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How to transfer a given calibrated parameter sets over time on a watershed?: Case of West and Central Africa

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Our work studies whether the transfer of parameters based on a hydro-climatic period different from the calibration period could give reliable results. For this purpose, two versions of the GR2M model were used in 27 western and central African watersheds. The results show that the calibration performance of the models used depends on the average rainfall, the climatic variability and the size of the basin. They are better for watersheds with high rainfall, less hydro-climatic variability and large size. The transfer of parameters over time results in decreases in performance related to changes in hydro-climatic variables from the calibration period to the validation period. Losses in performance are lower for transfers from dry periods to wet periods. Similarly, it is easier for models based on a period with high hydro-climatologic variability to predict flow over a period with low hydro-climatologic variability than the opposite. Our work also tests the hypothesis that the transposability of rainfall-flow models / variable hydro-climatic conditions / local sensitivity of model parameters can be related. The results, which are inconclusive, nevertheless show a variability according to the efficiency criteria and the chosen periods. All these results, which are inconclusive, nevertheless show variability according to the efficiency criteria and the periods chosen. All these results indicate that the transfer of model parameters from one period to another can introduce a major error in flow simulations, which means increased uncertainty for assessments of the impact of climate and environmental changes, a key issue for West and Central Africa.
For the rest of the work, the aim is to find ways and means of reducing the amplification of errors during the transfer of parameters from one period to another. The study will be carried out on 326 watersheds of West and Central Africa with 4 hydrological models (2 daily and 2 monthly).