

**2012 GSA Annual Meeting and Exposition  
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*Invited Presentation for Session T103 Groundwater Model Calibration and Uncertainty Analysis*

**Federal Work Group on Uncertainty Analysis and Parameter Estimation**

Thomas J. Nicholson  
U.S. Nuclear Regulatory Commission,  
Rockville, MD 20852

Mary C. Hill  
U.S. Geological Survey  
Boulder, CO 80303

Many U.S. federal agencies simulate environmental systems with mathematical models to understand, remediate, and predict hazardous events, and to inventory and understand natural resources used by local governments and industry. Hazardous events include, for example, tsunamis, floods, air pollution, draughts, and surface and subsurface contamination. Natural resources include, for example, water and minerals. The Interagency Steering Committee on Multimedia Environmental Modeling (ISCMEM) was established to address the shared concerns of federal staff that develop and use simulations of environmental systems. The ISCMEM Working Group (WG) on Uncertainty Analysis and Parameter Estimation was formed to: (1) develop a common understanding of parameter estimation and sources of uncertainty; (2) develop common terminology; (3) identify, evaluate, and compare available uncertainty analysis strategies, tools, software, and databases, and develop a tool box of methods and software; (4) develop and apply new methods; (5) facilitate exchange of techniques thru meetings, workshops, the ISCMEM Website (<https://iemhub.org/topics/iscmem>), interaction with other WGs, and exchange of reports and software; (6) develop better ways to communicate uncertainty to decision makers; and (7) formulate proposals for field applications. WG participants come from federal agencies, academia and industry. Products include: (a) *Proceedings of the International Workshop on Uncertainty, Sensitivity, and Parameter Estimation for Environmental Modeling*, (NUREG/CP-0187); (b) *Joint Universal Parameter Identification and Evaluation of Reliability Application Programming Interface* (JUPITER API) for constructing computer programs designed to analyze mathematical models (joint USGS and EPA project, Banta and others, 2006); (c) *Hydrologic Conceptual Model, Parameter and Scenario Uncertainty Methodology* (project of University of Arizona, Pacific Northwest National Laboratory and NRC, NUREG/CR-6940); and (d) *Model Abstraction Techniques for model structure and parameter estimation* (joint Agricultural Research Service and NRC project, NUREG/CR-7026). The WG plans to test and demonstrate these parameter estimation and uncertainty techniques using cooperative field studies and existing datasets.

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