About the 1.5°C warming IPCC Special Report :

# Global warming of 1.5°C

## (…) in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty


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**Former IPCC Vice-Chair (2008-2015)**

**Prof UCLouvain, Earth & Life Institute**

**Twitter: @JPvanYpersele,**


Brussels (ITCSD/ERCST event), 15 October 2018


Thanks to the Government of Wallonia (funding the Walloon Platform for IPCC) for its support

# Why this report?

- 1992: Article 2 of the UNFCCC: avoid « dangerous interference »
- 1996: EU Environment Council: for us, dangerous = <2°C
- 2009: COP15 (Copenhagen): dangerous = <2°C
- 2010: COP16 (Cancun): formalizes COP15
- 2015: COP21 (Paris): objective = « Well below 2°C » & « pursuing efforts to limit warming to 1.5°C»

# Why this report?

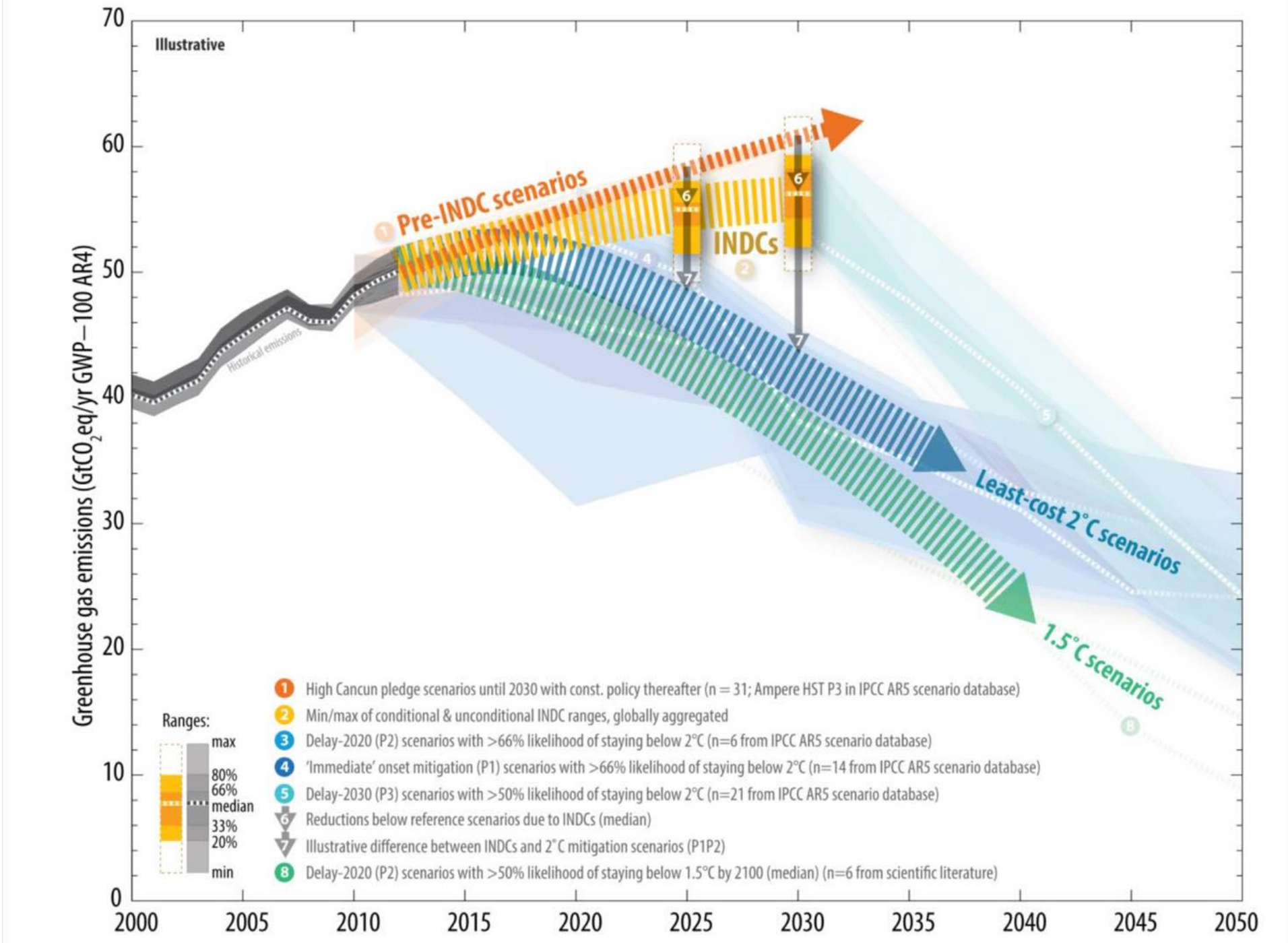
COP21 decided to invite the IPCC « to provide a special report in 2018 on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways » (Article 21 of 1/CP21)

# Why this report?

COP21 « Notes with concern that the estimated aggregate GHG emission levels in 2025 and 2030 resulting from the INDCs

- do not fall within least-cost 2 ˚C scenarios but rather lead to a projected level of 55 gigatonnes in 2030,
- and also notes that much greater emission reduction efforts will be required (…) in order to hold the increase in the global average temperature
  -- to below 2 ˚C above pre-industrial levels by reducing emissions to 40 gigatonnes
  -- or to 1.5 ˚C above pre-industrial levels by reducing to a ***level to be identified in the [IPCC] special report*** » (Article 17 of 1/CP21)

# 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

# Why this report?

After a scoping process, the IPCC Plenary (Bangkok, October 2016) decided to accept the COP21 invitation and to produce:

« *An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways,* ***in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*** »

# SUSTAINABLE DEVELOPMENT GOALS

# Global warming of 1.5°C

*A IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways,* ***in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty***

Proposed outline (as adopted in October 2016; report to be finalized in 2018) :

- Summary for policy makers *(max 10 pages)*
- Chapters :
  - 1. Framing and context
  - 2. Mitigation pathways compatible with 1.5°C in the context of sustainable development
  - 3. Impacts of 1.5°C global warming on natural and human systems
  - 4. Strengthening and implementing the global response to the threat of climate change
  - 5. Sustainable development, poverty eradication and reducing inequalities
- Boxes (integrated case studies/regional and cross-cutting themes),
- FAQs (10 pages)

# Tentative and personal conclusions (of my talk to ITCSD/ECRST on 11 January 2017, when writing of the SR1.5 had not started yet!)

**1.5°C matters: lower impacts, adaptation less costly than in 2°C world, even if there is a temporary overshoot above 1.5°C**

**It is very ambitious to reduce emissions enough for a 1.5°C long-term average temperature above pre-industrial objective; a little easier with overshoot**

**The slower radical changes in emission patterns take place, the more we may need uncertain or risky technologies, such as large use of carbon dioxide removal from the atmosphere (possibly at the expense of bio-energy competition with food production)**

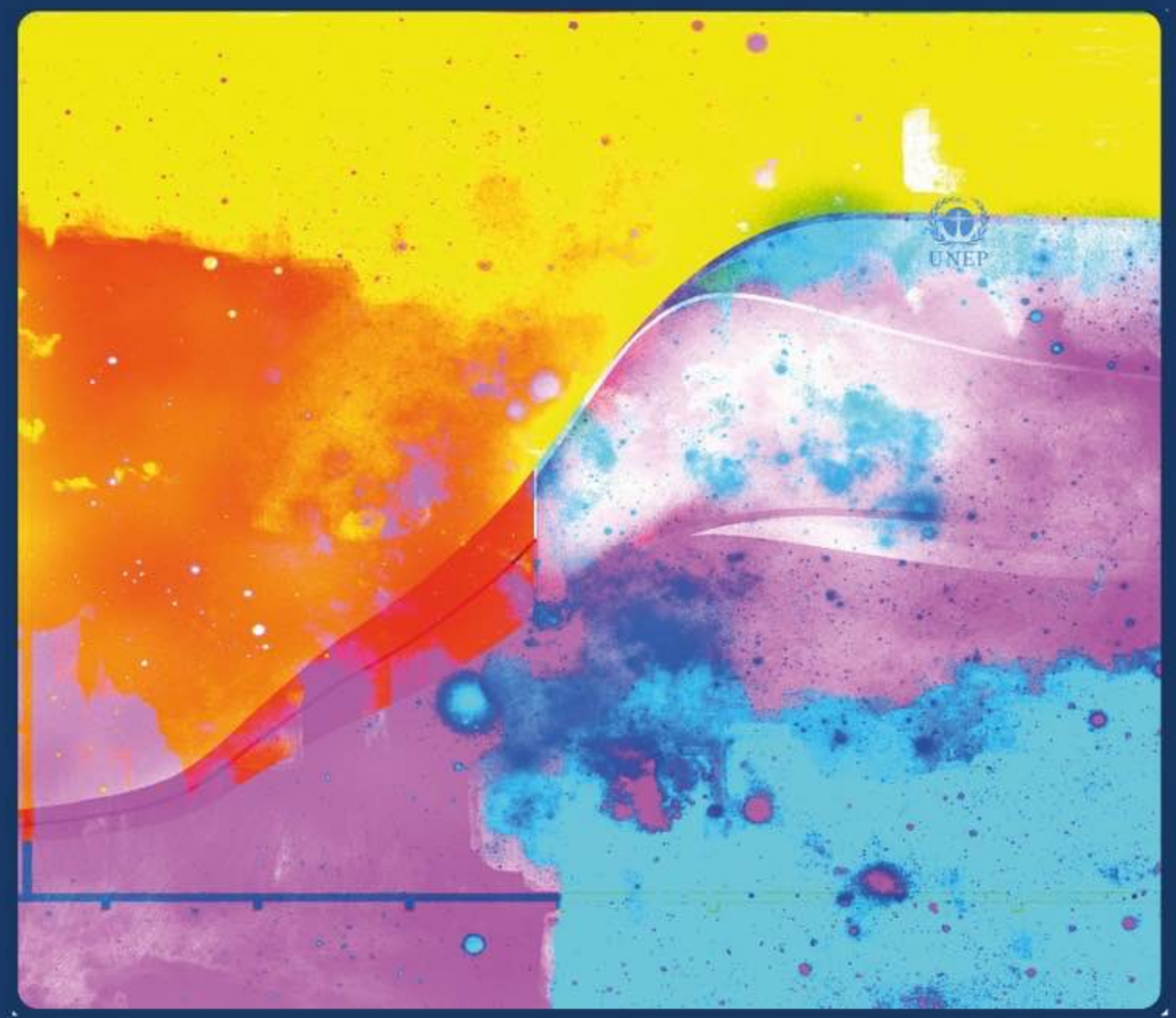
**Decision making needs the best scientific information possible – the IPCC SR 1.5 will be essential, but much can be done without waiting for it**

ipcc
INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

# Global Warming of 1.5°C

An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

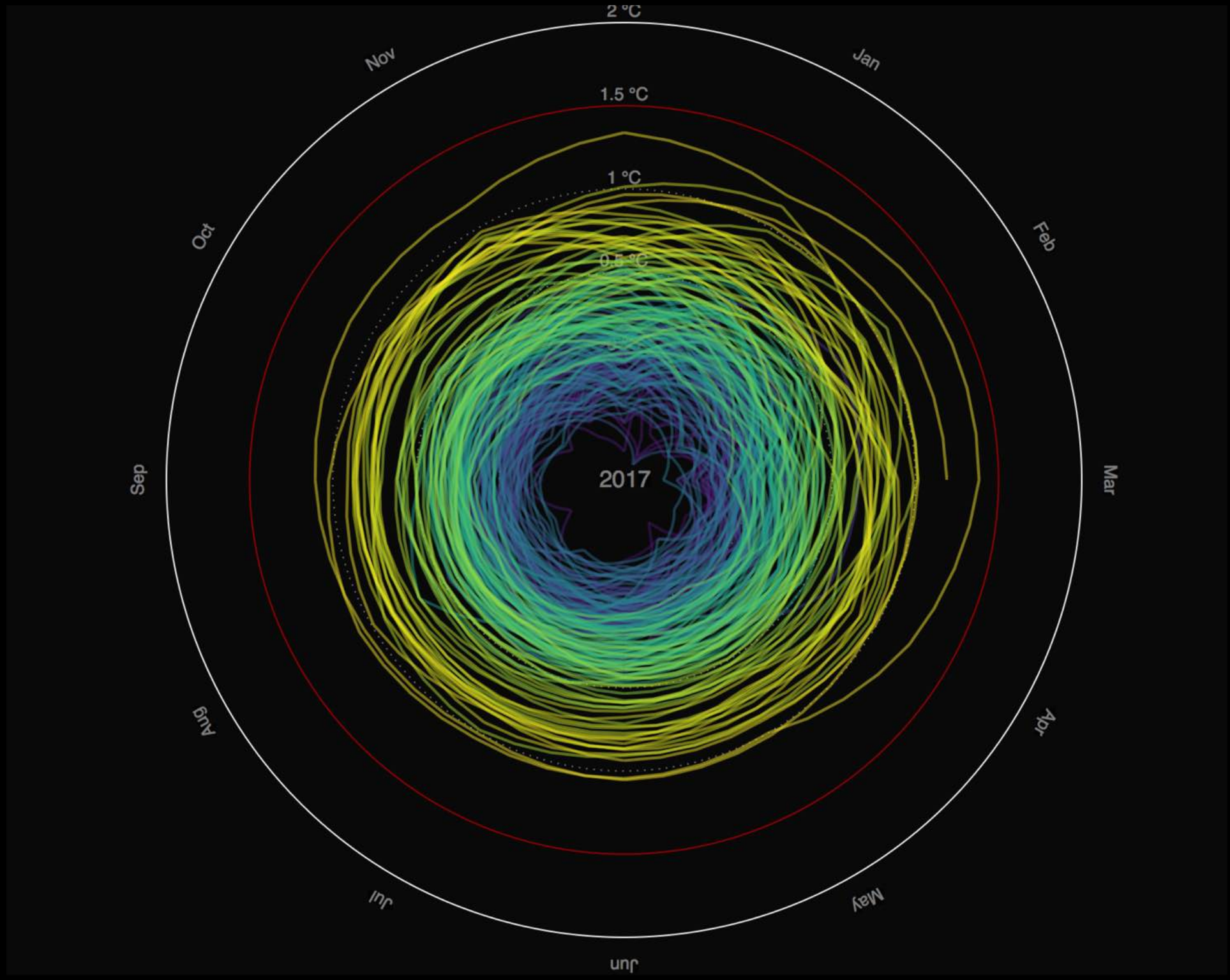


# Where are we now?

Since preindustrial times, human activities have caused approximately 1.0° C of global warming.

- Already seeing consequences for people, nature and livelihoods
- At current rate, would reach 1.5° C between 2030 and 2052
- Past emissions alone do not commit the world to 1.5° C

# 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

# Impacts of global warming 1.5°C

At 1.5°C compared to 2°C:

- Less extreme weather where people live, including extreme heat and rainfall
- By 2100, global mean sea level rise will be around 10 cm lower
- 10 million fewer people exposed to risk of rising seas

# Impacts of global warming 1.5°C

At 1.5°C compared to 2°C:

- Lower impact on biodiversity and species
- Smaller reductions in yields of maize, rice, wheat
- Global population exposed to water shortages up to 50% less

# Impacts of global warming 1.5°C

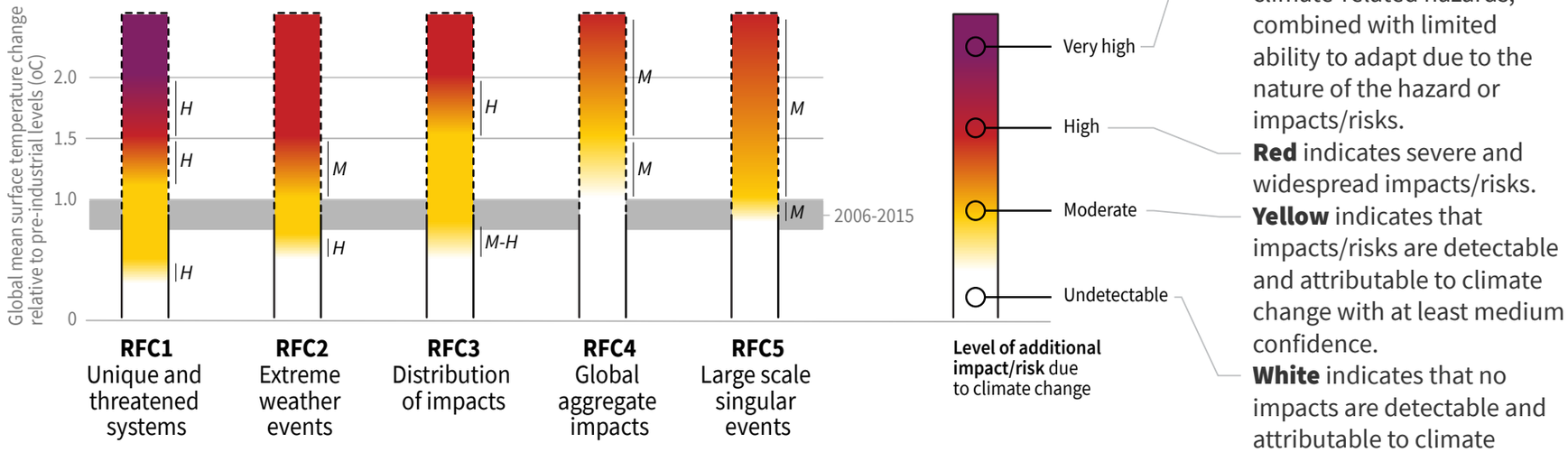
At 1.5°C compared to 2°C:

- Lower risk to fisheries & the livelihoods that depend on them
- Up to several hundred million fewer people exposed to climate-related risk and susceptible to poverty by 2050

# How the level of global warming affects impacts and/or risks associated with the Reasons for Concern (RFCs) and selected natural, managed and human systems

Five Reasons For Concern (RFCs) illustrate the impacts and risks of different levels of global warming for people, economies and ecosystems across sectors and regions.

## Impacts and risks associated with the Reasons for Concern (RFCs)



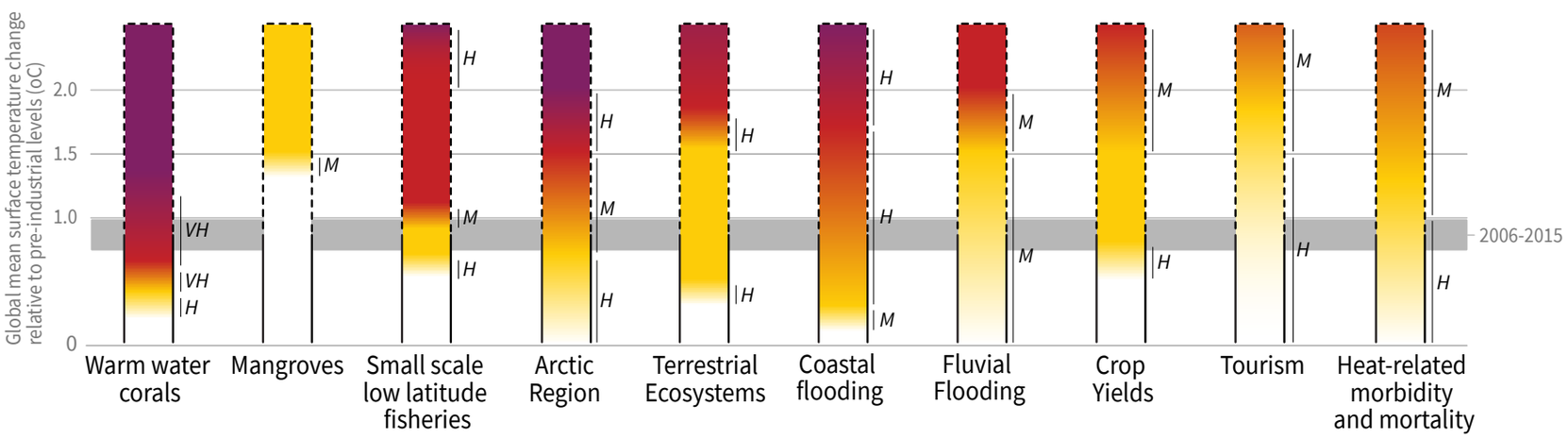

**Purple** indicates very high risks of severe impacts/risks and the presence of significant irreversibility or the persistence of climate-related hazards, combined with limited ability to adapt due to the nature of the hazard or impacts/risks.

**Red** indicates severe and widespread impacts/risks.

**Yellow** indicates that impacts/risks are detectable and attributable to climate change with at least medium confidence.

**White** indicates that no impacts are detectable and attributable to climate change.

## Impacts and risks for selected natural, managed and human systems




**Confidence level for transition:** *L*=Low, *M*=Medium, *H*=High and *VH*=Very high

Source: IPCC Special Report on Global Warming of 1.5°C

# How the level of global warming affects impacts and/or risks associated with the Reasons for Concern (RFCs) and selected natural, managed and human systems

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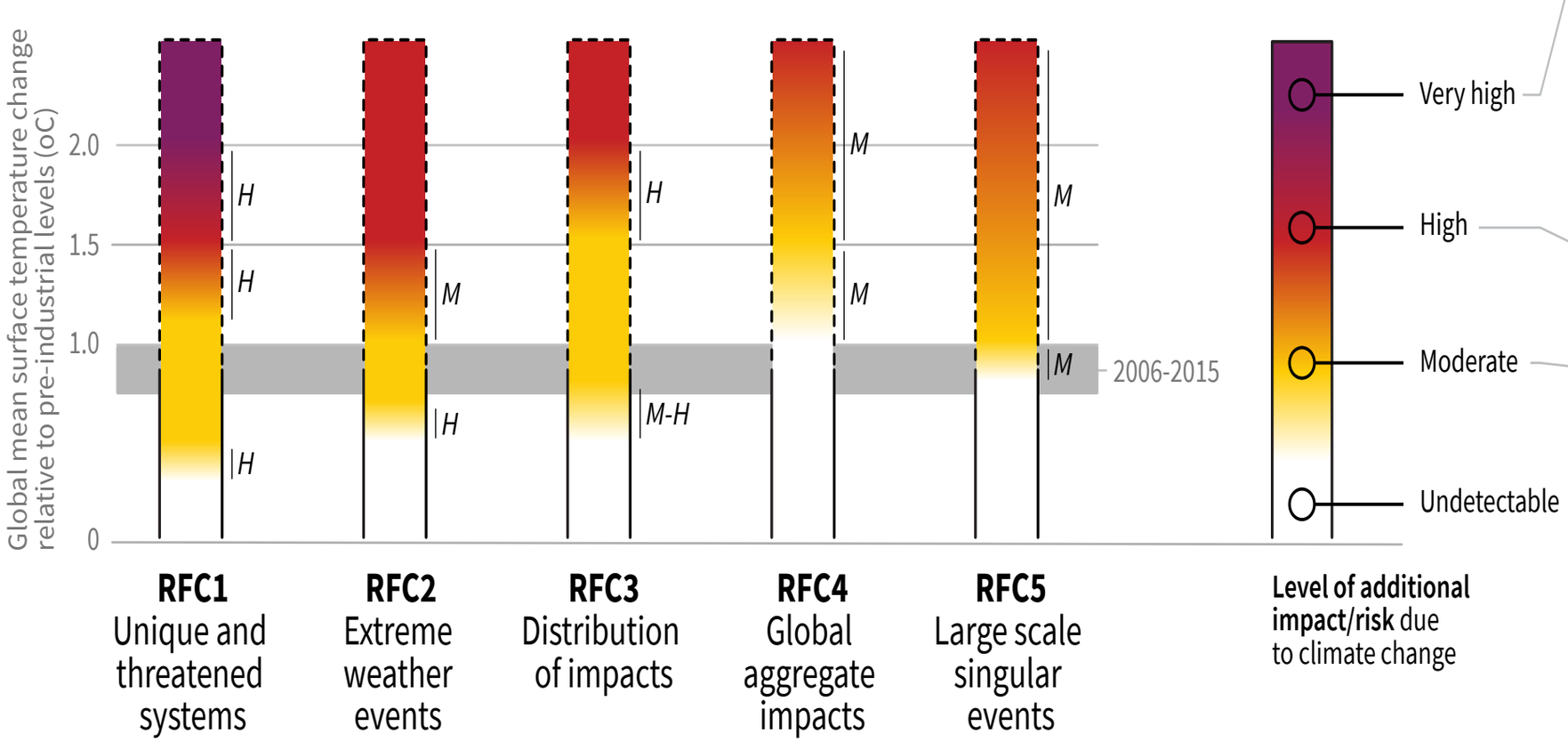


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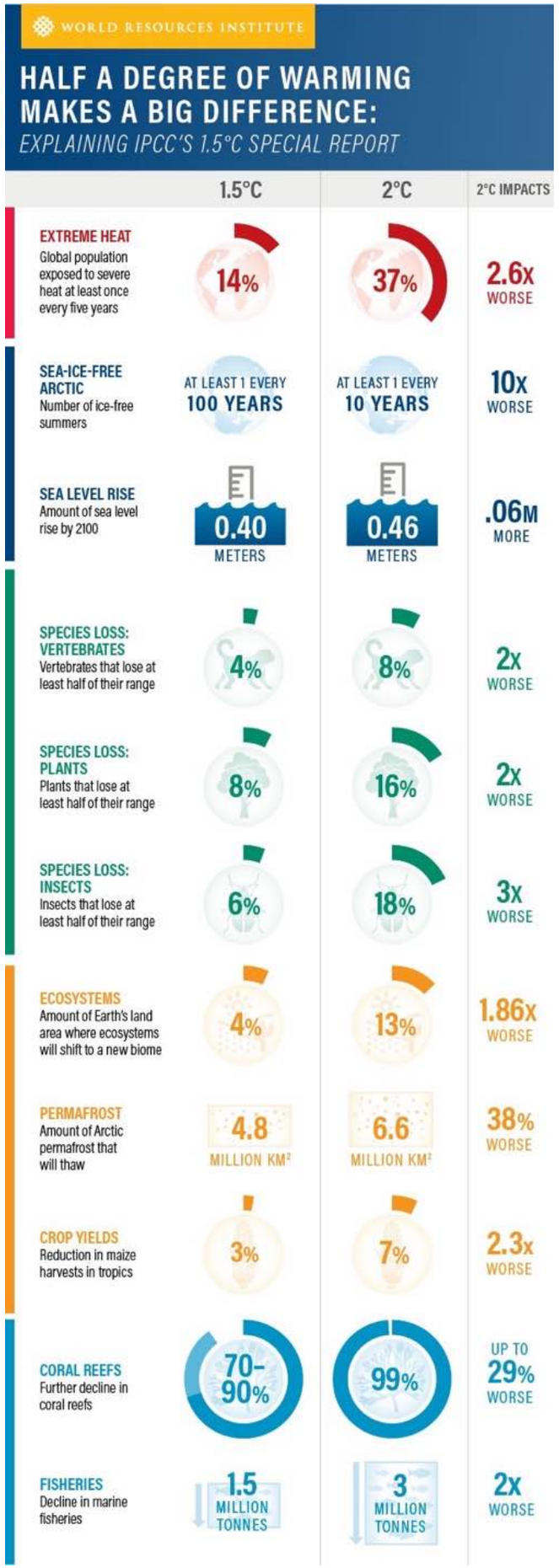

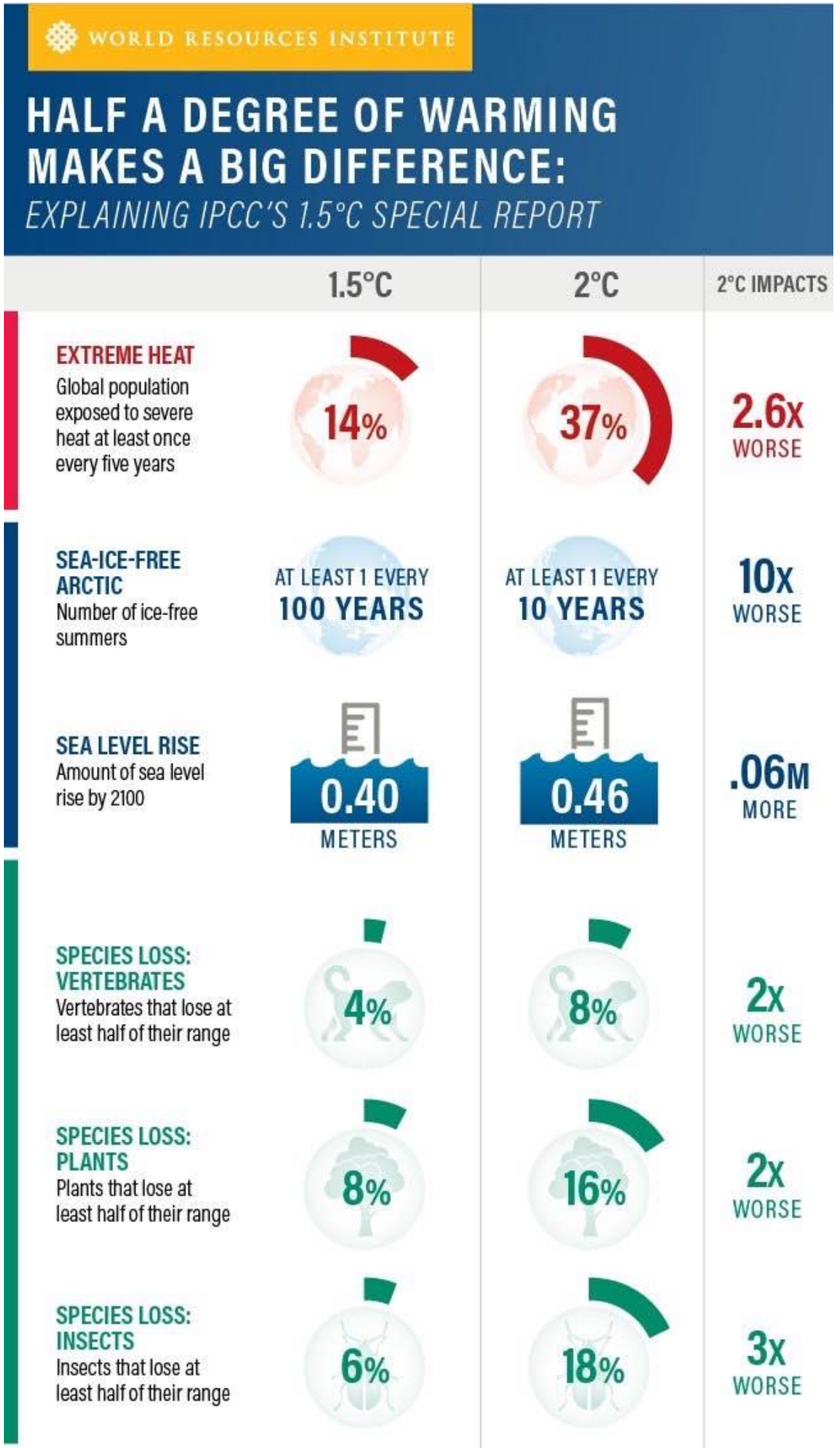


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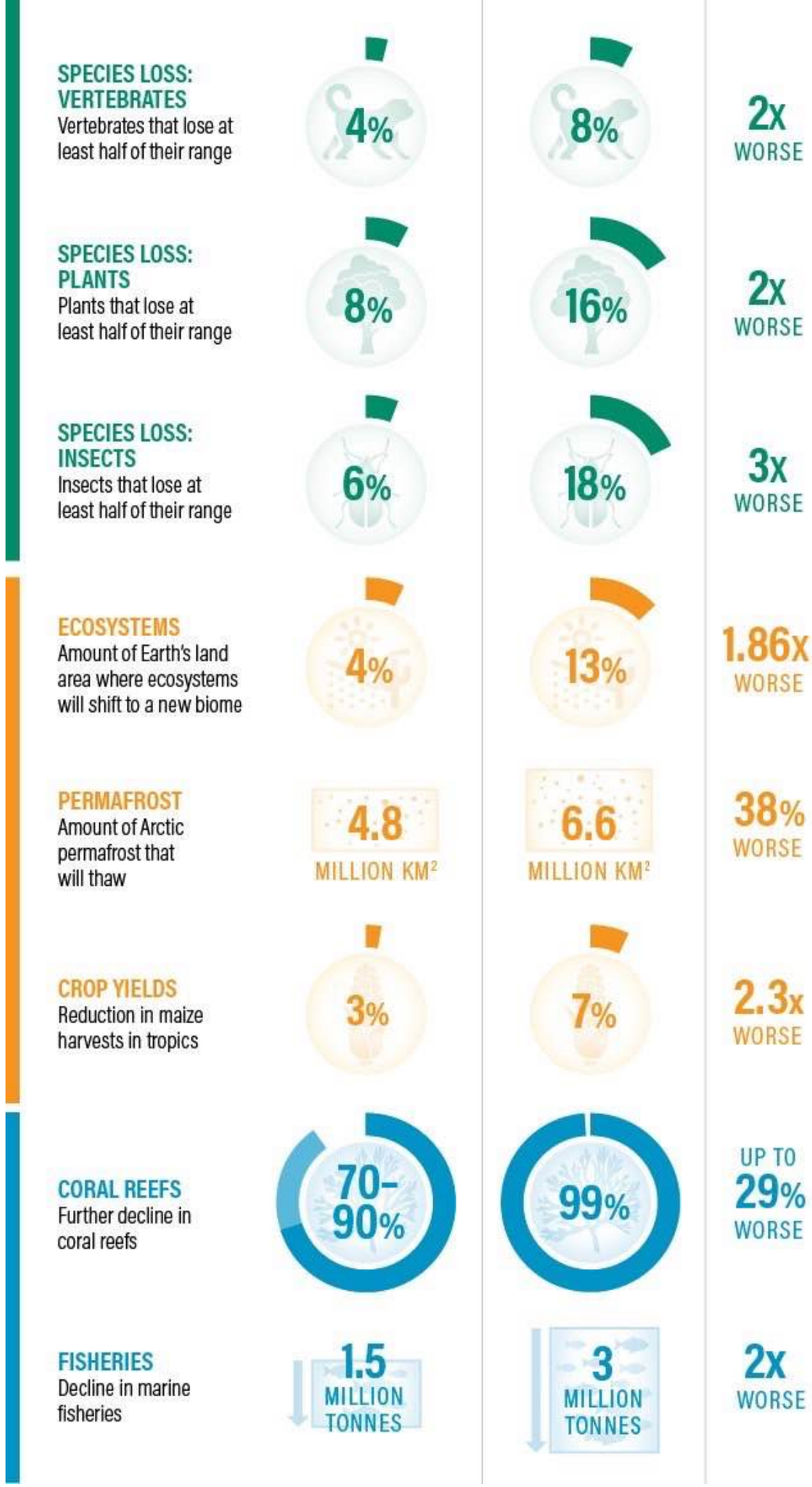


# IPCC SR15: Impacts on agriculture

- B5.3 Limiting warming to 1.5°C, compared with 2ºC, is projected to result in smaller net reductions in **yields of maize, rice, wheat,** and potentially other cereal crops, particularly in sub-Saharan Africa, Southeast Asia, and Central and South America; and in the CO2 dependent, and in the **nutritional quality of rice and wheat** (high confidence). **Reductions in projected food availability are larger at 2ºC** than at 1.5°C of global warming **in the Sahel, southern Africa, the Mediterranean, central Europe, and the Amazon** (medium confidence). **Livestock are projected to be adversely affected** with rising temperatures, depending on the extent of changes in feed quality, spread of diseases, and water resource availability (high confidence).

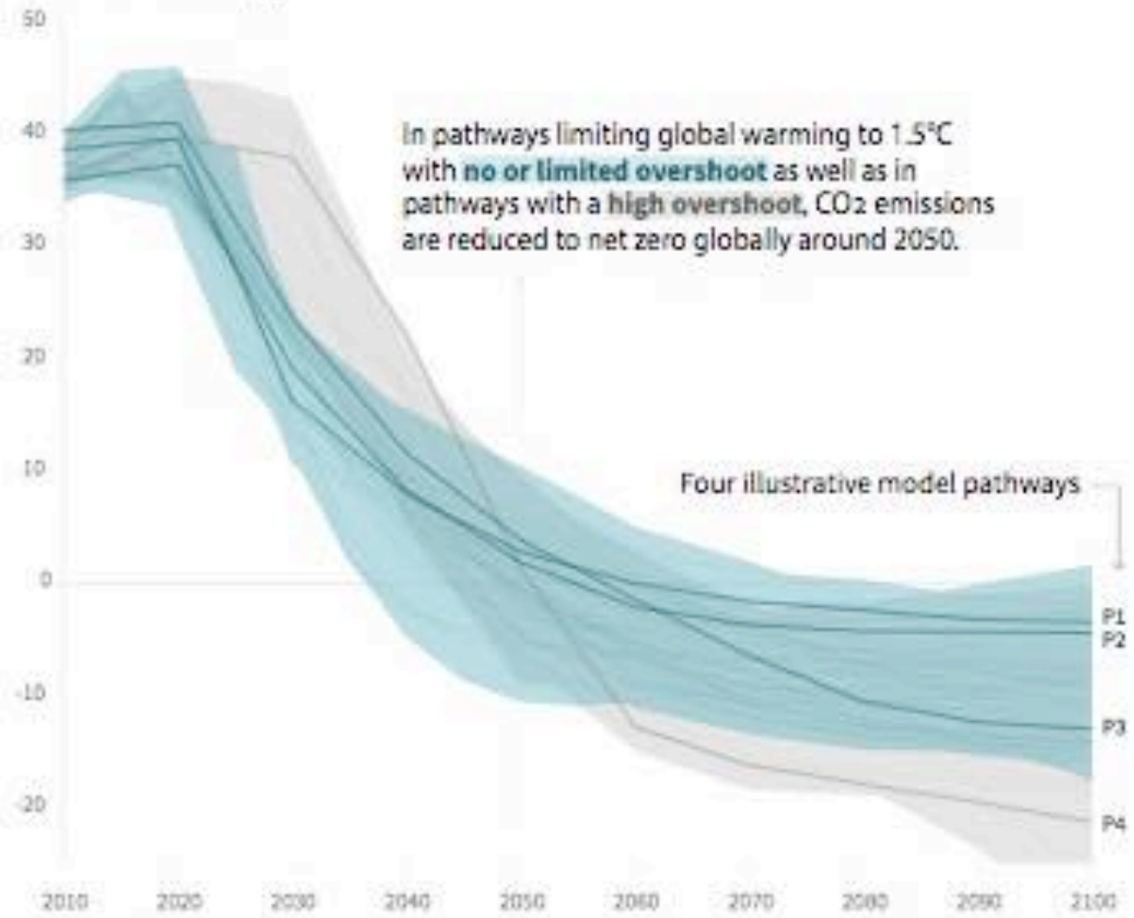
Next parts of the IPCC Special Report on 1.5°C will be covered by the following speakers

- ***Emission pathways and system transitions consistent with 1.5°C global warming***
- ***Strengthening the global response in the context of sustainable development and efforts to eradicate poverty***

## Global emissions pathway characteristics

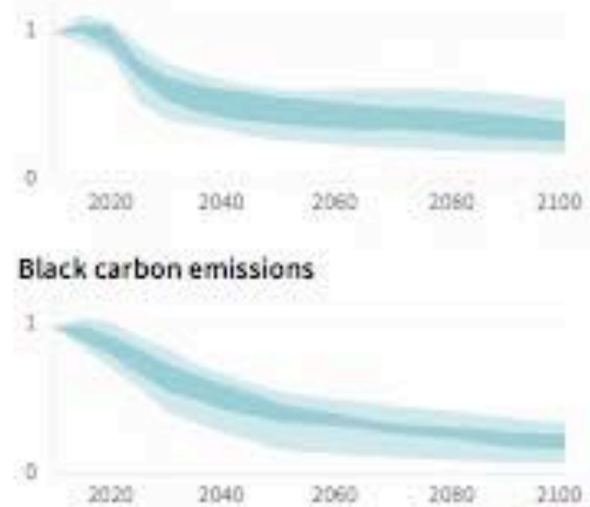
General characteristics of the evolution of anthropogenic net emissions of $CO_2$, and total emissions of methane, black carbon, and nitrous oxide in model pathways that limit global warming to 1.5°C with no or limited overshoot. Net emissions are defined as anthropogenic emissions reduced by anthropogenic removals. Reductions in net emissions can be achieved through different portfolios of mitigation measures illustrated in Figure SPM3B.

### Global total net $CO_2$ emissions




### Non-$CO_2$ emissions relative to 2010

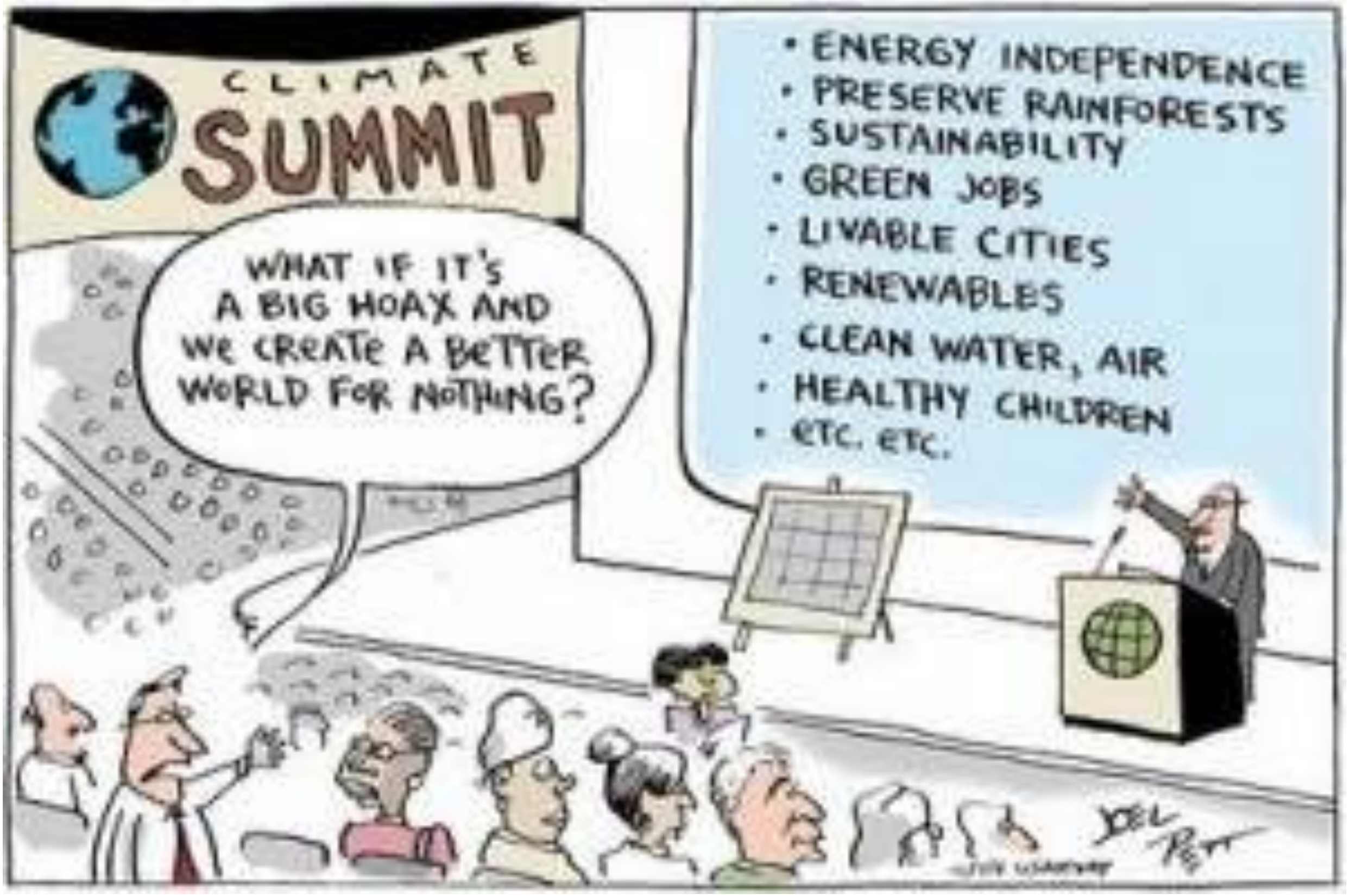
Emissions of non-$CO_2$ forcers are also reduced or limited in pathways limiting global warming to 1.5°C with **no or limited overshoot**, but they do not reach zero globally.




**Timing of net zero $CO_2$**
Line widths depict the 5-95th percentile and the 25-75th percentile of scenarios

- Pathways limiting global warming to 1.5°C with **no or low** overshoot
- Pathways with **high overshoot**
- Pathways limiting global warming below 2°C (Not shown above)

Source: IPCC Special Report on Global Warming of 1.5°C




**Joel Pett, USA Today**

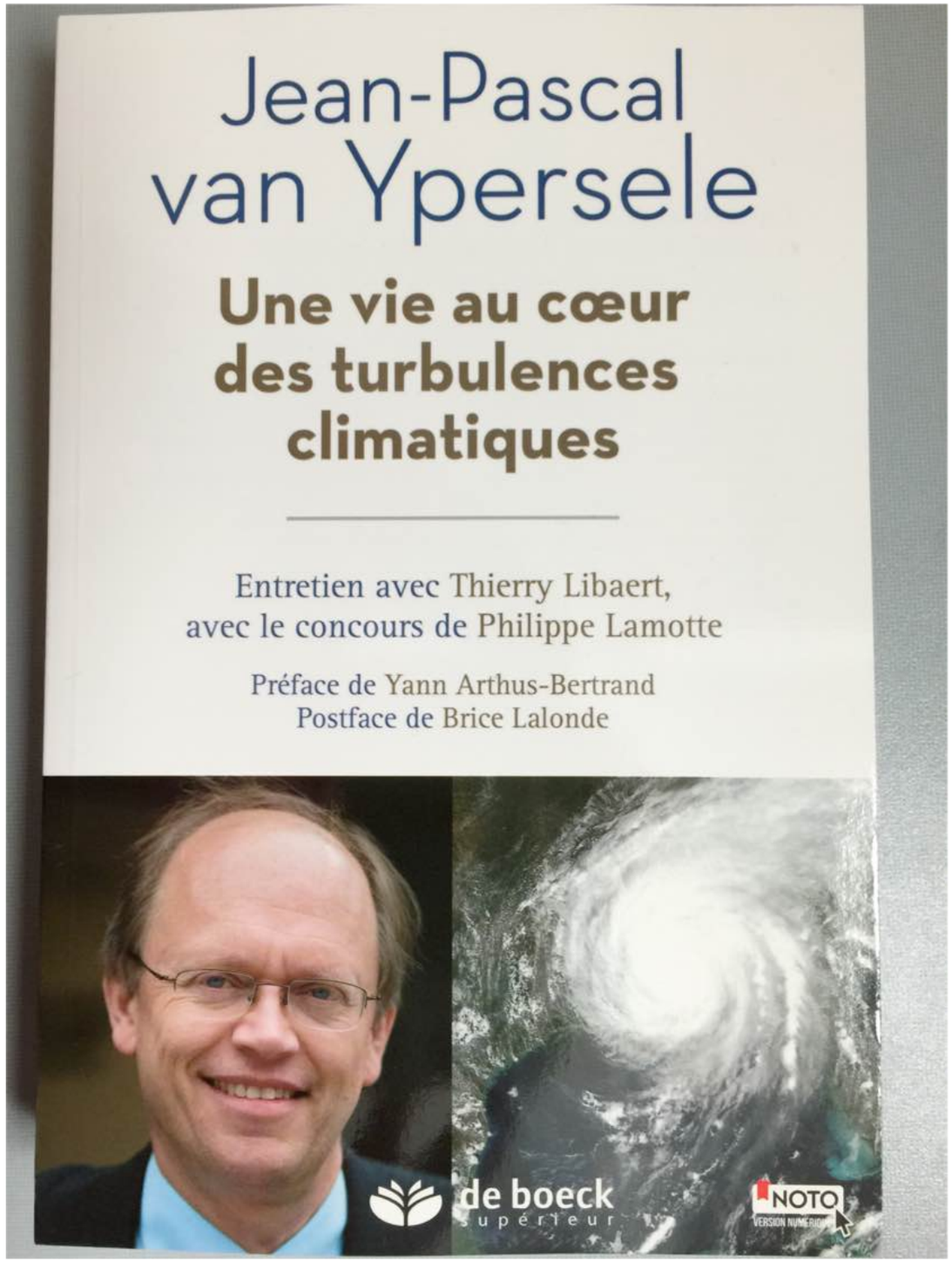
# Hidden message of IPCC SR15:

- ***Yes, we can!***
- ***What is now needed is much more political will***

**Pour en savoir plus:**

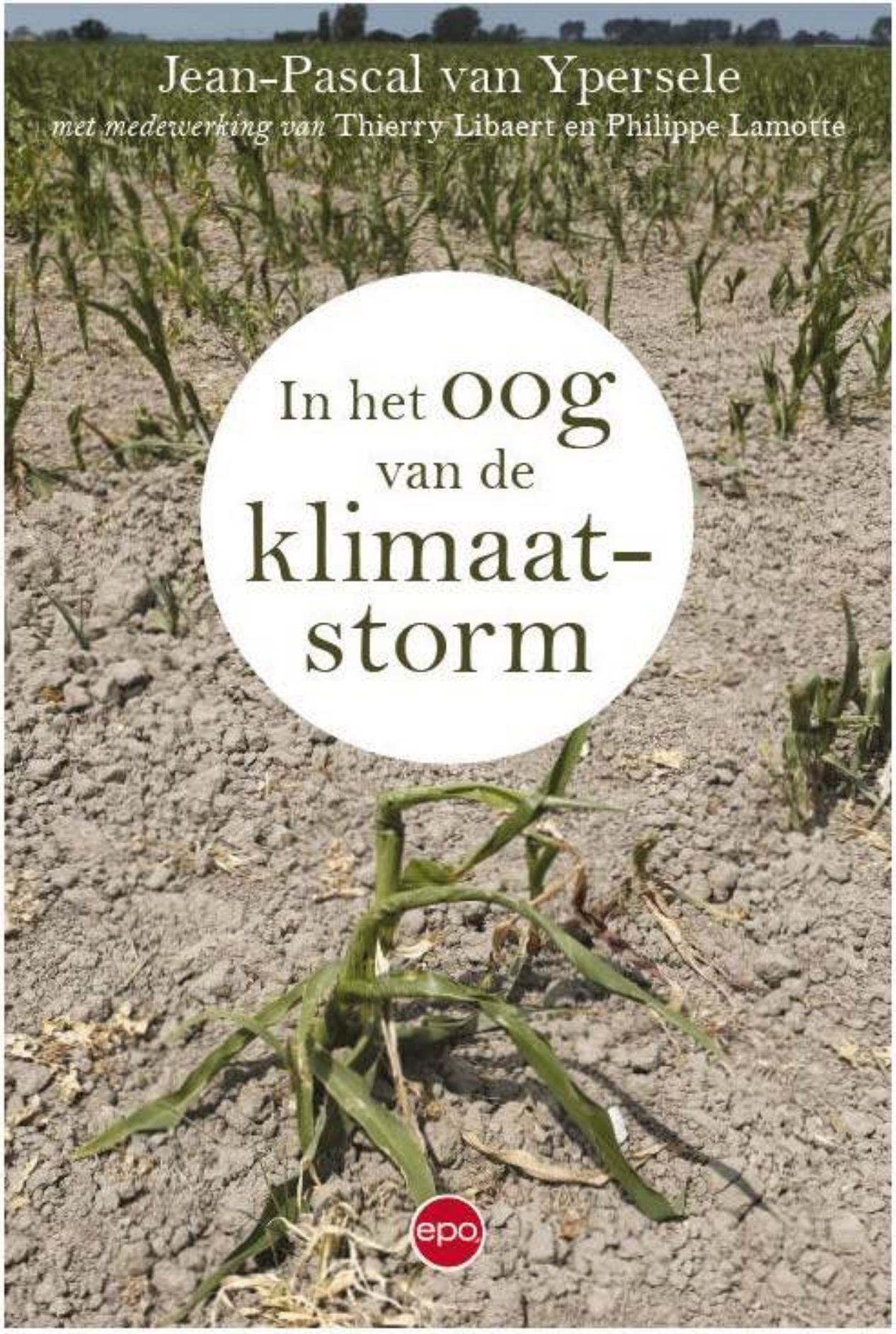
**Lisez mon livre, où j'aborde tous ces sujets**

**Publié chez De Boeck supérieur**



**bij EPO**
**(februari 2018)**

**Voorwoord:**
**Jill Peeters**



# Useful links:

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

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