

Ten arguments about the urgency of addressing climate change, and some remarks about the EU

Jean-Pascal van Ypersele

UCLouvain, Earth & Life Institute

IPCC Vice-Chair from 2008 to 2015

Twitter: @JPvanYpersele

**Keynote lecture at the Permanent Representation of Belgium to the
European Union, « Countdown to COP 24 in Katowice:
When Policy meets science: is the EU up to speed? » event,
Brussels, 18 September 2018**

Thanks to the Walloon government for supporting www.pplateforme-wallonne-giec.be & my team at UCLouvain

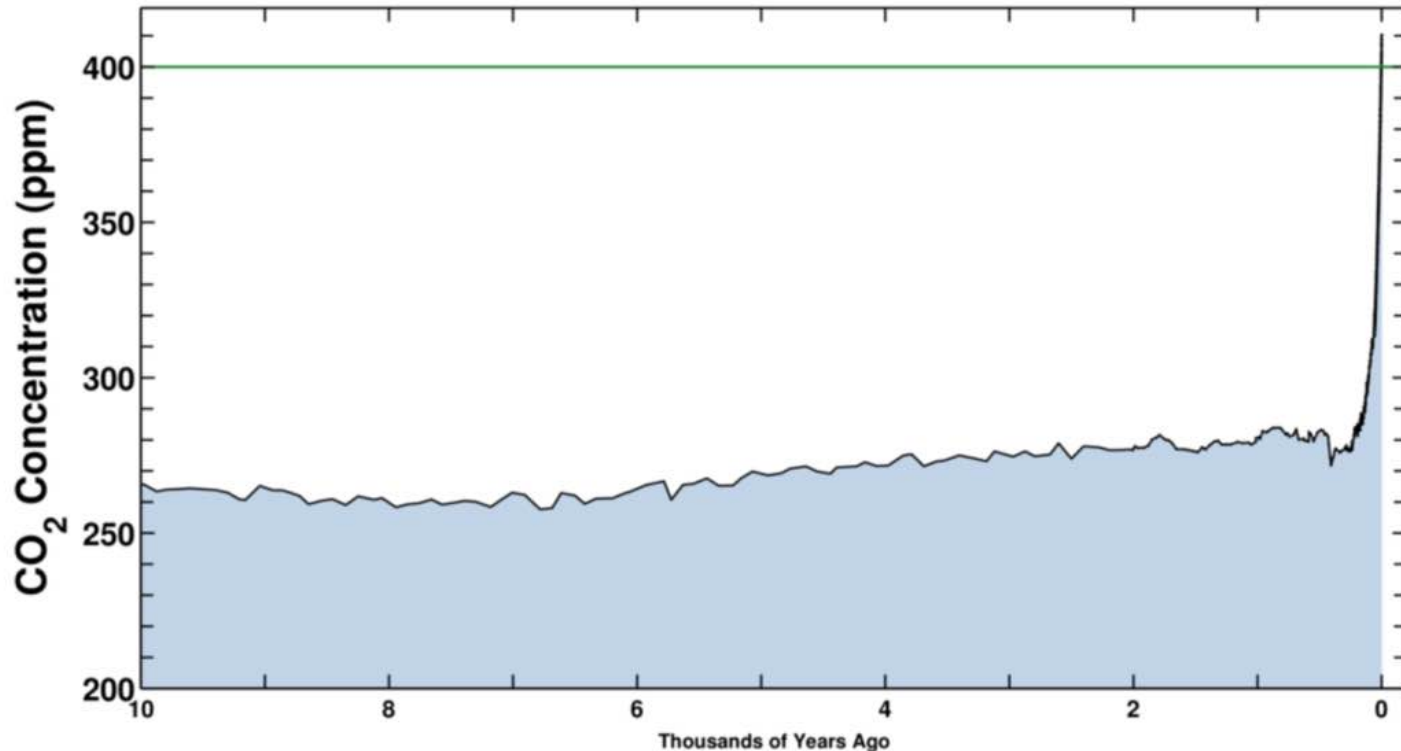
**Argument n° 1: We have
changed the composition of the
atmosphere on an extraordinary
speed and scale**

CO₂ Concentration, 28 May 2018 (Keeling curve)

Latest CO₂ reading
May 28, 2018

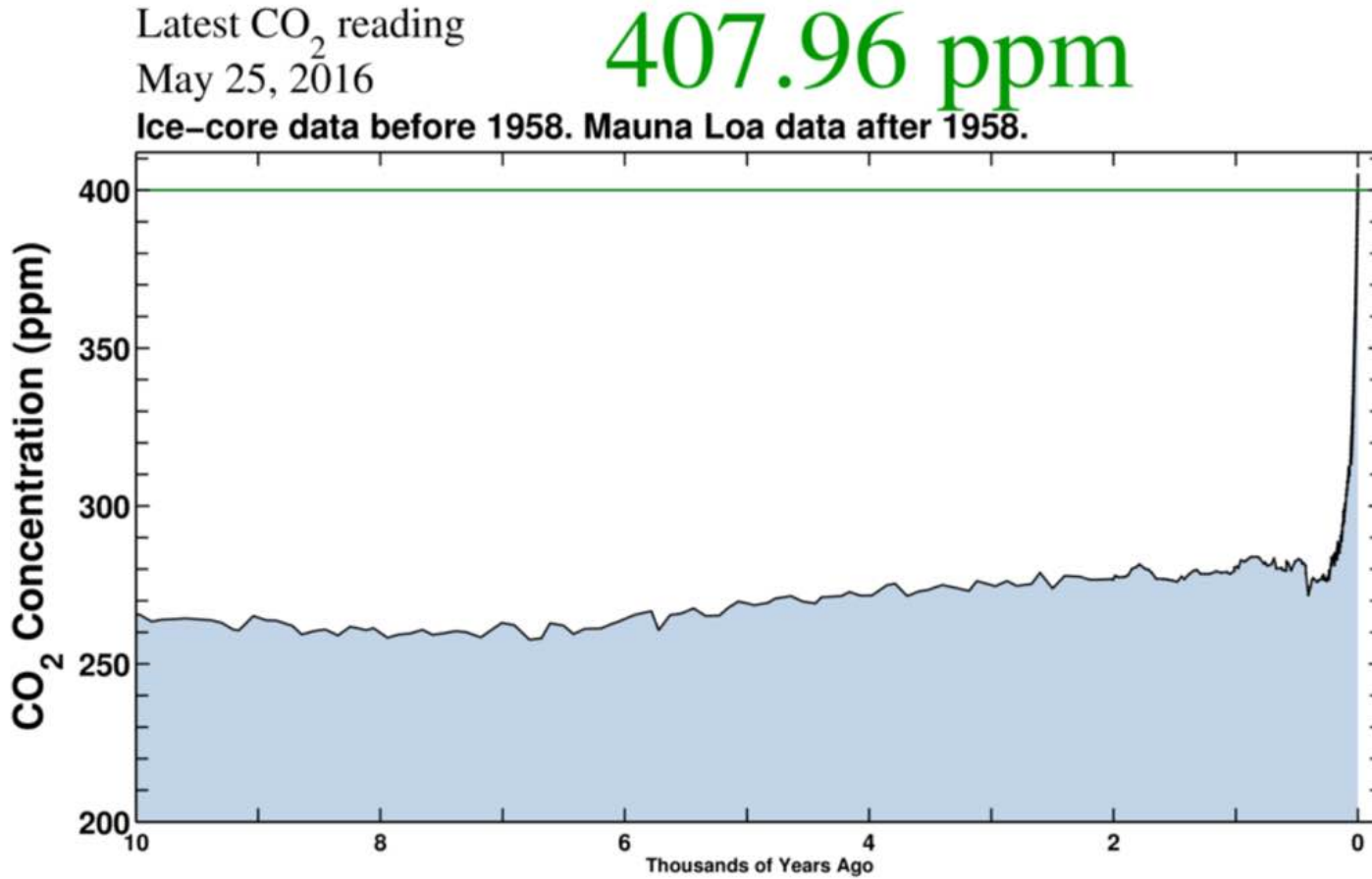
411.98 ppm

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



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

CO₂ Concentration, 25 May 2016 (Keeling curve)



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

**Argument n° 2: 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**

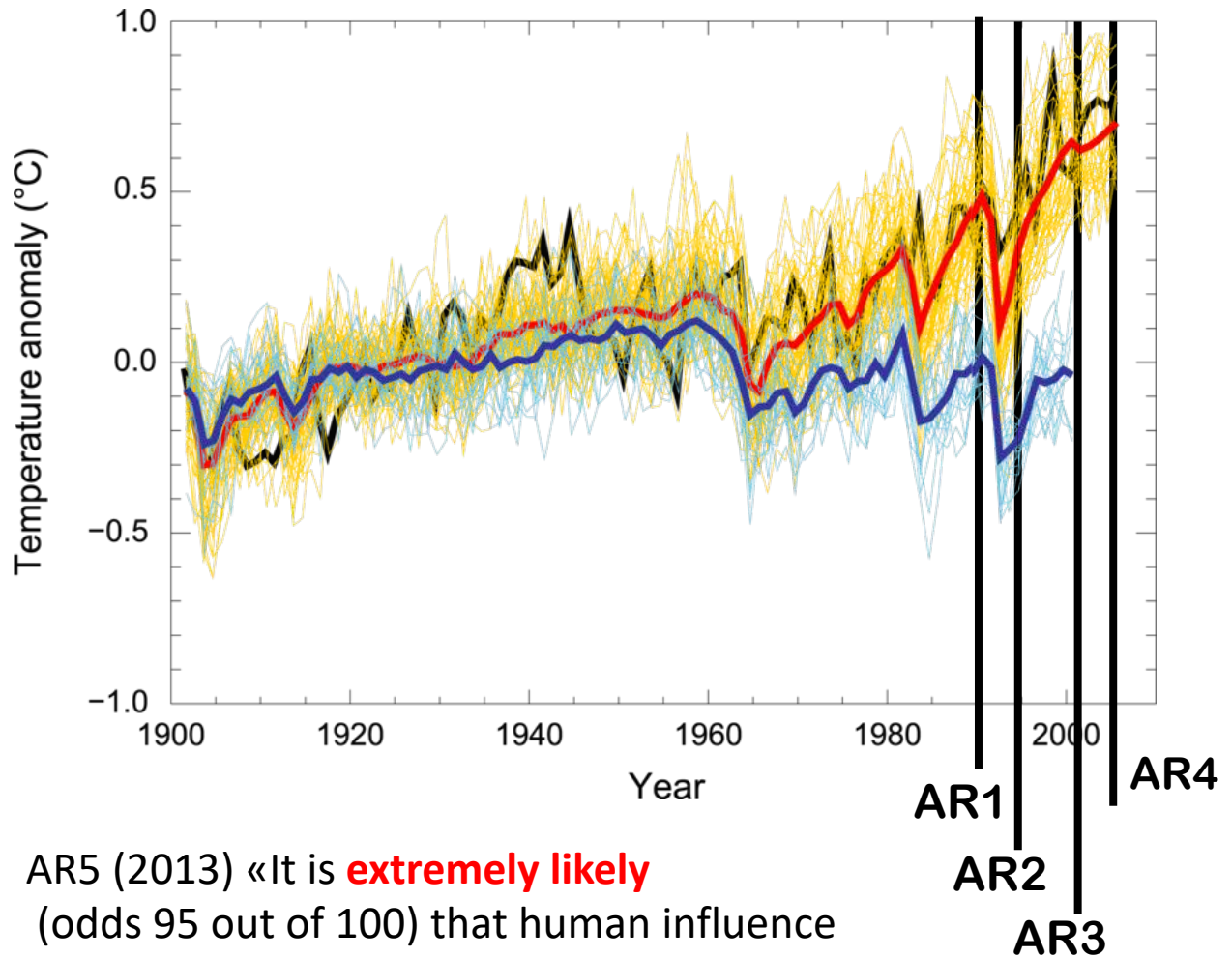
A Progression of Understanding: Greater and Greater Certainty in Attribution

AR1 (1990):
“unequivocal detection
not likely for a decade”

AR2 (1995): “balance
of evidence suggests
discernible human
influence”

AR3 (2001): “most of
the warming of the
past 50 years is **likely**
(odds 2 out of 3) due
to human activities”

AR4 (2007): “most of
the warming is **very
likely** (odds 9 out of 10)
due to greenhouse
gases”



AR5 (2013) «It is **extremely likely**
(odds 95 out of 100) that human influence
has been the dominant cause... »

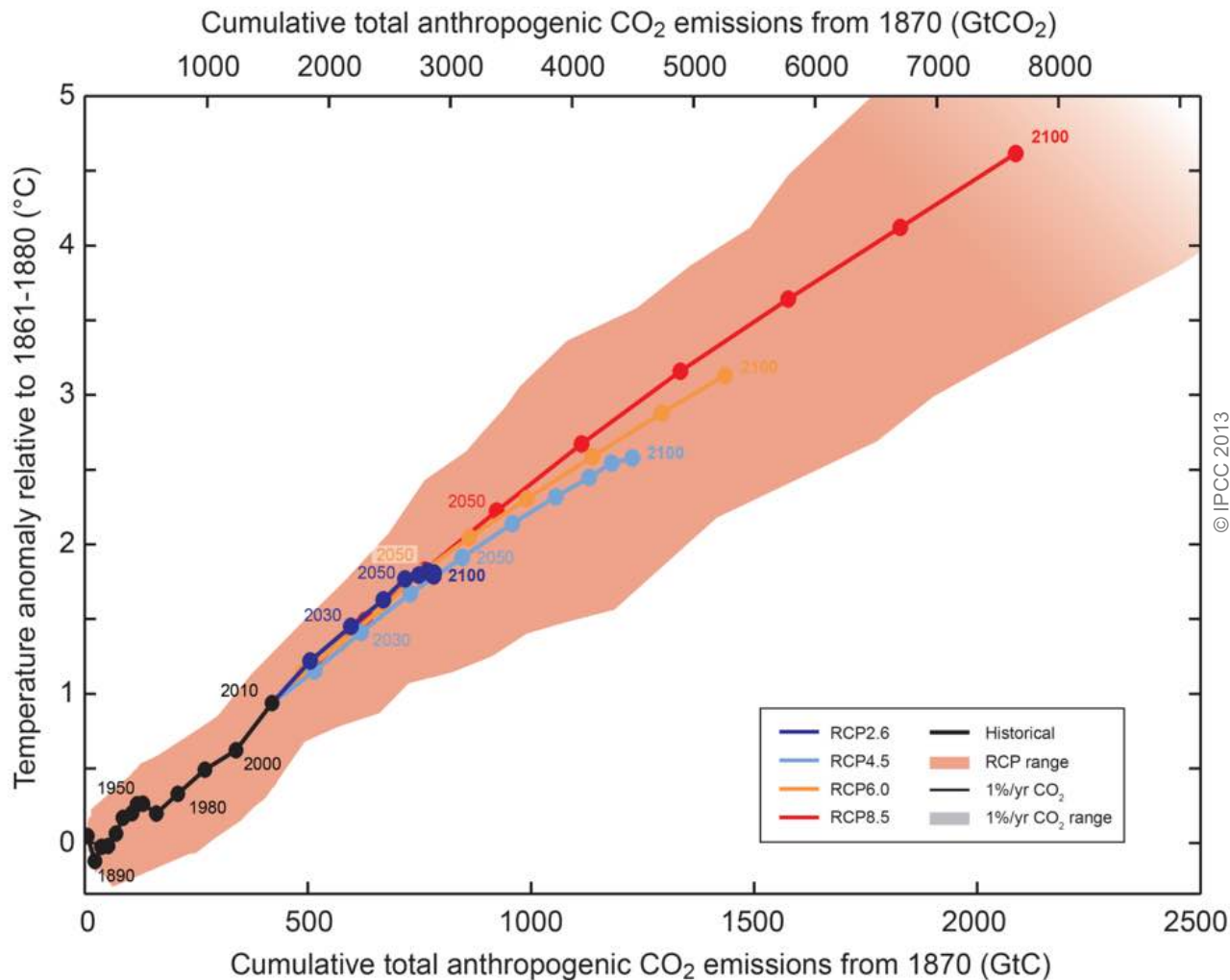
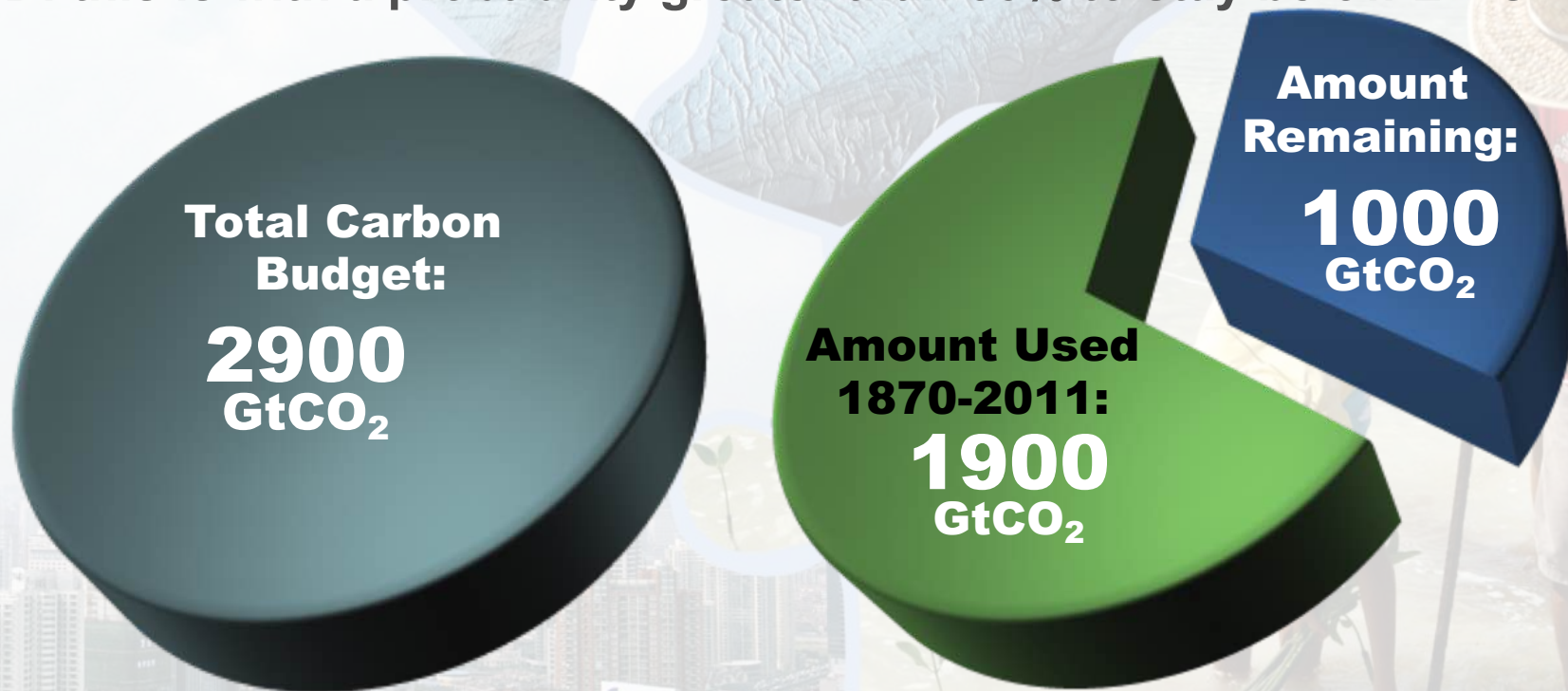


Fig. SPM.10

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

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

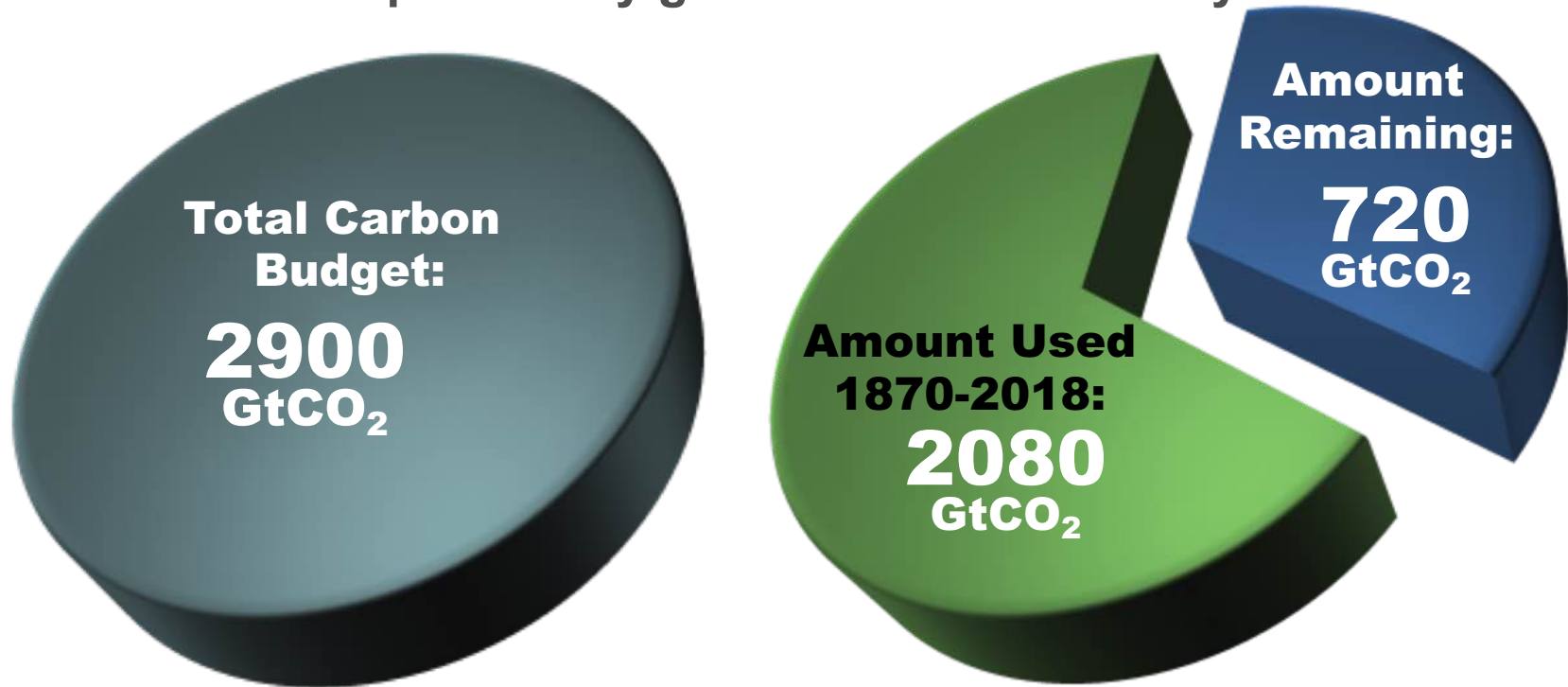
AR5 WGI SPM

My personal update (2018):

The window for action is VERY rapidly closing

75% 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



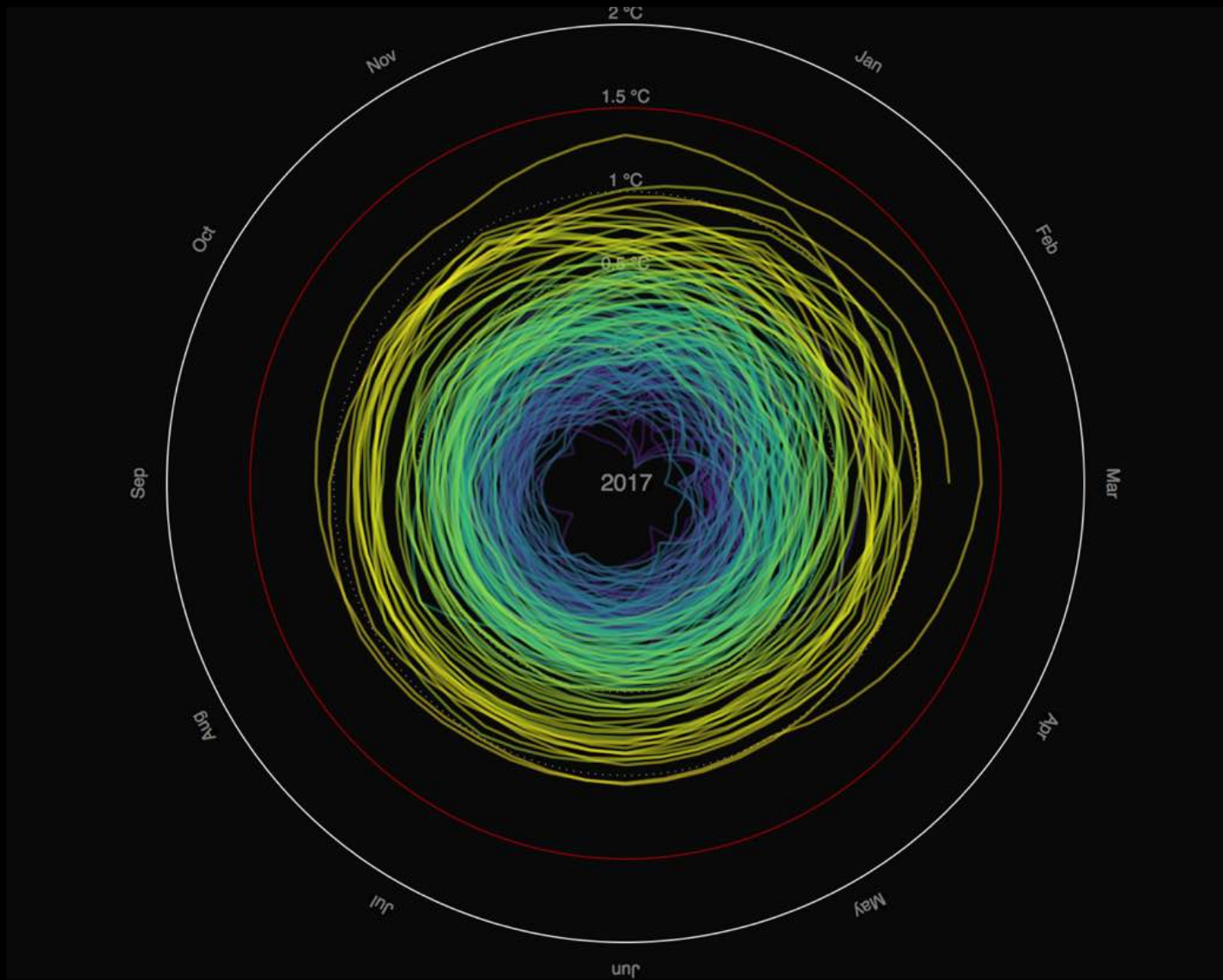
NB: Emissions in 2011: 38 GtCO₂/yr

AR5 WGI SPM

Adapted by @JPvanYpersele from the IPCC AR5

Argument n° 3: Global surface temperature is increasing fast, some extreme events become more frequent or intense, and glaciers are melting

Temperature spiral



Global Mean Temperature in °C relative to 1850 – 1900

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

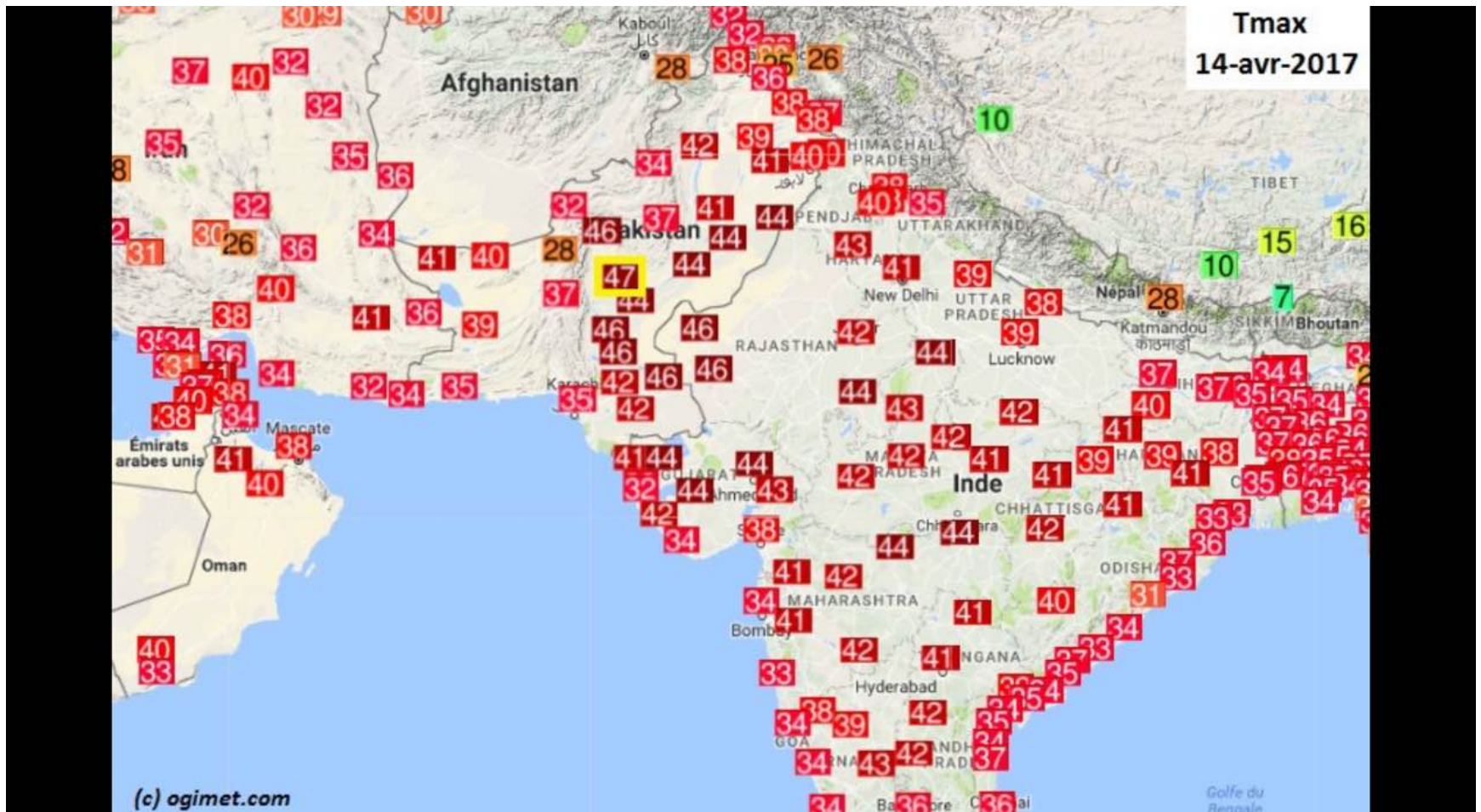
Animated version available on <http://openclimatedata.net/climate-spirals/temperature>

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

Heat waves kill



Plateau Glacier (1961) (Alaska)



http://www.weather.com/news/science/environment/alaskas-glaciers-capturing-earth-changing-our-eyes-20131125?cm_ven=Email&cm_cat=ENVIRONMENT_us_share

Plateau Glacier (2003) (Alaska)



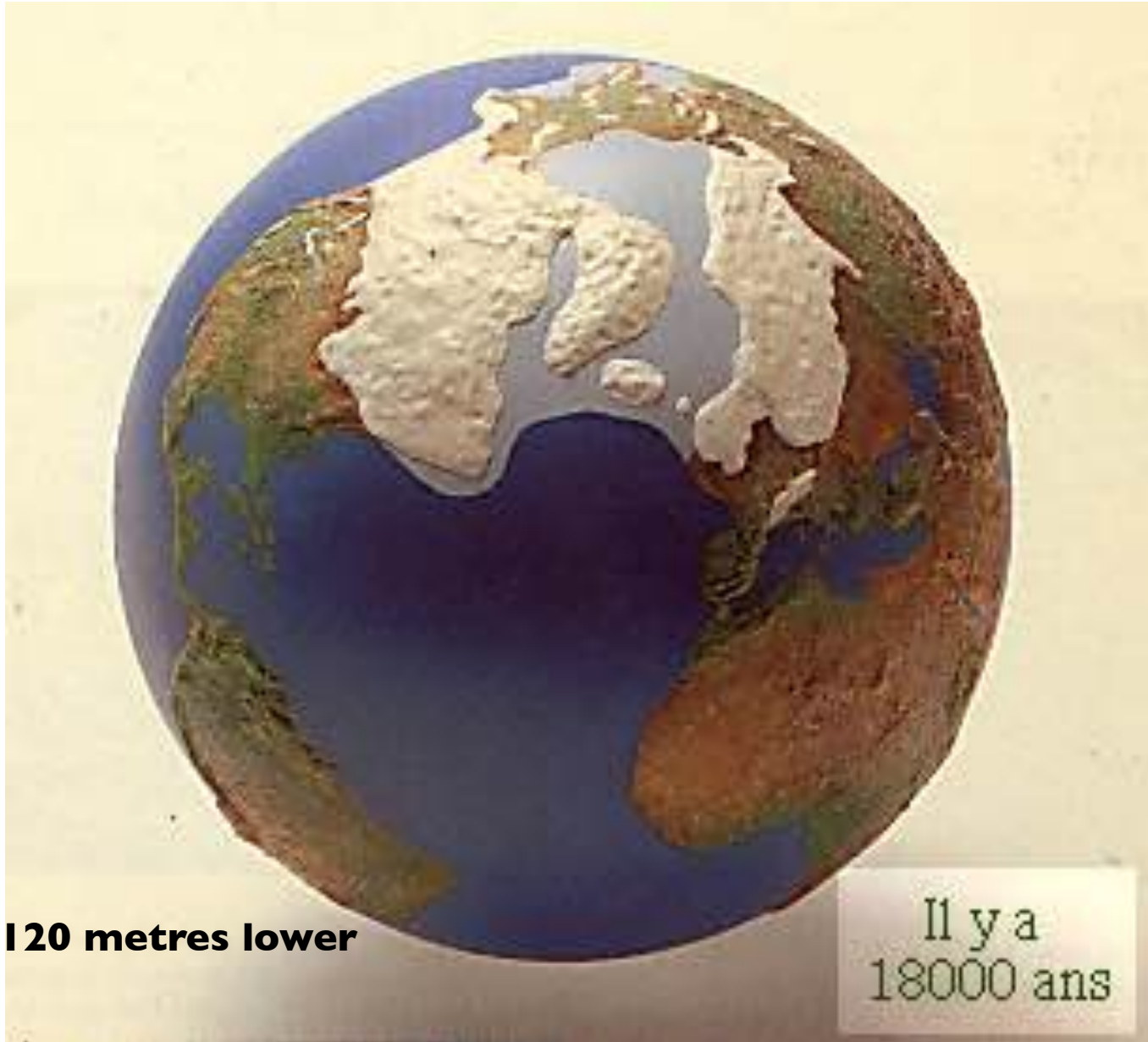
http://www.weather.com/news/science/environment/alaskas-glaciers-capturing-earth-changing-our-eyes-20131125?cm_ven=Email&cm_cat=ENVIRONMENT_us_share

Argument n° 4: 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

Il y a
18000 ans

Today, with +4-5° C globally

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



Aujourd'hui

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

« Boomerang » effect:

Belgian Prime Minister Charles Michel (RTBF, 4 May 2018): « when there is a geopolitical instability, we pay the cost as well »

Risk = Hazard x Vulnerability x Exposure

(Victims of New Orleans floods after Katrina in 2005)



Effects on the Nile Delta, where more than 10 million people live less than 1 m above sea level



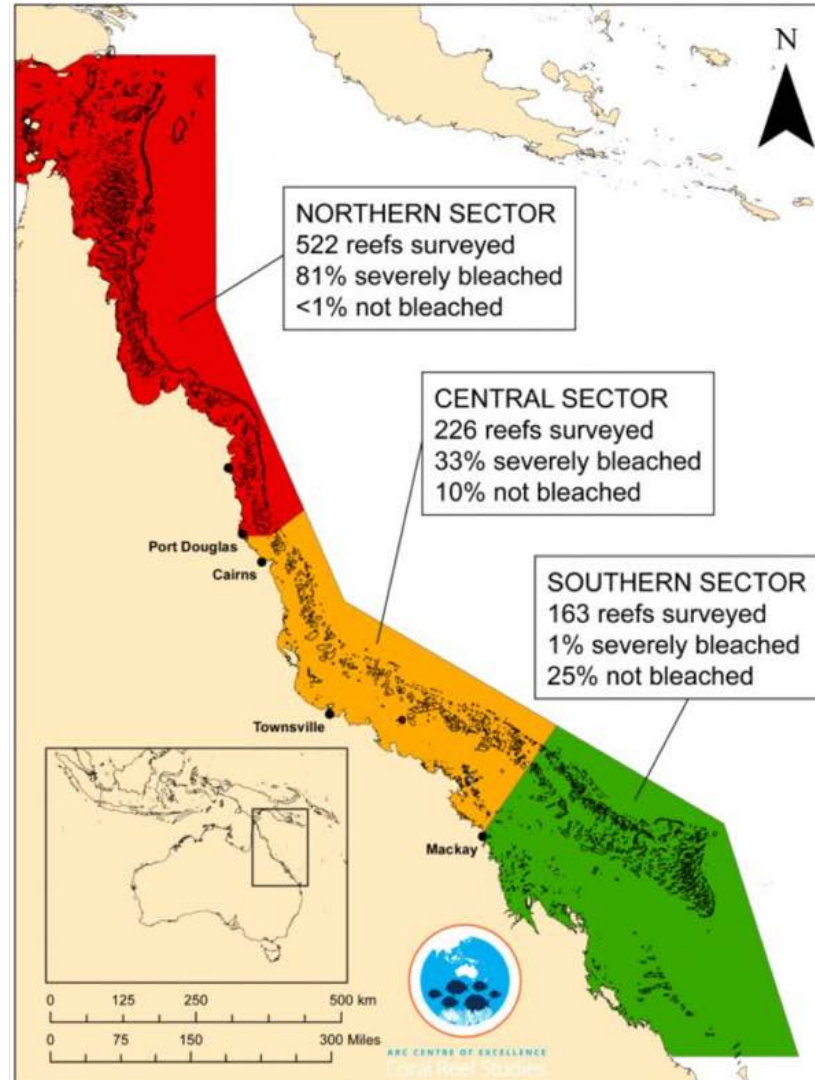
NB: + 1 m is possible
in the next 100 years...

(Time 2001)

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

The « 6th Extinction » has started

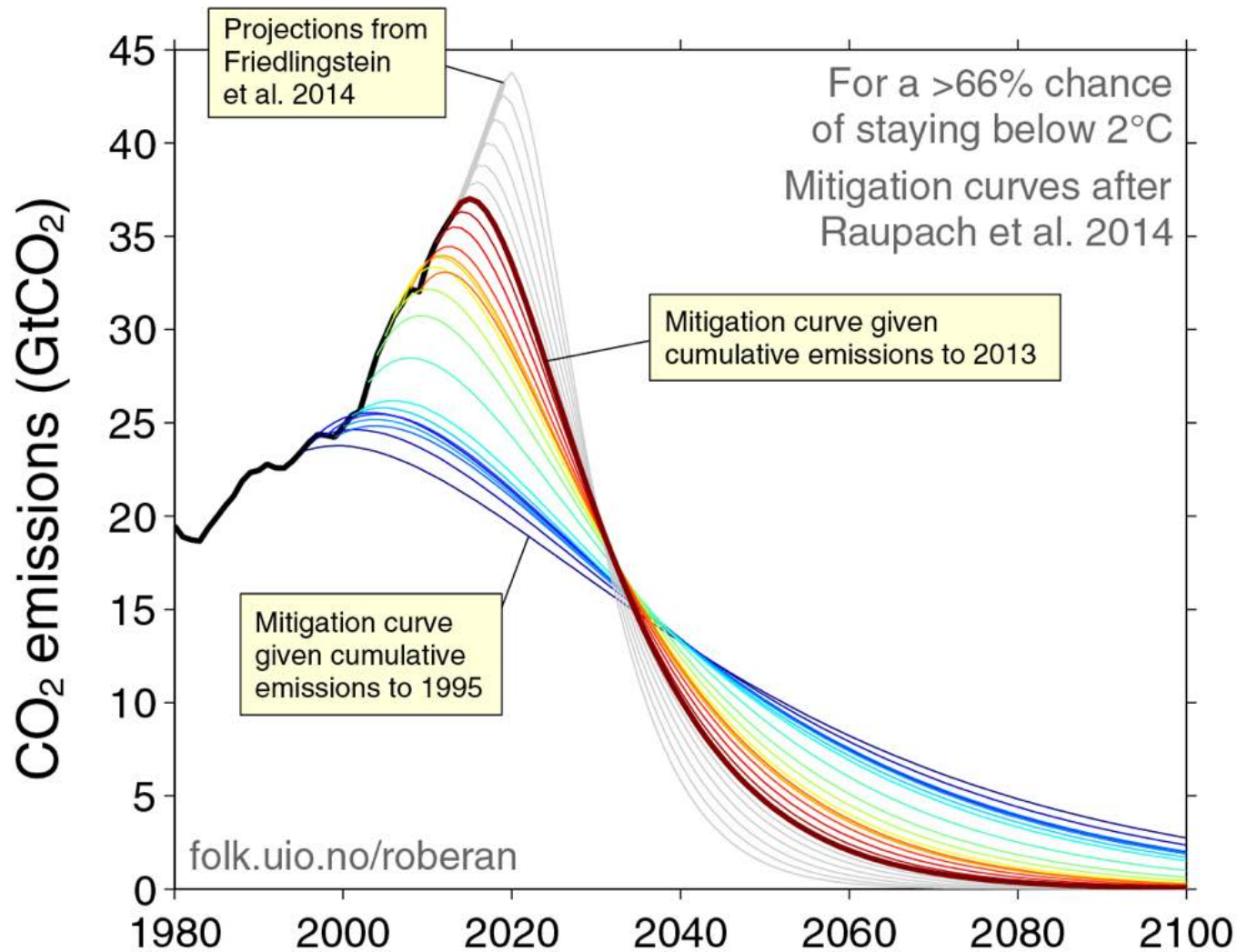
2016: Only 7% of the Great Barrier Reef has avoided coral bleaching



Argument n°7: The longer we wait to reduce emissions, the more we have to reduce them

15 to 40% of the CO₂ emitted today will still be in the atmosphere in 1000 years from now

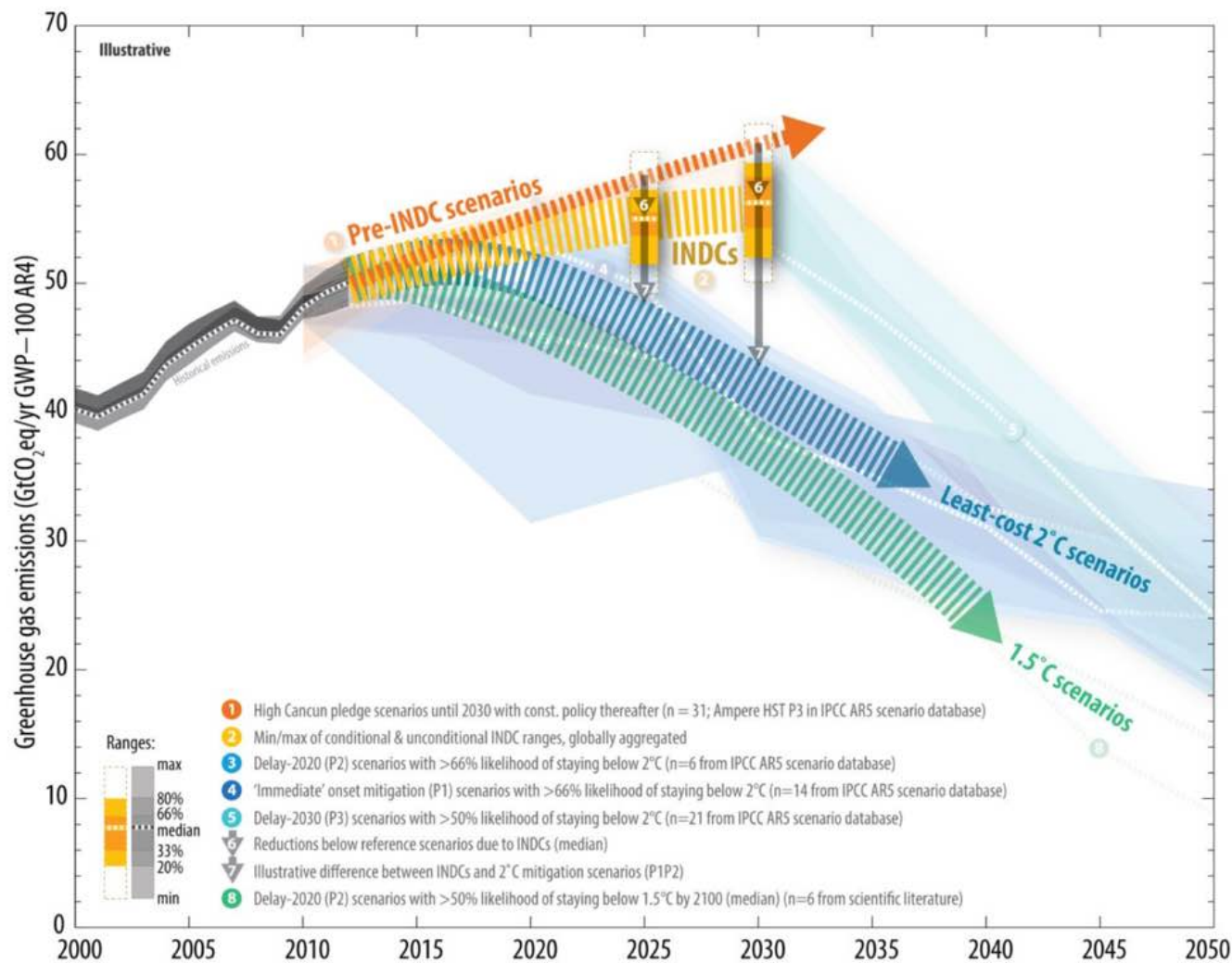
Limiting warming becomes much more difficult when the peak happens later



Source and details:

http://folk.uio.no/roberan/t/global_mitigation_curves.shtml

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>

**Argument n° 8: Combustion of fossil fuels, wood, and biomass also cause air pollution, which kills 7 million people per year (including 500 000 in Europe)
(World Health Organization, 2018)**

Opportunity: Addressing the causes of climate change can also improve air quality and wellbeing

Fine particulates from fossil fuel and wood burning kill



Photo: Jerzy Gorecki, Pixabay

Children are particularly sensitive to air pollution

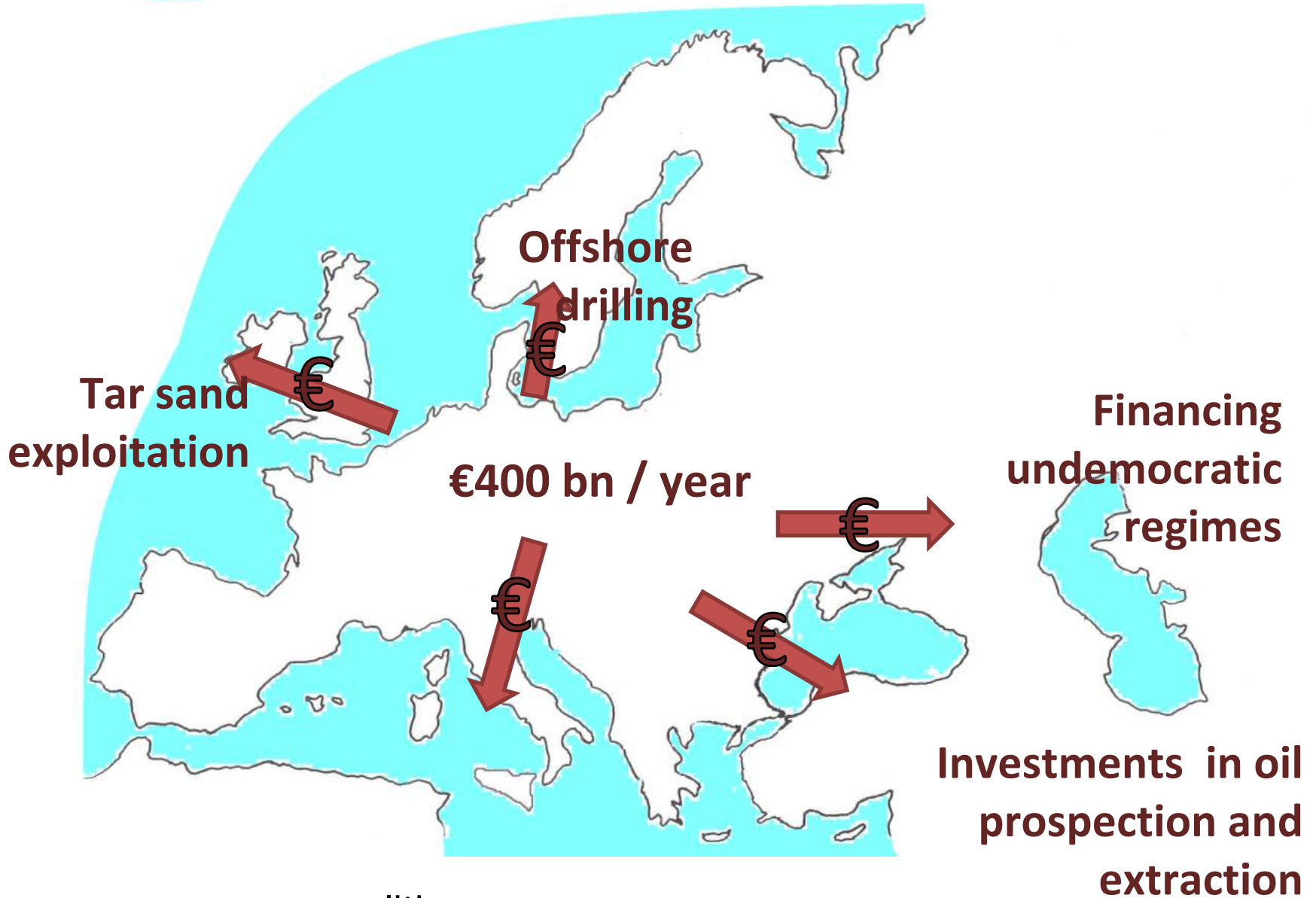


Photo: Indiatoday.in, 6-12-2017

Argument n° 9: European Union loses 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

EU: annual cost of buying fossil fuels



- **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

Trying to practice what I « preach »:

- Energy audit before renovation
- Strong external insulation (wood fiber)
- Super-efficient windows
- Air tightness + heat recovery ventilation system
- Ground-water heat pump replacing oil furnace
- Solar PV covering all consumption
- No tropical wood
- Small, used electric car
- Electric bicycles

Trying to practice what I « preach »



Trying to practice what I « preach »

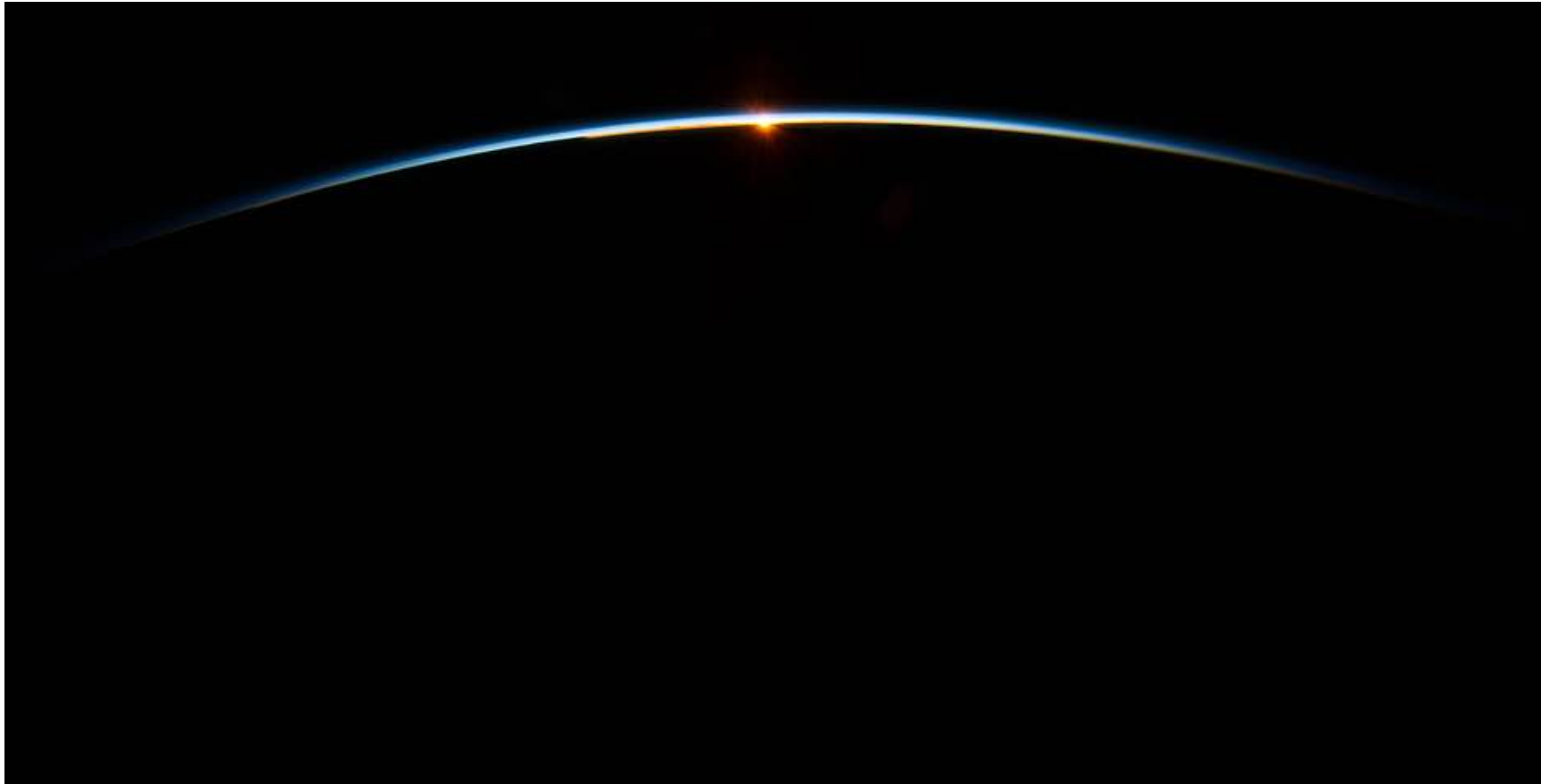


Final argument:
There is no planet B

**That small blue dot is the Earth, as seen from
Cassini, orbiting Saturn, 1.44 billion km from
us, on 19-7-2013**



Our atmosphere is thin and fragile (as seen by ISS crew on 31 July 2013)

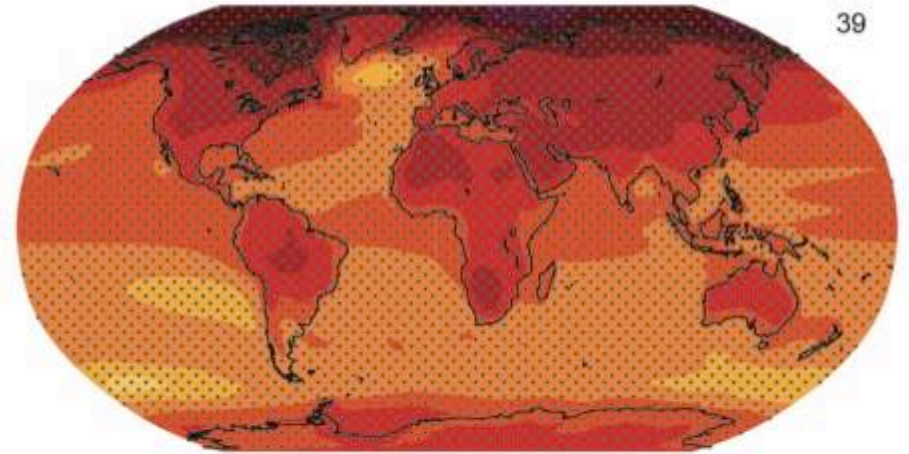
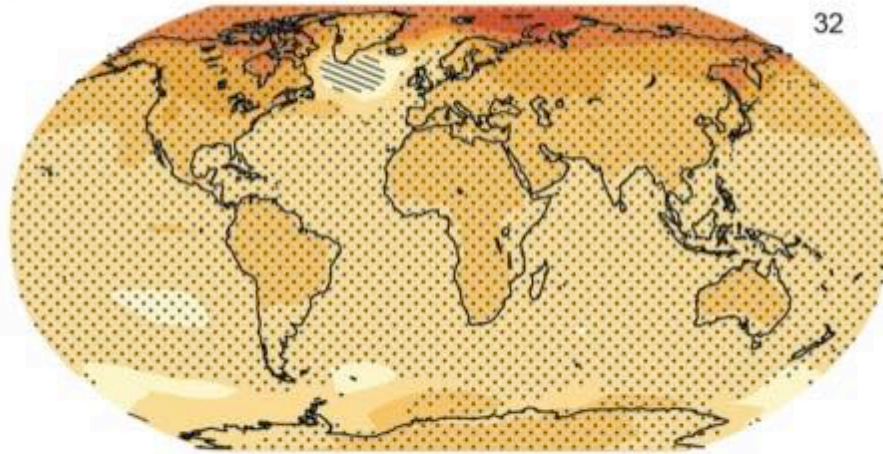


Jean-Pascal van Ypersele
(vanyp@climate.be)

RCP2.6

RCP8.5

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



Humanity has the choice



SUSTAINABLE DEVELOPMENT GOALS



Just a few remarks about the EU

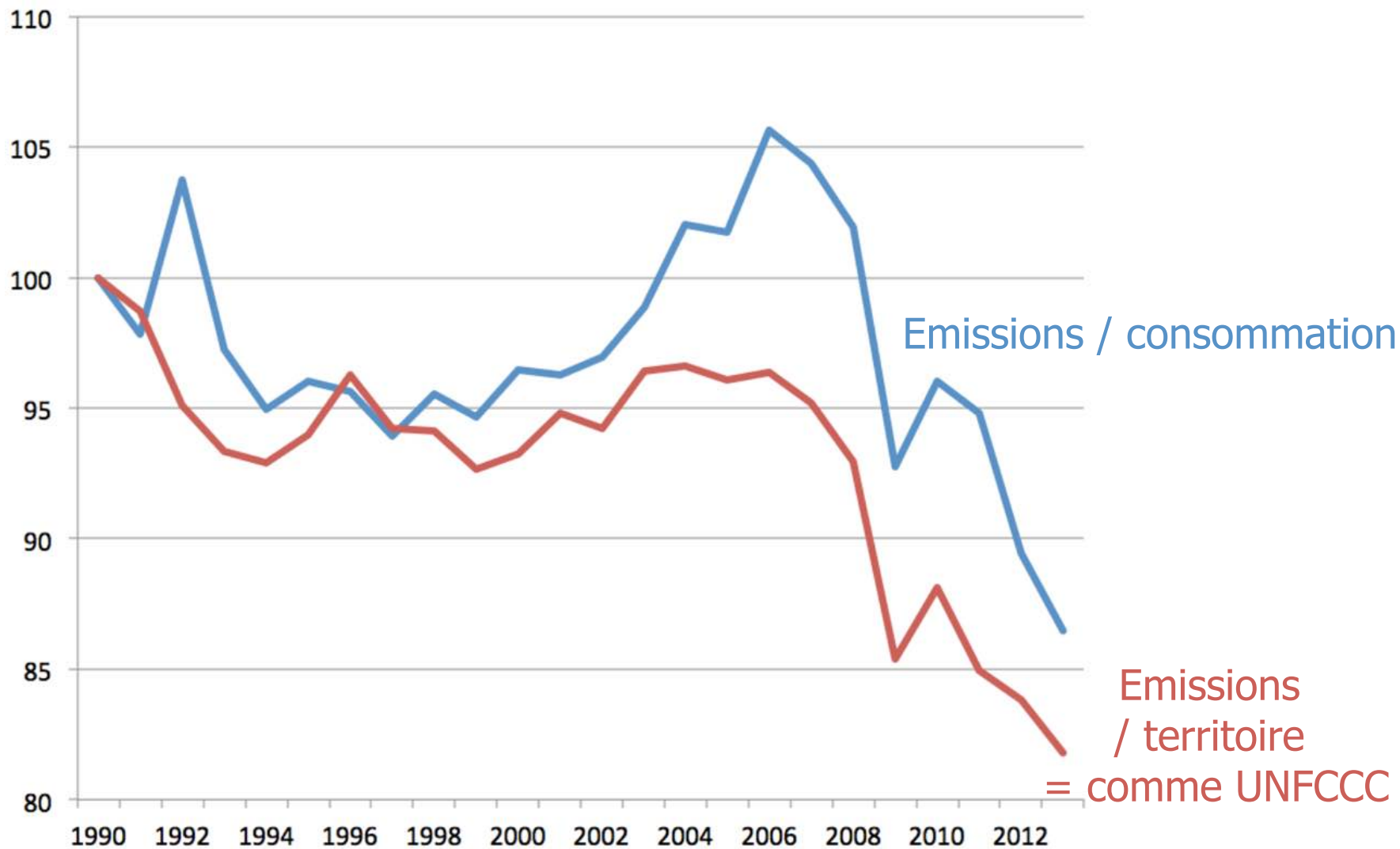
- Its climate leadership role needs work to be maintained, otherwise China...
- Example: the EU has not yet updated its 2014 plans (« NDCs ») to the new objectives of the Paris Agreement (« well below 2°C », not « below 2°C, and the 1.5°C objective... »)

Just a few remarks about the EU (2)

- The Renewable Energy Directive considers wood as carbon neutral. That is fundamentally wrong (see letter signed by 800 scientists in December 2017, & article Searchinger et al.(2018, Nature Comm. <https://rdcu.be/6ssN>)
- Some of its emission reductions have been « externalised » (i.e. some goods are now imported, and lead to emissions increase elsewhere) (see next slide)

Europe : évolution des émissions depuis 1990

Attention à la production des objets importés...



Source : données de C Le Quéré et al, ESSD 2015

Tongue in cheek:

- Jos Delbeke was wrong last April, speaking at the Club of Rome EU Chapter, but it is good news for climate (see next slide)

Historic ETS prices and (one) WRONG forecast:

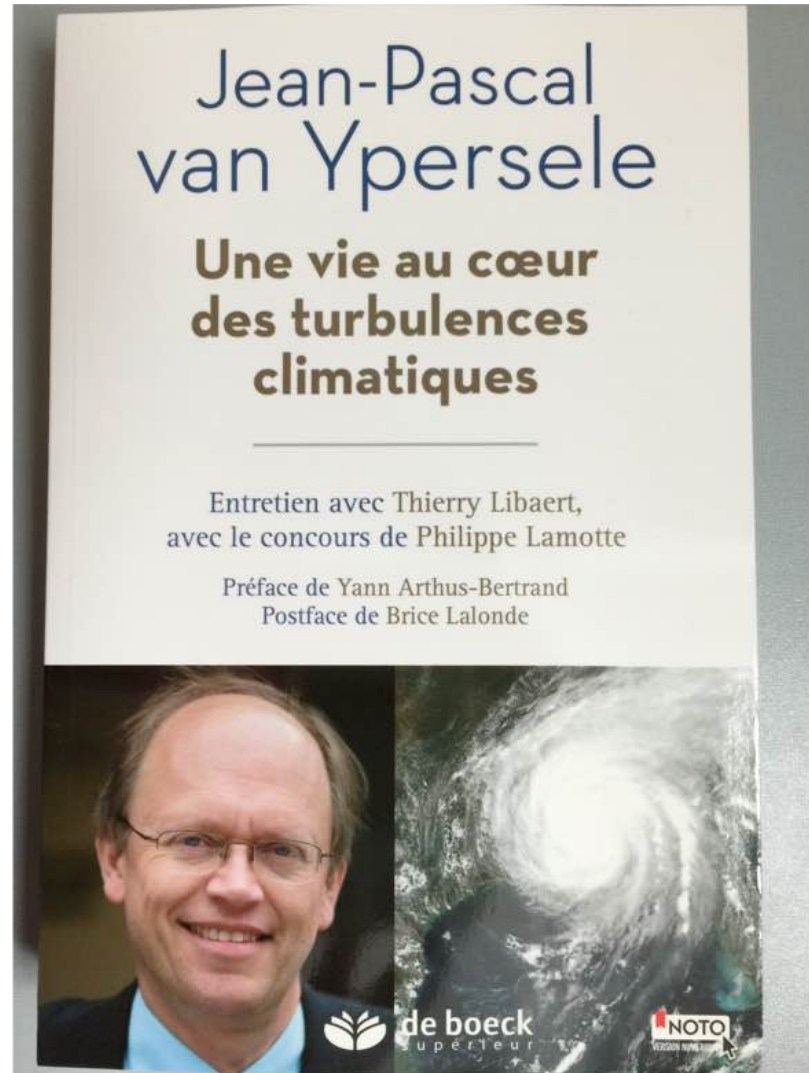


Source: ICIS November 2017

Pour en savoir plus:

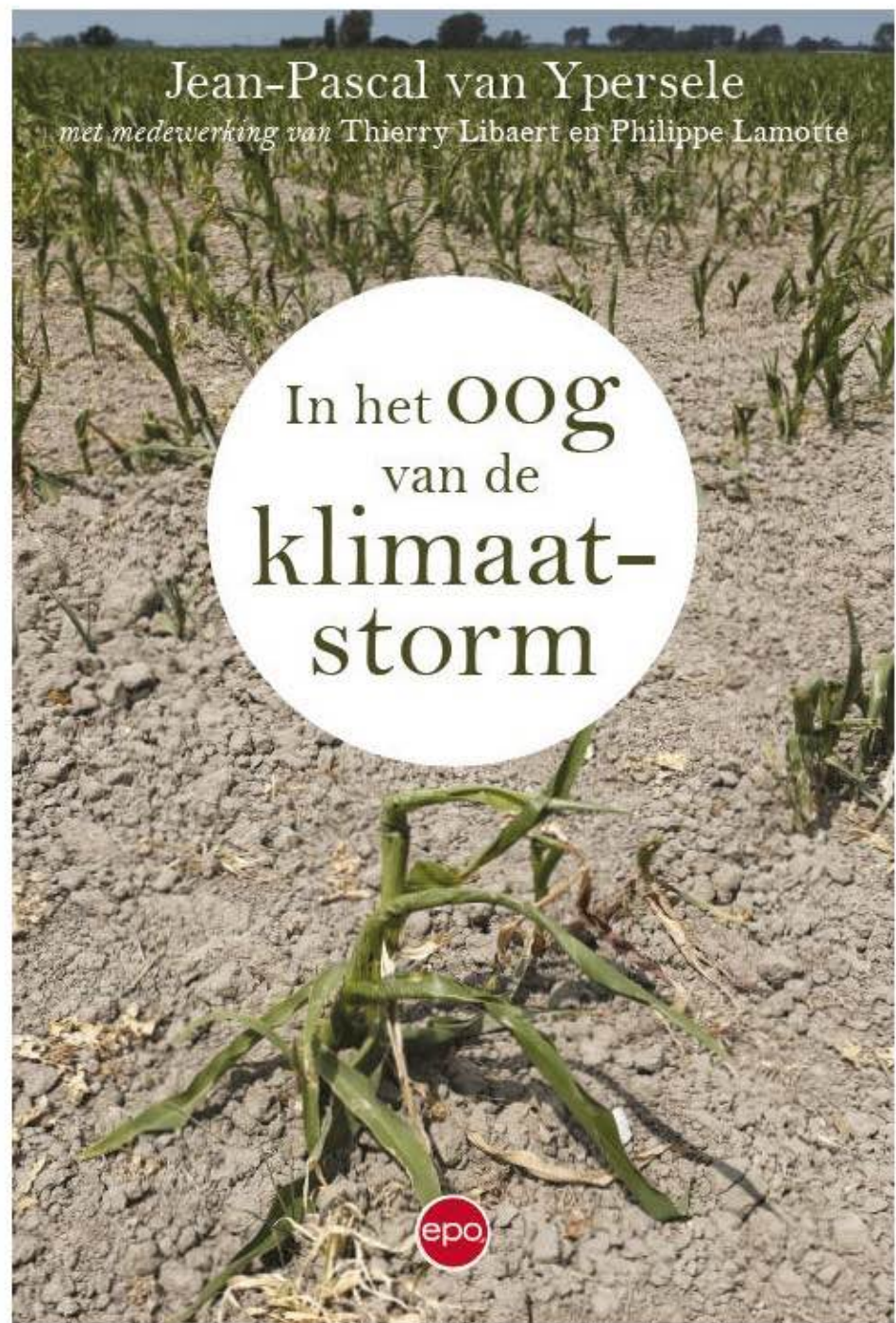
**Lisez mon livre, où
j'aborde tous ces sujets**

**Publié chez De Boeck
supérieur**



**bij EPO
(februari 2018)**

**Voorwoord:
Jill Peeters**



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