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Snow accumulation and snow melt assessment using HBV model in Toplica river basin

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Abstract: The Toplica River is the largest leftside tributary of the Južna Morava. River originates from the eastern slopes of the Kopaonik Mountain, just south of the highest peak, Pančićev vrh. Upper part of the basin with area of 346 km2, will supply nearly finished multipurpose reservoir 'Selova' with fresh water. Reservoir will secure water for towns and industry and irrigate of the agricultural lands in Toplica District. As snowmelt discharge is dominant in the total annual runoff, determining of the amount and timing of snowmelt runoff is an important task, in order to use water resources in optimal manner. In order to mitigate the risk of spring flooding, caused by sudden meltdown or sudden warm rainfall, a successful modeling of the snow reservoir is necessary. The Swedish IHMS/HBV model with a daily timescale was selected because of its simple structure, modest input requirements and inclusion of a satisfactory snow routine. Module is degree-day approach, based on the air temperature with the snow water holding capacity which delays runoff. The HBV is a semi-distributed conceptual model where subbasin represent a primary modelling unit, and the basin is characterised by area-elevation distribution and classification of vegetation distributed by height zones. In this paper the results of the HBV simulation were compared with observed data for the heavy snowfall episode in January and February 2012, when in the hilly-mountainous areas of southern and southwestern Serbia, in two significant snowfall episodes, the height of snow cover exceeded 200 cm.