Key messages of the IPCC AR5

Messages clés du 5ème rapport du GIEC

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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**
- ➜ **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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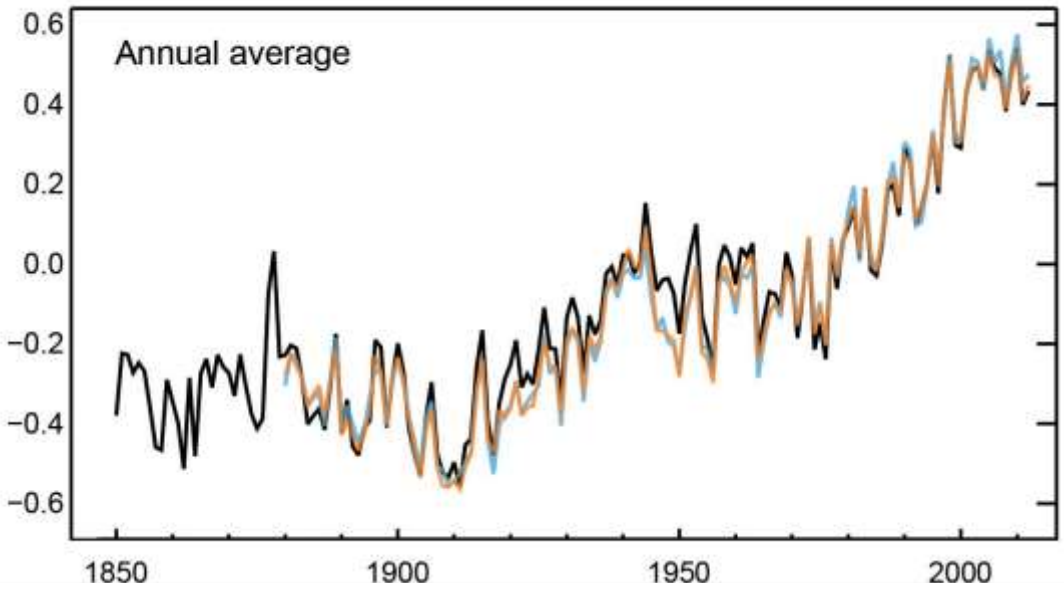
Humans are changing the climate

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

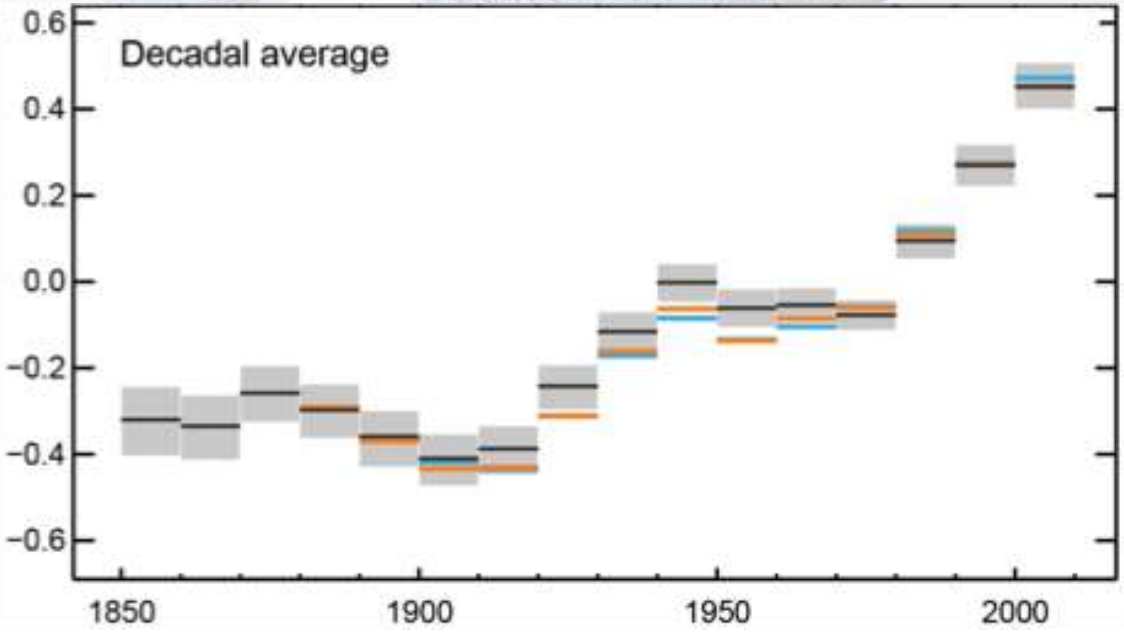


Globally averaged combined land and ocean surface temperatures

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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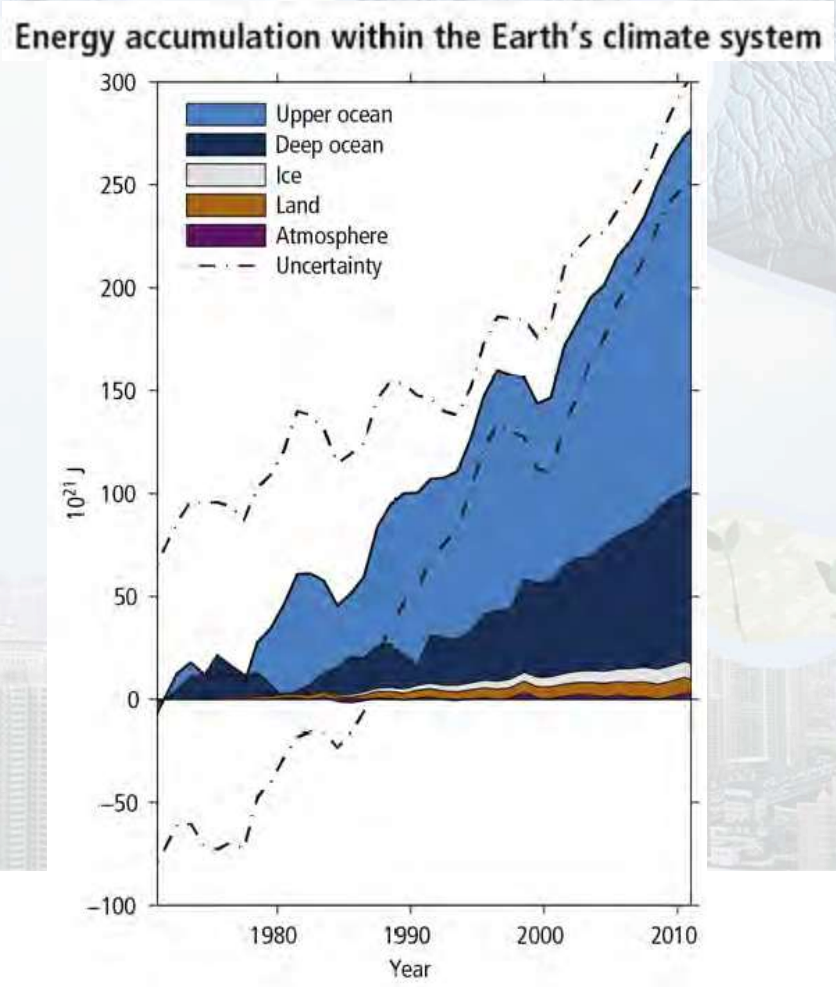
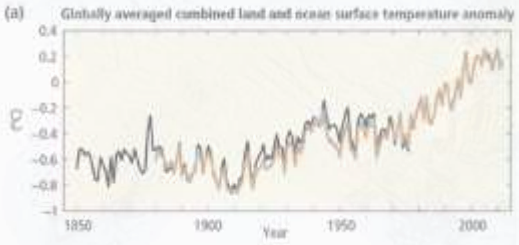
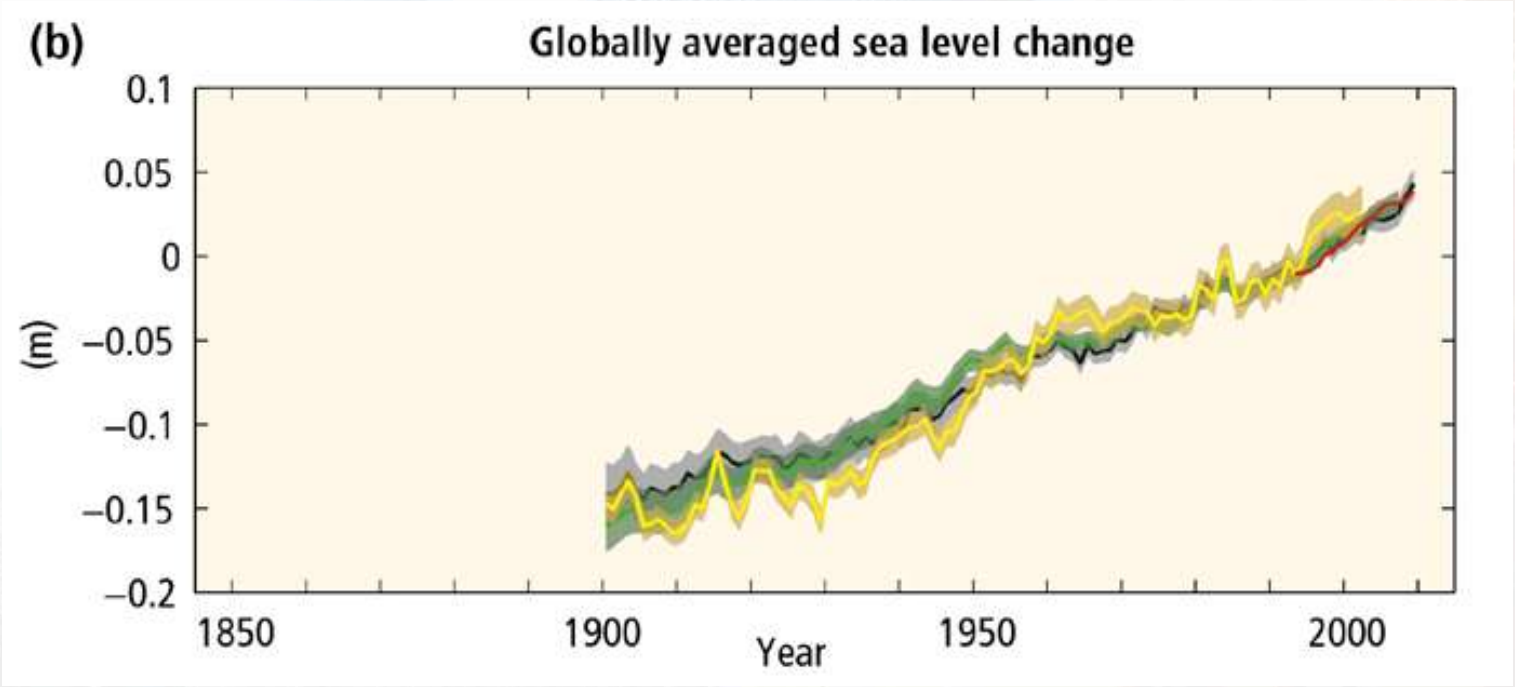
Oceans absorb most of the heat



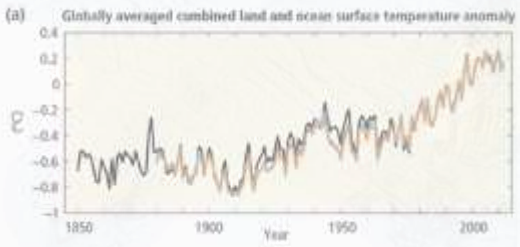
➜ **More than 90% of the energy accumulating in the climate system between 1971 and 2010 has accumulated in the ocean**

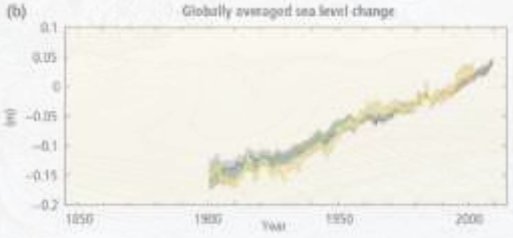
AR5 SYR

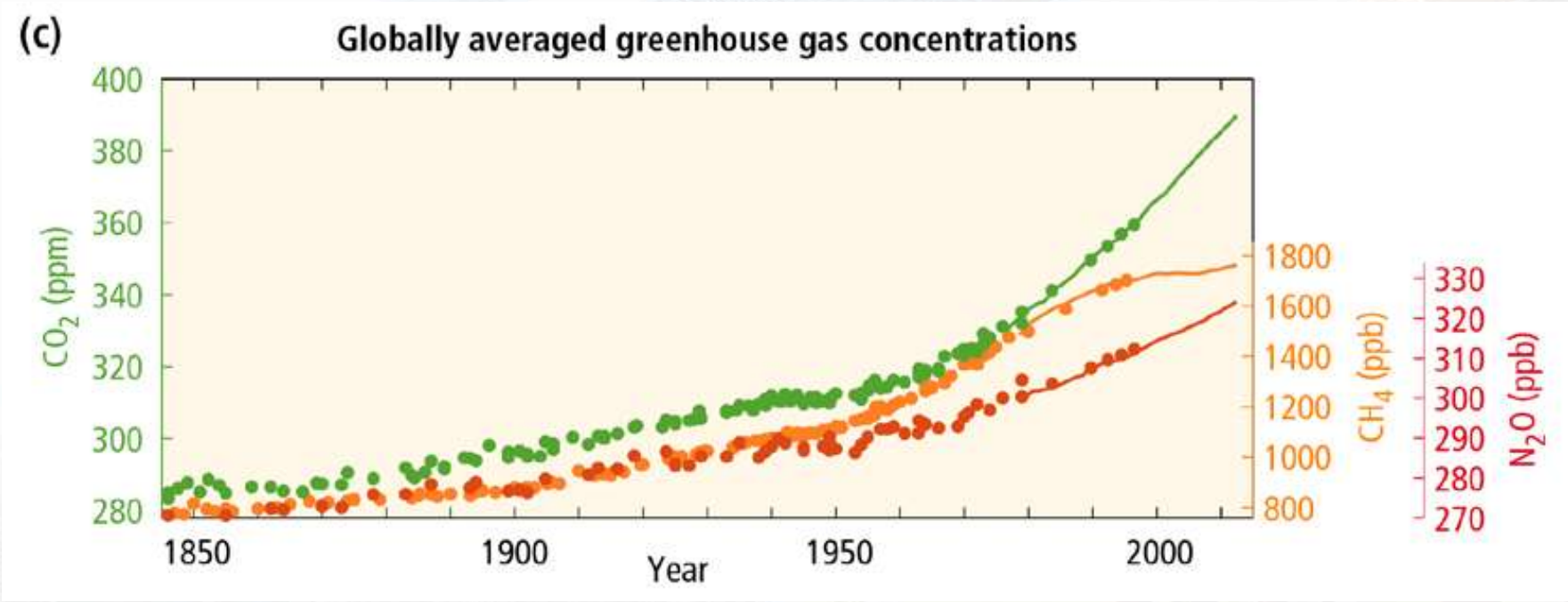

(a)
Globally averaged combined land and ocean surface temperature anomaly
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
°C
1850
1900
Year
1950
2000


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

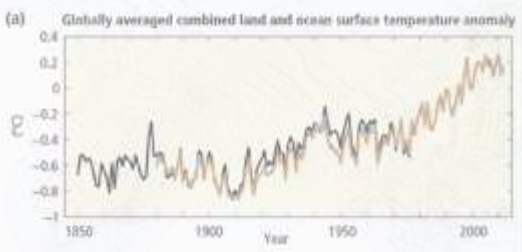
AR5 SYR SPM

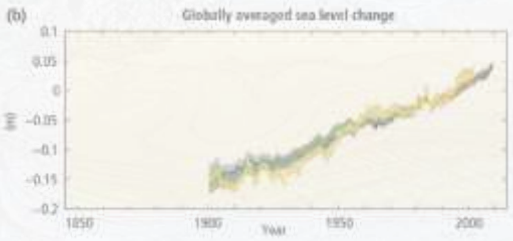

(a)
Globally averaged combined land and ocean surface temperature anomaly
°C
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
1850
1900
Year
1950
2000

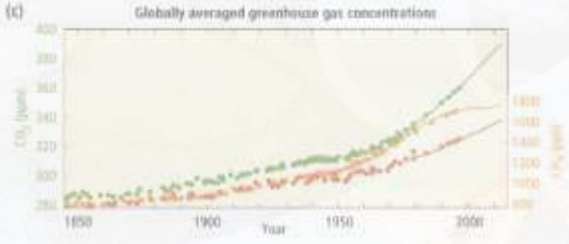

(b)
Globally averaged sea level change
(m)
0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
1850
1900
Year
1950
2000

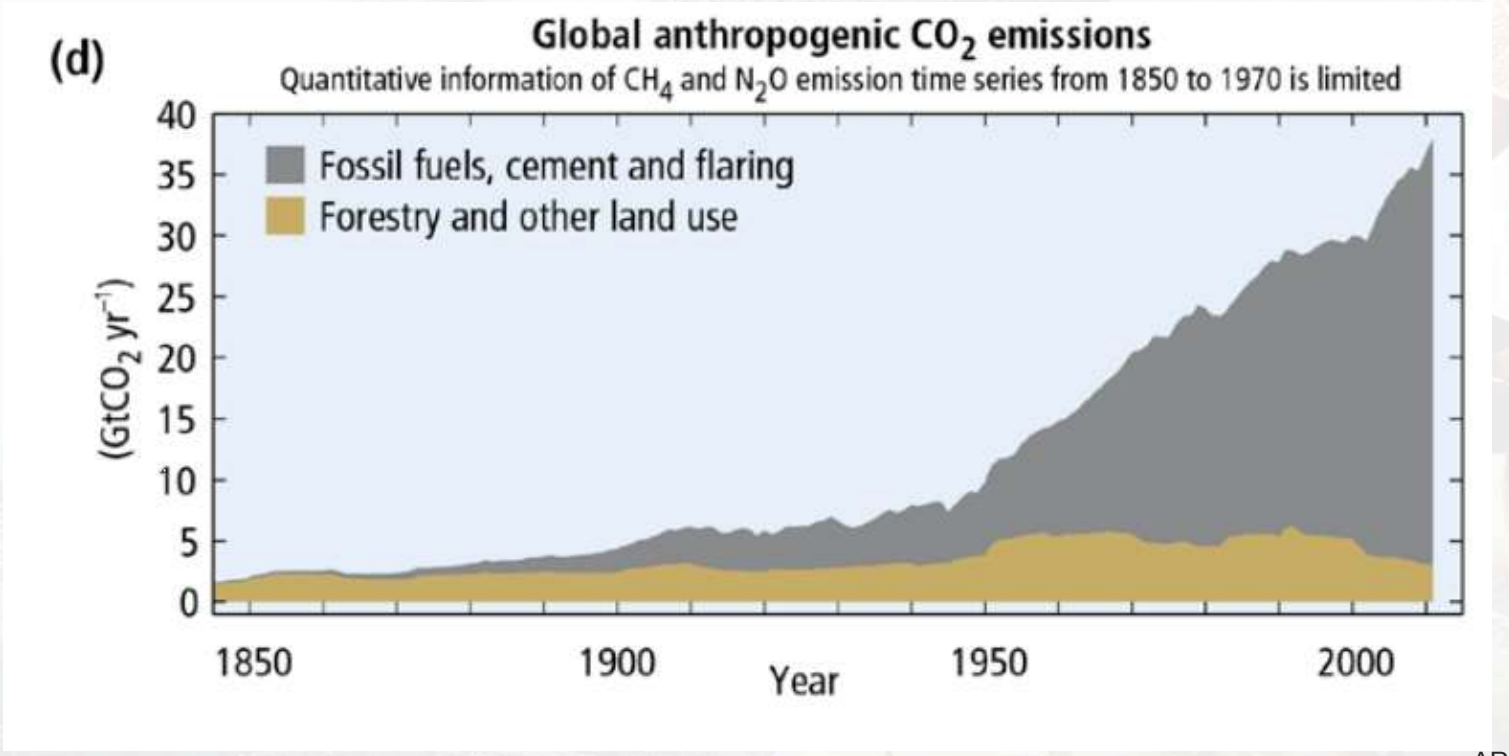

(c)
Globally averaged greenhouse gas concentrations
CO_2 (ppm)
400
380
360
340
320
300
280
CH_4 (ppb)
1800
1600
1400
1200
1000
800
N_2O (ppb)
330
320
310
300
290
280
270
1850
1900
Year
1950
2000

AR5 SYR SPM


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


(b)
Globally averaged sea level change
Year


(c)
Globally averaged greenhouse gas concentrations
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
$(GtCO_2\ yr^{-1})$
40
35
30
25
20
15
10
5
0
1850
1900
1950
2000
Year

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Sources of emissions

Energy production remains the primary driver of GHG emissions

2010 GHG emissions

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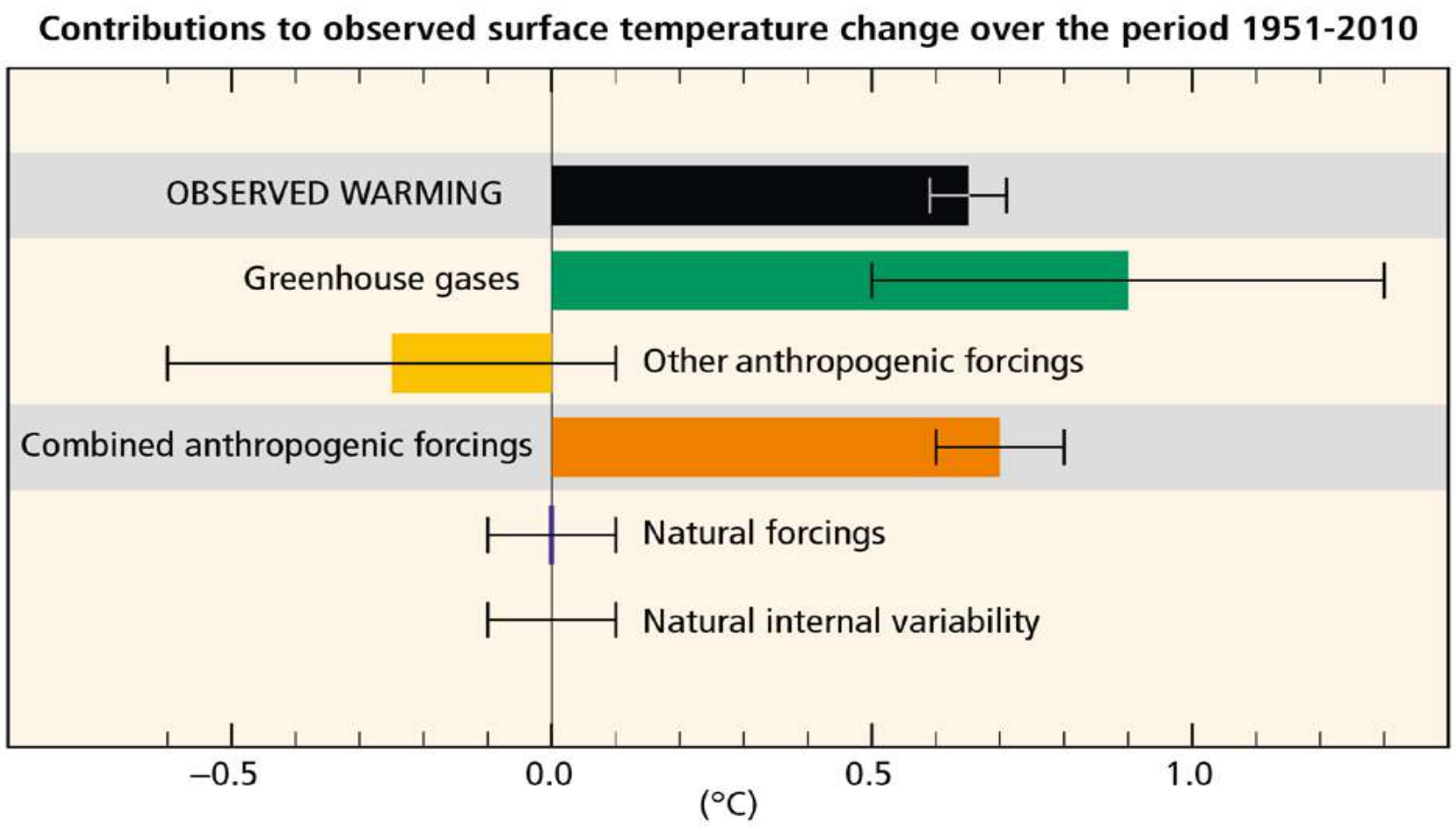
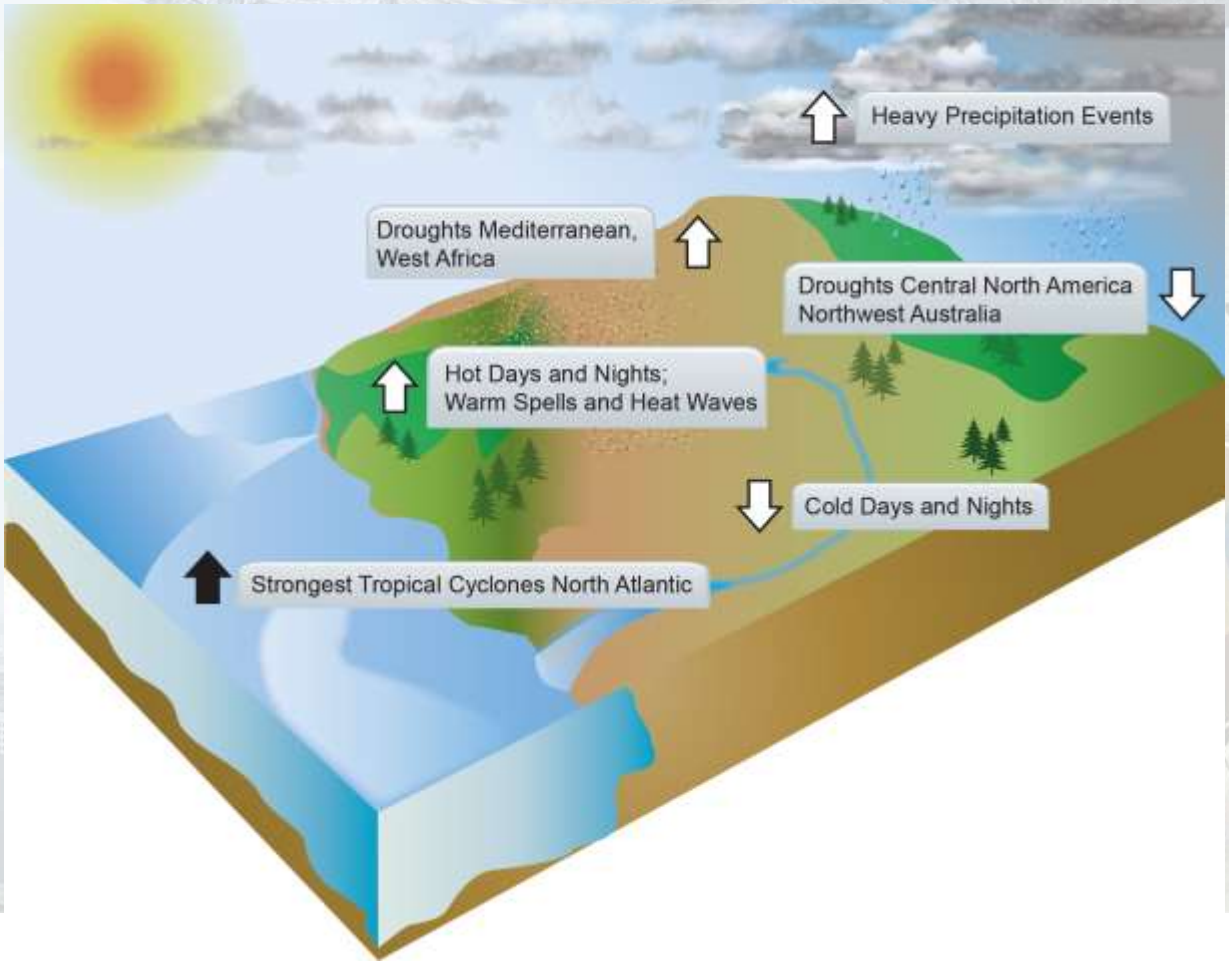
Antropogenic forcings are *extremely likely* the cause of warming



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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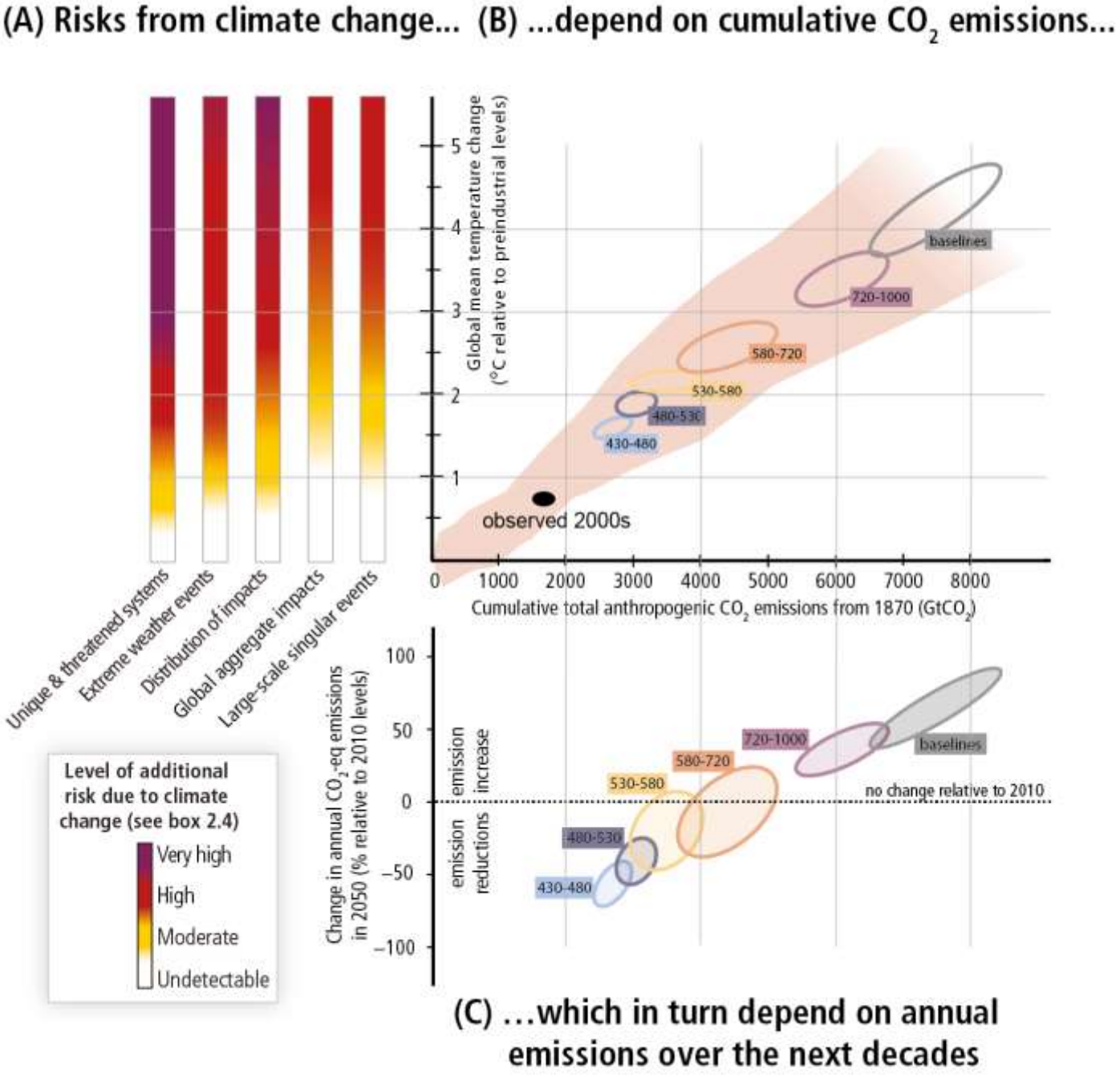
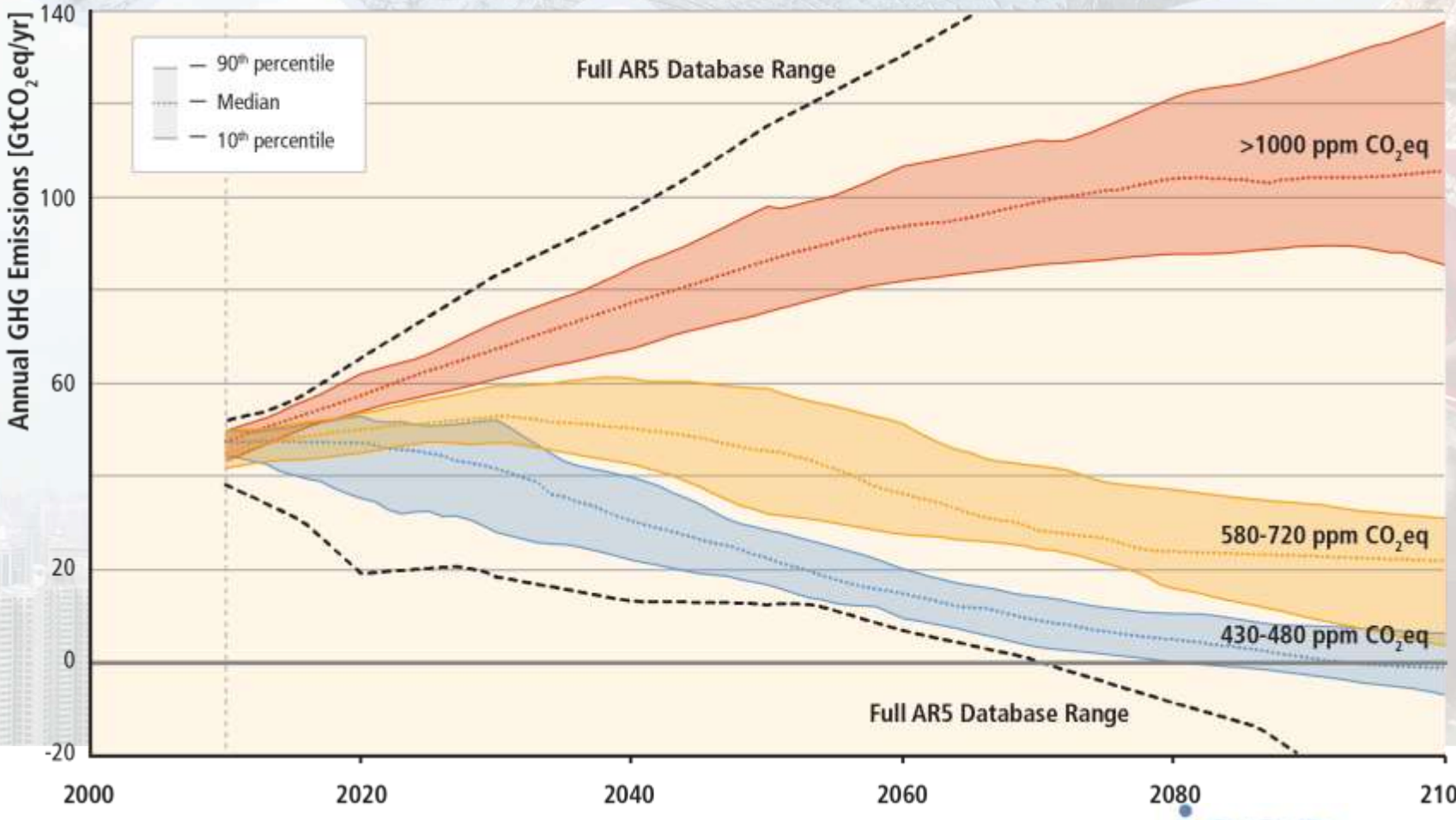

(A) Risks from climate change...
(B) ...depend on cumulative CO_2 emissions...
Unique & threatened systems
Extreme weather events
Distribution of impacts
Global aggregate impacts
Large-scale singular events
Level of additional risk due to climate change (see box 2.4)
Very high
High
Moderate
Undetectable
Global mean temperature change (°C relative to preindustrial levels)
observed 2000s
baselines
720-1000
580-720
530-580
480-530
430-480
Cumulative total anthropogenic CO_2 emissions from 1870 ($GtCO_2$)
Change in annual CO_2-eq emissions in 2050 (% relative to 2010 levels)
emission increase
emission reductions
no change relative to 2010
(C) …which in turn depend on annual emissions over the next decades

Climate stabilization requires moving away from the baseline – regardless of the target



Based on Figure 6.7

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IPCC AR5 Synthesis Report

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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 (40-70% reduction in GHGs globally by 2050 and near zero GHGs in 2100)

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 ~ 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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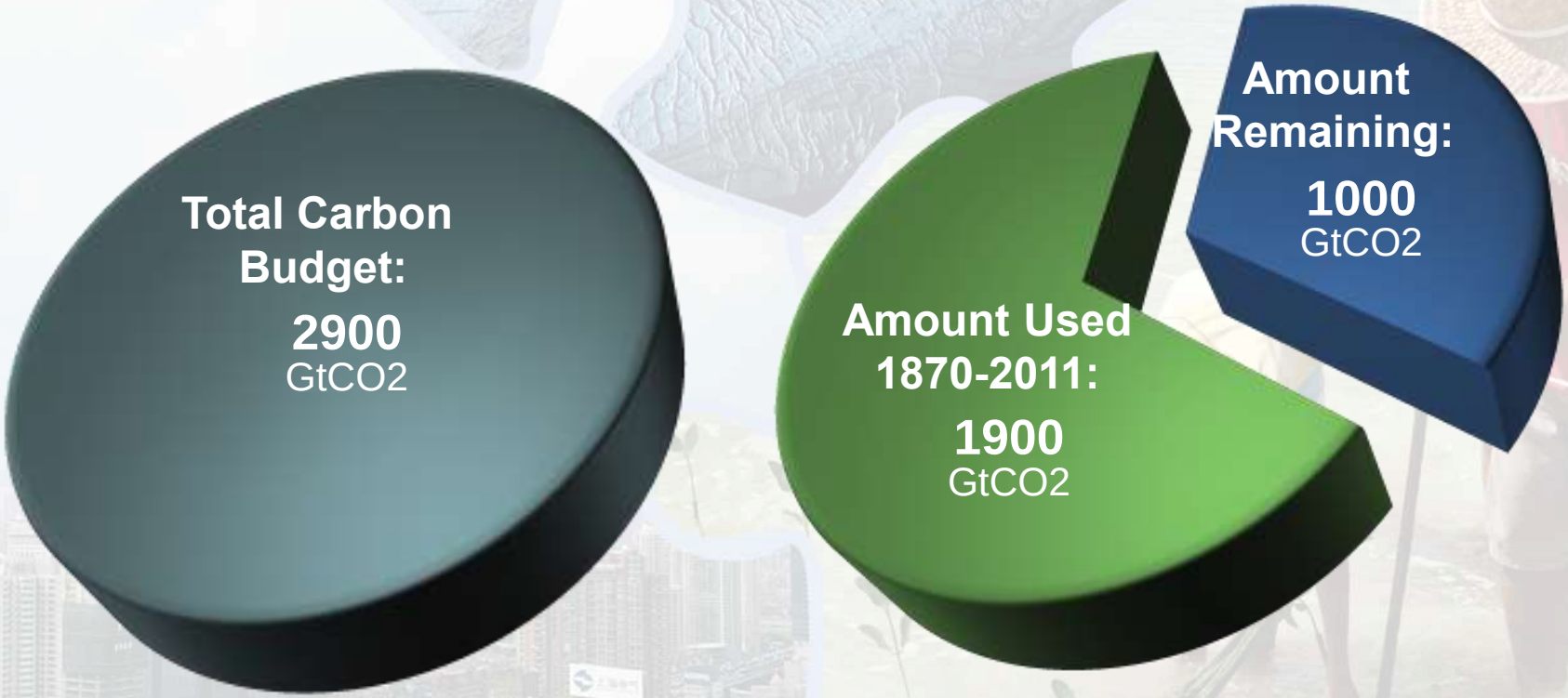
The window for action is rapidly closing

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



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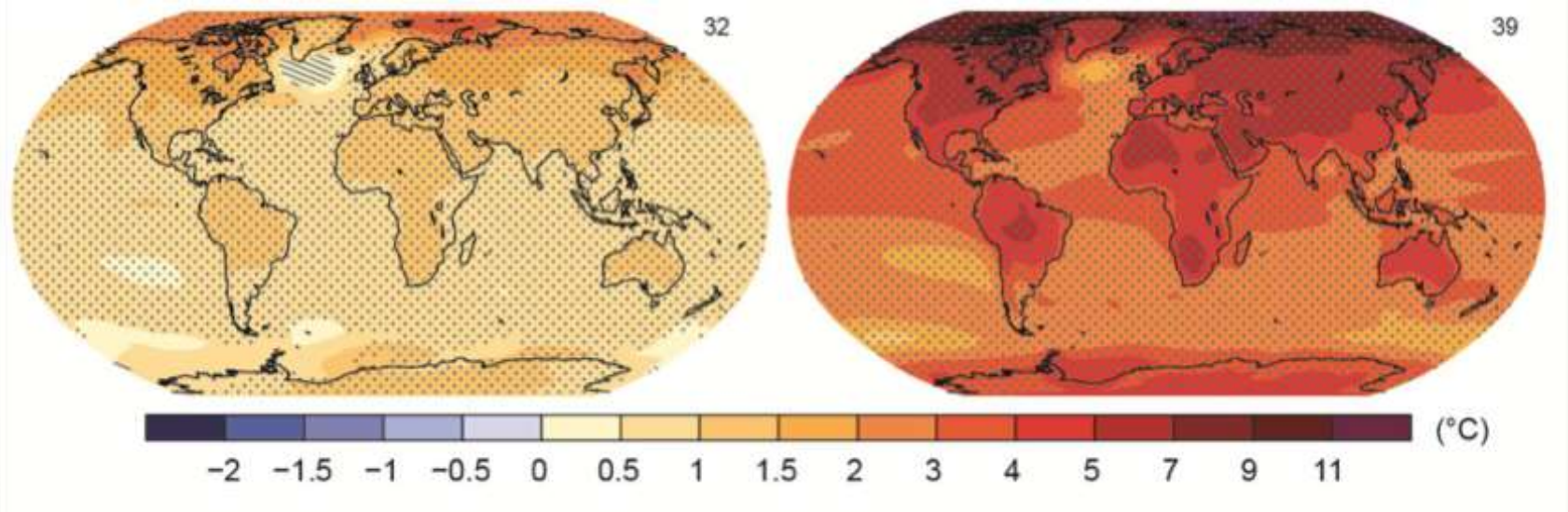
The Choices We Make Will Create Different Outcomes

With substantial mitigation

Without additional mitigation



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

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IPCC Fifth Assessment Report

Synthesis Report

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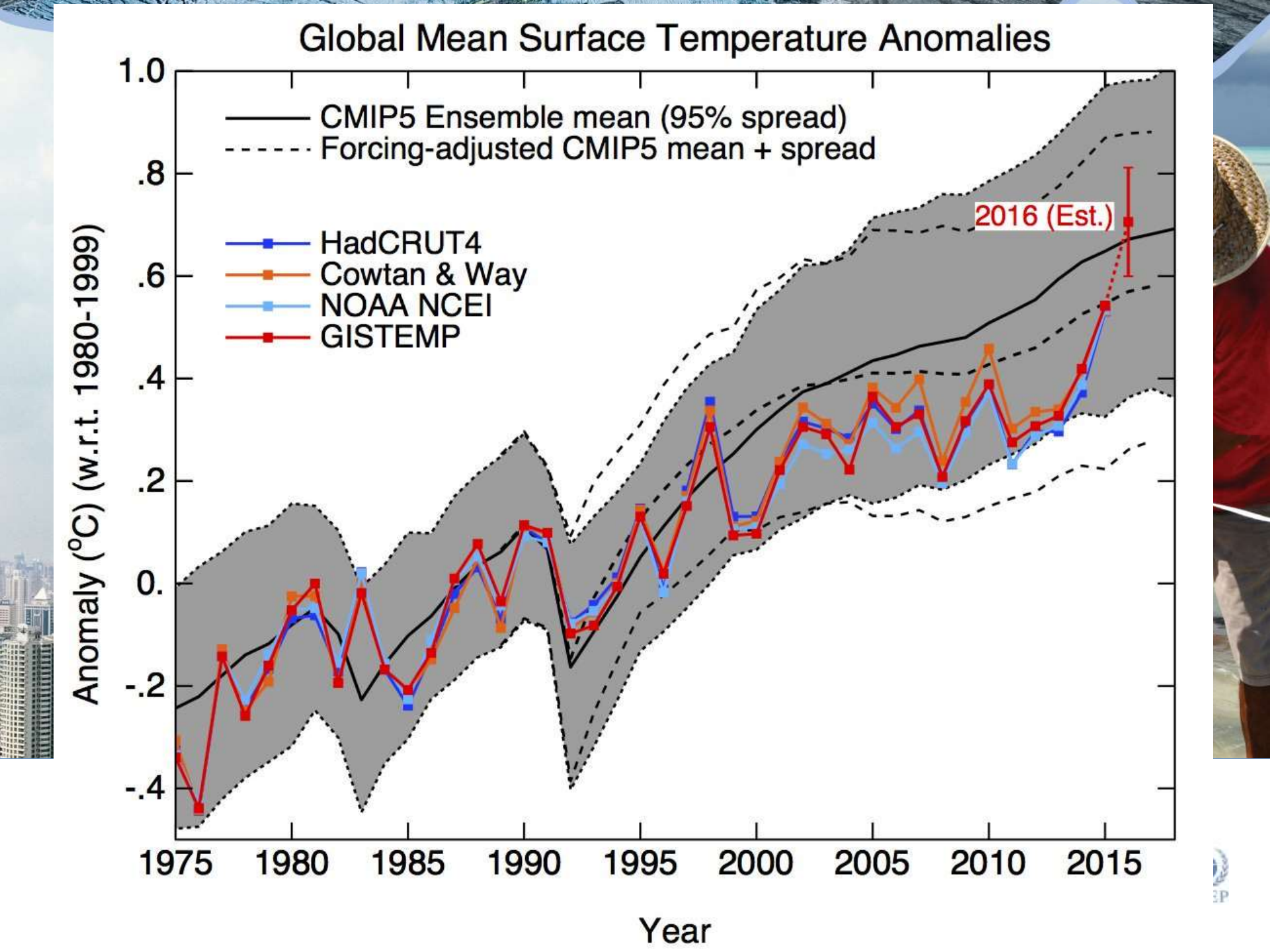
Global Mean Surface Temperature Anomalies
CMIP5 Ensemble mean (95% spread)
Forcing-adjusted CMIP5 mean + spread
HadCRUT4
Cowtan & Way
NOAA NCEI
GISTEMP
2016 (Est.)
Anomaly (°C) (w.r.t. 1980-1999)
1.0
.8
.6
.4
.2
0.
-.2
-.4
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year

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