Overall Messages from the IPCC Fifth Assessment Report (AR5)

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National Climate Change Response Dialogue,
Midrand, South Africa, 10 November 2014

Thanks to the Belgian Federal Science Policy Office (BELSPO) and to my team at the Université catholique de Louvain for their support

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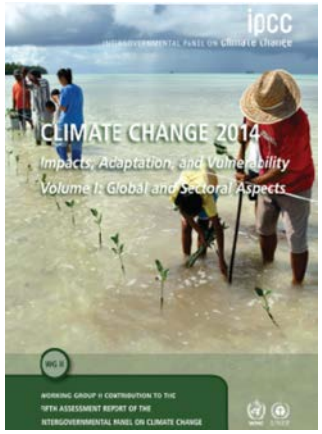
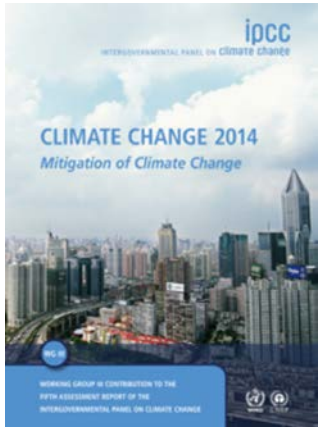
Strengths of the IPCC

- ✓ Mobilisation of thousands of multi-disciplinary experts worldwide
- ✓ Policy-relevant findings (but not policy-prescriptive)
- ✓ Widely used methodological reports
- ✓ Assessments relying on peer reviewed literature
- ✓ Review process involving experts and Governments
- ✓ Media attention and outreach activities

AR5 is the best ever

- **Better integration of Mitigation and Adaptation**
- **Improved risk-management approach**
- **Evolving away from the non-mitigation SRES scenarios (SRES= Special Report on Emission Scenarios, 2000)**
- **Special effort to provide regional information when available**
- **Sustainable development & equity aspects**
- **More comprehensive treatment of economic aspects, and of cross-cutting issues**
- **Emerging issues handled (acidification, …)**
- **Better handling & communication of uncertainties**





What is happening in the climate system?

What are the risks?

What can be done?

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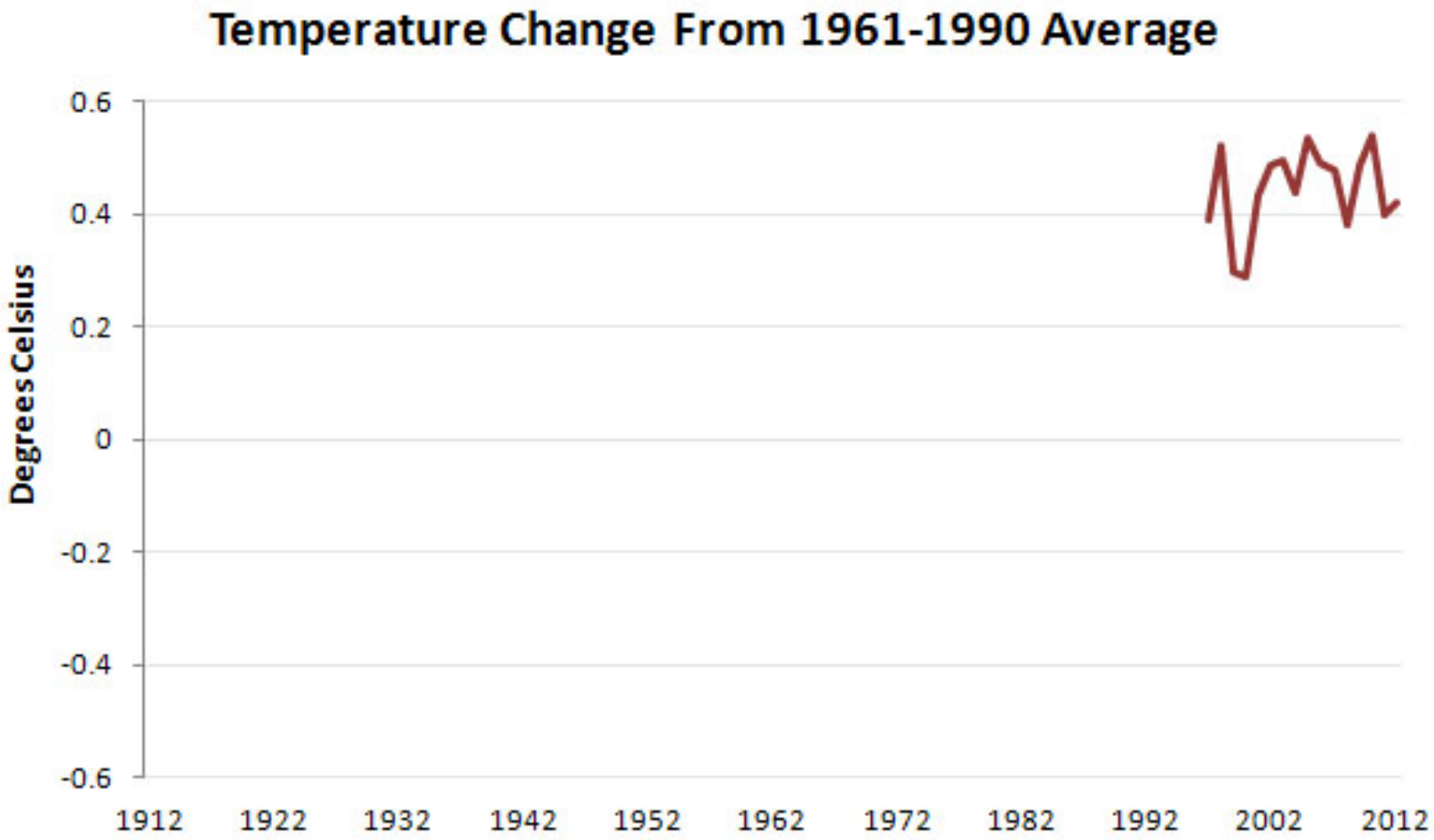
Key Messages

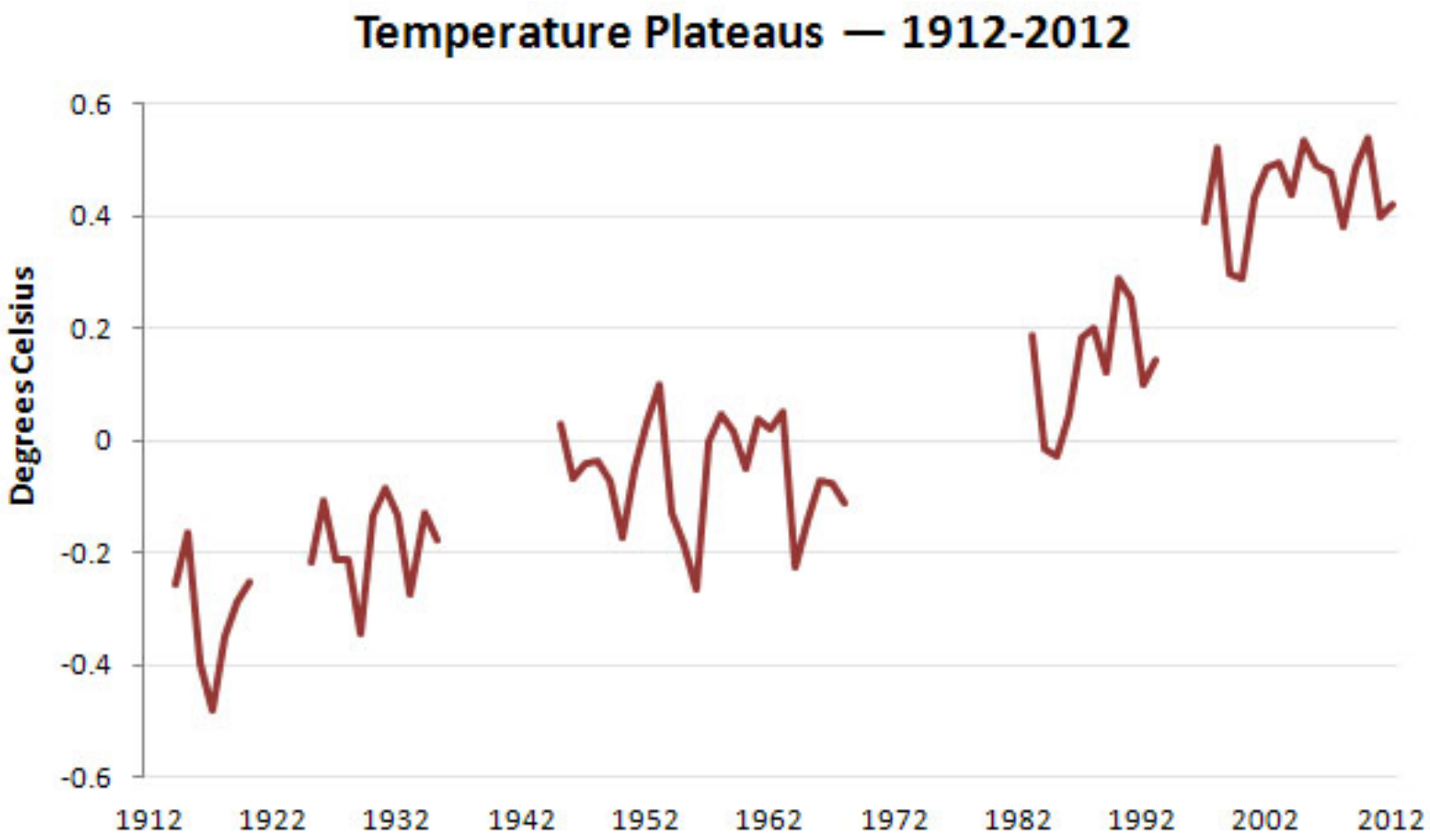
- ➜ Human influence on the climate system is clear
- ➜ The more we disrupt our climate, the more we risk severe, pervasive, and irreversible impacts
- ➜ While climate change is a threat to sustainable development, there are many opportunities to integrate mitigation, adaptation, and the pursuit of other societal objectives
- ➜ We have the means to limit climate change and build a more prosperous, sustainable future

AR5 WGI SPM, AR5 WGII SPM, AR5 WGIII SPM



http://www.motherjones.com/kevin-drum/2012/10/lying-statistics-global-warming-edition

Lying With Statistics, Global Warming Edition



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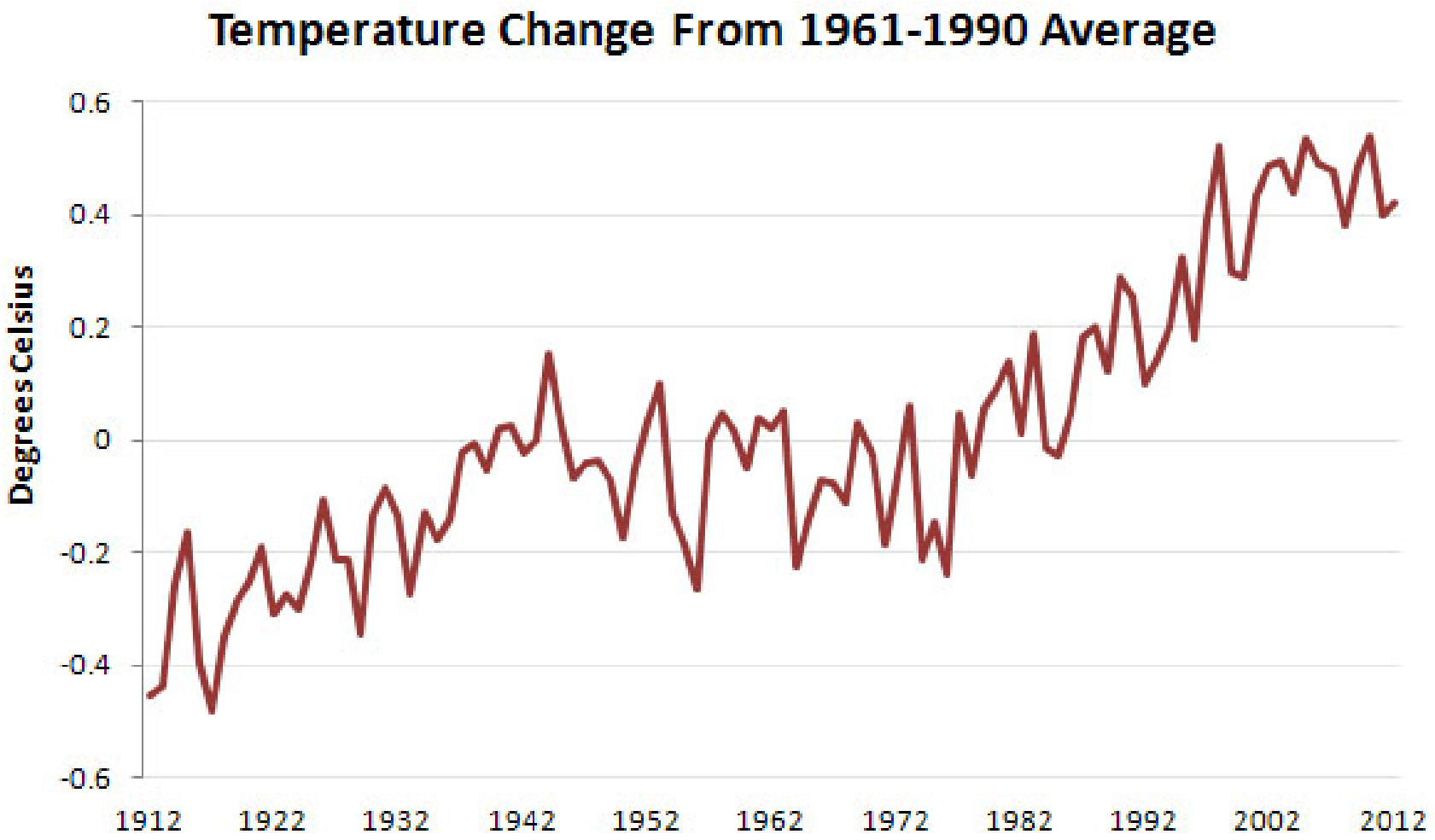

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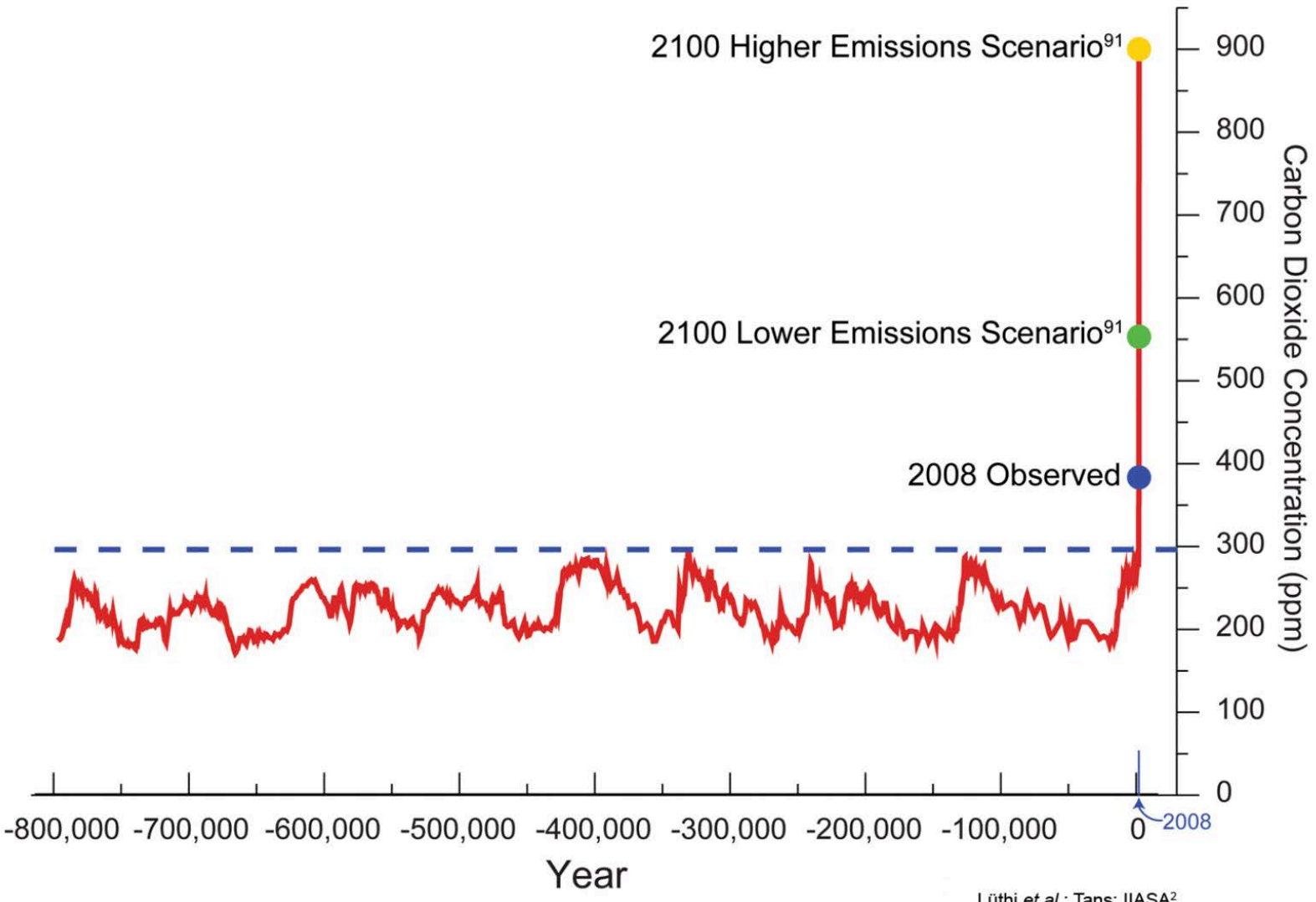
Atmospheric CO_2 over the last 800000 years



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Climate Char

U.S. Global Change Research Program:Lüthi *et al.*; Tans; IIASA2

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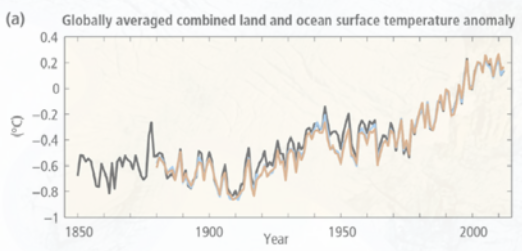
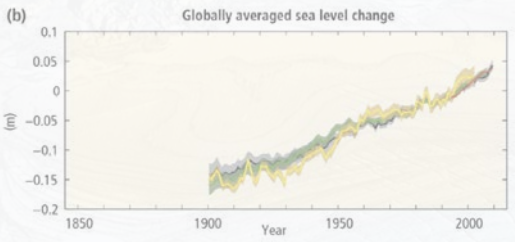
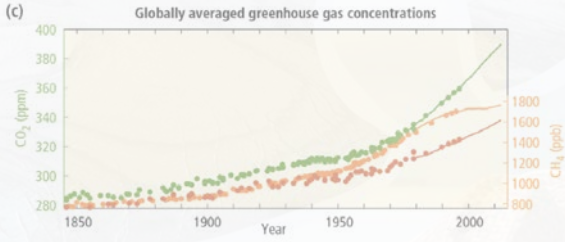
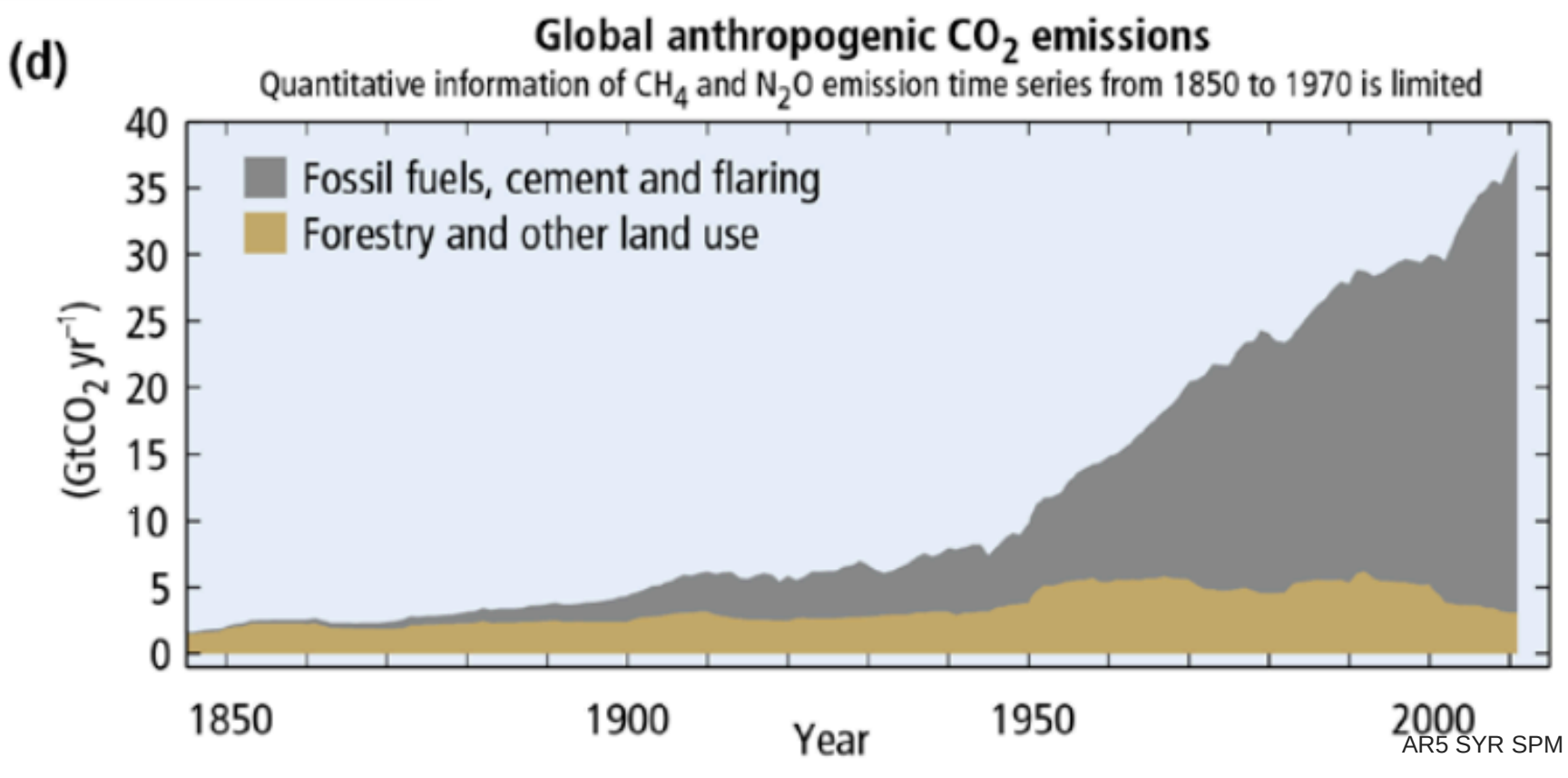

(a)
Globally averaged combined land and ocean surface temperature anomaly
(°C)
Year


(b)
Globally averaged sea level change
(m)
Year


(c)
Globally averaged greenhouse gas concentrations
Year


(d)
Global anthropogenic CO2 emissions
Quantitative information of CH4 and N2O emission time series from 1850 to 1970 is limited
Fossil fuels, cement and flaring
Forestry and other land use
(GtCO2 yr-1)
Year

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Sources of emissions

Energy production remains the primary driver of GHG emissions

2010 GHG emissions

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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

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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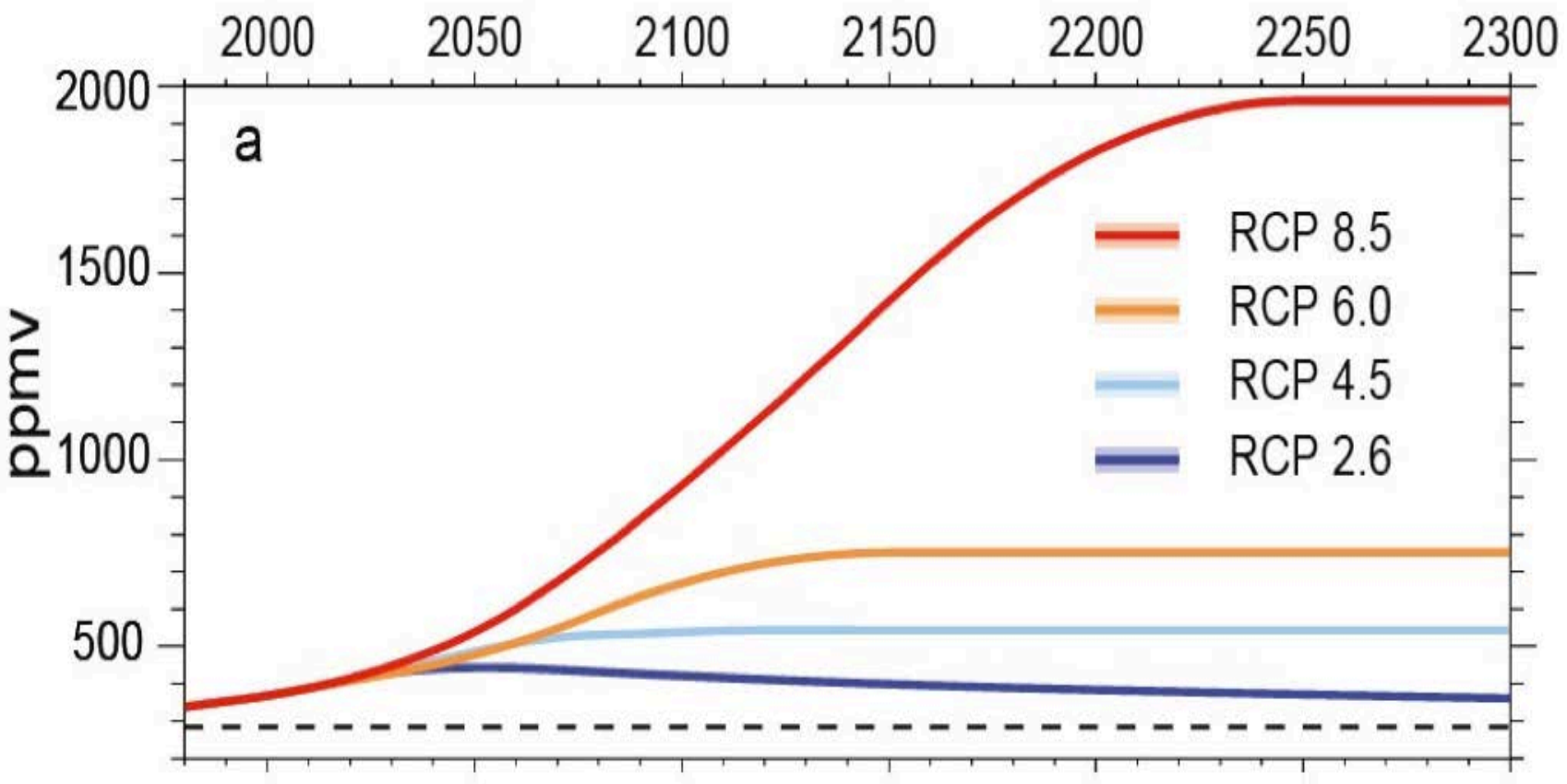
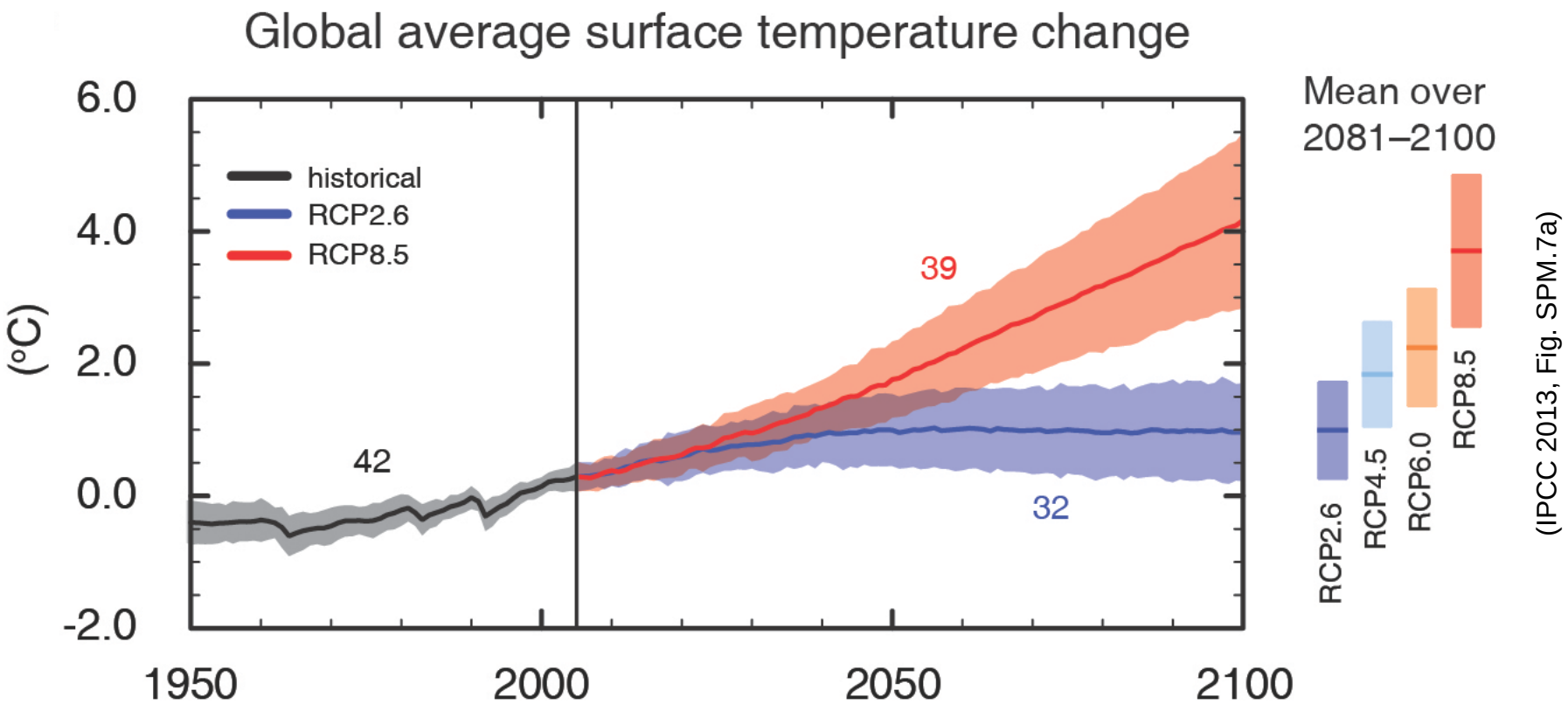
RCP Scenarios: Atmospheric CO_2 concentration

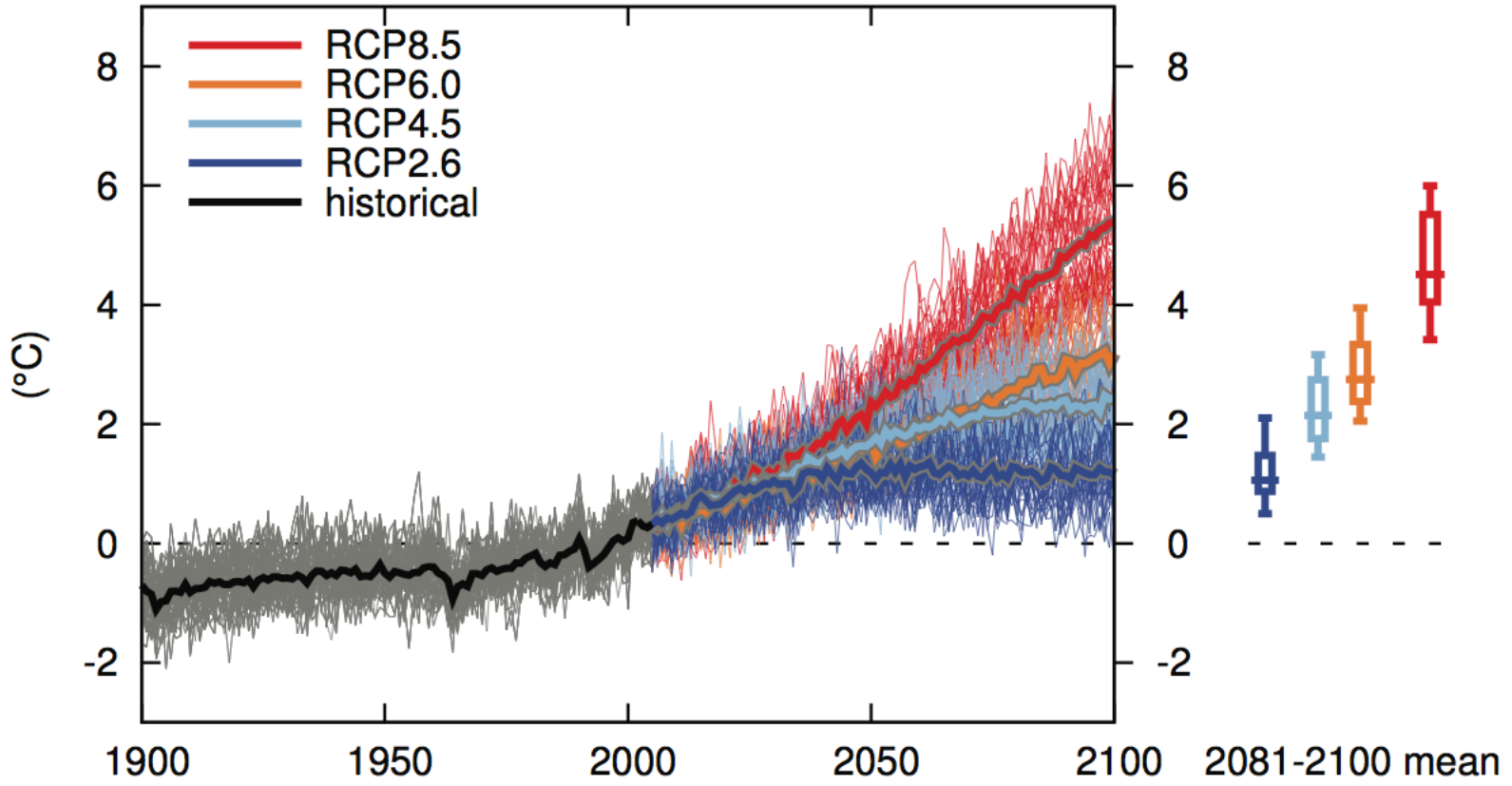


Three stabilisation scenarios: RCP 2.6 to 6
One Business-as-usual scenario: RCP 8.5



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

Temperature change Southern Africa annual



IPCC, WGI, Annex I: Atlas of Global and Regional Climate Projections Supplementary Material RCP8.5

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
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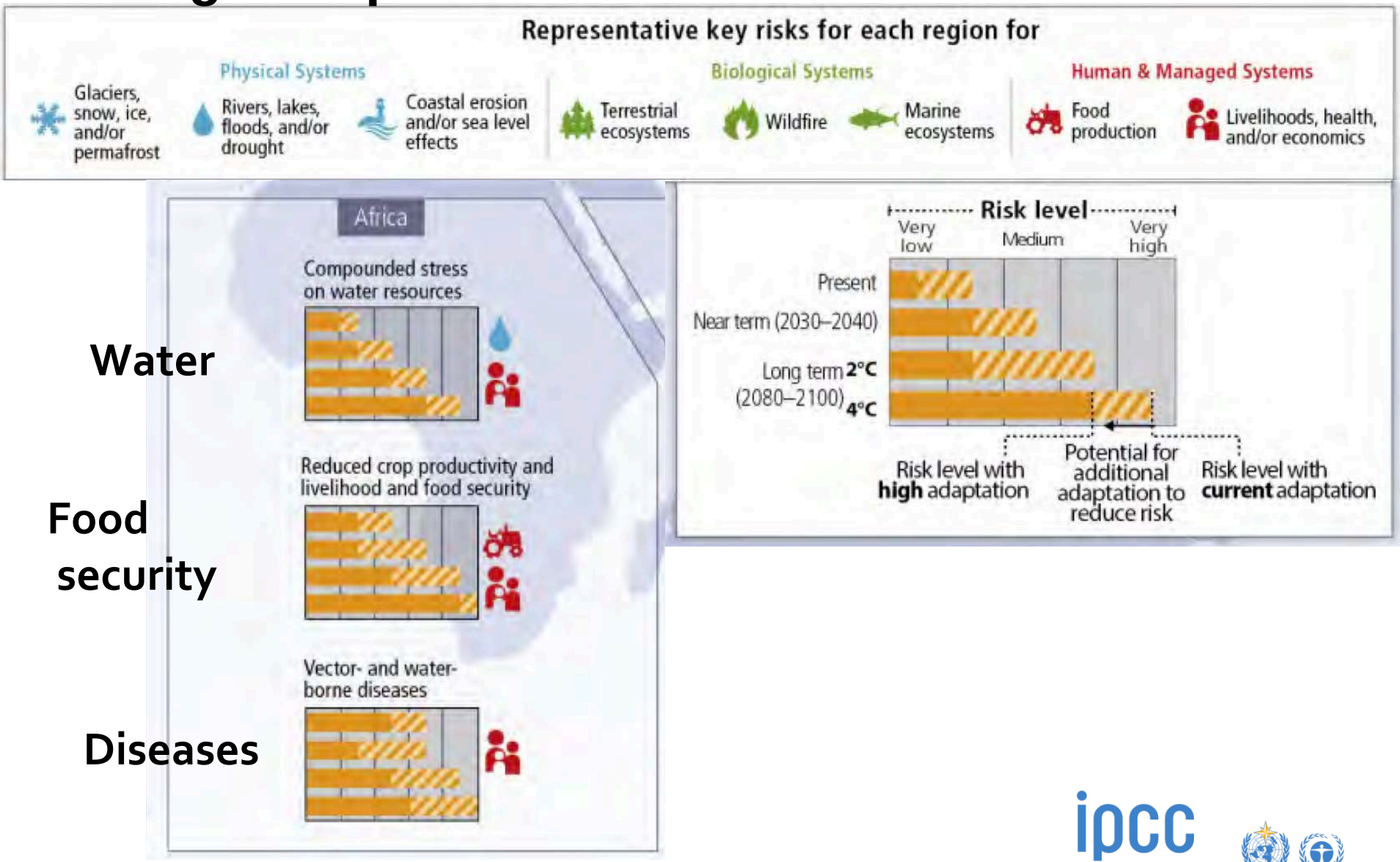
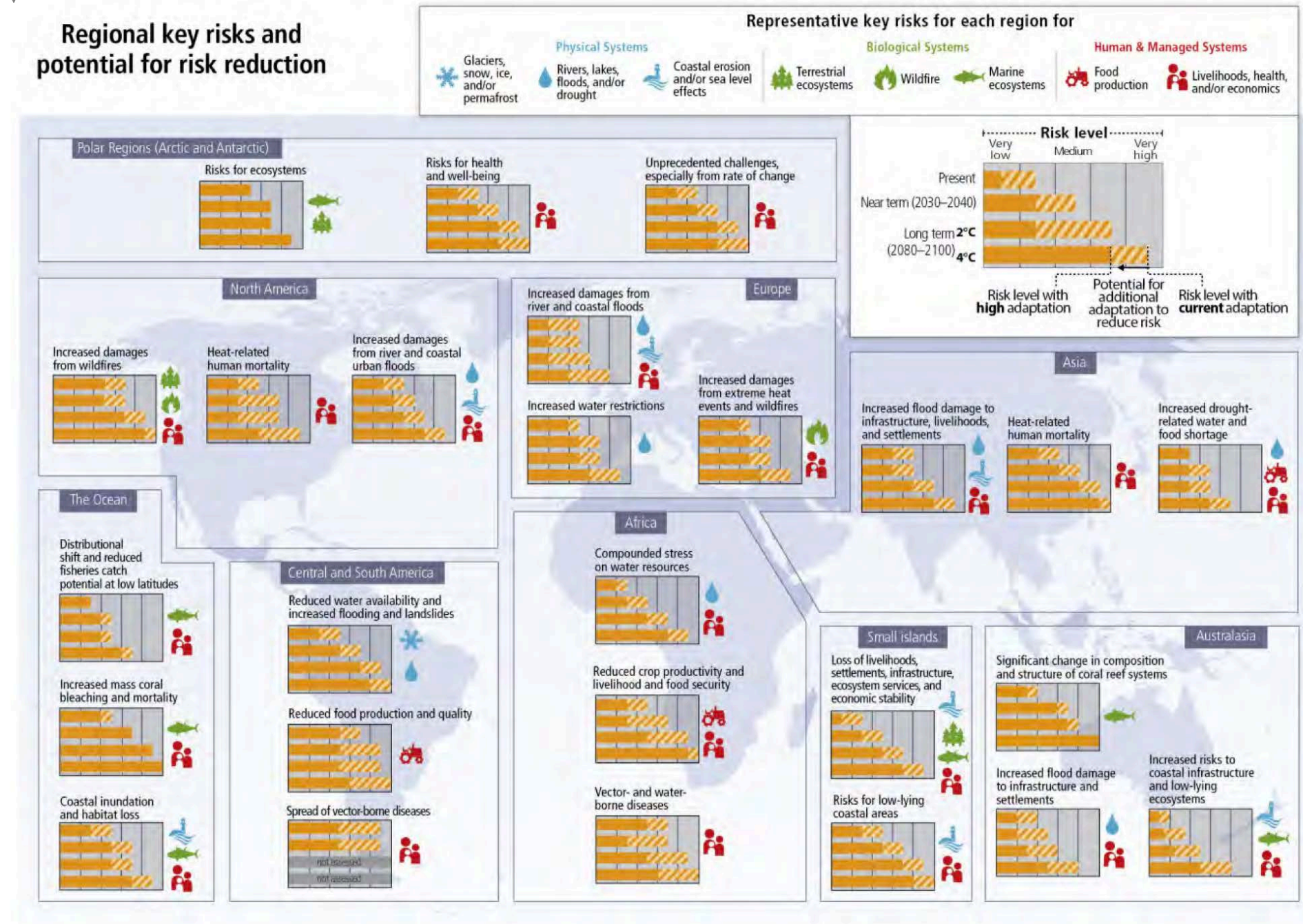
Regional key risks and risk reduction through adaptation



IPCC, AR5, SPM, Figure SPM.8

Regional key risks and potential for risk reduction



IPCC, AR5, SPM, Figure SPM.8


RISKS OF
CLIMATE CHANGE
INCREASE
WITH CONTINUED
HIGH EMISSIONS
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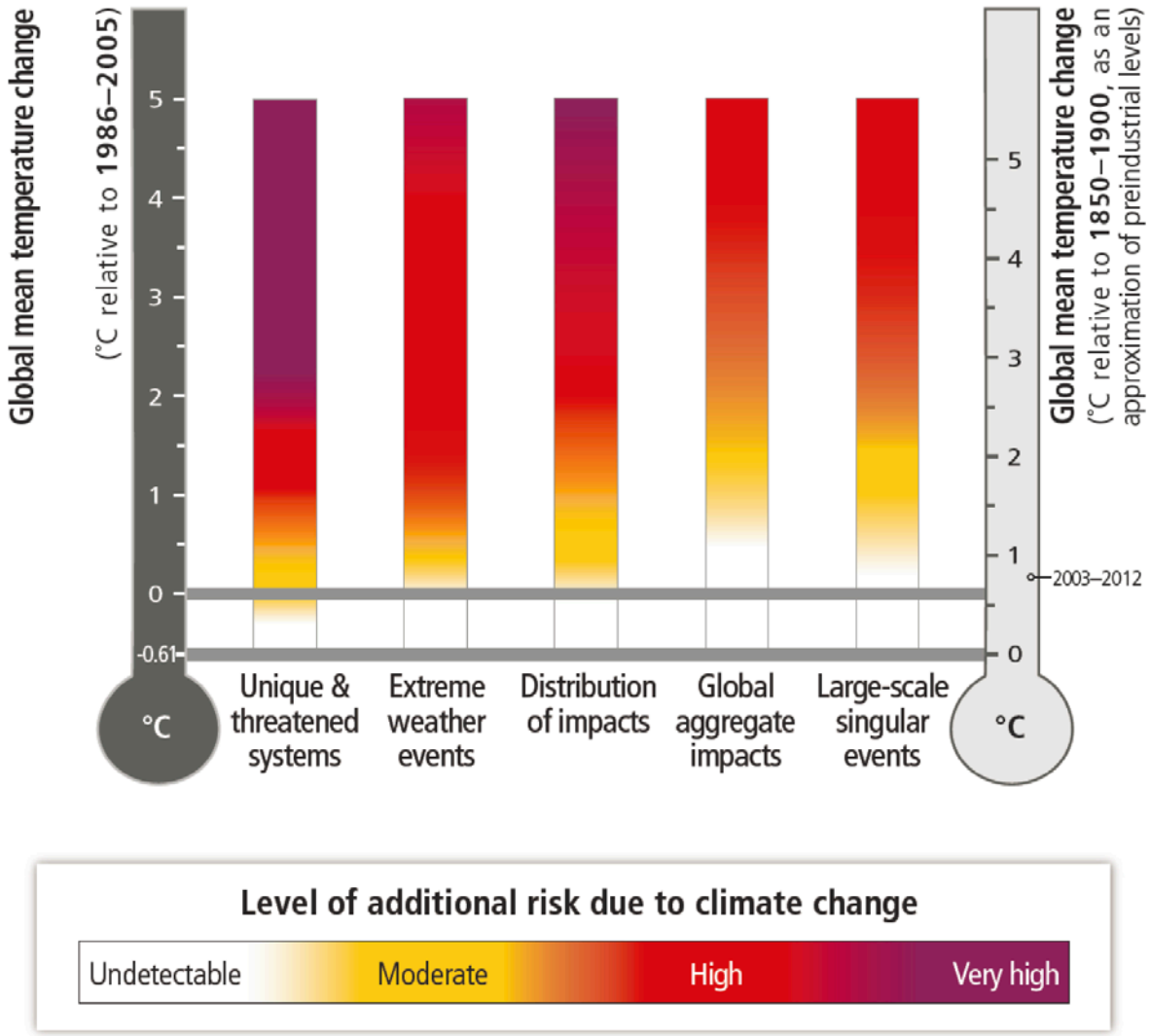
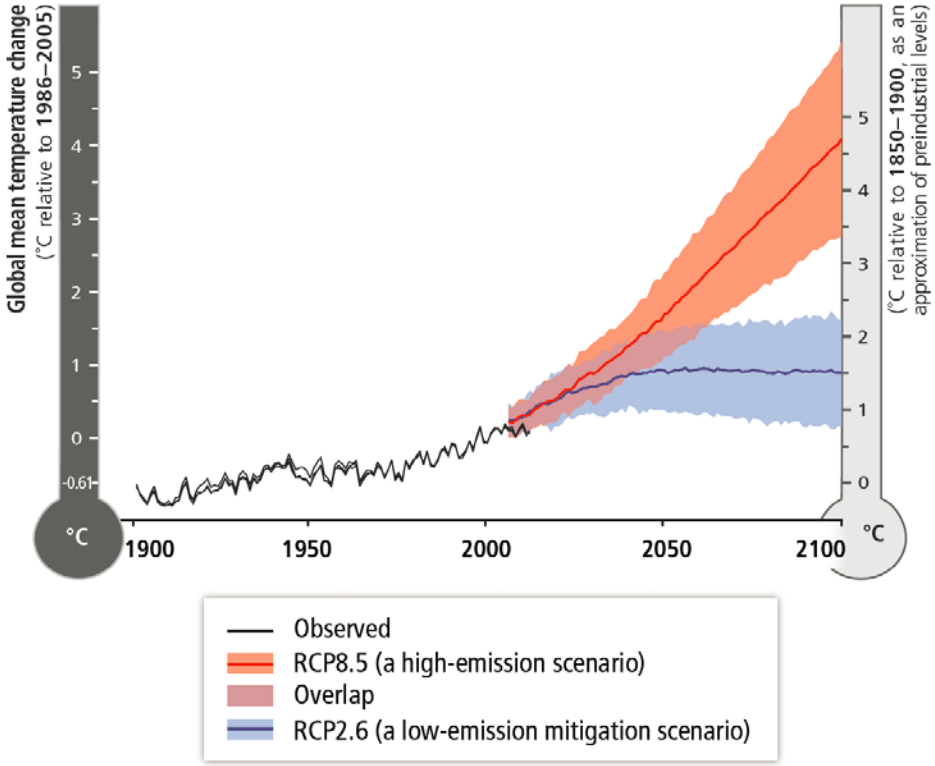
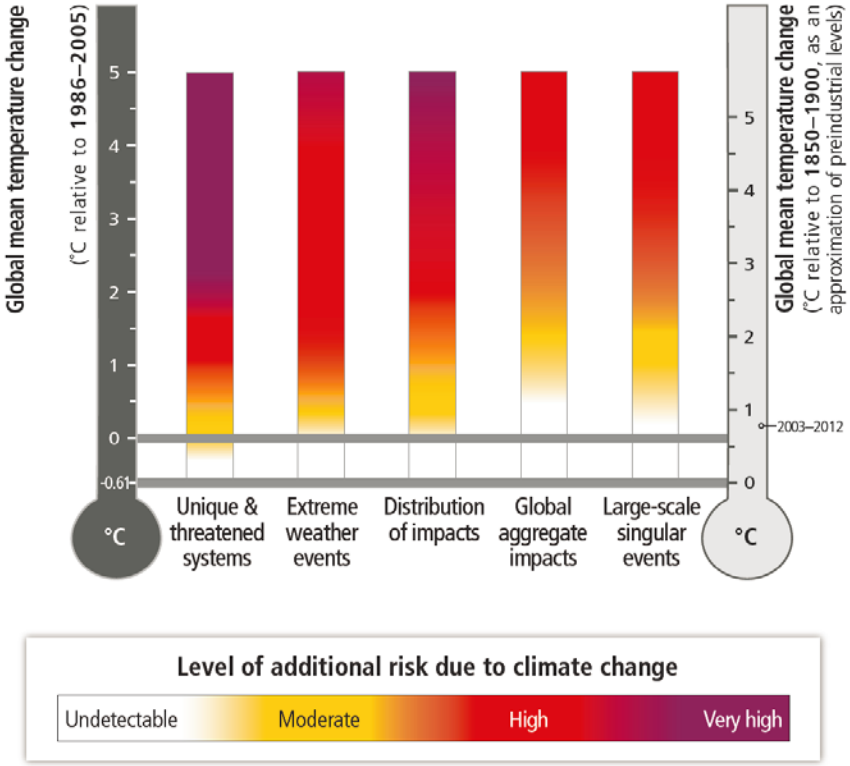


AR5, WGII, Box SPM.1 Figure 1





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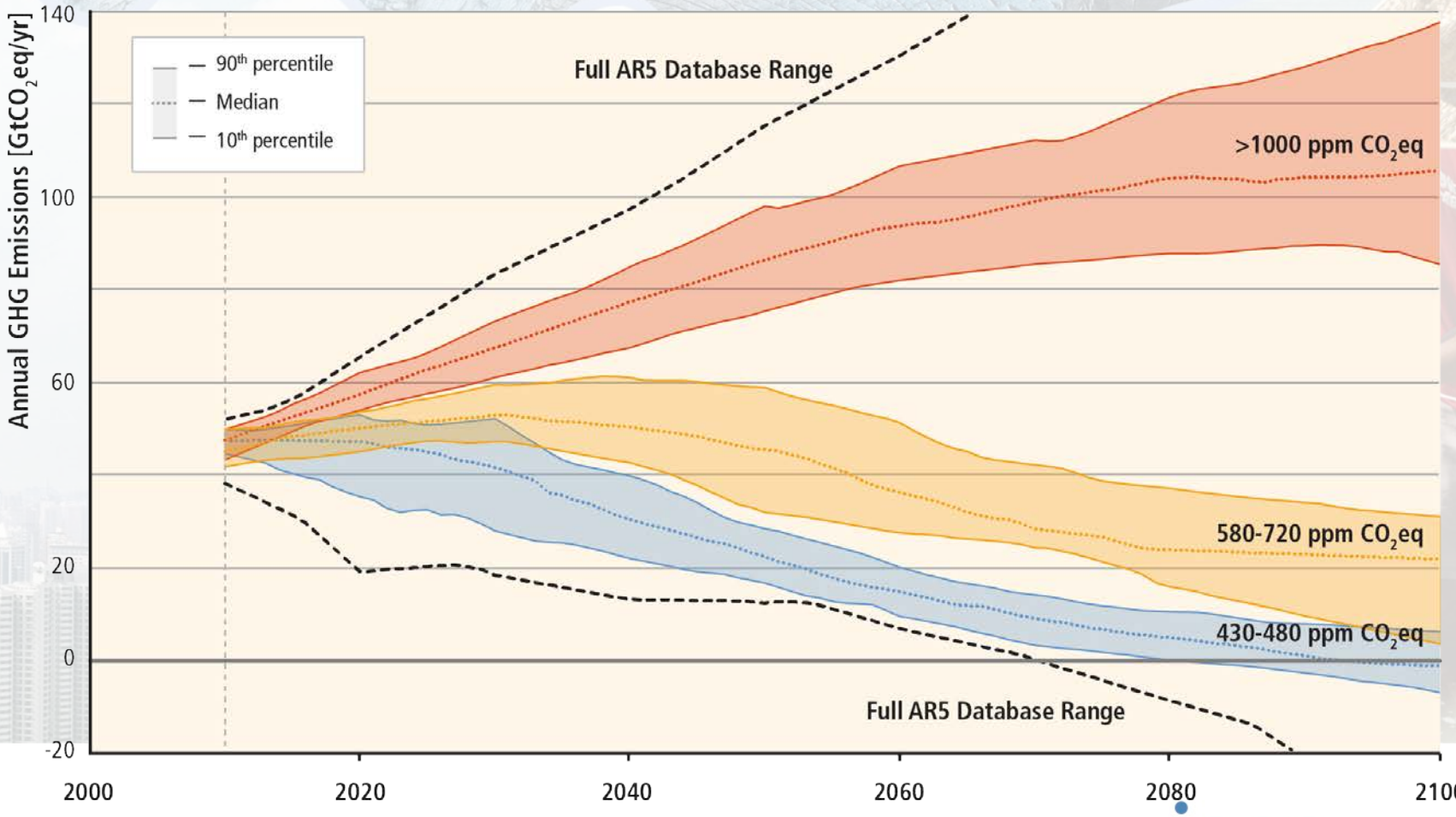
Stabilization of atmospheric concentrations requires moving away from the baseline – regardless of the mitigation goal.



Based on Figure 6.7

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IPCC AR5 Synthesis Report

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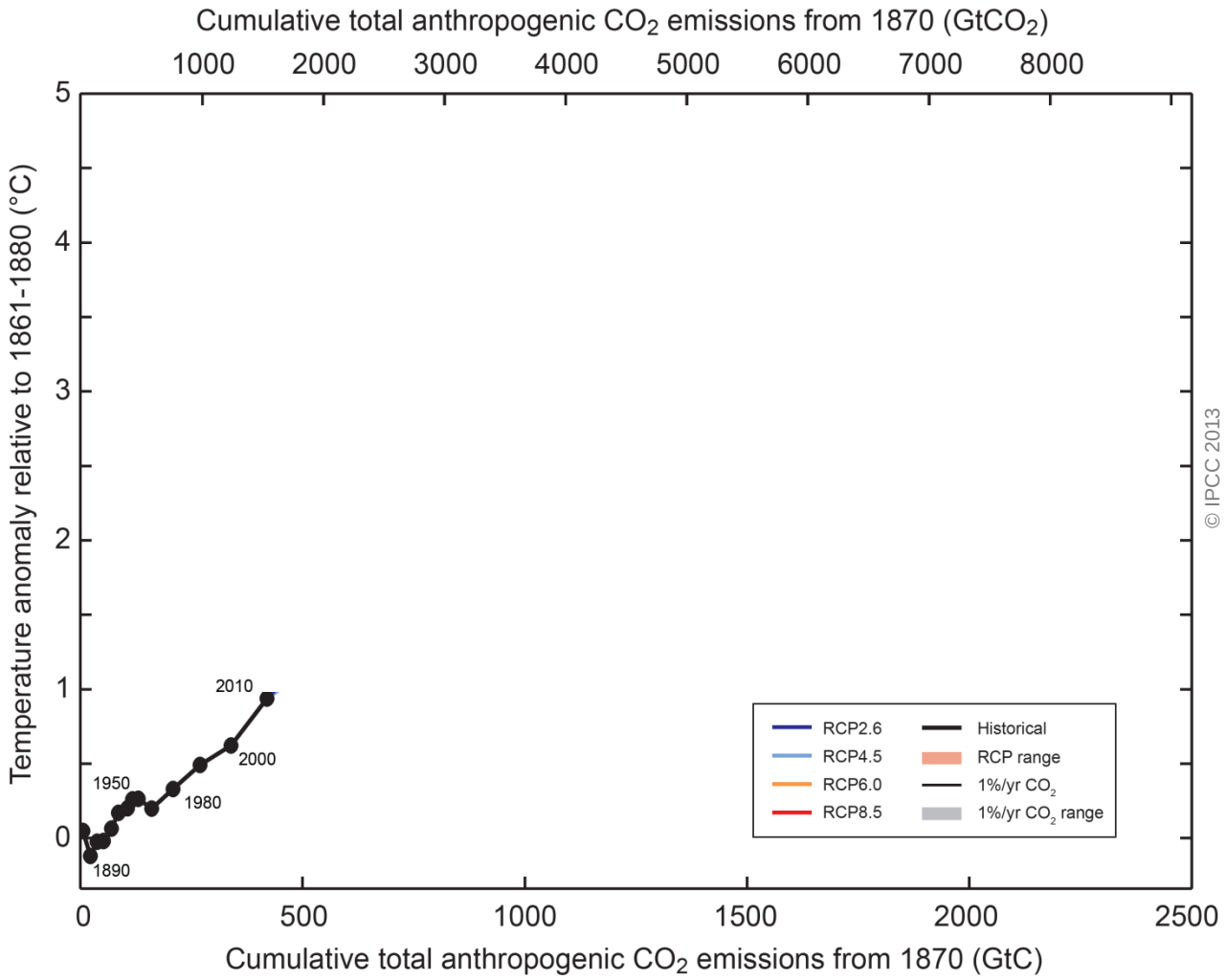


Fig. SPM.10

Cumulative emissions of CO_2 largely determine global mean surface warming by the late 21st century and beyond.

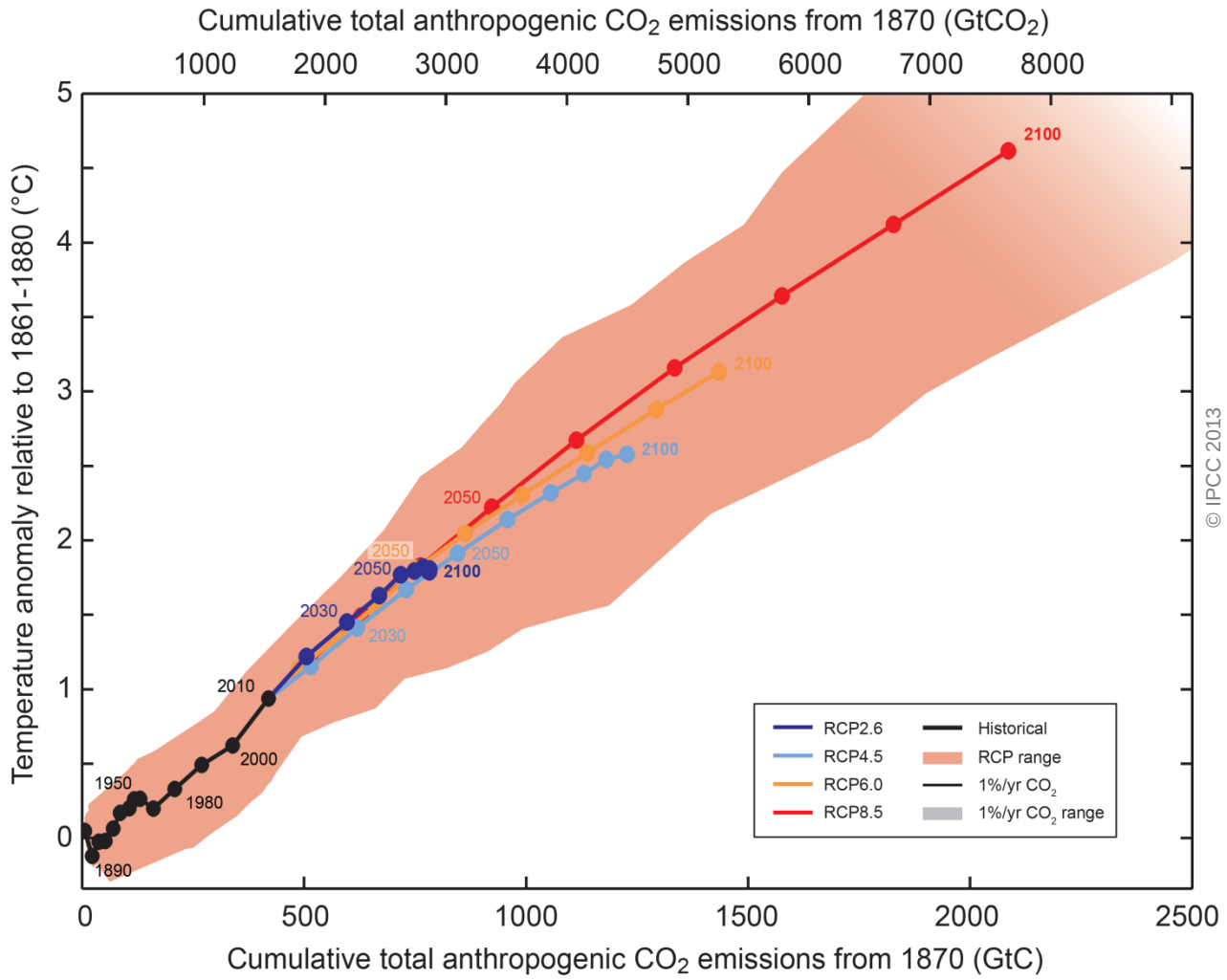
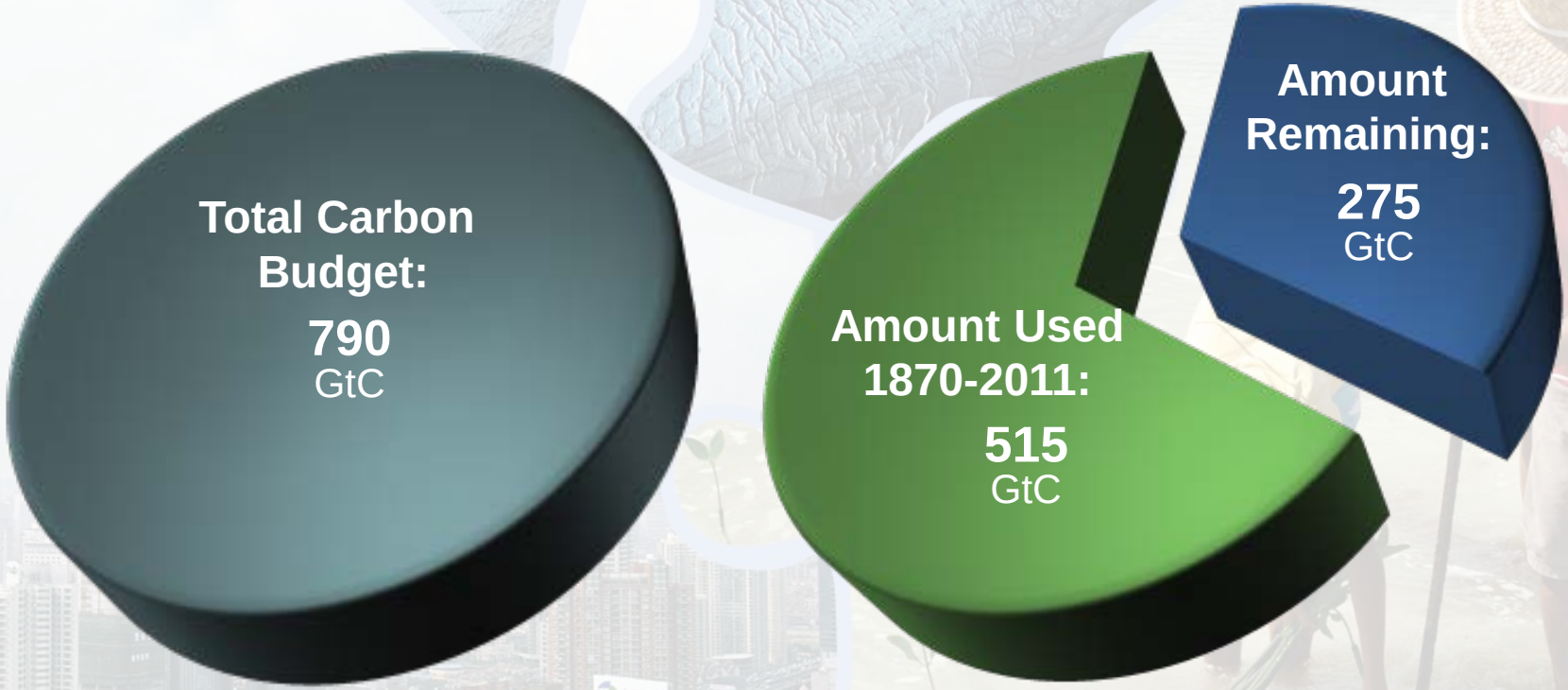


Fig. SPM.10

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

The window for action is rapidly closing

65% of our carbon budget compatible with a 2˚ C goal already used
NB: this is with a probability greater than 67% to stay below 2˚ C



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Limiting Temperature Increase to 2˚C

Measures exist to achieve the substantial emissions reductions required to limit likely warming to 2˚ C

A combination of adaptation and substantial, sustained reductions in greenhouse gas emissions can limit climate change risks

Implementing reductions in greenhouse gas emissions poses substantial technological, economic, social, and institutional challenges

But delaying mitigation will substantially increase the challenges associated with limiting warming to 2˚ C

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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

AR5 WGIII SPM

Ambitious Mitigation Is Affordable

- ➜ Economic growth reduced by ~ 0.06%
  (BAU growth 1.6 - 3%)
- ➜ This translates into delayed and not forgone growth
- ➜ Estimated cost does not account for the benefits of reduced climate change
- ➜ Unmitigated climate change would create increasing risks to economic growth

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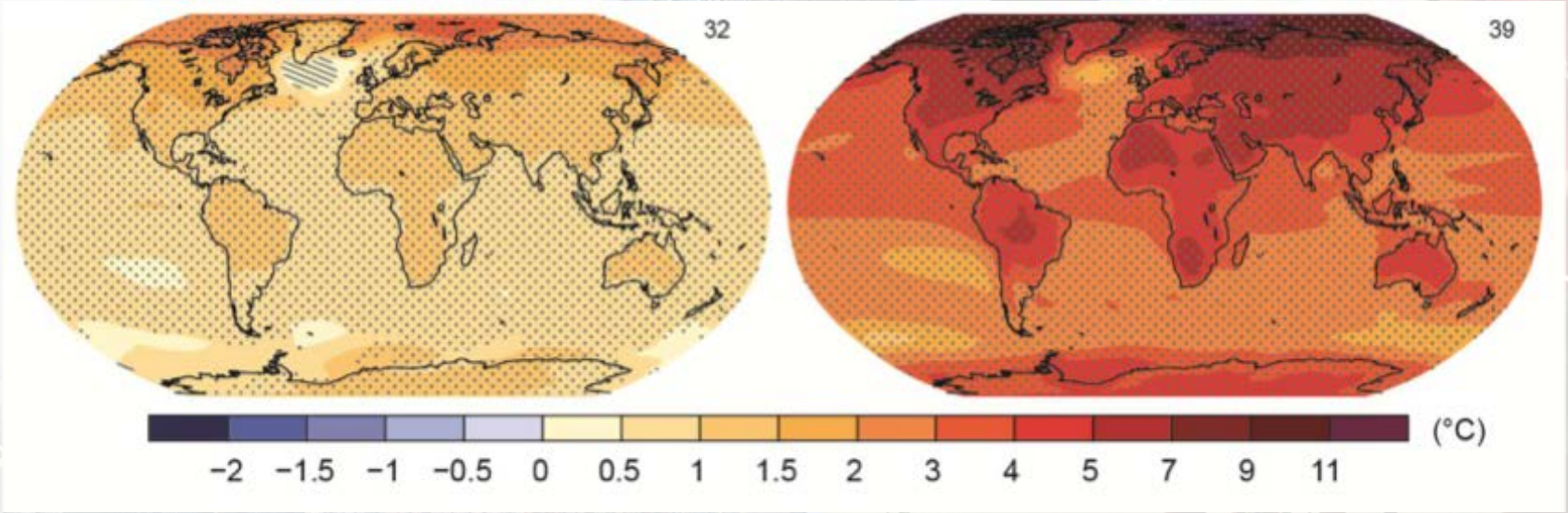
The Choices We Make Will Create Different Outcomes (and increase prospects for effective adaptation)

With substantial mitigation

Without additional mitigation



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

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Useful links:

- www.ipcc.ch : IPCC (reports and videos)
- www.climate.be/vanyp : my slides and other documents
- www.skepticalscience.com: excellent responses to contrarians arguments
- **On Twitter: @JPvanYpersele and @IPCC_CH**