Humans, Climate Change, and the Future of Life on Earth

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IPCC Vice-Chair from 2008 to 2015

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« How human activities cause biodiversity loss: Interactions and relative contributions of human activities - What do we know, what do we need to know? », Conference organised by the Earth and Life Institute (@ELI_UCLouvain), Louvain-la-Neuve, 24 October 2019

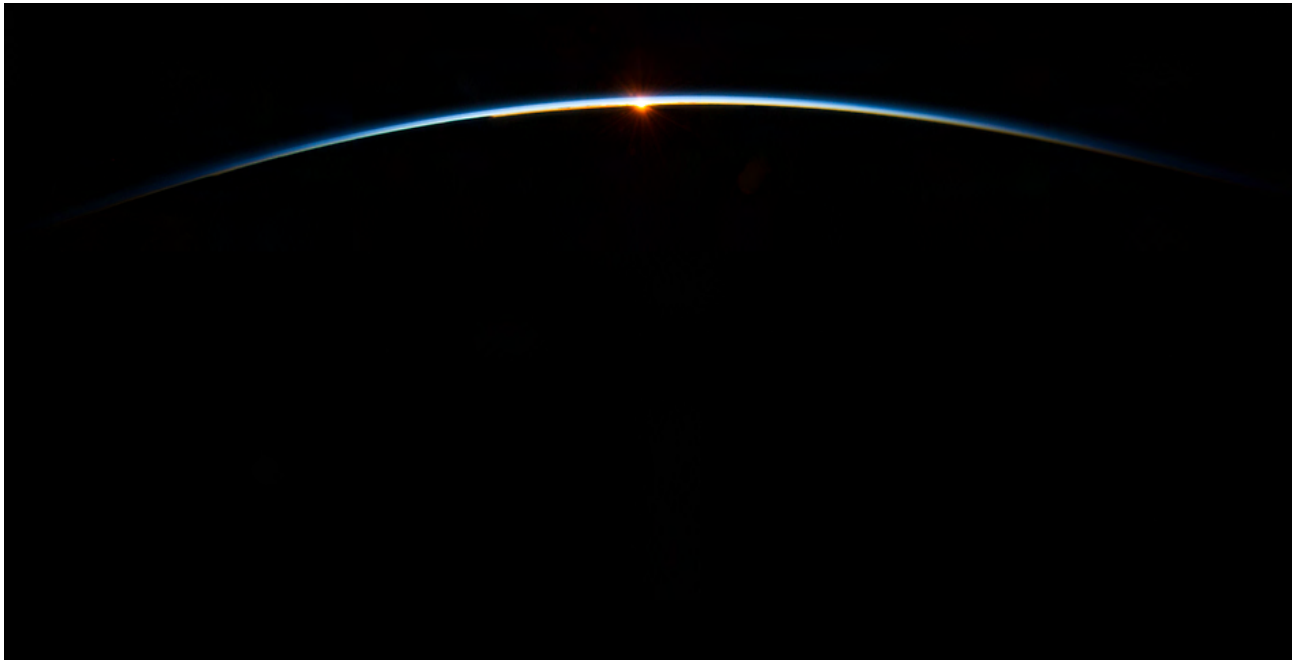
Thanks to the Walloon government for supporting www.plateforme-wallonne-giec.be & my team at UCLouvain

Climate Change

@JPvanYpersele

Source: @JohnfoCook

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



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Reminder: 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 (net) emissions to ZERO as soon as possible

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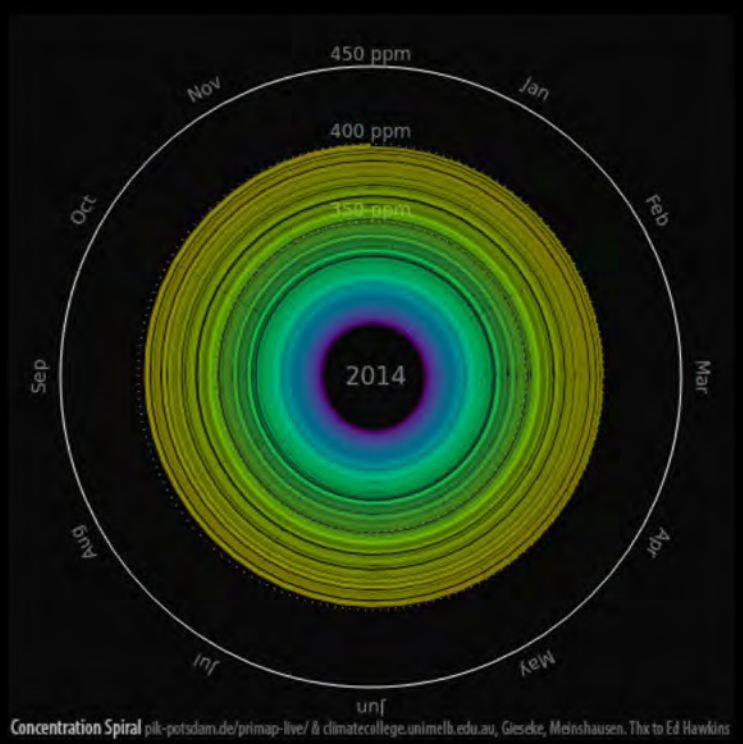
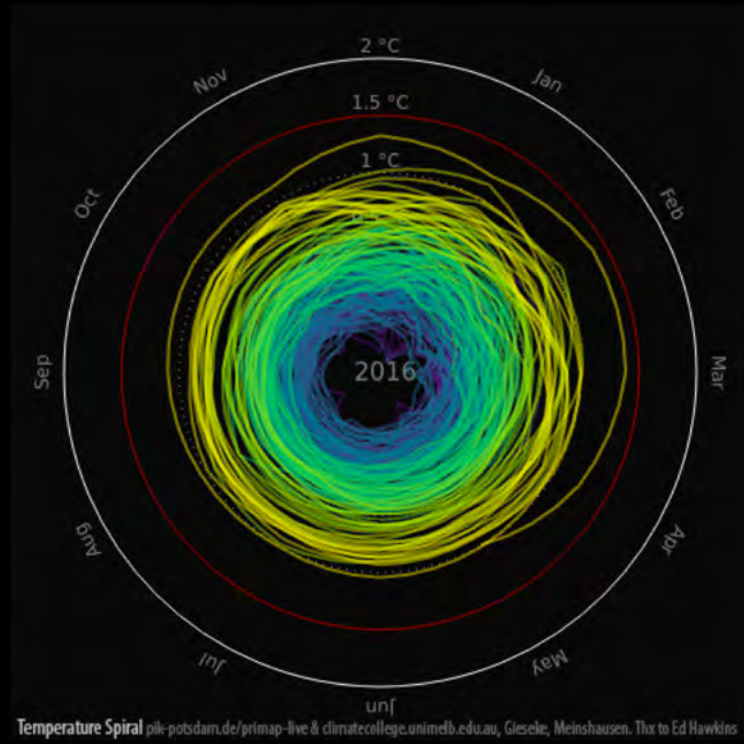
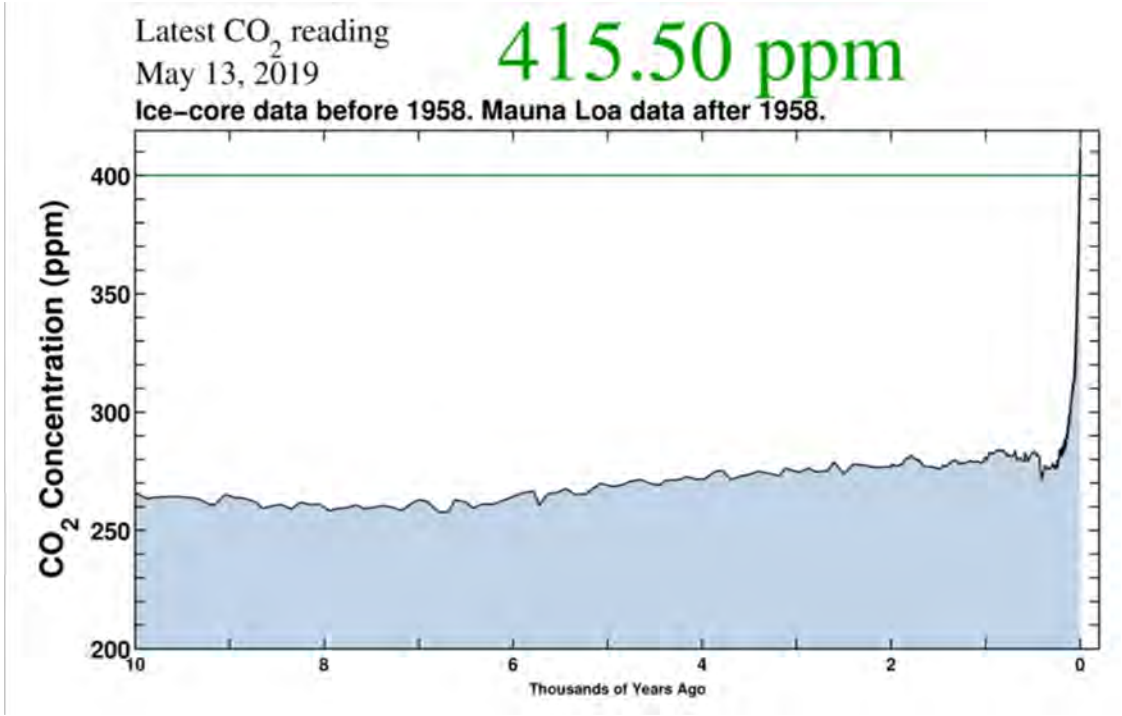
CO_2 Concentration and Temperature spirals





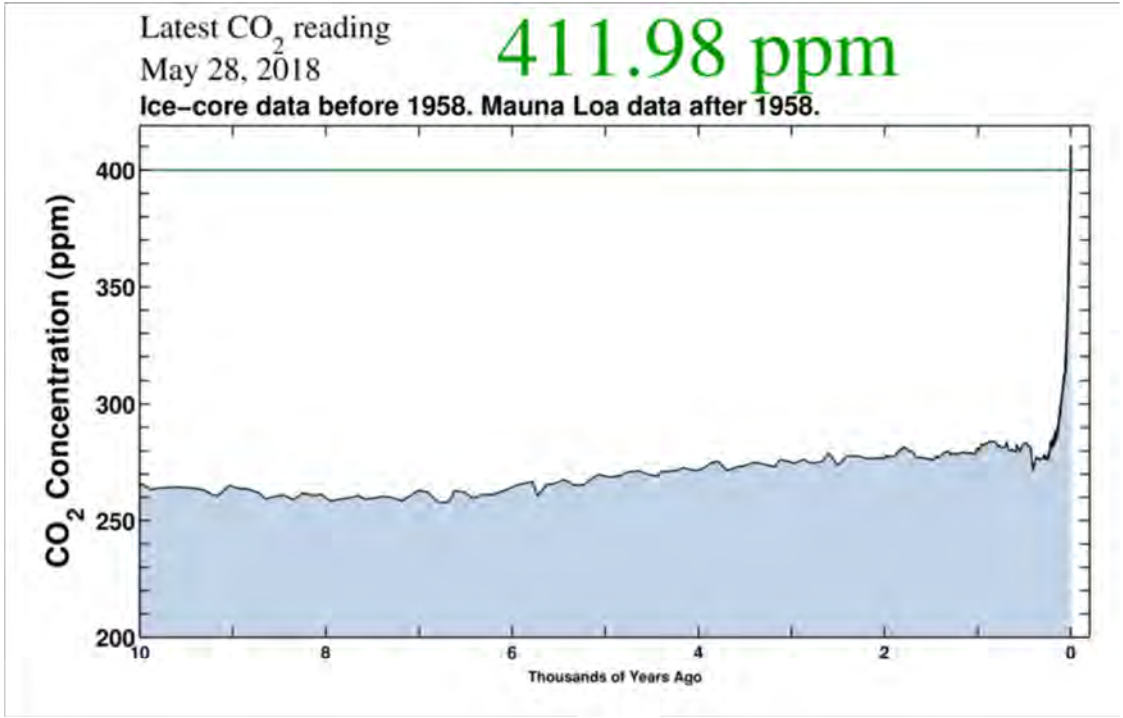
CO_2 Concentration since 1850 and Global Mean Temperature in °C relative to 1850 – 1900
Graph: Ed Hawkins (Climate Lab Book) – Data: HadCRUT4 global temperature dataset
Animation available on http://openclimatedata.net/climate-spirals/concentration-temperature/

CO_2 Concentration, 13 May 2019 (Keeling curve)



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

CO_2 Concentration, 28 May 2018 (Keeling curve)



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

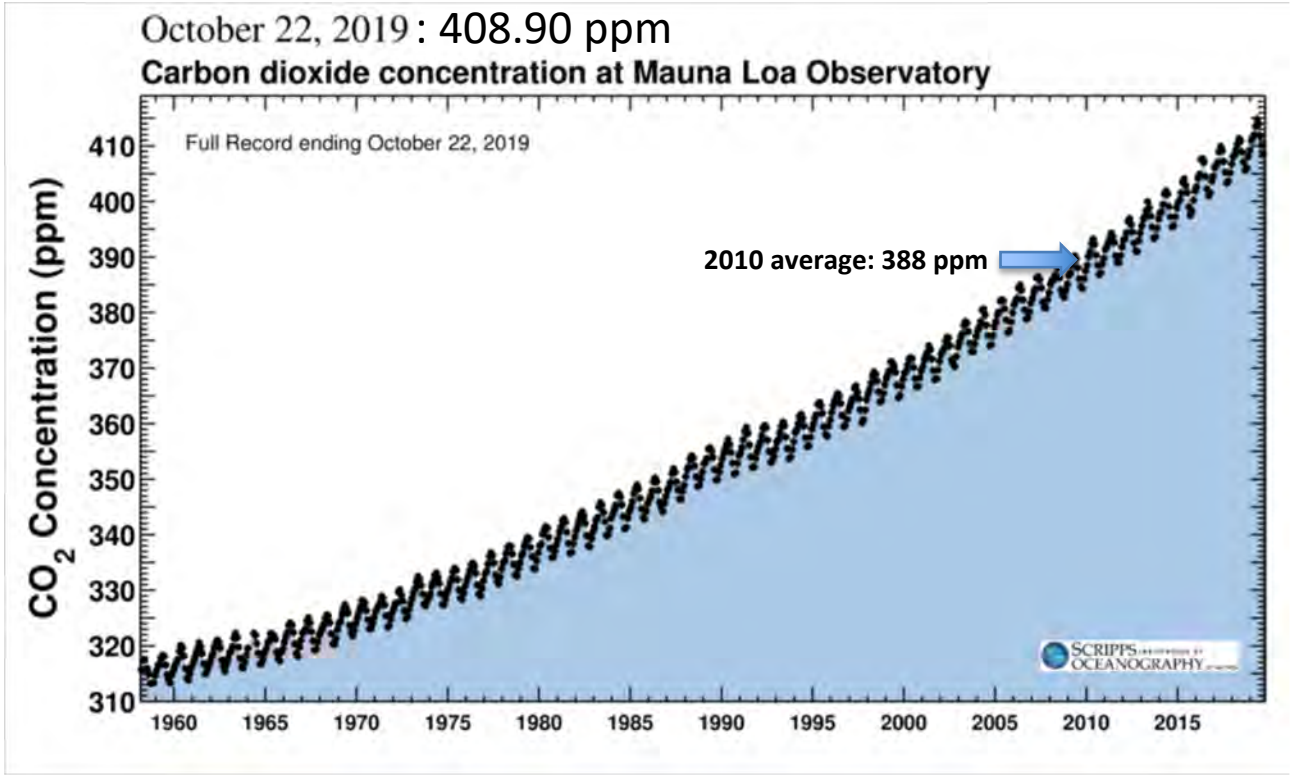
Climatic Change: Are We on the Brink of a Pronounced Global Warming? (Broecker,1975)

Table 1. Reconstruction and prediction of atmospheric CO_2 contents based on fuel consumption data.

Year	Chemical fuel CO_2 ($\times 10^{16}$ g)	Excess atmospheric CO_2* ($\times 10^{16}$ g)	Excess atmospheric CO_2 (%)	Excess atmospheric CO_2 (ppm)	CO_2 content of the atmosphere† (ppm)	Global temperature increase‡ (°C)
1900	3.8	1.9	0.9	2	295	0.02
1910	6.3	3.1	1.4	4	297	.04
1920	9.7	4.8	2.2	6	299	.07
1930	13.6	6.8	3.1	9	302	.09
1940	17.9	8.9	4.1	12	305	.11
1950	23.3	11.6	5.3	16	309	.15
1960	31.2	15.6	7.2	21	314§	.21
1970	44.0	22.0	10.2	29	322§	.29
1980‖	63	31	14	42	335	.42
1990‖	88	44	20	58	351	.58
2000‖	121	60	28	80	373	.80
2010‖	167	83	38	110	403	1.10

*On the assumption that 50 percent of the CO_2 produced by the burning of fuel remains in the atmosphere. †The preindustrial atmospheric partial pressure of CO_2 is assumed to be 293 ppm. ‡Assumes a 0.3°C global temperature increase for each 10 percent rise in the atmospheric CO_2 content. §Value observed on Hawaii for 1960, 314 ppm; value for 1970, 322 ppm (*8*). ‖Post-1972 growth rate taken to be 3 percent per year.

CO_2 Concentration 1958-2019 (Keeling curve)



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

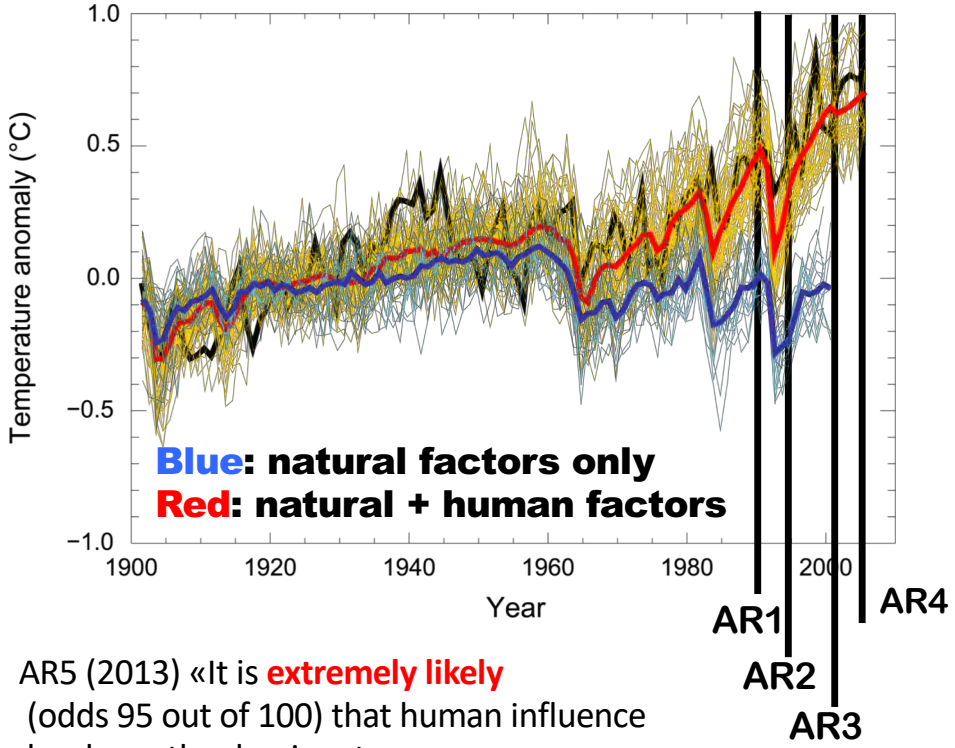
A Progression of Understanding: Greater and Greater Certainty in Attribution

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

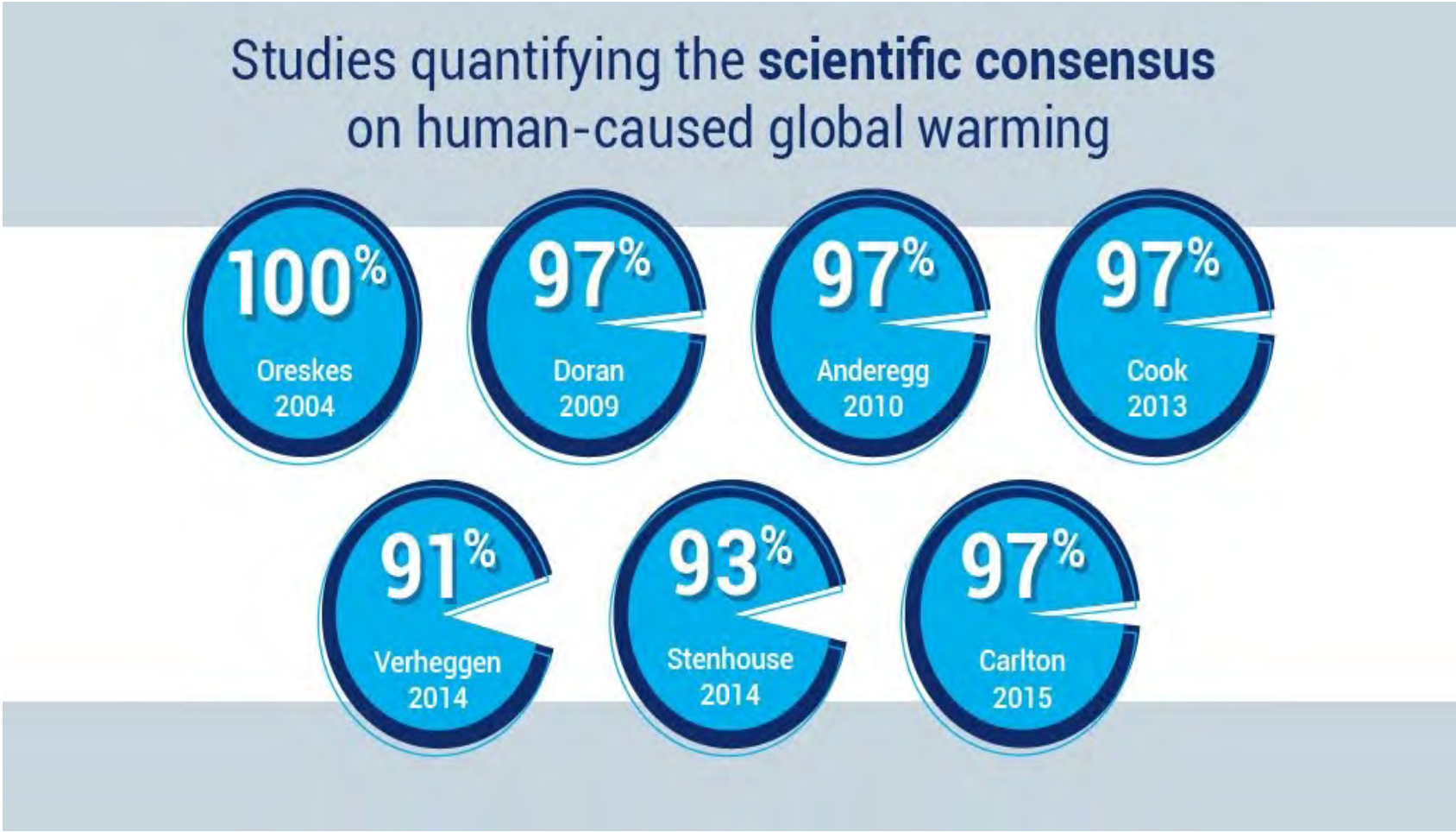
AR2 (1995): "balance of evidence suggests **discernible** human influence"

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… »

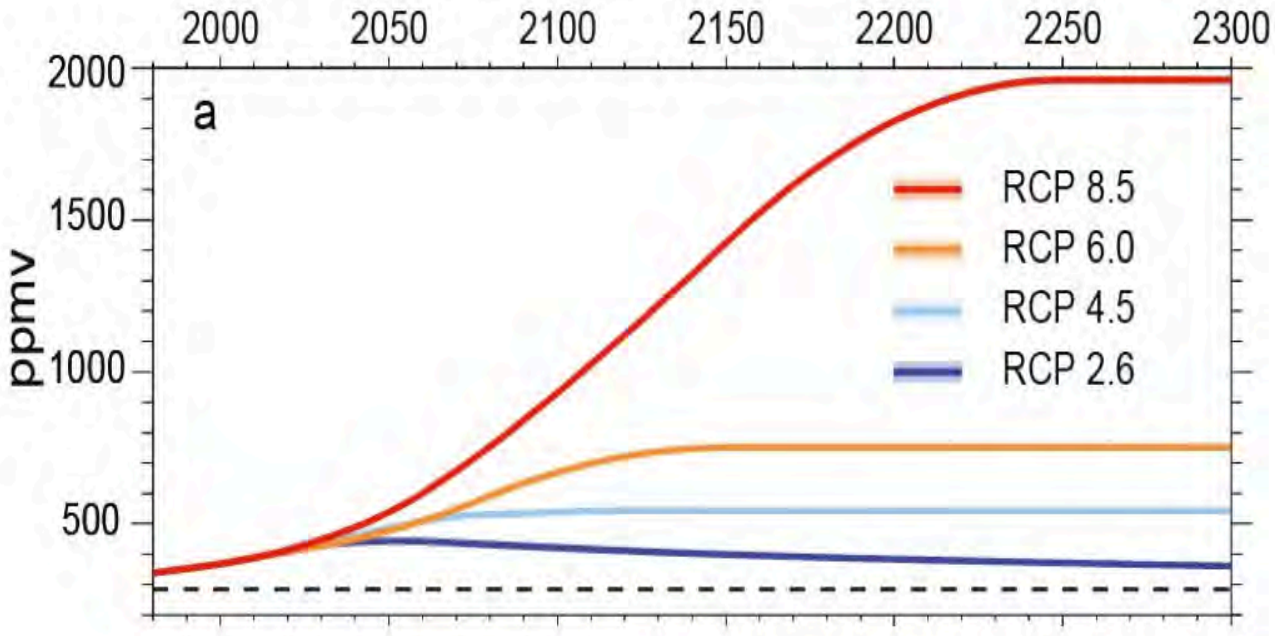


Source: @JohnfoCook

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

RCP Scenarios: Atmospheric CO_2 concentration



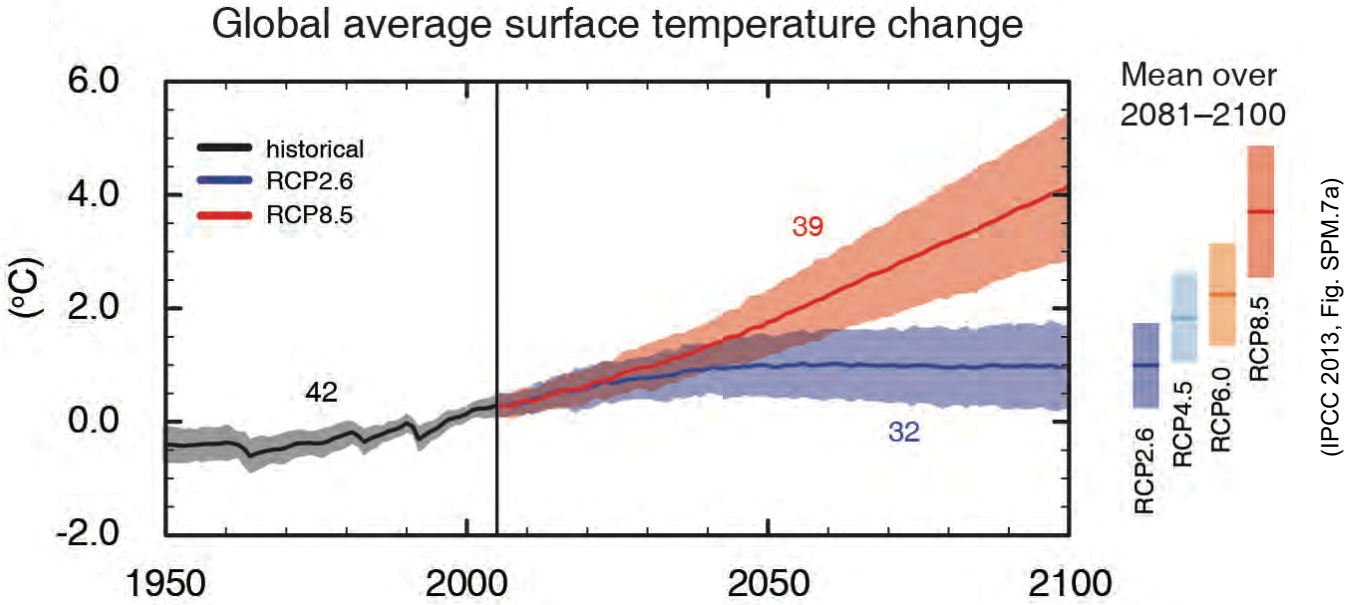
Three stabilisation scenarios: RCP 2.6 to 6
One Business-as-usual scenario: RCP 8.5

AR5, chapter 12. WGI- Adopted version / subject to final copyedit

An experimental study points to a *direct* effect of CO_2 on mental performance (decision taking, problem solving) from approximately 1000 ppm (Satish et al., 2012) !

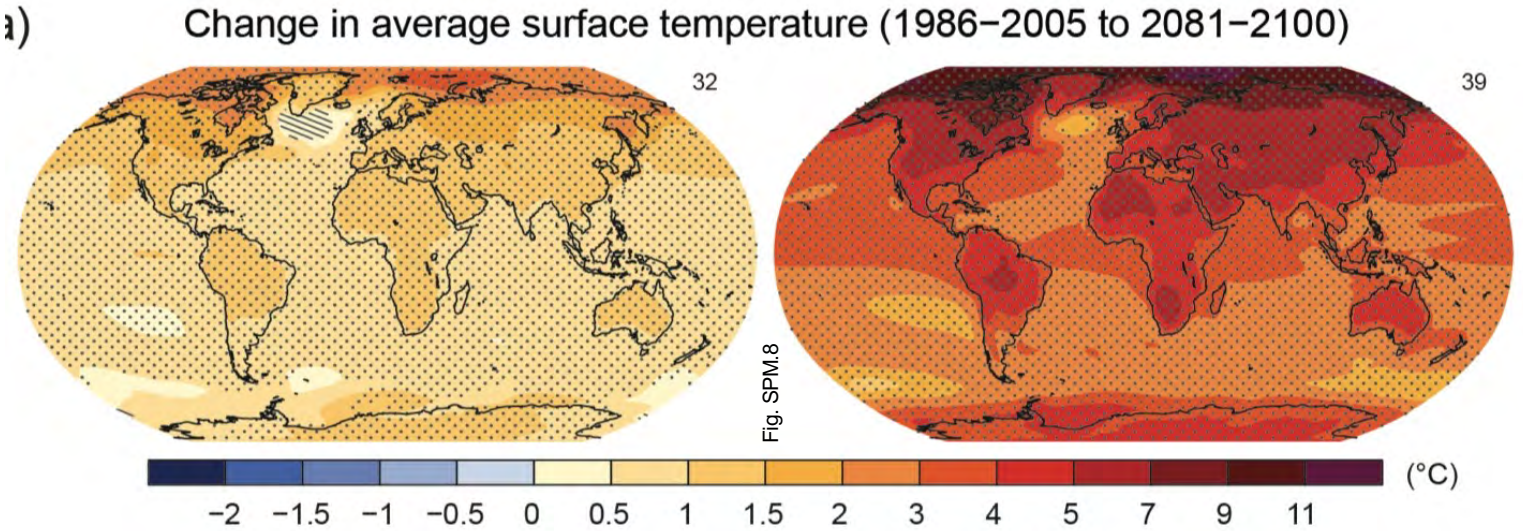
NB: If we stay on the present pathway, « fresh air » would contain close to 1000 ppm by 2100!

@JPvanYpersele



Only the lowest (RCP2.6) scenario maintains the global surface temperature increase above the pre-industrial level to less than 2°C with at least 66% probability

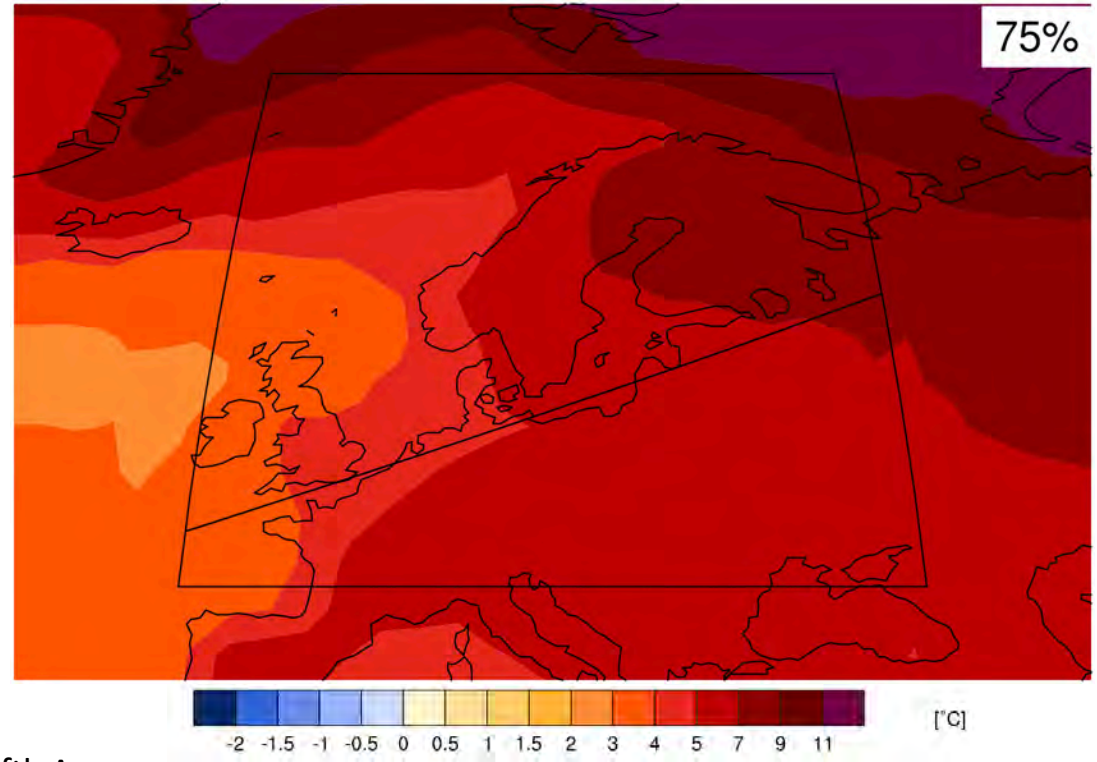
RCP2.6 RCP8.5



Hatching [hachures] indicates regions where the multi-model mean is small compared to natural internal variability (i.e., less than one standard deviation of natural internal variability in 20-year means).

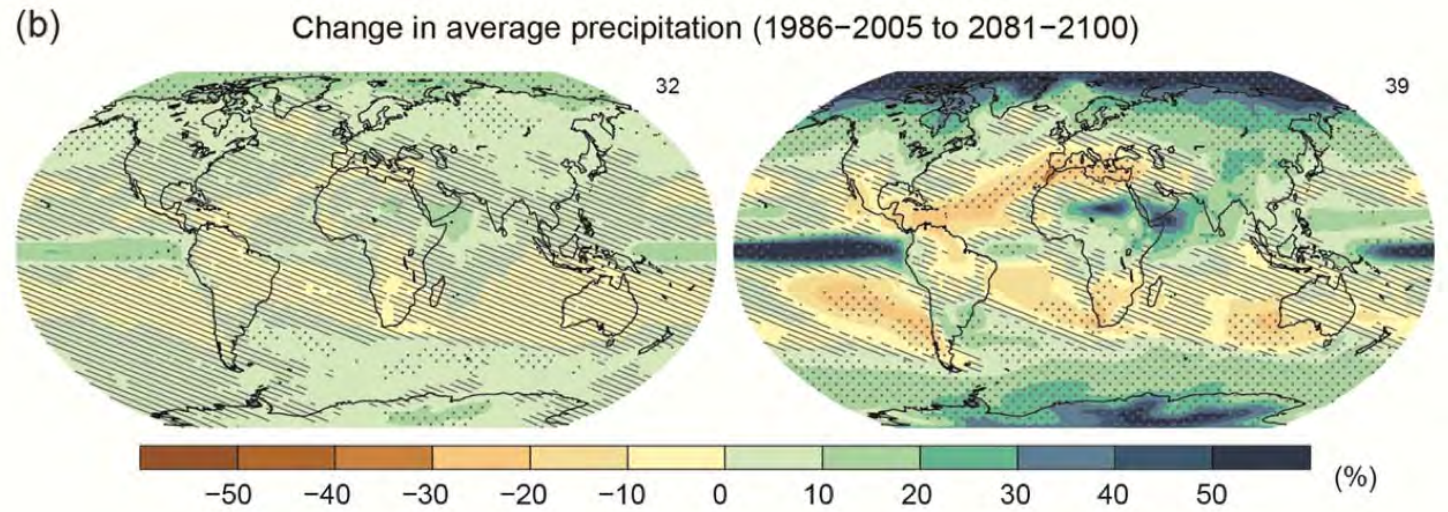
Stippling [pointillés] indicates regions where the multi-model mean is large compared to natural internal variability (i.e., greater than two standard deviations of natural internal variability in 20-year means) and where at least 90% of models agree on the sign of change

North Europe - Map of temperature changes: 2081–2100 with respect to 1986–2005 in the RCP8.5 scenario (annual)



IPCC WG1 Fifth Assessment Report (Final Draft)

Projected Change in Precipitation



Hatching indicates regions where *the multi-model mean is small compared to natural internal variability* (i.e., less than one standard deviation of natural internal variability in 20-year means).

Stippling indicates regions where the multi-model mean is large compared to natural internal variability (i.e., greater than two standard deviations of natural internal variability in 20-year means) and where at least 90% of models agree on the sign of change

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)

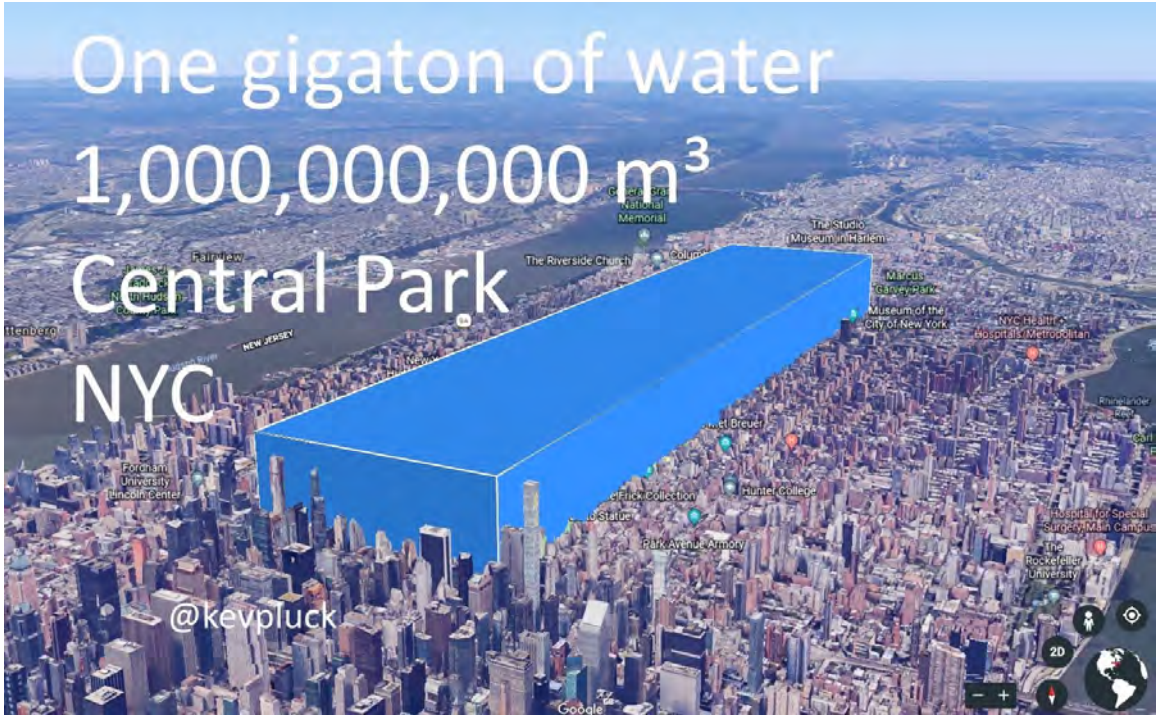
http://www.weather.com/news/science/environment/alaskas-glaciers-capturing-earth-changing-our-eyes-20131125?cm_ven=Email&cm_cat=ENVIRONMENT_us_share

Fact: Average global 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

@JPvanYpersele

The Antarctic Ice Sheet presently loses 1 Gt of water every 1.5 day



Source: @Kevpluck, June 2018

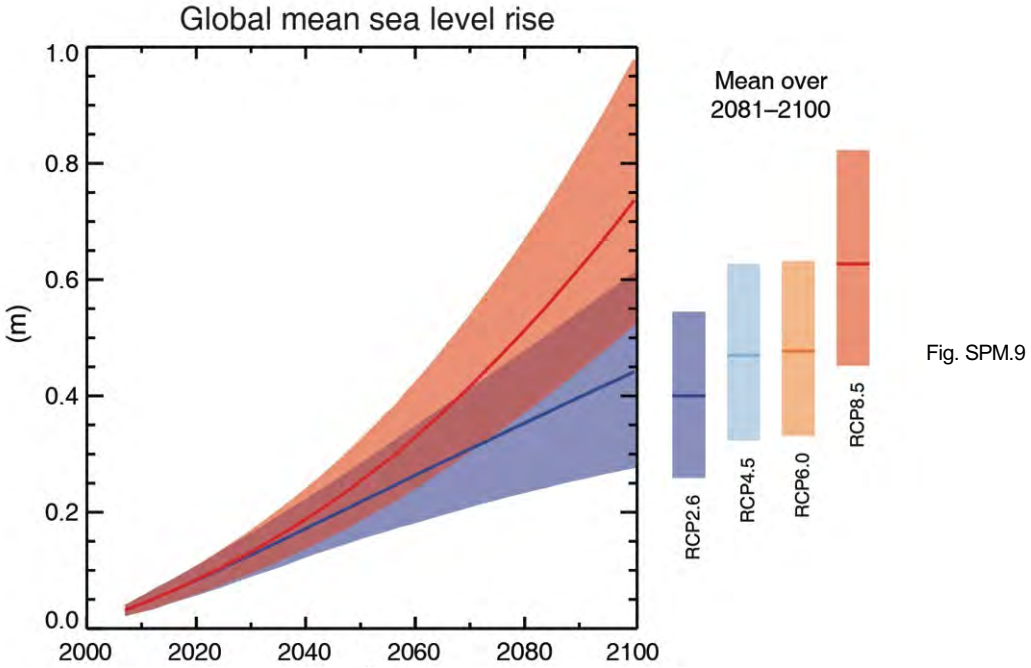


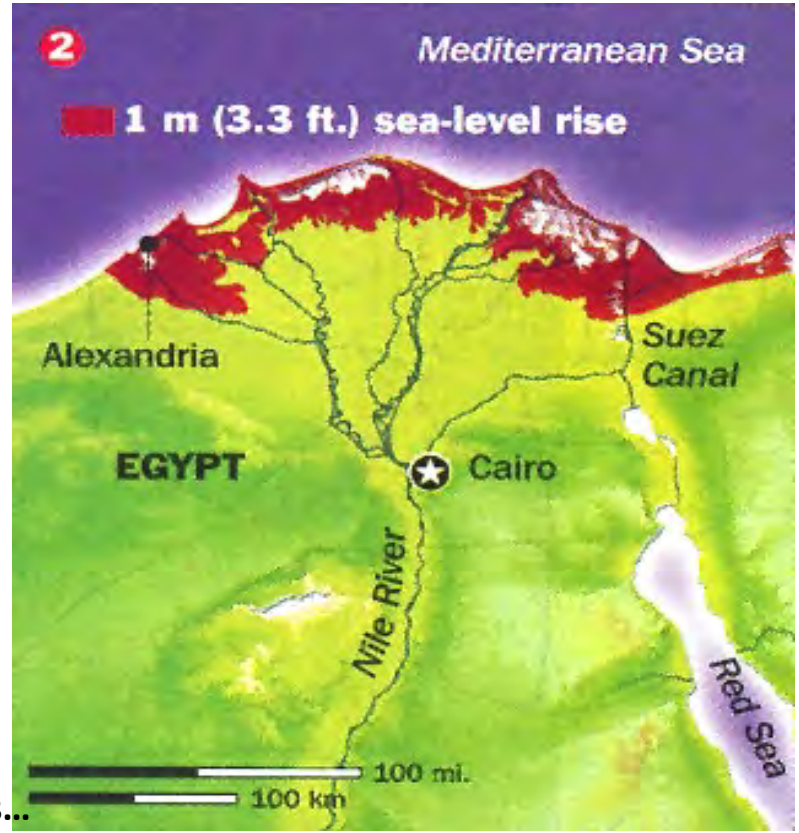
Fig. SPM.9

RCP2.6 (2081-2100), *likely* range: **26 to 55 cm**

RCP8.5 (in 2100), *likely* range: **52 to 98 cm**

Source: IPCC AR5 (2013); See update in IPCC SROCC (2019): add 10 cm to maximum

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

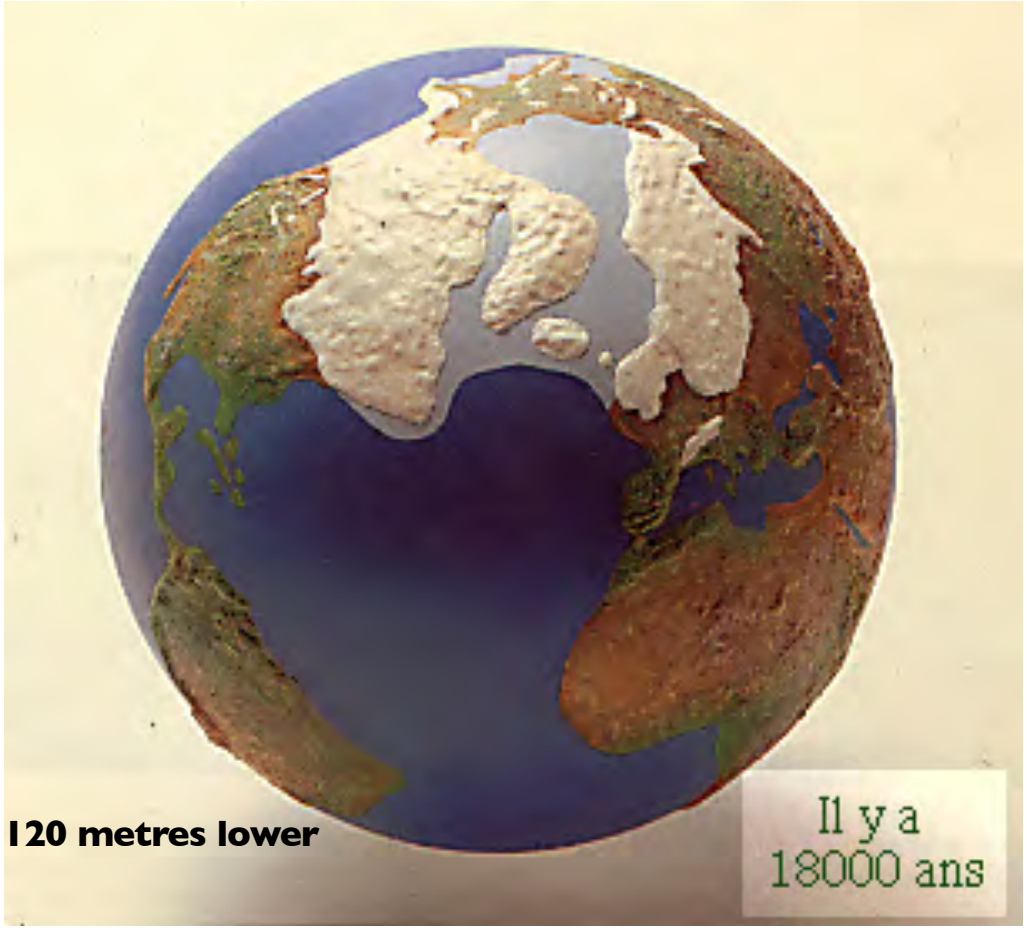


NB: + 1 m is possible in the next 100 years…

(Time 2001)

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.

Once upon a time, a US climatologist said this in Belgium (1):

- **Net accumulation of carbon as CO_2 in the atmosphere is about 3 gigatons per year. There is no quantitative explanation why the annual accumulation is 3 GtC when emissions are 8 GtC.**
- **There is no reason to expect that existing trends between emissions and atmospheric buildup will continue in the future.**

Once upon a time, a US climatologist said this in Belgium (2):

- **Contrary to what you may believe from accounts of the IPCC report, these observations still do not confirm that human activities have led to any global warming.**
- **Warming amounts to about 0.5° C over the last 140 years. This increase is entirely within the range of natural variability. The pattern does not agree with trends in greenhouse gases.**

Once upon a time, a US climatologist said this in Belgium (2):

- **Projections are based on unverified models of natural and social science.**
- **Results from climate models are known to be wrong.**
- **It is impossible today to project future impacts of climate change.**
- **Progress to advance the science will require major effort and many years of study.**

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

I was there, and confronted him

- **This US climatologist was Dr. B. Flannery, science advisor to Exxon Research and Engineering, with a Ph.D in astrophysics**
- **He was speaking (and sowing doubt) to the Belgian delegation about to leave for the final negotiations of the Kyoto Protocol, in 1997**
- **This was at a lunch event organised by the Belgian Oil Industry Federation (Fédération pétrolière) on 21 November 1997**

Exxon efforts did not stop there…

- **The next day, Dr. B. Flannery presented a similar talk to a few hundreds secondary school science teachers in Ghent**

Facsimile Cover Sheet

TO: **John Howard**
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FROM: **Randy Randol**
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Date/Time: 6 Feb 2001, 10:00 a.m.

Pages including Cover: 18

Regarding: *Bush Team for IPCC Negotiations*

Attached is a brief memo outlining the issues related to the on-going IPCC negotiations on the Third Assessment Report. I have also attached other material that may be useful to you.

I will call to discuss the recommendations regarding the team that can better represent the Bush Administration interests until key appointments and re-assessments are made.

Randy

Issue: Can Watson be replaced now at the request of the U.S.?

Issue: Have Bierbaum and MacCracken been removed from their positions of influence?

Fact: 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…)

@JPvanYpersele

The « merchants of doubt » have evolved in their arguments:

- Existence of global warming
- Human responsability in the warming
- Uncertainties around the science
- More research needed before taking measures
- Cost of decarbonization
- Drawbacks from alternatives

(recent example: so-called enormous needs of cobalt for electric mobility reported on CNN; see critical analysis on https://www.desmogblog.com/2018/05/02/cnn-wrongly-blames-electric-cars-unethical-cobalt-mining)

Impacts of Climate Change

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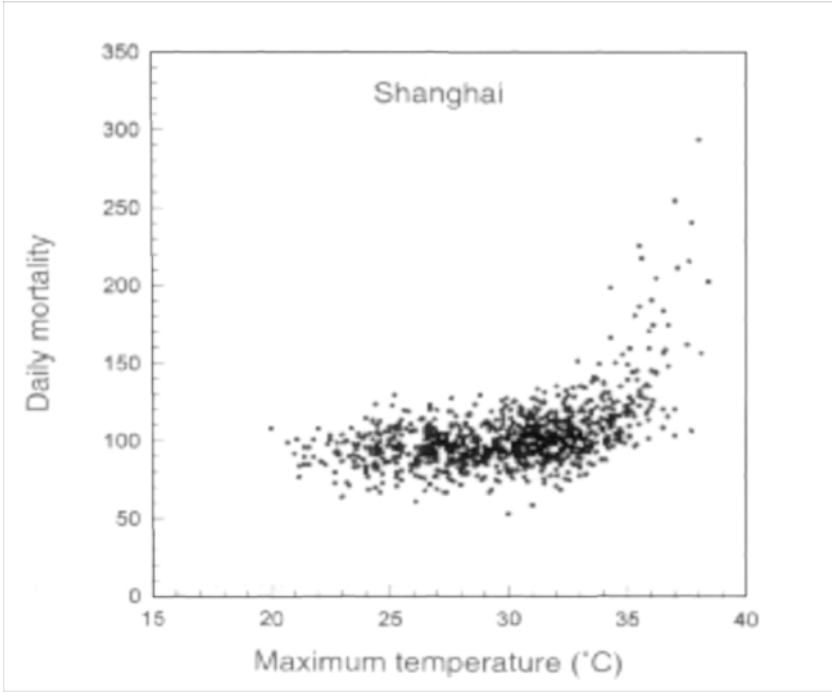
Heat waves kill

Une personne âgée dans un couloir des urgences du centre hospitalier de Versailles en août 2003. I AFP PHOTO MARTIN BUREAU

Relationship between maximum temperature and mortality in Shanghai, China, 1980-89



Référence : CILIMATE CHANGE AND HUMAN HEALTH, 1996

Fact: World Health Organization (2018): Air pollution kills 7 million people per year (including 500 000 in Europe)

Sources of air pollution are broadly the same as those affecting climate: fossil fuels, wood and biomass combustion

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Fine particulates from fossil fuel and wood burning kill

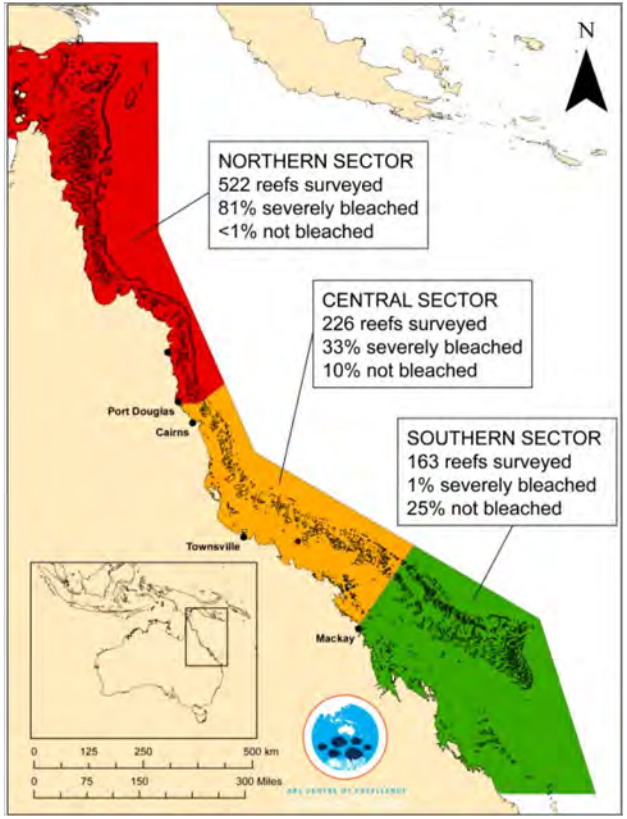
Photo: Jerzy Gorecki, Pixabay

Fact: Ecosystems suffer more and more, while our wellbeing depends on their good state

The « Sixth Extinction » has started, and climate change is one of the causing factors

@JPvanYpersele

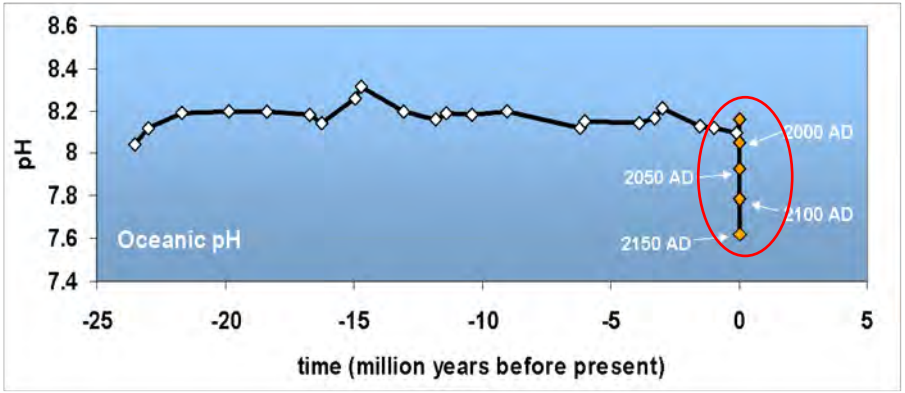
2016: Only 7% of the Great Barrier Reef has avoided coral bleaching



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

Oceans are Acidifying Fast …….

Changes in pH over the last 25 million years



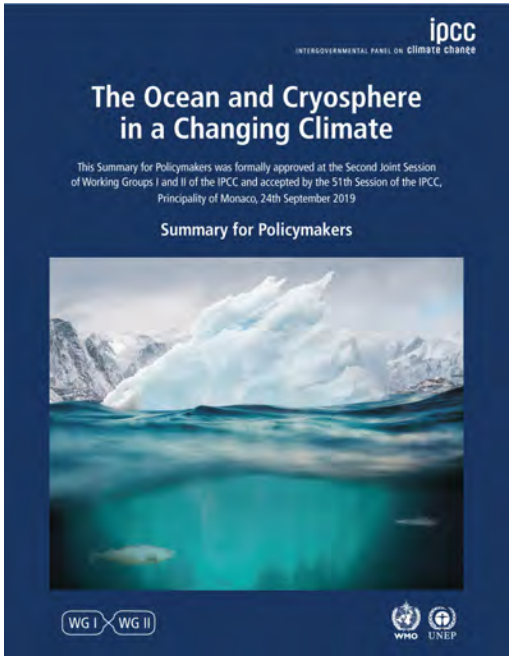
"Today is a rare event in the history of the World"

- **It is happening now, at a speed and to a level not experienced by marine organisms for about 60 million years**
- **Mass extinctions linked to previous ocean acidification events**
- **Takes 10,000's of years to recover**

Turley et al. 2006

Slide courtesy of Carol Turley, PML

SROCC


ipcc
INTERGOVERNMENTAL PANEL ON climate change
The Ocean and Cryosphere in a Changing Climate
This Summary for Policymakers was formally approved at the Second Joint Session of Working Groups I and II of the IPCC and accepted by the 51th Session of the IPCC, Principality of Monaco, 24th September 2019
Summary for Policymakers
WG I
WG II
WMO
UNEP


ipcc
INTERGOVERNMENTAL PANEL ON climate change
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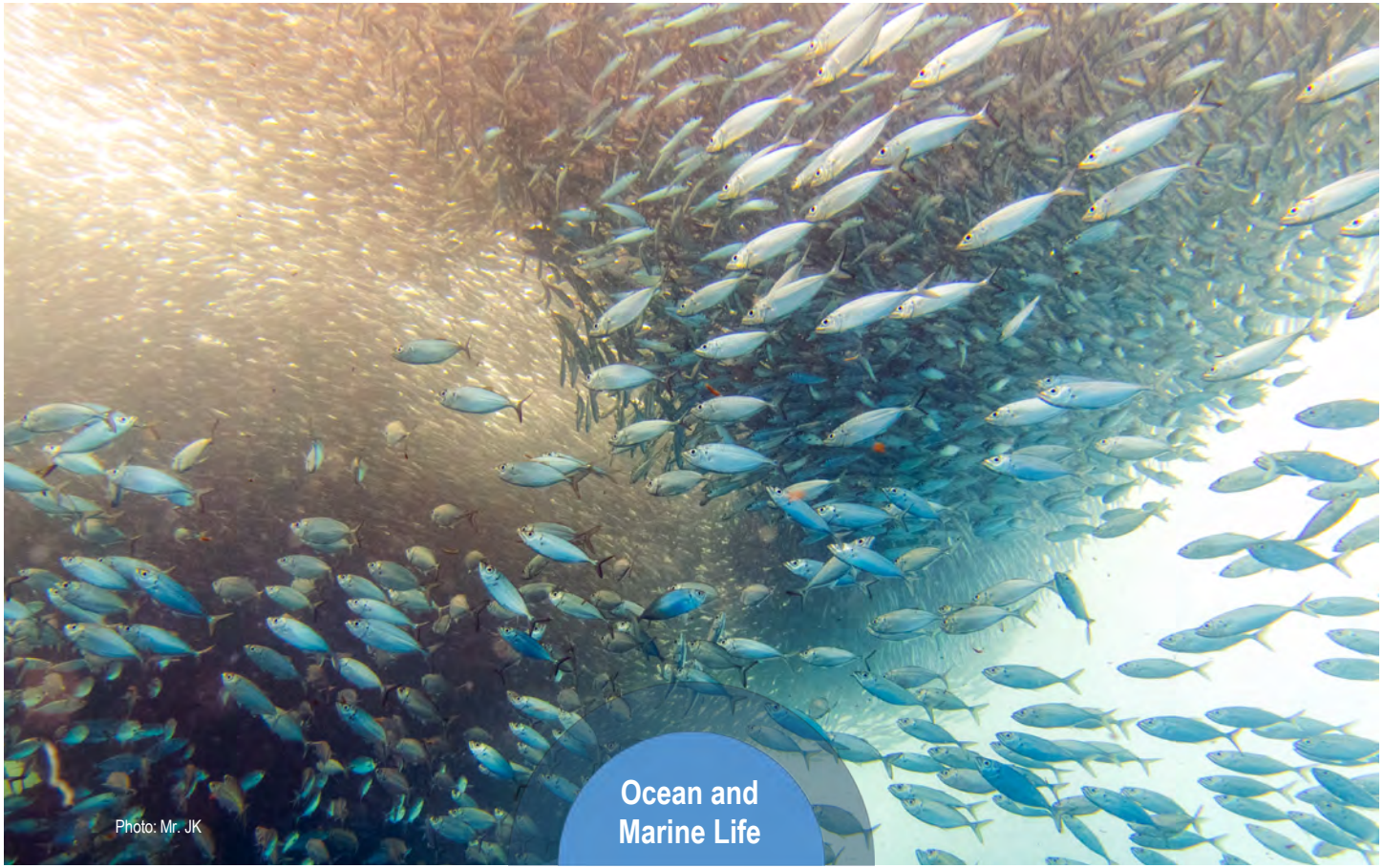


Photo: Mr. JK

ipcc
INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

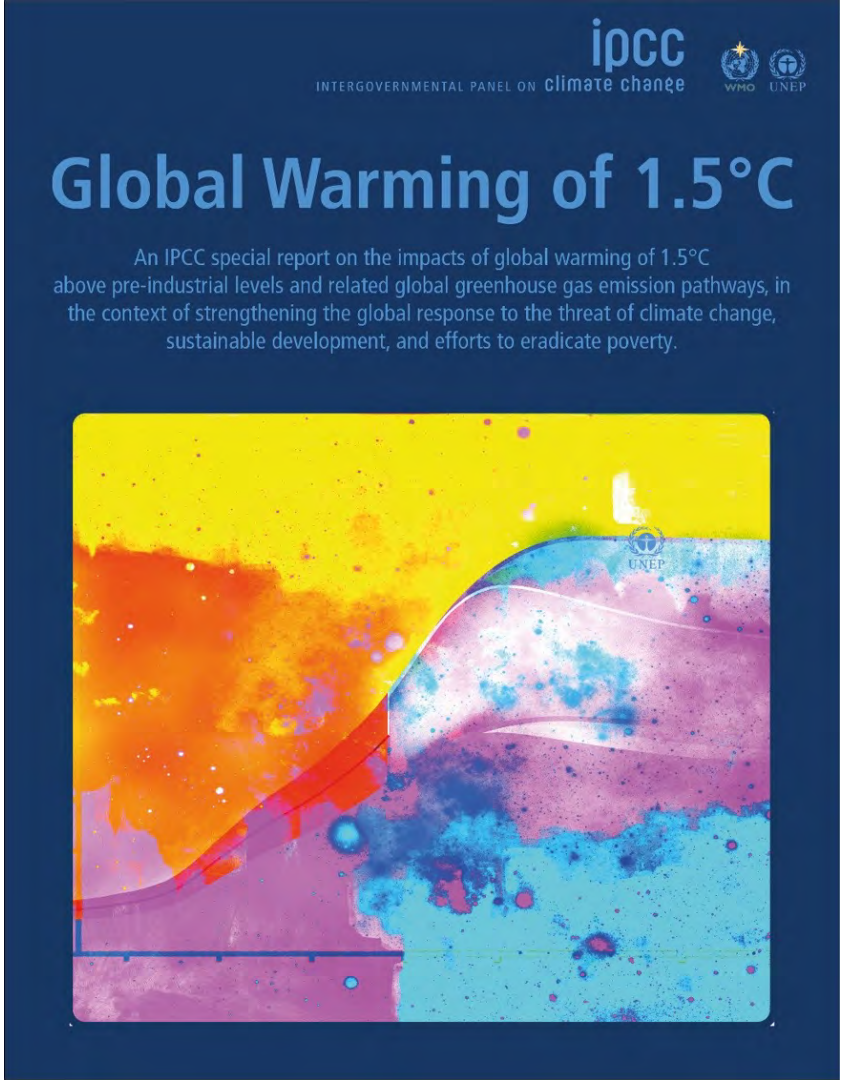
Changes in the ocean

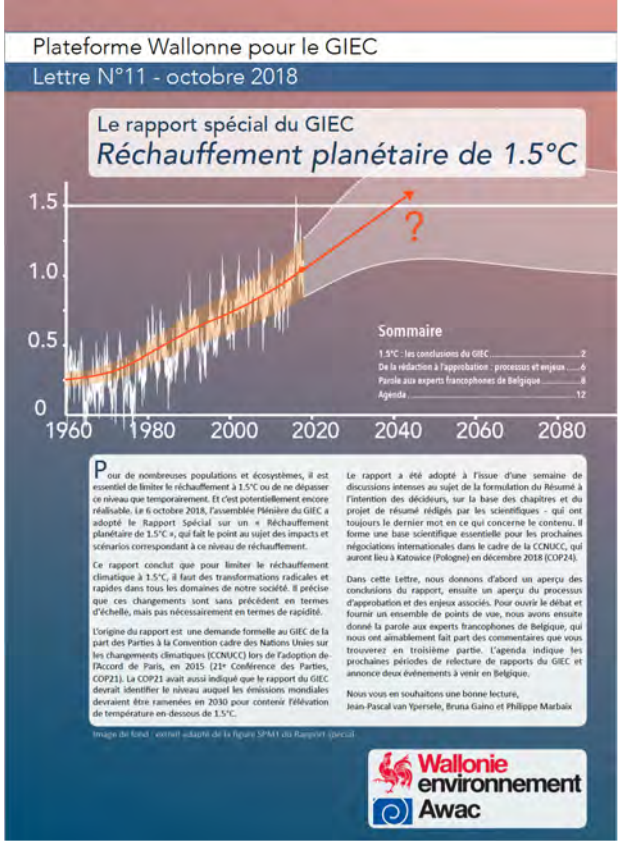
- To date, the ocean has taken up **more than 90%** of the excess heat in the climate system. By 2100, the ocean will take up **2 to 4 times** more heat if global warming is limited to 2°C and **up to 5 to 7 times** at higher emissions.
- Ocean warming reduces mixing between water layers and therefore the supply of **oxygen and nutrients for marine life.**
- **Marine heatwaves** are becoming more frequent and severe, especially harming warm-water corals, kelp forests and the distribution of marine life.
- The ocean takes up human-induced carbon emissions. This increases ocean acidity**.** It has taken up 20 to 30% of these emissions and continued uptake will exacerbate this.

Changes in marine life

- Changes in the ocean cause **shifts in fish populations**. This has reduced the global catch potential. In the future some regions will see further decreases but there will be increases in others.
- Communities that depend highly on seafood may face **risks to nutritional health and food security**.
- Reducing other pressures such as **pollution** will further help marine life deal with changes in their environment.
- Policy frameworks for **fisheries management** and **marine protected areas** offer opportunities for people to adapt.

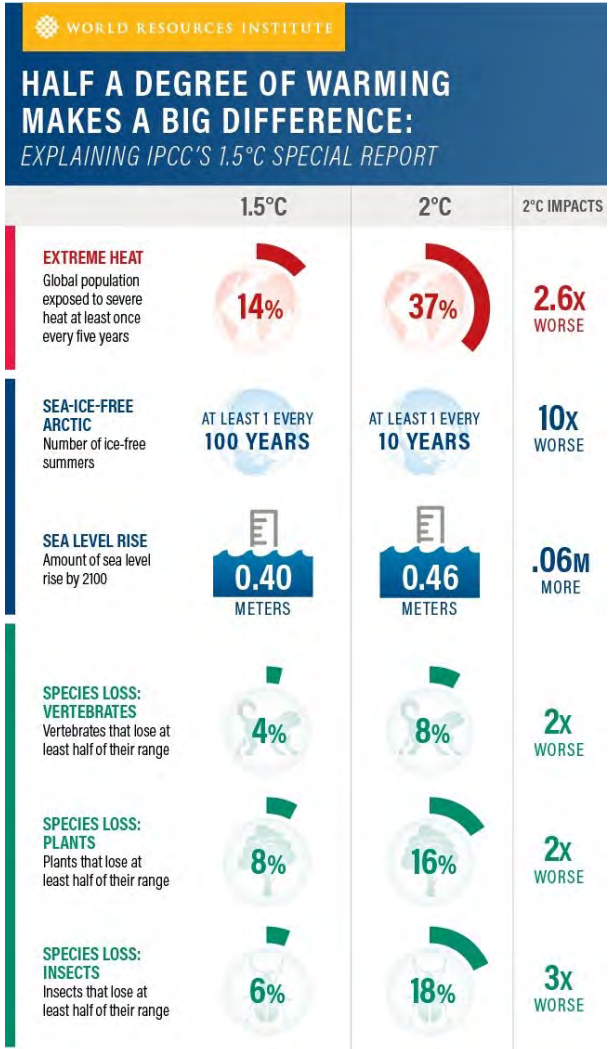
The SR15

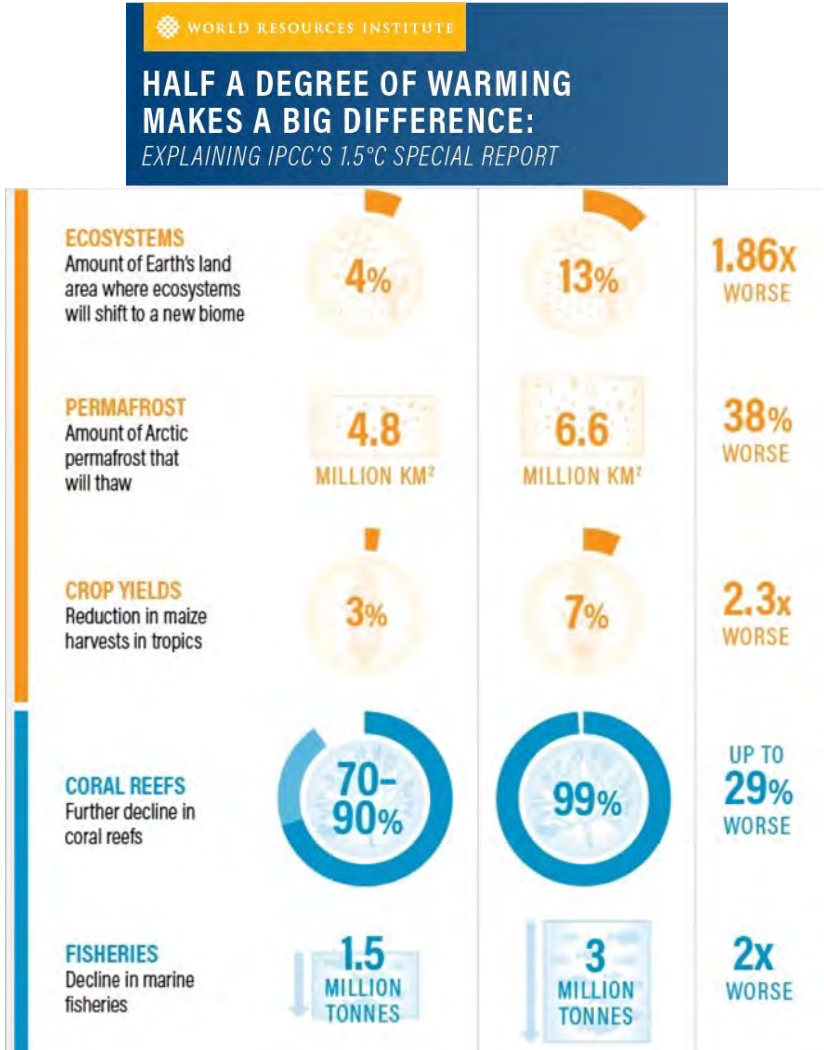

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP
Global Warming of 1.5°C
An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate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



Disponible gratuitement, 6X/an: www.plateforme-wallonne-giec.be

Responsibility for content: WRI



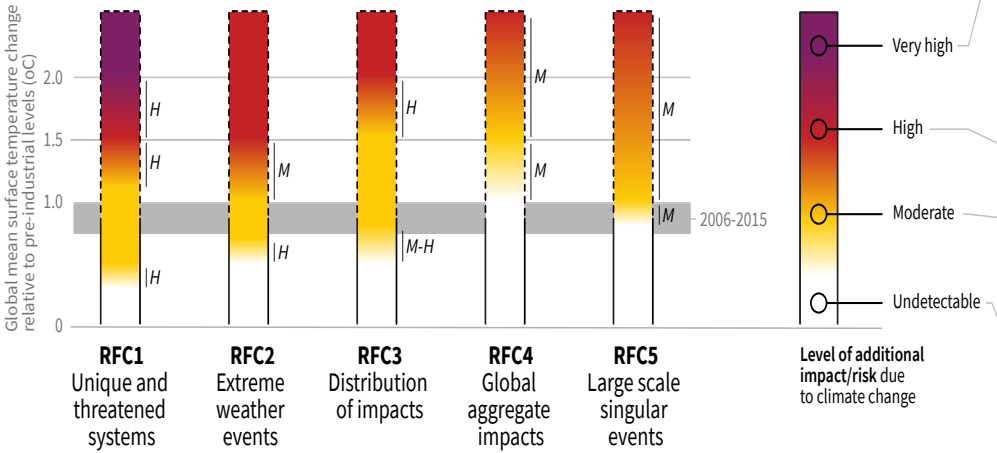


Responsibility for content: WRI

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)



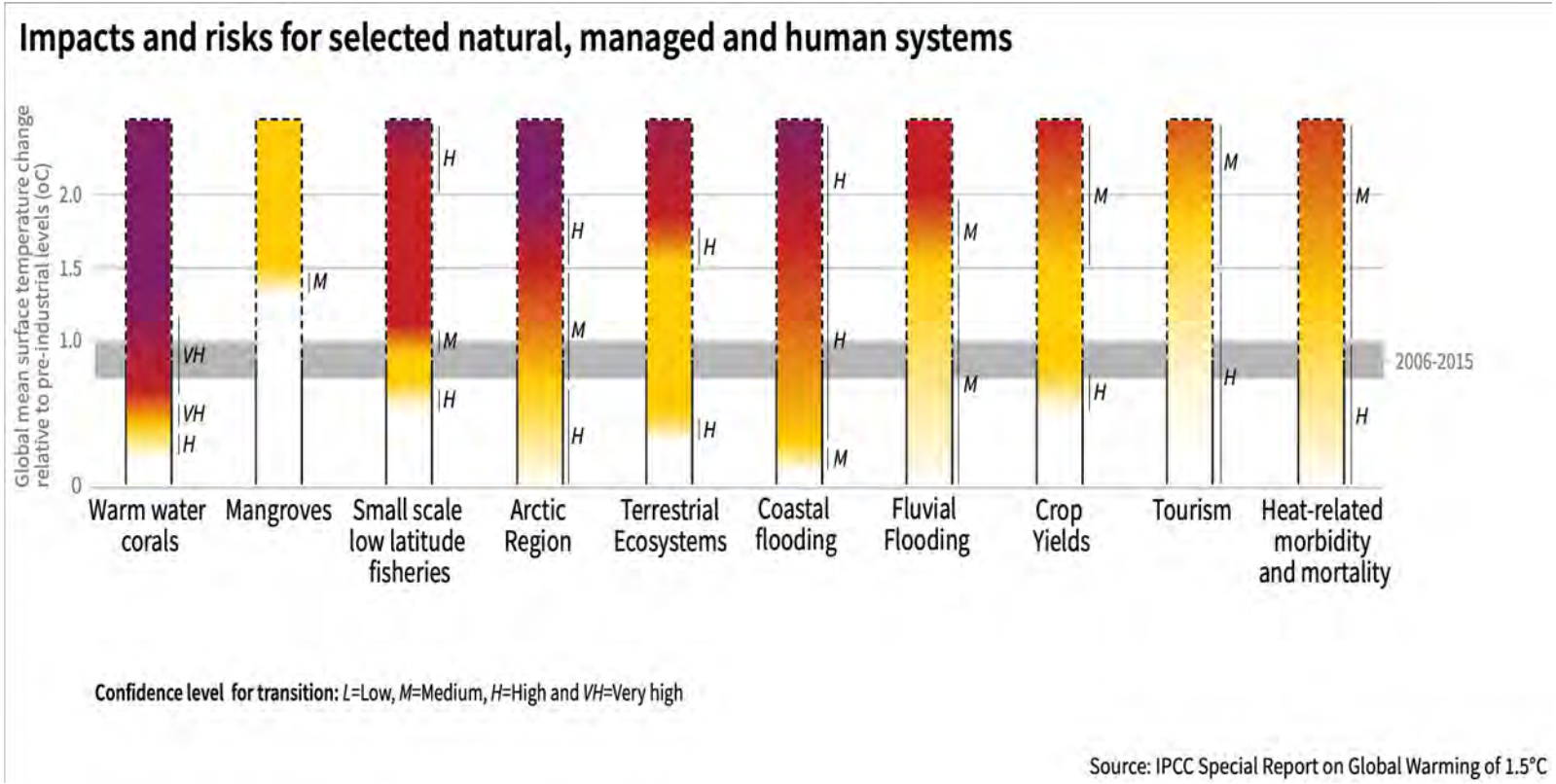
Purple indicates very high risks of severe impacts/risks and the presence of significant irreversibility or the persistence of climate-related hazards, combined with limited ability to adapt due to the nature of the hazard or impacts/risks.

Red indicates severe and widespread impacts/risks.

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

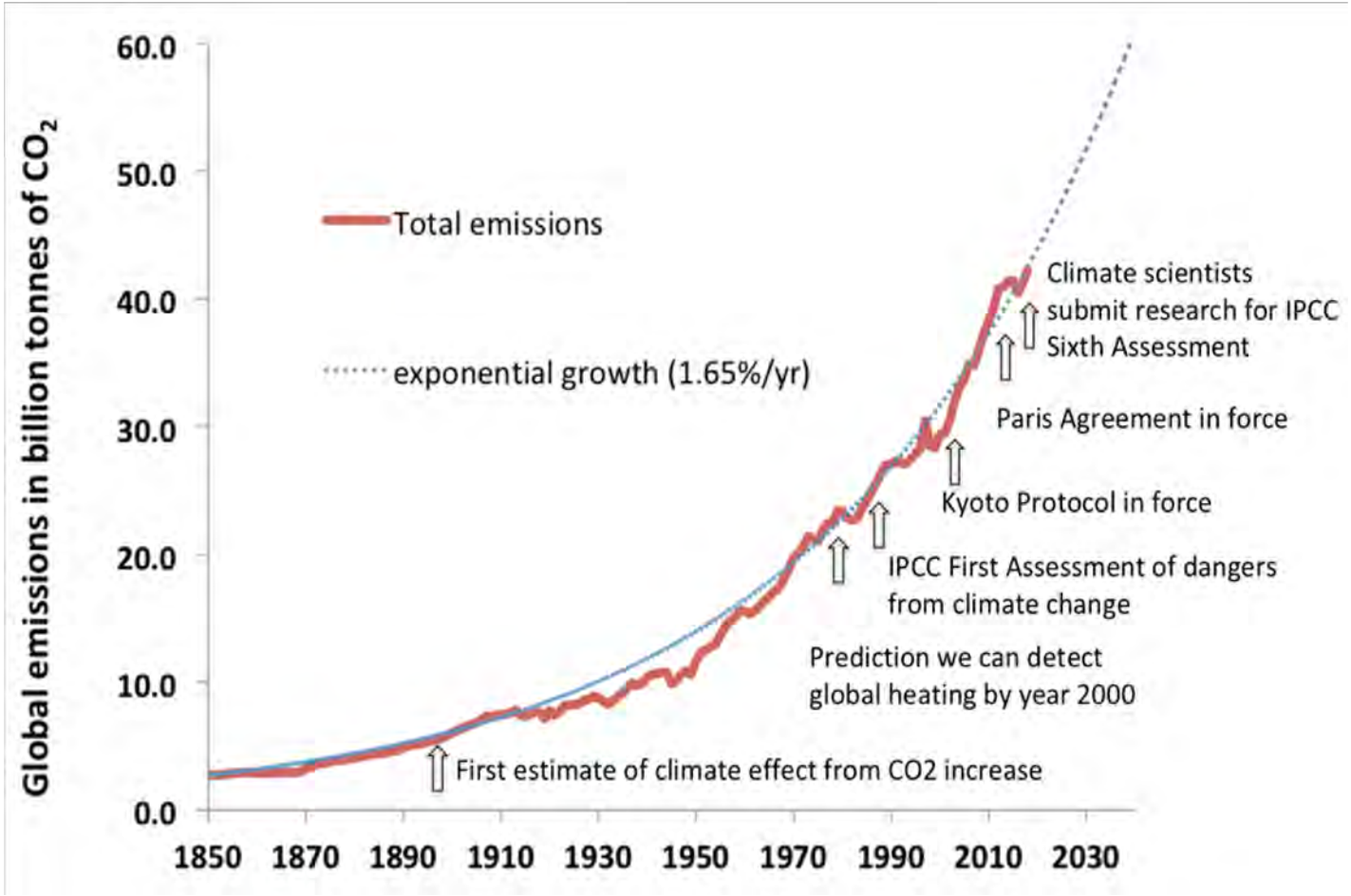
White indicates that no impacts are detectable and attributable to climate change.

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



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

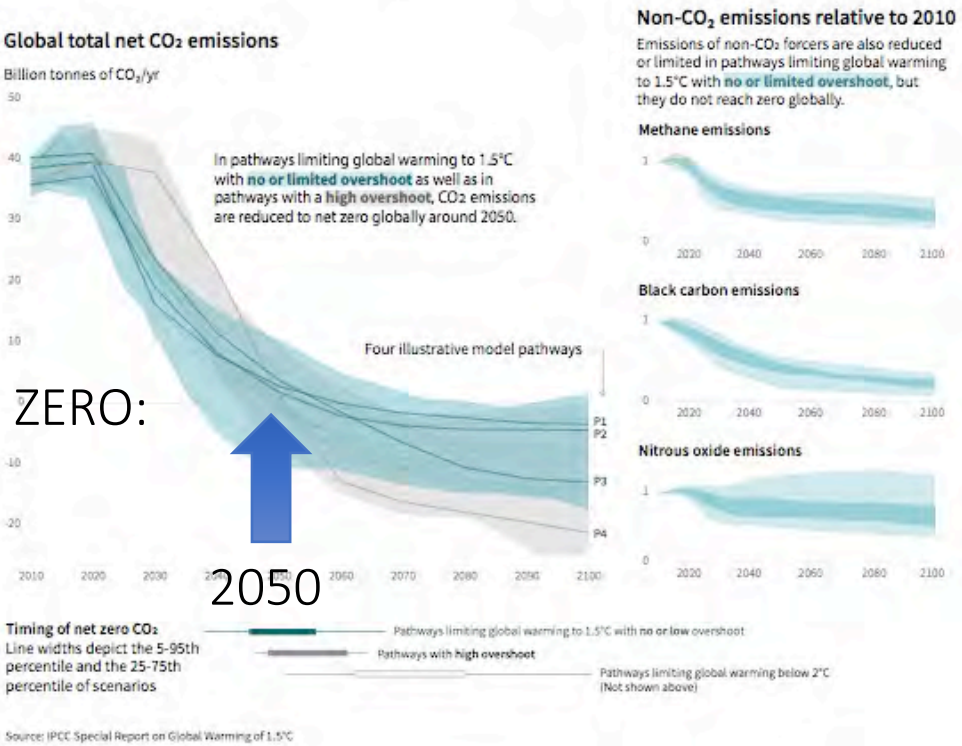
Human activities



Source: Wolfgang Knorr, in The Conversation (2019)

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.



Net ZERO:

2050

Greenhouse gas emissions pathways

- Limiting warming to 1.5° C would require changes on an unprecedented scale
  - Deep emissions cuts in all sectors
  - A range of technologies
  - Behavioural changes
  - Increase investment in low carbon options

Greenhouse gas emissions pathways

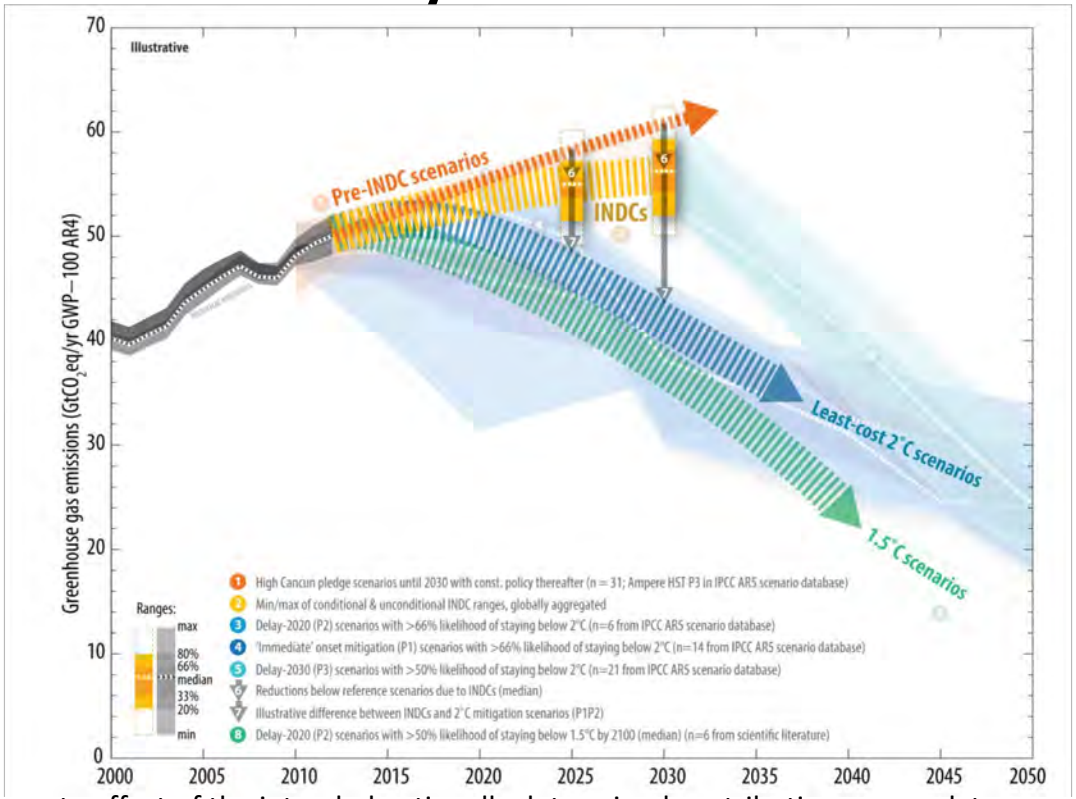
- Progress in renewables would need to mirrored in other sectors
- We would need to start taking carbon dioxide out of the atmosphere (Afforestation or other techniques)
- Implications for food security, ecosystems and biodiversity

Fact: The present national plans (NDCs) introduced *ahead* of the Paris Agreement are far from what is needed to respect the 1.5° C objective, and even to stay below 2° C warming

Please note that the Paris Agreement speaks about 1.5° C and « *well below* 2° C » warming, not 2° C

@JPvanYpersele

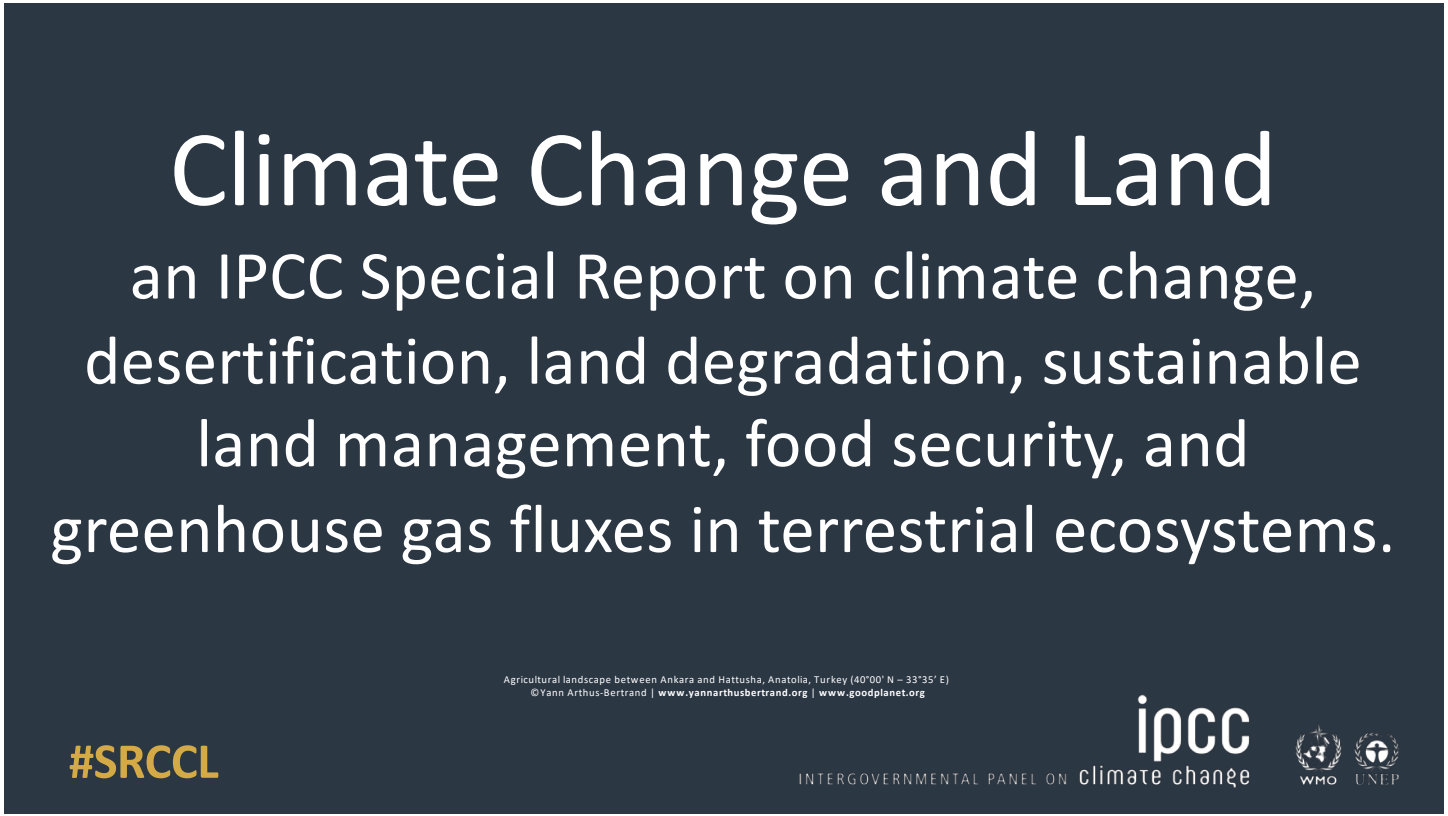
Comparison of global emission levels in 2025 and 2030 resulting from the implementation of the intended nationally determined contributions



UNFCCC, Aggregate effect of the intended nationally determined contributions: an update
http://unfccc.int/resource/docs/2016/cop22/eng/02.pdf

Climate Change and Land

an IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems.



Agricultural landscape between Ankara and Hattusha, Anatolia, Turkey (40°00' N – 33°35' E)
©Yann Arthus-Bertrand | **www.yannarthusbertrand.org** | **www.goodplanet.org**

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63

“Land is a critical resource – we rely on it for food, water, health and wellbeing – but it is already under growing human pressure. Climate change is adding to these pressures

Climate change is making a **challenging situation worse and undermining food security**.

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Agriculture, food production, and deforestation are major drivers of climate change.

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WMO UNEP

Agriculture, Forestry and Other Land Use (AFOLU) activities accounted for Around:

- 13% of CO2
- 44% of methane (CH4)
- 82% of nitrous oxide (N2O)

emissions from human activities globally during 2007-2016, representing **23%** (12.0 +/- 3.0 GtCO2e yr-1) **of total net anthropogenic emissions of GHGs**

> Coordinated action to tackle climate change can **simultaneously improve land, food security and nutrition, and help to end hunger.**

The **way we produce our food matters**; dietary choices can help reduce emissions and pressure on land.

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A move to more balanced diets could help us adapt to and limit climate change

- Some diets require more land and water and lead to higher emissions than others.
- Diets high in grains, nuts and vegetables have a lower carbon footprint than those that are high in meat, and lead to better health outcomes.
- Dietary choices are influenced by local production practices and cultural habits.

70

There are things we can do to both **tackle land degradation** and prevent or adapt to further climate change.

Better land management also supports **biodiversity conservation**

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Tackling this challenge requires a **coordinated response.**

“ **Better land management can play its part** in tackling climate change, but it can’t do it all.

Land is where we live

Land is under growing human pressure

Land is a part of the solution

But land can't do it all

75

Hope

Felix Schaad (Tages Anzeiger, Switzerland)

Fact: European Union spends 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

@JPvanYpersele

Ambitious Mitigation Is Affordable

- → Economic growth reduced by ~ 0.06%
  (BAU growth 1.6 - 3%/year)
- → This translates into delayed and not forgone growth
- → Estimated cost does not account for the benefits of reduced climate change
- → Unmitigated climate change would create increasing risks to economic growth and efforts to eradicate poverty

AR5 WGI SPM, AR5 WGII SPM

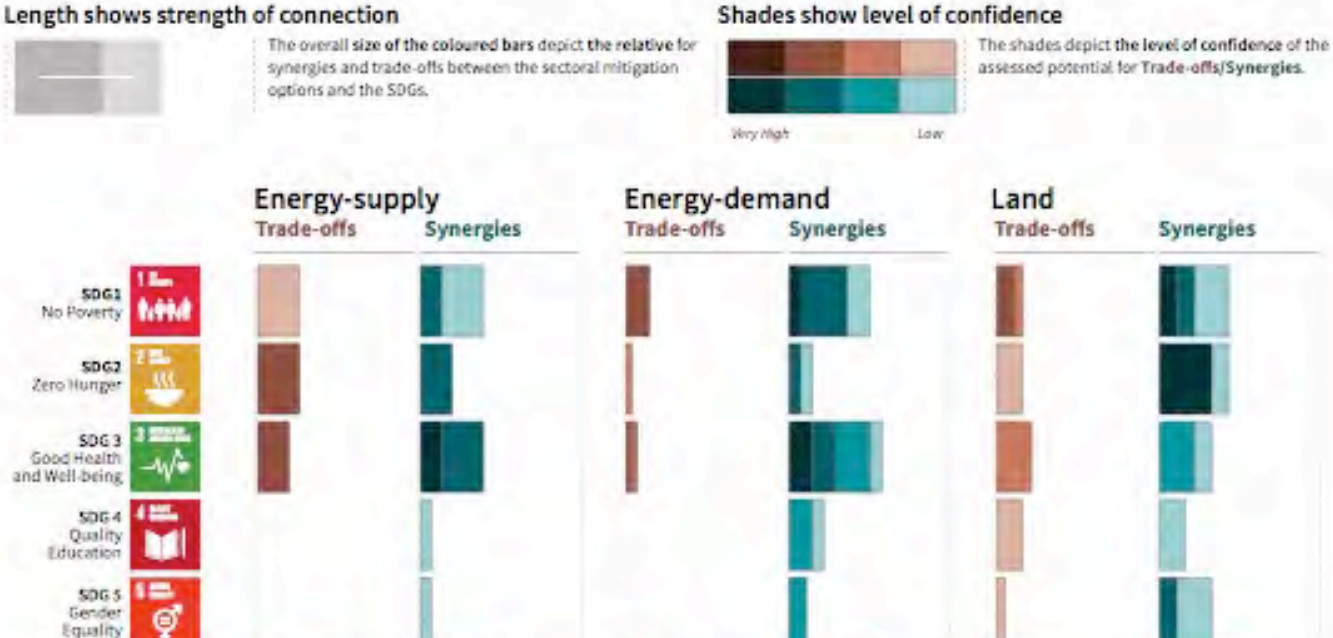

Nations Unies
onférence sur les Changements Climatiques
COP21/CMP11
Paris, France
SECRETAIRE EXECUTIVE CCNUCC
PRESIDENT

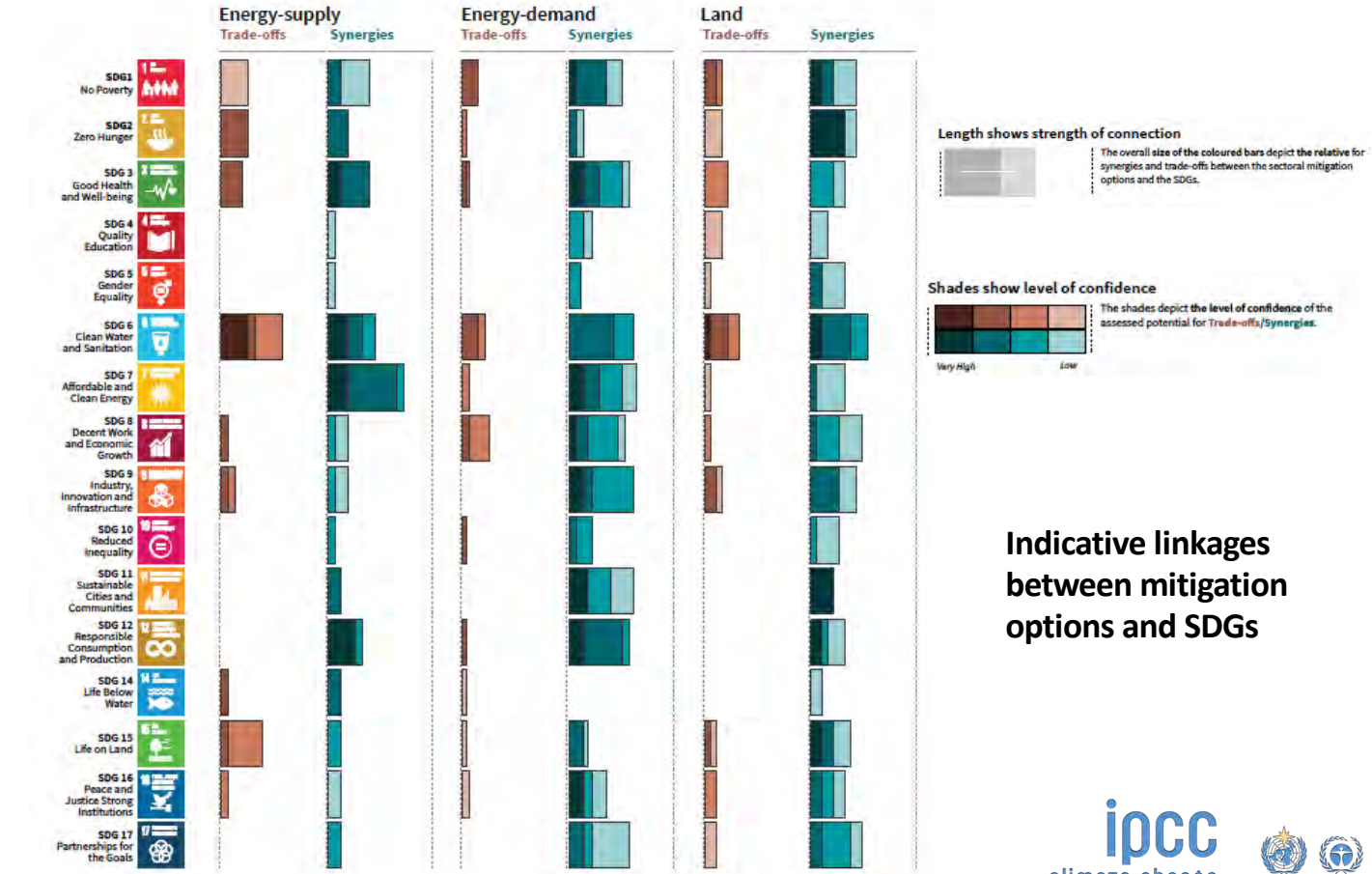
SUSTAINABLE DEVELOPMENT GOALS

IPCC SR15
Fig SPM 4

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.





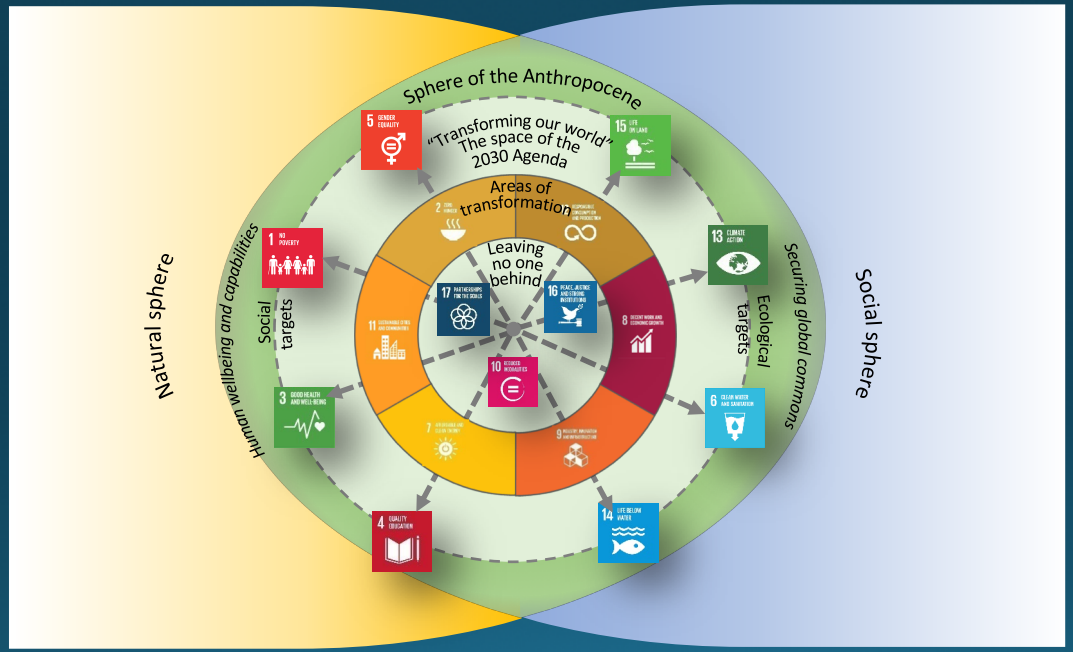
Indicative linkages between mitigation options and SDGs

The Future is Now – Science for achieving sustainable development

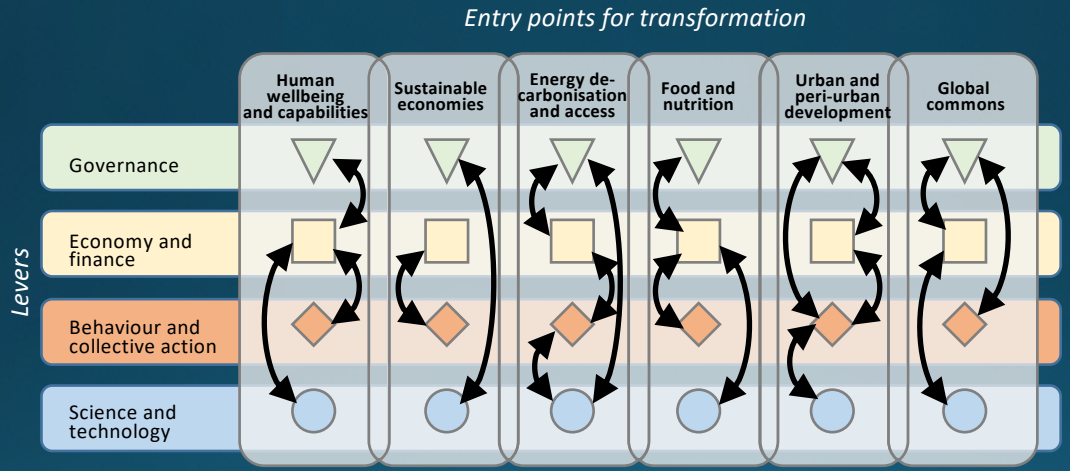
#GSDR2019: Global Sustainable Development Report 2019

sustainabledevelopment.un.org/gsdr2019

Sustainable Development in the world of the 2030 Agenda



Transforming our world



Innovative pathways to transformation represent context-specific configurations of levers to achieve transformation in each area

Joel Pett, USA Today

Concluding remarks

Scenario 3 (high emissions):

In 2020, despite past pledges, the international support for the Paris Agreement starts to wane. In the years that follow, CO2 emissions are reduced at the local and national level but efforts are limited and not always successful.(…)

Major ecosystems (coral reefs, wetlands, forests) are destroyed over that period, with massive disruption to local livelihoods. An unprecedented drought leads to large impacts on the Amazon rainforest, which is also affected by deforestation.
A hurricane with intense rainfall and associated with high storm surges destroys a large part of Miami. (…)

The world as it was in 2020 is no longer recognizable, with decreasing life expectancy, reduced outdoor labour productivity, and lower quality of life in many regions because of too frequent heatwaves and other climate extremes.

IPCC SR15 Cross chapter Box 8 P 279 : @JPvanYpersele

Scenario 3 (high emissions):

Global mean warming reaches 3°C by 2100 but is not yet stabilized (…)
The world as it was in 2020 is no longer recognizable, with decreasing life expectancy, reduced outdoor labour productivity, and lower quality of life in many regions because of too frequent heatwaves and other climate extremes.

Droughts and stress on water resources renders agriculture economically unviable in some regions and contributes to increases in poverty. Progress on the sustainable development goals is largely undone and poverty rates reach new highs. Major conflicts take place. Almost all ecosystems experience irreversible impacts, species extinction rates are high in all regions, forest fires escalate, and biodiversity strongly decreases, resulting in extensive losses to ecosystem services. These losses exacerbate poverty and reduce quality of life.

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Scenario 3 (high emissions):

Life for many indigenous and rural groups becomes untenable in their ancestral lands. The retreat of the West Antarctic ice sheet accelerates, leading to more rapid sea level rise. Several small island states give up hope of survival in their locations and look to an increasingly fragmented global community for refuge.

Aggregate economic damages are substantial, owing to the combined effects of climate changes, political instability, and losses of ecosystem services.

The general health and wellbeing of people is substantially reduced compared to the conditions in 2020 and continues to worsen over the following decades.

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Scenario 1 (low emissions):

In 2020, strong participation and support for the Paris Agreement and its ambitious goals for reducing CO2 emissions by an almost unanimous international community led to a time frame for net zero emissions that is compatible with halting global warming at 1.5°C by 2100.
(…) **Several industry-sized plants for carbon capture and storage are installed and tested in the 2020s. Competition for land between bioenergy cropping, food production, and biodiversity conservation is minimized by sourcing bioenergy for carbon capture and storage from agricultural wastes, algae and kelp farms.**
Agriculture is intensified in countries with coordinated planning associated with a drastic decrease in food waste. This leaves many natural ecosystems relatively intact, supporting continued provision of most ecosystem services, although relocation of species towards higher latitudes and elevations still results in changes in local biodiversity in many regions, particularly in mountain, tropical, coastal and Arctic ecosystems.

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Scenario 1 (low emissions):

Adaptive measures such as the establishment of corridors for the movement of species and parts of ecosystems become a central practice within conservation management. (…) **Crops are grown on marginal land, no-till agriculture is deployed, and large areas are reforested with native trees. Societal preference for healthy diets reduces meat consumption and associated GHG emissions.**

By 2100, (…) **in mid-latitudes, frequent hot summers and precipitation events tend to be more intense.(…) In the tropics, in particular in megacities, there are frequent deadly heatwaves whose risks are reduced by proactive adaptation**, (…) **While some climate hazards become more frequent, timely adaptation measures help reduce the associated risks for most, although poor and disadvantaged groups continue to experience high climate risks to their livelihoods and well-being.**

Human well-being remains overall similar to that in 2020.

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RCP2.6 RCP8.5

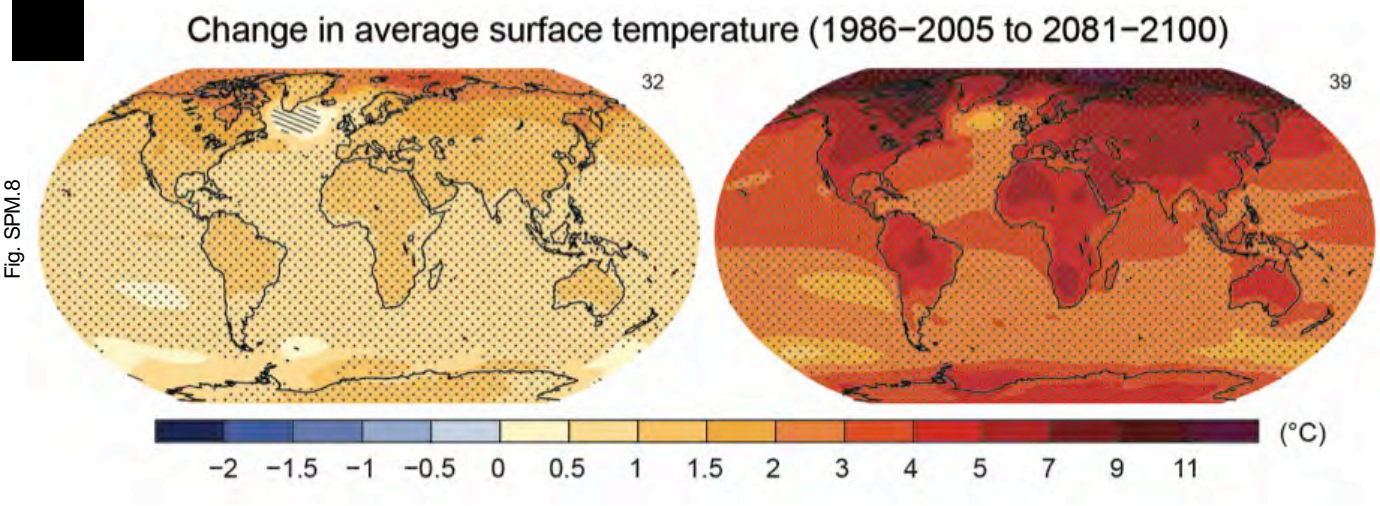

Fig. SPM.8

Humanity has the choice

This gives me hope:

Well-informed young people speaking truth to power

With @GretaThunberg at COP24

Greta is inconvenient, like the truth

Greta is inconvenient, like the truth[1]

Jean-Pascal van Ypersele (@JPvanYpersele)

Professor of climatology at the Université catholique de Louvain (Belgium)
Former IPCC Vice-Chair (2008-2015),
Member of the Académie royale de Belgique

Greta Thunberg is inconvenient, and has been the subject of renewed criticism since her speech to the United Nations in New York. Some, often older white men, criticize her appearance or her so-called "mental illness." They call her "unstable" and seem to take pride in bullying her.

But maybe they feel threatened because Greta is gifted. She understands the challenges of the climate crisis much better than most political or economic leaders.

I have seen this myself. As a physicist and climate scientist for nearly 40 years, and a former Vice-Chair of the Intergovernmental Panel on Climate Change (IPCC), I am no stranger to the climate crisis. But Greta has raised awareness about the climate crisis to a level never before seen.

I first saw Greta at the Katowice Climate Conference in December 2018. She was alone on a podium at a United Nations climate conference, answering questions from a host and the audience. She has no cards, but answers without hesitation, sometimes simply saying: "*I don't know, I'm only 15 years old, ask the experts.*" But she already knows a lot. She also recognizes that "*no one is too small to make a difference.*" I am blown away by the accuracy of her words, based on a serious knowledge of the mechanisms at work and the causes of the climate crisis.

A few days later, I heard Greta addressing the diplomats and negotiators in the plenary room. "*The year 2078, I will celebrate my seventy-fifth birthday. If I have children, then maybe they will spend that day with me. Maybe they will ask about you. Maybe they will ask why you didn't do anything, while there still was time to act. You say that you love your children above everything else. And yet you are stealing their future.*" The video of her speech was shared around the world.

In all my years working on climate change in the United States, Belgium, and with the IPCC, and having participated in each meeting of the UN's climate treaty, I had never heard such a strong and moving climate speech. Her heart was talking, and she was right.

Greta read the IPCC reports. She understands the immense risks that the accumulation of greenhouse gases poses to life on Earth. She does not confuse the ozone hole, air pollution or the daily weather forecast with the climate crisis.

Few leaders can say the same.

Greta speaks without any shame about her Asperger's syndrome. In fact, it probably helps her see the contradiction between the speeches of world leaders and their actions. With great emotional intelligence, she expresses her fear of this gap. A fear that is shared by millions of young people.

The adults who blame Greta for sharing her concern would do better to listen to this fear, and to take action. Many adults defend themselves by attacking or devaluing youth. They try to make people believe that the decarbonization Greta is demanding implies a return to the Stone Age and poverty. They believe that they must protect the status quo of unlimited economic growth that relies on fossil fuels—their status quo.

Clearly these critics of Greta and the climate strikers have not read the IPCC reports. A just energy and ecological transition can lead to a better quality of life for everyone, particularly if it's integrated with the pursuit of the 17 Sustainable Development Goals adopted by the United Nations in 2015. The recent UN Global Sustainable Development Report has just emphasized this point.

Greta is no longer alone, as she was at the beginning of the movement she started. In many countries, including the United States, young people are rising to the challenge through dialogue and collective non-violent action. Greta's leadership and ability to speak truth to power has earned her a nomination for the Nobel Peace Prize...and I hope she receives this prize of prizes.

We have so much to learn from them. It is our generation's short-term thinking and actions that have brought us to the brink. We must listen to these young people who dare to speak about their fears for their future, and stop believing that we know better than they do. We must change our attitudes, and utilize the technological, economic, and political tools that will make it possible to transform young people's fears into a force of hope for a sustainable and just future.

Those who refuse to do this have signed their own death wish – for themselves, their children and their grandchildren.

I support Greta because she supports life.

[1] Adapted from the tribune published in « Le Monde » on Octobre 1st 2019 (https://www.lemonde.fr/idees/article/2019/10/01/jean-pascal-van-ypersele-greta-derange-comme-la-verite_6013798_3232.html); this text is available on www.climate.be/vanyp

Ecrit pour les jeunes (et moins jeunes), avec des liens vers des ressources utiles

Disponible gratuitement, 6X/an: www.plateforme-wallonne-giec.be

To go further :

- www.climate.be/vanyp : my slides (under « conferences) & my letter for Greta
- www.ipcc.ch : IPCC
- sustainabledevelopment.un.org/gsdr2019
  GSDR2019: Global Sustainable Development Report 2019
- www.skepticalscience.com : answers to the merchants of doubt arguments
- www.plateforme-wallonne-giec.be : IPCC-related in French, Newsletter, latests on SR15, basic climate science
- **Twitter: @JPvanYpersele & @IPCC_CH**

Jean-Pascal van Ypersele
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Also:

- www.wechangeforlife.org :
  250 Belgians experts speak

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