1 — About JPI Climate

2 — Projects' actions & impact

3 — JPI Climate calls

4 — Projects' staff, stakeholders & expertise

SINCERE

About JPI Climate

Climate change is the defining challenge of our time. It is changing the world as we know it. How we respond to the causes of climate change and its consequences will uniquely define the future for our world and humanity. Many of the major changes we are currently seeing, such as sea-level rise and glacier loss, as well as their increasing impacts on vulnerable communities and ecosytems, are irreversible on human time scales.

Science has been key in informing political and policy responses in this area. These include the adoption of the Paris Agreement in 2015, which provides a framework for global actions on climate change. The Paris Agreement itself recognises the need for the ongoing use of "the best available science" and the information provided by systematic observations in the achievement of its goals.

The individual and collective investments by European countries in climate change research and innovation mean that Europe is at the forefront of providing the best available science. Since its establishment, the Joint Programming Initiative *"Connecting Climate Knowledge for Europe"* (JPI Climate) has been at the centre of pan-European investments in climate change research and in harnessing their outcomes to inform effective responses by policy-makers and practitioners. Ultimately, these efforts are designed to underpin the European efforts in tackling climate change.

JPI Climate is an intergovernmental initiative that coordinates shared strategic research investments and provides climate knowledge and services for European and national climate strategies. It is Europe-focused, but its outputs have global reach and value. Its mission is to provide science to inform the implementation of the Paris Agreement and the 2030 Agenda for Sustainable Development, including its Sustainable Development Goals. 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.
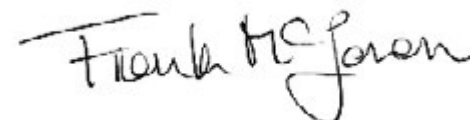
The *"European Research Area for Climate Services"* (ERA4CS) is JPI Climate's flagship project on climate services (in collaboration with the EC). ERA4CS is designed to boost the development of efficient climate services. It includes 45 partners from 18 European countries, with an overall budget of approximately 65 Mio EUR, which supports 26 projects.

JPI Climate has and continues to fund projects that advance the understanding of fundamental climate science and the societal transformations that are required in the face of climate change. It is also exploring key current issues, such as carbon neutrality and achievement of a balance between greenhouse gas emissions and removals, as required under the Paris Agreement. In total, 53 research projects have been (or are currently being) funded by JPI Climate, with two upcoming calls in the pipeline.

"Strengthening INternational Cooperation on climatE change REsearch" (SINCERE) is a priority project for JPI Climate and the EC, given that it works towards enhancing the use of climate information and knowledge provided by European research investments, both within Europe and with our global partners. In doing this, SINCERE aims to increase the societal impact of these research investments, by disseminating their results and findings to decision-makers, practitioners and the public.

This e-magazine has been developed as part of the SINCERE project and seeks to provide a window on the work being done by JPI Climate with its partners within Europe and more widely.

I hope that you enjoy reading it and please provide us with feedback on its contents and how these can be improved.

Frank McGovern, *Chair, JPI Climate Governing Board*

Thematic areas
- Societal transformation in the face of climate change
- Climate science
- Climate services

Row 1

SELF CITY | EPCC | HOPE (HOusehold Preferences for reducing greenhouse gas emissions in four European high income countries) | mobilizing grassroots | ARCTIC CENTRE University of Lapland | JPI TransAdapt (ANALYSING COMMUNITY FLOOD RISK MANAGEMENT) | SIWA

SELF CITY	EPCC	HOPE	mobilizing grassroots	Arctic Centre	TransAdapt	SIWA
• self-organisation • responses • capacity building	• public perceptions • cross- national survey • climate change • policy support	• carbon footprint • climate change mitigation • sustainable lifestyles	• grass roots initiatives • mobilising grassroots • crenewable energy challenge	• nomadic pastoralism • reindeer herding • social-ecological systems	• adaptation • bottom-up approach • drivers • barriers	• Siberia • lakes • rivers • greenhouse gas

Row 2

COUP EU-JPI climate | LowPerm | CLIMAX (Climate Services Through Knowledge Co-Production) | HIWAVES3 | ʃNTEGRATE | InterDec | PaCMEDy (Palaeoclimate Constraints on Monsoon Evolution and Dynamics) | PREREAL (predicting circumboreal fires) | BITMAP

COUP	LowPerm	CLIMAX	HIWAVES3	ʃNTEGRATE	InterDec	PaCMEDy	PREREAL	BITMAP
• permafrost • climate change	• permafrost • biogas • active layer • Svalbard	• co-production • climate prediction • vegetation models • South America	• impact extremes • compound events • climate ensemble • climate modelling	• teleconnections • paleoclimate • monsoons • climate variability	• Arctic Amplification • Arctic sea ice decline • extreme temperatures	• monsoon • El Niño Southern oscillation	• forest fire activity • predictability of fire • fire history • fire forecast	• BITMAP • climate change • western disturbances • storm tracking

Row 3

GOTHAM | AquaClew | CIREG | Citizen Sensing | Clim2Power | CLIMALERT (Climate Alert Smart System) | ClimApp | Clim INVEST (Tailored climate risk information for financial decision makers) | CLISWELN

GOTHAM	AquaClew	CIREG	Citizen Sensing	Clim2Power	CLIMALERT	ClimApp	Clim INVEST	CLISWELN
• teleconnections • El Nino; monsoons • weather@home • Belmont-GOTHAM	• co-development • adaptation • climate change • water management	• renewable energy • West Africa • power mix • climate change	• urban resilience • climate services • participatory risk management	• climate services • seasonal forecasts • renewable energy • climate adaptation	• climatic events • biodiversity • ecosystem services • good practices	• personalized warning • personalized advice • thermal stress • heat stress	• physical climate risk • TCFD • climate finance	• climate services • nexus • drought • cities

Row 4

Co-development of place-based Climate Services for action | CO-MICC | CoCliME | EVOKED | INNOVA Climate Service Provision | INSeaPTION | ISIpedia | SALIENSEAS | SENSES

Co-development	CO-MICC	CoCliME	EVOKED	INNOVA / INSeaPTION	ISIpedia	SALIENSEAS	SENSES
• naratives • scenario • co-development	• climate change hazards • climate change adaptation • uncertainty	• marine ecosystem • biotoxins • pathogens • blooms	• climate services • living Labs • risk • uncertainty	• climate services • local adaptation • innovation • adaptation cycle	• coastal climate services • extra probabilistic sea-level projections • sea level services	• climate change impacts • cross-sectoral simulations	• Arctic shipping • Arctic cruise tourism • sea ice forecasting • sea ice dynamics	• climate change scenarios • toolkit • co-production

Row 5

WATExR | DustClim | ECLISEA | Eupheme | Indecis Sectorial Climate Services | MEDSCOPE (MEDiterranean Services Chain based On climate PrEdictions) | SERV_FORFIRE (INTEGRATED SERVICES AND APPROACHES FOR FIRE MONITORING) | URCLIM | WINDSURFER

WATExR	DustClim	ECLISEA	Eupheme	Indecis	MEDSCOPE	SERV_FORFIRE	URCLIM	WINDSURFER
• extreme events • water quality • co-development • seasonal prediction	• dust • reanalysis • aviation • solar energy	• coastal climate hazard • coastal impacts • sea level rise	• climate change • global warming • extreme weather • attribution	• climate datasets • climate indices • climate software	• seasonal forecasts • climate services • Mediterranean region • Mediterranean climate	• fire and post fire risk seasonal forecast • mitigation strategy • emissions	• urban heat island • downscaling methods • air quality • urban maps	• extremes • storms • waves • climate change

EPCC

European Perceptions of Climate Change

What is the EPCC project about?

EPCC gathered information on how people feel about climate change, whether they support climate policies and what energy sources are most popular across four European countries (France, Germany, Norway, the UK). In collaboration with international advisors, the research team designed a survey that was carried out in June 2016 simultaneously in the four countries through face-to-face and telephone interviews, with just over 4 000 respondents. The answers given showed that most people in these countries are very concerned about climate change and do believe that humans contribute to the changing climate. Findings Report.

Coastal buildings at risk of climate change.

Highlights

- Across France, Germany, Norway and the UK there is strong support for the Paris COP-21 Climate Agreement, for renewable energy sources and for preparing the country for the impacts of climate change.
- Most people in France, Germany, Norway and the UK think that we are already feeling the impacts of climate change now.
- Respondents in Norway were generally most concerned about climate change and expressed the strongest support for policies that aim to reduce national greenhouse gas emissions.

Keywords / hashtags

Keywords: public perceptions, cross- national survey, climate change, EPCC, policy support
Hashtags: #EPCC, #climatechange, #publicperceptions

Potential societal impacts

Results of EPCC provide important insights into how climate change and related issues are perceived by people living in four large European nations. These insights help to identify which responses to climate change are already popular amongst the public and provide suggestions for effective communication strategies – such as to focus on the strong support for international agreements. Our project partner Climate Outreach published important recommendations for public engagement and communication strategies in a separate (freely available) report.
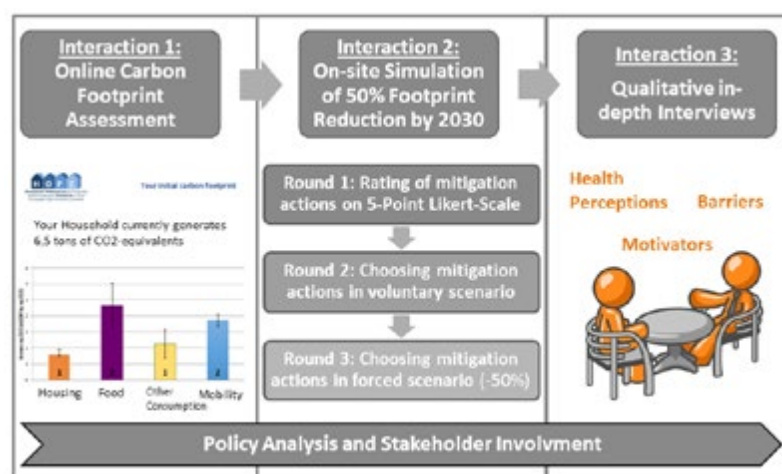
HOPE

Household Preferences for reducing greenhouse gas emissions in four European high-income countries

What is the HOPE project about?

In the HOPE project we investigated what households in France, Germany, Norway and Sweden are willing to do to reduce their carbon footprint. Keeping in mind the international goal to keep global warming at 1,5°C, we even challenged households to half their carbon footprint. With a precise tool we first calculated households' carbon footprints and then provided them up to 60 options to reduce it. Afterwards we interviewed households to identify the motivators and barriers to reduce emissions, including health aspects of more sustainable lifestyles. The household survey was accompanied by a policy analysis, evaluating current climate policies and their affect on households.

Adapted from Herrmann *et al*: Household preferences for reducing greenhouse gas emissions in four European high-income countries: Does health information matter? A mixed-methods study protocol. *BMC public health* 2017, 18(1):71.

Highlights

• With current policy support, households in those four European countries would at the maximum reduce their carbon footprint by 25%. Health seems to be a relevant motivator for households to consider sustainable lifestyle options. However, many barriers still prevent households from substantial carbon footprint reductions. Climate policy-making has to be more focused on promoting lifestyle and consumption-changes, also implementing regulative policy instruments like carbon taxes.

• Households were most willing to reduce emissions in the food and recycling sector. Households even wished for stronger regulations for industry to make it easier for them to buy food with less or greener packaging.

• Households found it most difficult to reduce emissions in the mobility sector (esp. car and plane use). Alongside policies supporting sustainable mobility choices, a whole new public discourse about mobility is needed to substantially reduce emissions in this sector.

Keywords / hashtags

Keywords: carbon footprint, climate change mitigation, sustainable lifestyles, climate policy; health

Hashtags: #household, #reduction, #greenhousegases

Potential societal impacts

We believe that our results can encourage policy makers to implement a policy-mix consisting of incentives plus regulations in sectors where they are accepted (e.g. food and recycling). In sectors like mobility, first of all infrastructural investments are needed to make healthy and sustainable transport modes easy and affordable. However, more ambitous climate policies in the mobility sector are necessary. It is particularly crucial to involve civil society in policy decision making by fostering a public discourse about sustainable lifestyles within our planetary boundaries.

MOBGIs

Mobilizing grassroots capacities for sustainable energy transitions: path improvement or path change?

mobilizing grassroots

What is the MOBGIs project about?

The project is about grass roots initiatives and innovations in the domain of renewable energy. It takes stock of all the renewable energy grassroots initiatives that exist in Denmark, Sweden and the Netherlands, focusing on innovations and networking. This study, supplemented with a media framing analysis, produced dedicated case studies capturing the innovative capacities of these dispersed, yet creative, networks to provide policy advice to decision-makers.
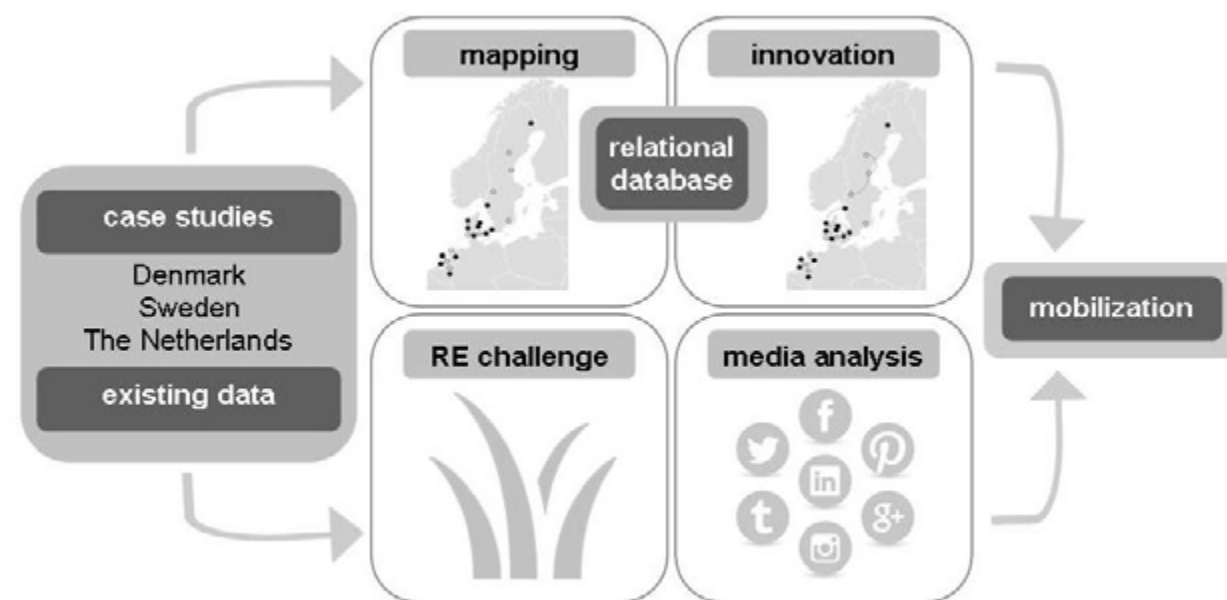
Overview of research steps in MOBGIs.

Highlights

- MOBGIs created an extensive database of all renewable energy grass roots initiatives (GIs) in Denmark, Sweden and the Netherlands.
- A media analysis revealed that GIs are related to different aspects than just the technical framing of renewable energy that we see in media more generally. GIs are more related to *social aspects*, focusing on the importance for the community in which they are located.
- In Sweden, GIs are *covered far less* in media compared to Denmark and the Netherlands. The focus on GIs' importance for *local development* is particularly emphasised in the Netherlands. Whereas the focus in Denmark is given to aspects of *innovation and technology.*

Keywords / hashtags

Keywords: grass roots initiatives, mobilising grassroots; renewable energy challenge; media framing, energy cooperatives

Hashtags: #grassroots, #energy transition, #civilsociety, #energycooperatives

Potential societal impacts

The project contributes to broader awareness of energy transition and of the possibility of a decentralised, citizens' based movement in the energy transition. It delivers a comparison of the role of cooperatives in the energy transition in three countries (Sweden, Denmark and The Netherlands) and shows how energy cooperatives are framed and position themselves, how they are facilitated by governments or markets in different ways. This contributes to cross-country learning to strengthen the role of civil society in the energy transition, both for civil society actors with regard to positioning themselves and for local governments to facilitate community initiatives.

HUMANOR

Social-Ecological Transformations:
Human-Animal Relations Under Climate Change in Northern Eurasia

ARCTIC CENTRE
University of Lapland

What is the HUMANOR project about?

The HUMANOR project examines both climatic and non-climate drivers of societal transformations in nomadic pastoralist social-ecological systems across Northern Eurasia. Across diverse geographic scales it focuses on retrospective partitioning of: (1) socio-economic & political from climate drivers over decadal scales; and (2) human-animal agency from climate drivers over centennial scales. It involves indigenous people from herding societies in all phases of the research. We demonstrate that both ancient and modern pastoralism have been constantly undergoing shifts in terms of feedbacks between humans, animals and the environment. Modern herders have important knowledge to contribute to the co-production of knowledge to facilitate resilience.

Uppsala University, Sweden re-interviewed Swedish Sámi reindeer herding families after 30 years.

Highlights

- There is important evidence of socio-cultural, economic and environmental drivers of the transition from wild (hunted) to semi-domesticated (herded) reindeer in West Siberia.
- We document a transition from a narrative dominated by concerns about mutual coexistence of reindeer herding with large-scale hydrocarbon extraction in West Siberia, to one dominated by concerns about extreme weather, and cascading social-ecological impacts.
- In Fennoscandia, the expansion of reindeer herding took place during a period of cold, stable climate, The Little Ice Age (AD1300 to AD1900). Around AD1900 a transformation to extensive reindeer herding started focusing on meat production.

Keywords / hashtags

Keywords: nomadic pastoralism, reindeer herding, social-ecological systems, dendroclimatology, arctic tundra
Hashtags: #arctic, #climatechange, #resilience

Potential societal impacts

Our stakeholder-driven research addresses highly applied topics to develop a more complete and nuanced understanding of highly complex social-ecological systems in the Eurasian North. By taking both non-climatic and climate drivers into account, our findings can contribute to the formulation of policies that aim for adaptive forms of governance in the study regions.

Through working directly with science exhibitions in e.g. Finland, Sweden and Russia, HUMANOR is contributing to improve public perceptions of modern nomadism and get beyond simplistic and overtly negative narratives, such as "overgrazing".

TRANS-ADAPT

Societal transformation and adaptation necessary to manage dynamics in flood hazard and risk mitigation

JPI TransAdapt
ANALYSING COMMUNITY FLOOD RISK MANAGEMENT

What is the TransAdapt project about?

Losses from extreme hydrological events have focused the attention of policymakers how to response to increasing natural hazard risks. Citizens and local communities are setting up initiatives for natural hazard risk management that may complement existing top-down initiatives by national governments. A major challenge is to represent the complexity of coupled human-environmental systems and particularly the feedback loops between environmental dynamics and human decision-making processes on different scales. The project analysed local initiatives to natural hazard risk management which are different from the mainstream. For the final report.

Alpinarium.
Credits: M. Keiler.

Entrance shooting range in Großkirchheim.
Credits: A. Rieger.

Highlights

- Significant evidence suggests that current adaptation efforts are incommensurate with the scale and rate at which climate change is occurring.
- To effectively respond to increasing climate change risks, large-scale transformative adaptation is being proposed. TRANS-ADAPT examines the opportunities/challenges associated with transformative adaptation in the context of natural hazards risk management using empirical examples from across Europe.
- According to our findings, key drivers of community-based initiatives with multiple functionality and use include: (i) lack of funding, (ii) lack of legal protection or (iii) lack of space, where classical risk management measures can no longer respond to new circumstances. In contrast, key barriers relate to: (i) lack of local capacities, (ii) lack of local political support and (iii) technological challenges in the implementation phase.

Keywords / hashtags

Keywords: adaptation, bottom-up approach, drivers, barriers, multi-functional
Hashtags: #adaptation, #natural hazards, #community, #engagement

Potential societal impacts

TRANS-ADAPT offers valuable empirical insights into the process of transformation and an opportunity to learn from empirical examples of how transformative approaches in flood risk management can be organised. The aim of the TRANS-ADAPT project is to support innovative solutions to mitigate natural hazard events. This fosters enhanced approaches in risk mitigation and contributes to disaster risk reduction and achieving the Sustainable Development Goals and the Paris Agreement. TRANS-ADAPT shows the lack of knowledge and action related with attempting societal transformation in disaster risk management, by drawing on findings from eleven case studies across four European countries (Austria, France, Ireland and the Netherlands). Priority should be given encouraging communities to engage in transformative adaptation, as they often showed innovative ideas and concepts which were then further developed and implemented. Nevertheless, this ambitious policies also request resources and capacities at local, regional and national level.

SIWA

Climate impact on the carbon emission and export from Siberian inland waters

What is the SIWA project about?

This interdisciplinary project links expertise in aquatic biogeochemistry, hydrology and permafrost dynamics. SIWA aims to better understand the role of high latitude inland waters in the carbon cycle and how this varies across different climate zones. The project produced comparative studies of lake-stream networks across climate and permafrost gradients in western Siberia. The main objective was to quantify to what extent terrestrial carbon export is emitted to the atmosphere versus exported downstream in river networks along the gradients, and how these fluxes are related to differences in hydrological dynamics.

Highlights

- SIWA producted the first quantification of carbon emissions from Siberian lakes and rivers along gradients in climate and permafrost, showing overall high atmospheric emissions and high emission:export ratios.
- Different patterns of carbon fluxes were identified in different water bodies: riverine carbon emissions increase but lake carbon emissions decrease with warmer climate and thawing of permafrost.

Keywords and hashtags

Keywords: Siberia, lakes; rivers, greenhouse gas, permafrost
Hashtags: #carbon, #emission, #cycle, #inland, #waters

Potential societal impacts

Major advancement in the understanding of Siberian inland waters in the carbon cycle at high latitudes, and their role in the permafrost carbon feedback. This results in improved accuracy of assessments of current and future carbon cycle and feedbacks on the climate system.

COUP

Constraining uncertainties in the permafrost-climate feedback

COUP
EU-JPI climate

What is the COUP project about?

COUP aimed to improve the way climate models deal with permafrost, ground that is frozen all year round. As the global climate warms, thawing permafrost may lead to increased greenhouse gas release from the huge amounts of carbon frozen into the earth. This permafrost-carbon climate feedback is important, but remains poorly understood. The overall aim of COUP is to use detailed understanding of landscape-scale processes to improve global scale climate models. Better predictions of how permafrost areas will respond to a warming climate can help us understand and plan for future global change.

Highlights

- COUP supported new field campaigns which allowed us to samples soils and describe ecosystems in unique, remote Arctic locations. This includes the first studies of peat-rich mountain soils in NW Canada and discovering a new source of methane from the receding Greenland ice-sheet.
- COUP used field data to improve the state-of-the-art CryoGRID permafrost model that will form the basis of the next official global permafrost map.
- In COUP, we were able to use knowledge from detailed studies and specialised permafrost models to improve the global scale climate model UKESM. New runs with the improved model showed us that the permafrost-carbon feedback is important to consider if we want to reach global warming stabilisation at +1.5 or 2° C.

Keywords

Keywords: JPI COUP, permafrost, climate change, permafrost carbon feedback, climate model

Potential societal impacts

COUP has generated extensive new knowledge about the permafrost-climate feedback, especially focusing on low emissions scenarios relevant to the COP21 Paris Agreement and the SDG no 13 "Climate Action" under the 2030 Agenda for Sustainable Development. These results have been published in high impact papers that are being absorbed into high-level syntheses documents, such as reports from the IPCC. The results of this research thus has the potential to influence global climate policy.

LowPerm

More than methane: quantifying melt-driven biogas production and nutrient export from Eurasian Arctic lowland permafrost

LowPerm

What is the LowPerm project about?

LowPerm examined greenhouse gas release from Arctic floodplain sediments. The analysis of sediment cores showed a preoccupation with iron and sulphur cycling by microbes in the summer thaw layer, making CO2 emissions far greater than methane emissions. However, we also discovered vast reserves of methane trapped beneath permafrost, but capable of escaping through groundwater seeps. Emissions of these greenhouse gases was partially compensated by the fertilising effects of rivers, which now carry more nutrients to marine plankton capable of removing CO2 via photosynthesis. However, the deeper sources of methane represent a new area of great uncertainty for emissions forecasting.

The LowPerm study domain: a deltaic, post-glacial permafrost landscape largely overlooked by Arctic research. Methane seeps upwards from deep, natural (geogenic) gas. Younger biogenic methane sources also exist beneath the permafrost and in either unfrozen marine sediments or the seasonal thaw layer in sediments above sea level.
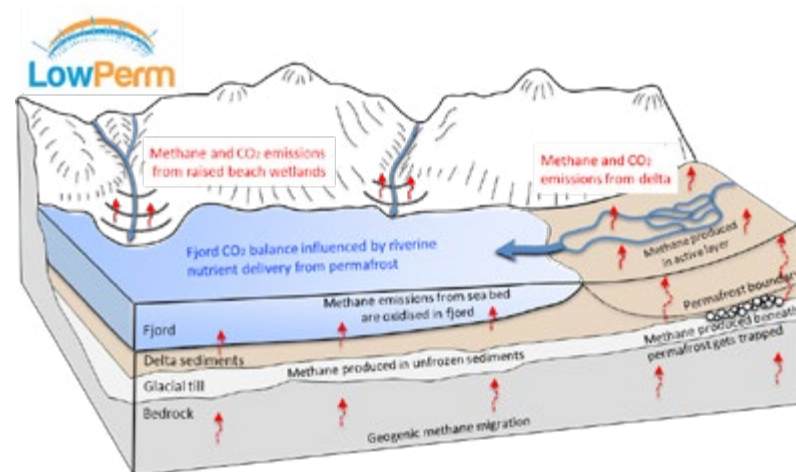
Highlights

- Today's greenhouse gas emission hotspots in Arctic fjord coastlines include sediments uplifted from the sea floor after the retreat of the great ice sheets began 10000 years ago.
- The uplift caused the marine sediments to freeze, trapping lots of methane underneath. The escape of this methane to the atmosphere requires inclusion in emission estimates, because it is sensitive to climate change.
- Micro-organisms such as bacteria and archaea control the production of methane in the summer thaw layer and beneath the permafrost. They also reduce methane emissions by either consuming it or by using iron and sulphur as alternative energy sources.

Keywords / hashtags

Keywords: permafrost, biogas; active layer, Svalbard; fjords
Hashtags: #permafrost, #thaw, #Arctic, #methane, #chemistry

Potential societal impacts

LowPerm provided further evidence that our understanding of methane emissions from surface and sub-surface permafrost sources must improve if we are to work out how best to prevent dangerous increases in greenhouse gas emissions throughout the rest of the 21st century.

LowPerm was important for society's perception of climate change feedbacks because it demonstrated that there are complex and variable natural emission sources in remote parts of our planet which are controlled by unstoppable processes that began at the end of the last ice age. This is why our own, far greater emissions of greenhouse gases urgently need better management: because they are easier to quantify and then control.
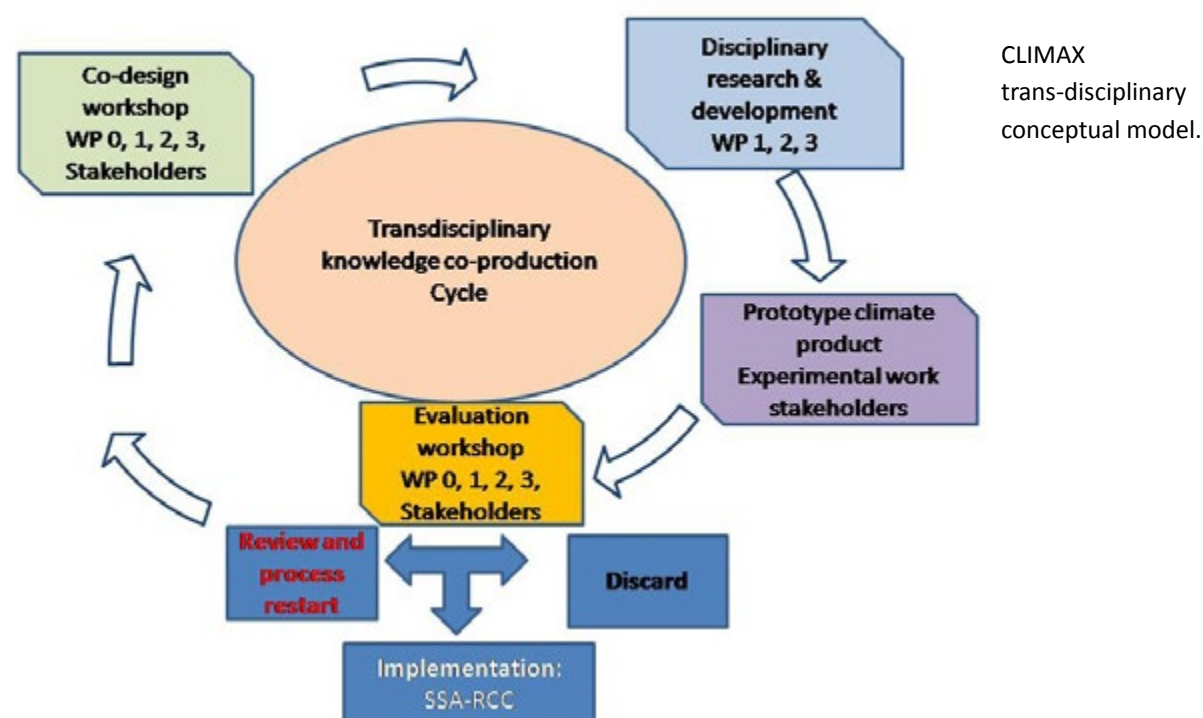
CLIMAX

Climate services through knowledge co-production

CLIMAX
Climate Services
Through Knowledge
Co-Production

What is the CLIMAX project about?

CLIMAX is an inter- and trans-disciplinary project implemented to underpin climate services in South America. CLIMAX engages scientists as well as key actors from national meteorological services, public institutions and civil society organizations. The project is intended to better understand climate variability and predictability in South America, to develop innovative monitoring and prediction tools of regional climate, and to co-produce climate-related knowledge of relevance for agriculture and hydropower sectors.

CLIMAX trans-disciplinary conceptual model.

Highlights

- The developed new dynamic vegetation models better simulate the interaction between tropical vegetation and climate variability. They provide novel insights about the impact of land use change on climate, as well as they evaluate high-impact events such as drought on rainforest in South America.
- CLIMAX' innovative monitoring and prediction tools deliver regional climate information. Specific products of relevance for agriculture and hydrology sectors have been made, such as new monitoring indices and prediction information on weeks and seasons in advance.
- The co-production has been implemented through a theoretical-methodological framework that was unprecedented for the regional climate research. It facilitates the development of socially meaningful and valuable products such as a rainfall community network and a cellphone application to disseminate codesigned climate information among small farmer communities in Argentina. It provides a continuous learning space for all the actors involved.

Keywords and hashtags

Keywords: co-production, climate prediction, vegetation models, South America, agriculture

Hashtag: #climateprediction, #coproduction, #drought

Potential societal impacts

The project is helping to reinforce the interaction among local actors in Argentina and Brazil on issues related to climate and the production of public policies in agriculture and electricity energy distribution sectors for climate related risk management. CLIMAX is being recognized by national meteorological services of South America, and local institutions as a source of reliable climate information and to collaborate in the management of climate risk.

HiWAVES3

High Impact Weather Events in EurAsia Selected, Simulated and Storified

What is the HiWAVES3 project about?

The weather impacts our society in many ways. In HiWAVES3 we study high impact weather events, i.e. the events that most severly impact society. For example, we identify these events by calculating river levels, wind and solar energy yields and crop yields using thousands of years of global daily weather generated by state-of-the-art climate models and selecting the most extreme cases. Climate model data are used because generally the observational record is relatively short, which limits the possibility of sampling and studying extreme events. We study the meteorological conditions leading to the extreme societal impacts, the effect of climate change and the predictability of these events. Stories of these events are created for communication purposes.

Highlights

- HIWAVES3 has generated a novel dataset of climate data totalling 24.000 years of global daily weather using two global climate models (EC-Earth v2.3, HadGEM2-ES). It forms an excellent resource to study extreme high impact events in current and warmer climate conditions.
- HIWAVES3 identified meteorological events leading to extreme low wind and solar energy production and simultaneous high electricity demand in Europe. Furthermore, the impact of climate change on extreme low and high river levels globally was calculated.
- HiWAVES3 illustrates how high impact events might arise from meteorological conditions that are not considered extreme.

Keywords / hashtags

Keywords: impact extremes, compound events, climate ensemble, climate modeling; variable renewable energy, energy transition
Hashtags: #climatemodels, #extremeweatherevents, #climatepredictability, #energy, #meteorology, #compoundevents

Potential societal impacts

The design of a robust future energy system based on a large share of variable renewable energy resources will need to account for changing weather conditions. Changing weather conditions lead to low production and high demand in the entire European domain as identified in this project. The ensemble climate impact modelling approach implemented in this project provides more accurate estimates of risks by sampling a larger space of possible weather conditions. This project helps support SDG's food, water, energy and safety.

INTEGRATE

An integrated data-model study of interactions between tropical monsoons and extra-tropical climate variability and extremes

ʃNTEGRATE

What is the INTEGRATE project about?

INTEGRATE studies "teleconnections" that link regional climates and alter the risk of climate/weather extremes. INTEGRATE evaluates the ability of climate models to simulate them. We focus on linkages between polar and tropical (especially monsoon) regions because of the societal importance of monsoon regions and knowledge gaps for these regions. Additionally, we consider other sources of variability that affect these regions. Another focus of the project is on decadal to century timscales, necessitating the use of tree-ring and historical documentary records alongside the instrumental climate record. Our work has suggested linkages between Tibetan Plateau precipitation and the Northern Hemisphere temperature variations over the last 2000 years.
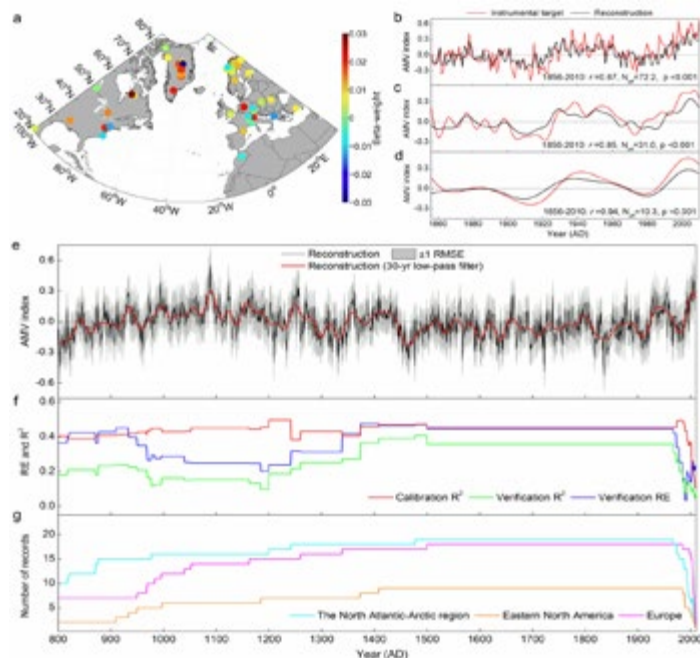
Reconstruction of Atlantic Multidecadal Variability (AMV). (a) Proxy data sites. (b-d) Calibration of proxy data against instrumental AMV. (e) AMV reconstruction (including the root-mean-squared-error [RMSE] uncertainty estimate). (f) Estimates of reconstruction (correlation [R] and reduction of error [RE]). (g) Number of proxy data sites.
From Wang et al. (2017).

Highlights

- INTEGRATE's reconstruction of Atlantic Multidecadal Variability (AMV), confirms that natural variability inherent to the climate system, so not being caused by an exteral mechanism like changes in solar activity, is present throughout the past 1200 years (Wang et al., 2017, and figure above).
- This reconstruction is used to estimate the influence of the AMV on East Asian temperature, alongside the contributions from solar, volcanic and human activities (Wang et al., 2018).

INTEGRATE is assessing the ability of climate models to simulate these observed behaviours (Ratna et al., under review 2019).
The project has already contributed to at least 16 published studies.
Published papers are listed here.

Keywords / hashtags

Keywords: teleconnections, paleoclimate, monsoons, climate variability, tree-rings
Hashtags: #monsoon,#climatevariability

Potential societal impacts

This project is targeted at understanding the regional climate changes in the Asian region, including the summer monsoon area but also areas north of the monsoon. Understanding how variability and trends temperature, precipitation or humidity is a very helpful scientific basis to develop ecological and environmental assessments and effective guidance. Our focus on the Asian monsoon regions is especially important because of their large populations and exposure to climatic variability and extremes.

InterDec

The potential of seasonal-to-decadal-scale inter-regional linkages to advance climate predictions

InterDec

What is the InterDec project about?

Global surface temperature increased by around 1°C since 1900, largely because of anthropogenic greenhouse gas emissions. Superposed on this warming trend were pronounced inter-decadal fluctuations, especially within the Arctic. Decadal-scale variability is also found in Eurasian winter temperature, Atlantic hurricane activity as well as African, Indian and East Asian Monsoon. The nature and interrelation of these fluctuations that are often of great societal and economical relevance, remains, however, unclear. InterDec brings together scientists from ten leading climate research institutions to deepen our understanding of mechanisms of decadal-to-interdecadal climate variability in different regions, their interrelations and resulting predictability potential of extreme weather and climate events.
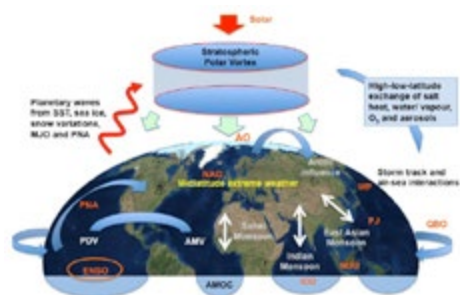

Diagram illustrating specific processes and climate phenomena involve in inter-regional linkages.
© Jinro Ukita.

Highlights

- Two periods of enhanced Arctic warming were observed during the 20th century: an Early Warming from 1910-1940 and a later warming since end of 1970s. We found that the Pacific variability accounts for 50% of the Early Arctic Warming. This result implies that a warmer Pacific Ocean in the following decades could accelerate the ongoing Arctic warming.

- The impact of recent strong Arctic sea ice reduction on the Northern Hemisphere mid-latitude climate is debated. The atmospheric response is found to account for nearly half of the cooling trend observed in wintertime central Eurasia, but likely to be underestimated in atmospheric model simulations.
- Using a very large ensemble of climate simulations, we found that only 10% of the most extreme European summer temperature events at 2°C could be avoided by limiting global warming to 1.5°C.

Keywords / Hashtags

Keywords: Arctic Amplification, Arctic sea ice decline, extreme temperatures, tropical-extratropical teleconnections, subseasonal-to-seasonal linkages.
Hashtags: #Arctic amplification, #ArcticSeaIce, #teleconnections.

Potential societal impacts

Knowing the factors driving climate variability is extremely valuable for improving and interpreting climate forecasts and climate change projections. Increased reliability of climate predictions is not only important to decision makers itself, but also helps developing and implementing international climate and sustaintability agreements.

Natural variability is large and important, even for long-term future regional climate changes. Stakeholders need to be prepared for large, decadal scale and longer deviations from multi model mean future changes.

The dependence of Tropical Pacific-North Atlantic teleconnections on background state has strong implications for subseasonal predictability in the North Atlantic European region. Understand this is valuable for multiple industries in society.

BELMONT FORUM

JPI Climate

PACMEDY

Paleoclimate constraints on monsoon evolutions and dynamics

PaCMEDy

Palaeoclimate Constraints on Monsoon Evolution and Dynamics

What is the PACMEDY project about?

PACMEDY project uses annually-resolved paleo environmental records of climate variability over the past 6000 years from corals, molluscs, speleothems and tree rings, together with global climate-model simulations and high-resolution simulations of the Indian, Africa and South American monsoons. The goal is to provide a better understanding of monsoon dynamics and inter annual to multi decadal variability (IM). By linking modelling of past climates and future projections, the project assesses the credibility of these projections and the likelihood of extreme events at decadal time scales. An ultimate goal is the identification of paleo-constraints that can be used to assess the reliability of future monsoon evolution.

Highlights

- PACMEDY reconstructed climatic trends and inter annual to multi decadal variability over the last 6000 years from pollen, lakes, ice cores, speleothems, tree rings, corals and shells.
- PACMEDY provides an ensemble of simulations of the last 60000 years.
- The project uses water isotopes, vegetation and tree rings to compare model results with past climate records.
- New analyses of the linkages between the long term Indian, African and South American monsoon change and monsoon variability and extremes provide constraint on future climate projections are conducted.
- A focus on the energy transfer from high frequency climatic variability to the decadal/ multi decadal time scales highlights nonlinear resonance interactions.

Keywords / hashtags

Keywords: monsoon, El Niño Southern Oscillation, Holocene climate variability, paleoclimate climate reconstruction, climate modelling
Hashtags: #monsoon variability, #Holocene, #hydrological cycle, #monsoon teleconnections, #variability, #cycle, #teleconnections;

Potential societal impacts

PACMEDY assesses how well state-of-the-art climate models represent climate conditions outside the modern range. It will provide a set of new constraints on the realism of representation of tropical hydrologic budgets. It will deliver an improved understanding of monsoon dynamics and an assessment of the likelihood of extreme droughts and flood. Such assessments, at the very least, provide information that allows climate services to define the level of uncertainty inherent in any projections that are to be used for planning purposes. The project results will have direct relevance to policy-related advisory panels, such as the Intergovernmental Panel on Climate Change and the Convention on Global Biodiversity.
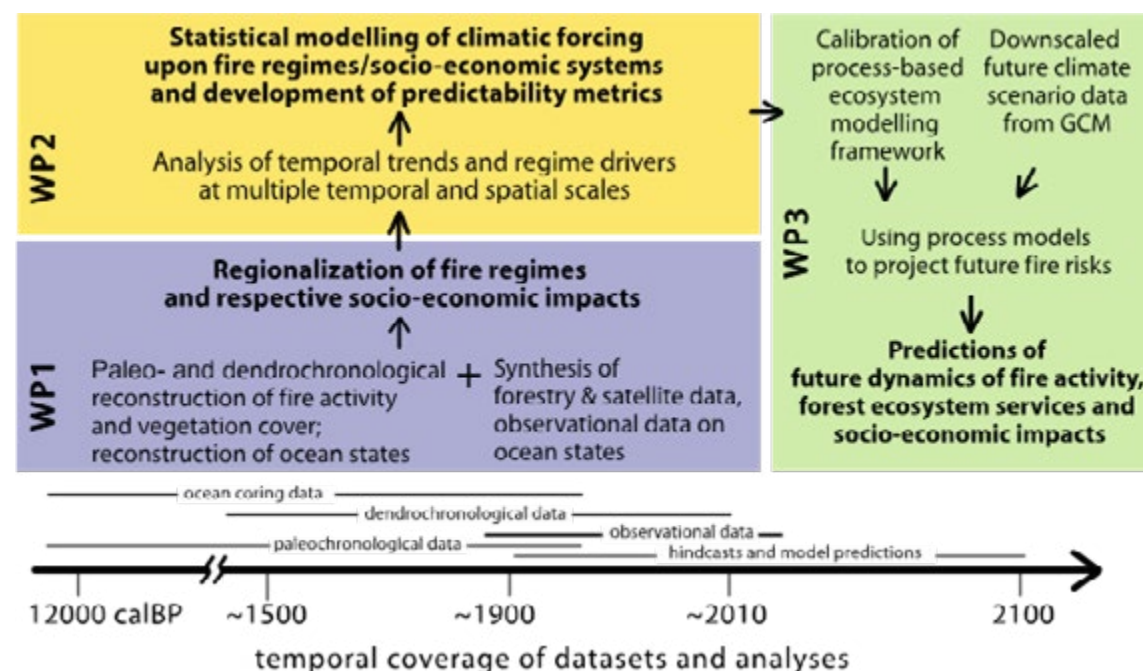
PREREAL

Improving PREdictability of circumboREAL forest fire activity and its ecological and socio-economic impacts through multi-proxy data comparisons

predicting circumboreal fires
PREREAL
a EU Horizon 2020 project

What is the PREREAL project about?

Forest fires are both an important factor of natural dynamics in many Northern Hemisphere forests and a natural hazard which causes large economic losses in boreal countries. Future forest fire activity will likely increase. To address this dynamics, we need a better understanding of the climatic drivers of fires, especially during seasons with increased fire activity when our capacity to control fires is limited. PREREAL aims to predict such periods through analyses of modern, century and millennia long records of historic fire activity, climate variation, and ocean temperature.

Conceptual framework and datastreams in PREREAL project.

Highlights

- PREREAL synthesizes the information of the historical fire activity across the boreal (taiga) zone of the Northern Hemisphere. We synthesize data from various fields to provide mechanistic interpretation of trends and patterns in historical and modern fires.
- PREREAL creates an operational system that predicts forest fire risks across this region prior to the start of the fire season. We already demonstrated a strong connection between ocean temperatures and fire activity in sections of the boreal zone and sufficiently high levels of predictability of fire risk based on the weather conditions in the previous months.
- PREREAL establishes thresholds and ranges of variability in historical fire activity across the circumboreal forest

Keywords /hashtags

Keywords: forest fire activity, predictability of fire, fire history, fire forecast; prereal
Hashtags: #firePredictions, #fireReconstructions, #prereal

Potential societal impacts

PREREAL aims to support governmental agencies with tackling the issue of forest fire hazards by increasing the efficiency of fire suppression and reducing its costs. It will also provide valuable information on the historical fire regimes in various sections of the boreal biome in the Northern Hemisphere, which can be used as targets for nature conservation policies. PREREAL reaches this goal by quantifying long-term (500 years to the whole Holocene) variability in forest fire activity, which in turn allows for the critical evaluation of the modern levels of fire.

BITMAP

Better understanding of Interregional Teleconnections for prediction in the Monsoon and Poles

What is the BITMAP project about?

Most work that examines "teleconnections" to India, the pathways that connect remote drivers with how the weather and climate of India varies from year to year, are based on studies of the tropics. BITMAP is different! We are discovering the links between higher latitudes and the winter rains of northern India or the summer monsoon. This includes, for example, the fast-moving "jet stream" of air over northern India. BITMAP further considers how changing temperatures and patterns of sea ice in the Arctic may be affecting the jet stream and Indian weather in general.
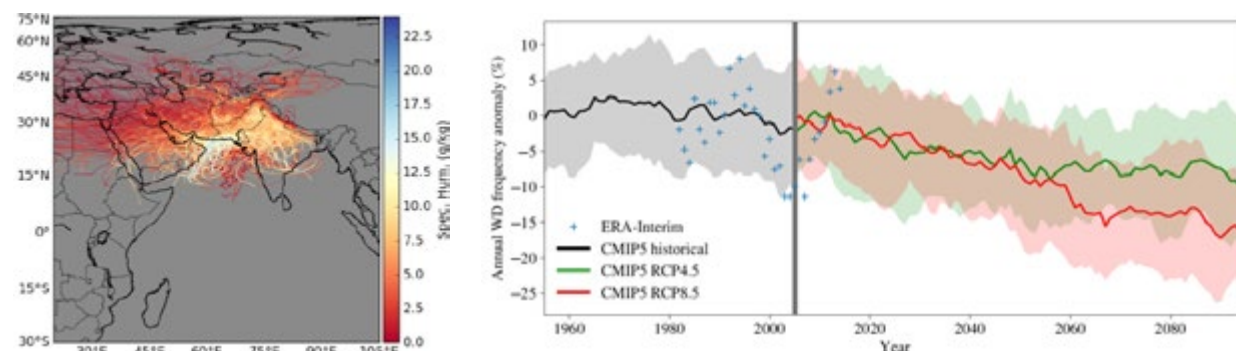
Tracks of moist (blue) and dry (red) air approaching the Himalaya in winter.
Projected changes in annual "western disturbance" storms between the present day and future climates in model experiments of the CMIP5[1] models. The future projections used are the "middle-of-the-road" RCP[2] 4.5 scenario (green) and the high-emissions RCP8.5 scenario (red).

Highlights

• Western disturbances are an important type of storm supplying winter rainfall or snowfall to northern India and Pakistan. BITMAP has developed tracking software and published the first comprehensive catalogue of these storms, in addition to identifying the origin of their moisture;
• Using the CMIP5 climate models, our work shows we can expect fewer of these storms in the future, meaning less winter rainfall;
• Temperature gradients between the tropics and poles are an important factor driving Western Disturbances. In the past, this temperature gradient was weaker, leading to a weaker jet stream and Western Disturbances that happen less often, potentially contributing to the demise of an ancient civilisation in the Indus region of Pakistan.

Keywords / hashtags

Keywords: BITMAP, climate change, Western Disturbances, storm tracking; South Asia rainfall extremes
Hashtags: #flooding, #extremes, #stormtracking, #westerndisturbances

Potential societal impacts

The storm-tracking technique developed in BITMAP for winter storms over northern India and Pakistan can be applied to operational weather forecasting models in order to produce real-time tracks as they happen. This will allow mitigation procedures to be put in place to alleviate the damage caused in the case of extremes events. Also, leading international weather centres such as the Met Office can benefit from adding tracks of these storms to their seasonal forecast products, to provide governments with information on the likelihood of damages or the implications for water resources. Based on our predictions of reduced numbers of these regional winter storms, at the longer-term, governments may need to start planning for the projected reductions in future winter rainfall.

[1] The Fifth Coupled Model Intercomparison Project
[2] Representative concentration pathway

GOTHAM

Globally Observed Teleconnections in a Hierarchy of Atmospheric Models

What is the GOTHAM project about?

GOTHAM represents an ambitious research programme to gain robust, relevant and transferable knowledge of past and present-day patterns and trends of regional climate extremes and variability of vulnerable areas identified by the Intergovenmental Panel for Climate Change, including the tropics and high-latitudes. It has achieved this by identifying the influence of remote drivers – teleconnections - of regional climate variability, and assessing their relative impact. The project has improved season-decadal prediction and understanding by using a combination of contemporary climate models, citizen-science computing and advanced statistical analysis tools.
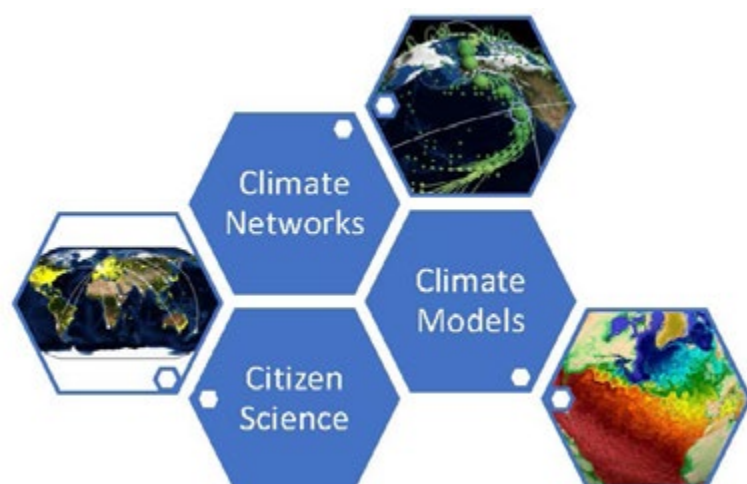
GOTHAM is about networks – not just physical teleconnections linking different parts of the climate system but also researchers bringing disciplinary strength together within a seamless whole. GOTHAM investigator and collaborator groups use a wide variety of climate models which feed into global weather forecasts and climate asssesments.

GOTHAM investigators also utilise the power of citizen science by way of the renown distributed computing project climateprediction.net.

Highlights

- GOTHAM groups achieved the first retrospective forecast of an unprecedented disruption to winds within the tropical upper atmosphere, an event also discovered by GOTHAM investigator and collaborator groups.
- GOTHAM groups undertook a study which linked extreme weather events occurring during the northern summer of 2018 with unique hemisphere-wide wave patterns.
- A very popular mid-project summer school was held in Germany. This summer school helped underscore present-day environmental challenges while promoting the science solutions presented by GOTHAM groups.

Keywords/hashtags

Keywords: teleconnections, El Nino; monsoons, weather@home, Belmont-GOTHAM
Hashtags: #citizenscience, #complexnetworks, #climatechange, #ClimateEmergency

Potential societal impacts

Impacts for GOTHAM have been achieved through the GOTHAM investigator/collaborator networks, and their extensive involvement in wider science and science-policy programmes with co-aligned strategies, such as the core projects within the World Climate Research Programme. Improved seasonal to decadal scale forecasts improve predictions of extreme events and natural hazard risks such as flooding that can have devastating impacts. The project has striven to feed through to impacts-related research groups, such as those involved in weather, hydrological and flood forecasting, by involving those groups in the research we have done and exposing them to the techniques we use.

AQUACLEW

Advancing Quality of Climate Services for European Water

What is the AQUACLEW project about?

AQUACLEW investigates how to increase user uptake of climate services in a broad community using online, general information, and tailored decision-support in multiple case studies. We investigate how to improve co-development to better incorporate user feedback along the entire climate service production chain, from research to production, service use and decision making? And, how should data, quality-assurance metrics and guidance be tailored along the whole data-production chain to closer meet user requirements, including resolution and precision?
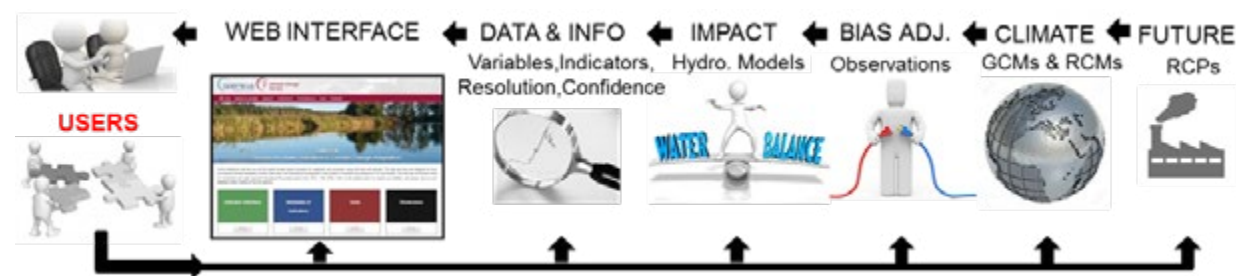
Feedback loops in user-driven design, development, production and evaluation of climate services.Feedback loops are based on steps in the production chain. Representative Concentration Pathways (RCPs) are the future scenarios, Global Climate Models (GCMs) and Regional Climate Models (RCMs) provide climate data, which are then bias adjusted and used in impact modelling. Then the data and information from the modelling are given through a web interface to users. Users give feedback on all steps, creating the feedback loops.

Highlights

- AQUACLEW developed three frameworks. One for scientific selection of climate and hydrological models for impact assessment when using climate services, one framework for procedures on calibration/validation of hydrological models and one framework for calibration and validation of bias adjustment methods. All frameworks are designed for climate change impact analyses.
- Preliminary results of AQUACLEW focus group meetings show that understanding and use of climate services can vary between people with similar backgrounds. The initial feedback loop results on all steps in the production chain (see figure) seem to reflect a similar pattern, but further data needs to be collected.
- The seven case studies around Europe use existing and new methods developed in the project for climate impact assessments. These assessments support water management decisions in relation to biodiversity, flash flooding, agriculture, coastal flooding, hydro-power and water allocation.

Keywords / hashtags

Keywords: co-development; adaptation; climate change; water management, climate service

Hashtags: #co-development, #dataquality, #aquaclew

Potential societal impacts

AQUACLEW provides scientists, engineers, businesses and policy makers with climate change impact assessments by means of indicators tailored to users' adaptation needs. It provides options for improving the quality and usability of climate services for water and can foster the use of improved climate services by purveyors and end-users. AQUACLEW advances the knowledge on how adaptation decisions and actions are taken. It contributes to societal and business resilience against climate change and natural disasters and creates new business opportunities in climate services.

CIREG

Climate Information to support integrated Renewable Electricity Generation

What is the CIREG project about?

The CIREG project develops methods and scenarios for renewable electricity generation in West Africa. Using high-resolution state-of-the-art data on weather, water and climate, it highlights various ways in which West African countries could look towards solar power, wind power and hydropower to meet their rapidly rising electricity demand, both on-grid and off-grid. To valorise its scientific results, the multidisciplinary CIREG team, maintains strong links with West African policymakers such as national power utilities and river basin authorities, and provides training schools for West African stakeholders on energy and water resources planning.

CIREG scientist Dr. Seyni Salack demonstrates the solar PV pumping system installed by WASCAL in Sékoukou, Niger, to members of the CIREG consortium and stakeholders. Photo: R. Cantoni.

Highlights

- CIREG is supporting several renewables-based off-grid projects in West Africa, such as solar PV systems for water pumping.
- CIREG scientists are actively involved in knowledge exchange between European and West African institutions, funding training schools and organising capacity building workshops.
- CIREG scientists have performed a unique complete assessment of the combined potential of on-grid solar power, wind power and adequately managed hydropower from hourly to decadal scales in West Africa.

Keywords / hashtags

Keywords: renewable energy, West Africa, power mix, climate change, electrification.
Hashtags: #RE4All, #100RE, #renewable #electricity #Africa,

Potential societal impacts

The results from the CIREG project are being communicated to West African policymakers and other stakeholders through various channels, e.g. training schools, workshops and conferences. They may feed into electricity sector planning and target-setting in energy policy. The focus on renewable electricity sources and knowledge exchange ensure that the results contribute to reaching the objectives of the Paris Agreement while enhancing sustainable development in terms of climate-proofing and increasing electricity access and safeguarding ecological integrity.

Citizen Sensing

Urban Climate Resilience through Participatory Risk Management Systems

What is the Citizen Sensing project about?

The Citizen Sensing app.
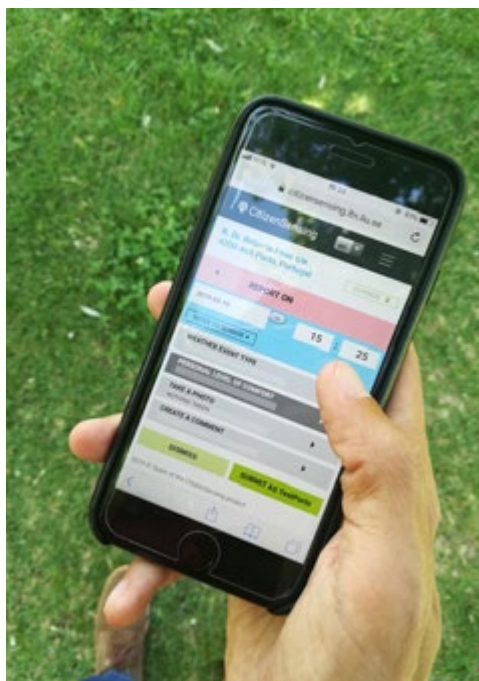
The Citizen Sensing project addresses the potential of engaging citizens as providers of local observations of climate impacts and as receivers of site-specific information on local conditions and actions to increase urban climate resilience.

CitizenSensing develops a Participatory Risk Management System (PRMS) that incorporates site-specific information, links to existing guidelines on urban climate risk management and adaptation, and functions as an integrative Climate Service platform for citizens and local organizations. It will analyse if, how and to what extent the system has potential to increase engagement, preparedness and appropriate responses by citizens and authorities in different European contexts – with pilots in the cities of Porto, Rotterdam, Trondheim and Norrköping.

Highlights

- The Participatory Risk Management System is co-designed with local authorities, organisations and end-users and tested during campaigns with different user groups
- We assess the potential usefulness of the system in different aspects: engagement, motivation, knowledge and awareness of climate adaptation and trust in information and recommendations from authorities.

- The system allows different types of commucation: end-users send observations of climate impacts, interact with sensors and receive adaptation recommendations from the Participatory Risk Management System.
- A system of this type has potential to change the mind-sets of citizens, authorities and policy-makers as to who and how information is collected and shared

Keywords / hashtags

Keywords: urban resilience, climate services, participatory risk management, citizen science, climate adaptation
Hashtags: #citizensensing, #citizenscience, #crowdsourcing, #climateadaptation

Potential societal impacts

The co-design of the Participatory Risk Management System aims to foster a greater contribution from urban residents to risk management. Participating researchers aim to learn with citizens and local authorities and organizations based on local experiences and perspectives to develop and contribute to more robust climate service processes and local adaptive governance that supports urban resilience. Which groups of citizens that are involved, what climatic aspects that are included, as well as the design of the CitizenSensing app is identified in a participatory process involving stakeholders and potential end-users in all of the pilot cities. This project has potential to trigger personal changes in awareness and response to extreme climate events, by designing novel ways of getting citizens engaged and contributing to risk management.

Clim2Power

Translating climate data into power plant operational guidance
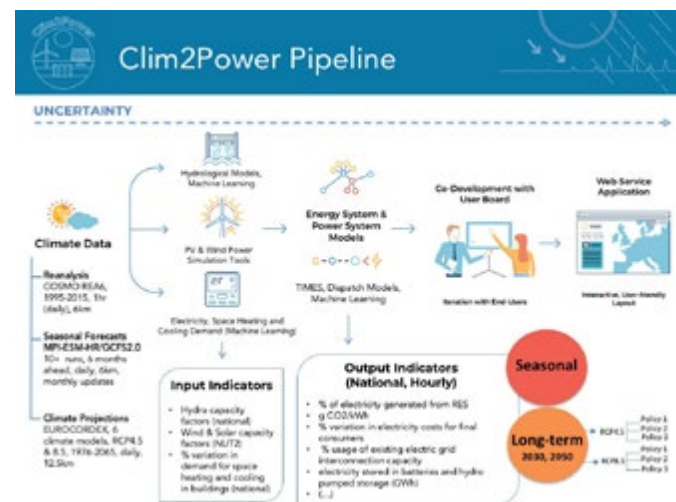
What is the Clim2Power project about?

Clim2Power is developing a climate service that integrates seasonal climate forecasts into decision-making in the electricity sector. The project aims to "climate-proof" the current European electricity system by ensuring that energy and power models respond to climate variability. Cutting-edge seasonal forecasts, down-scaled and coupled with stochastic power system models, will be used to estimate the impact of seasonal climate conditions on renewable electricity generation and heating and cooling demand. The climate service, co-developed with stakeholders in an iterative process, will be available as a public web service, creating usable information for end users within climate, environment, energy and water industries.

The Clim2Power Project Pipeline, showing research and outputs from climate data analysis to the final web service application.

Highlights

- The Clim2Power web Climate Service supports better decision-making in the energy sector and is being co-developed with end-users. The most relevant indicators are, for each EU-country: electricity generated from Renewable Energy Sources, g CO2/kWh, and variation in electricity costs.
- Potential end users are involved in the creation of the Clim2Power climate service from start to end to ensure a useful and usable final product. User requirements were initially identified through a comprehensive online survey. European-level User Board meetings with stakeholders provide guidance for the development of the Clim2Power Climate Service, while complementary National User Board meetings address regional and country-specific needs.
- Preliminary results show that climate variability plays a significant role in the EU power system. These are particularly relevant in the long-term for carbon-neutral scenarios.

Keywords / hashtags

Keywords: climate services, seasonal forecasts, renewable energy, climate adaptation, power system

Hashtags: #climateservices, #renewable #energy

Potential societal impacts

Two levels of climate service are being produced to make the project useful for society and policymakers: 1) operational information mainly targets power companies, namely seasonal climate decision-support information for the optimal operation of hydro, wind, and solar; and 2) investment decision information for policymakers, which focuses on long-term analysis. Power generation & trading companies, power system operators & regulators, power consumers, and water managers will particularly benefit from the outcome of the project through better decision-making, planning, and operation. The climate service will provide salient information that enables energy professionals to make better decisions in light of climate variability and climate change.

CLIMALERT

Climate Alert Smart System for Sustainable Water and Agriculture

What is the CLIMALERT project about?

- CLIMALERT provides climate information in a format that the forthcoming users find easy to understand and/or to incorporate into decision-making.
- CLIMALERT's main goals are:
- Strengthening the link between climate research, water resources and agriculture
- Improving techniques and tools (mobile app, web-dynamic maps) to incorporate weather and climate information into the assessment of risks and decision-making in agriculture and water management practices
- Contributing to a global framework to improve the exchange of information on weather forecasts to help decision-makers in applying adaptation and mitigation strategies

CLIMALERT: Climate Alert Smart System for Sustainable Water and Agriculture

Highlights

- Co-development of user-friendly tools (mobile app and web-dynamics maps) for proper risk management related to climate.
- Development of guidelines and recommendation of good practices to help decision-makers in applying adaptation and mitigation strategies.
- Encouragement of adaptive management strategies for water and agriculture, ameliorating the water use conflict, and delivering environmental and socio-economic benefits.

Keywords / hashtags

Keywords: climatic events, biodiversity; ecosystem services, good practices, wellbeing
Hashtags: #Sustainability, #Mitigation, #Climateaction

Potential societal impacts

The support of climate science is needed to better understand deviations from the long-term norm and to make use of climate information for agro-ecological zoning, sustainable land-use planning and management.

CLIMALERT will lead to monetary benefits by contributing to reduce costs of facing extreme events, improve the efficiency of water allocation, reduce soil erosion, improve land management decision, reduce planning time and workload, and increase efficiency and productivity. Among nonmonetary benefits, CLIMALERT will contribute to improve water efficiency, biodiversity and ecosystem services and long-term benefits to human life and societal wellbeing.

ClimApp

Translating climate service into personalized adaptation strategies to cope with thermal climate stress
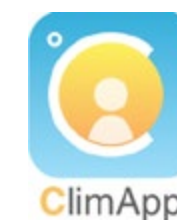
What is the ClimApp project about?

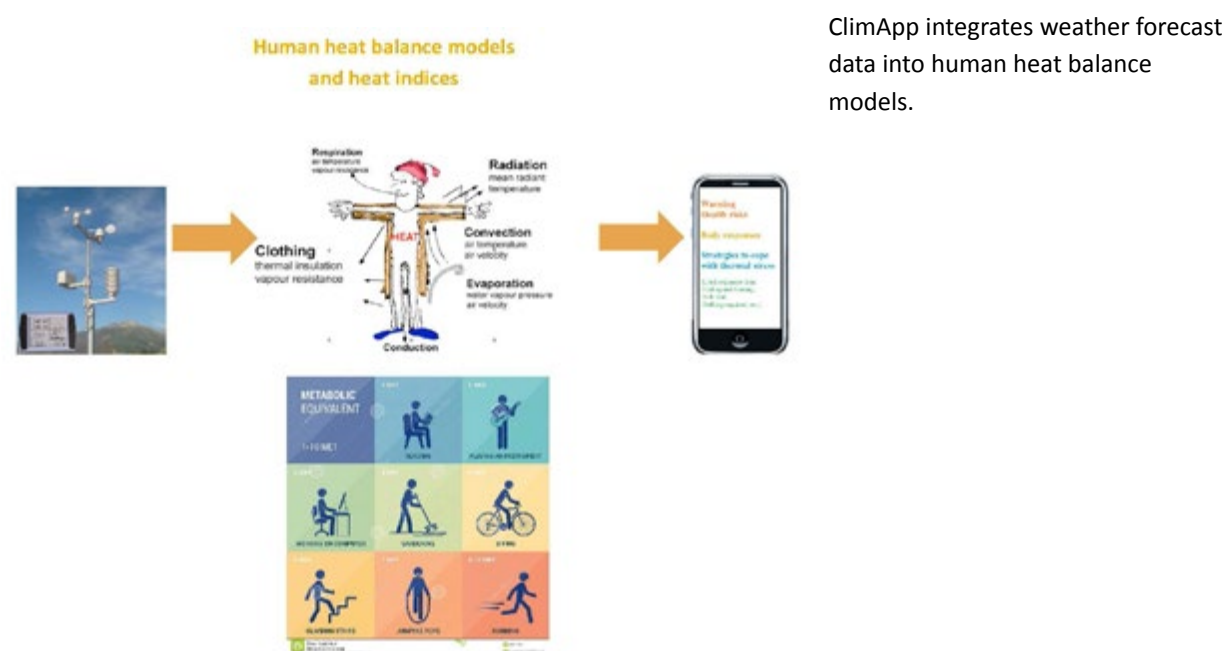Extreme weather events such as heat waves and cold spells are societal challenges. The impacts of extreme weather on human health are dependent not only on climate factors, but also on individual factors. The overall aim of this project is to develop an advanced mobile phone app that integrates weather forecast data into human heat balance models. The app will predict body responses, to provide health risk warning and advice for individuals, public and private sectors, to support decision-making for adaptation strategies, and to improve the quality of life, health and productivity when facing climate challenges.

ClimApp integrates weather forecast data into human heat balance models.

Highlights

- ClimApp provides human health risk warnings and advice for adaptation strategies. In connection with weather forecast, ClimApp covers the range of temperatures from -50 to +50 °C.
- The warning and advice are based on heat stress index and human body heat balance models. The impacts of extreme weather on human health are dependent not only on climate factors, but also on individual factors such as acclimatization to heat, activity intensity, clothing, etc.

Keywords / hashtags

Keywords: personalized warning, personalized advice, thermal stress, heat stress, cold stress, human heat balance model, heat stress index, mobile phone app
Hastags: #individualweatherresponse, #healthriskwarning, #lifequalityimproving, #climatechallenge, #extremeweatherevents

Potential societal impacts

ClimApp predicts human body responses during extreme weather events, provides health risk warning and advice for individuals, public and private sectors, supports decision-making for adaptation strategies, and improves the quality of life, health and productivity when facing climate challenges. It can help to support the implementation of the Sustaianble Development Goal 3: Good health and well-being; 8: Decent work and economic growth; and 13: Climate action.
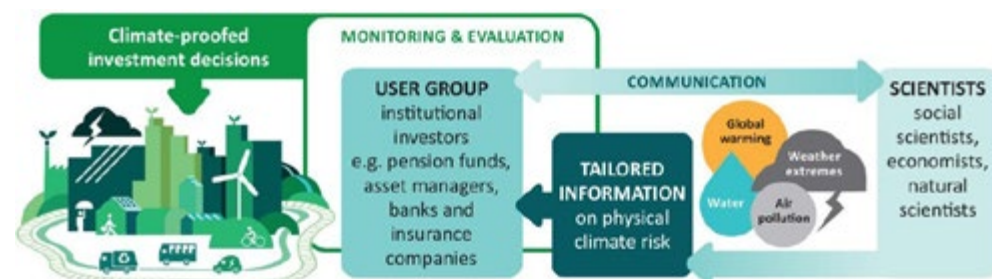
ClimINVEST

Tools for climate-resilient investment

What is the ClimINVEST project about?

In 2018, the Financial Stability Board (FSB)'s Task Force for Climate Related Financial Disclosure (TCFD) noted that climate risks have become financial risks and recommended that investors measure and report their exposure. To date, a number of tools have been launched by climate service providers to help investors respond to this request for disclosure. Although there is ample demand for physical climate risk assessment tools, both climate scientists and investors have concerns about transparency and methodology. The current tools do not provide insight into climate service providers' approach to calculate physical climate risk, which introduces considerable potential for miscalculation and makes it difficult to tailor the results to investor portfolios.

The ClimINVEST Concept.

ClimINVEST aims to help investors respond to the TCFD recommendations and bring transparency to methodology used in climate risk assessment tools. It does so by promoting structured dialogue between investors and climate scientists on physical climate risks, co-designing relevant physical climate risk indicators with investors, and developing practical tools – such as flow charts, maps, and checklists – that investors can use to support decision making. The results of the project, both findings and tools, will be publicly accessible.

Highlights

- ClimINVEST engages investor user groups in Norway, France, and the Netherlands to understand their needs, and reviews existing tools offered by climate service providers to understand and identify gaps.
- ClimINVEST report: "*Getting started on physical climate risk analysis in finance*" overviews existing tools available to assess physical climate risk in the financial sector. The report "*Physical climate risk: Investor needs and information gaps*" takes a closer look at investors' knowledge gaps and includes case studies from France, The Netherlands and Norway.
- The project consortium members are co-designing physical climate indicators relevant for selected sectors and translating them into practical visualization tools, tailored to investor needs.

Keywords / hashtags

Keywords: physical climate risk, financial risk disclosures, climate finance
Hashtags: #Physicalclimaterisk, #TCFD, #climatefinance, #climaterisk, #ClimINVEST

Potential societal impacts

The ClimINVEST project enhances understanding, informed discussion, and facilitates prioritization of the financial implications of physical climate risk among investors in three country user groups. By project end, ClimINVEST aims to translate co-designed climate indicators into practical tools, such as maps and flow charts, that investors can use to support decision making.

CLISWELN

Climate Services for the Water-Energy-Land Nexus

What is the CLISWELN project about?

We need to understand what are the factors that imperil the economy, factors that will play a role together with climate change, in order to transform climate scenario data into information useful for planning and decision making for stakeholders. In this context, drought risk plays an important role, as we saw during the summer of 2018 in Germany. This project aims to provide climate services for drought affected sectors and systems of sectors, like agriculture, forestry and cities, using climate change projection data in integrated models and decision-making tools in order to analyze the complex water-energy-land-food nexus (see Figure 1). CLISWELN analyses the drought because it has a significant impact on water supplies, but in socio-economic terms, a drought is the imbalance between supply and demand, so it is necessary to understand what demand factors play a role, together with climate change, and to analyse the entire system of demand and supply including all the involved sectors in each case study.

Technical scheme of the integration of climate services with the water-energy-land nexus in the project CLISWELN (Source: Cremades et al., in prep.).

Highlights

- CLISWELN is producing tools for urban planning and information for decision makers in agriculture, forestry and cities so that they can understand the implications of management decisions under climate change scenarios.
- CLISWELN links forest land use to water supply availability for cities and greenhouse gas emissions from additional sources of water. In this way it introduces an approach to assure that adaptation options advised by climate services do not increase greenhouse gas emissions.
- CLISWELN provides insights about the resilience of the tourism sector to climate change in areas with high pressures for urban development that could significantly increase water demands, in a context where the nexus between water, cities and agriculture is crucial to understand how to adapt to longer and more intense droughts.
- In some case studies we have been able to install field meteorological equipment that will improve the quality of the research performed by providing better data to calibrate the results of the hydrological simulations.

Keywords / hashtags

Keywords: climate services, nexus, drought, cities, agriculture
Hashtags: #clisweln, #nexus, #drought, #climateservices

Potential societal impacts

To exemplify the societal impact of the project, the information for urban water supply planning in the Sacele river basin in Romania involves stakeholders from a water treatment plant linked to a dam that is used for urban water provision for Brasov, an important city; in this dam there are sedimentation problems and the dam managers and urban water suppliers are truly eager to see our final results and understand the implications of co-designed land use scenarios and climate change in the sedimentation problem.

CoCliServ

Co-development of place-based climate services for action

What is the CoCliServ project about?

Imagine scientists, with her and his, butterfly net. Yet these are not butterflies she and he are after. They are (gracefully) hunting down climate-centred narratives – as elusive and beautiful as the rarest of butterflies. And no, he and she will NOT pin them down. They will look at them as they deploy, live, change, and exist. By observing these, with the help of an international interdisciplinary team, they will identify the fabric of local communities' weatherworlds. And from these weatherworlds they will infer the needs for climate services – current and future. This is what CoCliServ is about.

Highlights

- CoCliServ makes Climate services Co-development Protocols for current and future needs available.
- Desired future, local community needs and value, are at the center of CoCliServ's scientific agenda.
- Knowledge quality in all its dimensions is assessed along the way, and questioned, by citizens, by scientists, by policy developers.

Keywords / hashtags

Keywords: naratives, scenario, co-developement, knowledge quality asessment, arts and science
Hashtags: #transdisciplinary, #citizenscience, #coproduction

Potential societal impacts

Local communities and scientists will benefit from well tested protocols in order to develop local scenario - centered on identifying information needs - that are explicitly aimed at eliciting key information and climate service needs. These will be rooted in local vision. Rather than focusing on what will or might happen in the future, communities and scientists will be equipped, through CoCLiServ's production, to develop scenarios centred on what should happen - and most importantly to co-develop climate services aimed at making local needs fulfilled.

CO-MICC

Supporting risk assessment and adaptation at multiple spatial scales: CO-development of Methods to utilize uncertain multi-model based Information on freshwater-related hazards of Climate Change

What is the CO-MICC project about?

The research project aims to co-develop how global hydrologic modelling can be optimally used to support adaptation to climate change at various scales. This includes the provisioning of multi-model ensemble output on a webportal hosted at a UNESCO centre as well as the development of a handbook on providing and utilizing ensemble information. It is state-of-the-art to use a number of different global models when simulating future projections. The range of results represents one component of the unavoidable uncertainty in our knowledge about future hazards. Optimal ways to provide and integrate uncertainty information in adaptation planning are explored with expert stakeholders.

CO-MICC Climate Projection Modelling Chain

In one part of the CO-MICC project a chain of climate projection modelling is used to obtain the state-of-the-art multi-model ensemble for simulating future projections.

Highlights

In an iterative dialogue process of three workshop rounds, scientists and stakeholders learn from each other, which hydrological information is of value to end user risk assessment – and which is the optimal way to convey this information so that it is practically used by end user stakeholders around the world in local, trans-boundary and global climate change adaptation and mitigation planning.

Following are the major highlights (that will be publicly accessible):

- Freely available web portal with the resulting information
- Handbook (freely available) with support for users on how to optimally utilize the provided information including uncertainty in their own strategic planning.

Keywords / hashtags

Keywords: climate change hazards, climate change adaptation, global hydrological models, uncertainty, bayesian network modeling

Hastags: #riskassessment, #uncertainty, #models, #hazards

Potential societal impacts

Regarding freshwater-related hazards, both the web portal and the handbook are expected to have major societal impacts as many local to regional participatory climate change risk assessment and adaptation processes will have to be done to enable a sustainable development in times of climate change. In addition, globally operating industries will be able to better manage their freshwater-related climate change risks either by directly using the information or through specialized consultant services that utilize the information. The provided global multi-model data is usable for assessing these hazards even where a detailed model already exists because risk assessment requires to account for the existing uncertainty of projections caused by the hydrologic modelling approach, which single model output cannot yield.
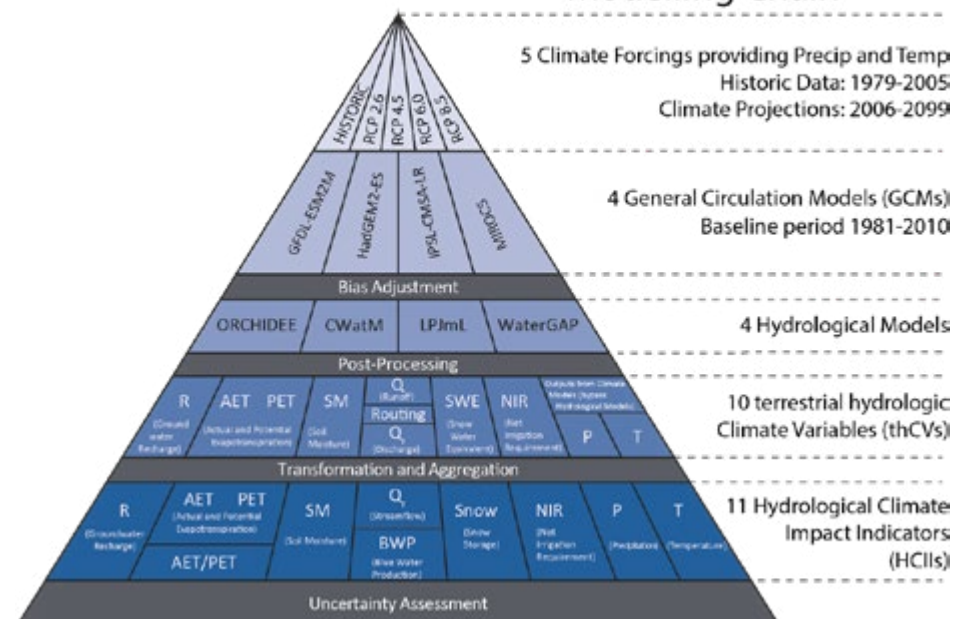
CoCliMe

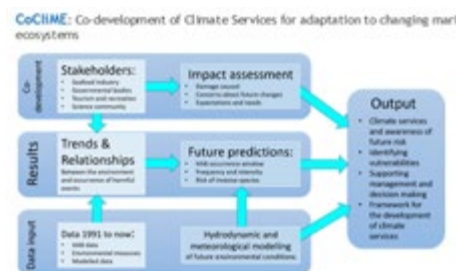## Co-development of Climate services for adaptation to changing Marine Ecosystems

What is the CoCliMe project about?

CoCliME focuses on the impacts of climate change on harmful marine microorganisms in European regional seas. It develops regional climate change services involving Case Study specific data analyses, including community diversity (genetic diversity research), laboratory experiments, field studies, analysis of time series, marine-coupled climate modelling, and economic impact modelling. Our job is to co-produce bespoke, proof-of-concepts or prototype climate services related to changing marine ecosystems that support adaptive decision-making. This is achieved by focusing on intensive user co-development, exploitation of existing data sets, new scientific knowledge, and through lessons learned and understanding gained during the project. The co-development process is illustrated here.

CoCliME's approach to co-development of climate services for adaptation to changing marine ecosystems.

Conceptual framework of the CoCliME Indicators Under Development. Example taken from the Atlantic Irish Case Study.

Highlights

- CoCliME documented the environmental, human health and socio-economic impacts for historic harmful events in coastal areas along the Atlantic, Baltic, Black Sea, Mediterranean, North Sea and Norwegian Sea.
- CoCliME addresses key coastal ecosystem status indicators that can be markedly influenced by climate change and have direct impacts on human health. We review and fine the indicators periodically throughout the project as new knowledge becomes available. An example of a MECCII relates to the onset of an Ostreopsis blooms. Environmental trends are clear concerning temperature; if the water is warmer earlier in the year then the bloom occurs earlier; 23°C to 24°C is needed for Ostreopsis. A cold spring (April, May & June) = bloom later at end July/start August. A warm spring (April, May & June) = earlier bloom.
- Direct human health impacts of climate change may relate to changes in seafood-borne poisoning and water-quality related health disorders. Also, economic prosperity (fisheries, aquaculture, tourism) and social wellbeing (recreation) may be impacted by climate change. e.g. the (prolonged) closure of shellfish farms and potential loss of markets, due to a toxin producing HAB genera.

Keywords / hashtags

Keywords: marine ecosystem, biotoxins, pathogens, blooms, coastal zone management
Hashtags: #coclime, #climateservices, #climatechange

Potential societal impacts

The CoCliME team informs decision making relevant to climate change-related ecological and socio-economic impacts. CoCliME results are communicated to marine sectors and policy makers developing climate resilience through planning for climate change adaptation. CoCliME outputs are also relevant to the EU Marine Strategy Framework Directive, Marine Spatial Planning and the 2030 Agenda on Sustainable Development "transforming our world". The project can inform the UN Sustainable Development Goals, 1 "no poverty", 2 "food security", 3 "health & well-being", 11 "sustainable cities and communities", 13 "climate change" and 14 "life below water", to ensure the protection and sustainable use of European marine and coastal ecosystems for future generations.
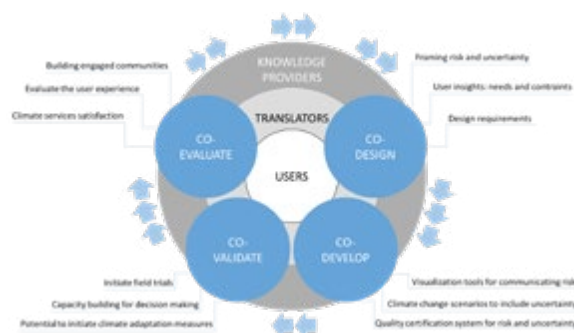
EVOKED

Enhancing the value of climate data

What is the EVOKED project about?

The EVOKED project tailors the presentation and specification of climate data to the individual user's knowledge and needs, thus enhancing the value of the data. EVOKED will help translate risk and uncertainty utilizing a Living Labs approach. The process of user-driven presentation of data will help improve the interface between the climate science community and policy makers with regard to adaptation measures to address the impacts of climate change. The project team will engage end-users in a Living Labs approach at established case study sites in Norway, Sweden, Germany and the Netherlands.

EVOKED framework and the Living Labs user initiated feedback-loop to translate the risk and uncertainty of climate knowledge to enhance the quality and relevance of climate services.

Highlights

- EVOKED has developed a common understanding of what a Living Lab is and how it is bound in time and space.
- Key principles of Living Labs practiced at the different case study sites include: continuity, openness, realism, influence, value and sustainability.
- As one central Co-Design activity, all EVOKED partners have developed **local socioeconomic scenarios** consistent with the Shared Socioeconomic Pathways (SSPs) to assess climate change risks at the case study sites. Scenario narratives have been drafted based on the local scenarios and the local contexts. For example, Flensburg

developed narratives for a Sustainable Flensburg, The old Flensburg, an Aging and shrinking Flensburg, and Fossil-fueled Flensburg. Similar narratives were also developed for Larvik and subsequently created into illustrations that have been communicated to both local youth and politicians.

Vision of a "Sustainable Larvik", based on strategic municipal plans (illustration by Bar Bakke).

Vision of Larvik in a "Business as usual" scenario, based on current growth statistics and from discussing the situation in Larvik today (illustration by Bar Bakke).

Vision of "Regional rivalry" for Larvik, a potential future if targets for growth and investments are not met (illustration by Bar Bakke).

Keywords / hashtags

Keywords: climate services, living labs, rsk, uncertainty, co-design
Hashtags: #EVOKED, #LivingLabs, #climatechange, #climatedata

Potential societal impacts

EVOKED's end-user partners have a central role in the project with activities tailored to their needs. The end-users have also identified specific areas where EVOKED can enhance the value of their ongoing climate adaptation processes. They have indicated that EVOKED will contribute to: improve the visualization of climate data for the local authorities, find ways to communicate the integrated risks associated with a changing climate, improve the access and applicability of climate knowledge, learn how the collaborating governments are able to shape the preparedness of communities at risk, as well as support in assessing vulnerability and in exploring potential adaptation options.
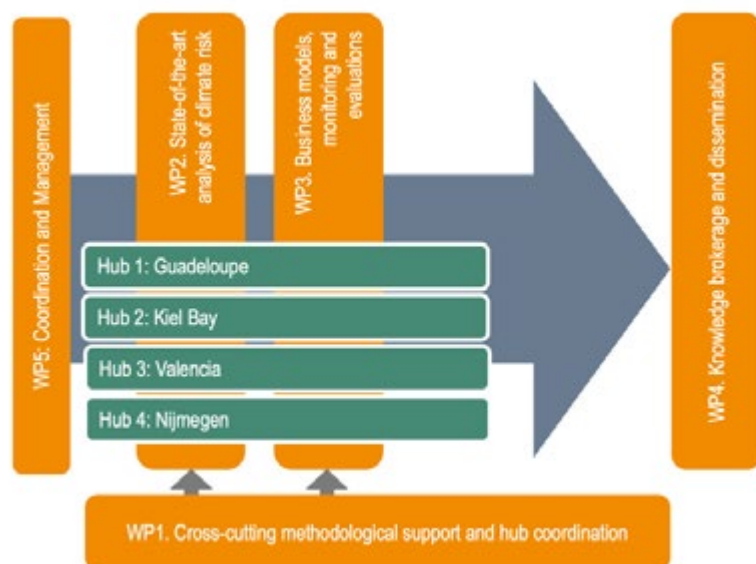
INNOVA

Innovation in Climate Services Provision

What is the INNOVA project about?

INNOVA aims to co-develop climate services in a bottom-up approach to support the climate change policy cycle for local adaptation. INNOVA is identifying and exploring innovative ways to speed up and simplify the use of climate services at the local scale, including applying the business model concept in the climate service development processes. This is tested in four distinct hubs: Guadeloupe archipelago and Martinique (French West Indies Islands), Kiel Bay (Germany), Valencia, (Spain) and Nijmegen (The Netherlands). The main elements of INNOVA include the user-driven services, innovation support and engagement with multiple stakeholders for innovative climate services for local adaptation.

INNOVA project workflow

Highlights

For climate services to support local adapatation needs it is important to understand the perceptions and objectives of people and communities.

- A user-oriented climate data platform is co-developed with the local actors to assist managers to adapt to the changing environment.
- There are generic and easy-to-understand methods and processes (called "service development models") to assist local stakeholders and their climate change partners to develop climate services that can be applied for their specific conditions, challenges and opportunities.
- Transdisciplinary knowledge exchange and providing business models for the implementation and knowledge brokerage instruments to increase the uptake of these step elsewhere.

Keywords / hashtags

Keywords: climate service, local adaptation, innovation, adaptation cycle, climate change
Hashtags: #climateadaptation, #climateservices, #innovation

Potential societal impacts

In the innovation hubs, climate services solutions to actual local climate-related challenges will be created, developed, standardized, tested and monitored. The solutions created, the processes established, and lessons learned will be used as to enable not only inspiration for a wider community, including similar locations with similar challenges but to kick start practices that would enable scale up and replicability. The INNOVA project provides a mechanism for local actors to contribute to the implementation of major international agreements, such as the Paris Agreement, the Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction 2015-2030.

INSeaPTION

INtegrating Sea-level Projections in climate services for coastal adaptaTION

What is the INSeaPTION project about?

INSeaPTION aims at co-designing and co-developing, with users, coastal climate services based on state-of-the art sea-level rise, impact and adaptation science. The project will deliver two sets of services: (1) global to regional mean and extreme sea-level projections with their impacts and uncertainties, and (2) local sea-level, coastal impact and adaptation services. As tropical islands are high impact sectors, we select Maldives and French Polynesia as pilot sites for local coastal climate services. Both global and local services address the committed impacts of sea-level rise and large impacts, and adaptation needs, which will be required if polar ice-sheets melt rapidly.
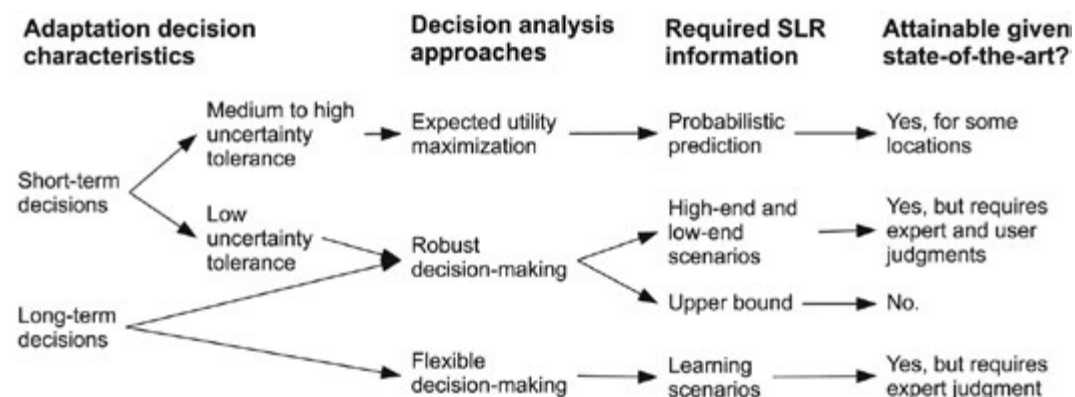
Applicable decision analysis approaches and corresponding sea level information requirements, depending on the decision horizon of coastal adaptation decisions and the uncertainty tolerance of users (Hinkel et al., 2019).

Highlights

- Different kinds of contexts, e.g. low or high uncertainty aversion, short or long-time horizons, require different kinds of sea-level rise information to support coastal adaptation decision making, e.g. probabilistic predictions, low-probability-high-impacts (high-end) scenarios, upper and lower bounds.
- Uncertainty intolerant users such as managers of critical coastal infrastructures require high-end and low-end sea-level rise scenarios produced for different levels of uncertainty intolerance.
- Long-term decisions such as planning for future improvments in estuarine barriers or developing new coastal zones can be improved through learning scenarios estimating what will be learned about sea-level rise in the future. INSeaPTION delivers here sea-level projections with quantified uncertainties, allowing to understand which future research and observations can deliver more precise sea-level projections in the coming decades.

Keywords / hashtags

Keywords: coastal climate services, extraprobabilistic sea-level projections, sea level services, coastal adaptation decisions, coastal impacts of sea level rise
Hashtags: #codesign, #sealevelrise, #sealevel, #projections, #climateservices

Potential societal impacts

Coastal climate services have the potential for significant positive economic and wellbeing impacts, and INSeaPTION contributes to uncap this potential. Investments in the area of coastal risk prevention are already important at present, and future global annual investments needed for flood protection only are expected to grow up to US$ 100 billion per year during the 21st century. INSeaPTION also contributes to build capacities in Maldives and Polynesia through training sessions addressing risk assessment, adaptation and nature based solutions.

ISIpedia

The open inter-sectoral impacts encyclopedia

What is the ISIpedia project about?

ISIpedia develops the ISIpedia online encyclopedia and coordinates the research within ISIMIP: The Inter-Sectoral Impact Model Intercomparison Project. Comprehensive information about the impacts of climate change is essential for decision makers when considering response options to projected climate-change. These options range from adjusting international mitigation targets to planning regional adaptation measures. They include informing the implementation of both adaptation and mitigation measures. The central product of this project is the ISIpedia open inter-sectoral impacts encyclopedia. This encyclopedia will act as a hub for multi-model, policy-relevant, climate-impact simulations and assessments. The ISIpedia encyclopedia is a prototype stakeholder-driven climate service to assist stakeholders to respond to evolving future climate-change scenarios.

Work structure within the ISIpedia project.

Highlights

- ISIpedia provides access to the assessments and syntheses of national-level climate-impact information: historical observations, present-day conditions, projections on near-term to far-term future developments.
- Model limitations are transparently documented and comparisons between historical simulations and observations are provided for model evaluation
- ISIpedia provides regionally-resolved visualisations of projections of climate-impacts for important sector-specific and cross-sectoral indicators, such as land area affected by droughts or population affected by crop failure.

Keywords / hashtags

Keywords: climate-change impacts, cross-sectoral simulations, policy-relevant assessments, user-driven climate-impacts indicators, visualisations of climate-impacts projections

Hashtags: #ISIpedia, #climateimpacts, #ISIMIP

Potential societal impacts

Information about the impacts of climate change that will be provided by ISIpedia will help for example decision makers while considering response options to projected climate change. Thereby ISIpedia can contribute to the implementation of international agreements as the Paris Agreement. ISIpedia addresses not only decision makers. Its information about climate impacts can also help a variety of stakeholders from civil society with their work on responding to climate change.

SALIENSEAS

Enhancing the saliency of climate services for marine mobility sectors in European Arctic seas

What is the SALIENSEAS project about?

The warming of the Arctic ocean has profound implications for socioeconomic activities of local communities and maritime sectors, like shipping, cruise tourism and fisheries. Despite large investments in the development of environmental information systems, the potential for these user groups is not sufficiently realised. SALIENSEAS brings together a team of social and natural scientists, metocean service personnel, and end-users in an iterative research and co-production process, to map the needs of various end-user groups for sea ice forecasting services, to co-produce a number of demonstration sea ice forecasting services, and to develop and apply participatory approaches to understanding the impact of such services.

Warming of the arctic ocean.

Highlights

- SALIENSEAS carries out a spatially explicit survey tool (Maptionnaire) to map user requirements, which leads to much needed context specific insights in navigational challenges and information needs;
- Sea ice forecasting services at various temporal ranges form a cutting edge new field: SALIENSEAS develops several demonstration services and forecasting skills to set the stage for new developments in this field;
- To explore the socioeconomic potential of sea ice forecasting services SALIENSEAS carries out a companion modelling approach, using serious gaming and agent-based modelling, to simulate decision making processes under uncertainty.

Keywords / hashtags

Keywords: Arctic shipping, Arctic cruise tourism, sea ice forecasting, sea ice dynamics, coproduction
Hashtags: #seaiceforecasting, #arcticchange, #maritimesafety

Potential societal impacts

Sea ice forecasting services are crucial for safe navigation in increasingly used Arctic waters and vital for timely delivery of goods to remote Arctic communities. Tailoring of sea ice services to the needs of important shipping sectors in European Arctic waters can reduce risks, increase resilience and enhance economic opportunities for communities and sectors that have so far lacked the level and quality of environmental information services that are considered normal in lower latitude areas. Moreover, sea ice forecasting contributes to the implementation of the recently established Polar Code of the Internaltional Maritime Organisation.

SENSES

Climate Change ScENario SErviceS: Mapping the future

What is the SENSES project about?

The SENSES project investigates potential socio-economic futures in the face of climate change and how this knowledge can be made accessible to a broader public. SENSES develops tools and approaches to make the new generation of climate change scenarios more comprehensible, culminating in a climate service for decision makers. Central needs are identified in a co-creation process between scientists and users. The results will be combined to a tailor-made, user-determined Climate Scenario Toolkit including scenario visualization tools and co-creation techniques for three stakeholder groups:

1. National and international climate policy makers,
2. Regional climate scenario users, and
3. Businesses, particularly financial businesses.

Climate Change Scenarios

SENSES Toolkit
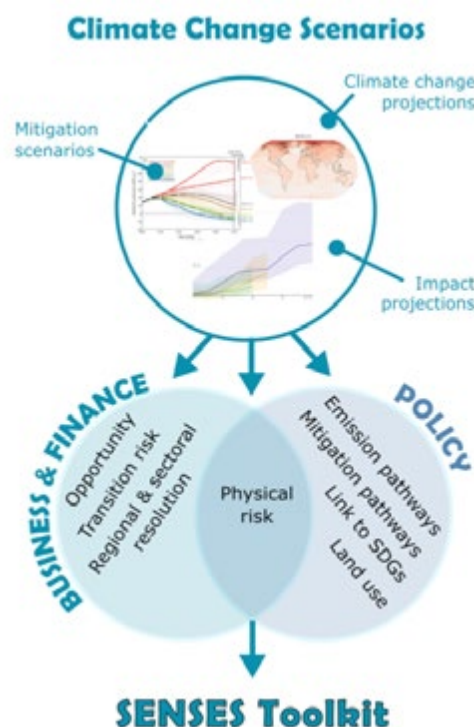
Highlights

- One major finding in the project is that our stakeholders need staged access to climate change scenarios. Different levels of complexity of the scenario knowledge need to be provided, e.g. capacity building elements to include new user groups.
- Our co-production workshops showed that the combination of mitigation and impact scenarios hits an urgent need of stakeholders to link emission and mitigation pathways to the potential implications of climate change.
- A great highlight is how relevant our scenarios are for the finance community. The TCFD (Task Force on Climate-related Financial Disclosures) initiative gave scenario driven risk assessment an enormous push. Our third workshop received so much interest that we had to broadcast parts of the workshop via youtube.

Keywords / hashtags

Keywords: climate change scenarios, toolkit, co-production, visualization toolkit, risk assessment, physical risk, transition risk scenarios

Hashtags: #ClimateChangeScenarios, #toolkit, #co-production

Potential societal impacts

We provide access to climate change scenarios at different complexity levels for a broad variety of stakeholders. Providing them with this information will support complex decision making, e.g. in the transformation of the energy system, required investments, and risk assessment.

Users get an understanding how potential pathways might look like and which parameters are important for a future that cannot be predicted.

WATExR

Extreme Climate Events and Water Quality

What is the WATExR project about?

Climate extreme events, like heat waves, droughts, and floods, stress ecosystems and compromise their capacity to provide key services related to water. However, despite the vulnerability of the water quality sector to climate extremes, there has been limited development of solution-oriented tools integrating Climate Services and ecosystem impacts modeling. WATExR emerges to co-develop practical tools for anticipating climate extreme events and their impacts on ecosystem services provided by aquatic ecosystems.

Hurricane over the ocean.

Highlights

- Despite the vulnerability of the water quality sector to climate extremes, there has been limited development of solution-oriented tools integrating seasonal prediction of extreme events and ecosystem impacts modelling.
- WATExR is bridging the gap between two research communities (climate and freshwater sciences) that have been working in isolation. WATExR is co-developing solutions to anticipate and manage the impacts of extreme events on water quality, using QGIS plug-ins. Pilots for prediction salmon fisheries and water quality in reservoirs already in use!
- WATExR has defined a new Impact Sector in the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP): the Lake Sector. The first model runs on the impacts of climate change on lakes are already executing!

Keywords / hashtags

Keywords: Extreme events, water quality; co-development, seasonal prediction, ISIMIP
Hashtags: #ExtremeEvent, #WaterQuality, #EcologicalForecasting

Potential societal impacts

WATExR contributes to the implementation of the European Roadmap for Climate Sciences, delivering an application demonstrating the potential benefit of CS for water quality management. In particular, we are developing tools to anticipate the impacts of climate extremes on water quality, supply, and fisheries (for instance, harmful algal blooms development during a heatwave), using seasonal climate prediction. The tools developed in WATExR assist in the adaptation of the water sector to a future with more frequent climate extremes, offering anticipation to managers, so they have time to devise strategies to cope with extreme events before they strike (for instance, stocking reagents in treatment plants before the impact of a severe storm on a water supply reservoir).
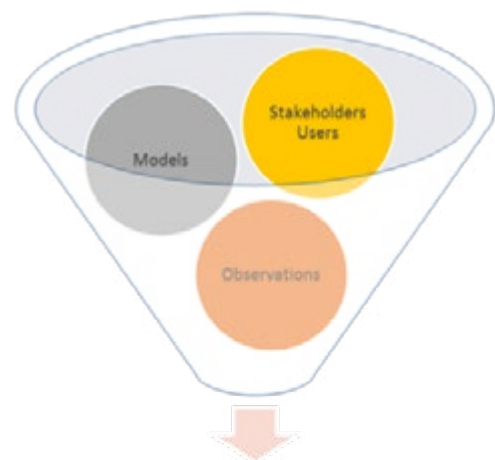
DustClim

Dust Storms Assessments for the development of user-oriented Climate Services in Northern Africa, Middle East and Europe

What is the DustClim project about?

Sand and dust storms can be a major threat to life, health, property, environment and economy in many countries. There is an increasing need for accurate sand and dust information and predictions to support early warning systems, and preparedness and mitigation plans. DustClim produces and delivers an advanced dust regional model reanalysis covering the satellite era (since 2000) of quantitative aerosol information. It develops dust-related services tailored to specific socio-economic sectors. Thereby it will make a major step forward in the way sand and dust storms affect society., since these services enable to integrate dust information into practice and policy.

DustClim project structure: Dust forecast and observations together with stakeholders' interests will be the base of the design of the dust-related climate services for aviation, solar energy and air quality.

Dust-related Climate Services

Highlights

- There is currently a very limited integration of dust information into practice and policy. In this context, DustClim provides reliable information on sand and dust storms trends and current conditions, and develops dust impact assessment pilot studies for three key economic sectors: air quality, aviation and solar energy.
- The DustClim reanalysis is of unprecedented high-resolution (10km x10km) and assimilates satellite products over dust source regions with specific dust observational constraints.
- The accuracy of the DustClim's products are evaluated using an exceptional wide variety of observations.

Keywords / hashtags

Keywords: dust, reanalysis, aviation, solar energy, air quality
Hashtags: #dust, #storms, #COSTinDust, #wmo, #DustClim

Potential societal impacts

DustClim aims to impact a variety of sectors and communities by benefitting them both socially (improved quality of life) and economically (improved resource management).
It creates applied products tailored to the needs of specific sectors whose activities are highly impacted by sand and dust storms such as:

- Solar power generation sector.
- Public health, air quality assessment and management agencies.
- Air traffic management.

A well-evaluated high-resolution dust dataset can be applied to earth system studies to identify the impact of dust on weather, climate and ecosystem, and weather/chemistry forecast.

ECLISEA

European advances on CLImate services for coasts and SEAs

What is the ECLISEA project about?

ECLISEA is a project that aims to advance coastal and marine climate science and associated services through developing innovative research of sea surface dynamics. The project is built upon the premise that the outcomes should be applicable throughout Europe. ECLISEA proposes an integral research plan that starts with assessing the needs of specific stakeholders; includes groundbreaking investigation related to mean sea level rise, storm surge, waves, total water level and coastal flooding and erosion methodologies, and ends up with the development of an on-line open prototype of a coastal climate service in Europe.
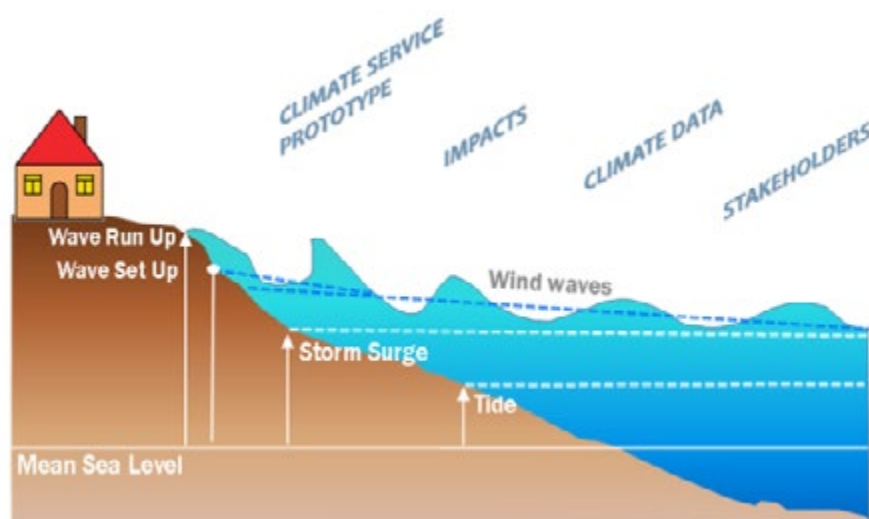
Schematic view of the marine variables that cause coastal flooding hazard (sea level components and wind-generated waves). On the top the key-points of the scope of the project are shown (first stakeholders' consultation, then generation of climate data, impact assessment, and finally the development of a marine/coastal climate service prototype).

Highlights

- A climate dataset of sea surface variables (waves and sea level) along the coast and European seas is processed and available.
- A set of documents providing information and best practices related marine and coastal climate services. An example of the topics of the on-line documents are: the available climate datasets; the stakeholder's need; a guide of downscaling methods for regional studies on the coast; the framework to assess climate change driven shoreline changes.
- A prototype of a coastal climate service is been developed. The CCS will contain (i) a smart data model infrastructure, (ii) a European coastal climate atlas, and (iii) a decision support tool for coastal impacts.

Keywords / hashtags

Keywords: coastal climate hazard, coastal impacts, sea level rise, water level climate changes, waves.
Hashtags: #ECLISEAproject, #climateservices, #coastal

Potential societal impacts

We are developing climate information and related services tailored in coastal areas for multi-sector stakeholders (e.g. energy, tourism, navigation and insurance).
The research under ECLISEA umbrela will allow to move forward on climate predictability of sea level and waves.
A framework accounting for coastal uncertainties in assessing flooding and erosion impacts from European to local scales is being developed.

EUPHEME

EUropean Prototype demonstrator for the Harmonisation and Evaluation of Methodologies for attribution of extreme weather Events

What is the EUPHEME project about?

The EUPHEME project is developing a scientific capability to help societies throughout Europe become more resilient to extremes of weather in a changing climate. This scientific capability will provide a wide range of interested user groups with information about how climate change is affecting the risks of extreme weather. To achieve this EUPHEME is developing new methods to attribute the risks of extreme events to human and natural causes. It is also building a scientific platform to host data and support data processing and is providing tools to disseminate the results of such attribtion assessments to a variety of stakeholders.

The project (see diagram) is organised in such a way that a stakeholder panel informs the development of methodologies which in turn inputs into the development of a platform for the production of attribution assessments. These in turn are delivered to stakeholders and feedback from the stakeholder panel is then used to improve methodologies further. In this way, the project structure aims to facilitate a continual improvement of attribution capability for Europe.

Project workflow.

Highlights

- Researchers at CEA/CNRS have developed new methods for attributing extreme weather events by calculating the characteristics of the weather patterns involved. This enables a more detailed understanding of how weather events are affected by climate change, for example by understanding how climate change has made heatwaves hotter given particular weather patterns.
- A new platform has been developed by KNMI that enables researchers from different institutions to pool their data and analyses. This will facilitate more comprehensive assessments of extreme weather events by combining attribution methods developed at different institutes.
- An attribution analysis by the Met Office showing a substantial effect of climate change on the 2018 European heatwave was presented at the UNFCCC climate change negotiations in Katowice, Poland in December 2018 and was widely reported in the press. This is a good example of how the EUPHEME work is eliciting interest from both policy makers and the media.

Keywords / hashtags

Keywords: climate change, global warming, extreme weather, attribution, climate services
Hashtags: #attribution, #extremeweather, #climateservices

Potential societal impacts

EUPHEME is delivering a prototype attribution service to enhance the development more broadly of future climate services. As well as incorporating information about past and future climate it is important that climate services also consider the current climatic situation which is what an attribution service aims to do. Such a service will support endeavours for societies to become more resilient to extreme weather under climate change. This supports the UN Sustainable Development Goal on climate action by strengthening resilience and adaptive capacity to climate-related hazards. A clearer identification of the effects of climate change on extreme weather also supports efforts to integrate climate change measures into national policies, strategies and planning.

INDECIS

Integrated approach for the development across Europe of user oriented climate indicators for GFCS priority sectors: agriculture, disaster risk reduction, energy, health, water and tourism

What is the INDECIS project about?

INDECIS is a "from data to service" project. INDECIS improves the available climate datasets by adding data and improving their quality. INDECIS defines climate indicators oriented to the sectors agriculture, disaster risk reduction, energy health, tourism and water. These indicators are defined by the consortium in consultation with sector's specialists. The figure shows a precipitation index example of the coldest quarter for a particular data point. Data and indices definitions are downloadable from the site in NetCDF format. The indicators are suitable for comparison with atmospheric patterns and sectoral data. INDECIS compares its indices with modelled data and discusses with sectoral stakeholders on their potential as climate services.

Example index.

Highlights

- INDECIS has digitized more than 600.000 daily values across Europe, especially for the Balkan region and Italy, and compiled over 300 subdaily records across the globe of tall wind masts.
- INDECIS created experimental datasets to improve its statistical methodologies, compiled software suites for analyis that are open to the scientific community and defined and provided a series of climate indicators.
- INDECIS invites stakeholders to discuss its series of climate indicators and to compare them with atmospheric patterns, reanalysis and models.

Keywords / hashtags

Keywords: climate datasets, climate indices, climate software
Hashtags: #indecis, #climateindices, #GFCSsectors

Potential societal impacts

INDECIS provides open access to climate products such as indices, data and software. The project dedicates efforts to engage stakeholders with potential interests in INDECIS's results through workshops and has already published 35 contributions. Climate services delivery to end-users is the focus of the second half of the project by providing climate datasets, indices, software and reports to potential customers from priority sectors such as agriculture, disaster risk reduction, energy, health, water and tourism.
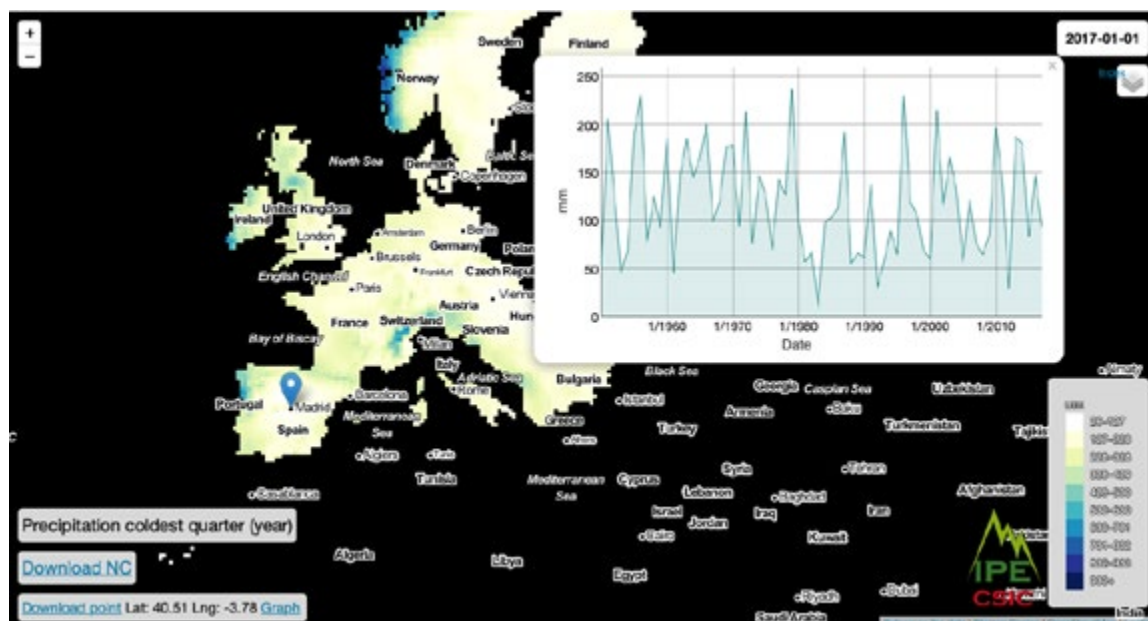
MEDSCOPE

MEDiterranean Services Chain based On climate PrEdictions

What is the MEDSCOPE project about?

MEDSCOPE aims at improving climate information and data obtained from seasonal forecasts in the Mediterranean area This information and data will feed into climate services in different socio–economic sectors relevant to the region. This is achieved by improving the understanding of the processes driving climate variability and its predictability in the target area. Then, based on the improved knowledge, MEDSCOPE develops methodology and tools (e.g., bias correction, downscaling, statistical models) to improve predictions, making them available to a community of users operating in the Mediterranean area.
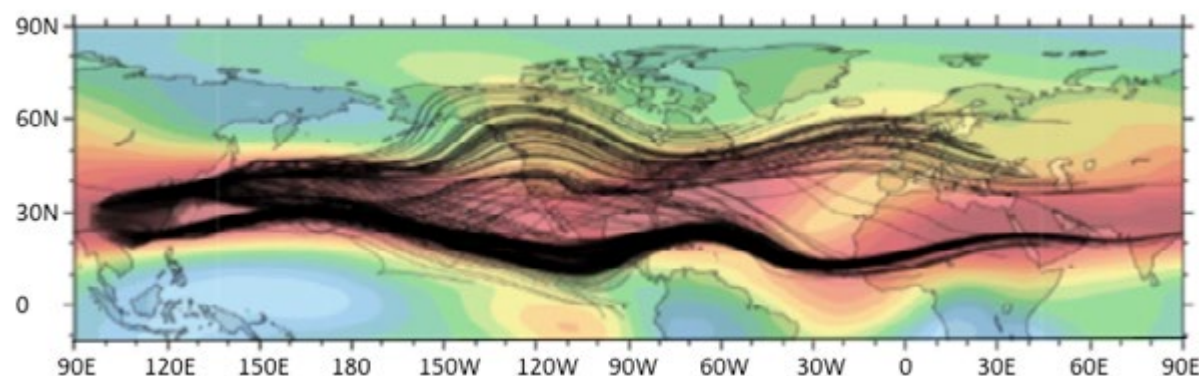
Rossby wave tracks, illustrating how the variability in the tropical Pacific can reach and influence the Mediterranean region.

Highlights

- MEDSCOPE enhances knowledge of key mechanisms, like teleconnections from tropical oceans or land surface–atmosphere interactions, that might influence climate variability over the Mediterranean region on different time-scales, improving the understanding of possible sources of predictability for the area.
- This advanced understanding has led to the development of a software package (Climate Service Toolbox, CSTools), which contains process-based methods for forecast calibration, bias correction, statistical and stochastic downscaling, optimal forecast combination and multivariate verification
- These tools allow obtaining tailored products and better exploiting dynamical seasonal forecasts to provide information relevant to public and private stakeholders in a number of important social and economic sectors in the Mediterranean region.

Keywords / hashtags

Keywords: seasonal Forecasts, climate services, Mediterranean region, Mediterranean Climate Outlook Forum, medCOF

Hashtags: #climatepredictions, #climateservices, #mediterraneanclimate

Potential societal impacts

MEDSCOPE improves tools and methods of extracting climate information from predictions. It contributes to data readiness from seasons to years ahead to climatic conditions in the Mediterranean region. These results will help the development of better decision support tools, enabling a better management of the environmental risks, which, in practice, will imply a reduction of emergency interventions' costs, a better integration of climate-dependent products or services into markets, and a higher business stability. Overall, this contributes to resilience of society towards the impacts of climate variability and change.
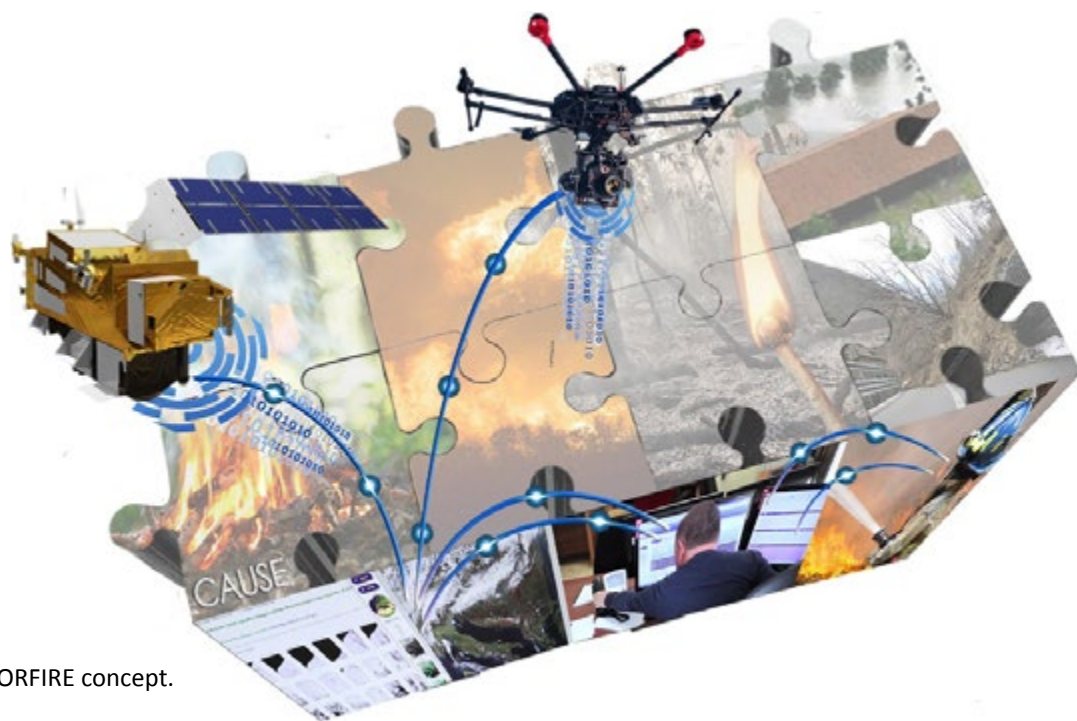
SERV_FORFIRE

Integrated services and approaches for assessing effects of climate change and extreme events, for fire and post fire risk prevention

What is the SERV_FORFIRE project about?

SERV_FORFIRE has the aim of creating an international collaborative community, to share the best methodologies related to the fire and post fire risk prevention. Experts in remote sensing of soil and vegetation, risk management and mitigation, and climate change are joined under this project to provide information to stakeholders and users to better understand and manage fires. The core activities are the seasonal fire occurrence model development, the Post fire risk assessment and the implementation of the joint activities among partners. Monitoring and mitigation strategies are shared at European and local scales also investigating pilot areas selected in Europe.

SERV_FORFIRE concept.

Highlights

• SERV_FORFIRE delivers seasonal and sub-seasonal forecasts of fire and post-fire risks such as landslides and erosion, which allows us improving mitigation strategy.
• The developed drought-monitoring and forecasting system provides a semi-automatic, more detailed, timely and comprehensive operational service for decision making by water authorities, researchers and general stakeholders.
• Forecasts of particulate matter emissions from wildfires worldwide can be used in global-scale air quality forecasting simulations.

Keywords / hashtags

Keywords: fire and post fire risk seasonal forecast, mitigation strategy, forecasting simulations, emissions, burned areas
Hashtags: #fire, #risk, #prevention, #servforfire

Potential societal impacts

Results obtained in remote sensing of soil and vegetation, risk management and mitigation, and climate change, can be useful for stakeholders and users to better understand and better manage fires.

URCLIM

Urban Climate Services

What is the URCLIM project about?

URCLIM project develops a general methodology to produce integrated Urban Climate Services for urban planners and related stakeholders, using open urban data and regional climate data, and to evaluate the uncertainties.

The project develops high resolution maps of urban parameters for climate studies, evaluates multi-criteria impacts and various types of adaptation strategies. It defines pertinent Urban Climate Services and smart visualization processes. This happens in cooperation with stakeholders. Several case studies have been chosen, each located in a different climate, influenced by different geographical features, and with a different urban history and structure.
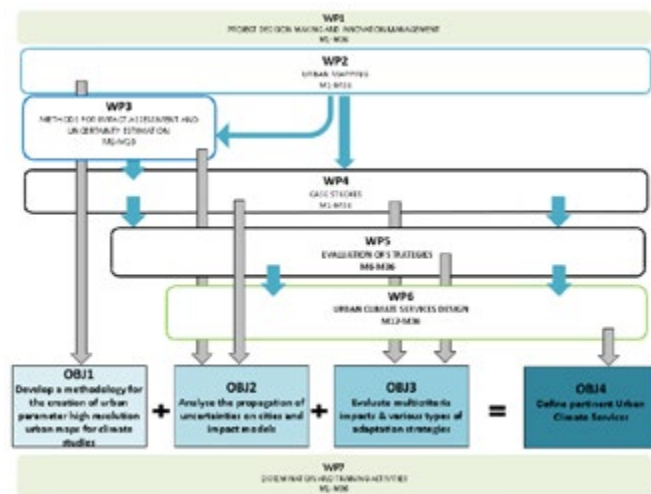
Highlights

- A generic tool to produce urban morphological and buildings' indicators from open datasets is built. Among the indicators are, at the scale of each block: building or road density, building type and use, mean height and Local Climate Zones.
- Downscaling methodologies are developed from Euro-Cordex to the urban and infra-urban (block) scales for assessment of urban heat island, precipitation and air quality local projections.
- Urban planning adaptation strategies are evaluated according to a wide range of impacts such as Urban Heat Island, Thermal Confort, sliperness, economic impacts.
- Urban Climate Services are developed. A smart visualization too is used to co-construct services rendering and analysis.

Keywords / hashtags

Keywords: urban heat island, downscaling methods, air quality, urban maps, adaptation scenario to climate change, climate service
Hashtag: #UrbanClimateServices, #HealthyUrbanLiving, #integratedUrbanModelling

Potential societal impacts

The URCLIM project provides major advances on Climate Services for urban end users, especially urban planners and city administrations. The services provide pertinent climate information on a multitude of impacts and risks. This approach enables further deployment for cities (at least in Europe), because

- the urban description tools are based on open data
- the climate input data is based on the World Climate Research Program Euro-Cordex
- the methodologies are open-access, and the technical developments are open-source
- a smart visualization tool is associated to the Urban Climate Services
- the Urban Climate Services are developed in common with stakeholders supported by case studies.

WINDSURFER

WIND and wave Scenarios, Uncertainty and
climate Risk assessments for Forestry, Energy and Reinsurance

What is the WINDSURFER project about?

Extreme winds pose major risks to life, property and forestry, while extreme ocean waves can impact on offshore infrastructures and coastal communities. WINDSURFER is a 3-year project that brings together eight leading research institutions across Europe to co-develop new methods, tools and assessments of extreme wind and wave risk with a focus on the Insurance, Forestry and Energy sectors.

WINDSURFER Project pictures.
Extreme winds and waves have substantial socioeconomic impacts.

top left: Forestry damage after windstorm Gudrun.
top right : Property damage after windstorm Kyrill.
bottom left: Extreme waves at the North Sea Ekofisk platform.

Highlights

- Frozen soil can limit the damage that extreme winds do to forests. WINDSURFER has improved our understanding of the relationship between extreme wind gusts and frozen soils on forestry damage.
- The clustering of windstorms (e.g. storms Martin and Lothar in Dec 1999) can lead to increased wind risk. A novel assessment of the impact of windstorm clustering on extreme European wind risk, and their potential impacts on insurance losses, has been made using long climate model simulations.
- WINDSURFER has investigated the suitability of the Copernicus C3S ERA20C reanalyses for understanding how mid-latitude storms and wind risks have varied over the 20th Century.

Keywords / hashtags

Keywords: extremes, storms, waves, climate change, Windsurfer-project
Hashtags: #storms, #waves, #climatechange

Potential societal impacts

The results from WINDSURFER are being used to improve our understanding of extreme winds and waves and their associated socioeconomic impacts. WINDSURFER is engaging with the forestry, insurance, and offshore energy sectors to understand their needs and provide them with new tools and data to assess extreme wind and wave risks for present-day and future climates.

③ JPI Climate calls

Click on a project's logo to go to its website. Some projects do not have a website.

Legend:
- 🟧 2013 Joint Call for Transnational Collaborative Research Projects
- 🟩 2015 Joint Call for Climate Services Collaborative Research Action on "Climate Predictability and Inter-regional Linkages"
- 🟦 2016 ERA4CS Joint Call on Researching and Advancing Climate Services Development

Row 1

SELF CITY
- self-organisation
- responses
- capacity building

EPCC
- public perceptions
- cross- national survey
- climate change
- policy support

HOPE — HOusehold Preferences for reducing greenhouse gas emissions in four European high income countries
- carbon footprint
- climate change mitigation
- sustainable lifestyles

mobilizing grassroots
- grass roots initiatives
- mobilising grassroots
- crenewable energy challenge

ARCTIC CENTRE University of Lapland
- nomadic pastoralism
- reindeer herding
- social-ecological systems

JPI TransAdapt — ANALYSING COMMUNITY FLOOD RISK MANAGEMENT
- adaptation
- bottom-up approach
- drivers
- barriers

SIWA
- Siberia
- lakes
- rivers
- greenhouse gas

Row 2

COUP EU-JPI climate
- permafrost
- climate change

LowPerm
- permafrost
- biogas
- active layer
- Svalbard

CLIMAX — Climate Services Through Knowledge Co-Production
- co-production
- climate prediction
- vegetation models
- South America

HIWAVES3
- impact extremes
- compound events
- climate ensemble
- climate modelling

INTEGRATE
- teleconnections
- paleoclimate
- monsoons
- climate variability

InterDec
- Arctic Amplification
- Arctic sea ice decline
- extreme temperatures

PaCMEDy — Palaeoclimate Constraints on Monsoon Evolution and Dynamics
- monsoon
- El Niño Southern oscillation

PREREAL — predicting circumboreal fires
- forest fire activity
- predictability of fire
- fire history
- fire forecast

BITMAP
- BITMAP
- climate change
- western disturbances
- storm tracking

Row 3

GOTHAM
- teleconnections
- El Nino; monsoons
- weather@home
- Belmont-GOTHAM

AquaClew
- co-development
- adaptation
- climate change
- water management

CIREG
- renewable energy
- West Africa
- power mix
- climate change

Citizen Sensing
- urban resilience
- climate services
- participatory risk management

Clim2Power
- climate services
- seasonal forecasts
- renewable energy
- climate adaptation

CLIMALERT — Climate Alert Smart System
- climatic events
- biodiversity
- ecosystem services
- good practices

ClimApp
- personalized warning
- personalized advice
- thermal stress
- heat stress

Clim INVEST — Tailored climate risk information for financial decision makers
- physical climate risk
- TCFD
- climate finance

CLISWELN
- climate services
- nexus
- drought
- cities

Row 4

Co-development of place-based Climate Services for action
- naratives
- scenario
- co-development

CO-MICC
- climate change hazards
- climate change adaptation
- uncertainty

CoCliME
- marine ecosystem
- biotoxins
- pathogens
- blooms

EVOKED
- climate services
- living Labs
- risk
- uncertainty

INNOVA — Climate Service Provision
- climate services
- local adaptation
- innovation
- adaptation cycle

INSeaPTION
- coastal climate services
- extra probabilistic sea-level projections
- sea level services

ISIpedia
- climate change impacts
- cross-sectoral simulations

SALIENSEAS
- Arctic shipping
- Arctic cruise tourism
- sea ice forecasting
- sea ice dynamics

SENSES
- climate change scenarios
- toolkit
- co-production

Row 5

WATExR
- extreme events
- water quality
- co-development
- seasonal prediction

DustClim
- dust
- reanalysis
- aviation
- solar energy

ECLISEA
- coastal climate hazard
- coastal impacts
- sea level rise

Eupheme
- climate change
- global warming
- extreme weather
- attribution

Indecis — Sectorial Climate Services
- climate datasets
- climate indices
- climate software

MEDSCOPE — MEDiterranean Services Chain based On climate PrEdictions
- seasonal forecasts
- climate services
- Mediterranean region
- Mediterranean climate

SERV_FORFIRE — INTEGRATED SERVICES AND APPROACHES FOR FIRE MONITORING
- fire and post fire risk seasonal forecast
- mitigation strategy
- emissions

URCLIM
- urban heat island
- downscaling methods
- air quality
- urban maps

WINDSURFER
- extremes
- storms
- waves
- climate change

Thematic areas
- Societal transformation in the face of climate change
- Climate science
- Climate services

SELF CITY | **EPCC** | **HOPE** HOusehold Preferences for reducing greenhouse gas emissions in four European high income countries | mobilizing grassroots | ARCTIC CENTRE University of Lapland | JPI TransAdapt ANALYSING COMMUNITY FLOOD RISK MANAGEMENT | **SIWA**

• self-organisation • responses • capacity building	• public perceptions • cross- national survey • climate change • policy support	• carbon footprint • climate change mitigation • sustainable lifestyles	• grass roots initiatives • mobilising grassroots • crenewable energy challenge	• nomadic pastoralism • reindeer herding • social-ecological systems	• adaptation • bottom-up approach • drivers • barriers	• Siberia • lakes • rivers • greenhouse gas

COUP EU-JPI climate | **LowPerm** | **CLIMAX** Climate Services Through Knowledge Co-Production | **HIWAVES3** | **∫NTEGRATE** | **InterDec** | **PaCMEDy** Palaeoclimate Constraints on Monsoon Evolution and Dynamics | **PREREAL** predicting circumboreal fires | **BITMAP**
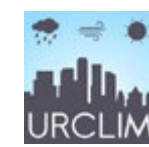
• permafrost • climate change	• permafrost • biogas • active layer • Svalbard	• co-production • climate prediction • vegetation models • South America	• impact extremes • compound events • climate ensemble • climate modelling	• teleconnections • paleoclimate • monsoons • climate variability	• Arctic Amplification • Arctic sea ice decline • extreme temperatures	• monsoon • El Niño Southern oscillation	• forest fire activity • predictability of fire • fire history • fire forecast	• BITMAP • climate change • western disturbances • storm tracking

GOTHAM | **AquaClew** | **CIREG** | **Citizen Sensing** | **Clim2Power** | **CLIMALERT** Climate Alert Smart System | **ClimApp** | **Clim INVEST** Tailored climate risk information for financial decision makers | **CLISWELN**

• teleconnections • El Nino; monsoons • weather@home • Belmont-GOTHAM	• co-development • adaptation • climate change • water management	• renewable energy • West Africa • power mix • climate change	• urban resilience • climate services • participatory risk management	• climate services • seasonal forecasts • renewable energy • climate adaptation	• climatic events • biodiversity • ecosystem services • good practices	• personalized warning • personalized advice • thermal stress • heat stress	• physical climate risk • TCFD • climate finance	• climate services • nexus • drought • cities

Co-development of place-based Climate Services for action | **CO-MICC** | **CoCliME** | **EVOKED** | **INNOVA** Climate Service Provision | **INSeaPTION** | **ISIpedia** | **SALIENSEAS** Co-producing marine climate services | **SENSES**

• naratives • scenario • co-development	• climate change hazards • climate change adaptation • uncertainty	• marine ecosystem • biotoxins • pathogens • blooms	• climate services • living Labs • risk • uncertainty	• climate services • local adaptation • innovation • adaptation cycle	• coastal climate services • extra probabilistic sea-level projections • sea level services	• climate change impacts • cross-sectoral simulations	• Arctic shipping • Arctic cruise tourism • sea ice forecasting • sea ice dynamics	• climate change scenarios • toolkit • co-production

WATER | **DustClim** | **ECLISEA** | **Eupheme** | **Indecis** Sectorial Climate Services | **MEDSCOPE** MEDiterranean Services Chain based On climate PrEdictions | **SERV_FORFIRE** INTEGRATED SERVICES AND APPROACHES FOR FIRE MONITORING | **URCLIM** | **WINDSURFER**

• extreme events • water quality • co-development • seasonal prediction	• dust • reanalysis • aviation • solar energy	• coastal climate hazard • coastal impacts • sea level rise	• climate change • global warming • extreme weather • attribution	• climate datasets • climate indices • climate software	• seasonal forecasts • climate services • Mediterranean region • Mediterranean climate	• fire and post fire risk seasonal forecast • mitigation strategy • emissions	• urban heat island • downscaling methods • air quality • urban maps	• extremes • storms • waves • climate change

The project leader of EPCC

I am Professor Nick Pidgeon (MBE, PhD), lead investigator of the EPPC project. As researcher I am interested in explaining how people form their opinions and understandings of climate change and related policies. EPCC provided the unique opportunity to examine perceptions of climate change within and across countries. For example, we could look at whether support for climate change actions are motivated by moral considerations (or practical considerations) and whether these motivations are different across different cultural contexts.

EPCC Research consortium and advisory panel members.

About the project consortium

EPCC was a collaboration between five academic teams in four participating nations: Cardiff University, UK; Institut Symlog, France; NORCE (formerly Rokkan Centre for Social Studies) and University of Bergen, Norway, and University of Stuttgart, Germany and Climate Outreach, a UK-based think tank which specialises in climate change communication. The consortium was led by Nick Pidgeon at Cardiff University).

The role of JPI Climate

JPI Climate supported the project by providing important contacts and opportunities to present our project and its results internationally. An invitation to present at the COP23 in Bonn is only one example of how JPI facilitated the outreach and success of EPCC.

The project coordinator of HOPE

My name is Dr. med. Alina Herrmann and I was the HOPE project coordinator, working closely together with the project leader Prof. Rainer Sauerborn, MD PhD. As a medical doctor I am interested in how to tackle health issues that modern societies suffer from: chronic diseases like diabetes, cardiocascular and respiratory disease. Most of these diseases are due to our sedentary lifestyles and unhealthy diets, which are often unsustainable as well. Thus, for me it is essential to find out how we can make our societies more sustainable and more healthy at the same time.

About the project consortium

Institute for Global Health, University Hospital Heidelberg, Heidelberg, Germany was in charge of the Scientific coordination, study design and quantitative analysis. TEC-Conseil, Marseille, France, managed the project and built the tool. CIRED, Centre International de Recherche sur l'Environnement et le Développement, France, worked on the economic evaluation. The Western Norway Research Institute, Sogndal, Norway, was in charge of the involvement of stakeholders and of policy analysis. From Sweden, the Department of Epidemiology and Global Health, Umeå University, worked on the qualitative study design and the quantitative analysis. Each country was assisted by a policy advisory board, consisting of local policy-makers and experts from NGOs and local, regional and/or national government.

HOPE-Scientists at work...

… and after lunch with policy makers in France.

The role of JPI Climate

The JPI call made it possible to fund research on societal transformation in the face of climate change, a topic that has yet received less attention than technical solutions. Furthermore, JPI encouraged the European collaboration in this project, which brought together different perspectives and disciplines. We als received a lot of support from JPI Climate in organizing our final event with researchers and local, national, as well as European stakeholders in Brussels, enabling us to communicate our results effectively.

The leading principal investigator of MOBGIS

I am Dr. Mark Wiering and an Associate Professor in Political Sciences of the Environment at Nijmegen School of Management, Radboud University in Nijmegen, The Netherlands. I am interested in the societal transformations in light of sustainability - and the role of environmental governance therein. Interesting domains are: transitions in water management (water quality, flood risk management) renewable energy, sustainable agriculture.

About the project consortium

This research is a collaboration between Radboud University Nijmegen (the Netherlands), Aalborg University (Denmark) and Linköping University (Sweden). The consortium provides a combination of state-of-the-art research on societal initiatives in renewable energy in all three countries, expertise in (environmental) policy-, framing and discourse analysis, and expertise in advanced network-methodologies. This also includes digital tracing methods, ethnographic participatory approaches, and policy analysis. The consortium's strength lies in its complementarity, both within partners' contributions and between partners.

The role of JPI Climate

With this Call, JPI Climate enabled international collaboration on the innovative topic of grassroots initiatives in the renewable energy field. This has become a very popular theme nowadays. The project highlights the potential of decentralised, citizens' based movements in the energy transition education, research and policy advice.

Linköping University (Sweden), Lund University (Sweden), Radboud University Nijmegen (The Netherlands), Aalborg University (Denmark).
See Partners

Scientific partners:

Dutch stakeholders: ODE-decentraal, Nijmegen Municipality, ECN, Alliander, Hier opgewekt

Danish stakeholders: Vallastaden, Tekniska Verken I Linköping Ab, Linköping Municipality

Swedish stakeholders: Samsø Energy Academy, Hofor (Greater Copenhagen Utility), Danmarks Vindmolleforening, Wind People, Vedvarende Energi

The projectleader of HUMANOR
I am Bruce Forbes (Professor of Global Change, PhD McGill University), a geographer living north of the Arctic Circle in Finnish Lapland studying complex social-ecological systems. My approach is strongly interdisciplinary and participatory, aiming for the co-production of knowledge, particularly concerning local and regional stakeholder-driven research questions. My motivation for the project came from a desire to directly involve indigenous pastoralists in international, interdisciplinary research with like-minded colleagues that would otherwise have been impossible to support with national funding.

Bruce Forbes during fieldwork on Yamal Peninsula, West Siberia.

About the project consortium
The Arctic Centre, University of Lapland, Finland, is leading HUMANOR and is responsible for overall project coordination and output. **University of Aberdeen, Scotland**, led

Part of the HUMANOR team during fieldwork on Yamal Peninsula, Russia, August 2017.

HUMANOR's palaeoecological research, with fieldwork in Scotland, Sweden, eastern and western Siberia and also studied transitioning gender roles in NW Siberia. *Sámi Mountain & Science Museum, Jokkmokk* led HUMANOR's environmental archaeological research and fieldwork at various sites in Sweden and palaeoecological research and fieldwork at various sites in Sweden, Finland and Russia. *Norwegian Univ. of Life Sciences* conducted environmental history research at various sites in Mongolia. The Norwegian Institute for Cultural Heritage Research conducted Participatory Geographic Information Systems (PGIS) research at various historic Sámi reindeer herding sites in northernmost Norway. *The Arctic Centre, University of Lapland, Finland*, conducted extensive social anthropological fieldwork among the Yamal tundra Nenets of West Siberia, building an oral history of their responses to extreme weather events (rain-on-snow, heat waves) associated with a warming Arctic climate. *University of Eastern, Finlan*d together with the Arctic Centre, University of Lapland, conducted extensive fieldwork on remote sensing of reindeer habitats in Northern Fennoscandia and Russia, and on dendroclimatology.

The role of JPI Climate
JPI Climate allowed us to establish a new research initiative with fully-funded partners in Finland, Sweden, Norway, Scotland. Russian field research was funded jointly via the various EU partners. Also, through HUMANOR we successfully attracted funds for new post-doctoral and drone support from National Geographic.

The project leader of TRANS-ADAPT

Sven Fuchs is a senior researcher at the Institute of Mountain Risk Engineering at the University of Natural Resources and Life Sciences in Vienna, Austria. His research interests include mountain hazard risk management, the study of coupled human–environment systems, and the question of social justice and vulnerabilities for natural hazards. His research has taken him to the mountain regions of Europe, Southeast Asia, Central Africa, and the Russian Federation.

TRANS-ADAPT Kick-off meeting.
Credits: S. Fuchs.

About the project consortium

Maynooth University, Ireland, is responsible for the Irish case studies. University of Utrecht, the Netherlands, is in charge of the Dutch case studies.
CITERES Laboratory, François-Rabelais University Tours, France, Maison des Sciences de l'Homme (MSH) Val de Loire are responsible for the French case studies.

The role of JPI Climate

JPI Climate made this project and addressing the underlying research questions possible.

Stakeholder workshop in Tours.
Credits: S. Fuchs.

The project leader of SIWA

I am Jan Karlsson (Professor) and my research focuses on impacts of climate change on the biogeochemistry and ecology of high latitude aquatic ecosystems. The role of inlands waters in Siberia is of particular interest to me because of the high density of inland waters, large permafrost carbon stocks and ongoing and predicted strong climate change.

About the project consortium

Umeå University, Sweden- project lead and coordination- is responsible for assessment of CO2 and CH4 emission from lakes and streams, and for providing new techniques for this work. It links C emission in the inland waters to the specific properties along the climate and perfarost gradient.

Tomsk University, Russia, links the C dynamics observed to climate and permafrost dynamics.

Swedish University of Agricultural Sciences, Sweden, is responsible for estimating the fluvial C export and the availability of this C in the aquatic network.

University Toulouse, France, organizes the field campaigns, including sub-contracting local staff and arranging for transport and accommodation. It will be involved in estimating C emission from lakes and streams and lateral C export.

University of Aberdeen, UK, is responsible for tracer studies to assess hydrological transit times and flow path ways of water and to link this to observed dynamics in permafrost and to carbon fluxes in running waters.

The role of JPI Climate

JPI Climate was very important because it made this collaborative effort of SIWA project possible. Siberia stores vast amounts of carbon in permafrost and is home of the largest rivers draining to the Arctic ocean. Still, only a few studies have estimated carbon emissions from Siberian inland waters. JPI Climate allowed us to make the first assessment of the magnitude and control of carbon emissions from various Siberian inland waters, which is critical in order to fully understand the carbon cycle and impacts of climate warming. JPI Climate was also important in facilitating interactions among various research dicipilines in different projects.

The project leader of COUP

My name is Gustaf Hugelius and my main scientific interest is the role of soils in the global carbon cycle. I have particularly worked on the carbon cycle in Arctic and Boreal ecosystems. I was the lead principal investigator of COUP. The project provided a unique opportunity to make real progress in our ability to project permafrost changes and the collaborative aspect of the project was a fantastic learning experience for us.

About the project consortium

The COUP consortium included participants of different backgrounds and career stages from several institutions. Stockholm University coordinated COUP and led the work on detailed field surveys of soils as well as making new pan-Arctic maps to support model development. The University of Helsinki led the work on high-resolution remote sensing with satellites and field sampling of Arctic vegetation. The University of Copenhagen led work on synthesising field data of greenhouse gas fluxes as well as field work to measure methane fluxes. The University of Eastern Finland led the work on local scale ecosystem modelling and laboratory studies of permafrost soil greenhouse gas fluxes. The University of Vienna led the work studying the composition of permafrost soil and its sensitivity to temperature increases. The University of Oslo led the permafrost modelling. The global modelling and development of global climate models was jointly led by the United Kingdom Met Office, Hadley Centre and the University of Leeds.

The role of JPI Climate

The unique opportunity offered by JPI Climate to collaborate across multiple countries and to initiate and deepen collaboration between scientist working in the field and with modelling. The JPI framework allowed us to gather a large group of scientists, but also allowed greater scientific freedom than traditional EU consortia which allowed us to adapt and improve our science as the project progressed.

A polar scientist involved in LowPerm

My name is Andrew Hodson, Professor (PhD). I am a polar scientist living in Svalbard, Norway and studying the complex relationships between glaciers, permafrost and the effects of thaw upon the microorganisms that live in them. My motivation for the project came from the opportunity to demonstrate how understanding the net release of greenhouse gas emissions from permafrost demands an appreciation of the connections between the glaciers, the permafrost and the sea.

About the project consortium

Sheffield University was leading the LowPerm Project, also responsible for the geochemical analysis of the sediment cores. *The University Centre in Svalbard, Norway*, provided the expertise on permafrost physical characteristics and dissemination. *University of Aarhus*, Denmark, was responsible for the microbiological research conducted at Aarhus. *Høgskulen På Vestlandet*, Sogndal, Norway, helped with the field work and geochemical analysis of summer runoff. The *Arctic and Antarctic Research Institute*, St. Petersburg, Russia, was responsible for operations at Russian field sites.

The role of JPI Climate

Initially, JPI Climate was the sole funder of the LowPerm project consortium that resulted into a new research initiative in Norwegian and Russian sites on Svalbard. The initiative combines long established expertise in the physical characteristics of permafrost that informs us about the chemical and biological processes that influence emissions. Through LowPerm we have been successful in capturing new research funds that continue this research emphasis. This includes a smaller research grant from the Royal Geographical Society (UK) and a major research council award from Norway.

The project leader of CLIMAX

My name is Carolina Vera and I am the CLIMAX Project Coordinator. As a climate scientist I am interested in understanding climate variability and change in South America, to develop useful climate monitoring and prediction tools. My main motivation in this project is to engage researchers from different disciplines (climate, ecology, anthropology, computer) with local actors in a symmetric dialog that allows an increase of climate related knowledge of social relevance.

About the project consortium

French-Argentinean Institute of Climate Studies and its Impacts (IFAECI), University of Buenos Aires, CONICET, Argentina and CNRS, France, oversaw the scientific general coordination, developed climate prediction and monitoring tools and studied climate variability and change in South America. Institut de recherche pour le développement (IRD/UMR245), France, coordinated the stakeholder engagement and coproduction activities in Argentina and performed the related social science research. Potsdam Institute for Climate Impact Research (PIK) and Technical University of Munich (TUM), Germany, coordinated the simulations activities with dynamic vegetation models and the associated analyses. National Institute for Space Science (INPE), Brazil, coordinated the stakeholder engagement and coproduction activities in Brazil, the studies on climate variability and predictability in South America, and modelling development. Laboratoire des sciences du climat et de l'environnement (LSCE), Alternative Energies and Atomic Energy Commission (CEA), France, developed one of the dynamica vegetation models. ALTERRA, Wageningen University, Netherlands, developed impact models for agriculture and hydrology.

Stakeholders:

- Servicio Meteorológico Nacional (SMN), Argentina
- Instituto Nacional de Meteorología (INMET), Brazil
- Operador Nacional do Sistema Elétrico (ONS), Brazil
- Instituto Nacional de Tecnología Agropecuaria- Centro regional Chaco-Formosa, Argentina
- Delegación de la Subsecretaría de Agricultura Familiar y Desarrollo Territorial en la provincia de Chaco, Argentina

The role of JPI Climate

JPI contributed in promoting the Call and facilitating the interaction of CLIMAX with the other projects of the joint call at the Mid-term project meetings held in Kyoto on October 2018.

A postdoc researcher involved in HiWAVES3

My name is Karin van der Wiel. I worked as a postdoc on the HiWAVES3 project. I joined the project because I am interested in the impact of changing weather conditions to society at large. I develop methods for investigating extreme events, try to understand internal variability and climate change, and investigate societal risk related to weather to contribute to a society resilient to `bad' weather conditions.

About the project consortium

Project partners are climate scientists from University of Exeter (UK), BNU (CN) and KNMI (NL), agricultural scientists from IIT Gandhinagar (IN) and Chinese Academy of Sciences (CN), and economic scientists from CICERO (NO).Climate scientists from KNMI and Exeter created large ensemble experiments with two global state-of-the-art climate models. At KNMI these were used to study extreme events in relation to the energy transition and impacts on extreme hydrological events. At Exeter the impact of Arctic sea ice on mid-latitude weather was investigated. Scientists at CAS calculated global wheat yields, which were used to calculate global food prices by CICERO.

The role of JPI Climate

The JPI Climate Call has enabled the formation of the inter-disciplinary project consortium needed for carrying out the HiWAVES3 project. Without this call, we would never have cooperated on this inter-disciplinary topic.

The project leader of INTEGRADE

I am Timothy Osborn, the lead principal investigator of INTEGRATE. My interests are to understand how we can learn about past and possible future climates by integrating the information we can obtain from various sources, namely climate proxies, instrumental climate observations and climate models. Within the climate proxy domain, my particular interest is in the use of tree-ring measurements. The INTEGRATE project combines all these elements and applies them to a region of great societal importance.

About the project consortium

INTEGRATE brings together three institutions: University of East Anglia (UEA), UK; Northwest Institute of Eco-Environment and Resources (NIEER), Chinese Academy of Sciences, China; and Justus Liebig University Giessen (UG) with complementary experience. The research centres at these intitutions working on INTEGRATE are the Climatic Research Unit (UEA), the Key Laboratory of Desert and Desertification (NIEER) and the Department of Geography (UG). UEA has a strong track record with long, temperature-sensitive tree-ring records and with using climate models such as HadGEM2 and IGCM to understand large-scale climate dynamics. NIEER has proven experience in proxy and historical climate evidence across the globe but especially in South and East Asia. UG has expertise in paleoclimate modelling, historical model-data comparisons and analysis of weather and climate extremes. The consortium also benefits from long-standing collaborations with unfunded partners with relevant experience and additional data: The Tree-Ring Laboratory, Lamont-Doherty Earth Observatory; Institute of Plant and Animal Ecology, Russia; Sukachev Institute of Forest, Russia; PAGES2k initiatives from Europe, Asia and the Arctic.

Workshop of the full INTEGRATE consortium at the University of Giessen, Germany, November 2018.

The role of JPI Climate

JPI Climate contributed to the INTEGRATE project, with its "ecosystem" of projects funded within the same programme through the mid-term programme meeting. Additionally, JPI provided us with the names of UK partners who were part of JPI climate programme projects. This enabled us to bring together these UK partners in a UK workshop that we organized at the University of Reading, UK, 1-2 May 2018. These opportunities enabled sharing of ideas and potential for further collaborations.

The Principal Investigator of InterDec

My name is Dr. Daniela Matei, Max Planck Institute for Meteorology, Hamburg, Germany, I am the Lead Principal Investigator for the project. I am a climate scientist focusing on ocean's role in the climate, interannual to decadal climate variability and predictability, near term climate predictions, teleconnections, and climate change impacts.

About the project consortium

Max Planck Institute for Meteorology, Germany – is leading the project. The institute's main actions focus the role of Ural Blocking, Arctic sea ice loss and stratospheric processes in driving Northern Hemisphere extreme conditions in observations, coordinated sea-ice sensitivity experiments and very large ensemble of historical and climate change climate model simulations. The institute also focuses implications of polar-lower latitude linkages for climate predictions. University of Tokyo, Japan, is a partner in the project. It studies the impact of enhanced resolution on the realism of lower-latitude-Arctic linkages and extratropical air-sea interaction, in addition to dissemination of achieved predictive capacities information to relevant stakeholders. Also from Japan is the Niigata University. The university focus Stratospheric processes for Arctic-Mid-latitude-Tropics linkages in coordinated sea-ice sensitivity experiment results and their comparison with observations. The Institute of Atmospheric Physics, Chinese Academy of Sciences, mainly studies the impacts of Arctic warming and recent strong sea-ice reduction on Northern Hemisphere continental climate variability and extreme events. From Germany, Helmholtz-Zentrum für Ozeanforschung GEOMAR, is involved.

Their actions focus on Identifying elements of the observed climate variability that can be explained by wind forcing in observations and pacemaker experiments; Interbasin linkages and Dissemination of achieved predictive capacities information to relevant stakeholders, end-users and decision makers. The Norwegian Nansen Environmental and Remote Sensing Center, studies Arctic warming impact on Northern Hemisphere continental climate variability and extreme events in coordinated atmospheric sensitivity experiments. The University of Bergen, also from Norway, looks into the role of tropical and extratropical oceanic forcing for Artic and midlatitude variability during the 20th century in observations and wind-driven pacemaker experiments. University of Reading, UK, studies Tropical Arctic

InterDec Consortium, InterDec kick-off meeting, 21-23 Nov. 2016, Elsa Brändström Haus, Hamburg, Germany. Photo © Daniela Matei.

linkages involving sub-seasonal processes and implications for predictability in the North Atlantic European region. Main actions of the Sveriges meteorologiska och hydrologiska institut, from Sweden, focus on the role of North Atlantic Ocean circulation in linking polar and lower latitudes and interbasin linkages in observations and climate models. The European Centre for Medium-range Weather Forecasts, from the UK, studies Tropical Arctic linkages involving sub-seasonal processes and implications for predictability in the North Atlantic European region.

The role of JPI Climate

The international exchange and active collaboration of European, Japanese and Chinese scientists jointly supported by JPI Climate and Belmont Forum was essential for the success of the project. Joint meetings of projects funded under the same call are an excelent instrument for increasing the projects' sustainability and enhance future collaborations.

The project leader of PACMEDY

My name is Pascal Braconnot (PhD). I have 25-year expertise in climate modelling. My scientific activity ranges from coupled ocean-atmosphere model development to the use of these models in different climatic contexts. My main scientific interests concern the role of insolation, ocean feedbacks and of the hydrological cycle in past and future climate changes. Mediation toward different audience, as well as the development of climate services in France, is also part of my interests.

About the project consortium

PACMEDY brings together specialists in palaeo environmental data and in palaeo climate modeling, as well as scientists working on modern day climate dynamics and future projections from 4 countries in Europe (France, Germany, United Kingdom, Sweden), India and Brazil. The leading institutions in each country are:

The French PACMEDY consortium gathers researchers specialized in oceans (sediment, corals, shell), ice or continent (lake, pollen and speleothem archives) and climate modeling to reconstruct the evolution of the tropical climate over the last 6000 years.

University of Reading coordinates 3 UK groups to reconstruct past climate variations, produce mid Holocene and last millennium simulations using the MetOffice model, and directly simulates tree-rings and other environmental records to improve model-data comparisons.

Max Planck Institute for Meteorology coordinates a group across 3 German laboratories (MPI-M Hamburg, AWI Bremerhaven, HZG Geesthacht). They focus on simulations of the Holocene and the last millennium with the MPI-ESM model, and on understanding the role of the intertropical convergence zone in the global energetics and monsoon variability and teleconnections.

Stockholm University brings new results on the role of aerosols on the African monsoon and interannual variability, as well as on its teleconnection with ENSO and cyclones, using the EC-Earth model.

The Indian Institute of Tropical Meteorology provides expertise on monsoon variability and predictability and paleoclimate archives such as speleothem and tree-ring and high

resolution regional simulations to document past variation and extremes in monsoon and assess monsoon changes.

University of São Paulo, contributes expertise on on tropical/extratropical interactions, with emphasis on the role of tropical heat sources. The Brasilian group brings expertise in oceanography and theoretical work on climate variability for the analyses of the South American monsoon and its teleconnections.

The role of JPI Climate

This call was seen for us as a good opportunity to align the agendas of groups connected through the international unfunded Paleoclimate Modeling Intercomparison Project and to collectively address questions at the forefront of ongoing international research, and closely related to climate service needs.

The project leader PREREAL

I am a forest teacher Igor Drobyshev, (Docent).I am an ecologist with interest in historical disturbance regimes, climate-disturbance interactions, and tree growth patterns. I strongly believe in the value of large scale analyses to get a better picture of the processes which affect forest dynamics and tree-ring science (dendrochronology) as an important tool in this work.

About the project consortium

- *Swedish University of Agricultural Sciences (SLU)*, Sweden, coordinates the project, supervises the dendrochronological work, supplies the main data on the dendrochronological fire reconstructions, and provides expertise in the downscaling of climate scenarios and numeric modeling.
- *University of Montpellier*, France, is responsible for for paleo-chronological analyses and process-based modeling of climate-fire-vegetation. It calibrates and geographically analyses dynamics of fire weather indices and its future projections.
- Royal Netherlands Meteorological Institute, Netherlands has the overall responsibility for climatic analyses, development of predictability metrics and the numerical modeling of historical, modern, and future climate data. It will assist the Canadian and Swedish teams in analyzing ocean-climate-fire linkages at different temporal scales.
- *University of Science and Technology of China*, China, co- analyses fire history data across the Eurasian boreal zone.
- *Norwegian Inst. for Nature Research (NINA)*, Norway analyzes the sensitivity of northern boreal vegetation to fire and climate impacts. Together with the Canadian researchers, [name of institute] analyses ocean circulation affecting fire weather.
- *Université du Québec à Montréal (UQAM)*, Canada, (a self-financed non-Belmont partner) provides expertise on the modeling of fire weather conditions, their evolution over the Holocene and in modern times. It develops predictability metrics, GCM and their downscaling, ocean circulation, a. It provides knowledge of socio-economic impacts of fires.

- University of Helsinki, Finland (a self-financed non-Belmont partner) contributes expertise on fire ecology across Eurasian boreal forests and in the analysis of social impacts.
- *Forest Research Institute*, Karelia, Russia (a self-financed non-Belmont partner) contribute to the paleo- and dendrochronological analyses of fire activity and is the main coordinator of activities over the Russian section of the boreal zone.
- Icelandic Forest Research, Iceland (a self-financed non-Belmont partner) contributes knowledge of ocean circulation in the North Atlantic region, and dendrochronological data relevant for PREREAL projects.

The role of JPI Climate

JPI Climate provides crucial funding and momentum to unite a multi-disciplinary team of researchers coming from several national projects into a cross-national research consortium.

The project leader of BITMAP

I am Dr. Andy Turner, Associate Professor of Monsoon Systems and BITMAP project Principal Investigator at University of Reading. I have been researching the weather and climate of India and the wider Asian monsoon region for more than 15 years. My interests lie in making predictions of weather extremes, seasonal climate and of climate change. In all my work, I am motivated to understand why weather and climate behaves the way it does, by understanding the physical mechanisms involved.

About the project consortium

ITMAP is led by University of Reading Department of Meteorology, one of the world's leading organisations for the study of atmospheric and climate sciences. It includes components of the UK's National Centre for Atmospheric Science and its Tropical Climate group, with expertise in seasonal prediction, climate change, monsoons, ENSO and the MJO.

The BITMAP consortium also features Universität Hamburg (Germany) and the National Centre for Medium Range Weather Forecasting (NCMRWF, India). The Hamburg group have been performing Lagrangian moisture-tracking analyses to determine origins of moisture sources for producing extremes rains in northern India, Pakistan and the Hindu Kush-Himalaya region. Meanwhile, NCMRWF, which also has stakeholder interests as one of the major national-level weather forecasting institutes of India, has been examining the potential impact of Arctic sea-ice patterns on seasonal forecasts of rainfall in India.

The role of JPI Climate

JPI Climate has provided a unique opportunity for international partners to bring their skills together on the cross-disciplinary BITMAP project. Standard national funding routes prevent small international teams being able to work together in this way. The international nature of the project encourages partner countries to think about bigger issues than their everyday concerns.

University of Reading

NCMRWF

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

The project coordinator of GOTHAM

My name is Scott Osprey and I am the Project Coordinator for GOTHAM based at the University of Oxford. My interests include the large-scale circulation in the upper atmosphere and how it is linked with weather. By understanding how a changing climate affects large-scale circulation and how this is linked with weather, I hope to better inform climate service providers of what changes we should expect in the future. I have been involved with GOTHAM from its conception and particularly relish the involvement of all the international investigator and collaborator groups.

About the project consortium

GOTHAM Investigator groups include the Indian Institute for Tropical Meteorology, Institute for Atmospheric Physics, Japanese Agency for Marine-Earth Science and Technology, University of Oxford, Institute Pierre Simon Laplace, Potsdam Institute for Climate Impacts Research.
GOTHAM Collaborators include the UK Met Office, National Center for Atmospheric Research (NCAR), Danish Meteorological Institute, Finnish Meteorological Institute, Commonwealth Scientific and Industrial Research Organisation, Centre for Ecology and

Gotham Investigators

GOHTAM Collaborators

The first GOTHAM summer school (Potsdam, Germany) brought together experts, researchers and students to better understand climate linkages, their impacts and the bespoke techniques used to identify these.

The role of JPI Climate

JPI provided a funding forum to allow groups to naturally coalesce under a common framing of global teleconnections and their impacts on vulnerable regions. JPI had the vision to link with other national funders (under the auspices of the Belmont Forum) to forge effective and long-lasting collaboration between Europe, South America and Asia. As a science consortium between different countries we have achieved alot and look forward to JPI providing a future framework for tackling the new outstanding challenges identified by our groups.

1 2 3 4

The project leader of AQUACLEW

I am <u>Christiana Photiadou</u> (Dr.), the project coordinator. My interests are hydroclimatic impact modelling and forecasting on seasonal and long-term scales. I develop climate services for the water sector. I am motivated to improve the quality of data that is delivered through different climate services and platforms and want to ensure that the data is used following good practices.

About the project consortium

In AQUACLEW project, nine organisations from across Europe cooperate. They have different experience and expertise in developing climate services, providing data and collaborating with users. All partners are actively involved in researching user needs for better understanding, improving data quality for climate change impacts and evaluating how co-development of climate services facilitates decision-making in Europe.
Swedish Meteorological and Hydrological Institute (SMHI) – Sweden (coordinator), Universität für Bodenkultur Wien (BOKU) – Austria, Geological Survey of Denmark and Greenland (GEUS) – Denmark, National Research Institute of Science and Technology for Environment and Agriculture (IRSTEA) – France, Technische Universität Dortmund (TUDO) – Germany, Universität Innsbruck (UIBK) – Austria, University of Còrdoba (UCO) – Spain and University of Granada (UGR) – Spain.
We have an extensive user community across different countries; please <u>visit</u> for a full list of users. Those involved in case study work are:
- Jonköpings Länstyrelsen; Sweden (Future Changes in Biodiversity)
- Federal government of Upper Austria, Section of surface water bodies; Municipality of Schwertberg, Upper Austria; Austria (Pluvial Flash Floods in Alpine Regions)
- Electricité de France (EDF); France (Climate Services in Hydropower)
- Andalusian Regional Government, Provincial Coastal Service of Granada, Management Service of the Rules-Béznar reservoirs' system, Hydrological Service of the Andalusian Mediterranean Basin and Port Authority of Motril; Granada (Fluvial and Coastal Interactions under Mediterranean Climate Conditions)

Members of the project consortium at the mid-term General Assembly in October 2018, Copenhagen, Denmark.

- Plants and Environment, SEGES, Nature, Environment and Farming at University of Aarhus, and Climate adaptation and groundwater consultancy; Central Denmark Region (Agricultural Production in Central Denmark)
- Tropical Coast of Granada, Municipalities Community, Endesa Hydropower Generation, Unit Sur, and Water Planning Office Andalusian Department of Environment; Spain (Water Resource Allocation for Tourism, Agriculture and Energy)
- City of Hagen; Germany (Urban Flash Floods)

The role of JPI Climate

JPI Climate contributes to the success of our project through providing funding, inspiration for climate friendly measures and disseminating project news and developments to a wide audience. The organisation of various events by JPI Climate and their communication via frequent newsletters, magazines and mid-term reports on project progress, also contributes to long term access to project outcomes.

A researcher involved in CIREG

My name is Sebastian Sterl and I am an applied physicist by training. I have been working for the Vrije Universiteit Brussel (Belgium) since 2018, after having been active for several years in international energy and climate policy consulting. The work for CIREG combines my professional interests in a single package: climate change, renewable energy, power systems, sustainable development, and energy/climate policy.

About the project consortium

The consortium consists of climate scientists, physicists, hydrologists, economists and sociologists from Europe and West Africa. PIK – Potsdam Institute for Climate Impact Research (Germany) leads the project, and models water resources and hydropower via a NEXUS approach. WASCAL – West African Science Service Centre for Climate Change and Adapted Land Use is in charge of the science-policy interface and stakeholder engagement, climate modelling, technical field work, and social media. The VUB – Free University of Brussels (Belgium) works on the energy meteorology, power mix modelling and hydrological modelling. SEI – Stockholm Environment Institute (Sweden) works on the science-policy interface, and leads the organisation the training schools. DTU, the Technical University of Denmark, performs socio-economic modelling and is in charge of setting up an SDG framework. ZEF – Center for Development Research from the University of Bonn (Germany), is in charge of socio-economic field research.

Group photo of the CIREG team during the project kickoff meeting in Potsdam, February 2018.

Stakeholders involved in the project and/or using its products include West African power utilities, (e.g. SONABEL, NIGELEC), river basin authorities (Volta Basin Authority, Niger Basin Authority), and policymaking bodies (e.g. Burkina Faso's Energy Ministry, Ghana's Energy Commission).

The role of JPI Climate

JPI Climate provides valuable networking opportunities with other projects working on comparable issues in other regions of the world. Furthermore, it enables valorization of research results through offering platforms of disseminating research results. JPI Climate has actively contributed to spreading our research results.

The project leader of Citizen Sensing

I am Tina-Simone Neset, Associate Professor at the Department of Thematic Studies – Environmental Change; Centre for Climate Science and Policy Research, Linköping University in Sweden. My scientific areas of interest related to this project are the potential of visualization and interactive applications to increase citizen engagement and to co-create knowledge with various types of end-users and other stakeholders in different European urban contexts.

About the project consortium

Lead Partner is Linköping University, Department of Thematic Studies – Environmental Change, Centre for Climate Science and Policy Research, Sweden. The university is in charge of Project Management, Communication and Synthesis, and co-leading the work on Pilot Study Setup, Participatory Processes, and Evaluation as well as the sensor development. It is responsible for the Norrköping Pilot.

University of Porto, The Research Centre for Territory, Transports and Environment (CITTA), Portugal is co-leading Pilot study setup, Participatory Process and Evaluation. University of Porto is responsible for the Porto Pilot.

Norwegian Institute for Science and Technology (NTNU), Norway co-leads the Interactive Applications and Databases as well as the Sensor Development. It is responsible for the Trondheim Pilot.

Deltares, Netherlands, is co-leading the work package on Interactive Applications and Databases. It is responsible for the Rotterdam Pilot.

The role of JPI Climate

JPI Climate provides a framework for research and collaboration for the different projects funded under this call. We anticipate JPI Climate to be an important platform for cross-project synthesis, collaborative learning and knowledge exchange.

A researcher involved in Clim2Power

I am Amy Dozier and I have been using energy system models for supporting energy and climate policy making for around 14 years, at both the national and European level. These models are used for long-term energy analysis, typically 20 or 40 years into the future and assess the optimal deployment of new, renewable-based electricity technologies for mitigating CO_2 emissions and climate change. However, these tools so far do not consider in detail how changes in climate patterns could affect the cost-effectiveness of renewable electricity power plants. Moreover, so far it has not been assessed what the combined effects will be for the whole power system in light of a changing climate affecting power demand and power plant operation. This was my main motivation leading to the development of the Clim2power project: making energy system models respond to climate variability and testing how climate-proof current European energy and climate policies are.

About the project consortium

The NOVA School of Science and Technology (FCT NOVA) coordinates Clim2Power. FCiencias.ID carries out, supports, promotes and fosters research, development and service activities. The MINES ParisTech - ARMINES is involved in modeling, mathematical control, optimization and decision-making for addressing socio-economic needs of the economy and relate to energy systems and the electricity and carbon markets. Institute of Hydrology and Water Management (HyWa) is involved in low flow and flood risk management strategies, runoff prediction for hydropower management systems, or water management for tourism and snow production. The Institute for Sustainable Economic Development focuses on Austria and Europe but also integrate global and development perspectives, including scientifically-sound policy advice. MaREI, University College Cork (UCC), Ireland focuses on solving the main scientific, technical and socio-economic challenges across the

The Clim2Power Project Consortium.

marine and renewable energy sectors. Luleå University of Technology is active in research related to bio-energy/bio-refinery technology, hydropower, wind power and how to make industry and society more energy efficient.

Germany's National Meteorological Service (DWD) is responsible for meeting meteorological requirements arising from all areas of economy and society in Germany and carried out R&D for improving weather forecasts and warnings and climate services, including user-oriented adaption to climate change. ACTeon, from France, mobilizes skills in environmental sciences, economics, sociology, political sciences, environmental law and spatial planning. Eletricidade de Portugal (EDP) is a leader in value creation, innovation and sustainability. Wien Energie is responsible for ensuring the reliable supply of electricity, natural gas and heating to the Greater Vienna metropolitan area. Project stakeholders included representatives from The European Environment Agency (EEA), World Energy & Meteorology Council (WEMC), Barcelona Supercomputing Centre, Directorate General for Energy (DG Energy), Directorate General for Climate Action (DG Clima), European Network of Transmission System Operators for Electricity (ENTSO-E), International Energy Agency (IEA), Électricité de France (EDF), Directorate General for the Joint Research Centre (JRC).

The role of JPI Climate

JPI climate provides the fundamental support for Clim2Power that allows collaboration between multidisciplinary European institutions to ultimately support research that can address the societal challenge of climate change. JPI Climate has actively nurtured the project's network, connecting Clim2Power with relevant stakeholders and researchers pursuing similar gaols. A representative of JPI Climate has been present to open our European User Board meetings, and JPI Climate also provided the facility to host our first European User Board. Throughout the project, JPI Climate has supported Clim2Power through disseminating project information through their channels and networks.
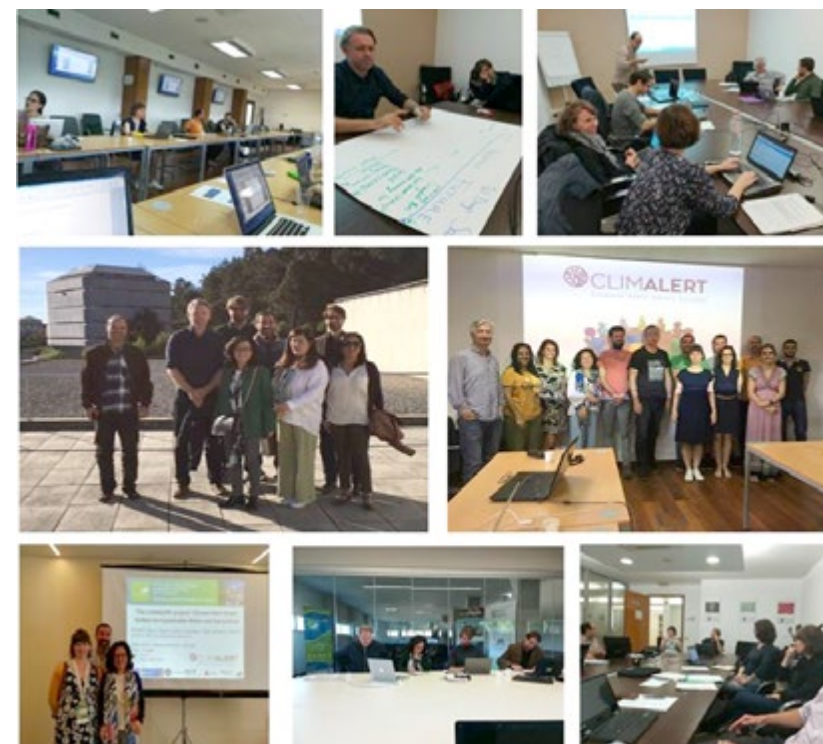
The project leader of CLIMALERT

My name is Cláudia Pascoal and I am Professor of Ecology at CBMA /IB-S at the University of Minho, Portugal. My research addresses the impacts of global change on biodiversity, ecosystem functions and services in freshwaters. Currently, I am leading the CLIMALERT project aiming at co-developing innovative tools for climate services. I want to disentangle effects of multiple stressors related to climate change, while proposing adaptation and mitigation strategies with social and environmental benefits.

About the project consortium

The project is being carried out by a multidisciplinary team with expertize in i) social and economic sciences (UFZ) to guarantee the sustained dialogue between users and providers throughout the co-production project; ii) climate sciences (IPMA and UFZ) to select climatic and hydrological indicators and models; iii) engineering (IB-S/UMinho) to co-develop tools and technologies that meet stakeholder demands; and iv) ecology (ICRA and CBMA/IB-S/ UMinho) to assess the environmental and the socio-economic benefits from the project. The team is closely cooperating with relevant stakeholders during the co-production process. This is the case of water managers (e.g., AdP Águas de Portugal / AdN Águas do Norte, Catalan Water Agency) and farmers (e.g., The Portuguese Farmer Confederation (CAP), Portugal, SOGRAPE Vinhos Portugal).

The role of JPI Climate

The CLIMALERT project is a JPI initiative that encourages different European countries to jointly coordinate climate research. JPI promotes transnational research initiatives that provide useful climate knowledge and services for Climate Action. The CLIMALERT project took benefit from the support of JPI and the networking events organized in Brussels and other EU countries to underpin the European efforts in tackling the societal challenge of climate change.
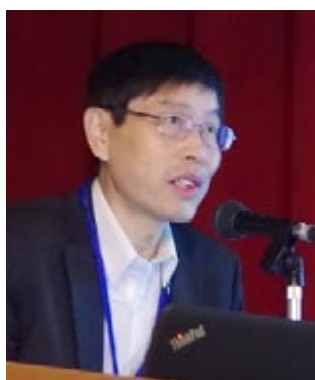

Pictures during the Project Meetings.

Pictures during the workshops with stakeholders.

The project leader of ClimApp

I am Chuansi Gao, PhD, Associate professor at Lund Universtiy, Sweden and I am coordinator of the ClimApp project. I check weather forecast everyday and find it especially exciting if the weather forecast (environmental information) is combined with human thermal physiology. The integrated mobile tool can improve and personalize the predicted effects of extreme weather events on health. My main research interest is in the impact of climate on human health, quality of life, comfort and productivity; development of protective measures and adaptation strategies to protect and prevent workers and vulnerable population from extreme weather events.

About the project consortium

The competence of the consortium is of a multidisciplinary nature. Lund University (LU), Sweden is in charge of project coordination, overall monitoring and management to ensure the integration of various parts of the ClimApp. University of Copenhagen (KU), Denmark leads the implementation of the ClimApp, liaises and collaborate with climate service providers and EU H2020 HEAT-SHIELD project consortium. Technical University of Denmark (DTU) contributes to the development of technical platform of the ClimApp and to the integration of indoor climate and thermal comfort model. VU University Amsterdam (VU) is responsible for the integration of individual physiological characteristics into ClimApp. The Regional Public Health Services Gelderland-Midden (VGGM), The Netherlands are public health service providers who participate as a stakeholder and user, contribute to the project with knowledge on both risk communication to all age group users as well as expertise on preventive youth health care. Meteo Swiss, Switzerland participates as a stakeholder and a climate service provider through EU Heat-Shield network to support ClimApp.

Companies involved in the project are FritsdorfSport, experts in smartphone hydration app development and exercise performance.

The role of JPI Climate

The coordination of JPI Climate projects and networking contributes to the success of ClimApp. We appreciate continuous support from JPI Climate also through the remainder of the project. Particularly with connecting the scientific community with relevant stakeholders. A key element for ClimApp is the sustainability of the app also after the project ends and therefore we appreciate support with keeping the app operational and continuously updated.

The project leader of ClimINVEST

I am Jana Sillmann, the scientific lead on the ClimINVEST project. I am a physical climate scientist (PhD) specialized in analyses of climate extremes. In my work, I focus on factors that can drive changes in climate extremes. I use interdisciplinary approaches for better integration of natural and social sciences. Particularly, I am interested in relating physical and statistical aspects of climate extremes to socio-economic impacts and questions related to risk assessment and decision making.

About the project consortium

ClimINVEST brings stakeholders together from three different countries. CICERO (Norway) convenes the CICERO Climate Finance Center and leads the ClimINVEST project. I4CE (France) integrates climate change into investment and financial decision-making. Wageningen Environmental Research (Netherlands) advises on building resilience to climate change through user-driven climate services. Carbone4 (France) develops user-friendly decision-making tools to develop and conduct scenario analysis. Météo-France (France) contributes to the development of climate services. Climate Adaptation Services (Netherlands) specializes in combining information about climate change with innovative communication and visualization techniques.

Annual consortium meeting in Oslo, 2018.

The role of JPI Climate

The JPI ERA4CS Call provided the opportunity to embark on this ambitious project that brings investors and scientists closer together on important questions regarding physical climate risk. Via kick-off and mid-term meetings, JPI facilitates acquaintance and interaction with other projects funded by the ERA4CS call, which have, to some extend similar or complementary goals and challenges with ClimINVEST. This stimulates collaboration, sharing of experiences and knowledge exchange that is important in the fast-growing landscape of climate services.

The project leader of CLISWELN

I am Dr. Roger Cremades, the leading investigator of CLISWELN, you can drop me an email at roger.cremades@hzg.de. I envisioned this project when droughts were not yet perceived in the media as a present major risk in Germany. I am mostly interested in realistically integrating all economic sectors and their nexus across resources (water, land, energy) in socio-economic tools for climate change adaptation and sustainability. For me 2+2 sometimes can sum more than 4, because the real world is a complex system full of synergies and feedback loops. Traditional methods exclude this complexity. My goal is to improve existing practices by focussing on complex systems applied to climate services.

About the project consortium

Helmholtz-Zentrum Geesthacht Zentrum für Material- und Küstenforschung GmbH, particularly its Climate Service Center Germany (GERICS), is the lead partner and focuses on the interactions of cities with droughts under climate change in a case study in a Mediterranean tourism hub in Spain. Universität für Bodenkultur Wien, Austria, runs an agricultural model that reproduces land, water and energy use in agriculture and applies it to a case study in Austria. Centre for Ecological Research and Forestry Applications, Spain, does the hydrological simulations for the Spanish case study. And finally, the National Institute for Research and Development in Forestry "Marin Dracea", Romania, prepared a case study linking forestry land use with urban resilience to droughts. The stakeholders in the project are mostly in the urban planning, water management, and agriculture and forestry sectors, depending on each case study.

Project meeting and field visit during a visit to the Spanish case study in Benidorm. The project partners visited medieval water infrastructure and appreciated that there is a long story in the area about innovations dealing with water scarcity.
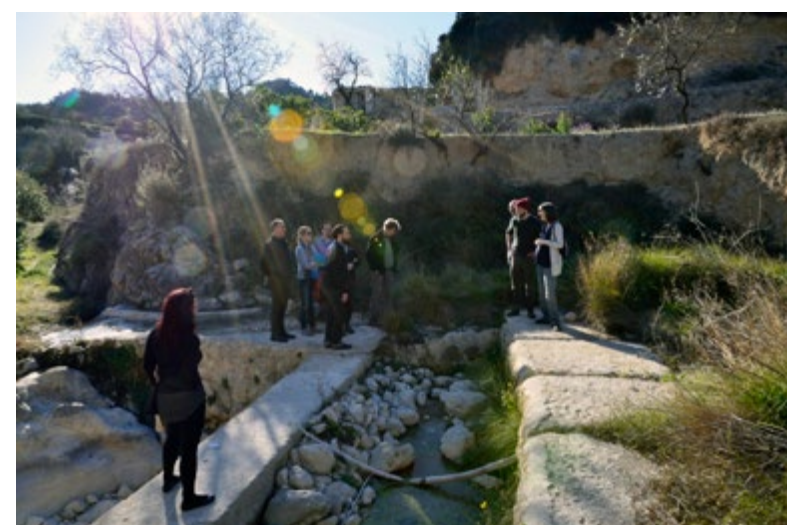
The role of JPI Climate

JPI Climate is supporting research on climate services and cross-sectoral complexity, and is helping us to develop the research. JPI Climate gives us the opportunity to attend and organise sessions in major project-related conferences at the global and European scales, particularly CLISWELN organised sessions at Adaptation Futures 2018 and at the European Climate Change Adaptation 2019 conference, on which the project partners collected feedback from multiple international colleagues. JPI Climate also helps us to create synergies with other projects about climate services and about the water-energy-land nexus.

The Principal Investigator of CoCliServ

My name is Jean-Paul Vanderlinden and I am currently focusing my research activities on adaptation to climate change. I work with local communities, analyzing how climate change is, or will potentially, impact their daily lives - transdisciplinary science and thus the co-develoment of climate services is central to these challenges. I use risk governance and land use planning as a conceptual entry point. My main geographical focus is the coastal zone. I am also conducting research on the espistemic dimension of interdisciplinary work and the practice of art and science integration.

CoCliServ's consortium gathered for the project's kick off meeting.

About the project consortium

CoCliServ is coordinated by the CEARC Research Center (Université de Versailles Saint-Quentin-en-Yvelines, France - CEARC-UVSQ). Beyond coordination work, the CEARC-UVSQ is leading the work in the two French field sites: Brest and the Gulf of Morbihan. CEARC-UVSQ is also leading the work on the ways of representing scientific results.

The artec Sustainability Research Centre, Bremen University, is leading the work on narrative collection and analysis. It also leads the fieldwork in the Jade Bay fieldsite.

The Copernicus Institute of Sustainable Development, Utrecht University (Copernicus-UU) is leading the work on scenario development as well as the Dordrecht fieldwork.

The Helmholtz-Zentrum Geesthach (HZG) is coordinating the work on climate science analysis and development.

The LSCE research Center (Cenre National de la Recherche Scientifique, LSCE/CNRS) contributes to the work on climate science analysis and development.

The Institut d'aéronomie (IASB-BIRA) contributes to the project by developing innovative metadata analysis and sets

IGEAT, fromm Université Libre de Bruxelles, contributes by developing georeferencing schemes an interactive maps.

The Centre for the Study of the Sciences and the Humanities from the University of Bergen, is leading the work onf Knowledge quality assessment, on citizen sciences. It is also leading the work in the Bergen fieldsite/

The role of JPI Climate

JPI climate is seen by our consortium as a central facilitator of transdisciplinary approaches to climate change research. It made CoCliServ possible through the legitimacy it lends to science with and for the people. CoCliServ's results maximum impact is conditional to JPI climate support for transidisciplnary science.

The Principal Investigator of CO-MICC

My name is Petra Döll, I am the Lead-PI (Principle Investigator) of the Co-MICC project. My special interests, which are expressed in this project so explicitly, lie in the communication and the utilization of the – to a certain degree always – uncertain quantitative data in global hydrology. This includes the fact that uncertainty is not avoidable in a fundamental sense and, thus, should be "embraced" and integrated in adaptation planning. Therefore, my other interest, in co-development with end-users.

About the project consortium

The Goethe University Frankfurt, Germany (PI: Petra Döll), coordinates the project. Its main contribution to CO-MICC is two-fold, with hydrological modelling as well as being responsible for the co-development, stakeholder participation and transdisciplinary research methods. The Laboratoire de Météorologie Dynamique (LMD), France (PI: Jan Polcher), the Potsdam Institute for Climate Impact Research, Germany (PI: Dieter Gerten), and the International Institute for Applied Systems Analysis (IIASA), Austria (PI: Yoshihide Wada) are mainly contributing to the global hydrological modelling. The University of Le Mans (UM), France (PI: Yamna Djellouli), contributes social scientific expertise to the co-development and stakelholder participation process with a focus on climate change impacts in Morroco, Algeria, Tunesia.

Consortium photo from the Mid-term Meeting at Goethe University Frankfurt, Germany, March 2019).

Quantis, Germany (PI: Michael Spielmann) is responsible for the global stakeholder dialog focussing on life cycle analyses and water risk estimation. The International Centre for Water Resources and Global Change (ICWRGC), Germany (PI: Harald Köthe), is responsible for knowledge dissemination, contributing to the development of the web portal and hosting it. Kisters AG, Germany (PI: Michael Natschke), is responsible for the technical development of the web portal.

The role of JPI Climate

JPI Climate provides us with opportunities for connecting to other projects/efforts in a similar or the same field and learn from their experiences. For example, we were part of the "JPI Climate"-organized side event at the ECCA 2019 conference in Lisbon on "Climate services: state of affairs, relevance for users and the way forward"

An oceanographer involved in CoCliMe

I am Caroline Cusack, an oceanographer in the Irish Marine Institute, my main interest lies in scientific research projects where I get to collaborate with multidisciplinary teams. Projects that facilitate the co-development and delivery of operational oceanographic and climate science-based products and services are essential to help protect marine ecosystems and support sustainable marine economic activities.

About the project consortium

The Marine Institute (MI) Ireland coordinates the CoCliME project and carries out the scientific activities with a large group of experts across Europe. CoCliME members include social scientists (CICERO, SEI), economists (UNantes), modellers (statistical, numerical, climate), biologists, chemists and oceanographers (AWI, BMRS, CSIC, Ifremer, IMR, MI, NIMRD, SMHI, SU).

The CoCliME team at the General Assembly in Paris, November 2018.

The role of JPI Climate

CoCliME is a transdisciplinary project - each partner has a key strength in a specialised field. The JPI Climate facilitates sharing of expertise between partners and other stakeholders. The JPI Climate, therefore, allows us to develop climate services of benefit to society through knowledge and infrastructure sharing. JPI also supports the building of capacity, trust and partnerships across Europe. Transnational cooperation is essential to facilitate the free flow of information and knowledge among experts in different fields.

The project leader of EVOKED

I am Amy Oen and my current research interests focus on the effects of climate change with regard to water quality and the assessment of risk reduction measures to include nature-based solutions. I enjoy working at the interface between academia, industry and government to achieve acceptable solutions. As project leader for EVOKED, I have a keen interest in exploring synergies and knowledge exchange with the project parters and case study site stakeholders.

About the project consortium

End-user partners also representing the case study sites are Larvik municipality, Norway; Värmland County Administrative Board, Sweden; Province of North Brabant, the Netherlands; Drents Overijselse Delta Waterboard, the Netherlands; and the City of Flensburg, Germany.
In addition to the end-user partners, the climate science community is represented by the following research organizations involved:
Norwegian Geotechnical Institute: NGI is project leader in EVOKED, responsible for quality assurance and leader for Co-Evaluate.
Swedish Geotechnical Institute: SGI is leader for Co-Design. Deltares is leader for Co-Validate. And the Department of Geography at Christian-Albrechts University Kiel (CAU) is leader for Co-Develop.


EVOKED project consortium at the mid-term consortium meeting held 13-14 March 2019 in Den Bosch, The Netherlands.

The role of JPI Climate

JPI Climate has the crucial role as the overall facilitator for EVOKED. Particularly, JPI Climates' support to identify synergies and encourage knowledge exchange between similar projects has been very useful. JPI Climate and ERA4CS's first networking event held in Brussels in December 2017 established these links using a combination of communication methods; speed networking and project match making. Having these connections early on has been advantageous. For example, Deltares is also a partner in CitiSense and they were invited to participate for part of the EVOKED mid-term consortium meeting. The side event at ECCA2019 was also a highlight to touch base with the other projects and reconnect. As we enter the last year of EVOKED, we are now exploring ideas for our final conference and are looking for co-organizers. We hope that JPI Climate can support and continue to take the lead to encourage this cross collaboaration with the JPI Climate co-funded projects. We strongly believe that such cooperation will lead to broader and stronger impact as we share our project findings and recommendations for climate services.

The project leaders of INNOVA
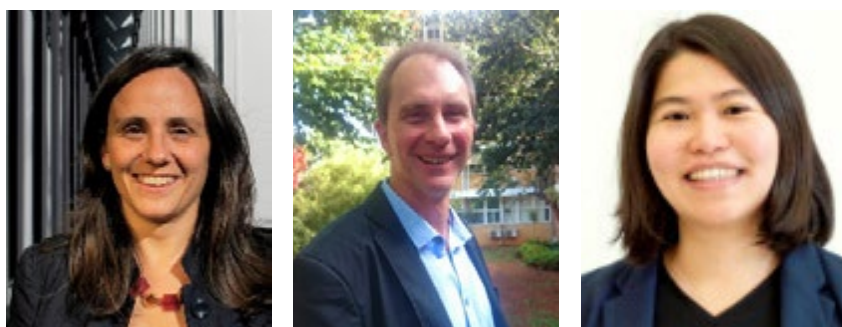
Prof. Dr. María Máñez Costa, Dr. Louis Celliers and Jo-Ting Huang-Lachmann are the coordination team of INNOVA and we enjoy very much the processes of co-developing with the INNOVA hubs to steer the innovative climate service provision for local adaptation on the topics of water, agriculture, nature-based adaptation and coastal climate services.

About the project consortium

German Climate Service Centre (GERICS) of the Helmholtz-Zentrum Geesthacht (HZG, Germany) is the consortium leader and expert in participatory modelling and systems dynamics. ECOLOGIC (Germany) is the Kiel Bay hub leader with a particular interest in perception, risk and vulnerability assessment. Wageningen Environmental Research (WENR) of Wageningen University and Research is the hub leader of Nijmegen on the river Waal in the Netherlands. Université des Antilles (UA) from the French West-Indies are leading the Guadeloupe and Martinique hub and the development of a data and knowledge hub for local climate service development. Finaly, the Polytechnic University of Valencia (UPV) is responsible for the Valencia hub and the overall development of a model for climate service development. An important element of the INNOVA project is the

incorporation of users as part of the research team. These users are from the four hubs and form an advisory board for the project. These stakeholders are Aguas de Valencia, (Spain), City of Nijmegen (The Netherlands), French National Institute for Agricultural Research Antilles-Guyane (Guadeloupe and Martinique) and Kiel Bay Climate Alliance (Germany).

The role of JPI Climate

JPI Climate is supporting the project by providing a platform for the experimentation of climate service production at a different scale, in the case of INNOVA: the local scale. The dissemination of project outputs and outcomes through JPI Climate is a major benefit.

The project leader of INSeaPTION

My name is Gonéri Le Cozannet (PhD). I am an engineer in space and aeronautics now working at the French Geological Survey on coastal impacts of sea-level rise. I am especially interested in climate change and sea-level rise because this scientific topic has obvious societal implication. My personal motivation in this project and climate services in general is very much related to the cobenefits of mitigation and adaptation, which I think we underestimate a lot.

About the project consortium

The French Geological Survey (BRGM), France, is in charge of the project coordination. The University La Rochelle (LIENSs), France, leads the Polynesia case study. The Global Climate Forum (GCF) leads the Global and Maldives case studies. The Mediterranean Institute for Avanced Studies, University of Balearic Islands (IMEDEA), studies waves and extreme water levels. From the Netherlands, the Institute for Marine and Atmospheric research Utrecht, Utrecht University (IMAU) is involved in the work on mean and extreme sea-level changes. The private company CREOCEAN develops the innovation and climate services. INSeaPTION involves research laboratories (IMAU, IMEDEA, LIENSs), applied science institutes (GCF, BRGM) and a private company (CREOCEAN), all concerned with finding adaption solutions for coastal regions. CREOCEAN has a leading role in ocean and coastal management, with experience in many coastal regions, including Maldives and French Polynesia. Some examples of user organisations include the Ministry in charge of Environment in the Maldives, the Government of French Polynesia, Electricité de France, among others.

Participants of the fisrt annual meeting at IMEDEA (2018)

The role of JPI Climate

JPI Climate was very successful in stimulating projects involving a small number of very motivated scientists exploring new approaches, such as, in our case, decision analytics applied to sea-level rise adaptation. Such small projects are very efficient to explore new ideas and to innovate. Regarding the sustainability of the project, JPI Climate can play a crucial role in creating a sustainable knowledge hub in the area of coastal adaptation, for which sea-level rise is a major issue, and also raise awareness regarding national climate actions.

A Stakeholder Engagement expert involved in ISIpedia

I am <u>Inga Menke</u> and a Stakeholder Engagement Expert in the ISIpedia team. I am particularly interested in the science-policy interface and contribute to the design and implementation of workshops, the design and distribution of online surveys and engage in continuous communication with stakeholders. Within the consortium, I bring the stakeholder perspective to the discussions on how to present scientific results on climate change impacts.

About the project consortium

ISIpedia is a consortium of researchers from twelve institutions in seven countries Potsdam Institute for Climate Impact Research (PIK) is in charge of the project coordination. Climate Analytics is leading the Stakeholder Engagement Team. The International Institute for Advanced System Analysis (IIASA) leads the Assessment & Editorial work. The ISIpedia sector coordinators are part of the ISIMIP work package: Senckenberg Institute for Climate and Biodiversity, Global Climate Forum, Goethe University Frankfurt, Autonomous University of Barcelona, Karlsruhe Institute of Technology, Laboratoire des Sciences du Climat et de l'Environment, Umea University, University Pablo de Olavide, Utrecht University.

Participants of the ISIMIP Strategy Group meeting in September, 2018.

The role of JPI Climate

JPI Climate plays a central role in the implementation of ISIpedia. It is through the joint efforts of numerous European states to harmonize research activities and enable cross-border research that an endeavour like ISIpedia becomes possible. ISIMIP itself brings together over 100 modelling groups worldwide.

The project leader of SALIENSEAS

My name is dr. Machiel Lamers and I am the SALIENSEAS project leader. I have a longstanding interest in sustainability and climate adaptation of tourism in the polar regions. My interest in the coproduction of sea ice forecasts came from my role as co-chair of the Social and Economic Research Applications group of the Polar Prediction Project (PPP-SERA) of the World Meteorological Organisation in which we stimulate social science in these fields.

About the project consortium

Umeå University, Sweden is responsible for studying mobility patterns and sea ice information needs of different Arctic marine sectors. The work relies on observation, interviewing, and on an innovative public participatory GIS approach to map Arctic marine mobility patterns and the challenges and risks faced by end-users. It will lead to an agenda for the development of climate services for the European Arctic.

Wageningen University, The Netherlands, is the overall project lead and responsible for studying the impact of sea ice forecasts services in decision-making contexts (e.g. planning, operations). It formulates design principles, simulates the use of tailor-made services and develops a support-tool for co-producing and testing climate services. State-of-the art methods are used such as companion modelling, a role-playing game and agent-based modelling.

The Norwegian Meteorological Institute and the Danish Meteorological Institute aim to utilize the great potential of currently available databases of metocean conditions for developing sea ice forecasts. By using advanced statistical downscaling methods, predictive power of key monitoring data are evaluated in order to define new forecast products, tailored to end-user needs. Importantly, the demonstration services developed will be merged into MET Norway's and DMI's forecasting infrastructure and maintained and developed beyond the lifetime of this project.

SALIENSEAS partners and stakeholder representatives at the first Stakeholder Advisory Group meeting in Tromso, Norway, January 2018.

Stakeholder and researcher interaction at the SALIENSEAS scenario workshop in Copenhagen, Denmark, November 2018.

Maritime sector representatives involved in the project are: Association of Arctic Expedition Cruise Operators, MaritimT Nord, Royal Arctic Line, Arctia, Greenland Pilot Service, Association of Fishers and Hunters Greenland.

The role of JPI Climate

JPI Climate made it possible to establish a small and focused interdisciplinary consortium on the co-production of climate service products. Particularly the requirement to co-produce climate services has been ideal for our project collaboration, allowing more freedom to experiment and to take the time to truly collaborate interdisciplinary and transdisciplinary. JPI Climate also provides ample opportunities for knowledge exchange and collaboration across funded projects.

The project coordinator of SENSES

My name is Cornelia Auer (PhD) and I am coordinator of the SENSES project. I am working with climate change scenarios because they allow to explore possible solution pathways in an unpredictable future. Sustainable development is central for nature and humankind. The two can only work if they go hand in hand. In this vein economic growth is a very interesting topic. Digitalization and limited resources will require to re-think growth. How can wealth be distributed, preserving prosperity in developed countries but facilitating decent-living standards in all developing countries?

About the project consortium

Potsdam Institute for Climate Impact Research (PIK) is the overall coordinater, brings in extensive climate change scenario expertise (climate change, impact, mitigation) and works on user interaction and co-production.

International Institute for Applied Systems Analysis (IIASA) has extensive mitigation scenario expertise and works on the mitigation scenario infrastructure infrastructure and data management.

Fachhochschule Potsdam (FHP) is responsible for (co-)design and implementation of the visualization toolkit and portals.

Stockholm Environment Institute (SEI) has extensive expertise in the co-production of climate change scenario knowledge. Their work has a focus on transnationial impacts in Kenya through climate change.

Wageningen University & Research (WUR) has extensive expertise on co-production of regional climate change scenarios and knowledge. Their work focusses on de Vecht in the Netherlands.

The role of JPI Climate

JPI Climate organised several events of benefit for the project. For example, the regular calls on climate services and a communication event supported us greatly to place a service in a respective market, identifying end-user groups and using targeted means. This also helped us shaping a language, like an elevator pitch-style to successfully spark interest of new users. Additionally, the networking fostered by JPI is extremely helpful to exchange with scientists concerned with similar research questions, and is highly appreciated.

The project leader of WATExR

I am Dr. Rafael Marcé, coordinator of the WATExR project. My research has always been related to water quality in lakes and reservoirs, with a strong focus on the interface between science and industry. This primed my research with the ambition to deliver useful tools to managers and policy makers. WATExR is a wonderful opportunity to engage in a research program totally oriented to deliver operational tools to solve one of the most pressing demands from the water sector.

About the project consortium

- Catalan Institute for Water Research, Spain is in charge of the Project Coordination.
- Universidad de Cantabria, Spain – works on Seasonal climate prediction.
- Helmholtz-Centre for Environmental Research, Germany – is in charge of Water quality modelling.
- Aarhus University, Denmark leads the QGIS plug-in development.
- Marine Institute Galway, Ireland is responsible for the Fisheries work.
- Dundalk Institute of Technology, Ireland, works on Extreme events and water quality.
- Norwegian Institute for Water Research, Norway
- and Uppsala University, Sweden are in charge of respectively Watershed water quality modelling and – Water quality modelling in lakes.

Together with co-developers (stakeholders and policy makers) from 10 institutions from Europe and Australia, such as Aigües Ter-Llobregat and the Catalan Water Agency (Spain), SAWater (Australia), MORSA (Norway), Wupperverband (Germany), and the Ministry of Environment and Food (Denmark).

WATExR group picture at the Kick-off meeting at ICRA, Girona, September 2017.

The role of JPI Climate

This project is the result of many years of previous collaboration between partners and co-developers. Seasonal prediction and water quality has always been a priority topic to our stakeholders, but only the ERA4CS Call from JPI Climate enabled us to turn the idea into a real proposal. Also, the project by JPI Climate enabled us to build the network and the mutual trust between stakeholders, freshwater scientists and climate modellers needed for a project like WATExR.

The project leader of DustClim

I am Dr Sara Basart (Earth Sciences Department, Barcelona Supercomputing Center). My main research background covers atmospheric composition and air quality modelling. I am the scientist in charge of the WMO SDS-WAS Regional Center for Northern Africa, Middle East and Europe. ERA4CS is giving me the opportunity to contact climate services experts from other projects globally. It enables me to incorporate previous experiences in the design and visualisation of new user-oriented dust products and in the strategies to engage new user communities.

About the project consortium

The DustClim consortium is formed by a multidisciplinary group of international scientific experts on aerosol measurements (CNR-DTA/IMAA, CNRS-LISA), aerosol modelling (BSC, CNR-DTA/ISAC), and dust impacts and services (AEMET, FMI, CNR-DTA/ISAC).

BSC, the Spanish National Supercomputing facility, is coordinating the overall project and will develop the dust reanalysis using the in-house NMMB-MONARCH model. AEMET, the Spanish Meteorological State Agency, is leading the user engagement and dissemination activities of the DustClim project. CNR-DTA, Italy, together with CNRS-LISA, France, will coordinate the dust observational work and the model evaluation. FMI, Finland, will lead and coordinate the generation of new socio-economic dust products.

End users of DustClim products are expected to be used by solar power plant operators (as DLR and EnBW), air traffic managers (EUROCONTROL), air quality stakeholders (INERIS, UNEP) and epidemiological experts (WHO).

The role of JPI Climate

There is an increasing interest in accurate dust information because the substantial adverse impacts upon life, health, property, economy and other strategic sectors. Nowadays, research and operational centers are providing mature dust products that are ready to be transformed into services. JPI Climate provides us with the perfect framework to design a first and unique set of dust-oriented services considering the experiences of climate community. We anticipate that JPI Climate will support us with the dissemination of the project's results by introducing aerosols (and dust in particular) as the topic of discussion in climate audiences that currently only is considering meteorological parameters.

The project leader of ECLISEA

My name is Melisa Menendez, project coordinator). My background is in marine sciences, engineering and statistics. I have been engaged for the last 15 years on the study of marine climate and related impacts to provide new information and services to coastal engineers and managers. Understanding and characterizing the extreme met-ocean events and the consequences of climate change on the ocean and coasts are interesting issues for me.

About the project consortium

Five leading research performing organizations on marine and coastal science compounded ECLISEA project. They are from four European countries whose coasts presents multiple climatologies and socio-economic risks.

- UC-IHC; Universidad de Cantabria (Environmental Hydraulics Institute & Santander Meteorology Group). Leader of the project. Main actions are on understanding and providing information of climate variations of marine variables (historical and under climate change scenarios) and the estimation of related impacts.
- BRGM; Bureau de Recherches Géologiques et Minières. BRGM role is based on impact models.
- HZG, Helmholtz-Zentrum Geesthacht (Centre for materials and coastal research). HZG main activities are focused on the collection of stakeholders needs and decadal prediction of storm surge.

- CNRS; National Center for Scientific Research (Laboratoire d'etudes en geophysique et oceanographie spatiale). CNRS focuses research of historical and future behaviour of the mean sea level rise.
- NCSRD; National centre for scientific research "DEMOKRITOS" (Institute of nuclear & radiological sciences & technology, energy & safety). NCSRD main activity is based on wave climate data and analysis on the Mediterranean Sea.

The role of JPI Climate

The JPI call made it possible to fund this project on marine and coastal climate sciences, a topic that requires more research to advance on related climate services. Additionally, JPI provides continuous support in different communication issues of the project and encourages the European collaboration within similar areas.

The project leader of EUPHEME

My name is Prof. Peter Stott. I am the PI of the EUPHEME project. I have a long-standing interest in understanding the causes of climate change and in assessing the extent to which extreme weather events have been affected by climate variability and change. Based at the Met Office I am keen to ensure that increased scientific understanding is exploited to the benefit of improved weather and climate services.

About the project consortium

The project partners are Met Office, KNMI, Met Eireann, CNRS/CEA, Czech Globe, National Centre for Atmospheric Science (UK), BRGM, Meteo France.
The Met Office leads the project and is involved in developing new attribution methodologies alongside Meteo France, CNRS/CEA, KNMI, National Centre for Atmospheric Sciences and BRGM. KNMI leads on the development of the attribution platform. The delivery of attriution assessments is led by Met Office and CNRS/CEA. Stakeholder engagement is led by Met Eireann and Czech Globe. All partners work together to help ensure a coherent collaborative project.

The role of JPI Climate

JPI Climate has contributed to the success of the project through its organisation of project administration, its championing of the projects funded under ERA4CS and in its organisation and facilitation of meetings for projects to analyse aims and discuss outcomes.

The project leader of INDECIS

I am Dr. Enric Aguilar, projectleader of INDECIS. I started this project because of my scientific interest in climate data stewardship that improves the availability and usability of climate data. Our project provides me with the opportunity to continue working in this field, as well as following on the path of "our data" to service society.

About the project consortium

The project Consortium is led by University Rovira i Virgili /Center for Climate Change (URV, C3, Spain), also in charge of data quality and homogeneity .The other 16 partners (see logos below) are a mixture of National Meteorological and Hydrological Weather Services, research and academic institutions. The Royal Netherlands Meteorological Institute leads Data Rescue and Data Set Organization; Instituto Pirenaico de Ecología / Consejo Superior de Investigaciones Científicas , leads indices definition and calculation; University of Reading leads indices time evolution and relations with the atmosphere; National Meterorological Administration of Romania leads the evaluation of gridded datasets, reanalyses and model output and Agencia Estatal de Meteorolgía leads the generation and communication of climate services.
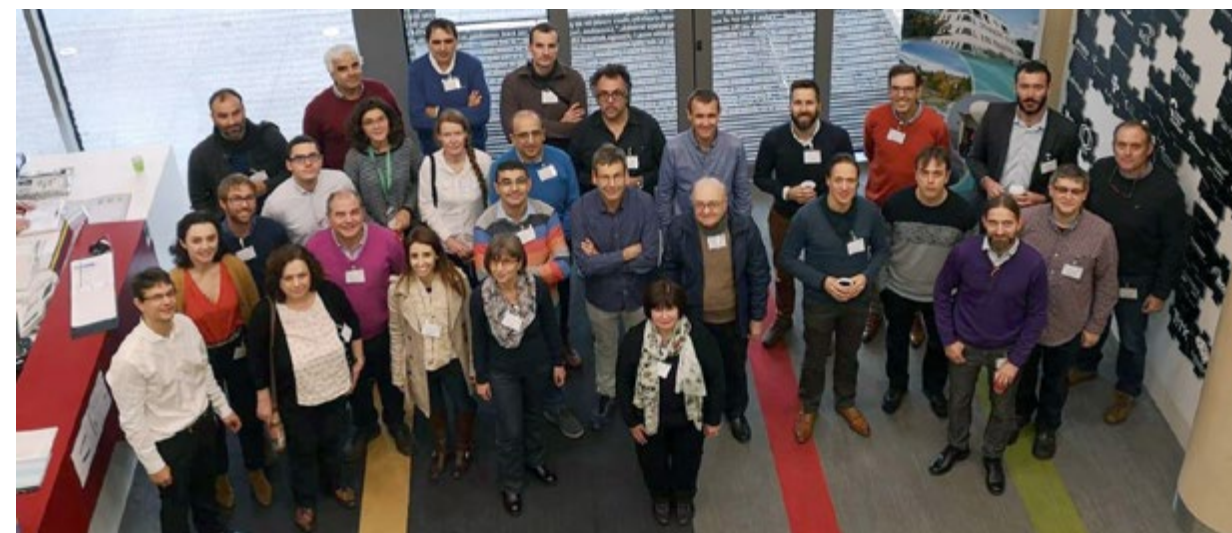
Participants in the second General Assembly, November 2018 , at Met Éireann Headquarters in Dublin.

The role of JPI Climate

JPI Climate is supporting INDECIS by providing funds and networks. Additionally, JPI Climate can help us to ensure that project results are transferred to society and contribute to increased climate resilience, even after the project ends.

The project leader of MECSCOPE

My name is Silvio Gualdi (PhD)and I work at CMCC in Bologna, where I lead the Division of Climate Simulations and Predictions. My main research interests relate to climate variability and the capability to predict it, with a special emphasis on the European and Mediterranean region. I am convinced that an enhanced capability to anticipate possible adverse (or favourable) climatic conditions might improve the quality of life of a large number of people.

About the project consortium

- **CMCC** coordinates the project and, among other tasks, contributes to the investigation of the sources of predictability for the Mediterranean area, performing the project coordinated sensitivity experiments.
- **BSC** is co-coordinator of the project and investigates, among others, teleconnection with low latitudes. BSC also leads work on calibration, verification and information synthesis, coordinating the building and release of MEDSCOPE toolbox. BSC participates in the work on climate services and leads the task on wind energy.
- **ISAC–CNR** leads the task on teleconnection with mid–latitudes and investigates teleconnections with low–latitudes, contributing to set up and analyses of the coordinated sensitivity experiments ISAC participates in the work on climate services by contributing to the development of hydrological products.
- **METEO-FRANCE** also contributes to the coordinated sensitivity experiment set up, production and analysis. Meteo–France leads the task on bias correction and forecast calibration and contributes to the implementation of advanced multivariable forecast scores. In the work on climate services it it contributes to those on renewable energy, water management, and agriculture and forestry.

The MEDSCOPE community during its mid-term meeting, May 2019, in Milan.

- **AEMET** leads the development of empirical forecast systems and contributes to the development of tools for bias correction, calibration, statistical downscaling, and forecast system combination and selection of sub-ensembles for applications. In the work on climate services it contributes on hydrology, to services for renewable energy, agriculture and forestry, and to the activities of communication.
- **INRA** is in charge of WP4 data storage management.
- **RMI** among others works on bias correction and forecast calibration, and on statistical downscaling in it contributes to the task on hydrological products, where post-processing tools are developed and applied to provide information on floods.
- **Plan-Bleu** contributes to the capitalization and communication of the project products.

The role of JPI Climate

JPI Climate contributes to the success of MEDSCOPE by fostering a community building approach that has produced a cooperative development and by sharing the project products among partners and other users. This provides a solid foundation for the consolidation of a collaborative community of climate service providers in the Mediterranean region.

The project leader of SERV_FORFIRE

My name is Rosa Lasaponara (Dr, Senior Researcher, Research Director of Remote Sensing of Forest Fire Laboratory of IMAA-CNR since 2008). I am interested in the development of fire monitoring adaptation and mitigation strategies that help to face fire and post fire risks at different spatial and temporal scales. I use remote sensing, statistical analysis, and modelling and I am involved in the characterization of environmental phenomena and processes based on satellite time series and ancillary data. I engage in this project for its transnational cooperation and inter-transdisciplinary approach for fire data science. Also, topics such as operational applications and exploiting climate services as a source of key strategic information in a sustainable future perspective, have my attention.

About the project consortium

The consortium consists of the following partners.

- **National Council Research of Italy, Department of Earth systems science and environmental technologies (CNR DTA)** coordinates SERV_FORFIRE and is involved in analysis and modeling for risk monitoring, drought forecasting at seasonal up to climatic scale, dissemination activity.
- **Finnish Meteorological Institute (FMI)** evaluates the applicability of seasonal and sub-seasonal climate forecasts in fire risk prediction in Finland and builds a short term fire forecasting model using the analysis of multi-annual fire observations by MODIS and SEVIRI.
- **Bureau de Recherches Géologiques et Minières (BRGM)** develops erosion models to simulate the impacts on soil erosion and sediment transport of different post-fire land use scenarios.

Kick-off meeting, held in Rome at CNR, in October 2017

- **Global Change Research Centre CAS (GCRI).**
  The integral part of GCRI are activities aiming at the development of innovation technological processes, proposals of measures for adaptation and educational activities. GCRI is in charge of implementation of joint activities.
- **Environmental Research Laboratory (INRASTES, NCSRD)**, Greece leads the Transnational cooperation and development of joint activities.
- **Royal Netherlands Meteorological Institute (KNMI)** has extended its Climate Explorer web service with empirical statistical forecasts of the monthly drought code on seasonal to long-term time scales.

Numerous stakeholder organisations and associated partner are involved in SERV_FORFIRE.

The role of JPI Climate

JPI Climate contributes to the success of the SERV_FORFIRE project. It does so by facilitating the transdisciplinary research collaboration, by enabling cross-border research, and increasing science-practice interaction. JPI Climate supports the sustainability of the project because it supports institutional integration, and contributes to spreading out key strategic information for fire and post fire risk monitoring. It also supports the development of adaptation and mitigation strategies, in view of a sustainable future.

The project leader of URCLIM

I am Valéry Masson, (PhD) a senior researcher in meteorology and head of the urban climate research team of CNRM. I started to study urban climate in the late 1990s, developed the urban climate model Town energy Balance (TEB), and designed or participated in various field experiments in cities. I particularly enjoy interdisciplinary research with sociologists, architects, economists, lawyers, urban planners, hydrologists, geographers, and even meteorologists!

About the project consortium

Five of the total seven project partners are Meteorological institutes: METEO-FRANCE (coordinator), Royal, Meteorological Institute (RMI) of Belgium, the Royal Netherlands Meteorological Institute KNMI from the Netherlands, Meteo-RO from Romania and the Finish Meteorological Institute (FMI) from Finland. All meteorological partners develop, with the TEB urban model, downscaling methods with the high resolution (kilometer-scale) urbanized climate model. The development as well as the evaluation of the different sources of uncertainties were dispatched among the partners.

Methods to produce high-resolution urban maps for the urban climate models are developed by the 2 other partners: the geomatician researchers of the Lab-STICC laboratory of CNRS, and the French mapping agency: IGN.

All the partners collaborate on the quantification of various impacts and the design of the Urban Climate Services. Each partner is in relation with local stakeholders in each case study of the project: Brussels and Ghent in Belgium, Paris and Toulouse in France, the Randstad cities (Utrecht, Rotterdam, Amsterdam and The Hague), Helsinki in Finland and Bucarest in Romania.

The project consortium during the 2nd General Assembly in Toulouse (Sept 2018).

The project consortium and stakeholders during the 3rd General Assembly in Helsinki (May 2019).

The role of JPI Climate

The URCLIM project has not yet in particular sought specific assistance from JPI Climate. However, URCLIM is directly benefitting from JPI Climates efforts in terms of promoting climate services and its related projects. Especially, the climate services market event during the ERA4CS kick-off meeting in November 2017 in Brussels, jointly organised with the EC/EASME, was truly useful. URCLIM will seek more cooperation with JPI Climate regarding climate service portals.

The project leader of WINDSURFER

My name is Len Shaffrey. I am a Professor of Climate Science in the Department of Meteorology at the University of Reading and the Theme Leader for Climate and High Impact Weather in the National Centre for Atmospheric Science in the UK. My personal research focuses on the impact of climate variability and change on weather extremes such as storms, floods and droughts, including improving seasonal to decadal climate forecasts.

About the project consortium

WINDSURFER is being led by the University of Reading in the UK. Met Éireann in Ireland, CMCC in Italy, KNMI in Netherlands and the Finnish Meteorological Institute in Finland are working on wind extremes. The Norwegian Meteorological Institute in Norway, IH Cantabria in Spain and NCSR Demokritos, Greece are working on wave extremes. WINDSURFER is enagaging with stakeholders in the insurance, offshore energy and forestry sectors. For example, WINDSURFER partners gave presentations on climate change and wave and wind risk at the International Oil and Gas Producers workshop on "Our Future Climate". Similary, results on the impact of windstorm clustering are being used to evaluate loss models in the insurance industry.

The role of JPI Climate

I would consider JPI Climate to be essential for WINDSURFER. In addition to providing support for the WINDSURFER project, JPI Climate has provided stakeholder engagement opportunities (e.g at the European Climate Change Adaptation conferences) and support for Early Career Scientists through the ERA4CS summer school. JPI Climate will also play a key role in ensuring the legacy of WINDSURFER.

Colophon

Concept:

Carmen Aalbers,
Fokke de Jong,
Petra Siebelink,
Alexandre Fernandes,
Martina Haindl,
Ingrid Coninx

Traffic & graphic design:

Wageningen University & Research, Communication Services

Editors:

Carmen Aalbers,
Martina Haindl,
Alexandre Fernandes,
Amanda Krijgsman