



Gauging the ungauged catchment: a combination of regionalization and limited streamflow observations

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The PUB (Prediction in Ungauged Basins) initiative highlights the long-standing issue of streamflow estimation in ungauged basins. Recent studies demonstrated that taking a few streamflow measurements might be useful to constrain runoff models for simulations in ungauged basins. While in these previous studies the modelling started from the assumption of no prior information, in this study the usefulness of taking a few streamflow measurements was explored for the case where some regional information of parameter values exists. For two groups of monitored catchments, one in Sweden and one in Switzerland, a collection of regional parameter sets for a simple catchment model was compiled by selecting behavioral parameter sets from the individual catchments. In a second step then one catchment at a time was treated as 'ungauged' and streamflow for this catchment was estimated based on selected regional parameter sets. This selection was based on model evaluations for different sub-sets of streamflow observations on a few days. In other words these sub-sets consisted of a limited number of single runoff measurements and represent data that could be measured with limited efforts in an ungauged basin. Results indicated that a few runoff measurements, especially if selected with a hydrological reasonable strategy, can contain much of the information content of continuous runoff time series. Compared to the case with no prior information fewer streamflow observations were required to obtain good model simulations. When a few streamflow observations were used to guide the parameter set selection, this information allowed a better selection than the proximity of catchments with respect to geographic location or catchment characteristics.