

Climate Change:

A few important facts, and a few possible elements of solution

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**« Climate justice for all: climate change and just transition »,
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Thanks to the Walloon government for supporting www.plateforme-wallonne-giec.be & my team at UCLouvain

Fact n° 1: Because we use the atmosphere as a dustbin for our greenhouse gases, we thicken the insulation layer around the planet

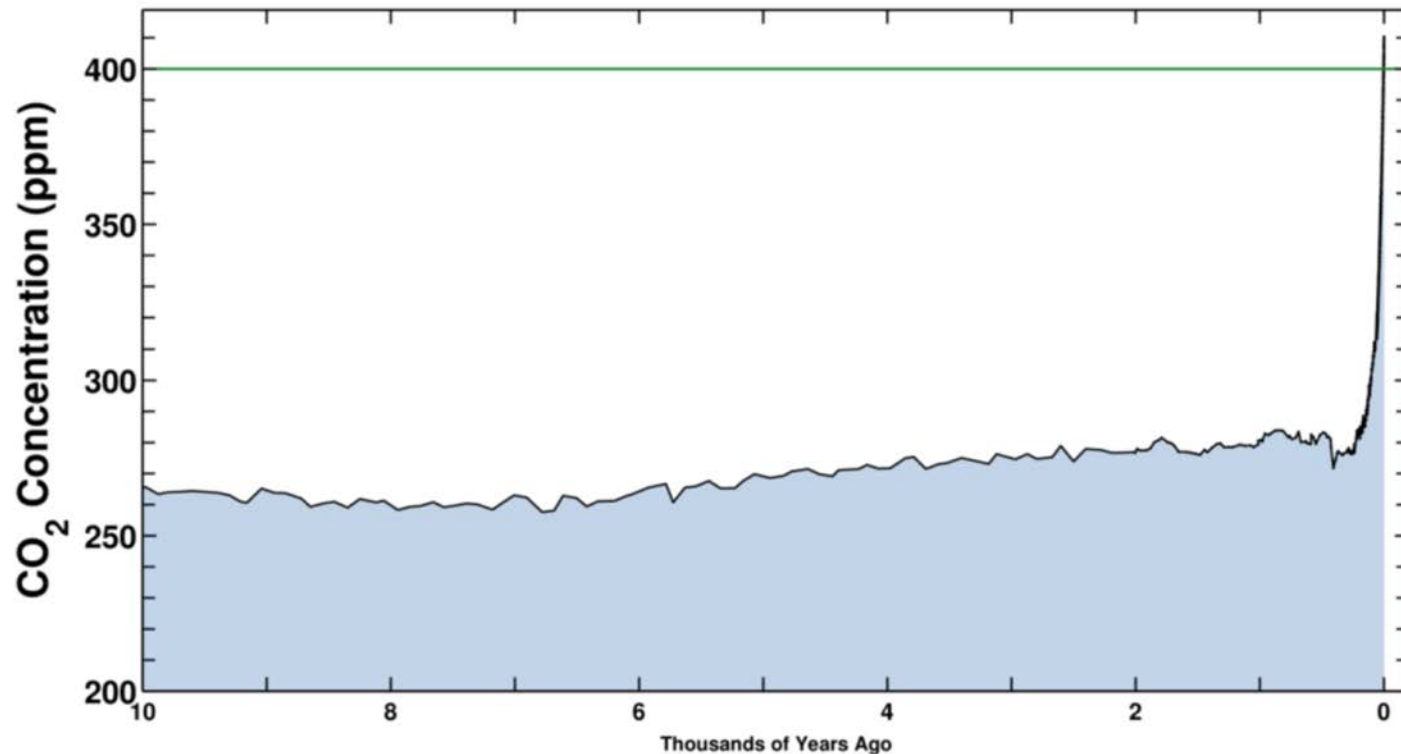
That is why we must cut emissions to ZERO as soon as possible

CO₂ Concentration, 28 May 2018 (Keeling curve)

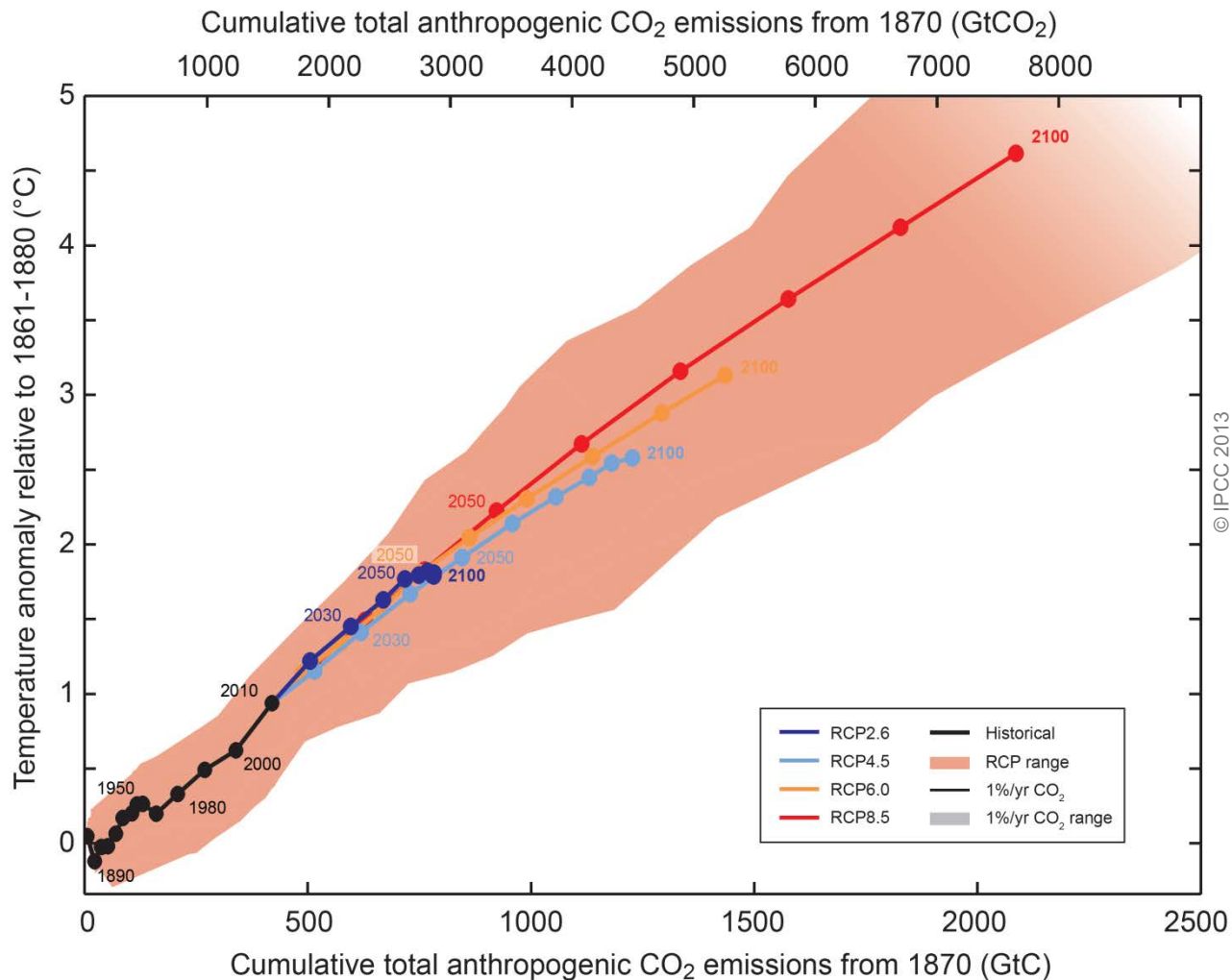
Latest CO₂ reading
May 28, 2018

411.98 ppm

Ice-core data before 1958. Mauna Loa data after 1958.



Source: scripps.ucsd.edu/programs/keelingcurve/



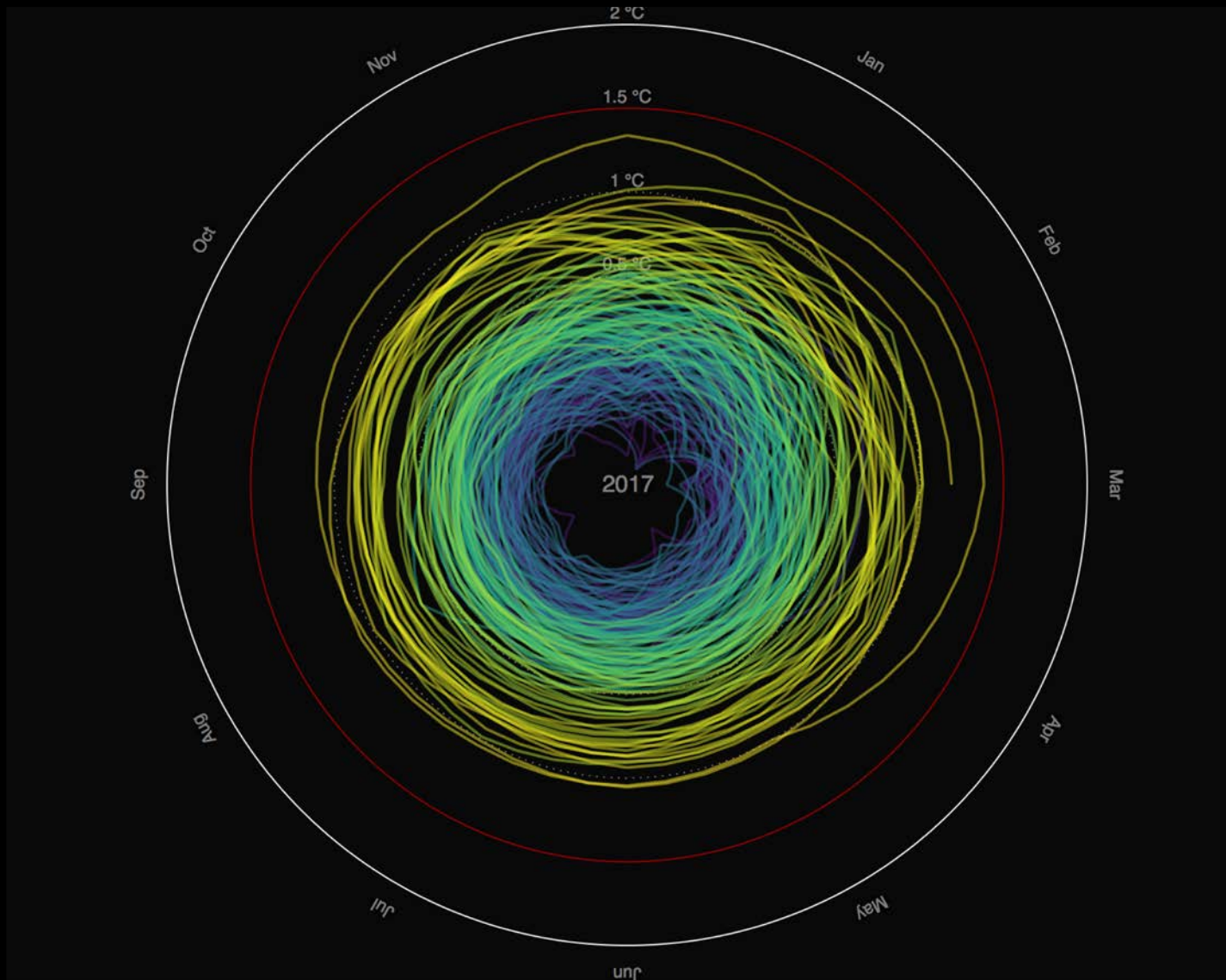
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Fig. SPM.10

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

**Fact n° 2: We have changed the
composition of the atmosphere
and disturbed the climate
system**

Temperature spiral



Global Mean Temperature in °C relative to 1850 – 1900

Graph: Ed Hawkins (Climate Lab Book) – Data: HadCRUT4 global temperature dataset

Animated version available on <http://openclimatedata.net/climate-spirals/temperature>

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



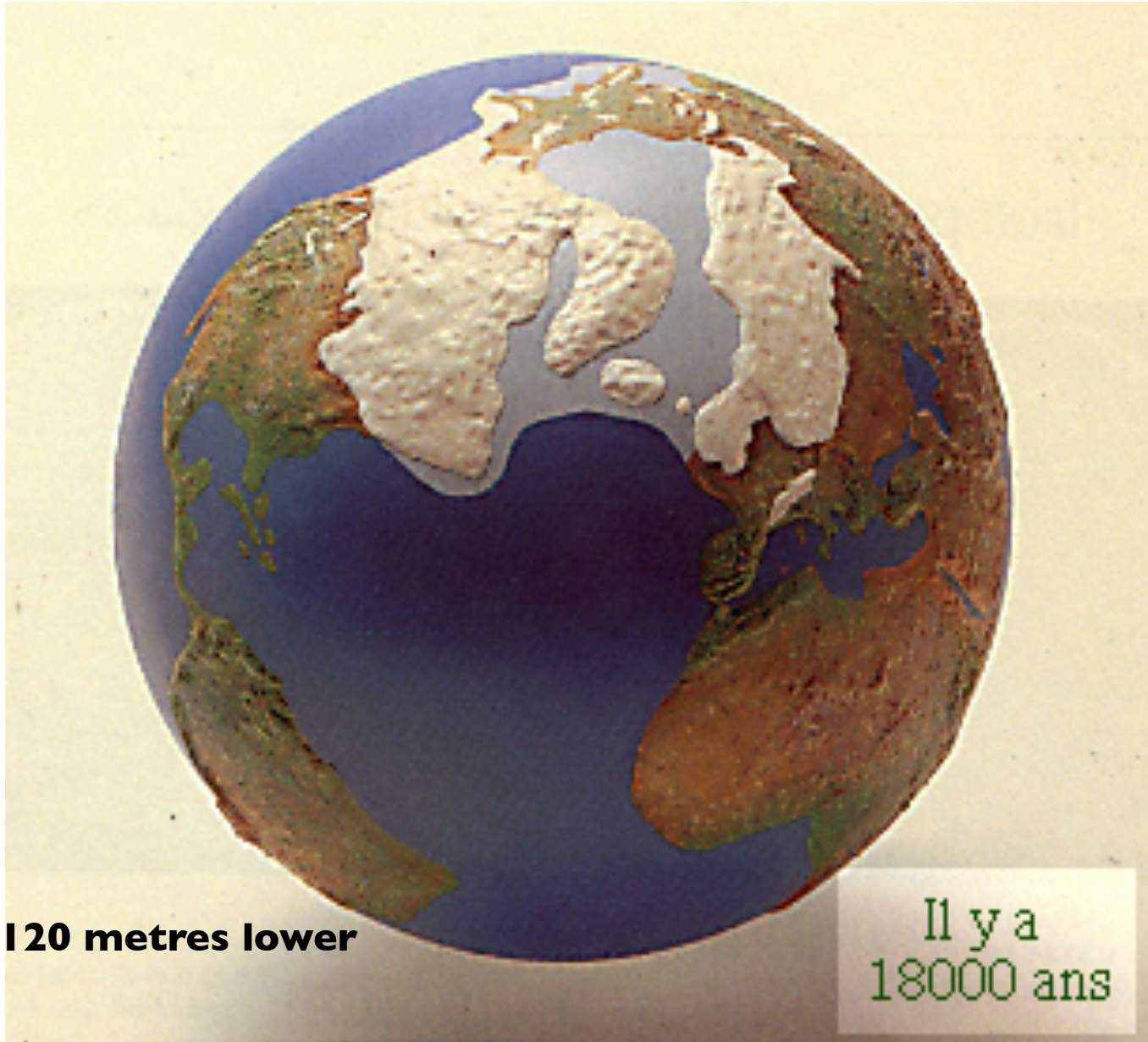
There is evidence that anthropogenic influences, including increasing atmospheric **greenhouse gas concentrations**, have changed these extremes

Fact n° 3: Average temperature is probably on its way to exceed the « conservation temperature » for the Greenland and (some of the) Antarctic ice sheet

There is therefore a very high risk that average sea level would increase by several metres over the next century or two

18-20000 years ago (Last Glacial Maximum)

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



Sea level: 120 metres lower

Today, with +4-5° C globally

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



Fact n° 4: World Health Organization (2018): Air pollution kills 7 millions people per year (inc. 500 000 in Europe)

Sources of air pollution are broadly the same as those affecting climate: fossil fuels, wood and biomass combustion

Fine particulates from fossil fuel and wood burning kill



Photo: Jerzy Gorecki, Pixabay

Children are particularly sensitive to air pollution



Photo: Indiatoday.in, 6-12-2017

**Fact n° 5: Climate change
impacts poor people first, but we
are all on the same spaceship**

Risk = Hazard x Vulnerability x Exposure

(Victims of New Orleans floods after Katrina in 2005)



Fact n° 6: Ecosystems suffer more and more, while our wellbeing depends on their good state

The « Sixth Extinction » has started, and climate change is one of the causing factors

**Fact n° 7: In the USA alone,
organizations which sow doubt
about climate change spend almost
a billion dollars/year! (Brulle 2014, average
numbers for 2003-2010)**

The European Union fares a little better, but many Brussels lobbyists try to dilute the EU environmental efforts (see the car industry...)

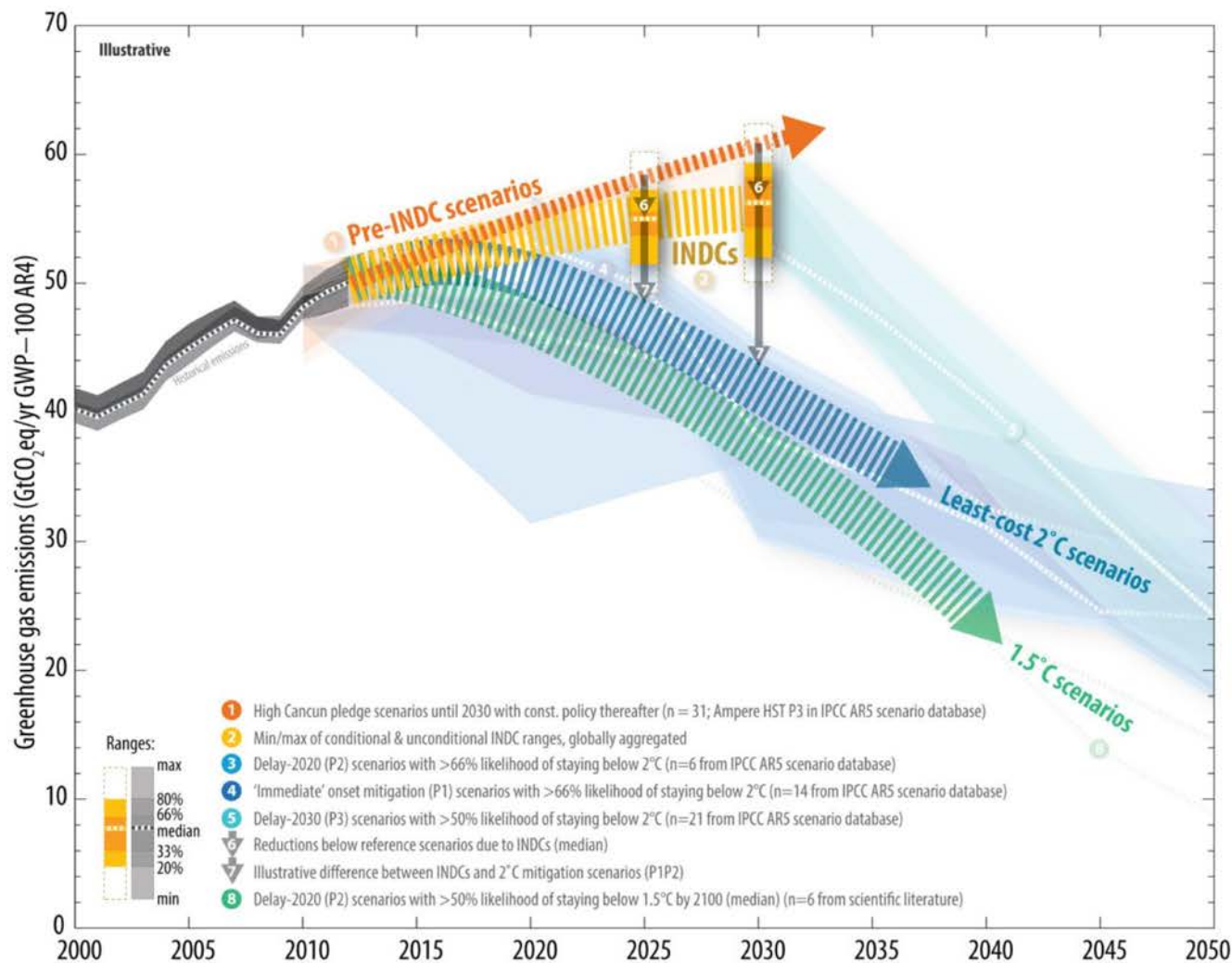
**Fact n° 8: European Union
spends at least 1 billion euros
per day simply to buy fossil fuels
outside its borders.**

True, decarbonizing the EU economy will cost, but not doing it could cost much more in impacts. Saving these 400 billions €/year could offer many opportunities

Fact n° 9: China is waking up to the climate and pollution challenge. It might become the world climate leader if the EU (5% of world population in 2050 ?) does not raise its ambition level in line with the Paris Agreement

Fact n° 10: The present national plans (NDCs) introduced ahead of the Paris Agreement are far from what is needed to respect the 1.5° C objective, and even to stay below 2° C warming

Comparison of global emission levels in 2025 and 2030 resulting from the implementation of the intended nationally determined contributions



UNFCCC, Aggregate effect of the intended nationally determined contributions: an update

<http://unfccc.int/resource/docs/2016/cop22/eng/02.pdf>

**(Element) of solution n° 1: The
survival of humanity and
ecosystems must become a
much higher political priority**

... as if we were at war, or all running for our life.

Solution n° 2: Economic actors must be confronted much more clearly with their responsibilities

Degrowth of climate-unfriendly activities must be accepted, while growth of activities helping climate protection and poverty eradication must be encouraged

Solution n° 3: The best understood language is the price. Destroying the environment must become more and more expensive. Collected funds must be used to help the decarbonization, and avoid impacting the poor disproportionately

EU Emission Trading System, CO₂ taxes, fines, internal CO₂ price (firms do « as if » CO₂ emission was expensive). NB: Price must match the effect desired!

**Solution n° 4: Transition
towards a clean and sustainable
economy and energy system
must be « just »**

**Ex : The Polish energy system cannot
be transformed without facilitating
the coal miners reconversion**

Solution n° 5: Before looking at how to produce energy cleanly, much more attention must be given to reducing energy demand, in all sectors

All production and consumption patterns must be reconsidered, helped by energy audits, etc.

- **Substantial reductions in emissions to stay under 2° C 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**

Solution n° 6: Building sector: offers many opportunities in energy saving, economic activity, improving wellbeing...

Trying to practice what I « preach »



Trying to practice what I « preach »



Solution n° 7: Mobility : much more space and priority to pedestrians, bicycles, and public transport; reduce priority given too long to individual transport in urban planning

Electrify remaining vehicles (with clean electricity). Fly less.

Solution n° 8: Food and agriculture. A possible change with big positive impact: eat less meat, of better quality! Eat more plant-based food (produced cleanly)

...It is good for health as well!

**Solution n° 9: Sun gives us in
two hours about as much
energy as the world uses in *one*
year, all forms of energy
considered**

The cost of solar kWh is crashing, wind power, heat and electricity storage, and smart grids are moving forward

**Solution n° 10: Banks and the
finance sector increasingly see the
opportunities in climate-friendly and
ethical investments promoting the
17 Sustainable Development Goals**

... but their ethical/green
investments are still marginal for
most banks



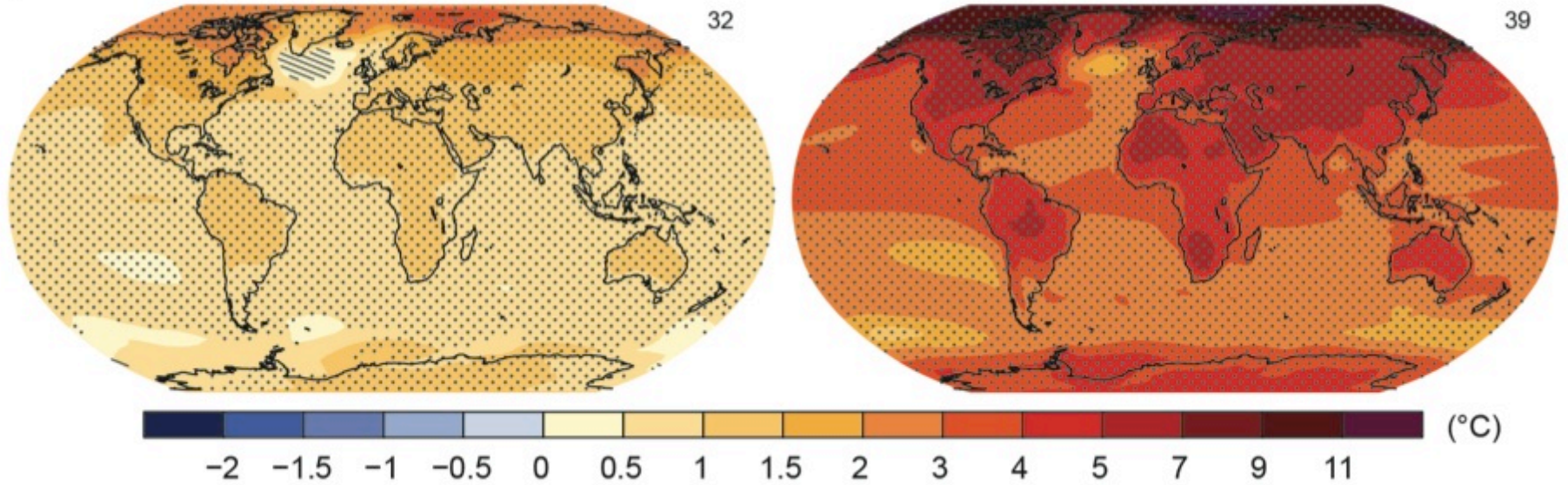
SUSTAINABLE DEVELOPMENT GOALS



RCP2.6

RCP8.5

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

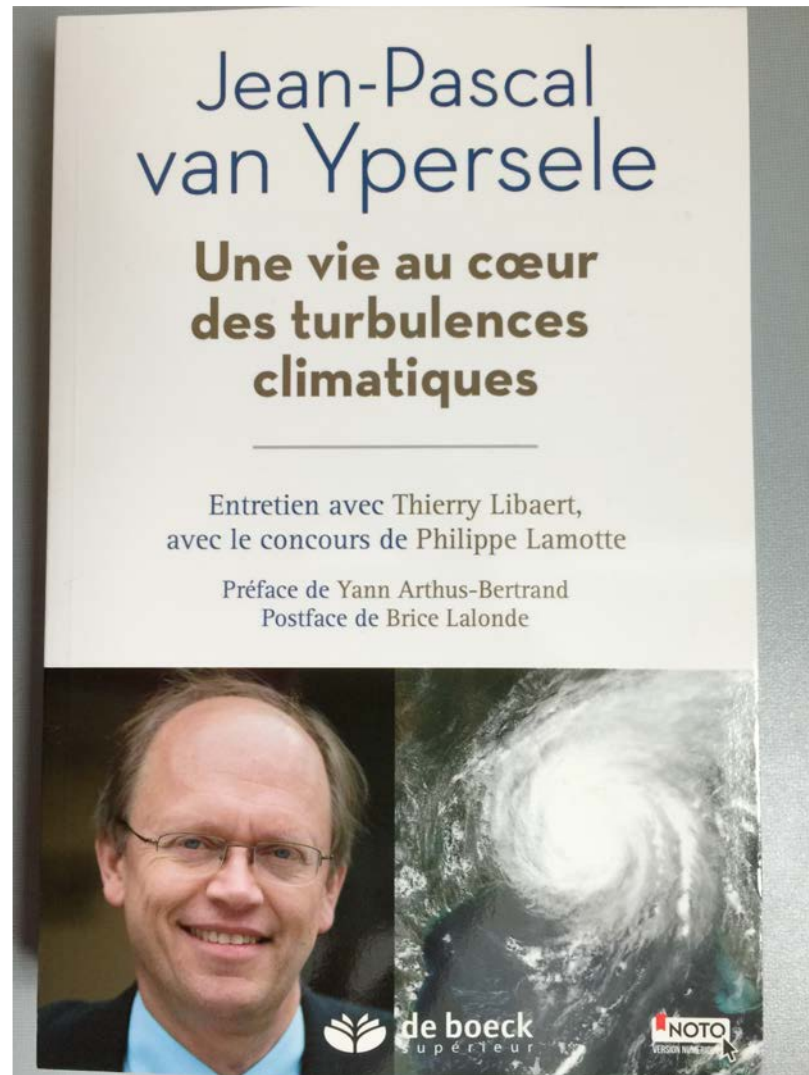


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To go further :

- www.climate.be/vanyp : my slides (under « conferences)
- www.ipcc.ch : IPCC
- www.realclimate.org : answers to the merchants of doubt arguments
- www.skepticalscience.com : same
- **Twitter: @JPvanYpersele**
@IPCC_CH