

# **Contribution to the study of floods in M'ZAB valley-Wilaya of Ghardaia**

To warn to a possible flooding at the mouth of a watershed, we must be able to estimate the flow, but for most watersheds, water level measurements are almost absent, hence the inability to monitor flows evolution in real time. The use of a rainfall-runoff model seems essential.

The aim of this study is to develop effective rainfall-runoff models for estimating the flows of scarce flood frequencies, applicable in the watershed of M'Zab valley. The first work consists first in studying the watershed of M'Zab valley in terms of geomorphology, lithology, hydrography and climate, then analyzing the hydrological processes that are the main contributing factors to the formation of floods. After listing the main hydrological rainfall-runoff models, the application of two models that have proved their robustness and performance on an international level: the semi-distributed model HEC-HMS and the ORSTOM global model which is a purely classic deterministic model, was chosen. Results show that both models succeed in a quick estimate of the flows of scarce frequencies and the other features of the flood and result in the tracing of typical flood hydrograph. The discrepancy between the results achieved by these two models is slight. Mathematical relations giving the flood characteristics according to the area of the watershed have been established using the ORSTOM model. A hydrodynamic simulation of a reach of M'Zab wadi was made by the HEC-RAS model using the centennial flow achieved by the HEC-HMS model as basic data.

**Key words:** Ghardaïa; floods; watershed; M'Zab wadi; rainfall-runoff modeling; HEC-HMS model; model of ORSTOM; HEC-RAS model.