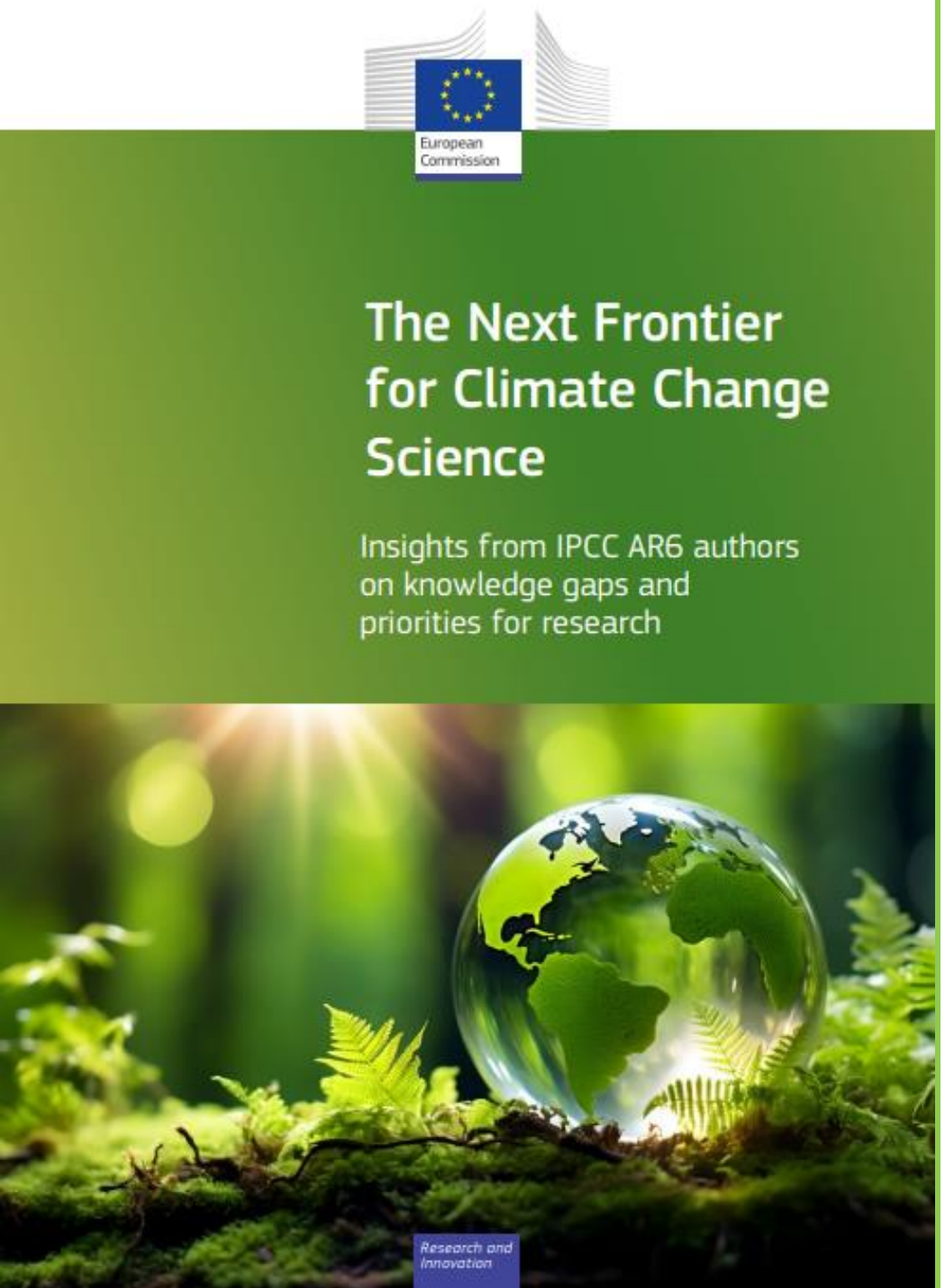


Building up the evidence base for guiding future work programmes

Gerhard Krinner

IGE Grenoble, CNRS

Most slides provided by:

Katarzyna Drabicka

Unit Climate & Planetary Boundaries

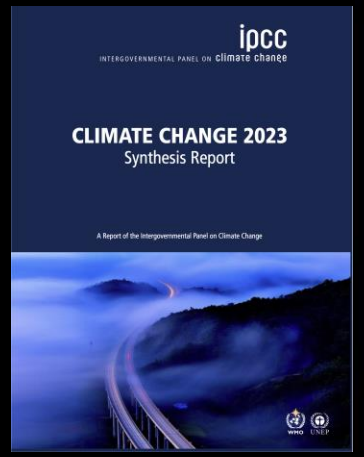
DG R&I

European Commission

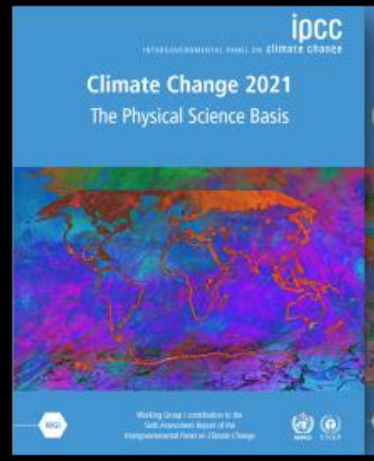
The WHY

IPCC AR6: Researchers have delivered

Synthesis Report

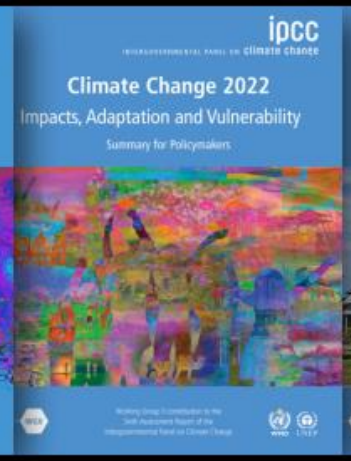


WGI



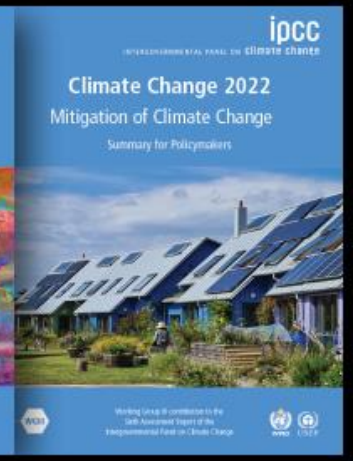
AR6 Climate Change 2021: The Physical Science Basis

WGII



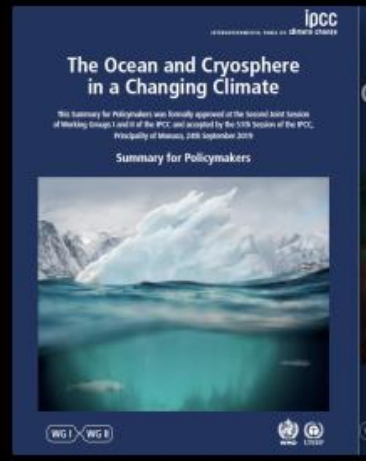
Climate Change 2022: Impacts, Adaptation and Vulnerability

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

Sixth Assessment Report | Synthesis Report

ipcc

European Commission

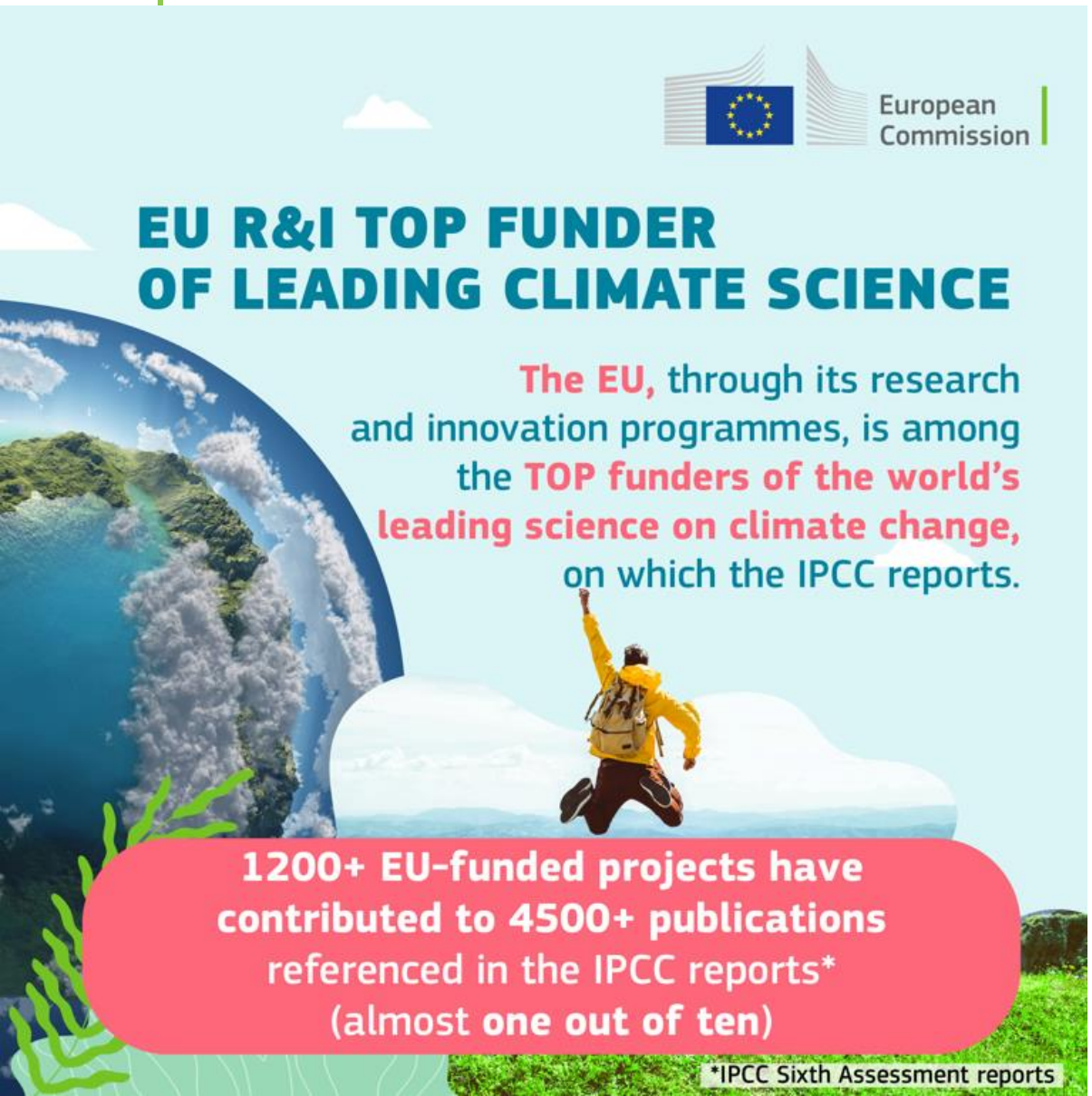
But what next for climate science?

HOW TO:

- Maximise the impact of EU-funded research
- Deliver actionable knowledge for the Green Deal & the Paris Agreement
- Build bridges across scientific domains
- Promote a more evidence-based approach to WP drafting
- …

European Commission

EU funding matters



The EU is a top funder of leading climate science:

- ✓ EU-funded research contributed to ~10% of publications cited in IPCC AR6
- ✓ EU is the 2nd most acknowledged funding source of research referenced in IPCC AR6 evidence base
- ✓ 75% of IPCC WG III scenarios come from European models

More details available here:

Contribution of the framework programmes to IPCC

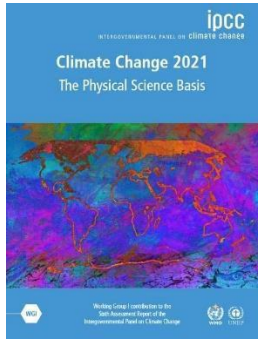
European Commission

The HOW

27 IPCC experts contracted to identify most pressing research gaps in climate science

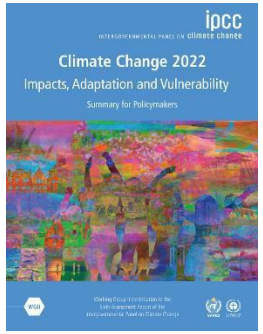
Legal base: HE CL5 WP 2021-2022 ➔ External expertise to advise on EU R&I policy

WGI SCIENCE



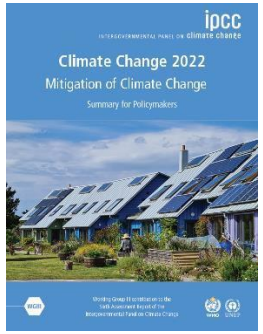
+14,000 papers ➔ 234 authors ➔ ~8 lead experts

WGII IMPACTS & ADAPTATION



+10,000 papers ➔ 330 authors ➔ ~8 lead experts

WGIII MITIGATION



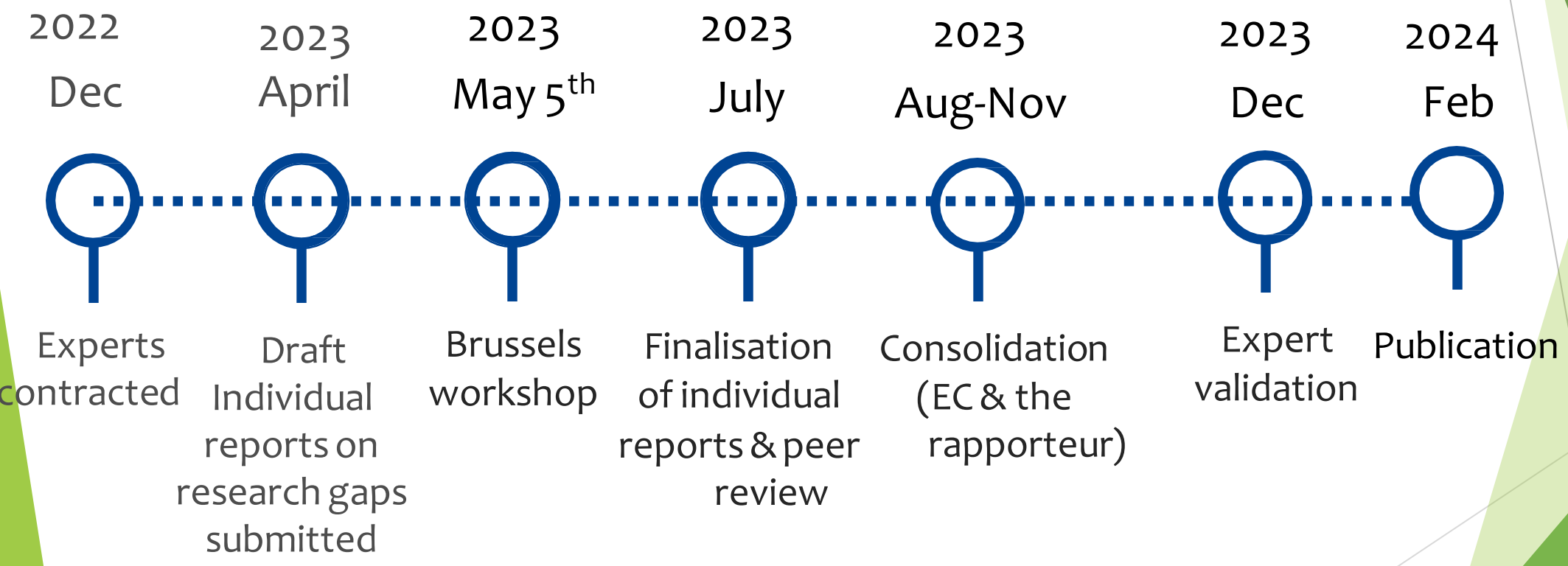
+18,000 papers ➔ 239 authors ➔ ~10 lead experts

+ 1 rapporteur

DG RTD IPCC Expert pool

European Commission

Timeline



European Commission

The OUTCOME

52 research gaps, 11 clusters

1: Earth system processes, climate feedbacks and climate sensitivity

2: Changes in the climate system, including abrupt and irreversible change

3: Risks and vulnerability across time and space

4: Adaptation: effectiveness, pathways and limits, losses and damages

5: Water, biodiversity, nature-based solutions and the coastal environment in a changing climate

6: Towards more coherence in climate policies: Integrating impacts-adaptation mitigation

7: Sectoral and systems transitions

8: Land Use, Agriculture and Carbon Dioxide Removal

9: Equity and just transitions

10: Accelerating climate action: levers and enablers

11: Climate intervention

A sample of research gap fiche

10.2 Understanding social dynamics, including tipping points, as drivers of climate action

☐ Earth system science ■ Impacts, risks and adaptation ■ Mitigation

The current pace of mitigation and adaptation is falling short of the transformational change needed now and, in this decade, to address climate change and its consequences. The barriers to climate action need to be identified through monitoring and evaluation of past measures/policies, together with the societal thresholds that can unlock rapid action. In the latest IPCC report, social movements are considered as a catalyst for social tipping points, which either positively unlock rapid social action or lead to system destabilisation. Empirical evidence shows that social tipping points can be triggered before tolerance thresholds are reached, yet much better understanding of these processes is needed.

We need to learn more about the relationships between adaptive capacity, social capital and social tipping points, both positive (e.g., transformational structural changes for fast decarbonisation and resilience) and negative (e.g., system destabilisation, social unrest, migration), the political economy, structural power issues, perceptions, and also climate justice and distributional aspects (including both costs and benefits of the transition). Migration decisions, for example, can be based on perceptions of environmental changes by local populations rather than on actual changes themselves. There is a need to better understand social perceptions and psychological aspects of climate change, as well as the role of education in closing information gaps and bringing motivation and societal readiness.

Future societal decisions are impossible to predict due to the deep uncertainty associated with social structures, the many interacting processes, abrupt changes in other fields, unintended consequences of certain policy decisions, and other factors. While the latest IPCC report has comprehensively assessed the feasibility of mitigation or adaptation options – societal dynamics, including social inertia, path dependency, disruptive change, user practices, actor constellations, and regulatory environment determine the plausibility of these measures being implemented and deserve more in-depth exploration.

Policy relevance

Investigating the activation of social dynamics towards net zero will help to design effective policies for low carbon climate resilient transformation. It will also expedite the pace of climate action by providing insights on how to trigger social mobilisation and pro-environmental behaviour.

Flag

Gender

SSH

Related fiche

3.6, 4.3, 9.2

Structure:

- Each research gap is a 1-pager
- Two main sections
  - Description
  - Policy relevance
- Category (IPCC WG I, II, III)
- Flags for cross-cutting issues:
  - International cooperation
  - Gender
  - Ecosystems & Biodiversity
  - SSH
  - Digitalisation
- Links to other fiches

Some highlights

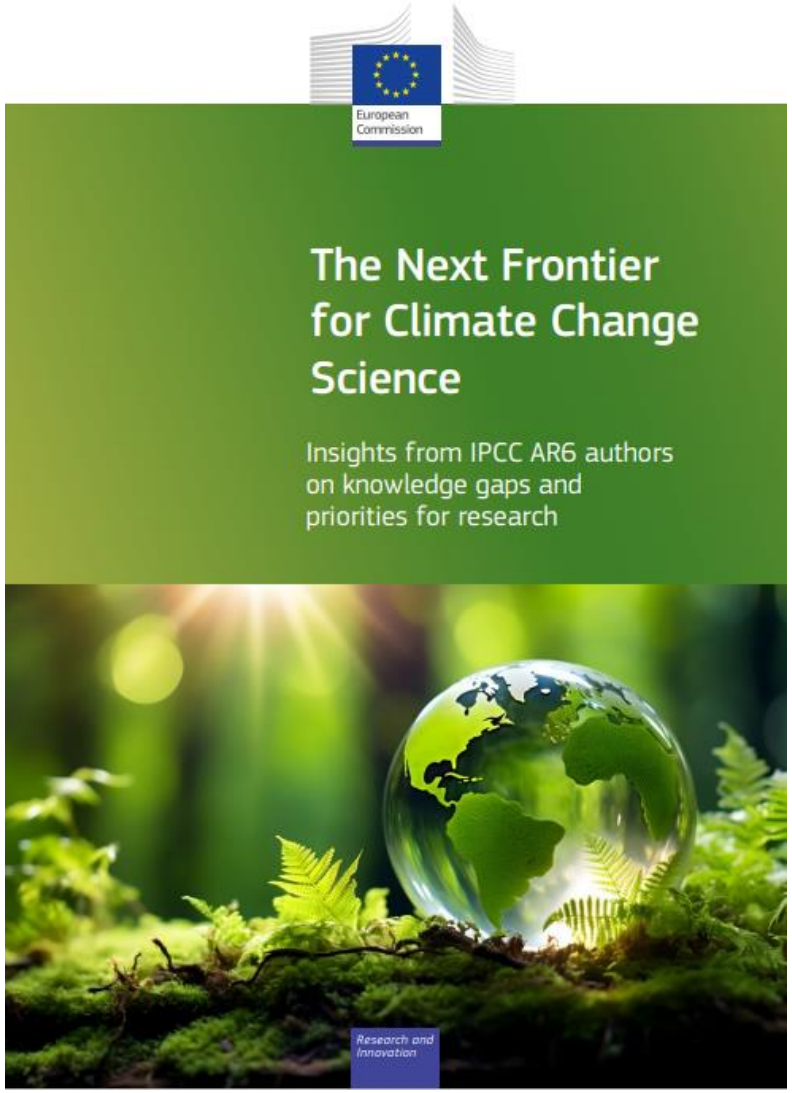
- Adaptation and climate resilient development very prominent
- Equity & justice as key enablers of climate action
- Bridging natural and social sciences
- Integrating mitigation & adaptation
- Understanding overshoot
- Not only for D1 CL5 ➔ some research gaps highly relevant for other destinations/clusters
- Good news: some topics already covered in 2023-24 WP

Some selected identified research gaps

- Near-surface fluxes of heat, moisture and momentum
  - Relationship between SST and MAT
- Assessing feedback mechanisms in the climate system and their dependence on climate state
- Understanding how the Earth system components will respond to a state of net zero emissions
- Modeling atmospheric circulation and precipitation changes
  - Polar amplification; high-resolution modelling?
- AMOC: proxies, monitoring, modelling
- Abrupt, irreversible, and committed changes in the cryosphere

Some selected identified research gaps

- Extending high-resolution proxy reconstructions with a focus on the mid-Holocene
- Advancing knowledge on risks from overshooting 1.5°C and options to bring temperatures back down
- Understanding adaptation effectiveness and limits at different degrees of warming
- Attributing climate impacts in a climate justice context
- Improving integrated assessment models to represent different dimensions of justice and equity
- Communicating and translating climate science to policymakers and general public
- Assessing interdisciplinary research on solar radiation modification



Investing in climate science is investing in our future by securing the necessary knowledge to shape the climate action that is required.

This report, building on state-of-art scientific expertise, is invaluable for maximising the impact of EU-funded R&I and for generating the evidence-base for guiding the implementation of the European Green Deal.

Marc Lemaître,
Director-General for Research and Innovation (DG RTD)

European Commission

Thank you for your attention!