La prévention des risques de catastrophes et changement climatique au Maghreb

Atelier en ligne à destination des journalistes du Maghreb

Introduction au changement climatique et à ses phénomènes

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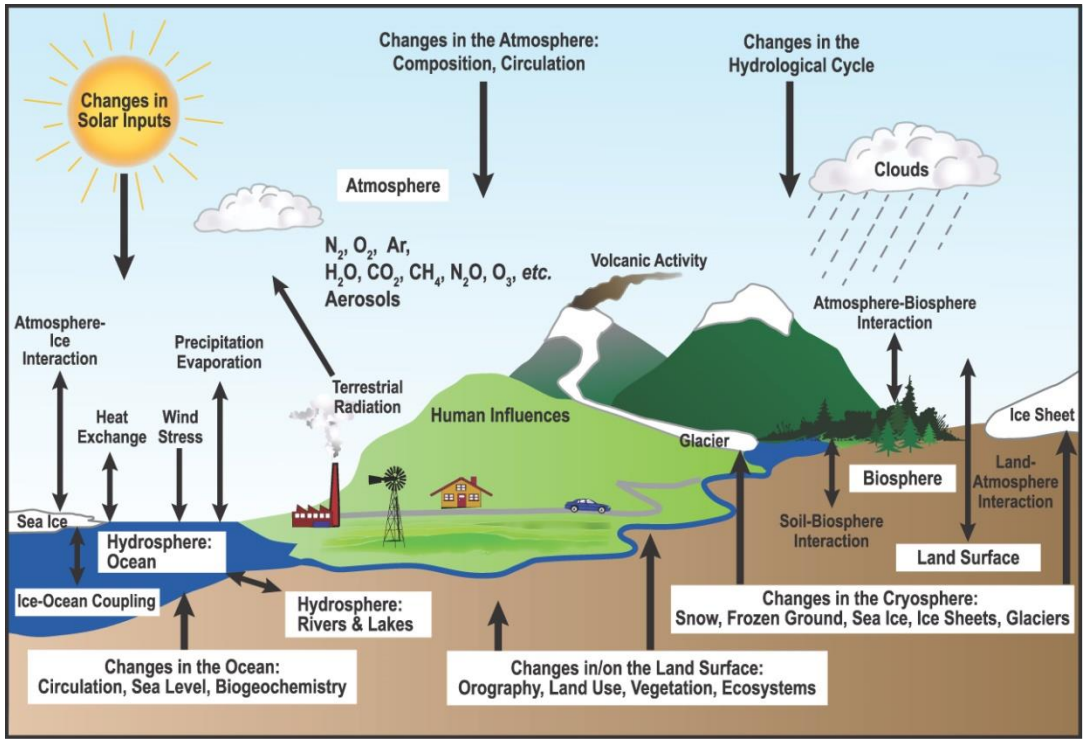
INTERGOVERNMENTAL PANEL ON climate change

20/09/2020

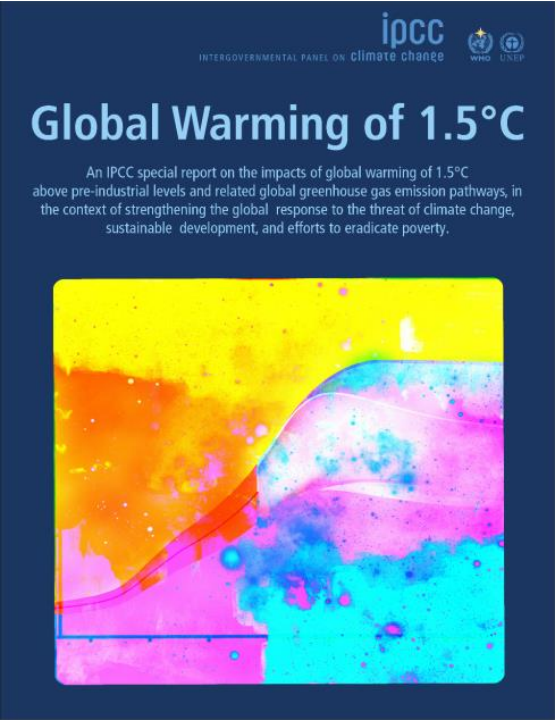
Le système climatique

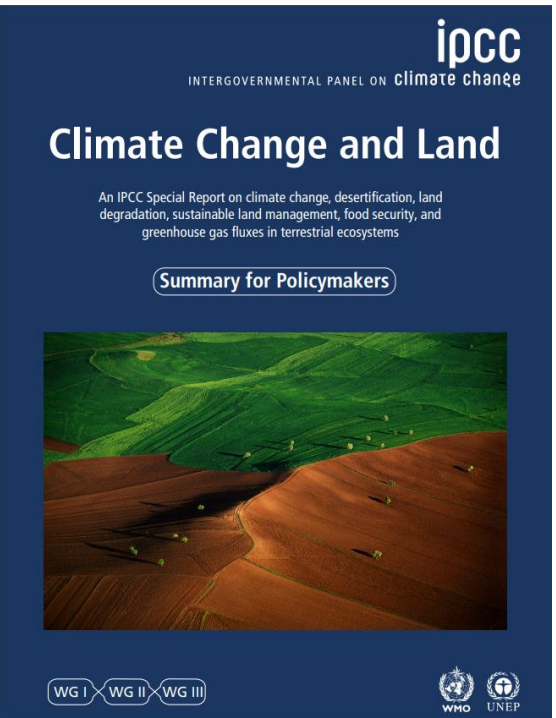


Les interactions et échanges d'énergie et de matière entre les composantes du système climatique influe sur le climat et détermine son état et ses changements

Vue schématique des composantes du système climatique, leurs processus et interactions
Source: IPCC (2007): AR4

Temps ⟷ **Climat**





- Human-induced global warming has already caused multiple observed changes in the climate system.
- The global climate has changed relative to the preindustrial period with **multiple lines of evidence that these changes have had impacts on organisms and ecosystems, as well as human systems and wellbeing.**
- Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, **increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems.**
- Limiting climate change would require substantial and sustained **reductions in greenhouse** gas emissions which, together with **adaptation,** can limit climate change risks.
- Past emissions alone do not commit the world to 1.5°C

Where are we now?

Ashley Cooper / Aurora Photos

Since pre-industrial times, human activities have caused approximately 1.0°C of global warming.

- Already seeing consequences for people, nature and livelihoods
- At current rate, would reach 1.5°C between 2030 and 2052
- Past emissions alone do not commit the world to 1.5°C

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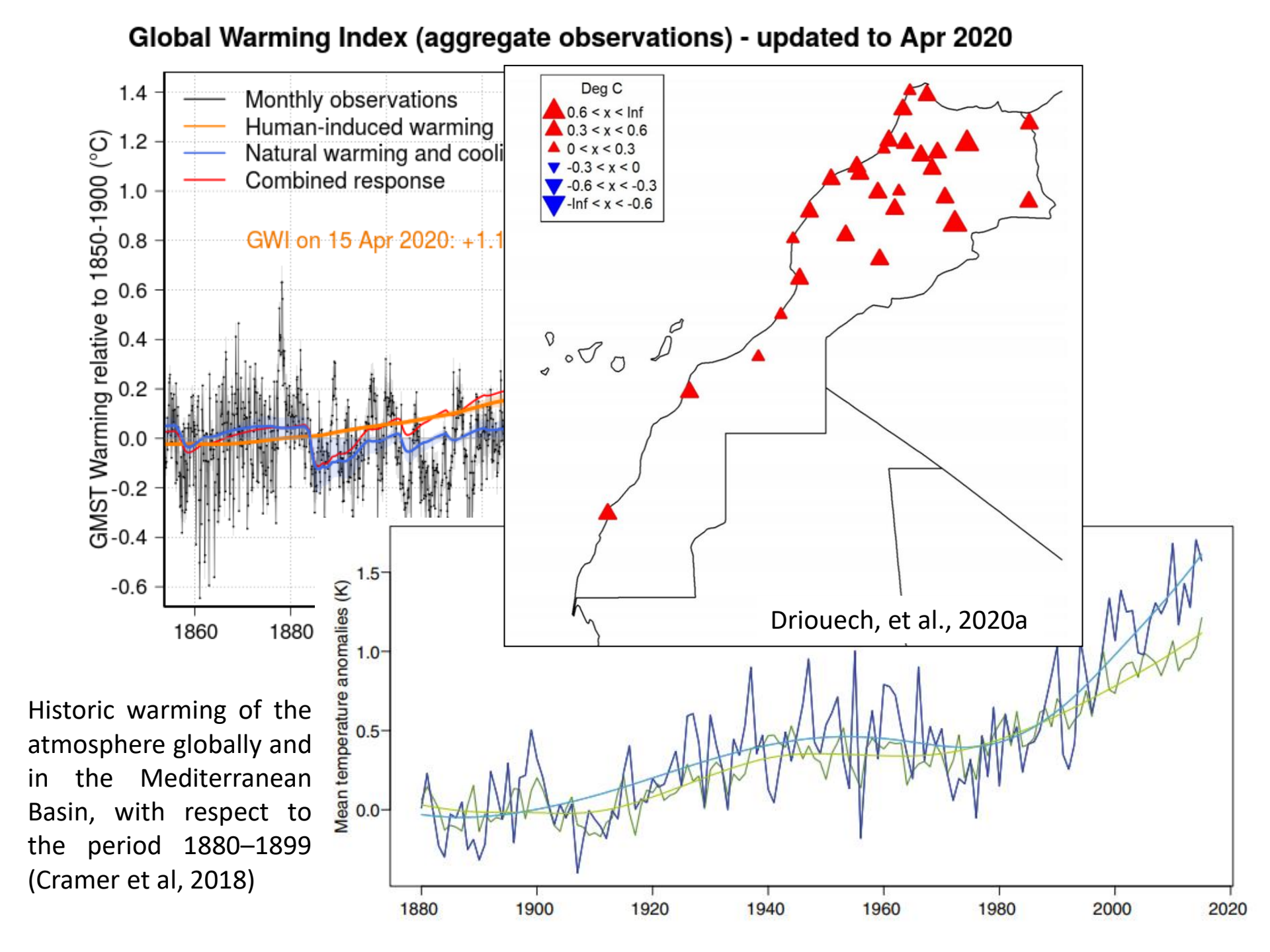


Historic warming of the atmosphere globally and in the Mediterranean Basin, with respect to the period 1880–1899 (Cramer et al, 2018)

Trends of Observed temperature extremes in the Arab region

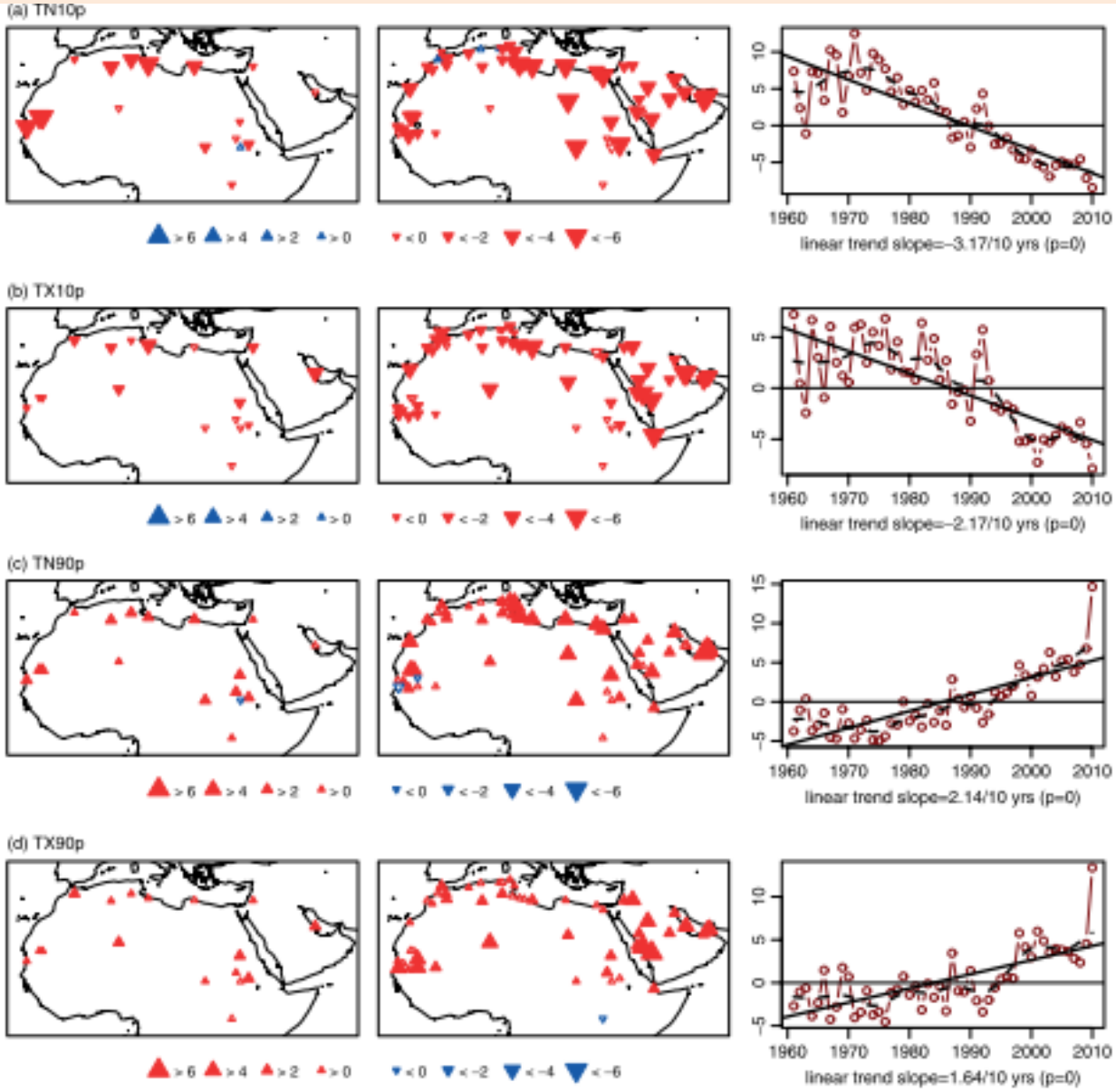


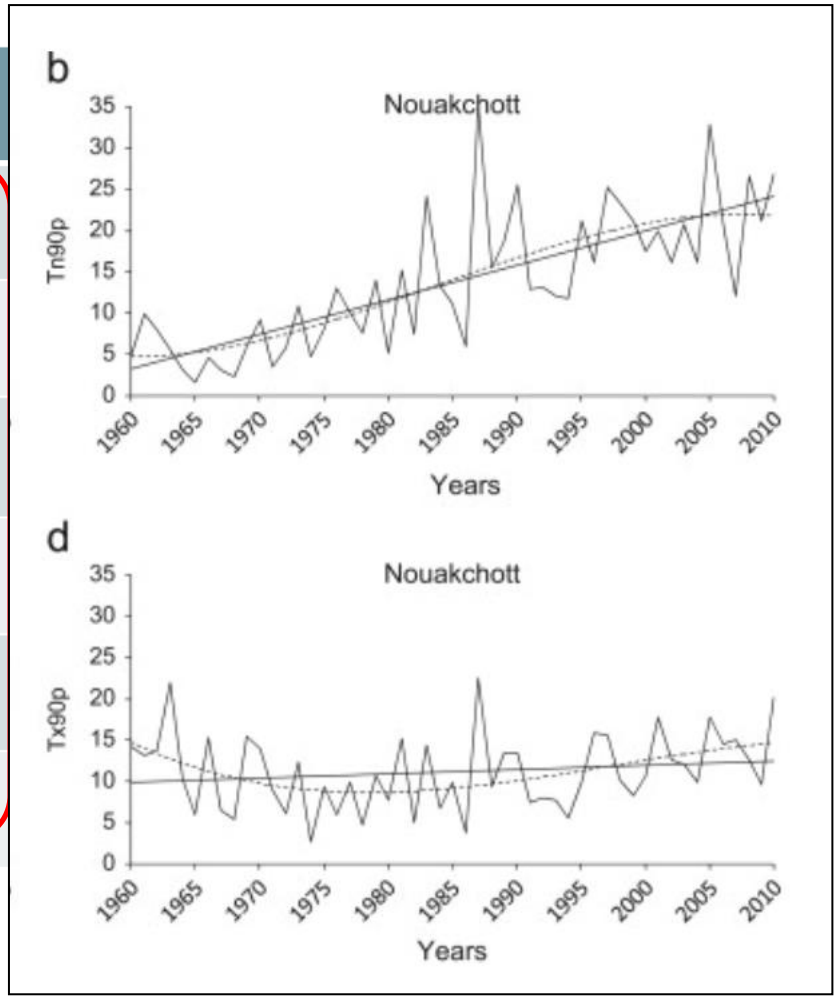
Figure 3. As Figure 2, but for frequency of cool nights (TN10p), cool days (TX10p), warm nights (TN90p), and warm days (TX90p). Upward pointing triangles show increasing trends, downward pointing triangles represent decreasing trends. Significant changes ($p \leq 0.05$) are indicated by filled symbols. Red colour coding indicates warming, blue indicates cooling trends (unit: % of days/10 years).

Donat et al (2013)

Changements observés des extrêmes de température

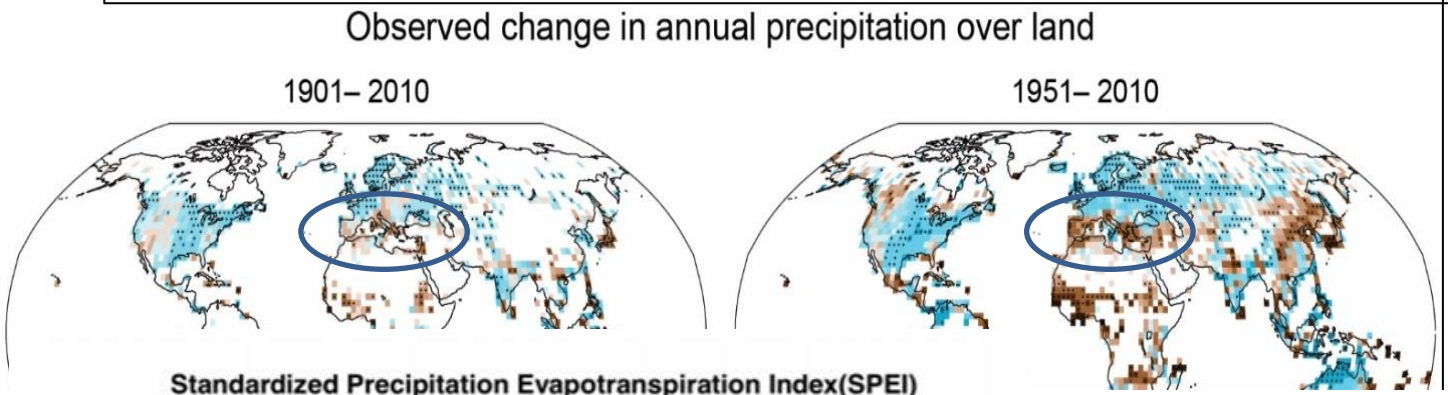
	TX10p (j/d)	TX90p (j/d)	TN10p (j/d)	TN90p (j/d)	TXn (°C/d)	TNx (°C/d)
Saida	-2,12**	+1,59	-3,22**	+0,7	+0,61	+0,19
Mascara	-2,28**	+0,2	-4,68***	+1,12	+0,89*	+0,35
Tiaret	$-2,75^{+}$	+4,79***	+0,94	+1,24	+0,44	+0,36
Maghnia	-2,12**	+0,13	-9,22***	+5,13***	+0,14	+0,7**
Tlemcen	-1,82*	+0,95	-4**	$+1,77^{+}$	+0,08	+0,54*
Mostaganem	-3,27***	+0,77	-4,79***	2,59**	$+0,58^{+}$	+0,99*

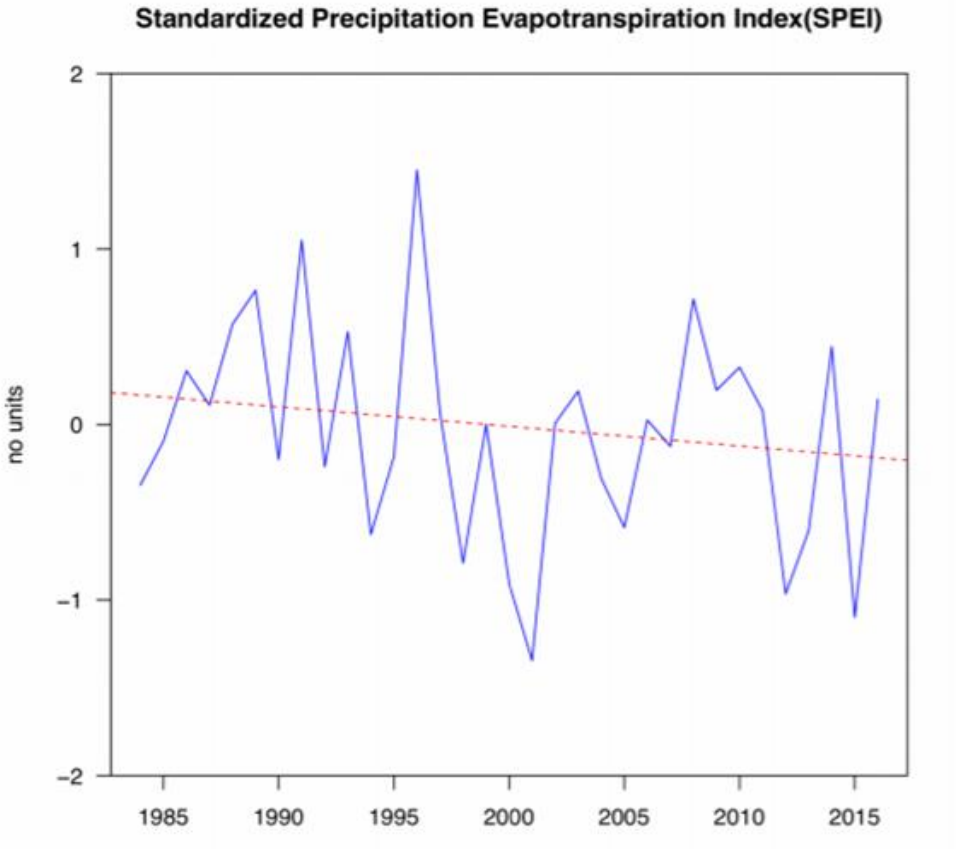
Salah Sahabi (ONM Algeria)



Ly et al. (2013)

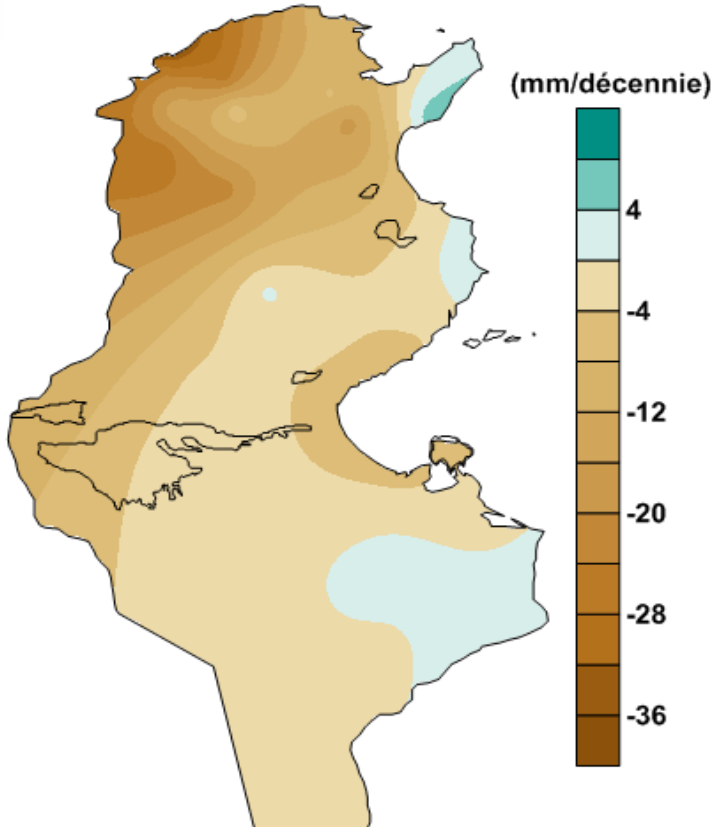
➔ Une baisse des cumuls pluviométriques





Changement observé de sécheresse, Maroc

Driouech et al., 2020a

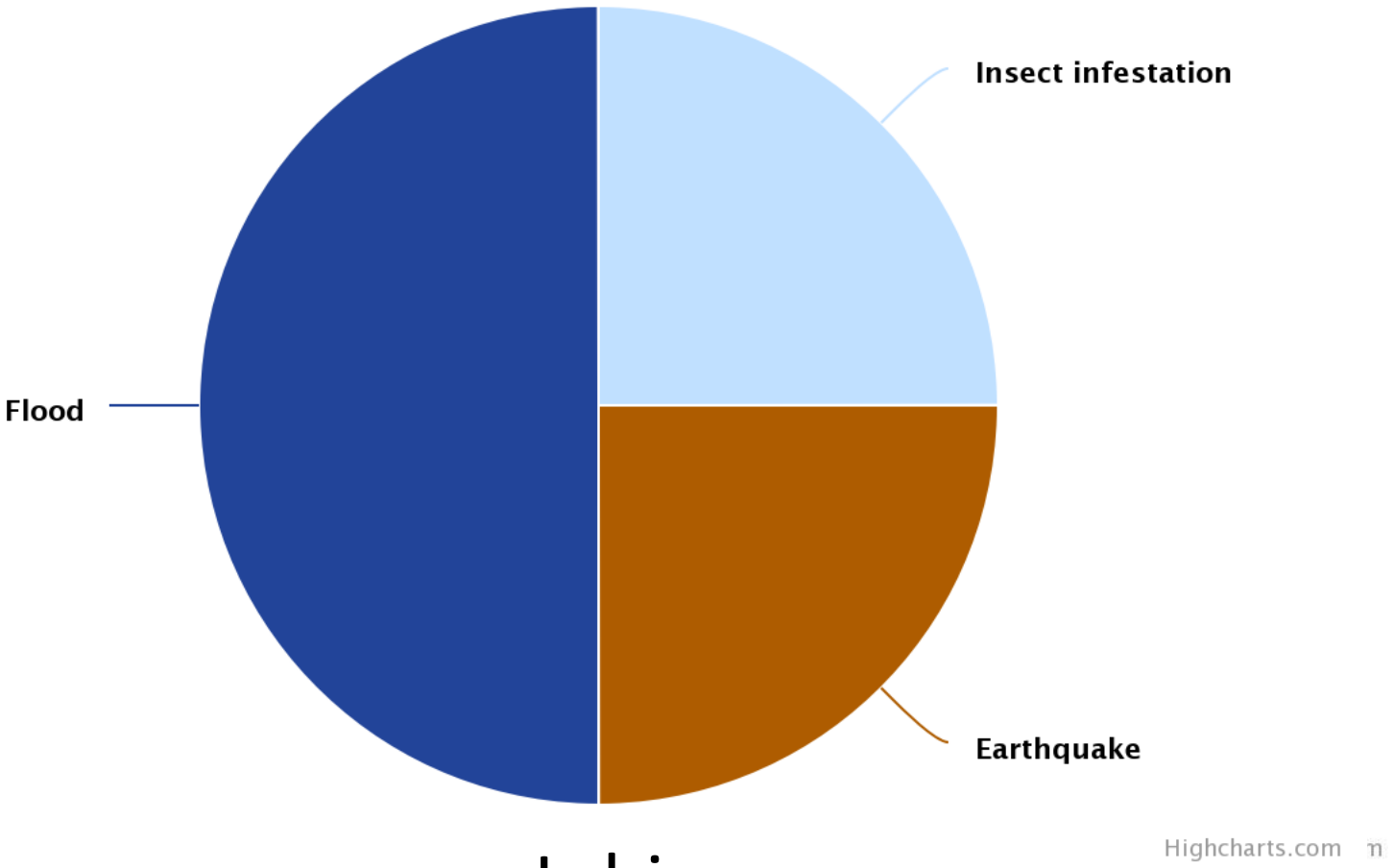


Trends of mean annual precipitation 1951-2010

Ben Rached Soumaya/Zammel Anis INM Tunisia

Clim

Climat

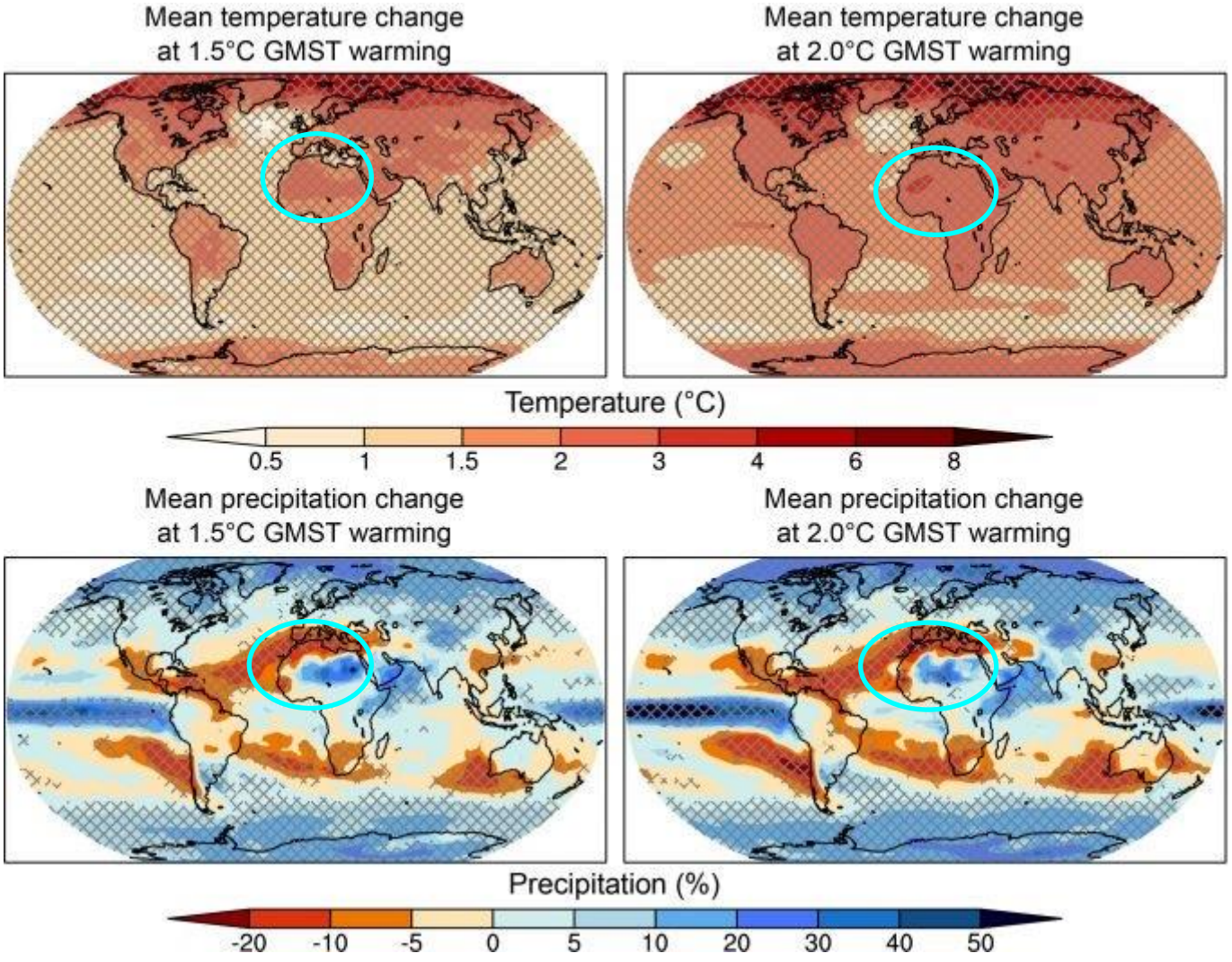


Lybie

Les aléas climatiques comptent pour plus des 3/4 au Maroc et plus de 50% en Lybie

climateknowledgeportal.worldbank.org

Changements futurs selon le degré de réchauffement global



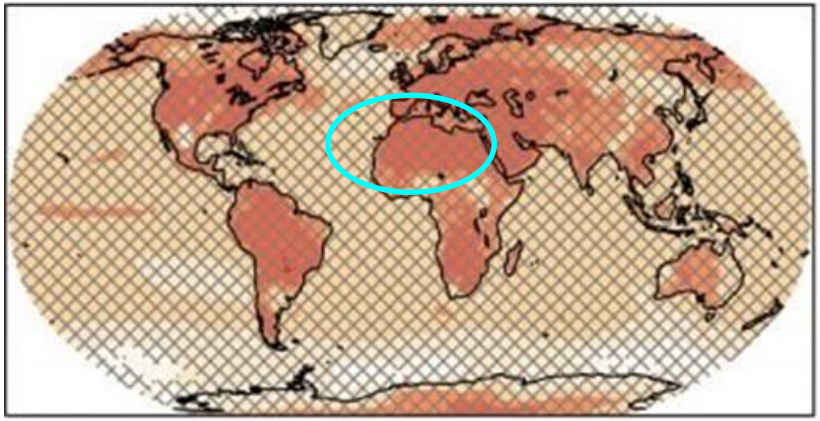
Changement de température moyenne annuelle

Changement de précipitation annuelle

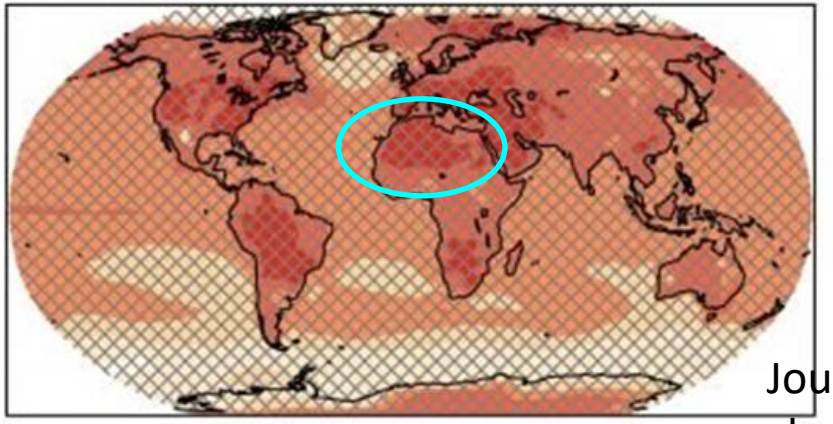
IPCC-SR1.5

Changements futurs selon le degré de réchauffement global

Change in temperature of hottest days (TXx) at 1.5°C GMST warming

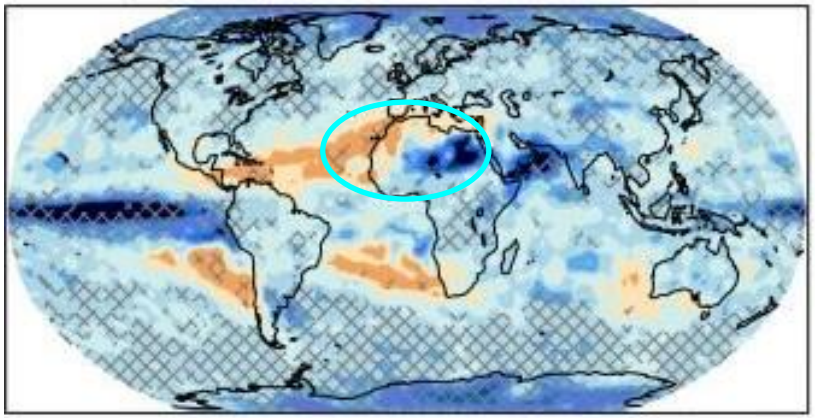


Change in temperature of hottest days (TXx) at 2.0°C GMST warming

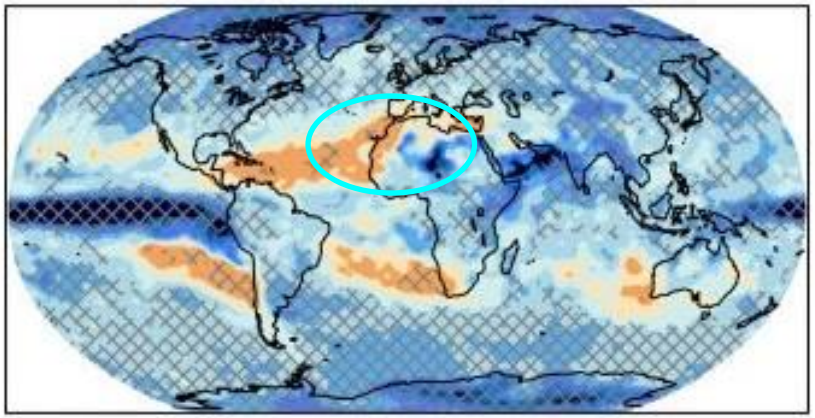


Jours très chauds

Change in extreme precipitation (Rx5day) at 1.5°C GMST warming

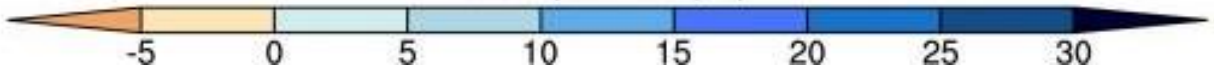


Change in extreme precipitation (Rx5day) at 2.0°C GMST warming



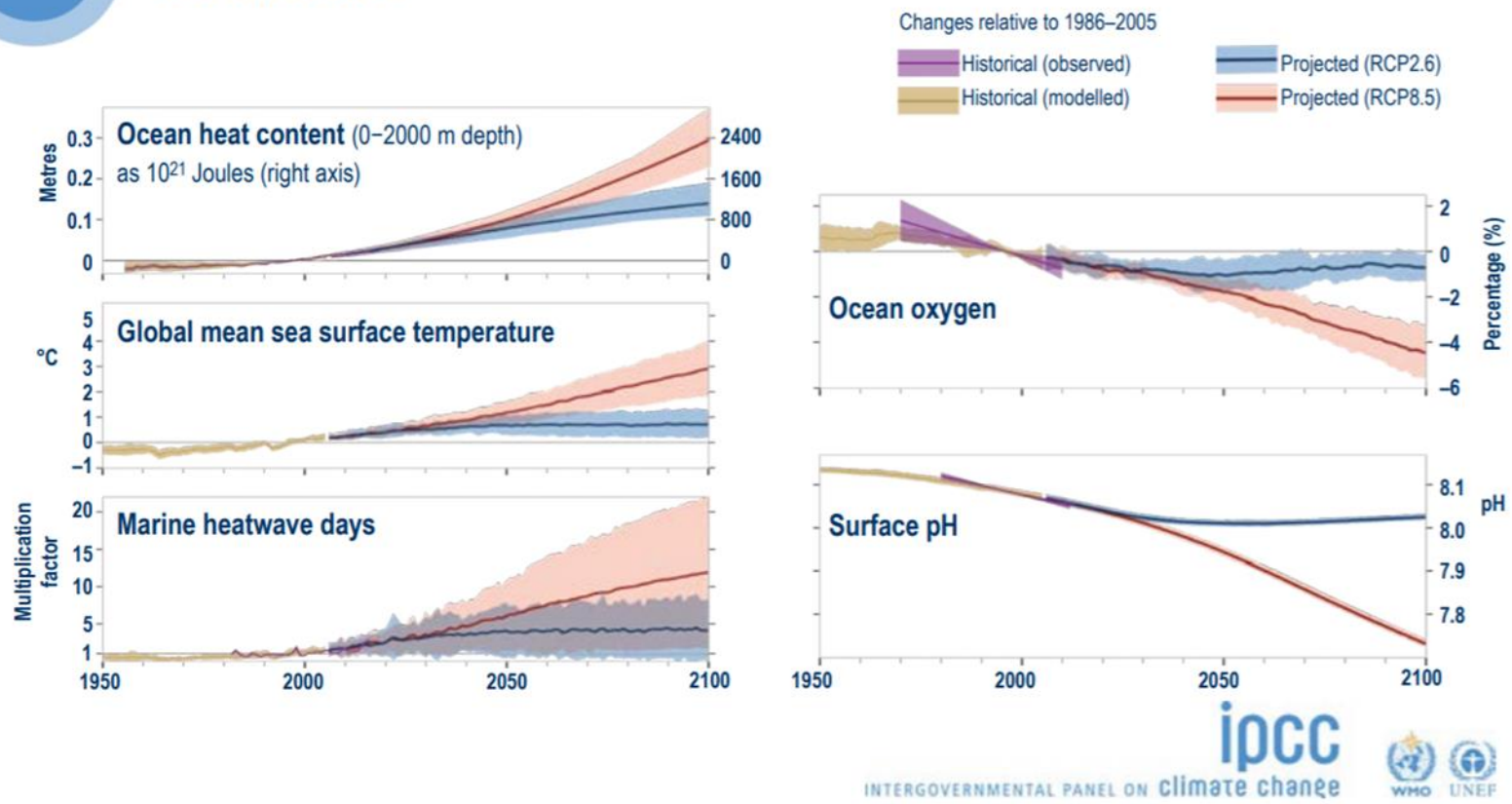
Pluies intenses

Precipitation (%)



IPCC-SR1.5

The ocean is projected to transition to unprecedented conditions

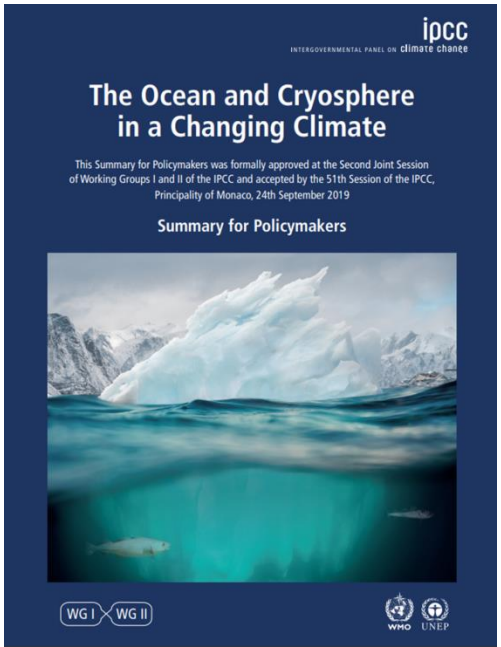


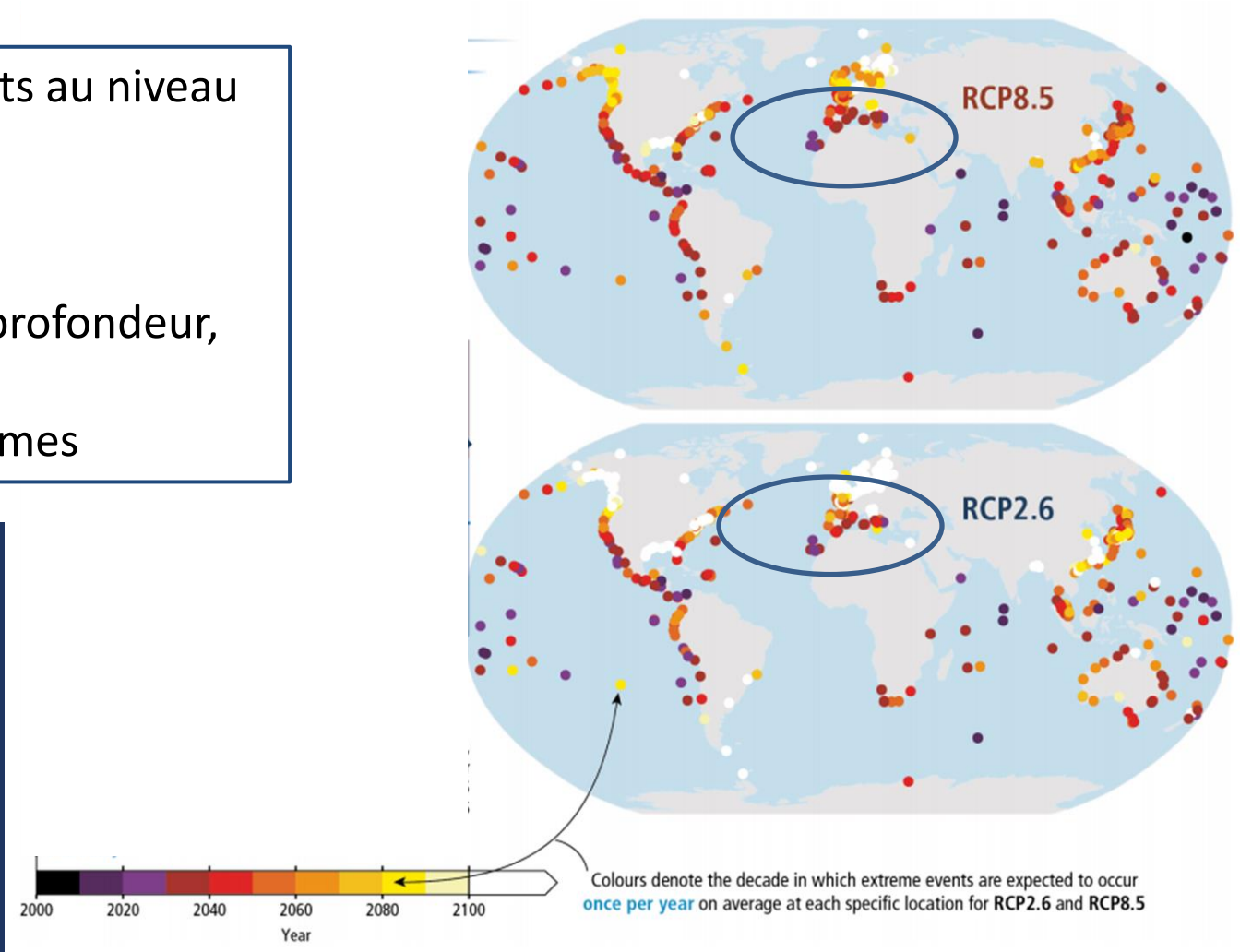
The ocean has absorbed 20 to 30% of CO2 emissions and 93% of anthropogenic heat

IPCC-SROC

Les évènements de niveau de mer extrêmes (actuellement 1 fois par an) se produiront chaque année dans plusieurs régions dès 2030

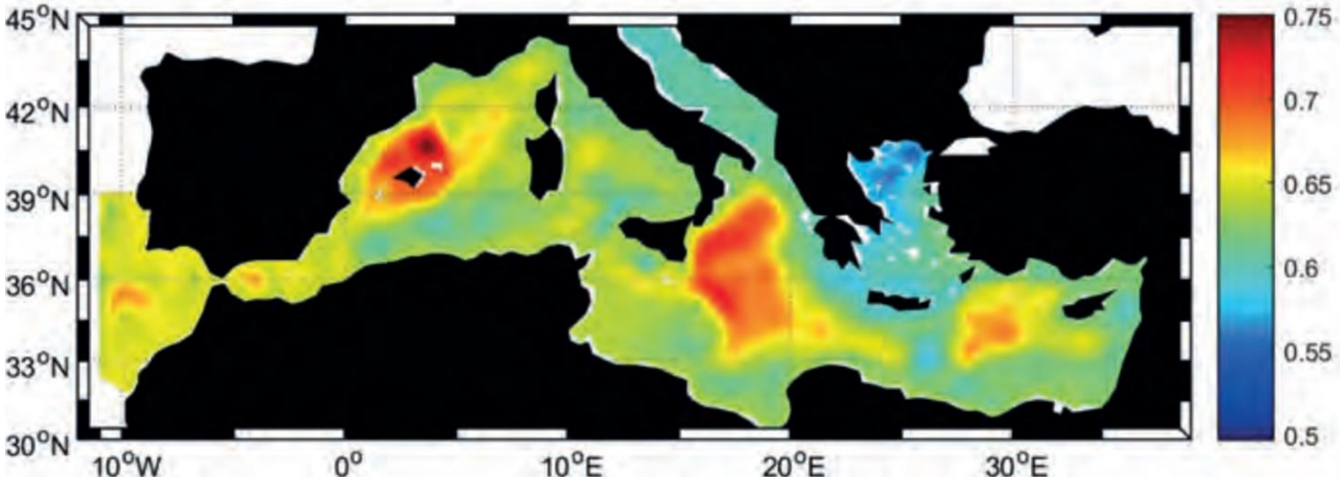
Plusieurs changements au niveau de l'océan:
Baisse PH,
Peu de mélange,
Moins d'oxygène en profondeur,
Vague de chaleurs,
Risque pour écosystèmes





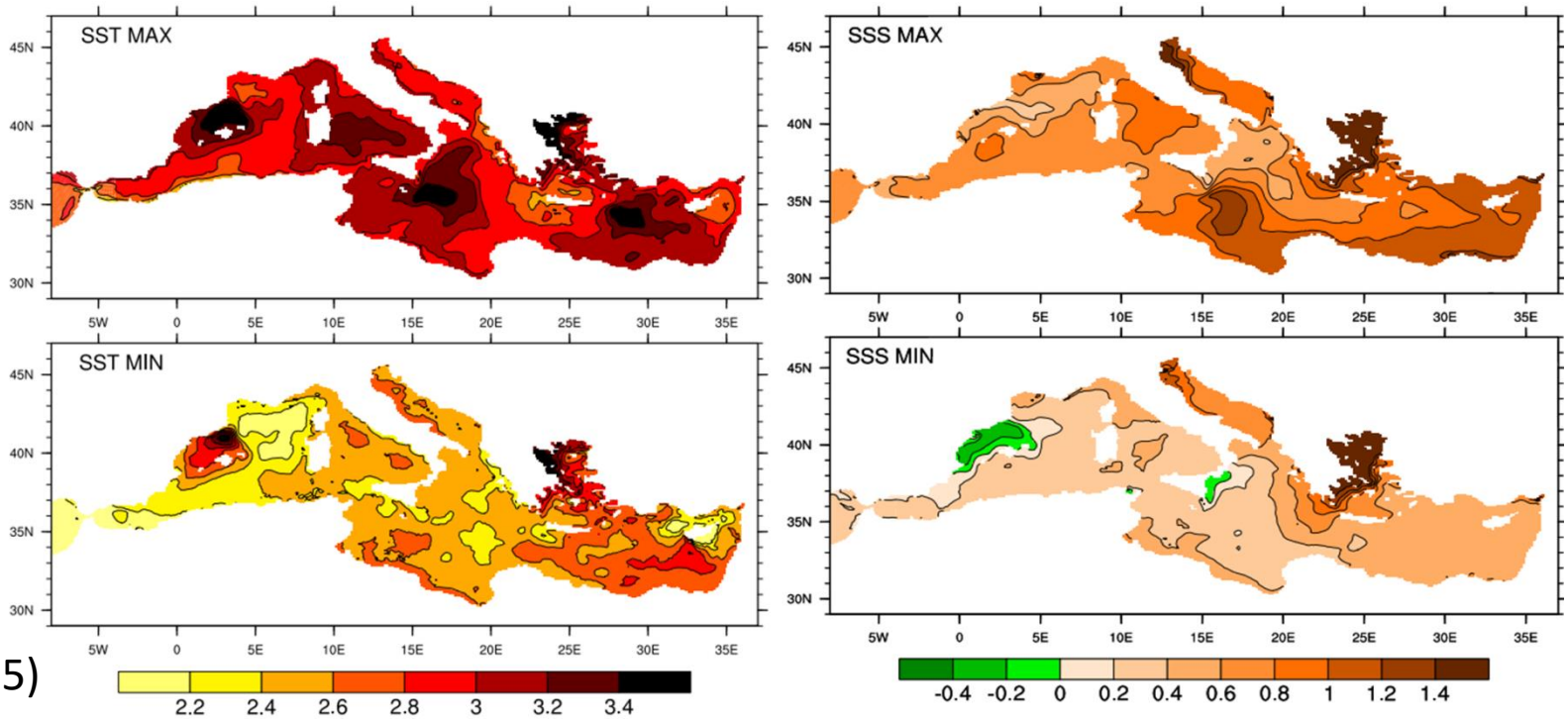
IPCC-SROC

Future projections: Sea changes



Projection of sea level change for the period 2080-2100 with respect to the period 1980-2000. Under moderate GHG emission scenarios (A1b and RCP6.0). Somot et al (2016)

Projected changes of sea surface temperature and salinity . Max and Min changes

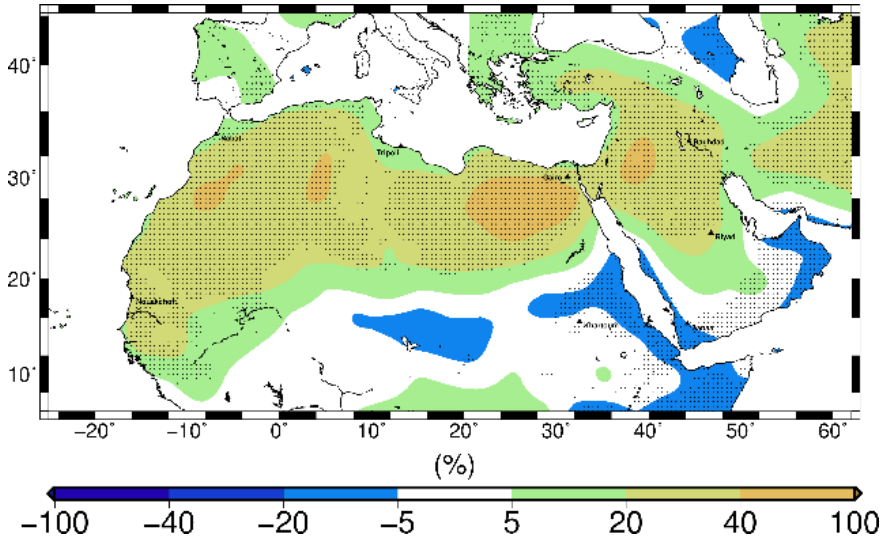


Adloff et al (2015)

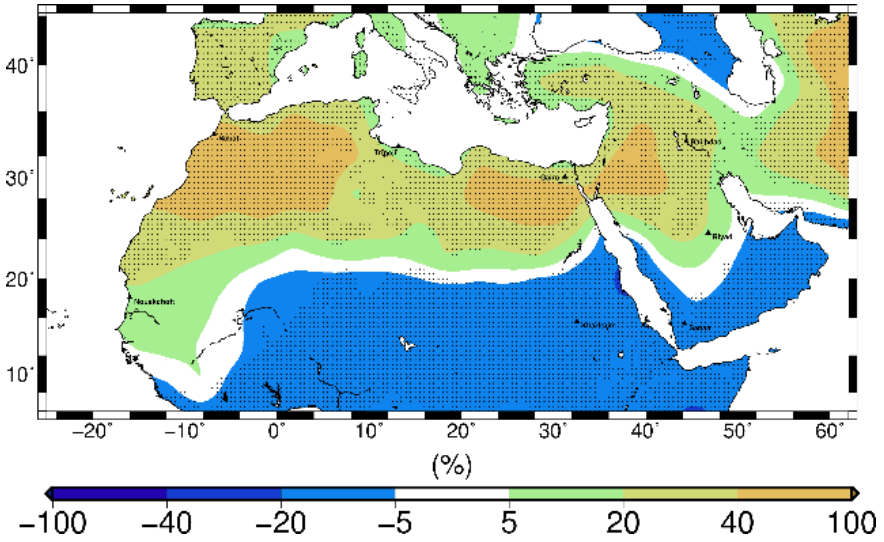
Changements projetés: phénomènes extrêmes

SPEI (sécheresse)

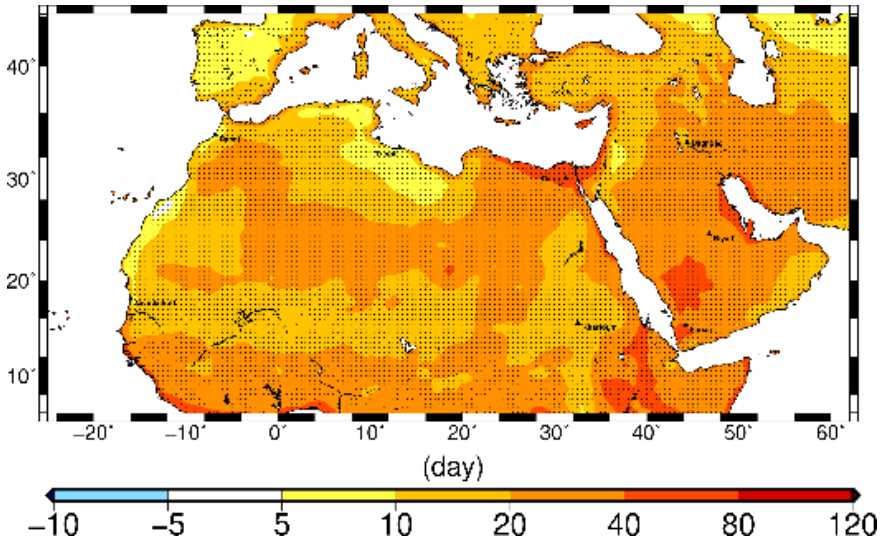
RCP4.5

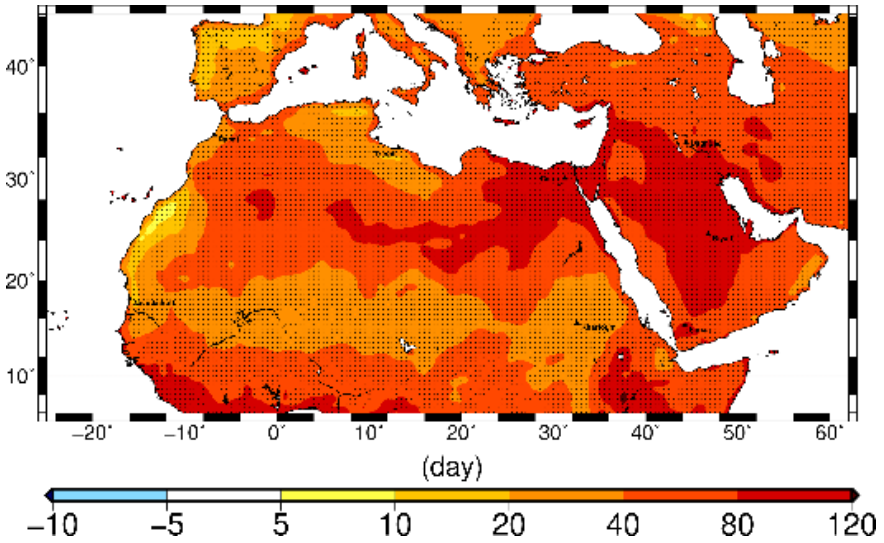


RCP 8.5



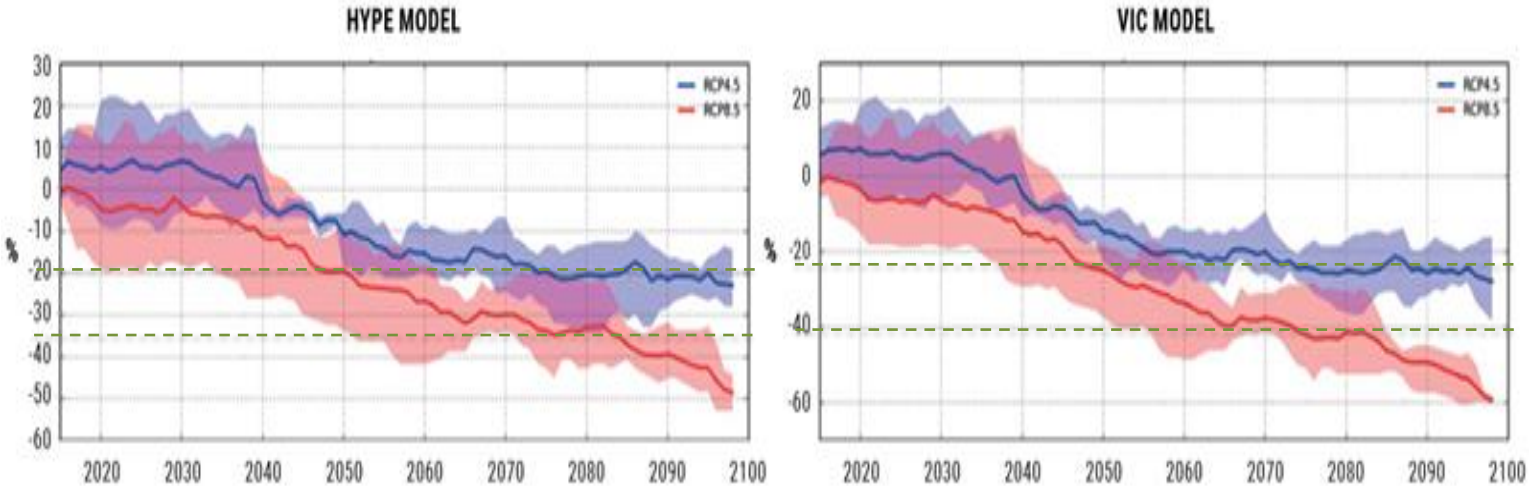
Durée des vagues de chaleur



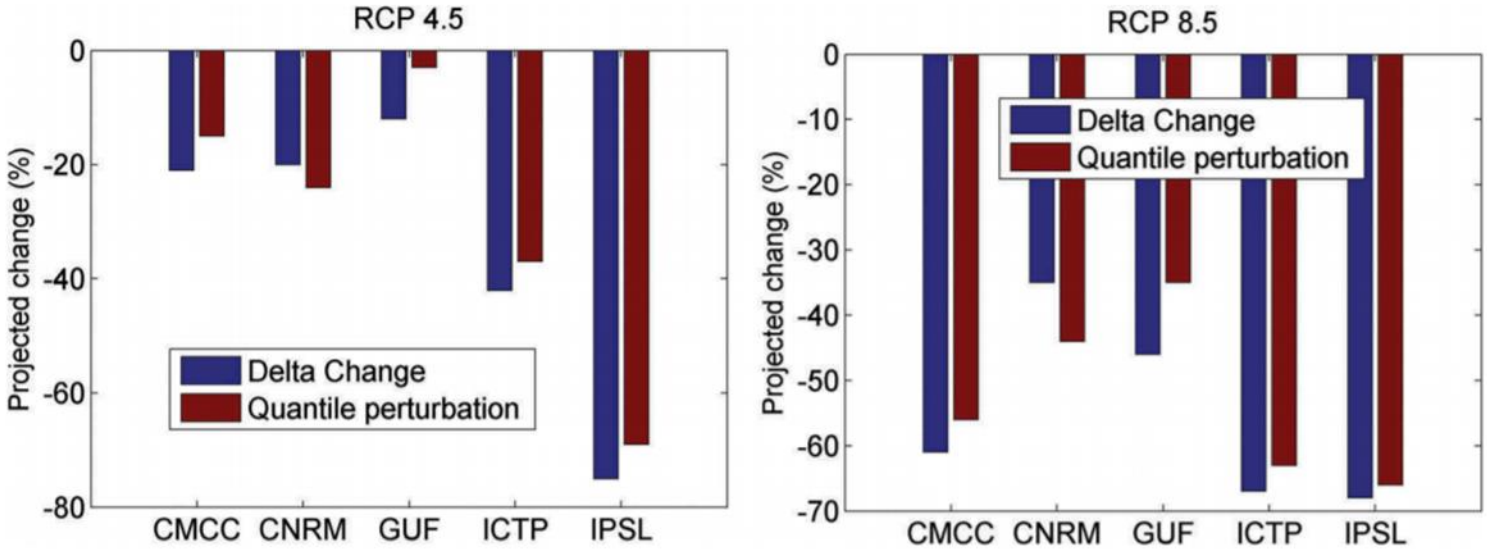


Driouech et al. (2020b)

➔Baisse des débits annuels moyens au niveau des hauts plateaux

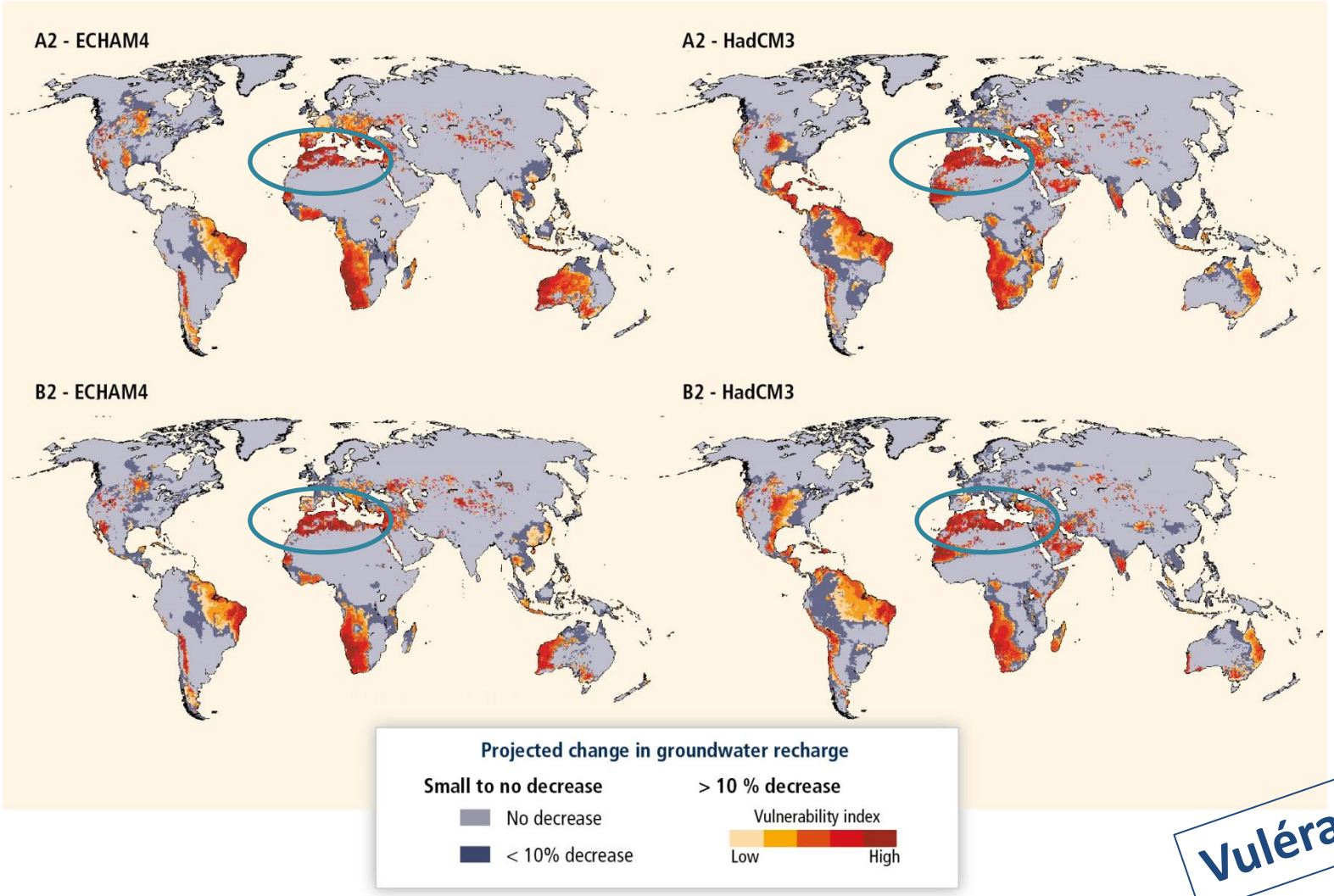


Changement futur de l'écoulement annuel moyen des hauts plateaux marocains (9W 1W 30N 35N) tels qu'issus de deux modèles hydrologiques HYPE (gauche) et VIC (droite) alimentés par différentes simulations climatiques sous les deux scénarios RCP4.5 et RCP8.5. Source : RICCAR (ESCWA et al., 2017)



Marchane et al. 2017

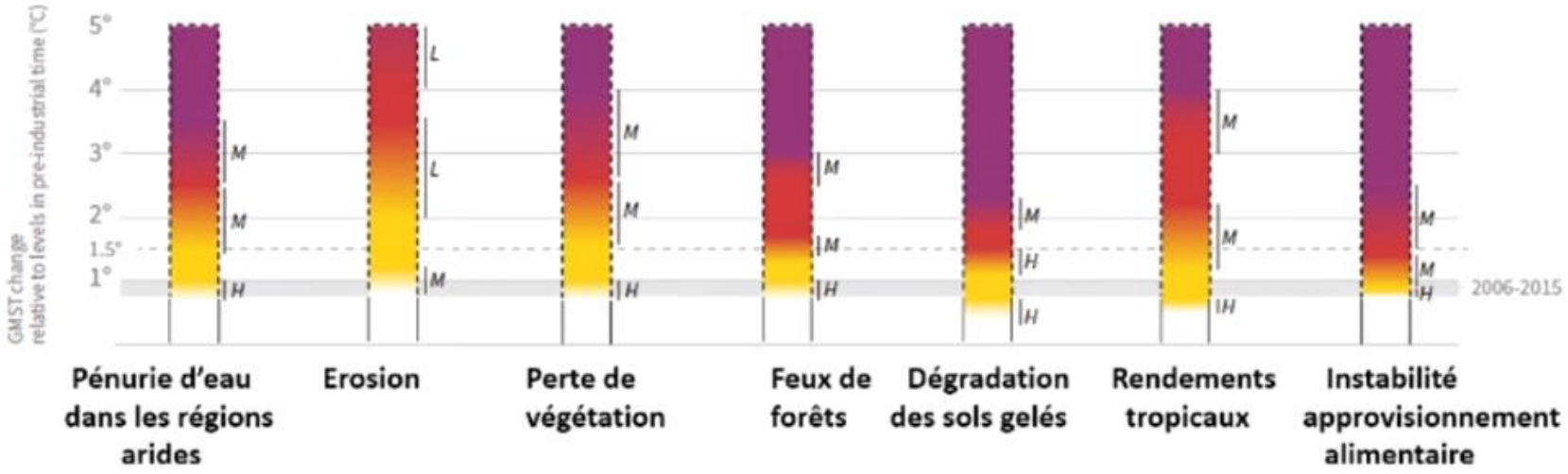
Comparison of the projected changes in runoff with delta-change and quantile-perturbation methods.



Vulérabilité

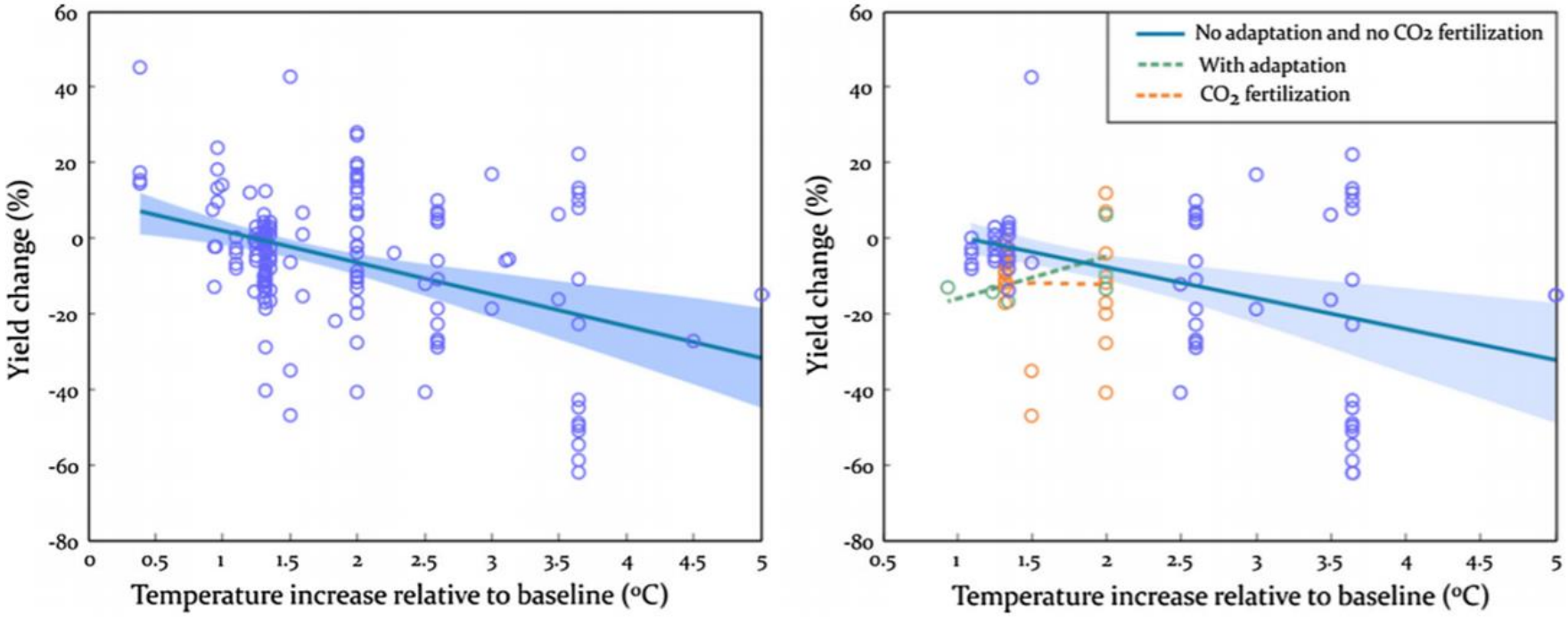
Human vulnerability to climate change–induced decreases of renewable groundwater resources by the 2050s. . The index is defined only for areas where groundwater recharge is projected to decrease by at least 10% relative to 1961–1990. IPCC- WGII AR5 (2014)

Risques liés aux processus terrestres du fait du changement climatique



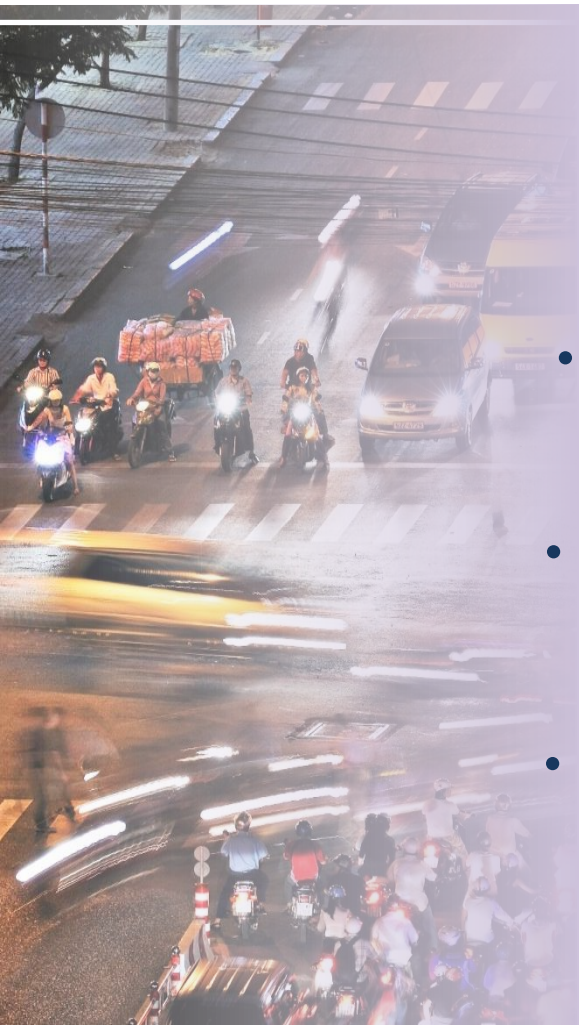
IPCC-SRCCL

Examples of projected impacts



Crop yield changes with temperature increase in the MENA region over all studies (left) and for studies that take the effects of adaptation measures (green line) and CO2 fertilization (orange line) into account.

Waha et al. 2017

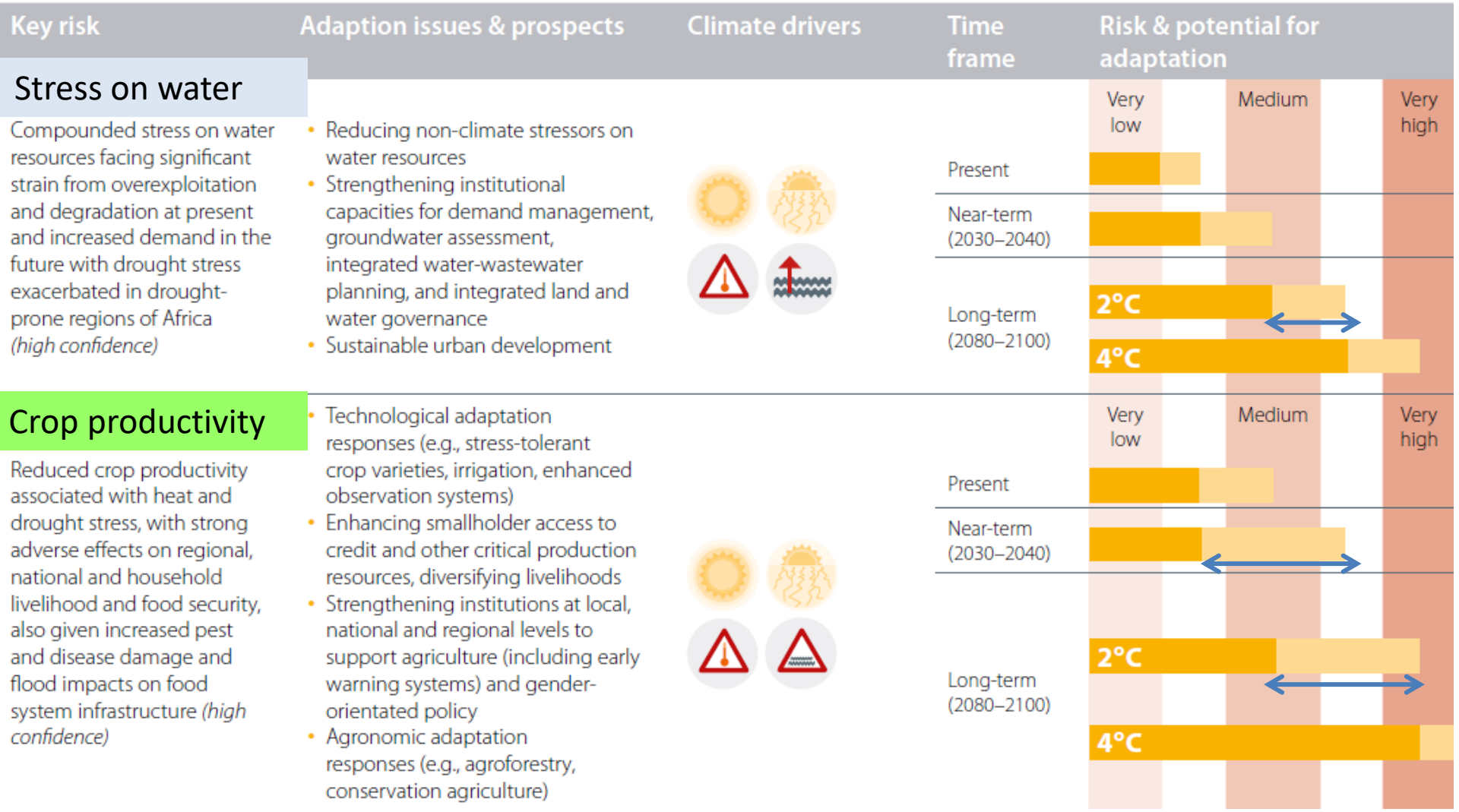


Gerhard Zwerger-Schoner / Aurora Photos

Greenhouse gas emissions pathways

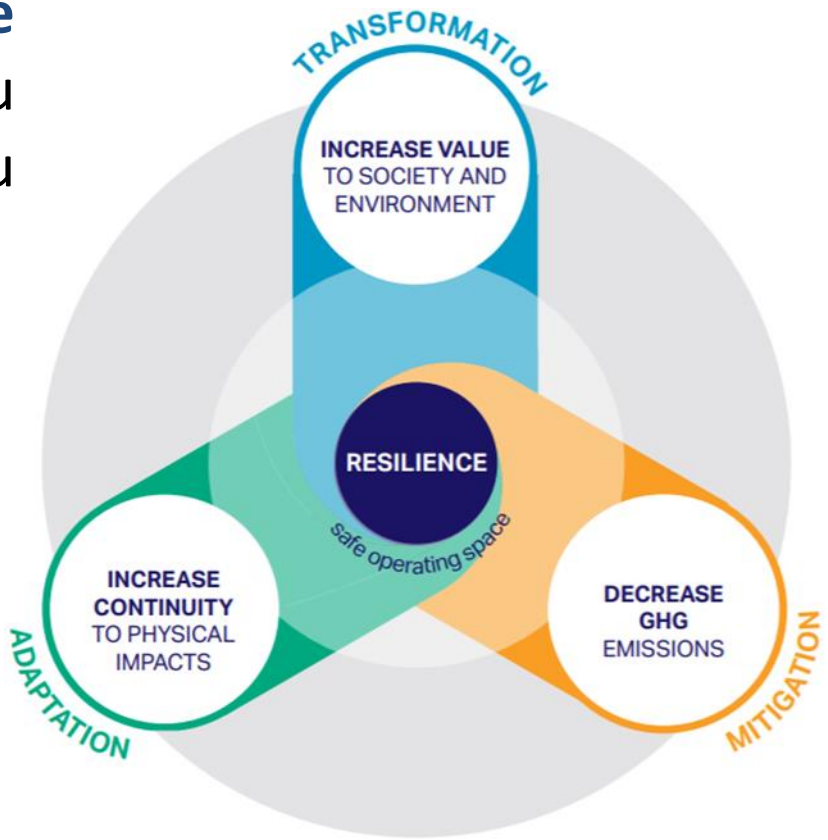
- National pledges are not enough to limit warming to 1.5°C
- To limit warming to 1.5°C, CO_2 emissions fall by about 45% by 2030 (from 2010 levels) (20% for 2°C)
- To limit warming to 1.5°C, CO_2 emissions would need to reach 'net zero' around 2050 (2075 for 2°C)

Examples of Main risks and role of adaptation and mitigation (Africa)



Besoin de meilleure résilience

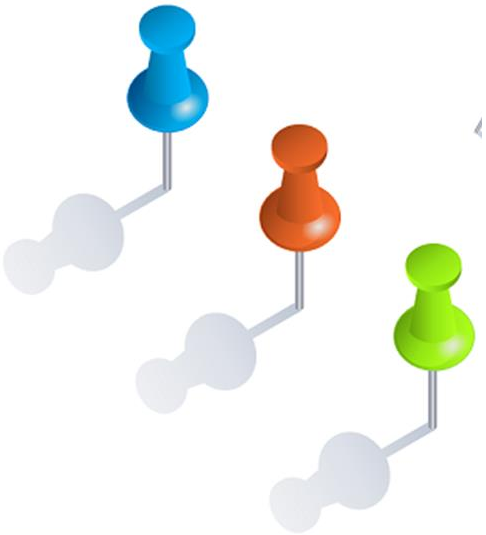
- La résilience climatique est la capacité **d'anticiper**, de **se préparer** et **de réagir** aux événements, tendances ou perturbations dangereux liés au climat.



Business Climate Resilience: Thriving Through the Transformation (2019)

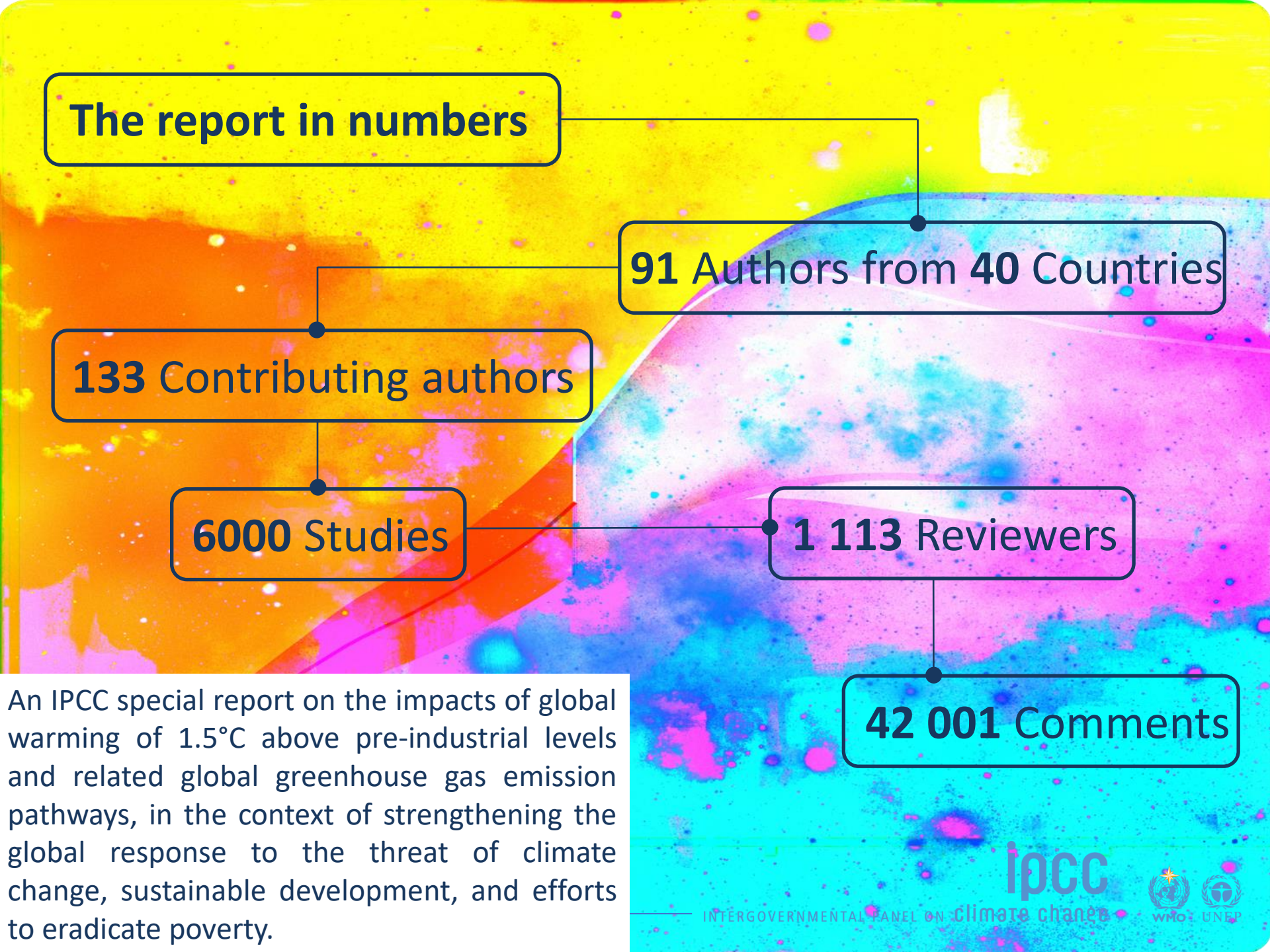
La résilience climatique part de la conviction que

- les systèmes humains et naturels sont fortement interconnectée aux variations et changements du climat
- L'action non correctement réfléchie de l'homme a des répercussion néfaste sur le climat et le système climatiques entier
- la capacité « d'innovation » qui nous a mis dans la situation/fragilité climatique actuelle peut également être utilisée pour nous en sortir



Working Group I Outline

Chapter 1: Framing, context, methods
Chapter 2: Changing state of the climate system
Chapter 3: Human influence on the climate system
Chapter 4: Future global climate: scenario-based projections and near-term information
Chapter 5: Global carbon and other biogeochemical cycles and feedbacks
Chapter 6: Short-lived climate forcers
Chapter 7: The Earth's energy budget, climate feedbacks, and climate sensitivity
Chapter 8: Water cycle changes
Chapter 9: Ocean, cryosphere, and sea level change
Chapter 10: Linking global to regional climate change
Chapter 11: Weather and climate extreme events in a changing climate
Chapter 12: Climate change information for regional impact and for risk assessment


The report in numbers
91 Authors from 40 Countries
133 Contributing authors
6000 Studies
1 113 Reviewers
42 001 Comments
An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.
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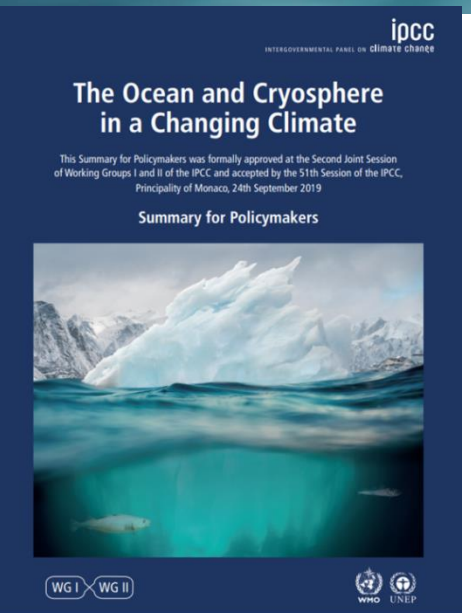
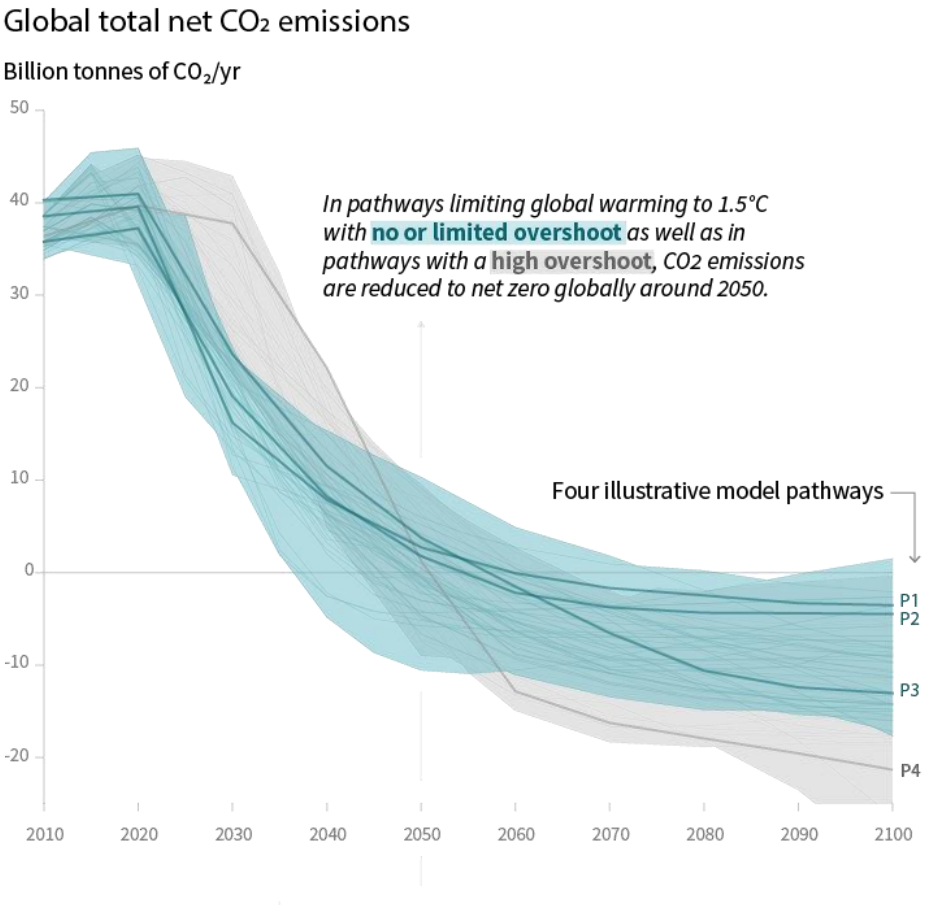
Human use directly affects more than 70% of the global, ice free land surface

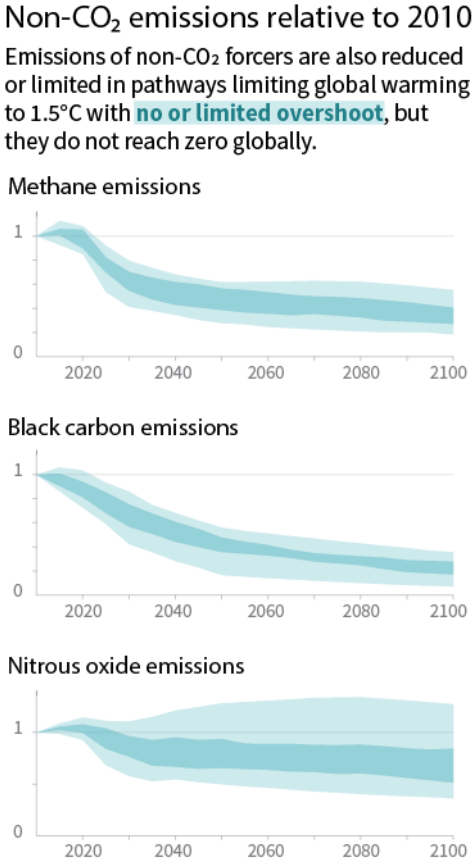
Special Report on the Ocean and Cryosphere in a Changing Climate

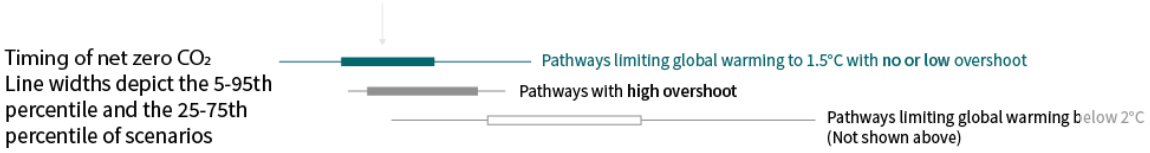


Merci de Votre Attention

Global emissions pathway characteristics







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