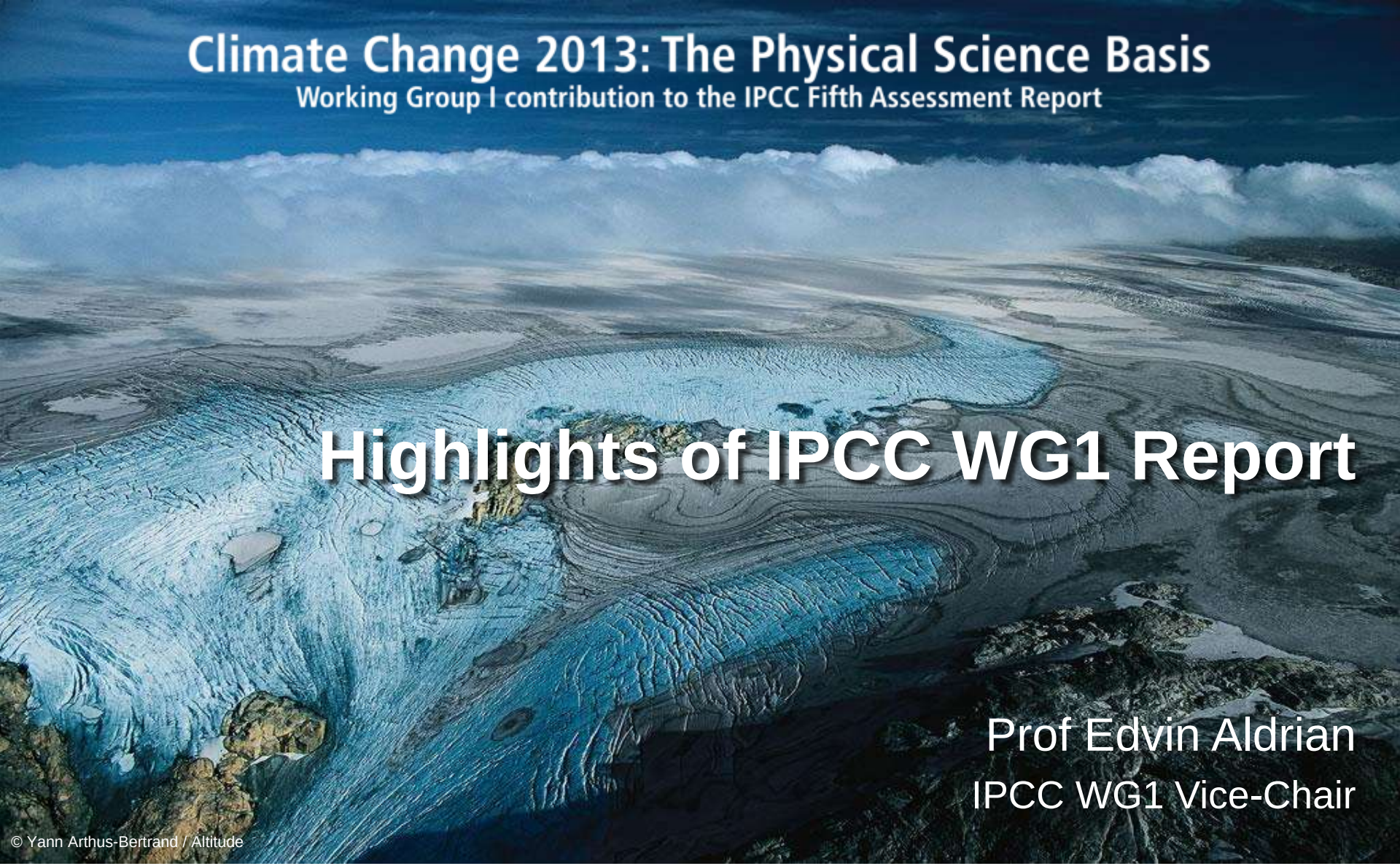


Highlights of IPCC WG1 Report

Prof Edvin Aldrian
IPCC WG1 Vice-Chair

Observations

Understanding

Future

www.climatechange2013.org

Key SPM Messages

19 Headlines

on less than 2 Pages

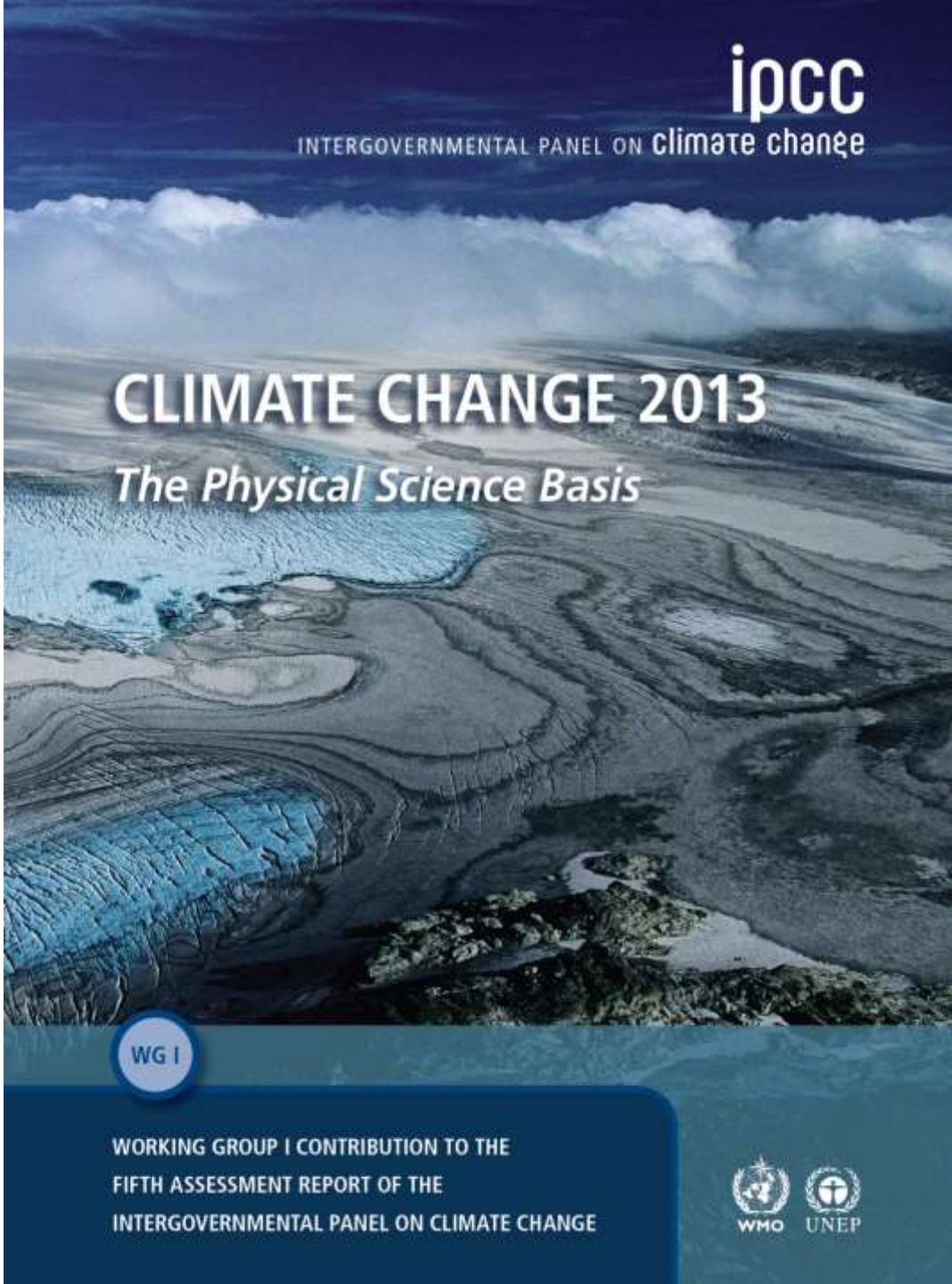
Summary for Policymakers
~14,000 Words

14 Chapters
Atlas of Regional Projections

54,677 Review Comments
by 1089 Experts

2010: 259 Authors Selected

2009: WGI Outline Approved

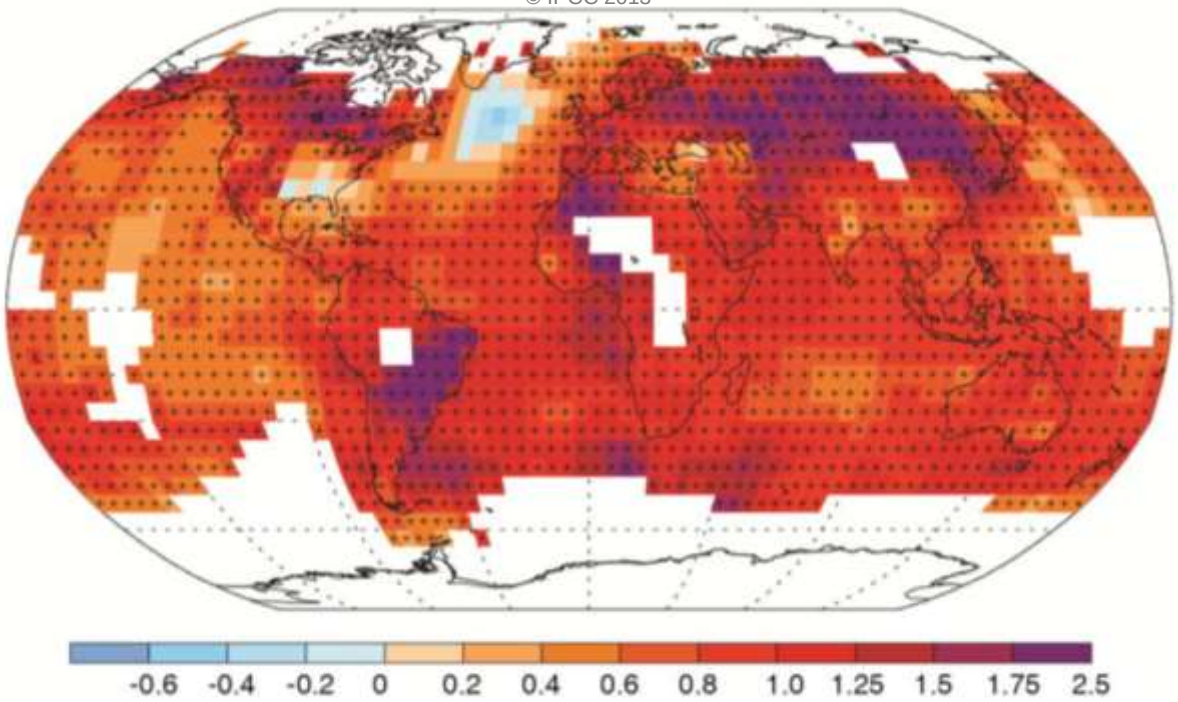


Warming in the climate system is unequivocal

Human influence on the climate system is clear

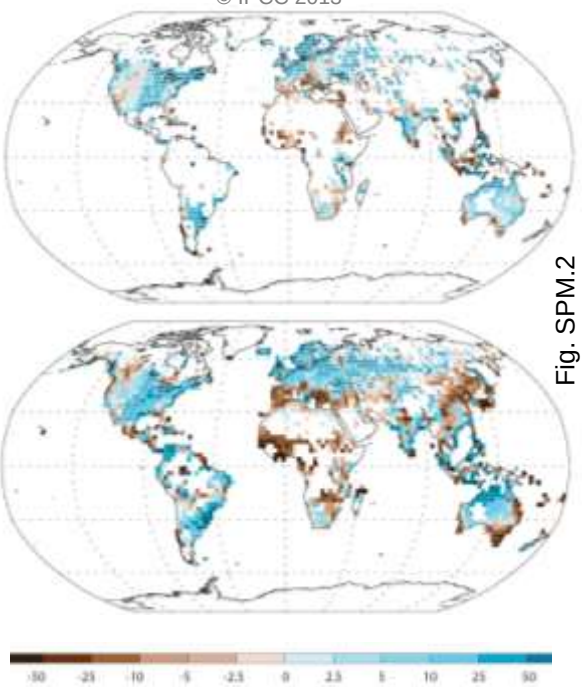
Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions

Fig. SPM.1b



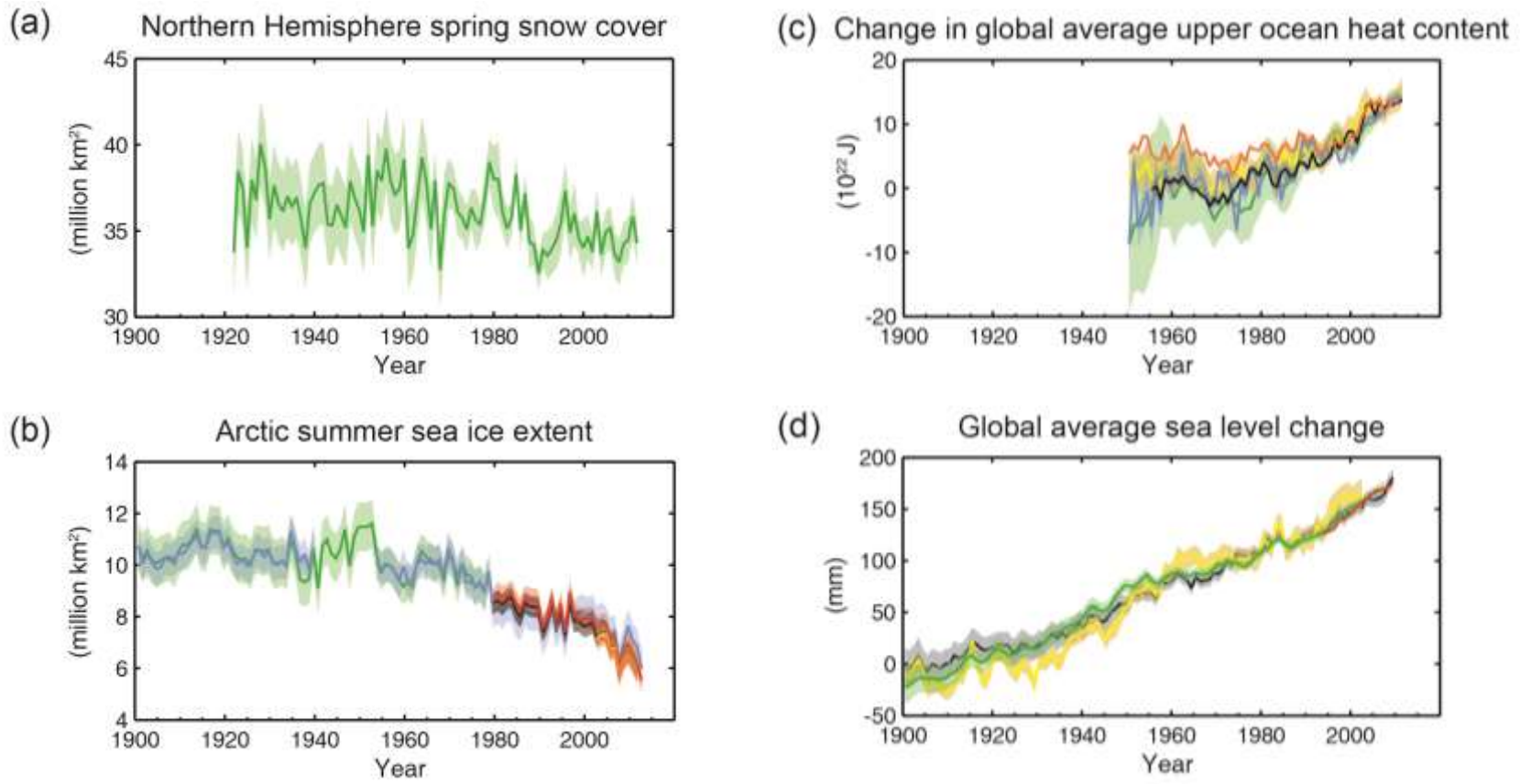
Temperature Difference 1901 to 2012 based on trend (°C)

Fig. SPM.2



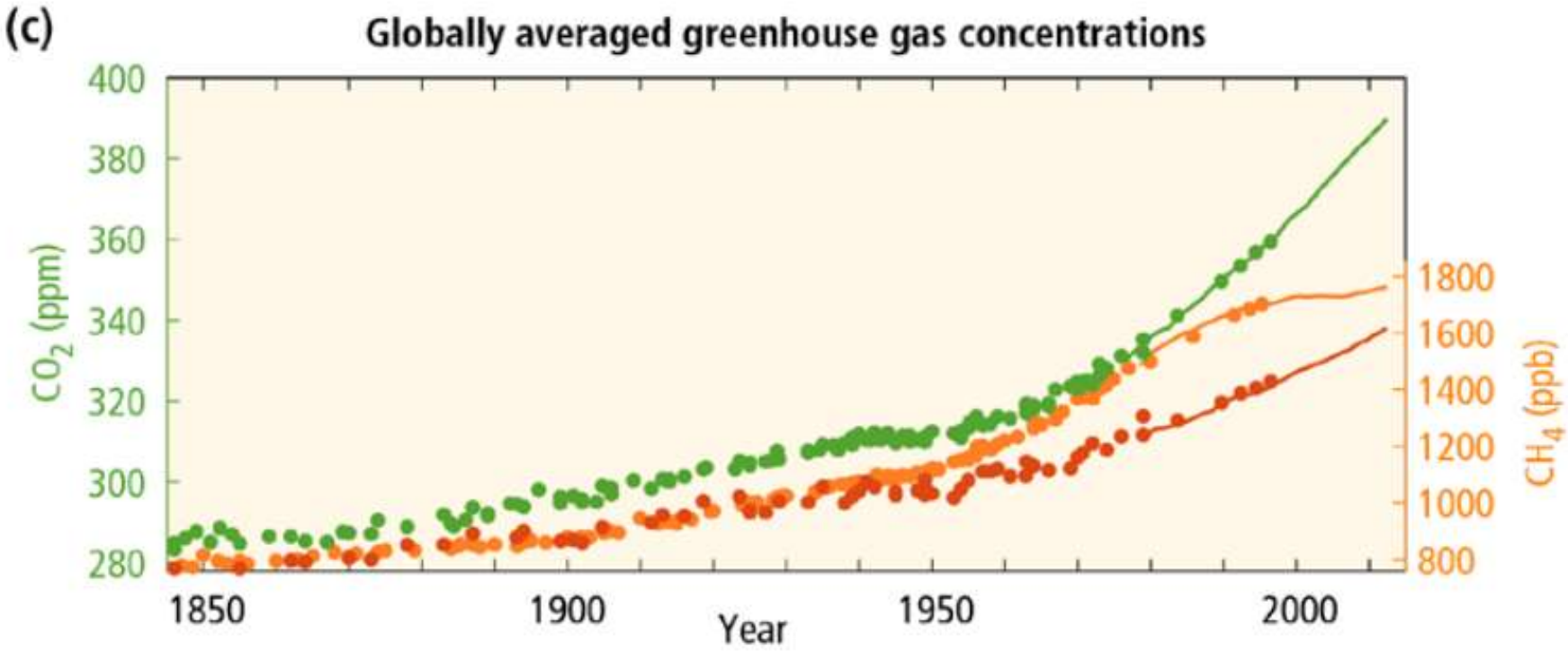
Precipitation Trend (mm/yr per decade)

Warming of the climate system is unequivocal



Warming of the climate system is unequivocal

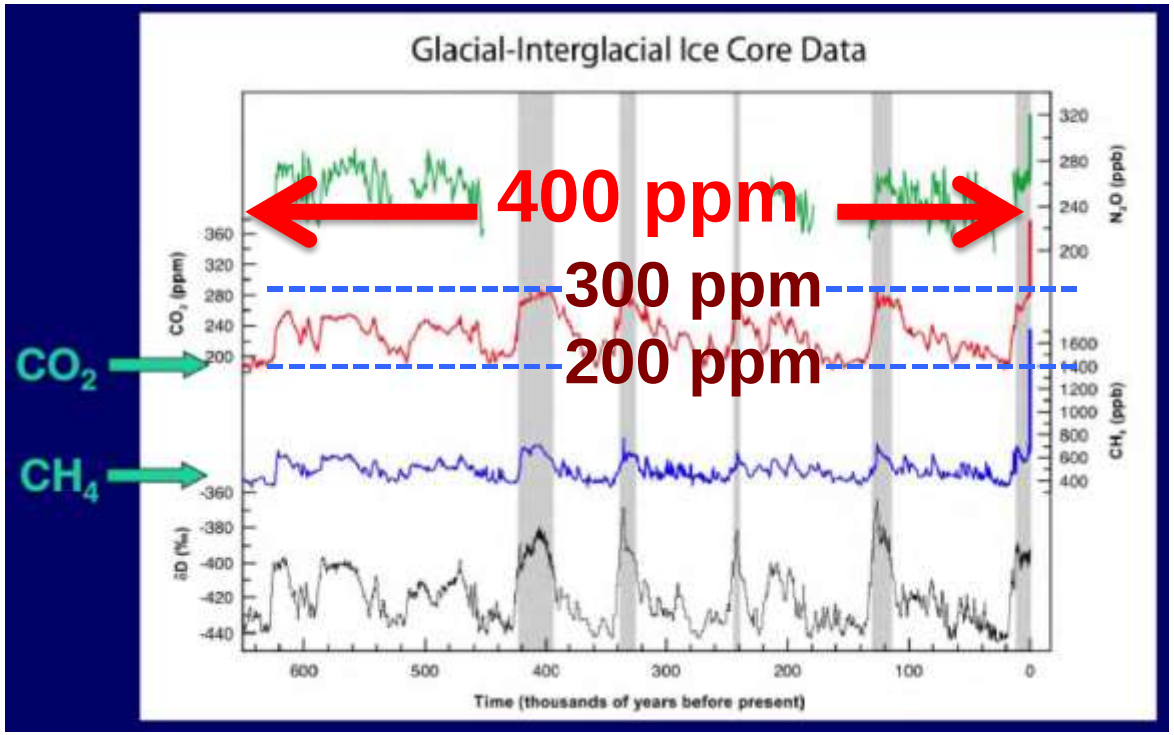
Historical GHG Emission



The atmospheric concentrations of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) have increased to levels unprecedented in at least the last 800,000 years.

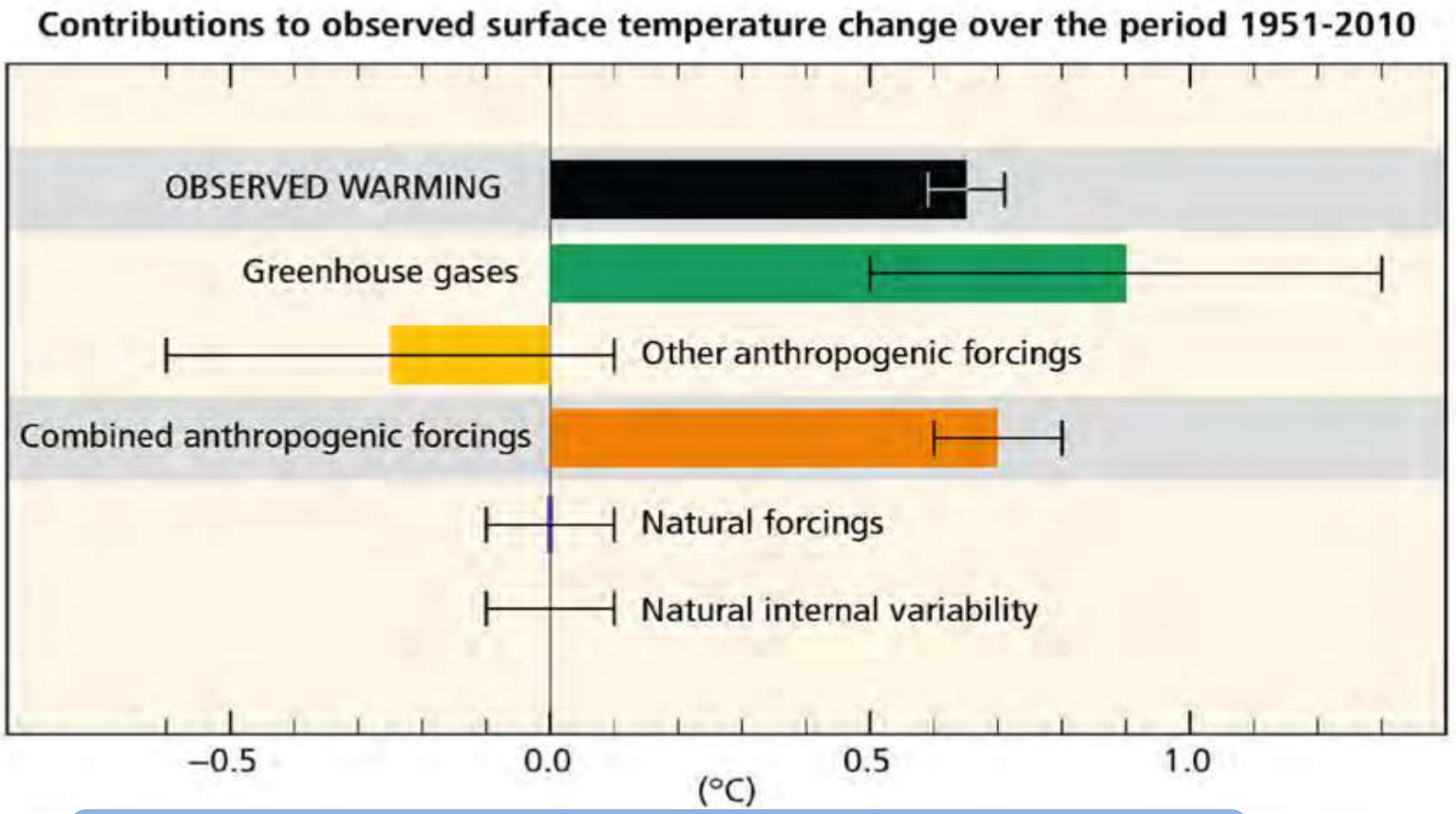
GHG Historical Record in Ice Cores

Ice Cores



IPCC (2007)

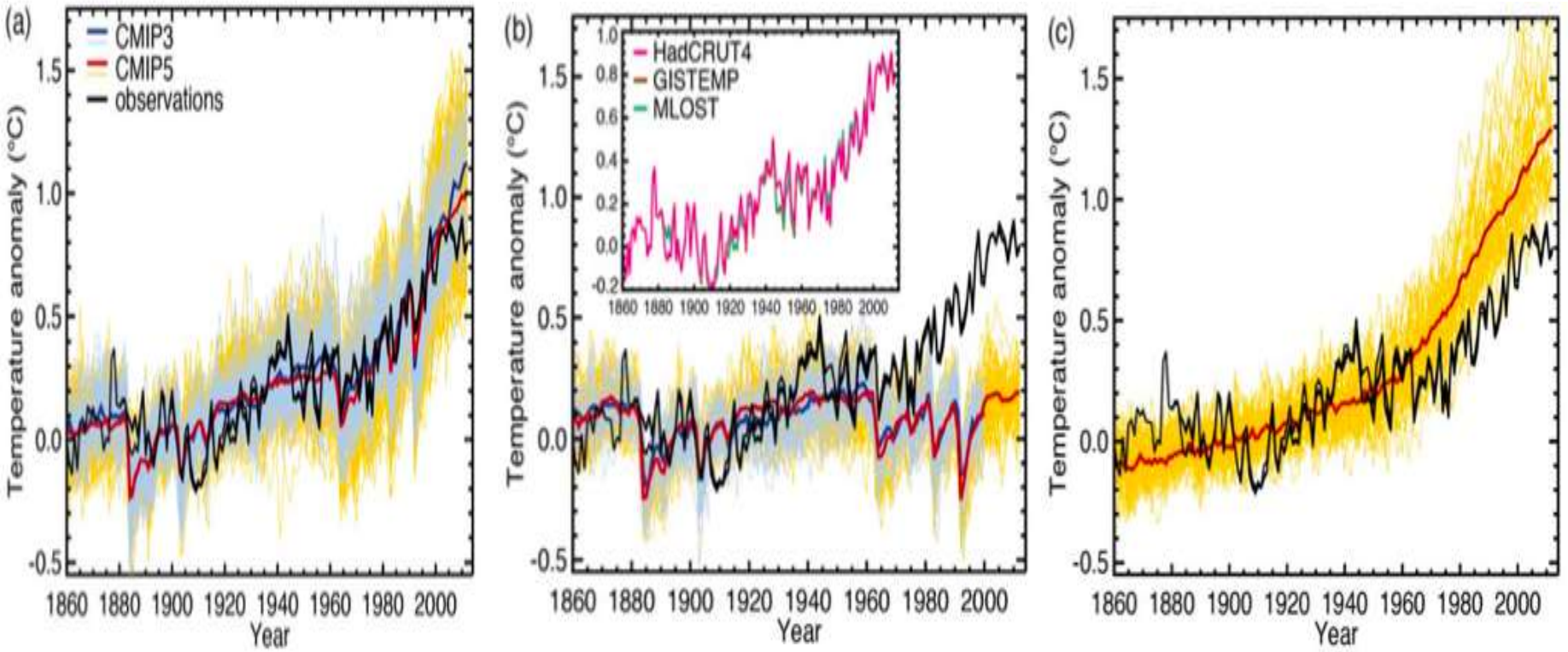
Humans are changing the climate



Human Influence is Clear

Climate Models Responses to Various Forcings

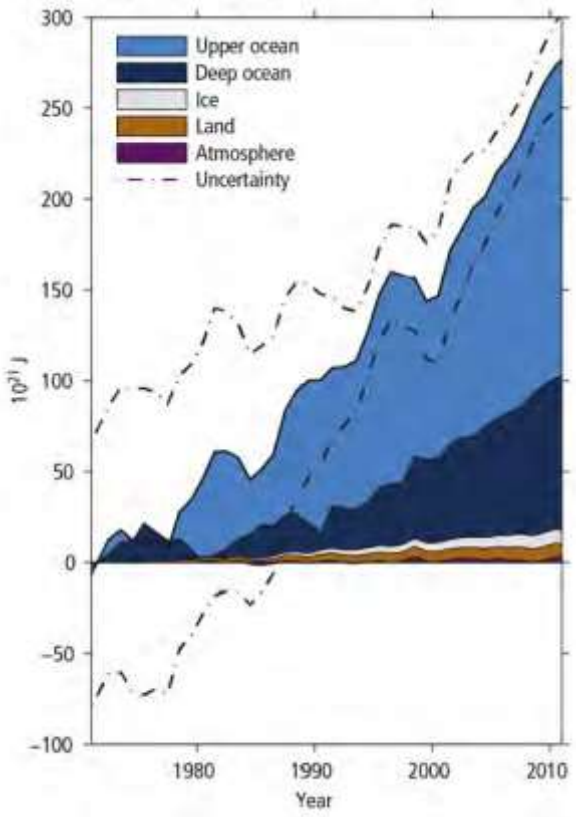
Natural + Anthropogenic | **Natural** | **CO2 forcing only**

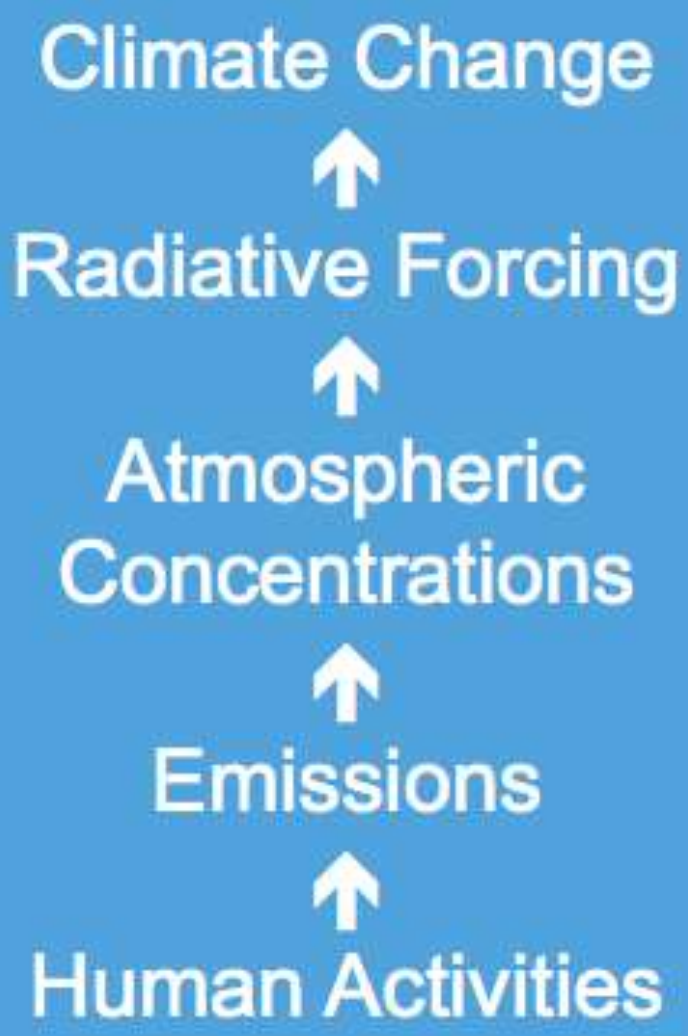


Human Influence is Clear

Earth is in Radiative Imbalance

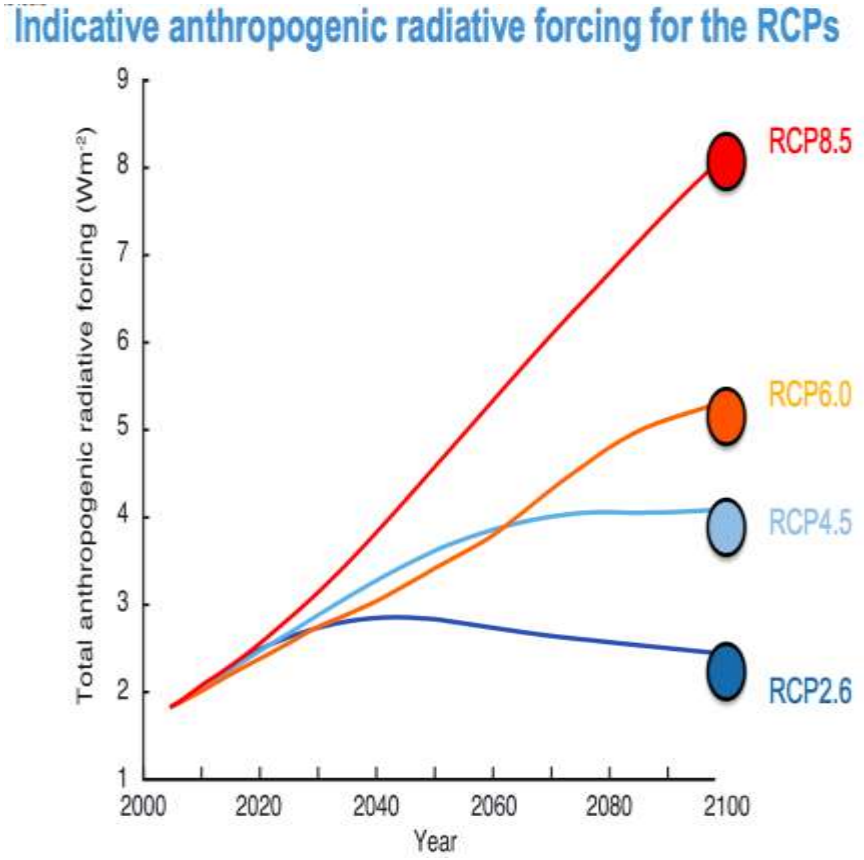
Earth has been in radiative imbalance, with more energy from the sun entering than exiting the top of the atmosphere, since at least circa 1970. It is *virtually certain* that Earth has gained substantial energy from 1971–2010. More than 90% of this extra heat is absorbed by the ocean (*high confidence*)



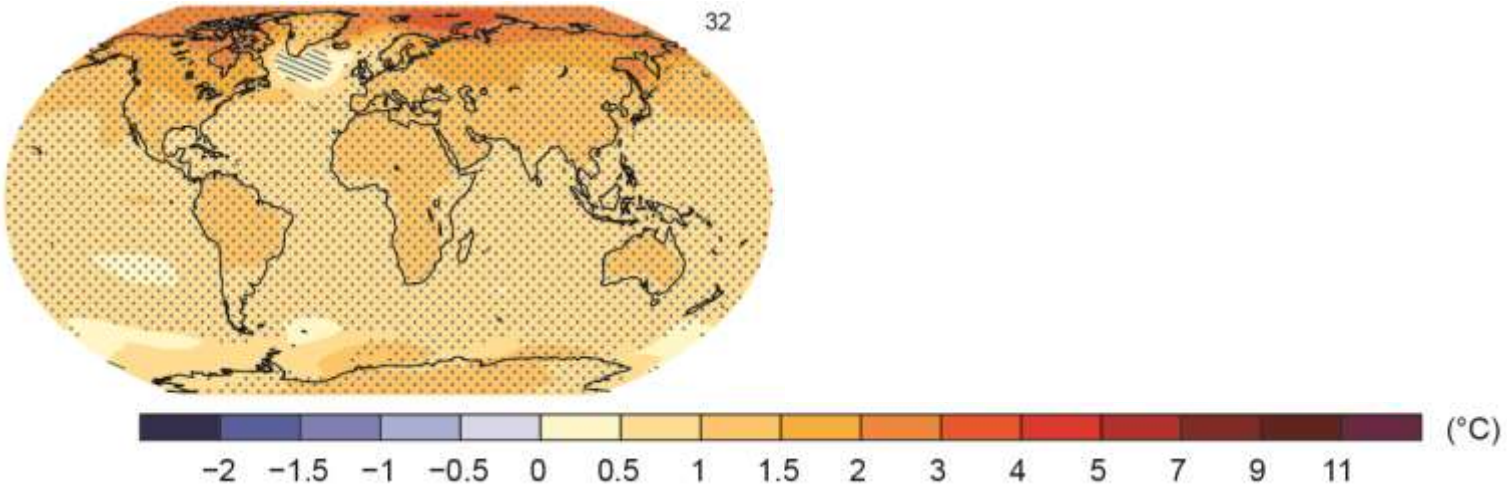

Climate Change
Radiative Forcing
Atmospheric Concentrations
Emissions
Human Activities

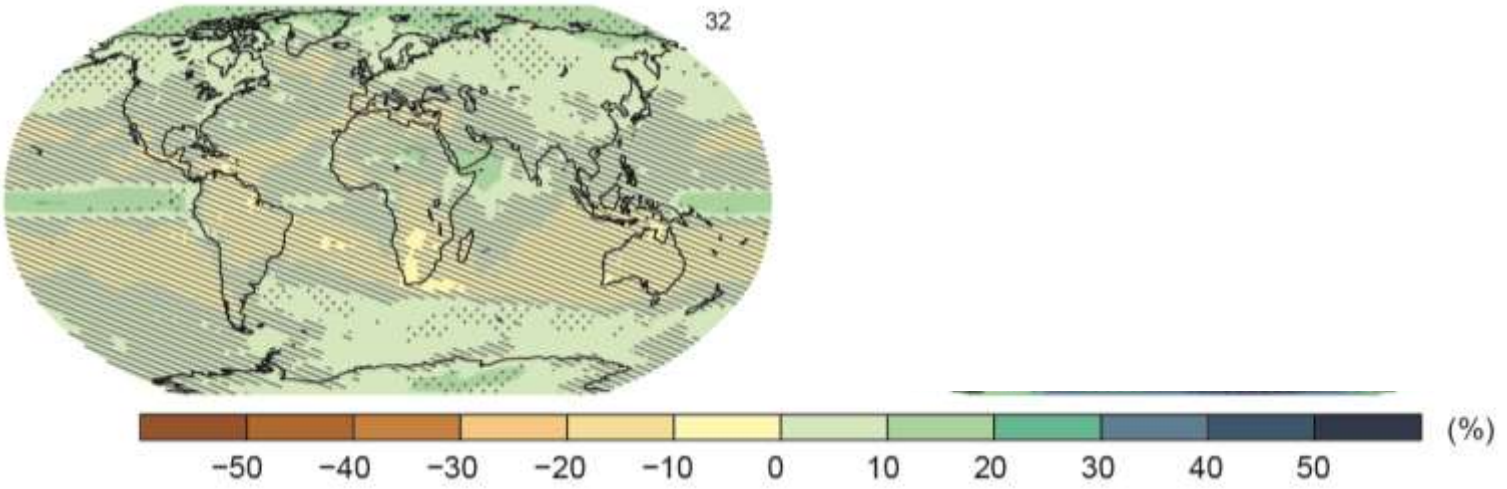
Projecting Future Climate Requires GHG Concentration Pathway

For future climate projections, climate models require Emission Scenarios. Models in AR5 use Representative Concentration Pathway (RCP)



2°C world

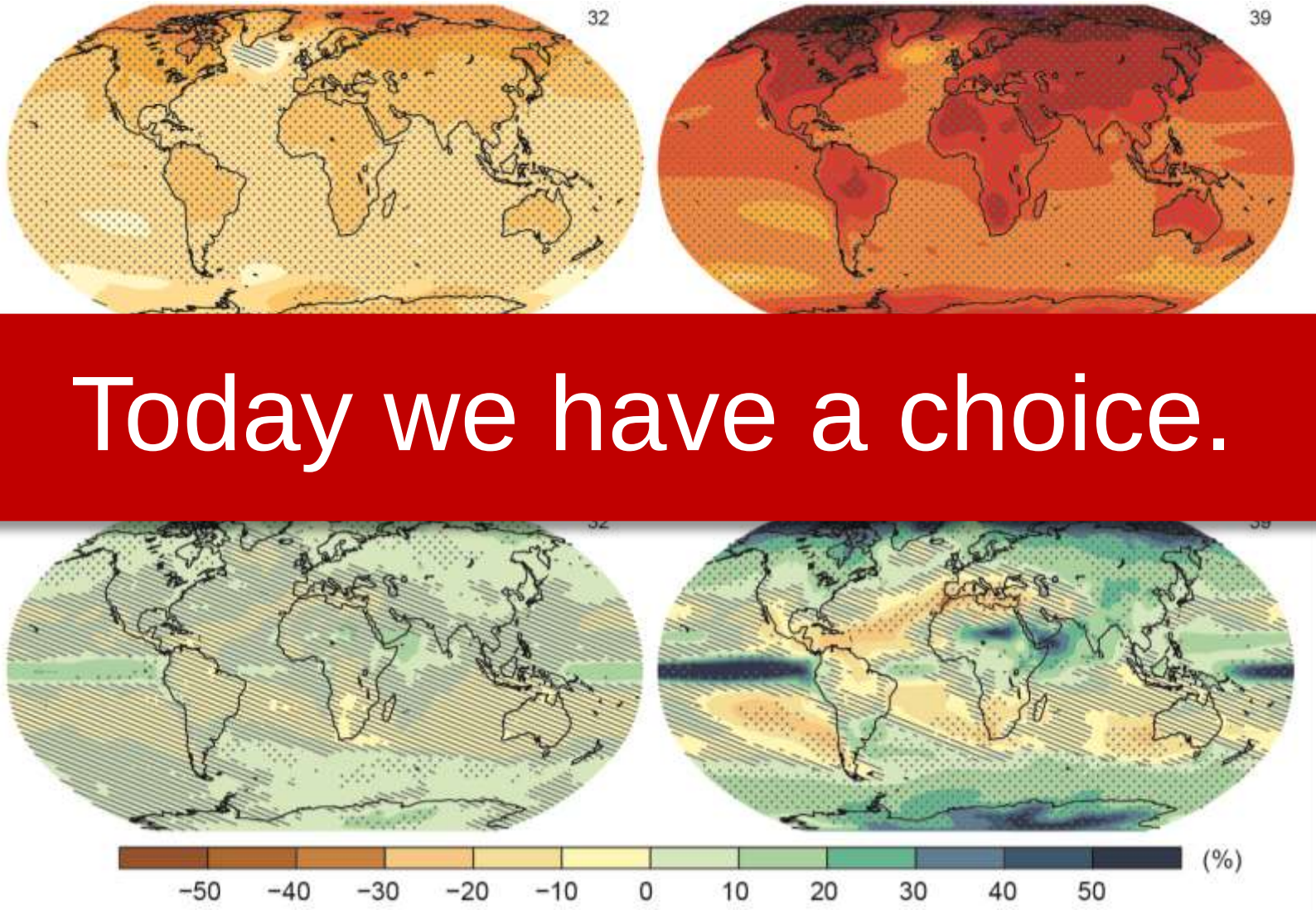




IPCC 2013, Fig. SPM.8

2°C world

4.5°C world



Today we have a choice.

IPCC 2013, Fig. SPM.8

Tropical phenomena: Convergence Zones

Rainfall Change
(*medium confidence*)

"wet-get-wetter" over CZ regions

"warmer-get-wetter" over oceans

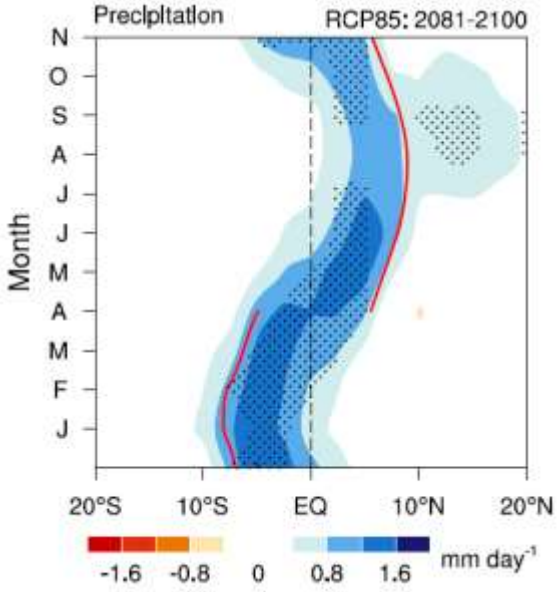


Figure 14.9: Seasonal cycle of zonal-mean tropical precipitation change (2081–2100 in RCP8.5 minus 1986–2005) in CMIP5 multimodel ensemble mean. Eighteen CMIP5 models were used. Stippling indicates that more than 90% models agree on the sign of MME change. The red curve represents the meridional maximum of the climatological rainfall. Adapted from Huang et al. (2013).

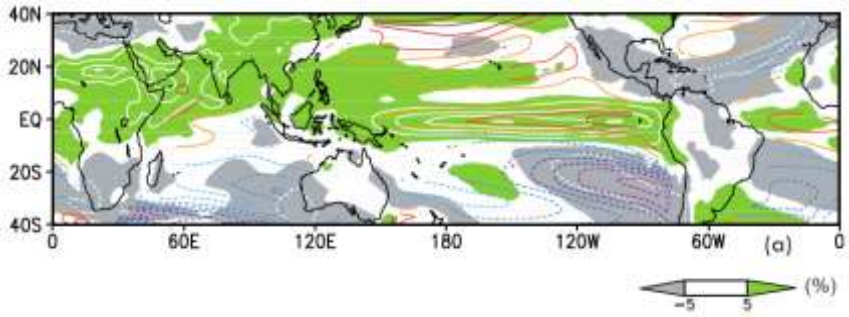


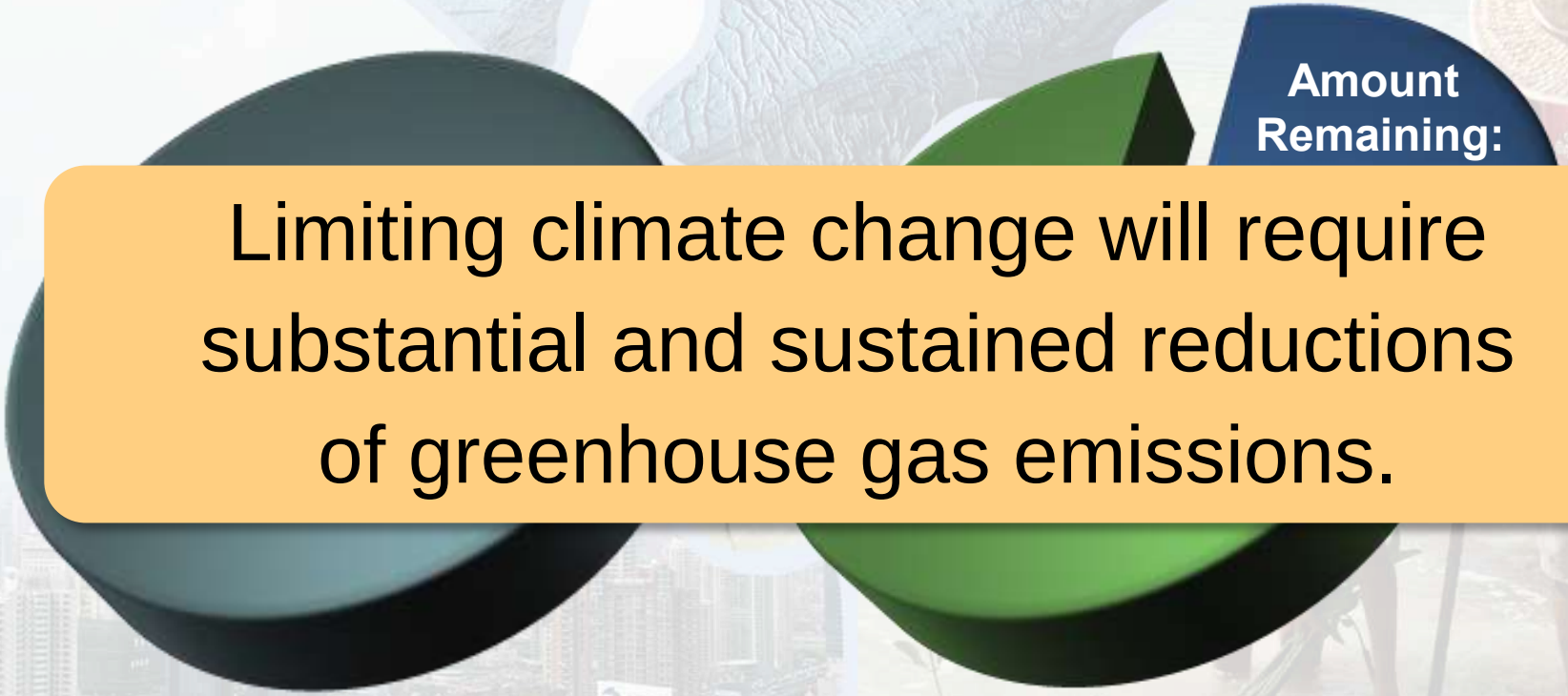
Figure 14.8: Upper panel: Annual-mean precipitation percentage change (ΔP/P in green/gray shade and white contours at 20% intervals), and relative SST change (colour contours at intervals of 0.2°C; negative shaded) to the tropical (20S–20N) mean warming in RCP8.5 projections, shown as 23 CMIP5 model ensemble mean.

The seasonal-mean rainfall is projected to increase on the ITCZ equatorward flank

More warming and rainfall at north of the equator. Less zonal SST gradient across the equatorial Pacific that contribute to the weakened Walker cells.

The window for action is rapidly closing

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



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

CO_2 emissions in 2013: ***9.9 GtC***

ipcc
INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

Annex I: Atlas of Global and Regional Climate Projections

- **35 regions**
- **42 global climate models**
- **2 variables**

  Temperature, Precipitation

- **4 scenarios**

  RCPs 2.6, 4.5, 6.0, 8.5

- **2 seasons**

  temp: DJF, JJA (for temp)

  precip: AMJJAS, ONDJFM

- **Maps for 3 time horizons**

  2016-35, 2046-65, 2081-2100

  reference period 1986-2005

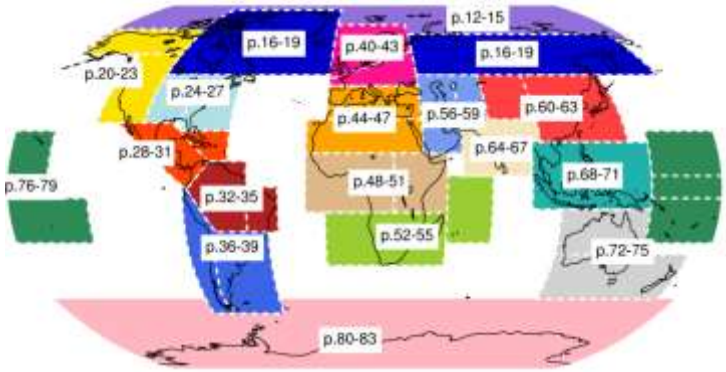
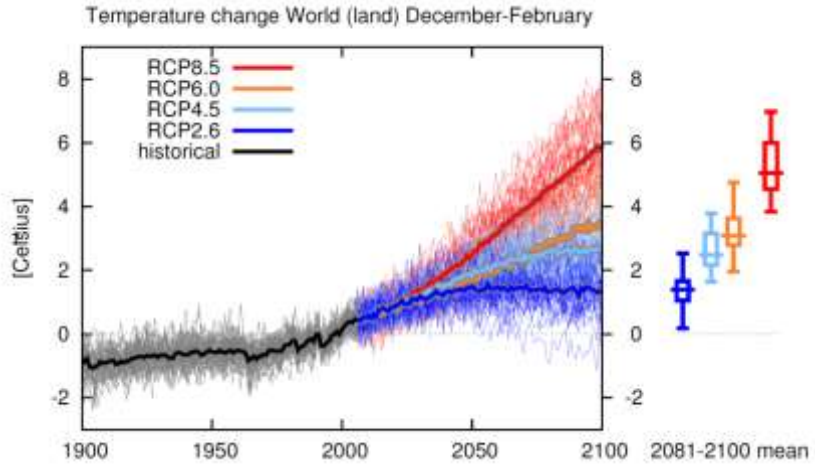


Fig. AI.3



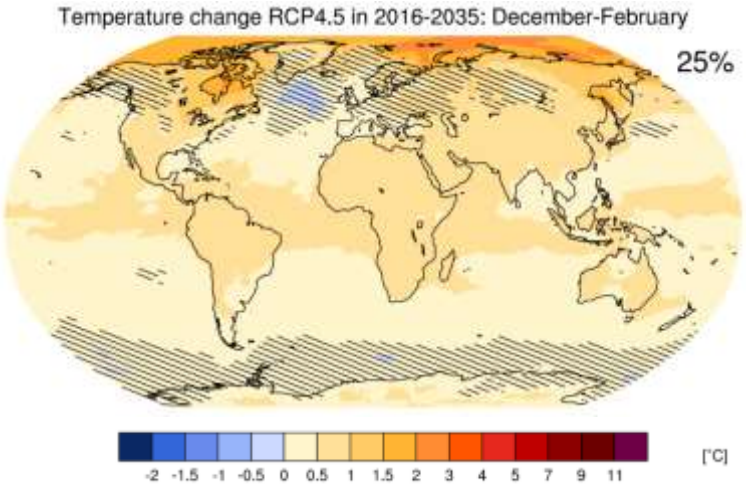
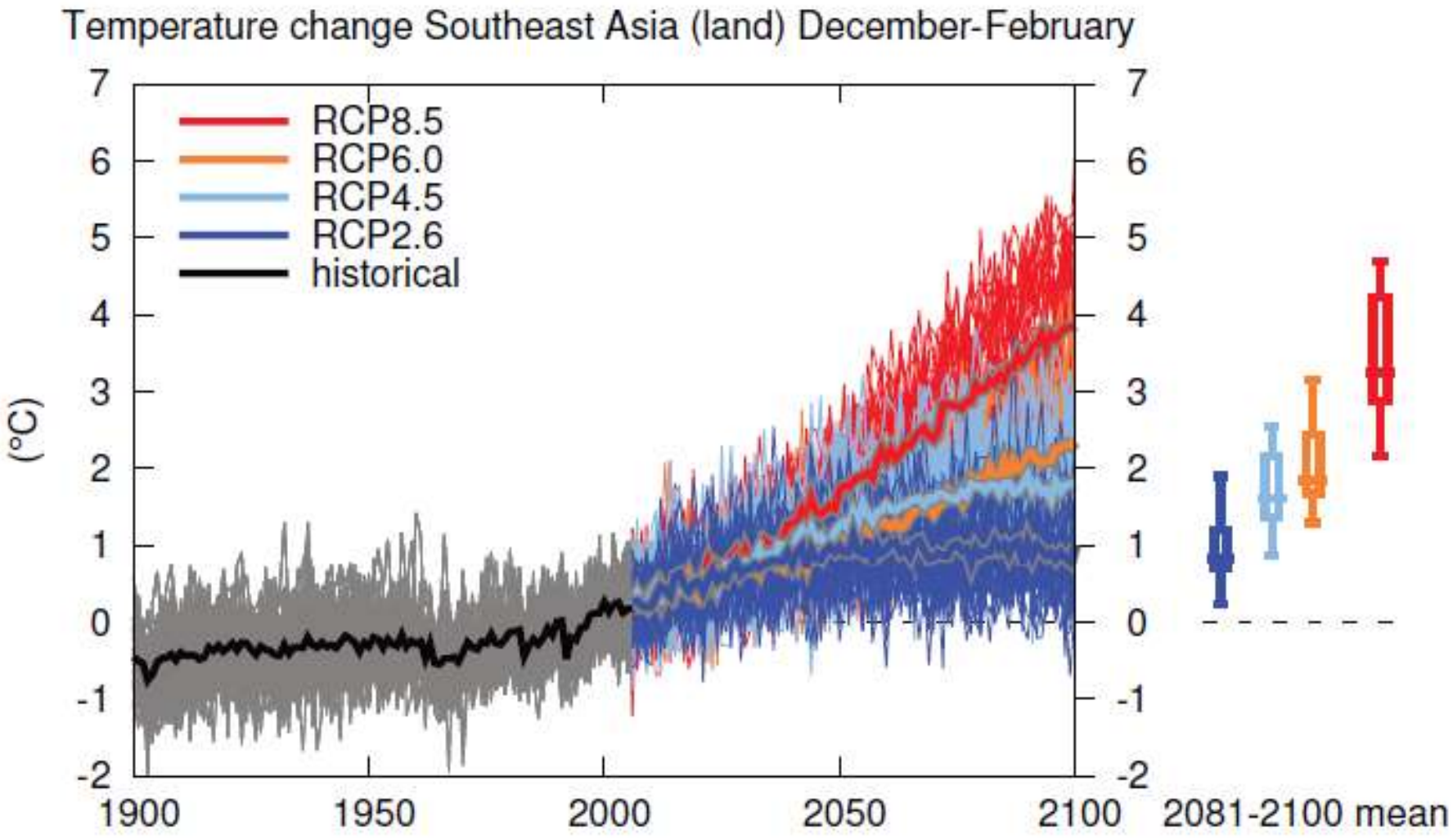
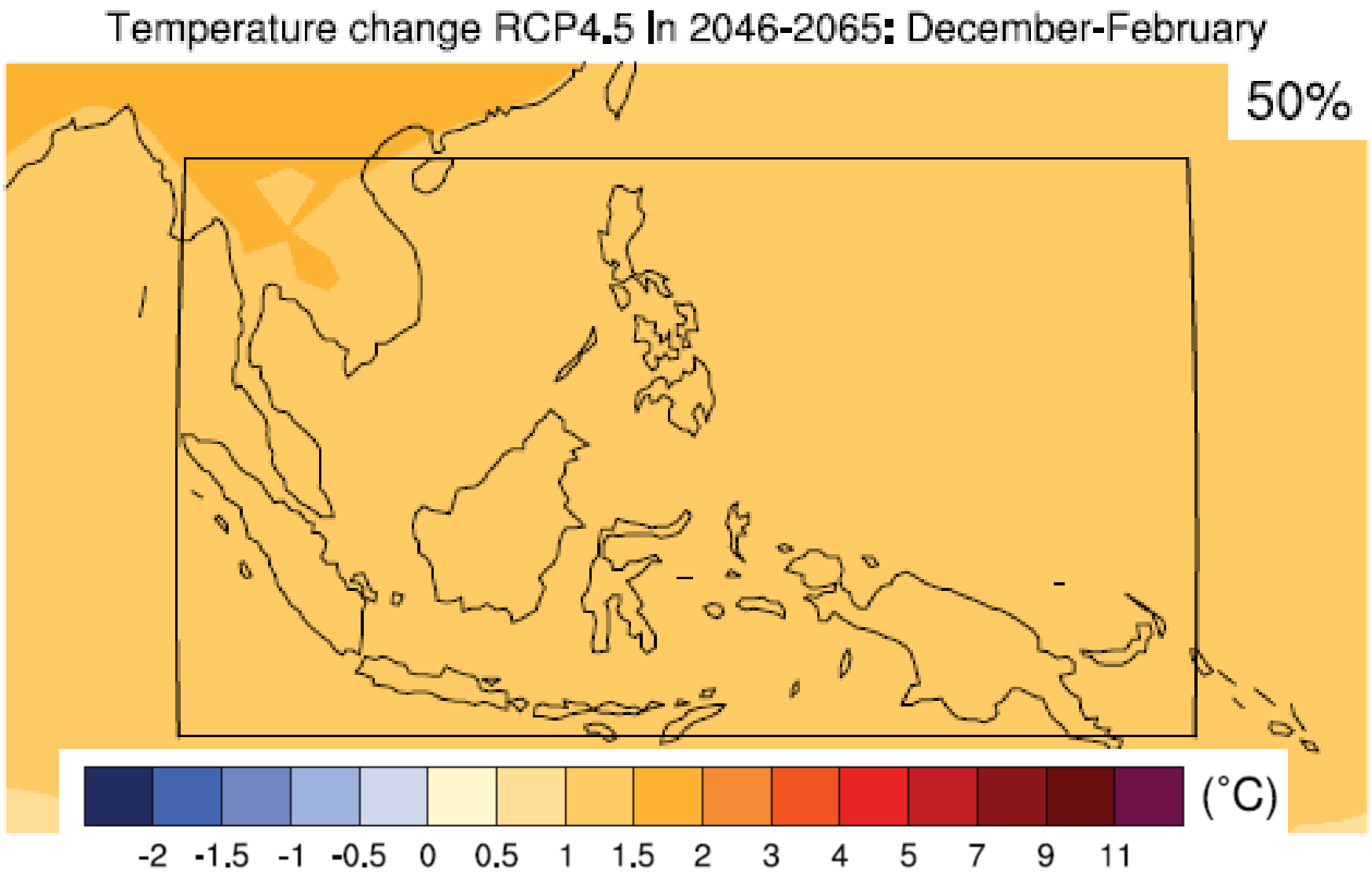


Fig. AI.4

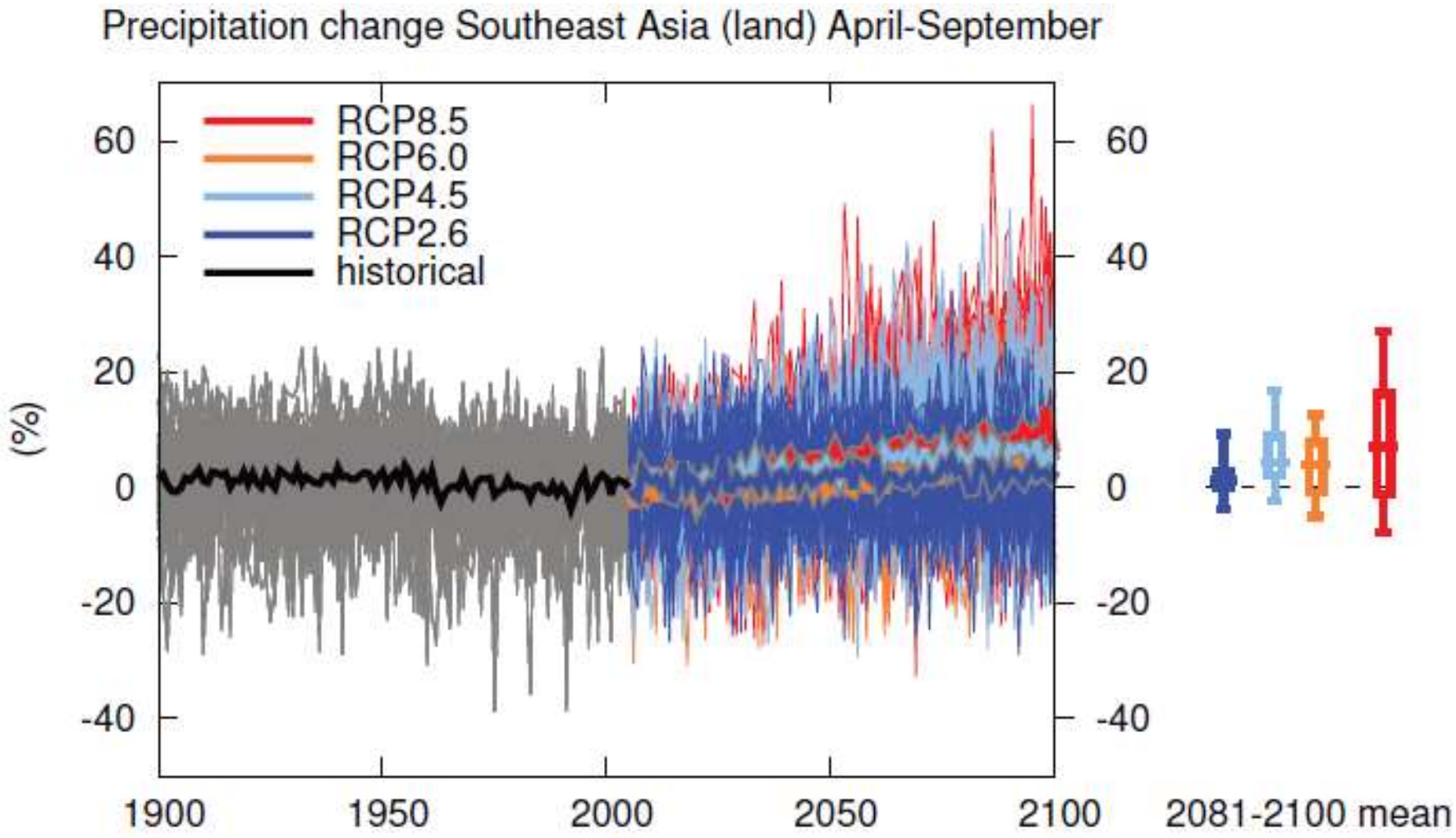
Temperature Change Graph – Southeast Asia



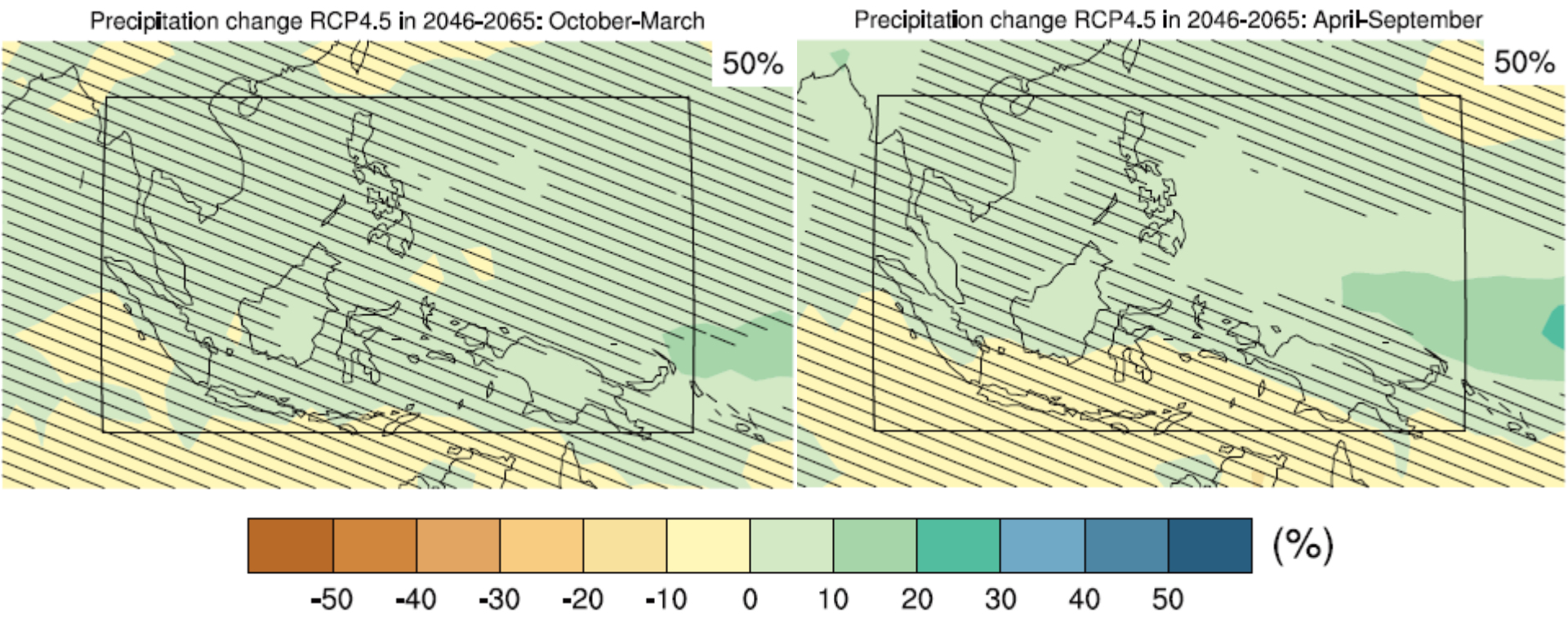
Temperature Change Map Southeast Asia – RCP4.5



Rainfall Change Graph – Southeast Asia



Rainfall Change Maps Southeast Asia - RCP4.5



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