

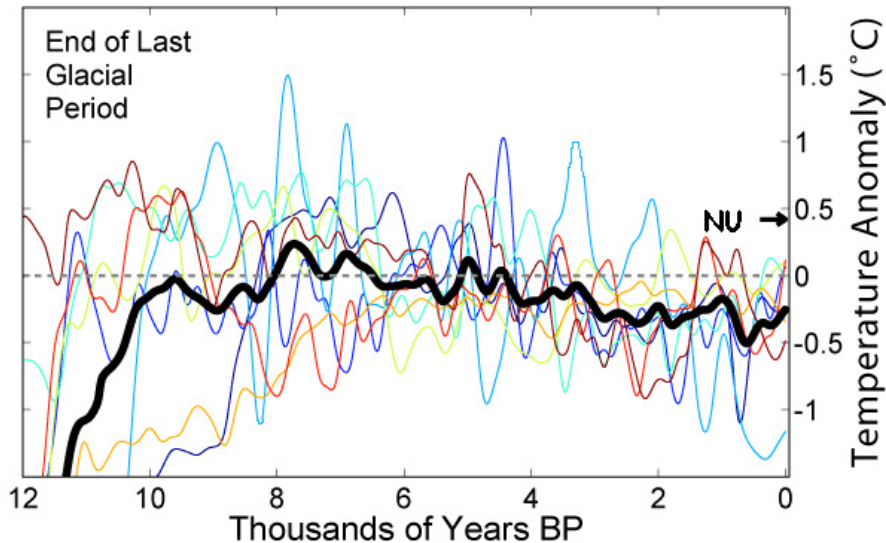
# Klimaforandringer -status og scenarier med særlig blik på det arktiske område



Dorthe Dahl-Jensen, Niels Bohr Institut, Københavns Universitet

# Klima og hav niveau

Holocene Temperature Variations



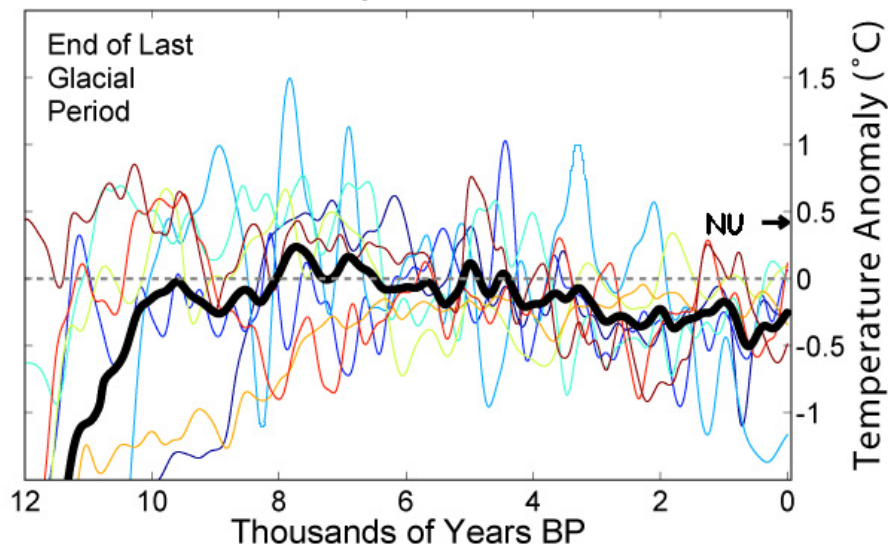
**Vi har været i en varm mellemistid  
I de sidste 11.700 år.**

**Vi har haft klimaændringer i denne  
periode.**

**Det klimatiske optimum for 8000 til  
5000 år før nu var også en varm  
periode.**

# Klima og hav niveau

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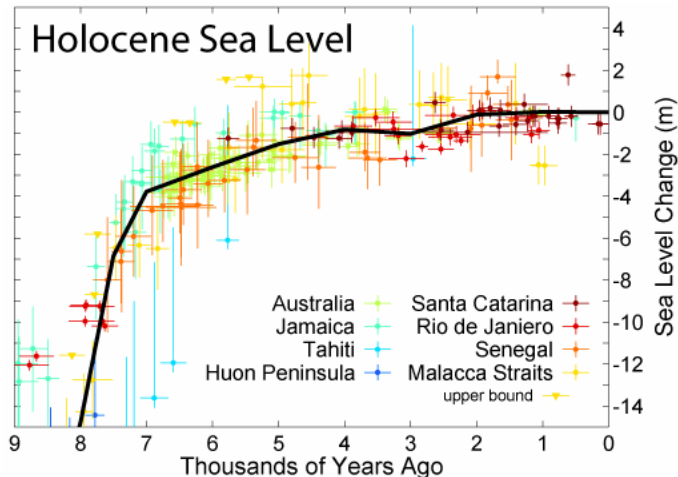


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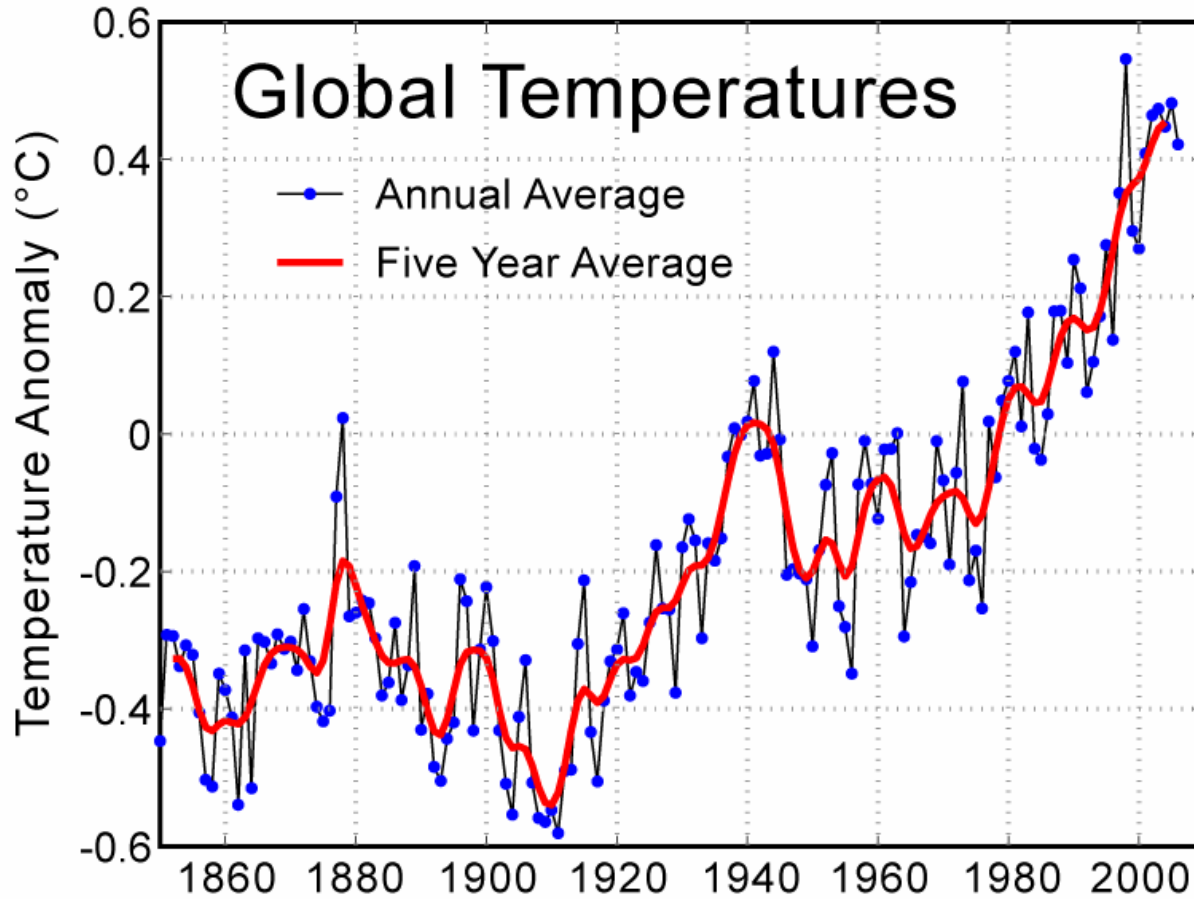
## Holocene Sea Level



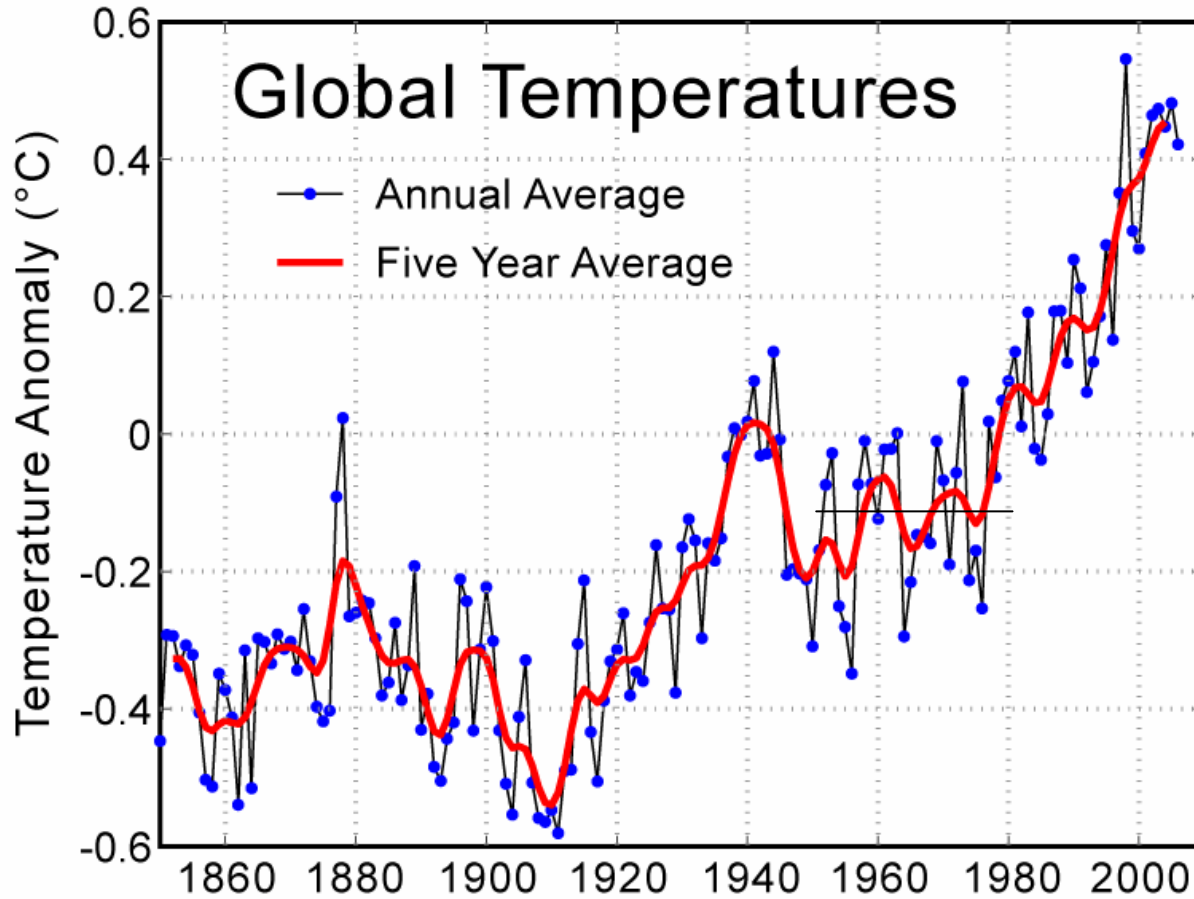
**Under istiden var havniveauet 110 m  
Lavere end nu.**

**Der har været en jævn stigning i hav  
niveauet gennem hele mellemistiden**

# Global opwarming



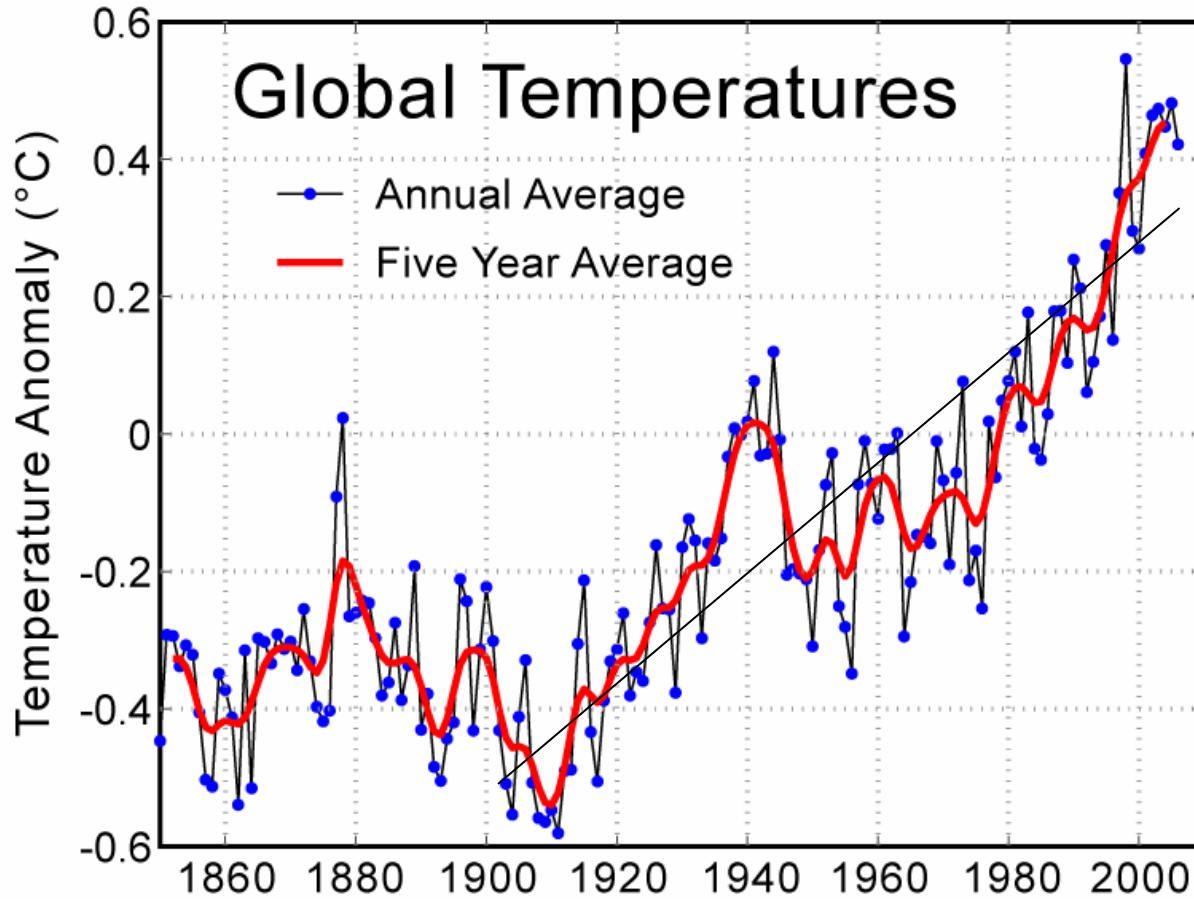
# Global opvarming



**Temperatur stigning på 0.53°C siden perioden (1951-1980)**

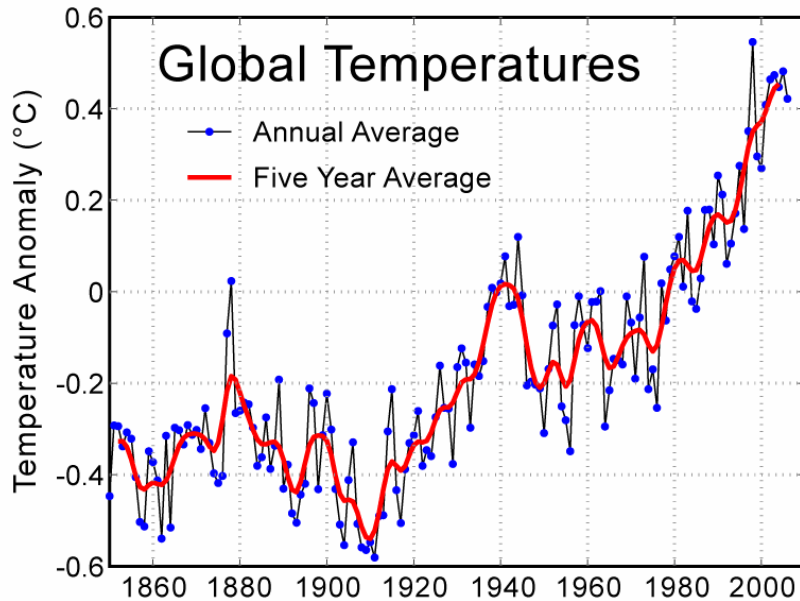


# Global opvarming

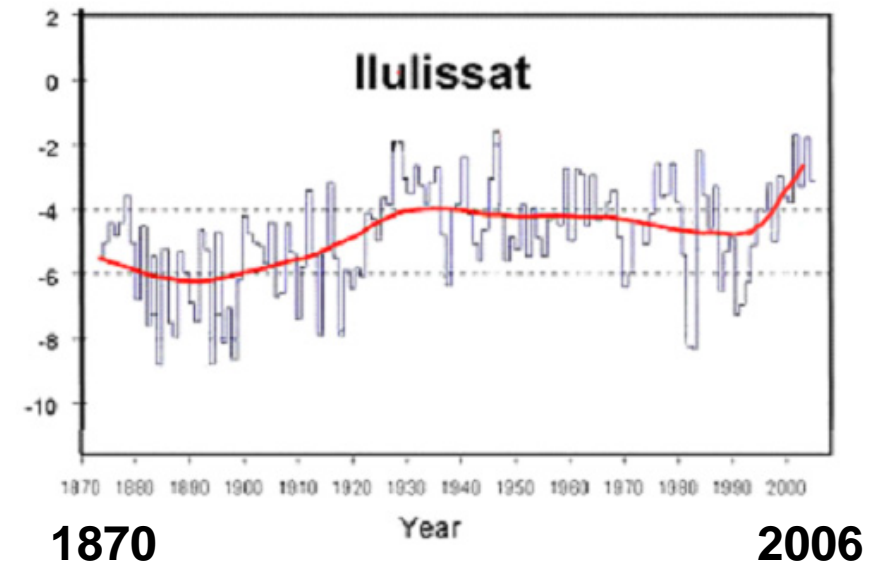
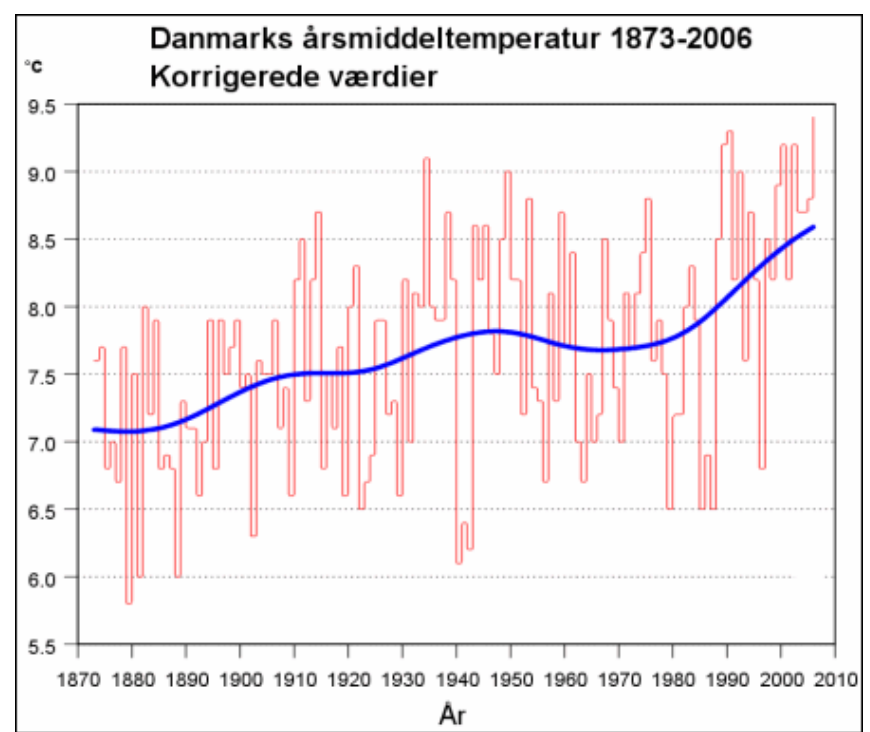


**Temperatur stigning på 0.74°C i løbet af de sidste 100 år**

# Global opvarming



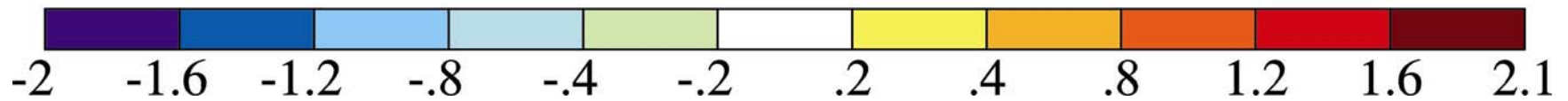
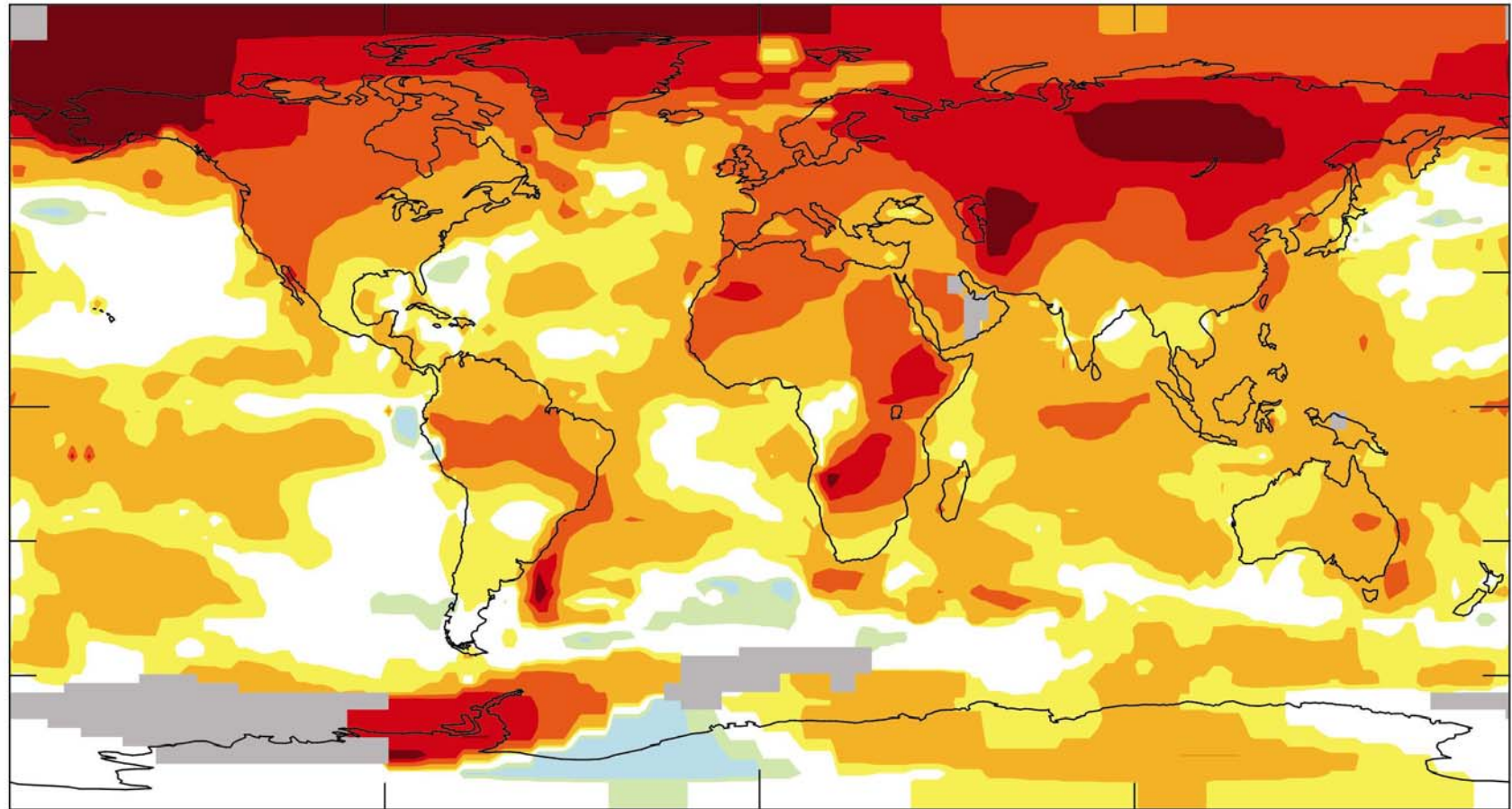
Temperaturkurver for Danmark og Grønland fra DMI



# 2001-2005 Mean Surface Temperature Anomaly ( $^{\circ}\text{C}$ )

Base Period = 1951-1980

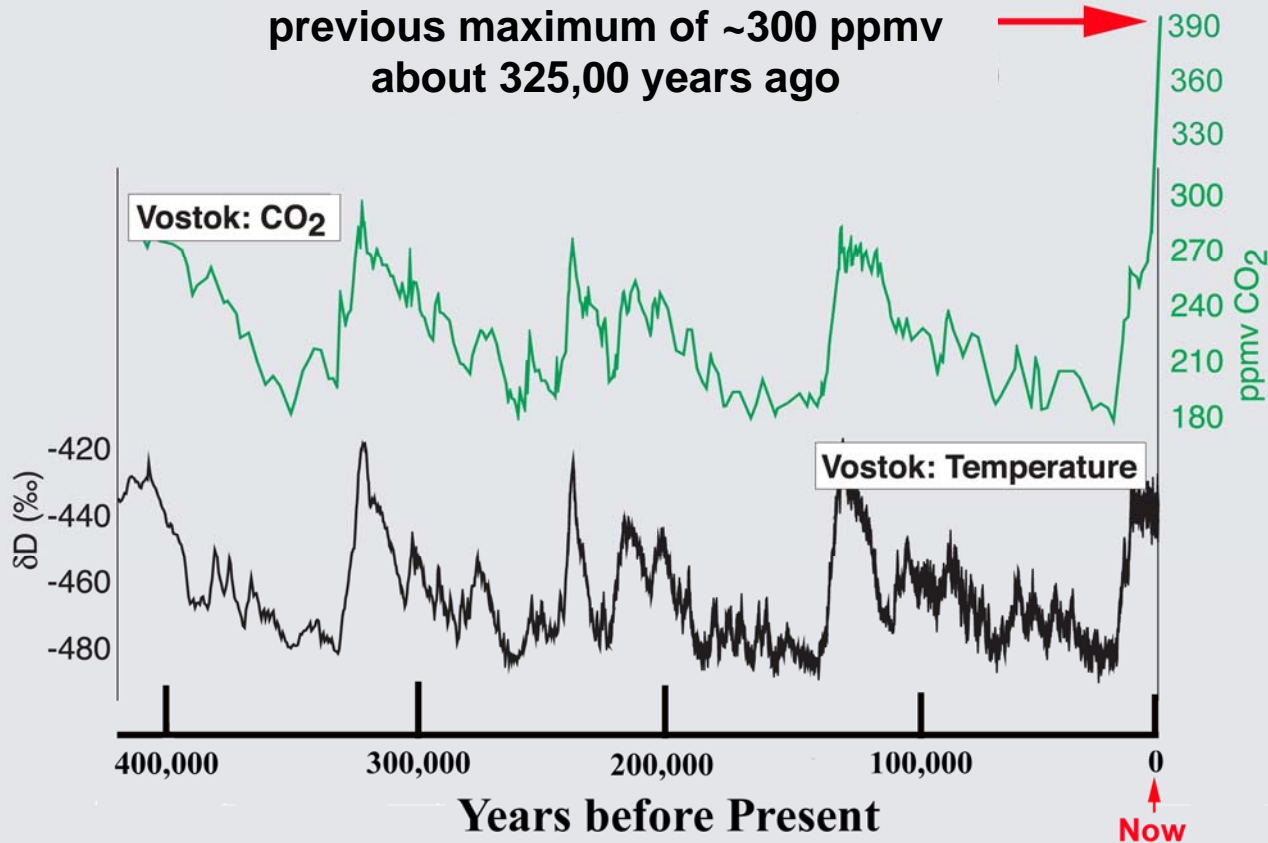
Global Mean = 0.53





# CO<sub>2</sub> Concentrations and Proxy Temperatures from the 400,000<sup>+</sup> years Vostok Ice Core Data Set.

CO<sub>2</sub> levels now 25% above the previous maximum of ~300 ppmv about 325,000 years ago

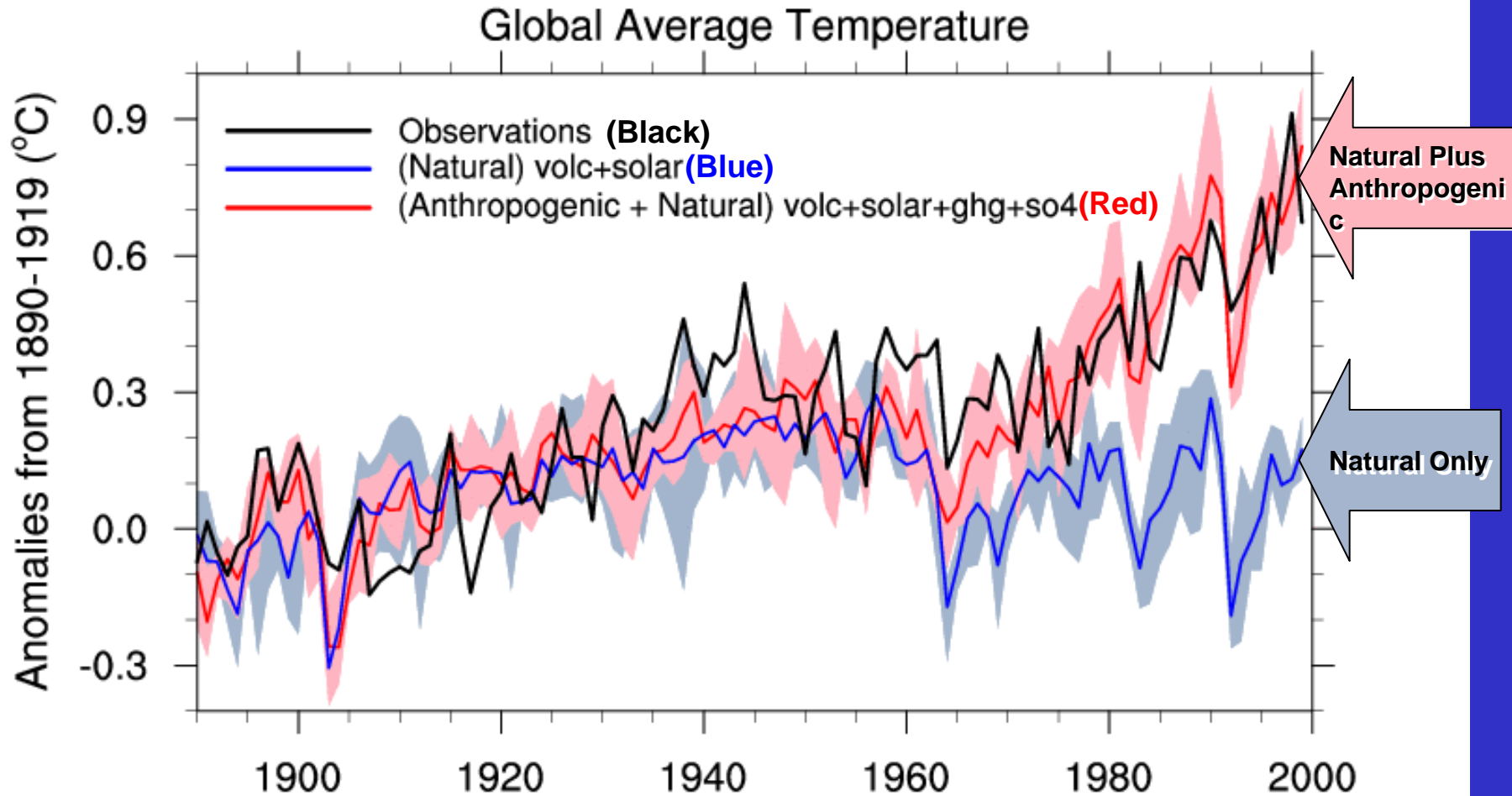


Tiny Hollow Spheres with Captured Air



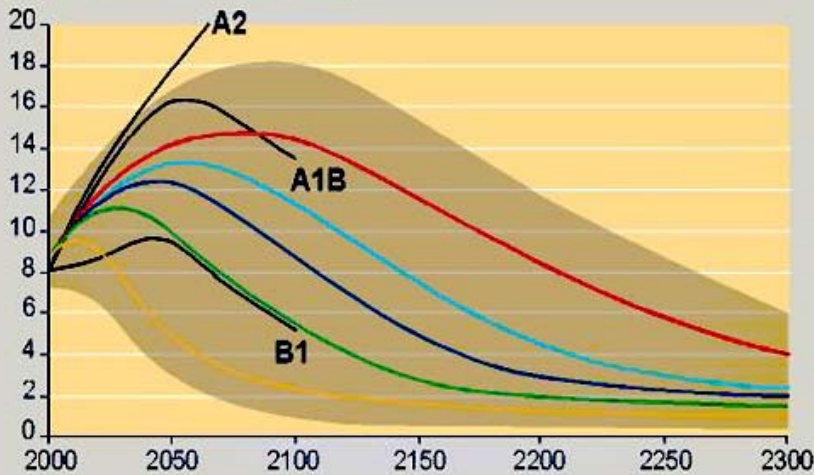
Cross-Section of an Ice Core

# How well are the models depicting the last 100 years?



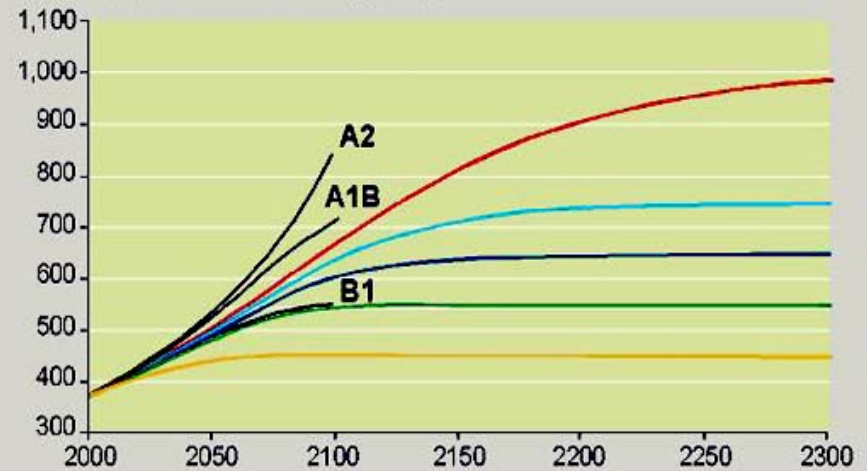
# CO<sub>2</sub> Emissions and Concentrations corresponding to different IPCC Scenarios.

(a) CO<sub>2</sub> emissions (Gt C)



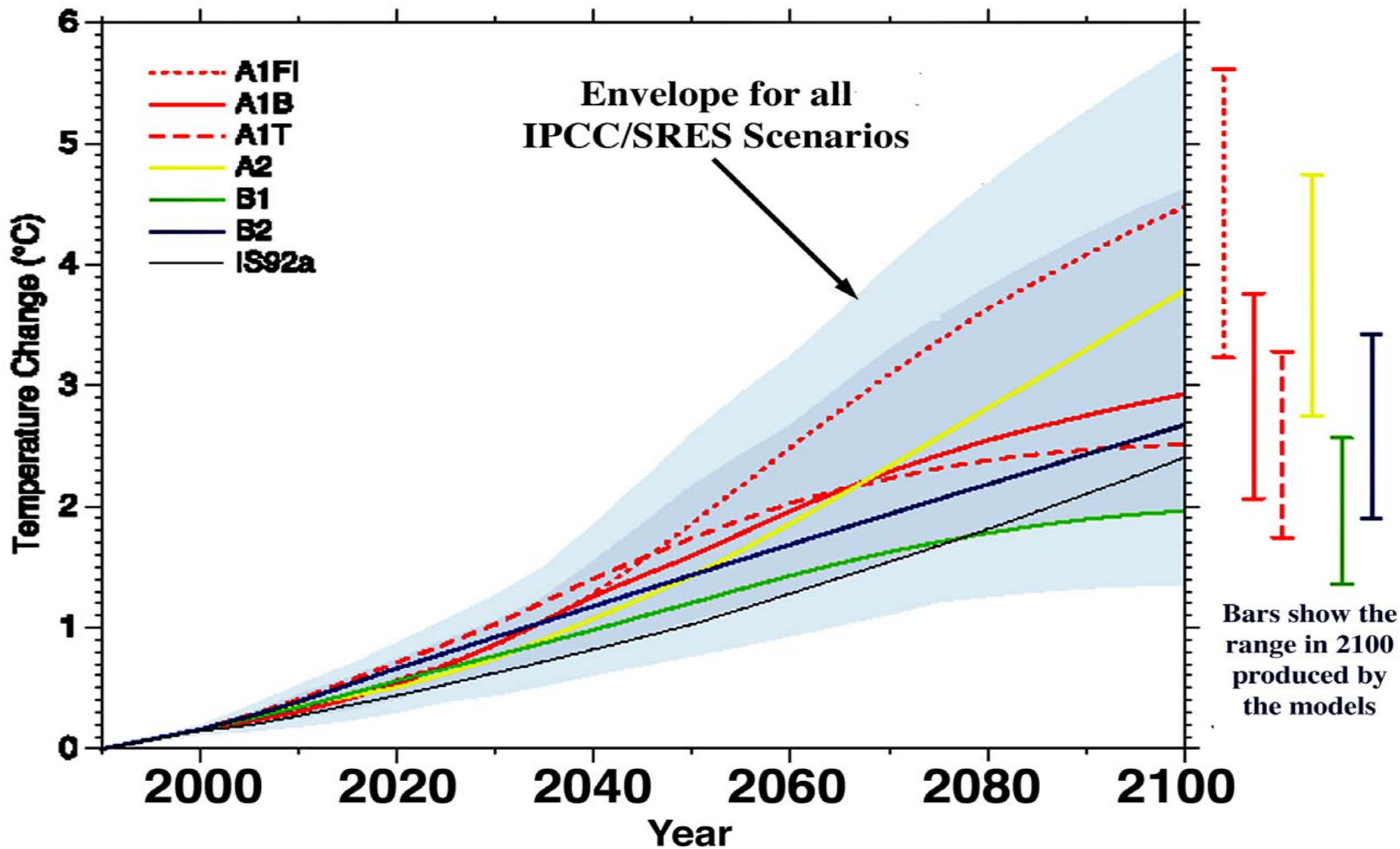
The CO<sub>2</sub> emission projections (i.e., energy uses and other sources) for the full range of scenarios used in the IPCC.

(b) CO<sub>2</sub> concentration (ppm)



The projections of CO<sub>2</sub> concentrations in the atmosphere for the full range of scenarios used in the IPCC.

# IPCC Scenarios for Climate Model Runs

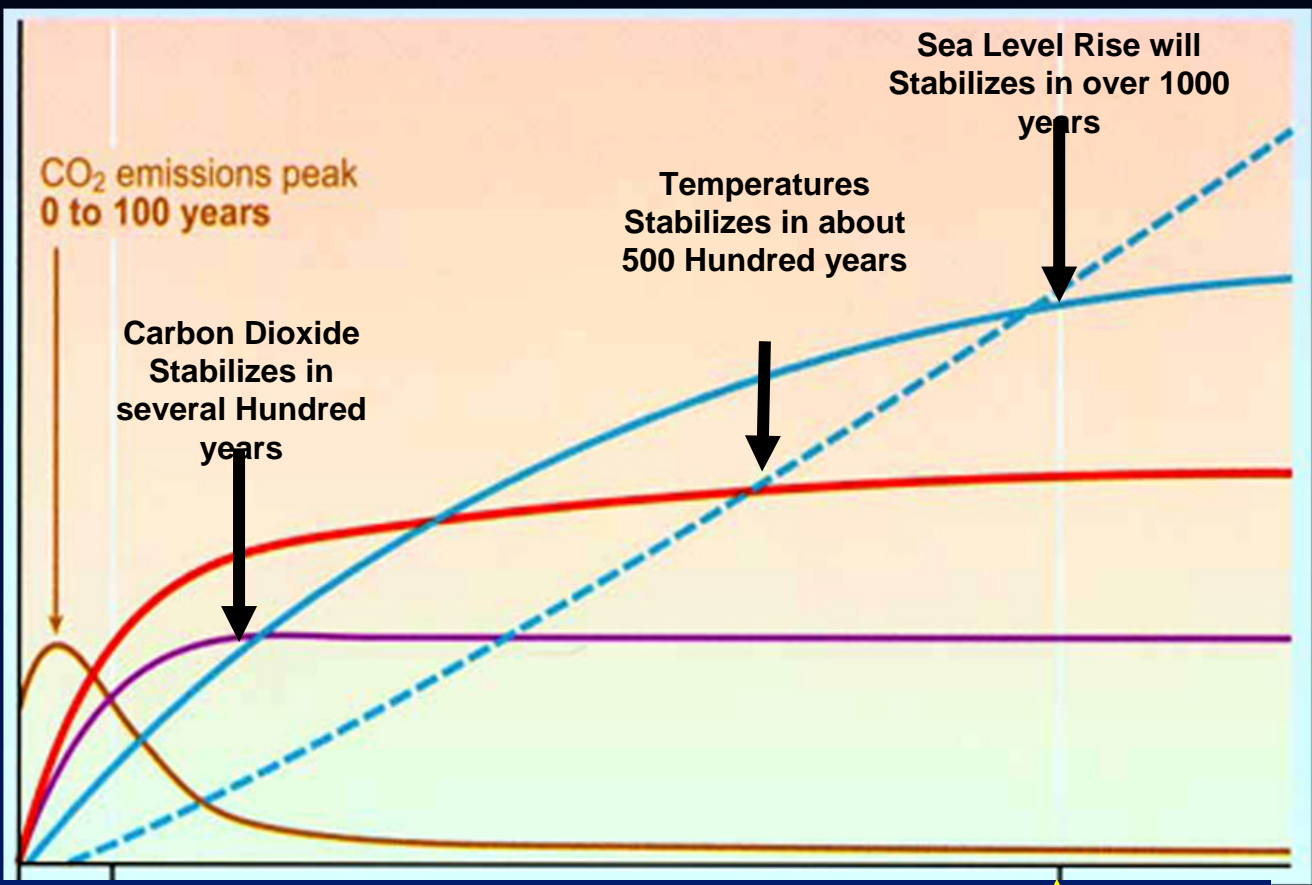




# There is a fundamental asymmetry between the time scales that the climate system reacts to increases in greenhouse gases and the time scales to recover from such increases.

Magnitude

Time to Equilibrium



Sea-level rise due to ice melting:  
SEVERAL MILLENNIA

Sea-level rise due to thermal expansion:  
CENTURIES TO MILLENNIA

Temperature Stabilization:  
A FEW CENTURIES

CO<sub>2</sub> Stabilization:  
100 to 300 YEARS

CO<sub>2</sub> Emissions

Today

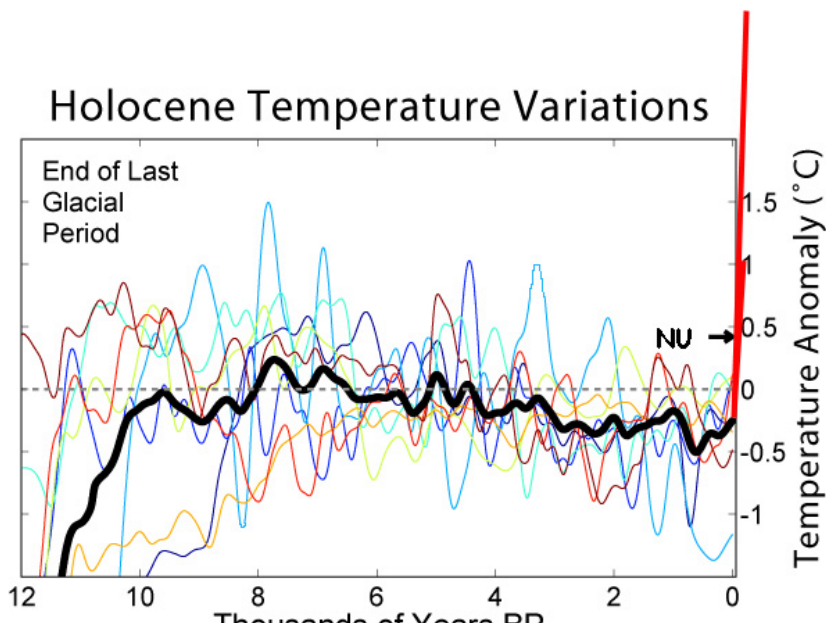
100 Years

1000 Years



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Holocene Temperature Variations



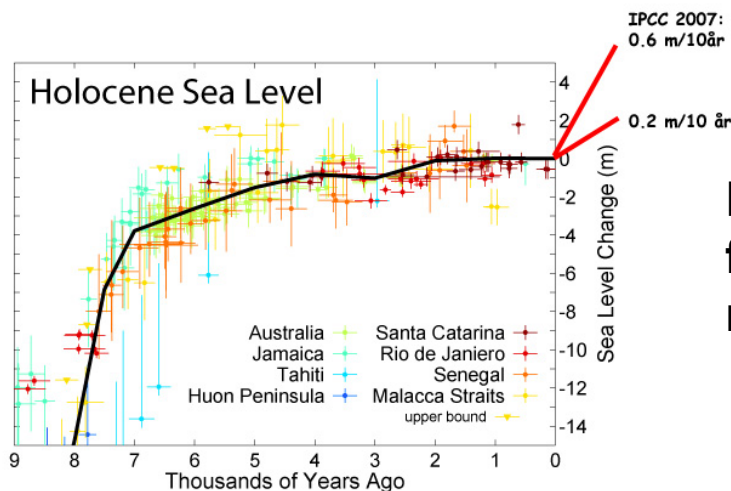
**Opvarmningen nu er stadig beskeden**

**Vi må se frem til en stor temperatur stigninger i fremtiden**

**Det er tankevækkende så alvorlige konsekvenser af opvarmningen vi allerede har nu**

**Vi er meget følsomme overfor ændringer fordi Jordens befolkning er stor**

**Både en ansvarlige energi politik for fremtiden og en tilpasnings politik er nødvendige**



# Ilulissat Isstrøm trækker sig tilbage 1998-2005

51°W

Ja  
50°30'W

50°W

49°30'W

De hurtig flydende gletschere  
øger hastigheden

1998

7 km/y

2005

15 km/y

Ilulissat Isstrøm dræner 7%  
of Indlandsisens area

51°W

50°30'W

50°W

49°30'W

Landsat TM 1996

