

# ROAT: Building a Climate Service as a tool for managing multipurpose reservoirs

Javier Herrero, Eva Contreras, Cristina Aguilar, María José Polo  
Fluvial Dynamics and Hydrology Research Group - Andalusian Institute for Earth System Research. University of Córdoba

## Multipurpose reservoir operation

In reservoirs with different and competitive water demands, some questions need to be addressed: How operate to guarantee the supply for all the demands during the next season? How to **maximize** the economic performance of water management in the reservoir? When to release water to maintain the **optimum reservoir level** with the minimum affection downstream?

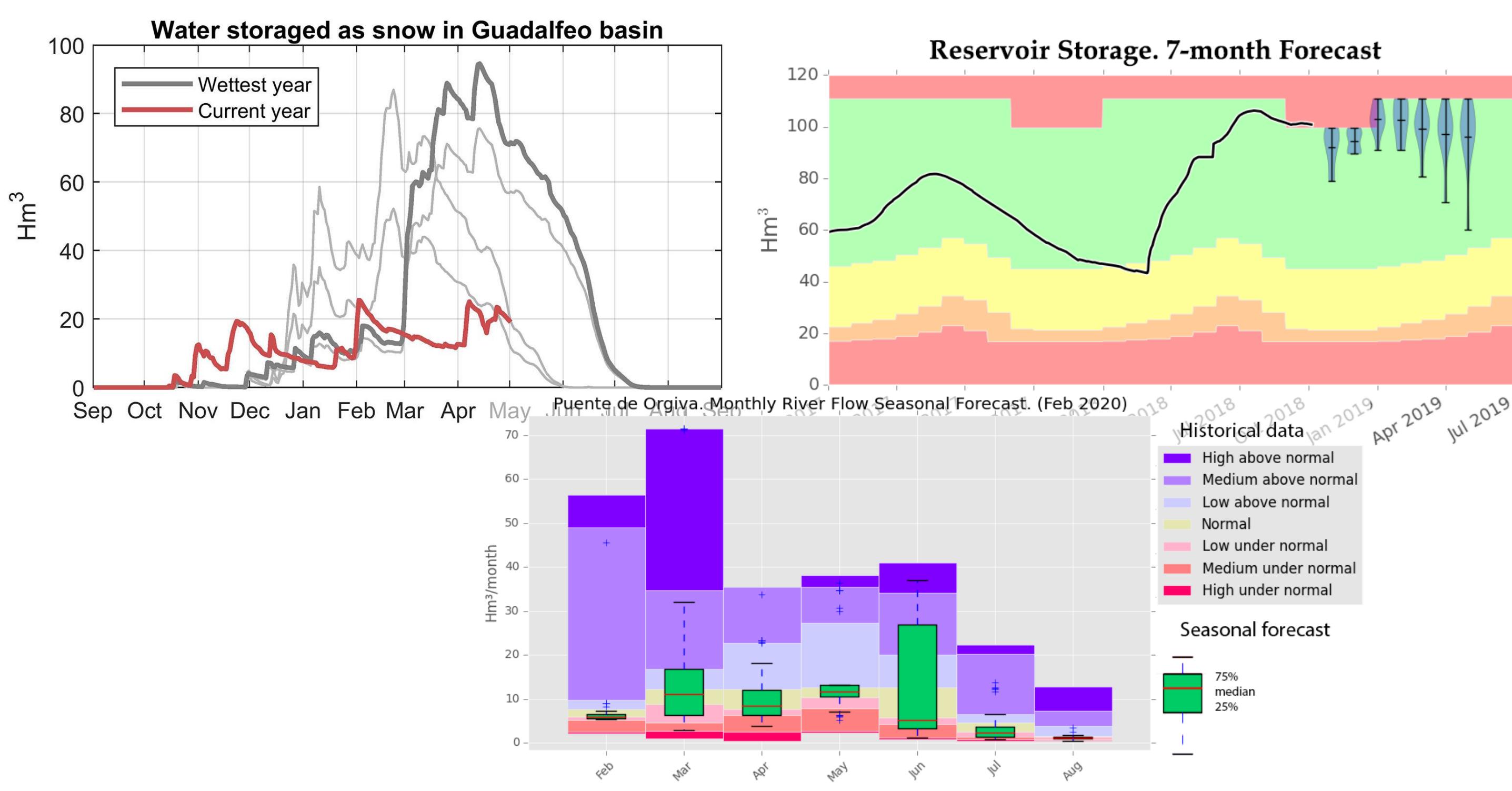


## Changing the traditional operation

Traditionally, water managers deal with those questions by using historical information of precipitation and river flow. However the dynamics of water contributions to a reservoir can be very different from year to year.

ROAT (Reservoir Operation Assessment Tool) combines measurements and modeling, together with the most forward-looking **seasonal forecasts** that already exist at European level. This will help them to:

- Anticipate the actual risk of droughts and floods.
- Optimize reservoir operations and the timing of water allocation.
- Gain a global view of the current hydrological state of the watershed, from measurements and a physically based hydrological model.



## How the service works

ROAT Climate Service CS is a cloud-based application that provides intuitive and comprehensive data visualizations through web browser of:

- **Current state** of reservoir and basin water reserves.
- **Seasonal forecast** of precipitation, river flow, reservoir state and satisfaction of water demands.



The development of the service within project H2020 CLARA can be summarized in certain KEYWORDS:

- COGENERATED with the **final users**: reservoir water managers and hydropower producers, to understand their specific needs.
- MARKETABLE: previous **value** and **market** study of the CS to assess its suitability and viability.
- SCALABLE: the CS is easy to **export** to new reservoir systems but also to different business sectors related to water (hydropower producers, farmers, drinking water producers) thanks to the flexible architecture and the base administration panel.

## Results

The co-generated CS proved the **high potential** of the Seasonal Forecast SF for the end-users (managers of the reservoir), who were previously unaware of it. As a tailored app, it fulfils the users needs.

The pilot application was conducted in Southern Spain (mountainous site, with seasonal snow, in Mediterranean semi-arid climate). Here, SF only slightly improved statistical forecast based on historical data (+3% reliability with +7% sharpness) and only in **winter and spring**. With these results the service turns out to be **ineffective** (for this user needs and in this region). SF needs further improvement for the CS to be viable in this case study.

