

Climate Change:

A few important facts, and a few possible elements of solution

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ITUC, Katowice, 10 December 2018

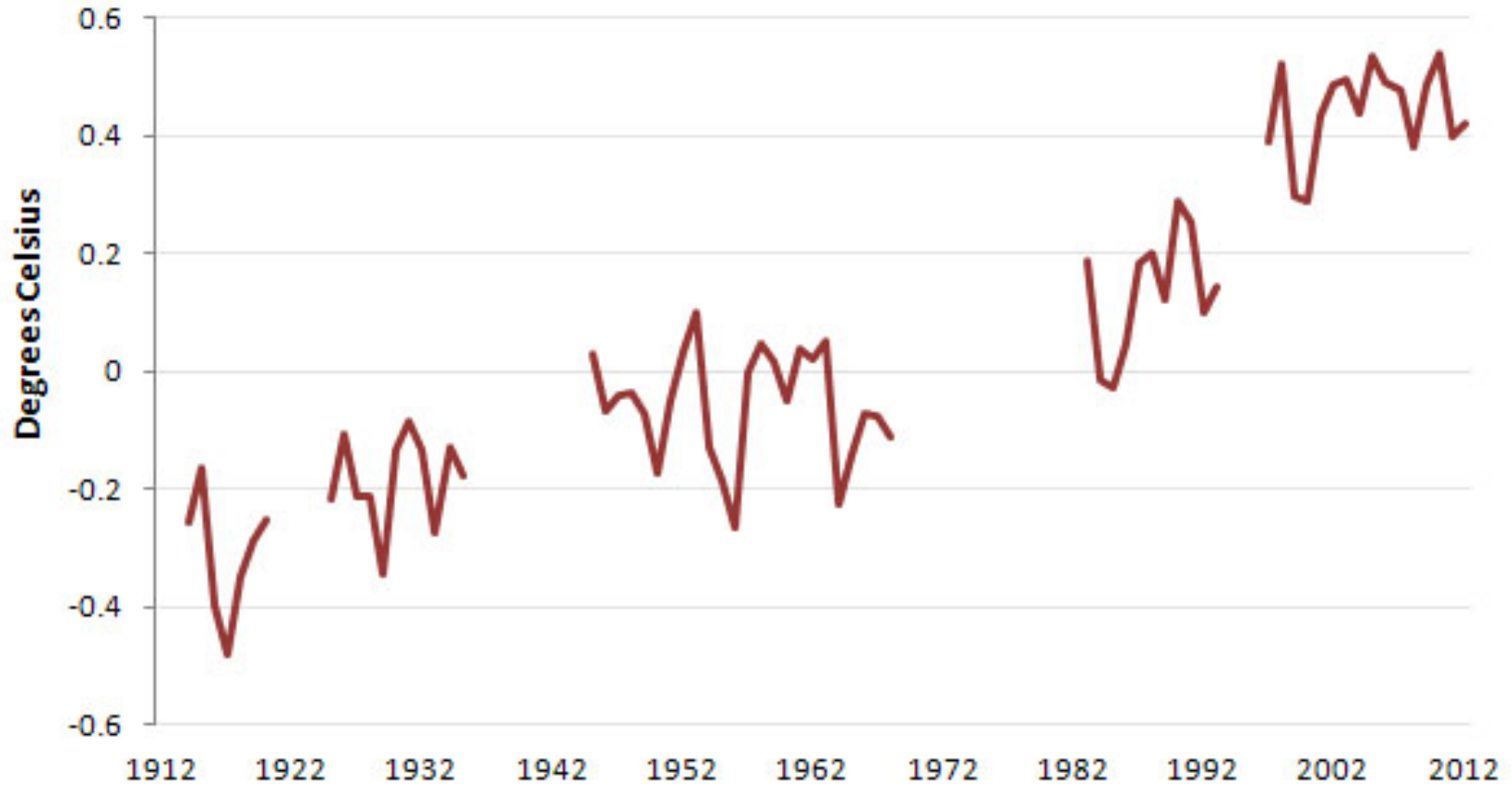
Thanks to the Walloon government for supporting www.pplateforme-wallonne-giec.be & my team at UCLouvain

Temperature Change From 1961-1990 Average



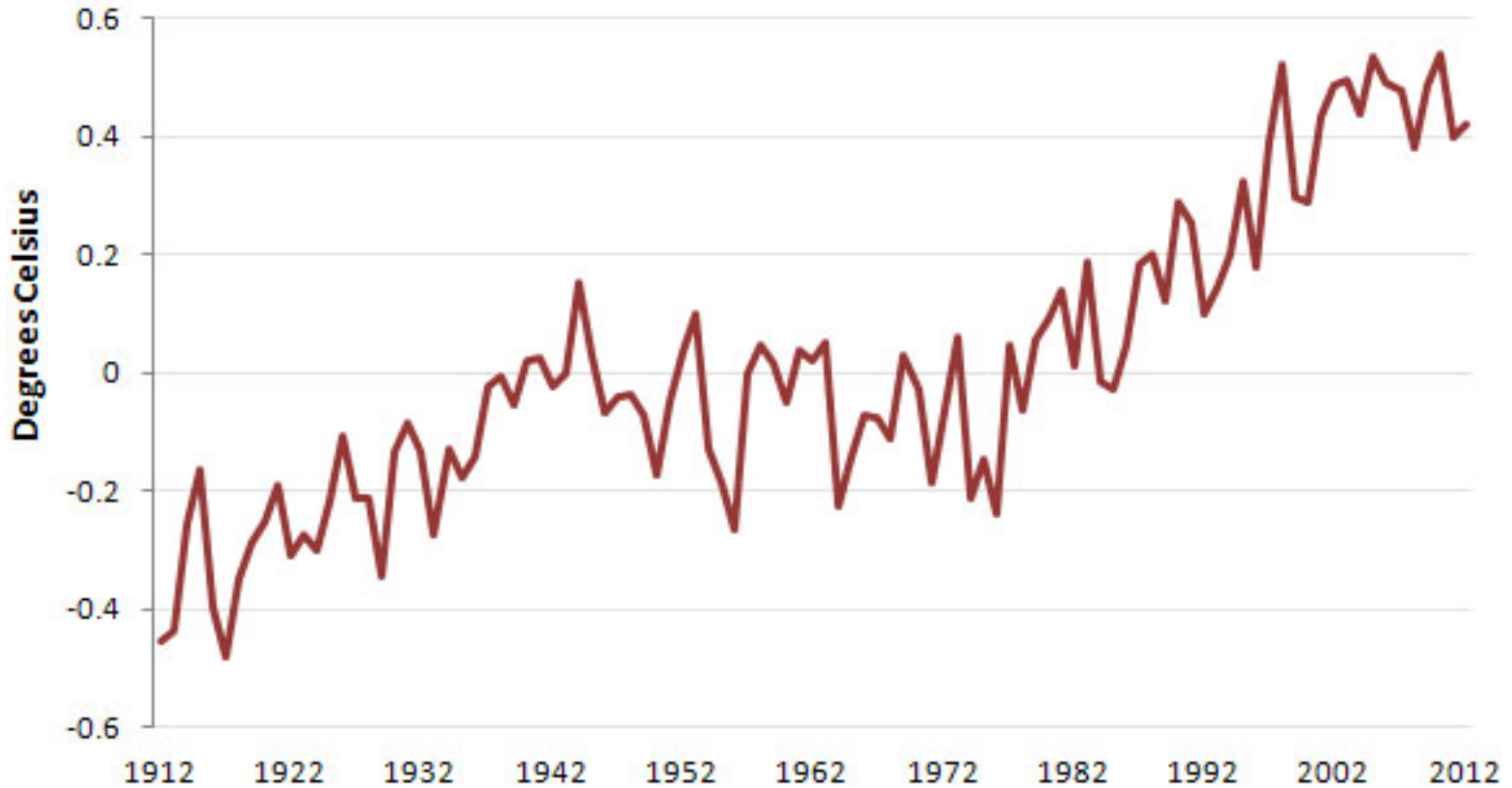
Lying With Statistics, Global Warming Edition

Temperature Plateaus — 1912-2012



Lying With Statistics, Global Warming Edition

Temperature Change From 1961-1990 Average



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



The role of the IPCC is ...

“... to **assess** on a comprehensive, objective, open and transparent basis the **scientific, technical and socio-economic information** relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation.”

“IPCC reports should be **neutral with respect to policy**, although they may need to **deal objectively with scientific, technical and socio-economic factors** relevant to the application of particular policies.”

Principles Governing IPCC Work, paragraph 2

Source: <http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf>

ipcc

INTERGOVERNMENTAL PANEL ON climate change



Fact n° 1: Because we use the atmosphere as a dustbin for our greenhouse gases, we thicken the insulation layer around the planet

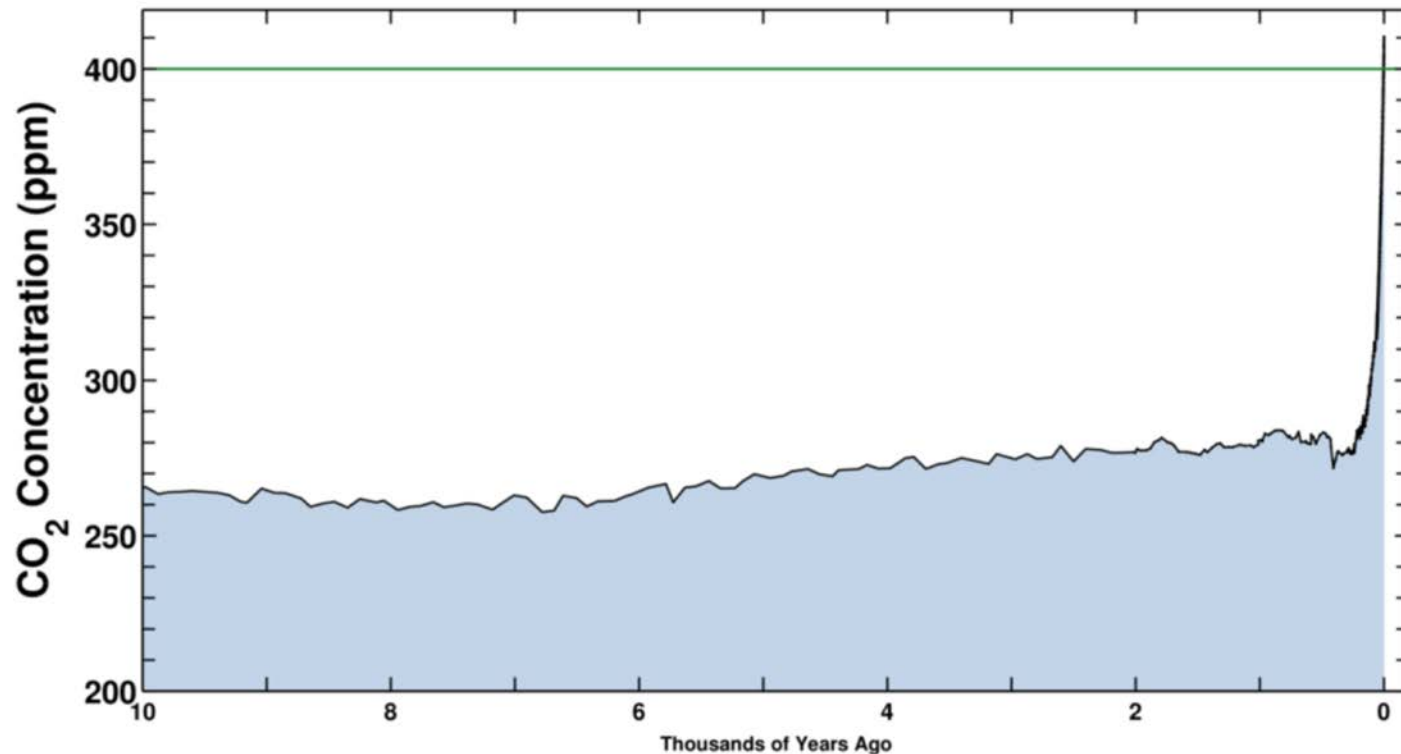
That is why we must cut emissions to ZERO as soon as possible

CO₂ Concentration, 28 May 2018 (Keeling curve)

Latest CO₂ reading
May 28, 2018

411.98 ppm

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



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

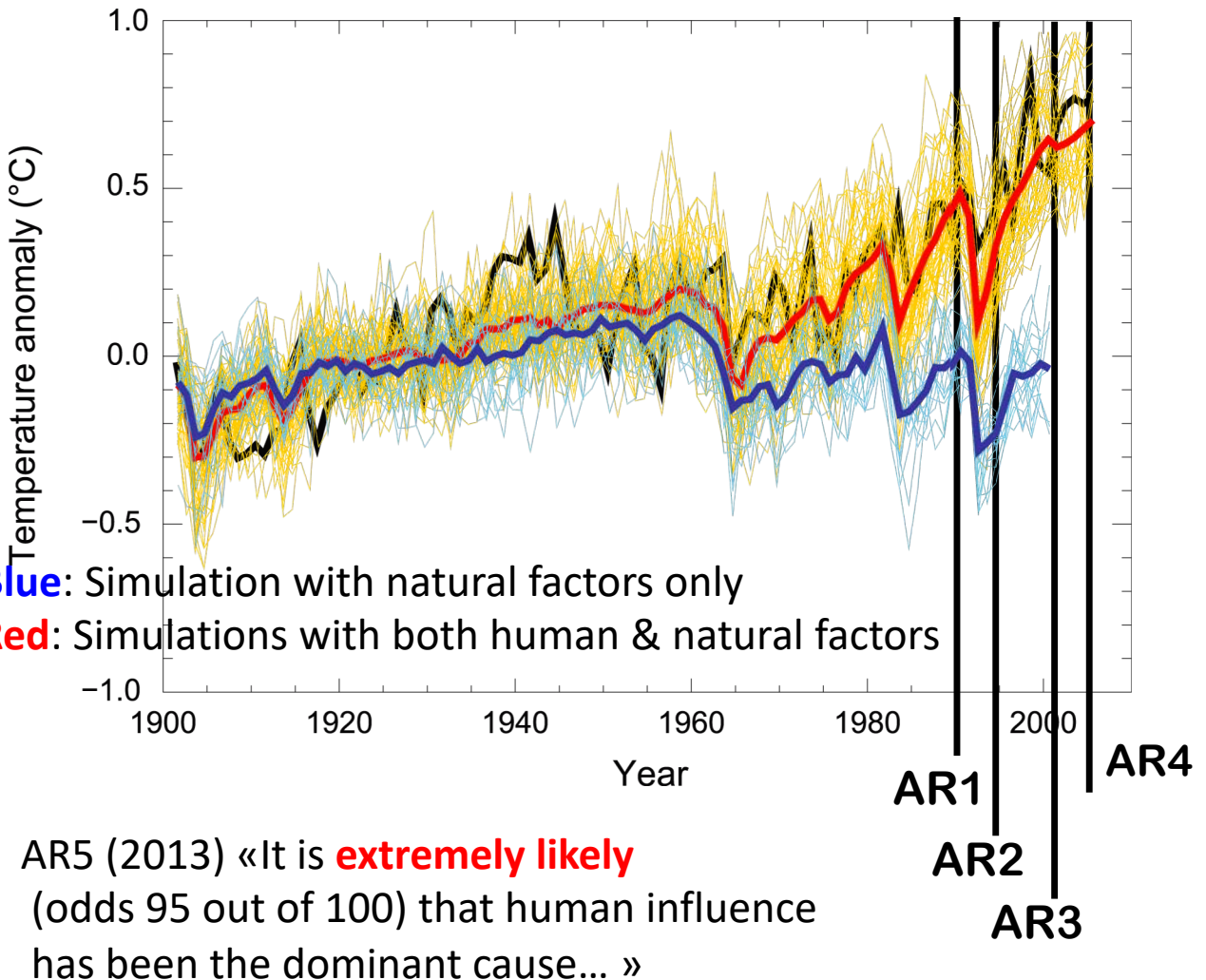
A Progression of Understanding: Greater and Greater Certainty in Attribution

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

AR2 (1995): “balance
of evidence suggests
discernible human
influence”

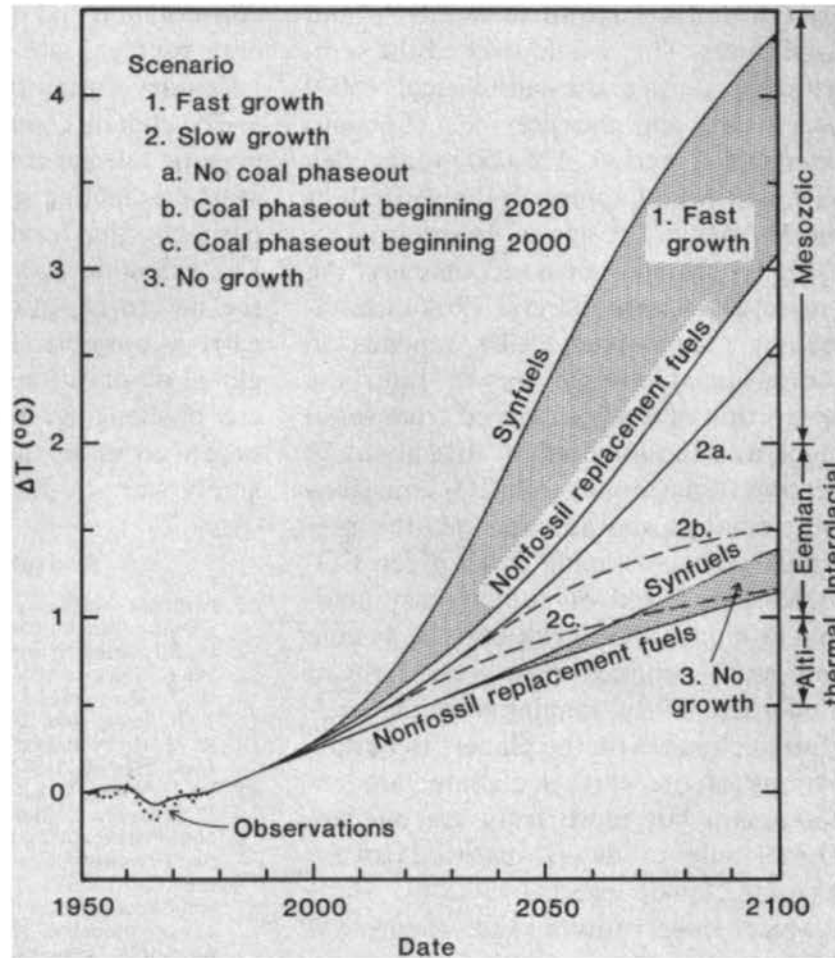
AR3 (2001): “most of
the warming of the
past 50 years is **likely**
(odds 2 out of 3) due
to human activities”

AR4 (2007): “most of
the warming is **very
likely** (odds 9 out of 10)
due to greenhouse
gases”

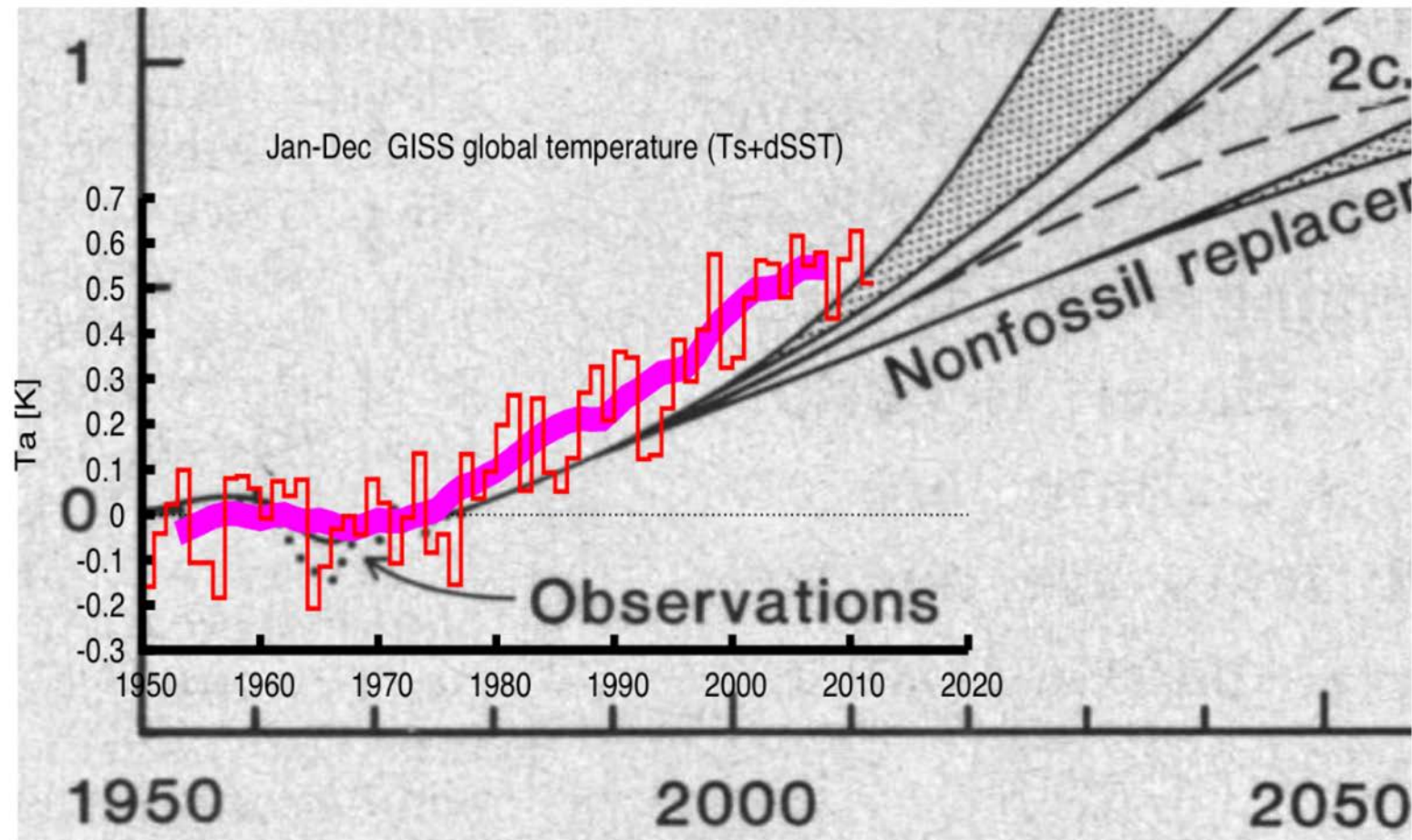


What did climate models say, almost 40 years ago?

Fig. 6. Projections of global temperature. The diffusion coefficient beneath the ocean mixed layer is $1.2 \text{ cm}^2 \text{ sec}^{-1}$, as required for best fit of the model and observations for the period 1880 to 1978. Estimated global mean warming in earlier warm periods is indicated on the right.

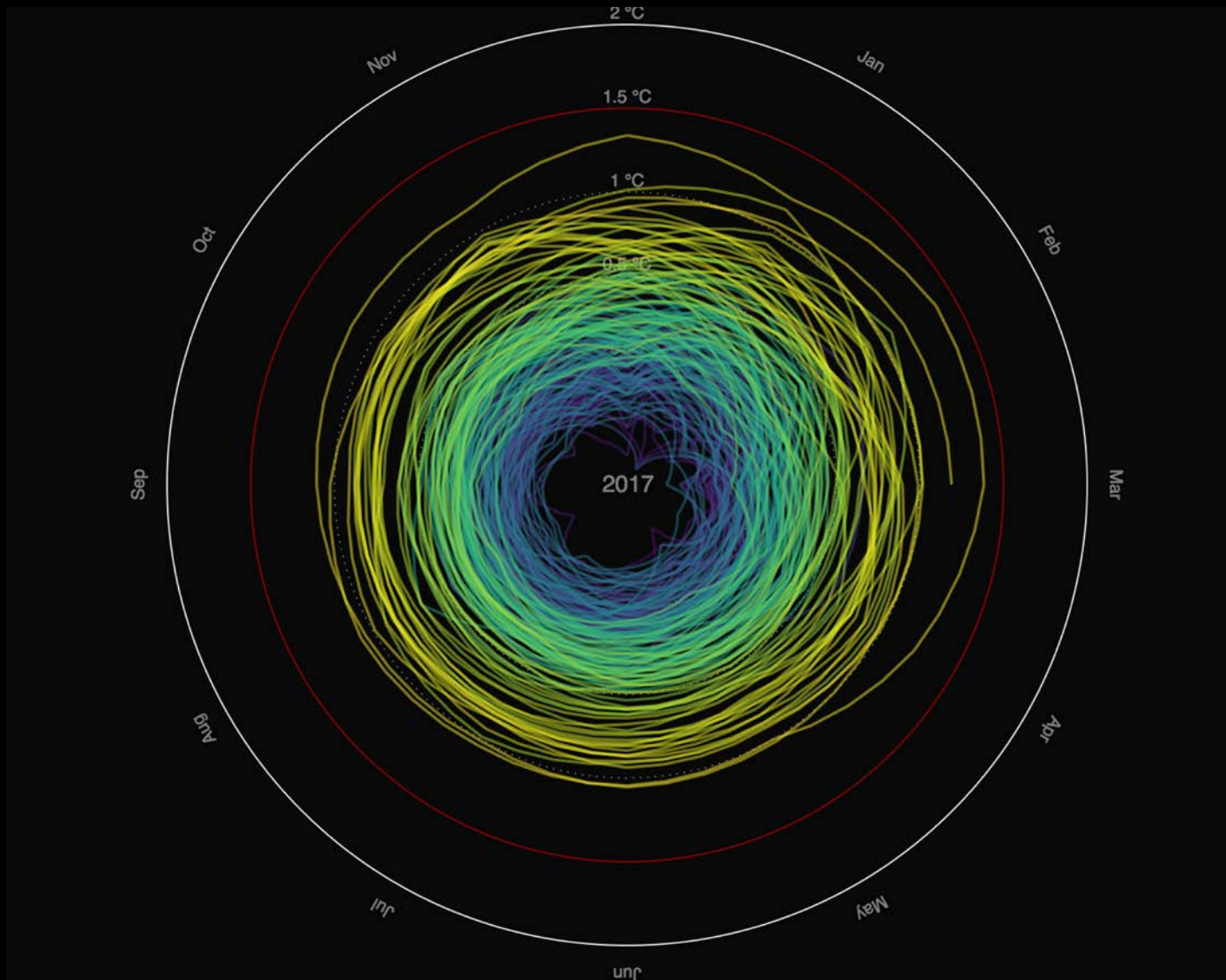


Model results are quite close to what really happened



**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>

Since 1950, extreme hot days and heavy precipitation have become more common



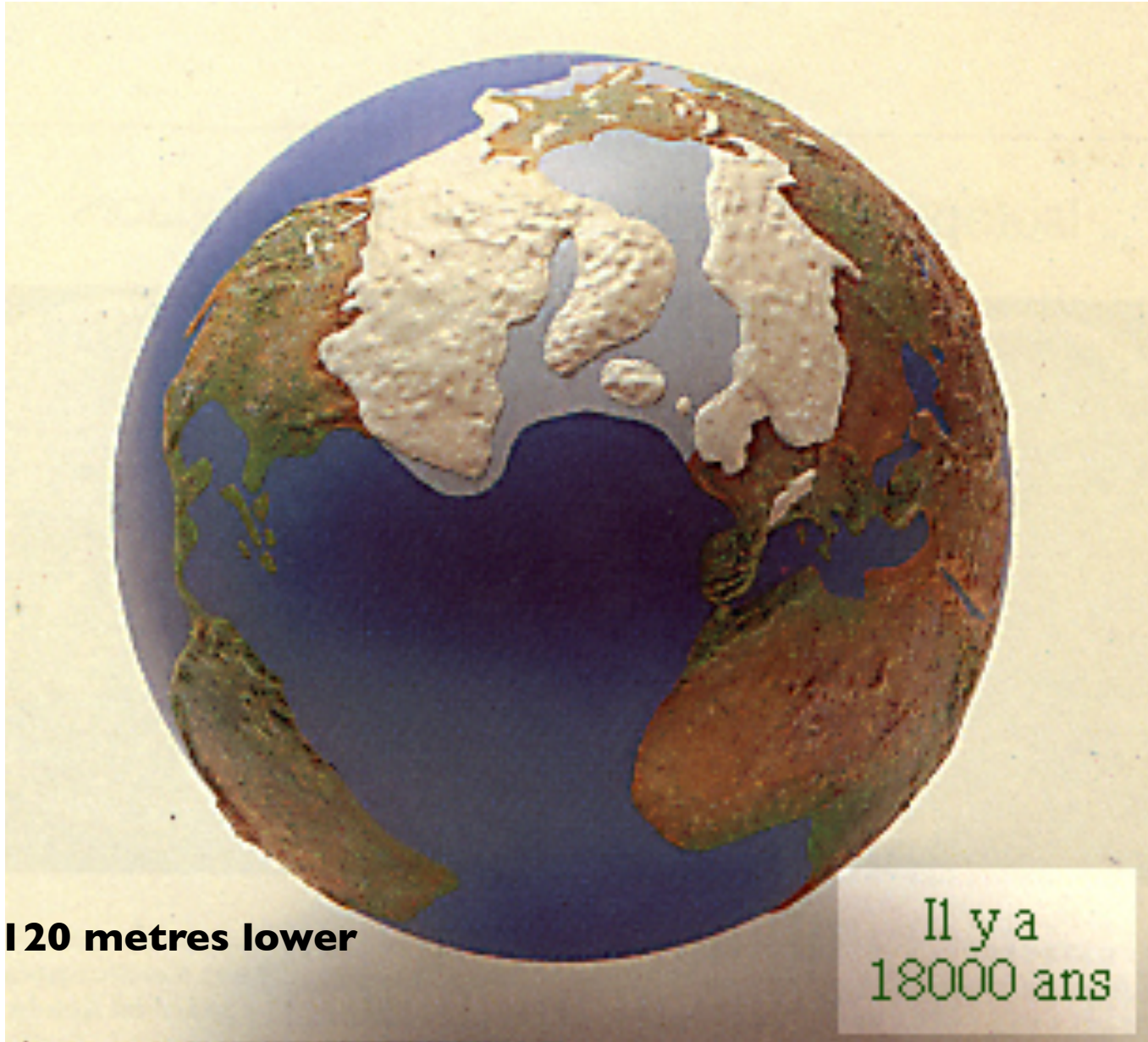
There is evidence that anthropogenic influences, including increasing atmospheric greenhouse gas concentrations, have changed these extremes

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

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

Il y a
18000 ans

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 millions 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

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**

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>)

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

**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...)

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

... as if we were at war, or all running for our life.

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, CO₂ taxes, fines, internal CO₂ price (firms do « as if » CO₂ emission was expensive). NB: Price must match the effect desired!

**Solution n° 4: Transition
towards a clean and sustainable
economy and energy system
must be « just »**

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

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

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.

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

...It is good for health as well!

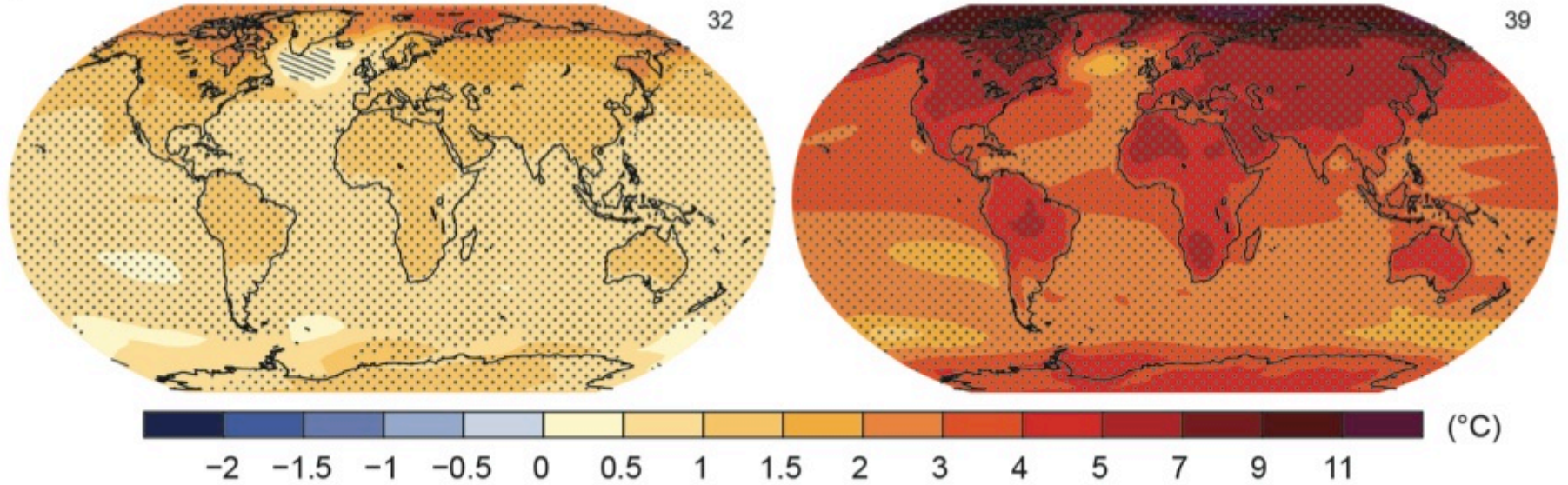
**Solution n° 9: Sun gives us in
two hours about as much
energy as the world uses in *one*
year, all forms of energy
considered**

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

RCP2.6

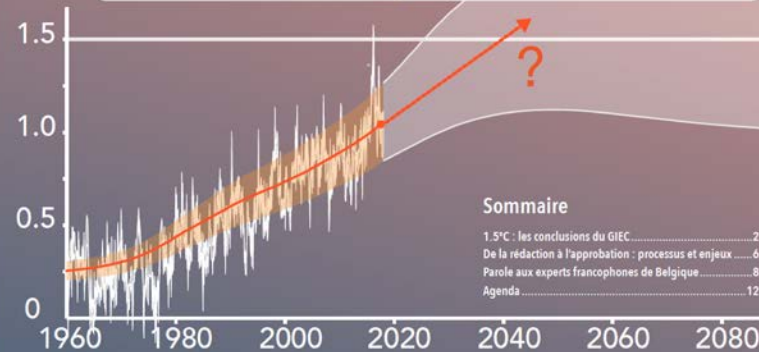
RCP8.5

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



Humanity has the choice

Le rapport spécial du GIEC Réchauffement planétaire de 1.5°C



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

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

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

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

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

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

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

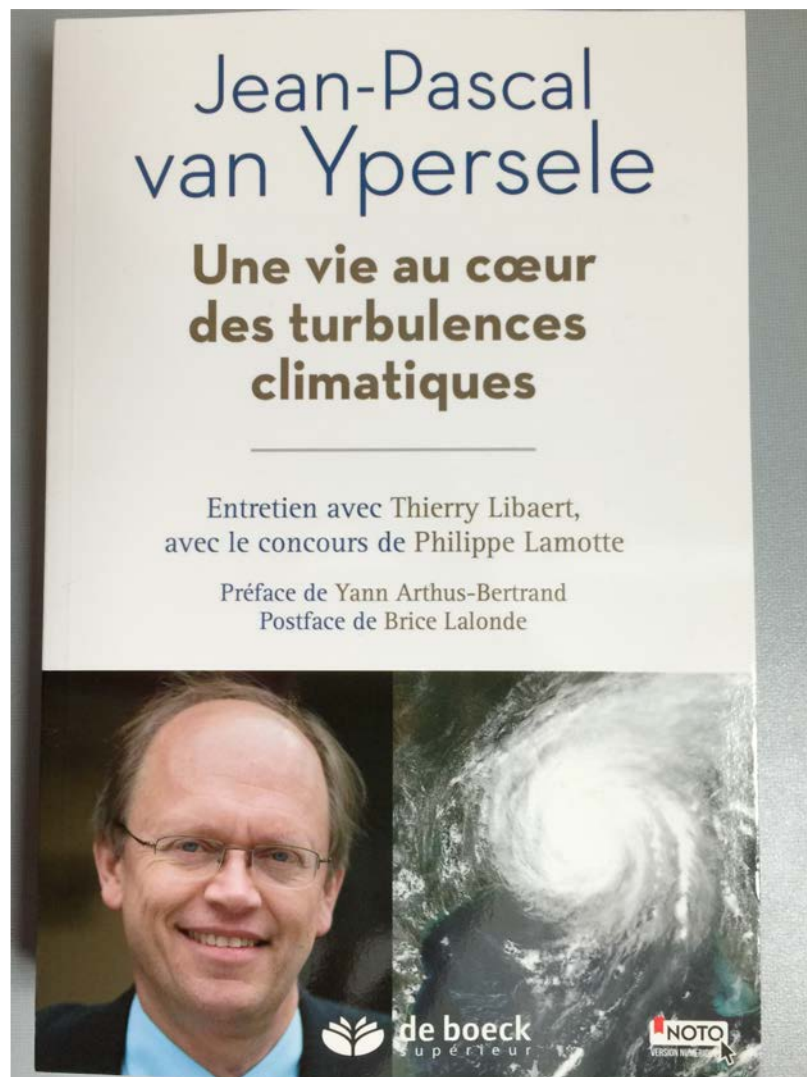


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To go further :

- www.climate.be/vanyp : my slides (under « conferences)
- www.ipcc.ch : IPCC
- www.realclimate.org : answers to the merchants of doubt arguments
- www.skepticalscience.com : same
- www.plateforme-wallonne-giec.be : Lettre d'information gratuite liée aux travaux du GIEC (in French)

Twitter: @JPvanYpersele
@IPCC_CH