

In het oog van de klimaatstorm: 10 feiten, 10 mogelijke oplossingen

Jean-Pascal van Ypersele

**(UCLouvain: Université catholique de Louvain,
Earth & Life Institute, Belgium)**

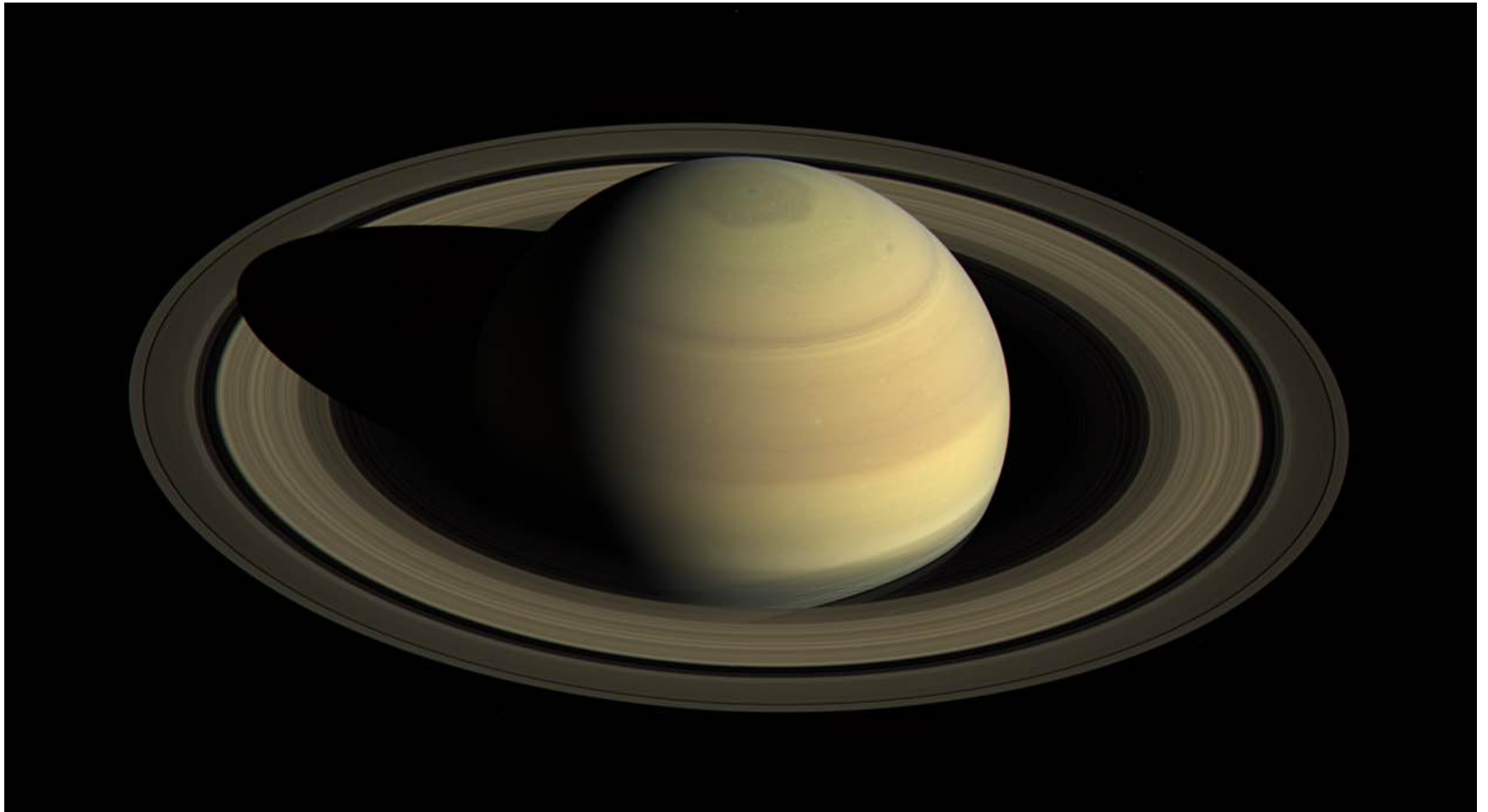
IPCC Vice-voorzitter 2008 - 2015

Twitter: @JPvanYpersele

Nederlandstalige Bibliotheek, Anderlecht, 24 september 2018

Fact n^o 1: There is no planet B

Saturn, as seen on 25-4-2016 from a 3 million km distance by the Cassini satellite launched in October 1997, 40 years after Sputnik



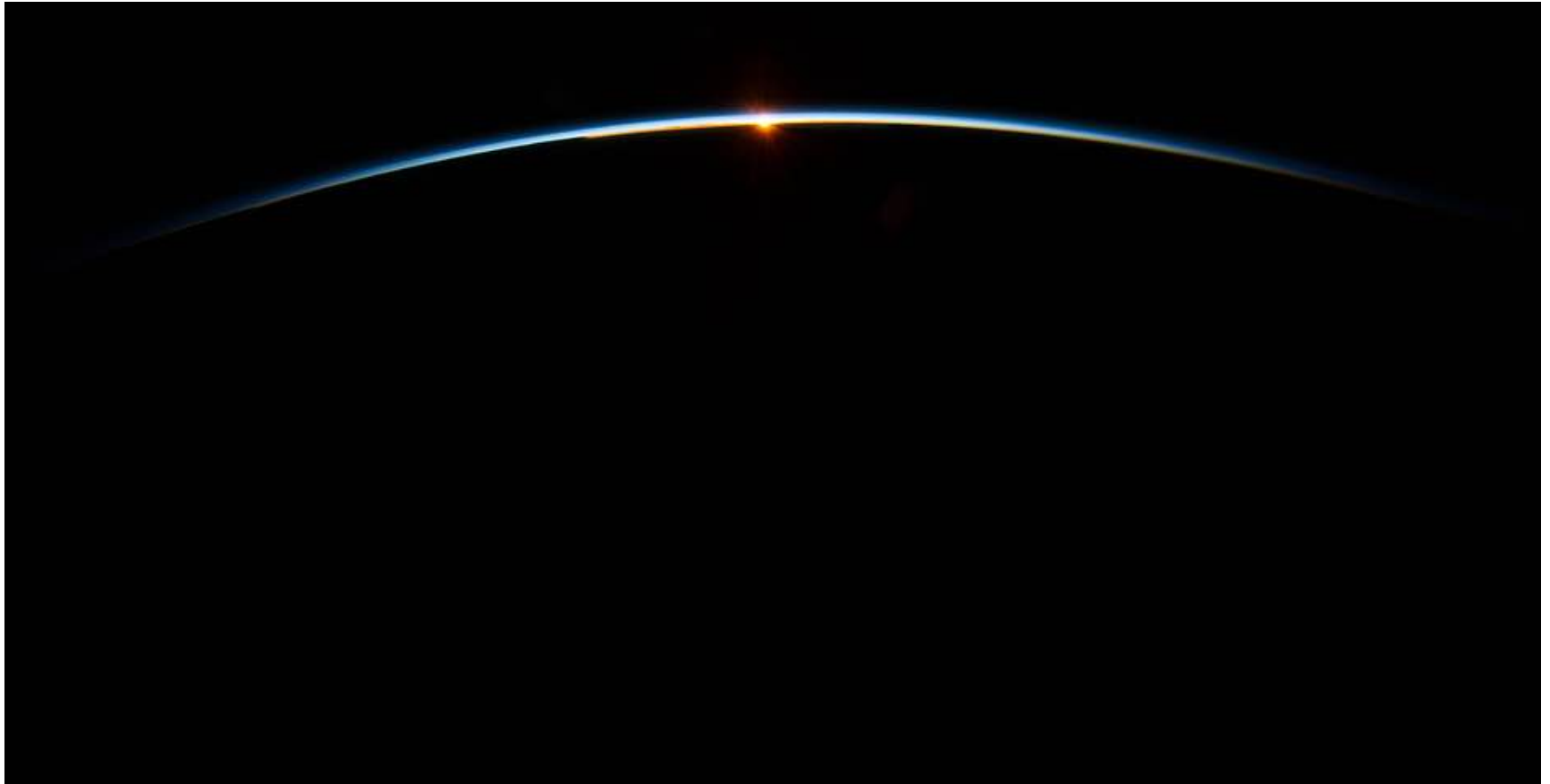
That small blue dot is the Earth, as seen from Cassini, orbiting Saturn, 1.44 billion km from us, on 19-7-2013





Apollo 17,
7 Dec. 1972

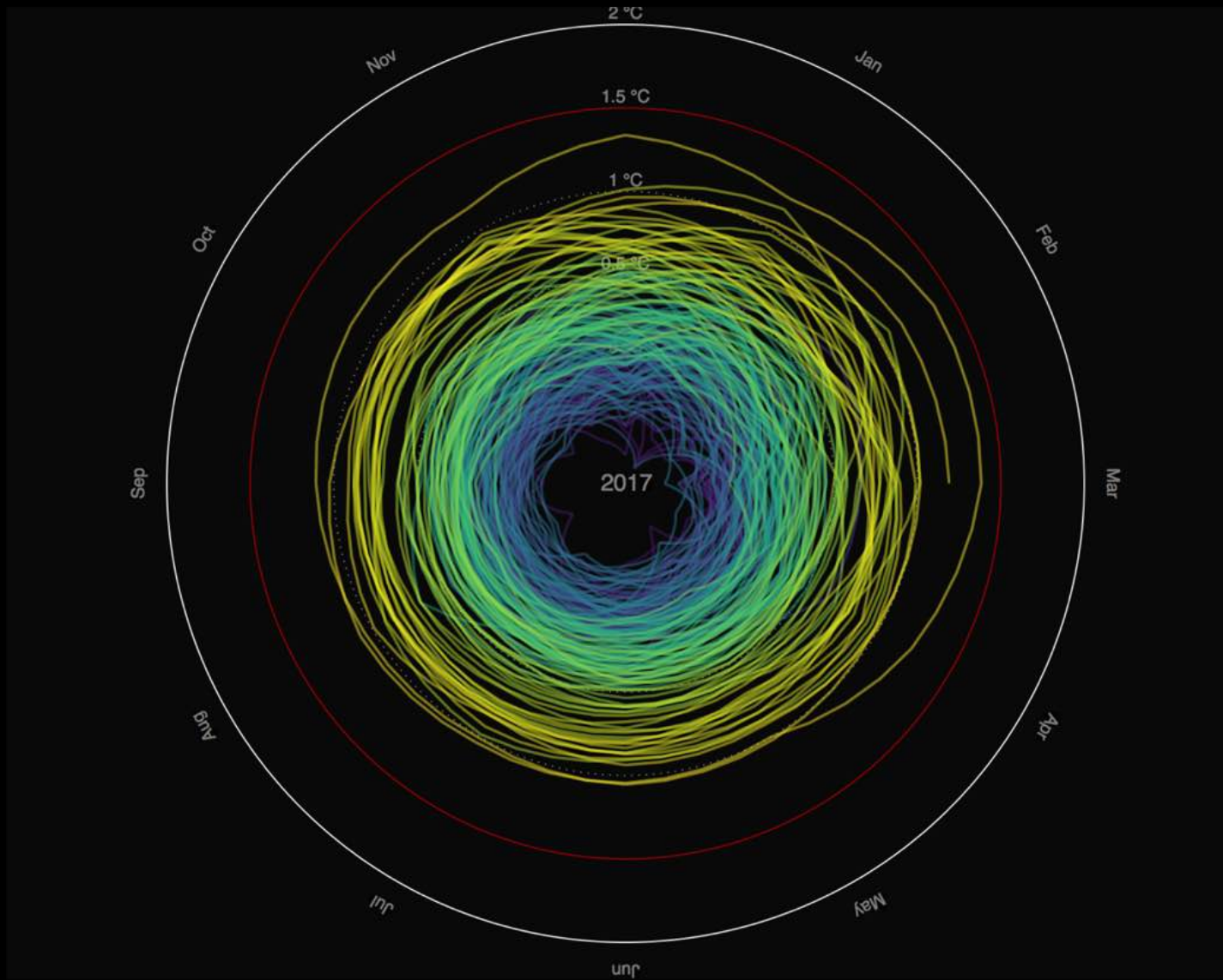
Our atmosphere is thin and fragile (as seen by ISS crew on 31 July 2013)



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

**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

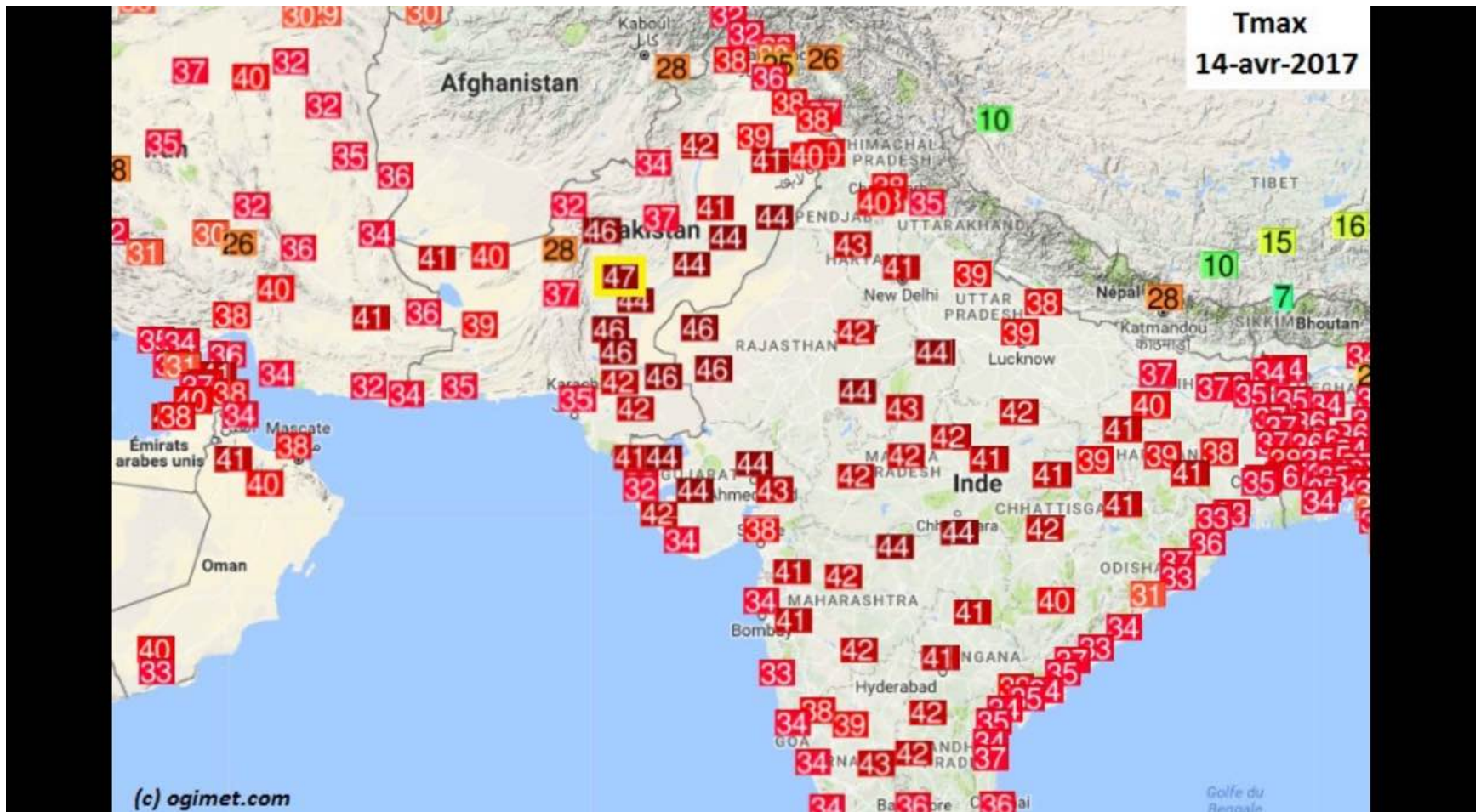
Animated version available on <http://openclimatedata.net/climate-spirals/temperature>

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

Heat waves kill



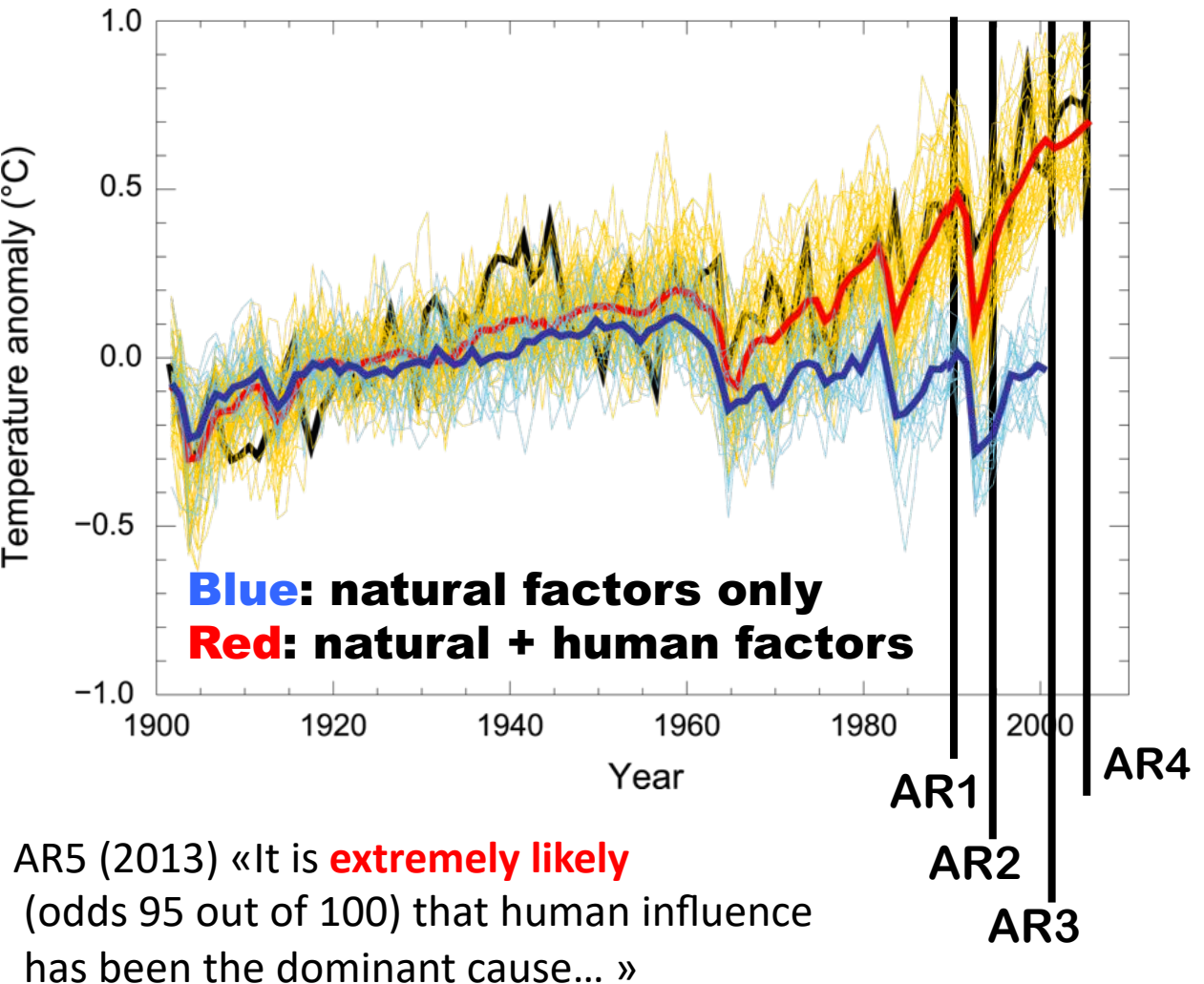
A Progression of Understanding: Greater and Greater Certainty in Attribution

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”

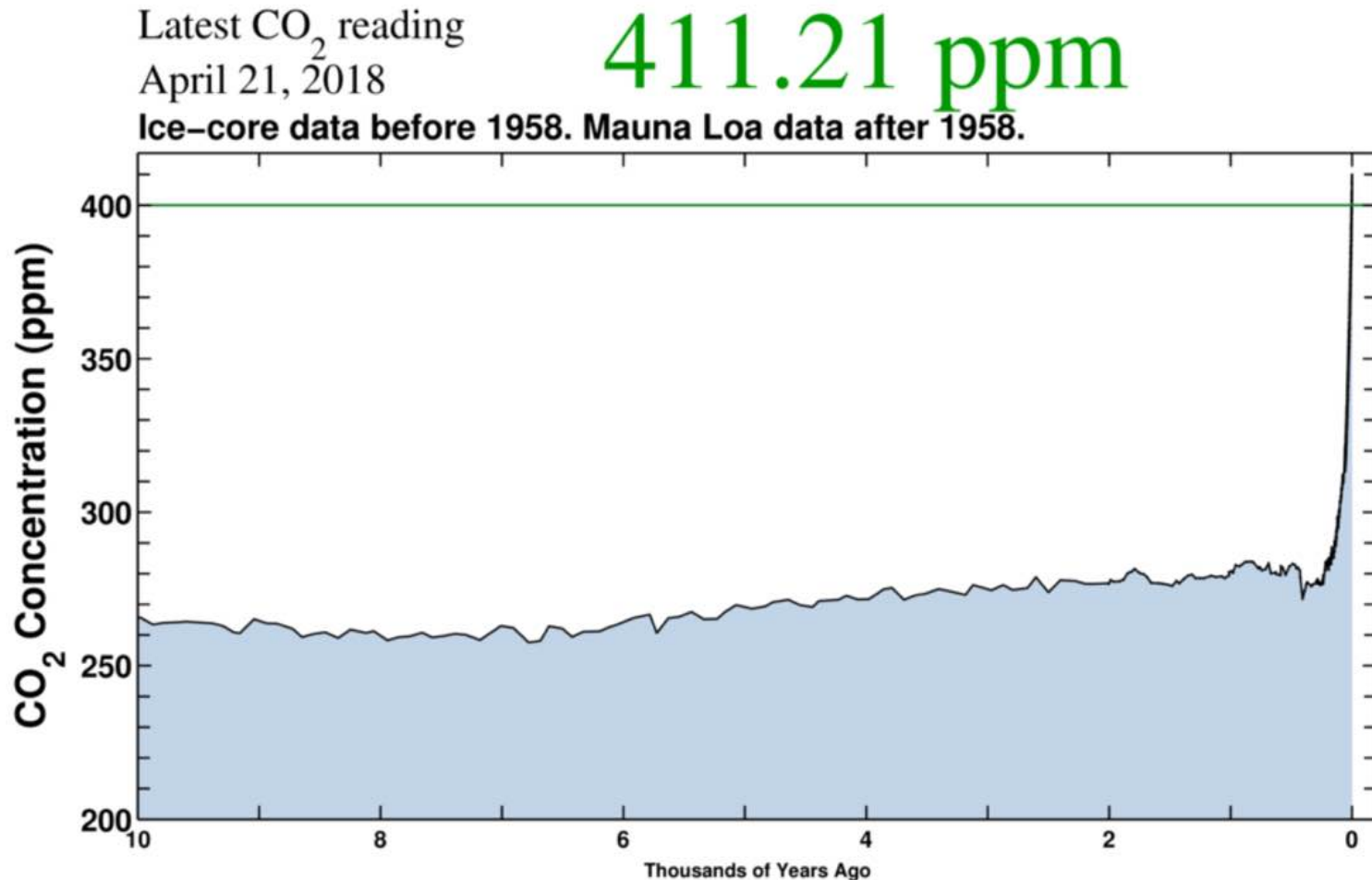
AR4 (2007): “most of
the warming is **very
likely** (odds 9 out of 10)
due to greenhouse
gases”



Fact n° 3: 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, 21 april 2018 (Keeling curve)



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

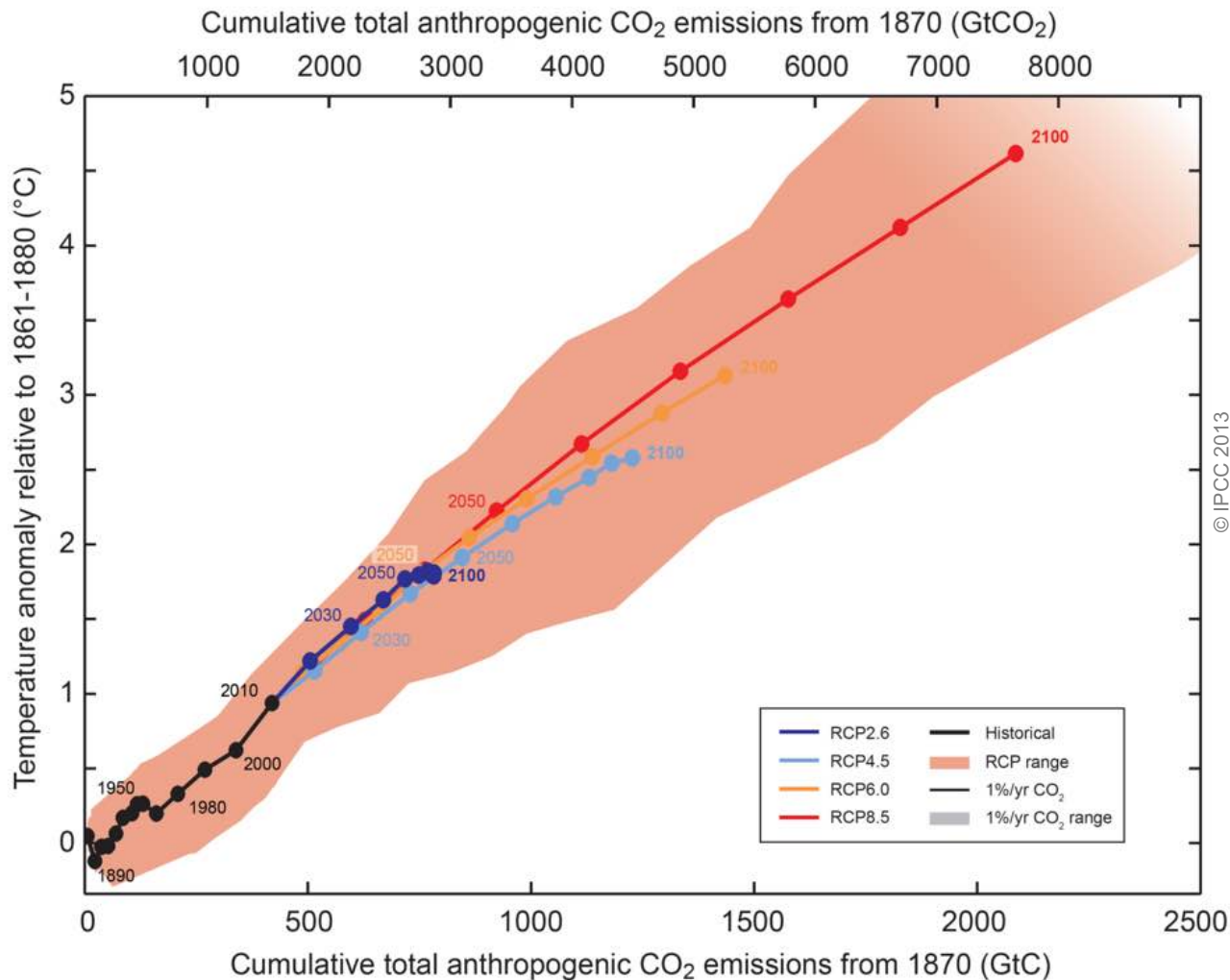


Fig. SPM.10

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

Fact 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.



Today, with +4-5° C globally

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



Fact n° 5: 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° 6: Climate change
impacts poor people first, but we
are all on the same spaceship**

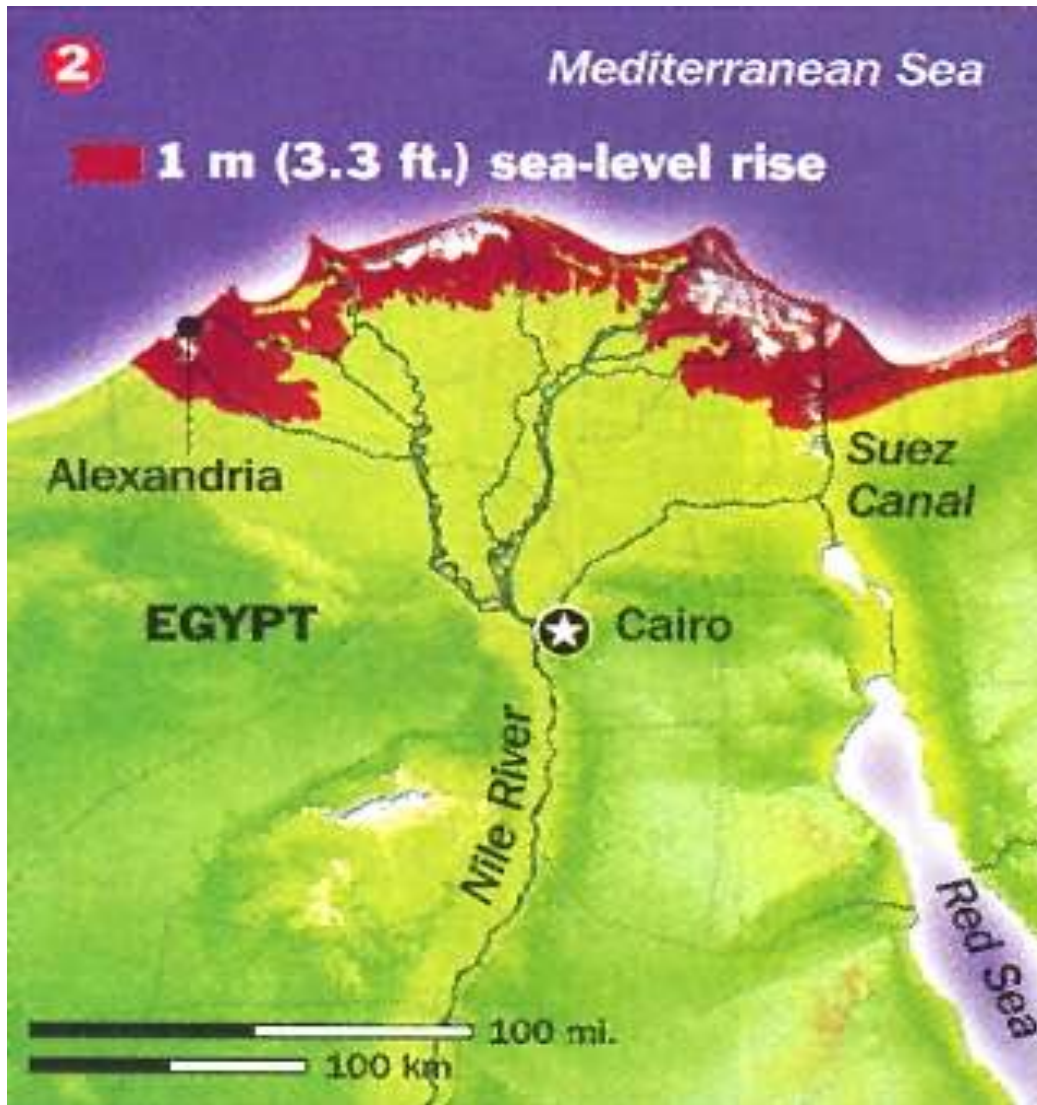
Belgian Prime Minister Charles Michel (RTBF,
4 May 2018): « when there is a geopolitical
instability, we pay the coast as well »

Risk = Hazard x Vulnerability x Exposure (Victims of New Orleans floods after Katrina)



AP Photo - Lisa Krantz (<http://lisakrantz.com/hurricane-katrina/zspbn1k4cn17phidupe4f9x5t1mzdr>)

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



(Time 2001)

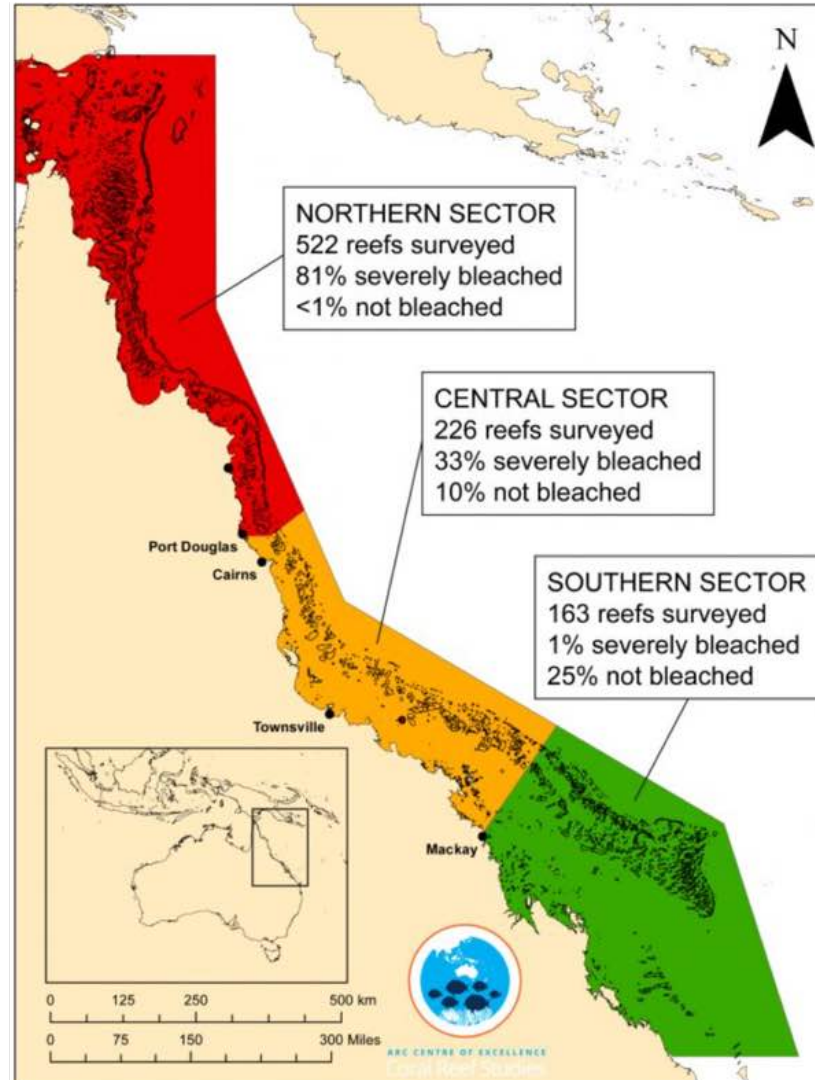
In Puerto Rico, Hurricane Maria created the worst humanitarian crisis in the US for decades



Fact n° 7: Ecosystems suffer more and more, but our wellbeing depends on their good state

« Miners use canaries to warn them of deadly gases. It might not be a bad idea if we took the same warning from the dead birds in the countryside »
(Duke of Edinburgh at the Wildlife Fund dinner, quoted in « Silent Spring » (Rachel Carson, 1962))

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



**Fact n° 8: 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...)

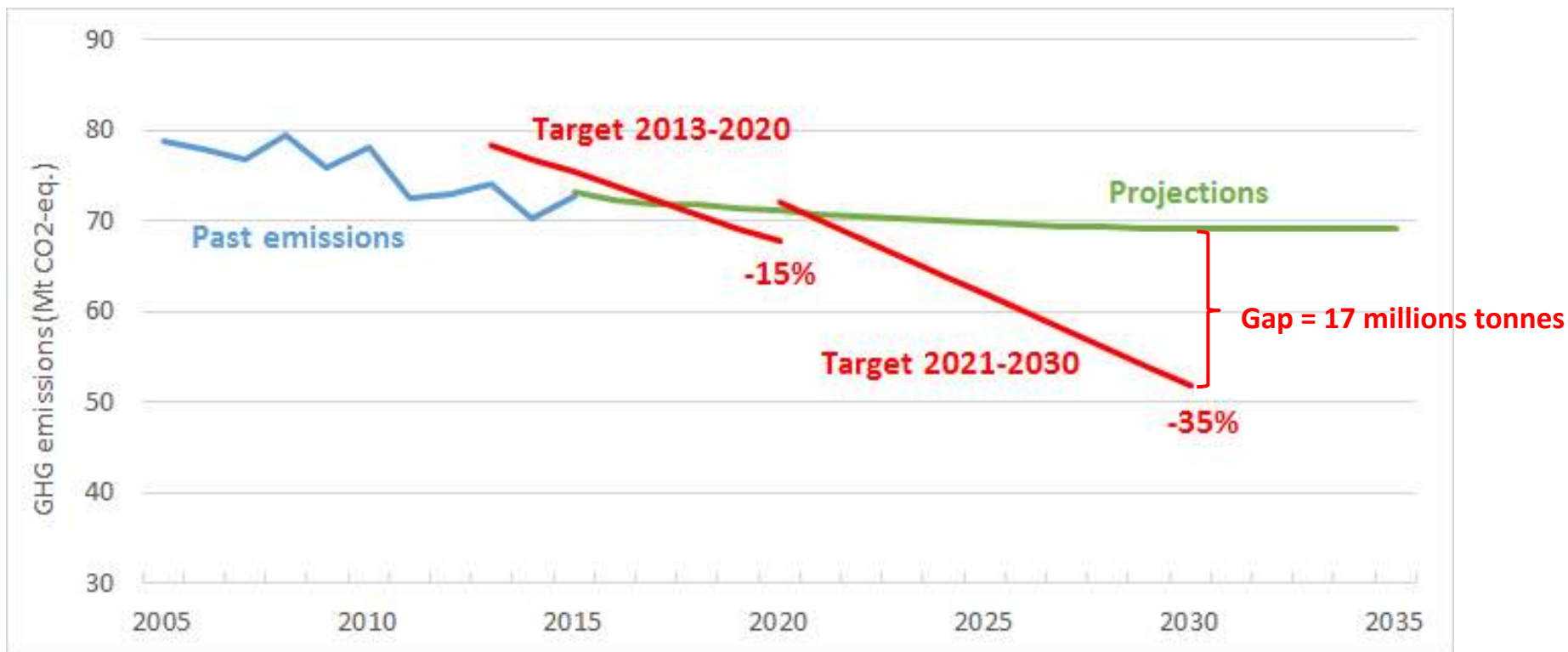
**Fact n° 9: European Union
spends 1 billion euros *per day*
simply to buy fossil fuels outside
its borders.**

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

Fact n° 10: China is waking up to the climate and pollution challenge. It might become the world climate leader if the EU does not raise its ambition level in line with the Paris Agreement

The US economy will become less and less attractive, as it risks missing the decarbonizing trend. Hopefully, climate measures at the level of cities and states can somewhat compensate federal actions

OBJECTIFS DE LA BELGIQUE DANS LE CADRE EUROPÉEN

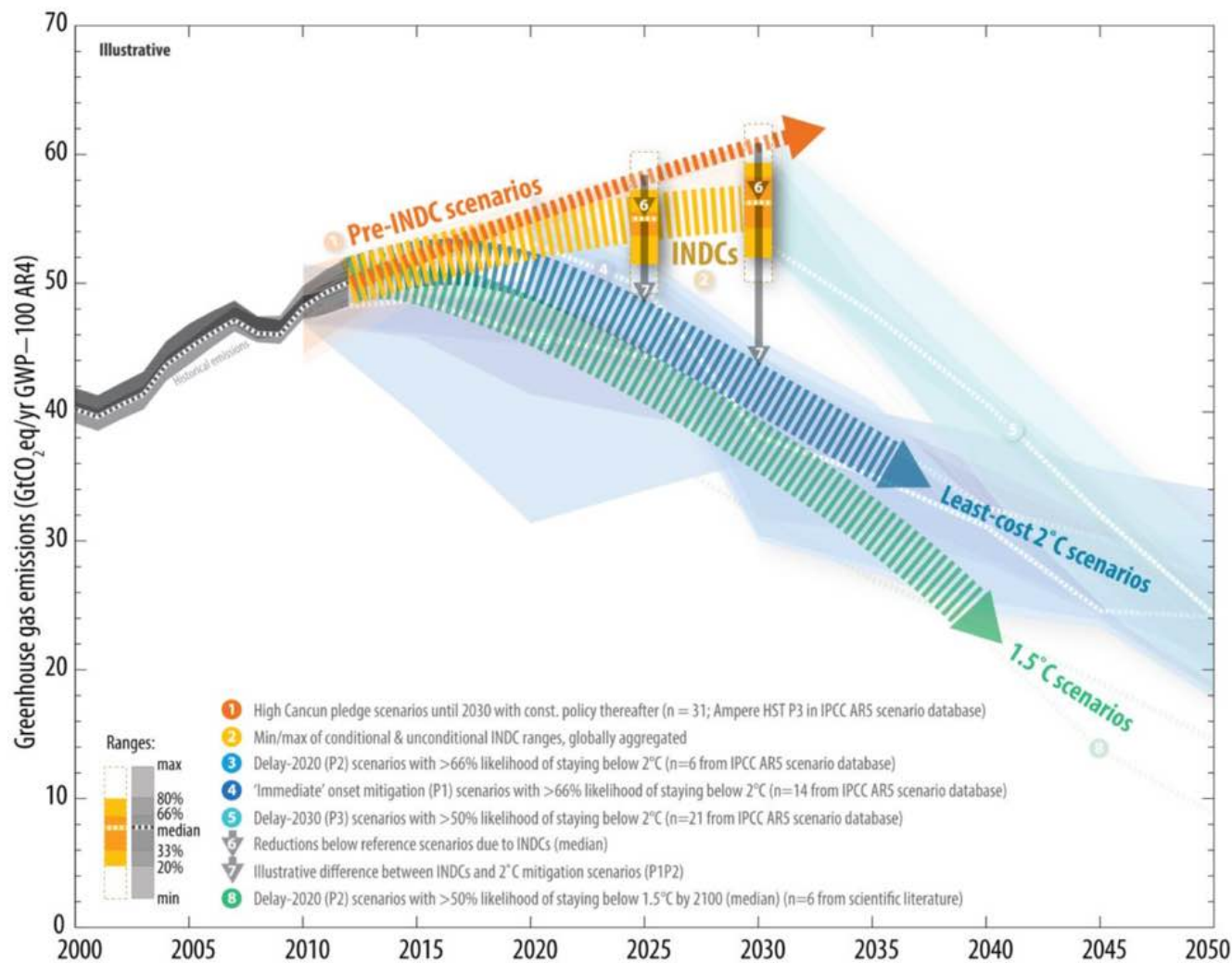


Evolution des émissions en Belgique et objectifs de réduction (secteurs non-ETS)

(2005-2015: émissions réelles; 2015-2035: projections)

Source: Commission Nationale Climat (2017)

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>

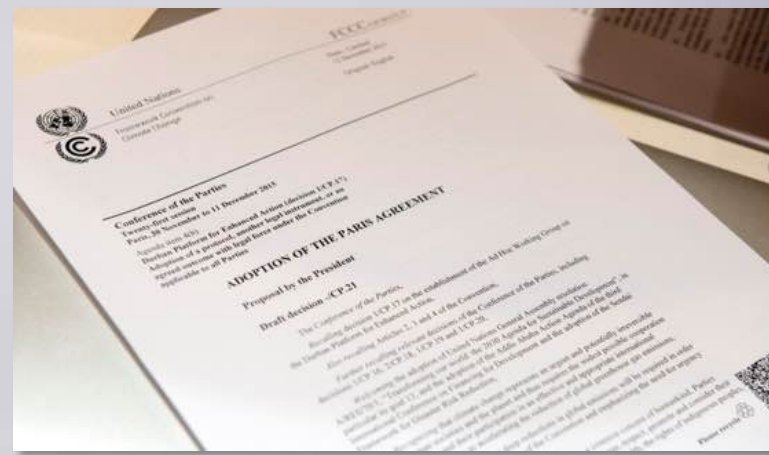
**(Element) of solution n° 1: The
survival of humanity and
ecosystems must become a
much higher political priority**

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

Sur les Changements Climatiques 2015

COP21/CMP11

Paris, France



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

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 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 be coherent...



Trying to be coherent...



**Solution n° 7: Mobility : 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!

...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**

Le coût du kWh solaire s'effondre, l'éolien, le stockage (chaleur et électricité) et le pilotage de la demande progressent.

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



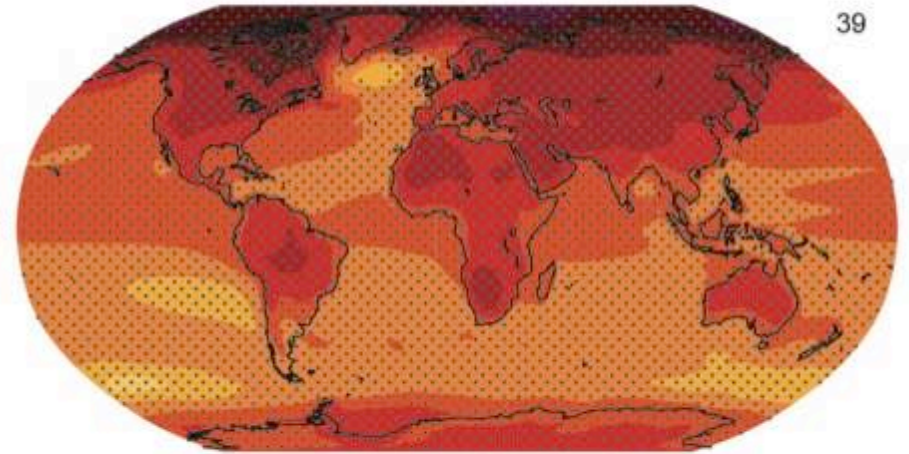
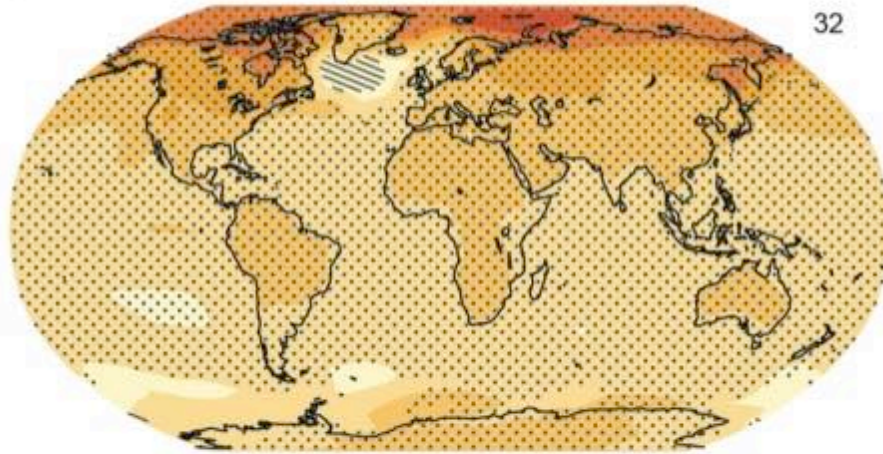
SUSTAINABLE DEVELOPMENT GOALS



RCP2.6

RCP8.5

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



Humanity has the choice

Bij EPO (2018)

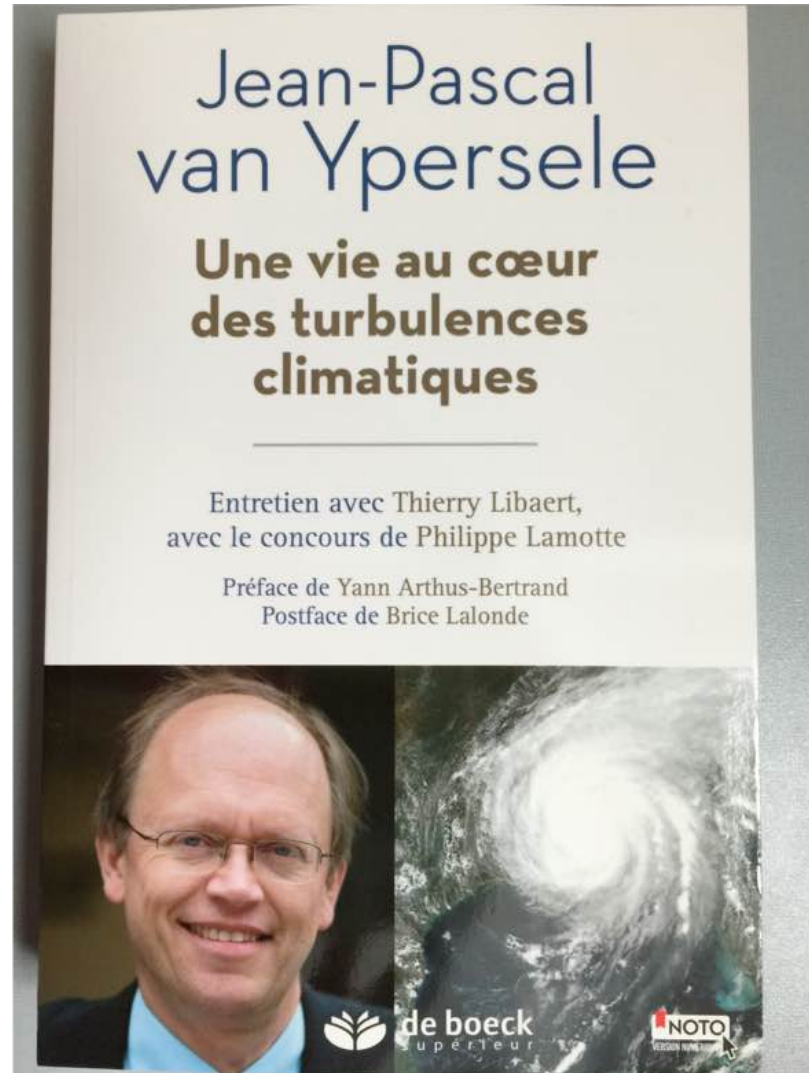
**Voorwoord:
Jill Peeters**



Pour en savoir plus:

**Publié chez De Boeck
supérieur,**

En vente à la sortie



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