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Snow accumulation and melt in a mountain headwater catchment

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We present results of measurement and modeling of snow accumulation and melt in the alpine catchment located in the Western Tatra Mountains, northern Slovakia, in winter 2016. Spatially distributed model MIKE SHE was used in simulations. Spatial distribution of input precipitation was reconstructed according to the relationship between snow depth and terrain attributes. Simulated outputs (snow water equivalent, snow patterns, amount of water from melting snow entering the soil, catchment runoff and hydrograph components) were validated using data from snow courses, ground thermometers, terrestrial photographs, snow lysimeters, soil moisture sensors, environmental isotopes and water conductivity. Isotopic composition and electrical conductivity of catchment runoff after the snowmelt period indicated presence of older water in the creek. The main snowmelt phase lasted only about a week and the mean contribution of the snowmelt to catchment runoff was 34% to 55% depending on the isotopic composition of the snowmelt water.