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Adaptation of a conceptual rainfall runoff model by means of hillslope runoff observations

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Hydrological models are applied for numerous problems in hydraulic engineering and water management. Usually these models are designed for the catchment scale and the process representation is rather based on a lumped or integrative response of the contributing area. A conceptual hydrological model was developed and tested at the hillslope and local scale (some ha up to 20 km2), were observation data of surface flow, interflow and delayed flow (baseflow) as well as soil moisture and soil suction data were monitored during a two years hillslope runoff experiment. The experimental plot represents steep, mountainous environments with forest vegetation cover. The presentation focus on the model performance and the demand of process related model extentions based on the intercomparison of the runoff components. It could be concluded, that storage models types representing the saturation runoff excess theory can only partially reproduce the observed runoff mechanism. A module allowing for Hortonian surface runoff will better perform the natural behaviour in the investigated environment. Some model state variables, like soil storage content, can only with few transformations directly be interpreted and compared to physical properties like observed soil moisture. This can allow for parameter estimations from soil related data. Some shortcomings will also be referred due to scaling problems of particular model parameters like storage retention constants.