An application of the HBV model to the Tamor Basin in Eastern Nepal

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ABSTRACT

The semi-distributed, conceptual hydrological model HBV was applied to Tamor Nadi in order to estimate runoff at Tapethok, Taplejung, in Eastern Nepal. As there was no discharge data available for this particular location, the model was first calibrated and validated for the bigger, gauged basins at Mulghat and Majithar. However due to its structure HBV shows difficulties in modelling low and high flows correctly at the same time. Therefore two parameter sets were produced: one with focus on the model performance during low flows and the second one, on high flows. Those parameters were then applied to the basin at Tapethok. Generally HBV was able to correctly simulate low flows except for some sharp peaks due to isolated precipitation events. However, pre-monsoon discharge was overestimated while the runoff of the monsoon season were most of the time underestimated. The main reasons for this situation are: (1) HBV generates runoff from one single groundwater reservoir for the entire catchment, leading to sharp peaks with a rapid recession and therefore exaggerated reactions on precipitation during dry season; (2) during pre-monsoon snow and ice melt gain in importance and add to the mentioned problem; (3) due to the simplified representation of storages in the model structure the catchment area drains too quickly.

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