Media Workshop

29 April 2017, Addis Ababa

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ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

Climate Change is a broad Issue

- ✓ Majority of the sciences and engineering disciplines are involved.
- ✓ Social sciences are interested.
- ✓ Business/Industry has a stake.
- ✓ Involves citizens, politicians, public policy experts….
- ✓ **Every sector of the economy affected**.
- ✓ Many aspects of our lives touched: environment, jobs, health, politics, national security, etc.

If the world had no atmosphere, it would be very cold

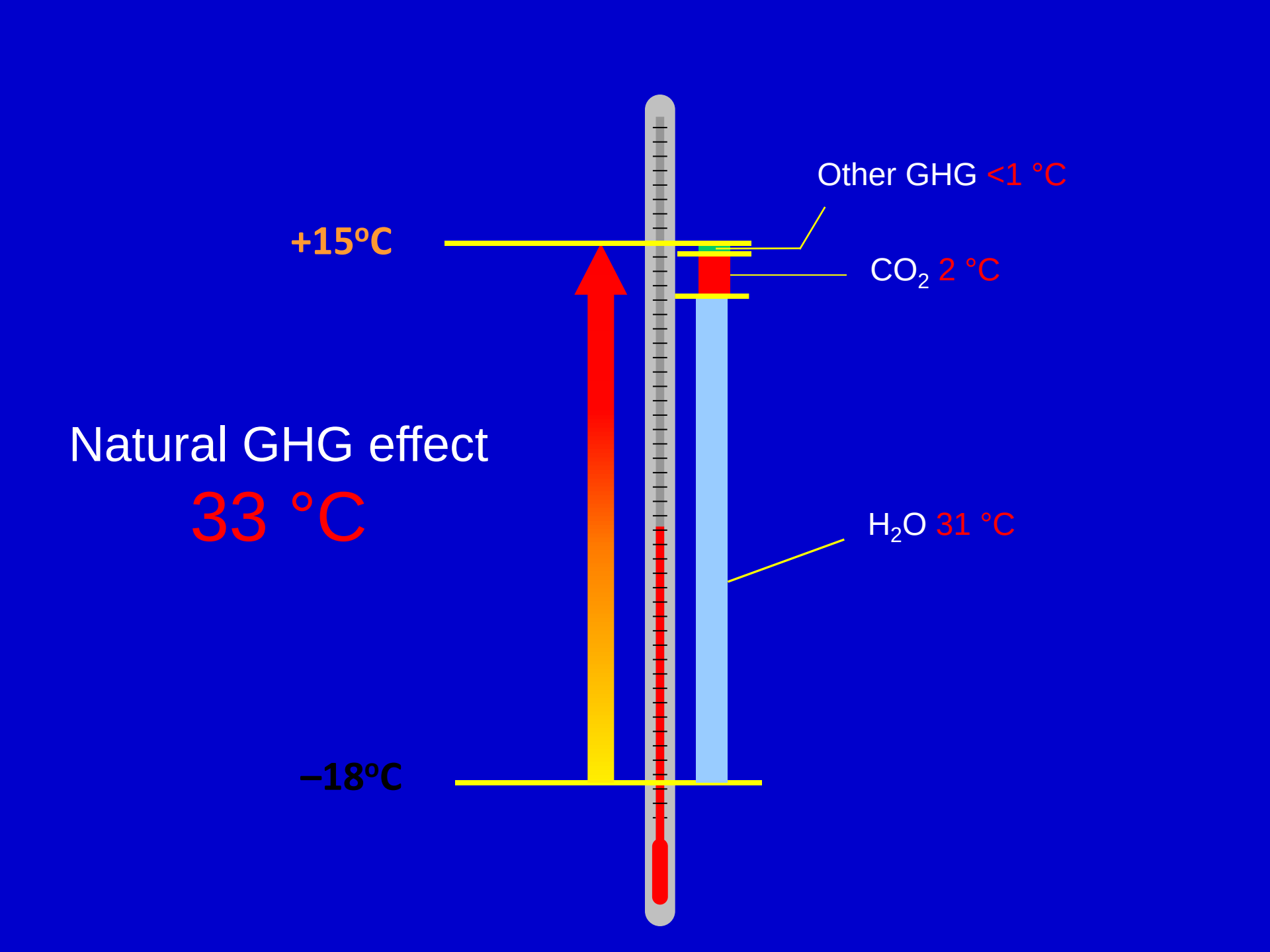
–18°C

+15°C

+ 33°C

Earth without air

Our planet


Other GHG <1 °C
+15°C
CO2 2 °C
Natural GHG effect
33 °C
H2O 31 °C
–18°C

BUT THE COMPOSITION OF AIR IS CHANGING RAPIDLY due to human activities:

→ more GHG (CO_2, CH_4, N_2O...)

→ more ozone, aerosols (air pollution)

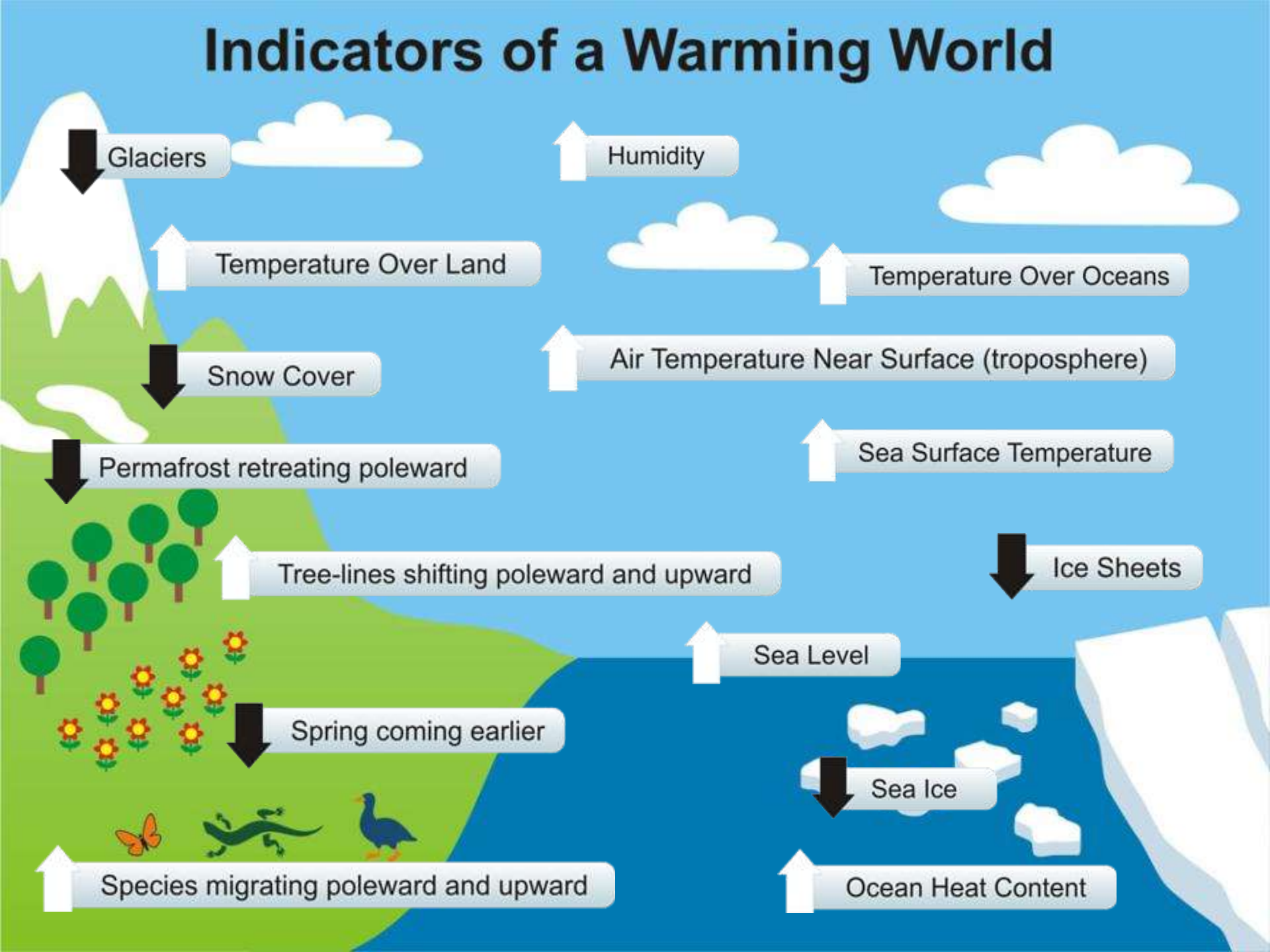
Sources of emissions

Energy production remains the primary driver of GHG emissions

2010 GHG emissions

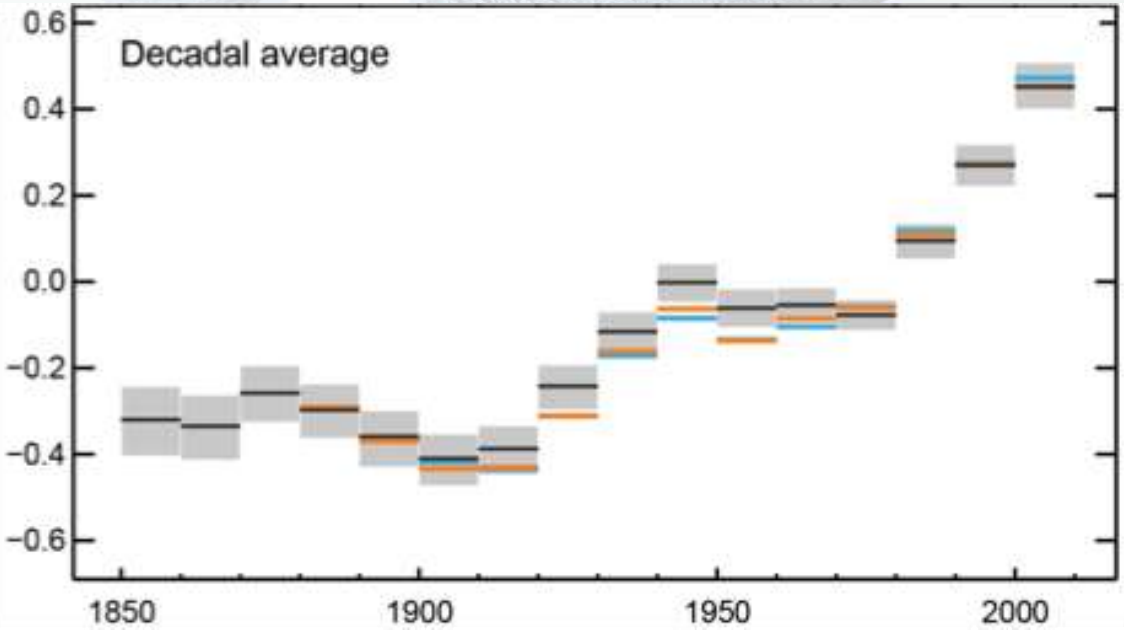
AR5 WGIII SPM

Indicators of a Warming World



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

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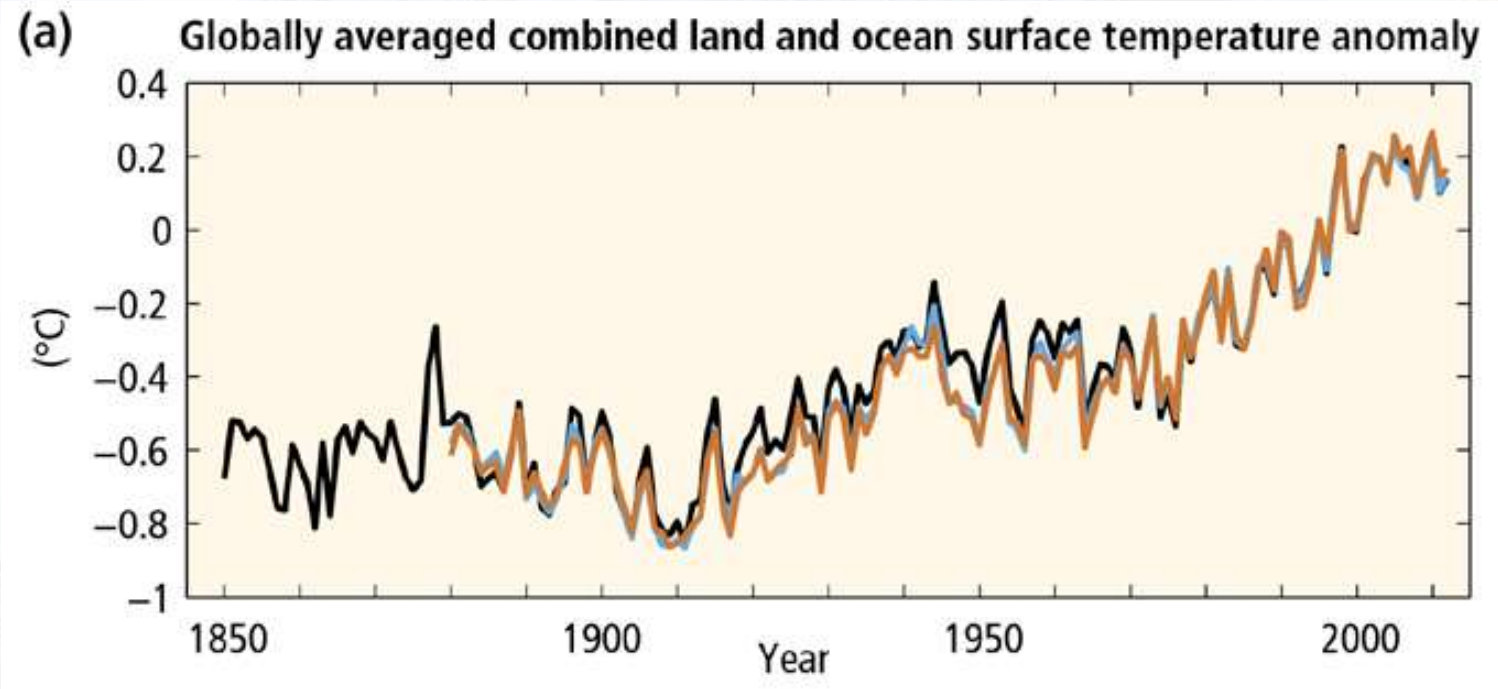
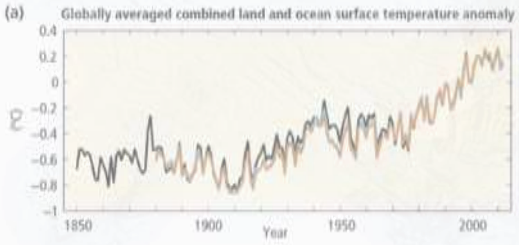

(a)
Globally averaged combined land and ocean surface temperature anomaly
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
(°C)
1850
1900
1950
2000
Year

AR5 SYR SPM


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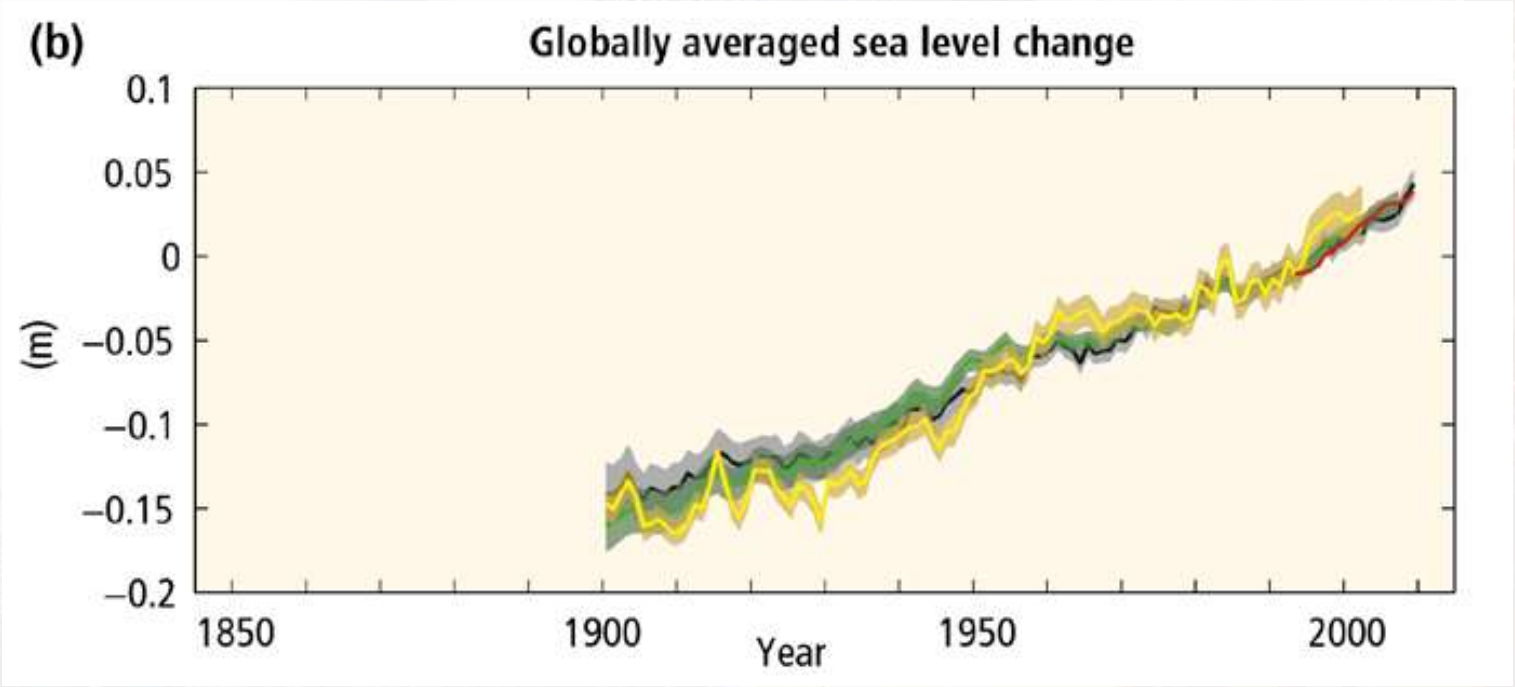
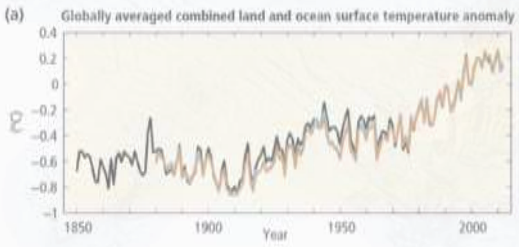
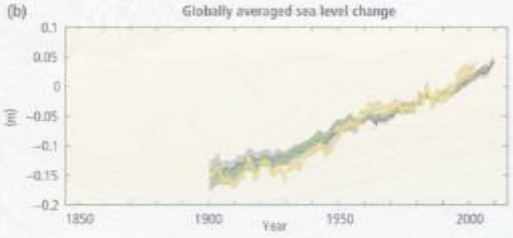
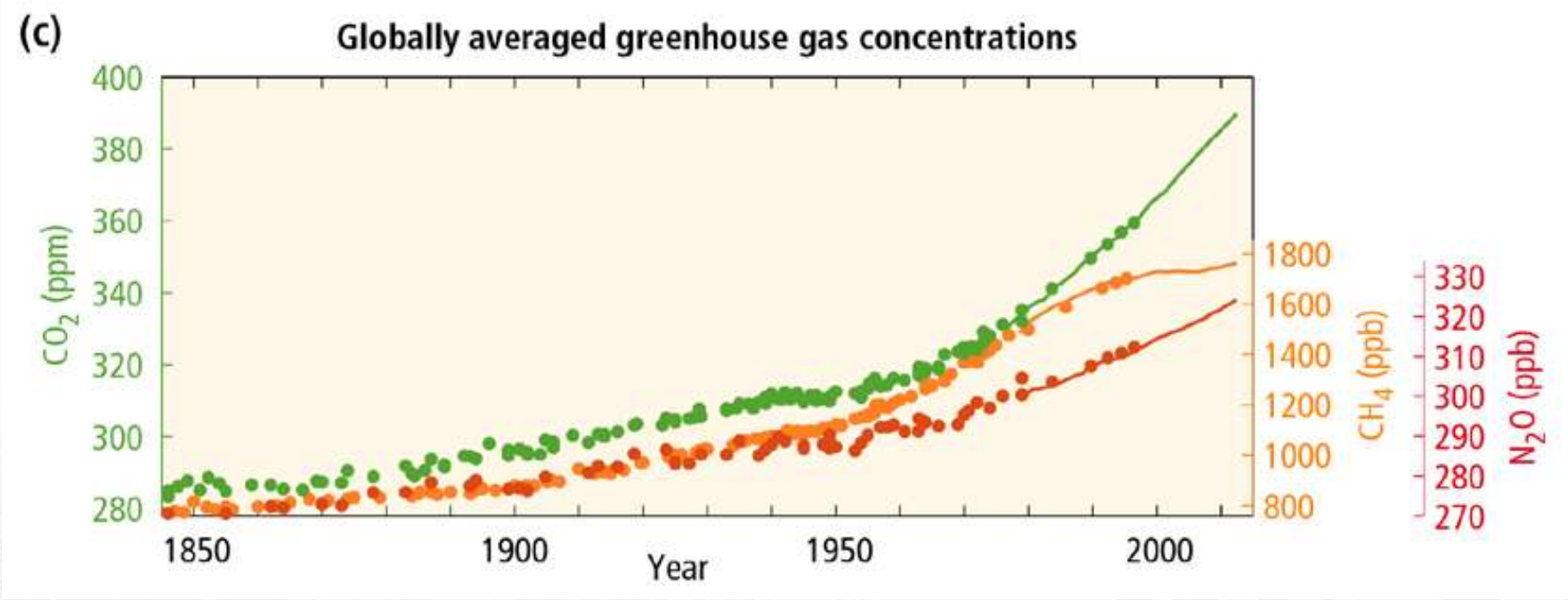
−0.2
−0.4
−0.6
−0.8
−1
1850
1900
Year
1950
2000


(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

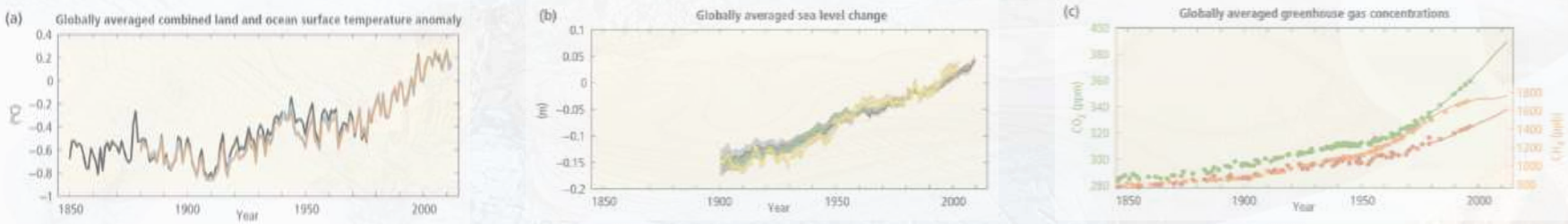
AR5 SYR SPM

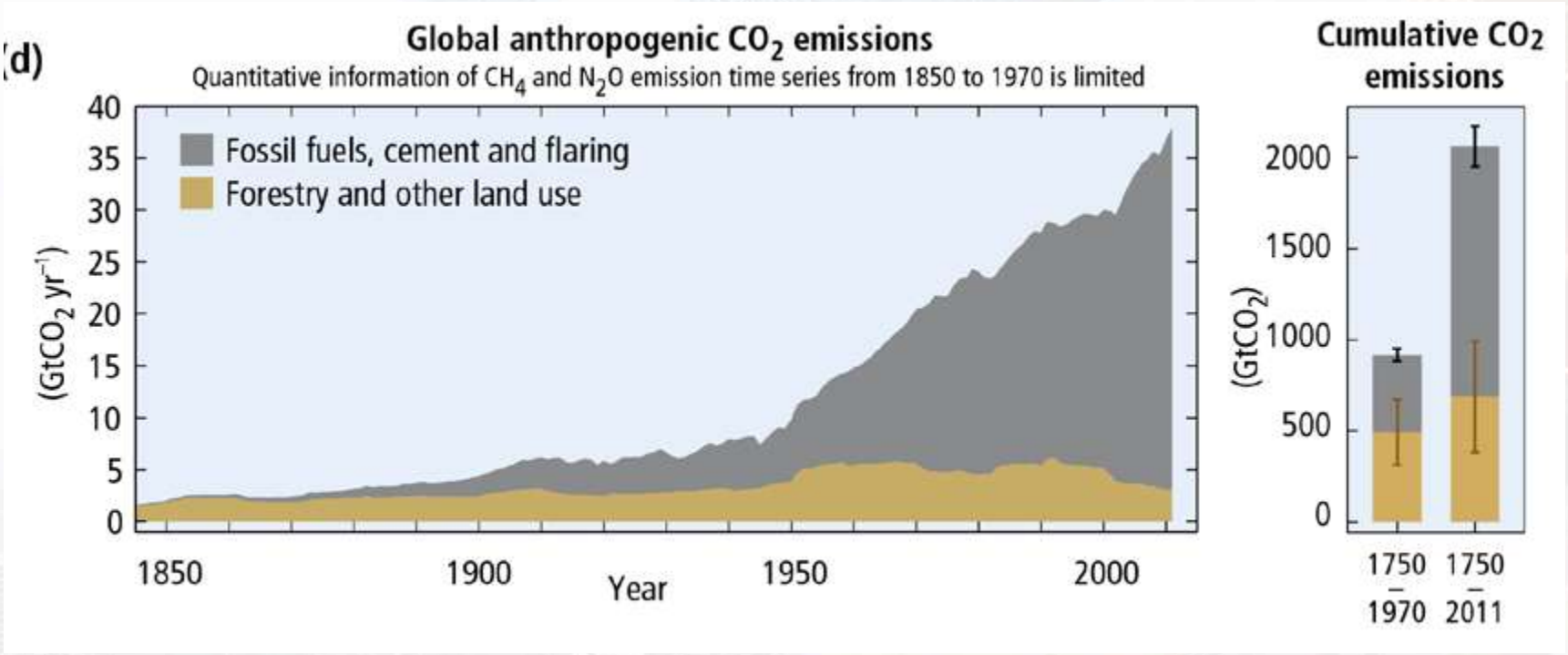

(a)
Globally averaged combined land and ocean surface temperature anomaly
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
1850
1900
Year
1950
2000


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


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

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
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
Cumulative CO_2 emissions
$(GtCO_2)$
1750 – 1970
1750 – 2011

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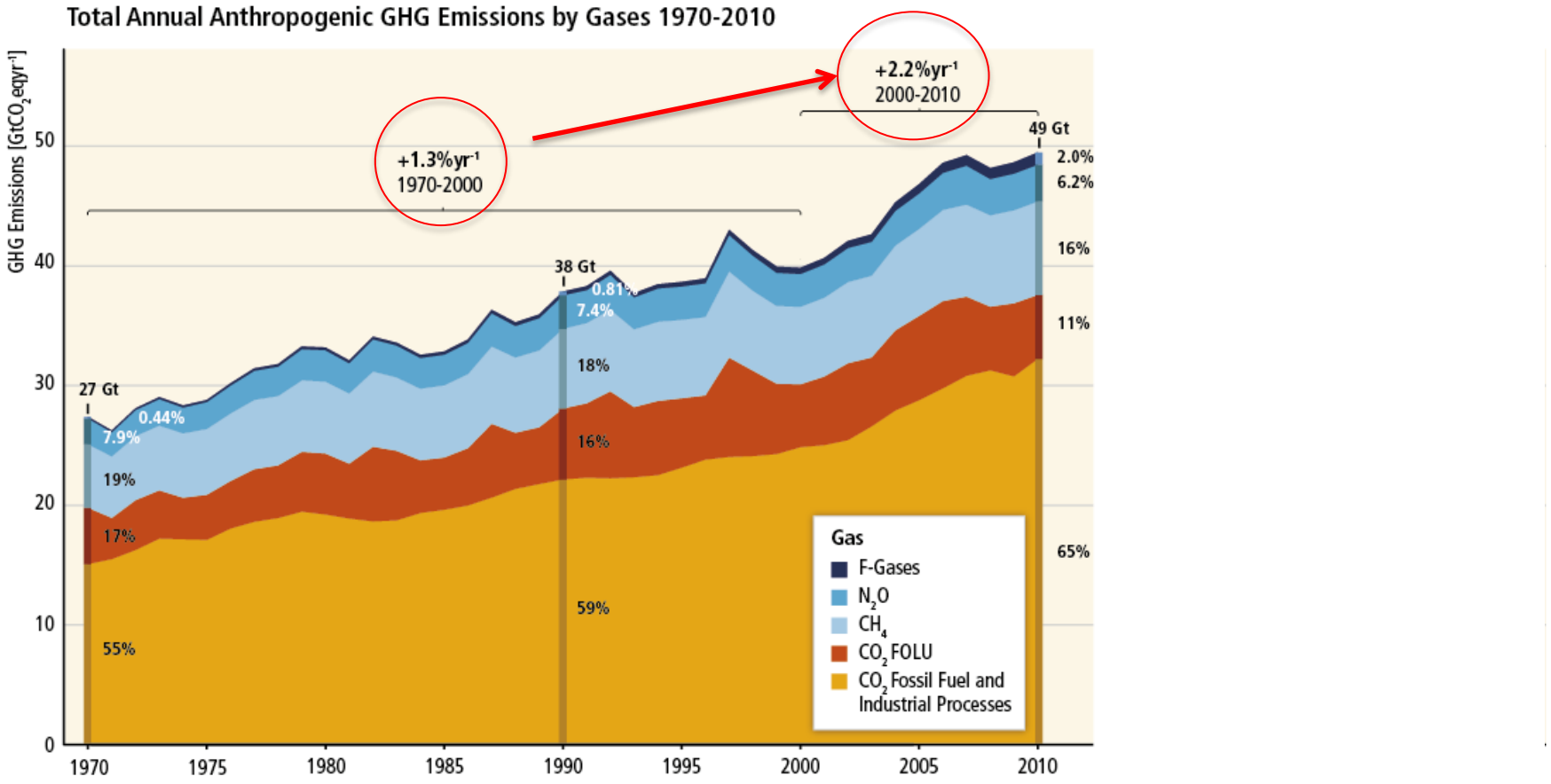
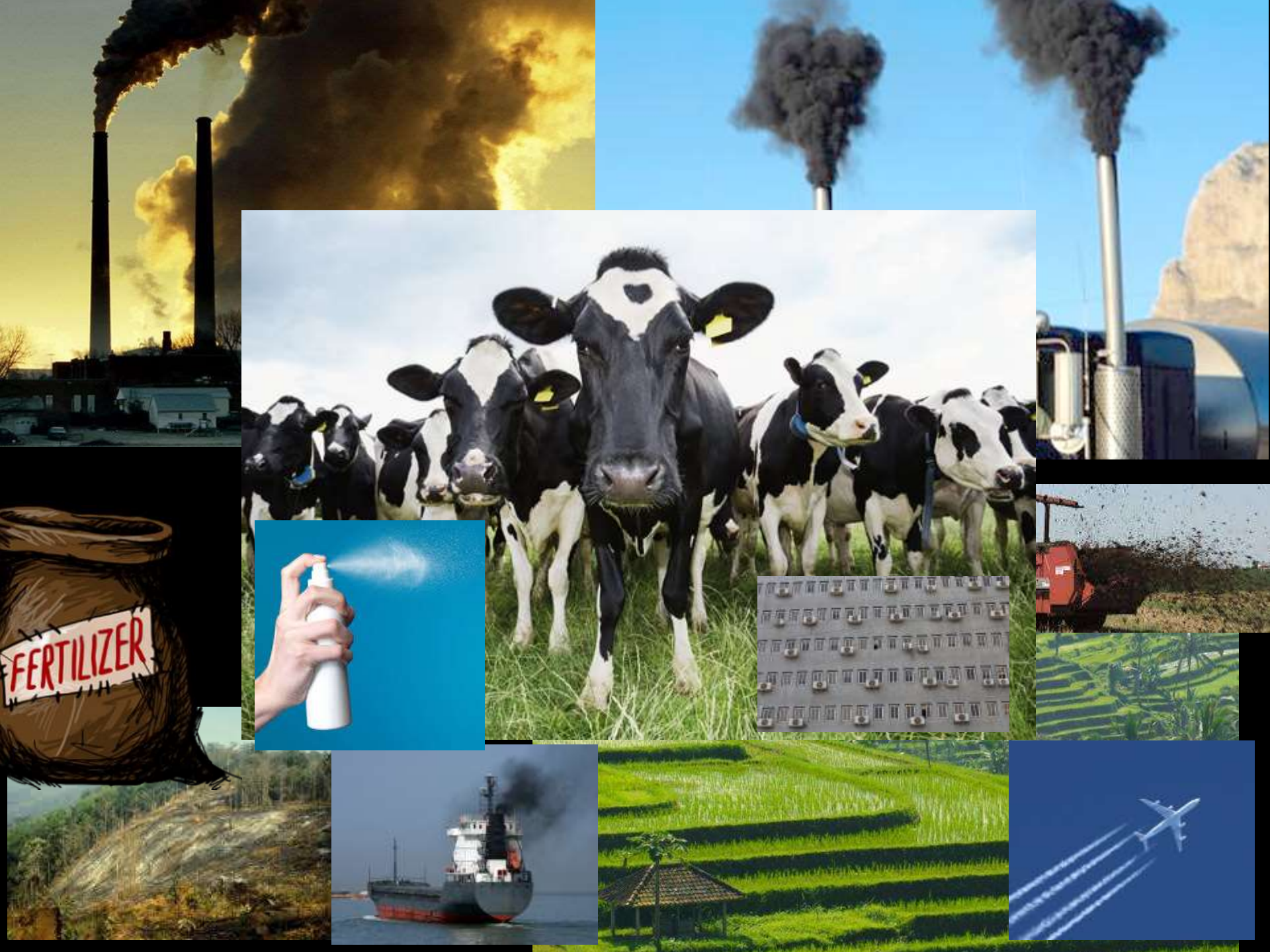
More recent data (1970-2010) and other gases than CO2

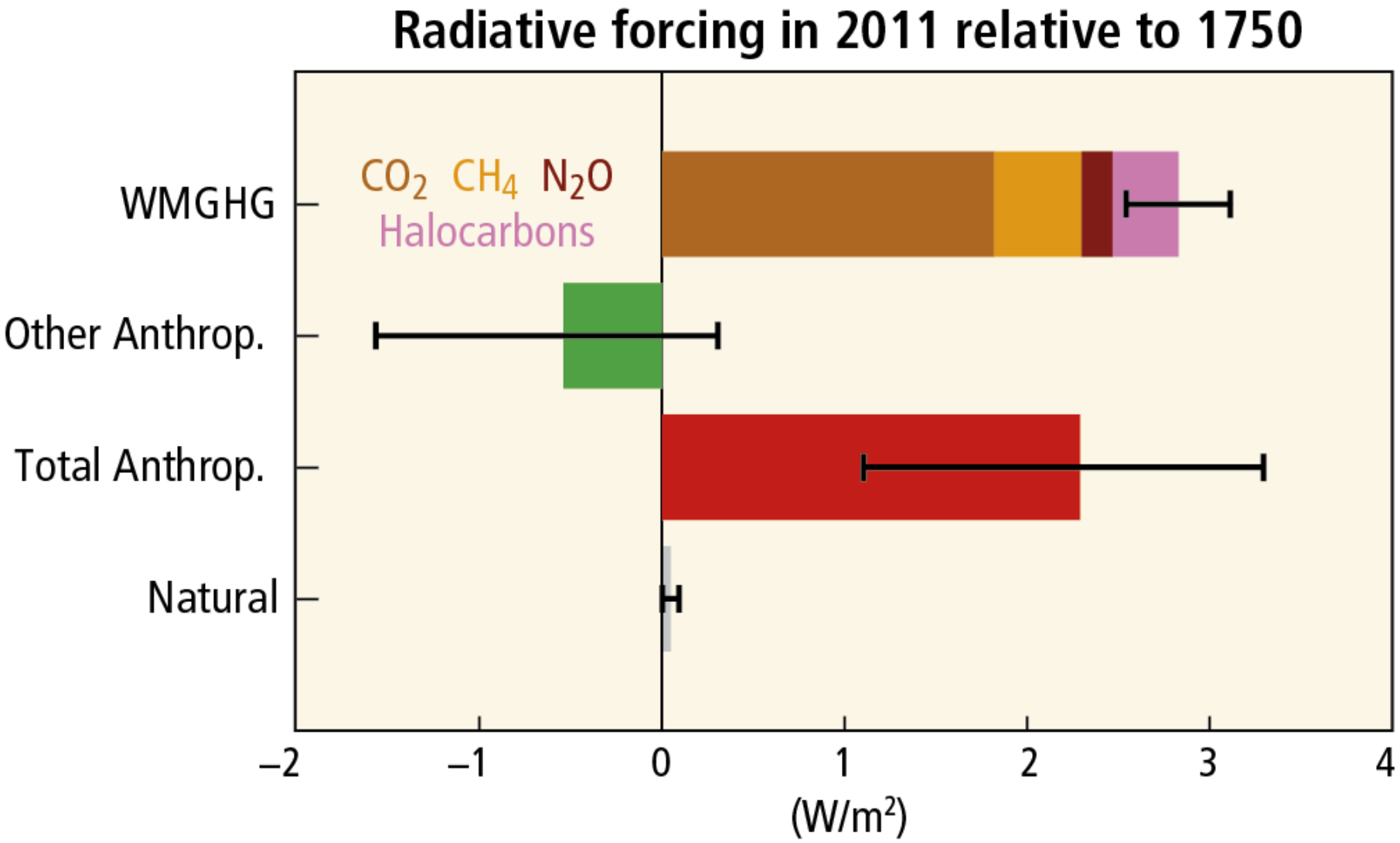


Understanding

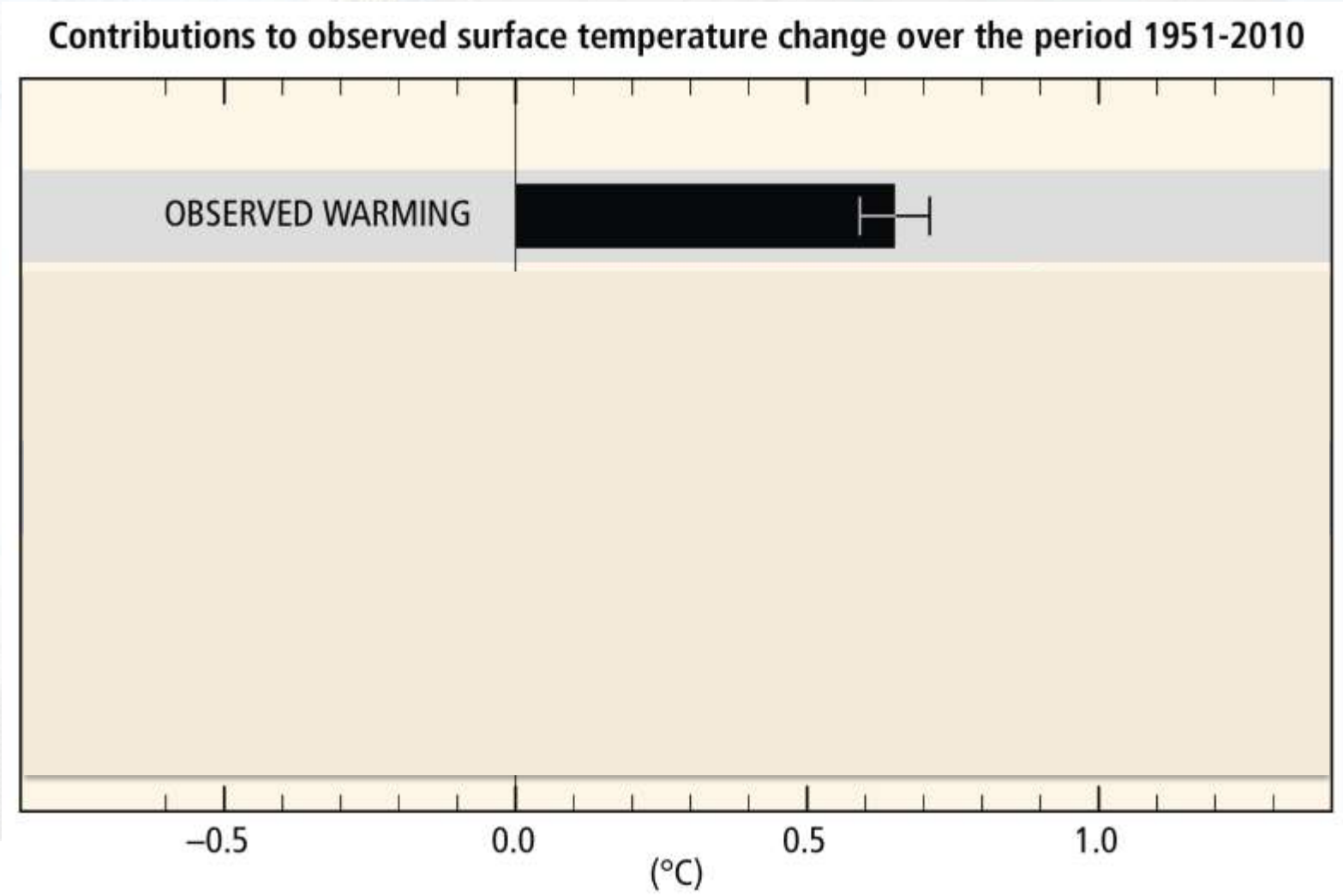
Why has it changed?


FERTILIZER

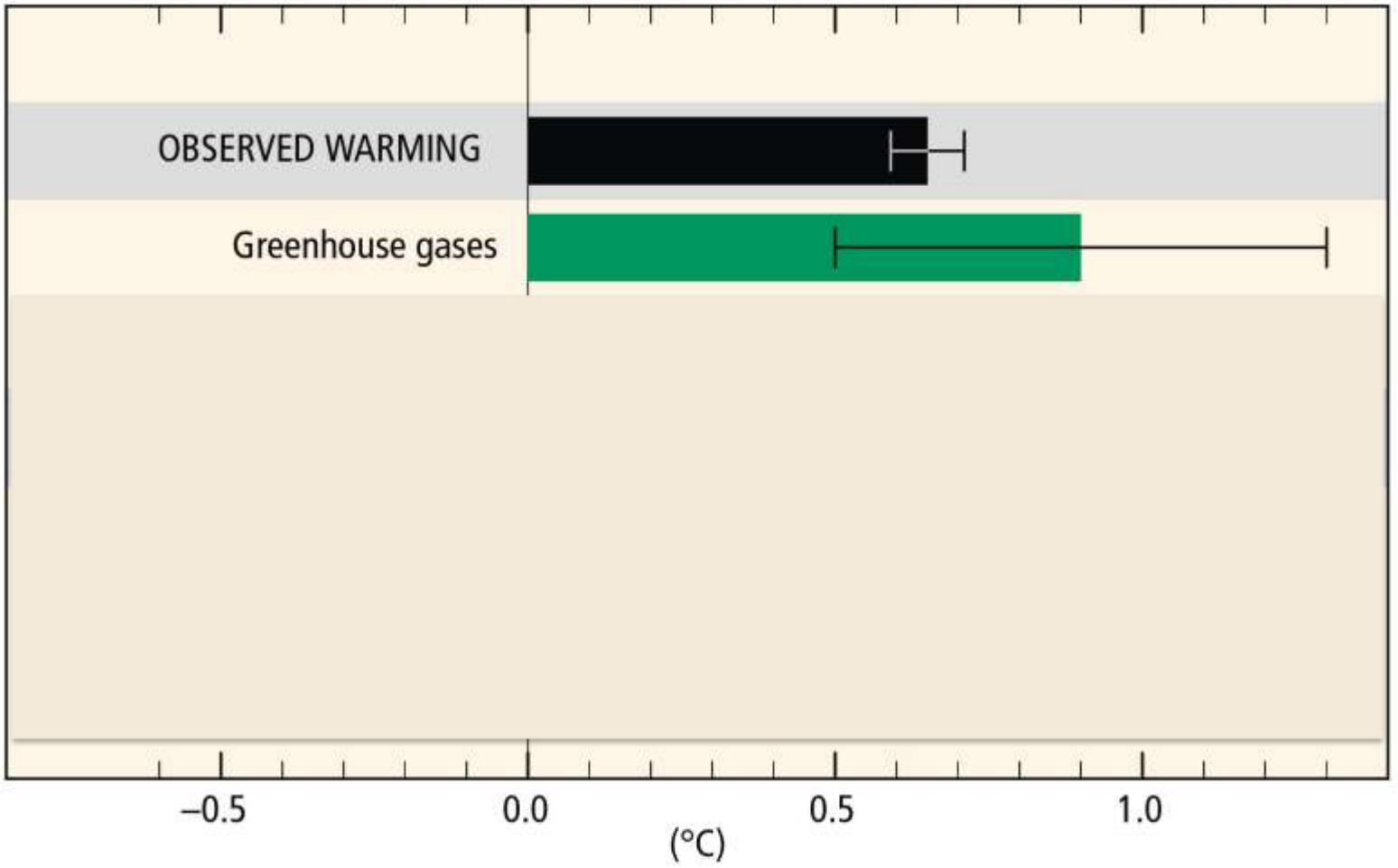
Climate impact of various components



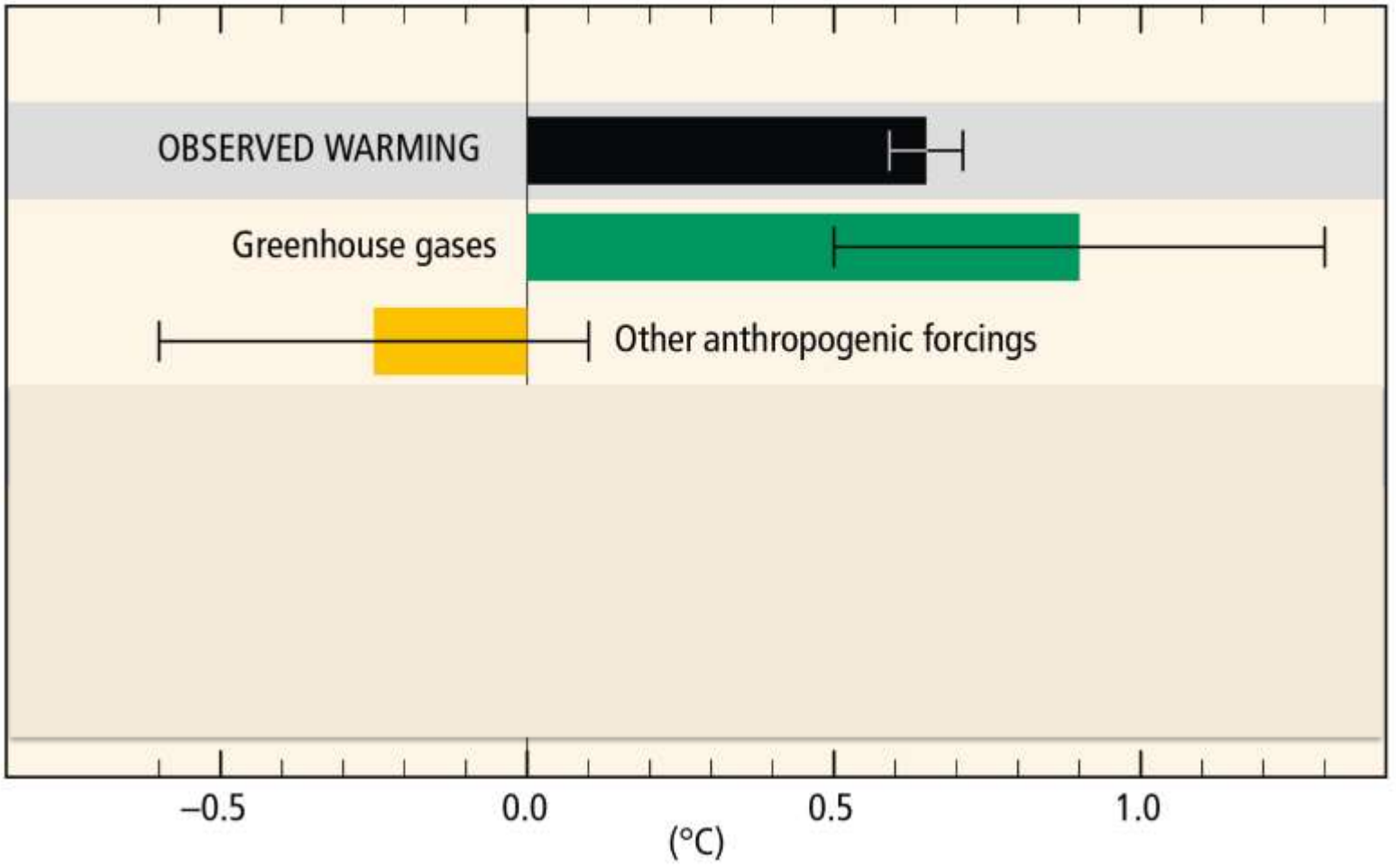
Causes of climate change



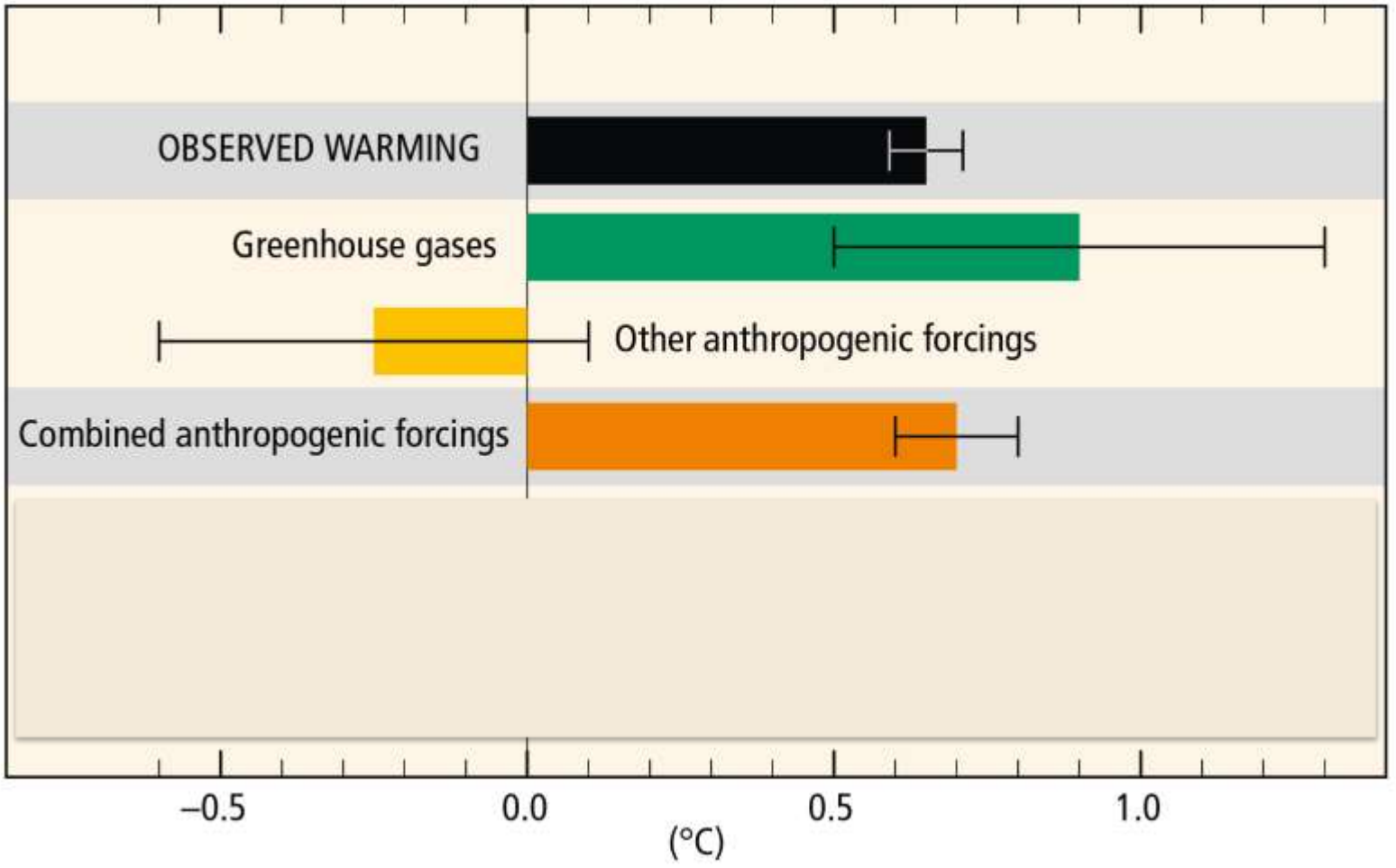
Contributions to observed surface temperature change over the period 1951-2010

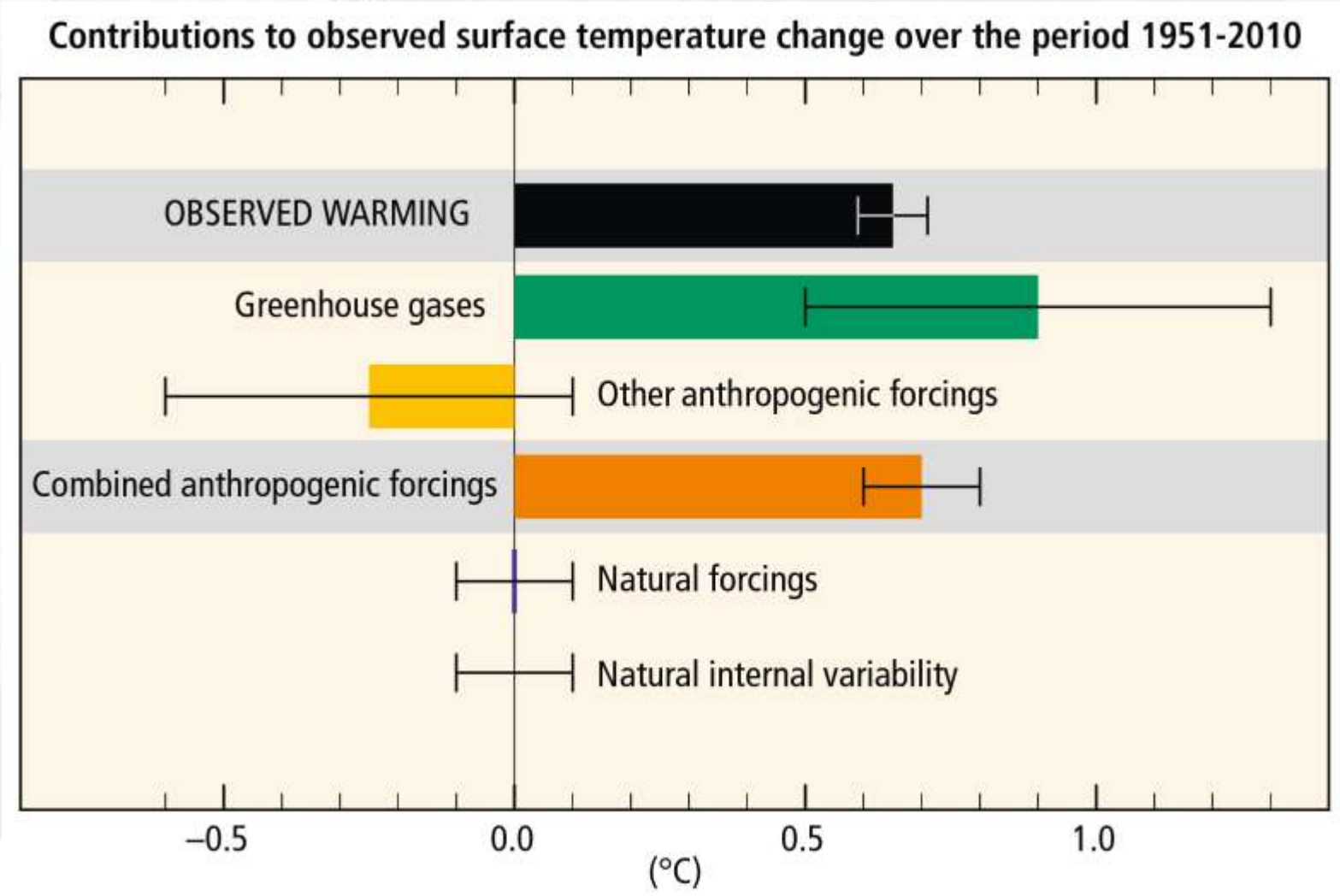


Contributions to observed surface temperature change over the period 1951-2010

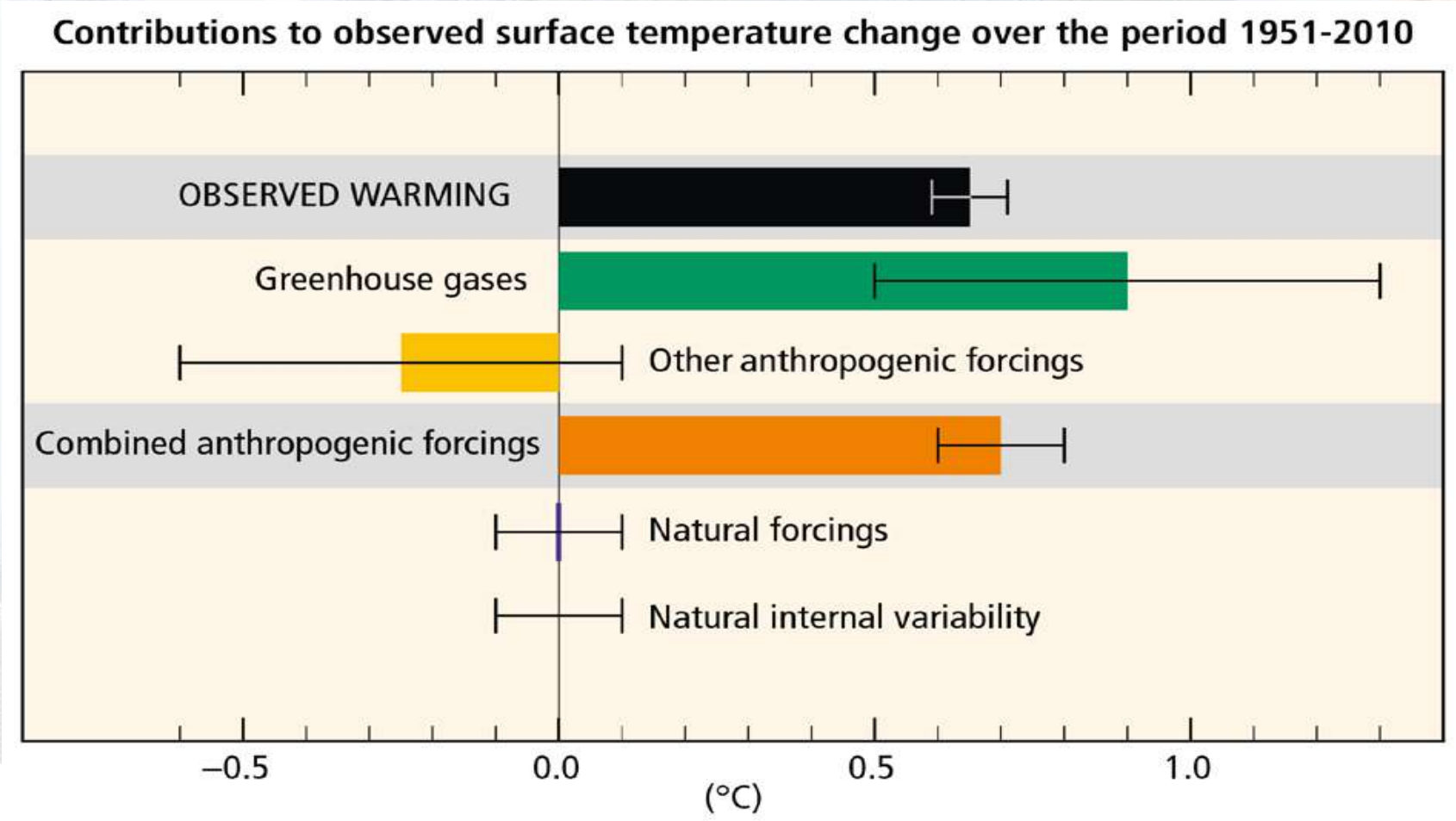


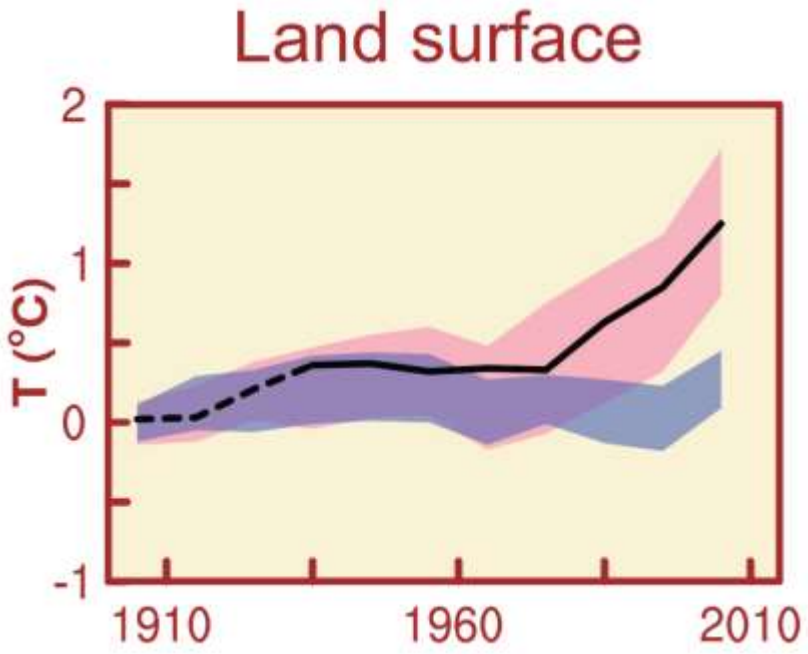
Contributions to observed surface temperature change over the period 1951-2010




Contributions to observed surface temperature change over the period 1951-2010
OBSERVED WARMING
Greenhouse gases
Other anthropogenic forcings
Combined anthropogenic forcings
Natural forcings
Natural internal variability
–0.5
0.0
0.5
1.0
(°C)

Antropogenic forcings are *extremely likely* the cause of warming





Human influence on the climate system is clear.

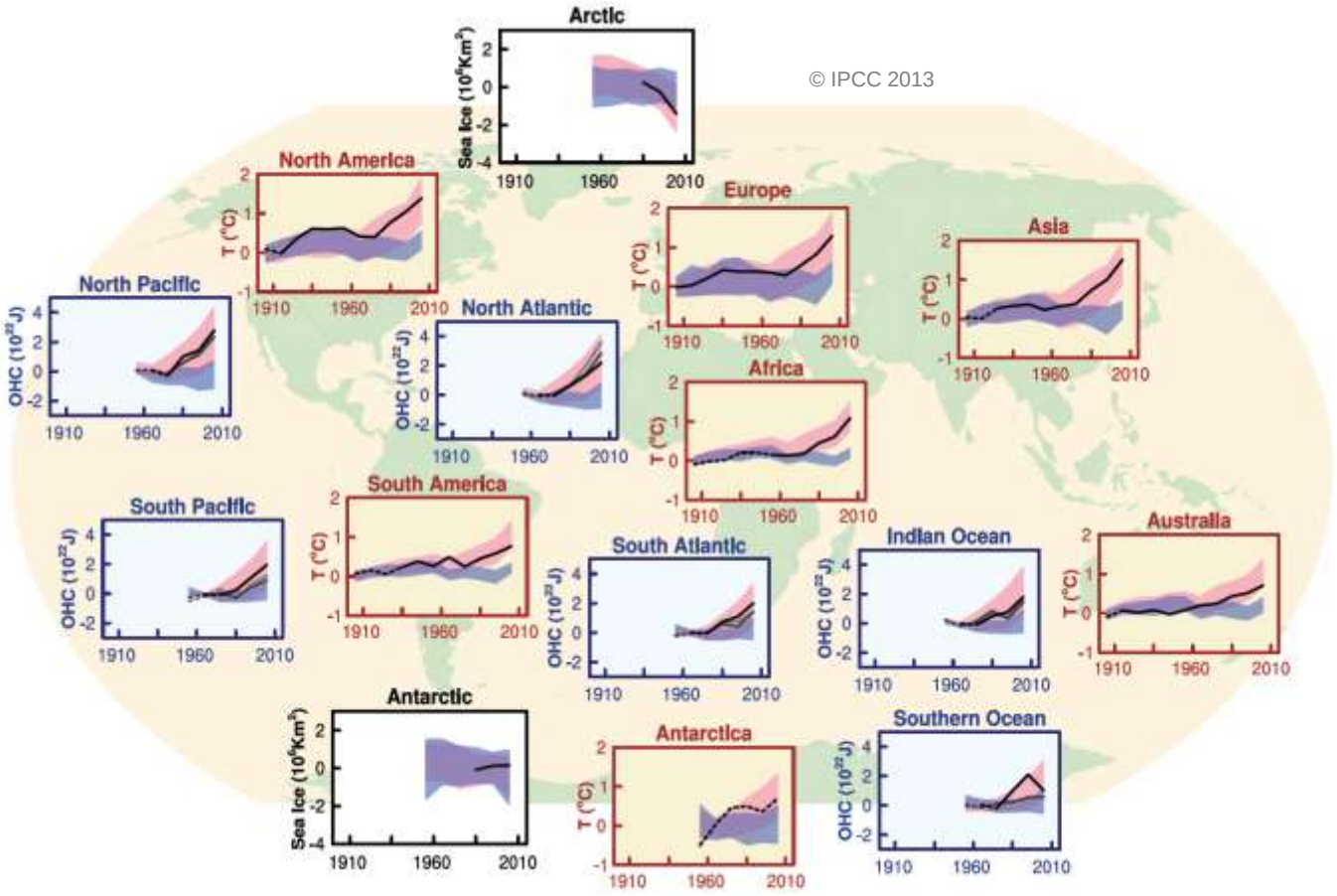


Fig. SPM.6

Human influence on the climate system is clear.

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)




HUMAN INFLUENCE: Some changes in extreme weather and climate events observed since ~1950 are linked to human activity

In a number of regions, impacts are already underway:

- decrease in cold temperature extremes
- increase in warm temperature extremes
- increase in extreme high sea levels
- increase in the number of heavy precipitation events

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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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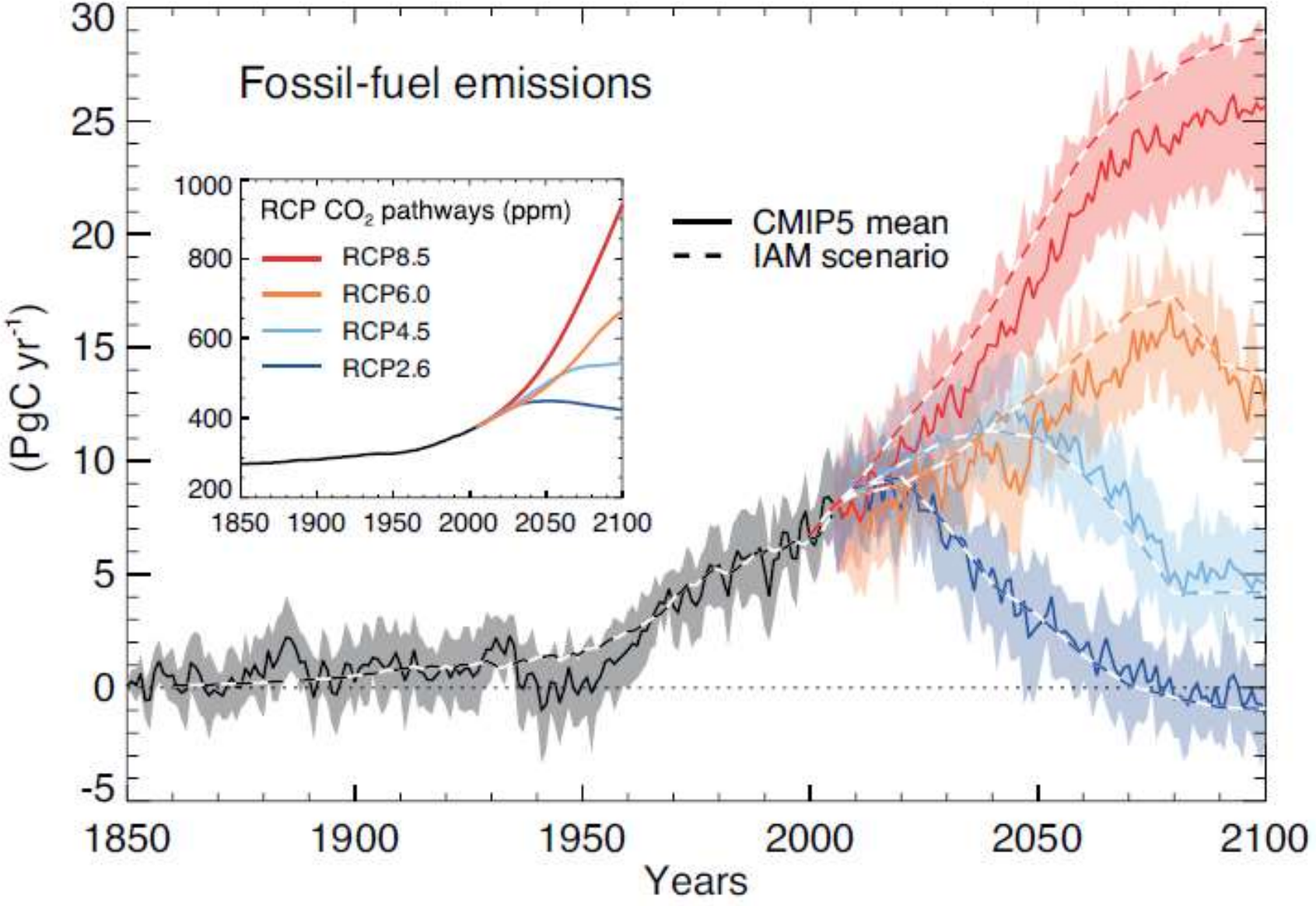


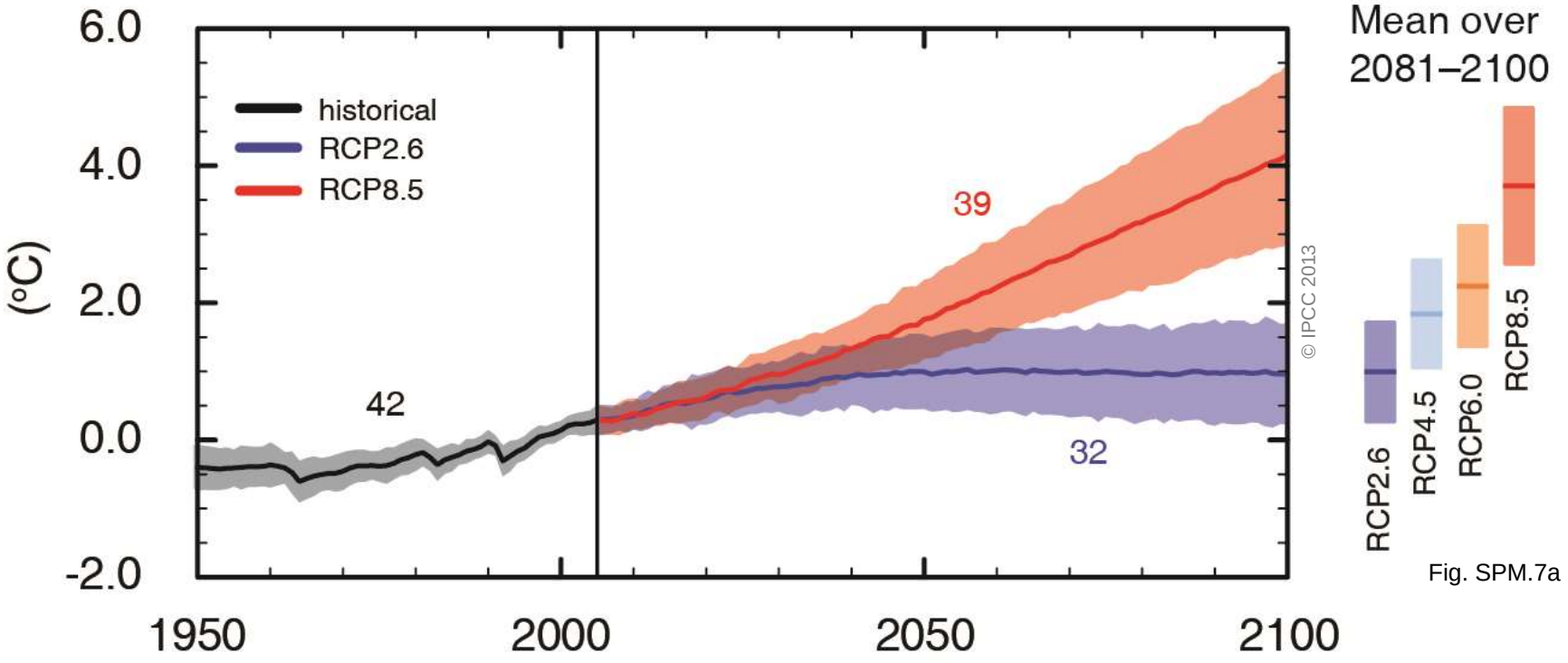
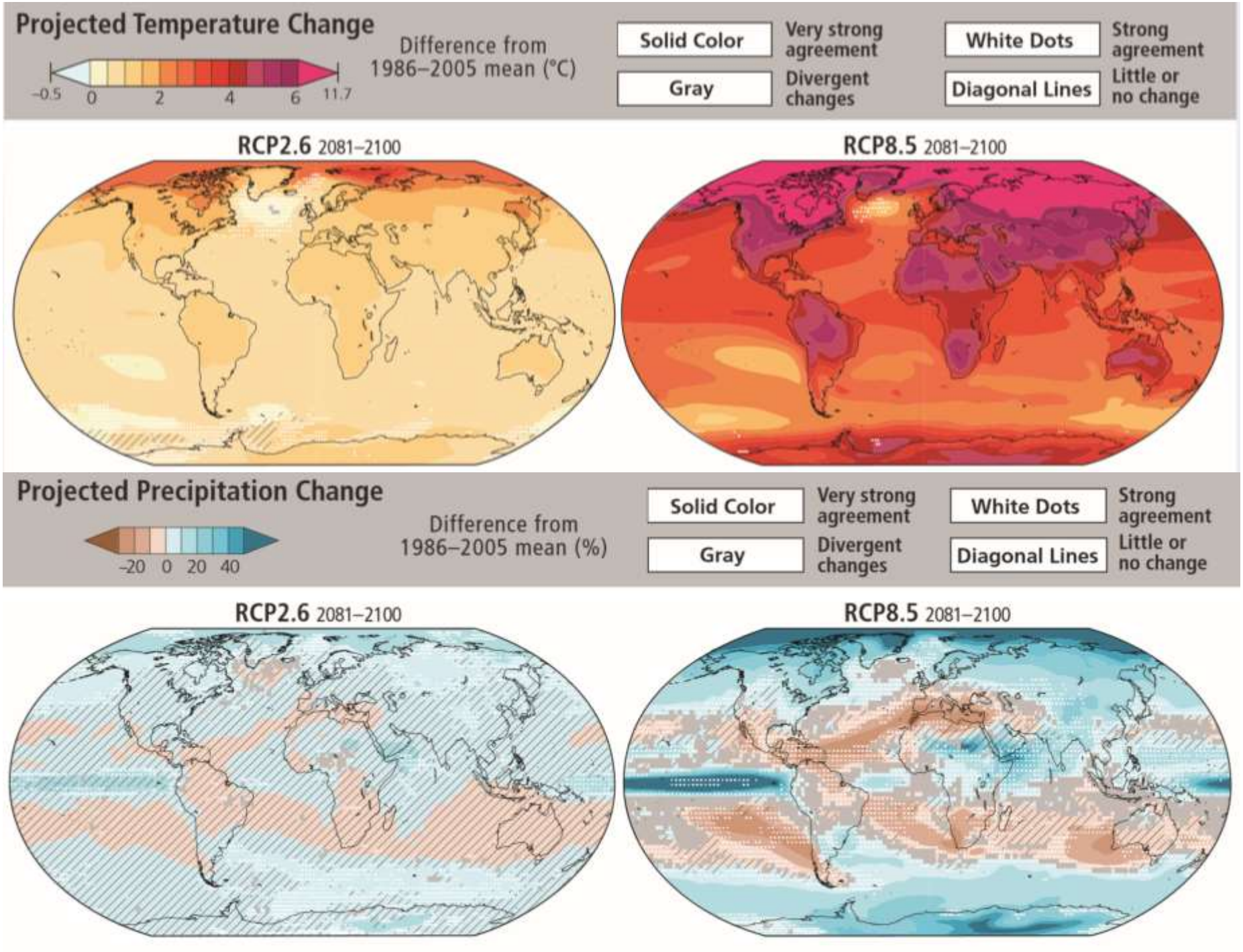


Fig. SPM.7a

Global surface temperature change for the end of the 21st century is *likely* to exceed 1.5°C relative to 1850−1900 for all scenarios except RCP2.6.


Projected Temperature Change
Difference from 1986–2005 mean (°C)
−0.5 0 2 4 6 11.7
Solid Color
Very strong agreement
White Dots
Strong agreement
Gray
Divergent changes
Diagonal Lines
Little or no change
RCP2.6 2081–2100
RCP8.5 2081–2100
Projected Precipitation Change
Difference from 1986–2005 mean (%)
−20 0 20 40
Solid Color
Very strong agreement
White Dots
Strong agreement
Gray
Divergent changes
Diagonal Lines
Little or no change
RCP2.6 2081–2100
RCP8.5 2081–2100

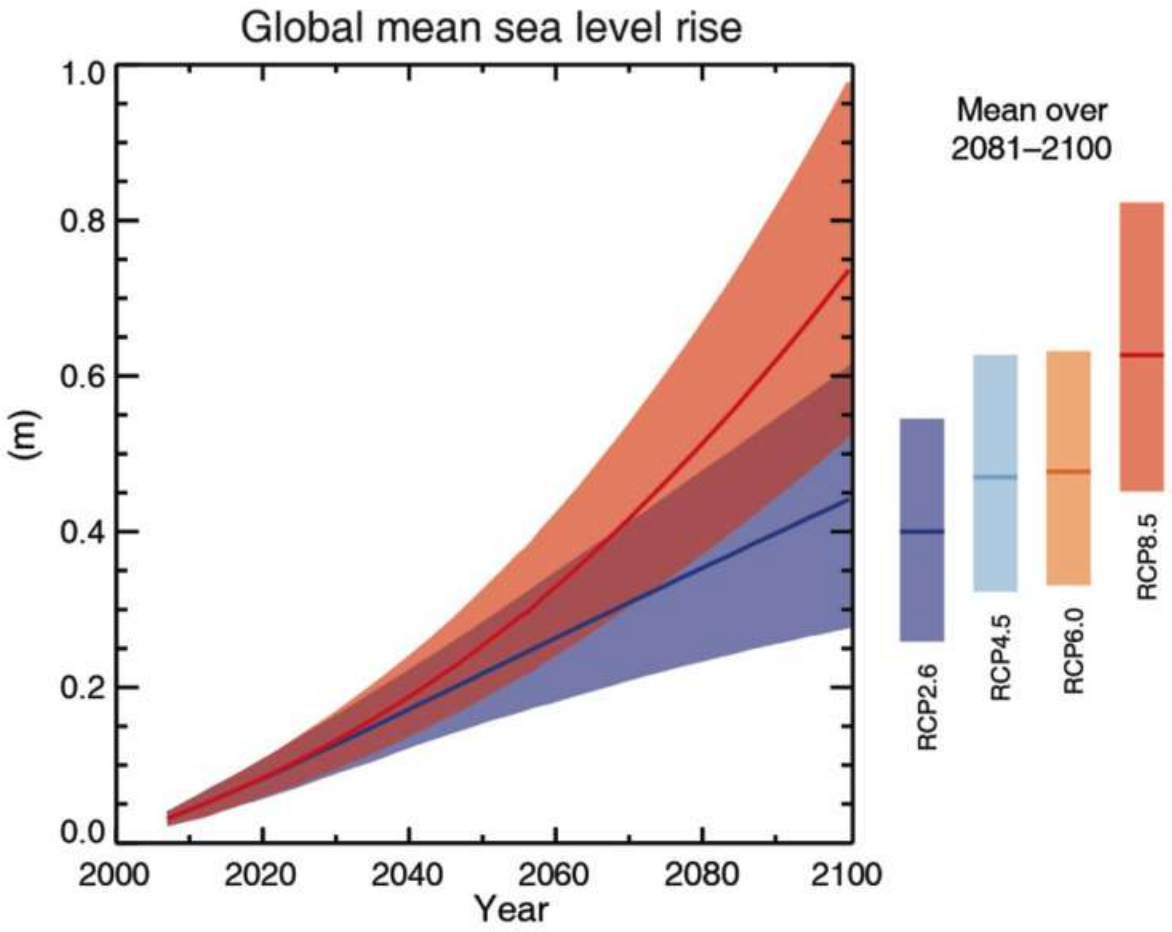
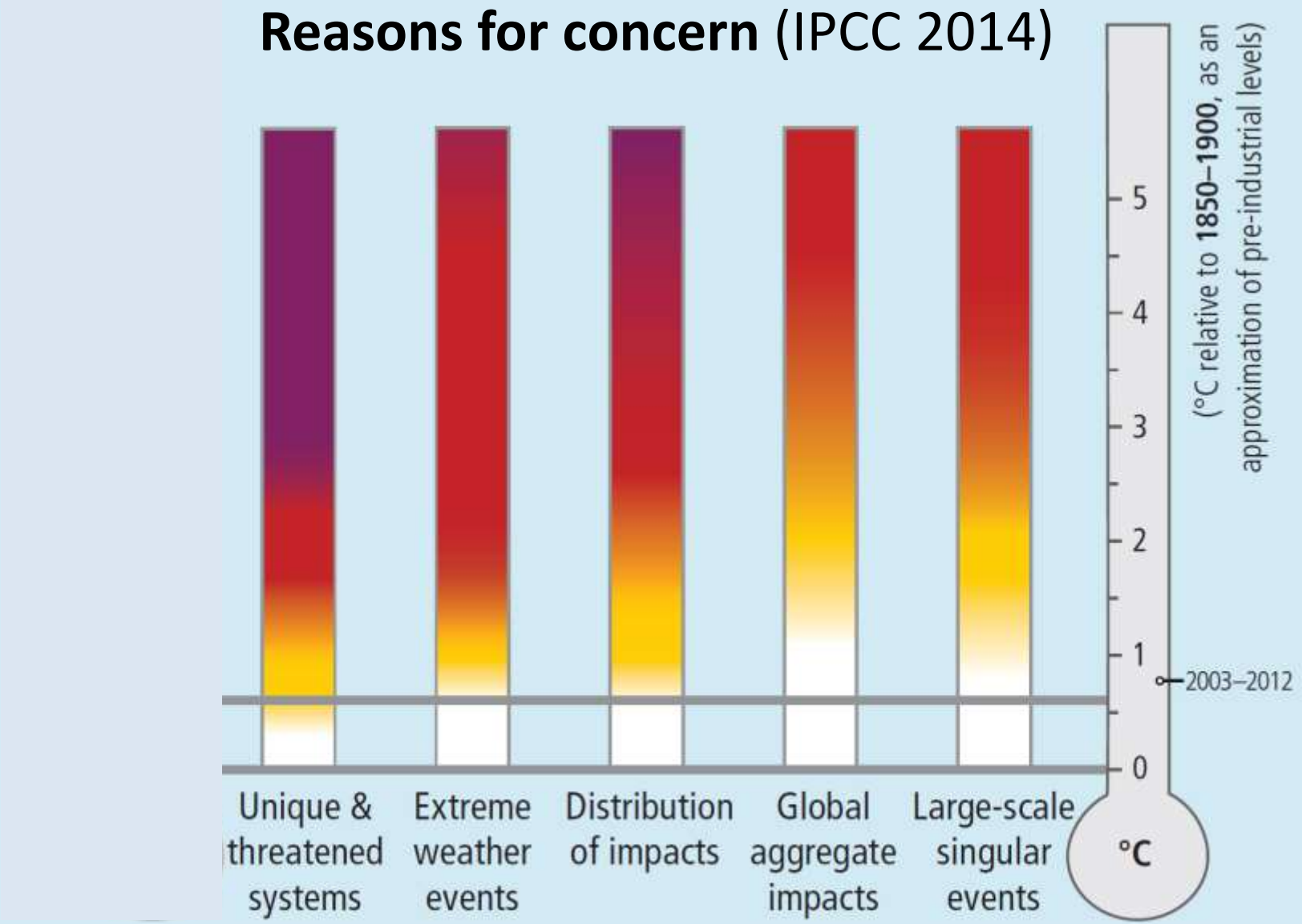


Fig. SPM.9

RCP2.6 (2081-2100), *likely* range: 26 to 55 cm

RCP8.5 (2081-2100), *likely* range: 45 to 82 cm

Reasons for concern (IPCC 2014)



Global temperature rise

+2°

- 1 - 2 billion additional people with water stress
- Impacts on cereal productivity at low latitudes
- Increased coastal flooding and storms
- Greater depth of seasonal permafrost thaw

+4°

- A 8-10ºC increase in the Arctic
- 1.1 - 3.2 billion additional people with water stress
- Widespread coral mortality; risk of major extinctions around the globe
- Substantial global impact on major crops
- Long-term prospect of sea level rise

Potential Impacts of Climate Change

Food and water shortages

Increased displacement of people

Increased poverty

Coastal flooding

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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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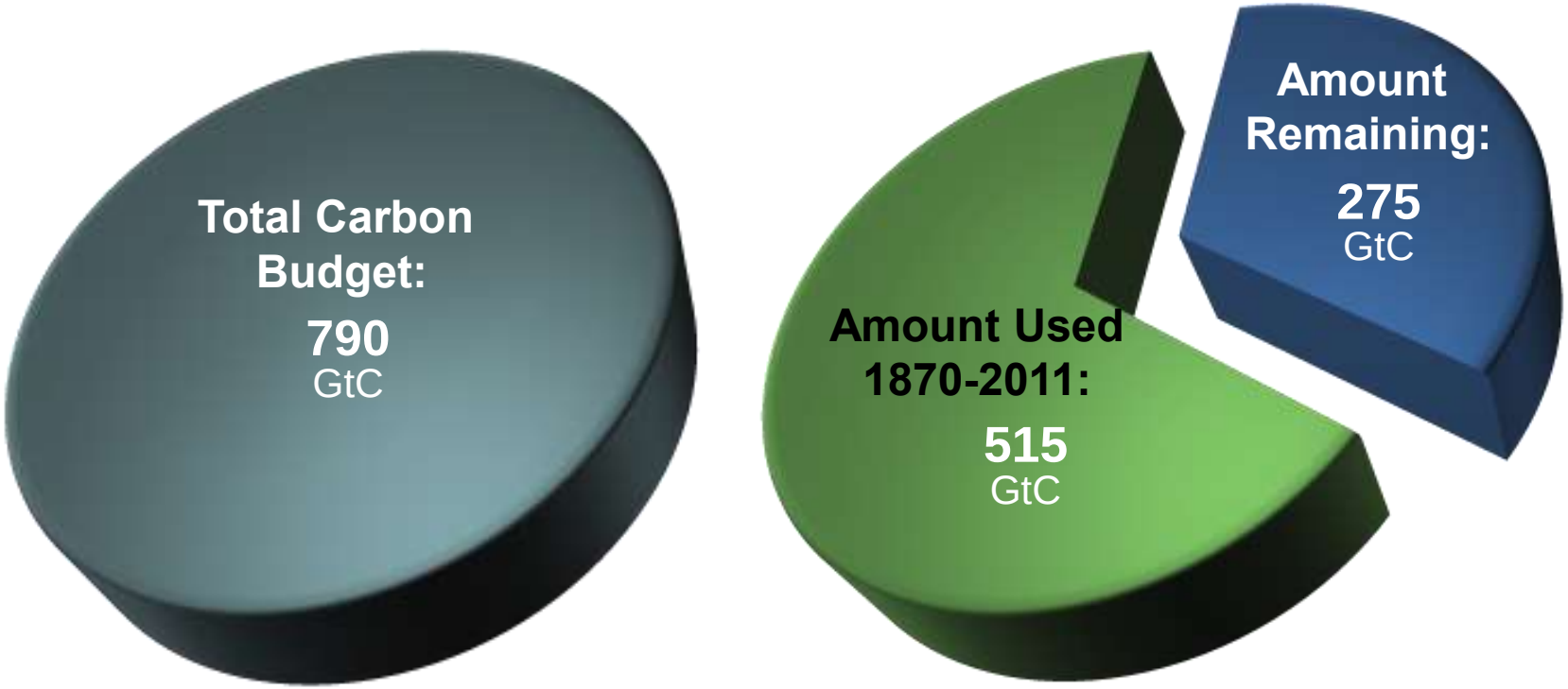
The window for action is rapidly closing

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

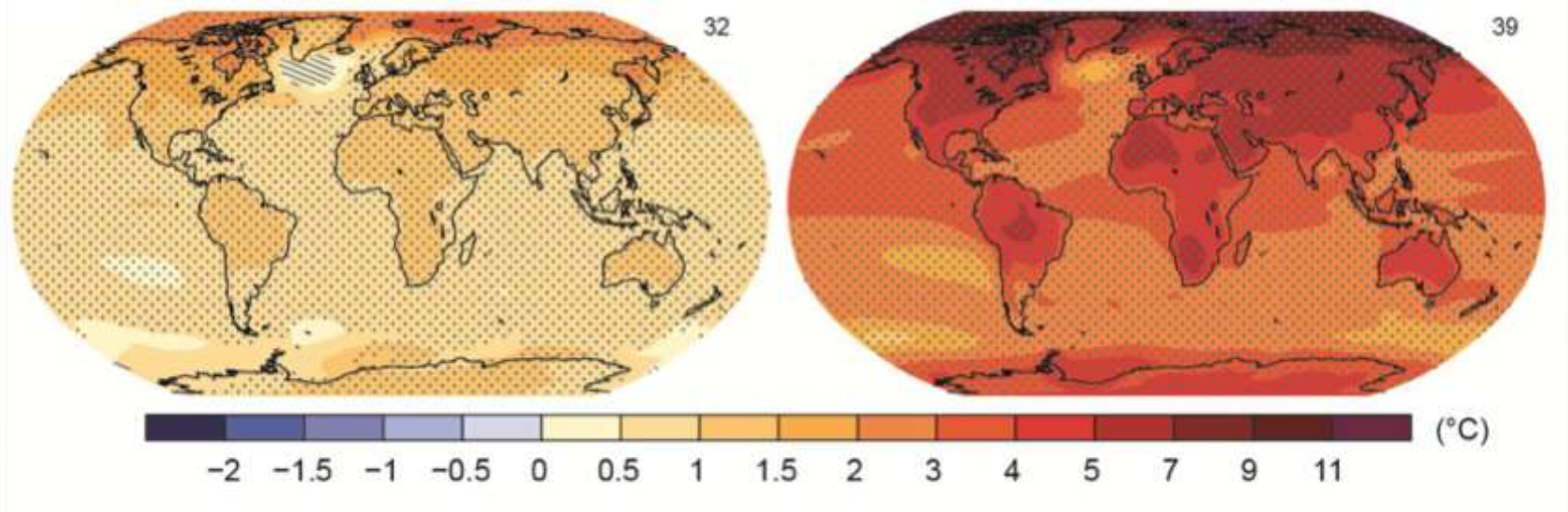


Fossil carbon reserves exceed this remaining budget by a factor of 4 to 7, with resources much larger still.

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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Warming in the climate system is unequivocal, […]

Human influence on the climate system is clear.

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

IPCC Fifth Assessment Report

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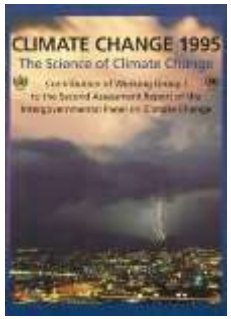
1990

Gave a broad overview of climate change science, discussion of uncertainties and evidence of warming



1995

"The balance of evidence suggests a **discernible** human influence on global climate"

2001

"There is new and **stronger evidence** that most of the warming observed over the last 50 years is attributable to human activities"

2007

"Warming of the climate system is **unequivocal**…"

2013

"Human influence on the climate system is **clear**."

Improvements: