

CLUSTER OF EXCELLENCE CLIMATE, CLIMATIC CHANGE, AND SOCIETY (CLICCS)

HOW CLIMATE PROTECTION IS CHALLENGING THE LIBERAL WORLD Governance and the Influence of Society in Times of Global Upheaval



CLICCS QUARTERLY

NEWS FROM CLIMATE RESEARCH



HOW CLIMATE PROTECTION IS CHALLENGING THE LIBERAL WORLD

From climate justice and generational justice to regulating CO_2 emissions – efforts to mitigate the climate crisis have produced a range of new norms. Yet the corresponding obligations are often a source of controversy. For example, how should responsibilities and burdens be distributed around the world? Prof. Antje Wiener is investigating how social actors and networks are shaping global governance for more environmental protection – in a time in which the liberal world order is being called into question and climate change is becoming the ultimate stress test for democracy.

The entire world is striving to find cooperative responses to the climate crisis. What headway has been made, and where are climate norms facing resistance?

Antje Wiener: Debates over norms can spur on the required transformation, as they call into question the existing balance of power. Movements like Fridays for Future have given environmental protection a powerful, global voice and sparked social changes. Further, successful lawsuits have put governments and companies under pressure. On the other hand, lawsuits have also been filed against climate protection measures – which are also the target of widespread resistance.

Where does this resistance come from?

Wiener: In order to reduce greenhouse-gas emissions, federal governments need to introduce far-reaching measures. As such, climate change represents a challenge to the liberal principles of individual freedom. Norms and regulations are questioned or criticized when certain parts of a given society, or of the international community, feel they are being imposed on them. For example, in the Global South we're currently observing skepticism towards the Global North. Environmental protection laws are seen as violating fundamental freedoms, which these countries and social groups are up in arms about. It's a bit like the reactions to the EU's enlargement policy: Eastern countries find themselves constantly required to implement new regulations. In response, populist forces, who call into question basic elements of liberal democracy itself, come out of the woodwork. The ensuing conflicts can take on an authoritarian spin.

So, what you're seeing is that these political currents aren't just focused on norms but also disrupt the entire liberal order?

Wiener: In countries like the USA, Hungary, Poland and the UK, we can see that certain treaties are no longer honored. This weakens the international order and was particularly dramatic when the USA, one of the largest greenhouse-gas emitters, withdrew from the Paris Agreement. Generally speaking, this type of backlash has become more likely. But climate change especially calls for more cooperation and taking decisive action.

Wiener: Exactly; what's problematic is how polarized politics have now become. In the USA, views have become so entrenched that the two parties in power can no longer suitably represent society. At the same time, there is still leeway that can be taken advantage of: Throughout the Trump administration, the State of California pursued a consistently progressive course, launching measures and initiatives in line with the United Nations' climate policy and the Paris Agreement.

And what options does society have?

Wiener: Norms offer us orientation; you could say they glue society together. We can use them, and we can lend support to organizations, initiatives and networks pursuing more environmental protection. There are a variety of ways for us to get involved socially and politically – like local projects, clubs and teams, at the workplace, as educators, and above all at the ballot box. At CLICCS, we will continue to explore these key avenues of influence.

HOW MUCH METHANE IS RELEASED IN THE TUNDRA

Infinitely vast, not a tree in sight, and with permanently frozen soil: the tundra is an important carbon reservoir. Yet climate change is now warming the Arctic regions, causing permafrost to thaw. A team led by Leonardo A. Galera asked themselves: in which proportion are greenhouse gases released when permafrost soils thaw? Given that methane is a far more potent greenhouse gas than carbon dioxide, higher methane emissions would have a more pronounced effect on climate warming. For their study, the researchers measured carbon dioxide and methane flows in dry and moist tundra soils on Samoylov Island in northeastern Siberia.

As the study shows: a thicker active layer and higher temperatures in the subsoil promote the decay of organic material. This is conducive to the production of methane. The researchers also discovered that, due to these factors, the ratio of carbon dioxide to methane shifted – that is, that more methane was produced in relation to carbon dioxide. Although carbon was also released, primarily as



Under the extreme temperature conditions of the Siberian winter, cracks form in the permafrost soils. In spring, they fill with meltwater, which freezes in the deeper, colder ground layers. When this process is repeated year after year for centuries, lattices of so-called ice-wedge polygons are formed.

CO₂, in moist tundra soils the methane concentration was nearly seven percent. In contrast, it was less than 0.3 percent in dry soils. These new findings pave the way for new simulations and processes to more accurately predict climate future.

https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2022JG006956



GERMAN ECO-TAX TAKES EFFECT

Since 1999, gasoline and diesel have been taxed in Germany. Initially planned as an ambitious project, the eco-tax was locked in at 15 cents per liter as early as 2003. Until now, there have been doubts about its benefits. Piero Basaglia and Prof. Moritz Drupp have now shown that the tax has massively reduced CO₂, saving Germany around 80 billion euros. Both climate and health benefit.

Using economic indicators from the transport sector, the researchers programmed a Germany "clone" that simulates how certain parameters would have developed in Germany without the eco-tax. To do this, they used datasets from industrialized countries that are similar to Germany but did not introduce such a tax.

Basaglia and Drupp were able to clearly refute the widespread assumption that the tax would be ineffective. On the contrary, its effect was resounding: between 1999 and 2009, it reduced CO_2 emissions in traffic by ten percent annually compared to the clone. At the same time, 27 percent less particulate matter and 13 percent less harmful nitrogen oxides were emitted per year.

https://www.cesifo.org/DocDL/cesifo1_wp10508.pdf (Download PDF)

CARBON DIOXIDE IN THE OCEAN: HIDDEN UNCERTAINTIES

The Southern Ocean has absorbed ca. 40 percent of the global anthropogenic carbon emissions, providing a substantial buffer to climate change. How will carbon flows between the ocean and atmosphere change in the future? The majority of studies provide an annual mean estimate for these fluxes. A team led by Paridhi Rustogi, who is meanwhile a researcher at Princeton University, and Prof. Johanna Baehr has analyzed flows in individual seasons, using the example of the Southern Ocean – and revealed previously hidden uncertainties in the tools used to evaluate these fluxes.

The figure shows the Southern Hemisphere, with Antarctica in the middle. The two rows represent the annual mean carbon fluxes (far left) and the seasonal progression. The top row is based on observational data; the bottom row, on simulations. As the top left and bottom left figures show, the values for the annual mean fluxes match up relatively well. Yet, if we take a closer look at the individual seasons, there are clearly recognizable differences between the observational data and simulations.

These findings show how important uncertainties can be overlooked in the annual mean values. For example, based on the observational data, the Southern Ocean is an important CO₂ sink year-round. In contrast, the bottom row, based on simulations, shows increased uptake in the spring and summer and more pronounced outgassing in the autumn and winter. In order to reliably project how overall carbon uptake in the Southern Ocean will be affected by climate change, reducing uncertainties is of tremendous importance.

https://www.nature.com/articles/s41612-023-00378-3



Carbon fluxes between the ocean and atmosphere in the Southern Ocean (0-360°, 35-65°S)

NEWS IN BRIEF

HOW COMPANIES CAN HELP MEET CLIMATE TARGETS

In the last week of June, the second D°GREES Symposium (CLICCS B4) was held in Hamburg. At the event, researchers discussed CO_2 reduction, climate protection, and successful projects together with representatives of companies from Brazil, Hong Kong, Japan and Germany.

https://uhh.de/cliccs-climate-management

OFFERING GLOBAL ACCESS TO DIGITAL CLIMATE INFORMATION

This June, more than 180 international experts on climate research, risk management and Artificial Intelligence met at the EVE Summit in Berlin – including members of CLICCS. Together, they developed a concrete concept for Earth Virtualization Engines, the first freely accessible information system for climate data with 1-kilometer resolution. <u>https://uhh.de/cliccs-eve</u>

PHYTOPLANKTON AND SEA ICE UNDER CLIMATE CHANGE

In recognition of their excellent dissertations, two researchers have been awarded the Wladimir Köppen Prize from CLICCS: Marine biologist Dr. Miriam Seifert investigated the impacts of climate change on phytoplankton. Environmental physicist Dr. Luisa von Albedyll explored how ice thickness is changing in the Arctic Ocean. <u>https://uhh.de/cliccs-koeppen22</u>

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