

IPCC (Intergovernmental Panel on Climate Change): Origin, role, reports, and the role of science in policymaking

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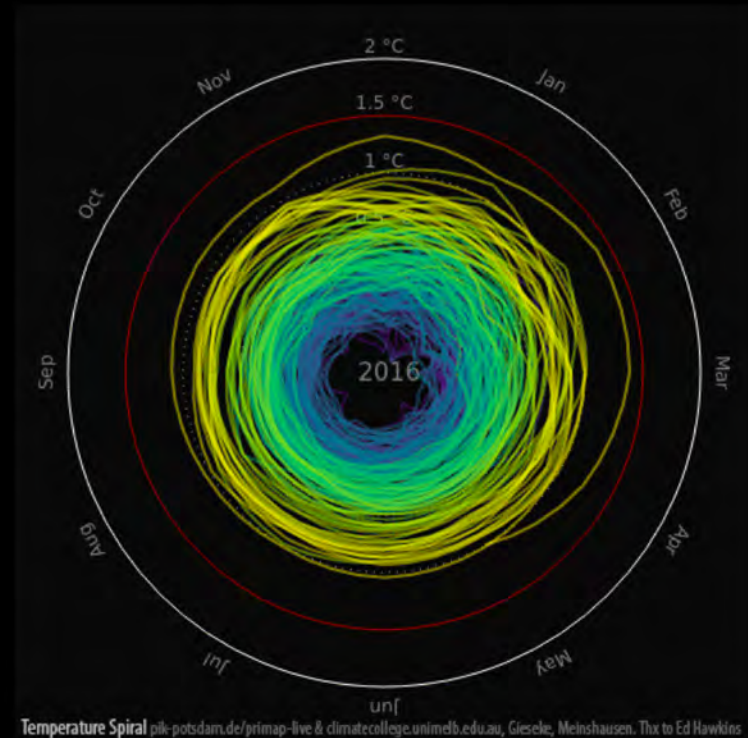
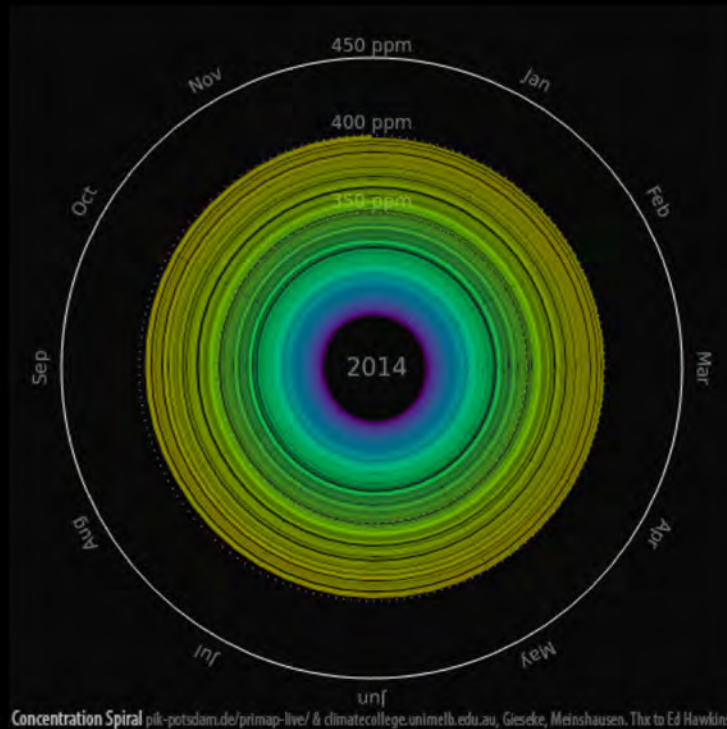
Former IPCC Vice-Chair (2008-2015)

Twitter: @JPvanYpersele

**Postgraduate course « Energy & Climate », University of Antwerp,
Antwerpen, 16 September 2020**

**Thanks to the Government of Wallonia, supporting the [Walloon Platform for IPCC](#)
and to my team at the Université catholique de Louvain**

CO₂ Concentration and Temperature spirals



CO₂ 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/>

The Essential Truth About Climate Change in Ten Words

The basic facts of climate change, established over decades of research, can be summarized in five key points:

IT'S REAL
IT'S US
EXPERTS AGREE
IT'S BAD
THERE'S HOPE

Global warming is happening.

Human activity is the main cause.

There's scientific consensus on human-caused global warming.

The impacts are serious and affect people.

We have the technology needed to avoid the worst climate impacts.

Source: @JohnfoCook

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





Donald J. Trump

@realDonaldTrump



Suivre

The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.

Voir la traduction

RETWEETS

99 789

JAIME

63 394



11:15 - 6 nov. 2012



100 k



63 k

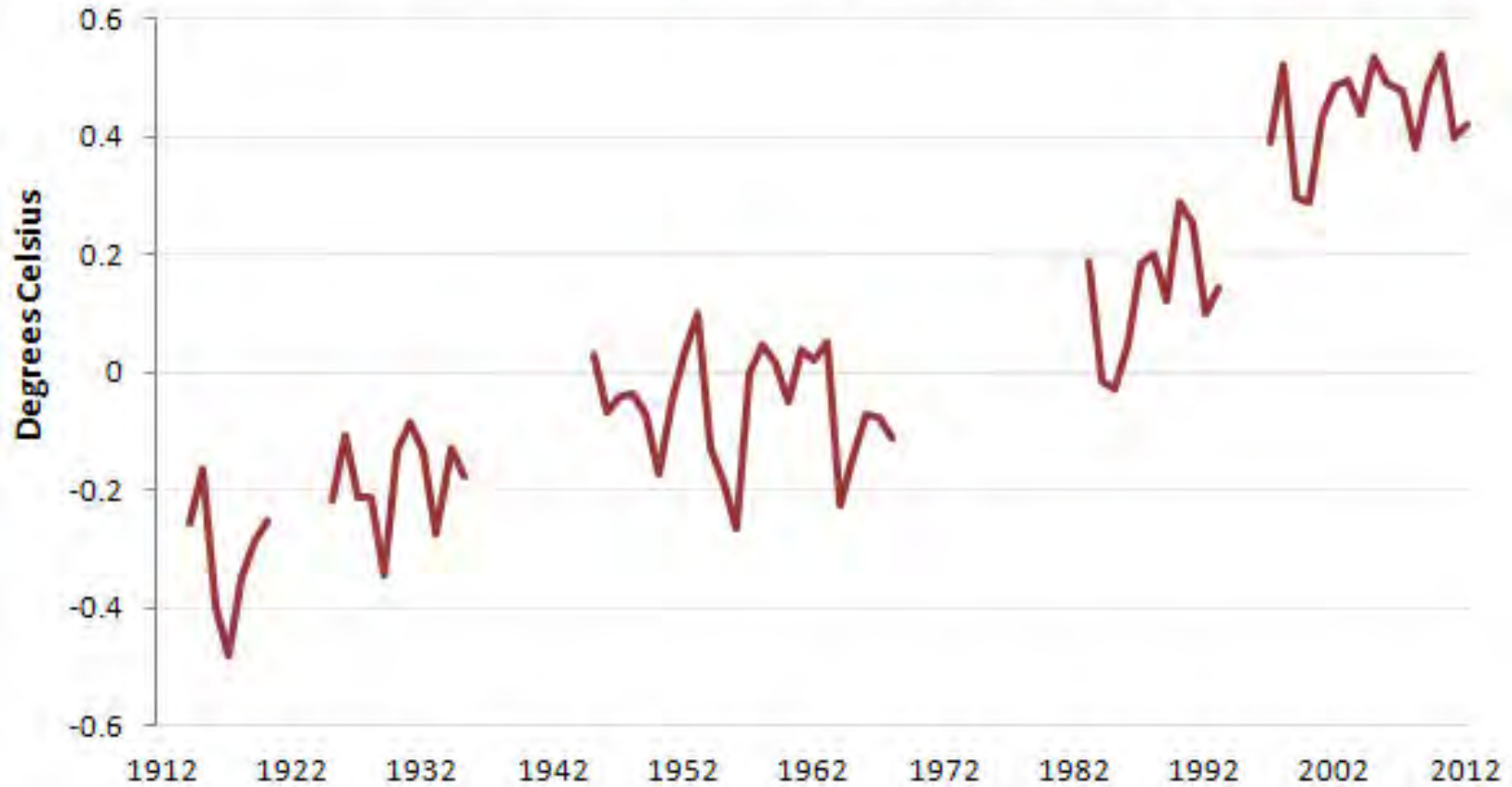


Temperature Change From 1961-1990 Average



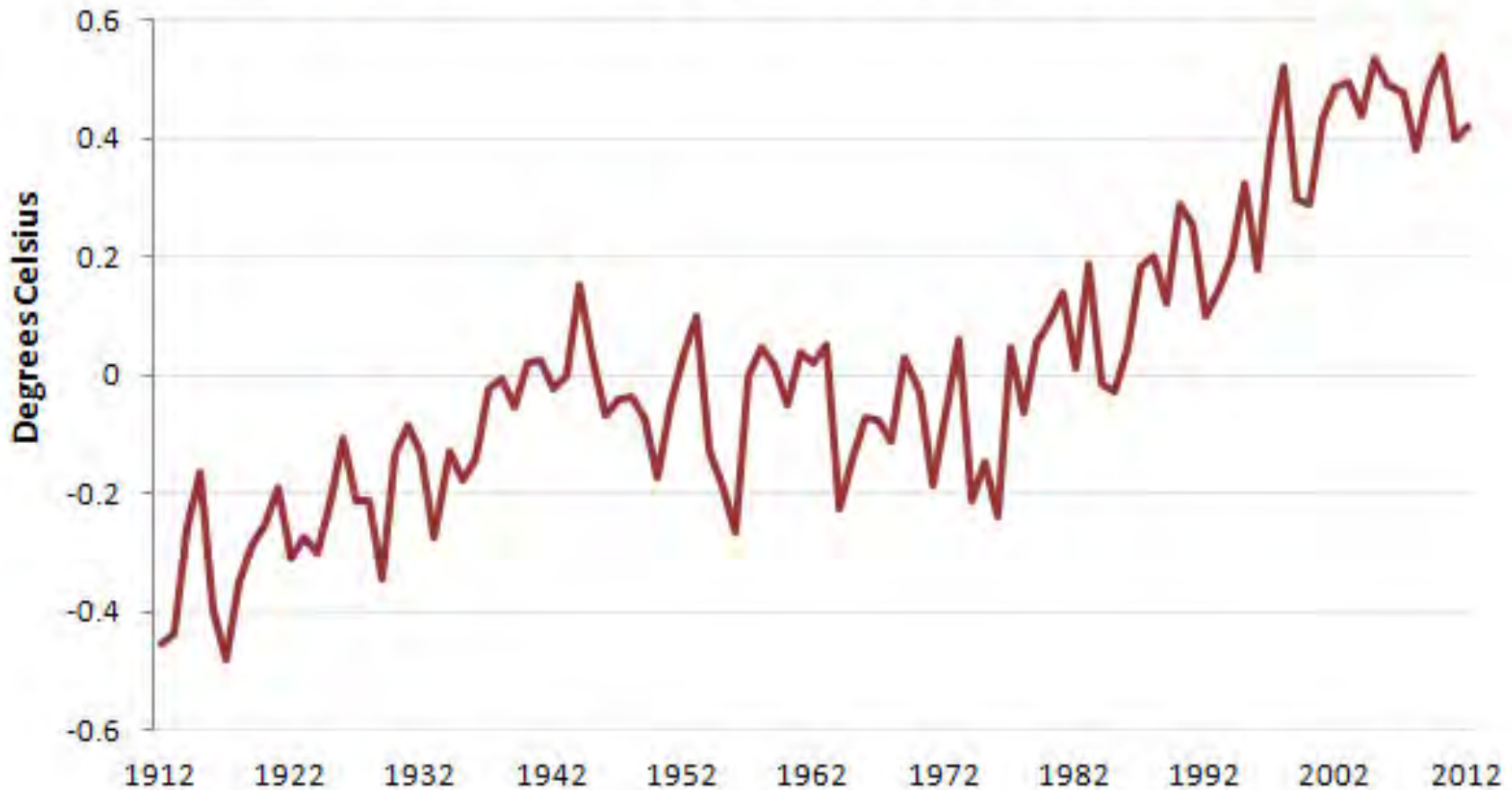
Lying With Statistics, Global Warming Edition

Temperature Plateaus — 1912-2012

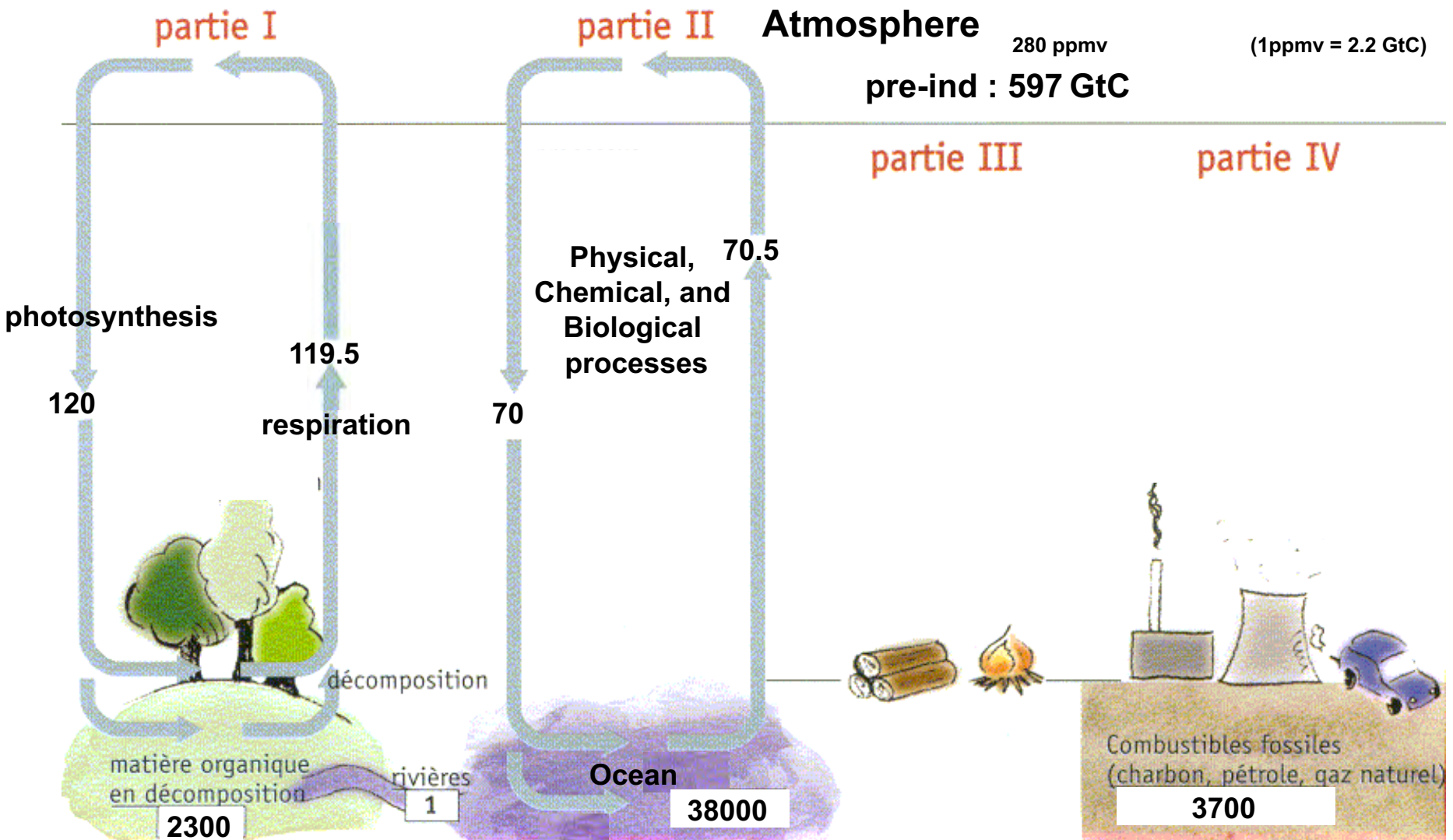


Lying With Statistics, Global Warming Edition

Temperature Change From 1961-1990 Average



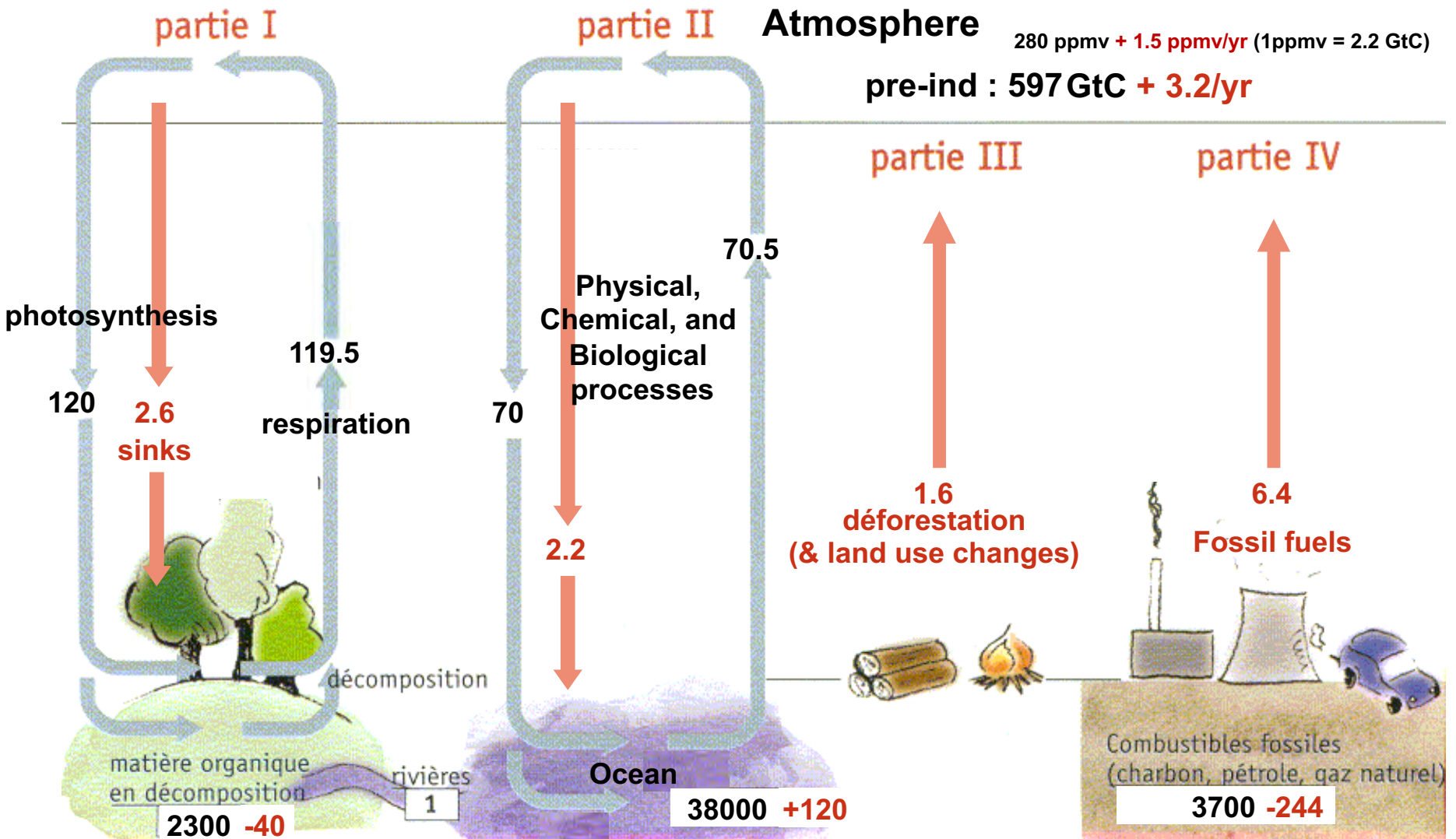
Carbon cycle: unperturbed fluxes



Units: GtC (billions tons of carbon) or GtC/year (multiply by 3.7 to get GtCO₂)

Carbon cycle: perturbed by human activities

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



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

Stocks!

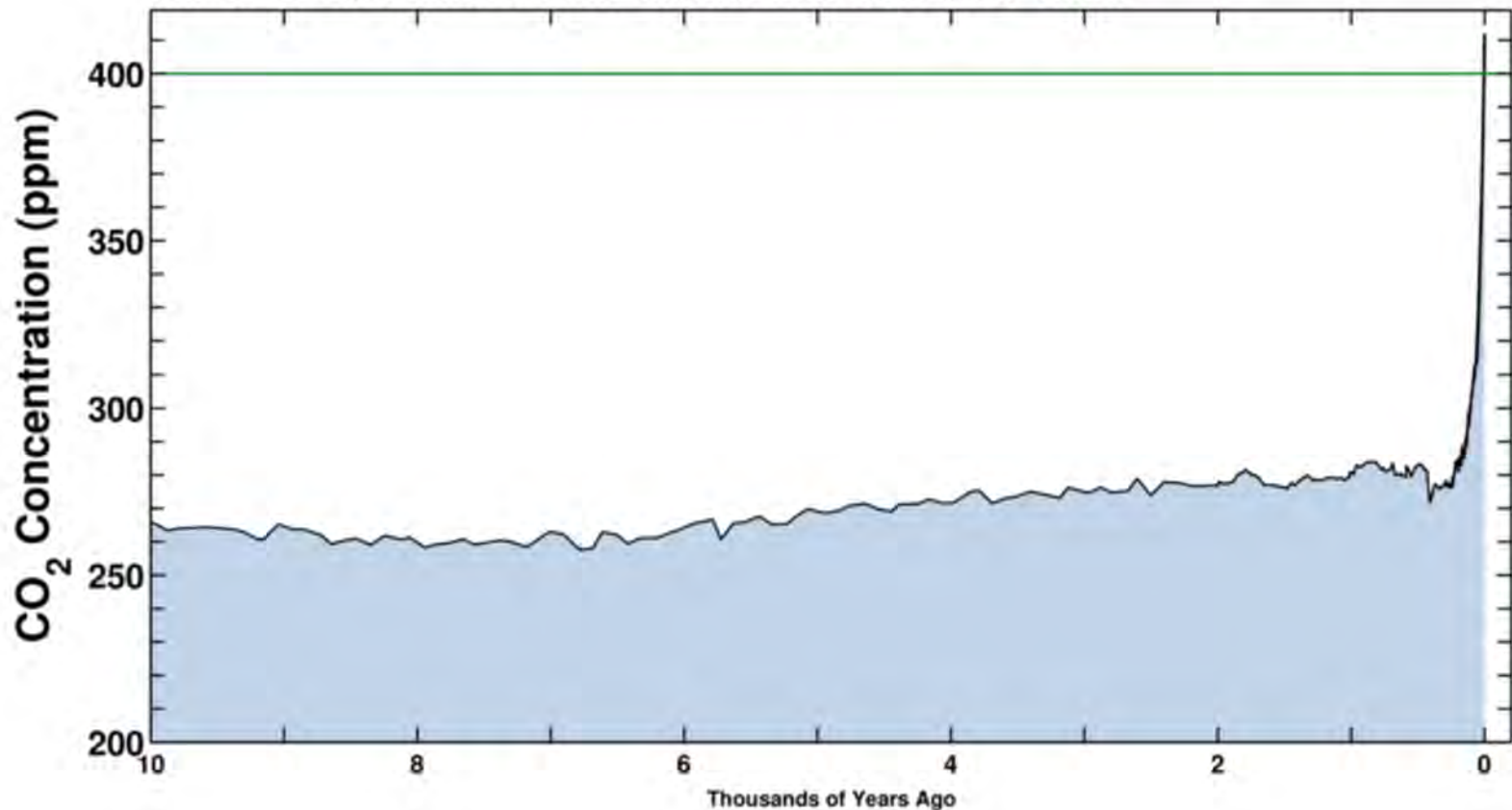
CO₂ Concentration, 18 March 2019 (Keeling curve, last 10000 years)

Latest CO₂ reading

March 18, 2019

414.79 ppm

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



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 CO₂ contents based on fuel consumption data.

Year	Chemical fuel CO ₂ ($\times 10^{16}$ g)	Excess atmo- spheric CO ₂ * ($\times 10^{16}$ g)	Excess atmo- spheric CO ₂ (%)	Excess atmo- spheric CO ₂ (ppm)	CO ₂ content of the atmosphere† (ppm)	Global temper- ature 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 CO₂ produced by the burning of fuel remains in the atmosphere.
†The preindustrial atmospheric partial pressure of CO₂ is assumed to be 293 ppm. ‡Assumes a 0.3°C global temperature increase for each 10 percent rise in the atmospheric CO₂ 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.

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



- Net accumulation of carbon as CO₂ 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 (3):



- 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.**

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**Office:** CEQ**FAX:** 202.456.2710**Telephone:** 202.456.6540**FROM:** Randy Randol**Company:** ExxonMobil - Washington Office**FAX:** 202.862.0267 (Backup: 202.862.0268)**Telephone:** 202.862.0220 (Backup: 202.862.0223)**E-Mail:** arthur.g.randol@exxon.com**A. G. (Randy) Randol III, Ph.D.**
Senior Environmental Advisor**ExxonMobil****Date/Time:** 6 Feb 2001, 10:00 a.m.**Pages including Cover:** 18**Exxon Mobil Corporation**
2001 Pennsylvania Avenue, N.W.
Suite 300
Washington, District of Columbia 20006-1813
202 862 0220 Telephone
202 862 0267 Facsimile
arthur.g.randol@exxon.com**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?

Falsely argues that because we don't know everything, we know nothing.

False: In the 1990s, scientists had already formed a consensus that humans were causing global warming.

Just because climate has changed naturally in the past does not mean it's natural now.

Unsettled Science

Knowing that weather forecasts are reliable for a few days at best, we should recognize the enormous challenge facing scientists seeking to predict climate change and its impact over the next century. In spite of everyone's desire for clear answers, it is not surprising that fundamental gaps in knowledge leave scientists unable to make reliable predictions about future changes.

A recent report from the National Research Council (NRC) raises important issues, including these still-unanswered questions: (1) Has human activity already begun to change temperature and the climate, and (2) How significant will future change be?

The NRC report confirms that Earth's surface temperature has risen by about 1 degree Fahrenheit over the past 150 years. Some use this result to claim that humans are causing global warming, and they point to storms or floods to say that dangerous impacts are already under way. Yet scientists remain unable to confirm either contention.

Geological evidence indicates that climate and greenhouse gas levels experience significant natural variability for reasons having nothing to do with human activity. Historical records and current scientific evidence show that Europe and North America experienced a medieval warm period one thousand years ago, followed centuries later by a little ice age. The geological record shows even larger changes throughout Earth's history. Against this backdrop of large, poorly understood natural variability, it is impossible for scientists to attribute the recent small surface temperature increase to human causes.

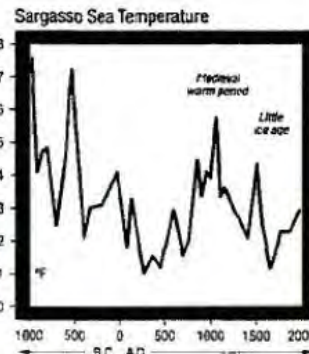
Moreover, computer models relied upon by climate scientists predict that lower atmospheric temperatures will rise as fast as or faster than temperatures at the surface. However, only within the last 20 years have reliable global measurements of temperatures in the lower atmosphere been available through the use of satellite technology. These measurements show little if any warming.

Even less is known about the potential positive or negative impacts of climate change. In fact, many academic studies and field experiments have demonstrated that increased levels of carbon dioxide can promote crop and forest growth.

So, while some argue that the science debate is settled and governments should focus only on near-term policies—that is empty rhetoric. Inevitably, future scientific research will help us understand how human actions and natural climate change may affect the world and will help determine what actions may be desirable to address the long-term.

Science has given us enough information to know that climate changes may pose long-term risks. Natural variability and human activity may lead to climate change that could be significant and perhaps both positive and negative. Consequently, people, companies and governments should take responsible actions now to address the issue.

One essential step is to encourage development of lower-emission technologies to meet our future needs for energy. We'll next look at the promise of technology and what is being done today.



ExxonMobil

Cast doubt on the scientific consensus on climate change.

Contradicts themselves: they already talk about 1 degree warming.

Uses the same delay argument as the tobacco industry: "Let's wait before we act".

Figure 4: ExxonMobil 2000 advertorial in The New York Times.

The fossil fuel industry implemented their plans to promote climate denial in the 1990s-2010s.

Source: @GeoffreySupran

**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 responsibility 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>)

Why I prefer to speak about « climate confusers »



- I reserve the word « denialist » to those who deny the Holocaust, out of respect for the victims of the Shoah
- I don't speak of « climate skeptics » either, as skepticism is at the root of the scientific method, and those « climate confusers » should not be given the monopoly of skepticism
- « Climate confuser » is an expression suggested to me by Kees van der Leun (@Sustainable2050)

Mandate of the IPCC

“The General Assembly [...] endorses action of the World Meteorological Organisation and the United Nations Environment Programme in jointly establishing an Intergovernmental Panel on Climate Change to provide **international coordinated scientific assessments** of the magnitude, timing and potential environmental and socio-economic impact of climate change and realistic response strategies [...].”

United Nations General Assembly
43rd session resolution, 6th December 1988


Role of IPCC



"The IPCC does not carry out research nor does it monitor climate related data or other relevant parameters. It bases its assessment mainly on peer reviewed and published scientific/technical literature."

(source: www.ipcc.ch)

Jean-Pascal van Ypersele
(vanypersele@astr.ucl.ac.be)



IPCC Reports are
policy-relevant,
NOT
policy-prescriptive

Inter-governmental Panel on Climate Change (IPCC): Organization Structure



IPCC Plenary

IPCC Bureau

IPCC Secretariat

Working
Group I

The Physical
Science Basis

TSU

Working
Group II

Climate Change
Impacts,
Adaptation and
Vulnerability

TSU

Working
Group III

Mitigation
of
Climate Change

TSU

Task Force
on
National
Greenhouse
Gas
Inventories

TSU

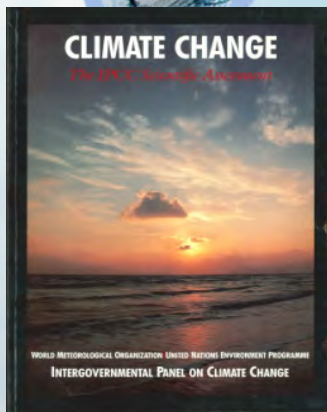
Authors, Contributors, Reviewers

- IPCC plenary comprises of all countries in the world
- IPCC Bureau comprises of 34 elected members; IPCC elects its Bureau every 6-7 years
- 3 Working Groups & a Task Force on National Greenhouse Gas Inventories
- Authors, Contributors, Reviewers, Review Editors

IPCC writing cycle (4 years, 831 Lead authors)

- Plenary decides table of content of reports
- Bureau appoints world-class scientists as authors, based on publication record
- Authors assess all scientific literature
- *Draft* – Expert review (+ Review editors)
- *Draft 2 (+ Draft 1 Summary for Policy Makers (SPM))* – Combined expert/government review
- *Draft 3 (+ Draft 2 SPM)* – Government review of SPM
- Approval Plenary (interaction authors – governments) – *SPM and full report*
- ***NB: the scientists have the last word!***

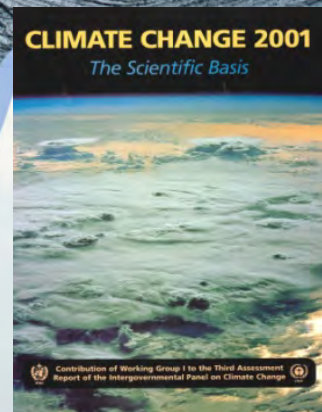
IPCC Assessment Reports



FAR 1990



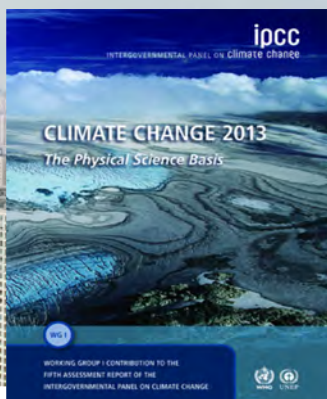
SAR 1995



TAR 2001



AR4 2007



AR5 WGI 2013



AR5 WGII 2014



AR5 WGIII 2014



IPCC AR5 Synthesis Report

The IPCC assessments have influenced global action on an unprecedented scale

- 1. The First Assessment Report (FAR, 1990) had a major impact in defining the content of the UNFCCC**
- 2. The Second Assessment Report (SAR, 1996) was largely influential in defining the provisions of the Kyoto Protocol**
- 3. The Third Assessment Report (TAR, 2001) focused attention on the impacts of climate change and the need for adaptation**
- 4. The Fourth Assessment Report (AR4, 2007) informed the decision on the ultimate objective (2° C) and is creating a strong basis for a post Kyoto Protocol agreement**
- 5. The Fifth Assessment Report (AR5, 2013-14) is informing the review of the 2° C objective, and the preparation of the Paris 2015 agreement**

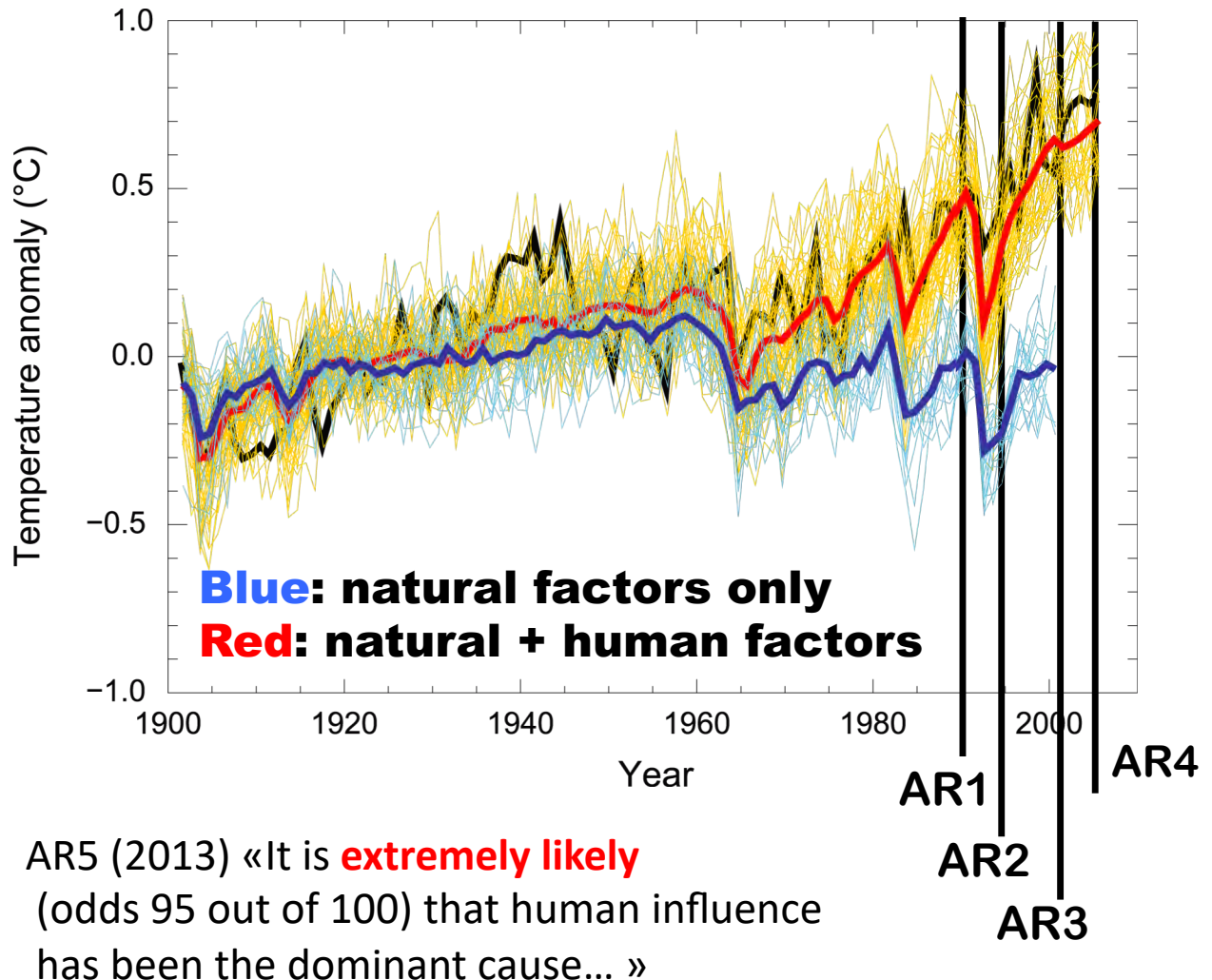
A Progression of Understanding: Greater and Greater Certainty in Attribution

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”



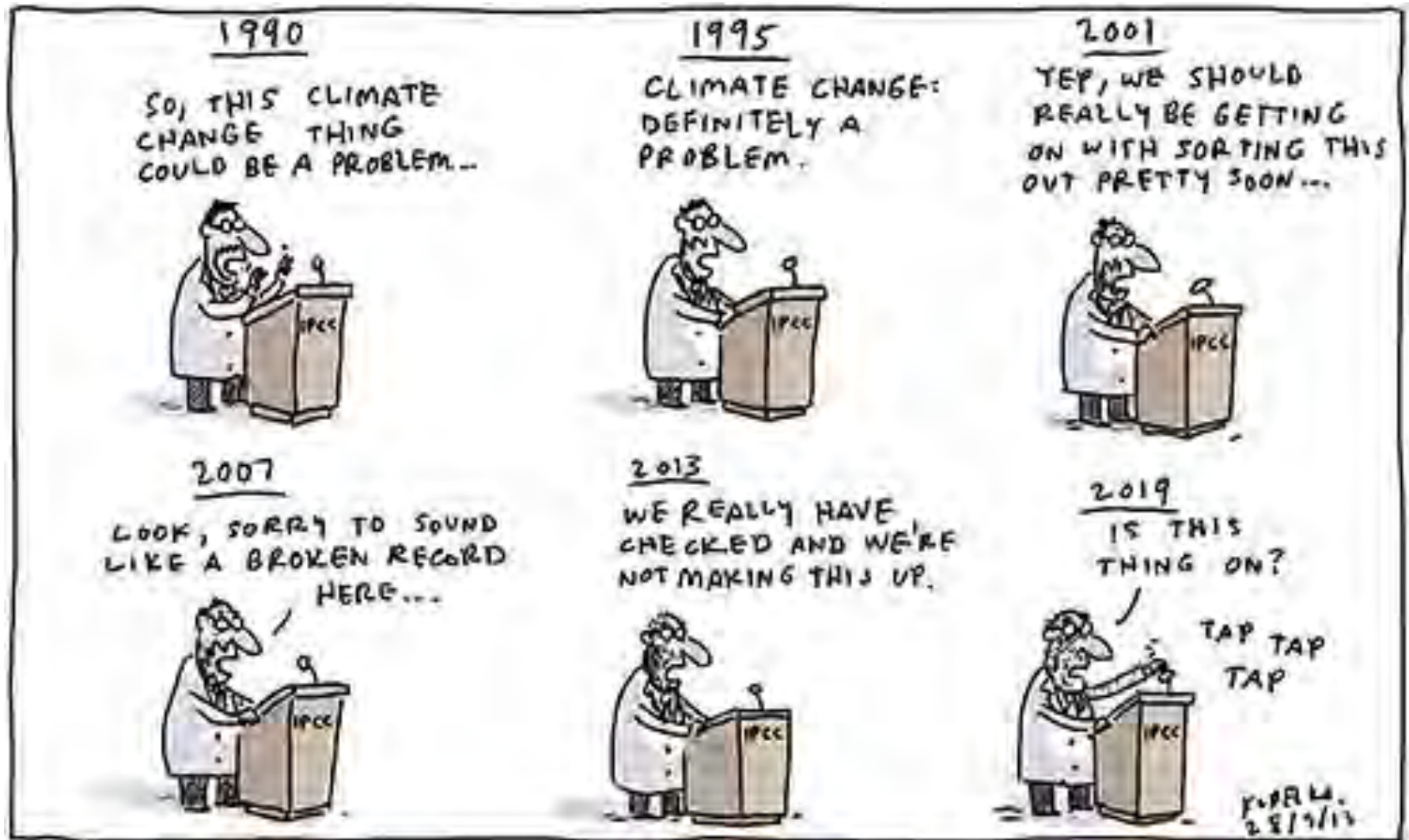
Key messages from IPCC AR5

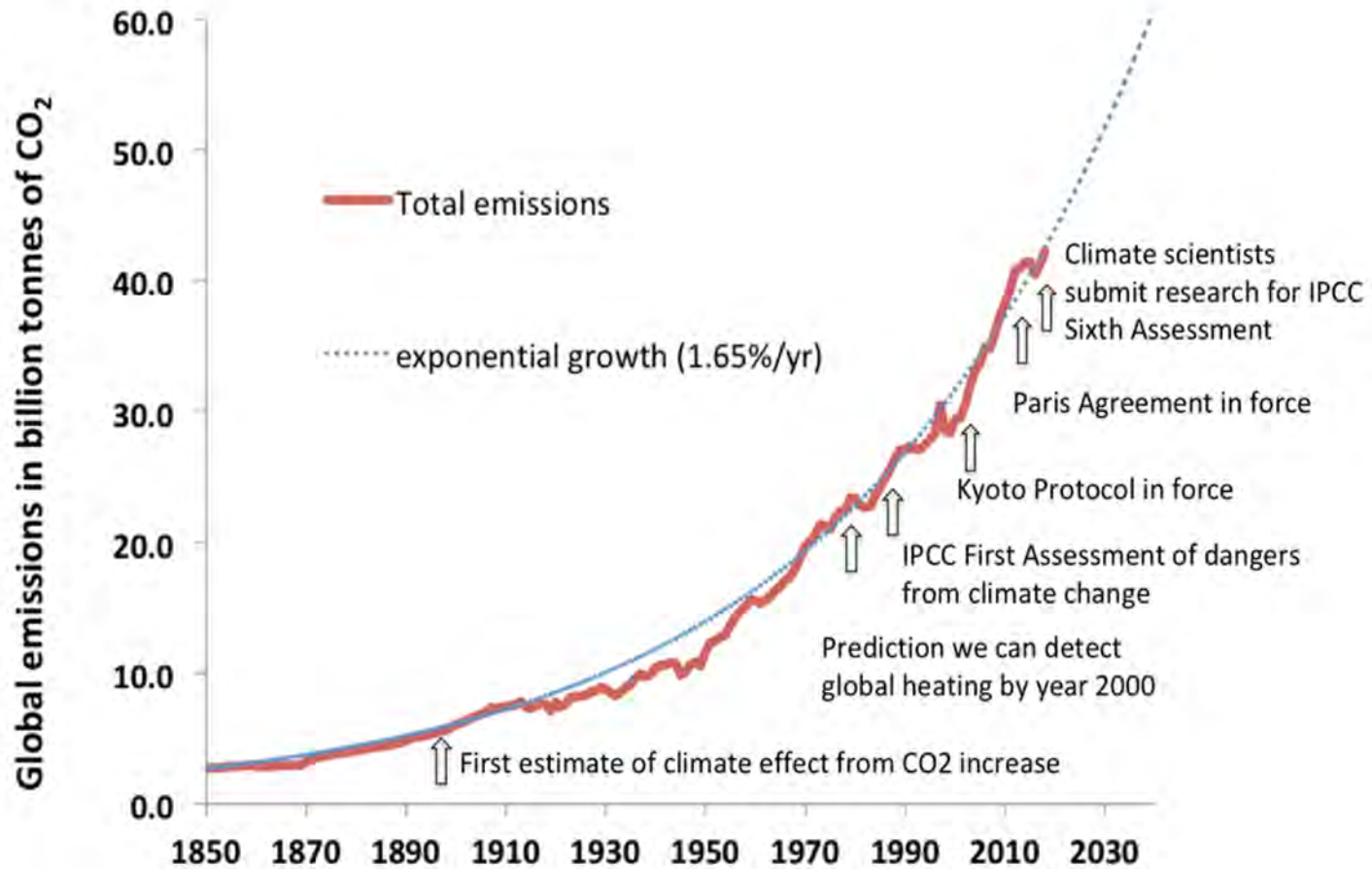
- **Human influence on the climate system is clear**
- **Continued emissions of greenhouse gases will increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems**
- **While climate change is a threat to sustainable development, there are many opportunities to integrate mitigation, adaptation, and the pursuit of other societal objectives**
- **Humanity has the means to limit climate change and build a more sustainable and resilient future**

30 years old: IPCC first report warning of global warming induced climate change

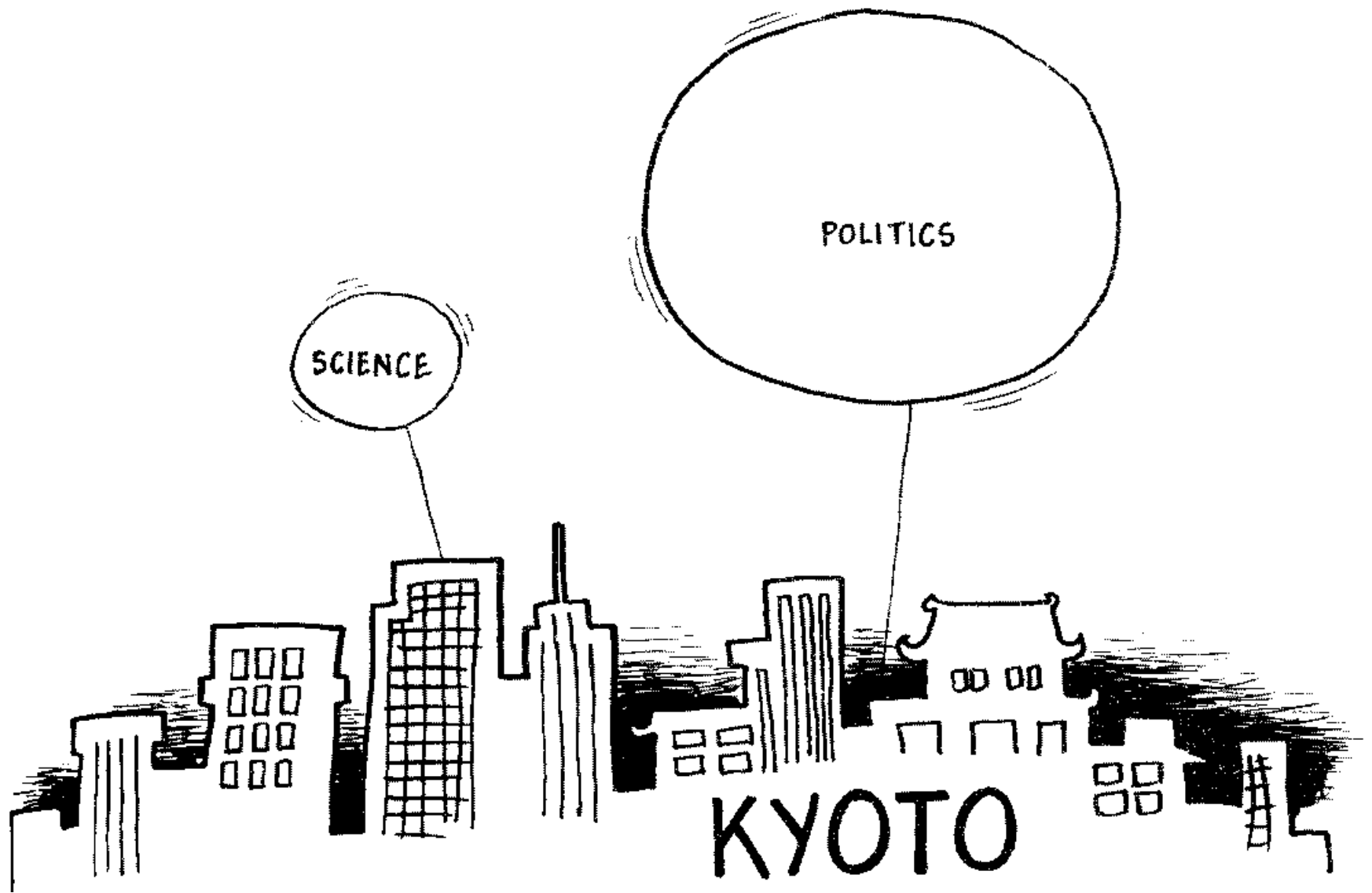


None So Deaf

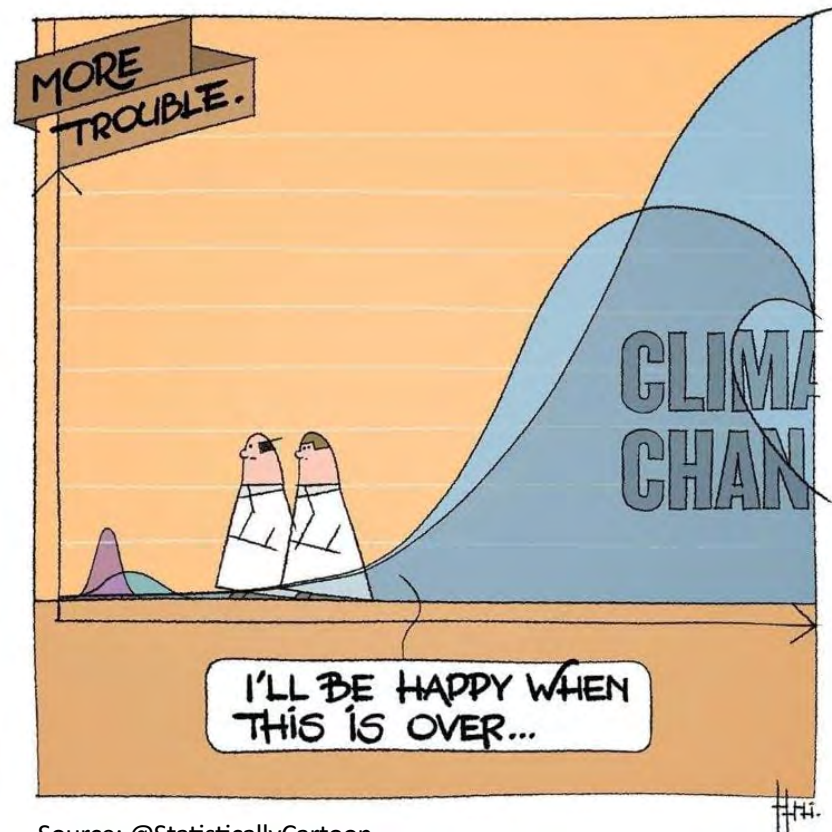




Source: Wolfgang Knorr, in The Conversation (2019)



Agarwal et al., 1999



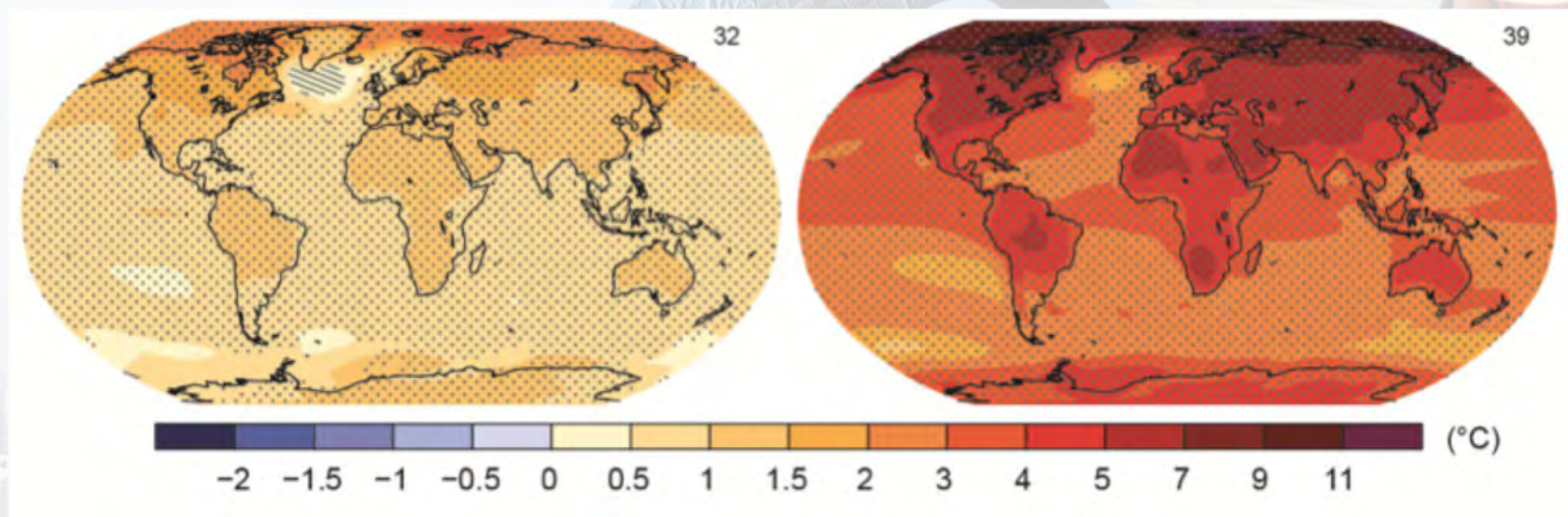
Source: @StatisticallyCartoon

@JPvanYpersele

Humanity still has the choice

With substantial
mitigation

Without additional
mitigation



Change in average surface temperature (1986–2005 to 2081–2100)

AR5 WGI SPM



@Kroll

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 truth¹

Jean-Pascal van Ypersele ([@JPvanYpersele](https://twitter.com/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/vany

Conclusions



- **Knowledge about the climate problem and its solutions is more than enough to lead to the urgent action needed**
- **Climate confusers efforts, including those funded by fossil fuel lobbies, are slowing things down**
- **IPCC has an essential role to inform citizens and policymakers**

Om meer te weten:

Bij EPO (2018)

**Voorwoord:
Jill Peeters**



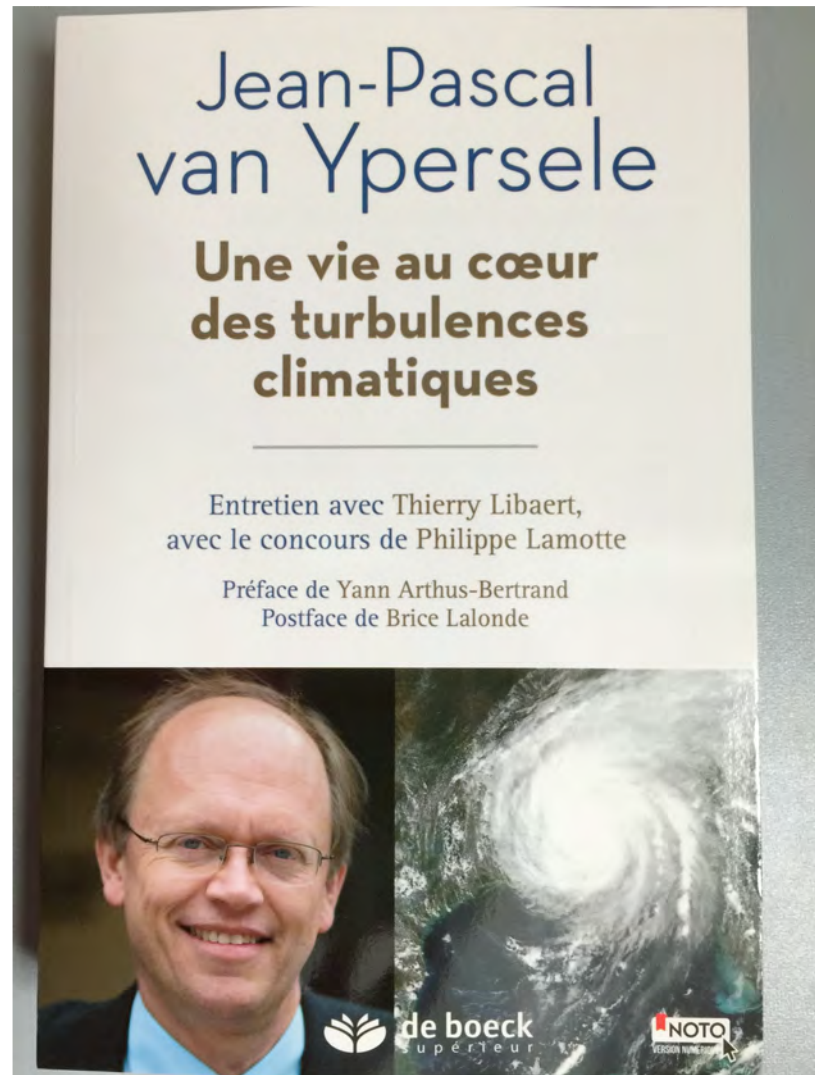
Pour en savoir plus:

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

**Publié chez De Boeck
supérieur**

**Préface: Yann Arthus-
Bertrand**

Postface: Brice Lalonde



Additional book references

- Oreskes, N. & E. Conway (2010) "The Merchants of Doubt - How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming." Bloomsbury Press.
- Schneider, S.H. (2009) "Science as a contact sport – Inside the battle to save Earth's climate", National Geographic Society.
- Bolin, B. (2007) "A History of the Science and Politics of Climate Change -- The Role of the Intergovernmental Panel on Climate Change", Cambridge University Press

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DAT POLITICI OVER TWINTIG JAAR NIET KOMEN JANKEN DAT ZE HET NIET WISTEN.



DIRK DRAULANS
(1956) is bioloog, doctor in de wetenschappen en was gastonderzoeker aan de University of Oxford. Sinds 1987 is hij journalist bij Knack.



JEAN-PASCAL VAN YPERSELE (1957) is fysicus en klimatoloog. Hij is hoogleraar klimatologie en milieuwetenschappen aan de UCLouvain en was ondervoorzitter van het Intergovernmental Panel on Climate Change (IPCC).

BIJLAGE BIJ KNACK VAN 16 SEPTEMBER 2020. MAG NIET LOS VERKOCHT WORDEN.

HET KLIMAAT ALARM

Dirk Draulans en
Jean-Pascal van Ypersele



Knack

HET KLIMAATALARM

Gratis pdf op : www.knack.be/klimaatalarm

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.desmogblog.com: analysis of contrarians strategies
- www.plateforme-wallonne-giec.be : IPCC-related in French, Newsletter, latests on SR15, basic climate science
- **Twitter: @JPvanYpersele & @IPCC_CH**

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