
GCCA+
THE GLOBAL CLIMATE CHANGE ALLIANCE PLUS INITIATIVE


Funded by
the European Union

Climate Change: the defining challenge of our time

Global Climate Change Alliance+ Training Course

Module 1

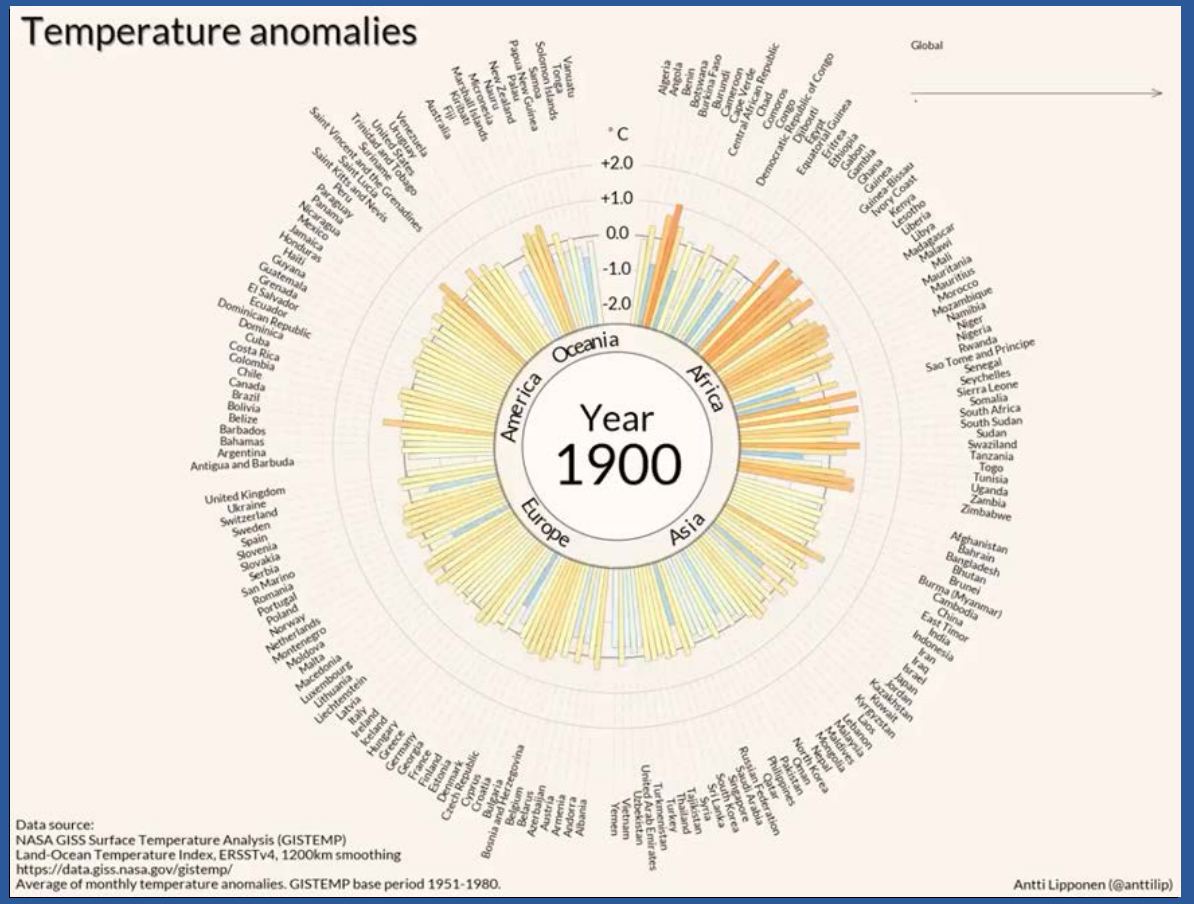
Climate: a hot topic these days

2017 was the warmest year since records began to exist in the second half of the 1800s.

Several countries report that they set new temperature records during 2017.

Arctic ice reached its lowest level (extent and depth) in 37 years despite above average spring snow cover

Average sea level, which also reached a record high, exceeded the average height recorded in 1993 by 77mm.



Challenges

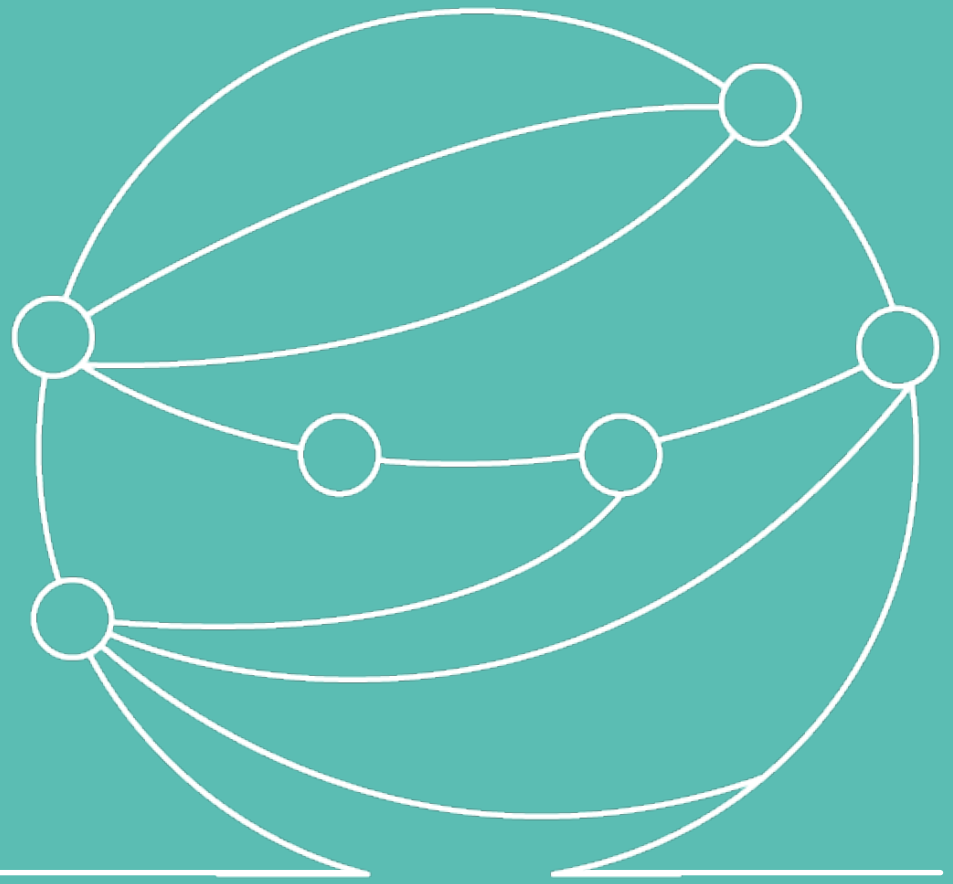
Climate is closely related to ***expectations.***

Climate ***change*** affects the ways natural and human sytems are organised.

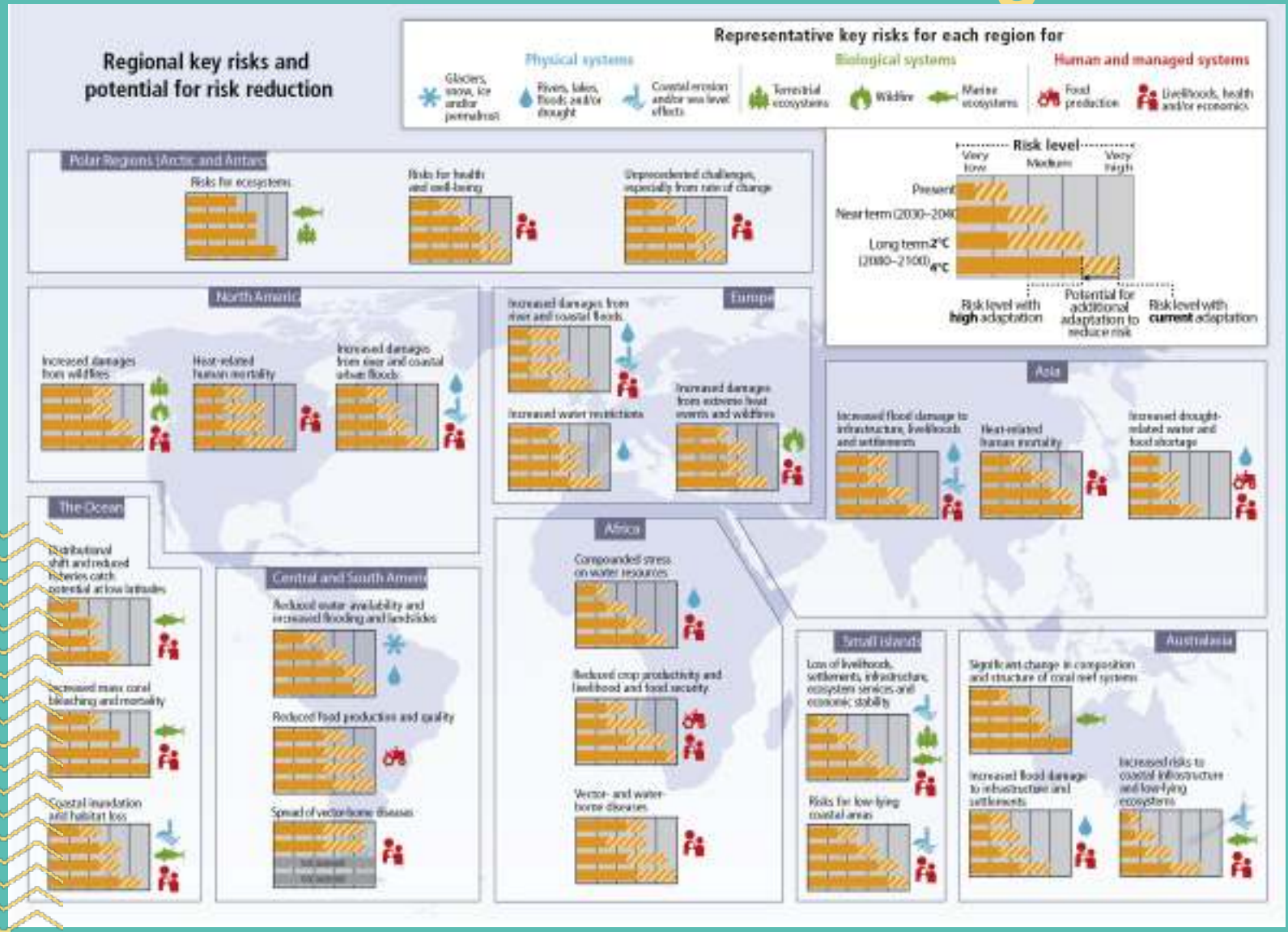
Climate Change affects basic needs of life: food, water, shelter, health

Challenges: Developing Countries are the Most Vulnerable

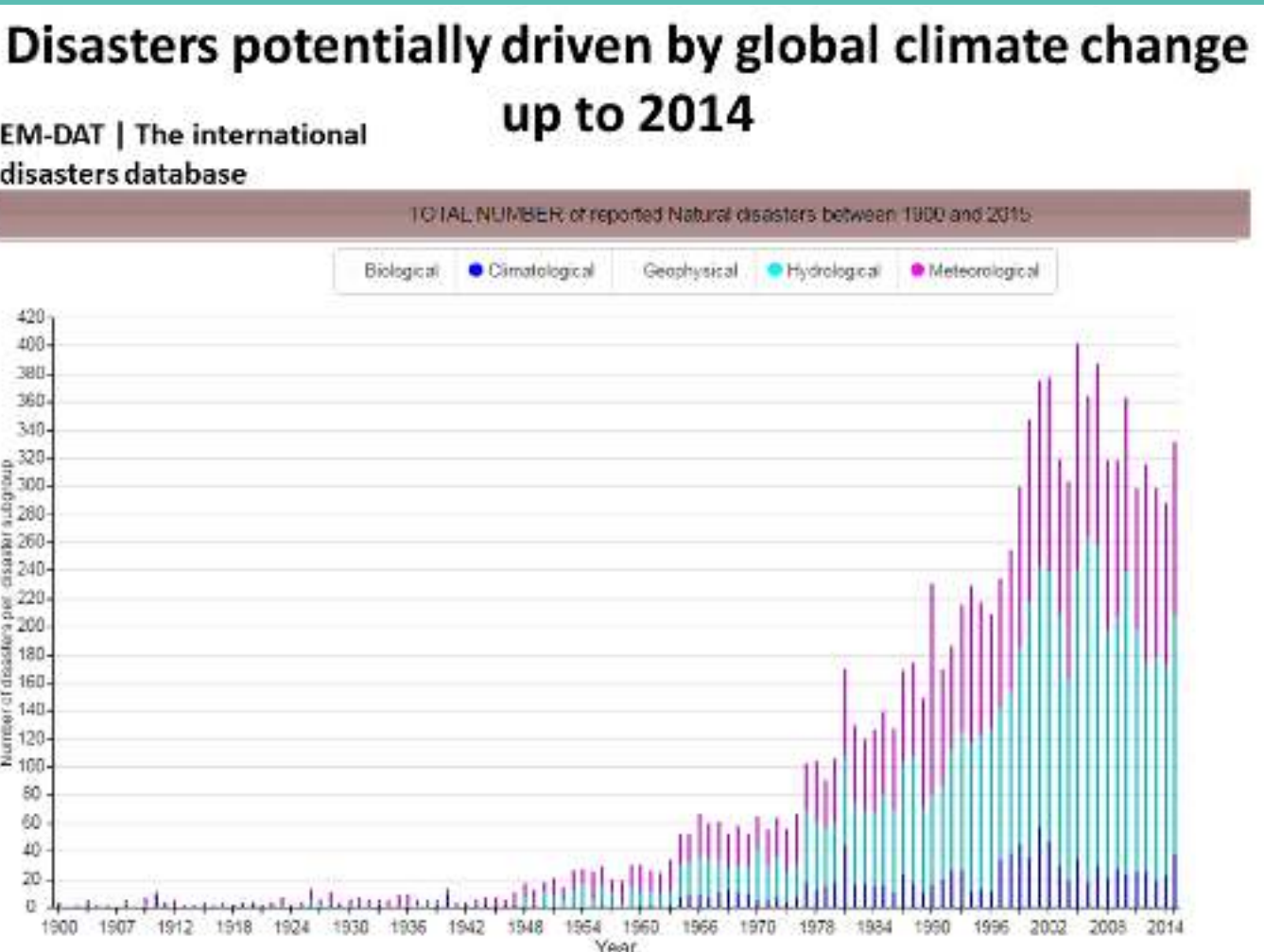
- Impacts are worse:
  - Large share of economy in climate sensitive sectors (e.g. agriculture, tourism)
  - Prone to natural disasters (e.g. floods and droughts)
  - Adds to existing water resource stresses
- Multiple stresses and lower adaptive capacity:
  - Limited financial, institutional, technological capacity
  - Limited access to knowledge
- Impacts disproportionately on poorest countries and poorest people:
  - Exacerbated human health, food security, malnutrition, clean water and other resource access concerns.

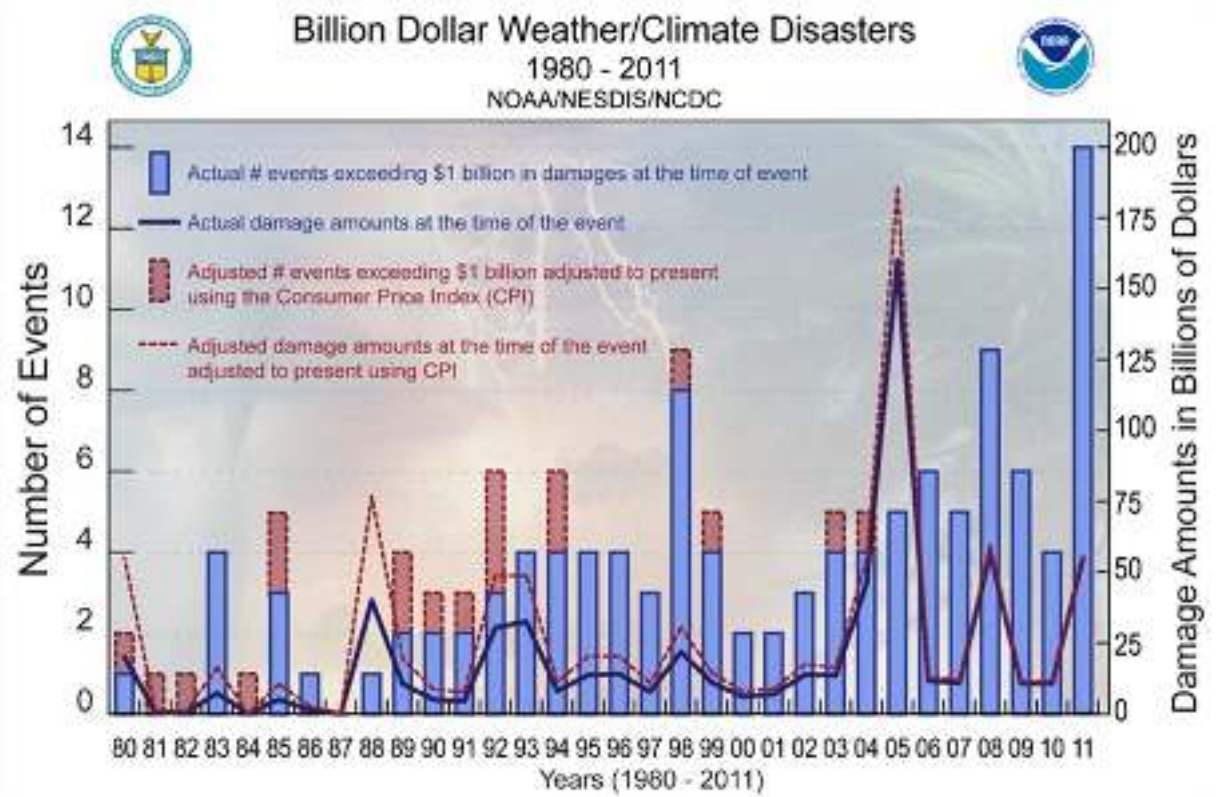


Challenges: Representative risks for each region



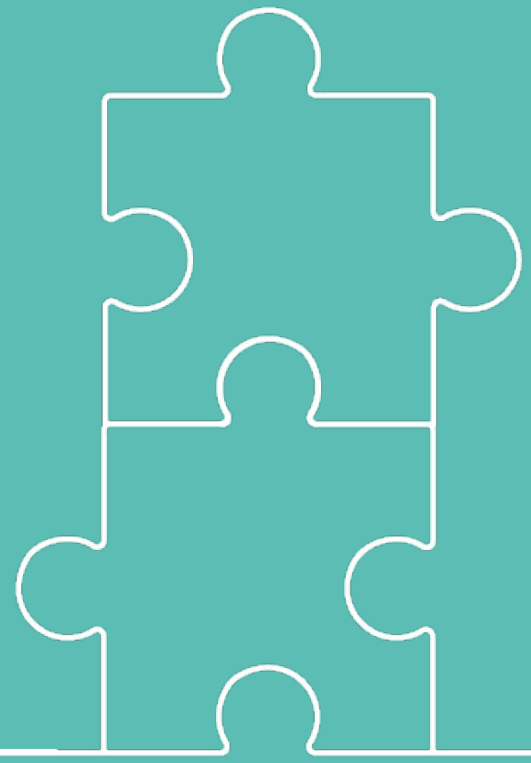
Challenges: Frequency and cost of extreme weather events





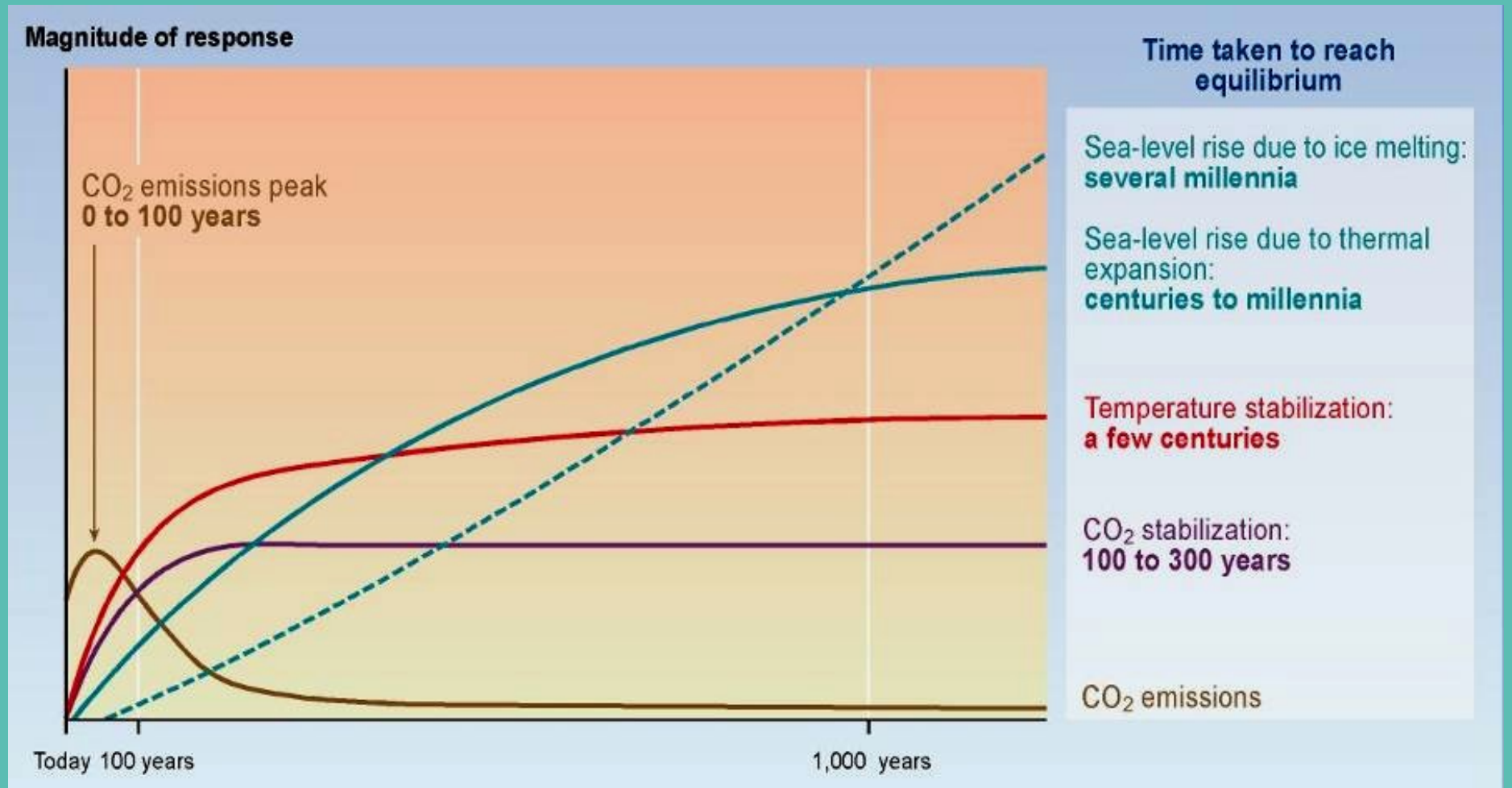
Challenges: Slow effects, time lags, and non-returning point

- Acrruing value of CO2 in the atmosphere
- Time lag in climate systems and in human response
- Retroaction (ice melting ⎵ higher warming ⎵ ice melting)
- Biodiversity: irreversibilty
- Disappearing life support systems in the only planet we know



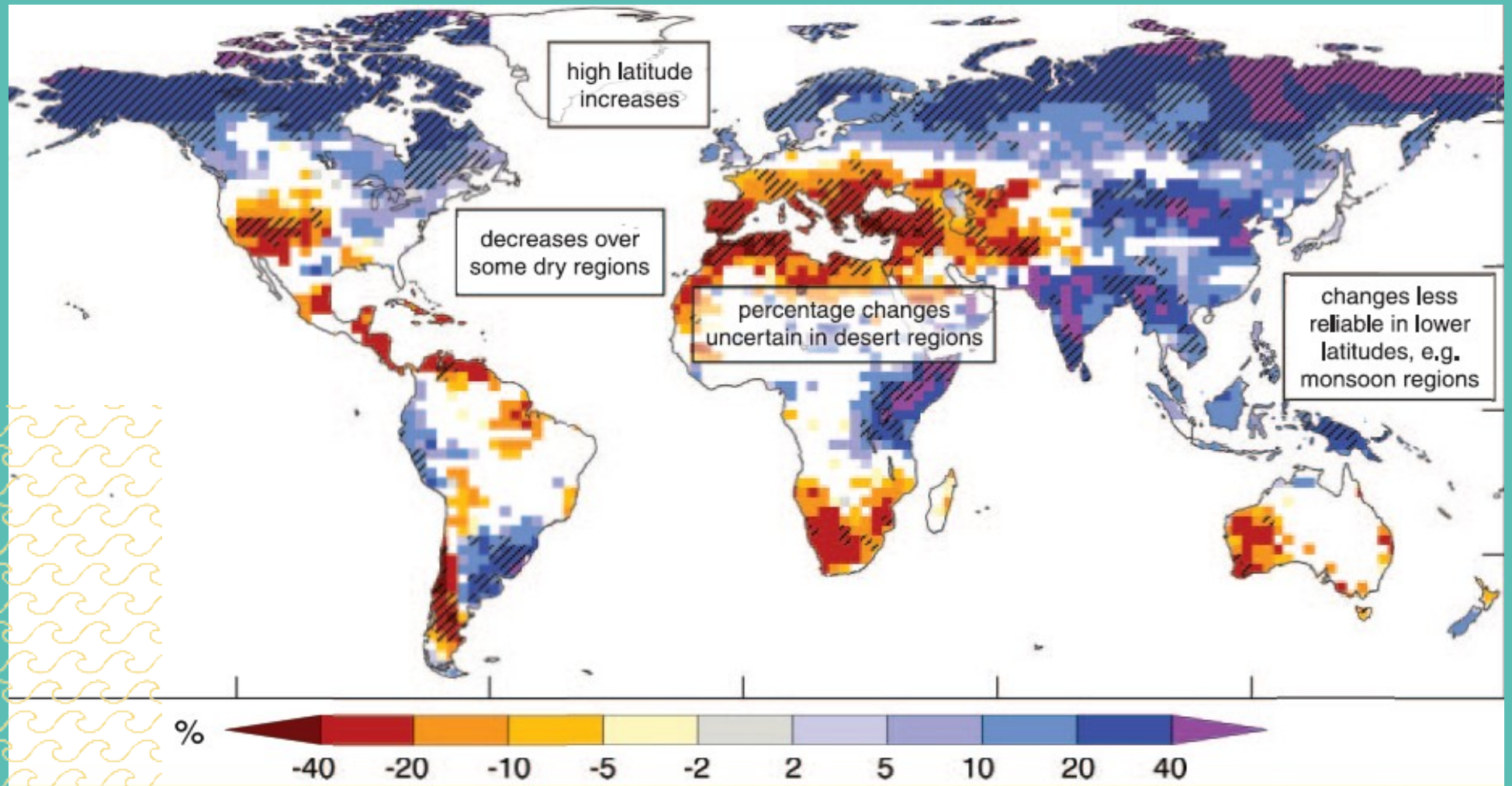
"Continued GHG emissions [...] would induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century".

Challenges: Slow effects and time to reach equilibrium



CO2 concentration, temperature, and sea level continue to rise long after emissions are reduced!

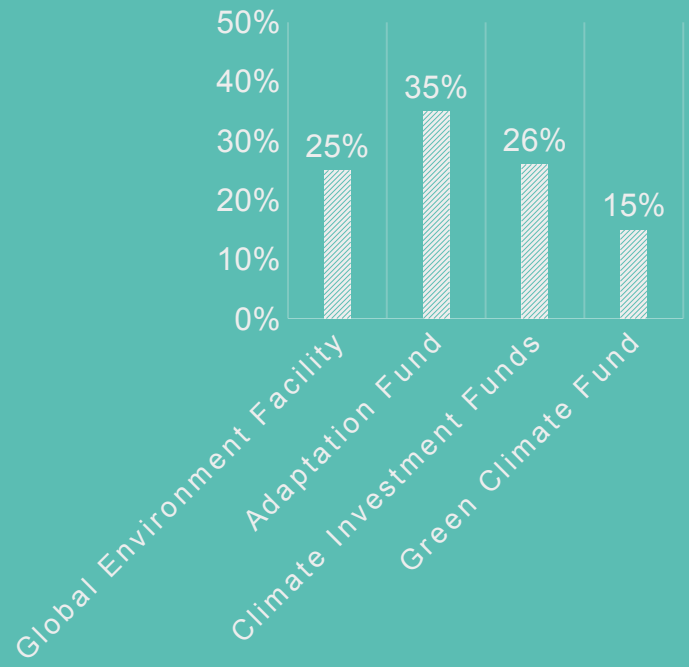
Challenges: Climate Change will exacerbate water stress / insecurity



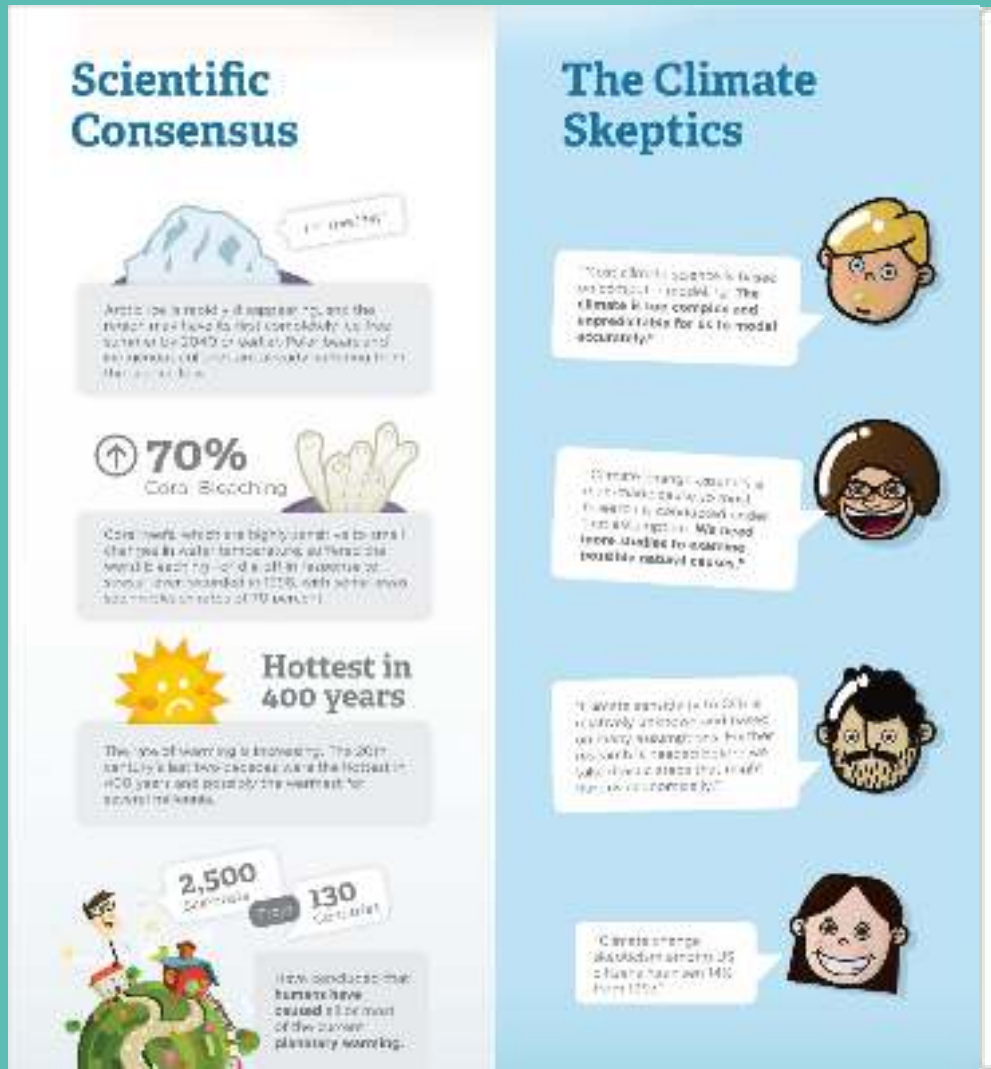
Challenges : Gender

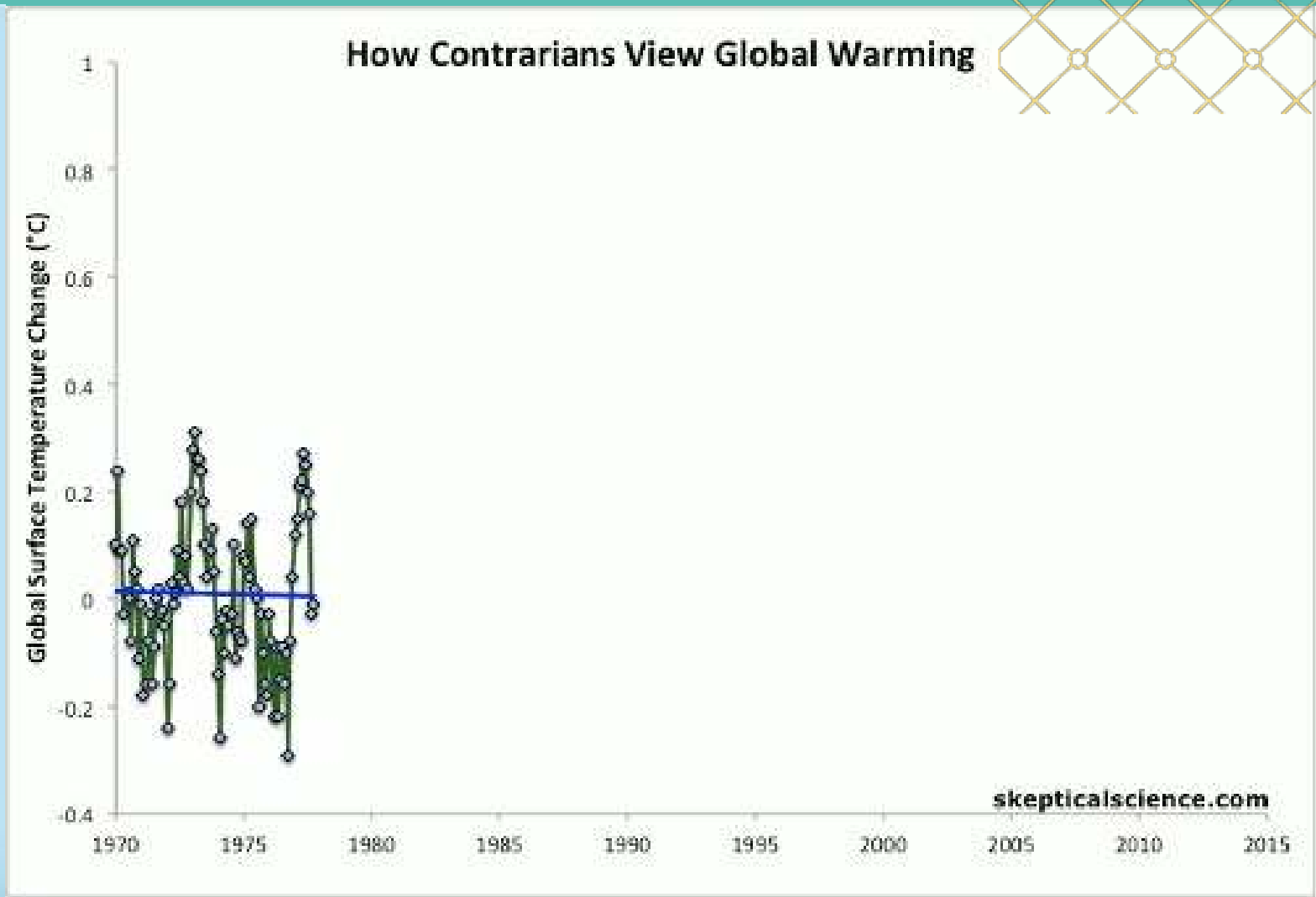
- Gender inequality intersects with climate risks and vulnerabilities
- Women are a majority among the most vulnerable and the underprivileged. Stats indicate up to 70 % of the world's poorest people are women and girls.
- Women have less access to resources that would enhance their capacity to adapt to climate change—including land, credit, education etc. – making them vulnerable
- Vulnerability depends in large part on access to resources and assets (physical, financial, human, social, and natural) "The more assets, the less vulnerability".
- Women are also a minority among the people who draw up climate strategies, or sector related strategies (e.g., energy, agriculture)

Participation of Women on climate finance mechanism boards



Challenges : Views and misinformation





Challenges

“What is certain is that we need to face uncertainty”

We need science and experience to fill gaps in knowledge and capacity

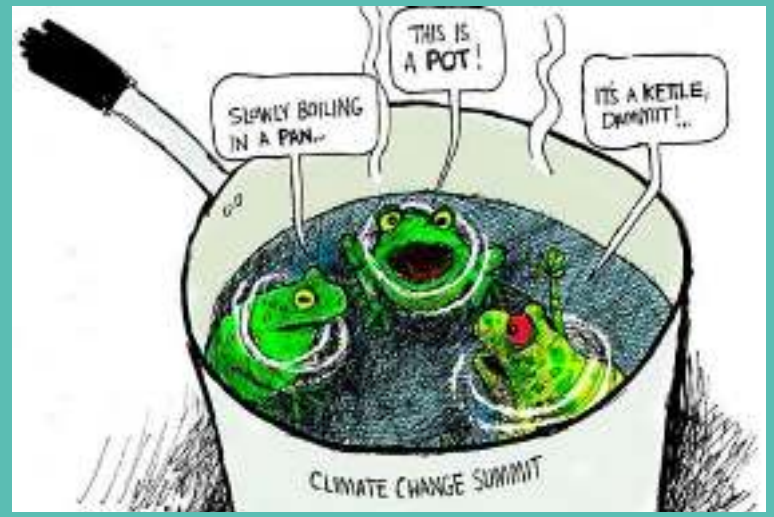
Scientific capacity is also needed to ensure that the science carried out is relevant to the needs of vulnerable countries (“know-do” gap)

Challenges: Scientific gaps to fill

- **Climate models** – Need for local models of relevance to developing countries.
- **Health** – Infectious diseases such as malaria, dengue and diarrhoea. Unknown effects on other health
- **Agriculture** - Effects on traditional crops and varieties, agricultural systems and investments needed for ensuring sustainable shifts.
- **Fisheries** – Changes to ocean currents affect biodiversity and fisheries. Temperature changes affect food-chains.
- **Water** – Widespread effects on the hydrological cycle, especially in arid and semi-arid areas where people already lack sufficient safe drinking water and water for irrigating crops. Security issues?
- **Other sectors** – Rising sea-level, disaster mitigation …

The Challenge

CHANGE !

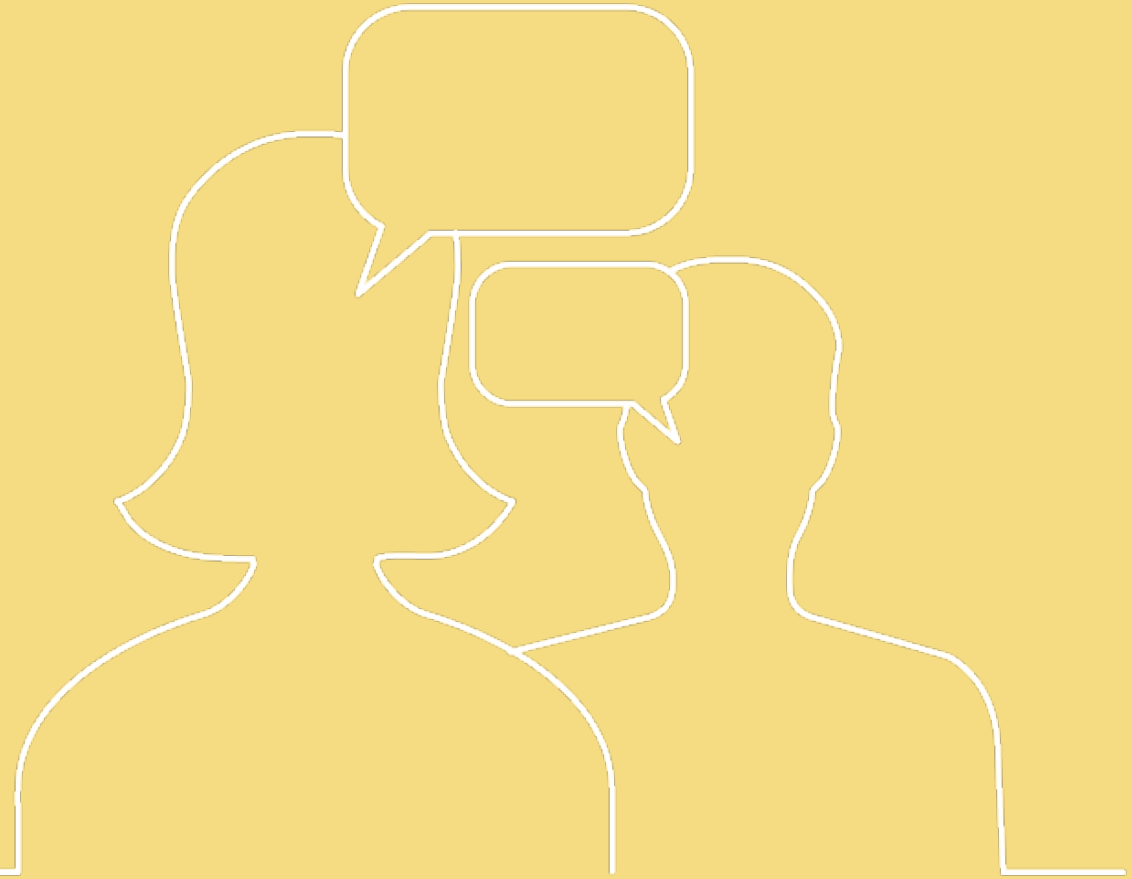


Challenge of realising change.

Difficulties can be seen at all levels:
why, what, how, when?

The basic science accepted by the UNFCCC

- The Convention recognizes that ever increasing amounts of anthropogenic (I.e. human produced) Greenhouse gas emissions are increasing the atmosphere's ability to absorb infra-red radiation.
- More specifically, the IPCC projects that global mean surface temperatures to increase by 1.4-5.8 degrees Celsius by 2100, which is the fastest rate of change since the end of the last ice age (10,000 years ago).
- In addition, the IPCC expects global mean sea levels to rise by 9 – 88cm by 2100.

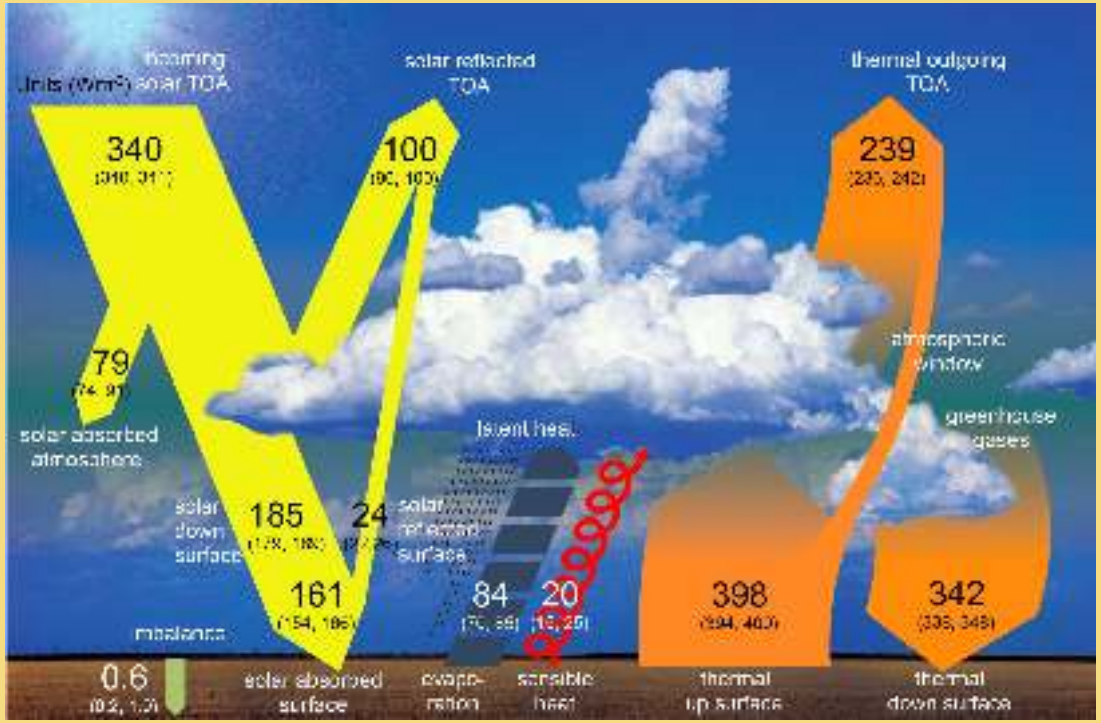


BACKGROUND Planets and atmospheres

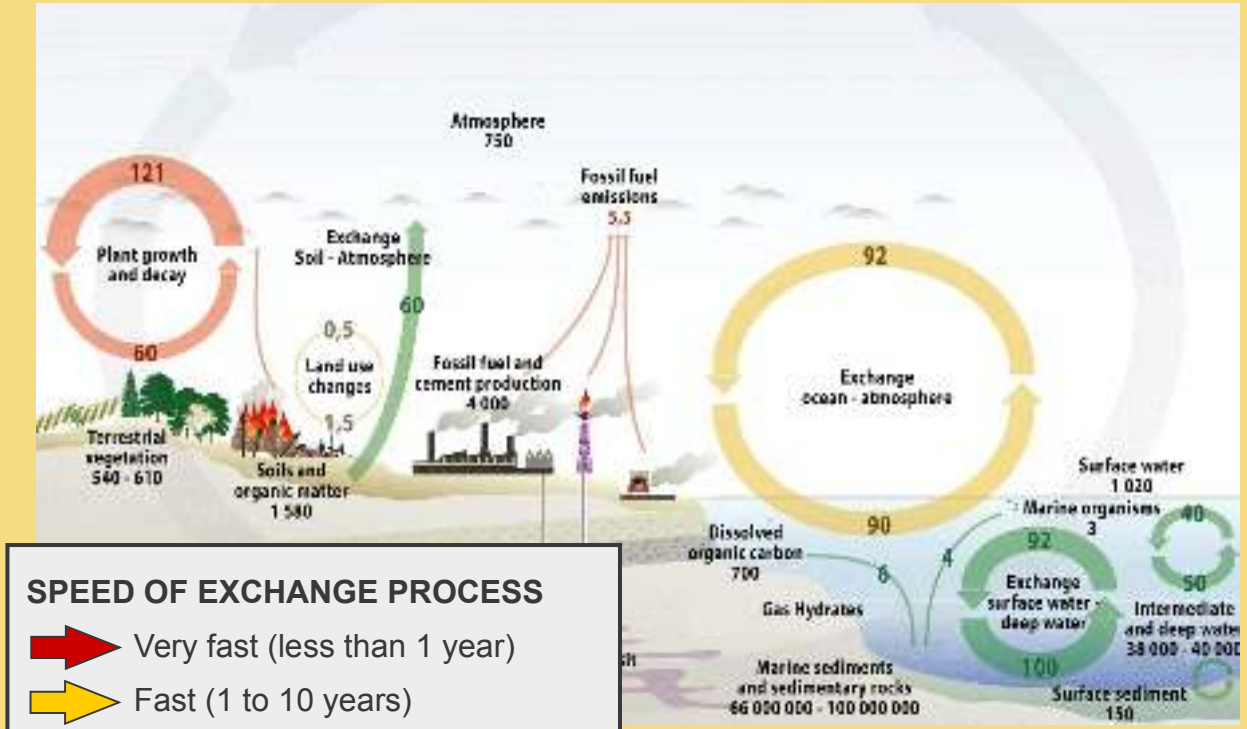
MARS	EARTH	VENUS
		
Thin atmosphere (CO_2 in the ground) Average temperature: - 50°C	0,03% of CO_2 in the atmosphere Average temperature: + 15°C	96% of CO_2 in the atmosphere Average temperature: + 420°C

BACKGROUND

Greenhouse Gases



Carbon Cycle

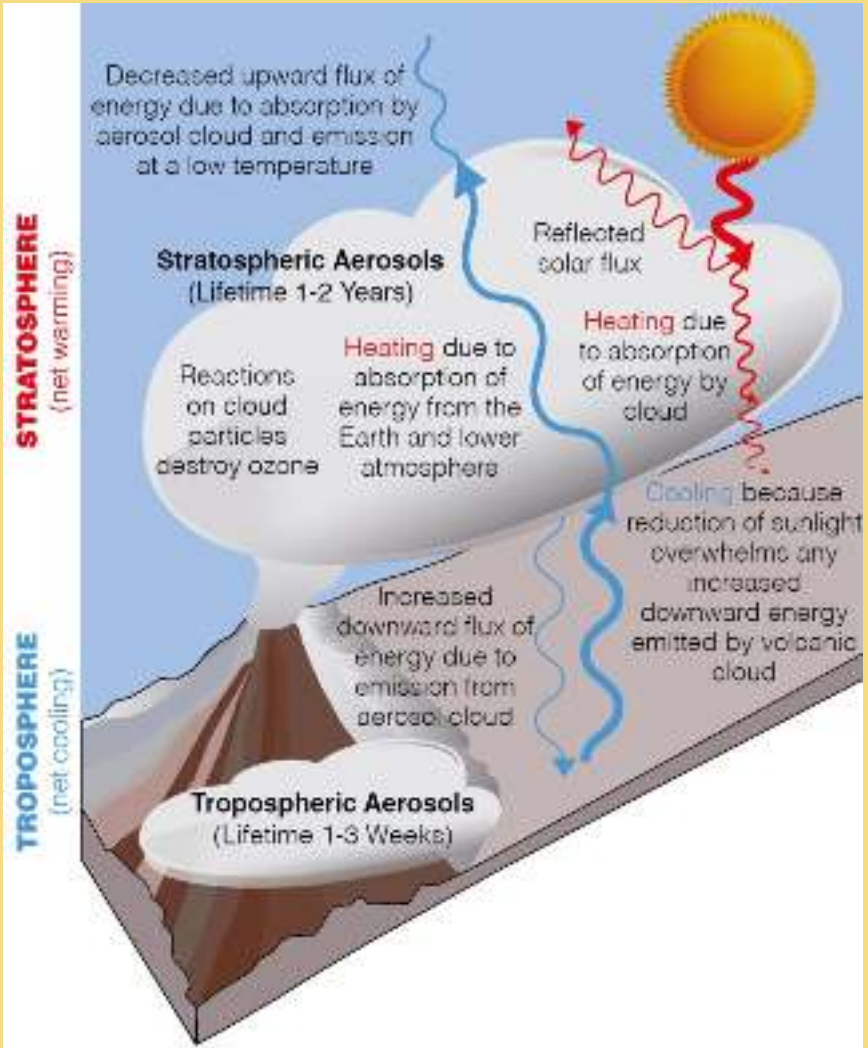


SPEED OF EXCHANGE PROCESS

- Very fast (less than 1 year)
- Fast (1 to 10 years)
- Slow (10 to 100 years)
- Very slow (more than 100 years)

BACKGROUND

Aerosols

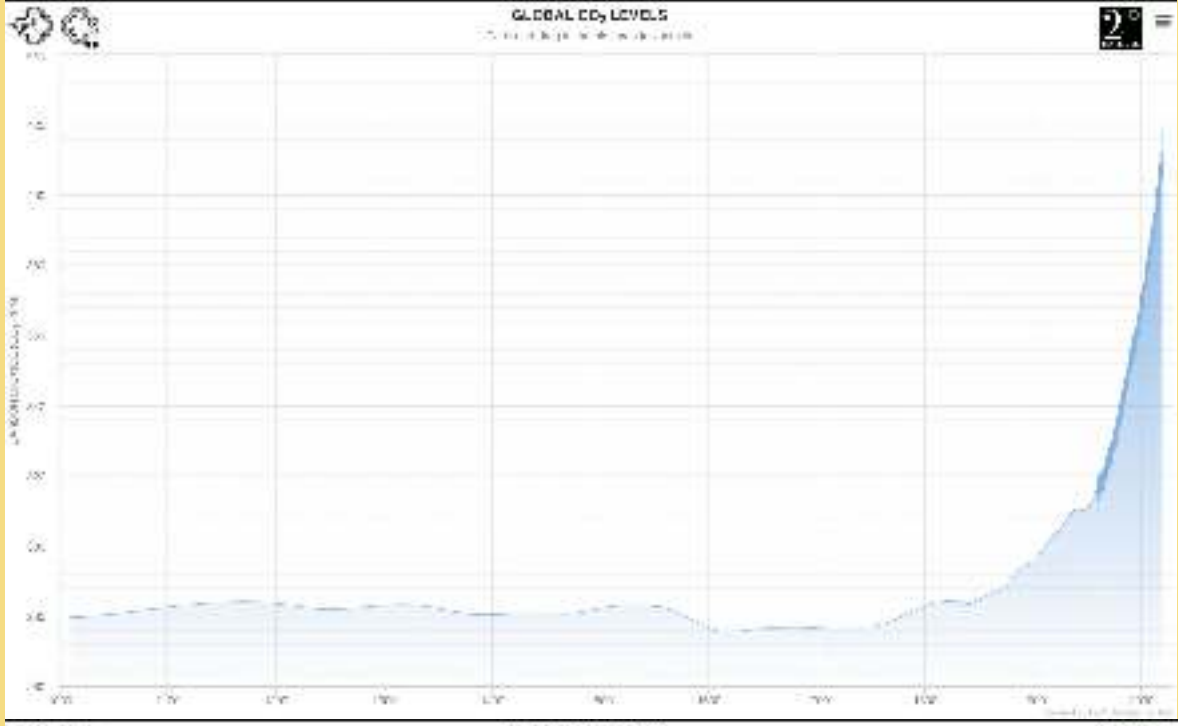


- Reflect and absorb radiation from the Sun
- May result in cooling of the earth's surface
- Affects photosynthesis
- Responsible for clouds and rainfall
- Short lifetime in the lowest part of the atmosphere

BACKGROUND

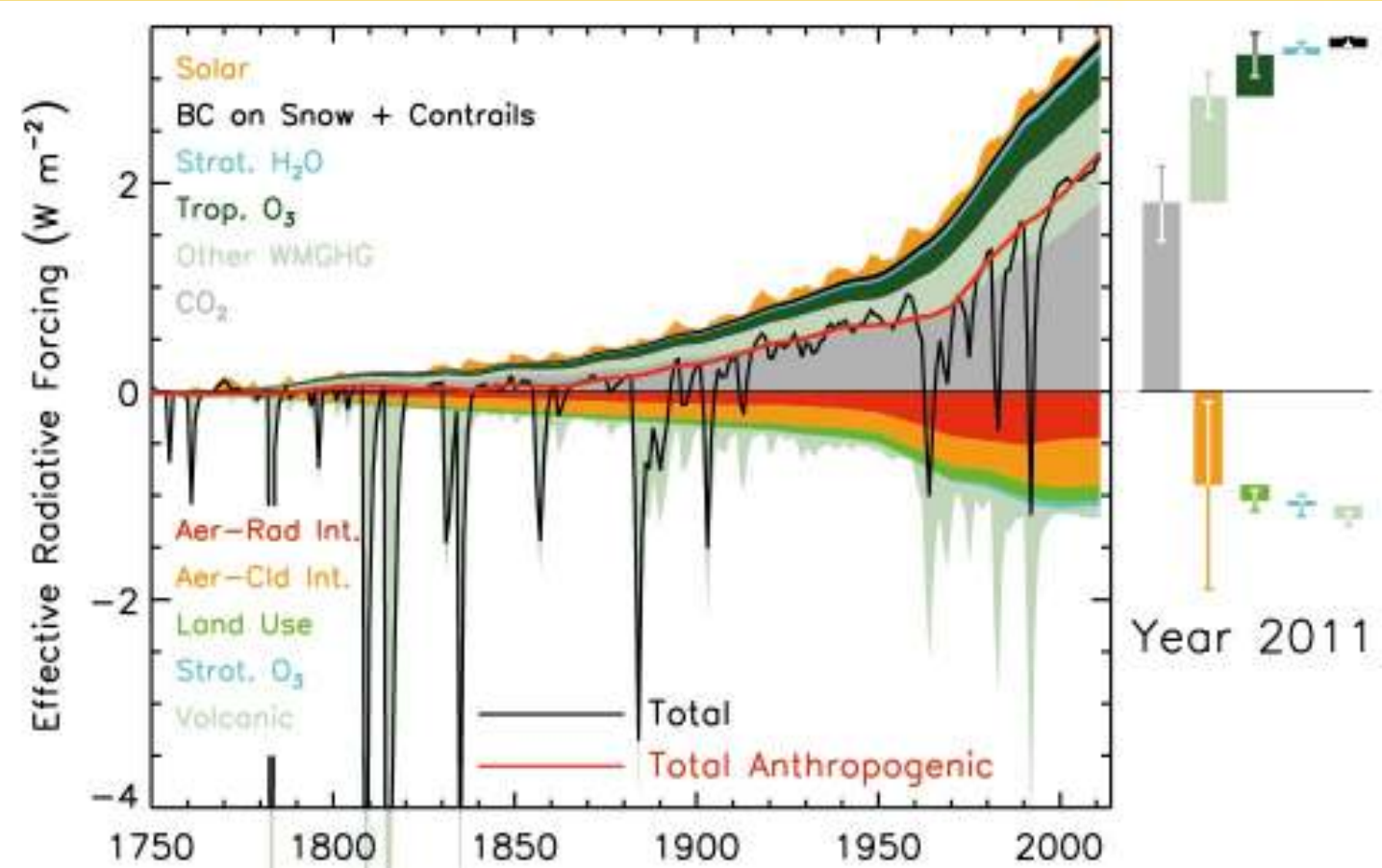
Global CO2

- Current carbon dioxide (CO_2) & methane (CH_4) concentrations greatly exceed ice core records dating back 650,000 years.
- CO_2 concentrations increased ~100 ppm over last 250 years (from ~280 ppm pre-industrial to 379 ppm in 2005).
- Between 1995 and 2005, CO_2 increased ~19 ppm: highest average growth rate recorded for a decade since measurements began in 1950s.



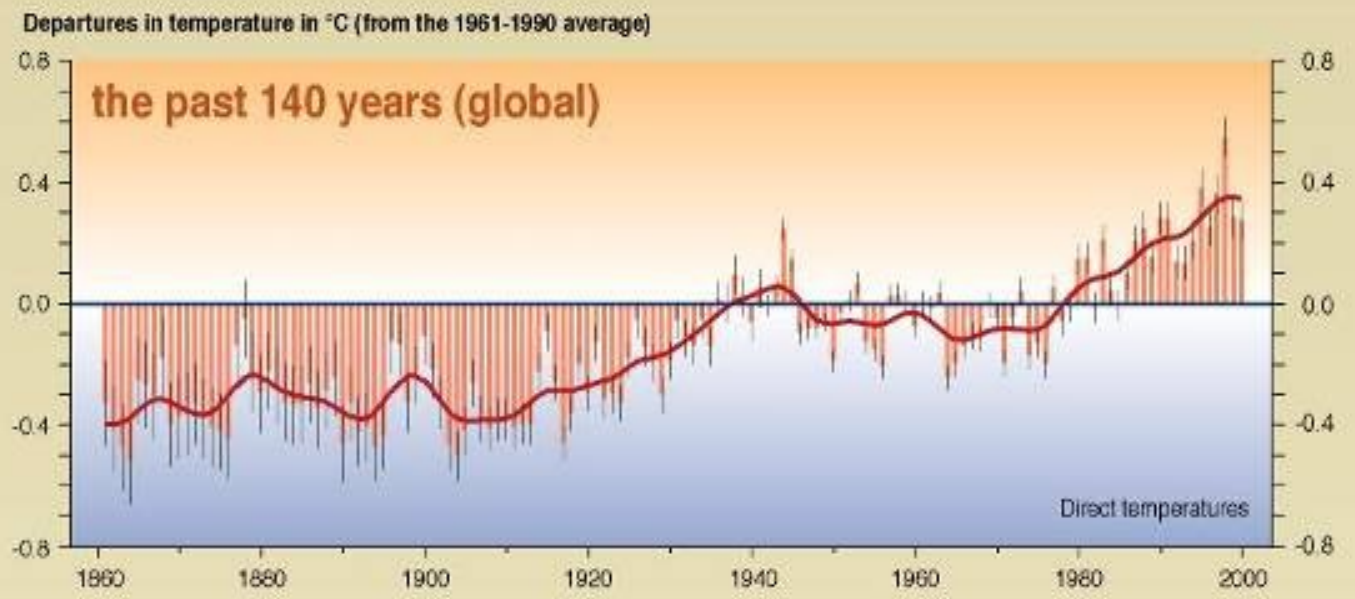
BACKGROUND

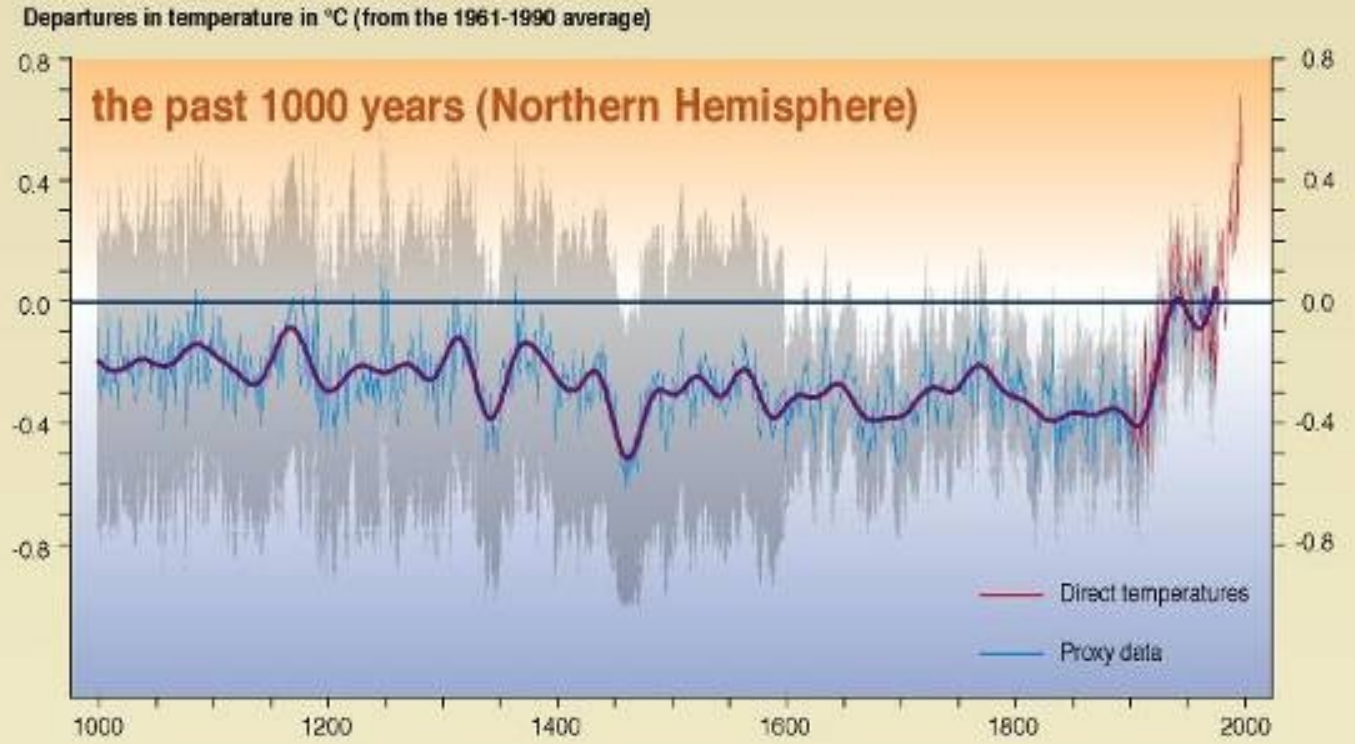
Human activity influence



BACKGROUND

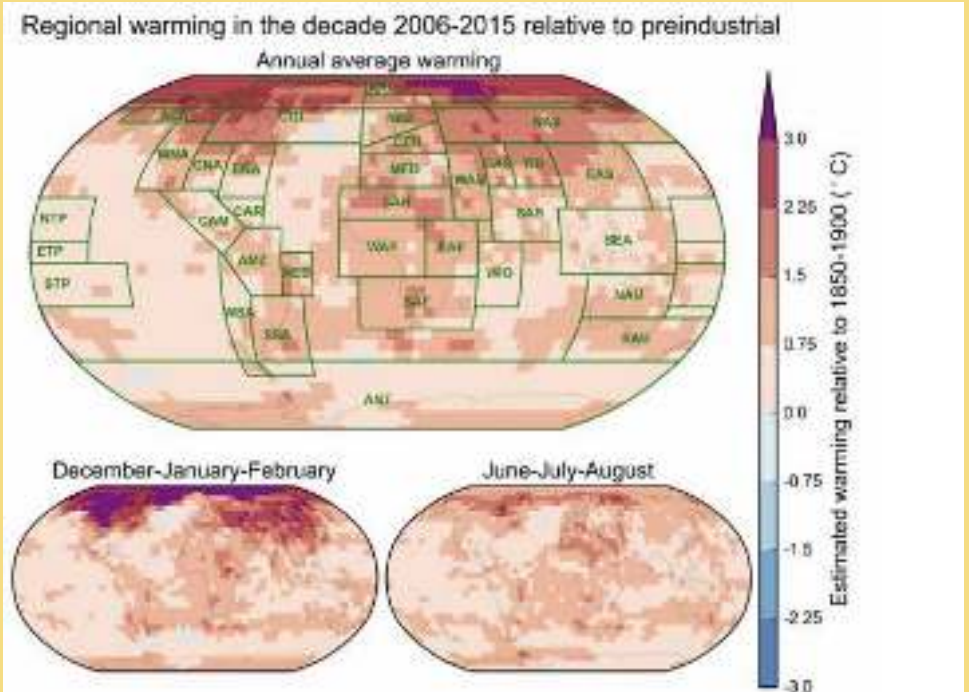
“Warming of the climate system is unequivocal”

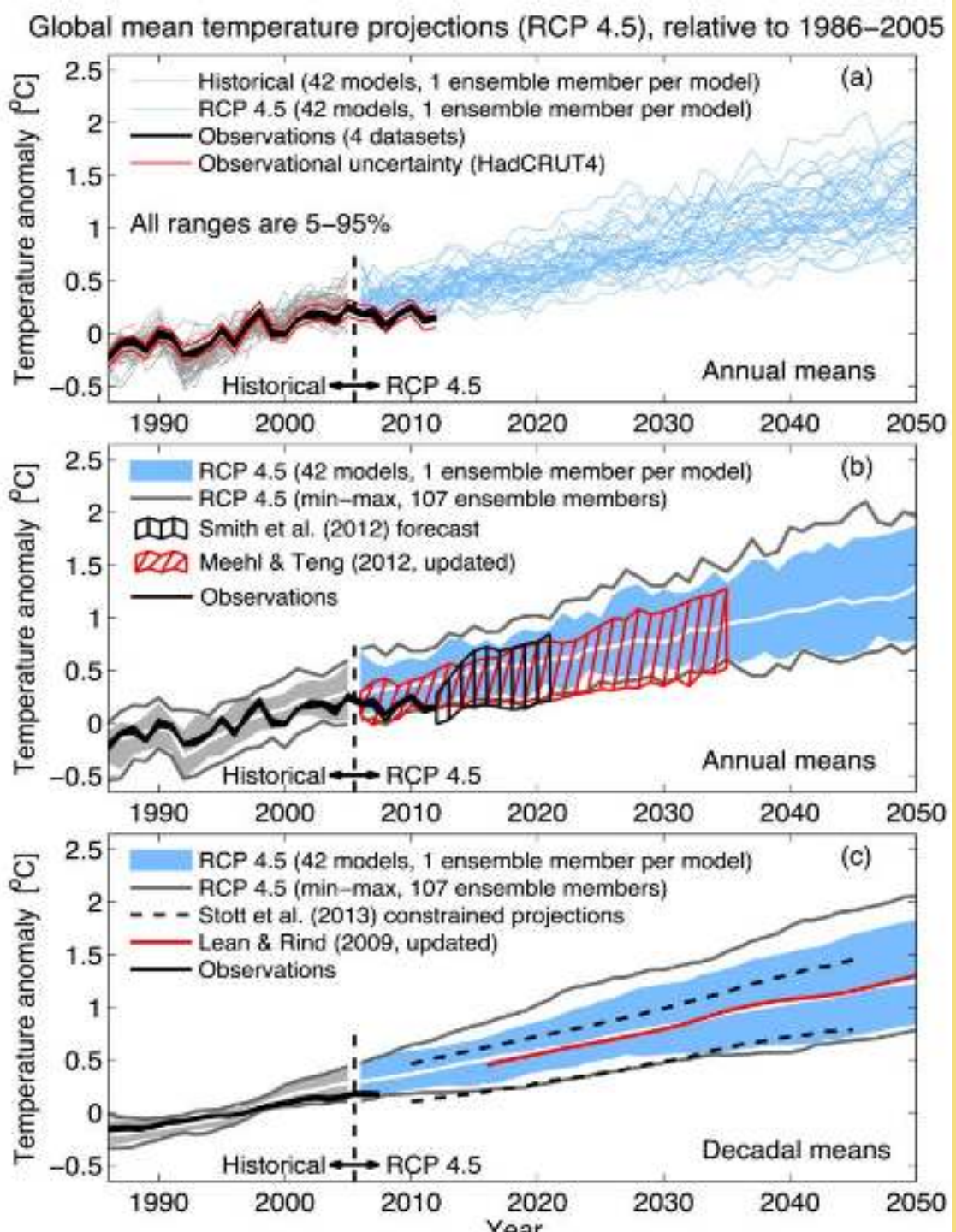




BACKGROUND

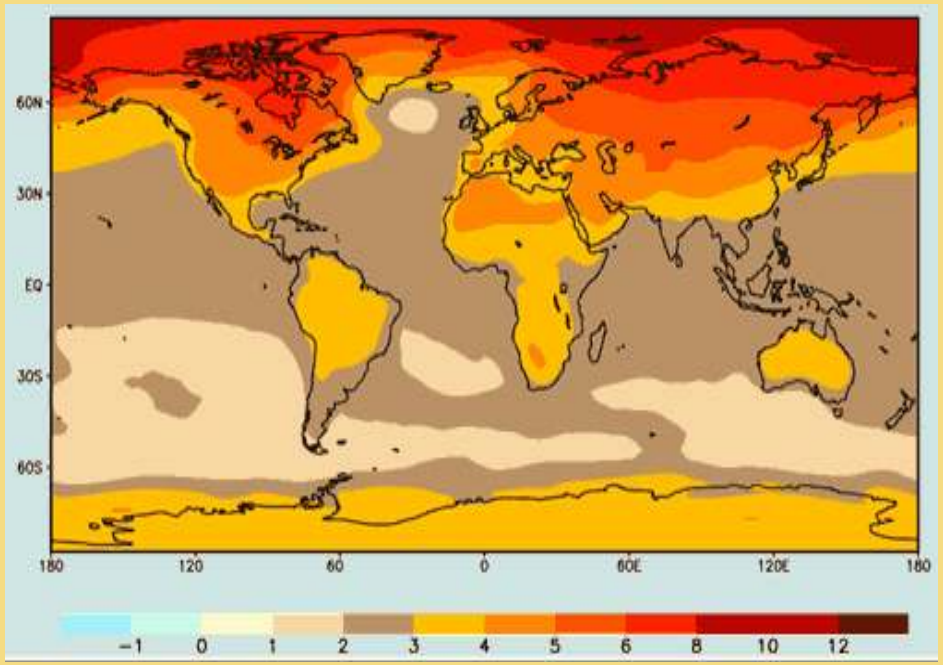
- Global average air and ocean temperatures are increasing.
- Global average sea level is rising.
- Extent of snow and ice cover is decreasing.



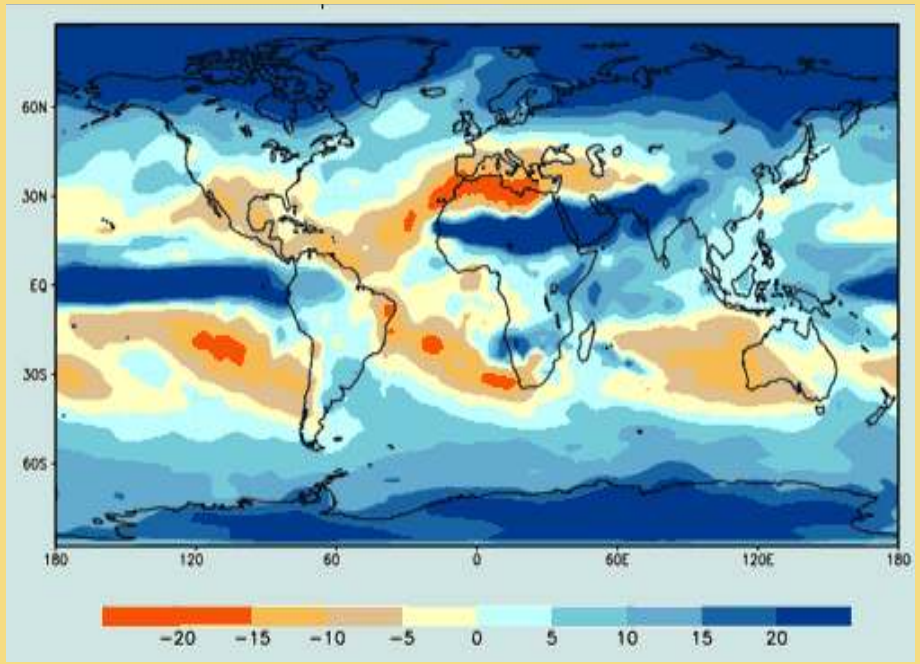


BACKGROUND Climate change tends by 2100

TEMPERATURE



PRECIPITATIONS

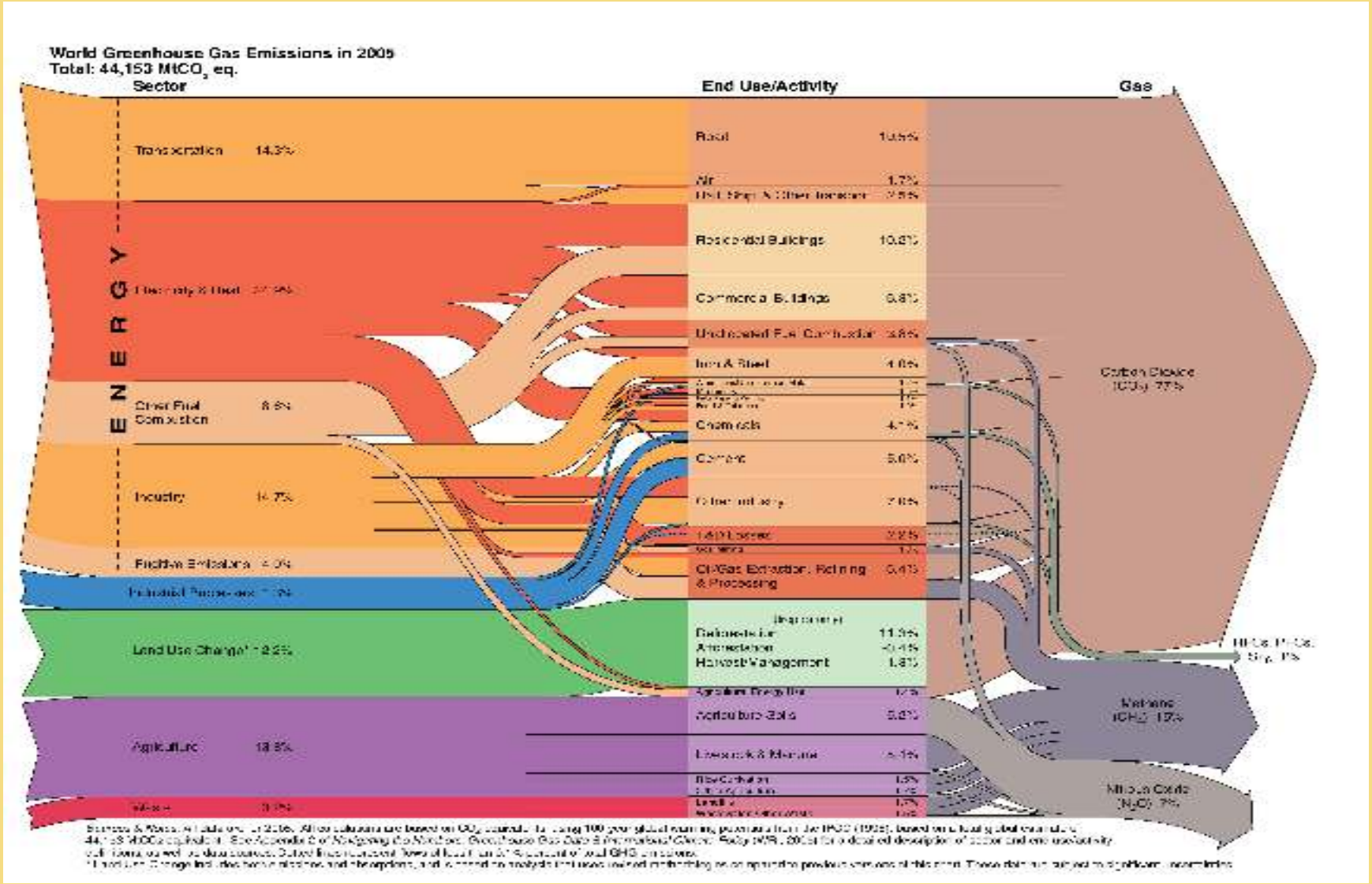


5 degrees = What separates us from the last glacial era (-15 000 BC)

Models' forecasts : **+1,4** to **+5,8 degrees** by 2100.

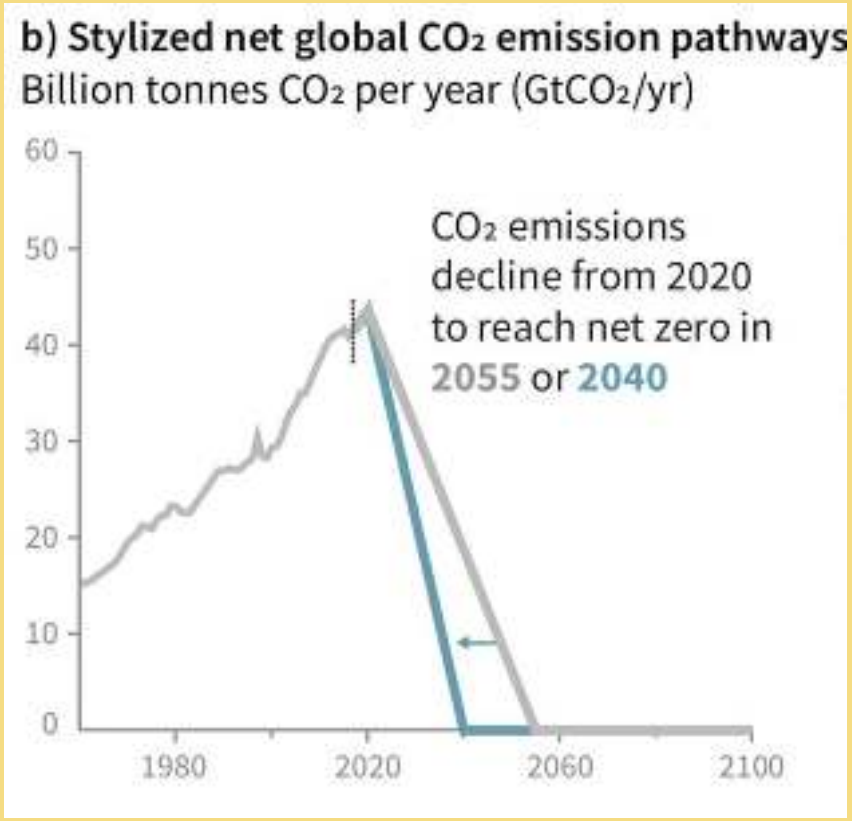
- Man-made greenhouse gas (GHG) emissions have increased the global temperature by 1°C since the Industrial Revolution.
- The last half degree is already associated with an increase in extreme weather events.
- According to the Intergovernmental Panel on Climate Change (IPCC), "it is likely" that global warming will reach 1.5°C between 2030 and 2052 if it continues at its current rate. This will not happen without disrupting our world. Especially since "many regions" are warming even faster. As a result, the Arctic is warming two to three times faster than the average.
- In its "Special Report" the IPCC even warns that at +1.5°C or +2°C, the world will not be the same. This small half degree could be responsible for increased risks, both for species and for our economies

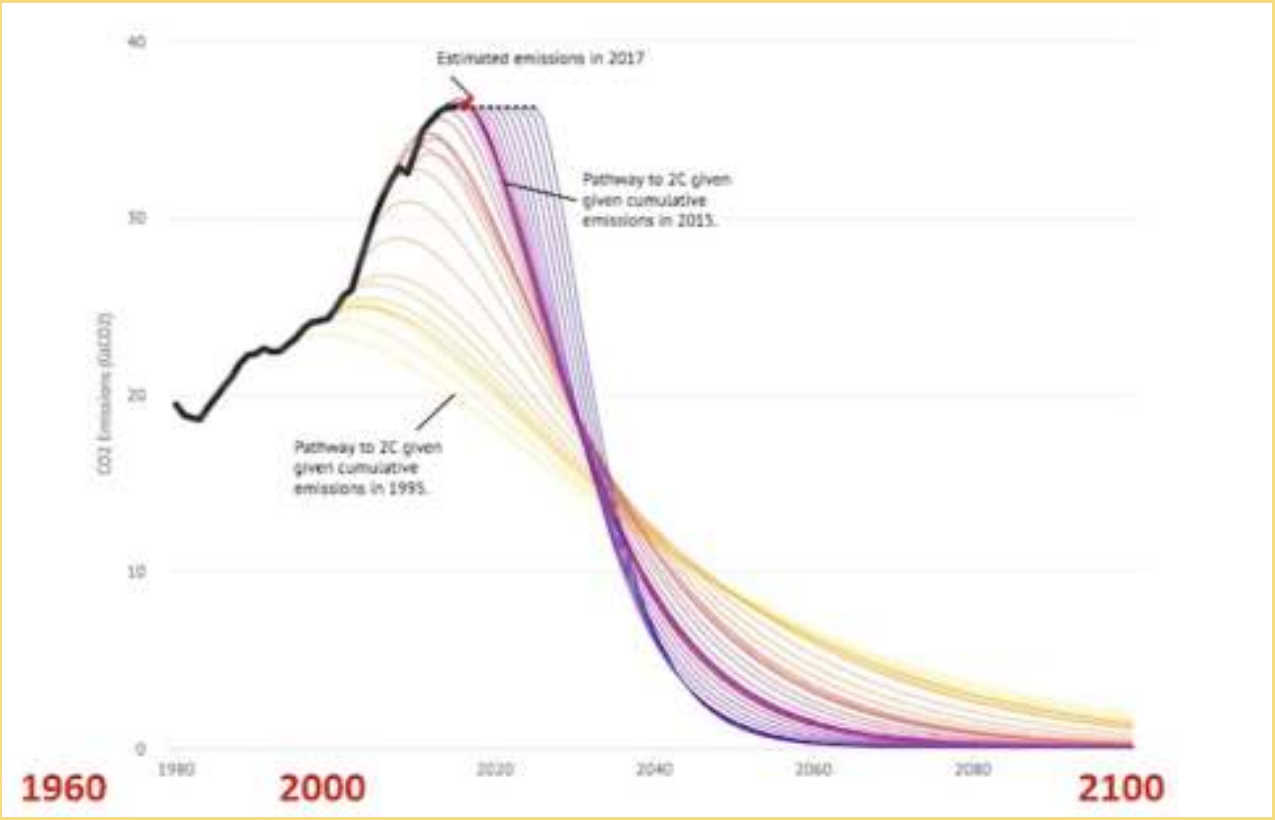
Sources of GHG emissions

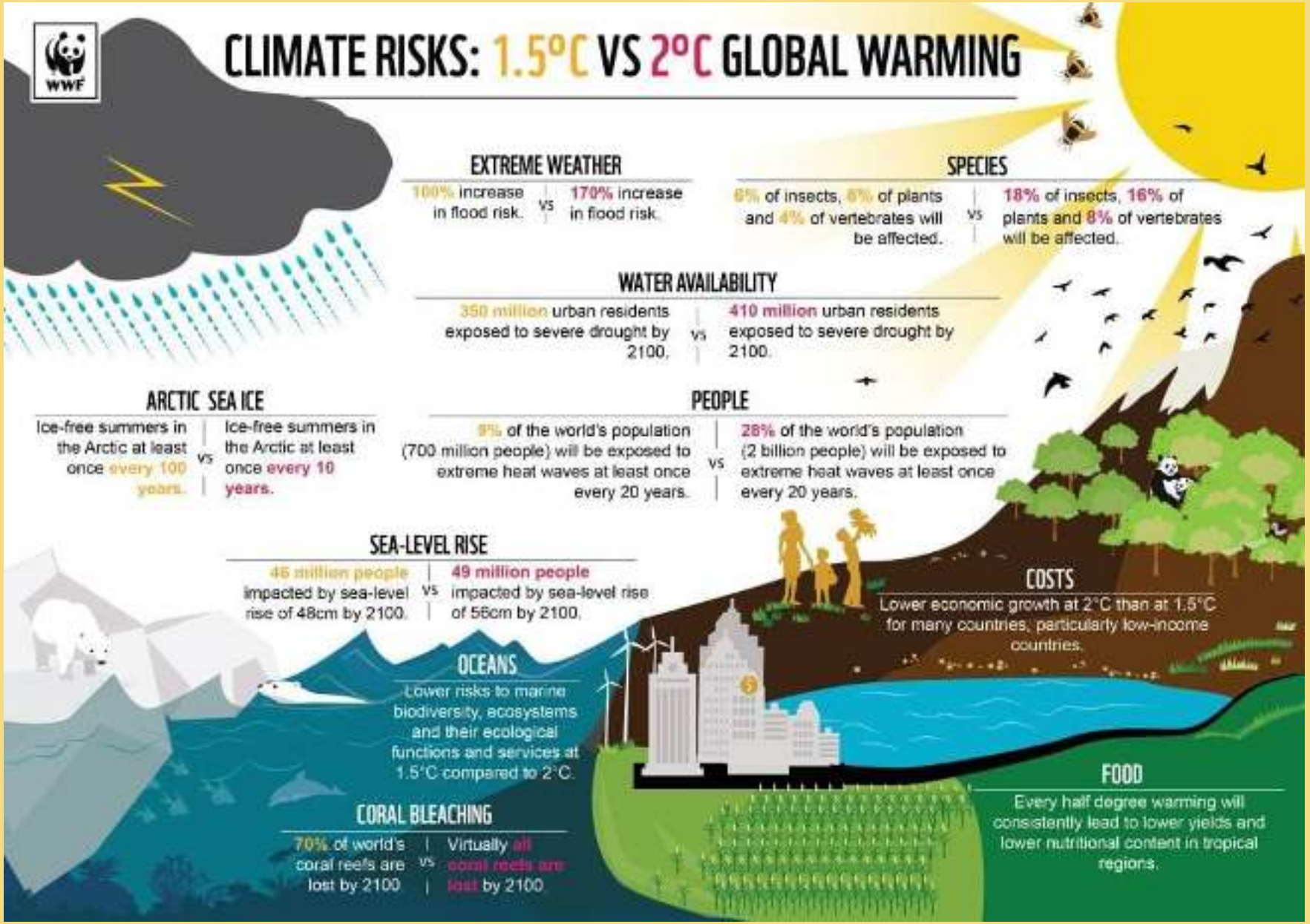


Source: Herzog (2005)– WRI

It is more and more difficult (or impossible) to respect a pathway towards 2ºC






CLIMATE RISKS: 1.5°C VS 2°C GLOBAL WARMING
WWF
EXTREME WEATHER
100% increase in flood risk.
VS
170% increase in flood risk.
SPECIES
6% of insects, 8% of plants and 4% of vertebrates will be affected.
VS
18% of insects, 16% of plants and 8% of vertebrates will be affected.
WATER AVAILABILITY
350 million urban residents exposed to severe drought by 2100.
VS
410 million urban residents exposed to severe drought by 2100.
ARCTIC SEA ICE
Ice-free summers in the Arctic at least once every 100 years.
VS
Ice-free summers in the Arctic at least once every 10 years.
PEOPLE
9% of the world's population (700 million people) will be exposed to extreme heat waves at least once every 20 years.
VS
28% of the world's population (2 billion people) will be exposed to extreme heat waves at least once every 20 years.
SEA-LEVEL RISE
46 million people impacted by sea-level rise of 48cm by 2100.
VS
49 million people impacted by sea-level rise of 56cm by 2100.
COSTS
Lower economic growth at 2°C than at 1.5°C for many countries, particularly low-income countries.
OCEANS
Lower risks to marine biodiversity, ecosystems and their ecological functions and services at 1.5°C compared to 2°C.
CORAL BLEACHING
70% of world's coral reefs are lost by 2100
VS
Virtually all coral reefs are lost by 2100
FOOD
Every half degree warming will consistently lead to lower yields and lower nutritional content in tropical regions.

www.gcca.eu | www.[illegible] www.[illegible]