



Implementation of a snow routine into the hydrological model WASA-SED and its validation in a mountainous catchment

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In many regions of the world, snow accumulation and melt constitute important components of the hydrologic cycle. With the objective to improve model performance of the hydrological model WASA-SED (Water Availability in Semi-Arid environments - SEDiments) in catchments affected by snow and ice, a physically-based snow routine has been implemented into the model. The snow routine bases on the energy-balance method of the ECHSE (Eco-hydrological Simulation Environment) software. A first test application has been conducted in two sub-basins of the Isábena river catchment (Central Spanish Pre-Pyrenees). Results were validated using satellite-derived snow cover data. Furthermore, a rainfall gauge correction algorithm to restore the liquid precipitation signal of measurements affected by solid precipitation was applied. The snow module proved to be able to capture the dynamics of the snow cover forming during the cold months of the year. The temporary storage of water in the snow cover is able to improve simulations of river discharge. General patterns of the temporal evolution of observed and simulated snow cover fractions coincide. The work conducted only represents a first step in the process of implementation and evaluation of a physically-based snow routine into WASA-SED. Future work is necessary to further improve and test the snow routine and to resolve difficulties that occurred during model applications in the catchment.