

THE WATER COMPONENT OF THE COPERNICUS CLIMATE CHANGE SERVICE

SUPPORTING EU WATER AND A BROAD RANGE OF OTHER POLICIES

Water resources in Europe are impacted by climate change with either increasing water scarcity and droughts or increasing risk of floods throughout most of Europe. Management of these resources that takes these impacts into account can reduce the vulnerability of people, economies and ecosystems.

Climate change adaptation is already mainstreamed in water management legislation in the EU and its Member States, but the implementation of this legislation at the river basin and local level requires up-to-date information of climate change impacts on water quantity and quality.

The Copernicus Climate Change Service ([C3S](#)) provides this information in the Sectorial Information System (SIS) in the water sector. The C3S SIS Water has developed a service to help actors in water management to co-create climate-resilient solutions to regional and local water challenges. Because water is key to many economic sectors, biodiversity and human health, the service is widely applicable across a range of policy areas and can be used to evaluate the resilience of current policies to climate change. As a European service, it can also be used for impact assessments of new water-related legislation. Compared to other available services, the C3S SIS Water provides comprehensive information about policy-relevant climate impacts on water systems and with an intuitive interface and guidance it is easy to work with.

The service has been optimized for use by water practitioners, managers and policy makers with the time and skills to access and interpret spatial and graphical climate and water information, but is particularly useful for knowledge purveyors such as consultants and researchers who support water managers and policy makers in making climate-resilient decisions.

By making this service and its climate and climate impact indicators freely available, C3S SIS Water has the ambition to contribute to a real reduction of the vulnerability of people, economies and ecosystems to climate-related water scarcity and droughts, flooding and water quality impacts in Europe.



Do you need information about water-related climate risks to support your decisions?

Then use the Proof-of-Concept [C3S-SIS Water](#) or have it used by your consultants, because

- it reflects the state-of-the-art knowledge on water-related climate risks in Europe,
- it can address actual water-related problems of decision-makers in a wide variety of environments, as shown in the showcases,
- it is easy to use and results are attractively visualised,
- using the service saves time: by using indicators, climate impact assessments can be prepared without having to run a full analysis from basic climate model results.

What are Climate Services and how does Copernicus help to develop them for Europe?

Climate Services are defined by the European Commission’s [Roadmap for Climate Services](#) as covering “the transformation of climate-related data — together with other relevant information — into customised products such as projections, forecasts, information, trends, economic analysis, assessments (including technology assessment), counselling on best practices, development and evaluation of solutions and any other service in relation to climate that may be of use for the society at large. As such, these services include data, information and knowledge that support adaptation, mitigation and disaster risk reduction.

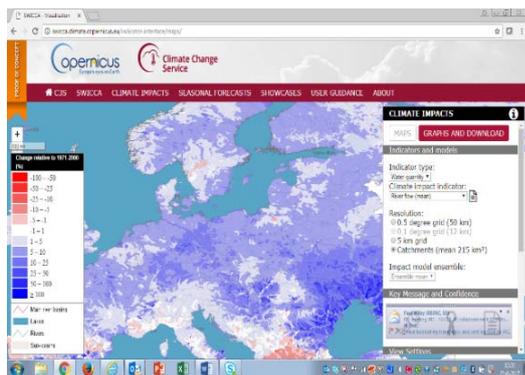
The [Copernicus Climate Change Service](#) (C3S) is currently being developed and combines observations of the climate system with the latest science to develop authoritative, quality-assured information about the past, current and future states of the climate in Europe and worldwide. C3S provides key indicators on climate change drivers such carbon dioxide and impacts of climate change. The aim of the indicators is to support European adaptation and mitigation policies in a number of sectors: water management; biodiversity; agriculture and forestry; tourism; insurance; transport; energy; health; infrastructure and disaster risk reduction. The C3S is operated on behalf of ECMWF for the European Commission and brings together expertise from across Europe.

Experience from the application of the C3S SIS Water service to support decision-making in a municipality in Spain: *As the Jucar River Basin is a highly stressed river basin, knowing the amount of water resources available in the territory in each moment is a basic question in order to distribute them in a sustainable way among all water users.* In this way the C3S-SIS Water service supports implementation of EU policy for water scarcity and droughts in Spain.

What does the Proof-of-Concept C3S-SIS Water Management Service offer?

The C3S SIS Water offers an interactive web site with pan-European data for visualisation, assessment and download which can then be tailored to specific local or regional challenges. 15 cases across Europe demonstrate its use in a real-world decision-making context. The service provides:

- Climate impact indicators, representing past climate and different future time-slices.
- Pan-European spatial patterns of the projected changes as ensemble means.
- Download of indicators for any European area for the full ensemble.
- Guidance for downscaling and correction, to adapt each indicator to local conditions.
- Instructions, tutorial videos, and examples from case-studies on how to use the climate-impact indicators in a local workflow of water management.
- Capacity building of consultant companies through a learning network and web-based forum for knowledge brokerage.



The C3S-SIS Water service has already proven its usefulness in support of policy development and implementation at local and regional levels for issues as diverse as climate-proof irrigation, hydropower production, flash flood warning, drinking water supply, inland navigation, adequacy of quantity and quality of industrial water supply and lake ecosystem conditions.

The Proof-of-Concept C3S SIS Water Service supports EU water policies



The C3S SIS Water Service enables water managers working with knowledge purveyors (where needed) to improve decision-making for adaptation to climate change.

The review and implementation of many EU policies requires reliable information about the impacts of climate change. The C3S SIS Water service supports policy makers in the realisation of policies at different stages and at different administrative levels of the [Blueprint to Safeguard Europe's Water Resources](#), in particular the [Water Framework Directive](#) (WFD). The WFD commits EU member states to achieve good qualitative and quantitative status of all water bodies, contributing to the EU [Drinking Water policy](#). The [Floods Directive](#) requires the assessment of flood risk in river basins and the development of flood risk management plans to be updated every 6 years, taking into account climate change. The EU [Water Scarcity and Drought](#) strategy aims at preventing water scarcity and drought situations, the frequency and intensity of which are affected by climate change. Climate change impacts will affect implementation activities of these water policies due to influences on water resources and therefore climate change should be considered when aiming to achieve policy objectives.



Experience from the application of the C3S SIS Water service to support decision-making in a municipality in Sweden: *With the new information on when the lake has the sharpest thermocline, we can perform better environmental monitoring in a warmer climate. C3S SIS Water helps to protect a good ecological status in lakes in the context of the Water Framework Directive.*

The importance of water in sufficient quality and quantity as a resource for people, ecosystems and economic activities implies that the C3S SIS Water service is applicable in the context of a broad range of policy areas, where the service can be used to assess water-related climate impacts. These areas include but are not limited to:

- Mapping risks to water quantity and quality contributes to the enhancement of resilience, adaptation and reduced vulnerability in the context of EU [Climate Policy](#) and the UNFCCC Paris Agreement.
- Agriculture is highly exposed to climate change, as farming activities directly depend on water and thus on climate. Therefore, water-related risks should be mapped and addressed to achieve the objectives of the [Common Agricultural Policy](#) and enhance resilience to floods and droughts, and food security.
- Supporting a shift toward a climate-resilient economy is one of the core goals of the EU [Rural Development Policy](#), and climate action objectives represent at least 20 % of EU spending in the period 2014-2020 to enhance Europe's competitiveness and create more and greener jobs, in particular via the 5 [European Structural and Investment Funds](#) (ESIF). Resilience to climate impacts of regional, urban and rural development, and infrastructure requires understanding of associated climate risks for water management.
- Climate change has been identified as one of 5 key threats to biodiversity and ecosystem services, endangering the implementation of the EU [Biodiversity Strategy](#). Protection of the [Nature2000](#) network and implementation of the [Habitat](#) and [Birds Directives](#) requires understanding of water-related climate risks.
- The EU [Renewable Energy Policy](#) requires the EU to achieve a 20% renewables target by 2020 – in particular hydropower and biofuels are vulnerable to changes in water availability, which can be assessed using the C3S SIS Water service.
- Also EU [Health Policy](#) is affected by water-related climate impacts, such as water stress, flooding, and water-related vector-borne diseases. Addressing these threats requires reliable information on climate impacts.
- Europe is the world's No. 1 tourist destination and availability of water is an important challenge for the competitiveness of the tourism industry and EU [Tourism Policy](#).
- Many European policies related to Disaster Risk Reduction, like the [Civil Protection Mechanism](#) in the context of the Sendai Framework are very relevant to the financial and insurance sector, as they may help to prevent significant losses and financial disasters, also based on sound information on water-related risks.
- Water-related risks for EU [Transport Policy](#) include low water levels for inland shipping and flooding of transport infrastructure. The C3S SIS Water service can be used to assess these risks.

Experience from the application of the C3S SIS Water service to support decision-making in a metallurgy company in Greece: the service *“has brought climate change information on a mouse click”, “introduced climate change concepts and awareness in future planning” and “added value to the company’s reputational profile concerning environmental awareness and sustainability.”* In this way the service helped in implementing the objectives of the Water Framework Directive at the local level.



Examples of Water Management issues addressed by C3S SIS Water	Adaptation needs and possible measures explored
Irrigation	Strategy to anticipate water shortages and prevent economic damages
Flash floods	Basin-wide analysis, building of protective structures
Inland navigation	Innovative ship designs
Environmental flows and emissions	Adaptation of emission limit values
Industrial water supply	Integration of future water availability in industrial strategies
Hydropower production	Changed investment plans and/or production/regulatory capacities
Drinking water supply	Increased local water storage
Lake ecosystem conditions	Adapted fish management and environmental monitoring
Water availability	New hydraulic structures and desalinisation

The Proof-of-Concept C3S-SIS water management service was developed for the Copernicus Climate Change Service on behalf of ECMWF. For more information contact the Project Office, by email: berit.arheimer@smhi.se.

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