

SOME CHILLING CONSIDERATIONS ABOUT GLOBAL WARMING

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Temple Israel of Riverhead

May 10, 2008

<http://www.ecd.bnl.gov/steve>

The Greenhouse Effect



Some solar radiation is reflected by the Earth and the atmosphere.

Some of the infrared radiation passes through the atmosphere, and some is absorbed and re-emitted in all directions by greenhouse gas molecules. The effect of this is to warm the Earth's surface and the lower atmosphere.

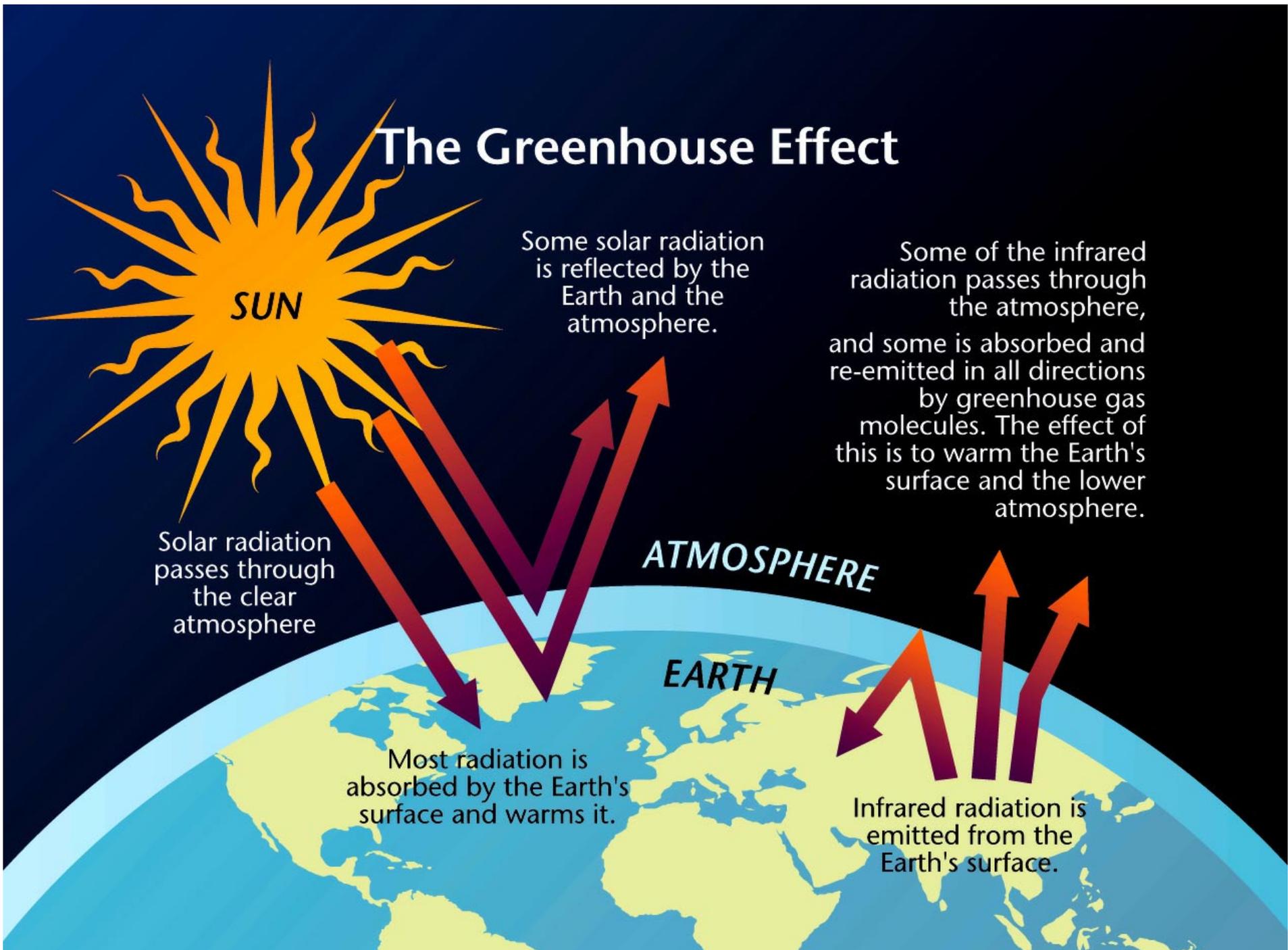
Solar radiation passes through the clear atmosphere

ATMOSPHERE

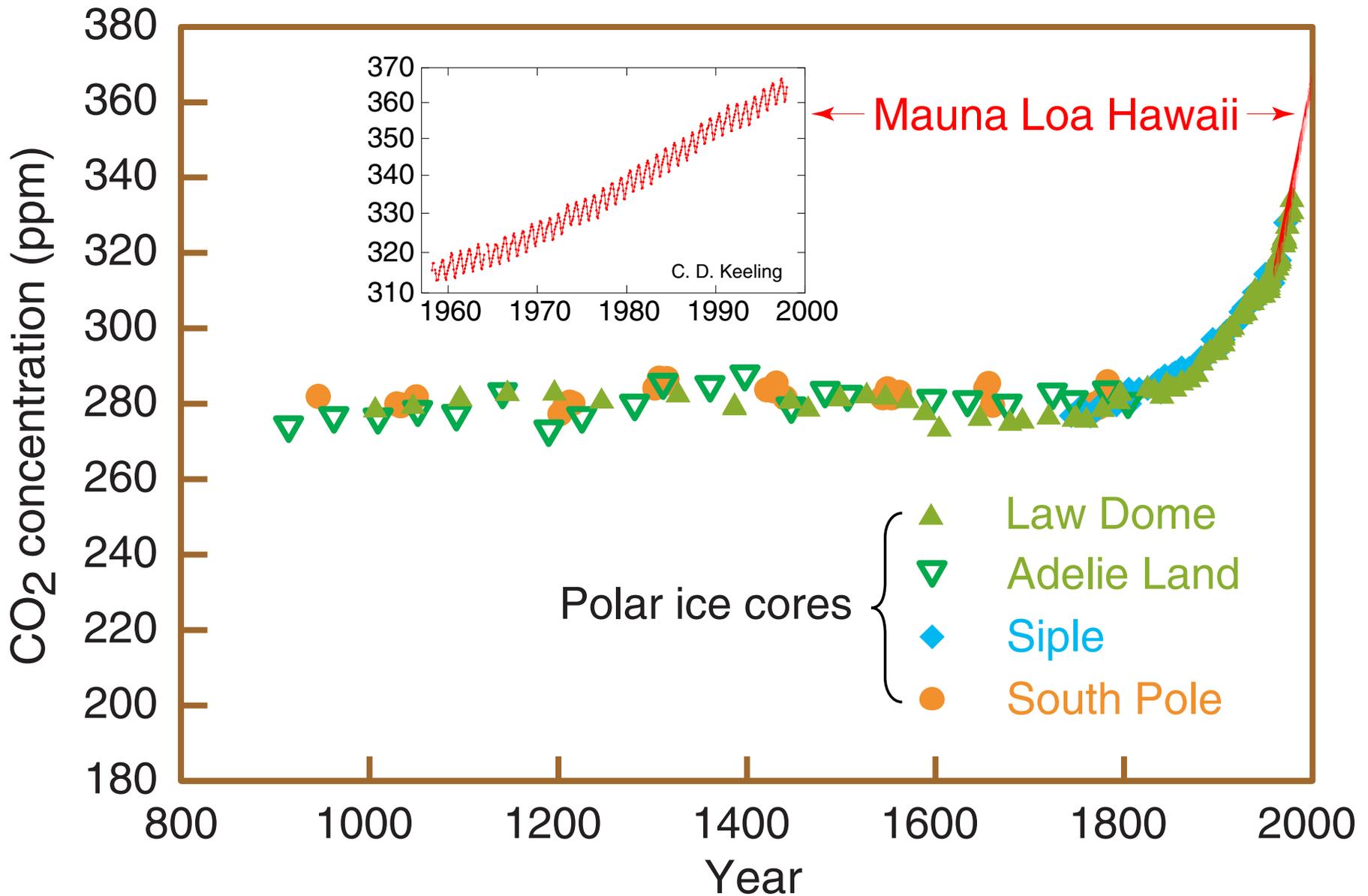
EARTH

Most radiation is absorbed by the Earth's surface and warms it.

Infrared radiation is emitted from the Earth's surface.

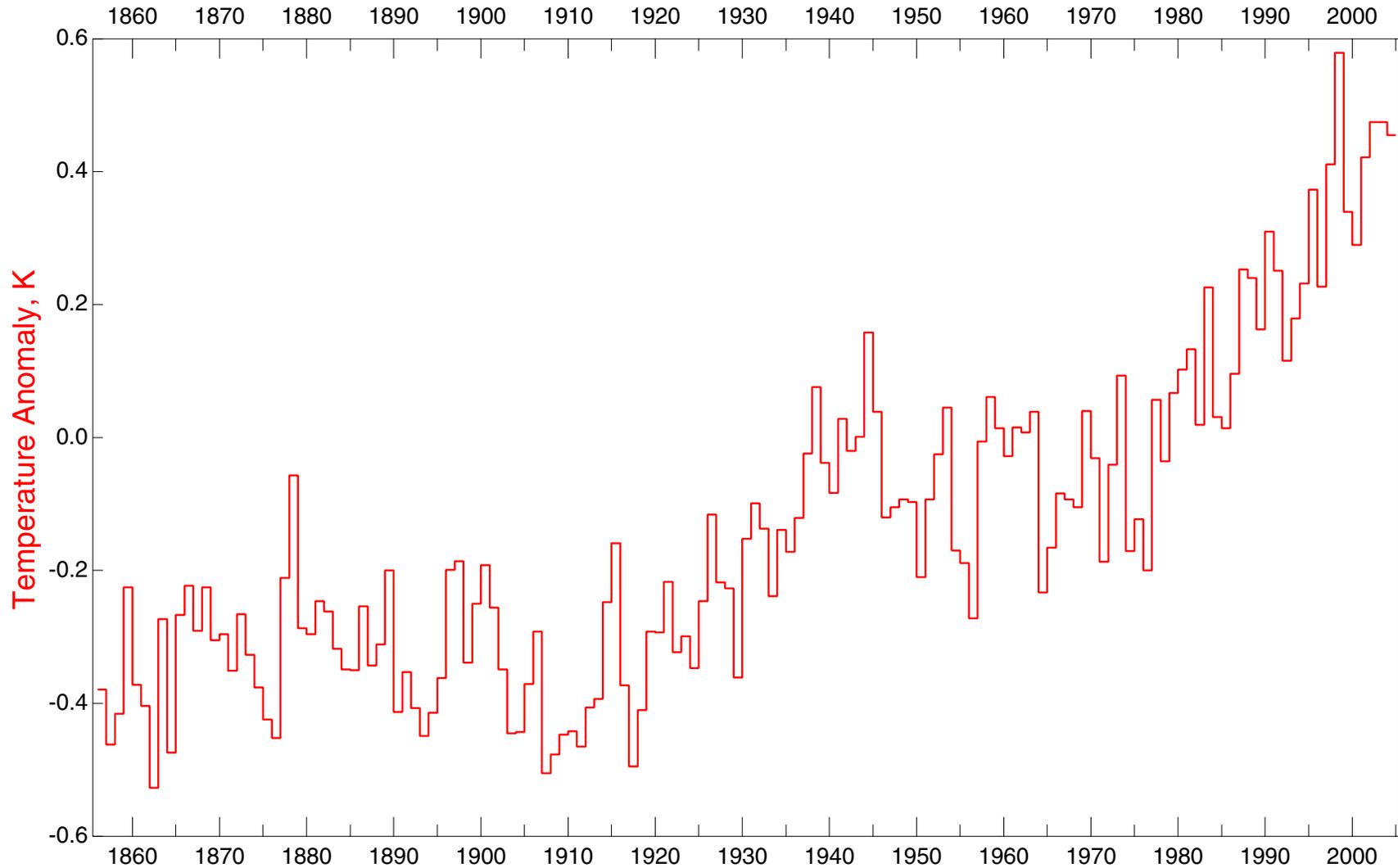


ATMOSPHERIC CARBON DIOXIDE IS INCREASING



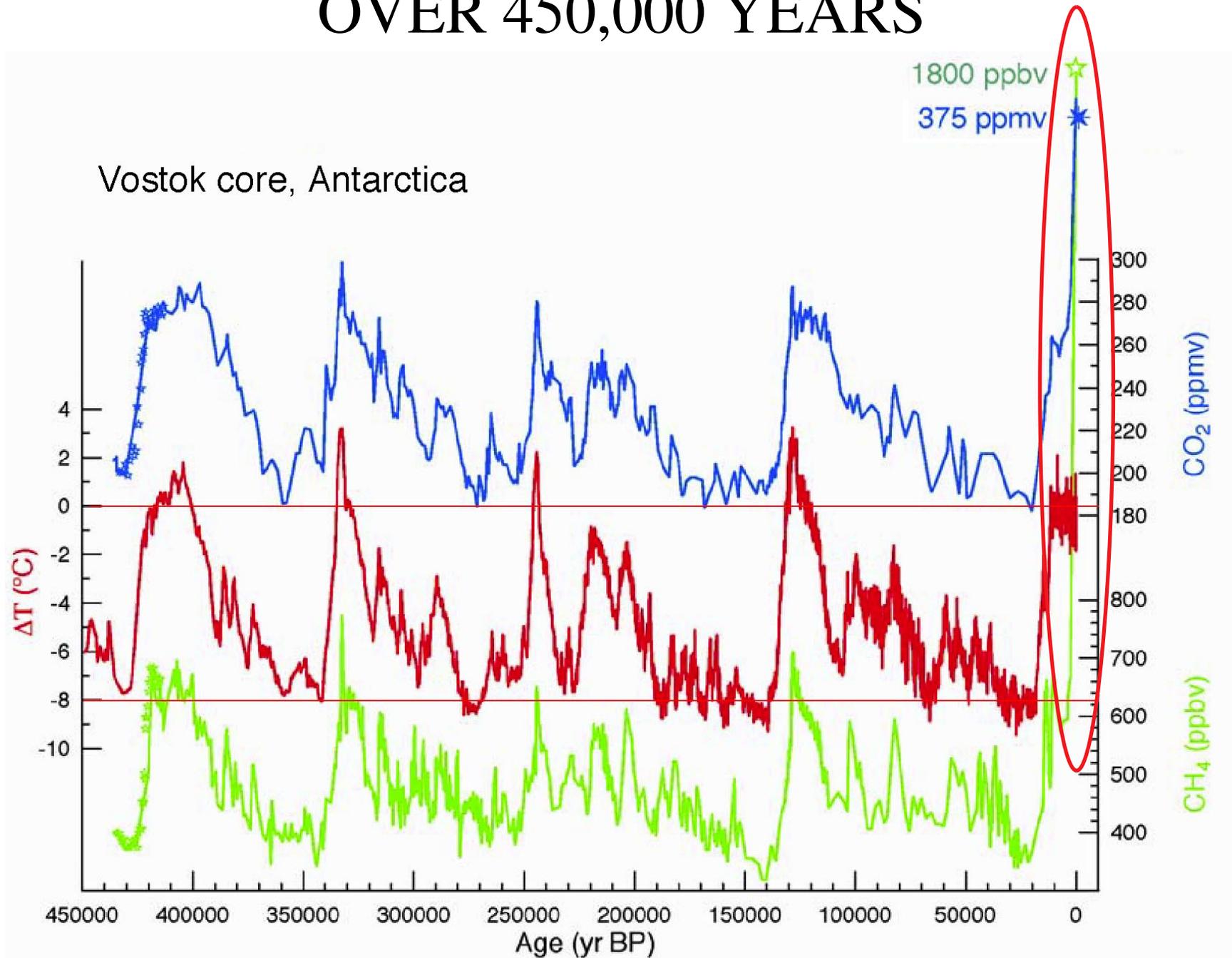
Global carbon dioxide concentration over the last thousand years

CHANGE IN GLOBAL MEAN SURFACE TEMPERATURE 1855-2004



Climate Research Unit, University of East Anglia, UK

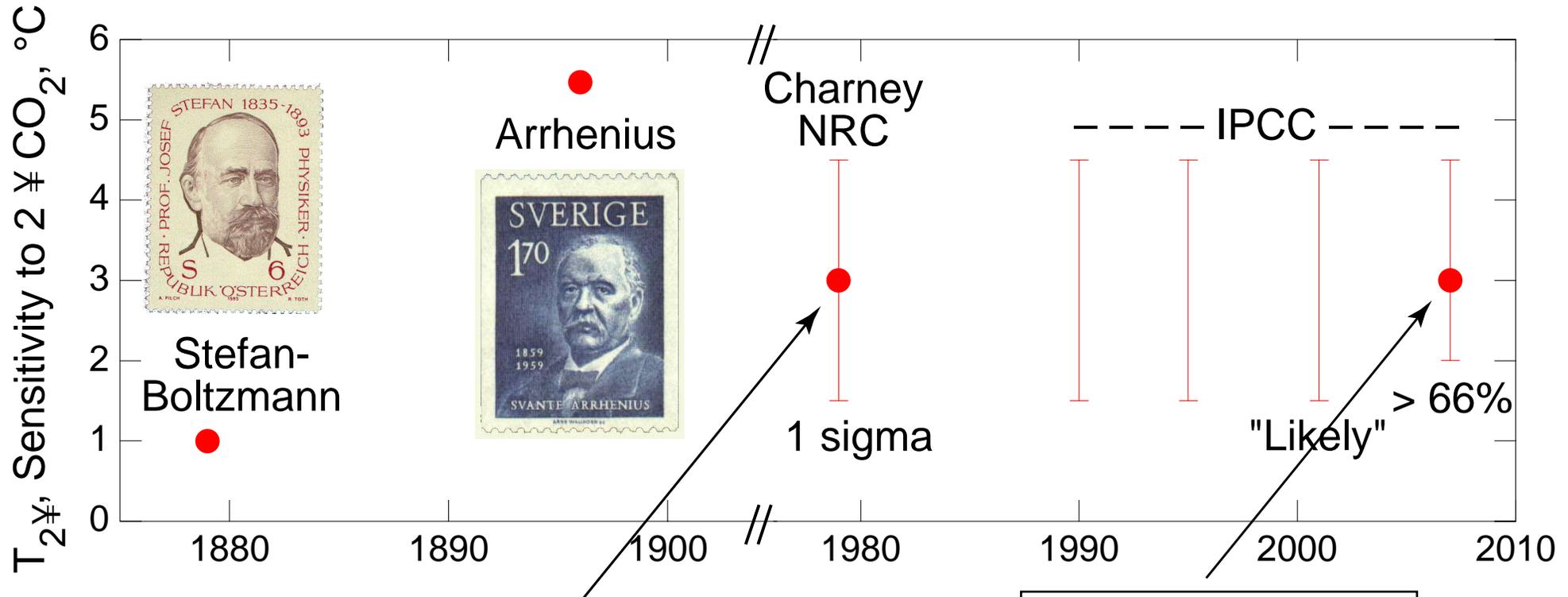
GREENHOUSE GASES AND TEMPERATURE OVER 450,000 YEARS



Modified from Petit et al., Nature, 1999

CLIMATE SENSITIVITY ESTIMATES THROUGH THE AGES

Estimates of central value and uncertainty range from major national and international assessments



**Carbon Dioxide and Climate:
A Scientific Assessment**
NATIONAL ACADEMY OF SCIENCES
Washington, D.C. 1979



Despite extensive research, climate sensitivity remains *highly uncertain*.

THE 'BIBLE' OF CLIMATE CHANGE

It's big and thick.

Every household should have one.

No one reads it from cover to cover.

*You can open it up on any page
and find something interesting.*

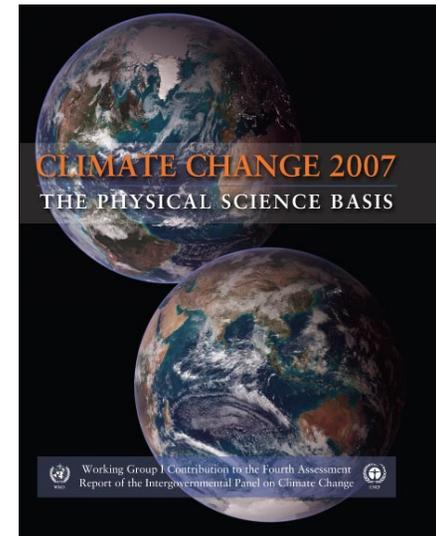
It was written by a committee.

It is full of internal contradictions.

*It deals with cataclysmic events such as
floods and droughts.*

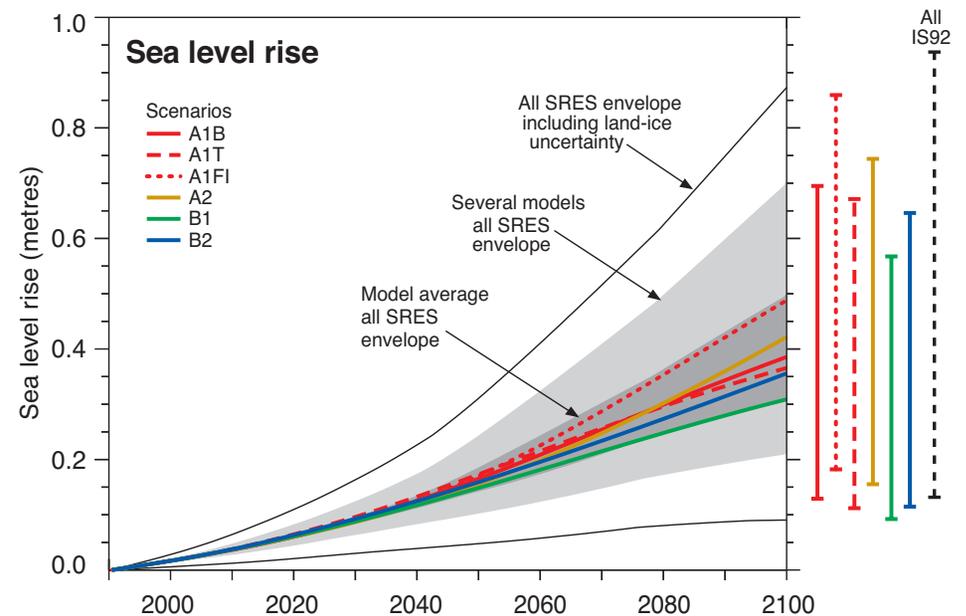
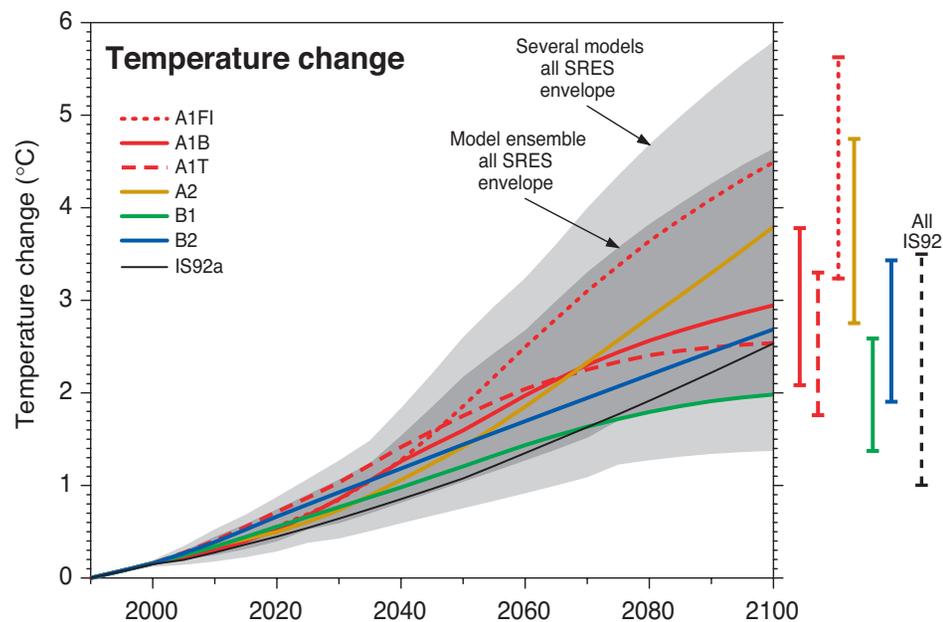
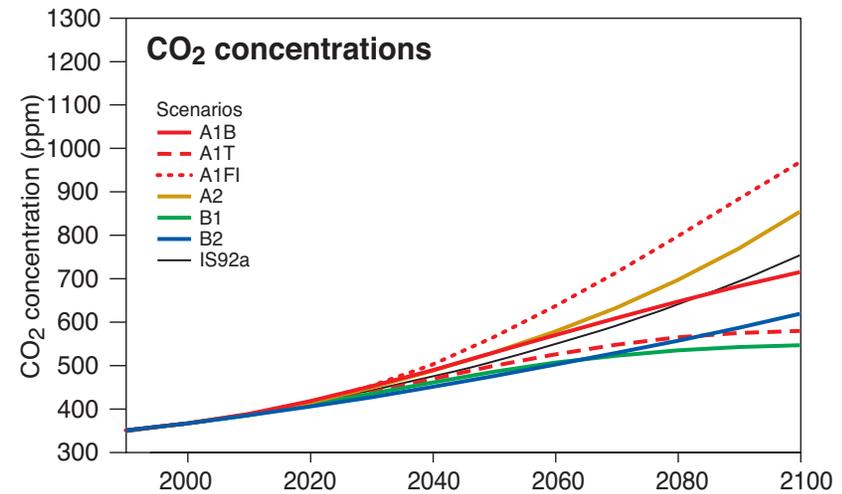
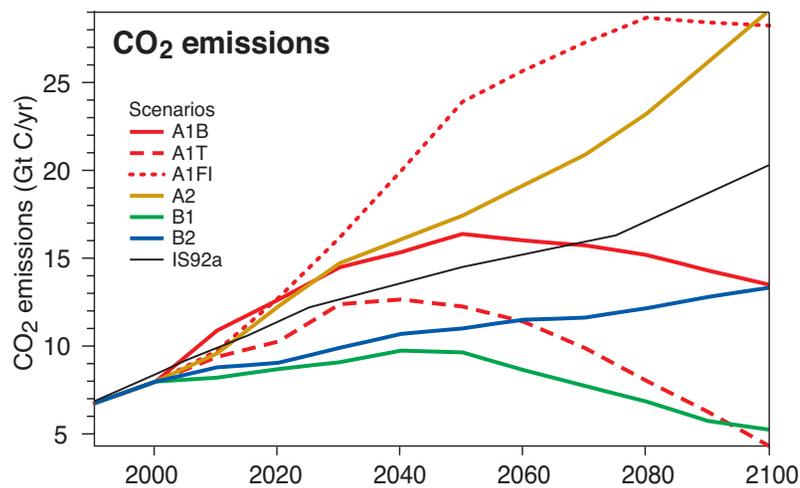
It has its true believers and its rabid skeptics.

<http://ipcc-wg1.ucar.edu/wg1/wg1-report.html>



PROJECTIONS OF FUTURE CLIMATE CHANGE

Temperature change and sea level rise for different emissions scenarios



IPCC, 2001

Sea level rise includes only thermal expansion, not land-ice melt.



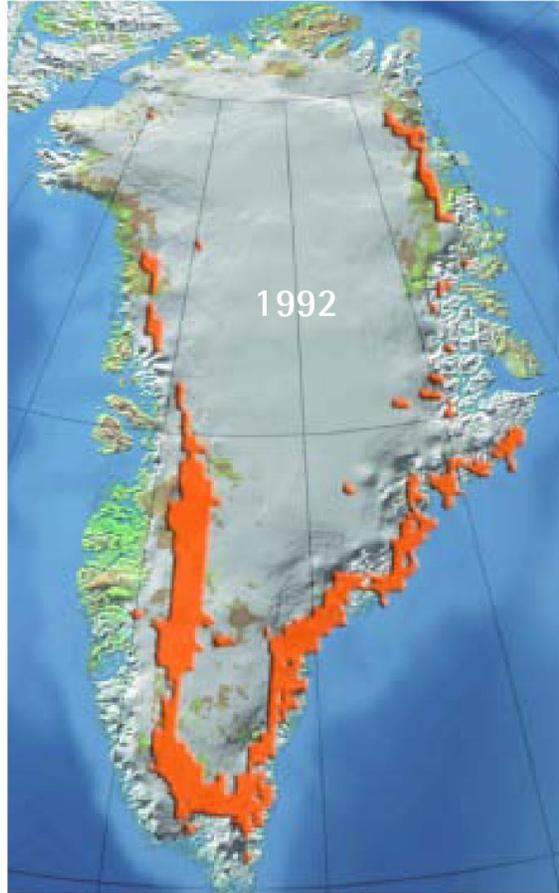


MELTING OF GREENLAND ICE CAP

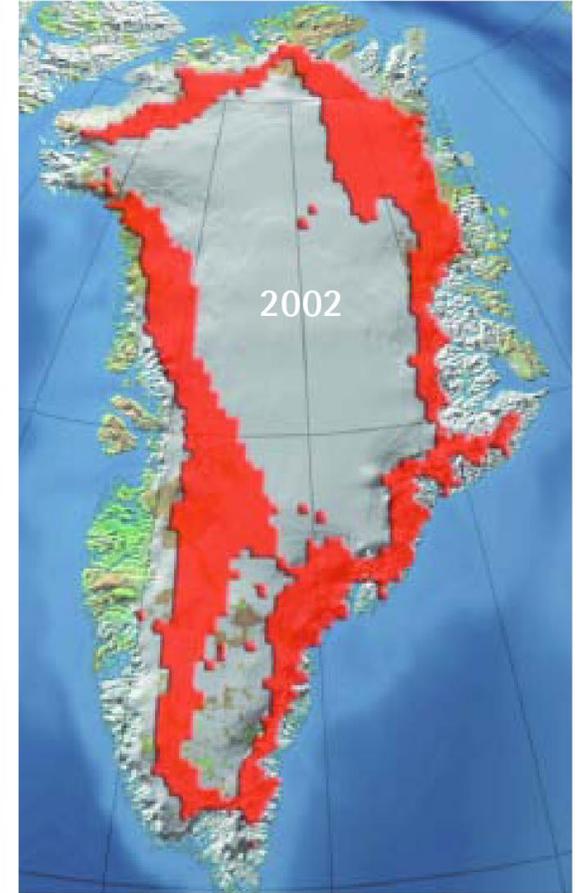
Satellite determination of extent of glacial ice 1992 vs 2002



NASA



1992



2002

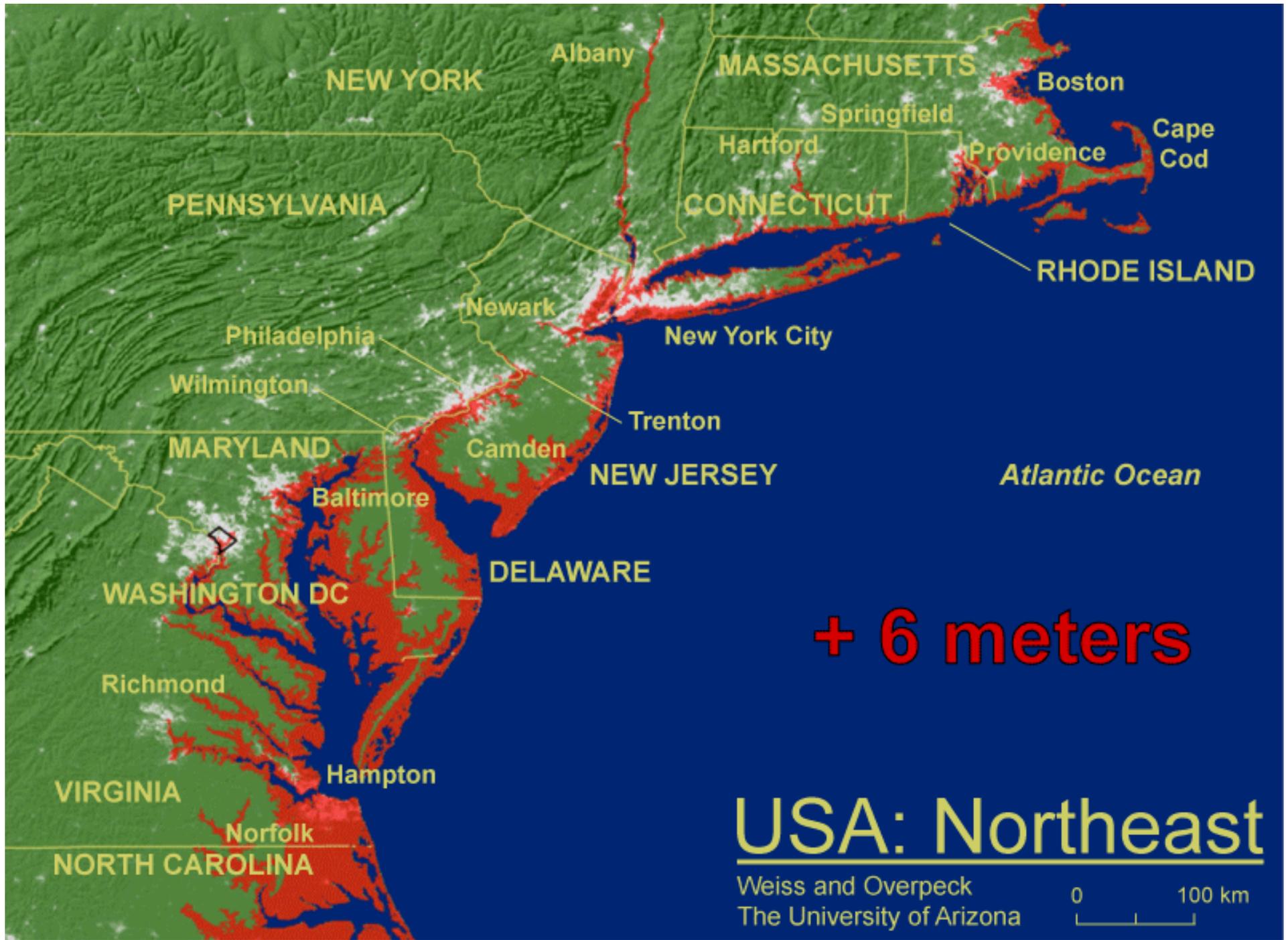
Arctic Climate Impact Assessment, Cambridge, 2004

Complete melt of the Greenland ice sheet would raise the level of the global ocean 7 meters.



6 meters







"Gentlemen, it's time we gave some serious thought to the effects of global warming."

CONCLUDING REMARKS

Atmospheric carbon dioxide will continue to increase absent major changes in the world's energy economy.

The consequences of this increase are not well known but they range from *serious* to *severe* to *catastrophic*.

Present scientific understanding is sufficient to permit “no regrets” decision making.

Research is urgently needed to refine “what if” projections.

Actions taken (or not taken) today will inevitably affect future generations.

***WHERE IS THIS CARBON DIOXIDE COMING FROM?
WE ARE ALL RESPONSIBLE.***



Burning a gallon of gasoline in your car puts 5 pounds of carbon in the atmosphere as carbon dioxide (CO₂), and it will stay there for decades — maybe a century!

Other sources are home heating and electric power production.



Global Atmosphere, Global Warming

QUESTIONS ABOUT GLOBAL WARMING

- IS IT REAL?
- IS IT IMPORTANT?
- WHAT IS IT DUE TO?
- HOW MUCH MORE CAN WE EXPECT?
- ARE WE SEEING JUST THE TIP OF THE ICEBERG?



***RESEARCH AT BROOKHAVEN
NATIONAL LABORATORY IS HELPING
TO ANSWER THESE QUESTIONS.***