De klimaatverandering uitdaging en opportuniteiten

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European Think Tank, Edegem, 13 januari 2018
NB: Merci au Gouvernement wallon pour son soutien à la http://plateforme-wallonne-giec.be.

Why the IPCC ?

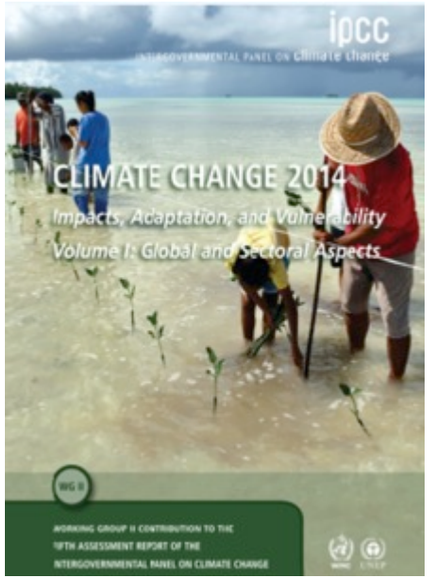
Established by WMO and UNEP in 1988

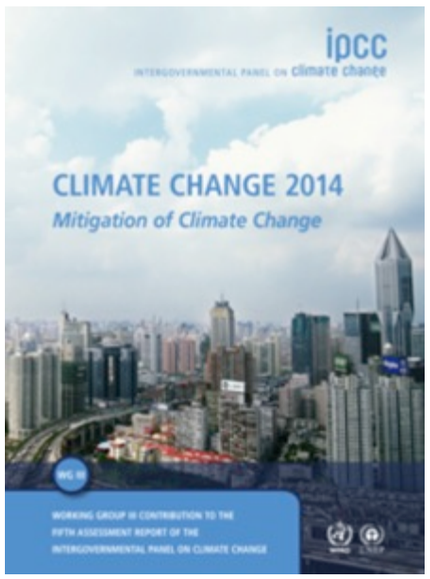
to provide policy-makers with an objective source of information about

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

WMO=World Meteorological Organization

UNEP= United Nations Environment Programme





What is happening in the climate system?

What are the risks?

What can be done?

ipcc
INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

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**

IPCC AR5 Synthesis Report

INTERGOVERNMENTAL PANEL ON ipcc climate change

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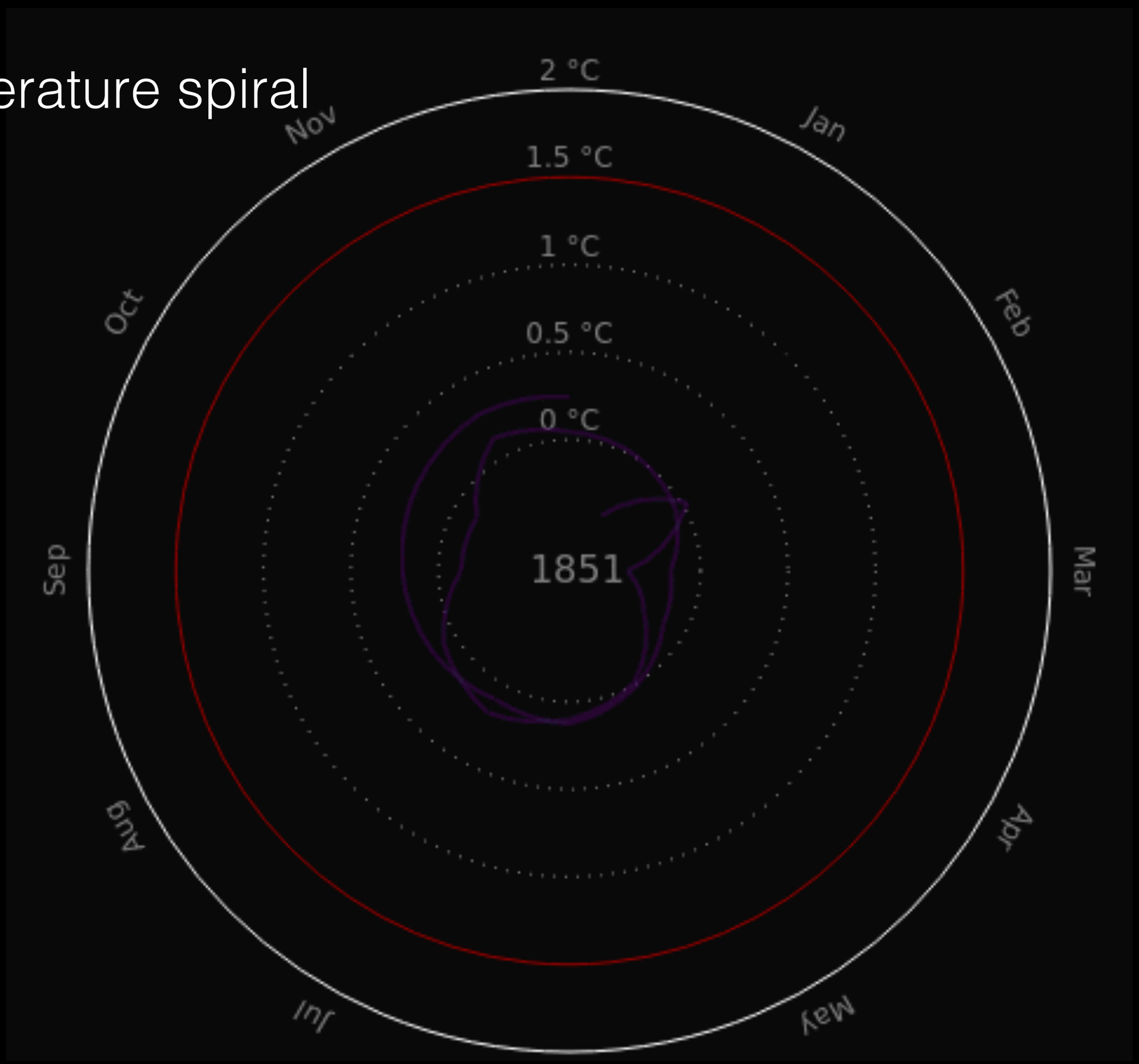
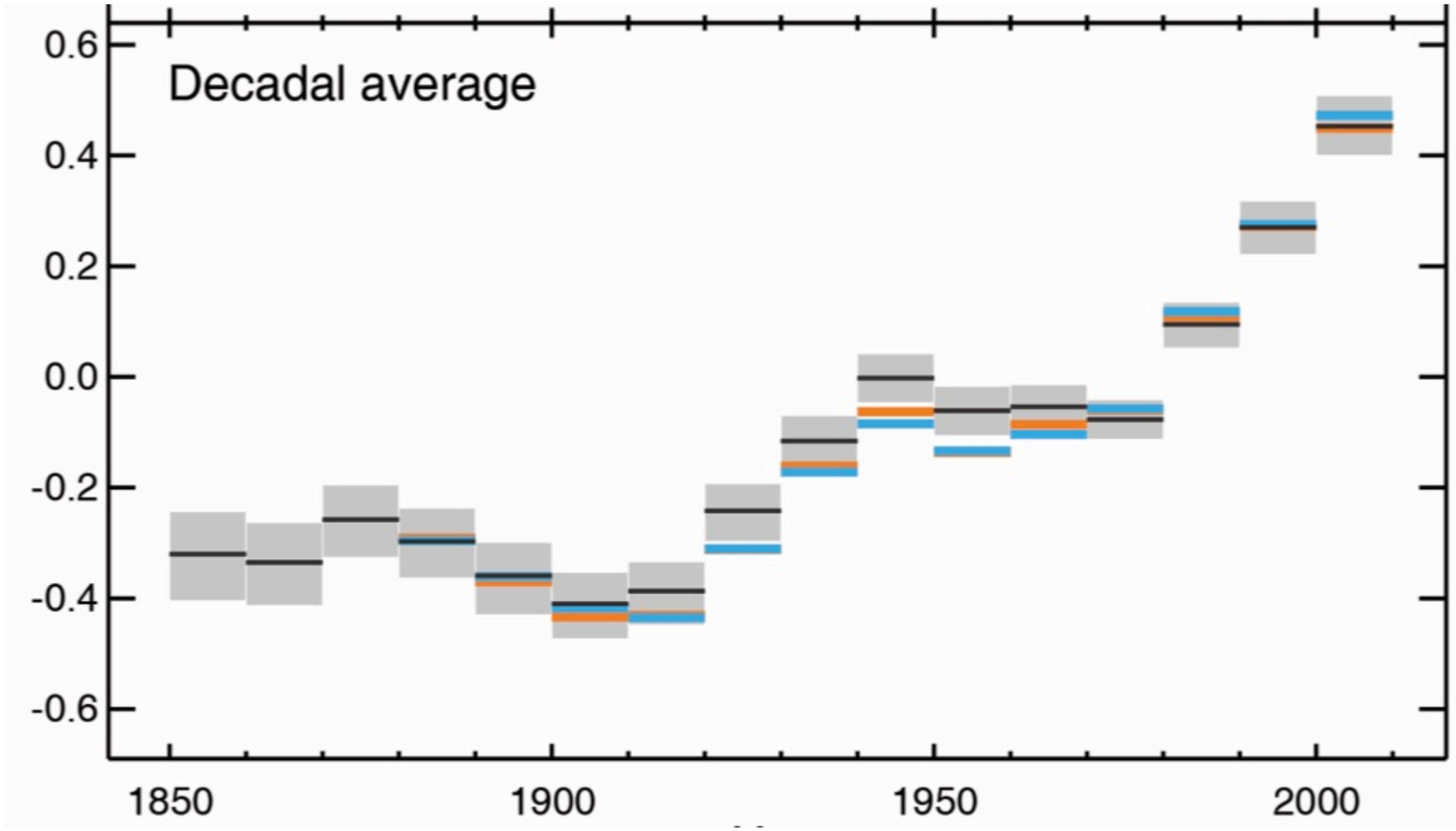
Knelpunten

- **Klimaat veranderd inderdaad**
- **Meestal onder de invloed van menselijke activiteiten (meestal CO_2)**
- **Zonder mitigatie, gevolgen zullen kostbaar zijn, ook voor België**
- **Adaptatie is belangrijk, maar kan niet alles doen**
- **Grote emissie reducties zijn nodig om de opwarming te limiteren**
- **Er zijn veel mogelijkheden om dat te doen,**
- **Het kost niet zoveel als de gevolgen, en er zijn ook "co-benefits" en opportuniteiten**

Temperature spiral



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



(IPCC 2013, Fig. SPM.1a)

Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850.

In the Northern Hemisphere, 1983–2012 was *likely* the **warmest 30-year period of the last 1400 years** (*medium confidence*).

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

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)
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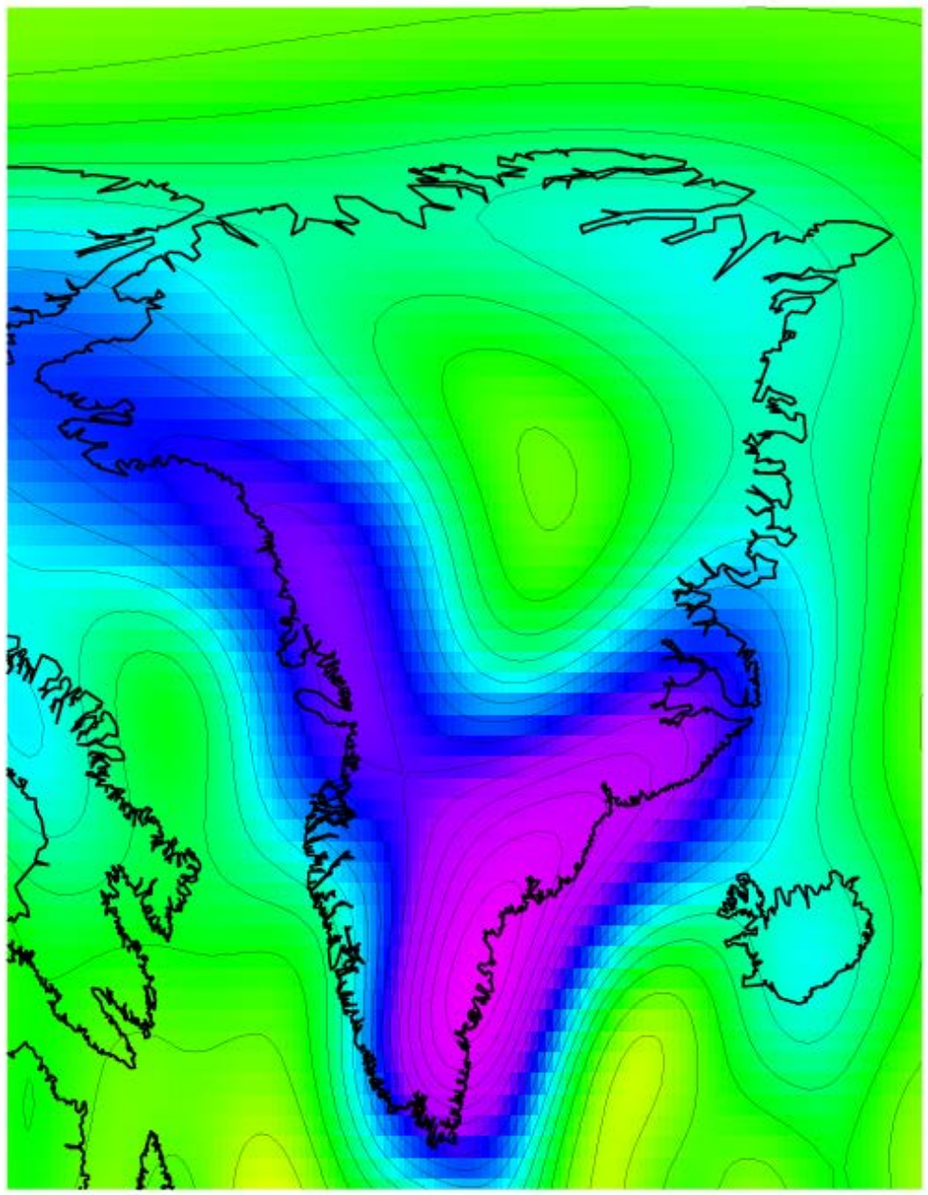
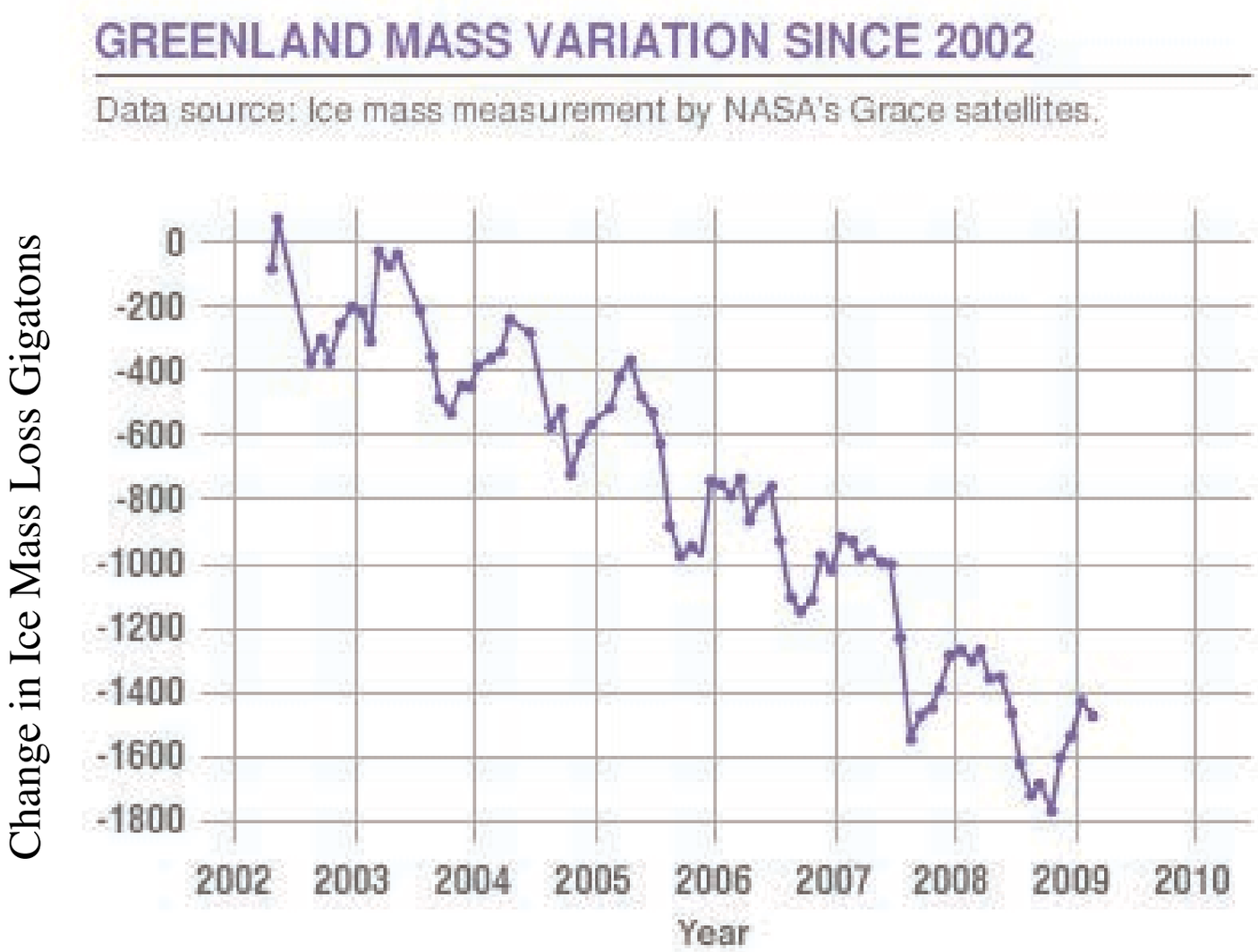
Greenland Ice Mass Loss 2002-2009 Derived From NASA GRACE Gravity Mission

Greenland



J. Wahr, U. Colorado

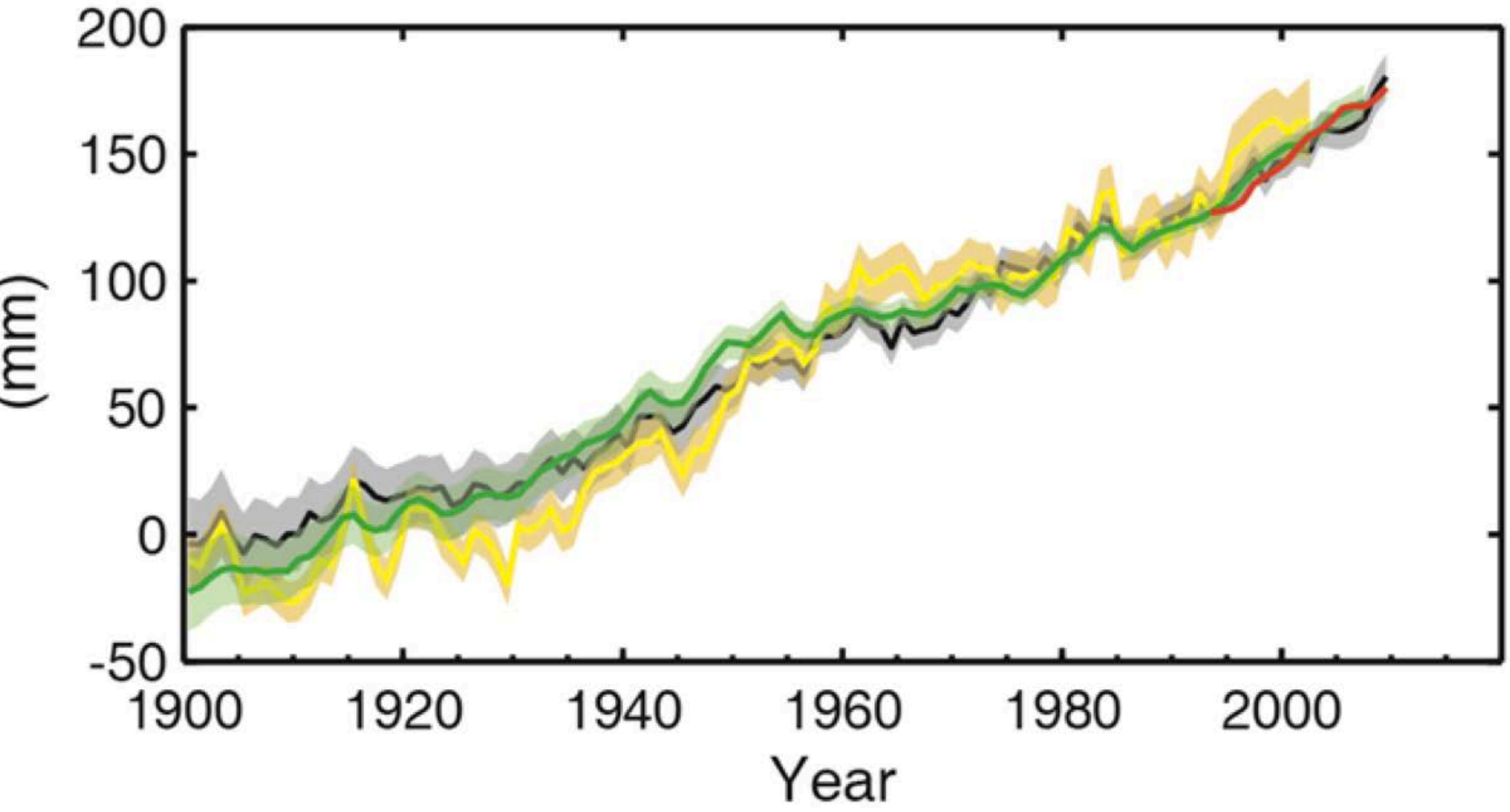


Velicogna, Geophysical Research Letters, 2009

•Contributes to sea level rise

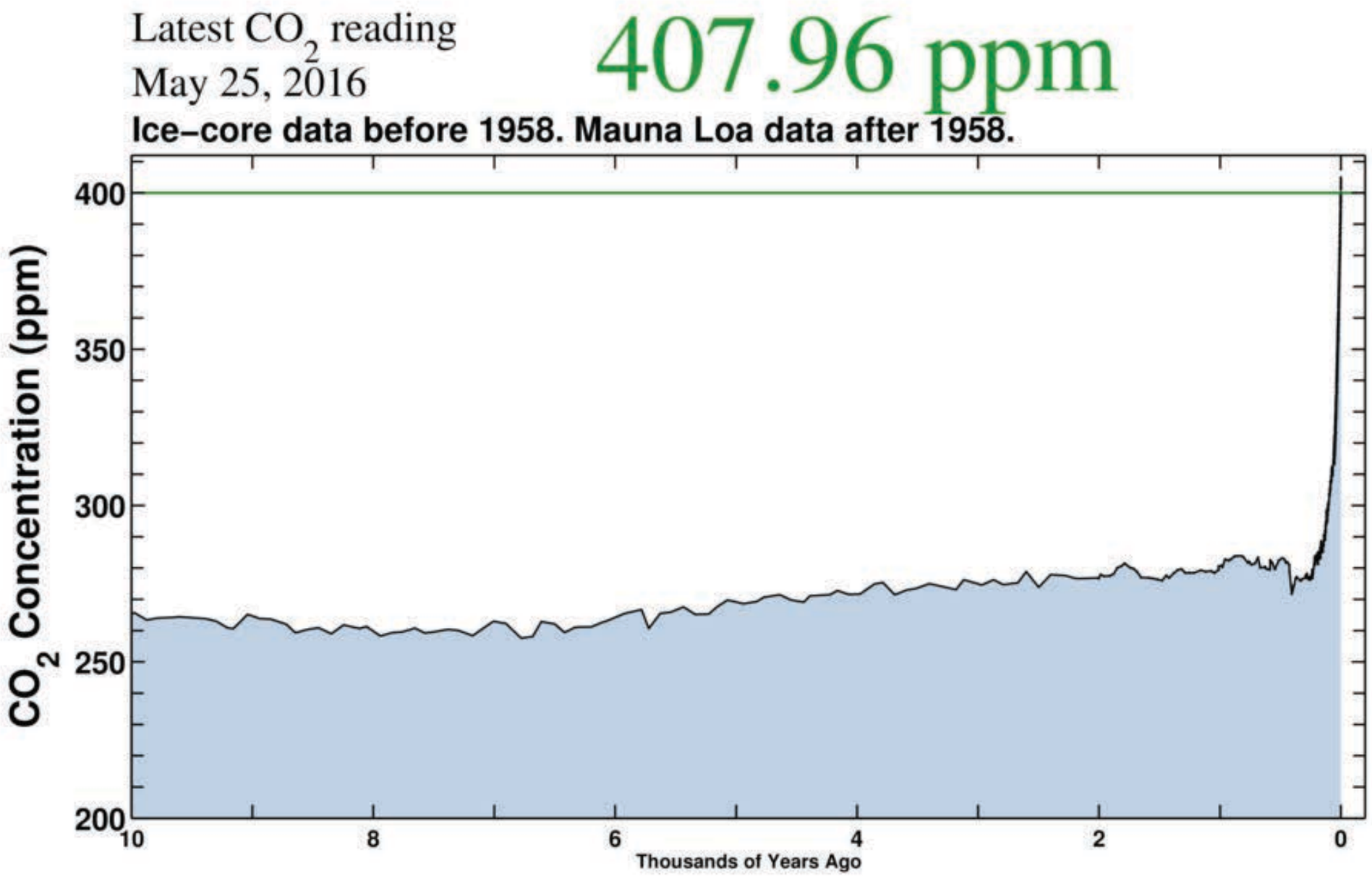
B. Holt - JPL

Change in average sea-level change



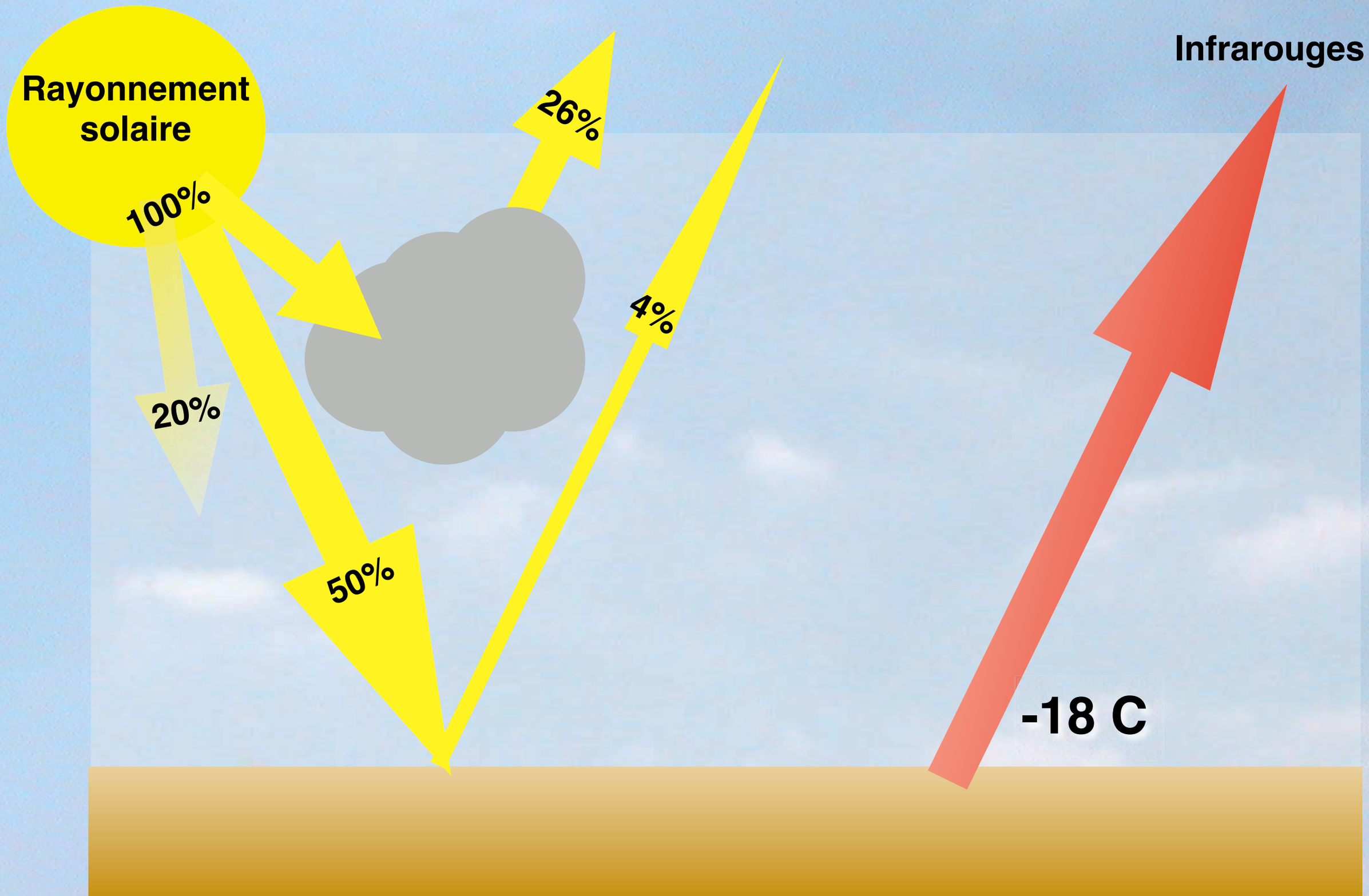
AR5 WGI SPM - Approved version / subject to final copyedit

CO_2 Concentration, 25 May 2016 (Keeling curve)



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

Cycle de l'énergie et effet de serre



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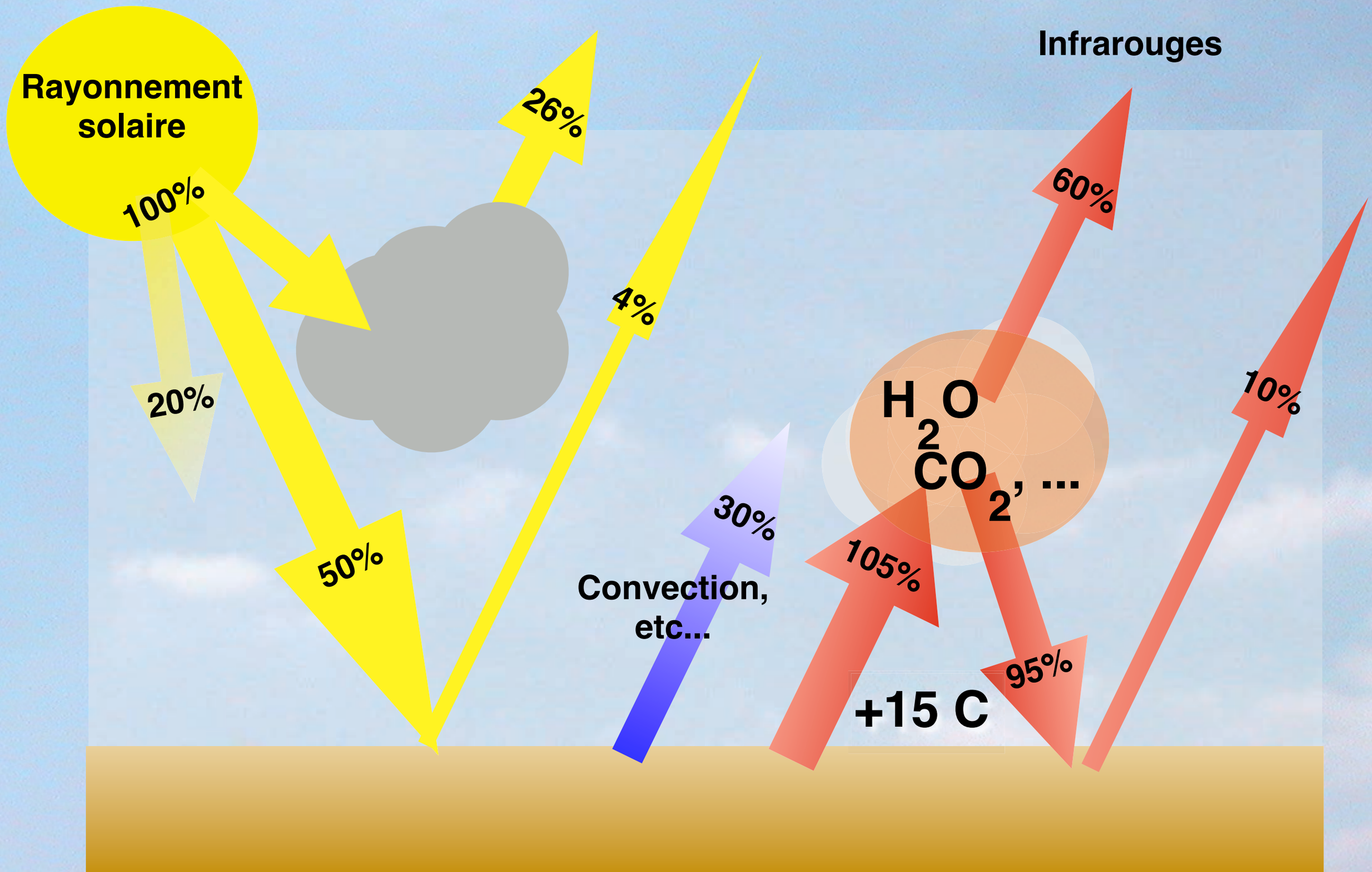
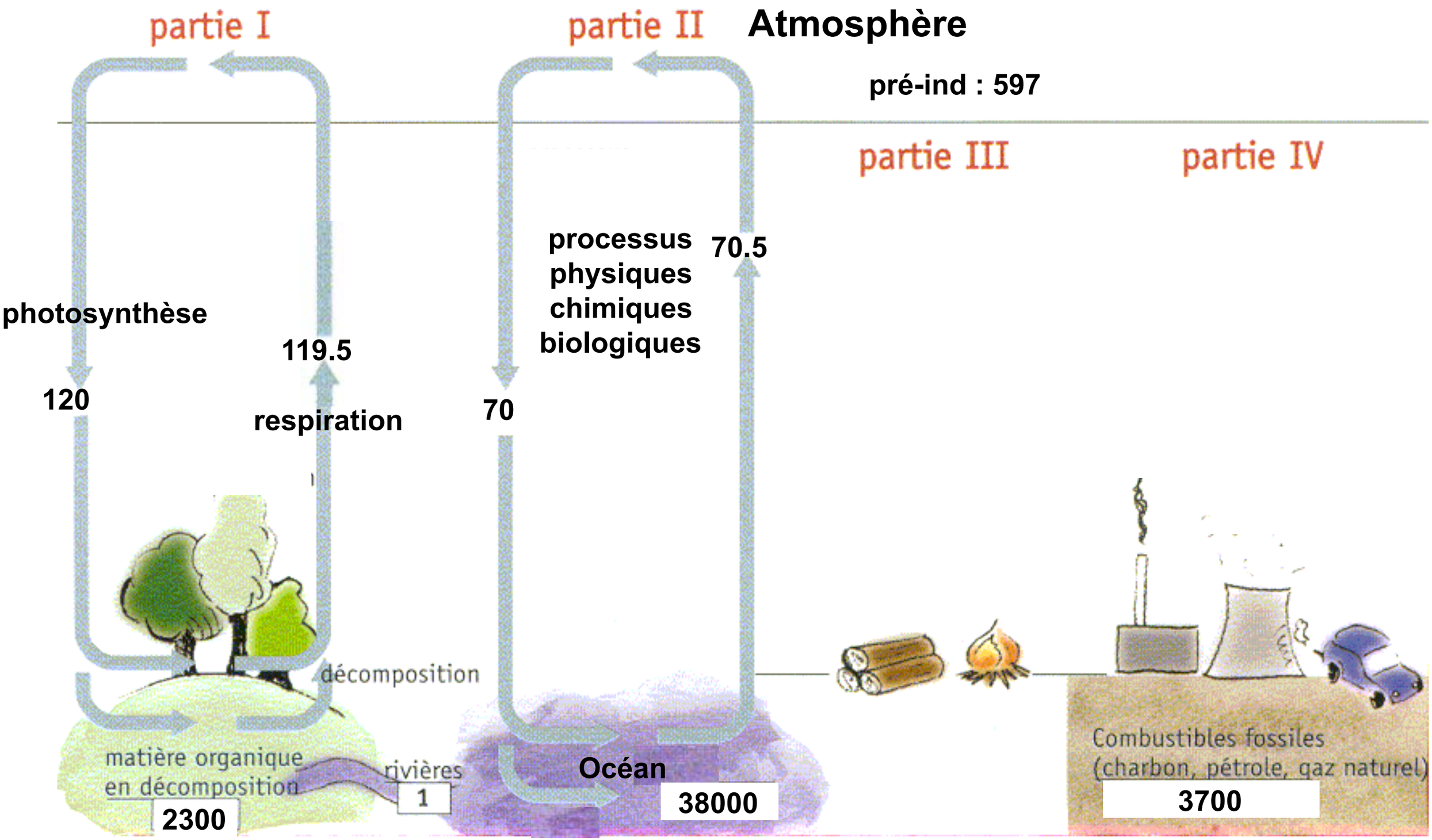
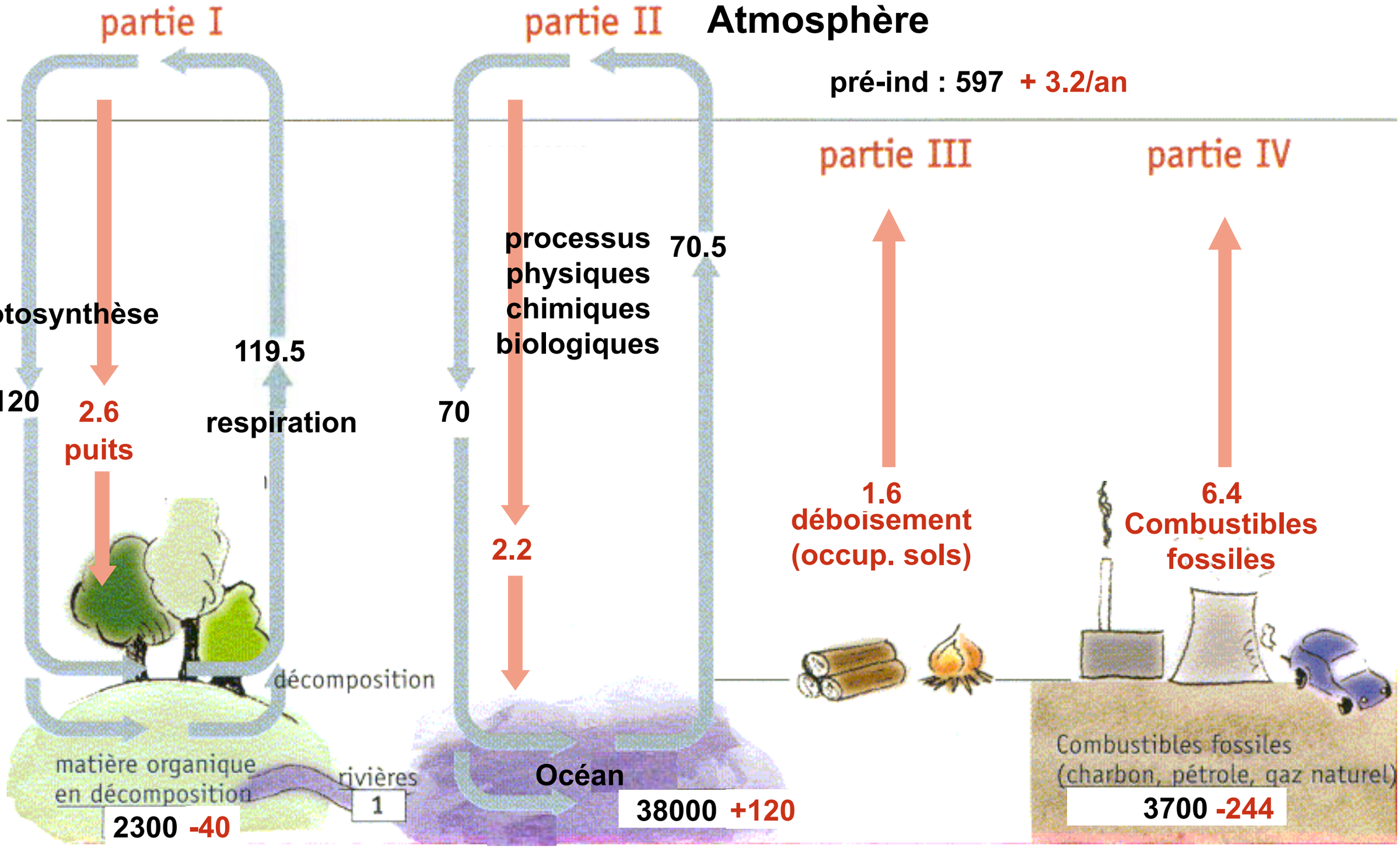


Cycle du carbone



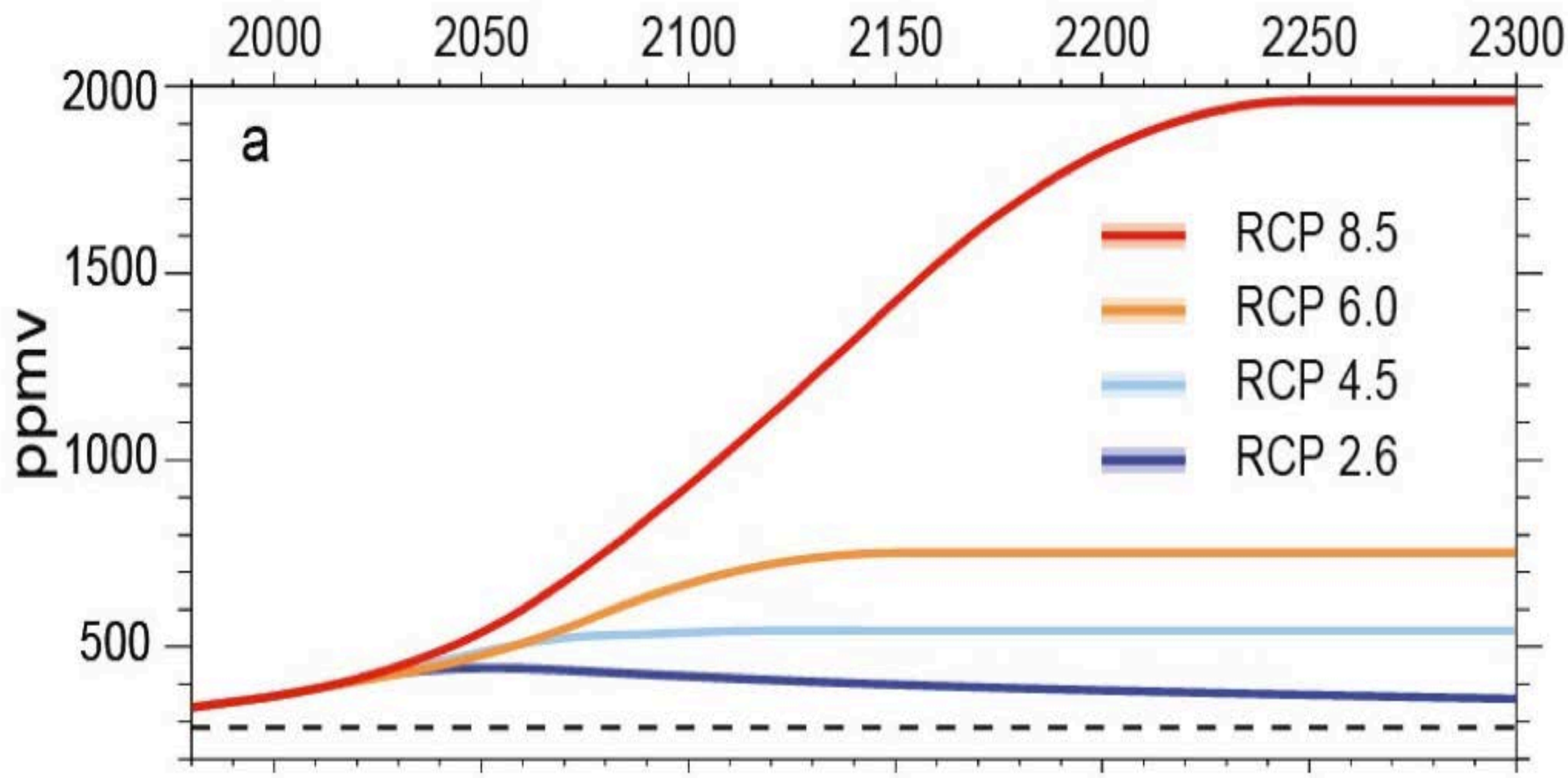
Unités: GtC (milliards de tonnes de carbone) ou GtC/an

Cycle du carbone



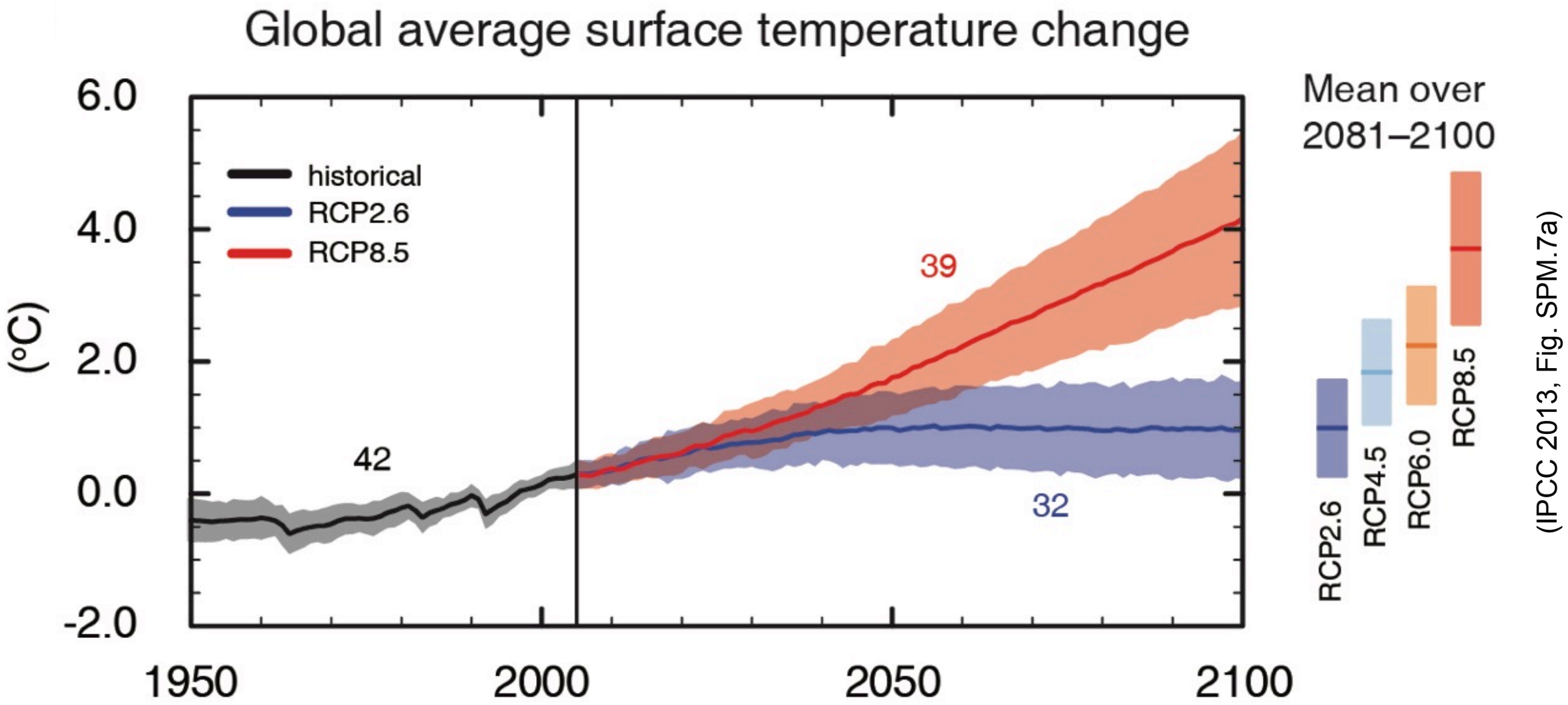
Unités: GtC (milliards de tonnes de carbone) ou GtC/an

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

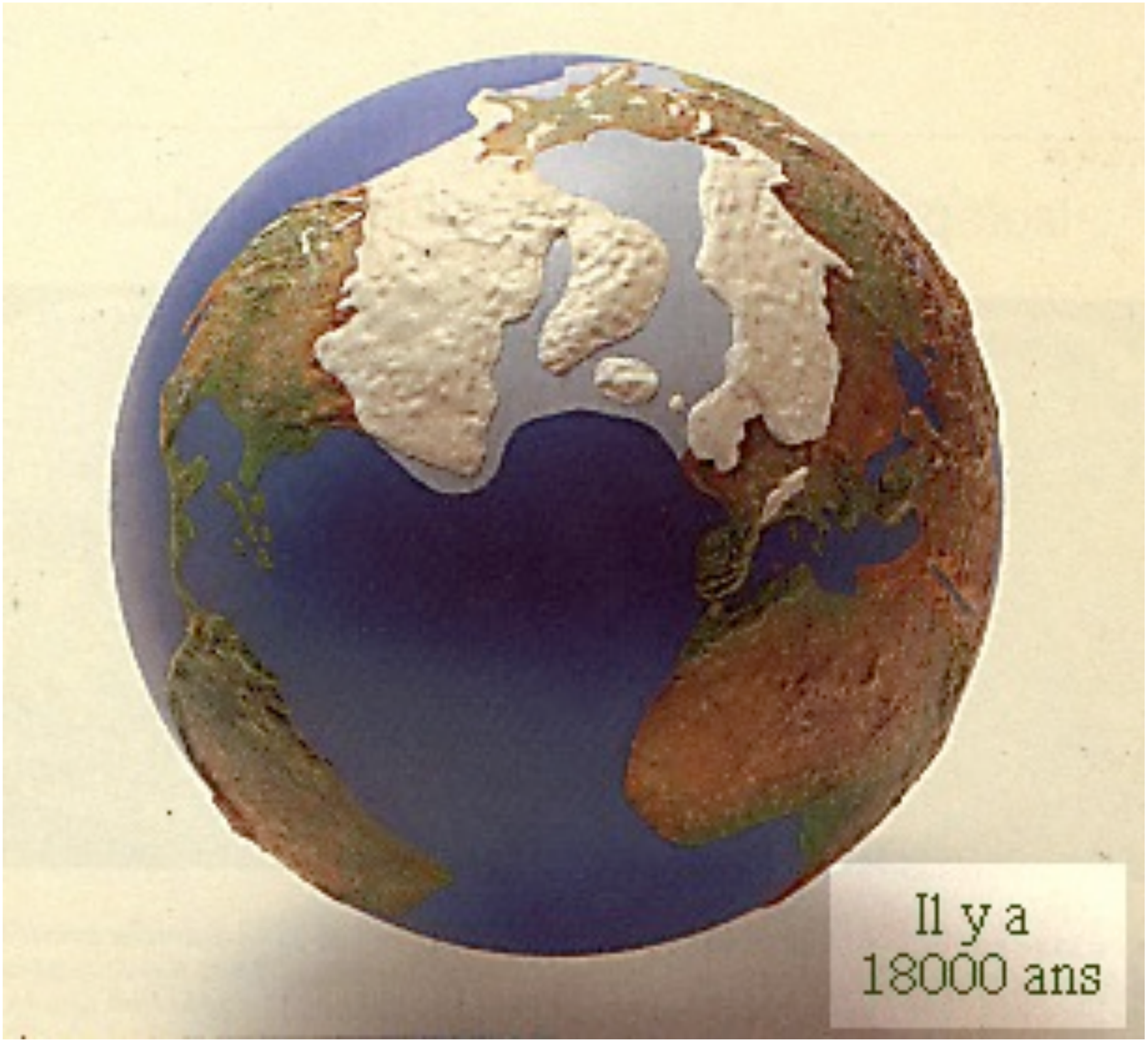


(IPCC 2013, Fig. SPM.7a)

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

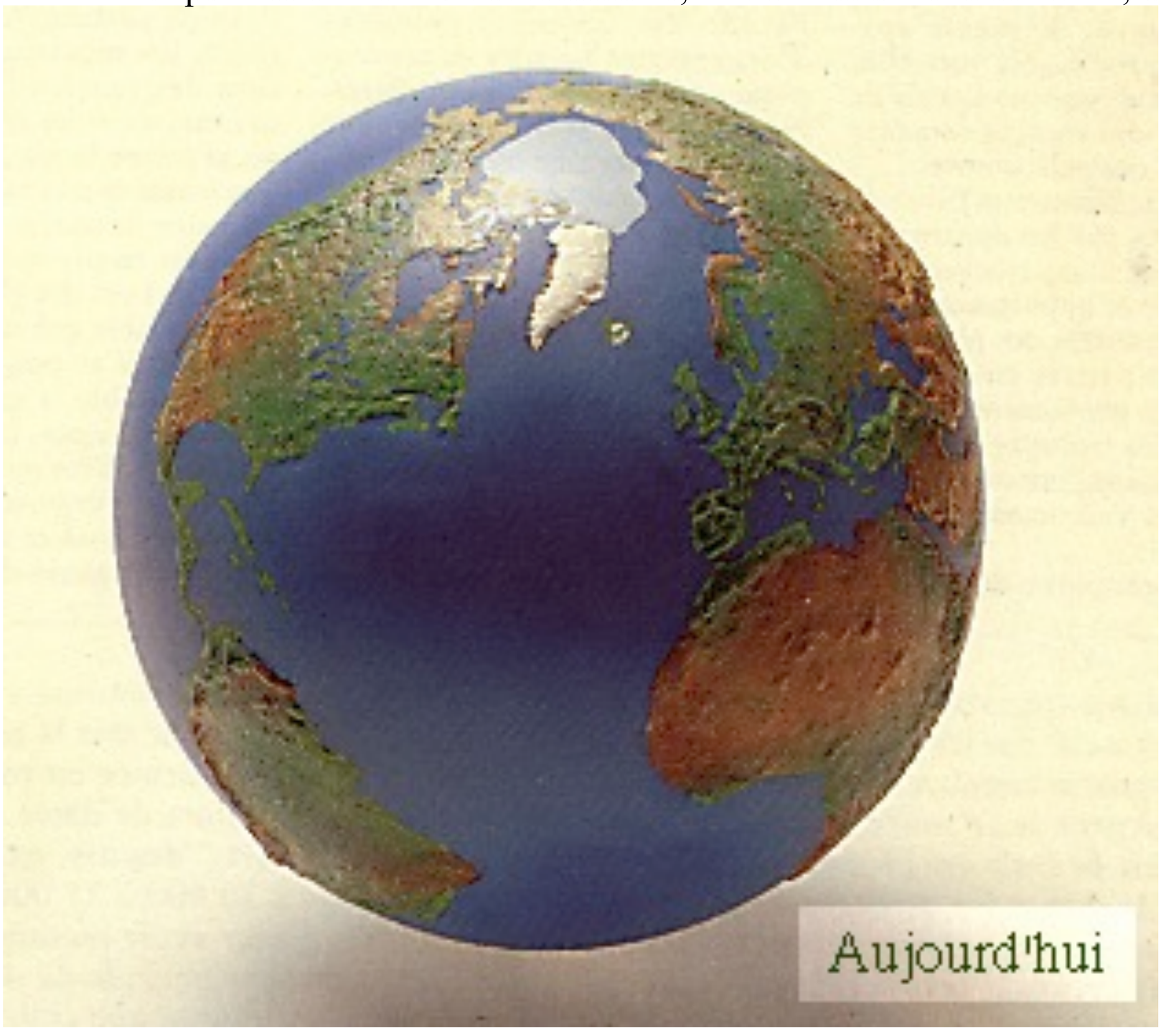
18-20000 years ago (Last Glacial Maximum)

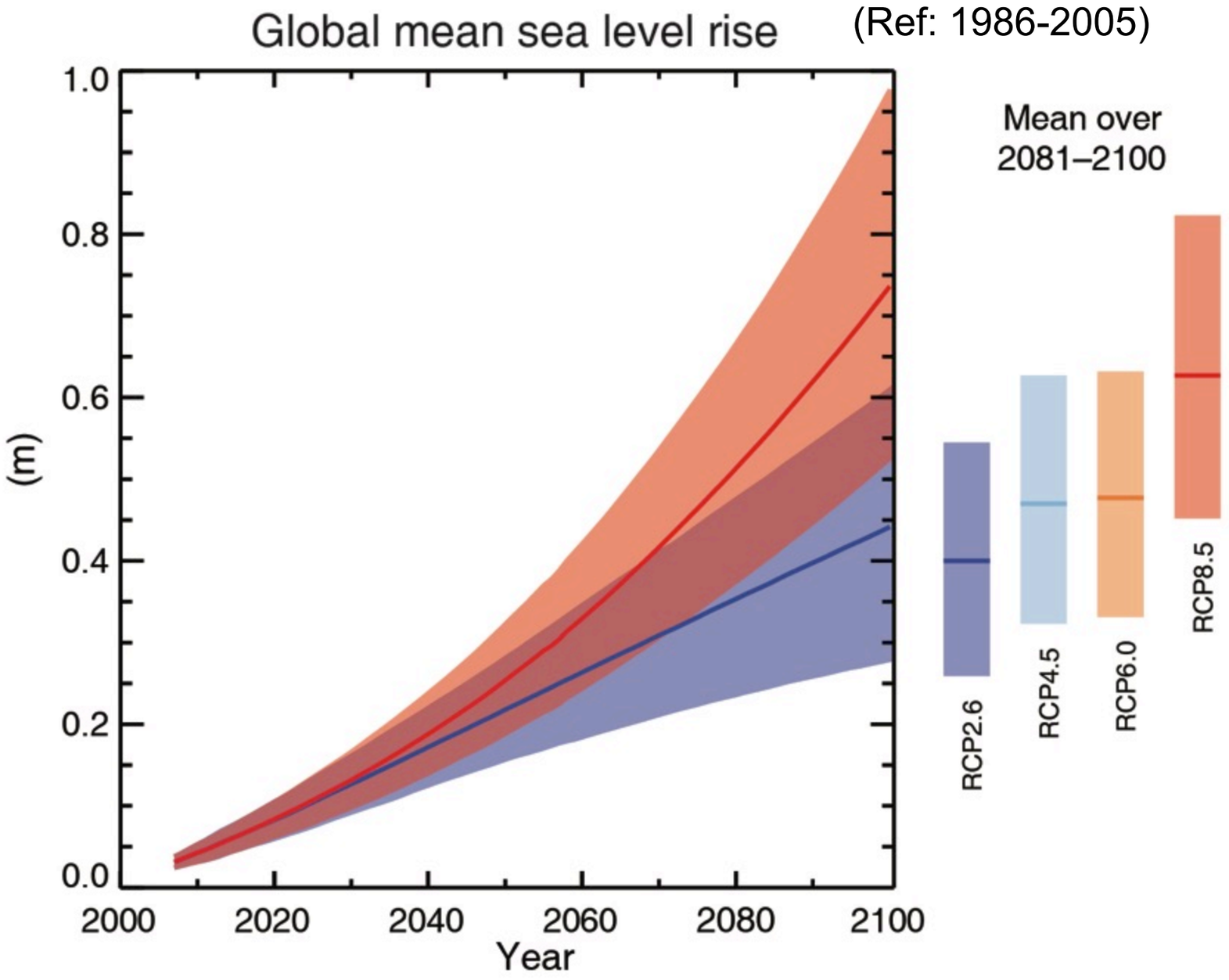
With permission from Dr. S. Joussaume, in « Climat d'hier à demain », CNRS éditions.



Today, with +4-5°C globally

With permission from Dr. S. Joussaume, in « Climat d'hier à demain », CNRS éditions.





(IPCC 2013, Fig. SPM.9)

Sea level due to continue to increase

With 1 metre sea-level rise: 63000 ha below sea-level in Belgium (likely in 22nd century, not impossible in 21st century)

(NB: flooded area depends on protection)

Source: N. Dendoncker (Dépt de Géographie, UCL), J.P. van Ypersele et P. Marbaix (Dépt de Physique, UCL) (www.climate.be/impact)

With 8 metre sea-level rise: 3700 km^2 below sea-level in Belgium (very possible in year 3000)
(NB: flooded area depends on protection)

Source: N. Dendoncker (Dépt de Géographie, UCL), J.P. van Ypersele et P. Marbaix (Dépt de Physique, UCL) (www.climate.be/impact)

Gazet van Antwerpen 8 September 2004

Gent koningin der badsteden?

Zonder maatregelen voor milieu is Antwerpen overspoeld in 3000

BRUSSEL - Zonder nieuwe maatregelen zal ons klimaat verder opwarmen. Dan komt tegen 3000 tien procent van België onder water te staan. Daaronder uiteraard alle kuststeden, maar ook Brugge, Antwerpen en zelfs Mechelen. Gent komt aan zee te liggen. Dat blijkt uit een studie van professoren van de UCL in opdracht van Greenpeace.

Gerard Govers, professor geografie aan de Katholieke Universiteit Leuven, tekende gisteren op onze vraag het nieuwe kaartje van Vlaanderen anno 3000 uit. Een land waarin de zeespiegel volgens het rapport van Greenpeace mogelijk 8 meter gestegen is. "In dat geval zou het grootste gedeelte

Govers. "Gent zou nog net boven water blijven, ze mogen daar al appartementjes beginnen bouwen."

Gent als koningin der badsteden? Het is een grapje, volgens professor Govers is het moeilijk om nu al voorspellingen voor het volgende millennium te maken. "Dat lijkt me

meetbaar te worden en er bestaan al voorspellingen voor het jaar 2050, zelfs 2100. Maar verder hangt veel af van wat op Antarctica gaat gebeuren en dat is moeilijk te zeggen. Afwachten dus."

Het rapport van Greenpeace werd gisteren overhandigd aan Bruno Tobback en Kri

Effects of a 1 m Sea-Level Rise in the Nile Delta (>10 million people live at less than 1 m a.s.l.)

(Time 2001)

Potential Impacts of Climate Change

Food and water shortages

Increased displacement of people

Increased poverty

Coastal flooding

AR5 WGII SPM

IPCC AR5 Synthesis Report

INTERGOVERNMENTAL PANEL ON climate change

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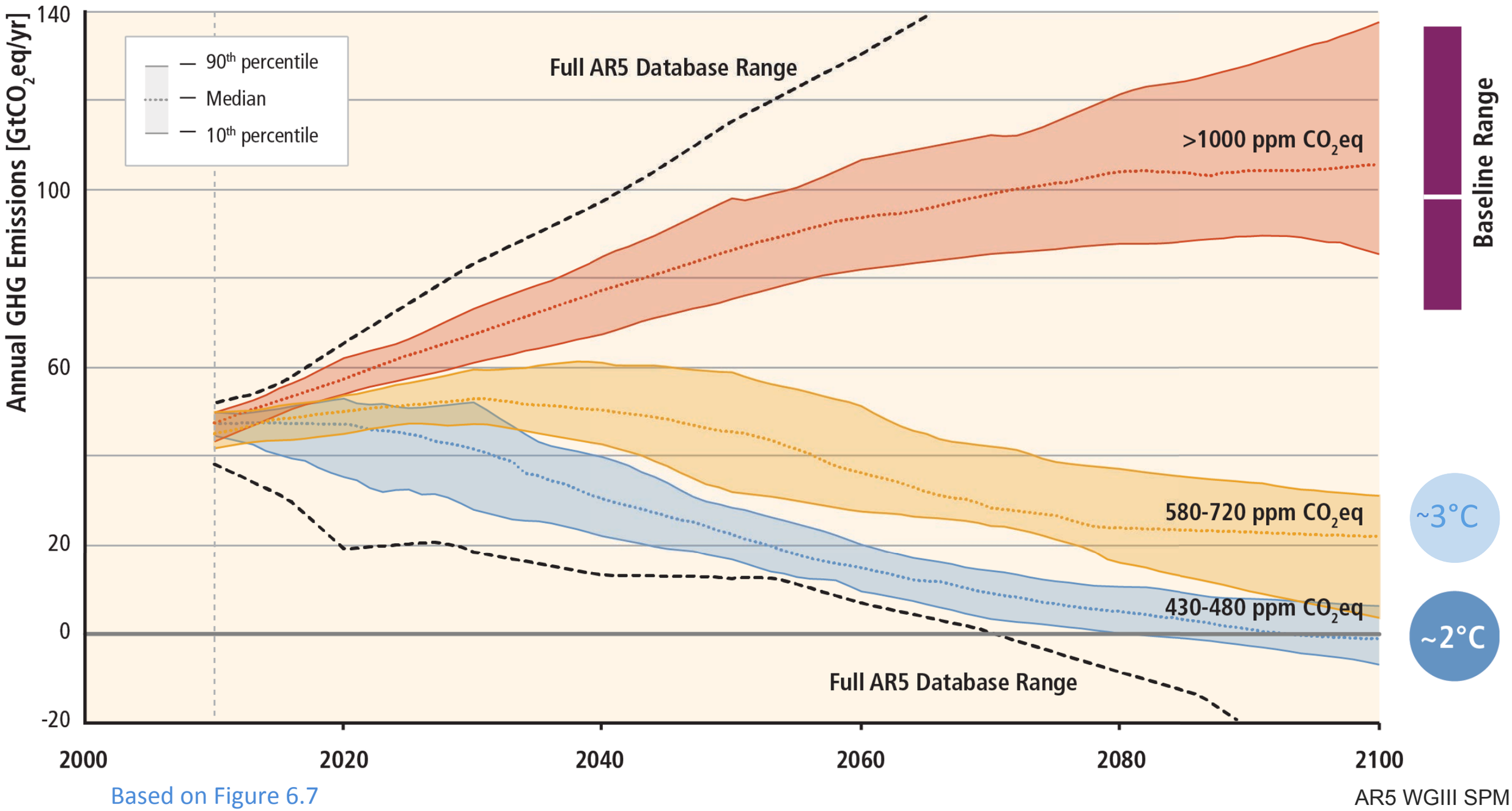


Based on Figure 6.7

AR5 WGIII SPM

Can temperature rise still be kept below 1.5 or 2°C (over the 21st century) compared to pre-industrial ?

- **Many scenario studies confirm that it is technically and economically feasible to keep the warming below 2°C, with more than 66% probability (”likely chance”).** This would imply limiting atmospheric concentrations to 450 ppm CO_2-eq by 2100.
- **Such scenarios** for an above 66% chance of staying below 2°C **imply reducing by 40 to 70% global GHG emissions compared to 2010 by mid-century, and reach zero or negative emissions by 2100.**

Mitigation Measures

More efficient use of energy

Greater use of low-carbon and no-carbon energy

- Many of these technologies exist today
- But worldwide investment in **research** in support of GHG mitigation is small…

Improved carbon sinks

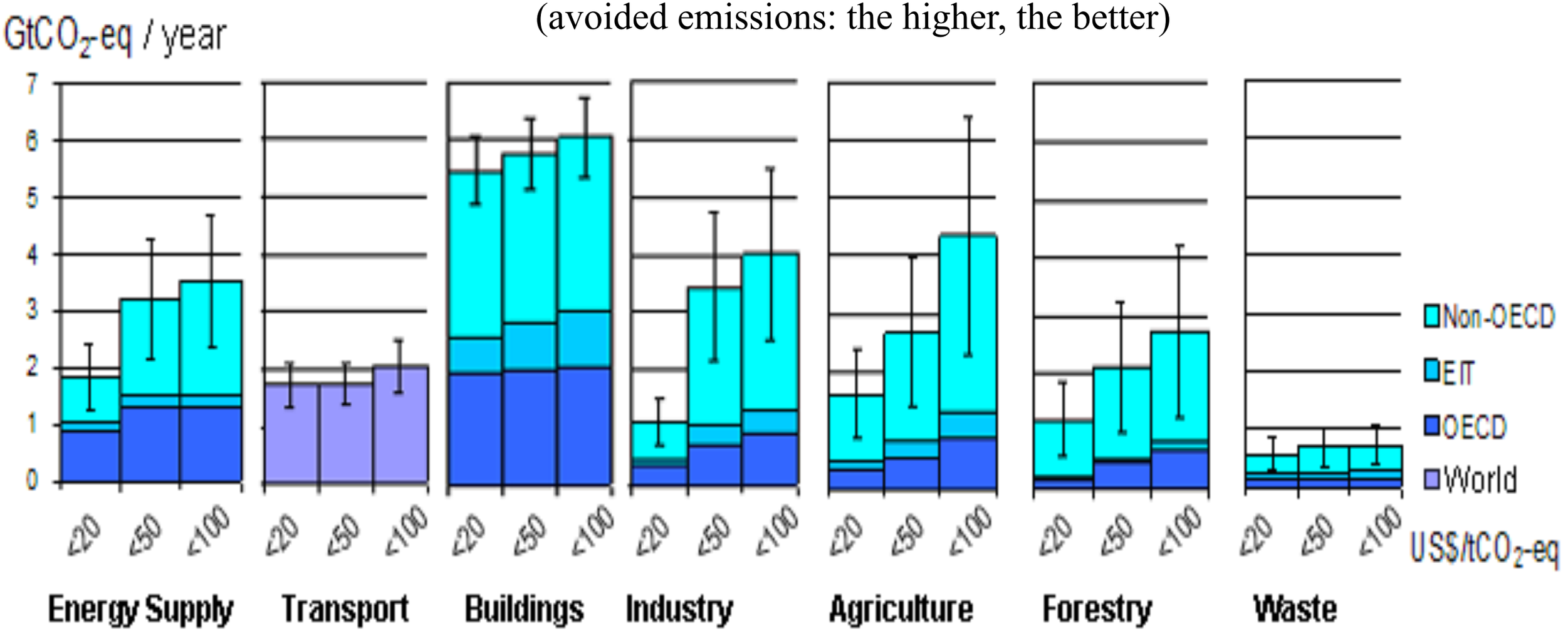
- **Reduced deforestation** and improved forest management and planting of new forests
- **Bio-energy with carbon capture and storage**

Lifestyle and behavioural changes

AR5 WGIII SPM

All sectors and regions have the potential to contribute by 2030

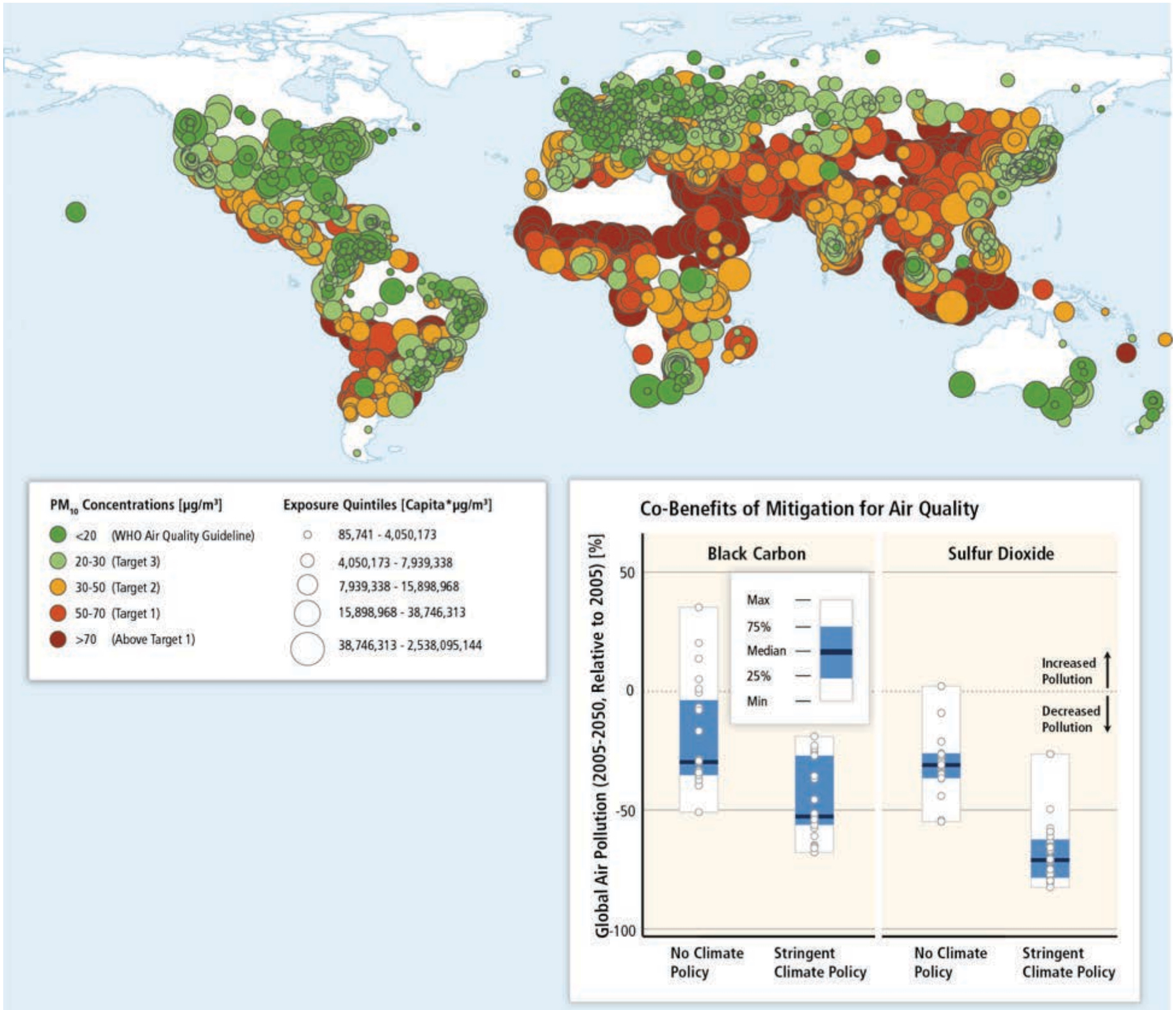
(avoided emissions: the higher, the better)



IPCC AR4 (2007)

Note: estimates do not include non-technical options, such as lifestyle changes.

- **Substantial reductions in emissions 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**



Mitigation can result in large co-benefits for human health and other societal goals.

Wat kunnen we doen ?

- De CO_2 afdruk van onze activiteiten analyseren

- Het verbruik van fossiele energie verminderen.

    Verwarming (isolatie, gebruik van een thermostaat, warmtepompen,.....)

    Transport: met openbaar vervoer, met de fiets (elektrische fiets ?), te voet, via carpooling, en zo weinig mogelijk het vliegtuig nemen.

Wat kunnen we doen ?

- Het verbruik aan goederen verminderen, van dewelke de productie, het vervoer of het gebruik veel fossiele energie vereisen, of die broeikasgassen uitstoten.

  bij voorbeeld vlees, de voeding met producten buiten het seizoen of met niet plaatselijk geteelde producten; en weinig duurzame elektronische producten vermijden.

- Personen aanspreken/interpelleren

Wat kunnen we doen ?

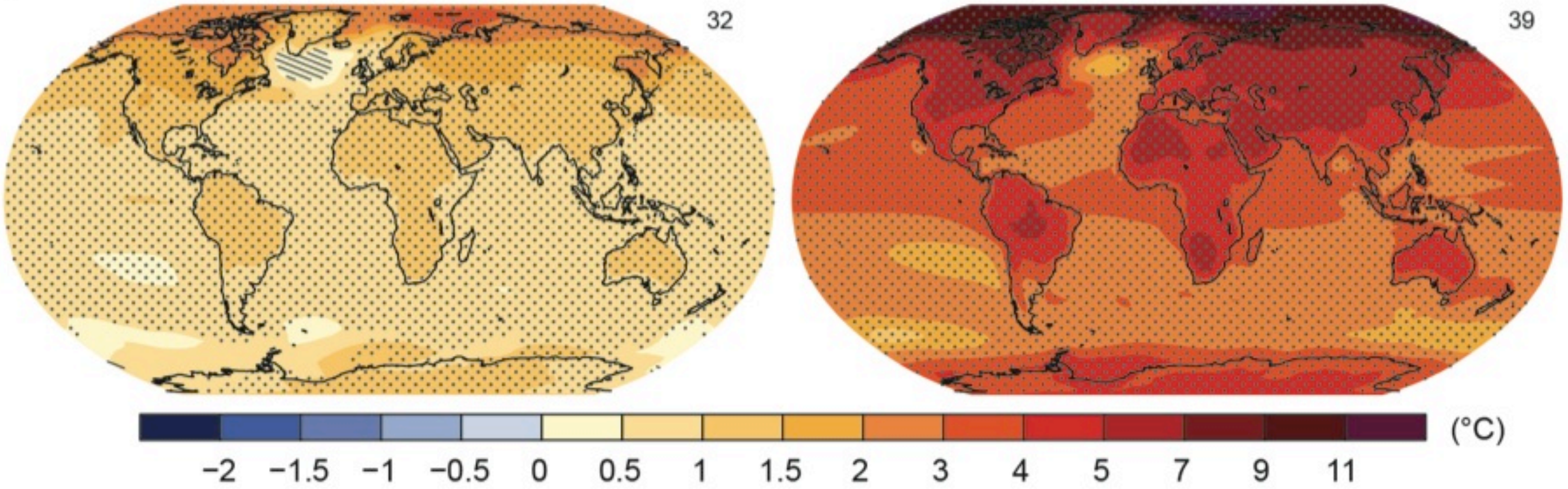
- Personen aanspreken/interpelleren die voldoende macht hebben, alsook overeenkomstige instituten opdat zij de context zouden creëren/ bewerkstelligen opdat de overgang zou uitgevoerd worden

Ik probeer om coherent te zijn…

RCP2.6

RCP8.5

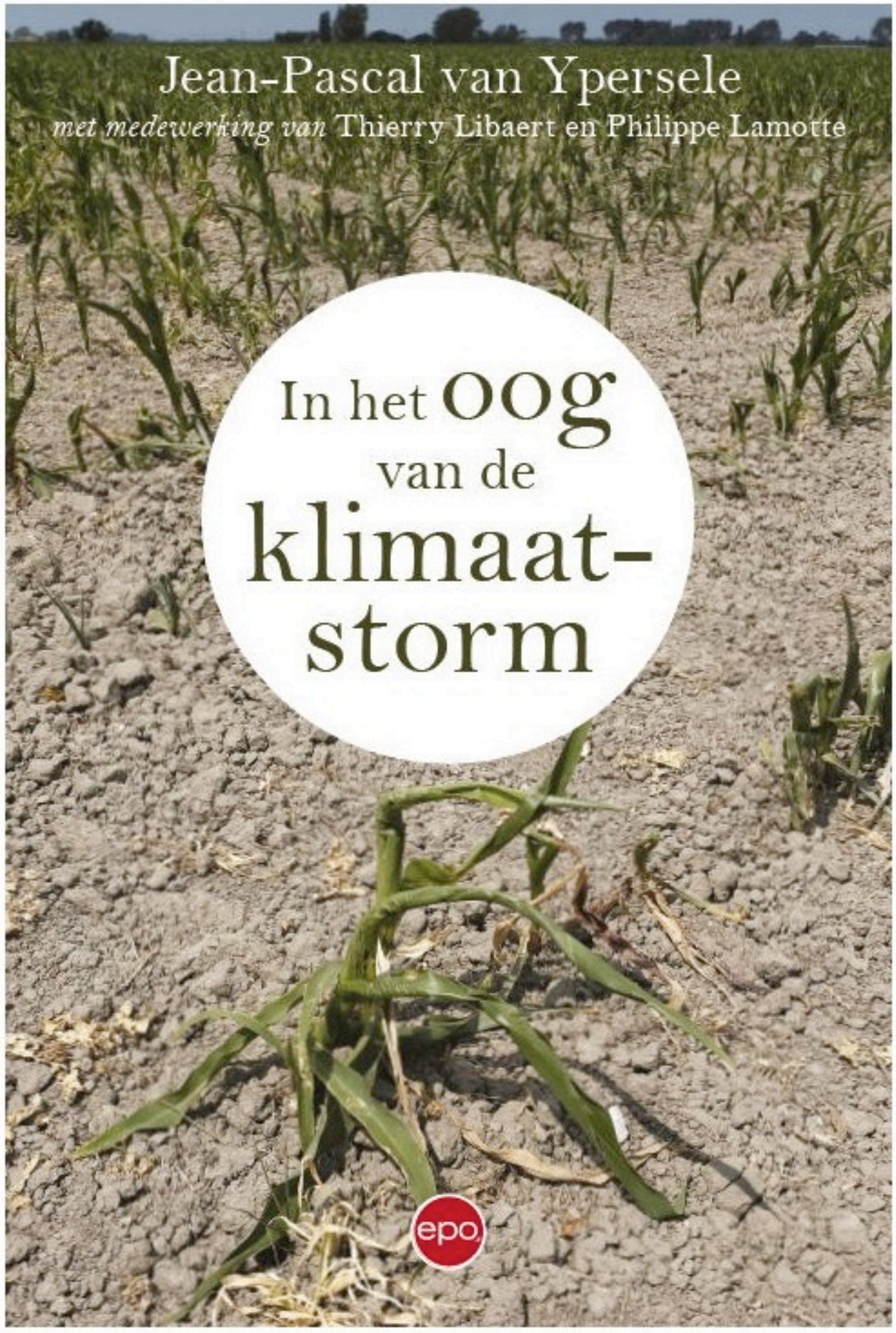
Fig. SPM.8



Humanity has the choice

Straks bij EPO (begin 2018)

Voorwoord: Jill Peeters



Useful links:

- www.ipcc.ch : IPCC (reports and videos)
- www.climate.be/vanyp : my slides and other documents
- www.skepticalscience.com: excellent responses to contrarians arguments
- **On Twitter: @JPvanYpersele and @IPCC_CH**

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