

SR1.5, October 2018

ipcc

INTERGOVERNMENTAL PANEL ON climate change

Global Warming of 1.5°C

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

Summary for Policymakers

SRCLL, August 2019

ipcc

INTERGOVERNMENTAL PANEL ON climate change

Climate Change and Land

An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems

Summary for Policymakers

SROCC, September 2019

ipcc

INTERGOVERNMENTAL PANEL ON climate change

The Ocean and Cryosphere in a Changing Climate

Special Report of the Intergovernmental Panel on Climate Change

Summary for Policymakers

Current and projected relationships between climate change and biodiversity and system risks
...exploring similarities across oceans, freshwater and land, IPCC SRs and beyond...

WG I WG II WG III



WG I WG II WG III



WG I WG II



WGII: Reducing Impact (Severity), guiding AMBITION in Mitigation and Adaptation

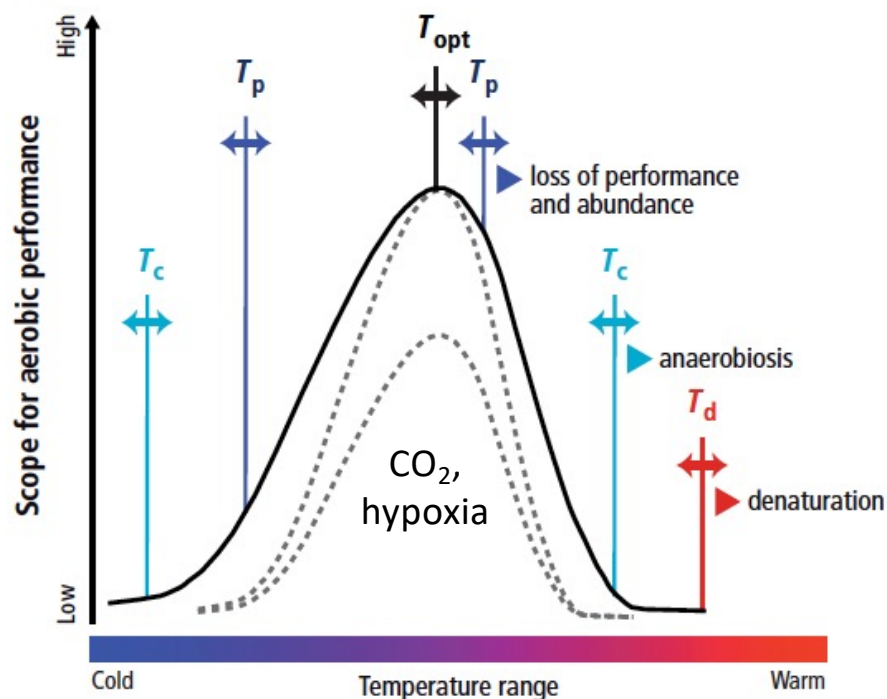
Hans-O. Pörtner, Co-Chair IPCC Working Group II AR6

IPCC 6th Assessment Cycle: 3 Special Reports released between October 2018 and September 2019

ipcc
INTERGOVERNMENTAL PANEL ON climate change

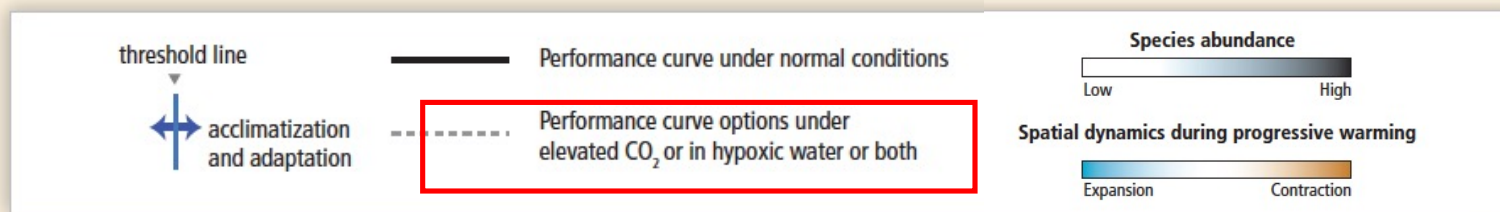


(a) Thermal windows for animals: limits and acclimatization



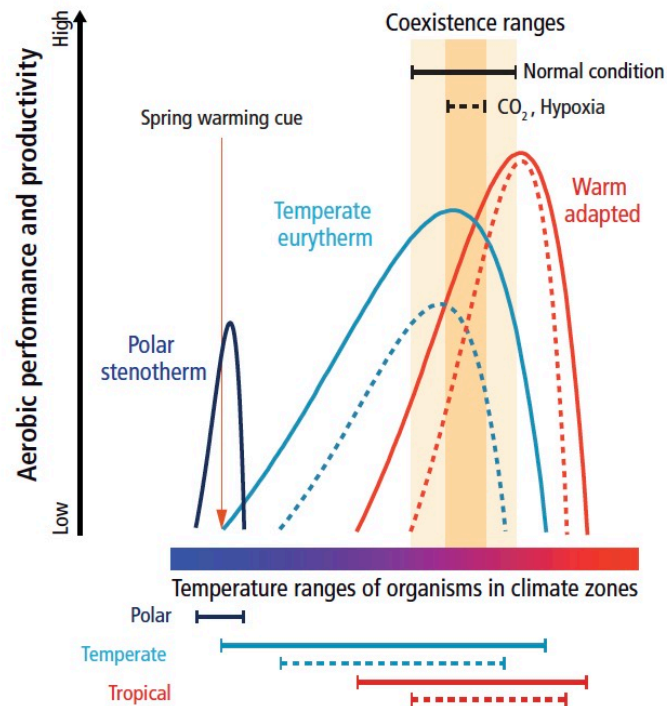
Common functional background :
specialization on limited ranges of ambient temperature, reflected in dynamic thermal performance curves, constrained by other drivers (CO_2 , hypoxia etc.)

Temperature dependent **performance constraints** in animals, plants etc. reduce the ability to grow and **store carbon**

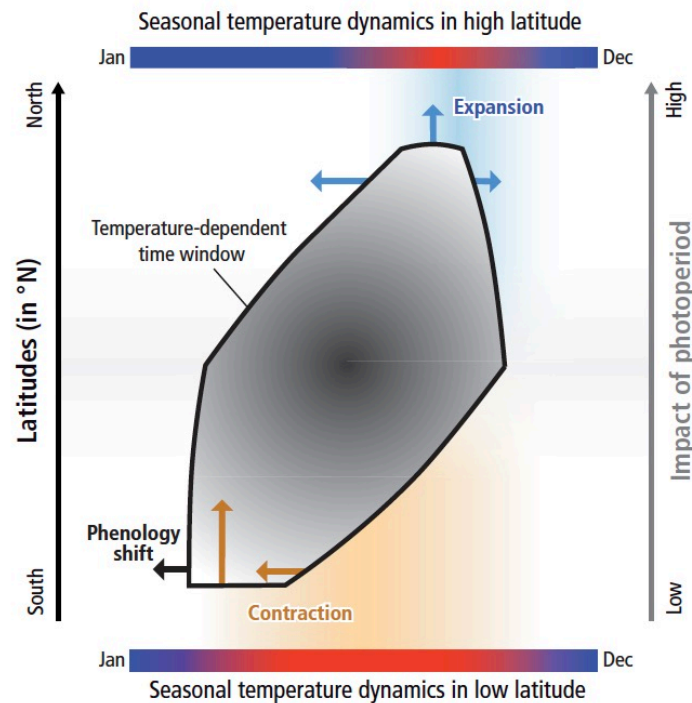


IPCC AR5 WGII Figure 6.5

(a) Competition, predator/prey, phenologies of organisms in different climate zones



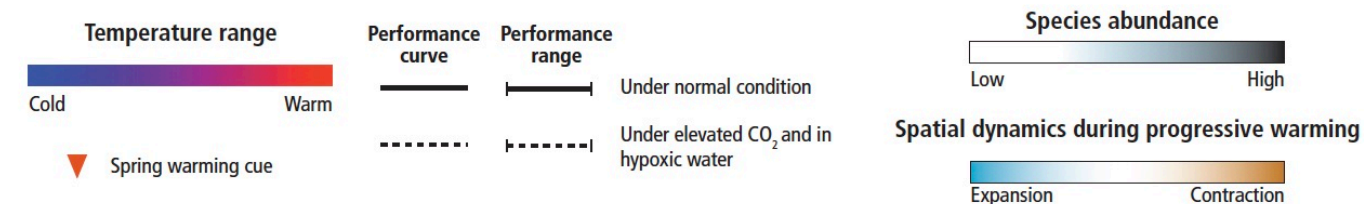
(b) Spatial dynamics during progressive warming



Species on the move

Thermal windows are characteristic for species, life stages, climate zones

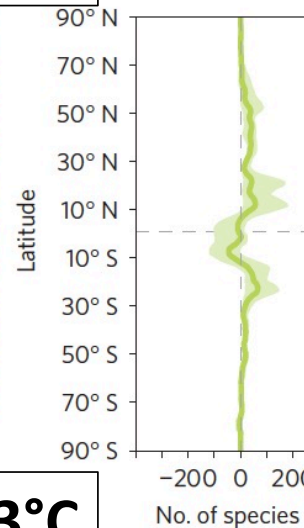
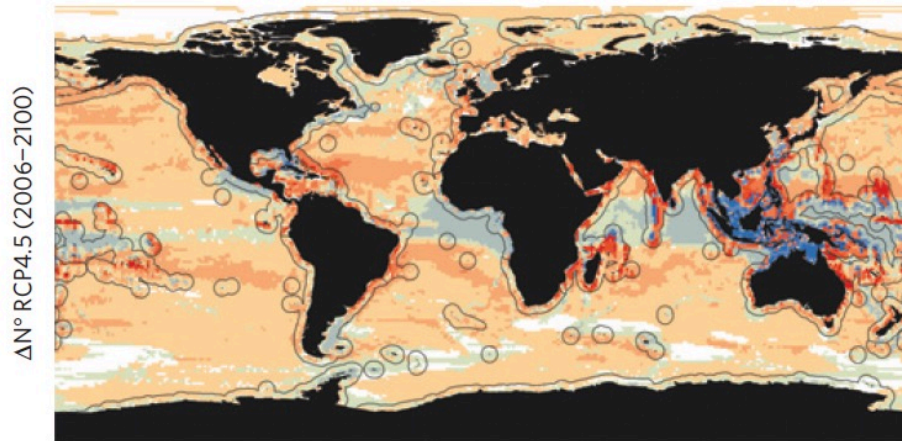
.... shaping biogeography and species co-existence and interactions



IPCC AR5 WGII Figure 6.5

$\approx +2.4^{\circ}\text{C}$

b



RCP 4.5

Species on the move: Implications for marine biodiversity

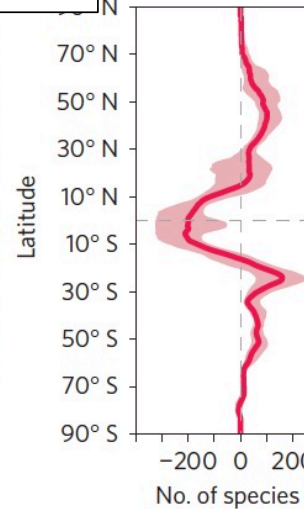
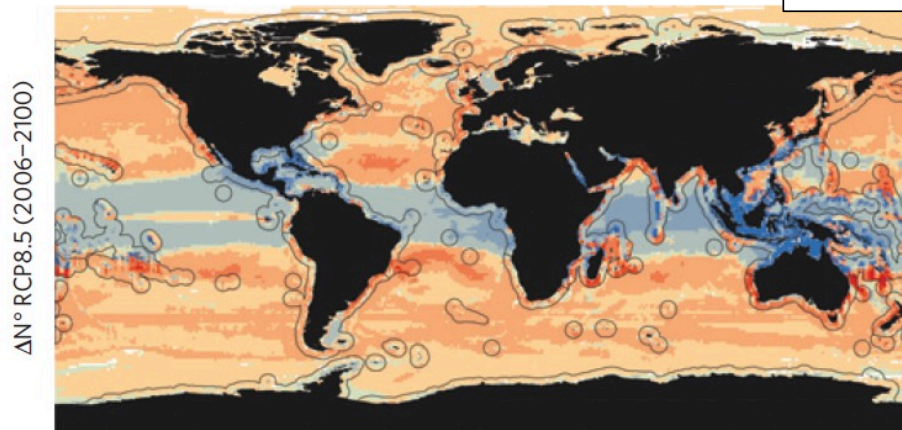
Drivers of change:
Warming and velocity....

RCP4.5 versus 8.5

Ultimate Species Heat Limits surpassed in Tropics

$\approx +4.3^{\circ}\text{C}$

c



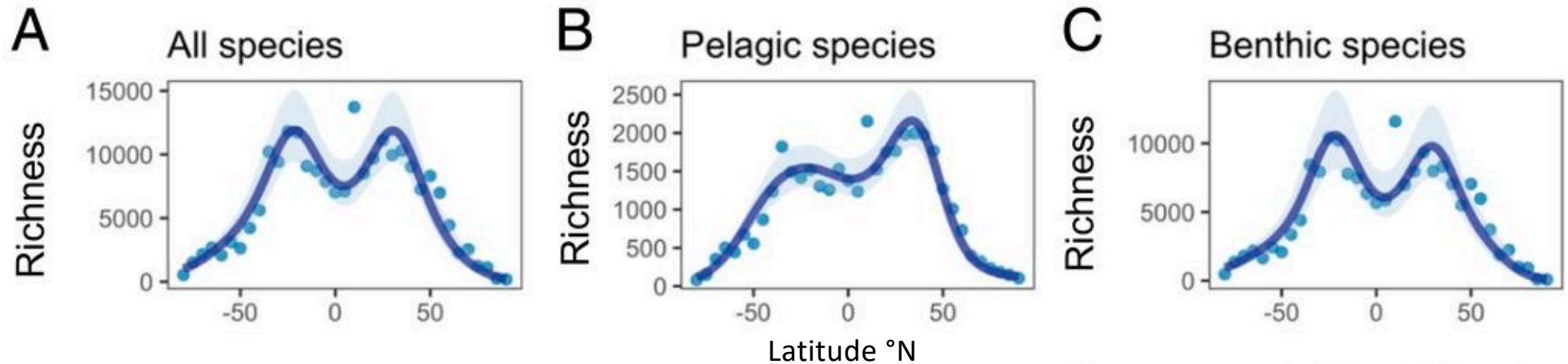
RCP 8.5

... Resembling palaeo-
patterns on land and
in the oceans

Projections: Large changes in community composition
expected driven by local invasions and losses

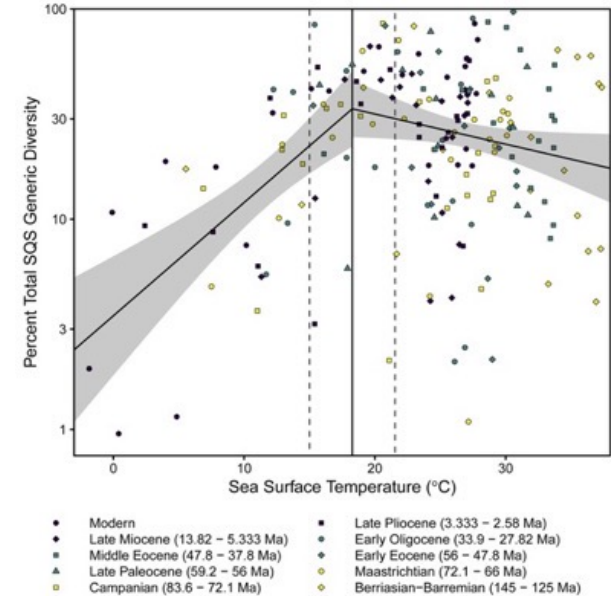
Garcia-Molinos et al. 2015, 2017 NCC

Modern findings resembling palaeo patterns



The latitudinal distribution of species richness in marine taxa at the scale of 5° latitudinal bands (the effect of latitude adjusting for shelf area)

Present and palaeo
 $T_{opt} \approx \leq 20^{\circ}\text{C}$



Integrated climate hazards

Biota

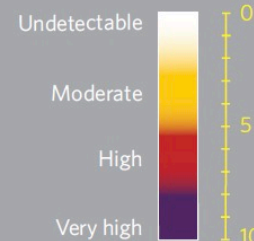
Coastal and marine organisms

Linking to INDCs and Global Stocktake

Services

Ecosystem services

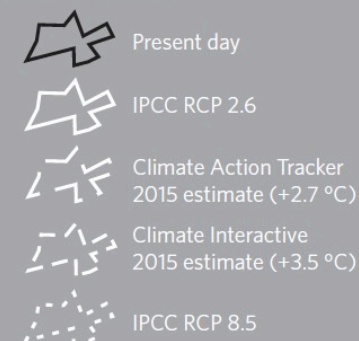
Risk of impact



Confidence levels for the present day and the RCPs

E	Very low
D	Low
C	Medium
B	High
A	Very high

Emission scenarios



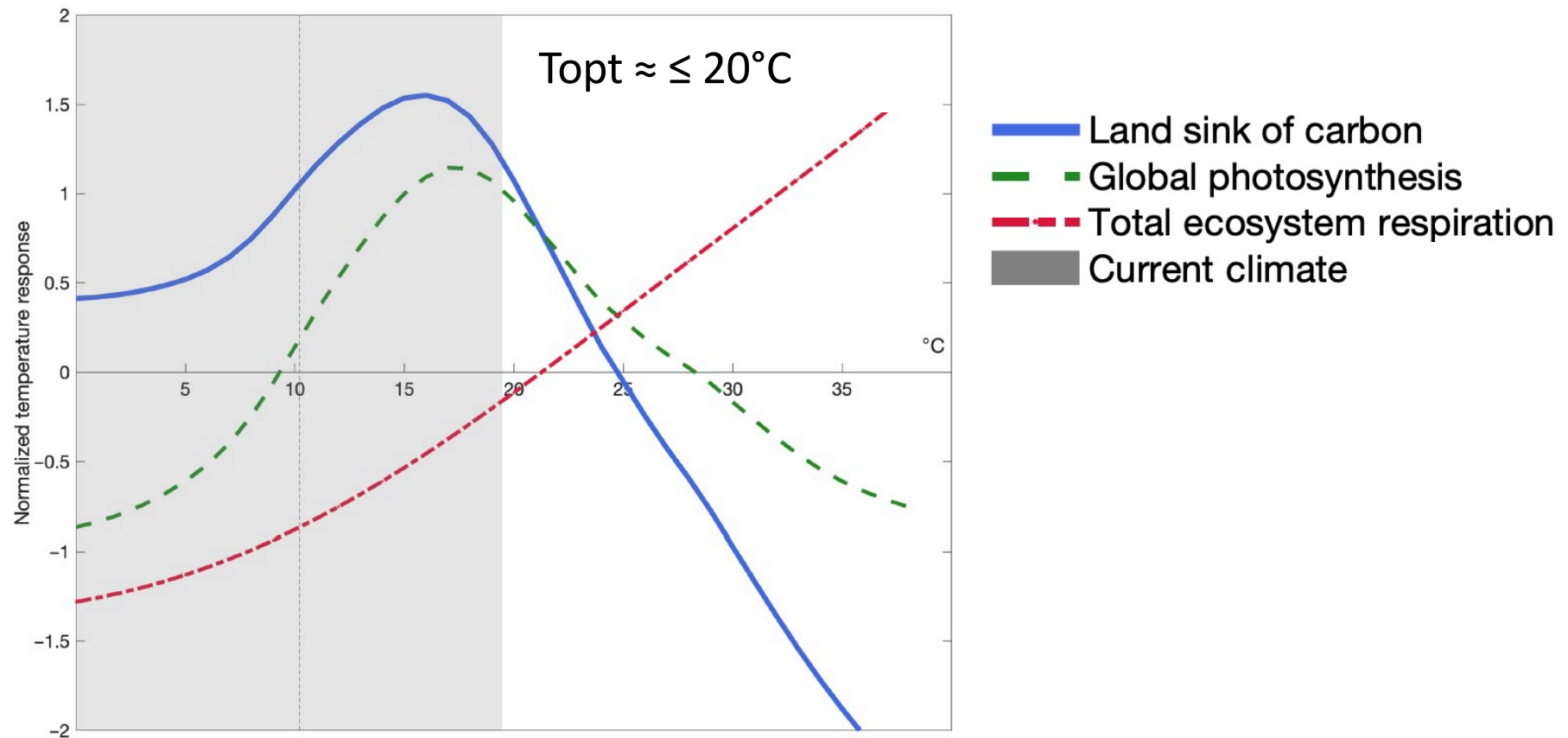
The red zone means potential losses ... including performance losses, ... e.g. in carbon storage by plants and animals ...

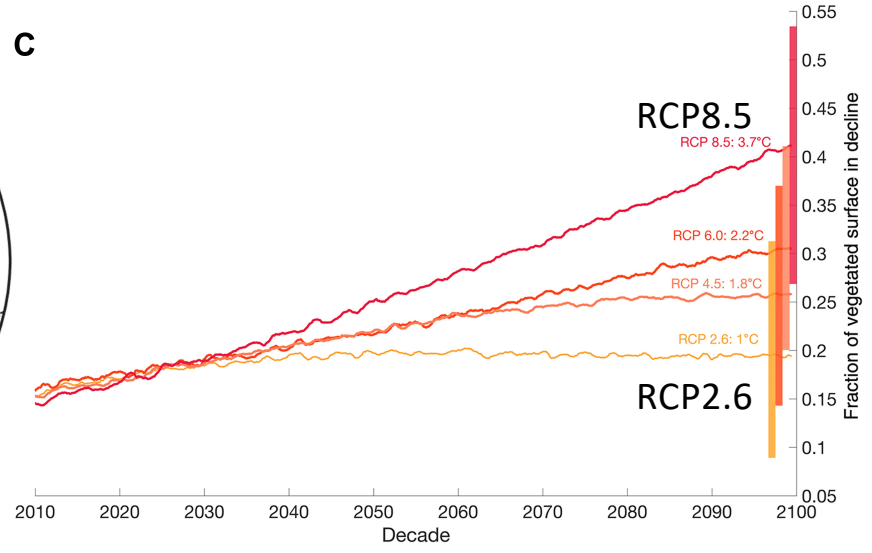
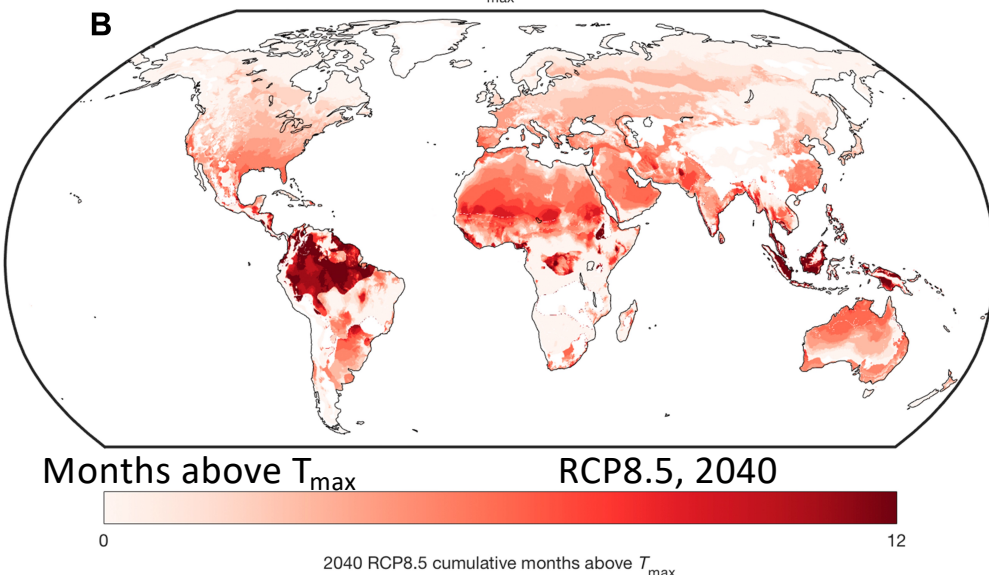
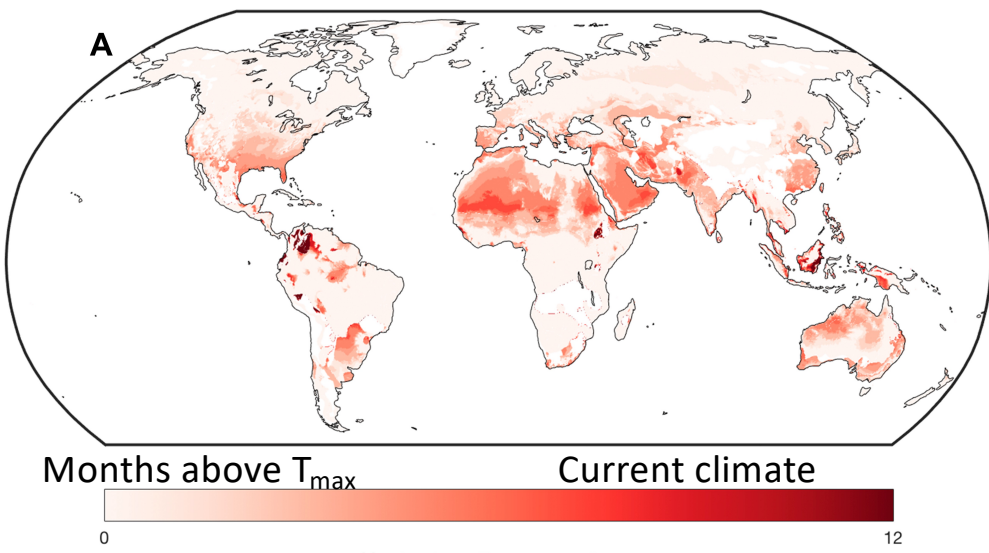
... in the ocean and on land

OCEAN RISKS

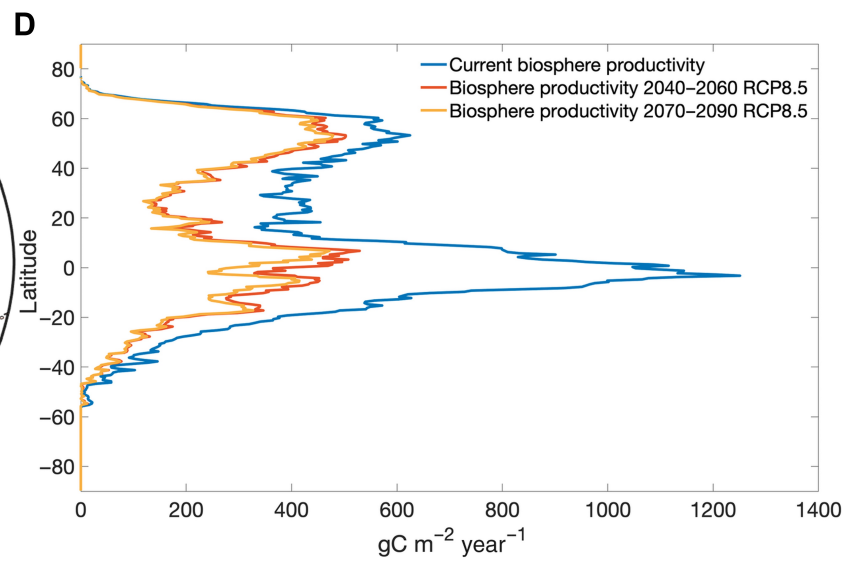
°C
0.8
1.5
2.7
3.5
>4

Temperature dependent performance of carbon metabolism on land



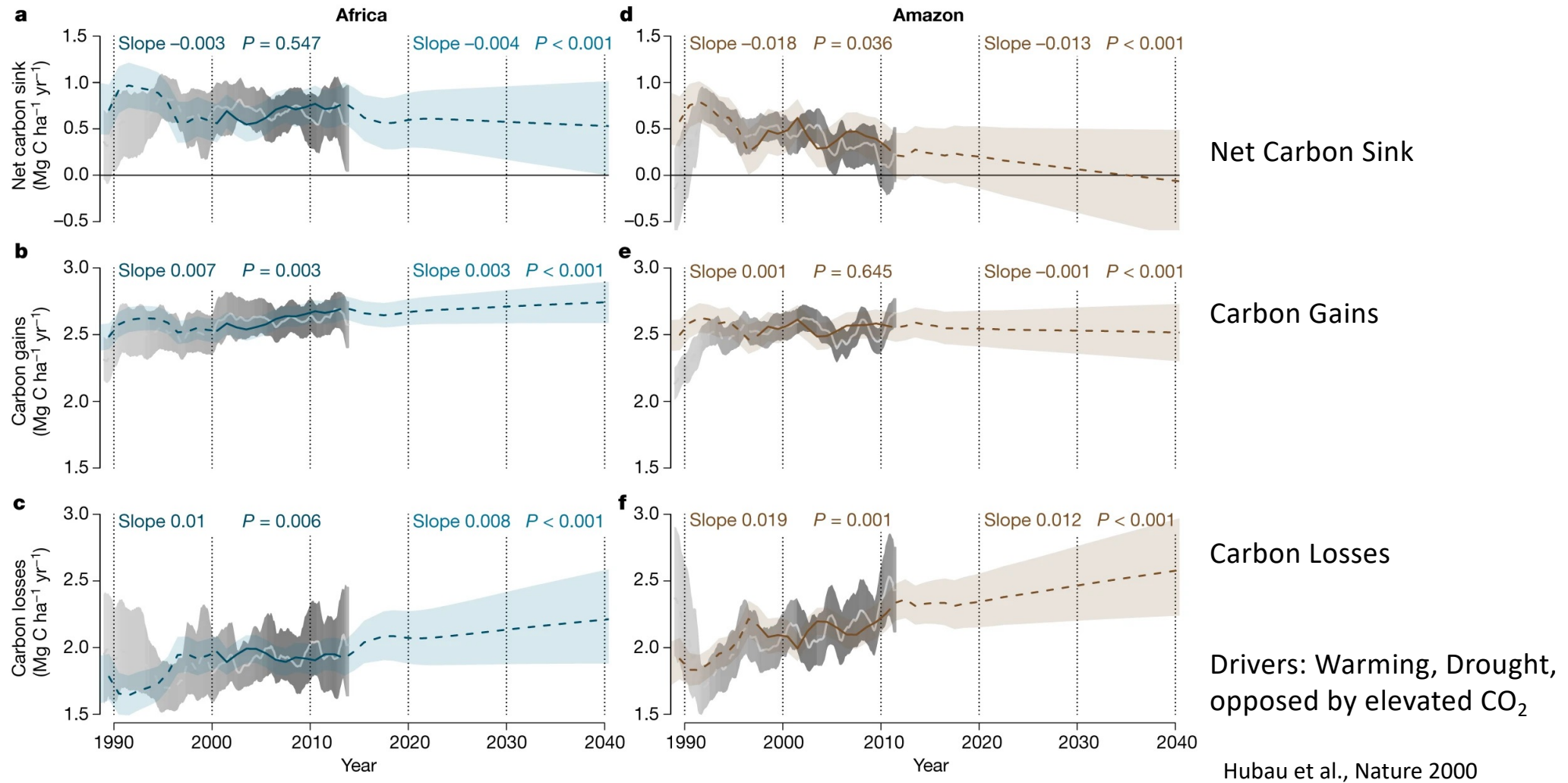


Fraction of
vegetated
surface in
decline

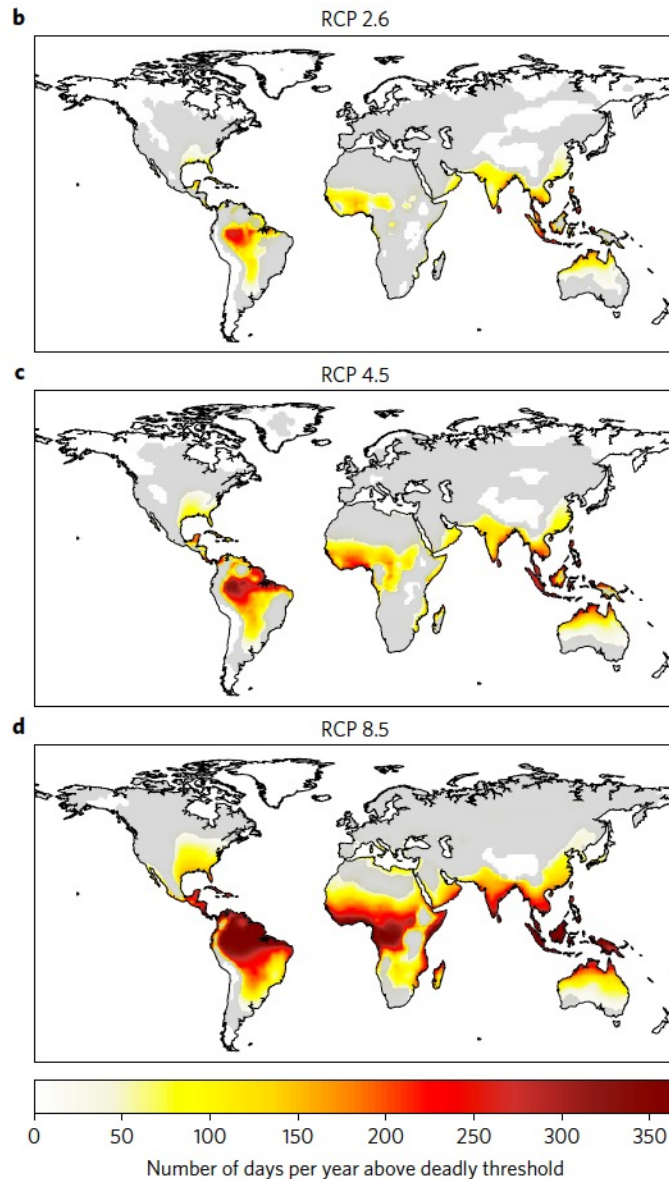


Productivity

Carbon storage by tropical forests constrained by warming and drought



Human (Mammalian) biogeography



$\approx +1.5^{\circ}\text{C}$

Depending on the degree of climate change conditions, some parts of the planet may become intolerable outdoors for humans and other mammals (e.g. livestock)

$\approx +2^{\circ}\text{C}$

exposure aggravated by an ageing population (higher vulnerability) and increasing urbanization (heat-island effects).

$\approx +4^{\circ}\text{C}$

Mora et al., NCC 2017



IPBES-IPCC co-sponsored workshop on biodiversity and climate change

First joint meeting in history

14 – 17 December 2020

- Looked at how climate, biodiversity and human society are interconnected
- Looked at solution options and co-benefits of ambitious mitigation, nature-based solutions and sustainable development

Structure and Messages of meeting report, a teaser...

Ambitious emissions reductions are crucial for MAINTAINING / STRENGTHENING THE BIOSPHERE's capacity to support both mitigation and adaptation (excluding premature accounting)

Section 1: **Climate** and **biodiversity** are inextricably connected with each other, and with **human** futures

Section 2: **Climate change** affects/harms **biodiversity conservation**

Section 3: **Actions** taken to mitigate climate change can have **beneficial or harmful effects on biodiversity** depending on **policy**

Section 4: Biodiversity assists people and ecosystems to **adapt to climate change**

Section 5: Actions that halt, slow or reverse biodiversity loss can also **help mitigate climate change**.

Section 6: Treating climate, biodiversity and human society as **coupled systems** is key to successful outcomes

Section 7: There are **pathways of development** that can successfully navigate through the multiple crises we face.



***SR1.5, SRCCL, SROCC
and beyond:***

***Ambitious emissions
reductions, combined with
land and ocean management
for conservation, restoration
and sustainability ($\geq 30\%$),,
support***

- biodiversity conservation,**
- food security for humankind,**
- climate mitigation, and...**

- avoid future pandemics!**

ipcc
INTERGOVERNMENTAL PANEL ON climate change



THANK YOU FOR YOUR ATTENTION!

For more information:

Website: <http://ipcc.ch/>

IPCC Secretariat: ipcc-sec@wmo.int

IPCC Press Office: ipcc-media@wmo.int

IPCC WGII

<http://ipcc-wg2.awi.de/>

<http://www.ipcc.ch/report/srocc/>

Find us on:



@IPCCNews



IPCC_Climate_Change



<http://www.slideshare.net/ipcc-media/presentations>



<https://www.youtube.com/c/ipccgeneva>



@IPCC_CH



<https://www.linkedin.com/company/ipcc>



<https://www.flickr.com/photos/ipccphoto/sets/>



<https://vimeo.com/ipcc>

ipcc
INTERGOVERNMENTAL PANEL ON climate change

