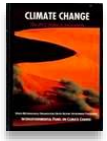
Some challenges for climate and energy

Robert Vautard
IPCC, WGI co-chair

History | IPCC Reports: Unique, gather scientists, produce consensus

IPCC jointly established by WMO and UNEP

1988



First Assessment Report Led to creation of UNFCCC in 1994

1990

Second Assessment Report Kyoto Protocol

1995

Third Assessment Report Focus attention on adaptation to climate change

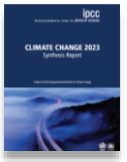
2001

Fourth Assessment Report 2°C Limit Nobel Peace Prize

2007

Fifth Assessment Report Paris Agreement - 2015

2014



Sixth Assessment Report First Global Stocktake - COP28

2023

AR7

2028?

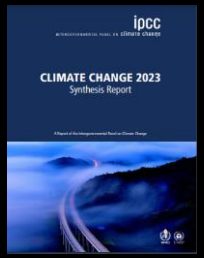
GROWTH IN SCIENTIFIC RESEARCH

INCREASE IN STAKEHOLDER INVOVEMENT

GROWING PUBLIC AWARENESS

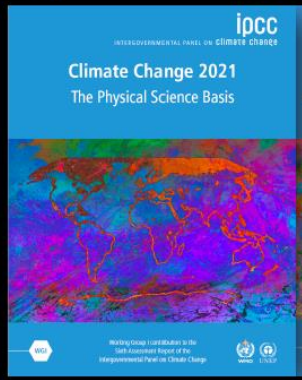
The State of Knowledge about Climate Change

AR6



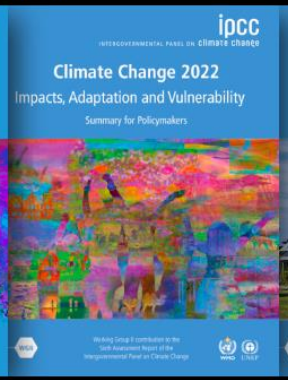
Synthesis Report

WGI



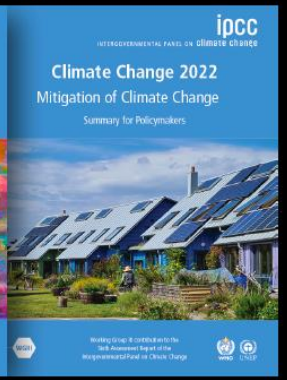
AR6 Climate Change 2021: The Physical Science Basis

WGII



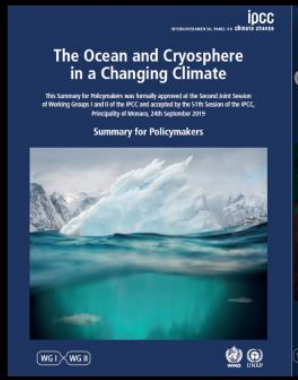
Climate Change 2022: Impacts, Adaptation and Vulnerability

WGIII

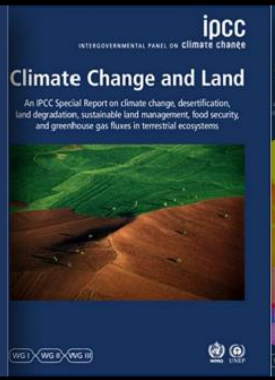


Climate Change 2022: Mitigation of Climate Change

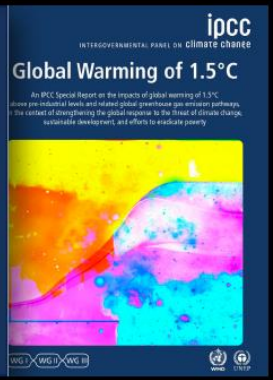
Special Report



Ocean and Cryosphere in a Changing Climate



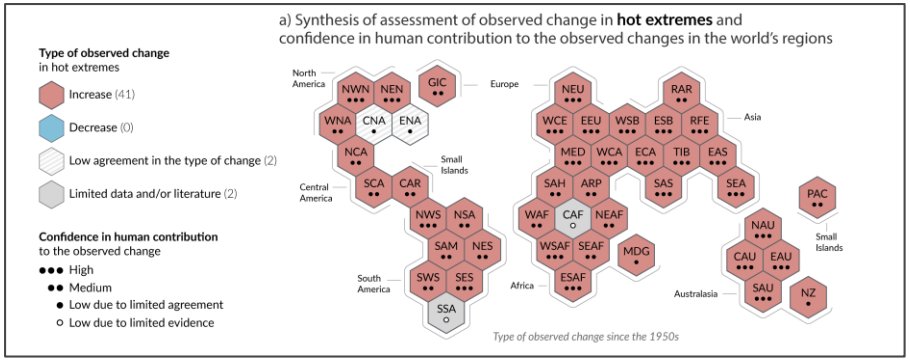
Climate Change and Land

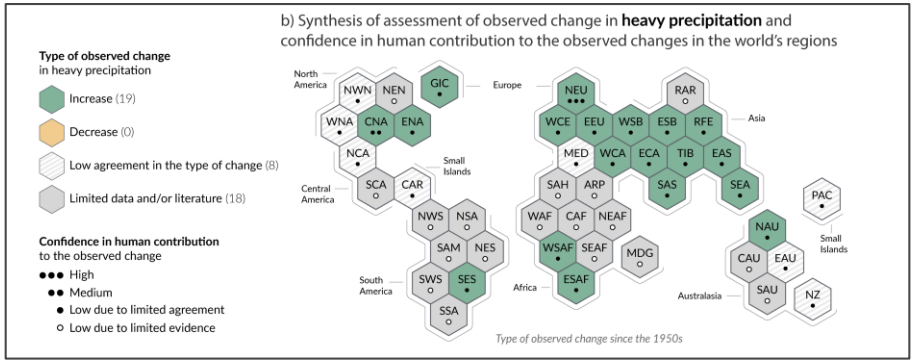


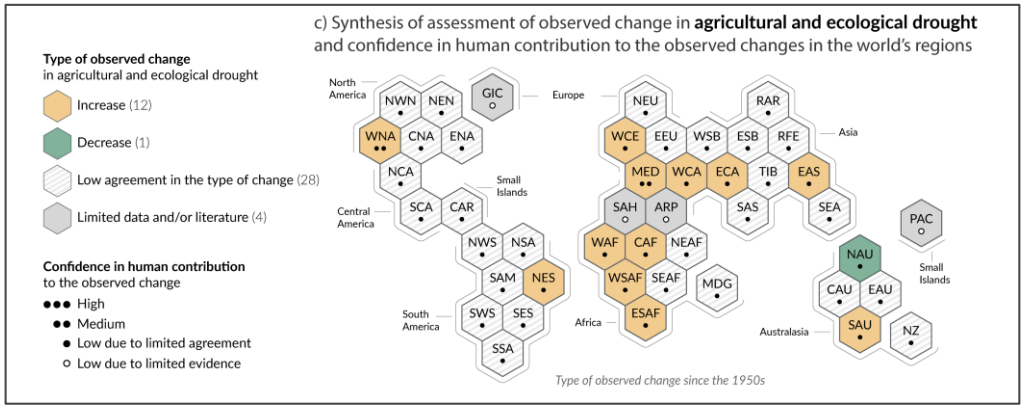
Global Warming of 1.5 °C

Attribution of climate extremes

Climate change is already affecting every inhabited region across the globe, with human influence contributing to many observed changes in weather and climate extremes

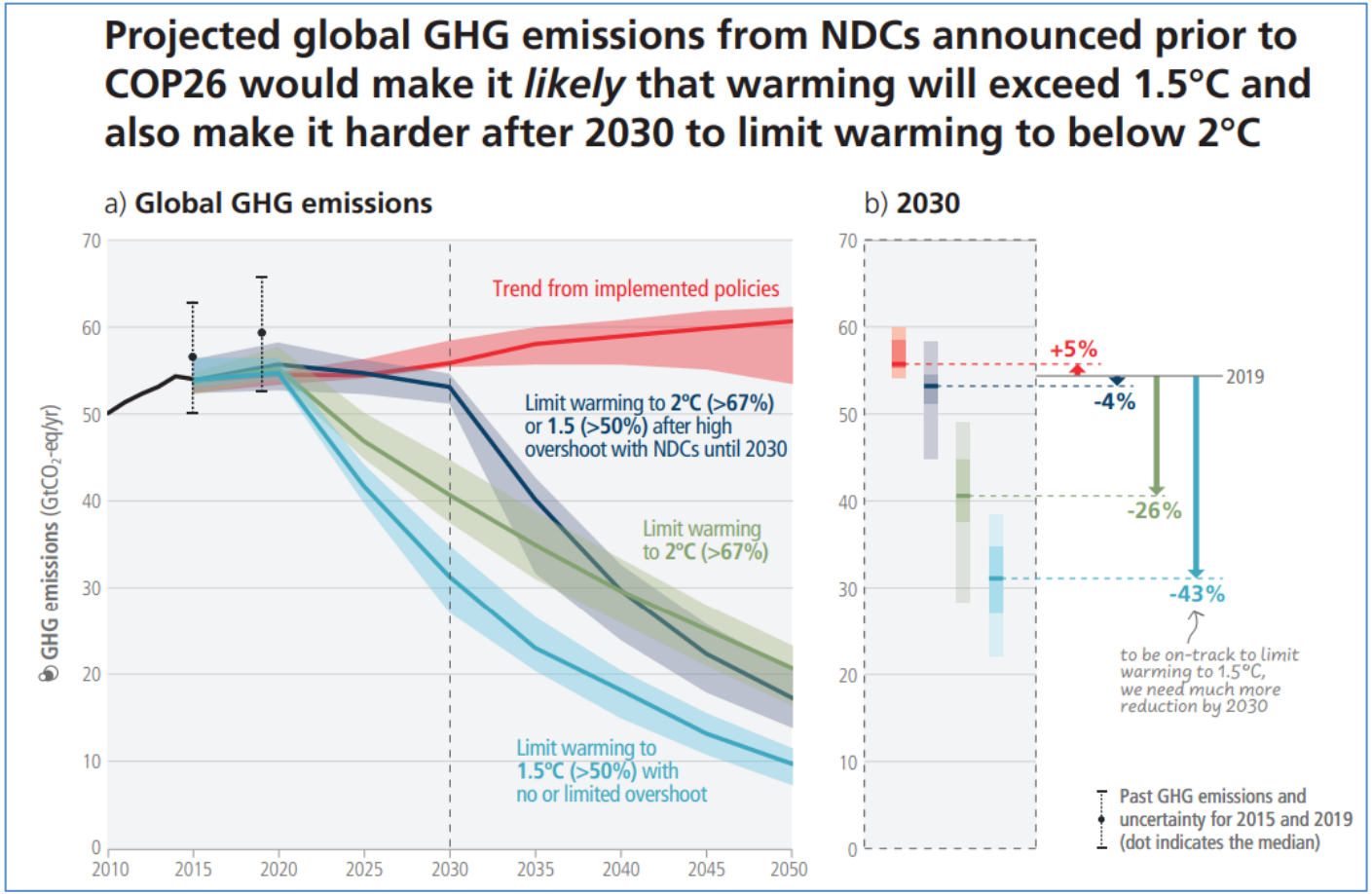




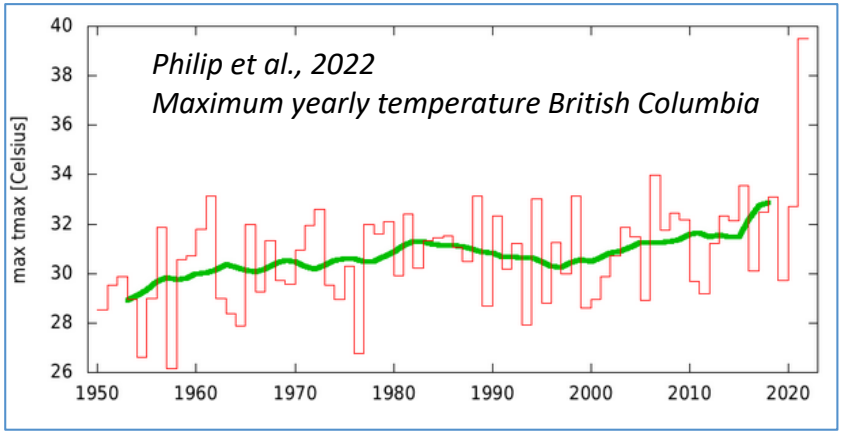


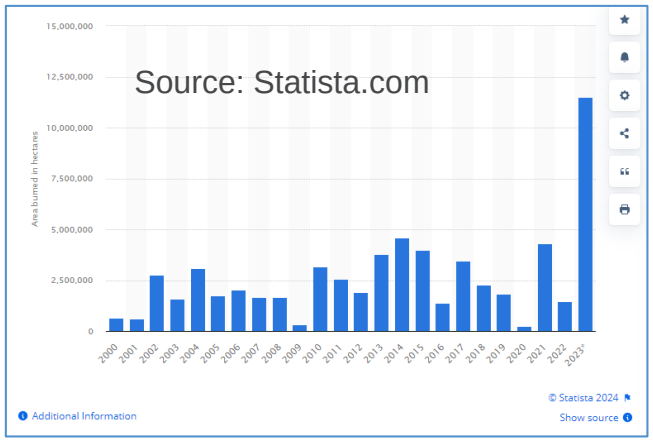
IPCC, AR6 WG1

Scenarios for 2050

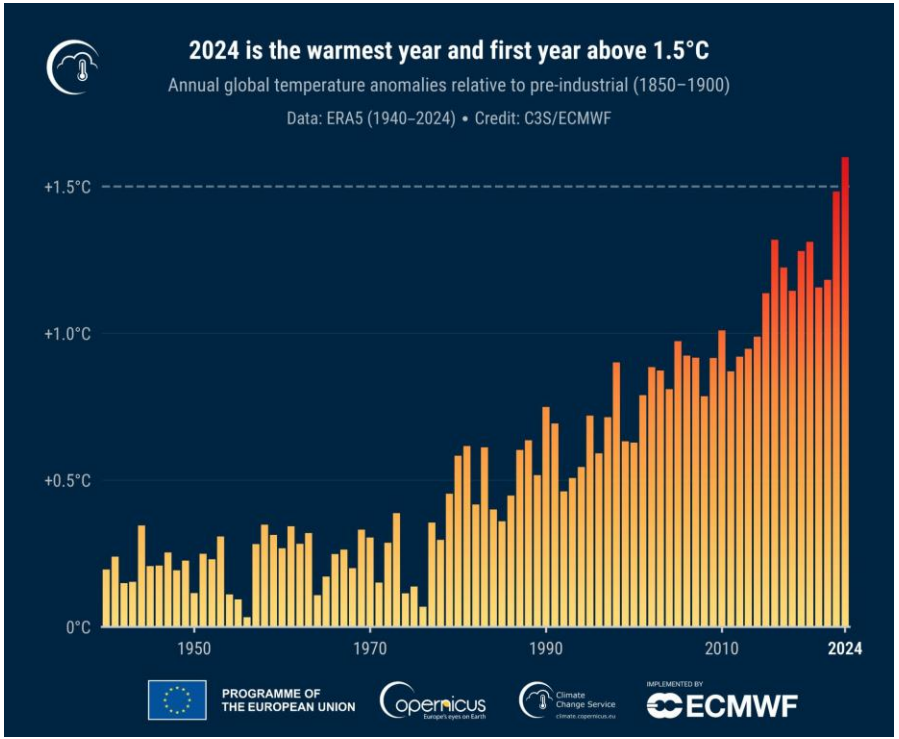


Since AR6, numerous unprecedented events to understand



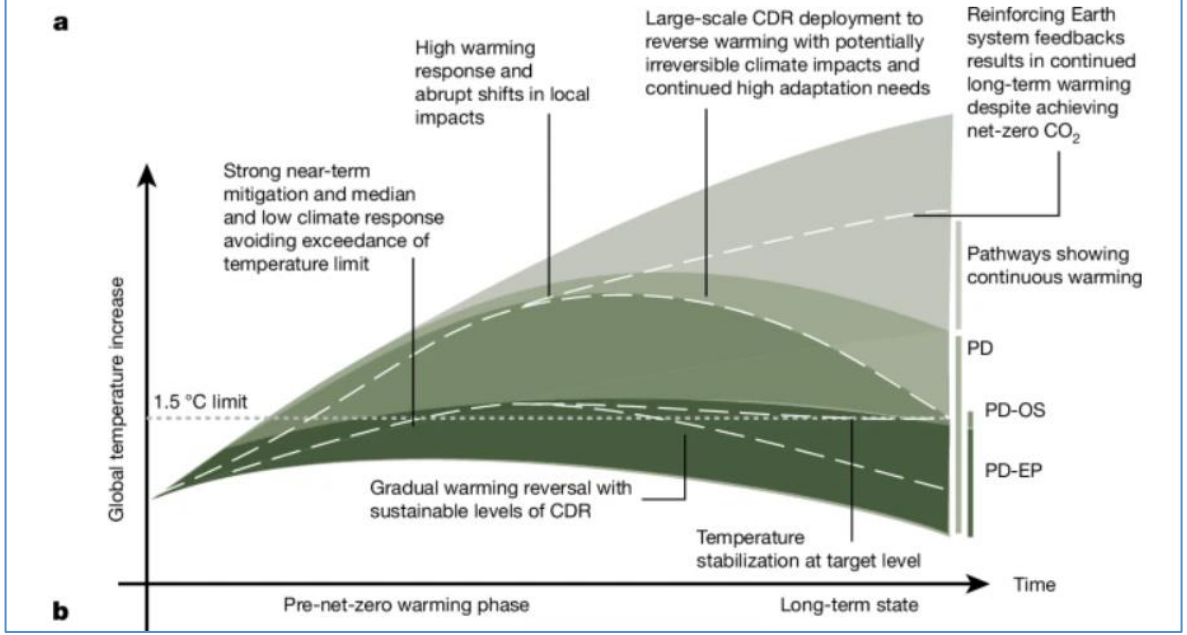


2023 Fires: Surfaces brûlées au Canada (ha)



Feasibility for an “overshoot” and consequences ?

Fig. 1: Illustrative climate outcomes under different conceptual categories of peak and decline pathways.

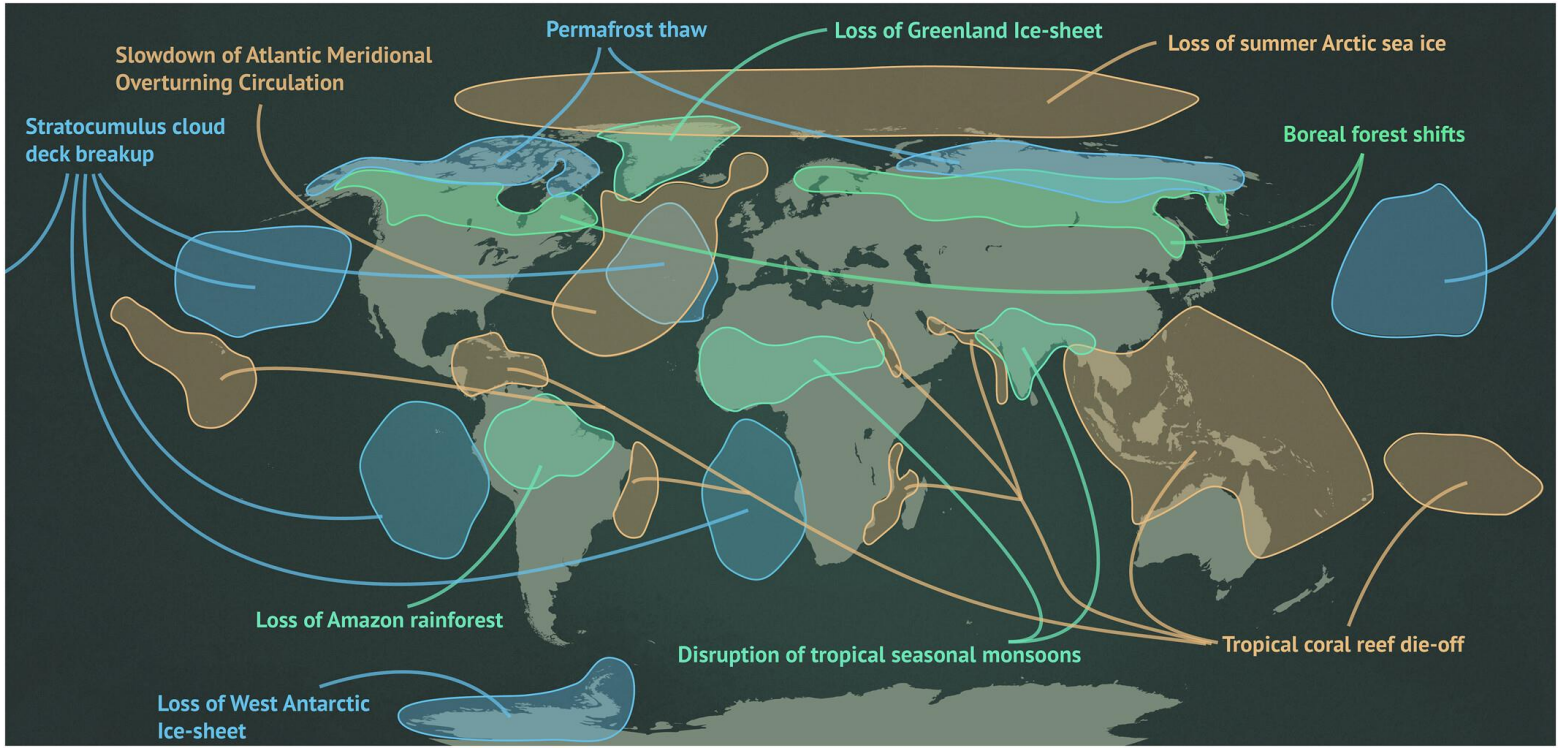


Schleussner et al., 2024 – « Overconfidence in climate overshoot »

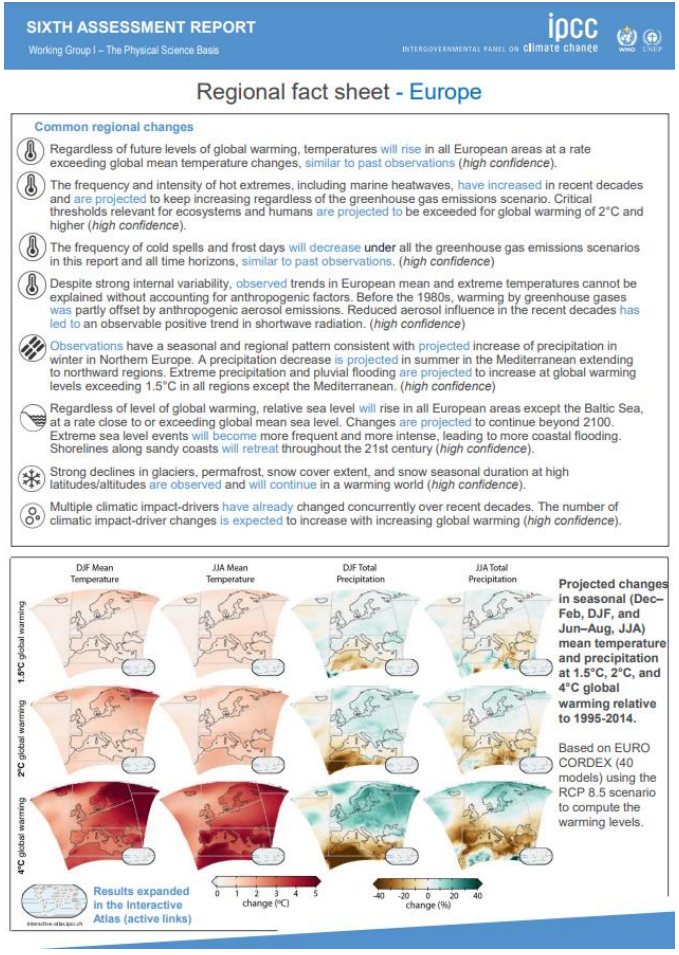
- Potentially « non collaborative » response of the Earth System to negative emissions
- Economic feasibility
- Irreversible consequences
- What would look like a « net negative » word

Potential abrupt changes and tipping points

Mechanisms and Impacts of Earth System Tipping elements, Wang et al., 2023



European case & Energy : IPCC fact sheets



https://www.ipcc.ch/report/ar6/wg1/resources/factsheets/

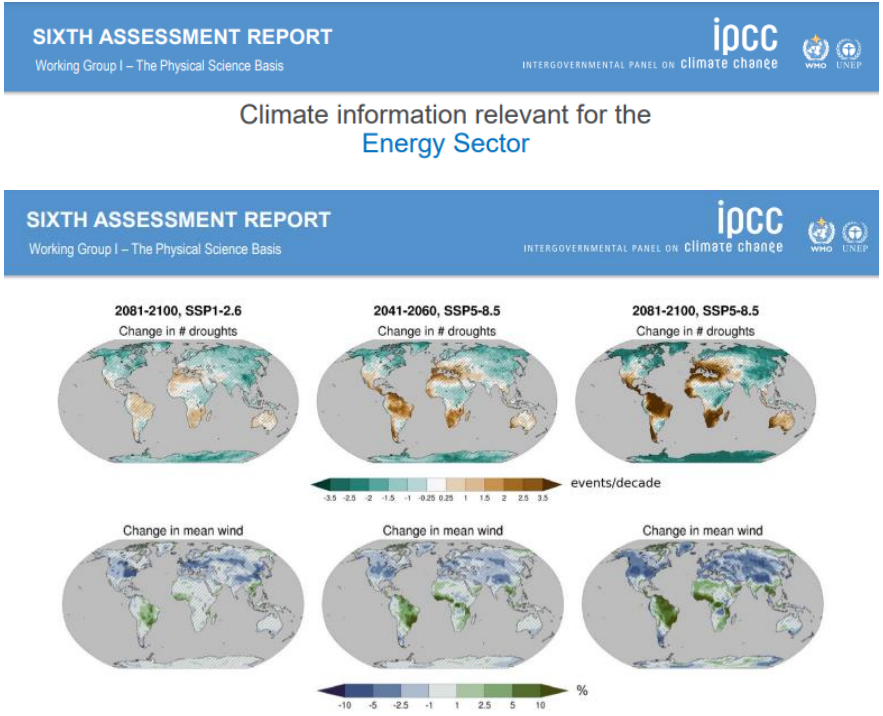
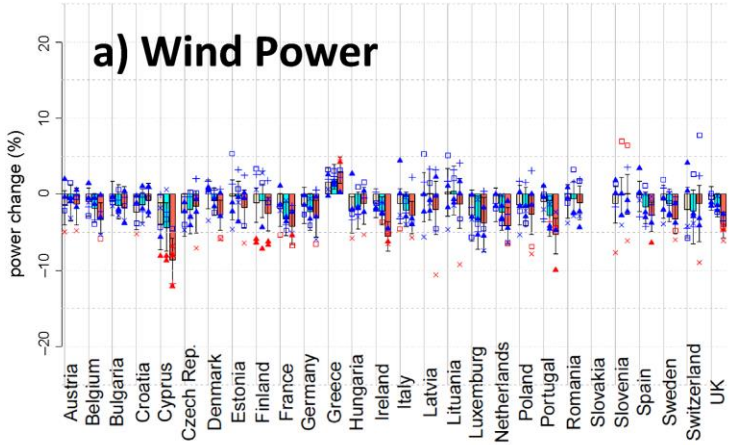
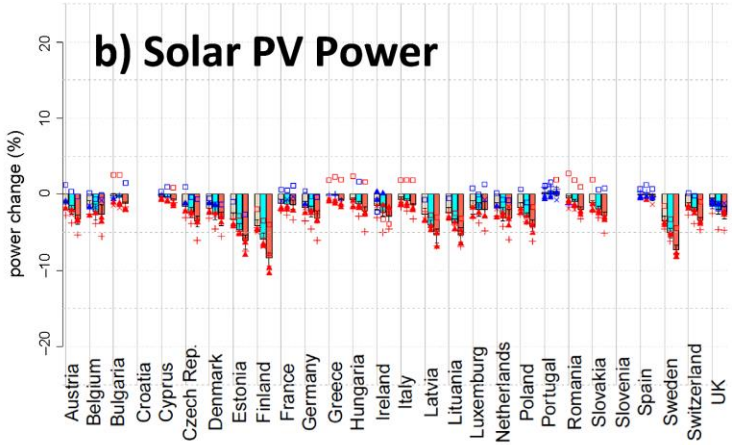
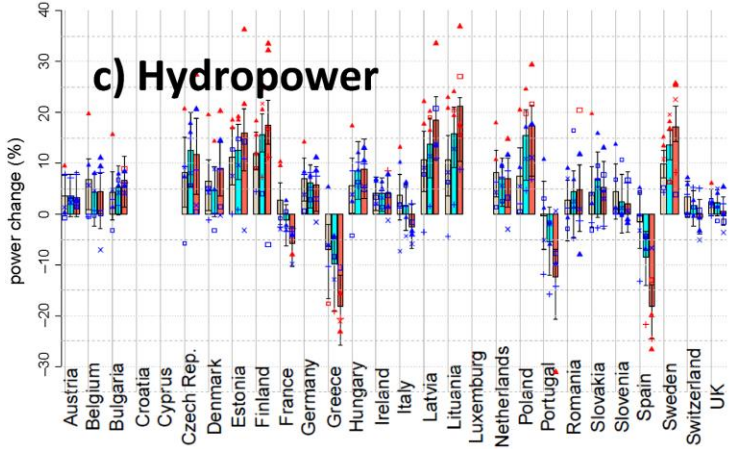


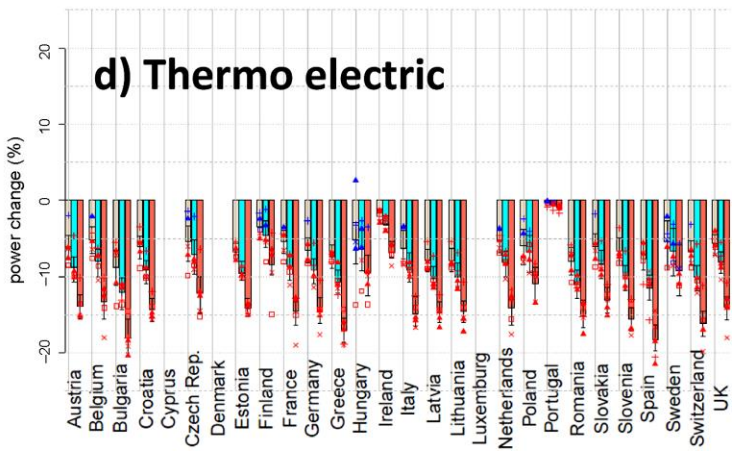
Figure 2: From Figure 12.4, the number of negative precipitation anomaly 4 events per decade using the 6-month Standardized Precipitation Index. For more information on the simple approach for confidence, please refer to the Cross-Chapter Box Atlas.1. See Annex VI for details of indices.

Changes to expect due to climate change for +1.5C, 2C, 3C









Tobin et al., 2018

Information pour l’énergie : Cas extrêmes à prévoir

Use of existing or « boosted » simulations to analyze worst case scenarios

https://doi.org/10.5194/egusphere-2023-2523

Abstract | Discussion | Metrics

07 Nov 2023

An extreme cold Central European winter such as 1963 is unlikely but still possible despite climate change

Sebastian Sippel, Clair Barnes, Camille Cadiou, Erich Fischer, Sarah Kew, Marlene Kretschmer, Sjoukje Philip, Theodore G. Shepherd, Jitendra Singh, Robert Vautard, and Pascal Yiou

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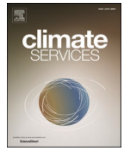

Original research article

How could 50 °C be reached in Paris: Analyzing the CMIP6 ensemble to design storylines for adaptation

Pascal Yiou [a,*], Robert Vautard [a], Yoann Robin [a], Nathalie de Noblet-Ducoudré [a], Fabio D'Andrea [b], Robin Noyelle [a]

[a] Laboratoire des Sciences du Climat et de l'Environnement, UMR8212 CEA-CNRS-UVSQ, IPSL & Université Paris-Saclay, 91191 Gif-sur-Yvette, France
[b] Laboratoire de Météorologie Dynamique, UMR CNRS-X-ENS, IPSL & Université PSL, 75005 Paris, France

The choices and actions implemented in this decade will have impacts now and for thousands of years

IPCC AR6 SYR

Toutes mes presentations disponibles à partir de: https://cloud.ipsl.fr/index.php/s/XbjHgTAMt2pxXt5

Photo: R. Vautard