



Enhancing the readiness for drought events in the European Alps bridging research and practice

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The Alpine water towers are essential for sustaining life and driving the economy across central and southern Europe. This vital resource faces growing pressure from global warming, which is changing precipitation patterns, reducing snow availability and accelerating glacier melt, and from economic growth, which is driving an ever-increasing demand for water. Consequently, significant shifts in water's spatial and temporal availability are observed, accompanied by a rising frequency and intensity of drought events. In this context, the Interreg Alpine Space project, Alpine DROught Prediction (A-DROP, 2024-2027), aims to enhance the preparedness of the Alpine regions for droughts and foster a sustainable use of water. The project partners, from research to public administrations, collaboratively develop and implement solutions for water management based on science. Embedding the drought monitoring methods and platforms set up in previous EU projects, like the Alpine Drought Observatory (<https://ado.eurac.edu/>), the ambition of A-DROP is to create 1) an innovative hydrological drought early warning and forecasting tool, not yet available for alpine river basins, that complements the instruments adopted by the regional water authorities, paving the way for a pan-Alpine prediction system, and 2) an open, spatially consistent database of climate and hydrological variables, drought indices, and impacts at an unprecedented level of detail, integrable with local water management systems. In pilot areas, decision-makers and stakeholders in agriculture, hydropower production, and winter tourism exploit the new dataset and the A-DROP prediction tool in real situations. Specifically, pilot 1 focuses on optimizing

farm water consumption in Slovenia, pilot 2 develops a climate for ski resorts in France, Italy and Germany, pilot 3 generates an optimized hydropower management tool for a plant in Germany, and pilot 4 creates a drought public dashboard and, concurrently with pilot 5, tests a seasonal hydrological forecast system over two Italian regions. In parallel, A-DROP employs multi-faceted regional hydroclimatic model ensemble simulations to estimate climate change effects on droughts, thus informing decision-making processes, and facilitating risk reduction and adaptation pathways. Tailored information and training sessions support the transition process at the policy and operational levels towards science-based water governance. The active involvement of actors from macro-regional strategies, like EUSALP, and observers from public administrations facilitates the translation of A-DROP outputs into co-designed guidelines for water governance policies.