

Climate Change: Urgency, Ambition, Innovation, and Collaboration

*Key messages from the IPCC
Fifth Assessment Report (AR5)*

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Why the IPCC ?

Established by WMO and UNEP in 1988

to provide **policy-makers** with an **objective source of information** about

- causes of climate change,
- potential environmental and socio-economic impacts,
- possible response options (adaptation & mitigation).

WMO=World Meteorological Organization

UNEP= United Nations Environment Programme



Key messages from IPCC AR5

- **Human influence on the climate system is clear**
- **Continued emissions of greenhouse gases will increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems**
- **While climate change is a threat to sustainable development, there are many opportunities to integrate mitigation, adaptation, and the pursuit of other societal objectives**
- **Humanity has the means to limit climate change and build a more sustainable and resilient future**

Since 1950, **extreme hot days** and **heavy precipitation** have become more common



There is evidence that anthropogenic influences, including increasing atmospheric **greenhouse gas concentrations**, have changed these extremes

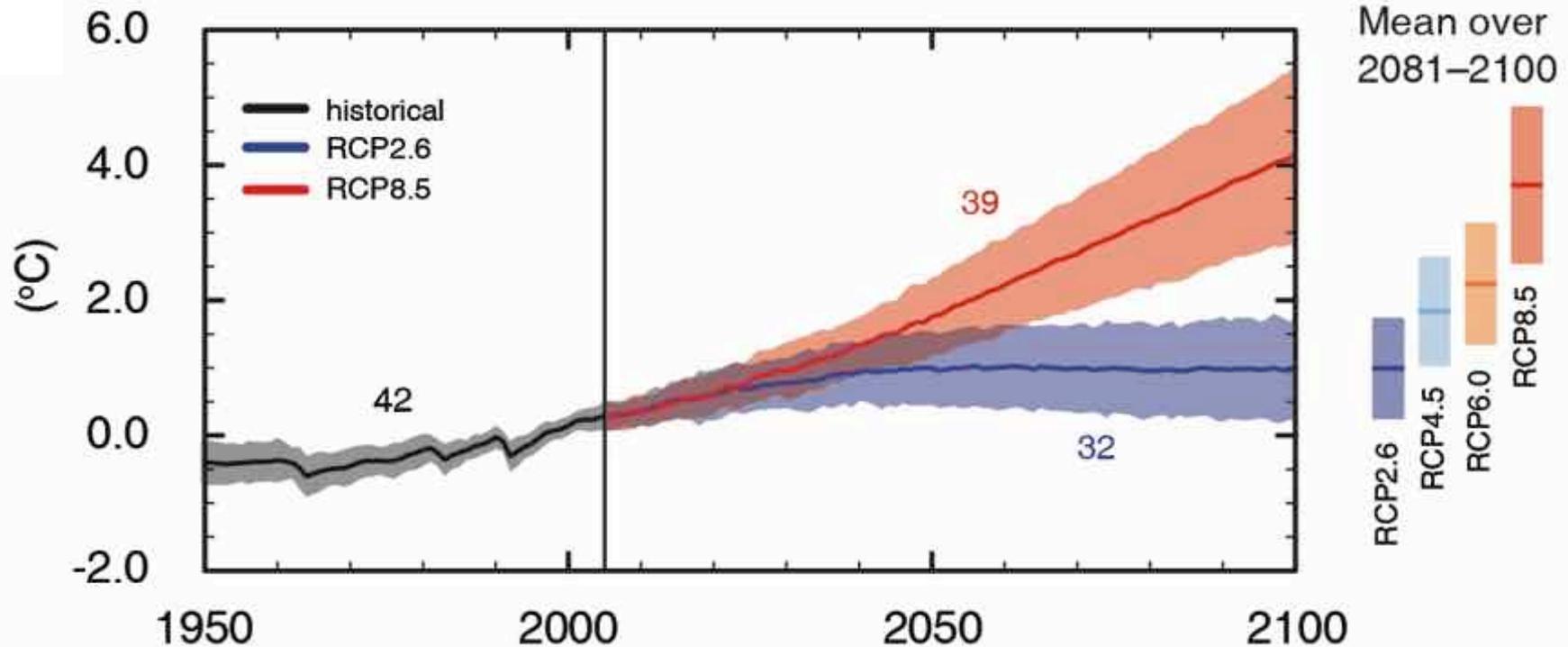
Impacts are already underway

- **Tropics to the poles**
- **On all continents and in the ocean**
- **Affecting rich and poor countries (but the poor are more vulnerable everywhere)**



AR5 WGII SPM

Global average surface temperature change



(IPCC 2013, Fig. SPM.7a)

Only the lowest (RCP2.6) scenario maintains the global surface temperature increase above the pre-industrial level to less than 2°C with at least 66% probability

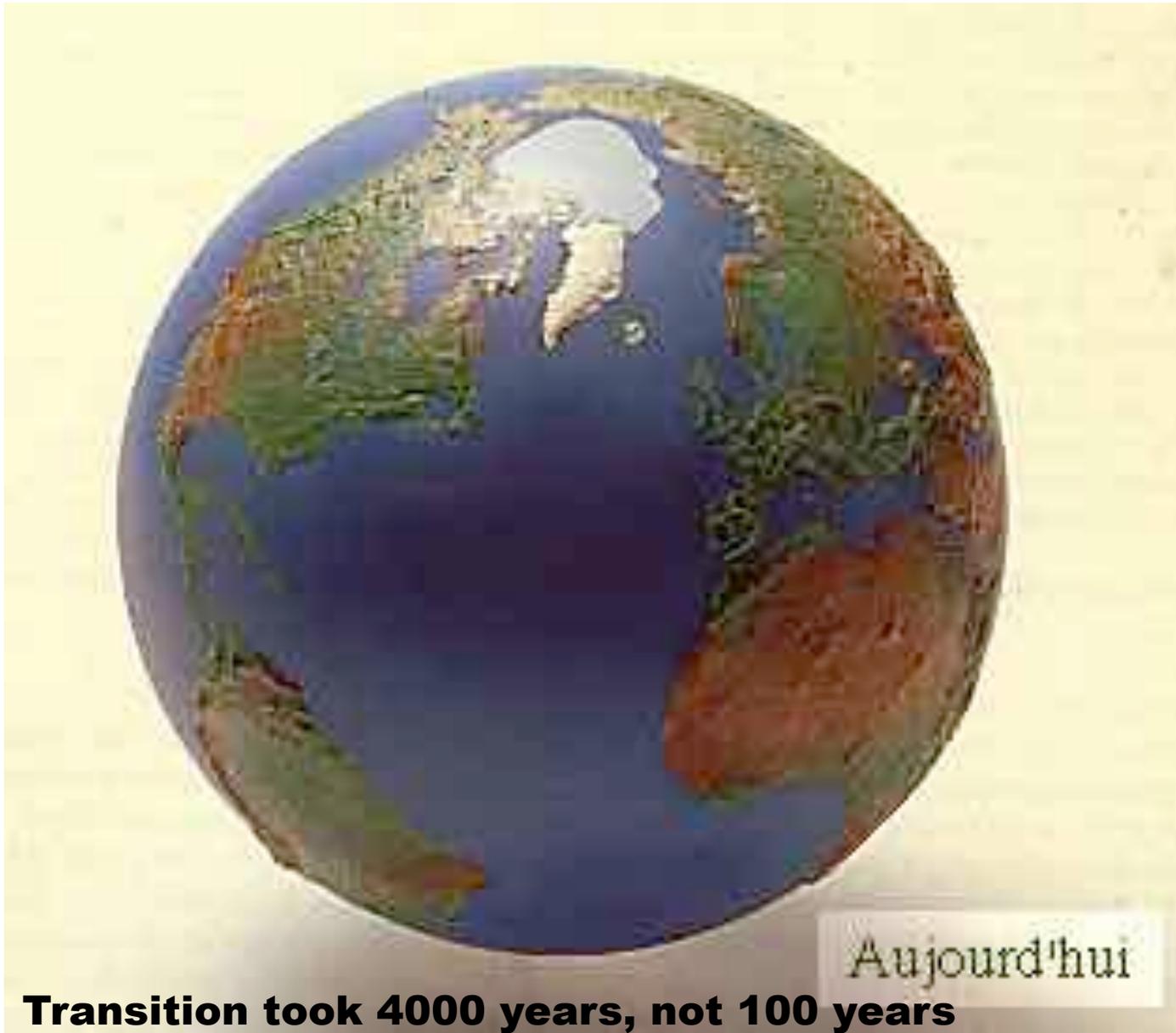
18-20000 years ago (Last Glacial Maximum)

With permission from Dr. S. Jousaume, in « Climat d'hier à demain », CNRS éditions.



Today, with +4-5°C globally

With permission from Dr. S. Joussaume, in « Climat d'hier à demain », CNRS éditions.

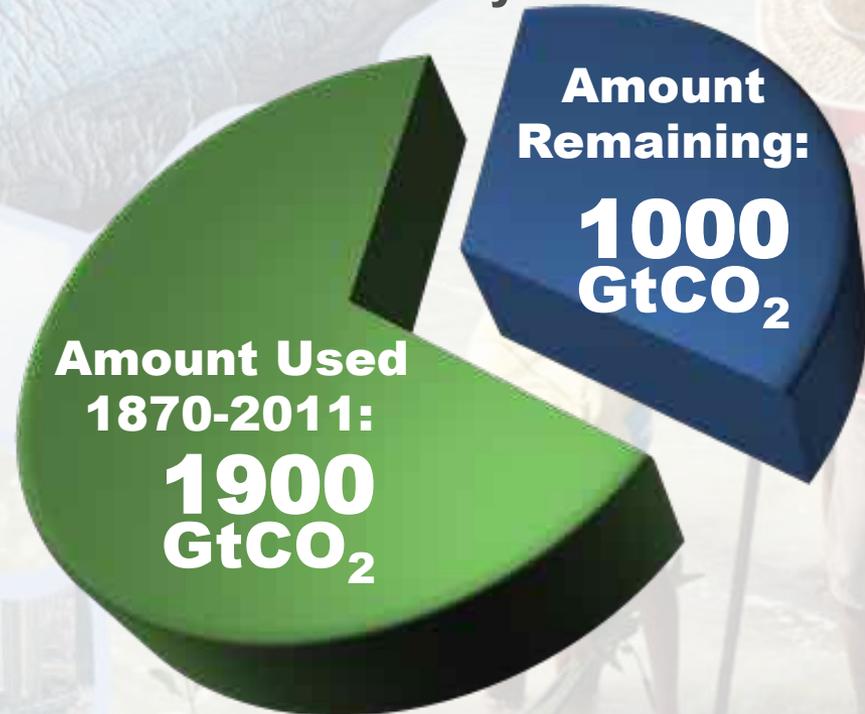


Transition took 4000 years, not 100 years

Urgency

The window for action is rapidly closing

65% of the carbon budget compatible with a 2°C goal is already used
NB: this is with a probability greater than 66% to stay below 2°C



NB: Emissions in 2011: 38 GtCO₂/yr

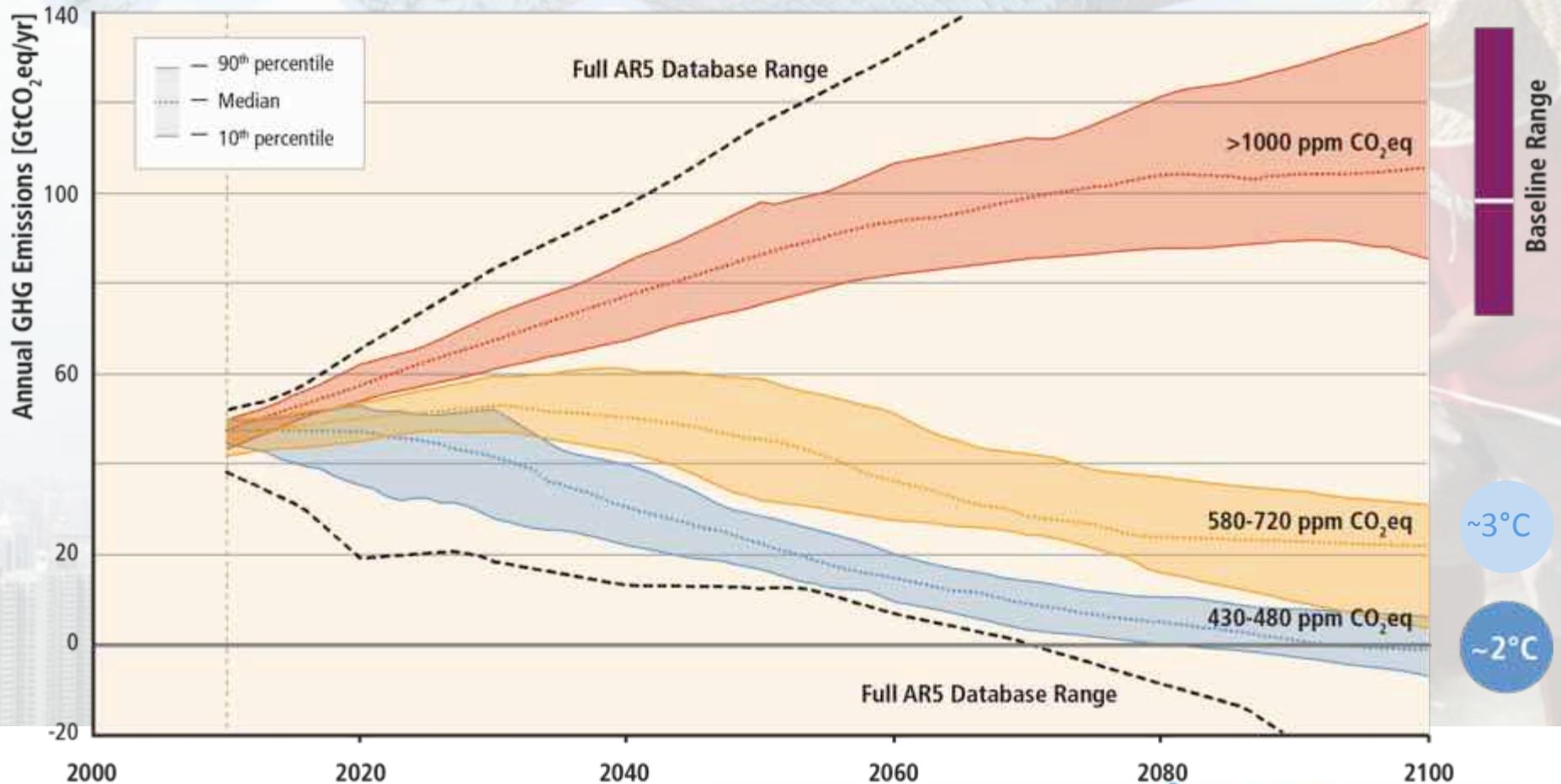
AR5 WGI SPM

Ambition

**« Limiting warming to
below 2°C...**

**... requires substantial
emissions reductions over
the next few decades and
near zero emissions of
CO₂ and other long-lived
greenhouse gases by the
end of the century » (AR5 SYR)**

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



Based on Figure 6.7

Ambitious Mitigation Is Affordable

- Economic growth only reduced by $\sim 0.06\%$ (BAU growth 1.6 - 3%/year)
- 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 and efforts to eradicate poverty

AR5 WGI SPM, AR5 WGII SPM

NB: Ambition *before* 2020 is essential as well (lock-in & entrainment effects)

- **Substantial reductions in emissions would require large changes in investment patterns e.g., from 2010 to 2029, in billions US dollars/year:**

(mean numbers rounded, IPCC AR5 WGIII Fig SPM 9)

- **energy efficiency: +330**
- **renewables: + 90**
- **power plants w/ CCS: + 40**
- **nuclear: + 40**
- **power plants w/o CCS: - 60**
- **fossil fuel extraction: - 120**

Innovation

**(12 occurrences in Synthesis
Report SPM)**

- **Mitigation requires major technological and institutional changes including the upscaling of low- and zero carbon energy (quadrupling from 2010 to 2050 for the scenario limiting warming below 2°C)**

Mitigation Measures



More efficient use of energy



Greater use of low-carbon and no-carbon energy

- Many of these technologies exist today
- But worldwide investment in **research** in support of GHG mitigation is small...



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

Cooperation

38 occurrences in SYR text

IPCC AR5 on Cooperation:

- **Effective *mitigation* will not be achieved if individual agents advance their own interests independently**
- **The effectiveness of *adaptation* can be enhanced through complementary actions across levels, including international cooperation**
- **The evidence suggests that outcomes seen as *equitable* can lead to more effective cooperation**

Useful links:



- www.ipcc.ch : IPCC (reports and videos)
- www.climate.be/vanyp : my slides and other documents, including my candidacy
- www.skepticalscience.com: excellent responses to contrarians arguments
- **On Twitter: @JPvanYpersele
and @IPCC_CH**