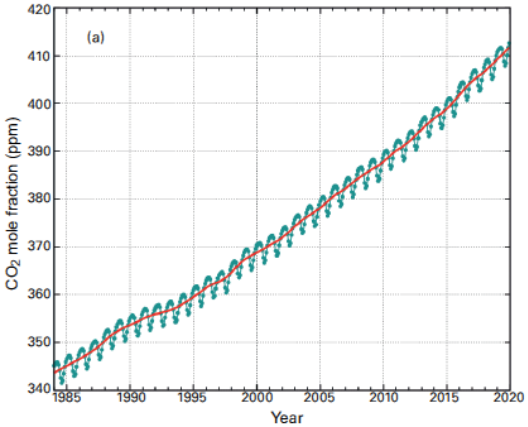
Climate change is moving fast
We need to move faster

ESSRI workshop 2022 - Grenoble

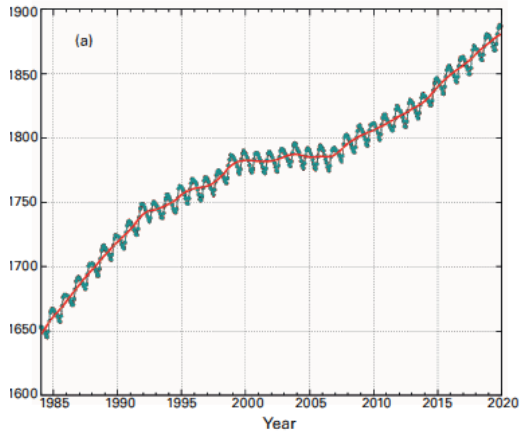
M Jarraud - Secretary-General Emeritus WMO

(29 September 2022)

Greenhouse gases concentrations: new records



Carbon dioxide (CO_2)



Methane (CH_4)

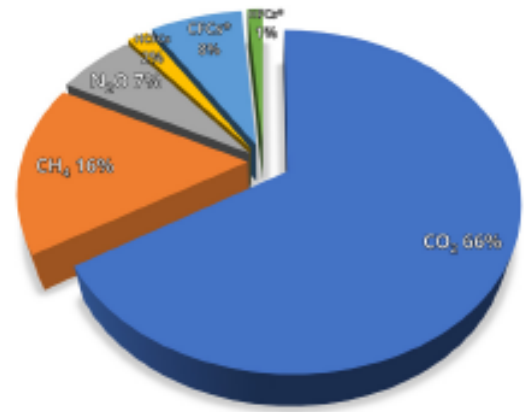
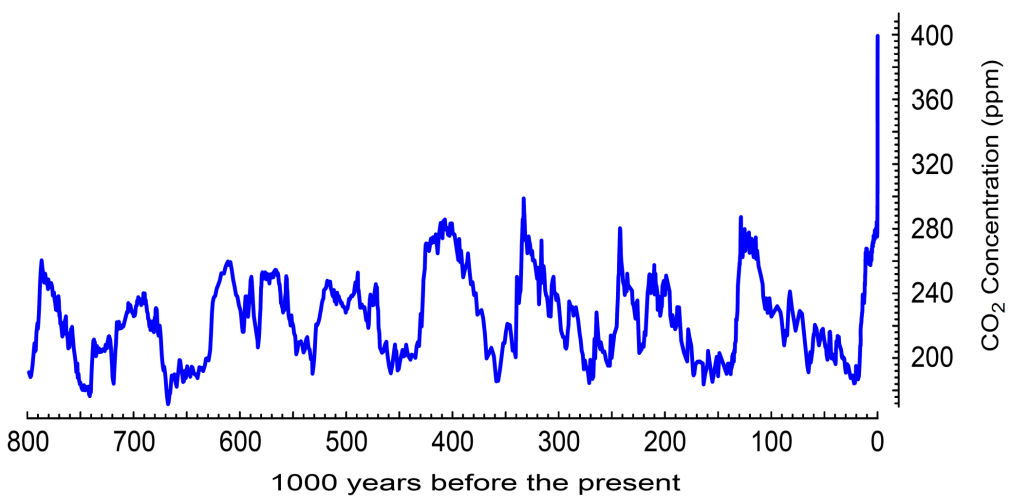


Figure 5. Contributions of the most important LLGHGs to the increase in global radiative forcing due to these gases from the pre-industrial era to 2020 [8].



- Water vapour and CO_2 are the major greenhouse gases, with CO_2 the main driver of climate change.
- Concentrations are reaching highest levels for more than 800 000 years
- Mostly due to human activities

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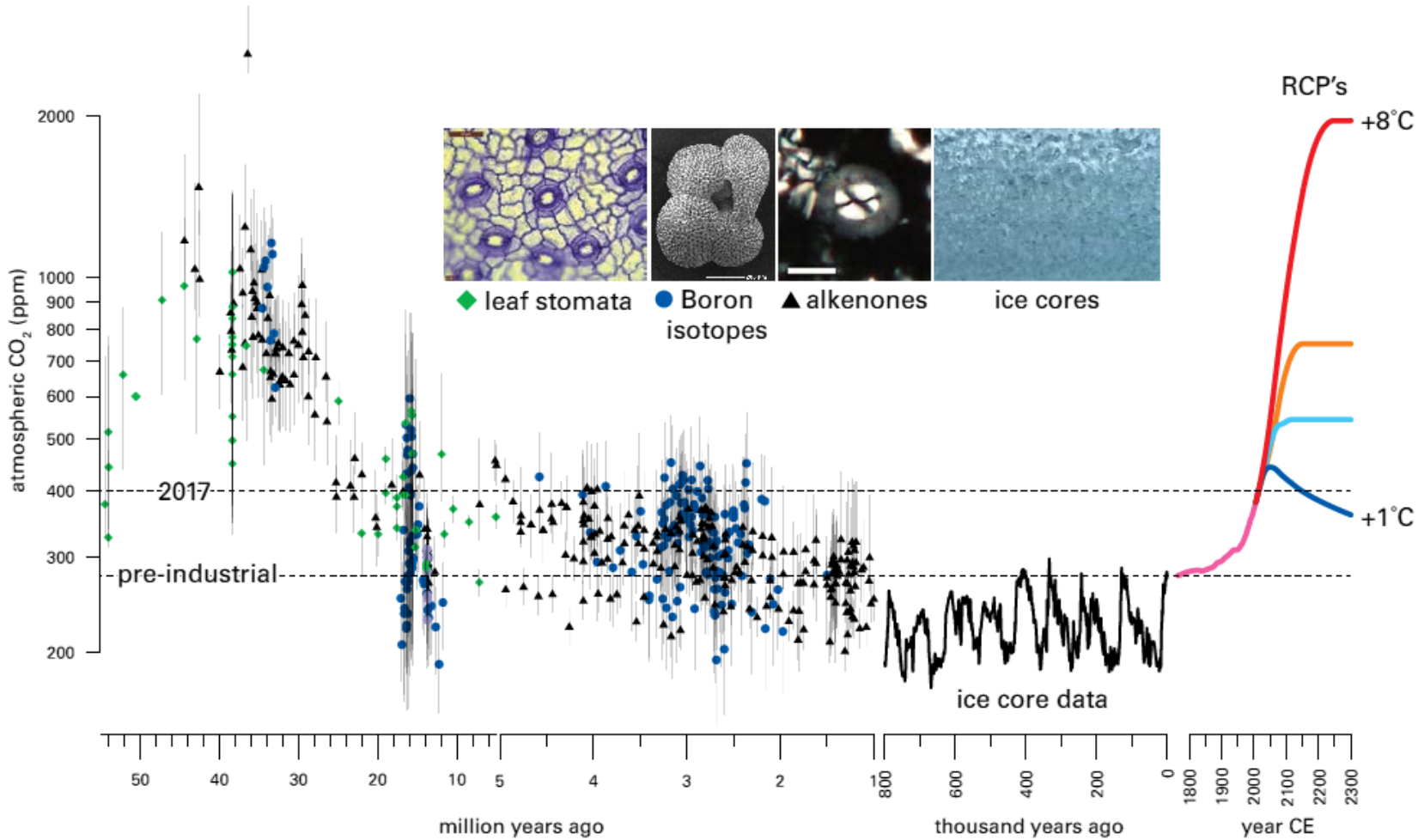
CO_2 over last 55 million years



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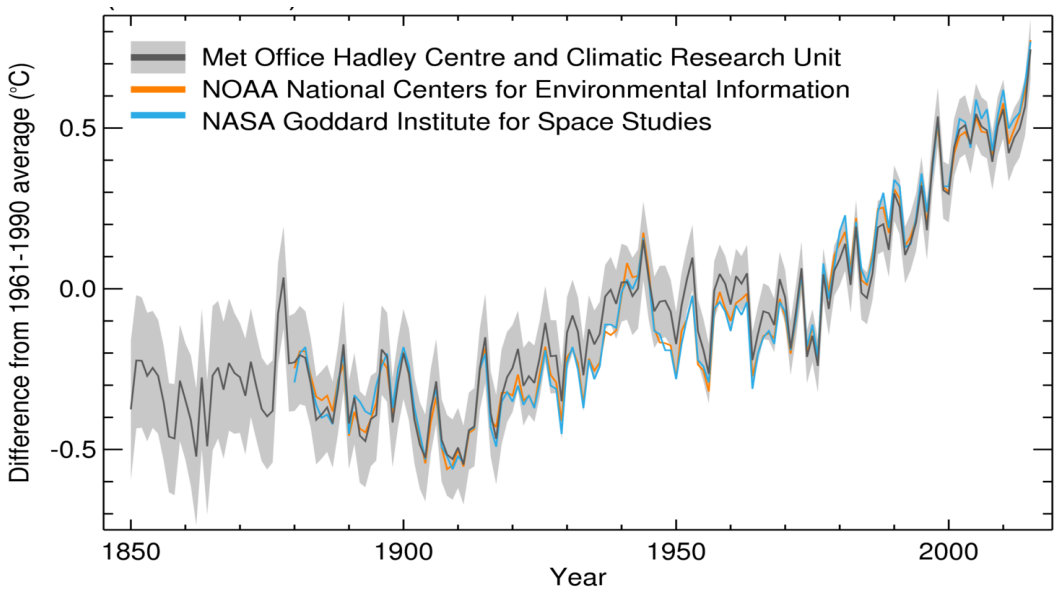
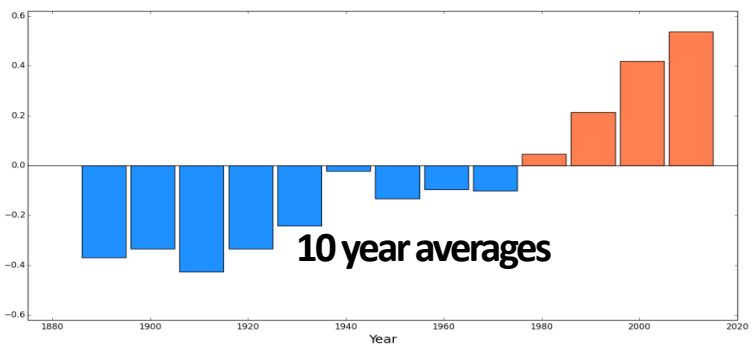
Climate change: Temperature

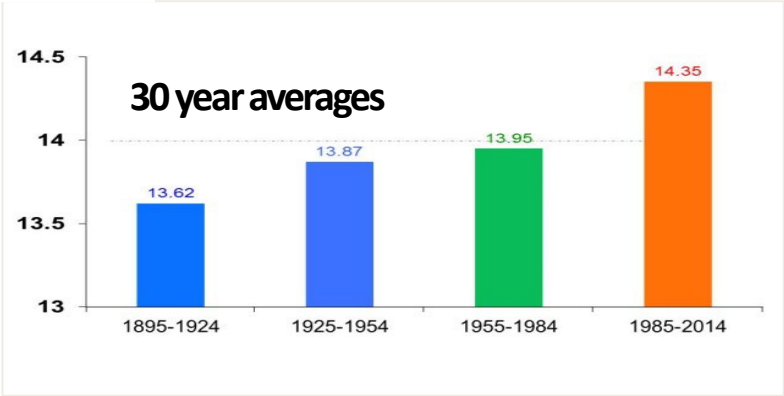


(source: WMO)

- 2016 and 2020: warmest years since instrumental records are available
- Last 7 years warmest on record (more than 1.2° warmer than in pre-industrial period)
- IPCC: "warming of climate system is unequivocal". "Human influence on the climate system is clear"

Global surface temperature anomalies 1880-2015





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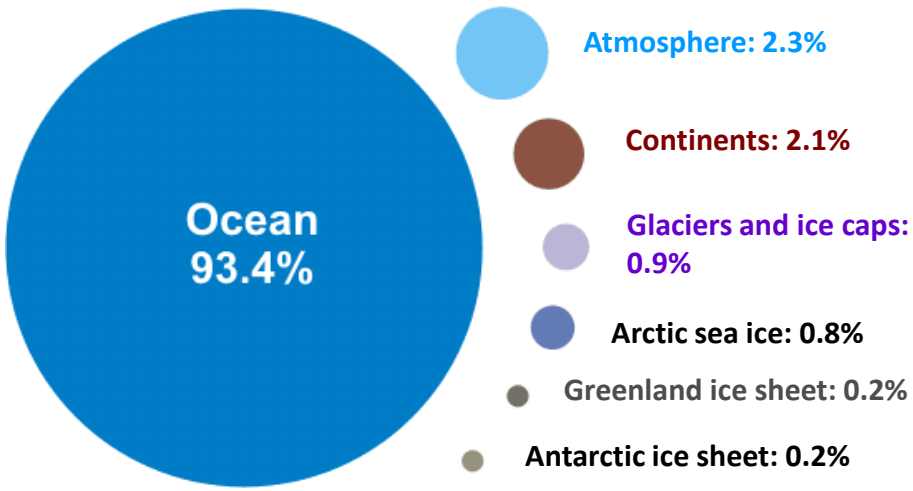
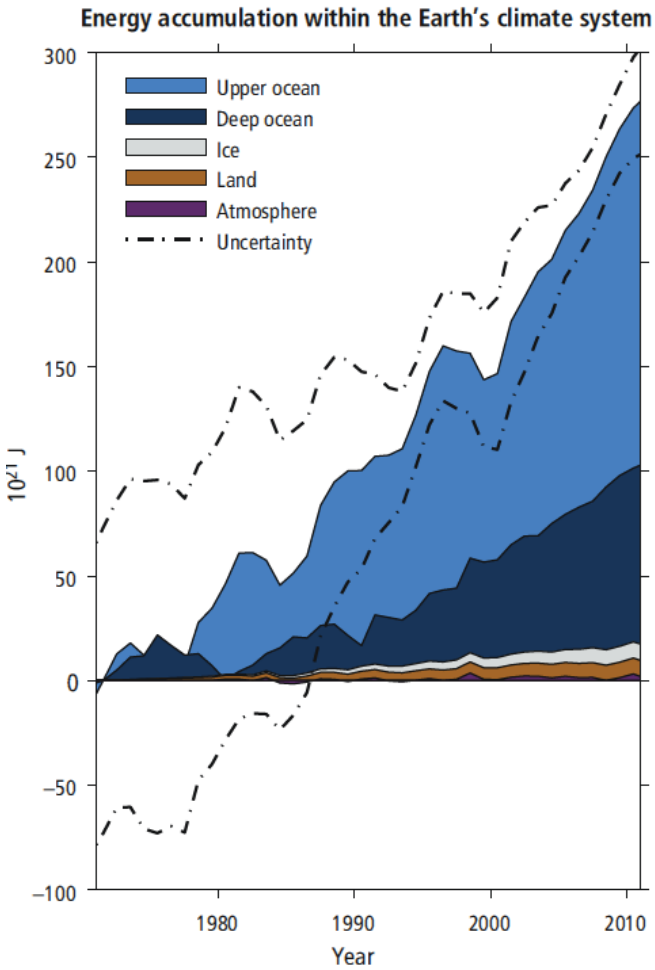
No climate hiatus – No Climate pause !

Climate change : Oceans

- **Oceans absorb about 93% of extra heat**





- **Sea-level rise**
- **Acidification**
- **Arctic ice melting**
- **Decrease in oxygen content**

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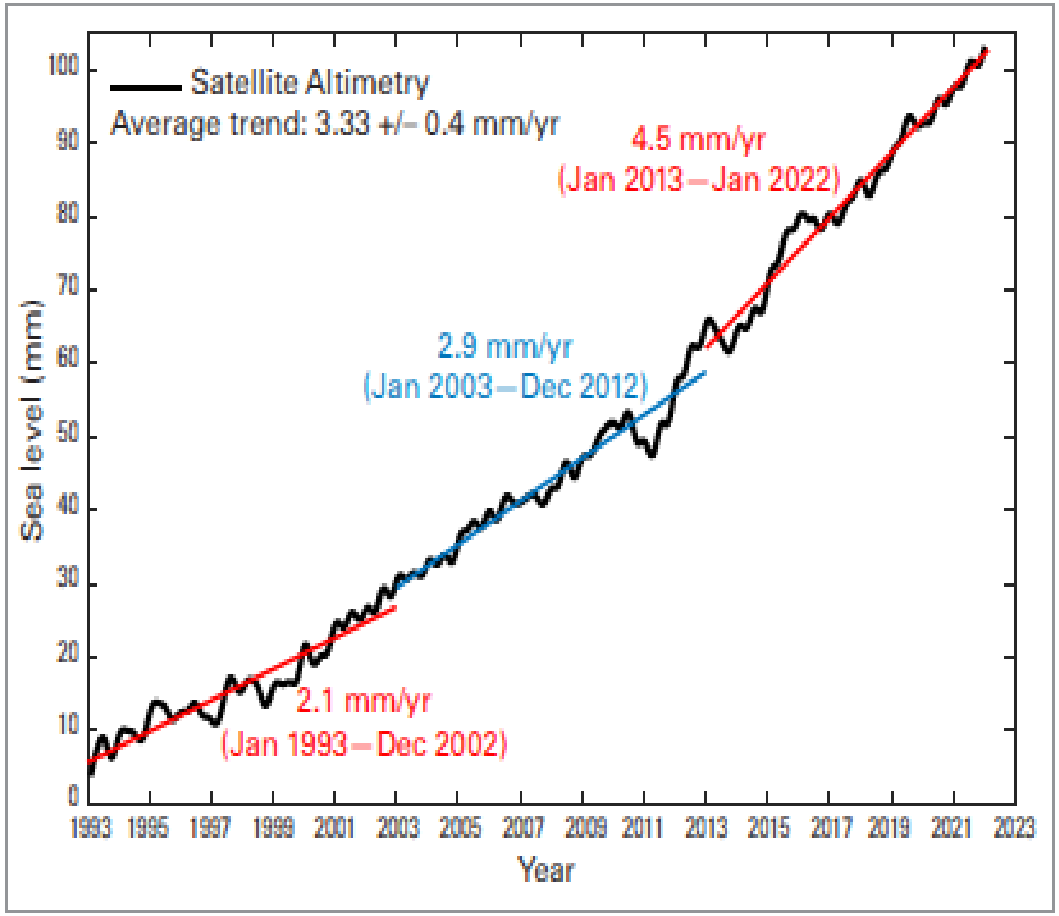
Sea level rise

- 1901-1990: 1.9 mm/yr
- 2003-2012: 2.9 mm/yr
- 2013-2022: 4.5 mm/yr

- Causes:
  - thermal expansion
  - Melting of land glaciers
  - Others
- Impacts:
  - Coastal erosion
  - Intrusion of salted water
  - Impact of storm surges and tsunamis
  - …



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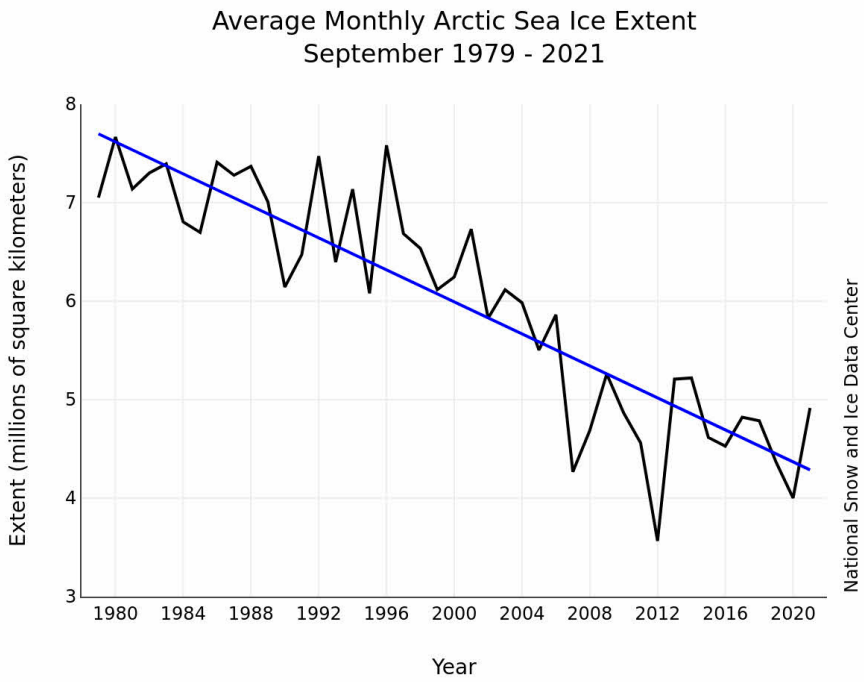
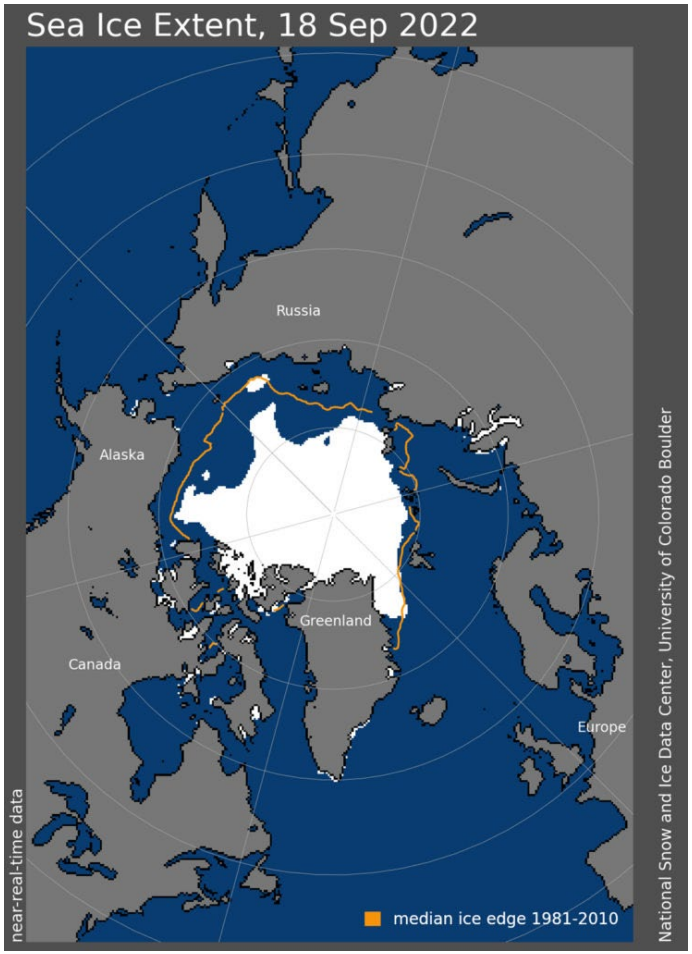
Arctic sea ice

Trend 1979–2021
-13% per decade





Arctic ice extent (Sept 2022)
(source: US-NSIDC)

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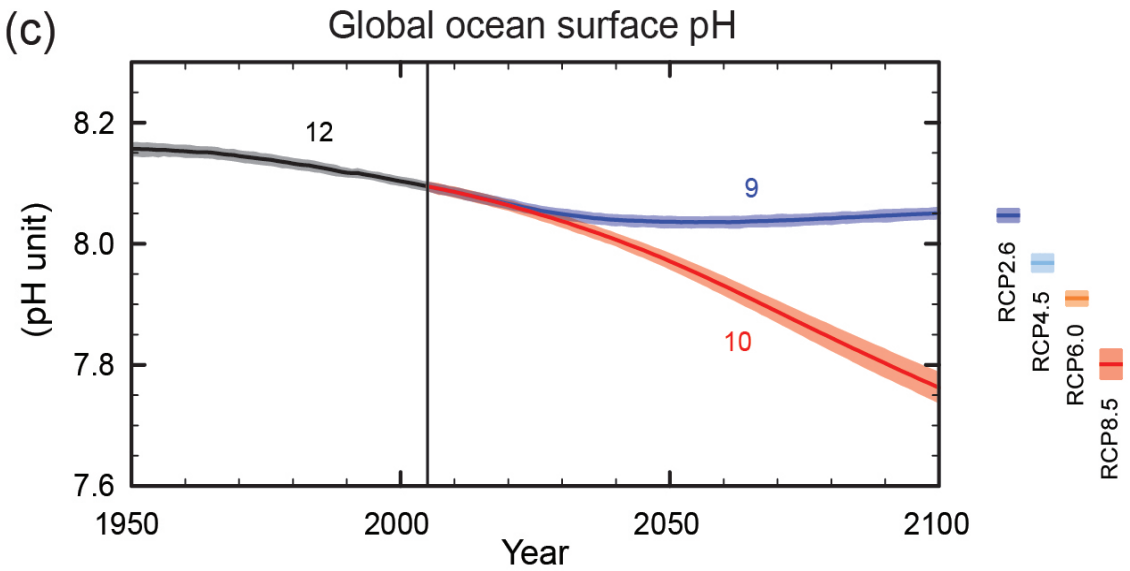
Oceans acidification and CO_2 absorption

- Oceans have absorbed about 25% of all anthropogenic CO_2
- Acidification: about 26% since pre-industrial time
  - Rate unprecedented in last 300 million years
  - Acidification will continue for centuries, even with zero CO_2 emissions
- Acidification reduces capacity of oceans to absorb CO_2

pH drop of 0.1 unit since pre-industrial times



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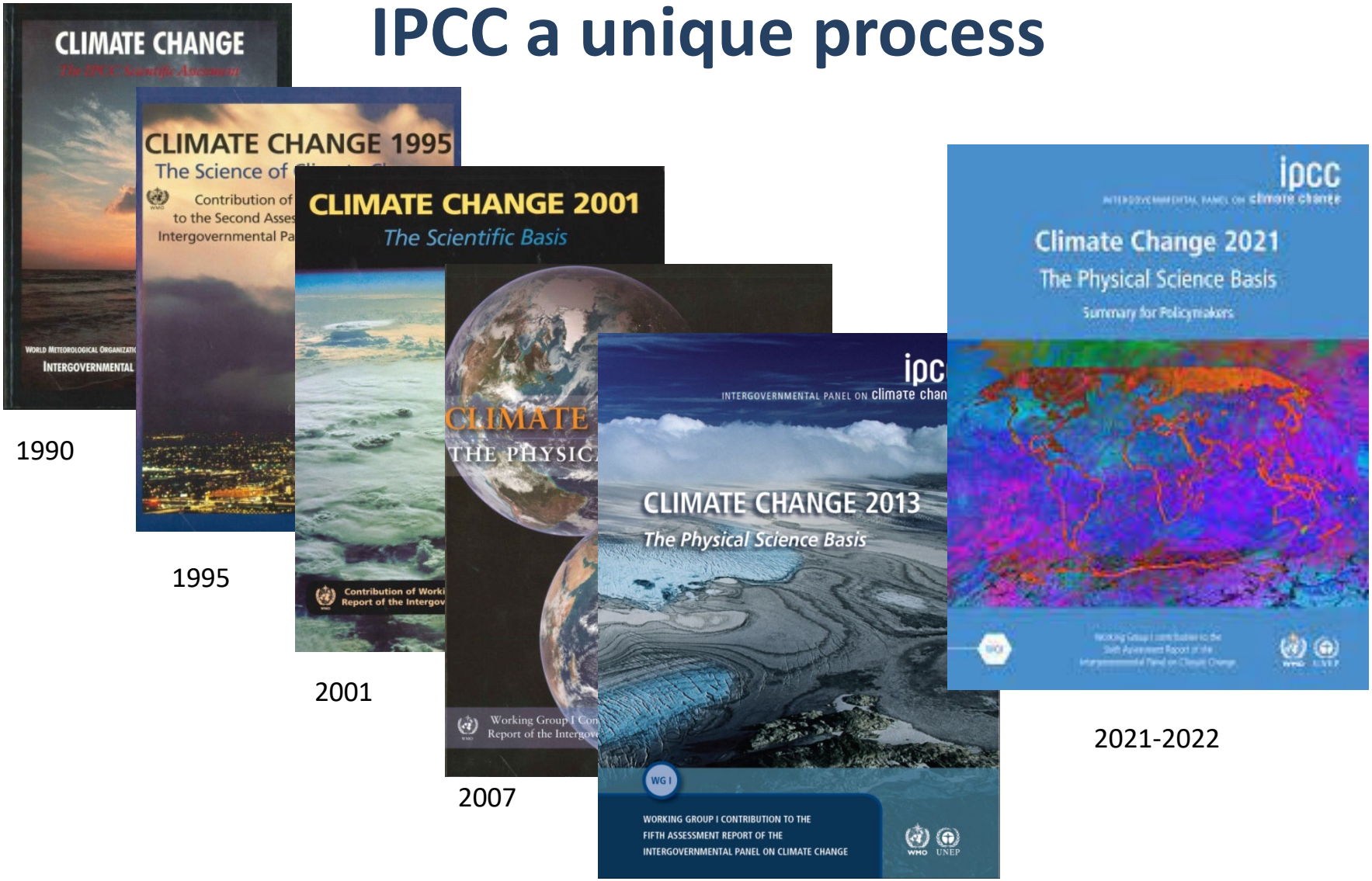
IPCC a unique process



IPCC Assessment Reports since 1990

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(Credit: Yoza Arlaman | Unsplash)

> It is indisputable that human activities are causing climate change, making extreme climate events, including heat waves, heavy rainfall, and droughts, more frequent and severe.

ipcc
INTERGOVERNMENTAL PANEL ON climate change

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[Credit: Peter John Maridable | Unsplash]

"Unless there are immediate, rapid, and large-scale reductions in greenhouse gas emissions, limiting warming to 1.5°C will be beyond reach.

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INTERGOVERNMENTAL PANEL ON climate change

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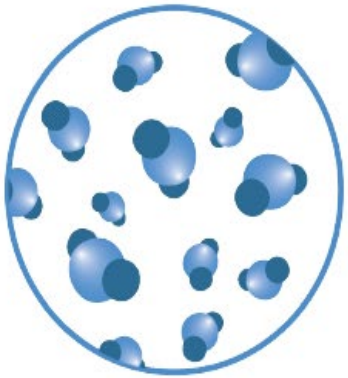
CO_2
concentration



Highest

in at least

2 million years

Sea level
rise

Fastest rates

in at least

3000 years

Arctic sea ice
area

Lowest level

in at least

1000 years

Glaciers
retreat

Unprecedented

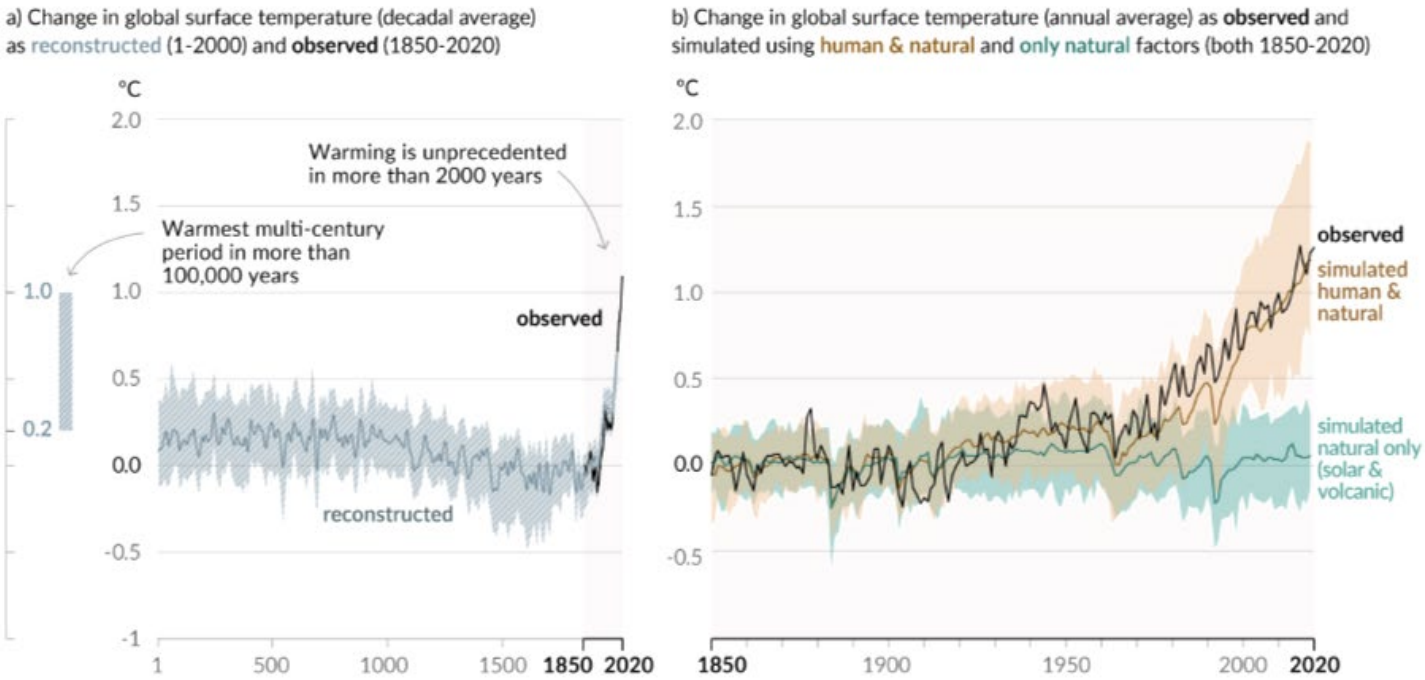
in at least

2000 years

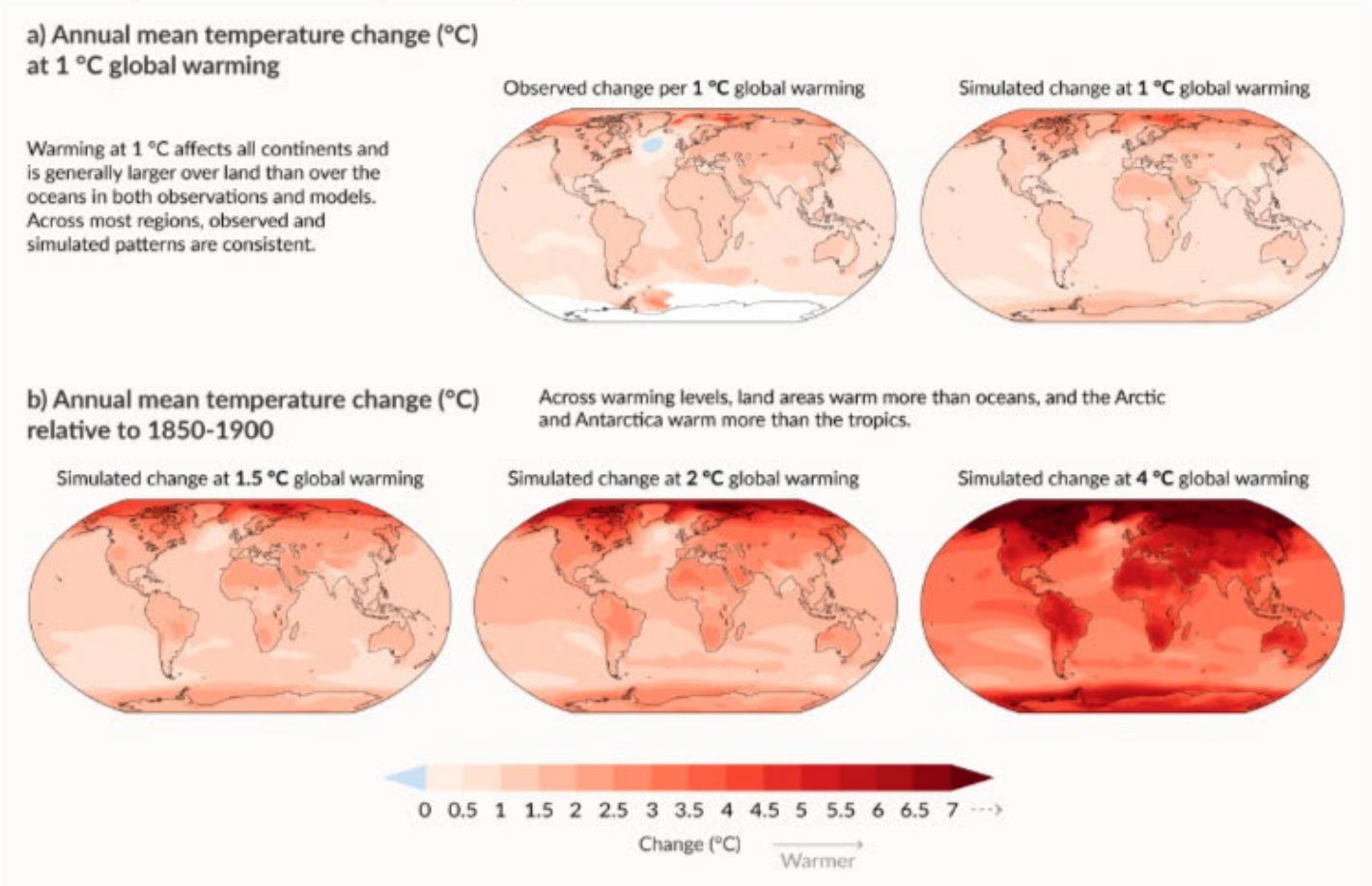
Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years

Figure SPM.1

Changes in global surface temperature relative to 1850-1900

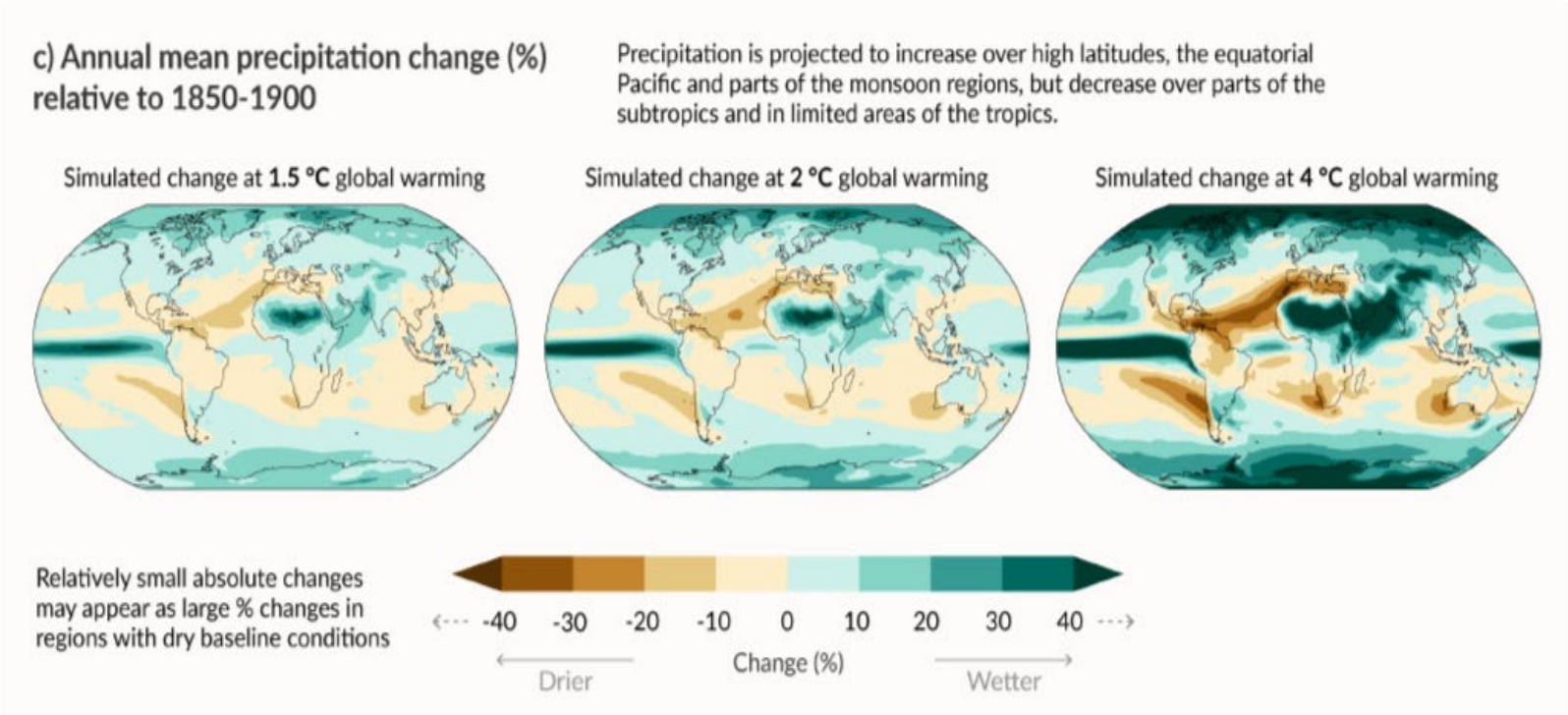


With every increment of global warming, changes get larger in regional mean temperature, precipitation and soil moisture



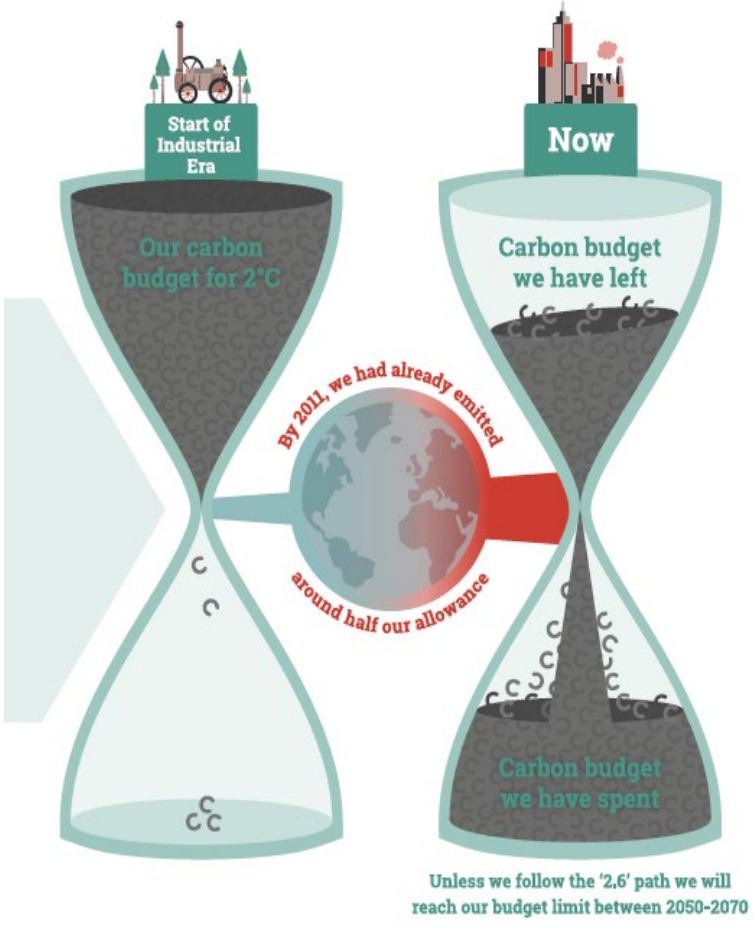
With every increment of global warming, changes get larger in regional mean temperature, precipitation and soil moisture

Figure SPM.5



There is urgency

- Need for GHG emissions to peak by 2030, and to be zero equivalent by 2050-2070
- The decisions we take (or do not take) now will have consequences for centuries or millennia
- Cost of dealing with consequences of inaction will greatly exceed cost of action now



University of Cambridge 2013

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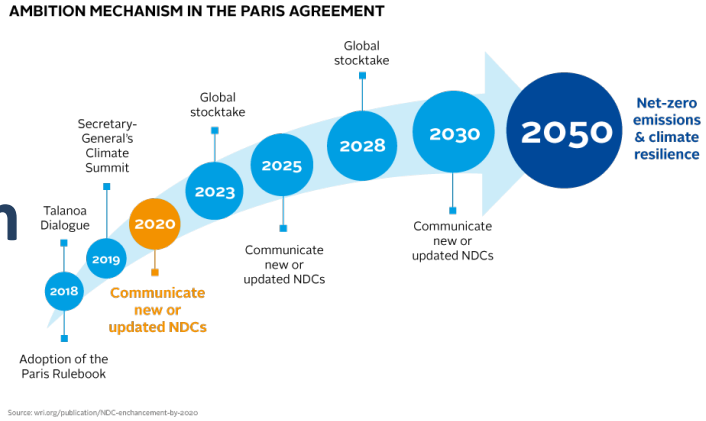
Paris Agreement (Dec 2015)-Key elements:

- Ambitious "binding" agreement ("well below 2°C")
- Mitigation: voluntary pledges to be reviewed (up) every 5 years
- Transparency and reporting on national progress
- Adaptation: supported by financial mechanisms and technology transfers
- Funding with a new goal of USD 100 billion (floor) per year, taking into account needs and priorities of developing countries
- Need for climate services
- Loss and damage mechanism
- Involvement of all actors



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~~2020~~ 2021: COP 26 Glasgow

- Delayed by one year due to the Covid pandemic
- Review of commitments towards achieving Paris goals: Only a few countries announced strengthening of their commitments, but insufficient to meet Paris goals. The emission gaps is still very large.
- No decision on rules for a global carbon market as requested by previous COP. Postponed again to next COP
- Reference to “phasing out” of coal energy plants removed at last minute. Replaced by “phasing down unabated”
- Reference to “phasing down of inefficient fossil fuel subsidies”

GLASGOW COP26

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2022: COP 27 Sharm el-Sheikh

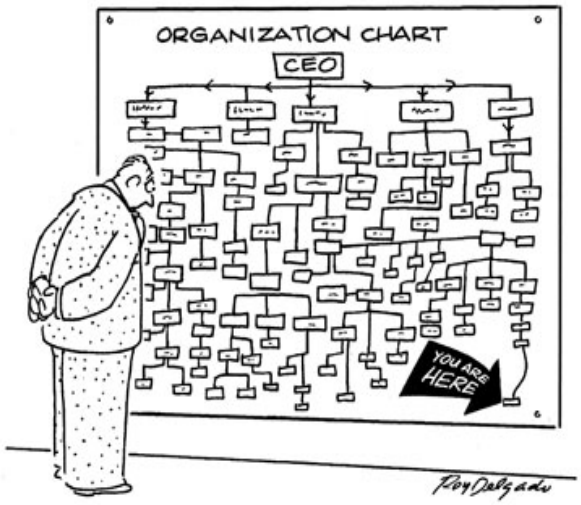
What to expect?

- Annual review of commitments for reduction of emissions
- Need for progress on a carbon market and pricing
- Need for progress on financing for adaptation
- Need for progress on loss and damage

Urgency is growing
But context is difficult
Last chance?

Challenges (1): Cross-cutting issues

1. Most (all) SDGs and other major issues are cross-cutting
2. Very complex matrix to manage.
3. However, many organisations and structures were designed with specific thematic focus (at all levels: international, national and local)



4. No tradition of cooperation in some disciplines
5. Current recommended management approaches often inadequate

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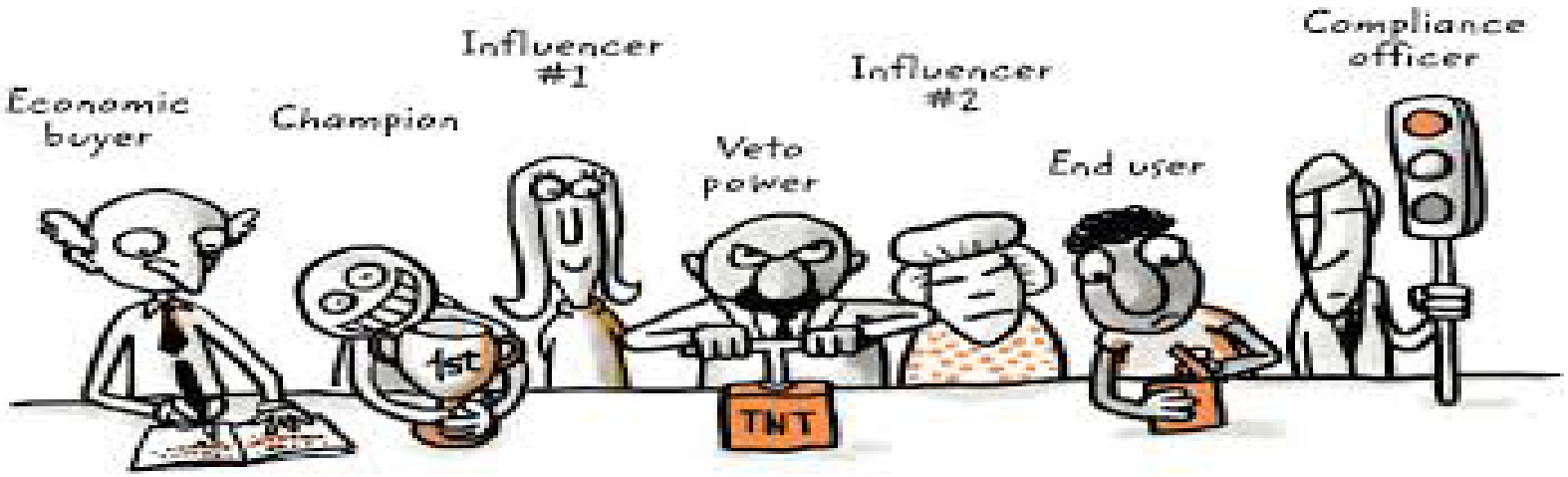
Challenges (2): new paradigm needed for decision making

1. Decision making does not easily takes into account long (decades or longer) time scales
2. Past is increasingly misleading as predictor (climate change)
3. Conflicting cost benefit analyses (cf cross-cutting)
4. Decisions to be based on scenarios, probabilities
5. Multiplicity of decision makers and actors



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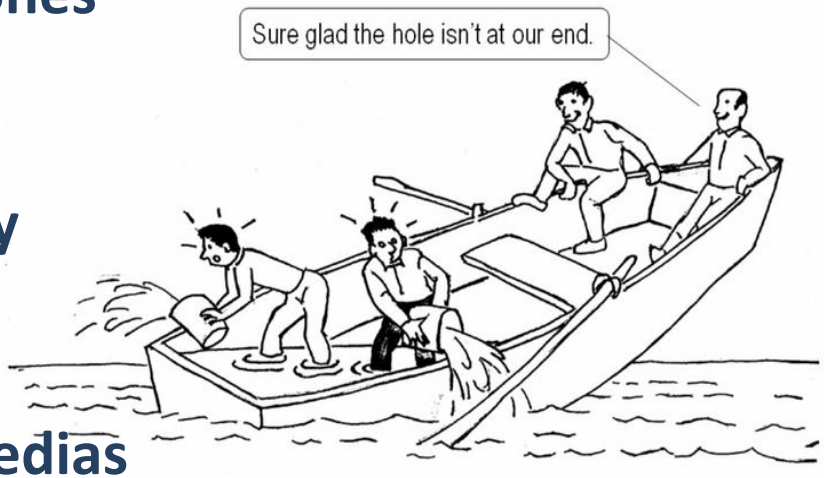
Challenges (3)

Some current worrying political and social trends

- In many countries, resurgence or strengthening of nationalistic trends
- Favoring short term national interests, rather than medium or long term global ones
- Tendency to blame "others"
- Increased individualism
- Weakening of global solidarity
- Refusal to accept (or even to listen to) different opinions
- Trends reinforced by social medias
- More and more difficult for individuals, and even top decision makers, to distinguish real from fake news

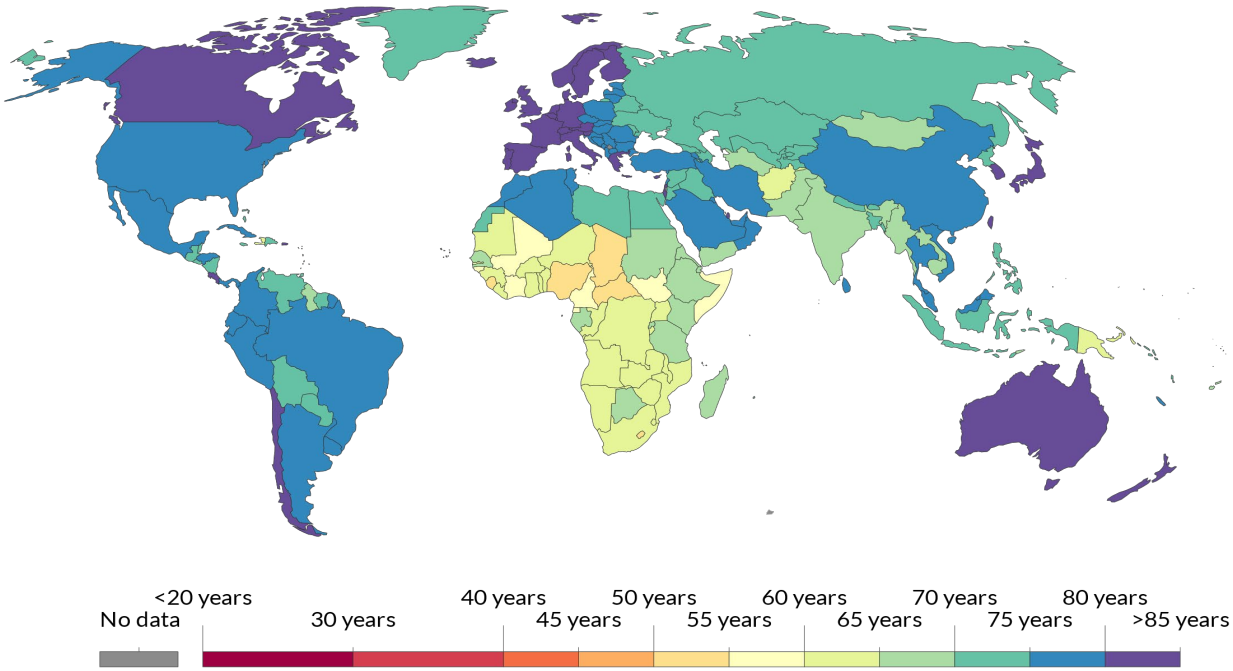


A few (concluding) remarks (1)

The end of the century is tomorrow

- Negotiations based on 2100 time horizon
- Looks very far in future, but …

Life expectancy, 2019



Source: Riley (2005), Clio Infra (2015), and UN Population Division (2019) OurWorldInData.org/life-expectancy • CC BY
Note: Shown is period life expectancy at birth, the average number of years a newborn would live if the pattern of mortality in the given year were to stay the same throughout its life.

A few (concluding) remarks (2)

- Market forces not sufficient (or even not appropriate)
- Transparent reporting and monitoring
- Introduce appropriate pricing mechanisms for carbon
- Need for global strategies for key sectors (energy, transport, industry, agriculture, forestry and land use …)
- Responsibilities (current and future)
- Ethical issues
- Inclusion of all key actors, not only governments: cities, regions, private sector, civil society, academia and young people
- …

A few (concluding) remarks (3)

- We are facing a unique situation
- Our planet is unique: « no plan B, because no planet B » (Ban Ki-moon)
- A fundamental principle: global solidarity. Failure to cooperate will ensure failure (for humanity, not for the planet)
- Our differences are minuscule compared to the collective interest of mankind
- Medium and long term consideration must prevail on national, local or even personal short term interests
- Success in addressing anthropogenic climate change could be a model for other global issues

No one, no country can do it alone.

A multilateral approach is essential

We have very little time left. We must take decisions and act quickly

We may be the first (and last) generation to be able to do it

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شكرا

谢谢

Gracias

Merci

Thank you

спасибо

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TEMPS CLIMAT EAU

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World Meteorological Organization
Organisation météorologique mondiale

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