Toward an International Geoengineering Agreement: The Promises (and Pitfalls) of Negotiating a Convention on Global Climate Interventions

Aaron Strong

Introduction: Perceived Need for Geoengineering

Article 2 of the UN Framework Convention on Climate Change (UNFCC) states:

"[T]he ultimate objective of this Convention ... is to achieve ... stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

(UNFCC, 1992)

Two points are of immediate note. The first is textual: while the directly stated goal is to stabilize atmospheric greenhouse gas (GHG) concentrations, the desired policy outcome is to prevent "dangerous anthropogenic interference with the climate system," and the intention of the international community can be read generally as a desire to avoid the negative impacts of climate change, although the stated approach does not leave room for mitigation of climate change through reduced black carbon emissions or other non-greenhouse gas climate forcing agents. The second is factual: 18 years after the Convention entered into force, the international community has failed both to stabilize GHG concentrations and to prevent dangerous anthropogenic interference with the climate system. This point has been implicitly driven home at the 16th Conference of the Parties, which took place in December 2010; the Cancun Agreement states that "scaled-up overall mitigation efforts that allow for the achievement of desired stabilization levels are necessary" (Cancun Agreement, 2010). The point is: current mitigation actions, and the current pledges for emissions cuts that have been put forward, will not achieve the ultimate objective of the Convention.

Combining these two observations, it’s clear there has been increasing interest in investigating how to prevent dangerous anthropogenic interference with the climate system other than by mitigating anthropogenic greenhouse gas emissions. Over the past decade, and especially over the last three years, there has been increasing interest from scientists, policy-makers, and academics in the idea of preventing dangerous anthropogenic interference with the climate system through direct intervention in the climate system, an idea generally referred to as "geoengineering" the climate.1 The Royal Society (2009) defines geoengineering as "the deliberate large-scale manipulation of the planet’s environment to counteract...

1 I use the term ‘geoengineering’ rather than ‘geo-engineering’ as the former is coming into more frequent usage. Furthermore, I use the terms ‘geoengineering’ and ‘climate intervention’ relatively interchangeably.
Toward an International Geoengineering Agreement

climate change\(^2\) (Shepherd, 2009). This definition is functionally usable in a
descriptive (although perhaps not a regulatory) context, as it captures what I
propose as the three defining characteristics of a geoengineering idea: a)\nintentionality, b) the normative goal of counteracting climate change, and c) large
scale.

The general idea behind geoengineering is that if humanity has unintentionally
altered the climate since the industrial revolution by increasing the concentration of
carbon dioxide, methane, nitrous oxide, and other heat-trapping gases in the
atmosphere, then humanity ought to be able to intentionally alter this system at a
global scale so as to prevent global warming and the impacts of climate change
associated with such warming.

The idea of geoengineering is not new. Both the United States and the Soviet Union
engaged in active weather modification research during the early years of the Cold
War, and the application of weather modification techniques for civilian use is a
relatively common phenomenon today (employed for the Beijing Olympics, and by
Israeli scientists, for example). As early as 1968, the US President’s Science Advisory
Committee recommended investigating the possibility of using geoengineering as a
response to rising atmospheric CO\(_2\) concentrations (Rayner, 2011). One of the
earliest academic proposals for the application of geoengineering to address “the
CO\(_2\) problem” was that advanced by Cesare Marchetti, an atmospheric physicist at
the International Institute for Applied Systems Analysis, in Austria, in 1977. Marchetti suggested that the “disposal” of industrially produced carbon dioxide
could be accomplished on a global scale by injecting carbon dioxide into ocean
water in areas where thermohaline convection carries surface water to the deep
ocean. This technique, it was suggested, would transfer the carbon dioxide into the
depths of the ocean, where it would not be exchanged with the atmosphere.
Marchetti argued that this proposal would have “sufficient capacity to deal with all
the CO\(_2\) produced in Europe even in the year 2100” (Marchetti, 1977).

typology of geoengineering

Since Marchetti’s time, academic research scientists, as well as entrepreneurial
interests, have proposed numerous geoengineering schemes; it is necessary briefly
to review these here. While a thorough description of these techniques is beyond
the scope of this paper (please see Shepherd, 2009), I will briefly present the most
commonly used typological framework for categorizing the proposals, and will
present slightly more detailed descriptions of the two most prominently referenced
proposals in the literature, ocean iron fertilization and sulfur aerosol injection.
Broadly, the various proposals for geoengineering to address climate change are
grouped into two categories: carbon dioxide removal (CDR) and solar radiation
management (SRM) (Shepherd, 2009).

CDR techniques seek to alter the global carbon cycle by manipulating natural
biological, geophysical, and chemical processes, on land or in the oceans, to remove
carbon dioxide from the atmosphere. Biological methods generally aim to stimulate
natural biological production to increase rates of photosynthesis in such a manner
as to prevent the fixed carbon from being remineralized and re-exchanged with the
atmosphere. Thus, on land, large reforestation projects may be considered
geoengineering. Perhaps the best known of the CDR techniques is ocean iron
fertilization, which proposes to sequester carbon in the deep oceans through the
constant application of FeSO\(_4\) to ocean areas in which iron is a limiting nutrient. The
idea is that the addition of iron would stimulate a bloom of diatoms, which would
(through photosynthesis) draw down carbon dioxide from the atmosphere and then
sink, exporting carbon in their bodies from the surface to the oceans. Other methods
for stimulating surface productivity, such as enhanced upwelling using wave-powered
pumps (Maruyama et al., 2004), have also been put forward. Physical
and chemical techniques, such as enhanced weathering or altering the meridional
overturning circulation, have not received as much attention as biological methods.

From a governance perspective, the question of whether the burying of recalcitrant
carbon in the form of “biochar” (aka charcoal) in soils on a large scale should be
considered a form of geoengineering is an active topic of debate (“Climate Change
Techno-Fixes,” side event at UNFCCC COP16 in Cancun, personal observation),
though it clearly fits most general definitions of geoengineering if enacted on a
large enough scale. Where enhanced soil carbon storage through agricultural
management practices falls on this continuum is not fully clear, and few “hard lines”
seem to exist in the attempt to define what is and what is not geoengineering.

SRM techniques do not address the biogeochemical side of the equation, but rather
the radiative forcing side. As such, these techniques seek to address climate change
by mitigating “global warming” rather than carbon dioxide emissions. Either by
increasing the reflectivity of the Earth’s atmosphere or the Earth’s surface, and thus
increasing the albedo effect, or by reducing solar radiation that is absorbed by the
surface by enhancing absorption of radiation in the atmosphere, SRM techniques
seek to reduce planetary warming despite increasing concentrations of anthropogenic
greenhouse gases in the atmosphere. These proposals range from sending a reflective mirror into orbit to seeding clouds to increase cloud cover and
enhance their albedo effect, as well as from covering deserts with white sheets to
painting more urban roofs white (Connor, 2009).

The SRM technique that has garnered the most attention in the literature is the
injection of sulfur dioxide into the stratosphere, where it would oxidize to create
sulfate aerosol particles that are the right size to scatter solar radiation, thus
reducing the incident radiative forcing on the Earth’s surface. Scientists have
observed that volcanic eruptions emit large quantities of sulfate aerosol into the

\(^2\) Part of the difficulty with geoengineering governance is defining what constitutes mitigation and what constitutes geoengineering. Thus, I present this conception as an analysis as to why interest in the idea has increased, but not as a formal definition.
upper atmosphere and that these aerosolized particles have led to global cooling events, most notably that which followed 1991 eruption of Mount Pinatubo in the Philippines. The geengineering form of this proposal is to directly inject sulfur dioxide into the upper atmosphere at a concentration sufficient to mimic the cooling effects of a volcanic eruption. As such, this proposal is sometimes referred to as “man-made volcanic eruption.”

There is a final part of the geengineering typology that is relevant from a governance perspective, which is the degree of “encapsulation.” Proposed by Steve Rayner (2011), this typological framework distinguishes geengineering techniques on the basis of their potential downstream effects. Painting roofs white would be considered an encapsulated form of geengineering, while ocean iron fertilization, because it is conducted in unbounded oceanic space, would not. While this distinction may at times be blurry, it is necessary when considering potential legal issues related to trans-boundary or global-scale impacts of geengineering actions.

Reasons for Caution and Concern

The current and future impacts of climate change are cause for great concern and alarm. However, the nature and the scale of both CDR and SRM geengineering proposals have also been a cause for scientific, ethical, and epistemological concerns. These concerns range from possible “knock-on” effects—the fear that the manipulation that will ripple through ecosystems and geophysical systems, to concerns over human health, pollution, and the irreversibility of the action itself.

Numerous criticisms and concerns of ocean iron fertilization have been advanced on the grounds that the technique will significantly disrupt the base of the marine food web with unpredictable ecological consequences, potentially leading to anoxic conditions as a result of the same processes that led to the eutrophication of coastal waters (Chisholm et al. 2001; Strong et al. 2009a; Strong et al. 2009b).

Concerns about sulfate aerosol injections have been raised over: the impacts on hydrological cycles and predictability of weather patterns (Bala et al. 2008); the impact of the reduction in solar radiation on crop yields and ecosystems (Shepherd et al. 2009); and the possible depletion of the stratospheric ozone layer (Tilmes et al. 2010).

Large-scale biochar has been attacked less on the grounds that the intentional method of carbon removal is disruptive (although it is criticized as potentially ineffective), but more on the grounds that the conversion of land for biochar plantations is likely to disrupt natural ecosystems, agriculture, biodiversity, and other social and economic uses of the land (ETC Group, 2010).

On a more fundamental level, epistemological concerns have been raised about the scientific method as it applies to geengineering experimental testing. This author and others have raised this concern relating to experimentation on ocean iron fertilization (Strong et al. 2009a; Strong et al. 2009b). We have argued that scale-dependent effects make it impossible to predict the responses of ecosystems to “geengineering-scale” manipulations on the basis of small-scale experiments. Model projections, which currently predict a wide range of possible results, are therefore our only basis for action. This means that the only way to test geengineering’s efficacy and possible side effects is to conduct an experiment on the scale of implementation, and the potential for extreme negative effects from such an experiment should prevent policy-makers and scientists from pursuing such a course of action. In essence, the “scientific method” concern argues that there is a fundamental catch-22 that ought to make at least some forms of geengineering non-starters.

While these concerns over hypothesis testing were raised in the context of discussions of ocean iron fertilization because there is a history of mesoscale in situ experimentation in this area, the concerns are equally applicable to other forms of geengineering. For example, we know from models of sulfate aerosol injection that it is likely to substantially disrupt the hydrological cycle and deplete the ozone layer. The most advanced modeling teams working on this issue have begun to investigate different options for methods of injection, which could mitigate these potential impacts. However, the full impacts of a global-scale manipulation could not be fully predicted without in situ experimentation at a global scale. For the purposes of this paper, this “scientific method” argument should not be read to mean that no forms of geengineering could ever be legitimately implemented, but rather that the fundamental and irreducible uncertainty of the results of implementation must be addressed by a geengineering governance regime.

Need for Geengineering Governance

The failure of the global climate regime to adequately prevent dangerous anthropogenic interference with the climate system has increased interest in the possible implementation of geengineering techniques in recent years. This has ratcheted up the level of scientific attention, including modeling and assessment, as well as the scientific calls for caution and concern. Geengineering has also been given increasing attention by domestic governments (the United States, for example), nongovernmental environmental advocacy organizations, and international decision-makers. This increased attention to the issue has shed light on the current lack of any coordinated international governance of geengineering implementation and research. Regardless of whether one is a proponent, an opponent, or an agnostic of geengineering, the fundamentally global nature of geengineering requires international rules, which are currently lacking, or only in their nascent stages (Blackstock and Long, 2010).

These 12 experiments, conducted between 1993 and 2009 in the equatorial Pacific, subarctic Pacific and Southern Oceans on scales smaller than 300km², were not designed to test the geengineering hypothesis, although the results from their estimates of carbon export below the pycnocline have been used by geengineering advocates and critics alike. (See Strong et al. 2009a for a full review of these experiments.)
Toward an International Geoengineering Agreement

Currently Feasible

One of the most alarming aspects of this situation is that implementation of geoengineering is currently feasible. While geoengineering techniques are often referred to as "science fiction," for the most part, the technology to engage in iron fertilization, sulfate aerosol injection, or large-scale biochar sequestration is readily deployable. While some forms of geoengineering might require more research and development to make them cost-effective on a large scale (cloud seeding ships, direct capture of carbon dioxide from the air, wave-motion-driven upwelling pumps), these options are not "futuristic."

It is not only the feasibility, but the nature of the consequences that calls for coordinated multilateral governance. As David Victor, director of the University of California San Diego Laboratory on International Law and Regulation, and colleagues argue, geoengineering is an option at the disposal of any reasonably advanced nation. A single country could deploy geoengineering systems from its own territory without consulting the rest of the planet. Geoengineers keen to alter their own country's climate might not assess or even care about the dangers their actions could create for climates, ecosystems, and economies elsewhere. A unilateral geoengineering project could impose costs on other countries, such as changes in precipitation patterns and river flows or adverse impacts on agriculture, marine fishing, and tourism. Yet, merely knowing that geoengineering exists as an option may take the pressure off governments to implement the policies needed to cut emissions (Victor et al., 2009).

Concerns over the potential for conflict over geoengineering’s impacts have also been raised. As oceanographer Philip Boyd points out, it is not enough to discuss the legal questions about geoengineering, we must also discuss the potential for political conflicts, and do so right now, as research programs continue to be developed:

A more in-depth analysis of [the] broader international issues [related to geoengineering] must be conducted sooner rather than later, before we can even consider purposefully counteracting climate change...[M]inimizing the potential for conflict between nations as a result of geoengineering must be taken into account when considering the focus for future research (Boyd, 2009).

Current State of International Regulation of Climate Intervention

Geoengineering does not exist in a governance vacuum. At least four decisions taken by international organizations are directly related to the regulation of geoengineering: the 1977 Environmental Modification Treaty; the 2008 London Convention Resolution on Ocean Iron Fertilization and the subsequent 2010 Assessment Framework for Legitimate Scientific Research on Ocean Iron Fertilization; the 2008 Convention on Biological Diversity Decision on Ocean Fertilization; and the 2010 Convention on Biological Diversity Decision on Geoengineering.

In 1977, states negotiated the Environmental Modification Treaty (formally the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification), which bans the use of weather modification and/or geoengineering techniques for military purposes. The treaty was negotiated in order to avoid a weather modification arms race during the Cold War, as both the United States and the Soviet Union had actively engaged in research on military applications of weather modification (Fleming, 2006). There are currently 75 parties to the treaty. The convention, however, does not directly address geoengineering for climate change, given that the intent of such proposals is not explicitly hostile. The convention does, however, offer internationally agreed upon definitions for environmental modification and relevant definitions of spatiotemporal scale. In the EnMod Treaty, environmental modification is defined as "any technique for changing—through the deliberate manipulation of natural processes—the dynamics, composition, or structure of the Earth, including its biota, lithosphere, hydrosphere, and atmosphere, or of outer space" (EnMod Treaty, 1977). The EnMod Treaty’s Article I prohibits the use of such techniques that have "widespread, long-lasting or severe effects as a means of destruction, damage or injury," where widespread is defined as "encompassing an area on the scale of several hundred square kilometers," and "long-lasting" is defined as "lasting for a period of several months, or approximately a season." This explicit treaty language may also be supplemented by customary international environmental law stemming from the non-binding 1972 Stockholm and 1992 Rio de Janeiro declarations, which urge a prohibition on causing pollution or environmental harm beyond a state's own sovereign borders.

In response to rising concerns from nongovernmental organizations and scientists about the potential use of ocean iron fertilization techniques to generate carbon credits by private interests operating in international waters, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention) raised the question of regulating iron fertilization as "dumping" first in 2007 (see Strong et al. 2009a for a description of this process), and the parties issued a "statement of concern" regarding the practice. In October 2008, the parties to the London Convention agreed to a resolution which stated that no further ocean fertilization activities should take place, with the exception of legitimate scientific research, and initiated a process to spell out what constituted legitimate scientific research. This culminated in an Assessment Framework in October 2010.

Concerns about the impact of ocean fertilization activities on biological diversity also prompted the issue to be raised in the Convention on Biological Diversity (CBD). In 2008, the CBD agreed to what is generally referred to as a "moratorium" on ocean fertilization. The CBD requested parties to prohibit ocean iron fertilization, with the exception of small-scale research, until there is sufficient scientific evidence
Toward an International Geoengineering Agreement

upon which to justify such activities. Small-scale has been defined as 200 km by 200 km or smaller by the Intergovernmental Oceanographic Commission, which reviewed the issue of ocean iron fertilization.

In January 2009, a joint German-Indian oceanography team set out to conduct a small-scale scientific experiment using iron fertilization. The German Federal Ministry of Environment temporarily prevented the experiment from proceeding for two weeks while it reviewed whether the CBD moratorium applied to this experiment. After confusion about whether or not the experiment constituted "geoengineering" or was being used even to test the geoengineering hypothesis, and despite intense pressure from environmental NGOs to stop the experiment, the German ministry eventually determined that the experiment was legitimate science and allowed it to proceed. This episode, however, cast light on the difficulty of distinguishing between scientific experiments, experiments designed to test the geoengineering hypothesis, and implementation of geoengineering at a small-scale.

In October 2010, the Convention on Biological Diversity expanded its moratorium to cover all forms of geoengineering that affect biological diversity. The text of this "moratorium," which is part of the 10th Conference of the Parties to the CBD, has been debated. In the lead up to the CBD's decision on biodiversity and climate change, merits examination and is recopied here. The COP invites parties to:

Ensure, in line and consistent with decision IX/16 C, on ocean fertilization and biodiversity and climate change, in the absence of science based, global, transparent and effective control and regulatory mechanisms for geoengineering, and in accordance with the precautionary approach and Article 14 of the Convention, that no climate-related geo-engineering activities that may affect biodiversity take place, until there is an adequate scientific basis on which to justify such activities and appropriate consideration of the associated risks for the environment and biodiversity and associated social, economic and cultural impacts, with the exception of small scale scientific research studies that would be conducted in a controlled setting in accordance with Article 3 of the Convention, and only if they are justified by the need to gather specific scientific data and are subject to a thorough prior

assessment of the potential impacts on the environment (Convention on Biological Diversity, 2010).

The moratorium thus invokes the precautionary approach in reference to both scientific and governmental uncertainty in order to justify a prohibition on geoengineering, except small-scale research. Notably, even the definition of allowed research is now constrained to research that is justified by the need to gather specific scientific data and is subject to a prior environmental impact assessment as well as to the requirement that the experiment be undertaken in a controlled setting. Furthermore, the footnote from the decision proposes a definition for geoengineering, which is currently the only applicable internationally agreed upon definition for geoengineering. It states that "any technologies that deliberately reduce solar insolation or increase carbon sequestration from the atmosphere on a large scale that may affect biodiversity." This definition is, of course, incomplete. First of all, it only applies to concerns regarding impacts on biodiversity. Secondly, the CBD's decision is explicit that this definition is only an "understanding" until "a more precise definition can be developed." Thirdly, the United States is not a party to the Convention on Biological Diversity, which, from a geopolitical standpoint, is relevant. Finally, carbon dioxide capture and storage is explicitly exempted from consideration as a form of geoengineering because it involves the capture of carbon dioxide produced from human activities before it enters the atmosphere.

The UNFCCC has not explicitly addressed the question of geoengineering. The IPCC has not explicitly addressed geoengineering under Working Group III (Edenhofer, 2010), but the IPCC will hold a special workshop to assess geoengineering options in July 2011, further indicating increased interest in the question.

While the three conventions referred to above are the only ones that have explicitly treated the subject to date, many more conventions may be relevant to the governance of geoengineering research and/or implementation, including the UNFCCC, the UN Convention on the Law of the Sea (UNCLOS), Long Range Transboundary Air Pollution Treaty (LRTAP), and the Vienna Convention and Montreal Protocol, to name a few. The anti-geoengineering ETC Group has identified 13 different international multilateral agreements, which they argue could be violated by the implementation of geoengineering (ETC Group, 2010).

---

1 This is to bring the CBD governance regime in line with the London Convention's provisions for defining legitimate scientific research.

2 The conventions or agreements are: Vienna Convention on Protection of the Ozone Layer and Montreal Protocol; the EMNOD Treaty; Convention on Biological Diversity; London Dumping Convention; Convention on Long-Range Transboundary Air Pollution; International Convention on Economic Social and Cultural Rights; the International Declaration on the Rights of Indigenous Peoples; the UN Framework Convention on Climate Change and Kyoto Protocol; the UN Convention on the Law of the Sea; the Outer Space Treaty; the UN Convention to Combat Desertification; the Convention on Access to Information, on Public Participation in Decision-Making and Access to Justice in Environmental Matters (Europe); and the Antarctic Treaty System.
State of the Discussion

The Nagoya Decision has squarely framed the issue of geoengineering and put it in the spotlight. It has highlighted the necessity for a more fully developed operational definition of geoengineering, and has confirmed a multi-convention trend toward a model that allows for a continuation of scientific research that has gone through a process of environmental assessment, while prohibiting any large-scale implementation of geoengineering actions.

In the meantime, there has been increased discussion of the issue of geoengineering governance within civil society as well as on the subject of further geoengineering research. In March 2010, scientific and academic experts on the subject convened for the Asilomar International Conference on Climate Intervention Technologies. The report from this conference was released in November 2010; it provides five principles for further research into climate intervention technologies:

1. Climate engineering research should be aimed at promoting the collective benefit of humankind and the environment.
2. Governments must clarify responsibilities for, and, when necessary, create new mechanisms for the governance and oversight of large-scale climate engineering research activities.
3. Climate-engineering research should be conducted openly and cooperatively, preferably within a framework that has broad international support.
4. Iterative, independent technical assessments of research progress will be required to inform the public and policymakers.
5. Public participation and consultation in research planning and oversight, assessments, and development of decision-making mechanisms and processes must be provided. (Asilomar Report, 2010)

Also in 2010, an international conference was held in Missoula, MT, to discuss the ethics of solar radiation management, highlighting the fact that the discussion has left the confines of science and policy discussion, and entered a new phase of broader societal debate. This new phase is reflected in the increased attention to the "governance gap" in the literature on the subject.

Calls for a global governance regime on geoengineering have now been coming from scientists (Asilomar), from environmental advocacy groups (ETC Group report, personal communication), and numerous academic observers. The Convention on Biological Diversity has opened the door to a treatment of all forms of geoengineering, but has not settled the issue, either in terms of definition, or in terms of ultimate governance structure. Under these circumstances, both the need and the opportunity are present for a concerted international effort to define a global governance regime for geoengineering in order to fill this gap. This paper seeks to fill the governance gap by proposing a potential Convention on Global Climate Interventions (CGCI), which would build upon the recent science, analysis, decisions, and interlocution on the subject. The time for such a convention is ripe.

The Convention on Global Climate Interventions

The following is a proposal for a new convention on geoengineering. Because issues related to geoengineering proposals fall under the remit of many current multilateral agreements, this proposal is advanced without prejudice to the question of the forum in which it might be negotiated. For example, this could be done through the UN Framework Convention on Climate Change as a Protocol (because of the relatedness of the objectives of this convention) or between United Nations member states in the context of a conference specifically convened for this purpose (which is the form in which it is presented here.)

The proposed convention is an attempt to elaborate both on the current state of the discussion of geoengineering governance and the current state of geoengineering governance within the UN system. As such, the convention includes elements inspired by the CBD moratorium, the London Convention's procedures for an environmental impact assessment framework for small-scale scientific research proposals, elements of the UNFCCC, and principles for public participation, principles for governance, and coordinated approval procedures that have been put forward in the recent literature on the subject. (For example, Lim, 2009, who proposes a new set of serial decisions under the UNFCCC.) The convention takes as a fundamental given the need for further elaboration of a global governance regime for geoengineering. Regardless of one's position vis-à-vis geoengineering implementation, there is nearly universal recognition that some form of elaboration of governance is required, and the intent here is to frame what "taking the next step forward" in geoengineering governance might look like.

United Nations Convention on Global Climate Intervention

The Parties to this Convention,

Acknowledging that climate change and its adverse effects are of common concern for humankind,

Concerned that human activities have been substantially increasing the atmospheric concentrations of greenhouse gases, that these increases enhance the natural greenhouse effect, and that this will result on average in an additional warming of the Earth's surface and atmosphere and are adversely affecting natural ecosystems and humankind,

Aware of the immediate cause for concern of such adverse effects, Recalling the Declaration of the United Nations Conference on the Human Environment adopted at Stockholm on 16 June 1972, the relevant 2008 and 2010
Toward an International Geoengineering Agreement


Recalling also the Vienna Convention for the Protection of the Ozone Layer, 1985, and the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, as adjusted and amended on 29 June 1990,

Recalling further that states have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction,

Recalling the obligation of states not to create harm or release pollutants outside of their national boundaries as has been affirmed in the Stockholm and Rio Declarations, and as is generally accepted in International Customary Law,

Recalling further the objectives and principles of the UN Framework Convention on Climate Change, 1992

Recognizing that scientific and technical advances may open new possibilities with respect to direct human intervention with the Earth’s climate system in order to prevent or avoid the adverse effects of climate change,

Recognizing also the uncertain and untested nature of these scientific and technical advances,

Recognizing further the need for additional research to reduce this uncertainty, while also recognizing that some uncertainty may be irreducible,

Affirming the precautionary principle, regarding both the impacts of climate change and the impacts of intentional human intervention with the Earth’s climate system,

Affirming also that research into direct human intervention should be aimed at promoting the collective benefit of humankind and the environment,

Noting Resolution 10/4 of the United Nations Human Rights Council on Human Rights and Climate Change, which recognizes that the adverse effects of climate change have a range of direct and indirect implications for the effective enjoyment of human rights and that the effects of climate change will be felt most acutely by those segments of the population that are already vulnerable owing to geography, gender, age, indigenous or minority status, and disability,

Determined to protect the system for present and future generations,

Determined also to prevent adverse effects of intentional human intervention with the Earth’s climate system,

Have agreed as follows:

Article 1: Definitions

1. “Adverse effects of climate change” means changes in the physical environment or biota resulting from climate change that have significant deleterious effects on the composition, resilience, or productivity of natural and managed ecosystems or on the operation of socioeconomic systems or on human health and welfare.

2. “Global climate intervention” means the deliberate large-scale manipulation of the Earth’s climate system, or any part thereof, to counteract climate change, either through the removal of greenhouse gases from the atmosphere in such a manner as to fail to be able to distinguish between anthropogenic and natural sources of the greenhouse gas, or through the alteration of the energy balance of the climate system so as to reduce the net positive anthropogenic radiative forcing experienced at the surface of the Earth. For the purposes of this convention, restoration of ecosystems to a state similar in function to that before any anthropogenic change, including land-use change, shall not be considered as global climate intervention, even if these actions fulfill the definition (i.e. reforestation of once forested lands shall not be considered a global climate intervention).

3. “Climate system” means the totality of the atmosphere, hydrosphere, biosphere, and geosphere and their interactions, including outer space.

4. “Large-scale” means an area of size, implementation, experimentation, or potential impacts or effects of greater than or equal to 200 km by 200 km.

5. “Small-scale” means an area of size, implementation, experimentation, or potential impacts or effects of less than 200 km by 200 km.

6. “Encapsulate” means to introduce substances or processes in a manner that allows their control and withdrawal so as to prevent introduction of substances into an uncontrolled environment or into an environment where there is no means of control of the effects of those substances.

7. “Irreversible” means that a return to the state or conditions present prior to an action is not reasonably considered to be possible within a human generation.

8. “Carbon dioxide removal” (CDR) and “solar radiation management” (SRM) are two categories of geoengineering, but there may be others that can also be managed by this convention.

Article 2: Objectives
Toward an International Geoengineering Agreement

The ultimate objective of this convention is to ensure that any global climate intervention that may be made in an attempt to prevent dangerous anthropogenic interference with the climate system is conducted according to the principles in Article 3 and the provisions in Article 4 of this convention.

Article 3: Principles

In their actions to achieve the objective of the convention and to implement its provisions, the parties shall be guided, inter alia, by the following:

1. Global climate intervention techniques should not be used as a justification to avoid or otherwise alter or amend commitments under the UN Framework Convention on Climate Change and its Kyoto Protocol, and nothing in this convention should be taken to have any bearing upon the commitments under, or implementation, or principles of the UN Framework Convention on Climate Change, its Kyoto Protocol, or any amendments or additional protocols or conventions to address climate change that may be adopted at a later date.

2. Where there are threats of serious or irreversible damage to ecosystems, human health, biodiversity, agriculture, or human rights, inter alia, from a global climate intervention, no such intervention should be implemented.

3. Any implementation of global climate intervention techniques under this convention should take into account the common but differentiated responsibilities of the parties and their specific national and regional development priorities, objectives, and circumstances consistent with national sovereignty.

4. Global climate intervention implementation should not constitute a means of arbitrary or unjustifiable discrimination or create a disguised restriction on international trade.

5. Global climate intervention should be regulated as a public good. Since people cannot opt out of such actions, all decisions should be made with public participation. Furthermore, any attempts at climate intervention, including as a result of climate intervention research, should be made public and the results disseminated openly. Global climate intervention should not be conducted for commercial gain or profit. The use of market incentives and "carbon markets" should not be applied to global climate interventions as defined in this convention.

6. The parties should cooperate fully in all stages of research and implementation under Articles 4 and 5 of this convention. Parties should strive to engage in multilateral research activities, especially taking into account the need to engage in such research activities in developing countries and with developing country interests in mind.

7. The specific needs and special circumstances of developing country parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those parties, especially developing country parties, without a history of engagement in global climate intervention research, should be given full consideration.

8. Nothing in this convention should be construed to suggest support for, or a requirement to engage in, any form of global climate intervention. The option of "no global climate intervention" should be regarded as the status quo.

Article 4: Implementation

1. Parties shall not engage in any unilateral global climate intervention, as defined in Article 1 of this convention, except as permitted in Article 4, Paragraph 2.

2. Parties shall not engage in any implementation of any global climate intervention, unless specifically authorized by a decision of the Conference of the Parties to be established under Article 7 of this convention, under circumstances where there is sufficient scientific evidence to justify such an action and an impact assessment has been performed, as determined under Article 6, Paragraph 1biii and Article 7 of this convention.

3. Parties shall not engage in, or permit, any large-scale research experiments into the efficacy of global climate interventions, in areas beyond the limits of national jurisdiction, including, but not limited to both sovereign territory and Exclusive Economic Zones (EEZ), as defined in the 1982 Convention on the Law of the Sea.

4. Parties shall not engage in, or permit, any large-scale research experiments into the efficacy of global climate interventions within their territories or EEZ where there is risk of adverse trans-boundary, global, or other irreversible effects of such experimentation.

5. Parties shall not engage in, or permit, any small-scale, unencapsulated research experiments into the efficacy of global climate interventions, except as stipulated under Article 5 of this convention.

Article 5: Further Research

1. In order to ensure that all adverse effects of research activities into the efficacy of global climate intervention techniques are minimized, while also ensuring scientific integrity and the pursuit of knowledge, parties shall provide an environmental, social, and economic impact assessment to the Conference of the Parties as established under Article 7 of this convention, for all small-scale, unencapsulated scientific research proposals into global climate intervention techniques, to be undertaken in areas beyond the limits of national jurisdiction. The impact assessment shall be made on a case-by-case basis using an assessment framework
to be developed by the Conference of the Parties. The Conference of the Parties shall communicate to the party its receipt of the assessment and its assent to the scientific research proposal prior to the party permitting such research.

2. Parties shall provide an impact assessment to the Conference of the Parties as established under Article 7 of this convention, for all small-scale, unencapsulated scientific research proposals into global climate intervention techniques, within their territories where there is risk of adverse trans-boundary, global, or other irreversible effects of such experimentation. The impact assessment shall be made on a case-by-case basis using an assessment framework, to be developed by the Conference of the Parties. The Conference of the Parties shall communicate to the party its receipt of the assessment and its assent to the scientific research proposal prior to the party permitting such research.

3. Each party may, for itself, determine whether there is risk of adverse trans-boundary, global, or other irreversible effects of small-scale unencapsulated scientific research proposals within territory subject to national jurisdiction. In all cases where a determination is made that a small-scale, unencapsulated scientific research proposal poses no risk of adverse trans-boundary, global, or other irreversible effects, the party must communicate that finding to the Conference of the Parties to this convention, and must include a description of the proposed research.

Article 6: Intergovernmental Expert Panel on Global Climate Intervention

1. In order to assess the current state of knowledge regarding the intended positive and negative effects of global climate intervention technologies, parties agree to:

(a) Establish an Intergovernmental Expert Panel on Global Climate Intervention (IEPGCI). This panel shall be composed of scientific experts from the parties, reflecting equitable geographic distribution [under the same principles as the IPCC mandate regarding expertise]. Its role is to assess on a comprehensive, objective, open, and transparent basis the latest scientific, technical, and socioeconomic literature produced worldwide relevant to the understanding of the risk of global climate intervention techniques. IEPGCI reports should be neutral with respect to policy, although they need to deal objectively with policy relevant scientific, technical, and socioeconomic factors.

(b) The IEPGCI shall review the current state of knowledge of all global climate intervention techniques, and, within one year of its first meeting, shall submit an assessment to the Conference of the Parties of the Convention on Global Climate Intervention, including the following:

(i) A determination of what proposed climate intervention measures constitute global climate intervention techniques, as defined in Article 1, Paragraph 2 of this convention.

(ii) A thorough and comprehensive review statement of the current state of knowledge with regard to the potential efficacy and potential negative effects—including on ecosystems, human health, biodiversity, agriculture, or human rights—of each of these techniques identified as global climate interventions, consistent with Article 6, Paragraph 1b of this convention.

(iii) A separate, nonpolitical, determination as to whether there is sufficient scientific evidence to justify any global climate intervention measure, under criteria to be established by the IEPGCI at its first meeting.

(c) The IEPGCI shall first convene six months after entry into force of the convention in New York, NY, in the United States. The next meeting, location, and date shall be determined by the parties and members of the IEPGCI at this first meeting.

(d) The IEPGCI shall meet every two years after its first meeting to determine if and whether any changes should be made to any of the assessments under Article 6, Paragraph 1b of this convention, or to determine the implications of any additional interventions that have been proposed.

Article 7: Conference of the Parties

1. A Conference of the Parties is hereby established.

2. The Conference of the Parties, as the supreme body of this convention, shall keep under regular review the implementation of the convention and shall make, within its mandate, the decisions necessary to promote the effective implementation of the convention. To this end the Conference of the Parties, shall

(a) Be the sole body entrusted to make decisions to undertake any global climate intervention, by unanimous consent of all parties.

(b) Review the assessments of the IEPGCI and take into account these assessments in all decisions.
Toward an International Geoengineering Agreement

(c) Develop an assessment framework for evaluating the environmental impacts of small-scale scientific research proposals in accordance with Article 5 of the convention.

(d) Review the impact assessments from parties submitted under Article 5 of the convention and assent to small-scale unencapsulated scientific research proposals.

(e) Review all communication from parties that relate to geoengineering, including those regarding small-scale unencapsulated scientific research proposals not requiring impact assessments under Article 5 of the convention.

3. The first session of the Conference of the Parties shall take place not later than one year after the date of entry into force of the convention.

4. The Conference of the Parties shall meet once per year, each year, after its first meeting.

Article 8: Public Participation

1. Parties shall work to ensure full public participation in the processes of research, assessment, and implementation of global climate intervention.

2. Consistent with the principles of the convention, accredited representatives from nongovernmental organizations shall be allowed to observe all meetings, including contact groups and informal consultations and sessions, of the Conference of the Parties to the Convention and to the IEPGCI.

Remaining Articles (Truncated)

Voting (one country, one vote, no majority voting for decisions on implementation). Signature (standard), Depositary (standard), Ratification (standard), Entry into Force (90 days after the 30th instrument of ratification), Reservations (no reservations permissible) and Withdrawal (allow for withdrawal after five years), and Authentic Texts (standard).

References


Toward an International Geoengineering Agreement


