Identification of hydrological similarities as a precondition for regionalization of model parameters for catchments in Lusatia, Germany

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The water balance of the catchments of the rivers Schwarze Elster, Spree and Lusatian Neisse in Lusatia is profoundly disturbed due to lignite mining activities. Ground water resources have been reduced by dewatering during the lignite production. River discharges have been increased and the annual variations have been evened out. Due to those interventions on the hydrological system there is no natural relationship between rainfall and runoff. This makes it difficult to calibrate water balance models based on time series of observed discharges. Nevertheless, in order to set up water balance models, at first subcatchments without influence of both water management and mining were identified taking into account the heterogeneity of the region. Secondly, the semi-distributive ecohydrological model SWIM (Soil and Water Integrated Model) was calibrated and validated for the identified subcatchments. Different sets of optimum parameters were found for the subcatchments. Hydrological similarities should be found to explain similarities and differences between model parameters for the subcatchments. Therefore, the sensitivity of model parameters to catchment properties like catchments size, topography, dominating soil type and dominating land use is examined. The study aims at finding a regionalization approach to transfer parameters in order to set up water balance models for subcatchments with impact of both water management and mining activities.