Monte Carlo simulation for Diyala River basin in Iraq utilizing VIC model

Saddam Q. Waheed and Jorge A. Ramirez
Department of Civil and Environmental Engineering, Colorado State University

Abstract. Uncertainty in both hydrologic behavior and model characterization of such behavior is a concern for current and future water resource system optimal planning, operation, and management. To develop optimal dam operation schemes under future uncertainty, the sensitivity of the precipitation-runoff response to changes in hydro-climatic forcing must be quantified. In this presentation, we evaluate the sensitivity and identifiability of the Variable Infiltration Capacity model (VIC) for the Diyala River basin in Iraq using Monte Carlo simulation technique. The Diyala River is a tributary of the Tigris River in eastern Iraq. Its total length is about 216.5 km and its basin area is about 16,763.7 km^2 (until Derbendikhan Dam). The sensitivity and identifiability of seven VIC model parameters (namely: *b_infilt, Ds, Ws, Dsmax and soil depth1, soil depth2, and soil depth3*) associated with the infiltration and surface runoff production processes are examined. Preliminary results show that the most sensitive parameters are the depth of the third soil layer (*soil depth3*) and the fraction of maximum soil moisture where non-linear baseflow occurs (*Ws*).