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Hillslope modelling based on geophysical exploration

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In low mountain ranges one of the important discharge components is the interflow. This is investigated in a small catchment in the *downer Harz Mountains*, the Schäfertal vale with an area of 1.44 km^2. Long term series have shown, that flood events with a high initial moisture have a second delayed discharge peak after the normal direct reaction on precipitation events. This delayed peak persists a few days and has an amount of up to 82 % of the basin discharge. The secondary peak is interpreted as an interflow component. This assumption is supported by the synchronic reaction of corresponding groundwater level records in the catchment. To explain the phenomenon of the second discharge peak some hypotheses were created. One is the percolation of the precipitation through the soil which caused saturation on top of the bedrock. In this case the basin discharge will be directly effected through a pressure transfer to the valley floor and lower slopes. A further one could be the interaction of rising groundwater with the unsaturated zone of the hillslope. These hypotheses have to be falsified with the physical based deterministic model CATFLOW. For the simulation of the hillslope processes it is important that the model discretisates the geomorphologic structure of the vale and the slopes. Geoelectric resistivity prospection is used exemplary on one hillslope. The aim of this investigation is to detect the thickness of the complete subsurface over the bedrock as a discharge potent area as well as the localisation of possible less permeable layers. Which are in the upper soil layer and produce fast interflow. Under the above mentioned circumstances the model CATFLOW is then used to falsify the generated hypotheses with some conceptional adaptations. To test the hypotheses some hillslopes were generated with different structure and border conditions and also simulated with the corresponding precipitation. A discussion of the results will follow in the lecture.