IPCC Fifth Assessment Report Synthesis Report

2nd November 2014
Copenhagen

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

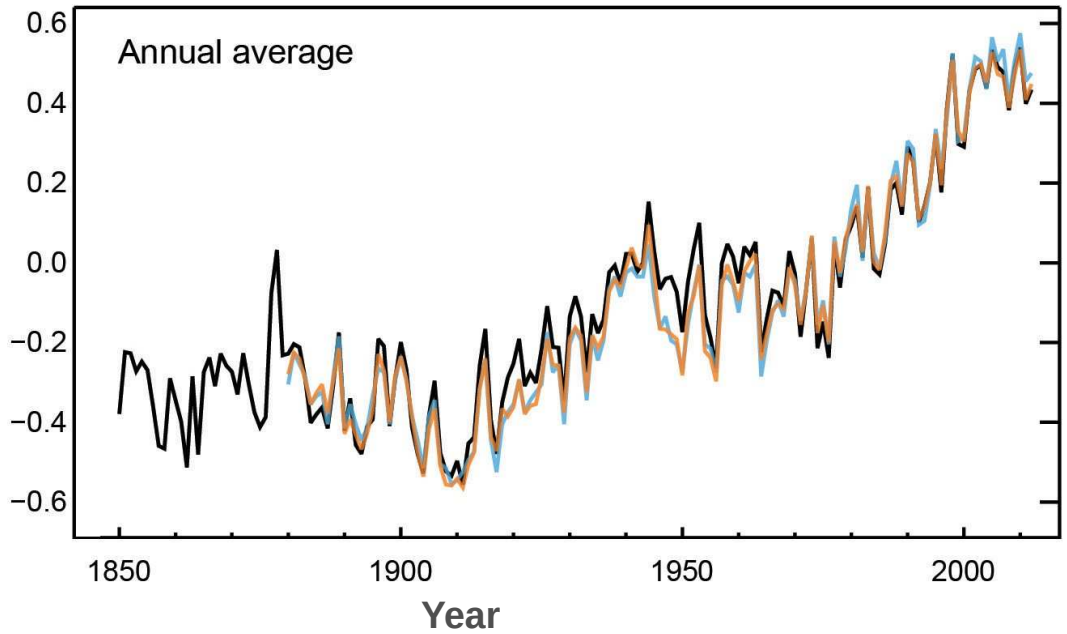
Key Messages

- ➔ **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

Humans are changing the climate

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

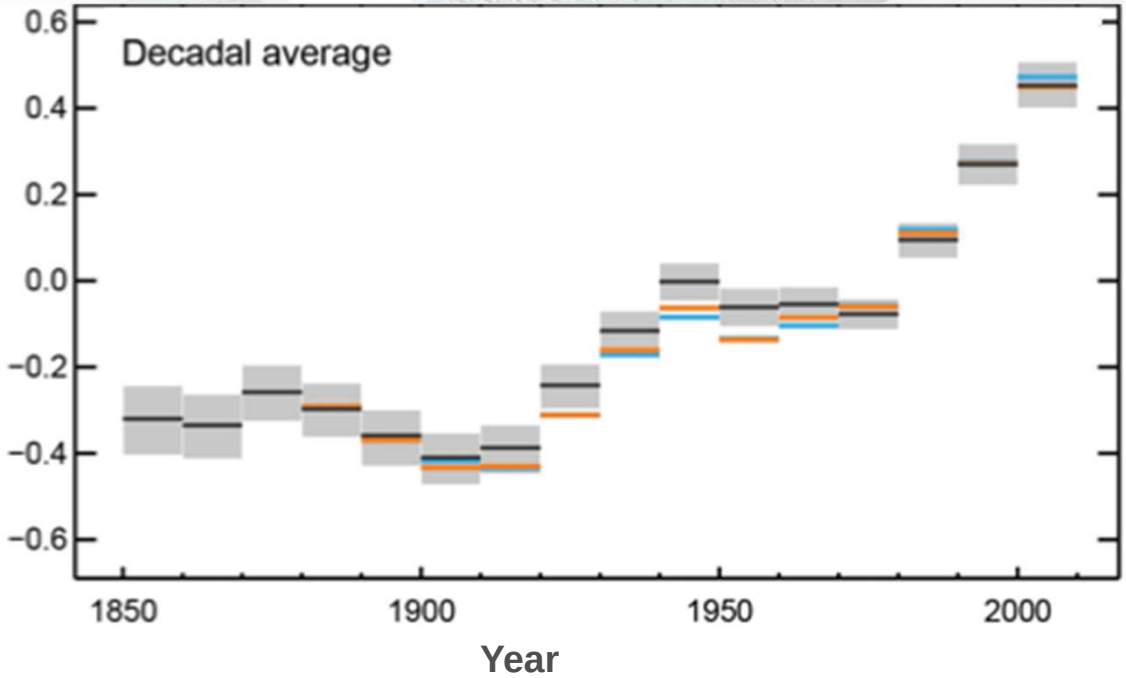


Globally averaged combined land and ocean surface temperatures

AR5 WGI SPM

Temperatures continue to rise

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



Globally averaged combined land and ocean surface temperatures

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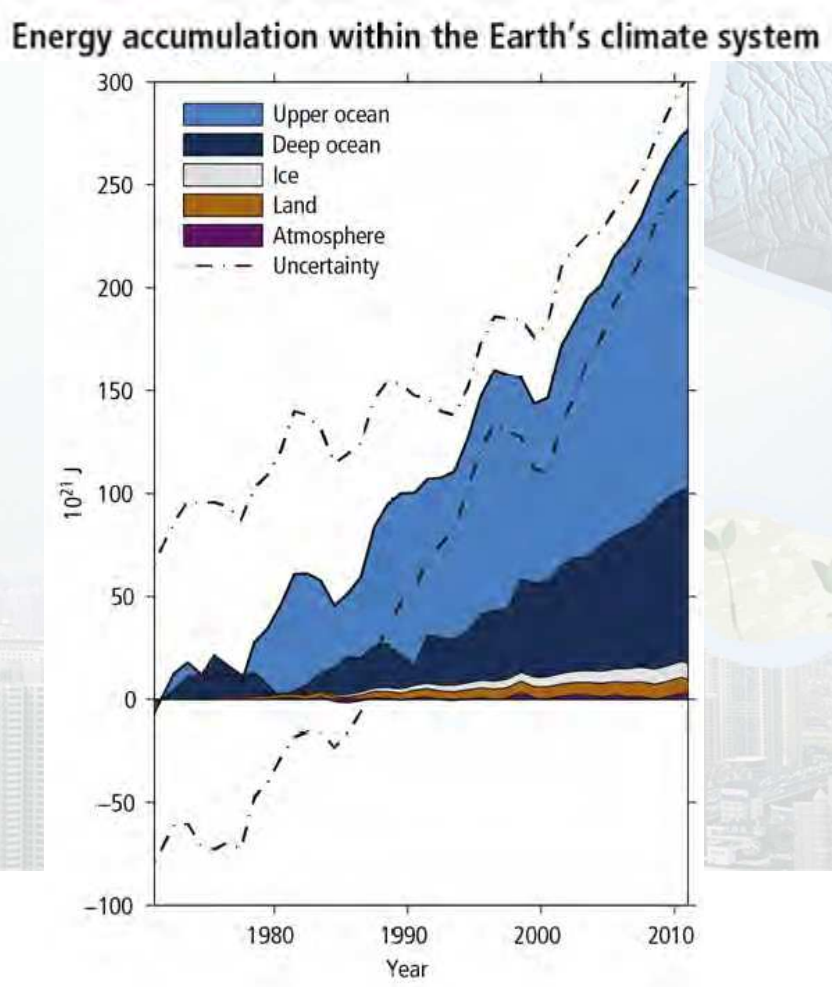
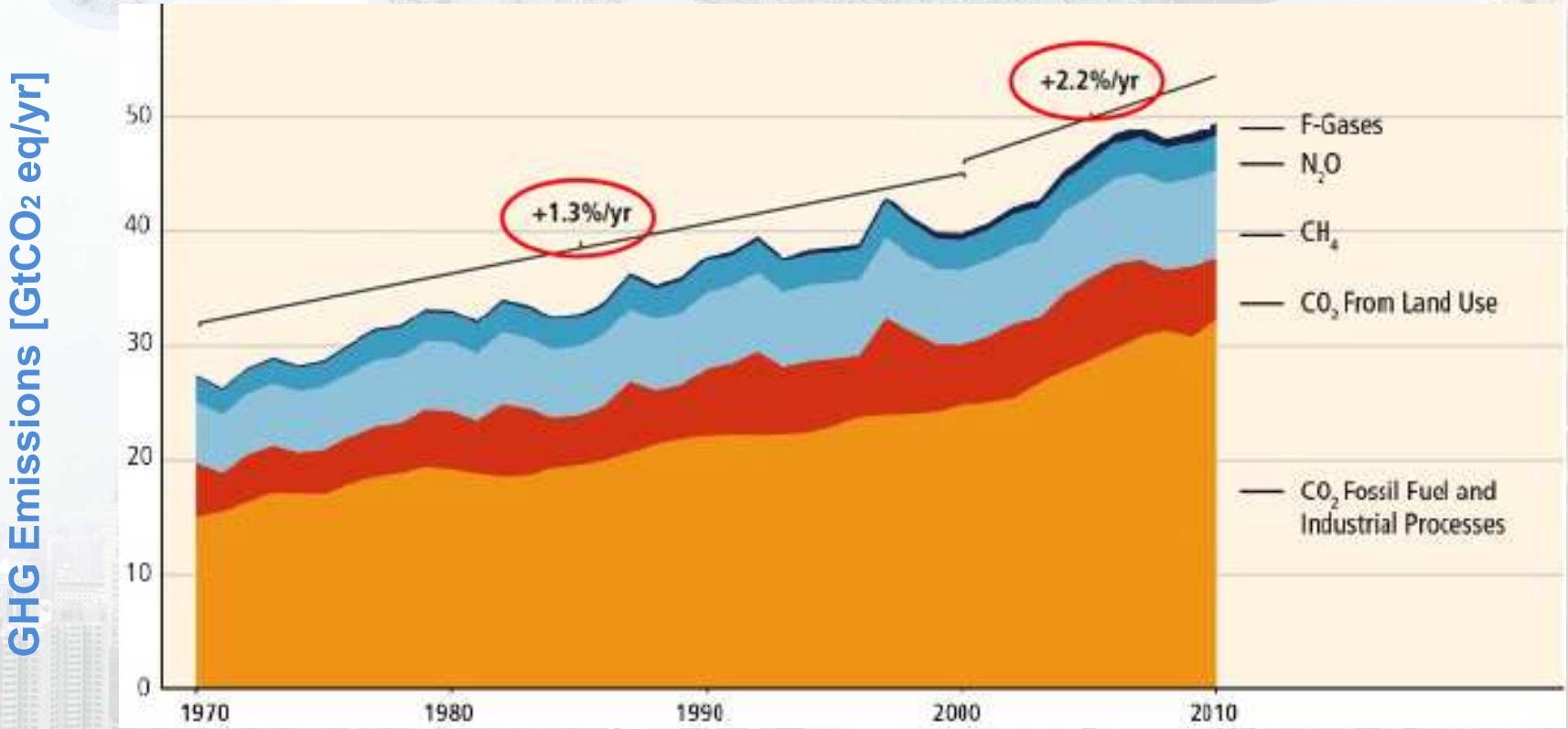
Oceans absorb most of the heat



- ➜ **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**

AR5 SYR

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



AR5 WGIII SPM

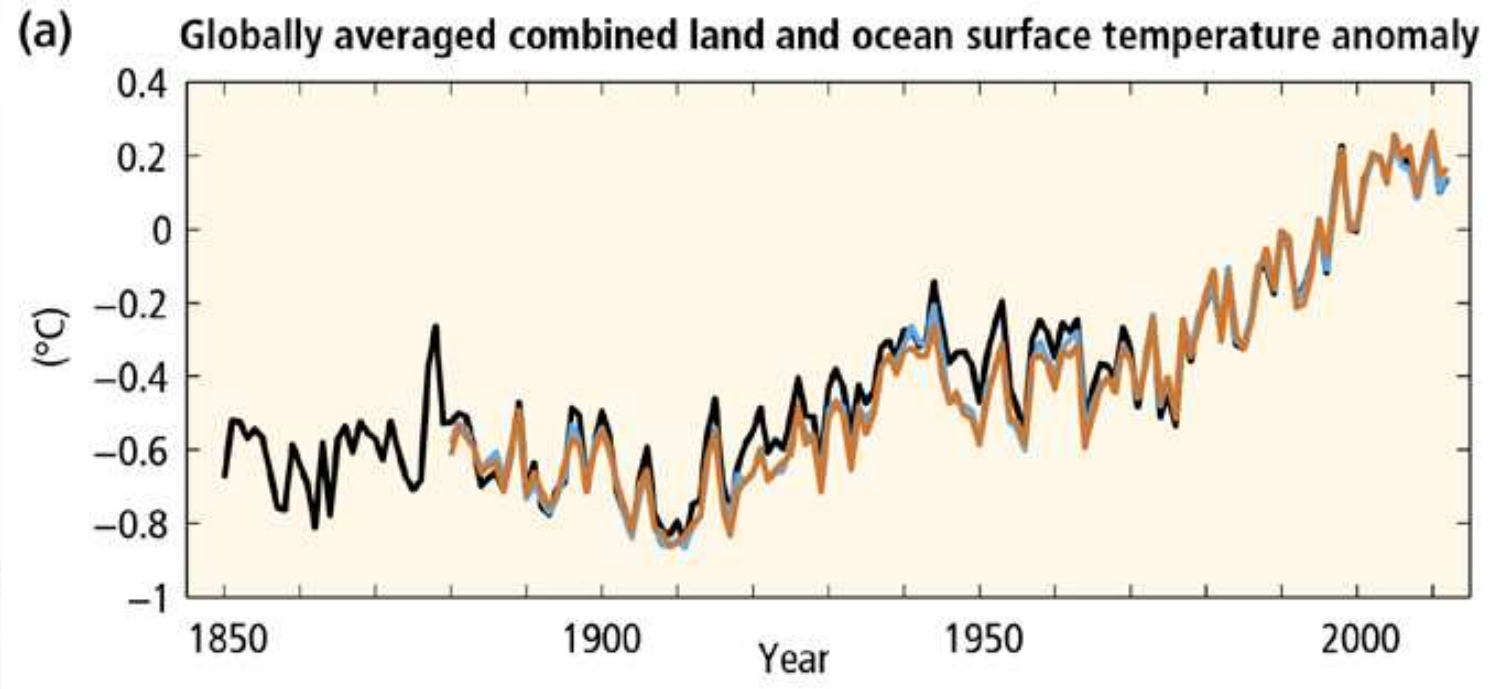
INTERGOVERNMENTAL PANEL ON climate change

Sources of emissions

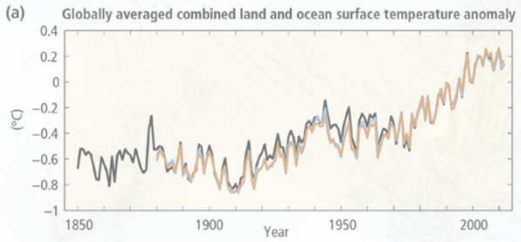
Energy production remains the primary driver of GHG emissions

2010 GHG emissions

AR5 WGIII SPM


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

AR5 SYR SPM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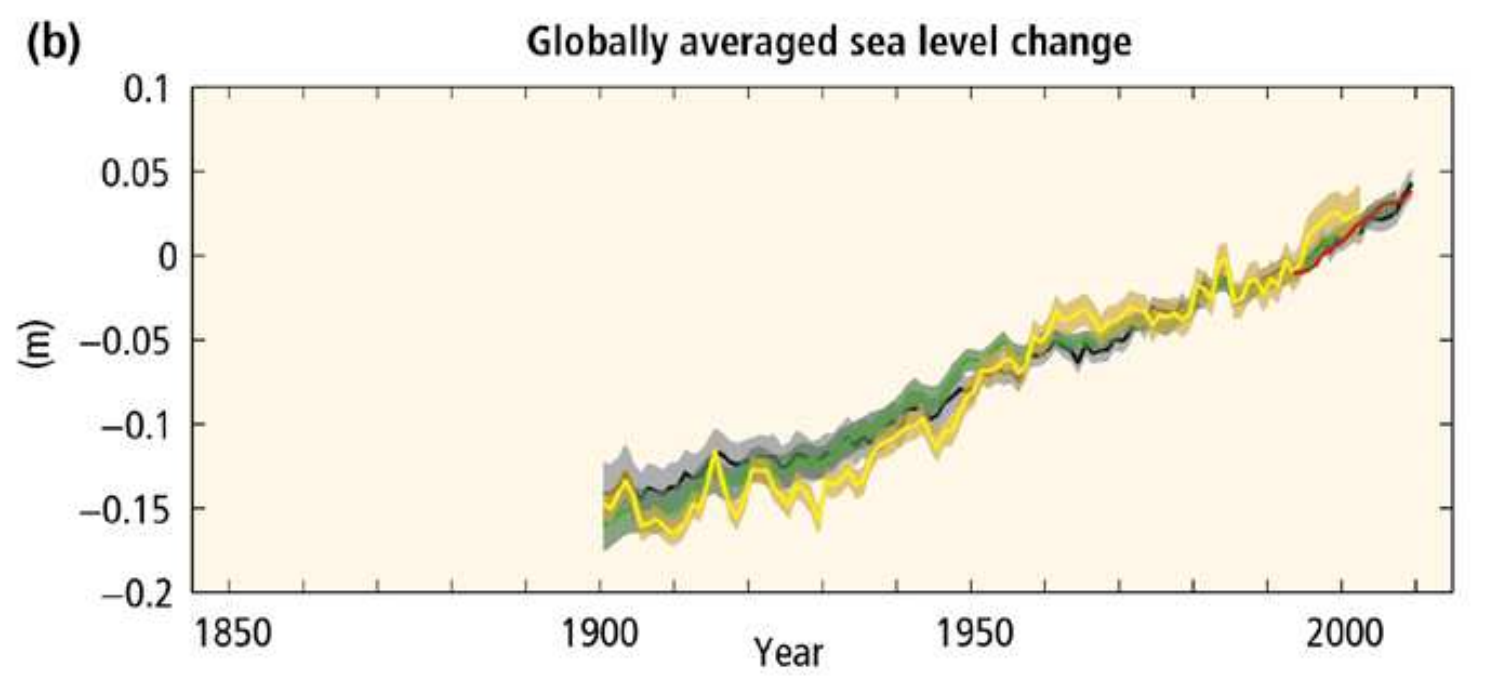
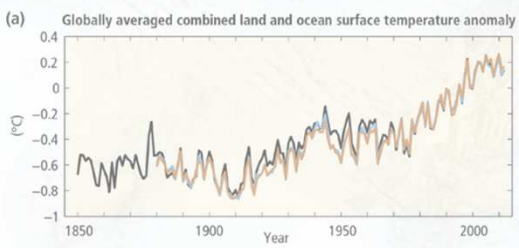

(b)
Globally averaged sea level change
0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
(m)
1850
1900
1950
2000
Year

AR5 SYR SPM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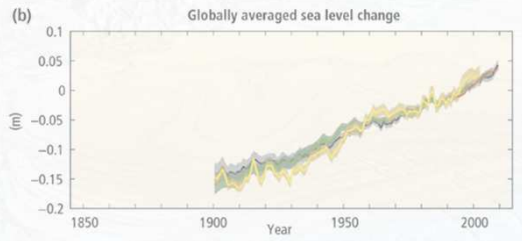
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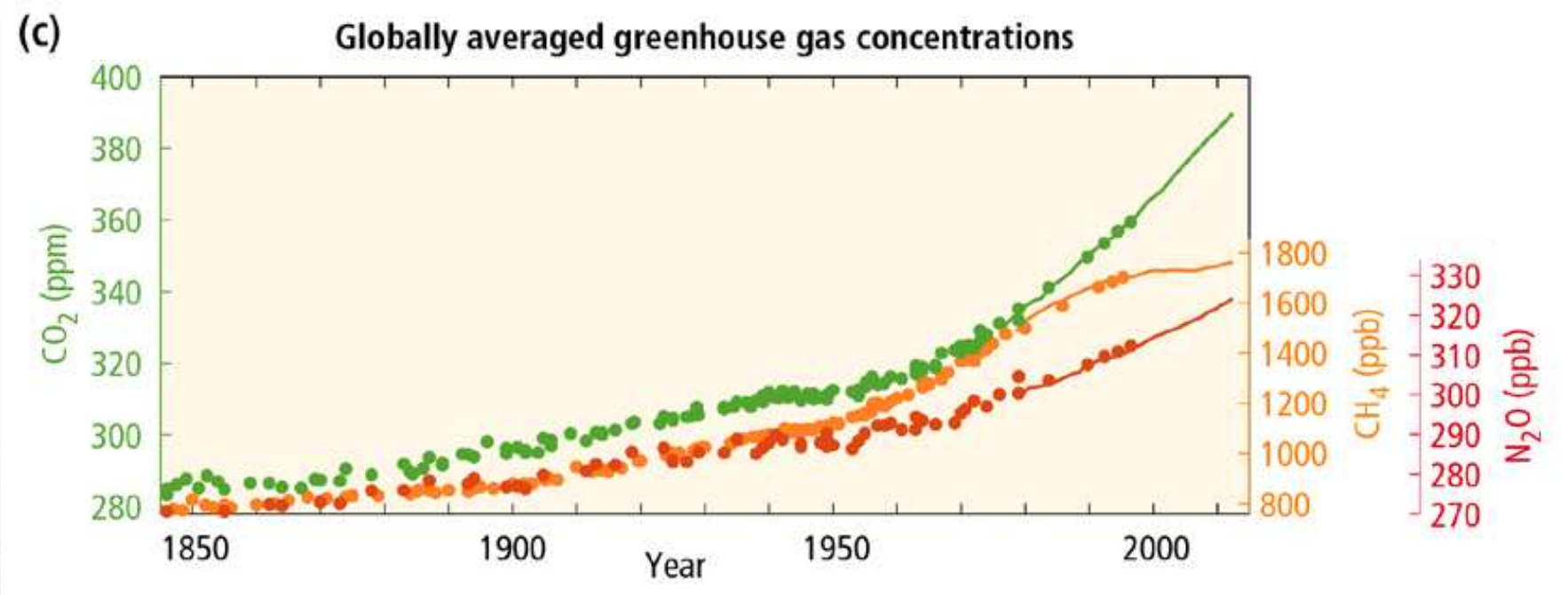
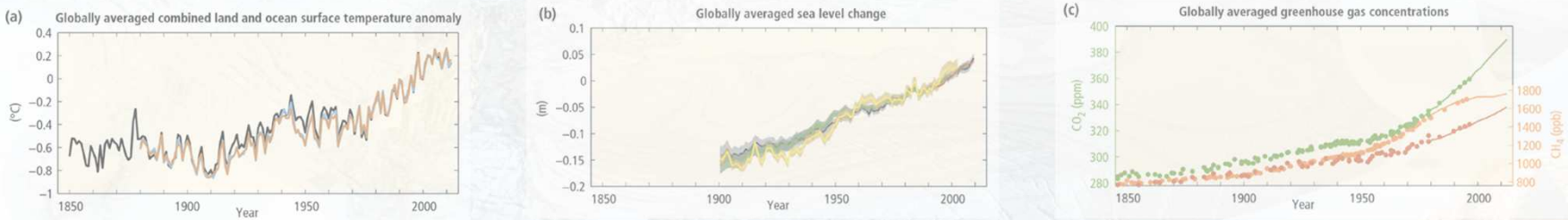
Year


(c)
Globally averaged greenhouse gas concentrations
CO_2 (ppm)
400
380
360
340
320
300
280
CH_4 (ppb)
1800
1600
1400
1200
1000
800
N_2O (ppb)
330
320
310
300
290
280
270
1850
1900
1950
2000
Year

AR5 SYR SPM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(°C)
Year
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(m)
Year
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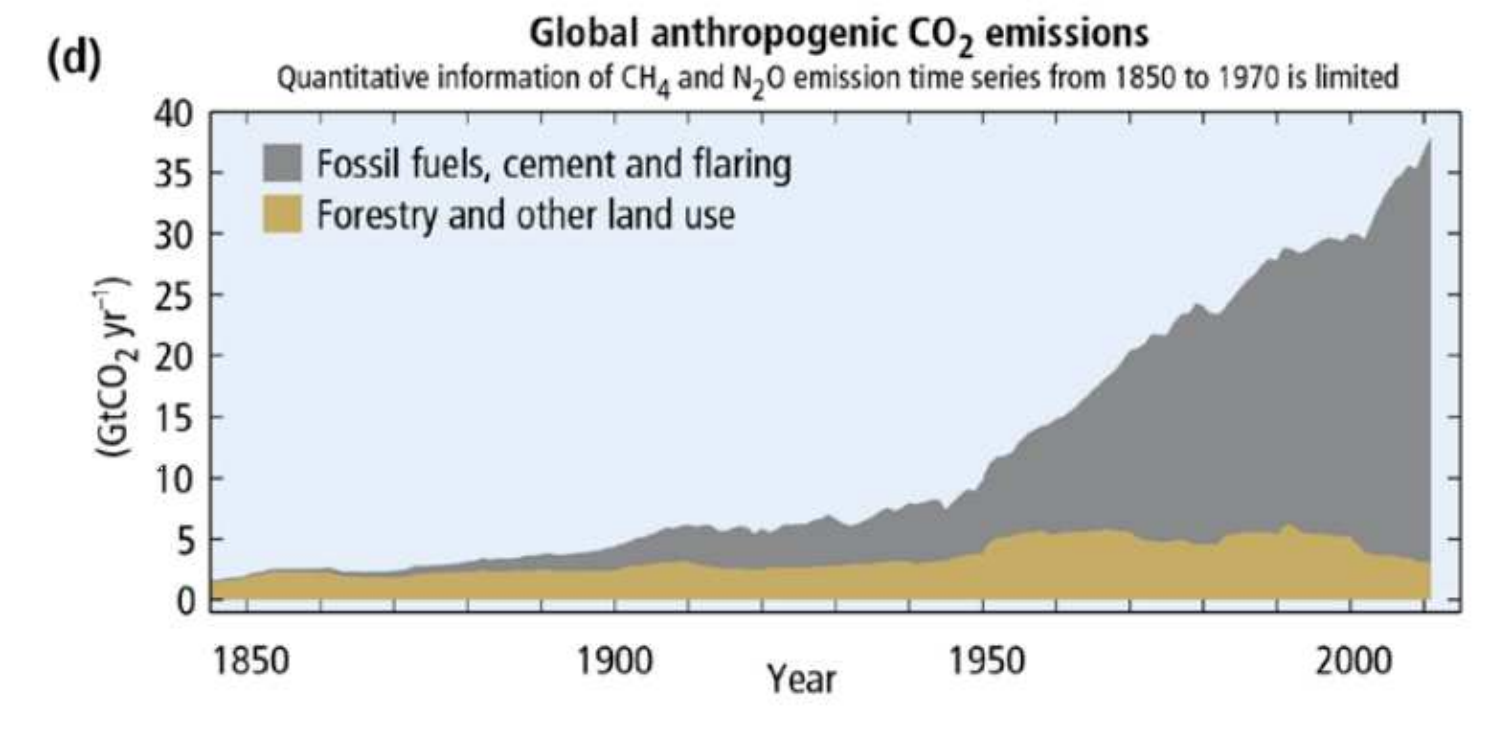
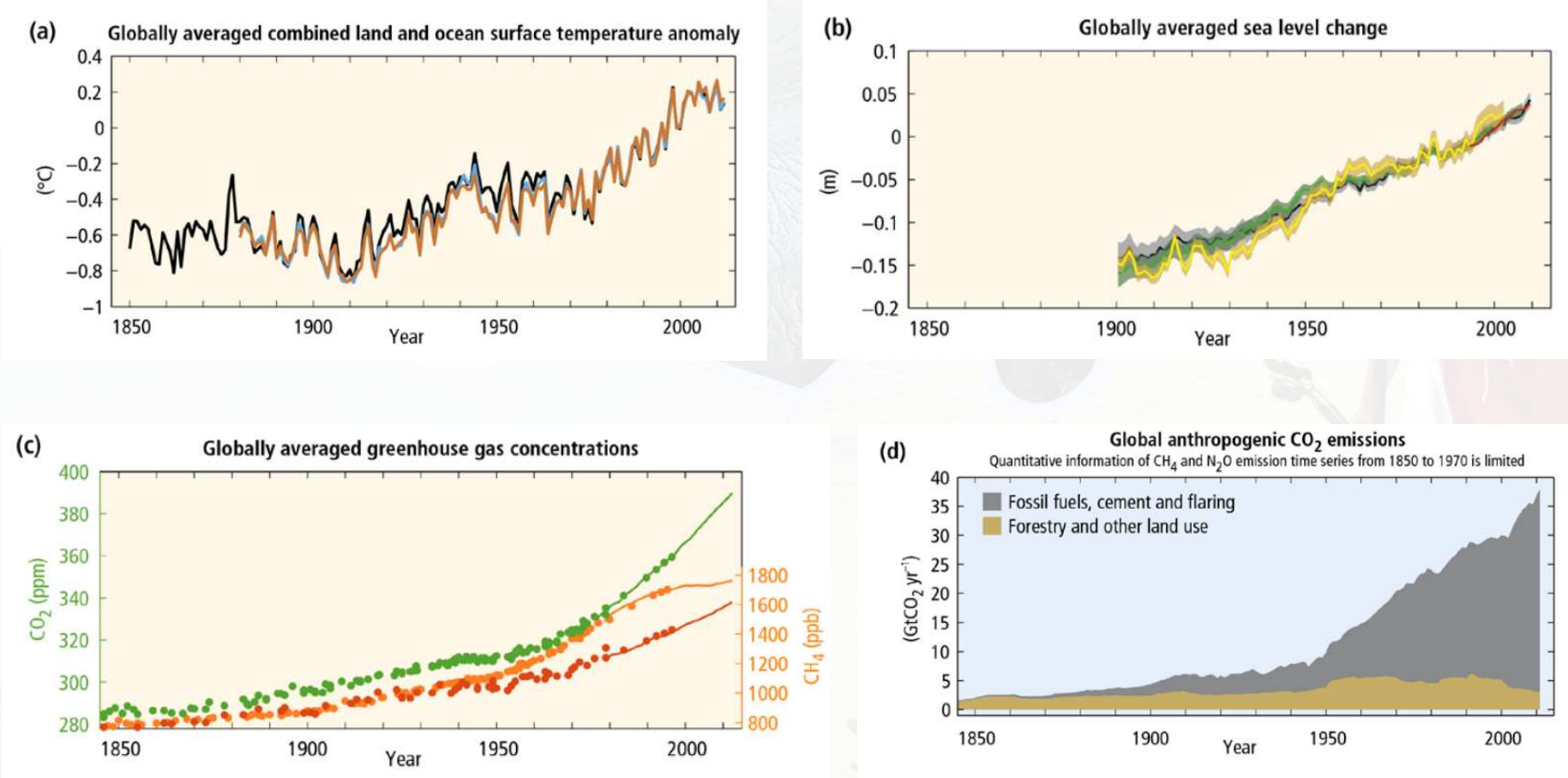
CO_2 (ppm)
CH_4 (ppb)
Year


(d)
Global anthropogenic CO_2 emissions
Quantitative information of CH_4 and N_2O emission time series from 1850 to 1970 is limited
Fossil fuels, cement and flaring
Forestry and other land use
($GtCO_2\ yr^{-1}$)
Year

AR5 SYR SPM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AR5 SYR SPM

Some of the changes in extreme weather and climate events observed since about 1950 have been linked to human influence

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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

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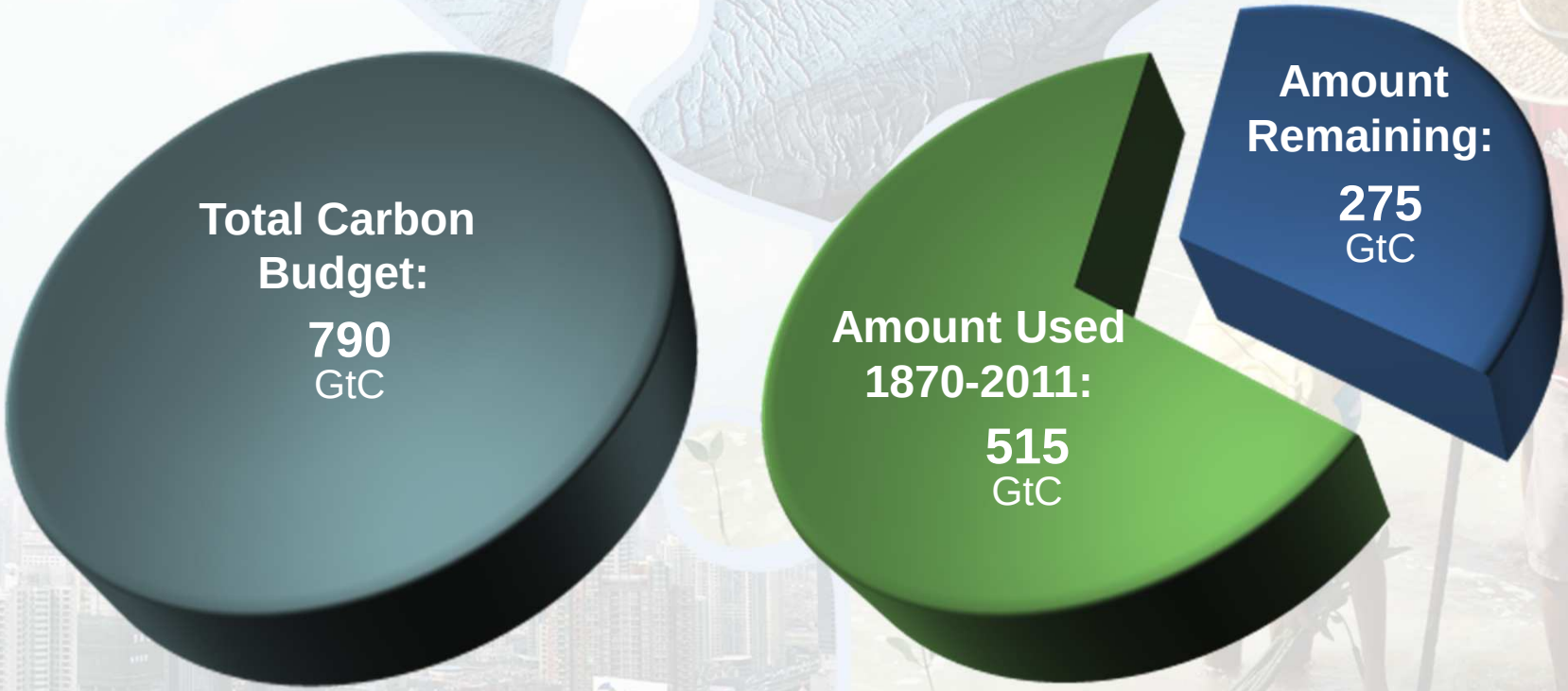
Potential Impacts of Climate Change

- Food and water shortages
- Increased displacement of people
- Increased poverty
- Coastal flooding

AR5 WGII SPM

The window for action is rapidly closing

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



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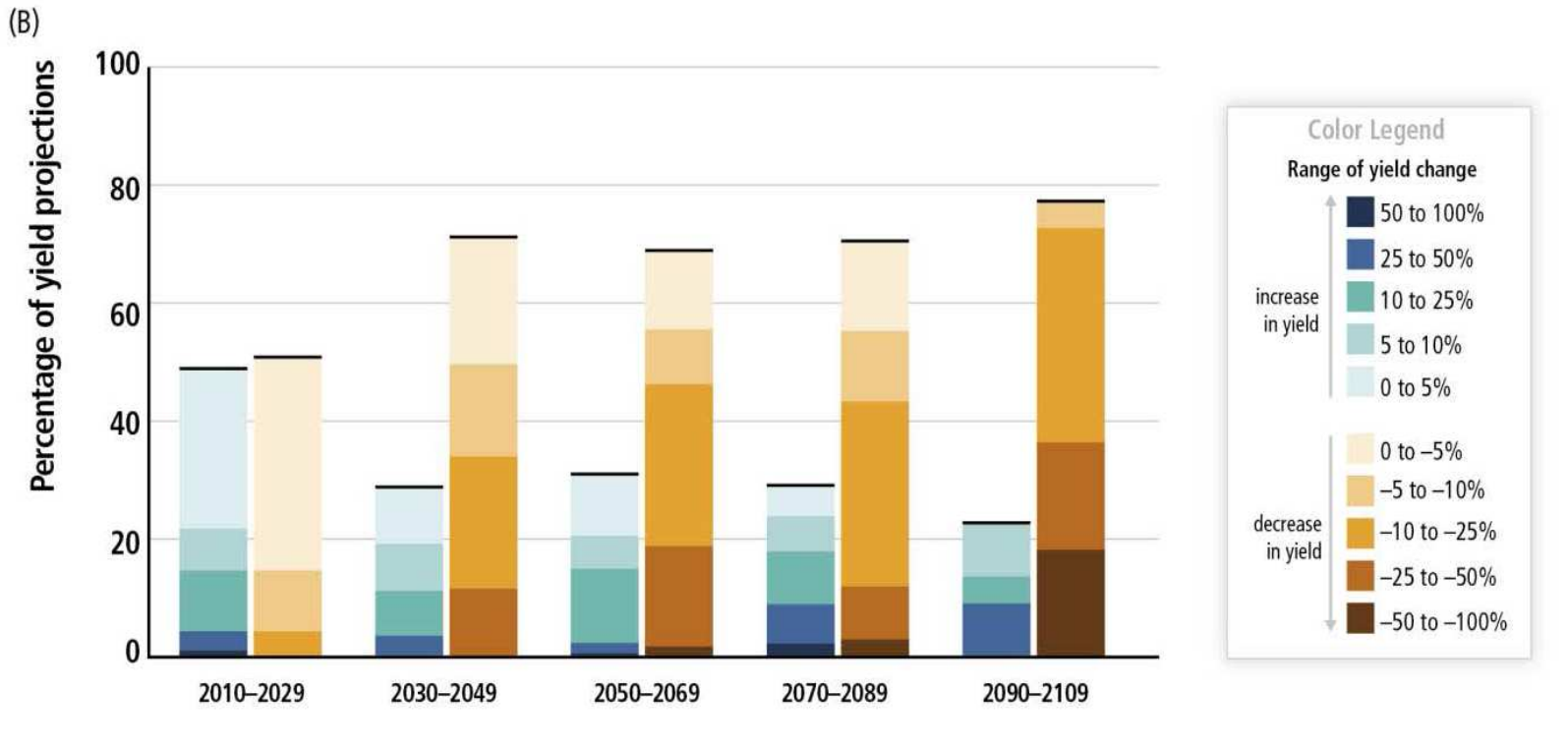
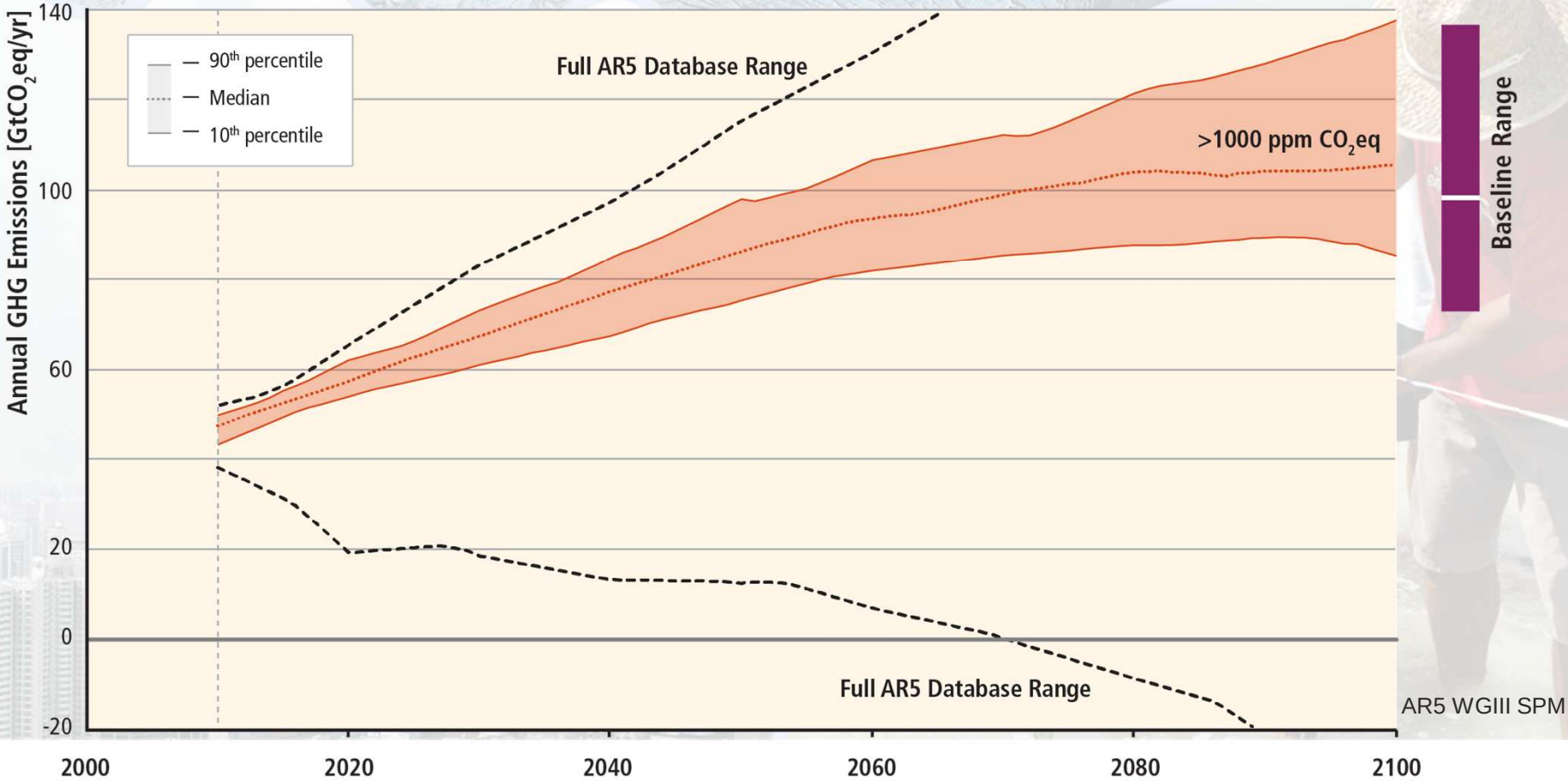
Climate Change Poses Risk for Food Production

Percentage of yield projections



AR5 SYR SPM

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



AR5 WGIII SPM

Based on Figure 6.7

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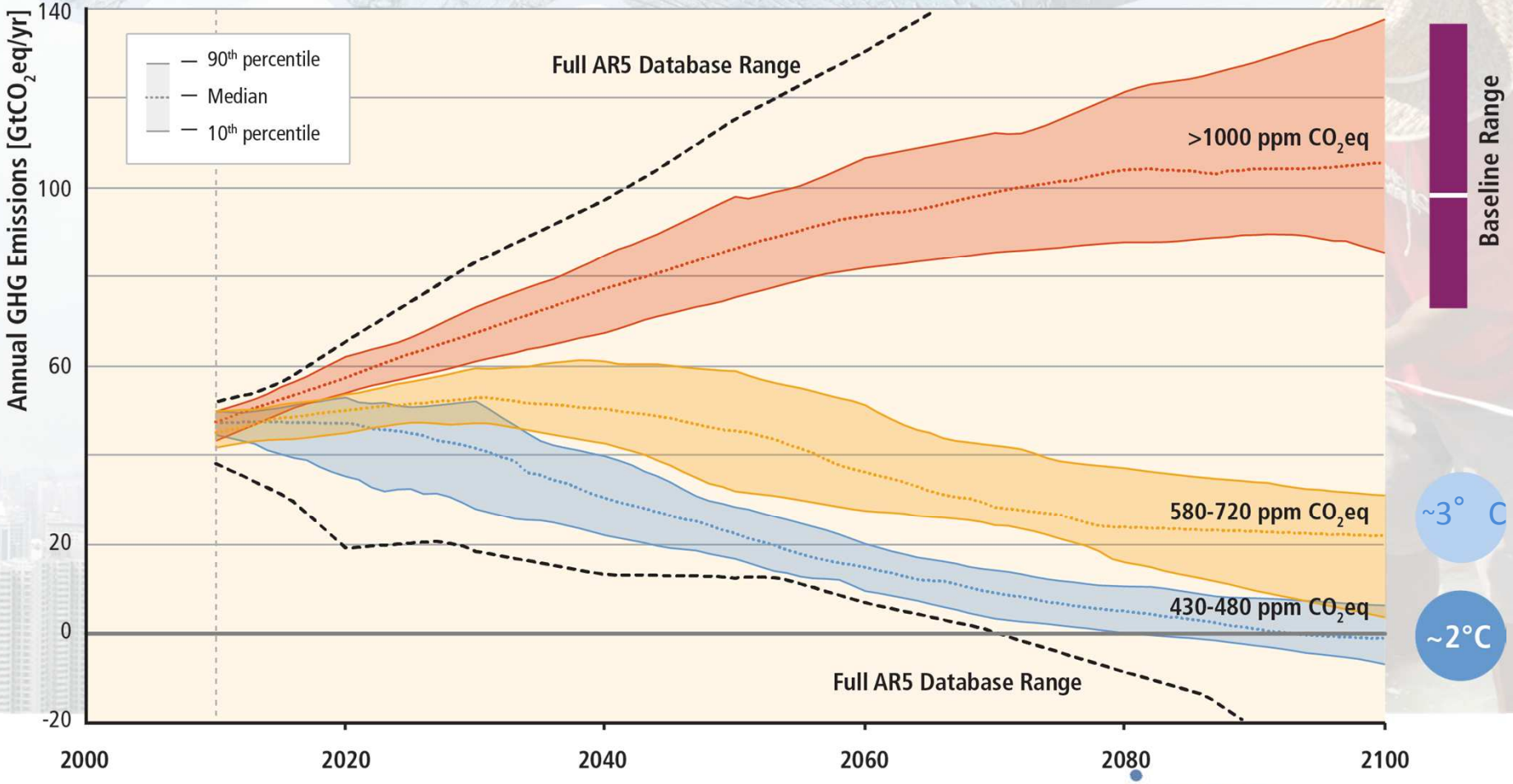

Based on Figure 6.7

AR5 WGIII SPM

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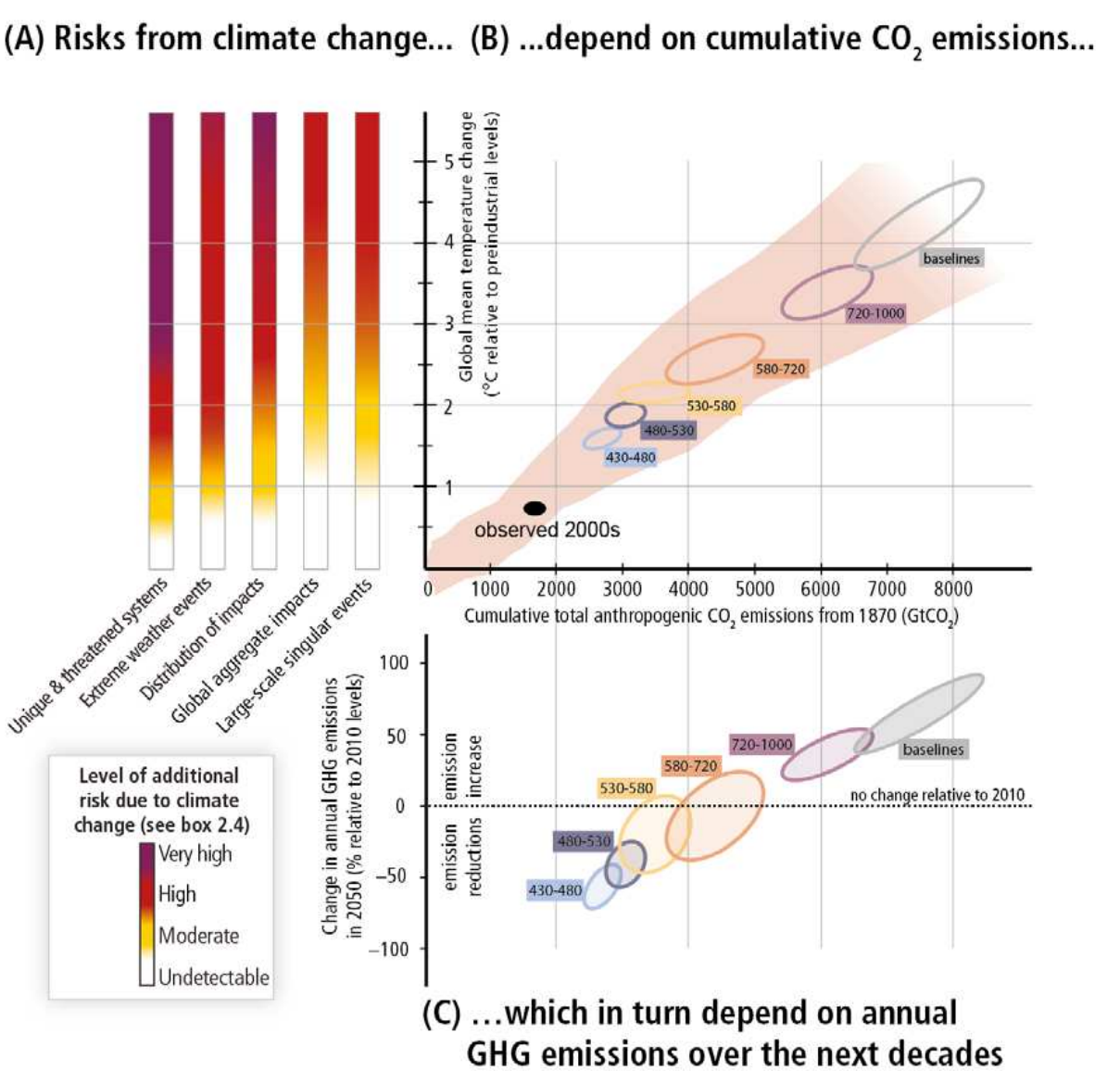
INTERGOVERNMENTAL PANEL ON climate change

Figure SPM.10, A reader's guide

From climate change risks to GHG emissionse



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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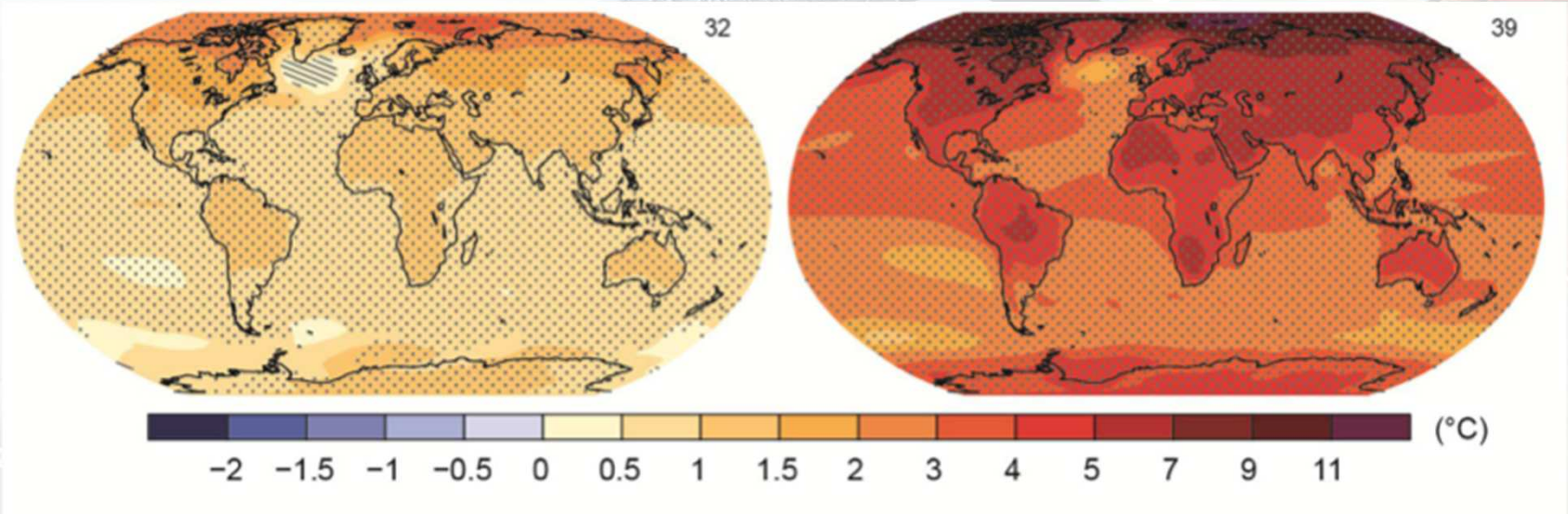
The Choices We Make Will Create Different Outcomes

With substantial mitigation

Without additional mitigation



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

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