Cutting-edge tools for spring monitoring and groundwater system characterization in mountain environments

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Cutting-edge tools for spring monitoring and groundwa characterization in mountain environments

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Mountain aquifers represent one of the largest and most valuable water sour meet the population's water needs. Over time, they have been threatened by hu exploitation activities, which are currently leading to the depletion of aquif worldwide. Furthermore, the vulnerability of groundwater resources is rapidl climate change, urbanization, massive industry production, intensive agri

Knowledge and forecasting about groundwater flow systems are required to g management and territorial planning strategies, according to the mountai evolution taking place. Besides, examining how groundwater storage mecha regions have changed in response to both climate-driven and anthropogenic e increasingly crucial.

In remote alpine areas, continuous monitoring and data collection of spring parameters is still often hampered by technical and logistical problems. In t automated techniques and tools need to be applied to monitor springs h parameters, punctually understanding the dynamics of exhausting of the avai resources.

The instrumentation and sensors complex, installed in correspondence with th basin (Aosta Valley, Italy) allows detailed analyses of the surface and under system, recording continuously hydrogeological variables entering and leavin system. A cutting-edge weather station was here combined with a spring mo through snowpack-hydrometeorological sensors installation. This setup, co scale, ultrasonic and laser sensors for snow weight and snow depth readi possibility of a detailed study of the snow layer evolution during each se multiparametric probe allows water discharge, temperature and electric co detection.

The high quality of the data provided and the small-size basin features have pe the variables affecting the system and standing out those are evolving in t relationship between changes in weather conditions and water availability performing correlations between different hydrogeological and meteorolog

series.

The Mascognaz spring s pilot site could be helpful as an example for other
authorities who need to identify suitable instruments, sensors and methods
groundwater flow system and hydrogeological structure of a mountain bas