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## Streamflow event classification in snowfed rivers in Mediterranean catchments: a process-oriented assessment

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Streamflow in Mediterranean Mountain Areas is highly linked to the storage capacity of snowpacks and its seasonal dynamics, these becoming the only water source, during long periods, particularly during dryer seasons such as spring or summer. This fact makes that to have a better understanding of the significant drivers of change in the hydrological regimen in many mountain rivers requires a process-oriented approach to assess the different interacting effects and their propagation from atmospheric conditions to runoff and baseflow generation in these areas. Snow dynamics has a direct and major impact on the partitioning of river flow into baseflow, subsurface flow, and runoff. Moreover, the snowpack is extremely affected by the partitioning of precipitation and water outflows (i.e., rainfall vs snowfall and snowmelt vs evapostublimation) that largely modify the riverflow regime with a strong nonlinearity of their interactions.

This work presents the characterization of streamflow events in mountain rivers of semiarid areas based on a process-oriented approach from the identification of the major sources/sinks of water in the snow-dominated headwaters of different basins in the Sierra Nevada area, in southern Spain, within an altitudinal range of 1000-3479 m a.s.l. For this, two catchments with available time series of streamflow are analyzed together with meteorological data and the simulation of water fluxes from the snowpack by the physically-based model SNOWMED, validated and operational in this area ([www.uco.es/dfh/snowmed](http://www.uco.es/dfh/snowmed)). First, the Cadiar River catchment (area of 0.19 km<sup>2</sup> and mean elevation of 2034 m, 20-yr daily flow series), which is highly dominated by snow, was chosen as a representative catchment with direct dominant impacts on streamflow from snow-related water fluxes. Secondly, the contributing catchment area upstream the Órgive gauge station, in the Guadalfeo River (area of 1058 km<sup>2</sup> and mean elevation of 1418.5 m, 28-yr daily flow series), which includes the previous case, was analyzed to assess the snow impacts propagation and lamination by other runoff generation conditions downstream the snow-dominated areas..

The resulting streamflow-event series i) shows the variability of the flooding and recession periods in this area on both the seasonal and annual scales due to the variability of the snow regime upstream, and ii) constitutes a key database to assess the impact of climate trends on these rivers and understand how future climate may condition the availability of water during the dry season in the downstream areas. The results not only expand this comprehension of how snowpack-streamflow interacts in semiarid regions, but also provide us with an assessment on predictable

events within a short and seasonal forecasting local framework, that can be applied to other Mediterranean mountain rivers after local analyses.