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Different approaches to model temporary hydrological regimes in a Mediterranean karst basin using the SWAT model.

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In the Mediterranean Region basins are characterized by a specific hydrological regime that generally includes periods of absence of flow and flash flood events. Lithological and geological features are factors that greatly affect the flow regime. In this work, the Soil and Water Assessment Tool (SWAT) model was applied to simulate the Canale d'Aiedda (Apulia, Italy) flow regime, a Mediterranean temporary karst river basin with limited data availability. Different basin delineations and model parameterizations were adopted that include: (i) cut-off of karst areas in GIS (Configuration A); (ii) setting up the basin including the karst areas (Configuration B) and (iii) parameterizing, in the calibration process, the Crack Flow function in the karst sub-basins (Configuration C). The model performed satisfactorily for daily streamflow for configurations B and C and good for A. A better simulated large floods. C was the best solution for monthly flow from May to July. Regarding the water balance, C showed higher surface runoff values and lower total water yield values than A and B. The Crack flow function proved to be a valid option to improve the simulation of hydrological processes in karst areas. Several factors, such as the final aim of the study, data availability, and basin characteristics should be considered in selecting the best model configuration.

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