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The Role of Vegetation Interception on the Streamflow Prediction at the Mesoscale

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Several studies underline the importance of interception as one of the key processes affecting the water balance at the mesoscale. Often this process, in the hydrological models, is either disregarded or taken as a fixed percentage of the precipitation, so as to reduce the model complexity in terms of number of calibration parameters. With the increasingly availability of remotely sensed data on the vegetation cover such as leaf area index (LAI), it becomes possible to estimate the role of vegetation. The objective of this paper is to study the role of vegetation interception on the streamflow prediction in the mesoscale catchment. The present study uses a grid based mesoscale Hydrologic Model (mHM), in which the canopy interception of vegetation cover is modeled as the function of LAI. The LAI data are obtained from the Moderate Resolution Imaging Spectroradiometer (MODIS). The model is calibrated with and without taking interception process into account. The proposed study was carried out at upper catchment of the Neckar River (Germany) covering an area of approximately 4000 km^2. Results obtained in this study indicated that the interception process play a significant role on the prediction of stream flow, in particular during the summer season. The Nash Sutcliffe Efficiency for the daily discharge simulation during this season, with interception process was, on average, 5% higher than that obtained without taking the interception process into the account.