Ten arguments about the urgency of addressing climate change

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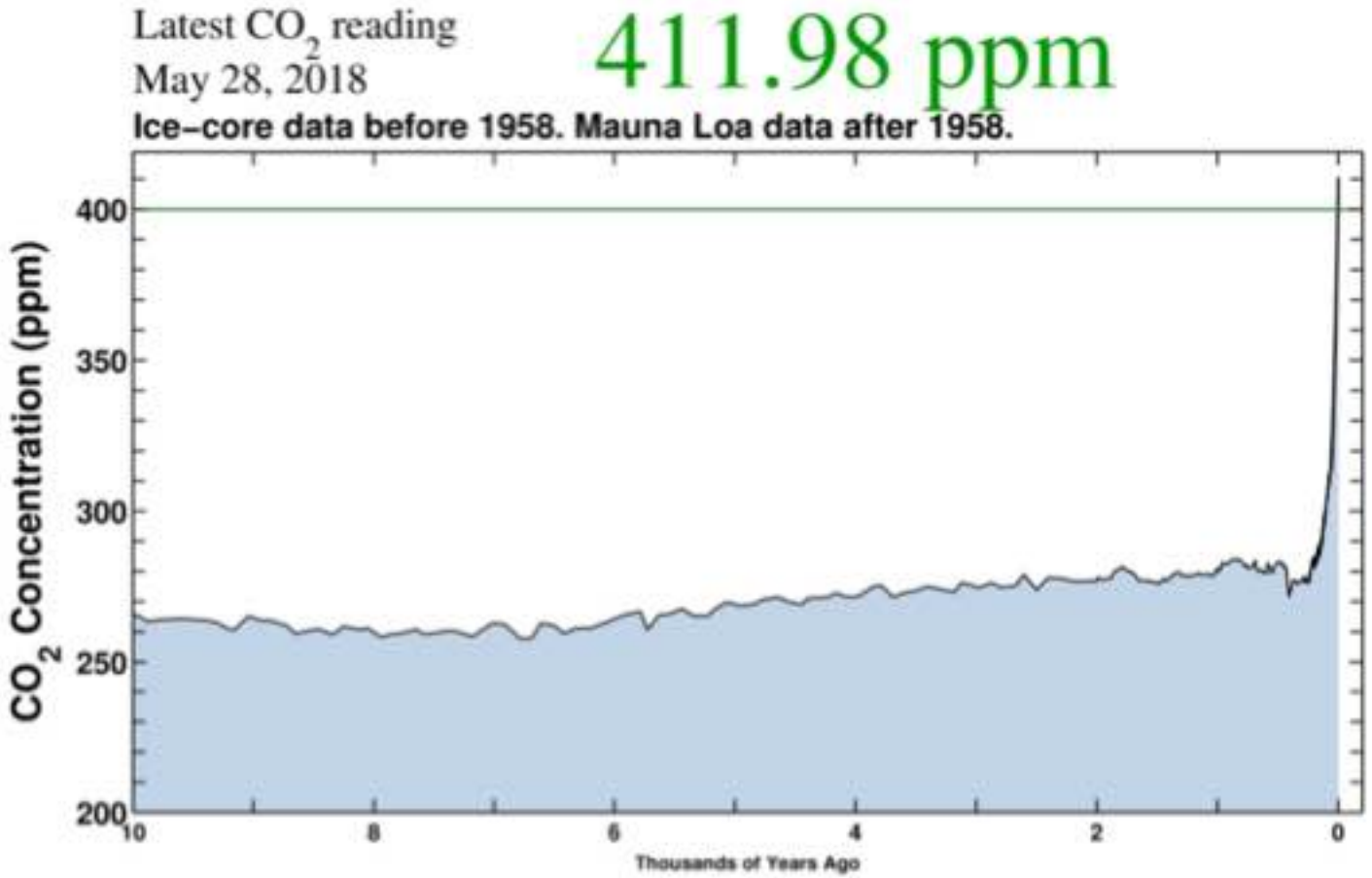
FEBEG event, Brussels, 27 June 2018

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

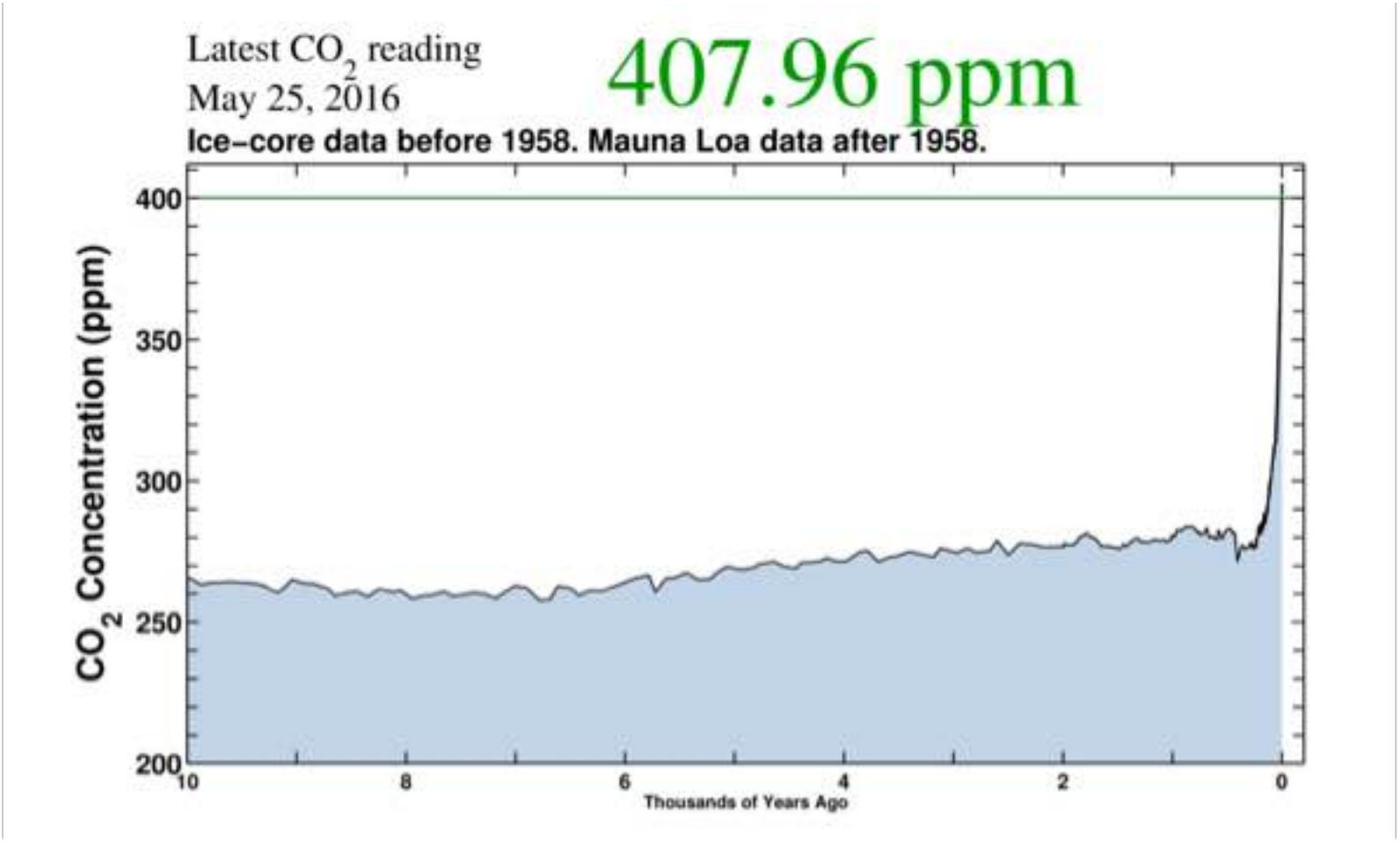
Argument n° 1: We have changed the composition of the atmosphere on an extraordinary speed and scale

CO_2 Concentration, 28 May 2018 (Keeling curve)



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

CO_2 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

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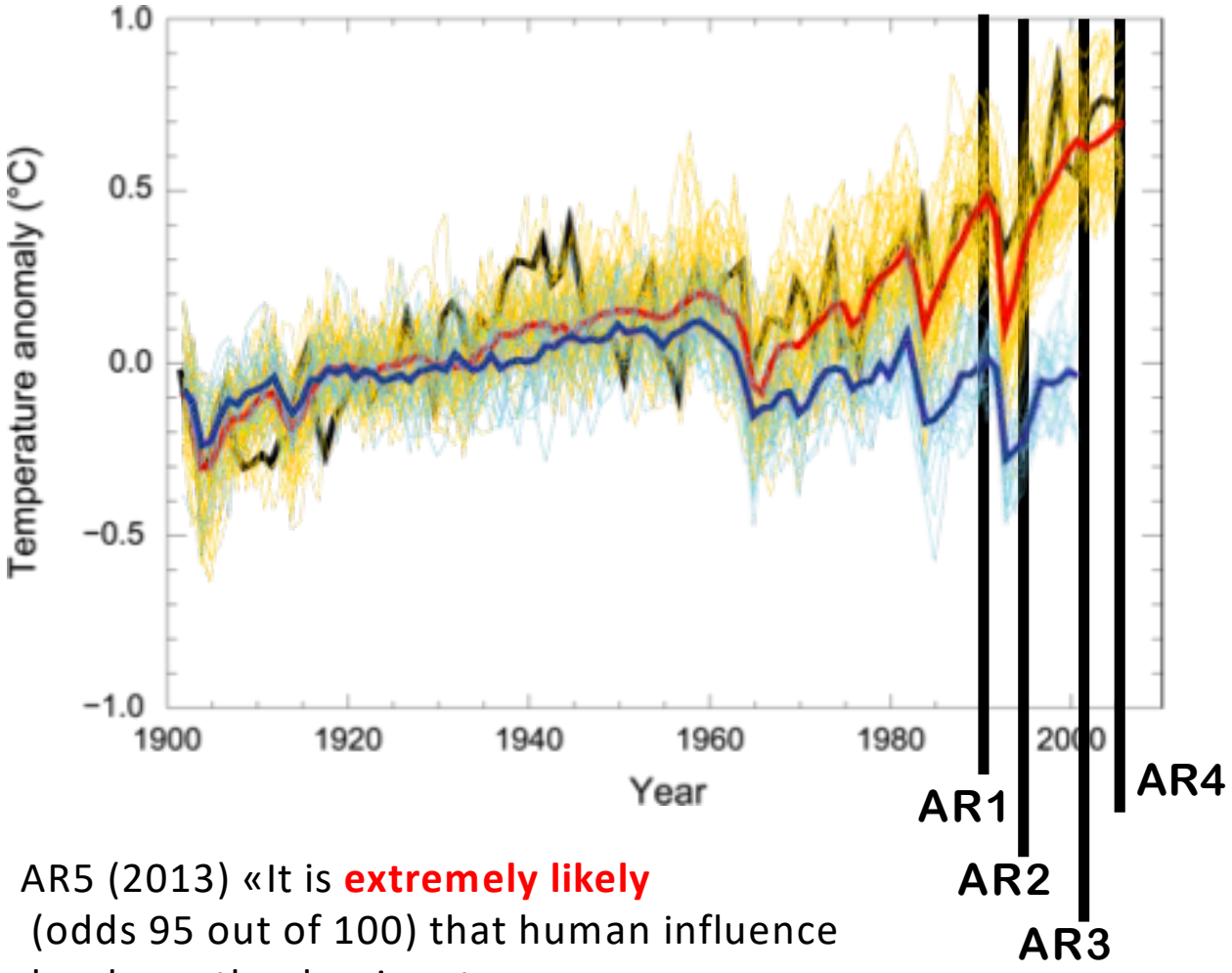
A Progression of Understanding: Greater and Greater Certainty in Attribution

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… »

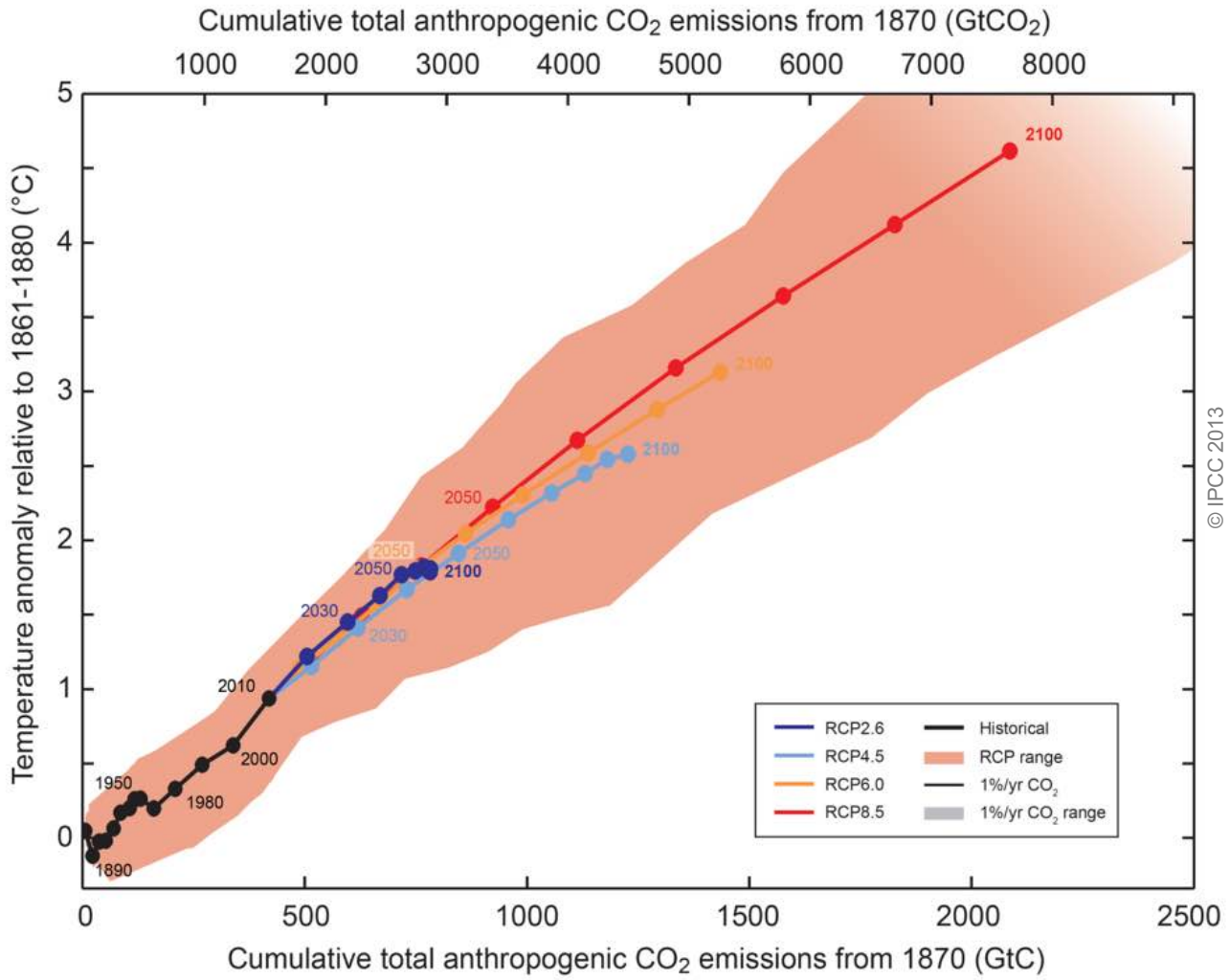
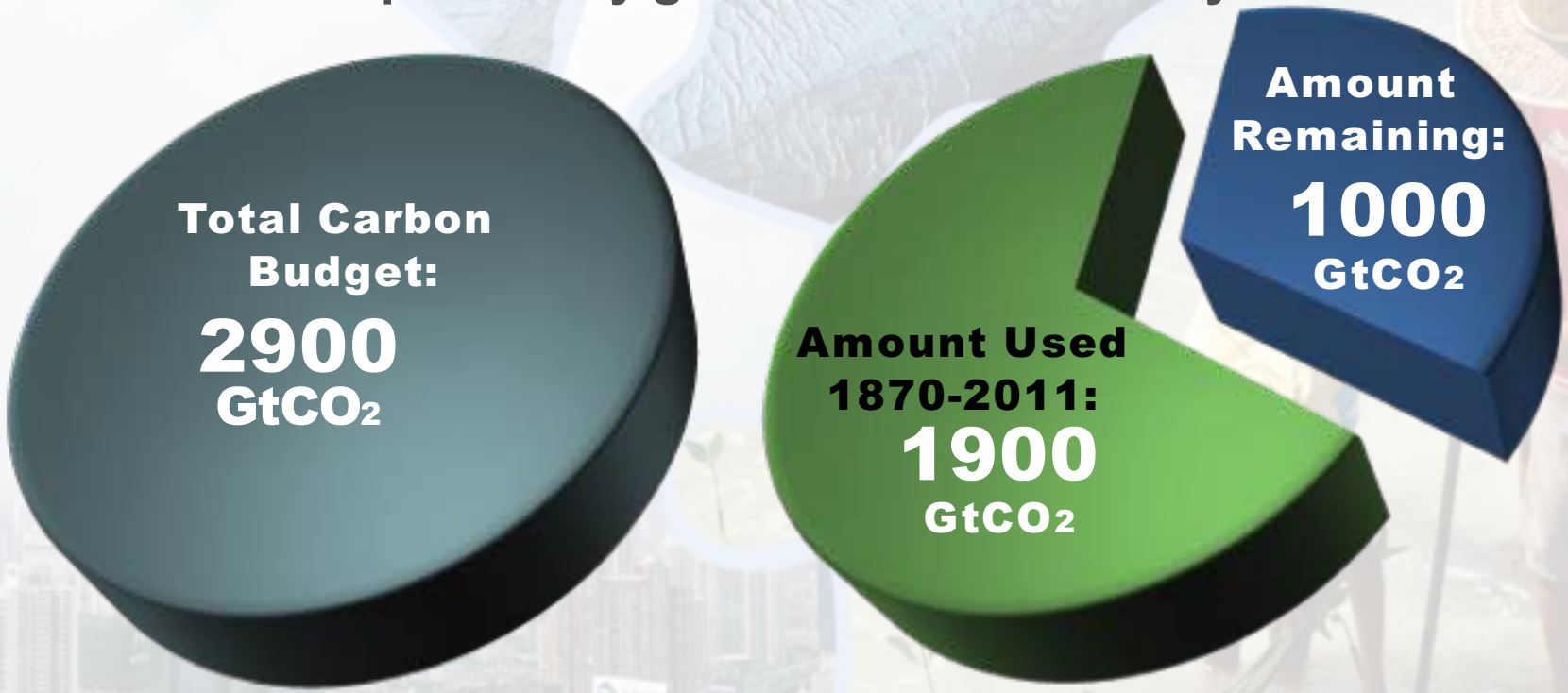


Fig. SPM.10

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

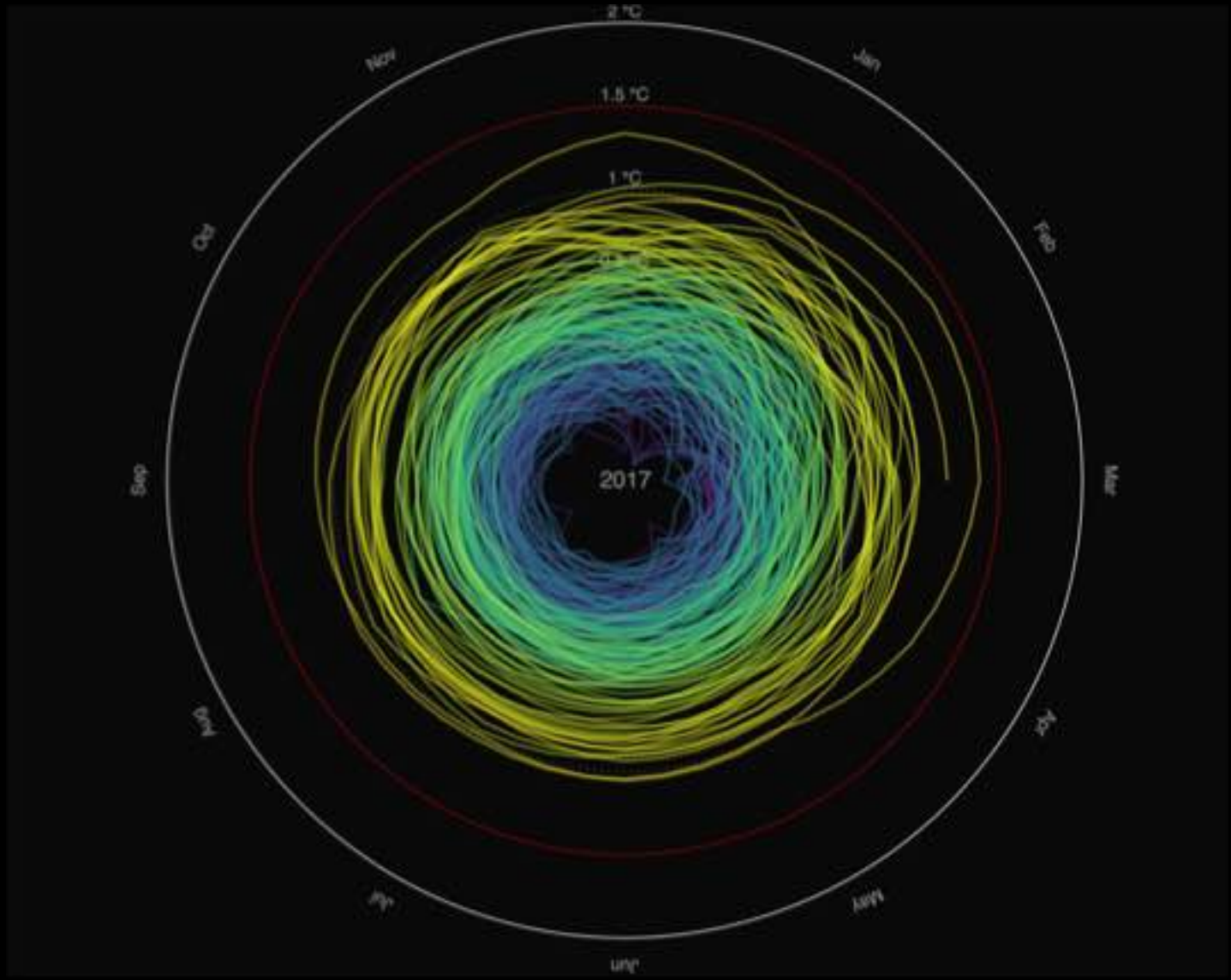


NB: Emissions in 2011: 38 GtCO2/yr

AR5 WGI SPM

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

Temperature spiral

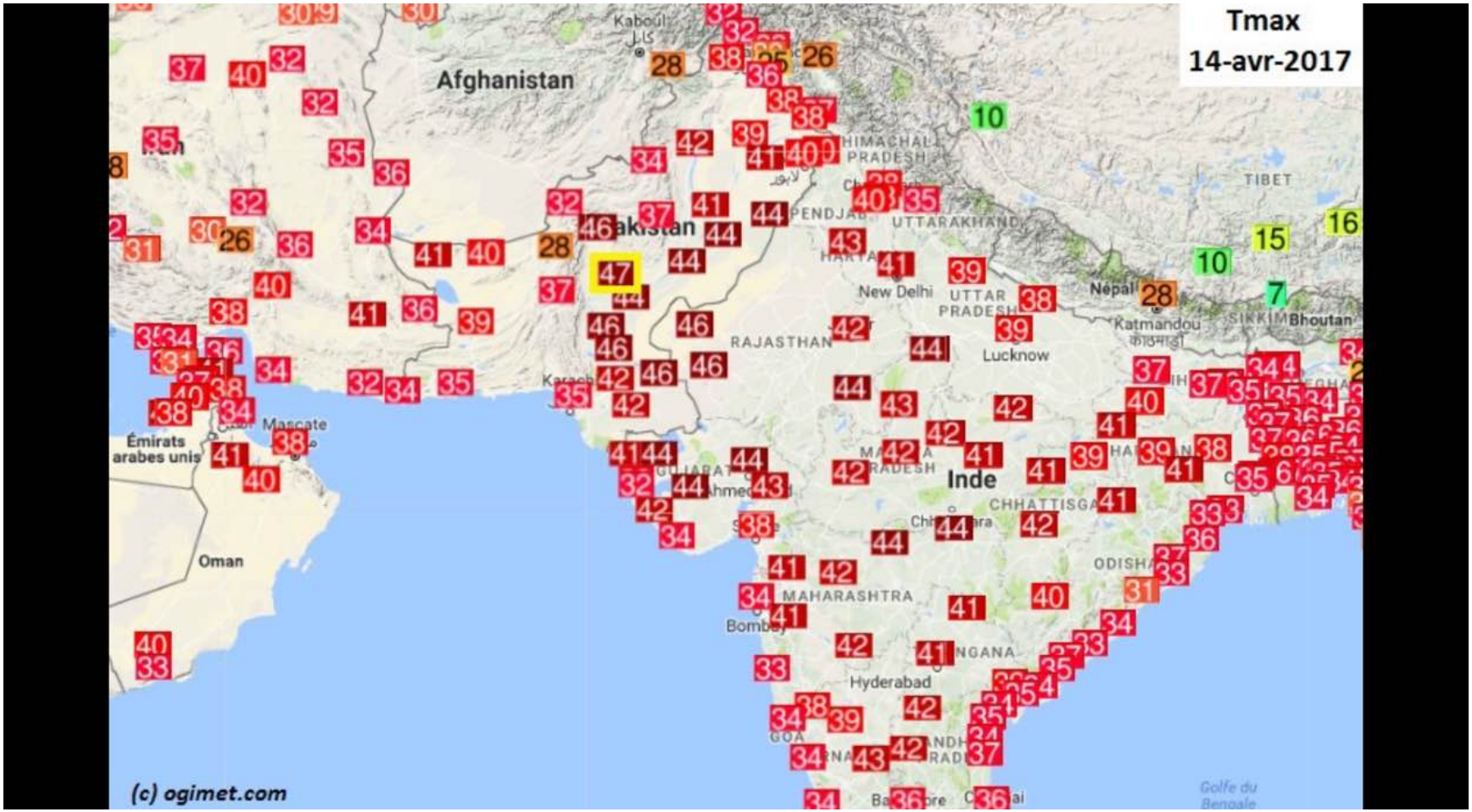


Global Mean Temperature in °C relative to 1850 – 1900
Graph: Ed Hawkins (Climate Lab Book) – Data: HadCRUT4 global temperature dataset
Animated version available on http://openclimatedata.net/climate-spirals/temperature

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

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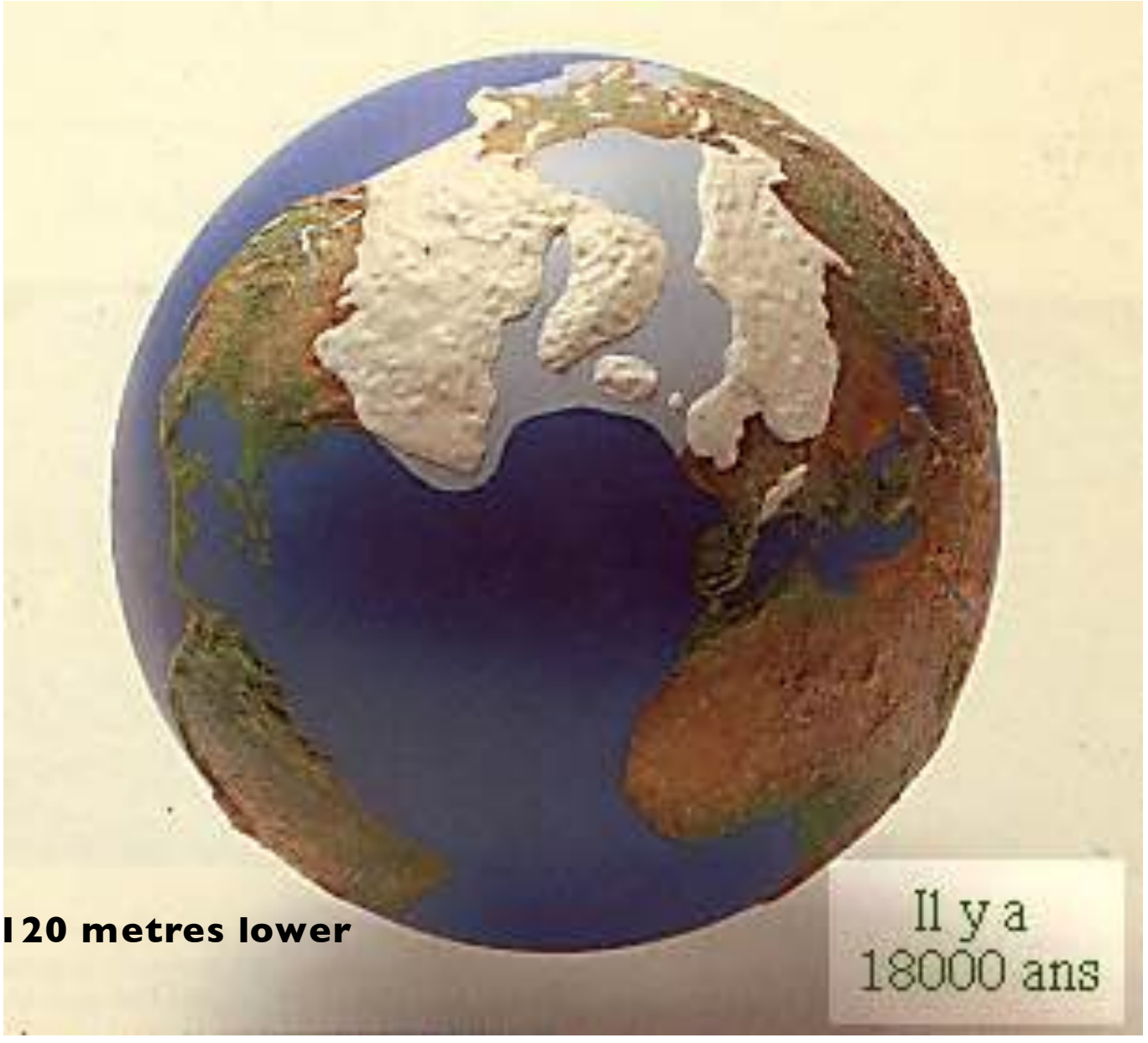
18-20000 years ago (Last Glacial Maximum)

With permission from Dr. S. Joussaume, 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.

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

« Boomerang » effect:

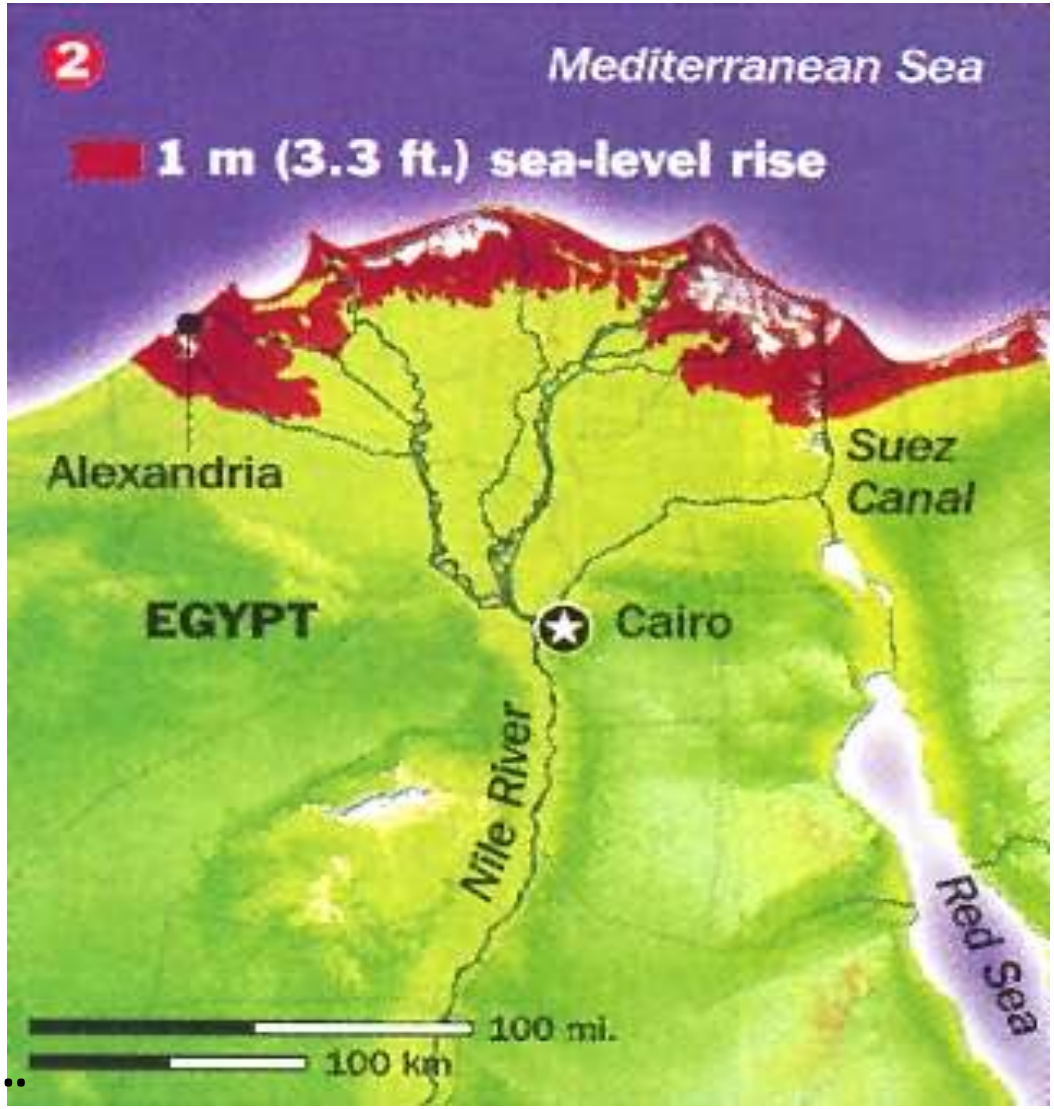
Belgian Prime Minister Charles Michel (RTBF, 4 May 2018): « when there is a geopolitical instability, we pay the cost as well »

Risk = Hazard x Vulnerability x Exposure

(Victims of New Orleans floods after Katrina in 2005)

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



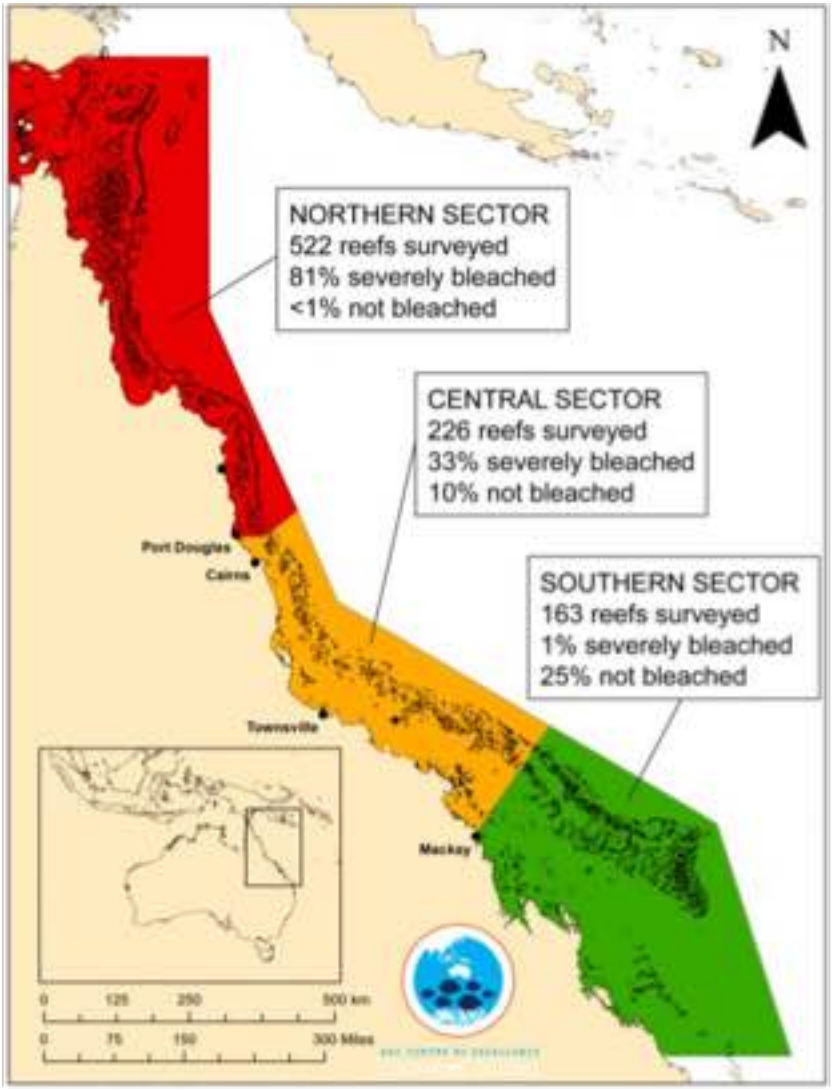
NB: + 1 m is possible in the next 100 years…

(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

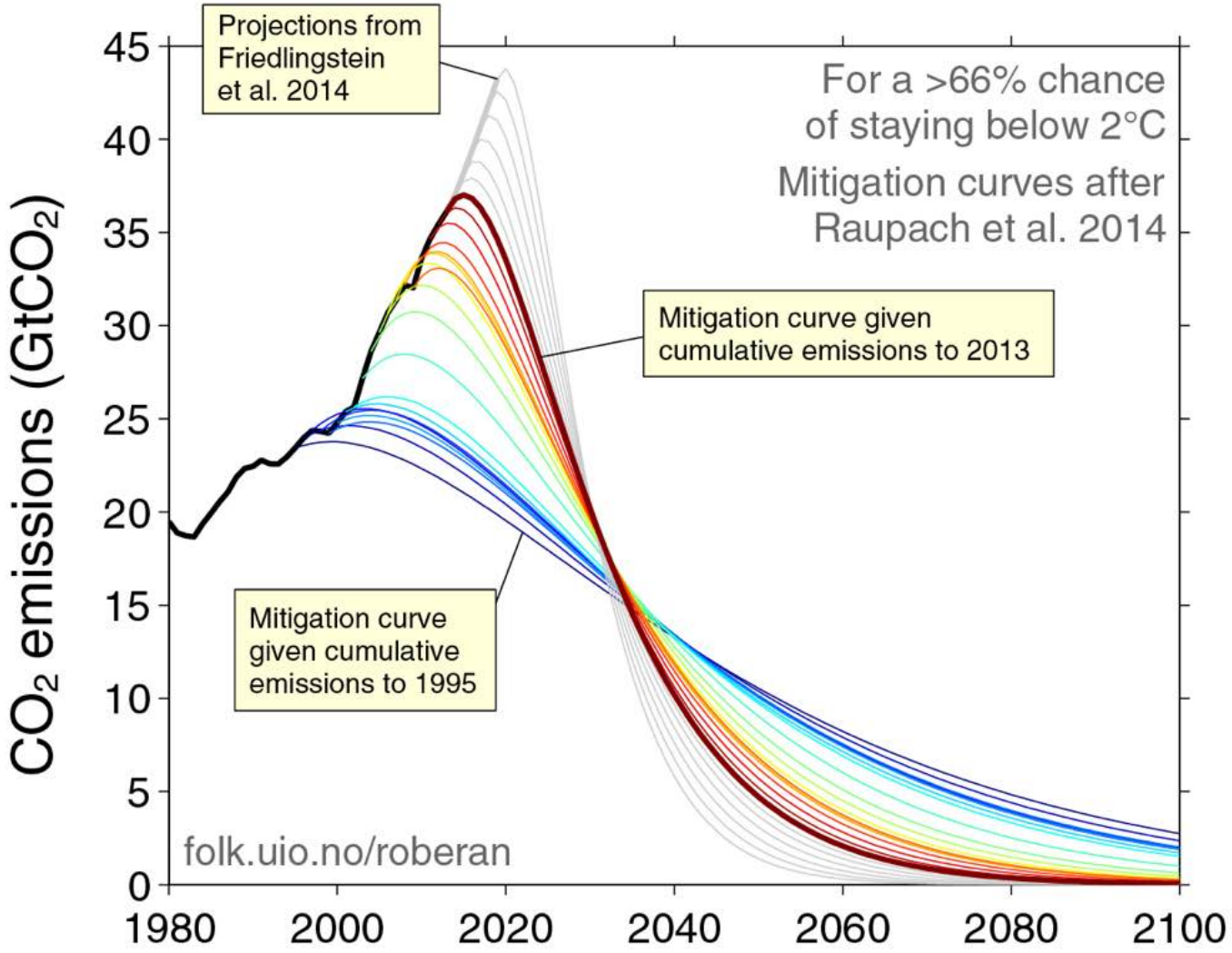


JCU Australia - ARC Centre of Excellence for Coral Reef Studies / Tom Bridge and James Kerry

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

15 to 40% of the CO_2 emitted today will still be in the atmosphere in 1000 years from now

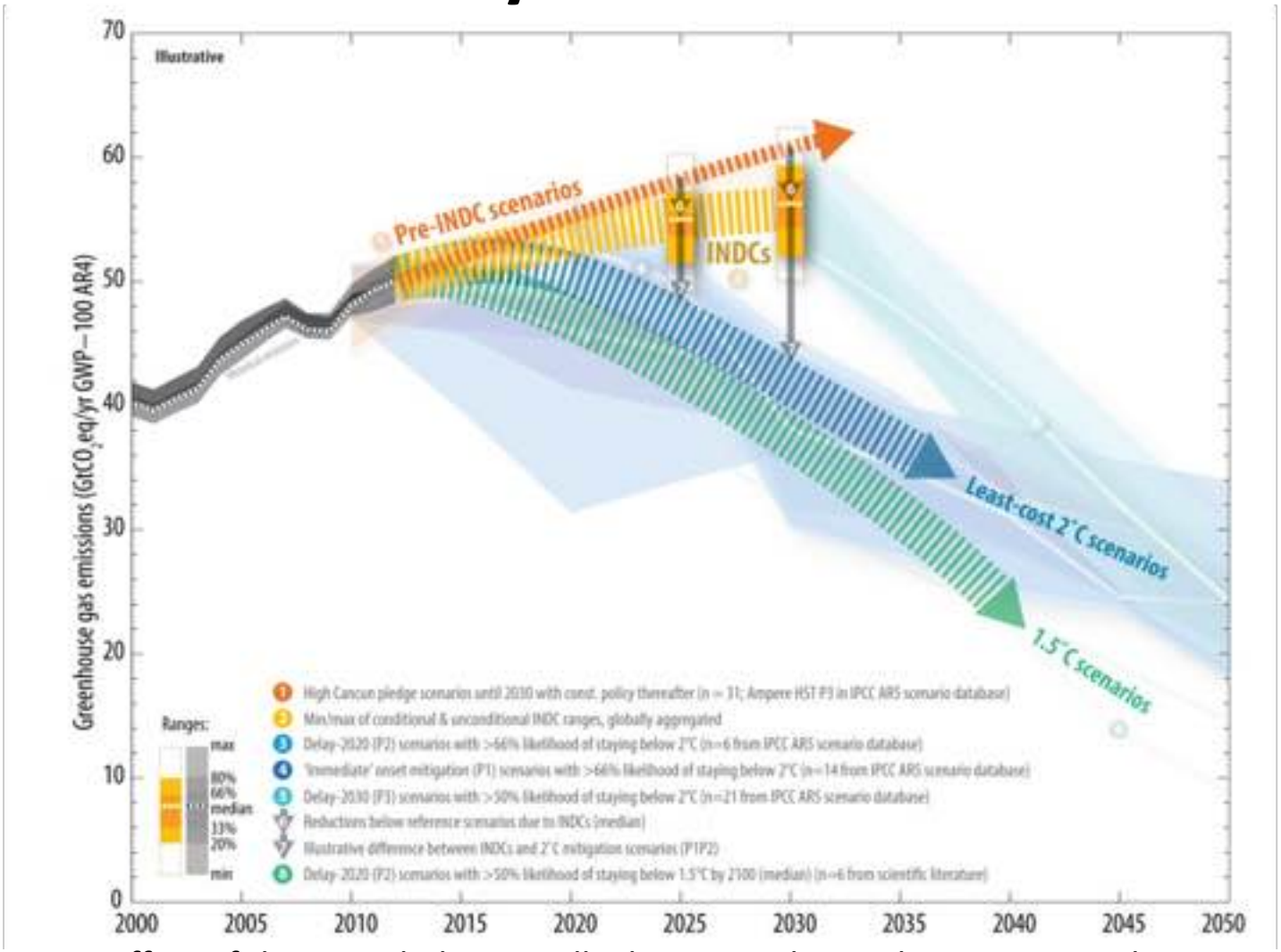
Limiting warming becomes much more difficult when the peak happens later



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

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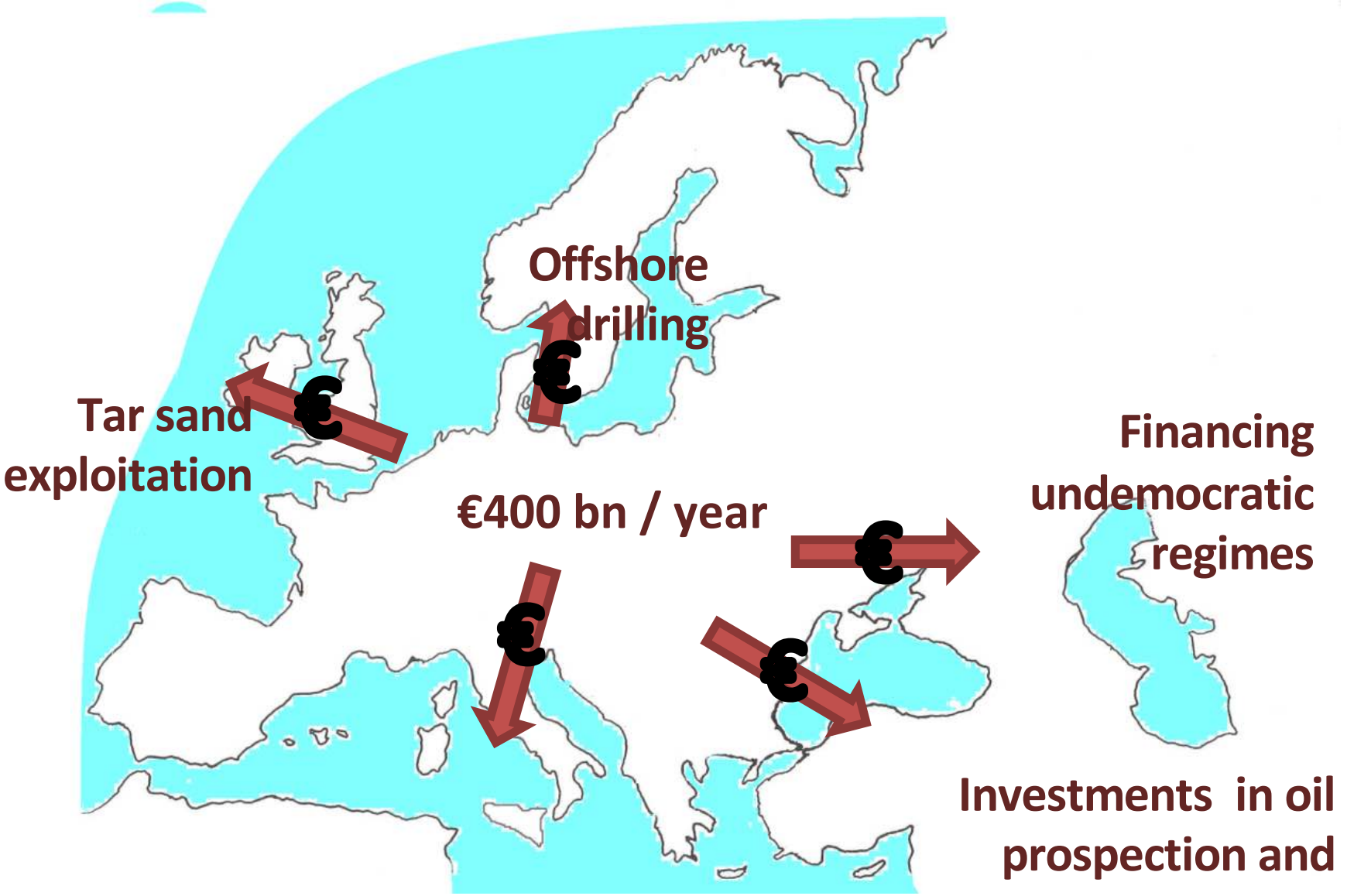
EU: annual cost of buying fossil fuels



Source: www.energycoalition.eu

- **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 tightiness + 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

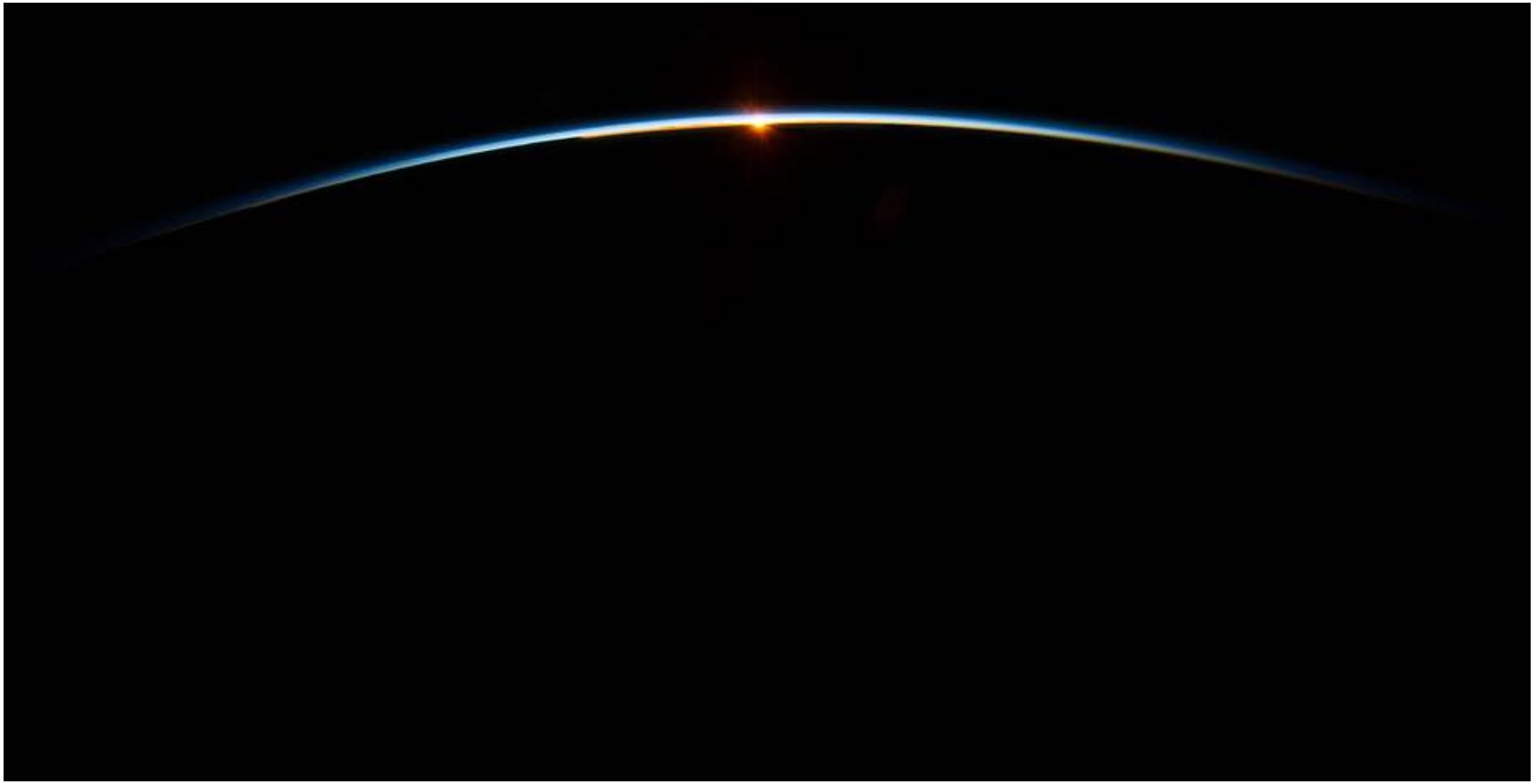
Trying to practice what I « preach »

Trying to practice what I « preach »

Final argument:
There is no planet B

That small blue dot is the Earth, a 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)



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RCP2.6

RCP8.5

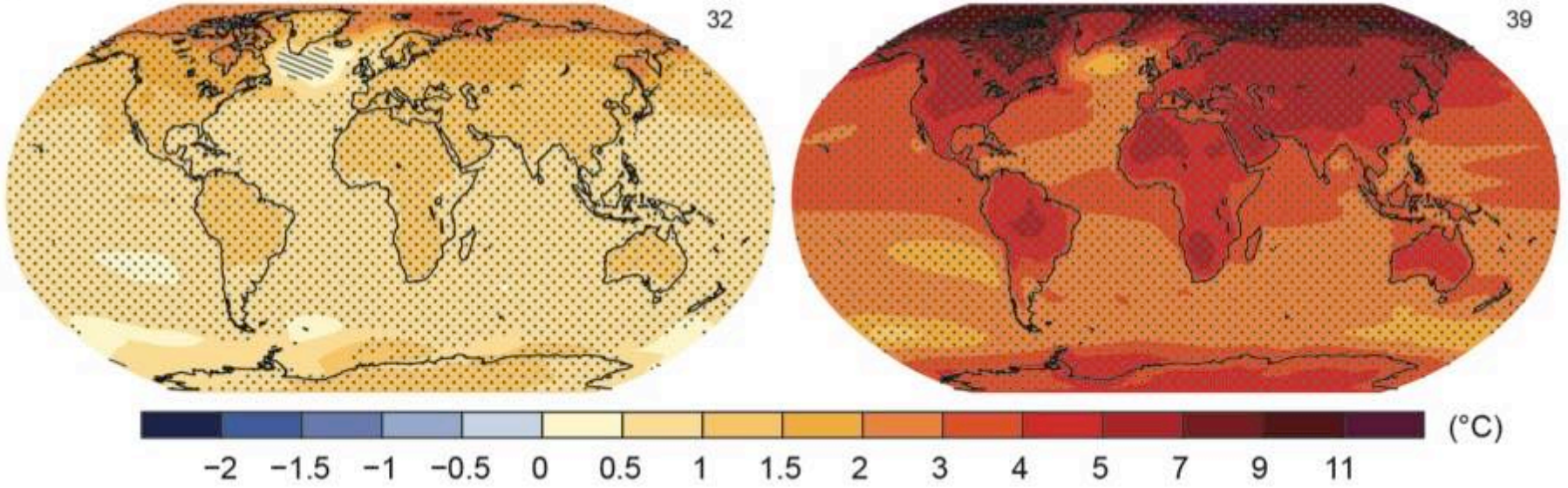


Fig. SPM.8

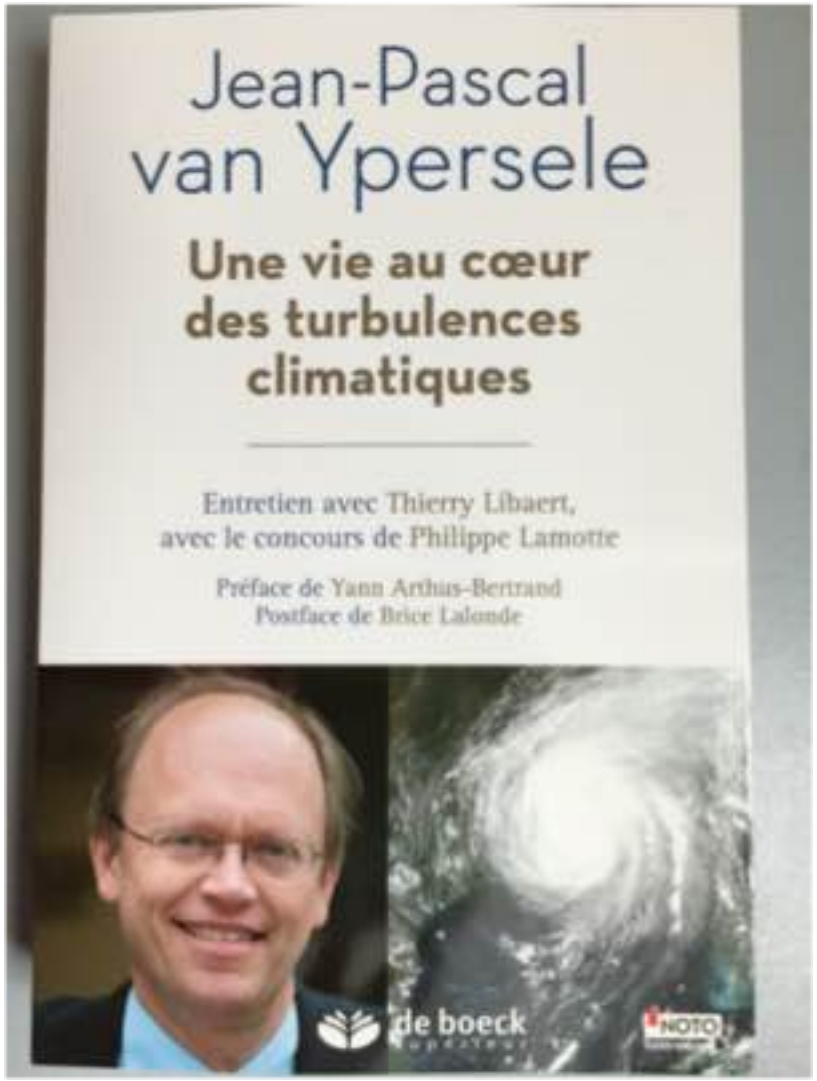
Humanity has the choice

SUSTAINABLE DEVELOPMENT GOALS

Pour en savoir plus:

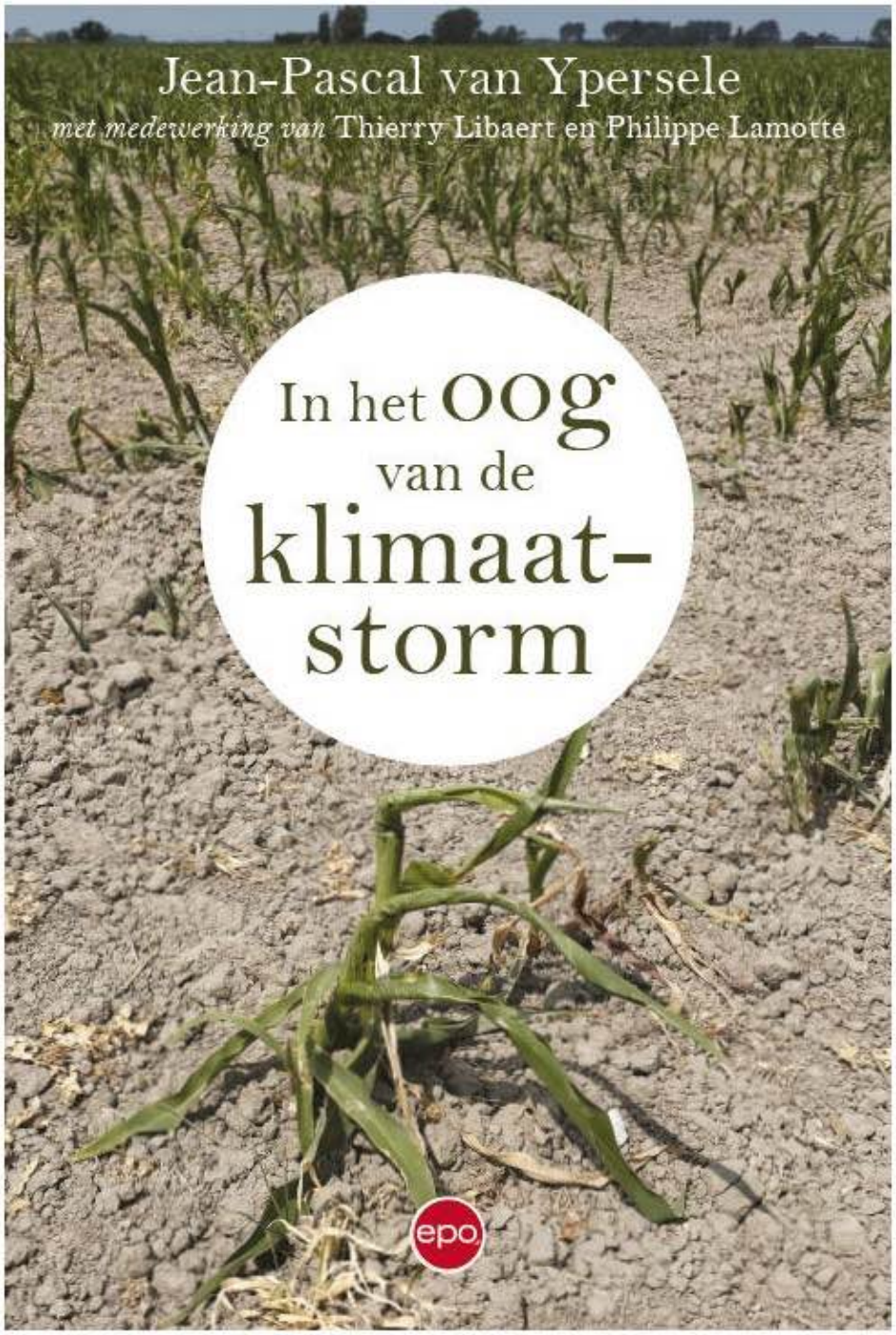
Lisez mon livre, où j'aborde tous ces sujets

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