



Frequently Asked Questions

UNEP-WMO Joint Consultative Workshop on Solar Radiation Modification: A Global Science-Policy Dialogue

19-20 May 2025, Geneva, Switzerland

What is Solar Radiation Modification?

Solar Radiation Modification (SRM) encompasses a suite of technologies designed to cool the planet by enhancing the Earth's ability to reflect sunlight. The most developed of these is stratospheric aerosol injection, which involves releasing aerosols into the stratosphere to reflect a small fraction of sunlight back into space. The technique mirrors the natural phenomenon that occurs after volcanic eruptions, when aerosols are thrust into the stratosphere, resulting in measurable cooling.

While there is a growing body of literature and advanced modelling on the topic, which has been developing for many years, there is very little evidence or research on the risks and impacts of SRM.

Why is the United Nations engaging in this topic, and why are we concerned?

Earth's climate and environmental systems are shaped by a complex interplay of natural and human-induced forces. Solar Radiation Modification (SRM), as a potential means to rapidly cool the planet, could trigger unforeseen changes that may jeopardize both human health and natural ecosystems. The risks of SRM are largely unknown, and its operational deployment could lead to a cascade of unintended effects. Given the limited scientific understanding and uncertainty surrounding these technologies, particularly on the environmental and social impacts, the United Nations and UNEP remain concerned about the viability and potential risks of SRM and strongly cautions against such measures as an alternative to emissions abatement.

While SRM technologies remain largely speculative (theoretical) and full-scale deployment is not anticipated in the immediate future, research is advancing, technologies and schemes are being discussed, and outdoor experiments are being pursued. As these technologies gain momentum as a potential "last resort" or emergency option, UNEP stresses the need for caution. As part of its mandate to keep the environment under review, UNEP must carefully examine and monitor technologies that may impact or affect aspects of the environment.

Why are UNEP and WMO organizing a consultative workshop on SRM?

In 2023, UNEP released the [One Atmosphere](#) report, highlighting the complexity of SRM and the lack of international scientific consensus on its risks, impacts and potential benefits. Diverging views persist not only within the scientific community but also across sectors and geographies. The Independent Expert Review subsequently recommended four priority actions, chief among them the establishment of a globally inclusive, transparent and equitable scientific review process that incorporates diverse perspectives—especially those from developing countries—and considers the full spectrum of natural and social science on SRM including its technological, financial, and governance dimensions.

As the urgency of addressing climate change intensifies, SRM technologies are being placed under growing scrutiny and debate, with sharply divergent views and understandings on their potential to benefit, harm, or exacerbate challenges. Some are calling for expanded research and consultation to better understand SRM's impacts, while others are calling for a moratorium on deployment and large-scale outdoor experiments.

Over the past 24 months, there has been a sharp increase in journal articles on SRM, covering a wide range of topics. These predominantly focus on projected climate impacts but also explore its potential effects on food security, regional hydrological cycles, governance, societal reactions, and technical feasibility. The breadth of these issues, coupled with the uncertainty surrounding these emerging technologies, underscores the need for inclusive knowledge sharing, international cooperation, and robust science-policy discussions.

Consultative workshops and science-policy dialogues are efficient mechanisms to update scientific information and promote collective inquiry whilst facilitating constructive debate on contested subject areas. This approach fosters a consultative environment, facilitating the exchange of knowledge, expertise, and concerns about SRM. It aims to inform and develop key questions that need addressing, with a particular emphasis on engaging informed perspectives from developing countries. The goal is to provide a foundation for future discussions and decision-making, supporting inclusive, transparent dialogue on the issue.

What is expected from the workshop on SRM?

The main objectives of the workshop are to provide space and time for international dialogue, knowledge sharing and exchange on SRM with a view to helping build capacity enabling more effective and inclusive engagement on the topic. The event will comprise:

Knowledge Sharing in regards of the status of the science, advances in research and development of SRM technologies, impact research, predictive capabilities of potential global and regional near-term risks, governance literature and perceptions and societal considerations. (Day 1)

Science-Policy Dialogue on the key questions that need to be answered regarding these controversial technologies including ethical and legal issues and governance considerations. (Day 2)

What is the format of the workshop?

The workshop will be hybrid, and open to all Member States, experts as well as representatives of UNEP's Major Groups and Stakeholders (MGS) by invitation, due to resource limitations, bringing diverse perspectives and specialized knowledge to the discussions. The workshop will take place entirely in plenary, allowing for collective dialogue, shared insights, and a dynamic exchange of ideas among all participants. The outcomes of the workshop will be made publicly available.

Each session will kick off with a round of rapid-fire interventions (responding to the overarching question followed by a structured debate / discussion. While it may be possible to incorporate pre-screened interventions from the audience, it is proposed that we avoid an explicit Q&A given the number of participants and that the first day is about knowledge sharing. The framing questions for Day two will be structured around three sessions that include representatives from both the science and policy community and be overseen by a single professional facilitator.

What will happen next?

The consultative workshop and science-policy dialogue will culminate in a Summary Report, which could serve as the foundation for an update to UNEP's One Atmosphere report and its associated Issues Note. This will ensure the event remains science-focused, with a practical emphasis, aiming to establish:

- a) An update on key research and scientific advancements shared with Member States since May 2023 on SRM.
- b) An assessment of critical knowledge gaps and the potential risks, impacts, benefits and unintended consequences of experimentation and deployment.
- c) A preliminary mapping /shared understanding of key questions that need to be answered about the technologies, their status and areas of concern, including environmental and social aspects, governance, what constitutes deployment among other considerations.

What prior international initiatives have been undertaken in SRM?

Various bodies have also examined the issue of solar radiation modification technologies. In January 2022, the Montreal Protocol's Scientific Assessment Panel (SAP) first assessed the impact of Stratospheric Aerosol Injection (SAI) on stratospheric ozone. It warned of unintended consequences, including disruptions to stratospheric temperatures, circulation, and ozone production. A year later, the UN Human Rights Council's Advisory Committee flagged risks to human rights from climate-altering interventions like SAI, citing significant uncertainties.

The Intergovernmental Panel on Climate Change (IPCC) touched on SAI in its Sixth Assessment Report (AR6), acknowledging critical knowledge gaps but excluding it from the climate solutions mix. Despite calls for more attention, particularly regarding its effects on the water cycle, SAI will not be a focus in the upcoming AR7. Some Member States have called for a clearer distinction between SAI and carbon sequestration in the broader climate intervention debate.

In July 2024, UNEP's [Navigating New Horizons](#) report identified SRM deployment as a potential weak "signal of change," underscoring the vast gaps in understanding its environmental and socio-economic impacts.

In December 2024, the European Commission's Scientific Advice Mechanism Group released a report offering recommendations on SRM research governance, addressing both its risks and opportunities.

The World Climate Research Programme (WCRP), co-sponsored by the World Meteorological Organization (WMO), the International Science Council (ISC), and the Intergovernmental Oceanographic Commission (IOC) of UNESCO, has initiated a [Lighthouse Activity](#) focusing on Climate Intervention Research. This initiative aims to advance scientific understanding of the physical, biogeochemical, and societal dimensions of two climate intervention (CI) approaches, Solar Radiation Modification (SRM) and Carbon Dioxide Removal (CDR). The primary objective is to explore future scenarios involving climate interventions, providing an unbiased assessment of associated Earth system risks, opportunities, uncertainties, and knowledge gaps. A perspective paper on CI research was published in December 2024, followed by a comprehensive [assessment of SRM research gaps](#) in early 2025. WCRP continues to collaborate with the IPCC, providing critical insights for upcoming assessments.

Are there any existing international treaties or UN resolutions that address SRM?

Parties to the Convention on Biological Diversity (CBD) issued non-binding decisions regarding geoengineering specifically, Decision X/33 (2010) which calls for Parties and other Governments to ensure that 'no climate-related geoengineering activities that may affect biodiversity take place' in the absence of an adequate scientific basis, impact assessment and a global mechanism for governance. Further, Decision XIII/14 (2014) noted that "more transdisciplinary and sharing of knowledge among appropriate institutions is needed in order to better understand the impacts of climate-related geoengineering on biodiversity and ecosystem functions and services, socio-economic, cultural and ethical issues and regulatory options".

At the thirty fifth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer considered and took decisions XXXV/3 and XXXV/4 (2023) focused on assessing the potential effects of SRM on the Ozone layer, and on one SRM technologies in particular, namely stratospheric aerosol injection (SAI) – noting the limited scientific information available about the risks posed by this technology to the ozone layer. It also called for more scientific understanding about the potential impacts of this technology on the ozone layer.

In February 2024, at the sixth session of the UN Environment Assembly (UNEA-6), Member States were unable to agree to a resolution that would launch an independent scientific review of SRM, with many countries reaffirming their positions on the complex and contentious nature of SRM research.

The International Law Commission has also considered SRM in the context of discussing Intentional large-scale modification of the atmosphere and highlights the need to ensure prudence and caution while conducting activities aimed at intentional large-scale modification of the atmosphere, subject to any applicable rules of international law, including those relating to environmental impact assessment.