Climate change:
What you need to know

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IPCC Vice-Chair from 2008 to 2015

Twitter: @JPvanYpersele

« EPFL Summer school on energy », Champéry, Switzerland, 10 June 2019

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

Why the IPCC ?

Established by WMO and UNEP in 1988

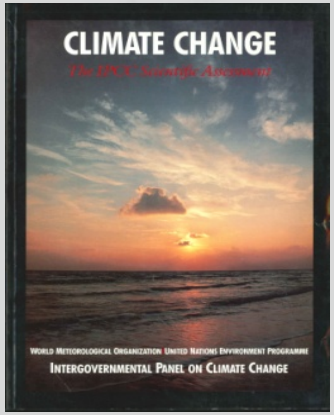
to provide **policy-makers** with an **objective source of information** about

- causes of climate change,
- potential environmental and socio-economic impacts,
- possible response options (adaptation & mitigation).

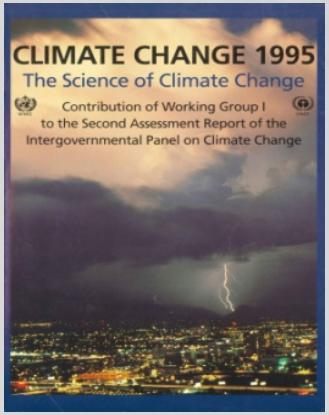
WMO=World Meteorological Organization

UNEP= United Nations Environment Programme

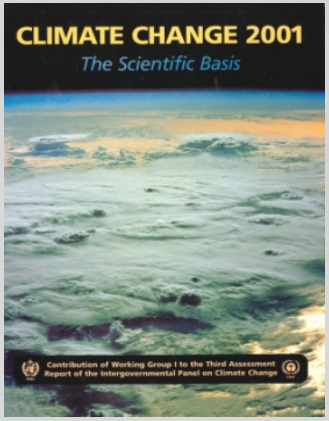
IPCC Assessment Reports



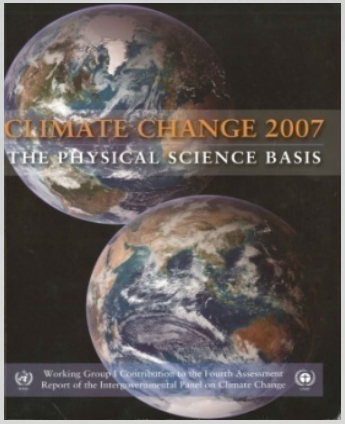
FAR 1990



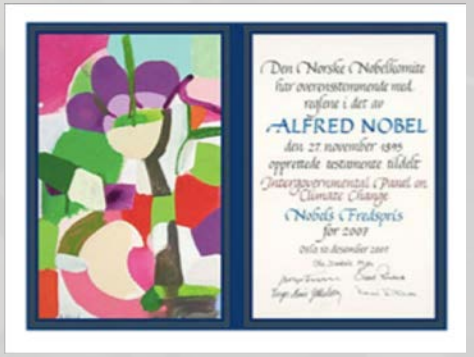
SAR 1995

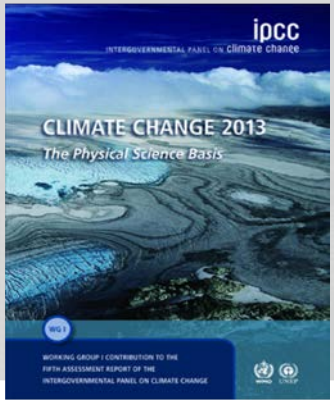


TAR 2001



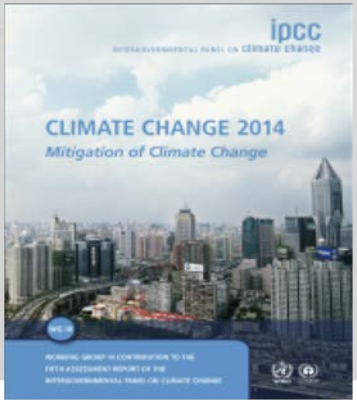
AR4 2007





AR5 WGI 2013

AR5 WGII 2014



AR5 WGIII 2014

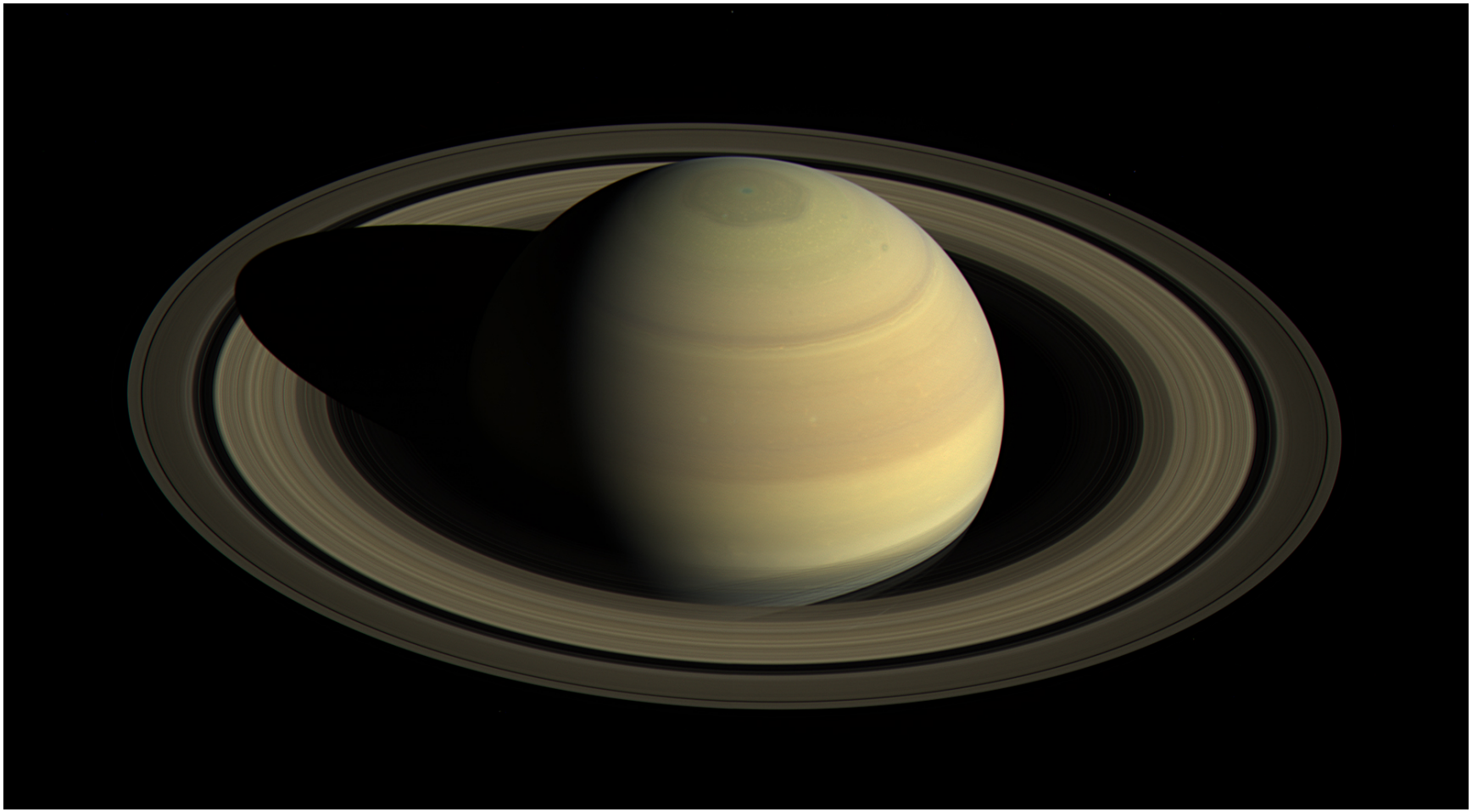
IPCC AR5 Synthesis Report

ipcc
INTERGOVERNMENTAL PANEL ON climate change

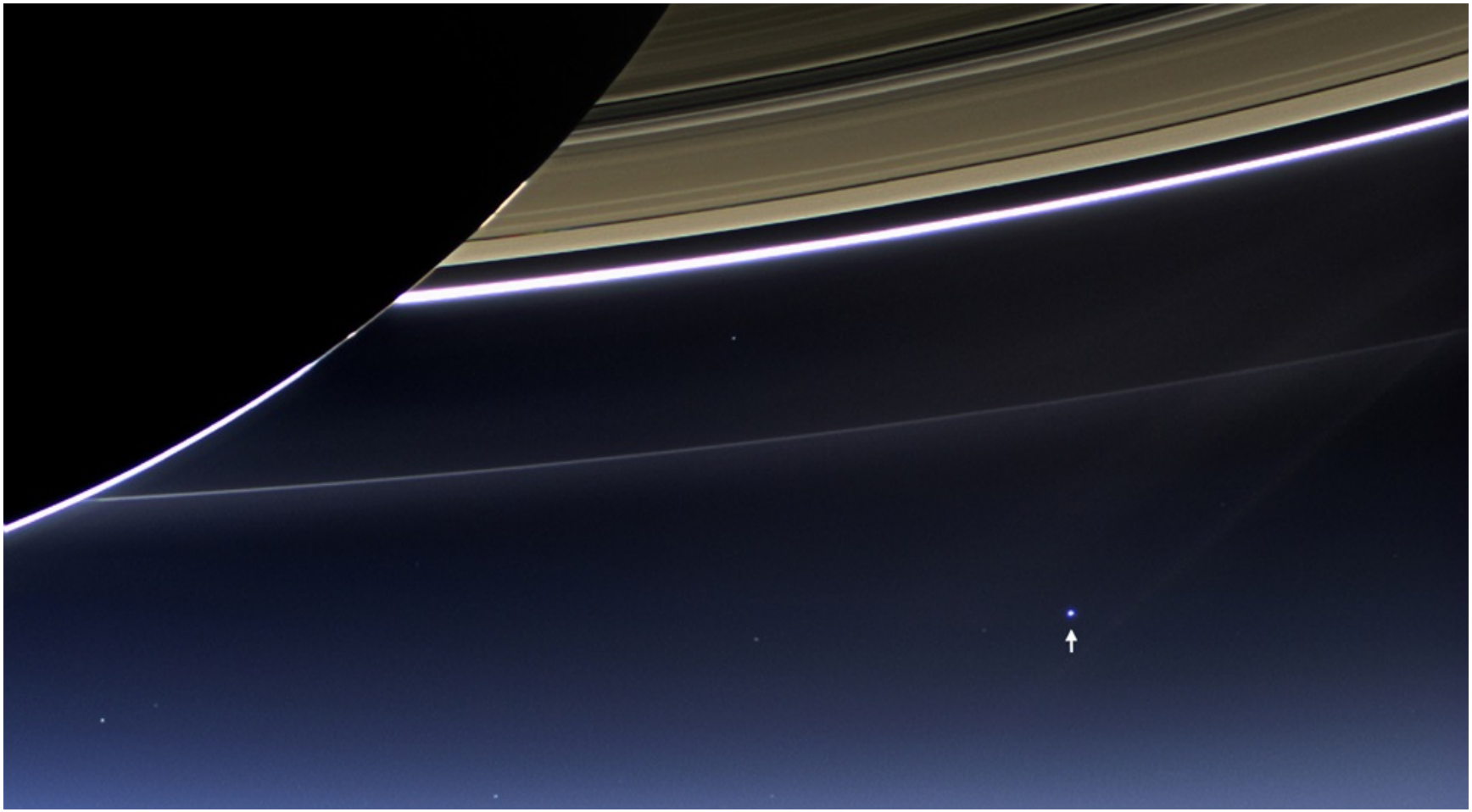
WMO UNEP

Reminder: There is no planet B

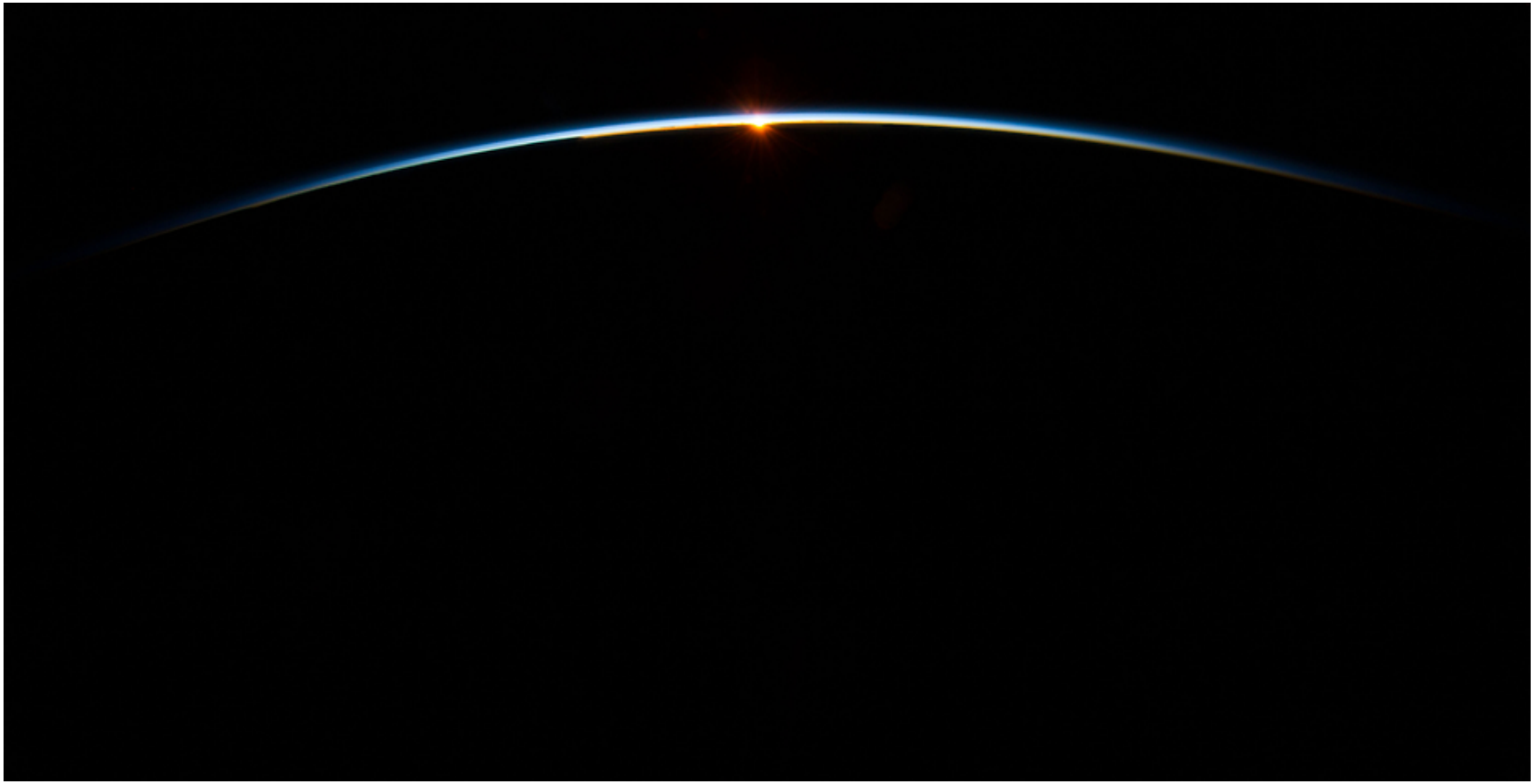
Saturn, as seen on 25-4-2016 from a 3 million km distance by the Cassini satellite launched in October 1997, 40 years after Sputnik



That small blue dot is the Earth, 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)



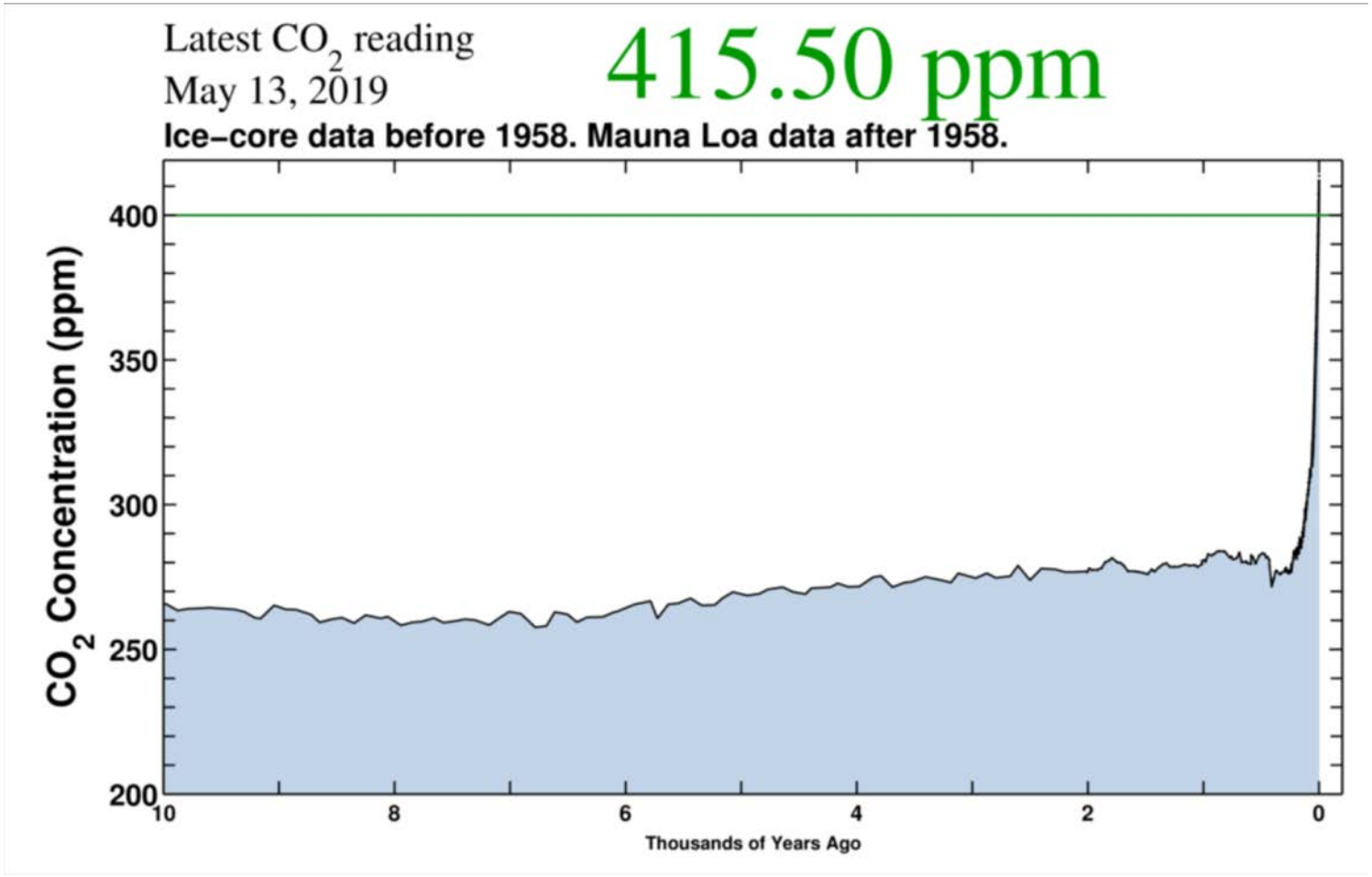
Jean-Pascal van Ypersele
(vanyp@climate.be)

Fact n° 1: 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

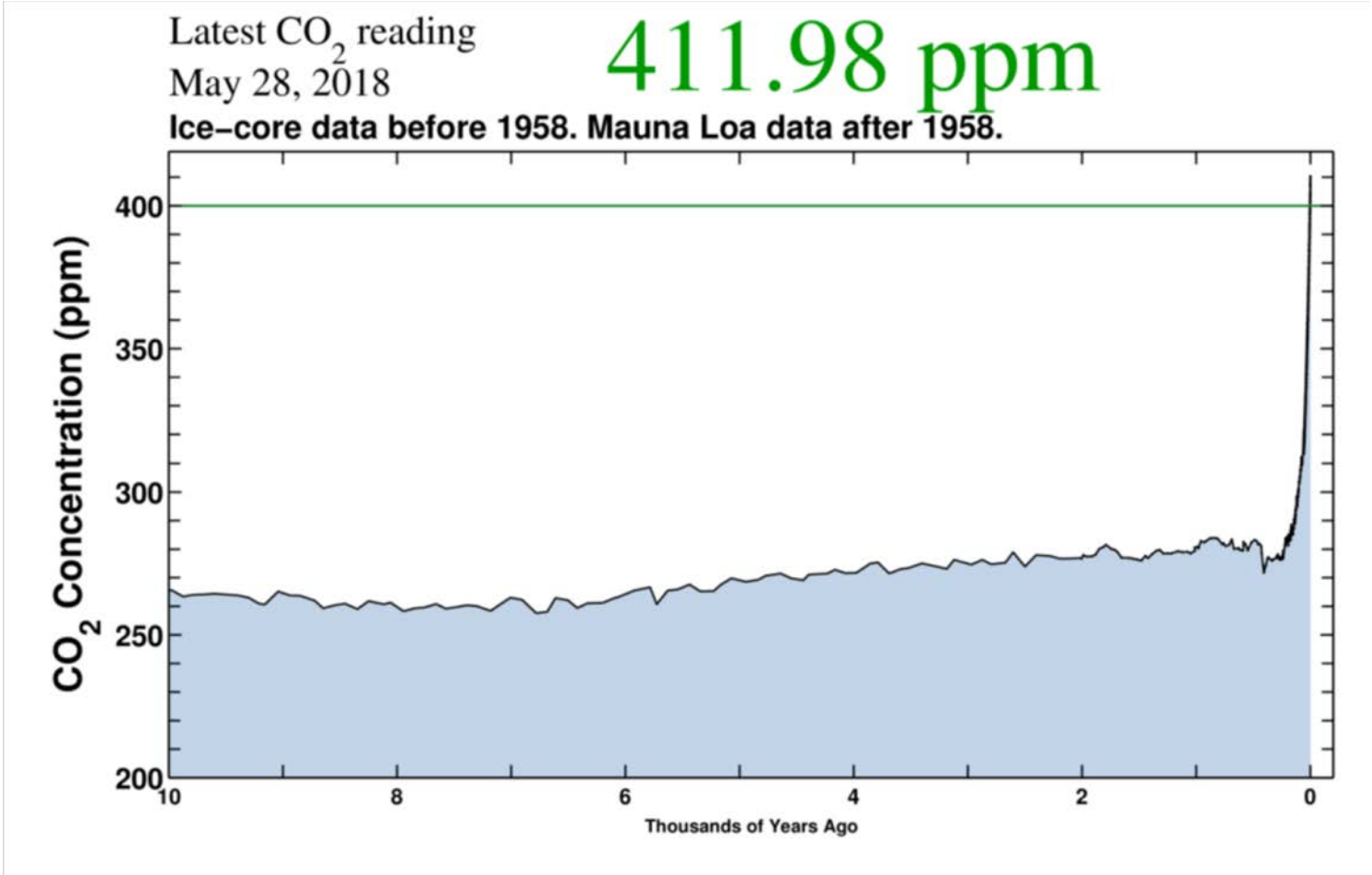
@JPvanYpersele

CO_2 Concentration, 13 May 2019 (Keeling curve)



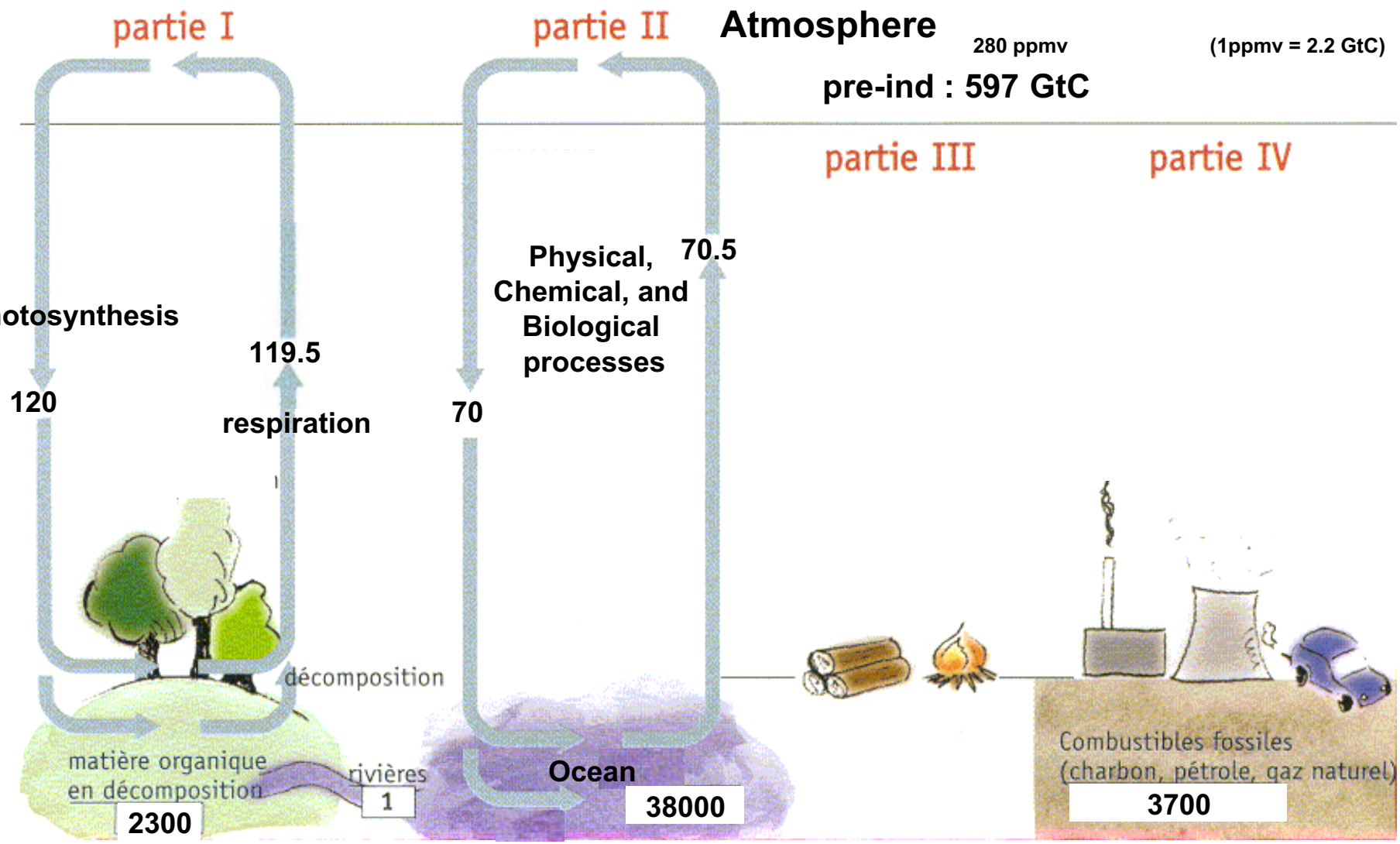
Source: scripps.ucsd.edu/programs/keelingcurve/

CO_2 Concentration, 28 May 2018 (Keeling curve)



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

Carbon cycle: unperturbed fluxes

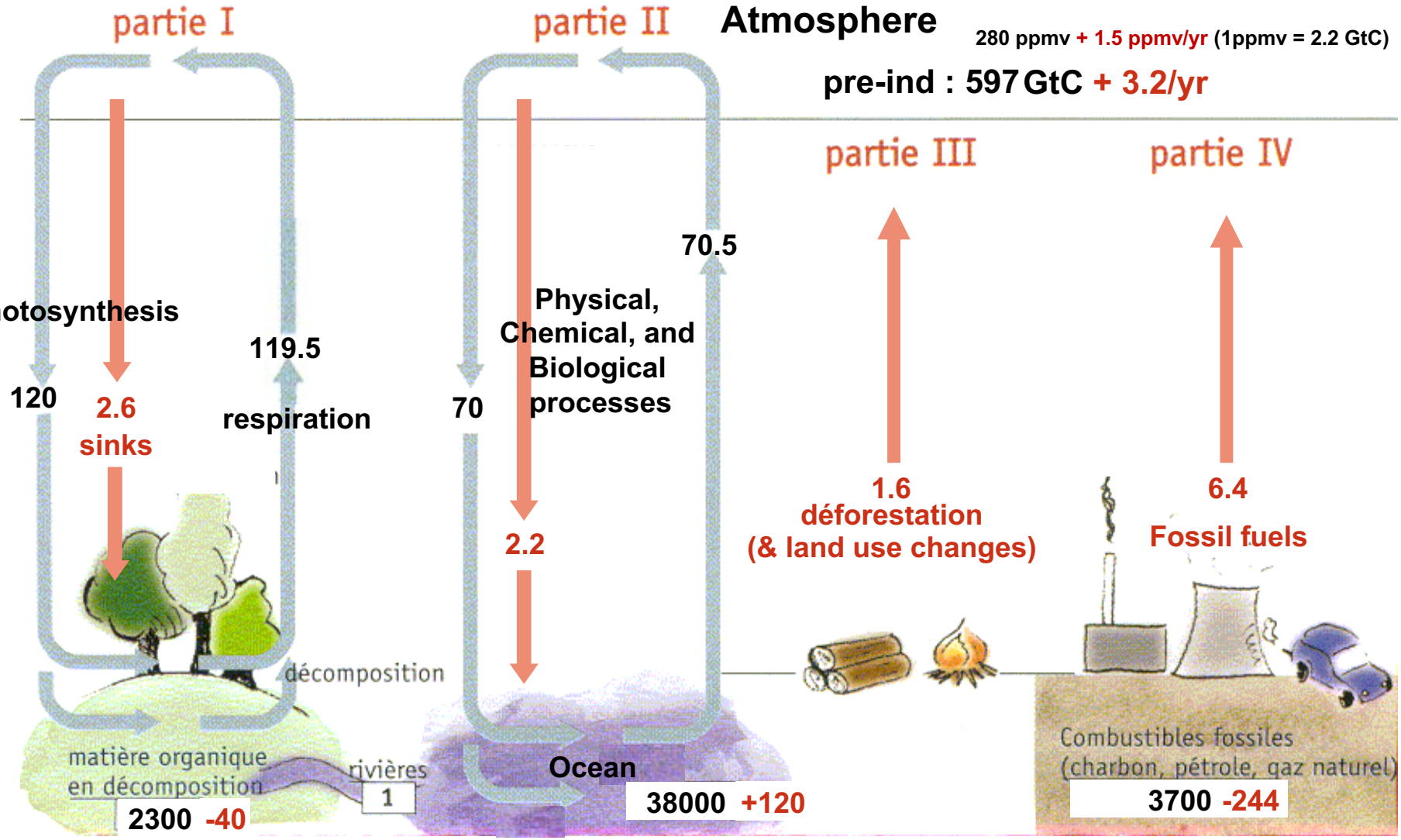


Units: GtC (billions tons of carbon) or GtC/year (multiply by 3.7 to get $GtCO_2$)

vanyp@climate.be

Carbon cycle: perturbed by human activities

(numbers for the decade 1990-1999s, based on IPCC AR4)



Stocks!

Units: GtC (billions tons of carbon) or GtC/year

vanyp@climate.be

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

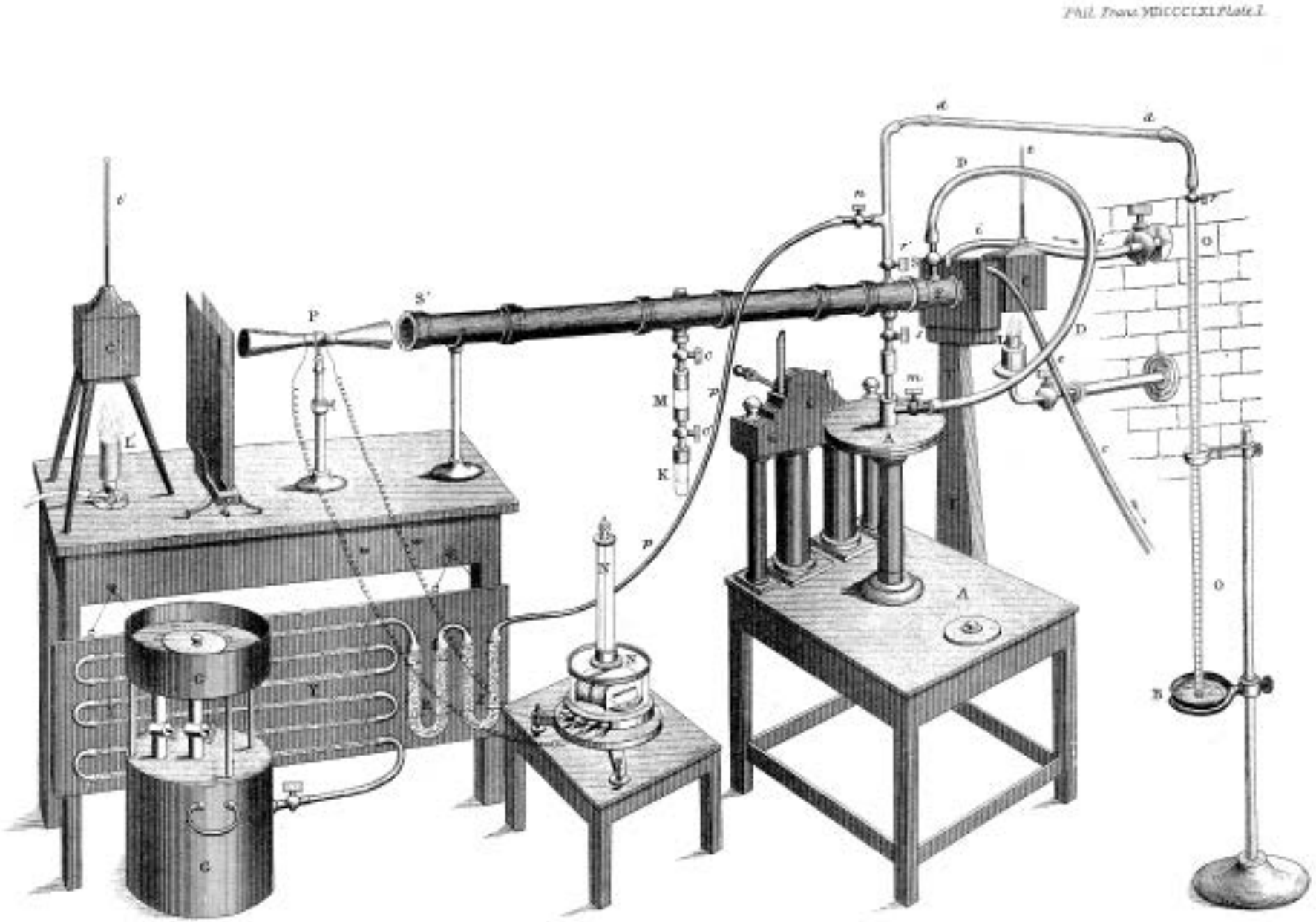
Table 1. Reconstruction and prediction of atmospheric CO_2 contents based on fuel consumption data.

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.

GREENHOUSE EFFECT?

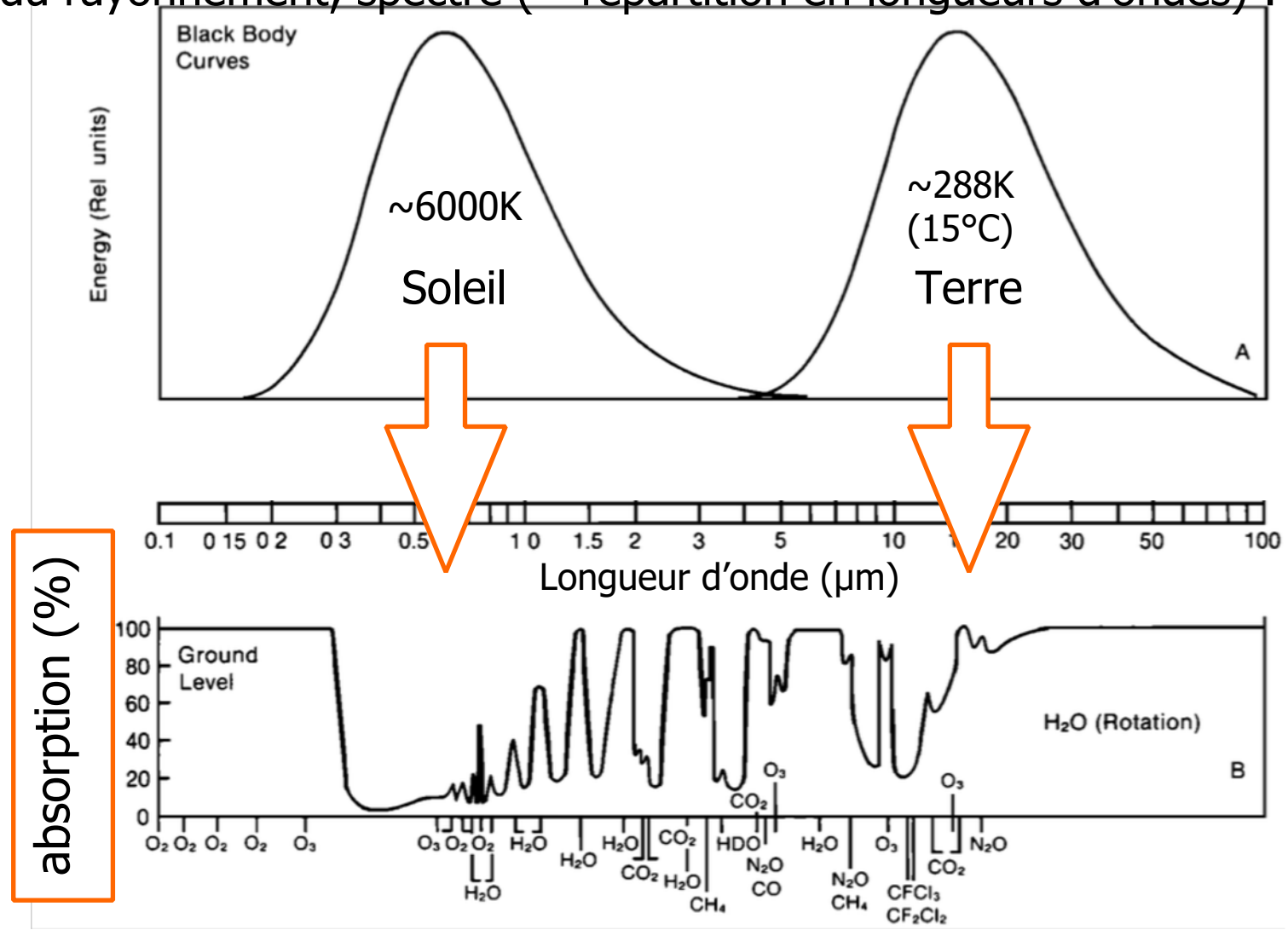
… un peu d'analogie,
mais grande
différence
de principe



Tyndall (1861) mesure l'absorption du rayonnement par les gaz

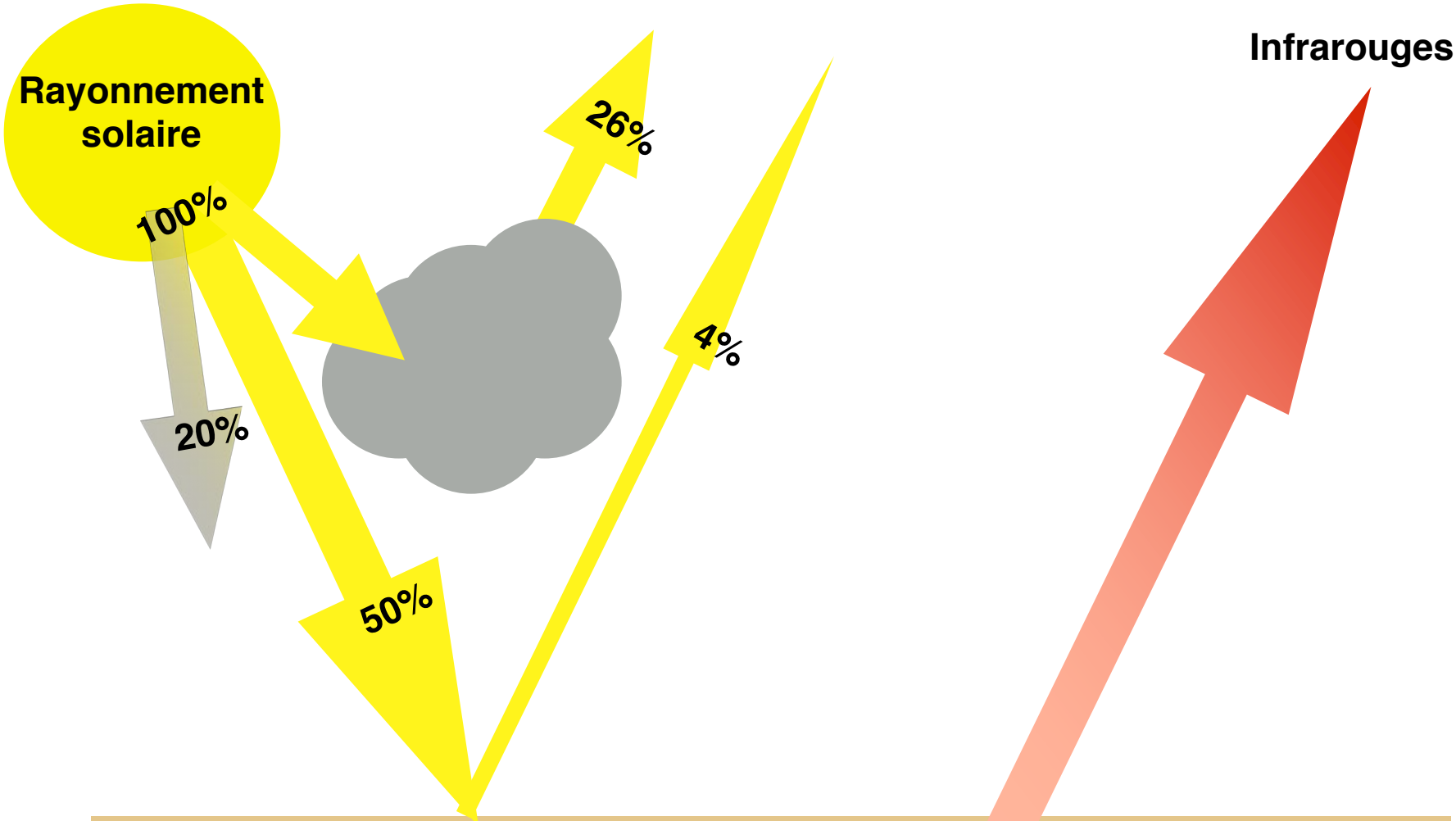
Le rayonnement solaire passe largement l'atmosphère, mais l'infrarouge est largement absorbé

Source du rayonnement, spectre (= répartition en longueurs d'ondes) :

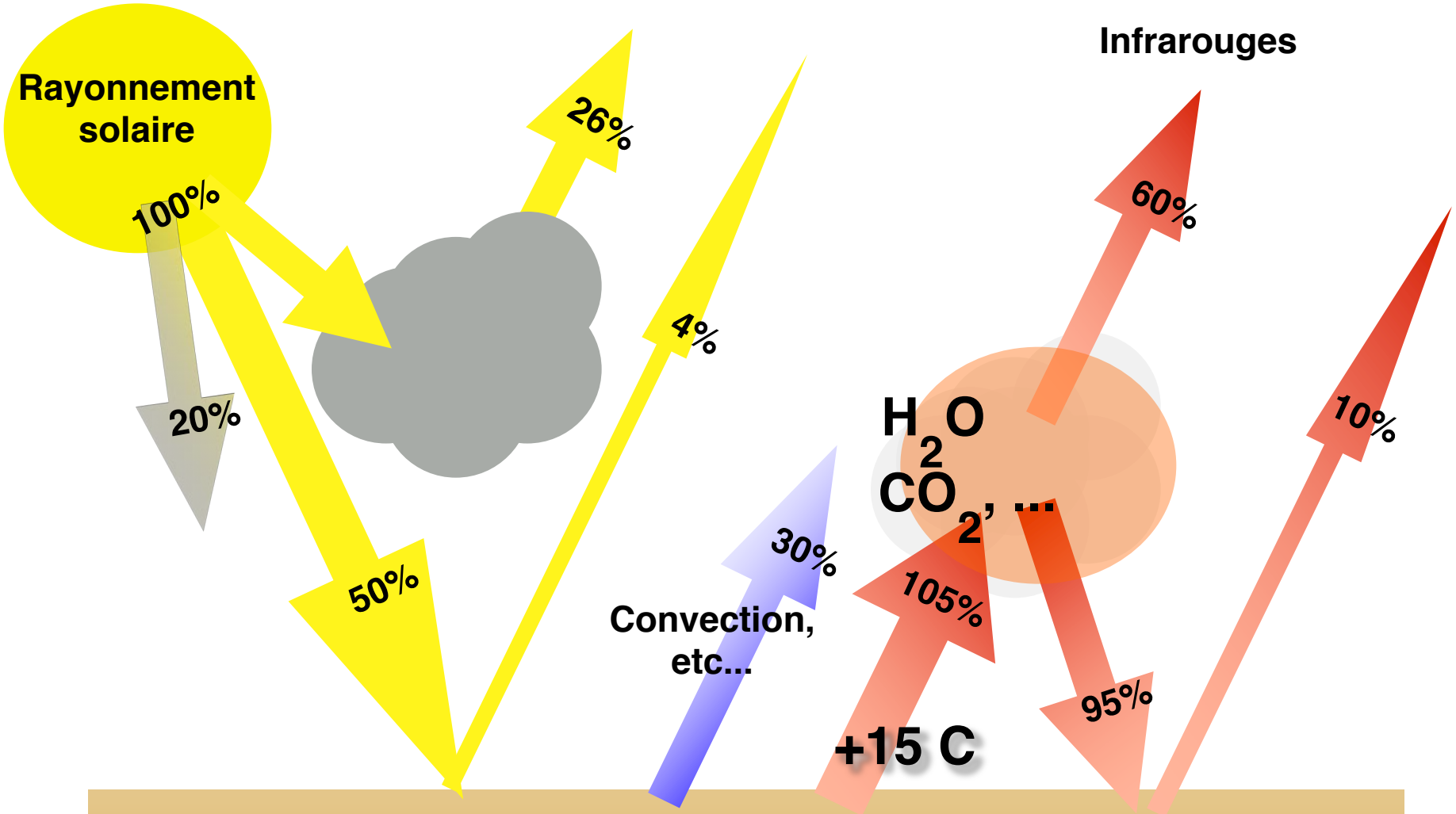


Source : J. Mitchell, Reviews of Geophysics, 1989

Energie et effet de serre



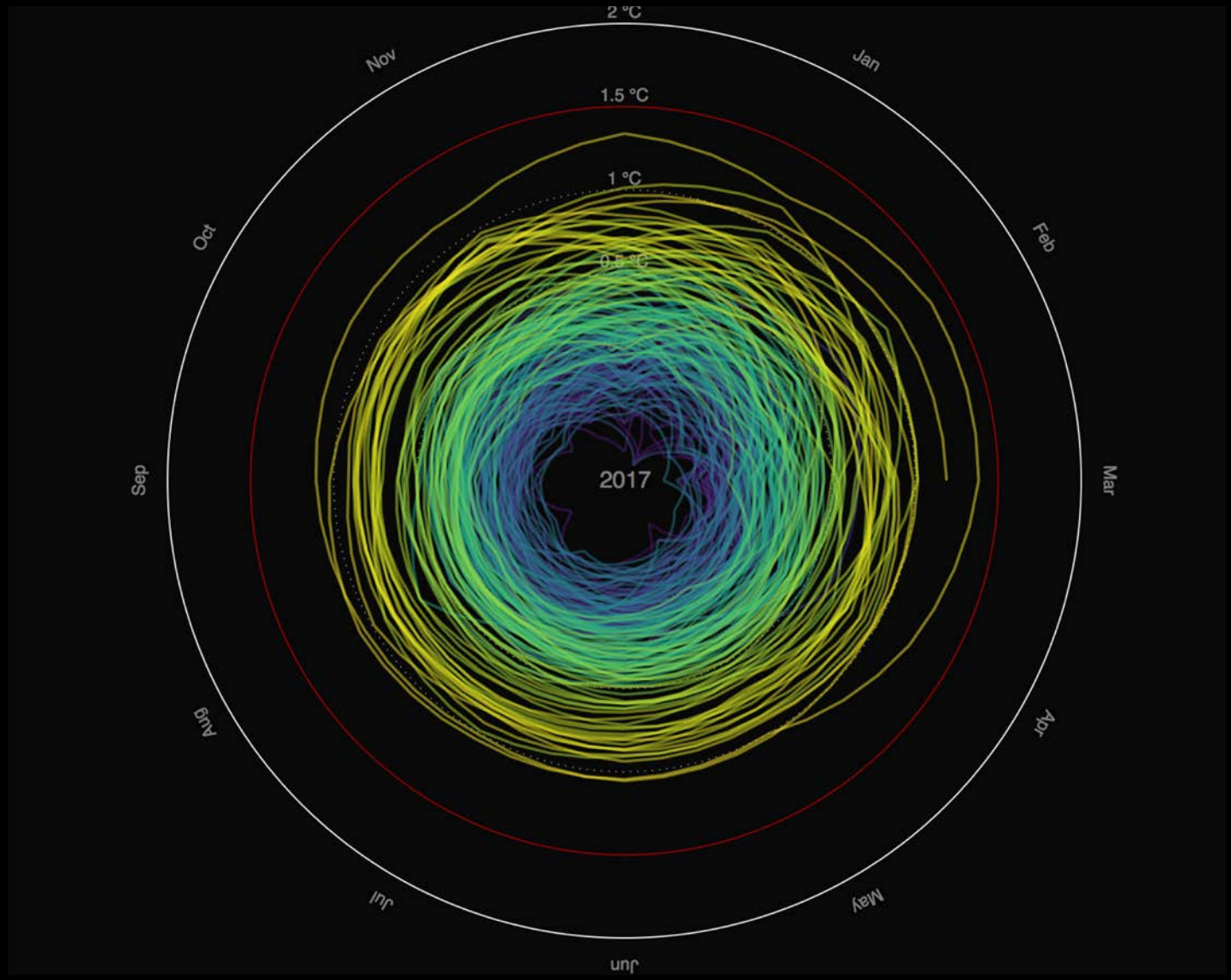
Energie et effet de serre



Source : **AR4**

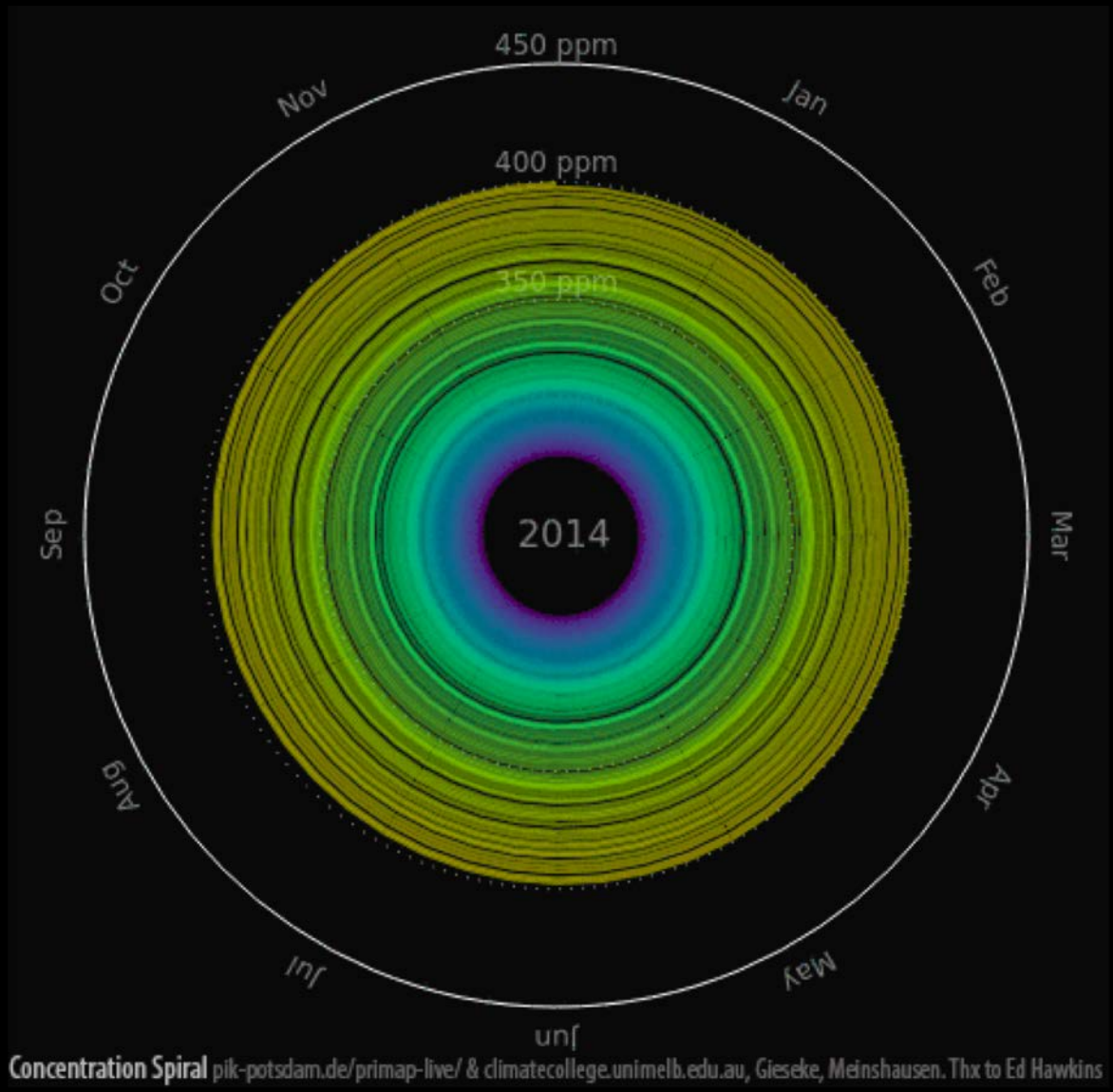
Fact n° 2: We have changed the composition of the atmosphere and disturbed the climate system

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

CO_2 concentration spiral: the insulation thickens!

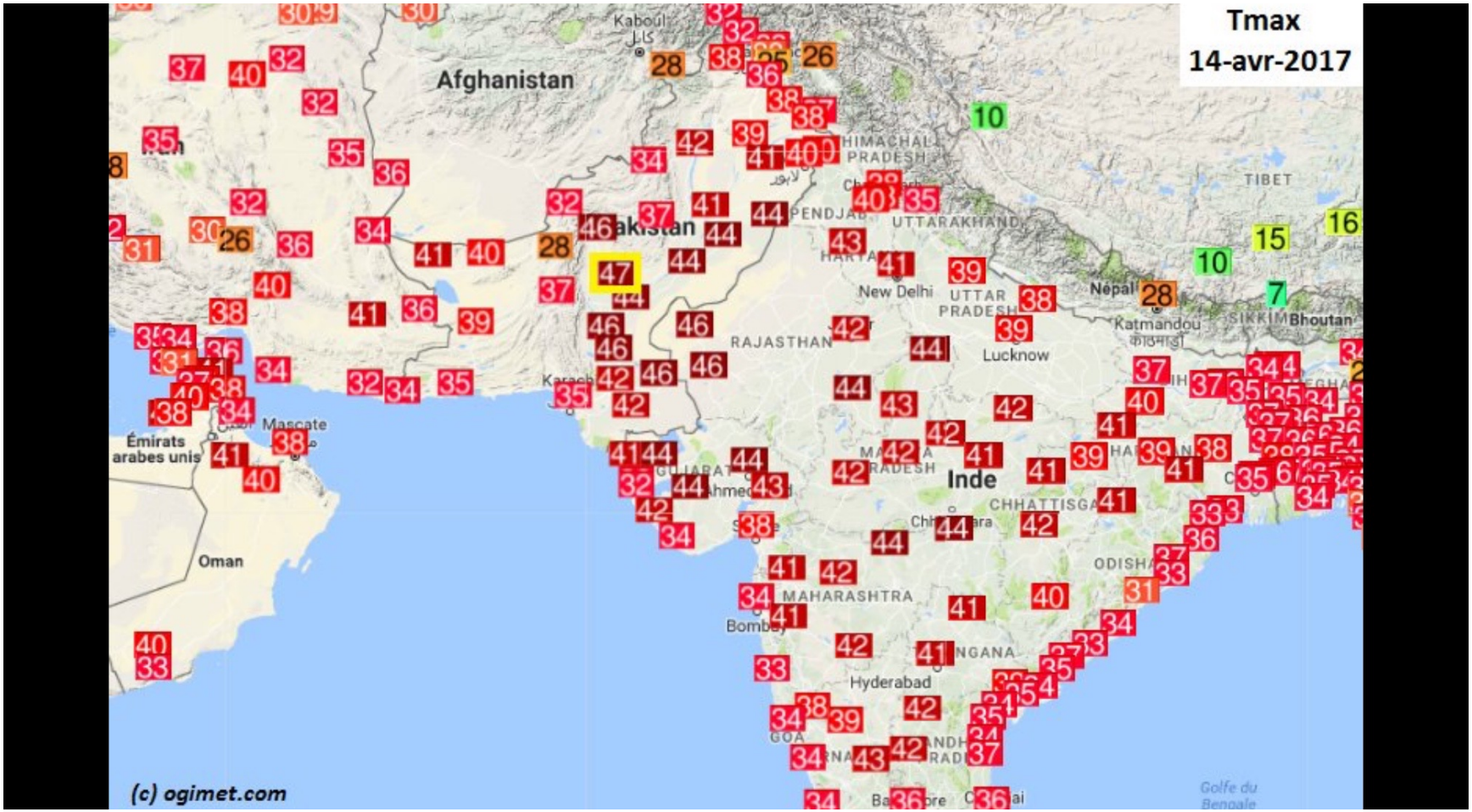


CO_2 concentration spiral 1851-2014 (ppm), by Gieseke & Meinshausen,
Available on http://pik-potsdam.de/primap-live

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

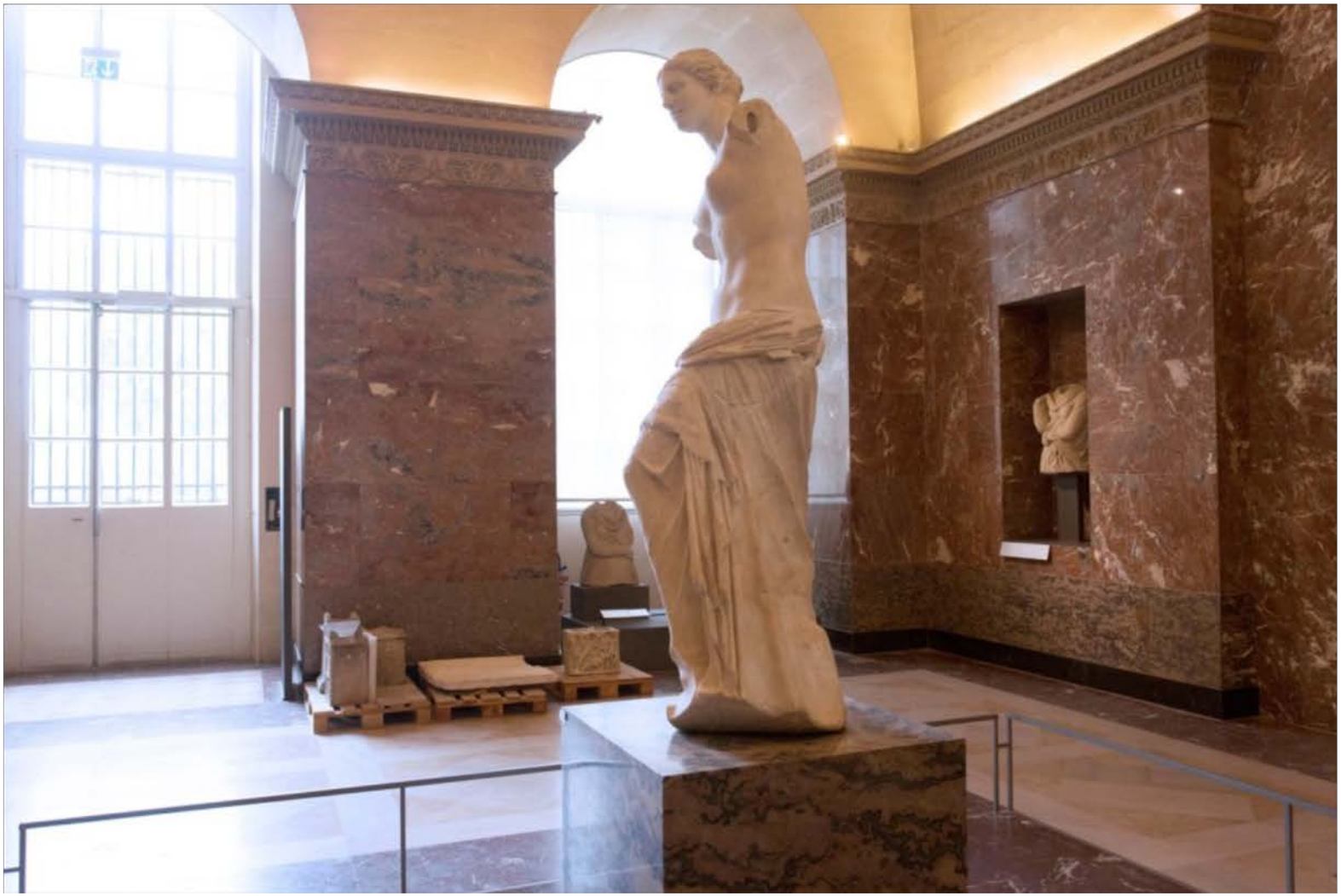
Heat waves kill



Six weeks worth of rain has fallen in three days over parts of France (May 2016)

Markus Schreiber / AP

The Louvre and Musée d'Orsay in Paris evacuated their vaults (May 2016)



Geoffroy Van Der Hasselt / Getty Images

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

Source: FEMA, 24-9-2017

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

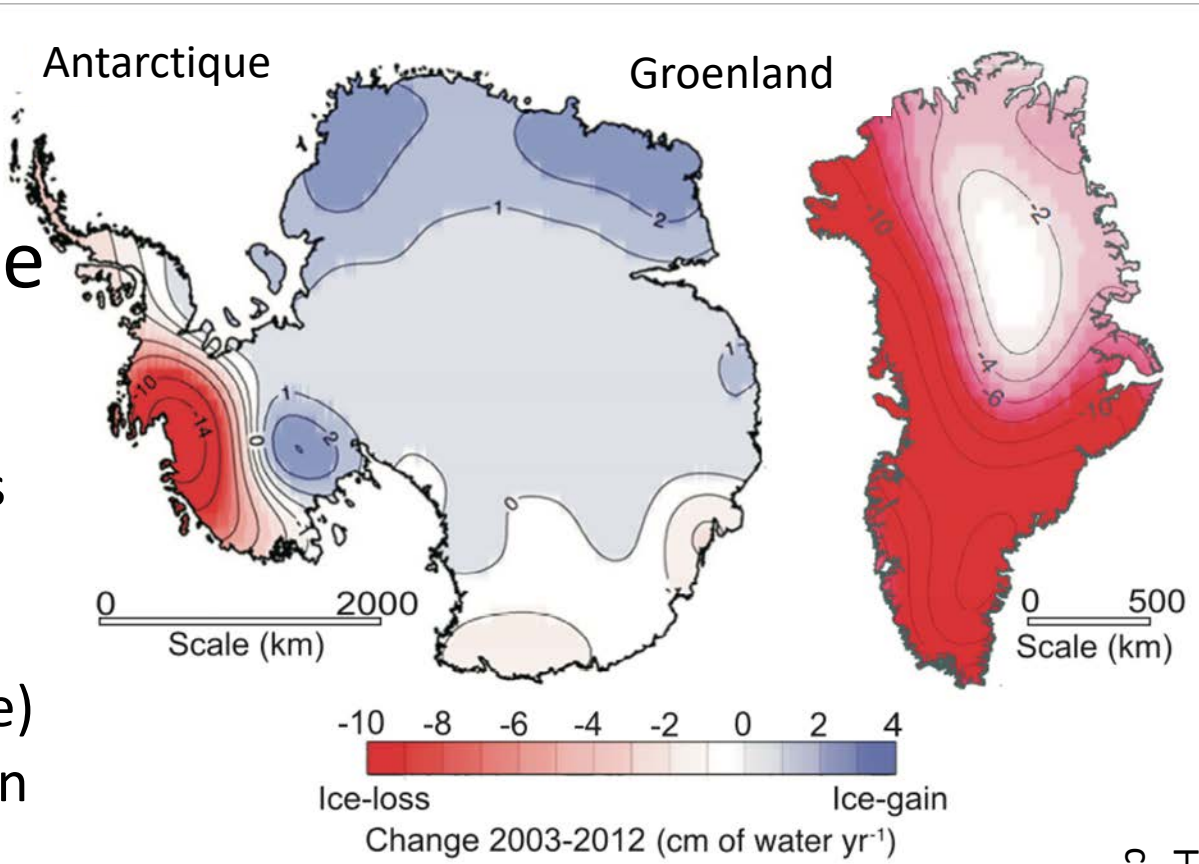
Plateau Glacier (2003) (Alaska)

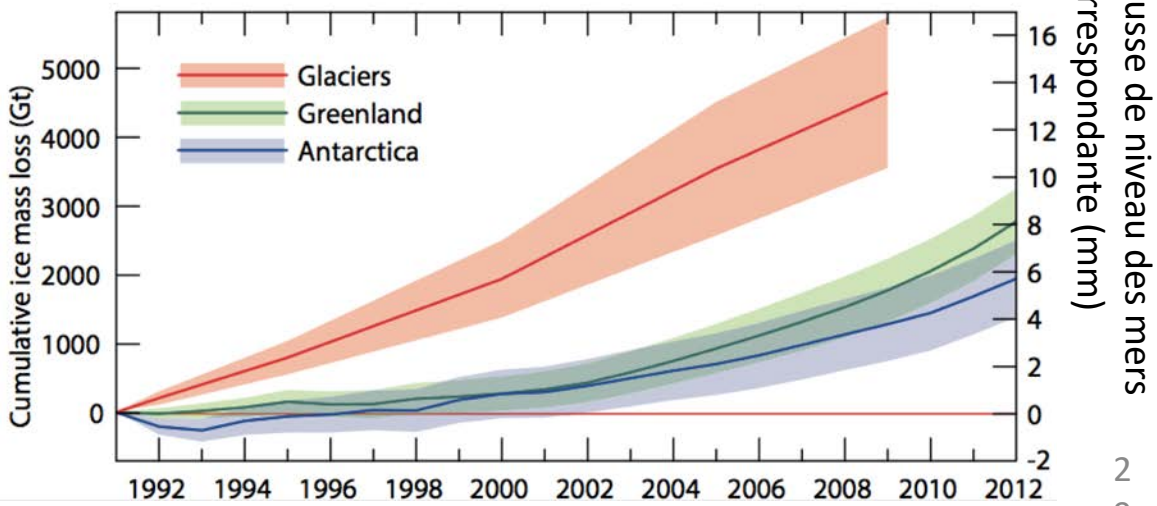
http://www.weather.com/news/science/environment/alaskas-glaciers-capturing-earth-changing-our-eyes-20131125?cm_ven=Email&cm_cat=ENVIRONMENT_us_share

Le Groenland et l'Antarctique perdent de la glace

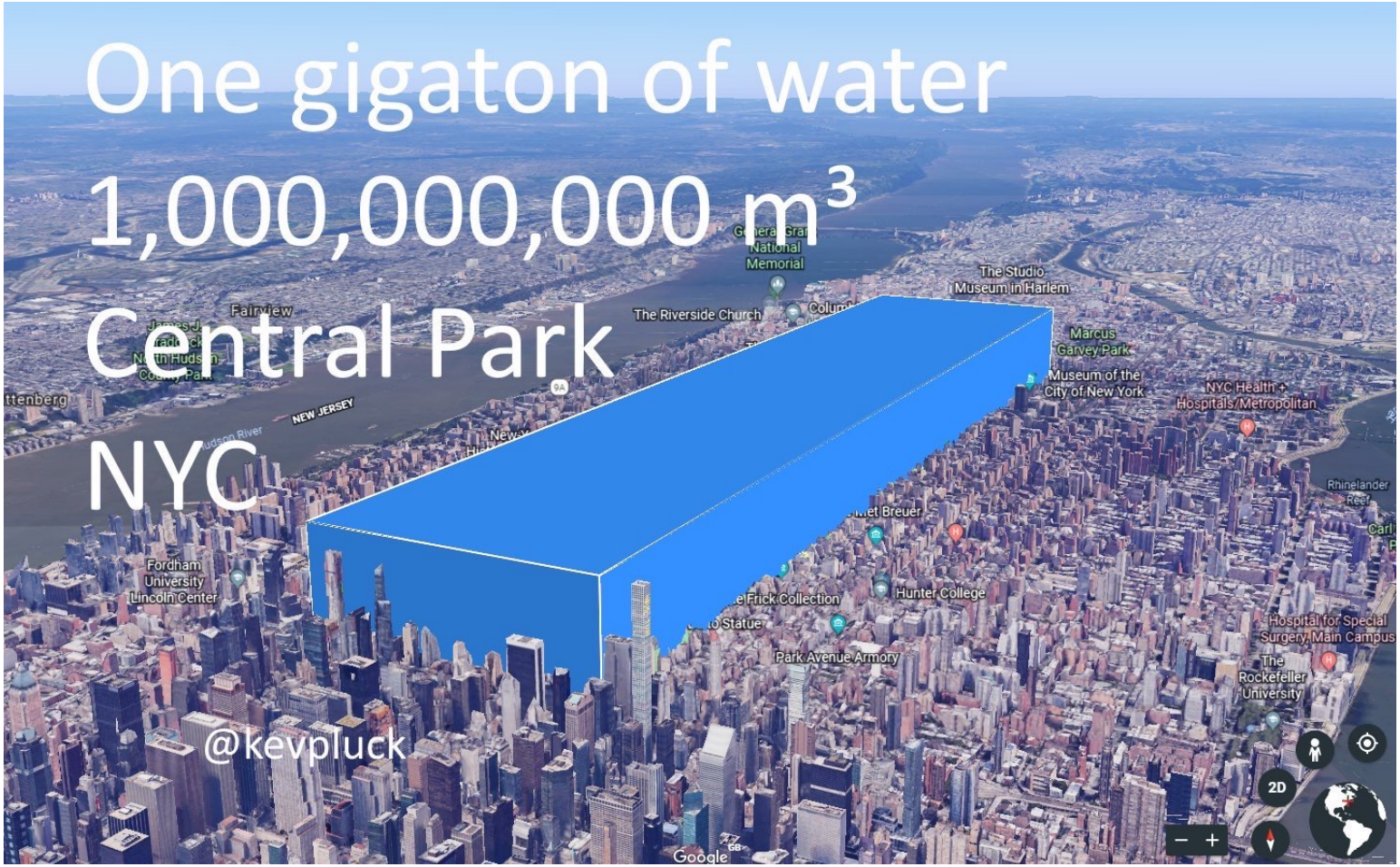
- Au Groenland, la perte de masse a lieu près des côtes car l'altitude est plus élevée au centre (environ 3000m de glace) donc il y fait plus froid en surface
- La figure ci-contre montre l'évolution de la contribution à la hausse du niveau des mers, comparée à celle des glaciers de montagne

Source: IPCC AR5 WG1 fig TS.3





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



Source: @Kevpluck, June 2018

Fact n° 3: 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

@JPvanYpersele

Modèles climatiques

Atmosphère et surface

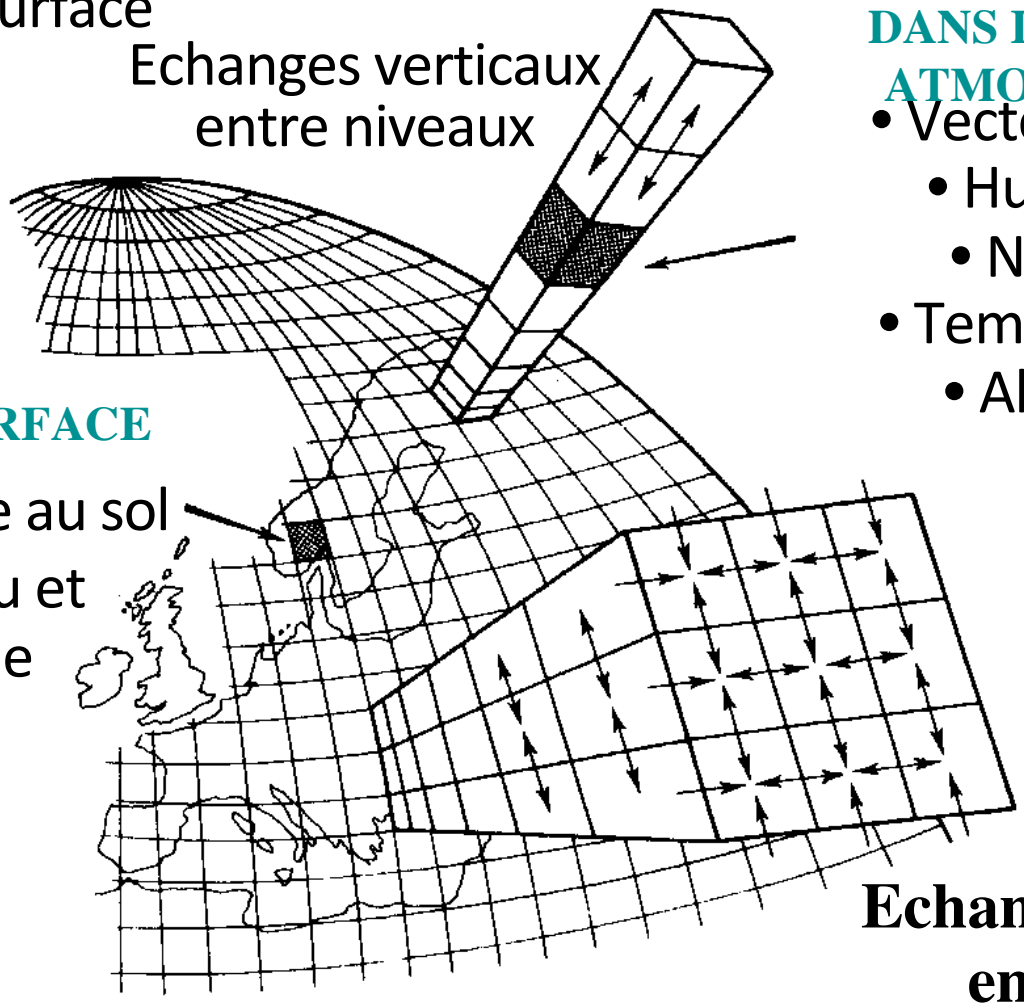
Echanges verticaux entre niveaux

DANS LA COLONNE ATMOSPHERIQUE

- Vecteurs vent
- Humidité
- Nuages
- Température
- Altitude

A LA SURFACE

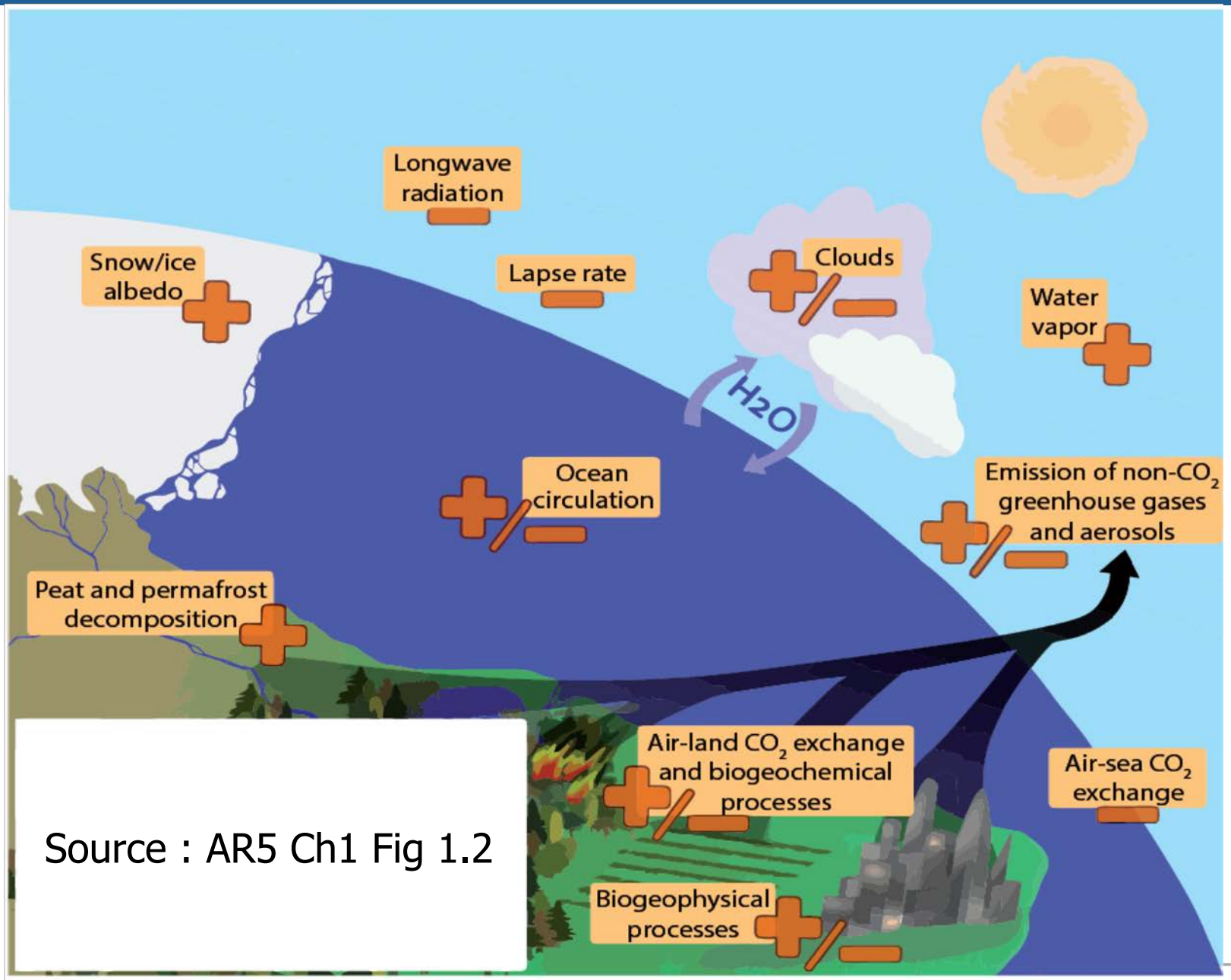
- Température au sol
- Flux d'eau et d'énergie



Echanges horizontaux entre colonnes

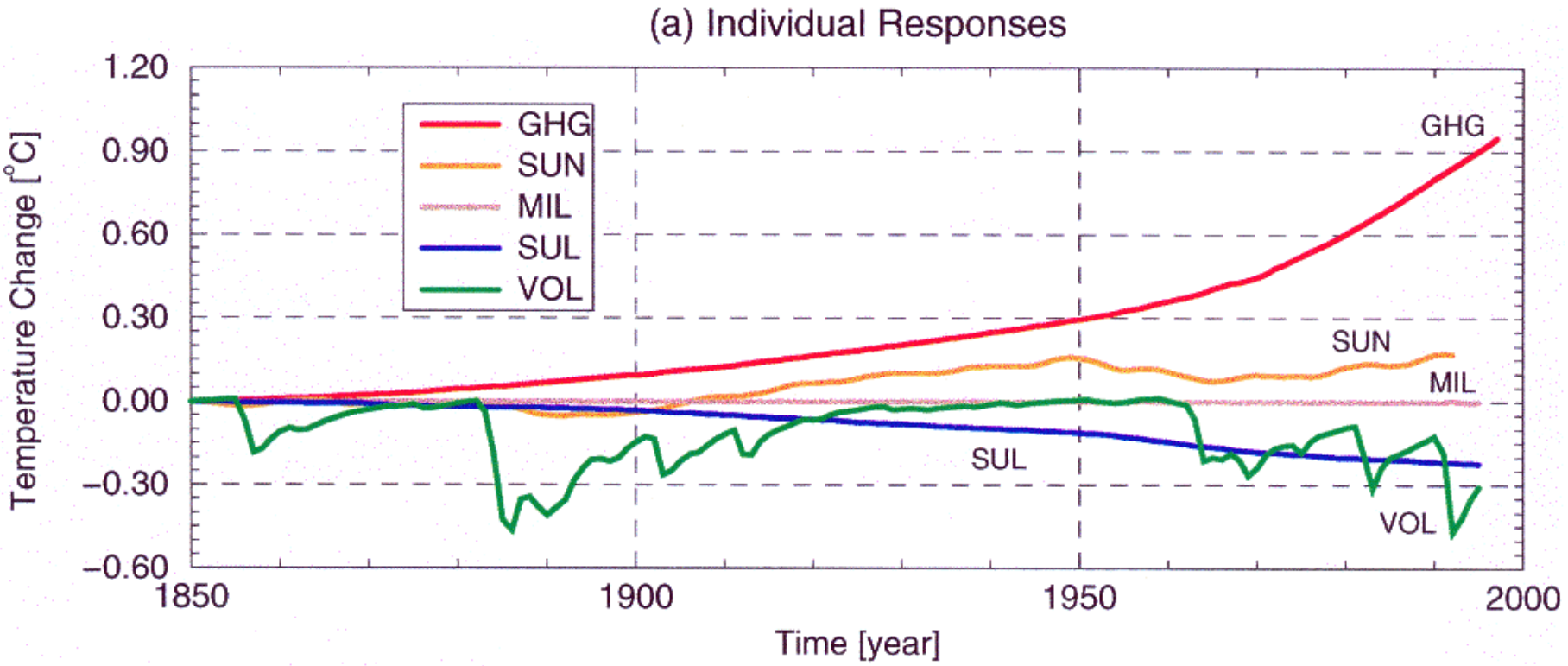
Résolution typique ~ 2°x 2°(modèle global, atmosphère)
Intervalle de temps typique : ≤ 30 minutes

Synthesis of main climate feedbacks (IPCC AR5)



Source : AR5 Ch1 Fig 1.2

Effet des différents facteurs sur le modèle 2D de LLN



Bertrand et al. 2001

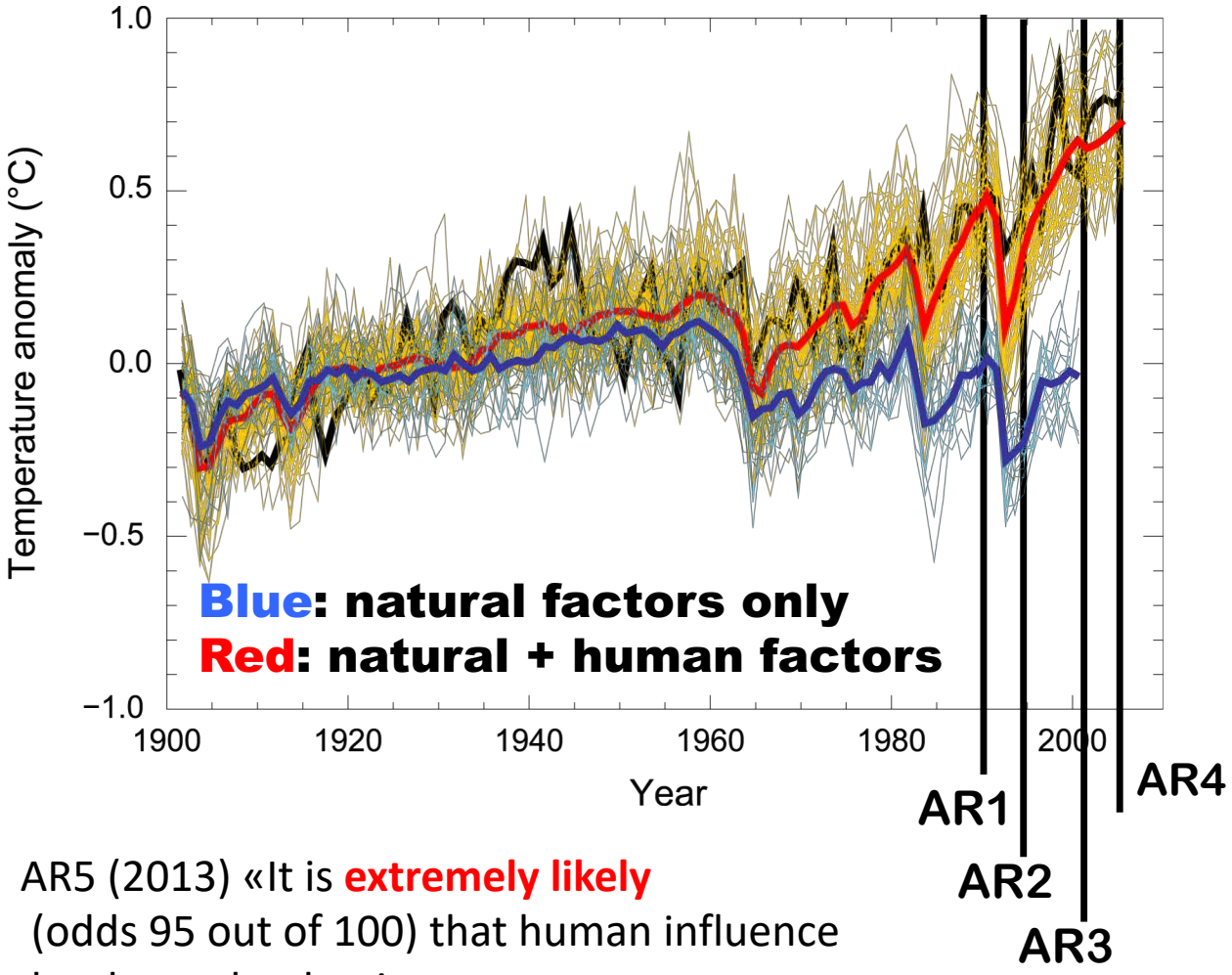
A Progression of Understanding: Greater and Greater Certainty in Attribution

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

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

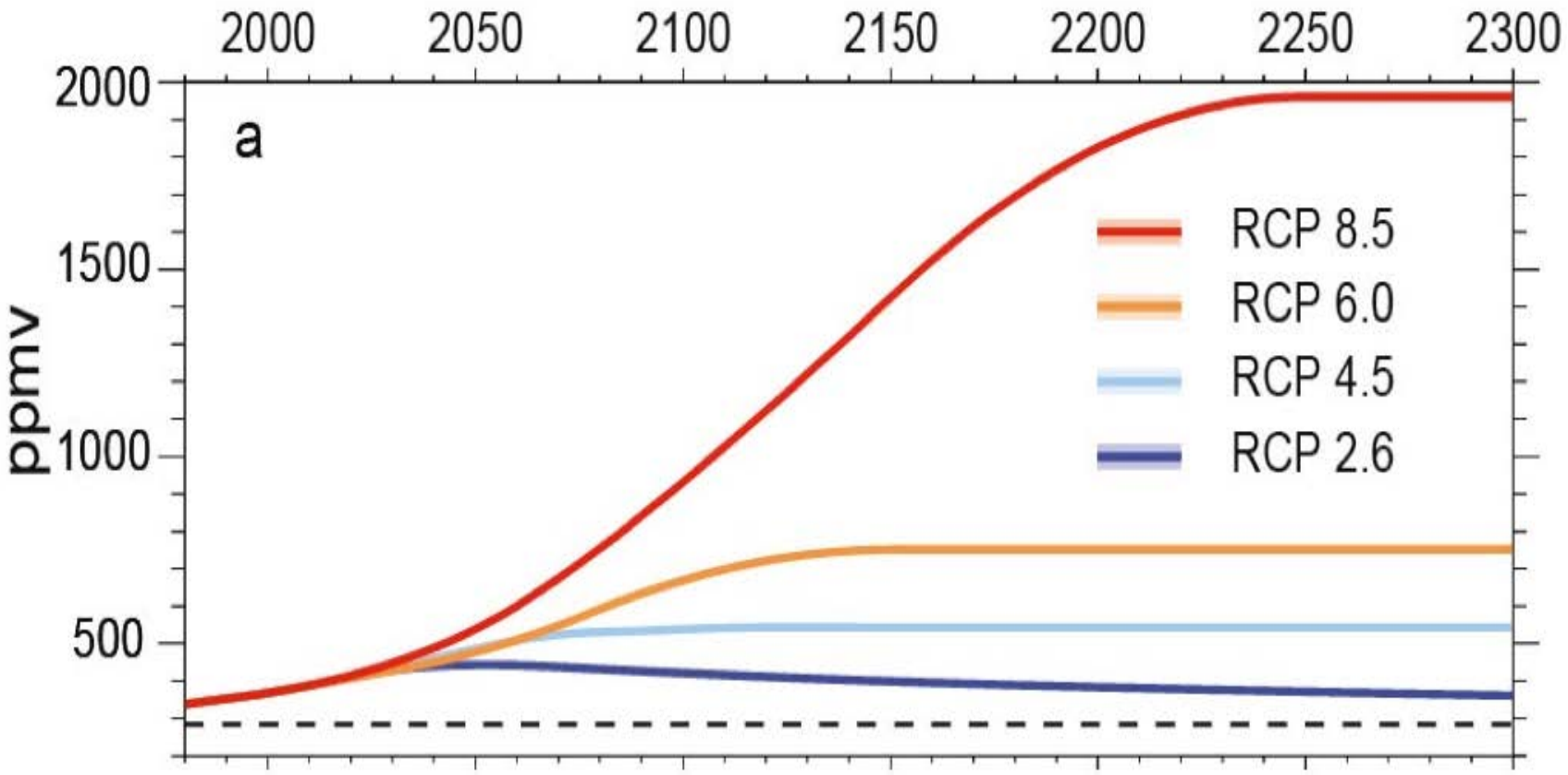
AR3 (2001): "most of the warming of the past 50 years is **likely** (odds 2 out of 3) due to human activities"

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… »

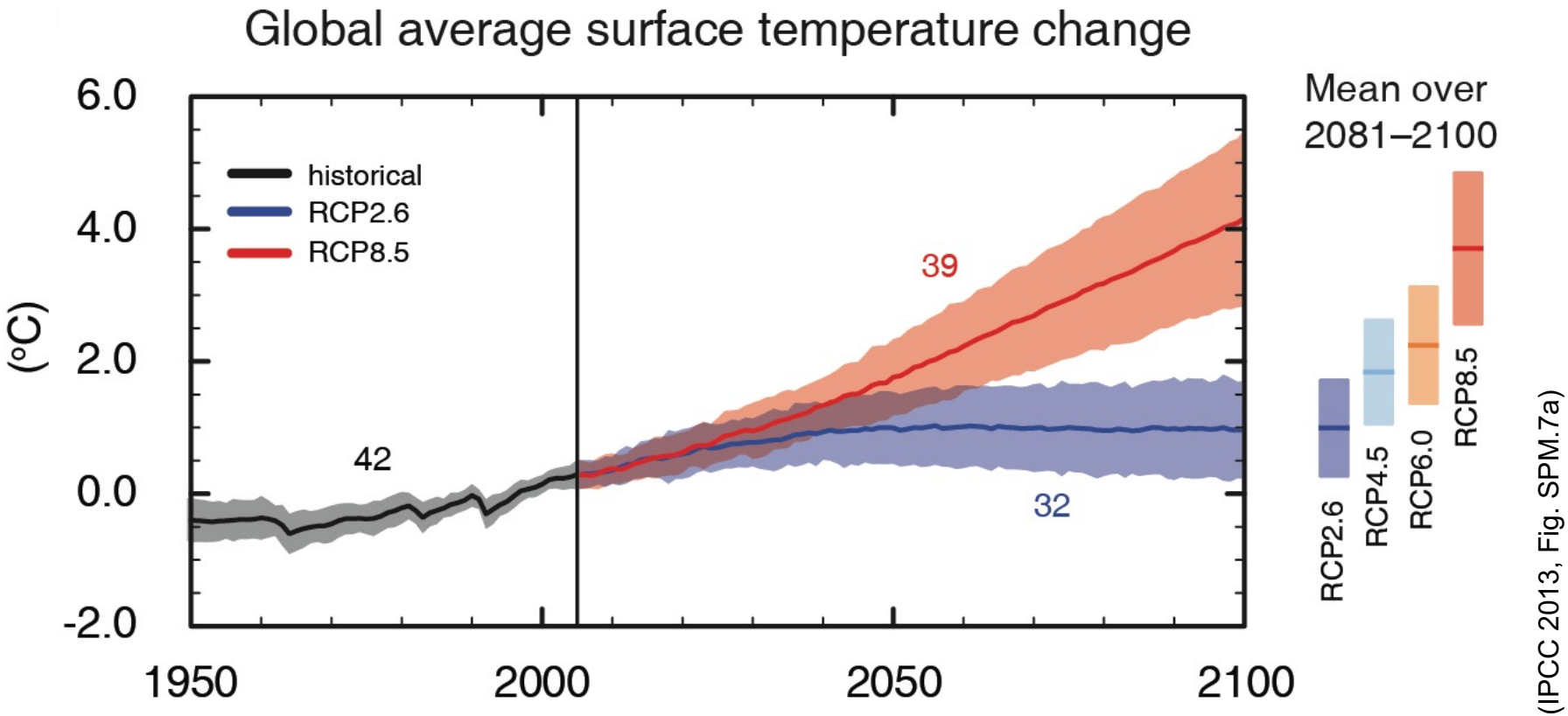
AR5 RCP: Atmospheric CO_2 concentration



Most CMIP5 runs are based on the concentrations, but emissions-driven runs are available for RCP 8.5

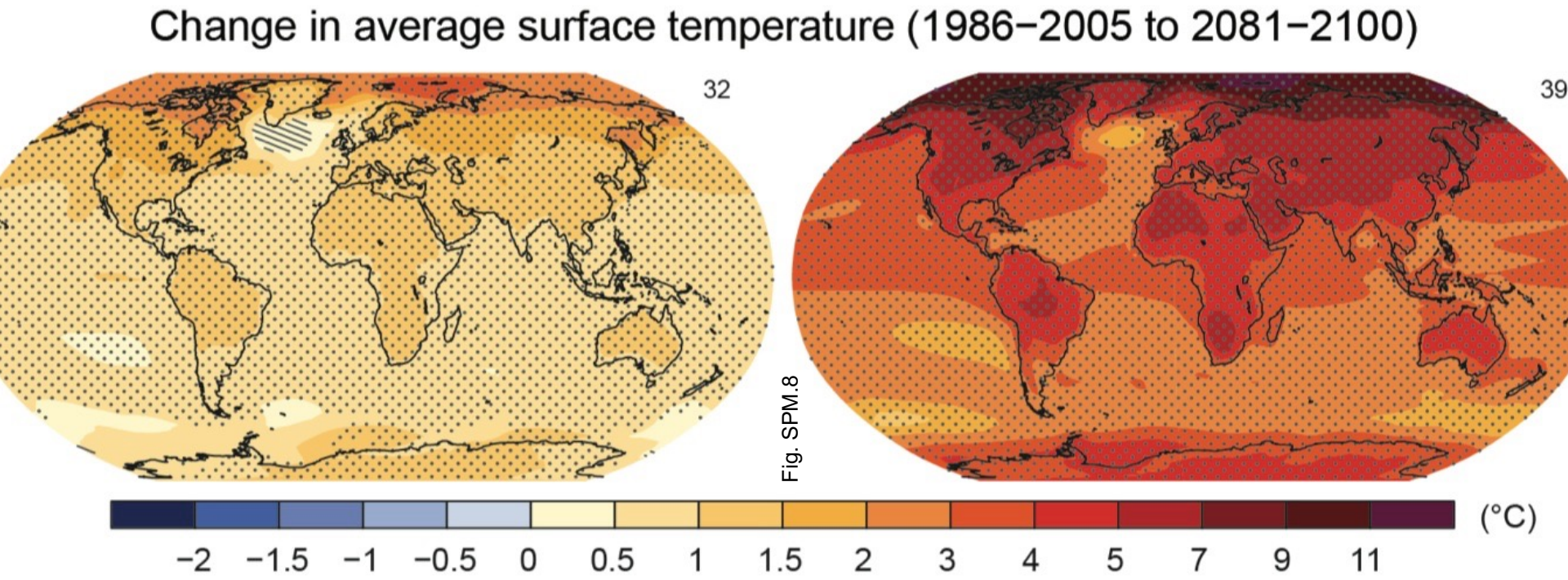
Note : « emission-driven » -> knowledge of C-cycle uncertainty

Réchauffement moyen – scén. RCP, 21s



(IPCC 2013, Fig. SPM.7a)

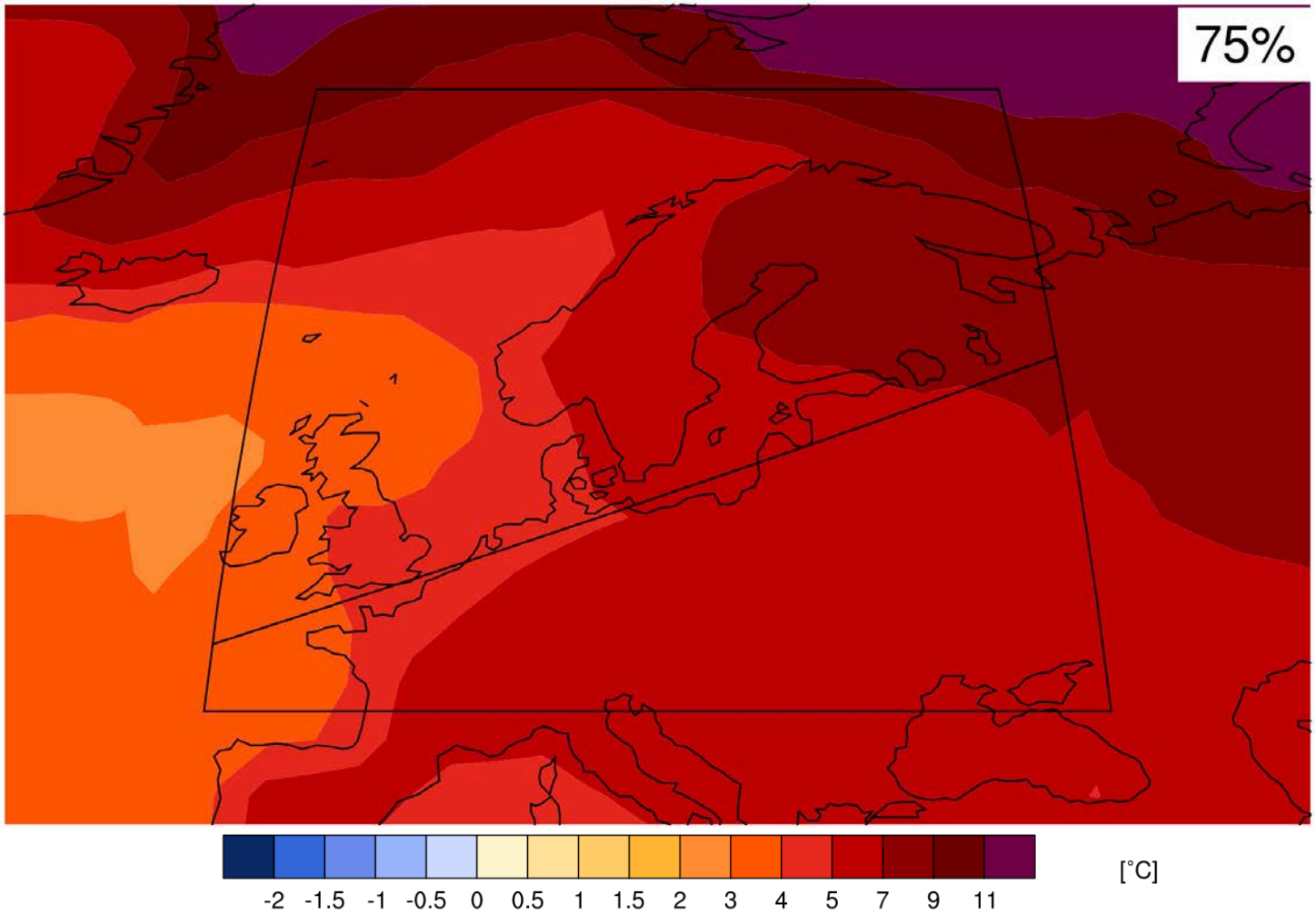
RCP2.6 RCP8.5



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).

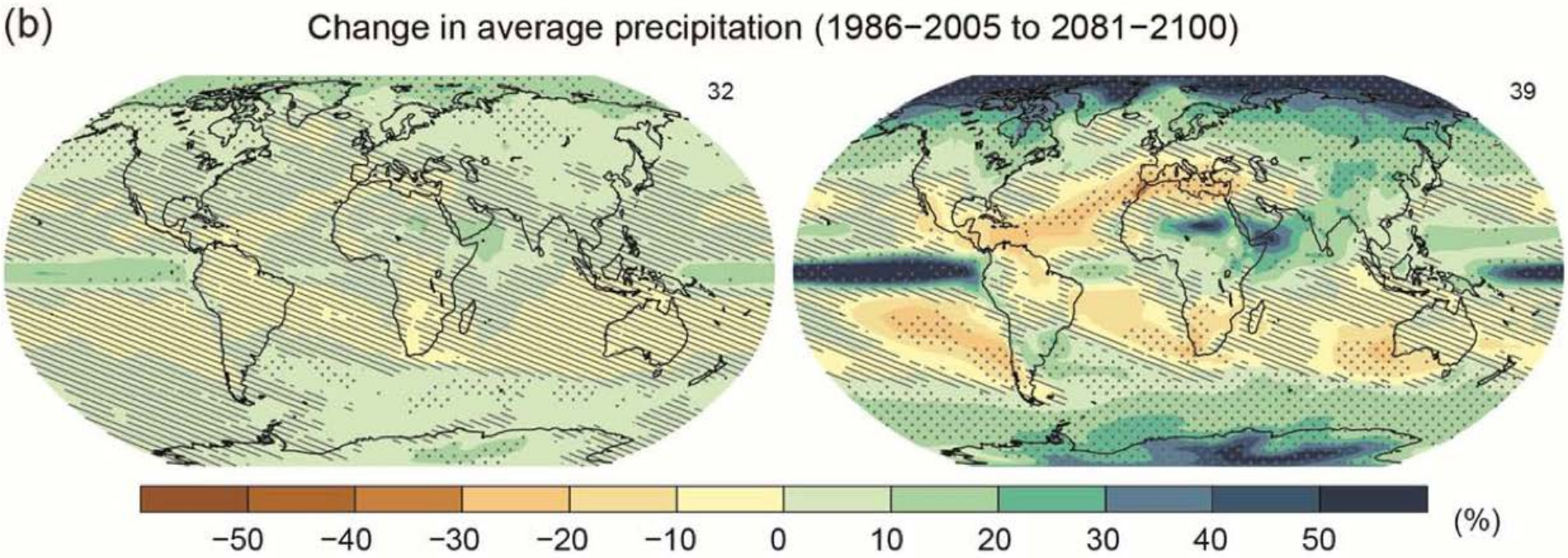
Stippling [pointillés] indicates regions where the multi-model mean is large compared to natural internal variability (i.e., greater than two standard deviations of natural internal variability in 20-year means) and where at least 90% of models agree on the sign of change

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

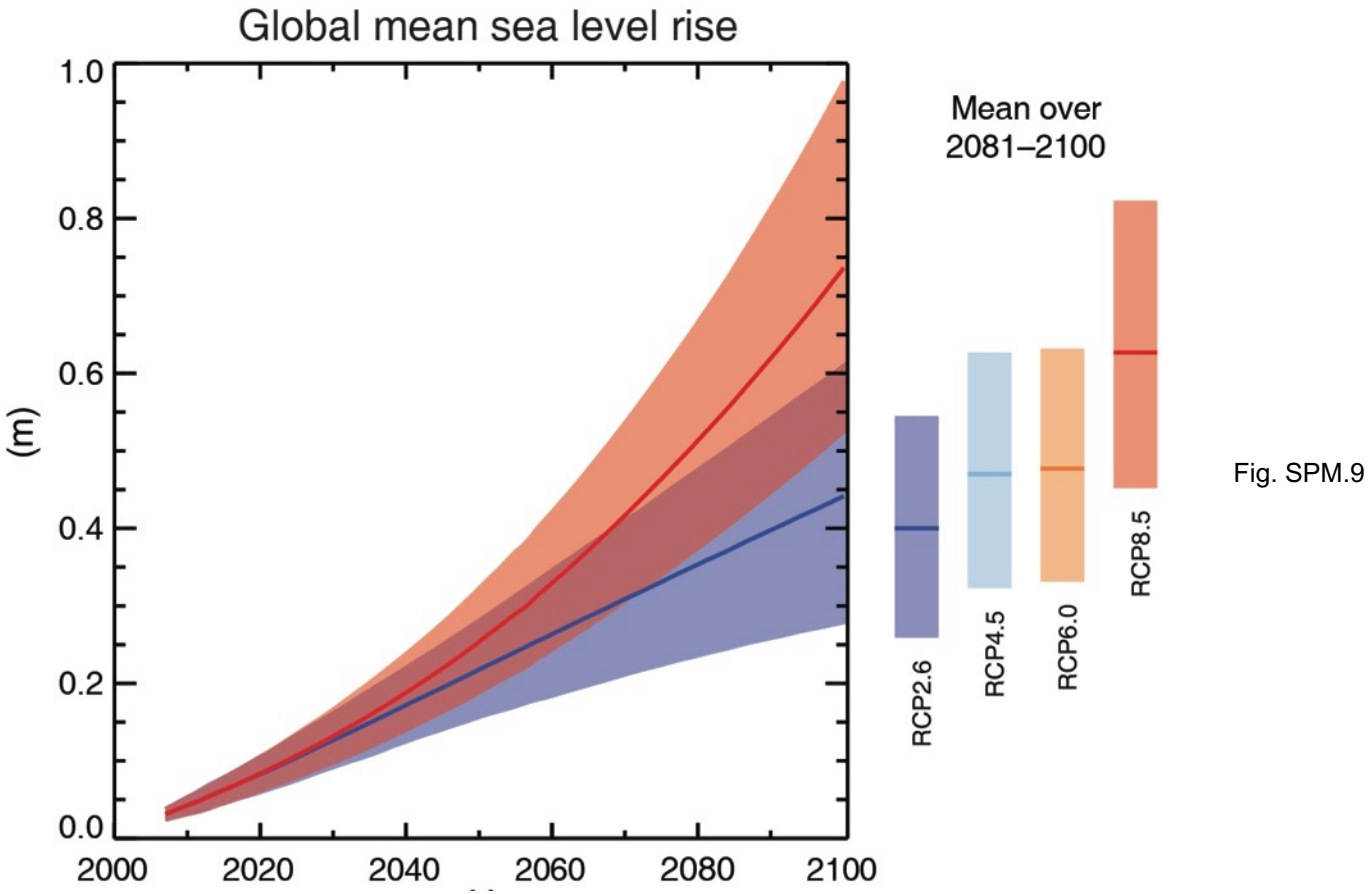


Fig. SPM.9

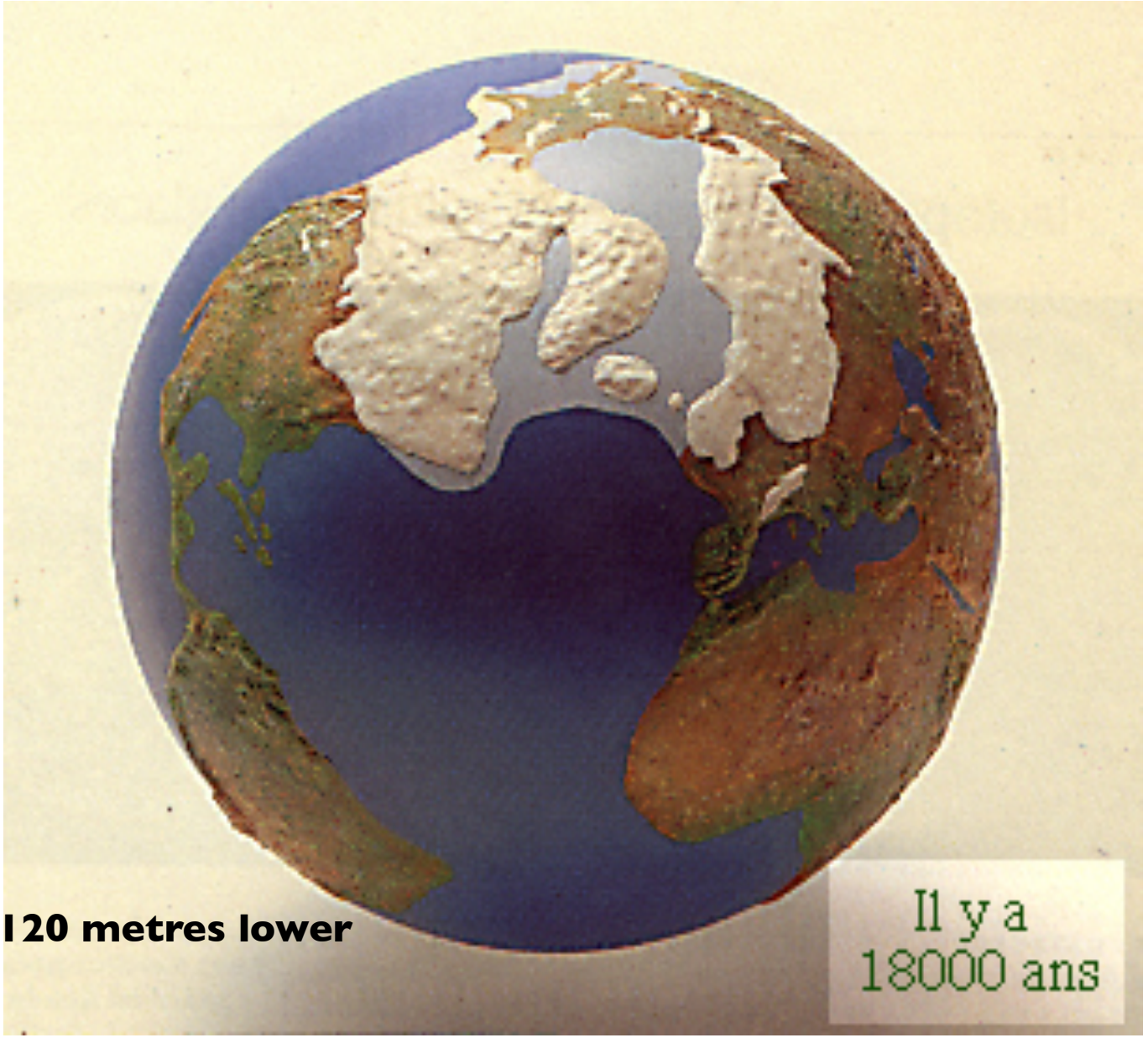
© IPCC 2013

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

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

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.

Fact n° 4: World Health Organization (2018): Air pollution kills 7 million 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° 5: 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 cost as well »

@JPvanYpersele

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

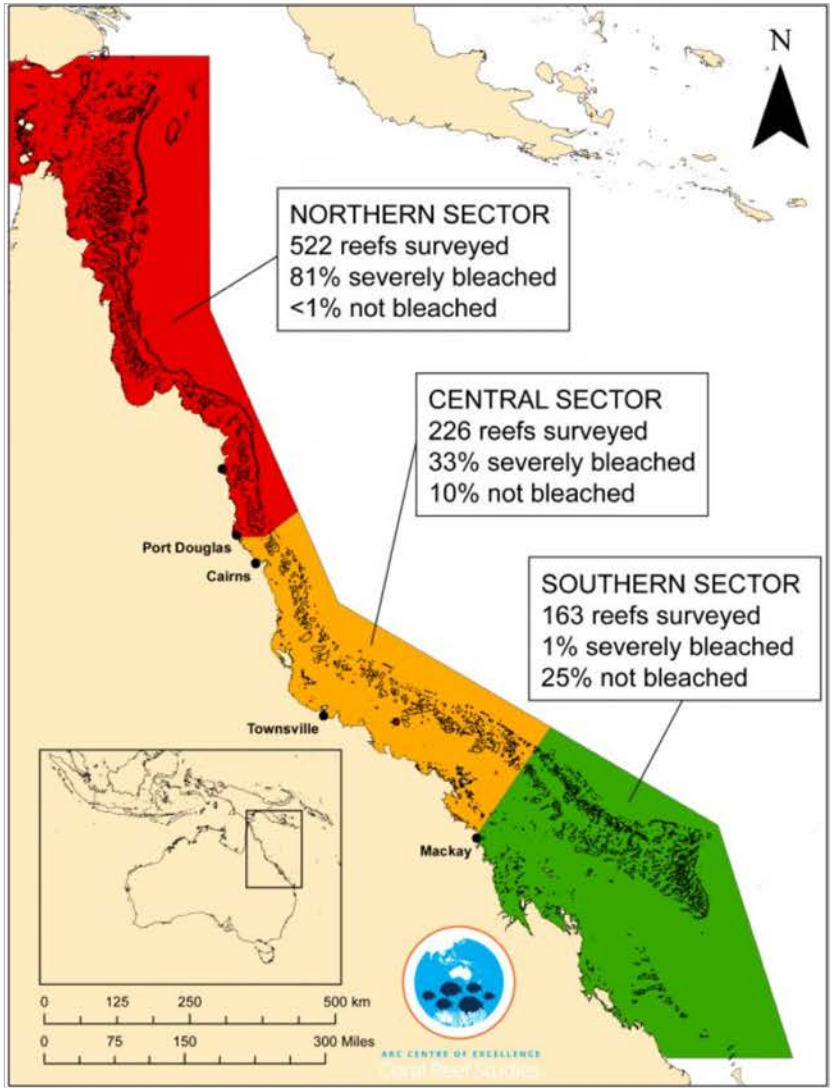
NB: + 1 m is possible in the next 100 years…

(Time 2001)

Fact n° 6: Ecosystems suffer more and more, while our wellbeing depends on their good state

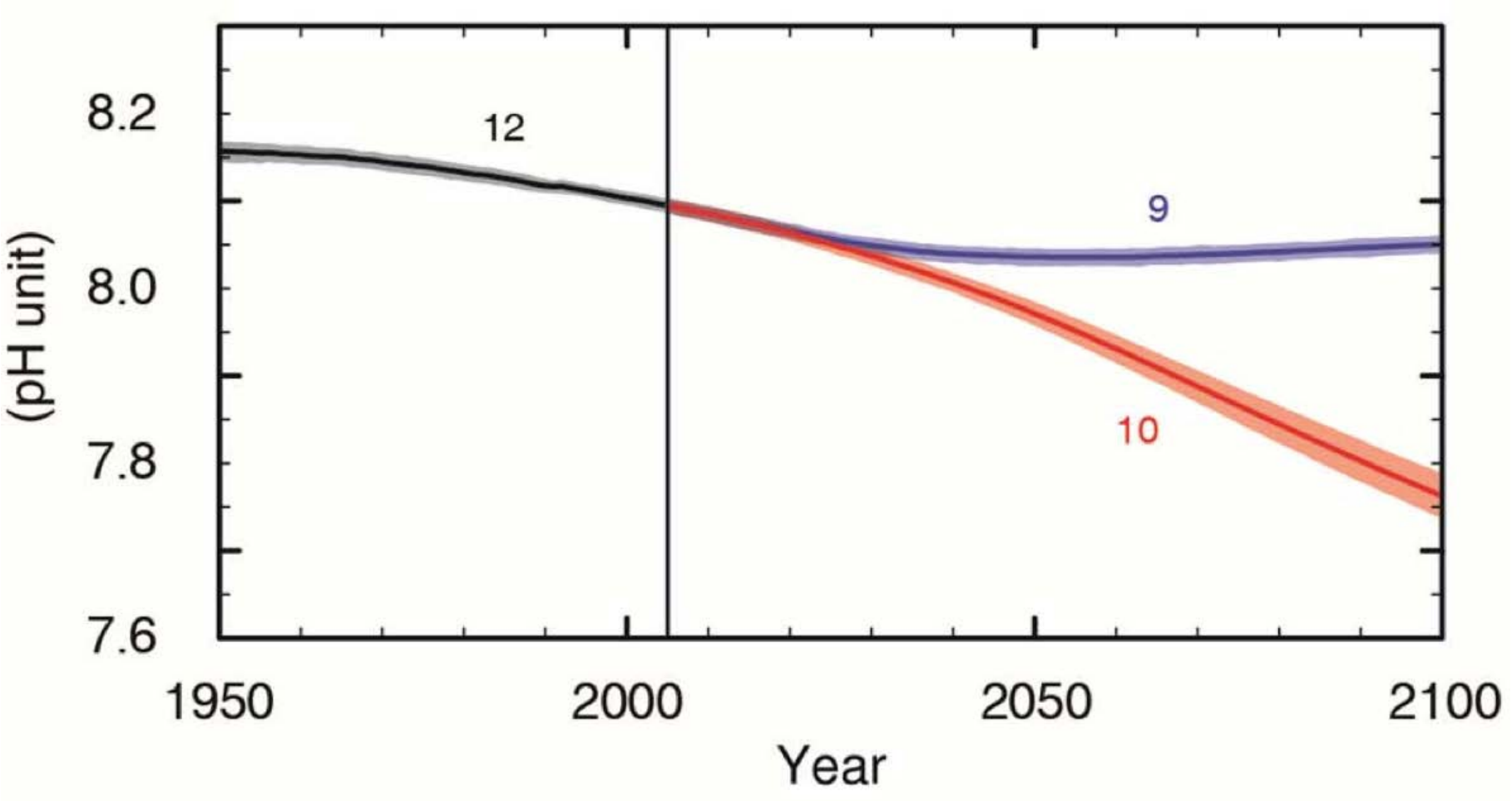
The « Sixth Extinction » has started, and climate change is one of the causing factors

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



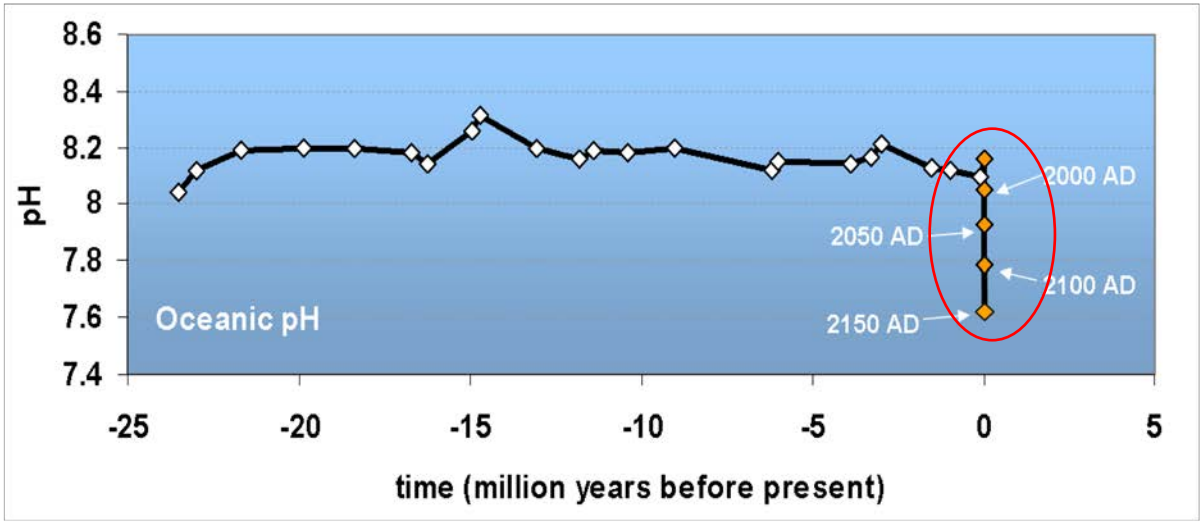
JCU Australia - ARC Centre of Excellence for Coral Reef Studies / Tom Bridge and James Kerry

Ocean Acidification, for RCP 8.5 (orange) & RCP2.6 (blue)



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

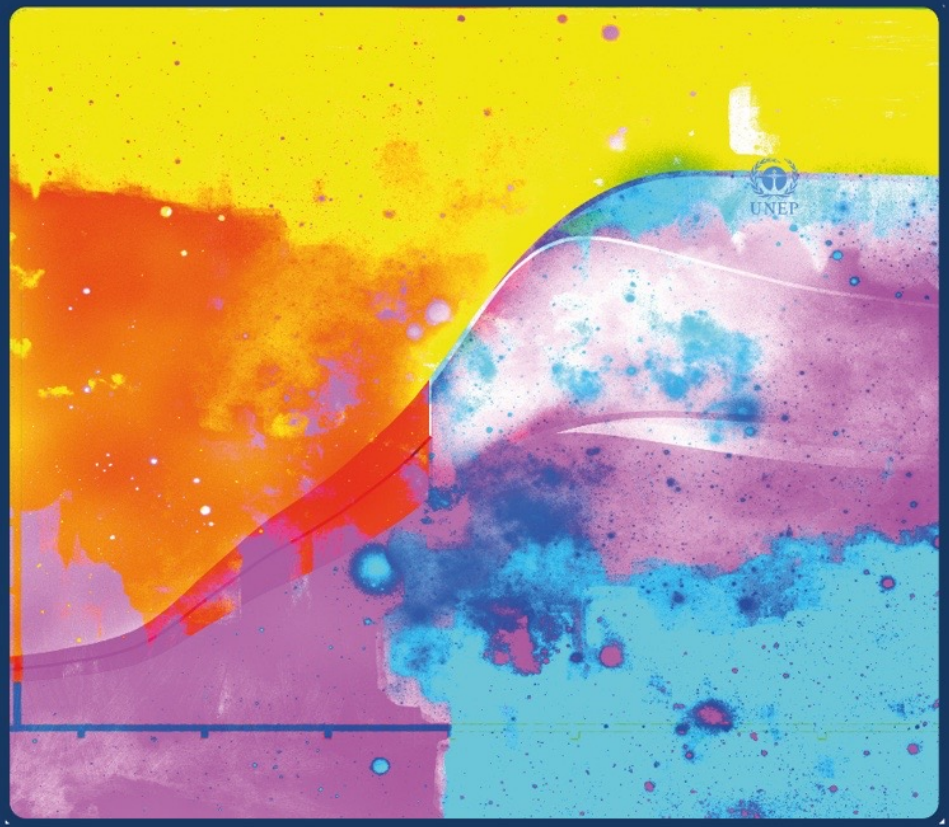
The SR15

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.

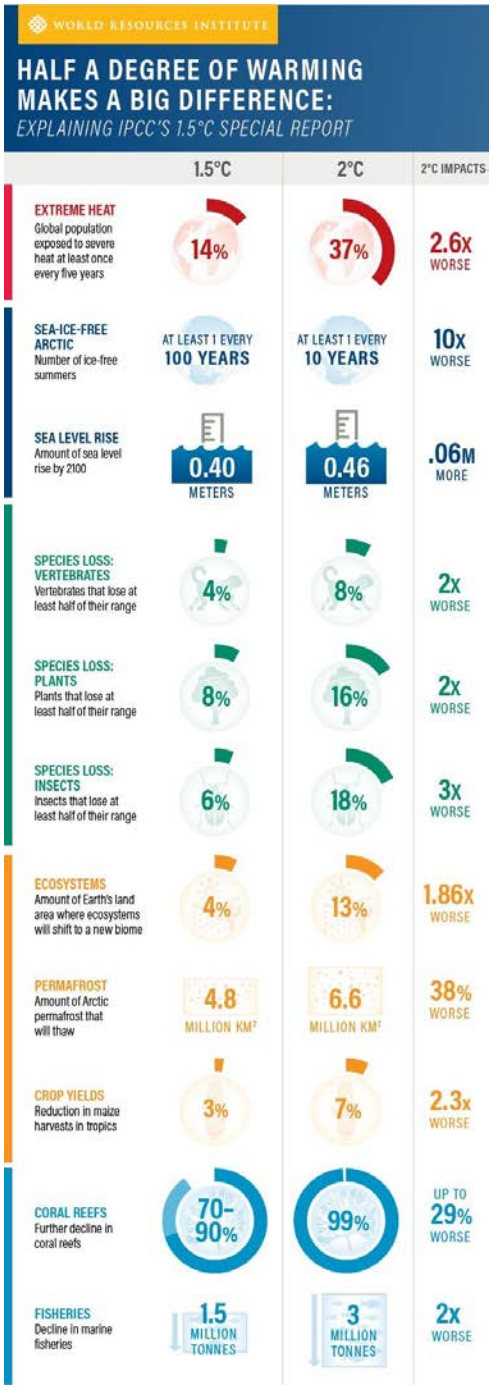


Global warming of 1.5°C

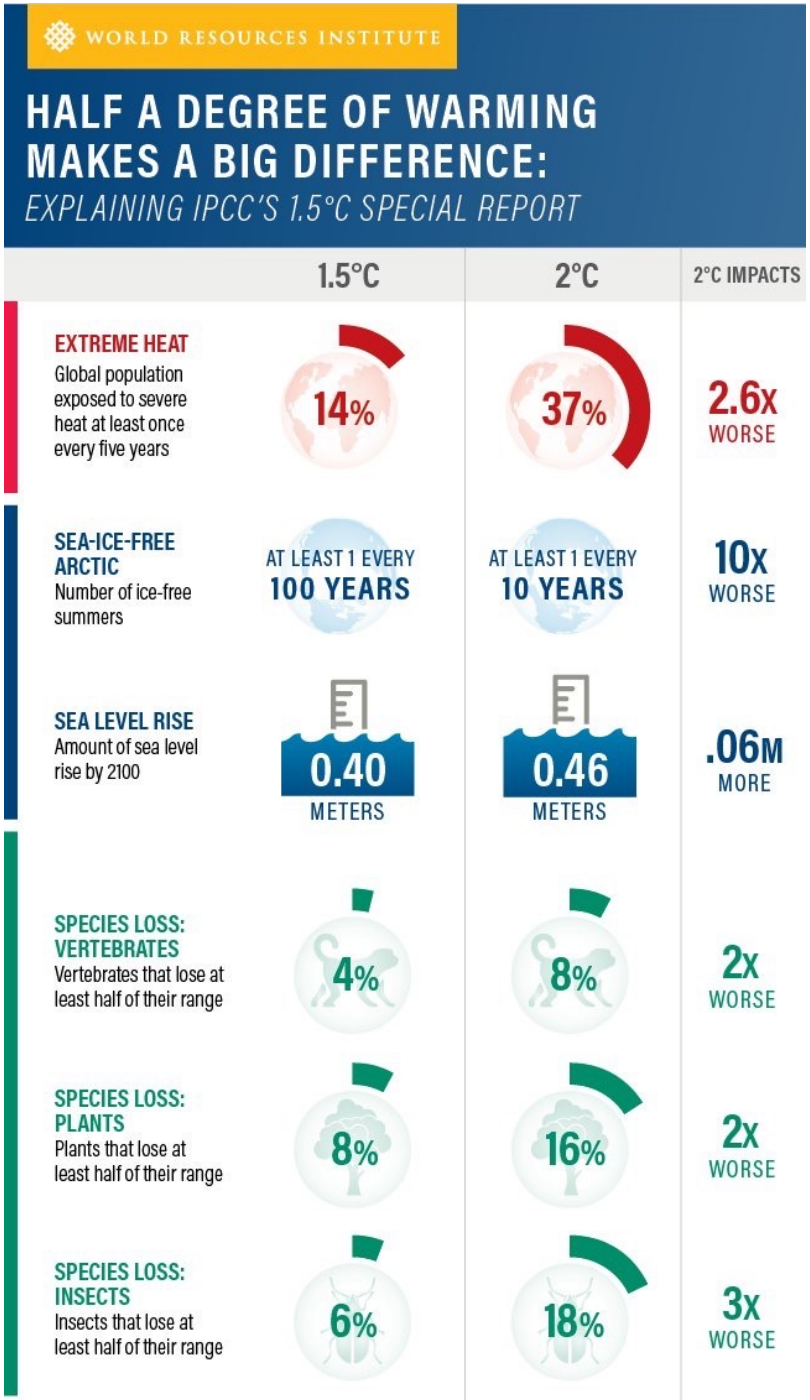
A IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, ***in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty***

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)



Responsibility for content: WRI

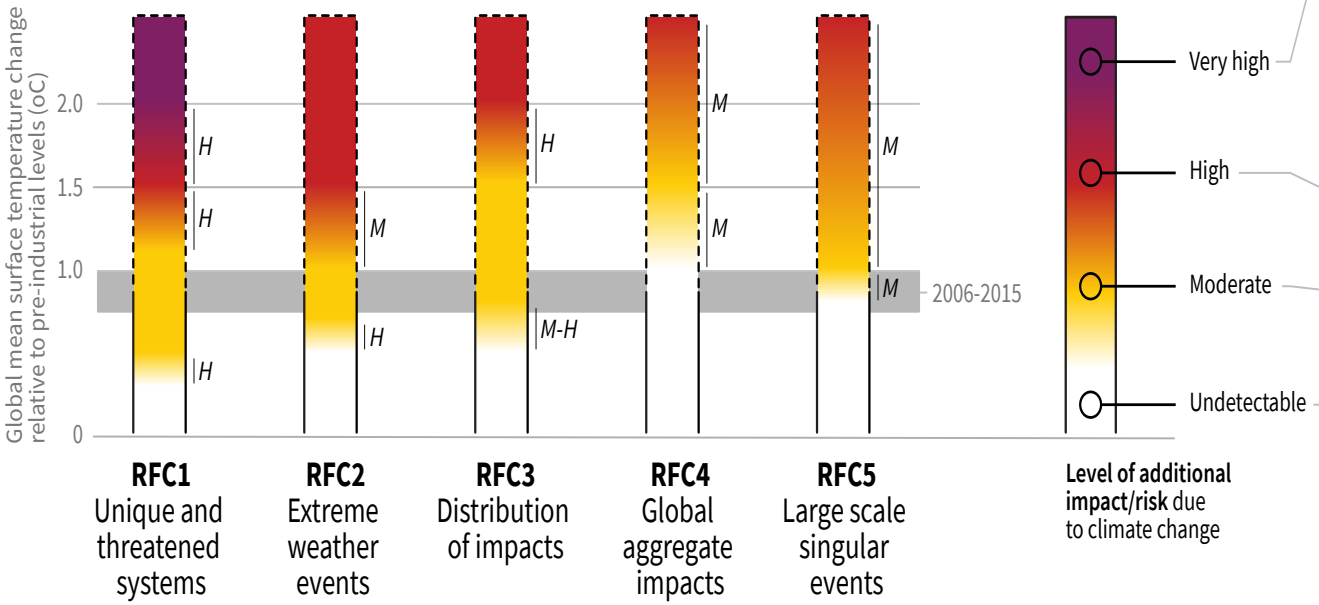


Responsibility for content: WRI

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.

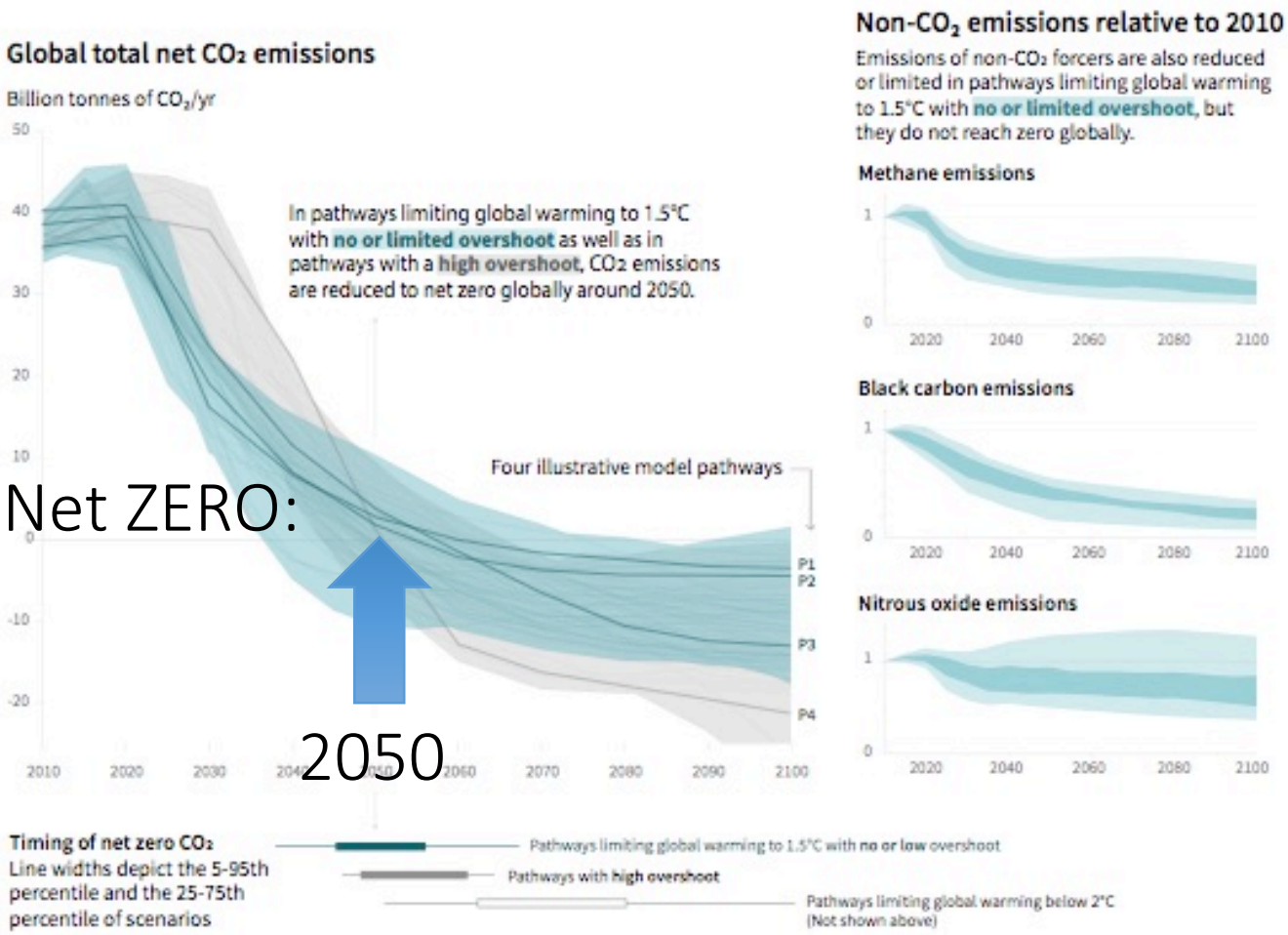
Red indicates severe and widespread impacts/risks.

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.

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.



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

Greenhouse gas emissions pathways

- To limit warming to 1.5° C, CO_2 emissions fall by about 45% by 2030 (from 2010 levels)
  - Compared to 20% for 2° C
- To limit warming to 1.5° C, CO_2 emissions would need to reach 'net zero' around 2050
  - Compared to around 2075 for 2° C
- Reducing non-CO_2 emissions would have direct and immediate health benefits

Remaining carbon budget in 2018
(Source: IPCC SR15)

- The remaining carbon budget of 580 $GtCO_2$ for a 50% probability of limiting warming to 1.5˚C, and 420 $GtCO_2$ for a 66% probability (medium confidence)
- The remaining budget is being depleted by current emissions of 42± 3 $GtCO_2$ per year

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

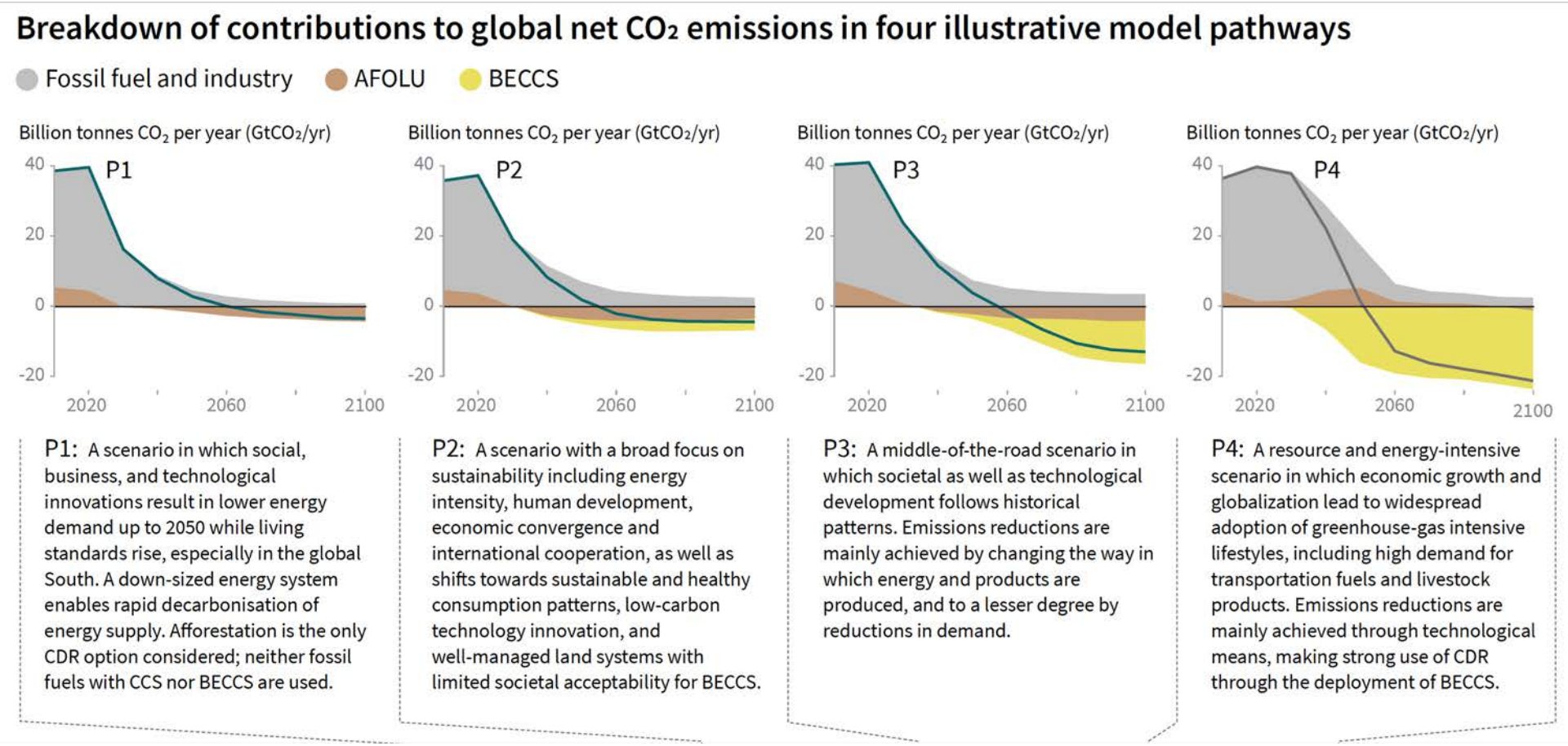
Greenhouse gas emissions pathways

- 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

Greenhouse gas emissions pathways

- National pledges are not enough to limit warming to 1.5° C
- Avoiding warming of more than 1.5° C would require carbon dioxide emissions to decline substantially before 2030

Four illustrative model pathways in the IPCC SR15:



Four illustrative model pathways in the IPCC SR15:

Global indicators	P1	P2	P3	P4	**Interquartile range**
Pathway classification	No or low overshoot	No or low overshoot	No or low overshoot	High overshoot	No or low overshoot
CO_2 emission change in 2030 (% rel to 2010)	-58	-47	-41	4	(-59,-40)
↳ in 2050 (% rel to 2010)	-93	-95	-91	-97	(-104,-91)
Kyoto-GHG emissions in 2030 (% rel to 2010)*	-50	-49	-35	-2	(-55,-38)
↳ in 2050 (% rel to 2010)	-82	-89	-78	-80	(-93,-81)
*Final energy demand** in 2030 (% rel to 2010)*	-15	-5	17	39	(-12, 7)
↳ in 2050 (% rel to 2010)	-32	2	21	44	(-11, 22)
Renewable share in electricity in 2030 (%)	60	58	48	25	(47, 65)
↳ in 2050 (%)	77	81	63	70	(69, 87)
Primary energy from coal in 2030 (% rel to 2010)	-78	-61	-75	-59	(-78, -59)
↳ in 2050 (% rel to 2010)	-97	-77	-73	-97	(-95, -74)
from oil in 2030 (% rel to 2010)	-37	-13	-3	86	(-34,3)
↳ in 2050 (% rel to 2010)	-87	-50	-81	-32	(-78,-31)
from gas in 2030 (% rel to 2010)	-25	-20	33	37	(-26,21)
↳ in 2050 (% rel to 2010)	-74	-53	21	-48	(-56,6)
from nuclear in 2030 (% rel to 2010)	59	83	98	106	(44,102)
↳ in 2050 (% rel to 2010)	150	98	501	468	(91,190)
from biomass in 2030 (% rel to 2010)	-11	0	36	-1	(29,80)
↳ in 2050 (% rel to 2010)	-16	49	121	418	(123,261)
from non-biomass renewables in 2030 (% rel to 2010)	430	470	315	110	(243,438)
↳ in 2050 (% rel to 2010)	832	1327	878	1137	(575,1300)
Cumulative CCS until 2100 ($GtCO_2$)	0	348	687	1218	(550, 1017)
↳ of which BECCS ($GtCO_2$)	0	151	414	1191	(364, 662)
Land area of bioenergy crops in 2050 (million hectare)	22	93	283	724	(151, 320)
Agricultural CH_4 emissions in 2030 (% rel to 2010)	-24	-48	1	14	(-30,-11)
in 2050 (% rel to 2010)	-33	-69	-23	2	(-46,-23)
Agricultural N_2O emissions in 2030 (% rel to 2010)	5	-26	15	3	(-21,4)
in 2050 (% rel to 2010)	6	-26	0	39	(-26,1)

NOTE: Indicators have been selected to show global trends identified by the Chapter 2 assessment. National and sectoral characteristics can differ substantially from the global trends shown above.

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

** Kyoto-gas emissions are based on SAR GWP-100*
*** Changes in energy demand are associated with improvements in energy efficiency and behaviour change*

For 3 illustrative model pathways that limit warming with no or limited overshoot

(%rel to 2010)	P1	P2	P3
CO_2 (2030/2050)	-58 / - 93	-47 / -95	-41 / -91
Final energy demand (2030/2050)	-15 / -32	-5 / +2	+17 / +21
Primary energy from coal (2030/2050)	-78/-97	-61/-77	-75/-73
Primary energy from non-biomass renewables (2030/2050)	+430/+832	+470/+1327	+315/+878

IPCC SR15
Fig SPM 3b

Fact n° 7: 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…)

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)

Fact n° 8: 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

Fact n° 9: China is waking up to the climate and pollution challenge. It might become the world climate leader if the EU (5% of world population in 2050 ?) 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 US cities and states can somewhat compensate federal actions

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Fact n° 10: 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

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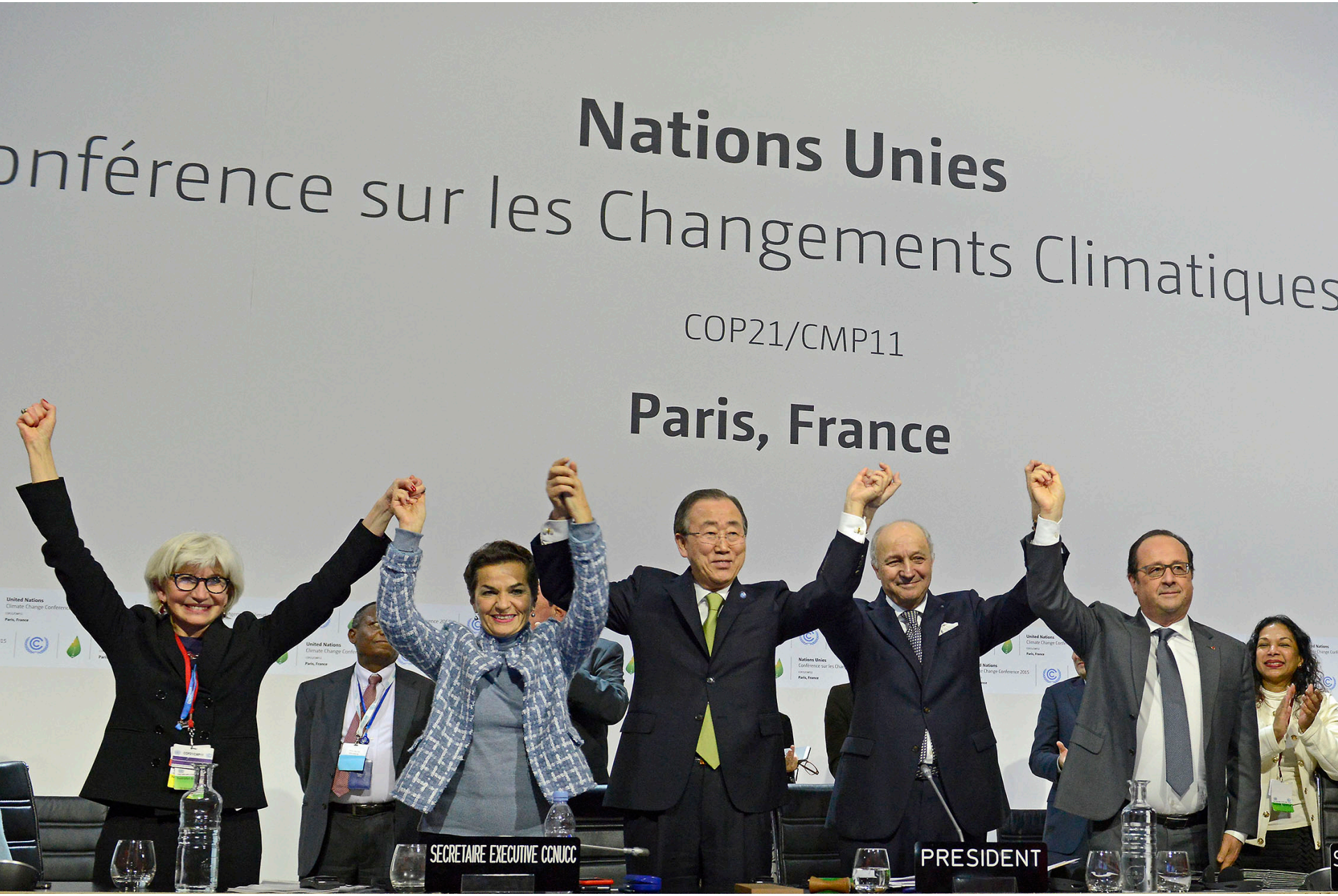
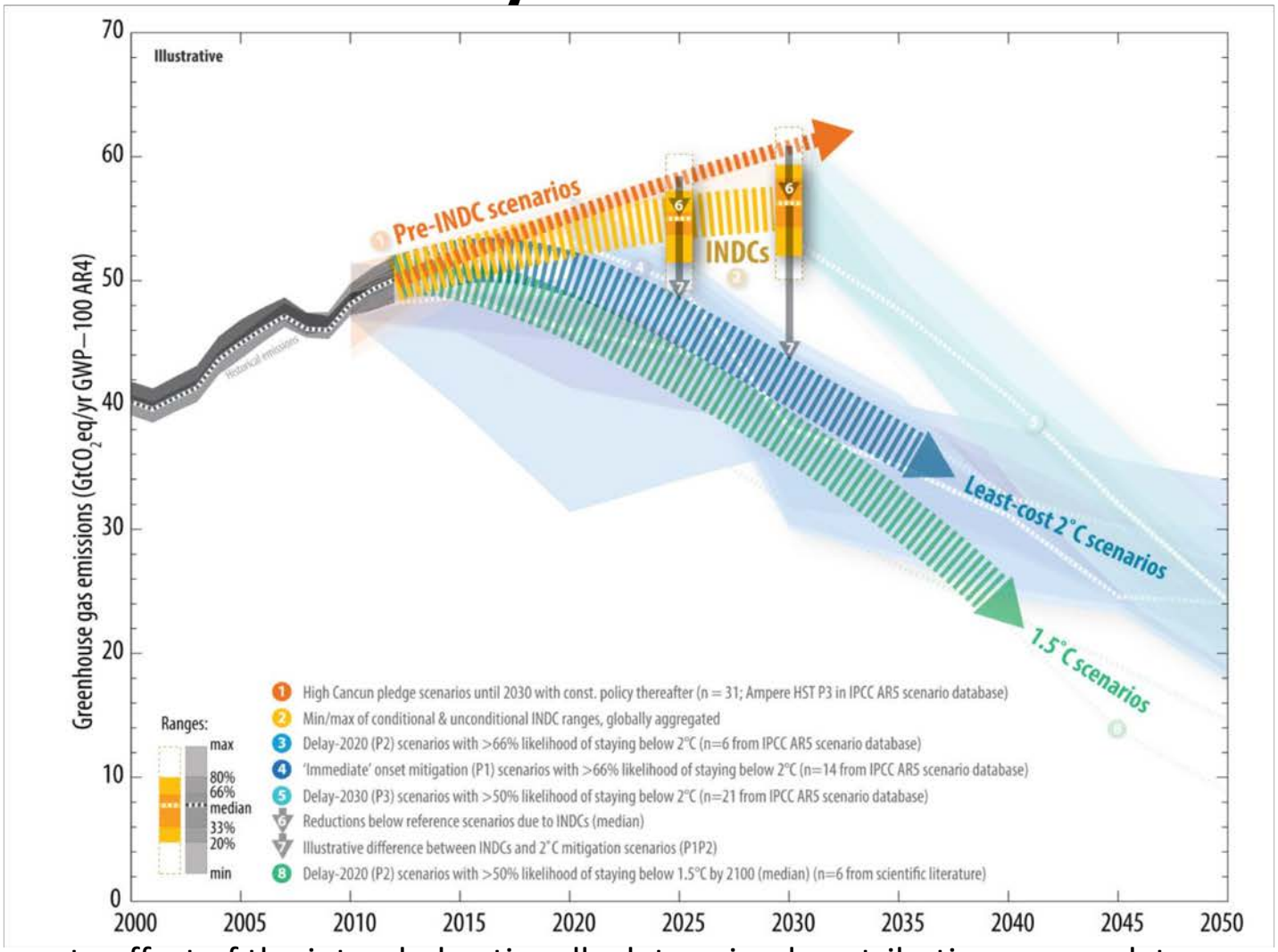

Nations Unies
onférence sur les Changements Climatiques
COP21/CMP11
Paris, France
SECRETAIRE EXECUTIVE CCNUCC
PRESIDENT

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

I want you to panic… and act

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

… as if we were all running for our life.

@JPvanYpersele

The Paris Agreement (COP21, December 2015)

Vision

« …strengthen the **global response to the threat of climate change**, in the context of **sustainable development** and efforts to **eradicate poverty** »

Objectives

a) Holding the increase in the global average temperature:

- *« **to well below 2°C** above pre-industrial levels »*
- *« **pursuing 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 »

b) Adaptation and Mitigation

- *« **Increasing the ability to adapt** to the adverse impacts of climate change and **foster climate resilience** and*
- ***low greenhouse gas emissions development**, in a manner that does not threaten food production»*

c) Finances

- *« Making **finance flows consistent** with a pathway towards low greenhouse gas emissions and climate-resilient development. »*

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 disproportionately

EU Emission Trading System, CO_2 taxes, fines, internal CO_2 price (firms do « as if » CO_2 emission was expensive). NB: Price must match the effect desired!

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Solution n° 4: Transition towards a clean and sustainable economy and energy system must be « just », and other synergies with the SDGs must be seeked

Ex : The Polish energy system cannot be transformed without facilitating the coal miners reconversion

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SUSTAINABLE DEVELOPMENT GOALS

Solution n° 5: Before looking at how to produce energy cleanly, much more attention must be given to reducing energy demand and efficiency, 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…

Walking the talk…

- Energy audit of our home
- Strong external insulation (wood fibre)
- Ultra-efficient windows
- Airtightness inspecting + heat-recovery mechanical ventilation
- Oil furnace replaced by geothermal heat pump principally fed with PV pannels
- Non-tropical wood
- Small, used electric car
- Electric bicycles

Trying to be coherent (external insulation)

Trying to be coherent...

Solution n° 7: Mobility : much 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, only if essential.

Solution n° 8: Food and agriculture. A possible change with big positive impact: eat less (red) meat and cheese, of better quality! Eat more plant-based food (produced cleanly)(*)

…It is good for health as well!

(*) See « Beyond-Meat », page 14 of De Tijd, page 13 of L'Écho, 23 November 2018

@JPvanYpersele

Solution n° 9: The Sun gives us in two hours about as much energy as the world uses in *one year*, all forms of energy considered

The cost of solar kWh is crashing, wind power, heat and electricity storage, and smart grids are moving forward

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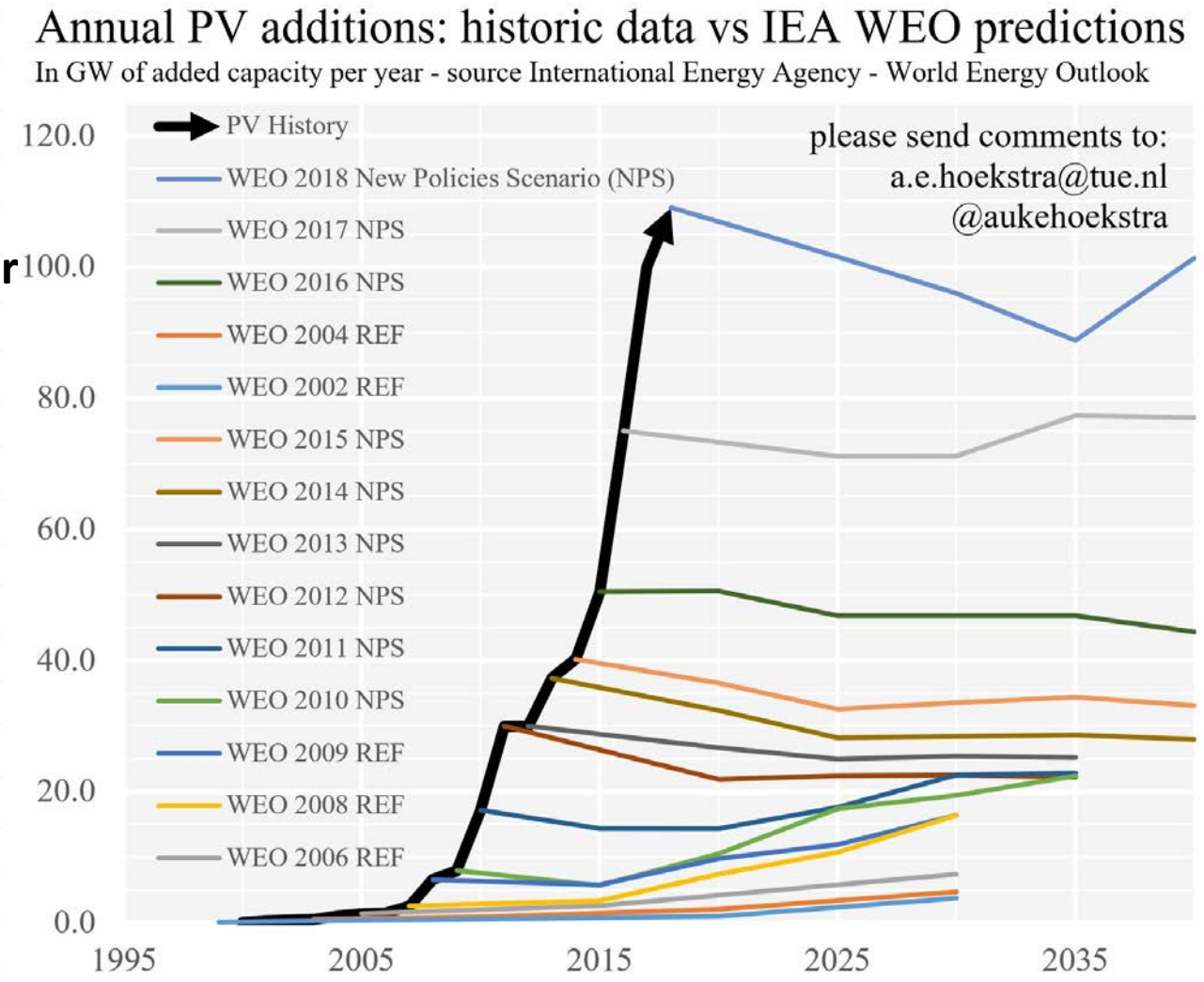
The International Energy Agency has missed that point…



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

… but their ethical/green investments are still marginal for most banks

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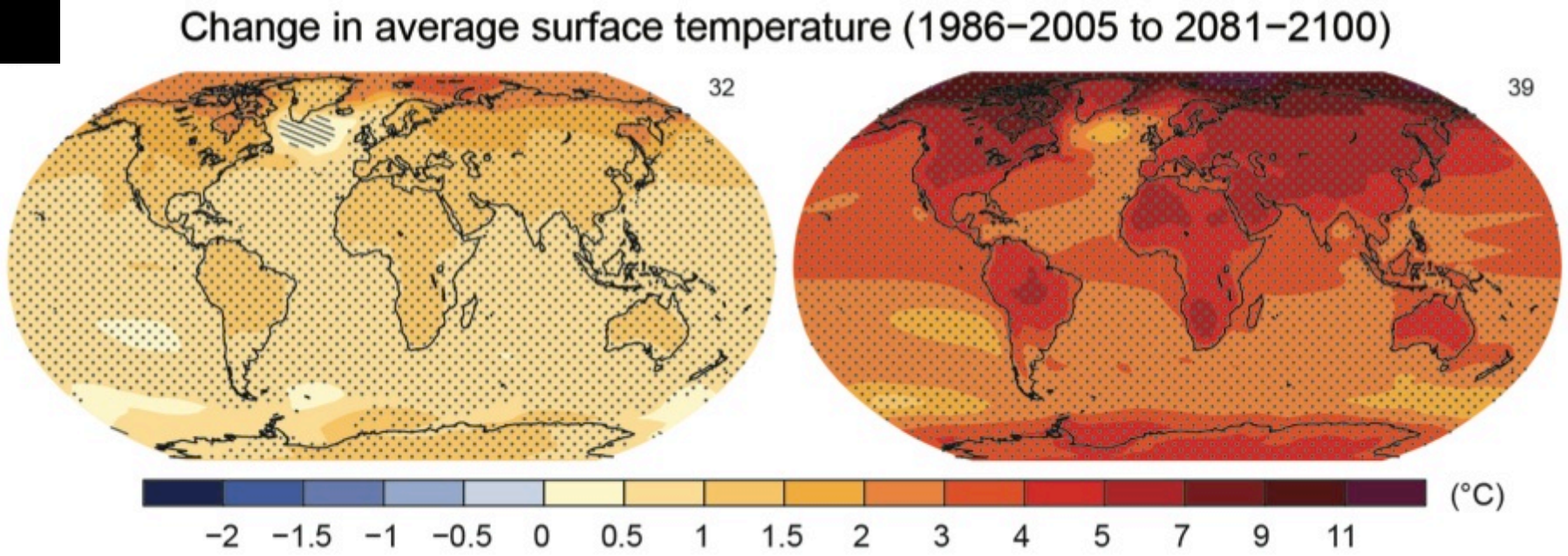
RCP2.6 RCP8.5

Fig. SPM.8



Humanity has the choice

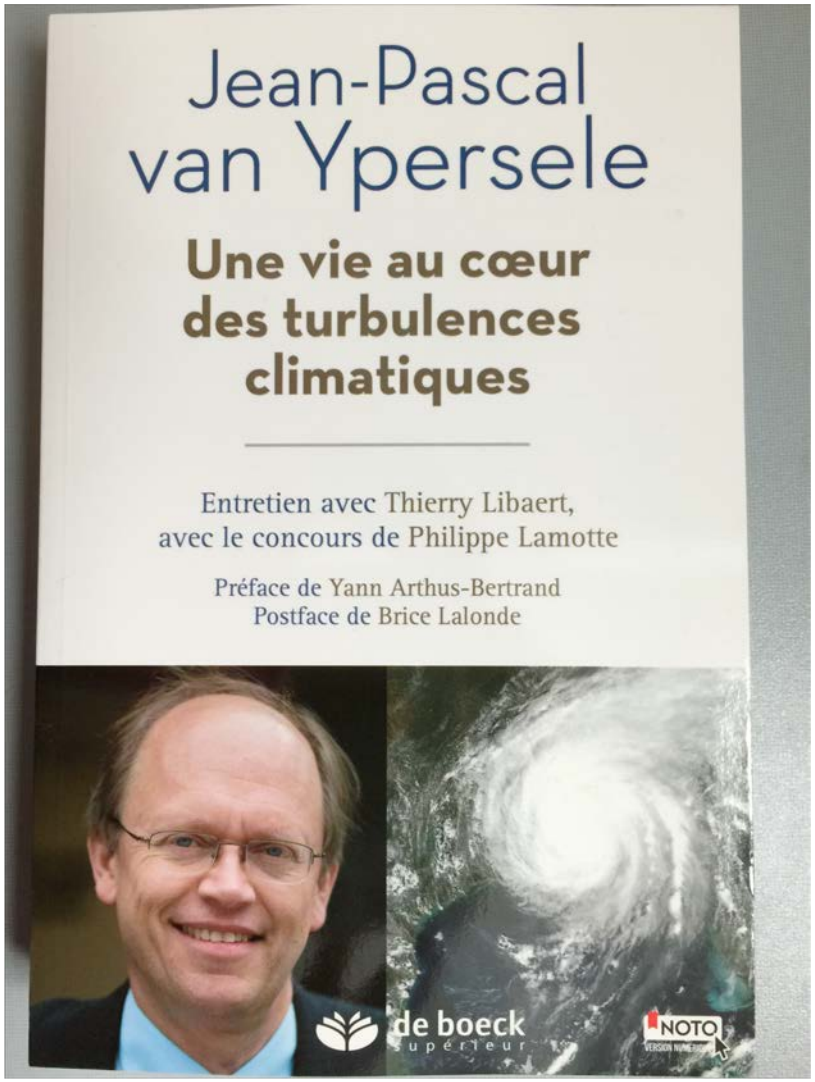
Pour en savoir plus:

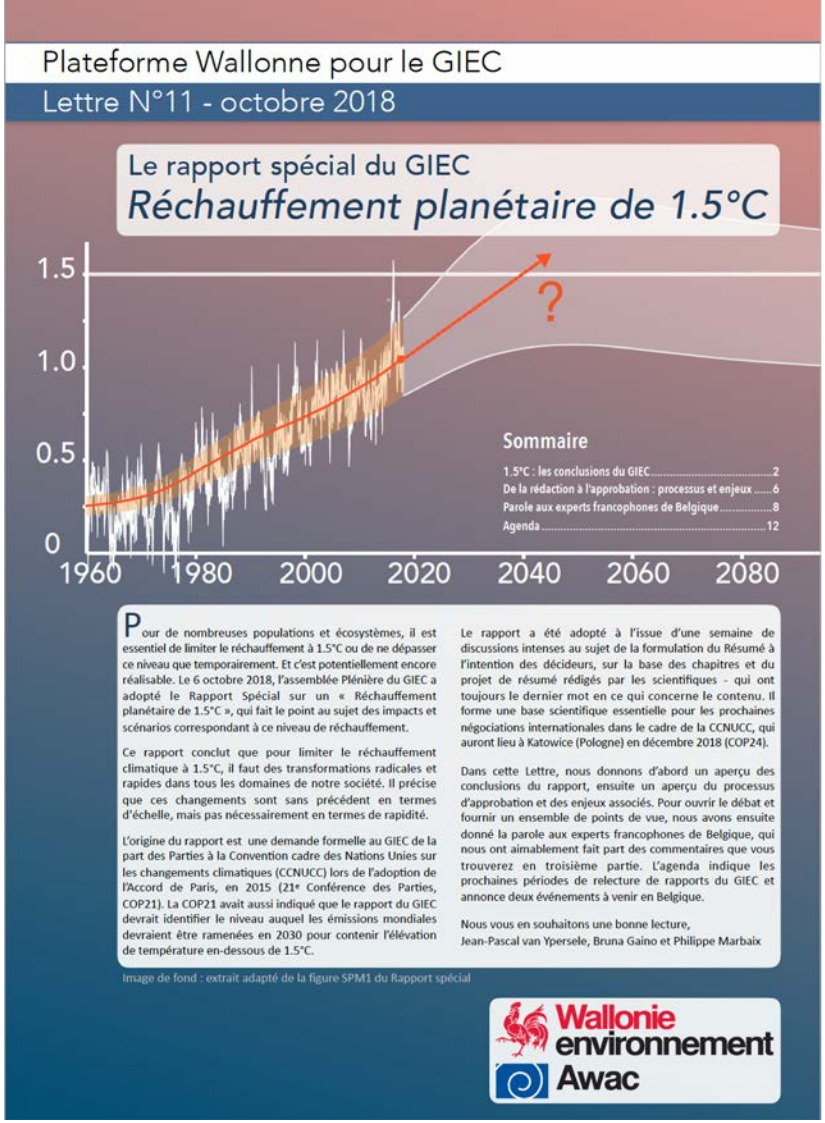
Lisez mon livre, où j'aborde tous ces sujets

Publié chez De Boeck supérieur

Préface:Yann Arthus-Bertrand

Postface: Brice Lalonde





Plateforme Wallonne pour le GIEC

Lettre N°11 - octobre 2018

Le rapport spécial du GIEC

Réchauffement planétaire de 1.5°C

Sommaire

1.5°C : les conclusions du GIEC 2
De la rédaction à l'approbation : processus et enjeux 6
Parole aux experts francophones de Belgique 8
Agenda 12

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 (CCNUCC) lors de l'adoption de l'Accord de Paris, en 2015 (21e 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 CCNUCC, 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

Wallonie environnement
Awac

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

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

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

This gives me hope:

Well-informed young people speaking truth to power

With @GretaThunberg at COP24

To go further :

- www.climate.be/vanyp/conferences: my slides
- www.ipcc.ch : IPCC
- www.realclimate.org : answers to the merchants of doubt arguments
- www.skepticalscience.com : same
- www.wechangeforlife.org : 250 Belgians experts speak
- www.plateforme-wallonne-giec.be : IPCC-related in French, Newsletter, latest on SR15, basic climate science
- **Twitter: @JPvanYpersele & @IPCC_CH**