



Typology of precipitation-discharge events according to stable isotope and discharge dynamics in an Alpine Catchment, Switzerland

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In a warming climate, even high elevation catchments might experience regular rainfall events in the middle of the snow accumulation season, ie. more discharge events are influenced by both simultaneously. Even in the high mountain environment, discharge events are no longer just rain or just snow-melt dominated but have more frequently been observed to be rain-on-snow or short-term snow-melt events. This perturbation of seasonal precipitation patterns, which may take place variably over an elevation gradient in mountain environments, creates a spectrum of precipitation - discharge events. It is important to understand and identify the physical mechanisms for these events in order to improve prediction of downstream runoff behavior.

In this presentation, we will describe the seasonal fluctuations of stable isotopes in water and the quantity of water flow in a snow-dominated environment. We explore when the two response variables behave similarly and contrastingly, on an event by event basis, with each event testing hypotheses of physical flow generation mechanisms. We thus create a typology of events that sheds light on how isotopes can inform discharge interpretation. We use a small alpine catchment, the Vallon de Nant, which includes a small glacier, where snow dominates runoff generation in the Swiss Alps as a case study.