

WEATHER AND CLIMATE SERVICES FOR HYDROPOWER MANAGEMENT

Maria-Helena Ramos¹, Andrea Castelletti², Manuel Pulido-Velazquez³, David Gustafsson⁴

1. Irstea, UR HBAN, Antony, France, 2. Politecnico di Milano, Italy, 3. Universitat Politècnica de València, Spain, 4. Swedish Meteorological and Hydrological Institute, SMHI, Sweden

It is essential today:

- to promote actions that support and improve the uptake of weather products by hydrological services
- to guide the development and application of science-based climate information and services in support of decision-making in climate sensitive sectors
- to provide a range of services and products that can better inform decision makers at all levels, from public administrations to business operators, when taking decisions for which the implications of a changing climate are an issue

What are weather and climate services?

Weather and climate services involve the production, translation, transfer, and use of weather or climate knowledge and information for decision making, policy and planning

But challenges remain: provision and effective use

- The increasing complexity and amount of information produced by W&C services and requested by a diversity of stakeholders from contrasted geographic regions should not act as a disincentive.
- At least two translating issues need special attention: translating users' needs into services and translating services into added socio-economic value.
- Progress requires transdisciplinary scientific approaches and inter-sectoral impact modelling, supported by more creative strategies to efficiently engage stakeholders in supporting and providing feedback to research and innovation.
- Improvements on the scientific understanding of natural processes and the prediction of high-impact events should go together with improvements on impact modelling and economic assessment.
- Increasing professional capacity from both communities of providers and users of W&C services to communicate, access, understand and use services appropriately is crucial. It goes hand in hand with building confidence and developing credibility in W&C services.

The hydropower sector is a user of W&C services with broad objectives along the chain of energy generation, management and planning

- Energy systems search to optimize their production and improve their resilience to extreme weather events and climate changes.
- Hydropower needs accurate and reliable weather forecasts over a wide range of space and time scales.
- Extreme hydrometeorological events affect their business activities not only in terms of water availability (power production), but also of water demand for power (load).
- Hydrological predictions based on future climate conditions and projected trends of expected changes in precipitation and temperature may lead to changes in runoff volume, extremes and seasonality, directly affecting the potential for hydropower generation.



- A typical south Mediterranean basin with an important share of water for irrigated agriculture and conflicts on water allocation in a multi-reservoir system, the Jucar River basin in Spain:** an ideal case-study for in-depth analyses of water use

- The upper part of the River Umeälven in Sweden, a typical north European catchment:** a catchment highly influenced by snowmelt runoff and volumes for planning the hydropower production for the current and next winter seasons



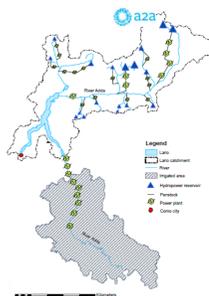
Four case studies in the IMPREX project

WP8 - Hydropower

- South-eastern French catchments:** a set of catchments where the French energy company EDF runs an expert-based semi-automatic hydrologic ensemble prediction system operationally



- A typical snow-dominated Alpine basin, the Lake Como in Italy:** a system exploited for hydropower production in the upper catchment and with a multi-sectoral use in the lower part



This work is part of the IMPREX research project, supported by the European Commission under the Horizon 2020 Framework programme

The IMPREX project (2015-2019) proposes to investigate the value of improving predictions of hydrometeorological extremes in a number of water sectors, including hydropower. The project's rationale is based on the fact that we can, and we should, learn from today's experience and practice to better anticipate the needs (and trigger the opportunities) of tomorrow. This is reflected in its ambition to bridge the gap between science and practice, operations and planning, as well as between past and future

Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture



CONTACT :
Maria-Helena Ramos – maria-helena.ramos@irstea.fr
Centre in Antony - UR HBAN – Catchment Hydrology Research Group
<http://webgr.irstea.fr/>



<http://imprex.eu/>