A preliminary study on Variational Data Assimilation for the control of rainfall overthe Ouémé river (Benin)

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Abstract

Variational data assimilation is applied to A Rainfall-runoff model GR4J on the basin of Oueme. This model is a mathematical model describing the rainfall-runoff relations at catchment scale. The adjoint semi-generator software called YAO is used as a framework to implement 4D-Var assimilation. First, sensitivity analysis was performed in order to validate the adjoint and to identify the most influential parameters in the runoff estimation.The results obtained when controlling the internal parameters and the initial conditions of runoff, show the flexibility of the assimilation scheme and the potential of runoff data assimilation to improve model calibration and reduce prediction errors.Second, we use twin experiments, using synthetic rainfall observations, to test the feasibility of the assimilation scheme to quantify (and correct) biases in the rainfall observations. In the future such methods could be implemented to diagnose rainfall biases in basins with scarce gauges network.

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