

CIVIL AND ENVIRONMENTAL ENGINEERING

MUR DM 117/C.V.A. - Sustainable management of water resources through multi-objective design of large water schemes

Funded By	C.V.A. SRL [Piva/CF:10484860019] MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [Piva/CF:97429780584] Politecnico di TORINO [Piva/CF:00518460019]
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Context of the research activity	<p>The research activity will include:</p> <ul style="list-style-type: none">- analysis of the meteorological and hydrological data available in the Valle d'Aosta watersheds;- selection of some reference watersheds;- development of algorithms for the computation of the watershed water balance with different time ranges (from some days to several months);- evaluation of weather forecast (precipitation and air temperature) with different time ranges (from some days to several months)- comparison and integration of physically based and machine learning algorithm in order to forecast water discharge,- development of algorithms for discharge forecast combining the two approaches;- development of post-processing algorithms for the formulation of quantitative discharge forecast;- testing of the whole forecast chain. <p>Progetto Finanziato nell'ambito del PNRR - DM117/2023 - CUP E14D23001990004</p>
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Objectives	<p>The specific objectives of the research are those related to the operational needs of the hydroelectric plants of Compagnia Valdostana delle Acque.</p> <p>They can be summarized as follows:</p> <ul style="list-style-type: none">- development of algorithms for the forecast of inlet discharge in water reservoirs (e.g. Gabiet, Valgrisenche, Valpelline etc.);- interaction with operational tools at different time frames from days to several months;- validation of numerical modelling for the production of historical analysis
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with high spatial resolution of main fluxes (snowfall and rainfall, discharge, evapotranspiration);
- use of high resolution meteorological reanalyses.

The overall objective of the research is to use weather and hydrology up to date knowledge for water balance forecasting.

**Skills and
competencies
for the
development of
the activity**

Physics: hydrological and meteorological processes.

Data science and modeling: data analysis, also using machine learning and physically based models application.

Information Technology: good knowledge of Python or R or Matlab.

Soft skills: teamwork, problem-solving, self-time management, critical thinking, curious personality.