

IPCC AR5: Observed & Projected Climate Change Impacts, Reasons for Concern, & Opportunities and Limits of Adaptation

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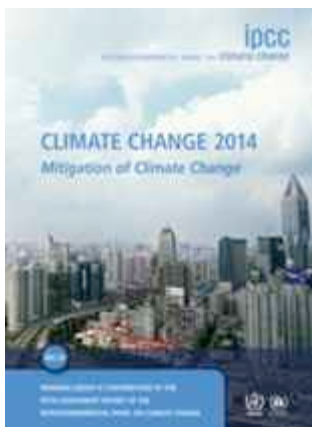
**Thanks to the Belgian Federal Science Policy Office (BELSPO)
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Université catholique de Louvain for their support**



What is happening in the climate system?



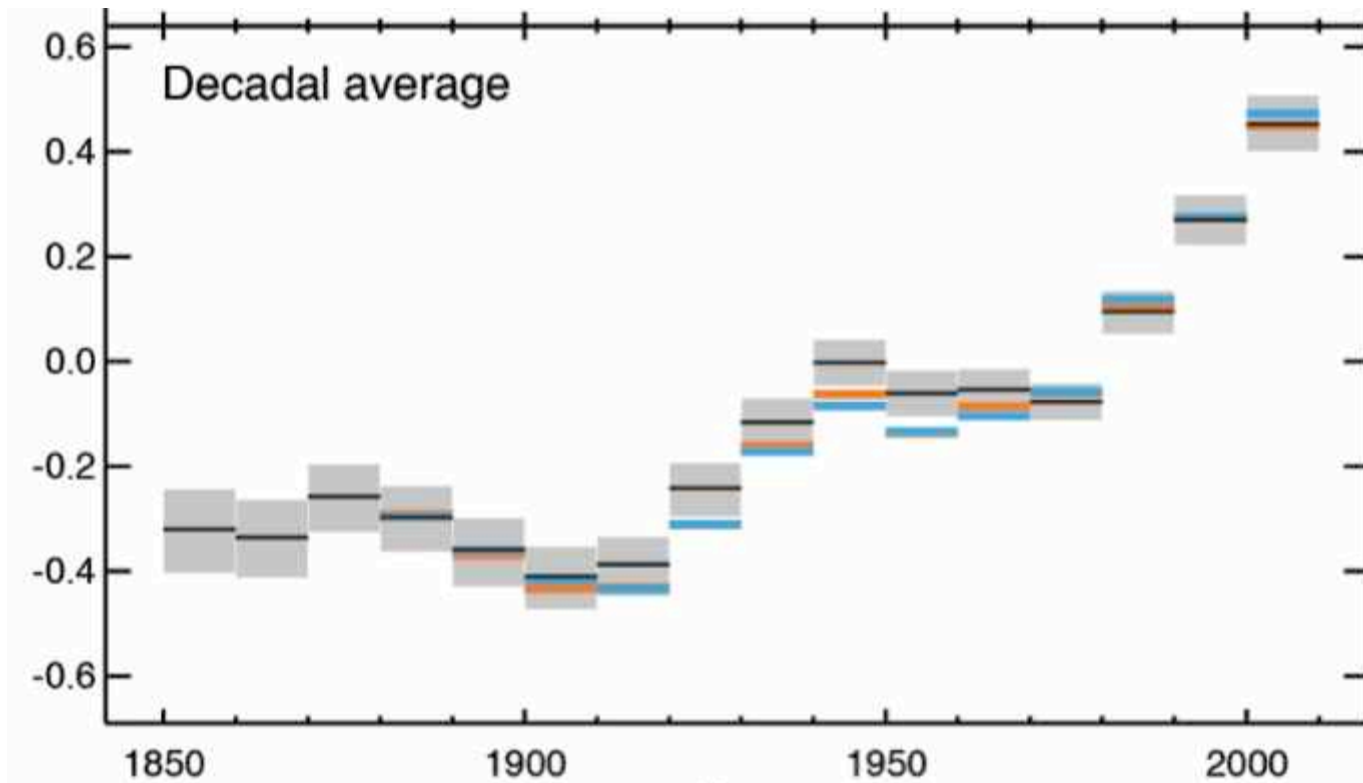
What are the risks?



What can be done?

Key messages from IPCC AR5

- **Human influence on the climate system is clear**
- **Continued emissions of greenhouse gases will increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems**
- **While climate change is a threat to sustainable development, there are many opportunities to integrate mitigation, adaptation, and the pursuit of other societal objectives**
- **Humanity has the means to limit climate change and build a more sustainable and resilient future**

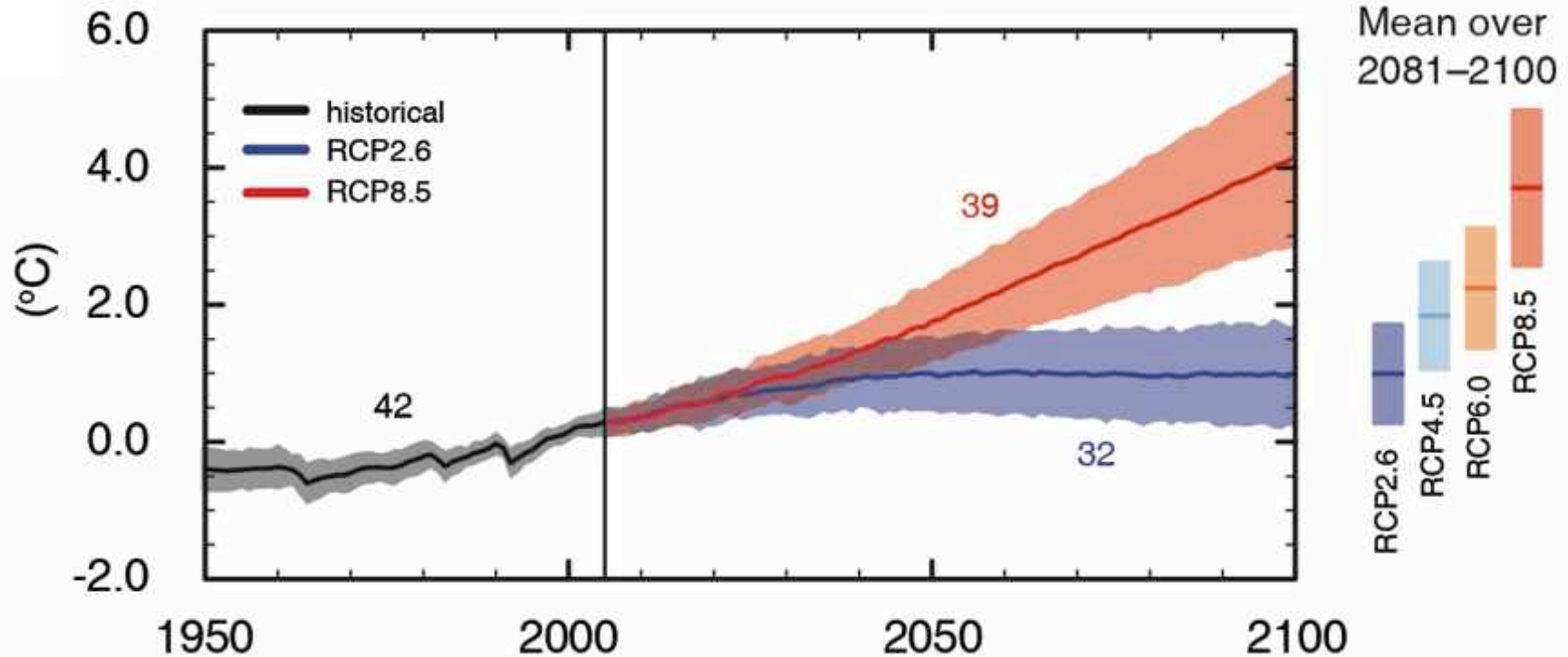


(IPCC 2013, Fig. SPM.1a)

Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850.

In the Northern Hemisphere, 1983–2012 was *likely* the warmest 30-year period of the last 1400 years (*medium confidence*).

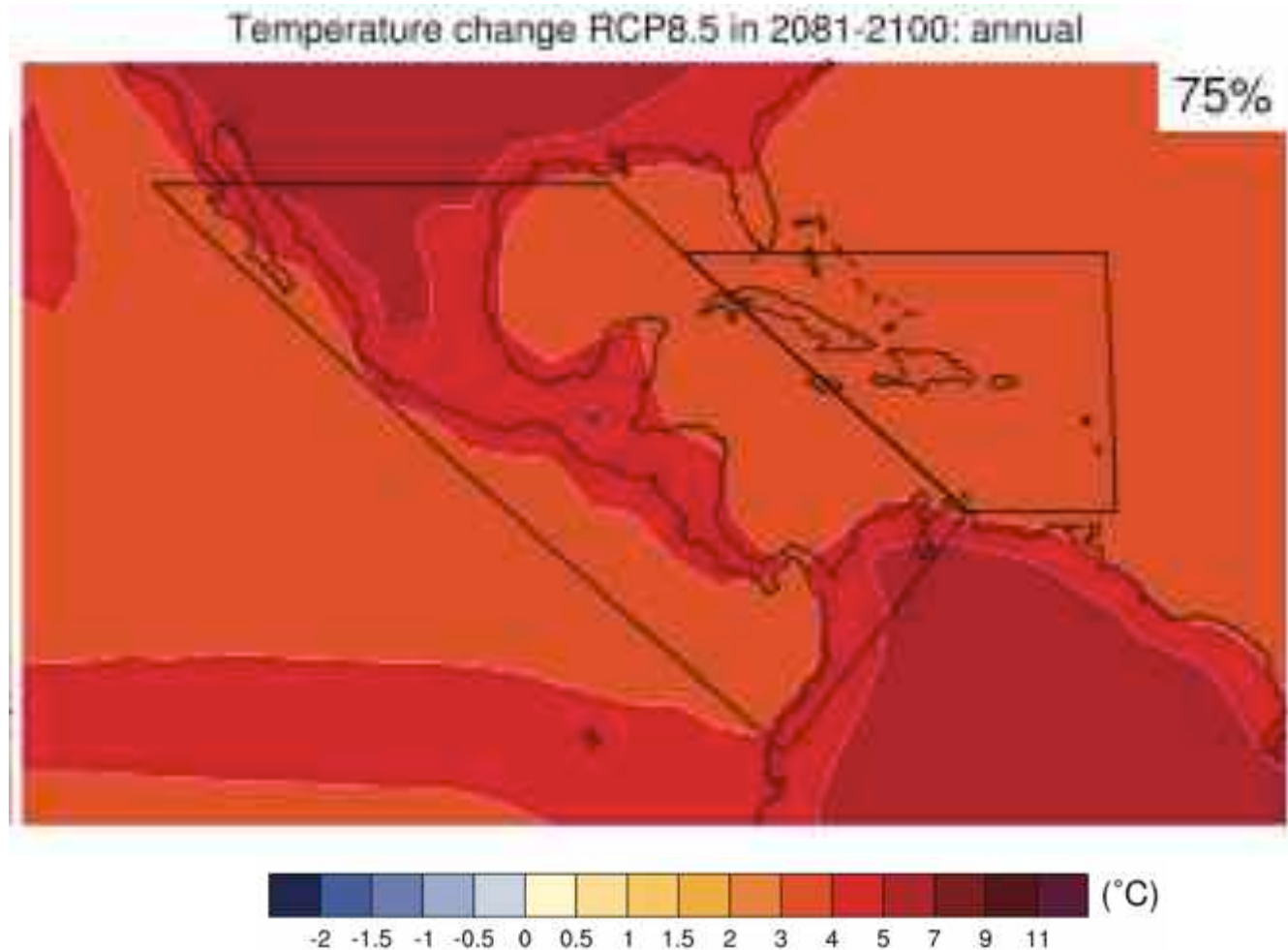
Global average surface temperature change



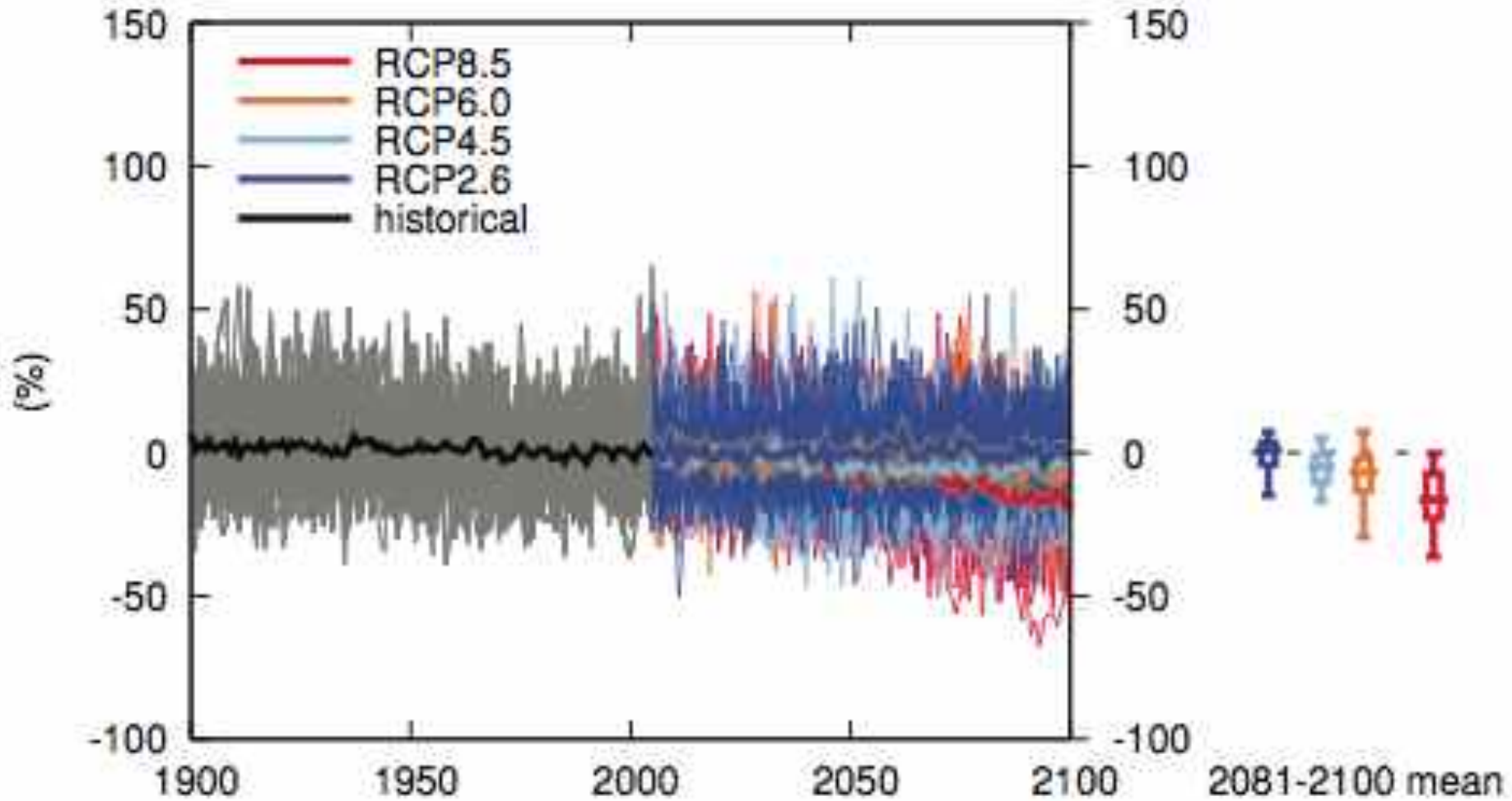
(IPCC 2013, Fig. SPM.7a)

Only the lowest (RCP2.6) scenario maintains the global surface temperature increase above the pre-industrial level to less than 2°C with at least 66% probability

Map of temperature changes in 2081–2100, with respect to 1986–2005 in the RCP8.5 scenario

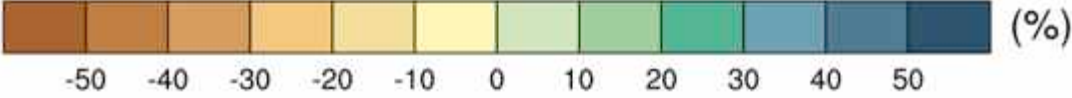
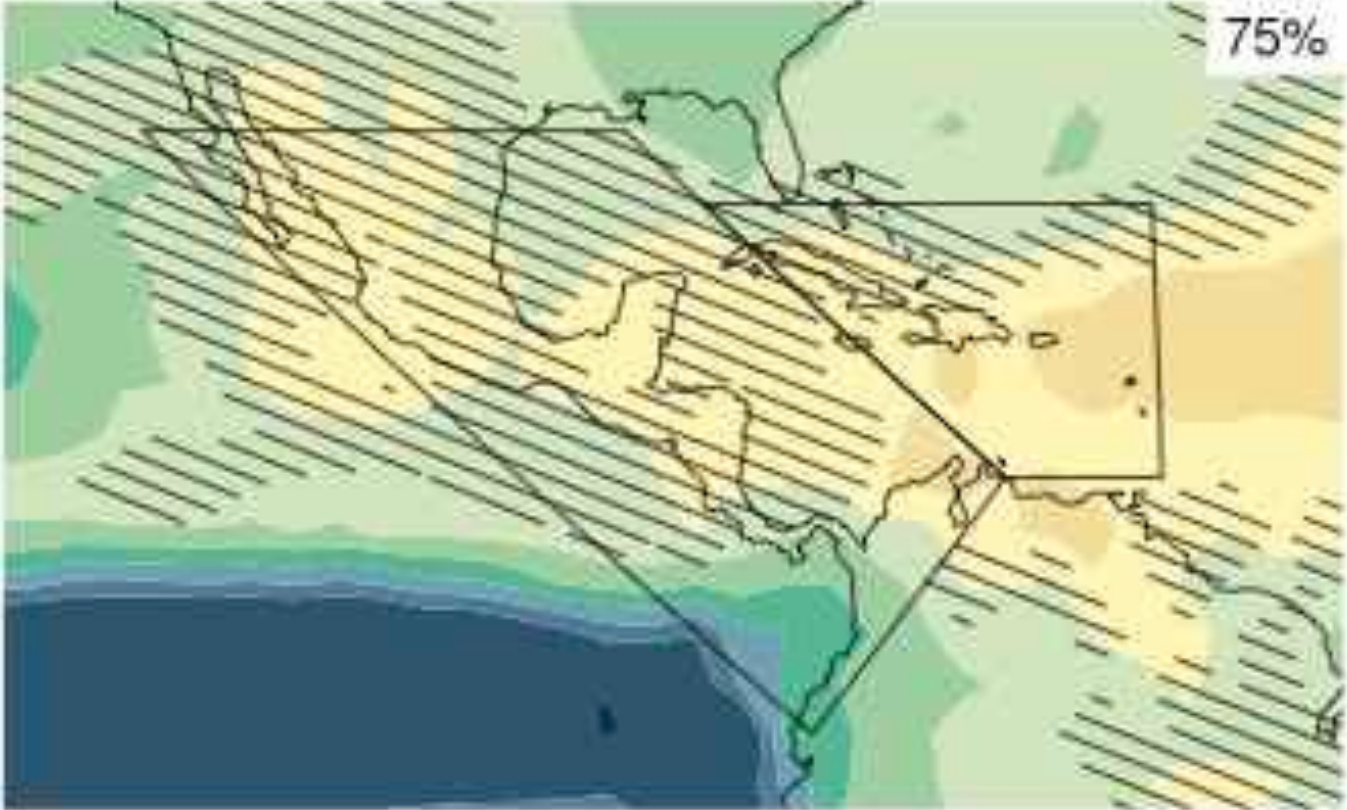




Precipitation change Caribbean (land and sea) annual



Map of precipitation changes in 2081–2100 with respect to 1986–2005 in the RCP8.5 scenario

Precipitation change RCP8.5 in 2081-2100: annual



-  Regions where the projected change is less than one standard deviation of the natural internal variability
-  Regions where the projected change is large compared to natural internal variability, and where at least 90% of models agree on a sign of change

Since 1950, **extreme hot days** and **heavy precipitation** have become more common



There is evidence that anthropogenic influences, including increasing atmospheric **greenhouse gas concentrations**, have changed these extremes

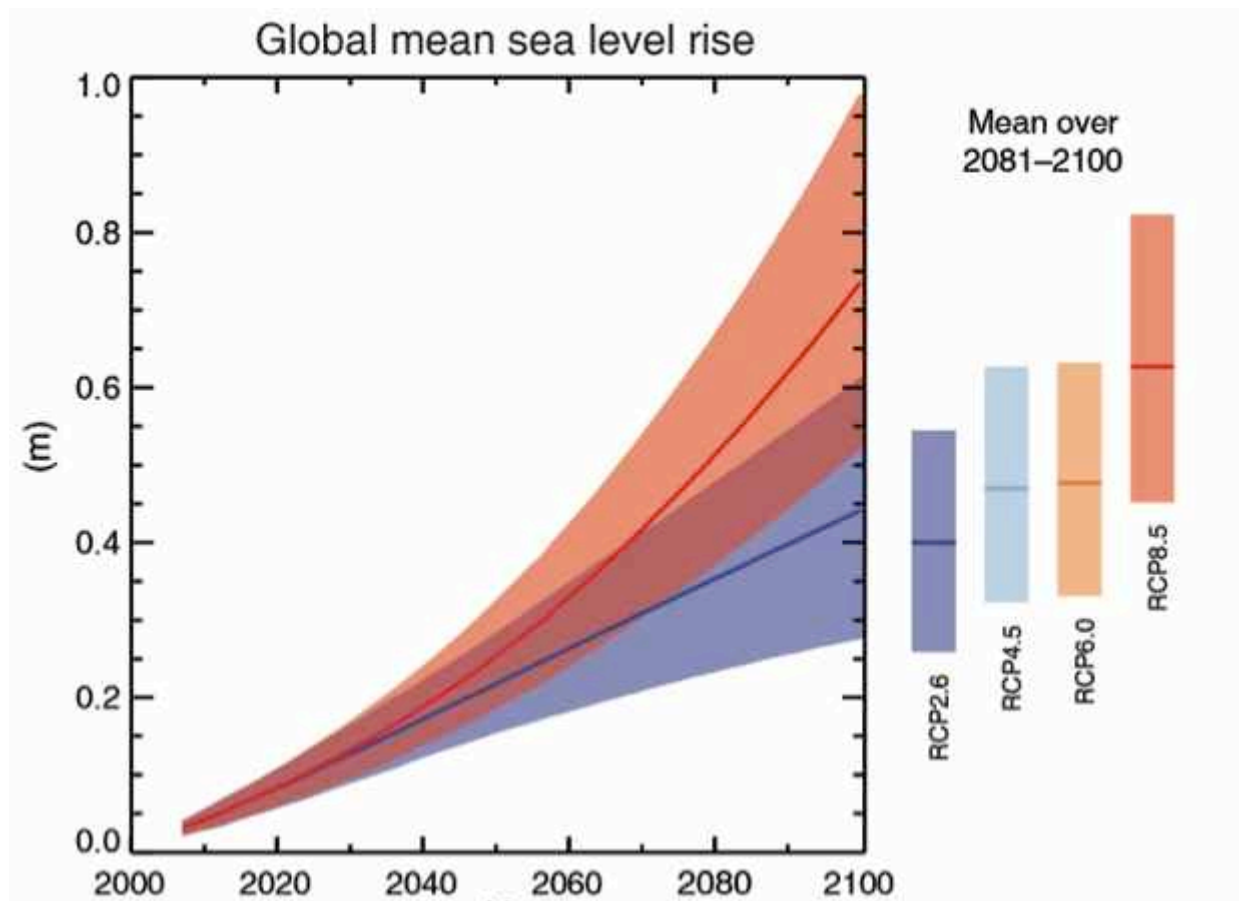


Fig. SPM.9

RCP2.6 (2081-2100), *likely* range: 26 to 55 cm
RCP8.5 (in 2100), *likely* range: 52 to 98 cm

Impacts are already underway

- **Tropics to the poles**
- **On all continents and in the ocean**
- **Affecting rich and poor countries (but the poor are more vulnerable everywhere)**



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Risk = Hazard x Vulnerability x Exposure (Katrina flood victim)



Potential Impacts of Climate Change



Food and water shortages



Increased displacement of people



Increased poverty



Coastal flooding

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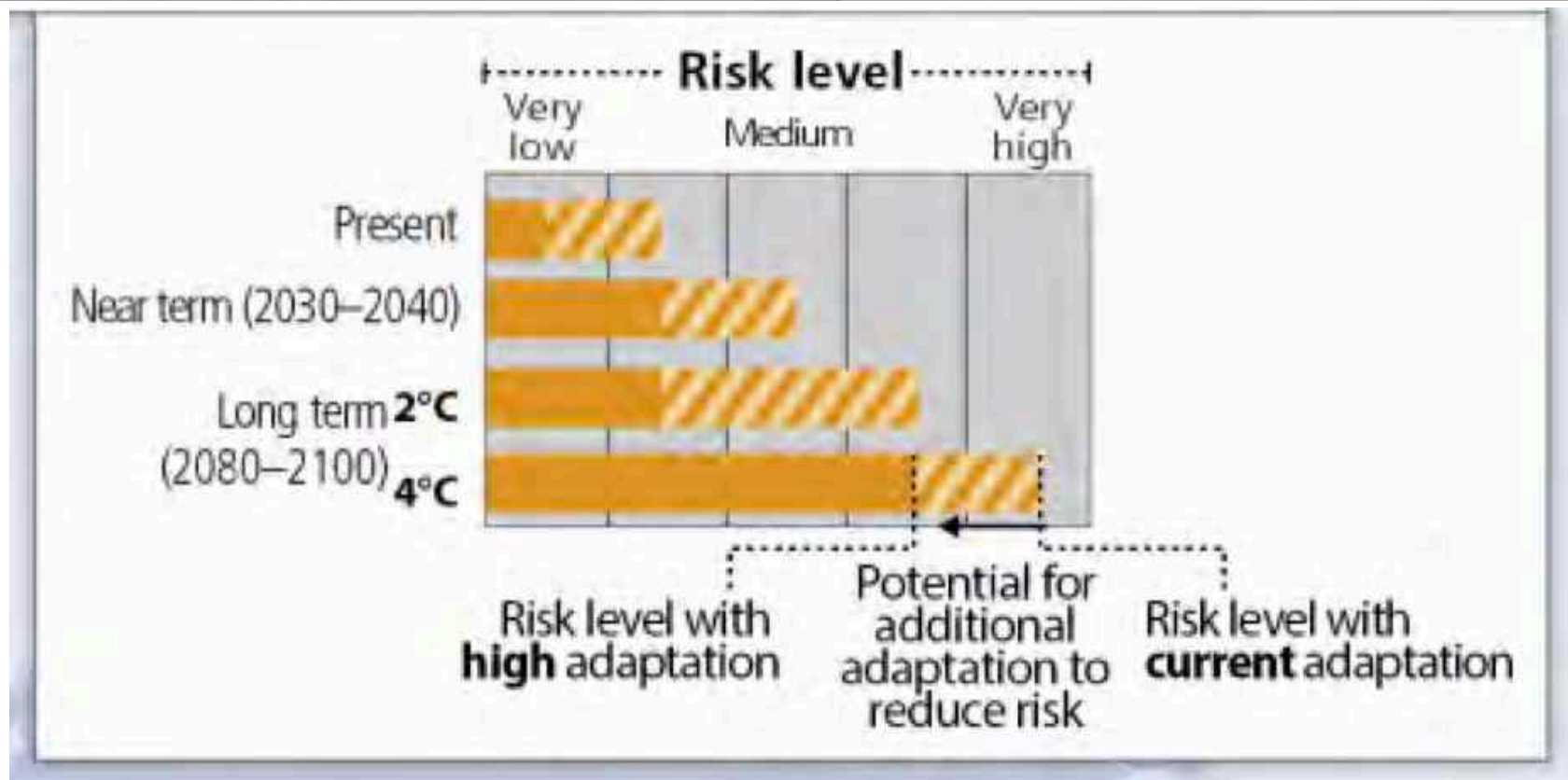


ADAPTATION IS

ALREADY OCCURRING

Regional key risks and potential for risk reduction through adaptation

Representative key risks for each region for



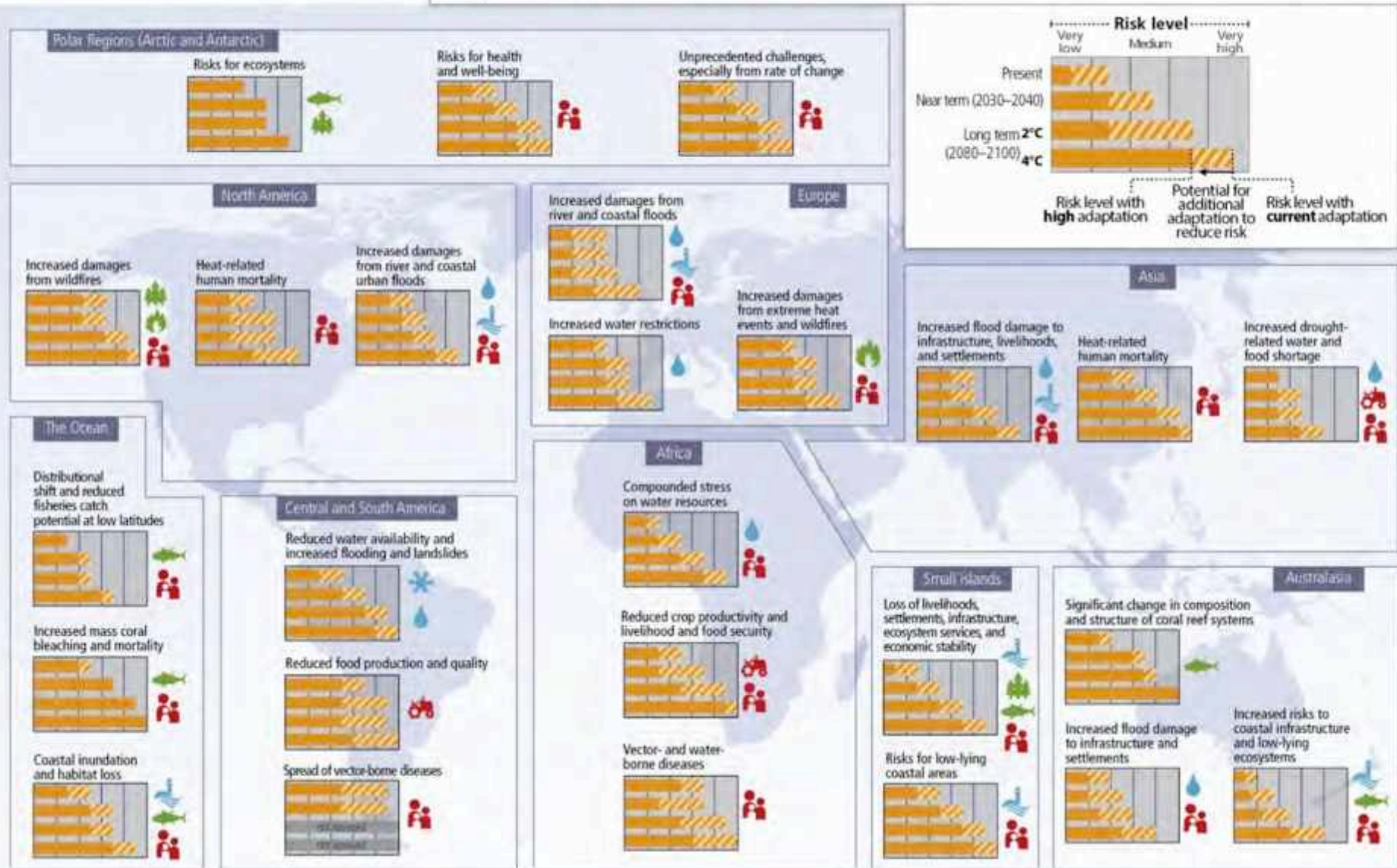
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INTERGOVERNMENTAL PANEL ON climate change



Regional key risks and potential for risk reduction

Representative key risks for each region for

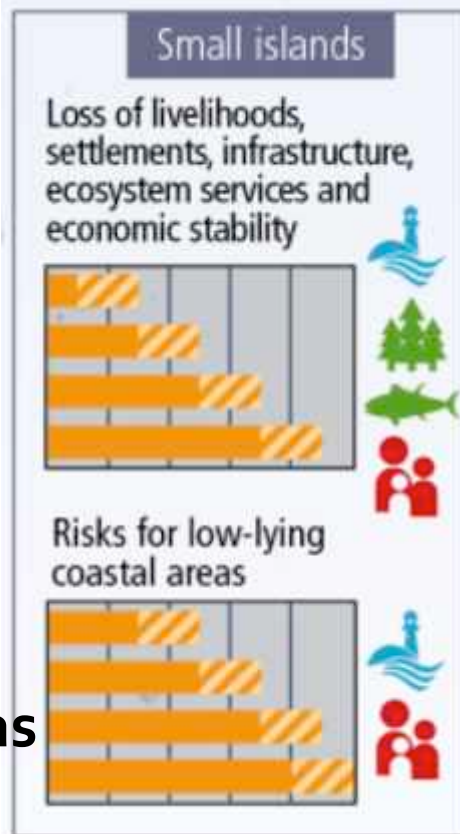


Regional key risks and potential for risk reduction: Small Islands

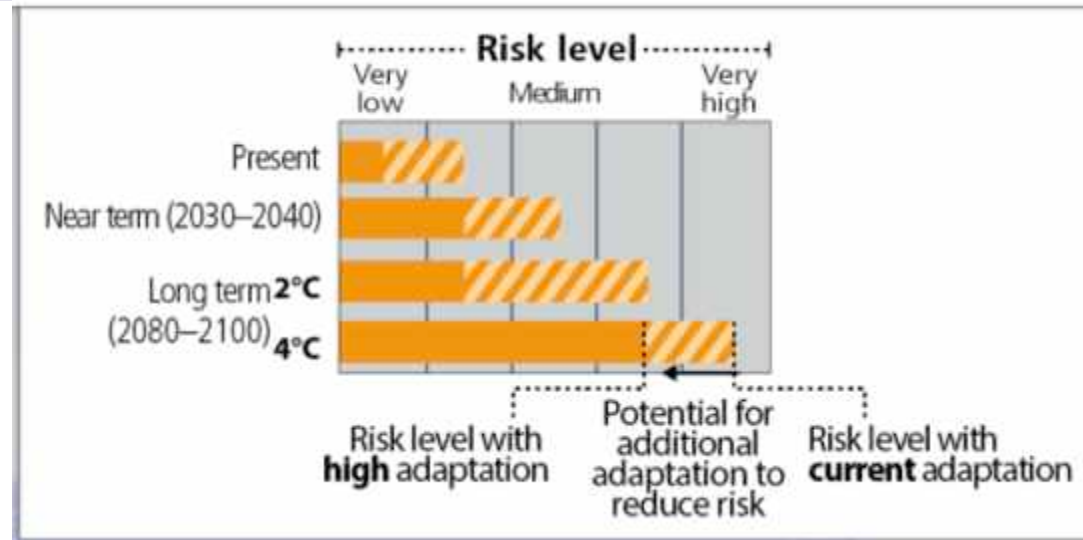
Representative key risks for each region for



Losses



Risk to coastal areas



Small islands: adaptation

Adaptation generates **larger benefit to small islands when delivered in conjunction with other development activities**, such as disaster risk reduction and community-based approaches to development

- address current social, economic, environmental issues,
- raise awareness, communicate future risks to local communities

Adaptation and mitigation on small islands are not always trade-offs - they **can be complementary**

- examples include energy supply, tourism infrastructure, coastal wetland services

Appropriate **assistance from the international community may help**

Flood risk adaptation in Bangladesh (example): cyclone shelters, awareness raising, forecasting and warning

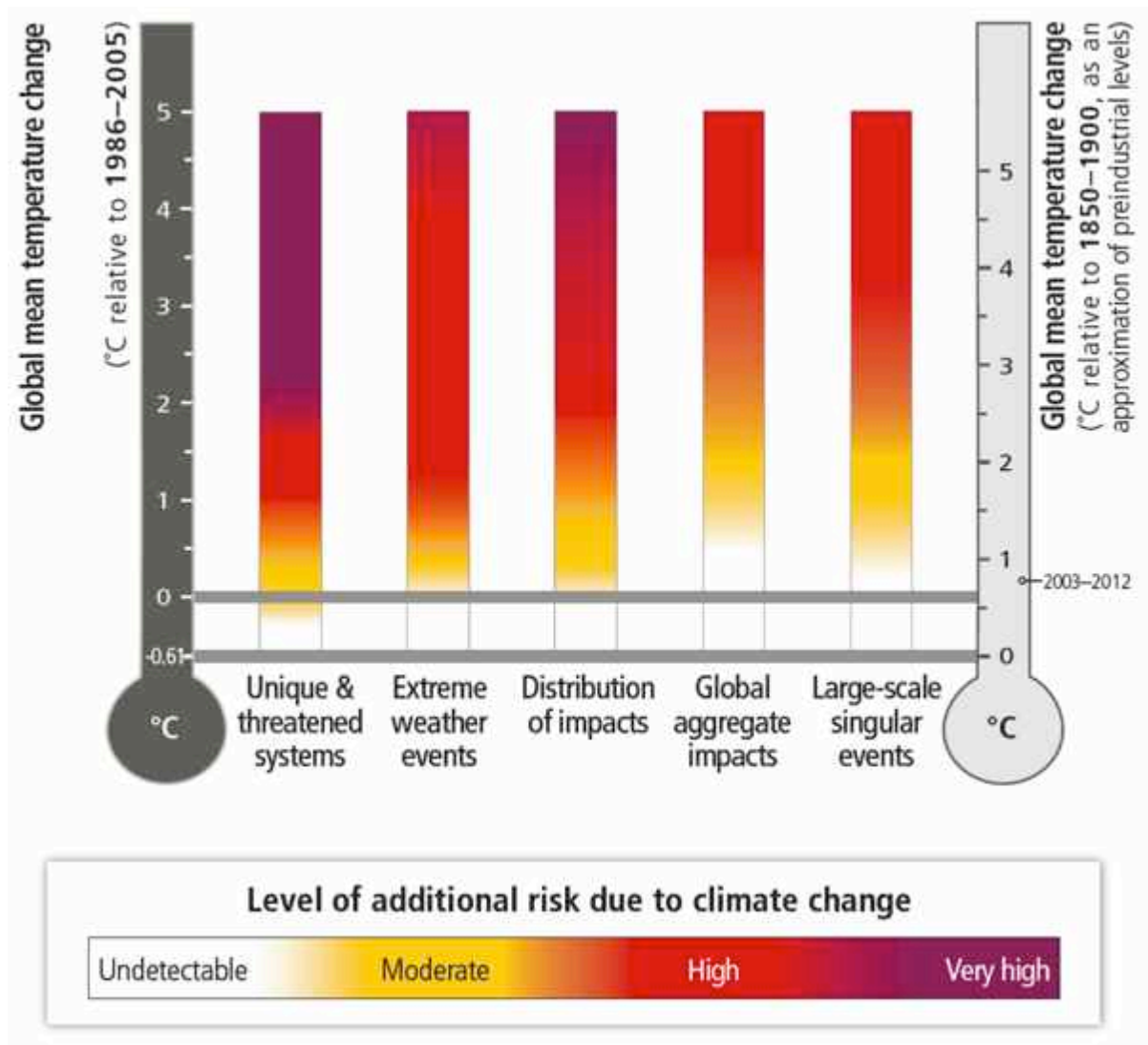


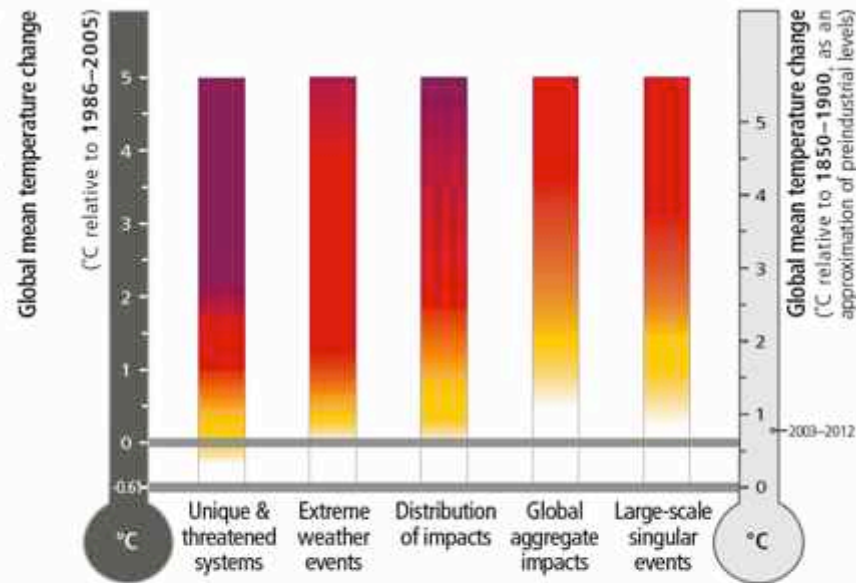
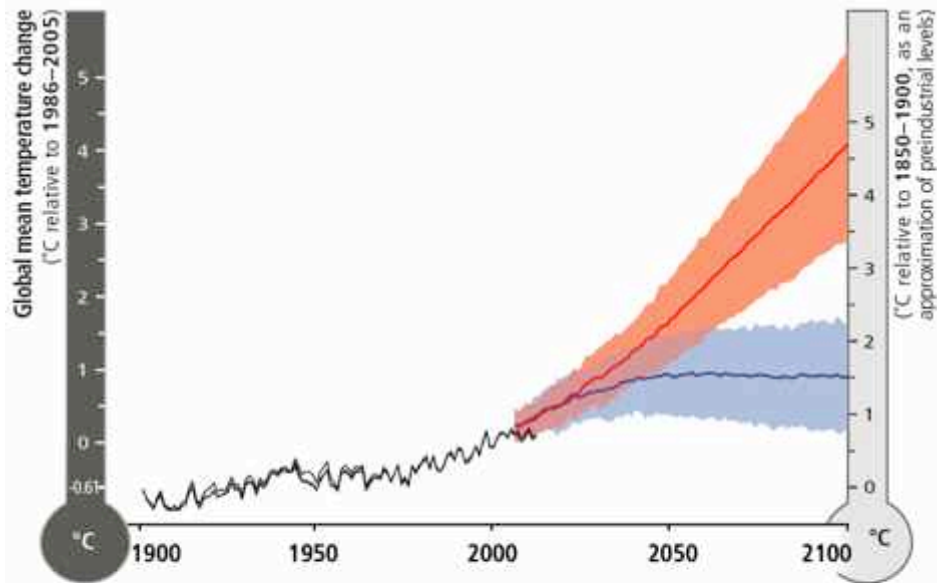
photo: Dr Thorsten Klose/German Red Cross (2010), evaluation of the Community Based Disaster Preparedness Programme run by the Red Cross in 1996-2002



RISKS OF
CLIMATE CHANGE
INCREASE
WITH CONTINUED
HIGH EMISSIONS

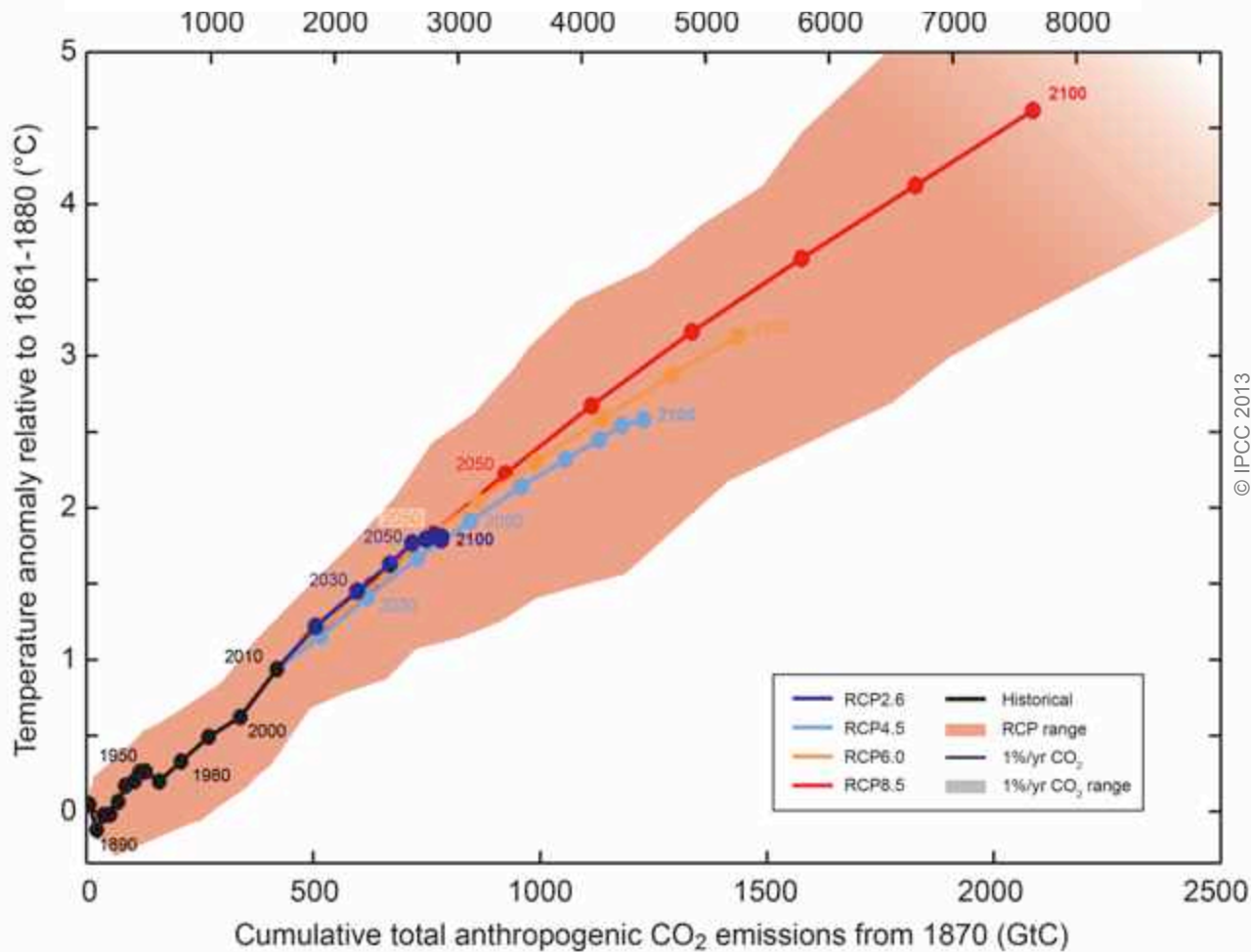
The Reasons For Concern





Cumulative total CO₂ emissions since 1870 (GtCO₂)

Warming



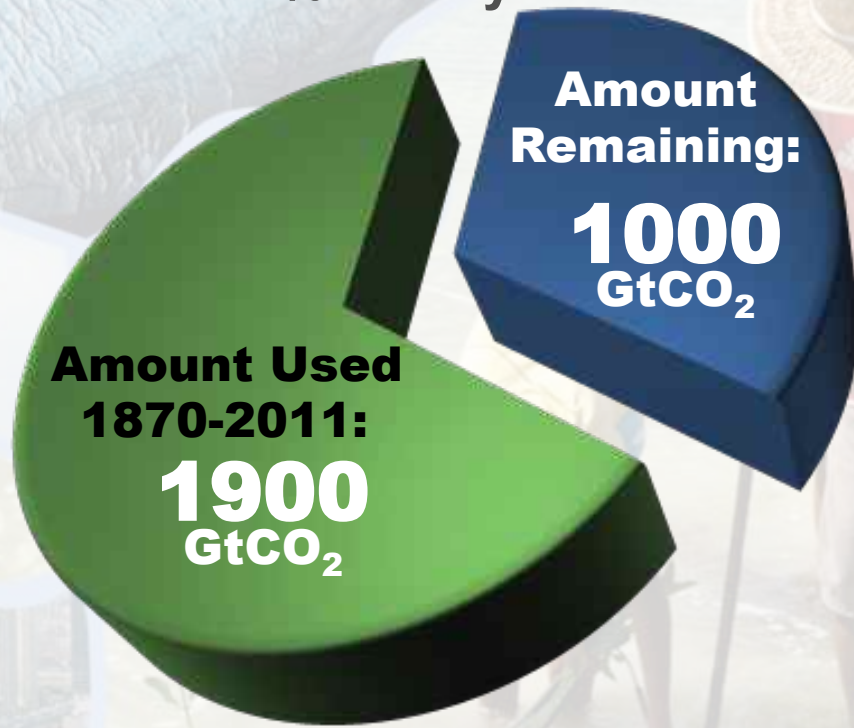
© IPCC 2013

Fig. SPM.10

Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.

The window for action is rapidly closing

65% of the carbon budget compatible with a 2°C goal is already used
NB: this is with a probability greater than 66% to stay below 2°C



NB: Emissions in 2011: 38 GtCO₂/yr

AR5 WGI SPM

- **Sustainable development and equity provide a basis for assessing climate policies and highlight the need for addressing the risks of climate change**
- **Issues of equity, justice, and fairness arise with respect to mitigation and adaptation**

Mitigation Measures



More efficient use of energy



Greater use of low-carbon and no-carbon energy

- Many of these technologies exist today
- But worldwide investment in **research** in support of GHG mitigation is small...



Improved carbon sinks

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



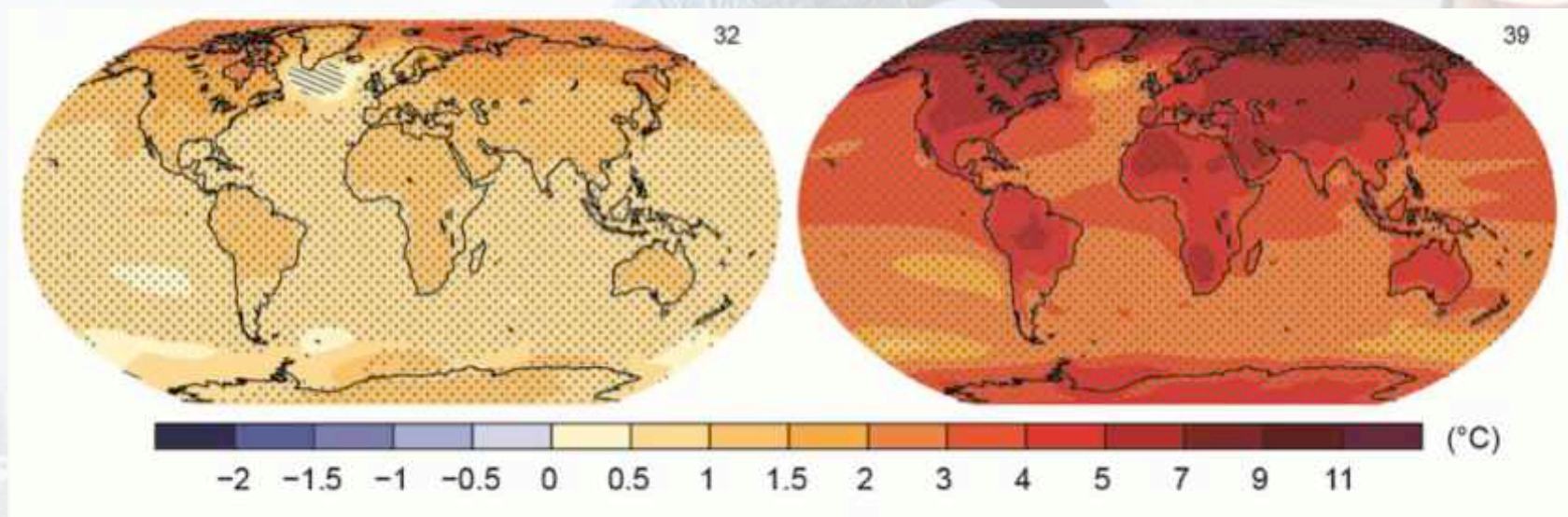
Lifestyle and behavioural changes

AR5 WGIII SPM

The Choices Humanity Makes Will Create Different Outcomes & increase prospects for effective adaptation

With substantial mitigation

Without additional mitigation



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

AR5 WGI SPM

Useful links:



- www.ipcc.ch : IPCC (reports and videos)
- www.climate.be/vanyp : my slides & my platform as candidate IPCC Chair
- **On Twitter: @JPvanYpersele
and @IPCC_CH**