Introducing an implementation of Brook90 in R

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Brook90 is a widely used lumped hydrological model for evaporation, soil water, and streamflow. Its development lasts back to the 70s by Federer. Since that time, the model found a vast extent of applications, mainly in the field of forestry. The simple reason for its popularity is the profound process description, especially its detailed description of evaporation processes. The original model was written in FORTRAN and translated into Visual Basic. Both languages are highly capable and recommended to run the model. However, user preferences and demands are changing over time and current demands, like model applications in web technologies hardly can be performed with the original model versions. Therefor we present a well-documented R-implementation of Brook90 (https://github.com/rkronen/Brook90_R).

The implementation shows marginal numerical differences at single iteration steps due to different variable precisions. These small differences in the balance only can be observed between single time steps and disappear at daily and larger time steps. The current R version of the model takes twice as long to calculate as the original Visual Basic version.

However, the R implementation enables the user to run Brook90 simply in batch mode, to run it in parallel for different catchments and even to run it spatially distributed as the water fluxes of different catchments can easily be connected. This R version of the Brook90 allows for comprehensive investigation of all model parameters and variables at every time step, which is another great advantage. The R version of Brook90 has a detailed documentation and might therefore find also application in academic teaching.