Geophysical Research Abstracts
Vol. 20, EGU2018-11989, 2018
EGU General Assembly 2018

Effective combination of stochastic and deterministic hydrological models in a changing environment

Andreas Efstratiadis (1), Ioannis Nalbantis (2), and Demetris Koutsoyiannis (1)

(1) Department of Water Resources and Environmental Engineering, School of Civil Engineering, National Technical University of Athens, Heroon Polytechneiou 5, GR-157 80, Zographou, Greece, (2) Department of Infrastructure and Rural Development, School of Rural and Surveying Engineering, National Technical University of Athens, Heroon Polytechneiou 9, GR-157 80, Zographou, Greece

Water resource systems are subject to continuous changes, at all temporal scales. Changes are induced due to the inherently varying meteorological processes, anthropogenic interventions of all kinds, as well as other exogenous factors modifying the system characteristics. Traditionally, stochastic models, for generating synthetic input data, and deterministic hydrological models, for representing anticipated or hypothesized environmental changes, have been regarded as alternative approaches to provide future projections of the system responses. Given that both approaches are driven by historical data, they are restricted by the limited, and sometimes misinterpreted, information of past observations. Using examples from real-world hydrosystems, we propose a nonlinear stochastic framework, by coupling stochastic and deterministic models, which aims to take full advantage of the existing data and understanding. A central assumption is that all key uncertain aspects of the overall simulation procedure are expressed in stochastic terms (including model parameters and water demands, among others), while major uncertainties with respect to changing processes that cannot be captured by past data are consistently represented through the Hurst-Kolmogorov paradigm.