



IPCC Fifth Assessment Report Synthesis Report

IPCC AR5 Synthesis Report

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INTERGOVERNMENTAL PANEL ON climate change



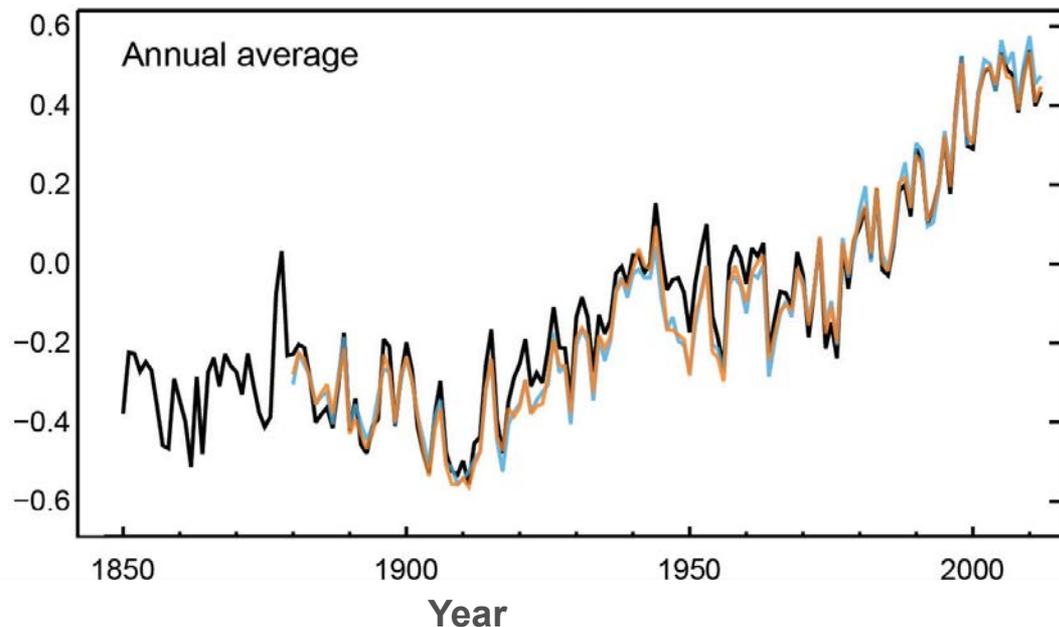
Key Messages

- 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

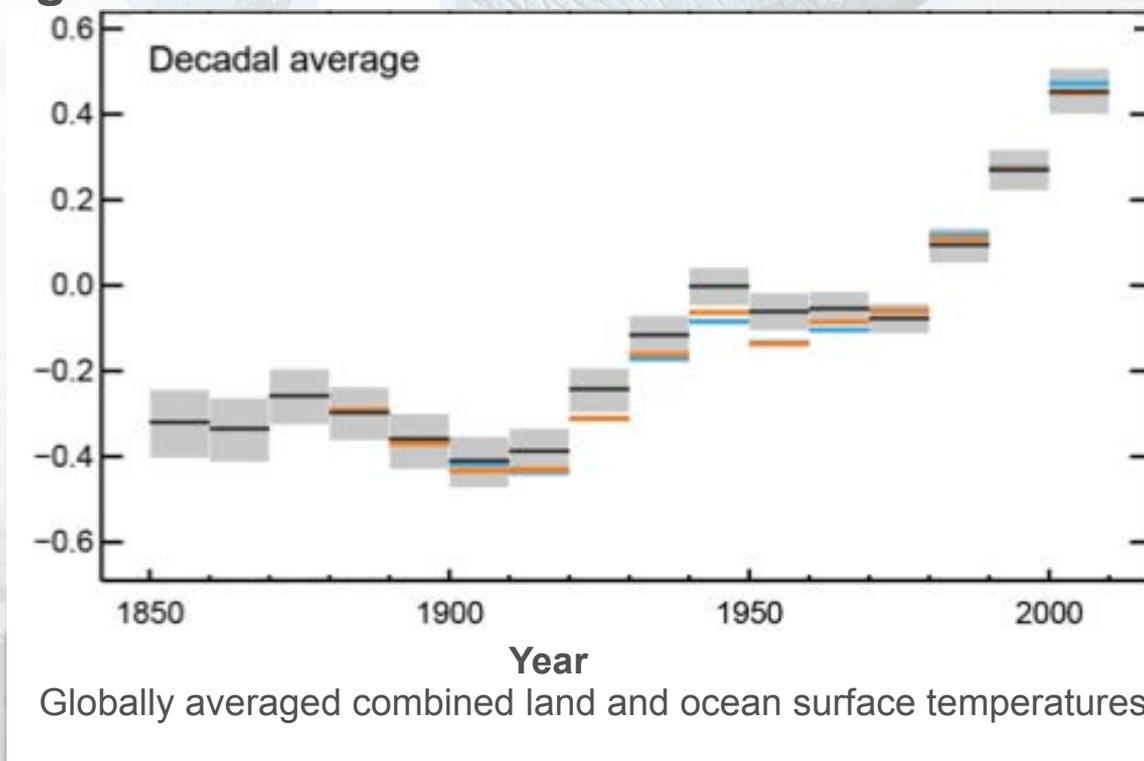


Globally averaged combined land and ocean surface temperatures

AR5 WGI SPM

Temperatures continue to rise

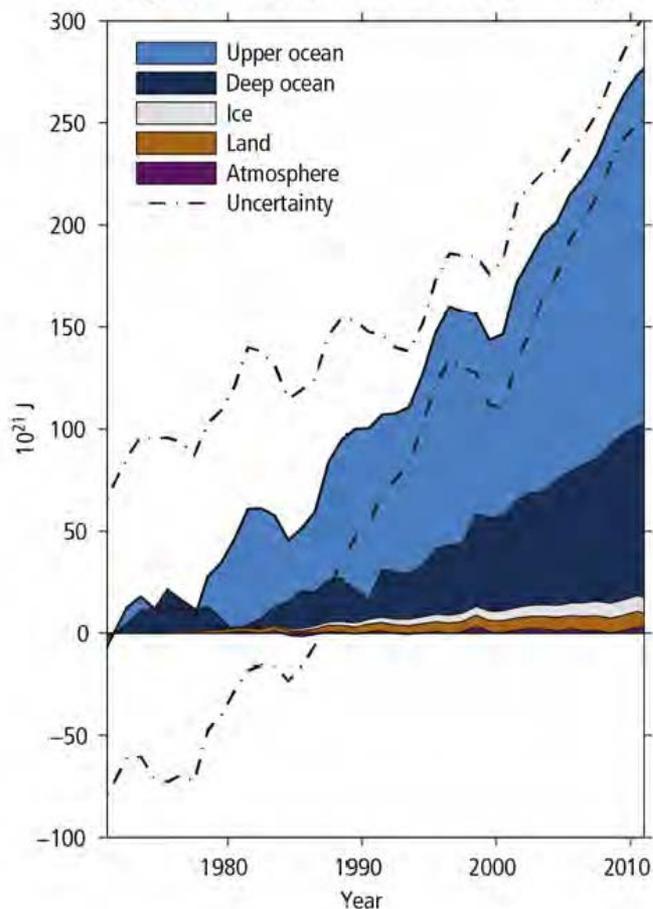
Each of the past 3 decades has been successively warmer than the preceding decades since 1850



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Oceans absorb most of the heat

Energy accumulation within the Earth's climate system



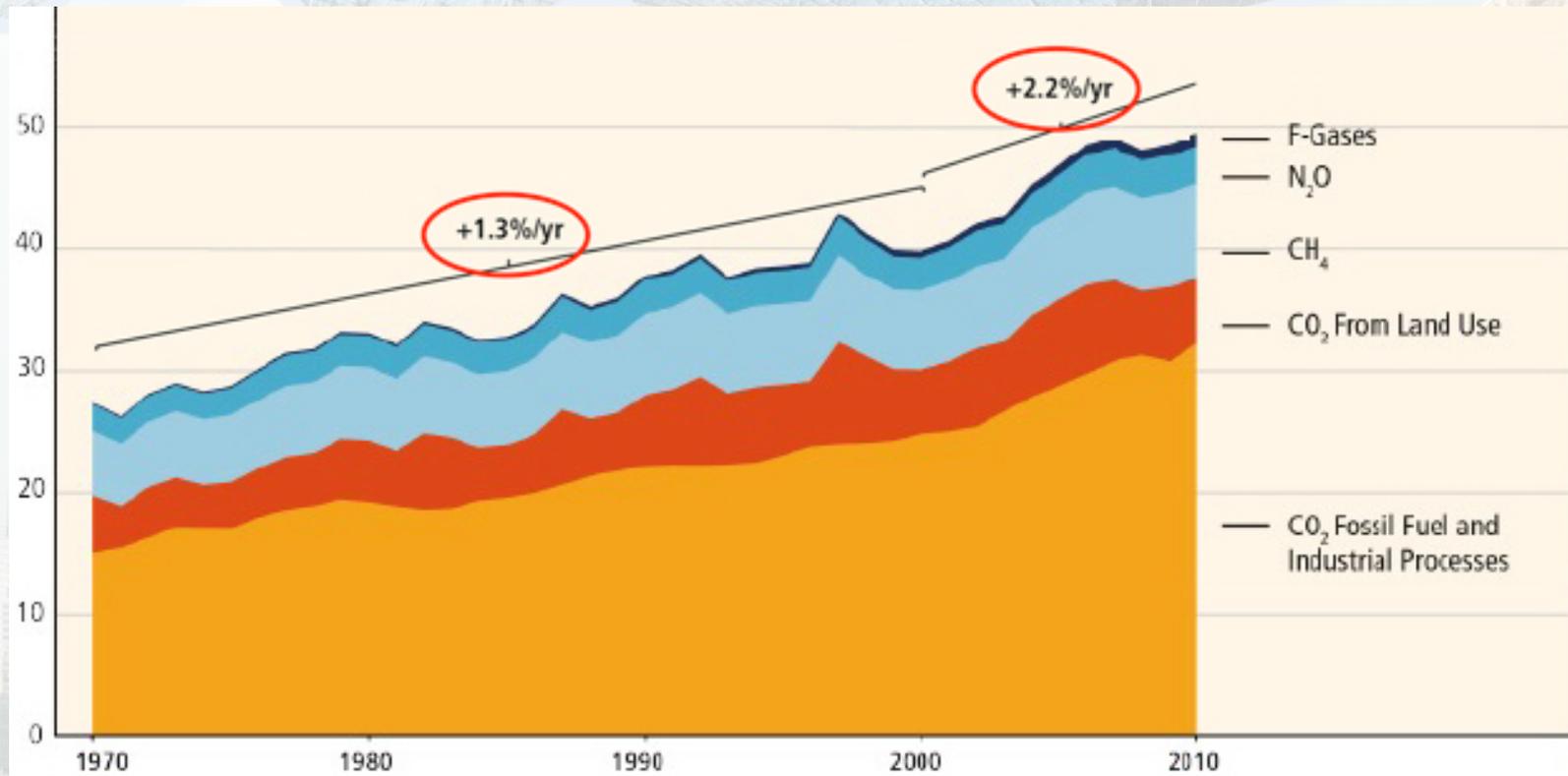
→ More than 90% of the energy accumulating in the climate system between 1971 and 2010 has accumulated in the ocean

→ 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

GHG Emissions [GtCO₂ eq/yr]



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Sources of emissions

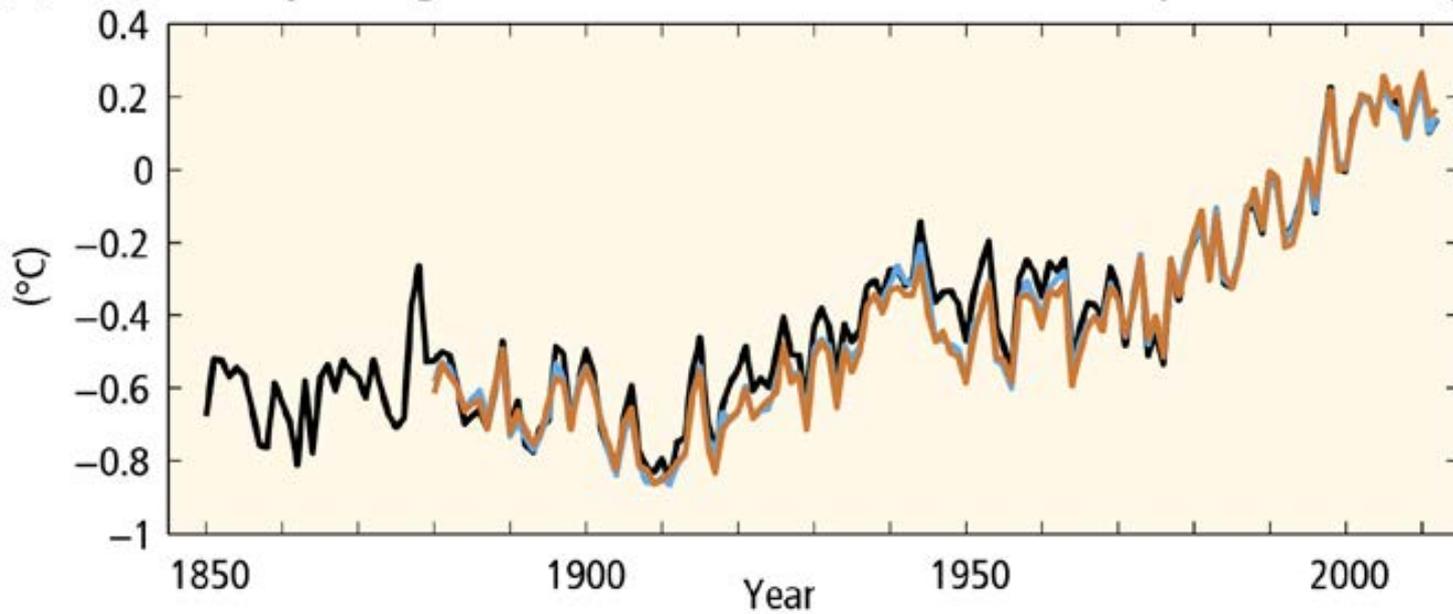
Energy production remains the primary driver of GHG emissions



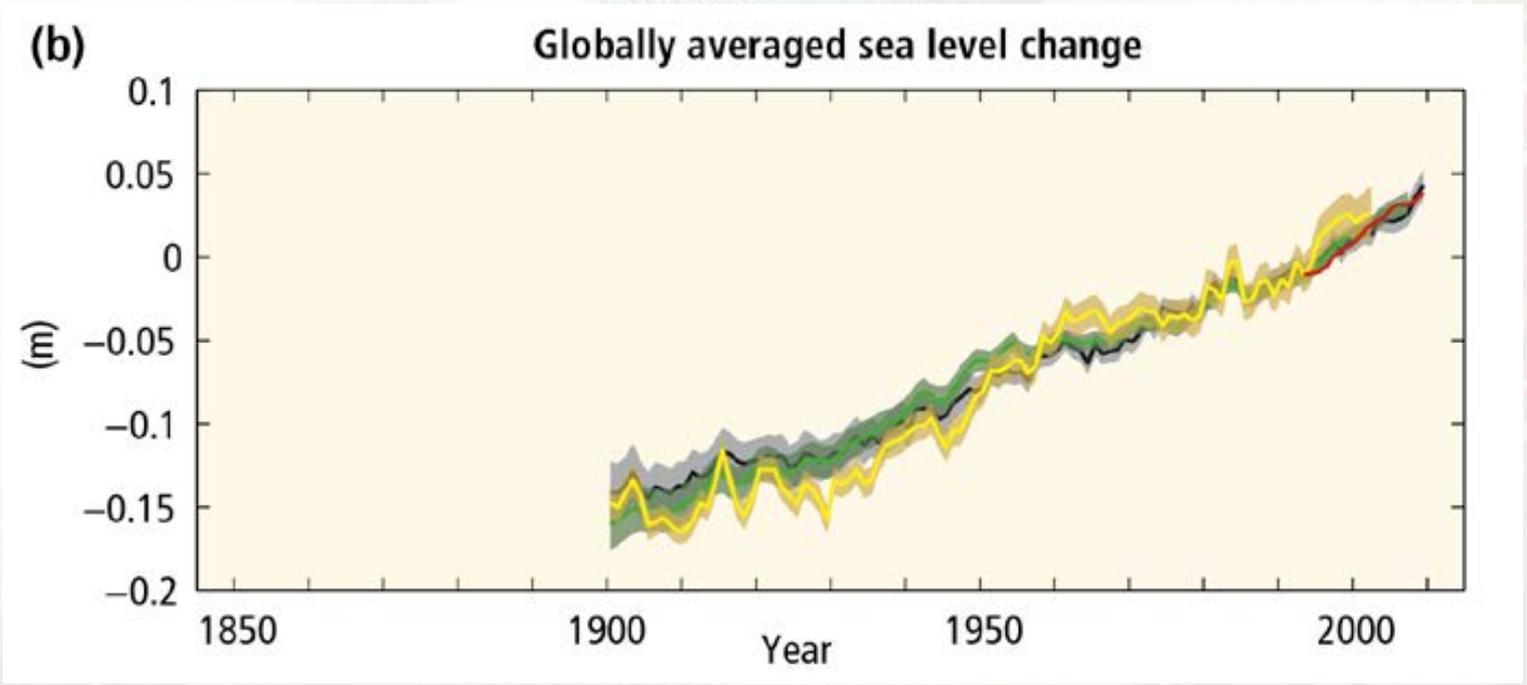
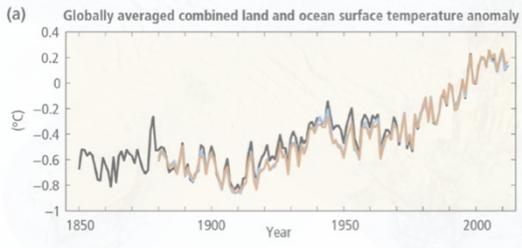
2010 GHG emissions

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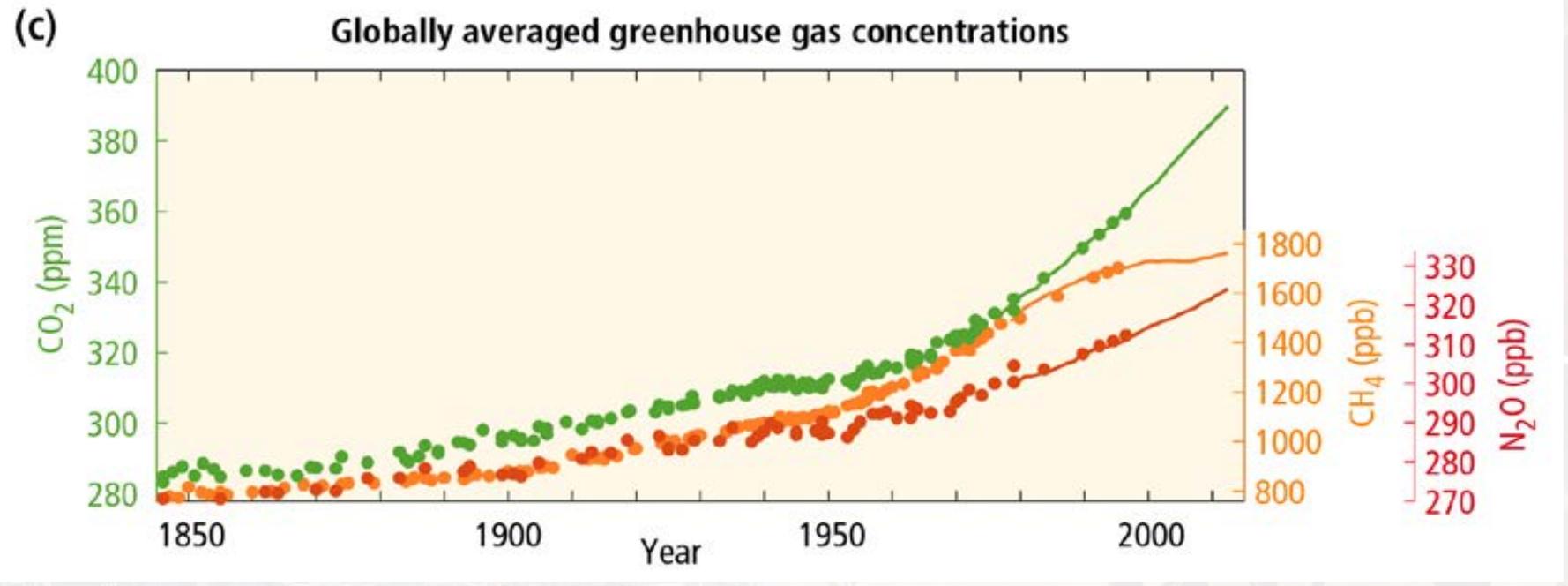
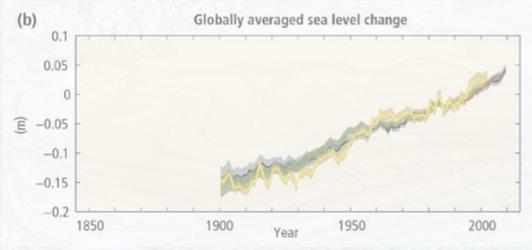
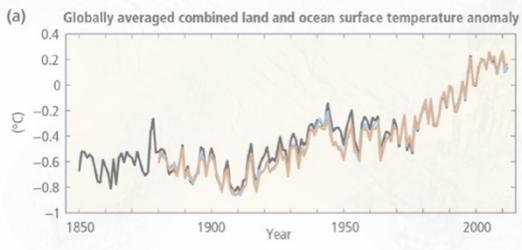
(a) Globally averaged combined land and ocean surface temperature anomaly



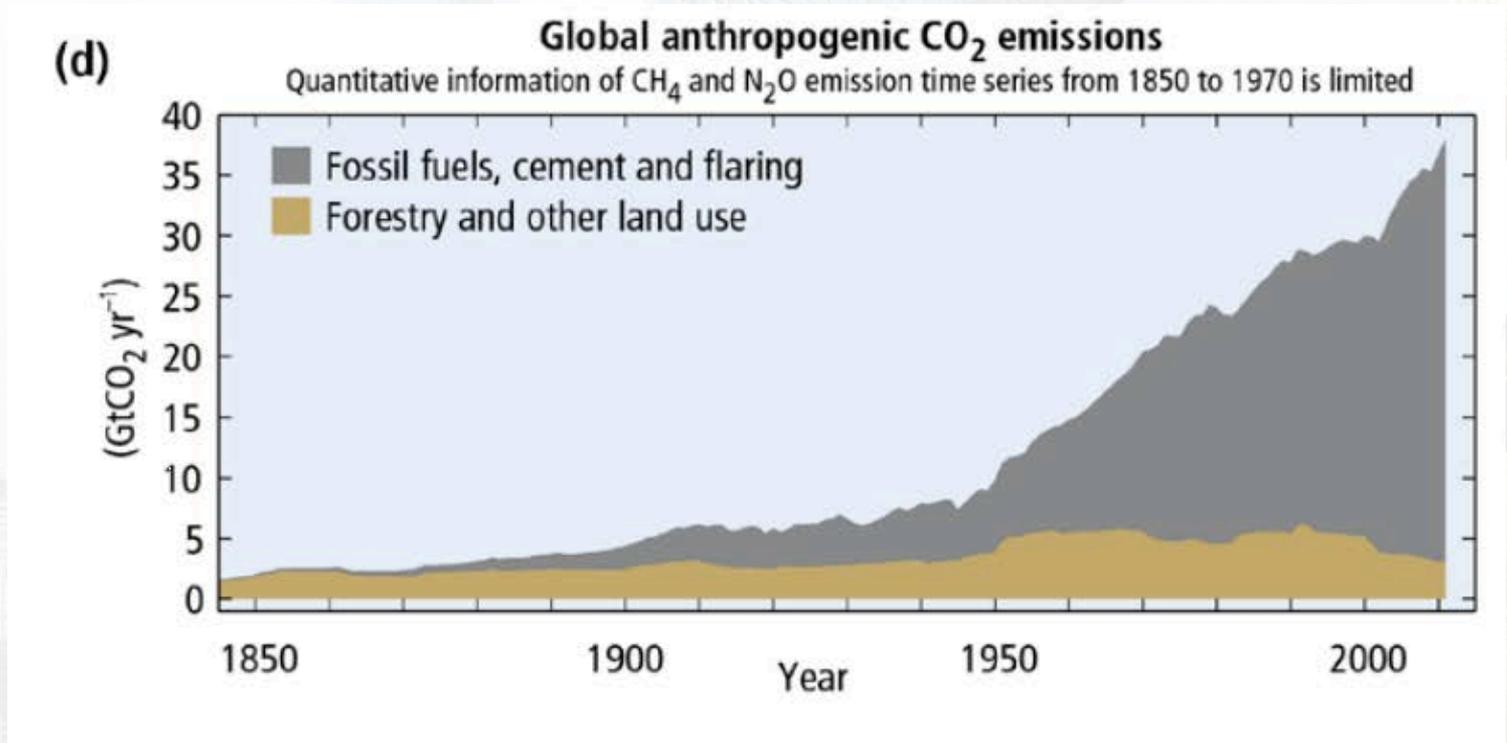
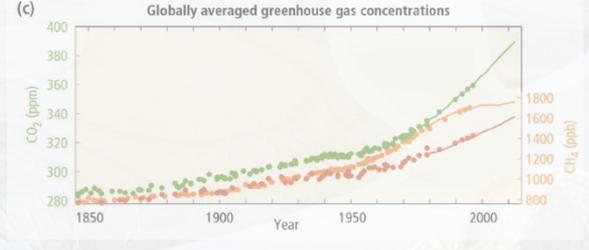
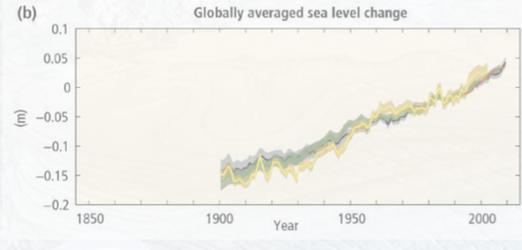
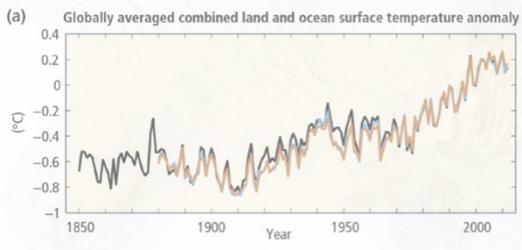
AR5 SYR SPM



AR5 SYR SPM

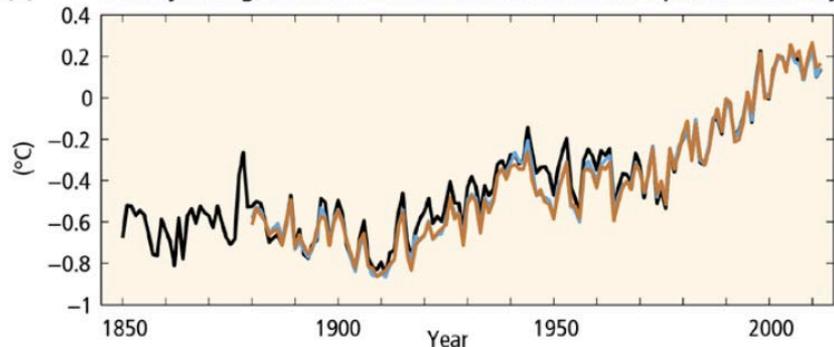


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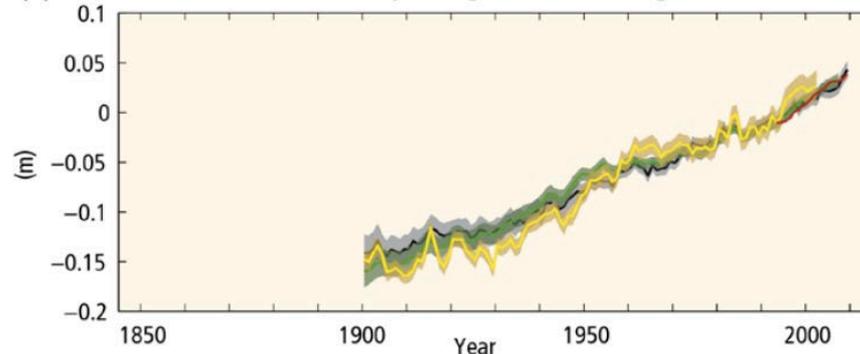


AR5 SYR SPM

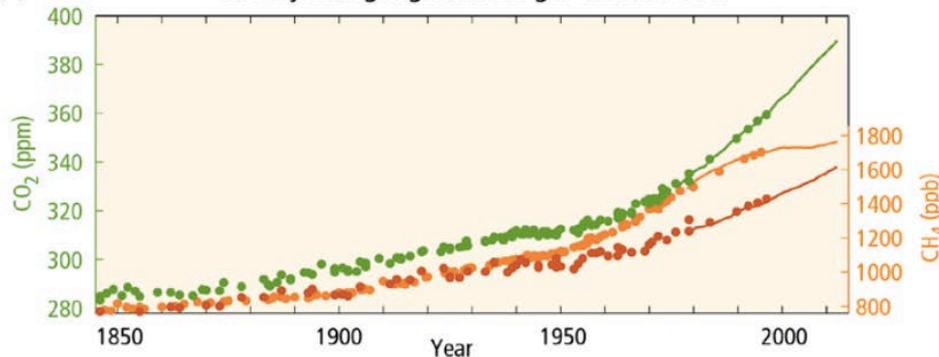
(a) Globally averaged combined land and ocean surface temperature anomaly



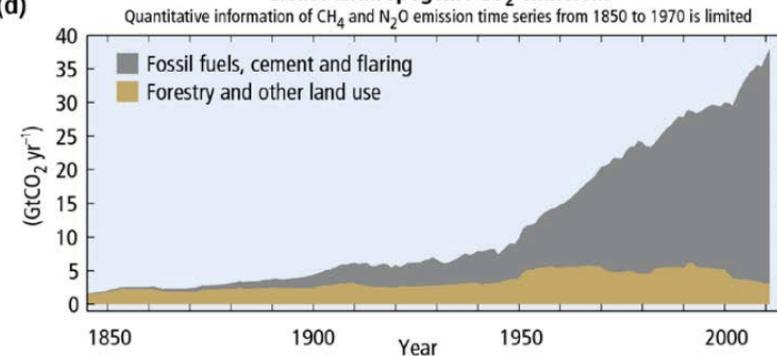
(b) Globally averaged sea level change



(c) Globally averaged greenhouse gas concentrations



(d) Global anthropogenic CO₂ emissions



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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**



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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



Food and water shortages



Increased displacement of people



Increased poverty

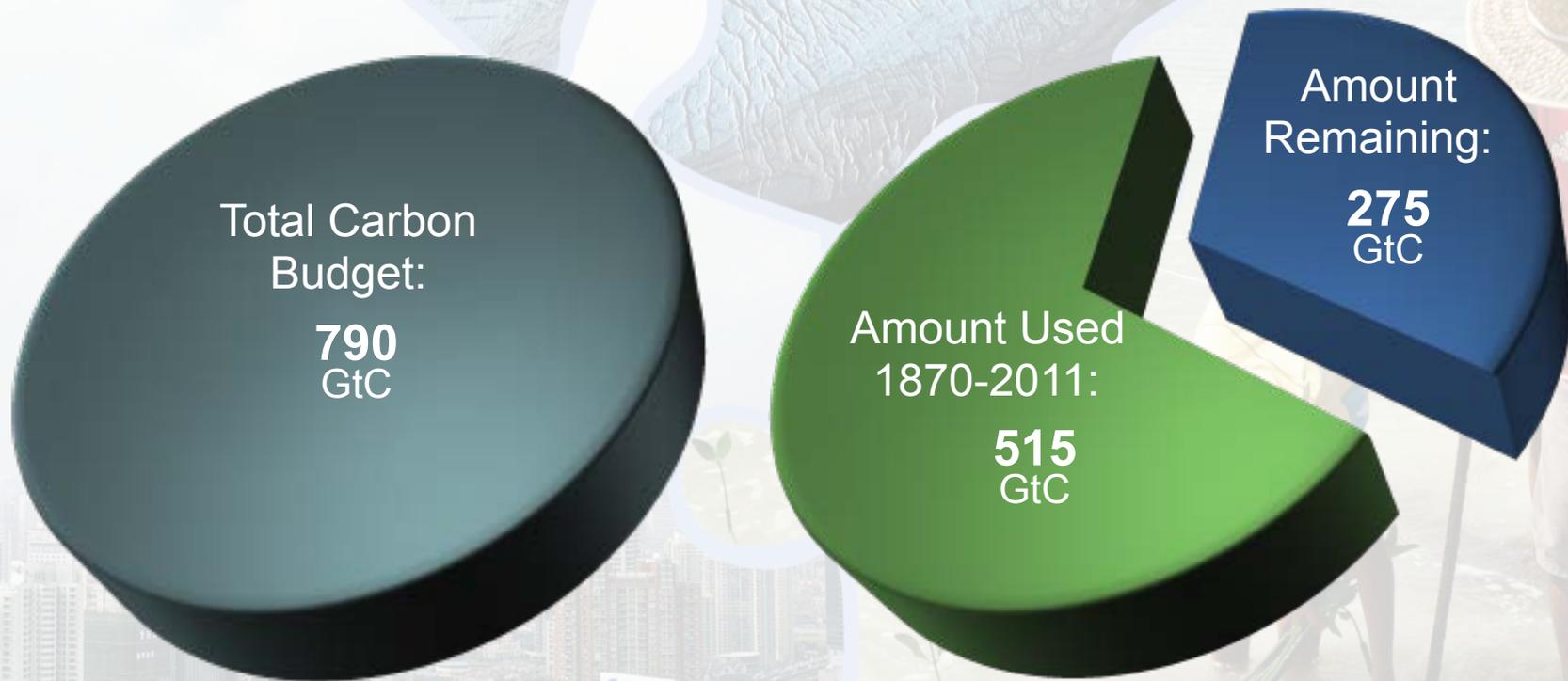


Coastal flooding

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The window for action is rapidly closing

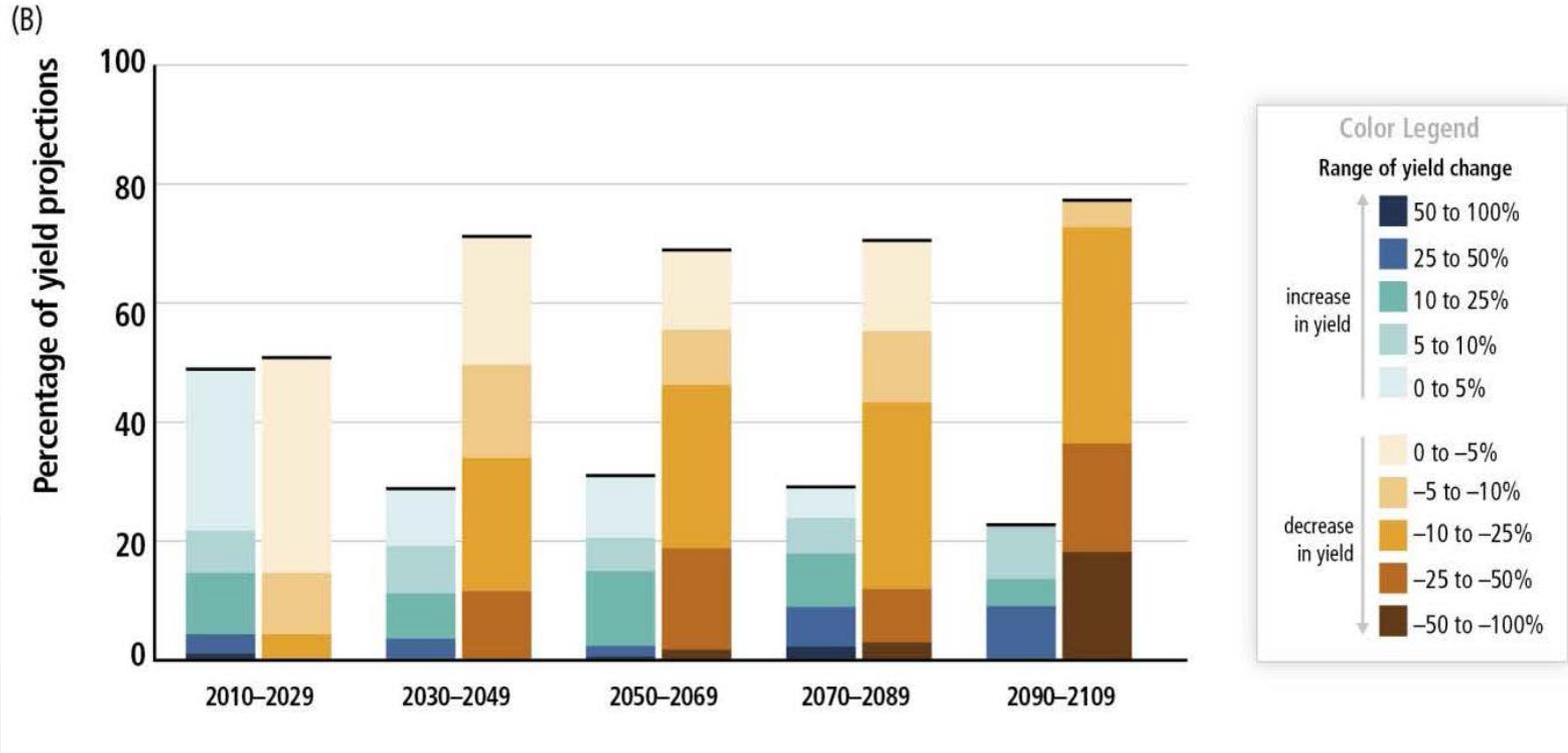
65% of our carbon budget compatible with a 2°C goal already used



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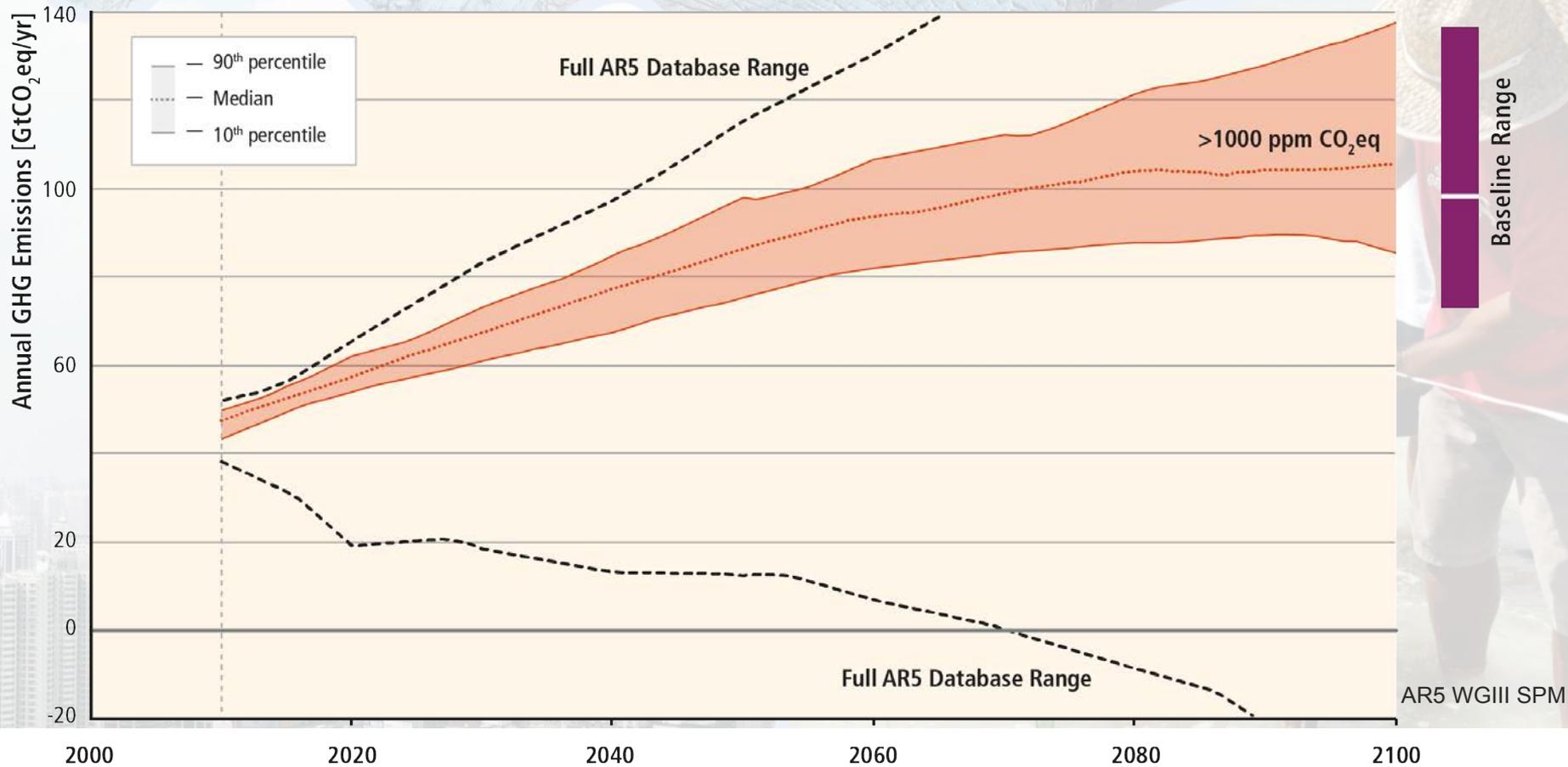
Climate Change Poses Risk for Food Production

Percentage of yield projections



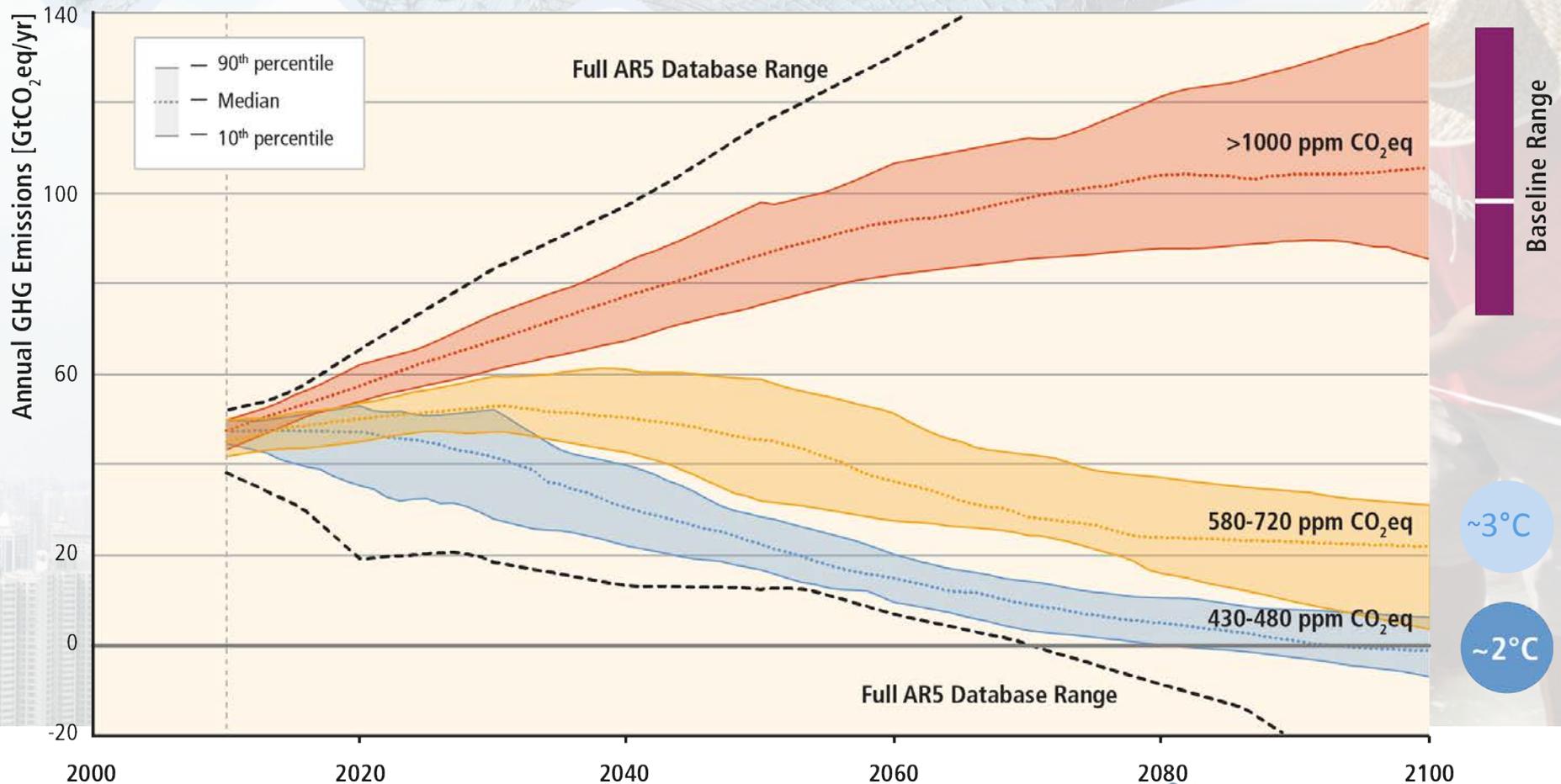
AR5 SYR SPM

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



Based on Figure 6.7

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

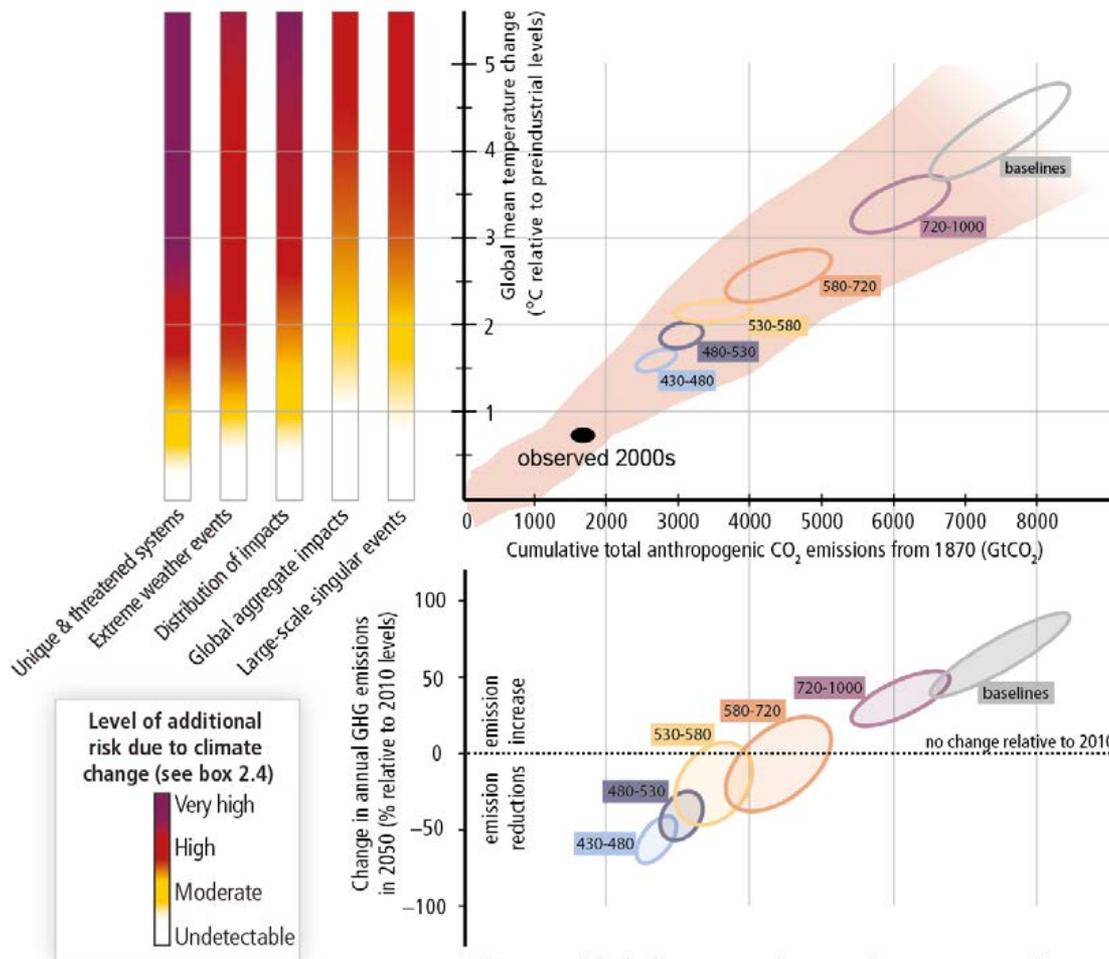


Based on Figure 6.7

Figure SPM.10,
A reader's guide

From climate change
risks to GHG
emissions

(A) Risks from climate change... (B) ...depend on cumulative CO₂ emissions...



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

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Ambitious Mitigation Is Affordable

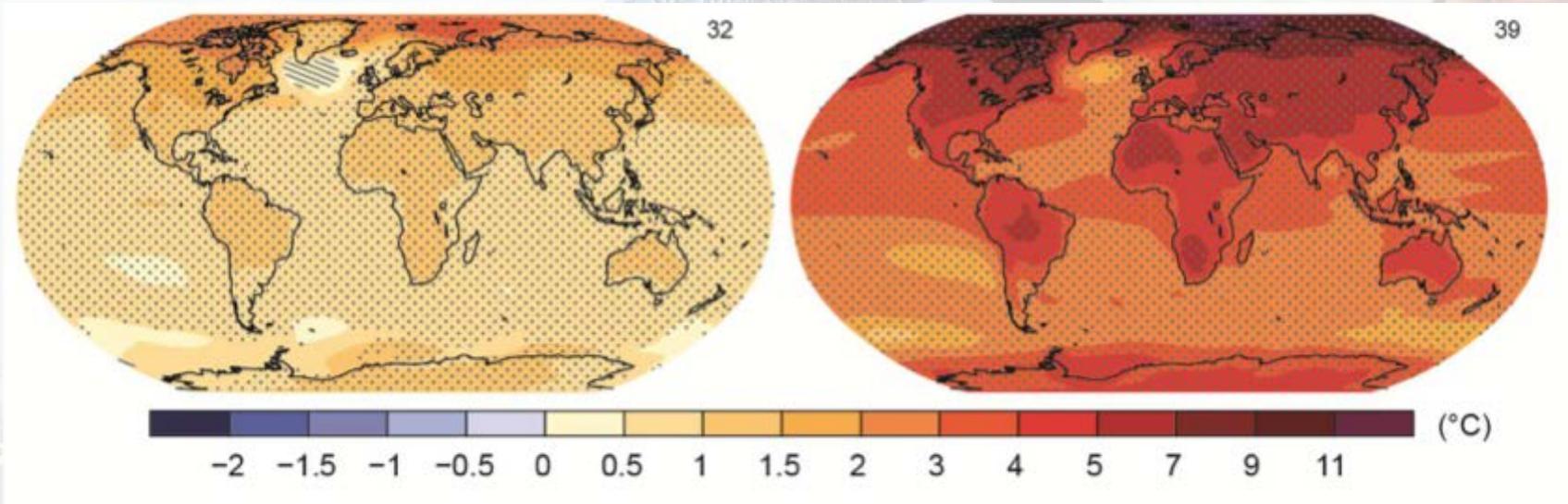
- Economic growth reduced by $\sim 0.06\%$ (BAU growth 1.6 - 3%)
- This translates into delayed and not forgone growth
- Estimated cost does not account for the benefits of reduced climate change
- Unmitigated climate change would create increasing risks to economic growth

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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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Synthesis Report