SPATIAL TRANSFERABILITY OF AUTOMATICALLY CALIBRATED SWAT MODEL PARAMETERS IN THE DILL CATCHMENT AND THREE OF ITS SUB-CATCHMENTS

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Parameters of hydrological models cannot always be derived from readily available input data. When measured stream flow data are available, automatic calibration can be used to determine optimal values for the unknown parameters. We used a version of the distributed conceptual model SWAT adapted to low mountainous regions (SWAT-G) and the Shuffled Complex Evolution algorithm developed at the University of Arizona (SCE-UA) for automatic calibration. SCE-UA is a global optimization algorithm that has successfully been used to find optimized model parameters within the bounds defined by the user. Because it is not feasible (and meaningful) to optimize all parameters for a spatially distributed model, we chose 11 parameter values and adjusted the others in fixed ratios. With this approach, SWAT-G was calibrated to 3 years of stream flow data for the Dill catchment (Germany) and three of its sub-catchments. The four sets of optimized values were only partly consistent. The significance of these observed differences was investigated by determining confidence intervals for the optimized parameter values. This study provided interesting insights in the spatial transferability of the SWAT model and the possibilities and limitations of automatic calibration.