

Webinar Kickoff April 15, 2020

Introduction and motivation of the Community Climate Interventions Strategies Project and webinar series.

The first of a series of nine webinars included three presentations, an introduction of the Community Climate Intervention Strategies (CCIS) project, and two keynote talks by Will Steffen and Holly Buck.

The **Community Climate Intervention Strategies (CCIS)** project was introduced in the first presentation by the chair of the CCIS steering committee, **Simone Tilmes**, National Center for Atmospheric Research, Boulder CO.

Achieving a sustainable climate may not be possible any more without applying intervention strategies coupled with aggressive mitigation and adaptation measures. However, not enough is known about the effectiveness, risks and benefits of different approaches and the practicalities and governance to implement those. This complex problem requires a unified response from the research community; the convergence and integration of a multitude of natural and social science disciplines working together to identify research questions, priorities, stakeholder values and needs. The main mission of the CCIS project is to integrate various research communities to develop a unifying research framework in order to holistically assess the large collection of possible strategies, including mitigation, adaptation, and interventions such as carbon dioxide removal and solar radiation management. The project has a mandate to be open and transparent, and provide scientifically valid information that is meaningful to the public and policy makers. It aims towards unbiased research that is not driven by any specific interest group. The work is meant to target the global good, including social and ecological considerations and to develop shared principles of best practices that apply throughout this project. The CCIS Steering Committee consists of members from a diverse background that have been formed as part of the UCAR president's strategic initiative. The SC is initiating a forum to exchange information and initiate a research program and has organized a workshop that was planned for April 15-17th, 2020, but due to COVID-19 had to be postponed to October 28-30th, 2020. In the meantime, a webinar series has been initiated to start gathering important information that will be a baseline for connecting currently disjoint communities <https://www2.acom.ucar.edu/workshop/ccis-2020-webinars>.

The second presentation was given by **Will Steffen**, Emeritus Professor at the Australian National University and Senior Fellow with the Stockholm Resilience Centre: “**Climate Change 2020: Why we are facing an emergency**”. Will's presentation motivated the urgent need to address climate change, with a focus on mitigation. He illustrated changes in the last two years. His home is in Australia, where severe drought and massive bushfires put climate change

focussed attention on the issue over the summer 2019, and raised the issue of abrupt, catastrophic shifts in the climate. Will further illustrated broadly how Earth System scientists have made important progress in understanding the potential for tipping points to rapidly take us into planetary *terra incognita*. The work in recent years has provided the basis for a scientifically based, quantitative definition of a climate emergency. These analyses suggest that time for effective action is rapidly running out, as the scientific evidence mounts that the ‘the more we learn about climate change, the riskier it looks’. Although the COVID-19 crisis has taken the attention away from the climate change emergency for now, it has shown that rapid and effective action, based on scientific understanding, can be taken in the face of an emergency.

The third presentation was given by **Holly Buck**, Emmett Climate Engineering Fellow in Environmental Law and Policy at the UCLA School of Law: “**What is a holistic approach to climate intervention?**”. Holly’s presentation identified how a holistic approach to climate and ecological crises makes research more robust and legitimate and what a process of creating a holistic research and policy agenda might look like. Holly introduced the two most discussed climate intervention methods, solar radiation management and carbon dioxide removal. These methods, including various different proposals, provide varying potentials in terms of timing and efficiency to counter global warming. These under-researched technologies may have to be considered to prevent reaching a tipping point, but how the research is done matters, and a holistic approach can make the research more relevant to communities and decision makers. Holly discussed three ways in which research could be holistic: in terms of understanding how different pillars of the climate response (mitigation, adaptation, carbon dioxide removal, and solar radiation management) interact with each other, both biophysically and socially; in terms of understanding the problem not just in terms of climate change, but in terms of a wider ecological and social crisis; and in terms of understanding the temporal dimensions of different climate response strategies. She discussed what implementing a holistic approach might look like in practice, and suggested that co-producing research with communities could be one way to guiding a holistic research agenda.

Question and **Answers:**

The CCIS SC presentation:

Comments were raised on the holistic diagram by Long and Shepherd, 2014, regarding suggested temperature goals that are suggested on the diagram:

Answer: This diagram is illustrative of the holistic nature of climate intervention not prescriptive of targets and is not suggesting specific targets or length and amount of certain interventions. Some interventions, especially mitigation, are needed as much as possible, while others may act on different scales and may be used for a limited time with the goal to reduce suffering. The purpose of the CCIS project is to identify potential benefits, limitations and risks of all of these approaches, before they can be considered as part of a portfolio addressing climate change.

Will's presentation:

Why do you not mention negative emissions as one of the immediate actions that we need?

Massive drawdown is required, along with emissions reductions, no?

Answer: 'Massive drawdown' would certainly help but there are no viable technologies to do that yet (planting trees is not a long-term solution). But we do have ways to rapidly reduce emissions. For example, Canberra reduced its emissions by 40% in 9 years via rapid rollout of renewables.

Which climate tipping points could be forestalled by solar geoengineering and which reversed? It seems like some are driven primarily by temperature change, though others are more mixed.

Answer: Not sure what you mean by solar geoengineering (geoengineering seems to be an issue mainly discussed in the US; hardly ever mentioned in Australia, nor in Europe either). Most tipping points can't be reversed in short timescales. Arctic sea ice is an exception. It can be reversed in a few decades. Big ice sheets cannot, nor can large-scale biome transformation (e.g., the Amazon).

I was a bit surprised that Will Steffen at the end talked about the situation in Australia as being a "drought" which to me implies to the public that the rains will return. Earlier he said the shift was due to expanding tropics and subtropics—so what they are experiencing is aridification, the rains are unlikely to be coming back on the course we are on?

Answer: I think it is a matter of semantics. We use the term 'drought' very commonly here, and talk about increasing frequency, intensity and duration of droughts. That probably amounts to aridification in a long-term perspective.

A question regarding the steering of the planetary body back into the steady state (referring to the diagram of glacial and interglacial time frames) considering the fragmented nature of geopolitics, fueled by neoliberal acceleration, is it even possible to govern, the assemblage of resources required to achieve a holistic steering of the planet back into the 'happy/stable' zone?

Answer: Very good question. The geopolitical situation does indeed look bleak at present, but there are also social tipping points that can change the geopolitical landscape expertise. But I'll defer to my colleagues in the social sciences and humanities for comments on how likely such a tipping point might be and what it would take to trigger it.

I'm trying to understand the subject in a fundamental way. We understand the Greenhouse effect from a molecular level, the science is well established that increasing concentrations of Greenhouse gases like CO₂ will naturally increase the temperature. I think there might be some statistical evidence in favor of the connection between Global average temperature increase and the extreme events like recent Australian Bushfire and our instincts also support this, but do we have concrete scientific foundation and understanding to validate this relation considering the fact that other factors might also affect these events?

Answer: Yes, but the scientific foundation comes from complex system science and not the more reductionist cause-effect logic that permeates much of natural science. The classic scientific approach is to pull out a piece of system and study it in detail using a cause-effect approach (i.e., 'keeping other factors constant'), whereas complex system science studies states-and-transitions, and triggers for reorganisations of systems as a whole. Tipping dynamics (and the Aussie bushfires are a classic example - going from 2% (+or-2%) of eastern forests burning in a season to 21% burning in a single season). To understand such tipping point behaviour, a really good source is a book by Marten Scheffer - "Critical Transitions in Nature and Society", published in 2009 by Princeton University Press. Marten goes through the maths in some detail in the back section of the book. So to understand tipping points, classic cause-effect logic (increasing greenhouse gases cause rising temperatures) is not the best approach.

Questions to Holly:

In the area of carbon neutrality and negative emission technologies, of course there is the incentive of a "moral" obligation to achieve carbon neutrality, but in the case presented (Microsoft, carbon neutrality by 2030) what other incentives do corporations have to reduce their emissions? Will this come from social pressure, government regulation, etc.?

Answer: Right now, the incentives are limited (corporate sustainability goals, perhaps investor / shareholder pressure to be more ambitious about decarbonization). These are not different from incentives to pursue carbon neutrality more broadly. Large-scale reductions probably require a combination of carrots and regulatory sticks, including but not limited to a price on carbon.

In terms of public engagement, it's often difficult to explain the high complexity that comes with a holistic approach. How can we communicate the complexity better, to avoid reductionist or single-issue interpretation.

Answer: In my experience, the high complexity is better understood that we might surmise - the situation of having multiple things that can simultaneously be worked on to address a problem is not unique. Some things that help with discussion are having enough time, and having multiple

perspectives. This is also a question that can be empirically researched via social science / communications research.

Does a holistic-approach include voluntary reductions in reproduction and consumption rates at the individual level? E.g., each human not born removes ~80 years of individual carbon emissions. Any reduction in consumption rates via reduced personal incomes would result in an equivalent amount of reduction in carbon emissions by removing that income from the carbon-based economic development cycle.

Answer: I do think that voluntary reductions in consumption are researched as part of the holistic approach, including by modelers attempting to learn more about the potential of demand-side reductions. Population is also certainly a parameter in modeling - for example, see the paper “Alternative pathways to the 1.5 °C target reduce the need for negative emission technologies” by [VanVuuren et al \(2018\)](#). This is a paper which models a decrease in fertility rates in one scenario. One thing important to keep in mind when discussing population is that the impacts of an individual are based on their level of consumption, which differs vastly between countries and within countries.

Do you know of any proposals for “deliberative polling” to assess public concerns / perceptions / preferences, or think this would be a useful avenue?

Answer: This has been discussed in terms of geoengineering, but not yet tried as far as I am aware, though there has been research that used [other deliberative methods](#). There are also deliberative polling approaches to climate change more broadly: see <https://cdd.stanford.edu/dp-topics/environment/>. I think this would be a great avenue.

Have you already analysed the probability that the negative impacts of the “negative emissions actions”, as CDR and SRM, would be so negative that they do not compensate for the benefits? Or, the probability that there will be not enough energy to afford them?

Answer: The former is one of the key questions in both CDR and SRM research right now. The latter could stand to receive more analysis.

In a holistic view of SRM, have you thought about the role and example of anthropogenic aerosols (cooling) in producing some, as yet uncertain, climate effects. I have found that this often changes dialogue with members of the public.

Answer: I have not seen any research on this from a communications / social science standpoint.

On taxpayers covering carbon capture, there’s a question of which countries should be responsible and/or identification of emitters?

Answer: The question of who has the responsibility to do carbon clean-up is one which deserves more attention. Olufemi Taiwo and I wrote about it [here](#).

At which level should geo engineering practices be regulated (regional, national, or international)? Is it possible and is it necessary to create an international body for governing these practices?

Answer: Stratospheric aerosol injections would have a global effect, and many people believe that this approach would require international regulation. One attempt to create an international assessment of these practices grounded in the UN Environmental Assembly [was tried, but it did not succeed](#). When it comes to carbon dioxide removal, I believe that we will see some international accounting mechanisms and the like, but there is also a case to [govern these approaches more regionally](#).

Do you see carbon negative fuels derived from waste feedstocks making a greater contribution to carbon reductions globally?

Answer: Yes. One can look at the recent report, [Getting to Neutral: Options for Negative Carbon Emissions in California](#), for a detailed example of how this could be scaled up in one region.

Other comments, and posts:

Green Climate Fund from the UN: <https://www.greenclimate.fund>

Possibly an example of deliberative polling, which reached nearly 10,000 international participants is WorldWide Views on Climate and Energy <http://climateandenergy.wvviews.org/>