

45th Session of the WCRP Joint Scientific Committee (JSC)

27-30 May 2024

DEADLINE: 1 May

Instructions

Overarching content/goal: *To provide an update on progress made during the last year, as well as your future plans, and highlight any aspects that you want to bring to the attention of the JSC.*

- *The length of the report should be kept to around 4 pages if possible (appendices and links can of course be used).*
- *Include the topics indicated below.*
- *Work with the WCRP secretariat responsible for your activity, in the preparation of the report and/or presentation.*

Report to the WCRP Joint Scientific Committee

Research on Climate Intervention (R-CI)

1. Revised one pager on the R-CI LHA

WCRP's Lighthouse Activity on Climate Intervention Research

The World Climate Research Programme (WCRP) has launched a Lighthouse Activity (LHA) on Climate Intervention Research. As current emissions reduction commitments are not sufficient to meet the Paris Agreements' temperature goals, and global mean warming is likely to exceed 1.5°C above the pre-industrial level in the 2030s, overshoot narratives and climate interventions are increasingly being brought up as options to complement emissions reduction efforts and reduce or reverse warming. Climate interventions (CI) refer to deliberate large-scale manipulations of the planetary environment with the aim to counteract anthropogenic climate change. Following this definition, CI includes large-scale Carbon Dioxide Removal (CDR; also known as Greenhouse Gas Removal, or Negative Emissions Technologies) and Solar Radiation Modification (SRM; also known as Solar Reflection Modification, Albedo Modification, or Radiative Forcing Management).

CDR describes human activities that aim to intervene in the Earth's carbon cycle by removing atmospheric carbon dioxide (CO₂), through the enhancement of existing, or creation of new carbon sinks relying on biological, geochemical, or chemical removal processes, or a combination thereof.

Recent scientific assessments based on future scenario designs indicate that holding anthropogenic warming at Paris Agreement compatible levels is implausible without the implementation of CDR at scale. Furthermore, ambitious mitigation scenarios project the world to require net-negative CO₂ emissions by mid-century to compensate for a carbon budget overshoot. Such a deliberate reduction in atmospheric CO₂, through global net-negative CO₂ emissions warrants the consideration of CDR implementations as a climate intervention activity.

However, there are significant uncertainties concerning the efficacy and side-effects of CDR implementation at scale, the additionality of multiple CDR implementations and the Earth system's response to net-negative emissions.

SRM approaches aim to directly impact the Earth's net radiation balance by either reflecting a percentage of incoming solar radiation back to space or reducing the amount of infrared radiation retained by Earth.

SRM is increasingly proposed as a complement to long-term emissions reductions and adaptation since it is not intended to reduce greenhouse gas (GHG) emissions and does not address the causes of anthropogenic climate change. Therefore, other environmental harms from increased concentrations of CO₂ and other GHGs (e.g., ocean acidification) would continue even with SRM implementation.

While SRM might rapidly reduce global warming, the extent to which SRM could reduce climate change impacts, risks, or hazards has not been robustly established in the scientific literature, nor has the extent to which SRM might introduce new risks to people and ecosystems at both global and regional scales.

In addition to environmental risks, there are substantial technical, societal, political, ethical, and economic challenges associated with the implementation of proposed CDR and SRM approaches at the scale needed to slow or halt global warming.

The WCRP LHA on climate intervention research will explore potential future scenarios that include CI implementations and provide an objective overview of expected Earth system risks and opportunities, remaining key uncertainties, and associated knowledge gaps based on the rapidly evolving CI scene. By providing an unbiased and objective perspective on proposed climate interventions and identifying and promoting best practices for research, we aim to foster rigorous, transparent, and globally inclusive research to further our understanding of CI and its implications. Only by advancing our understanding of the Earth system's responses to CI, will we be able to provide the basis for well-informed climate policies, potential future CI governance, including litigation.

2. Interim Scientific Steering Group (SSG) membership status

Nadine	Mengis	CDR	Co-Chair	GEOMAR	Germany
Daniele	Visioni	SRM	Co-Chair	Cornell University	USA
Ines	Camilloni	SRM	Member	Univ. Buenos Aires	Argentina
Romaric	Odoulami	SRM	Member	African Climate and Development Institute	South Africa
Nana	Klutse	SRM	Member	University of Ghana	Ghana
Chris	Lennard	SRM	Member	Univ. Of Cape Town	South Africa
Karen	Rosenlof	SRM	Member	NOAA	USA
Jim	Haywood	SRM	Member	Exeter	UK
Andrew	Lenton	CDR	Member	CSIRO and CDRMIP	Australia
Lisa	Miller	CDR	Member	SOLAS	Canada
David	Ho	CDR	Member	SOEST	USA
Peter	Lawrence	CDR	Member	UCAR	USA
Roland	Seferian	CDR	Member	CNRM	France
Julia	Pongratz	CDR	Member	Univ. Munich and lead of CDRterra	Germany
Opha Pauline	Dube	Policy, Governance and Ethics	Member	University of Botswana	Botswana
Miranda	Boettcher	Policy, Governance and Ethics	Member	SWP, Berlin	Germany
Christine	Merk	Policy, Governance and Ethics		Institute for the World Economy, Kiel	Germany

3. Plan for 2024-2025

- 1- Oversee and assist with submission of research gaps papers on SRM and CDR (submission planned for June-July 2024)
- 2- Outreach with scientific community (AGU Townhall in December 2024, others) to include and foster exchange of the global community with the aim to build a globally-inclusive community of CI researchers
- 3- Identification of partners for collaboration (both inside WCRP and outside)
- 4- Collaboration with UNEP in light of UNEA-7 meeting in 2025
- 5- Review of best practices in CI research / proposition of best practices and standards in CI research
- 6- Identify resources needed for best-practice research of Climate Intervention