Climate impacts are hitting home – PIK Alumni Newsletter, No. 4, 08/2021

Dear PIK Alumni,

PIK impact in a key year for the climate

The devastating flooding in parts of Germany and in other parts of the world in July helped drive the message home. But since the start of the year the momentum to make the 2020s a decade of change has been growing. Policy-makers are now reiterating what scientists have long been saying: that this decade is critical. To achieve climate neutrality by 2050 and keep the 1.5 degree target within reach, we must reduce emissions steeply by 2030. With President Biden in office, the US is back on the climate stage and is now following the example of Europe by setting a new and more ambitious emissions reduction target. This is an important step on the road towards a meaningful l UN Climate Change Conference (COP 26) in November 2021 in Glasgow.

A couple of major events underline this momentum. In April, the first Nobel Prize Summit "Our Planet, Our Future", which was co-organised by PIK, brought together Nobel Prize laureates and other key leaders like John Kerry, Ursula von der Leyen, and the Dalai Lama to explore what actions can be achieved this decade to put the world on a path to a more sustainable, more prosperous future for all. A statement by many of the participating Nobel laureates and experts was published, calling for urgent action to value the long-term potential of humanity.

Also in April, US President Joe Biden hosted heads of states from 40 countries as well as scientists and civil society actors at a virtual Leaders Summit on Climate. Prompted by this historic event, in which many states, including the US, announced new ambitious greenhouse gas reduction targets, countless media outlets sought out PIK's scientific expertise.

But PIK is also going new ways in underscoring the scientific imperative for ambitious climate action. The Netflix documentary Breaking Boundaries portrays the work of Johan Rockström and other scientists from PIK including Ricarda Winkelmann. Narrated by Sir David Attenborough, it tells the story of the most important scientific discovery of our time - that humanity has pushed Earth beyond the boundaries that have kept Earth stable for 10,000 years, since the dawn of civilization. A preview to the series was presented exclusively to world leaders at President Biden's Leaders Summit on Climate.

Another new medium is PIK's recently-launched podcast "Sustain Ability. The Potsdam Dialogues - Science for a Safe Tomorrow". The series aims to present some of the brilliant science done at PIK by bringing together leading thinkers and doers to discuss how to stabilize our climate and advance the transition to sustainability. The first podcast looks at the future of farming, asking whether the new EU Common Agricultural Policy (CAP) can meet the climate challenge. Johan Rockström discussed the challenges of the current CAP reform with Frans Timmermans, Vice President of the European Commission, and Alan Matthews, blogger and former Professor of Agricultural Policy at Trinity College Dublin. You can listen or subscribe to the series here or on the following channels, Spotify, Google Podcasts, Deezer, or Apple itunes.

Other high-level events and inputs involving PIK's directors and scientists over the first half of 2021 included, for instance, numerous lectures given by Ottmar Edenhofer on themes such as climate neutrality, the energy transformation and the European Green Deal for (among others) political parties and ministries (see here for his statement on the EU's Green Deal "Fit for 55" policy package). And in June PIK was visited by President Frank-Walter Steinmeier together with the Heads of State of Belgium, Liechtenstein, Luxembourg, Austria and Switzerland at the meeting of German-speaking heads of state. The directors discussed topics of climate, the economy and justice with the VIP guests to Telegraph Hill. Read more ….

President Steinmeier and other Heads of State in discussion with PIK's directors and speaking to the press in front of the Trefoil building. *Pictures: Bundesregierung / Henning Schacht.*

As regards PIK input to major scientific events, August saw the release of the Working Group I contribution – The Physical Science Basis - to the IPCC 6th Assessment Report, with the WG II and III reports due to be published later this year. (See here for Stefan Rahmstorf and Anders Levermann on the WGI release.) PIK authors have been involved in all three reports to AR6. Looking forward to COP26, PIK is likely to be organising or involved in a large number of side events, on issues including Enabling and financing carbon neutrality, road freight transport decarbonisation, cascading climate impacts, and migration issues.

Finally, a couple of developments at PIK:

Firstly, our important seven-yearly Evaluation by the Leibniz Association in March 2021 had to take place online due to the corona situation. Only a very limited number of people could take part in the virtual meeting with the evaluation commission (a bit different from some of the big evaluation visits of the past, which some Alumni will remember!) However, the impression was that the evaluation procedure went well, and PIK expects to receive initial feedback from the Leibniz Association in September.

Secondly, Professor Jürgen Kurths retired as Head of RD4 from July 2021. In his new role as Senior Advisor he will be relieved of his administrative tasks and will be able to dedicate his time fully to his outstanding research.

PIK Research

ISIpedia is launched

A tool to give decision-makers and the public improved access to climate-impact science and generate a better understanding of climate-related risks became available in June when the new online portal ISIpedia – the open climate-impacts encyclopedia – was launched. The portal features science "from the expert to the public", and breaks down global studies to the country level to support adaptation and mitigation planning. ISIpedia articles not only provide easily accessible data, condensed in maps and graphs, and crucial country-level information, but they also tell about the research process and the methods that have been applied. Thus ISIpedia is also about explaining climate impact science to non-experts with the longer-term goal of enhancing acceptance and trust in the knowledge about climate impacts generated by the scientific community. Users can search by topics, regions or countries, or types of study (observed impacts, model evaluation, or future projections). The results collected under the "future projections" category are based on simulations generated within the Inter-Sectoral Impact Model Intercomparison project (ISIMIP) and ISIpedia will be developed further as the ISIMIP outreach channel. Anyone engaged in climate impact science and interested in communicating their research results is invited to contribute to the platform.

There are ISIpedia Stories that shed light on the relevance of climate impact research for societal questions. These may feature, e.g., the role of climate impact assessment as a robust basis for climate litigation cases, or for evaluating the risks that climate change poses for the financial sector. Many PIK Alumni will know ISIMIP as a huge community-driven modelling endeavour supported by about 80 modelling teams worldwide; a PIK research group around Katja Frieler has been heavily involved in this activity for some years. You might want to browse the ISIpedia portal or get in touch to support the effort.

A first version of the Potsdam Earth Model POEM is up and running

Members of PIKs department Earth System Analysis have realised a long-term research goal with the first version of the Potsdam Earth Model POEM. In a new study published in Geoscientific Model Development, the team coupled the state-of-the-art dynamic global vegetation model LPJmL5 to the coupled climate model developed by GFDL (CM2Mc-LPJmL v.1.0). Several improvements to LPJmL5 were implemented to allow a fully functional biophysical coupling. The new Earth model is able to capture important biospheric processes, including fire, mortality, permafrost, hydrological cycling and the impacts of managed land (crop growth and irrigation). In a first application, the team was able to find a potentially dangerous path bifurcation for tropical forests under severe climate change. Tropical rainforests could undergo detrimental transitions as a result of changing fire and biophysical feedbacks with climate. Combining the process depths of the state-of-the-art vegetation model LPJmL and the low computational cost of GFDL's CM2Mc, the new Earth system model is a powerful tool to project and investigate future trajectories of the Earth system and potential terrestrial tipping points.

For an overview of POEM see the dedicated webpage. POEM contributes to the planetary boundary simulator, an ambitious project (POEM-PBSim) currently funded by the Volkswagenstifung, in order to analyse the impacts of the interaction of planetary boundaries in the Earth System. Read more …

Looking at migration

How climate change affects conflict, security and migration is gaining more relevance as a research topic at PIK and is the focus of PIK's FutureLab on Security, Ethnic Conflicts and Migration. In a new initiative "Weathering Risk" a team of researchers from PIK and Adelphi are developing a methodology to map the impacts of climate change, analyse vulnerability and resilience, and ultimately find options to address context-specific climate-security risks. Read more about the project here and on the project website … In a recent commentary in Science, Jacob Schewe, co-leader of the FutureLab, and co-authors look at the hidden economic impacts of disaster- and climate-related displacement. They argue for locally led displacement risk assessments that account for the potential economic cost of displacement to guide decision making

Two studies on migration have been produced in the context of the EPICC project. “Locked Houses, Fallow Lands: Climate Change and Migration in Uttarakhand, India,” by authors from PIK and TERI, discusses how climate change impacts influence inhabitants' decisions to migrate from the hills to the plains, leaving a growing number of uninhabited villages behind. The report aims to provide an evidence-based foundation for science-policy dialogue but also makes concrete policy recommendations, such as ensuring the safe and orderly migration of those on the move, creating and supporting alternative livelihood options for the state’s farmers or training them to diversify their crops. Read more …

Scientists from PIK partnered with the International Organization for Migration to produce the report Climate Change and Migration in Peru, which seeks to shed light on the available evidence on the environment, climate change and migration nexus in Peru. The extensive report presents a systematic review of links between climate-related hazards and mobility in Peru’s three main topographical zones, discusses the necessity to understand climate migration patterns and improve planning and policies in the short term to the mid-term. Read more ….

Publication Highlights

Potential and risk of hydrogen-based e-fuels.

In a recent paper in Nature Climate Change, a team including members of the Energy Systems group looked at the potential and risks of using hydrogen-based electro-fuels or e-fuels in different sectors. While hydrogen-based fuels produced using renewable energy sound promising as a climate-friendly solution, they are likely to remain scarce and not competitive for at least another decade. Producing these fuels is currently too inefficient and costly for them to be used to broadly replace fossil fuels in cars or in heating houses, for instance, where directly using batteries or heat pumps makes more economic sense. Moreover, expecting to broadly use hydrogen-based fuels for cars and home heating would risk locking in a dependency on fossil fuels and existing combustion technology. Instead, the team concluded that hydrogen-based fuels should primarily be used in sectors such as aviation or industrial processes that cannot be electrified. Read more ..... and see some of the press coverage here and here.

Also on the subject of hydrogen, the German government's Advisory Council on the Environment (Sachverständigenrat für Umweltfragen, SRU), of which Wolfgang Lucht of RD1 is a member, published a recent report on the use of hydrogen in the context of renewable energies and decarbonisation: myths, realities and recommendations ("Wasserstoff im Klimaschutz: Klasse statt Masse"). More information here.

Coffee from Ethiopia – What are the future projections?

In an article in Nature Scientific Reports, an international team of researchers discussed the likely impacts of climate change on coffee production in Ethiopia, Africa's largest coffee producing nation. Results from the detailed modelling study indicate that although the area that is suitable for average quality coffee might actually increase gradually until the 2090s, the suitable area for high quality specialty coffee types will be reduced. This is especially relevant for the country's millions of smallholder farmers, who earn more on specialty coffee than on ordinary coffee. The researchers project that the area suitable for premium coffee varieties will decline, with some areas hit harder than others. They conclude that depending on drivers of suitability and projected impacts, climate change will significantly affect the Ethiopian speciality coffee sector and area-specific adaptation measures are required to build resilience. Read more .....

Resilient agricultural development is incidentally the focus of the Adaptation in Agricultural Systems working group in RD2. The AGRICA project has produced climate risk analyses for Ethiopia and other countries in sub-Saharan Africa.

Don't forget, you can consult PIK's publication database to see newest papers by PIK researchers: https://www.pik-potsdam.de/en/output/publications. Most papers are Open Access, i.e., the final copy is freely available from the database. In 2020 PIK scientists published nearly 400 papers in peer-reviewed journals.

Other news

With its focus on health, PIK's Research Department 2 - Climate Resilience organised a webinar on 'Emotional Resilience for climate scientists' with Psychologists for Future, to help climate scientists handle their own emotions as well as understand why others react in certain ways. If this is a subject that interests you, there are further resources available on the news page and on the Psy4F

homepage, including an English and a German handout with 14 strategies for emotional climate resilience.

Congratulations to …

… some members of PIK on their recent honours:

- PIK's founder and Director Emeritus John Schellnhuber received the Grand Cross of Merit (Große Verdienstkreuz) of the Order of Merit of the Federal Republic of Germany from the President of Germany Frank-Walter Steinmeier at a ceremony at Bellevue Palace. He was honoured for his pioneering work in climate science which has had a defining impact on the national and international debate on climate change. Read more ….
- **Zbigniew Kundzewicz was awarded** the prestigious Prince Sultan Abdulaziz International Prize for Water in a ceremony attended by UN Secretary General António Gutteres. The award honours efforts which contribute to the sustainable availability of fresh water and the alleviation of water scarcity.
- Jürgen Kurths has been awarded a Fellowship of the Network Science Society 2021, the first German scientist to receive this recognition. The Society honoured him for his "seminal contributions on network dynamics elucidating synchronization, basin stability, causality detection and for pioneering network science applications to power grids and to prediction of extreme events in climate."

Forthcoming events

The CASCADES Project is organising a 'Cascading Climate Impacts Simulation Workshop' on 21st September 2021, 10-17:00 CET, for international experts in trade, policy and security and finance. Participants will be confronted with a climate-induced crisis and meet in a virtual conference centre to discuss possible policy interventions. If you are interested in participating or would like to know more, please contact Lukasz Jarzabek (lukasz.jarzabek@crs.org.pl) or Hetty Saes (saesheib@pik-potsdam.de).

A Webinar "Climate Change Impacts on Migration and Urbanization" is taking place on 16th-17th September 2021. For more details contact Diego Rybski (diego.rybski@pik-potsdam.de).

PIK's Alumni programme

Many thanks to those Alumni who responded positively to the request in the last issue for possible "mentors" for younger scientists. Due to the difficulties involved in getting back to a more normal working situation at PIK, we haven't yet been able to further develop our ideas to offer greater career development support to young scientists. However, a few Alumni will be joining the next PIK PhD Day in September to talk about their experiences.

What about your news? Please send an update to alumni@pik-potsdam.de if you have changed your job or otherwise want to update your details in our Alumni database. We'd also be very pleased to receive news about your recent publications, personal achievements, or research activities, which we may be able to use on the PIK Alumni website.

Keep in touch!

Alison Schlums

Alumni Officer

IMPRESSUM
Potsdam Institute for Climate Impact Research (PIK) e. V.
Telegraphenberg A 31
14473 Potsdam
Germany
https://www.pik-potsdam.de/en/impressum

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NEWSLETTER
Alumni Officer: Alison Schlums
Tel.: +49 (0)331 288-2504
Email: alumni@pik-potsdam.de
PIK Alumni website: https://www.pik-potsdam.de/en/people/alumni

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