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Torrentiality and aridity in Sierra Nevada (Spain): observed trends and projected climate scenarios

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Mountain areas in Mediterranean regions are highly vulnerable to global warming due to the impacts on the snow occurrence and persistence. Different works highlight the observed shift in the fluvial regime in snow-influenced rivers, especially during the summer recession phase. Drought and aridity have been extensively analized in terms of the precipitation regime, but less effort has been done to characterize torrentiality and aridity in snow-dominated areas.

This work presents an analysis of the observed trends of selected weather variables on an annual scale (precipitation, snowfall, days with precipitation, precipitation intensity, days with snowfall, and snowfall intensity) in the Sierra Nevada mountain area in South Spain and proposes different indicators to monitor the torrentiality and aridity in this study site on this time scale associated to the snow regime, and their trends on a long term basis for different future climate scenarios. The results include the impacts of these trends on selected ecosystem services provided by the snow in a pilot area, the Guadalfeo River Basin: snow water equivalent, soil moisture, low flow season in the river).