

The worst and the best news we have learned in the last two years about climate

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The Shift Forum, Pizay (France)

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**Thanks to the Walloon Government (funding the [Plateforme wallonne pour le GIEC](#))
and to my team at the Université catholique de Louvain for their support**

I want you to panic... and act

“I don’t want your hope. I don’t want you to be hopeful. I want you to panic ... and act as if the house was on fire. ”

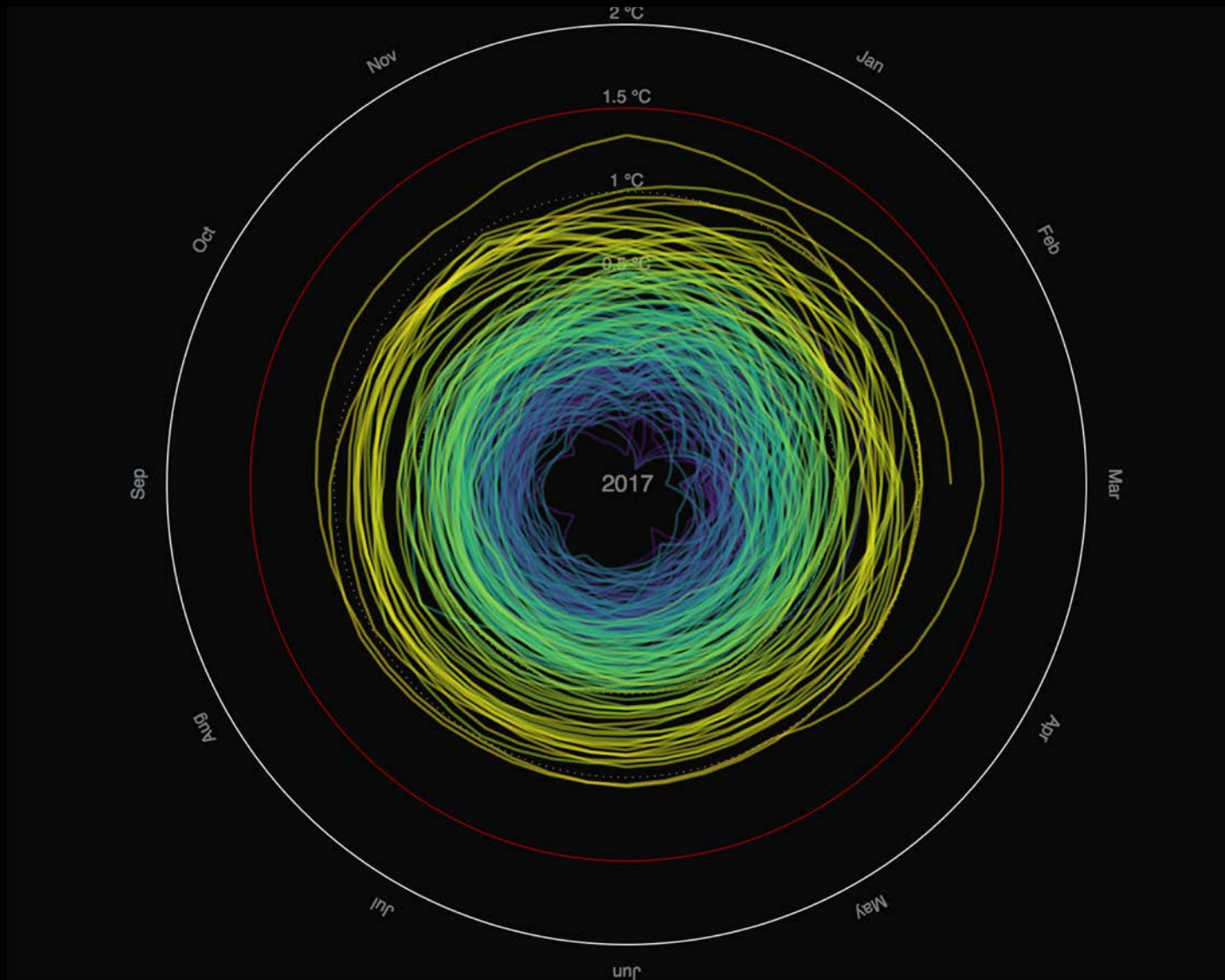
Greta Thunberg
Environmental Activist

WORLD
ECONOMIC
FORUM



The worst news:

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

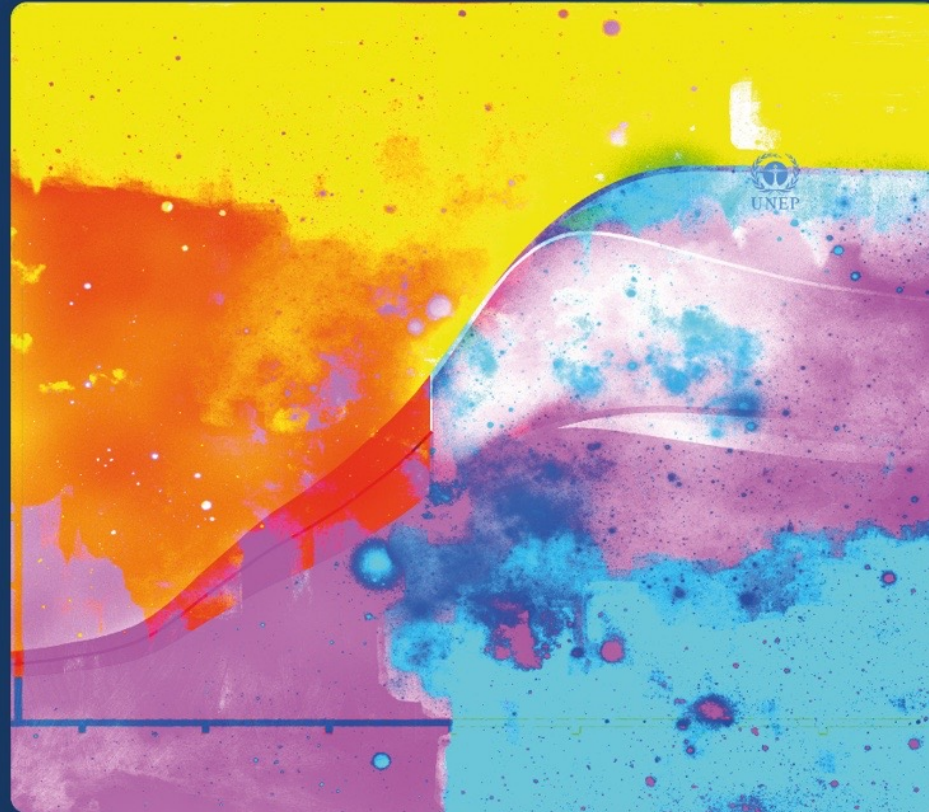
Mozambique, March 2019, after cyclone Idai



The SR15

Global Warming of 1.5°C

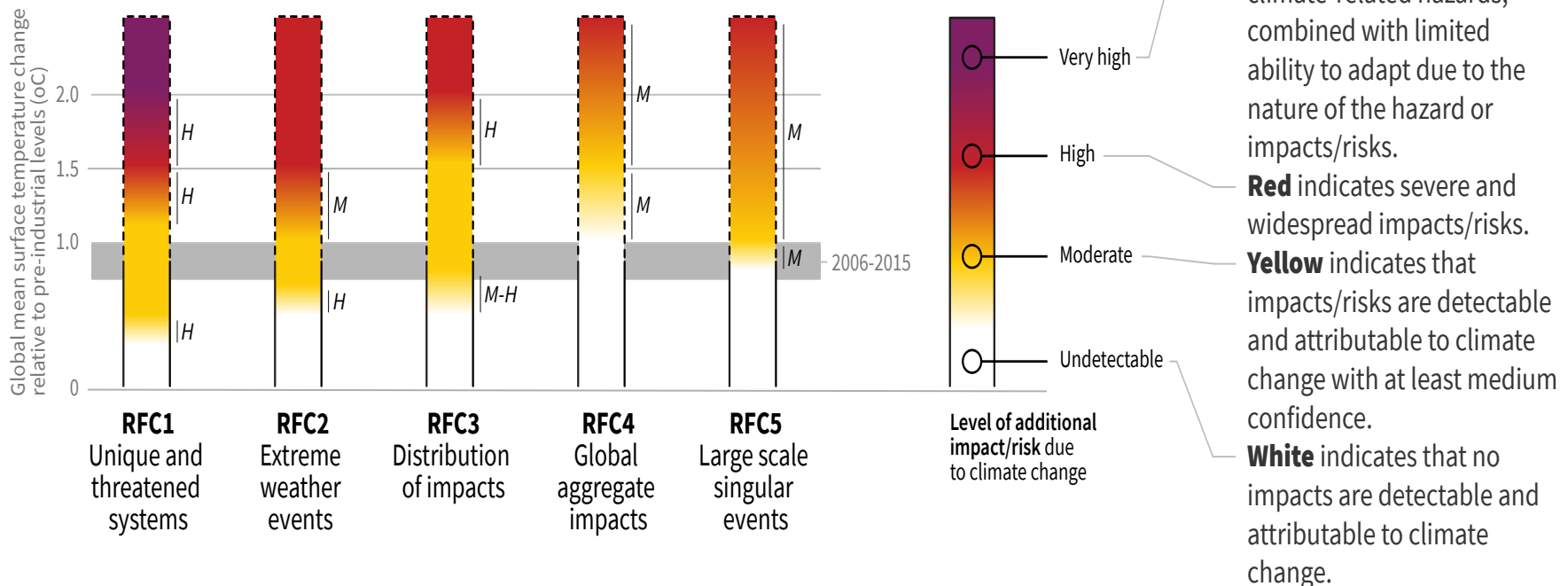
An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.



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

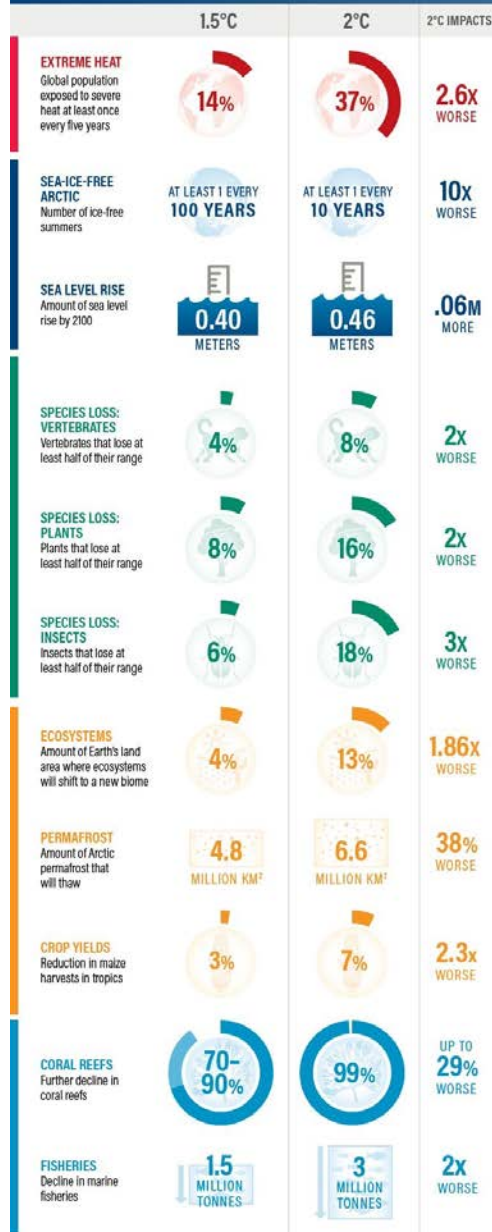
Five Reasons For Concern (RFCs) illustrate the impacts and risks of different levels of global warming for people, economies and ecosystems across sectors and regions.

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



HALF A DEGREE OF WARMING MAKES A BIG DIFFERENCE:

EXPLAINING IPCC'S 1.5°C SPECIAL REPORT



IPCC SR15:
Each half-degree matters

Responsibility for content: WRI

HALF A DEGREE OF WARMING MAKES A BIG DIFFERENCE:

EXPLAINING IPCC'S 1.5°C SPECIAL REPORT

	1.5°C	2°C	2°C IMPACTS
EXTREME HEAT Global population exposed to severe heat at least once every five years	<p>14%</p>	<p>37%</p>	2.6x WORSE
SEA-ICE-FREE ARCTIC Number of ice-free summers	AT LEAST 1 EVERY 100 YEARS	AT LEAST 1 EVERY 10 YEARS	10x WORSE
SEA LEVEL RISE Amount of sea level rise by 2100	<p>0.40 METERS</p>	<p>0.46 METERS</p>	.06M MORE
SPECIES LOSS: VERTEBRATES Vertebrates that lose at least half of their range	<p>4%</p>	<p>8%</p>	2x WORSE
SPECIES LOSS: PLANTS Plants that lose at least half of their range	<p>8%</p>	<p>16%</p>	2x WORSE
SPECIES LOSS: INSECTS Insects that lose at least half of their range	<p>6%</p>	<p>18%</p>	3x WORSE

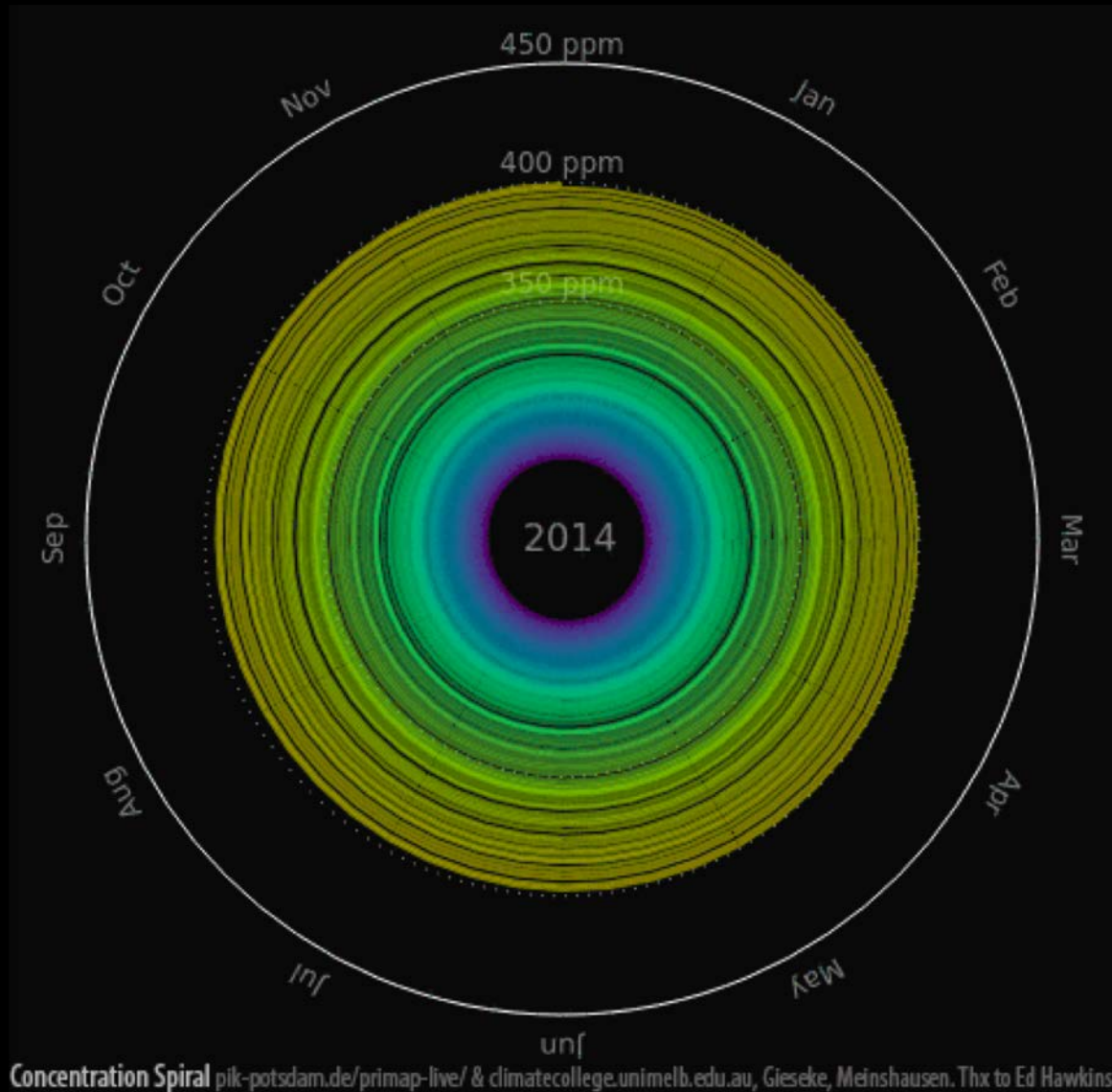
IPCC SR15:
Each half-degree matters

Responsibility for content: WRI

**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 (net) ZERO as soon as possible**

CO₂ concentration spiral: the insulation thickens!



CO₂ concentration spiral 1851-2014 (ppm), by Gieseke & Meinshausen,
Available on <http://pik-potsdam.de/primap-live>

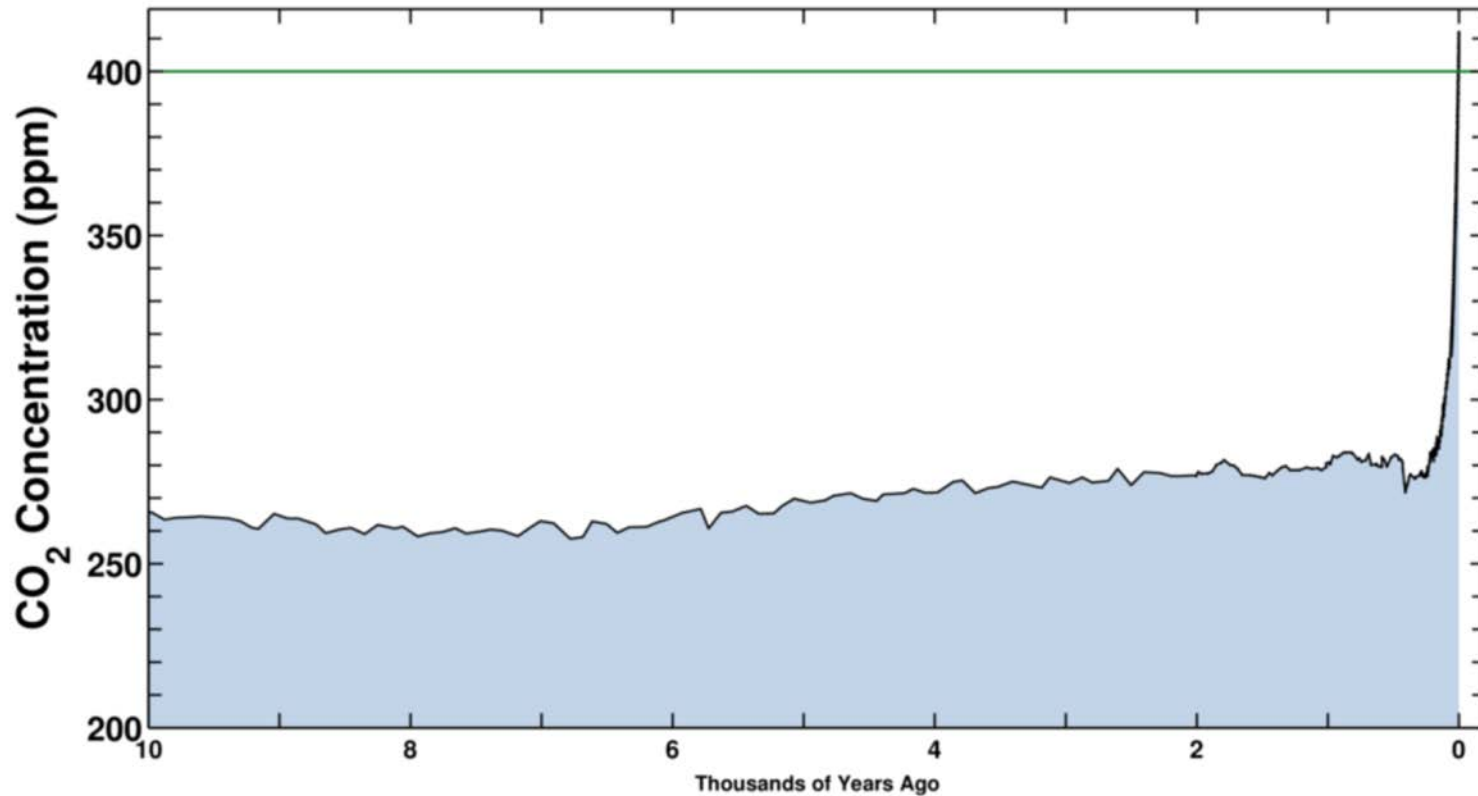
CO₂ Concentration, 3 April 2019 (Keeling curve over last 10000 years)

Latest CO₂ reading

April 03, 2019

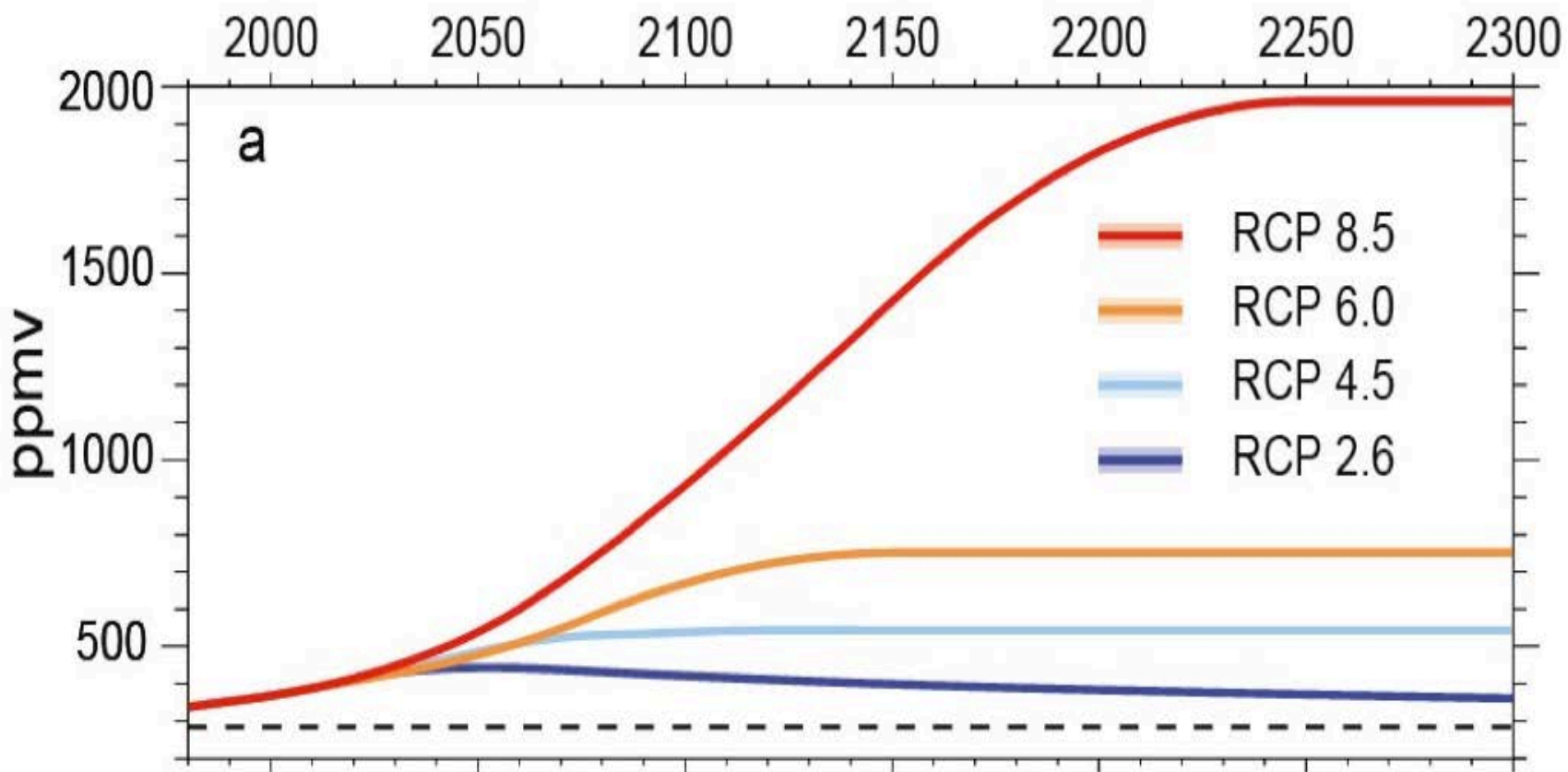
413.14 ppm

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



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

RCP Scenarios: Atmospheric CO₂ concentration

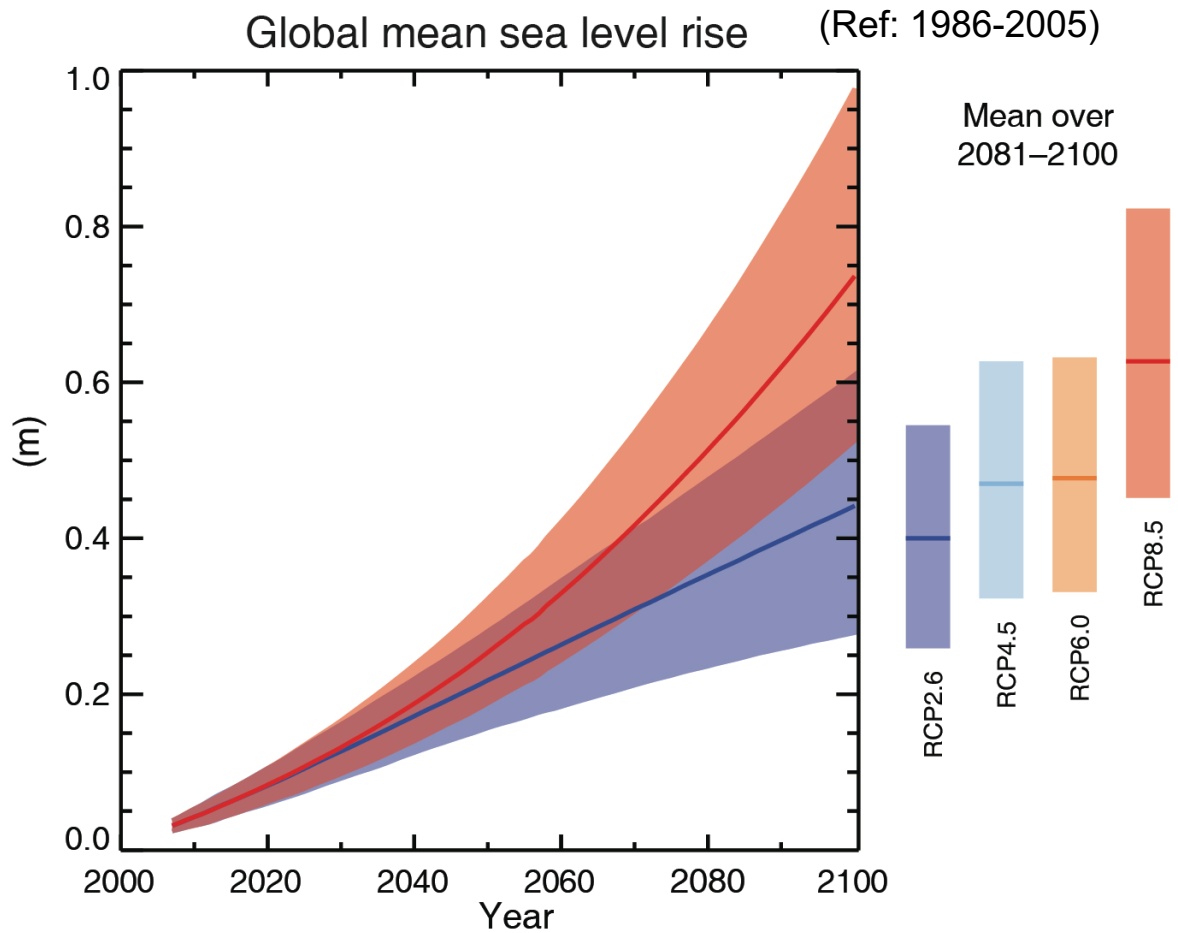


Three stabilisation scenarios: RCP 2.6 to 6
One Business-as-usual scenario: RCP 8.5

An experimental study points to a *direct* effect of CO₂ on mental performance (decision taking, problem solving) from approximately 1000 ppm (Satish et al., 2012) !

NB: If we stay on the present pathway, « fresh air » would contain close to 1000 ppm by 2100!

@JPvanYpersele



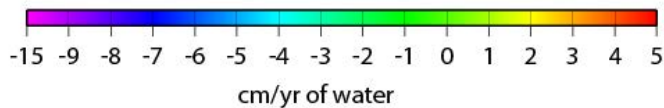
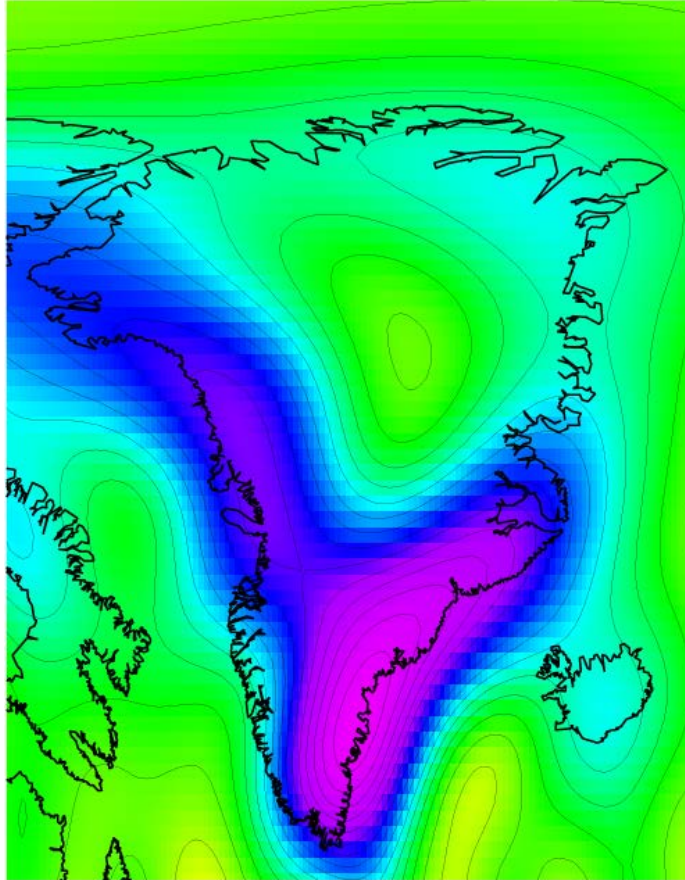
(IPCC 2013, Fig. SPM.9)

Sea level due to continue to increase

Greenland Ice Mass Loss 2002-2009

Derived From NASA GRACE Gravity Mission

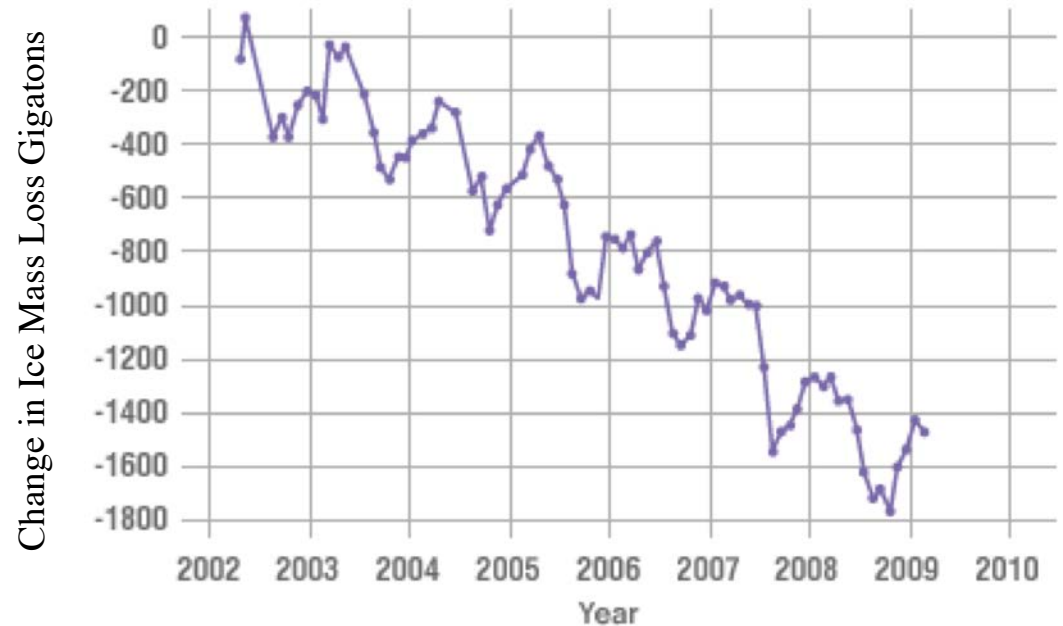
Greenland



J. Wahr, U. Colorado

GREENLAND MASS VARIATION SINCE 2002

Data source: Ice mass measurement by NASA's Grace satellites.



Velicogna, Geophysical Research Letters, 2009

•Contributes to sea level rise

**We are closer than thought
before of exceeding the
conservation temperature of the
Greenland and Antarctic
icesheets, with huge long-term
consequences for sea level**

See IPCC Special Report to be
published in September 2019

@JPvanYpersele

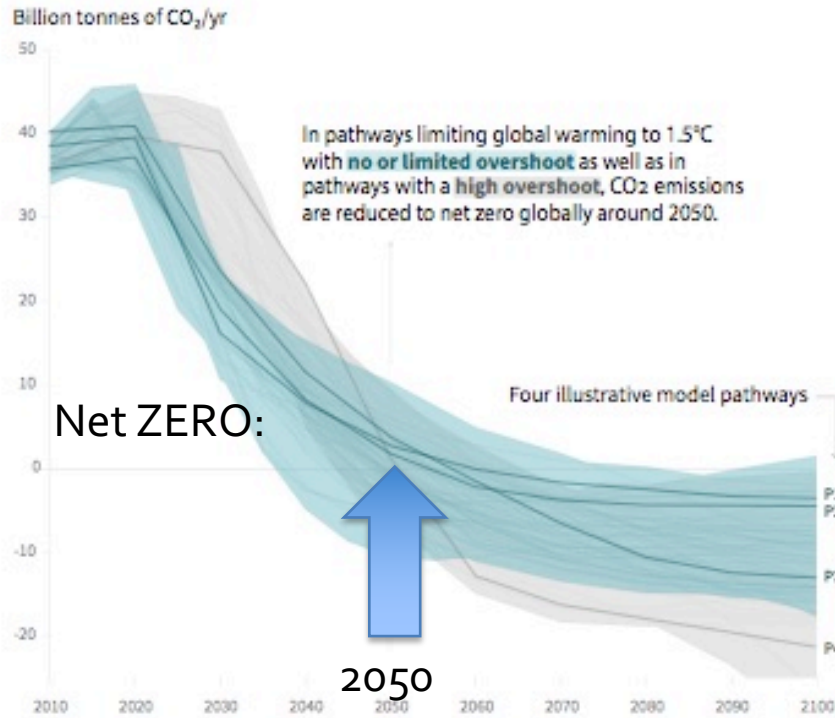
To stay below 1.5° C:

Global emissions pathway characteristics

General characteristics of the evolution of anthropogenic net emissions of CO₂, 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.

IPCC SR15:

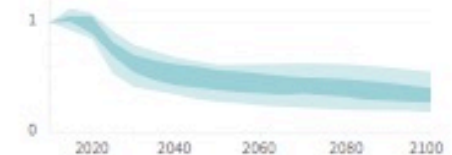
Global total net CO₂ emissions



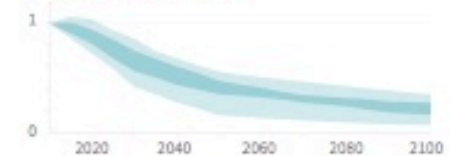
Non-CO₂ emissions relative to 2010

Emissions of non-CO₂ 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.

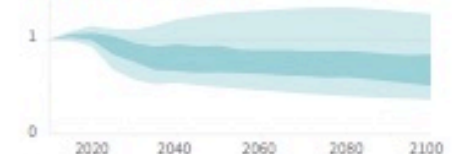
Methane emissions



Black carbon emissions

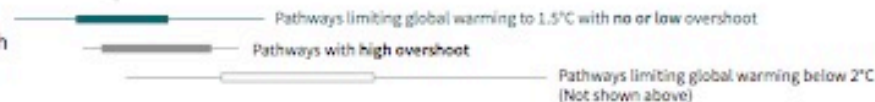


Nitrous oxide emissions



Timing of net zero CO₂

Line widths depict the 5-95th percentile and the 25-75th percentile of scenarios

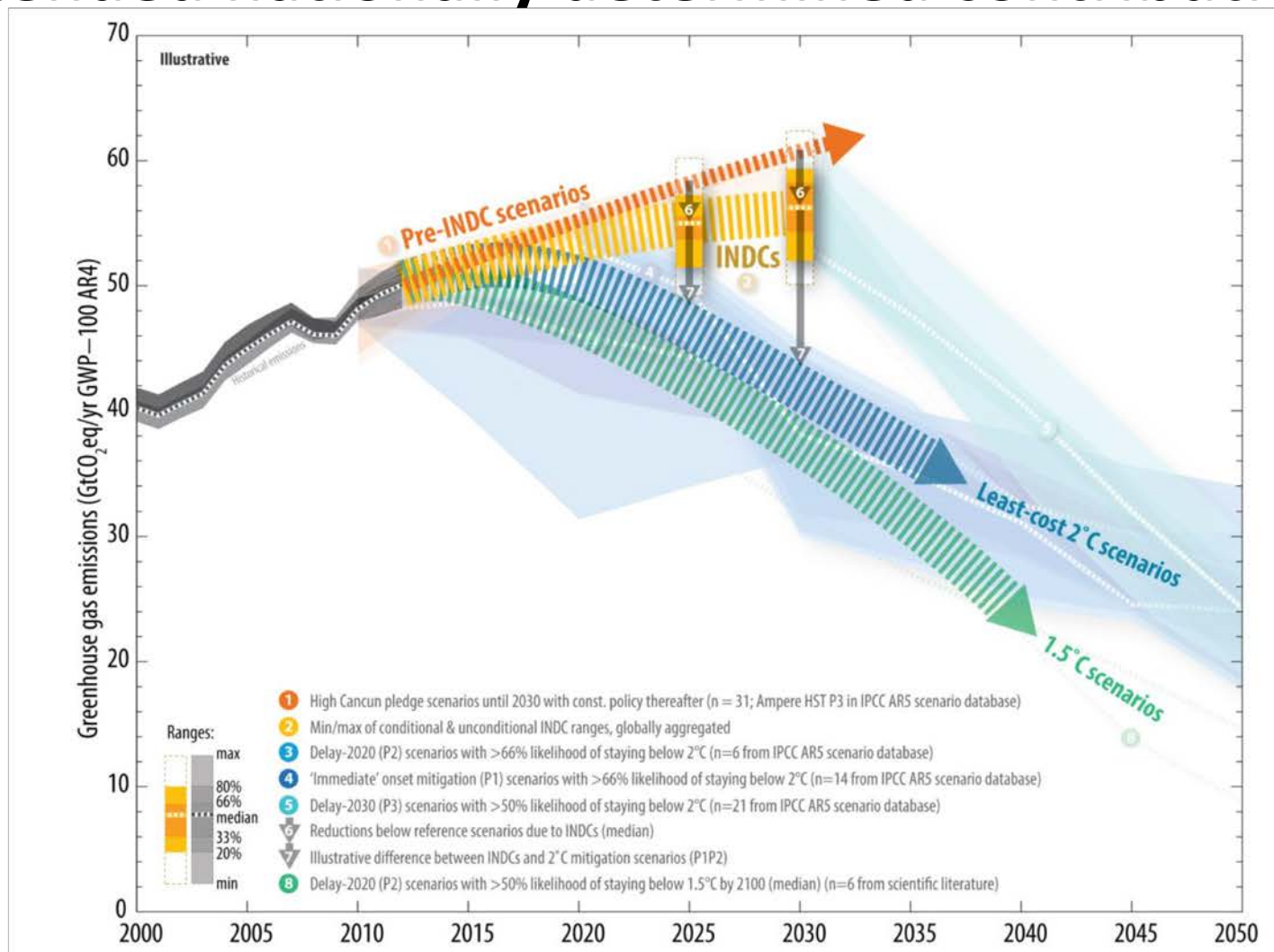


The best news:

The Climate Convention and the Paris Agreement (will) have an effect

But action up to now has handled low-hanging fruits, not the system changes needed to fully decarbonize, according to the IPCC SR15

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>

Paris Agreement

- Article 2:
 - ✦ (...) to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:
 - ▶ Holding the increase in the global average temperature to **well below 2 °C** above pre-industrial levels and to **pursue efforts** to limit the temperature increase to **1.5 °C** above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;
 - ▶ **Increasing the ability to adapt** (...) and foster climate resilience **and low greenhouse gas emissions development**, in a manner that does not threaten food production;
 - ▶ Making **finance flows consistent** with a pathway towards low greenhouse gas emissions and climate-resilient development

**Setting climate action in
the broader framework of
the 17 SDGs (Sustainable
Development Goals)
deliver co-benefits**

Les 17 Objectifs de Développement Durable, adoptés par l'ONU en septembre 2015



Indicative linkages between mitigation options and sustainable development using SDGs (The linkages do not show costs and benefits)

Mitigation options deployed in each sector can be associated with potential positive effects (synergies) or negative effects (trade-offs) with the Sustainable Development Goals (SDGs). The degree to which this potential is realized will depend on the selected portfolio of mitigation options, mitigation policy design, and local circumstances and context. Particularly in the energy-demand sector, the potential for synergies is larger than for trade-offs. The bars group individually assessed options by level of confidence and take into account the relative strength of the assessed mitigation-SDG connections.

Length shows strength of connection

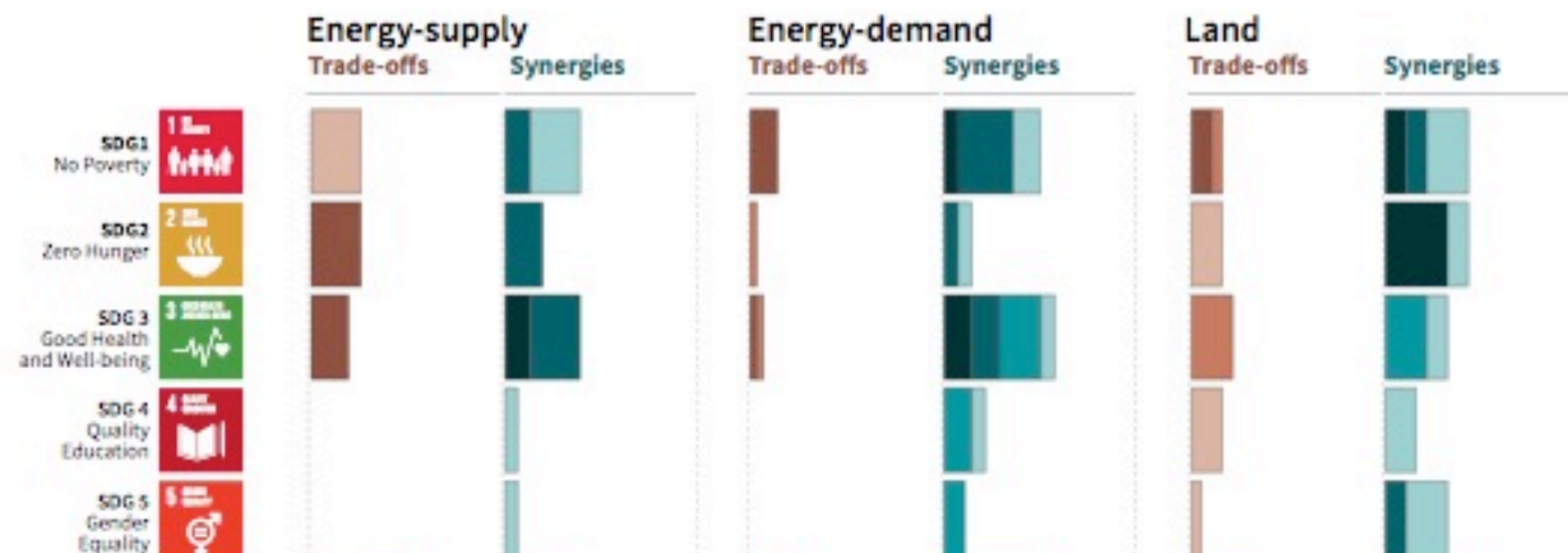


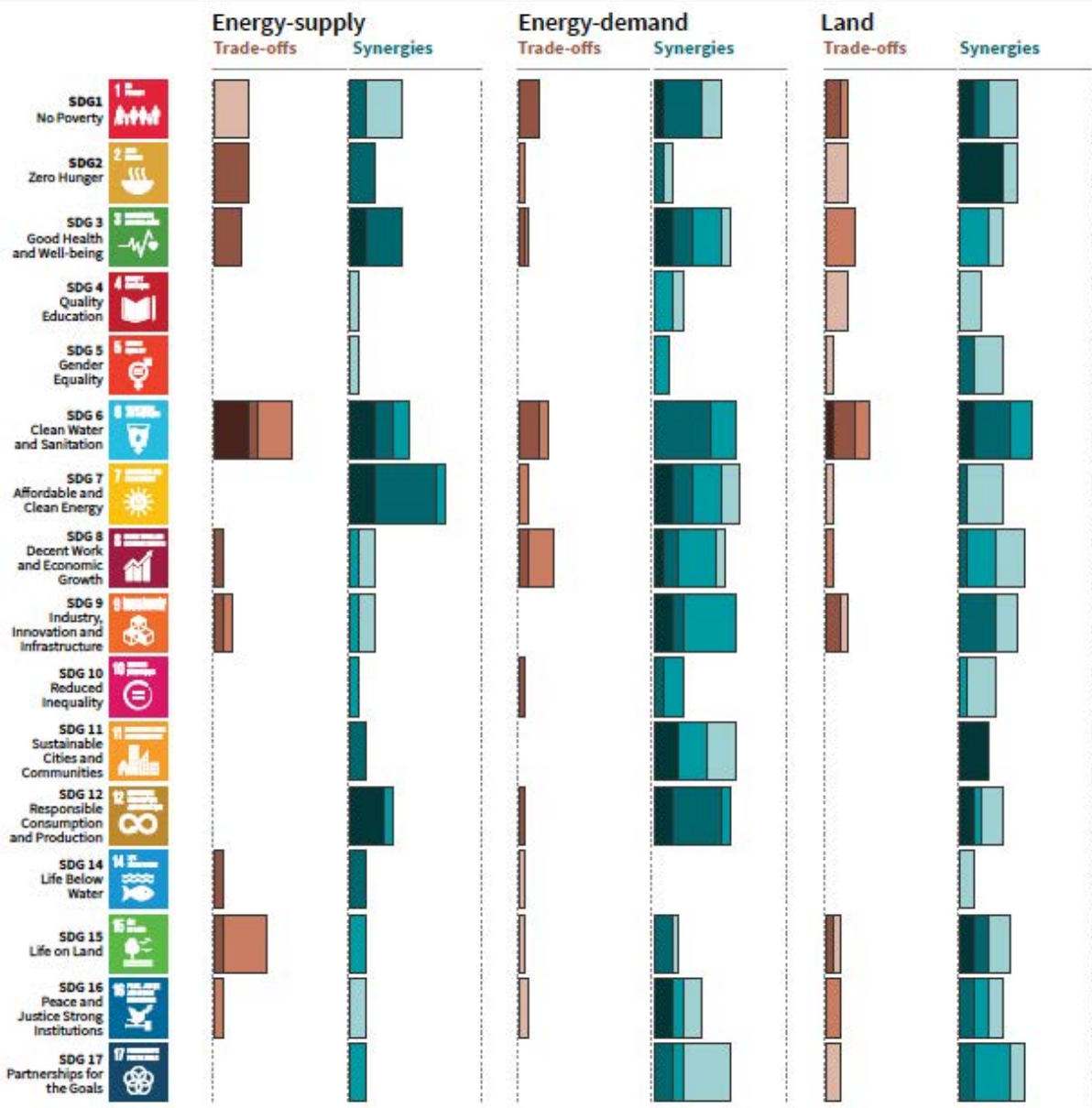
The overall size of the coloured bars depict the relative for synergies and trade-offs between the sectoral mitigation options and the SDGs.

Shades show level of confidence

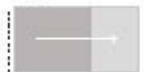


The shades depict the level of confidence of the assessed potential for Trade-offs/Synergies.





Length shows strength of connection



The overall size of the coloured bars depict the relative for synergies and trade-offs between the sectoral mitigation options and the SDGs.

Shades show level of confidence



The shades depict the level of confidence of the assessed potential for Trade-offs/Synergies.

**Indicative linkages
between mitigation
options and SDGs**

This gives me
hope:

Well-
informed
young people
speaking
truth to
power



With @GretaThunberg at COP24

Summary

Worst news:

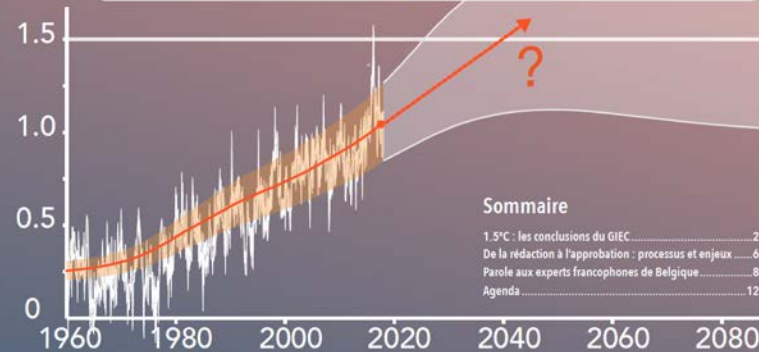
- 1) **Each half-degree matters** in terms of avoided impacts (heat waves, sea-level, biodiversity, coral reefs...)
- 2) We are closer than we thought of the **long-term melting of the Greenland (6-7m) and Antarctic (60-70m potential sea-level rise) ice sheets**
- 3) Soon **no fresh air for anybody** if we don't change

Summary

Best news:

- 1) Jean-Marc is (partially) wrong: **the COPs deliver, but far from enough**
- 2) **Integrating climate action and the SDGs can deliver many co-benefits and synergies**
- 3) The **youth awakening** is starting to move lines

Le rapport spécial du GIEC Réchauffement planétaire de 1.5°C



Pour de nombreuses populations et écosystèmes, il est essentiel de limiter le réchauffement à 1.5°C ou de ne dépasser ce niveau que temporairement. Et c'est potentiellement encore réalisable. Le 6 octobre 2018, l'Assemblée Plénière du GIEC a adopté le Rapport Spécial sur un « Réchauffement planétaire de 1.5°C », qui fait le point au sujet des impacts et scénarios correspondant à ce niveau de réchauffement.

Ce rapport conclut que pour limiter le réchauffement climatique à 1.5°C, il faut des transformations radicales et rapides dans tous les domaines de notre société. Il précise que ces changements sont sans précédent en termes d'échelle, mais pas nécessairement en termes de rapidité.

L'origine du rapport est une demande formelle au GIEC de la part des Parties à la Convention cadre des Nations Unies sur les changements climatiques (CNUCC) lors de l'adoption de l'Accord de Paris, en 2015 (21^e Conférence des Parties, COP21). La COP21 avait aussi indiqué que le rapport du GIEC devrait identifier le niveau auquel les émissions mondiales devraient être ramenées en 2030 pour contenir l'élévation de température en-dessous de 1.5°C.

Le rapport a été adopté à l'issue d'une semaine de discussions intenses au sujet de la formulation du Résumé à l'intention des décideurs, sur la base des chapitres et du projet de résumé rédigés par les scientifiques - qui ont toujours le dernier mot en ce qui concerne le contenu. Il forme une base scientifique essentielle pour les prochaines négociations internationales dans le cadre de la CNUCC, qui auront lieu à Katowice (Pologne) en décembre 2018 (COP24).

Dans cette Lettre, nous donnons d'abord un aperçu des conclusions du rapport, ensuite un aperçu du processus d'approbation et des enjeux associés. Pour ouvrir le débat et fournir un ensemble de points de vue, nous avons ensuite donné la parole aux experts francophones de Belgique, qui nous ont aimablement fait part des commentaires que vous trouverez en troisième partie. L'agenda indique les prochaines périodes de relecture de rapports du GIEC et annonce deux événements à venir en Belgique.

Nous vous en souhaitons une bonne lecture,
Jean-Pascal van Ypersele, Bruna Gaino et Philippe Marbaix

Image de fond : extrait adapté de la figure SPM1 du Rapport spécial



**Le seul document de synthèse en français sur le Rapport spécial SR15 du GIEC
Disponible gratuitement, 6X/an: www.plateforme-wallonne-giec.be**

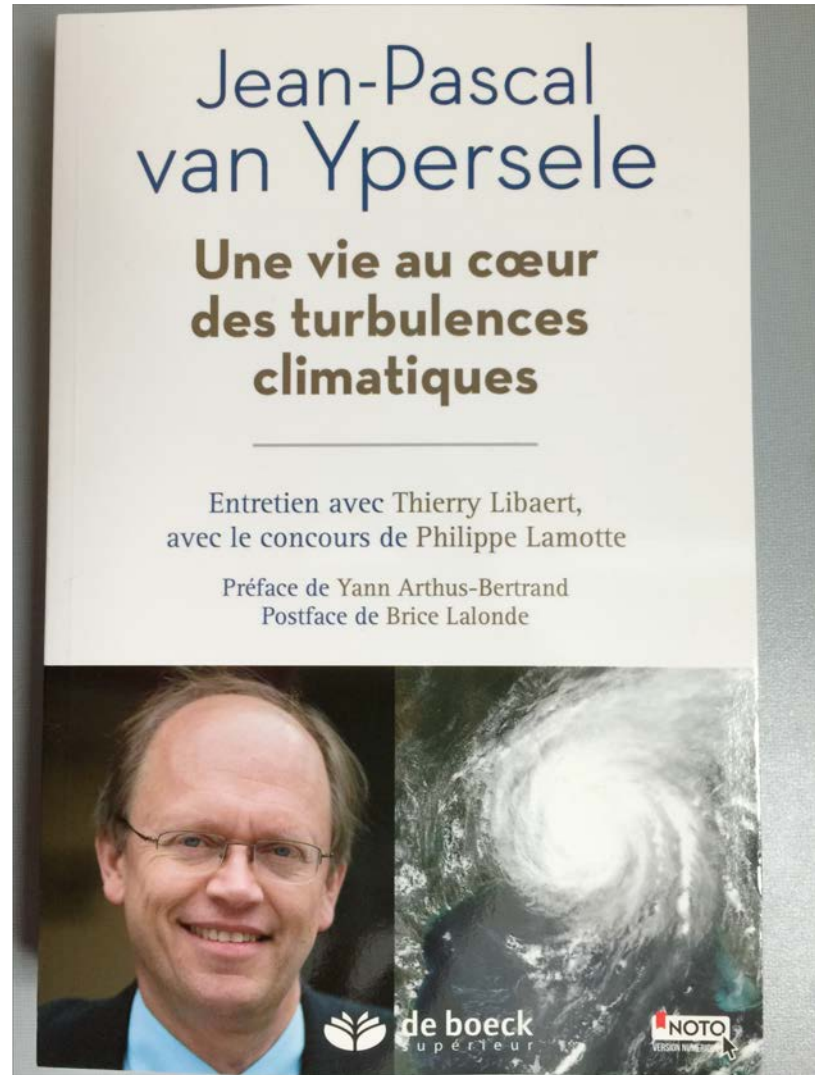
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**Lisez mon livre, où
j'aborde tous ces sujets**

**Publié chez De Boeck
supérieur**

**Préface: Yann Arthus-
Bertrand**

Postface: Brice Lalonde



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
- www.plateforme-wallonne-giec.be : IPCC-related in French, Newsletter, latest on SR15 & COP24
- **Twitter: @JPvanYpersele & @IPCC_CH**