

Is the “Day After Tomorrow” a reality? Facts and Fiction about the film

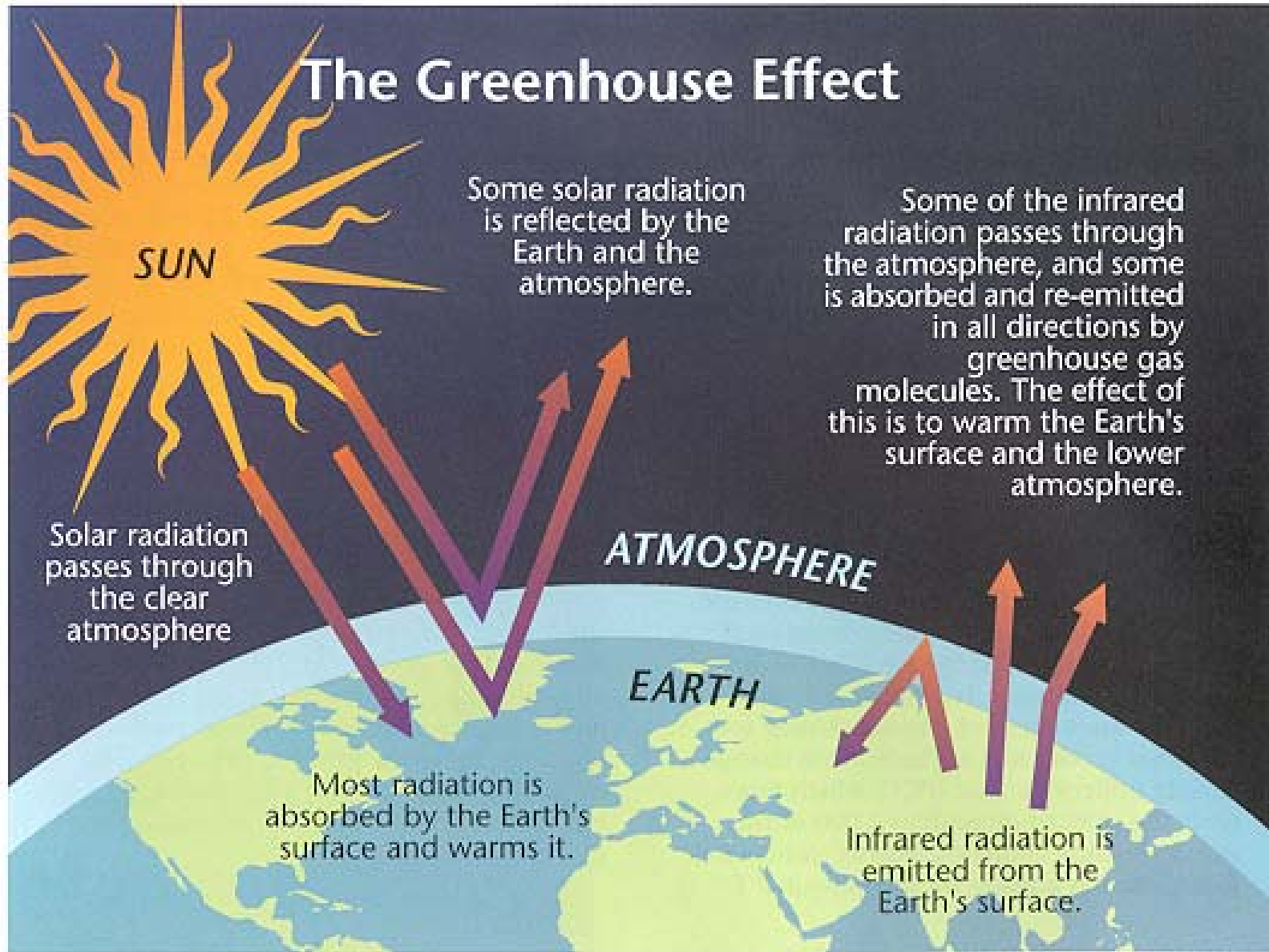


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in association with



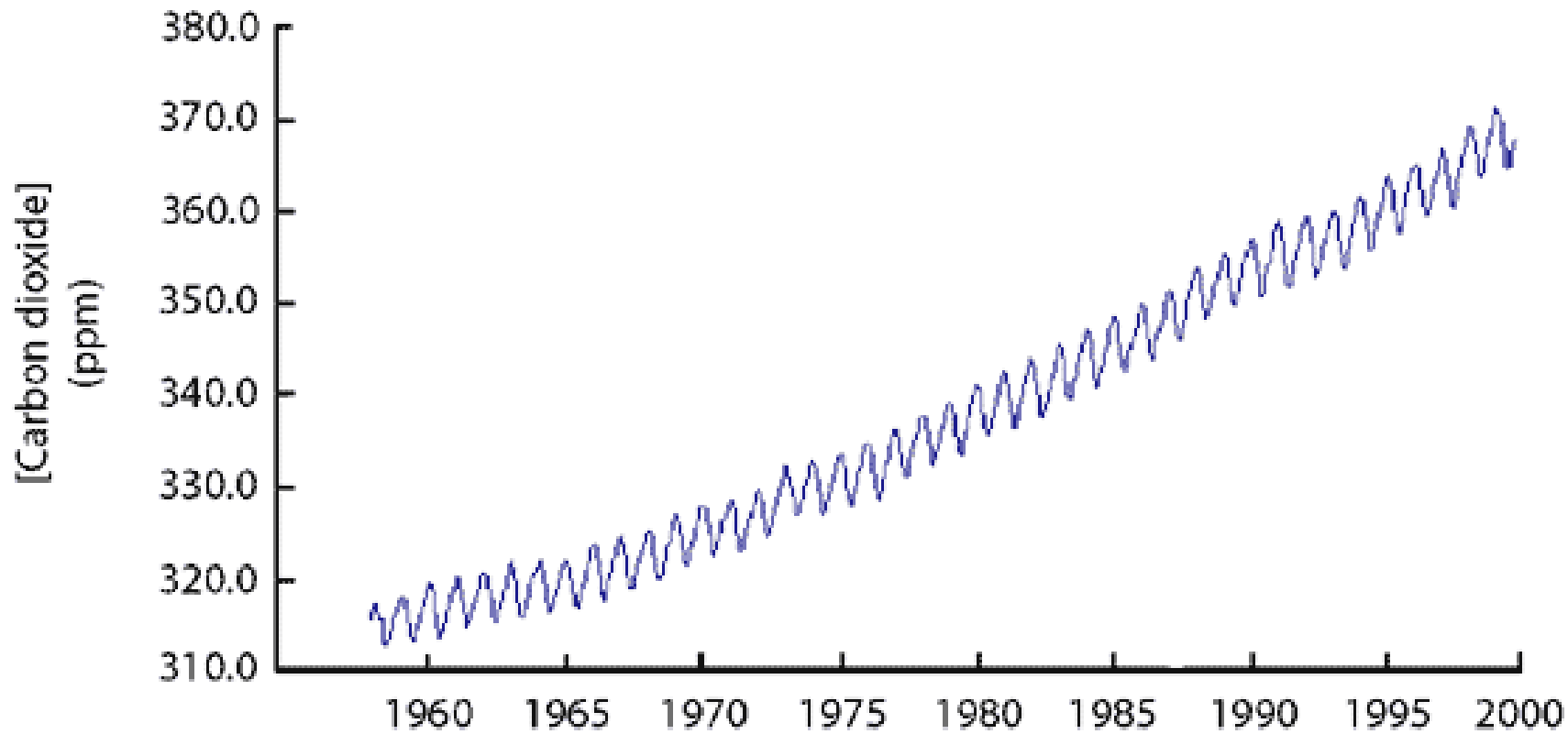
1. Certainties
2. North Atlantic Current Shutdown
3. Abrupt Climate Shift
4. NYC Climate Change
5. Super Cell Storms
6. Take Home

The Greenhouse Effect



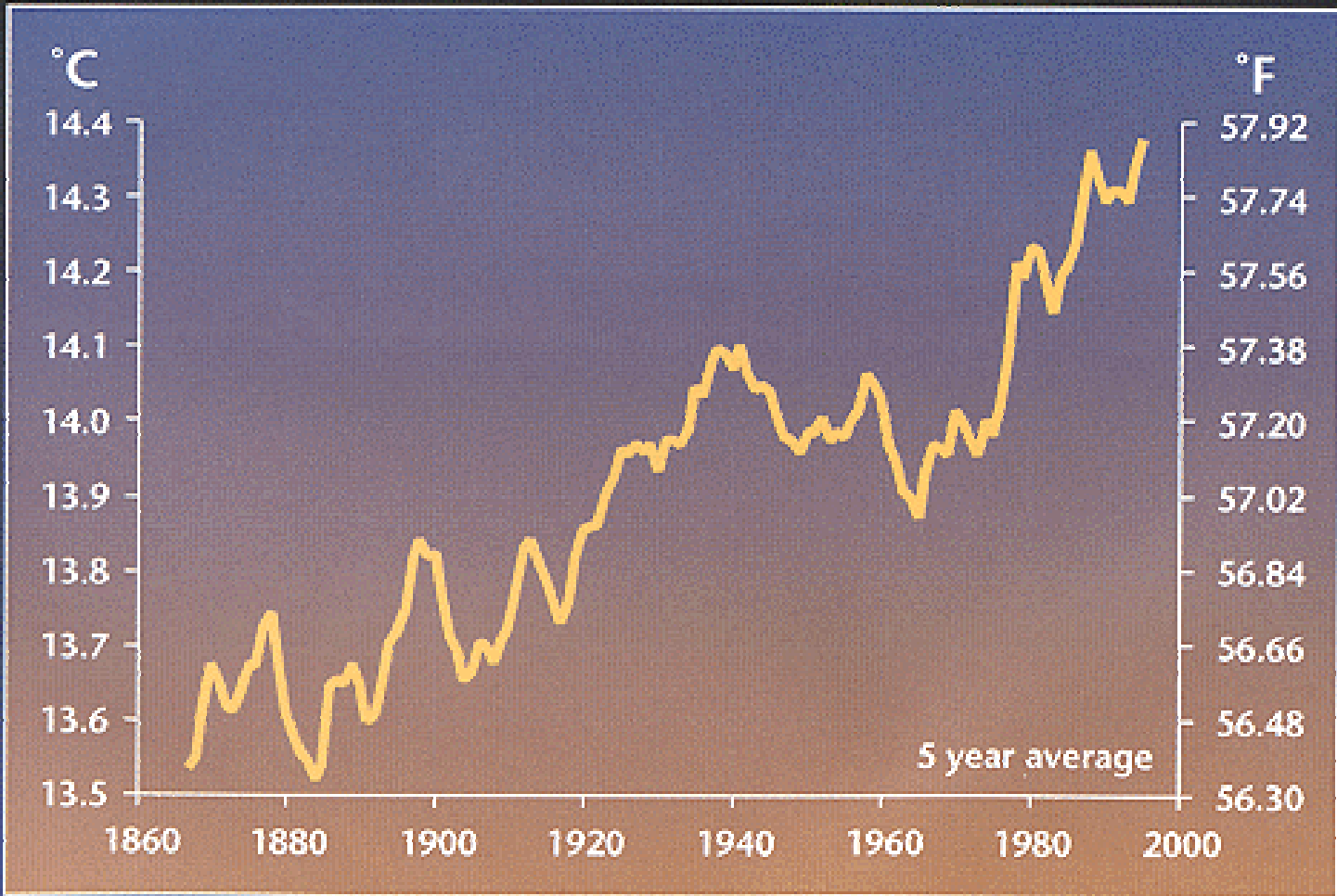
Source: OSTP

Keeling Curve of Atmospheric Carbon Dioxide from Mauna Loa, Hawaii



Source: NOAA

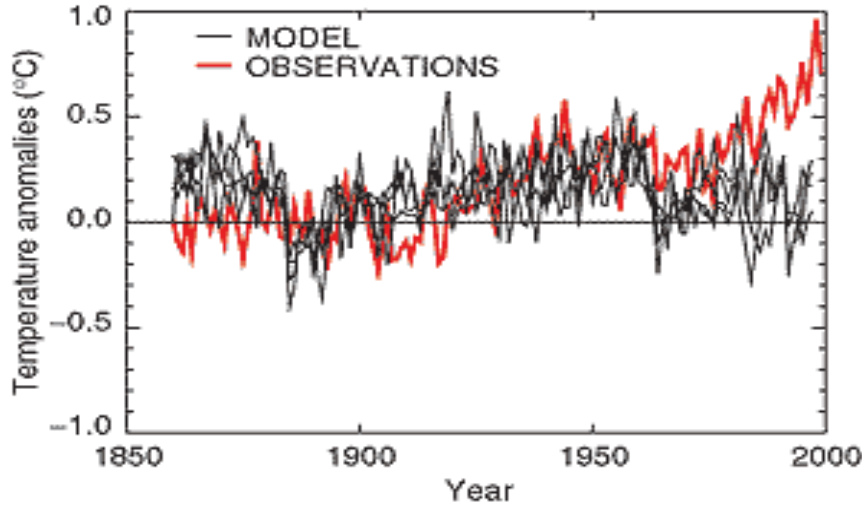
Global Average Temperature



Source: OSTP

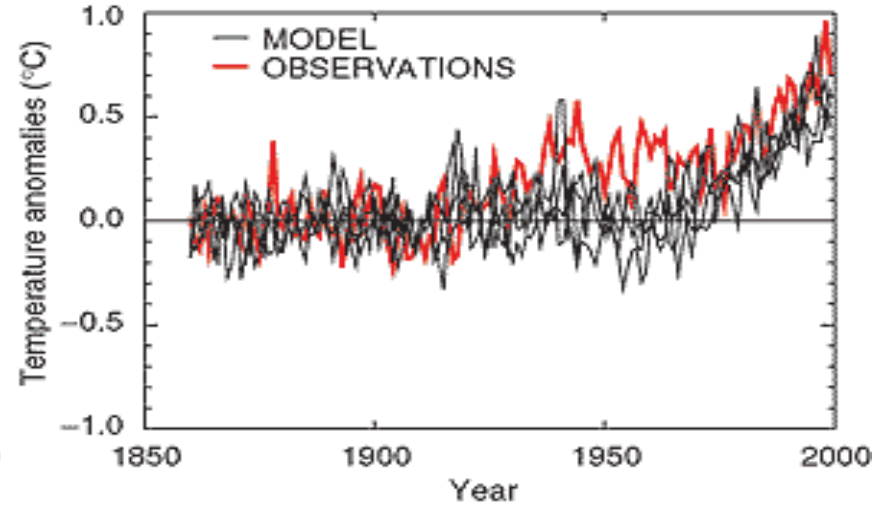
(a)

NATURAL : Annual global mean temperatures



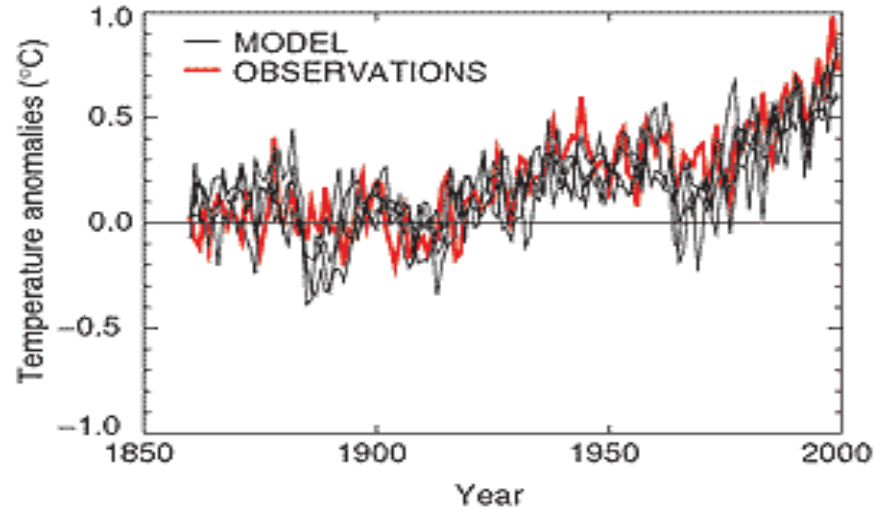
(b)

ANTHROPOGENIC : Annual global mean temperatures



(c)

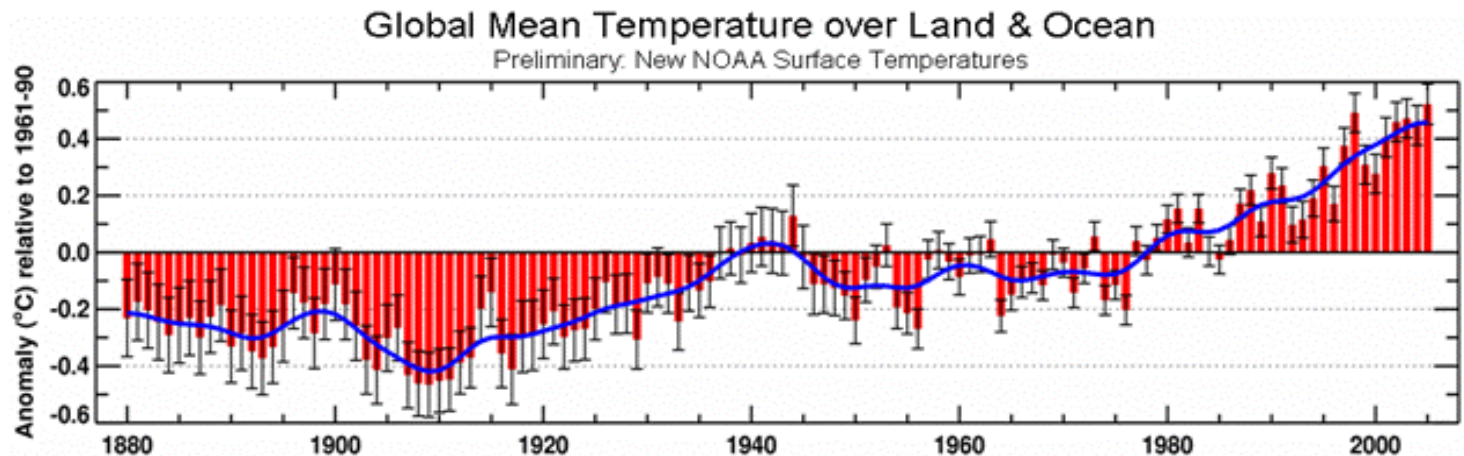
ALL FORCINGS : Annual global mean temperatures

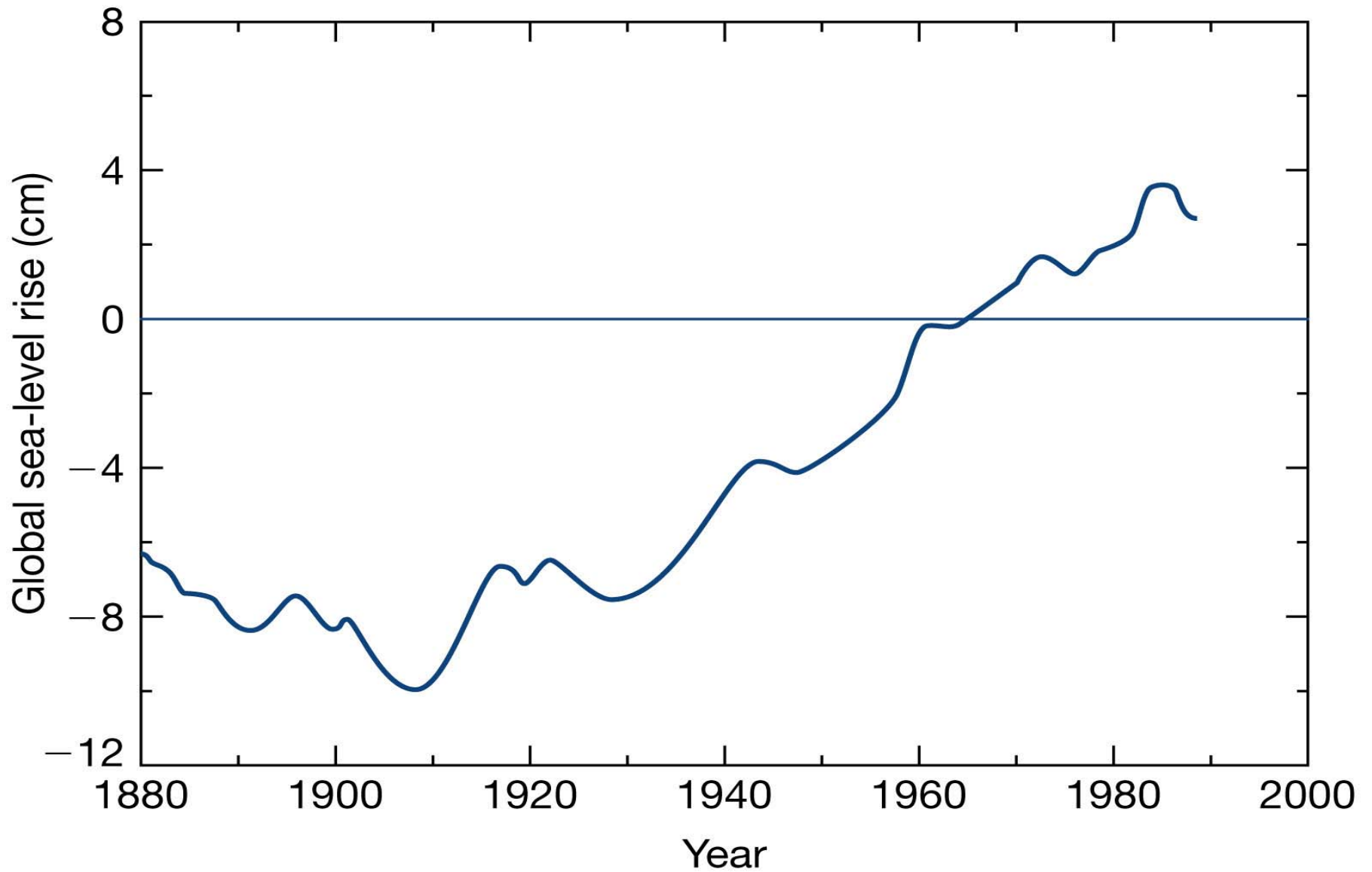


Current temperature trends - globally

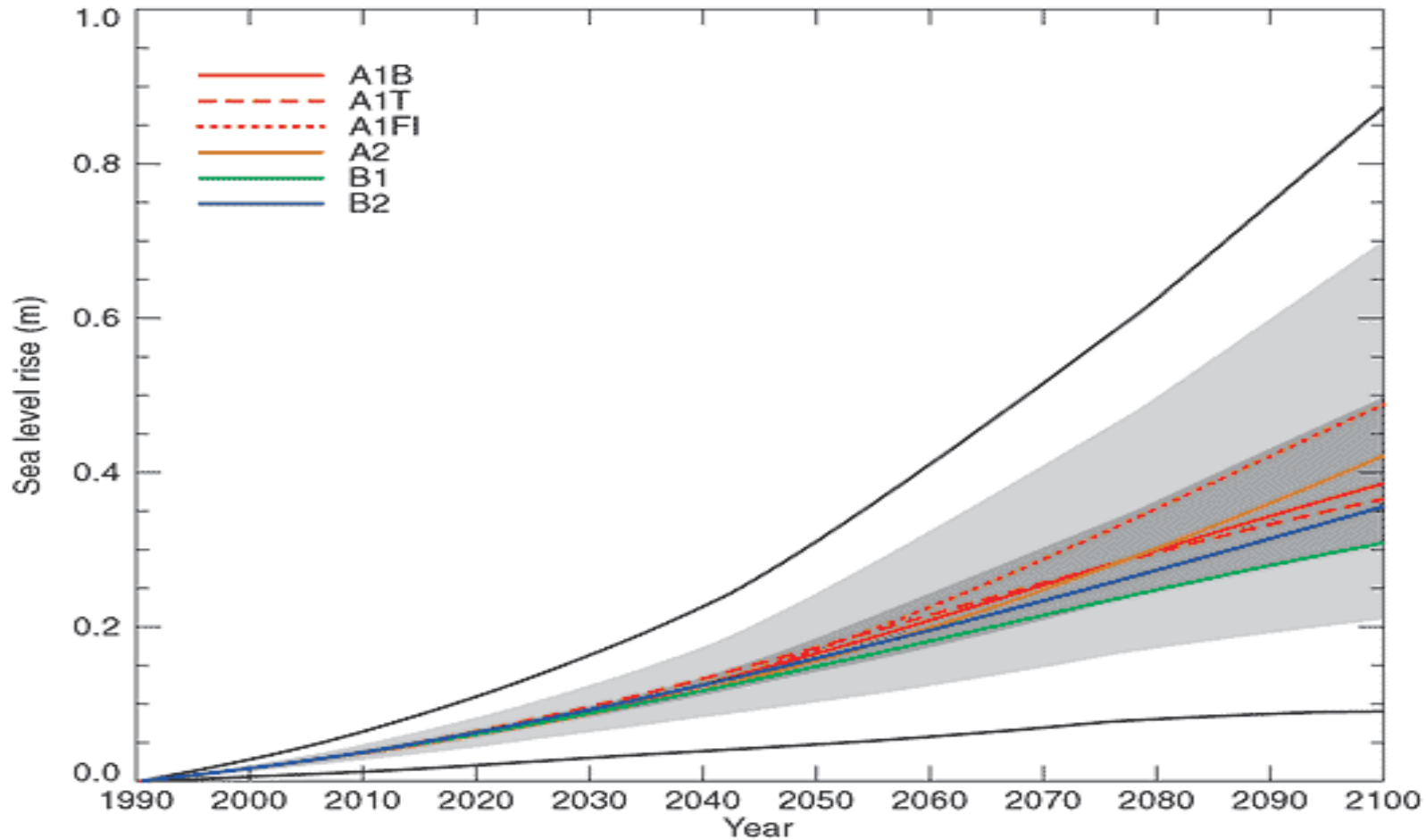
Rank	Year
1	2005 ¹
1	1998 ¹
3	2002
4	2003
5	2004
6	2001
7	1997
8	1990
9	1995
10	1999
11	2000
12	1991
13	1987
14	1988
15	1994
16	1983
17	1996
18	1944
19	1989
20	1993

- Globally: 19 of hottest 20 years on record occurred since 1980 (*global mean surface temp*)





Global Sea Level Rise Projections



Source: IPCC TAR, 2001

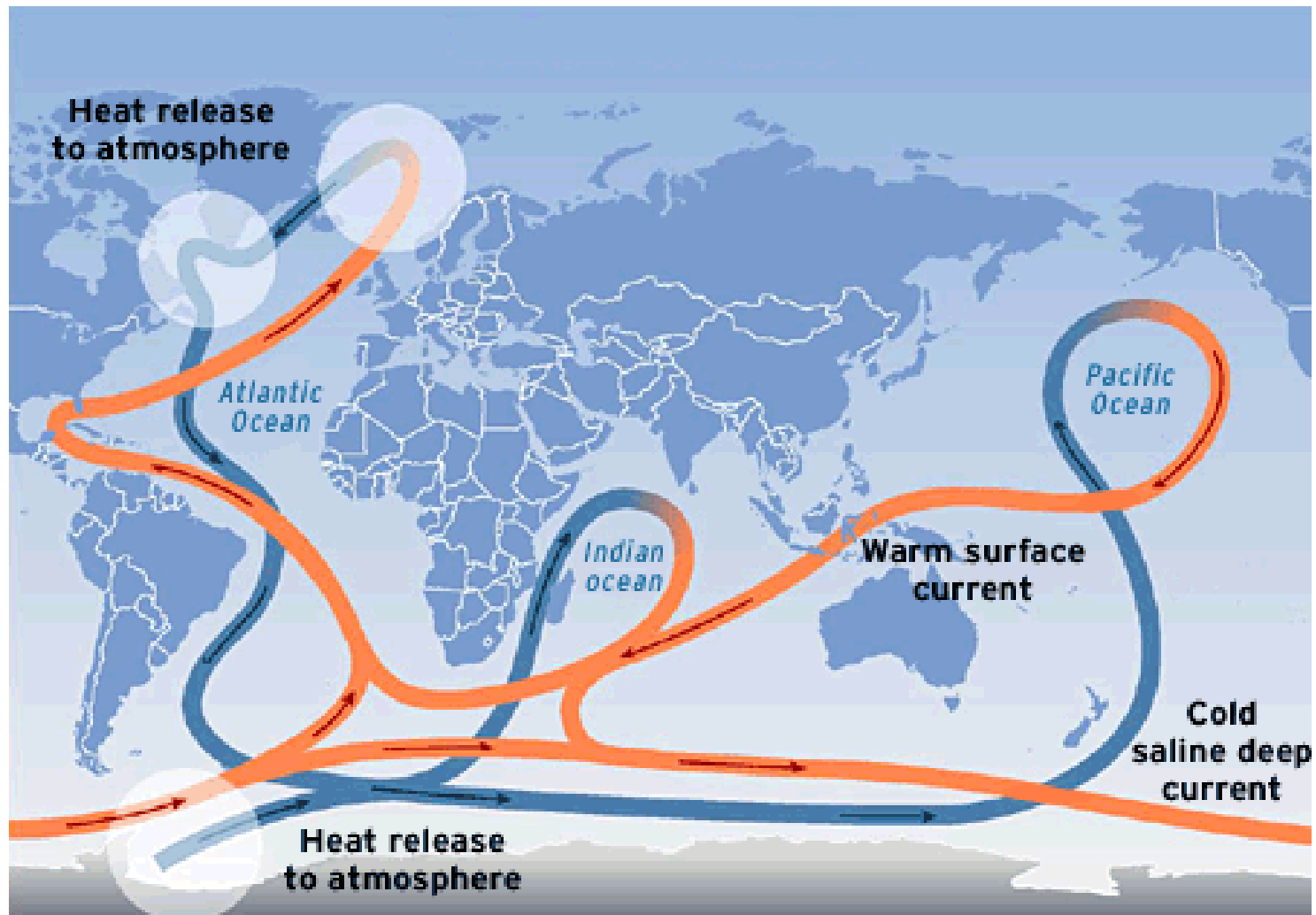
**Can the North Atlantic Current
Shutdown?**

Can Abrupt Climate Change Occur?

Sea Ice Melting



Great Ocean Conveyor Belt



Source: IPCC

NYC Tidal Wave



- **Models indicate that a storm surge of about 20 feet is possible in New York given an intense hurricane strike in northern New Jersey**
- **10 foot storm surges have occurred in the past in the Northeastern US**
- **The wave in the movie was a tsunami and would have to be caused by an earthquake**

Source:

Woods Hole Oceanographic Institute



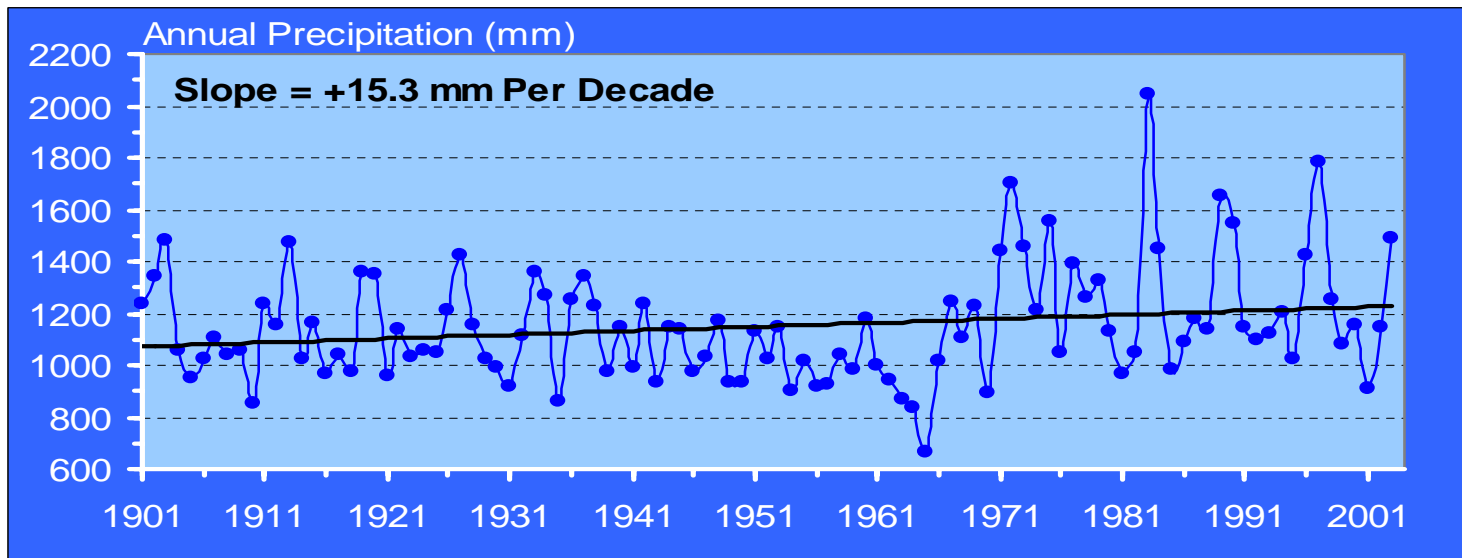
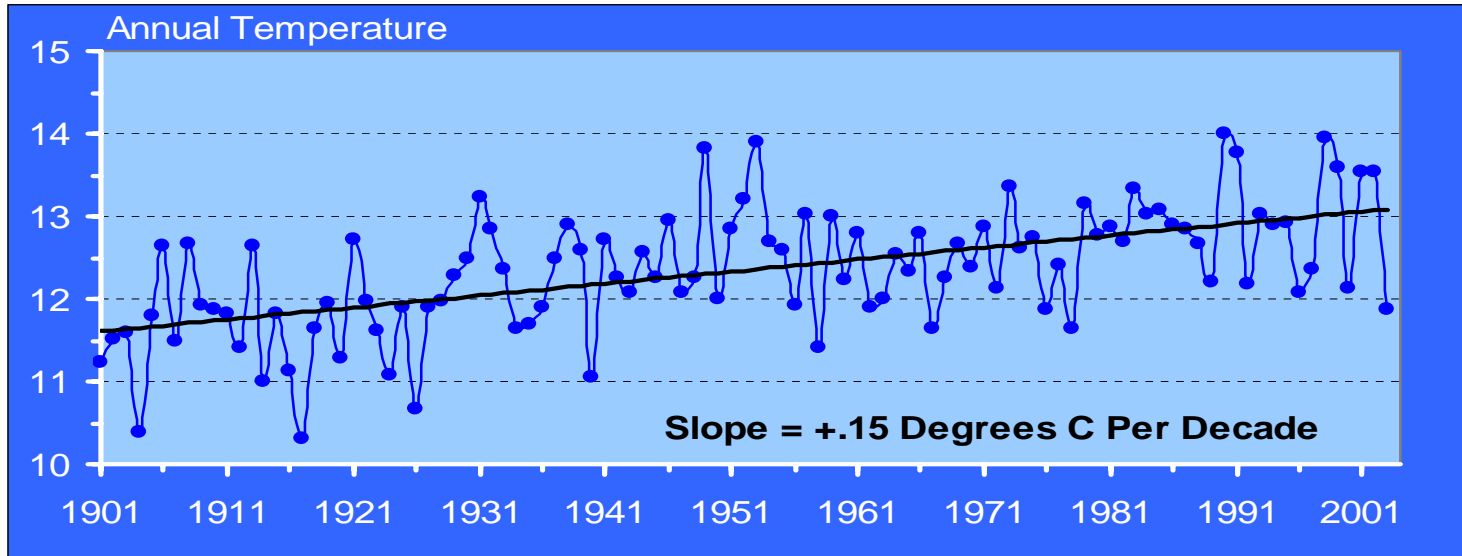
Model simulations show how a 6-meter (20-foot) rise in sea level would swamp Miami, Fort Lauderdale, Tampa, and the entire Florida coastline.

Image created by Jonathan Overpeck and Jeremy Weiss, courtesy University of Arizona Department of Geosciences

[Environmental Studies Laboratory](#)

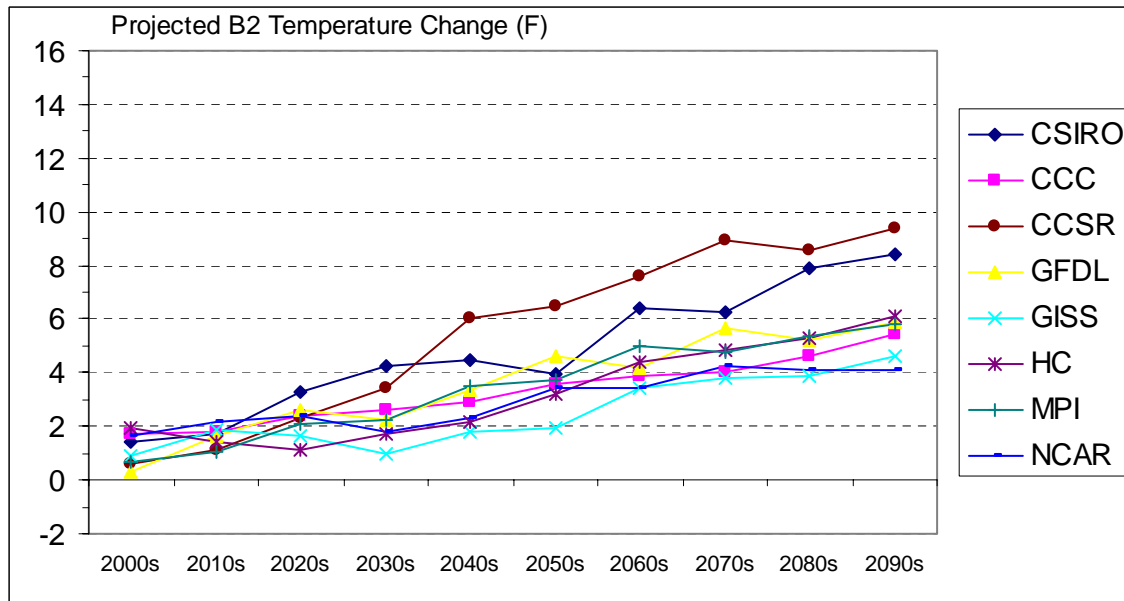
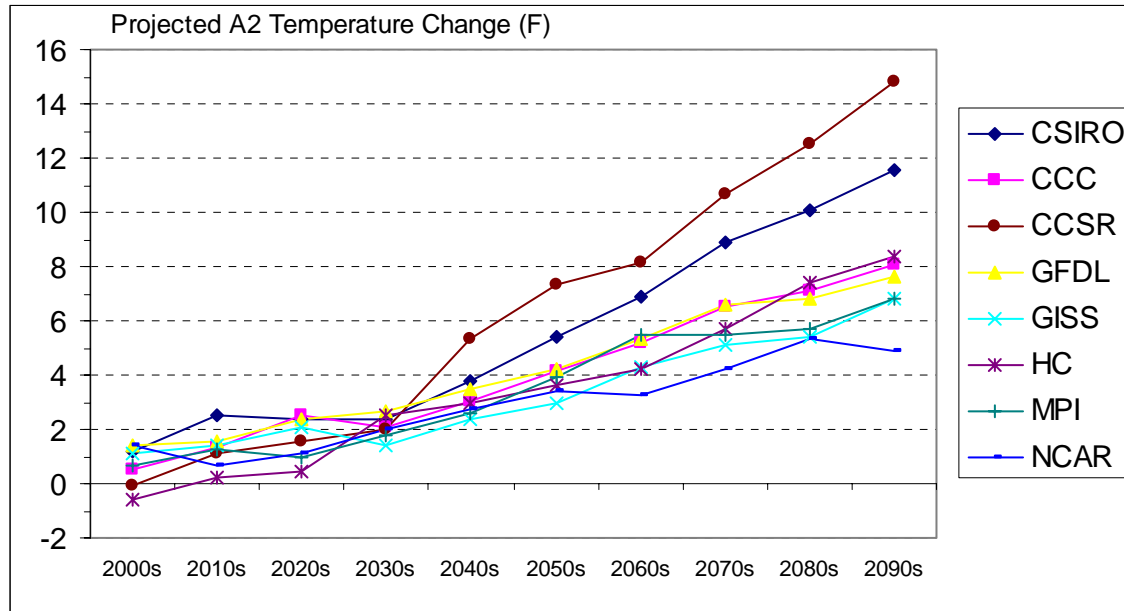
Source: National Geographic

NYC Climate Trends



Source: NASA/GISS

NYC Climate Change Projections

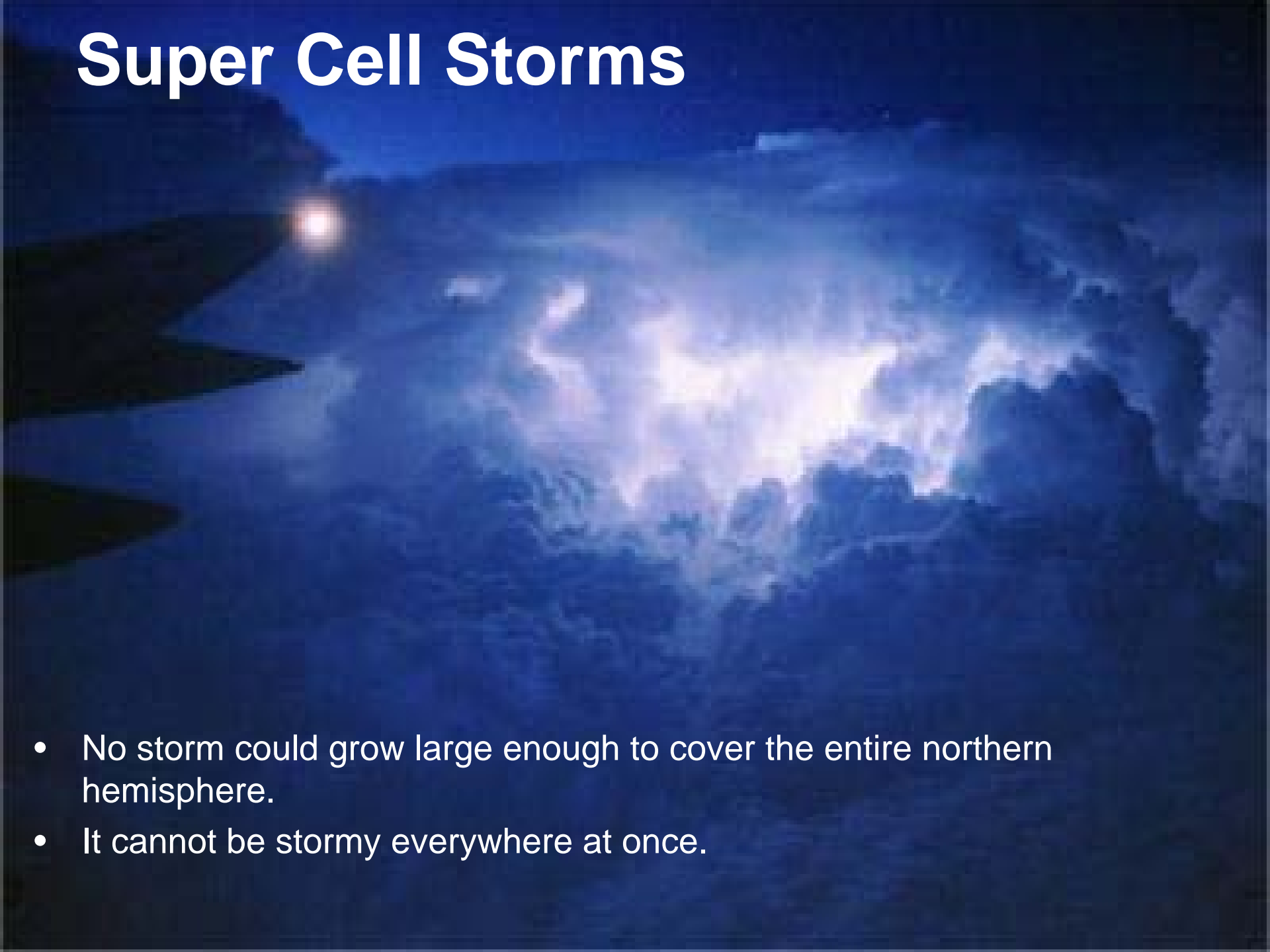


NYC Impacts

- **Sea level may rise by 10 to 43 inches by 2080.**
- **Both winters and summers will be warmer.**
- **Inland droughts and floods may both increase in severity and frequency and the 100 year coastal flood return period is likely to decrease to, at best, 20-30 years by 2080.**
- **Most of the region's low-elevation transportation, water, and sewage facilities will be at risk to flooding in the 21st C.**

Source: *Climate Change and a Global City: The Potential Consequences of Climate Variability and Change*. C. Rosenzweig and w. Solecki (eds.), Columbia University Earth Institute, 2001, 210 pp.

Super Cell Storms



- No storm could grow large enough to cover the entire northern hemisphere.
- It cannot be stormy everywhere at once.

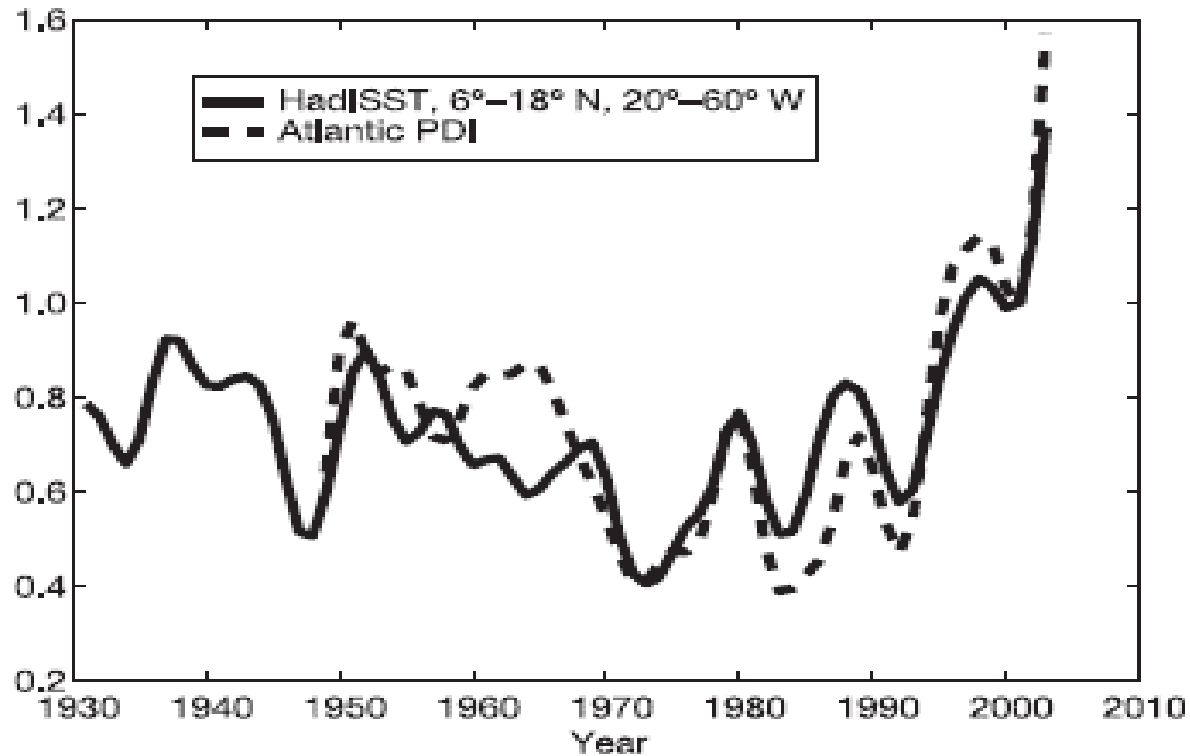


Figure 1 | A measure of the total power dissipated annually by tropical cyclones in the North Atlantic (the power dissipation index, PDI) compared to September sea surface temperature (SST). The PDI has been multiplied by 2.1×10^{-12} and the SST, obtained from the Hadley Centre Sea Ice and SST data set (HadISST)²², is averaged over a box bounded in latitude by 6° N and 18° N, and in longitude by 20° W and 60° W. Both quantities have been smoothed twice using equation (3), and a constant offset has been added to the temperature data for ease of comparison. Note that total Atlantic hurricane power dissipation has more than doubled in the past 30 yr.

Source: Emanuel, 2005

Take Home Points

- Global Climate Change is Occurring
- According to the IPCC, it is virtually certain that the increasing global temperature changes are due to human actions
- Sea levels are rising, partly due to accelerated ice melt over land.
- There is new evidence that the thermohaline circulation is weakening which could effect the regional climate of northern Europe
- Abrupt change has occurred in the past in a couple of decades