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Dear reader,

we are pleased to present a new issue of the CSP newsletter as this challenging year is coming to a close.

As always, you will find various information on partner activities, recent publications and upcoming events. Early this year, from February 11 to 13, the Sixth International Conference on Climate Services (ICCS 6) took place in Pune, India - have a look at page 3 for more information.

In case you are not yet a subscriber, we invite you to visit
https://www.gerics.de/network/secretariats/CSP_Newsletter/index.php.en
 for subscription.

Enjoy reading!

A year is coming to close that has been very different. Covid19 has scrambled also the CSP; nevertheless, we would like to send news to the community on what has happened in the partnership, and I hope my message finds you well in these circumstances being everything less than easy.

First of all, I'd like to attract your attention to the Sixth International Conference on Climate Services, ICCS6, that took place in February in Pune, India. The event was a great success in gathering colleagues from all over the world, with a focus on the Asian continent and its state of climate services. The conference was an important opportunity for stocktaking of the past almost 10 years of work in the CSP, and paved the way for future cooperations. You can find more insights from Pune on page 3.

The coming 10 years will be decisive - the transformation towards climate neutrality has to be realized in large parts by 2030, if global warming shall be limited according to the goals of the Paris Agreement.

How can the CSP bring in and further develop its expertise?

The work during the past years, e.g., numerous stakeholder dialogues and the development of concepts and formats for co-development, is characterized by inter- and transdisciplinarity. This intensive advancement of working methods represents a growth of experience that can be extremely valuable in taking on the challenges that the transformation poses to societies now.

The current Covid-19 crisis impressively shows the degree of interconnectedness and interdependence between societies. There are also striking parallels between the Corona and the climate crises, e.g., that both hit harder where infrastructure and governance are weaker, or that human wellbeing is, despite all our technological progress, lastly depending on biological systems and our environment.

In the meantime, the crisis also provides opportunities: The situation shows, on all levels from the very personal to the global, supranational one, how self-efficacy can strengthen us, and how it can support to take on even huge difficulties to overcome them step by step. This self-efficacy is an important part of the puzzle of developing resilience.

Moreover, the crisis reveals how crucial it is to cooperate and to take on responsibility for others and for our surroundings.

Aside of these aspects, the crisis might hold a sense through triggering the transformation processes that are necessary to dampen global warming and to cope with climate change; it shows what is possible, if decision makers are aware of a problem, but it also opens windows that otherwise might not have opened, possibilities for change for which one would need to wait much longer in "normal times". We should make use of these evolving opportunities.

How can the future of the CSP look like in the light of all these different challenges? To jointly design this, we would like to initiate a dialogue around central topics that should be at the heart of the CSP's activities. We imagine this dialogue to be filled with life during 2021, and to ideally channel the discussion results into a white paper within roughly one year from now.

Last but not least I would like to send you warm regards and wish you all the best for you and your families - stay healthy.

Daniela Jacob

Director of Climate Service Center Germany (GERICS)

The Sixth International Conference on Climate Services, ICCS 6

a look back

The Sixth International Conference on Climate Services, ICCS 6

11 - 13 February 2020, Pune, India

On February 11-13, 2020, over 200 attendees gathered from all over the world for the Sixth International Conference on Climate Services held in Pune, India. The event, which took place at the Indian Institute of Tropical Meteorology (IITM), was supported by India's Ministry of Earth Sciences, UK Department for International Development, and the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Participants represented a diverse group of institutions from NGOs, international organizations, research institutions, and government agencies. Participants gathered to hear presentations on „advancing the knowledge and practice of climate services for climate resilience,” across a set of thematic topics on the state of the practice of climate services, the state of knowledge, and building resilience. A full conference report, along with a conference statement, will be published.

Please follow up with Alison Rose at arose@iri.columbia.edu for more details.



(c) Jackie Turner/CCAFS

S2S4E Decision Support Tool: Success story of an operational climate service

Need for tailored climatic and impact information

Record-breaking high temperatures have been reported in 2019 in Europe and the northern hemisphere, while 2020 is predicted to be one of the warmest years on record. The consequences of climate change are gaining visibility across different sectors of society. In this context, climate services that provide climatic and impact information to a wide-range of practitioners and decision-makers who work at the national, continental and/or global scales are becoming more prevalent resources to prepare for climate change and climate variability.

Scientific and technological advances in climate services

The remarkable technological advances in super-computing capacities and data storage have contributed significantly to the success of climate services. Operational centres of excellence can now support the production of high-resolution systems, resulting in high-quality climate information. A paradigm example is the Climate Data Store (CDS) of the Copernicus Climate Change Service programme (C3S; <https://climate.copernicus.eu/>), providing openly available climatic and impact predictions to users.



(c) BSC | S2S4E DST for the energy sector

Within these services, different time horizons, ranging from sub-seasonal to seasonal or multidecadal time scales, have shown potential to inform user groups and sectors affected by climatic variations: from sudden extreme weather events to seasonal and intra-annual variability. Water management, energy, tourism, insurance, transport, emergency management, health and agriculture are examples of sectors in society that are sensitive to climate change and variability.

Recent advances in our understanding and forecasting of climate conditions have also resulted in useful climate services that provide reliable predictions of climate and its associated impacts (e.g. river flooding and agricultural drought). Besides improving climate predictions, adapting climate services to better address climate and water-related societal problems requires a strong collaborative effort between scientists, data/service providers, policy/decision-makers and the public. In this collabora-

tive effort, there is a need to provide tools for risk management. These tools must efficiently apply risk models to strengthen the resilience of communities by improving the coping and adaptive capacities for decision-making. To continuously add value to decision-making, information from climate services is gradually moving from case studies and demonstrations in past events to open and operational (continuously updated) services, further tailored to the specific needs of particular user groups.

Co-generating climate services: the S2S4E Decision Support Tool

The co-generation of climate services is a way to ensure service viability and business uptake. The co-generation process includes several steps, for example: co-design, co-development, co-delivery and co-evaluation, ensuring the continuous engagement of partners involved and co-evolution of knowledge.

A promising example of co-generation and a reliable climate service is S2S4E (Sub-seasonal to Seasonal Climate Forecasting for Energy; <https://www.s2s4e.eu/>). This EU-funded project set up an operational Decision Support Tool (DST) to provide reliable and robust predictions of solar, wind and hydropower generation, with the prognosis ranging from one week to three months ahead. The online DST was carefully designed together with industrial stakeholders to create a tool that is tailored and customisable to the user needs in the energy sector.

The energy companies ENBW, EDPR, and EDF are among the partners in the project. They have contributed to the development of the DST by providing knowledge about what kind of information energy traders and other players in the energy market really need, and by customising the interface so that it shows the forecasts in a way that is useful for them. The DST co-generation process strengthened the user engagement and usability of the tool, ultimately resulting in a platform that can be used for effective decision-making.

S2S4E's guiding purpose is to be a significant force of change to help strengthen the renewable energy sector, and increase resilience to climate change and variability across different sectors of society. Therefore, the project is striving to increase the uptake of this cutting-edge forecasting tool to all types of users, not only within the energy sector, who can benefit from user-friendly forecasts of climate conditions, such as wind speed, snow, river inflows, temperature, precipitation, and solar radiation. The DST is available at <https://s2s4e-dst.bsc.es/>.

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Snowmaking for winter tourist resorts in Northern Finland (Blue-Action)

The Principal Stakeholders: Commercial

The Challenge

Winter tourist destinations rely on predictable cold weather conditions to ensure the safety and enjoyment of the millions of visitors each year and hence economic success. Global rises in temperature, warmer early season temperatures and unusual weather occurrences are a challenge to the livelihoods of communities based around destinations such as ski resorts. Our project partner Ruka is a Northern Finnish ski resort that has around 200 skiing days per year from early October to early May and it welcomes annually around 400,000 skiers. A consistent snow base is a key resource for Ruka, and in addition to plentiful natural snowfall, Ruka relies on machine-made and stored snow to ensure the slopes can be opened early and maintained through the winter. Other ski resorts in Northern Finland face similar challenges.

This case study focuses on providing relevant predictions on snowmaking conditions for the partner ski resort to allow preparation for the winter season.

The Solution

Within the H2020 Blue-Action project, the Arctic Centre at the University of Lapland and Ruka Ski Resort have co-designed a climate service, in the form of a SnowApp, incorporating short- to medium-term climate forecast into ski season, offering substantial value to ski resorts.



For example, early season snowmaking can be up to 30 times more expensive than it is in the colder mid-season.

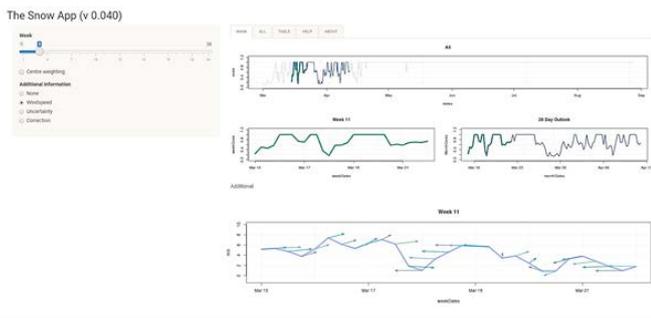
This difference in energy consumption and cost means that it is more efficient to make snow in January and store it over the summer, than it is to make snow for immediate use in October.

The Snow App



(c) BlueAction

Seasonal climate forecasting can help ski resorts to anticipate its machine-made and stored snow requirements and to plan accordingly for the upcoming ski season. It can also provide ski resorts with valuable information about changing weather patterns and future temperature trends.



(c) BlueAction

Heat health early warning system for Europe

The Principal Stakeholder: Governmental organizations

The Challenge

As the number of warm days and nights continues to increase across Europe, so does the intensity, frequency and length of heat waves. Heat waves have caused many more fatalities in Europe in recent decades than any other extreme weather event, according to the European Environment Agency. However, the vulnerability of communities and individuals to heatwaves is localised, and depends on socioeconomic, political, physiological, and behavioural factors.

This case study focuses on developing a prototype of heat health early warning system for European regions. Heat early warning systems are designed to reduce the health consequences of heat episodes, by providing sufficient warning to allow authorities to notify affected populations and put mitigation measures in place for the most vulnerable communities.

Even though the majority of the European countries already have early warning systems, they only consider climate information and do not include health data. Moreover the predictive capacity of currently available operational schemes is currently limited to lead times of a few days, within the temporal scales of weather phenomena and forecasting.

The Solution

Within the H2020 Blue-Action project, the Barcelona Institute for Global Health has developed a climate service to provide more accurate sub-seasonal to seasonal forecasts of heat wave events. Co-designed with the City Council of Almada, Portugal, and other relevant national and international health agencies and built on the experiences of existing operational schemes, this initiative provides targeted information to help the public health sector improve decision-making, planning and adaptation to climate change.



Blue-Action is using sub-seasonal to seasonal climate forecasts to drive the European heat health early warning system and extend their predictive capacity.



With improved spatial resolution of climate data, as well as an exhaustive mortality dataset covering a large ensemble of 147 regions in 16 countries, this innovative prototype of heat health early warning system enables health services to predict the impacts of heat on health and therefore activate preventive actions, as well as to understand the spatiotemporal differences among European societies in human vulnerability to ambient temperatures. <https://www.heathealth.eu/>

Predicting Severe Weather Formations & Their Relevance to Maritime & Offshore activity in the Arctic (Blue-Action)

The Principal Stakeholder: Commercial, governmental organisations

The Challenge

Polar lows are a special weather phenomenon occurring in Polar Regions. They are much like tropical hurricanes, only they appear where cold winds draw across relatively warm ocean waters. With a melting ice cap, and a more unstable and volatile atmosphere, severe and extreme weather formations tend to become more common, especially in some regions. As the face of these storms can exert a high risk to operations, the risks involved need to be managed.

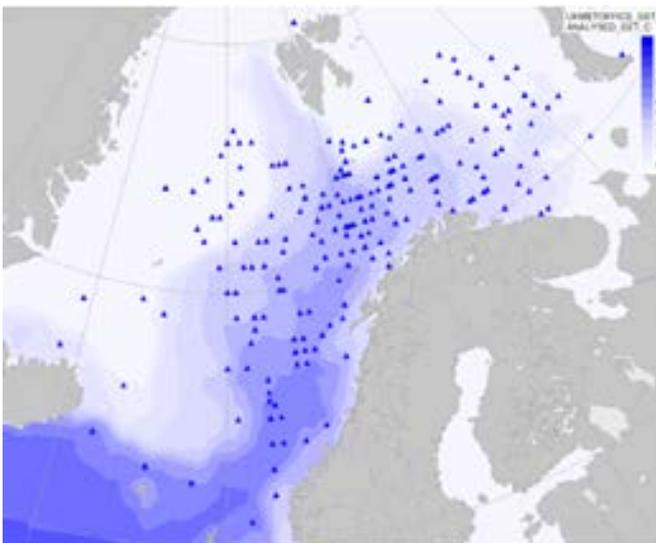
This case study seeks to understand how polar lows develop and deliver predictions on a sub-seasonal scale. The IMO Polar Code identifies specific hazards which must be addressed in voyage preparation and operational procedures, which means ships sailing in Arctic waters need to be aware of the environmental conditions they face. Through investigating links to marine cold-air outbreaks and other large-scale atmospheric features, the project investigates a set of precursors to describe the environment in which they form, helping the industry become aware and improve resilience towards polar lows and other extremes.

Fish forecasts for marine fisheries (Blue-Action)

The Principal Stakeholder: Commercial, governmental organisations, recreational fishers

The Challenge

Climate change is causing warming sea temperatures and increasing ocean acidification, fundamentally altering marine ecosystems. In particular, fish species are responding by changing their distributions productivity and the timing of their migrations, with consequences for conservation, fisheries and tourism.



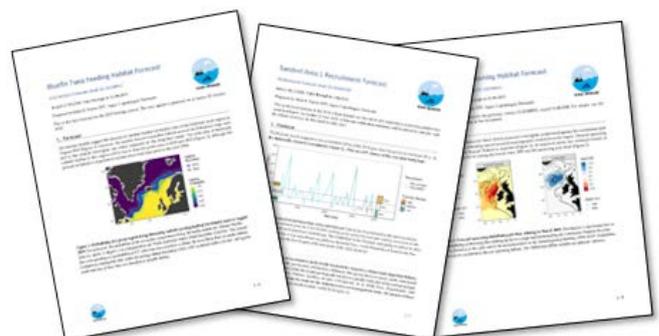
(c) BlueAction

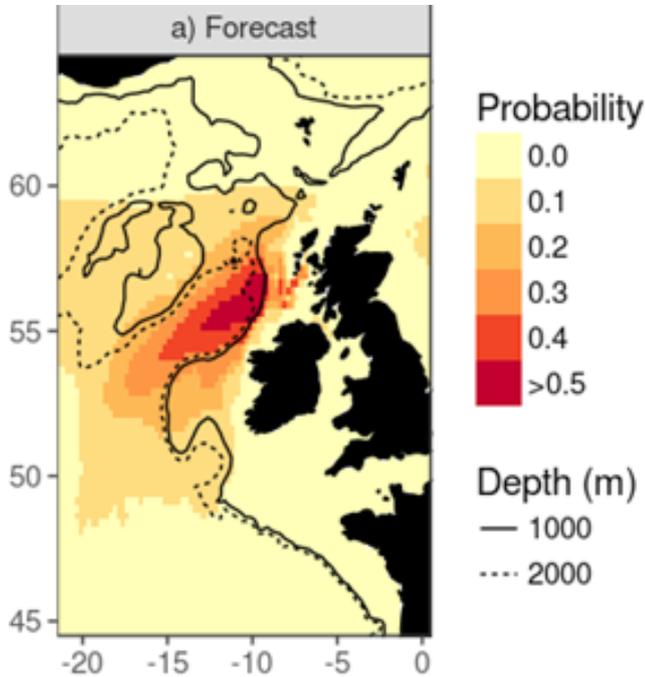


This case study focuses on forecasting fisheries up to a decade into the future. Advances in our ability to measure and model the oceans and climate over the last decade mean that in some areas (e.g. the North East Atlantic) we are increasingly able to predict ocean characteristics such as sea surface temperature five years or more into the future. These ocean characteristics play an important role in the timing of migration, spawning, and population dynamics of many economically important fish species such as blue whiting, makrel, Bluefin tuna, cod, herring, sandeel.

The Solution

Within the H2020 Blue-Action project, the National Institute of Aquatic Resources of the Technical University of Denmark, has developed a climate service by exploiting newly available predictive skill in climate model outputs: <https://fishforecasts.dtu.dk/> This climate service aims to improve the management of marine living resources, enabling productive and sustainable fisheries in both the short and long term. Blue-Action is working with a broad group of fisheries stakeholders to co-develop the first suite of marine ecological climate services for Europe. This has the potential to improve the way that fisheries are performed and the quality of fisheries management systems by facilitating better planning and reducing uncertainty associated with estimates of fish abundance, productivity, and fish stock dynamics.





(c) BlueAction

Above right: Blue Whiting (*Micromesistius pou-tassou*). Above left: Blue Whiting forecast habitat, 2019, the figure shows that the habitat is compacted against the shelf edge, but little or no spawning on Rockall Plateau. (Courtesy of Mark Payne, DTU Aqua)

Successful public briefing on climate services in Scotland

Since Scotland declared a climate emergency in 2019, there has been widespread interest in how policy-makers, NGOs, businesses and scientists can come together to exchange knowledge on how to respond. The Blue-Action project organised a public briefing and invited a range of stakeholders to discuss recent scientific developments and future directions on “Ocean observations and predictions in response to the climate emergency.”

The event took place 16th October 2019 at Edinburgh City Chambers, Edinburgh, UK. Four speakers from the Blue-Action project gave short presentations, followed by a question and answer session and an open moderated discussion.



The event was an opportunity to share cutting-edge research by European researchers on ocean observations and model projections, and how this work can lead to robust predictions of the physical characteristics and productivity of Scottish seas up to a decade in advance.



(c) BlueAction

This was an opportunity to share in discussions about how these findings translate into climate services, providing vital relevant information for diverse industries, including conservation, fisheries and transport.

A booklet describing the key messages from the briefing is publicly available here to download: <https://zenodo.org/record/3819943#.XtYKYDp-KiM8>

Local Demonstration of Climate Services for Renewable Electricity Regeneration in Rural West Africa

Seyni Salack¹, Safiétou Sanfo¹, Adjara Dindane¹, Aida Ganaba¹, Arthur Guischet², Girma K. Mensuro², Stefan Liersch³

The “Climate Information for Integrated Renewable Electricity Generation” (CIREG project) is deploying demand-driven climate services that address existing needs of policy makers and rural communities in Burkina Faso, Ghana, Niger, and Togo (Figure 1).

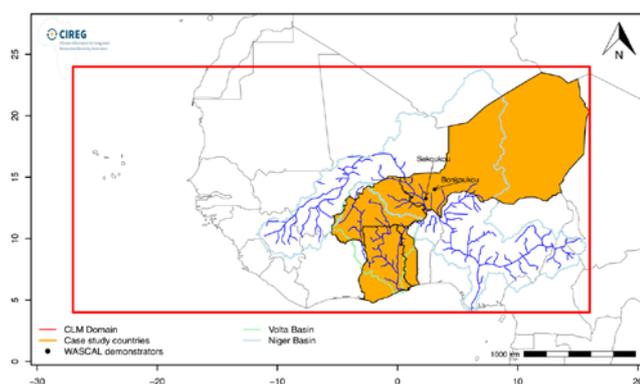


Figure 1: Case study countries and the location of demonstrator sites of the CIREG project

The CIREG project installed three demonstrators of renewable electricity generation to communities:

- An off-grid photo-voltaic (PV) power plant (Photo 1a), in Sekoukou (Niger). About 120 households of the village were connected, each receiving two lighting points and a multipurpose power socket.
- A centralized PV-based borehole water pumping system (Photo 1b) in Bonkoukou (Niger) to provide access to clean water for consumption and micro-irrigation of the villagers.

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2 Center for Development Research (ZEF), University of Bonn, Genscherallee 3, D-53113 BONN

3 Potsdam Institute for Climate Impact Research (PIK), RD2 Climate Resilience, Telegraphenberg A31, 14473 Potsdam, Germany

- A hybrid Hydropower-solar power generation in Gbandidi (Togo) to provide electricity to the local community business center.

The three demonstrators are flexible to future extensions and directly managed by the local communities. The community management business model is responsible for the maintenance, security, and payments for the long term sustainability of the demonstrators and their potential future extensions. Additional research activities are ongoing in these demonstrator sites to showcase of local climate services provision through WASCAL (www.wascal.org) in partnership with the consortium members of the project.

The CIREG project (<https://cireg.pik-potsdam.de/>) is part of ERA4CS, an ERA-NET Co-fund action initiated by JPI Climate, funded by BMBF (DE), FORMAS (SE), BELSPO (BE), and IFD (DK) with co-funding by the European Union's Horizon 2020 Framework Program (Grant 690462). The project is managed by the Potsdam institute on Climate impact research (PIK) and the consortium members include SEI, ZEF, VUB, DTU and WASCAL.



Family photo (top) with recipients of the off-grid PV power plant (bottom) at Sékoukou (Niger) for household electricity consumption. (c) CIREG

Please see the *recent publications* section for related journal articles.

E-magazine - valorisation of the JPI Climate projects results

Carmen Aalbers, Ingrid Coninx, Fokke de Jong, Petra Siebelink (Wageningen University & Research), Alexandre Fernandes (JPI Climate Central Secretariat), Martina Haindl (BOKU Vienna - Center for Global Change and Sustainability)

This e-magazine is the result of the work developed by SINCERE and ERA4CS projects, in close collaboration with the coordinators from the research projects featured in it, and has the intention to increase the societal impact of these projects, by disseminating their results and achievements in ways that are understandable to lay audiences.



JPI Climate has mobilised more than 100 Mio EUR in research investments and has provided access to knowledge and expertise across Europe and beyond. This has been possible with the support of its member countries and the European Commission (EC), and it has been done in partnership with other JPIs (such as FACCE-JPI , JPI Oceans, JPI Urban Europe) and, at the global level, with the Belmont Forum.

The e-magazine is meant to be a living document and to integrate the results from future research projects funded by JPI Climate.

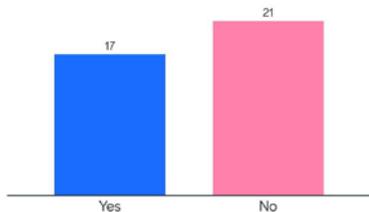
GERICS at the 4th Climateurope Webstival, November 19th 2020

Session: Quality assurance and standards for climate services

The 4th Climateurope Webstival on the 19th of November was again well prepared and creatively organised by the Climateurope project team.

The event focussed in the first session on quality assurance and standards for climate services. Agreeing on the prominence of this issue the discussion was encouraged by speed talks highlighting the effort towards quality assurance of the C3S climate data store and sectoral information system.

Have you ever performed an evaluation of your climate service product? Mentimeter



To complement the topic quality assurance, Dr. E. Keup-Thiel presented the QUACK tool (<https://climate.copernicus.eu/global-quality-assurance>) developed by the GERICS team (Zahid, M. et al, 2020: https://link.springer.com/chapter/10.1007/978-3-030-36875-3_10) in the C3S tender (C3S_422_Lot1_SMHI). The QUACK tool consists of a QQuality Assurance ChecKlist to make the quality assurance transparent. It is developed along an evaluation cascade (Schuck-Zoeller et al., 2017) from general to detailed, from dimension, criteria and indicators to a checklist and guidance material. Beside the presentations of the QUACK tool, a polling was organised to get a feedback if the audience ever performed an evaluation of their climate service products. The feedback of 37 participants of the first session on the 4th Webstival is shown in



the figure. The majority of the polling participants never evaluated their climate service product. However, climate service products need an evaluation to ensure the scientific quality and usability of the product.



Please see the *recent publications* section for related journal articles.

Webinar about indicators for transdisciplinary developed climate service products

To offer high quality and valid climate service products is one of the key tasks of climate services. For this reason, an evaluation of a climate service product is important to assess and enhance its quality and relevance.



(c) GERICS | E. Keup-Thiel, S. Schuck-Zöller

In the context of Helmholtz Open Science online seminars in September 2020 (<https://os.helmholtz.de/bewusstsein-schaerfen/workshops/online-seminare/>) moderated by Dr. Paul Schultze-Motel (Helmholtz Open Science Office), GERICS scientists Dr. Elke Keup-Thiel and Susanne Schuck-Zöller presented their experiences in developing and using a framework for the evaluation of transdisciplinary developed climate service products. This framework was developed and used based on a logical model approach (OECD, 2002) and the corresponding classification of a functional chain of input, activity, outputs, outcome and impact of a project.

HELMHOLTZ Open Science

The presented method focussed on outputs and outcome and allowed wide applications. However, for each evaluation planned the evaluation criteria and indicators should be adapted to the evaluation subject and goal.

Link to the presentation: https://os.helmholtz.de/fileadmin/user_upload/os.helmholtz.de/Workshops/helmholtz_oonlineseminar55_keupthiel.pdf (only in German)

OECD (2002) Glossary of key terms in evaluation and results based management, <http://www.oecd.org/development/peer-reviews/2754804.pdf>, last access 14 July 2016

Impact factor for the journal „Climate Services”

The peer-reviewed, scientific journal Climate Services has been selected for an Impact Factor from June 2021 onward. This is another milestone on the journal's road to success.

In cooperation with Elsevier, the Climate Service Center Germany (GERICS) had developed the Climate Services journal. Climate services pioneers'

novel research areas that directly refer to how climate information can be applied in methodologies and tools for adaptation to climate change.



(c) GERICS | J. Petersen

The Open Access journal, which is published four times a year, brings science and application together and serves as a platform for exchange between scientists and actors in practice. In order to address the science as well as the practice community, the journal introduced a new section in the research article type called practical implications. Additionally to the classical scientific part, the practical implication is an easy understandable section targeted for policy makers and practitioners, including actors from business, administration, politics and science.

Climate scientist Prof. Dr. Daniela Jacob, head of GERICS and the journal's Editor-in-Chief, is pleased about this milestone: „It is nice that the journal is becoming even better known in this way. I cordially invite scientists and practitioners from this broad field of work to publish their work with us“.

More information on: <https://www.journals.elsevier.com/climate-services/>

INNOVA: Innovation in Climate Services Provision

Have you have heard of Ezines? The ERA4CS project 'INNOVA: Innovation in Climate Services Provision' has published a series of narratives in digital forms that are exploitable during the Pandemic time.



The Ezines introduce various topics including cities' challenges on water quality and urban supply, island agro-ecological transition, urban development and coastal development and the outcomes of the local stakeholder workshops

Please see Ezines on the INNOVA project website:
<https://www.innovaclimate.org/ezines/>

The Climate & Our Community: Preparing our Citizens for Climate-Induced Migration

On Human Rights Day last year, 10th December 2019, Bristol (UK) held a first of its kind city-wide event on climate-induced migration, called [The Climate & Our Community](#). The event was officially shared during refugee week last month (15th – 21st June).

The day intended to be a space for learning and exchange between community members and leaders, with an emphasis on participation from across the city and from individuals from diverse backgrounds. Meena Rajput, Green Peace UK Diversity Manager, commented: "I was pleased to see such a diverse group of people - especially a high number of people from BAME communities. I would say it was the most diverse climate event that I have attended in my 6 years of working in this sector".

Stories from individuals and refugees with experience of climate impacts set the tone of the day. Participants were given the chance to collectively explore the topics of climate change and migration and what this means in terms of community values.

We believe open and inclusive discussion is a crucial first step in preparing our citizens for a radically different world. We see this event as not the end goal but a first step.

You can watch a [video on the event](#) here. A [shorter promo video](#) is also available here.

We would love to discuss different ways to foster conversation on climate-induced migration with other cities.

Feel free to get in contact with us to explore ideas:
ourclimate@bristol.cityofsanctuary.org

selection of the latest publications from the CSP community

Title: Six Priorities for Investment in Snow Research and Product Development

Authors: M. M. Hurwitz, Baxter, S., Brown, B., Carman, J., Dale, J., Draper, C. Horsfall, F., Hughes, M., Gerth, J., Kapnick, S., Olheiser, C., Olsen, M., Stachelski, C., Vincent, M., Webb, R.S., Zdrojewski, J.

Summary: The NOAA Snow Workshop took place virtually in March 2020. The workshop brought together the snow observation and research communities from offices across NOAA's National Weather Service (NWS), Oceanic and Atmospheric Research (OAR), and National Environmental Satellite, Data, and Information Service (NESDIS), along with subject matter experts from other agencies and organizations. Participants identified six priorities for snow research and product development, including the need for a unified snow dataset that ingests many types of snow observations, identifying gaps in the spatial observational record, and developing snow outlooks at subseasonal to seasonal timescales.

Link for more information: <https://journals.ametsoc.org/view/journals/bams/101/11/bamsD200218.xml>

Title: The missing middle of climate services: layering multiway, two-way, and one-way modes of communicating seasonal climate forecasts

Authors: C. Knudson, Zackery, G.

Summary: The production and distribution of seasonal climate forecasts (SCFs) have been principal global climate service activities for decades. During this time, the climate service community has increasingly moved away from using only one-way communication modes, like radio or bulletins, to also include multiway communication modes in the form of interactive models of science communication, like participatory workshops. The combination of such workshops with the more traditional unidirectional forms of communication helps climate service providers overcome many of the limitations that inhere in each form. However, important gaps remain even with the combination of

one-way and multiway modes of communication. In this article, we draw on 17 workshops we convened in six locations that engaged with 406 small-scale coffee farmers in the Jamaican Blue Mountains and 106 farmer interviews. These workshops aimed to improve farmer access to, and understanding of, weather and climate information. We argue that an intermediate form of communication between providers and users that takes place between workshops would help providers better tailor the one-way and multiway communication modes by evaluating in real time the users' understanding and use of the forecasts and by monitoring the dynamic context in which the users make decisions.

Link/DOI: <https://link.springer.com/article/10.1007%2Fs10584-019-02540-4>

Title: Behind the scenes of an interdisciplinary effort: conception, design and production of a flyer on climate change for the citizens of Hamburg

Authors: B. Steuri, Blome, T., Bülow K., El Zohbi J., Hoffmann P., Petersen J., Pfeifer S., Rechid D., Jacob D.

Summary: The goal of an interdisciplinary team of scientists at the Climate Service Center Germany (GERICS) was to make the findings of the special report IPCC SR1.5 more accessible to the citizens of Hamburg. Therefore, a flyer was created that is understandable to non-climate scientists, visually attractive and generates interest. It contains up-to-date climate information, readily understandable texts and several graphical visualisations. The team has been working intensively on analysing and processing further the consequences of a 1.5 degrees C global warming for the Hamburg metropolitan region. While the team's natural scientists elaborated the impacts on specific climate indices, other team members focused on the visualisation and communication of the results.

Link/DOI: <https://www.adv-sci-res.net/17/9/2020/>

selection of the latest publications from the CSP community

Title: Earth observation and coastal climate services for small islands**Authors:** L. Rölfer, Winter, G., Máñez Costa, M., Celliers, L.**Summary:** The workshop on Earth Observation and Coastal Climate Services for Small Islands, held in Guadeloupe in November 2019, brought together 35 participants constituting stakeholders predominantly from the Caribbean with representation from the Pacific and Indian Ocean region, as well as providers of climate and earth observation services. The workshop was jointly organized by the Climate Service Center Germany – Helmholtz Zentrum Geesthacht and the University of the French Antilles in Guadeloupe. The aims of the workshop were to: (1) recognize the common challenges and data needs of small islands in relation to risk reduction and climate change adaptation; (2) identify development needs for additional data services; and (3) identify useful methods for the dissemination of such services. The workshop format combined participatory methods, individual presentations, plenary discussions and group work. The presentations highlighted regionally (for the Caribbean) and globally available data sources as well as location specific case studies.**Link/DOI:** <https://www.sciencedirect.com/science/article/pii/S2405880720300200>**Additional information/material:** <https://www.innovaclimate.org/worksh> and [p-on-earth-observation-and-coastal-climate-services-for-small-islands/](https://www.p-on-earth-observation-and-coastal-climate-services-for-small-islands/)**Title: Smart renewable electricity portfolios for West Africa****Authors:** S. Sterl, Vanderkelen, I., Chawanda, C.J., Russo, D., Brecha, R.J., van Griensven, A., van Lipzig, N., Thiery, W.**Summary:** The worldwide growth of variable renewable power sources necessitates power system flexibility to safeguard the reliability of electricity supply. Yet today, flexibility is mostly delivered by fossil fuel power plants. Hydropower can be a renewable alternative source of flexibility, but only if

operated according to adequate strategies considering hourly-to-decadal and local-to-regional energy and water needs. Here, we present a new model to investigate hydro–solar–wind complementarities across these scales. We demonstrate that smart management of present and future hydropower plants in West Africa can support substantial grid integration of solar and wind power, limiting natural gas consumption while avoiding ecologically harmful hydropower overexploitation. We show that pooling regional resources and planning transmission grid expansion according to spatiotemporal hydro–solar–wind synergies are crucial for optimally exploiting West Africa’s renewable potential. By 2030, renewable electricity in such a regional power pool, with solar and wind contributing about 50%, could be at least 10% cheaper than electricity from natural gas.

Link/DOI: <https://www.nature.com/articles/s41893-020-0539-0>**Title: Evaluating co-creation of knowledge: from quality criteria and indicators to methods****Authors:** S. Schuck-Zöller, Cortekar J., Jacob D.**Summary:** Basic research in the natural sciences rests on a long tradition of evaluation. However, since the San Francisco Declaration on Research Assessment (DORA) came out in 2012, there has been intense discussion in the natural sciences, above all amongst researchers and funding agencies in the different fields of applied research and scientific service. This discussion was intensified when climate services and other fields, used to make users participate in research and development activities (co-creation), demanded new evaluation methods appropriate to this new research mode.

This paper starts by describing a comprehensive and interdisciplinary literature overview of indicators to evaluate co-creation of knowledge, including the different fields of integrated knowledge production. Then the authors harmonize the different elements of evaluation from literature in an evaluation cascade that scales down from very general evaluation dimensions to tangible assessment methods.

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They describe evaluation indicators already being documented and include a mixture of different assessment methods for two exemplary criteria. It is shown what can be deduced from already existing methodology for climate services and envisaged how climate services can further to develop their specific evaluation method.

Link/DOI: doi.org/10.5194/asr-14-305-2017

Title: What does quality mean to climate data users/providers and how to enable them to evaluate the quality of climate model data and derived products?

Authors: M. Zahid, El Zhobi, J., Viktor, E., Rechid, D., Schuck-Zöller, S., Keup-Thiel, E., Jacob, D.

Summary: The core of climate services is to provide high quality climate-related information and data that are beneficial for the users. Between the provision of data and the application of climate services, a chain of providers and subsequent users exists. It is an ongoing challenge for providers to conclusively define what users perceive as beneficial regarding the quality of climate model output. This study aims (1) to understand the needs of users with regard to the quality of climate data and information, and (2) to enable providers to assess the quality of climate data input and derived products. From a large-scale survey, we distilled three main user groups: (i) Donna data (data user/product provider), (ii) Pete product (product user/product provider) and (iii) Nick non (potential-user). The survey results show that all three user groups struggle—amongst other things—with identifying reliable climate model output, that is relevant to their needs. They also desire guidance on how to evaluate the quality of climate model data to determine the suitability of the selected dataset for their purpose. Addressing this central need is breaking new ground. The evaluation of quality in the field of climate services in terms of climate model output is of high relevance to both climate model data users and providers of tailored climate information and not restricted to scientific standards and technical quality. We present a customized and tested tool (“QUACK”) as one of the first

hands-on, scientifically-based and at the same time user-oriented guidelines on how to assure data quality and to self-evaluate the processing of the data.

Link/DOI: https://link.springer.com/chapter/10.1007/978-3-030-36875-3_10

Title: Identifying local governance capacity needs for implementing climate change adaptation in Mauritius

Authors: D.S. Williams, Rosendo, S., Sadasing, O., Celliers, L.

Summary: Climate change adaptation is a priority for Small Island States. Local capacities have been highlighted as a key constraint for implementing climate change adaptation measures. Methods for identifying local capacity needs are therefore key for enabling multi-level governance to effectively respond to climate change. Hence, this study carries out a local governance assessment based on evaluative criteria to identify local capacity needs for implementing climate change adaptation in Mauritius, and co-develops eight policy recommendations to address the identified capacity needs.

Link/DOI: <https://www.tandfonline.com/doi/full/10.1080/14693062.2020.1745743>

Title: Ocean circulation causes the largest freshening event for 120 years in eastern subpolar North Atlantic.

Authors: N. P. Holliday, Bersch, M., Berx, B., Chafik, L., Cunningham, S., Florindo-López, C., ... & Mulet, S.

Summary: The Atlantic Ocean overturning circulation is important to the climate system because it carries heat and carbon northward, and from the surface to the deep ocean. The high salinity of the subpolar North Atlantic is a prerequisite for overturning circulation, and strong freshening could herald a slowdown. We show that the eastern subpolar North Atlantic underwent extreme freshening during 2012 to 2016, with a magnitude never seen before in 120 years of measurements. The cause was unusual winter wind patterns driving major changes in ocean circulation, including slowing of the North

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Atlantic Current and diversion of Arctic freshwater from the western boundary into the eastern basins. We find that wind-driven routing of Arctic-origin freshwater intimately links conditions on the North West Atlantic shelf and slope region with the eastern subpolar basins. This reveals the importance of atmospheric forcing of intra-basin circulation in determining the salinity of the subpolar North Atlantic.

Link/DOI: <https://www.nature.com/articles/s41467-020-14474-y>

Title: Unraveling the choice of the north Atlantic subpolar gyre index

Authors: V. Koul, Tesdal, J. E., Bersch, M., Hátún, H., Brune, S., Borchert, L., ... & Baehr, J.

Summary: The north Atlantic subpolar gyre (SPG) has been widely implicated as the source of large-scale changes in the subpolar marine environment. However, inconsistencies between indices of SPG-strength have raised questions about the active role SPG-strength and size play in determining water properties in the eastern subpolar North Atlantic (ENA). Here, by analyzing various SPG indices derived from observations and a global coupled model, we show that the choice of the SPG index dictates the interpretation of SPG strength-salinity relationship in the ENA. Variability in geostrophic currents derived from observed hydrography and model based Lagrangian trajectories reveal zonal shifts of advective pathways in the ENA and meridional shifts in the western intergyre region. Such shifts in advective pathways are manifestations of variability in the size and strength of the SPG, and they impact salinity by modulating the proportion of subpolar and subtropical waters reaching the ENA. SPG indices based on subsurface density and principal component analysis of sea surface height variability capture these shifts in advective pathways, and are therefore best suited to describe SPG-salinity relationship in the ENA.

Our results establish the dynamical constraints on the choice of the SPG index and emphasize that SPG indices should be cautiously interpreted.

Link/DOI: <https://doi.org/10.1038/s41598-020-57790-5>

Title: A sea change in our view of overturning in the subpolar North Atlantic

Authors: M.S. Lozier, Li, F., Bacon, S., Bahr, F., Bower, A. S., Cunningham, S. A., ... & Gary, S. F.

Summary: To provide an observational basis for the Intergovernmental Panel on Climate Change projections of a slowing Atlantic meridional overturning circulation (MOC) in the 21st century, the Overturning in the Subpolar North Atlantic Program (OSNAP) observing system was launched in the summer of 2014. The first 21-month record reveals a highly variable overturning circulation responsible for the majority of the heat and freshwater transport across the OSNAP line. In a departure from the prevailing view that changes in deep water formation in the Labrador Sea dominate MOC variability, these results suggest that the conversion of warm, salty, shallow Atlantic waters into colder, fresher, deep waters that move southward in the Irminger and Iceland basins is largely responsible for overturning and its variability in the subpolar basin.

Link/DOI: <https://doi.org/10.1126/science.aau6592>

Title: Less Information, Similar Performance: Comparing Machine Learning-Based Time Series of Wind Power Generation to Renewables.ninja

Authors: J. Baumgartner, Gruber, K.; Simoes, S., Saint-Drenan, Y., Schmidt, J.

Summary: Driven by climatic processes, wind power generation is inherently variable. Long-term simulated wind power time series are therefore an essential component for understanding the temporal availability of wind power and its integration into future renewable energy systems. In the recent past, mainly power curve-based models such as Renewables.ninja (RN) have been used for deriving

synthetic time series for wind power generation, despite their need for accurate location information and bias correction, as well as their insufficient replication of extreme events and short-term power ramps. In this paper, we assessed how time series generated by machine learning models (MLMs) compare to RN in terms of their ability to replicate the characteristics of observed nationally aggregated wind power generation for Germany. Hence, we applied neural networks to one wind speed input dataset derived from MERRA2 reanalysis with no location information and two with additional location information. The resulting time series and RN time series were compared with actual generation. All MLM time series feature an equal or even better time series quality than RN, depending on the characteristics considered. We conclude that MLM models show a similar performance to RN, even when information on turbine locations and turbine types is unavailable.

Link/DOI: <https://www.mdpi.com/1996-1073/13/9/2277>

upcoming events in the climate and climate services community

Climate Adaptation Summit 2021 25 - 26 January 2021

Online worldwide

At the online international Climate Adaptation Summit (CAS) 2021 on 25 and 26 January, hosted by the Netherlands, global leaders will launch a comprehensive Adaptation Action Agenda. It will set out clear commitments to deliver concrete new endeavours and partnerships to make our world more resilient to the effects of climate change.

Over the course of 24 hours, a range of events streamed from time zones across the globe will inspire change and support tangible solutions to the problems of a warming world, showing how we can achieve a climate-resilient future.

More details: <https://www.cas2021.com/>

European Climate Change Adaptation Conference - ECCA 2021

May and June 2021

Brussels, Belgium & online

JPI Climate, together with the European Commission and EU projects SINCERE, RECEIPT and CASCADES will lead the organisation of the next European Climate Change and Adaptation Conference (ECCA) in 2021.

Climate change is considered by many to be the challenge of the 21st century. The urgency and severity of this challenge, call for integrated ways of looking at responses to reduce the risks associated with environmental and social stressors, and ensure a secure future for humans and ecosystems. Adapting to climate change requires a coordinated and synergistic approach from a diverse range of actors across sectors, as well as questioning assumptions about the drivers of risk, vulnerability and environmental change.

A cooperative approach is allowing to improve learning and knowledge exchange in order to deliver optimal solutions. Interaction and collaboration with the disaster risk reduction (DRR) community, is a critical element in improving climate change adaptation (CCA), as the communities share similar goals and activities. Bringing the two groups together is particularly important in relation to the goals and targets of the three major international agreements: Paris, Sendai Framework for DRR and the Sustainable Development Goals, and along the European Green Deal.

The European Climate Change Adaptation Conference (ECCA) is Europe's largest conference on CCA, and is a perfect platform for exchanging knowledge between scientist, policy makers and practitioners.

More details: <http://jpi-climate.eu/ecca2021>

26th UN Climate Change Conference of the Parties (COP26)

1 - 12 November 2021

Glasgow, UK; in cooperation with Italy

The COP26 summit will bring parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change.

The UK is committed to working with all countries and joining forces with civil society, companies and people on the frontline of climate change to inspire climate action ahead of COP26.

More details: <https://ukcop26.org/>

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2021 Global Conference on Health and Climate Change

6 - 7 November 2021

Glasgow, UK

The 2021 Global Conference on Health & Climate Change with a special focus on Climate Justice, will convene at the margin of the COP26 UN climate change conference. The aim of the conference is to support and showcase Nationally Determined Contributions (NDCs) to the Paris Agreement which are ambitious, based on the principles of justice and equity, and promote and protect health. It will also mobilize the rapidly growing movement of health professionals around the world who are now driving ambitious climate action.

The conference will be organized by the World Health Organization (WHO) and by the Global Climate and Health Alliance (GCHA), in close collaboration with Glasgow Caledonian University and its Centre for Climate Justice, with the UK Health Alliance on Climate Change, and other partners.

More details: <https://www.who.int/news-room/events/detail/2021/11/06/default-calendar/2021-global-conference-on-health-and-climate-change>

AdaptationFutures2020 -

postponed due to CoVid-19 and partly replaced by online events - please see the link below for information on new dates in 2021

It is the sixth in the Adaptation Futures international conference series on global adaptation and the first to be held in Asia. Adaptation Futures is the flagship event of the World Adaptation Science Program, which is one of the four components of World Climate Programme (WCP) based on the World Meteorological Organisation Congress XVI Resolution 18. As a premier event in the global adaptation spectrum, Adaptation Futures is a unique platform to facilitate dialogues towards action oriented solutions from a diverse range of stakeholders that includes academia, practitioners, scientists and policy makers from across the world.

More details: <http://adaptationfutures2020.in/>

The following web page shows more events:

<https://climate-adapt.eea.europa.eu/more-events>



The Climate Services Partnership (CSP) is a platform for knowledge sharing and collaboration to advance climate service capabilities worldwide. CSP members are climate information users, providers, donors, and researchers; though they represent diverse interests, all are actively engaged with climate services through their own programmes and activities. Partners collaborate to develop and improve climate services; they also learn from each other by sharing resources and experiences. The CSP creates a venue to generate new knowledge, establish best practices, and promote a resilient, sustainable, and climate-smart future. More information is also available on our website: www.climate-services.org.

The CSP newsletter is a publication meant to keep all informed of the latest updates of the partnership community. We rely on you for news of your activities, upcoming events, and recent publications.

Editorial board: Tanja Blome, Daniela Jacob, María Máñez Costa, Irene Fischer-Bruns (all GERICS)



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