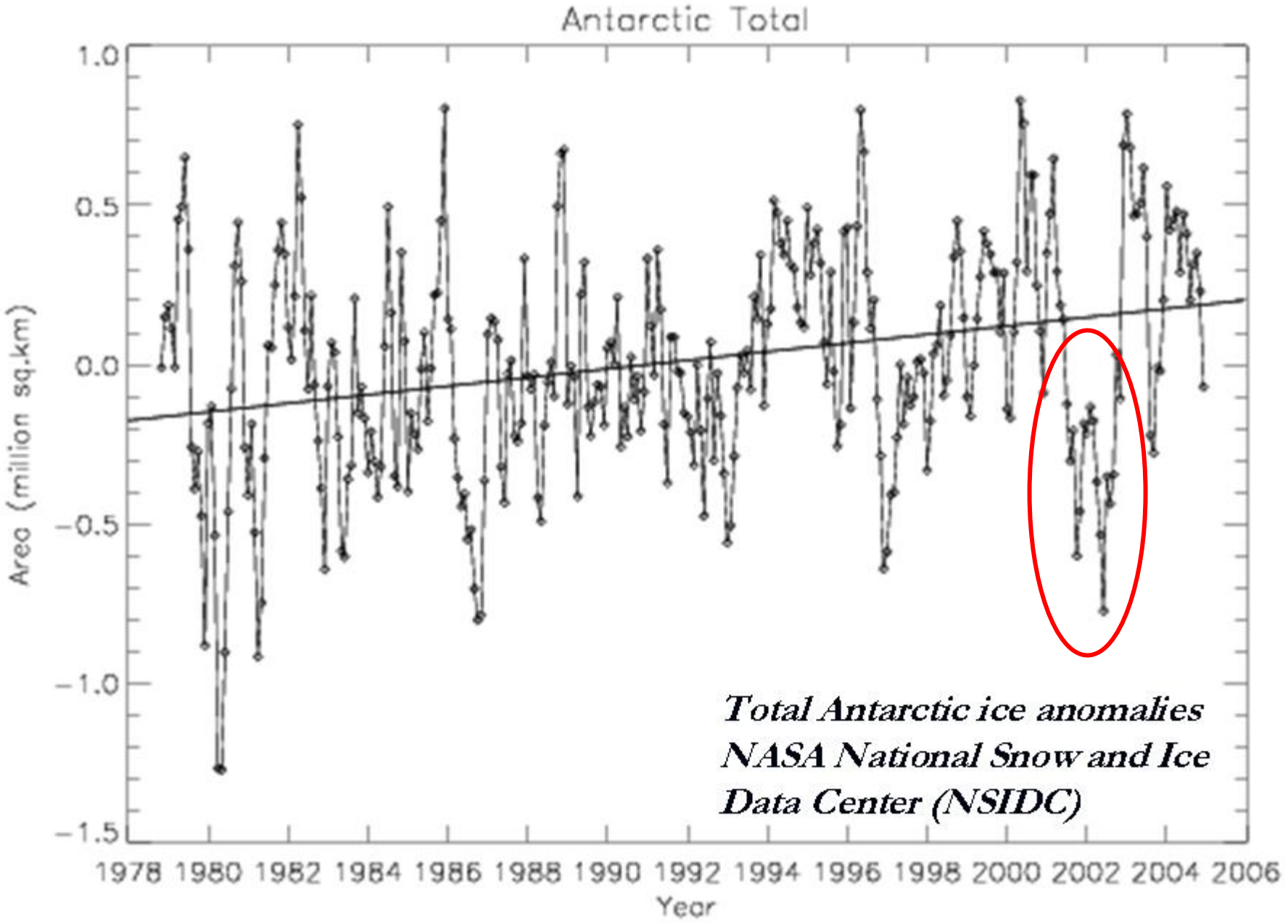
- Though there are coupled ocean and atmospheric models used, they do not fully capture all the important processes involved (salinity changes) that result in multi-decadal shifts
- Indeed they are not able to replicate the warm and cold modes in the Pacific and Atlantic
- So looking forward we see no cyclical behavior in temperatures in the models only a warming

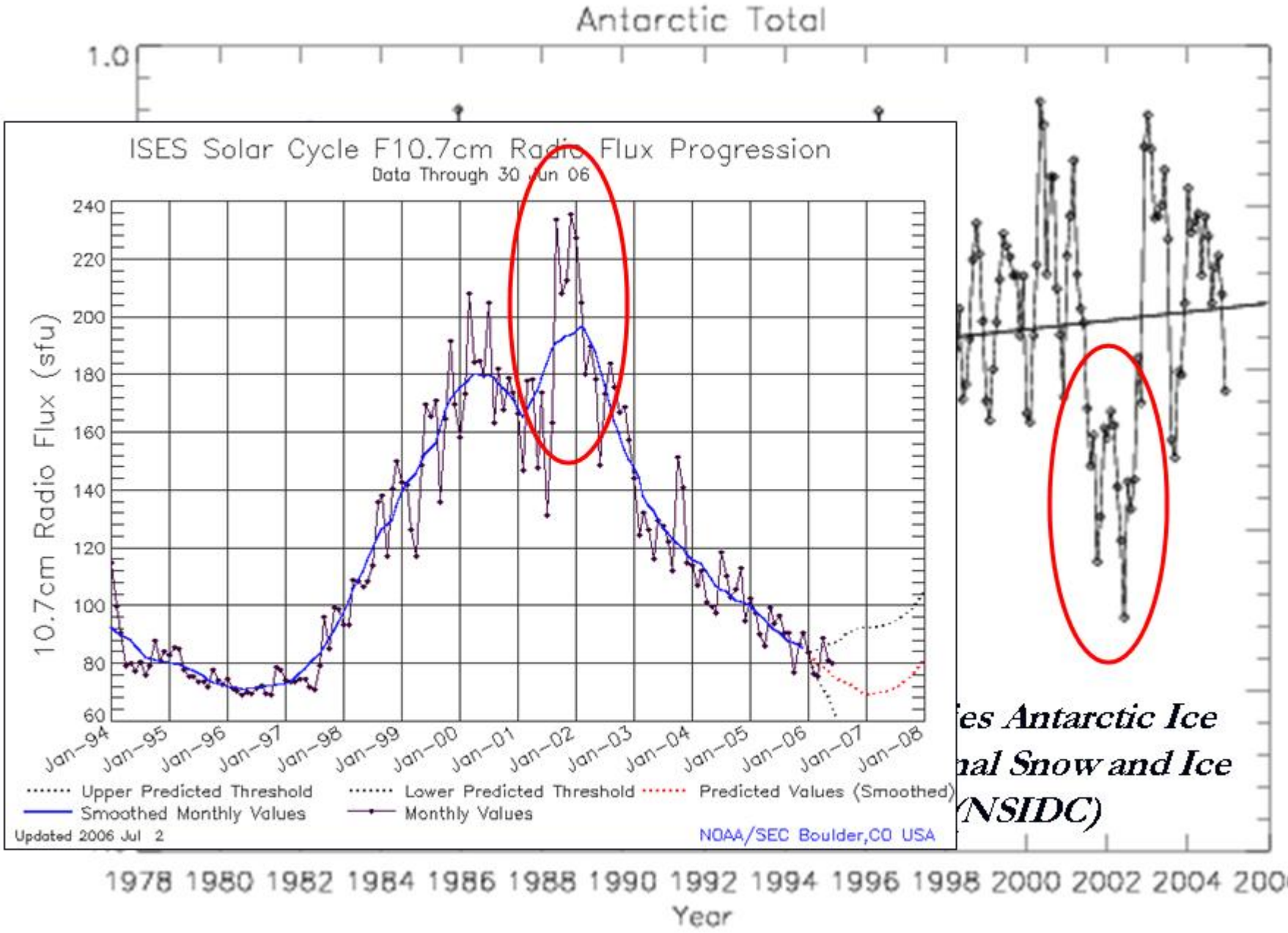
Iceaps and Glaciers

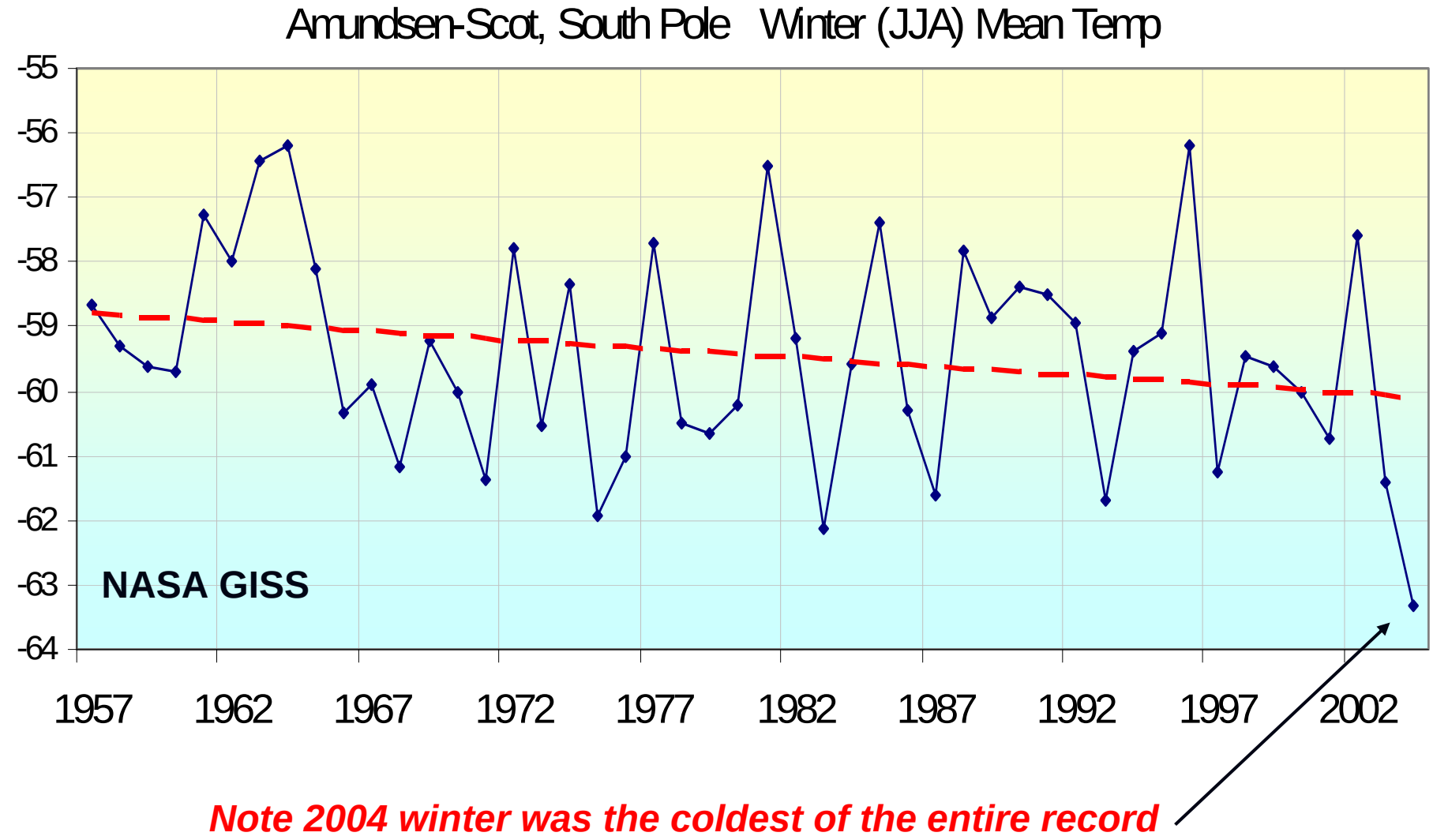
95% of the world's ice in found in the Antarctic and Greenland Icecaps



Antarctica
Summer 2002
Larsen Ice Sheet
Break-up

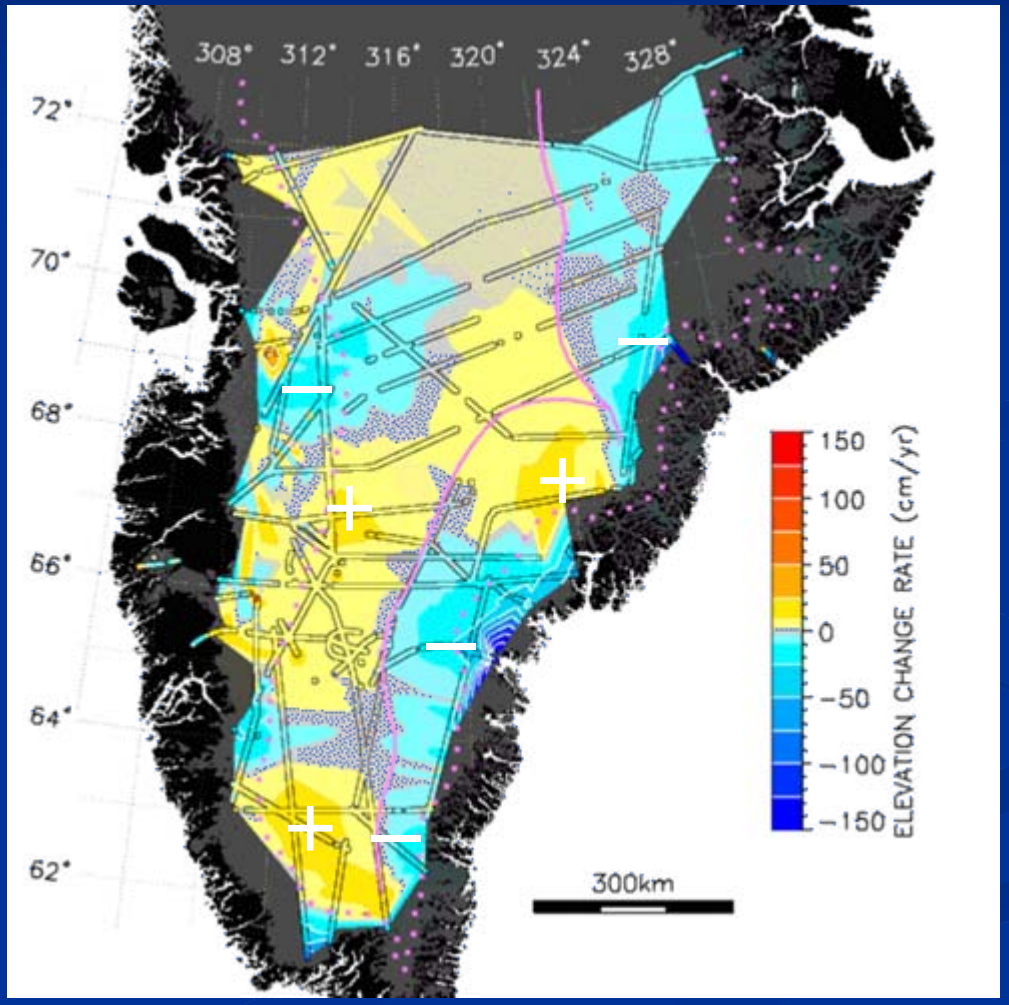

Antarctic Total
Area (million sq.km)
1.0
0.5
0.0
−0.5
−1.0
−1.5
1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006
Year
Total Antarctic ice anomalies
NASA National Snow and Ice
Data Center (NSIDC)

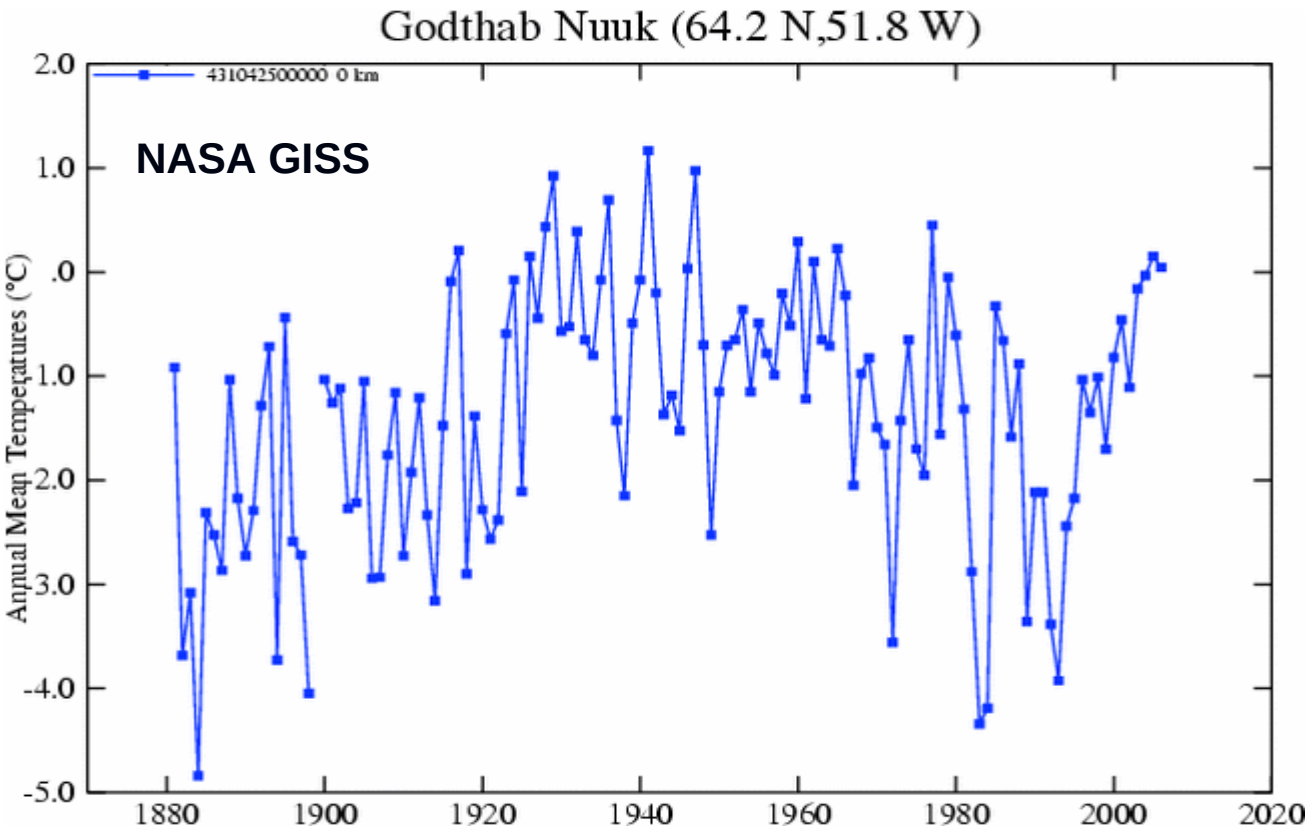

Antarctic Total
1.0
ISES Solar Cycle F10.7cm Radio Flux Progression
Data Through 30 Jun 06
10.7cm Radio Flux (sfu)
240
220
200
180
160
140
120
100
80
60
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Upper Predicted Threshold
Lower Predicted Threshold
Predicted Values (Smoothed)
Smoothed Monthly Values
Monthly Values
Updated 2006 Jul 2
NOAA/SEC Boulder,CO USA
es Antarctic Ice
nal Snow and Ice
(NSIDC)
1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006
Year



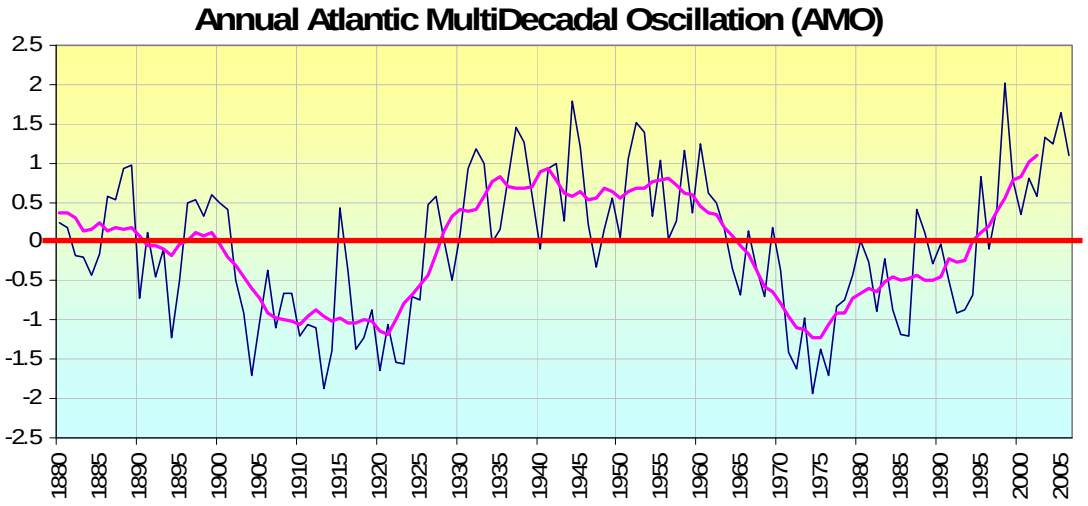
Note 2004 winter was the coldest of the entire record

Greenland Icecap and Global Warming





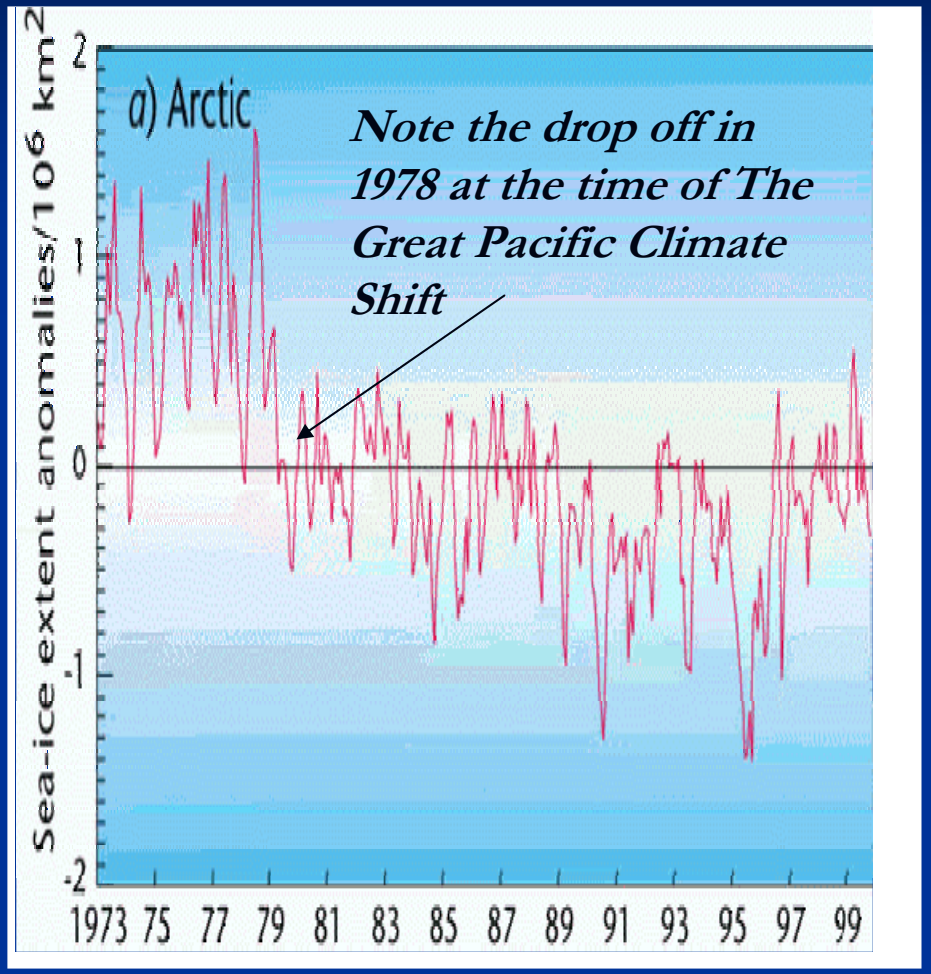
Greenland Annual Mean Temperatures



Sea Level Rises

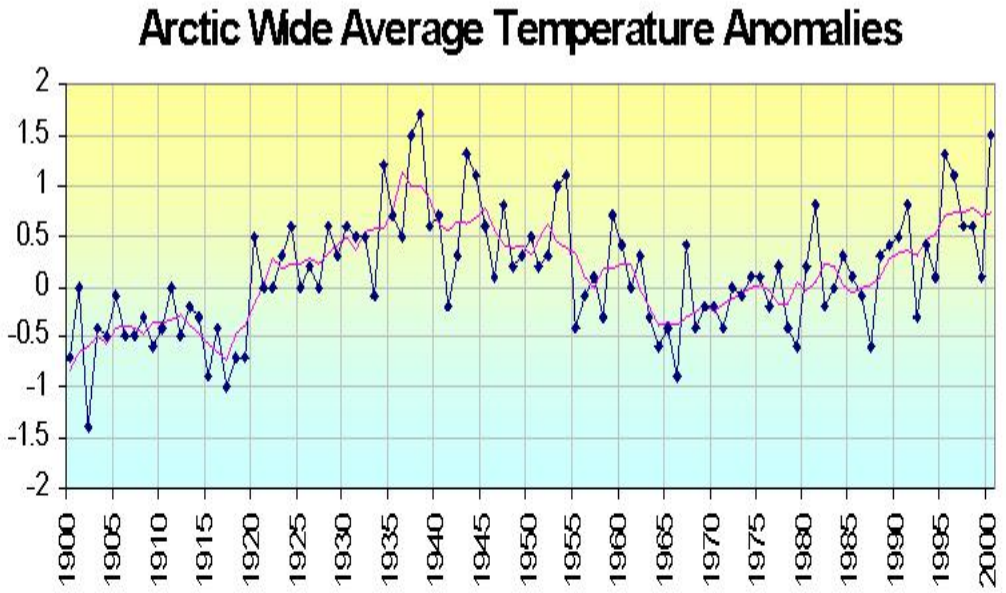
- The lack of convincing melting of the Antarctic ice cap (+100 to -200Gt/yr) and the uncertainty about Greenland (+25 to -60Gt/yr) has led the IPCC to reduce sea level rises this century to a range from of 8 to 17 inches
- The rate-of-rise of global sea level over the last half of the 20th century was actually less than the rate-of-rise over the first half of the century (Jevrejeva et al., 2006; Holgate, 2007), which is suggestive of a decelerating rate of global sea level rise.
- This is far short of the 18-20 feet Al Gore and others have proposed

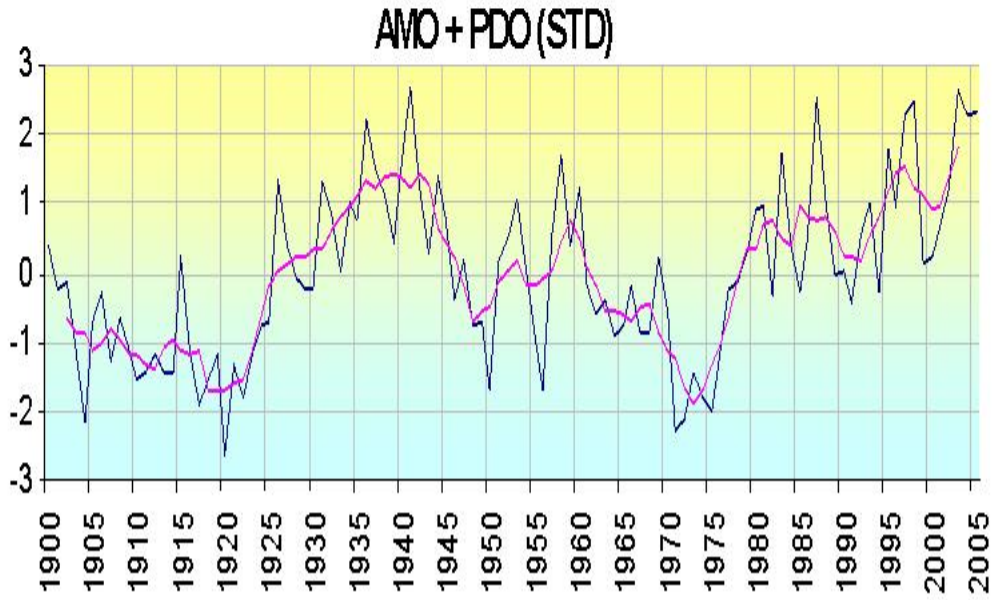
Arctic



USGRCP, June 2000

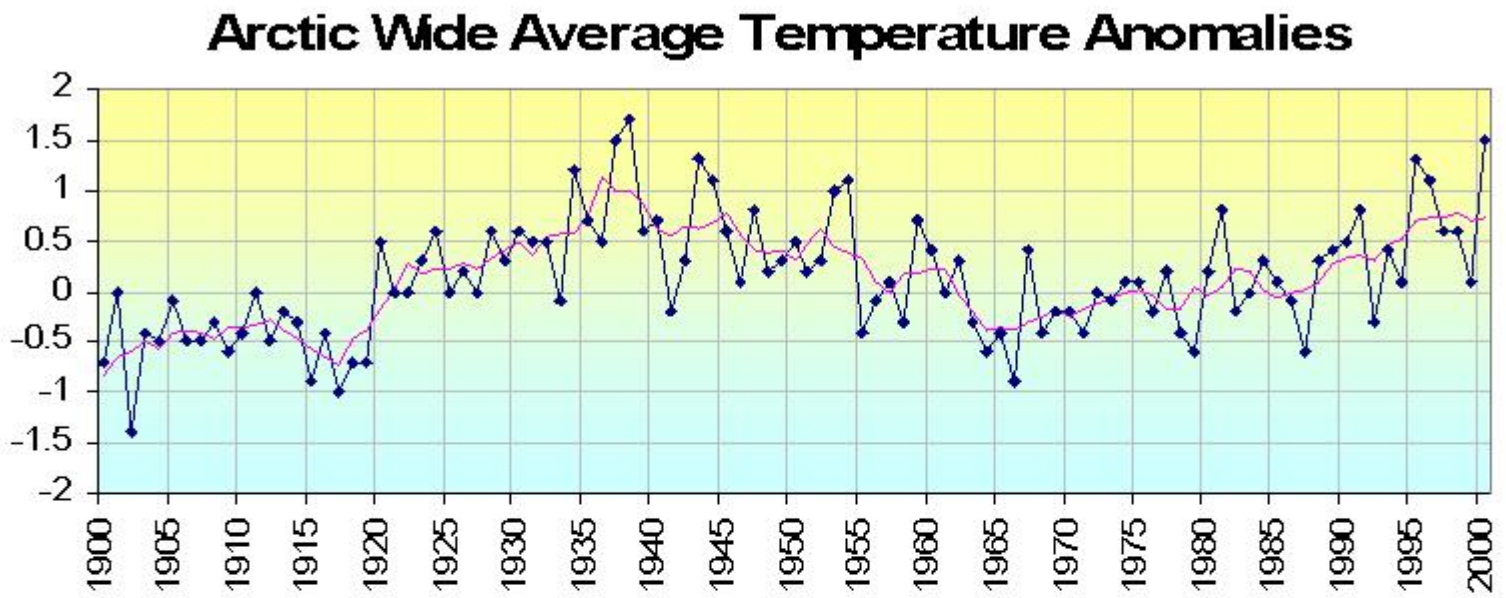
- Arctic ice has diminished in thickness and extent in the summer since the Great Pacific Climate shift in 1978 as warming North Pacific water made its way into the arctic through the Bering Straits
- JAMSTEC (2006) has noted another surge occurred after the super El Nino of 1997/98

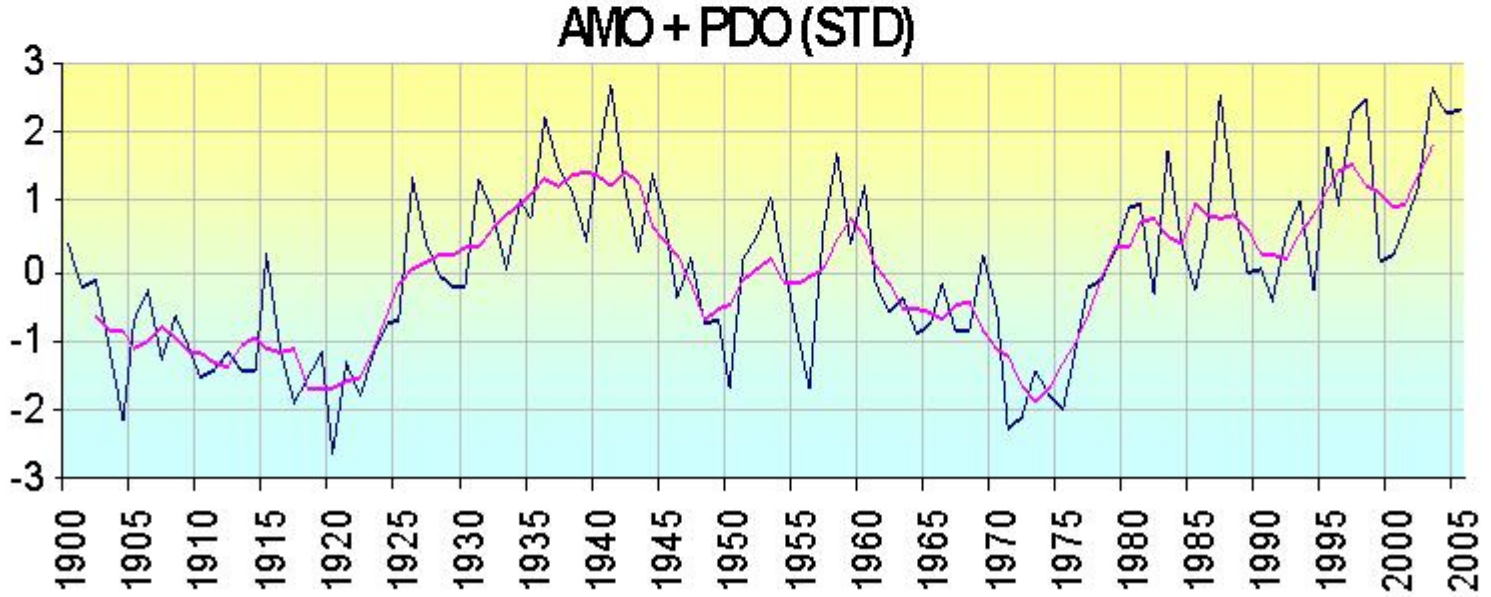




Dmitrenko and Polyakov tracked warm Atlantic water under arctic ice and noted it is playing a role in ice thinning as it did in 1930s (when thickness decreased by 30% from 1890)

Arctic temperatures correlate well 73% with PDO+AMO


Arctic Wide Average Temperature Anomalies
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000


AMO + PDO (STD)
3
2
1
0
-1
-2
-3
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005

Kilimanjaro

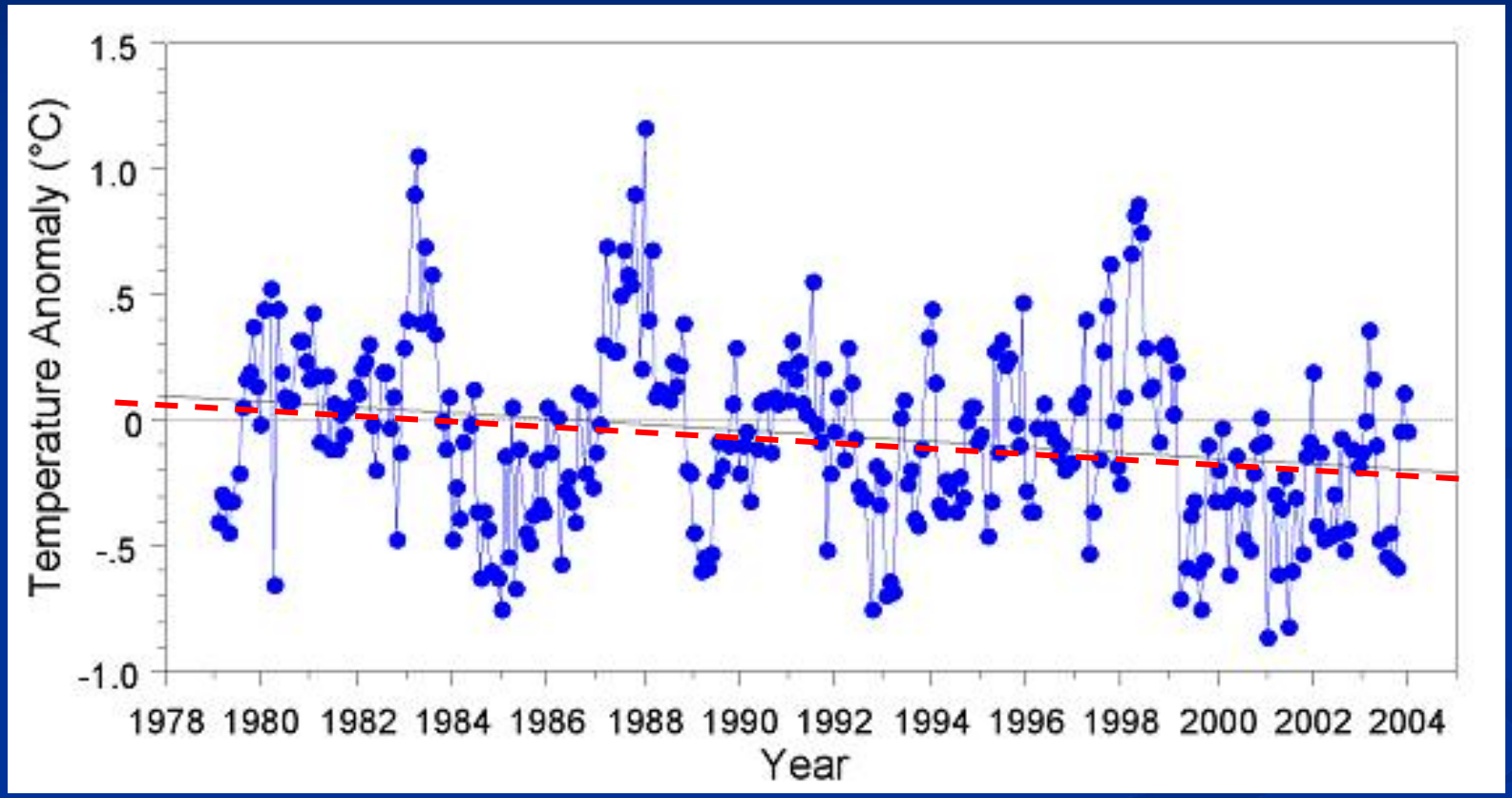
Africa

1970

2000

Kilamanjaro Snowfield

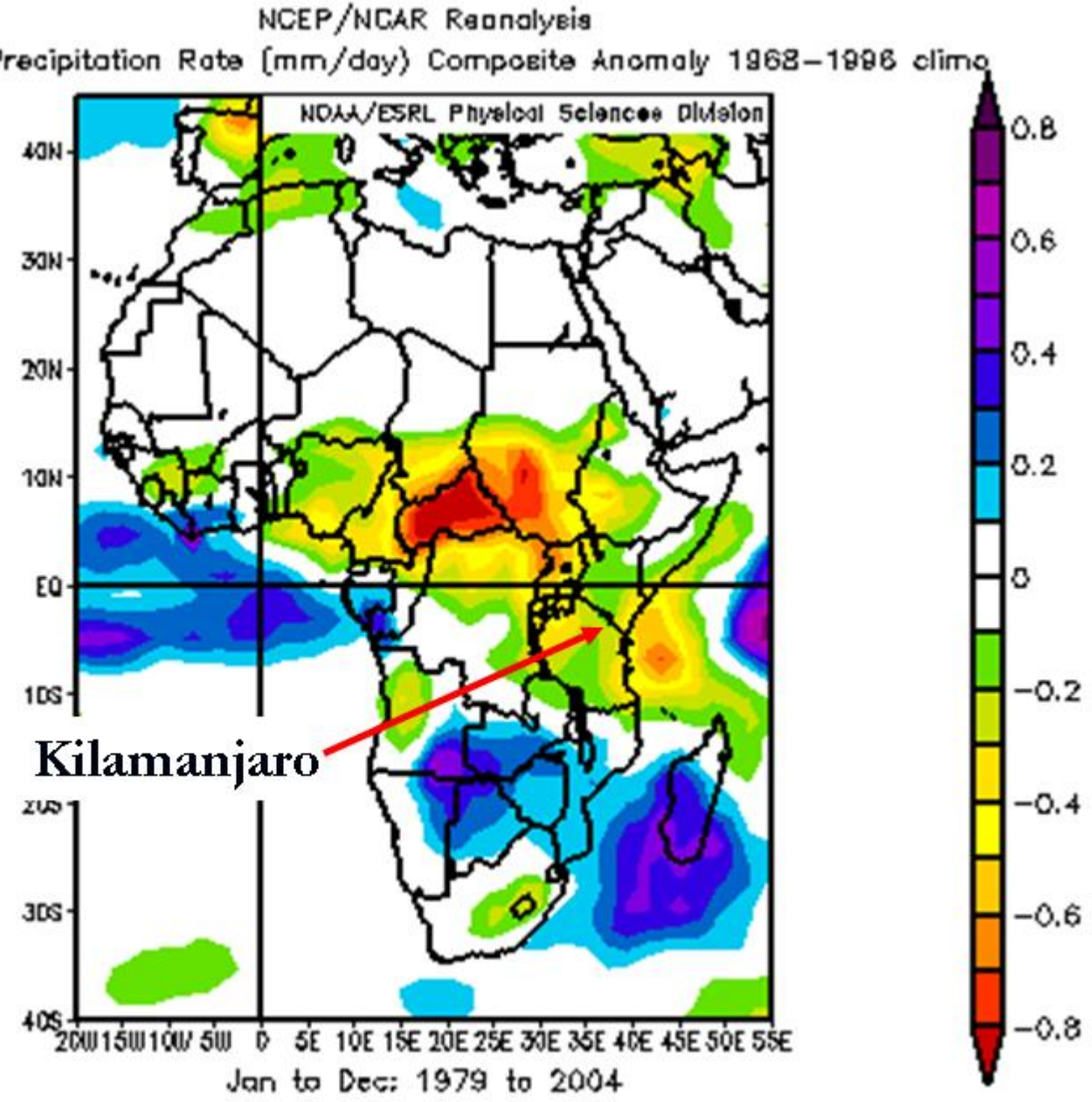
- Certainly not due to global warming – temperatures have been cooling last 25 years

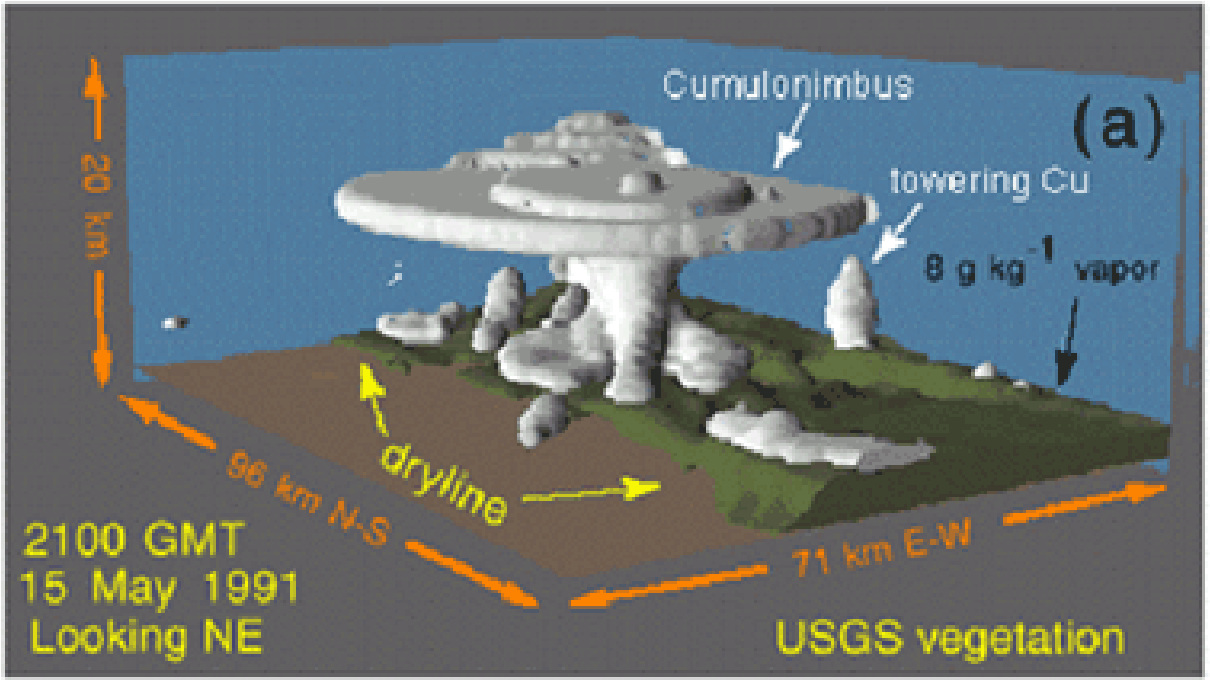


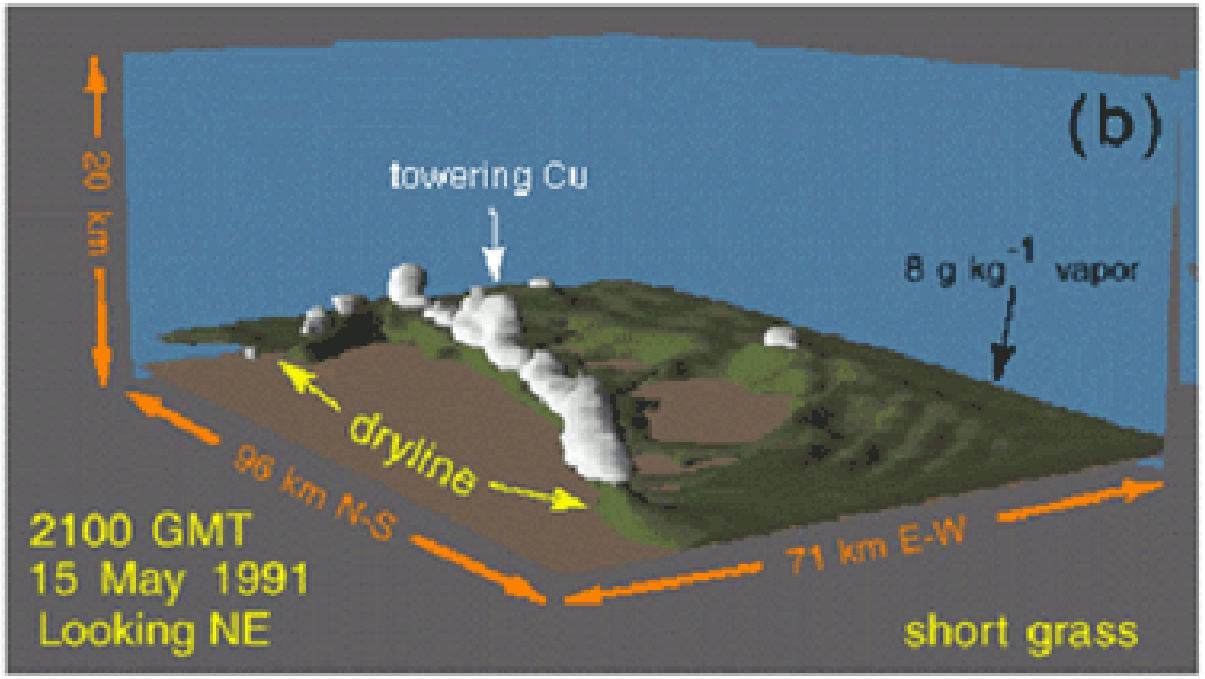
- Ice retreat has been due to less precipitation

Precipitation anomalies same 25 years

Relates to Atlantic Multidecadal Oscillation and land use changes (deforestation)





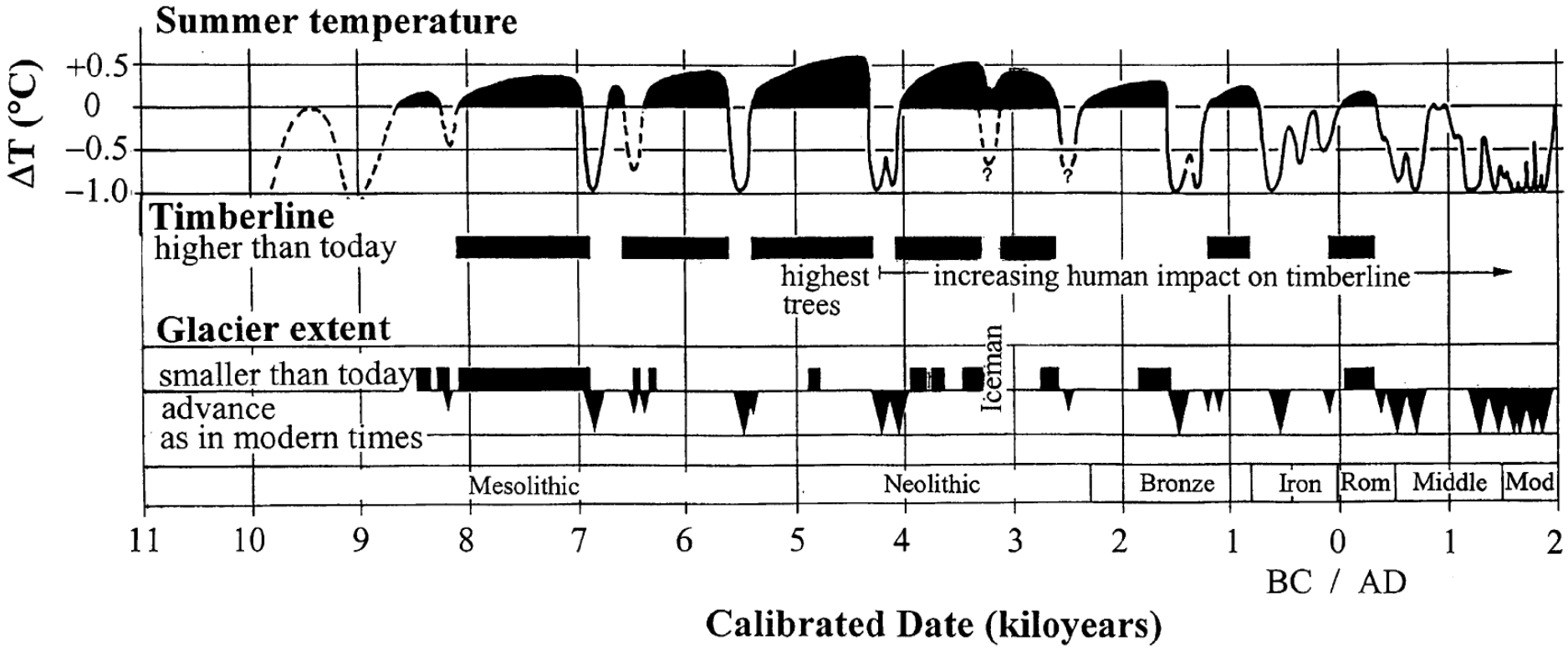


(C. Ziegler, NSSL)

Shrubs and trees

Short grasses

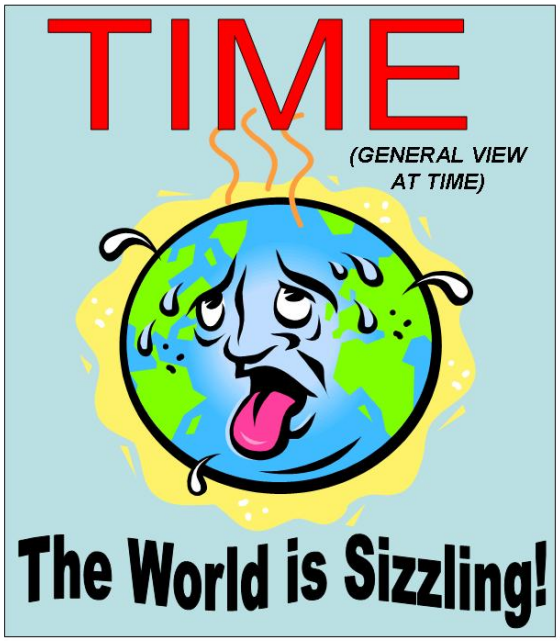
Schematic presentation of Alpine climate variations during the last 10,000 years (Holocene), as established by Gernot Patzelt, University of Innsbruck



Consensus on Global Warming

- Most scientists are not climatologists. Most work in other fields and many maybe observing first-hand the effects of climate change. No doubt many have been convinced man is behind it (though 17,200 of them signed petition urging US not to sign Kyoto).
- Many climatologists that work closely with the data see the importance of local factors such as urbanization, land use changes and bad siting and see changes that are cyclical and natural
- I estimate 2/3^{rds} to 3/4^{ths} of the forecast and broadcast meteorologists and non-modeler climatologists believe natural factors are important
- Survey of American Association of State Climatologists in 1997 showed 73% felt natural cycles were largely behind climate changes, especially the old-timers who have seen this frenzied overreaction to change before

SEPTEMBER 10



1945

JANUARY 31

1977

APRIL 3

2006

Al Gore's Own Words

- ***"….what is most dangerous for us is not what we don't know, but that which we know for sure which just ain't so"***
- Though meant for the politicians and 'skeptics', it really applies to Al Gore and the 'alarmists'
- By focusing solely on greenhouse gases and discouraging efforts to understand other factors, we stand to be blindsided when other factors change and the climate makes its next quick about face

Cooling Instead of Warming

- Russian Academy of Science has **warned of an imminent recurrence of a minor Ice Age**, similar to the one in the 17th century, when temperatures dropped in Europe, North America and Greenland, the Thames and Dutch canals froze in winter, and people fled from Greenland because of unbearable cold. The scientists made the conclusion on the basis of a big decline in solar activity expected the next 50 years or so.
- Many solar scientists in Europe, Canada and the US share the same concern but they are not being heard among the shouting and media frenzy about global warming
- The Pacific appears to be heading back into the "cold phase" and Atlantic may follow in a decade.
- Warming may have peaked in 1998, still the warmest year in the global data bases (9 years ago)

A Climatologist's Viewpoint

- Man plays some role in the world's climate through greenhouse gases and especially urbanization
- Lack of warming in rural areas suggest the greenhouse component is likely small and overall warming estimates overdone. Global data bases are contaminated by siting, urbanization, station dropout and an increase in missing data
- Background temperatures are cyclical in nature and correlate better with natural cycles in the sun and oceans than with greenhouse gases
- The world's icecap and glacial situation is not exactly as portrayed but where changes are occurring they too can be largely explained by these same cycles in sun and oceans
- There is clearly not a consensus among meteorologists and climatologists that greenhouse warming is entirely behind recent changes