CLIMATE & DISASTER RISK FINANCING ONLINE TRAINING

SESSION 2:

Evolving Disaster and Climate Risk Context of Africa

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PERIPERI U | PARTNERS ENHANCING RESILIENCE FOR PEOPLE EXPOSED TO RISKS

Co-funded by the European Union

AFRICA ADAPTATION INITIATIVE

Plan

- Observed climate change
- Future climate change
- Issues at COP 27

TERMINOLOGIES

- **TIME:** instantaneous state of the atmosphere at a given location
- **CLIMATE:** the average state (mean and variability of meteorological parameters) of the atmosphere at a given location during one or more years of observation.
- **CLIMATE CHANGE:** long-term trends (typically decades or centuries) in the mean state of the climate and its variability. Characterized by the shift of the mean and the dispersion around that mean.
- **CLIMATE VARIABILITY:** Short-term variations in climate, including variations associated with global climate events (e.g., El Nino).
- **GLOBAL WARMING:** A gradual increase, expected or observed, in global surface temperature that is one of the consequences of radiative forcing caused by anthropogenic emissions

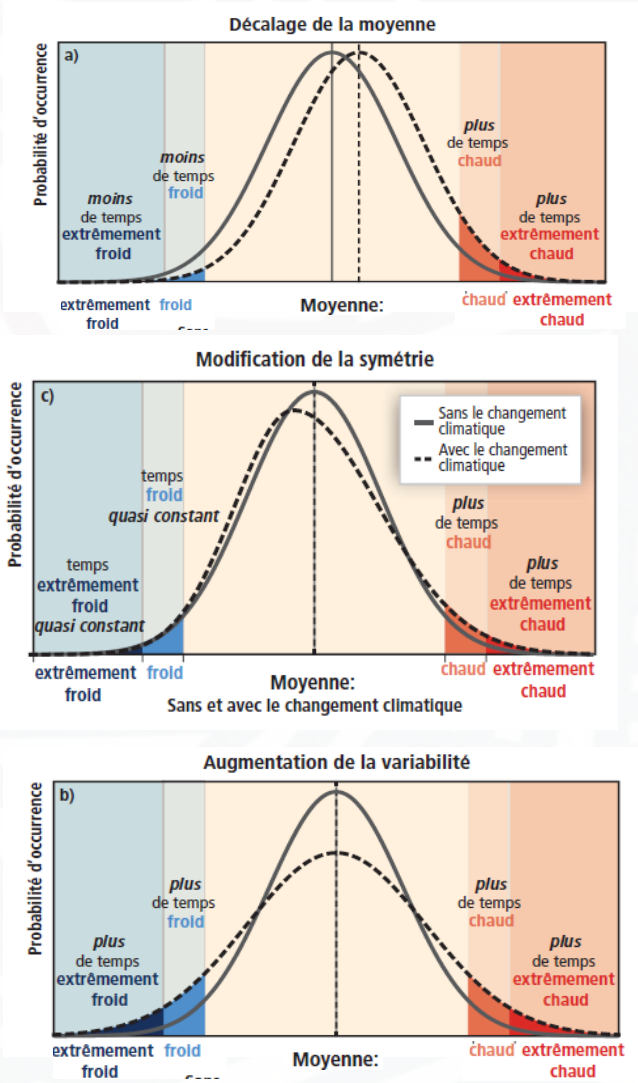
TERMINOLOGIE

- **NORMAL:** Averaged over a uniform and relatively long period (30 years)
- **ADAPTATION:** The accommodation of natural or human systems to actual or expected climatic stimuli or their effects, in order to mitigate their adverse effects or exploit their benefits
- **MITIGATION:** Human intervention to reduce sources or enhance sinks of greenhouse gases
- **VULNERABILITY:** The degree to which a system is susceptible to - or unable to cope with - adverse effects of climate change, including climate variability and extremes
- **RESILIENCE:** The ability to organize and adapt to stress and change

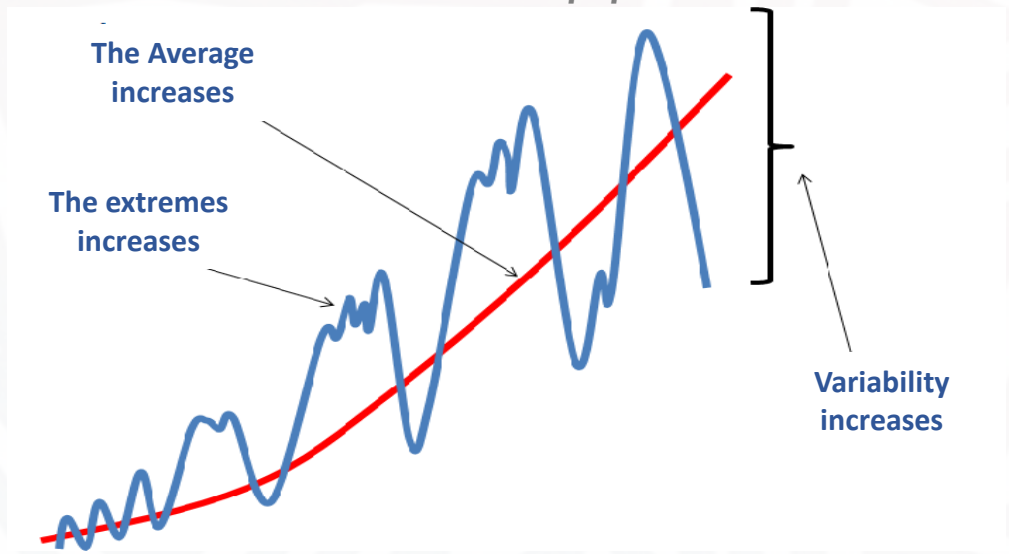
CLIMATE CHANGE

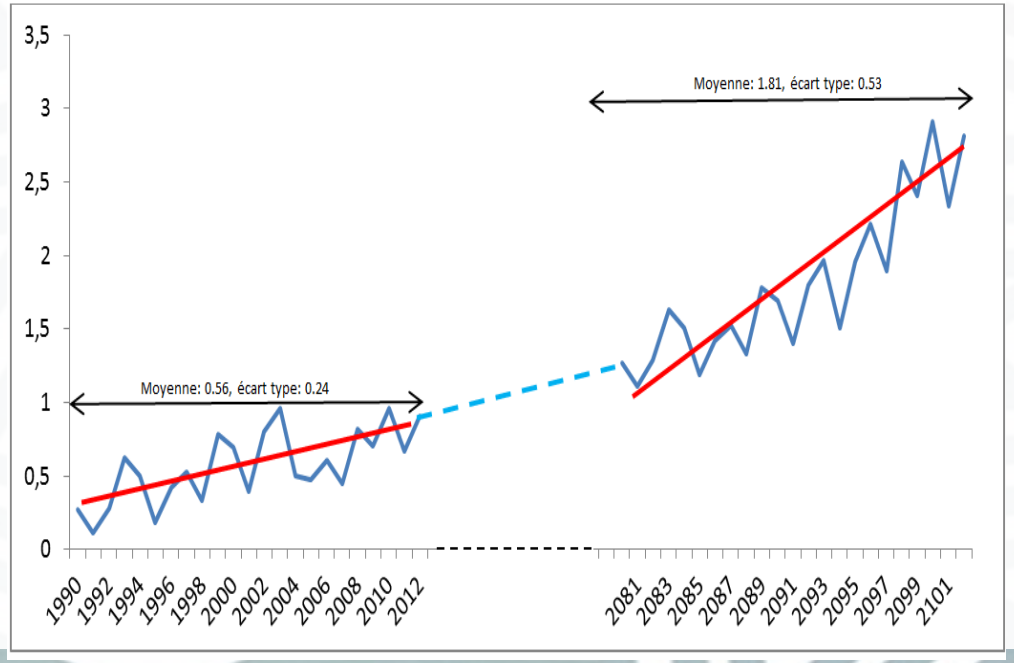
- **Climate change:** a slow and sustained change (from a decade to a million years) in the statistical parameters (mean, variability) of climate properties.

- These changes may be due to processes intrinsic to the Earth, to external influences or, more recently, to human activities.



SREX-SPM , GIEC 2012





CLIMATE CHANGE OBSERVATIONS

IN GENERAL ABOUT AFRICA -AR6 (GIEC)

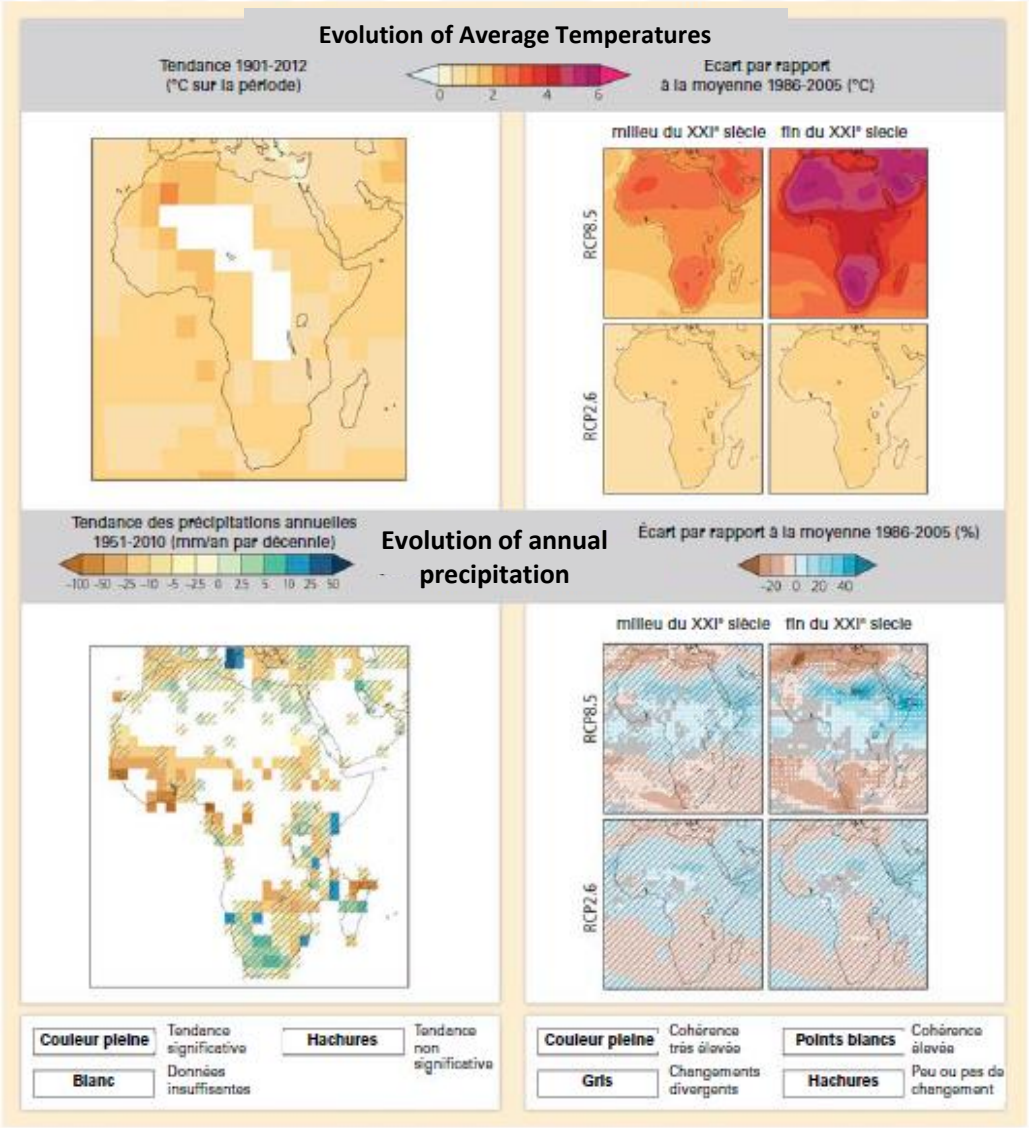
- Mean and extreme temperatures appeared to be above natural variability, relative to 1850-1900, in all continental regions of Africa (high confidence).
- The rate of surface temperature increase has generally been faster in Africa than the global average, with human-induced climate change being the dominant factor (high confidence).
- The observed increases in hot extremes (including heat waves) and decreases in cold extremes (including cold waves) are expected to continue throughout the 21st century with additional climate warming (high confidence).
- Marine heat waves have become more frequent since the 20th century and are expected to increase around Africa (high confidence).

EN GÉNÉRAL SUR L'AFRIQUE -AR6 (GIEC)

Relative sea level has risen at a higher rate than the global average sea level around Africa over the past 3 decades. Relative sea level rise is likely to continue around Africa, contributing to increased frequency and severity of coastal flooding in low-lying areas with coastal erosion and along most sandy coasts (high confidence).

The frequency and intensity of heavy precipitation events are expected to increase almost everywhere in Africa with further climate warming (high confidence).

Observed increase in West African monsoonal rainfall during the 20th century due to warming greenhouse gas emissions masked by the cooling decrease in anthropogenic aerosol emissions (high confidence). The observed increase since the 1980s is partly due to the increasing influence of greenhouse gases and the reduced cooling effect of human aerosol emissions in Europe and North America.


Evolution of Average Temperatures
Tendance 1901-2012
(°C sur la période)
0 2 4 6
Ecart par rapport
à la moyenne 1986-2005 (°C)
milieu du XXIe siècle
fin du XXIe siecle
RCP8.5
RCP2.6
Tendance des précipitations annuelles
1951-2010 (mm/an par décennie)
-100 -50 -25 -10 -5 -2.5 0 2.5 5 10 25 50
Evolution of annual precipitation
Écart par rapport à la moyenne 1986-2005 (%)
-20 0 20 40
milieu du XXIe siècle
fin du XXIe siecle
RCP8.5
RCP2.6
Couleur pleine
Tendance significative
Hachures
Tendance non significative
Blanc
Données insuffisantes
Couleur pleine
Cohérence très élevée
Points blancs
Cohérence élevée
Gris
Changements divergents
Hachures
Peu ou pas de changement

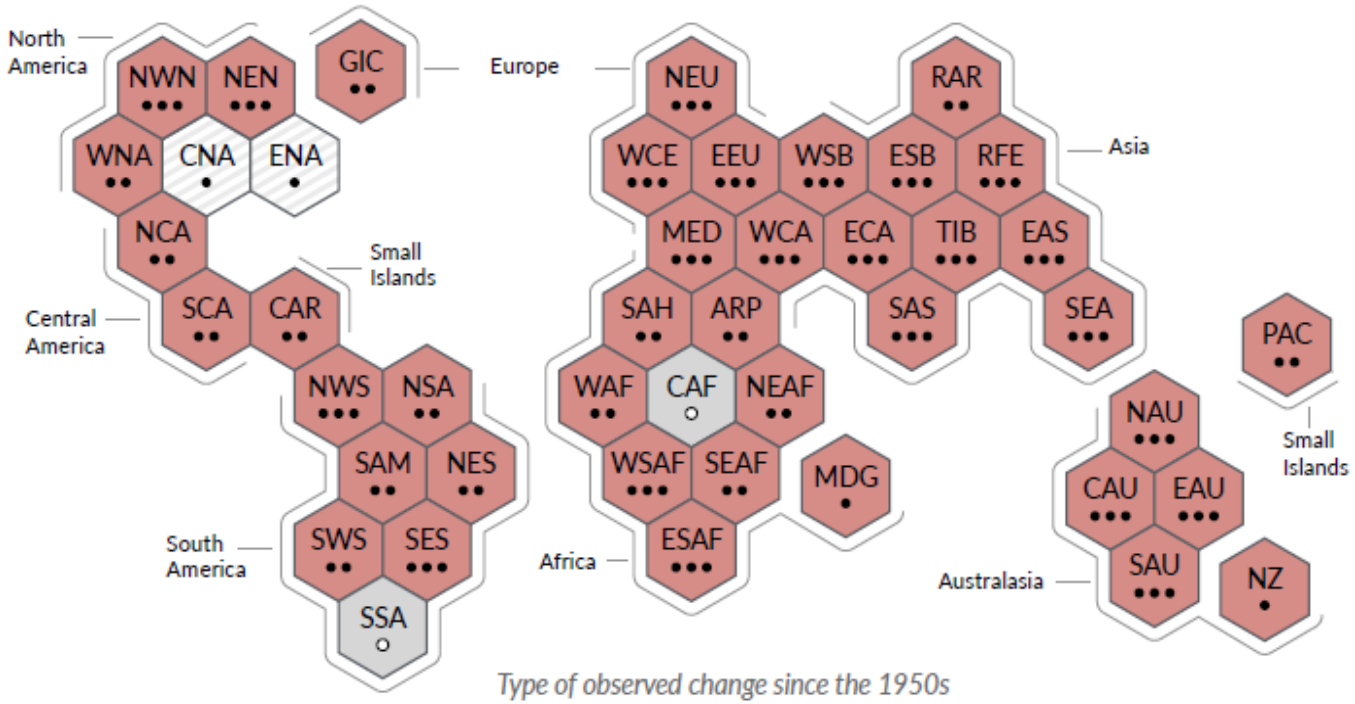
a) Synthesis of assessment of observed change in **hot extremes** and confidence in human contribution to the observed changes in the world's regions

Type of observed change in hot extremes

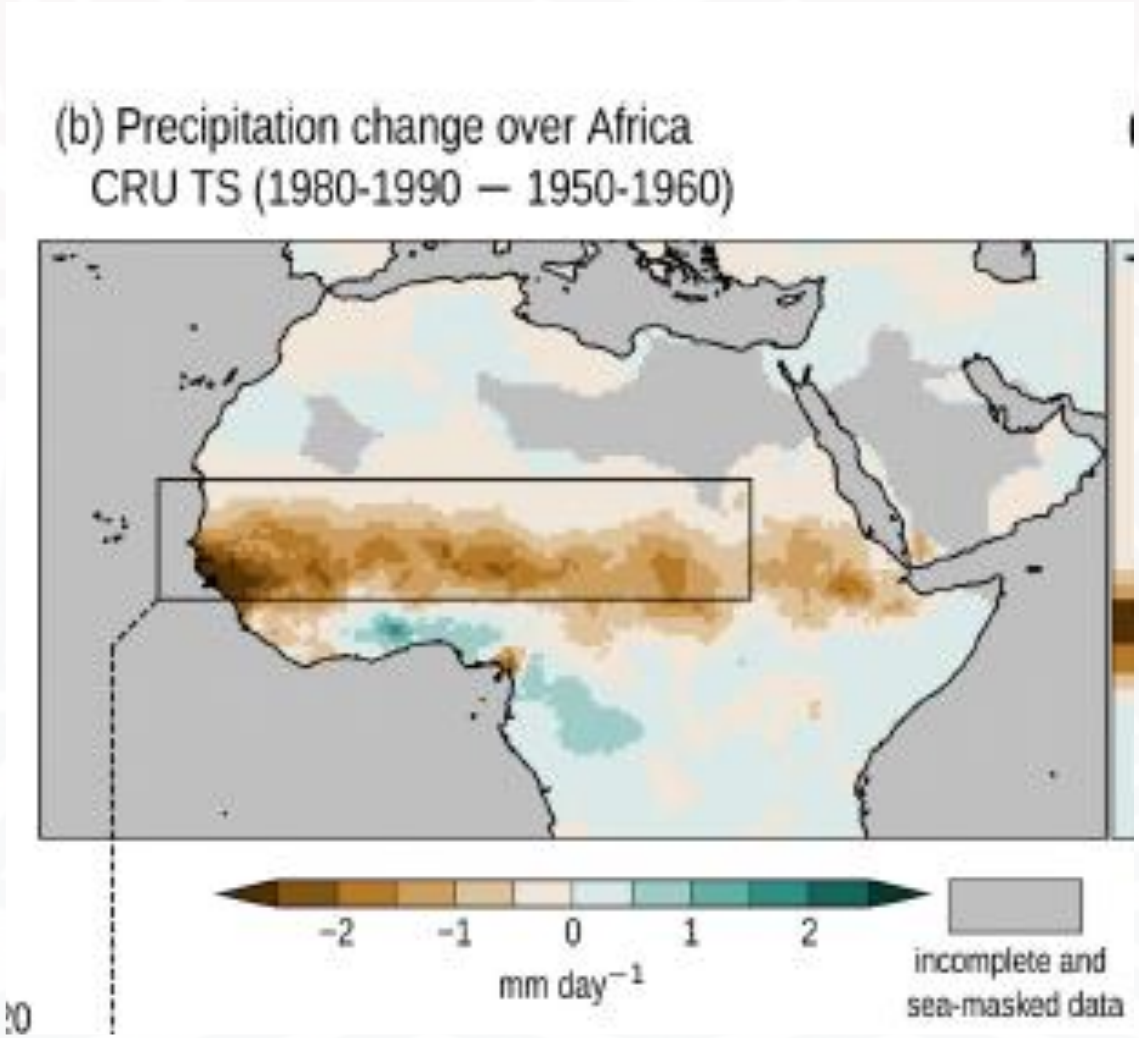
- Increase (41)
- Decrease (0)
- Low agreement in the type of change (2)
- Limited data and/or literature (2)

Confidence in human contribution to the observed change

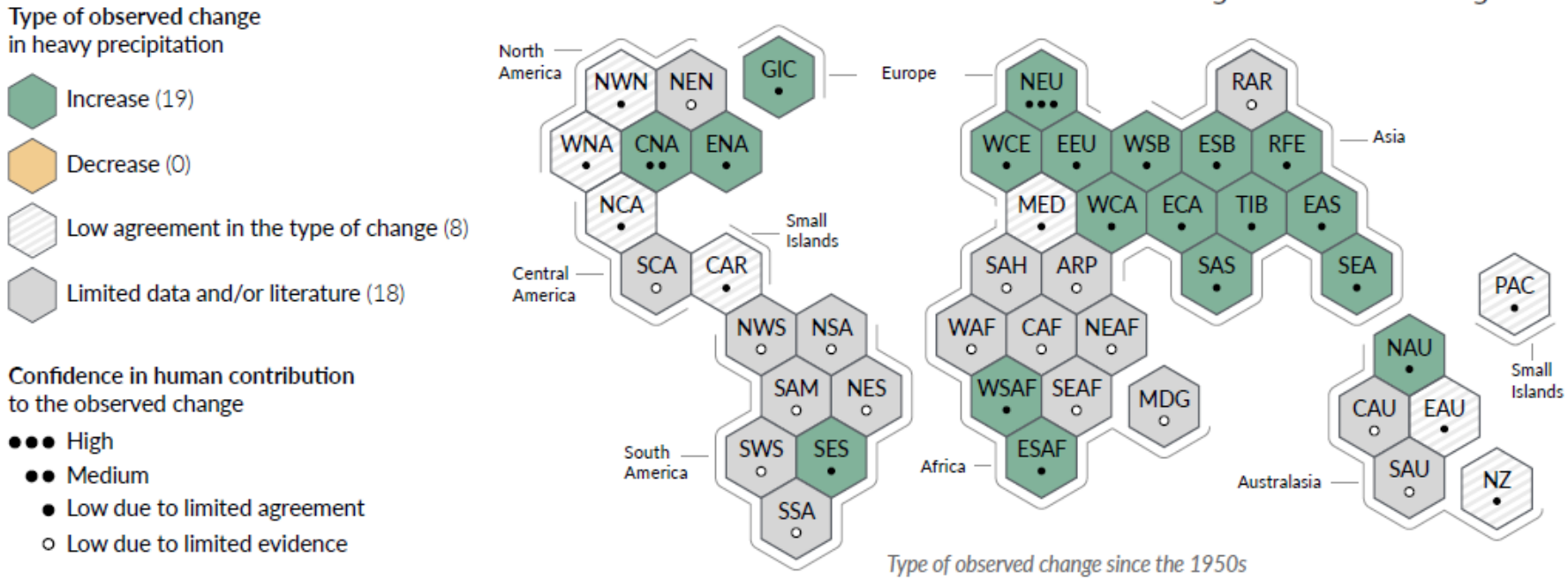
- ●●● High
- ●● Medium
- ● Low due to limited agreement
- ○ Low due to limited evidence



Type of observed change since the 1950s


(b) Precipitation change over Africa
CRU TS (1980-1990 – 1950-1960)
−2
−1
0
1
2
mm day−1
incomplete and
sea-masked data

b) Synthesis of assessment of observed change in **heavy precipitation** and confidence in human contribution to the observed changes in the world's regions



Type of observed change since the 1950s

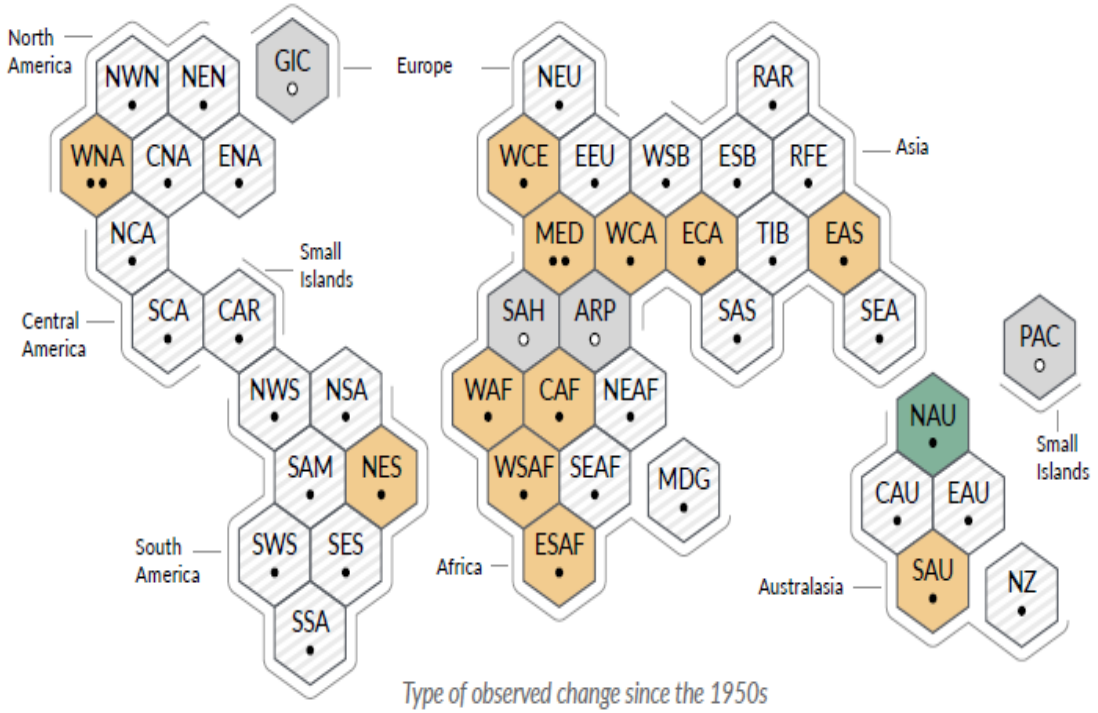
c) Synthesis of assessment of observed change in **agricultural and ecological drought** and confidence in human contribution to the observed changes in the world's regions

Type of observed change in agricultural and ecological drought

- Increase (12)
- Decrease (1)
- Low agreement in the type of change (28)
- Limited data and/or literature (4)

Confidence in human contribution to the observed change

- ●●● High
- ●● Medium
- ● Low due to limited agreement
- o Low due to limited evidence

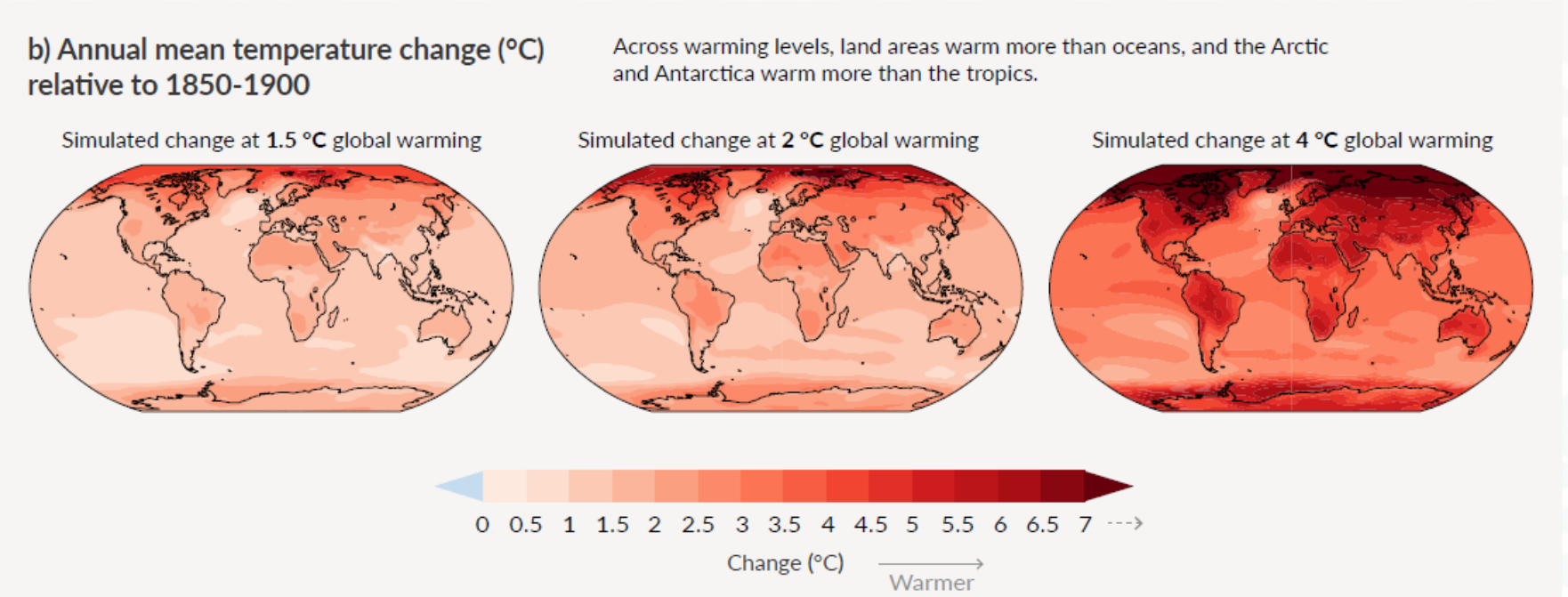


Type of observed change since the 1950s

FUTURE CLIMATE CHANGE

Average Annual Temperatures

- **The Sahel is warming up more than the global average**

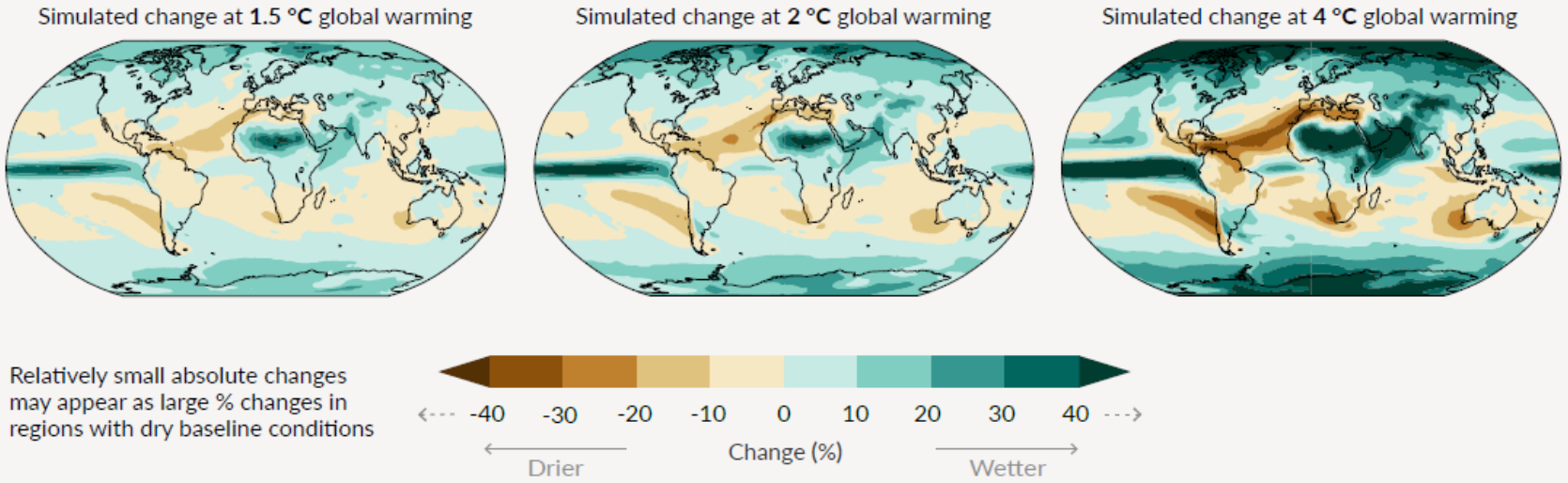


Precipitation

- **Rainfall will increase in the monsoon areas**

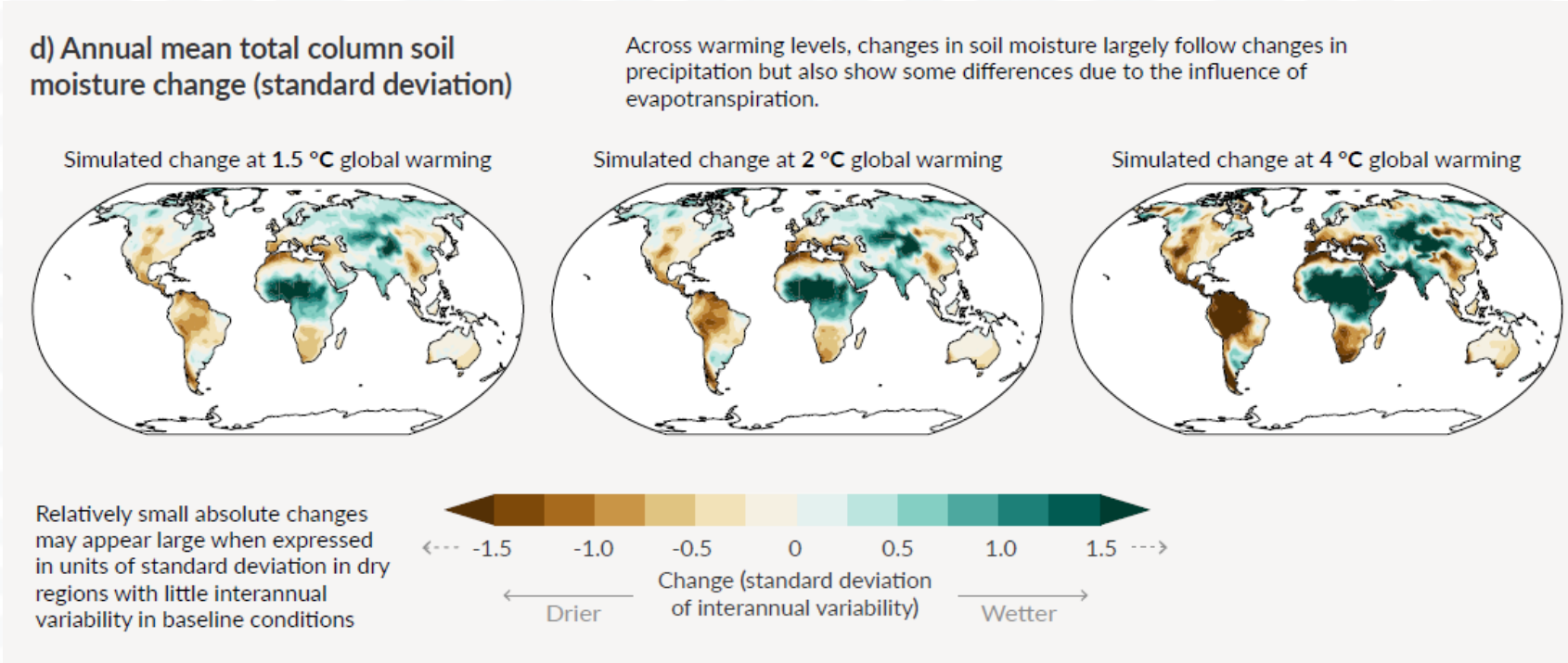
c) Annual mean precipitation change (%) relative to 1850-1900

Precipitation is projected to increase over high latitudes, the equatorial Pacific and parts of the monsoon regions, but decrease over parts of the subtropics and in limited areas of the tropics.

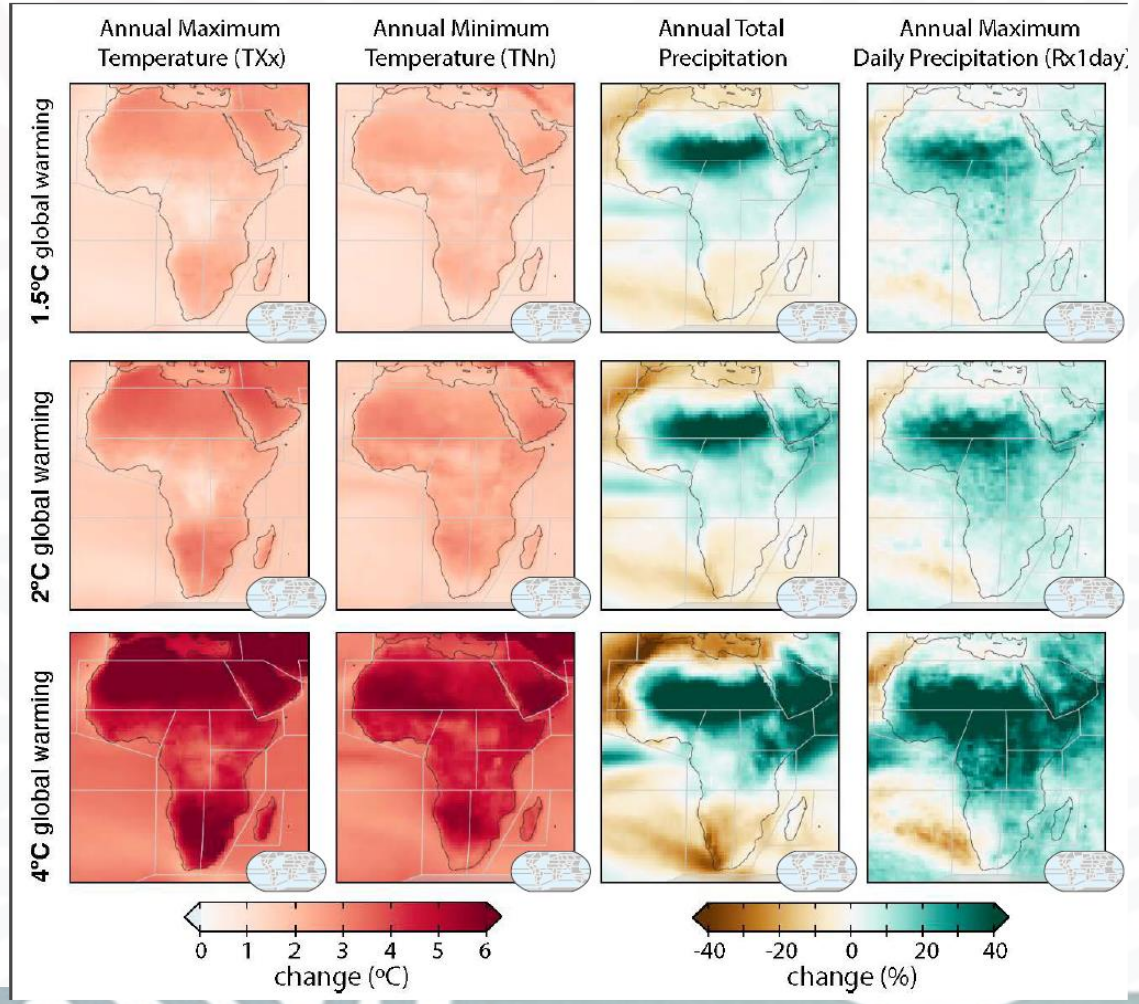


Annual average soil moisture variation

- In general, the variation in soil moisture follows the variation in precipitation with some differences due to evapotranspiration;
- The small absolute variations appear large when expressed in standard deviation in arid areas with little inter-annual variability



With further increases in global warming, changes in extreme hot and cold temperatures, averages and maximum daily precipitation become more important.



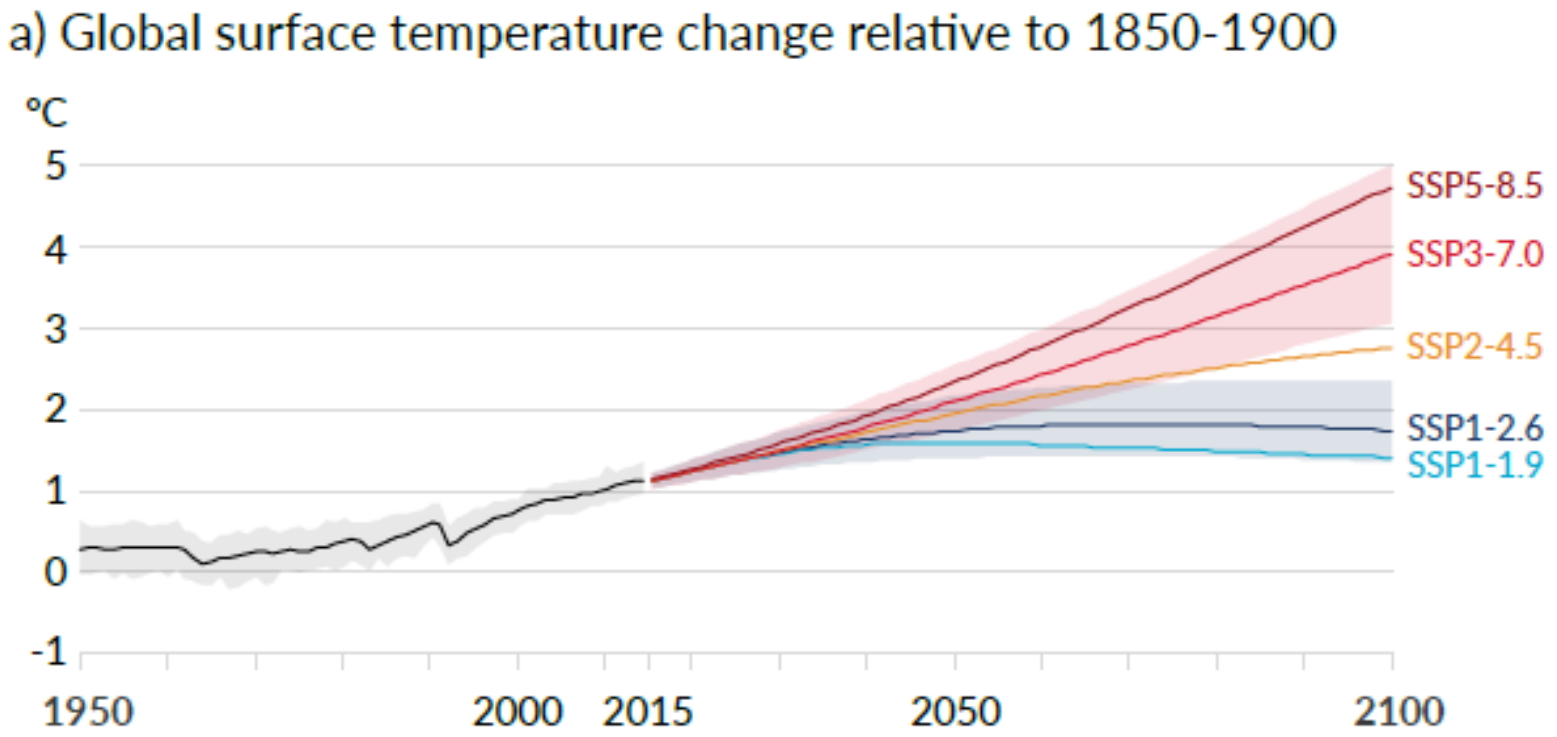
- Projected changes in annual maximum temperature (TXx), annual minimum temperature (TNn), annual average precipitation, and annual maximum daily precipitation (RX1day) at 1.5°C, 2°C, and 4°C of global warming relative to 1851-1900.
- The results are based on simulations of the ensemble average CMIP6 multi-model.

AR6 (GIEC 2021)

PROJECTIONS FOR THE SAHEL

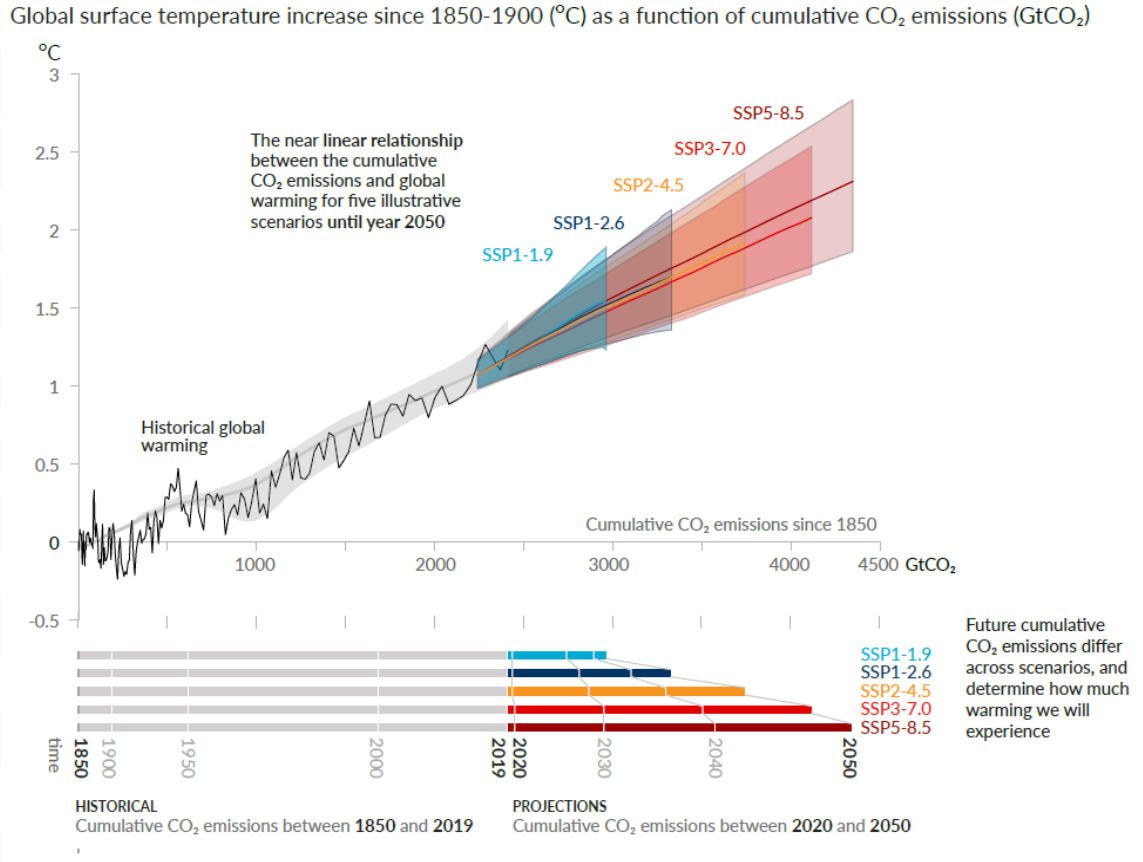
- Higher than global average temperature increase;
- Increases in warm extremes (including heat waves) and decreases in cold extremes (including cold waves) are expected to continue throughout the 21st century with additional global warming (high confidence).
- Heat wave frequencies are projected to increase (high confidence).
- Projected increases in heavy precipitation and rainfall flooding.
- Monsoon rainfall is expected to increase over the central Sahel and decrease over the extreme western Sahel. The monsoon season is expected to have a delayed onset and withdrawal.

STAKES OF THE COP 27


a) Global surface temperature change relative to 1850-1900
°C
5
4
3
2
1
0
-1
1950
2000
2015
2050
2100
SSP5-8.5
SSP3-7.0
SSP2-4.5
SSP1-2.6
SSP1-1.9

Stabilizing the human-induced global temperature increase requires achieving zero net anthropogenic CO2 emissions

- Each 1000 GtCO2 of cumulative CO2 emissions probably causes a 0.27°C to 0.63°C increase in global surface temperature with a best estimate of 0.45°C.



Augmentation globale de la température de surface depuis 1850-1900 en fonction des émissions cumulées de CO_2 ($GtCO_2$)

Limiting global temperature increase to a specific level would mean limiting cumulative CO2 emissions to a carbon budget.

Global warming between 1850–1900 and 2010–2019 *(°C)*	Historical cumulative CO_2 emissions from 1850 to 2019 *($GtCO_2$)*
1.07 (0.8–1.3; *likely* range)	2390 (± 240; *likely* range)

Approximate global warming relative to 1850–1900 until temperature limit *(°C)**(1)	Additional global warming relative to 2010–2019 until temperature limit *(°C)*	Estimated remaining carbon budgets from the beginning of 2020 *($GtCO_2$)* — *Likelihood of limiting global warming to temperature limit*(2)*					Variations in reductions in non-CO_2 emissions*(3)
		17%	*33%*	*50%*	*67%*	*83%*	
1.5	0.43	900	650	500	400	300	Higher or lower reductions in accompanying non-CO_2 emissions can increase or decrease the values on the left by 220 $GtCO_2$ or more
1.7	0.63	1450	1050	850	700	550	
2.0	0.93	2300	1700	1350	1150	900	

Estimations des émissions de CO2 historiques et bilans carbone restants

AR6, 2021

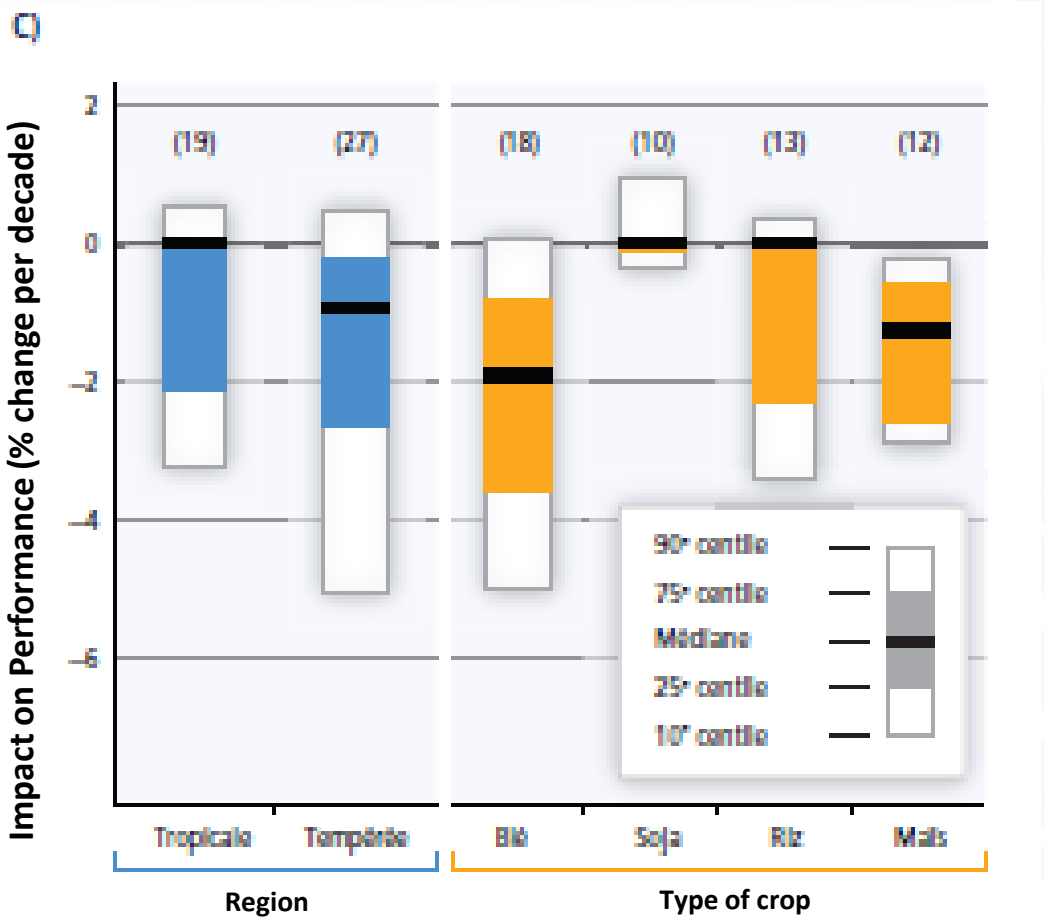
COP 27: BECAUSE EVERY FRACTION OF A °C COUNTS!

- Future warming depends on future emissions
- Current global emissions: 40 GtCO2 /year
- To limit to 1.5°C by 2030, carbon budget: 300GtCO2
- For carbon neutrality by 2030: *we need to quickly and drastically reduce greenhouse gas emissions (CO2, methane etc.)!*
- We only have a decade to do it!

FUTURE RISK IS GREATER THAN THE IMPACTS ALREADY OBSERVED!

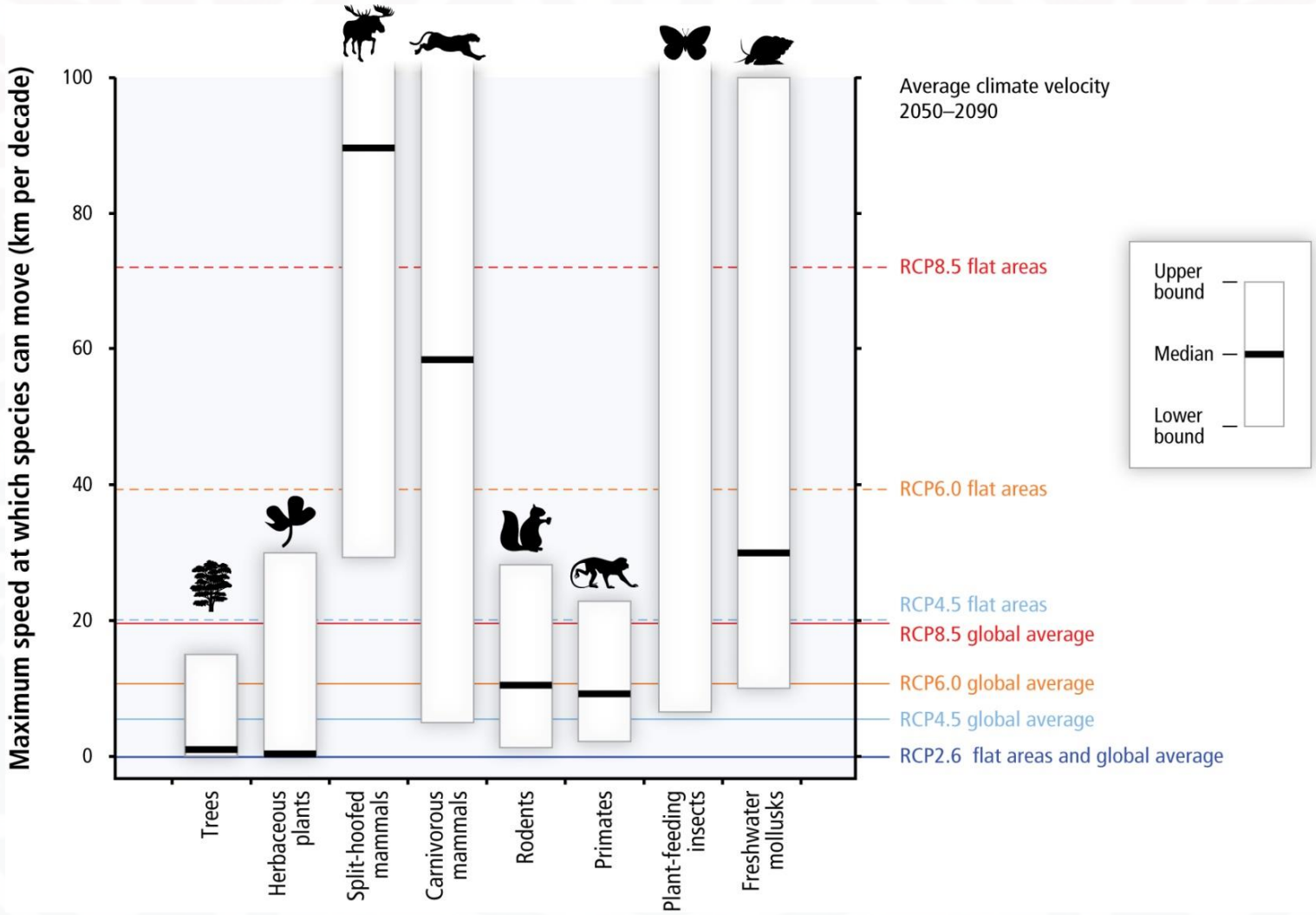
- Risks of loss of livelihoods and income in rural areas due to inadequate access to drinking and irrigation water, as well as reduced agricultural productivity.
- Risks of loss of marine and coastal ecosystems, biodiversity, and the ecosystem goods, functions, and services they provide to livelihoods
- Many changes are irreversible beyond 1.5°C of warming!

CROP YIELD



GIEC, 2014

MIGRATION OF SPECIES



GIEC, 2014


Merci!