

# CLIMATE CHANGE 2014

## *Synthesis Report*

SYR Topic 2

# Future Climate Changes, Risks and Impacts

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CLA Chapter 13 Livelihoods  
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Synthesis Report of the  
Fifth Assessment Report of the  
Intergovernmental Panel on Climate Change

**ipcc**  
INTERGOVERNMENTAL PANEL ON climate change



# Key Message

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Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks.

# Climate Projections

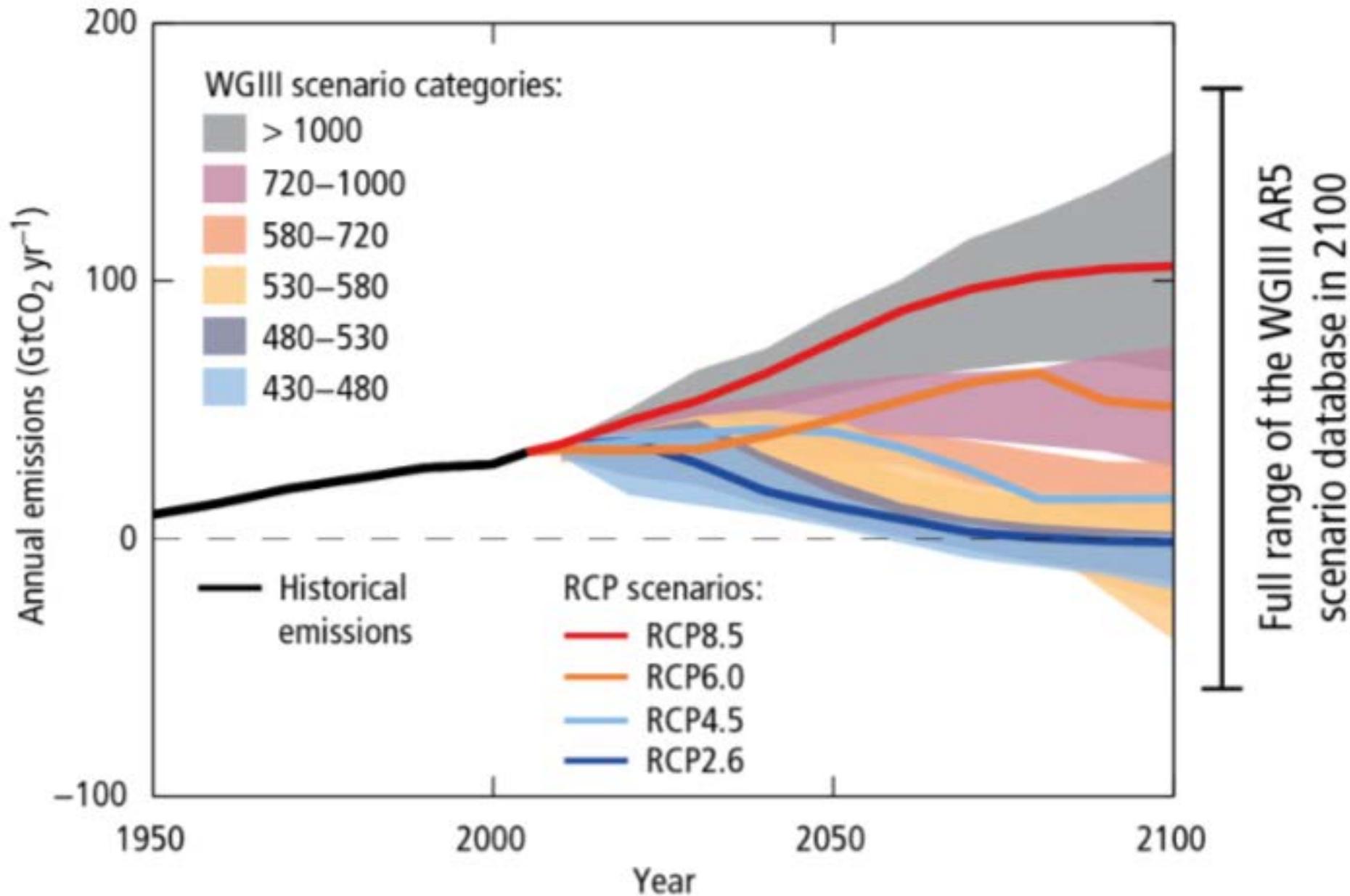


**Scenarios of future projections of greenhouse gas emissions vary over a wide range, depending on both socio-economic development and future climate policy.**

**Cumulative emissions of CO<sub>2</sub> largely determine global mean surface warming by the late 21<sup>st</sup> century and beyond.**

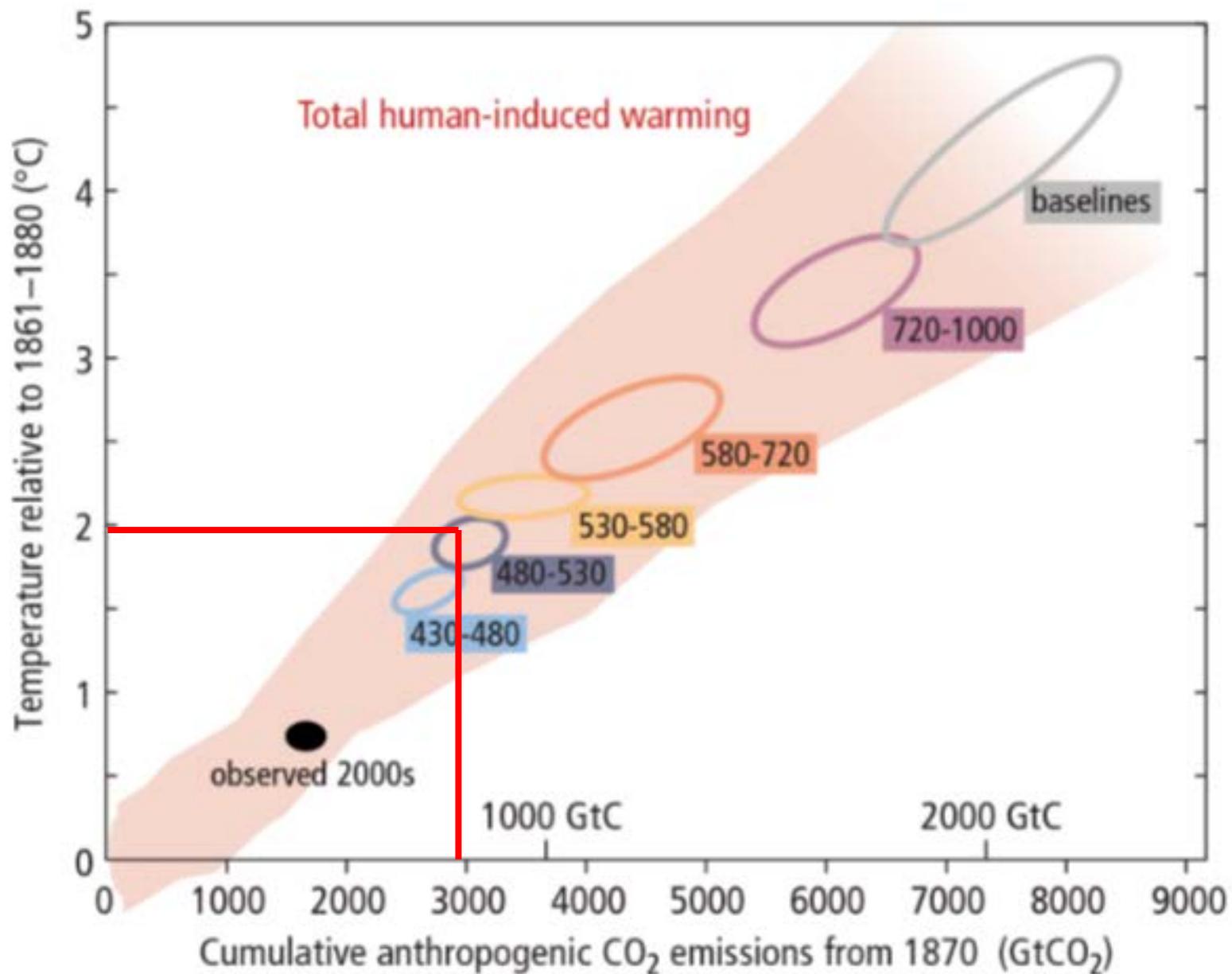
(a)

# Annual anthropogenic CO<sub>2</sub> emissions



(b)

## Warming versus cumulative CO<sub>2</sub> emissions



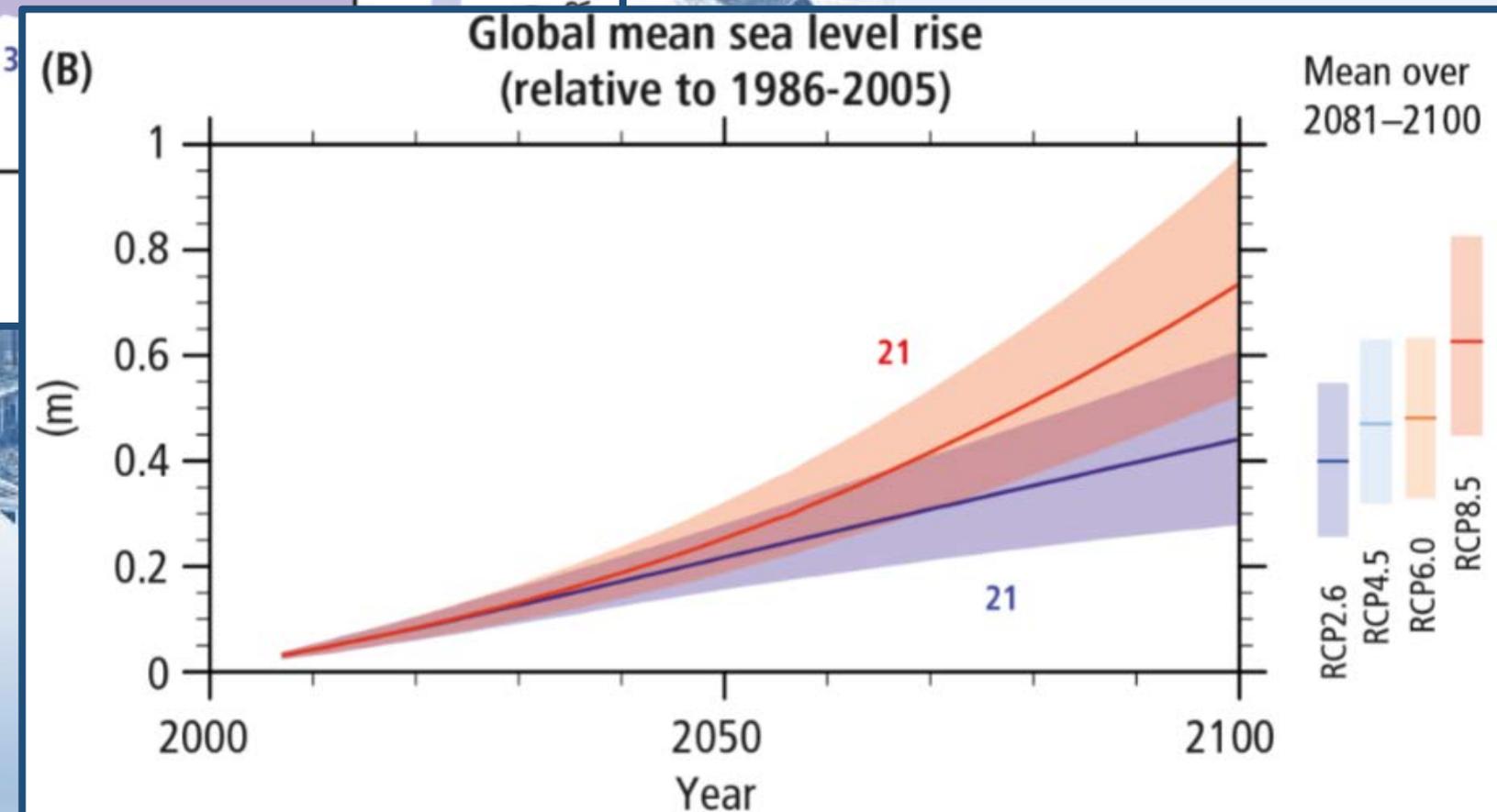
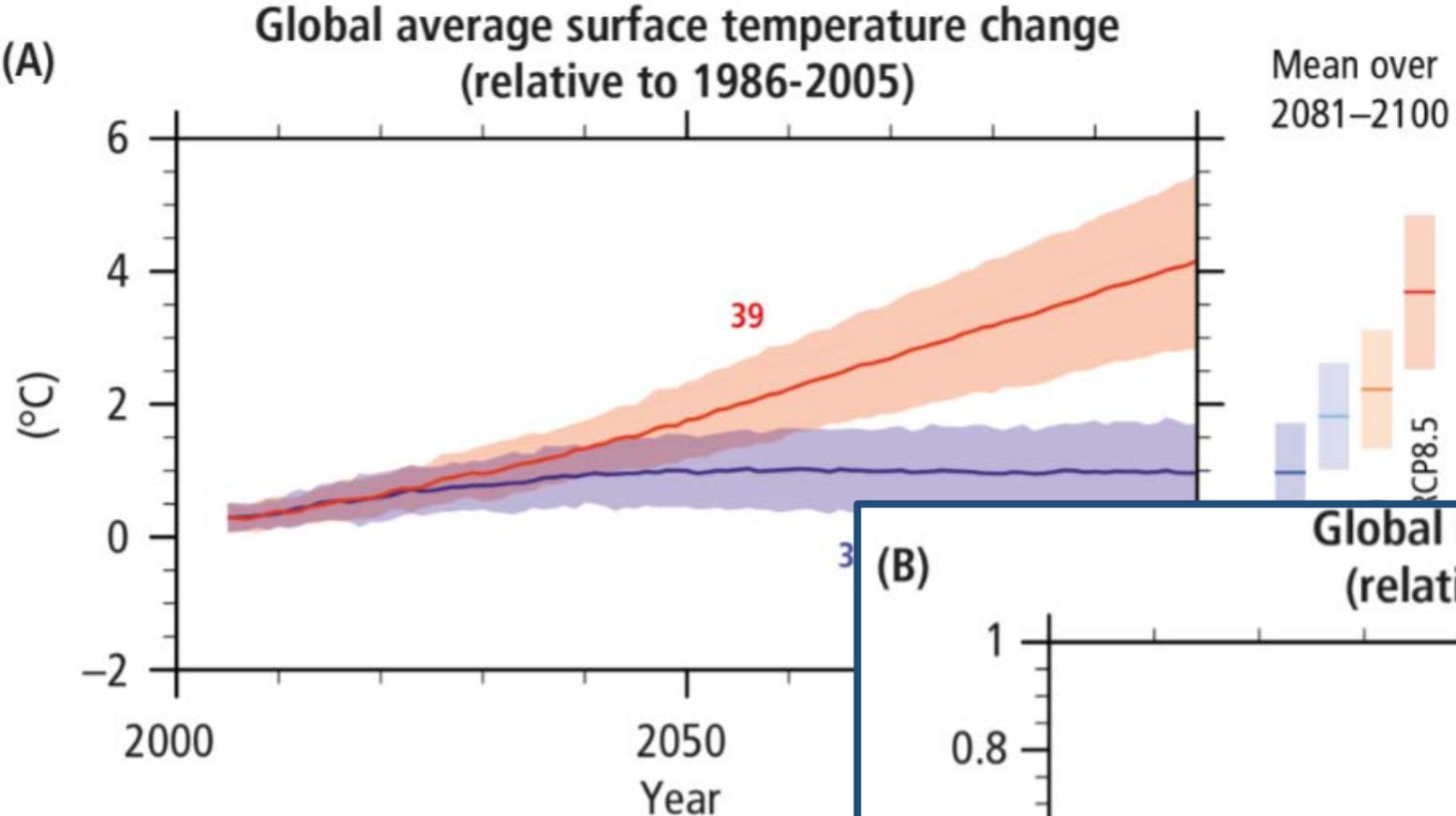
# Projected Changes in the Climate System



**Surface temperature** is projected to rise over the 21st century under all assessed emission scenarios.

It is very likely that **heat waves** will occur more often and last longer, and that **extreme precipitation** events will become more intense and frequent in many regions.

The **ocean** will continue to warm and acidify, and **global mean sea level** to rise.

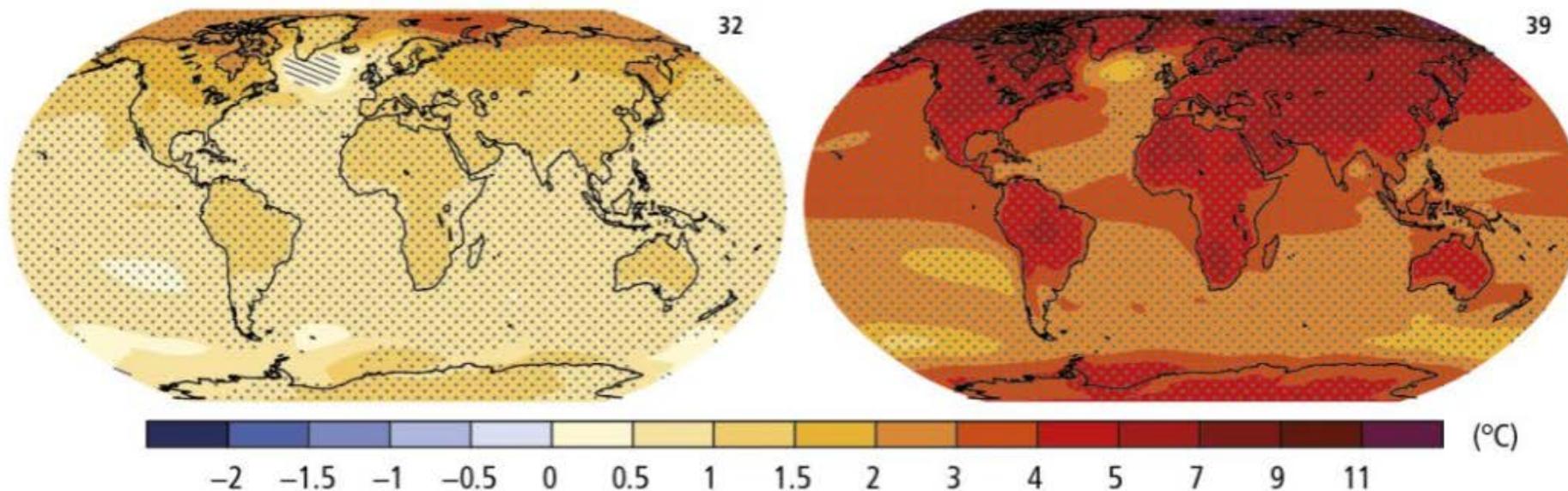


RCP 2.6

RCP 8.5

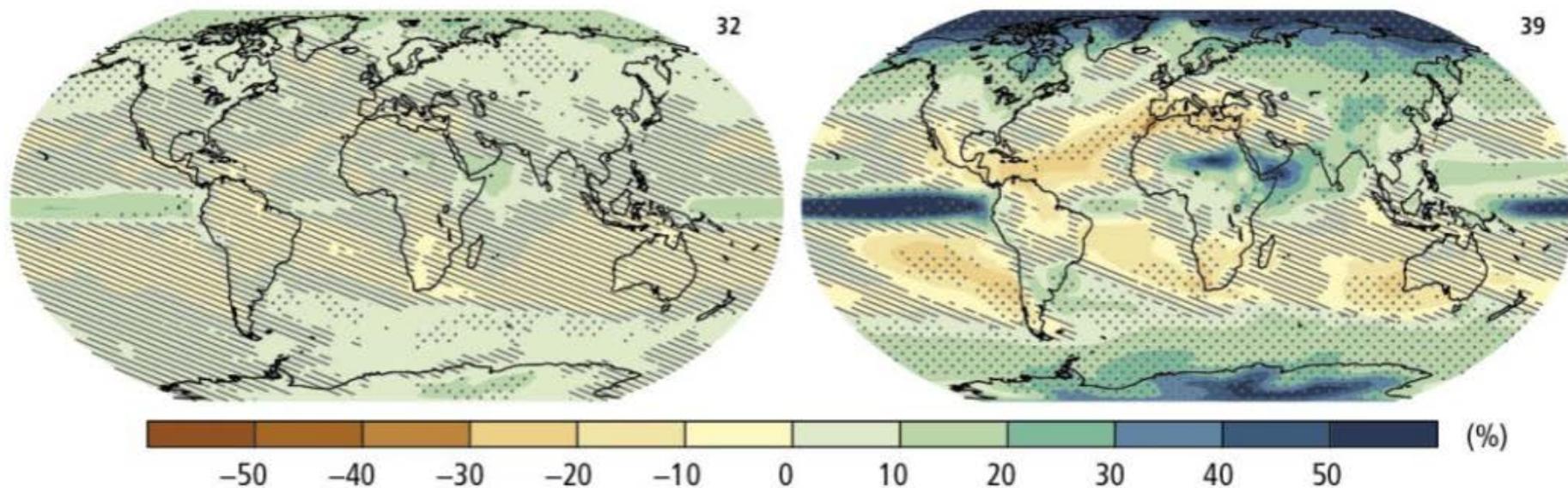
(a)

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



(b)

Change in average precipitation (1986–2005 to 2081–2100)

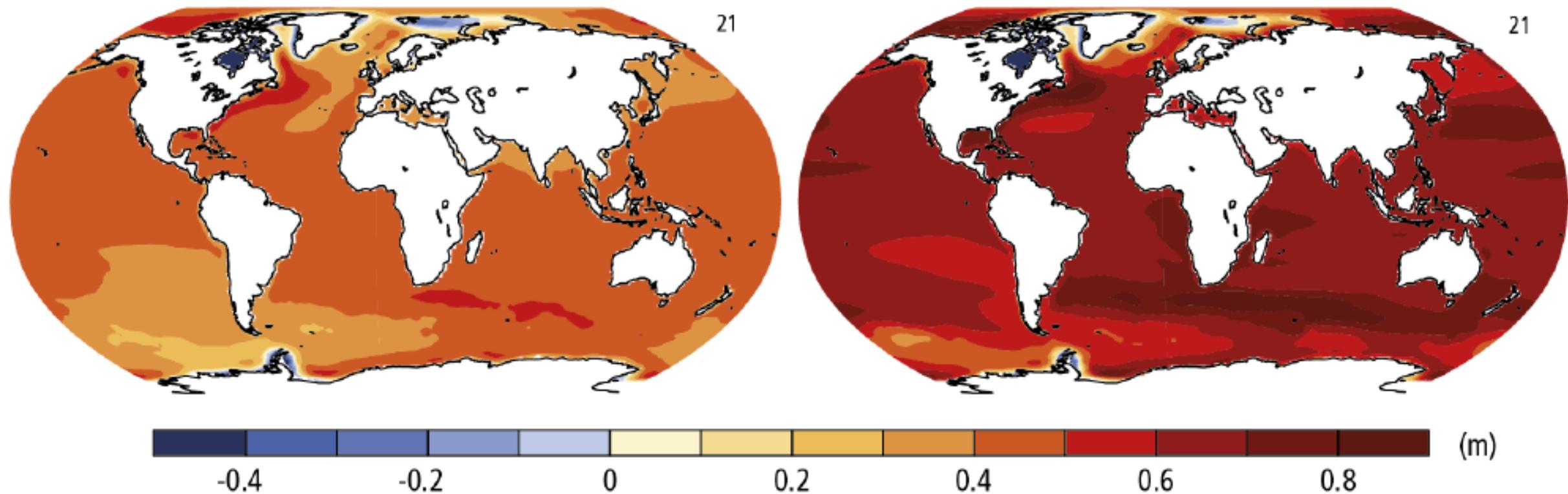


RCP 2.6

RCP 8.5

(c)

### Change in average sea level (1986–2005 to 2081–2100)



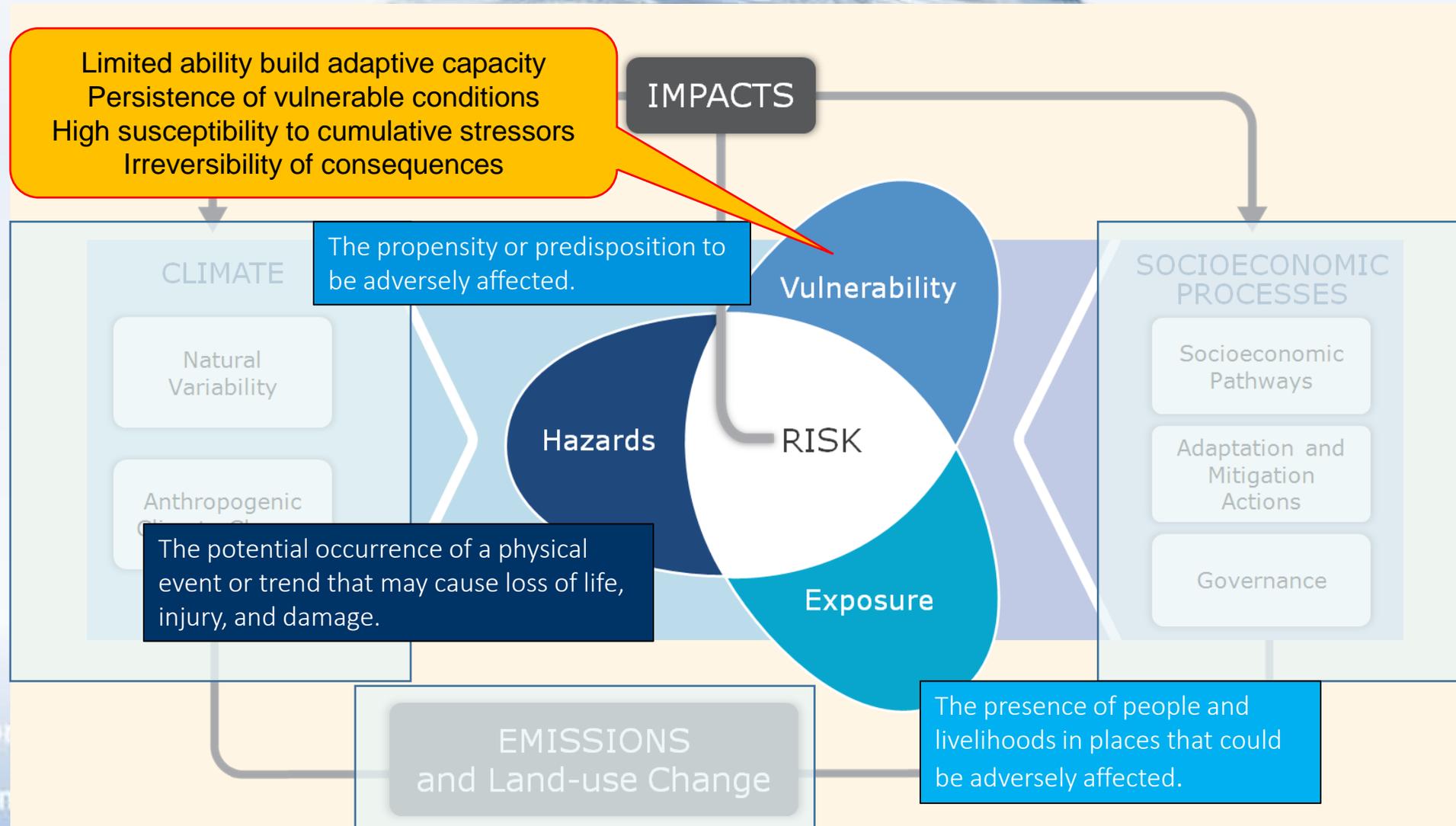
# Future Risks and Impacts



Climate change will **amplify existing risks** and **create new risks** for natural and human systems.

**Risks are unevenly distributed** and are generally greater for disadvantaged people and communities in countries at all levels of development.

# Highlighting Risk in the AR5 (WGII)



# Understanding Vulnerability

## AR4:



**Vulnerability** is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes.

Some criteria of **key vulnerabilities**:

- size (magnitude)
- time
- persistence of impacts.

## AR5:

**Vulnerability** is the propensity or predisposition to be adversely affected.

Much **stronger focus** on:

- (uneven) development processes
- inequalities in societies

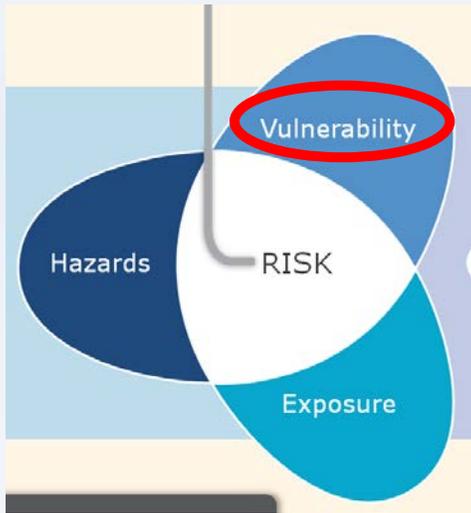


Heat wave 2003, France

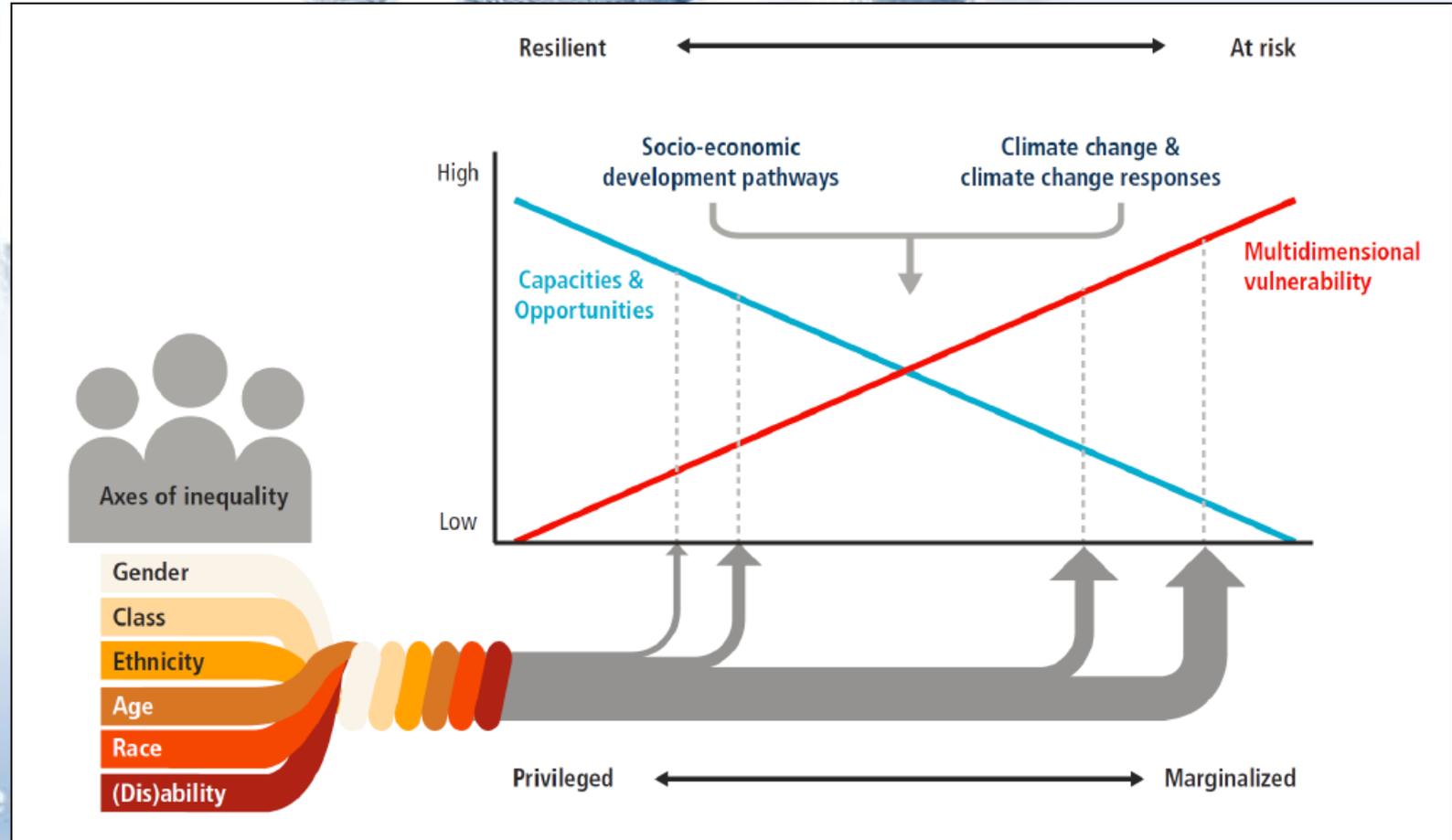
African agricultural lands



# Multidimensional Vulnerability



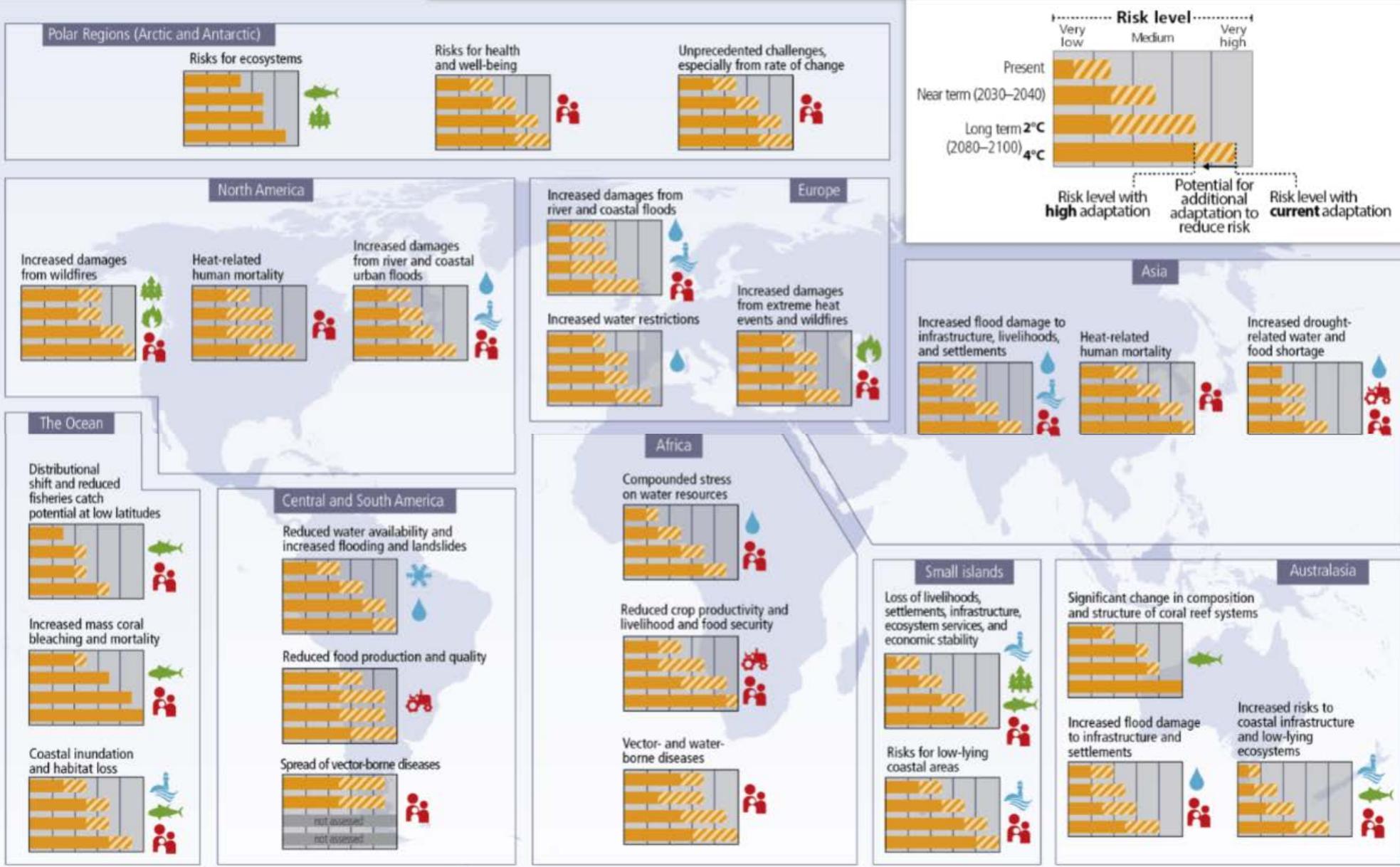
Inequalities



Synthesis Report of the Fifth Assessment Report of the Intergovernmental Panel on Climate

# Regional key risks and potential for risk reduction

## Representative key risks for each region for



# Representative key risks for each region for

**Physical Systems**

- Glaciers, snow, ice, and/or permafrost
- Rivers, lakes, floods, and/or drought
- Coastal erosion and/or sea level effects

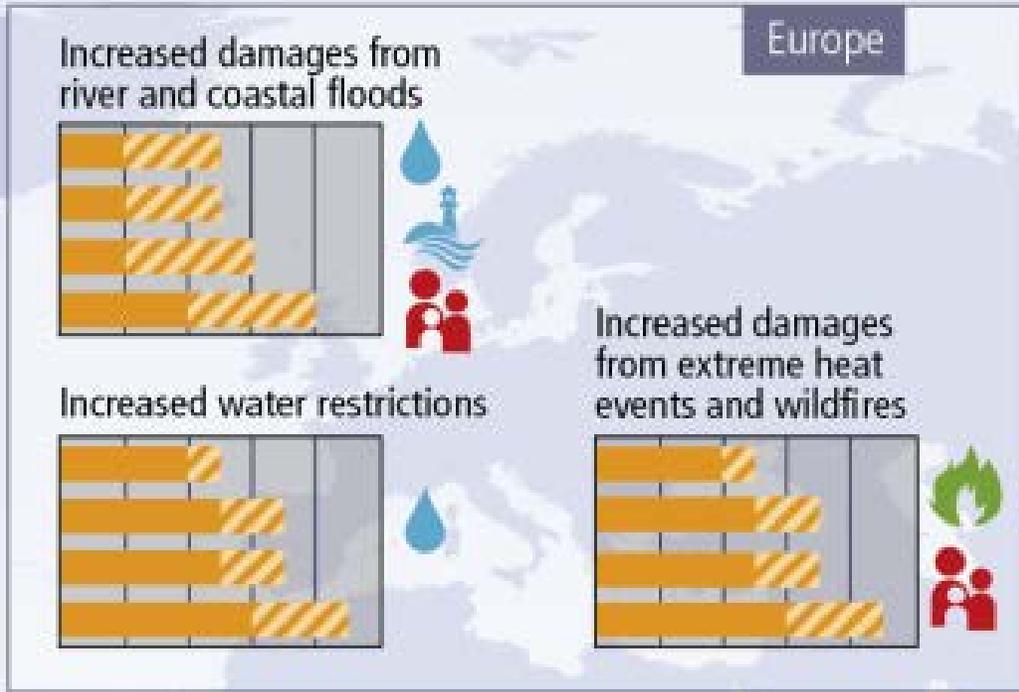
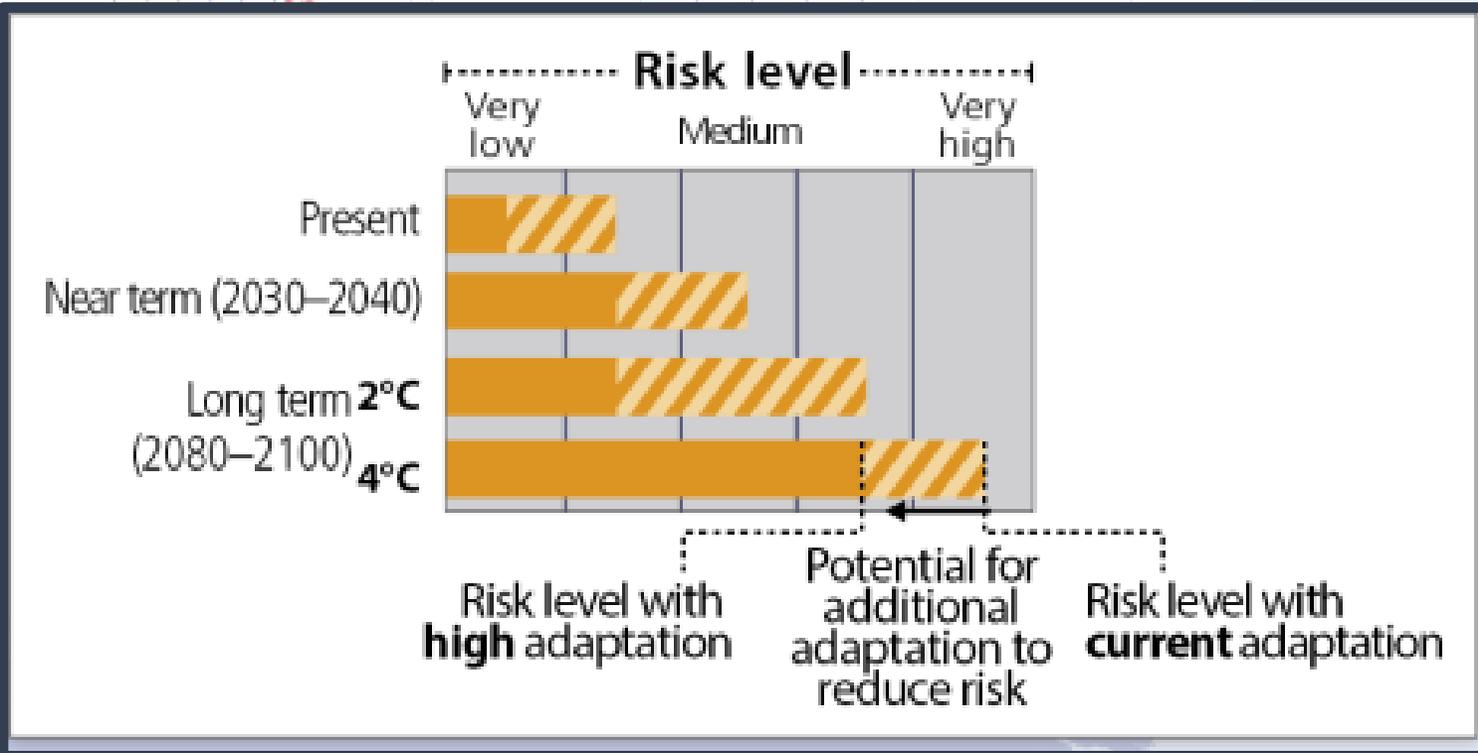
**Biological Systems**

- Terrestrial ecosystems
- Wildfire
- Marine ecosystems

**Human & Managed Systems**

- Food production
- Livelihoods, health, and/or economics

## Regional key risks and potential for risk reduction



# Representative key risks for each region for

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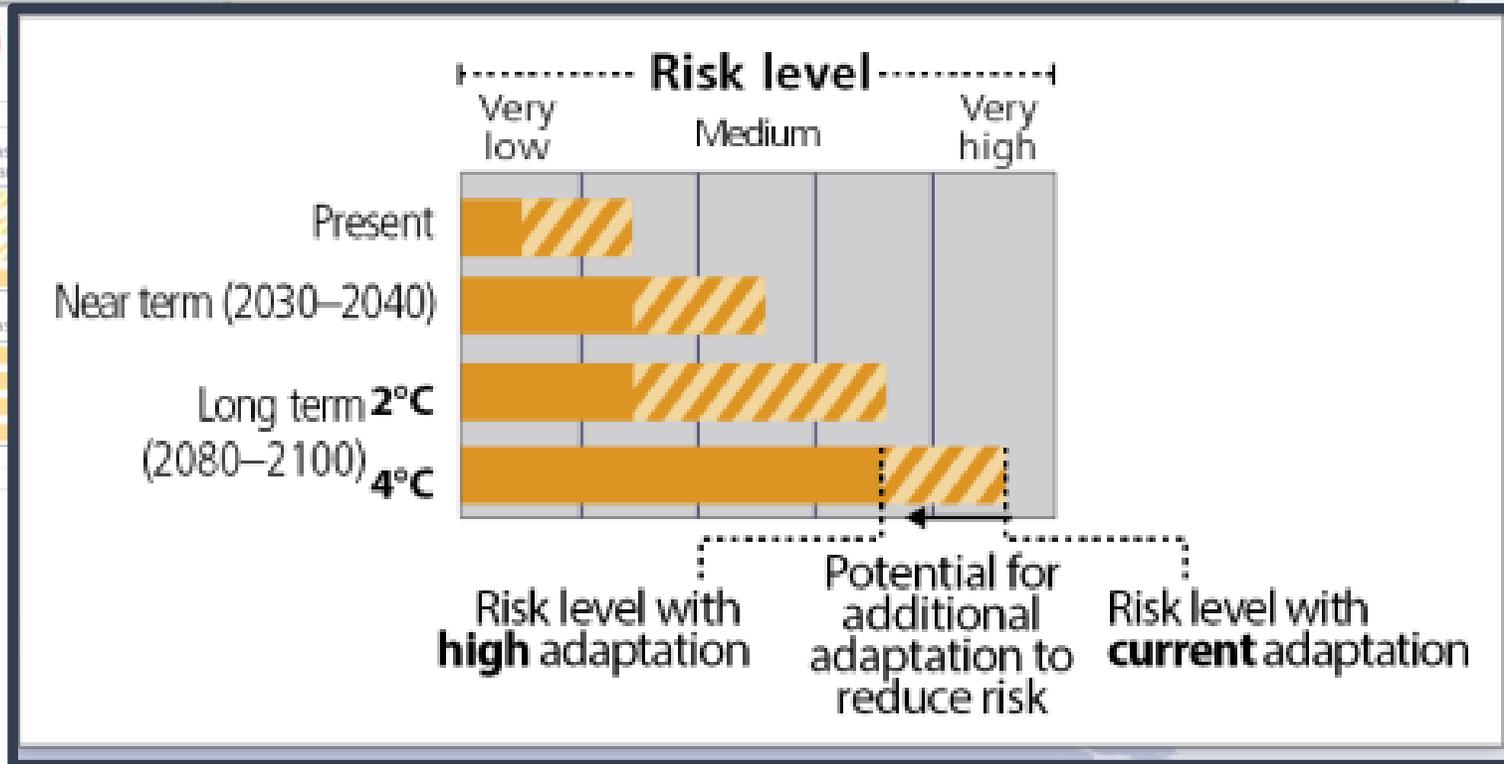
- Food production
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### Africa

- Compounded stress on water resources
- Reduced crop productivity and livelihood and food security
- Vector- and water-borne diseases

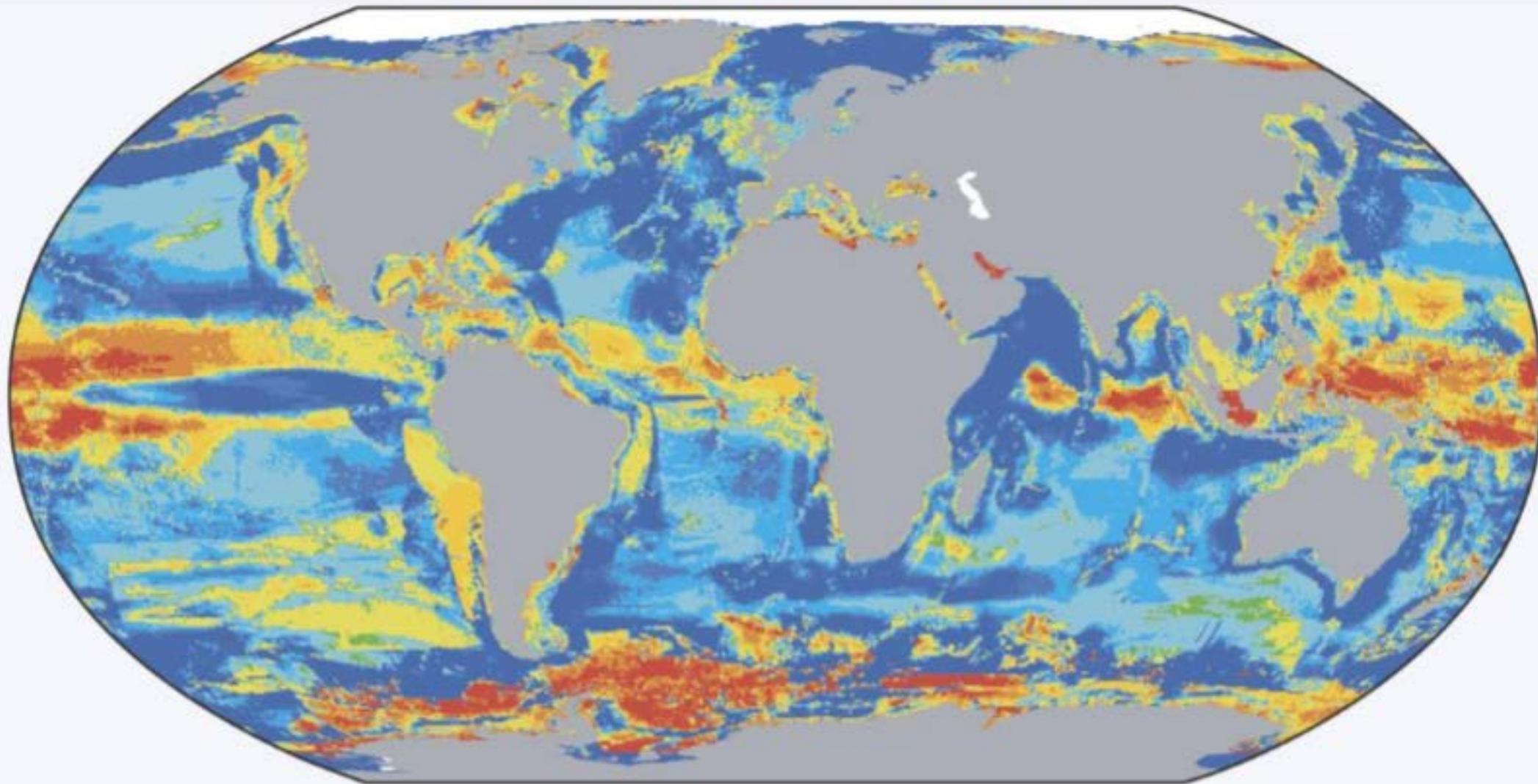
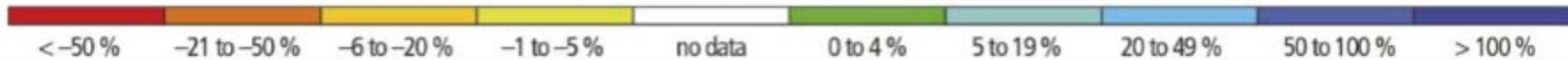
### The Ocean

- Distributional shift and reduced fisheries catch potential at low latitudes
- Increased mass coral bleaching and mortality
- Coastal inundation and habitat loss

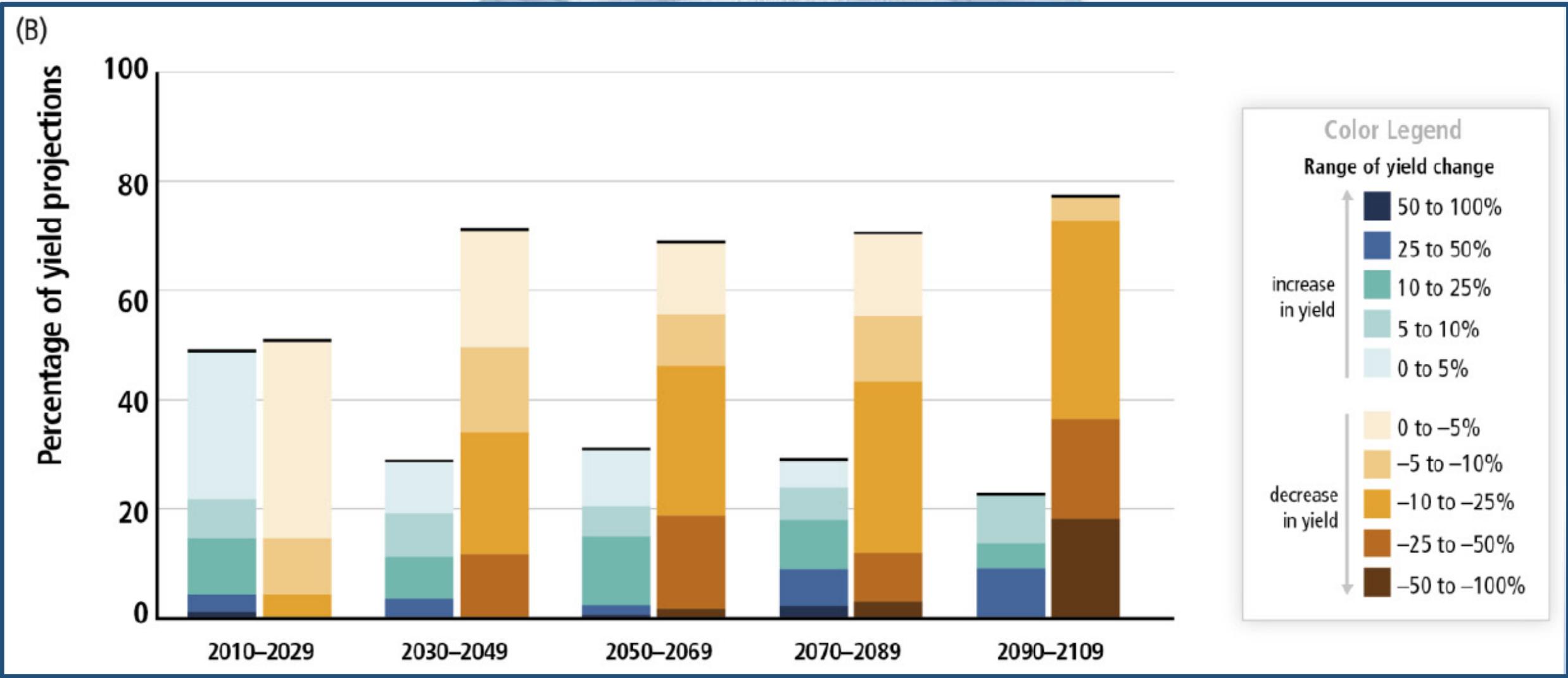


- economic stability
- Increased flood damage to infrastructure and settlements
- Increased risks to coastal infrastructure and low-lying ecosystems
- Vector- and water-borne diseases
- Risks for low-lying coastal areas

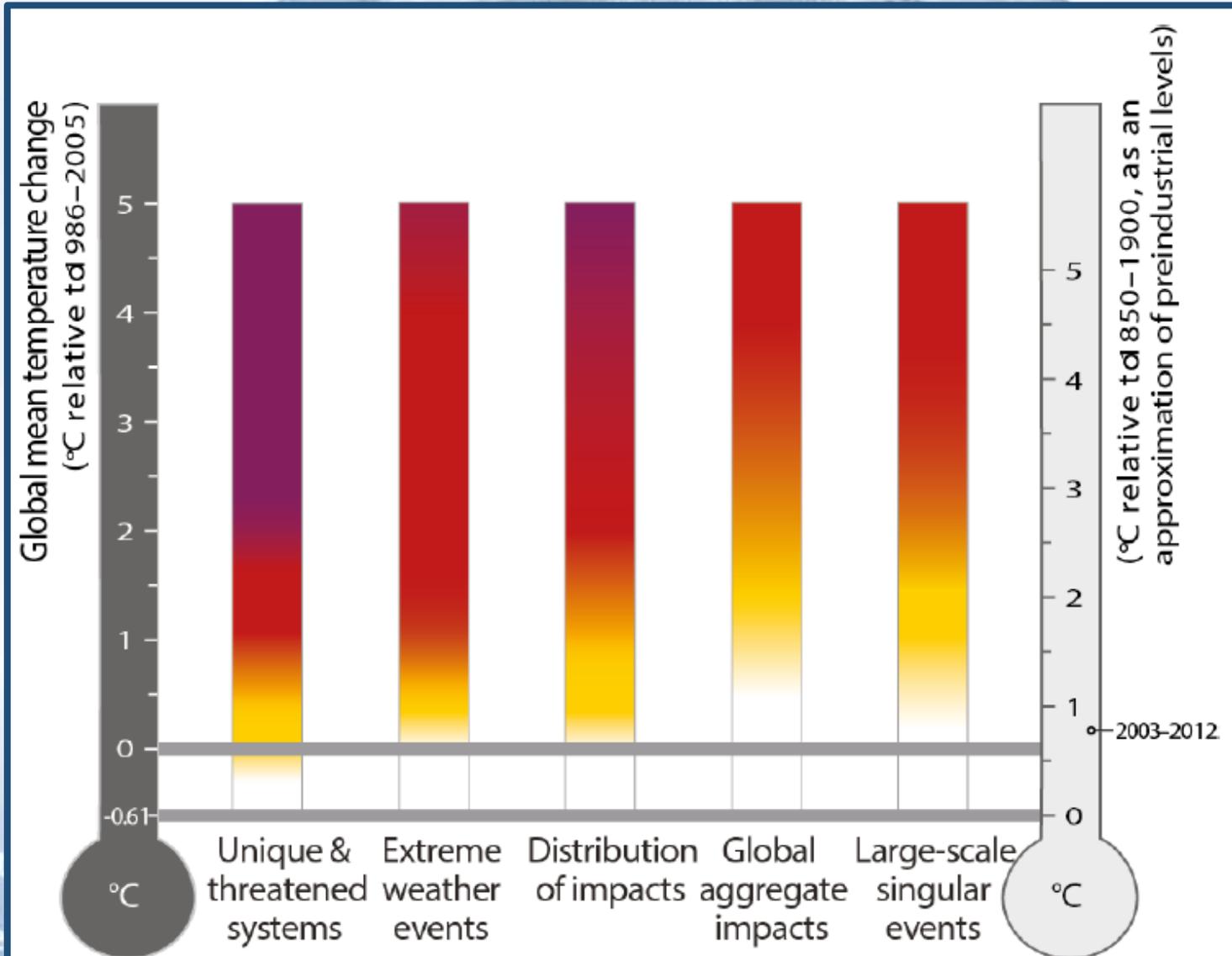
Change in maximum catch potential (2051–2060 compared to 2001–2010, SRES A1B)



# Impacts for Food Security



# Reasons for Concern



# Climate Change Beyond 2100

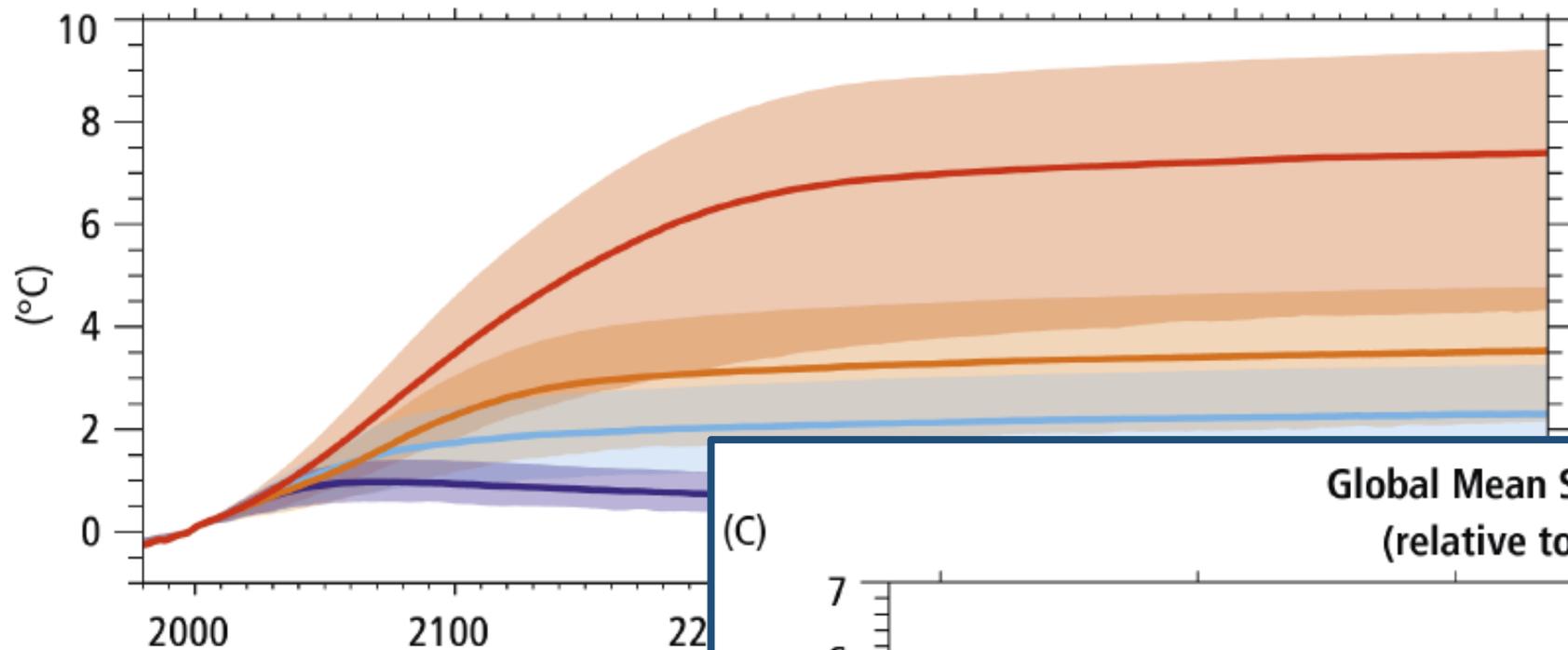


Many aspects of climate change and associated impacts **will continue for centuries**, even if anthropogenic emissions of greenhouse gases are stopped.

**The risks of abrupt or irreversible changes** increase as the magnitude of the warming increases.

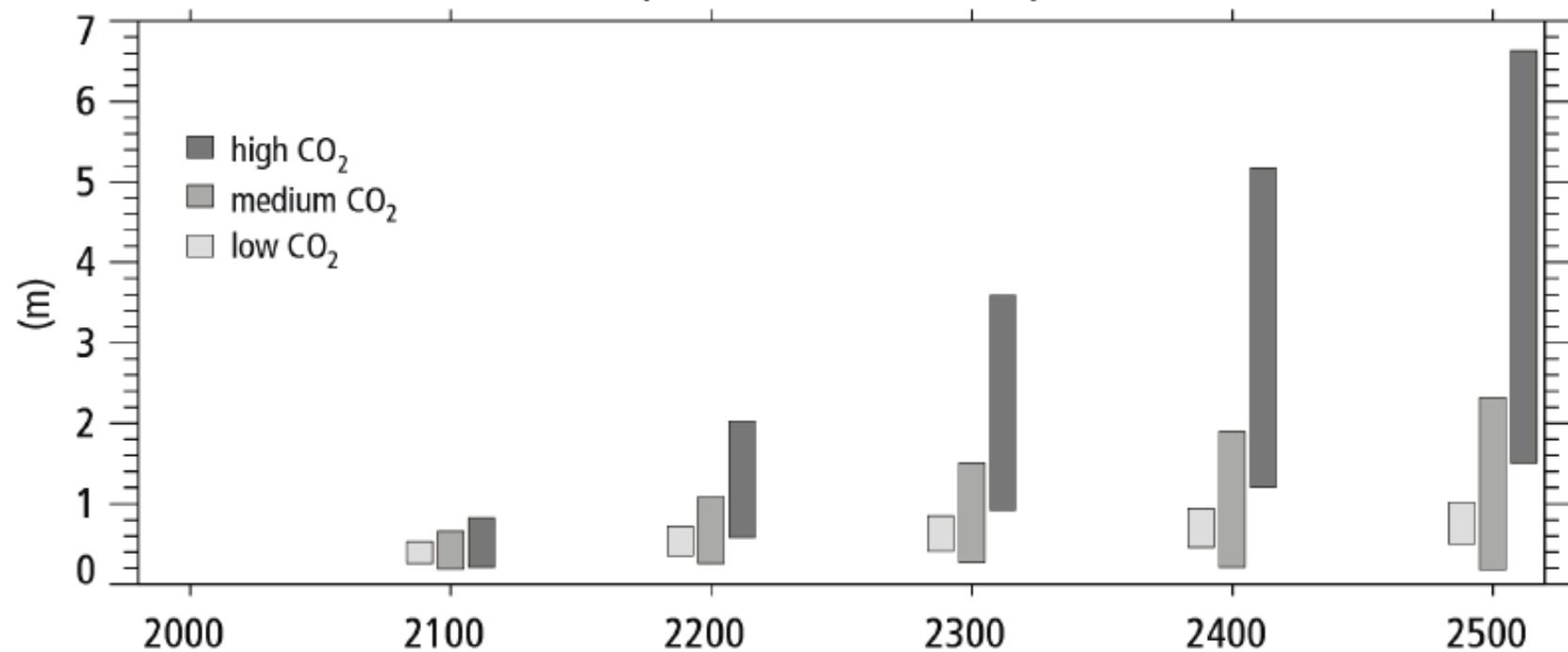
Surface Air Temperature Change  
(relative to 1986-2005)

(B)



Global Mean Sea Level Change  
(relative to 1986-2005)

(C)



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