

Improvement of input data quality and reduction of parameters uncertainties in low flow modelling

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Improvement of input data quality and reduction of parameters uncertainties in low flow modelling.

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The quality of the model's simulations depends both on data input quality and on the parameters of the model. The main objective of this study is to reduce these two types of uncertainties. In this work two conceptual models are used to simulate monthly and daily discharges for 60 stations located in the East of France. The area covers 32 320 km² whereas the smallest basin covers 39 km² and the largest 10 700 km².

INPUT DATA QUALITY PARAMETERS UNCERTAINTIES First we have to focus on the role of the hydro-meteorological data quality in the model's simulations. Concerning the estimation of the potential evaporation we use station data. Furthermore the model is less sensitive to evaporation data than to precipitations. Among the input data the rainfall has so the most important influence in the simulations. Thus the rainfall which evolves from 750 to 2200 mm has been spatializated by a geostatistical method with a relief parametrization (fig. 2). This method can only be applied for the monthly step. Indeed it is difficult to apply a method of spatialization for The second uncertainty is associated to the parameters of the model. To reduce it the main parameters are pre-determinated by a previous hydrological analysis, in particular a recession **THE RAINFALL-RUNOFF** MODELS analysis. Furthermore the model's calibration follows a particular device which has really proved its efficiency in the reduction of uncertainties linked to equifinality problems. **INPUT DATA** PARAMETERS THE MONTHLY MODEL: An attempt without calibration 2). This interface can be applied for the monthly step, indeed it is difficult to apply a method of spatialization for the daily step and values used in the models correspond in many cases to station data. These values can be corrected by a coefficient but, the uncertainty is very high especially in mountainous regions, and the model is very sensitive to rainfall data (fig. 4). To improve this input data we propose Fig. 5: THE MONTHLY MODEL r model has 3 parameters (fig. 5) but they are not calibrated. stimation of these three parameters is proposed: nd flow coefficients are calculated from a hydrograph separation m ion coefficients are calculated from a recession analysis (<u>CVN</u>). ty of the soil reservoir is fixed to 100 mm (<u>S</u>). P Without any calibration the model shows good simulations (see fig. 8 & 9). an estimation of daily basin rainfall. The method is based on the results of the monthly spatializated rainfall and uses multiple regressions: The monthly model efficiency Fig.8: Example of simulati on of the Spatialization of monthly rainfall (François [1], 2004) to determine basins rainfall Fig. 1: Rainfall network: Daily step: 142 stations - Monthly step: 33 stations Figure 2: Rainfall spatialized from a geostatistical method (142 stations) 1 Fig. 9: Recession analysis and hyd Fig. 6: THE DAILY MODEL Extraction of monthly basins rainfall 2 THE DAILY MODEL : An aided calibration 3 Two precipitation stations are se del has 6 parameters (fig. 6). = 0.551 X R Lane are calibrated in order to reach a good efficiency of the mode flow (CEC) and the capacity of the soil reservoir (S) de ts of the multiple re er of stations has d flow (CVR) and the percolation param from the hydrograph separation (fig. 9). ter (P) are calib The daily model's efficiency Fig. 11: Example of simulations: The Moselle River at Epinal 1500 Determination of daily basins rainfall regressions are applied to daily step to calculate daily itivity of the mod The Moselle Riv CONCLUSION n leads to an a Its of the hydrograph ser od. On the off

d for the daily model an in



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