

Newsletter from CICERO Center for International Climate Research August 2025

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Newsletter

Dissemination of CICERO researchers' scientific publications, reports and other outputs.

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Featured



Nature Communications Earth & Environment

[Air pollution cuts in East Asia likely accelerated global warming](#)

[Bjørn H. Samset](#) et. al. including [Camilla W. Stjern](#) and [Marianne T. Lund](#) from CICERO

Global warming has accelerated since 2010. A new CICERO-led study shows that unmasking of greenhouse-gas-driven warming due to a substantial cleanup in air pollution over East Asia can explain it. [Read the paper.](#) [Read the press release.](#)

Publications



Energy

[Green dilemmas: Public opposition and support for Norway's energy transition](#)

[Steffen Kallbekken](#), [Sofie Waage Skjeflo](#), [Nina Bruvik Westberg](#) and Eirik Ogner Jåstad

The rapid expansion of non-fossil energy is crucial for achieving climate targets and ensuring energy security. However, public opposition has emerged as a major barrier to developing new generation capacity. Using a nationally representative survey, the authors analyze public support for six power generation technologies in Norway—wind power (onshore and offshore), solar power (building- and ground-mounted), hydropower, and nuclear power. They find strong support for solar power on buildings, hydropower, and nuclear

power, while wind power, particularly onshore, faces considerable opposition. [Read more.](#)

Energy Policy

[**The power of information: A survey experiment on public support for electricity price compensation schemes**](#)

[Nina Bruvik Westberg](#), [Sofie Waage Skjeflo](#) and [Steffen Kallbekken](#)

The researchers assess how information about the distribution of compensation and electricity-saving incentives affects public support for price subsidies and lump sum transfers. Initial support for price subsidies is very high. Informing about the distribution of compensation reduces support for subsidies and increases support for lump sum transfers. The findings suggest that correcting misperceptions about the distribution of compensation drives these shifts. [Read more.](#)

npc Climate and Atmospheric Sciences

[**Future increase in European compound events where droughts end in heavy precipitation**](#)

[Birthe Marie Steensen](#), [Gunnar Myhre](#), [Øivind Hodnebrog](#) and Erich Fischer

Compound events where droughts end with heavy precipitation can lead to damage to infrastructure, crops and ecosystems that exceed those of an isolated drought or heavy precipitation event due to increased flooding and runoff from the hardened dry ground. Based on regional climate models the authors show that the occurrence of these compound events during summer in Europe increases by around 35% (+/-22%) for both the mid-

century and end-of-century future projections with an intermediate emission scenario compared to present-day. [Read more.](#)

International Journal of Hydrogen Energy

**[What to consider when considering climate effects of hydrogen –
Towards an assessment framework](#)**

[Marit Sandstad](#), [Srinath Krishnan](#), [Gunnar Myhre](#), [Maria Sand](#) and [Ragnhild Bieltvedt Skeie](#)

The use of hydrogen as an energy carrier has been part of future projections for some time, however, the climate impacts of hydrogen itself have often not been included. Researchers present how the global warming impacts of hydrogen as employed for various purposes may be assessed. The paper finds that the climate benefits of hydrogen depend on sector, production method and leakage rate, showing that hydrogen leakage impacts climate both through hydrogen's chemical reactions in the atmosphere, but also from the loss of hydrogen which could otherwise be employed to offset emissions in the sector. [Read more.](#)

Atmospheric Chemistry and Physics

**[Sensitivity of climate effects of hydrogen to leakage size, location, and
chemical background](#)**

[Ragnhild Bieltvedt Skeie](#), [Marit Sandstad](#), [Srinath Krishnan](#), [Gunnar Myhre](#) and [Maria Sand](#)

In this article researchers investigated how sensitive hydrogen's warming effect over 100 years (called GWP100) is to different factors: the magnitude

of hydrogen emitted, where the leaks happen and finally to the chemical composition of the atmosphere – which may change in the future. The study concluded that the H₂ GWP₁₀₀ is independent of the size of the emission; depends, to some degree, on the emission location (distance to soil sink active areas); and depends slightly on the chemical background atmosphere. [Read more.](#)

Atmospheric Chemistry and Physics

[Investigating the role of stratospheric ozone as a driver of inter-model spread in CO₂ effective radiative forcing](#)

[Rachel E. Byrom](#), [Gunnar Myhre](#), [Øivind Hodnebrog](#), Dirk Olivié and Michael Schulz

[Addressing the cause of inter-model spread in carbon dioxide \(CO₂\) radiative forcing is essential for reducing uncertainty in estimates of climate sensitivity. Recent studies have demonstrated that a large proportion of this spread arises from variance in model base-state climatology, particularly the specification of stratospheric temperature, which itself plays a dominant role in determining the magnitude of CO₂ forcing. In this paper researchers investigate stratospheric ozone \(O₃\) as a cause of inter-model differences in stratospheric temperature, and hence its role as a contributing factor to spread in CO₂ radiative forcing. \[Read more.\]\(#\)](#)

Earth's Future

[Irreversible Land Water Availability Changes From a Potential ITCZ Shift During Temperature Overshoot](#)

[Norman Julius Steinert](#) et. al.

Without rapid emission reduction, it is increasingly likely that global temperatures will overshoot 1.5°C before carbon dioxide removal may help reverse warming. Such temperature overshoots affect the future hydrological cycle, with implications for land water availability. However, the hydrological response to such temperature overshoots is not well understood. Here, researchers investigate regional and seasonal changes of precipitation minus evaporation in an ensemble of Earth system model simulations of temperature overshoot. [Read more.](#)

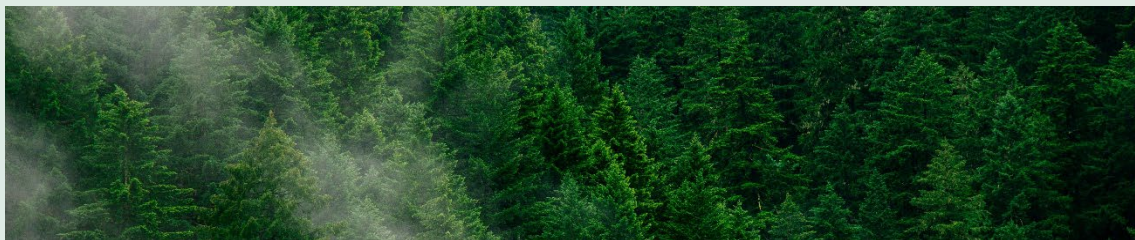
Earth's Future

[No Robust Sign of Human Influence in the Unprecedented Atmospheric Circulation of Summer 2018 Over Northern Europe](#)

[Carley E. Iles](#), R. Vautard, M. Vrac

The summer of 2018 was characterized by prolonged heatwaves over Northern Europe, associated with persistent atmospheric blocking, and an unusually northward jet stream location over Scandinavia. Whilst event attribution studies tend to focus on the change in probability or magnitude of the extreme temperatures themselves, this paper provides context to these studies by examining whether there are human induced trends in the atmospheric circulation that might affect the likelihood of similar extreme circulation patterns and associated heat waves occurring in the future. [Read more.](#)

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Science

[Observed trend in Earth energy imbalance may provide a constraint for low climate sensitivity models](#)

[Gunnar Myhre](#), [Øivind Hodnebrog](#), Norman Loeb and Pierce Forster

Climate forcings by greenhouse gases and aerosols cause an imbalance at the top of the atmosphere between the net incoming solar radiation and outgoing longwave radiation from Earth. This Earth energy imbalance has strengthened over the period 2001 to 2023 with satellite data. Here, authors show that low climate sensitivity models fail to reproduce the trend in Earth energy imbalance, particularly in the individual longwave and shortwave contributions to the imbalance trend. [Read more.](#)

JGR Atmospheres

[The Evaluation of Hydroclimatic Variables Over Nordic Fennoscandia Using WRF-CTSM](#)

[Iris Mužić](#), [Øivind Hodnebrog](#), Yeliz A. Yilmaz, Terje K. Berntsen, David M. Lawrencen, Negin Sobhani

This study is the first to evaluate the state-of-the-art coupled land-atmosphere regional climate model WRF-CTSM. It comprises the Weather Research and Forecasting model, WRF, and the Community Terrestrial Systems Model, CTSM. The evaluation is conducted over Nordic Fennoscandia (Norway, Sweden, and Finland) since there is uncertainty in

climate models' representation of key hydroclimatic variables in high-latitude regions as they experience accelerated transformation in a changing climate. [Read more.](#)

npj Clean Air

[Strong reduction in near-surface turbulence due to aerosols in South and East Asia](#)

[Øivind Hodnebrog](#), [Kristin Aunan](#), [Sourangsu Chowdhury](#), Louis Marelle, [Gunnar Myhre](#), [Camilla W. Stjern](#) & Shuxiao Wang

Absorbing and scattering aerosols influence the vertical temperature profile and can lead to a shallower boundary layer and potentially enhanced surface air pollution. Using a regional chemistry-climate model validated against >1000 air quality monitoring stations, we show that absorbing black carbon (BC) aerosols reduce near-surface turbulence and boundary layer height through aerosol-radiation interactions (ARI). [Read more.](#)

PLOS Climate

[How climate models reproduce the observed increase in extreme precipitation over Europe](#)

[Birthe Marie Steensen](#), [Gunnar Myhre](#), [Øivind Hodnebrog](#), [Kari Alterskjær](#)

The last years extreme precipitation and flooding events demonstrate the necessity to investigate how climate models represent the response of extreme precipitation to a warming climate to better prepare for flooding hazards. In this study the researchers investigate heavy to extreme

precipitation that has been observed over Europe since the 1950s, and how this increase is represented in climate models, with a particular focus on the frequency vs. intensity increase of heavy precipitation events. [Read more.](#)

Energy Research & Social Science

[Corporate-led approaches to affordable energy: the advantages and limitations of pay-as-you-go \(PayGo\) for cooking with LPG in Dar Es Salaam](#)

Kirsten Ulsrud, [Mikkel Vindegg](#), Lars Kåre Grimsby and [Borgar Aamaas](#)

Pay-as-you-go (PayGo) business models are promoted as win-win solutions for doing good and making profit, to enable affordable access to energy for all through private sector-led energy solutions in developing countries. Inspired by PayGo for solar electricity, PayGo for Liquefied Petroleum Gas (LPG) has been developed to improve the affordability of cooking with gas to replace the use of charcoal. This study investigates how PayGo contributes to affordability of LPG in Dar es Salaam, Tanzania, and how the characteristics of this energy provision enable or constrain affordability. [Read more.](#)

Energies

[Integrating Energy Justice and SDGs in Solar Energy Transition: Analysis of the State Solar Policies of India](#)

Bhavya Batra, [Karina Standal](#), [Solveig Aamodt](#), Gopal K. Sarangi and Manish Kumar Shrivastava

The transition to clean energy is not inherently positive or negative, and its impacts depend on the social context, power relations, and mechanisms to include marginalized voices. India, with its ambitious climate targets and commitment to the UN SDG Agenda, is a key country for ensuring an inclusive and sustainable transition. This paper aims to understand whether India's commitment to the SDG Agenda's overarching principle of 'leaving no one behind' is reflected in the design of its domestic solar policies. [Read more.](#)

Environmental Research Letters

[An exploration and evaluation framework for climate change mitigation scenarios with varying feasibility and desirability](#)

Hamish Beath, [Shivika Mittal](#), Robin Lamboll and Joeri Rogelj

Ensembles of climate change mitigation scenarios present users with a collection of strategies for limiting global warming. These strategies may differ in their associated feasibility challenges, mitigation co-impacts, and ultimately their relative societal desirability. Understanding these scenario characteristics is therefore crucial when scenarios are used to inform strategic decisions. One approach to enhance this understanding is to establish scenario archetypes and select contrasting illustrative scenarios from a larger ensemble. Here the authors present a new multidimensional framework for the systematic comparison of scenarios at the global or regional level. [Read more.](#)

Environmental Research Letters

[Plant and soil characteristics as key predictors for future agricultural drought](#)

A Kumar Samantaray, [N J Steinert](#) and P A Mooney

[Drought is one of the most complex and multidimensional types of extreme events, with meteorological and agricultural droughts being two of the most widely studied types. This paper analyzes agricultural drought with a crop water stress index \(CSI\) that incorporates plant and soil characteristics and soil moisture. The results emphasize the importance of combining plant and soil information with standardized indices in the assessment of drought-driven crop stress under climate change aiding effective policy formulation. Read more.](#)



Frontiers in Communication

“Mixing the Green and the Grey”: how public officials use strategic communication to advance sustainable transport policies in Norwegian medium-sized cities

Hilmar Mjelde and [Anders Tønnesen](#)

This article fills a gap in existing transport and strategic communication literature by examining the role of public communication as a core component

in the design and implementation of large-scale policy packages for urban transport-system development. The article is using a case-study approach focused on the three Norwegian medium-sized urban regions of Grenland, Haugesund, and Sandefjord. [Read more.](#)

PLOS Climate

[**Policy-driven acceleration of climate action**](#)

[Elin Boasson](#), [Glen Peters](#) and Jale Tosun

Since the signing of the Paris Agreement, the term “acceleration” has become increasingly prevalent in the global discourse on climate change mitigation. Its meaning, however, is ambiguous. This article argue for distinguishing three levels when referring to acceleration in the context of policymaking: the policies adopted by policymakers to reduce GHG emissions (policy outputs), the behavioral changes these policies induce in their target groups (policy outcomes), and the resulting changes in the reduction of GHG emissions (policy impacts). [Read more.](#)

Earth Systems Dynamics

[**Change in negative emission burden between an overshoot versus peak-shaved stratospheric aerosol injection pathway**](#)

Susanne Baur, [Benjamin M. Sanderson](#), Roland Séférian and Laurent Terray

Stratospheric aerosol injection (SAI) could be used alongside mitigation to reduce global warming. Previous studies suggest that more atmospheric CO₂ is taken up when SAI is deployed. In this study authors look at the entire SAI deployment from start to after termination. They show how the

initial CO₂ uptake benefit, and hence lower mitigation burden, is reduced in later stages of SAI, where the reduction in natural CO₂ uptake turns into an additional mitigation burden. [Read more.](#)

Geophysical Research Letters

[Aerosol Background Concentrations Influence Aerosol-Cloud Interactions as Much as the Choice of Aerosol-Cloud Parameterization](#)

Louise Marelle, [Gunnar Myhre](#), Jennie L Thomas and Jean-Christophe Raut

Particles suspended in the atmosphere (aerosols) play a key role in cloud formation. These aerosol-cloud interactions have a major but uncertain influence on climate. Authors compare four different ways to calculate aerosol-cloud interactions in a numerical atmospheric model. They compare model results to observed changes in clouds measured from satellites during the Holuhraun eruption in Iceland in 2014, which released large amounts of volcanic gases forming atmospheric aerosols. They find that all four approaches reproduce the observed reduction in cloud droplet sizes during the eruption, but that they disagree on its intensity and its impacts on the Earth's energy budget. [Read more.](#)

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