



## Modelling the water-system in the Pyrenean Aure-Louron Valley

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The increasing demand for renewable energy renders the optimal management of the water-energy nexus highly important, and the complexity of global change compromises the sustainability of current water use. Therefore, models representing human interventions on water resource are crucial. This work takes the multipurpose reservoir system of the Aure-Louron Valley in the center of the Pyrenees as a typical study case to establish an integrated hydrological modelling framework. Hydropower and downstream consumption represent the main water uses in the study case. The work is a scientific contribution to the Interreg PIRAGUA project (<https://www.opcc-ctp.org/en/piragua>). Detailed work aims to develop a modelling chain that integrates a water resource model, a water demand model, and a water management model. This study focuses on the water resource model and the water demand model for energy. Water resource is characterized by the hydrological model GR6J (Riboust et al., 2019), calibrated with the SAFRAN surface reanalysis (Vidal et al., 2010) with a dedicated Pyrenean 2.5 km resolution version, and gap-filled MODIS data (Gascoïn et al., 2015) for better robustness of snowpack modelling. The energy demand model is based on the air temperature of France and calendar day (Hendrickx and Sauquet, 2013). It is validated with the historical data of water used for hydropower production over the 2001-2018 period. Tools are being developed to make the models transposable to a wide range of water management contexts. The next steps of the study will focus on establishing a water demand model for downstream consumption, and a water management model. Finally, the modelling chain will be applied under various global change scenarios to assess the vulnerability of the system.

### References:

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