

Stochastic watershed models for hydrologic risk management

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Over half a century ago, the Harvard Water Program introduced the field of operational or synthetic hydrology, providing stochastic streamflow models (SSMs) which could generate equally likely synthetic streamflow traces useful for hydrologic risk management. The application of SSM's revolutionized water resources planning activities, yet have fallen out of favor due to their inability to account for the now nearly ubiquitous anthropogenic influences on streamflow. This presentation advances the modern equivalent of SSMs, termed 'stochastic watershed models' (SWMs), which could provide useful input to nearly all modern, risk-based water-resource decision making approaches. SWMs combine deterministic watershed models-- which are ideally suited to accounting for anthropogenic influences-- with recent developments in uncertainty analysis and principles of stochastic simulation.

Biographical Sketch:

Professor Vogel is a professor of civil and environmental engineering at Tufts University, where he has taught since 1984. His primary expertise is in the areas of hydrology and water resource engineering with emphasis on hydrologic and statistical methods for analyzing water resource systems. His current research program focuses upon the areas of natural hazards, watershed modeling and management, water quality, regional hydrology, and environmental statistics. His scholarship has applied innovations in the study of extreme events from the field of hydrology to: earthquakes, bird and plant extinctions, precipitation, landslides, wind speeds, and numerous other natural phenomena. His consulting experiences include global water resources assessment, reservoir systems analysis, flood and drought management, dam safety analyses, and a range of applications of statistics to hydrologic problems.