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News

JPI Climate: A key player in advancing Climate Services in Europe

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1. A short history of Climate Services in JPI Climate

Climate Services (CS) do not look back at a long history such as weather services, which have their beginnings in the 18th century originally focusing on meteorological observations for military reasons.

Since mid-20th century, climate scientists have been discussing the raise of greenhouse gases and air temperature, which led to the first World Climate Conference in 1979 (WMO, 1979) and to the first IPCC Assessment Report (IPCC, 1990). More recently, the third World Climate Conference (GFCS, 2009) and the UNFCCC Paris Agreement (UNFCCC, 2015) clearly focused on strategies and solutions for the climate problems of the future. Big progress in science was stated over the last four decades, thanks to the World Climate Research Programme, but progress had still to be made between providers and users of climate knowledge.

The climate science community found itself increasingly confronted with specific demands for climate-related information from different sectors and actors in society. As a result, many countries (among the first e.g. Germany, United Kingdom, U.S.A.) started developing Climate Services capacity, producing knowledge-based information about projected regional and sectoral Climate Changes and impacts (Vaughan and Dessai, 2014). However, each national provider used its own methods/approaches for data and information resulting in duplication of efforts and a significant degree of inconsistency. Consistency on a larger European and global level was found to be highly relevant with regard to data availability/description, improved tools/methods and for cross-border issues.

To progress in concretely tackling the societal challenge of climate change and its consequences, the 150 heads of state agreed in 2009 on creating the Global Framework for Climate Services (GFCS, 2009). It was time to integrate the progress in climate modelling and observations at global, national and regional level into operational applications. In addition to national activities, the GFCS has been a reference framework to stimulate a step forward in progressing CS research in Europe and beyond.

For JPI Climate (www.jpi-climate.eu), as a Joint Programming Initiative of 17 European countries dedicated to "*Connecting Climate Knowledge for Europe*" through their respective climate research funding and performing organisations (Kraus, 2012), CS development has been at the heart from the beginning of its operations. JPI Climate started in 2011 with a Strategic Research Agenda previously developed on the base of the input from a transnational team of key researchers in climate sciences, like geophysicists and climate modellers, as well as social sciences and humanities focusing on societal transformation processes in the light of climate change (JPI Climate, 2011).

Advancing CS research was then identified as one of the four priority working groups of JPI Climate, specifically dedicated to CS with the view to produce science-based client oriented information about projected regional climatic changes and regional and sectoral impacts based on a sound understanding of user needs (Bley et al., 2011). The added value of JPI Climate was conceived in bringing interaction between emerging national and European CS initiatives.

The work of this dedicated Working Group was crucial in building a European CS community and framing the research needs in CS. In fact, members of this Working Group were later part of the Expert Group established by the European Commission (EC) to propose a European Research and Innovation Roadmap for Climate Services (Street et al., 2015) that is used for the definition of future actions promoted by the EC mainly through Horizon 2020 (H2020), the European Earth Observation Programme Copernicus and the European Institute of Innovation and Technology (EIT) climate knowledge and innovation communities (Climate-KIC), but also by the various other European players financed through transnational, national and regional programmes – JPI Climate being a key player for aligning the latter programmes. With the various activities (Bessembinder et al., 2013) like the mapping of CS in various European countries (Máñez et al., 2014), and carrying out national dialogues to understand user needs and requirements (Street et al., 2013; Capela Lourenço et al., 2016), as well as a stakeholder workshop under the title "Demand driven Climate Services in Europe" (JPI Climate, 2015), the work of this Working Group finally laid the ground for a large scale H2020 Cofund action on Climate Services that is now under way.

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2. ERA4CS in the European Climate Services landscape

After a two year preparation and negotiation phase in close cooperation with the EC, the ERA-NET "European Research Area for Climate Services" (www.ERA4CS.eu) was launched in January 2016 to boost the development of efficient CS in Europe. ERA4CS is now a network of 45 European partner organisations: 15 public Research Funding Organisations (RFOs) and 30 Research Performing Organisations (RPOs) from 18 European countries, most of them already participating in JPI Climate.

ERA4CS aims to boost national and European CS research at the interface between user communities and climate system science. ERA4CS complements other programmes at the European level, in synergy with key international activities, such as the GFCS (http://gfcs-climate.org/), Future Earth (http://www.futureearth.org/) and the Belmont Forum (http://belmontforum.org/).

In March 2016, a large joint call was launched by the ERA4CS partners, contributing either with cash or in-kind resources, and co-funded by the EC. A total budget of about 72 M€ will be potentially available to support 3-year research projects involving at least three countries. To improve user adoption and satisfaction with CS, the overall aim is to advance CS by supporting scientific research on how to produce, transfer, communicate and use reliable climate information to address current and future climate variability and change. Fig. 1 displays a simplified landscape of CS and the complementary initiatives in Europe for the period 2015–2017.

In addition to the implementation and monitoring of the 2016 joint call, ERA4CS will develop a new joint vision for CS research in Europe, contributing to the JPI Climate implementation strategy and will propose new co-alignment tools between European states for 2018–2020 and beyond.

ERA4CS represents a significant contribution to the implementation of the above mentioned European Research and Innovation Roadmap for Climate Services. It is expected to contribute to, benefit from and complement linked initiatives within the European landscape and internationally. In Europe, ERA4CS complements for instance ongoing and planned H2020 actions, such as CS market research to exploit CS added value, to improve regional climate modelling or to access Earth observations; the Copernicus Climate Change Service (C3S) is also seen as complementary. C3S focuses on essential climate variables, data access facilitation and operational CS to be delivered primarily for policy makers and public authorities. Complementarity with ERA4CS is also sought with the European climate change adaptation knowledge platforms, such as Climate-ADAPT, and projects stemming from the Climate-KIC.

About the definition of Climate Services in ERA4CS

Easily accessible, timely, and decision-relevant scientific information can help society to cope with current and future climate variability and change in order to limit climate-related economic, social and ecological impacts and damages. This includes information about climate change (CC) mitigation, adaptation and disaster risk management. Effective Climate Services (CS) also allow society to take advantage of transformation opportunities, to build resilience to CC, to support a sustainable development and to contribute to a climate-resilient and climate-friendly society. CS could address wide timescales, i.e. month to century time-scale, going beyond current operational weather services.

Regardless the different existing definitions of climate services, the aim is always to respond to the increasing demand of stakeholders for usable information and solutions about CC impacts, vulnerability, risks and opportunities, their uncertainties and probabilities and options for actions. The stakeholders can be e.g. decision-makers in enterprises, non-governmental organisations, policy makers at transnational, national, regional and local levels, as well as scientists using the data for impact and applied research and, of course, in the end by all types of citizens and consumers.

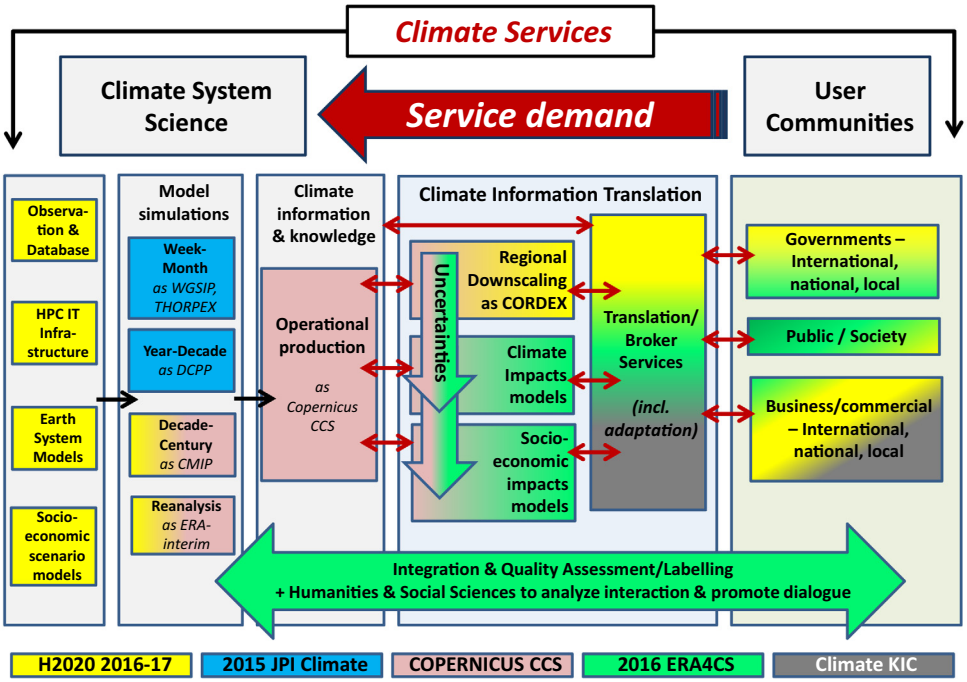

Fig. 1. Simplified Climate Service Landscape in Europe for the period 2015–2017. The main focus of the 2016 ERA4CS call is displayed in green, and is related to complementary roles of other main European initiatives (H2020 WP 2016–2017 SC5 Actions, the 2015 JPI Climate call on Climate predictability and interregional linkages, Copernicus Climate Change Service, EIT/Climate-KIC). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

3. ERA4CS: 2016 call scope and objectives

ERA4CS is the first flagship project developed by JPI Climate. It will help to include new partners and countries in this intergovernmental public partnership initiative with the aim to better co-align research activities, reduce fragmentation of the research landscape and enable relevant stakeholders to make better use of climate knowledge. The aim is to enhance national CS activities and support the various disciplines to address research gaps that exist between the diverse needs of user communities and climate system science.

The 2016 call places an emphasis on integrated research that creates a bridge between observations, model development, operational products, translation of information and user uptake. At the same time, ERA4CS aims to improve the scientific expertise on CC risks and adaptation options, and to connect that knowledge with decision-making, e.g. by developing and assessing climate adaptation strategies and pathways for countries, regions, cities, catchments and vulnerable sectors.

In practice, during a research project lifetime, the feedback loop from users to research development is crucial, from co-design of research priorities to co-development of tools, up to the co-production and co-evaluation of products and a subsequent refinement of the research strategy.

Resulting products/instruments from ERA4CS will help to assess vulnerability, impacts, and adaptation responses to current and future climate variability and change, including extremes for specific regions, sectors, over relevant time periods and spatial scales. They may for example be designed to provide insight into CC effects in urban and/or rural areas, in order to assist in determination of the appropriate risk reduction and adaption measures. They could also advance understanding of integrated management of small to large scale ecological and social systems (e.g. a city) and how this can be optimised to face climate variability and change. CS may also be designed to help e.g. shaping a climate adaption plan for an entire catchment area or river basin, shedding light on the integrated behaviour of water systems influenced by CC and dynamic user demands. The concept could include approaches to address multi-driver vulnerability, risk and economic analyses, e.g. arising from infrastructure investments, assessing aspects of adaptation measures, and guiding their implementation in planning processes and including dealing with conflicting interests, institutional issues and wider societal and environmental objectives.

By developing a "*translation layer along the Climate Services chain*", ERA4CS expects to stimulate advanced solutions for risk reduction, resilience and adaptation, including the management of uncertainties, possibly giving at the same time an impulse for the development of a CS market. The assessment of the potential of such advanced approaches in the field of CS (incl. demonstration of the added value) is part of the call. The operational deployment and building of the market itself, as well as the routine provision of raw and generic climate information (observations, projections, etc.), is not included, however. As shown in Fig. 1, these are part of complementary initiatives, such as Copernicus, Climate-KIC and H2020.

4. JPI Climate outlook

With the adoption of its new Strategic Research and Innovation Agenda (SRIA) (JPI Climate, 2016), JPI Climate is now entering a new phase after five years of its existence. Under a common strategic mechanism (Connecting people, problems and solutions in a systemic approach), this new SRIA sets out three overarching challenges to develop and support excellent, innovative, relevant and informative climate research:

1. Understanding the processes and consequences of climate change.
2. Improving knowledge on climate-related decision-making processes and measures.
3. Researching sustainable societal transformation in the context of climate change.

The framing – especially the emphasis on connectivity and synergy - reflects the priorities and approaches of researchers, funders and practitioners in the countries participating in JPI Climate. The development of efficient CS will be key to address the second challenge of the SRIA.

In this context, JPI Climate will continue to play a major role in supporting the implementation of the European Research and Innovation Roadmap for Climate Services, building upon the layer of activities already launched, in order to support knowledge-based decision making, both in the public and private sector, to avoid risks and seize opportunities towards sustainable development. This requires cross-sectoral and robust impact assessments that nest climate change information into other socio-economic changes, as well as taking into account adaptation policies to reduce vulnerabilities and increase resilience in future.

To co-fund JPI Climate activities, supported by European Members States or Associated Countries, the H2020 Work Programme for 2017 on Societal Challenge 5 (SC5) includes an ERA-NET on cross-sector impact assessments. This new ERA-NET will contribute to the implementation of the roadmap for climate services and will align actions of the various national entities by developing, evaluating, and integrating climate impact assessments, methodologies, and models while building on the scenario framework of the Shared Socioeconomic Pathways (SSP). It requires transdisciplinary research and co-design with key stakeholders across economic and societal sectors, such as food, water, energy, health, finance, investment, equity and security.

With the decision to propose this next ERA-NET, to be implemented jointly with the Belmont Forum as international partner, JPI Climate shows its long term commitment to comprehensive, transdisciplinary knowledge-based approaches to CS with the view to serve society in the face of climate change, in Europe and beyond.

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