



How to improve the simulation of low flow discharges? (Use of the knowledge of low flow processes in a model)

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Both factors and processes related to low flow and drought have to be known to improve their forecasts. We have studied low flow genesis of sixty basins located in the East of France. The main objectives were to determinate the factors and the processes generating severe low flows in order to make forecasts (Lang & al., 2006 ^[1]).

Rainfall deficit is obviously the dominant factor explaining hydrological drought, but we have to accurate our knowledge about quantities which risk to give rise to water scarcity. A regionalization is realized because in front of same climatic anomalies basins have different behaviours depending on their physical characteristics.

The most important characteristic is groundwater capacity because during drought period the discharge of rivers essentially comes from groundwater flow. This one constitutes the fundamental aspect of low flow processes. The role of groundwater storages was also studied by a recession analysis and a regionalization was realized. The recession parameter was easily included in a model by using a linear equation to simulate base flow (Lang & al., 2006 ^[2]).

The current works are based on the results of this research. The objective is to improve still the model results for the lowest low flow discharges. However during severe low water the river discharges can be constant or decrease less fast for catchments with important aquifer capacity. The initial configuration of our model is so adapted for impermeable basin because the discharges decrease regularly (Lang & al., 2006 ^[2]). On the other hand for basin with aquifer capacity, the addition of a second gravitational reservoir is necessary to respect the observed minimum discharges. By adding an other reservoir the variability of the observed recession rate can be respected and explained.

- ^[1]C. LANG, A. FREYERMUTH, E. GILLE, D. FRANCOIS (2006):

« PRESAGES: a tool for low flow forecasting ». *EGU, General Assembly 2006*, Session HS5-N° A0262, Vienna, 2-7 April 2006.

- ^[2]C. LANG, E. GILLE, FRANCOIS D., AUER J.C. (2006) : « Le dispositif PRESAGES : un ensemble d'outils pour la prévision des étiages ». *AISH Red Book, Climate Variability and Change - Hydrological Impacts*, Publ. 308, p. 145-150.