

60th Jubilee-Symposium

“Climate change and pandemics: the persistent burden for global health systems”

Heidelberg, June 23-25, 2022

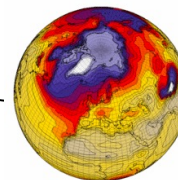
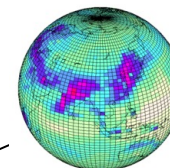
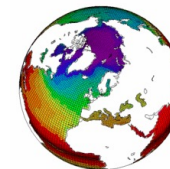
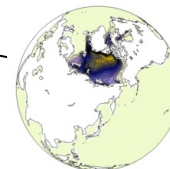


# Climate projections in the aftermath of COP26 commitments

Sylvie Joussaume

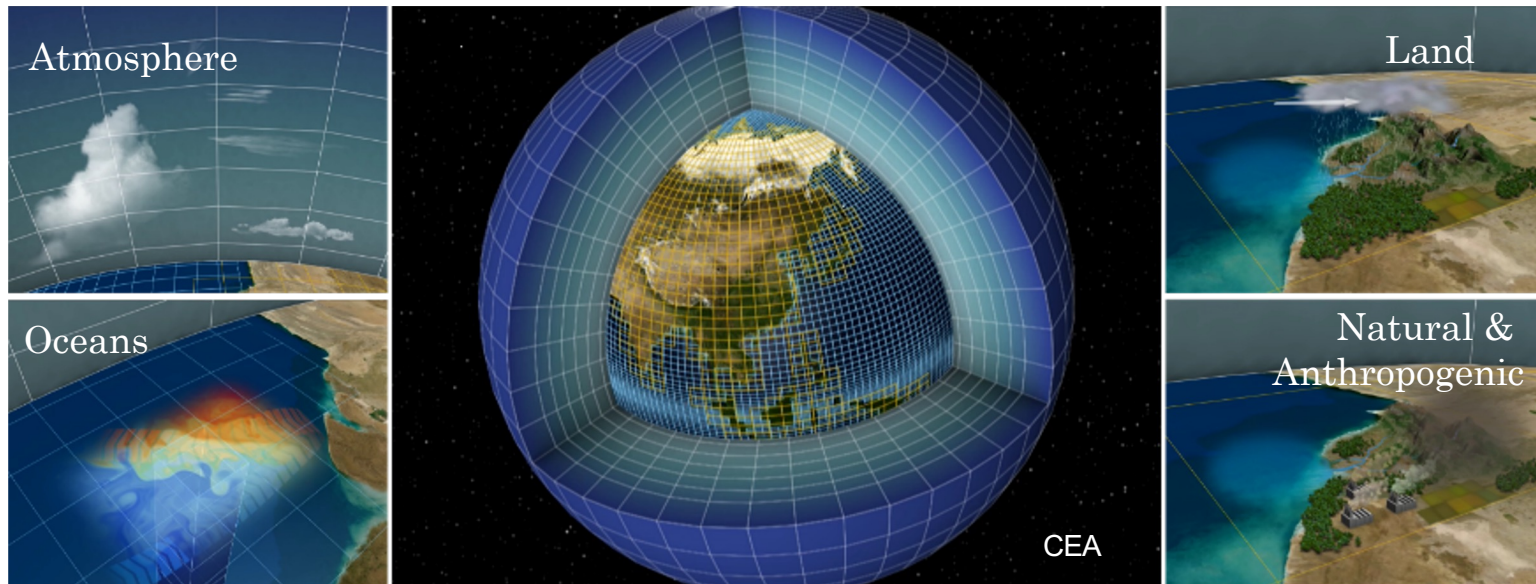
Laboratoire des Sciences du Climat et de l'Environnement,  
Institut Pierre Simon Laplace

CNRS



# Modelling the Earth's climate system

## Understand & Predict Climate Variability and Changes



WCRP Coupled Model Intercomparison Project : CMIP6 (AR6)

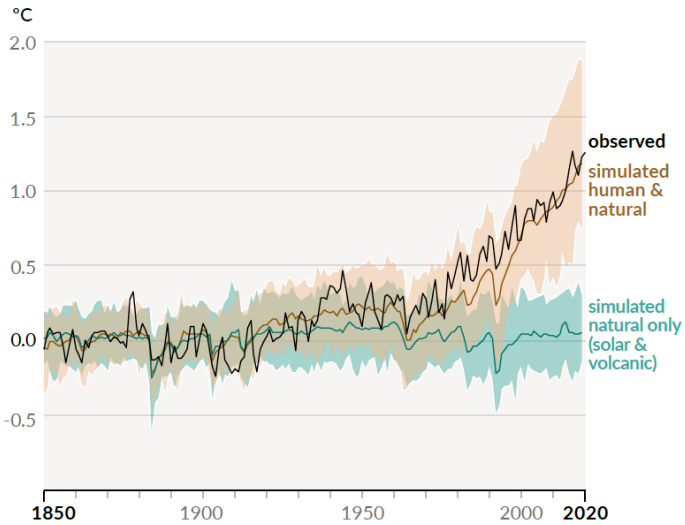
**Understand / Evaluate / Project**

Open database (Earth System Grid Federation)

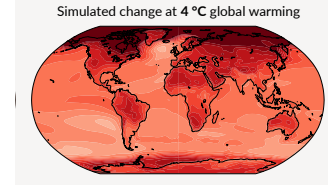
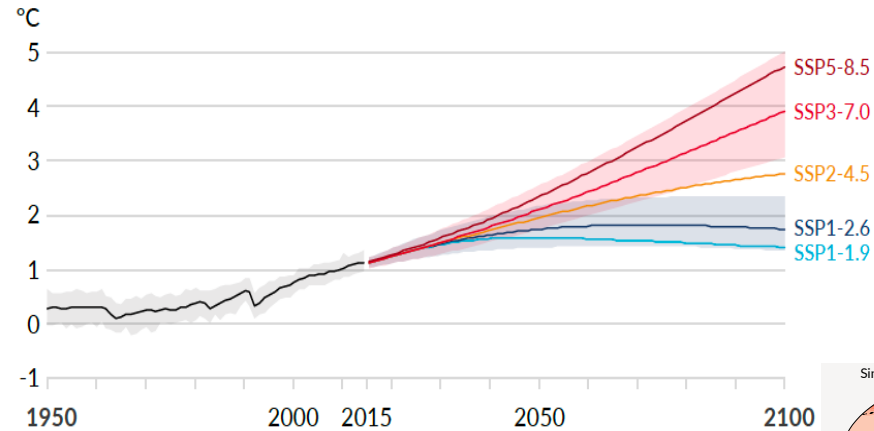
30 PB / 15 000 users



“It is unequivocal that human influence has warmed the atmosphere, ocean and land”



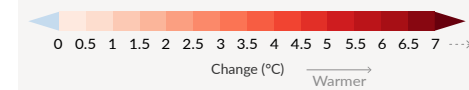
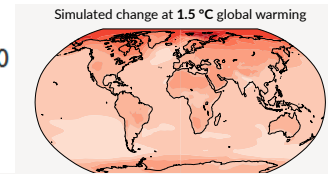
a) Global surface temperature change relative to 1850-1900



**4.4°C**  
3.3 - 5.7

**2.7°C**  
2.1 - 3.5

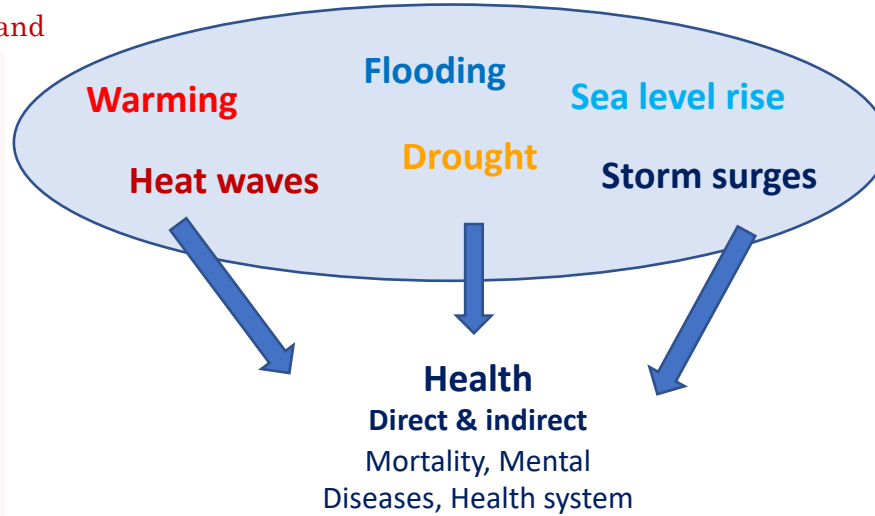
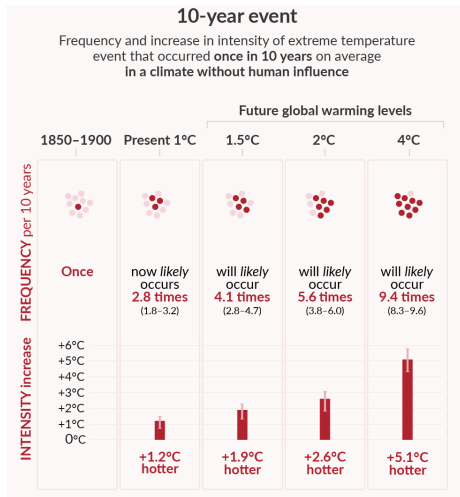
**1.4°C**  
1.0 - 1.8



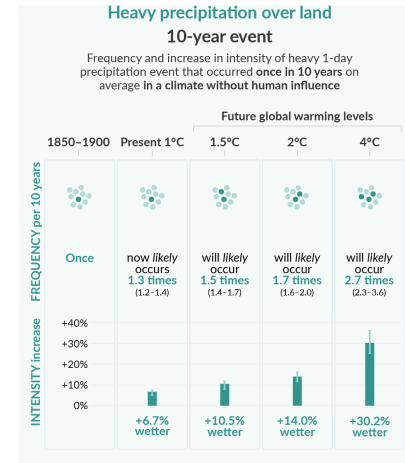
IPCC AR6 WG1 SPM (2021)

and temperature will continue to grow

## Hot temperature extremes over land



## Heavy precipitation over land



IPCC AR6 WG1 SPM (2021)

## Ecosystems, agriculture & food



Samoa 2015

The Ocean Agency/  
Ocean Image Bank

WHO/Marko Kokic



Crédit photo : Soriano/Le Figaro



## Extreme events



January 2014, UK



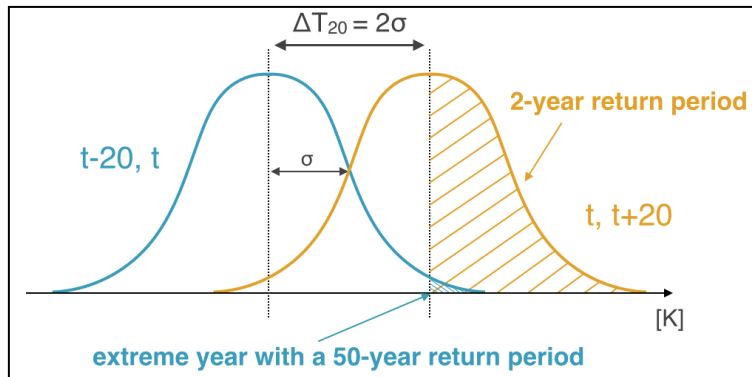
Tuvalu

AFP Torsten Blackwood

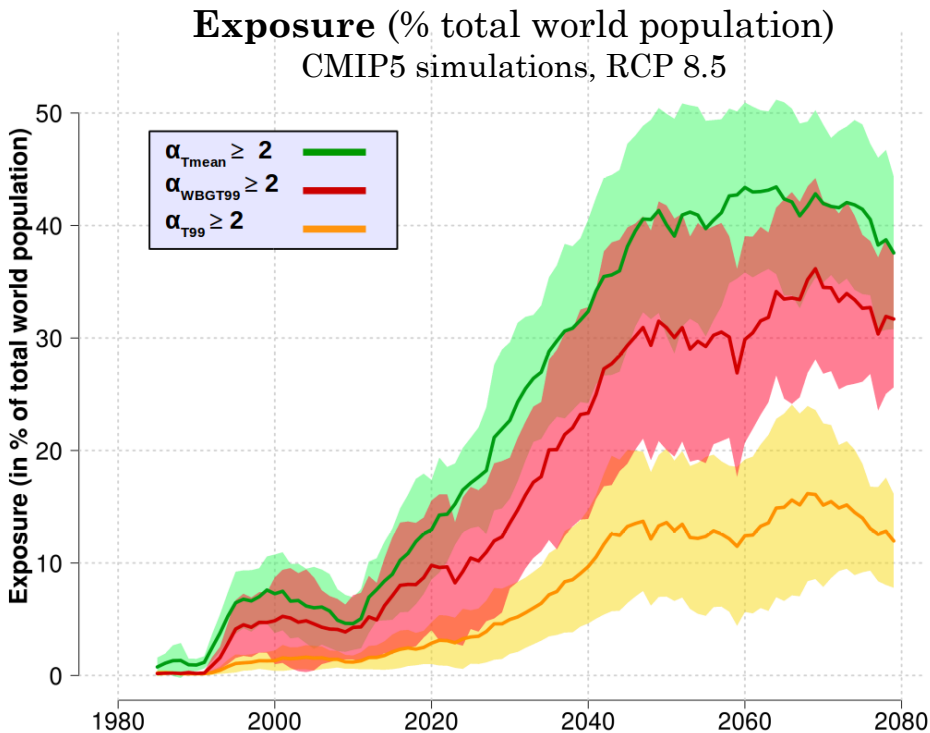
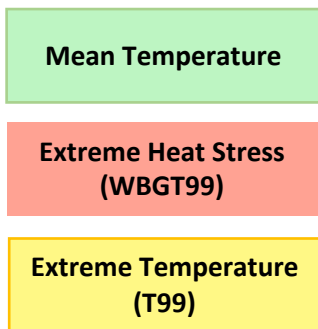
## Sea level rise



# Rate of change: Heat stress extremes more perceived than temperature extremes



Chavaillaz et al. (Climatic Change, 2016)

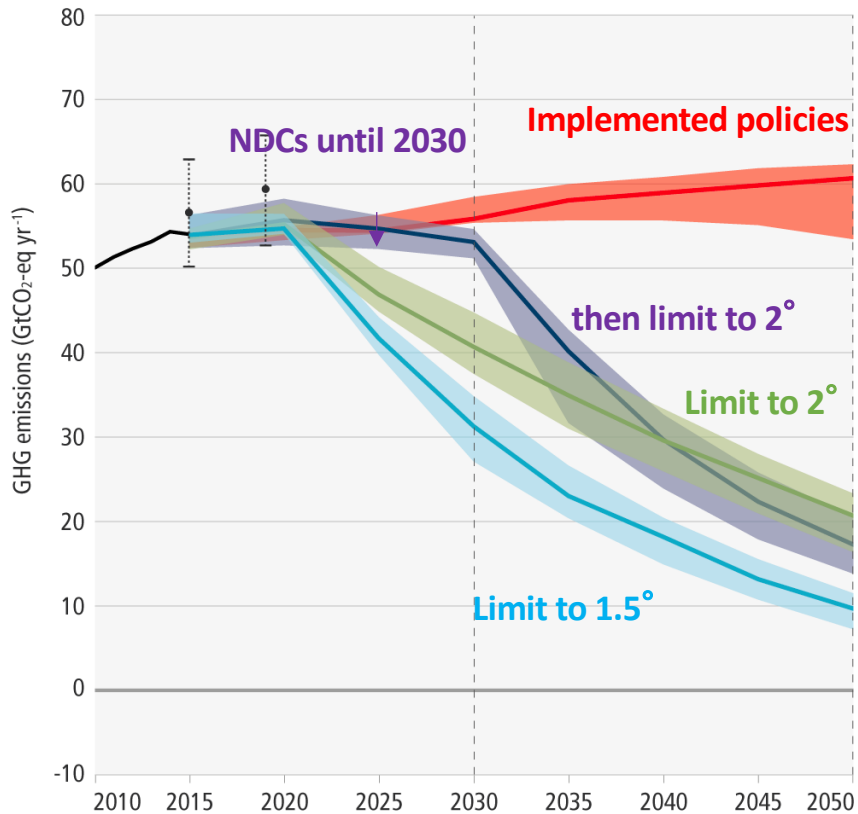


Brouillet and Jousaume, Climatic Change (2020)

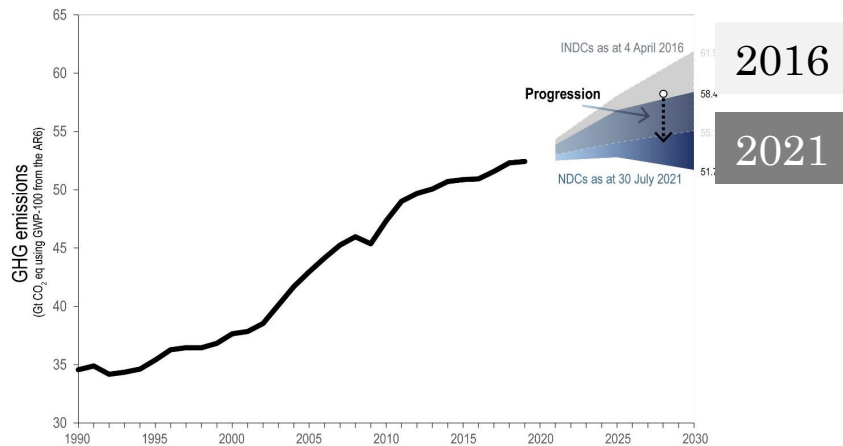
# Mitigation

2015 Paris Agreement goal:  
Limit to 2°C, ideally 1.5°C, by end of century  
**NDCs**  
Nationally Determined Contributions

a. Global GHG emissions



NDCs as announced in July 2021 prior to COP 26  
Warming likely to exceed 1.5°C during 21<sup>st</sup> century

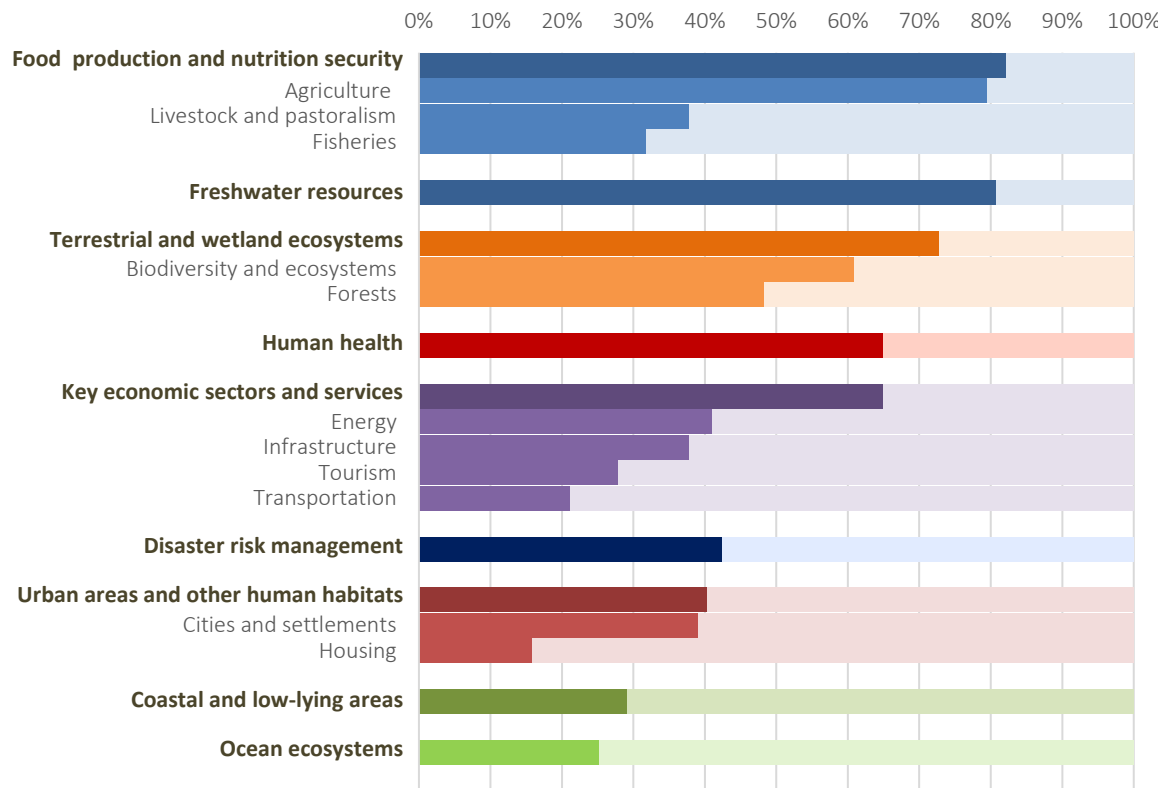


IPCC AR6 WG3 SPM (2022)

# Adaptation

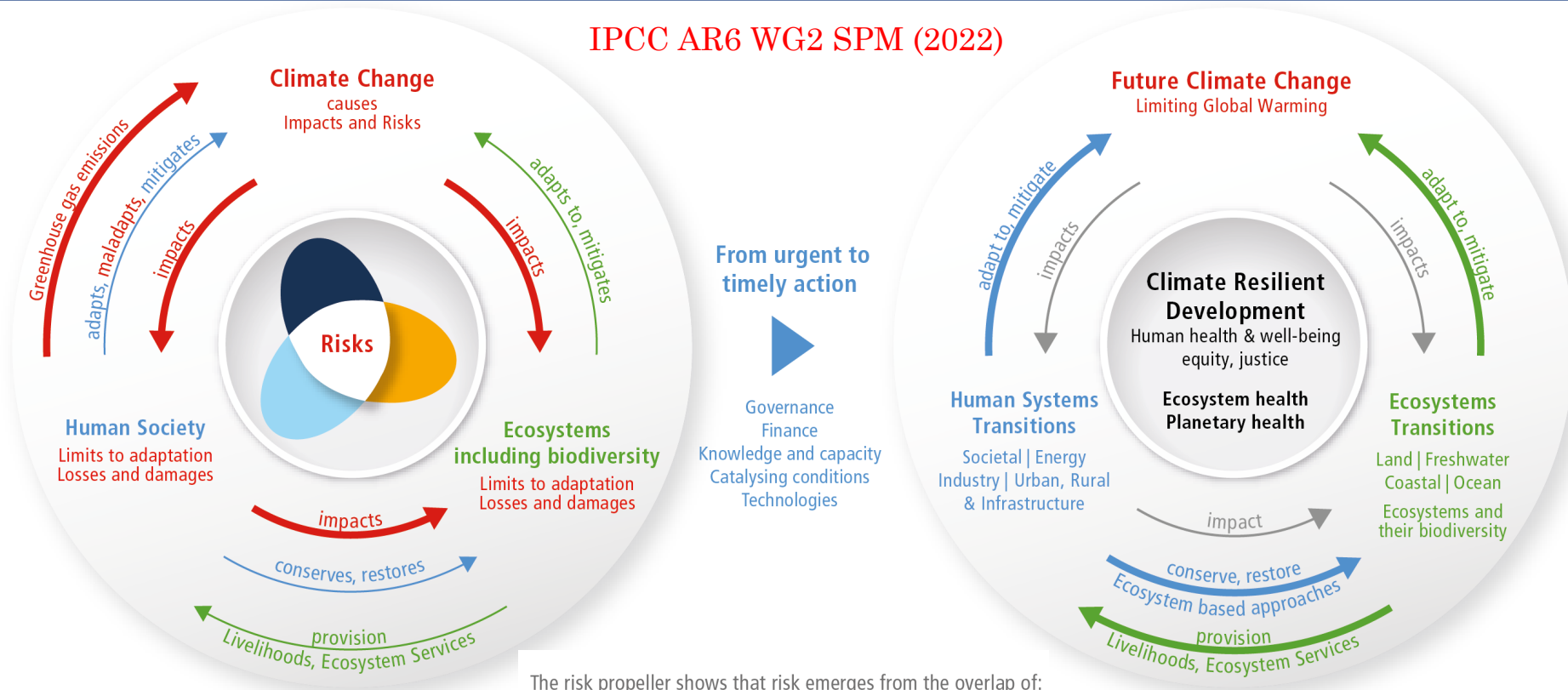
## Nationally Determined Contributions

### Adaptation priority areas and sectors UNFCCC COP26 (2021)



# Towards Climate Resilient Development

IPCC AR6 WG2 SPM (2022)



The risk propeller shows that risk emerges from the overlap of:

- Climate hazard(s)
  - Vulnerability
  - Exposure
- ...of human systems, ecosystems and their biodiversity



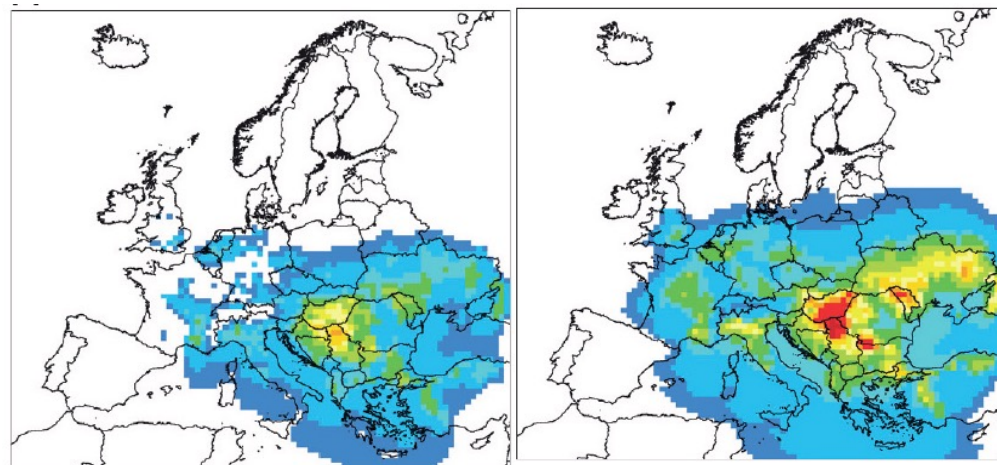
# Climate change, ecology and health

ATOPICA EU

1986-2005

Ragweed

2050 (RCP8.5)



Hamaoui-Laguel et al. (2015)

2050 : x 4 climate (2/3), invasion (1/3)



Pollen  
Allergie  
Climat

## Pollen, Allergy and Climate

### Objectives:

- Develop a platform for the impacts of climate change on pollen and allergy
- Coupling models for phenology, pollen transport and allergy risk to provide maps of allergy risks
- Develop an alert system

# Conclusions

COP26: some improvements but still more needed to limit climate change

COVID-19 : CO<sub>2</sub> emission declined by 5.8% in 2020 versus 2019  
But undetectable above climate variability (IPCC AR6 WG1 and WG3)

## Research gaps:

- **Gaps in climate modelling :**  
precipitation at regional scale, uncertainties, complexity of the system, tipping points ...
- **For adaptation & increasing resilience:** The need to foster interdisciplinary approaches on:

**Climate / Ecology / Health / Societal**