

# **IPCC 4th Assessment Report - Overview**

**2nd IEA/CSLF Workshop on CCS  
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## **Intergovernmental Panel on Climate Change (IPCC)**

- Established in 1988 by UNEP and WMO
- Provide independent scientific advice on climate change
- Policy relevant but not policy prescriptive
- The Panel does not carry out research, but bases its assessments mainly on peer reviewed and published scientific literature
- The IPCC has been the most important scientific source for the climate policy process under UNFCCC

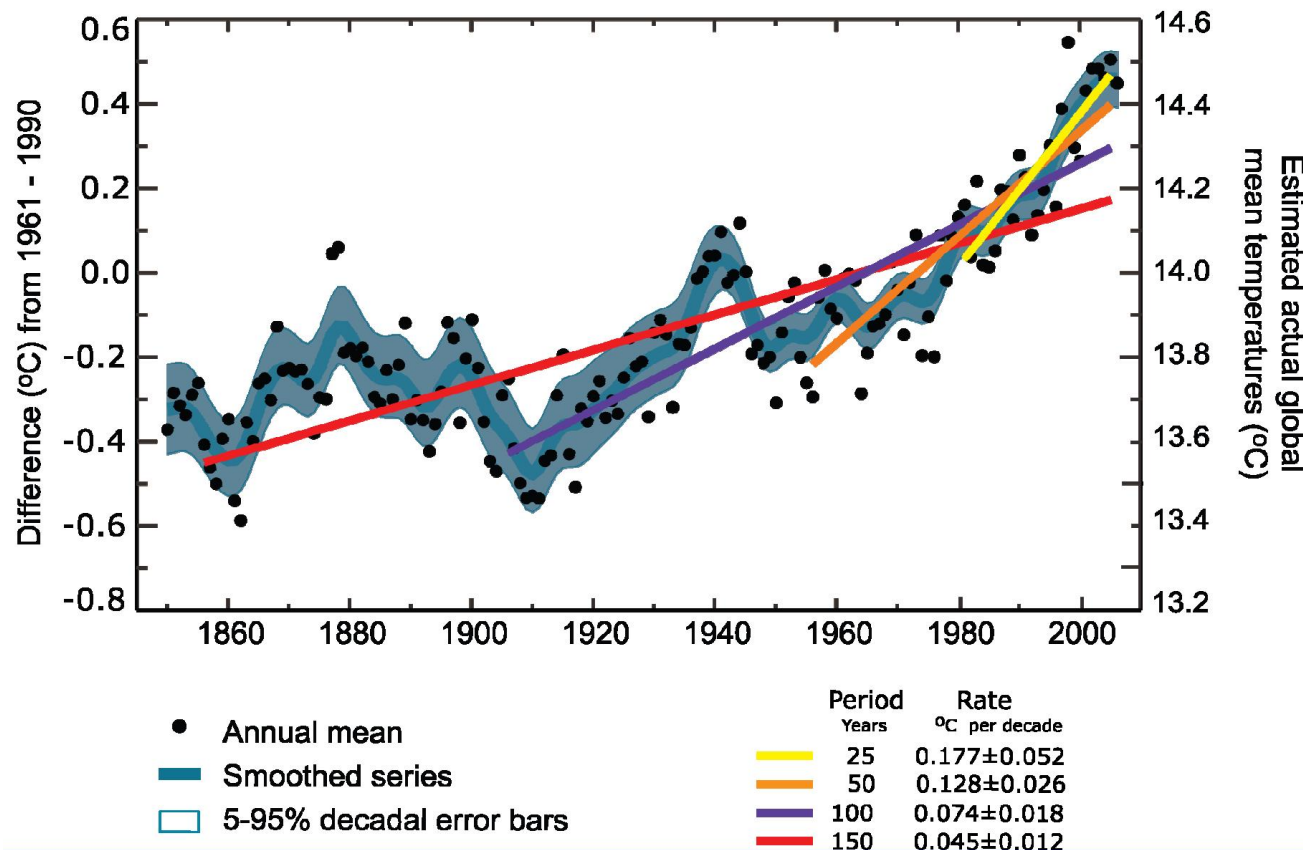
## **The IPCC 4th Assessment Report**

- **WG I - The Physical Science Basis – 2 February 2007**
- **WG II - Impacts, Adaptation and Vulnerability – 6 April 2007**
- **WG III - Mitigation of Climate Change – 4 May 2007**
- **Synthesis Report (SYS) – 16 November 2007**

## The IPCC 4th Assessment Report

- Major advance over 3rd Assessment Report:
  - Substantial new research
  - Gaps addressed
  - Tighter estimates
- Greater confidence and reduced uncertainty
- Improved observation and data sets
- Greater regional insights

“Most of the observed increase in globally averaged temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic greenhouse gas concentrations”

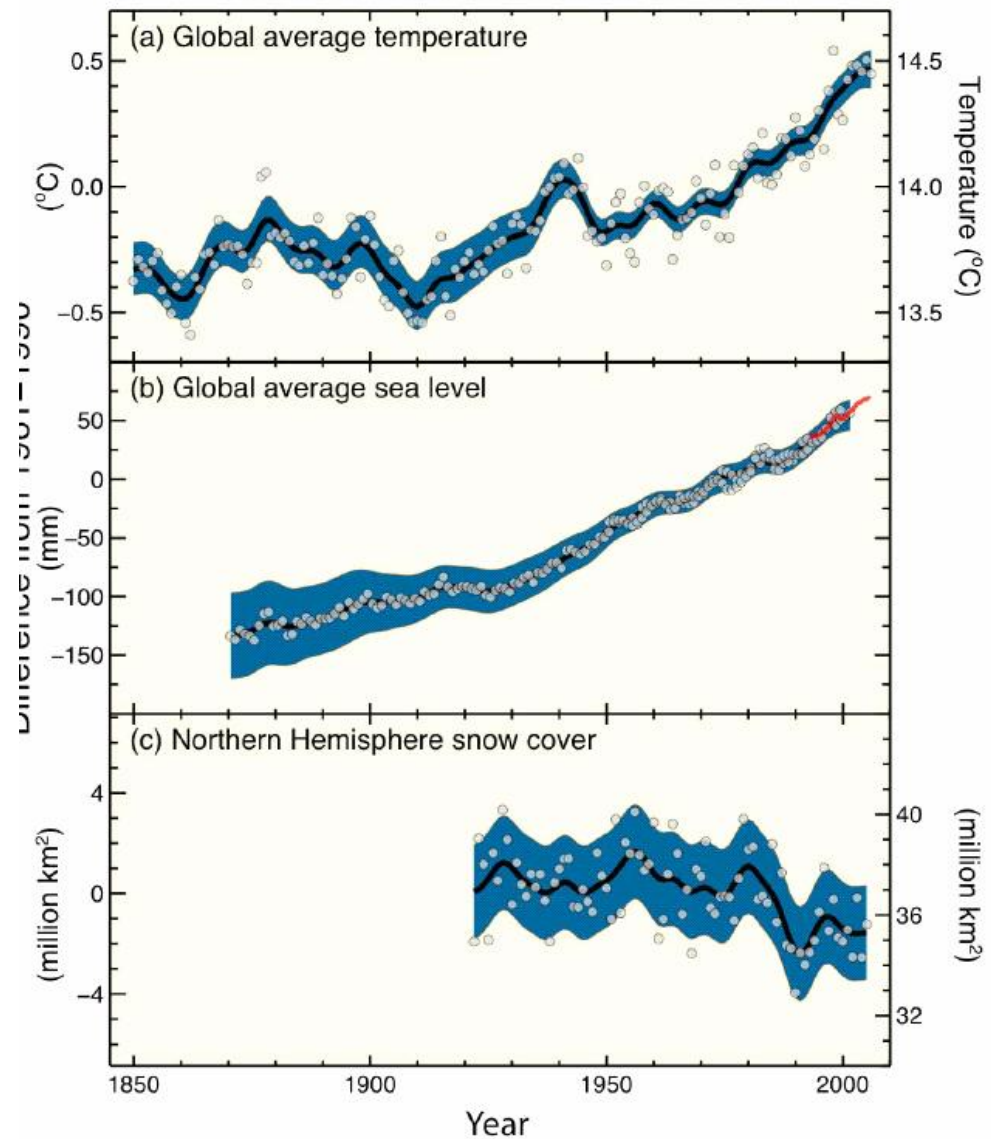


**The global temperature increased by 0.74 °C last 100 years**

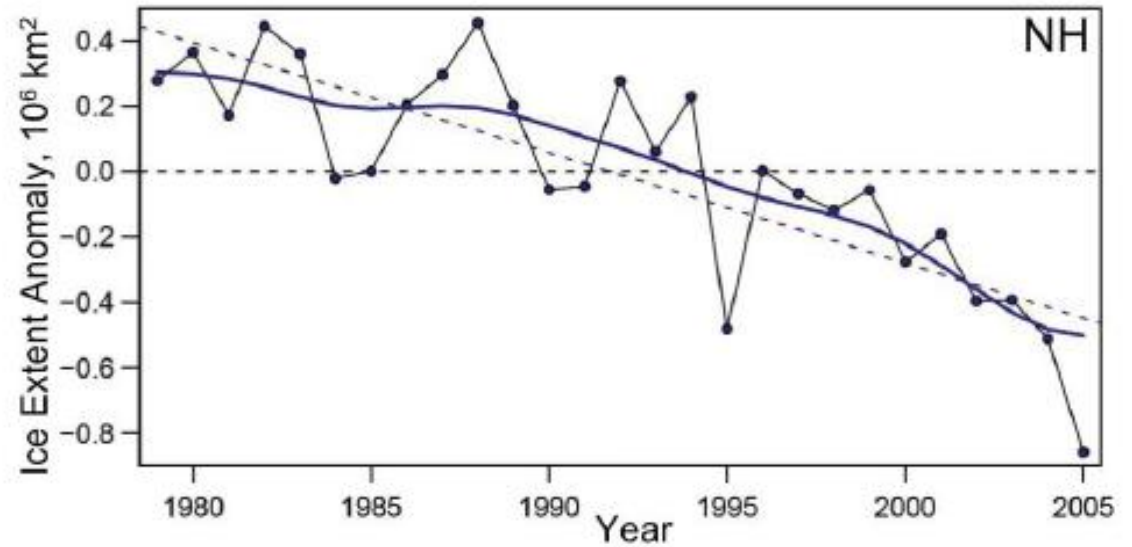
**The global average sea level rose by 17 cm last 100 years**

**Northern hemisphere snow cover has been reduced by 10%**

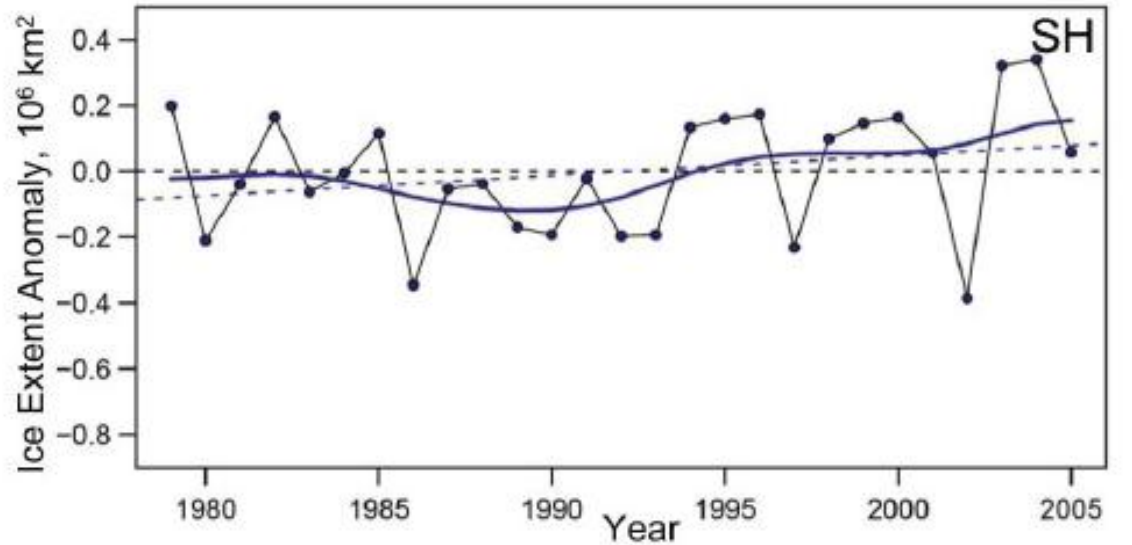
Changes in Temperature, Sea Level and Northern Hemisphere Snow Cover



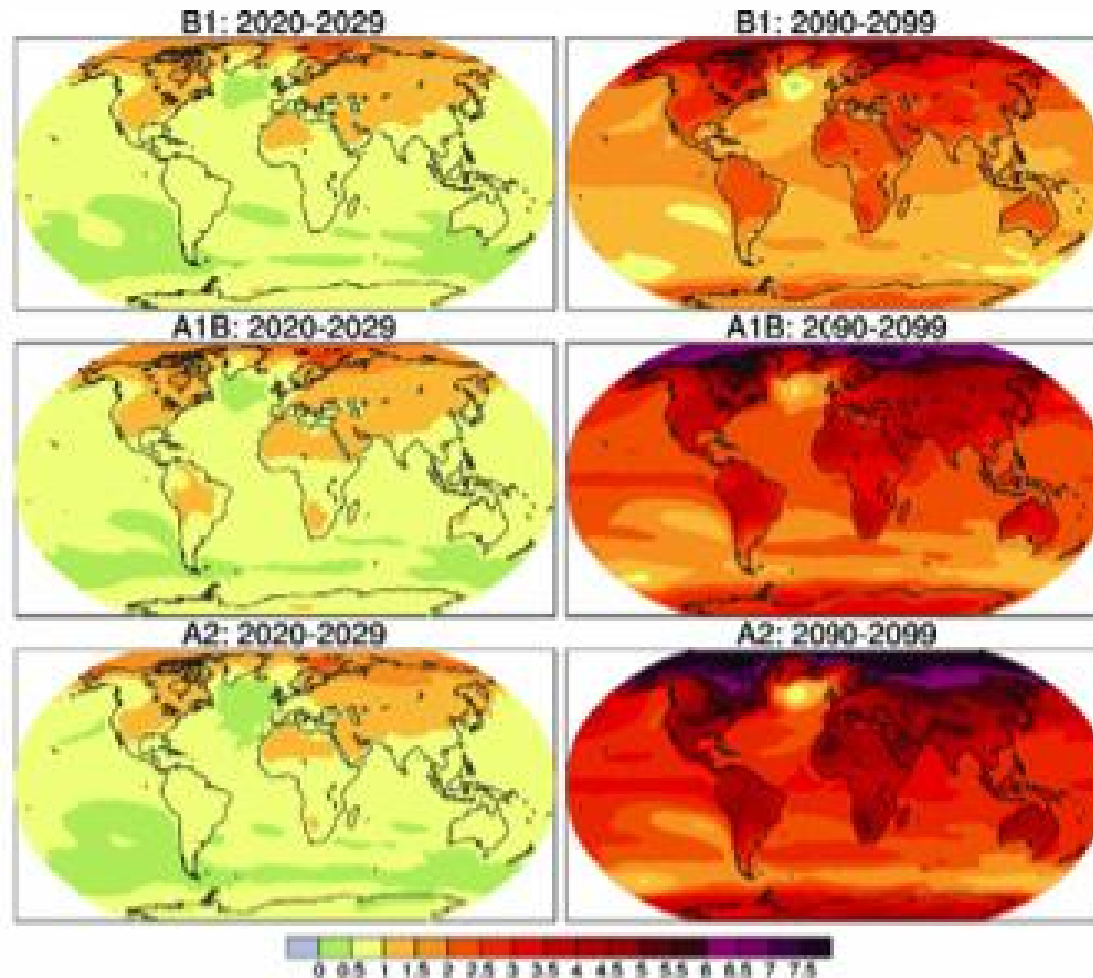
**Arctic sea ice extent:  
1980-2005 trend - 2.7%  
per decade**



**Antarctica sea ice extent:  
no statistical significant  
trend**



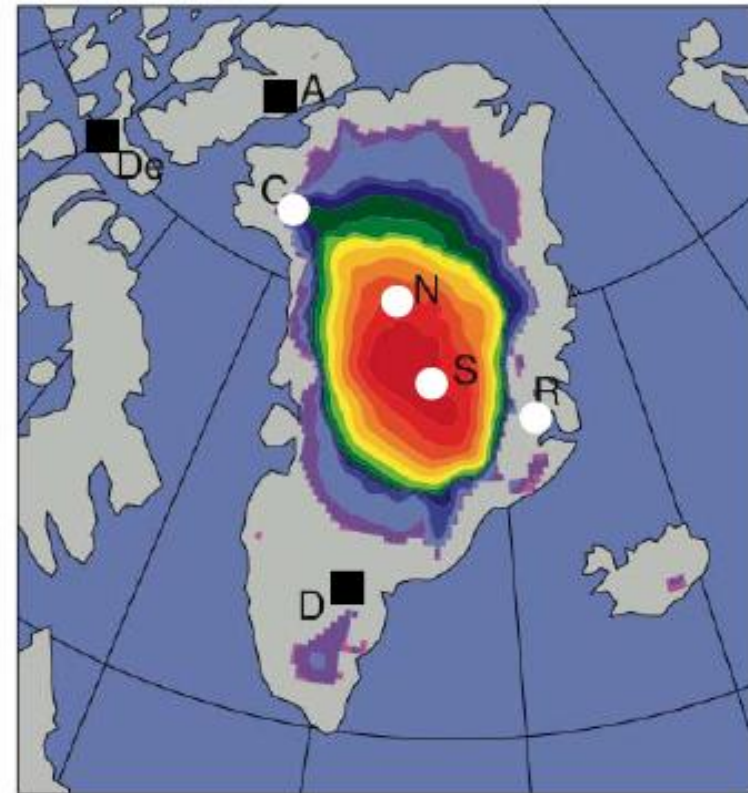
The global temperature can increase by 1.1–6.4 °C next 100 years - best estimate being 3 °C



**Greatest warming over land and high northern latitudes**

The last time polar regions were significant warmer than present (125,000 years ago), reduction in polar ice volume led to 4 to 6 meters of sea level rise

### Annual Ice Thickness and Extent at Last Interglacial



Meters

## **Current knowledge about future impacts of climate change**

- Fresh water resources and their management:

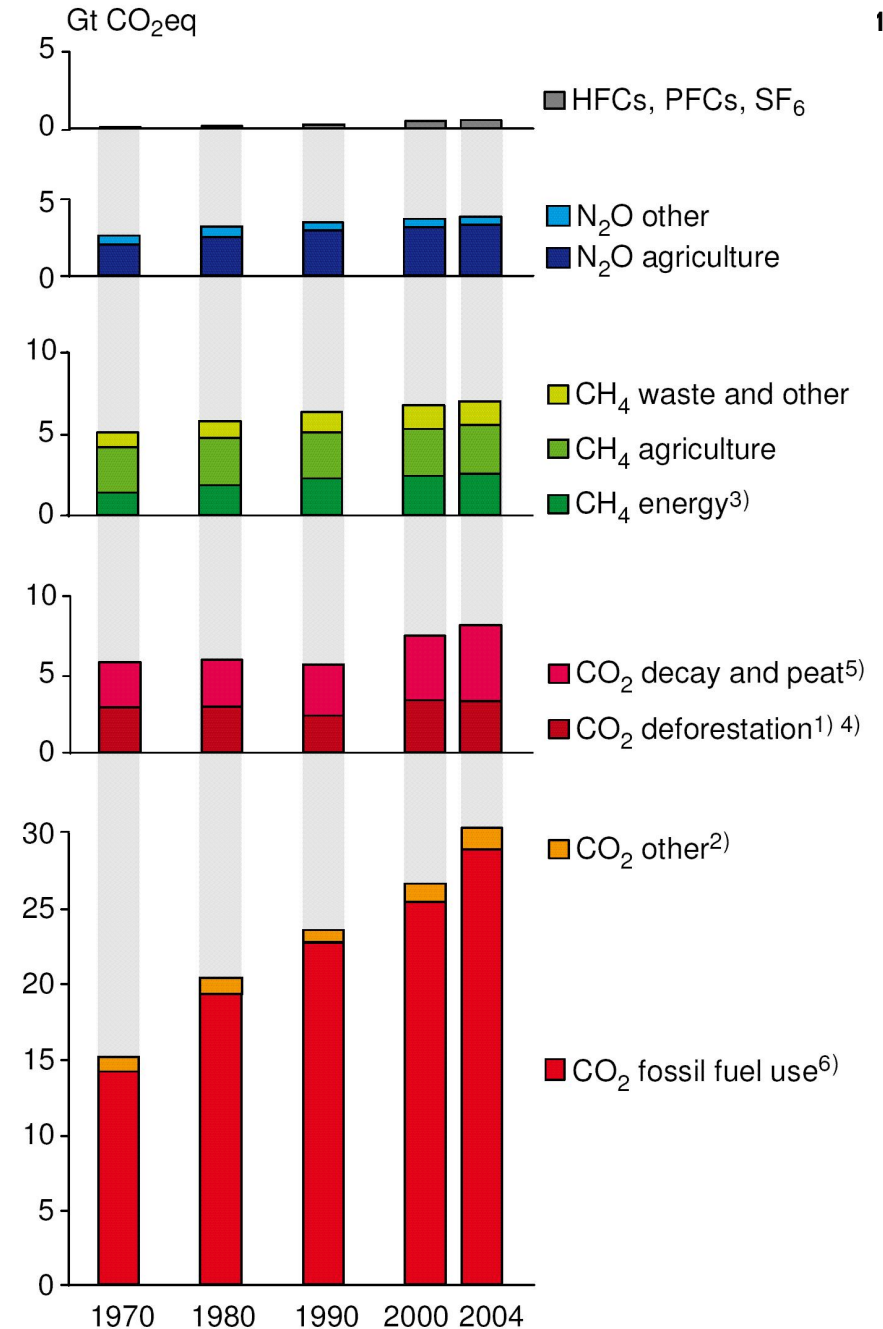
Drought-affected areas will likely increase.

Heavy precipitation events is very likely to increase

- Ecosystems:

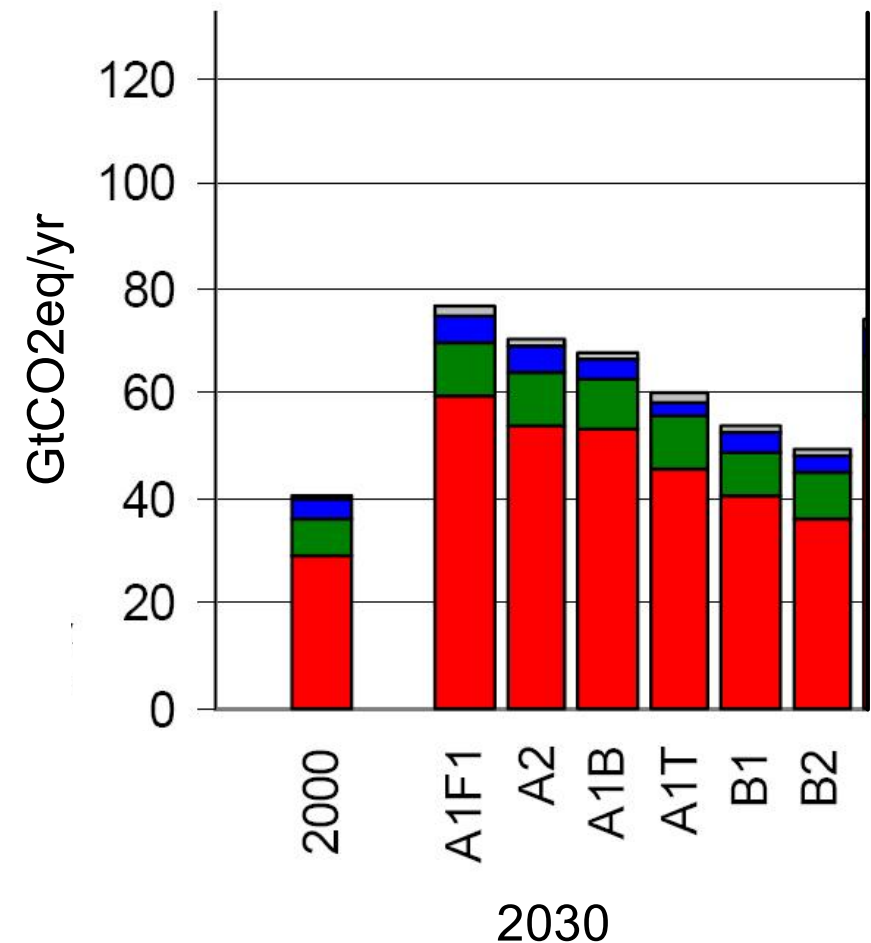
Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5 °C.

- Global greenhouse gas emissions have increased by 70 % from 1970 to 2004
- CO<sub>2</sub> alone increased by 80 % from 1970 to 2004
- Mainly due to increased population and increased GDP



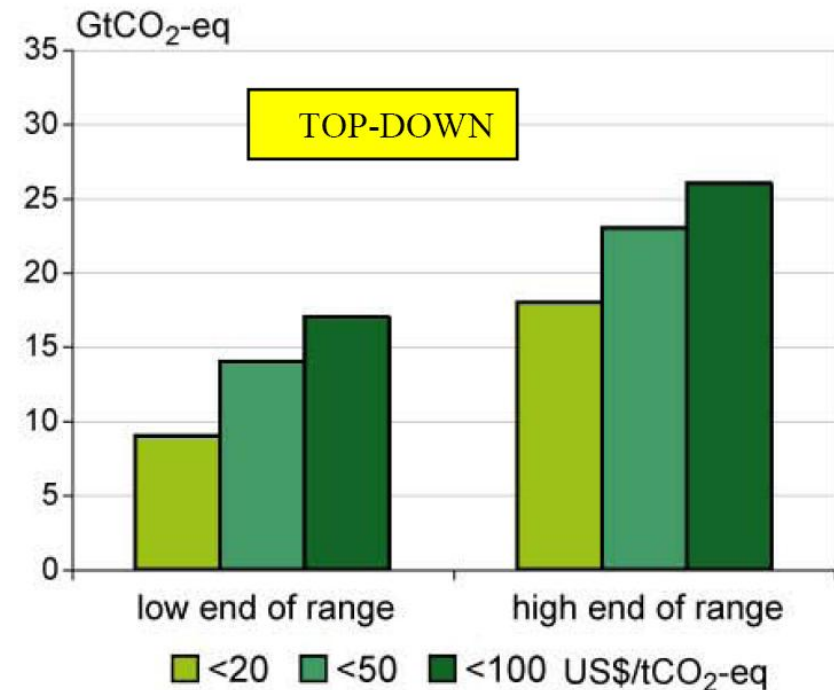
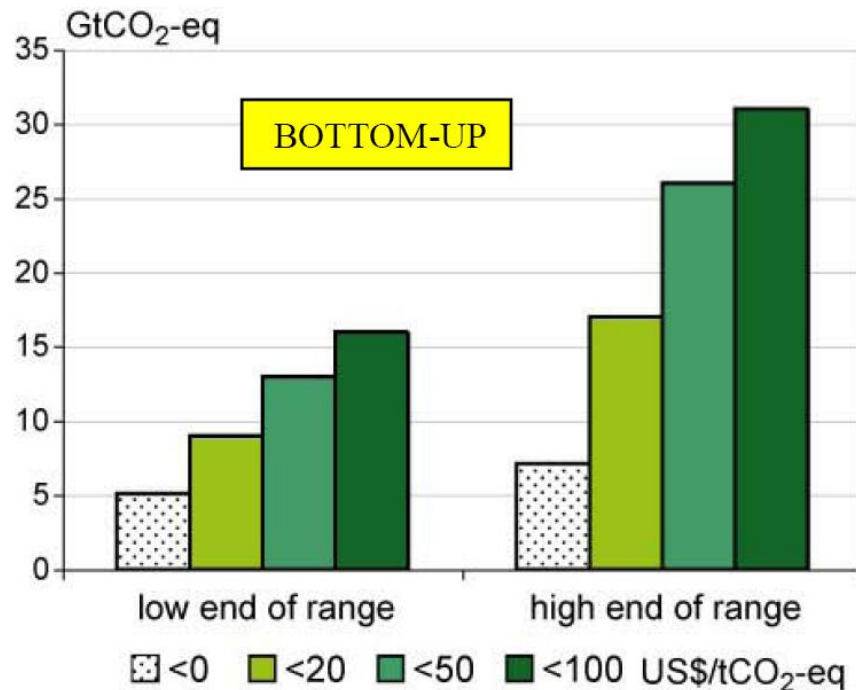
## Without new mitigation policies the emissions will continue to grow over the next few decades

- Based IPCC SRES scenarios GHG emissions will increase by 25-90% from 2000 to 2030
- 2/3 – 3/4 of the increase in CO<sub>2</sub>-emissions is projected to come in developing countries
- CO<sub>2</sub>-emissions per capita in 2030 will remain substantially lower in developing countries

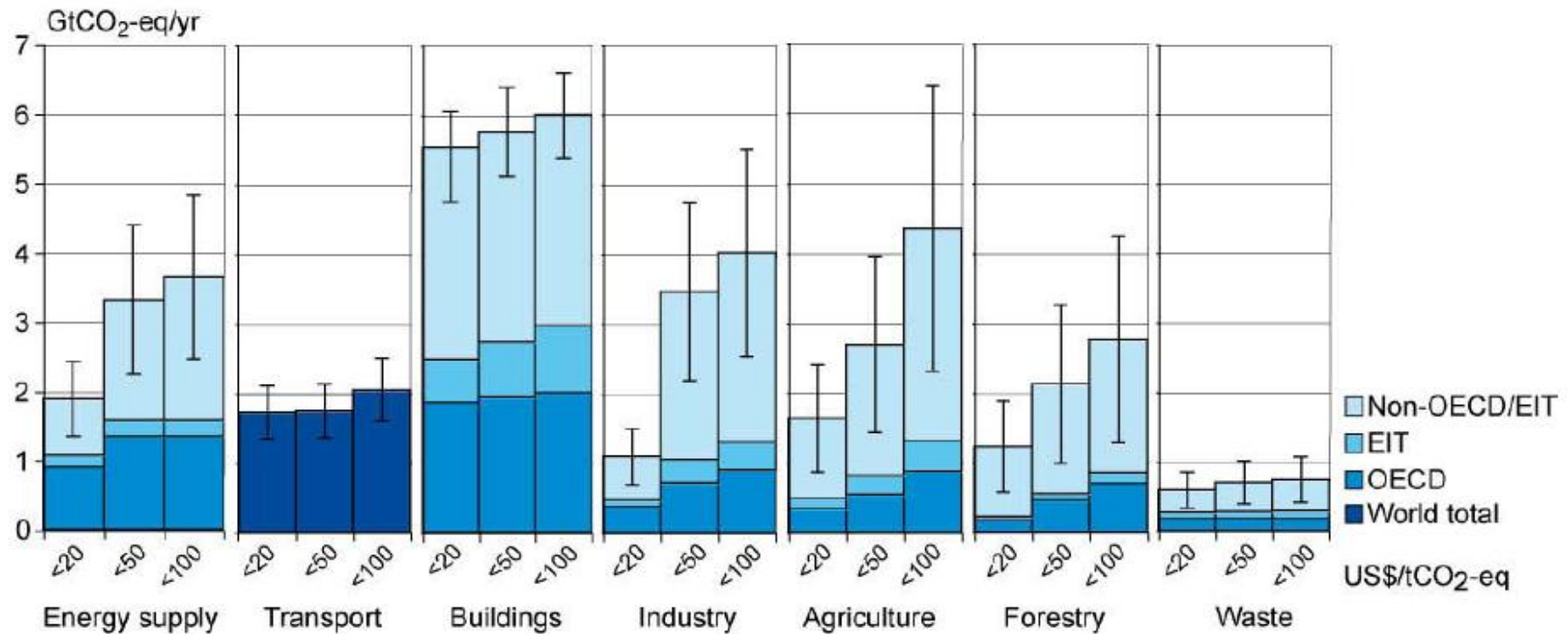


# Substantial economic potential for the mitigation of global GHG emissions over the coming decades

- Mitigation options with lower cost than 100 \$ per ton CO<sub>2</sub>-eq can reduce emissions in 2030 by 16-31 Gt (bottom-up studies)



# All sectors and regions have the potential to reduce GHG emissions



Changes in lifestyle and behaviour patterns can also contribute to climate change mitigation

## Macro-economic costs of a stabilization on 445-535 ppm CO<sub>2</sub>-eq are estimated at less than 3% GDP decrease in 2030

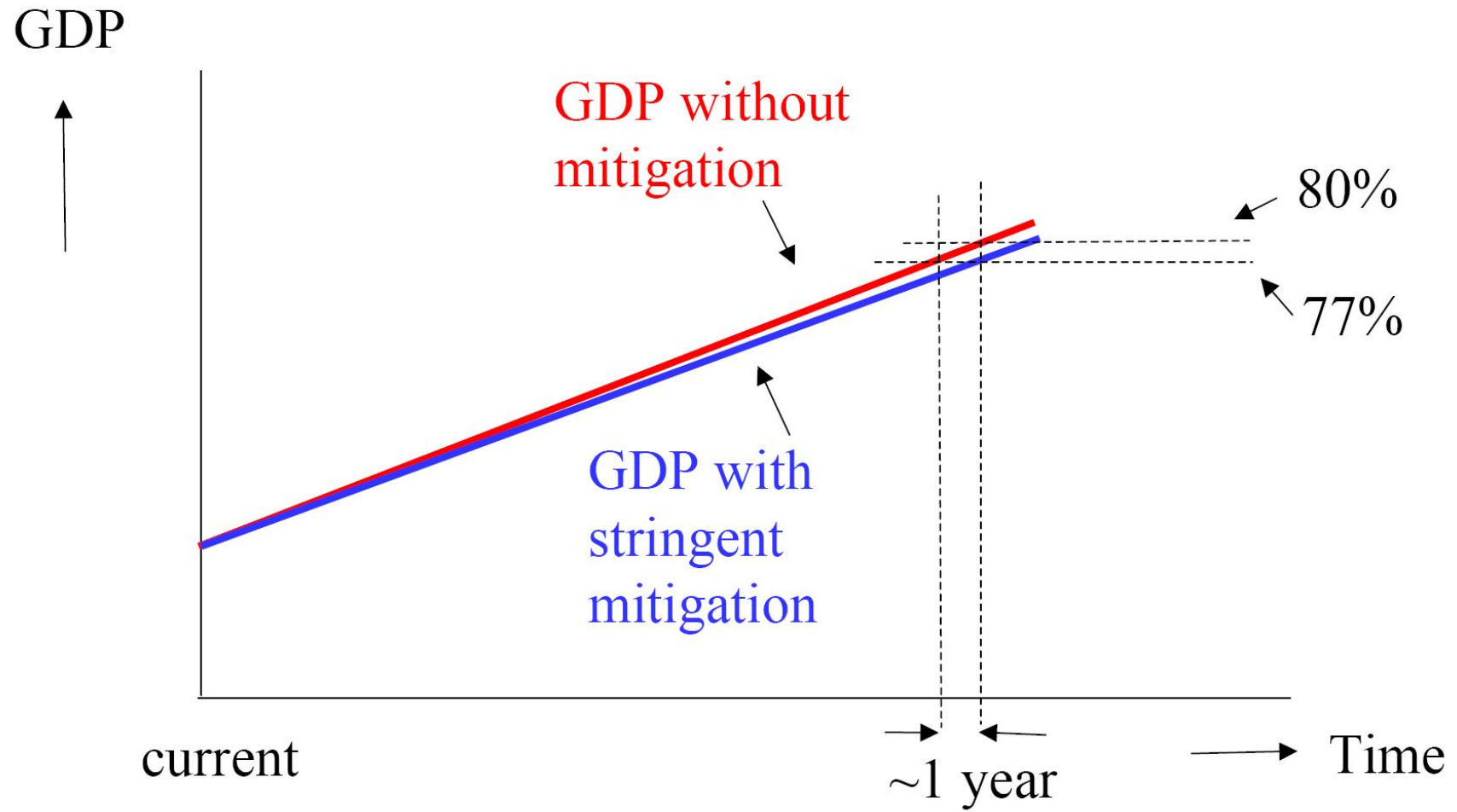
Trajectories towards stabilization levels (ppm CO <sub>2</sub> -eq)	Median GDP reduction <sup>[1]</sup> (%)	Range of GDP reduction <sup>[2]</sup> (%)	Reduction of average annual GDP growth rates <sup>[3]</sup> (percentage points)
590-710	0.2	-0.6 – 1.2	< 0.06
535-590	0.6	0.2 – 2.5	<0.1
445-535 <sup>[4]</sup>	Not available	< 3	< 0.12

<sup>[1]</sup> This is global GDP based market exchange rates.

<sup>[2]</sup> The median and the 10<sup>th</sup> and 90<sup>th</sup> percentile range of the analyzed data are given.

<sup>[3]</sup> The calculation of the reduction of the annual growth rate is based on the average reduction during the period till 2030 that would result in the indicated GDP decrease in 2030.

<sup>[4]</sup> The number of studies that report GDP results is relatively small and they generally use low baselines.



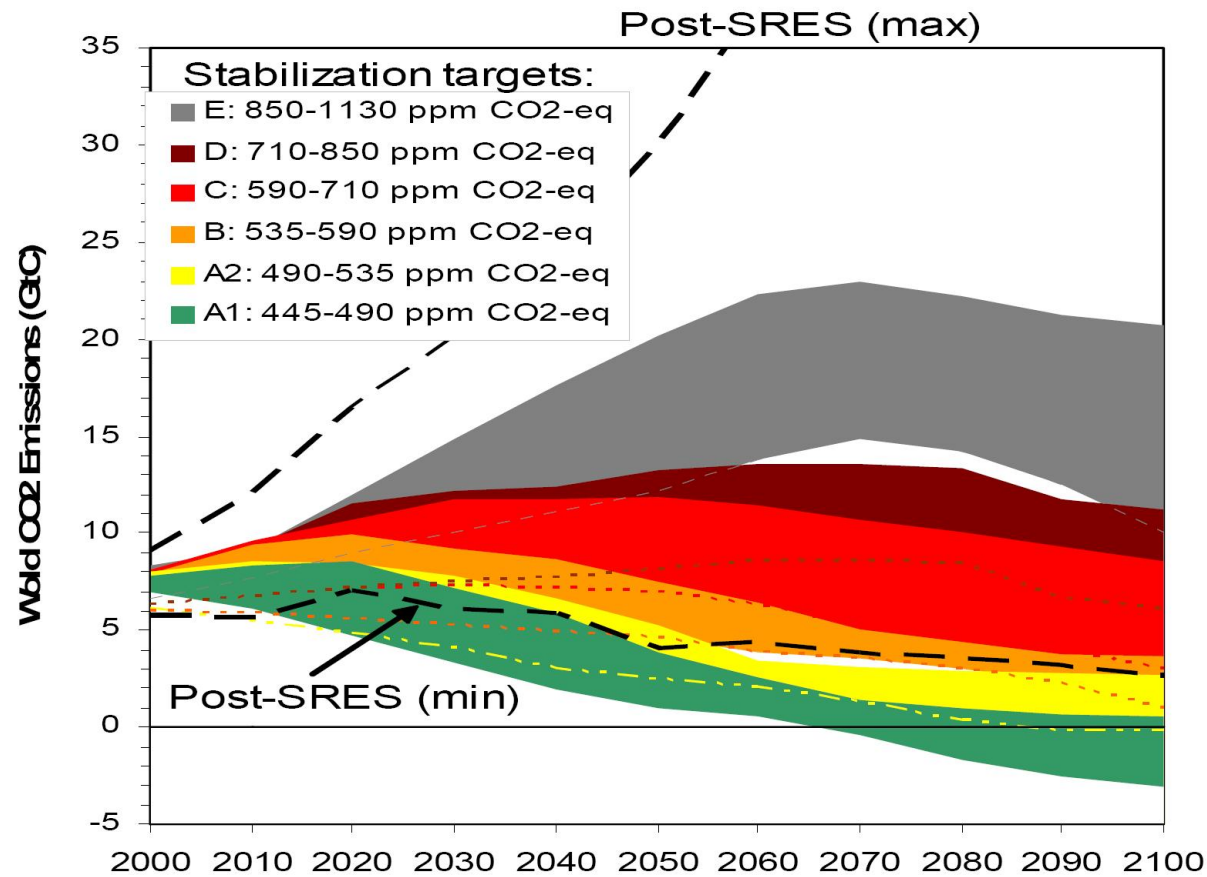
## **Co-benefits of mitigation can be substantial**

- Health benefits from reduced air pollution can offset a substantial fraction of the mitigation costs
- Mitigation can be positive for energy security, increased agricultural production and reduced pressure on natural ecosystems

## Long-term mitigation:

- In order to stabilize the GHG concentration on 445-490 ppm CO<sub>2</sub>-eq the global emissions need to be reduced by 50-85% in 2050
- The lower the stabilization level, the more quickly the emissions need to peak and decline thereafter
- Mitigation efforts over the next two to three decades will have a large impact on opportunities to achieve lower stabilization levels

# Emission pathway of mitigation scenarios for alternative stabilization levels



Thank you !

