IPCC Fifth Assessment Report

Synthesis Report

Presentation by Renate Christ
Budapest, 20 November 2014

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INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

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

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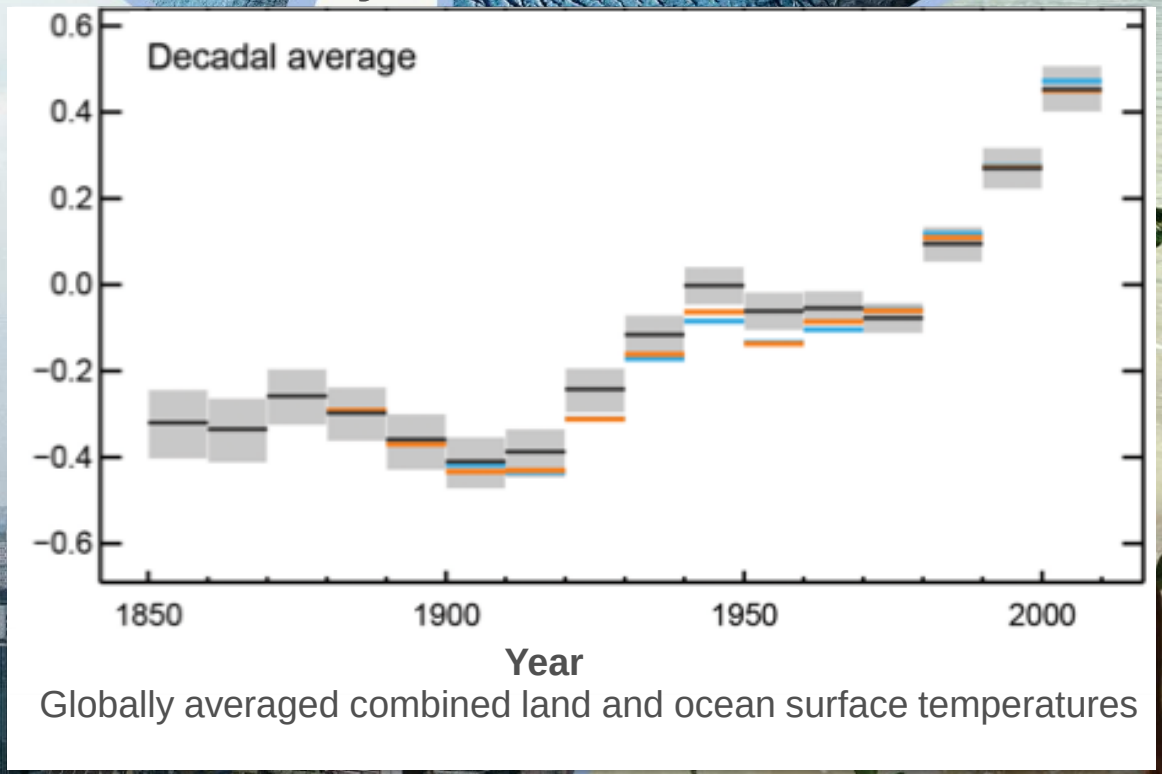
Temperatures are rising

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

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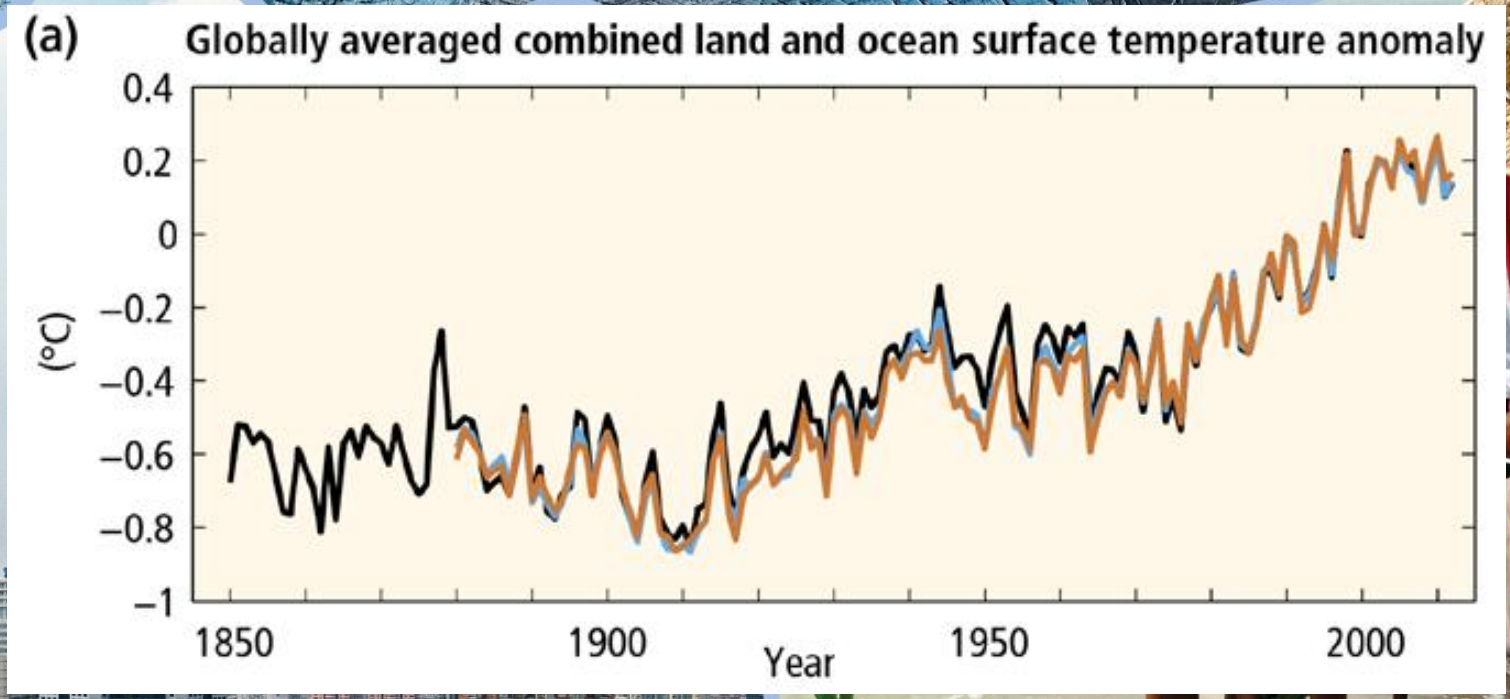

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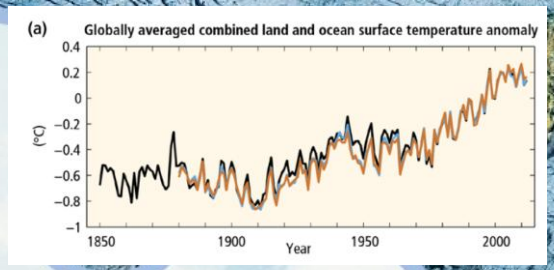

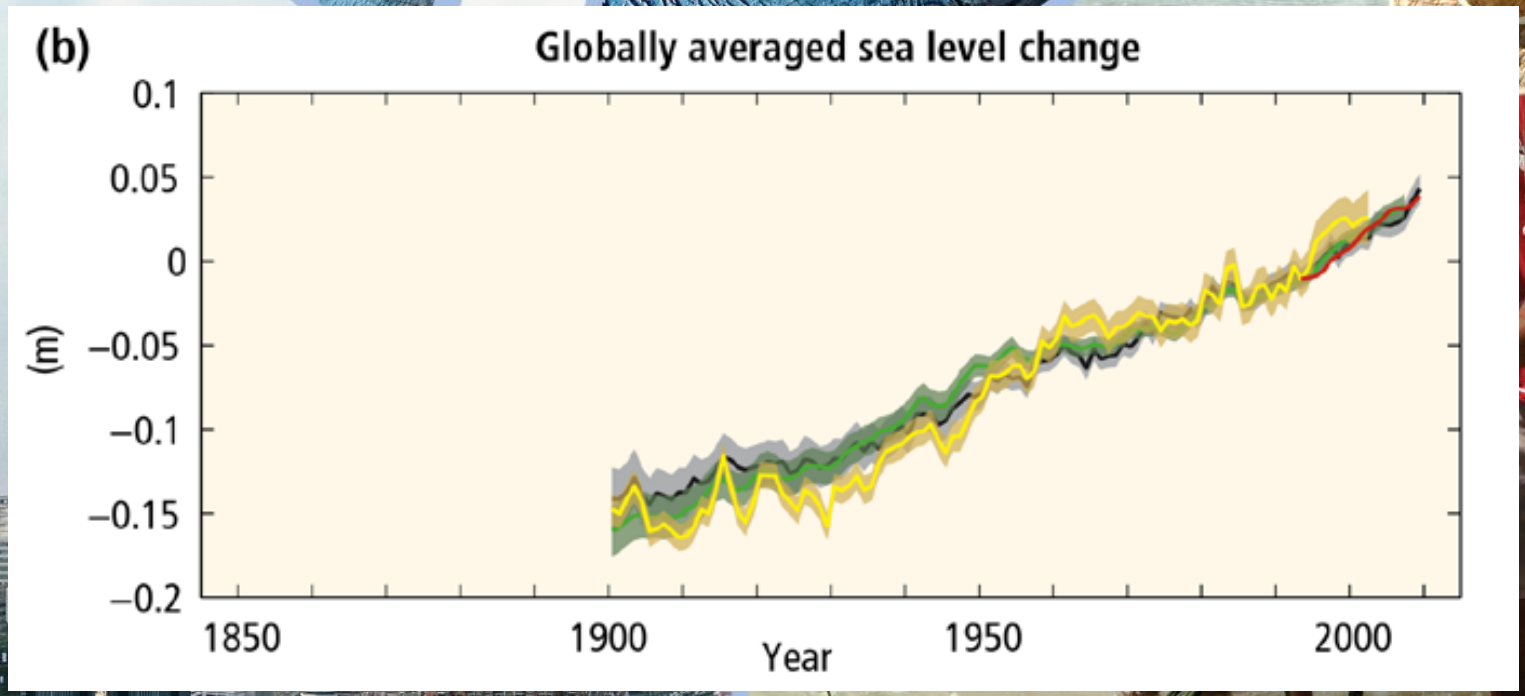

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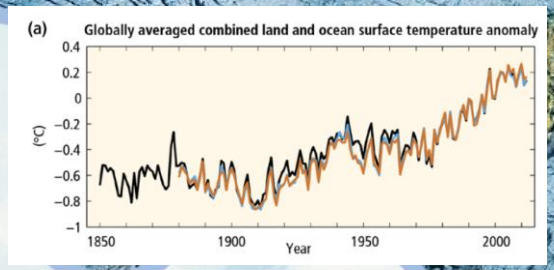
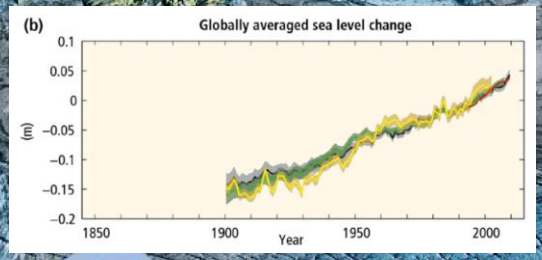
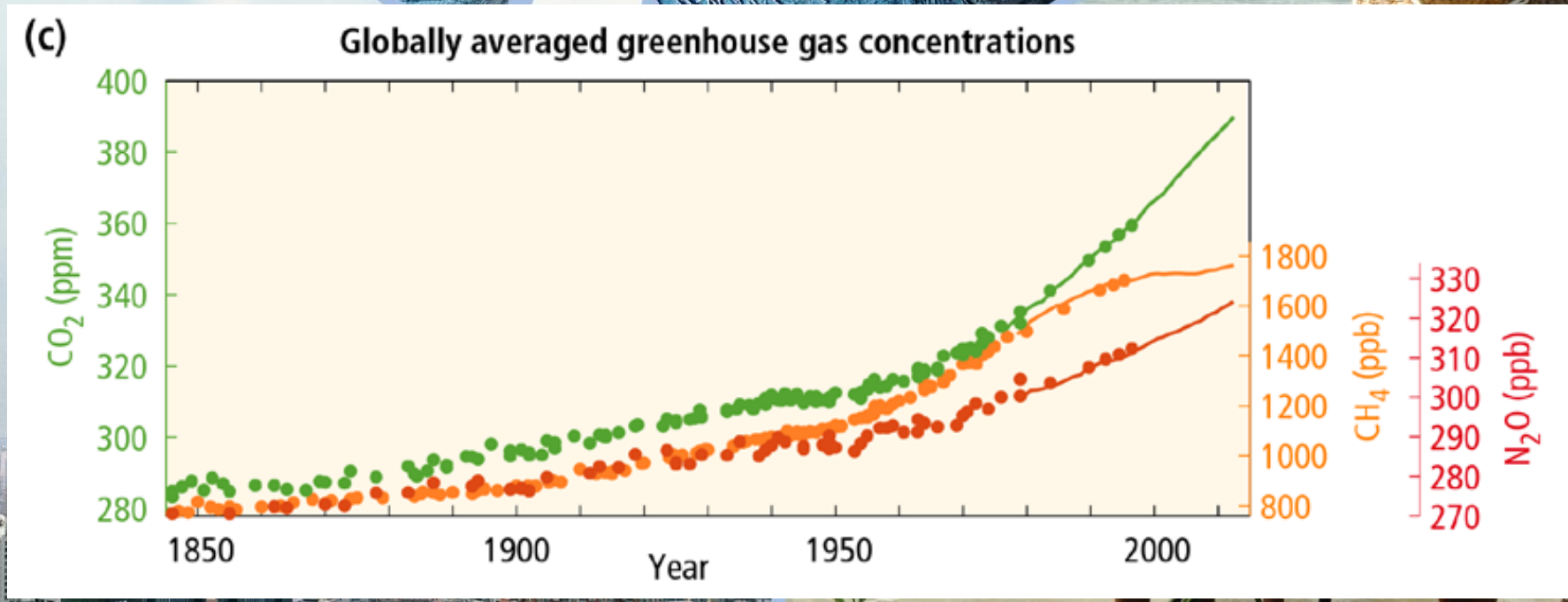

(a)
Globally averaged combined land and ocean surface temperature anomaly
(°C)
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
1850
1900
1950
2000
Year


(b)
Globally averaged sea level change
(m)
0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
1850
1900
1950
2000
Year


(c)
Globally averaged greenhouse gas concentrations
CO2 (ppm)
400
380
360
340
320
300
280
CH4 (ppb)
1800
1600
1400
1200
1000
800
N2O (ppb)
330
320
310
300
290
280
270
1850
1900
1950
2000
Year

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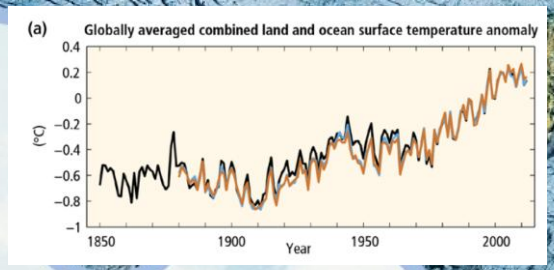

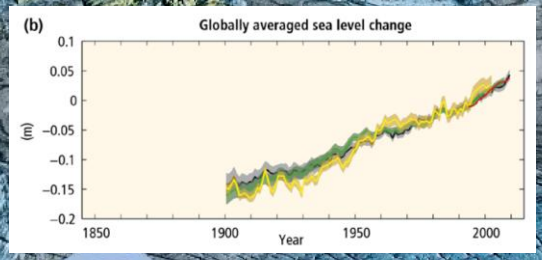

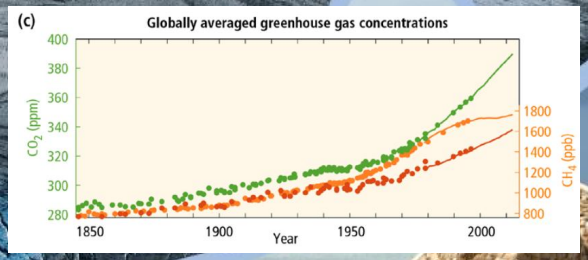

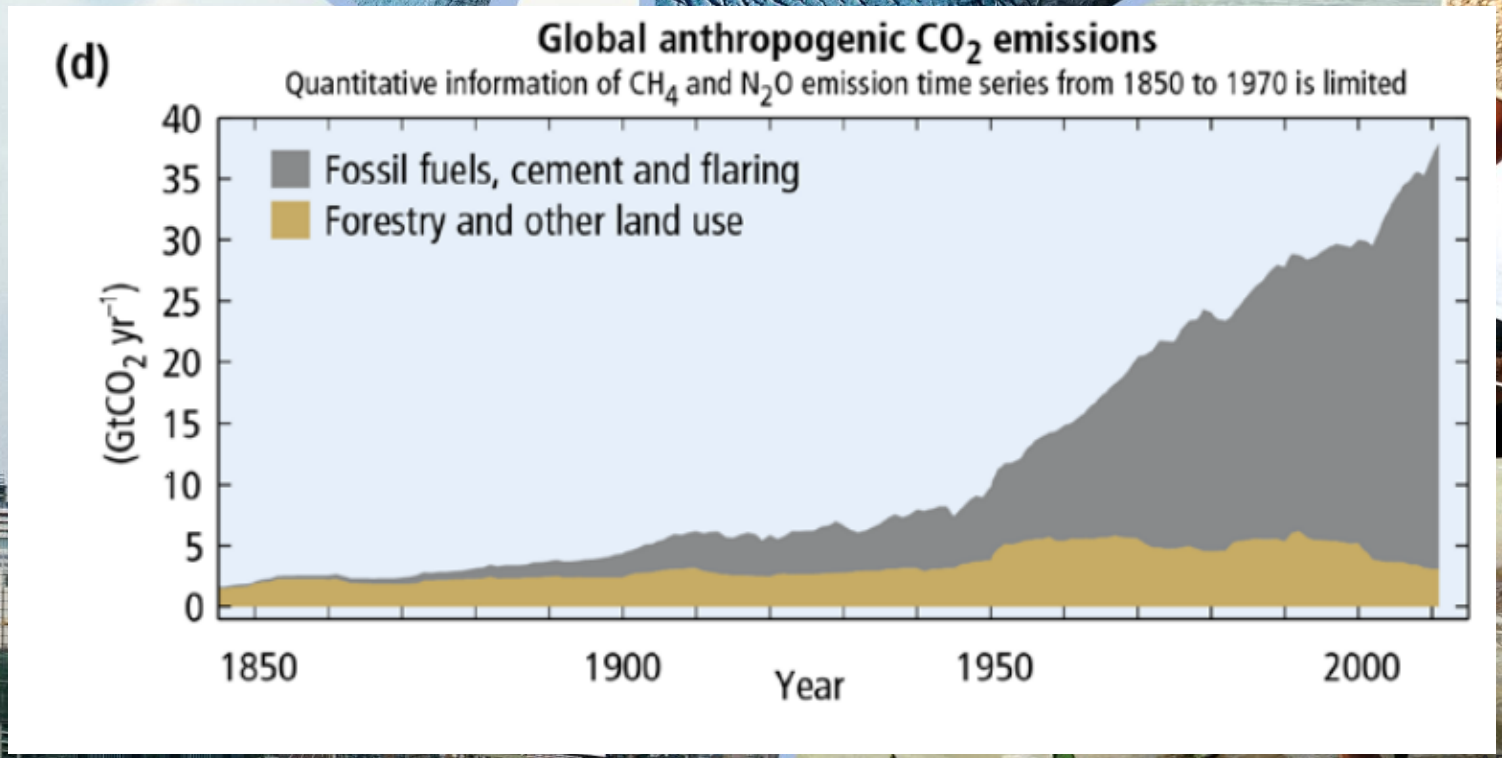

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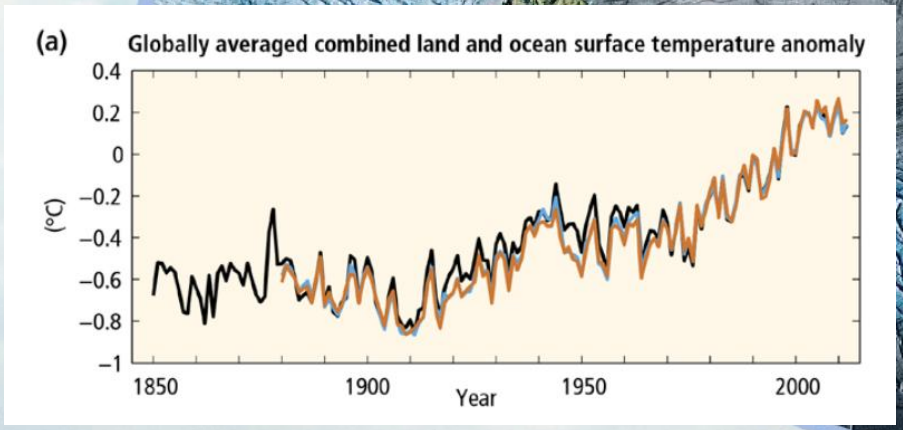
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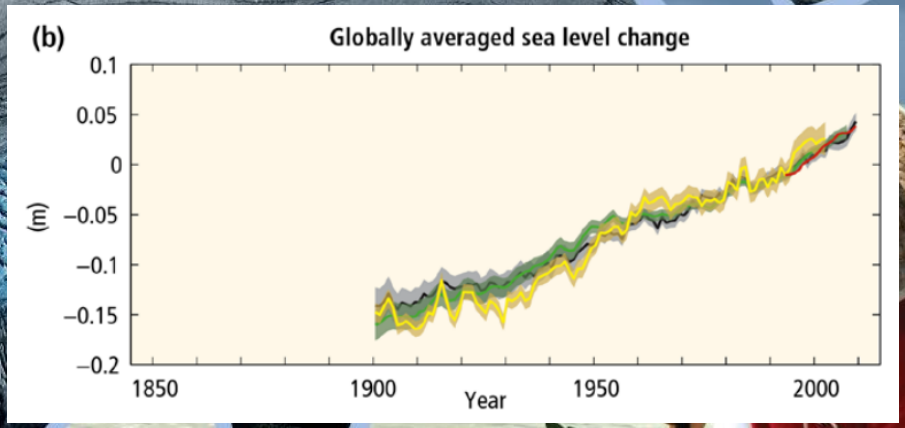
−0.8
−1
(°C)
1850
1900
1950
2000
Year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1950
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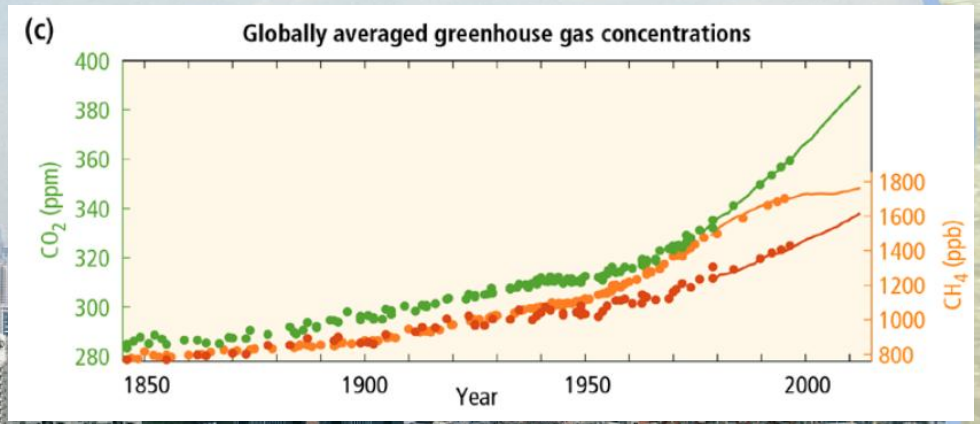
Year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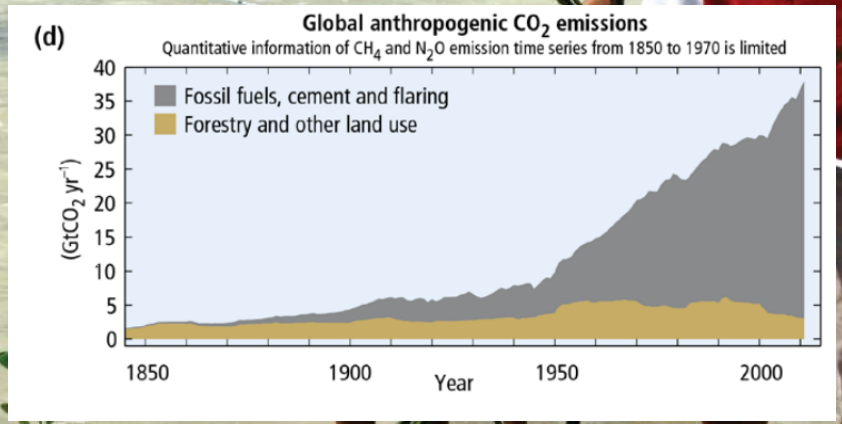
(d)
Global anthropogenic CO2 emissions
Quantitative information of CH4 and N2O emission time series from 1850 to 1970 is limited
Fossil fuels, cement and flaring
Forestry and other land use
40
35
30
25
20
15
10
5
0
(GtCO2 yr−1)
1850
1900
1950
2000
Year

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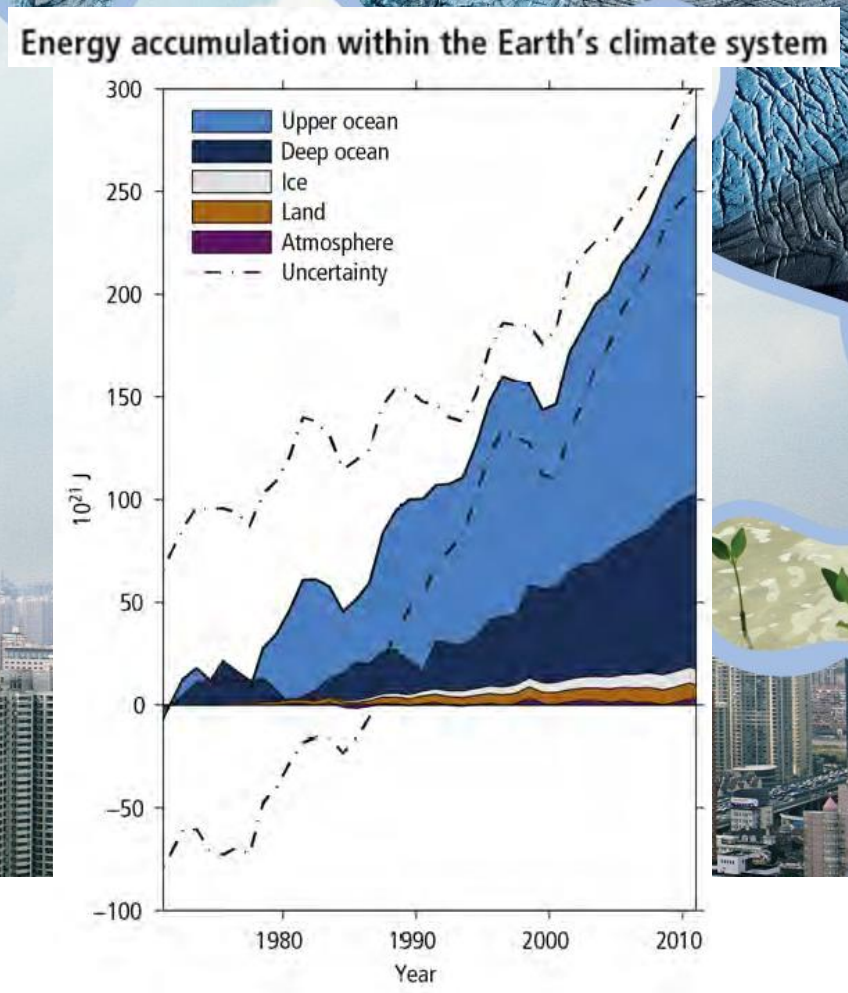
Oceans absorb most of the heat



- 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

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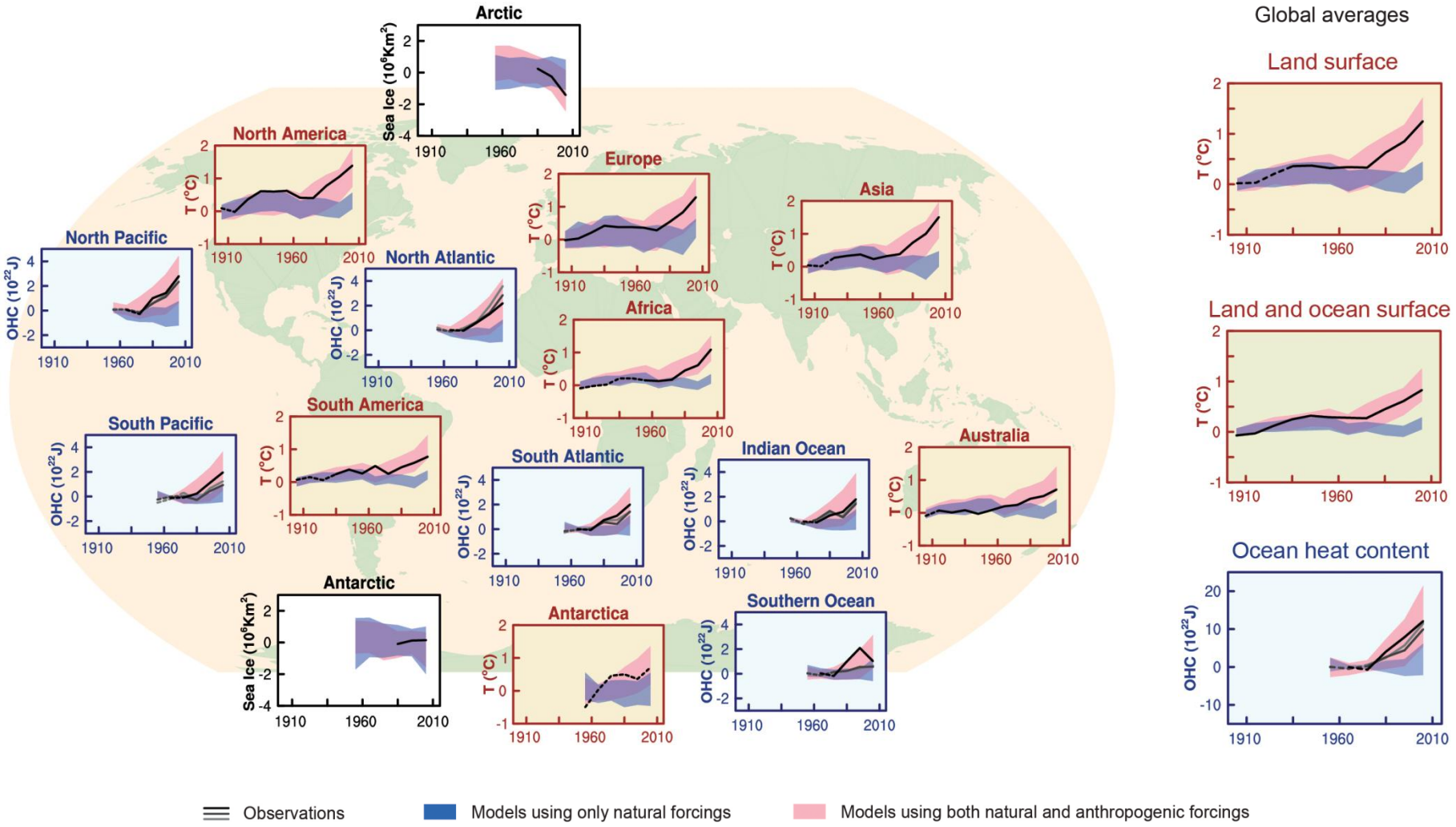
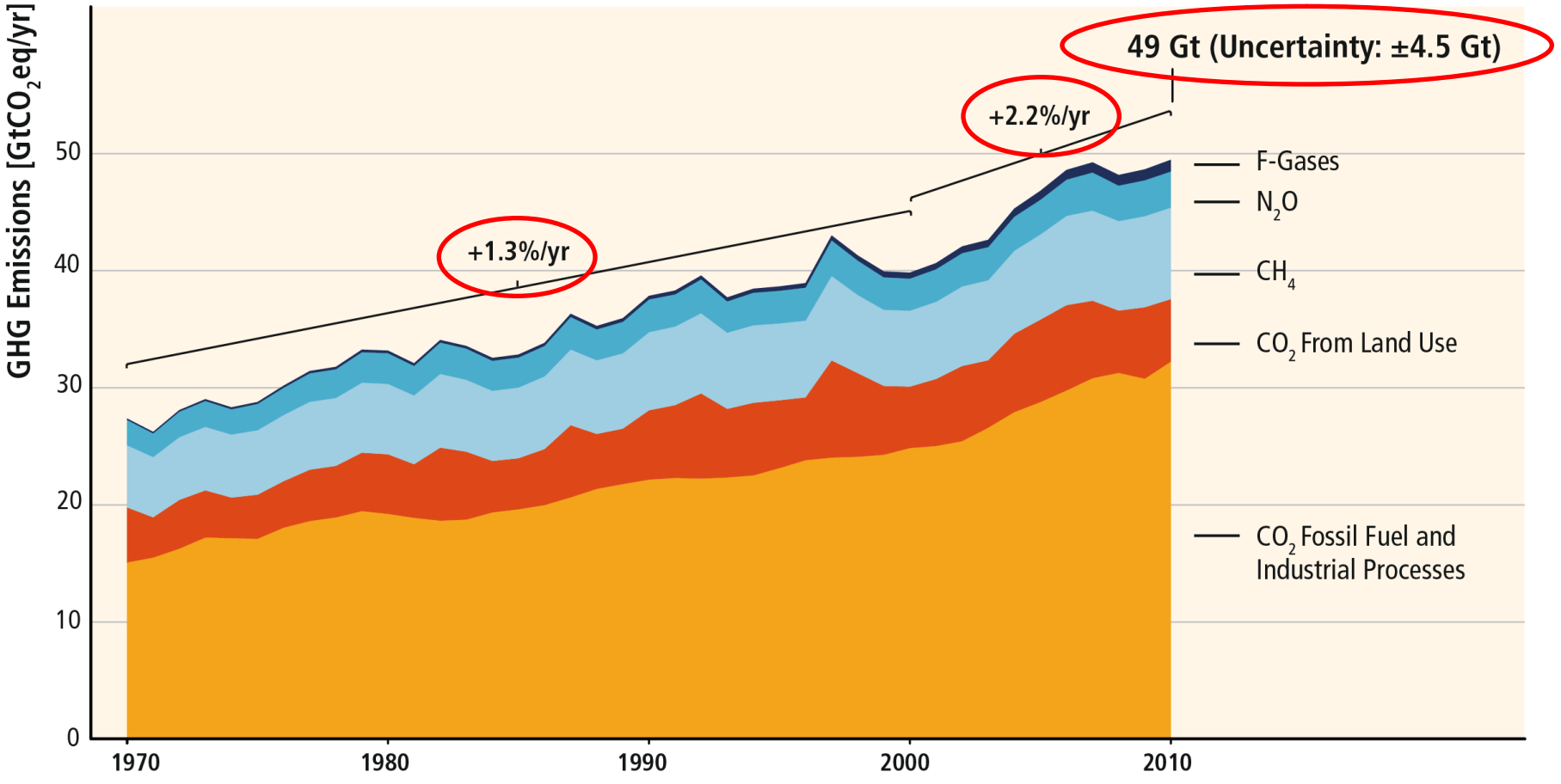
Human influence on the climate system is clear

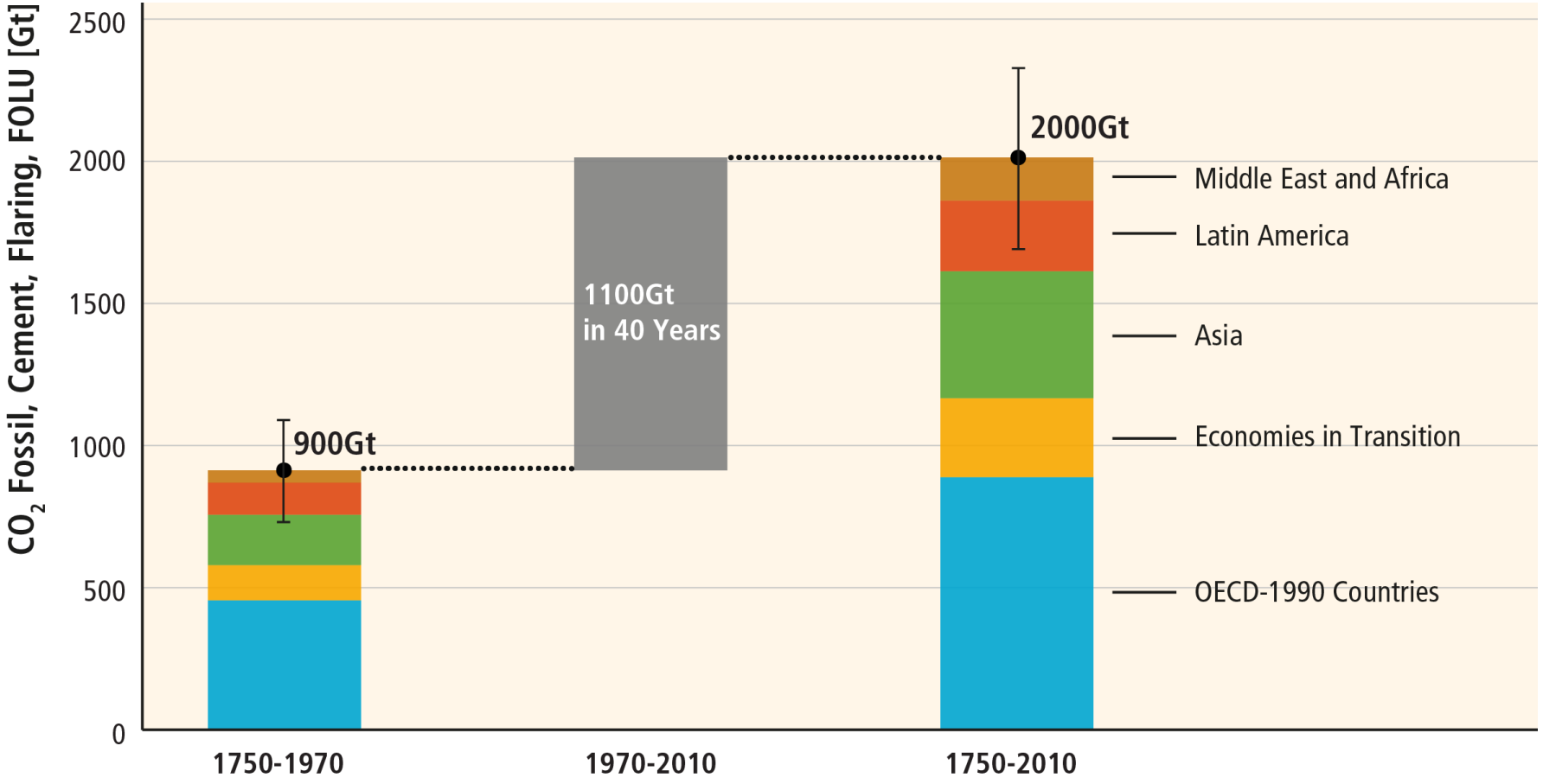


GHG emissions growth has accelerated despite reduction efforts



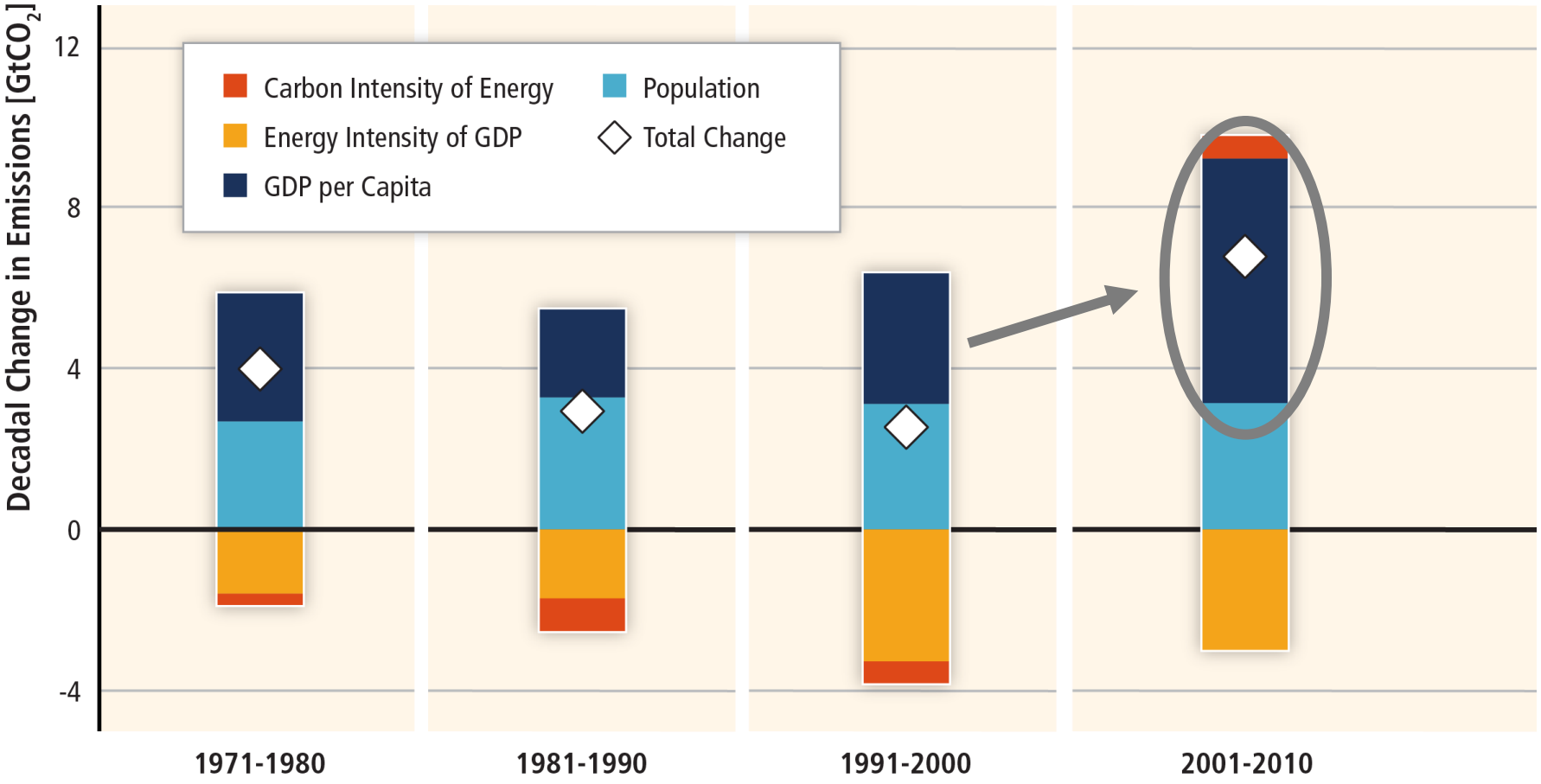
Based on Figure 1.3

About half of cumulative anthropogenic CO_2 emissions between 1750 and 2010 have occurred in the last 40 years.



Based on Figure 5.3

GHG emissions rise with growth in GDP and population; long-standing trend of decarbonisation of energy reversed.



Based on Figure 1.7

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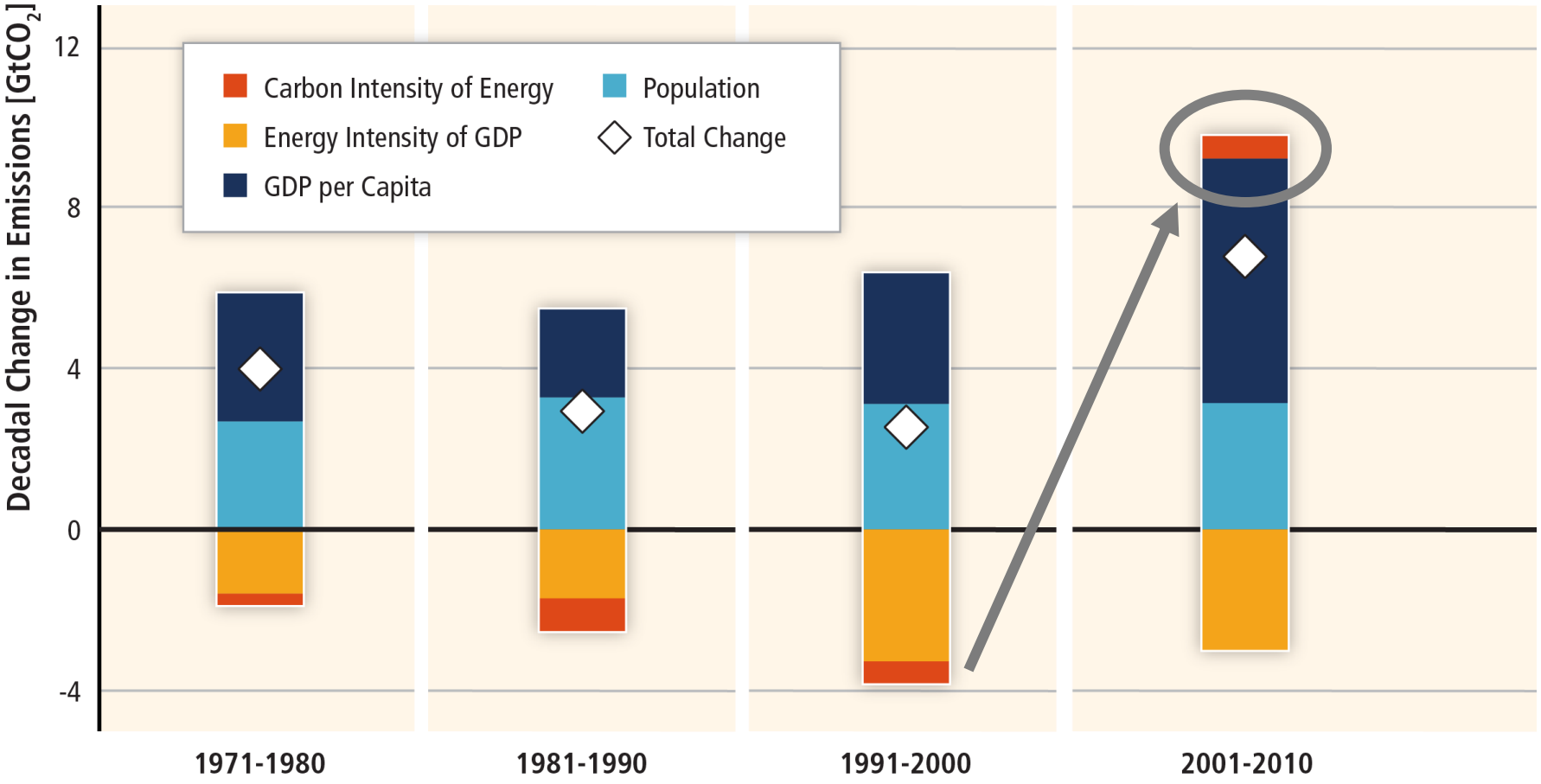
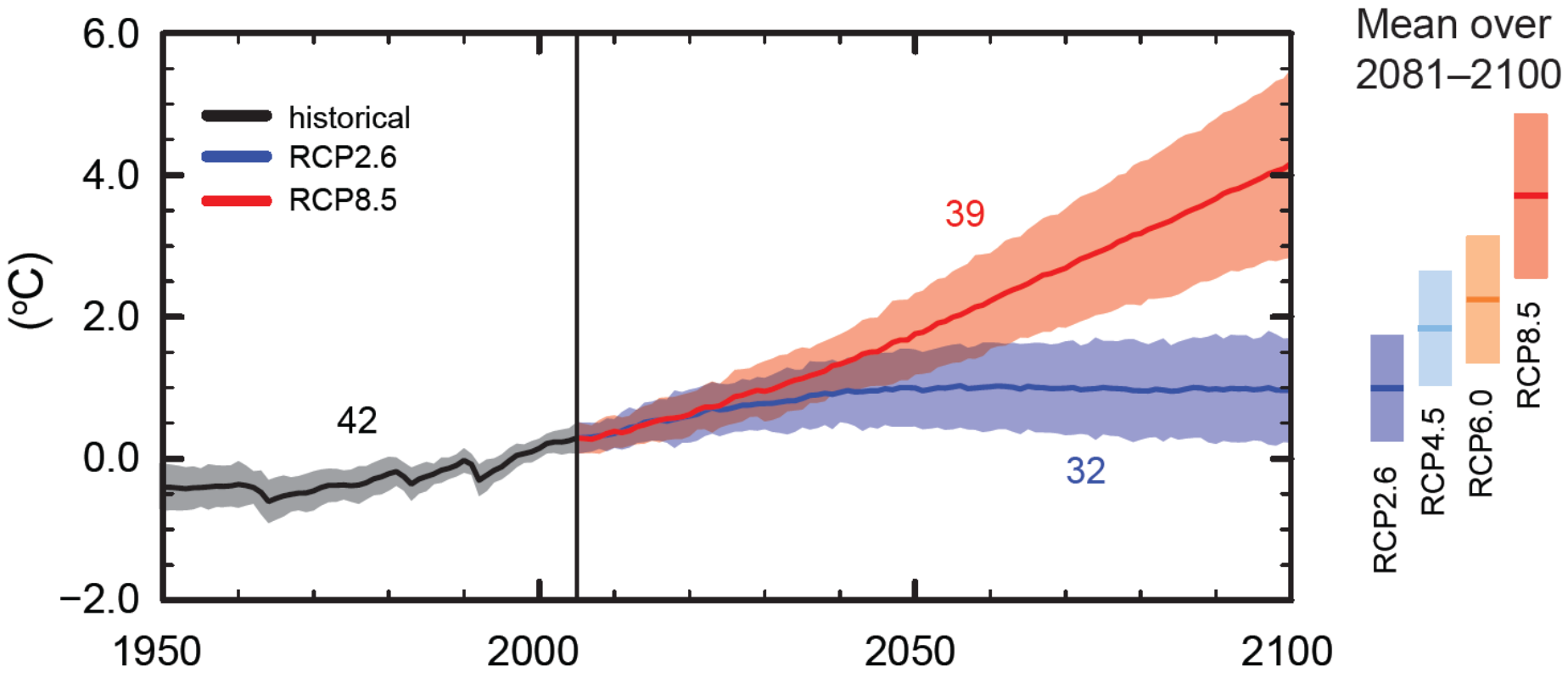
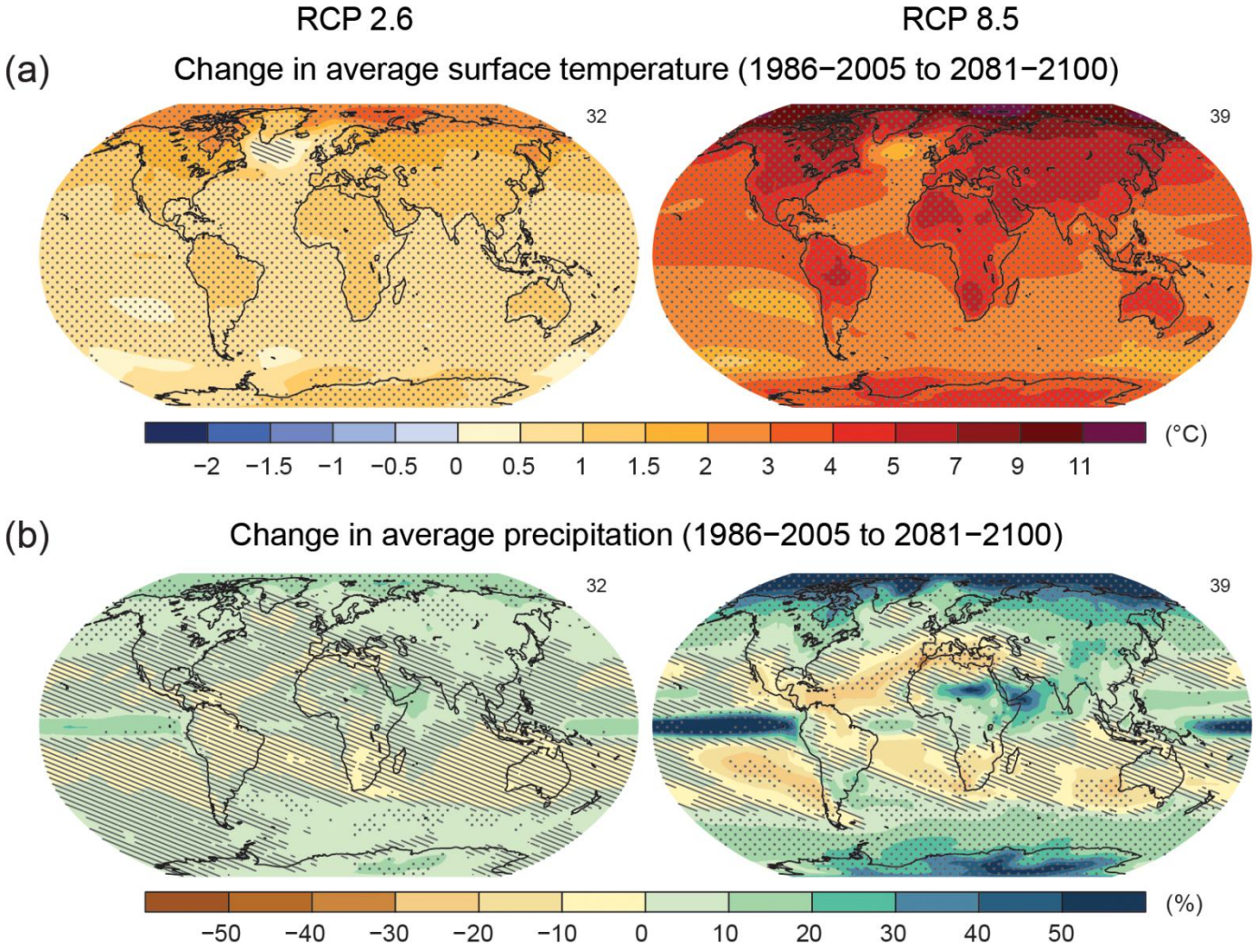


Based on Figure 1.7

Projected global average surface temperature change



Projected changes in temperature and precipitation



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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

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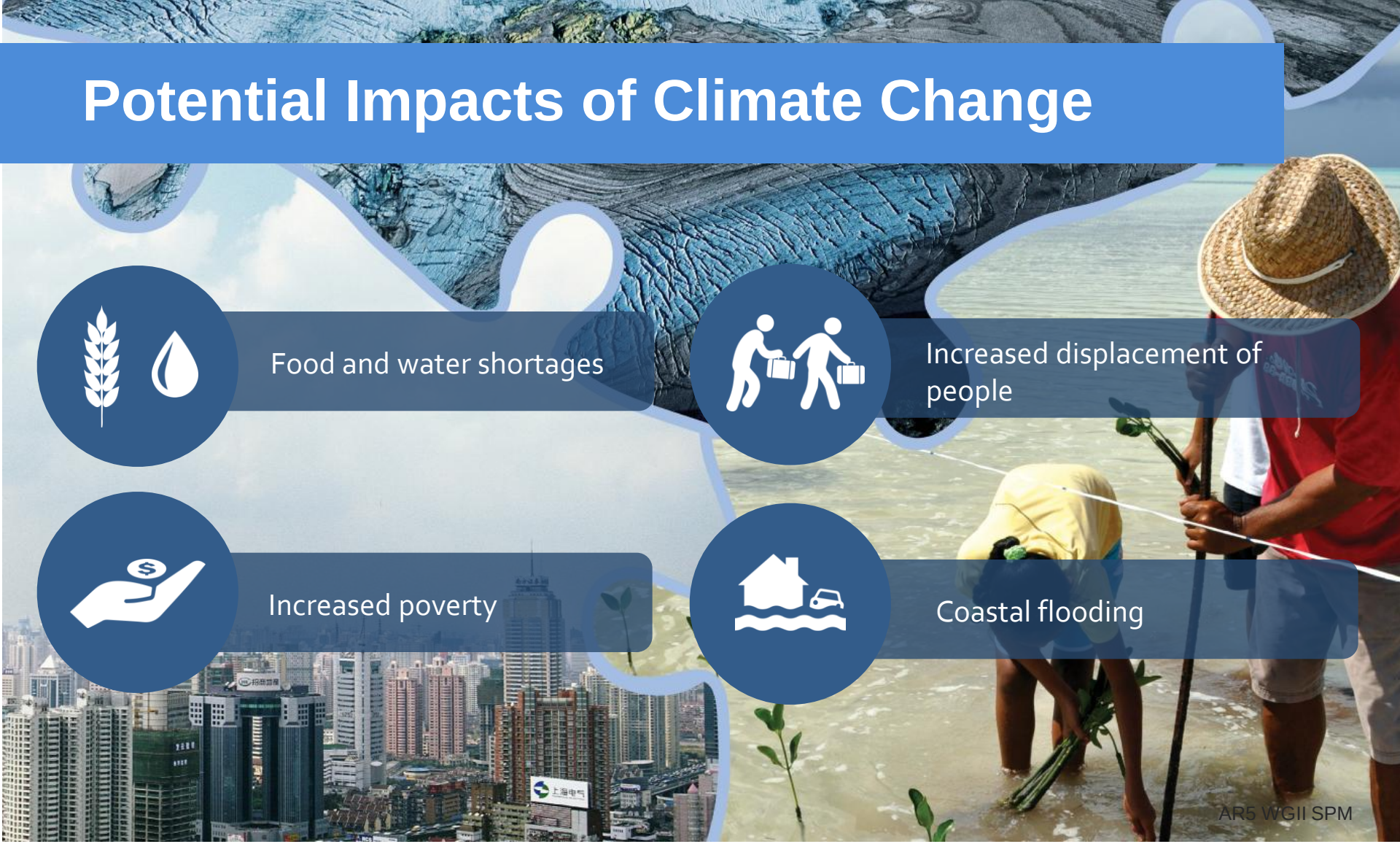
Potential Impacts of Climate Change



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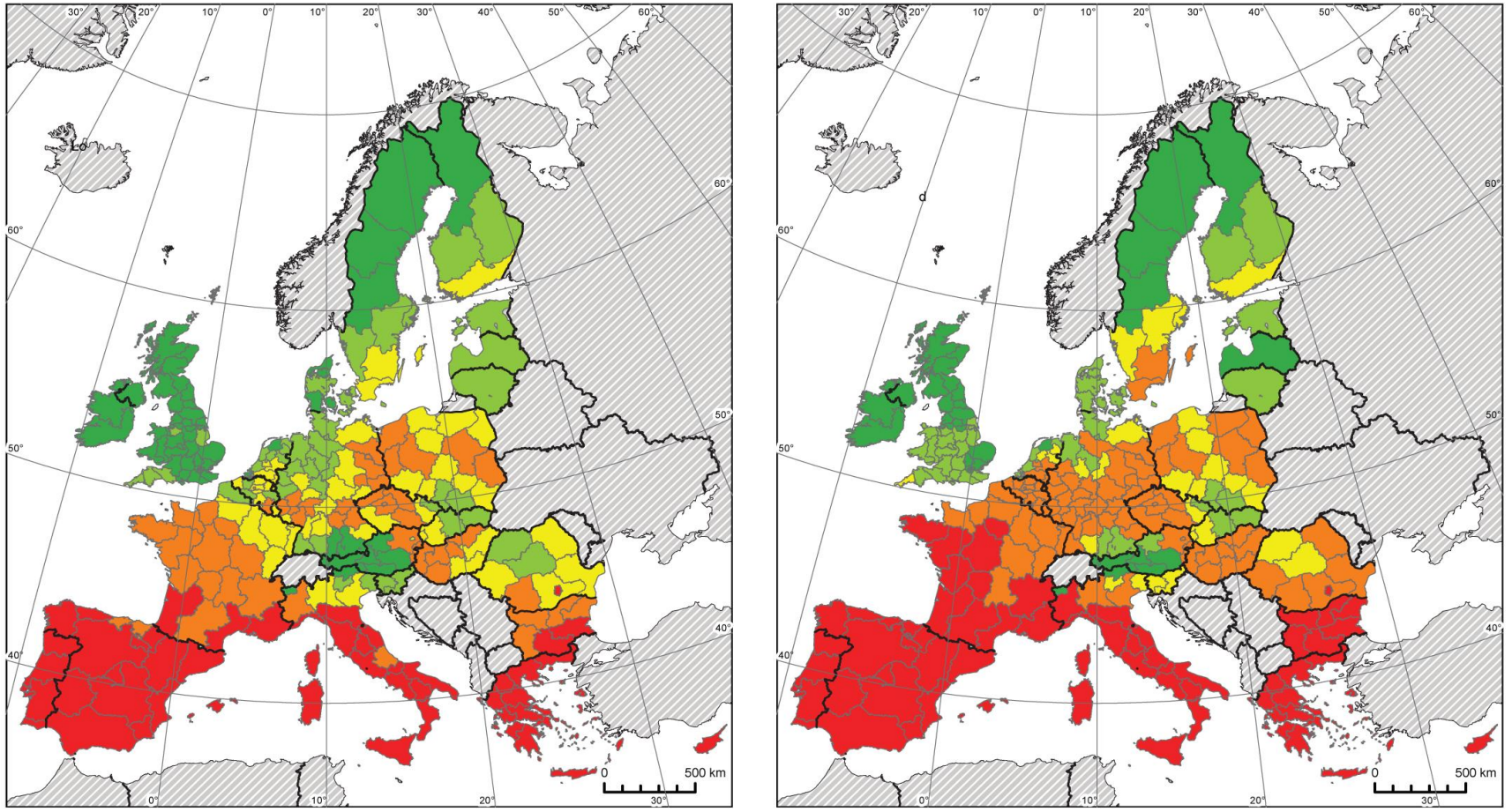
Forest Fire Risk

(a) Baseline climate (1961–1990)

(b) climate scenario 2041–2070 (A1B emission scenario)



Forest fire risk | Very high | High | Medium | Low | Very low | Not assessed

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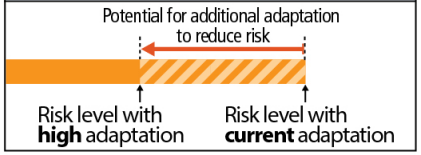
Europe – climate change risks and potential for adaptation

Climate-related drivers of impacts				
Warming trend	Extreme temperature	Extreme precipitation	Drying trend	Sea level

Level of risk & potential for adaptation



Key risk	Adaptation issues & prospects	Climatic drivers	Timeframe	Risk & potential for adaptation
Increased economic losses and people affected by flooding in river basins and coasts, driven by increasing urbanization, increasing sea levels, coastal erosion, and peak river discharges (*high confidence*) [23.2-3, 23.7]	Adaptation can prevent most of the projected damages (*high confidence*). • Significant experience in hard flood-protection technologies and increasing experience with restoring wetlands • High costs for increasing flood protection • Potential barriers to implementation: demand for land in Europe and environmental and landscape concerns		Present Near term (2030–2040) Long term (2080-2100) 2°C 4°C	Very low / Medium / Very high
Increased water restrictions. Significant reduction in water availability from river abstraction and from groundwater resources, combined with increased water demand (e.g., for irrigation, energy and industry, domestic use) and with reduced water drainage and runoff as a result of increased evaporative demand, particularly in southern Europe (*high confidence*) [23.4, 23.7]	• Proven adaptation potential from adoption of more water-efficient technologies and of water-saving strategies (e.g., for irrigation, crop species, land cover, industries, domestic use) • Implementation of best practices and governance instruments in river basin management plans and integrated water management		Present Near term (2030–2040) Long-term (2080–2100) 2°C 4°C	Very low / Medium / Very high
Increased economic losses and people affected by extreme heat events: impacts on health and well-being, labor productivity, crop production, air quality, and increasing	• Implementation of warning systems • Adaptation of dwellings and workplaces and of transport and		Present	Very low / Medium / Very high

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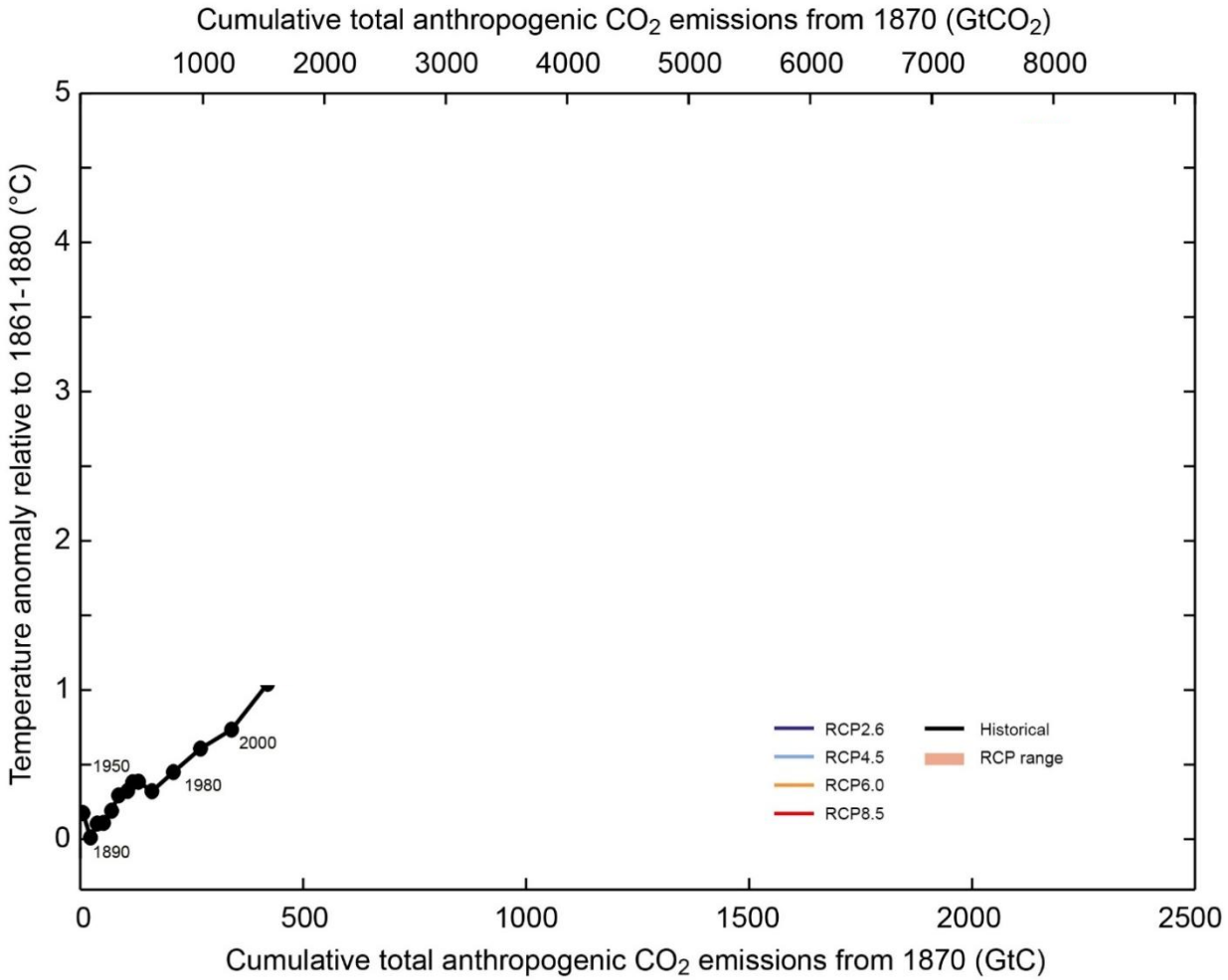
Temperature increase and cumulative carbon emissions



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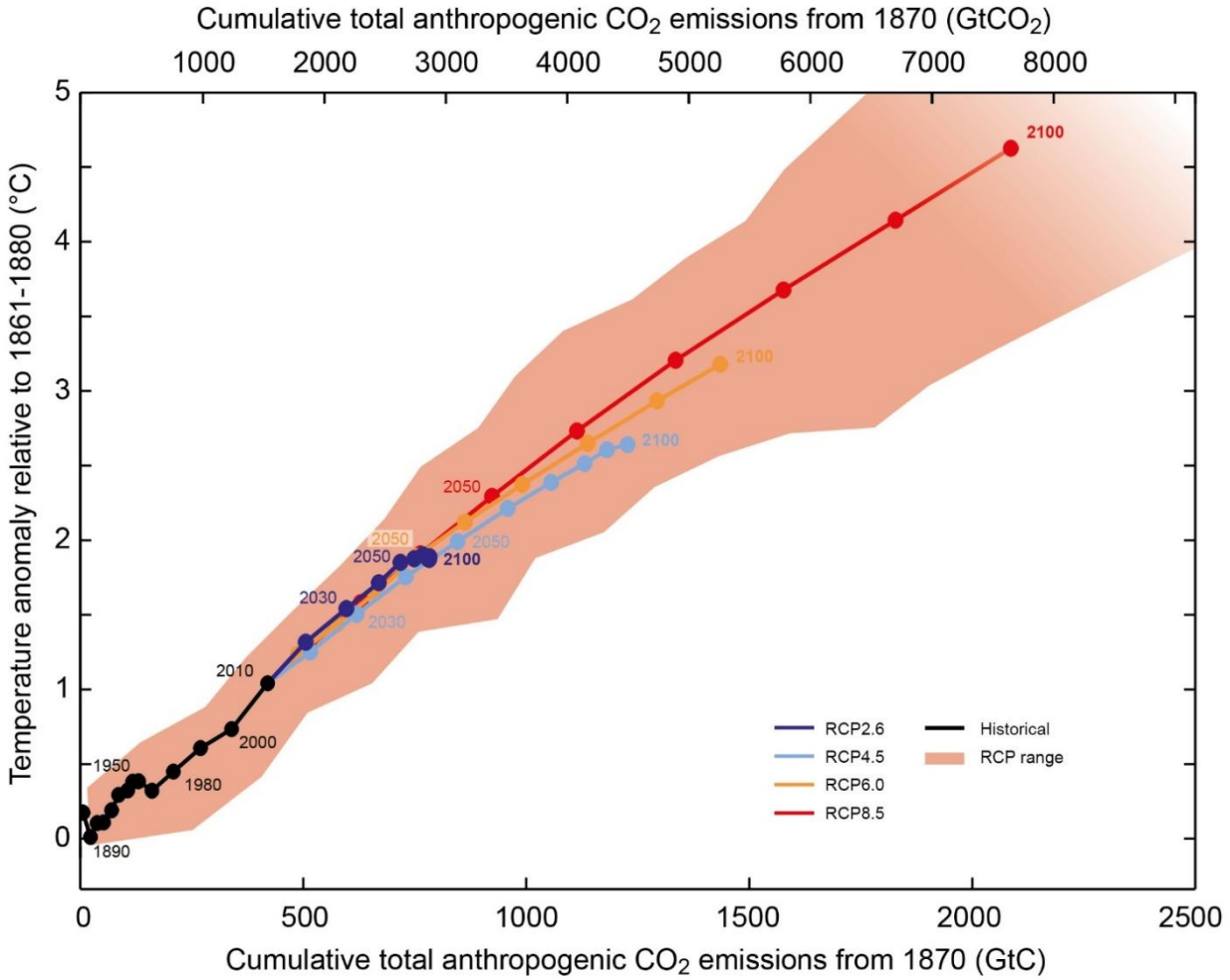

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The window for action is rapidly closing

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

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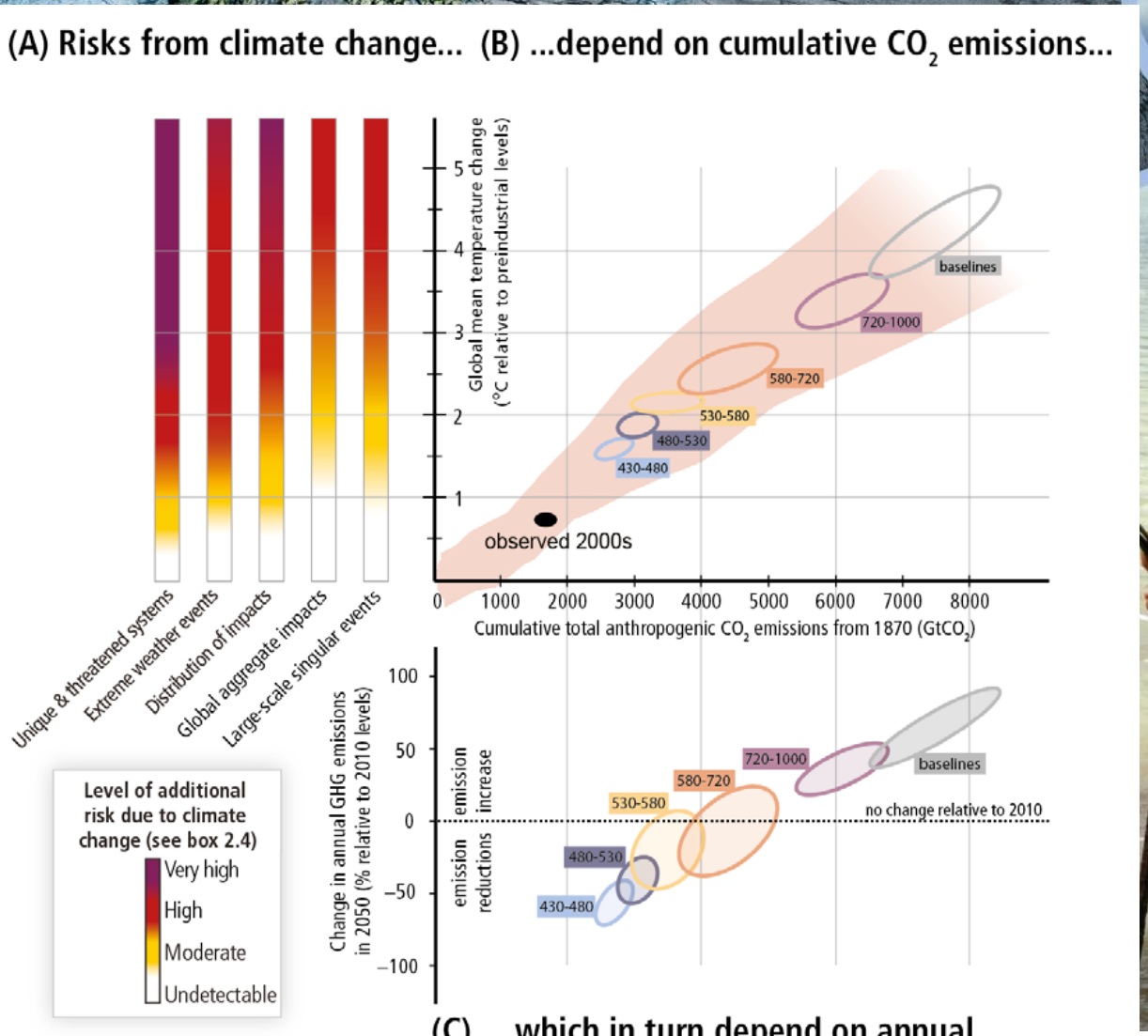
Figure SPM.10
A reader's guide

From climate change risks to GHG emissionse



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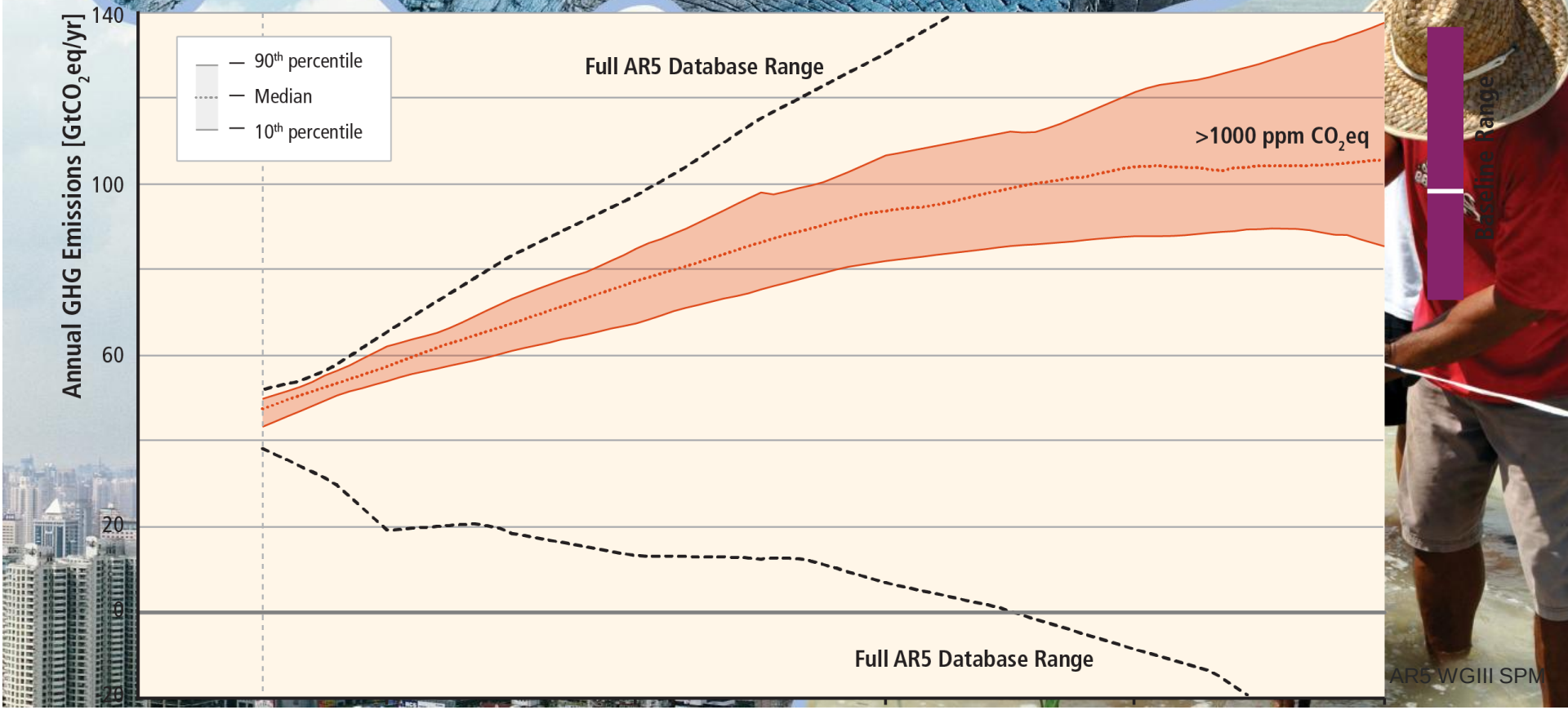
Stabilization of atmospheric concentrations requires moving away from the baseline – regardless of the mitigation goal.



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Based on Figure 6.7

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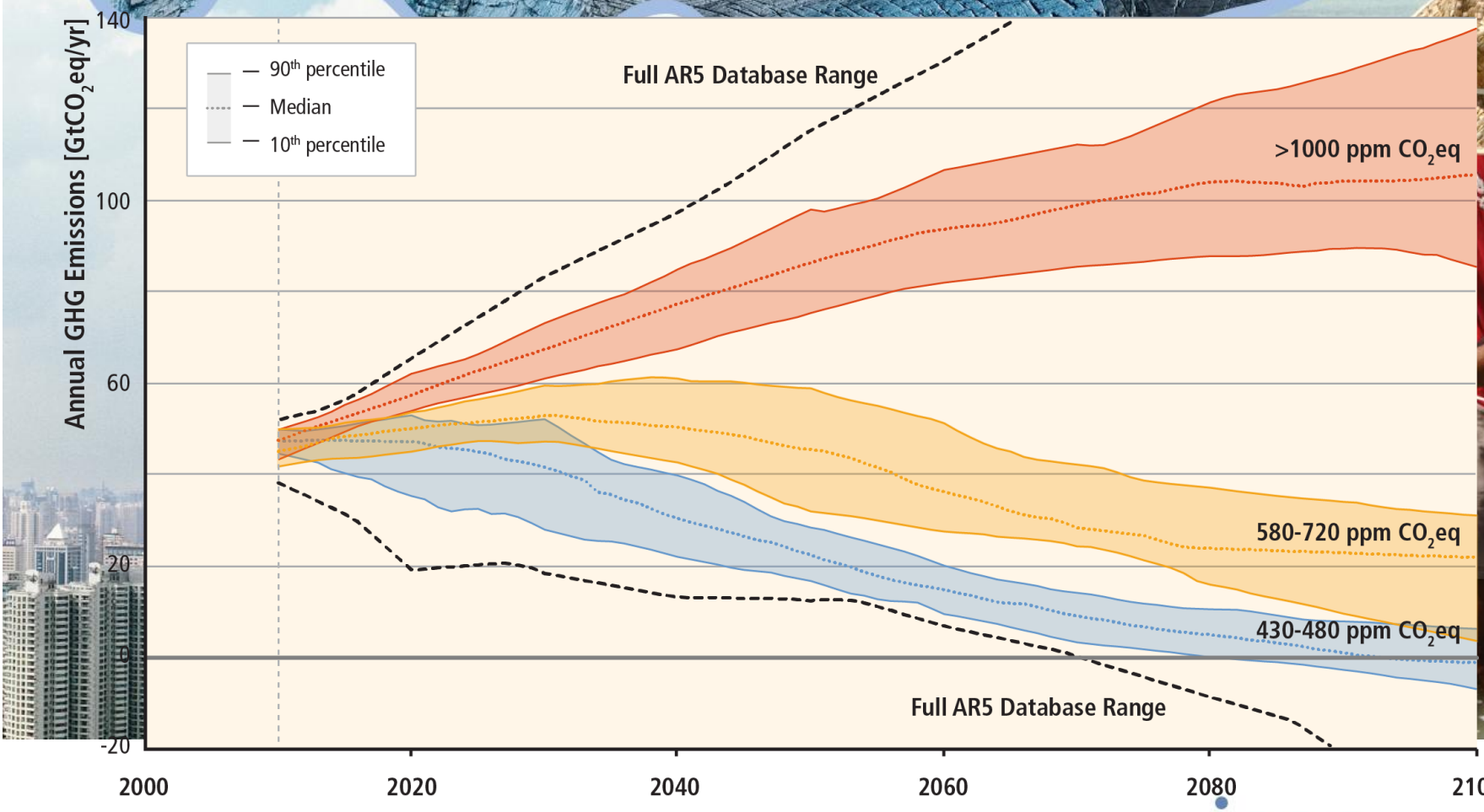

Based on Figure 6.7

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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

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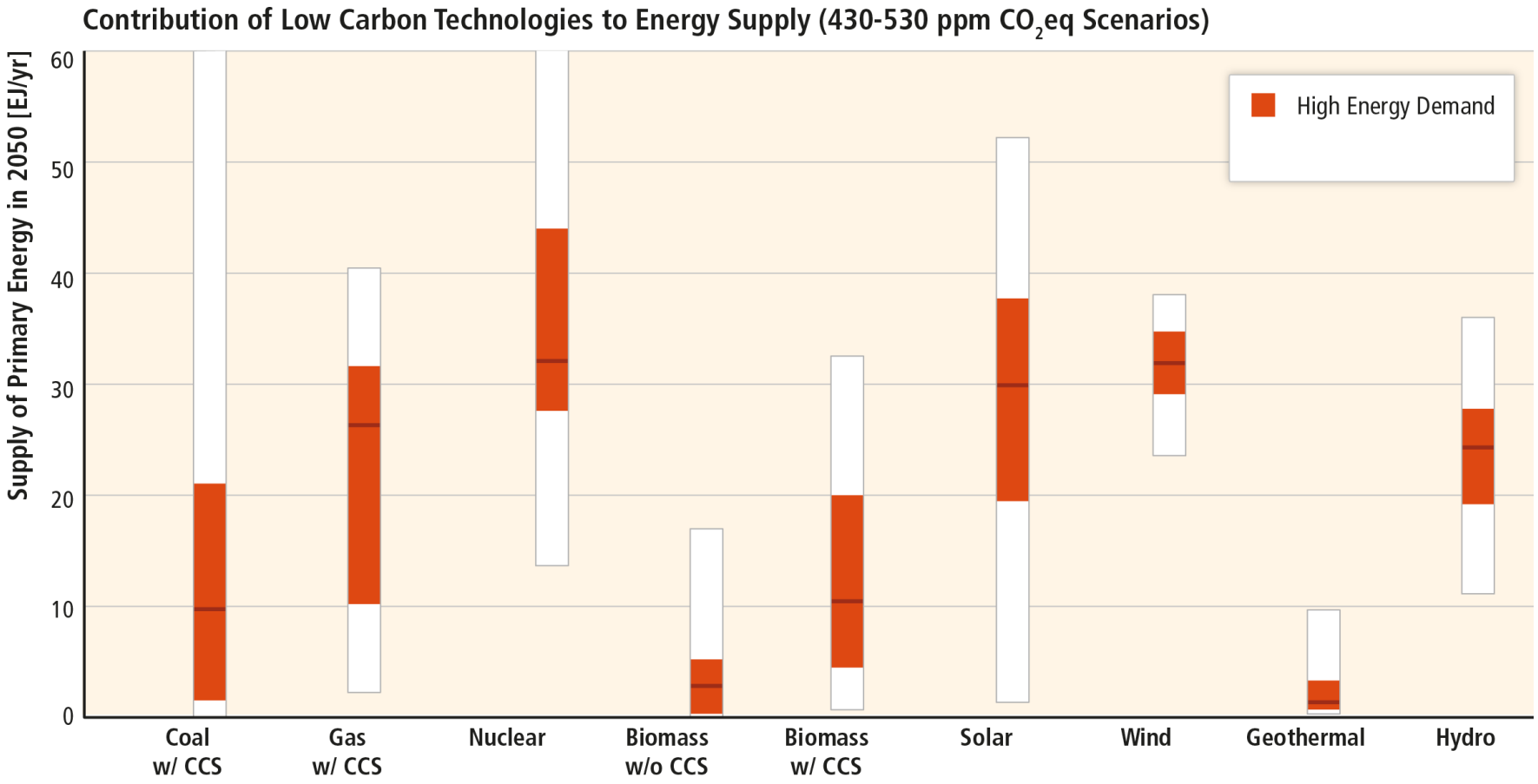
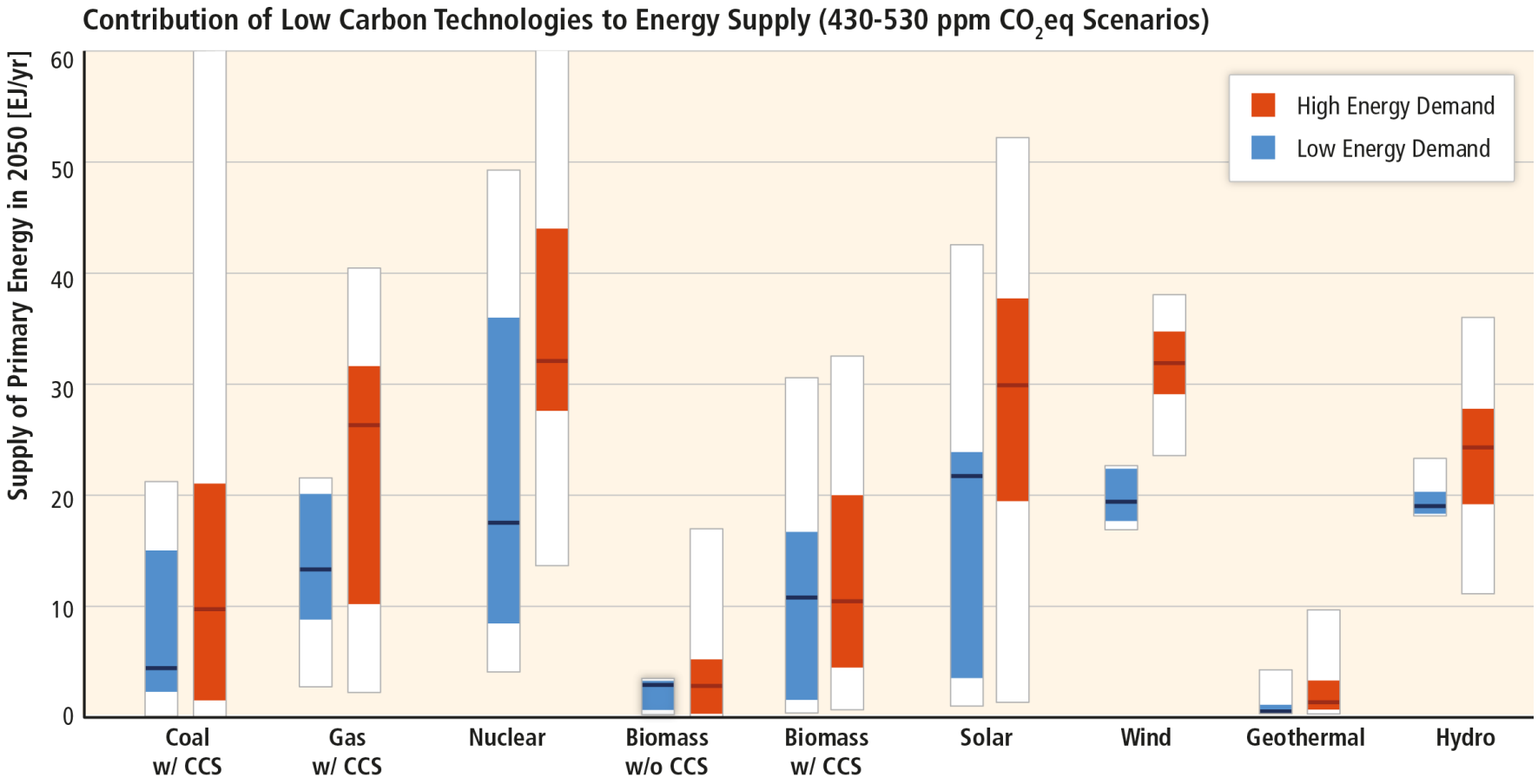
Decarbonization of energy supply is a key requirement for limiting warming to 2°C.



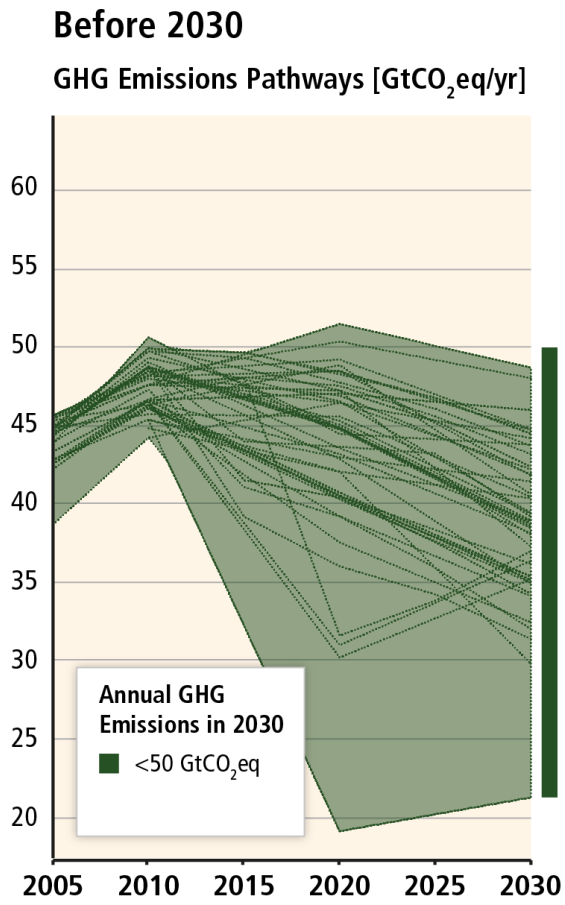
Based on Figure 7.11

Energy demand reductions can provide flexibility, hedge against risks, avoid lock-in and provide co-benefits.



Based on Figure 7.11

Delaying mitigation increases the difficulty and narrows the options for limiting warming to 2°C.



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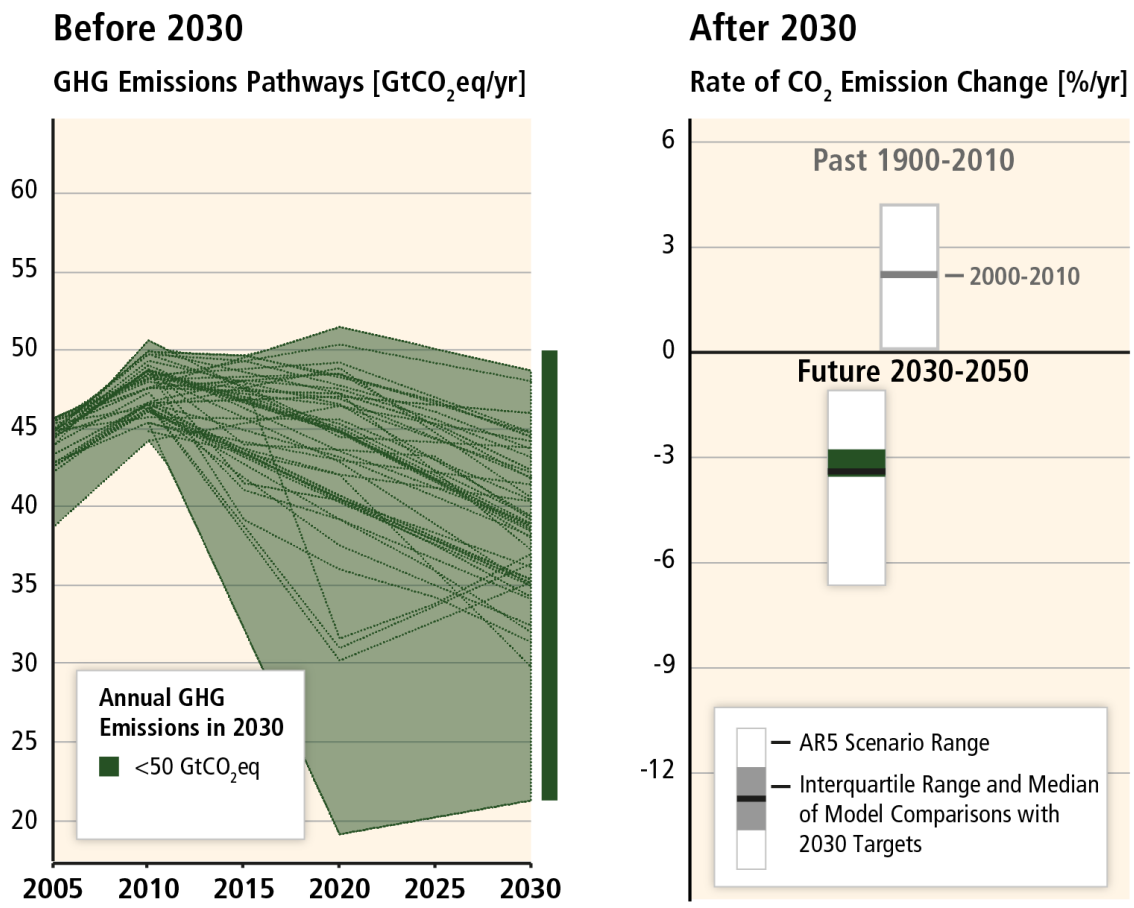

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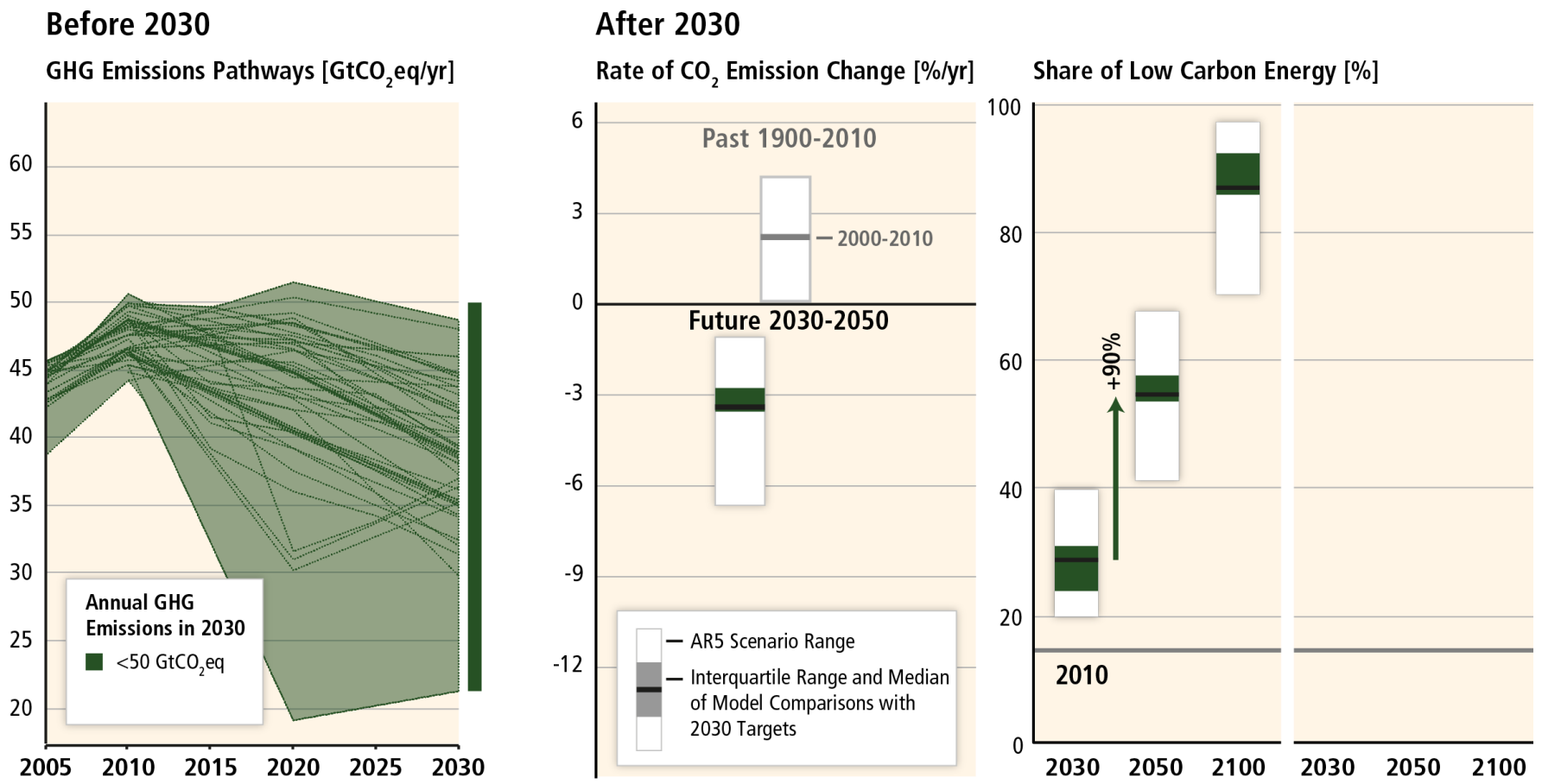

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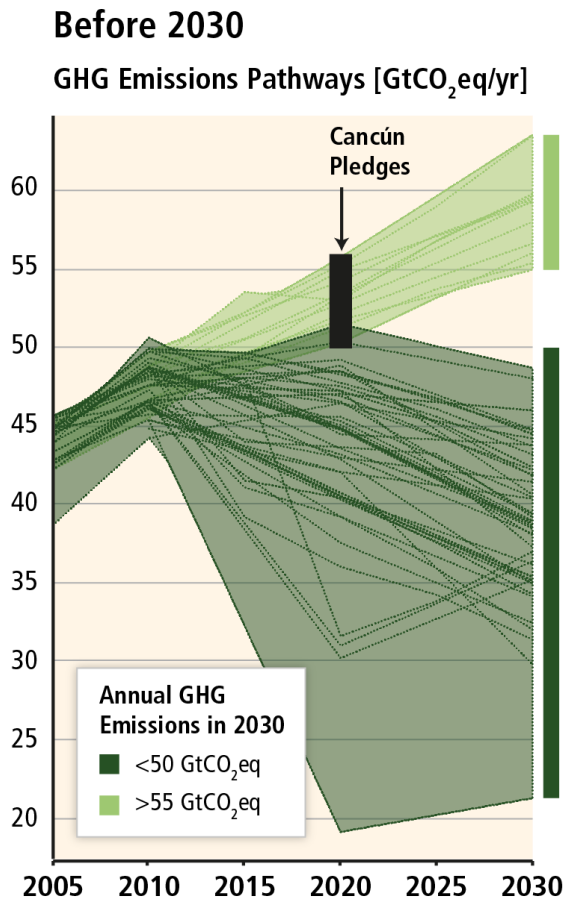
Delaying mitigation is estimated to increase the difficulty and narrow the options for limiting warming to 2°C.



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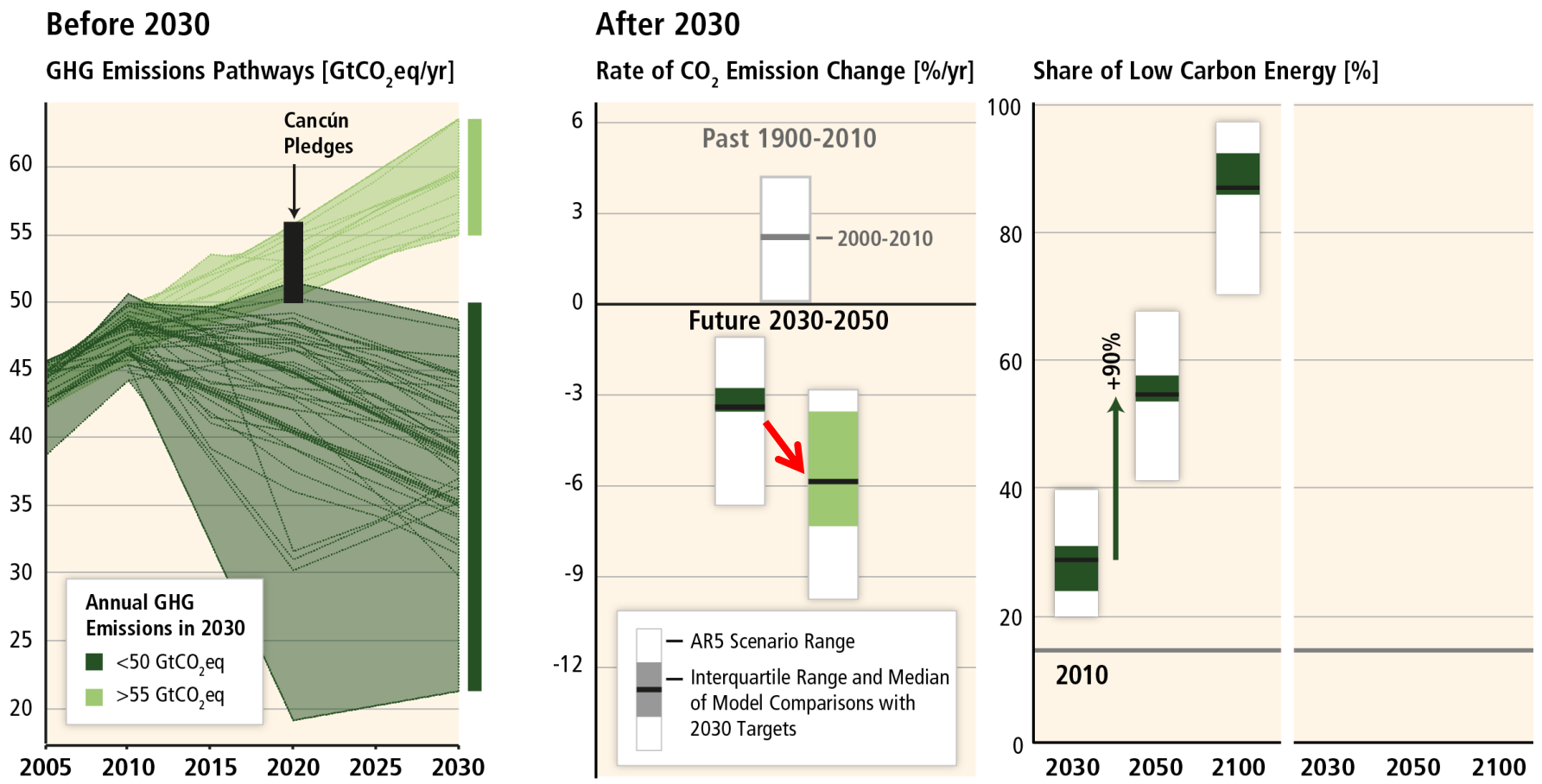

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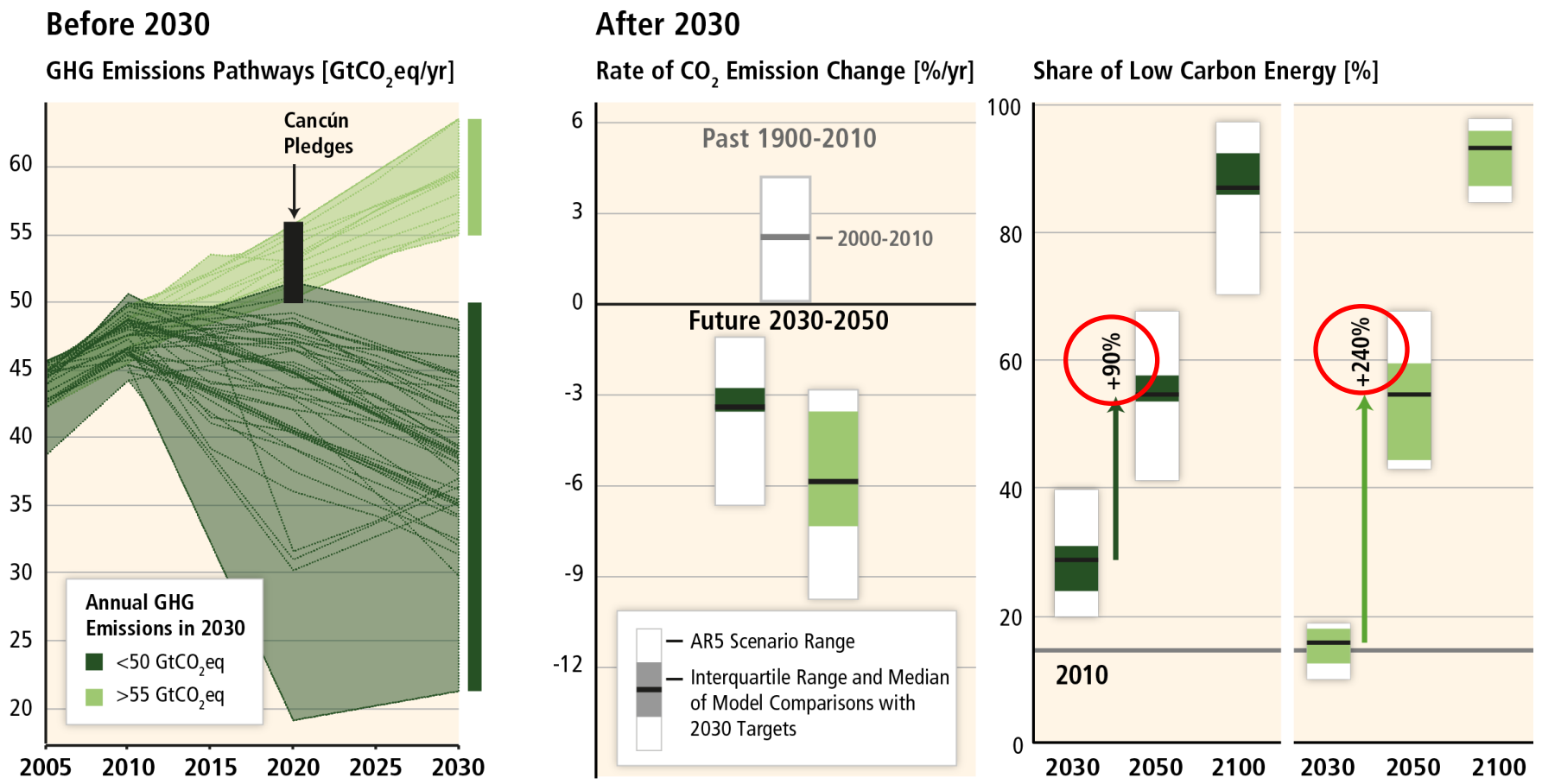
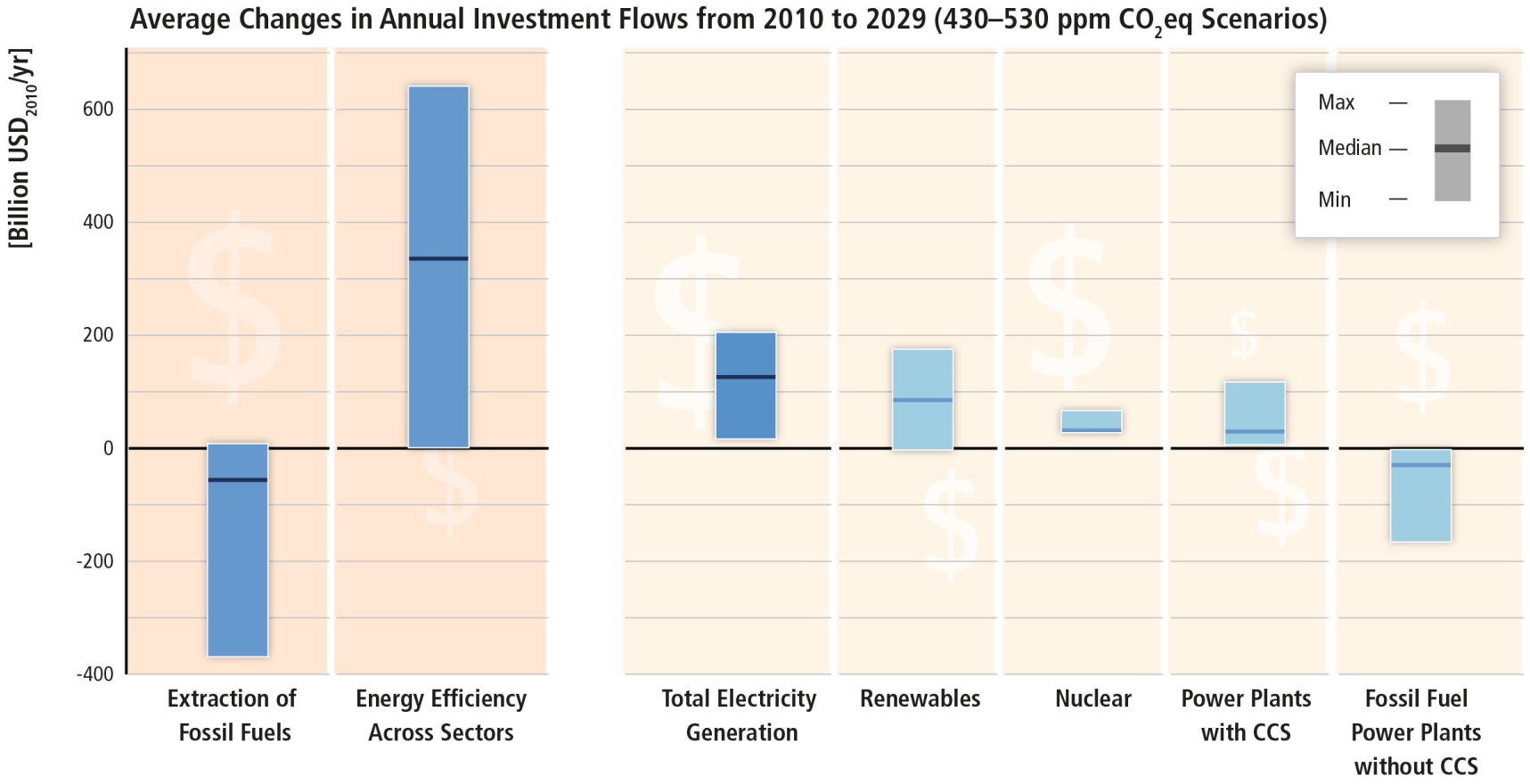


Based on Figures 6.32 and 7.16

Substantial reductions in emissions would require large changes in investment patterns and appropriate policies.



Based on Figure 16.3

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 for economic growth

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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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