



# IPCC en het Fifth Assessment Synthesis Report

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NNV Klimaatsymposium 29 oktober 2015

IPCC AR5 Synthesis Report

**ipcc**  
INTERGOVERNMENTAL PANEL ON climate change

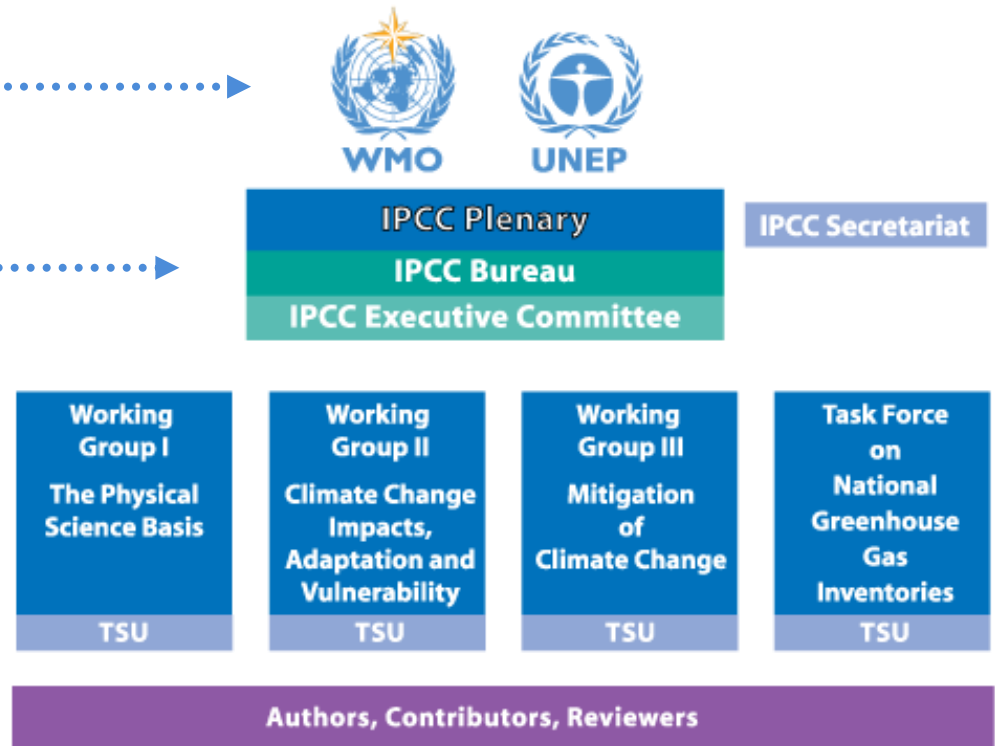


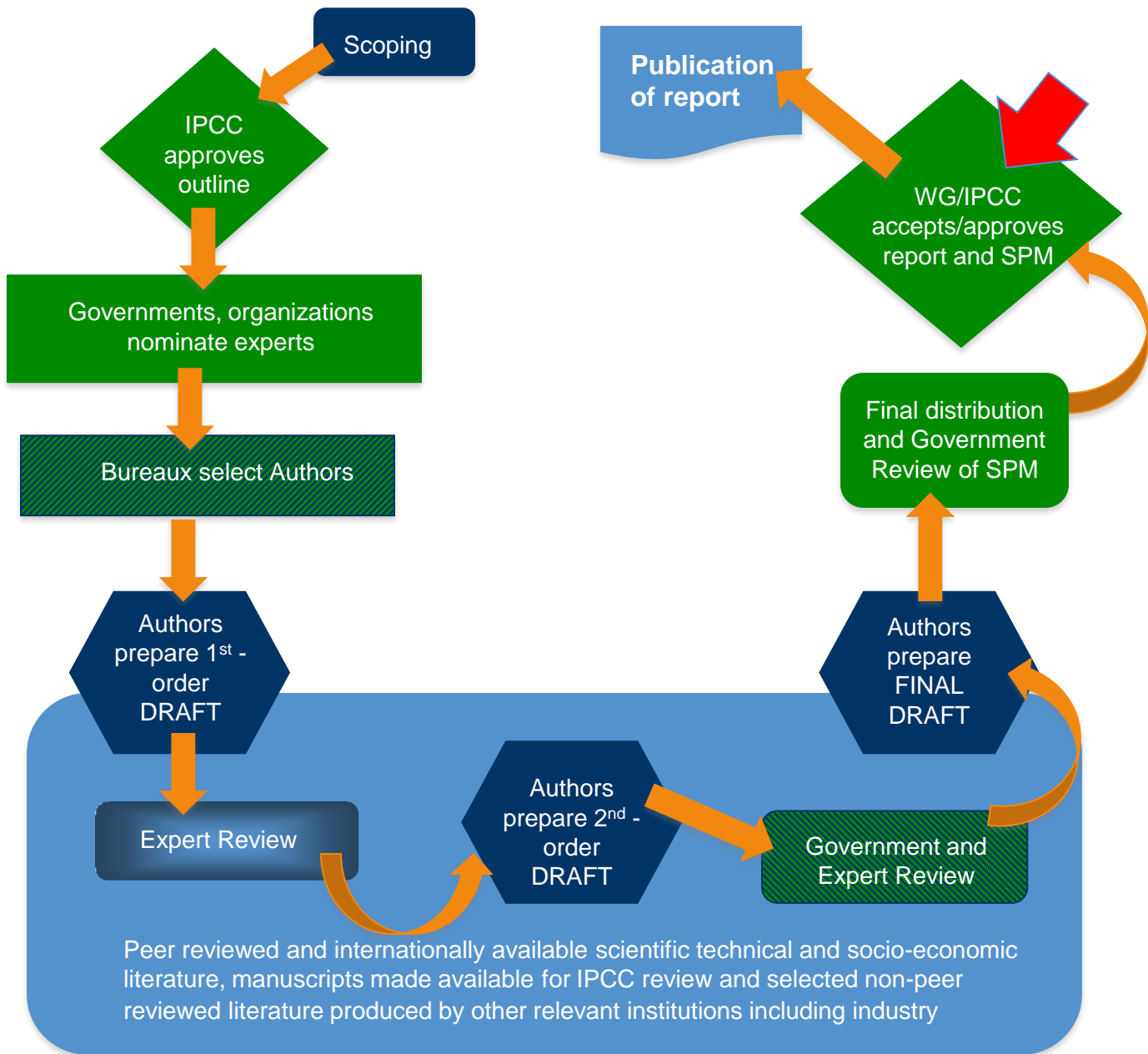
# IPCC structure

UN supported



Intergovernmental  
(195 members)





# Summary for Policymakers (SPM)

A report is accepted by the Panel through the approval of its summary (Summary for Policymakers)

Government representatives have to approve all text line by line!

Proposals for changes have to be endorsed by the authors

Full consensus on each and every detail is needed otherwise no report.

Option to 'footnote' dissidents





# IPCC – strong basis for global climate policy

- First Assessment 1990: Rio Climate Framework Convention on Climate Change 1992 (UNFCCC)
- Second Assessment 1995: Kyoto Protocol 1997
- Third Assessment 2001: Ratification Kyoto in 2005  
→ Basis for EU climate policy incl Netherlands
- Fourth Assessment 2007: Nobel Peace Prize  
→ Copenhagen Accord 2009, 2 degrees limit
- Fifth Assessment 2014: Review objectives Climate Convention Paris 2015

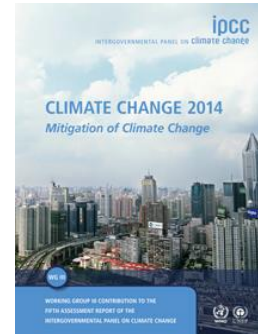
# Fifth Assessment Report (2013/14)



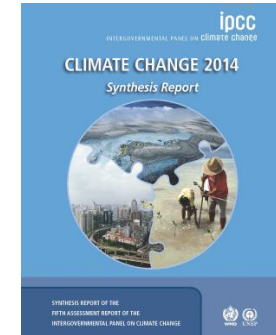
WG I: the physical science basis



WG II: Impacts, Adaptation, and Vulnerability



WG III: Mitigation of Climate Change



Synthesis Report

836 authors from 85 countries (incl 301 DC/EIT, 179 women, 529 new)

>30,000 papers cited; ~5,000 pages

~143,000 comments from > 2000 expert reviewers

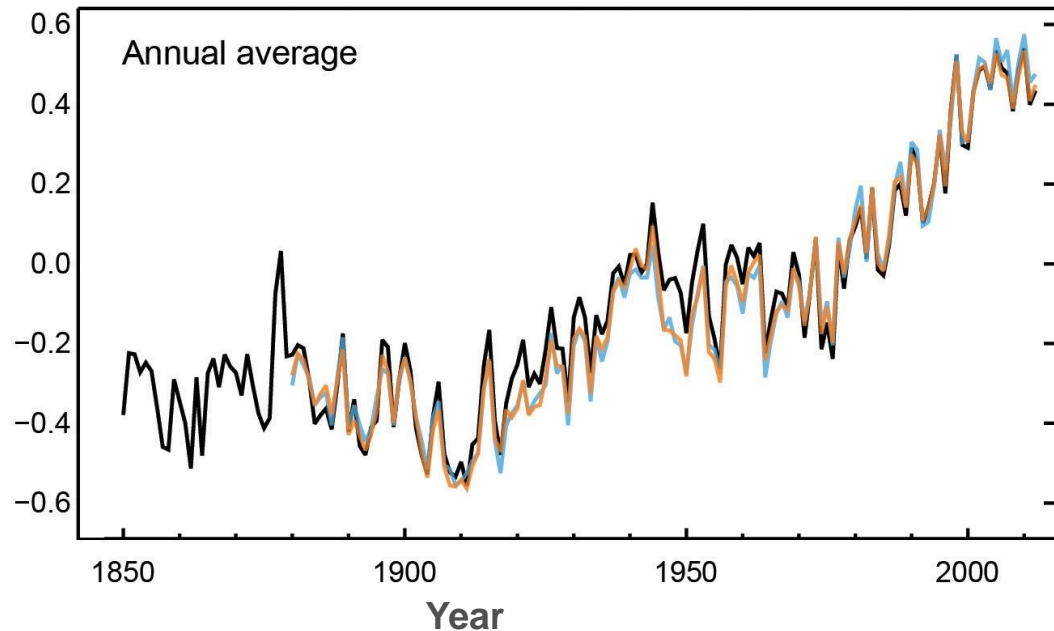
# Key Messages

- **Human influence on the climate system is clear**
- **The more we disrupt our climate, the more we risk severe, pervasive and irreversible impacts**
- **We have the means to limit climate change and build a more prosperous, sustainable future**

AR5 WGI SPM, AR5 WGII SPM, AR5 WGIII SPM

# Humans are changing the climate

It is extremely likely that we are the dominant cause of warming since the mid-20th century



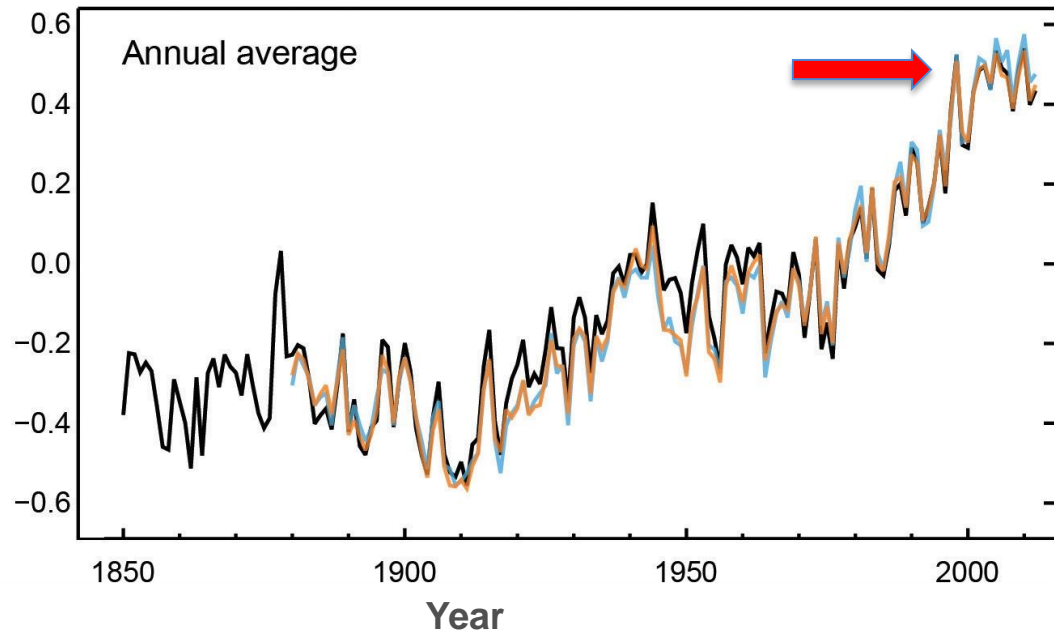
Globally averaged combined land and ocean surface temperatures

AR5 WGI SPM



# Humans are changing the climate

It is extremely likely that we are the dominant cause of warming since the mid-20th century

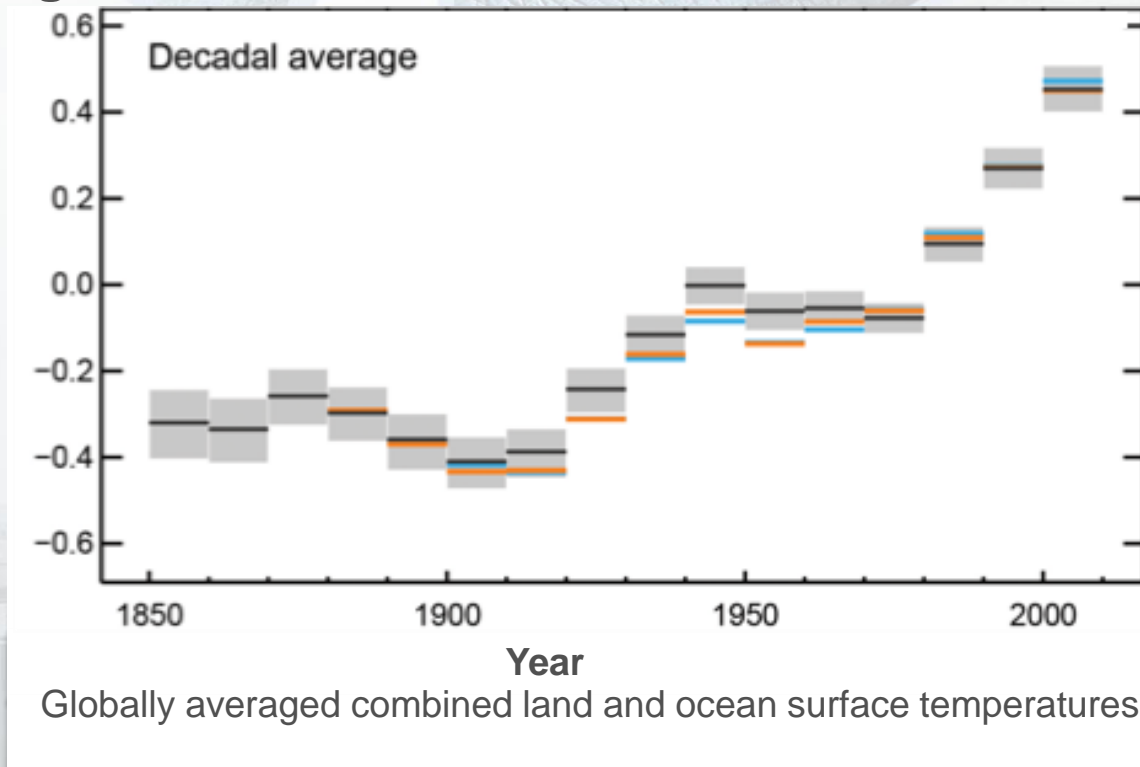


Globally averaged combined land and ocean surface temperatures

AR5 WGI SPM

# Temperatures continue to rise

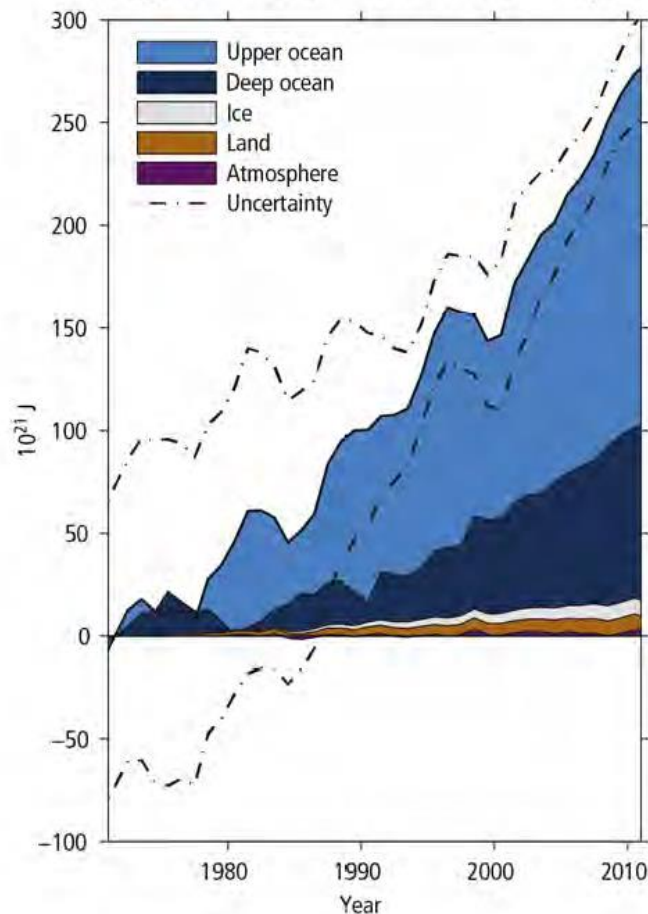
Each of the past 3 decades has been successively warmer than the preceding decades since 1850



AR5 WGI SPM

# Oceans absorb most of the heat

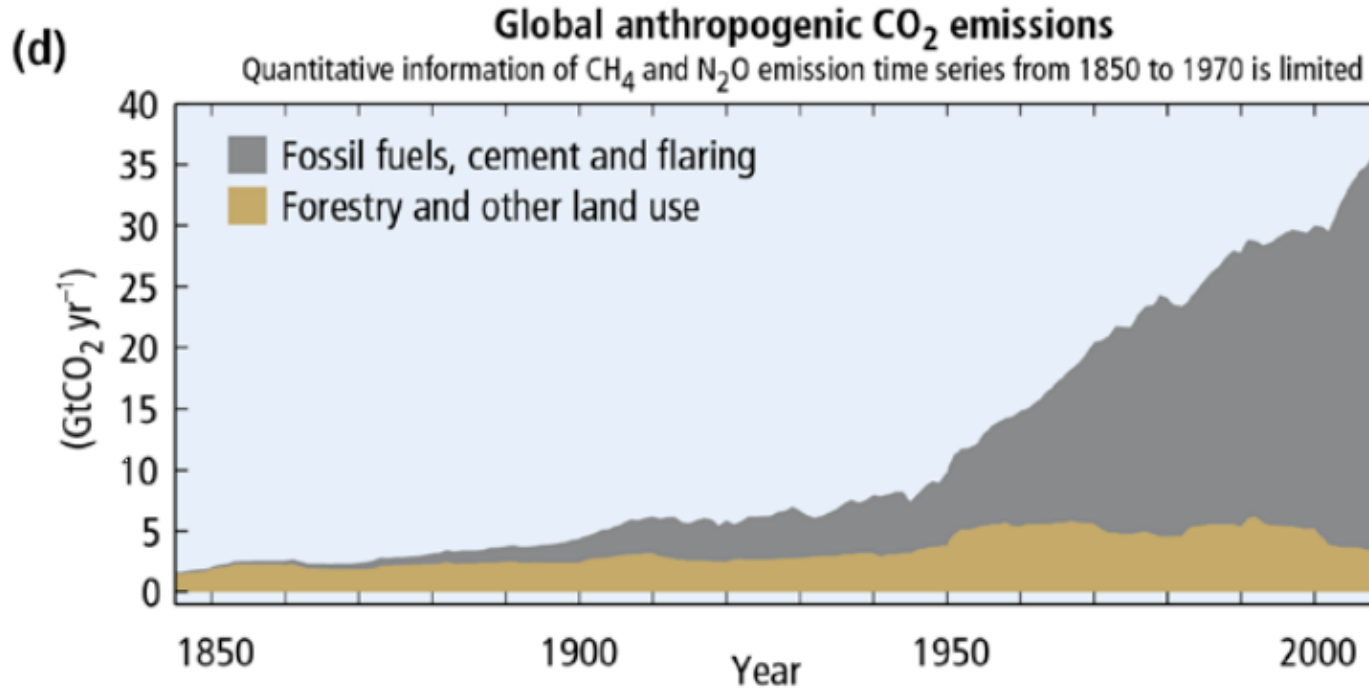
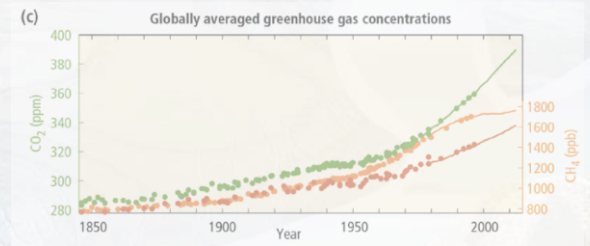
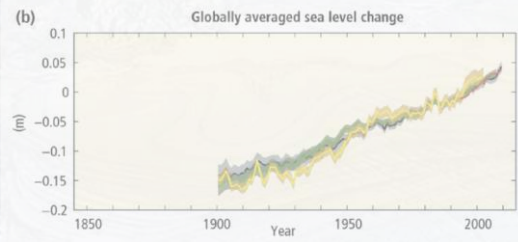
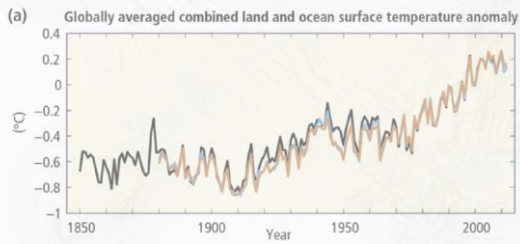
Energy accumulation within the Earth's climate system



→ More than 90% of the energy accumulating in the climate system between 1971 and 2010 has accumulated in the ocean

→ Land temperatures remain at historic highs while ocean temperatures continue to climb

AR5 SYR

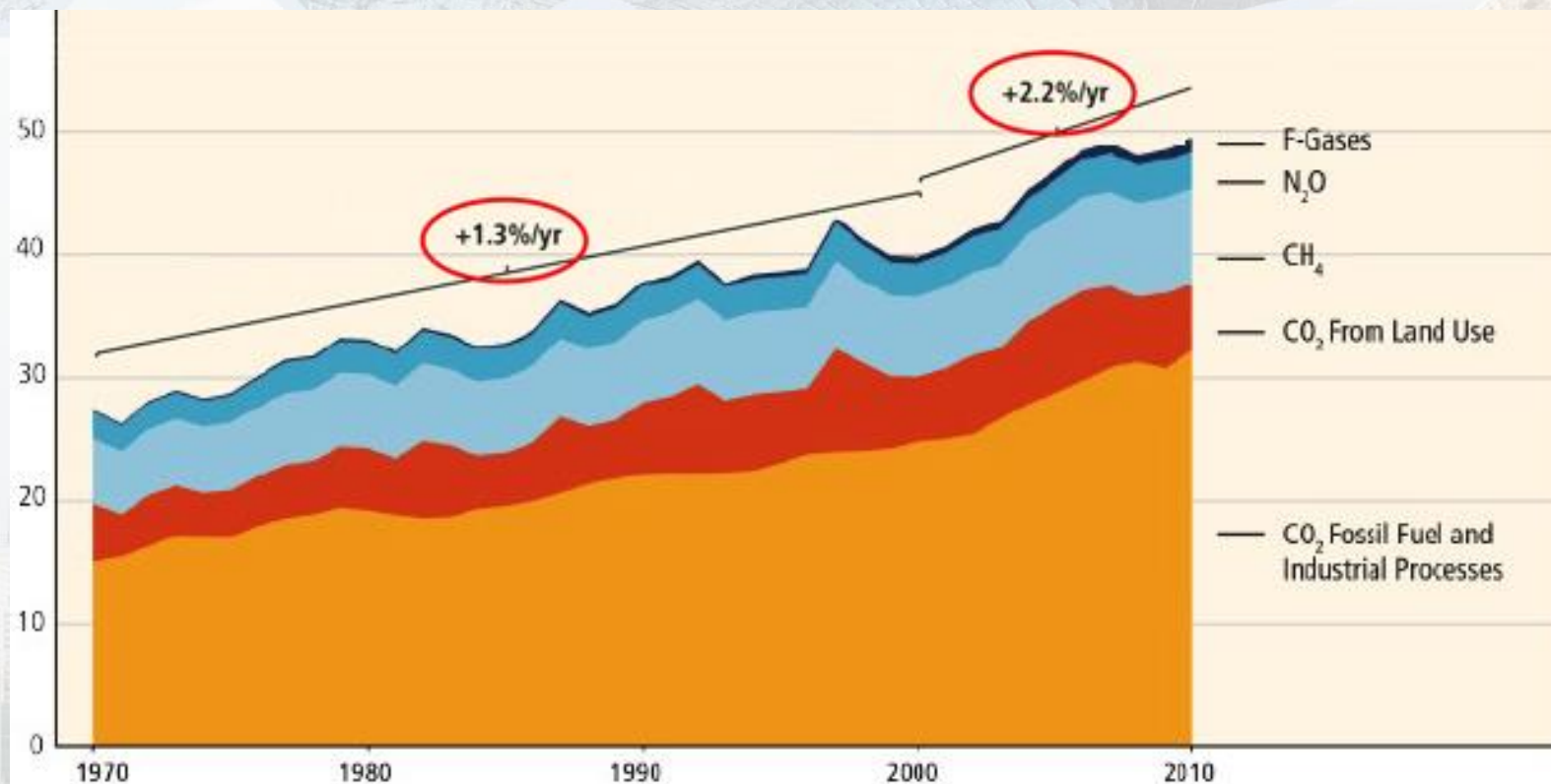


AR5 SYR SPM



# GHG emissions growth between 2000 and 2010 has been larger than in the previous three decades

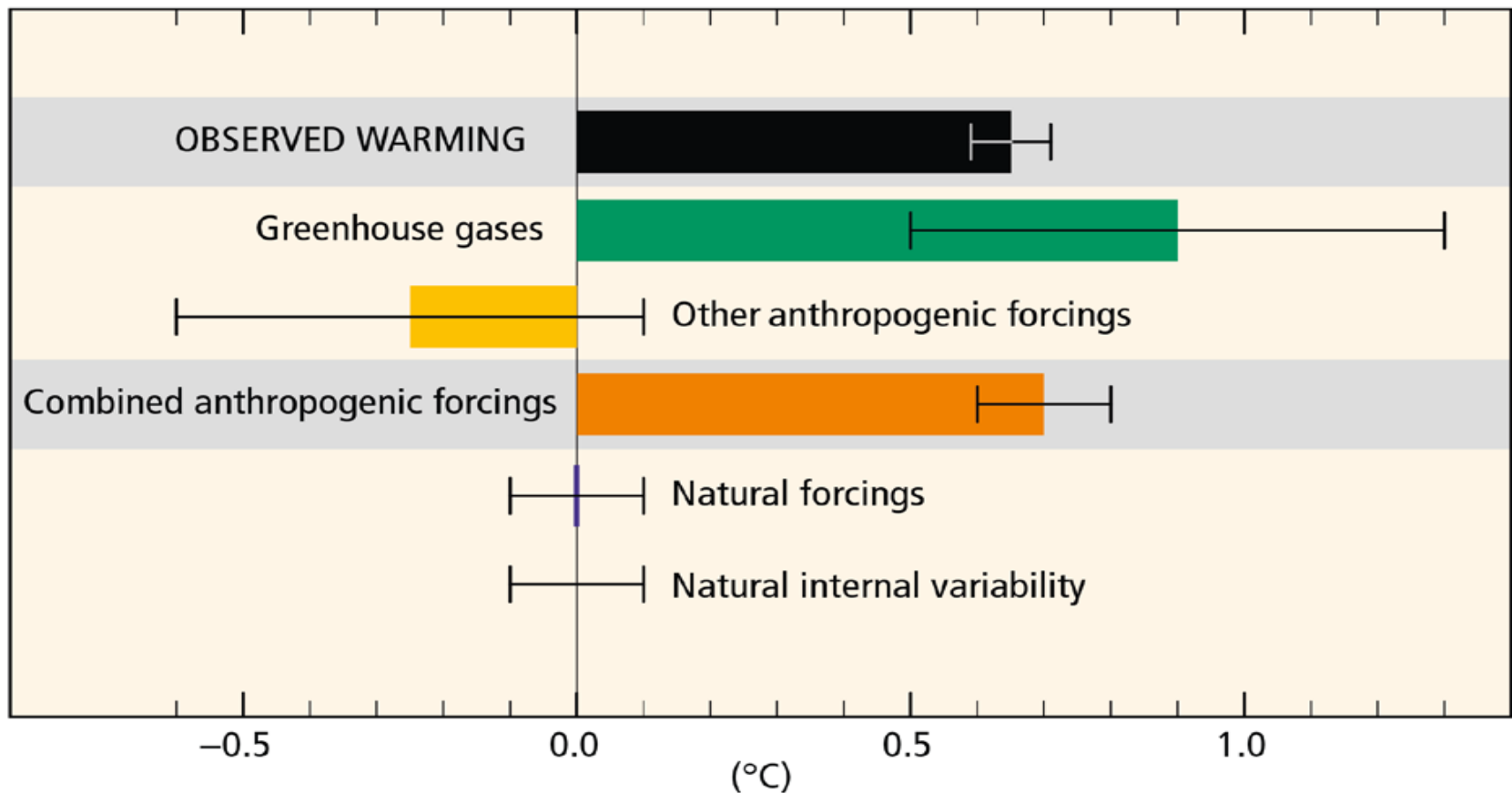
GHG Emissions [GtCO<sub>2</sub> eq/yr]



AR5 WGIII SPM

# Anthropogenic forcings are *extremely likely* the cause of warming

Contributions to observed surface temperature change over the period 1951-2010



# Impacts are already underway

- **Tropics to the poles**
- **On all continents and in the ocean**
- **Affecting rich and poor countries**



AR5 WGII SPM



# Projected climate changes

**Continued emissions of greenhouse gases will cause further warming and changes in the climate system**



Oceans will continue to warm during the 21st century



Global mean sea level will continue to rise during the 21st century



It is very likely that the Arctic sea ice cover will continue to shrink and thin as global mean surface temperature rises



Global glacier volume will further decrease

AR5 WGI SPM



# Potential Impacts of Climate Change



Food and water shortages



Increased displacement of people



Increased poverty

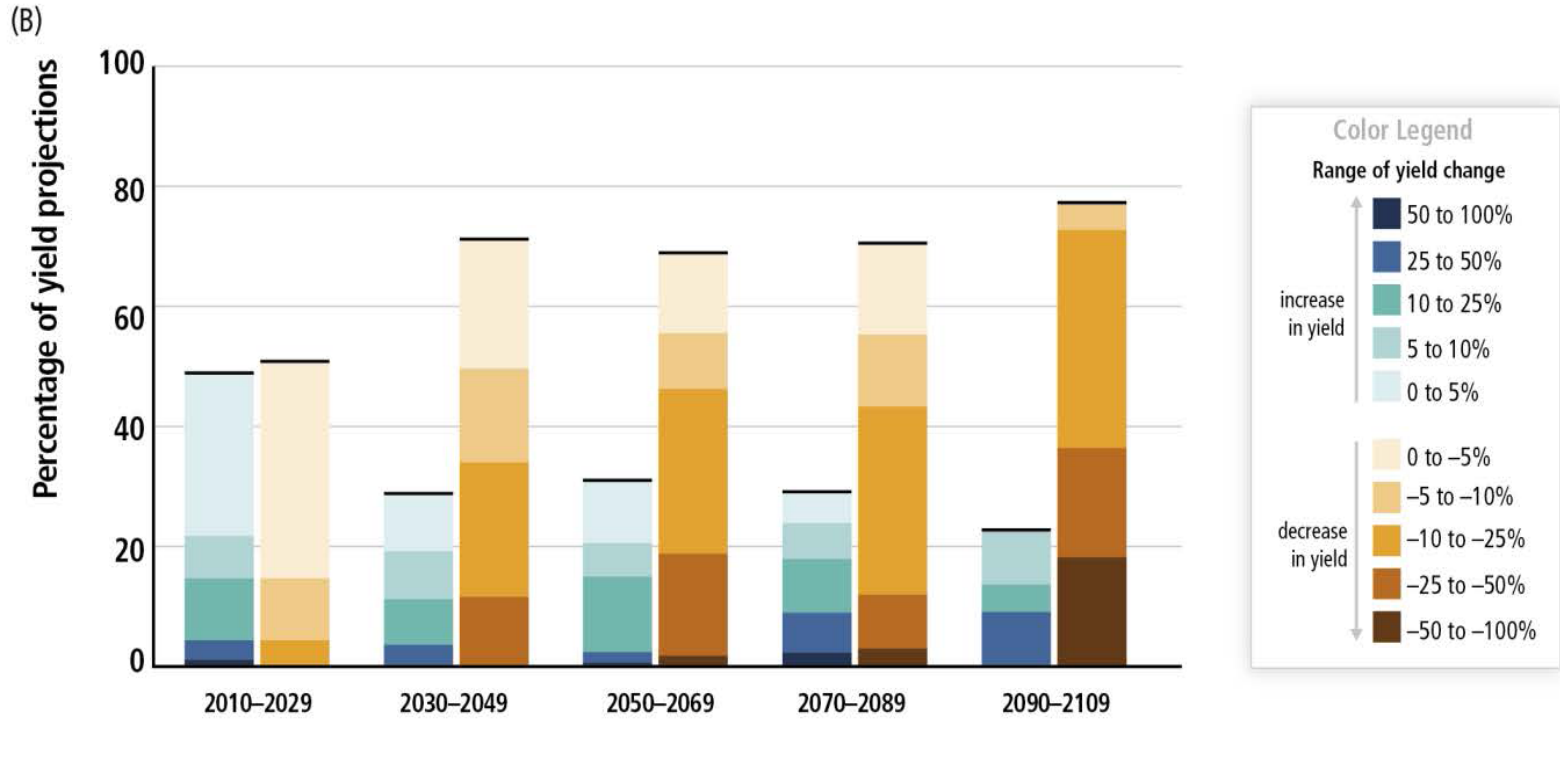


Coastal flooding

AR5 WGII SPM

# Climate Change Poses Risk for Food Production

Percentage of yield projections

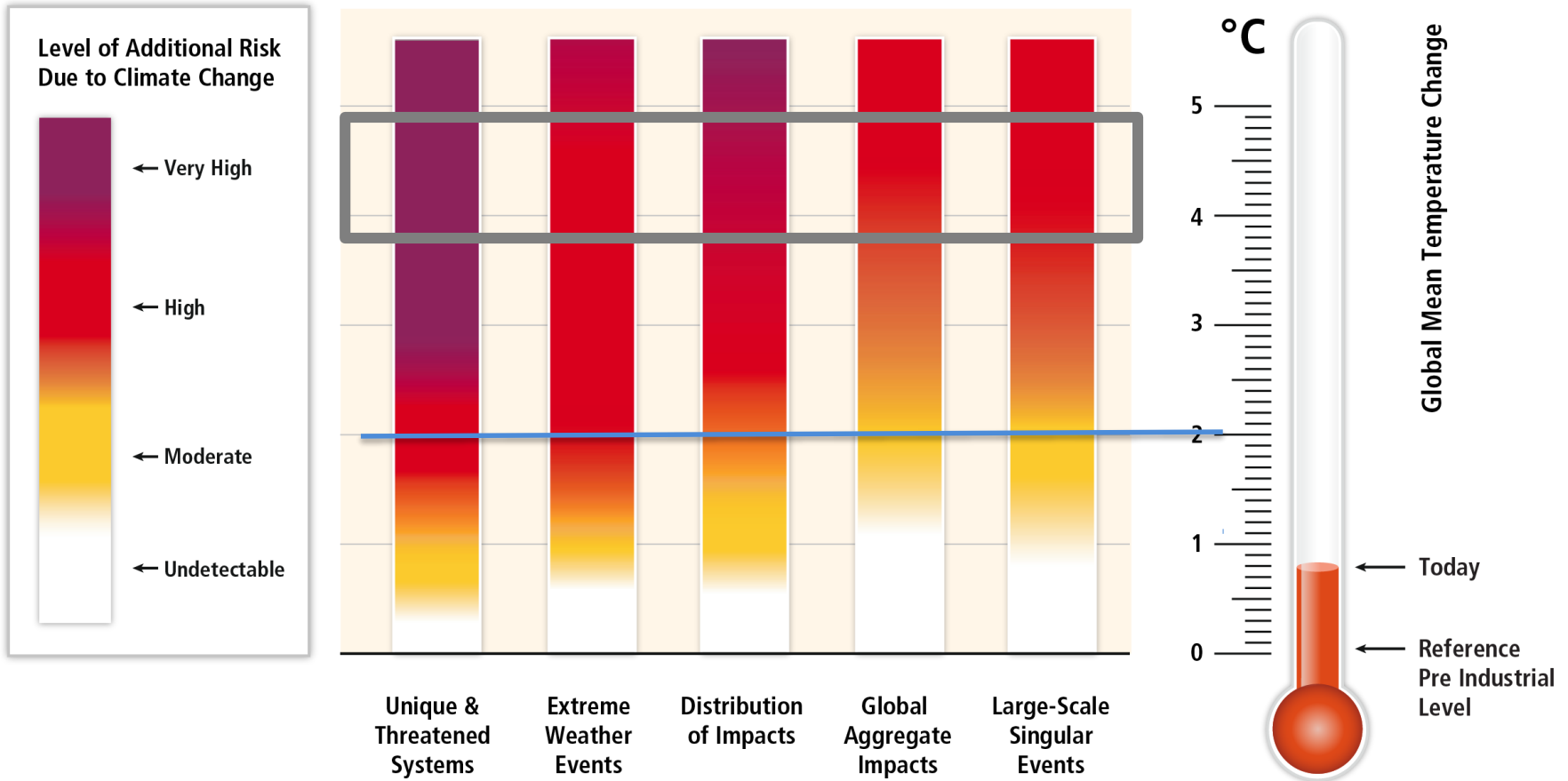


AR5 SYR SPM

"Why should I care about future generations? What have they ever done for me?"



# Without additional mitigation, global mean surface temperature is projected to increase by 3.7 to 4.8 °C over the 21<sup>st</sup> century...



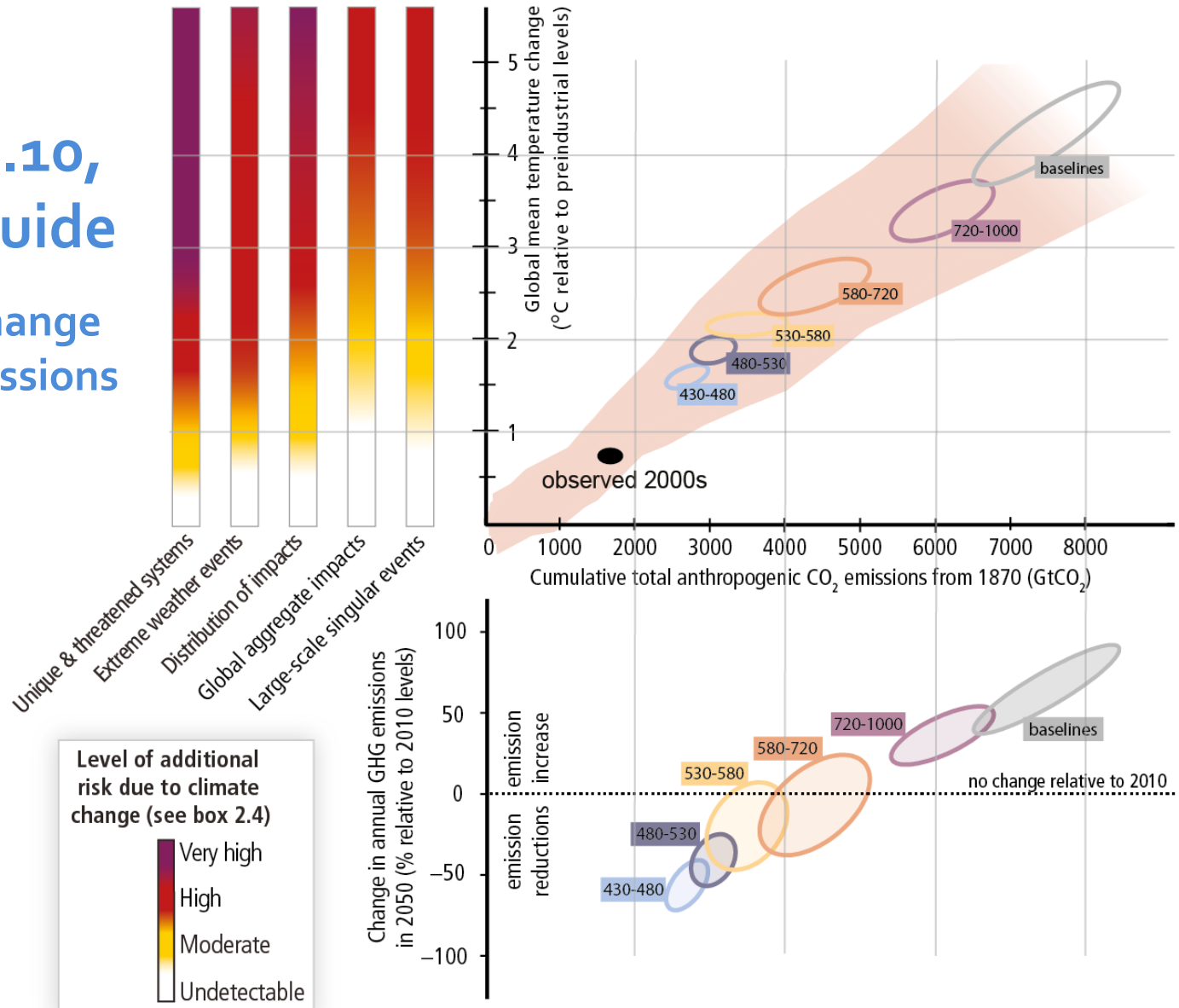
Based on WGII AR5 Figure 19.4



(A) Risks from climate change... (B) ...depend on cumulative CO<sub>2</sub> emissions...

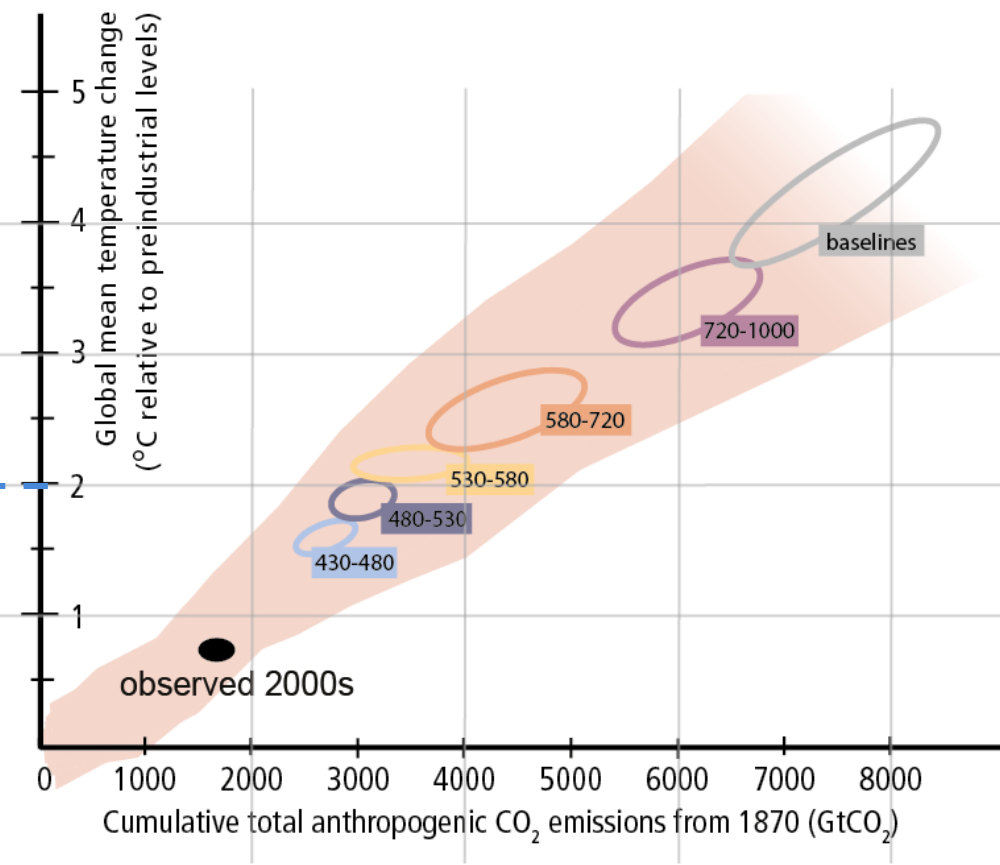
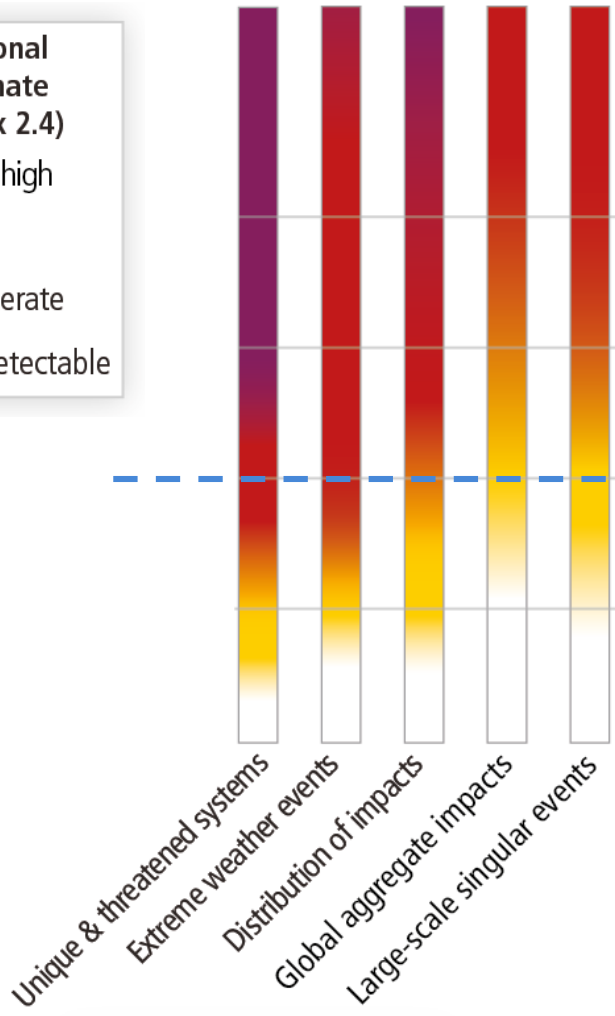
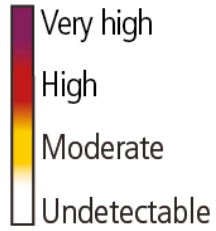
Figure SPM.10,  
A reader's guide

From climate change  
risks to GHG emissions



(C) ...which in turn depend on annual  
GHG emissions over the next decades

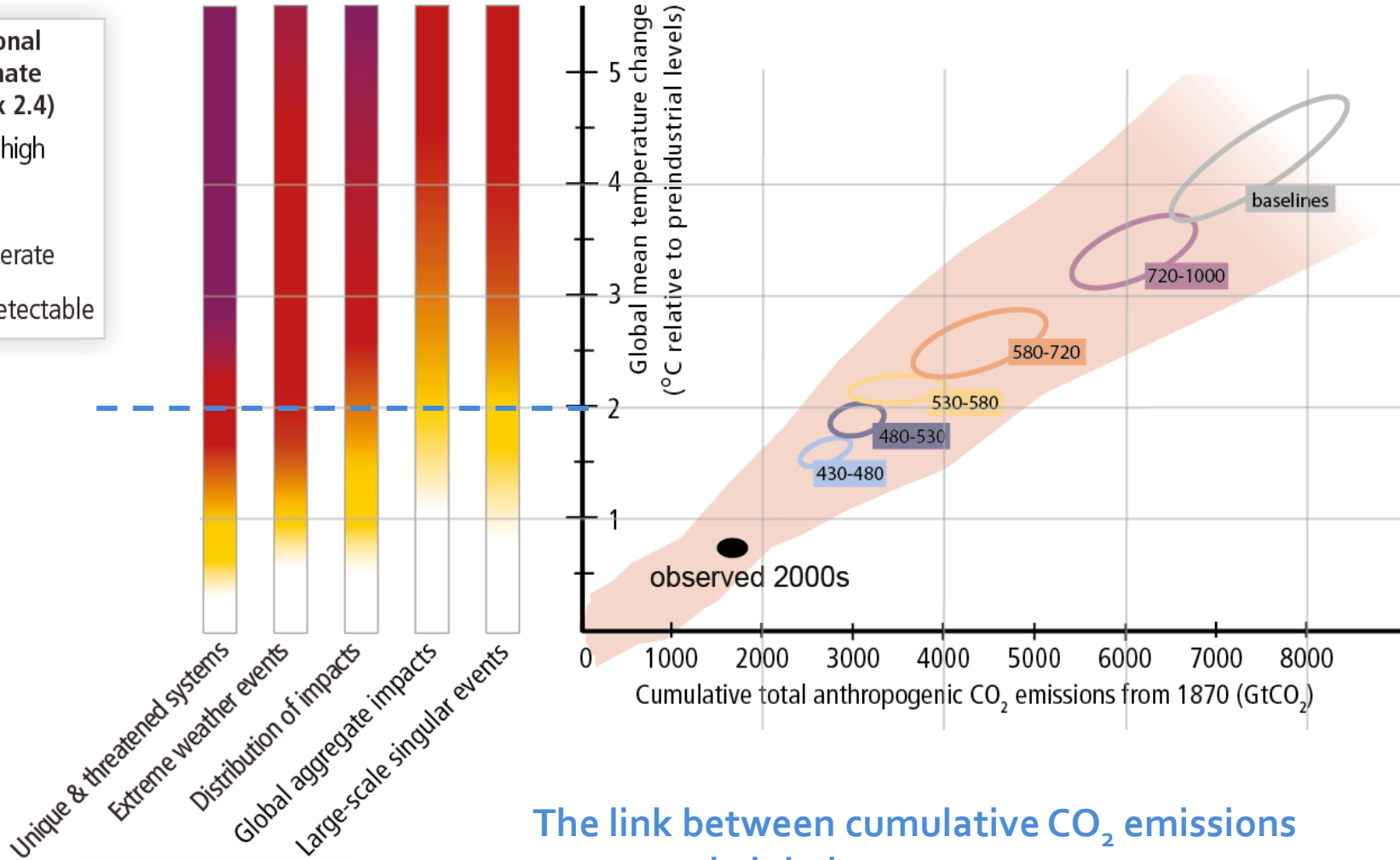
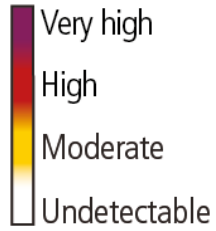
Level of additional risk due to climate change (see box 2.4)



### The link between cumulative CO<sub>2</sub> emissions and global mean temperature

The pink plume is from WGI complex models. It includes the uncertainty from non-CO<sub>2</sub> gases and climate and carbon cycle uncertainty, using the likely range

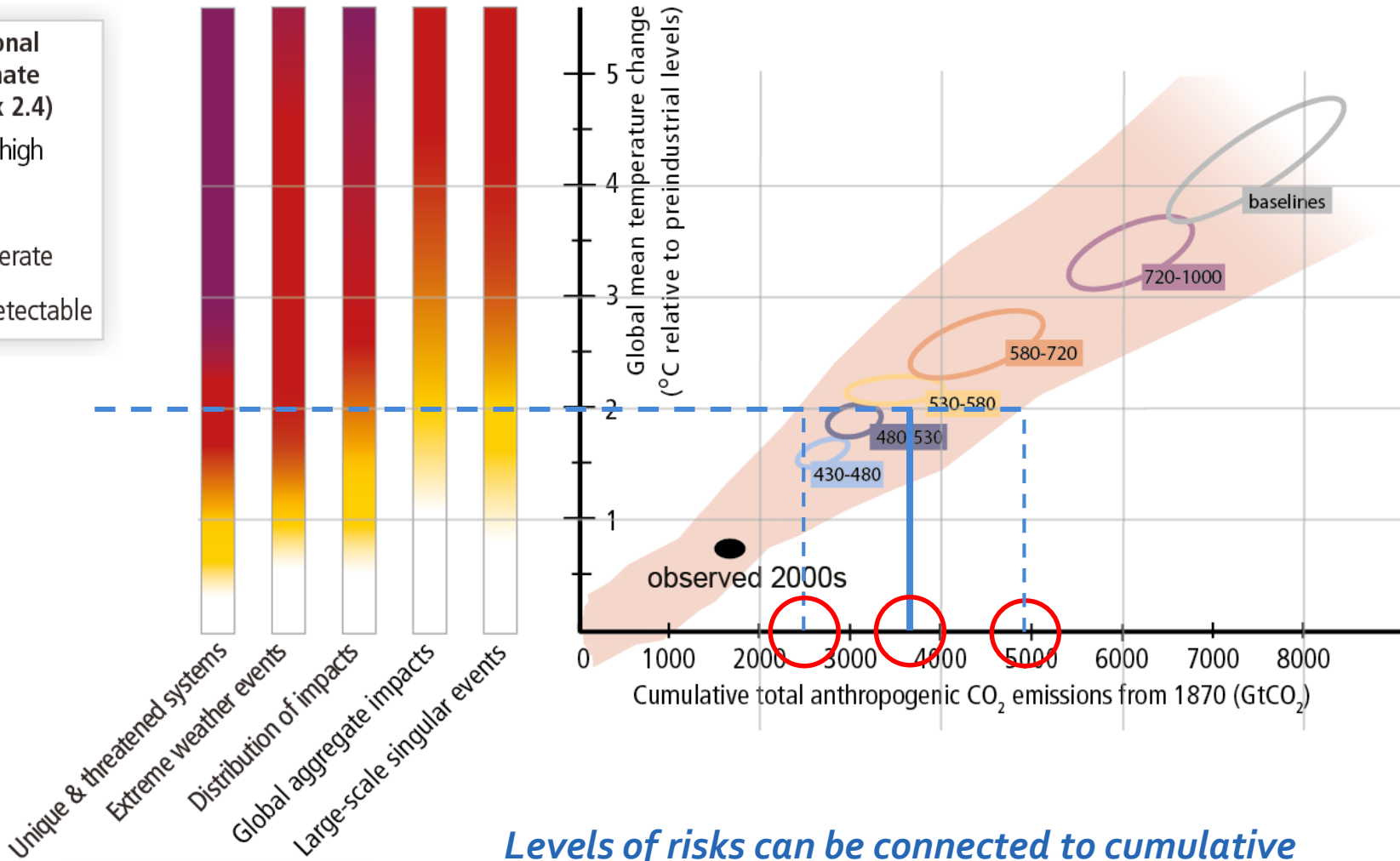
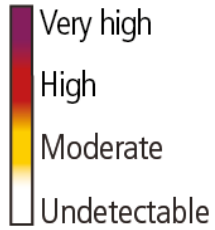
Level of additional risk due to climate change (see box 2.4)



## The link between cumulative CO<sub>2</sub> emissions and global mean temperature

The ellipses show results from the WGI models, using a simple climate model. It does not include climate and carbon cycle uncertainty, but explores more comprehensively the scenario uncertainty from a range of CO<sub>2</sub> and non-CO<sub>2</sub> pathways

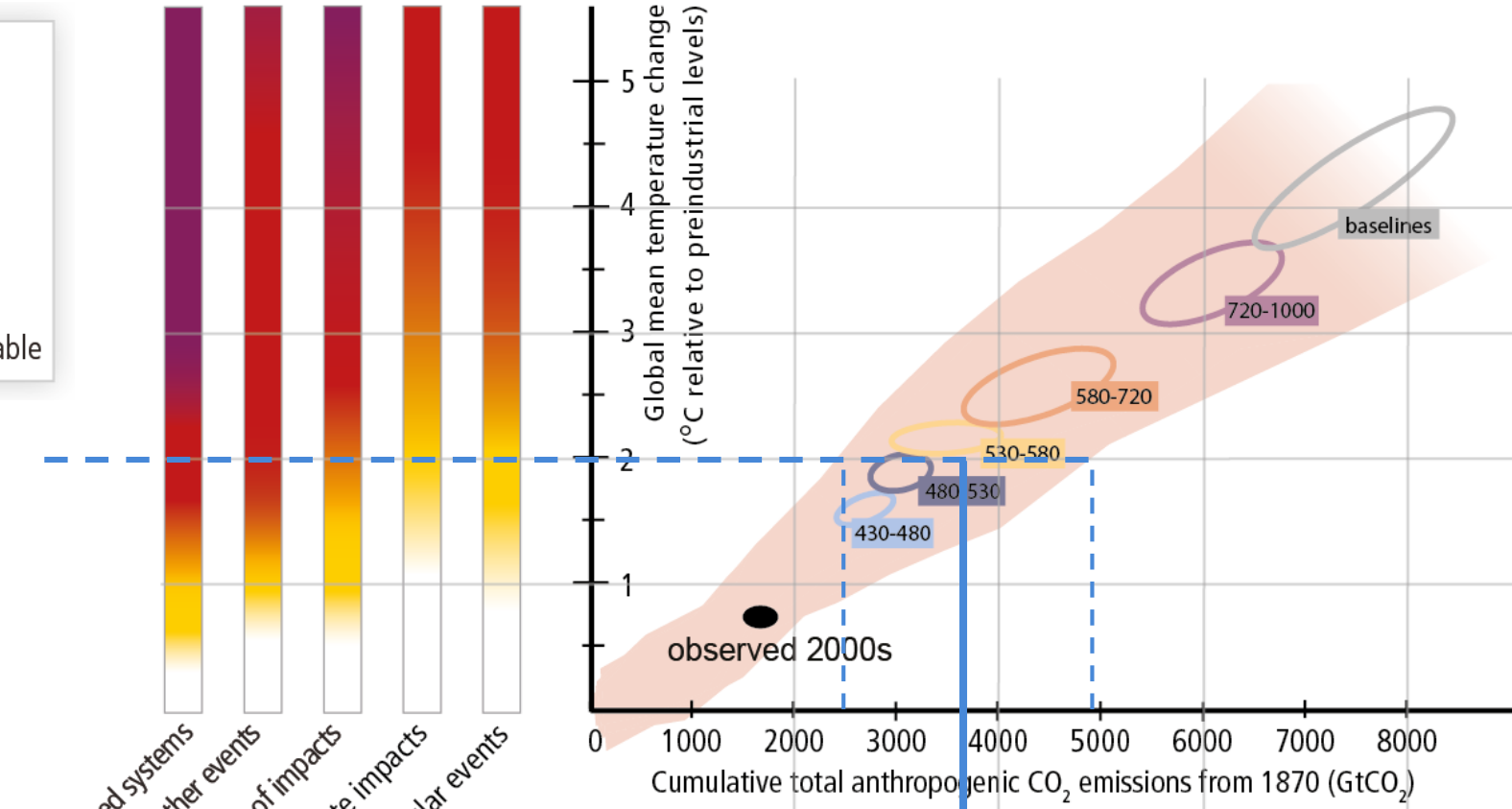
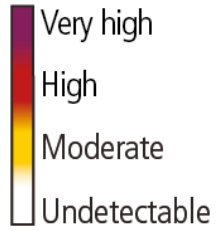
Level of additional risk due to climate change (see box 2.4)



*Levels of risks can be connected to cumulative CO<sub>2</sub> emission levels, for the average climate response,*

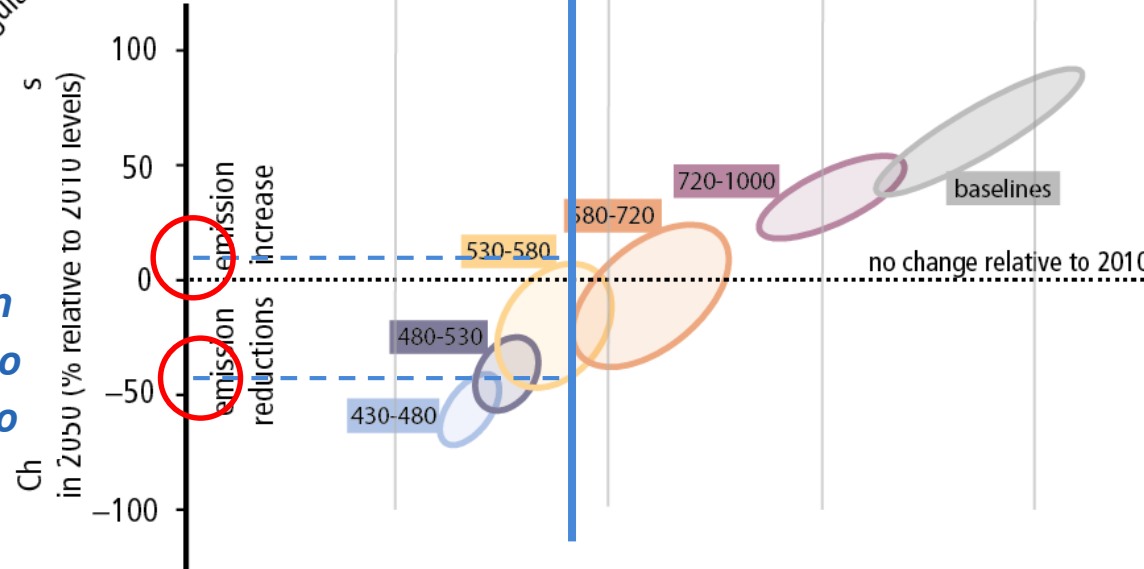


Level of additional risk due to climate change (see box 2.4)

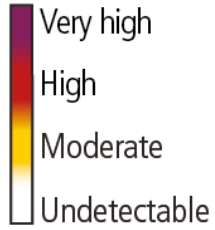


& threatened systems  
 extreme weather events  
 distribution of impacts  
 aggregate impacts  
 scale singular events

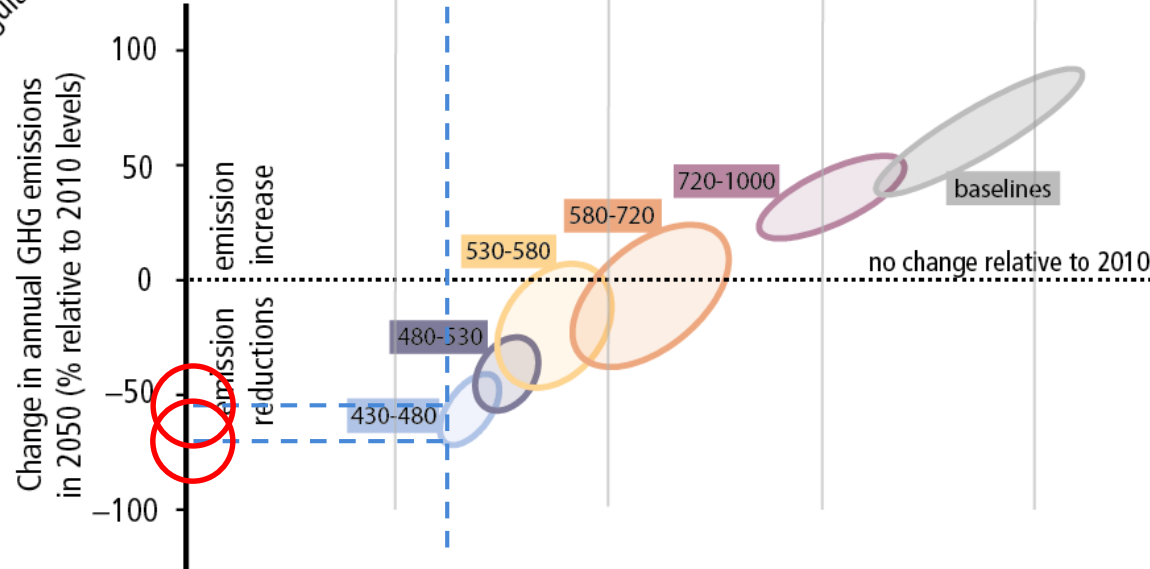
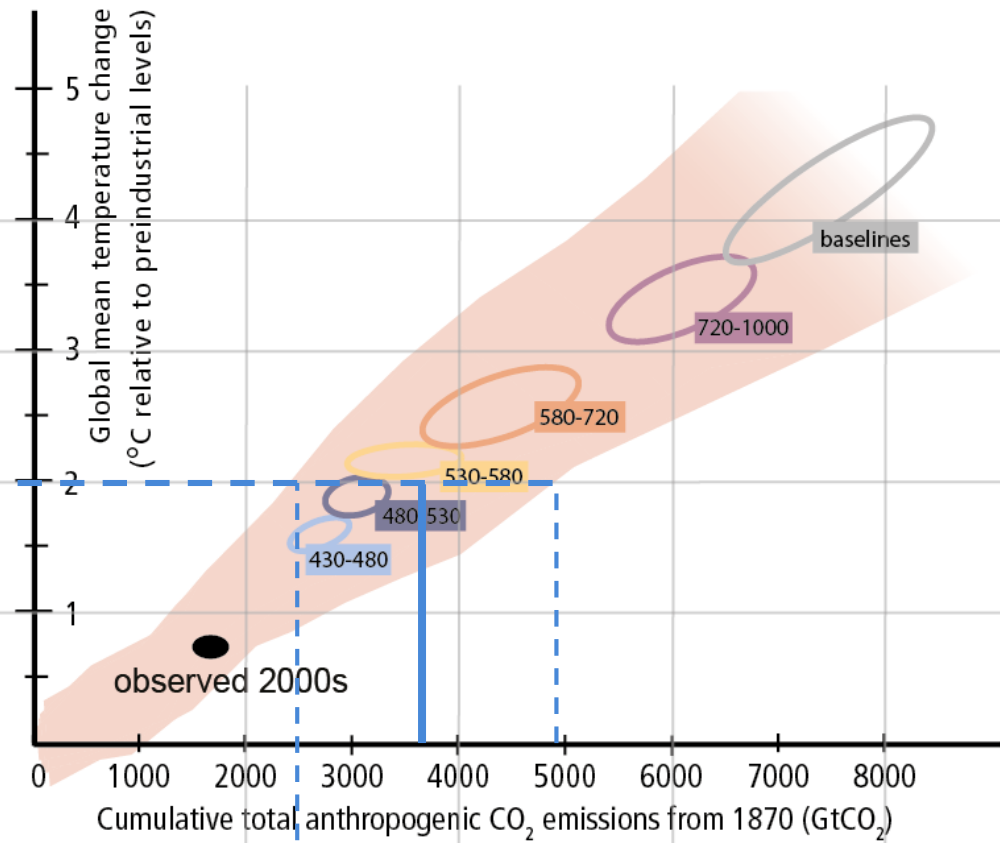
*Levels of risks can now be connected to GHG emission changes by 2050. Added uncertainty arises from action on non-CO<sub>2</sub> gases, timing of pre-2050 action, and ambition of post-2050 action.*



Level of additional risk due to climate change (see box 2.4)



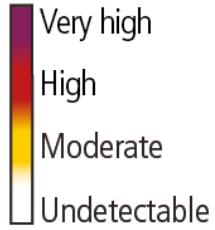
Unique & threatened systems  
Extreme weather events  
Distribution of impacts  
Global aggregate impacts  
Large-scale singular events



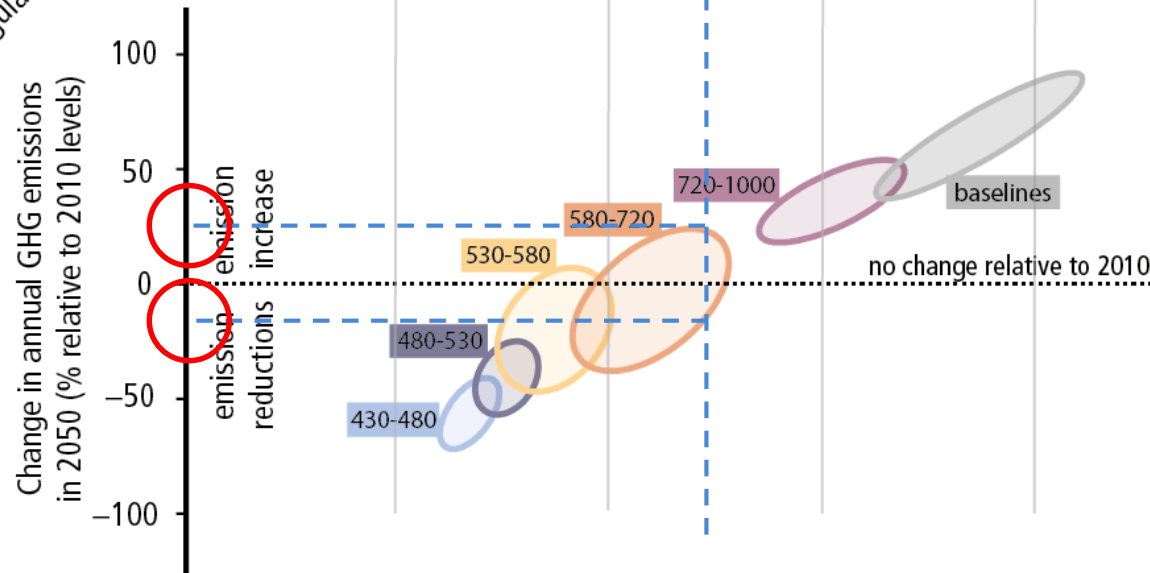
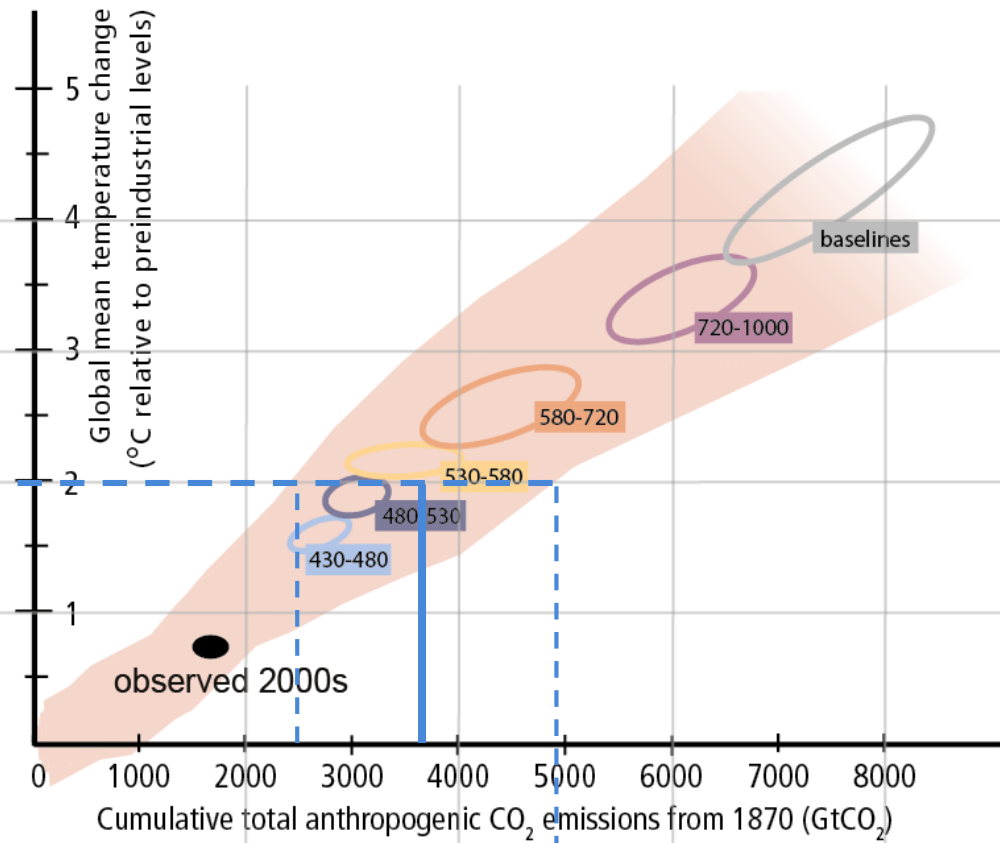
*The constraint on changes in GHG emissions by 2050 depends on the sensitivity of the climate response.*

*Here, with large climate sensitivity*

Level of additional risk due to climate change (see box 2.4)



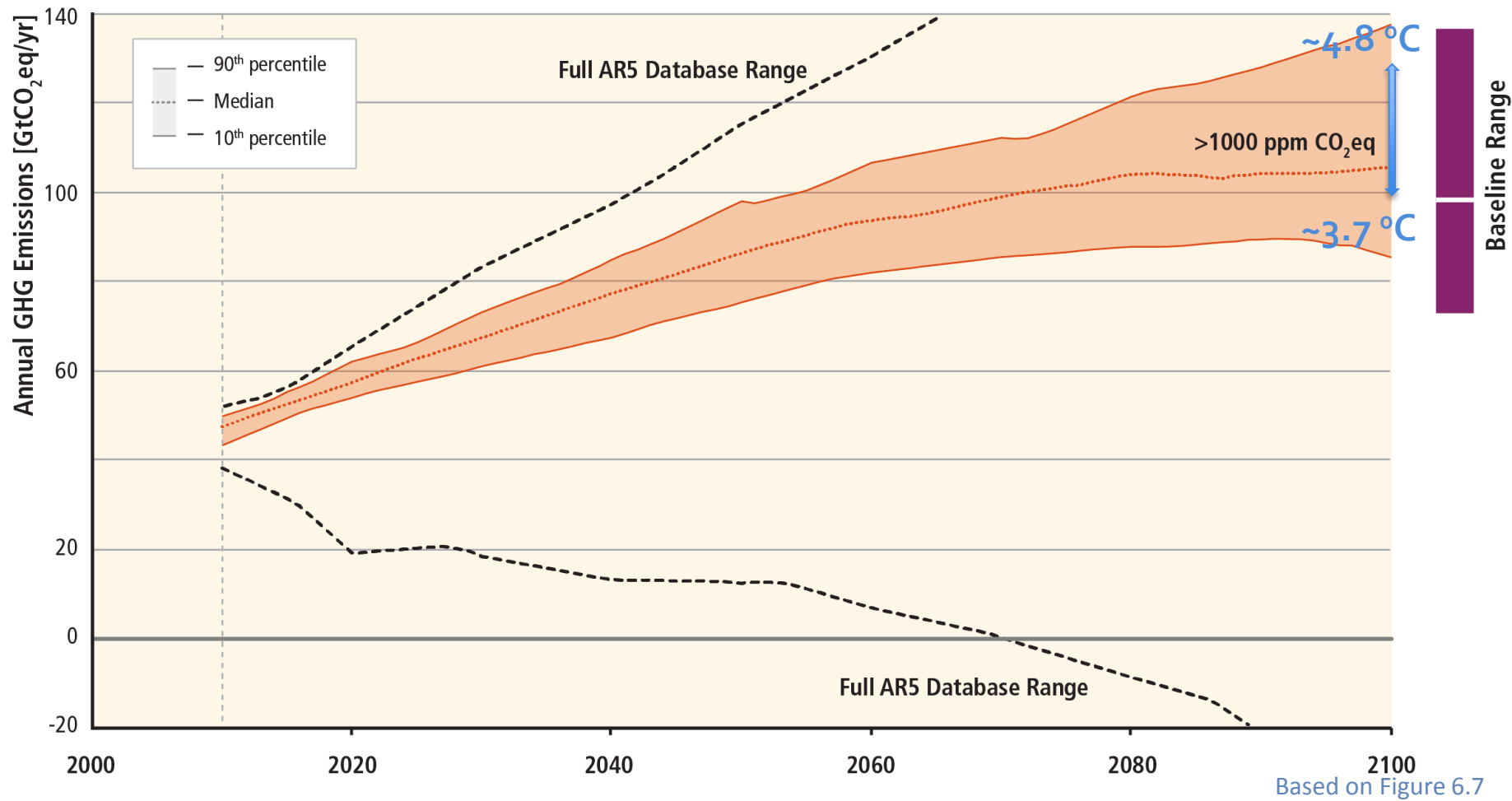
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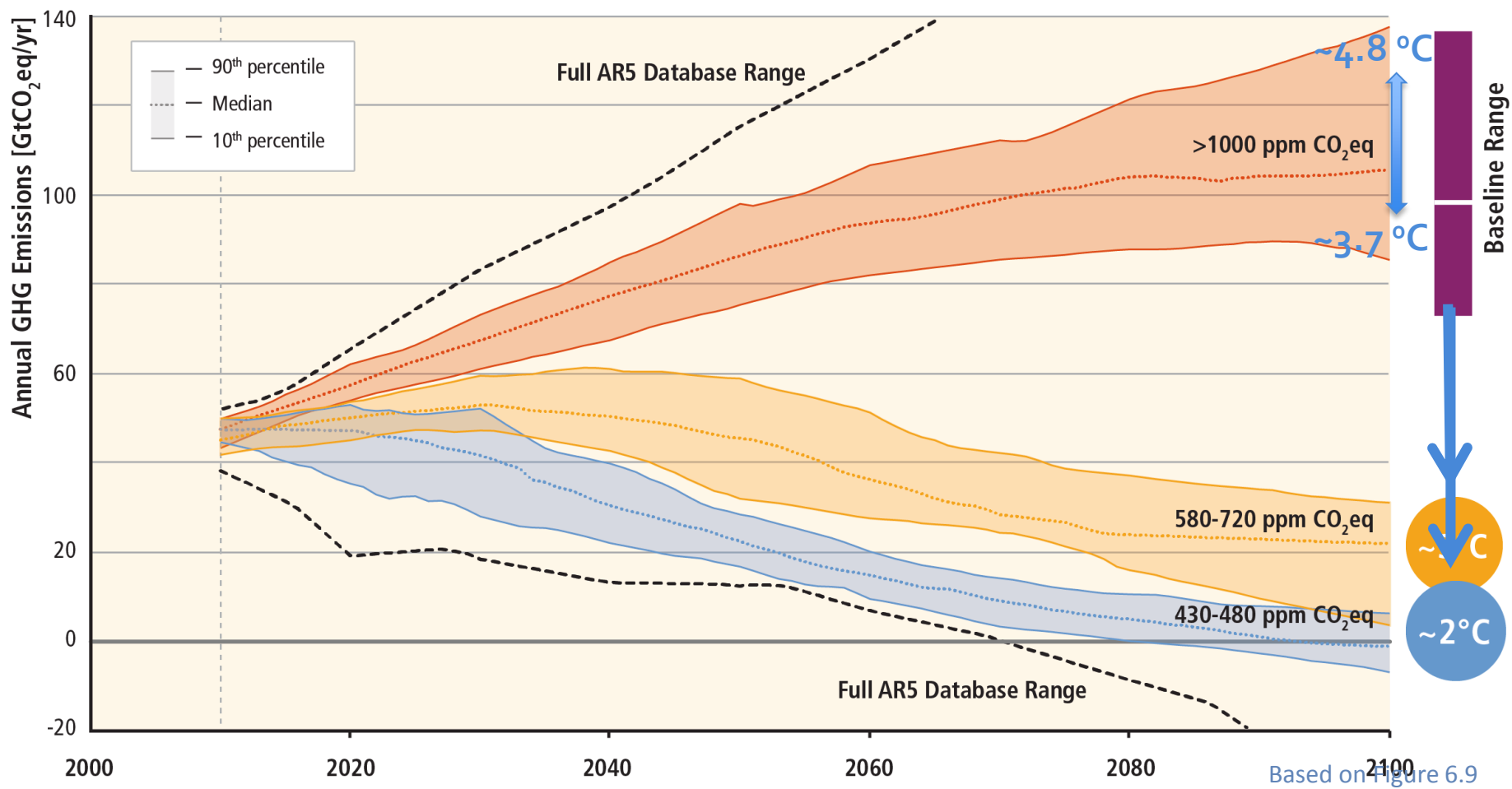
*The constraint on changes in GHG emissions by 2050 depends on the sensitivity of the climate response.*

*Here, with low climate sensitivity*

# Stabilization of atmospheric GHG concentrations requires moving away from business as usual.



# Lower ambition mitigation goals require similar reductions of GHG emissions.





# Limiting Temperature Increase to 2°C

**Global GHG emissions reduction of 40-70 % in 2050 compared to 2010**

**Net zero or negative GHG emissions in 2100**

**Global emissions to decline in 5-15 years from now**

AR5 WGIII SPM

# Mitigation Measures



## More efficient use of energy



## Greater use of low-carbon and no-carbon energy

- Many of these technologies exist today



## Improved carbon sinks

- Reduced deforestation and improved forest management and planting of new forests
- Bio-energy with carbon capture and storage ←

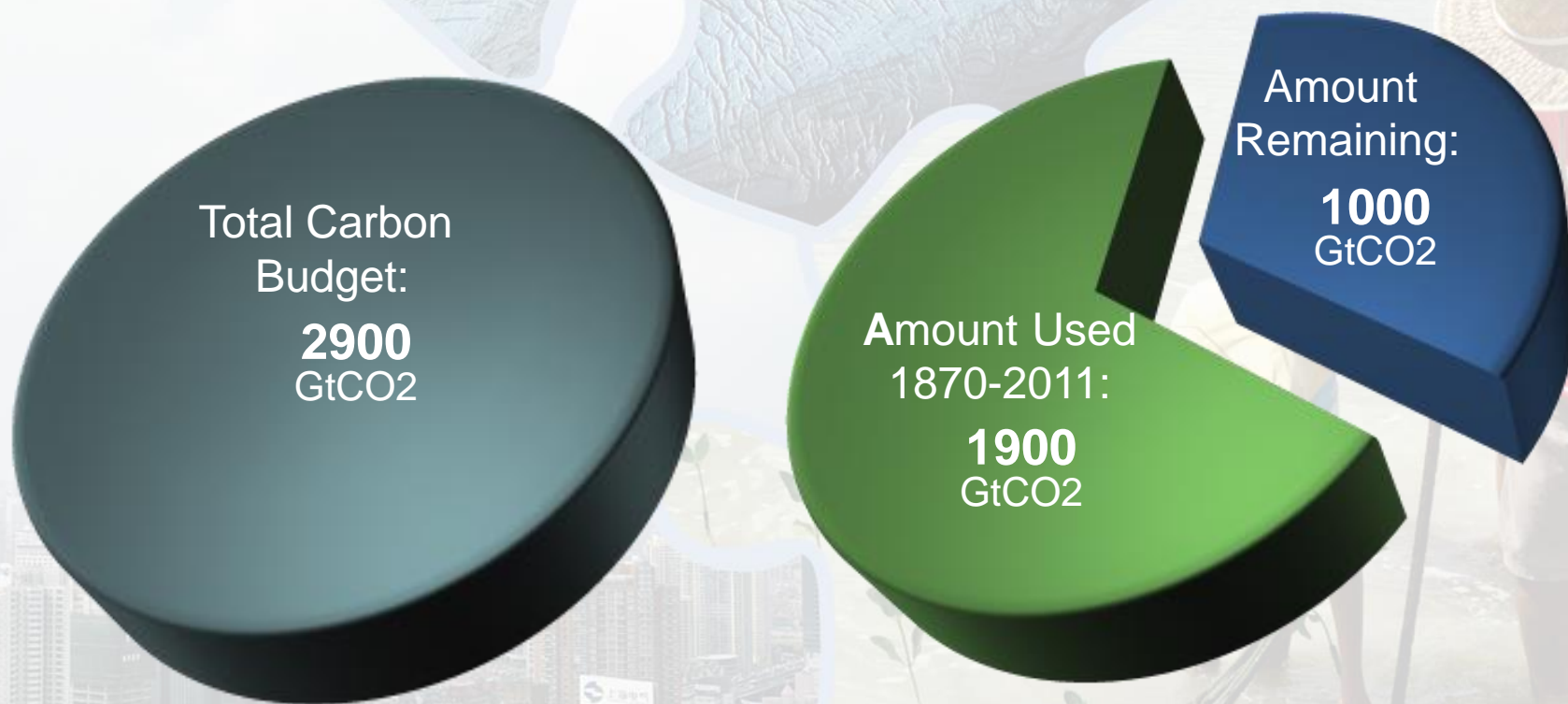


## Lifestyle and behavioural changes

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# The window for action is rapidly closing

65% of our carbon budget compatible with a 2° C goal already used



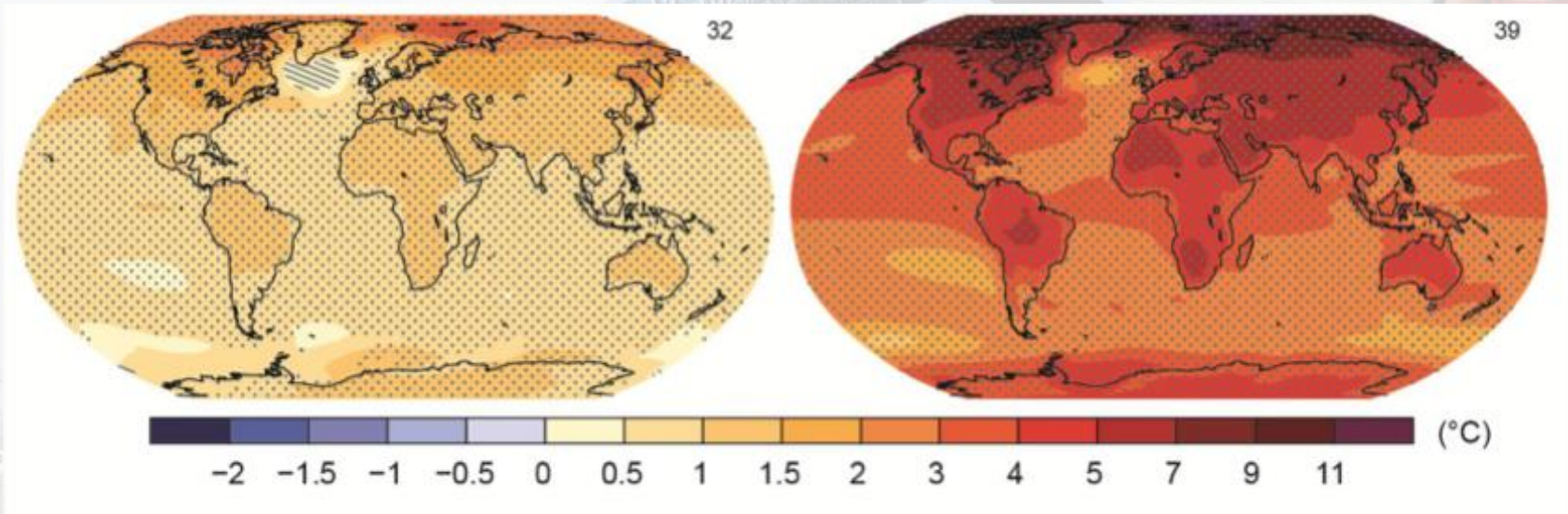
AR5 WGI SPM



# The Choices We Make Will Create Different Outcomes

With substantial mitigation

Without additional mitigation



Change in average surface temperature (1986–2005 to 2081–2100)

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