



Analysis of predictive uncertainty of environmental models using a possibilistic approach

A.P. Jacquin (1) and **A.Y. Shamseldin** (2)

(1) Facultad de Ingeniería, Pontificia Universidad Católica de Valparaíso, Av. Brasil 2147, Valparaíso, Chile, (2) Department of Civil and Environmental Engineering, The University of Auckland, Private Bag 92019, Auckland, New Zealand (a.shamseldin@auckland.ac.nz)

This study discusses the development of a novel possibilistic method for the evaluation of predictive uncertainty in environmental models. The method is based on possibility theory, which is related to fuzzy sets theory. Possibility theory is regarded as a more appropriate formal framework than probability theory for modelling uncertainties that originate in partial ignorance rather than randomness.

The method developed is inspired by the well known Generalized Likelihood Uncertainty Estimation (GLUE) methodology and it is likewise based on the notion that there may be many model structures and parameter sets that are compatible with the knowledge available about the real system. The possibilistic method uses Monte Carlo simulations to obtain the possibility distributions of the model outputs, which are subsequently used to derive the prediction uncertainty bounds.

A case study on the application of the possibilistic method in rainfall-runoff modelling is presented. The results of this method are compared with those obtained with the GLUE methodology.