PROGRAMME OF THE EUROPEAN UNION

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COPERNICUS4REGIONS 2025

ADVANCING WATER MONITORING WITH SATELLITE DATA

Fran Martin Rivas
EarthPulse | Spain



> This tool enables treatment systems to ensure the high quality of the water supplied
>
> **Sergi Grau Torrent**
> *PERTE project leader for digitalization of Aigües de Manresa water cycle, Mayor of Avinyó.*

Dawn in the Parc de l'Agulla, Manresa, Spain | Credits to Carme Molist Vidal

EarthPulse partnered with Aigües de Manresa, the local water authority responsible for water management in the Manresa region, to enhance water quality monitoring using satellite data. Leveraging the capabilities of the Copernicus program and advanced analytics, this initiative improved decision-making for water resource management in key regions across Spain

THE CHALLENGE

Assessing and maintaining water quality is a core responsibility for public authorities managing reservoirs.
This task is becoming more complex due to climate change and growing resource constraints. Traditional systems rely on:

- Manual field sampling is time-consuming, costly, and challenging to scale across large or remote areas.
- Static sensor networks, which offer limited spatial coverage and require ongoing maintenance.

These approaches limit the ability of local authorities to monitor water quality frequently and to respond quickly to emerging risks. Our challenge was to:

- Replace most routine fieldwork with remote monitoring at high spatial and temporal resolution.
- Automate the processing of large-scale time series, removing the need for manual handling of datasets.
- Provide real-time insights that support proactive, data-driven water governance.

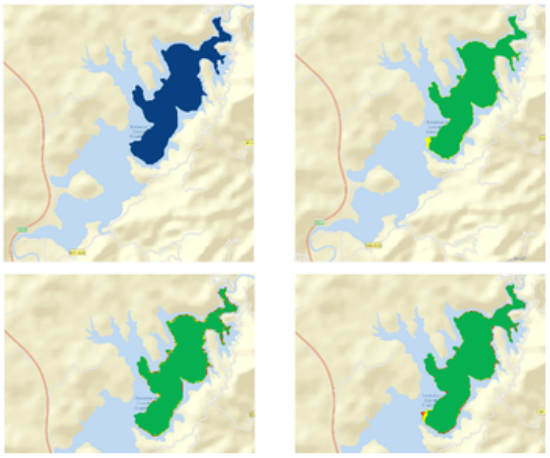
This represents a significant shift from fragmented, reactive monitoring toward a continuous, scalable, and operational solution.

THE SPACE SOLUTIONS

EarthPulse provides Aigües de Manresa with a comprehensive solution. The system is currently used to monitor the Parc de l'Agulla, an artificial lake located in the city of Manresa. It has a surface area of 0.64 km^2 and a storage capacity of 200,000 m^3 of water.

1. Innovative Algorithms:
    - Automated cloud filtering using AI (S2Cloudless model)
    - Median filtering and interpolation for data cleaning
    - Temporal extrapolation to fill data gaps caused by atmospheric interference

2. Client-Focused Features:
    - Confidence Layer: provides a clear, color-coded overview of data reliability for each monitored area.
        - Green: Ideal conditions for accurate analysis
        - Gray: Data may be affected by atmospheric obstacles like clouds or haze
        - Red: Indicates the presence of built structures (e.g., bridges) that may skew results
    - Users can also view a percentage breakdown of these conditions, giving them precise insights to make informed decisions.
    - Traceability Analytics: offers a straightforward timeline showing when reliable data is available.
        - A binary series ("Yes/No" system) highlights dates when atmospheric conditions allowed for valid data collection



Example of temporally extrapolated analytics | Screenshot: EarthPulse

    - This transparency enables clients to plan actions and trust the insights derived from the data.

3. Optimized Workflow:
    - Over 90% reduction in processing times by focusing on new data only
    - Full automation of data acquisition, updates, and quality controls

THEMATIC AREA

Climate, Water and Energy

REGION OF APPLICATION

Barcelona

SENTINEL MISSION USED

S2

COPERNICUS SERVICE USED

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THE BENEFITS AND THE BENEFICIARIES

The primary beneficiaries are the Manresa water authorities, who are now equipped with a system that enables them to provide a higher quality of water to their citizens.

This system has three main lines of benefits:

1. Efficiency Gains:
   - Faster processing times reduced client response times up to 90%
   - Fully automated data updates provide near real-time access to key insights that drive decision-making and direct action
2. Improved Data Integrity:
   - Automation of quality control and advanced filtering deliver data that is more reliable than ever before
   - Confidence and traceability layers make the solution more transparent and usable for technical and non-technical people
3. Strategic Decision Support:
   - Enhanced analysis capabilities enable proactive water management by the authorities
   - New indicators make it easier to orchestrate targeted actions during critical events

Secondary beneficiaries are the 103.000 people who are directly supplied by Aigües de Manresa, in the districts of Manresa, Sant Joan de Vilatorrada, El Pont de Vilomara i Rocafort, Sant Salvador de Guardiola, Fonollosa, Sant Mateu de Bages, Rajadell, Marganell, Castellfollit del Boix, and Castellbell i el Vilar.

	TIER 1 SERVICE PROVIDER	TIER 2 PRIMARY USER	TIER 3 SECONDARY USER	TIER 4 END USER BENEFICIARIES
SERVICES AND BENEFITS	Sentinel-2 L2A	Spatial and temporal water quality indicators for water extent, chlorophyll, turbidity and dissolved organic carbon levels	Water quality indicators for decision making in the use of drinking water	The population of Manresa uses and consumes quality drinking water suitable for consumption, without impacts on health
BENEFICIARIES	EarthPulse	Aigües de Manresa	Ajuntament de Manresa	Manresa Citizens

EU POLICY / DIRECTIVE

EU Water Framework Directive

TYPE OF SERVICE PROVIDER

Commercial Service

TYPE OF FUNDING SOURCE

National or regional non space Programme

USAGE MATURITY LEVEL

5



A FUTURE WITH COPERNICUS

Copernicus is key to our solution, offering unmatched temporal consistency, spatial coverage, and high radiometric and geometric reliability. This makes it ideal for water quality monitoring and long-term environmental management. We are committed to utilizing Copernicus data to enhance analytics and expand our geographic reach. Its trusted datasets ensure dependable operations, enabling public authorities to monitor resources more sustainably and proactively. Looking forward, Copernicus is one of the cornerstones of our strategy to support informed decision-making across Europe and beyond.



DID YOU KNOW?

Did you know satellite data can be used to assess the quality of water?
Satellite data can be used to measure parameters such as chlorophyll levels, turbidity, or dissolved organic carbon in the water, as well as their spatial and temporal distribution. These indicators describe the quality of the water. High levels of chlorophyll, for example, can contain a large population of algae, which is toxic.

Acknowledgements

Aigües de Manresa, Copernicus

Contacts

Fran Martin Rivas | fran@earthpulse.ai

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